Cisco Catalyst 9400 Supervisor Engine Modules

Contents

Product overview

The Cisco Catalyst® 9400 Series is Cisco's leading modular enterprise switching access and aggregation platform, and is built for security, the Internet of Things (IoT), and multicloud environments. These switches form the foundational building blocks for Cisco® SD-Access, our leading enterprise architecture. The platform provides strong investment protection, with a chassis architecture that is capable of supporting up to nine Tbps of system bandwidth and industry-leading power delivery for high-density IEEE 802.3bt (60 W and 90W PoE). Redundancy is now available across the portfolio. Cisco Catalyst 9400 Series switches deliver state-of-the-art high availability with capabilities such as Nonstop Forwarding and Stateful Switchover (NSF/SSO), In-Service Software Upgrade (ISSU), uplink resiliency, and N+1/N+N redundancy for power supplies and Cisco StackWise® virtual (SVL) with ISSU. The platform is enterprise-optimized with an innovative, dual‑serviceable fan-tray design and side-to-side airflow and is closet-friendly with approximately 16 inches in depth. A single system can scale up to 384 access ports with your choice of 1 Gigabit Ethernet copper, 1 Gigabit Ethernet fiber, Cisco UPOE+©, Cisco Universal Power over Ethernet (Cisco UPOE®), and Power over Ethernet Plus (PoE+) options and up to 192 ports of 10G fiber and multigigabit options. The platform also supports advanced routing and infrastructure services, SD-Access capabilities, and network system virtualization. These features enable placement of the platform in the core and aggregation layers of small- to medium-sized campus environments.

A foundation for Software-Defined Architecture

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 (Cisco 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

Cisco Catalyst 9400 Series switches support enterprise fabric to provide these benefits, while extending controller-based networking with uniform enterprise-wide policy and mobility.

Cisco DNA Software

Cisco DNA Software offers a valuable and flexible way to buy software for the access, WAN, and data center domains. At each stage in the product lifecycle, Cisco DNA Software helps make buying, managing, and upgrading your network and infrastructure software easier. Cisco DNA Software provides:

- 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 Service (SWSS)

- Lower cost of entry with the new Cisco DNA Subscription for Switching model

Cisco DNA for Access lets you 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.

Details

Cisco Catalyst 9400 Series switches support three supervisors optimized for various campus deployments–access and aggregation. Along with Cisco's campus-optimized 25 GE optics, these modular platforms are now capable of supporting architectural transformations with industry-leading investment protection.

The Catalyst 9400 Supervisor Engine-1XL-Y is designed for the core and aggregation with 25G uplinks (Figure 1).

Figure 1.
Supervisor Engine-1XL-Y

The Cisco Catalyst 9400 Supervisor Engine-1XL-Y is a next-generation supervisor optimized for the enterprise-class core and aggregation layers, supporting up to 240 Gbps per slot with 25G uplinks. Supervisor Engine-1XL-Y allows for unique investment protection through a 25G uplink connectivity option, which is becoming a popular alternative to 10G in the core. The Cisco Catalyst 9400 Supervisor Engine-1XL-Y hardware is capable of supporting advanced routing and infrastructure services such as Multiprotocol Label Switching (MPLS); software-defined access control and border capabilities (such as a host-tracking database, cross-domain connectivity, and VPN Routing and Forwarding [VRF]-aware Locator/ID Separation Protocol [LISP]); and flexible ASIC templates to create resources to optimize table sizes for different places in the network.

The Catalyst 9400 Supervisor Engine-1XL is designed for the core and aggregation layers (Figure 2).

Figure 2.
Supervisor Engine-1XL

The Cisco Catalyst 9400 Supervisor Engine-1XL is a next-generation supervisor optimized for enterprise-class the core and aggregation layers, supporting up to 240 Gbps. The Supervisor Engine-1XL hardware is capable of supporting advanced routing and infrastructure services such as Multiprotocol Label Switching (MPLS); software-defined access control and border capabilities (such as a host tracking database, cross-domain connectivity, and VPN routing and forwarding [VRF]-aware Locator/ID Separation Protocol [LISP]); flexible ASIC templates to create resources to optimize table sizes for different places in the network; and network system virtualization with Cisco StackWise® virtual technology, which is critical for placement in the campus core.

The Cisco Catalyst 9400 Supervisor Engine-1 is designed for access (Figure 3).

Figure 3.
Supervisor Engine-1

Features

Product Highlights

- The Cisco Unified Access Data Plane (UADP) 2.0 ASIC is ready for next-generation technologies with its programmable pipeline, microengine capabilities, and template-based configurable allocation of Layer 2, Layer 3, forwarding, Access Control List (ACL), and Quality of Service (QoS) entries

- Intel 2.4-GHz x86 with up to 960 GB of SATA SSD local storage for container-based application hosting

- Up to 1.44 Tbps wired switching capacity (IPv4) with 900 Mpps of throughput

- Up to two nonblocking 25 Gigabit Ethernet uplinks on Supervisor-1XL-Y

- Up to two nonblocking 40 Gigabit Ethernet uplinks (Quad Small Form-Factor Pluggable [QSFP]) and up to eight nonblocking 10 Gigabit Ethernet uplinks (SFP+)

- SFP support on uplinks to offer flexibility for up to eight Gigabit Ethernet ports

- 384 ports of nonblocking 10/100/1000 RJ-45 ports

- 392 ports of nonblocking 1 Gigabit Ethernet Fiber (SFP) ports

- 200 ports of 10 Gigabit Ethernet SFP+ ports (eight uplinks plus 192 line card ports)

- Cisco UPOE+© (90 W) capabilities on 263 ports simultaneously

- Cisco UPOE (60W)/PoE+ (30W) capabilities on 384 ports simultaneously

- Line rate hardware-based Flexible NetFlow (FNF) delivering flow collection up to 384,000 flows

- IPv6 support in hardware, providing wire rate forwarding for IPv6 networks

- Dual-stack support for IPv4 and IPv6 and dynamic hardware forwarding table allocations for ease of IPv4-to-IPv6 migration

- Scalable routing (IPv4, IPv6, and multicast) tables and Layer 2 tables

- Open 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. The OS also has built-in defenses to protect against runtime attacks

- **SD-Access**: The Cisco Catalyst 9400 Series Switches form the foundation building block for SD-Access – Cisco's leading enterprise architecture, which includes:
  ◦ Policy-based automation from edge to cloud
  ◦ Segmentation and micro-segmentation made easy, with having predictable performance and scalability
  ◦ Automation through Cisco DNA Center™
  ◦ Policy through the Cisco Identity Services Engine (ISE)
  ◦ Network assurance through Network Data Platform
  ◦ The ability to launch new business services faster and improve issue resolution time significantly

- SD-Access Embedded Wireless: The Cisco Catalyst 9800 embedded Wireless Controller Software package can be installed on Cisco Catalyst 9400 Series switches to enable wireless controller functionality for distributed branches and small campuses. Once installed, the Catalyst 9800 embedded Wireless Controller running on a Catalyst 9400 Series switch can support up to 200 APs and 4000 Clients. A maximum two wireless controllers can be enabled per site on two different Catalyst 9400 Series switches which will increase to scale up to 200 APs and 4000 Wireless Clients. The Catalyst 9800 embedded Wireless Controller Software package will enable wireless functionality only for SD-Access deployments with two supported topologies:
  ◦ The Catalyst 9800 embedded Wireless Controller Software package can be enabled on Catalyst 9400 Series switches functioning as Co-Located Border and Control Plane
  ◦ C9800 Wireless Software Package can be enabled on Catalyst 9400 Series switches functioning as Fabric in a Box

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

- **Advanced security**
  - Cisco Encrypted Traffic Analytics (ETA): You benefit from the power of machine learning to identify and take actions toward threats or anomalies in your network, including malware detection in encrypted traffic (without decryption) and distributed anomaly detection
  - AES-256[1] support with the powerful MACsec-256 encryption algorithm is available in hardware
  - Trustworthy systems: Secure Unique Device Identification (SUDI) support for 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 onto your network

[1] MAC Sec is not supported in hardware in C9400-SUP-1XL-Y

Supervisor Engine Chassis and Line Card Support

Table 1 shows the supervisor engine and line card slot assignment options in the Cisco Catalyst 9400 Series chassis.

Table 1.   Cisco Catalyst 9400 Chassis Slot: Assignment Options

Chassis	Single Supervisor Engine slot assignments	Redundant Supervisor Engine slot assignments	Line card slot options
Cisco Catalyst C9404R	Slots 2 or 3	Slots 2 or 3	Slots 1 and 4
Cisco Catalyst C9407R	Slots 3 or 4	Slots 3 or 4	Slots 1, 2, and 5 to 7
Cisco Catalyst C9410R	Slots 5 or 6	Slots 5 or 6	Slots 1 to 4, and 7 to 10

Table 2.   Cisco Catalyst 9400 Chassis Minimum Software Support

Chassis	Supervisor Engine-1 minimum software	Supervisor Engine-1XL minimum software	Supervisor Engine-1XL-Y minimum software
Cisco Catalyst C9404R	Cisco IOS XE 16.9.1	Cisco IOS XE 16.9.1	Cisco IOS XE 16.9.1
Cisco Catalyst C9407R	Cisco IOS XE 16.6.1	Cisco IOS XE 16.6.2	Cisco IOS XE 16.9.1
Cisco Catalyst C9410R	Cisco IOS XE 16.6.1	Cisco IOS XE 16.6.2	Cisco IOS XE 16.9.1

Table 3 summarizes the performance capacities of the Supervisor Engine on a per-chassis basis.

Table 3.   Cisco Catalyst 9400 Supervisor Engine Bandwidth per Slot for Different Chassis

	Cisco Catalyst C9404R chassis	Cisco Catalyst C9407R chassis	Cisco Catalyst 9410R chassis
Supervisor Engine-1	80 Gbps per slot	80 Gbps per slot	80 Gbps per slot
Supervisor Engine-1XL	240 Gbps per slot	120 Gbps per slot	80 Gbps per slot
Supervisor Engine-1XL-Y	240 Gbps per slot	120 Gbps per slot	80 Gbps per slot

Table 4 summarizes the line card modules supported on Supervisor Engine.

Table 4. Cisco Catalyst 9400 Supervisor Engine Line Card and Module Support

Supervisor Engine	Line card	Description	Minimum software
Supervisor Engine-1	C9400-LC-48U	Cisco Catalyst 9400 Series 48-Port UPOE 10/100/1000 (RJ-45)	Cisco IOS XE 16.6.1
	C9400-LC-48T	Cisco Catalyst 9400 Series 48-Port 10/100/1000 (RJ-45)	Cisco IOS XE 16.6.1
	C9400-LC-48UX	Cisco Catalyst 9400 Series 48-Port UPOE with 24p mGig 24p RJ-45	Cisco IOS XE 16.6.2
	C9400-LC-24XS	Cisco Catalyst 9400 Series 24-Port 10 Gigabit Ethernet (SFP+)	Cisco IOS XE 16.6.2
	C9400-LC-48P	Cisco Catalyst 9400 Series 48-Port POE+ 10/100/1000 (RJ-45)	Cisco IOS-XE 16.8.1
	C9400-LC-24S	Cisco Catalyst 9400 Series 24-Port Gigabit Ethernet(SFP)	Cisco IOS-XE 16.8.1
	C9400-LC-48S	Cisco Catalyst 9400 Series 48-Port Gigabit Ethernet(SFP)	Cisco IOS-XE 16.8.1
	C9400-LC-48H	Cisco Catalyst 9400 Series 48-Port UPOE+ 10/100/1000 (RJ-45)	Cisco IOS XE 16.12.1
Supervisor Engine-1XL	C9400-LC-48U	Cisco Catalyst 9400 Series 48-Port UPOE 10/100/1000 (RJ-45)	Cisco IOS XE 16.6.2
	C9400-LC-48T	Cisco Catalyst 9400 Series 48-Port 10/100/1000 (RJ-45)	Cisco IOS XE 16.6.2
	C9400-LC-48UX	Cisco Catalyst 9400 Series 48-Port UPOE with 24p mGig 24p RJ-45	Cisco IOS XE 16.6.2
	C9400-LC-24XS	Cisco Catalyst 9400 Series 24-Port 10 Gigabit Ethernet (SFP+)	Cisco IOS XE 16.6.2
	C9400-LC-48P	Cisco Catalyst 9400 Series 48-Port POE+ 10/100/1000 (RJ-45)	Cisco IOS-XE 16.8.1
	C9400-LC-24S	Cisco Catalyst 9400 Series 24-Port Gigabit Ethernet(SFP)	Cisco IOS-XE 16.8.1
	C9400-LC-48S	Cisco Catalyst 9400 Series 48-Port Gigabit Ethernet(SFP)	Cisco IOS-XE 16.8.1
	C9400-LC-48H	Cisco Catalyst 9400 Series 48-Port UPOE+ 10/100/1000 (RJ-45)	Cisco IOS XE 16.12.1

Supervisor Engine	Line card	Description	Minimum software
Supervisor Engine-1XL-Y	C9400-LC-48U	Cisco Catalyst 9400 Series 48-Port UPOE 10/100/1000 (RJ-45)	Cisco IOS XE 16.9.1
	C9400-LC-48T	Cisco Catalyst 9400 Series 48-Port 10/100/1000 (RJ-45)	Cisco IOS XE 16.9.1
	C9400-LC-48UX	Cisco Catalyst 9400 Series 48-Port UPOE with 24p mGig 24p RJ-45	Cisco IOS XE 16.9.1
	C9400-LC-24XS	Cisco Catalyst 9400 Series 24-Port 10 Gigabit Ethernet(SFP+)	Cisco IOS XE 16.9.1
	C9400-LC-48P	Cisco Catalyst 9400 Series 48-Port POE+ 10/100/1000 (RJ-45)	Cisco IOS-XE 16.9.1
	C9400-LC-24S	Cisco Catalyst 9400 Series 24-Port Gigabit Ethernet(SFP)	Cisco IOS-XE 16.9.1
	C9400-LC-48S	Cisco Catalyst 9400 Series 48-Port Gigabit Ethernet(SFP)	Cisco IOS-XE 16.9.1
	C9400-LC-48H	Cisco Catalyst 9400 Series 48-Port UPOE+ 10/100/1000 (RJ-45)	Cisco IOS XE 16.12.1

Performance and Scalability

Table 5 highlights the performance and scalability enhancements of the Cisco Catalyst 9400 Supervisor Engine.

Table 5.   Cisco Catalyst 9400 Supervisor Engine Performance and Scalability Features

Features	Performance and scalability	
Supervisor	Supervisor Engine-1	Supervisor Engine-1XL / Supervisor Engine-1XL-Y
Centralized wired capacity	Up to 1.44 Tbps	Up to 1.44 Tbps
Per-slot switching Capacity	80 Gbps	240 Gbps – C9404R 120 Gbps – C9407R 80 Gbps – C9410R
Total number of MAC addresses	Up to 64,000	Up to 64,000[*]
Total number of IPv4 routes (ARP plus learned routes)	Up to 112,000[1]	Up to 144,000[*3]
FNF entries (v4/v6)	Up to 384,000/192,000	Up to 384,000/192,000
DRAM	16 GB	16 GB
Flash	10 GB	10 GB
VLAN IDs	4096	4096
SSD capacity	960 GB	960 GB

Features	Performance and scalability	
Total Switched Virtual Interfaces (SVIs)	4,000	4,000
Jumbo frame	9198 bytes	9198 bytes
Forwarding rate	• 900 Mpps for IPv4 • 782.6 Mpps for IPv6 (@95 byte)	• 900 Mpps for IPv4 • 782.6 Mpps for IPv6 (@95 byte)
IPv4 routing entries	Up to 112,000[1]	Up to 144,000[*3]
IPv6 routing entries	Up to 56,000[2]	Up to 56,000[*]
Multicast routes	Up to 16,000	Layer 2 up to 16,000[*] Layer 3 up to 32,000[*]
QoS hardware entries	Up to 18,000	Up to 18,000
Security ACL hardware entries	Up to 18,000	Up to 18,000
Packet buffer	96 MB	96 MB

[*] Varies based on selected flexible ASIC template

[1] 48,000 host + 64,000 indirect

[2] 24,000 host + 32,000 indirect

[3] 80,000 host + 64,000 indirect in SDA template

Host routes refer to any /32 routes, including those that are learned indirectly (for instance, learned over Open Shortest Path First [OSPF] or other routing protocols). It does not mean the supervisor module can install 80,000 directly connected clients (/32) for attached VLANs or SVIs. In other words, directly connected routes in engineering terms refers to any /32 prefix. This includes clients attached to switch's own VLAN/SVI and those /32 prefixes learned over any routing protocols as well. An indirectly connected route is a route with a prefix other than /32.

Flexible ASIC Templates

Flexible ASIC templates enable universal deployments by leveraging the Unified Access Data Plane's (UADP) 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 flexible ASIC template may be selected to configure the switch for specific features.

The following flexible ASIC templates are supported on Cisco Catalyst 9400 Series switches:

- Access: Maximizes system resources for MAC and security
- Core: Maximizes system resources for unicast and multicast routing
- Software-Defined access (SD-Access): Maximizes system resources to support fabric deployment
- Network Address Translation (NAT): Maximizes system resources for Layer 3 and NAT to support collapsed core WAN deployments

Supervisor	Supervisor Engine-1	Supervisor Engine-1XL / Supervisor Engine-1XL-Y		
Template name	Access	Access	Core	SDA
IPV4 /IPV6 LPM	64,000 / 32,000	64,000 / 32,000	64,000 / 32,000	64,000 / 32,000

Supervisor	Supervisor Engine-1	Supervisor Engine-1XL / Supervisor Engine-1XL-Y		
IPV4/ IPV6 Host	48,000 / 24,000	48,000 / 24,000	32,000 / 16,000	80,000 / 40,000
Layer 2 Multicast	16,000	16,000	16,000	16,000
Layer 3 Multicast	16,000	16,000	32,000	16,000
MAC address	64,000	64,000	16,000	16,000
SGT label	8,000	8,000	8,000	8,000
Flexible NetFlow	384,000	384,000	384,000	384,000
Security ACL	18,000	18,000	18,000	18,000
QoS ACL	18,000	18,000	18,000	18,000
PBR / NAT	2,000	2,000	2,000	2,000
Tunnel	1000	1000	1000	1000
LISP	1000	1000	1000	1000
MPLS L3VPN VRF	256	256	256	N/A
MPLS label	12000	12000	16000	
MPLS L3VPN routes VRF	32000	32000	32000	
MPLS L3VPN routes prefix	4000	4000	4000	

SD-Access Architecture

What if you could give time back to IT? Provide network access in minutes for any user or device to any application – without compromise? SD-Access is the industry's first policy-based automation from network edge to cloud and the foundation for your digital network. Built on the principles of Cisco DNA, SD-Access provides end-to-end segmentation to keep user, device, and application traffic separate without a redesign of the network. It automates user access policy so you can make sure the right policies are set for any user or device with any application across the network. This is accomplished with a single network fabric across LAN and WLAN, which creates a consistent user experience anywhere without compromising on security.

There are many challenges today in managing the network to drive business outcomes. These limitations are due to manual configuration and fragmented tool offerings. SD-Access provides:

- A transformational management solution that reduces operational expenses and enhances business agility
- Consistent management of wired and wireless network provisioning and policy
- Automated network segmentation and group-based policy
- Contextual insights for fast issue resolution and capacity planning
- Open and programmable interfaces for integration with third-party solutions

For an overview of key use cases SD-Access addresses, refer to the SD-Access Solution Overview.

Cisco StackWise Virtual

StackWise Virtual is an advanced stacking technology that supports both access and distribution deployments through multiple topologies (such as two nodes or a ring). It provides higher scale for system virtualization at the network layer. Cisco Catalyst 9400 Series switches support StackWise Virtual with a two-node topology on select models. Refer to the [Release Notes](#) for more details.

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

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

Platform benefits

Open Cisco IOS XE 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. Various mechanisms employed to bring about the ease of network automation are outlined below based.

- **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 like Plug and Play along with off-the-shelf tools like Zero Touch Provisioning and Pre-boot Execution Environment (PXE) that enable an effortless and automated deployment.

- **API-driven configuration:** A modern network switch like Cisco Catalyst 9400 Series switches support a wide range of automation features and provides robust open APIs over Network Configuration Protocol (NETCONF) and RESTconf using YANG data models for external tools, both off-the-shelf and custom-built, so you can 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 of a data set in a YANG model. The subscribed data set is streamed to the destination at a configured interval. Additionally, open Cisco IOS XE enables the push model, which provides near real-time monitoring of the network leading to quick detection and rectification of failure situations.

Security

- **Encrypted Traffic Analytics (ETA):** ETA is a unique capability for identifying malware in encrypted traffic from the access layer. Since more and more traffic is becoming encrypted, the visibility this feature affords for threat detection is critical for keeping your networks secure at different layers. Additionally, ETA is able detect vulnerable implementations in encrypted traffic.

- **Advanced Encryption Standard (AES)-256 MACsec encryption[1]:** AES is the IEEE 802.1AE standard for authenticating and encrypting packets between switches and endpoints. Catalyst 9400 Series switches are hardware capable 256-bit and 128-bit AES on all ports at all speeds providing the most secure link encryption.

- **Trustworthy systems:** Cisco Trust Anchor Technologies provide a highly secure foundation for Cisco products. With Cisco Catalyst 9400 Series switches, Trust Anchor Technologies enable hardware and software authenticity assurance for supply chain trust and strong mitigation against man-in-the-middle compromise of software and firmware. Trust Anchor capabilities include:
  - **Image signing:** Cryptographically signed images provide assurance that the firmware, BIOS, and other software are authentic and unmodified. As the system boots, the system's software signatures are checked for integrity.
  - **Secure Boot:** Secure Boot anchors the boot sequence chain of trust to immutable hardware, mitigating threats against a system's foundational state and the software that is to be loaded, regardless of a user's privilege level. It provides layered protection against the persistence of illicitly modified firmware.
  - **Cisco Trust Anchor module:** This tamper-resistant, strong-cryptographic, single-chip solution provides hardware authenticity assurance to uniquely identify the product so that its origin can be confirmed to Cisco, providing assurance that the product is genuine.

[1] MAC Sec is not supported in hardware in C9400-SUP-1XL-Y

Resiliency and High Availability

Cisco Catalyst 9400 Series switches are designed for excellent nonstop communications with noninterrupted hardware switching. With Cisco IOS XE Software, you can continue to reap the benefit of this best-in-class resiliency in various ways.

- Cross-Stack EtherChannel provides the ability to configure Cisco EtherChannel technology across different members of the stack for high resiliency.

- IEEE 802.1s Multiple Spanning Tree Protocol (MSTP) provides rapid spanning tree convergence independent of spanning tree timers and also offers the benefit of Layer 2 load balancing and distributed processing.

- Per-VLAN Rapid Spanning Tree Plus (PVRST+) allows rapid spanning tree (IEEE 802.1w) reconvergence on a per-VLAN spanning tree basis, providing simpler configuration than MSTP. In both MSTP and PVRST+ modes, stacked units behave as a single spanning tree node.

- Switch port autorecovery ("err-disable" recovery) automatically attempts to reactivate a link that is disabled because of a network error.

- NSF/SSO offers continuous packet forwarding during supervisor-engine switchover. Information is fully synchronized between supervisor engines to allow the standby supervisor engine to immediately take over in subsecond time if the primary engine fails.

- NSF/SSO dramatically improves the network reliability and availability in a Layer 2 or Layer 3 environment. NSF/SSO is essential for business-critical applications such as Voice over IP (VoIP). These features help ensure that VoIP calls are not dropped.

- ISSU allows you to upgrade or downgrade complete Cisco IOS® Software images with minimal (less than 200 msec) to no disruption to the network when using a redundant Cisco Catalyst 9400 Series system with dual supervisor engines.

Facilitating rapid, non-disruptive software upgrades for new line cards, new power supplies, new features, or bug fixes, ISSU offers continuous packet forwarding during the supervisor-engine switchover running different Cisco IOS Software releases.

- In addition to redundant power supplies and fans, the Cisco Catalyst C9404R, C9407R, and C9410R chassis models support 1+1 supervisor-engine redundancy, using the Supervisor Engine. The primary supervisor engine is active and is responsible for normal system operation. The secondary supervisor engine serves as a standby, monitoring the operation of the primary supervisor engine. The resiliency features of the Cisco Catalyst 9400 Series prevent network outages that could result in lost business and revenue.

- Apart from the features previously mentioned, Supervisor Engine-1 has resiliency built into its uplinks. Table 6 shows the uplink options on Supervisor Engine-1 and Supervisor Engine-1XL. Table 7 shows the uplink options on Supervisor Engine-1XL-Y.

Table 6.   Cisco Catalyst 9400 Supervisor Engine-1 and Supervisor Engine-1XL Uplink Options

Supervisor configuration	Uplink ports options
Single supervisor	8x 10 Gigabit Ethernet ports are active (ports 1 to 8) (2x 40 Gigabit Ethernet ports are disabled [ports 9 to 10])
	2x 40 Gigabit Ethernet ports are active (ports 9 to 10) (8x 10 Gigabit Ethernet ports are disabled [ports 1 to 8])
	4x 10 Gigabit Ethernet and 1x 40 Gigabit Ethernet ports are active (the other 4x 10 Gigabit Ethernet and 1x 40 Gigabit Ethernet ports are disabled)
Dual supervisors	Active supervisor: 4x 10 Gigabit Ethernet ports are active (ports 1 to 4) (the other 4x 10 Gigabit Ethernet ports are disabled); standby supervisor: 4x 10 Gigabit Ethernet ports (ports 1 to 4) (the other 4x10 Gigabit Ethernet ports are disabled)
	Active supervisor: 1x 40 Gigabit Ethernet port is active (port 9) (the other 1x 40 Gigabit Ethernet port is disabled); standby supervisor: 1x 40 Gigabit Ethernet port (port 9) (the other 1x 40 Gigabit Ethernet port is disabled)
	Active supervisor: 1x 40 Gigabit Ethernet port is active (the other 1x 40 Gigabit Ethernet port and 8 x 10 Gigabit Ethernet ports are disabled); standby supervisor: 4x 10 Gigabit Ethernet ports (the other 4x10 Gigabit Ethernet ports and 2 x 40 Gigabit Ethernet are disabled)

Table 7.   Cisco Catalyst 9400 Supervisor Engine-1XL-Y Uplink Options

Supervisor configuration	Uplink ports options
Single supervisor	8x 10 Gigabit Ethernet ports are active (ports 1 to 8) (2x 40 Gigabit Ethernet ports are disabled [ports 9 to 10])
	2x 40 Gigabit Ethernet ports are active (ports 9 to 10) (8x 10 Gigabit Ethernet ports are disabled [ports 1 to 8])
	4x 10 Gigabit Ethernet and 1x 40 Gigabit Ethernet ports are active (the other 4x 10 Gigabit Ethernet 1x 40 Gigabit Ethernet ports are disabled)
	2x 25 Gigabit Ethernet ports are active (ports 1 and 5) (6 x 10 Gigabit Ethernet ports are disabled (ports 2-4 and 6-8) and 2 x 40G [ports 9 to 10])
	4x 10 Gigabit Ethernet and 1 x 25 Gigabit Ethernet ports are active (the remaining ports are disabled)
	1x 25 Gigabit Ethernet and 1x 40 Gigabit Ethernet ports are active (the remaining ports are disabled)
Dual supervisors	Active supervisor: 4x 10 Gigabit Ethernet ports are active (ports 1 to 4) (the other 4x 10 Gigabit Ethernet

Supervisor configuration	Uplink ports options
	ports are disabled); standby supervisor: 4x 10 Gigabit Ethernet ports (ports 1 to 4) (the other 4x10 Gigabit Ethernet ports are disabled)
	Active supervisor: 1x 40 Gigabit Ethernet port is active (port 9) (the other 1x 40 Gigabit Ethernet port is disabled); standby supervisor: 1x 40 Gigabit Ethernet port (port 9) (the other 1x 40 Gigabit Ethernet port is disabled)
	Active supervisor: 1x 25 Gigabit Ethernet port is active (port 1) (the other 1x 25 Gigabit Ethernet port is disabled); standby supervisor: 1x 25 Gigabit Ethernet port (port 1) (the other 1x 25 Gigabit Ethernet port is disabled)
	Active supervisor: 1x 25 Gigabit Ethernet port is active (the remaining ports are disabled); standby supervisor: 1x 40 Gigabit Ethernet port (the remaining ports are disabled) vice versa
	Active supervisor: 1x 25 Gigabit Ethernet port is active (the remaining ports are disabled); standby supervisor: 4 x 10 Gigabit Ethernet port (the remaining ports are disabled) vice versa
	Active supervisor: 1x 40 Gigabit Ethernet port is active (the other 1x 40 Gigabit Ethernet port and 8 x 10 Gigabit Ethernet ports are disabled); standby supervisor: 4x 10 Gigabit Ethernet ports (the other 4x10 Gigabit Ethernet ports and 2 x 40 Gigabit Ethernet are disabled) vice versa

Note: LRM optics cannot be supported on Supervisor Engine-1XL-Y

Flexible NetFlow

- **Flexible NetFlow (FNF):** Cisco IOS Software FNF is the next generation in flow visibility technology, allowing optimization of the network infrastructure, reducing operational costs, and improving capacity planning and security incident detection with increased flexibility and scalability. The supervisor is capable of up to 384,000 flow entries.

Application Visibility and Control

- **Advanced analytics:** Superior FNF reports application performance and activities within the network to any supported NetFlow collector, such as Cisco Stealthwatch® or any compliant third-party tool.

QoS

- **Superior QoS:** Cisco Catalyst 9400 Series switches offers Gigabit Ethernet speeds with intelligent services that keep traffic flowing smoothly, even at 10 times the normal network speed. Industry-leading mechanisms for cross-stack marking, classification, and scheduling deliver superior performance for data, voice, and video traffic at wire speed. This includes granular wireless bandwidth management and fair sharing, 802.1p Class of Service (CoS) and Differentiated Services Code Point (DSCP) field classification, Shaped Round Robin (SRR) scheduling, Committed Information Rate (CIR), and eight egress queues per port.

Smart operation

- **Bluetooth enabled:** Cisco Catalyst 9400 Series switches have the hardware support to connect a Bluetooth dongle to your switch to use this wireless interface as a Management port. This port functions as an IP management interface and can be used to configure and troubleshoot using the WebUI, CLI, and transfer images and configurations.

- **WebUI:** WebUI is an embedded GUI-based device-management tool that provides the ability to provision the device, to simplify device deployment and manageability, and to enhance the user experience. WebUI comes with the default image. There is no need to enable anything or install any license on the device. WebUI can be used by customers to build a configuration, monitor and troubleshoot the device without having to know how to use the CLI.

- **Efficient switch operation:** Cisco Catalyst 9400 Series switches provide optimum power savings with Energy Efficient Ethernet (EEE) on the RJ-45 ports and low power operations for industry best-in-class power management and power

consumption capabilities. The ports are capable of reduced power modes so that ports not in use can move into a lower power utilization state. Other efficient switch operation features are:

- ◦ The per-port power consumption command allows you to specify maximum power setting on an individual port.
- ◦ Per-port PoE power sensing measures the actual power being drawn, enabling more intelligent control of powered devices. The PoE MIB provides proactive visibility into power usage and lets you set different power level thresholds.

- **RFID tags:** Cisco Catalyst 9400 Series switches have an embedded RFID tag which facilitates easy asset and inventory management using commercial RFID readers.

- **Blue Beacon:** Cisco Catalyst 9400 Series switches support a blue beacon LED which allows easy identification of the switch being accessed.

High-Performance IP Routing

The Cisco Express Forwarding hardware routing architecture delivers extremely high-performance IP routing in the Cisco Catalyst 9400 Series switches, based on these features:

- IP unicast routing protocols (static, Routing Information Protocol Version 1 [RIPv1], RIPv2, RIPng, and Open Shortest Path First [OSPF] Routed Access) are supported for small network routing applications with the Network Essentials stack. Equal-cost routing facilitates Layer 3 load balancing and redundancy across the stack.

- Advanced IP unicast routing protocols (Full OSPF, Enhanced Interior Gateway Routing Protocol [EIGRP], Border Gateway Protocol Version 4 [BGPv4], and Intermediate System-to-Intermediate System Version 4 [IS-ISv4]) are supported for load balancing and constructing scalable LANs. IPv6 routing using OSPFv3 and EIGRPv6 is supported in hardware for maximum performance.

- Protocol-Independent Multicast (PIM) for IP multicast routing is supported, including PIM Sparse Mode (PIM SM), and Source-Specific Multicast (SSM).

- IPv6 addressing is supported on interfaces with appropriate show commands for monitoring and troubleshooting.

Power over Ethernet Leadership

Cisco UPOE+ IEEE 802.3bt Type 4: PoE removes the need for wall power to each PoE-enabled device and eliminates the cost for additional electrical cabling and circuits that would otherwise be necessary in IP phone and WLAN deployments. Cisco UPOE+ enables 90W of power per port. This facilitates delivery of network power to a broad range of devices requiring higher power. These devices include virtual desktop terminals, IP turrets, compact switches, building management gateways, LED lights, wireless access points and IP phones. The Cisco Catalyst 9400 Series also supports Cisco UPOE (60 watts), PoE+ (30 watts), and PoE (15 watts), thereby addressing the largest range of network power needs.

Licensing

Cisco Catalyst 9400 Series switches introduce a new and simplified licensing package in the form of base and add-on licenses.

- **The base licensing** package includes the Network Essentials and Network Advantage licensing options that are tied to the hardware. Between them, the base licensing packages cover switching fundamentals, management automation, troubleshooting, and advanced switching features. These base licenses are perpetual.

- **The subscription licensing** package includes the Cisco DNA Premier, Cisco DNA Advantage and Cisco DNA Essentials options. 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.

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). Table 8 shows the combinations of base and add-on licenses that must be purchased.

Licensing Combinations

Table 8 lists the Cisco DNA Essentials and Cisco DNA Advantage licensing combinations.

Table 8.   Licensing Combinations

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

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

Managing licenses with Smart Accounts: Creating Smart Accounts by using Cisco Smart Software Manager (SSM) enables you to order devices and licensing packages and also manage your software licenses from a centralized website. You can set up Cisco SSM to provide daily email alerts and to notify you 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 reload.

Note: You are not required to deploy Cisco DNA Center, just to use one of the add-on software packages

Table 9 shows the features included in the Network Essentials and Advantage packages.

Table 9. Network Essentials and Advantage Package Features

Features	Network Essentials	Network Advantage
Switch fundamentals Layer 2, Routed Access (RIP, EIGRP Stub, OSPF - 1000 routes),PBR, PIM Stub Multicast (1000 routes)), PVLAN, VRRP, PBR, CDP, QoS, FHS, 802.1x, Macsec-128, CoPP, SXP, IP SLA Responder, SSO	✓	✓
Advanced switch capabilities and scale BGP, EIGRP, HSRP, IS-IS, BSR, MSDP, IP SLA, OSPF	✗	✓
Network segmentation VRF, VXLAN, LISP, SGT, MPLS, mVPN	✗	✓
Automation Netconf, Restconf, gRPC, YANG, PnP Agent, ZTP/Open PnP, GuestShell (On-Box Python)	✓	✓
Telemetry and visibility Model-driven telemetry, sampled NetFlow, SPAN, RSPAN	✓	✓
High availability and resiliency NSF, GIR,ISSU	✗	✓
IoT integration CoAP	✗	✓
Security MACsec-256	✗	✓

Table 10 shows the features included in the Cisco DNA Premier, Cisco DNA Advantage and Cisco DNA Essentials packages.

Table 10. Cisco DNA Premier, Advantage and Essentials Features

Features	Cisco DNA Essentials	Cisco DNA Advantage	Cisco DNA Premier
Switch Features			
Optimized network deployments Cisco DNA Service for Bonjour	✗	✓	✓
Advanced telemetry and visibility Full Flexible NetFlow, EEM	✓	✓	✓
Optimized telemetry a visibility ERSPAN, AVC (NBAR2), App Hosting (in Containers/VMs), Wireshark	✗	✓	✓

Features	Cisco DNA Essentials	Cisco DNA Advantage	Cisco DNA Premier
Advanced security Encrypted Traffic Analytics (ETA)	✗	✓	✓
Cisco DNA Center Features			
Day 0 network bring-up automation Cisco Network Plug-n-Play application, network settings, device credentials, LAN Automation, Host onboarding	✓	✓	✓
Element management Discovery, inventory, topology, software image, licensing, and configuration management	✓	✓	✓
Element management Patch Management	✗	✓	✓
Basic Assurance Health Dashboards – Network, Client, Application; Switch & Wired Client Health Monitoring	✓	✓	✓
SD-Access Policy-based Automation & Assurance for Wired & Wireless	✗	✓	✓
Network assurance and analytics Global Insights, Trends, Compliance, Custom Reports; Switch 360, Wired Client 360; Fabric and Non-Fabric Insights; App Health, App 360, App Performance (Loss, Latency, Jitter)	✗	✓	✓

Specification

Table 11 shows information on dimensions, weight, acoustic characteristics and Mean Time Between Failures (MTBF).

Table 11. Dimensions, Weight, Acoustic, and MTBF Details

Physical specifications	(H x W x D): 1.6 x 14.92 x 14.57 in. (4.06 x 37.90 x 37.00 cm) Weight: 10 lb (4.5 kg)
Operating temperature	Normal operating[*] temperature and altitudes: • 23° to 113°F (-5° to +45°C), up to 6000 feet (1800 m) • 23° 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: • 23° to 131°F (-5° to +55°C), up to 6000 feet (1800 m) • 23° to 122°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 operating and nonoperating noncondensing	10 to 95 percent, noncondensing
Altitude	-60 to 3000m

MTBF	C9400-SUP-1: 253,010 hours
	C9400-SUP-1XL: 253,010 hours
	C9400-SUP-1XL-Y: 237,670 hours

Supported Pluggables

For details about the different optical modules and the minimum Cisco IOS Software release required for each of the supported optical modules, visit https://www.cisco.com/c/en/us/support/interfaces-modules/transceiver-modules/products-device-support-tables-list.html.

Management and Standards Support

Table 12 shows management and standards support for the Cisco Catalyst 9400 Series.

Table 12.   Management and Standards Support for the Cisco Catalyst 9400 Series

Description	Specifications	
Management	BGP4-MIB	CISCO-RESILIENT-ETHERNET-PROTOCOL-MIB
	BRIDGE-MIB	CISCO-RF-MIB
	CISCO-ACCESS-ENVMON-MIB	CISCO-RMON-CONFIG-MIB
	CISCO-AUTH-FRAMEWORK-MIB	CISCO-RMON-MIB
	CISCO-BRIDGE-EXT-MIB	CISCO-RMON2-MIB
	CISCO-BULK-FILE-MIB	CISCO-RTP-METRICS-MIB
	CISCO-CABLE-DIAG-MIB	CISCO-RTTMON-ICMP-MIB
	CISCO-CALLHOME-MIB	CISCO-RTTMON-RTP-MIB
	CISCO-CDP-MIB	CISCO-SMART-LIC-MIB
	CISCO-CEF-MIB	CISCO-SNMP-TARGET-EXT-MIB
	CISCO-CLASS-BASED-QOS-MIB	CISCO-STACKMAKER-MIB
	CISCO-CONFIG-COPY-MIB	CISCO-SYSLOG-MIB
	CISCO-CONFIG-MAN-MIB	CISCO-TAP2-MIB
	CISCO-DATA-COLLECTION-MIB	CISCO-TCP-MIB
	CISCO-DHCP-SNOOPING-MIB	CISCO-USER-CONNECTION-TAP-MIB
	CISCO-DYNAMIC-ARP-INSPECTION-MIB	CISCO-VLAN-IFTABLE-RELATIONSHIP-MIB
	CISCO-EMBEDDED-EVENT-MGR-MIB	CISCO-VLAN-MEMBERSHIP-MIB
	CISCO-ENERGYWISE-MIB	CISCO-VOIP-TAP-MIB
	CISCO-ENHANCED-IMAGE-MIB	CISCO-VTP-MIB
	CISCO-ENHANCED-MEMPOOL-MIB	DIFFSERV-MIB
	CISCO-ENTITY-ASSET-MIB	DISMAN-EXPRESSION-MIB
	CISCO-ENTITY-DIAG-MIB	ENTITY-MIB
	CISCO-ENTITY-EXT-MIB	ENTITY-STATE-MIB
	CISCO-ENTITY-FRU-CONTROL-MIB	ENTITY-VENDORTYPE-OID-MIB
	CISCO-ENTITY-PERFORMANCE-MIB	ETHERLIKE-MIB
	CISCO-ENTITY-QFP-MIB	EVENT-MIB
	CISCO-ENTITY-SENSOR-MIB	HC-ALARM-MIB
	CISCO-ENTITY-VENDORTYPE-OID-MIB	HC-RMON-MIB
	CISCO-ENVMON-MIB	
	CISCO-ERR-DISABLE-MIB	

Description	Specifications	
	CISCO-ETHERLIKE-EXT-MIB	IP-FORWARD-MIB
	CISCO-FLASH-MIB	IP-MIB
	CISCO-FLOW-MONITOR-MIB	IPMROUTE-STD-MIB
	CISCO-FTP-CLIENT-MIB	LLDP-MED-MIB
	CISCO-HSRP-EXT-MIB	LLDP-MIB
	CISCO-HSRP-MIB	MAU-MIB
	CISCO-IEEE8021-PAE-MIB	MPLS-LSR-STD-MIB
	CISCO-IEEE8023-LAG-MIB	MPLS-TE-MIB
	CISCO-IETF-BFD-MIB	MPLS-VPN-MIB
	CISCO-IETF-DHCP-SERVER-MIB	MSDP-MIB
	CISCO-IETF-FRR-MIB	NHRP-MIB
	CISCO-IETF-PW-MPLS-MIB	NOTIFICATION-LOG-MIB
	CISCO-IF-EXTENSION-MIB	NTPv4-MIB
	CISCO-IF-MIB	OLD-CISCO-CHASSIS-MIB
	CISCO-IGMP-FILTER-MIB	OLD-CISCO-CPU-MIB
	CISCO-IMAGE-LICENSE-MGMT-MIB	OLD-CISCO-INTERFACES-MIB
	CISCO-IMAGE-MIB	OLD-CISCO-IP-MIB
	CISCO-IP-CBR-METRICS-MIB	OLD-CISCO-MEMORY-MIB
	CISCO-IP-SEC-MIB	OLD-CISCO-SYSTEM-MIB
	CISCO-IP-URPF-MIB	OLD-CISCO-TCP-MIB
	CISCO-IPMROUTE-MIB	OLD-CISCO-TS-MIB
	CISCO-L2-CONTROL-MIB	OLD-MPLS-LSR-MIB
	CISCO-L2L3-INTERFACE-CONFIG-MIB	POWER-ETHERNET-MIB
	CISCO-LICENSE-MGMT-MIB	RFC1213-MIB
	CISCO-LLDP-EXT-MED-MIB	RFC2668-MIB
	CISCO-LOCAL-AUTH-USER-MIB	RFC2982-MIB
	CISCO-MAC-AUTH-BYPASS-MIB	SMON-MIB
	CISCO-MAC-NOTIFICATION-MIB	SNMP-FRAMEWORK-MIB
	CISCO-MDI-METRICS-MIB	SNMP-MPD-MIB
	CISCO-MEDIA-METRICS-MIB	SNMP-NOTIFICATION-MIB
	CISCO-MEMORY-POOL-MIB	SNMP-TARGET-MIB
	CISCO-NBAR-PROTOCOL-DISCOVERY-MIB	SNMPv2-MIB
	CISCO-PAGP-MIB	SONET-MIB
	CISCO-PIM-MIB	TCP-MIB
	CISCO-PORT-SECURITY-MIB	UDP-MIB
	CISCO-PORT-STORM-CONTROL-MIB	VRRPV3-MIB
	CISCO-POWER-ETHERNET-EXT-MIB	VTP-MIB
	CISCO-PRIVATE-VLAN-MIB	
	CISCO-PROCESS-MIB	
	CISCO-PRODUCTS-MIB	

Description	Specifications	
Standards	Ethernet: IEEE 802.3 10 Gigabit Ethernet: IEEE 802.3ae IEEE 802.1D Spanning Tree Protocol IEEE 802.1w Rapid Reconfiguration of Spanning Tree IEEE 802.1s Multiple VLAN Instances of Spanning Tree IEEE 802.3ad LACP IEEE 802.1p CoS Prioritization IEEE 802.1Q VLAN IEEE 802.1X User Authentication RMON I and II standards SNMPv1, SNMPv2c, and SNMPv3	

Power Consumption of Supervisor Engine

Active supervisor power: Maximum power (400W).

Standby supervisor power: Maximum power (400W).

This result is not indicative of the actual power draw during operation. It is the absolute maximum value recommended for facility power, system configuration and cooling capacity planning. Typical power draw is about 40%-75% maximum rated power value shown.

Safety and Compliance

Table 13 lists safety and compliance information for Cisco Catalyst 9400 Series switches.

Table 13.   Safety and Compliance Information for the Cisco Catalyst 9400 Series

Description	Specifications
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

Description	Specifications
	• CISPR24 • EN 300 386 • EN55024 • TCVN 7317
Environmental	Reduction Of Hazardous Substances (ROHS) 5

Warranty

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 https://www.cisco.com/go/warranty. Table 14 provides information about the E-LLW.

Table 14.   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 900 Services provide expert guidance to help you successfully deploy, manage and support the new Catalyst 9000 family of 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 Cisco DNA-ready infrastructure. Learn more about Cisco Services for Enterprise Networks.

Software Policy for Cisco Catalyst 9400 Series Switches

Software Policy for Network Stack Components

Customers with Network Essential Stack and 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 compliance 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.

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 protects your investment. Embedded Support for 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 Embedded Support site for increased productivity with anytime access.

Ordering

Table 15 contains ordering information for the Cisco Catalyst 9400 Series.

Table 15.   Cisco Catalyst 9400 Series Ordering Information

Product number	Description
C9400-SUP-1(=)	Cisco Catalyst 9400 Series Supervisor 1 Module
C9400-SUP-1/2	Cisco Catalyst 9400 Series Redundant Supervisor 1 Module
C9400-SUP-1XL(=)	Cisco Catalyst 9400 Series Supervisor 1XL Module
C9400-SUP-1XL/2	Cisco Catalyst 9400 Series Redundant Supervisor 1XL Module
C9400-SUP-1XL-Y(=)	Cisco Catalyst 9400 Series Supervisor 1XL with 25G Module
C9400-SUP-1XL-Y/2	Cisco Catalyst 9400 Series Redundant Supervisor 1XL with 25G Module
C9400-SSD-240GB	Cisco Catalyst 9400 Series 240GB M2 SATA memory (Supervisor)
C9400-SSD-480GB	Cisco Catalyst 9400 Series 480GB M2 SATA memory (Supervisor)
C9400-SSD-960GB	Cisco Catalyst 9400 Series 960GB M2 SATA memory (Supervisor)
C9400-DNA-E	Catalyst 9400 Cisco DNA Essentials Term license

Product number	Description
C9400-DNA-E-3Y	Catalyst 9400 Cisco DNA Essentials 3 Year Term license
C9400-DNA-E-5Y	Catalyst 9400 Cisco DNA Essentials 5 Year Term license
C9400-DNA-E-7Y	Catalyst 9400 Cisco DNA Essentials 7 Year Term license
C9400-DNA-A	Catalyst 9400 Cisco DNA Advantage Term license
C9400-DNA-A-3Y	Catalyst 9400 Cisco DNA Advantage 3 Year Term license
C9400-DNA-A-5Y	Catalyst 9400 Cisco DNA Advantage 5 Year Term license
C9400-DNA-A-7Y	Catalyst 9400 Cisco DNA Advantage 7 Year Term license
C9400-NW-E	Cisco Catalyst 9400 Network Essential License
C9400-NW-A	Cisco Catalyst 9400 Network Advantage License
C9400-DNA-P	C9400 Cisco DNA Premier Term: Includes Term Licenses for Cisco DNA Advantage, 100 ISE Base & 100 ISE Plus Endpoints, 100 Stealthwatch Flows (including Virtual Flow Collector & Management Console). Requires separate purchase of ISE appliance/ISE VM and Cisco DNA Center appliance.
C9400-DNA-P-3Y	C9400 Cisco DNA Premier 3Y Term - DNA, 100 ISE PLS and ISE BASE, 100 SWATCH
C9400-DNA-P-5Y	C9400 Cisco DNA Premier 5Y Term - DNA, 100 ISE PLS and ISE BASE, 100 SWATCH
C9400-DNA-P-7Y	C9400 Cisco DNA Premier 7Y Term - DNA, 100 ISE PLS and ISE BASE, 100 SWATCH
C9400-DNA-P-AA	C9400 Cisco DNA Premier Add-On Term: Includes Term Licenses for 50 ISE Base & 50 ISE Plus Endpoints, 50 Stealthwatch Flows (including Virtual Flow Collector & Management Console). Requires separate purchase of ISE appliance/ISE VM and Cisco DNA Center appliance.
C9400-DNA-P-AA-3Y	C9400 Cisco DNA Premier Add-On 3Y Term - 50 ISE PLS, 50 SWATCH
C9400-DNA-P-AA-5Y	C9400 Cisco DNA Premier Add-On 5Y Term - 50 ISE PLS, 50 SWATCH
C9400-DNA-P-AA-7Y	C9400 Cisco DNA Premier Add-On 7Y Term - 50 ISE PLS, 50 SWATCH
C9400-LIC=	Electronic SW License for C9400 Switches
C9400-DNA-E-A	C9400 NW & Cisco DNA Essentials to NW & Cisco DNA Advantage Upgrade
C9400-DNA-E-A-3	C9400 NW & Cisco DNA Essentials to NW & DNA Adv Upgrade License (3Y)
C9400-DNA-E-A-5	C9400 NW & Cisco DNA Essentials to NW & DNA Adv Upgrade License (5Y)
C9400-DNA-E-A-7	C9400 NW & Cisco DNA Essentials to NW & DNA Adv Upgrade License (7Y)

*Note: Cisco DNA Essentials subscriptions Essentials is sold only in bundles in for Catalyst 9400 Series switches

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](#).

Cisco Services

Achieve infrastructure excellence faster with less risk

Cisco Services for Cisco Catalyst 9000 switches provide expert guidance to help you successfully plan, deploy, manage and support your new switches. With unmatched networking expertise, best practices and innovative tools, Cisco Services can help you reduce overall upgrade, refresh, and migration costs as you introduce new hardware, software and protocols into the network. With a comprehensive lifecycle of services, Cisco experts will help you minimize disruption and improve operational efficiency to extract maximum value from your Cisco DNA-ready infrastructure.

Document History

New or Revised Topic	Described In	Date
Added SD-Access Embedded Wireless information	Features	08/20/19
Added New UPOE+ Linecard information	Linecard support	08/20/19
Revised Table of Contents Headings	Specifications (was "Dimensions, eight, acoustic, mean time between failures"), added Document History	1/18/19
Text change from "add-on" to "subscription"	Page 16, Packaging section	12/17/18
Product name change from "Essentials and Cisco DNA Advantage" to "Premier, Cisco DNA Advantage and Cisco DNA Essentials"	Page 16, Packaging section	12/17/18
Product name change from "DNA" to "Cisco DNA"	Page 16, Packaging section	12/17/18
Text change from "License" to "Subscription license"	Page 16, Packaging section	12/17/18
Text edit to "Cisco DNA Essentials" and "Cisco DNA Advantage"	Page 17, Licensing combinations and Table 8	12/17/18
Product name change to Cisco DNA Premier, Cisco DNA Advantage and Cisco DNA Essentials	Page 18, Table 10 description and caption	12/17/18
Product name change to "Cisco DNA"	Page 23, Cisco Services for next-generation Cisco Catalyst switches	12/17/18
Product name change to "Cisco DNA"	Page 24, Table 15	12/17/18
Product number change to C9400-DNA-P	Page 24, Table 15	12/17/18
Product name change to "Cisco DNA Premier"	Page 24, Table 15	12/17/18
Product number change to C9400-DNA-P-AA	Page 24, Table 15	12/17/18
Fix typo: "Cisco DNA Essentials"	Page 24, Table 15	12/17/18
Fix typo: "Cisco DNA Essentials"	Page 24, Table 15	12/17/18
Text change to for Catalyst 9400 Series switches	Page 25, Table 15 footnote	12/17/18
Text change to Cisco DNA Essentials subscriptions	Page 25, Table 15 footnote	12/17/18

Printed in USA

C78-739055-07   08/19