Cisco Catalyst 9500 Series Switches

Contents

Built for Security, IoT, and Cloud

The Cisco® Catalyst® 9500 Series switches are the next generation of enterprise-class core and aggregation layer switches, supporting full programmability and serviceability. Based on an x86 CPU, the Cisco Catalyst 9500 Series is Cisco's lead purpose-built fixed core and aggregation enterprise switching platform, built for security, IoT, and cloud. The switches come with a 4-core x86, 2.4-GHz CPU, 16-GB DDR4 memory, and 16-GB internal storage.

The Cisco Catalyst 9500 Series is the industry's first purpose-built 25, 40 and 100 Gigabit Ethernet line of switches targeted for the enterprise campus. These switches deliver unmatched table scale (MAC/route/ACL) and buffering for enterprise applications. The Cisco Catalyst 9500 Series includes nonblocking 40 and 100 Gigabit Ethernet Quad Small Form-Factor Pluggable (QSFP+, QSFP28) and 1, 10 and 25 Gigabit Ethernet Small Form-Factor Pluggable Plus (SFP/SFP+/SFP28) switches with granular port densities that fit diverse campus needs. The switches support advanced routing and infrastructure services (such as Multiprotocol Label Switching [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 Cisco Catalyst 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.

The foundation of Software-Defined Access

Advanced persistent security threats. The exponential growth of Internet of Things (IoT) devices. Mobility everywhere. Cloud adoption. All of these require a network fabric that integrates advanced hardware and software innovations to automate, secure, and simplify customer networks. The goal of this network fabric is to enable customer revenue growth by accelerating the rollout of business services.

The Cisco Digital Network Architecture (Cisco DNA) with Software-Defined Access (SD-Access) is the network fabric that powers business. It is an open and extensible, software-driven architecture that accelerates and simplifies your enterprise network operations. The programmable architecture frees your IT staff from time-consuming, repetitive network configuration tasks so they can focus instead on innovation that positively transforms your business. SD-Access enables policy-based automation from edge to cloud with foundational capabilities. These include:

- Simplified device deployment
- Unified management of wired and wireless networks
- Network virtualization and segmentation
- Group-based policies
- Context-based analytics

The Cisco Catalyst 9500 Series switches form the foundational building block for Software-Defined Access–Cisco's leading enterprise architecture.

Product overview

Product highlights

- Cisco Unified Access™ Data Plane (UADP) Application-Specific Integrated Circuit (ASIC) ready for next-generation technologies with its programmable pipeline, microengine capabilities, and template-based, configurable allocation of Layer 2 and Layer 3 forwarding, Access Control Lists (ACLs), and Quality-of-Service (QoS) entries
- 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 6.4-Tbps switching capacity with up to 2 Bpps of forwarding performance
- 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
- Platinum-rated AC/DC power supplies
- Up to 512,000 Flexible NetFlow (FNF) entries in hardware
- Up to 36 MB of unified buffer per ASIC
- Up to 212,000 routing entries (IPv4/IPv6) for high-end campus core and aggregation deployments
- IPv6 support in hardware, providing wire-rate forwarding for IPv6 networks
- IEEE 802.1ba AV 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
- Dual-stack support for IPv4/IPv6 and dynamic hardware forwarding table allocations, for ease of IPv4-to-IPv6 migration
- Support for both static and dynamic NAT and Port Address Translation (PAT)
- Scalable routing (IPv4, IPv6, and multicast) tables and Layer 2 tables
- Cisco IOS® XE Software, a modern operating system for the enterprise with support for model-driven programmability, on-box Python scripting, streaming telemetry, container-based application hosting, and patching for critical bug fixes. The OS also has built-in defenses to protect against runtime attacks
- 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
- Highest wireless scale for Wi-Fi 6 and 802.11ac Wave 2 access points supported on a single switch

- **SD-Access:** With the Cisco Catalyst 9500 Series, you can be part of the future of networking with features that include:
  - Policy-based automation from edge to cloud
  - Segmentation and micro-segmentation made easy, with predictable performance and scalability
  - Automation and network assurance through the Cisco DNA Center Appliance
  - Faster launch of new business services and significantly improved issue resolution time
  - SD-Access Embedded Wireless: The Cisco Catalyst 9800 embedded wireless controller software package can be installed on Cisco Catalyst 9500 Series Switches to enable wireless controller functionality for distributed branches and small campuses. Once installed, the embedded wireless controller running on a Cisco Catalyst 9500 Series Switch can support up to 200 APs and 4000 clients. A maximum of two wireless controllers can be enabled per site on two different Cisco Catalyst 9500 Series Switches, which will increase the scale up to 400 APs and 8000 wireless clients per site.
  - The Cisco Catalyst 9800 embedded wireless controller software package will enable wireless functionality only for SD-Access deployments, with two supported topologies:
  - It can be enabled on Cisco Catalyst 9500 Series Switches functioning as a co-located border and control plane.
  - It can be enabled on Cisco Catalyst 9500 Series Switches functioning as fabric in a box.
  - **Embedded Wireless on Catalyst 9k switches (SD-Access network not required) using WebUI:** The Cisco Catalyst 9800 embedded Wireless Controller Software package can be installed on Cisco Catalyst 9500 Series switches to enable wireless controller functionality. This solution is designed for Single secure site deployment. Configuration needed to enable wireless is enabled using simple WebUI. Once installed, the Catalyst 9800 embedded Wireless Controller running on a Catalyst 9500 Series switch can support up to 200 APs and 4000 Clients. A maximum of two wireless controllers can be enabled per site on two different Catalyst 9500 Series switches which will increase to scale up to 400 APs and 8000 Wireless Clients. Up to 4 VRFs are supported.
- **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
- **Advanced security:**
  - Support for AES-256 with the powerful MACsec 256-bit encryption algorithm available on all models
  - Trustworthy solutions: Secure Unique Device Identification (SUDI) support for Plug and Play, enabling tamper-proof device identity capability, which secures zero-touch provisioning by allowing your device to show a certificate to the server to be able to get onto your network

Platform details

Switch models and configurations

All switches ship with the 650W/950W/1600W AC power supply as default

Figures 1 through 8 show the Cisco Catalyst 9500 Series Switches

Figure 1.
C9500-32C: Cisco Catalyst 9500 Series high-performance switch with 32x 100 Gigabit Ethernet

Figure 2.
C9500-32QC: Cisco Catalyst 9500 Series high-performance switch with 32x 40 or 16x100 Gigabit Ethernet

Figure 3.
C9500-48Y4C: Cisco Catalyst 9500 Series high-performance switch with 48x 1/10/25G Gigabit Ethernet + 4x 40/100G Uplink

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

Figure 5.
C9500-24Q: Cisco Catalyst 9500 Series switch with 24x 40G Gigabit Ethernet

Figure 6.
C9500-12Q: Cisco Catalyst 9500 Series switch with 12x 40G Gigabit Ethernet

Figure 7.
C9500-40X: Cisco Catalyst 9500 Series switch with 40x 1/10G Gigabit Ethernet

Figure 8.
C9500-16X: Cisco Catalyst 9500 Series switch with 16x 1/10G Gigabit Ethernet

Table 1 shows the Cisco Catalyst 9500 Series configurations

Table 1. 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
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 1/10/25G Gigabit Ethernet switch with SFP28	48	48	48	4	4	-	-
C9500-24Y4C	Cisco Catalyst 9500 Series high-performance 24-port 1/10/25G Gigabit Ethernet switch with SFP28	24	24	24	4	4	-	-
C9500-24Q	Cisco Catalyst 9500 Series 24-port 40 Gigabit Ethernet switch with QSFP+			-	24	-	96	-
C9500-12Q	Cisco Catalyst 9500 Series 12-port 40 Gigabit Ethernet switch with QSFP+			-	12	-	48	-
C9500-40X	Cisco Catalyst 9500 Series 40-port 1/10 Gigabit Ethernet Switch with SFP/SFP+	40+8**	40+8**	-	2	-	8**	-

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
C9500-16X	Cisco Catalyst 9500 Series 16-port 1/10 Gigabit Ethernet switch with SFP/SFP+	16+8**	16+8**	-	2	-	8**	-

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

**with uplink module.

Network modules

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 2 and 3.

Table 2. 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 3. Network module matrix

Model	C9500-NM-8X	C9500-NM-2Q
C9500-32C	No	No
C9500-32QC	No	No
C9500-48Y4C	No	No
C9500-24Y4C	No	No
C9500-24Q	No	No
C9500-12Q	No	No
C9500-40X	Yes	Yes
C9500-16X	Yes	Yes

Figures 9 and 10 show the available network modules

Figure 9.
Cisco Catalyst 9500 Series network module 8-port 1/10 Gigabit Ethernet with SFP/SFP+

Figure 10.
Cisco Catalyst 9500 Series network module 2-port 40 Gigabit Ethernet with QSFP+

Accessories

The Cisco Catalyst 9500 Series Switches support optional accessories.

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

Table 4. Accessories and descriptions

Product number	Description
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
SSD-120G	Cisco pluggable USB3.0 SSD storage – 120 GB
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

Table 5. Accessory matrix

Model	C9500-ACCKIT-19I=	C9500-ACCKIT-23I=	C9500-4PTH-KIT=	C9K-F1-SSD-240G	C9500-ACC-KIT-19I=	C9500-ACC-KIT-23I=	C9500-4PT-KIT=	SSD-120G	C9K-F1-SSD-240G	C9K-F1-SSD-480G	C9K-F1-SSD-960G
C9500-32C	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes
C9500-32QC	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes
C9500-48Y4C	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes
C9500-24Y4C	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes
C9500-24Q	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No
C9500-12Q	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No
C9500-40X	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No
C9500-16X	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No

Figure 11 shows the 240-GB SSD storage.

Figure 11.
240-GB SSD storage

Power supplies and fan tray

The Cisco Catalyst 9500 Series Switches support dual 1+1 redundant power supplies. 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 switches also 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.

Table 6 shows the maximum fans and fan trays for each configuration.

Table 6. Fan and fan tray matrix

Model	FAN-T4-R (Max # of fans)	C9K-T1-FANTRAY (Max # of fans)
C9500-32C	Yes (5)	No
C9500-32QC	No	Yes (4)

Model	FAN-T4-R (Max # of fans)	C9K-T1-FANTRAY (Max # of fans)
C9500-48Y4C	No	Yes (4)
C9500-24Y4C	No	Yes (4)
C9500-24Q	Yes (5)	No
C9500-12Q	Yes (5)	No
C9500-40X	Yes (5)	No
C9500-16X	Yes (5)	No

Figures 12 through 14 show the power supplies available for the Cisco Catalyst 9500 Series

Figure 12.
950W AC power supply

Figure 13.
650W AC power supply

Figure 14.
1600W AC power supply

Tables 7 and 8 provides more details on the Cisco Catalyst 9500 Series power supplies

Table 7. Power supply specifications

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

Table 8. BTU Details for 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-930WDC-R	PWR-C4-950WAC-R	PWR-C4-950WDC-R
C9500-32C	3,631	3,709	N/A	N/A	N/A	N/A
C9500-32QC	N/A	N/A	1,815	1,856	N/A	N/A
C9500-48Y4C	N/A	N/A	1,856	1,856	N/A	N/A
C9500-24Y4C	N/A	N/A	1,454	1,484	N/A	N/A
C9500-24Q	N/A	N/A	N/A	N/A	2,900	2,976
C9500-12Q	N/A	N/A	N/A	N/A	1,536	1,562
C9500-40X with 10G NM	N/A	N/A	N/A	N/A	1,467	1,451

Total output BTU (Note: 1000 BTU/hr = 293W) - Model	C9K-PWR-1600WAC-R	C9K-PWR-1600WDC-R	C9K-PWR-650WAC-R	C9K-PWR-930WDC-R	PWR-C4-950WAC-R	PWR-C4-950WDC-R
C9500-40X with 40G NM	N/A	N/A	N/A	N/A	1,365	1,376
C9500-16X with 10G NM	N/A	N/A	N/A	N/A	941	967
C9500-16X with 40G NM	N/A	N/A	N/A	N/A	904	930

Table 9 shows the power supplies supported in the Cisco Catalyst 9500 Series Switches

Table 9. Power supply matrix

Model	C9K-PWR-1600WAC-R	C9K-PWR-1600WDC-R	C9K-PWR-650WAC-R	C9K-PWR-930WDC-R	PWR-C4-950WAC-R	PWR-C4-950WDC-R
C9500-32C	Yes	Yes	No	No	No	No
C9500-32QC	No	No	Yes	Yes	No	No
C9500-48Y4C	No	No	Yes	Yes	No	No
C9500-24Y4C	No	No	Yes	Yes	No	No
C9500-24Q	No	No	No	No	Yes	Yes
C9500-12Q	No	No	No	No	Yes	Yes
C9500-40X	No	No	No	No	Yes	Yes
C9500-16X	No	No	No	No	Yes	Yes

Switch performance

Table 10 shows performance specifications for the Cisco Catalyst 9500 Series Switches

Table 10. Performance specifications

Performance numbers for all switch models	C9500-24Q	C9500-12Q	C9500-40X	C9500-16X	C9500-32C	C9500-32QC	C9500-48Y4C	C9500-24Y4C
ASIC	UADP 2.0				UADP 3.0			
Switching capacity	Up to 1920 Gbps	Up to 960 Gbps	Up to 960 Gbps	Up to 480 Gbps	Up to 6.4 Tbps**	Up to 3.2 Tbps**	Up to 3.2 Tbps**	Up to 2.0Tbps**
Forwarding rate	Up to 1440 Mpps	Up to 720 Mpps	Up to 720 Mpps	Up to 360 Mpps	Up to 2 Bpps	Up to 1 Bpps	Up to 1 Bpps	Up to 1 Bpps
Total number of MAC addresses	Up to 64,000*				Up to 82,000*			

Performance numbers for all switch models	C9500-24Q	C9500-12Q	C9500-40X	C9500-16X	C9500-32C	C9500-32QC	C9500-48Y4C	C9500-24Y4C
ASIC	**UADP 2.0**				**UADP 3.0**			
Total number of IPv4 routes (Address Resolution Protocol [ARP] plus learned routes)	Up to 64,000 indirect* Up to 80,000 host*				Up to 212,000 indirect + direct* Up to 90,000 host/ARP*			
Total number of IPv6 routes	Up to 32,000 indirect* Up to 40,000 host*				Up to 212,000 indirect + direct* Up to 90,000 host*			
Total number of IPv4 Multicast routes	Up to 32,000*				Up to 32,000*			
Total number of IPv6 Multicast routes	Up to 16,000*				Up to 32,000*			
QoS ACL scale	Up to 18,000*				Up to 16,000*			
Security ACL scale	Up to 18,000*				Up to 27,000*			
FNF entries	Up to 512,000*				Up to 98,000*			
DRAM	16 GB				16 GB			
Flash	16 GB				16 GB			
VLAN IDs	4,094				4094			
PVST Instances	300***				1,000			
STP Virtual Ports (Port* VLANs) for PVST	13,000				16,000			
STP Virtual Ports (Port* VLANs) for MST	13,000				52,000****			
Total Switched Virtual Interfaces (SVIs)	1,000				1,000			
Jumbo frame	9,198 bytes				9,216 bytes			

* Varies based on selected flexible ASIC template.

** Line rate for 187byte packet size and above.

*** 300 with IOSXE release 17.1.1 or later. 256 with IOSXE 16.12.x and 16.11.x 128 with IOSXE 16.10.x or earlier.

**** 32,000 with C9500-32C and C9500-32QC; 52,000 with C9500-48Y4C; 28,000 with C9500-24Y4C.

By host routes, it means any /32 routes, including those are learned indirectly (such as over OSPF or other routing protocols).

This does not mean that it can install 80,000 directly connected clients (/32) for attached VLANs/SVIs. In other words, directly connected routes in engineering term means, any /32 prefix (that includes clients attached to switch's own VLAN/SVI and those /32 prefixes learned over any routing protocols as well).

An indirectly connected route is a route with a prefix other than /32.

Important note

UADP 2.0 based C9500-12Q, C9500-24Q, C9500-40X, and C9500-16X support 32,000 adjacency in hardware. So essentially, they can support up to ~32,000 directly attached clients (including all adjacency) in their own VLAN/SVI.

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

Flexible ASIC templates

Cisco Catalyst 9000 series 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.

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
- SDA: Maximizes system resources to support fabric deployment
- NAT: Maximizes system resources for Layer 3 and NAT for support collapsed core WAN deployments

Table 11 describes the standard SDM ASIC templates

Table 11. SDM template descriptions

Template numbers for models C9500-32C, C9500-32QC, C9500-24Y4C, C9500-48Y4C	Distribution template	Core template	NAT template	SDA template**
IPv4/IPv6(LPM/Host)	114,000	212,000	212,000	212,000
Multicast route(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/SGT label	32,000	32,000	32,000	32,000
NetFlow/ASIC	98,000	64,000	64,000	64,000
Security ACL	27,000*	27,000*	20,000*	27,000*

Template numbers for models C9500-32C, C9500-32QC, C9500-24Y4C, C9500-48Y4C	Distribution template	Core template	NAT template	SDA template**
QoS ACL	16,000*	16,000*	8,000*	16,000*
PBR/NAT	3,000	3,000	15,500	2000
Tunnel/MACsec	3000	3000	2000	3000
LISP	1000	1000	1000	2000
SPAN	1000	1000	1000	1000
STP Instances	1000	1000	1000	1000
Control Plane Policing (CoPP)	1000	1000	1000	1000
NetFlow ACL	1000 ingress, 1000 egress	1000 ingress, 1000 egress	1000 ingress, 1000 egress	1000 ingress, 1000 egress

Template numbers for models C9500-12Q, C9500-24Q, C9500-40X, C9500-16X	Distribution template	Core template	NAT template	SDA template*
IPv4/IPv6 LPM	64,000 / 32,000	64,000 / 32,000	64,000 / 32,000	64,000 / 32,000
IPv4/IPv6 host	48,000 / 24,000	32,000 / 16,000	48,000 / 24,000	80,000 / 40,000
IPv4/ IPv6 Multicast route	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 label	8000	8000	8000	8000
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	2000	2000	16,000	2000
Tunnel/MACsec	1000	1000	1000	1000
LISP	1000	1000	1000	1000
SPAN	1000	1000	1000	1000

Template numbers for models C9500-12Q, C9500-24Q, C9500-40X, C9500-16X	Distribution template	Core template	NAT template	SDA template*
STP instances	256	256	256	256
CoPP	1000	1000	1000	1000
NetFlow ACL	1000 ingress, 2000 egress	1000 ingress, 2000 egress	1000 ingress, 2000 egress	1000 ingress, 2000 egress

*ACL allocation is configurable between ingress, egress, IPv4 and non IPv4 (layer 2 and IPv6)

** SD-Access template has been removed from 17.3.1 onwards (in lieu of Custom ASIC templates)

* SD-Access template has been removed from 17.3.1 onwards (in lieu of Custom ASIC templates)

Custom ASIC templates (C9500-32C, C9500-32QC, C9500-24Y4C, 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 the Cisco IOS-XE 17.3.1 release, 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 12. Custom template configurable FIB values

Features	Scale Values (Min - Max)	Step Units	Default Value
MAC addresses	32,000 – 128,000	16,000	32,000
IPv4/IPv6 routes	64,000 – 256,000	16,000	64,000
Multicast routes[1]	0 – 32,000	16,000	16,000
IGMP/MLD Snooping[1]	0 – 32,000	16,000	16,000
SGT/MPLS labels[2]	0 – 64,000	32,000	32,000
Netflow entries – Input[3]	0 – 64,000	32,000	32,000
Netflow entries – Output[3]	0 – 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 13. Custom template configurable ACL values

Features	Scale Values (Min - Max)	Step Units	Default Value
Security ACL - Input	6,000 – 21,000	10-90%	6,000
Security ACL - Output	6,000 – 21,000	10-90%	21,000
QoS ACL - Input	2,000 – 14,000	10-90%	8,000
QoS ACL - Output	2,000 – 14,000	10-90%	8,000
Netflow ACL - Input	250 – 750	10-90%	512
Netflow ACL - Output	250 – 750	10-90%	512
Flow SPAN - Input	250 – 750	10-90%	512
Flow SPAN - Output	250 –750	10-90%	512
Total Resources	**54,000**		

Cisco SD-Access architecture

Enterprises are in search of ways to transform their operations to add digital capabilities that enhance service delivery and asset management. Cisco SD-Access provides this transformational shift in building and managing networks. It provides faster, easier, and improved business efficiency with investment protection for enhanced business outcomes. By decoupling network functions from hardware, SD-Access helps ensure policy compliance, allows you to launch new business services faster, and improves issue resolution times significantly. At the same time, it is open and extensible and can significantly reduce your operational expenses.

Cisco SD-Access enables policy-based automation from edge to cloud with foundational capabilities. These include simplified device deployment, unified management of wired and wireless networks, network virtualization and segmentation, group-based policies, and context-based analytics. With these fundamental features in place, key use cases can now be orchestrated. These use cases include user mobility, secure segmentation, user onboarding and policies, IoT integration, guest access, context-based troubleshooting, and data center and cloud integration.

Cisco StackWise Virtual

StackWise Virtual is an advanced stacking technology that supports both core and distribution deployments through multiple topologies. It provides higher scale for system virtualization at the network layer. The Cisco Catalyst 9500 Series with Network Advantage License supports StackWise Virtual with a 2-node topology.

StackWise Virtual in the distribution layer of the network interacts with the access and core layer switches as if it were a single logical switch. An access/core switch connects to both switches of the StackWise Virtual switch using one logical port channel called a Multichassis Ether Channel (MEC). The MEC enables the StackWise Virtual switches to provide redundancy and load balancing on the port channel.

This capability enables a loop-free Layer 2 network topology, since the StackWise Virtual switches are treated as one logical switch for both access and core switches. The StackWise Virtual switch also simplifies the Layer 3 network topology by presenting itself as one logical switch, thus reducing the number of routing peers in the network.

Platform benefits

Cisco IOS XE

The Cisco Catalyst 9500 Series opens a completely new paradigm in network configuration, operation, and monitoring through network automation. Cisco's automation solution is open, standards-based, and extensible across the entire lifecycle of a network device. The various mechanisms that bring about network automation are outlined below, based on a device lifecycle.

- **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 Plug and Play 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 the Cisco Catalyst 9500 Series support a wide range of automation features and provide robust open APIs over Network Configuration Protocol (NETCONF) and RESTCONF 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.

Security

- **Advanced Encryption Standard (AES)-256 MACsec encryption:** AES is the IEEE 802.1AE standard for authenticating and encrypting packets between switches and endpoints. The Cisco Catalyst 9500 Series Switches support 256-bit and 128-bit AES on all ports at all speeds, providing the most secure link encryption (switch to switch).
- **Trustworthy solutions:** Cisco Trust Anchor Technologies provide a highly secure foundation for Cisco products. In the Cisco Catalyst 9500 Series, these trustworthy solutions enable hardware and software authenticity assurance for supply chain trust and strong mitigation against man-in-the-middle attacks on software and firmware.
- **Image signing:** Cryptographically signed images provide assurance that the firmware, BIOS, and other software are authentic and unmodified. As the system boots, the system's software signatures are checked for integrity.
- **Object group ACLs (ipv4 and ipv6):** Object groups for ACLs allow the classification of users, devices, or protocols into groups and apply those groups to ACLs to create access control policies for those groups. This feature allows the use of object groups instead of individual IP addresses, protocols, and ports, which are used in conventional ACLs.

- **Secure Boot:** Cisco Secure Boot technology anchors the boot sequence chain of trust to immutable hardware, mitigating threats against a system's foundational state and the software that is to be loaded, regardless of a user's privilege level. It provides layered protection against the persistence of illicitly modified firmware.
- **Cisco Trust Anchor module:** A tamper-resistant, strong cryptographic, single-chip solution provides hardware authenticity assurance to uniquely identify the product so that its origin can be confirmed to Cisco, providing assurance that the product is genuine.

Resiliency and high availability

- **Cisco StackWise Virtual:** StackWise Virtual is an advanced stacking technology that supports both core and distribution deployments. It provides higher scale for system virtualization at the network layer. The Cisco Catalyst 9500 Series with Network Advantage License supports StackWise Virtual with a 2-node topology.
- **Software Maintenance Upgrades (SMUs):** The SMU is a package that can be installed on a system to provide a patch fix or security resolution to a released image. SMUs allow you to address the network issue quickly while reducing the time and scope of the testing required. The Cisco IOS XE platform internally validates the SMU compatibility and does not allow you to install noncompatible SMUs. All SMUs are integrated into the subsequent Cisco IOS XE Software maintenance releases.
- **Flexlink+:** Flexlink+ allows the setting up of active and backup interfaces or port channels, which can provide Layer 2 failover redundancy without the use of Spanning Tree Protocol (STP). Flexlink+ is currently supported on the C9500-12Q, C9500-24Q, C9500-40X, and C9500-16X models.
- **MKA High Availability:** MKA sessions are now SSO-aware. In the event of failure of the active switch, the standby switch takes over the existing MKA sessions in a minimally disruptive switchover.

Flexible NetFlow

- **Flexible NetFlow (FNF):** Cisco IOS® Software FNF is the next generation in flow visibility technology, allowing optimization of the network infrastructure, reducing operation costs, and improving capacity planning and security incident detection with increased flexibility and scalability. The Cisco Catalyst 9500 Series is capable of up to 512,000 flow entries.

Open standards based fabric

- The Cisco Catalyst 9500 Series Switches support modern fabric technologies such as VXLAN with BGP-EVPN control plane, with open APIs. This technology provides the flexibility to build open standards based fabrics to secure infrastructure, users and data. This fabric architecture provides rich unicast and multicast protocol support to optimally route or bridge traffic as well as support for integrated campus services all of which can be automated via open APIs to effectively configure and monitor the network.

Programmability

- Cisco IOS-XE provides open standards based APIs such as NETCONF, RESTCONF, gNMI to simplify provisioning and configuration, that allows network administrators to save time when provisioning new network devices and to prevent the human errors that often are a byproduct of manual configuration. Integrating Zero Touch Provisioning with various Devops toolkits allows network admins to drastically reduce the time and resources needed to onboard a device onto their network. The ability to collect real-time statistics through model driven telemetry through gRPC and gNMI allows administrator to integrate to many health monitoring tools to optimize their environments and to troubleshoot and provide alerts about any potential problems.

Audio video bridging

- **Audio Video Bridging (AVB):** With Cisco IOS XE Software Release 16.8, selected models of the Cisco Catalyst 9500 Series now support the IEEE 802.1 AVB standard. This standard enables highly reliable delivery of low-latency, time-synchronized AV streaming services through Layer 2 Ethernet networks. The standard also makes it easier to integrate new services and for AV equipment from different vendors to interoperate. Whether the AV endpoint connections are analog or are inflexible digital one to one, the network transport enables many-to-many transparent plug-and-play connections for multiple AV endpoints. AVB is currently supported on the C9500-12Q, C9500-24Q, C9500-40X, and C9500-16X models.

Benefits

- Improves quality of experience by lowering jitter and latency for time-synchronized delivery of high-quality AV.
- Provides scalability of applications across networked deployments, including expansive and complex AV infrastructure.
- Lowers Total Cost of Ownership (TCO) with reduced cabling (lowers CapEx) and no license fees (lowers OpEx).

* AVB is supported on the C9500-12Q, C9500-24Q, C9500-40X, and C9500-16X models. For more details about AVB, refer to https://www.cisco.com/go/avb.

Superior QoS

QoS technologies are a set of tools and techniques for managing network resources and are considered the key enabling technologies for the transparent convergence of voice, video, and data networks. QoS on the Cisco Catalyst 9500 Series consists of classification and marking, policing and markdown, scheduling, shaping, and queuing functions. A modular QoS command-line framework provides consistent platform-independent and flexible configuration behavior. The 9500 Series also supports 2-level hierarchical or nested policies.

Subinterfaces

Layer 3 interfaces forward IPv4 and IPv6 packets to another device using static or dynamic routing protocols. You can use Layer 3 interfaces for IP routing and inter-VLAN routing of Layer 2 traffic. Subinterfaces can also be created on Layer 3 port channels.

MPLS is supported on Layer 3 subinterfaces.

BGP EVPN with VXLAN

Virtual Extensible LAN (VXLAN) Border Gateway Protocol (BGP) Ethernet VPN (EVPN)

VXLAN is a network overlay that allows layer 2 segments to be stretched across an IP core. All the benefits of layer 3 topologies are thereby available with VXLAN. The overlay protocol is VXLAN and BGP uses EVPN as the address family for communicating end host MAC and IP addresses.

Service discovery

- **Multicast DNS (mDNS) gateway:** This service discovery gateway capability facilitates the sharing of services advertised using the Apple mDNS (Bonjour) protocol (such as printers, Apple TVs and file services across the network). Additionally, the administrator can create policies defining which services can be seen and accessed by the users in the network. This capability facilitates a Bring-Your-Own-Device (BYOD) rollout.

Smart operation

- **Bluetooth ready:** The Cisco Catalyst 9500 Series has hardware support to connect a Bluetooth dongle to your switch, enabling you to use this wireless interface as a management port. This port functions as an IP management interface and can be used for configuration and troubleshooting using the WebUI or the Command-Line Interface (CLI), and to transfer images and configurations.
- **WebUI:** WebUI is an embedded GUI-based device-management tool that provides the ability to provision the device, to simplify device deployment and manageability and to enhance 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.
- **RFID tags:** The Cisco Catalyst 9500 Series switches have an embedded RFID tag that facilitates easy asset and inventory management using commercial RFID readers.
- **Blue beacon:** The Cisco Catalyst 9500 Series Switches support a blue beacon LED for easy identification of the switch being accessed.

High-performance IP routing

- IP routing protocols provide the fundamental infrastructure for the delivery of advanced IP services across the Cisco Catalyst 9500 Series. Whether based on Internet Engineering Task Force (IETF) standards or Cisco innovations, these protocols enable Cisco to offer the broadest portfolio of IP routing technologies. All share industry-leading scalability, availability, manageability, fast convergence, and high-performance capabilities.
- IP unicast routing protocols (including static; Routing Information Protocol version 1 [RIPv1], version 2 [RIPv2], and next generation [RIPng]; and Open Shortest Path First [OSPF] routed access) are supported for small network routing applications with the Network Essentials stack.
- Advanced IP unicast routing protocols (such as OSPF, Enhanced Interior Gateway Routing Protocol [EIGRP], Border Gateway Protocol Version 4 [BGPv4], and Intermediate System-to-Intermediate System Version 4 [IS-ISv4]) are supported for load balancing and for constructing scalable LANs. IPv6 routing (using OSPFv3 and EIGRPv6) is supported in hardware for maximum performance.
- Protocol-Independent Multicast (PIM) for IP multicast routing is supported, including PIM Sparse Mode (PIM SM), bidirectional PIM, and Source-Specific Multicast (SSM).

- IPv6 addressing is supported on interfaces with appropriate show commands for monitoring and troubleshooting.
- Seamless MPLS integrates multiple networks into a single MPLS domain. This removes the need for service-specific configurations in network transport nodes.

Multiprotocol label switching (MPLS)

The Cisco Catalyst 9500 Series Switches support Multiprotocol label switching (MPLS) which combines the performance and capabilities of Layer 2 (data link layer) switching with the proven scalability of Layer 3 (network layer) routing. MPLS enables the explosive growth in network utilization while providing the opportunity to differentiate services without sacrificing the existing network infrastructure. MPLS support includes

- **MPLS L3 VPN:** An MPLS Virtual Private Network (VPN) consists of a set of sites that are interconnected by means of a Multiprotocol Label Switching (MPLS) provider core network. At each customer site, one or more Customer Edge (CE) devices attach to one or more Provider Edge (PE) devices.
- **VPLS:** VPLS (Virtual Private LAN Service) enables enterprises to link together their Ethernet-based LANs from multiple sites via the infrastructure provided by their service provider.
- **EoMPLS:** EoMPLS is a category of Any Transport over MPLS (AToM) to transport Layer 2 packets over an MPLS backbone.
- **MPLS over GRE:** L3VPN over GRE and VPLS over GRE, are supported to tunnel MPLS/VPLS packets over non-MPLS networks utilizing GRE tunneling

Software requirements

- The Cisco Catalyst 9500 Series Switches run on Cisco IOS XE Software version 16.5.1a or later. This software release includes all the features listed earlier in the Platform Benefits section. Table 12 lists the minimum software requirements for the switch models.

Table 14. Minimum software requirements

Model	Description	Minimum software requirement
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 1/10/25G 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 1/10/25G Gigabit Ethernet switch with SFP/SFP+/SFP28	Cisco IOS XE Software Release 16.8.1a
C9500-24Q	Cisco Catalyst 9500 Series 24-port 40 Gigabit Ethernet with QSFP+	Open Cisco IOS XE Software Release 16.5.1a

Model	Description	Minimum software requirement
C9500-12Q	Cisco Catalyst 9500 Series 12-port 40 Gigabit Ethernet with QSFP+	Open Cisco IOS XE Software Release 16.6.1
C9500-40X	Cisco Catalyst 9500 Series 40-port 1/10 Gigabit Ethernet with SFP/SFP+	Open Cisco IOS-XE Software Release 16.6.1
C9500-16X	Cisco Catalyst 9500 Series 16-port 1/10 Gigabit Ethernet with SFP/SFP+	Open Cisco IOS-XE Software Release 16.8.1

Licensing

Packaging

The Cisco Catalyst 9000 family introduced new packaging that includes vastly simplified base network packages (Network Essentials and Network Advantage) and term-based software packages (Cisco DNA Premier, Cisco DNA Advantage and Cisco DNA Essentials). The Cisco DNA packages, in addition to on-box capabilities, also unlock additional functionality in Cisco DNA Center, enabling controller-based software-defined automation in your network.

For information about feature support on specific models, please refer to the Cisco Feature Navigator (https://cfn.cloudapps.cisco.com/ITDIT/CFN/jsp/index.jsp) and the Cisco Catalyst 9500 Series Release Notes.

License consumption is easily determined by the package itself. While perpetual licenses are always permanent and without an expiration date, subscription licenses have to be purchased for a 3-, 5-, or 7-year term (and hence are also known as term-based licenses). Table 15 shows the combinations of perpetual and subscription licenses that must be purchased.

Table 15. Licensing combinations

	Cisco DNA Essentials	Cisco DNA Advantage	Cisco DNA Premier
Network Essentials	Yes	No	No
Network Advantage	No*	Yes	Yes

*At the time of Cisco DNA license renewal, the Cisco DNA Essentials license can be purchased to be used with Network Advantage

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 subscription term license in order to purchase a 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.

Tables 16 shows the features included in the Network Essentials and Advantage packages,

Table 17 shows the Cisco DNA Essentials, Advantage and Premier packages.

Table 16. 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, VRRP, PBR, CDP, QoS, FHS, 802.1x, Macsec-128, CoPP, SXP, IP SLA Responder, SSO	✓	✓
Advanced switch capabilities and scale BGP, EIGRP, HSRP, IS-IS, BSR, MSDP, PIM SM, PIM SSM, PIM-BIDIR, IP SLA, OSPF	✗	✓
Network segmentation VRF, VXLAN, LISP, SGT, MPLS, mVPN	✗	✓
Automation NETCONF, RESTCONF, gRPC, YANG, PnP Agent, ZTP/Open PnP, GuestShell (On-Box Python)	✓	✓
Telemetry and visibility Model-driven telemetry, sampled NetFlow, SPAN, RSPAN	✓	✓
High availability and resiliency NSF, ISSU, StackWise Virtual	✗	✓
IoT integration PTP	✗	✓
Security MACsec-256	✗	✓

Table 17. Cisco DNA Essentials and Advantage package features

Features	Cisco DNA Essentials	Cisco DNA Advantage	Cisco DNA Premier
Switch features			
Optimized network deployments Cisco DNA Service for Bonjour	✗	✓	✓
Advanced telemetry and visibility Full Flexible NetFlow, EEM	✓	✓	✓
Optimized telemetry a visibility ERSPAN, App Hosting (in Containers/VMs)*, Wireshark	✗	✓	✓

Features	Cisco DNA Essentials	Cisco DNA Advantage	Cisco DNA Premier
Cisco DNA Center features			
Day 0 network bring-up automation Cisco Network Plug-n-Play application, network settings, device credentials, LAN Automation, Host onboarding	✓	✓	✓
Element management Discovery, inventory, topology, software image, licensing, and configuration management	✓	✓	✓
Element management Patch Management	✗	✓	✓
Basic Assurance Health Dashboards – Network, Client, Application; Switch and Wired Client Health Monitoring	✓	✓	✓
SD-Access Policy-based Automation and Assurance for Wired and Wireless	✗	✓	✓
Embedded Wireless (with or without SD-Access) Cisco Catalyst 9800 wireless software package to enable wireless controller functionality**	✗	✓	✓
Network assurance and analytics Global Insights, Trends, Compliance, Custom Reports; Switch 360, Wired Client 360; Fabric and Non-Fabric Insights; App Health	✗	✓	✓

* Feature will be available in future software releases

**Note: A purchase of Cisco DNA Advantage or Cisco DNA Premier per access point is required in order to enable the wireless controller functionality on Cisco Catalyst switches.

Specifications

Dimensions, physical specifications, weight, and mean time between failures (MTBF)

Table 18 lists the dimensions, physical specifications, weight and operating temperature for the Cisco Catalyst 9500 Series Switches

Table 18. Dimensions, physical specifications, weight and operating temperature

Description	Specifications							
SKU	**C9500-32C**	**C9500-32QC**	**C9500-48YC**	**C9500-24YC**	**C9500-12Q**	**C9500-24Q**	**C9500-40X**	**C9500-16X**
Dimensions (H x W x D)	1.73 x 17.5 x 21.2 in	1.73 x 17.5 x 18.0 in			1.73 x 17.5 x 21.52 in			
Rack Units (RU)	1 RU							
Chassis with 2 power supplies and built-In fan	25.64 lb (11.63 kg)	21.85lLb (9.91 kg)	21.96 lb (9.96 kg)	20.99 lb (9.52 kg)	25.75 lb (11.68 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.

Table 19 lists MTBF for the Cisco Catalyst 9500 Series Switches

Table 19. MTBF information

Model	MTBF (hours)
C9500-32C	212,820
C9500-32QC	307,200
C9500-48Y4C	316,960
C9500-24Y4C	336,780
C9500-12Q	276,430
C9500-24Q	230,770
C9500-40X	277,310
C9500-16X	315,790

Model	MTBF (hours)
PWR-C4-950WAC-R	2,268,760
PWR-C4-950WDC-R	2,559,000
C9K-PWR-650WAC-R	2,268,760
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

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 https://tmgmatrix.cisco.com/

Management and standards support

Table 20 shows management and standards support for the Cisco Catalyst 9500 Series

Table 20. Management and standards support

Description	Cisco Catalyst 9500	Cisco Catalyst 9500 High Performance
Management	BRIDGE-MIB CISCO-BRIDGE-EXT-MIB CISCO-BULK-FILE-MIB CISCO-CABLE-DIAG-MIB CISCO-CALLHOME-MIB CISCO-CEF-MIB CISCO-CIRCUIT-INTERFACE-MIB CISCO-DEVICE-LOCATION-MIB CISCO-DHCP-SNOOPING-MIB ENTITY-VENDORTYPE-OID-MIB CISCO-EIGRP-MIB CISCO-EMBEDDED-EVENT-MGR-MIB CISCO-ENTITY-FRU-CONTROL-MIB CISCO-ENTITY-SENSOR-MIB CISCO-RTTMON-ICMP-MIB CISCO-802-TAP-MIB	BGP4-MIB BRIDGE-MIB CISCO-ACCESS-ENVMON-MIB CISCO-AUTH-FRAMEWORK-MIB CISCO-BGP4-MIB CISCO-BRIDGE-EXT-MIB CISCO-BULK-FILE-MIB CISCO-CABLE-DIAG-MIB CISCO-CALLHOME-MIB CISCO-CDP-MIB CISCO-CEF-MIB CISCO-CLASS-BASED-QOS-MIB CISCO-CONFIG-COPY-MIB CISCO-CONFIG-MAN-MIB CISCO-CONTEXT-MAPPING-MIB CISCO-DATA-COLLECTION-MIB

Description	Cisco Catalyst 9500	Cisco Catalyst 9500 High Performance
	CISCO-ACCESS-ENVMON-MIB	CISCO-DHCP-SNOOPING-MIB
	CISCO-DATA-COLLECTION-MIB	CISCO-EIGRP-MIB
	CISCO-DYNAMIC-ARP-INSPECTION-MIB	CISCO-EMBEDDED-EVENT-MGR-MIB
	CISCO-ENERGYWISE-MIB	CISCO-ENHANCED-IMAGE-MIB
	CISCO-ENHANCED-IMAGE-MIB	CISCO-ENHANCED-MEMPOOL-MIB
	CISCO-ENHANCED-MEMPOOL-MIB	CISCO-ENTITY-ASSET-MIB
	CISCO-ENTITY-ASSET-MIB	CISCO-ENTITY-EXT-MIB
	CISCO-ENTITY-DIAG-MIB	CISCO-ENTITY-FRU-CONTROL-MIB
	CISCO-ENTITY-EXT-MIB	CISCO-ENTITY-SENSOR-MIB
	CISCO-ENTITY-PERFORMANCE-MIB	CISCO-ENTITY-VENDORTYPE-OID-MIB
	CISCO-ENTITY-QFP-MIB	CISCO-ENVMON-MIB
	CISCO-ENVMON-MIB	CISCO-ERR-DISABLE-MIB
	CISCO-ETHER-CFM-MIB	CISCO-FLASH-MIB
	ENTITY-MIB	CISCO-FTP-CLIENT-MIB
	CISCO-ERR-DISABLE-MIB	CISCO-HSRP-EXT-MIB
	CISCO-CONFIG-COPY-MIB	CISCO-HSRP-MIB
	CISCO-FLOW-MONITOR-MIB	CISCO-IETF-BFD-MIB
	CISCO-FTP-CLIENT-MIB	CISCO-IETF-DHCP-SERVER-EXT-MIB
	CISCO-HSRP-EXT-MIB	CISCO-IETF-DHCP-SERVER-MIB
	CISCO-HSRP-MIB	CISCO-IETF-ISIS-MIB
	CISCO-IETF-BFD-MIB	CISCO-IETF-PPVPN-MPLS-VPN-MIB
	CISCO-IETF-PPVPN-MPLS-VPN-MIB	CISCO-IF-EXTENSION-MIB
	CISCO-IETF-PW-MPLS-MIB	CISCO-IGMP-FILTER-MIB
	CISCO-IF-EXTENSION-MIB	CISCO-IMAGE-LICENSE-MGMT-MIB
	CISCO-IGMP-FILTER-MIB	CISCO-IMAGE-MIB
	CISCO-IMAGE-LICENSE-MGMT-MIB	CISCO-IP-CBR-METRICS-MIB
	CISCO-IP-TAP-MIB	CISCO-IP-STAT-MIB
	CISCO-CONFIG-MAN-MIB	CISCO-IP-URPF-MIB
	CISCO-IP-CBR-METRICS-MIB	CISCO-IPMROUTE-MIB
	CISCO-IP-STAT-MIB	CISCO-IPSLA-AUTOMEASURE-MIB
	CISCO-IP-URPF-MIB	CISCO-IPSLA-ECHO-MIB
	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

Description	Cisco Catalyst 9500	Cisco Catalyst 9500 High Performance
	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
	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

Description	Cisco Catalyst 9500	Cisco Catalyst 9500 High Performance
	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
	CISCO-IPSEC-FLOW-MONITOR-MIB	MAU-MIB
	CISCO-IPSEC-MIB	MPLS-L3VPN-STD-MIB
	CISCO-IPSEC-PROVISIONING-MIB	MPLS-LDP-GENERIC-STD-MIB
	CISCO-IPSLA-AUTOMEASURE-MIB	MPLS-LDP-MIB
	CISCO-IPSLA-ECHO-MIB	MPLS-LSR-STD-MIB
	CISCO-IPSLA-JITTER-MIB	MPLS-VPN-MIB
	CISCO-L2-CONTROL-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

Description	Cisco Catalyst 9500	Cisco Catalyst 9500 High Performance
		RFC1213-MIB RMON-MIB RMON2-MIB SNMP-COMMUNITY-MIB SNMP-FRAMEWORK-MIB SNMP-MPD-MIB SNMP-NOTIFICATION-MIB 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	

Safety and compliance

Table 21 lists the safety and compliance information for the Cisco Catalyst 9500 Series

Table 21. Safety and compliance information

Description	Specification
Safety certifications	C9500-12Q, C9500-24Q, C9500-40X, 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
EMI and EMC compliance	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

Warranty

Cisco Enhanced Limited Lifetime Hardware 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 https://www.cisco.com/go/warranty.

Table 22 provides information about the E-LLW

Table 22. 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.

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 "Environment Sustainability" section of the CSR Report) are provided in the following table:

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.

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 23 for more information on Cisco's Technical Services available for the Cisco Catalyst 9500 Series Switches.

Table 23. 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 set[1] • 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 available[2] • Ongoing operating system software updates[1]

Cisco Technical Services
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.

Software policy for Cisco Catalyst 9500 Series Switches

Cisco DNA Software for Access Switching is available for the Cisco Catalyst 9500.

Cisco DNA Software for Access Switching offers comprehensive solutions for the enterprise campus and branch offices. Cisco DNA for Access Switching introduces a simpler and more economical way to deploy access, aggregation, and core switches across enterprise campus and branch locations.

The Cisco DNA Subscription for Switching offer delivers an unbound network on an open and extensible architecture to help you navigate the digital journey. This subscription offer simplifies the buying process and includes lower initiation costs and flexible terms. It includes: Cisco DNA Premier with full Cisco Digital Network Architecture (Cisco DNA) capabilities and Cisco Software-Defined Access (SD-Access).

For ordering information for Cisco DNA Software for the Cisco Catalyst 9500 Series, go to https://www.cisco.com/c/en/us/products/software/one-access/switching-part-numbers.html.

Software policy for network stack components

Customers with the Network Essential Stack and Network Advantage Stack software feature sets will be provided with maintenance updates and bug fixes. These are designed to maintain compliance of the software with published specifications, release notes, and industry standards as long as the original end user continues to own or use the product or for up to one year from the end-of-sale date for the product, whichever occurs earlier.

Cisco Embedded Support for Cisco DNA term components

Cisco Embedded Support delivers the right support for Cisco software products and suites. It will keep your business applications performing as expected and protect your investment. Cisco Embedded Support for the Cisco DNA Essentials and Cisco DNA Advantage term components is included as part of the switch value. Embedded Support provides access to TAC support, major software updates, maintenance and minor software releases, and the Cisco Software Support site, for increased productivity with anytime access.

Table 24. Cisco DNA Term Support on the 9500 Series

Model	C9500-DNA-A-3Y/5Y/7Y or C9500-DNA-E-3Y/5Y/7Y	C9500-DNA-L-A-3Y/5Y/7Y or C9500-DNA-L-E-3Y/5Y/7Y
C9500-32C	Yes	No
C9500-32QC	Yes	No
C9500-48Y4C	Yes	No
C9500-24Y4C	No	Yes
C9500-24Q	Yes	No
C9500-12Q	No	Yes
C9500-40X	Yes	No
C9500-16X	No	Yes

Ordering information

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

Table 25 lists ordering information for the Cisco Catalyst 9500 Series

Table 25. Ordering information

Product number	Product description
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

Product number	Product description
C9500-24Q-E	Cisco Catalyst 9500 24-port 40G switch, NW Ess. License
C9500-24Q-A	Cisco Catalyst 9500 24-port 40G switch, NW Adv. License
C9500-12Q-E	Cisco Catalyst 9500 12-port 40G switch, NW Ess. License
C9500-12Q-A	Cisco Catalyst 9500 12-port 40G switch, NW Adv. License
C9500-40X-E	Cisco Catalyst 9500 40-port 10G switch, NW Ess. License
C9500-40X-A	Cisco Catalyst 9500 40-port 10G 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-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
C9500-48X-A	Cisco Catalyst 9500 40-port 10G switch, 8 x 10GE Network Module, NW Adv. License
C9500-48X-E	Cisco Catalyst 9500 40-port 10G switch, 8 x 10GE Network Module, NW Ess. License
C9500-24X-A	Cisco Catalyst 9500 16-port 10G switch, 8 x 10GE Network Module, NW Adv. License
C9500-24X-E	Cisco Catalyst 9500 16-port 10G switch, 8 x 10GE Network Module, NW Ess. 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
C9500-40X-2Q-A	Cisco Catalyst 9500 40-port 10G switch, 2 x 40GE Network Module, NW Adv. License
C9500-40X-2Q-E	Cisco Catalyst 9500 40-port 10G switch, 2 x 40GE Network Module, NW Ess. License
Cisco DNA License Upgrade	Upgrade from Essentials to Advantage
C9500-LIC=	Electronic SW License for C9500 Switches

Product number	Product description
Cisco DNA Term Licenses	
C9500-DNA-P*	C9500 C1 Advantage Term, High-port density: Includes Term Licenses for Cisco DNA Advantage, 25 ISE Base & 25 ISE Plus Endpoints, 25 Stealthwatch Flows (including Virtual Flow Collector & Management Console). Requires separate purchase of ISE appliance/ISE VM and Cisco DNA Center appliance
C9500-DNA-P-3Y	C9500 C1 Advantage, High-port density, 3Y Term - DNA, 25 ISE PLS and ISE BASE, 25 SWATCH
C9500-DNA-P-5Y	C9500 Cisco DNA Premier, High-port density, 5Y Term - DNA, 25 ISE PLS and ISE BASE, 25 SWATCH
C9500-DNA-P-7Y	C9500 Cisco DNA Premier, High-port density, 7Y Term - DNA, 25 ISE PLS and ISE BASE, 25 SWATCH
C9500-DNA-L-P*	C9500 Cisco DNA Premier Term, Low-port density: Includes Term Licenses for Cisco DNA Advantage, 25 ISE Base & 25 ISE Plus Endpoints, 25 Stealthwatch Flows (including Virtual Flow Collector & Management Console). Requires separate purchase of ISE appliance/ISE VM and Cisco DNA Center appliance
C9500-DNA-L-P-3Y	C9500 Cisco DNA Premier, Low-port density, 3Y Term - DNA, 25 ISE PLS and ISE BASE, 25 SWATCH
C9500-DNA-L-P-5Y	C9500 Cisco DNA Premier, Low-port density, 5Y Term - DNA, 25 ISE PLS and ISE BASE, 25 SWATCH
C9500-DNA-L-P-7Y	C9500 Cisco DNA Premier, Low-port density, 7Y Term - DNA, 25 ISE PLS and ISE BASE, 25 SWATCH
C9500-DNA-P-L*	C9500 Cisco DNA Premier Add-On Term: Includes Term Licenses for 25 ISE Base & 25 ISE Plus Endpoints, 25 Stealthwatch Flows (including Virtual Flow Collector & Management Console). Requires separate purchase of ISE appliance/ISE VM and Cisco DNA Center appliance
C9500-DNA-P-AA	C9500 Cisco DNA Premier Add-On 3Y Term - 25 ISE PLS and ISE BASE, 25 SWATCH
C9500-DNA-P-AA	C9500 Cisco DNA Premier Add-On 5Y Term - 25 ISE PLS and ISE BASE, 25 SWATCH
C9500-DNA-P-AA	C9500 Cisco DNA Premier Add-On 7Y Term - 25 ISE PLS and ISE BASE, 25 SWATCH
C9500-DNA-E-3Y	Catalyst 9500 NW & Cisco DNA Essentials. license (3Y) for 24Q, 40X, 32C, 32QC, 48Y4C SKU
C9500-DNA-E-5Y	Catalyst 9500 NW & Cisco DNA Essentials. license (5Y) for 24Q, 40X, 32C, 32QC, 48Y4C SKU
C9500-DNA-E-7Y	Catalyst 9500 NW & Cisco DNA Essentials. license (7Y) for 24Q, 40X, 32C, 32QC, 48Y4C SKU
C9500-DNA-A-3Y	Catalyst 9500 NW & Cisco DNA Advantage license (3Y) for 24Q, 40X, 32C, 32QC, 48Y4C SKU
C9500-DNA-A-5Y	Catalyst 9500 NW & Cisco DNA Advantage license (5Y) for 24Q, 40X, 32C, 32QC, 48Y4C SKU
C9500-DNA-A-7Y	Catalyst 9500 NW & Cisco DNA Advantage license (7Y)
C9500-DNA-L-E-3Y	Catalyst 9500 NW & Cisco DNA Essentials. low port density license (3Y) for 12Q, 16X, 24Y4C SKU

Product number	Product description
C9500-DNA-L-E-5Y	Catalyst 9500 NW & Cisco DNA Essentials. low port density license (5Y) for 12Q, 16X, 24Y4C SKU
C9500-DNA-L-E-7Y	Catalyst 9500 NW & Cisco DNA Essentials. low port density license (7Y) for 12Q, 16X, 24Y4C SKU
C9500-DNA-L-A-3Y	Catalyst 9500 NW & Cisco DNA Advantage low port density license (3Y) for 12Q, 16X, 24Y4C SKU
C9500-DNA-L-A-5Y	Catalyst 9500 NW & Cisco DNA Advantage low port density license (5Y) for 12Q, 16X, 24Y4C SKU
C9500-DNA-L-A-7Y	Catalyst 9500 NW & Cisco DNA Advantage low port density license (7Y) for 12Q, 16X, 24Y4C SKU
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-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-1600WDCR/2	1600W DC Power Supply, Redundant
C9K-PWR-930WDC-R/2	930W DC Power Supply, Redundant
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

Product number	Product description
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
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

* Cisco DNA Premier midcycle refresh SKUs can be found under C1-CAT-ADD-T.

For ordering information for Cisco DNA Software for the Cisco Catalyst 9500 Series Switches, go to https://www.cisco.com/c/en/us/products/software/one-access/switching-part-numbers.html.

Optics support

The Cisco Catalyst 9500 Series supports a wide range of optics. please visit below link for the latest Optics compatibility information:

https://tmgmatrix.cisco.com

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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
Added Custom ASIC template, eWLC without SD-Access, EVPN, MPLS, Programambility, removed ETA & AVC, updated Operating temperature	Product Overview, Paltform Details, Specifications	Sep 28, 2020
Added NEBS Certification details, 16.11.1 features, VLAN ID correction, SDM template corrections, SVL	Page 13, 14, 15, 22, 23, 24	April 16, 2019
Cisco Catalyst 9500 Series spec change	Updated Page 3	January 11th 2019
Product highlights changes (switching capacity and ports spec changes)	Updated Page 4	January 11th 2019
Cisco Catalyst 9500 Series configurations and port density spec changes	Updated Page 7	January 11th 2019
Performance spec changes	Updated Page 13	January 11th 2019
Text changes to "Important Note"	Updated Page 14	January 11th 2019
Text changes to "Cisco StackWise Virtual"	Updated Page 16	January 11th 2019
Text changes to "Trustworthy systems" and "Cisco StackWise Virtual"	Updated Page 18	January 11th 2019
Added text for Layer 3 Subinterface and BGP EVPN with VXLAN	Updated Page 20	January 11th 2019
Deleted text for "High-performance IP routing" and spec edits to "Minimum software requirements"	Updated Page 22	January 11th 2019
Text changes to "Licensing" and spec edits to "Network Essentials and Advantage Package Features"	Updated Page 23	January 11th 2019
Text changes to "Cisco DNA Essentials and Advantage Package Features"	Updated Page 24	January 11th 2019
Added product numbers for "Cisco Catalyst 9500 Series"	Updated Page 33	January 11th 2019
Deleted product numbers for "Cisco Catalyst 9500 Series"	Updated Page 34	January 11th 2019
Product highlights changes (switching capacity and ports spec changes)	Updated Page 4	January 11th 2019
Updates to Table 1	Updated Table 1	August 15th 2018
Added clearer description of SKUs, Updated date for Tables 1, 10, 11	Updated SKU descriptions, Table 11 data, Table 10 data, Table 1 Footnotes	July 3rd 2018
Added clearer descriptions of host routes and scale adjacency in hardware	Updated Table 10 Footnotes	June 1st 2018

New or revised topic	Described In	Date
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	Mar 31st 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	Dec 15th 2017

Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV Amsterdam,
The Netherlands

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