Cisco Catalyst 9400 Series Line Cards

Built for Security, IoT, Mobility and Cloud

Advanced persistent security threats, the exponential growth of the Internet of Things (IoT) devices, mobility everywhere and cloud adoption 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 business service rollout.

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

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

The Cisco Catalyst 9400 is Cisco's lead modular enterprise switching access platform built for security, IoT and cloud. This switch series forms the foundational building blocks for SD-Access — Cisco's leading enterprise architecture. The platform provides unparalleled investment protection with a chassis architecture that is capable of supporting up to 9Tbps of system bandwidth and unmatched power delivery for high density IEEE 802.3BT (60W PoE). Redundancy is now table stakes across the portfolio. The Catalyst 9400 delivers state-of-the-art High Availability (HA) with capabilities like uplink resiliency, N+1/N+N redundancy for power supplies. The platform is enterprise optimized with an innovative dual-serviceable fan tray design, side to side airflow and is closet-friendly with ~16" depth. A single system can scale up to 384 access ports with your choice of 1G copper 10G SFP+, UPoE and PoE+ options. The platform also supports advanced routing and infrastructure services, SD-Access capabilities and network system virtualization. These features enable optional placement of the platform in the core and aggregation layers of small to medium-sized campus environments.

Catalyst 9400 Series line cards

Cisco Catalyst 9400 Series UPoE line card

Figure 1.   C9400-LC-48U Cisco Catalyst 9400 Series 48-Port UPoE 10/100/1000 (RJ-45)
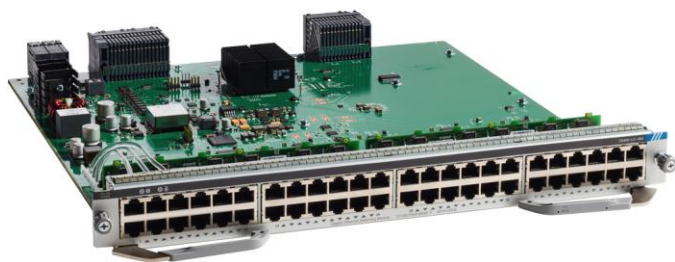
The UPoE line card supports PoE, PoE+, and Cisco Universal PoE to deliver 15W, 30W or 60W to the access point. 60W of in-line power can used to power more devices—including IP phones, IPTVs, surveillance cameras, virtual desktop clients, and many others—without having to install extra wall or ceiling circuits while taking advantage of advanced power management capabilities such as Cisco EnergyWise®.

C9400-LC-48U Features:

- 48 ports nonblocking

- 10/100/1000 module (RJ-45)

- Supported on Cisco Open IOS-XE release 16.6.1 or later

- UPoE is enabled, capable of up to 60W on all the ports in the line card

- Energy Efficient Ethernet 802.3az

- IEEE 802.3af/at and Cisco pre-standard PoE

- IEEE 802.1AE and Cisco TrustSec capability in hardware (Software Roadmap)

- Hardware-ready for IEEE1588/802.1AS and PTP used for time synchronization across the network for applications such as video and audio. (Software Roadmap)

- Layer 2 to Layer 4 Jumbo Frame support up to 9216 bytes

- Enterprise and commercial design to power next-generation IP phones, wireless base stations, video cameras, virtual desktop clients, and other PoE/UPoE devices

- Ideal for campus and branch applications requiring enhanced performance for large file transfers and network backups

Supervisor		Chassis C9407R	Chassis C9410R
C9400 Supervisor Engine-1 (C9400-SUP-1)	Bandwidth Per Slot	80 Gbps	80 Gbps
	Oversubscription	1:1	1:1

Cisco Catalyst 9400 Series RJ45 data line card

Figure 2.   C9400-LC-48T Cisco Catalyst 9400 Series 48-Port 10/100/1000 (RJ-45)
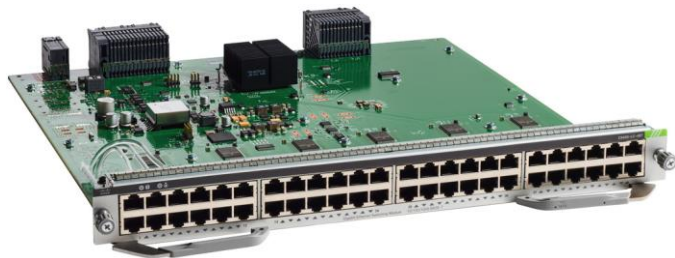
C9400-LC-48T Highlights:

- Supports up to 48 ports nonblocking

- 10/100/1000 module (RJ-45)

- Supported on Cisco Open IOS-XE release 16.6 or later

- Energy Efficient Ethernet 802.3az

- IEEE 802.1AE and Cisco TrustSec capability in hardware (Software Roadmap)

- L2-4 Jumbo Frame support up to 9216 bytes

- Hardware-ready for IEEE1588/802.1AS and Precision Time Protocol (PTP) used for time synchronization across the network for applications such as video and audio. (Software Roadmap)

- Enterprise and commercial design for data only user access

- Ideal for campus and branch applications requiring enhanced performance for large file transfers and network backups

Supervisor			Chassis C9407R	Chassis C9410R
C9400 Supervisor Engine-1 (C9400-SUP-1)	Bandwidth Per Slot		80 Gbps	80 Gbps
	Oversubscription		1:1	1:1

Power over Ethernet

The Cisco Catalyst 9400 Series offers line cards, power supplies, and accessories required to deploy and operate standards-based Power over Ethernet/Power over Ethernet Plus (PoE/PoEP) and Universal PoEP (UPoE). PoE provides power over 100 m of standard Unshielded Twisted-Pair (UTP) cables when an IEEE 802.3af/at-compliant or Cisco pre-standard powered device is attached to the PoE/PoEP and UPoE line card port. Instead of requiring wall power, attached devices such as IP phones, wireless base stations, video cameras, and other IEEE-compliant appliances can use power provided from the Cisco Catalyst 9400 Series UPoE line cards. This capability gives network administrators centralized control over power and eliminates the need to install outlets in ceilings and other out-of-the-way places where a powered device can be installed.

Although all references to "PoE/PoEP/UPOE," "inline power," and "voice" power supplies and line cards are synonymous, there are currently four versions: Cisco pre-standard, IEEE 802.3af compliant, IEEE 802.3at compliant and UPoE. Every Cisco Catalyst 9400 Series chassis and PoE power supply supports the IEEE 802.3af/at standard and the Cisco pre-standard power implementation, helping ensure backward compatibility with existing devices powered by Cisco. All IEEE 802.3af/at-compliant and UPoE line cards can distinguish an IEEE or Cisco pre-standard powered device from an unpowered Network Interface Card (NIC), helping ensure that power is applied only when an appropriate device is connected.

Energy Efficient Ethernet

Energy Efficient Ethernet (EEE) is an IEEE 802.3az standard that is designed to reduce power consumption in Ethernet networks during idle periods.

EEE can be enabled on devices that support Low Power Idle (LPI) mode. Such devices can save power by entering LPI mode during periods of low utilization. In LPI mode, systems on both ends of the link can save power by shutting down certain services. EEE provides the protocol needed to transition into and out of LPI mode in a way that is transparent to upper layer protocols and applications.

Features and benefits

Functional transparency

Cisco Catalyst 9400 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 QoS occur in the supervisor engine. To that end line cards acquire the features and capabilities of the installed supervisor engine. The architecture let you easily upgrade all Ethernet line cards on your Cisco Catalyst 9400 Series systems to newer switching functions 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 9400 Series is a centralized 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 9400 Series through the various line cards goes through the supervisor engine for processing, even in single-slot port-to-port communications.

A modular, centralized design allows you to use your investment in high-performance line cards across the entire line of Cisco Catalyst 9400 Series chasses and supervisor engines. With the centralized architecture of the Cisco Catalyst 9400, 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.

Specification summary: ports for line cards

Table 1 summarizes port specifications for the line cards.

Table 1.   Port Information for line cards

Line Card	Number of Ports	Port Speed	Port Type	Cisco Catalyst 9400 Series Min/Max Ports	
				C9407R	C9410R
C9400-LC-48U	48	10/100/1000	RJ-45 UPOE IEEE 802.3at, IEEE 802.3af, Cisco pre-standard	48/240	48/384
C9400-LC-48T	48	10/100/1000	RJ-45	48/240	48/384

Optics

Cisco Catalyst 9400 line cards provide a variety of optical port types and port speeds, including SFP+ and SFP. 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 http://www.cisco.com/c/en/us/support/interfaces-modules/transceiver-modules/products-device-support-tables-list.html.

Product specifications: Standards, Technologies, Environmental and other Line Card features

Table 2 lists additional line card product specifications.

Table 2.   Product specifications

Feature	Description
Standards	● Gigabit Ethernet: IEEE 802.3z, IEEE 802.3x, IEEE 802.3ab, IEEE 803.3at, IEEE 802.3af, IEEE 802.3az
EtherChannel Technology	● Gigabit EtherChannel: All 1000 Mbps ports ● 10 Gigabit EtherChannel: All 10Gbps ports ● IEEE 802.3ad (Link Aggregation Control Protocol): All 1000 Mbps ports ● Port Aggregation Protocol (PagP): Yes ● Number of ports per tuple: 8 ● EtherChannel and IEEE 802.3ad technology across line cards: Yes
Physical Dimensions	● Occupies one slot in the Cisco Catalyst 9400 Series platform ● Dimensions (H x W x D): 1.6 x 14.92 x 14.57 in. (4.06 x 37.90 x 37.00 cm)

Feature	Description
Environmental Conditions	• Operating temperature: • Normal Operating* Temperature and Altitudes: 　○ 27° to 109°F (-5 to +45°C), up to 6,000 feet (1800 m) 　○ 27° to 104°F (-5 to +40°C), up to 10,000 feet (3000 m) 　○ *Minimum ambient temperature for cold startup is 0°C • Short-Term** Exceptional Conditions: 　○ 27° to 119°F (-5 to +55°C), up to 6,000 feet (1800 m) 　○ 27° to 114°F (-5 to +50°C), up to 10,000 feet (3000 m) 　○ **Not more than following in one-year period: 96 consecutive hours, or 360 hours total, or 15 occurrences • Storage temperature: -40° to 158° F (-40° to 70°C) • Relative humidity: 10 to 95%, noncondensing • Operating altitude: -60 to 3000m
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	• 47 CFR Part 15 • CISPR22 Class A • EN 300 386 V1.6.1 • EN 55022 Class A • EN 55032 Class A • CISPR 32 Class A • EN61000-3-2 • EN61000-3-3 • ICES-003 Class A • TCVN 7189 Class A • V-3 Class A • CISPR24 • EN 300 386 • EN55024 • TCVN 7317
ROHS Compliance	ROHS5

Power and MTBF information

Table 3 gives power and MTBF information for different line cards.

Table 3.　　Power and MTBF information

Part Number	Average Power (W)	Max Rated Power (W)	Rated MTBF (Hours)
C9400-LC-48U	48.7	65	823,000
C9400-LC-48T	45.5	65	1,157,000

Note:　　All power numbers shown in Table 3 are maximum values recommended for facility power and cooling capacity planning. These figures are not indicative of the actual power draw during operation. Typical power draw is about 40%-75% maximum rated power value shown.

Refer to the Cisco Power Calculator for more details: http://cpc.cloudapps.cisco.com/cpc/DS.cpc.

Ordering information

To place an order, visit the Cisco Ordering homepage. Table 4 details ordering information.

Table 4.   Ordering information

Part Number ("=" Indicates "Spare")	Product Name
C9400-LC-48U (=)	Cisco Catalyst 9400 Series 48-Port UPOE 10/100/1000 (RJ-45)
C9400-LC-48T (=)	Cisco Catalyst 9400 Series 48-Port 10/100/1000 (RJ-45)

Cisco Enhanced Limited Lifetime Hardware warranty

The Cisco Catalyst 9400 Series Switches come with a Cisco 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 http://www.cisco.com/go/warranty. Table 5 provides information about the E-LLW.

Table 5.   E-LLW details

	Cisco E-LLW
Devices covered	Applies to Cisco Catalyst 9400 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 9400 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 for Next-Generation Cisco Catalyst Switches

Achieve infrastructure excellence faster and with less risk. Cisco Catalyst 9K Services provide expert guidance to help you successfully deploy, manage and support the new Catalyst 9K Series Switches. With unmatched networking expertise, best practices and innovative tools, we can help you reduce overall upgrade, refresh, and migration costs as you introduce new hardware, software and protocols into the network. Offering a comprehensive lifecycle of services – from implementation, optimization, technical and managed services – Cisco experts help you minimize disruption and achieve operational excellence to extract maximum value from your DNA-ready infrastructure. Learn more about Cisco Services for Enterprise Networks.

Cisco Capital

Financing to help you achieve your objectives

Cisco Capital can help you acquire the technology you need to achieve your objectives and stay competitive. We can help you reduce CapEx. Accelerate your growth. Optimize your investment dollars and ROI. Cisco Capital financing gives you flexibility in acquiring hardware,

software, services and complementary third-party equipment. And there's just one predictable payment. Cisco Capital is available in more than 100 countries. Learn more.

Printed in USAs

C78-739054-00   06/17