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

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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 a16-inch depth

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Whats New in Cisco IOS XE Fuji 16.9.8

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 67.

Whats New in Cisco IOS XE Fuji 16.9.7

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 67.

Software Features in Cisco IOS XE Fuji 16.9.7

Feature Name	Description and License Level Information
Software Maintenance Upgrade (SMU)	The SMU feature is now available with the Network Advantage license. See System Management → Software Maintenance Upgrade. (Network Advantage)

Whats New in Cisco IOS XE Fuji 16.9.6

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 67.

Whats New in Cisco IOS XE Fuji 16.9.5

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 67.

Whats New in Cisco IOS XE Fuji 16.9.4

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 67.

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 67.

Whats New in Cisco IOS XE Fuji 16.9.2

Software Features in Cisco IOS XE Fuji 16.9.2

Feature Name	Description and License Level Information
In Service Software Upgrade (ISSU) with Cisco StackWise Virtual	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. See High Availability → Configuring ISSU . (Network Advantage)

Whats New in Cisco IOS XE Fuji 16.9.1

Hardware Features in Cisco IOS XE Fuji 16.9.1

Feature Name	Description and Documentation Link
Cisco Catalyst 9400 Series Switches—Catalyst 9404R Switch (C9404R)	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.
Cisco Catalyst 9400 Series Supervisor XL25 Module with 25G uplink support (C9400-SUP-1XL-Y)	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.

Feature Name	Description and Documentation Link
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. **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 64 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 • SFP-H25G-CU1M, SFP-H25G-CU2M, SFP-H25G-CU3M, SFP-H25G-CU5M • SFP-25G-AOC1M, SFP-25G-AOC2M, SFP-25G-AOC3M, SFP-25G-AOC5M, SFP-25G-AOC7M, SFP-25G-AOC10M For information about the module, see the Cisco 25GBASE SFP28 Modules Data Sheet. For information about compatibility with a device, see the Cisco 25-Gigabit Ethernet Transceiver Modules Compatibility Matrix.
Cisco 40-Gigabit Ethernet, QSFP+ Transceiver Module—QSFP-H40G-AOC	Supported transceiver module product numbers—QSFP-H40G-AOC20M, QSFP-H40G-AOC25M, QSFP-H40G-AOC30M, QSFP-H40G-CU0.5M, QSFP-H40G-CU2M, QSFP-H40G-CU4M. For information about the module, see the Cisco 40GBASE QSFP Modules Data Sheet. For information about compatibility, see the Cisco 40-Gigabit Ethernet Transceiver Modules Compatibility Matrix.

Feature Name	Description and Documentation Link
Cisco 40GBASE-CSR4 QSFP Transceiver Module	Supported transceiver module product numbers—QSFP-40G-CSR4 For information about the module, see the Cisco 40GBASE QSFP Modules Data Sheet. For information about compatibility, see the Cisco 40-Gigabit Ethernet Transceiver Modules Compatibility Matrix.
M.2 Serial Advanced Technology Attachment (SATA) Storage	Provides extra storage to host applications and to capture packet trace logs. M.2 SATA also supports Self-Monitoring, Analysis and Reporting Technology System (S.M.A.R.T.) attributes. You can monitor the health of SATA device through the S.M.A.R.T tools integrated in the Cisco IOS XE Fuji 16.9.1 image.

Software Features in Cisco IOS XE Fuji 16.9.1

Feature Name	Description and License Level Information
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)

Feature Name	Description and License Level Information
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)

Feature Name	Description and License Level Information
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. See Security → MACsec Encryption . 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	Description and License Level Information
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)	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 multihomed 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)

Feature Name	Description and License Level Information
Network-Based Application Recognition (NBAR) and NBAR2	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)
Open Shortest Path First version 3 (OSPFv3) Authentication Trailer	Provides a mechanism to authenticate OSPFv3 protocol packets as an alternative to existing OSPFv3 IPsec authentication. See Routing → Configuring OSPFv3 Authentication Trailer . (Network Advantage)
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.

Feature Name	Description and License Level Information
Resilient Ethernet Protocol (REP)	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)
SDM Templates	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)
Security Group Tag (SGT) Caching	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)
Smart Licensing	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 Cisco Smart Licensing, on page 62 section in this release note document and System Management → Configuring Smart Licensing in the configuration guide. A license level is not applicable.

Feature Name	Description and License Level Information
Virtual Extensible LAN (VXLAN) Border Gateway Protocol (BGP) Ethernet VPN (EVPN)	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)

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 Licencing—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

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 Sofware-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)
- IPsec VPN
- MACSec Encryption (128-bit and 256-bit switch-to-switch connections and 256-bit host-to switch connections)
- 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 Comman 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*.

Switch Model (append with "=" for spares)	Description
C9404R	Cisco Catalyst 9400 Series 4 slot chassis • Redundant supervisor module capability • Two switching module slots • Hot-swappable, front and rear serviceable, non-redundant fan tray assembly • Four power supply module slots
C9407R	Cisco Catalyst 9400 Series 7 slot chassis • Redundant supervisor module capability • Five switching module slots • Hot-swappable, front and rear serviceable fan tray assembly • Eight power supply module slots

Switch Model (append with "=" for spares)	Description
C9410R	Cisco Catalyst 9400 Series 10 slot chassis • Redundant supervisor module capability • Eight switching module slots • Hot-swappable, front and rear serviceable fan tray assembly • Eight power supply module slots

Supported Hardware on Cisco Catalyst 9400 Series Switches

Product ID (append with "=" for spares)	Description
Supervisor Modules	
C9400-SUP-1	Cisco Catalyst 9400 Series Supervisor 1 Module This supervisor module is supported on the C9404R, C9407R, and C9410R chassis.
C9400-SUP-1XL	Cisco Catalyst 9400 Series Supervisor 1XL Module This supervisor module is supported on the C9404R, C9407R, and C9410R chassis.
C9400-SUP-1XL-Y	Cisco Catalyst 9400 Series Supervisor 25XL Module This supervisor module is supported on the C9404R, C9407R, and C9410R chassis.
Gigabit Ethernet Switching Modules	
C9400-LC-24S	Cisco Catalyst 9400 Series 24 Port, 1 Gigabit Ethernet SFP module that supports 100/1000 BASET-T with Cu-SFP
C9400-LC-48P	Cisco Catalyst 9400 Series 48 Port, 1 Gigabit Ethernet POE/POE+ module supporting up to 30W per port.
C9400-LC-48S	Cisco Catalyst 9400 Series 48 Port, 1 Gigabit Ethernet SFP module that supports 100/1000 BASET-T with Cu-SFP.
C9400-LC-48T	Cisco Catalyst 9400 Series 48-Port 10/100/1000 (RJ-45)
C9400-LC-48U	Cisco Catalyst 9400 Series 48-Port UPOE 10/100/1000 (RJ-45) module supporting up to 60W per port.
Ten Gigabit Ethernet Switching Modules	
C9400-LC-24XS	Cisco Catalyst 9400 Series 24-Port SFP/SFP+ Module

Product ID (append with "=" for spares)	Description
Multigigabit Ethernet Switching Modules	
C9400-LC-48UX	Cisco Catalyst 9400 Series 48-port, UPOE Multigigabit Ethernet Module with: • 24 ports (Ports 1 to 24) 1G UPOE 10/100/1000 (RJ-45) • 24 ports (Ports 25 to 48) MultiGigabit Ethernet 100/1000/2500/5000/10000 UPOE ports
M.2 SATA SSD Modules[1] **(for the Supervisor)**	
C9400-SSD-240GB	Cisco Catalyst 9400 Series 240GB M2 SATA memory
C9400-SSD-480GB	Cisco Catalyst 9400 Series 480GB M2 SATA memory
C9400-SSD-960GB	Cisco Catalyst 9400 Series 960GB M2 SATA memory
AC Power Supply Modules	
C9400-PWR-2100AC	Cisco Catalyst 9400 Series 2100W AC Power Supply
C9400-PWR-3200AC	Cisco Catalyst 9400 Series 3200W AC Power Supply
DC Power Supply Modules	
C9400-PWR-3200DC	Cisco Catalyst 9400 Series 3200W DC Power Supply

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

Optics Modules

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

Compatibility Matrix

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

Catalyst 9400	Cisco Identity Services Engine	Cisco Access Control Server	Cisco Prime Infrastructure
Fuji 16.9.8	2.5 2.1	5.4 5.5	PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → **Downloads**.

Catalyst 9400	Cisco Identity Services Engine	Cisco Access Control Server	Cisco Prime Infrastructure
Fuji 16.9.7	2.5 2.1	5.4 5.5	PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → **Downloads**.
Fuji 16.9.6	2.3 Patch 1 2.4 Patch 1	5.4 5.5	PI 3.4 + PI 3.4 latest maintenance release + PI 3.4 latest device pack See Cisco Prime Infrastructure 3.4→ **Downloads**.
Fuji 16.9.5	2.3 Patch 1 2.4 Patch 1	5.4 5.5	PI 3.4 + PI 3.4 latest maintenance release + PI 3.4 latest device pack See Cisco Prime Infrastructure 3.4→ **Downloads**.
Fuji 16.9.4	2.3 Patch 1 2.4 Patch 1	5.4 5.5	PI 3.4 + PI 3.4 latest maintenance release + PI 3.4 latest device pack See Cisco Prime Infrastructure 3.4→ **Downloads**.
Fuji 16.9.3	2.3 Patch 1 2.4 Patch 1	5.4 5.5	PI 3.4 + PI 3.4 latest maintenance release + PI 3.4 latest device pack See Cisco Prime Infrastructure 3.4→ **Downloads**.
Fuji 16.9.2	2.3 Patch 1 2.4 Patch 1	5.4 5.5	PI 3.4 + PI 3.4 latest maintenance release + PI 3.4 latest device pack See Cisco Prime Infrastructure 3.4→ **Downloads**.
Fuji 16.9.1	2.3 Patch 1 2.4 Patch 1	5.4 5.5	PI 3.4 + PI 3.4 latest device pack See Cisco Prime Infrastructure 3.4→ **Downloads**.
Fuji 16.8.1a	2.3 Patch 1 2.4	5.4 5.5	PI 3.3 + PI 3.3 latest maintenance release + PI 3.3 latest device pack See Cisco Prime Infrastructure 3.3→ **Downloads**.
Everest 16.6.4a	2.2 2.3	5.4 5.5	PI 3.1.6 + Device Pack 13 See Cisco Prime Infrastructure 3.1 → **Downloads**.

Catalyst 9400	Cisco Identity Services Engine	Cisco Access Control Server	Cisco Prime Infrastructure
Everest 16.6.4	2.2 2.3	5.4 5.5	PI 3.1.6 + Device Pack 13 See Cisco Prime Infrastructure 3.1 → **Downloads**.
Everest 16.6.3	2.2 2.3	5.4 5.5	PI 3.1.6 + Device Pack 13 See Cisco Prime Infrastructure 3.1 → **Downloads**
Everest 16.6.2	2.2 2.3	5.4 5.5	PI 3.1.6 + Device Pack 13 See Cisco Prime Infrastructure 3.1 → **Downloads**
Everest 16.6.1	2.2	5.4 5.5	PI 3.1.6 + Device Pack 13 See Cisco Prime Infrastructure 3.1 → **Downloads**

Web UI System Requirements

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

Minimum Hardware Requirements

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

[2] We recommend 1 GHz
[3] We recommend 1 GB DRAM

Software Requirements

Operating Systems

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

Browsers

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

ROMMON and CPLD Versions

The following table provides ROMMON and CPLD version information for the Cisco Catalyst 9400 Series Supervisor Modules. For ROMMON and CPLD version information of Cisco IOS XE 17.x.x releases, refer to the corresponding Cisco IOS XE 17.x.x release notes of the respective platform.

Release	ROMMON Version (C9400-SUP-1, C9400-SUP-1XL, C9400-SUP-1XL-Y)	CPLD Version (C9400-SUP-1, C9400-SUP-1XL, C9400-SUP-1XL-Y)
Fuji 16.9.x	16.6.2r[FC1]	17101705
Fuji 16.8.1a	16.6.2r	17101705
Everest 16.6.x	16.6.2r[FC1]	17101705

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

Release	Image Type	File Name
Cisco IOS XE Fuji 16.9.8	CAT9K_IOSXE	cat9k_iosxe.16.09.08.SPA.bin
	Licensed Data Payload Encryption (LDPE)	cat9k_iosxeldpe.16.09.08.SPA

Release	Image Type	File Name
Cisco IOS XE Fuji 16.9.7	CAT9K_IOSXE	cat9k_iosxe.16.09.07.SPA.
	Licensed Data Payload Encryption (LDPE)	cat9k_iosxeldpe.16.09.07.S
Cisco IOS XE Fuji 16.9.6	CAT9K_IOSXE	cat9k_iosxe.16.09.06.SPA.
	Licensed Data Payload Encryption (LDPE)	cat9k_iosxeldpe.16.09.06.S
Cisco IOS XE Fuji 16.9.5	CAT9K_IOSXE	cat9k_iosxe.16.09.05.SPA.
	Licensed Data Payload Encryption (LDPE)	cat9k_iosxeldpe.16.09.05.S
Cisco IOS XE Fuji 16.9.4	CAT9K_IOSXE	cat9k_iosxe.16.09.04.SPA.
	Licensed Data Payload Encryption (LDPE)	cat9k_iosxeldpe.16.09.04.S
Cisco IOS XE Fuji 16.9.3	CAT9K_IOSXE	cat9k_iosxe.16.09.03.SPA.
	Licensed Data Payload Encryption (LDPE)	cat9k_iosxeldpe.16.09.03.S
Cisco IOS XE Fuji 16.9.2	CAT9K_IOSXE	cat9k_iosxe.16.09.02.SPA.
	Licensed Data Payload Encryption (LDPE)	cat9k_iosxeldpe.16.09.02.S
Cisco IOS XE Fuji 16.9.1	CAT9K_IOSXE	cat9k_iosxe.16.09.01.SPA.
	Licensed Data Payload Encryption (LDPE)	cat9k_iosxeldpe.16.09.01.S

Automatic Boot Loader Upgrade

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.

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:

Note 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

Summary of Software Installation Commands	
To install and activate the specified file, and to commit changes to be persistent across reloads: **`install add file`** *`filename`* [**`activate commit`**] To separately install, activate, commit, cancel, or remove the installation file: **`install ?`**	
add file tftp: *filename*	Copies the install file package from a remote location to the device and performs a compatibility check for the platform and image versions.
activate [**auto-abort-timer**]	Activates the file, and reloads the device. The **auto-abort-timer** keyword automatically rolls back image activation.
commit	Makes changes persistent over reloads.
rollback to committed	Rolls back the update to the last committed version.
abort	Cancels file activation, and rolls back to the version that was running before the current installation procedure started.
remove	Deletes all unused and inactive software installation files.

Upgrading with In Service Software Upgrade (ISSU) in Dual Supervisor Module Configuration

Follow these instructions to perform ISSU upgrade from Cisco IOS XE Fuji 16.9.1, in install mode. The sample output in this section displays upgrade from Cisco IOS XE Fuji 16.9.1 to Cisco IOS XE Fuji 16.9.4 using install commands.

Before you begin

ISSU from Cisco IOS XE Fuji 16.9.1 to any release up to Cisco IOS XE Fuji 16.9.5 in the 16.9.x release train requires installation of Software Maintenance Upgrade (SMU) packages. ISSU from Cisco IOS XE Fuji 16.9.5 and later releases does not require installation of SMU packages.

Install the following SMU packages before performing ISSU.

Scenario	File Name (Hot Patch)
Cisco IOS XE Fuji 16.9.1 to any ISSU supported release	cat9k_iosxe.16.09.01.CSCvs66914.SPA.smu.bin
Cisco IOS XE Fuji 16.9.2 to any ISSU supported release	cat9k_iosxe.16.09.02.CSCvs66914.SPA.smu.bin
Cisco IOS XE Fuji 16.9.3 to any ISSU supported release	cat9k_iosxe.16.09.03.CSCvs66914.SPA.smu.bin
Cisco IOS XE Fuji 16.9.4 to any ISSU supported release	cat9k_iosxe.16.09.04.CSCvs66914.SPA.smu.bin

Note Downgrade with ISSU is not supported. To downgrade, follow the instructions in the Downgrading in Install Mode, on page 52 section.

For more information about ISSU release support and recommended releases, see Technical References → In-Service Software Upgrade (ISSU).

Procedure

Step 1 **enable**

Enables privileged EXEC mode. Enter your password if prompted.

```
Switch# enable
```

Step 2 **show redundancy**

Use this command to display redundancy facility information.

```
Switch# show redundancy
Redundant System Information :
------------------------------
       Available system uptime = 3 minutes
Switchovers system experienced = 0
              Standby failures = 0
        Last switchover reason = none

                 Hardware Mode = Duplex
    Configured Redundancy Mode = sso
     Operating Redundancy Mode = sso
              Maintenance Mode = Disabled
```

```
                Communications = Up

Current Processor Information :
-------------------------------
              Active Location = slot 5
        Current Software state = ACTIVE
       Uptime in current state = 3 minutes
                 Image Version = Cisco IOS Software [Fuji], Catalyst L3 Switch Software
(CAT9K_IOSXE), Version 16.9.1, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2018 by Cisco Systems, Inc.
Compiled Tue 17-Jul-18 17:00 by mcpre
                         BOOT = bootflash:packages.conf;
                   CONFIG_FILE =
        Configuration register = 0x102

Peer Processor Information :
----------------------------
             Standby Location = slot 6
        Current Software state = STANDBY HOT
       Uptime in current state = 1 minute
                 Image Version = Cisco IOS Software [Fuji], Catalyst L3 Switch Software
(CAT9K_IOSXE), Version 16.9.1, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2018 by Cisco Systems, Inc.
Compiled Tue 17-Jul-18 17:00 by mcpre
                         BOOT = bootflash:packages.conf;
                   CONFIG_FILE =
        Configuration register = 0x102
```

Step 3 **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 R0 ---
Finished local lock acquisition on R0

--- Starting installation state synchronization ---
Finished installation state synchronization

No ISSU operation is in progress
```

Step 4 **install add file activate commit**

Use the commands below to install the SMU packages.

install add file tftp:cat9k_iosxe.16.09.01.CSCvs66914.SPA.smu.bin activate commit

The following sample output displays installation of the CSCvs66914 SMU package.

```
Switch# install add file tftp:cat9k_iosxe.16.09.01.CSCvs66914.SPA.smu.bin activate commit
install_add_activate_commit: START Tue Feb 11 19:45:49 UTC 2020
Downloading file tftp:cat9k_iosxe.16.09.01.CSCvs66914.SPA.smu.bin
Finished downloading file tftp:cat9k_iosxe.16.09.01.CSCvs66914.SPA.smu.bin to
bootflash:cat9k_iosxe.16.09.01.CSCvs66914.SPA.smu.bin
install_add_activate_commit: Adding SMU

--- Starting initial file syncing ---
Copying image file: bootflash:cat9k_iosxe.16.09.01.CSCvs66914.SPA.smu.bin to standby
Info: Finished copying bootflash:cat9k_iosxe.16.09.01.CSCvs66914.SPA.smu.bin to standby
Finished initial file syncing


*Feb 11 19:45:50.405 UTC: %INSTALL-5-INSTALL_START_INFO: R0/0: install_engine: Started
```

```
install one-shot tftp:cat9k_iosxe.16.09.01.CSCvs66914.SPA.smu.binExecuting pre scripts....
Executing pre sripts done.
--- Starting SMU Add operation ---
Performing SMU_ADD on Active/Standby
  [R0] SMU_ADD package(s) on R0
  [R0] Finished SMU_ADD on R0
  [R1] SMU_ADD package(s) on R1
  [R1] Finished SMU_ADD on R1
Checking status of SMU_ADD on [R0 R1]
SMU_ADD: Passed on [R0 R1]
Finished SMU Add operation

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

--- Starting SMU Activate operation ---
Performing SMU_ACTIVATE on Active/Standby
  [R0] SMU_ACTIVATE package(s) on R0
  [R0] Finished SMU_ACTIVATE on R0
  [R1] SMU_ACTIVATE package(s) on R1
  [R1] Finished SMU_ACTIVATE on R1
Checking status of SMU_ACTIVATE on [R0 R1]
SMU_ACTIVATE: Passed on [R0 R1]
Finished SMU Activate operation

SUCCESS: install_add_activate_commit /bootflash/cat9k_iosxe.16.09.01.CSCvs66914.SPA.smu.bin
 Tue Feb 11 19:46:29 UTC 2020

Switch#
*Feb 11 19:46:29.915 UTC: %INSTALL-5-INSTALL_COMPLETED_INFO: R0/0: install_engine: Completed
 install one-shot SMU bootflash:cat9k_iosxe.16.09.01.CSCvs66914.SPA.smu.bin
```

Step 5 show install summary

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

The following sample output displays that the CSCvs66914 SMU package has been installed on the switch.

```
Switch# show install summary
[ R0 R1 ] Installed Package(s) Information:
State (St): I - Inactive, U - Activated & Uncommitted,
            C - Activated & Committed, D - Deactivated & Uncommitted
--------------------------------------------------------------------------------
Type  St   Filename/Version
--------------------------------------------------------------------------------
SMU   C    bootflash:cat9k_iosxe.16.09.01.CSCvs66914.SPA.smu.bin
IMG   C    16.9.1.0.70

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

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 16.9.4 software image with ISSU procedure.

```
Switch# install add file tftp:cat9k_iosxe.16.09.04.SPA.bin  activate issu commit
install_add_activate_commit: START Tue Feb 11 20:12:44 UTC 2020

System configuration has been modified.
```

```
Press Yes(y) to save the configuration and proceed.
Press No(n) for proceeding without saving the configuration.
Press Quit(q) to exit, you may save configuration and re-enter the command. [y/n/q]y
Building configuration...
Compressed configuration from 35837 bytes to 15488 bytes[OK]
*Feb 11 20:13:04.036 UTC: %SYS-2-PRIVCFG_ENCRYPT: Successfully encrypted private config
fileModified configuration has been saved
Downloading file tftp:cat9k_iosxe.16.09.04.SPA.bin

*Feb 11 20:13:06.921 UTC: %INSTALL-5-INSTALL_START_INFO: R0/0: install_engine: Started
install one-shot ISSU tftp:cat9k_iosxe.16.09.04.SPA.bin
Finished downloading file tftp:cat9k_iosxe.16.09.04.SPA.bin to
bootflash:cat9k_iosxe.16.09.04.SPA.bin
install_add_activate_commit: Adding ISSU

--- Starting initial file syncing ---
Copying image file: bootflash:cat9k_iosxe.16.09.04.SPA.bin to standby
Info: Finished copying bootflash:cat9k_iosxe.16.09.04.SPA.bin to standby
Finished initial file syncing

--- Starting Add ---
Performing Add on Active/Standby
  [R0] Add package(s) on R0
  [R0] Finished Add on R0
  [R1] Add package(s) on R1
  [R1] Finished Add on R1
Checking status of Add on [R0 R1]
Add: Passed on [R0 R1]
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 remote RP/Bay
--- Starting install local lock acquisition on R1 ---
Finished install local lock acquisition on R1

--- Starting local lock acquisition on R1 ---
Finished local lock acquisition on R1

--- Starting file path checking ---
Finished file path checking

--- Starting image file verification ---
Checking image file names
Locating image files and validating name syntax
  Found cat9k-cc_srdriver.16.09.04.SPA.pkg
  Found cat9k-espbase.16.09.04.SPA.pkg
  Found cat9k-guestshell.16.09.04.SPA.pkg
  Found cat9k-rpbase.16.09.04.SPA.pkg
  Found cat9k-rpboot.16.09.04.SPA.pkg
```

```
  Found cat9k-sipbase.16.09.04.SPA.pkg
  Found cat9k-sipspa.16.09.04.SPA.pkg
  Found cat9k-srdriver.16.09.04.SPA.pkg
  Found cat9k-webui.16.09.04.SPA.pkg
  Found cat9k-wlc.16.09.04.SPA.pkg
Verifying image file locations
Inspecting image file types
    WARNING: In-service installation of RP Boot package
    WARNING: requires software reboot of target RP
    WARNING: Automatically setting the on-reboot flag
    WARNING: In-service installation of RP Base package
    WARNING: requires software reboot of target RP
Processing image file constraints
Creating candidate provisioning file
Finished image file verification

--- Starting candidate package set construction ---
Verifying existing software set
Processing candidate provisioning file
Constructing working set for candidate package set
Constructing working set for running package set
Checking command output
Constructing merge of running and candidate packages
Checking if resulting candidate package set would be complete
Finished candidate package set construction

--- Starting ISSU compatibility verification ---
Verifying image type compatibility
Checking IPC compatibility for candidate software
Checking candidate package set infrastructure compatibility
Checking infrastructure compatibility with running software
Checking infrastructure compatibility with running software ... skipped
Checking package specific compatibility
Finished ISSU compatibility verification

--- Starting list of software package changes ---
Old files list:
  Removed cat9k-cc_srdriver.16.09.01.SPA.pkg
  Removed cat9k-espbase.16.09.01.SPA.pkg
  Removed cat9k-guestshell.16.09.01.SPA.pkg
  Removed cat9k-rpbase.16.09.01.SPA.pkg
  Removed cat9k-rpboot.16.09.01.SPA.pkg
  Removed cat9k-sipbase.16.09.01.SPA.pkg
  Removed cat9k-sipspa.16.09.01.SPA.pkg
  Removed cat9k-srdriver.16.09.01.SPA.pkg
  Removed cat9k-webui.16.09.01.SPA.pkg
  Removed cat9k-wlc.16.09.01.SPA.pkg
New files list:
  Added cat9k-cc_srdriver.16.09.04.SPA.pkg
  Added cat9k-espbase.16.09.04.SPA.pkg
  Added cat9k-guestshell.16.09.04.SPA.pkg
  Added cat9k-rpbase.16.09.04.SPA.pkg
  Added cat9k-rpboot.16.09.04.SPA.pkg
  Added cat9k-sipbase.16.09.04.SPA.pkg
  Added cat9k-sipspa.16.09.04.SPA.pkg
  Added cat9k-srdriver.16.09.04.SPA.pkg
  Added cat9k-webui.16.09.04.SPA.pkg
  Added cat9k-wlc.16.09.04.SPA.pkg
Finished list of software package changes

--- Starting commit of software changes ---
Updating provisioning rollback files
Creating pending provisioning file
Committing provisioning file
```

```
Finished commit of software changes

SUCCESS: Software provisioned.  New software will load on reboot.
  [R1] install_remote package(s) on R1
  [R1] Finished install_remote on R1
install_remote: Passed on [R1]
Finished install_remote


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

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

*Feb 11 20:20:00.881 UTC: %IOSXE_OIR-6-OFFLINECARD: Card (rp) offline in slot R1
*Feb 11 20:20:00.885 UTC: %SMART_LIC-3-EVAL_EXPIRED: Evaluation period expired
*Feb 11 20:20:00.923 UTC: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault
(PEER_NOT_PRESENT)
*Feb 11 20:20:00.923 UTC: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault (PEER_DOWN)
*Feb 11 20:20:00.924 UTC: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault
(PEER_REDUNDANCY_STATE_CHANGE)
*Feb 11 20:20:01.865 UTC: %RF-5-RF_RELOAD: Peer reload. Reason: EHSA standby down
*Feb 11 20:20:01.871 UTC: %IOSXE_REDUNDANCY-6-PEER: Active detected switch -1 as standby.
*Feb 11 20:20:01.865 UTC: %CMRP-3-RP_RESET: R1/0: cmand: RP is resetting : remote RP requested
 reset of this RP
*Feb 11 20:20:03.866 UTC: %CMRP-6-RP_SB_RELOAD_REQ: R0/0: cmand: Reloading Standby RP:
initiated by RF reload message
*Feb 11 20:21:26.677 UTC: %IOSXE-3-PLATFORM: R1/0: kernel: usb 1-1: device not accepting
address 2, error -110
*Feb 11 20:21:37.506 UTC: %IOSXE-3-PLATFORM: R1/0: kernel: dplr_intrpt: Entered
dplr_intrpt_module_init dplr_intrpt 1
*Feb 11 20:21:37.509 UTC: %IOSXE-3-PLATFORM: R1/0: kernel: chr_mmap: Allocating DMA Reserve
 Pool ...
*Feb 11 20:21:42.349 UTC: %IOSXE-3-PLATFORM: R1/0: kernel: usb 1-1: device not accepting
address 3, error -110
*Feb 11 20:21:53.199 UTC: %IOSXE-3-PLATFORM: R1/0: kernel: usb 1-1: device not accepting
address 4, error -110
*Feb 11 20:22:00.410 UTC: %IOSXE-3-PLATFORM: R1/0: kernel: i2c i2c-2: Failed to register
i2c client perrier_cpld at 0x0e (-16)
*Feb 11 20:22:00.410 UTC: %IOSXE-3-PLATFORM: R1/0: kernel: i2c i2c-3: Failed to register
i2c client perrier_cpld at 0x0e (-16)
*Feb 11 20:22:00.410 UTC: %IOSXE-3-PLATFORM: R1/0: kernel: i2c i2c-4: Failed to register
i2c client perrier_cpld at 0x0e (-16)
*Feb 11 20:22:00.410 UTC: %IOSXE-3-PLATFORM: R1/0: kernel: i2c i2c-5: Failed to register
i2c client perrier_cpld at 0x0e (-16)
*Feb 11 20:22:00.410 UTC: %IOSXE-3-PLATFORM: R1/0: kernel: i2c i2c-6: Failed to register
i2c client perrier_cpld at 0x0e (-16)
*Feb 11 20:22:00.410 UTC: %IOSXE-3-PLATFORM: R1/0: kernel: i2c i2c-7: Failed to register
i2c client perrier_cpld at 0x0e (-16)
*Feb 11 20:22:00.410 UTC: %IOSXE-3-PLATFORM: R1/0: kernel: i2c i2c-8: Failed to register
i2c client perrier_cpld at 0x0e (-16)
*Feb 11 20:22:00.410 UTC: %IOSXE-3-PLATFORM: R1/0: kernel: i2c i2c-9: Failed to register
i2c client perrier_cpld at 0x0e (-16)
*Feb 11 20:22:03.747 UTC: %IOSXE-3-PLATFORM: R1/0: kernel: usb 1-1: device not accepting
address 5, error -110
*Feb 11 20:22:03.747 UTC: %IOSXE-3-PLATFORM: R1/0: kernel: usb usb1-port1: unable to enumerate
 USB device
*Feb 11 20:23:06.935 UTC: %IOSXE_OIR-6-ONLINECARD: Card (rp) online in slot R1
*Feb 11 20:23:16.937 UTC: %SMART_LIC-3-EVAL_EXPIRED: Evaluation period expired
*Feb 11 20:23:22.024 UTC: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby
insertion (raw-event=PEER_FOUND(4))
```

```
*Feb 11 20:23:22.024 UTC: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby
insertion (raw-event=PEER_REDUNDANCY_STATE_CHANGE(5))

*Feb 11 20:23:24.498 UTC: %REDUNDANCY-3-IPC: IOS versions do not match.

*Feb 11 20:23:56.751 UTC: %IPC_LOG-3-IPC_LOGWRITE_FAILED: R0/0: repm: ipc log write 8216
bytes failed because Resource temporarily unavailable
*Feb 11 20:24:21.297 UTC: %UICFGEXP-6-SERVER_NOTIFIED_START: R1/0: psd: Server iox has been
 notified to start
*Feb 11 20:24:26.772 UTC: %NDBMAN-5-ACTIVE: R1/0: ndbmand: All data providers active.
*Feb 11 20:24:47.759 UTC: %IPC_LOG-3-IPC_LOGWRITE_FAILED: R0/0: repm: ipc log write 8216
bytes failed because Resource temporarily unavailable
*Feb 11 20:24:50.830 UTC: %HA_CONFIG_SYNC-6-BULK_CFGSYNC_SUCCEED: Bulk Sync succeeded
*Feb 11 20:24:51.871 UTC: %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 active RP/Bay
--- Starting install local lock acquisition on R0 ---
Finished install local lock acquisition on R0

--- Starting local lock acquisition on R0 ---
Finished local lock acquisition on R0

--- Starting file path checking ---
Finished file path checking

--- Starting image file verification ---
Checking image file names

*Feb 11 20:25:16.768 UTC: %IPC_LOG-3-IPC_LOGWRITE_FAILED: R0/0: repm: ipc log write 8216
bytes failed because Resource temporarily unavailableLocating image files and validating
name syntax
  Found cat9k-cc_srdriver.16.09.04.SPA.pkg
  Found cat9k-espbase.16.09.04.SPA.pkg
  Found cat9k-guestshell.16.09.04.SPA.pkg
  Found cat9k-rpbase.16.09.04.SPA.pkg
  Found cat9k-rpboot.16.09.04.SPA.pkg
  Found cat9k-sipbase.16.09.04.SPA.pkg
  Found cat9k-sipspa.16.09.04.SPA.pkg
  Found cat9k-srdriver.16.09.04.SPA.pkg
  Found cat9k-webui.16.09.04.SPA.pkg
  Found cat9k-wlc.16.09.04.SPA.pkg
Verifying image file locations
Inspecting image file types
    WARNING: In-service installation of RP Boot package
    WARNING: requires software reboot of target RP
    WARNING: Automatically setting the on-reboot flag
    WARNING: In-service installation of RP Base package
    WARNING: requires software reboot of target RP
Processing image file constraints
Creating candidate provisioning file
Finished image file verification

--- Starting candidate package set construction ---
Verifying existing software set
Processing candidate provisioning file

*Feb 11 20:25:47.765 UTC: %IPC_LOG-3-IPC_LOGWRITE_FAILED: R0/0: repm: ipc log write 8216
bytes failed because Resource temporarily unavailable
Constructing working set for candidate package set
```

```
Constructing working set for running package set
Checking command output
Constructing merge of running and candidate packages
Checking if resulting candidate package set would be complete
Finished candidate package set construction

--- Starting ISSU compatibility verification ---
Verifying image type compatibility
Checking IPC compatibility for candidate software
Checking candidate package set infrastructure compatibility
Checking infrastructure compatibility with running software
Checking infrastructure compatibility with running software ... skipped
Checking package specific compatibility
Finished ISSU compatibility verification

--- Starting list of software package changes ---
Old files list:
  Removed cat9k-cc_srdriver.16.09.01.SPA.pkg
  Removed cat9k-espbase.16.09.01.SPA.pkg
  Removed cat9k-guestshell.16.09.01.SPA.pkg
  Removed cat9k-rpbase.16.09.01.SPA.pkg
  Removed cat9k-rpboot.16.09.01.SPA.pkg
  Removed cat9k-sipbase.16.09.01.SPA.pkg
  Removed cat9k-sipspa.16.09.01.SPA.pkg
  Removed cat9k-srdriver.16.09.01.SPA.pkg
  Removed cat9k-webui.16.09.01.SPA.pkg
  Removed cat9k-wlc.16.09.01.SPA.pkg
New files list:
  Added cat9k-cc_srdriver.16.09.04.SPA.pkg
  Added cat9k-espbase.16.09.04.SPA.pkg
  Added cat9k-guestshell.16.09.04.SPA.pkg
  Added cat9k-rpbase.16.09.04.SPA.pkg
  Added cat9k-rpboot.16.09.04.SPA.pkg
  Added cat9k-sipbase.16.09.04.SPA.pkg
  Added cat9k-sipspa.16.09.04.SPA.pkg
  Added cat9k-srdriver.16.09.04.SPA.pkg
  Added cat9k-webui.16.09.04.SPA.pkg
  Added cat9k-wlc.16.09.04.SPA.pkg
Finished list of software package changes

--- Starting commit of software changes ---
Updating provisioning rollback files
Creating pending provisioning file
Committing provisioning file
Finished commit of software changes

SUCCESS: Software provisioned.  New software will load on reboot.
  [R0] install_active package(s) on R0
  [R0] Finished install_active on R0
install_active: Passed on [R0]
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  Tue Feb 11 20:26:34 UTC 2020

Switch#
*Feb 11 20:26:35.175 UTC: %INSTALL-5-INSTALL_COMPLETED_INFO: R0/0: install_engine: Completed
 install one-shot ISSU bootflash:cat9k_iosxe.16.09.04.SPA.bin
                          Chassis 0 reloading, reason - Reload command
                                                                    Feb 11 20:26:47.666:
```

```
 %P

Initializing Hardware...

System Bootstrap, Version 16.12.1r, RELEASE SOFTWARE (P)
Compiled Mon 04/15/2019 10:19:23.77 by rel

Current ROMMON image : Primary
Last reset cause     : SoftwareResetTrig
C9400-SUP-1XL platform with 16777216 Kbytes of main memory

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

<output truncated>

Switch#%IOSXEBOOT-4-ISSU_ONE_SHOT: (rp/1): ISSU finished successfully

*Feb 11 20:35:25.752 UTC: %INSTALL-5-INSTALL_COMPLETED_INFO: R0/0: install_engine: Completed
 install commit ISSU
Switch#

Switch>en
```

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 16.9.4 image on the device:

```
Switch# Cisco IOS XE Software, Version 16.09.04
Cisco IOS Software [Fuji], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 16.9.4, RELEASE
 SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2019 by Cisco Systems, Inc.
Compiled Thu 22-Aug-19 18:14 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 R1 ---
Finished local lock acquisition on R1

--- Starting installation state synchronization ---
Finished installation state synchronization

No ISSU operation is in progress
```

Step 9 **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 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.x, 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.

Release	File Name (Hot Patch)
Cisco IOS XE Fuji 16.9.2	cat9k_iosxe.16.09.02.CSCvo12166.SPA.smu.bin
	cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin

- 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

Note Downgrade with ISSU is not supported. To downgrade, follow the instructions in the Downgrading in Install Mode, on page 52 section.

For more information about ISSU release support and recommended releases, see Technical References → In-Service Software Upgrade (ISSU).

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
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.binFinished
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
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 sripts 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 sripts 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 sripts 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 sripts 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 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


IMG   C    16.9.2.0.2433
```

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

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
[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 02:27:20.551: %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>


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.x, 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.

Release	File Name (Hot Patch)	File Name (Cold Patch)
Cisco IOS XE Fuji 16.9.2	cat9k_iosxe.16.09.02.CSCvo12166.SPA.smu.bin	[illegible]
	cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin	

- 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

Note Downgrade with ISSU is not supported. To downgrade, follow the instructions in the Downgrading in Install Mode, on page 52 section.

For more information about ISSU release support and recommended releases, see Technical References → In-Service Software Upgrade (ISSU).

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**

Note 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

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

*Mar 23 00:03:56.980 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.CSCvo12166.SPA.smu.bin[2]:
 Finished copying to chassis 2
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 sripts 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 sripts 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 00:04:16 PST 2019

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 00:05:54 PST 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 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 sripts 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 sripts 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 sripts 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 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

UUT1#
*Mar 23 00:15:59.577 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,
            C - Activated & Committed, D - Deactivated & Uncommitted
--------------------------------------------------------------------------------
Type  St   Filename/Version
--------------------------------------------------------------------------------
SMU   C    bootflash:cat9k_iosxe.16.09.02.CSCvo00460.SPA.smu.bin
SMU   C    bootflash:cat9k_iosxe.16.09.02.CSCvo12166.SPA.smu.bin
SMU   C    bootflash:cat9k_iosxe.16.09.02.CSCvo71912.SPA.smu.bin
IMG   C    16.9.2.0.2433
```

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
[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 02:27:20.551: %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>
```

```
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 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 [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 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.

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 ...
Cisco IOS XE Everest 16.6.1[4]	Upgrade a single supervisor, and complete the boot loader and CPLD upgrade. After completing the first supervisor upgrade, remove and swap in the second supervisor. After both supervisors are upgraded, they can be inserted and booted in a high availability setup. **Note** Do not simultaneously upgrade dual supervisors from Cisco IOS XE Everest 16.6.1 to a later release. Doing so may cause hardware damage.	Cisco IOS XE Everest 16.6.3 Follow the upgrade steps as in the Release Notes for Cisco Catalyst 9400 Series Switches, Cisco IOS XE Everest 16.6.x → Upgrading the Switch Software → Upgrading in Install Mode	Cisco IOS XE Fuji 16.x.x
Cisco IOS XE Everest 16.6.2 and later releases	This procedure automatically copies the images to both active and standby supervisor modules. Both supervisor modules are simultaneously upgraded.	Not applicable	

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

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.16.06.01.SPA.pkg
File is in use, will not delete.
packages.conf
File is in use, will not delete.
done.

The following files will be deleted:
[R0]:
/flash/cat9k-cc_srdriver.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
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.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** and the manual boot variable is set to **no**.

The output should display **BOOT variable** = **flash:packages.conf**.

```
Switch# show boot system
```

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.

The system reloads automatically after executing the **install add file activate commit** command. You do not have to manually reload the system.

If you choose to not reload the system by entering **n**, when prompted with the message `This operation requires a reload of the system. Do you want to proceed? [y/n]`, follow the steps 2 and 3 below to avoid any boot issues during the next or subsequent reloads. You should use these commands only if you chose to not reload the system.

b) **install activate**

Use this command to activate the installed image in Step a.

```
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
Install will reload the system now!
SUCCESS: install_activate Fri Mar 22 19:57:48 UTC 2019
```

c) **install commit**

Use this command to commit the installed image. If this step is not performed, the rollback timer takes effect.

```
install_commit: START Thu Jul  10 20:59:43 UTC 2017
Jul  10 20:59:45.556: %INSTALL-5-INSTALL_START_INFO: R0/0: install_engine: Started install
 commit
Jul  10 20:59:45.556 %INSTALL-5-INSTALL_START_INFO: R0/0: install_engine: Started install
 commit

install_commit: Committing PACKAGE

--- 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

SUCCESS: install_commit  Fri Mar 22 20:59:52 UTC 2019
```

d) **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- 70333380  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- 349635524 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
475146 -rw- 2962372   Jul 26 2017 09:52:56 -07:00 cat9k-srdriver.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:/

434197 -rw- 7406 Jul 10 2018 10:59:16 -07:00 packages.conf
434196 -rw- 7504 Jul 10 2018 10:59:16 -07:00 packages.conf.00-
516098 -rw- 7406 Jul 10 2018 10:58:08 -07:00 cat9k_iosxe.16.09.01.SPA.conf
11353194496 bytes total (8963174400 bytes free)
```

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 mcpre
```

Downgrading in Install Mode

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

Before you begin

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

When downgrading from ...	Permitted Supervisor Setup (Applies to the release you are downgrading from)	To ...
Cisco IOS XE Fuji 16.9.5 or Cisco IOS XE Fuji 16.9.4 or Cisco IOS XE Fuji 16.9.3 or Cisco IOS XE Fuji 16.9.2 or Cisco IOS XE Fuji 16.9.1	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
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.bininstall_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-sipspa.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
/flash/cat9k-webui.16.06.02.SPA.pkg
/flash/cat9k-srdriver.16.06.02.SPA.pkg
/flash/cat9k-sipspa.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-guestshell.16.06.02.SPA.pkg
/flash/cat9k-espbase.16.06.02.SPA.pkg
/flash/cat9k-cc_srdriver.16.06.02.SPA.pkg
Fri Mar 16 22:53:58 UTC 2018
Switch#
```

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]
*Jul 10 14:24:57.555: %IOSXE-5-PLATFORM: R0/0: Jul 10 14:24:57 install_engine.sh:
%INSTALL-5-INSTALL_START_INFO: Started install rollbacky
--- Starting Rollback ---
Performing Rollback on Active/Standby

WARNING: Found 55 disjoint TDL objects.
[R0] Rollback package(s) on R0
--- Starting rollback impact ---
Changes that are part of this rollback
Current : rp 0 0 rp_boot cat9k-rpboot.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 1 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
Current : cc 10 0 cc_spa cat9k-sipspa.16.09.01.SPA.pkg
Current : cc 10 0 cc_srdriver cat9k-cc_srdriver.16.09.01.SPA.pkg
Current : cc 2 0 cc_srdriver cat9k-cc_srdriver.16.09.01.SPA.pkg
Current : cc 2 0 cc cat9k-sipbase.16.09.01.SPA.pkg
Current : cc 2 0 cc_spa cat9k-sipspa.16.09.01.SPA.pkg
Current : cc 3 0 cc_srdriver cat9k-cc_srdriver.16.09.01.SPA.pkg
Current : cc 3 0 cc cat9k-sipbase.16.09.01.SPA.pkg
Current : cc 3 0 cc_spa cat9k-sipspa.16.09.01.SPA.pkg
Current : cc 4 0 cc_srdriver cat9k-cc_srdriver.16.09.01.SPA.pkg
Current : cc 4 0 cc cat9k-sipbase.16.09.01.SPA.pkg
Current : cc 4 0 cc_spa cat9k-sipspa.16.09.01.SPA.pkg
Current : cc 5 0 cc_srdriver cat9k-cc_srdriver.16.09.01.SPA.pkg
Current : cc 5 0 cc cat9k-sipbase.16.09.01.SPA.pkg
Current : cc 5 0 cc_spa cat9k-sipspa.16.09.01.SPA.pkg
Current : cc 6 0 cc_srdriver cat9k-cc_srdriver.16.09.01.SPA.pkg
Current : cc 6 0 cc cat9k-sipbase.16.09.01.SPA.pkg
Current : cc 6 0 cc_spa cat9k-sipspa.16.09.01.SPA.pkg
Current : cc 7 0 cc_srdriver cat9k-cc_srdriver.16.09.01.SPA.pkg
Current : cc 7 0 cc cat9k-sipbase.16.09.01.SPA.pkg
Current : cc 7 0 cc_spa cat9k-sipspa.16.09.01.SPA.pkg
Current : cc 8 0 cc_srdriver cat9k-cc_srdriver.16.09.01.SPA.pkg
Current : cc 8 0 cc cat9k-sipbase.16.09.01.SPA.pkg
Current : cc 8 0 cc_spa cat9k-sipspa.16.09.01.SPA.pkg
Current : cc 9 0 cc_srdriver cat9k-cc_srdriver.16.09.01.SPA.pkg
Current : cc 9 0 cc cat9k-sipbase.16.09.01.SPA.pkg
Current : cc 9 0 cc_spa cat9k-sipspa.16.09.01.SPA.pkg
Current : fp 0 0 fp cat9k-espbase.16.09.01.SPA.pkg
Current : fp 1 0 fp cat9k-espbase.16.09.01.SPA.pkg
Current : rp 0 0 guestshell cat9k-guestshell.16.09.01.SPA.pkg
Current : rp 0 0 rp_base cat9k-rpbase.16.09.01.SPA.pkg
Current : rp 0 0 rp_daemons cat9k-rpbase.16.09.01.SPA.pkg
Current : rp 0 0 rp_iosd cat9k-rpbase.16.09.01.SPA.pkg
Current : rp 0 0 rp_security cat9k-rpbase.16.09.01.SPA.pkg
Current : rp 0 0 rp_webui cat9k-webui.16.09.01.SPA.pkg
Current : rp 0 0 rp_wlc cat9k-wlc.16.09.01.SPA.pkg
Current : rp 0 0 srdriver cat9k-srdriver.16.09.01.SPA.pkg
Current : rp 1 0 guestshell cat9k-guestshell.16.09.01.SPA.pkg
Current : rp 1 0 rp_base cat9k-rpbase.16.09.01.SPA.pkg
Current : rp 1 0 rp_daemons cat9k-rpbase.16.09.01.SPA.pkg
Current : rp 1 0 rp_iosd cat9k-rpbase.16.09.01.SPA.pkg
Current : rp 1 0 rp_security cat9k-rpbase.16.09.01.SPA.pkg
Current : rp 1 0 rp_webui cat9k-webui.16.09.01.SPA.pkg
Current : rp 1 0 rp_wlc cat9k-wlc.16.09.01.SPA.pkg
Current : rp 1 0 srdriver cat9k-srdriver.16.09.01.SPA.pkg
Replacement: cc 0 0 cc_srdriver cat9k-cc_srdriver.16.06.02.SPA.pkg
Replacement: cc 0 0 cc cat9k-sipbase.16.06.02.SPA.pkg
Replacement: cc 0 0 cc_spa cat9k-sipspa.16.06.02.SPA.pkg
Replacement: cc 1 0 cc_srdriver cat9k-cc_srdriver.16.06.02.SPA.pkg
Replacement: cc 1 0 cc cat9k-sipbase.16.06.02.SPA.pkg
Replacement: cc 1 0 cc_spa cat9k-sipspa.16.06.02.SPA.pkg
Replacement: cc 10 0 cc cat9k-sipbase.16.06.02.SPA.pkg
Replacement: cc 10 0 cc_spa cat9k-sipspa.16.06.02.SPA.pkg
Replacement: cc 10 0 cc_srdriver cat9k-cc_srdriver.16.06.02.SPA.pkg
Replacement: cc 2 0 cc_srdriver cat9k-cc_srdriver.16.06.02.SPA.pkg
Replacement: cc 2 0 cc cat9k-sipbase.16.06.02.SPA.pkg
Replacement: cc 2 0 cc_spa cat9k-sipspa.16.06.02.SPA.pkg
Replacement: cc 3 0 cc_srdriver cat9k-cc_srdriver.16.06.02.SPA.pkg
Replacement: cc 3 0 cc cat9k-sipbase.16.06.02.SPA.pkg
Replacement: cc 3 0 cc_spa cat9k-sipspa.16.06.02.SPA.pkg
Replacement: cc 4 0 cc_srdriver cat9k-cc_srdriver.16.06.02.SPA.pkg
Replacement: cc 4 0 cc cat9k-sipbase.16.06.02.SPA.pkg
Replacement: cc 4 0 cc_spa cat9k-sipspa.16.06.02.SPA.pkg
```

```
Replacement: cc 5 0 cc_srdriver cat9k-cc_srdriver.16.06.02.SPA.pkg
Replacement: cc 5 0 cc cat9k-sipbase.16.06.02.SPA.pkg
Replacement: cc 5 0 cc_spa cat9k-sipspa.16.06.02.SPA.pkg
Replacement: cc 6 0 cc_srdriver cat9k-cc_srdriver.16.06.02.SPA.pkg
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 1 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_iosd 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
Replacement: rp 1 0 rp_base cat9k-rpbase.16.06.02.SPA.pkg
Replacement: rp 1 0 rp_daemons cat9k-rpbase.16.06.02.SPA.pkg
Replacement: rp 1 0 rp_iosd cat9k-rpbase.16.06.02.SPA.pkg
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 R1Nov 2 14:26:5

Initializing Hardware...

System Bootstrap, Version 16.8.1r[FC1], RELEASE SOFTWARE (P)
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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software.



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

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

If you require further assistance please contact us by sending email to
export@cisco.com.

cisco C9410R (X86) processor (revision V00) with 868521K/6147K bytes of memory.
Processor board ID FXS2118Q1GM
312 Gigabit Ethernet interfaces
40 Ten Gigabit Ethernet interfaces
4 Forty Gigabit Ethernet interfaces
32768K bytes of non-volatile configuration memory.
```

```
15958516K bytes of physical memory.
11161600K bytes of Bootflash at bootflash:.
1638400K bytes of Crash Files at crashinfo:.
0K bytes of WebUI ODM Files at webui:.

%INIT: waited 0 seconds for NVRAM to be available

Press RETURN to get started!
```

Step 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://cfnng.cisco.com. 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 1: Permitted Combinations

	DNA Essentials	DNA Advantage
Network Essentials	Yes	No
Network Advantage	Yes[5]	Yes

[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. This applies only to *Smart Licensing*. The notion of evaluation licenses does not apply to *Smart Licensing Using Policy*.

Cisco Smart Licensing

Cisco Smart Licensing is a flexible licensing model that provides you with an easier, faster, and more consistent way to purchase and manage software across the Cisco portfolio and across your organization. And it's secure – you control what users can access. With Smart Licensing you get:

- Easy Activation: Smart Licensing establishes a pool of software licenses that can be used across the entire organization—no more PAKs (Product Activation Keys).
- Unified Management: My Cisco Entitlements (MCE) provides a complete view into all of your Cisco products and services in an easy-to-use portal, so you always know what you have and what you are using.
- License Flexibility: Your software is not node-locked to your hardware, so you can easily use and transfer licenses as needed.

To use Smart Licensing, you must first set up a Smart Account on Cisco Software Central (http://software.cisco.com).

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

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

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.

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.

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:

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

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

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

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 autonegotation, the link does not come up.
- Interoperability limitations:
  - When you use Cisco QSFP-4SFP10G-CUxM Direct-Attach Copper Cables, if one end of the 40G link is a Catalyst 9400 Series Switch and the other end is a Catalyst 9500 Series Switch, the link does not come up, or comes up on one side and stays down on the other. To avoid this interoperability issue between devices, apply the **speed nonegotiate** command on the Catalyst 9500 Series Switch interface. This command disables autonegotiation and brings the link up. To restore autonegotiation, use the **no speed nonegotiation** command.
- In-Service Software Upgrade (ISSU)
  - While performing ISSU from Cisco IOS XE Fuji 16.9.x to Cisco IOS XE Gibraltar 16.12.x, if **interface-id snmp-if-index** command is not configured with OSPFv3, packet loss can occur. Configure the **interface-id snmp-if-index** command either during the maintenance window or after isolating the device (by using maintenance mode feature) from the network before doing the ISSU.
- 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.
- Stack Queuing and Scheduling (SQS) drops CPU bound packets exceeding 1.4 Gbps.

- Redundancy—The supervisor module (hardware) supports redundancy. Software redundancy is supported starting with Cisco IOS XE Everest 16.6.2. However, the associated route processor redundancy (RPR) feature is not supported.

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

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

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

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

Current Processor Information :
------------------------------
Active Location = slot 3
Current Software state = ACTIVE
Uptime in current state = 2 hours, 57 minutes
Image Version = Cisco IOS Software [Fuji], Catalyst L3 Switch Software (CAT9K_IOSXE),
Version 16.8.1, RELEASE SOFTWARE (fc3)
Technical Support: http://www.cisco.com/techsupport
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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

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

In the following sample output for the **show platform 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

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

- 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.
- The File System Check (fsck) utility is not supported in install mode.

Caveats

Caveats describe unexpected behavior in Cisco IOS-XE 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

Identifier	Description
CSCvm79234	Show version cli shows invalid USB-SSD disk size on a CAT9k switch
CSCvq22224	cat9k // evpn/vxlan // dhcp relay not working over l3vni
CSCvi78178	SUP-1 and SUP-1XL should not form HA
CSCvn04428	Unknown module in show inventory even after inserting a new supported one
CSCvn55969	FED crash when 'show tech nbar' is run
CSCvp31385	Cat9K SVL: Buffer values not changed with qos queue-softmax-multiplier modification
CSCvr90465	MACSEC link does not recover upon link flap
CSCvs15759	DHCP server sends out a NAK packet during DHCP renewal process.

Resolved Caveats in Cisco IOS XE Fuji 16.9.8

Caveat ID Number	Description
CSCvt53563	Cisco IOS XE Software NETCONF and RESTCONF Authentication Bypass Vulnerability
CSCvt88722	Keep auto-neg enabled even with hard code speed and duplex causing auto-neg mismatch

Caveat ID Number	Description
CSCvu36162	Cat9400 SFP port link up take long time and peer interface link up earlier more than 30sec
CSCvu90882	Romvar: Bootloop if SWITCH_DISABLE_PASSWORD_RECOVERY and SWITCH_IGNORE_STARTUP_CFG are both set to 1
CSCvv12527	Crash in SNMP Engine process while polling chassis id in lldp
CSCvw46194	IOS and IOS XE Software UDLD Denial of Service Vulnerability
CSCvx08994	CTS credential password will be added to local keystore even if the password is longer than 24 char
CSCvx30283	LiteON PSU in standby slot goes to faulty state after some time
CSCvx34341	Netfilter: Linux Kernel triggers crash by race condition through delete operation
CSCvx41294	High CPU usage caused by "TCP Timer" process
CSCvx55976	Switch stack crash with FIPS mode enabled
CSCvx66699	Cisco IOS and IOS XE Software TrustSec CLI Parser Denial of Service Vulnerability
CSCvy17757	A crash due to issue with internal QOS policy specfic to EPC
CSCvy19160	C9400 switch may reload with Last reload reason: RP-CPU

Resolved Caveats in Cisco IOS XE Fuji 16.9.7

Caveat ID Number	Description
CSCvn22162	Cat3k crash from corruption in AVL tree
CSCvu35094	Switch reloads due to fed crash after sending multicast data packets in pvlan

Resolved Caveats in Cisco IOS XE Fuji 16.9.6

Caveat ID Number	Description
CSCvm93748	Extra white space for interface in configuration after stackwise interfaces configured
CSCvm99266	C9400/C9500:Tracelogs and Chasfs addition to system report
CSCvn98703	FED_QOS_ERRMSG-3-POLICER_HW_ERROR on Catalysts switches running 16.6 releases
CSCvq23523	Remove "request platform software trace rotate all" from show tech
CSCvr37805	Cat3k/9k: Device might reboot after applying "mac address-static xxxx.xxxx.xxxx vlan x drop" command

Caveat ID Number	Description
CSCvr92287	EPC with packet-len opt breaks CPU in-band path for bigger frames
CSCvs14673	SVL node may get removed if one of the SVL links goes bad.
CSCvs50391	FED crash when premature free of SG element
CSCvs71084	Cat9k - Not able to apply Et-analytics on an interface
CSCvs71519	Switch reloads due to dhcp snooping
CSCvs75010	Traffic forwarding stops when Session Idle time out is configured 10 sec with active traffic running
CSCvt02962	Uplink Port-channel Trunk member link Port LED truns to amber blinking after link down/up
CSCvt04880	C9400: System reload with last reload reason in Rommon as Unrecoverable Error
CSCvt13067	Nvram Failed to initializae (startup missing)
CSCvt13518	QoS ACL matching incorrectly when udp range is used
CSCvt22293	C9400: %PMAN-0-PROCFAILCRIT: R0/0: pvp: A critical process cmand has failed
CSCvt27570	interface with 100FX SFP stuck in up-state
CSCvt31437	DAD links go into err-disable due to portfast bpduguard global config when both members reload
CSCvt33163	'sh controllers ethernet-controller g1/0/1 ph d' is not showing PHY register dump
CSCvt39133	OID cswDistrStackPhyPortInfo triggers memory leak
CSCvt50788	Cat9400 mGig interop issues with other mGig devices causes link flaps
CSCvt52532	16.9.4 - Cat9400 links used for SVL not coming up after SFP QSFP-40G-SR-BD reseat.
CSCvt65043	PSU Operating State changes to combined when "power budget mode single-sup" is enabled
CSCvt74856	C9407R Operating Redundancy mode shown as SSO after standby SUP fullly booting up.
CSCvu15007	Crash when invalid input interrupts a role-based access-list policy installation
CSCvu37176	SPAN filter cannot work well when configure FSPAN after 5th session.
CSCvu95137	snmp monitoring tool timesout for ciscoEntitySensorMIB 1.3.6.1.4.1.9.9.91.1.1.1.1

Resolved Caveats in Cisco IOS XE Fuji 16.9.5

Identifier	Description
CSCvj91911	C9400: Kernel error msgs are printed on the console log during boot up.
CSCvm72574	16.6.4 CPP Police rate wrong in "class system-cpp-police-control-low-priority"
CSCvn78069	memory leak @ ngmodslot_get_chassis_id(linux_iosd-imag process).
CSCvo36359	C9400: Enable TestUnusedPortLoopback.
CSCvo81311	FMAN-RP crash observed on Guest Anchor
CSCvp62101	C9400 ~3sec Traffic Loss on Uplink Port Channel After Active SUP removal
CSCvp84502	ERSPAN destination does not work or forward traffic
CSCvq05337	Cat3k/9k EGR_INVALID_REWRITE counter increasing in mVPN setup
CSCvq13053	NAT translation entry not cleared after fin-rst time-out
CSCvq22011	IOS-XE drops ARP reply when IPDT gleans from ARP
CSCvq30464	CAT9400: MTU config not getting applied to inactive ports becoming active
CSCvq38901	Enable CDP - removed on shut/ no shut dot1Q-tunnel interface
CSCvq44397	Cat3k/9k Ospf down upon switchover with aggressive timers "hello-interval 1" and "dead-interval 4"
CSCvq50632	C9410 - SUP uplinks and/or slot 7 or slot 8 stop passing traffic or fail POST upon SUP failover
CSCvq50846	ip verify source mac-check prevents device tracking from getting arp probe reply
CSCvq55940	%BIT-4-OUTOFRANGE: bit 4095 is not in the expected range of 1 to 4093
CSCvq66802	igmp query with src ip 0.0.0.0 is not ignored
CSCvq68337	Cat3k/9k does not forward packet when active route down
CSCvq72472	Private-vlan mapping XXX configuration under SVI is lost from run config after switch reload
CSCvq72713	Cat3k/Cat9k can't forwarding traffic follow the rule of EIGRP unequal cost load-balancing
CSCvq75887	intermediate hop with SVI in PIM domain is not forwarding multicast traffic
CSCvq91675	The active and the standby Sup crashes due to ccmc crash when upgraded to 16.12.1.
CSCvq92567	SVL Switchover: standby reloads during bootup
CSCvq94738	The COPP configuration back to the default After rebooting the device

Identifier	Description
CSCvr03905	Memory Leak on FED due to IPv6 Source Guard
CSCvr04551	Multicast stream flickers on igmp join/leave
CSCvr04660	change show module output from faulty to post-fail for post failures
CSCvr09651	[C9400] - Loss of data-plane traffic and both supervisor engines missing in system after failover.
CSCvr20522	Cat3k/9k BOOTREPLY dropped when DHCP snooping is enabled
CSCvr23358	Switches are adding Device SGT to proxy generated IGMP leave messages while keeping End host src IP
CSCvr29921	Inserting 1Gige SFP (GLC-SX-MMD or SFP GE-T) to SUP port causes another port to link flap.
CSCvr38087	Diagnostics errors after the Line Card OIR on C9400
CSCvr40421	9400-SVL : block command "switch 1 role active" when switch is in Stackwise-Virtual mode
CSCvr43959	C9400 ISSU to 16.9.4 or 16.12.1c With Port Security Enabled Causes Traffic Loss
CSCvr46622	Cat9k || scaled mVPN || tracebacks and errors seen in FED trace
CSCvr46931	ports remain down/down object-manager (fed-ots-mo thread is stuck)
CSCvr48249	High memory utilization under fman_fp_image
CSCvr51939	Inactive Interfaces Incorrectly Holding Buffers, causing output drops on 9400 SUP active ports.
CSCvr59959	Cat3k/9k Flow-based SPAN(FSPAN) can only work in one direction when mutilple session configured
CSCvr63642	To address sync done message missing after LC OIR and switchover resulting in HMS timeout
CSCvr79474	HW-faulty not present in OID list for cefcModuleOperStatus object MIB:CISCO-ENTITY-FRU-CONTROL-MIB
CSCvr80063	Catalyst 9400: Memory leak due to bcm54185-debug-slotX file in /tmp
CSCvr82402	SNMP timeout when querying entSensorValueEntry
CSCvr86223	c9400 Not able to configure power redundancy mode in SVL
CSCvr88090	Cat3k/9k crash on running show platform software fed switch 1 fss abstraction
CSCvr98281	After valid ip conflict, SVI admin down responds to GARP
CSCvr98368	CAT9K intermittently not responding to SNMP

Identifier	Description
CSCvs14374	16.9.2 ES standby crashed
CSCvs21266	POST failures seen on svl SUP slot with polaris_dev images
CSCvs29659	To commit 0x1A PSE firmware to 16.9.5 throttle
CSCvs30569	cmand crash after removal fantray
CSCvs32426	Chassis Manager crash occurs when connected to device via RJ-45 console.
CSCvs50868	Fed memory leak in 16.9.X related to netflow

Resolved Caveats in Cisco IOS XE Fuji 16.9.4

Caveat ID Number	Description
CSCvj15473	Linux IOSD crash with sh vtp counters cmd
CSCvj84601	Called-Station-Id attribute not included in Radius Access-Request
CSCvk44304	"show env" and SNMP output don't show correct sensor info for remote chassis
CSCvk60809	Wrong Time-Stamp is saved in pcap.
CSCvm55520	C9407R - C9400-PWR-3200AC Power Supply goes into faulty state randomly ("n.a.")
CSCvm80443	IOSd memory leak within DSMIB Server within xqos_malloc_wrapper
CSCvm91107	standby reloads and crashed @fnf_ios_config_dist_validate_sel_process_add
CSCvm91642	MACsec SAP 128 Bits doesn't work with network-essentials license
CSCvn30230	Catalyst 3k/9k: Slow memory leak in linux_iosd-imag
CSCvn57892	High Memory utilization due to Wireless Manager IOSD process
CSCvn69629	ND packets received in remote vtep SISF table - EVPN part
CSCvn99482	IPv6 traffic is stopped on interface when more than 3 invalid ARPs are detected
CSCvo02389	"system disable password recovery switch all" is not available
CSCvo05751	Changes for sending vlan attrs in access request
CSCvo21122	Memory leak at hman process
CSCvo33809	9400: Input QoS policy may not get installed in Hardware
CSCvo41632	C9400-LC-48U goes to faulty status when specific MAC ACL is applied on interfaces
CSCvo42353	SDA-Cat9k-External border creating incorrect CEF/map-cache entry due to multicast

Caveat ID Number	Description
CSCvo49876	SISF not honoring 1 IPv4-to-MAC rule when DHCP ACK comes from a different VLAN (via Relay)
CSCvo56629	Cat9500 - Interface in Admin shutdown showing incoming traffic and interface Status led in green.
CSCvo57768	NetFlow issue 3850 switch not sending TCP flags
CSCvo60400	errdisable detect cause bpduguard shutdown vlan continues to forward BPDUs
CSCvo61570	spanning-tree uplinkfast max-update-rate's value is abnormal
CSCvo65974	QinQ tunnels causing L2 loop in specific topology of Cat3850
CSCvo66246	Enabling SPAN source of VLAN 1 affects LACP operations
CSCvo71264	Cat3k / Cat9k Gateway routes DHCP offer incorrectly after DHCP snooping
CSCvo73205	Identity policy won't update after config changes.
CSCvo73897	[SDA] [PI changes] No audio during first few seconds of voice call between 2 Fabric Edge
CSCvo75559	Cat9300 | First packet not forwarded when (S,G) needs to be built
CSCvo78538	Counters in the "show interface" command are not increasing
CSCvo85422	Directly connected IPv4/IPv6 hosts not programmed in HW - %FMFP-3-OBJ_DWNLD_TO_DP_FAILED
CSCvp00026	[SDA] [PD changes] No audio during first few seconds of voice call between 2 Fabric Edge
CSCvp03816	ENH Hex dump constantly logging when registering access point using DNAC
CSCvp09091	When sourcing Radius from loopback in VRF, auth right out of boot up might fail
CSCvp12187	Standby switch crash due to memory leak due to Switch Integrated Security feature
CSCvp13114	Cat9400 incoming packet from PVLAN access port is not forwarded out on etherchannel interface
CSCvp26792	Cat9k control plane impacted when > 1Gbps multicast passes through and no entry in IGMP snooping
CSCvp30629	Cat9300: Lisp site entry count mismatch in external dual border on reload
CSCvp33294	Cat9k || Asic 0 Core 0 buffer stuck, rwePbcStall seen
CSCvp37170	9500-40X Stackwise virtual split after many days
CSCvp40743	Cat9400 crashing after running 'test platform soft fed active xcvr lpn <> <> dump <> <>' command

Caveat ID Number	Description
CSCvp45948	Ports on empty slot incorrectly holding Buffers, causing drops on active Ports with same ASIC & Core
CSCvp49518	DHCP SNOOPING DATABASE IS NOT REFRESHED AFTER RELOAD
CSCvp54581	C9400-LC-48U fails POST after Hot Swapping with C9400-LC-48UX/C9400-LC-24XS
CSCvp54779	[SDA] 1st ARP Reply is dropped at remote Fabric Edge
CSCvp55337	C9400 Uplink Port Channel Link Flap After Active SUP removal
CSCvp65173	SDA: DHCP offer being dropped on BN with L2 and L3 Handoff configured
CSCvp72220	crash at sisf_show_counters after entering show device-tracking counters command
CSCvp75221	Modules shows faulty status when specific MAC ACL is applied on interfaces
CSCvp81190	%FED_QOS_ERRMSG-3-TABLEMAP_INGRESS_HW_ERROR was generated after setting policy-map with table-map
CSCvp85601	STP TCN is generated on etherchannel port during a switchover in a 3850 stack
CSCvp86983	Connectivity over AC tunnel broken due to tunnel deletion from FMAN FP but remains FMAN FP
CSCvp89755	VPN label is wrongly derived as explicit-null in Cat9k for L3 VPN traffic
CSCvp90279	Catalyst switches is sending ADV and REP DHCPv6 packets to SISF when source udp port is not 547
CSCvq09504	Cat9400 CMCC memory leak when line cards are shut down
CSCvq17688	Packets could loop between supervisor and linecard on Catalyst 9400
CSCvq30316	[SDA] 1st ARP fix for CSCvp00026 is eventually failing after longevity
CSCvq30460	SYS-2-BADSHARE: Bad refcount in datagram_done - messages seen during system churn
CSCvq40137	Mac address not being learnt when "auth port-control auto" command is present
CSCvq43450	C9400 Sup uplinks with netflow configuration stopped forwarding traffic after switchover
CSCvq55779	FIVE GIG INTERFACE NOT SHOWING IN CLI WHILE CONFIGURING IP IGMP SNOOPING

Resolved Caveats in Cisco IOS XE Fuji 16.9.3

Identifier	Description
CSCuw36080	SNMP with Extended ACL

Identifier	Description
CSCvi78178	SUP-1 and SUP-1XL should not form HA
CSCvj73828	output drops counter mismatch after applied "qos queue-softmax-multiplier 1200"
CSCvj79694	sgt-map gets cleared for some of the end points for unknown reason
CSCvk45142	Crash with smd fault on rp_0_0
CSCvk66900	16.6.3 - IP radius source command does not take affect after reboot
CSCvm07353	Router may crash when a SSH session is closed after configure TACACS
CSCvm16012	C9400: Group of 4 ports stop forwarding traffic
CSCvm46851	16.9.1 / 2 - LC not power down if autoLC after standby SUP OIR
CSCvm47335	IOSd: large amount of bursty IPC traffic sometime can cause high CPU utilization in fastpath
CSCvm59949	Cat9400 | MAT event not generated in EEM when MAC address is added or removed from MAC add table
CSCvm70276	Cat9400: Continuous Failed Identification Test msg when inserting a linecard
CSCvm82912	C9400/16.6.4- standby sup port shows green LED even when port is err-disabled due to POST fail
CSCvm87134	Cat9K stackwise-virtual- Smart license registration status is lost after 2 to 3 multiple reloads/SSO
CSCvm94788	Device reloads when applying #client <IP> vrf Mgmt-vrf server-key 062B0C09586D590B5656390E15
CSCvn02171	HOLE is not created when acl default passthrough configured
CSCvn13181	Active SUP v2 removal causing IOMD to restart
CSCvn31653	Missing/incorrect FED entries for IGMP Snooping on Cat9300/Cat3850/Cat3650
CSCvn36494	WCCP redirection to proxy server breaks in certain scenarios.
CSCvn38590	CTS policies download fails with Missing/Incomplete ACEs error
CSCvn46171	Rapid Memory Leak in "FED Main Event" Process due to Modifying Adjacencys
CSCvn58515	Ac Tunnel in "pending-issue-update" state in FMAN FP
CSCvn65834	Packet drops on mgig ports due to link negotiation issue
CSCvn71041	TACACS group server is not seen, when "transport-map type console test" is configured.
CSCvn72973	Device is getting crashed on the "cts role-based enforcement"

Identifier	Description
CSCvn83359	IOSD Memory Leak in SVL
CSCvn97400	Potential memleak with crimson_tam_boot_integrity_init in 6.9.2 in IOS
CSCvn99610	'speed nonegotiate' config disappears after reload - C9400-LC-24S
CSCvo00968	Radius attr 32 NAS-IDENTIFIIER not sending the FQDN
CSCvo08436	C9400 - Half-Pair Ethernet Cables do not auto-negotiate to 100 Full with Certain IP Phones
CSCvo17778	Cat9k not updating checksum after DSCP change
CSCvo32446	High CPU Due To Looped Packet and/or Unicast DHCP ACK Dropped
CSCvo33983	Mcast traffic loss seen looks due to missing fed entries during IGMP/MLD snooping.

Resolved Caveats in Cisco IOS XE Fuji 16.9.2

Identifier	Description
CSCvg81784	Converting a layer 2 port-channel to L3 causes some Protocols to break
CSCvj16271	Addressing memory leaks in IPC error handling cases in LED, RPS, VMARGIN, USB, THERMAL
CSCvj66609	DHCP offer received from SVI sent back to the same SVI when DHCP Snooping is enabled
CSCvj75719	System returning incorrect portchannel MIB value (IEEE8023-LAG-MIB)
CSCvk06087	mGig ports on C9400 - Link down with forced speed 100/full duplex when connect to half duplex device
CSCvk06857	Standby also going down during SWO with CONN_ERR_CONN_TIMEOUT_ERR
CSCvk16813	DHCP client traffic dropped with DHCP snooping and port-channel or cross stack uplinks.
CSCvk27755	9410:Duplicate client LE index assigned to the client over slot 9 & slot 10 (CSCvi09442)
CSCvk32563	Catalyst 9400 cmand memory leak
CSCvk33369	Stack-merge on Stby and CONN_ERR_CONN_TIMEOUT_ERR on Active with multiple SWO
CSCvk53444	Packets with Fragment Offset not forwarded with DHCP Snooping Enabled
CSCvk53452	2nd sso of 9400 cause mac flapping under other switches
CSCvm07921	OOB TX path excessive congestion cause software to force crash a switch

Identifier	Description
CSCvm16012	C9400: Group of 4 ports stop forwarding traffic
CSCvm36748	FED crash at expired "FED MAC AGING TIMER" or "unknown" timer without a stack trace.

Resolved Caveats in Cisco IOS XE Fuji 16.9.1

Identifier	Description
CSCvf66725	[Cat9400] After switchover, ping does not work for management interface
CSCvg57547	[cat9400] No dataplane traffic on 40gb ports due to issues with QSFP
CSCvg76770	Same Serial number displayed for both supervisors in show module output
CSCvh63530	MPLS traffic drops with ECMP loadbalance towards core. All cat9ks
CSCvh96261	EXP based Queuing on cat9k platforms
CSCvi38191	Memory leak in lman process due to "ld_license_ext.dat" build-up.
CSCvi75488	Ping from client fails with enforcement enabled on known mappings
CSCvi78178	SUP-1 and SUP-1XL should not form HA

Troubleshooting

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

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

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

Related Documentation

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

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

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

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

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