Cisco N9300-H2 Series Switches

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Contents

Product overview	3
Features and benefits	4
Licensing	6
Product specifications	7
Supported optics modules	9
Ordering information	10
Regulatory standards compliance	11
Warranty information	12
Product sustainability	12
Cisco and partner services	12
Cisco Capital	12
Document history	13

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Product overview

Artificial Intelligence and Machine Learning (AI/ML) applications are being used increasingly in today's data centers, and the Cisco N9000 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 N9000 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. Managed by the operations and automation platform Cisco Nexus Dashboard with services such as Cisco Nexus Dashboard Insights for visibility and Nexus Dashboard Fabric Controller for automation, Cisco N9000 Series switches are ideal platforms to build a high-performance AI/ML network fabric.

The Cisco N9332D-H2R Switch introduces the first switch with deep-buffer capability to the N9000 fixed-switch portfolio. The switch is built with backward-compatible 400G optical interface Quad Small Form-Factor Pluggable–Double Density (QSFP-DD) ports to migrate existing data center fabrics from 40-Gbps and 100-Gbps speeds to 400 Gbps; it also offers various lower port speeds and densities, including 10, 25, 40, 50, 100, and 200 Gbps, using breakouts. The Cisco N9332D-H2R Switch is based on Cisco® Cloud Scale technology equipped to support next-generation cloud architecture.

The Cisco N9332D-H2R is a 1-Rack-Unit (1RU) 32-port 400 Gigabit Ethernet switch that supports 25.6 Tbps of bandwidth and 4.98 bpps. The switch provides 80MB of on-die packet buffer and 8GB of high bandwidth memory (or HBM) with MACsec capability on all 32 ports.

The Cisco N9332D-H2R supports the Precision Time Protocol (PTP) with Class C timing accuracy for telecom as well as media profiles. Through PTP and Synchronous Ethernet, it delivers frequency and time distribution with high accuracy.



Figure 1.
Cisco N9332D-H2R Switch, front side



Figure 2.
Cisco N9332D-H2R Switch, rear side

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The Cisco N9348C8D-H2 is a 1-Rack-Unit (1RU) 48-port 100 and 8 port 400 Gigabit Ethernet switch that supports 25.6 Tbps of bandwidth and 4.98 bpps. The switch can be configured to work as 10/25/40/50/100-Gbps offering flexible options in a compact form factor.

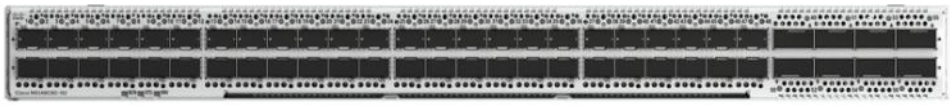


Figure 3.
Cisco N9348C8D-H2 Switch, front side



Figure 4.
Cisco N9348C8D-H2 Switch, rear side

Features and benefits

Table 1. Features and benefits

Features	Description and benefits
Architectural flexibility	• Cisco N9000 Series switches support Cisco Application Centric Infrastructure (ACI), Cisco NXOS VXLAN EVPN, Cisco IP Fabric for Media (IPFM), Cisco Nexus Data Broker, and IP routed or 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), Interior System to Interior System (IS-IS), 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

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Features	Description and benefits
	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 enhances network observability • 3rd party application hosting using Cisco Application Framework (CAF)
High scalability, flexibility, and security	• Flexible forwarding tables support up to two million shared entries • Flexible shared ingress and egress of max 56000 ACL entries • 8GB of off-die High Bandwidth Memory (HBM), DRAM based deep buffer • IEEE 802.1ae MAC Security (MACsec) capability on all ports, allows traffic encryption at the physical layer and provides secure server, border leaf, and leaf-to-spine connectivity.
AI/ML Networking	Cisco N9000 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 N9000 Series switches that prevents Ethernet frame drops by signaling, controlling, and managing Ethernet flows along the path by sending pause frames to appropriate senders. • The platform also supports Explicit Congestion Notification (ECN), which provides end-to-end notification per IP flow by marking packets that experienced congestion, without dropping traffic. The platform can track 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 N9000 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). AFD distinguishes long-lived elephant flows from short-lived mice flows, by using ETRAP. 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.

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Features	Description and benefits
Hardware and software high availability	• Virtual Port-Channel (vPC) technology provides Layer 2 multipathing through the elimination of Spanning Tree Protocol (STP). • Can do fabric link in the 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 Upgrade (SMU) contains fixes for a specific defect. They provide a quick resolution of critical issues. • In-service software upgrade (ISSU) allows to upgrade the device software while the switch continues to forward traffic. ISSU reduces or eliminates 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) and Cisco Nexus Dashboard Orchestrator (NDO) are integrated as services in Cisco Nexus Dashboard. Cisco Nexus Dashboard is included with all Cisco N9000 switch tiered licenses, DCN Essentials, Advantage and Premier. The services hosted on Cisco Nexus Dashboard require their own licenses. For the full breakdown of features included in each tier, please refer to the Cisco DCN Software Subscriptions page.

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 N9332D-H2R switch uses the XF2 class Cisco Data Center Network (Cisco DCN) Premier, Advantage, and Essentials subscription licenses. The Cisco N9348C8D-H2 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.

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Product specifications

Table 2. Cisco N9332D-H2R Switch specifications

Item	Cisco N9332D-H2R Switch	Cisco N9348C8D-H2 Switch
Technical	• 32-port 400G QSFP-DD ports • On-die buffer: 80MB • High-bandwidth memory: 8GB • System memory: 32GB, expandable to 64GB • SSD: 128GB • USB: 1 port • RS-232 serial console ports: 1 • Management ports: 2 • CPU: 6 cores	• 48 port 100G SFP-DD and 8 port 400G QSFP-DD ports • System memory: 32GB, expandable to 64GB • SSD: 128GB • USB: 1 port • RS-232 serial console ports: 1 • Management ports: 2 (SFP+ and RJ45) • CPU: 8 cores
Power and cooling	• Power: 2000W AC, DC, HV • Hot-swappable, 6 fans, 5+1 redundancy • Typical power: 1015 W • Maximum power: 1900 W	• Power: 1100W AC, DC, HV • Hot-swappable, 6 fans, 5+1 redundancy
Physical and Environmental	• Dimensions (H x W x D): 1.72 x 17.3 x 29.34 in. (4.36 x 43.94 x 74.52 cm) • Acoustics: ◦ at 60% fan speed: 76.3dB ◦ at 70% fan speed: 80.4dB ◦ at 100% fan speed: 87.6dB • 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 10,000 ft (0 to 3048m) • Mean Time Between Failure (MTBF): 154,950 hours	• Acoustics: ◦ at 60% fan speed: 76.3dB ◦ at 70% fan speed: 80.4dB ◦ at 100% fan speed: 87.6dB • 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 10,000 ft (0 to 3048m)

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Table 3. Cisco N9332D-H2R Switch power-supply specifications

Model	Cisco N9300 2000W AC power supply	Cisco N9300 1100W AC power supply	Cisco N9300 2000W DC power supply	Cisco N9300 1100W DC power supply	Cisco N9300 2000W HV power supply	Cisco N9300 1100W HV power supply
Output power	2000 W	1100W	2000 W	1100 W	2000 W	1100 W
Input voltage	90-140V AC 180-264V AC	90-140V AC 180-264V AC	-40 to -72V DC	-40 to -72V DC	90-140V AC 180-305V AC 192-400V DC	90-140V AC 180-305V AC 192-400V DC
Input frequency	50/60 Hz	50/60 Hz	-	-	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 4. Performance and scalability specifications

Item	Cisco N9332D-H2R Switch
Number of slices	4 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* **Maximum number of IPv6 host entries***	~1 Million ~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: 56,000 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

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Item	Cisco N9332D-H2R Switch
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 N9000 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 5. Weight

Part Number	Weight
N9K-C9332D-H2R without power supplies or fans	31.6 lbs (14.3 kg)
N9K-C9332D-H2R with power supplies and fans	38.4 lbs (17.4 kg)
NXA-SFAN-35CFM-PI	0.26 lbs (0.1 kg)

Supported optics modules

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

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Ordering information

Table 6. Ordering information

Part number	Product description
N9K-C9332D-H2R	Cisco N9300 Series w 32p 400G w HBM
N9K-C9332D-H2R=	Cisco N9300 Series w 32p 400G w HBM w/o power supply, fans
N9348C8D-H2	Cisco N9300 Series w 48 port 100G and 8 port 400G
N9348C8D-H2=	Cisco N9300 Series w 48 port 100G and 8 port 400G w/o power supply, fans
NXA-PAC-2KW-PI	Cisco N9000 2KW AC power supply, port-side intake
NXA-PAC-1100W-PI2	Cisco N9000 1100W AC power supply, port-side intake
NXA-PAC-1100W-PE2	Cisco N9000 1100W AC power supply, port-side exhaust
NXA-PHV-2KW-PI	Cisco Nexus 2KW PHV power supply, port-side intake
NXA-PDC-2KW-PI	Cisco Nexus 9K 2KW DC PS, port-side intake
NXA-PDC-1100W-PI	Cisco N9000 1100W DC power supply, port-side intake
NXA-PDC-1100W-PE	Cisco N9000 1100W DC power supply, port-side exhaust
NXA-PHV-1100W-PI	Cisco N9000 1100W HVDC power supply, port-side intake
NXA-PHV-1100W-PE	Cisco N9000 1100W HVDC power supply, port-side exhaust
NXA-SFAN-35CFM-PI	Cisco Nexus fan, 35CFM, port-side intake airflow /w EEPROM
NXA-PAC-2KW-PI=	Cisco N9000 2KW AC power supply, port-side intake, spare
NXA-PHV-2KW-PI=	Cisco Nexus 2KW PHV power supply, port-side intake, spare
NXA-PDC-2KW-PI=	Cisco Nexus 9K 2KW DC PS, port-side intake, spare
NXA-SFAN-35CFM-PI=	Cisco Nexus fan, 35CFM, port-side intake airflow /w EEPROM, spare
NXA-SFAN-39CFM-PI	Cisco Nexus fan, 39CFM, port-side intake airflow /w EEPROM
NXA-SFAN-39CFM-PI=	Cisco Nexus fan, 39CFM, port-side intake airflow /w EEPROM, spare
NXA-SFAN-39CFM-PE	Cisco Nexus fan, 39CFM, port-side exhaust airflow /w EEPROM
NXA-SFAN-39CFM-PE=	Cisco Nexus fan, 39CFM, port-side exhaust airflow /w EEPROM, spare

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Regulatory standards compliance

Table 7. 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 Third Edition • AS/NZS 62368-1 Third Edition • GB4943
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 9610-3-11 • KS C 9610-3-12 • KS C 9610-3-2 • KS C 9610-3-3 • 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.

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Warranty information

The Cisco N9332D-H2R 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).

Product sustainability

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

Table 8. 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 7: Regulatory Compliance
Power	Power	Table 3: Power-supply specifications
Material	Product packaging weight and materials	Contact: environment@cisco.com
	Weight	Table 5. Weight

Cisco and partner services

Cisco offers a wide range of services to help accelerate your success in deploying and optimizing the Cisco N9300 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. 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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Document history

New or revised topic	Described in	Date
Added Interior System to Interior System (IS-IS)	Table 1	August 2025

Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV Amsterdam,
The Netherlands

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