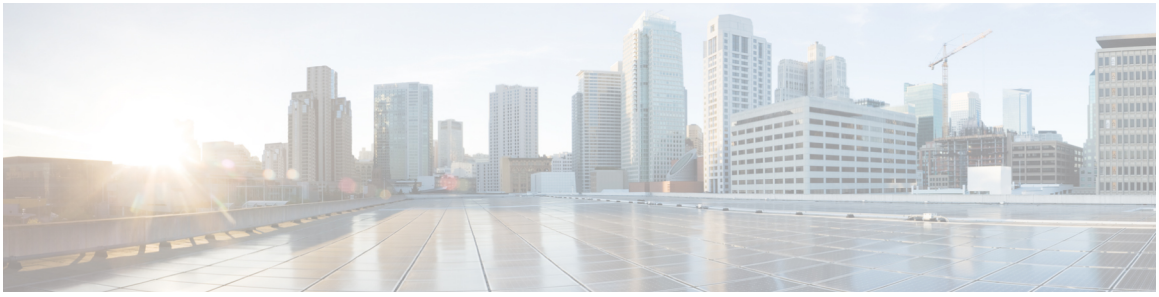


# Release Notes for Cisco Catalyst 9400 Series Switches, Cisco IOS XE Dublin 17.12.x

**First Published:** 2023-07-28

**Last Modified:** 2026-08-05

**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

CHAPTER 2

**What's New in Cisco IOS XE Dublin 17.12.x** 5

Hardware Features in Cisco IOS XE 17.12.8 5

Software Features in Cisco IOS XE 17.12.8 5

Hardware and Software Behavior Changes in CIsco IOS XE Dublin 17.12.8 6

Hardware Features in Cisco IOS XE 17.12.7a 6

Software Features in Cisco IOS XE 17.12.7a 6

Hardware and Software Behavior Changes in CIsco IOS XE Dublin 17.12.7a 6

Hardware Features in Cisco IOS XE 17.12.6 6

Software Features in Cisco IOS XE 17.12.6 6

Hardware and Software Behavior Changes in Cisco IOS XE Dublin 17.12.6 6

Hardware Features in Cisco IOS XE 17.12.5 6

Software Features in Cisco IOS XE 17.12.5 7

Hardware and Software Behavior Changes in CIsco IOS XE Dublin 17.12.5 7

Hardware Features in Cisco IOS XE Dublin 17.12.4 7

Software Features in Cisco IOS XE Dublin 17.12.4 7

Hardware and Software Behavior Changes in Cisco IOS XE Dublin 17.12.4 7

Hardware Features in Cisco IOS XE Dublin 17.12.3 8

Software Features in Cisco IOS XE Dublin 17.12.3 8

Hardware and Software Behavior Changes in Cisco IOS XE Dublin 17.12.3 8

Hardware Features in Cisco IOS XE Dublin 17.12.2 8
Software Features in Cisco IOS XE Dublin 17.12.2 8
Hardware and Software Behavior Changes in Cisco IOS XE Dublin 17.12.2 8
Hardware Features in Cisco IOS XE Dublin 17.12.1 9
Software Features in Cisco IOS XE Dublin 17.12.1 10
Hardware and Software Behavior Changes in Cisco IOS XE Dublin 17.12.1 13

CHAPTER 3 **Important Notes** 15
Important Notes 15

CHAPTER 4 **Compatibility Matrix and Web UI System Requirements** 19
Compatibility Matrix 19
Web UI System Requirements 19

CHAPTER 5 **Licensing and Scaling Guidelines** 21
Licensing 21
Available Licensing Models and Configuration Information 21
Scaling Guidelines 21

CHAPTER 6 **Limitations and Restrictions** 23
Limitations and Restrictions 23

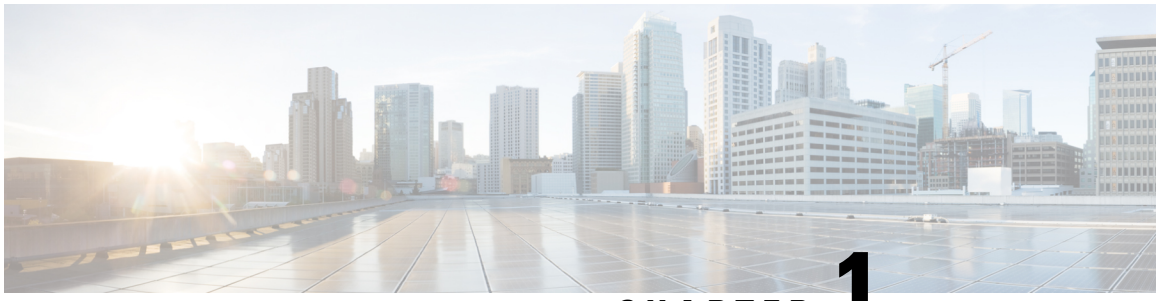
CHAPTER 7 **ROMMON and CPLD Versions** 29
ROMMON and CPLD Versions 29

CHAPTER 8 **Upgrading the Switch Software** 33
Finding the Software Version 33
Software Images 33
Upgrading the ROMMON 34
Software Installation Commands 35
Upgrading in Install Mode 35
Downgrading in Install Mode 42
In Service Software Upgrade (ISSU) with Cisco StackWise Virtual and Dual Supervisor Module Configuration 50

Upgrading the Complex Programmable Logic Device Version 53
Upgrading the CPLD Version: High Availability Setup 54
Upgrading the CPLD Version: Cisco StackWise Virtual Setup 54
Upgrading the CPLD Version: Single Supervisor Module Setup 55
Upgrading the CPLD Version: Alternative Manual Method 56

CHAPTER 9 Caveats 57
Cisco Bug Search Tool 57
Open Caveats in Cisco IOS XE Dublin 17.12.x 57
Resolved Caveats in Cisco IOS XE Dublin 17.12.8 58
Resolved Caveats in Cisco IOS XE Dublin 17.12.7a 58
Resolved Caveats in Cisco IOS XE Dublin 17.12.6 58
Resolved Caveats in Cisco IOS XE Dublin 17.12.5 58
Resolved Caveats in Cisco IOS XE Dublin 17.12.4 58
Resolved Caveats in Cisco IOS XE Dublin 17.12.3 59
Resolved Caveats in Cisco IOS XE Dublin 17.12.2 59
Resolved Caveats in Cisco IOS XE Dublin 17.12.1 59

CHAPTER 10 Additional Information 61
Troubleshooting 61
Related Documentation 61
Communications, Services, and Additional Information 61



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 a16-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<br>(append with "=" for spares) | Description |
|---|---|
| C9404R | Cisco Catalyst 9400 Series 4 slot chassis<br>• Redundant supervisor module capability<br>• Two switching module slots<br>• Hot-swappable, front and rear serviceable, non-redundant fan tray assembly<br>• Four power supply module slots |

| Switch Model (append with "=" for spares) | Description |
|---|---|
| C9407R | Cisco Catalyst 9400 Series 7 slot chassis<br>• Redundant supervisor module capability<br>• Five switching module slots<br>• Hot-swappable, front and rear serviceable fan tray assembly<br>• Eight power supply module slots |
| C9410R | Cisco Catalyst 9400 Series 10 slot chassis<br>• Redundant supervisor module capability<br>• Eight switching module slots<br>• Hot-swappable, front and rear serviceable fan tray assembly<br>• 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<br>This supervisor module is supported on the C9404R, C9407R, and C9410R chassis. |
| C9400-SUP-1XL | Cisco Catalyst 9400 Series Supervisor 1XL Module<br>This supervisor module is supported on the C9404R, C9407R, and C9410R chassis. |
| C9400-SUP-1XL-Y | Cisco Catalyst 9400 Series Supervisor 25XL Module<br>This supervisor module is supported on the C9404R, C9407R, and C9410R chassis. |
| C9400X-SUP-2 | Cisco Catalyst 9400 Series Supervisor 2 Module<br>This supervisor module is supported on the C9404R, C9407R, and C9410R chassis. |
| C9400X-SUP-2XL | Cisco Catalyst 9400 Series Supervisor 2XL Module<br>This supervisor module is supported on the C9404R, C9407R, and C9410R chassis. |

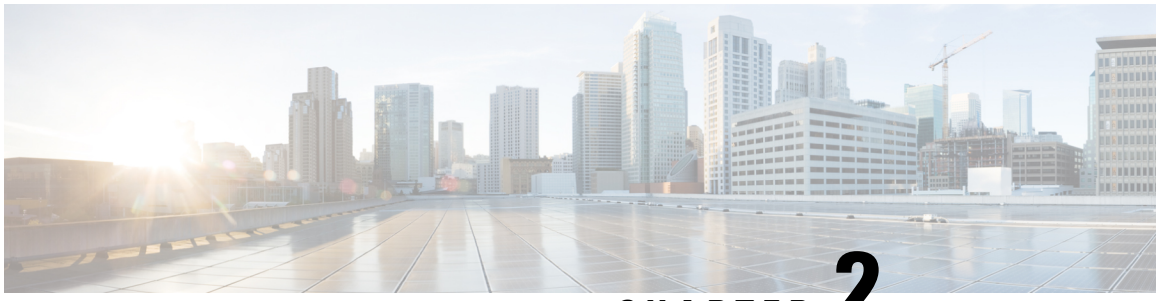
| Product ID<br>(append with "=" for spares) | Description |
|---|---|
| **Line Cards** | |
| C9400-LC-12QC | 12-port fiber optic Ethernet switching module that supports 10, 25, 40, and 100 Gbps connectivity. |
| C9400-LC-24S | 24-port, 1 Gigabit Ethernet SFP module that supports 100/1000 BASET-T with Cu-SFP |
| C9400-LC-24XS | 24-port Gigabit Ethernet module that supports 1 and 10 Gbps connectivity. |
| C9400-LC-24XY | 24-port fiber optic Ethernet switching module that supports 1, 10, and 25 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 BASET-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:<br>• 24 ports (Ports 1 to 24) 1G UPOE 10/100/1000 (RJ-45)<br>• 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 Modules**[1] **(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 |

| Product ID<br>(append with "=" for spares) | Description |
|---|---|
| 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

# What's New in Cisco IOS XE Dublin 17.12.x


- Hardware Features in Cisco IOS XE 17.12.8, on page 5
- Software Features in Cisco IOS XE 17.12.8, on page 5
- Hardware and Software Behavior Changes in CIsco IOS XE Dublin 17.12.8, on page 6
- Hardware Features in Cisco IOS XE 17.12.7a, on page 6
- Software Features in Cisco IOS XE 17.12.7a, on page 6
- Hardware and Software Behavior Changes in CIsco IOS XE Dublin 17.12.7a, on page 6
- Hardware Features in Cisco IOS XE 17.12.6, on page 6
- Software Features in Cisco IOS XE 17.12.6, on page 6
- Hardware and Software Behavior Changes in Cisco IOS XE Dublin 17.12.6, on page 6
- Hardware Features in Cisco IOS XE 17.12.5, on page 6
- Software Features in Cisco IOS XE 17.12.5, on page 7
- Hardware and Software Behavior Changes in CIsco IOS XE Dublin 17.12.5, on page 7
- Hardware Features in Cisco IOS XE Dublin 17.12.4, on page 7
- Software Features in Cisco IOS XE Dublin 17.12.4, on page 7
- Hardware and Software Behavior Changes in Cisco IOS XE Dublin 17.12.4, on page 7
- Hardware Features in Cisco IOS XE Dublin 17.12.3, on page 8
- Software Features in Cisco IOS XE Dublin 17.12.3, on page 8
- Hardware and Software Behavior Changes in Cisco IOS XE Dublin 17.12.3, on page 8
- Hardware Features in Cisco IOS XE Dublin 17.12.2, on page 8
- Software Features in Cisco IOS XE Dublin 17.12.2, on page 8
- Hardware and Software Behavior Changes in Cisco IOS XE Dublin 17.12.2, on page 8
- Hardware Features in Cisco IOS XE Dublin 17.12.1, on page 9
- Software Features in Cisco IOS XE Dublin 17.12.1, on page 10
- Hardware and Software Behavior Changes in Cisco IOS XE Dublin 17.12.1, on page 13


## Hardware Features in Cisco IOS XE 17.12.8

There are no new hardware features in this release.

## Software Features in Cisco IOS XE 17.12.8

There are no new software features in this release.

# Hardware and Software Behavior Changes in CIsco IOS XE Dublin 17.12.8

There are no behavior changes in this release.

# Hardware Features in Cisco IOS XE 17.12.7a

There are no new hardware features in this release.

# Software Features in Cisco IOS XE 17.12.7a

There are no new software features in this release.

# Hardware and Software Behavior Changes in CIsco IOS XE Dublin 17.12.7a

There are no behavior changes in this release.

# Hardware Features in Cisco IOS XE 17.12.6

There are no new hardware features in this release.

# Software Features in Cisco IOS XE 17.12.6

There are no new software features in this release.

# Hardware and Software Behavior Changes in Cisco IOS XE Dublin 17.12.6

There are no behavior changes in this release.

# Hardware Features in Cisco IOS XE 17.12.5

There are no new hardware features in this release.

# Software Features in Cisco IOS XE 17.12.5

There are no new software features in this release.

# Hardware and Software Behavior Changes in CIsco IOS XE Dublin 17.12.5

There are no behavior changes in this release.

# Hardware Features in Cisco IOS XE Dublin 17.12.4

| Feature Name | Description |
|---|---|
| Cisco SFP Modules for Gigabit Ethernet Applications | Supported transceiver module product numbers:<br>• SFP-1G-LH<br>• SFP-1G-SX<br>Compatible Supervisor modules:<br>• C9400X-SUP-2<br>• C9400X-SUP-2XL<br>**Note**<br>These transceiver modules are only supported on uplink ports 1 to 4.<br>For information about the module, see Cisco SFP Modules for Gigabit Ethernet Applications Data Sheet. For information about device compatibility, see the Transceiver Module Group (TMG) Compatibility Matrix. |

# Software Features in Cisco IOS XE Dublin 17.12.4

There are no new software features in this release.

# Hardware and Software Behavior Changes in Cisco IOS XE Dublin 17.12.4

There are no behavior changes in this release.

# Hardware Features in Cisco IOS XE Dublin 17.12.3

There are no new hardware features in this release.

# Software Features in Cisco IOS XE Dublin 17.12.3

There are no new software features in this release.

# Hardware and Software Behavior Changes in Cisco IOS XE Dublin 17.12.3

There are no behavior changes in this release.

# Hardware Features in Cisco IOS XE Dublin 17.12.2

There are no new hardware features in this release.

# Software Features in Cisco IOS XE Dublin 17.12.2

There are no new software features in this release.

# Hardware and Software Behavior Changes in Cisco IOS XE Dublin 17.12.2

There are no behavior changes in this release.

# Hardware Features in Cisco IOS XE Dublin 17.12.1

| Feature Name | Description |
|---|---|
| Cisco Catalyst 9400 Series 12-Port 40G/100G Module (C9400-LC-12QC) | A 12-port fiber optic Ethernet switching module with these key hardware and software features:<br>**Hardware Features:**<br>• Can be installed on Cisco Catalyst C9404R, C9407R, and C9410R chassis. See Cisco Catalyst 9400 Series Switches Hardware Installation Guide.<br>• Supports a maximum bandwidth of 480 Gbps. See Cisco Catalyst 9400 Series Switch Line Cards Data Sheet.<br>• Compatible with supervisor modules C9400X-SUP-2 and C9400X-SUP-2XL only. See Cisco Catalyst 9400 Series Line Card Installation Note.<br>• Supports 10, 25, 40, and 100 Gbps connectivity.<br>  • Port nos. 1 through 12 can be used interchangeably as 10 or 40 Gbps ports, with a suitable transceiver installed.<br>  • Port nos. 9 through 12 can also be configured as 25 or 100 Gbps ports, with a suitable transceiver and the required software configuration. When a port is configured to operate at 100 Gbps or 25 Gbps, one port from 5 to 8 and belonging to the same port group, is disabled. For example, if port no. 9 is configured to operate at 100 Gbps speeds, port no. 5 is disabled.<br>See Example: 100 Gbps and 40 Gbps Configuration on C9400-LC-12QC.<br>**Software Features:**<br>• For 25 or 100 Gbps support on port nos. 9 through 12, configure the **enable mode 100G** command in interface configuration mode. See Configuring Interface Characteristics and Interface and Hardware Commands.<br>• Supports Cisco StackWise Virtual on all ports. See Configuring Cisco StackWise Virtual. When Cisco StackWise Virtual is configured on ports 9 through 12, they can operate only at 100 Gbps speeds |

| Feature Name | Description |
|---|---|
| Cisco Catalyst 9400 Series 24-Port 10G/25G Module (C9400-LC-24XY) | A 24-port fiber optic Ethernet switching module with these key hardware and software features:<br>**Hardware Features:**<br>• Can be installed on Cisco Catalyst C9404R, C9407R, and C9410R chassis. See Cisco Catalyst 9400 Series Switches Hardware Installation Guide.<br>• Supports a maximum bandwidth of 480 Gbps. See Cisco Catalyst 9400 Series Switch Line Cards Data Sheet.<br>• Compatible with supervisor modules C9400X-SUP-2 and C9400X-SUP-2XL only. See Cisco Catalyst 9400 Series Line Card Installation Note.<br>• Supports 1, 10, and 25 Gbps connectivity.<br>  • Port nos. 1 through 4 can be used interchangeably as 1 or 10 Gbps ports, with a suitable transceiver installed.<br>  • Port nos. 5 through 24 can be used interchangeably as 1 or 10 or 25 Gbps ports, with a suitable transceiver installed.<br>See Example: 25 Gbps and 10 Gbps Connectivity on C9400-LC-24XY.<br>**Software Features:**<br>• Supports Cisco StackWise Virtual on all ports. See Configuring Cisco StackWise Virtual. |

# Software Features in Cisco IOS XE Dublin 17.12.1

| Feature Name | Description |
|---|---|
| BGP EVPN VXLAN<br>• ARP inspection and DHCP Rogue Server Protection in VXLAN Environment (L2 VNIs)<br>• BGP EVPN VRF Auto RD and Auto RT | The following BGP EVPN VXLAN features are introduced in this release:<br>• ARP inspection and DHCP Rogue Server Protection in VXLAN Environment (L2 VNIs): BGP EVPN VXLAN fabric now supports ARP inspection and DHCP Rogue Server Protection. To configure these features, enable ARP inspection and DHCP Snooping on the VTEPs of the EVPN VXLAN fabric.<br>• BGP EVPN VRF Auto RD and Auto RT: BGP EVPN Layer 3 overlay VRF configuration is simplified with the introduction of new CLIs to auto generate the route distinguisher (RD) and route target (RT) for a VRF.<br>You can enable the auto generation of RD either at a global level, using the **vrf rd-auto** command or specifically for a VRF, using the **rd-auto** [**disable**] command in the VRF submode.<br>To enable auto assignment of RT for a VRF, use the **vnid** *vni-id* command in the VRF submode.<br>You can also choose to disable the auto RD and RT features by using the **no** form of the command. |

| Feature Name | Description |
|---|---|
| DSCP marking for RADIUS packets for administrative sessions | Allows you to configure DSCP marking for RADIUS packets for administrative sessions such as SSH and Telnet.<br><br>(Network Essentials) |
| EPC support of AppGigabitEthernet | Introduces support for configuring the AppGigabitEthernet port as an interface for Embedded Packet Capture (EPC).<br><br>(DNA Advantage) |
| Interface ID Option in DHCPv6 Relay Message | Introduces support for interface ID option in DHCPv6 Relay message. With this, the physical interface details of the client interface are included along with the VLAN number in the message.<br><br>(Network Essentials and Network Advantage) |
| Interface Template Support for IPv6 DHCP Guard | Enables you to add the **ipv6 dhcp guard attach-policy** *policy_name* global configuration command to an interface template. IPv6 DHCP Guard is then enabled and the policy is applied, wherever the template is applied.<br><br>(Network Advantage) |
| IP DHCP Server Changes to Limit IP Assignment to Next Hop only | Allows you to assign DHCP IP address only to the neighbouring device in an interface using the **ip dhcp restrict next hop** command. When this command is enabled, the DHCP server in the interface uses the MAC addresses in the DHCP packet and compares it with the addresses in the Cisco Discovery Protocol (CDP) or Link Layer Discovery Protocol (LLDP) cache table. If the MAC addresses match, then the DHCP IP address is assigned to that device.<br><br>(Network Advantage) |

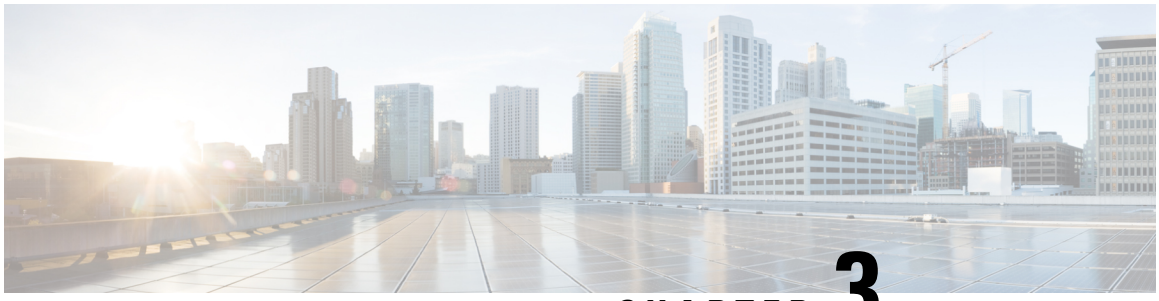
| Feature Name | Description |
|---|---|
| Modified Trustpoints for Secure Unique Device Identity (SUDI) Certificates | Starting from Cisco IOS XE Dublin 17.12.1, the following changes have been introduced for trustpoints.<br>• Trustpoint names for existing SUDI certificates<br>If your device supports Cisco Manufacturing CA III certificate and is not disabled, the trustpoint names are as follows.<br>• For *Cisco Manufacturing CA III* certificate, the trustpoint name has changed from CISCO_IDEVID_SUDI to CISCO_IDEVID_CMCA3_SUDI<br>• For *Cisco Manufacturing CA SHA2* certificate, the trustpoint name has changed from CISCO_IDEVID_SUDI_LEGACY to CISCO_IDEVID_CMCA2_SUDI<br>If your device does not support Cisco Manufacturing CA III certificate or if the certificate is disabled using **no platform sudi cmca3** command, the trustpoint names are as follows.<br>• For *Cisco Manufacturing CA SHA2* certificate, the trustpoint name has changed from CISCO_IDEVID_SUDI to CISCO_IDEVID_CMCA2_SUDI<br>• For *Cisco Manufacturing CA* certificate, the trustpoint name has changed from CISCO_IDEVID_SUDI_LEGACY to CISCO_IDEVID_CMCA_SUDI<br>• Hardware SUDI certificates<br>• If your device supports *High Assurance SUDI CA* certificate, this certificate is loaded under CISCO_IDEVID_SUDI trustpoint.<br>• If your device does not support *High Assurance SUDI CA* certificate, *ACT2 SUDI CA* certificate is loaded under CISCO_IDEVID_SUDI trustpoint.<br>• **show ip http server status** command output<br>If you configure the trustpoint for the HTTP server as CISCO_IDEVID_SUDI, the output of **show ip http server status** command displays the operating trustpoint along with the configured trustpoint.<br>The following example shows a sample output of **show ip http server status** command with both the configured and the operating trustpoint names. Note that if your device does not support Cisco Manufacturing CA III certificate or if the certificate is disabled, the operating trustpoint in the below output displays CISCO_IDEVID_CMCA2_SUDI.<br>`Device# show ip http server status`<br>`…`<br>`HTTP secure server trustpoint: CISCO_IDEVID_SUDI`<br>`HTTP secure server operating trustpoint: CISCO_IDEVID_CMCA3_SUDI`<br>(Network Essentials) |

| Feature Name | Description |
|---|---|
| Programmability:<br>• NETCONF-SSH Algorithms<br>• YANG Data Models | The following programmability features are introduced in this release:<br>• NETCONF-SSH Algorithms: The NETCONF-SSH server configuration file contains the list of all supported algorithms. From this release onwards, you can enable or disable these algorithms at runtime by using Cisco IOS commands or YANG models.<br>(Network Essentials)<br>• 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/17121.<br>(Network Advantage) |
| **show idprom tan** command | The **show idprom tan** command was introduced. It displays the top assembly part number and top assembly part revision number for the identification programmable read-only memory. |

| New on the WebUI |
|---|
| There are no new WebUI features in this release. |

# Hardware and Software Behavior Changes in Cisco IOS XE Dublin 17.12.1

| Behavior Change | Description |
|---|---|
| BDPU Guard and Root Guard Syslogs | The BDPU guard and root guard syslogs have been modified to include client bridge ID information. |
| C9400-LC-48XS Linecard idprom value for max_power | For some C9400-LC-48XS linecards with hardware version less than 3.1 (use the **show module** command to check), the idprom value for max_power is incorrectly programmed to 360. The correct value is 250. This will cause the device to overbudget by ~100W for each of these linecards.<br>No field failures have been observed due to this issue. However, rare scenarios exist where the device can run out of power budget. |



CHAPTER 3

# Important Notes


- Important Notes, on page 15


# Important Notes

- Unsupported Feature
- Complete List of Supported Features
- Accessing Hidden Commands
- Default Behaviour

### 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

Important Notes

- **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 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.

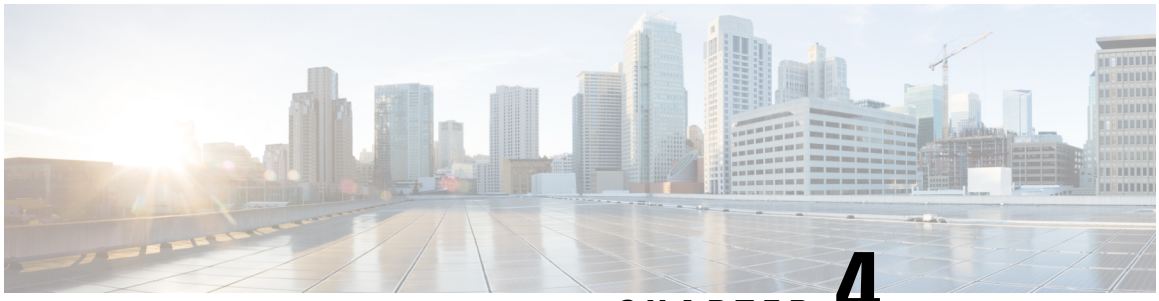
If you find that you are using a hidden command, open a TAC case for help with finding another way of collecting the same information as the hidden command (for a hidden EXEC mode command), or to configure the same functionality (for a hidden configuration mode command) using non-hidden commands.

## Default Behaviours

### DF Bit Behavior for RADIUS Packets

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).

Important Notes



CHAPTER 4

# Compatibility Matrix and Web UI System Requirements


- Compatibility Matrix, on page 19
- Web UI System Requirements, on page 19


## Compatibility Matrix

To view the software compatibility information between Cisco Catalyst 9400 Series Switches, Cisco Identity Services Engine, and Cisco Prime Infrastructure, go to Cisco Catalyst 9000 Series Switches Software Version Compatibility Matrix.

## 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

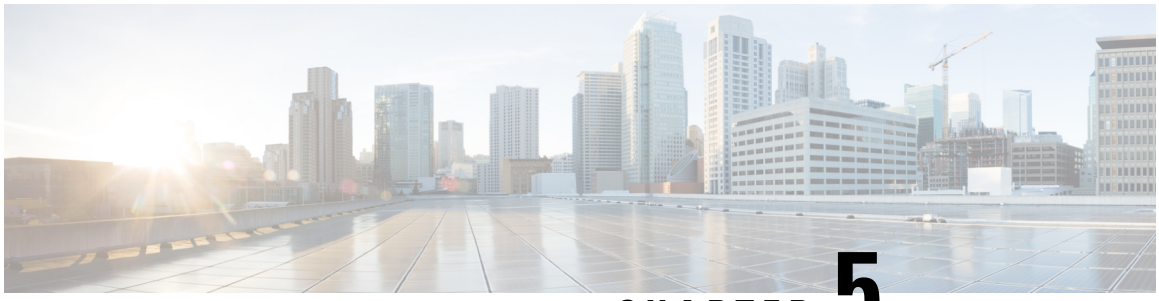
#### Operating Systems

- 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 21


## Licensing

For information about licenses required for the features available on Cisco Catalyst 9000 Series Switches, see Configuring Licenses on Cisco Catalyst 9000 Series Switches.

All licensing information relating to Cisco Catalyst 9000 Series Switches are available on this collection page: Cisco Catalyst 9000 Switching Family Licensing.

### 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.
- 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.

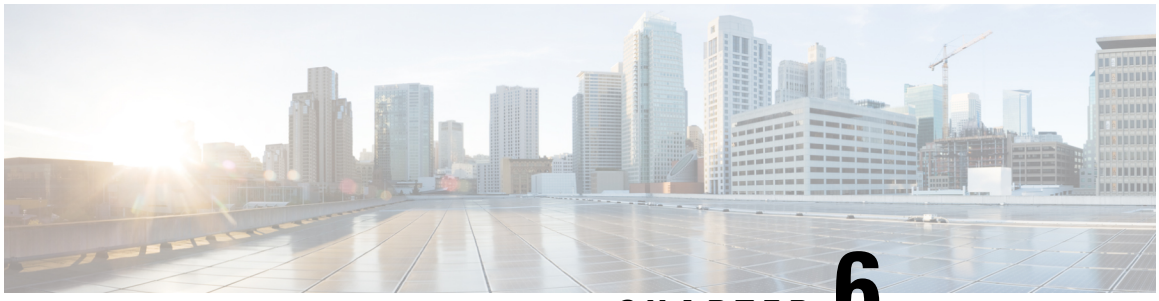
## Scaling Guidelines

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 23


## 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 autonegotation, 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 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)
  - Within a major release train (16.x or 17.x or 18.x ), ISSU is supported between any two EMs that are released not more than 3 years apart.
  - Within a major release train, ISSU is supported from:
    - Any EM (EM1, EM2, EM3) to another EM (EM1, EM2, EM3)

      Example: 16.9.x to 16.12.x, 17.3.x to 17.6.x, 17.6.x to 17.9.x
    - Any release within the same EM

      Example: 16.9.2 to 16.9.3 or 16.9.4 or 16.9.x, 16.12.1 to 16.12.2 or 16.12.3 or 16.12.x, 17.3.1 to 17.3.2 or 17.3.3 or 17.3.x
  - Between major release trains, ISSU is not supported from:
    - An EM of a major release train to an EM of another major release train

      Example: 16.x.x to 17.x.x or 17.x.x to 18.x.x is not supported
    - An SM to EM or EM to SM

      Example: 16.10.x or 16.11.x to 16.12.x is not supported
  - ISSU is not supported on engineering special releases and .s (or similar) images.
  - ISSU is not supported between Licensed Data Payload Encryption (LDPE) and No Payload Encryption (NPE) Cisco IOS XE software images.
  - ISSU downgrades are not supported.
  - 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.
  - Upgrade to Cisco IOS XE Dublin 17.12.x from any prior release using ISSU may fail if the **snmp-server enable traps license** command is configured. Ensure that you remove the **snmp-server enable traps license** command from the configuration before starting an ISSU upgrade because this command has been removed from Cisco IOS XE Dublin 17.12.x.
- 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 switched 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. Quad-supervisor with Route Processor Redundancy (RPR) with Cisco StackWise Virtual is also 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
  ```
- Catatyst 9000 Series Switches support MACsec switch-to-switch connections. We do not recommend configuring MACsec switch-to-host connections in an overlay network. For assistance with an existing switch-to-host MACsec implementation or a design review, contact your Cisco Sales Representative or Channel Partner.
- 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.
- Switch Web UI allows configuration of data VLANs only and not voice VLANs. If you remove a voice VLAN configured to an interface using the Web UI, then all data VLANs associated with the interface are also removed by default.
- Starting from Cisco IOS XE Release 17.10, the following Key Exchange and MAC algorithms are removed from the default list:

  Key Exchange algorithm:

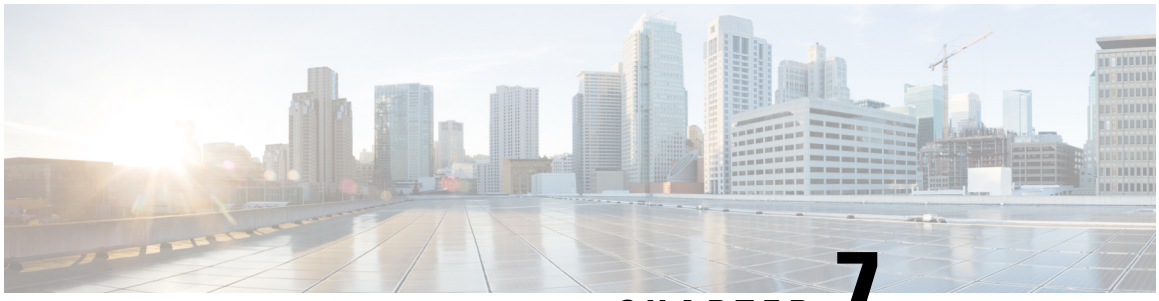
  - diffie-hellman-group14-sha1

  MAC algorithms:

  - hmac-sha1
  - hmac-sha2-256

- hmac-sha2-512

**Note** You can use the **ip ssh server algorithm kex** command to configure the Key Exchange algorithm and the **ip ssh server algorithm mac** command to configure the MAC algorithms.



CHAPTER 7

# ROMMON and CPLD Versions


- ROMMON and CPLD Versions, on page 29


# ROMMON and CPLD Versions

This topic list the ROMMON and CPLD versions for Cisco Catalyst 9400 Series Switches.

### 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. A Cisco IOS XE release is also compatible with a ROMMON version lower or higher than what is specified in this table. For more information, see "Upgrading the ROMMON" section.

### Complex Programmable Logic Device (CPLD)

CPLD refers to hardware-programmable firmware. We recommend that you perform CPLD upgrade to resolve firmware defects or to support new features. There may not be new CPLD versions with every release.

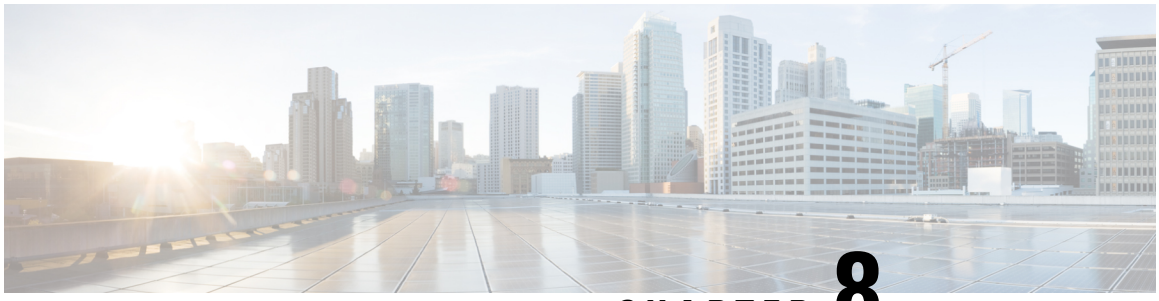
If your device is running CPLD version 0x171017, you must upgrade to a later version. Every IOS XE version has a specific CPLD version bundled with it as shown in the table below. If your device is running CPLD version lower than the version bundled with the IOS XE image, we recommend you upgrade the CPLD. IOS XE does not allow CPLD downgrade. For information on how to perform CPLD upgrade, refer Upgrading the Complex Programmable Logic Device Version, on page 53.

This 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 17.12.8 | 17.10.1r | 20062105 | 17.12.1r[FC1] | 21080305 |
| Dublin 17.12.7a | 17.10.1r | 20062105 | 17.12.1r[FC1] | 21080305 |
| Dublin 17.12.6 | 17.10.1r | 20062105 | 17.12.1r[FC1] | 21080305 |
| Dublin 17.12.5 | 17.10.1r | 20062105 | 17.12.1r[FC1] | 21080305 |
| Dublin 17.12.4 | 17.10.1r | 20062105 | 17.12.1r[FC1] | 21080305 |
| Dublin 17.12.3 | 17.10.1r | 20062105 | 17.12.1r[FC1] | 21080305 |
| Dublin 17.12.2 | 17.10.1r | 20062105 | 17.12.1r[FC1] | 21080305 |
| Dublin 17.12.1 | 17.10.1r | 20062105 | 17.12.1r[FC1] | 21080305 |
| Dublin 17.11.1 | 17.10.1r | 20062105 | 17.11.1r | 21080305 |
| Dublin 17.10.1 | 17.10.1r | 20062105 | 17.9.1r[FC1] | 21080305 |
| Cupertino 17.9.10 | 17.8.1r[FC1] | 20062105 | 17.9.3r | 21080305 |
| Cupertino 17.9.9 | 17.8.1r[FC1] | 20062105 | 17.9.3r | 21080305 |
| Cupertino 17.9.8 | 17.8.1r[FC1] | 20062105 | 17.9.3r | 21080305 |
| Cupertino 17.9.7 | 17.8.1r[FC1] | 20062105 | 17.9.3r | 21080305 |
| Cupertino 17.9.6a | 17.8.1r[FC1] | 20062105 | 17.9.3r | 21080305 |
| Cupertino 17.9.6 | 17.8.1r[FC1] | 20062105 | 17.9.3r | 21080305 |
| Cupertino 17.9.5 | 17.8.1r[FC1] | 20062105 | 17.9.3r | 21080305 |
| 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 17.6.8 | 17.6.1r[FC2] | 20062105 | - | - |
| Bengaluru 17.6.7 | 17.6.1r[FC2] | 20062105 | - | - |
| Bengaluru 17.6.6a | 17.6.1r[FC2] | 20062105 | - | - |

| 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) |
|---|---|---|---|---|
| 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 | - | - |
| Amsterdam 17.1.1 | 17.1.1r | 19032905 | - | - |

ROMMON and CPLD Versions



CHAPTER 8

# Upgrading the Switch Software


- Finding the Software Version, on page 33
- Software Images, on page 33
- Upgrading the ROMMON, on page 34
- Software Installation Commands, on page 35
- Upgrading in Install Mode, on page 35
- Downgrading in Install Mode, on page 42
- In Service Software Upgrade (ISSU) with Cisco StackWise Virtual and Dual Supervisor Module Configuration, on page 50
- Upgrading the Complex Programmable Logic Device Version, on page 53


## 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 17.12.8 | CAT9K_IOSXE | cat9k_iosxe.17.12.08.SPA.bin |
| | No Payload Encryption (NPE) | cat9k_iosxe_npe.17.12.08.SPA.bin |

| Release | Image Type | File Name |
|---|---|---|
| Cisco IOS XE Dublin 17.12.7 | CAT9K_IOSXE | cat9k_iosxe.17.12.07.SPA.bin |
| | No Payload Encryption (NPE) | cat9k_iosxe_npe.17.12.07.SPA.bin |
| Cisco IOS XE Dublin 17.12.6 | CAT9K_IOSXE | cat9k_iosxe.17.12.06.SPA.bin |
| | No Payload Encryption (NPE) | cat9k_iosxe_npe.17.12.06.SPA.bin |
| Cisco IOS XE Dublin 17.12.5 | CAT9K_IOSXE | cat9k_iosxe.17.12.05.SPA.bin |
| | No Payload Encryption (NPE) | cat9k_iosxe_npe.17.12.05.SPA.bin |
| Cisco IOS XE Dublin 17.12.4 | CAT9K_IOSXE | cat9k_iosxe.17.12.04.SPA.bin |
| | No Payload Encryption (NPE) | cat9k_iosxe_npe.17.12.04.SPA.bin |
| Cisco IOS XE Dublin 17.12.3 | CAT9K_IOSXE | cat9k_iosxe.17.12.03.SPA.bin |
| | No Payload Encryption (NPE) | cat9k_iosxe_npe.17.12.03.SPA.bin |
| Cisco IOS XE Dublin 17.12.2 | CAT9K_IOSXE | cat9k_iosxe.17.12.02.SPA.bin |
| | No Payload Encryption (NPE) | cat9k_iosxe_npe.17.12.02.SPA.bin |
| Cisco IOS XE Dublin 17.12.1 | CAT9K_IOSXE | cat9k_iosxe.17.12.01.SPA.bin |
| | No Payload Encryption (NPE) | cat9k_iosxe_npe.17.12.01.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 29.

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 53.
- 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:<br>**`install add file`** *`filename`* [**`activate commit`**]<br>To separately install, activate, commit, cancel, or remove the installation file: **`install ?`** | |
| **add file tftp:** *filename* | Copies the install file package from a remote location to the device and performs a compatibility check for the platform and image versions. |
| **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<br>(Applies to the release you are upgrading from) | First upgrade to... | To upgrade to ... |
|---|---|---|---|
| Cisco IOS XE Everest 16.6.1[4] | 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.<br>**Note**<br>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<br>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 17.12.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 | |

[4] 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 Dublin 17.11.1 to Cisco IOS XE Dublin 17.12.1 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 Mon Jul 24 14:14:40 UTC 2023
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.17.11.01.SPA.pkg
File is in use, will not delete.
cat9k-espbase.17.11.01.SPA.pkg
File is in use, will not delete.
cat9k-rpbase.17.11.01.SPA.pkg
File is in use, will not delete.
cat9k-rpboot.17.11.01.SPA.pkg
File is in use, will not delete.
cat9k-sipbase.17.11.01.SPA.pkg
File is in use, will not delete.
cat9k-sipspa.17.11.01.SPA.pkg
File is in use, will not delete.
cat9k-srdriver.17.11.01.SPA.pkg
File is in use, will not delete.
cat9k-webui.17.11.01.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.17.11.01.SPA.pkg
/flash/cat9k-espbase.17.11.01.SPA.pkg
/flash/cat9k-guestshell.17.11.01.SPA.pkg
/flash/cat9k-rpbase.17.11.01.SPA.pkg
/flash/cat9k-rpboot.17.11.01.SPA.pkg
/flash/cat9k-sipbase.17.11.01.SPA.pkg
/flash/cat9k-sipspa.17.11.01.SPA.pkg
/flash/cat9k-srdriver.17.11.01.SPA.pkg
/flash/cat9k-webui.17.11.01.SPA.pkg
/flash/cat9k-wlc.17.11.01.SPA.pkg
/flash/packages.conf
/flash/cat9k_iosxe.17.11.01.SPA.bin

Do you want to remove the above files? [y/n]y
[R0]:
Deleting file flash:cat9k-cc_srdriver.17.11.01.SPA.pkg ... done.
Deleting file flash:cat9k-espbase.17.11.01.SPA.pkg ... done.
```

```
Deleting file flash:cat9k-guestshell.17.11.01.SPA.pkg ... done.
Deleting file flash:cat9k-rpbase.17.11.01.SPA.pkg ... done.
Deleting file flash:cat9k-rpboot.17.11.01.SPA.pkg ... done.
Deleting file flash:cat9k-sipbase.17.11.01.SPA.pkg ... done.
Deleting file flash:cat9k-sipspa.17.11.01.SPA.pkg ... done.
Deleting file flash:cat9k-srdriver.17.11.01.SPA.pkg ... done.
Deleting file flash:cat9k-webui.17.11.01.SPA.pkg ... done.
Deleting file flash:cat9k-wlc.17.11.01.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 Mon Jul 24 14:16:29 UTC 2023
Switch#
```

**Step 2** Copy new image to flash

a) **copy tftp:***[[//location]/directory]/filename* **flash:**

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.17.12.01.SPA.bin flash:
destination filename [cat9k_iosxe.17.12.01.SPA.bin]?
Accessing tftp://10.8.0.6/image/cat9k_iosxe.17.12.01.SPA.bin...
Loading /cat9k_iosxe.17.12.01.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    Jul 24 2023 10:18:11 -07:00 cat9k_iosxe.17.12.01.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 17.12.1 software image in the flash memory:

```
Switch# install add file flash:cat9k_iosxe.17.12.01.SPA.bin
 activate commit

install_add_activate_commit: START Mon Jul 24 22:49:41 UTC 2023

*Jul 24 22:49:42.772: %IOSXE-5-PLATFORM: Switch 1 R0/0: Jul 24 22:49:42 install_engine.sh:
 %INSTALL-5-INSTALL_START_INFO: Started install one-shot flash:cat9k_iosxe.17.12.01.SPA.bin

install_add_activate_commit: Adding PACKAGE

--- Starting initial file syncing ---
Info: Finished copying flash:cat9k_iosxe.17.12.01.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.17.12.01.SPA.pkg
/flash/cat9k-srdriver.17.12.01.SPA.pkg
/flash/cat9k-sipspa.17.12.01.SPA.pkg
/flash/cat9k-sipbase.17.12.01.SPA.pkg
/flash/cat9k-rpboot.17.12.01.SPA.pkg
/flash/cat9k-rpbase.17.12.01.SPA.pkg
/flash/cat9k-guestshell.17.12.01.SPA.pkg
/flash/cat9k-espbase.17.12.01.SPA.pkg
/flash/cat9k-cc_srdriver.17.12.01.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.17.12.01.SPA.pkg
/flash/cat9k-srdriver.17.12.01.SPA.pkg
/flash/cat9k-sipspa.17.12.01.SPA.pkg
/flash/cat9k-sipbase.17.12.01.SPA.pkg
/flash/cat9k-rpboot.17.12.01.SPA.pkg
/flash/cat9k-rpbase.17.12.01.SPA.pkg
/flash/cat9k-guestshell.17.12.01.SPA.pkg
/flash/cat9k-espbase.17.12.01.SPA.pkg
/flash/cat9k-cc_srdriver.17.12.01.SPA.pkg
Jul 24 11 22:53:58 UTC 2023
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     Mar 9 2023 09:52:41 -07:00 cat9k-cc_srdriver.17.11.01.SPA.pkg
475141 -rw- 70333380    Mar 9 2023 09:52:44 -07:00 cat9k-espbase.17.11.01.SPA.pkg
```

```
475142 -rw- 13256       Mar 9 2023 09:52:44 -07:00 cat9k-guestshell.17.11.01.SPA.pkg
475143 -rw- 349635524   Mar 9 2023 09:52:54 -07:00 cat9k-rpbase.17.11.01.SPA.pkg
475149 -rw- 24248187    Mar 9 2023 09:53:02 -07:00 cat9k-rpboot.17.11.01.SPA.pkg
475144 -rw- 25285572    Mar 9 2023 09:52:55 -07:00 cat9k-sipbase.17.11.01.SPA.pkg
475145 -rw- 20947908    Mar 9 2023 09:52:55 -07:00 cat9k-sipspa.17.11.01.SPA.pkg
475146 -rw- 2962372     Mar 9 2023 09:52:56 -07:00 cat9k-srdriver.17.11.01.SPA.pkg
475147 -rw- 13284288    Mar 9 2023 09:52:56 -07:00 cat9k-webui.17.11.01.SPA.pkg
475148 -rw- 13248       Mar 9 2023 09:52:56 -07:00 cat9k-wlc.17.11.01.SPA.pkg

491524 -rw- 25711568    Jul 24 2023 11:49:33 -07:00  cat9k-cc_srdriver.17.12.01.SPA.pkg
491525 -rw- 78484428    Jul 24 2023 11:49:35 -07:00  cat9k-espbase.17.12.01.SPA.pkg
491526 -rw- 1598412     Jul 24 2023 11:49:35 -07:00  cat9k-guestshell.17.12.01.SPA.pkg
491527 -rw- 404153288   Jul 24 2023 11:49:47 -07:00  cat9k-rpbase.17.12.01.SPA.pkg
491533 -rw- 31657374    Jul 24 2023 11:50:09 -07:00  cat9k-rpboot.17.12.01.SPA.pkg
491528 -rw- 27681740    Jul 24 2023 11:49:48 -07:00  cat9k-sipbase.17.12.01.SPA.pkg
491529 -rw- 52224968    Jul 24 2023 11:49:49 -07:00  cat9k-sipspa.17.12.01.SPA.pkg
491530 -rw- 31130572    Jul 24 2023 11:49:50 -07:00  cat9k-srdriver.17.12.01.SPA.pkg
491531 -rw- 14783432    Jul 24 2023 11:49:51 -07:00  cat9k-webui.17.12.01.SPA.pkg
491532 -rw- 9160        Jul 24 2023 11:49:51 -07:00  cat9k-wlc.17.12.01.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 Jul 24 2023 05:39:42 +00:00  packages.conf
16634  -rw- 4882 Jul 24 2023 05:34:06 +00:00  cat9k_iosxe.17.12.01.SPA.conf
```

- `packages.conf`—the file that has been re-written with the newly installed .pkg files
- `cat9k_iosxe.17.12.01.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 17.12.01.0.58

--------------------------------------------------------------------------------
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 17.12.1 image on the device:

```
Switch# show version

Cisco IOS XE Software, Version 17.12.01
Cisco IOS Software [Dublin], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 17.12.1,
 RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2023 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<br><br>(Applies to the release you are downgrading from) | To ... |
|---|---|---|
| Cisco IOS XE Dublin 17.12.x | This procedure automatically copies the images to both active and standby supervisor modules. Both supervisor modules are simultaneously downgraded.<br><br>**Note**<br>Do not perform an Online Removal and Replacement (OIR) of either supervisor module during the process. | Cisco IOS XE Dublin 17.11.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 17.12.1 to Cisco IOS XE Dublin 17.11.1, 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 Mon Jul 24 11:42:27 UTC 2023

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.17.12.01.SSA.pkg
      File is in use, will not delete.
    cat9k-espbase.17.12.01.SSA.pkg
      File is in use, will not delete.
    cat9k-guestshell.17.12.01.SSA.pkg
      File is in use, will not delete.
    cat9k-rpbase.17.12.01.SSA.pkg
      File is in use, will not delete.
    cat9k-rpboot.17.12.01.SSA.pkg
      File is in use, will not delete.
    cat9k-sipbase.17.12.01.SSA.pkg
      File is in use, will not delete.
    cat9k-sipspa.17.12.01.SSA.pkg
      File is in use, will not delete.
    cat9k-srdriver.17.12.01.SSA.pkg
      File is in use, will not delete.
    cat9k-webui.17.12.01.SSA.pkg
      File is in use, will not delete.
    cat9k-wlc.17.12.01.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  Mon Jul 24 11:42:39 UTC 2023

--- 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 Mon Jul 24 19:52:25 UTC 2023
Switch#
```

**Step 2** Copy new image to flash

a) **copy tftp:***[[//location]/directory]/filename* **flash:**

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.17.11.01.SPA.bin flash:
Destination filename [cat9k_iosxe.17.11.01.SPA.bin]?
Accessing tftp://10.8.0.6//cat9k_iosxe.17.11.01.SPA.bin...
Loading /cat9k_iosxe.17.11.01.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 Jul 24 2023 13:35:16 -07:00 cat9k_iosxe.17.11.01.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.17.11.01.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.17.11.01.SPA.bin activate commit

install_add_activate_commit: START Mon Jul 24 22:49:41 UTC 2023

*Jul 24 22:49:42.772: %IOSXE-5-PLATFORM: Switch 1 R0/0: Jul 24 22:49:42 install_engine.sh:
%INSTALL-5-INSTALL_START_INFO: Started install one-shot
flash:cat9k_iosxe.17.11.01.SPA.bininstall_add_activate_commit: Adding PACKAGE

--- Starting initial file syncing ---
Info: Finished copying flash:cat9k_iosxe.17.11.01.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.17.11.01.SPA.pkg
/flash/cat9k-srdriver.17.11.01.SPA.pkg
/flash/cat9k-sipspa.17.11.01.SPA.pkg
/flash/cat9k-sipbase.17.11.01.SPA.pkg
/flash/cat9k-rpboot.17.11.01.SPA.pkg
/flash/cat9k-rpbase.17.11.01.SPA.pkg
/flash/cat9k-espbase.17.11.01.SPA.pkg
/flash/cat9k-cc_srdriver.17.11.01.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.17.11.01.SPA.pkg
/flash/cat9k-srdriver.17.11.01.SPA.pkg
/flash/cat9k-sipspa.17.11.01.SPA.pkg
/flash/cat9k-sipbase.17.11.01.SPA.pkg
/flash/cat9k-rpboot.17.11.01.SPA.pkg
/flash/cat9k-rpbase.17.11.01.SPA.pkg
/flash/cat9k-guestshell.17.11.01.SPA.pkg
/flash/cat9k-espbase.17.11.01.SPA.pkg
/flash/cat9k-cc_srdriver.17.11.01.SPA.pkg
Mon Jul 24 22:53:58 UTC 2023
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 Mon Jul 24 14:24:56 UTC 2023

This operation requires a reload of the system. Do you want to proceed? [y/n]
*Jul 24 14:24:57.555: %IOSXE-5-PLATFORM: R0/0: Jul 24 14:24:57 install_engine.sh:
%INSTALL-5-INSTALL_START_INFO: Started install rollbacky
--- 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.17.12.01.SPA.pkg
Current : rp 1 0 rp_boot cat9k-rpboot.17.12.01.SPA.pkg
Replacement: rp 0 0 rp_boot cat9k-rpboot.17.11.01.SPA.pkg
Replacement: rp 1 0 rp_boot cat9k-rpboot.17.11.01.SPA.pkg
Current : cc 0  0 cc_srdriver cat9k-cc_srdriver.17.12.01.SPA.pkg
Current : cc 0  0 cc cat9k-sipbase.17.12.01.SPA.pkg
Current : cc 0  0 cc_spa cat9k-sipspa.17.12.01.SPA.pkg
Current : cc 1  0 cc_srdriver cat9k-cc_srdriver.17.12.01.SPA.pkg
Current : cc 1  0 cc cat9k-sipbase.17.12.01.SPA.pkg
Current : cc 1  0 cc_spa cat9k-sipspa.17.12.01.SPA.pkg
Current : cc 10 0 cc cat9k-sipbase.17.12.01.SPA.pkg
Current : cc 10 0 cc_spa cat9k-sipspa.17.12.01.SPA.pkg
Current : cc 10 0 cc_srdriver cat9k-cc_srdriver.17.12.01.SPA.pkg
Current : cc 2  0 cc_srdriver cat9k-cc_srdriver.17.12.01.SPA.pkg
Current : cc 2  0 cc cat9k-sipbase.17.12.01.SPA.pkg
Current : cc 2  0 cc_spa cat9k-sipspa.17.12.01.SPA.pkg
Current : cc 3  0 cc_srdriver cat9k-cc_srdriver.17.12.01.SPA.pkg
Current : cc 3  0 cc cat9k-sipbase.17.12.01.SPA.pkg
Current : cc 3  0 cc_spa cat9k-sipspa.17.12.01.SPA.pkg
Current : cc 4  0 cc_srdriver cat9k-cc_srdriver.17.12.01.SPA.pkg
Current : cc 4  0 cc cat9k-sipbase.17.12.01.SPA.pkg
Current : cc 4  0 cc_spa cat9k-sipspa.17.12.01.SPA.pkg
Current : cc 5  0 cc_srdriver cat9k-cc_srdriver.17.12.01.SPA.pkg
Current : cc 5  0 cc cat9k-sipbase.17.12.01.SPA.pkg
Current : cc 5  0 cc_spa cat9k-sipspa.17.12.01.SPA.pkg
Current : cc 6  0 cc_srdriver cat9k-cc_srdriver.17.12.01.SPA.pkg
Current : cc 6  0 cc cat9k-sipbase.17.12.01.SPA.pkg
Current : cc 6  0 cc_spa cat9k-sipspa.17.12.01.SPA.pkg
Current : cc 7  0 cc_srdriver cat9k-cc_srdriver.17.12.01.SPA.pkg
```

```
Current : cc 7  0 cc cat9k-sipbase.17.12.01.SPA.pkg
Current : cc 7  0 cc_spa cat9k-sipspa.17.12.01.SPA.pkg
Current : cc 8  0 cc_srdriver cat9k-cc_srdriver.17.12.01.SPA.pkg
Current : cc 8  0 cc cat9k-sipbase.17.12.01.SPA.pkg
Current : cc 8  0 cc_spa cat9k-sipspa.17.12.01.SPA.pkg
Current : cc 9  0 cc_srdriver cat9k-cc_srdriver.17.12.01.SPA.pkg
Current : cc 9  0 cc cat9k-sipbase.17.12.01.SPA.pkg
Current : cc 9  0 cc_spa cat9k-sipspa.17.12.01.SPA.pkg
Current : fp 0  0 fp cat9k-espbase.17.12.01.SPA.pkg
Current : fp 1  0 fp cat9k-espbase.17.12.01.SPA.pkg
Current : rp 0  0 guestshell cat9k-guestshell.17.12.01.SPA.pkg
Current : rp 0  0 rp_base cat9k-rpbase.17.12.01.SPA.pkg
Current : rp 0  0 rp_daemons cat9k-rpbase.17.12.01.SPA.pkg
Current : rp 0  0 rp_iosd cat9k-rpbase.17.12.01.SPA.pkg
Current : rp 0  0 rp_security cat9k-rpbase.17.12.01.SPA.pkg
Current : rp 0  0 rp_webui cat9k-webui.17.12.01.SPA.pkg
Current : rp 0  0 rp_wlc cat9k-wlc.17.12.01.SPA.pkg
Current : rp 0  0 srdriver cat9k-srdriver.17.12.01.SPA.pkg
Current : rp 1  0 guestshell cat9k-guestshell.17.12.01.SPA.pkg
Current : rp 1  0 rp_base cat9k-rpbase.17.12.01.SPA.pkg
Current : rp 1  0 rp_daemons cat9k-rpbase.17.12.01.SPA.pkg
Current : rp 1  0 rp_iosd cat9k-rpbase.17.12.01.SPA.pkg
Current : rp 1  0 rp_security cat9k-rpbase.17.12.01.SPA.pkg
Current : rp 1  0 rp_webui cat9k-webui.17.12.01.SPA.pkg
Current : rp 1  0 rp_wlc cat9k-wlc.17.12.01.SPA.pkg
Current : rp 1  0 srdriver cat9k-srdriver.17.12.01.SPA.pkg
Replacement: cc 0  0 cc_srdriver cat9k-cc_srdriver.17.11.01.SPA.pkg
Replacement: cc 0  0 cc cat9k-sipbase.17.11.01.SPA.pkg
Replacement: cc 0  0 cc_spa cat9k-sipspa.17.11.01.SPA.pkg
Replacement: cc 1  0 cc_srdriver cat9k-cc_srdriver.17.11.01.SPA.pkg
Replacement: cc 1  0 cc cat9k-sipbase.17.11.01.SPA.pkg
Replacement: cc 1  0 cc_spa cat9k-sipspa.17.11.01.SPA.pkg
Replacement: cc 10 0 cc cat9k-sipbase.17.11.01.SPA.pkg
Replacement: cc 10 0 cc_spa cat9k-sipspa.17.11.01.SPA.pkg
Replacement: cc 10 0 cc_srdriver cat9k-cc_srdriver.17.11.01.SPA.pkg
Replacement: cc 2  0 cc_srdriver cat9k-cc_srdriver.17.11.01.SPA.pkg
Replacement: cc 2  0 cc cat9k-sipbase.17.11.01.SPA.pkg
Replacement: cc 2  0 cc_spa cat9k-sipspa.17.11.01.SPA.pkg
Replacement: cc 3  0 cc_srdriver cat9k-cc_srdriver.17.11.01.SPA.pkg
Replacement: cc 3  0 cc cat9k-sipbase.17.11.01.SPA.pkg
Replacement: cc 3  0 cc_spa cat9k-sipspa.17.11.01.SPA.pkg
Replacement: cc 4  0 cc_srdriver cat9k-cc_srdriver.17.11.01.SPA.pkg
Replacement: cc 4  0 cc cat9k-sipbase.17.11.01.SPA.pkg
Replacement: cc 4  0 cc_spa cat9k-sipspa.17.11.01.SPA.pkg
Replacement: cc 5  0 cc_srdriver cat9k-cc_srdriver.17.11.01.SPA.pkg
Replacement: cc 5  0 cc cat9k-sipbase.17.11.01.SPA.pkg
Replacement: cc 5  0 cc_spa cat9k-sipspa.17.11.01.SPA.pkg
Replacement: cc 6  0 cc_srdriver cat9k-cc_srdriver.17.11.01.SPA.pkg
Replacement: cc 6  0 cc cat9k-sipbase.17.11.01.SPA.pkg
Replacement: cc 6  0 cc_spa cat9k-sipspa.17.11.01.SPA.pkg
Replacement: cc 7  0 cc_srdriver cat9k-cc_srdriver.17.11.01.SPA.pkg
Replacement: cc 7  0 cc cat9k-sipbase.17.11.01.SPA.pkg
Replacement: cc 7  0 cc_spa cat9k-sipspa.17.11.01.SPA.pkg
Replacement: cc 8  0 cc_srdriver cat9k-cc_srdriver.17.11.01.SPA.pkg
Replacement: cc 8  0 cc cat9k-sipbase.17.11.01.SPA.pkg
Replacement: cc 8  0 cc_spa cat9k-sipspa.17.11.01.SPA.pkg
Replacement: cc 9  0 cc_srdriver cat9k-cc_srdriver.17.11.01.SPA.pkg
Replacement: cc 9  0 cc cat9k-sipbase.17.11.01.SPA.pkg
Replacement: cc 9  0 cc_spa cat9k-sipspa.17.11.01.SPA.pkg
Replacement: fp 0  0 fp cat9k-espbase.17.11.01.SPA.pkg
Replacement: fp 1  0 fp cat9k-espbase.17.11.01.SPA.pkg
Replacement: rp 0  0 guestshell cat9k-guestshell.17.11.01.SPA.pkg
Replacement: rp 0  0 rp_base cat9k-rpbase.17.11.01.SPA.pkg
Replacement: rp 0  0 rp_daemons cat9k-rpbase.17.11.01.SPA.pkg
```

```
Replacement: rp 0  0 rp_iosd cat9k-rpbase.17.11.01.SPA.pkg
Replacement: rp 0  0 rp_security cat9k-rpbase.17.11.01.SPA.pkg
Replacement: rp 0  0 rp_webui cat9k-webui.17.11.01.SPA.pkg
Replacement: rp 0  0 srdriver cat9k-srdriver.17.11.01.SPA.pkg
Replacement: rp 1  0 guestshell cat9k-guestshell.17.11.01.SPA.pkg
Replacement: rp 1  0 rp_base cat9k-rpbase.17.11.01.SPA.pkg
Replacement: rp 1  0 rp_daemons cat9k-rpbase.17.11.01.SPA.pkg
Replacement: rp 1  0 rp_iosd cat9k-rpbase.17.11.01.SPA.pkg
Replacement: rp 1  0 rp_security cat9k-rpbase.17.11.01.SPA.pkg
Replacement: rp 1  0 rp_webui cat9k-webui.17.11.01.SPA.pkg
Replacement: rp 1  0 srdriver cat9k-srdriver.17.11.01.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 Mon Jul 24 14:26:35 UTC 2023

Switch#
*Jul 24 14:26:35.880: %IOSXE-5-PLATFORM: R0/0: Jul 24 14:26:35 install_engine.sh:
%INSTALL-5-INSTALL_COMPLETED_INFO: Completed install rollback PACKAGE
*Jul 24 14:26:37.740: %IOSXE_OIR-6-REMCARD: Card (rp) removed from slot R1
*Jul 24 14:26:39.253: %IOSXE_OIR-6-INSCARD: Card (rp) inserted in slot R1 Jul 24 14:26:5

Initializing Hardware...

System Bootstrap, Version 17.3.1r
Compiled Tue 03/14/2023 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 17.11.01
Cisco IOS Software [Dublin], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 17.11.1,
RELEASE SOFTWARE (fc1)
```

```
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2023 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 Dublin 17.11.1 image on the device:

```
Switch# show version
Cisco IOS XE Software, Version 17.11.01
Cisco IOS Software [Dublin], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 17.11.1,
```

```
RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2023 by Cisco Systems, Inc.
<output truncated>
```

# In Service Software Upgrade (ISSU) with Cisco StackWise Virtual and Dual Supervisor Module Configuration

Follow the instructions described here to perform an In Service Software Upgrade (ISSU) upgrade. Use the procedure described here, only for the releases indicated in the table below. For more general information about ISSU release support and recommended releases, see this technical reference document: In-Service Software Upgrade (ISSU).

### Before you begin

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

| When upgrading from... | Use these commands... | To... |
|---|---|---|
| Cisco IOS XE Cupertino 17.9.x | **install add file activate issu commit** | Cisco IOS XE Dublin 17.12.x |
| Not applicable | ISSU does not support downgrade. To downgrade, see Downgrading in Install Mode, on page 42. | Not applicable |

### Procedure

**Step 1** **enable**

Enables privileged EXEC mode. Enter your password if prompted.

```
Switch# enable
```

**Step 2** **install add file activate issu commit**

Use this command to automate the sequence of all the upgrade procedures, including downloading the images to both the switches, expanding the images into packages, and upgrading each switch as per the procedures.

```
Switch# install add file tftp:cat9k_iosxe.17.12.01.SPA.bin activate issu commit
```

The following sample output displays installation of Cisco IOS XE Dublin 17.12.1 software image with ISSU procedure.

```
Switch# install add file tftp:cat9k_iosxe.17.12.01.SPA.bin activate issu commit
install_add_activate_commit: START Thu Jul 19 06:16:32 UTC 2023
Downloading file tftp://172.27.18.5//cat9k_iosxe.17.12.01.SPA.bin

*Jul 19 06:16:34.064: %INSTALL-5-INSTALL_START_INFO: Switch 1 R0/0: install_engine: Started
 install one-shot ISSU tftp://172.27.18.5//cat9k_iosxe.17.12.01.SPA.bin
Finished downloading file tftp://172.27.18.5//cat9k_iosxe.17.12.01.SPA.bin to
```

```
flash:cat9k_iosxe.17.12.01.SPA.bin
install_add_activate_commit: Adding ISSU

--- Starting initial file syncing ---
[1]: Copying flash:cat9k_iosxe.17.12.01.SPA.bin from switch 1 to switch 2
[2]: Finished copying to switch 2
Info: Finished copying flash:cat9k_iosxe.17.12.01.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
  [2] Add package(s) on switch 2
  [2] Finished Add on switch 2
Checking status of Add on [1 2]
Add: Passed on [1 2]
Finished Add

install_add_activate_commit: Activating ISSU

NOTE: Going to start Oneshot ISSU install process

STAGE 0: Initial System Level Sanity Check before starting ISSU
================================================
--- Verifying install_issu supported ---
--- Verifying standby is in Standby Hot state ---
--- Verifying booted from the valid media ---
--- Verifying AutoBoot mode is enabled ---
Finished Initial System Level Sanity Check


STAGE 1: Installing software on Standby
================================================
--- Starting install_remote ---
Performing install_remote on Chassis remote
[2] install_remote package(s) on switch 2
[2] Finished install_remote on switch 2
install_remote: Passed on [2]
Finished install_remote


STAGE 2: Restarting Standby
================================================
--- Starting standby reload ---
Finished standby reload

--- Starting wait for Standby to reach terminal redundancy state ---

*Jul 19 06:24:16.426: %SMART_LIC-5-EVAL_START: Entering evaluation period
*Jul 19 06:24:16.426: %SMART_LIC-5-EVAL_START: Entering evaluation period
*Jul 19 06:24:16.466: %HMANRP-5-CHASSIS_DOWN_EVENT: Chassis 2 gone DOWN!
*Jul 19 06:24:16.497: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault (PEER_NOT_PRESENT)
*Jul 19 06:24:16.498: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault (PEER_DOWN)
*Jul 19 06:24:16.498: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault
(PEER_REDUNDANCY_STATE_CHANGE)
*Jul 19 06:24:16.674: %RF-5-RF_RELOAD: Peer reload. Reason: EHSA standby down
*Jul 19 06:24:16.679: %IOSXE_REDUNDANCY-6-PEER_LOST: Active detected switch 2 is no longer
 standby
*Jul 19 06:24:16.416: %NIF_MGR-6-PORT_LINK_DOWN: Switch 1 R0/0: nif_mgr: Port 1 on front
side stack link 0 is DOWN.
*Jul 19 06:24:16.416: %NIF_MGR-6-PORT_CONN_DISCONNECTED: Switch 1 R0/0: nif_mgr: Port 1 on
 front side stack link 0 connection has DISCONNECTED: CONN_ERR_PORT_LINK_DOWN_EVENT
*Jul 19 06:24:16.416: %NIF_MGR-6-STACK_LINK_DOWN: Switch 1 R0/0: nif_mgr: Front side stack
```

```
 link 0 is DOWN.
*Jul 19 06:24:16.416: %STACKMGR-6-STACK_LINK_CHANGE: Switch 1 R0/0: stack_mgr: Stack port
1 on Switch 1 is down

<output truncated>

*Jul 19 06:29:36.393: %IOSXE_REDUNDANCY-6-PEER: Active detected switch 2 as standby.
*Jul 19 06:29:36.392: %STACKMGR-6-STANDBY_ELECTED: Switch 1 R0/0: stack_mgr: Switch 2 has
been elected STANDBY.
*Jul 19 06:29:41.397: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby insertion
 (raw-event=PEER_FOUND(4))
*Jul 19 06:29:41.397: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby insertion
 (raw-event=PEER_REDUNDANCY_STATE_CHANGE(5))
*Jul 19 06:29:42.257: %REDUNDANCY-3-IPC: IOS versions do not match.
*Jul 19 06:30:24.323: %HA_CONFIG_SYNC-6-BULK_CFGSYNC_SUCCEED: Bulk Sync succeededFinished
wait for Standby to reach terminal redundancy state


*Jul 19 06:30:25.325: %RF-5-RF_TERMINAL_STATE: Terminal state reached for (SSO)
STAGE 3: Installing software on Active
==================================================
--- Starting install_active ---
Performing install_active on Chassis 1

<output truncated>

[1] install_active package(s) on switch 1
[1] Finished install_active on switch 1
install_active: Passed on [1]
Finished install_active


STAGE 4: Restarting Active (switchover to standby)
==================================================
--- Starting active reload ---
New software will load after reboot process is completed
SUCCESS: install_add_activate_commit  Thu Jul 19 23:06:45 UTC 2023
Jul 19 23:06:45.731: %INSTALL-5-INSTALL_COMPLETED_INFO: R0/0: install_engine: Completed
install one-shot ISSU flash:cat9k_iosxe.17.12.01.SPA.bin
Jul 19 23:06:47.509: %PMAN-5-EXITACTION: F0/0: pvp: Process manager is exiting: reload fp
action requested
Jul 19 23:06:48.776: %PM

Initializing Hardware...

System Bootstrap, Version 17.12.1r[FC2], RELEASE SOFTWARE (P)
Compiled Fri 07/19/2023 10:48:42.68 by rel

Current ROMMON image : Primary
Last reset cause     : PowerOn
C9500-40X platform with 16777216 Kbytes of main memory

boot: attempting to boot from [flash:packages.conf]
boot: reading file packages.conf
#
################################################################################################################################



Jul 19 23:08:30.238: %PMAN-5-EXITACTION: C0/0: pvp: Process manager is exiting:

Waiting for 120 seconds for other switches to boot
######################
Switch number is 1
```

```
All switches in the stack have been discovered. Accelerating discovery


Switch console is now available


Press RETURN to get started.




Jul 19 23:14:17.080: %INSTALL-5-INSTALL_START_INFO: R0/0: install_engine: Started install
commit
Jul 19 23:15:48.445: %INSTALL-5-INSTALL_COMPLETED_INFO: R0/0: install_engine: Completed
install commit ISSU
```

**Step 3** **show version**

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 17.12.1 image on the device:

```
Switch# show version
Cisco IOS XE Software, Version 17.12.01
Cisco IOS Software [Amsterdam], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 17.12.1,
 RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2023 by Cisco Systems, Inc.
<output truncated>
```

**Step 4** **show issu state** [*detail*]

Use this command to verify that no ISSU process is in pending state.

```
Switch# show issu state detail
--- Starting local lock acquisition on chassis 2 ---
Finished local lock acquisition on chassis 2

No ISSU operation is in progress

Switch#
```

**Step 5** **exit**

Exits privileged EXEC mode and returns to user EXEC mode.

# 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 which may cause a temporary loss of uplink connectivity. This completes the CPLD upgrade process for the supervisor module. Auto-upgrade of CPLD is not supported, and so 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 [r0 | r1]`

Use **r0** if the targeted Supervisor is on the lower slot of the chassis, and **r1** if the targeted Supervisor is on the upper slot of the chassis.

**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

Perfom 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.

# Upgrading the CPLD Version: Alternative Manual Method

This is an alternate method to upgrade CPLD where reloading with down time is possible. Perform the following steps in a single maintenance window. Refer to the *ROMMON and CPLD Versions* chapter of the release notes for the supported CPLD version.

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

### Procedure

**Step 1** Add rommon-variable FPGA_UPGRADE=1 on to the supervisor. In a high availability or stackwise virtual setup, this configuration will set the rommon variable on both the supervisors.

a) `Device# configure terminal`

b) `Device(config)# service internal`

c) `Device(config)# boot fpga-upgrade`

d) `Device(config)# end`

e) `Device# write memory`

**Step 2** Use any method to upgrade the software or reload the supervisor. If the current running CPLD version is lower than the intergrated version in the software image, the FPGA files will be copied to the respective supervisor's flash. This message will appear during the reload:

%IOSXEBOOT-4-FPGA_UPGRADE: Copy required files to Flash - FPGA UPGRADING

%IOSXEBOOT-4-FPGA_UPGRADE: Supervisor will not be reloaded. New FPGA will activate with next reload or switchover

**Step 3** (Optional) Verify that the images are copied to flash.

a) `Device# dir bootflash:mcnewfpgabinclose*`

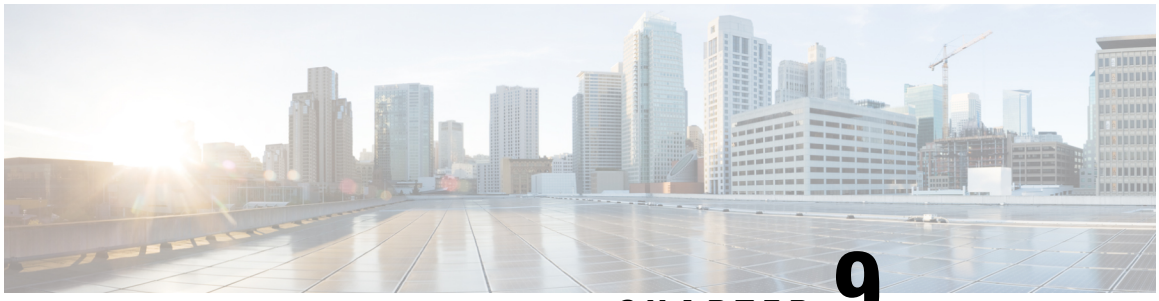
**Step 4** Once the switch boots to IOS and is in SSO hot state, an additional reload is required for the actual CPLD upgrade, as the rommon takes care of upgrading the CPLD version. Traffic can be disrupted during the power cycle initiated by the supervisor.

**Step 5** Verify that the CPLD/FPGA version is updated.

a) `Device# show firmware version all`

**Step 6** Use the no boot fpga-upgrade command to remove the rommon-variable FPGA_UPGRADE=1 from the supervisors. Verify that the rommon variable is FPGA_UPGRADE=0. This indicates that there are no further upgrades.

a) `Device# show romvar`



CHAPTER 9

# Caveats


- Cisco Bug Search Tool, on page 57
- Open Caveats in Cisco IOS XE Dublin 17.12.x, on page 57
- Resolved Caveats in Cisco IOS XE Dublin 17.12.8, on page 58
- Resolved Caveats in Cisco IOS XE Dublin 17.12.7a, on page 58
- Resolved Caveats in Cisco IOS XE Dublin 17.12.6, on page 58
- Resolved Caveats in Cisco IOS XE Dublin 17.12.5, on page 58
- Resolved Caveats in Cisco IOS XE Dublin 17.12.4, on page 58
- Resolved Caveats in Cisco IOS XE Dublin 17.12.3, on page 59
- Resolved Caveats in Cisco IOS XE Dublin 17.12.2, on page 59
- Resolved Caveats in Cisco IOS XE Dublin 17.12.1, on page 59


## 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 17.12.x

| Identifier | Headline |
|---|---|
| CSCvu14870 | Cat9k / Archive command causing 'bulk sync failure' and reloading Standby |
| CSCwh35728 | Need switch to host macsec support in Sda overlay network |
| CSCwi79445 | Interfaces with QSFP 40/100G SRBD go disabled after reload |

# Resolved Caveats in Cisco IOS XE Dublin 17.12.8

There are no resolved caveats in this release.

# Resolved Caveats in Cisco IOS XE Dublin 17.12.7a

| Identifier | Headline |
|---|---|
| CSCwq89734 | Catalyst 9000: Interface Total Output Drops Counter May Show Very Large False Values |
| CSCwr70792 | IOS PHY loopback test fails on connected ports |
| CSCwr83127 | C9400-LC-48S/C9400-LC-24S line card with SVL DAD link configuration sees ports fail to link up |
| CSCws01065 | Catalyst 9400 Series: Packet Loss May Occur With Intel I219-LM Hosts At 1G |
| CSCws83145 | Datapath stuck at the PHY layer inside Bell LC after SWO |

# Resolved Caveats in Cisco IOS XE Dublin 17.12.6

| Identifier | Headline |
|---|---|
| CSCwn98779 | Multihome DC publication has inconsistent domain and mh id |

# Resolved Caveats in Cisco IOS XE Dublin 17.12.5

There are no resolved caveats in this release.

# Resolved Caveats in Cisco IOS XE Dublin 17.12.4

| Identifier | Applicable Models | Headline |
|---|---|---|
| CSCwj55093 | C9400 | Catalyst 9K Switches: Unexpected reload in FED due to SIGFPE Arithmetic exception |
| CSCwi79445 | C9400 | Interfaces with QSFP 40/100G SRBD go disabled after reload |

# Resolved Caveats in Cisco IOS XE Dublin 17.12.3

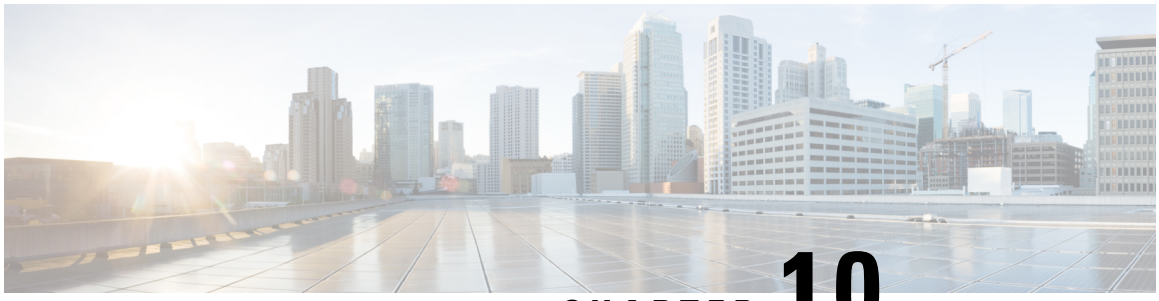
| Identifier | Headline |
|---|---|
| CSCwi59993 | Memory leak due to pubd process when connection is terminated from the receiver side |
| CSCwh91796 | BUM not forwarding while the L2 vni is down |
| CSCwi24734 | single-sup mode of power budget is rejected in Cat9400 SVL |
| CSCwh99354 | C9400 SVL: command - test platform hardware chassis fantray service-mode on/off - does not work |
| CSCwi06404 | PKI crash after failing a CRL Fetch |

# Resolved Caveats in Cisco IOS XE Dublin 17.12.2

| Identifier | Headline |
|---|---|
| CSCwh87343 | Cisco IOS XE Software Web UI Privilege Escalation Vulnerability<br>For more information, see Security Advisory: cisco-sa-iosxe-webui-privesc-j22SaA4z. |

# Resolved Caveats in Cisco IOS XE Dublin 17.12.1

There are no resolved caveats in this release.



CHAPTER 10

# Additional Information


- Troubleshooting, on page 61
- Related Documentation, on page 61
- Communications, Services, and Additional Information, on page 61


## 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://cfnng.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 results 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 NONINFRINGEMENT 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.