Cisco Catalyst 9500 Series Switches



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Introduction

Reimagine, reinforce, redefine

The Cisco Catalyst™ 9500 Series, including the Catalyst 9500X models, continues to shape the future with continued innovation that helps you reimagine connections, reinforce security and redefine the experience for your hybrid workforce big and small.

Cisco Catalyst 9500 Series Switches, based on the Cisco® Unified Access Data Plane (UADP) Application-Specific Integrated Circuit (ASIC), are Cisco's lead fixed enterprise core and aggregation switching platform and, as part of the Catalyst 9000 family, are built to transform your network to handle a hybrid world where the workplace is anywhere, endpoints could be anything, and applications are hosted all over the place.

The Cisco Catalyst 9500X switches, based on the Cisco Silicon One™ Q200 ASIC, are purpose built for the next-generation core, with a programmable pipeline (P4), and are the first network silicon to offer switching capacity up to 12.8-Tbps full duplex in the enterprise. The Q200 ASIC offers high performance along with full routing and switching capabilities without external memories. This is enabled by an internal architecture that includes an on-chip High-Bandwidth Memory (HBM). The Catalyst 9500X switches leverage a high-performance multiple-core x86 CPU and are Cisco's leading purpose-built fixed core and edge services enterprise switching platform, built for security, IoT, and cloud.

The Cisco Catalyst 9500X switches are the industry's first purpose-built fixed 10, 25, 50, 40, 100, 200, and 400 Gigabit Ethernet switches targeted for the enterprise campus. The Catalyst 9500X switches deliver unmatched forwarding scale (MAC addresses, IP unicast and multicast routes, Multiprotocol Label Switching [MPLS] labels) and deep buffering for enterprise applications. The Catalyst 9500X models include nonblocking 50 Gigabit Ethernet Small Form-Factor Pluggable (SFP-56) and nonblocking 400 Gigabit Ethernet Quad SFP Double Density (QSFP-DD) ports.

Catalyst 9500 Series switches support advanced routing and infrastructure services (such as MPLS Layer 2 and Layer 3 VPNs, Multicast VPN [MVPN], and Network Address Translation [NAT]); Cisco Software-Defined Access capabilities (such as a host tracking database, cross-domain connectivity, and VPN Routing and Forwarding [VRF]-aware Locator/ID Separation Protocol [LISP]); and network system virtualization with Cisco StackWise® Virtual technology that are critical for their placement in the campus core. The 9500 Series also supports foundational high-availability capabilities such as patching, Cisco Nonstop Forwarding with Stateful Switchover (NSF/SSO), redundant Platinum-rated power supplies, and fans, while supporting a wide array of optics. The switches provide an operational choice of Cisco Catalyst Center or Cisco Meraki® cloud monitoring.

The foundation of Software-Defined Access

The enterprise network lies at the heart of digital transformation. A network that is open, programmable, integrated, and secure maximizes business agility, allowing new business opportunities to be pursued and captured.

The Cisco Networking Cloud with Software-Defined Access (SD-Access) is the network fabric that powers business. Cisco SD-Access is an open and extensible, software-driven architecture that accelerates and simplifies your enterprise network operations. SD-Access enables policy-based automation from edge to cloud with foundational capabilities.

Cloud Ethernet Virtual Private Network (EVPN) fabric capabilities are supported for high-performance Cisco Catalyst 9500 models being managed from the Meraki dashboard. Learn more about cloud management and cloud fabric here.

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Product overview

Cisco Catalyst 9500X models

- The Cisco Silicon One Q200 ASIC is purpose built for the next-generation network core plus edge switch. It is the first enterprise ASIC to offer speeds up to 12.8 Tbps full duplex with 8 Bpps of forwarding performance, while supporting high performance and full routing and switching capabilities without external memories.
- The Cisco Silicon One Q200 ASIC is built on 7nm fabrication technology, capable of high performance while maintaining a low power footprint.
- Up to 12.8 (switching ASIC capacity) Tbps switching capacity with 8 Bpps forwarding rate.
- 80 MB of dedicated low-latency buffer, with up to 8 GB of HBM buffer for deep packet buffers.
- Up to 28 native nonblocking 40/100 Gigabit Ethernet QSFP28 ports.
- Up to 60 native nonblocking 10/25/50 Gigabit Ethernet SFP56 ports.
- Up to 8 native nonblocking 40/100/200/400 Gigabit Ethernet QSFPDD ports.
- Intel 2.3-GHz x86 CPU with 8 cores and 32 GB of DDR4 memory.
- Up to 960 GB of SSD local storage for container-based application hosting (2x 10G KR ports).
- Flexible routing (IPv4, IPv6, and multicast) tables, Layer 2 tables, Access Control List (ACL) tables, and Quality-of-Service (QoS) tables.
- ASIC tables for switching scale up to 256,000 MAC addresses and routing scale up to 2 million routes.
- Dual-stack IPv4/IPv6 and dynamic hardware forwarding table allocations, for ease of IPv4-to-IPv6 migration.
- Hardware support for application hosting.
- Hardware support for line-rate 256-bit 802.1ae MACsec and WAN-MACsec data encryption.
- Cisco StackWise Virtual technology, a network system virtualization technology that increases operational efficiency and boosts nonstop communications and scaled system bandwidth. Multichassis EtherChannel can be configured across StackWise Virtual members for high resiliency.
- Platinum-rated (90% efficient) 1500-watt AC and/or DC power supplies.
- Field-replaceable, N+1 redundant fan-tray units, with added flexibility to choose the direction of airflow.

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Cisco Catalyst 9500 models

- The Cisco UADP ASIC is ready for next-generation technologies with its programmable pipeline, microengine capabilities, and template-based, configurable allocation of Layer 2 and Layer 3 forwarding, ACLs, and QoS entries.
- Up to 6.4-Tbps switching capacity with up to 2 Bpps of forwarding performance.
- Up to 36 MB of unified buffer per ASIC.
- Intel® 2.4-GHz x86 CPU with up to 120 GB of USB 3.0 or up to 960 GB of SATA SSD storage for container-based application hosting.
- Up to 32 nonblocking 100 Gigabit Ethernet QSFP28 ports.
- Up to 32 nonblocking 40 Gigabit Ethernet QSFP+ ports.
- Up to 48 nonblocking 25 Gigabit Ethernet SFP28 ports.
- Up to 48 nonblocking 10 Gigabit Ethernet SFP+ ports.
- Scalable Layer 3 routing (IPv4, IPv6, and multicast) tables and Layer 2 switching tables.
- Hardware support for application hosting.
- IEEE 802.1ba Audio Video Bridging (AVB) built in to provide a better AV experience through improved time synchronization and QoS.
- Precision Time Protocol (PTP; IEEE 1588v2) provides accurate clock synchronization with sub-microsecond accuracy, making it suitable for distribution and synchronization of time and frequency over the network.
- Support for both static and dynamic NAT and Port Address Translation (PAT).
- Cisco StackWise Virtual technology, a network system virtualization technology that increases operational efficiency and boosts nonstop communications and scaled system bandwidth. Multichassis EtherChannel can be configured across StackWise Virtual members for high resiliency.
- Platinum-rated (greater than 90% efficient) AC and/or DC power supplies.
- Field-replaceable fan-tray units.
- Meraki cloud monitoring option.

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Cisco IOS XE

This modern operating system for the enterprise provides support for model-driven programmability, on-box Python scripting, streaming telemetry, container-based application hosting, and patching for critical bug fixes. Cisco IOS® XE also has built-in defenses to protect against runtime attacks.

- **Simplified Campus Automation** is designed to optimize the discovery and configuration of devices in your network with a more streamlined simple and easy-to-use automation tool. With features such as simplified discovery, IT can discover devices within the network within just a few steps. Also available is a more streamlined GUI that provides a simplified view of switch configurations and software details on a port-by-port basis.
- **Cisco Plug and Play (PnP) enabled:** A simple, secure, unified, and integrated offering to ease new branch or campus device rollouts or updates to an existing network.
- **Automated device provisioning:** This is the ability to automate the process of upgrading software images and installing configuration files on Cisco Catalyst switches when they are being deployed in the network for the first time. Cisco provides both turnkey solutions such as PnP and off-the-shelf tools such as Zero-Touch Provisioning (ZTP) and Preboot Execution Environment (PXE) that enable an effortless and automated deployment.
- **API-driven configuration:** Modern network switches such as the Cisco Catalyst 9500 Series support a wide range of automation features and provide robust open APIs over NETCONF, RESTCONF, and gNMI using YANG data models for external tools, both off-the-shelf and custom built, to automatically provision network resources.
- **Granular visibility:** Model-driven telemetry provides a mechanism to stream data from a switch to a destination. The data to be streamed is driven through subscription to a data set in a YANG model. The subscribed data set is streamed out to the destination at configured intervals. Additionally, Cisco IOS XE enables the push model, which provides near-real-time monitoring of the network, leading to quick detection and rectification of failures.
- **Seamless software upgrades and patching:** To enhance OS resilience, Cisco IOS XE supports patching, which provides fixes for critical bugs and security vulnerabilities between regular maintenance releases. This support allows customers to add patches without having to wait for the next maintenance release.
- **Cloud management:** The Catalyst 9500 support cloud management with IOS XE. Cloud management provides the ability to view Catalyst 9500 Series switch statistics, manage configurations, and access troubleshooting capabilities directly from the Meraki dashboard. Learn more about cloud management.
- **WebUI:** Embedded GUI-based device-management tool that provides the ability to provision the device, simplifying device deployment and manageability and enhancing the user experience. WebUI comes with the default image. There is no need to enable anything or install any license on the device. You can use WebUI to build a day-1 configuration and from then on monitor and troubleshoot the device without having to know how to use the CLI.

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Platform benefits

Table 1. Platform benefits

Model	Catalyst 9500	Catalyst 9500X
Resiliency and high availability		
Software Maintenance Upgrade (SMU)	Yes	Yes
Cisco StackWise Virtual	Yes	Yes[3]
Stateful Switchover (SSO)	Yes (StackWise Virtual Link)	Yes (StackWise Virtual Link)[3]
In-Service Software Upgrade (ISSU)	Yes (StackWise Virtual Link)	Yes (StackWise Virtual Link)[3]
Graceful Insertion and Removal (GIR)	Yes	Yes
MACsec Key Agreement (MKA) high availability	Yes	No[1]
Enterprise security		
Trustworthy solutions	Yes	Yes
Image signing	Yes	Yes
Secure Boot	Yes	Yes
Cisco Trust Anchor Module	Yes	Yes
MACsec encryption (256-bit AES-GCM)	Yes	Yes
Cisco WAN MACsec (256-bit AES-GCM)	No	Yes[2,5]
Object-group ACLs (IPv4/IPv6)	Yes	Yes[4]
Enterprise QoS		
Modular QoS CLI (MQC)	Yes	Yes
Strict priority queuing	Yes	Yes
Class/color-aware queuing	Yes (weighted fair queuing [WFQ])	Yes (virtual output queuing [VoQ])
Policing/metering	Yes	Yes
Shaping/bandwidth	Yes	Yes
Hierarchical QoS	Yes (2-level)	Yes (2-level)

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Model	Catalyst 9500	Catalyst 9500X
IP routing		
Routing Information Protocol version 2 (RIPv2) and next generation [RIPng]	Yes	Yes
Open Shortest Path First version 2 (OSPFv2) and OSPFv3	Yes	Yes
Enhanced Interior Gateway Routing Protocol (EIGRP), and EIGRPv6	Yes	Yes
Intermediate System-to-Intermediate System version 4 (IS-ISv4)	Yes	Yes
Border Gateway Protocol version 4 (BGPv4) and BGPv6	Yes	Yes
Protocol-Independent Multicast (PIM) Sparse Mode (PIM-SM)	Yes	Yes
PIM Source-Specific Mode (PIM-SSM)	Yes	Yes
Bidirectional PIM (PIM-BIDIR)	Yes	No[1]
IPv6 routing	Yes	Yes
Layer 3 routed subinterfaces	Yes	Yes
MPLS		
MPLS Layer 3 VPN	Yes	Yes
Ethernet over MPLS (EoMPLS)	Yes	Yes
Virtual private LAN service (VPLS)	Yes	No[1]
MPLS over GRE	Yes	No[1]
MPLS traffic engineering (MPLS-TE)	Yes	Yes

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Model	Catalyst 9500	Catalyst 9500X
BGP Ethernet VPN (EVPN) VXLAN		
Fabric spine, leaf, and border support	Yes	Yes[3]
Layer 2/Layer 3 Virtual Network Interface (VNI)	Yes	Yes[3]
Distributed anycast gateway (symmetric integrated routing and bridging [IRB])	Yes	Yes[3]
Centralized gateway (asymmetric IRB)	Yes	No
ESI multihome support	Yes	No
Tenant routed multicast (IPv4/IPv6)	Yes	Yes[3]
Layer 3 border handoff: Multi-VRF, MPLS L3 VPN	Yes	Yes[3]
Layer 2 border handoff: VPLS, EoMPLS L2 VPN	Yes	No[1]
Software-Defined Access (SD-Access)		
Virtual eXtensible LAN (VXLAN)	Yes	Yes
Layer 2 VNI	Yes	Yes
Layer 3 VNI	Yes	Yes
SD-Access control plane	Yes	Yes
SD-Access border	Yes	Yes
SD-Access Layer 2 border	Yes	No
SD-Access edge	Yes	No
Flexible NetFlow (FNF)		
FNF IPv4 flow records	Yes	Yes[2] (software)
FNF IPv6 flow records	Yes	Yes[2] (software)
FNF sampler	Yes	Yes[2]
FNF data export	Yes	Yes[2]
NetFlow version 9 (NFv9) export	Yes	Yes[2]
IPFIX export	Yes	Yes[2]

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Model	Catalyst 9500	Catalyst 9500X
Programmability		
NETCONF	Yes	Yes
RESTCONF	Yes	Yes
gNMI/gNOI	Yes	Yes
YANG config models	Yes	Yes
YANG oper models	Yes	Yes
ZTP/PnP	Yes	Yes
Smart operations		
Bluetooth ready	Yes	Yes[2]
RFID tags	Yes	Yes
Blue beacon	Yes	Yes
Out-of-band device management	Yes (RJ-45 and USB-mini type B)	Yes (RJ-45 and USB-C)
Meraki cloud management	Yes	No

[1] Catalyst 9500X models: Feature is not available at FCS, but it is hardware capable.

[2] Catalyst 9500X models: Minimum IOS XE software release 17.8.1 (C9500X-28C8D) and 17.10.1 (C9500X-60L4D).

[3] Catalyst 9500X models: Minimum IOS XE software release 17.10.1 (C9500X-28C8D) and 17.11.1 (C9600X-60L4D). SSO support requires StackWise Virtual for fixed Catalyst 9500 models. ISSU supported on Catalyst 9500X models starting with Release 17.12.1.

[4] Catalyst 9500X models: Object-group ACLs are supported only in the ingress direction.

[5] Need to order HSEC key.

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Platform details

Switch models and configurations

All switches ship with the 650W, 950W, 1500W, or 1600W AC power supply as the default.

Figures 1 through 7 show the Cisco Catalyst 9500 Series Switches.

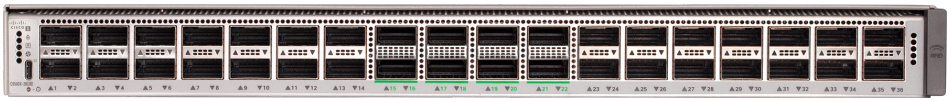


Figure 1. C9500X-28C8D: Cisco Catalyst 9500X switch with 28x 40/100 Gigabit Ethernet QSFP28 ports + 8x 40/100/200/400 Gigabit Ethernet ports



Figure 2. C9500X-60L4D: Cisco Catalyst 9500X switch with 60x 10/25/50 Gigabit Ethernet + 4x 40/100/200/400G Gigabit Ethernet ports



Figure 3. C9500-32C: Cisco Catalyst 9500 Series high-performance switch with 32x 100 Gigabit Ethernet ports



Figure 4. C9500-32QC: Cisco Catalyst 9500 Series high-performance switch with 32x 40 or 16x 100 Gigabit Ethernet ports



Figure 5. C9500-48Y4C: Cisco Catalyst 9500 Series high-performance switch with 48x 1/10/25 Gigabit Ethernet ports + 4x 40/100 Gigabit Ethernet uplink ports



Figure 6. C9500-24Y4C: Cisco Catalyst 9500 Series high-performance switch with 24x 1/10/25 Gigabit Ethernet + 4x 40/100 Gigabit Ethernet uplink ports



Figure 7. C9500-16X: Cisco Catalyst 9500 Series switch with 16x 1/10 Gigabit Ethernet ports

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Switch configurations and port density

Table 2 shows the Cisco Catalyst 9500X switch configurations.

Table 2. Cisco Catalyst 9500X switch configurations and port density

Model	Description	1G port density	10/25/50G port density	40/100G port density	400G port density	10/25G port density with breakout cable	50G port density with breakout cable	40G port density with breakout cable	100G port density with breakout cable
C9500X-28C8D	Cisco Catalyst 9500X with 28x 100 + 8x 400 Gigabit Ethernet	-	-	36	8	88 (1201)	-641	36 (601)	60
C9500X-60L4D	Cisco Catalyst 9500X with 60x 50 + 4x400 Gigabit Ethernet	82	60	4	4	76 (921)	60 (921)	4 (161)	16

[1] Hardware capable. All numbers in the above table are for a single standalone switch.
[2] C9500X-60L4D only supports SFP-1G-SX/LH optics for 1 Gbps. See the Cisco TMG Matrix for details.

Table 3 shows the Cisco Catalyst 9500 Series switch configurations.

Table 3. Cisco Catalyst 9500 Series configurations and port density

Model	Description	1G port density	10G port density	25G port density	40G port density	100G port density	10G port density with breakout cable	25G port density with breakout cable
C9500-32C	Cisco Catalyst 9500 Series high-performance 32-port 100 Gigabit Ethernet switch with QSFP28	-	-	-	32	32	96	96

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Model	Description	1G port density	10G port density	25G port density	40G port density	100G port density	10G port density with breakout cable	25G port density with breakout cable
C9500-32QC	Cisco Catalyst 9500 Series high-performance 32-port 40 Gigabit Ethernet switch with QSFP+	–	–	–	32	16	–	–
C9500-48Y4C	Cisco Catalyst 9500 Series high-performance 48-port 1/10/25 Gigabit Ethernet switch with SFP28	48	48	48	4	4	–	–
C9500-24Y4C	Cisco Catalyst 9500 Series high-performance 24-port 1/10/25 Gigabit Ethernet switch with SFP28	24	24	24	4	4	–	–
C9500-16X	Cisco Catalyst 9500 Series 16-port 1/10 Gigabit Ethernet switch with SFP/SFP+	16+8[1]	16+8[1]	–	2	–	8[1]	–

All numbers in the above table are for the standalone switch.

[1] **With uplink module.**

Network modules

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The Cisco Catalyst 9500 Series Switches support optional network modules for uplink ports on some of the configurations.

The default switch configuration does not include the network module. When you purchase the switch, you can choose from the network modules described in Tables 4 and 5.

Table 4. Network module numbers and descriptions

Network module	Description
C9500-NM-8X	Cisco Catalyst 9500 Series Network Module 8-port 1/10 Gigabit Ethernet with SFP/SFP+
C9500-NM-2Q	Cisco Catalyst 9500 Series Network Module 2-port 40 Gigabit Ethernet with QSFP+

Table 5. Network module matrix

Model	C9500-NM-8X	C9500-NM-2Q
C9500X-28C8D	No	No
C9500X-60L4D	No	No
C9500-32C	No	No
C9500-32QC	No	No
C9500-48Y4C	No	No
C9500-24Y4C	No	No
C9500-16X	Yes	Yes

Figures 8 and 9 show the available network modules.

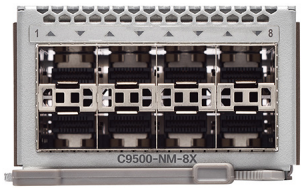


Figure 8. Cisco Catalyst 9500 Series network module 8-port 1/10 Gigabit Ethernet with SFP/SFP+



Figure 9. Cisco Catalyst 9500 Series network module 2-port 40 Gigabit Ethernet with QSFP+

Accessories

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The Cisco Catalyst 9500 Series Switches support optional accessories.

The default switch configuration ships with default 19-inch brackets. The accessories mentioned below need to be selected during configuration and ordered separately.

Table 6. Accessories and descriptions

Product number	Description
C9500X-ACCKIT-19I=	Accessory Kit for Cisco Catalyst 9500X Switch - 19” rack mount[1]
C9500X-ACCKIT-23I=	Accessory Kit for Cisco Catalyst 9500X Switch - 23” rack mount[1]
C9500X-4PTH-KIT=	Extension rails and brackets for four-point mounting for Cisco Catalyst 9500X Switch[1]
C9500-ACCKITH-19I=	Accessory Kit for Cisco Catalyst 9500 Series – High-End - 19” rack mount
C9500-ACCKITH-23I=	Accessory Kit for Cisco Catalyst 9500 Series – High-End - 23” rack mount
C9500-4PTH-KIT=	Extension rails and brackets for four-point mounting for Cisco Catalyst 9500 Series – High-End
C9500-ACC-KIT-19I=	Accessory Kit for Cisco Catalyst 9500 Series - 19” rack mount
C9500-ACC-KIT-23I=	Accessory Kit for Cisco Catalyst 9500 Series - 23” rack mount
C9500-4PT-KIT=	Extension rails and brackets for four-point mounting for Cisco Catalyst 9500 Series
C9K-F3-SSD-240GB	Cisco pluggable SSD storage – 240 GB (Catalyst 9500X)[1]
C9K-F3-SSD-480GB	Cisco pluggable SSD storage – 480 GB (Catalyst 9500X)[1]
C9K-F3-SSD-960GB	Cisco pluggable SSD storage – 960 GB (Catalyst 9500X)[1]
C9K-F1-SSD-240G	Cisco pluggable SSD storage – 240 GB
C9K-F1-SSD-480G	Cisco pluggable SSD storage – 480 GB
C9K-F1-SSD-960G	Cisco pluggable SSD storage – 960 GB

[1] Only supported on Catalyst 9500X models.

Table 7. Accessory matrix

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Model	C9500-ACCKITH-19I=	C9500-ACCKITH-23I=	C9500-4PTH-KIT=	C9500-ACC-KIT-19I=	C9500-ACC-KIT-23I=	C9500-4PT-KIT=	C9K-F1-SSD-240G	C9K-F1-SSD-480G	C9K-F1-SSD-960G
C9500-32C	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes
C9500-32QC	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes
C9500-48Y4C	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes
C9500-24Y4C	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes
C9500-16X	No	No	No	Yes	Yes	Yes	No	No	No

Catalyst 9500X models have their own accessory kits and SSD storage.

Refer to the Cisco Catalyst 9500X Series Switches Hardware Installation Guide for more information.

For Catalyst 9500 high-performance (C9500-24Y4C, C9500-48Y4C, C9500-32C, C9500-32QC) and 9500X switches, an RFID tag is an optional selection. The RFID tag can be opted out with the selection of C9500-RFID-NONE. The RFID tag can be opted in by selecting C9500-RFID for Catalyst 9500 high-performance (C9500-24Y4C, C9500-48Y4C, C9500-32C, C9500-32QC) switches and C9500X-RFID for Catalyst 9500X switches. UADP 2.0-based C9500-16X will continue to ship with RFID tags.

Note: For Catalyst 9500 high-performance (C9500-24Y4C, C9500-48Y4C, C9500-32C, C9500-32QC) and Catalyst 9500X switches, it is important to make the right selection for RFID opt in or opt out at the time of ordering. An RFID cannot be installed later if it is opted out at the time of ordering.

Power supplies and fan tray

The Cisco Catalyst 9500 Series Switches support dual 1+1 redundant power supplies (AC or DC). The switches ship with one power supply by default. The second power supply can be purchased at the time the switch is ordered or at a later time. If only one power supply is installed, it should always be in power supply bay #1.

The Catalyst 9500 Series ship with up to five field-replaceable variable-speed fans. These have front-to-back airflow and can operate with up to one individual fan failure. The fan trays support fan-tray Online Insertion and Removal (OIR) and can support a maximum fan speed of up to 24,000 rpm.

Catalyst 9500X models ship with six field-replaceable variable-speed fan units. By default these have front-to-back (port-side intake) airflow fan units. The switch also has the option to select six back-to-front (port-side exhaust) airflow fans. The fan trays support fan-tray OIR and can support a maximum fan speed of up to 30,000 rpm.

Note: All Catalyst 9500X fan units must be the same type (either front-to-back or back-to-front). Mix and match of fan trays (front-to-back or back-to-front) is not supported.

Table 8. Catalyst 9500X fan options

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Product number	Description
C9500X-FAN-1U-R	Catalyst 9500X front to back cooling fan (maximum 6 per switch)
C9500X-FAN-1U-F	Catalyst 9500X back to front cooling fan (maximum 6 per switch)

Table 9 shows the maximum fans and fan trays for each configuration.

Table 9. Catalyst 9500 fan and fan tray matrix

Model	FAN-T4-R (max # of fans)	C9K-T1-FANTRAY (max # of fans)	C9K-T2-FANTRAY (max # of fans)
C9500-32C	No	No	Yes (5)
C9500-32QC	No	Yes (4)	No
C9500-48Y4C	No	Yes (4)	No
C9500-24Y4C	No	Yes (4)	No
C9500-16X	Yes (5)	No	No

Figures 10 to 13 show the power supplies available for the Cisco Catalyst 9500 Series



Figure 10. 950W AC power supply



Figure 11. 650W AC power supply (C9K-PWR-650WAC-R)

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Figure 12. 1600W AC power supply



Figure 13. 650W AC power supply (C9K-PWR-650WACL-R)

Tables 10 and 11 provide more details on the Cisco Catalyst 9500X models' power supplies.

Table 10. Catalyst 9500X power supply specifications

Power supply feature	C9K-PWR-1500WAC	C9K-PWR-1500WDC
Power max rating	1500	1500
Input voltage range and frequency	90 to 264 VAC 47-63Hz	-40 to -72 VDC
Power supply efficiency	92% (115VAC 50% load) 94% (230VAC 50% load)	94% (-48 to -60 VDC, 50% load)
Input current	17A (max) at VAC 100V 7A (max) at VAC 240V	45A (max) at -40VDC
Output ratings	Main output: 12V 125A Standby output: 3.3V 5A	Main output: 12V 125A Standby output: 3.3V 5A
Output holdup time	12 ms	2 ms
Power-supply input receptacles	C22[1]	C10-638977-00 Amphenol Connector
Power cord rating	16A	–

[1] The Catalyst 9500X uses a different AC connector (C21) than the rest of the Catalyst 9500 product family.

Note: The PSU has only one airflow direction (back to front) and supports two system airflows (back to front/front to back).

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Table 11. BTU details for Catalyst 9500X switches with AC/DC PSU

Total output BTU (Note: 1000 BTU/hr = 293W) – Model	C9K-PWR-1500WAC	C9K-PWR-1500WDC
C9500X-28C8D	4,034	4,034
C9500X-60L4D	3,412	3,412

Tables 12 and 13 provides more details on the Cisco Catalyst 9500 Series power supplies.

Table 12. Catalyst 9500 power supply specifications

Power supply feature	PWR-C4-950WAC-R	PWR-C4-950WDC-R	C9K-PWR-650WAC-R	C9K-PWR-650WACL-R	C9K-PWR-930WDC-R	C9K-PWR-1600WAC-R	C9K-PWR-1600WDC-R
Power max rating	950W	950W	650W	650W	930W	1600W	1600W
Input voltage range and frequency	AC 90 to 264 VAC, 47 to 63 Hz	-36 to ~72 VDC	AC 90VAC to 264VAC, 47 to 63 Hz	AC 90 to 264 VAC, 47 to 63 Hz	DC -40 to -72 VDC	AC 90 to 140 VAC and 180 to 264 VAC 47 to 63 Hz	DC -40 to
Power supply efficiency	94%	91% at 48Vin, 50% load	94% (Typ)	94% (Typ)	92% (Typ)	94% (Typ)	92% (Typ)
Input current	AC 10A at 115VAC, 5 A at 230VAC	22.6A at 48Vin, 950W	AC 6.8A max at 115VAC, 3.4A max at 230VAC (when full loading)	AC 6.8A max at 115VAC, 3.4A max at 230VAC (when full loading)	DC 23A max at -48VDC (when full loading)	AC 10.5A max at 115VAC (1050W), 7.8A max at 230VAC (1600W)	DC 40A max at -48VDC (when full loading)
Output ratings	12V at 79A, 12V at 3A	950W	12Vmain at 54A, 12Vsb at 3A	12Vmain at 54A, 12Vsb at 3A	12Vmain at 54A, 12Vsb at 3A	12Vmain at 133A, 12Vsb at 3A	12Vmain at 133A, 12Vsb at 3A
Output holdup time	AC = 10 ms at maximum load	1 ms	AC = 20 ms minimum for system	AC = 12 ms minimum at maximum load	AC = 8 ms minimum for system	AC = 20 ms minimum for system	AC = 5 ms minimum for system
Power-supply input receptacles	AC IEC 60320 C16		AC IEC 60320 C14	AC IEC 60320 C14	Molex Minifit 44540-1001	AC IEC 60320 C16	Amphenol C10-638976-000
Power cord rating	AC 15A	DC 40A	AC 10A	AC 10A	DC 40A	AC 15A	DC 70A

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Table 13. BTU details for Catalyst 9500 power supplies (BTU/hr)

Total output BTU (Note: 1000 BTU/hr = 293W) - Model	C9K-PWR-1600WAC-R	C9K-PWR-1600WDC-R	C9K-PWR-650WAC-R	C9K-PWR-650WACL-R	C9K-PWR-930WDC-R	PWR-C4-950WAC-R	PWR-C4-950WDC-R
C9500-32C	3,631	3,709	–	–	–	–	–
C9500-32QC	–	–	1,815	1,815	1,856	–	–
C9500-48Y4C	–	–	1,856	1,856	1,856	–	–
C9500-24Y4C	–	–	1,454	1,454	1,484	–	–
C9500-16X with 10G NM	–	–	–	–	–	941	967
C9500-16X with 40G NM	–	–	–	–	–	904	930

Table 14 shows the power supplies supported in the Cisco Catalyst 9500 Series Switches.

Table 14. Catalyst 9500 power supply matrix

Model	C9K-PWR-1600WAC-R	C9K-PWR-1600WDC-R	C9K-PWR-650WAC-R	C9K-PWR-650WACL-R	C9K-PWR-930WDC-R	PWR-C4-950WAC-R	PWR-C4-950WDC-R
C9500-32C	Yes	Yes	No	No	No	No	No
C9500-32QC	No	No	Yes	Yes	Yes	No	No
C9500-48Y4C	No	No	Yes	Yes	Yes	No	No
C9500-24Y4C	No	No	Yes	Yes	Yes	No	No
C9500-16X	No	No	No	No	No	Yes	Yes

Table 15 shows key differences between the C9K-PWR-650WAC-R and C9K-PWR-650WACL-R power supplies.

Table 15. Key differences between the C9K-PWR-650WAC-R and C9K-PWR-650WACL-R

Criteria	C9K-PWR-650WAC-R	C9K-PWR-650WACL-R
IEC-61000-4-5 surge	4KV CM, 2KV DM	2.5KV CM, 1KV DM
AC line hold-up time	>=20 ms at 90% load	>=12 ms at 100% load
Over Power Protection (OPP)	130% x rated load	140% x rated load

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Switch performance

Table 16 shows performance specifications for the Cisco Catalyst 9500 Series Switches.

Table 16. Performance specifications

Performance numbers for all switch models	C9500-16X	C9500-32C	C9500-32QC	C9500-48Y4C	C9500-24Y4C	C9500X-28C8D	C9500X-60L4D
ASIC	**UADP 2.0**	**UADP 3.0**				**Q200**	
Switching capacity	Up to 480 Gbps	Up to 6.4 Tbps[2]	Up to 3.2 Tbps[2]	Up to 3.2 Tbps[2]	Up to 2.0 Tbps[2]	Up to 12 Tbps	Up to 9.2 Tbps
Forwarding rate	Up to 360 Mpps	Up to 2 Bpps	Up to 1 Bpps	Up to 1 Bpps	Up to 1 Bpps	8 Bpps	8 Bpps
Total MAC addresses	Up to 64,000[1]	Up to 82,000[1]				Up to 256,000[1]	
Total IPv4 routes (indirect routes)	Up to 64,000 indirect[1,6]	Up to 256,000 indirect + direct[1,6]				Up to 2,000,000[6]	
Total IPv4 host routes (direct routes and ARP)	Up to 80,000 host[1,6]	Up to 90,000 host/ARP[2,6]				Up to 256,000[1,6]	
Total IPv6 routes (indirect routes)	Up to 32,000 indirect[1,6]	Up to 256,000 indirect + direct[1,6]				Up to 1 million[6]	
Total IPv6 host routes (direct routes and NDP)	Up to 40,000 host[1,6]	Up to 90,000 host[1,6]				Up to 128,000[1,6]	
Total IPv4 multicast routes	Up to 32,000[1,6]	Up to 32,000[1,6]				Up to 32,000[1,6]	
Total IPv6 multicast routes	Up to 16,000[1,6]	Up to 32,000[1,6]				Up to 16,000[1,6]	
QoS ACL scale (v4/v6)	Up to 18,000/9,000[1]	Up to 16,000/8,000[1]				Up to 8,000/4,000[1,7]	
Security ACL scale (v4/v6)	Up to 18,000/9,000[1]	Up to 27,000/13,500[1]				Up to 8,000/4,000[1,7]	
FNF entries	Up to 512,000[1]	Up to 256,000[1]				Up to 2 million[5]	
DRAM	16 GB	16 GB				32 GB	
Flash	16 GB	16 GB				32 GB	
VLAN IDs	4,094	4,094				4,094	

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Performance numbers for all switch models	C9500-16X	C9500-32C	C9500-32QC	C9500-48Y4C	C9500-24Y4C	C9500X-28C8D	C9500X-60L4D
ASIC	UADP 2.0	UADP 3.0				Q200	
Per-VLAN Spanning Tree (PVST) instances	300[3]	40,00[1]				4,094	
Spanning Tree Protocol (STP) virtual ports (port* VLANs) for PVST	13,000	16,000				16,000	
STP virtual ports (port VLANs) for Multiple Spanning Tree (MST)	13,000	1,000,00[4]				32,000	
Total switched virtual interfaces (SVIs)	1,000	4,000[1]				3800	
Jumbo frames	9,198 bytes	9,216 bytes				9,216 bytes	

[1] Varies based on selected flexible ASIC template and platform.

[2] Line rate for 187-byte packet size and above.

[3] 300 with IOS XE Release 17.1.1 or later. 256 with IOS XE 16.12.x and 16.11.x 128 with IOS XE 16.10.x or earlier.

[4] 100,000 with IOS XE Release 17.5.1 or later. With IOS XE 17.4.1 or earlier: 32,000 with C9500-32C and C9500-32QC; 52,000 with C9500-48Y4C; 28,000 with C9500-24Y4C.

[5] Flexible NetFlow requires IOS XE Release 17.8.1 or later.

[6] Table maximum. The exact percentage of allocation will depend on specific IP/mask combinations.

[7] Table maximum. Shared hardware resource. Maximum ACEs depends on number and type of ACLs configured across various interface types.

Important notes

Directly connected (or host) IP routes mean any /32 or /128 routes, including those that are learned indirectly (clients attached to switch's own VLAN/SVI and those /32 prefixes learned over any routing protocols, such as over OSPF).

Indirectly connected (or advertised) IP routes are subnet routes with a prefix other than /32 or 128 (for example: /8, /16, /24, etc.).

UADP 2.0 based C9500-16X supports 32,000 adjacencies in hardware. So, they can support up to ~32,000 directly attached clients (including all adjacencies) in their own VLAN/SVI.

UADP 3.0 based C9500-32C, 32QC, 24Y4C, and 48Y4C support 80,000 adjacencies for SVI, with Software Database Manager (SDM) template of distribution and 90,000 direct routes for all supported templates when a Layer 3 routed port is used.

In both UADP 3.0 and Silicon One Q200 models, the exact hardware programming (hash efficiency) of IP/mask entries depends on the specific number and type of IP/mask prefixes.

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Flexible ASIC templates

Cisco Catalyst 9000 switches use flexible Software Database Manager (SDM) ASIC templates to enable universal deployments by leveraging the UADP's ability to create resources to optimize table sizes for different places in the network. Based on how the switch is used in the network, an appropriate SDM ASIC template may be selected to configure the switch for specific features.

Catalyst 9500X models

Cisco Catalyst 9500X models support the following SDM ASIC templates

- Default (core)
- Custom

Table 17 describes the default SDM ASIC template for the Catalyst 9500X models.

Table 17. SDM template descriptions for Catalyst 9500X models

Feature	Default template
MAC addresses	128,000
IP host routes[1]	128,000
IP longest prefix match (LPM) routes[1,2]	2 million
IP multicast routes[1]	32,000
Internet Group Management Protocol (IGMP)/Multicast Listener Discovery (MLD) snooping[1]	16,000
MPLS labels[3]	256,000
Security/object groups	32,000
Security ACLs[1]	8,000
QoS ACLs[1]	8,000
Policy-based routing (PBR)	16,000
Generic Routing Encapsulation (GRE) tunnels	1,024
Sampled NetFlow entries[1]	2 million

[1] IPv4 and IPv6 entries coexist in the same tables, but IPv6 entries require two entries.

[2] LPM entries are stored as a hash, and efficiency is dependent on the actual routes learned. Catalyst 9500X hashing efficiency has been improved in Release 17.12.2.

[3] Per-prefix MPLS labels are limited to 62,000 on Catalyst 9500X models.

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Catalyst 9500 models

The following SDM ASIC templates are supported on the Cisco Catalyst 9500 Series.

- Distribution: Maximizes system resources for MAC and security.
- Core: Maximizes system resources for unicast and multicast routing.
- SD-Access: Maximizes system resources to support fabric deployment.
- NAT: Maximizes system resources for Layer 3 and NAT for support of collapsed-core WAN deployments.

Table 18 describes the standard SDM ASIC templates for the Catalyst 9500 models.

Table 18. SDM template descriptions for Catalyst 9500 models

Template numbers for models C9500-32C, C9500-32QC, C9500-24Y4C, C9500-48Y4C	Distribution template	Core template (default)	NAT template	SD-Access template[2]
IPv4/IPv6 (LPM/host)	114,000	212,000	212,000	212,000
Multicast routes (IPv4/IPv6)	16,000	32,000	32,000	32,000
IGMP/MLD snooping	2,000	2,000	2,000	2,000
MAC addresses	82,000	32,000	32,000	32,000
MPLS/security group tag (SGT) labels	**32,000**	**32,000**	**32,000**	**32,000**
NetFlow/ASIC	**98,000**	**64,000**	**64,000**	**64,000**
Security ACL	270,00[1]	270,00[1]	200,00[1]	270,00[1]
QoS ACL	160,00[1]	160,00[1]	80,00[1]	160,00[1]
PBR/NAT	3,000	3,000	15,500	2,000
Tunnel/MACsec	3,000	3,000	2,000	3,000
LISP	1,000	1,000	1,000	2,000
SPAN	1,000	1,000	1,000	1,000
STP instances	1,000	1,000	1,000	1,000
Control plane policing (CoPP)	1,000	1,000	1,000	1,000
NetFlow ACL	1,000 ingress, 1,000 egress	1,000 ingress, 1,000 egress	1,000 ingress, 1,000 egress	1,000 ingress, 1,000 egress

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Template numbers for models C9500-12Q, C9500-24Q, C9500-40X, C9500-16X	Distribution template (default)	Core template	NAT template	SD-Access template2
IPv4/IPv6 LPM	64,000/32,000	64,000/32,000	64,000/32,000	64,000/32,000
IPv4/IPv6 host routes	48,000/24,000	32,000/16,000	48,000/24,000	80,000/40,000
IPv4/IPv6 multicast routes	16,000/8,000	32,000/16,000	32,000/16,000	16,000/8,000
IGMP/MLD snooping	16,000	16,000	16,000	16,000
MAC address	64,000	16,000	16,000	16,000
SGT labels	8,000	8,000	8,000	8,000
NetFlow/ASIC	128,000	128,000	128,000	128,000
Security ACL	18,000	18,000	18,000	18,000
QoS ACL	18,000	18,000	3000	18,000
PBR/NAT	2,000	2,000	16,000	2,000
Tunnel/MACsec	1,000	1,000	1,000	1,000
LISP	1,000	1,000	1,000	1,000
SPAN	1,000	1,000	1,000	1,000
STP instances	300[3]	300[3]	300[3]	300[3]
CoPP	1,000	1,000	1,000	1,000
NetFlow ACL	1,000 ingress, 2,000 egress	1,000 ingress, 2,000 egress	1,000 ingress, 2,000 egress	1,000 ingress, 2,000 egress

[1] ACL allocation is configurable between ingress, egress, IPv4, and non-IPv4 (Layer 2 and IPv6).

[2] SD-Access template has been removed from IOS XE 17.3.1 onwards (in lieu of custom ASIC templates).

[3] 300 with IOS XE Release 17.1.1 or later. 256 with IOS XE 16.12.x and 16.11.x 128 with IOS XE 16.10.x or earlier.

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Custom ASIC templates

Catalyst 9500X models (C9500X-28C8D and C9500X-60L4D)

Beginning with the Cisco IOS XE 17.7.1 release, a custom SDM template allows you to configure several features of the template based on your requirements and not the location of the device in the network.

Table 19. Custom template Forwarding Information Base (FIB) configurable values

Feature	Default value	Scale values (min – max)	Step units
MAC addresses	128,000	32,000[1] to 256,000	1,000
IPv4 host routes	32,000	32,0001 to 256,000	1,000
IPv6 host routes	16,000	16,000[1] to 128,000	1,000
MPLS labels[3]	256,000	0[2] to 512,000	1,000
Security/object groups	32,000	0[2] to 64,000	1,000
Total resources	**608,000**		

[1] Critical features require a minimum allocation to ensure operation. If a custom value is not defined, this value is used.
[2] Some (noncritical) features are allowed to have a 0-entry allocation, to allow increased allocation of other features.
[3] Per-prefix MPLS labels are limited to 62,000 on Catalyst 9500X models.

Learn more about configuring custom SDM templates.

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C9500-32C, C9500-32QC, C9500-24Y4C, and C9500-48Y4C

Standard SDM templates can be used to configure system resources and optimize support for specific features. However, SDM templates are defined based on how the device is deployed in the network.

Beginning with Cisco IOS XE Release 17.3.1, a custom SDM template will allow you to configure the features of the template based on your requirements and not the location of the device in the network.

Table 20. Custom template configurable FIB values

Feature	Scale values (min – max)	Step units	Default value
MAC addresses	32,000 to 128,000	16,000	32,000
IPv4/IPv6 routes	64,000 to 256,000	16,000	64,000
Multicast routes[1]	0 to 32,000	16,000	16,000
IGMP/MLD snooping[1]	0 to 32,000	16,000	16,000
SGT/MPLS labels[2]	0 to 64,000	32,000	32,000
NetFlow entries – input[3]	0 to 64,000	32,000	32,000
NetFlow entries – output[3]	0 to 64,000	32,000	0
Total resources	416,000		

[1] Total Layer 2 and Layer 3 multicast entries may not exceed 48,000.
[2] Each resource holds two SGT + MPLS entries.
[3] NetFlow entries require double entries.

Table 21. Custom template configurable ACL values

Feature	Scale values (min – max)	Step units	Default value
Security ACL - input	4000 to 26,000, 27,000	2000	4000
Security ACL - output	4000 to 26,000, 27,000	2000	4000
QoS ACL - input	1000, 2000 to 16,000	2000	1000
QoS ACL – output	1000, 2000 to 16,000	2000	1000
PBR/NAT	1000, 2000 to 16,000	2000	2000
NetFlow ACL	1000 to 2000	1000	1000
LISP	1000 to 2000	1000	1000
Tunnels	1000 to 2000	1000	1000
Total Resources	**54,000**		

Learn more about configuring Custom SDM templates.

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Software requirements

The Cisco Catalyst 9500 Series Switches run on Cisco IOS XE Software Release 16.5.1a or later. This software release includes all the features listed earlier in the Platform Benefits section. Table 22 lists the minimum software requirements for the switch models.

Table 22. Minimum software requirements

Model	Description	Minimum software requirement
C9500X-28C8D	Cisco Catalyst 9500X Switch with 28x 100 Gigabit Ethernet + 8x 400 Gigabit Ethernet	Cisco IOS XE Software Release 17.7.1
C9500X-60L4D	Cisco Catalyst 9500X Switch with 60x 50 Gigabit Ethernet + 4x 400 Gigabit Ethernet	Cisco IOS XE Software Release 17.10.1
C9500-32C	Cisco Catalyst 9500 Series 32-port 40/100 Gigabit Ethernet with QSFP+/ QSFP28	Cisco IOS XE Software Release 16.8.1a
C9500-32QC	Cisco Catalyst 9500 Series 32-port 40 Gigabit Ethernet with QSFP+/16-port 100 Gigabit Ethernet with QSFP28	Cisco IOS XE Software Release 16.8.1a
C9500-48Y4C	Cisco Catalyst 9500 Series high-performance 48-port 1/10/25 Gigabit Ethernet switch with SFP/SFP+/SFP28	Cisco IOS XE Software Release 16.8.1a
C9500-24Y4C	Cisco Catalyst 9500 Series high-performance 24-port 1/10/25 Gigabit Ethernet switch with SFP/SFP+/SFP28	Cisco IOS XE Software Release 16.8.1a
C9500-16X	Cisco Catalyst 9500 Series 16-port 1/10 Gigabit Ethernet with SFP/SFP+	Open Cisco IOS XE Software Release 16.8.1

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Licensing

Introduction to Smart Licensing

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

- **Easy activation:** Smart Licensing establishes a pool of software licenses that can be used across the entire organization—no more PAKs (product activation keys).
- **Unified management:** Cisco License Central (CLC) provides a complete view into all of your Cisco products and services in an easy-to-use portal, so you always know what you have and what you are using.
- **License flexibility:** Your software is not node-locked to your hardware, so you can easily use and transfer licenses as needed.
- **Smart Licensing Using Policy (SLUP):** Enhanced version of Smart Licensing, with the overarching objective of providing a licensing solution that does not interrupt the operations of your network. Rather, it enables a compliance relationship to account for the hardware and software licenses you purchase and use.

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

For a more detailed overview on Cisco Licensing, visit the Licensing Hub.

Software licenses

Table 23. Software licenses

	Cisco Catalyst Software Subscription new	Cisco DNA subscription	Network Advantage	Network Essentials
Packages[1]	3-, 5-, or 7-year terms	3-, 5-, or 7-year terms	Perpetual	Perpetual
Tiers	Advantage, Essentials	Advantage, Essentials	Advantage, Essentials	Advantage, Essentials
Portability[2]	✓	✓	✓	✓
Management options	Catalyst Center, Meraki dashboard	Catalyst Center, Meraki dashboard	CLI, WebUI	CLI, WebUI
Included support	Base product-level support for hardware, software, and OS	Software support (SWSS)	✕	✕

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	Cisco Catalyst Software Subscription new	Cisco DNA subscription	Network Advantage	Network Essentials
Included[3] add-ons: Common Cisco Identity Services Engine (ISE) policy, ThousandEyes® network, and application assurance, Cisco Spaces	×	×	×	×
Included ISE endpoint licenses	10	×	×	×

[1] For all new orders, subscription licenses are mandatory and must be of the same tier as network licenses.
[2] Portability within the same Catalyst 9000 series of hardware
[3] Only available with the Advantage tier.

Network Essentials and Advantage package features

Table 24. Network Essentials and Advantage package features

Features	Network Essentials	Network Advantage
Switch fundamentals Layer 2, Routed Access (RIP, EIGRP Stub, OSPF – up to 1000 routes), PBR, PIM Stub Multicast (up to 1000 routes), PVLAN,[2] VRRP, PBR,[3] Cisco Discovery Protocol, QoS, FHS, 802.1X[2], MACsec-128, CoPP, SXP, IP SLA Responder, SSO	Yes	Yes
Advanced switch capabilities and scale BGP, EIGRP, HSRP, IS-IS, BSR, MSDP, PIM SM, PIM SSM, PIM-BIDIR,[2] IP SLA, OSPF	No	Yes
Network segmentation VRF, VXLAN, LISP, BGP-EVPN,[3] Cisco TrustSec®/CMD,[3] SGT, MPLS, mVPN[2]	No	Yes
Automation NETCONF, RESTCONF, gRPC, gNMI/gNOI, YANG, PnP agent, ZTP/Open PnP, Guest Shell (on-box Python)	Yes	Yes
Telemetry and visibility Model-driven telemetry, sampled NetFlow, Switched Port Analyzer (SPAN), Remote SPAN (RSPAN)[2]	Yes	Yes

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Features	Network Essentials	Network Advantage
High availability and resiliency GIR, NSF, ISSU,[3] StackWise Virtual[3], SMU	No	Yes
IoT integration PTP[2] (IEEE 1588v2)	No	Yes
Security MACsec-256, WAN MACsec[1, 4]	No	Yes
Cisco trustworthy solutions Trust Anchor module, Secure Boot, image signing, modern crypto, runtime defenses	Yes	Yes

Cisco Catalyst Essentials and Advantage package features

Table 25. Cisco Catalyst Essentials and Advantage package features

Feature	Cisco Catalyst Essentials	Cisco Catalyst Advantage	Cisco DNA Essentials	Cisco DNA Advantage
Switch features				
Optimized network deployments Cisco Catalyst Service for Bonjour[3]	No	Yes	No	Yes
Advanced telemetry and visibility Flexible NetFlow,[3] Embedded Event Manager (EEM)	Yes	Yes	Yes	Yes
Optimized telemetry and visibility Encapsulated RSPAN (ERSPAN), app hosting (in containers/VMs), Wireshark	No	Yes	No	Yes
Cisco Catalyst Center features (formerly Cisco DNA Center)				

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Feature	Cisco Catalyst Essentials	Cisco Catalyst Advantage	Cisco DNA Essentials	Cisco DNA Advantage
Simplified Campus Automation Simplified Campus Automation optimizes the discovery and configuration of devices in your network with a more streamlined simple and easy-to-use automation tool.	Yes	Yes	Yes	Yes
Day 0 network bring-up automation Cisco Network PnP application, network settings, device credentials, LAN automation, host onboarding	Yes	Yes	Yes	Yes
Element management Discovery, inventory, topology, software image, licensing, and configuration management	Yes	Yes	Yes	Yes
Element management Patch management	No	Yes	No	Yes
Basic Assurance Health dashboards – network, client, application; switch and wired client health monitoring	Yes	Yes	Yes	Yes
SD-Access Policy-based Automation and Assurance for wired and wireless	No	Yes	No	Yes
Embedded wireless (with or without SD-Access)[2] Cisco Catalyst 9800 Series wireless software package to enable wireless controller functionality**	No	Yes	No	Yes

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Feature	Cisco Catalyst Essentials	Cisco Catalyst Advantage	Cisco DNA Essentials	Cisco DNA Advantage
Network assurance and analytics Global Insights, trends, compliance, custom reports; Switch 360, Wired Client 360; Fabric and Non-Fabric Insights; App Health	No	Yes	No	Yes
Meraki cloud monitoring[2]	Yes* Limited device visibility	Yes	Yes* Limited device visibility	Yes

*** Feature may be available in future software releases.**
**** Note: Purchase of Cisco Catalyst Advantage per access point is required to enable the wireless controller function on Catalyst switches.**
[1] **Not supported on Catalyst 9500 UADP-based models.**
[2] **Not supported on Catalyst 9500X models.**
[3] **Supported in later IOS XE software versions. Refer to the latest Catalyst 9500 Release Notes.**
[4] **Need to order HSEC key.**

For a full list of network stack features as well as Cisco Catalyst Advantage features, please visit the Cisco Catalyst and Cisco DNA Software Subscription Matrix for Switching: https://www.cisco.com/c/m/en_us/products/software/dna-subscription-switching/en-sw-sub-matrix-switching.html.

Managing licenses with Smart Accounts: Creating Smart Accounts by using the Cisco Smart Software Manager (SSM) enables you to manage your software licenses from a centralized website. You can set up Cisco SSM to receive daily email alerts and to be notified of expiring subscription licenses that you want to renew.

You must order a Cisco DNA or Cisco Catalyst subscription term license in order to purchase a Catalyst 9500 Series switch. When the license term expires, you can either renew the add-on license to continue using it or deactivate the add-on license and then reload the switch to continue operating with the base license capabilities.

Both the base and add-on licenses are also available for a 90-day evaluation period. An evaluation license is activated temporarily, without purchase. An expired evaluation license cannot be reactivated after reload.

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Specifications

Dimensions, physical specifications, and weight

Catalyst 9500X models

Table 26 lists the dimensions, specifications, weight, and operating temperature for the Cisco Catalyst 9500X models.

Table 26. Catalyst 9500X dimensions, physical specifications, weight, and operating temperature

Description	Specifications	
SKU	C9500X-28C8D	C9500X-60L4D
Dimensions (H x W x D)	H = 1.73 in. (4.39 cm) W = 17.5 in. (44.45 cm) D = 21.8 in. (55.37 cm) including fan/tray handles	H = 1.73 in. (4.39 cm) W = 17.5 in. (44.45 cm) D = 21.8 in. (55.37 cm) including fan/tray handles
Rack units (RU)	1 RU	1RU
Chassis with 2 power supplies and built-in fan	29.27 lb (13.28 kg) Weights separated: Chassis = 22.13 lb (10.04 kg) Each fan tray = 0.26 lb (0.12 kg) AC PSU = 2.77 lb (1.26 kg) DC PSU = 2.71 lb (1.23 kg)	28.10 lb (12.75 kg) Weights separated: Chassis = 20.96 lb (9.51 kg) Each fan tray = 0.26 lb (0.12 kg) AC PSU = 2.77 lb (1.26 kg) DC PSU = 2.71 lb (1.23 kg)
Input voltage	See Table 10.	
Operating temperature	-5°C to +45°C (23° to 113°F) sea level when using the C9500X-FAN-1U-R FAN. -5°C to +35°C (23° to 95°F) sea level when using the C9500X-FAN-1U-F FAN.	
Altitude	If system is configured with a C9500X-FAN-1U-R fan: -5°C to +40°C (23° to 104°F) up to 6,000 feet (1800 m) -5°C to +35°C (23° to 95°F) up to 10,000 feet (3000 m) If system is configured with a C9500X-FAN-1U-F fan: -5°C to +30°C (23° to 86°F) up to 6,000 feet (1800 m) -5°C to +25°C (23° to 77°F) up to 10,000 feet (3000 m)	

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Description	Specifications	
Storage temperature	-40°C to 70°C (-40° to 158°F)	
Relative humidity operating and nonoperating (noncondensing)	Relative humidity operating: 10% to 85% (noncondensing) Relative humidity nonoperating: 0% to 95% (noncondensing)	

Catalyst 9500 models

Table 27 lists the dimensions, specifications, weight, and operating temperature for the Cisco Catalyst 9500 models.

Table 27. Catalyst 9500 dimensions, physical specifications, weight, and operating temperature

Description	Specifications				
SKU	C9500-32C	C9500-32QC	C9500- 48YC	C9500- 24YC	C9500-16X
Chassis with 2 power supplies and built-In fan	25.64 lb (11.63 kg)	21.85 lb (9.91 kg)	21.96 lb (9.96 kg)	20.99 lb (9.52 kg)	23.6 lb (10.7 kg)
Dimensions (H x W x D)	1.73 x 17.5 x 21.2 in. (4.39 x 44.45 x 53.85 cm)	1.73 x 17.5 x 18.0 in. (4.39 x 44.45 x 45.72 cm)			1.73 x 17.5 x 21.52 in. (4.39 x 44.45 x 54.66 cm)
Rack units (RU)	1 RU				
Chassis with 2 power supplies and built-In fan	25.64 lb (11.63 kg)	21.85 lb (9.91 kg)	21.96 lb (9.96 kg)		23.6 lb (10.7 kg)
Input voltage	90 to 264 VAC*				
Operating temperature	32° to 104°F (0° to 40°C) up to altitude of 10,000 feet				
Altitude	Operation up to 10,000 feet at 40°C; up to 6,000 feet at 45°C				
Storage temperature	-4° to 149°F (-20° to 65°C)				
Relative humidity operating and nonoperating (noncondensing)	Ambient (noncondensing) operating: 5% to 90% Ambient (noncondensing) nonoperating and storage: 5% to 95%				
NEBS criteria levels	NEBS: • ETSI 300-019 Requirements are covered under GR-63-CORE with some deviations. • SR-3580 NEBS level 3 (GR-63-CORE, to current issue, GR-1089-CORE, to current issue)				

*** Minimum input voltage is 90VAC, and maximum input voltage is 264VAC.**

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Mean Time Between Failures (MTBF)

Catalyst 9500X models

Table 28 lists the MTBF for the Cisco Catalyst 9500X models and components.

Table 28. MTBF information

Model	MTBF (hours)
C9500X-28C8D	123,950
C9500X-60L4D	133,260
C9K-PWR-1500WAC	1,303,300
C9K-PWR-1500WDC	1,737,740
C9500X-FAN-1U-R	4,429,340
C9500X-FAN-1U-F	4,429,340

Catalyst 9500 models

Table 29 lists the MTBF for the Cisco Catalyst 9500 Series models and components.

Table 29. MTBF information

Model	MTBF (hours)
C9500-32C	212,820
C9500-32QC	307,200
C9500-48Y4C	316,960
C9500-24Y4C	336,780
C9500-16X	315,790
PWR-C4-950WAC-R	2,268,760
PWR-C4-950WDC-R	2,559,000
C9K-PWR-650WAC-R	2,268,760
C9K-PWR-650WACL-R	1,229,043
C9K-PWR-930WDC-R	3,008,280
C9K-PWR-1600WAC-R	1,718,780
C9K-PWR-1600WDC-R	2,559,000
FAN-T4-R	5,710,990
C9K-T1-FANTRAY	3,035,430

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Optics/transceivers modules

The link below has the matrix of supported optics/transceivers for the Cisco Catalyst 9500 Series.

For the latest Cisco optics/transceivers modules compatibility information, refer to the Cisco Optics-to-Device Compatibility Matrix (https://tmgmatrix.cisco.com/).

Management and standards support

Table 30 shows management and standards support for the Cisco Catalyst 9500 Series.

Table 30. Management and standards support

Description	Cisco Catalyst 9500	Cisco Catalyst 9500 high performance/9500X
Management	ENTITY-MIB CISCO-ERR-DISABLE-MIB CISCO-CONFIG-COPY-MIB CISCO-FLOW-MONITOR-MIB CISCO-FTP-CLIENT-MIB CISCO-HSRP-EXT-MIB CISCO-HSRP-MIB CISCO-IETF-BFD-MIB CISCO-IETF-PPVPN-MPLS-VPN-MIB CISCO-IETF-PW-MPLS-MIB CISCO-IF-EXTENSION-MIB CISCO-IGMP-FILTER-MIB CISCO-IMAGE-LICENSE-MGMT-MIB CISCO-IP-TAP-MIB CISCO-CONFIG-MAN-MIB CISCO-IP-CBR-METRICS-MIB CISCO-IP-STAT-MIB CISCO-IP-URPF-MIB	CISCO-FTP-CLIENT-MIB CISCO-HSRP-EXT-MIB CISCO-HSRP-MIB CISCO-IETF-BFD-MIB CISCO-IETF-DHCP-SERVER-EXT-MIB CISCO-IETF-DHCP-SERVER-MIB CISCO-IETF-ISIS-MIB CISCO-IETF-PPVPN-MPLS-VPN-MIB CISCO-IF-EXTENSION-MIB CISCO-IGMP-FILTER-MIB CISCO-IMAGE-LICENSE-MGMT-MIB CISCO-IMAGE-MIB CISCO-IP-CBR-METRICS-MIB CISCO-IP-STAT-MIB CISCO-IP-URPF-MIB CISCO-IPMROUTE-MIB CISCO-IPSLA-AUTOMEASURE-MIB CISCO-IPSLA-ECHO-MIB

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Description	Cisco Catalyst 9500	Cisco Catalyst 9500 high performance/9500X
	CISCO-L2L3-INTERFACE-CONFIG-MIB	CISCO-IPSLA-JITTER-MIB
	CISCO-LAG-MIB	CISCO-L2-CONTROL-MIB
	CISCO-LICENSE-MGMT-MIB	CISCO-L2L3-INTERFACE-CONFIG-MIB
	CISCO-LOCAL-AUTH-USER-MIB	CISCO-LAG-MIB
	CISCO-MEDIA-METRICS-MIB	CISCO-LICENSE-MGMT-MIB
	CISCO-MAC-AUTH-BYPASS-MIB	CISCO-LISP-EXT-MIB
	CISCO-MAC-NOTIFICATION-MIB	CISCO-LOCAL-AUTH-USER-MIB
	CISCO-MDI-METRICS-MIB	CISCO-MAC-AUTH-BYPASS-MIB
	CISCO-FLASH-MIB	CISCO-MAC-NOTIFICATION-MIB
	CISCO-OSPF-MIB	CISCO-MEMORY-POOL-MIB
	CISCO-MEMORY-POOL-MIB	CISCO-MPLS-LSR-EXT-STD-MIB
	CISCO-MPLS-LSR-EXT-STD-MIB	CISCO-NHRP-EXT-MIB
	CISCO-NHRP-EXT-MIB	CISCO-NTP-MIB
	CISCO-NTP-MIB	CISCO-OSPF-MIB
	CISCO-PAGP-MIB	CISCO-OSPF-TRAP-MIB
	CISCO-PORT-SECURITY-MIB	CISCO-PAE-MIB
	CISCO-PORT-STORM-CONTROL-MIB	CISCO-PAGP-MIB
	CISCO-POWER-ETHERNET-EXT-MIB	CISCO-PIM-MIB
	CISCO-PRIVATE-VLAN-MIB	CISCO-PING-MIB
	CISCO-PROCESS-MIB	CISCO-PKI-MIB
	CISCO-PRODUCTS-MIB	CISCO-PORT-SECURITY-MIB
	CISCO-RF-MIB	CISCO-PORT-STORM-CONTROL-MIB
	CISCO-RTP-METRICS-MIB	CISCO-PRIVATE-VLAN-MIB
	CISCO-STP-EXTENSIONS-MIB	CISCO-PROCESS-MIB
	CISCO-SYSLOG-MIB	CISCO-PRODUCTS-MIB
	CISCO-TCP-MIB	CISCO-RESILIENT-ETHERNET-PROTOCOL-MIB
	CISCO-UDLDP-MIB	CISCO-RTTMON-ICMP-MIB
	CISCO-VLAN-IFTABLE-RELATIONSHIP-MIB	CISCO-RTTMON-IP-EXT-MIB
	HC-RMON-MIB	CISCO-RTTMON-MIB
	IF-MIB	CISCO-RTTMON-RTP-MIB

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Description	Cisco Catalyst 9500	Cisco Catalyst 9500 high performance/9500X
	CISCO-HC-RMON-MIB	CISCO-SNMP-TARGET-EXT-MIB
	IEEE8021-LAG-MIB	CISCO-STP-EXTENSIONS-MIB
	LLDP-EXT-MED-MIB	CISCO-SYSLOG-MIB
	IP-FORWARD-MIB	CISCO-TCP-METRICS-MIB
	IP-MIB	CISCO-TCP-MIB
	HC-ALARM-MIB	CISCO-TRUSTSEC-INTERFACE-MIB
	RFC1213-MIB	CISCO-TRUSTSEC-MIB
	LLDP-MIB	CISCO-TRUSTSEC-POLICY-MIB
	MAU-MIB	CISCO-TRUSTSEC-SERVER-MIB
	MPLS-L3VPN-STD-MIB	CISCO-TRUSTSEC-SXP-MIB
	MPLS-LSR-STD-MIB	CISCO-UDLDP-MIB
	MPLS-VPN-MIB	CISCO-VLAN-IFTABLE-RELATIONSHIP-MIB
	OLD-CISCO-CHASSIS-MIB	CISCO-VLAN-MEMBERSHIP-MIB
	OLD-CISCO-CPU-MIB	CISCO-VRF-MIB
	OLD-CISCO-INTERFACES-MIB	CISCO-VTP-MIB
	OLD-CISCO-IP-MIB	ENTITY-MIB
	OLD-CISCO-SYS-MIB	ENTITY-STATE-MIB
	OLD-CISCO-TCP-MIB	EtherLike-MIB
	OLD-CISCO-TS-MIB	HC-ALARM-MIB
	OLD-CISCO-MEMORY-MIB	HC-RMON-MIB
	CISCO-POWER-ETHERNET-MIB	IEEE8021-PAE-MIB
	CISCO-RMON2-MIB	IEEE8023-LAG-MIB
	CISCO-RMON-MIB	IF-MIB
	SNMPv2-MIB	IGMP-STD-MIB
	UDP-MIB	IP-FORWARD-MIB
	CISCO-IMAGE-MIB	IP-MIB
	CISCO-STACKWISE-MIB	IPMROUTE-STD-MIB
	SMON-MIB	LISP-MIB
	SONET-MIB	LLDP-EXT-MED-MIB
	TCP-MIB	LLDP-MIB

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Description	Cisco Catalyst 9500	Cisco Catalyst 9500 high performance/9500X
	CISCO-IPSLA-AUTOMEASURE-MIB CISCO-IPSLA-ECHO-MIB CISCO-IPSLA-JITTER-MIB CISCO-L2-CONTROL-MIB	MAU-MIB MPLS-L3VPN-STD-MIB MPLS-LDP-GENERIC-STD-MIB MPLS-LDP-MIB MPLS-LSR-STD-MIB MPLS-VPN-MIB MSDP-MIB NHRP-MIB NOTIFICATION-LOG-MIB NTPv4-MIB OLD-CISCO-CHASSIS-MIB OLD-CISCO-CPU-MIB OLD-CISCO-INTERFACES-MIB OLD-CISCO-IP-MIB OLD-CISCO-MEMORY-MIB OLD-CISCO-SYS-MIB OLD-CISCO-SYSTEM-MIB OLD-CISCO-TCP-MIB OLD-CISCO-TS-MIB OSPF-MIB OSPF-TRAP-MIB OSPFV3-MIB PIM-MIB RFC1213-MIB RMON-MIB RMON2-MIB SNMP-COMMUNITY-MIB SNMP-FRAMEWORK-MIB SNMP-MPD-MIB SNMP-NOTIFICATION-MIB

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Description	Cisco Catalyst 9500	Cisco Catalyst 9500 high performance/9500X
		SNMP-PROXY-MIB SNMP-TARGET-MIB SNMP-USM-MIB SNMP-VIEW-BASED-ACM-MIB SNMPv2-MIB TCP-MIB UDP-MIB CISCO-802-TAP-MIB CISCO-TAP2-MIB CISCO-IP-TAP-MIB
Standards	IEEE 802.1s IEEE 802.1w IEEE 802.1x IEEE 802.3ae for 10G SKU IEEE 802.3ae, IEEE 802.3ba on the 40G SKU IEEE 802.1x-Rev IEEE 802.3ad IEEE 802.3x full duplex on 10BASE-T, 100BASE-TX, and 1000BASE-T ports IEEE 802.1D Spanning Tree Protocol IEEE 802.1p Class-of-Service (CoS) prioritization IEEE 802.1Q VLAN IEEE 802.3 10BASE-T specification IEEE 802.3u 100BASE-TX specification IEEE 802.3ab 1000BASE-T specification IEEE 802.3z 1000BASE-X specification RMON I and II standards SNMPv1, SNMPv2c, and SNMPv3	

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Safety and compliance

Table 31 lists the safety and compliance information for the Cisco Catalyst 9500 Series.

Table 31. Safety and compliance information

Description	Specification
Safety certifications	C9500-16X • UL 60950-1 • CAN/CSA-C22.2 No. 60950-1 • EN 60950-1 • IEC 60950-1 • AS/NZS 60950-1 • GB4943 C9500-32C, C9500-32QC, C9500-24Y4C, C9500-48Y4C • IEC 60950-1 plus Am1, Am2 Am9, Am10, Am11, Am12 and all deviations and differences • AS/NZS 60950.1.2011 • CAN/CSA-C22.2 No. 60950-1-07 • GB 4943-95 • EN 60950-1; 2006 plus Am1, Am 2, Am9, Am10, Am11, Am12 and all deviations and differences • NOM-019-SCFI-1998 • UL 60950-1, Second Edition C9500X-28C8D, C9500X-60L4D • UL 60950-1 • CAN/CSA-C22.2 No. 60950-1 • IEC 60950-1 • AS/NZS 60950-1 • EN 62368-1 • UL 62368-1 • CAN/CSA-C22.2 No. 62368-1 • IEC 62368-1 • AS/NZS 62368-1

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Description	Specification
EMI and EMC compliance	Catalyst 9500 models • 47 CFR Part 15 Class A • CNS13438: 2006 Class A • EN 300 386 V1.6.1 • EN61000-3-2: 2014 • EN61000-3-3: 2013 • ICES-003 Issue 6: 2016 Class A • KN 32: 2015 Class A • TCVN 7189: 2009 Class A • EN 55032:2012/AC:2013 Class A • EN 55032:2015 Class A • CISPR 32 Edition 2 Class A • V-2/2015.04 Class A • V-3/2015.04 Class A • CISPR24: 2010 + A1: 2015 • EN 300 386 V1.6.1 • EN55024: 2010 + A1: 2015 • KN35: 2015 • TCVN 7317: 2003
	C9500X Models • CNS13438: 2006 Class A • EN 300 386 V1.6.1 • EN61000-3-2: 2014 • EN61000-3-3: 2013 • ICES-003 Issue 6: 2016 Class A • KS C 9832:2019 • CISPR32:2015:Ed:2 • EN 55032:2012/AC:2013 Class A • EN 55032:2015 Class A • CISPR 32 Edition 2 Class A • VCCI/CISPR 32 2016 • CISPR24: 2010 + A1: 2015 • EN 300 386 V1.6.1 • EN55024: 2010 + A1: 2015 • KS C 9835:2019 • EN 55035:2017+A11:2020 • 47 CFR Part 15:2016

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Ordering information

To place an order, visit the Cisco Ordering homepage at: https://www.cisco.com/en/US/ordering/or13/or8/order_customer_help_how_to_order_listing.html.

Table 32 lists ordering information for the Cisco Catalyst 9500 Series.

Table 32. Ordering information

Product number	Product description
C9500X-28C8D-A	Catalyst 9500 28x100G + 8x400G switch, NW Advantage License
C9500X-28C8D-E	Catalyst 9500 28x100G + 8x400G switch, NW Essentials License
C9500X-60L4D-A	Catalyst 9500 60x50G + 4x400G switch, NW Advantage License
C9500-32C-E	Cisco Catalyst 9500 Series high performance 32-port 100G switch, NW Ess. License
C9500-32C-A	Cisco Catalyst 9500 Series high performance 32-port 100G switch, NW Adv. License
C9500-32QC-E	Cisco Catalyst 9500 Series high performance 32-port 40G switch, NW Ess. License
C9500-32QC-A	Cisco Catalyst 9500 Series high performance 32-port 40G switch, NW Adv. License
C9500-48Y4C-E	Cisco Catalyst 9500 Series high performance 48-port 25G switch, NW Ess. License
C9500-48Y4C-A	Cisco Catalyst 9500 Series high performance 48-port 25G switch, NW Adv. License
C9500-24Y4C-E	Cisco Catalyst 9500 Series high performance 24-port 1/10/25G switch, NW Ess. License
C9500-24Y4C-A	Cisco Catalyst 9500 Series high performance 24-port 1/10/25G switch, NW Adv. License
C9500-16X-E	Cisco Catalyst 9500 16-port 10G switch, NW Ess. License
C9500-16X-A	Cisco Catalyst 9500 16-port 10G switch, NW Adv. License
C9500-16X-2Q-A	Cisco Catalyst 9500 16-port 10G switch, 2 x 40GE Network Module, NW Adv. License
C9500-16X-2Q-E	Cisco Catalyst 9500 16-port 10G switch, 2 x 40GE Network Module, NW Ess. License
Network modules	
C9500-NM-2Q	Cisco Catalyst 9500 2 x 40GE Network Module
C9500-NM-8X	Cisco Catalyst 9500 8 x 10GE Network Module
C9500-NM-2Q=	Cisco Catalyst 9500 2 x 40GE Network Module Spare
C9500-NM-8X=	Cisco Catalyst 9500 8 x 10GE Network Module Spare

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Product number	Product description
Software licenses for Catalyst 9500	
Cisco DNA software licenses	
C9500X-DNA-E-3Y	Catalyst 9500X Cisco DNA Essentials license (3Y) for 28C8D SKU
C9500X-DNA-E-5Y	Catalyst 9500X Cisco DNA Essentials license (5Y) for 28C8D SKU
C9500X-DNA-E-7Y	Catalyst 9500X Cisco DNA Essentials license (7Y) for 28C8D SKU
C9500X-DNA-A-3Y	Catalyst 9500X Cisco DNA Advantage license (3Y) for 28C8D, 60L4D SKU
C9500X-DNA-A-5Y	Catalyst 9500X Cisco DNA Advantage license (5Y) for 28C8D, 60L4D SKU
C9500X-DNA-A-7Y	Catalyst 9500X Cisco DNA Advantage license (7Y) for 28C8D, 60L4D SKU
C9500-DNA-E-3Y	Catalyst 9500 NW and Cisco DNA Essentials license (3Y) for 24Q, 40X, 32C, 32QC, 48Y4C SKU
C9500-DNA-E-5Y	Catalyst 9500 NW and Cisco DNA Essentials license (5Y) for 24Q, 40X, 32C, 32QC, 48Y4C SKU
C9500-DNA-E-7Y	Catalyst 9500 NW and Cisco DNA Essentials license (7Y) for 24Q, 40X, 32C, 32QC, 48Y4C SKU
C9500-DNA-A-3Y	Catalyst 9500 NW and Cisco DNA Advantage license (3Y) for 24Q, 40X, 32C, 32QC, 48Y4C SKU
C9500-DNA-A-5Y	Catalyst 9500 NW and Cisco DNA Advantage license (5Y) for 24Q, 40X, 32C, 32QC, 48Y4C SKU
C9500-DNA-A-7Y	Catalyst 9500 NW and Cisco DNA Advantage license (7Y)
C9500-DNA-L-E-3Y	Catalyst 9500 NW and Cisco DNA Essentials low port density license (3Y) for 12Q, 16X, 24Y4C SKU
C9500-DNA-L-E-5Y	Catalyst 9500 NW and Cisco DNA Essentials low port density license (5Y) for 12Q, 16X, 24Y4C SKU
C9500-DNA-L-E-7Y	Catalyst 9500 NW and Cisco DNA Essentials low port density license (7Y) for 12Q, 16X, 24Y4C SKU
C9500-DNA-L-A-3Y	Catalyst 9500 NW and Cisco DNA Advantage low port density license (3Y) for 12Q, 16X, 24Y4C SKU
C9500-DNA-L-A-5Y	Catalyst 9500 NW and Cisco DNA Advantage low port density license (5Y) for 12Q, 16X, 24Y4C SKU

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Product number	Product description
C9500-DNA-L-A-7Y	Catalyst 9500 NW and Cisco DNA Advantage low port density license (7Y) for 12Q, 16X, 24Y4C SKU
C9500-LIC=	Cisco DNA software license upgrade from Essentials to Advantage
Cisco Catalyst software licenses	
C9500-DNX-E-16X-3Y	C9500 16-Port 10G SFP+, 3 Year term Cisco Catalyst Essentials software subscription license (includes C9500-24X-E SKU)
C9500-DNX-E-16X-5Y	C9500 16-Port 10G SFP+, 5 Year term Cisco Catalyst Essentials software subscription license (includes C9500-24X-E SKU)
C9500-DNX-E-16X-7Y	C9500 16-Port 10G SFP+, 7 Year term Cisco Catalyst Essentials software subscription license (includes C9500-24X-E SKU)
C9500-DNX-A-16X-3Y	C9500 16-Port 10G SFP+, 3 Year term Cisco Catalyst Advantage software subscription license (includes C9500-24X-A SKU)
C9500-DNX-A-16X-5Y	C9500 16-Port 10G SFP+, 5 Year term Cisco Catalyst Advantage software subscription license (includes C9500-24X-A SKU)
C9500-DNX-A-16X-7Y	C9500 16-Port 10G SFP+, 7 Year term Cisco Catalyst Advantage software subscription license (includes C9500-24X-A SKU)
C9500-DNX-E-24Y-3Y	C9500 24-Port 25G SFP28, 3 Year term Cisco Catalyst Essentials software subscription license
C9500-DNX-E-24Y-5Y	C9500 24-Port 25G SFP28, 5 Year term Cisco Catalyst Essentials software subscription license
C9500-DNX-E-24Y-7Y	C9500 24-Port 25G SFP28, 7 Year term Cisco Catalyst Essentials software subscription license
C9500-DNX-A-24Y-3Y	C9500 24-Port 25G SFP28, 3 Year term Cisco Catalyst Advantage software subscription license
C9500-DNX-A-24Y-5Y	C9500 24-Port 25G SFP28, 5 Year term Cisco Catalyst Advantage software subscription license
C9500-DNX-A-24Y-7Y	C9500 24-Port 25G SFP28, 7 Year term Cisco Catalyst Advantage software subscription license
C9500-DNX-E-28C-3Y	C9500 28-Port 100G QSFP28, 8-port 400G QSFP-DD, 3 Year term Cisco Catalyst Essentials software subscription license
C9500-DNX-E-28C-5Y	C9500 28-Port 100G QSFP28, 8-port 400G QSFP-DD, 5 Year term Cisco Catalyst Essentials software subscription license

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Product number	Product description
C9500-DNX-E-28C-7Y	C9500 28-Port 100G QSFP28, 8-port 400G QSFP-DD, 7 Year term Cisco Catalyst Essentials software subscription license
C9500-DNX-A-28C-3Y	C9500 28-Port 100G QSFP28, 8-port 400G QSFP-DD, 3 Year term Cisco Catalyst Advantage software subscription license
C9500-DNX-A-28C-5Y	C9500 28-Port 100G QSFP28, 8-port 400G QSFP-DD, 5 Year term Cisco Catalyst Advantage software subscription license
C9500-DNX-A-28C-7Y	C9500 28-Port 100G QSFP28, 8-port 400G QSFP-DD, 7 Year term Cisco Catalyst Advantage software subscription license
C9500-DNX-E-32C-3Y	C9500 32-Port 100G QSFP28, 3 Year term Cisco Catalyst Essentials software subscription license
C9500-DNX-E-32C-5Y	C9500 32-Port 100G QSFP28, 5 Year term Cisco Catalyst Essentials software subscription license
C9500-DNX-E-32C-7Y	C9500 32-Port 100G QSFP28, 7 Year term Cisco Catalyst Essentials software subscription license
C9500-DNX-A-32C-3Y	C9500 32-Port 100G QSFP28, 3 Year term Cisco Catalyst Advantage software subscription license
C9500-DNX-A-32C-5Y	C9500 32-Port 100G QSFP28, 5 Year term Cisco Catalyst Advantage software subscription license
C9500-DNX-A-32C-7Y	C9500 32-Port 100G QSFP28, 7 Year term Cisco Catalyst Advantage software subscription license
C9500-DNX-E-32Q-3Y	C9500 32-Port 40G QSFP+, 3 Year term Cisco Catalyst Essentials software subscription license
C9500-DNX-E-32Q-5Y	C9500 32-Port 40G QSFP+, 5 Year term Cisco Catalyst Essentials software subscription license
C9500-DNX-E-32Q-7Y	C9500 32-Port 40G QSFP+, 7 Year term Cisco Catalyst Essentials software subscription license
C9500-DNX-A-32Q-3Y	C9500 32-Port 40G QSFP+, 3 Year term Cisco Catalyst Advantage software subscription license
C9500-DNX-A-32Q-5Y	C9500 32-Port 40G QSFP+, 5 Year term Cisco Catalyst Advantage software subscription license
C9500-DNX-A-32Q-7Y	C9500 32-Port 40G QSFP+, 7 Year term Cisco Catalyst Advantage software subscription license

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Product number	Product description
C9500-DNX-E-48Y-3Y	C9500 48-Port 25G SFP28, 3 Year term Cisco Catalyst Essentials software subscription license
C9500-DNX-E-48Y-5Y	C9500 48-Port 25G SFP28, 5 Year term Cisco Catalyst Essentials software subscription license
C9500-DNX-E-48Y-7Y	C9500 48-Port 25G SFP28, 7 Year term Cisco Catalyst Essentials software subscription license
C9500-DNX-A-48Y-3Y	C9500 48-Port 25G SFP28, 3 Year term Cisco Catalyst Advantage software subscription license
C9500-DNX-A-48Y-5Y	C9500 48-Port 25G SFP28, 5 Year term Cisco Catalyst Advantage software subscription license
C9500-DNX-A-48Y-7Y	C9500 48-Port 25G SFP28, 7 Year term Cisco Catalyst Advantage software subscription license
C9500-DNX-A-60L-3Y	C9500 60-Port 50G SFP56, 3 Year term Cisco Catalyst Advantage software subscription license
C9500-DNX-A-60L-5Y	C9500 60-Port 50G SFP56, 5 Year term Cisco Catalyst Advantage software subscription license
C9500-DNX-A-60L-7Y	C9500 60-Port 50G SFP56, 7 Year term Cisco Catalyst Advantage software subscription license
Power supplies, cables, and fan for the Cisco Catalyst 9500 Series	
C9K-PWR-1600WAC-R	1600W AC Power Supply
C9K-PWR-650WAC-R	650W AC Power Supply
C9K-PWR-650WACL-R	650W AC Power Supply
C9K-PWR-1600WDC-R	1600W DC Power Supply
C9K-PWR-930WDC-R	930W DC Power Supply
C9K-PWR-1600WACR/2	1600W AC Power Supply, Redundant
C9K-PWR-650WAC-R/2	650W AC Power Supply, Redundant
C9K-PWR-650WACLR/2	650W AC Power Supply, Redundant
C9K-PWR-1600WDCR/2	1600W DC Power Supply, Redundant
C9K-PWR-930WDC-R/2	930W DC Power Supply, Redundant

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Product number	Product description
C9K-PWR-C4-BLANK	Catalyst 9500 power supply blank cover
C9K-PWR-C5-BLANK	Catalyst 9500 power supply blank cover
C9K-T1-FANTRAY	Catalyst 9500 fan tray
FAN-T4-R	Catalyst 9500 Type 4 front to back cooling Fan
PWR-C4-950WAC-R	950W AC Config 4 Power Supply front to back cooling
PWR-C4-950WAC-R/2	950W AC Config 4 Power Supply front to back cooling, Redundant
PWR-C4-BLANK	Catalyst 9500 power supply blank cover
CAB-C15-CBN-JP	Japan Cabinet Jumper Power Cord, 250 VAC 12A, C14-C15
CAB-TA-250V-JP	Japan 250V AC Type A Power Cable
CAB-TA-AP	Australia AC Type A Power Cable
CAB-TA-AR	Argentina AC Type A Power Cable
CAB-TA-DN	Denmark AC Type A Power Cable
CAB-TA-EU	Europe AC Type A Power Cable
CAB-TA-IN	India AC Type A Power Cable
CAB-TA-IS	Israel AC Type A Power Cable
CAB-TA-IT	Italy AC Type A Power Cable
CAB-TA-SW	Switzerland AC Type A Power Cable
CAB-TA-UK	United Kingdom AC Type A Power Cable
CAB-TA-NA	North America AC Type A Power Cable
CAB-C15-CBN	Cabinet Jumper Power Cord, 250 VAC 13A, C14-C15 Connectors
CAB-TA-JP	Japan AC Type A Power Cable
Spare accessory and rack mount kits for the Cisco Catalyst 9500 Series	
C9500-ACCKITH-19I=	Accessory Kit for Cisco Catalyst 9500 Series – High-End - 19” rack mount
C9500-ACCKITH-23I=	Accessory Kit for Cisco Catalyst 9500 Series – High-End - 23” rack mount

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Product number	Product description
C9500-4PTH-KIT=	Extension rails and brackets for four-point mounting for Cisco Catalyst 9500 Series – High-End
C9500-ACC-KIT-19I=	Accessory Kit for Cisco Catalyst 9500 Series - 19” rack mount
C9500-ACC-KIT-23I=	Accessory Kit for Cisco Catalyst 9500 Series - 23” rack mount
C9500-4PT-KIT=	Extension rails and brackets for four-point mounting for Cisco Catalyst 9500 Series
Power supplies, cables, and fan for the Cisco Catalyst 9500X Switch	
C9K-PWR-1500WAC	Catalyst 9500X 1500W AC Power Supply
C9K-PWR-1500WDC	Catalyst 9500X 1500W DC Power Supply
C9K-PWR-1500WAC/2	Catalyst 9500X 1500W AC Power Supply, Redundant
C9K-PWR-1500WDC/2	Catalyst 9500X 1500W DC Power Supply, Redundant
PWR-C6-BLANK	Catalyst 9500X power supply blank cover
C9500X-FAN-1U-R	Catalyst 9500X front to back cooling fan
C9500X-FAN-1U-F	Catalyst 9500X back to front cooling fan
NO-POWER-CORD	ECO friendly green option, no power cable will be shipped
PWR-CAB-AC-USA520	US AC Power Cord for Cisco ASR 900, NEMA 5-20
PWR-CAB-AC-USA	Power Cord for AC V2 Power Module (USA), NEMA L6-20P
PWR-CAB-AC-AUS	Power Cord for AC V2 Power Module (Australia), AS 3112
PWR-CAB-AC-EU	Power Cord for AC V2 Power Module (Europe), CEE 7/7
PWR-CAB-AC-ITA	Power Cord for AC V2 Power Module (Italy), CEI-23-50
PWR-CAB-AC-SA	Power Cord for AC V2 Power Module (South Africa), SABS 164
PWR-CAB-AC-UK	Power Cord for AC V2 Power Module (UK), EN 60309-2
PWR-CAB-AC-ISRL	Power Cord for AC V2 Power Module (Israel), SI 32
PWR-CAB-AC-CHN	Power Cord for AC V2 Power Module (China), GB2099.1/GB1002
PWR-CAB-AC-BRA	Power Cord for AC V2 Power Module (Brazil), NBR 14136
PWR-CAB-AC-SUI	Power Cord for AC V2 Power Module (Swiss), SEV 1011

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Product number	Product description
PWR-CAB-AC-JPN	Power Cord for AC V2 Power Module (Japan), JIS C8303
PWR-CAB-AC-IND	India AC Power Cord for Cisco ASR 900, IS:1293
PWR-CAB-AC-ARG	AC POWER CORD, WIRE HARNESS, Argentina, IRAM 2073, IEC60320 C21, ST, 4M, 30 AWG, STRANDED, 250.0 V, 16.0 A
PWR-2KW-DC-CBL	Power Cord - 2KW DC
Spare accessory and rack mount kits for the Cisco Catalyst 9500X Switch	
C9500X-ACCKIT-19I=	Accessory Kit for Cisco Catalyst 9500X Switch - 19” rack mount
C9500X-ACCKIT-23I=	Accessory Kit for Cisco Catalyst 9500X Switch - 23” rack mount
C9500X-4PTH-KIT=	Extension rails and brackets for four-point mounting for Cisco Catalyst 9500X Switch
Spare storage options for the Cisco Catalyst 9500X Switch	
C9K-F3-SSD-240GB=	Cisco pluggable SSD storage – 240 GB
C9K-F3-SSD-480GB=	Cisco pluggable SSD storage – 480 GB
C9K-F3-SSD-960GB=	Cisco pluggable SSD storage – 960 GB
RFID opt in/opt out for C9500 high performance and C9500X switches	
C9500-RFID	RFID Selected for C9500 high performance switches (C9500-24Y4C, C9500-48Y4C, C9500-32C, C9500-32QC)
C9500X-RFID	RFID Selected for C9500X switches
C9500-RFID-NONE	No RFID Selected for C9500 high performance and C9500X switches

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Warranty

Cisco Enhanced Limited Lifetime Warranty

The Cisco Catalyst 9500 Series Switches come with an Enhanced Limited Lifetime Warranty (E-LLW) that includes Next-Business-Day (NBD) delivery of replacement hardware where available and 90 days of 8x5 Cisco Technical Assistance Center (TAC) support. Your formal warranty statement, including the warranty applicable to Cisco software, appears in the information packet that accompanies your Cisco product. We encourage you to carefully review the warranty statement shipped with your specific product before use. Cisco reserves the right to refund the purchase price as its exclusive warranty remedy. For further information about warranty terms, visit the Product Warranties page: https://www.cisco.com/go/warranty.

Table 33 provides information about the E-LLW.

Table 33. E-LLW details

	Cisco E-LLW
Devices covered	Applies to Cisco Catalyst 9500 Series Switches.
Warranty duration	As long as the original customer owns the product.
End-of-life policy	In the event of discontinuance of product manufacture, Cisco warranty support is limited to 5 years from the announcement of discontinuance.
Hardware replacement	Cisco or its service center will use commercially reasonable efforts to ship a replacement for NBD delivery, where available. Otherwise, a replacement will be shipped within 10 working days after receipt of the Return Materials Authorization (RMA) request. Actual delivery times might vary depending on customer location.
Effective date	Hardware warranty commences from the date of shipment to customer (and in case of resale by a Cisco reseller, not more than 90 days after original shipment by Cisco).
TAC support	Cisco will provide during business hours, 8 hours per day, 5 days per week, basic configuration, diagnosis, and troubleshooting of device-level problems for up to a 90-day period from the date of shipment of the originally purchased Cisco Catalyst 9500 Series product. This support does not include solution or network-level support beyond the specific device under consideration.
Cisco.com access	Warranty allows guest access only to Cisco.com.

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Cisco environmental sustainability

Information about Cisco's environmental sustainability policies and initiatives for our products, solutions, operations, and extended operations or supply chain is provided in the "Environment Sustainability" section of Cisco's Corporate Social Responsibility (CSR) Report.

Reference links to information about key environmental sustainability topics (mentioned in the "Environmental Sustainability" section of the CSR Report) are provided in the following table.

Table 34. Links to sustainability topics

Sustainability topic	Reference
Information on product material content laws and regulations	Materials
Information on electronic waste laws and regulations, including products, batteries, and packaging	WEEE Compliance

Cisco makes the packaging data available for informational purposes only. It may not reflect the most current legal developments, and Cisco does not represent, warrant, or guarantee that it is complete, accurate, or up to date. This information is subject to change without notice.

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Cisco and partner services

Cisco and partner services offer various personalized services to enable IoT, cloud, and secure networks. You can purchase advanced services designed to meet your business needs and help you maintain high-quality network performance while controlling operational costs. Please refer to Table 35 for more information on Cisco's Technical Services available for the Cisco Catalyst 9500 Series Switches.

Table 35. Technical Services

Cisco Technical Services
Cisco Smart Net Total Care® Service • Around-the-clock, global access to the Cisco TAC • Unrestricted access to the extensive Cisco.com knowledge base and tools • NBD, 8x5x4, 24x7x4, and 24x7x2 advance hardware replacement and onsite parts replacement and installation available • Ongoing operating system software updates within the licensed feature set1 • Proactive diagnostics and real-time alerts on Smart Call Home-enabled devices
Cisco Smart Foundation Service • NBD advance hardware replacement as available • Access during business hours to Small and Medium-sized Business (SMB) TAC (access levels vary by region) • Access to Cisco.com SMB knowledge base • Online technical resources through Smart Foundation portal • Operating system software bug fixes and patches
Cisco SP Base Service • Around-the-clock, global access to the Cisco TAC • Registered access to Cisco.com • NBD, 8x5x4, 24x7x4, and 24x7x2 advance hardware replacement; return to factory option available2 • Ongoing operating system software updates1
Cisco Focused Technical Support Services • Three levels of premium, high-touch services are available: – Cisco High-Touch Operations Management Service – Cisco High-Touch Technical Support Service – Cisco High-Touch Engineering Service • Valid Cisco Smart Net Total Care or SP Base contracts are required on all network equipment

[1] Cisco operating system updates include the following: maintenance releases, minor updates, and major updates within the licensed feature set.

[2] Advance hardware replacement is available in various service-level combinations. For example, 8x5xNBD indicates that shipment will be initiated during the standard 8-hour business day, 5 days a week (the generally accepted business days within the relevant region), with NBD delivery. Where NBD is not available, same-day shipping is provided. Restrictions apply. For details, review the appropriate service descriptions.

Learn more about available services.

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Flexible payment solutions to help you achieve your objectives

Cisco Capital makes it easier to get the right technology to achieve your objectives, enable business transformation and help you stay competitive. We can help you reduce the total cost of ownership, conserve capital, and accelerate growth. In more than 100 countries, our flexible payment solutions can help you acquire hardware, software, services and complementary third-party equipment in easy, predictable payments. Learn more.

Document history

New or revised topic	Described In	Date
Removed references to C9500-12Q/24Q/40X as the switch models are end of sale	All relevant sections	December 12, 2024
Added Simplified Campus Automation	All relevant sections	June 4, 2024
Added Cisco Catalyst software subscription details and SKUs, updated Cisco Catalyst Center naming	All relevant sections	September 10, 2023
Updated with IOS XE 17.10.1 contents	Entire Document	March 1, 2023
Added Catalyst 9500X-60L4D and updated relevant sections	Entire Document	November 28, 2022
Added new 650W AC power supply	Page 18, 19, 33, 46	September 21, 2022
Added Meraki Cloud Management	Removed Cisco DNA Premier licenses	September 21, 2022
Added Catalyst 9500X-28C8D and Silicon One Q200 details, and updated all sections	Entire document	January 31, 2022
Added Custom ASIC template, eWLC without SD-Access, EVPN, MPLS, Programmability, removed ETA and AVC, updated Operating temperature	Product Overview, Platform Details, Specifications	September 28, 2020
Added NEBS Certification details, 16.11.1 features, VLAN ID correction, SDM template corrections, SVL	Page 12, 14, 15, 22, 23, 24	April 16, 2019
Cisco Catalyst 9500 Series spec change	Updated Page 3	January 11, 2019
Product highlights changes (switching capacity and ports spec changes)	Updated Page 4	January 11, 2019
Cisco Catalyst 9500 Series configurations and port density spec changes	Updated Page 12	January 11, 2019

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New or revised topic	Described In	Date
Performance spec changes	Updated Page 12	January 11, 2019
Text changes to “Important Note”	Updated Page 21	January 11, 2019
Text changes to “Cisco StackWise Virtual”	Updated Page 15	January 11, 2019
Text changes to “Trustworthy systems” and “Cisco StackWise Virtual”	Updated Page 17	January 11, 2019
Added text for Layer 3 Subinterface and BGP EVPN with VXLAN	Updated Page 19	January 11, 2019
Deleted text for “High-performance IP routing” and spec edits to “Minimum software requirements”	Updated Page 22	January 11, 2019
Text changes to “Licensing” and spec edits to “Network Essentials and Advantage Package Features”	Updated Page 23	January 11, 2019
Text changes to “Cisco DNA Essentials and Advantage Package Features”	Updated Page 24	January 11, 2019
Added product numbers for “Cisco Catalyst 9500 Series”	Updated Page 33	January 11, 2019
Deleted product numbers for “Cisco Catalyst 9500 Series”	Updated Page 34	January 11, 2019
Product highlights changes (switching capacity and ports spec changes)	Updated Page 4	January 11, 2019
Updates to Table 2	Updated Table 2	August 15, 2018
Added clearer description of SKUs, Updated date for Tables 2, 11, 12	Updated SKU descriptions, Table 12 data, Table 11 data, Table 2 Footnotes	July 3, 2018
Added clearer descriptions of host routes and scale adjacency in hardware	Updated Table 11 Footnotes	June 1, 2018
Added Catalyst 9500 high density platforms and updated associated speeds and densities, e.g. Up to 6.4-Tbps switching capacity with up to 2 Bpps of forwarding performance from “3.2 Tbps/1 Bpps” a. 32 port 100G, b. 32 port 40G, c. 48 port 25G. Added Catalyst 9500 mid density platform a. 24 port 25G, b. 16 port 1/10G. Added new optical interfaces - QSFP28, SFP28. Added new power supply options - 650W, 1600W. Added RESCONF support. StackWise Virtual extended to all Catalyst 9500 platforms.	Updated Product Overview	March 31, 2018
AVB support noted for certain platforms. Corrected references to Catalyst 9000 switches, rather than Catalyst 9000 Series switches. Corrected references to Cisco IOS XE, rather than IOS-XE.	Updated Audio Video Bridging	December 15, 2017

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