Cisco Catalyst 9600 Series Switches

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Introduction

Empowering Core Layer and Edge Services with Higher Speeds and Scales

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 the lowest total operational cost. Built upon the foundation of the Catalyst 9000, the Catalyst 9600 Series offers scale and security when always-on is a must.

As a foundational building block for the Cisco Digital Network Architecture, the Catalyst 9600 Series switch help customers simplify complexity, optimize IT, and reduce operational costs by leveraging intelligence, automation, and human expertise that no other vendor can deliver regardless of where you are in the intent-based networking journey.

Catalyst 9600 Series Switches provide security features that protects the integrity of the hardware as well as the software and all data that flows through the switch. It provides resiliency that keeps your business up and running seamlessly. Combine that with open APIs of Cisco IOS XE and programmability of the UADP and Silicon1 ASIC technologies, Catalyst 9600 Series switches give you what you need now with investment protection on future innovations.

As the industry's first purpose-built 40,100, 200 and 400 Gigabit Ethernet line of modular switches targeted for the enterprise campus, Catalyst 9600 Series switches deliver unmatched table scale (MAC, route, and Access Control List [ACL]) and buffering for enterprise applications. The Cisco Catalyst 9606R chassis is hardware ready to support a wired switching capacity of up to 25.6 Tbps, with up to 6.4 Tbps of bandwidth per slot. Cisco Catalyst 9600 Series switches support granular port densities that fit diverse campus needs, including nonblocking 40, 100, 200 and 400 Gigabit Ethernet (GE) Quad Small Form Factor Double Density (QSFP-DD), 40 and 100 Gigabit Ethernet (GE) Quad Small Form-Factor Pluggable (QSFP+, QSFP28); 1, 10, 25, and 50 GE Small Form-Factor Pluggable Plus (SFP, SFP+, SFP28, SFP56); 10G Multigigabit Ethernet (GE) (10G/5G/2.5G/1G/100M/10M) RJ45 copper ports. The switches also support advanced routing and infrastructure services (such as, industry-standard BGP EVPN VXLAN, 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 9600 Series also supports foundational high-availability capabilities such as patching, Cisco Nonstop Forwarding with Stateful Switchover (NSF/SSO), redundant platinum-rated (2KW) or titanium-rated (3KW) power supplies, and fans, while supporting a wide array of optics.

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 Digital Network Architecture (Cisco DNA) 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.

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Product overview

Cisco Catalyst 9600 Series Chassis

- Hardware ready to support up to 25.6 Tbps in wired switching capacity, with up to 6.4 Tbps bandwidth per slot.
- 25.6 Tbps wired switching capacity unleashed with Cisco Catalyst 9600 Series Supervisor Engine 2. Up to 9.6 Tbps in wired switching capacity, with 3 Bpps of forwarding performance with the Cisco Catalyst 9600 Series Supervisor Engine 1.
- Capacity of up to 32 ports of 400G Gigabit Ethernet QSFP-DD ports with the Cisco Catalyst 9600 Series Supervisor Engine 2. Upto 8 non-blocking 400 Gigabit Ethernet QSFP-DD ports supported with current generation Line Cards.
- Up to 48 nonblocking 100 Gigabit Ethernet QSPF28 ports with the Cisco Catalyst 9600 Series Supervisor Engine 1, and upto 128 nonblocking 100 Gigabit Ethernet QSPF28 ports with the Cisco Catalyst 9600 Series Supervisor Engine 2.
- Up to 128 nonblocking 40 Gigabit Ethernet QSPF28 ports with the Cisco Catalyst 9600 Series Supervisor Engine 2 and up to 96 nonblocking 40 Gigabit Ethernet QSFP+ ports with the Cisco Catalyst 9600 Series Supervisor Engine 1.
- Up to 256 nonblocking 50G/25G/10G Gigabit Ethernet QSPF56 ports with the Cisco Catalyst 9600 Series Supervisor Engine 2 and upto 192 nonblocking 25 Gigabit Ethernet /10 Gigabit Ethernet SFP28/SFP+ ports with the Cisco Catalyst 9600 Series Supervisor Engine 1.
- Up to 192 non-blocking 10G multigigabit (10 Gigabit Ethernet / 5 Gigabit Ethernet / 2.5 Gigabit Ethernet / 1 Gigabit Ethernet / 100 Megabit / 10 Megabit) RJ45 copper ports with the Cisco Catalyst 9600 Series Supervisor Engine 1. Supervisor Engine 2 only supports speeds at and above 10 GBps.
- Platinum-rated (2KW) or titanium-rated (3KW) AC power supplies.
- Platinum-rated (2KW) DC power supplies.



Figure 1.
Cisco Catalyst 9606R Chassis

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Cisco IOS XE

Cisco IOS XE Software 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 automation mechanisms are outlined below.

- **Automated Device Provisioning** 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 turnkey solutions such as Plug and Play and Preboot Execution Environment (PXE) that enable an effortless and automated deployment.
- **API-driven configuration** is available with modern network switches such as Cisco Catalyst 9600 Series switches. It supports a wide range of automation features and provides robust open APIs over NETCONF and RESTCONF using YANG data models for external tools, both off the shelf and custom built, to automatically provision network resources.
- **Granular visibility** enables model-driven telemetry to stream data from a switch to a destination. The data to be streamed is identified through subscription to a data set in a YANG model. The subscribed data set is streamed to the destination at specified intervals. Additionally, Cisco IOS XE enables the push model. It provides near-real-time monitoring of the network, leading to quick detection and rectification of failures.
- **Seamless software upgrades and patching** supports OS resilience. On Cisco Catalyst 9600 Series switches Cisco IOS XE supports hot patching without reboot, which provides fixes for critical bugs and security vulnerabilities between regular maintenance releases. This support lets you add patches without having to wait for the next maintenance release.
- **Trustworthy solutions built with Cisco Trust Anchor Technologies** provide a highly secure foundation for Cisco products. With Cisco Catalyst 9600 Series switches, these technologies enable hardware and software authenticity assurance for supply chain trust and strong mitigation against man-in-the-middle attacks that compromise software and firmware. Trust Anchor capabilities include image signing, Secure Boot, and Cisco Trust Anchor module.

Platform benefits

Table 1. Platform Benefits of the Cisco Catalyst 9600 and 9600X

Model	Catalyst 9600 SUP-1	Catalyst 9600X SUP-2
Resiliency and High Availability		
Software Maintenance Upgrade (SMU)	Yes	Yes
Cisco StackWise Virtual	Yes	Yes
Cisco StackWise Virtual (QuadSup RPR)	Yes	No
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]

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Model	Catalyst 9600 SUP-1	Catalyst 9600X SUP-2
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
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
Protocol-Independent Multicast (PIM) Source- Specific Mode (PIM-SSM)	Yes	Yes
Bidirectional PIM (BIDIR-PIM)	Yes	No
IPv6 routing	Yes	Yes

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Model	Catalyst 9600 SUP-1	Catalyst 9600X SUP-2
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	No[2]
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
Border Handoff: Multi-VRF, MPLS VPN, VPLS, L2/L3	Yes	Yes
Software-Defined Access (SD-Access)		
Virtual eXtensible LAN (VXLAN)	Yes	Yes
L2 Virtual Network Interface (VNI)	Yes	Yes
L3 Virtual Network Interface (VNI)	Yes	Yes
Distributed Anycast Gateway	Yes	Yes
SDA Control-Plane	Yes	Yes
SDA Border	Yes	Yes
SDA Edge	Yes	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]

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Model	Catalyst 9600 SUP-1	Catalyst 9600X SUP-2
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.

Cisco Catalyst 9600 Series Chassis

Cisco Catalyst 9600 Series switches offers one chassis option, two supervisor options, and multiple line-card options. It provides a common architecture that can scale up to 192 10 Gigabit or 25 Gigabit Ethernet ports. The Cisco Catalyst 9600 Series redundant chassis offer High Availability (HA) by supporting 1 + 1 redundant supervisor engines with full-image In-Service Software Upgrades (ISSU). NSF/SSO and ISSU help ensure continuous packet forwarding during supervisor engine switchover to enable HA for business-critical applications.

The Cisco Catalyst 9600 Series chassis is enterprise optimized, with efficient side-to-side airflow and full front accessibility for all removable components, including supervisors, line cards, power supplies, and fan tray. The chassis also supports optional rear accessibility for the fan tray to enable efficient cable management. The Cisco Catalyst 9600 Series chassis, supervisor, line cards, power supply, and fan tray have embedded RFID tags that facilitate easy asset and inventory management using commercial RFID readers.

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Table 2. Chassis Features

Feature	Cisco Catalyst 9606R chassis
Total number of slots	6
Line Card slots	4
Supervisor Engine slots	2
Dedicated Supervisor Engine slot numbers	3 and 4
Supervisor Engine Redundancy	Yes
Supervisor Engines Supported	C9600-SUP-1, C9600X-SUP-2
Maximum bandwidth scalability per Line Card slot	6.4 Tbps with C9600X-SUP-2 2.4 Tbps with C9600-SUP-1
Number of Power Supply bays	4
Minimum number of Power Supplies	2[1]
Power Supplies supported	3000W AC, 2000W AC, and 2000W DC
Number of Fan-tray bays	1

[1]Fully loaded C9606R chassis, Minimum 3 power supplies required if input voltage is 110V

Supervisor configuration

Cisco Catalyst 9600 Series switches offers an industry-leading supervisor engine built for secure networks, IoT applications, next-generation mobility, and cloud adoption. Supervisor Engine 1 is built with the latest UADP ASIC, with its programmable pipeline and template-based, configurable allocation of Layer 2, Layer 3, forwarding, ACLs and QoS entries, making it ready for next-generation technologies.

The following table lists the maximum bandwidth per slot.

Table 3. Supervisor Engine 1 maximum bandwidth per slot

Feature	Cisco Catalyst 9600 Series Supervisor Engine 1	Cisco Catalyst 9600X Series Supervisor Engine 2
Cisco Catalyst C9606R Chassis	2.4 Tbps per slot	6.4 Tbps per slot

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The following table lists the minimum software requirements for the Cisco Catalyst 9600 Series Supervisor Engine 1.

Table 4. Supervisor Engine 1 minimum software requirements

Chassis	Supervisor Engine	Minimum Software Requirement
Cisco 9606R	Cisco Catalyst 9600 Series Supervisor Engine 1	Cisco IOS XE Software Release 16.11.1
	Cisco Catalyst 9600X Series Supervisor Engine 2	Cisco IOS XE Software Release 17.7.1

Line Card Options

Cisco Catalyst 9600 Series switches offers the ability to mix and match a range of line cards to support numerous cores and aggregation deployments. Supported line cards are listed in the following tables by part number.

Table 5. Line Cards compatible with Catalyst 9600 Supervisor Engine 1

Product Number	Description	Minimum Software Requirement
C9600-LC-24C	Cisco Catalyst 9600 Series 24-port 40GE/12-Port 100GE	Cisco IOS XE Software Release 16.11.1
C9600-LC-48YL	Cisco Catalyst 9600 Series 48-port 25GE/10GE/1GE	Cisco IOS XE Software Release 16.11.1
C9600-LC-48TX	Cisco Catalyst 9600 Series 48-port RJ45 Copper - 10GE/5GE/2.5GE/1GE/100Mbps/10Mbps	Cisco IOX XE Software Release 17.1.1
C9600-LC-48S	Cisco Catalyst 9600 Series 48-Port 1GE	Cisco IOX XE Software Release 17.2.1
C9600-LC-40YL4CD	C9600-LC-40YL4CD Cisco Catalyst 9600 Series Combo line card 40 ports 1/10/25GE SFP and 2 ports 40/100GE QSFP Uplinks	Cisco IOX XE Software Release 17.7.1

Table 6. Line Cards compatible with Catalyst 9600 Supervisor Engine 2

Product Number	Description	Minimum Software Requirement
Cisco Catalyst 9600 Series Line Cards		
C9600-LC-24C	Cisco Catalyst 9600 Series 24-port 40GE/100GE line card	Cisco IOS XE Software Release 17.7.1
C9600-LC-48YL	Cisco Catalyst 9600 Series 48-port 25GE/10GE[1] SFP28 line card	Cisco IOS XE Software Release 17.7.1
C9600-LC-48TX	Cisco Catalyst 9600 Series 48-port RJ45 Copper - 10GE[1] line card	Cisco IOX XE Software Release 17.7.1

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Product Number	Description	Minimum Software Requirement
C9600-LC-40YL4CD	Cisco Catalyst 9600 Series Combo line card 40 ports 50/25/10GE SFP56 2 ports 200/100/40GE QSFP56 uplinks 2 ports 400/200[2]/100/40GE QSFP-DD uplinks	Cisco IOX XE Software Release 17.7.1
C9600X-LC-32CD	Cisco Catalyst 9600 Series Combo line card 30 ports 100/40GE QSFP28 2 ports 400/200[2]/100/40GE QSFP-DD	Cisco IOS XE Software Release 17.9.1

[1] C9600X-SUP-2 only supports speeds of 10GE or higher.

[2] Hardware capable.

Cisco Catalyst 9600 Series switches has flexible interface types and port densities that allow you to mix and match network configurations to meet the specific needs of campus networks in the following table.

Table 7. Maximum Chassis Port Densities

Cisco Catalyst 9606R Chassis	C9600-SUP-1	C9600X-SUP-2
400G	-	8
200G	-	8
100G	48	128
50G	-	256[1]
40G	96	128
25G	192	256[1]
10G	192	256[1]
5G**	192	-
2.5G**	192	-
1G	192	-
100M**	192	-
10M**	192	-

**Using C9600-LC-48TX

[1] With Breakouts

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Licensing

Introduction to Smart Licensing

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

- **Easy Activation:** Smart Licensing establishes a pool of software licenses that can be used across the entire organization—no more PAKs (Product Activation Keys).
- **Unified Management:** My Cisco Entitlements (MCE) provides a complete view into all 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.
- 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/licensingguide.

Software policy for Cisco Catalyst 9600 Series Switches

Packaging: Network and Cisco DNA Licensing

The Cisco Catalyst 9000 family of switches introduces a new and simplified licensing package in the form of base and add-on licenses.

- **The base licensing** package includes Network Advantage licensing options that are tied to the hardware. The base licensing packages cover switching fundamentals, management automation, troubleshooting, and advanced switching features. These base licenses are perpetual.
- **The add-on licensing** package includes the Cisco DNA Advantage option. In addition to on-box capabilities, the features available with this package provide Cisco innovations on the switch, as well as on Cisco DNA Center. The Cisco DNA add-on licenses are available as a subscription.

License consumption is easily determined by the package itself. While base licenses are always permanent and without an expiration date, add-on licenses have to be purchased for a 3-, 5,- or 7- year term (and hence are also known as term- based licenses).

Cisco DNA Advantage Subscription

Cisco DNA Advantage subscriptions offer a flexible way to buy software for the access domain. At each stage in the product lifecycle, Cisco DNA Advantage subscriptions help make buying, managing, and upgrading your network and infrastructure software easier. Cisco DNA Advantage subscriptions provide:

- Flexible licensing models to smoothly distribute customers' software spending over time.
- Investment protection for software purchases through software services-enabled license portability.
- Lower cost of entry with the new Cisco DNA Advantage Subscription for Switching model.

Cisco Catalyst 9600 Series Supervisor 1 based switches run on Cisco IOS XE Release 16.11.1 or later. Catalyst 9600 Series Supervisor 2 based switches run on Cisco IOS XE Release 17.7.1 or later. This software release includes all the features listed earlier in the Platform Software Benefits section.

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Managing Licenses with Smart Accounts: Creating Smart Accounts by using the Cisco Smart Software Manager (Cisco SSM) enables you to order devices and licensing packages and 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 add-on licenses that you want to renew.

You must order an add-on 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 reloading.

Note: It is not required to deploy Cisco DNA Center, just to use one of the above packages.

For ordering information for Cisco DNA Software for the Cisco Catalyst 9600 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 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 if 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 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.

Network Licensing

Table 8. Network advantage package features

Features on Cisco Catalyst uplink switches	Network Advantage
Switch Fundamentals Layer 2, Routed Access (RIP, EIGRP Stub, OSPF), PBR, PIM Stub Multicast, PVLAN, VRRP, PBR, Cisco Discovery Protocol, QoS, FHS, 802.1X, CoPP, SXP, IP SLA Responder, SSO	✓
Advanced Switch Capabilities and Scale BGP, EIGRP, HSRP, IS-IS, BSR, MSDP, PIM SM, PIM SSM, BIDIR-PIM, IP SLA, OSPF	✓
Network Segmentation VRF, Software-Defined Access (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*	✓

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Features on Cisco Catalyst uplink switches	Network Advantage
Security MACsec-256	✓

*Sup-2: FCS+

Cisco DNA Licensing

Table 9. Cisco DNA Advantage package features

Features	Cisco DNA Advantage
Switch Features	
Advanced telemetry and visibility Full Flexible NetFlow, EEM	✓
Cisco DNA Center Features	
Day-0 network bring-up automation Cisco Network Plug-and-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	✓

For a full list of features, please see the Cisco DNA Software for Switching feature matrix: https://www.cisco.com/c/m/en_us/products/software/dna-subscription-switching/en-sw-sub-matrix-switching.html?OID=otren019471.

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.
- Plug and Play enabled: A simple, secure, unified, and integrated offering eases new branch or campus device rollouts and can also be used to provide updates to an existing network.

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Advanced Security

- Advanced Encryption Standard 256 (AES-256) support with the powerful MACsec-256 encryption algorithm is available in hardware.
- Trustworthy solutions: Secure Unique Device Identification (SUDI) support for Plug and Play (PnP) tamper-proof device identity capability secures zero-touch provisioning by allowing your device to show a certificate to the server to be able to get on your network.

SD-Access

- SD-Access is Cisco's leading enterprise architecture. It includes:
  - Policy-based automation from edge to cloud.
  - Macro-segmentation and micro-segmentation made easy, with predictable performance and scalability.
  - Automation through the Cisco DNA Center Appliance.
  - Policy through the Cisco Identity Services Engine (ISE).
  - Network assurance through the Network Data Platform.

Physical specifications

Catalyst 9600 chassis

The following table lists physical specifications of the Cisco Catalyst 9606 chassis.

Table 10. Physical Specifications of Cisco Catalyst 9606 Chassis

Description	Specifications
SKU	C9606R
Dimensions (H x W x D)	35.43 x 44.2 x 40.9 cm 13.95 x 17.4 x 16.1”
Rack Units (RU)	8
Chassis Weight with 2 Power Supplies (AC) and Fan tray	31.31 kg (69.03 lbs)
Input Voltage	AC: 90V to 264V, 47 to 63 Hz DC: -40V to -72V
Operating Temperature	-5° to 45° C (23° to 113° F) up to 6000 feet -5° to 40° C (23° to 104° F) up to 10,000 feet
Storage Temperature	-40° to 75° C (40° to 167° F)
Relative Humidity, Operating and Non-operating, Non-condensing	10% to 95%, Non-condensing
Altitude	-60 to 3000 m (-197 to 9843 feet)

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Description	Specifications
Mean Time Between Failures (MTBF) (hours)	C9606R chassis: 4,113,900 C9606 fan tray: 452,570 C9600-PWR-3KWAC: 300,000 C9600-PWR-2KWAC: 300,000 C9600-PWR-2KWDC: 300,000
Chassis Weight (without Fan tray, without PSU)	25.36 kg (55.90 lbs)
Weight of Fan-tray	3.56 kg (7.85 lbs)
Weight of individual PSUs	AC PSU (3000W): 1.4 kg (3.09 lbs) AC PSU (2000W): 1.2 kg (2.65 lbs) DC PSU (2000W): 1.28 kg (2.82 lbs)

Power supply

The Cisco Catalyst 9600 Series power supplies support two modes of operation.

Combined Mode

In combined mode, the power available for the entire chassis is equal to the sum of the output power of all of the power supplies multiplied by the share ratio. Additional power supply units operate at ~90% capacity. In combined mode, the power supplies need to be of equal wattage. The power supplies can be AC and DC mixed provided AC input voltage is 220V.

P = Power output of one PSU

Total combined mode power = P + (N-1) * P * (share ratio)

N = 1, 2, 3, or 4

Redundant N+1 Mode

The Cisco Catalyst 9600 Series chassis also supports N+1 redundancy, with N independent input circuits and safeguards against the failure of one (+1) of the circuits during a PSU failure. Additional PSUs operate at ~90% capacity. In redundant mode, the power supplies need to be of equal wattage. The power supplies can be AC and DC mixed provided AC input voltage is 220V.

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Power supply specifications

The following table gives the power supply specifications for Cisco Catalyst 9600 Series switches.

Table 11. Power Supply Specifications

Power Supply Feature	C9600-PWR-3KWAC	C9600-PWR-2KWAC	C9600-PWR-2KWDC
Max power rating	3000W	2000W	2000W
Input voltage range and frequency	90VAC to 140VAC and 180VAC to 264VAC 47 to 63 Hz	90VAC to 140VAC and 180VAC to 264VAC 47 to 63 Hz	-40VDC to -72VDC frequency
Power supply efficiency	94% (typical)	94% (typical)	92% (typical)
Input current	17.6A max at 115VAC (1500W) 17.6A max at 230VAC (3000W)	10.5A max at 115VAC (1050W) 10.5 A max at 230VAC (2000W)	Maximum: 60A per DC input at -40VDC input (when full PSU loading)
Output ratings	12Vmain at 125A (15000W) 12Vmain at 250A (3000W)	12Vmain at 88A 12Vmain at 167A	12Vmain at 167A
Output holdup time	AC = 20 ms minimum for system	AC = 20 ms minimum for system	AC = 5 ms minimum for system
Power-supply input receptacles	AC IEC 60320 C20	AC IEC 60320 C16	Amphenol C10-638976-000
Power cord rating	AC 20A	AC 15A	DC 70A

The power listed is the absolute maximum. Typically, the power would be 70% of absolute maximum.

BTU output

The following table shows the BTU (British Thermal Unit) output.

Table 12. BTU details for 9606R chassis with Fan tray

Total output BTU	BTU
C9606R + C9606-FAN	1,621 (max)

Table 13. Cisco Catalyst 9600 Series Power Cord Options

Power Supply	Product Number	Power Cable Options by Country
C9600-PWR-3KWAC	**CAB-9K20A-NA**	North America/Japan 20A, 125VAC
	CAB-9K16A-US2	US/Japan 16A, 250VAC
	CAB-9K16A-AUS	Australia 16A, 250VAC
	CAB-9K16A-CH	China 16A, 250VAC
	CAB-9K16A-INT	International 16A, 250VAC

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Power Supply	Product Number	Power Cable Options by Country
	CAB-9K16A-SW	Switzerland 16A, 250VAC
	CAB-9K16A-EU	Continental Europe 16A, 250VAC
	CAB-C19-CBN	Cabinet Jumper 16A, 250VAC
C9600-PWR-2KWAC	**CAB-TA-CN**	China AC Type A Power Cable
	CAB-TA-IS	Israel AC Type A Power Cable
	CAB-TA-AP	Australia AC Type A Power Cable
	CAB-TA-AR	Argentina AC Type A Power Cable
	CAB-TA-DN	Denmark AC Type A Power Cable
	CAB-TA-EU	Europe AC Type A Power Cable
	CAB-TA-IN	India AC Type A Power Cable
	CAB-TA-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
	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-ACBZ-12A	AC Power Cord (Brazil) 12A/125V BR-3-20 plug up to 12A
C9600-PWR-2KWDC	**PWR-2KW-DC-CBL**	Power Cord - 2KW DC

Fan tray

Each Cisco Catalyst 9600 Series switch uses a single serviceable fan tray for cooling. The switches can optionally be accessed from the rear for flexible cable management. The chassis is optimized for enterprise closets, with side-to-side airflow. All fan trays are composed of multiple independently controlled fans. If any single fan fails, the system will continue to operate without a significant degradation in cooling. Fan speeds change dynamically to compensate for fan failure. Cisco Catalyst 9600 Series fans have a barometric sensor, which allows slower fan speed curves at lower altitudes. The fans also have individual Pulse-Wide Modulation (PWM) fine-tuning to reduce variability in fan revolutions per minute (rpm) under throttled conditions. The measured acoustic noise in a formal NEBS test environment is 77.7 Lwad (dB). The chassis are designed to accommodate fanless operation of up to 90 seconds to enable serviceability.

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Figure 2.
Cisco Catalyst 9606R Chassis with Fan Tray

Regulatory standards compliance

The following table lists the regulatory standards compliance for Cisco Catalyst 9600 Series switches.

Table 14. Safety and Compliance Information

Description	Specification
Safety certifications	C9606R • 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

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Description	Specification
	EN 300 386 V1.6.1 EN55024: 2010 + A1: 2015 KN35: 2015 TCVN 7317: 2003

Ordering information

The following table lists the ordering information for chassis, power supplies, supervisor engines, and memory that are commonly used with the Cisco Catalyst 9600 Series, as well as the Cisco DNA term licenses.

Table 15. Ordering information

Product Number	Description
C9606R (=)	Cisco Catalyst 9600 Series 6 Slot Chassis
C9600-SUP-1 (=)	Cisco Catalyst 9600 Series Supervisor 1 Module
C9600-SUP-1/2	Cisco Catalyst 9600 Series Redundant Supervisor 1 Module
C9600X-SUP-2 (=)	Cisco Catalyst 9600 Series Supervisor 2 Module
C9600X-SUP-2/2	Cisco Catalyst 9600 Series Redundant Supervisor 2 Module
C9600-LC-24C (=)	Cisco Catalyst 9600 Series 24-Port 40GE/12-Port 100GE line card
C9600-LC-48YL (=)	Cisco Catalyst 9600 Series 48-Port 25GE/10GE/1GE line card
C9600-LC-48TX (=)	Cisco Catalyst 9600 Series 48-port RJ45 Copper – 10GE/5GE/2.5GE/1GE/100Mbps/10Mbps line card
C9600-LC-48S (=)	Cisco Catalyst 9600 Series 48-Port 1GE line card
C9600-LC-40YL4CD (=)	Cisco Catalyst 9600 Series Combo line card 40 ports 50/25/10GE SFP56 2 ports 200/100/40QSFP56 uplinks 2 ports 400/200/100GE QSFP-DD uplinks
C9600X-LC-32CD (=)	Cisco Catalyst 9600 Series Combo line card 30 ports 100/40G QSFP28 2 ports 400/200/100G QSFP-DD
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

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Product Number	Description
Cisco DNA Term Licenses	**Description**
C9600-DNA-A	C9600 Cisco DNA Advantage Term License
C9600-DNA-A-3Y	C9600 Cisco DNA Advantage 3 Year License
C9600-DNA-A-5Y	C9600 Cisco DNA Advantage 5 Year License
C9600-DNA-A-7Y	C9600 Cisco DNA Advantage 7 Year 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

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 16. 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

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Sustainability Topic	Reference	Resource
	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
Power	Default AC power supply	Platform Benefits
	Power supplies	Power Supply Specifications
	Fan	Fan Tray
Material	Weight	Physical Specifications
	Elimination of wet paint	Environment Circular Economy Commitment to Net Zero
	Product packaging weight and materials	Contact: environment@cisco.com
	Dimensions	Physical Specifications

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.

Warranty

Cisco Enhanced Limited Lifetime Hardware Warranty

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 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.

The following table provides information about the E-LLW.

Table 17. Enhanced Limited Lifetime Warranty (E-LLW) Details

Description	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.

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Description	Cisco E-LLW
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 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 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 18. 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 Solution Support Service • 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.

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Document history

New or Revised Topic	Described In	Date
Added 3000W AC power supply and updated Cisco environmental sustainability section	All applicable areas	November 24, 2022
Added C9600X-LC-32CD	All applicable tables	June 14, 2022
Added C9600X-SUP-2, C9600-LC-40YL4CD sections	All applicable tables	February 03, 2022
Added C9600-LC-48TX sections	All applicable tables	November 25, 2019
Original version of C9600 Switches data sheet	Data sheet	March 25, 2019

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Printed in USA C78-741943-13 04/23

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