Release Notes for Cisco Catalyst 9300 Series Switches, Cisco IOS XE Cupertino 17.8.x

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Introduction

Cisco Catalyst 9300 Series Switches are Cisco's lead stackable access platforms for the next-generation enterprise and have been purpose-built to address emerging trends of Security, IoT, Mobility, and Cloud.

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

Whats New in Cisco IOS XE Cupertino 17.8.1

Hardware Features in Cisco IOS XE Cupertino 17.8.1

There are no new hardware features in this release.

Software Features in Cisco IOS XE Cupertino 17.8.1

Feature Name	Description and License Level Information
Enforce minimum length for Enable password	Introduces support for specifying AAA common criteria policy in the enable password command. Use the **common-criteria policy** keyword to enable this feature.
G8275.x Timing Profile	Introduces G8275.1 telecom profile for accurate delivery of phase and time synchronization. The G8275.1 specifies a profile for telecommunication applications based on IEEE 1588 PTP.
Multicast traffic support for IPsec SVTI	Introduces support for multicast traffic on IPsec Static Virtual Tunnel Interfaces (SVTIs) for both IPv4 and IPv6 multicast routing. Support for this feature is introduced on the Cisco Catalyst 9300X Series Switches.

Feature Name	Description and License Level Information
Optimized Layer 2 Multicast in BGP EVPN VXLAN Fabric	In a BGP EVPN VXLAN fabric, layer 2 multicast traffic is optimized both at the access level and within the VXLAN fabric. Optimized layer 2 multicast is restricted to a Layer 2 Virtual Network Instance (L2VNI), wherein the source and receivers are within the same Layer 2 domain.
Programmability • YANG Data Models	The following programmability features are introduced in this release: • 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/1781. 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.
View System Power Consumption	Introduces support for **show power detail** and **show power module** commands to display the details of the total power allocation and consumption by the device.

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

Important Notes

Unsupported Features

- Cisco TrustSec Network Device Admission Control (NDAC) on Uplinks
- Converged Access for Branch Deployments
- IPsec VPN
- Performance Monitoring (PerfMon)
- Virtual Routing and Forwarding (VRF)-Aware web authentication

Complete List of Supported Features

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

Accessing Hidden Commands

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

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

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

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

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

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

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

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

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

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

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

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

Supported Hardware

Cisco Catalyst 9300 Series Switches—Model Numbers

The following table lists the supported hardware models and the default license levels they are delivered with. For information about the available license levels, see section *License Levels* .

Table 1: Cisco Catalyst 9300 Series Switches

Switch Model	Default License Level[1]	Description
C9300-24H-A	Network Advantage	Stackable 24 10/100/1000 Mbps UPOE+ ports; PoE budget of 830 W with 1100 WAC power supply; supports StackWise-480 and StackPower
C9300-24H-E	Network Essentials	
C9300-24P-A	Network Advantage	Stackable 24 10/100/1000 PoE+ ports; PoE budget of 437W; 715 WAC power supply; supports StackWise-480 and StackPower
C9300-24P-E	Network Essentials	
C9300-24S-A	Network Advantage	Stackable 24 1G SFP ports; two power supply slots with 715 WAC power supply installed by default; supports StackWise-480 and StackPower.
C9300-24S-E	Network Essentials	
C9300-24T-A	Network Advantage	Stackable 24 10/100/1000 Ethernet ports; 350 WAC power supply; supports StackWise-480 and StackPower
C9300-24T-E	Network Essentials	
C9300-24U-A	Network Advantage	Stackable 24 10/100/1000 UPoE ports; PoE budget of 830W; 1100 WAC power supply; supports StackWise-480 and StackPower
C9300-24U-E	Network Essentials	
C9300-24UB-A	Network Advantage	Stackable 24 10/100/1000 Mbps UPOE ports that provide deep buffers and higher scale; PoE budget of 830W with 1100 WAC power supply; supports StackWise-480 and StackPower
C9300-24UB-E	Network Essentials	
C9300-24UX-A	Network Advantage	Stackable 24 Multigigabit Ethernet 100/1000/2500/5000/10000 UPoE ports; PoE budget of 490 W with 1100 WAC power supply; supports StackWise-480 and StackPower
C9300-24UX-E	Network Essentials	
C9300-24UXB-A	Network Advantage	Stackable 24 Multigigabit Ethernet (100 Mbps or 1/2.5/5/10 Gbps) UPOE ports that provide deep buffers and higher scale; PoE budget of 560 W with 1100 WAC power supply; supports StackWise-480 and StackPower
C9300-24UXB-E	Network Essentials	

Switch Model	Default License Level[1]	Description
C9300-48H-A	Network Advantage	Stackable 48 10/100/1000 Mbps UPOE+ ports; PoE budget of 822 W with 1100 WAC power supply; supports StackWise-480 and StackPower
C9300-48H-E	Network Essentials	
C9300-48T-A	Network Advantage	Stackable 48 10/100/1000 Ethernet ports; 350 WAC power supply; supports StackWise-480 and StackPower
C9300-48T-E	Network Essentials	
C9300-48P-A	Network Advantage	Stackable 48 10/100/1000 PoE+ ports; PoE budget of 437W; 715 WAC power supply; supports StackWise-480 and StackPower
C9300-48P-E	Network Essentials	
C9300-48S-A	Network Advantage	Stackable 48 1G SFP ports; two power supply slots with 715 WAC power supply installed by default; supports StackWise-480 and StackPower.
C9300-48S-E	Network Essentials	
C9300-48T-A	Network Advantage	Stackable 48 10/100/1000 Ethernet ports; 350 WAC power supply; supports StackWise-480 and StackPower
C9300-48T-E	Network Essentials	
C9300-48U-A	Network Advantage	Stackable 48 10/100/1000 UPoE ports; PoE budget of 822 W; 1100 WAC power supply; supports StackWise-480 and StackPower
C9300-48U-E	Network Essentials	
C9300-48UB-A	Network Advantage	Stackable 48 10/100/1000 Mbps UPOE ports that provide deep buffers and higher scale; PoE budget of 822 W with 1100 WAC power supply; supports StackWise-480 and StackPower
C9300-48UB-E	Network Essentials	
C9300-48UN-A	Network Advantage	Stackable 48 Multigigabit Ethernet (100 Mbps or 1/2.5/5 Gbps) UPoE ports; PoE budget of 610 W with 1100 WAC power supply; supports StackWise-480 and StackPower
C9300-48UN-E	Network Essentials	

Switch Model	Default License Level[1]	Description
C9300-48UXM-A	Network Advantage	Stackable 48 (36 2.5G Multigigabit Ethernet and 12 10G Multigigabit Ethernet Universal Power Over Ethernet (UPOE) ports)
C9300-48UXM-E	Network Essentials	

[1] See section *Licensing → Table: Permitted Combinations*, in this document for information about the add-on licenses that you can order.

Table 2: Cisco Catalyst 9300L Series Switches

Switch Model	Default License Level[2]	Description
C9300L-24T-4G-A	Network Advantage	Stackable 24x10/100/1000M Ethernet ports; 4x1G SFP fixed uplink ports; 350 WAC power supply; supports StackWise-320.
C9300L-24T-4G-E	Network Essentials	
C9300L-24P-4G-A	Network Advantage	Stackable 24x10/100/1000M PoE+ ports; 4x1G SFP fixed uplink ports; PoE budget of 505W with 715 WAC power supply; supports StackWise-320.
C9300L-24P-4G-E	Network Essentials	
C9300L-24T-4X-A	Network Advantage	Stackable 24x10/100/1000M Ethernet ports; 4x10G SFP+ fixed uplink ports; 350 WAC power supply; supports StackWise-320.
C9300L-24T-4X-E	Network Essentials	
C9300L-24P-4X-A	Network Advantage	Stackable 24x10/100/1000M PoE+ ports; 4x10G SFP+ fixed uplink ports; PoE budget of 505W with 715 WAC power supply; supports StackWise-320.
C9300L-24P-4X-E	Network Essentials	
C9300L-48T-4G-A	Network Advantage	Stackable 48x10/100/1000M Ethernet ports; 4x1G SFP fixed uplink ports; 350 WAC power supply; supports StackWise-320.
C9300L-48T-4G-E	Network Essentials	
C9300L-48P-4G-A	Network Advantage	Stackable 48x10/100/1000M PoE+ ports; 4x1G SFP fixed uplink ports; PoE budget of 505W with 715 WAC power supply; supports StackWise-320.
C9300L-48P-4G-E	Network Essentials	

Switch Model	Default License Level[2]	Description
C9300L-48T-4X-A	Network Advantage	Stackable 48x10/100/1000M Ethernet ports; 4x10G SFP+ fixed uplink ports; 350 WAC power supply; supports StackWise-320.
C9300L-48T-4X-E	Network Essentials	
C9300L-48P-4X-A	Network Advantage	Stackable 48x10/100/1000M PoE+ ports; 4x10G SFP+ fixed uplink ports; PoE budget of 505W with 715 WAC power supply; supports StackWise-320.
C9300L-48P-4X-E	Network Essentials	
C9300L-48PF-4G-A	Network Advantage	Stackable 48 10/100/1000 Mbps PoE+ ports; 4x1G SFP+ fixed uplink ports; PoE budget of 890 W with 1100 WAC power supply; supports StackWise-320.
C9300L-48PF-4G-E	Network Essentials	
C9300L-48PF-4X-A	Network Advantage	Stackable 48 10/100/1000 Mbps PoE+ ports; 4x10G SFP+ fixed uplink ports; PoE budget of 890 W with 1100 WAC power supply; supports StackWise-320.
C9300L-48PF-4X-E	Network Essentials	
C9300L-24UXG-4X-A	Network Advantage	Stackable 16 10/100/1000 Mbps and 8 Multigigabit Ethernet (100 Mbps or 1/2.5/5/10 Gbps) UPOE ports; 4x10G SFP+ fixed uplink ports; PoE budget of 880 W with 1100 WAC power supply; supports StackWise-320.
C9300L-24UXG-4X-E	Network Essentials	
C9300L-24UXG-2Q-A	Network Advantage	Stackable 16 10/100/1000 Mbps and 8 Multigigabit Ethernet (100 Mbps or 1/2.5/5/10 Gbps) UPOE ports; 2x40G QSFP+ fixed uplink ports; PoE budget of 722 W with 1100 WAC power supply; supports StackWise-320.
C9300L-24UXG-2Q-E	Network Essentials	
C9300L-48UXG-4X-A	Network Advantage	Stackable 36 10/100/1000 Mbps and 12 Multigigabit Ethernet (100 Mbps or 1/2.5/5/10 Gbps) UPOE ports; 4x10G SFP+ fixed uplink ports; PoE budget of 675 W with 1100 WAC power supply; supports StackWise-320.
C9300L-48UXG-4X-E	Network Essentials	
C9300L-48UXG-2Q-A	Network Advantage	Stackable 36 10/100/1000 Mbps and 12 Multigigabit Ethernet (100 Mbps or 1/2.5/5/10 Gbps) UPOE ports; 2x40G QSFP+ fixed uplink ports; PoE budget of 675 W with 1100 WAC power supply; supports StackWise-320.
C9300L-48UXG-2Q-E	Network Essentials	

[2] See section *Licensing → Table: Permitted Combinations*, in this document for information about the add-on licenses that you can order.

Table 3: Cisco Catalyst 9300X Series Switches

Switch Model	Default License Level[3]	Description
C9300X-12Y-A	Network Advantage	Stackable 12 1/10/25 GE SFP28 downlink ports; 715 WAC power supply; supports StackPower+, StackWise-1T and C9300X-NM network modules.
C9300X-12Y-E	Network Essentials	
C9300X-24Y-A	Network Advantage	Stackable 24 1/10/25 GE SFP28 downlink ports; 715 WAC power supply; supports StackPower+, StackWise-1 and C9300X-NM network modules.
C9300X-24Y-A	Network Essentials	

[3] See section *Licensing → Table: Permitted Combinations*, in this document for information about the add-on licenses that you can order.

Network Modules

The following table lists the optional uplink network modules with 1-Gigabit, 10-Gigabit, 25-Gigabit, and 40-Gigabit slots. You should only operate the switch with either a network module or a blank module installed.

Network Module	Description
C9300-NM-4G [1]	Four 1 Gigabit Ethernet SFP module slots
C9300-NM-4M [1]	Four MultiGigabit Ethernet slots
C9300-NM-8X [1]	Eight 10 Gigabit Ethernet SFP+ module slots
C9300-NM-2Q [1]	Two 40 Gigabit Ethernet QSFP+ module slots
C9300-NM-2Y [1]	Two 25 Gigabit Ethernet SFP28 module slots
C9300X-NM-2C[2]	Two 40 Gigabit Ethernet/100 Gigabit Ethernet QSFP+ module slots
C9300X-NM-8M[2]	Eight Multigigabit Ethernet slots
C9300X-NM-8Y[2]	Eight 25 Gigabit Ethernet/10 Gigabit Ethernet/1 Gigabit Ethernet SFP+ module slots
C3850-NM-4-1G [3]	Four 1 Gigabit Ethernet SFP module slots
C3850-NM-2-10G [3]	Two 10 Gigabit Ethernet SFP module slots
C3850-NM-4-10G [3]	Four 10 Gigabit Ethernet SFP module slots

Network Module	Description
C3850-NM-8-10G [3]	Eight 10 Gigabit Ethernet SFP module slots
C3850-NM-2-40G [3]	Two 40 Gigabit Ethernet SFP module slots

Note

1. These network modules are supported only on the C9300 SKUs of the Cisco Catalyst 9300 Series Switches.
2. These network modules are supported only on the C9300X SKUs of the Cisco Catalyst 9300 Series Switches.
3. These network modules are supported only on the C3850 and C9300 SKUs of the Cisco Catalyst 3850 Series Switches and Cisco Catalyst 9300 Series Switches respectively.

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 9300	Cisco Identity Services Engine	Cisco Access Control Server	Cisco Prime Infrastructure
Cupertino 17.8.1	3.1 3.0 latest patch 2.7 latest patch 2.6 latest patch 2.4 latest patch	C9200 and C9200L: PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → **Downloads**.	
Cupertino 17.7.1	3.1 3.0 latest patch 2.7 latest patch 2.6 latest patch 2.4 latest patch	-	C9300, C9300L, and C9300X: PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → **Downloads**.

Catalyst 9300	Cisco Identity Services Engine	Cisco Access Control Server	Cisco Prime Infrastructure
Bengaluru 17.6.3	3.1 3.0 latest patch 2.7 latest patch 2.6 latest patch 2.4 latest patch	-	C9300, C9300L, and C9300X: PI 3.10 + PI 3.10 latest maintenance release + PI 3.10 latest device pack See Cisco Prime Infrastructure 3.10 → **Downloads**.
Bengaluru 17.6.2	3.1 3.0 latest patch 2.7 latest patch 2.6 latest patch 2.4 latest patch	-	C9300, C9300L, and C9300X: PI 3.10 + PI 3.10 latest maintenance release + PI 3.10 latest device pack See Cisco Prime Infrastructure 3.10 → **Downloads**.
Bengaluru 17.6.1	3.1 3.0 latest patch 2.7 latest patch 2.6 latest patch 2.4 latest patch	-	C9300, C9300L, and C9300X: PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → **Downloads**.
Bengaluru 17.5.1	3.0 Patch 1 2.7 Patch 2 2.6 Patch 7 2.4 Patch 13	-	C9300, C9300L, and C9300X: PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → **Downloads**.
Bengaluru 17.4.1	3.0 2.7 Patch 2	-	C9300 and C9300L: PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → **Downloads**.
Amsterdam 17.3.5	2.7	-	C9300 and C9300L: PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → **Downloads**.
Amsterdam 17.3.4	2.7	-	C9300 and C9300L: PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → **Downloads**.

Catalyst 9300	Cisco Identity Services Engine	Cisco Access Control Server	Cisco Prime Infrastructure
Amsterdam 17.3.3	2.7	-	C9300 and C9300L: PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → **Downloads**.
Amsterdam 17.3.2a	2.7	-	C9300 and C9300L: PI 3.8 + PI 3.8 latest maintenance release + PI 3.8 latest device pack See Cisco Prime Infrastructure 3.8 → **Downloads**.
Amsterdam 17.3.1	2.7	-	C9300 and C9300L: PI 3.8 + PI 3.8 latest maintenance release + PI 3.8 latest device pack See Cisco Prime Infrastructure 3.8 → **Downloads**.
Amsterdam 17.2.1	2.7	-	C9300 and C9300L: PI 3.7 + PI 3.7 latest maintenance release + PI 3.7 latest device pack See Cisco Prime Infrastructure 3.7 → **Downloads**.
Amsterdam 17.1.1	2.7	-	C9300: PI 3.6 + PI 3.6 latest maintenance release + PI 3.6 latest device pack C9300L: - See Cisco Prime Infrastructure 3.6 → **Downloads**.
Gibraltar 16.12.7	2.6	-	C9300: PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack C9300L: - See Cisco Prime Infrastructure 3.9 → Downloads.
Gibraltar 16.12.6	2.6	-	C9300: PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack C9300L: - See Cisco Prime Infrastructure 3.9 → Downloads.

Catalyst 9300	Cisco Identity Services Engine	Cisco Access Control Server	Cisco Prime Infrastructure
Gibraltar 16.12.5b	2.6	-	C9300: PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack C9300L: - See Cisco Prime Infrastructure 3.9 → Downloads.
Gibraltar 16.12.5	2.6	-	C9300: PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack C9300L: - See Cisco Prime Infrastructure 3.9 → Downloads.
Gibraltar 16.12.4	2.6	-	C9300: PI 3.8 + PI 3.8 latest maintenance release + PI 3.8 latest device pack C9300L: - See Cisco Prime Infrastructure 3.8 → Downloads.
Gibraltar 16.12.3a	2.6	-	C9300: PI 3.5 + PI 3.5 latest maintenance release + PI 3.5 latest device pack C9300L: - See Cisco Prime Infrastructure 3.5 → **Downloads**.
Gibraltar 16.12.3	2.6	-	C9300: PI 3.5 + PI 3.5 latest maintenance release + PI 3.5 latest device pack C9300L: - See Cisco Prime Infrastructure 3.5 → **Downloads**.
Gibraltar 16.12.2	2.6	-	C9300: PI 3.5 + PI 3.5 latest maintenance release + PI 3.5 latest device pack C9300L: - See Cisco Prime Infrastructure 3.5 → **Downloads**.
Gibraltar 16.12.1	2.6	-	C9300: PI 3.5 + PI 3.5 latest maintenance release + PI 3.5 latest device pack C9300L: - See Cisco Prime Infrastructure 3.5 → **Downloads**.

Catalyst 9300	Cisco Identity Services Engine	Cisco Access Control Server	Cisco Prime Infrastructure
Gibraltar 16.11.1	2.6 2.4 Patch 5	5.4 5.5	PI 3.4 + PI 3.4 latest maintenance release + PI 3.4 latest device pack See Cisco Prime Infrastructure 3.4 → **Downloads**.
Gibraltar 16.10.1	2.3 Patch 1 2.4 Patch 1	5.4 5.5	PI 3.4 + PI 3.4 latest maintenance release + PI 3.4 latest device pack See Cisco Prime Infrastructure 3.4→ **Downloads**.
Fuji 16.9.8	2.5 2.1	5.4 5.5	PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → **Downloads**.
Fuji 16.9.7	2.5 2.1	5.4 5.5	PI 3.9 + PI 3.9 latest maintenance release + PI 3.9 latest device pack See Cisco Prime Infrastructure 3.9 → **Downloads**.
Fuji 16.9.6	2.3 Patch 1 2.4 Patch 1	5.4 5.5	PI 3.4 + PI 3.4 latest maintenance release + PI 3.4 latest device pack See Cisco Prime Infrastructure 3.4→ **Downloads**.
Fuji 16.9.5	2.3 Patch 1 2.4 Patch 1	5.4 5.5	PI 3.4 + PI 3.4 latest maintenance release + PI 3.4 latest device pack See Cisco Prime Infrastructure 3.4→ **Downloads**.
Fuji 16.9.4	2.3 Patch 1 2.4 Patch 1	5.4 5.5	PI 3.4 + PI 3.4 latest maintenance release + PI 3.4 latest device pack See Cisco Prime Infrastructure 3.4→ **Downloads**.
Fuji 16.9.3	2.3 Patch 1 2.4 Patch 1	5.4 5.5	PI 3.4 + PI 3.4 latest maintenance release + PI 3.4 latest device pack See Cisco Prime Infrastructure 3.4→ **Downloads**.
Fuji 16.9.2	2.3 Patch 1 2.4 Patch 1	5.4 5.5	PI 3.4 + PI 3.4 latest maintenance release + PI 3.4 latest device pack See Cisco Prime Infrastructure 3.4→ **Downloads**.

Catalyst 9300	Cisco Identity Services Engine	Cisco Access Control Server	Cisco Prime Infrastructure
Fuji 16.9.1	2.3 Patch 1 2.4 Patch 1	5.4 5.5	PI 3.4 + PI 3.4 latest device pack See Cisco Prime Infrastructure 3.4→ **Downloads**.
Fuji 16.8.1a	2.3 Patch 1 2.4	5.4 5.5	PI 3.3 + PI 3.3 latest maintenance release + PI 3.3 latest device pack See Cisco Prime Infrastructure 3.3→ **Downloads**.
Everest 16.6.4a	2.2 2.3	5.4 5.5	PI 3.1.6 + Device Pack 13 See Cisco Prime Infrastructure 3.1 → **Downloads**.
Everest 16.6.4	2.2 2.3	5.4 5.5	PI 3.1.6 + Device Pack 13 See Cisco Prime Infrastructure 3.1 → **Downloads**.
Everest 16.6.3	2.2 2.3	5.4 5.5	PI 3.1.6 + Device Pack 13 See Cisco Prime Infrastructure 3.1 → **Downloads**
Everest 16.6.2	2.2 2.3	5.4 5.5	PI 3.1.6 + Device Pack 13 See Cisco Prime Infrastructure 3.1 → **Downloads**
Everest 16.6.1	2.2	5.4 5.5	PI 3.1.6 + Device Pack 13 See Cisco Prime Infrastructure 3.1 → **Downloads**
Everest 16.5.1a	2.1 Patch 3	5.4 5.5	-

Web UI System Requirements

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

Minimum Hardware Requirements

Processor Speed	DRAM	Number of Colors	Resolution	Font Size
233 MHz minimum[4]	512 MB[5]	256	1280 x 800 or higher	Small

[4] We recommend 1 GHz

[5] We recommend 1 GB DRAM

Software Requirements

Operating Systems

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

Browsers

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

Upgrading the Switch Software

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

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

Finding the Software Version

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

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

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

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

Software Images

Release	Image Type	File Name
Cisco IOS XE Cupertino 17.8.1	CAT9K_IOSXE	cat9k_iosxe.17.08.01.SPA.bin
	No Payload Encryption (NPE)	cat9k_iosxe_npe.17.08.01.SPA.bin

ROMMON Upgrades

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

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

ROMMON upgrades may be required to resolve firmware defects, or to support new features, but there may not be new versions with every release. To know the ROMMON or bootloader version that applies to every major and maintenance release, refer to the table below.

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

- Upgrading the ROMMON in the primary SPI flash device

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

- Upgrading the ROMMON in the golden SPI flash device

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

Note In case of a switch stack, perform the upgrade on the active switch and all members of the stack.

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

Release	ROMMON or Boot Loader Version

For Cisco IOS XE Cupertino 17.8.1	On the *C9300* models, the ROMMON version is 17.8.1r[FC2].
	`ROM: IOS-XE ROMMON`
	`BOOTLDR: System Bootstrap, Version 17.8.1r[FC2], RELEASE SOFTWARE (P)`
	`<output truncated>`
	On the *C9300L* models, the ROMMON version is 17.8.1r[FC2].
	`ROM: IOS-XE ROMMON`
	`BOOTLDR: System Bootstrap, Version 17.8.1r[FC2], RELEASE SOFTWARE (P)`
	`<output truncated>`
	On the *C9300X* models, the ROMMON version is 17.5.1r.
	`ROM: IOS-XE ROMMON`
	`BOOTLDR: System Bootstrap, Version 17.5.1r, RELEASE SOFTWARE (P)`
	`<output truncated>`
	When the boot loader upgrade occurs, you will see the following on the console:
	`<output truncated>`
	`!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!`
	`%IOSXEBOOT-4-BOOTLOADER_UPGRADE: (local/local): ### Tue Oct 13 11:09:47 PDT 2020 PLEASE DO NOT POWER CYCLE ### BOOT LOADER UPGRADING`
	`<output truncated>`

Software Installation Commands

Summary of Software Installation Commands **Supported starting from Cisco IOS XE Everest 16.6.2 and later releases**	
To install and activate the specified file, and to commit changes to be persistent across reloads: **`install add file`** *`filename`* [**`activate commit`**] To separately install, activate, commit, cancel, or remove the installation file: **`install ?`**	
add file tftp: *filename*	Copies the install file package from a remote location to the device and performs a compatibility check for the platform and image versions.
activate [**auto-abort-timer**]	Activates the file, and reloads the device. The **auto-abort-timer** keyword automatically rolls back image activation.
commit	Makes changes persistent over reloads.
rollback to committed	Rolls back the update to the last committed version.
abort	Cancels file activation, and rolls back to the version that was running before the current installation procedure started.
remove	Deletes all unused and inactive software installation files.

Note The **request platform software** commands are deprecated starting from Cisco IOS XE Gibraltar 16.10.1. The commands are visible on the CLI in this release and you can configure them, but we recommend that you use the **install** commands to upgrade or downgrade.

Summary of request platform software Commands	
`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 in Install Mode

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

Before you begin

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

When upgrading from ...	Use these commands...	To upgrade to...
Cisco IOS XE Everest 16.5.1a or Cisco IOS XE Everest 16.6.1	Only **request platform software** commands	Cisco IOS XE Cupertino 17.8.x
Cisco IOS XE Everest 16.6.2 and all later releases	Either **install** commands or **request platform software** commands[6].	

[6] The **request platform software** commands are deprecated. So although they are still visible on the CLI, we recommend that you use **install** commands.

The sample output in this section displays upgrade from Cisco IOS XE Cupertino 17.7.1 to Cisco IOS XE Cupertino 17.8.1 using **install** commands only.

Procedure

Step 1 Clean-up

install remove inactive

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

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

```
Switch# install remove inactive

install_remove: START Mon Apr 4 19:51:48 PDT 2022
Cleaning up unnecessary package files
Scanning boot directory for packages ... done.
Preparing packages list to delete ...
    cat9k-cc_srdriver.17.07.01.SPA.pkg
      File is in use, will not delete.
    cat9k-espbase.17.07.01.SPA.pkg
      File is in use, will not delete.
    cat9k-guestshell.17.07.01.SPA.pkg
      File is in use, will not delete.
    cat9k-rpbase.17.07.01.SPA.pkg
      File is in use, will not delete.
    cat9k-rpboot.17.07.01.SPA.pkg
      File is in use, will not delete.
    cat9k-sipbase.17.07.01.SPA.pkg
      File is in use, will not delete.
    cat9k-sipspa.17.07.01.SPA.pkg
      File is in use, will not delete.
    cat9k-srdriver.17.07.01.SPA.pkg
      File is in use, will not delete.
    cat9k-webui.17.07.01.SPA.pkg
      File is in use, will not delete.
    cat9k-wlc.17.07.01.SPA.pkg
      File is in use, will not delete.
    packages.conf
      File is in use, will not delete.
  done.
The following files will be deleted:
[switch 1]:
/flash/cat9k-cc_srdriver.17.07.01.SPA.pkg
/flash/cat9k-espbase.17.07.01.SPA.pkg
/flash/cat9k-guestshell.17.07.01.SPA.pkg
/flash/cat9k-rpbase.17.07.01.SPA.pkg
/flash/cat9k-rpboot.17.07.01.SPA.pkg
/flash/cat9k-sipbase.17.07.01.SPA.pkg
/flash/cat9k-sipspa.17.07.01.SPA.pkg
/flash/cat9k-srdriver.17.07.01.SPA.pkg
/flash/cat9k-webui.17.07.01.SPA.pkg
/flash/cat9k-wlc.17.07.01.SPA.pkg
/flash/packages.conf

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

[switch 1]:
Deleting file flash:cat9k-cc_srdriver.17.07.01.SPA.pkg ... done.
Deleting file flash:cat9k-espbase.17.07.01.SPA.pkg ... done.
Deleting file flash:cat9k-guestshell.17.07.01.SPA.pkg ... done.
Deleting file flash:cat9k-rpbase.17.07.01.SPA.pkg ... done.
Deleting file flash:cat9k-rpboot.17.07.01.SPA.pkg ... done.
Deleting file flash:cat9k-sipbase.17.07.01.SPA.pkg ... done.
Deleting file flash:cat9k-sipspa.17.07.01.SPA.pkg ... done.
Deleting file flash:cat9k-srdriver.17.07.01.SPA.pkg ... done.
Deleting file flash:cat9k-webui.17.07.01.SPA.pkg ... done.
Deleting file flash:cat9k-wlc.17.07.01.SPA.pkg ... done.
Deleting file flash:packages.conf ... done.
SUCCESS: Files deleted.
```

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

SUCCESS: install_remove Mon Apr 4 19:52:25 PDT 2022
Switch#
<output truncated>
```

Step 2 Copy new image to flash

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

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

```
Switch# copy tftp://10.8.0.6/image/cat9k_iosxe.17.08.01.SPA.bin flash:
destination filename [cat9k_iosxe.17.08.01.SPA.bin]?
Accessing tftp://10.8.0.6/image/cat9k_iosxe.17.08.01.SPA.bin...
Loading /cat9k_iosxe.17.08.01.SPA.bin from 10.8.0.6 (via GigabitEthernet0/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 601216545 bytes]

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

b) **dir flash:**

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

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

Directory of flash:/

434184 -rw- 601216545    Apr 4 2022 10:18:11 -07:00 cat9k_iosxe.17.08.01.SPA.bin
11353194496 bytes total (8976625664 bytes free)
```

Step 3 Set boot variable

a) **no system boot all**

Use this command to reset the boot variable. This command removes the startup system image specification. Otherwise, the switch may boot a previously configured boot image.

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

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

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

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

c) **no boot manual**

Use this command to configure the switch to auto-boot.

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

d) **write memory**

Use this command to save boot settings.

```
Switch# write memory
```

e) **show boot**

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

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

Boot Variables on next reload:
BOOT variable = flash:packages.conf;
Manual Boot = no
Enable Break = yes
Boot Mode = DEVICE
iPXE Timeout = 0
```

Step 4 Install image to flash

install add file activate commit

Use this command to install the image.

We recommend that you point to the source image on your TFTP server or the flash drive of the *active* switch, if you have copied the image to flash memory. 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 (flash-3): `Switch# install add file flash-3:cat9k_iosxe.17.08.01.SPA.bin activate commit`.

The following sample output displays installation of the Cisco IOS XE Cupertino 17.8.1 software image in the flash memory:

```
Switch# install add file flash:cat9k_iosxe.17.08.01.SPA.bin activate commit

install_add_activate_commit: START Mon Apr 4 15:37:20 PDT 2022
install_add_activate_commit: Adding PACKAGE
install_add_activate_commit: Checking whether new add is allowed ....

--- Starting initial file syncing ---
[2]: Copying flash:cat9k_iosxe.17.08.01.SPA.bin from switch 2 to switch 1 3 4
[1 3 4]: Finished copying to switch 1 switch 3 switch 4
Info: Finished copying flash:cat9k_iosxe.17.08.01.SPA.bin to the selected switch(es)
Finished initial file syncing

--- Starting Add ---
Performing Add on all members
  [1] Add package(s) on switch 1
  [1] Finished Add on switch 1
  [2] Add package(s) on switch 2
  [2] Finished Add on switch 2
  [3] Add package(s) on switch 3
  [3] Finished Add on switch 3
  [4] Add package(s) on switch 4
  [4] Finished Add on switch 4
Checking status of Add on [1 2 3 4]
Add: Passed on [1 2 3 4]
Finished Add

Image added. Version: 17.08.01
install_add_activate_commit: Activating PACKAGE
```

```
Following packages shall be activated:
/flash/cat9k-wlc.17.08.01.SPA.pkg
/flash/cat9k-webui.17.08.01.SPA.pkg
/flash/cat9k-srdriver.17.08.01.SPA.pkg
/flash/cat9k-sipspa.17.08.01.SPA.pkg
/flash/cat9k-sipbase.17.08.01.SPA.pkg
/flash/cat9k-rpboot.17.08.01.SPA.pkg
/flash/cat9k-rpbase.17.08.01.SPA.pkg
/flash/cat9k-lni.17.08.01.SPA.pkg
/flash/cat9k-guestshell.17.08.01.SPA.pkg
/flash/cat9k-espbase.17.08.01.SPA.pkg
/flash/cat9k-cc_srdriver.17.08.01.SPA.pkg
--- Starting Activate ---
Performing Activate on all members
  [1] Activate package(s) on switch 1
    --- Starting list of software package changes ---
    Old files list:
      Removed cat9k-cc_srdriver.17.07.01.SPA.pkg
      Removed cat9k-espbase.17.07.01.SPA.pkg
      Removed cat9k-guestshell.17.07.01.SPA.pkg
      Removed cat9k-rpbase.17.07.01.SPA.pkg
      Removed cat9k-rpboot.17.07.01.SPA.pkg
      Removed cat9k-sipbase.17.07.01.SPA.pkg
      Removed cat9k-sipspa.17.07.01.SPA.pkg
      Removed cat9k-srdriver.17.07.01.SPA.pkg
      Removed cat9k-webui.17.07.01.SPA.pkg
      Removed cat9k-wlc.17.07.01.SPA.pkg
    New files list:
      Added cat9k-cc_srdriver.17.08.01.SPA.pkg
      Added cat9k-espbase.17.08.01.SPA.pkg
      Added cat9k-guestshell.17.08.01.SPA.pkg
      Added cat9k-lni.17.08.01.SPA.pkg
      Added cat9k-rpbase.17.08.01.SPA.pkg
      Added cat9k-rpboot.17.08.01.SPA.pkg
      Added cat9k-sipbase.17.08.01.SPA.pkg
      Added cat9k-sipspa.17.08.01.SPA.pkg
      Added cat9k-srdriver.17.08.01.SPA.pkg
      Added cat9k-webui.17.08.01.SPA.pkg
      Added cat9k-wlc.17.08.01.SPA.pkg
    Finished list of software package changes
  [1] Finished Activate on switch 1
  [2] Activate package(s) on switch 2
    --- Starting list of software package changes ---
    Old files list:
      Removed cat9k-cc_srdriver.17.07.01.SPA.pkg
      Removed cat9k-espbase.17.07.01.SPA.pkg
      Removed cat9k-guestshell.17.07.01.SPA.pkg
      Removed cat9k-rpbase.17.07.01.SPA.pkg
      Removed cat9k-rpboot.17.07.01.SPA.pkg
      Removed cat9k-sipbase.17.07.01.SPA.pkg
      Removed cat9k-sipspa.17.07.01.SPA.pkg
      Removed cat9k-srdriver.17.07.01.SPA.pkg
      Removed cat9k-webui.17.07.01.SPA.pkg
      Removed cat9k-wlc.17.07.01.SPA.pkg
    New files list:
      Added cat9k-cc_srdriver.17.08.01.SPA.pkg
      Added cat9k-espbase.17.08.01.SPA.pkg
      Added cat9k-guestshell.17.08.01.SPA.pkg
      Added cat9k-lni.17.08.01.SPA.pkg
      Added cat9k-rpbase.17.08.01.SPA.pkg
      Added cat9k-rpboot.17.08.01.SPA.pkg
      Added cat9k-sipbase.17.08.01.SPA.pkg
      Added cat9k-sipspa.17.08.01.SPA.pkg
      Added cat9k-srdriver.17.08.01.SPA.pkg
```

```
      Added cat9k-webui.17.08.01.SPA.pkg
      Added cat9k-wlc.17.08.01.SPA.pkg
    Finished list of software package changes
  [2] Finished Activate on switch 2
  [3] Activate package(s) on switch 3
    --- Starting list of software package changes ---
    Old files list:
      Removed cat9k-cc_srdriver.17.07.01.SPA.pkg
      Removed cat9k-espbase.17.07.01.SPA.pkg
      Removed cat9k-guestshell.17.07.01.SPA.pkg
      Removed cat9k-rpbase.17.07.01.SPA.pkg
      Removed cat9k-rpboot.17.07.01.SPA.pkg
      Removed cat9k-sipbase.17.07.01.SPA.pkg
      Removed cat9k-sipspa.17.07.01.SPA.pkg
      Removed cat9k-srdriver.17.07.01.SPA.pkg
      Removed cat9k-webui.17.07.01.SPA.pkg
      Removed cat9k-wlc.17.07.01.SPA.pkg
    New files list:
      Added cat9k-cc_srdriver.17.08.01.SPA.pkg
      Added cat9k-espbase.17.08.01.SPA.pkg
      Added cat9k-guestshell.17.08.01.SPA.pkg
      Added cat9k-lni.17.08.01.SPA.pkg
      Added cat9k-rpbase.17.08.01.SPA.pkg
      Added cat9k-rpboot.17.08.01.SPA.pkg
      Added cat9k-sipbase.17.08.01.SPA.pkg
      Added cat9k-sipspa.17.08.01.SPA.pkg
      Added cat9k-srdriver.17.08.01.SPA.pkg
      Added cat9k-webui.17.08.01.SPA.pkg
      Added cat9k-wlc.17.08.01.SPA.pkg
    Finished list of software package changes
  [3] Finished Activate on switch 3
  [4] Activate package(s) on switch 4
    --- Starting list of software package changes ---
    Old files list:
      Removed cat9k-cc_srdriver.17.07.01.SPA.pkg
      Removed cat9k-espbase.17.07.01.SPA.pkg
      Removed cat9k-guestshell.17.07.01.SPA.pkg
      Removed cat9k-rpbase.17.07.01.SPA.pkg
      Removed cat9k-rpboot.17.07.01.SPA.pkg
      Removed cat9k-sipbase.17.07.01.SPA.pkg
      Removed cat9k-sipspa.17.07.01.SPA.pkg
      Removed cat9k-srdriver.17.07.01.SPA.pkg
      Removed cat9k-webui.17.07.01.SPA.pkg
      Removed cat9k-wlc.17.07.01.SPA.pkg
    New files list:
      Added cat9k-cc_srdriver.17.08.01.SPA.pkg
      Added cat9k-espbase.17.08.01.SPA.pkg
      Added cat9k-guestshell.17.08.01.SPA.pkg
      Added cat9k-lni.17.08.01.SPA.pkg
      Added cat9k-rpbase.17.08.01.SPA.pkg
      Added cat9k-rpboot.17.08.01.SPA.pkg
      Added cat9k-sipbase.17.08.01.SPA.pkg
      Added cat9k-sipspa.17.08.01.SPA.pkg
      Added cat9k-srdriver.17.08.01.SPA.pkg
      Added cat9k-webui.17.08.01.SPA.pkg
      Added cat9k-wlc.17.08.01.SPA.pkg
    Finished list of software package changes
  [4] Finished Activate on switch 4
Checking status of Activate on [1 2 3 4]
Activate: Passed on [1 2 3 4]
Finished Activate

--- Starting Commit ---
Performing Commit on all members
```

```
  [1] Commit package(s) on switch 1
  [1] Finished Commit on switch 1
  [2] Commit package(s) on switch 2
  [2] Finished Commit on switch 2
  [3] Commit package(s) on switch 3
  [3] Finished Commit on switch 3
  [4] Commit package(s) on switch 4
  [4] Finished Commit on switch 4
Checking status of Commit on [1 2 3 4]
Commit: Passed on [1 2 3 4]
Finished Commit

Send model notification for install_add_activate_commit before reload
[1 2 3 4]: Performing Upgrade_Service

*Apr 4 15:47:28.095: %IOSXEBOOT-4-BOOTLOADER_UPGRADE: (local/local): Starting boot preupgrade
300+0 records in
300+0 records out
307200 bytes (307 kB, 300 KiB) copied, 0.315817 s, 973 kB/s

AppGigabitEthernet port has the latest Firmware

MM [1] MCU version 191 sw ver 196
MM [2] MCU version 191 sw ver 196

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 ...440976 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 ...24506 bytes.
Front-end Microcode IMG MGR: Programming device
0...rrrrrrw..0%....10%....20%......30%...40%....50%......60%....70%.....80%....90%....100%w
Wating for MCU to come up .....Rr!
Front-end Microcode IMG MGR: Microcode programming complete for device 0.
Front-end Microcode IMG MGR: Preparing to program device[0], index=3 ...90974 bytes....
Skipped[3].
Front-end Microcode IMG MGR: Microcode programming complete in 298 seconds


MCU UPGRADE COMPLETED!!...  SUCCESS: Upgrade_Service finished
Install will reload the system now!
SUCCESS: install_add_activate_commit  Mon Apr 4 15:52:33 PDT 2022
Switch#
Chassis 2 reloading, reason - Reload command
Apr 4 15:52:36.588: %PMAN-5-EXITACTION: F0/0: pvp: Process manager is exiting: reload fp
action requested
Apr 4 15:52:38.199: %PMAN-5-EXITACTION: R0/0: pvp: Process manager is exiting: rp processes
 exit with reload switch code
```

```
Initializing Hardware......

System Bootstrap, Version 17.3.1r[FC2], RELEASE SOFTWARE (P)
Compiled Wed 04/29/2022 12:55:25.08 by rel

Current ROMMON image : Primary
Last reset cause     : SoftwareReload
C9300-48P platform with 8388608 Kbytes of main memory

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


Waiting for 120 seconds for other switches to boot
##################################################################################################################
Switch number is 2
<output truncated>
```

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

Step 5 Verify installation

After the software has been successfully installed, use the **dir flash:** command to verify that the flash partition has ten new `.pkg` files and two `.conf` files.

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

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

```
Switch# dir flash:*.pkg

Directory of flash:/
75140 -rw- 2012104     Mar 17 2022 09:52:41 -07:00 cat9k-cc_srdriver.17.07.01.SPA.pkg
475141 -rw- 70333380   Mar 17 2022 09:52:44 -07:00 cat9k-espbase.17.07.01.SPA.pkg
475142 -rw- 13256      Mar 17 2022 09:52:44 -07:00 cat9k-guestshell.17.07.01.SPA.pkg
475143 -rw- 349635524  Mar 17 2022 09:52:54 -07:00 cat9k-rpbase.17.07.01.SPA.pkg
475149 -rw- 24248187   Mar 17 2022 09:53:02 -07:00 cat9k-rpboot.17.07.01.SPA.pkg
475144 -rw- 25285572   Mar 17 2022 09:52:55 -07:00 cat9k-sipbase.17.07.01.SPA.pkg
475145 -rw- 20947908   Mar 17 2022 09:52:55 -07:00 cat9k-sipspa.17.07.01.SPA.pkg
475146 -rw- 2962372    Mar 17 2022 09:52:56 -07:00 cat9k-srdriver.17.07.01.SPA.pkg
475147 -rw- 13284288   Mar 17 2022 09:52:56 -07:00 cat9k-webui.17.07.01.SPA.pkg
475148 -rw- 13248      Mar 17 2022 09:52:56 -07:00 cat9k-wlc.17.07.01.SPA.pkg

491524 -rw- 25711568   Apr 4 2022 11:49:33 -07:00 cat9k-cc_srdriver.17.08.01.SPA.pkg
491525 -rw- 78484428   Apr 4 2022 11:49:35 -07:00 cat9k-espbase.17.08.01.SPA.pkg
491526 -rw- 1598412    Apr 4 2022 11:49:35 -07:00 cat9k-guestshell.17.08.01.SPA.pkg
491527 -rw- 404153288  Apr 4 2022 11:49:47 -07:00 cat9k-rpbase.17.08.01.SPA.pkg
491533 -rw- 31657374   Apr 4 2022 11:50:09 -07:00 cat9k-rpboot.17.08.01.SPA.pkg
491528 -rw- 27681740   Apr 4 2022 11:49:48 -07:00 cat9k-sipbase.17.08.01.SPA.pkg
491529 -rw- 52224968   Apr 4 2022 11:49:49 -07:00 cat9k-sipspa.17.08.01.SPA.pkg
491530 -rw- 31130572   Apr 4 2022 11:49:50 -07:00 cat9k-srdriver.17.08.01.SPA.pkg
491531 -rw- 14783432   Apr 4 2022 11:49:51 -07:00 cat9k-webui.17.08.01.SPA.pkg
491532 -rw- 9160       Apr 4 2022 11:49:51 -07:00 cat9k-wlc.17.08.01.SPA.pkg


11353194496 bytes total (9544245248 bytes free)
```

```
Switch#
```

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

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

- `packages.conf`—the file that has been re-written with the newly installed .pkg files
- `cat9k_iosxe.17.08.01.SPA.conf`— a backup copy of the newly installed packages.conf file

```
Switch# dir flash:*.conf

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

434197 -rw- 7406 Apr 4 2022 10:59:16 -07:00 packages.conf
516098 -rw- 7406 Apr 4 2022 10:58:08 -07:00 cat9k_iosxe.17.08.01.SPA.conf
11353194496 bytes total (8963174400 bytes free)
```

Step 6 **show version**

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

The following sample output of the **show version** command displays the Cisco IOS XE Cupertino 17.8.1 image on the device:

```
Switch# show version
Cisco IOS XE Software, Version 17.08.01
Cisco IOS Software [Cupertino], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 17.8.1,
 RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2022 by Cisco Systems, Inc.
<output truncated>
```

Downgrading in Install Mode

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

Before you begin

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

When downgrading from ...	Use these commands...	To downgrade to...
Cisco IOS XE Cupertino 17.8.x	• On Cisco Catalyst 9500 Series Switches, either **install** commands or **request platform software** commands[7]. • On Cisco Catalyst 9500 Series Switches - High Performance, only **install** commands	Cisco IOS XE Cupertino 17.7.x or earlier releases.

[7] The **request platform software** commands are deprecated. So although they are still visible on the CLI, we recommend that you use **install** commands.

Note New switch models that are introduced in a release cannot be downgraded. The release in which a switch model is introduced is the minimum software version for that model.

The sample output in this section shows downgrade from Cisco IOS XE Cupertino 17.8.1 to Cisco IOS XE Cupertino 17.7.1, using **install** commands.

Procedure

Step 1 Clean-up

install remove inactive

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

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

```
Switch# install remove inactive
 install_remove: START Wed Apr 6 11:42:27 IST 2022

Cleaning up unnecessary package files

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

Cleaning bootflash:
  Scanning boot directory for packages ... done.
  Preparing packages list to delete ...
    cat9k-cc_srdriver.17.08.01.SSA.pkg
      File is in use, will not delete.
    cat9k-espbase.17.08.01.SSA.pkg
      File is in use, will not delete.
    cat9k-guestshell.17.08.01.SSA.pkg
      File is in use, will not delete.
    cat9k-rpbase.17.08.01.SSA.pkg
      File is in use, will not delete.
    cat9k-rpboot.17.08.01.SSA.pkg
      File is in use, will not delete.
    cat9k-sipbase.17.08.01.SSA.pkg
      File is in use, will not delete.
    cat9k-sipspa.17.08.01.SSA.pkg
      File is in use, will not delete.
    cat9k-srdriver.17.08.01.SSA.pkg
      File is in use, will not delete.
    cat9k-webui.17.08.01.SSA.pkg
      File is in use, will not delete.
    cat9k-wlc.17.08.01.SSA.pkg
      File is in use, will not delete.
    packages.conf
      File is in use, will not delete.
  done.
SUCCESS: No extra package or provisioning files found on media. Nothing to clean.

SUCCESS: install_remove  Wed Apr 6 11:42:39 IST 2022
```

Step 2 Copy new image to flash

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

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

```
Switch# copy tftp://10.8.0.6/image/cat9k_iosxe.17.07.01.SPA.bin flash:
Destination filename [cat9k_iosxe.17.07.01.SPA.bin]?
Accessing tftp://10.8.0.6//cat9k_iosxe.17.07.01.SPA.bin...
Loading /cat9k_iosxe.17.07.01.SPA.bin from 10.8.0.6 (via GigabitEthernet0/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 508584771 bytes]
508584771 bytes copied in 101.005 secs (5035244 bytes/sec)
```

b) **dir flash:**

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

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

Directory of flash:/

434184 -rw- 508584771 Apr 6 2022 13:35:16 -07:00 cat9k_iosxe.17.07.01.SPA.bin
11353194496 bytes total (9055866880 bytes free)
```

Step 3 Set boot variable

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

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

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

b) **no boot manual**

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

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

c) **write memory**

Use this command to save boot settings.

```
Switch# write memory
```

d) **show bootvar** or **show boot**

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

```
Switch# show bootvar               <<on the C9500-24Y4C,C9500-32C, C9500-32QC, and
C9500-48Y4C models
BOOT variable = bootflash:packages.conf
MANUAL_BOOT variable = no
BAUD variable = 9600
ENABLE_BREAK variable = yes
BOOTMODE variable does not exist
IPXE_TIMEOUT variable does not exist
CONFIG_FILE variable =
```

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

Switch# show boot                          <<on the C9500-12Q,C9500-16X C9500-24Q, and
C9500-40X models
Current Boot Variables:
BOOT variable = flash:packages.conf;

Boot Variables on next reload:
BOOT variable = flash:packages.conf;
Manual Boot = no
Enable Break = yes
Boot Mode = DEVICE
iPXE Timeout = 0
```

Step 4 Downgrade software image

install add file activate commit

Use this command to install the image.

We recommend that you point to the source image on your TFTP server or the flash drive of the *active* switch, if you have copied the image to flash memory. 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 (flash-3): `Switch# install add file flash-3:cat9k_iosxe.17.07.01.SPA.bin activate commit`.

The following example displays the installation of the Cisco IOS XE Cupertino 17.7.1 software image to flash, by using the **install add file activate commit** command.

```
Switch# install add file flash:cat9k_iosxe.17.07.01.SPA.bin activate commit
install_add_activate_commit: Adding PACKAGE
install_add_activate_commit: Checking whether new add is allowed ....
--- Starting Add ---
Performing Add on Active/Standby
[1] Add package(s) on R0
[1] Finished Add on R0
Checking status of Add on [R0]
Add: Passed on [R0]
Finished Add
Image added. Version: 17.07.01.0.269
install_add_activate_commit: Activating PACKAGE

Following packages shall be activated:
/flash/cat9k-wlc.17.07.01.SPA.pkg
/flash/cat9k-webui.17.07.01.SPA.pkg
/flash/cat9k-srdriver.17.07.01.SPA.pkg
/flash/cat9k-sipspa.17.07.01.SPA.pkg
/flash/cat9k-sipbase.17.07.01.SPA.pkg
/flash/cat9k-rpboot.17.07.01.SPA.pkg
/flash/cat9k-rpbase.17.07.01.SPA.pkg
/flash/cat9k-guestshell.17.07.01.SPA.pkg
/flash/cat9k-espbase.17.07.01.SPA.pkg
/flash/cat9k-cc_srdriver.17.07.01.SPA.pkg

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


Performing Activate on Active/Standby
```

```
1] Activate package(s) on R0
    --- Starting list of software package changes ---
    Old files list:
      Removed cat9k-cc_srdriver.17.08.01.SSA.pkg
      Removed cat9k-espbase.17.08.01.SSA.pkg
      Removed cat9k-guestshell.17.08.01.SSA.pkg
      Removed cat9k-lni.17.08.01.SSA.pkg
      Removed cat9k-rpbase.17.08.01.SSA.pkg
      Removed cat9k-rpboot.17.08.01.SSA.pkg
      Removed cat9k-sipbase.17.08.01.SSA.pkg
      Removed cat9k-sipspa.17.08.01.SSA.pkg
      Removed cat9k-srdriver.17.08.01.SSA.pkg
      Removed cat9k-webui.17.08.01.SSA.pkg
      Removed cat9k-wlc.17.08.01.SSA.pkg
    New files list:
      Added cat9k-cc_srdriver.17.07.01.SPA.pkg
      Added cat9k-espbase.17.07.01.SPA.pkg
      Added cat9k-guestshell.17.07.01.SPA.pkg
      Added cat9k-rpbase.17.07.01.SPA.pkg
      Added cat9k-rpboot.17.07.01.SPA.pkg
      Added cat9k-sipbase.17.07.01.SPA.pkg
      Added cat9k-sipspa.17.07.01.SPA.pkg
      Added cat9k-srdriver.17.07.01.SPA.pkg
      Added cat9k-webui.17.07.01.SPA.pkg
      Added cat9k-wlc.17.07.01.SPA.pkg
    Finished list of software package changes
  [1] Finished Activate on R0
Checking status of Activate on [R0]
Activate: Passed on [R0]
Finished Activate

--- Starting Commit ---
Performing Commit on Active/Standby
 [1] Commit package(s) on R0
 [1] Finished Commit on R0
Checking status of Commit on [R0]
Commit: Passed on [R0]
Finished Commit

Send model notification for install_add_activate_commit before reload
Install will reload the system now!
SUCCESS: install_add_activate_commit  Wed Apr 6 11:51:01 IST 2022

Apr 6 11:51:07.505: %PMANTvp: Process manager is exiting: ren requested
Apr 6 11:51:07.505: %PMAN-5-EXITACTION: F0/0: pvp: Process manager is exiting: reload fru
action requested
Apr 6 11:51:07.834: %PMAN-5-EXITACTION: R0/0: pvp: Process manager is exiting: reload action
 requested

Initializing Hardware...

System Bootstrap, Version 17.3.1r[FC2], RELEASE SOFTWARE (P)
Compiled 30-04-2022 12:00:00.00 by rel
Current ROMMON image : Primary Rommon Image

Last reset cause:LocalSoft
C9500-32QC platform with 16777216 Kbytes of main memory
Preparing to autoboot. [Press Ctrl-C to interrupt]  5     5     /-\|/-\|/-4     \|/-\|/-\|3
     /-\|/-\|/-2     \|/-\|/-\|1     /-\|/-\|/-0
boot: attempting to boot from [bootflash:packages.conf]
boot: reading file packages.conf

<output truncated>
```

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

Step 5 Verify version

show version

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

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

The following sample output of the **show version** command displays the Cisco IOS XE Cupertino 17.7.1 image on the device:

```
Switch# show version
Cisco IOS XE Software, Version 17.07.01
Cisco IOS Software [Cupertino], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 17.7.1,
 RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2022 by Cisco Systems, Inc.
<output truncated>
```

Field-Programmable Gate Array Version Upgrade

A field-programmable gate array (FPGA) is a type of programmable memory device that exists on Cisco switches. They are re-configurable logic circuits that enable the creation of specific and dedicated functions.

To check the current FPGA version, enter the **version -v** command in ROMMON mode.

Note

- Not every software release has a change in the FPGA version.
- The version change occurs as part of the regular software upgrade and you do not have to perform any other additional steps.

Licensing

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

License Levels

The software features available on Cisco Catalyst 9300 Series Switches fall under these base or add-on license levels.

Base Licenses

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

Add-On Licenses

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

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

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

Available Licensing Models and Configuration Information

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

  In the software configuration guide of the required release, see **System Management → Configuring Smart Licensing**.
- Cisco IOS XE Amsterdam 17.3.2a and later: Smart Licensing Using Policy, which is an enhanced version of Smart Licensing, is the default and the only supported method to manage licenses.

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

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

License Levels - Usage Guidelines

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

Smart Licensing Using Policy	Smart Licensing
• Perpetual: There is no expiration date for such a license. • Subscription: The license is valid only until a certain date (for a three, five, or seven year period).	• Permanent: for a license level, and without an expiration date. • Term: for a license level, and for a three, five, or seven year period. • Evaluation: a license that is not registered.

- Base licenses (Network Essentials and Network-Advantage) are ordered and fulfilled only with a perpetual or permanent license type.
- Add-on licenses (DNA Essentials and DNA Advantage) are ordered and fulfilled only with a subscription or term license type.

- An add-on license level is included when you choose a network license level. If you use DNA features, renew the license before term expiry, to continue using it, or deactivate the add-on license and then reload the switch to continue operating with the base license capabilities.
- When ordering an add-on license with a base license, note the combinations that are permitted and those that are not permitted:

Table 4: Permitted Combinations

	DNA Essentials	DNA Advantage
Network Essentials	Yes	No
Network Advantage	Yes[8]	Yes

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

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

Scaling Guidelines

For information about feature scaling guidelines, see the Cisco Catalyst 9300 Series Switches datasheet at:

http://www.cisco.com/c/en/us/products/collateral/switches/catalyst-9300-series-switches/datasheet-c78-738977.html

Limitations and Restrictions

- Control Plane Policing (CoPP)—The **show run** command does not display information about classes configured under `system-cpp policy`, when they are left at default values. Use the **show policy-map system-cpp-policy** or the **show policy-map control-plane** commands in privileged EXEC mode instead.
- Cisco TrustSec restrictions—Cisco TrustSec can be configured only on physical interfaces, not on logical interfaces.
- Flexible NetFlow limitations
  - You cannot configure NetFlow export using the Ethernet Management port (GigabitEthernet0/0).
  - You can not configure a flow monitor on logical interfaces, such as layer 2 port-channels, loopback, tunnels.
  - You can not configure multiple flow monitors of same type (ipv4, ipv6 or datalink) on the same interface for same direction.
- Hardware Limitations — Optics:

- SFP-10G-T-X supports 100Mbps/1G/10G speeds based on auto negotiation with the peer device. 10Mbps speed is not supported and you cannot force speed settings from the transceiver.
- PHY Loopback test is not supported on SFP-10G-T-X.

- QoS restrictions
  - When configuring QoS queuing policy, the sum of the queuing buffer should not exceed 100%.
  - For QoS policies, only switched virtual interfaces (SVI) are supported for logical interfaces.
  - QoS policies are not supported for port-channel interfaces, tunnel interfaces, and other logical interfaces.
  - Stack Queuing and Scheduling (SQS) drops CPU bound packets exceeding 1.4 Gbps.

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

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

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

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

- Stacking:
  - A switch stack supports up to eight stack members.
  - Only homogenous stacking is supported, mixed stacking is not.

    C9300 SKUs can be stacked only with other C9300 SKUs. Similarly C9300L SKUs can be stacked only with other C9300L SKUs.

    The following additional restriction applies to the C9300-24UB, C9300-24UXB, and C9300-48UB models of the series: These models can be stacked only with each other. They cannot be stacked with other C9300 SKUs.

  - Auto upgrade for a new member switch is supported only in the install mode.

- TACACS legacy command: Do not configure the legacy **tacacs-server host** command; this command is deprecated. If the software version running on your device is Cisco IOS XE Gibraltar 16.12.2 or a later release, using the legacy command can cause authentication failures. Use the **tacacs server** command in global configuration mode.

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

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

- Wired Application Visibility and Control limitations:
  - NBAR2 (QoS and Protocol-discovery) configuration is allowed only on wired physical ports. It is not supported on virtual interfaces, for example, VLAN, port channel nor other logical interfaces.
  - NBAR2 based match criteria 'match protocol' is allowed only with marking or policing actions. NBAR2 match criteria will not be allowed in a policy that has queuing features configured.
  - 'Match Protocol': up to 256 concurrent different protocols in all policies.
  - NBAR2 and Legacy NetFlow cannot be configured together at the same time on the same interface. However, NBAR2 and wired AVC Flexible NetFlow can be configured together on the same interface.
  - Only IPv4 unicast (TCP/UDP) is supported.
  - AVC is not supported on management port (Gig 0/0)
  - NBAR2 attachment should be done only on physical access ports. Uplink can be attached as long as it is a single uplink and is not part of a port channel.
  - Performance—Each switch member is able to handle 2000 connections per second (CPS) at less than 50% CPU utilization. Above this rate, AVC service is not guaranteed.
  - Scale—Able to handle up to 20000 bi-directional flows per 24 access ports and per 48 access ports.
- YANG data modeling limitation—A maximum of 20 simultaneous NETCONF sessions are supported.
- Embedded Event Manager—Identity event detector is not supported on Embedded Event Manager.

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 Cupertino 17.8.x

Identifier	Headline
CSCwb17436	traffic drop and Rcv-Err when c9300 mgig switch 10g port connected with 2960 1gig ethernet port
CSCwa06718	9500X Reload: No control packet flow due to which all protocols failing b/w 9500X and 9300L

Resolved Caveats in Cisco IOS XE Cupertino 17.8.1

Identifier	Headline
CSCwa10331	Cat9300-48UX ports may not link up when connected to peer Intel NIC I219
CSCvz85562	Link may not come up between C9300 and C9500 at 25G with SFP-10/25G-CSR-S

Troubleshooting

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

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

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

Related Documentation

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

All support documentation for Cisco Catalyst 9300 Series Switches is at this URL: https://www.cisco.com/c/en/us/support/switches/catalyst-9300-series-switches/tsd-products-support-series-home.html

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

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

Communications, Services, and Additional Information

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

Cisco Bug Search Tool

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