Release Notes for Cisco Catalyst 3650 Series Switches, Cisco IOS XE Fuji 16.8.x

First Published: 2018-04-06

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Introduction

Cisco Catalyst 3650 Series Switches are the next generation of enterprise class stackable access layer switches, with the new and improved 160-Gbps StackWise-160. Security and application visibility and control are natively built into the switch.

Cisco Catalyst 3650 Series Switches also support full IEEE 802.3 at Power over Ethernet Plus (PoE+), modular and field replaceable network modules, redundant fans, and power supplies. Cisco Catalyst 3650 Series Switches enhance productivity by enabling applications such as IP telephony and video for a true borderless network experience.

Cisco IOS XE represents the continuing evolution of the preeminent Cisco IOS operating system. The Cisco IOS XE architecture and well-defined set of APIs extend the Cisco IOS software to improve portability across platforms and extensibility outside the Cisco IOS environment. The Cisco IOS XE software retains the same look and feel of the Cisco IOS software, while providing enhanced future-proofing and improved functionality.

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Whats New in Cisco IOS XE Fuji 16.8.1a

Software Features in Cisco IOS XE Fuji 16.8.1a

Feature Name	Description and License Level Information
AVC: NBAR2 attribute support for QoS	Wired Application Visibility and Control (Wired AVC) Attribute-based QoS (EasyQoS)—Support for defining QoS classes and policies based on Network-Based Application Recognition (NBAR) attributes instead of specific protocols, is available, with a few limitations. Only business-relevance and traffic-class are the supported NBAR attributes. (IP Base and IP Services)
DHCPv6: Client Link-Layer Address Option (RFC 6939)	Defines an optional mechanism and the related DHCPv6 option to allow first-hop DHCPv6 relay agents (relay agents that are connected to the same link as the client) to provide the client's link-layer address in the DHCPv6 messages being sent towards the server. (LAN Base, IP Base, and IP Services)
DHCPv6: Support for Option 52 and DNS Search List (DNSSL) Option	Wireless access points use the The Dynamic Host Configuration Protocol version 6 (DHCPv6) option 52 (RFC 5417) to supply the IPv6 management interface addresses of the primary, secondary, and tertiary wireless controllers. The DNSSL option is a list of DNS suffix domain names used by IPv6 hosts when they perform DNS query searches for short, unqualified domain names. The DNSSL option contains one or more domain names. (LAN Base, IP Base, and IP Services)

Feature Name	Description and License Level Information
Support for validation of DHCP Option 125	DHCP option 125 is used by DHCP clients and servers to identify vendor-specific information. Support for validation of DHCP option 125 is enabled if the switch is configured as a DHCP relay agent or if the DHCP snooping feature is turned on. Note that the switch drops those packets that do not conform to the RFC3925 format (HEX format) of option 125.
Fast Software Upgrade (FSU)	Reduces traffic downtime during a software upgrade or reload. The fast software upgrade feature is supported on both stacking and standalone systems. **Note** The feature is supported only with software upgrade in the install mode. (LAN Base, IP Base, and IP Services)
IEEE 1588v2, Precision Time Protocol (PTP) support	PTP is defined in IEEE 1588 as Precision Clock Synchronization for Networked Measurements and Control Systems, and was developed to synchronize the clocks in packet-based networks that include distributed device clocks of varying precision and stability. A PTP profile is the set of allowed PTP features applicable to a device. Only the default profile is available in Cisco IOS XE Fuji 16.8.1a. (IP Base and IP Services)
IP-aware Ingress Netflow on VRF Interfaces	Enables the collection of virtual routing and forwarding (VRF) IDs from incoming packets on a device by applying an input flow monitor having a flow record that collects the VRF ID as a key or a non-key field. IP-aware VRF ingress Netflow is supported only on the ingress traffic with IPv4, IPv6 and Multicast Virtual Private Network version 4 (MVPNv4) as Customer Edge Router (CE) facing interface. (IP Services)

Feature Name	Description and License Level Information
Media Access Control Security (MACsec): Must-Secure Support for SW-SW MACsec (128-bit and 256-bit encryption)	Support for the must-secure feature is enabled for MKA uplink. With must-secure, all the packets in data traffic are encrypted and unencrypted packets are dropped. (LAN Base, IP Base, and IP Services)
MACsec enhancements—MACsec Variable length CKN and Optional support for ICV	• MACsec Variable length CKN—Connectivity association key name (CKN) is enhanced to support variable length key-string for 128-bit encryption of MKA-PSK sessions. The range for CKN key-string varies from 1 to 32 hex-digits. • Optional support for ICV—A switch configured with MACsec accepts either MACsec or non-MACsec frames, depending on the policy associated with the MKA peer. MACsec frames are encrypted and protected with an integrity check value (ICV). Starting with this release, the ICV indicator in the MACsec Key Agreement Protocol Data Unit (MKPDU) is made optional. (IP Base and IP Services)
OCSP multiple response handling	Enables support to handle multiple Online Certificate Status Protocol (OCSP) single responses on an OCSP client. (IP Services)

Feature Name	Description and License Level Information
Programmability	

Feature Name	Description and License Level Information
	• Guest Shell Logging and Tracing Support—Provides logging services for guest applications that run separately from the host system, to report tracing data to the host file system. The tracing data is saved in an IOX tracelog and the logging data is saved in the IOS syslog, on the host machine. • Model Based AAA—Implements the NETCONF Access Control Model (NACM). NACM is a form of role-based access control (RBAC) specified in RFC 6536. • NETCONF Global Session Lock and Kill Session—Provides a global lock and the ability to kill non-responsive sessions in NETCONF. During a session conflict or client misuse of the global lock, NETCONF sessions can be monitored via the **show netconf-yang sessions** command, and non-responsive sessions can be cleared using the clear configuration lock command. • NETCONF and RESTCONF Debug commands—Commands for debugging were added. • NETCONF and RESTCONF IPv6 Support—Data model interfaces (DMIs) support the use of IPv6 protocol. DMI IPv6 support helps client applications to communicate with services that use IPv6 addresses. External facing interfaces will provide dual-stack support; both IPv4 and IPv6. • RESTCONF—Provides an RFC 8040 compliant HTTP-based protocol that provides a programmatic interface for accessing data defined in YANG, using the datastore concepts defined in NETCONF. • 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/1681. 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. • Operational Data Parser Polling—Starting with

Feature Name	Description and License Level Information
	Cisco IOS XE Fuji 16.8.1a, the Operational Data Parser Polling feature is deprecated. All operational data models provide direct operational data model access, hence this feature is no longer required. (LAN Base, IP Base, and IP Services)
Right-To-Use (RTU) Add-On Licenses	Enables configuration of the DNA Essentials and DNA Advantage add-on licenses on the switch. 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). Add-On Licenses require an RTU image-based as a pre-requisite: • The DNA Essentials add-on license can be purchased with LAN Base, IP Base, or IP Services image-based licenses. • The DNA Advantage (Contains DNA Essentials plus more) add-on license can be purchased only with IP Base or IP Services image-based licenses. A license level does not apply
Transmission Control Protocol (TCP) Maximum Segment Size (MSS) Adjustment	Enables configuration of the maximum segment size for transient packets that traverse the device during a TCP session. (IP Base and IP Services)

New on the Web UI	
These features are introduced on the Web UI in this release	• Python Sandbox—A new sandbox is introduced that to allows you to learn the Python APIs available to execute IOS commands (both Configuration and EXEC CLIs) and NETCONF requests. You can try sample Python scripts to see how the network device responds to them and get a better understanding of how Python APIs operate on the device. You can safely run your Python scripts in the sandbox before applying them to the network device. • Expose the password life time details from AAA to Web UI—A new security mechanism for defining rules, constraints and restrictions when specifying user passwords.

Important Notes

Unsupported Features

- 802.1x Configurable username and password for MAC Authentication Bypass (MAB)
- AAA: TACACS over IPv6 Transport
- Cisco Group Management Protocol (CGMP)
- Cisco Plug-In for OpenFlow (OpenFlow 1.0 and 1.3) is available in Cisco IOS XE Release 3.7.3E, but is not supported in Cisco IOS XE Fuji 16.8.x.
- Cisco TrustSec 802.1x
- Cisco TrustSec critical authentication
- Cisco Networking Services (CNS) configuration agent
- Converged Access (CA) is not supported beyond Cisco IOS XE Denali 16.3.x.

  On the Cisco Catalyst 3650 Series Switches, CA is supported in the Cisco IOS XE Denali 16.3.x software release, which has extended support for 40 months.
- Command Switch Redundancy
- Device classifier for Auto Smartports (ASP)
- Dynamic Host Configuration Protocol (DHCP) snooping ASCII circuit ID
- DHCP version 6 (DHCPv6) relay source configuration
- Distance Vector Multicast Routing Protocol (DVMRP) tunneling
- Dynamic access ports
- EX SFP Support (GLC-EX-SMD)

- Fallback bridging for non-IP traffic
- IEEE 802.1X-2010 with 802.1AE support
- Improvements in QoS policing rates
- Ingress Strict Priority Queuing (Expedite)
- IP-in-IP (IPIP) Tunneling
- IP SLA Media Operation
- IPsec
- IPv6 support for Internet Key Exchange (IKE) versoin 2 / IP Security (IPSec) version 3
- IPv6 ready logo phase II - host
- IPv6 static route support on LAN Base images
- IPv6 strict host mode
- Layer 2 tunneling protocol enhancements
- Link-state tracking
- Mesh, FlexConnect, and OfficeExtend access point deployment
- Medianet
- MSE 8.x is not supported with Cisco IOS XE Denali 16.x.x.
- Passive monitoring
- Per VLAN policer
- Performance Monitor (Phase 1)
- Port security on EtherChannels
- Pragmatic General Multicast (PGM)
- RFC 4292 IP-FORWARD-MIB (IPv6 only)
- RFC 4293 IP-MIB (IPv6 only)
- RFC4292/RFC4293 MIBs (IPv6 only)
- RFC5460 DHCPv6 Bulk leasequery
- Stack ports buffer is not shared as part of the shared pool. The dedicated buffer for stack ports can only be used by stack ports.
- Trust boundary configuration
- UniDirectional Link Routing (UDLR)
- VLAN access control lists (VACL) logging of access denied
- Virtual Routing and Forwarding (VRF)-Aware web authentication
- Web-Based Authentication without SVI

- Weighted Random Early Detection (WRED)

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. For information about CLI help, see Understanding the Help System. Such hidden commands are only meant to assist Cisco TAC in advanced troubleshooting and are therefore not documented.

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

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

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

- The commands have CLI help. 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 3650 Series Switches—Model Numbers

Switch Model	Cisco IOS Image	Description
WS-C3650-24TS-L	LAN Base	Stackable 24 10/100/1000 Ethernet downlink ports and four 1-Gigabit SFP (small form-factor pluggable) uplink ports, 250-W power supply
WS-C3650-48TS-L	LAN Base	Stackable 48 10/100/1000 Ethernet downlink ports and four 1-Gigabit SFP uplink ports, 250-W power supply
WS-C3650-24PS-L	LAN Base	Stackable 24 10/100/1000 PoE+ downlink ports, four 1-Gigabit SFP uplink ports, 640-W power supply. PoE+ = Power over Ethernet plus (provides up to 30 W per port).
WS-C3650-48PS-L	LAN Base	Stackable 48 10/100/1000 PoE+ downlink ports, four 1-Gigabit SFP uplink ports, 640-W power supply
WS-C3650-48FS-L	LAN Base	Stackable 48 10/100/1000 Full PoE downlink ports, four 1-Gigabit SFP uplink ports, 1025-W power supply
WS-C3650-24TD-L	LAN Base	Stackable 24 10/100/1000 Ethernet downlink ports, two 1-Gigabit SFP and two 10-Gigabit SFP+ uplink ports, 250-W power supply
WS-C3650-48TD-L	LAN Base	Stackable 48 10/100/1000 Ethernet downlink ports, two 1-Gigabit SFP and two 10-Gigabit SFP+ uplink ports, 250-W power supply
WS-C3650-24PD-L	LAN Base	Stackable 24 10/100/1000 PoE+ downlink ports, two 1-Gigabit SFP and two 10-Gigabit SFP+ uplink ports, 640-W power supply
WS-C3650-48PD-L	LAN Base	Stackable 48 10/100/1000 PoE+ downlink ports, two 1-Gigabit SFP and two 10-Gigabit SFP+ uplink ports, 640-W power supply
WS-C3650-24PDM-L	LAN Base	Stackable 24 10/100/1000 PoE+ downlink ports, two 1-Gigabit SFP uplink ports and two 10-Gigabit SFP+ uplink ports, Fixed 640-W power supply
WS-C3650-48FD-L	LAN Base	Stackable 48 10/100/1000 Full PoE downlink ports, two 1-Gigabit SFP and two 10-Gigabit SFP+ uplink ports, 1025-W power supply

Switch Model	Cisco IOS Image	Description
WS-C3650-48FQ-L	LAN Base	Stackable 48 10/100/1000 Full PoE downlink ports, four 10-Gigabit SFP+ uplink ports, 1025-W power supply
WS-C3650-48FQM-L	LAN Base	Stackable 48 10/100/1000 Full PoE downlink ports, four 10-Gigabit SFP+ uplink ports., Fixed 975-W power supply
WS-C3650-48PQ-L	LAN Base	Stackable 48 10/100/1000 PoE+ downlink ports, four 10-Gigabit SFP+ uplink ports, 640-W power supply
WS-C3650-48TQ-L	LAN Base	Stackable 48 10/100/1000 Ethernet downlink ports, four 10-Gigabit SFP+ uplink ports, 250-W power supply
WS-C3650-8X24UQ-L	LAN Base	Stackable 8 100M/1G/2.5G/5G/10G Cisco UPOE™ downlink ports, 16 10/100/1000 Cisco UPOE™ downlink ports, four 10-Gigabit uplink SPF+ ports, 1100-W power supply
WS-C3650-12X48UZ-L	LAN Base	Stackable 12 100M/1G/2.5G/5G/10G Cisco UPOE™ downlink ports, 36 10/100/1000 Cisco UPOE™ downlink ports, two 40-Gigabit uplink QSFP+ ports, 1100-W power supply
WS-C3650-12X48UR-L	LAN Base	Stackable 12 100M/1G/2.5G/5G/10G Cisco UPOE™ downlink ports, 36 10/100/1000 Cisco UPOE™ downlink ports, eight 10-Gigabit uplink SFP+ ports, 1100-W power supply
WS-C3650-12X48UQ-L	LAN Base	Stackable 12 100M/1G/2.5G/5G/10G Cisco UPOE™ downlink ports, 36 10/100/1000 Cisco UPOE™ downlink ports, four 10-Gigabit uplink SFP+ ports, 1100-W power supply
WS-C3650-12X48FD-L	LAN Base	Stackable 12 100M/1G/2.5G/5G/10G Full PoE downlink ports, 36 10/100/1000 Full PoE downlink ports, 2 10-Gigabit SFP+ uplink ports, 1100-W power supply
WS-C3650-24TS-S	IP Base	Stackable 24 10/100/1000 Ethernet downlink ports, four 1-Gigabit SFP uplink ports, 250-W power supply
WS-C3650-48TS-S	IP Base	Stackable 48 10/100/1000 Ethernet downlink ports, four 1-Gigabit SFP uplink ports, 250-W power supply
WS-C3650-24PS-S	IP Base	Stackable 24 10/100/1000 PoE+ downlink ports, four 1-Gigabit SFP uplink ports, 640-W power supply
WS-C3650-48PS-S	IP Base	Stackable 48 10/100/1000 PoE+ downlink ports, four 1-Gigabit SFP uplink ports, 640-W power supply

Switch Model	Cisco IOS Image	Description
WS-C3650-48FS-S	IP Base	Stackable 48 10/100/1000 Full PoE downlink ports, four 1-Gigabit SFP uplink ports, 1025-W power supply
WS-C3650-24TD-S	IP Base	Stackable 24 10/100/1000 Ethernet downlink ports, two 1-Gigabit SFP and two 10-Gigabit SFP+ uplink ports, 250-W power supply
WS-C3650-48TD-S	IP Base	Stackable 48 10/100/1000 Ethernet downlink ports, two 1-Gigabit SFP and two 10-Gigabit SFP+ uplink ports, 250-W power supply
WS-C3650-24PD-S	IP Base	Stackable 24 10/100/1000 PoE+ downlink ports, two 1-Gigabit SFP and two 10-Gigabit SFP+ uplink ports, 640-W power supply
WS-C3650-48PD-S	IP Base	Stackable 48 10/100/1000 PoE+ downlink ports, two 1-Gigabit SFP and two 10-Gigabit SFP+ uplink ports, 640-W power supply
WS-C3650-24PDM-S	IP Base	Stackable 24 10/100/1000 PoE+ downlink ports, two 1-Gigabit SFP uplink ports, two 10-Gigabit SFP+ uplink ports, Fixed 640-W power supply
WS-C3650-48FD-S	IP Base	Stackable 48 10/100/1000 Full PoE downlink ports, two 1-Gigabit SFP and two 10-Gigabit SFP+ uplink ports, 1025-W power supply
WS-C3650-48FQ-S	IP Base	Stackable 48 10/100/1000 Full PoE downlink ports, four 10-Gigabit SFP+ uplink ports, 1025-W power supply
WS-C3650-48FQM-S	IP Base	Stackable 48 10/100/1000 Full PoE downlink ports, four 10-Gigabit SFP+ uplink ports, Fixed 975-W power supply
WS-C3650-48PQ-S	IP Base	Stackable 48 10/100/1000 PoE+ downlink ports, four 10-Gigabit SFP+ uplink ports, 640-W power supply
WS-C3650-48TQ-S	IP Base	Stackable 48 10/100/1000 Ethernet downlink ports, four 10-Gigabit SFP+ uplink ports, 250-W power supply
WS-C3650-8X24UQ-S	IP Base	Stackable 8 100M/1G/2.5G/5G/10G Cisco UPOE™ downlink ports, 16 10/100/1000 Cisco UPOE™ downlink ports, four 10-Gigabit uplink SPF+ ports, 1100-W power supply
WS-C3650-12X48UZ-S	IP Base	Stackable 12 100M/1G/2.5G/5G/10G Cisco UPOE™ downlink ports, 36 10/100/1000 Cisco UPOE™ downlink ports, two 40-Gigabit uplink QSFP+ ports, 1100-W power supply

Switch Model	Cisco IOS Image	Description
WS-C3650-12X48UR-S	IP Base	Stackable 12 100M/1G/2.5G/5G/10G Cisco UPOE™ downlink ports, 36 10/100/1000 Cisco UPOE™ downlink ports, eight 10-Gigabit uplink SFP+ ports, 1100-W power supply
WS-C3650-12X48UQ-S	IP Base	Stackable 12 100M/1G/2.5G/5G/10G Cisco UPOE™ downlink ports, 36 10/100/1000 Cisco UPOE™ downlink ports, four 10-Gigabit uplink SFP+ ports, 1100-W power supply
WS-C3650-24TS-E	IP Services	Stackable 24 10/100/1000 Ethernet downlink ports, four 1-Gigabit SFP uplink ports, 250-W power supply
WS-C3650-48TS-E	IP Services	Stackable 48 10/100/1000 Ethernet downlink ports, four 1-Gigabit SFP uplink ports, 250-W power supply
WS-C3650-24PS-E	IP Services	Stackable 24 10/100/1000 PoE+ downlink ports, four 1-Gigabit SFP uplink ports, 640-W power supply
WS-C3650-48PS-E	IP Services	Stackable 48 10/100/1000 PoE+ downlink ports, four 1-Gigabit SFP uplink ports, 640-W power supply
WS-C3650-48FS-E	IP Services	Stackable 48 10/100/1000 Full PoE downlink ports, four 1-Gigabit SFP uplink ports, 1025-W power supply
WS-C3650-24TD-E	IP Services	Stackable 24 10/100/1000 Ethernet downlink ports, two 1-Gigabit SFP and two 10-Gigabit SFP+ uplink ports, 250-W power supply
WS-C3650-48TD-E	IP Services	Stackable 48 10/100/1000 Ethernet downlink ports, two 1-Gigabit SFP and two 10-Gigabit SFP+ uplink ports, 250-W power supply
WS-C3650-24PD-E	IP Services	Stackable 24 10/100/1000 PoE+ downlink ports, two 1-Gigabit SFP and two 10-Gigabit SFP+ uplink ports, 640-W power supply
WS-C3650-48PD-E	IP Services	Stackable 48 10/100/1000 PoE+ downlink ports, two 1-Gigabit SFP and two 10-Gigabit SFP+ uplink ports, 640-W power supply
WS-C3650-24PDM-E	IP Services	Stackable 24 10/100/1000 PoE+ downlink ports, two 1-Gigabit SFP uplink ports, two 10-Gigabit SFP+ uplink ports, Fixed 640-W power supply
WS-C3650-48FD-E	IP Services	Stackable 48 10/100/1000 Full PoE downlink ports, two 1-Gigabit SFP and two 10-Gigabit SFP+ uplink ports, 1025-W power supply

Switch Model	Cisco IOS Image	Description
WS-C3650-48FQ-E	IP Services	Stackable 48 10/100/1000 Full PoE downlink ports, four 10-Gigabit SFP+ uplink ports, 1025-W power supply
WS-C3650-48FQM-E	IP Services	Stackable 48 10/100/1000 Full PoE downlink ports, four10-Gigabit SFP+ uplink ports, Fixed 975-W power supply
WS-C3650-48PQ-E	IP Services	Stackable 48 10/100/1000 PoE+ downlink ports, four 10-Gigabit SFP+ uplink ports, 640-W power supply
WS-C3650-48TQ-E	IP Services	Stackable 48 10/100/1000 Ethernet downlink ports, four 10-Gigabit SFP+ uplink ports, 250-W power supply
WS-C3650-8X24UQ-E	IP Services	Stackable 8 100M/1G/2.5G/5G/10G Cisco UPOE™ downlink ports, 16 10/100/1000 Cisco UPOE™ downlink ports, four 10-Gigabit uplink SPF+ ports, 1100-W power supply
WS-C3650-12X48UZ-E	IP Services	Stackable 12 100M/1G/2.5G/5G/10G Cisco UPOE™ downlink ports, 36 10/100/1000 Cisco UPOE™ downlink ports, two 40-Gigabit uplink QSFP+ ports, 1100-W power supply
WS-C3650-12X48UR-E	IP Services	Stackable 12 100M/1G/2.5G/5G/10G Cisco UPOE™ downlink ports, 36 10/100/1000 Cisco UPOE™ downlink ports, eight 10-Gigabit uplink SFP+ ports, 1100-W power supply
WS-C3650-12X48UQ-E	IP Services	Stackable 12 100M/1G/2.5G/5G/10G Cisco UPOE™ downlink ports, 36 10/100/1000 Cisco UPOE™ downlink ports, four 10-Gigabit uplink SFP+ ports, 1100-W power supply

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.

Catalyst 3650	Cisco 5700 WLC	Cisco 5508 or WiSM2	MSE/CMX	ISE	ACS	Cisco PI
Everest 16.6.4	Not applicable	Not applicable	Not applicable	2.2 2.3	5.4 5.5	PI 3.1 + PI 3.1 latest maintenance release + PI 3.1 latest device pack See Cisco Prime Infrastructure 3.1→ **Downloads**.
Everest 16.6.3	Not applicable	Not applicable	Not applicable	2.2 2.3	5.4 5.5	PI 3.1 + PI 3.1 latest maintenance release + PI 3.1 latest device pack See Cisco Prime Infrastructure 3.1→ **Downloads**.
Everest 16.6.2	Not applicable	Not applicable	Not applicable	2.2 2.3	5.4 5.5	PI 3.1 + PI 3.1 latest maintenance release + PI 3.1 latest device pack See Cisco Prime Infrastructure 3.1→ **Downloads**.
Everest 16.6.1	Not applicable	Not applicable	Not applicable	2.2	5.4 5.5	PI 3.1 + PI 3.1 latest maintenance release + PI 3.1 latest device pack See Cisco Prime Infrastructure 3.1→ **Downloads**.
Everest 16.5.1a	Not applicable	Not applicable	Not applicable	2.1 Patch 3	5.4 5.5	PI 3.1 + PI 3.1 latest maintenance release + PI 3.1 latest device pack See Cisco Prime Infrastructure 3.1→ **Downloads**.

Catalyst 3650	Cisco 5700 WLC	Cisco 5508 or WiSM2	MSE/CMX	ISE	ACS	Cisco PI
Denali 16.3.6	03.07.04E 03.06.05E	8.2.0, 8.3.0	CMX 10.2.2	2.2 Patch 2(wired and wireless)	5.4 5.5	PI update PI 3.1 + PI 3.1 latest maintenance release 3.1.7 + PI 3.1 latest device pack 16 (Wired). PI update PI 3.1 + PI 3.1 latest maintenance release 3.1.7 + PI 3.1 latest device pack 14 (Wireless). See Cisco Prime Infrastructure 3.1→ **Downloads**.
Denali 16.3.5b	03.07.04E 03.06.05E	8.2.0, 8.3.0	CMX 10.2.2	2.2 Patch 2(wired and wireless)	5.4 5.5	PI update PI 3.1 + PI 3.1.5 + PI 3.1.5 update 1 + PI 3.1 latest device pack (Wired) PI 3.1 + PI 3.1 maintenance release 7+ PI 3.1 latest device pack (Wireless) See Cisco Prime Infrastructure 3.1→ **Downloads**.
Denali 16.3.5	03.07.04E 03.06.05E	8.2.0, 8.3.0	CMX 10.2.2	2.2 Patch 2(wired and wireless)	5.4 5.5	PI update PI 3.1 + PI 3.1.5 + PI 3.1.5 update 1 + PI 3.1 latest device pack (Wired) PI 3.1 + PI 3.1 maintenance release 7+ PI 3.1 latest device pack (Wireless) See Cisco Prime Infrastructure 3.1→ **Downloads**.

Catalyst 3650	Cisco 5700 WLC	Cisco 5508 or WiSM2	MSE/CMX	ISE	ACS	Cisco PI
Denali 16.3.3	03.07.04E 03.06.05E	8.2.0, 8.3.0	CMX 10.2.2	2.1 Patch 1 (Wired and Wireless)	5.4 5.5	PI update PI 3.1 + PI 3.1.5 + PI 3.1.5 update 1 + PI 3.1 latest device pack (Wired) PI 3.1 + PI 3.1 latest maintenance release + PI 3.1 latest device pack (Wireless) See Cisco Prime Infrastructure 3.1→ **Downloads**.
Denali 16.3.2	03.07.04E 03.06.05E	8.2.0, 8.3.0	CMX 10.2.2	2.1 Patch 1 (Wired and Wireless)	5.4 5.5	PI 3.1 + PI 3.1 latest maintenance release + PI 3.1 latest device pack (Wired and Wireless) See Cisco Prime Infrastructure 3.1→ **Downloads**.
Denali 16.3.1	03.07.04E 03.06.05E	8.2.0, 8.3.0	CMX 10.2.2	2.0 Patch 3 1.4 Patch 7 1.3 Patch 6 (Wired and Wireless)	5.4 5.5	PI 3.1 + PI 3.1 latest maintenance release + PI 3.1 latest device pack (Wired and Wireless) See Cisco Prime Infrastructure 3.1→ **Downloads**.
Denali 16.2.2	03.07.02E 03.06.03E [4, on page 20]	8.1.0, 8.2.0	CMX 10.2.2	1.3 Patch 5 (Wired and Wireless)	5.3 5.4	3.1.0 + Device Pack 1 (Wired and Wireless) See Cisco Prime Infrastructure 3.1→ **Downloads**.
Denali 16.2.1	03.07.03E 03.06.03E [4, on page 20]	8.1.0 8.2.0	CMX 10.2.2	1.3 Patch 5 (Wired and Wireless)	5.3 5.4	3.1.0 (Wired) 3.1.0, 3.0.2 [5, on page 20] + Device Pack 4 + PI 3.0 Technology Pack (Wireless) See Cisco Prime Infrastructure 3.1→ **Downloads**.

Catalyst 3650	Cisco 5700 WLC	Cisco 5508 or WiSM2	MSE/CMX	ISE	ACS	Cisco PI
Denali 16.1.3	03.07.02E 03.06.03E [4, on page 20]	8.1.0	CMX 10.2.0	1.3 Patch 3 (Wired) 1.4 (Wireless)	5.3 5.4	3.0.2 + Device Pack 5+ PI 3.0 Technology Pack See Cisco Prime Infrastructure 3.0 → **Downloads**.
Denali 16.1.2	03.07.02E 03.06.03E [4, on page 20]	8.1.0	CMX 10.2.0	1.3 Patch 3 (Wired) 1.4 (Wireless)	5.3 5.4	3.0.2 + Device Pack 4 + PI 3.0 Technology Pack See Cisco Prime Infrastructure 3.0 → **Downloads**.
Denali 16.1.1	03.07.02E 03.06.03E [4, on page 20]	8.1.0	CMX 10.2.0	1.3 Patch 3 (Wired) 1.4 (Wireless)	5.3 5.4	3.0.2 + PI 3.0 Device Pack 2 + PI 3.0 Technology Pack See Cisco Prime Infrastructure 3.0 → **Downloads**.
03.07.03E 03.07.02E 03.07.01E 03.07.00E	03.07.03E 03.07.02E 03.07.01E 03.07.00E	8.0 8.0 8.0 7.6	8.0 [3, on page 20]	1.3	5.2 5.3	2.2 See Cisco Prime Infrastructure 2.2 → **Downloads**.
03.06.04E 03.06.03E 03.06.02aE 03.06.01E 03.06.00E	03.06.04E 03.06.02aE 03.06.01E 03.06.00E	8.0 7.6	8.0	1.3 1.2	5.2 5.3	2.2 2.2, 2.1.2, or 2.1.1 if MSE is also deployed [2, on page 20] 2.1.0 if MSE is not deployed See Cisco Prime Infrastructure 2.2 → **Downloads** and Cisco Prime Infrastructure 2.1 → **Downloads**
03.03.03SE 03.03.02SE 03.03.01SE 03.03.00SE	03.03.03SE 03.03.02SE 03.03.01SE 03.03.00SE	7.5 [1, on page 20]	7.5	1.2	5.2, 5.3	2.0 See Cisco Prime Infrastructure 2.0 → **Downloads**

Note

1. Prime Infrastructure 2.0 enables you to manage Cisco WLC 7.5.102.0 with the features of Cisco WLC 7.4.110.0 and earlier releases. Prime Infrastructure 2.0 does not support any features of Cisco WLC 7.5.102.0 including the new AP platforms.
2. If MSE is deployed on your network, we recommend that you upgrade to Cisco Prime Infrastructure 2.1.2.
3. Because of SHA-2 certificate implementation, MSE 7.6 is not compatible with Cisco IOS XE Release 3.6E and later. Therefore, we recommend that you upgrade to MSE 8.0.
4. Cisco 5700 (with Cisco IOS XE Release 03.06.03E/Cisco IOS XE Release 03.07.02E) inter-operates as a Peer MC with Catalyst 3650 running Cisco IOS XE Denali 16.1.1.
5. The Cisco IOS XE Denali 16.2.1 features are not available with 3.0.2, but 3.0.2 is compatible with Cisco IOS XE Denali 16.2.1.

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[1]	512 MB[2]	256	1024 x 768	Small

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

Software Requirements

Operating Systems

- Windows 10 or later
- Mac OS X 10.11 or later

Browsers

- Google Chrome—Version 38 or later (On Windows and Mac)
- Microsoft Edge
- Mozilla Firefox—Version 42 or later (On Windows and Mac)
- Safari—Version 9 or later (On Mac)

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.

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.

Software Images

Release	Image Type	File Name
Cisco IOS XE Fuji 16.8.1a	Universal	cat3k_caa-universalk9.16.08.01a.SPA.bin
	Universal without Datagram Transport Layer Service (DTLS)	cat3k_caa-universalk9ldpe.16.08.01a.SPA.bin

Automatic Boot Loader Upgrade

When you upgrade from any prior Cisco IOS XE 3.x.xE release to a Cisco IOS XE Denali 16.x.x, or Cisco IOS XE Everest 16.x.x, or Cisco IOS XE Fuji 16.x.x release for the first time, the boot loader may be automatically upgraded, based on the hardware version of the switch. If the boot loader is automatically upgraded, it will take effect on the next reload. If you go back to a Cisco IOS XE Release 3.x.xE, your boot loader will not be downgraded. The updated boot loader supports all previous releases.

For subsequent Cisco IOS XE Denali 16.x.x, or Cisco IOS XE Everest 16.x.x, or Cisco IOS XE Fuji 16.x.x releases, if there is a new bootloader in the release, it may be automatically upgraded based on the hardware version of the switch when you boot up your switch with the new image for the first time.

Caution Do not power cycle your switch during the upgrade.

Scenario	Automatic Boot Loader Response

If you boot Cisco IOS XE Fuji 16.8.1a the first time	The boot loader may be upgraded to version 4.66. For example:
	`BOOTLDR: CAT3K_CAA Boot Loader (CAT3K_CAA-HBOOT-M) Version 4.66, RELEASE SOFTWARE (P)`
	If the automatic boot loader upgrade occurs, while booting Cisco IOS XE Fuji 16.8.1a, you will see the following on the console:
	`%IOSXEBOOT-Tue-###: (rp/0): Oct 17 13:07:19 Universal 2017 PLEASE DO NOT POWER CYCLE ### BOOT LOADER UPGRADING 4`
	`%IOSXEBOOT-loader-boot: (rp/0): upgrade successful 4`

Automatic Microcode Upgrade

During a Cisco IOS image upgrade or downgrade on a PoE or UPoE switch, the microcode is updated to reflect applicable feature enhancements and bug fixes. Do not restart the switch during the upgrade or downgrade process.

Starting with Cisco IOS XE Denali 16.1.1 and all later releases:It takes approximately an additional 4 minutes to complete the microcode upgrade in addition to the normal reload time; however, data traffic continues to be forwarded during the upgrade. The microcode update occurs only during an image upgrade or downgrade on PoE or UPoE switches. It does not occur during switch reloads or on non-PoE switches.

The following console messages are displayed during microcode upgrade:

```
MM [1] MCU version 111 sw ver 105
MM [2] MCU version 111 sw ver 105

Front-end Microcode IMG MGR: found 4 microcode images for 1 device.
Image for front-end 0: /tmp/microcode_update/front_end/fe_type_6_0 update needed: no
Image for front-end 0: /tmp/microcode_update/front_end/fe_type_6_1 update needed: yes
Image for front-end 0: /tmp/microcode_update/front_end/fe_type_6_2 update needed: yes
Image for front-end 0: /tmp/microcode_update/front_end/fe_type_6_3 update needed: no

Front-end Microcode IMG MGR: Preparing to program device microcode...
Front-end Microcode IMG MGR: Preparing to program device[0], index=0 ...594412 bytes....
Skipped[0].
Front-end Microcode IMG MGR: Preparing to program device[0], index=1 ...395790 bytes.
Front-end Microcode IMG MGR: Programming device 0...rwRrrrrrrw..
0%.....................................................................
10%.....................................................................
20%.....................................................................
30%.....................................................................
40%.....................................................................
50%.....................................................................
60%.....................................................................
70%.....................................................................
80%.....................................................................
90%.....................................................................
100%
Front-end Microcode IMG MGR: Preparing to program device[0], index=2 ...25186 bytes.
Front-end Microcode IMG MGR: Programming device
0...rrrrrrw..0%....10%....20%......30%...40%......50%....60%......70%...80%......90%....100%wRr!
```

```
Front-end Microcode IMG MGR: Microcode programming complete for device 0.
Front-end Microcode IMG MGR: Preparing to program device[0], index=3 ...86370 bytes....
Skipped[3].
Front-end Microcode IMG MGR: Microcode programming complete in 242 seconds
```

Software Installation Commands

This table of commands is supported in the Cisco IOS XE Release 3.x.xE release train.	
`Device# software`	
auto-upgrade	Initiates auto upgrade for switches running incompatible software
clean	Cleans unused package files from local media
commit	Commits the provisioned software and cancels the automatic rollback timer
expand	Expands a software bundle to local storage, default location is where the bundle currently resides
install	Installs software
rollback	Rolls back the committed software

This table of commands is supported starting from Cisco IOS XE Denali 16.x.x	
`Device# request platform software package ?`	
clean	Cleans unnecessary package files from media
copy	Copies package to media
describe	Describes package content
expand	Expands all-in-one package to media
install	Installs the package
uninstall	Uninstalls the package
verify	Verifies In Service Software Upgrade (ISSU) software package compatibility

Upgrading from Cisco IOS XE Release 3.x.xE in Install Mode

Follow these instructions to upgrade from Cisco IOS XE Release 3.x.xE in install mode:

Before you begin

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

When upgrading from ...	To...
Cisco IOS XE Release 3.x.xE	Cisco IOS XE Fuji 16.8.1a or Cisco IOS XE Denali 16.x.x or Cisco IOS XE Everest 16.6.x

The sample output shows upgrade from Cisco IOS XE Release 3.7.3E to Cisco IOS XE Fuji 16.8.1a.

Procedure

Step 1 Copy new image to stack

When you expand the image, if you point to the source image on your TFTP server, you can skip this section and go to Step 2: Software install image to flash

a) **show run | i tftp**

Use this command to make sure your tftp server is reachable from IOS via GigabitEthernet0/0.

```
Switch# show run | i tftp
ip tftp source-interface GigabitEthernet0/0
ip tftp blocksize 8192
Switch#
Switch# show run | i ip route vrf
ip route vrf Mgmt-vrf 5.0.0.0 255.0.0.0 5.30.0.1
Switch#
Switch# show run int GigabitEthernet0/0
Building configuration...

Current configuration : 115 bytes
!
interface GigabitEthernet0/0
vrf forwarding Mgmt-vrf
ip address 5.30.12.121 255.255.0.0
negotiation auto
end
Switch#
Switch# ping vrf Mgmt-vrf ip 5.28.11.250
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 5.28.11.250, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/2 ms
```

b) **copy tftp: flash:**

Use this command to copy the image from your tftp server to flash.

```
Switch# copy tftp://5.28.11.250/cat3k_caa-universalk9.16.08.01a.SPA.bin flash:
cat3k_caa-universalk9.16.08.01a.SPA.bin
Destination filename [cat3k_caa-universalk9.16.08.01a.SPA.bin]?
Accessing tftp://5.28.11.250/cat3k_caa-universalk9.16.08.01a.SPA.bin...
Loading cat3k_caa-universalk9.16.08.01a.SPA.bin from 5.28.11.250 (via
GigabitEthernet0/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 373203016 bytes]

373203016 bytes copied in 80.662 secs (4626927 bytes/sec)
```

```
Switch#
```

c) **dir flash:**

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

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

32339 -rw- 373217171 May 26 2017 13:52:53 -07:00 cat3k_caa-universalk9.16.08.01a.SPA.bin

1562509312 bytes total (731021312 bytes free)
Switch#
```

Step 2 Software install image to flash

a) **software install file**

Use this command with the **new** and **force** options, to expand 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# software install file flash:cat3k_caa-universalk9.16.08.01a.SPA.bin new force
Preparing install operation ...
[1]: Copying software from active switch 1 to switches 2,3,4
[1]: Finished copying software to switches 2,3,4
[1 2 3 4]: Starting install operation
[1 2 3 4]: Expanding bundle flash:cat3k_caa-universalk9.16.08.01a.SPA.bin
[1 2 3 4]: Copying package files
[1 2 3 4]: Package files copied
[1 2 3 4]: Finished expanding bundle flash:cat3k_caa-universalk9.16.08.01a.SPA.bin
[1 2 3 4]: Verifying and copying expanded package files to flash:
[1 2 3 4]: Verified and copied expanded package files to flash:
[1 2 3 4]: Starting compatibility checks
[1 2 3 4]: Bypassing peer package compatibility checks due to 'force' command option
[1 2 3 4]: Finished compatibility checks
[1 2 3 4]: Starting application pre-installation processing
[1 2 3 4]: Finished application pre-installation processing
[1]: Old files list:
Removed cat3k_caa-base.SPA.03.07.03E.pkg
Removed cat3k_caa-drivers.SPA.03.07.03E.pkg
Removed cat3k_caa-infra.SPA.03.07.03E.pkg
Removed cat3k_caa-iosd-universalk9.SPA.152-3.E3.pkg
Removed cat3k_caa-platform.SPA.03.07.03E.pkg
Removed cat3k_caa-wcm.SPA.10.3.130.0.pkg
[2]: Old files list:
Removed cat3k_caa-base.SPA.03.07.03E.pkg
Removed cat3k_caa-drivers.SPA.03.07.03E.pkg
Removed cat3k_caa-infra.SPA.03.07.03E.pkg
Removed cat3k_caa-iosd-universalk9.SPA.152-3.E3.pkg
Removed cat3k_caa-platform.SPA.03.07.03E.pkg
Removed cat3k_caa-wcm.SPA.10.3.130.0.pkg
[3]: Old files list:
Removed cat3k_caa-base.SPA.03.07.03E.pkg
Removed cat3k_caa-drivers.SPA.03.07.03E.pkg
Removed cat3k_caa-infra.SPA.03.07.03E.pkg
Removed cat3k_caa-iosd-universalk9.SPA.152-3.E3.pkg
Removed cat3k_caa-platform.SPA.03.07.03E.pkg
Removed cat3k_caa-wcm.SPA.10.3.130.0.pkg
[4]: Old files list:
Removed cat3k_caa-base.SPA.03.07.03E.pkg
Removed cat3k_caa-drivers.SPA.03.07.03E.pkg
Removed cat3k_caa-infra.SPA.03.07.03E.pkg
Removed cat3k_caa-iosd-universalk9.SPA.152-3.E3.pkg
```

```
Removed cat3k_caa-platform.SPA.03.07.03E.pkg
Removed cat3k_caa-wcm.SPA.10.3.130.0.pkg
[1]: New files list:
Added cat3k_caa-rpbase.16.08.01a.SPA.pkg
Added cat3k_caa-rpcore.16.08.01a.SPA.pkg
Added cat3k_caa-srdriver.16.08.01a.SPA.pkg
Added cat3k_caa-guestshell.16.08.01a.SPA.pkg
Added cat3k_caa-webui.16.08.01a.SPA.pkg
[2]: New files list:
Added cat3k_caa-rpbase.16.08.01a.SPA.pkg
Added cat3k_caa-rpcore.16.08.01a.SPA.pkg
Added cat3k_caa-srdriver.16.08.01a.SPA.pkg
Added cat3k_caa-guestshell.16.08.01a.SPA.pkg
Added cat3k_caa-webui.16.08.01a.SPA.pkg
[3]: New files list:
Added cat3k_caa-rpbase.16.08.01a.SPA.pkg
Added cat3k_caa-rpcore.16.08.01a.SPA.pkg
Added cat3k_caa-srdriver.16.08.01a.SPA.pkg
Added cat3k_caa-guestshell.16.08.01a.SPA.pkg
Added cat3k_caa-webui.16.08.01a.SPA.pkg
[4]: New files list:
Added cat3k_caa-rpbase.16.08.01a.SPA.pkg
Added cat3k_caa-rpcore.16.08.01a.SPA.pkg
Added cat3k_caa-srdriver.16.08.01a.SPA.pkg
Added cat3k_caa-guestshell.16.08.01a.SPA.pkg
Added cat3k_caa-webui.16.08.01a.SPA.pkg
[1 2 3 4]: Creating pending provisioning file
[1 2 3 4]: Finished installing software. New software will load on reboot.
[1 2 3 4]: Committing provisioning file

[1 2 3 4]: Do you want to proceed with reload? [yes/no]: yes
[1 2 3 4]: Reloading

Switch#
```

Note Old files listed in the logs should be removed using the **request platform software package clean switch all** command, after reload.

Step 3 Reload

If you said 'Yes' to the prompt in software install and your switches are configured with auto boot, the stack will automatically boot up with the new image. If not, you can manually boot flash:packages.conf

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

Use this command to manually boot the new image.

Note When you boot the new image, the boot loader is automatically updated.

```
switch: boot flash:packages.conf
```

b) **show version**

Use this command to verify the version of the new image.

```
Switch# show version
Cisco IOS XE Software, Version 16.08.01a
Cisco IOS Software [Fuji], Catalyst L3 Switch Software (CAT3K_CAA-UNIVERSALK9-M), Version
 16.8.1a, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2018 by Cisco Systems, Inc.
```

```
Compiled Tue 03-Apr-18 18:23 by mcpre
```

c) **delete flash:**

After you have successfully installed the image, you no longer need the .bin image and the file can be deleted from the flash of each switch if it was copied to flash.

```
Switch# delete flash:cat3k_caa-universalk9.16.08.01a.SPA.bin
Delete filename [cat3k_caa-universalk9.16.08.01a.SPA.bin]?
Delete flash:/cat3k_caa-universalk9.16.08.01a.SPA.bin? [confirm]
Switch#
```

Upgrading from Cisco IOS XE Release 3.x.xE in Bundle Mode

Follow these instructions to upgrade from Cisco IOS XE Release 3.x.xE in bundle mode:

Before you begin

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

When upgrading from ...	To...
Cisco IOS XE Release 3.x.xE	Cisco IOS XE Fuji 16.8.1a or Cisco IOS XE Denali 16.x.x or Cisco IOS XE Everest 16.x.x

The sample output shows upgrade from Cisco IOS XE Release 3.7.3E to Cisco IOS XE Fuji 16.8.1a.

Procedure

Step 1 Copy new image to stack

Note You cannot boot Cisco IOS XE Fuji 16.x.x, Cisco IOS XE Everest 16.x.x, or Cisco IOS XE Denali 16.x.x via TFTP for the first time with a Cisco IOS XE 3.x.xE boot loader. The Cisco IOS XE 3.x.xE boot loaders have a limitation, which prevents the booting of an image larger than 400MB via the TFTP server. Since Cisco IOS XE Fuji 16.x.x, Cisco IOS XE Everest 16.x.x, and Cisco IOS XE Denali 16.x.x images are larger than 400MB, you must boot the image via flash.

a) **show run | i tftp**

Use this command to make sure your tftp server is reachable from IOS via GigabitEthernet0/0.

```
Switch# show run | i tftp
ip tftp source-interface GigabitEthernet0/0
ip tftp blocksize 8192
Switch#
Switch# show run | i ip route vrf
ip route vrf Mgmt-vrf 5.0.0.0 255.0.0.0 5.30.0.1
Switch#
Switch# show run int GigabitEthernet0/0
Building configuration...
```

```
Current configuration : 115 bytes
!
interface GigabitEthernet0/0
vrf forwarding Mgmt-vrf
ip address 5.30.12.121 255.255.0.0
negotiation auto
end
Switch#
Switch# ping vrf Mgmt-vrf ip 5.28.11.250
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 5.28.11.250, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/2 ms
```

b) **copy tftp: flash:**

Use this command to copy the image from your tftp server to flash.

Note If you have a stack, you must copy the image to the flash drive of each switch in the stack.

```
Switch# copy tftp://5.28.11.250/cat3k_caa-universalk9.16.08.01a.SPA.bin flash:
cat3k_caa-universalk9.16.08.01a.SPA.bin
Destination filename [cat3k_caa-universalk9.16.08.01a.SPA.bin]?
Accessing tftp://5.28.11.250/cat3k_caa-universalk9.16.08.01a.SPA.bin...
Loading cat3k_caa-universalk9.16.08.01a.SPA.bin from 5.28.11.250 (via
GigabitEthernet0/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 373203016 bytes]

373203016 bytes copied in 80.662 secs (4626927 bytes/sec)
Switch#
```

c) **dir flash:**

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

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

32339 -rw- 373217171 May 26 2017 13:52:53 -07:00 cat3k_caa-universalk9.16.08.01a.SPA.bin
1562509312 bytes total (731021312 bytes free)
Switch#
```

Step 2 Edit the boot variable

a) **no boot system**

Use this command to clear the boot variable.

```
Switch(config)# no boot system
```

b) **boot system**

Use this command to edit the boot variable, to point to the new image.

```
Switch(config)# boot system flash:cat3k_caa-universalk9.16.08.01a.SPA.bin
```

c) **write memory**

Use this command to save configuration changes.

```
Switch# write memory
```

d) **show boot**

Use this command to display and verify that your boot variable is pointing to the new image.

```
Switch# show boot
--------------------------
Switch 1
--------------------------
Current Boot Variables:
BOOT variable = flash:cat3k_caa-universalk9.16.08.01a.SPA.bin;

Boot Variables on next reload:
BOOT variable = flash:cat3k_caa-universalk9.16.08.01a.SPA.bin;
Allow Dev Key = yes
Manual Boot = yes
Enable Break = yes
Switch#
```

Step 3 Reload

a) **reload**

Use this command to reload the switch.

```
Switch# reload
```

b) **boot flash**

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

Note When you boot the new image, the boot loader is automatically updated.

```
switch:boot flash:cat3k_caa-universalk9.16.08.01a.SPA.bin
```

c) **show version**

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

```
Switch# show version
Cisco IOS XE Software, Version 16.08.01a
Cisco IOS Software [Fuji], Catalyst L3 Switch Software (CAT3K_CAA-UNIVERSALK9-M), Version
 16.8.1a, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2018 by Cisco Systems, Inc.
Compiled Tue 03-Apr-18 18:23 by mcpre
```

Step 4 Move from bundle mode to install mode

Ensure you have enough space in flash to expand a new image by cleaning up old installation files. This command will erase your Cisco IOS XE Fuji 16.8.1a bin image file, so ensure that you copy it to your Active again.

a) **request platform software package clean switch all**

Use the **switch all** option to clean up all switches in your stack.

```
Switch# request platform software package clean switch all file flash:
Running command on switch 1
Cleaning up unnecessary package files
Scanning boot directory for packages ... done.
Preparing packages list to delete ...
done.
Running command on switch 2
Cleaning up unnecessary package files
Scanning boot directory for packages ... done.
Preparing packages list to delete ...
done.
Running command on switch 3
Cleaning up unnecessary package files
Scanning boot directory for packages ... done.
Preparing packages list to delete ...
done.
Running command on switch 4
Cleaning up unnecessary package files
Scanning boot directory for packages ... done.
Preparing packages list to delete ...
done.
The following files will be deleted:
[1]:
/flash/cat3k_caa-base.SPA.03.07.02E.pkg
/flash/cat3k_caa-drivers.SPA.03.07.02E.pkg
/flash/cat3k_caa-infra.SPA.03.07.02E.pkg
/flash/cat3k_caa-iosd-universalk9.SPA.152-3.E2.pkg
/flash/cat3k_caa-platform.SPA.03.07.02E.pkg
/flash/cat3k_caa-universalk9.16.08.01a.SPA.bin
/flash/cat3k_caa-wcm.SPA.10.3.120.0.pkg
/flash/packages.conf
[2]:
/flash/cat3k_caa-base.SPA.03.07.02E.pkg
/flash/cat3k_caa-drivers.SPA.03.07.02E.pkg
/flash/cat3k_caa-infra.SPA.03.07.02E.pkg
/flash/cat3k_caa-iosd-universalk9.SPA.152-3.E2.pkg
/flash/cat3k_caa-platform.SPA.03.07.02E.pkg
/flash/cat3k_caa-universalk9.16.08.01a.SPA.bin
/flash/cat3k_caa-wcm.SPA.10.3.120.0.pkg
/flash/packages.conf
[3]:
/flash/cat3k_caa-base.SPA.03.07.02E.pkg
/flash/cat3k_caa-drivers.SPA.03.07.02E.pkg
/flash/cat3k_caa-infra.SPA.03.07.02E.pkg
/flash/cat3k_caa-iosd-universalk9.SPA.152-3.E2.pkg
/flash/cat3k_caa-platform.SPA.03.07.02E.pkg
/flash/cat3k_caa-universalk9.16.08.01a.SPA.bin
/flash/cat3k_caa-wcm.SPA.10.3.120.0.pkg
/flash/packages.conf
[4]:
/flash/cat3k_caa-base.SPA.03.07.02E.pkg
/flash/cat3k_caa-drivers.SPA.03.07.02E.pkg
/flash/cat3k_caa-infra.SPA.03.07.02E.pkg
/flash/cat3k_caa-iosd-universalk9.SPA.152-3.E2.pkg
/flash/cat3k_caa-platform.SPA.03.07.02E.pkg
/flash/cat3k_caa-universalk9.16.08.01a.SPA.bin
/flash/cat3k_caa-wcm.SPA.10.3.120.0.pkg
/flash/packages.conf

Do you want to proceed? [y/n]y
[1]:
Deleting file flash:cat3k_caa-base.SPA.03.07.02E.pkg ... done.
Deleting file flash:cat3k_caa-drivers.SPA.03.07.02E.pkg ... done.
Deleting file flash:cat3k_caa-infra.SPA.03.07.02E.pkg ... done.
```

```
Deleting file flash:cat3k_caa-iosd-universalk9.SPA.152-3.E2.pkg ... done.
Deleting file flash:cat3k_caa-platform.SPA.03.07.02E.pkg ... done.
Deleting file flash:cat3k_caa-universalk9.16.08.01a.SPA.bin ... done.
Deleting file flash:cat3k_caa-wcm.SPA.10.3.120.0.pkg ... done.
Deleting file flash:packages.conf ... done.
SUCCESS: Files deleted.
[2]:
Deleting file flash:cat3k_caa-base.SPA.03.07.02E.pkg ... done.
Deleting file flash:cat3k_caa-drivers.SPA.03.07.02E.pkg ... done.
Deleting file flash:cat3k_caa-infra.SPA.03.07.02E.pkg ... done.
Deleting file flash:cat3k_caa-iosd-universalk9.SPA.152-3.E2.pkg ... done.
Deleting file flash:cat3k_caa-platform.SPA.03.07.02E.pkg ... done.
Deleting file flash:cat3k_caa-universalk9.16.08.01a.SPA.bin ... done.
Deleting file flash:cat3k_caa-wcm.SPA.10.3.120.0.pkg ... done.
Deleting file flash:packages.conf ... done.
SUCCESS: Files deleted.
[3]:
Deleting file flash:cat3k_caa-base.SPA.03.07.02E.pkg ... done.
Deleting file flash:cat3k_caa-drivers.SPA.03.07.02E.pkg ... done.
Deleting file flash:cat3k_caa-infra.SPA.03.07.02E.pkg ... done.
Deleting file flash:cat3k_caa-iosd-universalk9.SPA.152-3.E2.pkg ... done.
Deleting file flash:cat3k_caa-platform.SPA.03.07.02E.pkg ... done.
Deleting file flash:cat3k_caa-universalk9.16.08.01a.SPA.bin ... done.
Deleting file flash:cat3k_caa-wcm.SPA.10.3.120.0.pkg ... done.
Deleting file flash:packages.conf ... done.
SUCCESS: Files deleted.
[4]:
Deleting file flash:cat3k_caa-base.SPA.03.07.02E.pkg ... done.
Deleting file flash:cat3k_caa-drivers.SPA.03.07.02E.pkg ... done.
Deleting file flash:cat3k_caa-infra.SPA.03.07.02E.pkg ... done.
Deleting file flash:cat3k_caa-iosd-universalk9.SPA.152-3.E2.pkg ... done.
Deleting file flash:cat3k_caa-platform.SPA.03.07.02E.pkg ... done.
Deleting file flash:cat3k_caa-universalk9.16.08.01a.SPA.bin ... done.
Deleting file flash:cat3k_caa-wcm.SPA.10.3.120.0.pkg ... done.
Deleting file flash:packages.conf ... done.
SUCCESS: Files deleted.
Switch#
```

b) **copy tftp:**

Use this command to copy the image from your tftp server to flash

```
Switch# copy tftp://5.28.11.250/cat3k_caa-universalk9.16.08.01a.SPA.bin flash:
cat3k_caa-universalk9.16.08.01a.SPA.bin
Destination filename [cat3k_caa-universalk9.16.08.01a.SPA.bin]?
Accessing tftp://5.28.11.250/cat3k_caa-universalk9.16.08.01a.SPA.bin...
Loading cat3k_caa-universalk9.16.08.01a.SPA.bin from 5.28.11.250 (via
GigabitEthernet0/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 373203016 bytes]

373203016 bytes copied in 80.662 secs (4626927 bytes/sec)
Switch#
```

c) **request platform software package expand**

Use this command to expand the target image to flash and move from bundle mode to install mode. You can point to the source image on your TFTP server or in flash if you have it copied to flash. Use the **switch all** option to upgrade all switches in your stack. Use the **auto-copy** option to copy the .bin image from flash: to all other switches in your stack.

```
Switch# request platform software package expand switch all file
flash:cat3k_caa-universalk9.16.08.01a.SPA.bin auto-copy
[1]: Copying flash:cat3k_caa-universalk9.16.08.01a.SPA.bin from switch 1 to switch 2 3
4
[2 3 4]: Finished copying to switch 2 3 4
[1 2 3 4]: Expanding file
[1 2 3 4]: Finished expanding all-in-one software package in switch 1 2 3 4
SUCCESS: Finished expanding all-in-one software package.
Switch#
```

Step 5 Edit the boot variable

a) **no boot system**

Use this command to clear the boot variable.

```
Switch(config)# no boot system
```

b) **boot system**

Use this command to edit the boot variable to point to the new image.

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

c) **write memory**

Use this command to save configuration changes.

```
Switch# write memory
```

d) **show boot**

Use this command to display and verify that your boot variable is pointing to the new image.

```
Switch# show boot
----------------------------
Switch 1
----------------------------
Current Boot Variables:
BOOT variable = flash:packages.conf;

Boot Variables on next reload:
BOOT variable = flash:packages.conf;
Manual Boot = yes
Enable Break = yes
Switch#
```

Step 6 Reload

a) **reload**

Use this command to to reload the switch.

```
Switch# reload
```

b) **boot flash**

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

Note When you boot the new image, the boot loader is automatically updated.

```
switch:boot flash:packages.conf
```

c) **show version**

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

```
Switch# show version
Cisco IOS XE Software, Version 16.08.01a
Cisco IOS Software [Fuji], Catalyst L3 Switch Software (CAT3K_CAA-UNIVERSALK9-M), Version
 16.8.1a, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2018 by Cisco Systems, Inc.
Compiled Tue 03-Apr-18 18:23 by mcpre
```

Upgrading from Cisco IOS XE Denali 16.x.x in Install Mode

Follow these instructions to upgrade from a Cisco IOS XE Denali 16.x.x release to a later release in install mode.

Before you begin

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

When upgrading from ...	To...
Cisco IOS XE Denali 16.x.x	Cisco IOS XE Fuji 16.8.1a or Cisco IOS XE Everest 16.x.x

The sample output shows upgrade from Cisco IOS XE Denali 16.3.5 to Cisco IOS XE Fuji 16.8.1a in install mode.

Procedure

Step 1 Clean Up

a) **request platform software package clean switch all file flash:**

Use this command to clean up old installation files; this ensures that you have sufficient space in the flash drive, to expand a new image. Use the **switch all** option to clean up all switches in your stack.

```
Switch# request platform software package clean switch all file flash:
Running command on switch 1
Cleaning up unnecessary package files
Scanning boot directory for packages ... done.
Preparing packages list to delete ...
cat3k_caa-guestshell.16.03.05.SPA.pkg
File is in use, will not delete.
cat3k_caa-rpbase.16.03.05.SPA.pkg
File is in use, will not delete.
cat3k_caa-rpcore.16.03.05.SPA.pkg
File is in use, will not delete.
cat3k_caa-srdriver.16.03.05.SPA.pkg
File is in use, will not delete.
```

```
cat3k_caa-wcm.16.03.05.SPA.pkg
File is in use, will not delete.
cat3k_caa-webui.16.03.05.SPA.pkg
File is in use, will not delete.
packages.conf
File is in use, will not delete.
done.
SUCCESS: No extra package or provisioning files found on media. Nothing to clean.
Running command on switch 2
Cleaning up unnecessary package files
Scanning boot directory for packages ... done.
Preparing packages list to delete ...
cat3k_caa-guestshell.16.03.05.SPA.pkg
File is in use, will not delete.
cat3k_caa-rpbase.16.03.05.SPA.pkg
File is in use, will not delete.
cat3k_caa-rpcore.16.03.05.SPA.pkg
File is in use, will not delete.
cat3k_caa-srdriver.16.03.05.SPA.pkg
File is in use, will not delete.
cat3k_caa-wcm.16.03.05.SPA.pkg
File is in use, will not delete.
cat3k_caa-webui.16.03.05.SPA.pkg
File is in use, will not delete.
packages.conf
File is in use, will not delete.
done.
SUCCESS: No extra package or provisioning files found on media. Nothing to clean.
Running command on switch 3
Cleaning up unnecessary package files
Scanning boot directory for packages ... done.
Preparing packages list to delete ...
cat3k_caa-guestshell.16.03.05.SPA.pkg
File is in use, will not delete.
cat3k_caa-rpbase.16.03.05.SPA.pkg
File is in use, will not delete.
cat3k_caa-rpcore.16.03.05.SPA.pkg
File is in use, will not delete.
cat3k_caa-srdriver.16.03.05.SPA.pkg
File is in use, will not delete.
cat3k_caa-wcm.16.03.05.SPA.pkg
File is in use, will not delete.
cat3k_caa-webui.16.03.05.SPA.pkg
File is in use, will not delete.
packages.conf
File is in use, will not delete.
done.
SUCCESS: No extra package or provisioning files found on media. Nothing to clean.
Running command on switch 4
Cleaning up unnecessary package files
Scanning boot directory for packages ... done.
Preparing packages list to delete ...
packages.conf
File is in use, will not delete.
cat3k_caa-guestshell.16.03.05.SPA.pkg
File is in use, will not delete.
cat3k_caa-rpbase.16.03.05.SPA.pkg
File is in use, will not delete.
cat3k_caa-rpcore.16.03.05.SPA.pkg
File is in use, will not delete.
cat3k_caa-srdriver.16.03.05.SPA.pkg
File is in use, will not delete.
cat3k_caa-wcm.16.03.05.SPA.pkg
File is in use, will not delete.
```

```
cat3k_caa-webui.16.03.05.SPA.pkg
File is in use, will not delete.
packages.conf
done.
SUCCESS: No extra package or provisioning files found on media. Nothing to clean.
```

Step 2 Copy new image to stack

Copy the new image to flash: (If you point to the source image on a TFTP server you can skip this section and go to: Software install image to flash).

a) **copy tftp: flash:**

Use this command to copy the image from the tftp server to flash.

```
Switch# copy tftp://5.28.11.250/cat3k_caa-universalk9.16.08.01a.SPA.bin flash:
cat3k_caa-universalk9.16.08.01a.SPA.bin
Destination filename [cat3k_caa-universalk9.16.08.01a.SPA.bin]?
Accessing tftp://5.28.11.250/cat3k_caa-universalk9.16.08.01a.SPA.bin...
Loading cat3k_caa-universalk9.16.08.01a.SPA.bin from 5.28.11.250 (via
GigabitEthernet0/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 373203016 bytes]
```

b) **dir flash:**

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

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

32339 -rw- 373217171 Mar 1 2018 13:52:53 -07:00 cat3k_caa-universalk9.16.08.01a.SPA.bin


1562509312 bytes total (731021312 bytes free)
Switch#
```

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**.

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

```
Switch# show boot system
```

Step 4 Software install image to flash

a) **request platform software package install**

Use this command to install the target image to flash. Use the **switch all** option to upgrade all switches in your stack. Use the **auto-copy** option to copy the .bin image from flash: to all other switches in your stack

We recommend copying the image to a TFTP server or the flash drive of the active switch. If you point to an image on the flash or USB drive of a member switch (instead of the active), you must specify the exact flash or USB drive - otherwise installation fails. For example, if the image is on the flash drive of member switch 3, the corresponding flash drive is flash-3: `Switch# request platform software package install switch all file flash-3:cat3k_caa-universalk9.16.08.01a.SPA.bin new auto-copy`

Note You must use the **new** option when you upgrade from Cisco IOS XE Denali 16.1.x, 16.2.x or 16.3.1 to Cisco IOS XE Everest 16.x.x or Cisco IOS XE Fuji 16.8.1a, because there are packaging changes in the different 16.x.x releases.

Note When you execute the command, the following message is displayed. This is expected and does not affect the upgrade. See CSCux82059: `Unknown package type 21`

```
Switch# request platform software package install switch all file
flash:cat3k_caa-universalk9.16.08.01a.SPA.bin new auto-copy
Expanding image file: flash:cat3k_caa-universalk9.16.08.01a.SPA.bin
[1]: Copying flash:cat3k_caa-universalk9.16.08.01.SPA.bin from switch 1 to switch 2 3 4
[2 3 4]: Finished copying to switch 2 3 4
[1 2 3 4]: Expanding file
[1 2 3 4]: Finished expanding all-in-one software package in switch 1 2 3 4
SUCCESS: Finished expanding all-in-one software package.
[1 2 3 4]: Performing install
Unknown package type 21
Unknown package type 21
Unknown package type 21
Unknown package type 21
SUCCESS: install Finished
[1]: install package(s) on switch 1
--- Starting list of software package changes ---
Old files list:
Removed cat3k_caa-guestshell.16.03.05.SPA.pkg
Removed cat3k_caa-rpbase.16.03.05.SPA.pkg
Removed cat3k_caa-rpcore.16.03.05.pkg
Removed cat3k_caa-srdriver.16.03.05.SPA.pkg
Removed cat3k_caa-wcm.16.03.05.SPA.pkg
Removed cat3k_caa-webui.16.03.05.SPA.pkg
New files list:
Added cat3k_caa-rpbase.16.08.01a.SPA.pkg
Added cat3k_caa-rpcore.16.08.01a.SPA.pkg
Added cat3k_caa-srdriver.16.08.01a.SPA.pkg
Added cat3k_caa-guestshell.16.08.01a.SPA.pkg
Added cat3k_caa-webui.16.08.01a.SPA.pkg
Finished list of software package changes
SUCCESS: Software provisioned. New software will load on reboot.
[1]: Finished install successful on switch 1
[2]: install package(s) on switch 2
--- Starting list of software package changes ---
Old files list:
Removed cat3k_caa-guestshell.16.03.05.SPA.pkg
Removed cat3k_caa-rpbase.16.03.05.SPA.pkg
Removed cat3k_caa-rpcore.16.03.05.pkg
Removed cat3k_caa-srdriver.16.03.05.SPA.pkg
Removed cat3k_caa-wcm.16.03.05.SPA.pkg
Removed cat3k_caa-webui.16.03.05.SPA.pkg
New files list:
Added cat3k_caa-rpbase.16.08.01a.SPA.pkg
Added cat3k_caa-rpcore.16.08.01a.SPA.pkg
```

```
Added cat3k_caa-srdriver.16.08.01a.SPA.pkg
Added cat3k_caa-guestshell.16.08.01a.SPA.pkg
Added cat3k_caa-webui.16.08.01a.SPA.pkg
Finished list of software package changes
SUCCESS: Software provisioned. New software will load on reboot.
[2]: Finished install successful on switch 2
[3]: install package(s) on switch 3
--- Starting list of software package changes ---
Old files list:
Removed cat3k_caa-guestshell.16.03.05.SPA.pkg
Removed cat3k_caa-rpbase.16.03.05.SPA.pkg
Removed cat3k_caa-rpcore.16.03.05.pkg
Removed cat3k_caa-srdriver.16.03.05.SPA.pkg
Removed cat3k_caa-wcm.16.03.05.SPA.pkg
Removed cat3k_caa-webui.16.03.05.SPA.pkg
New files list:
Added cat3k_caa-rpbase.16.08.01a.SPA.pkg
Added cat3k_caa-rpcore.16.08.01a.SPA.pkg
Added cat3k_caa-srdriver.16.08.01a.SPA.pkg
Added cat3k_caa-guestshell.16.08.01a.SPA.pkg
Added cat3k_caa-webui.16.08.01a.SPA.pkg
Finished list of software package changes
SUCCESS: Software provisioned. New software will load on reboot.
[3]: Finished install successful on switch 3
[4]: install package(s) on switch 4
--- Starting list of software package changes ---
Old files list:
Removed cat3k_caa-guestshell.16.03.05.SPA.pkg
Removed cat3k_caa-rpbase.16.03.05.SPA.pkg
Removed cat3k_caa-rpcore.16.03.05.pkg
Removed cat3k_caa-srdriver.16.03.05.SPA.pkg
Removed cat3k_caa-wcm.16.03.05.SPA.pkg
Removed cat3k_caa-webui.16.03.05.SPA.pkg
New files list:
Added cat3k_caa-rpbase.16.08.01a.SPA.pkg
Added cat3k_caa-rpcore.16.08.01a.SPA.pkg
Added cat3k_caa-srdriver.16.08.01a.SPA.pkg
Added cat3k_caa-guestshell.16.08.01a.SPA.pkg
Added cat3k_caa-webui.16.08.01a.SPA.pkg
Finished list of software package changes
SUCCESS: Software provisioned. New software will load on reboot.
[4]: Finished install successful on switch 4
Checking status of install on [1 2 3 4]
[1 2 3 4]: Finished install in switch 1 2 3 4
SUCCESS: Finished install: Success on [1 2 3 4]
Switch#
```

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

b) **dir flash:**

After you have successfully installed the software, use this command to verify that the flash partition has five new .pkg files and one updated packages.conf file. See sample output below:

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

Directory of flash:/

7747  -rw- 281076014 Mar 27 2016 22:15:50 +00:00 cat3k_caa-guestshell.16.03.05.SPA.pkg
7748  -rw- 7197312   Mar 27 2016 22:15:51 +00:00 cat3k_caa-rpbase.16.03.05.SPA.pkg
7749  -rw- 166767220 Mar 27 2016 22:15:51 +00:00 cat3k_caa-rpcore.16.03.05.pkg
7750  -rw- 14631548  Mar 27 2016 22:15:51 +00:00 cat3k_caa-srdriver.16.03.05.SPA.pkg
31000 -rw- 22173354  Mar 27 2016 04:40:38 -07:00 cat3k_caa-wcm.16.03.05.SPA.pkg
```

```
30996 -rw- 266177140 Mar 1 2018 04:40:36 -07:00 cat3k_caa-webui.16.03.05.SPA.pkg
30998 -rw- 9067132   Mar 1 2018 04:40:37 -07:00 cat3k_caa-rpbase.16.08.01a.SPA.pkg
30999 -rw- 178403952 Mar 1 2018 04:40:38 -07:00 cat3k_caa-rpcore.16.08.01a.SPA.pkg
30997 -rw- 13333112  Mar 1 2018 04:40:39 -07:00 cat3k_caa-srdriver.16.08.01a.SPA.pkg
30994 -rw- 13333112  Mar 1 2018 04:40:40 -07:00 cat3k_caa-guestshell.16.08.01a.SPA.pkg
30994 -rw- 13333112  Mar 1 2018 04:40:41 -07:00 cat3k_caa-webui.16.08.01a.SPA.pkg
1621966848 bytes total (132620288 bytes free)


Switch# dir flash:*.conf
Directory of flash:/packages.conf

32342 -rw- 4690 Mar 1 2018 04:40:42 -07:00 packages.conf

1562509312 bytes total (730988544 bytes free)
Switch#
```

c) **dir flash:*.bin**

After you have successfully installed the image, you no longer need the.bin image. If you copied the file to flash, use this command to check if it is still saved in the the flash of each switch.

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

32339 -rw- 373217171 Mar 1 2018 13:52:53 -07:00 cat3k_caa-universalk9.16.08.01a.SPA.bin


1562509312 bytes total (731021312 bytes free)
Switch#
```

d) **delete flash:**

If an image is still saved, use this command to delete it, if not, it has been deleted as part of the install operation and you can skip this step.

```
Switch# delete flash:cat3k_caa-universalk9.16.08.01a.SPA.bin
Delete filename [cat3k_caa-universalk9.16.08.01a.SPA.bin]?
Delete flash:/ cat3k_caa-universalk9.16.08.01a.SPA.bin? [confirm]
Switch#
```

Step 5 Reload

a) **reload**

Use this command in the privileged EXEC mode to reload the switch.

```
Switch# reload
```

b) **boot flash:**

If the switch is configured with auto boot, then the stack automatically boots up with the new image. If not, you can manually boot flash:packages.conf

```
switch:boot flash:packages.conf
```

c) **show version**

Use this command to verify the version of the new image.

```
Switch# show version
Cisco IOS XE Software, Version 16.08.01a
Cisco IOS Software [Fuji], Catalyst L3 Switch Software (CAT3K_CAA-UNIVERSALK9-M), Version
 16.8.1a, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2018 by Cisco Systems, Inc.
Compiled Tue 03-Apr-18 18:23 by mcpre
```

Upgrading or Downgrading from Cisco IOS XE Fuji 16.8.1a in Install Mode

Follow these instructions to upgrade or downgrade from Cisco IOS XE Fuji 16.8.1a in install mode.

Before you begin

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

When upgrading from ...	To...
Cisco IOS XE Fuji 16.8.1a	A future Cisco IOS XE 16.x.x release.

When downgrading from ...	To...
Cisco IOS XE Fuji 16.8.1a	An earlier Cisco IOS XE 16.x.x release.

The sample output covers an upgrade scenario; the same steps apply when you downgrade as well.

Procedure

Step 1 Clean Up

a) **request platform software package clean**

Use this command to clean up old installation files; this ensures that you have sufficient space in the flash drive, to expand a new image. Use the **switch all** option to clean up all switches in your stack.

```
Switch# request platform software package clean switch all file flash:
Running command on switch 1
Cleaning up unnecessary package files
Scanning boot directory for packages ... done.
Preparing packages list to delete ...
packages.conf
File is in use, will not delete.
cat3k_caa-rpbase.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-rpcore.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-srdriver.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-guestshell.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-webui.16.08.01a.SPA.pkg
File is in use, will not delete.
done.
SUCCESS: No extra package or provisioning files found on media. Nothing to clean.
Running command on switch 2
```

```
Cleaning up unnecessary package files
Scanning boot directory for packages ... done.
Preparing packages list to delete ...
packages.conf
File is in use, will not delete.
cat3k_caa-rpbase.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-rpcore.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-srdriver.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-guestshell.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-webui.16.08.01a.SPA.pkg
File is in use, will not delete.
done.
SUCCESS: No extra package or provisioning files found on media. Nothing to clean.
Running command on switch 3
Cleaning up unnecessary package files
Scanning boot directory for packages ... done.
Preparing packages list to delete ...
packages.conf
File is in use, will not delete.
cat3k_caa-rpbase.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-rpcore.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-srdriver.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-guestshell.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-webui.16.08.01a.SPA.pkg
File is in use, will not delete.
done.
SUCCESS: No extra package or provisioning files found on media. Nothing to clean.
Running command on switch 4
Cleaning up unnecessary package files
Scanning boot directory for packages ... done.
Preparing packages list to delete ...
packages.conf
File is in use, will not delete.
cat3k_caa-rpbase.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-rpcore.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-srdriver.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-guestshell.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-webui.16.08.01a.SPA.pkg
File is in use, will not delete.
done.
SUCCESS: No extra package or provisioning files found on media. Nothing to clean.
Switch#
```

Step 2 Copy new image to stack

Copy the new image to flash: (If you point to the source image on a TFTP server you can skip this section and go to: Software install image to flash).

a) **copy tftp: flash:**

Use this command to copy the image from your tftp server to flash.

```
Switch# copy tftp://5.28.11.250/cat3k_caa-universalk9.16.09.01.SPA.bin flash:
Destination filename [cat3k_caa-universalk9.16.09.01.SPA.bin]?
Accessing tftp://5.28.11.250/cat3k_caa-universalk9.16.09.01.SPA.bin...
Loading cat3k_caa-universalk9.16.09.01.SPA.bin from 5.28.11.250 (via GigabitEthernet0/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 465466221 bytes]

465466221 bytes copied in 118.175 secs (3938788 bytes/sec)
Switch#
```

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:/

7759 -rw- 465466221 Mar 2 2018 04:35:43 +00:00 cat3k_caa-universalk9.16.09.01.SPA.bin
1621966848 bytes total (598597632 bytes free)
Switch#
```

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**.

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

```
Switch# show boot system
```

Step 4 Software install image to flash

a) **request platform software package install**

Use this command to install the target image to flash.

We recommend copying the image to a TFTP server or the flash drive of the active switch. If you point to an image on the flash or USB drive of a member switch (instead of the active), you must specify the exact flash or USB drive - otherwise installation fails. For example, if the image is on the flash drive of member switch 3, the corresponding flash drive is flash-3: `Switch# request platform software package install switch all file flash-3:cat3k_caa-universalk9.16.09.01.SPA.bin new auto-copy`

Use the **switch all** option to upgrade or downgrade all the switches in your stack. Use the **auto-copy** option to copy the .bin image from flash: to all other switches in your stack

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

```
Switch# request platform software package install switch all file
flash:cat3k_caa-universalk9.16.08.01a.SPA.bin auto-copy

Expanding image file: flash:cat3k_caa-universalk9.16.09.01.SPA.bin
[1]: Copying flash:cat3k_caa-universalk9.16.09.01.SPA.bin from switch 1 to switch 2 3 4
[2 3 4]: Finished copying to switch 2 3 4
[1 2 3 4]: Expanding file
[1 2 3 4]: Finished expanding all-in-one software package in switch 1 2 3 4
SUCCESS: Finished expanding all-in-one software package.
[1 2 3 4]: Performing install
SUCCESS: install Finished
[1]: install package(s) on switch 1
--- Starting list of software package changes ---
Old files list:
Removed cat3k_caa-rpbase.16.08.01a.SPA.pkg
Removed cat3k_caa-rpcore.16.08.01a.SPA.pkg
Removed cat3k_caa-srdriver.16.08.01a.SPA.pkg
Removed cat3k_caa-guestshell.16.08.01a.SPA.pkg
Removed cat3k_caa-webui.16.08.01a.SPA.pkg
New files list:
Added cat3k_caa-rpbase.16.09.01.SPA.pkg
Added cat3k_caa-rpcore.16.09.01.SPA.pkg
Added cat3k_caa-srdriver.16.09.01.SPA.pkg
Added cat3k_caa-guestshell.16.09.01.SPA.pkg
Added cat3k_caa-webui.16.09.01.SPA.pkg
Finished list of software package changes
SUCCESS: Software provisioned. New software will load on reboot.
[1]: Finished install successful on switch 1
[2]: install package(s) on switch 2
--- Starting list of software package changes ---
Old files list:
Removed cat3k_caa-rpbase.16.08.01a.SPA.pkg
Removed cat3k_caa-rpcore.16.08.01a.SPA.pkg
Removed cat3k_caa-srdriver.16.08.01a.SPA.pkg
Removed cat3k_caa-guestshell.16.08.01a.SPA.pkg
Removed cat3k_caa-webui.16.08.01a.SPA.pkg
New files list:
Added cat3k_caa-rpbase.16.09.01.SPA.pkg
Added cat3k_caa-rpcore.16.09.01.SPA.pkg
Added cat3k_caa-srdriver.16.09.01.SPA.pkg
Added cat3k_caa-guestshell.16.09.01.SPA.pkg
Added cat3k_caa-webui.16.09.01.SPA.pkg
Finished list of software package changes
SUCCESS: Software provisioned. New software will load on reboot.
[2]: Finished install successful on switch 2
[3]: install package(s) on switch 3
--- Starting list of software package changes ---
Old files list:
Removed cat3k_caa-rpbase.16.08.01a.SPA.pkg
Removed cat3k_caa-rpcore.16.08.01a.SPA.pkg
Removed cat3k_caa-srdriver.16.08.01a.SPA.pkg
Removed cat3k_caa-guestshell.16.08.01a.SPA.pkg
Removed cat3k_caa-webui.16.08.01a.SPA.pkg
New files list:
Added cat3k_caa-rpbase.16.09.01.SPA.pkg
Added cat3k_caa-rpcore.16.09.01.SPA.pkg
Added cat3k_caa-srdriver.16.09.01.SPA.pkg
Added cat3k_caa-guestshell.16.09.01.SPA.pkg
Added cat3k_caa-webui.16.09.01.SPA.pkg
Finished list of software package changes
SUCCESS: Software provisioned. New software will load on reboot.
[3]: Finished install successful on switch 3
[4]: install package(s) on switch 4
--- Starting list of software package changes ---
```

```
Old files list:
Removed cat3k_caa-rpbase.16.08.01a.SPA.pkg
Removed cat3k_caa-rpcore.16.08.01a.SPA.pkg
Removed cat3k_caa-srdriver.16.08.01a.SPA.pkg
Removed cat3k_caa-guestshell.16.08.01a.SPA.pkg
Removed cat3k_caa-webui.16.08.01a.SPA.pkg
New files list:
Added cat3k_caa-rpbase.16.09.01.SPA.pkg
Added cat3k_caa-rpcore.16.09.01.SPA.pkg
Added cat3k_caa-srdriver.16.09.01.SPA.pkg
Added cat3k_caa-guestshell.16.09.01.SPA.pkg
Added cat3k_caa-webui.16.09.01.SPA.pkg
Finished list of software package changes
SUCCESS: Software provisioned. New software will load on reboot.
[4]: Finished install successful on switch 4
Checking status of install on [1 2 3 4]
[1 2 3 4]: Finished install in switch 1 2 3 4
SUCCESS: Finished install: Success on [1 2 3 4]
Switch#
```

b) **dir flash:**

Use this command to confirm that the image has been successfully copied to flash. After you have successfully installed the software, verify that the flash partition has five new .pkg files and one updated packages.conf file. See sample output below:

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

Directory of flash:/

7761 -rw- 21906269  Mar 1 2018 04:45:48 +00:00 cat3k_caa-rpbase.16.08.01a.SPA.pkg
7765 -rw- 253160056 Mar 1 2018 04:45:50 +00:00 cat3k_caa-rpcore.16.08.01a.SPA.pkg
7763 -rw- 7328384   Mar 1 2018 04:45:49 +00:00 cat3k_caa-srdriver.16.08.01a.SPA.pkg
7762 -rw- 165657204 Mar 1 2018 04:45:49 +00:00 cat3k_caa-guestshell.16.08.01a.SPA.pkg
7764 -rw- 17408636  Mar 1 2018 04:45:49 +00:00 cat3k_caa-webui.16.08.01a.SPA.pkg
7749 -rw- 21902119  Mar 2 2018 06:09:38 +00:00 cat3k_caa-rpbase.16.09.01.SPA.pkg
7760 -rw- 253094520 Mar 2 2018 06:09:41 +00:00 cat3k_caa-rpcore.16.09.01.SPA.pkg
7755 -rw- 7326336   Mar 2 2018 06:09:39 +00:00 cat3k_caa-srdriver.16.09.01.SPA.pkg
7750 -rw- 165667444 Mar 2 2018 06:09:39 +00:00 cat3k_caa-guestshell.16.09.01.SPA.pkg
7759 -rw- 16829052  Mar 2 2018 06:09:39 +00:00 cat3k_caa-webui.16.09.01.SPA.pkg
1621966848 bytes total (137928704 bytes free)
Switch#


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

Directory of flash:/

7766 -rw- 5137 Mar 2 2018 06:10:39 +00:00 cat3k_caa-universalk9.16.09.01.SPA.conf
7769 -rw- 5125 Mar 2 2018 06:11:19 +00:00 packages.conf
1621966848 bytes total (137928704 bytes free)
Switch#
```

Step 5 Reload

a) **reload**

Use this command in the privileged EXEC mode to reload the switch.

```
Switch# reload
```

b) **boot flash:**

If the switch is configured with auto boot, then the stack automatically boots up with the new image. If not, you can manually boot flash:packages.conf

Note When you boot the new image, the boot loader is automatically upgraded.

```
switch: boot flash:packages.conf
```

c) **show version**

Use this command to verify the version of the new image.

```
Switch# show version
Cisco IOS XE Software, Version 16.09.01
Cisco IOS Software [Fuji], Catalyst L3 Switch Software (CAT3K_CAA-UNIVERSALK9-M), Version
 16.9.1, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2018 by Cisco Systems, Inc.
Compiled Tue 2-Mar-18 12:35 by mcpre
```

Downgrading to Cisco IOS XE 3.x.xE in Install Mode

Follow these instructions to downgrade to older Cisco IOS XE Release 3.x.xE releases in install mode.

Before you begin

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

When downgrading from ...	To...
Cisco IOS XE Fuji 16.8.1a or Cisco IOS XE Everest 16.x.x or Cisco IOS XE Denali 16.x.x	Cisco IOS XE Release 3.x.xE

The sample output shows downgrade from Cisco IOS XE Fuji 16.8.1a to Cisco IOS XE Release 3.7.2E.

Procedure

Step 1 Clean Up

a) **request platform software package clean**

Use this command to clean up old installation files; this ensures that you have sufficient space in the flash drive, to expand a new image. Use the **switch all** option to clean up all switches in your stack.

```
Switch# request platform software package clean switch all file flash:
Running command on switch 1
Cleaning up unnecessary package files
Scanning boot directory for packages ... done.
Preparing packages list to delete ...
cat3k_caa-rpbase.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-rpcore.16.08.01a.SPA.pkg
```

```
File is in use, will not delete.
cat3k_caa-srdriver.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-guestshell.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-webui.16.08.01a.SPA.pkg
File is in use, will not delete.
packages.conf
File is in use, will not delete.
done.
Running command on switch 2
Cleaning up unnecessary package files
Scanning boot directory for packages ... done.
Preparing packages list to delete ...
cat3k_caa-rpbase.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-rpcore.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-srdriver.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-guestshell.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-webui.16.08.01a.SPA.pkg
File is in use, will not delete.
packages.conf
File is in use, will not delete.
done.

Running command on switch 3
Cleaning up unnecessary package files
Scanning boot directory for packages ... done.
Preparing packages list to delete ...
cat3k_caa-rpbase.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-rpcore.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-srdriver.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-guestshell.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-webui.16.08.01a.SPA.pkg
File is in use, will not delete.
packages.conf
File is in use, will not delete.
done.

Running command on switch 4
Cleaning up unnecessary package files
Scanning boot directory for packages ... done.
Preparing packages list to delete ...
cat3k_caa-rpbase.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-rpcore.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-srdriver.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-guestshell.16.08.01a.SPA.pkg
File is in use, will not delete.
cat3k_caa-webui.16.08.01a.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:
```

```
[1]:
/flash/cat3k_caa-rpbase.16.02.01.SPA.pkg
/flash/cat3k_caa-srdriver.16.02.01.SPA.pkg
/flash/cat3k_caa-universalk9.16.01.01.SPA.bin
/flash/cat3k_caa-universalk9.16.01.01.SPA.conf
/flash/cat3k_caa-wcm.16.02.01.SPA.pkg
/flash/cat3k_caa-webui.16.02.01.SPA.pkg
/flash/packages.conf.00-
[2]:
/flash/cat3k_caa-rpbase.16.02.01.SPA.pkg
/flash/cat3k_caa-srdriver.16.02.01.SPA.pkg
/flash/cat3k_caa-universalk9.16.01.01.SPA.bin
/flash/cat3k_caa-universalk9.16.01.01.SPA.conf
/flash/cat3k_caa-wcm.16.02.01.SPA.pkg
/flash/cat3k_caa-webui.16.02.01.SPA.pkg
/flash/packages.conf.00-
[3]:
/flash/cat3k_caa-rpbase.16.02.01.SPA.pkg
/flash/cat3k_caa-srdriver.16.02.01.SPA.pkg
/flash/cat3k_caa-universalk9.16.01.01.SPA.bin
/flash/cat3k_caa-universalk9.16.01.01.SPA.conf
/flash/cat3k_caa-wcm.16.02.01.SPA.pkg
/flash/cat3k_caa-webui.16.02.01.SPA.pkg
/flash/packages.conf.00-
[4]:
/flash/cat3k_caa-rpbase.16.02.01.SPA.pkg
/flash/cat3k_caa-srdriver.16.02.01.SPA.pkg
/flash/cat3k_caa-universalk9.16.01.01.SPA.bin
/flash/cat3k_caa-universalk9.16.01.01.SPA.conf
/flash/cat3k_caa-wcm.16.02.01.SPA.pkg
/flash/cat3k_caa-webui.16.02.01.SPA.pkg
/flash/packages.conf.00-

Do you want to proceed? [y/n]y
[1]:
Deleting file flash:cat3k_caa-rpbase.16.02.01.SPA.pkg ... done.
Deleting file flash:cat3k_caa-srdriver.16.02.01.SPA.pkg ... done.
Deleting file flash:cat3k_caa-universalk9.16.01.01.SPA.bin ... done.
Deleting file flash:cat3k_caa-universalk9.16.01.01.SPA.conf ... done.
Deleting file flash:cat3k_caa-wcm.16.02.01.SPA.pkg ... done.
Deleting file flash:cat3k_caa-webui.16.02.01.SPA.pkg ... done.
Deleting file flash:packages.conf.00- ... done.
SUCCESS: Files deleted.
[2]:
Deleting file flash:cat3k_caa-rpbase.16.02.01.SPA.pkg ... done.
Deleting file flash:cat3k_caa-srdriver.16.02.01.SPA.pkg ... done.
Deleting file flash:cat3k_caa-universalk9.16.01.01.SPA.bin ... done.
Deleting file flash:cat3k_caa-universalk9.16.01.01.SPA.conf ... done.
Deleting file flash:cat3k_caa-wcm.16.02.01.SPA.pkg ... done.
Deleting file flash:cat3k_caa-webui.16.02.01.SPA.pkg ... done.
Deleting file flash:packages.conf.00- ... done.
SUCCESS: Files deleted.
[3]:
Deleting file flash:cat3k_caa-rpbase.16.02.01.SPA.pkg ... done.
Deleting file flash:cat3k_caa-srdriver.16.02.01.SPA.pkg ... done.
Deleting file flash:cat3k_caa-universalk9.16.01.01.SPA.bin ... done.
Deleting file flash:cat3k_caa-universalk9.16.01.01.SPA.conf ... done.
Deleting file flash:cat3k_caa-wcm.16.02.01.SPA.pkg ... done.
Deleting file flash:cat3k_caa-webui.16.02.01.SPA.pkg ... done.
Deleting file flash:packages.conf.00- ... done.
SUCCESS: Files deleted.
[4]:
Deleting file flash:cat3k_caa-rpbase.16.02.01.SPA.pkg ... done.
Deleting file flash:cat3k_caa-srdriver.16.02.01.SPA.pkg ... done.
```

```
Deleting file flash:cat3k_caa-universalk9.16.01.01.SPA.bin ... done.
Deleting file flash:cat3k_caa-universalk9.16.01.01.SPA.conf ... done.
Deleting file flash:cat3k_caa-wcm.16.02.01.SPA.pkg ... done.
Deleting file flash:cat3k_caa-webui.16.02.01.SPA.pkg ... done.
Deleting file flash:packages.conf.00- ... done.
SUCCESS: Files deleted.
Switch#
```

Step 2 Copy new image to stack

Copy the target Cisco IOS XE 3.x.xE image to flash: (you can skip this step if you want to use the image from your TFTP server).

a) **copy tftp: flash:**

Use this command to copy the image from your tftp server to flash.

```
Switch# copy tftp://5.28.11.250/cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin flash:
cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin
Destination filename [cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin]?
Accessing tftp://5.28.11.250/cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin...
Loading cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin from 5.28.11.250 (via
GigabitEthernet0/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!O!!!!!!!!!!
!!!!!!!!!!!!!!!
[OK - 311154824 bytes]

311154824 bytes copied in 68.781 secs (4523849 bytes/sec)
Switch#
```

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:/

47718 -rw- 311154824 Nov 25 2015 18:17:21 +00:00
cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin

3458338816 bytes total (2468995072 bytes free)
Switch#
```

Step 3 Downgrade Software Image

a) **request platform software package install**

You can point to the source image on your tftpserver or in flash if you have it copied to flash.

Use this command with the **new** option, to downgrade your stack. Use the **switch all** option to downgrade all the switches in your stack. Use the **auto-copy** option to copy the .bin image from flash: to all other switches in your stack.

```
Switch# request platform software package install switch all file flash:cat3k_caa-
universalk9.SPA.03.07.02.E.152-3.E2.bin new auto-copy

Expanding image file: flash:cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin
[4]: Copying flash:cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin from switch 4 to
switch 1 2 3
[1 2 3]: Finished copying to switch 1 2 3
[1 2 3 4]: Expanding file
```

```
[1 2 3 4]: Finished expanding all-in-one software package in switch 1 2 3 4
SUCCESS: Finished expanding all-in-one software package.
[1 2 3 4]: Performing install
SUCCESS: install Finished
[1]: install package(s) on switch 1
--- Starting list of software package changes ---
Old files list:
Removed cat3k_caa-rpbase.16.08.01a.SPA.pkg
Removed cat3k_caa-rpcore.16.08.01a.SPA.pkg
Removed cat3k_caa-srdriver.16.08.01a.SPA.pkg
Removed cat3k_caa-guestshell.16.08.01a.SPA.pkg
Removed cat3k_caa-webui.16.08.01a.SPA.pkg
New files list:
Added cat3k_caa-base.SPA.03.07.02E.pkg
Added cat3k_caa-drivers.SPA.03.07.02E.pkg
Added cat3k_caa-infra.SPA.03.07.02E.pkg
Added cat3k_caa-iosd-universalk9.SPA.152-3.E2.pkg
Added cat3k_caa-platform.SPA.03.07.02E.pkg
Added cat3k_caa-wcm.SPA.10.3.120.0.pkg
Finished list of software package changes
SUCCESS: Software provisioned. New software will load on reboot.
[1]: Finished install successful on switch 1
[2]: install package(s) on switch 2
--- Starting list of software package changes ---
Old files list:
Removed cat3k_caa-rpbase.16.08.01a.SPA.pkg
Removed cat3k_caa-rpcore.16.08.01a.SPA.pkg
Removed cat3k_caa-srdriver.16.08.01a.SPA.pkg
Removed cat3k_caa-guestshell.16.08.01a.SPA.pkg
Removed cat3k_caa-webui.16.08.01a.SPA.pkg
New files list:
Added cat3k_caa-base.SPA.03.07.02E.pkg
Added cat3k_caa-drivers.SPA.03.07.02E.pkg
Added cat3k_caa-infra.SPA.03.07.02E.pkg
Added cat3k_caa-iosd-universalk9.SPA.152-3.E2.pkg
Added cat3k_caa-platform.SPA.03.07.02E.pkg
Added cat3k_caa-wcm.SPA.10.3.120.0.pkg
Finished list of software package changes
SUCCESS: Software provisioned. New software will load on reboot.
[2]: Finished install successful on switch 2
[3]: install package(s) on switch 3
--- Starting list of software package changes ---
Old files list:
Removed cat3k_caa-rpbase.16.08.01a.SPA.pkg
Removed cat3k_caa-rpcore.16.08.01a.SPA.pkg
Removed cat3k_caa-srdriver.16.08.01a.SPA.pkg
Removed cat3k_caa-guestshell.16.08.01a.SPA.pkg
Removed cat3k_caa-webui.16.08.01a.SPA.pkg
New files list:
Added cat3k_caa-base.SPA.03.07.02E.pkg
Added cat3k_caa-drivers.SPA.03.07.02E.pkg
Added cat3k_caa-infra.SPA.03.07.02E.pkg
Added cat3k_caa-iosd-universalk9.SPA.152-3.E2.pkg
Added cat3k_caa-platform.SPA.03.07.02E.pkg
Added cat3k_caa-wcm.SPA.10.3.120.0.pkg
Finished list of software package changes
SUCCESS: Software provisioned. New software will load on reboot.
[3]: Finished install successful on switch 3
[4]: install package(s) on switch 4
--- Starting list of software package changes ---
Old files list:
Removed cat3k_caa-rpbase.16.08.01a.SPA.pkg
Removed cat3k_caa-rpcore.16.08.01a.SPA.pkg
Removed cat3k_caa-srdriver.16.08.01a.SPA.pkg
```

```
Removed cat3k_caa-guestshell.16.08.01a.SPA.pkg
Removed cat3k_caa-webui.16.08.01a.SPA.pkg
New files list:
Added cat3k_caa-base.SPA.03.07.02E.pkg
Added cat3k_caa-drivers.SPA.03.07.02E.pkg
Added cat3k_caa-infra.SPA.03.07.02E.pkg
Added cat3k_caa-iosd-universalk9.SPA.152-3.E2.pkg
Added cat3k_caa-platform.SPA.03.07.02E.pkg
Added cat3k_caa-wcm.SPA.10.3.120.0.pkg
Finished list of software package changes
SUCCESS: Software provisioned. New software will load on reboot.
[4]: Finished install successful on switch 4
Checking status of install on [1 2 3 4]
[1 2 3 4]: Finished install in switch 1 2 3 4
SUCCESS: Finished install: Success on [1 2 3 4]
```

The old files listed in the logs should be removed using the **software clean** command, after reload.

b) **delete flash:**

After you have successfully installed the image, you no longer need the .bin image. Use this command to delete the file from flash of each switch if you copied it to flash.

```
Switch# delete flash: cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin
Delete filename [cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin]?
Delete flash:/ cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin? [confirm]
Switch#
```

Step 4 Reload

a) **reload**

Use this command in the privileged EXEC mode to reload the switch.

```
Switch# reload
```

b) **boot flash:**

If the switch is configured with auto boot, then the stack automatically boots up with the new image. If not, you can manually boot flash:packages.conf

Note When you downgrade to a Cisco IOS XE 3.xE image, the boot loader does not automatically downgrade. It remains updated. The new boot loader can support booting both Cisco IOS XE Release 3.x.xE releases as well as Cisco IOS XE Denali 16.x.x, Cisco IOS XE Everest 16.x.x, and Cisco IOS XE Fuji 16.8.1a releases.

```
Switch:boot flash:packages.conf
```

Downgrading to Cisco IOS XE 3.x.xE in Bundle Mode

Follow these instructions to downgrade to older Cisco IOS XE Release 3.x.xE releases in bundle mode.

Before you begin

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

When downgrading from ...	To...
Cisco IOS XE Fuji 16.8.1a or Cisco IOS XE Everest 16.x.x or Cisco IOS XE Denali 16.x.x	Cisco IOS XE Release 3.x.xE

The sample output shows downgrade from Cisco IOS XE Fuji 16.8.1a to Cisco IOS XE Release 3.7.2E.

Procedure

Step 1 Copy new image to stack

a) **show run | i tftp**

Use this command to make sure your tftp server is reachable from IOS via GigabitEthernet0/0.

```
Switch# show run | i tftp
ip tftp source-interface GigabitEthernet0/0
ip tftp blocksize 8192
Switch#
Switch# show run | i ip route vrf
ip route vrf Mgmt-vrf 5.0.0.0 255.0.0.0 5.30.0.1
Switch#
Switch# show run int GigabitEthernet0/0
Building configuration...

Current configuration : 115 bytes
!
interface GigabitEthernet0/0
vrf forwarding Mgmt-vrf
ip address 5.30.12.121 255.255.0.0
negotiation auto
end
Switch#
Switch# ping vrf Mgmt-vrf ip 5.28.11.250
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 5.28.11.250, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/2 ms
```

b) **copy tftp: flash:**

Use this command to copy the image from your tftp server to flash.

Note If you have a stack, you must copy the image to the flash drive of each switch in the stack.

```
Switch# copy tftp://5.28.11.250/cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin flash:
cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin
Destination filename [cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin]?
Accessing tftp://5.28.11.250/cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin...
Loading cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin from 5.28.11.250 (via
GigabitEthernet0/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!O!!!!!!!!!!
!!!!!!!!!!!!!!
[OK - 311154824 bytes]

311154824 bytes copied in 68.781 secs (4523849 bytes/sec)
```

```
Switch#
```

c) **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:/

47718 -rw- 311154824 Nov 25 2015 18:17:21 +00:00
cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin

3458338816 bytes total (2468995072 bytes free)
Switch#
```

Step 2 Edit the boot variable

a) **no boot system**

Use this command to clear the boot variable.

```
Switch(config)# no boot system
```

b) **boot system**

Use this command to edit the boot variable, to point to the new image.

```
Switch(config)# boot system flash:cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin
```

c) **write memory**

Use this command to save configuration changes.

```
Switch# write memory
```

d) **show boot**

Use this command to display and verify that your boot variable is pointing to the new image.

```
Switch# show boot
--------------------------
Switch 1
--------------------------
Current Boot Variables:
BOOT variable = flash:cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin;

Boot Variables on next reload:
BOOT variable = flash:cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin;
Allow Dev Key = yes
Manual Boot = yes
Enable Break = yes
Switch#
```

Step 3 Reload

a) **reload**

Use this command to reload the switch.

```
switch# reload
```

b) **boot flash**

If your switches are configured with auto boot, the stack will automatically boot up with the new image. If not, you can manually boot flash:cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin

Note When you downgrade to a Cisco IOS XE Release 3.x.xE image, the boot loader does not automatically downgrade. The new boot loader can support booting bothCisco IOS XE Release 3.x.xE as well as Cisco IOS XE Denali 16.x.x, Cisco IOS XE Everest 16.x.x and Cisco IOS XE Fuji 16.8.1a releases.

```
switch:boot flash:cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin
```

c) **show version**

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

```
Switch# show version
Cisco IOS Software, IOS-XE Software, Catalyst L3 Switch Software
(CAT3K_CAA-UNIVERSALK9-M), Version 03.07.02E RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2015 by Cisco Systems, Inc.
Compiled Tue 21-Jul-15 12:51 by prod_rel_team
```

Step 4 Move from Cisco IOS XE 3.xE Bundle Mode to Install Mode

a) **software clean file flash:**

Use this command to ensure you have enough space in flash to expand a new image by cleaning up old installation files. This command will erase your Cisco IOS XE 3.x.xE bin image file, so ensure that you copy it to your active switch again.

```
Switch# software clean file flash:
Preparing clean operation ...
[1 2 3 4]: Cleaning up unnecessary package files
[1 2 3 4]: Preparing packages list to delete ...
[1]: Files that will be deleted:
cat3k_caa-rpbase.16.08.01.SPA.pkg
cat3k_caa-rpcore.16.08.01.SPA.pkg
cat3k_caa-srdriver.16.08.01.SPA.pkg
cat3k_caa-universalk9.16.08.01.SPA.bin
cat3k_caa-guestshell.16.08.01.SPA.pkg
cat3k_caa-webui.16.08.01.SPA.pkg
packages.conf
[2]: Files that will be deleted:
cat3k_caa-rpbase.16.08.01.SPA.pkg
cat3k_caa-rpcore.16.08.01.SPA.pkg
cat3k_caa-srdriver.16.08.01.SPA.pkg
cat3k_caa-universalk9.16.08.01.SPA.bin
cat3k_caa-guestshell.16.08.01.SPA.pkg
cat3k_caa-webui.16.08.01.SPA.pkg
packages.conf
[3]: Files that will be deleted:
cat3k_caa-rpbase.16.08.01.SPA.pkg
cat3k_caa-rpcore.16.08.01.SPA.pkg
cat3k_caa-srdriver.16.08.01.SPA.pkg
cat3k_caa-universalk9.16.08.01.SPA.bin
cat3k_caa-guestshell.16.08.01.SPA.pkg
cat3k_caa-webui.16.08.01.SPA.pkg
```

```
packages.conf
[4]: Files that will be deleted:
cat3k_caa-rpbase.16.08.01.SPA.pkg
cat3k_caa-rpcore.16.08.01.SPA.pkg
cat3k_caa-srdriver.16.08.01.SPA.pkg
cat3k_caa-universalk9.16.08.01.SPA.bin
cat3k_caa-guestshell.16.08.01.SPA.pkg
cat3k_caa-webui.16.08.01.SPA.pkg

[1 2 3 4]: Do you want to proceed with the deletion? [yes/no]: yes
[1 2 3 4]: Clean up completed
Switch#
```

b) **copy tftp: flash:**

Use this command to copy the image from your TFTP server to flash

```
Switch# copy tftp://5.28.11.250/cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin flash:
cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin
Destination filename [cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin]?
Accessing tftp://5.28.11.250/cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin...
Loading cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin from 5.28.11.250 (via
GigabitEthernet0/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!O!!!!!!!!!!
!!!!!!!!!!!!!!
[OK - 311154824 bytes]
311154824 bytes copied in 68.781 secs (4523849 bytes/sec)
Switch#
```

c) **software expand**

Use this command to expand the target image to flash and move from bundle mode to install mode. You can point to the source image on your TFTP server or in flash if you have it copied to flash.

```
Switch# software expand file flash:cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin
Preparing expand operation ...
[1]: Copying software from active switch 1 to switches 2,3,4
[1]: Finished copying software to switches 2,3,4
[1 2 3 4]: Expanding bundle flash:cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin
[1 2 3 4]: Copying package files
[1 2 3 4]: Package files copied
[1 2 3 4]: Finished expanding bundle
flash:cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin
Switch#
```

Step 5 Edit the boot variable

a) **no boot system**

Use this command to clear the boot variable.

```
Switch(config)# no boot system
```

b) **boot system**

Use this command to edit the boot variable to point to the new image.

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

c) **write memory**

Use this command to save configuration changes.

```
Switch# write memory
```

d) **show boot**

Use this command to confirm that your boot variable is pointing to the new image

```
Switch# show boot
--------------------------
Switch 1
--------------------------
Current Boot Variables:
BOOT variable = flash:packages.conf;

Boot Variables on next reload:
BOOT variable = flash:packages.conf;
Manual Boot = yes
Enable Break = yes
Switch#
```

Step 6 Reload

a) **reload**

Use this command to reload the switch.

```
Switch# reload
```

b) **boot flash**

Use this command to manually boot flash:packages.conf, to reload the switch. If your switches are configured with auto boot, the stack will automatically boot up with the new image.

```
switch:boot flash:packages.conf
```

c) **show version**

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

```
Switch# show version
Cisco IOS Software, IOS-XE Software, Catalyst L3 Switch Software
(CAT3K_CAA-UNIVERSALK9-M), Version 03.07.02E RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2015 by Cisco Systems, Inc.
Compiled Tue 21-Jul-15 12:51 by prod_rel_team
```

d) **delete flash:**

After you have successfully installed the image, you no longer need the .bin image. Use this command to delete the file from the flash of each switch if you had copied to flash.

```
Switch# delete flash:cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin
Delete filename [cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin]?
Delete flash:/cat3k_caa-universalk9.SPA.03.07.02.E.152-3.E2.bin? [confirm]
Switch#
```

Licensing

Feature Sets and Right-To-Use Licensing

This section provides information about the licensing packages for feature sets available on Cisco Catalyst 3650 Series Switches

License Levels

The features available on the switch can be classifed into those available with the image-based license levels and those available with add-on license levels.

Image-Based Licenses—The licenses levels that you can order and the corresponding feature sets are:

- LAN Base—Provides basic Layer 2+ features, including access control lists (ACLs) and quality of service (QoS), up to 255 VLANs, support for routing protocols (Routing Information Protocol (RIP), Open Shortest Path First (OSPF), Policy-Based Routing (PBR), Protocol Independent Multicast Stub Routing (PIM Stub Routing) with IPv4 and IPv6, and routed access with IPv4 and IPv6 (OSPF — up to 1000 routes, Multicast — up to 1000 routes).
- IP Base—Provides Layer 2+ and basic Layer 3 features (enterprise-class intelligent services). These features include access control lists (ACLs), quality of service (QoS), static routing, Enhanced Interior Gateway Routing Protocol (EIGRP) stub routing, IP multicast routing, RIP, basic IPv6 management, the OSPF Protocol (for routed access only). The license supports up to 4094 VLANs.
- IP Services—Provides a richer set of enterprise-class intelligent services and full IPv6 support. It includes all IP Base features plus full Layer 3 routing (IP unicast routing and IP multicast routing). The IP Services feature set includes protocols such as the EIGRP, OSPF Protocol. The license supports up to 4094 VLANs.

Add-On Licenses—These require an image-bases license as a prerequisite. 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). The add-on licenses that you can order are:

- Digital Networking Architecture (DNA) Essentials—This add-on license can be purchased with LAN Base, IP Base, or IP Services image-based licenses.

  DNA Advantage (Contains DNA Essentials plus more)—This add-on license can be purchased only with IP Base or IP Services image-based licenses.

License Types

The types of licenses available to order by duration are:

- Permanent—For image-based licenses only. Purchased with a specific feature set with no expiration date.
- Term—For add-on licenses only. Purchased with a feature set for a specific subscription period of 3, 5, or 7 years. The expiration date displays on Cisco Smart Software Manager (Cisco SSM).
- Evaluation licenses—Available with image-based and add-on licenses. Pre-installed on the switch and valid for only a 90 day in-use period.

Right-to-use (RTU) Licensing

The Right-to-use (RTU) licensing feature allows you to configure and activate a specific license type and level, and then to manage license usage on your switch.

Added licensing information is also available in the product data sheet, at this URL: https://www.cisco.com/en/US/products/ps13133/products_data_sheets_list.html

Using Smart Accounts

We recommend that you assign a Smart Account when you order devices or licenses. Smart Accounts enable you to manage all of your software licenses for switches, routers, firewalls, access-points or tools from one centralized website.

- Create Smart Accounts by going to https://software.cisco.com → **Administration** → **Request Smart Account**.
- Manage your licenses by going to https://software.cisco.com → **Administration** → **Manage Smart Account**.

Note This is especially relevant to the term licenses that you order, because information about the expiry of term licenses is available only through your Smart Account.

For more information about Smart Accounts and Smart Software Licensing in general, go to the Cisco Smart Software Manager (Cisco SSM) website on cisco.com: http://www.cisco.com/c/en/us/buy/smart-accounts/software-licensing.html

Upgrading RTU Licenses

The **licenseright-to-use** privileged EXEC command provides options to activate or deactivate all licenses supported on the platform.

licenseright-to-use{**activate** | **deactivate**}{**addon**{**dna-adantage** | **dna-essentials**}}{**evaluation** | **subscription**}[**acceptEULA** | **all** | **evaluation** | **slot**]

licenseright-to-use{**activate** | **deactivate**}{**ipbase** | **ipservices** | **lanbase**}[**acceptEULA** | **all** | **evaluation** | **slot**]

Ugrading an IP Base SKU to IP Services License

Follow these steps:

Procedure

Step 1 **license right-to-use activate ipservices slot** *switch-ID* **acceptEULA**

Activates the IP Services license. Enter the switch ID and enter **acceptEULA** to indicate acceptance.

Step 2 **show license right-to-use summary**

Displays the reboot license level.

Step 3 **reload**

Reboots the switch to boot with the IP Services license level.

Evaluating IP Services License on IP Base SKU

Follow these steps:

Procedure

Step 1 **license right-to-use activate ipservices evaluation slot** *switch-ID* **acceptEULA**

Activates the IP Services evaluation license. Enter the switch ID and enter **acceptEULA** to indicate acceptance.

Step 2 **show license right-to-use summary**

Displays the reboot license level.

Step 3 **reload**

Reboots the switch to boot with the IP Services evaluation license.

Deactivating Evaluation IP Services License on IP Base SKU

Follow these steps:

Procedure

Step 1 **license right-to-use deactivate ipservices evaluation slot** *switch-ID*

Deactivates the IP Services evaluation license.

Step 2 **show license right-to-use summary**

Displays the reboot license level.

Step 3 **reload**

Reboots the switch to boot with the IP Base license level.

Upgrading LAN Base Stack to IP Base Stack

Follow these steps:

Procedure

Step 1 **license right-to-use activate ipbase all acceptEULA**

Activates the IP Base license on all the switches in the stack. Enter **acceptEULA** to indicate acceptance.

Step 2 **show license right-to-use summary**

Displays the reboot license level.

Step 3 **reload**

Reboots the switch to boot with IP Base.

Ugrading from a DNA Essentials to a DNA Advantage License

Follow these steps:

Before you begin

The DNA Advantage add-on license can be purchased only with IP Base or IP Services image-based licenses. So if you are upgrading from DNA Essentials to DNA Advantage, check that you have the required image-based license.

Procedure

Step 1 **license right-to-use activate addon dna-advantage subscription** [**acceptEULA** | **all** | **slot** *switch-number*]

Activates the DNA Advantage license.

You can specify a switch number to activate the license on a particular switch in the stack (**slot** *switch-number*), or activate it on all the switches in the stack (**all**).

Enter **acceptEULA** to indicate acceptance.

Step 2 **show license right-to-use summary**

Displays the reboot license level.

Step 3 **reload**

Reboots the switch to boot with the DNA advantage license level.

Evaluating a DNA Advantage License

Follow these steps:

Procedure

Step 1 **license right-to-use activate addon dna-advantage evaluation** [**acceptEULA** | **all** | **slot** *switch-number*]

Activates the DNA Advantage evaluation license.

You can specify a switch number to activate the license on a particular switch in the stack (**slot** *switch-number*), or activate it on all the switches in the stack (**all**).

Enter **acceptEULA** to indicate acceptance.

Step 2 **show license right-to-use summary**

Displays the reboot license level.

Step 3 **reload**

Reboots the switch to boot with the DNA Advantage evaluation license.

Deactivating a DNA Advantage Evaluation License

Follow these steps:

Procedure

Step 1 **license right-to-use deactivate addon dna-advantage evaluation** [**all** | **slot** *switch-number*]

Deactivates the DNA Advantage evaluation license.

You can specify a switch number to activate the license on a particular switch in the stack (**slot** *switch-number*), or activate it on all the switches in the stack (**all**).

Step 2 **show license right-to-use summary**

Displays the reboot license level.

Step 3 **reload**

Reboots the switch to boot with the DNA Essentials license level.

Changing a License Level Mismatch from Active's Console

Two possbile mismatch scenarios are described here.

Mismatch Switch with Lower License Level than Stack

If the license mismatch switch has a lower license level than other switches in the stack, the stack is running at IP Services, and the mismatch switch is booted with IP Base license, follow these steps to resolve the mismatch:df

Procedure

	Command or Action	Purpose
Step 1	**show switch**	Displays the switch number in a license mismatch state.
Step 2	**show license right-to-use mismatch**	In the output, check the license level of the license mismatch switch.
Step 3	**license right-to-use activate ipservices slot** *switch-id* **acceptEULA**	Activates IP Services license on all the mismatch switches in the stack. Enter **acceptEULA** to indicate acceptance.

	Command or Action	Purpose
Step 4	**reload slot** *switch-id*	Reboots the license mismatch switch to boot with ipservices and join the stack.

Mismatch Switch with Higher License Level than Stack

If the license mismatch switch has a higher license level than other switches in the stack, where the stack is running at IP Base and the mismatch switch is booted with IP Services license, follow these steps to resolve the mismatch:

Procedure

	Command or Action	Purpose
Step 1	**show switch**	Displays the switch number in a license mismatch state.
Step 2	**show license right-to-use mismatch**	In the output, check the license level of the license mismatch switch.
Step 3	**license right-to-use activate ipbase slot** *switch-id* **acceptEULA**	Activates IP Base license on the mismatched switch. Enter **acceptEULA** to indicate acceptance.
Step 4	**reload slot** *switch-id*	Reboots the license mismatch switch to boot with ipservices and join the stack.

Scaling Guidelines

System Feature	Maximum Limit
Number of HTTP session redirections system-wide	Up to 100 clients per second
Number of HTTPS session redirections system-wide	Up to 20 clients per second

Limitations and Restrictions

- Cisco TrustSec restrictions:
  - Cisco TrustSec can be configured only on physical interfaces, not on logical interfaces.
  - Cisco TrustSec cannot be configured on a pure bridging domain with the IPSG feature enabled. You must either enable IP routing or disable the IPSG feature in the bridging domain.
- Centralized Management Mode (CMM)—Starting with Cisco IOS XE Denali 16.3.1, CMM is not supported.

- 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.
- DHCP Client—Starting with Cisco IOS XE Denali 16.1.x, a DHCP client that includes option 61 (used by DHCP clients to specify their unique client identifier) in their DHCP discover/offer packet must accept the response message with option 61 from the DHCP server/relay. A client that fails to accept the response message with option 61, is not in compliance with RFC 6842 and requires a firmware upgrade.
- Flexible NetFlow—You cannot configure NetFlow export using the Ethernet Management port (GigabitEthernet0/0).
- Flex Links are not supported. We recommend that you use spanning tree protocol (STP) as the alternative.
- Memory leak—When a logging discriminator is configured and applied to a device, memory leak is seen under heavy syslog or debug output. The rate of the leak is dependent on the quantity of logs produced. In extreme cases, the device may fail. As a workaround, disable the logging discriminator on the device.
- 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.
- 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.
- Mixed stacking—A switch stack containing a mix of Cisco Catalyst 3650 Series Switches and Cisco Catalyst 3850 Series Switches is not supported.
- VLAN Restriction—It is advisable to have well-defined segregation while defining data and voice domain during switch configuration and to maintain a data VLAN different from voice VLAN across the switch stack. If the same VLAN is configured for data and voice domains on an interface, the resulting high CPU utilization might affect the device.
- YANG data modeling limitation—A maximum of 20 simultaneous NETCONF sessions are supported.

Caveats

Caveats describe unexpected behavior in Cisco IOS-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 16.8.x

Caveat ID Number	Description
CSCvg31906	[L3-PTP] TC mode sync/follow up packets are not forward b/w peers for inter vlan communication
CSCvg53159	%SNMP-3-RESPONSE_DELAYED: processing GetNext of cafSessionEntry.2 seen on catalyst switch
CSCvg85084	3850 autonegotiated but remain down if remote device is configured manually
CSCvg96076	Mgig ports fail to link up with Intel NICs when using cable lenghts greater than 60 m
CSCvh14091	3850: SFP port gets up even if it is unconnected with cable
CSCvh28104	C3850: QSFP-H40G-CU5M 40g not showing as up on peer
CSCvh48269	Stack member loses connection to active on single cable auth failure
CSCvh52491	AVB : FED_QOS_ERRMSG-3-QUEUE_BUFFER_HW_ERROR on shutting down neigh port connected to msrp listener
CSCvh56835	3850 Watchdog crash after large number of %PLATFORM_INFRA-5-IOS_INTR_OVER_LIMIT: messages seen
CSCvh87131	TRACEBACK: OID cefcModuleEntry crashes the box
CSCvh87480	Slowness for x11perf with MGig port on 3850
CSCvi06186	Cat3850 stack logging onboard(OBFL) config disappear after switchover
CSCvi15897	Silent Reload on Cat3850 running Everest 16.6.2
CSCvi38191	memory leak in lman process in denali 16.3.6
CSCvg90106	[PTP] moving from one TC mode other mode, PTP packets is not forward by TC
CSCvh28402	optical signal present on shut interface with "cts manual"
CSCvh72186	Cat9k ROMMON: HTTP booting does not allow specified port number
CSCvh80159	C9400: %BOOT-3-SYSD_STARTFAIL: R0/0: Failed to launch boot task binos_script.service (exit-code)

Caveat ID Number	Description
CSCvh84345	IOS CLI "show platform software fed switch active punt cause summary" may display negative counts
CSCvh87749	GLC-GE-100FX SFP "vendor SN: OPA14203361" linked up half 10 with default config
CSCvi03642	Fan issue not showing up on switch 360 page
CSCvi21517	Username is not applying as configured in CAT 9K
CSCvi75488	Ping from client fails with enforcement enabled on known mappings

Resolved Caveats in Cisco IOS XE Fuji 16.8.1a

Caveat ID Number	Description
CSCvf27728	Cat3k improve Last Reload Reason
CSCvf75518	Controller port error Interface
CSCvf81218	SFP showing unknown status in show interface on stack standby device
CSCvf99697	WS-C3650-48FQM-E running 16.3.3 keeps generating FRU alarms
CSCvg34039	WS-C3650-12X48UR : no traffic over tex/1/7 ports
CSCvg70013	GLC-T/SFP-GE-T 100M link is half duplex after reinserting SFP or reloading device
CSCvh31431	Memory leak in linux_iosd-image on 16.6 releases
CSCvh52882	Memory Leak the fed process due nbar config
CSCvh85482	memory utilization increasing for tams_proc
CSCvh89372	Memory leak in linux_iosd-image or platfrom_mgr
CSCvi19809	Memory leak on C9300 due TMS process
CSCvf77673	Memory leak in OC-Platform

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 16 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 3650 Series Switches is at this URL: https://www.cisco.com/go/cat3650_docs

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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