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Cisco Catalyst 9600 Series Line Cards

Contents

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.

As foundational building blocks for the Cisco Digital Network Architecture, Catalyst 9600 Series switches 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 ASIC technology, 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 supports 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 Pluggable (QSFP+, QSFP28, QSFP56, QSFP-DD) and 1, 10, and 25 GE Small Form-Factor Pluggable Plus (SFP, SFP+, SFP28) and 10 Gigabit multigigabit (10 Gigabit Ethernet/5 Gigabit Ethernet/2.5 Gigabit Ethernet/1 Gigabit Ethernet/100 Megabit/10 Megabit) RJ45 copper ports. The switches also 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 9600 Series also supports foundational high-availability capabilities such as patching, Graceful Insertion and Removal (GIR), 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 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 businesses. It is an open, 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

Cisco Catalyst 9600 Series Line Cards

Table 1.   Catalyst 9600 Supervisor and Line Card compatibility and bandwidth

Line Card	C9600-SUP-1		C9600X-SUP-2	
	Bandwidth	Minimum SW requirement	Bandwidth	Minimum SW requirement
C9600X-LC-32CD	NA	NA	6.4 Tbps	17.9.1
C9600-LC-40YL4CD	2.4 Tbps	17.8.1	6.4 Tbps	17.7.1
C9600-LC-24C	2.4 Tbps	16.11.1	4.8 Tbps	17.7.1
C9600-LC-48YL	2.4 Tbps	16.11.1	4.8 Tbps	17.7.1
C9600-LC-48TX	960 Gbps	17.1.1	960 Gbps	17.7.1
C9600-LC-48S	96 Gbps	17.2.1	Not Compatible	NA

C9600X-LC-32CD - Cisco Catalyst 9600 Series 30-port 100/40GE, 2-port 200GE, 2-port 400GE Line Card

Figure 1.
Cisco Catalyst 9600 Series 30-port 100/40GE, 2-port 400/200/100GE (C9600X-LC-32CD)

Highlights of the C9600X-LC-32CD

- Paired with C9600X-SUP-2 (3.2 Tbps bandwidth), this line card provides up to 30 ports of 100/40 GE, 2 ports of 400/200/100 non blocking

- 100/40 GE QSFP28, 400/200 GE QSFP-DD ports

- IPv6 support on the Cisco Silicon One Application-Specific Integrated Circuit (ASIC)[*], providing wire-rate forwarding for IPv6 networks

- Advanced Encryption Standard 256 (AES-256) support with the powerful MACsec and WAN MACsec encryption algorithm[2]

[*]Cisco Silicon One ASIC is part of the Cisco Catalyst 9600 Series Supervisor Engine 2.

[2]WAN MACsec is supported only on C9600X-SUP-2

C9600-LC-40YL4CD - Cisco Catalyst 9600 Series 40-port 50/25/10GE, 2-port 200GE, 2-port 400GE Line Card
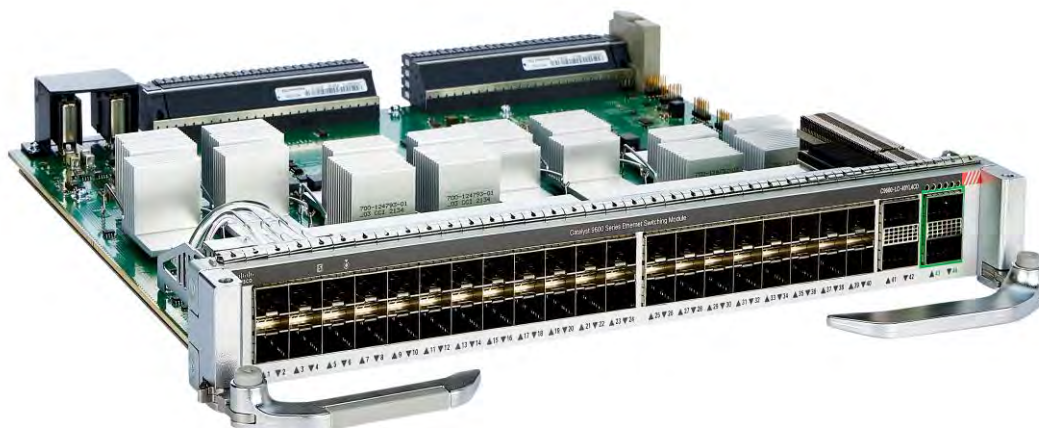

Figure 2.
Cisco Catalyst 9600 Series 40-port 50GE, 2-port 200GE, 2-port 400GE Line (C9600-LC-40YL4CD)

Highlights of the C9600-LC-40YL4CD

- Paired with C9600X-SUP-2 (3.2 Tbps bandwidth), this line card provides up to 40 ports of 50/25/10 GE, 2 ports of 100/200 GE and 2 ports of 400 GE non blocking

- Paired with C9600-SUP-1 (1.2 Tbps bandwidth), this line card provides up to 40 ports of 25/10/1 GE and 2 ports of 40/100 GE non blocking

- 50 GE SFP, 200 GE QSFP56 and 400 GE QSFP-DD ports

- IPv6 support on the Cisco Silicon One Application-Specific Integrated Circuit (ASIC)[*], providing wire-rate forwarding for IPv6 networks

- Advanced Encryption Standard 256 (AES-256) support with the powerful MACsec and WAN MACsec encryption algorithm[2]

[*]Cisco Silicon One ASIC is part of the Cisco Catalyst 9600 Series Supervisor Engine 2.

[2]WAN MACsec is supported only on C9600X-SUP-2

C9600-LC-24C - Cisco Catalyst 9600 Series 24-port 40GE/12-port 100GE Line Card

Figure 3.
Cisco Catalyst 9600 Series 24-Port 40GE/12-Port 100GE Line Card (C9600-LC-24C)

Highlights of the C9600-LC-24C

- Paired with C9600-SUP-1, this line card provides up to 24 ports of 40 GE or 12 ports of 100 GE nonblocking

- Paired with C9600X-SUP-2, this line card provides up to 24 ports of 100 GE nonblocking

- 40 GE, 100 GE QSFP28 ports

- IPv6 support on the UADP Application-Specific Integrated Circuit (ASIC)[*], providing wire-rate forwarding for IPv6 networks

- Advanced Encryption Standard 256 (AES-256) support with the powerful MACsec-256 encryption algorithm is available on the UADP ASIC[1]

[*]UADP ASIC is part of the Cisco Catalyst 9600 Series Supervisor Engine 1. This line card does not support MACsec with C9600X-SUP-2

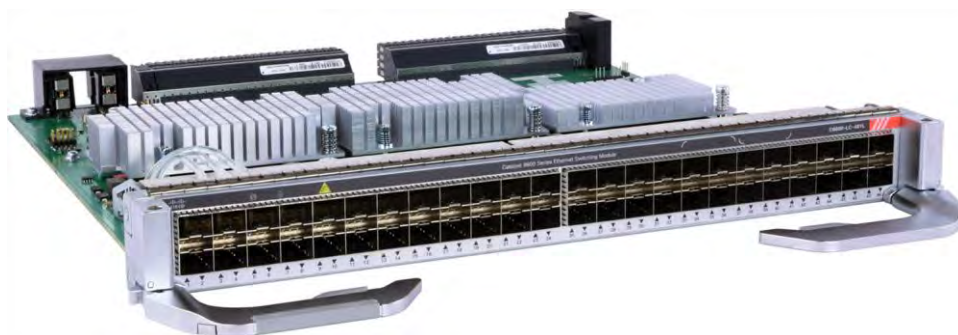## C9600-LC-48YL - Cisco Catalyst 9600 Series 48-port 25GE/10GE/1GE Line Card

Figure 4.
Cisco Catalyst 9600 Series 48-Port 25GE/10GE/1GE line card (C9600-LC-48YL)

Highlights of the C9600-LC-48YL

- 48 ports nonblocking

- 50[1], 25, 10, and 1 GE[2] SFP28, SFP+ ports

- IPv6 support on the UADP Application-Specific Integrated Circuit (ASIC)[2], providing wire-rate forwarding for IPv6 networks

- Advanced Encryption Standard 256 (AES-256) support with the powerful MACsec-256 encryption algorithm is available on the UADP ASIC[3]

[1] 50 GE Support available only on C9600X-SUP-2 is on roadmap, not available at FCS

[2] 1 GE support is available only on C9600-SUP-1

[3] UADP ASIC is part of the Cisco Catalyst 9600 Series Supervisor Engine 1. This line card does not support MACsec with C9600X-SUP-2

C9600-LC-48S - Cisco Catalyst 9600 Series 48-port 1GE Line Card

Figure 5.
Cisco Catalyst 9600 Series 48-Port 1GE Line Card (C9600-LC-48S)

Highlights of the C9600-LC-48S

- 48 ports nonblocking

- IPv6 support on the UADP Application-Specific Integrated Circuit (ASIC), providing wire-rate forwarding for IPv6 networks

- Advanced Encryption Standard 256 (AES-256) support with the powerful MACsec-256 encryption algorithm is available on the UADP ASIC[1]

- Supported only on C9600-SUP-1

[1] UADP ASIC is part of Supervisor Engine 1.

C9600-LC-48TX - Cisco Catalyst 9600 48-port Multigigabit RJ45 Copper Line Card

Figure 6.
Cisco Catalyst 9600 48-port RJ45 Copper - 10GE/5GE/2.5GE/1GE/100Mbps/10Mbps multigiabit Line Card (C9600-LC-48TX)

Highlights of the C9600-LC-48TX

- 48 ports nonblocking

- 10GE, 5GE, 2.5GE, 1GE, 100Mbps, 10Mbps multigigabit RJ45 Copper ports[1]

- IPv6 support on the UADP Application-Specific Integrated Circuit (ASIC), providing wire-rate forwarding for IPv6 networks

- Advanced Encryption Standard 256 (AES-256) support with the powerful MACsec-256 encryption algorithm is available on the UADP ASIC[2]

[1] Only 10 GE supported on C9600X-SUP-2

[2] UADP ASIC is part of the Cisco Catalyst 9600 Series Supervisor Engine 1. This line card does not support MACsec with C9600X-SUP-2

Features and benefits

Functional Transparency

The Cisco Catalyst 9600 Series Switches offer a line of modules that support numerous speeds and physical media combinations. These line cards are functionally transparent; all the packet processing, queuing, buffering, and Quality of Service (QoS) occur in the supervisor engine. To that end, the line cards acquire the features and capabilities of the installed supervisor engine. The architecture lets you easily upgrade all Ethernet line cards on your Cisco Catalyst 9600 Series to newer switching functions and higher throughput by adding a new supervisor engine. The simple design of the line cards results in a very high Mean Time Between Failures (MTBF), helping ensure high availability for a single connection to an end user.

Modular Versatility

The Cisco Catalyst 9600 Series is a modular architecture that is designed to provide dedicated wire-speed bandwidth to each line-card slot within the chassis. Each line card has a dedicated bandwidth to the supervisor engine for packet processing. All network data that flows into the Cisco Catalyst 9600 Series through the various line cards goes through the supervisor engine for processing, even in single-slot port-to-port communications.

A modular design allows you to use your investment in high-performance line cards across the entire line of Cisco Catalyst 9600 Series chassis and supervisor engines. With the architecture of the Cisco Catalyst 9600 Series, all line cards deployed in a chassis benefit from the enhanced features that the supervisor engine provides, including QoS; Layer 2 3, and 4 routing; and hardware-based IPv6.

Smart Operation

- **RFID Tags:** The Cisco Catalyst 9600 Series Switches have an embedded RFID tag that facilitates easy asset and inventory management using commercial RFID readers.

- **Blue Beacon:** The Cisco Catalyst 9600 Series Switches support a blue beacon LED for easy identification of the switch being accessed.

Specification summary

Ports for Line Cards

Table 2 summarizes the port specifications for the Line Cards.

Table 2.   Port information for Line Cards

Line Card	Port Speed	Maximum ports with C9600X-SUP-2	Maximum ports with C9600-SUP-1
C9600X-LC-32CD	40 GE	128	NA
	100 GE	128	NA
	200 GE	8	NA
	400 GE	8	NA
C9600-LC-40YL4CD	25, 10 GE	256[1]	192
	50 GE	256[1]	NA
	100 GE	96	NA
	200 GE	8	NA
	400 GE	8	NA
C9600-LC-24C	40 GE	96	96
	100 GE	96	48
	10 GE[2]	96	96
C9600-LC-48YL	25, 10, 1 GE	192[3]	192
	50 GE	192	NA
C9600-LC-48S	1GE	NA	192
C9600-LC-48TX	10GE, 5GE, 2.5GE, 1GE, 100M, 10M	192[3]	192

[1] Breakout support in roadmap, not available at FCS

[2] With CVR adapter.

[3] Speeds below 10GE not supported on C9600X-SUP-2

Power details

Table 3 gives power details information for the Line Cards.

Table 3.   Rated Power Details by line card

Line Card	Max rated power C9600X-SUP-2	Max rated power C9600-SUP-1
C9600X-LC-32CD	420 W	NA
C9600-LC-40YL4CD	420 W	420 W
C9600-LC-24C	280 W	200 W
C9600-LC-48YL	300 W	230 W
C9600-LC-48TX	315 W	315 W
C9600-LC-48S	NA	160 W

Catalyst 9600X-SUP-2 provides higher power to support higher high port speeds and density

Optics

Cisco Catalyst 9600 Series Line Cards provide a variety of optical port types and port speeds. For details about the different optical modules supported by each line card and the minimum Cisco software release required for each of the supported optical modules, visit https://tmgmatrix.cisco.com/.

MTBF information

Table 4 gives MTBF information for the Line Cards.

Table 4.   MTBF Details

Line Card	MTBF (Hours)
C9600X-LC-32CD	580,420
C9600-LC-40YL4CD	580,420
C9600-LC-24C	710,750
C9600-LC-48YL	640,750
C9600-LC-48TX	543,000
C9600-LC-48S	640,750

Ordering information

To place an order, visit the Cisco Ordering homepage. Table 5 details ordering information.

Table 5.   Ordering information

Part Number ("=" Indicates "Spare")	Product Name
C9600X-LC-32CD (=)	Cisco Catalyst 9600 Series 30 port 100/40GE, 2 port 400/200/100GE
C9600-LC-40YL4CD (=)	Cisco Catalyst 9600 Series 40 port 50GE, 2 port 200GE, 2 port 400GE
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
C9600-LC-48TX (=)	Cisco Catalyst 9600 Series 48-Port RJ45 Copper – 10GE/5GE/2.5GE/1GE/100Mbps/10Mbps
C9600-LC-48S (=)	Cisco Catalyst 9600 Series 48-Port 1GE

Product specifications

Standards, Technologies, Environmental Specifications

Table 6 lists additional Line Card product specifications.

Table 6.   Product specifications

Feature	Description
Standards	Gigabit Ethernet: IEEE 802.3z, IEEE 802.3x, IEEE 802.3ab
Physical Dimensions (H x W x D)	1.7 x 15.0 x 13.41 in. (to faceplate) (4.32 x 38.1 x 34.06 cm) 1.7 x 15.0 x 15.7 in. (to ejector) (4.32 x 38.1 x 39.88 cm)
Weight	C9600X-LC-32CDCD: 4.03 kg (8.88 lb) C9600-LC-40YL4CD: 4.03 kg (8.88 lb) C9600-LC-24C: 3.48 Kg (7.67 lb) C9600-LC-48YL: 3.55 Kg (7.83 lb) C9600-LC-48TX: 4.03 kg (8.88 lb) C9600-LC-48S: 3.55 Kg (7.83 lb)
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%, noncondensing

Feature	Description
Altitude	–60 to 3000 m (–197 to 9843 feet)

Safety and compliance

Table 7 lists the safety and compliance information for the Cisco Catalyst 9600 line cards.

Table 7.   Safety and Compliance Information

Feature	Description
Safety Conditions	Fiber optic lasers: Class 1 laser products
Safety Certifications	- UL 60950-1 - CAN/CSA-C222.2 No. 60950-1 - EN 60950-1 - IEC 60950-1 - AS/NZS 60950.1 - IEEE 802.3
Electromagnetic Emissions Certifications	- EN55032:2015 - EN61000-3-2:2014 - EN55032:2012 - NM EN 55032:2015 - QCVN 118:2018/BTTTT - ICES-003:2016:Iss:6 - NM EN 61000-3-3:2015 - NM EN 61000-3-2:2015 47 CFR Part 15:2016 - KN61000-3-3:2014 - CISPR32:2012:Ed:1 - EN300 386:2012:V1.6.1 - KN61000-3-2:2014 - CNS13438:2006 - CISPR32:2015:Ed:2 - KN32:2015 - VCCI-CISPR 32:2016 - EN61000-3-3:2013 - CISPR24:2010+A1:2015 - CISPR35:2016:Ed:1 - EN55024:2010 - EN55024:2010:A1 - EN55035:2017 - EN61000-6-1:2007 - EN61000-6-2:2005 - IEC61000-6-1:2016:Ed:3 - IEC61000-6-2:2016:Ed:3 - KN35:2015 - NM EN 55024:2018 - TCVN 7317:2003
Restriction of Hazardous	ROHS5

Feature	Description
Substances (ROHS) Compliance	

Product sustainability

Information about Cisco's environmental, Social and Governance (ESG) initiatives and performance is provided in Cisco's CSR and sustainability reporting.

Sustainability Topic		Reference
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	Table 7. Safety and compliance information
	Mean Time Between Failures – MTBF (hours)	Table.4: Mean Time between failures metrics
Power	Default AC power supply	Platform details
	Power details	Table 3: Power Details
	Energy Efficient Ethernet	Smart operation
	Product packaging weight and materials	Contact: environment@cisco.com
	Dimensions	Table.6. Standards, Technologies, Environmental Specifications
	Weight	Table.6. Standards, Technologies, Environmental Specifications
Material	Elimination of wet paint on plastic bezel	2019 Cisco Corporate Social Responsibility Report, Pg. 19 Stepping up our work on circularity

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 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 8 provides information about the E-LLW.

Table 8.   E-LLW details

Feature	Description
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, 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 9.   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.

Software Policy for Cisco Catalyst 9600 Series Switches

Cisco DNA Software for Access Switching is available for the Cisco Catalyst 9600 Series.

Cisco DNA Software for Access Switching offers comprehensive solutions for the enterprise campus and branch offices. Cisco ONE 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 Advantage with full Cisco DNA capabilities and Cisco SD-Access.

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 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.

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 C9600X-LC-32CD	All applicable tables	6/14/2022
Added C9600X-SUP-2, C9600-LC-40YL4CD sections	All Applicable sections	02/03/2022
Added C9600-LC-48S Sections	All Applicable Tables	03/17/2020
Added C9600-LC-48TX Sections	All applicable tables	11/25/2019
Original version of C9600 Line card data sheet	Data sheet	03/25/2019