

Cisco Catalyst 9600 Series Supervisor Engine

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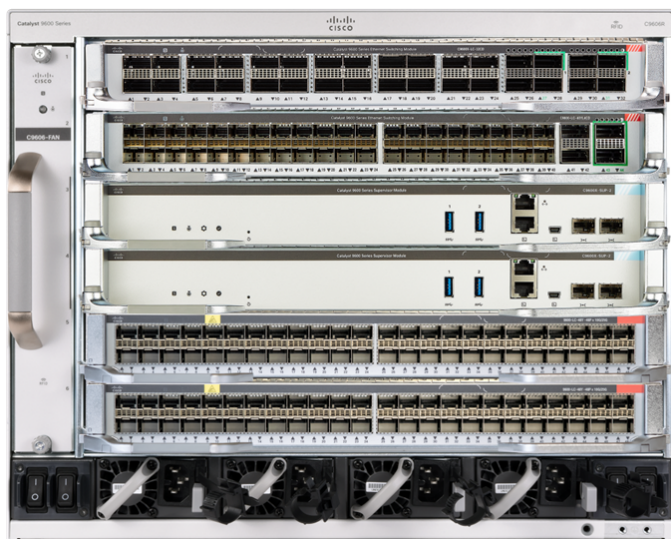
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Introduction

Reimagine, Reinforce, Redefine

Cisco Catalyst 9600 Series Switches are purpose-built for resiliency at scale with the industry's most comprehensive security and allows your business to grow at lowest total operational cost. Built upon the foundation of Catalyst 9000, the Catalyst 9600 Series offers scale and security when always on is a must.



Cisco Catalyst 9600 Series switches are Cisco's lead modular enterprise core 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 Catalyst 9600 Series 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.

As the industry's first purpose-built 400, 200, 100, 50 and 40 Gigabit Ethernet line of modular switches targeted for the enterprise campus, Catalyst 9600 Series switches deliver unmatched scale (MAC, route, and Access Control List [ACL]) and buffering for enterprise applications.

The Cisco Catalyst 9600 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

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.

Product overview

Cisco Catalyst 9600X Supervisor Engine 2

The new Catalyst 9600X SUP-2 supervisor is based on Cisco Silicon One Q200 Application-Specific Integrated Circuit (ASIC), which is purpose built for the next generation core with a programmable pipeline (P4) and is the first network silicon to offer switching capacity up to 12.8 Tbps full duplex per ASIC in the enterprise. The Q200 ASIC offers high- performance full routing and switching capabilities without external memories. The Catalyst 9600 Series leverages a high-performance multiple core x86 CPU and is Cisco's leading purpose-built modular core and edge services enterprise switching platform, built for security, IoT, and cloud.



Figure 1.
Cisco Catalyst 9600X Series Supervisor Engine 2

Catalyst 9600X SUP-2 overview

- The Cisco [Silicon One Q200](#) Application-Specific Integrated Circuit (ASIC)¹ is purpose built for the next generation network core and 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.
- The Cisco Silicon One Q200 ASIC includes an 8GB on-chip 2.5D High Bandwidth Memory (HBM), for deep packet buffers and route table expansion.
- 80MB of dedicated low-latency buffer, with up to 8GB of HBM buffer.
- Intel 2.7-GHz x86 CPU with 8 cores and 32GB of DDR4 memory.
- Up to 960 GB of SATA SSD local storage for container-based application hosting (2x 10G SFP+ management ports).
- ASIC tables for switching scale up to 256K MAC addresses and routing scale up to 2M routes.
- IPv6 support in hardware provides wire-rate forwarding for IPv6 networks.
- Dynamic hardware forwarding table allocations enable easy IPv4-to-IPv6 migration.
- Flexible routing (IPv4, IPv6, and multicast) tables, Layer 2 tables, ACL tables, and QoS tables.

¹ The Silicon One Q200 ASIC resides in the Cisco Catalyst 9600 Supervisor Engine 2.

Catalyst 9600 Chassis and Line Cards with C9600X-SUP-2

- Cisco Catalyst 9606R chassis is hardware ready to support up to 25.6 Tbps in wired switching capacity, with up to 6.4 Tbps bandwidth per slot.
- Up to 25.6 Tbps wired switching capacity, with 8 Bpps of forwarding performance is unleashed with Cisco Catalyst 9600 Series Supervisor Engine 2.
- Up to 8 non-blocking 400/200 Gigabit Ethernet QSFP-DD ports.
- Up to 128 non-blocking 100 Gigabit Ethernet QSPF28 ports.
- Up to 128 non-blocking 40 Gigabit Ethernet QSPF+ ports.
- Up to 256 non-blocking 50G/25G/10G Gigabit Ethernet SPF56 ports.
- Up to 224 non-blocking 10 Gigabit Ethernet RJ45 (copper) ports.
- Up to 8 non-blocking 1 Gigabit Ethernet SFP ports*
- Hardware support for Application Hosting.

***Note:** Supervisor Engine 2 only supports speeds of 10 Gbps or above, except for SFP-1G-SX/LH optics.

The following table shows the supervisor engine and line card slot assignment options in the Catalyst 9600 Series chassis.

Table 1. Chassis slot assignment options

Chassis	Single Supervisor Engine 2 slot assignments	Redundant Supervisor Engine 2 slot assignments	Line Card slot options
Cisco Catalyst 9606R	Slot 3 or 4	Slot 3 and 4	Slots 1 to 2 and 5 to 6

Table 2. Minimum software

Chassis	Minimum software
Cisco Catalyst 9606R	Cisco IOS XE 17.7.1

The following table summarizes the performance capacities of the Supervisor Engine 2.

Table 3. Bandwidth per slot for the 9606R chassis

Supervisor engine	Bandwidth per slot
Supervisor Engine 2	6.4 Tbps (3.2 Tbps full duplex) per slot

The following table summarizes the line card modules supported on the Catalyst 9600 Supervisor Engine 2.

Table 4. Line card support for C9600X-SUP-2

Line Card	Description	Bandwidth	Minimum SW requirement
C9600X-LC-56YL4C	Cisco Catalyst 9600 Series 56-Port 1GE ¹ /10GE/25GE/50GE, 4-Port 100GE line card	6.4 Tbps	17.13.1
C9600X-LC-32CD	Cisco Catalyst 9600 Series Combo line card 30-Port 100/40GE, 2-Port 400/200 ² /100GE	6.4 Tbps	17.9.1
C9600-LC-40YL4CD	Cisco Catalyst 9600 Series 40-Port 1GE ¹ /10GE/25GE/50GE, 2-Port 100GE/200GE ² , 2-Port 400GE line card	6.4 Tbps	17.7.1
C9600-LC-24C	Cisco Catalyst 9600 Series 24-Port 40GE/100GE	4.8 Tbps	17.7.1
C9600-LC-48YL	Cisco Catalyst 9600 Series 48-Port 1GE ¹ /10GE/25GE/50GE	4.8 Tbps	17.7.1
C9600-LC-48TX	Cisco Catalyst 9600 Series 48-Port 10GE ³	960 Gbps	17.7.1

¹ C9600X-SUP-2 only supports SFP-1G-SX/LH optics for 1Gbps. See Cisco TMG Matrix for details.

² Hardware capable.

³ Only 10Gbps supported with C9600X-SUP-2

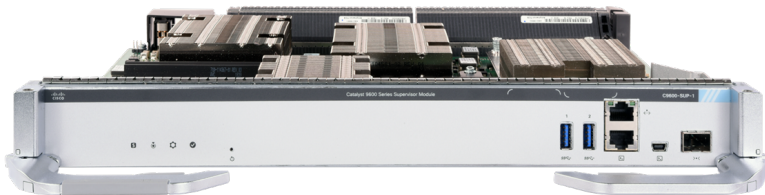


Figure 2. Cisco Catalyst 9600 Series Supervisor Engine 1

Catalyst 9600 SUP-1 overview

- The Cisco Unified Access Data Plane (UADP) Application-Specific Integrated Circuit (ASIC)¹ is future-ready for next-generation core technologies, with a programmable pipeline, micro-engine capabilities, and template-based customizable allocation of Layer 2, Layer 3, forwarding, ACL, and Quality-of-Service (QoS) entries.
- It is the first ASIC to support double-width hardware tables that provides equivalent table size and processing performance for IPv4 and IPv6.
- 2.0-GHz Intel x86 CPU with 8 cores.
- Up to 960 GB of SATASSD local storage for container-based application hosting.
- Up to 108 MB of buffer (36 MB of unified buffer per ASIC).
- Line-rate, hardware-based Flexible NetFlow (FNF) delivers flow collection for up to 294,000 flows.
- IPv6 support in hardware provides wire-rate forwarding for IPv6 networks.

- Dual-stack support for IPv4 and IPv6 and dynamic hardware forwarding table allocations enable easy IPv4-to-IPv6 migration.
- Flexible routing (IPv4, IPv6, and multicast) tables, Layer 2 tables, ACL tables, and QoS tables.

¹ The UADP ASIC resides in the Cisco Catalyst 9600 Supervisor Engine 1.

Catalyst 9600 Chassis and Line Cards with C9600-SUP-1

The following table shows the supervisor engine and line-card slot assignment options in the Catalyst 9600 Series chassis.

Table 5. Chassis slot assignment options

Chassis	Single Supervisor Engine 1 slot assignments	Redundant Supervisor Engine 1 slot assignments	Line Card slot options
Cisco Catalyst 9606R	Slot 3 or 4	Slot 3 and 4	Slots 1 to 2 and 5 to 6

Table 6. Minimum software

Chassis	Minimum software
Cisco Catalyst 9606R	Cisco IOS XE 16.11.1

The following table summarizes the performance capacities of the Supervisor Engine 1.

Table 7. Bandwidth per slot for the 9606R chassis

Supervisor engine	Bandwidth per slot
Supervisor Engine 1	2.4 Tbps (1.2 Tbps full-duplex) per slot

The following table summarizes the line-card modules supported on the Catalyst 9600 Supervisor Engine 1.

Table 8. Line-card and module support for Catalyst 9600 Supervisor Engine 1.

Line Card	Description	Bandwidth	Minimum SW requirement
C9600-LC-40YL4CD	Cisco Catalyst 9600X Series 40-Port 1/10/25/50GE ¹ , 2-Port 100GE/200GE ¹ , 2-Port 400GE ¹	2.4 Tbps	17.8.1
C9600-LC-24C	Cisco Catalyst 9600 Series 24-Port 40GE/12-Port 100GE	2.4 Tbps	16.11.1
C9600-LC-48YL	Cisco Catalyst 9600 Series 48-Port 100M/1GE/10GE/25GE/50GE ¹	2.4 Tbps	16.11.1
C9600-LC-48TX	Cisco Catalyst 9600 Series 48-Port 100M/1GE/2.5GE/5GE/10GE	960 Gbps	17.1.1
C9600-LC-48S	Cisco Catalyst 9600 Series 48 Port 100M/1GE	96 Gbps	17.2.1

¹ C9600-SUP-1 does not support 50GE, 200GE or 400GE. C9600X-SUP-2 is required to support 50GE, 200GE and 400GE. 200GE hardware capable with SUP-2.

Note: C9600X-LC-32CD, C9600X-LC-56YL4C is not supported on C9600-SUP-1.

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 better 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 Plug and Play (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 the Cisco Catalyst 9600X Switch support a wide range of automation features and provide robust open APIs over Network Configuration Protocol (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.
- **WebUI:** 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.

Platform benefits

Table 9. Platform benefits of the Cisco Catalyst 9600 and 9600X

Model	Catalyst 9600 (C9600-SUP-1)	Catalyst 9600X (C9600-SUP-2)
Resiliency and High Availability		
Software Maintenance Upgrade (SMU)	Yes	Yes
Cisco StackWise Virtual	Yes	Yes
Cisco StackWise Virtual (QuadSup RPR)	Yes	No ²
Stateful Switchover (SSO)	Yes (2 SUP, SVL)	Yes (2 SUP, SVL)
In-Service Software Upgrade (ISSU)	Yes (2 SUP, SVL)	Yes (2 SUP, SVL)
Graceful Insertion and Removal (GIR)	Yes	Yes
MKA High Availability	Yes	Yes 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 ⁴
Object-Group ACLs (IPv4/IPv6)	Yes	Yes ³
Enterprise QoS		
Modular QoS CLI (MQC)	Yes	Yes
Strict Priority Queuing	Yes	Yes
Class/Color-aware Queuing	Yes (WFQ)	Yes (VoQ)
Policing/Metering	Yes	Yes
Shaping/Bandwidth	Yes	Yes
Hierarchical QoS	Yes (2-level)	Yes (2-level)
IP Routing		
Routing Information Protocol version 2 (RIPv2), and next generation (RIPng)	Yes	Yes

Model	Catalyst 9600 (C9600-SUP-1)	Catalyst 9600X (C9600-SUP-2)
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
IPv6 routing	Yes	Yes
L3 Routed Sub-Interfaces	Yes	Yes
Multi-Protocol Label Switching (MPLS)		
MPLS L3 VPN	Yes	Yes
Ethernet over MPLS (EoMPLS)	Yes	Yes
Virtual Private LAN Service (VPLS)	Yes	No ²
MPLS over GRE	Yes	No ²
MPLS Traffic-Engineering (MPLS-TE)	Yes	Yes
BGP Ethernet VPN (EVPN) VXLAN		
Fabric Spine, Leaf and Border Support	Yes	Yes
L2/L3 Virtual Network Interface (VNI)	Yes	Yes
Distributed Anycast Gateway (Symmetric IRB)	Yes	Yes
Centralized Gateway (Asymmetric IRB)	Yes	No
ESI Multi-Home Support	Yes	No
Tenant Routed Multicast (IPv4/IPv6)	Yes	Yes
L3 Border Handoff: Multi-VRF, MPLS L3VPN	Yes	Yes
L2 Border Handoff: VPLS, EoMPLS L2VPN	Yes	No ²
Software-Defined Access (SD-Access)		

Model	Catalyst 9600 (C9600-SUP-1)	Catalyst 9600X (C9600-SUP-2)
Virtual Extensible LAN (VXLAN)	Yes	Yes
L2 Virtual Network Interface (VNI)	Yes	Yes
L3 Virtual Network Interface (VNI)	Yes	Yes
SDA Control-Plane	Yes	Yes
SDA Border	Yes	Yes
SDA Layer 2 Border	Yes	No
SDA Edge	No	No
Flexible NetFlow (FNF)		
FNF IPv4 flow records	Yes	Yes ¹ (software)
FNF IPv6 flow records	Yes	Yes ¹ (software)
FNF sampler	Yes	Yes ¹
FNF data export	Yes	Yes ¹
NetFlow version 9 (NFv9) export	Yes	Yes ¹
IPFIX export	Yes	Yes ¹
Programmability		
NETCONF	Yes	Yes
RESTCONF	Yes	Yes
gNMI/gNOI	Yes	Yes
YANG models	Yes	Yes
ZTP/PnP	Yes	Yes
Smart Operations		
Bluetooth Wireless UI	Yes	Yes
RFID tags	Yes	Yes
Blue beacon	Yes	Yes
Out-of-Band Management	Yes	Yes

¹ C9600X models: minimum IOS XE software release 17.8.1.

² C9600X models: feature is not available at FCS, but it is hardware capable.

³ C9600X models: Object Group ACLs are supported only in the ingress direction.

⁴ Need to order HSEC Key.

Platform details

Physical specifications

The following table lists physical specifications of Catalyst 9600X Supervisor Engine 2 and Supervisor Engine 1.

Table 10. Physical specifications

Description	Specifications
SKU	C9600-SUP-1, C9600X-SUP-2
Dimensions (H x W x D)	1.7 x 15.0 x 13.41" (4.32 x 38.1 x 34.06 cm) to faceplate 1.7 x 15.0 x 15.7" (4.32 x 38.1 x 39.88 cm) to ejector
Weight	5.45 Kg (12.02 lbs)
Rack Units (RU)	1 RU
Operating Temperature	-5° to 45° C (23° to 113° F) up to 6,000 feet (1828.8 meter) -5° to 40° C (23° to 104° F) up to 10,000 feet (3048 meter)
Storage Temperature	-40° to 70° C (40° to 158° F)
Relative Humidity, Operating and Non-operating, Non-condensing	10% to 95%, noncondensing
Altitude	-60 to 3,000 m (-197 to 9843 feet)
Mean Time Between Failures (MTBF) (hours)	C9600-SUP-1: 271,420 C9600X-SUP-2: 305,880

Supported optics

For details about the different optical modules and the minimum Cisco IOS Software release required for each of the supported optical modules, visit <https://tmgmatrix.cisco.com/>.

Switch Performance

The following table highlights the performance and scalability enhancements of the Catalyst 9600X Supervisor Engine 2 and the Catalyst 9600 Supervisor Engine 1.

Table 11. Performance and scalability features of C9600X-SUP-2 and C9600-SUP-1

Feature	C9600X-SUP-2	C9600-SUP-1
System Switching Capacity	Up to 25.6 Tbps ¹	Up to 9.6 Tbps ¹
Per-slot Switching Capacity	Up to 6.4 Tbps	Up to 2.4 Tbps
ASICs	1x Q200	3x UADP 3.0

Feature	C9600X-SUP-2	C9600-SUP-1
Forwarding Rate	8 Bpps	3 Bpps (1 Bpps per ASIC)
DRAM	32 GB	16 GB
Flash	16 GB	16 GB
SSD capacity	Up to 960 GB	Up to 960 GB
VLAN IDs	4,096 ⁴	4,094
PVST Instances	4,096 ⁴	1,000
STP Virtual Ports (Port* VLANs) for PVST	16,000	16,000
STP Virtual Ports (Port* VLANs) for MST	32,000	100,000
Switched Virtual Interfaces (SVIs)	3800	1,000
Jumbo Frames	9,216	9,216
MAC Addresses	Up to 256,000 ²	Up to 128,000 ^{2,3}
IPv4 Routes	Up to 2,000,000 ^{2,3,4}	Up to 256,000 (indirect + direct) ^{2,3,4}
IPv6 Routes	Up to 1,000,000 ^{2,3,4}	Up to 256,000 ^{2,3,4}
ARP (IPv4) entries	Up to 128,000	Up to 90,000
NDP (IPv6) entries	Up to 128,000	Up to 128,000
MPLS per-VRF routes	Up to 1,000,000 ^{2,3,4}	Up to 32,000 ^{2,3,4}
MPLS per-Prefix routes	Up to 64,000 ^{2,3,4}	N/A
Multicast Routes	Up to 32,000	Up to 32,000 ²
IGMP/MLD Snooping entries	Up to 16,000	Up to 16,000
QoS ACL Scale (IPv4/IPv6)	Up to 8,000/4,000 ²	Up to 16,000/8,000 ²
Security ACL Scale (IPv4/IPv6)	Up to 8,000/4,000 ²	Up to 27,000/13,500 ²
GRE Tunnels	Up to 1,024	Up to 1,024
MACsec sessions	Up to 1,024 per PHY	Up to 2,000
NetFlow entries (IPv4/IPv6)	Up to 2,000,000 (sampled)	Up to 384,000 (full, 128,000 per ASIC) ^{2,3}
Packet Buffer	80 MB (Shared Memory System) + 8 GB (High Bandwidth Memory)	Up to 108 MB (36 MB per ASIC)

¹ Based on C9606R chassis with 4 Line Cards operating at 2.4 Tbps.

² Varies based on selected flexible SDM ASIC template.

³ Total routes are shared between IPv4 and IPv6.

⁴ Table Maximum. The exact % of allocation will depend on specific IP/mask combinations.

Flexible ASIC templates - C9600X-SUP-2

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 standard SDM ASIC template may be selected to configure the switch for specific features.

The following SDM ASIC templates are supported on the Cisco Catalyst 9600 Supervisor Engine 2.

- **Default** (Core)

Default SDM ASIC template

The following table describes the default SDM ASIC template for C9600X-SUP-2.

Table 12. SDM template descriptions for C9600X-SUP-2

Features	Default Template
MAC Addresses	128,000
IP Host Routes ¹	128,000
IP LPM Routes ^{1,2}	2,000,000
IP Multicast Routes ¹	32,000
IGMP/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
PBR/NAT ⁴	16,000
GRE Tunnels	1,024
Sampled NetFlow entries ¹	2,000,000

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 learnt.

C9600X-SUP-2 hashing efficiency has been improved in 17.12.2 (CSCwf91503).

³ Per-prefix MPLS labels are limited to 62,000 on C9600X-SUP-2.

⁴ Feature is not available at FCS but may be available in future software releases.

Custom ASIC template

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 17.7.1 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.

The following table describes the standard SDM ASIC templates for C9600X-SUP-2.

Table 13. Custom template FIB configurable values for C9600X-SUP-2

Features	Default Value	Scale Values (Min – Max)	Step Units
MAC Addresses	128,000	32,000 ¹ – 256,000	1,000
IPv4 Host Routes	128,000	32,000 ¹ – 256,000	1,000
IPv6 Host Routes	64,000	16,000 ¹ – 128,000	1,000
MPLS Labels ³	256,000	0 ² – 512,000	1,000
Security/Object Groups	32,000	0 ² – 512,000	1,000
Total Resources	608,000		

¹ Critical features require a minimum allocation to insure operation. If a custom value is not defined, this value is used.

² Some (non-critical) 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 C9600X-SUP-2.

- [Learn more about configuring Custom SDM templates.](#)

Flexible ASIC templates - C9600-SUP-1

Standard SDM ASIC templates

The following table describes the standard SDM ASIC templates for C9600-SUP-1.

Table 14. SDM template descriptions for C9600-SUP-1

Features	Distribution Template	Core Template (Default)	NAT Template	SD-Access Template ¹
MAC Addresses	82,000	32,000	32,000	32,000
IPv4/IPv6 Routes (LPM/Host)	114,000	212,000	212,000	212,000
Multicast Routes	16,000	32,000	32,000	32,000
IGMP/MLD Snooping	2,000	2,000	2,000	2,000
MPLS/SGT Label	32,000	32,000	32,000	32,000
NetFlow entries	98,000	64,000	64,000	64,000
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
Security ACLs	27,000 ²	27,000 ²	20,000 ²	27,000 ²
QoS ACLs	16,000 ²	16,000 ²	8,000 ²	16,000 ²
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
STP Instances	1,000	1,000	1,000	1,000
CoPP	1,000	1,000	1,000	1,000

¹ SD-Access template has been removed from 17.3.1 onwards (in lieu of Custom ASIC templates).

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

Performance and scalability numbers are per ASIC where applicable, with three ASICs in the Catalyst 9600 Series Supervisor Engine 1.

Custom ASIC template

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 15. Custom template configurable FIB values for C9600-SUP-1

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 16. 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		

- [Learn more about configuring Custom SDM templates.](#)

Software requirements

Table 17. Minimum software requirements for C9600X-SUP-2 and C9600-SUP-1

Supervisor	Minimum software requirement
C9600X-SUP-2	Cisco IOS XE Software version 17.7.1
C9600-SUP-1	Cisco IOS XE Software version 16.11.1

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:** My Cisco Entitlements (MCE) 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, one that 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 Software Central (software.cisco.com). For a more detailed overview on Cisco Licensing, go to cisco.com/go/licensing_guide.

Software subscription

There are two choices for software subscription: Cisco DNA or Cisco Catalyst. They provide:

- Flexible licensing models to smoothly distribute customers' software spending over time.
- Investment protection for software purchases through software services-enabled license portability.
- Access to updates, upgrades, and new technology from Cisco through Cisco Software Support Services (SWSS).
- Base product-level support for hardware, software, and Cisco IOS (Catalyst Software only).
- ISE licenses included in the Advantage tier to facilitate zero-trust network security* (Catalyst Software only).
- Access to end-to-end network visibility with Cisco Spaces and service assurance through Cisco ThousandEyes Network and Application Synthetics (included with the Advantage license).

Manage your entire switching structure as a single, converged component. With one management system and one policy for wired and wireless networks, it offers an efficient way to provide more secure access.

*ISE license quantities are outlined below. Note that ISE is not eligible for Catalyst 9200 series switches.

ISE license quantities in Cisco Catalyst software subscription for Switching.

Eligible product families*	Cisco Catalyst 9600 Series	Cisco Catalyst 9500 Series	Cisco Catalyst 9400 Series	Cisco Catalyst 9300 Series
ISE quantity per Advantage license	40 endpoint sessions for ISE	10 endpoint sessions for ISE	40 endpoint sessions for ISE	10 endpoint sessions for ISE

Software licenses for Catalyst 9600

	Cisco Catalyst Software Subscription new	Cisco DNA Software subscription	Network Advantage
Packages¹	3, 5 or 7 Year Terms	3, 5 or 7 Year Terms	Perpetual
Tiers	Advantage	Advantage	Advantage
Portability²	✓	✓	✓
Management options	Catalyst Center	Catalyst Center	CLI, Web UI
Included support	Base product-level support for Hardware, Software and OS	Software support (SWSS)	X
Included³ add-ons: Common ISE policy, Thousand Eyes network and application assurance, Cisco Spaces	X	X	X
Included ISE endpoint licenses	40	X	X

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 Advantage tier

The following table lists the features of the Network Advantage packages. The proceeding table lists the features of the Cisco Catalyst Advantage.

Network advantage package features

Features	Network Advantage
Switch Fundamentals Layer 2, Routed Access (RIP, EIGRP Stub, OSPF stub), VRRP, PIM Stub Multicast, PBR, Cisco Discovery Protocol (CDP), QoS, FHS, CoPP, SXP, IP SLA Responder, SSO	Yes
Advanced Switch Capabilities and Scale BGP, EIGRP, IS-IS, OSPF, IP SLA, BSR, MSDP, PIM SM, PIM SSM, BIDIR-PIM ¹	Yes
Network Segmentation VRF, Cisco TrustSec, SGT, CMD ² , VXLAN, LISP, MPLS, EVPN-BGP, mVPN ¹	Yes
Automation NETCONF, RESTCONF, gRPC, gNMI/gNOI, YANG, PnP Agent, ZTP/Open PnP, GuestShell (on-box Python)	Yes
Telemetry and Visibility Model-Driven Telemetry (MDT), Flexible NetFlow (FNF) ² , SPAN, RSPAN	Yes
High Availability and Resiliency SSO, SMU, ISSU, HSRP, GIR ¹ , NSF, StackWise Virtual, Quad Sup RPR ¹	Yes
Security IP RAACL/VAACL/PAACL, OGACL, SGACL, MACsec-256, WAN MACsec ^{2,3}	Yes

¹ Feature not available at FCS for certain Supervisors, but will be available in future software releases.

² Cisco Catalyst Advantage package features.

Cisco Catalyst Advantage package features

Features	Cisco Catalyst Advantage / Cisco DNA Advantage*
Switch Features	
Optimized Network Deployments Cisco Catalyst Service for Bonjour ²	Yes
Advanced Telemetry and Visibility NetFlow ² , EEM	Yes
Optimized Telemetry and Visibility ERSPAN ¹ , App hosting (in containers) ² , Wireshark	Yes
Cisco Catalyst Center Features	

Features	Cisco Catalyst Advantage / Cisco DNA Advantage*
Day-0 Network Bring-up Automation Cisco Network Plug and Play application, network settings, device credentials, LAN automation, host onboarding	Yes
Element Management Discovery, inventory, topology, software image, licensing, and configuration management	Yes
Element Management Patch management	Yes
Basic Assurance Health dashboards - network, client, application; switch and wired client health monitoring	Yes
SD-Access Policy-based automation and assurance for wired and wireless	Yes
Network Assurance and Analytics² Global insights, trends, compliance, custom reports; Switch 360, Wired Client 360; fabric and non-fabric insights	Yes

* Cisco DNA Advantage doesn't include base product-level support (Smart Net Total Care)

¹ Feature not available on C9600X-SUP-2 FCS but may be available in future software releases.

² Supported in later IOSXE software versions. Refer to latest Catalyst 9600 Release Notes.

³ Need to order HSEC Key.

For a full list of network stack features as well as Cisco Catalyst Advantage features, please visit: https://www.cisco.com/c/m/en_us/products/software/dna-subscription-switching/en-sw-sub-matrix-switching.html?OID=otren019471.

Software Policy for Cisco Catalyst 9600 Series Switches

Software Policy for Network Stack components

Customers with the Network Advantage Stack software feature sets will be provided with maintenance updates and bug fixes designed to maintain the 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 up to one year from the end-of-sale date for this product, whichever occurs earlier.

Cisco Software Support Service for Cisco Catalyst Software Term components

Cisco Software Support Service (SWSS) delivers the right support for Cisco software products and suites. It will keep your business applications performing as expected and protects your investment. Cisco SWSS for

Cisco Catalyst Software Subscription Advantage term components is included as part of the switch value. SWSS provides access to TAC support, major software updates, maintenance and minor software releases, and the Cisco Software Support site for increased productivity.

For a full list of features, please see the switching feature matrix:

https://www.cisco.com/c/m/en_us/products/software/dna-subscription-switching/en-sw-sub-matrix-switching.html?OID=otren019471.

Management and standards support

The following table shows management and standards support for the Cisco Catalyst 9600 Series.

Table 18. Management and standards support

Description	Specification
Management	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 CISCO-DHCP-SNOOPING-MIB CISCO-EIGRP-MIB CISCO-EMBEDDED-EVENT-MGR-MIB CISCO-ENHANCED-IMAGE-MIB CISCO-ENHANCED-MEMPOOL-MIB CISCO-ENTITY-ASSET-MIB CISCO-ENTITY-EXT-MIB CISCO-ENTITY-FRU-CONTROL-MIB CISCO-ENTITY-SENSOR-MIB CISCO-ENTITY-VENDORTYPE-OID-MIB CISCO-ENVMON-MIB CISCO-ERR-DISABLE-MIB CISCO-FLASH-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

Description	Specification
	CISCO-IP-CBR-METRICS-MIB CISCO-IP-STAT-MIB
	CISCO-IP-URPF-MIB CISCO-IPMROUTE-MIB
	CISCO-IPSLA-AUTOMEASURE-MIB CISCO-IPSLA-ECHO-MIB
	CISCO-IPSLA-JITTER-MIB CISCO-L2-CONTROL-MIB
	CISCO-L2L3-INTERFACE-CONFIG-MIB CISCO-LAG-MIB
	CISCO-LICENSE-MGMT-MIB CISCO-LISP-EXT-MIB
	CISCO-LOCAL-AUTH-USER-MIB CISCO-MAC-AUTH-BYPASS-MIB CISCO-MAC-NOTIFICATION-MIB CISCO-MEMORY-POOL-MIB CISCO-MPLS-LSR-EXT-STD-MIB CISCO-NHRP-EXT-MIB
	CISCO-NTP-MIB
	CISCO-OSPF-MIB
	CISCO-OSPF-TRAP-MIB CISCO-PAE-MIB
	CISCO-PAGP-MIB CISCO-PIM-MIB CISCO-PING-MIB CISCO-PKI-MIB
	CISCO-PORT-SECURITY-MIB
	CISCO-PORT-STORM-CONTROL-MIB CISCO-PRIVATE-VLAN-MIB
	CISCO-PROCESS-MIB
	CISCO-PRODUCTS-MIB
	CISCO-RESILIENT-ETHERNET-PROTOCOL-MIB CISCO-RTTMON-ICMP-MIB
	CISCO-RTTMON-IP-EXT-MIB
	CISCO-RTTMON-MIB CISCO-RTTMON-RTP-MIB
	CISCO-SNMP-TARGET-EXT-MIB CISCO-STP-EXTENSIONS-MIB CISCO-SYSLOG-MIB
	CISCO-TCP-METRICS-MIB CISCO-TCP-MIB
	CISCO-TRUSTSEC-INTERFACE-MIB
	CISCO-TRUSTSEC-MIB
	CISCO-TRUSTSEC-POLICY-MIB CISCO-TRUSTSEC-SERVER-MIB CISCO-TRUSTSEC-SXP-MIB CISCO-UDLDP-MIB
	CISCO-VLAN-IFTABLE-RELATIONSHIP-MIB CISCO-VLAN-MEMBERSHIP-MIB
	CISCO-VRF-MIB
	CISCO-VTP-MIB ENTITY-MIB ENTITY-STATE-MIB
	EtherLike-MIB HC-ALARM-MIB HC-RMON-MIB
	IEEE8021-PAE-MIB
	IEEE8023-LAG-MIB
	IF-MIB
	IGMP-STD-MIB
	IP-FORWARD-MIB IP-MIB
	IPMROUTE-STD-MIB LISP-MIB
	LLDP-EXT-MED-MIB LLDP-MIB
	MAU-MIB
	MPLS-L3VPN-STD-MIB

Description	Specification
	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 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, IEEE 802.3by 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 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 19. Safety and compliance information

Description	Specification
Safety Certifications	C9606R <ul style="list-style-type: none"> • IEC 60950-1 plus Am1, Am2, Am9, Am10, Am11, Am12 and all deviations and differences • IEC 62368-1, Second Edition with all deviations and differences • AS/NZS 60950.1.2011 • CAN/CSA-C22.2 No. 60950-1-07 • CAN/CSA-C22.2 No. 62368-1-14 • 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 • UL 62368-1, 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

Ordering information

The following table contains ordering information for the Cisco Catalyst 9600 Series.

Table 20. Cisco Catalyst 9600 Series ordering information

Product Number	Description
C9606R (=)	Cisco Catalyst 9600 Series 6 Slot Chassis
C9600X-SUP-2 (=)	Cisco Catalyst 9600 Series Supervisor 2 Module
C9600X-SUP-2/2	Cisco Catalyst 9600 Series Redundant Supervisor 2 Module
C9600-SUP-1 (=)	Cisco Catalyst 9600 Series Supervisor 1 Module
C9600-SUP-1/2	Cisco Catalyst 9600 Series Redundant Supervisor 1 Module
C9600-LC-24C (=)	Cisco Catalyst 9600 Series 24-Port 40GE/12-Port 100GE
C9600-LC-48YL (=)	Cisco Catalyst 9600 Series 48-Port 25GE/10GE/1GE/100M
C9600-LC-48TX (=)	Cisco Catalyst 9600 Series 48-port RJ45 Copper - 10GE/5GE/2.5GE/1GE/100M/10M
C9600-LC-48S (=)	Cisco Catalyst 9600 Series 48-Port 1GE /100M
C9600-LC-40YL4CD (=)	Cisco Catalyst 9600 Series 40-Port 50/25/10/1GE, 2-Port 100/40GE, and 2-Port 400/200/100GE
C9600X-LC-56YL4C (=)	Cisco Catalyst 9600 Series Combo line card 56 ports 50/25/10/1GE SFP56 4 ports 100/40GE QSFP28 uplinks
C9600X-LC-32CD (=)	Cisco Catalyst 9600 Series 30-Port 100/40GE and 2-Port 400/200/100GE
C9606-FAN (=)	Cisco Catalyst 9600 Series C9606 Chassis Fan Tray
C9K-F2-SSD-240GB (=)	Cisco Catalyst 9600 Series 240GB SSD Storage
C9K-F2-SSD-480GB (=)	Cisco Catalyst 9600 Series 480GB SSD Storage
C9K-F2-SSD-960GB (=)	Cisco Catalyst 9600 Series 960GB SSD Storage
Cisco DNA Software Term Licenses	Description
C9600-DNA-A	C9600 Cisco DNA Advantage Software subscription Term License
C9600-DNA-A-3Y	C9600 Cisco DNA Advantage Software subscription, 3 Year License
C9600-DNA-A-5Y	C9600 Cisco DNA Advantage Software subscription, 5 Year License
C9600-DNA-A-7Y	C9600 Cisco DNA Advantage Software subscription, 7 Year License
Cisco Catalyst Software term licenses	Description

Product Number	Description
C9600-DNX-A-3Y	C9600 Advantage Catalyst Software subscription, 3Y License
C9600-DNX-A-5Y	C9600 Advantage Catalyst Software subscription, 5Y License
C9600-DNX-A-7Y	C9600 Advantage Catalyst Software subscription, 7Y License
Power Supplies	Description
C9600-PWR-3KWAC (=)	Cisco Catalyst 9600 Series 3000W AC Power Supply
C9600-PWR-2KWAC (=)	Cisco Catalyst 9600 Series 2000W AC Power Supply
C9600-PWR-2KWDC (=)	Cisco Catalyst 9600 Series 2000W DC Power Supply
Spare Accessories and Kits	Description
C9606-SLOT-BLANK (=)	Cisco Catalyst 9600 Series Blank for Chassis Module Slot
C9606-PWR-BLANK (=)	Cisco Catalyst 9600 Series Blank for Chassis Power Supply Slot
CAB-CONSOLE-USB	Console Cable 6ft with USB Type A and mini-B
CAB-CONSOLE-RJ45	Console Cable 6ft with RJ45 and DB9F
C9606-RACK-KIT=	Cisco Catalyst 9600 Series 6 slot chassis Rack Mount
C9606-ACC-KIT=	Cisco Catalyst 9600 Series 6 slot chassis Accessory Kit
C9606-SHELF-KIT=	Cisco Catalyst 9600 Series 6 slot chassis Shelf Install Kit
C9606-FB-23-KIT=	Cisco Catalyst 9600 Series 6 slot chassis Front to Back Kit

Warranty

Cisco Enhanced Limited Lifetime Hardware Warranty

The Cisco Catalyst 9600 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 review the warranty statement shipped with your specific product carefully 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>.

The following table provides information about the Enhanced Limited Lifetime Warranty (E-LLW).

Table 21. E-LLW details

Cisco E-LLW	
Devices Covered	Applies to Cisco Catalyst 9600 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, and 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 9600 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 Environmental, Social and Governance (ESG) initiatives, performance, and policies for our products, solutions, operations, and extended operations or supply chain is provided in the [Cisco ESG Reporting Hub](#) website, including the [Cisco Purpose Report](#).

Referenced links to information about key environmental sustainability topics are provided in the following table:

Table 22. Product Sustainability

Sustainability Topic	Reference	Resource
General	Information on product-material-content laws and regulations	Materials
	Information on electronic waste laws and regulations, including our products, batteries and packaging	WEEE compliance
	Sustainability Inquiries	Contact: csr_inquiries@cisco.com
	Information on product takeback and reuse program	Cisco Takeback and Reuse Program
	Safety and compliance	Safety and compliance information
	Mean Time Between Failures - MTBF (hours)	Physical Specifications
Material	Product packaging weight and materials	Contact: environment@cisco.com

Sustainability Topic	Reference	Resource
	Dimensions	Physical Specifications
	Weight	Physical Specifications
	Elimination of wet paint	

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 services

Successfully deploy, manage, and support Cisco Catalyst 9000 switches with a full life cycle of Cisco Services including implementation, optimization, technical, managed and training services. Our team of experts can help you speed deployment, reduce costs, and minimize risk as you introduce new hardware, software and protocols into the network. As your trusted advisor, we help you achieve extraordinary business outcomes, minimize risk and disruption so you can anticipate change and pivot quickly, securely, and confidently.

Table 23. Technical Services

Cisco Technical Services
<p>Cisco Smart Net Total Care Service</p> <ul style="list-style-type: none"> • 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
<p>Cisco Solution Support Service</p> <ul style="list-style-type: none"> • Provides a team of experts who act as primary point of contact to deliver centralized support, including in multivendor network environments • Speed is paramount when problems arise, so we deliver on a 30-minute service level objective and prioritize Solution Support cases • Expert guidance helps to enhance IT operations with fewer outages and faster problem resolution while maximizing performance and reliability of Catalyst 9600 Series Switches • We even look beyond identified problems and provide the necessary guidance needed to help you avoid any pitfalls before they can disrupt IT or your business

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

[Learn more about available services.](#)

Cisco Capital

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
Added Simplified Campus Automation	All relevant sections	June 4, 2024
Added 1G support for C9600X using SFP-1G-SX/LH	All applicable areas	April 15, 2024
Added C9600X-LC-56YL4C sections	All applicable areas	November 21, 2023
Added Cisco Catalyst Software Subscription	Software section	September 14, 2023
Added C9600-PWR-3KWAC Power Supply and updated Cisco environmental sustainability section	All applicable areas	November 24, 2022
Added C9600X-LC-32CD sections	All applicable tables	June 14, 2022
Added C9600X-SUP-2 and, C9600-LC-40YL4CD sections	All applicable tables	February 03, 2022
Added Custom SDM template section	All applicable tables	July 20, 2020
Added C9600-LC-48S section	All applicable tables	March 17, 2020
Added C9600-LC-48TX sections	All applicable tables	November 25, 2019
Original version of C9600 Supervisor data sheet	Data sheet	March 25, 2019

Tìm hiểu chi tiết sản phẩm tại vnsup.com hoặc liên hệ trực tiếp qua hotline Ngọc Thiên: 028-777-98-999 để được hỗ trợ tốt nhất

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