Release Notes for Cisco Catalyst 9400 Series Switches, Cisco IOS XE Fuji 16.9.x

Introduction

Cisco Catalyst 9400 Series Switches are Cisco’s leading modular enterprise switching access platform and has 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 a Unified Access Data Plane (UADP) 2.0. 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). The series forms the foundational building block for SD-Access, which is Cisco’s lead enterprise architecture.

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

Note

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Whats New in Cisco IOS XE Fuji 16.9.3

There are no new hardware or software features in this release. For the list of open and resolved caveats in this release, see Caveats, on page 55.
Whats New in Cisco IOS XE Fuji 16.9.2

Software Features in Cisco IOS XE Fuji 16.9.2

<table>
<thead>
<tr>
<th>Feature Name</th>
<th>Description and License Level Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Service Software Upgrade (ISSU) with Cisco StackWise Virtual</td>
<td>Starting with this release, ISSU with Cisco StackWise Virtual configured on the switch, is supported, only in single supervisor module configuration. Only the C9404R and C9407R switches support ISSU with Cisco StackWise Virtual.</td>
</tr>
<tr>
<td></td>
<td>See High Availability → Configuring ISSU.</td>
</tr>
<tr>
<td></td>
<td>(Network Advantage)</td>
</tr>
</tbody>
</table>

Whats New in Cisco IOS XE Fuji 16.9.1

Hardware Features in Cisco IOS XE Fuji 16.9.1

<table>
<thead>
<tr>
<th>Feature Name</th>
<th>Description and Documentation Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco Catalyst 9400 Series Switches—Catalyst 9404R Switch (C9404R)</td>
<td>The Catalyst 9404R Switch is a four-slot modular chassis, with two redundant supervisor module slots, two switching module slots. It supports 104 front panel ports, one non-redundant fan tray assembly, and has a provision to accommodate up to four power supply modules. For information about the hardware, see the Cisco Catalyst 9400 Series Switches Hardware Installation Guide.</td>
</tr>
<tr>
<td>Cisco Catalyst 9400 Series Supervisor XL25 Module with 25G uplink support (C9400-SUP-1XL-Y)</td>
<td>This supervisor module is supported on Cisco Catalyst C9404R, C9407R, and C9410R chassis. It supports ten uplink ports including two 25G uplink ports that use SFP28 transceivers and two 40G ports that use QSFP transceivers. For information about the hardware, see the Cisco Catalyst 9400 Series Supervisor Module Installation Note.</td>
</tr>
<tr>
<td>Feature Name</td>
<td>Description and Documentation Link</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Cisco Catalyst 9400 Series 3200W DC Power Supply (C9400-PWR-3200DC)        | This power supply module supports an input voltage of -40 to -72VDC, (with extended range to -75VDC) and provides 3200W of output power. It has two DC-inputs that can be powered from separate sources or can be paralleled to run from a suitable single source. It supports redundant and combined configuration modes. \n\n**Note** In the Cisco IOS XE Fuji 16.9.1 and Cisco IOS XE Fuji 16.9.2 releases, there is a limitation relating to the input voltage range in software. For more information, see the Limitations and Restrictions, on page 51 section of this release note document.  
For information about the features, installation, troubleshooting, and specifications, see the Cisco Catalyst 9400 Series Switches Hardware Installation Guide.  
For configuration examples, see System Management → Environmental Monitoring and Power Management.                                                                                                                                                                                                 |
| Cisco 10GBASE SFP+ Transceiver Modules                                     | Supported transceiver module product numbers—SFP-H10GB-CU1-5M, SFP-H10GB-CU2M, SFP-H10GB-CU2-5M  
For information about the module, see the Cisco 10GBASE SFP+ Modules Data Sheet. For information about device compatibility, see Cisco 10-Gigabit Ethernet Transceiver Modules Compatibility Matrix.                                                                                                                                                                                                                     |
| Cisco 25-Gigabit Ethernet Transceiver Modules (Cisco 25GBASE SFP28)        | Supported transceiver module product numbers—  
- SFP-25G-SR-S  
For information about the module, see the Cisco 25BASE SFP28 Modules Data Sheet. For information about compatibility with a device, see the Cisco 25-Gigabit Ethernet Transceiver Modules Compatibility Matrix.                                                                                                                                                                                                                           |
For information about the module, see the Cisco 40BASE QSFP Modules Data Sheet. For information about compatibility, see the Cisco 40-Gigabit Ethernet Transceiver Modules Compatibility Matrix.                                                                                                                                                                                                                       |
### Software Features in Cisco IOS XE Fuji 16.9.1

<table>
<thead>
<tr>
<th>Feature Name</th>
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</tr>
</thead>
</table>
| **Cisco StackWise Virtual** | Cisco StackWise Virtual is a network system virtualization technology that pairs two switches into one virtual switch to simplify operational efficiency with a single control and management plane.  
**Note** The feature is supported only on these chassis models and supervisor modules:  
- Chassis Models—Catalyst 9404R Switch and Catalyst 9407R Switch.  
- Supervisor Modules  
  - Cisco Catalyst 9400 Series Supervisor 1 Module (C9400-SUP-1). The feature requires a special, additional, C9400-SUP-UPG-LIC= license with this supervisor module.  
  - Cisco Catalyst 9400 Series Supervisor 1XL Module(C9400-SUP-1XL).  
  See High Availability → Configuring Cisco StackWise Virtual .  
(Network Advantage) |
| **Generic Online Diagnostics (GOLD)** | The **TestUnusedPortLoopback** and **TestPortTxMonitoring** diagnostic test commands are introduced; Use these commands to test and verify hardware functionality.  
See System Management → Configuring Online Diagnostics  
(Network Essentials and Network Advantage) |
<table>
<thead>
<tr>
<th>Feature Name</th>
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</tr>
</thead>
</table>
| Graceful Insertion and Removal (GIR) enhancements                            | These enhancements have been added the GIR feature:  
  • Snapshot templates can now be used to generate specific snapshots.  
  • Protocols belonging to one class within the same custom template are serviced in parallel.  
  • System mode maintenance counters have been added to track several events such as the number of times the switch went into maintenance.  
  See High Availability → Configuring Graceful Insertion and Removal.  
  (Network Advantage) |
| GIR Layer 2 protocol support for GIR Hot Standby Router Protocol (HSRP)       | GIR is now supported for the HSRP protocol.  
  See High Availability → Configuring Graceful Insertion and Removal.  
  (Network Advantage) |
| GIR Layer 2 protocol support for GIR Virtual Router Redundancy Protocol (VRRP)| GIR is now supported for the VRRP protocol.  
  See High Availability → Configuring Graceful Insertion and Removal.  
  (Network Advantage) |
| Hot Patching Support                                                         | Allows Software Maintenance Upgrade (SMU) to happen immediately after activation, without reloading the system.  
  See System Management → Software Maintenance Upgrade.  
  (Network Advantage for CLI and DNA Advantage for DNAC) |
<table>
<thead>
<tr>
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</table>
| In Service Software Upgrade (ISSU) | A process that allows Cisco IOS software to be updated or otherwise modified while packet forwarding continues. In most networks, planned software upgrades are a significant cause of downtime. ISSU allows Cisco IOS software to be modified while packet forwarding continues, which increases network availability and reduces downtime caused by planned software upgrades.  
**Note** ISSU is supported in dual supervisor module configuration on a standalone switch.  
See High Availability → Configuring ISSU .  
(Network Advantage) |
| Media Access Control Security (MACsec): Support for Host to Switch Connections | Support for 128-bit AES MACsec (IEEE 802.1AE) encryption with MACsec Key Agreement (MKA) on the line card ports is enabled.  
128-bit—(Network Essentials and Network Advantage) |
| Multicast scale increase | Starting from Cisco IOS XE Fuji 16.9.1, Access, Core, Software-Defined Access (SDA), and Network Address Translation (NAT) Switch Database Management (SDM) templates are available. For the Core and NAT templates, the multicast scale numbers are increased to 32,000.  
See the Cisco Catalyst 9400 Series Switch Data Sheet.  
(Network Advantage) |
### Feature Name: Multiprotocol Label Switching

- EIGRP MPLS VPN PE-CE Site of Origin (SoO)
- Route Target Rewrite
- External BGP (eBGP) and internal BGP (iBGP)
- IPv6 Provider Edge over MPLS (6PE)
- IPv6 VPN Provider Edge over MPLS (6VPE)

### Description and License Level Information:

The following MPLS features are introduced in this release:

- **EIGRP MPLS VPN PE-CE SoO**—Introduces the capability to filter MPLS Virtual Private Network (VPN) traffic on a per-site basis for Enhanced Interior Gateway Routing Protocol (EIGRP) networks. SoO filtering is configured at the interface level and is used to manage MPLS VPN traffic, and to prevent transient routing loops from occurring in complex and mixed network topologies.

- **Route Target Rewrite**—Allows the replacement of route targets on incoming and outgoing Border Gateway Protocol (BGP) updates. Route targets are carried as extended community attributes in BGP Virtual Private Network IP Version 4 (VPNv4) updates. Route target extended community attributes are used to identify a set of sites and VPN routing and forwarding (VRF) instances that can receive routes with a configured route target.

- **eBGP and iBGP**—Enables you to configure multipath load balancing with both eBGP and iBGP paths in Border Gateway Protocol (BGP) networks that are configured to use MPLS VPNs. The feature provides improved load balancing deployment and service offering capabilities and is useful for multi-homed autonomous systems and Provider Edge (PE) routers that import both eBGP and iBGP paths from multi-homed and stub networks.

- **6PE**—A technique that provides global IPv6 reachability over IPv4 MPLS. It allows one shared routing table for all other devices. 6PE allows IPv6 domains to communicate with one another over the IPv4 without an explicit tunnel setup, requiring only one IPv4 address per IPv6 domain.

- **6VPE**—A mechanism to use the IPv4 backbone to provide VPN IPv6 services. 6VPE is like a regular IPv4 MPLS-VPN provider edge, with an addition of IPv6 support within VRF. It provides logically separate routing table entries for VPN member devices.

See [Multiprotocol Label Switching (MPLS)](Network Advantage).
<table>
<thead>
<tr>
<th>Feature Name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Network-Based Application Recognition (NBAR) and NBAR2</td>
<td>Support for wired AVC is enabled. AVC is a solution for Cisco network devices that provides application-level classification, monitoring, and traffic control to improve business-critical application performance, facilitate capacity management and planning, and reduce network operating costs. See System Management → Configuring Application Visibility and Control in a Wired Network. (DNA Advantage)</td>
</tr>
<tr>
<td>Open Shortest Path First version 3 (OSPFv3) Authentication Trailer</td>
<td>Provides a mechanism to authenticate OSPFv3 protocol packets as an alternative to existing OSPFv3 IPsec authentication. See Routing → Configuring OSPFv3 Authentication Trailer. (Network Advantage)</td>
</tr>
</tbody>
</table>
| Programmability | The following programmability features are introduced in this release:  
  • Candidate Configuration—A temporary configuration that can be modified without changing running configuration. You can then choose when to update the device's configuration with the candidate configuration, by committing and confirming the candidate configuration.  
  • OpenFlow 1.3 Multitable—Enables integration with open source Faucet SDN Controllers to automate management of layer 2 switching, VLANs, ACLs, and layer 3 routing (Network Essentials and Network Advantage)  
  • 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/1691. Revision statements embedded in the YANG files indicate if there has been a model revision. The README.md file in the same github location highlights changes that have been made in the release.  
  • Zero Touch Provisioning (DHCPv6)—Dynamic Host Control Protocol Version 6 (DHCPv6) support is added to the Zero-touch provisioning feature in this release. DHCPv6 is enabled by default, and works on any device that boots without startup configuration. See Programmability Configuration Guide. |
<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>Resilient Ethernet Protocol (REP)</td>
<td>Controls network loops, handles link failures and improves convergence time. You can configure the feature on uplink and downlink ports. See Layer2 → Configuring Resilient Ethernet Protocol. (Network Essentials and Network Advantage)</td>
</tr>
<tr>
<td>SDM Templates</td>
<td>You can use SDM templates to configure system resources, to optimize support for specific features, depending on how your device is used in the network. You can select a template to provide maximum system usage for some functions. See System Management → Configuring SDM Templates. (Network Advantage)</td>
</tr>
<tr>
<td>Security Group Tag (SGT) Caching</td>
<td>Enhances the ability of Cisco TrustSec to make Security Group Tag (SGT) transportability flexible. This feature identifies the IP-SGT binding and caches the corresponding SGT so that network packets are forwarded through all network services for normal deep packet inspection processing and at the service egress point the packets are re-tagged with the appropriate SGT. See Cisco TrustSec → Cisco TrustSec SGT Caching. (Network Advantage)</td>
</tr>
<tr>
<td>Smart Licensing</td>
<td>A cloud-based, software license management solution that allows you to manage and track the status of your license, hardware, and software usage trends. Note Starting from this release, Smart Licensing is the default and the only available method to manage licenses. Important Starting from Cisco IOS XE Fuji 16.9.1 the Right-To-Use (RTU) licensing mode is deprecated, and the associated license right-to-use command is no longer available on the CLI. See the Smart Licensing, on page 50 section in this release note document and System Management → Configuring Smart Licensing in the configuration guide. A license level is not applicable.</td>
</tr>
</tbody>
</table>
### Feature Name

<table>
<thead>
<tr>
<th>Feature Name</th>
<th>Description and License Level Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Extensible LAN (VXLAN) Border Gateway Protocol (BGP) Ethernet VPN (EVPN)</td>
<td>A VXLAN is a network overlay that allows layer 2 segments to be stretched across an IP core. All the benefits of layer 3 topologies are thereby available with VXLAN. The overlay protocol is VXLAN and BGP uses EVPN as the address family for communicating end host MAC and IP addresses. See Layer 2 → Configuring VXLAN BGP EVPN (Network Advantage)</td>
</tr>
</tbody>
</table>

### New on the Web UI

These features are introduced on the Web UI in this release

- Multicast—Minor improvements to configuring Internet Group Management Protocol (IGMP) snooping and to set the IGMP timeout.
- Open Shortest Path First (OSPF)—Supports OSPF standards-based routing protocol for improved routing of data packets to their destination.
- Quality of Service (QoS)—Supports QoS to make your network performance more predictable and bandwidth utilization more effective.
- Site Profile—New site profiles for access, distributed, and core switches for easier initial configuration of the device.
- Smart Licensing—Supports both online and offline method of license reservation to simplify and automate the management of licenses for your Cisco products. Smart Licensing on the device works with the Cisco Smart Software Manager (Cisco SSM).
- Switched Port Analyzer (SPAN)—Supports SPAN to analyze network traffic passing through ports or VLANs.

### Important Notes

- Cisco StackWise Virtual - Supported and Unsupported Features, on page 10
- Unsupported Features, on page 11
- Complete List of Supported Features, on page 11
- Accessing Hidden Commands, on page 11

**Cisco StackWise Virtual - Supported and Unsupported Features**

When you enable Cisco StackWise Virtual on the device
Layer 2, Layer 3, Security, Quality of Service, Multicast, Application, Monitoring and Management, Multiprotocol Label Switching, and High Availability are supported. Contact the Cisco Technical Support Centre for the specific list of features that are supported under each one of these technologies.

Resilient Ethernet Protocol, Remote Switched Port Analyzer, and Software-Defined Access are NOT supported

Unsupported Features

- Audio Video Bridging (including IEEE802.1AS, IEEE 802.1Qat, and IEEE 802.1Qav)
- Bluetooth
- Cisco TrustSec Network Device Admission Control (NDAC) on Uplinks
- Converged Access for Branch Deployments
- Gateway Load Balancing Protocol (GLBP)
- MACSec Encryption (128-bit and 256-bit switch-to-switch connections and 256-bit host-to-switch connections)
- Network-Powered Lighting (including Constrained Application Protocol (CoAP) Proxy Server, 2-event Classification, Perpetual PoE, and Fast PoE)
- Performance Monitoring (PerfMon)
- Virtual Routing and Forwarding (VRF)-Aware web authentication

Complete List of Supported Features

For the complete list of features supported on a platform, see the Cisco Feature Navigator at https://www.cisco.com/go/cfn.

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. This means that entering enter a question mark (?) at the system prompt did not display the list of available commands. Such hidden commands are only meant to assist Cisco TAC in advanced troubleshooting and are therefore not documented. For more information about CLI help, see the Using the Command-Line Interface → Understanding the Help System chapter of the Command Reference document.

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. Entering enter a question mark (?) at the system prompt displays 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 the 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.

---

**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*.

<table>
<thead>
<tr>
<th>Switch Model (append with “=” for spares)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C9404R</td>
<td>Cisco Catalyst 9400 Series 4 slot chassis</td>
</tr>
<tr>
<td></td>
<td>• Redundant supervisor module capability</td>
</tr>
<tr>
<td></td>
<td>• Two switching module slots</td>
</tr>
<tr>
<td></td>
<td>• Hot-swappable, front and rear serviceable, non-redundant fan tray assembly</td>
</tr>
<tr>
<td></td>
<td>• Four power supply module slots</td>
</tr>
<tr>
<td>C9407R</td>
<td>Cisco Catalyst 9400 Series 7 slot chassis</td>
</tr>
<tr>
<td></td>
<td>• Redundant supervisor module capability</td>
</tr>
<tr>
<td></td>
<td>• Five switching module slots</td>
</tr>
<tr>
<td></td>
<td>• Hot-swappable, front and rear serviceable fan tray assembly</td>
</tr>
<tr>
<td></td>
<td>• Eight power supply module slots</td>
</tr>
</tbody>
</table>
## Supported Hardware on Cisco Catalyst 9400 Series Switches

<table>
<thead>
<tr>
<th>Product ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supervisor Modules</strong></td>
<td></td>
</tr>
<tr>
<td>C9400-SUP-1</td>
<td>Cisco Catalyst 9400 Series Supervisor 1 Module</td>
</tr>
<tr>
<td></td>
<td>This supervisor module is supported on the C9404R, C9407R, and C9410R chassis</td>
</tr>
<tr>
<td>C9400-SUP-1XL</td>
<td>Cisco Catalyst 9400 Series Supervisor 1XL Module</td>
</tr>
<tr>
<td></td>
<td>This supervisor module is supported on the C9404R, C9407R, and C9410R chassis</td>
</tr>
<tr>
<td>C9400-SUP-1XL-Y</td>
<td>Cisco Catalyst 9400 Series Supervisor 25XL Module</td>
</tr>
<tr>
<td></td>
<td>This supervisor module is supported on the C9404R, C9407R, and C9410R chassis</td>
</tr>
<tr>
<td><strong>Gigabit Ethernet Switching Modules</strong></td>
<td></td>
</tr>
<tr>
<td>C9400-LC-24S</td>
<td>Cisco Catalyst 9400 Series 24 Port, 1 Gigabit Ethernet SFP Module that supports 100/1000 BASE-T with Cu-SFP</td>
</tr>
<tr>
<td>C9400-LC-48P</td>
<td>Cisco Catalyst 9400 Series 48 Port, 1 Gigabit Ethernet POE/POE+ module supporting up to 30W per port.</td>
</tr>
<tr>
<td>C9400-LC-48S</td>
<td>Cisco Catalyst 9400 Series 48 Port, 1 Gigabit Ethernet SFP module that supports 100/1000 BASE-T with Cu-SFP</td>
</tr>
<tr>
<td>C9400-LC-48T</td>
<td>Cisco Catalyst 9400 Series 48-Port 10/100/1000 (RJ-45)</td>
</tr>
<tr>
<td>C9400-LC-48U</td>
<td>Cisco Catalyst 9400 Series 48-Port UPOE 10/100/1000 (RJ-45)</td>
</tr>
<tr>
<td><strong>Ten Gigabit Ethernet Switching Modules</strong></td>
<td></td>
</tr>
<tr>
<td>C9400-LC-24XS</td>
<td>Cisco Catalyst 9400 Series 24-Port SFP/SFP+ Module</td>
</tr>
<tr>
<td><strong>Multigigabit Ethernet Switching Modules</strong></td>
<td></td>
</tr>
</tbody>
</table>
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

Compatibility Matrix

The following table provides software compatibility information.

<table>
<thead>
<tr>
<th>Catalyst 9400</th>
<th>Cisco Identity Services Engine</th>
<th>Cisco Access Control Server</th>
<th>Cisco Prime Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuji 16.9.3</td>
<td>2.3 Patch 1</td>
<td>5.4</td>
<td>PI 3.4 + PI 3.4 latest maintenance release + PI 3.4 latest device pack</td>
</tr>
<tr>
<td></td>
<td>2.4 Patch 1</td>
<td>5.5</td>
<td>See Cisco Prime Infrastructure 3.4→Downloads.</td>
</tr>
</tbody>
</table>
Web UI System Requirements

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

Minimum Hardware Requirements

<table>
<thead>
<tr>
<th>Processor Speed</th>
<th>DRAM</th>
<th>Number of Colors</th>
<th>Resolution</th>
<th>Font Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>233 MHz minimum</td>
<td>512 MB³</td>
<td>256</td>
<td>1280 x 800 or higher</td>
<td>Small</td>
</tr>
</tbody>
</table>
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)

Upgrading the Switch Software

This section covers the various aspects of upgrading or downgrading the device software.

Note
You cannot use the Web UI to install, upgrade, or downgrade device software.

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

<table>
<thead>
<tr>
<th>Release</th>
<th>Image Type</th>
<th>File Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco IOS XE Fuji 16.9.3</td>
<td>CAT9K_IOSXE</td>
<td>cat9k_iosxe.16.09.03.SPA.bin</td>
</tr>
<tr>
<td></td>
<td>Licensed Data Payload Encryption (LDPE)</td>
<td>cat9k_iosxedpe.16.09.03.SPA.bin</td>
</tr>
</tbody>
</table>
Automatic Boot Loader Upgrade

<table>
<thead>
<tr>
<th>Release</th>
<th>Image Type</th>
<th>File Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco IOS XE Fuji 16.9.2</td>
<td>CAT9K_IOSXE</td>
<td>cat9k_iosxe.16.09.02.SPA.bin</td>
</tr>
<tr>
<td></td>
<td>Licensed Data Payload Encryption (LDPE)</td>
<td>cat9k_iosxeldpe.16.09.02.SPA.bin</td>
</tr>
<tr>
<td>Cisco IOS XE Fuji 16.9.1</td>
<td>CAT9K_IOSXE</td>
<td>cat9k_iosxe.16.09.01.SPA.bin</td>
</tr>
<tr>
<td></td>
<td>Licensed Data Payload Encryption (LDPE)</td>
<td>cat9k_iosxeldpe.16.09.01.SPA.bin</td>
</tr>
</tbody>
</table>

Note

If Cisco Catalyst 9400 Series Supervisor 1 Module power is disconnected and reconnected within a 5-second window, the boot SPI may get corrupted.

Caution

- Do not power cycle your switch during an upgrade.
- Do not disconnect power or remove the supervisor module during an upgrade.
- 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 OIR of a switching module (linecard) when the switch is booting up.

Note

There is no boot loader version upgrade in Cisco IOS XE Fuji 16.9.1

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Automatic Boot Loader Response</th>
</tr>
</thead>
</table>
| If you boot Cisco IOS XE Fuji 16.9.1 for the first time | The boot loader version may be upgraded to 16.6.2r [FC1]. For example:  

ROM: IOS-XE ROMMON  
BOOTLDR: System Bootstrap, Version 16.6.2r [FC1], RELEASE SOFTWARE (P)  

While booting Cisco IOS XE Fuji 16.9.1, you will see the following on the console:  

%IOSXEBOOT-4-BOOTLOADER_UPGRADE: (rp/0): ###  
BOOTLOADER_UPGRADE skipped |
Complex Programmable Logic Device (CPLD) Upgrade

This refers to hardware-programmable firmware. The CPLD upgrade process is part of the automatic boot loader upgrade. The sequence of events is as follows:

There are no FPGA or CPLD upgrades in Cisco IOS XE Fuji 16.9.1

1. The system copies mcnewfpgaclose.hdr and mcnewfpgaclose.img to the bootflash.
2. The supervisor module then automatically reloads to enable the new boot loader.
3. When the new boot loader boots up, the CPLD upgrade process starts automatically. The CPLD upgrade process takes approximately from 7 to 10 minutes. The supervisor will power cycle itself during the CPLD upgrade.

The following is sample output from a CPLD upgrade:

```
Initializing Hardware...
Initializing Hardware...
Initializing Hardware...

System Bootstrap, Version 16.6.2r, RELEASE SOFTWARE (P)
Compiled Thu 10/26/2017 8:30:34.63 by rel

Current image running:
Primary Rommon Image
Last reset cause: SoftwareResetTrig
C9400-SUP-1 platform with 16777216 Kbytes of main memory

Starting System FPGA Upgrade ...... 
Programming SPI Primary image is completed. 
Authenticating SPI Primary image ..... 
IO FPGA image is authenticated successfully. 

Programming Header ..... 
FPGA HDR file size: 12 
Image page count: 1 
Verifying programmed header ..... 
Verifying programmed header ..... 
Programmed header is verified successfully. 
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Power Cycle is needed to complete System firmware upgrade. 
It takes ~7 mins to upgrade firmware after power cycle starts. 
DO NOT DISRUPT AFTER POWER CYCLE UNTIL ROMMON PROMPT APPEARS. 
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

Power Cycling the Supervisor card now!
Initializing Hardware...
Initializing Hardware...

System Bootstrap, Version 16.6.2r, RELEASE SOFTWARE (P)
Compiled Thu 10/26/2017 8:30:34.63 by rel
Current image running:
Primary Rommon Image
Last reset cause: PowerOn
C9400-SUP-1 platform with 16777216 Kbytes of main memory
```
rommon 1 >version -v
System Bootstrap, Version 16.6.2r, RELEASE SOFTWARE (P)
Compiled Thu 10/26/2017 8:30:34.63 by rel

Current image running:
Primary Rommon Image
Last reset cause: PowerOn
C9400-SUP-1 platform with 16777216 Kbytes of main memory
Fpga Version: 0x17101705
System Integrity Status: C334ABCE 6A40 6A48

Software Installation Commands

<table>
<thead>
<tr>
<th>Summary of Software Installation Commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>To install and activate the specified file, and to commit changes to be persistent across reloads—<strong>install</strong></td>
</tr>
<tr>
<td>add file filename [activate commit]</td>
</tr>
<tr>
<td>To separately install, activate, commit, abort, or remove the installation file—<strong>install ?</strong></td>
</tr>
<tr>
<td><strong>add file</strong> tftp: filename</td>
</tr>
<tr>
<td><strong>activate</strong> [auto-abort-timer]</td>
</tr>
<tr>
<td><strong>commit</strong></td>
</tr>
<tr>
<td><strong>rollback to committed</strong></td>
</tr>
<tr>
<td><strong>abort</strong></td>
</tr>
<tr>
<td><strong>remove</strong></td>
</tr>
</tbody>
</table>

Upgrading with In Service Software Upgrade (ISSU) with Cisco StackWise Virtual (Supervisor Modules in the Lower Slot)

Note that this procedure is applicable only if the supervisor modules are installed in the lower slot of the chassis. Follow these instructions to perform ISSU upgrade from Cisco IOS XE Fuji 16.9.2 to Cisco IOS XE Fuji 16.9.3, in install mode with Cisco StackWise Virtual.

**Before you begin**

ISSU from Cisco IOS XE Fuji 16.9.2 to Cisco IOS XE Fuji 16.9.3 with Cisco StackWise Virtual requires installation of Software Maintenance Upgrade (SMU) packages. Install the following hot patching SMU packages before performing ISSU.

<table>
<thead>
<tr>
<th>Release</th>
<th>File Name (Hot Patch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco IOS XE Fuji 16.9.2</td>
<td>cat9k_iosxe.16.09.02.CSCvo12166.SPA.smu.bin</td>
</tr>
<tr>
<td></td>
<td>cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin</td>
</tr>
</tbody>
</table>
If the supervisor modules are installed in the lower slot of the chassis (Slot 2 for Catalyst 9404R Switch, Slot 3 for Catalyst 9407R Switch), install the following hot patching SMU packages.

- cat9k_iosxe.16.09.02.CSCvo12166.SPA.smu.bin
- cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin

**Procedure**

**Step 1**

*enable*

Enables privileged EXEC mode. Enter your password if prompted.

`Switch# enable`

**Step 2**

*show issu state [detail]*

Use this command to verify that no other ISSU process is in progress.

`Switch# show issu state detail`

--- Starting local lock acquisition on chassis 1 ---

Finished local lock acquisition on chassis 1

No ISSU operation is in progress

`Switch#`

**Step 3**

*install add file activate commit*

Use the following commands to install the SMU packages when the supervisor modules are installed in the lower slot of the chassis.

a) `install add file tftp:cat9k_iosxe.16.09.02.CSCvo12166.SPA.smu.bin activate commit`

b) `install add file tftp:cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin activate commit`

The following sample output displays installation of CSCvo12166 and CSCvo71912 SMU, by using the install add file tftp:cat9k_iosxe.16.09.02.CSCvo12166.SPA.smu.bin activate commit and install add file tftp:cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin activate commit commands.

**Installation of CSCvo12166 SMU**

`Switch# install add file tftp:cat9k_iosxe.16.09.02.CSCvo12166.SPA.smu.bin activate commit`

```plaintext`
install_add_activate_commit: START Sat Mar 23 02:19:21 UTC 2019

Downloading file tftp://172.27.18.5/cat9k_iosxe.16.09.02.CSCvo12166.SPA.smu.bin

*Mar 23 02:19:22.310: %INSTALL-5-INSTALL_START_INFO: Chassis 1 R0/0: install_engine: Started

install one-shot tftp://172.27.18.5/cat9k_iosxe.16.09.02.CSCvo12166.SPA.smu.bin

Finished downloading file tftp://172.27.18.5/cat9k_iosxe.16.09.02.CSCvo12166.SPA.smu.bin to flash:cat9k_iosxe.16.09.02.CSCvo12166.SPA.smu.bin

install_add_activate_commit: Adding SMU

--- Starting initial file syncing ---

[1]: Copying flash:cat9k_iosxe.16.09.02.CSCvo12166.SPA.smu.bin from chassis 1 to chassis 2

[2]: Finished copying to chassis 2
```

--- End of Installation ---

**Installation of CSCvo71912 SMU**

`Switch# install add file tftp:cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin activate commit`

```plaintext`
install_add_activate_commit: START Sat Mar 23 02:19:30 UTC 2019

Downloading file tftp://172.27.18.5/cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin

*Mar 23 02:19:31.310: %INSTALL-5-INSTALL_START_INFO: Chassis 1 R0/0: install_engine: Started

install one-shot tftp://172.27.18.5/cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin

Finished downloading file tftp://172.27.18.5/cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin to flash:cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin

install_add_activate_commit: Adding SMU

--- Starting initial file syncing ---

[1]: Copying flash:cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin from chassis 1 to chassis 2

[2]: Finished copying to chassis 2
```

--- End of Installation ---
Info: Finished copying flash:cat9k_iosxe.16.09.02.CSCvo12166.SPA.smu.bin to the selected chassis
Finished initial file syncing

Executing pre scripts....
Executing pre scripts done.

--- Starting SMU Add operation ---
Performing SMU_ADD on all members
[1] SMU_ADD package(s) on chassis 1
[1] Finished SMU_ADD on chassis 1
[2] SMU_ADD package(s) on chassis 2
[2] Finished SMU_ADD on chassis 2
Checking status of SMU_ADD on [1 2]
SMU_ADD: Passed on [1 2]
Finished SMU Add operation

install_add_activate_commit: Activating SMU
Executing pre scripts....
Executing pre scripts done.

--- Starting SMU Activate operation ---
Performing SMU_ACTIVATE on all members
[1] SMU_ACTIVATE package(s) on chassis 1
[1] Finished SMU_ACTIVATE on chassis 1
[2] SMU_ACTIVATE package(s) on chassis 2
[2] Finished SMU_ACTIVATE on chassis 2
Checking status of SMU_ACTIVATE on [1 2]
SMU_ACTIVATE: Passed on [1 2]
Finished SMU Activate operation

SUCCESS: install_add_activate_commit /flash/cat9k_iosxe.16.09.02.CSCvo12166.SPA.smu.bin Sat Mar 23 02:19:45 UTC 2019

Switch#
*Mar 23 02:19:46.161: %INSTALL-5-INSTALL_COMPLETED_INFO: Chassis 1 R0/0: install_engine: Completed install one-shot SMU flash:cat9k_iosxe.16.09.02.CSCvo12166.SPA.smu.bin
Switch#

Installation of CSCvo71912 SMU

Switch# install add file tftp:cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin activate commit
install_add_activate_commit: START Sat Mar 23 02:20:01 UTC 2019

Downloading file tftp://172.27.18.5/cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin

Finished downloading file tftp://172.27.18.5/cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin to flash:cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin
install_add_activate_commit: Adding SMU

--- Starting initial file syncing ---
[1]: Copying flash:cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin from chassis 1 to chassis 2

*Mar 23 02:20:03.047: %INSTALL-5-INSTALL_START_INFO: Chassis 1 R0/0: install_engine: Started install one-shot tftp://172.27.18.5/cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin[2]: Finished copying to chassis 2

Info: Finished copying flash:cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin to the selected chassis
Finished initial file syncing
Executing pre scripts....
Executing pre scripts done.
--- Starting SMU Add operation ---
Performing SMU_ADD on all members
  [1] SMU_ADD package(s) on chassis 1
  [1] Finished SMU_ADD on chassis 1
  [2] SMU_ADD package(s) on chassis 2
  [2] Finished SMU_ADD on chassis 2
Checking status of SMU_ADD on [1 2]
SMU_ADD: Passed on [1 2]
Finished SMU Add operation

install_add_activate_commit: Activating SMU
Executing pre scripts....
Executing pre scripts done.

--- Starting SMU Activate operation ---
Performing SMU_ACTIVATE on all members
  [1] SMU_ACTIVATE package(s) on chassis 1
  [1] Finished SMU_ACTIVATE on chassis 1
  [2] SMU_ACTIVATE package(s) on chassis 2
  [2] Finished SMU_ACTIVATE on chassis 2
Checking status of SMU_ACTIVATE on [1 2]
SMU_ACTIVATE: Passed on [1 2]
Finished SMU Activate operation

SUCCESS: install_add_activate_commit /flash/cat9k_iosxe.16.09.02.CSCvo12166.SPA.smu.bin Sat Mar 23 02:20:22 UTC 2019

Step 4  show install summary

Use this command to verify if the SMU packages are installed properly.

The following sample output displays that the CSCvo12166 and CSCvo71912 SMUs have been installed on the switch.

Switch# show install summary
  [ Chassis 1 2 ] Installed Package(s) Information:

State (St): I - Inactive, U - Activated & Uncommitted,
           C - Activated & Committed, D - Deactivated & Uncommitted

--------------------------------------------------------------------------------
Type St Filename/Version
--------------------------------------------------------------------------------
SMU C flash:cat9k_iosxe.16.09.02.CSCvo12166.SPA.smu.bin
SMU C flash:cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin
**Step 5**

**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.16.09.03.SPA.bin activate issu commit
```

The following sample output displays the installation of Cisco IOS XE Fuji 16.9.3 software image with ISSU procedure.

```
Switch# install add file tftp:cat9k_iosxe.16.09.03.SPA.bin activate issu commit
install_add_activate_commit: START Sat Mar 23 02:21:25 UTC 2019
Installing file tftp://172.27.18.5/cat9k_iosxe.16.09.03.SPA.bin

*Mar 23 02:21:26.446: %INSTALL-5-INSTALL_START_INFO: Chassis 1 R0/0: install_engine: Started
install one-shot ISSU tftp://172.27.18.5/cat9k_iosxe.16.09.03.SPA.bin
Finished downloading file tftp://172.27.18.5/cat9k_iosxe.16.09.03.SPA.bin to flash:cat9k_iosxe.16.09.03.SPA.bin

install_add_activate_commit: Adding ISSU

--- Starting initial file syncing ---
[1]: Copying flash:cat9k_iosxe.16.09.03.SPA.bin from chassis 1 to chassis 2
[2]: Finished copying to chassis 2
Info: Finished copying flash:cat9k_iosxe.16.09.03.SPA.bin to the selected chassis
Finished initial file syncing

--- Starting Add ---
Performing Add on all members
  [1] Add package(s) on chassis 1
  [1] Finished Add on chassis 1
  [2] Add package(s) on chassis 2
  [2] Finished Add on chassis 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 chassis 2
[2] Finished install_remote on chassis 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 ---

*Mar 23 02:27:20.503: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault (PEER_NOT_PRESENT)  
*Mar 23 02:27:20.504: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault (PEER_DOWN)  

*Mar 23 02:27:20.504: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault (PEER_REDUNDANCY_STATE_CHANGE)  
*Mar 23 02:27:20.547: %IOSXE_OIR-6-REMCARD: Card (cc) removed from chassis 2 slot 1  
*Mar 23 02:27:20.548: %IOSXE_OIR-6-REMCARD: Card (cc) removed from chassis 2 slot 2  
*Mar 23 02:27:20.549: %IOSXE_OIR-6-REMCARD: Card (cc) removed from chassis 2 slot 3  
*Mar 23 02:27:20.549: %IOSXE_OIR-6-REMCARD: Card (cc) removed from chassis 2 slot 4  
*Mar 23 02:27:20.550: %IOSXE_PEM-6-REMPEM_FM: PEM/FM chassis 2 slot P1 removed  
*Mar 23 02:27:20.551: %IOSXE_PEM-6-REMPEM_FM: PEM/FM chassis 2 slot P2 removed  
*Mar 23 02:27:20.551: %IOSXE_PEM-6-REMPEM_FM: PEM/FM chassis 2 slot P3 removed  
*Mar 23 02:27:20.552: %IOSXE_PEM-6-REMPEM_FM: PEM/FM chassis 2 slot P4 removed  
*Mar 23 02:27:20.552: %IOSXE_PEM-6-REMPEM_FM: PEM/FM chassis 2 slot P9 removed  
*Mar 23 02:27:20.557: %IOSXE_OIR-6-REMSPA: SPA removed from chassis 2 subslot 1/0, interfaces disabled  
<output truncated>  
*Mar 23 02:35:20.785: %HA_CONFIG_SYNC-6-BULK_CFGSYNC_SUCCEED: Bulk Sync succeeded  

*Mar 23 02:35:20.877: %LINEPROTO-5-UPDOWN: Line protocol on Interface TenGigabitEthernet2/1/0/19, changed state to up  
*Mar 23 02:35:21.826: %RF-5-RF_TERMINAL_STATE: Terminal state reached for (SSO)  

Finished wait for Standby to reach terminal redundancy state

STAGE 3: Installing software on Active

--- Starting install_active ---  
Performing install_active on Chassis 1  
[1] install_active package(s) on chassis 1  
[1] Finished install_active on chassis 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 Sat Mar 23 02:36:25 UTC 2019  

Switch#  
*Mar 23 02:36:25.774: %INSTALL-5-INSTALL_COMPLETED_INFO: Chassis 1 R0/0: install_engine: Completed install one-shot ISSU flash:cat9k_iosxe.16.09.03.SPA.bin
Chassis 1 reloading, reason

- Reload command

Mar 23 02:36:38.066: %PMAN-5-EXITACTION: R0/0: pvp: Process manager is exiting: reload fru action requested

Initializing Hardware...

System Bootstrap, Version 16.10.2r[FC1], RELEASE SOFTWARE (P)

<output truncated>

Mar 23 02:56:30.095 PDT: %HA_CONFIG_SYNC-6-BULK_CFGSYNC_SUCCEED: Bulk Sync succeeded
Mar 23 02:56:31.136 PDT: %RF-5-RF_TERMINAL_STATE: Terminal state reached for (SSO)
Mar 23 02:56:54.040 PDT: %INSTALL-5-INSTALL_START_INFO: Chassis 2 R1/0: install_engine: Started install commit%IOSXEBOOT-4-ISSU_ONE_SHOT: (rp/1): ISSU finished successfully

Mar 23 02:56:56.707 PDT: %INSTALL-5-INSTALL_COMPLETED_INFO: Chassis 2 R1/0: install_engine: Completed install commit ISSU

**Step 6**  
**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 Fuji 16.9.3 image on the device:

Switch# Cisco IOS XE Software, Version 16.09.03
Cisco IOS Software (Fuji), Catalyst L3 Switch Software (CAT9K_IOSXE), Version 16.9.3, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2019 by Cisco Systems, Inc.
Compiled Wed 20-Mar-19 08:02 by mcpre

**Step 7**  
**show issu state [detail]**

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

The following is a sample output of `show issu state detail` after installation of the software image with ISSU.

Switch# show issu state detail
--- Starting local lock acquisition on chassis 1 ---
Finished local lock acquisition on chassis 1
No ISSU operation is in progress
Switch#

**Step 8**  
**exit**

Exits privileged EXEC mode and returns to user EXEC mode.
Upgrading with In Service Software Upgrade (ISSU) with Cisco StackWise Virtual (Supervisor Modules in the Higher Slot)

Note that this procedure is applicable only if the supervisor modules are installed in the higher slot of the chassis. Follow these instructions to perform ISSU upgrade from Cisco IOS XE Fuji 16.9.2 to Cisco IOS XE Fuji 16.9.3, in install mode with Cisco StackWise Virtual.

**Before you begin**

ISSU from Cisco IOS XE Fuji 16.9.2 to Cisco IOS XE Fuji 16.9.3 with Cisco StackWise Virtual requires installation of Software Maintenance Upgrade (SMU) packages. Install the following hot patching and cold patching SMU packages before performing ISSU.

<table>
<thead>
<tr>
<th>Release</th>
<th>File Name (Hot Patch)</th>
<th>File Name (Cold Patch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco IOS XE Fuji 16.9.2</td>
<td>cat9k_iosxe.16.09.02.CSCvo12166.SPA.smu.bin</td>
<td>cat9k_iosxe.16.09.02.CSCvo00460.SPA.smu.bin</td>
</tr>
<tr>
<td></td>
<td>cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin</td>
<td></td>
</tr>
</tbody>
</table>

- If the supervisor modules are installed in the higher slot of the chassis (Slot 3 for Catalyst 9404R Switch, Slot 4 for Catalyst 9407R Switch), install the following hot and cold patching SMU packages.
  - cat9k_iosxe.16.09.02.CSCvo12166.SPA.smu.bin
  - cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin
  - cat9k_iosxe.16.09.02.CSCvo00460.SPA.smu.bin

**Procedure**

**Step 1**  
**enable**

Enables privileged EXEC mode. Enter your password if prompted.

```
Switch# enable
```

**Step 2**  
**show issu state [detail]**

Use this command to verify that no other ISSU process is in progress.

```
Switch# show issu state detail
--- Starting local lock acquisition on chassis 1 ---
Finished local lock acquisition on chassis 1
No ISSU operation is in progress
Switch#
```

**Step 3**  
**install add file activate commit**

Use the commands below to install the SMU packages when the supervisor modules are installed in the higher slot of the chassis.

a)  
```
install add file tftp:cat9k_iosxe.16.09.02.CSCvo12166.SPA.smu.bin activate commit
```

b)  
```
install add file tftp:cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin activate commit
```

c)  
```
install add file tftp:cat9k_iosxe.16.09.02.CSCvo00460.SPA.smu.bin activate issu commit
```
The `cat9k_iosxe.16.09.02.CSCvo00460.SPA.smu.bin` package must be installed with ISSU using the `install add file activate issu commit` command to prevent reloading of the stack.

The following sample outputs display installation of the CSCvo12166, CSCvo71912 and CSCvo00460 SMUs.

**Installation of CSCvo12166 SMU**

```bash
Switch# install add file tftp:cat9k_iosxe.16.09.02.CSCvo12166.SPA.smu.bin activate commit
```

**Installation of CSCvo71912 SMU**

```bash
Switch# install add file tftp:cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin activate commit
```
*Mar 23 00:05:55.630 PST: %INSTALL-5-INSTALL_START_INFO: Chassis 1 R1/0: install_engine:
Started install one-shot tftp://172.27.18.5/cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin[2]:
Finished copying to chassis 2
Info: Finished copying flash:cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin to the selected
chassis
Finished initial file syncing

Executing pre scripts....
Executing pre scripts done.
--- Starting SMU Add operation ---
Performing SMU_ADD on all members
  [1] SMU_ADD package(s) on chassis 1
  [1] Finished SMU_ADD on chassis 1
  [2] SMU_ADD package(s) on chassis 2
  [2] Finished SMU_ADD on chassis 2
Checking status of SMU_ADD on [1 2]
SMU_ADD: Passed on [1 2]
Finished SMU Add operation

install_add_activate_commit: Activating SMU
Executing pre scripts....
Executing pre scripts done.
--- Starting SMU Activate operation ---
Performing SMU_ACTIVATE on all members
  [1] SMU_ACTIVATE package(s) on chassis 1
  [1] Finished SMU_ACTIVATE on chassis 1
  [2] SMU_ACTIVATE package(s) on chassis 2
  [2] Finished SMU_ACTIVATE on chassis 2
Checking status of SMU_ACTIVATE on [1 2]
SMU_ACTIVATE: Passed on [1 2]
Finished SMU Activate operation

SUCCESS: install_add_activate_commit /flash/cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin Sat
Mar 23 00:06:15 PST 2019

Installation of CSCvo00460 SMU with ISSU

Switch# install add file tftp:cat9k_iosxe.16.09.02.CSCvo00460.SPA.smu.bin activate issu
commit
install_add_activate_commit: START Sat Mar 23 00:06:53 PST 2019
Downloading file tftp://172.27.18.5/cat9k_iosxe.16.09.02.CSCvo00460.SPA.smu.bin
Finished downloading file tftp://172.27.18.5/cat9k_iosxe.16.09.02.CSCvo00460.SPA.smu.bin
to flash:cat9k_iosxe.16.09.02.CSCvo00460.SPA.smu.bin
install_add_activate_commit: Adding ISSU
--- Starting initial file syncing ---
[1]: Copying flash:cat9k_iosxe.16.09.02.CSCvo00460.SPA.smu.bin from chassis 1 to chassis 2

*Mar 23 00:06:55.119 PST: %INSTALL-5-INSTALL_START_INFO: Chassis 1 R1/0: install_engine:
Started install one-shot ISSU
tftp://172.27.18.5/cat9k_iosxe.16.09.02.CSCvo00460.SPA.smu.bin[2]: Finished copying to
chassis 2
Info: Finished copying flash:cat9k_iosxe.16.09.02.CSCvo00460.SPA.smu.bin to the selected
chassis
Finished initial file syncing
--- Starting SMU Add operation ---
Performing SMU_ADD on all members
  [1] SMU_ADD package(s) on chassis 1
  [1] Finished SMU_ADD on chassis 1
  [2] SMU_ADD package(s) on chassis 2
  [2] Finished SMU_ADD on chassis 2
Checking status of SMU_ADD on [1 2]
SMU_ADD: Passed on {1 2}
Finished SMU Add operation

install_add_activate_commit: Activating ISSU
Executing pre scripts....
Executing pre scripts done.
install_add_activate_commit: Acquiring transaction lock...
--- Starting initial file syncing ---
[1]: Copying bootflash:.installer/issu_smu_one_time_sta from chassis 1 to chassis 2
[2]: Finished copying to chassis 2
Info: Finished copying bootflash:.installer/issu_smu_one_time_sta to the selected chassis
Finished initial file syncing

Done SMU ISSU prep. Now invoking ISSU state machine

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
---------------------------------------------------
Call SMU remote install function if required
STAGE 2: Restarting Standby
---------------------------------------------------
--- Starting standby reload ---
Finished standby reload
--- Starting wait for Standby to reach terminal redundancy state ---
*Mar 23 00:07:12.722 PST: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault (PEER_NOT_PRESENT)
*Mar 23 00:07:12.722 PST: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault (PEER_DOWN)
*Mar 23 00:07:12.722 PST: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault (PEER_REDUNDANCY_STATE_CHANGE)
(output truncated)
*Mar 23 00:15:48.248 PST: %LINEPROTO-5-UPDOWN: Line protocol on Interface TenGigabitEthernet2/1/0/48, changed state to up
*Mar 23 00:15:55.788 PST: %HA_CONFIG_SYNC-6-BULK_CFGSYNC_SUCCEED: Bulk Sync succeeded Finished wait for Standby to reach terminal redundancy state

*Mar 23 00:15:56.828 PST: %RF-5-RF_TERMINAL_STATE: Terminal state reached for (SSO)
STAGE 3: Installing software on Active
---------------------------------------------------
Call SMU install local function
*Mar 23 00:15:56.441 PST: %CMRP_PFU-6-PWR_MGMT_OK: Chassis 2 R1/0: cmand: Sufficient number of power supplies (1) are installed for power redundancy mode none (excess power 1574 watts).
STAGE 4: Restarting Active (switchover to standby)
---------------------------------------------------
--- Starting active reload ---
New software will load after reboot process is completed
SUCCESS: install_add_activate_commit /flash/cat9k_iosxe.16.09.02.CSCvo00460.SPA.smu.bin Sat Mar 23 00:15:59 PST 2019

UUT1#
*Mar 23 00:15:55.877 PST: %INSTALL-5-INSTALL_COMPLETED_INFO: Chassis 1 R1/0: install_engine: Completed install one-shot ISSU flash:cat9k_iosxe.16.09.02.CSCvo00460.SPA.smu.bin Chassis 1 reloading, reason - Reload command
*Mar 23 00:16:11.870: %PMAN-5-EXITACTION: R1/0: pvp: Process manager is exiting: reload fru action requested

Initializing Hardware...

System Bootstrap, Version 16.10.2r[FC1], RELEASE SOFTWARE (P)
Compiled Wed 11/28/2018 8:52:45.02 by rel

<output truncated>

*Mar 23 00:15:55.788 PST: %HA_CONFIG_SYNC-6-BULK_CFGSYNC_SUCCEED: Bulk Sync succeededFinished wait for Standby to reach terminal redundancy state

*Mar 23 00:15:56.828 PST: %RF-5-RF_TERMINAL_STATE: Terminal state reached for (SSO)
STAGE 3: Installing software on Active
-----------------------------------------------
Call SMU install local function

*Mar 23 00:15:56.441 PST: %CMRP_PFU-6-PWR_MGMT_OK: Chassis 2 R1/0: cmand: Sufficient number of power supplies (1) are installed for power redundancy mode none (excess power 1574 watts)
STAGE 4: Restarting Active (switchover to standby)
-----------------------------------------------
--- Starting active reload ---
New software will load after reboot process is completed
SUCCESS: install_add_activate_commit /flash/cat9k_iosxe.16.09.02.CSCvo00460.SPA.smu.bin Sat Mar 23 00:15:59 PST 2019

Step 4 show issu state [detail]
Use this command to verify that no ISSU process is in pending state.
The following is a sample output of the show issu state detail command after installation of the CSCvo12166, CSCvo71912 and CSCvo00460 SMUs.

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 show install summary
Use this command to verify if the SMU packages are installed properly.
The following sample output displays that the CSCvo12166, CSCvo71912 and CSCvo00460 SMUs have been installed on the switch.

Switch# show install summary
[ Chassis 1 2 ] Installed Package(s) Information:
State (St): I - Inactive, U - Activated & Uncommitted,
Step 6  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.

The following sample output displays the installation of the Cisco IOS XE Fuji 16.9.3 software image with ISSU procedure.

Switch# install add file tftp:cat9k_iosxe.16.09.03.SPA.bin activate issu commit
install_add_activate_commit: START Sat Mar 23 02:21:25 UTC 2019

Downloading file tftp://172.27.18.5/cat9k_iosxe.16.09.03.SPA.bin

*Mar 23 02:21:26.446: %INSTALL-5-INSTALL_START_INFO: Chassis 1 R0/0: install_engine: Started install one-shot ISSU tftp://172.27.18.5/cat9k_iosxe.16.09.03.SPA.binFinished downloading file tftp://172.27.18.5/cat9k_iosxe.16.09.03.SPA.bin to flash:cat9k_iosxe.16.09.03.SPA.bin

install_add_activate_commit: Adding ISSU

--- Starting initial file syncing ---
[1]: Copying flash:cat9k_iosxe.16.09.03.SPA.bin from chassis 1 to chassis 2
Info: Finished copying flash:cat9k_iosxe.16.09.03.SPA.bin to the selected chassis
Finished initial file syncing

--- Starting Add ---
Performing Add on all members
[1] Add package(s) on chassis 1
[1] Finished Add on chassis 1
[2] Add package(s) on chassis 2
[2] Finished Add on chassis 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 chassis 2
[2] Finished install_remote on chassis 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 ---
*Mar 23 02:27:20.503: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault (PEER_NOT_PRESENT)
*Mar 23 02:27:20.504: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault (PEER_DOWN)
*Mar 23 02:27:20.504: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault (PEER_REDUNDANCY_STATE_CHANGE)
*Mar 23 02:27:20.547: %IOSXE_OIR-6-REMCARD: Card (cc) removed from chassis 2 slot 1
*Mar 23 02:27:20.548: %IOSXE_OIR-6-REMCARD: Card (cc) removed from chassis 2 slot 2
*Mar 23 02:27:20.549: %IOSXE_OIR-6-REMCARD: Card (cc) removed from chassis 2 slot 3
*Mar 23 02:27:20.549: %IOSXE_OIR-6-REMCARD: Card (cc) removed from chassis 2 slot 4
*Mar 23 02:27:20.550: %IOSXE_PEM-6-REMPEM_FM: PEM/FM chassis 2 slot P1 removed
*Mar 23 02:27:20.551: %IOSXE_PEM-6-REMPEM_FM: PEM/FM chassis 2 slot P2 removed
*Mar 23 02:27:20.551: %IOSXE_PEM-6-REMPEM_FM: PEM/FM chassis 2 slot P3 removed
*Mar 23 02:27:20.551: %IOSXE_PEM-6-REMPEM_FM: PEM/FM chassis 2 slot P4 removed
*Mar 23 02:27:20.552: %IOSXE_PEM-6-REMPEM_FM: PEM/FM chassis 2 slot P9 removed
*Mar 23 02:27:20.557: %IOSXE_OIR-6-REMSPA: SPA removed from chassis 2 subslot 1/0, interfaces disabled
<output truncated>
*Mar 23 02:35:20.785: %HA_CONFIG_SYNC-6-BULK_CFGSYNC_SUCCEED: Bulk Sync succeeded
*Mar 23 02:35:20.877: %LINEPROTO-5-UPDOWN: Line protocol on Interface TenGigabitEthernet2/1/0/19, changed state to up
*Mar 23 02:35:21.826: %RF-5-RF_TERMINAL_STATE: Terminal state reached for (SSO)Finished

wait for Standby to reach terminal redundancy state

STAGE 3: Installing software on Active
===================================================
--- Starting install_active ---
Performing install_active on Chassis 1
[1] install_active package(s) on chassis 1
[1] Finished install_active on chassis 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  Sat Mar 23 02:36:25 UTC 2019

Switch#

*Mar 23 02:36:25.774: %INSTALL-5-INSTALL_COMPLETED_INFO: Chassis 1 R0/0: install_engine: Completed install one-shot ISSU flash:cat9k_iosxe.16.09.03.SPA.bin Chassis 1 reloading, reason - Reload command

Mar 23 02:36:38.066: %PMAN-5-EXITACTION: R0/0: pvp: Process manager is exiting: reload fru action requested

Initializing Hardware...

System Bootstrap, Version 16.10.2r[FC1], RELEASE SOFTWARE (P)

<output truncated>

--- Starting local lock acquisition on chassis 1 ---
Finished local lock acquisition on chassis 1
No ISSU operation is in progress

Switch#

Step 7 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 Fuji 16.9.3 image on the device:

Switch# Cisco IOS XE Software, Version 16.09.03
Cisco IOS Software (Fuj), Catalyst L3 Switch Software (CAT9K_IOSXE), Version 16.9.3, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2019 by Cisco Systems, Inc.
Compiled Wed 20-Mar-19 08:02 by mcpre

Step 8 show issu state [detail]

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

The following is a sample output of show issu state detail after installation of the software image with ISSU.

Switch# show issu state detail
--- Starting local lock acquisition on chassis 1 ---
Finished local lock acquisition on chassis 1
No ISSU operation is in progress

Switch#

Step 9 exit

Exits privileged EXEC mode and returns to user EXEC mode.
Downgrading with In Service Software Upgrade (ISSU) with Cisco StackWise Virtual

Follow these instructions to perform ISSU downgrade from Cisco IOS XE Fuji 16.9.3 to Cisco IOS XE Fuji 16.9.2 when the supervisor modules are installed in the lower slot of the chassis, in install mode with Cisco StackWise Virtual.

Note

Downgrade with ISSU is not supported when the supervisor modules are installed in the higher slot of the chassis (Slot 3 for Catalyst 9404R Switch, Slot 4 for Catalyst 9407R Switch)

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 downgrade procedures, including downloading the images to both the switches, expanding the images into packages, and downgrading each switch as per the procedures.

Switch# install add file tftp:cat9k_iosxe.16.09.02.SPA.bin activate issu commit

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 Fuji 16.9.2 image on the device:

Switch# show version
Cisco IOS XE Software, Version 16.09.02
Cisco IOS Software (Fuji), Catalyst L3 Switch Software (CAT9K_IOSXE), Version 16.9.2, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2019 by Cisco Systems, Inc.
Compiled Wed 20-Mar-19 08:02 by mcpree

Step 4 exit
Exits privileged EXEC mode and returns to user EXEC mode.

Upgrading in Install Mode

Follow these instructions to upgrade from one release to another, in install mode.

Before you begin
Note that you can use this procedure for the following upgrade scenarios.
When upgrading from...

Permitted Supervisor Setup
(Applies to the release you are upgrading from)

First upgrade to...

To upgrade to ...

<table>
<thead>
<tr>
<th>Cisco IOS XE Everest 16.6.1⁴</th>
<th>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.</th>
<th>Cisco IOS XE Everest 16.6.3</th>
<th>Cisco IOS XE Fuji 16.x.x</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note</td>
<td>Do not simultaneously upgrade dual supervisors from Cisco IOS XE Everest 16.6.1 to a later release. Doing so may cause hardware damage.</td>
<td>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</td>
<td></td>
</tr>
<tr>
<td>Cisco IOS XE Everest 16.6.2 and later releases</td>
<td>This procedure automatically copies the images to both active and standby supervisor modules. Both supervisor modules are simultaneously upgraded.</td>
<td>Not applicable</td>
<td></td>
</tr>
</tbody>
</table>

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

---

**Caution**

- Do not power cycle your switch during an upgrade.
- Do not disconnect power or remove the supervisor module during an upgrade.
- 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 OIR of a switching module (linecard) when the switch is booting up.

The sample output in this section displays upgrade from Cisco IOS XE Everest 16.6.3 to Cisco IOS XE Fuji 16.9.1 using **install** commands.

**Procedure**

**Step 1** Clean Up
a) **install remove inactive**

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

Switch# **install remove inactive**

install_remove: START Tue Jul 10 14:14:40 PDT 2018
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.16.06.03.SPA.pkg
File is in use, will not delete.
cat9k-espbase.16.06.03.SPA.pkg
File is in use, will not delete.
cat9k-rpbase.16.06.03.SPA.pkg
File is in use, will not delete.
cat9k-rpboot.16.06.03.SPA.pkg
File is in use, will not delete.
cat9k-sipbase.16.06.03.SPA.pkg
File is in use, will not delete.
cat9k-sipspa.16.06.03.SPA.pkg
File is in use, will not delete.
cat9k-srdriver.16.06.03.SPA.pkg
File is in use, will not delete.
cat9k-webui.16.06.03.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.16.06.03.SPA.pkg
/flash/cat9k-espbase.16.06.03.SPA.pkg
/flash/cat9k-rpbase.16.06.03.SPA.pkg
/flash/cat9k-rpboot.16.06.03.SPA.pkg
/flash/cat9k-sipbase.16.06.03.SPA.pkg
/flash/cat9k-sipspa.16.06.03.SPA.pkg
/flash/cat9k-srdriver.16.06.03.SPA.pkg
/flash/cat9k-webui.16.06.03.SPA.pkg
/flash/cat9k_1.bin
/flash/cat9k_1.conf
/flash/cat9k_2.1.conf
/flash/cat9k_2.bin
/flash/cat9k_2.conf
/flash/cat9k_iosxe.16.06.03.SPA.bin
/flash/packages.conf.00-

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

[R0]:
Deleting file flash:cat9k-cc_srdriver.16.06.03.SPA.pkg ... done.
Deleting file flash:cat9k-espbase.16.06.03.SPA.pkg ... done.
Deleting file flash:cat9k-rpbase.16.06.03.SPA.pkg ... done.
Deleting file flash:cat9k-rpboot.16.06.03.SPA.pkg ... done.
Deleting file flash:cat9k-sipbase.16.06.03.SPA.pkg ... done.
Deleting file flash:cat9k-sipspa.16.06.03.SPA.pkg ... done.
Deleting file flash:cat9k-srdriver.16.06.03.SPA.pkg ... done.
Deleting file flash:cat9k-webui.16.06.03.SPA.pkg ... done.
Deleting file flash:cat9k_1.bin ... done.
Deleting file flash:cat9k_1.conf ... done.
Deleting file flash:cat9k_2.1.conf ... done.
Deleting file flash:cat9k_2.bin ... done.
Deleting file flash:cat9k_2.bin ... done.
Deleting file flash:cat9k_2.conf ... done.
Deleting file flash:cat9k_iosxe.16.06.03.SPA.bin ... done.
Deleting file flash:packages.conf.00- ... done.
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 Tue Jul 10 14:16:29 PDT 2018
Switch#

Step 2  Copy new image to flash
a) copy tftp: flash:

Use this command to copy the new image to flash: (or skip this step if you want to use the new image from your TFTP server)

Switch# copy tftp://10.8.0.6//cat9k_iosxe.16.09.01.SPA.bin flash:

Destination filename [cat9k_iosxe.16.09.01.SPA.bin]?
Accessing tftp://10.8.0.6//cat9k_iosxe.16.09.01.SPA.bin...
Loading /cat9k_iosxe.16.09.01.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 10 2018 10:18:11 -07:00 cat9k_iosxe.16.09.01.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
Switch(config)# exit

b) write memory

Use this command to save boot settings.

Switch# write memory

c) show boot system

Use this command to verify the boot variable is set to flash:packages.conf.
Step 4  Software install image to flash
a)  install add file activate commit

Use this command to install the target image to flash. 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.16.09.01.SPA.bin activate commit
```

install_add_activate_commit: START Tue Jul 10 22:49:41 UTC 2018

*Jul 10 22:49:42.772: %IOSXE-5-PLATFORM: Switch 1 R0/0: Jul 10 22:49:42 install_engine.sh:

%INSTALL-5-INSTALL_START_INFO: Started install one-shot
flash:cat9k_iosxe.16.09.01.SPA.bin
install_add_activate_commit: Adding PACKAGE

--- Starting initial file syncing ---
Info: Finished copying flash:cat9k_iosxe.16.09.01.SPA.bin to the selected switch(es)
Finished initial file syncing

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

install_add_activate_commit: Activating PACKAGE

/flash/cat9k-webui.16.09.01.SPA.pkg
/flash/cat9k-srdriver.16.09.01.SPA.pkg
/flash/cat9k-sipspa.16.09.01.SPA.pkg
/flash/cat9k-sipbase.16.09.01.SPA.pkg
/flash/cat9k-rpboot.16.09.01.SPA.pkg
/flash/cat9k-rpbase.16.09.01.SPA.pkg
/flash/cat9k-guestshell.16.09.01.SPA.pkg
/flash/cat9k-espbase.16.09.01.SPA.pkg
/flash/cat9k-cc_srdriver.16.09.01.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.16.09.01.SPA.pkg
/flash/cat9k-srdriver.16.09.01.SPA.pkg
/flash/cat9k-sipspa.16.09.01.SPA.pkg
/flash/cat9k-sipbase.16.09.01.SPA.pkg
/flash/cat9k-rpboot.16.09.01.SPA.pkg
/flash/cat9k-rpbase.16.09.01.SPA.pkg
/flash/cat9k-guestshell.16.09.01.SPA.pkg
/flash/cat9k-espbase.16.09.01.SPA.pkg
/flash/cat9k-cc_srdriver.16.09.01.SPA.pkg

Tue Jul 10 22:53:58 UTC 2018
Switch#

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

b) dir flash:

After the software has been successfully installed, use this command to verify that the flash partition has nine new .pkg files and three .conf files.

Switch# dir flash:

Directory of flash:/

475140 -rw- 2012104 Jul 26 2017 09:52:41 -07:00 cat9k-cc_srdriver.16.06.03.SPA.pkg
475141 -rw- 7033380 Jul 26 2017 09:52:44 -07:00 cat9k-espbase.16.06.03.SPA.pkg
475142 -rw- 13256 Jul 26 2017 09:52:44 -07:00 cat9k-guestshell.16.06.03.SPA.pkg
475143 -rw- 34963524 Jul 26 2017 09:52:54 -07:00 cat9k-rpbase.16.06.03.SPA.pkg
475149 -rw- 24248187 Jul 26 2017 09:53:02 -07:00 cat9k-rpboot.16.06.03.SPA.pkg
475144 -rw- 25285572 Jul 26 2017 09:52:55 -07:00 cat9k-sipbase.16.06.03.SPA.pkg
475145 -rw- 20947908 Jul 26 2017 09:52:55 -07:00 cat9k-sipspa.16.06.03.SPA.pkg
475147 -rw- 13284288 Jul 26 2017 09:52:56 -07:00 cat9k-webui.16.06.03.SPA.pkg
475148 -rw- 13248 Jul 26 2017 09:52:56 -07:00 cat9k-wlc.16.06.03.SPA.pkg

491524 -rw- 25711568 Jul 10 2018 11:49:33 -07:00 cat9k-cc_srdriver.16.09.01.SPA.pkg
491525 -rw- 78484428 Jul 10 2018 11:49:35 -07:00 cat9k-espbase.16.09.01.SPA.pkg
491526 -rw- 1598412 Jul 10 2018 11:49:35 -07:00 cat9k-guestshell.16.09.01.SPA.pkg
491527 -rw- 404153288 Jul 10 2018 11:49:47 -07:00 cat9k-rpbase.16.09.01.SPA.pkg
491533 -rw- 31657374 Jul 10 2018 11:50:09 -07:00 cat9k-rpboot.16.09.01.SPA.pkg
491528 -rw- 27681740 Jul 10 2018 11:49:48 -07:00 cat9k-sipbase.16.09.01.SPA.pkg
491529 -rw- 52224968 Jul 10 2018 11:49:49 -07:00 cat9k-sipspa.16.09.01.SPA.pkg
491530 -rw- 31130572 Jul 10 2018 11:49:50 -07:00 cat9k-srdriver.16.09.01.SPA.pkg
491531 -rw- 14783432 Jul 10 2018 11:49:51 -07:00 cat9k-webui.16.09.01.SPA.pkg
491532 -rw- 9160 Jul 10 2018 11:49:51 -07:00 cat9k-wlc.16.09.01.SPA.pkg

11353194496 bytes total (9544245248 bytes free)
Switch#

The following sample output displays the .conf files in the flash partition; note the three .conf files:

• packages.conf—the file that has been re-written with the newly installed .pkg files
• packages.conf.00—backup file of the previously installed image
• cat9k_iosxe.16.09.01.SPA.conf—a copy of packages.conf and not used by the system.

Switch# dir flash:*.conf

Directory of flash:/*.conf
Directory of flash:/
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:

Step 5  
Reload  
a)  `reload`  
Use this command to reload the switch.

Switch# reload

b)  `boot flash:`  
If your switches are configured with auto boot, then the stack will automatically boot up with the new image. If not, you can manually boot `flash:packages.conf`

Switch: boot flash:packages.conf

c)  `show version`  
After the image boots up, use this command to verify the version of the new image.

Note  When you boot the new image, the boot loader is automatically updated, but the new bootloader version is not displayed in the output until the next reload.

The following sample output of the `show version` command displays the Cisco IOS XE Fuji 16.9.1 image on the device:

Switch# show version  
Cisco IOS XE Software, Version 16.09.01  
Cisco IOS Software [Fuji], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 16.9.1, RELEASE SOFTWARE (fc1)  
Technical Support: http://www.cisco.com/techsupport  
Copyright (c) 1986-2018 by Cisco Systems, Inc.  
Compiled Tue 10-Jul-18 07:45 by mcppre
When downgrading from ... | Permitted Supervisor Setup | To ...
---|---|---
Cisco IOS XE Fuji 16.9.3 | This procedure automatically copies the images to both active and standby supervisor modules. Both supervisor modules are simultaneously downgraded. **Note** Do not perform an Online Removal and Replacement (OIR) of either supervisor module during the process. | Cisco IOS XE Fuji 16.9.x or Cisco IOS XE Fuji 16.8.x or Cisco IOS XE Everest 16.x.x

The sample output in this section shows downgrade from Cisco IOS XE Fuji 16.9.1 to Cisco IOS XE Everest 16.6.2, using `install` commands.

**Important** New hardware models (supervisors or line card modules) that are introduced in a release cannot be downgraded. For instance, if a new model is first introduced in Cisco IOS XE Fuji 16.8.1a, this is the minimum software version for the model. We recommend upgrading all existing hardware to the same release as the latest hardware.

**Procedure**

**Step 1** Clean Up

a) `install remove inactive`

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

```
Switch# install remove inactive
install_remove: START Tue Jul 10 14:14:40 PDT 2018
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.16.09.01.SPA.pkg File is in use, will not delete.
cat9k-espbase.16.09.01.SPA.pkg File is in use, will not delete.
cat9k-guestshell.16.09.01.SPA.pkg File is in use, will not delete.
cat9k-rpbase.16.09.01.SPA.pkg File is in use, will not delete.
cat9k-rpboot.16.09.01.SPA.pkg File is in use, will not delete.
cat9k-sipbase.16.09.01.SPA.pkg File is in use, will not delete.
cat9k-sipspa.16.09.01.SPA.pkg File is in use, will not delete.
cat9k-srdriver.16.09.01.SPA.pkg File is in use, will not delete.
cat9k-webui.16.09.01.SPA.pkg
```

---

Release Notes for Cisco Catalyst 9400 Series Switches, Cisco IOS XE Fuji 16.9.x
Downgrading in Install Mode

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.16.09.01.SPA.pkg
/flash/cat9k-espbase.16.09.01.SPA.pkg
/flash/cat9k-guestshell.16.09.01.SPA.pkg
/flash/cat9k-rpbase.16.09.01.SPA.pkg
/flash/cat9k-rpboot.16.09.01.SPA.pkg
/flash/cat9k-sipbase.16.09.01.SPA.pkg
/flash/cat9k-sipspa.16.09.01.SPA.pkg
/flash/cat9k-srdriver.16.09.01.SPA.pkg
/flash/cat9k-webui.pkg
/flash/cat9k_1.bin
/flash/cat9k_1.conf
/flash/cat9k_2.1.conf
/flash/cat9k_2.bin
/flash/cat9k_2.conf
/flash/cat9k_iosxe.16.09.01.SSA.bin
/flash/packages.conf.00-

Do you want to remove the above files? [y/n]y
[R0]:
Deleting file flash:cat9k-cc_srdriver.16.09.01.SPA.pkg ... done.
Deleting file flash:cat9k-espbase.16.09.01.SPA.pkg ... done.
Deleting file flash:cat9k-guestshell.16.09.01.SPA.pkg ... done.
Deleting file flash:cat9k-rpbase.16.09.01.SPA.pkg ... done.
Deleting file flash:cat9k-rpboot.16.09.01.SPA.pkg ... done.
Deleting file flash:cat9k-sipbase.16.09.01.SPA.pkg ... done.
Deleting file flash:cat9k-sipspa.16.09.01.SPA.pkg ... done.
Deleting file flash:cat9k-srdriver.16.09.01.SPA.pkg ... done.
Deleting file flash:cat9k-webui.16.09.01.SPA.pkg ... done.
Deleting file flash:cat9k_1.bin ... done.
Deleting file flash:cat9k_1.conf ... done.
Deleting file flash:cat9k_2.1.conf ... done.
Deleting file flash:cat9k_2.bin ... done.
Deleting file flash:cat9k_2.conf ... done.
Deleting file flash:cat9k_iosxe.16.09.01.bin ... done.
Deleting file flash:packages.conf.00- ... done.
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 Tue Jul 10 14:16:29 PDT 2018
Switch#

Step 2 Copy new image to flash
a) copy tftp: flash:
Use this command to copy the new image to flash: (or skip this step if you want to use the new image from your TFTP server)

Switch# copy tftp://10.8.0.6//cat9k_iosxe.16.06.02.SPA.bin flash:
Destination filename [cat9k_iosxe.16.06.02.SPA.bin]?
Accessing tftp://10.8.0.6/cat9k_iosxe.16.06.02.SPA.bin...
Loading /cat9k_iosxe.16.06.02.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 Tue Jul 10 2018 13:35:16 -07:00 cat9k_iosxe.16.06.02.SPA.bin
11353194496 bytes total (9055866880 bytes free)

Step 3  Downgrade software image

• install add file activate commit
• install rollback to committed

The following example displays the installation of the cat9k_iosxe.16.06.02.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:
Switch# install add file flash:cat9k_iosxe.16.06.02.SPA.bin activate commit

install_add_activate_commit: START Tue Jul 10 22:49:41 UTC 2018

*Jul 10 22:49:42.772: %IOSXE-5-PLATFORM: Switch 1 R0/0: Jul 10 22:49:42 install_engine.sh: %INSTALL-5-INSTALL_START_INFO: Started install one-shot
flash:cat9k_iosxe.16.06.02.SPA.bin install_add_activate_commit: Adding PACKAGE

--- Starting initial file syncing ---
Info: Finished copying flash:cat9k_iosxe.16.06.02.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.16.06.02.SPA.pkg
/flash/cat9k-srdriver.16.06.02.SPA.pkg
/flash/cat9k-sipspga.16.06.02.SPA.pkg
/flash/cat9k-sipbase.16.06.02.SPA.pkg
/flash/cat9k-rpboot.16.06.02.SPA.pkg
/flash/cat9k-rpbase.16.06.02.SPA.pkg
/flash/cat9k-espbase.16.06.02.SPA.pkg
/flash/cat9k-cc_srdriver.16.06.02.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
/install_add_activate_commit
Switch# install rollback to committed
Switch# install rollback to committed
install_rollback: START Tue Jul 10 14:24:56 UTC 2018
This operation requires a reload of the system. Do you want to proceed? [y/n]

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

Important You 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
Switch# install rollback to committed
install_rollback: START Tue Jul 10 14:24:56 UTC 2018
This operation requires a reload of the system. Do you want to proceed? [y/n]

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.16.09.01.SPA.pkg
Current : rp 1 0 rp_boot cat9k-rpboot.16.09.01.SPA.pkg
Replacement: rp 0 0 rp_boot cat9k-rpboot.16.06.02.SPA.pkg
Replacement: rp 1 0 rp_boot cat9k-rpboot.16.06.02.SPA.pkg
Current : cc 0 0 cc_srdriver cat9k-cc_srdriver.16.09.01.SPA.pkg
Current : cc 0 0 cc cat9k-sipbase.16.09.01.SPA.pkg
Current : cc 0 0 cc_spa cat9k-sipspa.16.09.01.SPA.pkg
Current : cc 1 0 cc_srdriver cat9k-cc_srdriver.16.09.01.SPA.pkg
Current : cc 0 0 cc cat9k-sipbase.16.09.01.SPA.pkg
Current : cc 1 0 cc_spa cat9k-sipspa.16.09.01.SPA.pkg
Current : cc 10 0 cc cat9k-sipbase.16.09.01.SPA.pkg
<table>
<thead>
<tr>
<th>Release Notes for Cisco Catalyst 9400 Series Switches, Cisco IOS XE Fuji 16.9.x</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current: cc 10  cc_spa cat9k-sipspa.16.09.01.SPA.pkg</td>
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<tr>
<td>Current: cc 10  cc_srdriver cat9k-cc_srdriver.16.09.01.SPA.pkg</td>
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<td>Current: cc 2  cc_srdriver cat9k-cc_srdriver.16.09.01.SPA.pkg</td>
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<td>Current: cc 3  cc_srdriver cat9k-cc_srdriver.16.09.01.SPA.pkg</td>
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<td>Current: cc 3  cc cat9k-sipbase.16.09.01.SPA.pkg</td>
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<td>Current: cc 4  cc_srdriver cat9k-cc_srdriver.16.09.01.SPA.pkg</td>
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<td>Current: cc 4  cc cat9k-sipbase.16.09.01.SPA.pkg</td>
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<td>Current: cc 5  cc_srdriver cat9k-cc_srdriver.16.09.01.SPA.pkg</td>
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<td>Current: cc 5  cc_spa cat9k-sipspa.16.09.01.SPA.pkg</td>
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<td>Current: cc 6  cc_srdriver cat9k-cc_srdriver.16.09.01.SPA.pkg</td>
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<td>Current: cc 6  cc cat9k-sipbase.16.09.01.SPA.pkg</td>
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<td>Current: cc 6  cc_spa cat9k-sipspa.16.09.01.SPA.pkg</td>
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<td>Current: cc 7  cc_srdriver cat9k-cc_srdriver.16.09.01.SPA.pkg</td>
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<td>Current: cc 7  cc cat9k-sipbase.16.09.01.SPA.pkg</td>
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<td>Current: cc 7  cc_spa cat9k-sipspa.16.09.01.SPA.pkg</td>
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<tr>
<td>Current: cc 8  cc_srdriver cat9k-cc_srdriver.16.09.01.SPA.pkg</td>
</tr>
<tr>
<td>Current: cc 8  cc cat9k-sipbase.16.09.01.SPA.pkg</td>
</tr>
<tr>
<td>Current: cc 8  cc_spa cat9k-sipspa.16.09.01.SPA.pkg</td>
</tr>
<tr>
<td>Current: cc 9  cc_srdriver cat9k-cc_srdriver.16.09.01.SPA.pkg</td>
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<td>Current: cc 9  cc cat9k-sipbase.16.09.01.SPA.pkg</td>
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<td>Current: cc 9  cc_spa cat9k-sipspa.16.09.01.SPA.pkg</td>
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<tr>
<td>Current: fp 0  fp cat9k-espbase.16.09.01.SPA.pkg</td>
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<td>Current: fp 1  fp cat9k-espbase.16.09.01.SPA.pkg</td>
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<tr>
<td>Current: rp 0  guestshell cat9k-guestshell.16.09.01.SPA.pkg</td>
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<tr>
<td>Current: rp 0  rp_base cat9k-rpbase.16.09.01.SPA.pkg</td>
</tr>
<tr>
<td>Current: rp 0  rp_daemons cat9k-rpbase.16.09.01.SPA.pkg</td>
</tr>
<tr>
<td>Current: rp 0  rp_iosd cat9k-rpbase.16.09.01.SPA.pkg</td>
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<tr>
<td>Current: rp 0  rp_security cat9k-rpbase.16.09.01.SPA.pkg</td>
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<tr>
<td>Current: rp 0  rp_webui cat9k-webui.16.09.01.SPA.pkg</td>
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<td>Current: rp 0  rp_wlc cat9k-wlc.16.09.01.SPA.pkg</td>
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<td>Current: rp 0  srdriver cat9k-srdriver.16.09.01.SPA.pkg</td>
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<td>Current: rp 1  guestshell cat9k-guestshell.16.09.01.SPA.pkg</td>
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<tr>
<td>Replacement: cc 0  cc_srdriver cat9k-cc_srdriver.16.06.02.SPA.pkg</td>
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Replacement: cc 6 0 cc cat9k-sipbase.16.06.02.SPA.pkg
Replacement: cc 6 0 cc_spa cat9k-sipspa.16.06.02.SPA.pkg
Replacement: cc 7 0 cc srdriver cat9k-cc_srdriver.16.06.02.SPA.pkg
Replacement: cc 7 0 cc cat9k-sipbase.16.06.02.SPA.pkg
Replacement: cc 7 0 cc_spa cat9k-sipspa.16.06.02.SPA.pkg
Replacement: cc 8 0 cc_srdriver cat9k-cc_srdriver.16.06.02.SPA.pkg
Replacement: cc 8 0 cc cat9k-sipbase.16.06.02.SPA.pkg
Replacement: cc 8 0 cc_spa cat9k-sipspa.16.06.02.SPA.pkg
Replacement: cc 9 0 cc_srdriver cat9k-cc_srdriver.16.06.02.SPA.pkg
Replacement: cc 9 0 cc cat9k-sipbase.16.06.02.SPA.pkg
Replacement: cc 9 0 cc_spa cat9k-sipspa.16.06.02.SPA.pkg
Replacement: fp 0 0 fp cat9k-espbase.16.06.02.SPA.pkg
Replacement: fp 0 0 fp cat9k-espbase.16.06.02.SPA.pkg
Replacement: rp 0 0 guestshell cat9k-guestshell.16.06.02.SPA.pkg
Replacement: rp 0 0 rp_base cat9k-rpbase.16.06.02.SPA.pkg
Replacement: rp 0 0 rp_daemons cat9k-rpbase.16.06.02.SPA.pkg
Replacement: rp 0 0 rp_i osd cat9k-rpbase.16.06.02.SPA.pkg
Replacement: rp 0 0 rp_security cat9k-rpbase.16.06.02.SPA.pkg
Replacement: rp 0 0 rp_webui cat9k-webui.16.06.02.SPA.pkg
Replacement: rp 0 0 srdriver cat9k-srdriver.16.06.02.SPA.pkg
Replacement: rp 1 0 guestshell cat9k-guestshell.16.06.02.SPA.pkg
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Replacement: rp 1 0 rp_security cat9k-rpbase.16.06.02.SPA.pkg
Replacement: rp 1 0 rp_webui cat9k-webui.16.06.02.SPA.pkg
Replacement: rp 1 0 srdriver cat9k-srdriver.16.06.02.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 Tue Jul 10 14:26:35 UTC 2018

Switch:
*Mar 16 14:26:35.880: %IOSXE-5-PLATFORM: R0/0: Mar 16 14:26:35 install_engine.sh:
%INSTALL-5-INSTALL_COMPLETED_INFO: Completed install rollback PACKAGE
*Mar 16 14:26:37.740: %IOSXE_OIR-6-REMCARD: Card (rp) removed from slot R1
*Mar 16 14:26:39.253: %IOSXE_OIR-6-INSCARD: Card (rp) inserted in slot R1

Initializing Hardware...
System Bootstrap, Version 16.8.1r[FC1], RELEASE SOFTWARE (F)
Compiled Tue 10/31/2017 11:38:44.98 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"

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cisco Systems, Inc.
170 West Tasman Drive
San Jose, California 95134-1706

Cisco IOS Software [Everest], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 16.6.2, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
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Compiled Sat 22-Jul-17 05:51 by mcpre

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

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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:.
Step 4 Reload

a) boot flash:

If your switches are configured with auto boot, then the stack will automatically boot up with the new image. If not, you can manually boot flash:packages.conf

Switch: boot flash:packages.conf

Note When you downgrade the software image, the boot loader does not automatically downgrade. It remains updated.

b) show version

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

Note When you boot the new image, the boot loader is automatically updated, but the new bootloader version is not displayed in the output until the next reload.

The following sample output of the show version command displays the Cisco IOS XE Everest 16.6.2 image on the device:

Switch# show version
Cisco IOS XE Software, Version 16.06.02
Cisco IOS Software (Everest), Catalyst L3 Switch Software (CAT9K_IOSXE), Version 16.6.1, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2017 by Cisco Systems, Inc.
Compiled Tue 10-Jul-18 06:38 by mcpre
<output truncated>

Licensing

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

License Levels

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

Base Licenses

• Network Essentials

• Network Advantage—Includes features available with the Network Essentials license and more.
Add-On Licenses

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

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

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

License Types

The following license types are available:

- Permanent—for a license level, and without an expiration date.
- Term—for a license level, and for a three, five, or seven year period.
- Evaluation—a license that is not registered.

License Levels - Usage Guidelines

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

<table>
<thead>
<tr>
<th></th>
<th>DNA Essentials</th>
<th>DNA Advantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Essentials</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Network Advantage</td>
<td>Yes(^5)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

\(^5\) You will be able to purchase this combination only at the time of the DNA license renewal and not when you purchase DNA-Essentials the first time.

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

Cisco Smart Licensing is a unified license management system that manages all the software licenses across Cisco products.

It enables you to purchase, deploy, manage, track and renew Cisco Software. It provides information about license ownership and consumption through a single user interface.

The solution is composed of Smart Accounts and Cisco Smart Software Manager. The former is an online account of your Cisco software assets and is required to use the latter. Cisco Smart Software Manager is where you can perform all your licensing management related tasks, such as, registering, de-registering, moving, and transferring licenses. Users can be added and given access and permissions to the smart account and specific virtual accounts.

---

Important

Cisco Smart Licensing is the default and the only available method to manage licenses.

Deploying Smart Licensing

The following provides a process overview of a day 0 to day N deployment directly initiated from a device that is running Cisco IOS XE Fuji 16.9.1 or later releases. Links to the configuration guide provide detailed information to help you complete each one of the smaller tasks.

Procedure

Step 1

Begin by establishing a connection from your network to Cisco Smart Software Manager on cisco.com.

In the software configuration guide of the required release, see System Management → Configuring Smart Licensing → Connecting to CSSM

Step 2

Create and activate your Smart Account, or login if you already have one.

To create and activate Smart Account, go to Cisco Software Central → Create Smart Accounts. Only authorized users can activate the Smart Account.

Step 3

Complete the Cisco Smart Software Manager set up.

a) Accept the Smart Software Licensing Agreement.

b) Set up the required number of Virtual Accounts, users and access rights for the virtual account users.

   Virtual accounts help you organize licenses by business unit, product type, IT group, and so on.

c) Generate the registration token in the Cisco Smart Software Manager portal and register your device with the token.

   In the software configuration guide of the required release, see System Management → Configuring Smart Licensing → Registering the Device in CSSM

With this,

• The device is now in an authorized state and ready to use.
The licenses that you have purchased are displayed in your Smart Account.

**How Upgrading or Downgrading Software Affects Smart Licensing**

Starting from Cisco IOS XE Fuji 16.9.1, Smart Licensing is the default and only license management solution; all licenses are managed as Smart Licenses.

Starting from Cisco IOS XE Fuji 16.9.1, the Right-To-Use (RTU) licensing mode is deprecated, and the associated `license right-to-use` command is no longer available on the CLI.

Note how upgrading to a release that supports Smart Licensing or moving to a release that does not support Smart Licensing affects licenses on a device:

- **When you upgrade from an earlier release to one that supports Smart Licensing**—all existing licenses remain in evaluation mode until registered in Cisco Smart Software Manager. After registration, they are made available in your Smart Account.

  In the *software configuration guide* of the required release, see *System Management → Configuring Smart Licensing → Registering the Device in CSSM*

- **When you downgrade to a release where Smart Licensing is not supported**—all smart licenses on the device are converted to traditional licenses and all smart licensing information on the device is removed.

**Using Smart Licensing on an Out-of-the-Box Device**

Starting from Cisco IOS XE Fuji 16.9.1, if an out-of-the-box device has the software version factory-provisioned, all licenses on such a device remain in evaluation mode until registered in Cisco Smart Software Manager.

In the *software configuration guide* of the required release, see *System Management → Configuring Smart Licensing → Registering the Device in CSSM*

**Scaling Guidelines**

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


**Limitations and Restrictions**

- Cisco Catalyst 9400 Series 3200W DC Power Supply—The power supply module operates normally as long as DC input voltage is within the full input range (-40 to -75VDC). However, if the input voltage range is beyond the -51 to -57VDC range, Cisco IOS software displays the Capacity field as n.a (the...
show power command). This issue exists in the Cisco IOS XE Fuji 16.9.1 and Cisco IOS XE Fuji 16.9.2 releases; it is corrected in all the later releases of Cisco IOS XE Fuji 16.9.x train.

- Cisco TrustSec restrictions—Cisco TrustSec can be configured only on physical interfaces, not on logical interfaces.

- 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.

- 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 switched virtual interfaces (SVIs), port-channel, 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:
  - When you use Cisco QSFP-4SFP10G-CUxM Direct-Attach Copper Cables, autonegotiation is enabled by default. If the other end of the line does not support autonegotiation, the link does not come up.

- Interoperability limitations:
  - When you use Cisco QSFP-4SFP10G-CUxM Direct-Attach Copper Cables, if one end of the 40G link is a Catalyst 9400 Series Switch and the other end is a Catalyst 9500 Series Switch, the link does not come up, or comes up on one side and stays down on the other. To avoid this interoperability issue between devices, apply the 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 nonegotiate command.

- Memory leak—When a logging discriminator is configured and applied to a device, memory leak is seen under heavy syslog or debug output. The rate of the leak is dependent on the quantity of logs produced. In extreme cases, the device may fail. As a workaround, disable the logging discriminator on the device.

- 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%.
  - For QoS policies, only switched virtual interfaces (SVI) are supported for logical interfaces.
  - QoS policies are not supported for port-channel interfaces, tunnel interfaces, and other logical interfaces.

- Redundancy—The supervisor module (hardware) supports redundancy. Software redundancy is supported starting with Cisco IOS XE Everest 16.6.2. However, the associated route processor redundancy (RPR) feature is not supported.
Before performing a switchover, use the `show redundancy`, `show platform`, and `show platform software iomd redundancy` commands to ensure that both the SSOs have formed and that the IOMD process is completed.

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

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

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

Current Processor Information :
------------------------------------------
Active Location = slot 3
Current Software state = ACTIVE
Uptime in current state = 2 hours, 57 minutes
Image Version = Cisco IOS Software [Fuji], Catalyst L3 Switch Software (CAT9K_IOSXE),
Version 16.8.1, RELEASE SOFTWARE (fc3)
Technical Support: http://www.cisco.com/techsupport
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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` command, note that both SSOs have formed and the `HA_STATE` field is ready.

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

<table>
<thead>
<tr>
<th>slot</th>
<th>PSM STATE</th>
<th>SPA INTF</th>
<th>HA_STATE</th>
<th>HA_ACTIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ready</td>
<td>started</td>
<td>ready</td>
<td>00:01:16</td>
</tr>
<tr>
<td>2</td>
<td>ready</td>
<td>started</td>
<td>ready</td>
<td>00:01:22</td>
</tr>
<tr>
<td>3</td>
<td>ready</td>
<td>started</td>
<td>ready</td>
<td>00:01:27 ***active RP</td>
</tr>
<tr>
<td>4</td>
<td>ready</td>
<td>started</td>
<td>ready</td>
<td>00:01:27</td>
</tr>
</tbody>
</table>
```

<output truncated>
In the following sample output for the `show platform software iomd redundancy` 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 software iomd redundancy
Chassis type: C9407R

<table>
<thead>
<tr>
<th>Slot</th>
<th>Type</th>
<th>State</th>
<th>Insert time (ago)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>C9400-LC-24XS</td>
<td>ok</td>
<td>3d09h</td>
</tr>
<tr>
<td>2</td>
<td>C9400-LC-48U</td>
<td>ok</td>
<td>3d09h</td>
</tr>
<tr>
<td>R0</td>
<td>C9400-SUP-1</td>
<td>ok, active</td>
<td>3d09h</td>
</tr>
<tr>
<td>R1</td>
<td>C9400-SUP-1</td>
<td>ok, standby</td>
<td>3d09h</td>
</tr>
<tr>
<td>P1</td>
<td>C9400-PWR-3200AC</td>
<td>ok</td>
<td>3d08h</td>
</tr>
<tr>
<td>P2</td>
<td>C9400-PWR-3200AC</td>
<td>ok</td>
<td>3d08h</td>
</tr>
<tr>
<td>P17</td>
<td>C9407-FAN</td>
<td>ok</td>
<td>3d08h</td>
</tr>
</tbody>
</table>
```

• 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.

• 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.

• 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.

• 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.
Caveats

Caveats describe unexpected behavior in Cisco IOS releases. Caveats listed as open in a prior release are carried forward to the next release as either open or resolved.

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 Fuji 16.9.x

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCvh89452</td>
<td>[C9400]FCV: On &quot;reload/redundancy reload shelf&quot; CLI - standby comes as active (interim) at-times</td>
</tr>
<tr>
<td>CSCvj04522</td>
<td>cefcFRUPowerOperStatus isn't properly updated or notified for stby chassis PS</td>
</tr>
<tr>
<td>CSCvk02773</td>
<td>Standby crashed when defaulting vlan config reconfig vlan config with fnf/et-analytics</td>
</tr>
<tr>
<td>CSCvk22480</td>
<td>25G port fails to initialize after the port is shut and cable is removed and re-inserted</td>
</tr>
<tr>
<td>CSCvk33227</td>
<td>C9400: Shutting inactive 25G int will shut down all 10G int on the same port group</td>
</tr>
<tr>
<td>CSCvm79234</td>
<td>Show version cli shows invalid USB-SSD disk size on a CAT9k switch</td>
</tr>
<tr>
<td>CSCvm91642</td>
<td>MACsec SAP 128 Bits doesn't work with network-essentials license</td>
</tr>
<tr>
<td>CSCvn04428</td>
<td>Unknown module in show inventory even after inserting a new supported one</td>
</tr>
</tbody>
</table>

Resolved Caveats in Cisco IOS XE Fuji 16.9.3

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCuw36080</td>
<td>SNMP with Extended ACL</td>
</tr>
<tr>
<td>CSCvi78178</td>
<td>SUP-1 and SUP-1XL should not form HA</td>
</tr>
<tr>
<td>CSCvj73828</td>
<td>output drops counter mismatch after applied &quot;qos queue-softmax-multiplier 1200&quot;</td>
</tr>
<tr>
<td>CSCvj79694</td>
<td>sgt-map gets cleared for some of the end points for unknown reason</td>
</tr>
<tr>
<td>CSCvk45142</td>
<td>Crash with smd fault on rp_0_0</td>
</tr>
<tr>
<td>CSCvk66900</td>
<td>16.6.3 - IP radius source command does not take affect after reboot</td>
</tr>
<tr>
<td>CSCvm07353</td>
<td>Router may crash when a SSH session is closed after configure TACACS</td>
</tr>
<tr>
<td>Identifier</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>-------------</td>
</tr>
<tr>
<td>CSCvm16012</td>
<td>C9400: Group of 4 ports stop forwarding traffic</td>
</tr>
<tr>
<td>CSCvm46851</td>
<td>16.9.1 / 2 - LC not power down if autoLC after standby SUP OIR</td>
</tr>
<tr>
<td>CSCvm47335</td>
<td>IOSd: large amount of bursty IPC traffic sometime can cause high CPU utilization in fastpath</td>
</tr>
<tr>
<td>CSCvm59949</td>
<td>Cat9400</td>
</tr>
<tr>
<td>CSCvm70276</td>
<td>Cat9400: Continuous Failed Identification Test msg when inserting a linecard</td>
</tr>
<tr>
<td>CSCvm82912</td>
<td>C9400/16.6.4- standby sup port shows green LED even when port is err-disabled due to POST fail</td>
</tr>
<tr>
<td>CSCvm87134</td>
<td>Cat9K stackwise-virtual- Smart license registration status is lost after 2 to 3 multiple reloads/SSO</td>
</tr>
<tr>
<td>CSCvm94788</td>
<td>Device reloads when applying #client &lt;IP&gt; vrf Mgmt-vrf server-key 062B0C09586D590B5656390E15</td>
</tr>
<tr>
<td>CSCvn02171</td>
<td>HOLE is not created when acl default passthrough configured</td>
</tr>
<tr>
<td>CSCvn13181</td>
<td>Active SUP v2 removal causing IOMD to restart</td>
</tr>
<tr>
<td>CSCvn31653</td>
<td>Missing/incorrect FED entries for IGMP Snooping on Cat9300/Cat3850/Cat3650</td>
</tr>
<tr>
<td>CSCvn36494</td>
<td>WCCP redirection to proxy server breaks in certain scenarios.</td>
</tr>
<tr>
<td>CSCvn38590</td>
<td>CTS policies download fails with Missing/Incomplete ACEs error</td>
</tr>
<tr>
<td>CSCvn46171</td>
<td>Rapid Memory Leak in &quot;FED Main Event&quot; Process due to Modifying Adjacencys</td>
</tr>
<tr>
<td>CSCvn58515</td>
<td>Ac Tunnel in &quot;pending-issue-update&quot; state in FMAN FP</td>
</tr>
<tr>
<td>CSCvn65834</td>
<td>Packet drops on mgig ports due to link negotiation issue</td>
</tr>
<tr>
<td>CSCvn71041</td>
<td>TACACS group server is not seen, when &quot;transport-map type console test&quot; is configured.</td>
</tr>
<tr>
<td>CSCvn72973</td>
<td>Device is getting crashed on the &quot;cts role-based enforcement&quot;</td>
</tr>
<tr>
<td>CSCvn83359</td>
<td>IOSD Memory Leak in SVL</td>
</tr>
<tr>
<td>CSCvn97400</td>
<td>Potential memleak with crimson_tam_boot_integrity_init in 6.9.2 in IOS</td>
</tr>
<tr>
<td>CSCvn99610</td>
<td>'speed nonegotiate' config disappears after reload - C9400-LC-24S</td>
</tr>
<tr>
<td>CSCvo00968</td>
<td>Radius attr 32 NAS-IDENTIFIER not sending the FQDN</td>
</tr>
<tr>
<td>CSCvo08436</td>
<td>C9400 - Half-Pair Ethernet Cables do not auto-negotiate to 100 Full with Certain IP Phones</td>
</tr>
<tr>
<td>CSCvo17778</td>
<td>Cat9k not updating checksum after DSCP change</td>
</tr>
</tbody>
</table>
Resolved Caveats in Cisco IOS XE Fuji 16.9.2

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCvo32446</td>
<td>High CPU Due To Looped Packet and/or Unicast DHCP ACK Dropped</td>
</tr>
<tr>
<td>CSCvo33983</td>
<td>Mcast traffic loss seen looks due to missing fed entries during IGMP/MLD snooping.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCvg81784</td>
<td>Converting a layer 2 port-channel to L3 causes some Protocols to break</td>
</tr>
<tr>
<td>CSCvj16271</td>
<td>Addressing memory leaks in IPC error handling cases in LED, RPS, VMARGIN, USB, THERMAL</td>
</tr>
<tr>
<td>CSCvj66609</td>
<td>DHCP offer received from SVI sent back to the same SVI when DHCP Snooping is enabled</td>
</tr>
<tr>
<td>CSCvj75719</td>
<td>System returning incorrect portchannel MIB value (IEEE8023-LAG-MIB)</td>
</tr>
<tr>
<td>CSCvk06087</td>
<td>mGig ports on C9400 - Link down with forced speed 100/full duplex when connect to half duplex device</td>
</tr>
<tr>
<td>CSCvk06857</td>
<td>Standby also going down during SWO with CONN_ERRCONN_TIMEOUT_ERR</td>
</tr>
<tr>
<td>CSCvk16813</td>
<td>DHCP client traffic dropped with DHCP snooping and port-channel or cross stack uplinks.</td>
</tr>
<tr>
<td>CSCvk27755</td>
<td>9410: Duplicate client LE index assigned to the client over slot 9 &amp; slot 10 (CSCvi09442)</td>
</tr>
<tr>
<td>CSCvk32563</td>
<td>Catalyst 9400 command memory leak</td>
</tr>
<tr>
<td>CSCvk33369</td>
<td>Stack-merge on Sby and CONN_ERRCONN_TIMEOUT_ERR on Active with multiple SWO</td>
</tr>
<tr>
<td>CSCvk53444</td>
<td>Packets with Fragment Offset not forwarded with DHCP Snooping Enabled</td>
</tr>
<tr>
<td>CSCvk53452</td>
<td>2nd sso of 9400 cause mac flapping under other switches</td>
</tr>
<tr>
<td>CSCvm07921</td>
<td>OOB TX path excessive congestion cause software to force crash a switch</td>
</tr>
<tr>
<td>CSCvm16012</td>
<td>C9400: Group of 4 ports stop forwarding traffic</td>
</tr>
<tr>
<td>CSCvm36748</td>
<td>FED crash at expired &quot;FED MAC AGING TIMER&quot; or &quot;unknown&quot; timer without a stack trace.</td>
</tr>
</tbody>
</table>

Resolved Caveats in Cisco IOS XE Fuji 16.9.1

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>CSCvf66725</td>
<td>[Cat9400] After switchover, ping does not work for management interface</td>
</tr>
</tbody>
</table>
## Troubleshooting

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


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


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: http://www.cisco.com/go/mibs

## Obtaining Documentation and Submitting a Service Request

- To receive timely, relevant information from Cisco, sign up at **Cisco Profile Manager**.
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- 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**.