Cisco Nexus 93400LD-H1 Switch

Contents

The Cisco Nexus® 93400LD-H1 Switch is a 48-port 50G, 4-port 400G fixed switch.

Product overview

The advent of 5G networks creates unprecedented opportunities and challenges for telcos and enterprises to deliver secure services and new user experiences. Each new generation of mobile networks has driven the need for increased precision and accuracy in synchronization standards and solutions. 5G technology is needed to support Ultra-Reliable Low-Latency Communications (URLLC) services, and new revenue-generating services such as autonomous vehicle connectivity and eHealth services are simply not possible without highly accurate and reliable time synchronization. Even such services as massive Industrial Internet of Things (IoT) and other industrial automation services require reliable time synchronization.

Furthermore, Artificial Intelligence and Machine Learning (AI/ML) applications are being used increasingly in today's data centers, and the Cisco Nexus 9000 Series Switches have the hardware and software capabilities to provide the right latency, congestion-management mechanisms, and telemetry to meet the requirements of those applications. The Cisco Nexus 9000 Series Switches address the need for high-performance, power-efficient, compact switching in the networking infrastructure, designed to support 400G fabrics for next-generation leaf and spine designs.

Large-cloud and data-center networking teams require a flexible, reliable solution that efficiently manages, troubleshoots, and analyzes their IT infrastructure. In addition, they need security, automation, visibility, analytics, and assurance. Coupled with tools such as Cisco Nexus Dashboard Insights for visibility and Nexus Dashboard Fabric Controller for automation, Cisco Nexus 9000 Series Switches are ideal platforms to build a high-performance AI/ML network fabric.

The Cisco Nexus 93400LD-H1 Switch introduces Precision Time Protocol (PTP) with Class C 1588 timing accuracy to the Nexus 9000 fixed-switch portfolio. Through PTP and Synchronous Ethernet (SyncE), it delivers frequency and time distribution with high accuracy. The switch is built with backward-compatible 400G optical interface Quad Small Form-Factor Pluggable–Double Density (QSFP-DD) ports for high density aggregation at 400 Gbps speed; it also offers various lower port speeds and densities, including 10, 25, and 50 Gbps. The Cisco Nexus 93400LD-H1 Switch is based on Cisco® Cloud Scale technology equipped to support next-generation cloud architecture.

The Cisco Nexus 93400LD-H1 is a 1-Rack-Unit (1RU) 48-port 50 Gigabit Ethernet, 4-port 400 Gigabit Ethernet switch that supports 8 Tbps of bandwidth. The switch provides 40MB of on-die packet buffer with MACsec capability on all ports.

Figure 1.
Cisco Nexus 93400LD-H1 Switch, front view

Figure 2.
Cisco Nexus 93400LD-H1 Switch, rear view

Features and benefits

Table 1. Features and benefits

Features	Description and benefits
Architectural flexibility	Cisco Nexus 9000 Series Switches support Cisco Application Centric Infrastructure (Cisco ACI®), Cisco NX-OS VXLAN EVPN, Cisco IP Fabric for Media, Cisco Nexus Data Broker, and IP routed on Ethernet switched Layer-2 fabrics using a comprehensive set of unicast and multicast IPv6/IPv4 and Ethernet protocols. • Purpose-built Cisco NX-OS Software operating system with comprehensive, proven innovations. The operating system is modular, with a dedicated process for each routing protocol: a design that isolates faults while increasing availability. • Industry-leading Cisco Software-Defined Networking (SDN) solution with Cisco ACI support. Cisco ACI is a holistic, intent-driven architecture with centralized automation and policy-based application profiles. • Support for standards-based VXLAN EVPN fabrics, inclusive of hierarchical multisite support (Refer to VXLAN network with MP-BGP EVPN control plane for more information.) • Three-tier BGP architectures, enabling horizontal, nonblocking IPv6 network fabrics at web scale • Comprehensive protocol support for Layer-3 (v4 and v6) unicast and multicast routing protocol suites, including BGP, Open Shortest Path First (OSPF), Enhanced Interior Gateway Routing Protocol (EIGRP), Routing Information Protocol Version 2 (RIPv2), Protocol Independent Multicast Sparse Mode (PIM-SM), Source-Specific Multicast (SSM), and Multicast Source Discovery Protocol (MSDP) • Segment Routing (SR and SRv6) allows the network to forward Multiprotocol Label Switching (MPLS) packets and engineer traffic without Resource Reservation Protocol (RSVP) Traffic Engineering (TE). It provides a control-plane alternative for increased network scalability and virtualization. Cisco IP Fabric for Media helps you migrate from an SDI router to an IP-based infrastructure. In an IP-based infrastructure, a single cable has the capacity to carry multiple bidirectional traffic flows and can support different flow sizes without requiring changes to the physical infrastructure. • Nexus Dashboard Data Broker provides customers complete observability into their network and solution(s) that can help and facilitate them to identify and mitigate security threats, realize and remediate performance bottlenecks, adhere to data compliance, and have insight into capacity-planning operations.
Extensive programmability	• Day-0 automation through Power On Auto Provisioning (POAP), drastically reducing provision time • Industry-leading integrations for leading DevOps configuration management applications, such as Ansible. Extensive native YANG and industry-standard OpenConfig model support through RESTCONF/NETCONF/gNMI • REST API interacting with Data Management Engine (DME) • Model-Driven telemetry, which enhances network observability • Third-party application-hosting using Cisco Application Framework (CAF)
High scalability, flexibility, and security	• Flexible forwarding tables that support up to two million shared entries • Flexible shared ingress and egress of a maximum of 28,000 ACL entries • IEEE 802.1ae MAC Security (MACsec) capability on all ports, which allows traffic encryption at the physical layer and provides secure server, border leaf, and leaf-to-spine connectivity

Features	Description and benefits
AI/ML Networking	Cisco Nexus 9000 Series Switches support innovative congestion management and flow-control algorithms along with the right latency and telemetry to meet the design requirements of AI/ML fabrics. • Priority Flow Control (PFC) is a key capability supported on Cisco Nexus 9000 Series Switches that prevents Ethernet frame drops by signaling, controlling, and managing Ethernet flows along a path by sending pause frames to appropriate senders. • The platform also supports Explicit Congestion Notification (ECN), which provide end-to-end notification per IP flow by marking packets that experienced congestion, without dropping traffic. The platform is capable of tracking ECN statistics, including the number of marked packets that have experienced congestion. • The platform offers lossless transport for Remote Direct Memory Access (RDMA) over converged Ethernet (RoCE) with support of Data Center Bridging (DCB) protocols: ◦ Enhanced Transmission Selection (ETS) reserves bandwidth per priority class in network contention situations. ◦ Data Center Bridging Exchange Protocol (DCBX) can discover and exchange priority and bandwidth information with endpoints. • Weighted Random Early Detection (WRED) is a congestion-avoidance technique that allows Cisco Nexus 9000 Series Switches to detect and react to congestion in the network by marking flows that could cause congestion. • The platform offers Cisco's innovative intelligent buffer management, which offers the capability to distinguish mice and elephant flows and apply different queue-management schemes to them based on their network forwarding requirements in the event of link congestion. • Approximate Fair Dropping (AFD) with Elephant Trap (ETRAP). By using ETRAP, AFD distinguishes long-lived elephant flows from short-lived mice flows. ETRAP measures the byte counts of incoming flows and compares this against the user-defined ETRAP threshold. After a flow crosses the threshold, it becomes an elephant flow. • Dynamic Packet Prioritization (DPP) provides the capability of separating mice flows and elephant flows into two different queues so that buffer space can be allocated to them independently.
Hardware and software high availability	• Virtual Port-Channel (vPC) technology provides Layer-2 multipathing through the elimination of Spanning Tree Protocol (STP). • Provides the capability to link fabrics in a VXLAN environment, eliminating the need for peer-to-peer VPC. The 128-way Equal-Cost MultiPath (ECMP) routing enables the use of Layer-3 fat-tree designs. This feature helps organizations prevent network bottlenecks, increase resiliency, and add capacity with little network disruption. • Software-maintenance upgrades (SMUs) contain fixes for specific defects. They provide a quick resolution of critical issues. • In-service software upgrades (ISSUs) allow upgrades of device software while the switch continues to forward traffic. ISSUs reduce or eliminate the downtime typically caused by software upgrades. • The switches use hot-swappable Power-Supply Units (PSUs) and fans with N+1 redundancy.
Cisco Nexus Dashboard	Cisco Nexus Dashboard is a platform that transforms data-center and cloud network operations through simplicity, automation, and analytics. Cisco Nexus Dashboard Fabric Controller (NDFC), Cisco Nexus Dashboard Insights (NDI), Cisco Nexus Dashboard Orchestrator (NDO), and Cisco Nexus Dashboard Data Broker (NDDB) are integrated as services into Cisco Nexus Dashboard. Cisco Nexus Dashboard is included with all Cisco Nexus 9000 switch tiered licenses. Cisco Nexus Dashboard Fabric Controller requires a Cisco Data Center Networking (DCN) Essentials license, Cisco Nexus Dashboard Orchestrator requires a Cisco DCN Advantage license, and Cisco Nexus Dashboard Insights requires a Cisco DCN Premier or a Cisco DCN Day-2 Ops add-on license.

Licensing

The default system software has a comprehensive Layer-2 security and management feature set. To enable additional functions, including Layer-3 IP unicast and IP multicast routing and Cisco Nexus Data Broker, you must install additional licenses. The Cisco Nexus 93400LD-H1 Switch uses the XF class Cisco Data Center Network (Cisco DCN) Premier, Advantage, and Essentials subscription licenses. The licensing guide illustrates the software packaging and licensing available to enable advanced features. For the latest software release information and recommendations, refer to the release notes.

Product sustainability

Table 2. Cisco environmental sustainability information

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
	Information on product takeback and reuse program	Cisco Takeback and Reuse Program
	Sustainability inquiries	Contact: csr_inquiries@cisco.com
	Countries and regions supported	Table 8: Regulatory compliance
Power	Power	Table 4: Power-supply specifications
Material	Product packaging weight and materials	Contact: environment@cisco.com
	Weight	Table 6. Weight

Product specifications

Table 3. Cisco Nexus 93400LD-H1 Switch specifications

Item	Cisco Nexus 93400LD-H1 Switch
Technical	• 48-port 50G SFP56 and 4-port 400G QSFP-DD ports • On-die buffer: 40MB • System memory: 32GB, expandable to 64GB • SSD: 128GB • USB: 1 port • RS-232 serial console ports: 1 • Management ports: 2 • GPS 1PPS input or output ports: 1 • GPS 10Mhz input or output ports: 1 • CPU: 4 cores
Timing	• Synchronized Ethernet (SyncE) • G.8275.1, G.8275.2 Class C support on all ports

Power and cooling	• Power: 1400W AC, 2000W DC, 2000W HV • Hot-swappable, 5 fans, 4+1 redundancy • Typical power: 394 W • Maximum power: 765 W
Physical and environmental	• Dimensions (H x W x D): 1.72 x 17.3 x 19.69 in. (4.37 x 43.94 x 50.00 cm) • Acoustics: ◦ Port-side intake: ◦ at 50% fan speed: 70.5dBA ◦ at 70% fan speed: 78.9dBA ◦ at 90% fan speed: 84.6dBA ◦ at 100% fan speed: 87.2dBA ◦ Port-side exhaust: ◦ at 60% fan speed: 73.4dBA ◦ at 80% fan speed: 80.0dBA ◦ at 100% fan speed: 85.2dBA • Operating temperature: 32 to 104F (0 to 40C) • Nonoperating (storage temperature): -40 to 131F (-40 to 55C) • Humidity: 5 to 95% (non-condensing) • Altitude: 0 to 13,123 ft (0 to 4000m) • Mean time between failure (MTBF): 224,280 hours

Table 4. Cisco Nexus 93400LD-H1 Switch power-supply specifications

Model	Cisco Nexus 9300 AC power supply	Cisco Nexus 9300 DC power supply	Cisco Nexus 9300 HV power supply
Output power	1400 W	2000 W	2000 W
Input voltage	90-140V AC 180-264V AC	-40 to -72V DC	90-140V AC 180-305V AC 192-400V DC
Input frequency	50/60 Hz	-	50/60 Hz
Connector	IEC60320 C14	Amphenol C10-638976-000	Anderson Power product: Saf-D-Grid
Efficiency	80PLUS Platinum efficiency rating		80PLUS Platinum efficiency rating

Table 5. Performance and scalability specifications

Item	Cisco Nexus 93400LD-H1 Switch
Number of slices	• 2 slices
Maximum number of IPv4 Longest Prefix Match (LPM) routes*	• ~2 Million
Maximum number of IPv4 host entries*	• ~2 Million
Maximum number of IPv6 Longest Prefix Match (LPM) routes*	• ~1 Million
Maximum number of IPv6 host entries*	• ~2 Million
Maximum number of MAC address entries*	• ~1 Million
Maximum number of multicast routes	• 256,000
Number of Internet Group Management Protocol (IGMP) snooping groups	• Maximum: 32,000
Maximum number of access control list (ACL) entries	• 14,000 shared ingress and egress/slice Max: 28,000 shared ingress and egress
Maximum number of VLANs	• 4096**
Number of Virtual Routing and Forwarding (VRF) instances	• Maximum: 16,000
Maximum number of ECMP paths	• 128
Maximum number of port channels*	• 512
Maximum number of links in a port channel*	• 32
Number of SPAN sessions	• 32 (4 active)
Maximum number of VLANs in Rapid per-VLAN Spanning Tree (RPVST) instances	• 4K
Maximum number of Hot-Standby Router Protocol (HSRP) groups	• 1000
Maximum number of Multiple Spanning Tree (MST) instances	• 64
Flow-table size	• 128K/slice
Number of Network Address Translation (NAT) entries	• 2000
Number of output queues per physical port	• 8

*Refers to the hardware capacity, please visit the Cisco Nexus 9000 Series Verified Scalability Guide and Cisco Application Policy Infrastructure Scalability Guide for the latest supported scalability numbers validated for specific software.

**127 VLANs out of 4096 are reserved.

Table 6. Weight

Part number	Weight
N9K-C93400LD-H1 without power supplies or fans	18.7 lbs (8.48 kg)
N9K-C93400LD-H1 with power supplies and fans	23.5 lbs (10.65 kg)
NXA-PAC-1400W-PI / NXA-PAC-1400W-PE	2.50 lbs (1.13 kg)
NXA-PDC-2KW-PI / NXA-PDC-2KW-PE	2.73 lbs (1.24 kg)
NXA-FAN-35CFM-PI	0.28 lbs (0.13 kg)

Supported optics modules

For details on the optical modules available and the minimum software release required for each supported optical module, visit here.

Table 7. Ordering information

Part number	Product description
N9K-C93400LD-H1	Cisco Nexus 9300 48p 50G, 4p 400G Switch
N9K-C93400LD-H1=	Cisco Nexus 9300 48p 50G, 4p 400G Switch w/o power supply, fans
NXA-PAC-1400W-PI	Cisco Nexus 9000 1400W AC power supply, port-side intake
NXA-PAC-1400W-PI=	Cisco Nexus 9000 1400W AC power supply, port-side intake, spare
NXA-PAC-1400W-PE	Cisco Nexus 9000 1400W AC power supply, port-side exhaust
NXA-PAC-1400W-PE=	Cisco Nexus 9000 1400W AC power supply, port-side exhaust, spare
NXA-PDC-2KW-PI	Cisco Nexus 9K 2KW DC PS, port-side intake
NXA-PDC-2KW-PI=	Cisco Nexus 9K 2KW DC PS, port-side intake, spare
NXA-PDC-2KW-PE	Cisco Nexus 9K 2KW DC PS, port-side exhaust
NXA-PDC-2KW-PE=	Cisco Nexus 9K 2KW DC PS, port-side exhaust, spare
NXA-PHV-2KW-PI	Cisco Nexus 2KW PHV power supply, port-side intake
NXA-PHV-2KW-PI=	Cisco Nexus 2KW PHV power supply, port-side intake, spare
NXA-FAN-35CFM-PI	Cisco Nexus fan, 35CFM, port-side intake airflow /w EEPROM
NXA-FAN-35CFM-PI=	Cisco Nexus fan, 35CFM, port-side intake airflow /w EEPROM, spare
NXA-FAN-35CFM-PE	Cisco Nexus fan, 35CFM, port-side exhaust airflow /w EEPROM
NXA-FAN-35CFM-PE=	Cisco Nexus fan, 35CFM, port-side exhaust airflow /w EEPROM, spare

Part number	Product description
NXK-ACC-KIT-1RU	Nexus 3K/9K Fixed Accessory Kit, 1RU front and rear removal
NXK-ACC-KIT-1RU=	Nexus 3K/9K Fixed Accessory Kit, 1RU front and rear removal, spare
NXK-ACC-KIT-2P	Nexus Fixed Acc Kit w/ 2-post rack mount kit for 9348GC-FXP
NXK-ACC-KIT-2P=	Nexus Fixed Acc Kit w/ 2-post rack mount kit for 9348GC-FXP, spare

Regulatory standards compliance

Table 8. Regulatory standards compliance: safety and EMC

Specification	Description
Regulatory compliance	Products complies with CE Markings according to directives 2014/30/EU and 2014/35/EU
Safety	• ANSI/UL 60950-1 2nd Edition and 62368-1 3rd Edition • CAN/CSA-C22.2 No. 60950-1 2nd edition and 62368-1 3rd edition • EN 62368-1 2nd Edition • IEC 62368-1 3rd Edition • AS/NZS 62368-1 3rd Edition
EMC: emissions*	• 47 CFR Part 15 Class A • CISPR32 Class A • CNS 15936 • EN 55032 Class A • EN 61000-3-3 • EN IEC 61000-3-11 • EN IEC 61000-3-2 • EN61000-3-12 • ICES-003:Iss:7 Class A • KS C 9832 • VCCI-CISPR 32 Class A
EMC: immunity	• CISPR24 • CISPR35 • EN55035 • EN/IEC61000-6-1 • EN 300 386 • EN61000-6-1 • EN61000-6-2 • IEC61000-6-1 • IEC61000-6-2 • KS C 9835
RoHS	• The product is RoHS-6 compliant with exceptions for leaded-Ball Grid-Array (BGA) balls and lead press-fit connectors.

Warranty information

The Cisco Nexus 93400LD-H1 Switch has a 1-year limited hardware warranty. The warranty includes hardware replacement with a 10-day turnaround from receipt of a Return Materials Authorization (RMA).

Cisco and Partner Services

Cisco offers a wide range of services to help accelerate your success in deploying and optimizing the Cisco Nexus 9300 switch in your data center. The innovative Cisco Services offerings are delivered through a unique combination of people, processes, tools, and partners and are focused on helping you increase operation efficiency and improve your data-center network. Cisco Advanced Services uses an architecture-led approach to help you align your data center infrastructure with your business goals and achieve long-term value. The Cisco SMARTnet® service helps you resolve mission-critical problems with direct access at any time to Cisco network experts and award-winning resources.

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