

Release Notes for Cisco Catalyst 9500 Series Switches, Cisco IOS XE Everest 16.5.x

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This release note gives an overview of the hardware and software with the Cisco IOS XE Everest 16.5.x, on the Cisco Catalyst 9500 Series Switches.

Unless otherwise noted, the terms *switch* and *device* refer to a standalone switch.

- For information about unsupported features, see Important Notes, page 2
- For information about software and hardware restrictions and limitations, see Limitations and Restrictions, page 7.
- For information about open issues with the software, see Caveats, page 9.

Introduction

Cisco Catalyst 9500 Series Switches are Cisco's lead purpose-built fixed core and aggregation enterprise switching platform built for security, IoT and Cloud.

Cisco Catalyst 9500 Series Switches deliver complete convergence in terms of ASIC architecture with a Unified Access Data Plane (UADP) 2.0. The platform runs an Open Cisco IOS XE that supports model driven programmability, has the capacity to host containers, and run 3rd party applications and scripts natively within the switch (by virtue of x86 CPU architecture, local storage, and a higher memory footprint). The series forms the foundational building block for Software Defined-Access (SD-Access), which is Cisco's lead enterprise architecture.

Cisco Catalyst 9500 Series Switches are purpose-built 40 Gigabit switches, targeted for enterprise campus, delivering unmatched table scales (MAC/route/ACL) and buffering for enterprise applications. It offers non-blocking 40G (QSFP) switches with granular port densities that fit diverse campus needs.

The series also supports all the foundational high availability capabilities, and redundant platinum rated power supplies and fans.

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Important Notes

The following are the unsupported hardware and software features for the Cisco Catalyst 9500 Series Switches. For the list of supported features, go to http://www.cisco.com/go/cfn.

- Unsupported Hardware Features
  - The rear USB 3.0 Port
  - Breakout cables and breakout LED
- Unsupported Software Features:
  - IPsec with FIPS

  These features are supported on the Cisco Catalyst 3850 Series Switches, but not on the Cisco Catalyst 9500 Series Switches:
  - 256-bit AES MACsec (IEEE 802.1AE) host link encryption with MACsec Key Agreement (MKA)
  - Audio Video Bridging (including IEEE802.1AS, IEEE 802.1Qat, and IEEE 802.1Qav)
  - Bluetooth
  - Cisco StackWise Virtual
  - Cisco Plug-in for OpenFlow 1.3
  - Gateway Load Balancing Protocol (GLBP)
  - IPv4 Preboot eXecution Environment (iPXE)
  - Multicast—Bidirectional PIM
  - Virtual Router Redundancy Protocol(VRRP), VRRPv3, and VRRPv3 Object Tracking

Supported Hardware

Cisco Catalyst 9500 Series Switches—Model Numbers

Table 1 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, page 5

Table 1 Cisco Catalyst 9500 Series Switches—Model Numbers

Switch Model	Default License[1]	Description
C9500-24Q-E	Network Essentials	Cisco Catalyst 9500 Series 24-Port 40 Gigabit Ethernet.
C9500-24Q-A	Network Advantage	Cisco Catalyst 9500 Series 24-Port 40 Gigabit Ethernet.

1. See Table 5 Permitted Combinations, for information about the add-on licenses that you can order

Optics Modules

Catalyst switches support a wide range of optics. Because the list of supported optics is updated on a regular basis, consult the tables at this URL for the latest (SFP) compatibility information:

http://www.cisco.com/en/US/products/hw/modules/ps5455/products_device_support_tables_list.html

Compatibility Matrix

Table 2 Software Compatibility Matrix

Catalyst 9300 Release	Cisco Identity Services Engine	Cisco Access Control Server
Everest 16.5.1a	2.1 Patch 3	5.4 5.5

Web UI System Requirements

The following sections list the hardware and software required, in order to access the Web UI:

Hardware Requirements

Table 3 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 7 or later
  - Mac OS X 10.11 or later
- Browsers
  - Google Chrome—Version 38 and later (On Windows and Mac)
  - Microsoft Internet Explorer—Version 10 or later, and Microsoft Edge (On Windows)
  - Mozilla Firefox—Version 33 and later (On Windows and Mac)
  - Safari—Version 7 and 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.

Table 4 Software Images

Release	Image	File Name
Cisco IOS XE Everest 16.5.1a	CAT9K_IOSXE	cat9k_iosxe.16.05.01a.SPA.bin
Cisco IOS XE Everest 16.5.1a	Licensed Data Payload Encryption (LDPE)	cat9k_iosxeldpe.16.05.01a.SPA.bin

Licensing

Starting with Cisco IOS XE Everest 16.5.1a, features for Cisco Catalyst 9000 Series Switches come in licensing packages that are different from existing Cisco Catalyst switching platforms.

License Levels

The software features available on Cisco Catalyst 9500 Series Switches fall under the base or add-on license levels.

Base Licenses

- Network Essentials—This license level covers essential switch capabilities, such as, full layer 2 access and certain routed access capabilities.
- Network Advantage—This license level includes complete Layer 3 access and core capabilities including advanced routing, multicast, segmentation, security and high availability features. It is inclusive of features available with a Network Essentials license.

Add-On Licenses—Require a Network Essentials or 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—This license level includes DNA center features for Simplified Network Operations Solutions, and Cisco switch innovations, such as, Flexible NetFlow.
- DNA Advantage—This license level includes Cisco DNA Center features for SD-Access, assurance, and ETA. Added switch features include ERSPAN, AVC, mDNS GW, and NAT/ PAT. It is inclusive of features available with the DNA Essentials license.

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 http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

License Types

The following license types are available:

- Permanent—for a license level, and without an expiration date .
- Term— for a license level, and for a three, five, or seven year period.
- Evaluation—for a license level, preinstalled on the device, and for a 90-day trial period only.

Ordering with Smart Accounts

We recommend that you use Smart Accounts to order devices as well as licenses. Smart Accounts enable you to manage all of your software licenses for switches, routers, firewalls, access-points or tools from one centralized website. To create Smart Accounts, use the Cisco Smart Software Manager (Cisco SSM).

Note This is especially relevant to the term licenses that you order, because information about the expiry of term licences is available only through the Cisco SSM website.

For information more information about Cisco SSM, see:
http://www.cisco.com/c/en/us/buy/smart-accounts/software-licensing.html

The possible deployment modes are:

- Right-to-use (RTU) licensing mode—Supported on Cisco Catalyst 9000 Series Switches, in Cisco IOS XE Everest 16.5.1a. See The RTU Licensing Mode, page 6.

- Smart Licensing mode—Currently not supported on Cisco Catalyst 9000 Series Switches. It is on the roadmap for future releases.

The RTU Licensing Mode

This is the currently supported licensing mode for Cisco Catalyst 9000 Series Switches.

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

Note The RTU licensing structure has been modified to match the packaging model that will be used with Smart Licensing mode in the future. Unified licensing structures across the RTU and Smart Licensing modes, along with usage reports, will simplify migration and reduce the implentation time required for Smart Licensing.

The **license right-to-use** command (privilege EXEC mode) provides options to activate or deactivate any license supported on the platform.

Options for Base Licenses

license right-to-use [**activate | deactivate**] [**network-essentials | network-advantage**] [**all | evaluation | subscription** {**all | slot** <*1-8*>}] [**acceptEULA**]

Options for Add-On Licenses

license right-to-use [**activate | deactivate**] **addon** [**dna-essentials | dna-advantage**] [**all | evaluation | subscription** {**all | slot** <*1-8*>}][**acceptEULA**]

Usage Guidelines for the RTU Licensing Mode

- Licenses may be activated on a standalone device.
- Base licenses (Network Essentials and Network-Advantage) may be ordered only with a permanent license type.
- Add-on licenses (DNA Essentials and DNA Advantage) may be ordered only with a term license type.

  You can set up Cisco SSM to receive daily e-mail alerts, to be notified of expiring add-on licenses that you want to renew.

  You must order an add-on license to use the switch software. But after the initial term for the add-on license expires, you will be able to continue using the base license by deactivating the add-on and then reloading the device.
- When ordering an add-on license with a base license, note the combinations that are permitted and those that are not permitted:

Table 5 Permitted Combinations

	DNA Essentials	DNA Advantage
Network Essentials	Yes	No
Network Advantage	Yes[1]	Yes

1. For this combinaton, the DNA-Essentials license must be ordered seperately using Cisco SSM.

- The following features are currently available only at the Network Advantage license level. However, the correct minimum license level for these features is Network Essentials and the CFN reflects this correct license level.

  You will be able to configure the feature with a Network Essentials license level after the correction is made in an upcoming release.

  - IPv6 Multicast
  - IPv6 ACL Support for HTTP Servers
- Evaluation licenses cannot be ordered. They can be activated temporarily, without purchase. Warning system messages about the evaluation license expiry are generated 10 and 5 days before the 90-day window. Warning system messages are generated every day after the 90-day period. An expired evaluation license cannot be reactivated after reload.

For more information about using the RTU Licensing Mode, see the System Management > *Configuring Right-To-Use Licenses* chapter in the software configuration guide.

Scaling Guidelines

For information about feature scaling guidelines, see the Cisco Catalyst 9500 Series Switches datasheet at:

http://www.cisco.com/c/en/us/products/collateral/switches/catalyst-9500-series-switches/datasheet-c78-738978.html

Limitations and Restrictions

- Hardware
  - Use the MODE button to switch-off the beacon LED.
  - All port LED behavior is undefined until interfaces are fully initialized.
- Cisco TrustSec restrictions—Cisco TrustSec can be configured only on physical interfaces, not on logical interfaces.
- FNF limitations
  - You cannot configure NetFlow export using the Ethernet Management port (g0/0)
  - You can not configure a flow monitor on logical interfaces, such as SVI, port-channel, loopback, tunnels.
  - You can not configure multiple flow monitors of same type (ipv4, ipv6 or datalink) on the same interface for same direction.
- 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 crash. 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 (Secure Copy Protocol) 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 take upto 40 or 50 percent of CPU memory, but they do not cause the device to shutdown.
- Smart Install—Although the commands are visible on the CLI, the Smart Install feature is not supported. Enter the **no vstack** command in global configuration mode and disable the feature.
- 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.
- Wired AVC 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 attributes based QoS is not supported (‘match protocol attribute’).
  - 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 500 connections per second (CPS) at less than 50% CPU utilization. Above this rate, AVC service is not guaranteed.
  - Scale— Able to handle up to 5000 bi-directional flows per 24 access ports and 10000 bi-directional flows per 48 access ports
- YANG data modeling limitations—A maximum of 20 simultaneous NETCONF sessions are supported.

Caveats

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

- Cisco Bug Search Tool, page 9
- Open Caveats in Cisco IOS XE Everest 16.5.x, page 9

Cisco Bug Search Tool

The 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 Everest 16.5.x

The following are the open caveats in this release:

Identifier	Description
CSCvc74159	Show archive log config statistic does not display the expected values
CSCve29216	9500-WebUI: Upon hovering an interface, status description is incorrectly displayed as no link

Troubleshooting

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

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

Choose **Product Support > Switches**. Then choose your product and click **Troubleshoot and Alerts** to find information for the problem that you are experiencing.

Related Documentation

- Cisco Catalyst 9500 Series Switches documentation at this URL:

  http://www.cisco.com/go/c9500
- Cisco IOS XE 16 documentation at this URL:

  http://www.cisco.com/c/en/us/products/ios-nx-os-software/ios-xe/index.html
- Cisco SFP and SFP+ modules documentation, including compatibility matrixes at this URL:

  http://www.cisco.com/en/US/products/hw/modules/ps5455/tsd_products_support_series_home.html

- Cisco Validated Designs documents at this URL:

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

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/c/en/us/td/docs/general/whatsnew/whatsnew.html

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