



Cisco Nexus 9300-GX Series Switches

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Product overview

Based on Cisco® Cloud Scale technology, the Cisco Nexus® 9300-GX switches are the next generation of fixed Cisco Nexus 9000 Series Switches capable of supporting 400 Gigabit Ethernet (GE). With the increase in use cases for applications requiring Artificial Intelligence (AI) and Machine Learning (ML), the platform addresses the need for high-performance, power-efficient, compact switches in the networking infrastructure. These switches are designed to support 100G and 400G fabrics for mobile service provider environments, including the network edge, 5G, IoT, Professional Media Networking platform (PMN), and Network Functions Virtuapization (NFV) The platform introduces a backward-compatible 400G optical interface Quad Small Form-Factor Pluggable – Double Density (QSFP-DD) to transparently migrate existing data center fabrics from 40-Gbps and 100-Gbps speeds to 400 Gbps and also offers various lower port speeds and densities, including 10, 25, 50, and 200 Gbps using breakouts. The Cisco Nexus 9300-GX provides investment protection for customers, delivering higher performance to meet scaled out spine-leaf fabrics to support growing traffic for cloud applications.

Cisco provides two modes of operation for Cisco Nexus 9000 Series Switches. Organizations can deploy Cisco Application Centric Infrastructure (Cisco ACI°) or Cisco NX-OS mode.

<u>Cisco ACI</u> is a holistic, intent-driven architecture with centralized automation and policy-based application profiles. It provides a robust, transport network for dynamic workloads and is built on a network fabric that combines time-tested protocols with new innovations to create a highly flexible, scalable, and resilient architecture of low-latency, high-bandwidth links. This fabric delivers a network that can support the most demanding and flexible data center environments.

Designed for the programmable network, the <u>Cisco NX-OS</u> operating system automates configuration and management for customers who want to take advantage of the DevOps operation model and tool sets.

Switch models

Table 1 summarizes the Cisco Nexus GX Series Switches.

Table 1. Cisco Nexus 9300 switches

Model	Description
Cisco Nexus 9316D Switch	16 x 400/100-Gbps QSFP-DD ports
Cisco Nexus 93600CD Switch	28 x 100/40-Gbps Quad Small Form-Factor Pluggable (QSFP28) and 8 x 400/100-Gbps QSFP-DD ports
Cisco Nexus 9364C Switch	64 x 100/40-Gbps Quad Small Form-Factor Pluggable (QSFP28)

The Cisco Nexus 9316D-GX Switch (Figure 1) is a 1RU switch that supports 12.8 Tbps of bandwidth and over 4.3 bpps. The switch can be configured to work as 10/25/40/50/100/200/400-Gbps offering flexible options in a compact form factor. Please see feature table below for more information.



Figure 1. Cisco Nexus 9316D Switch

The Cisco Nexus 93600CD-GX Switch (Figure 2) is a 1RU switch that supports 12 Tbps of bandwidth and 4.0 bpps across 28 fixed 40/100G QSFP-28 ports and 8 fixed 40/100/400G QSFP-DD ports. The 28 ports support 10/25-Gbps. Please see feature table below for more information.



Figure 2. Cisco Nexus 93600CD Switch

The Cisco Nexus 9364C-GX Switch (Figure 3) is a 2RU switch that supports 12.8 Tbps of bandwidth and over 4.3 bpps across 64 fixed 40/100G QSFP-28 ports. Please see feature table below for more information.



Figure 3. Cisco Nexus 9364C Switch

Features and benefits

The Cisco Nexus 9300-GX Series provides the following features and benefits:

Architectural flexibility

- Industry-leading Cisco Software-Defined Networking (SDN) solution and Cisco ACI® support
- Support for standards-based VXLAN EVPN fabrics, inclusive of hierarchical multi-site support (refer to VXLAN network with MP-BGP EVPN control plane for more information)
- Three-tier BGP architectures, enabling horizontal, non-blocking IPv6 network fabrics at web scale
- 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
- 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 (PIMSM), Source-Specific Multicast (SSM), and Multicast Source Discovery Protocol (MSDP)

Extensive programmability

- Day-zero automation through Power On Auto Provisioning (POAP), drastically reducing provisioning time
- Industry-leading integrations for leading DevOps configuration management applications, such as Ansible, Chef, Puppet, and SALT. Extensive native YANG and industry-standard OpenConfig model support through RESTCONF/NETCONF
- Pervasive APIs for all switch Command-Line Interface (CLI) functions (JSON-based RPC over HTTP/HTTPs)

High scalability, flexibility, and security

 Flexible forwarding tables support up to one million shared entries on GX models. Flexible use of TCAM space allows for custom definition of Access Control List (ACL) templates

Intelligent buffer management

- 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
- Intelligent buffer management functions include:
 - Approximate Fair Dropping (AFD) with Elephant Trap (ETRAP). AFD distinguishes long-lived elephant flows from short-lived mice flows, by using ETRAP. AFD exempts mice flows from the dropping algorithm so that mice flows will get their fair share of bandwidth without being starved by bandwidth-hungry elephant flows. Also, AFD tracks elephant flows and subjects them to the AFD algorithm in the egress queue to grant them their fair share of bandwidth
 - 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. Mice flows—sensitive to congestion and latency—can take priority queue and avoid re-ordering that allows the elephant flows to take full link bandwidth

Remote Direct Memory Access (RDMA) over converged Ethernet - RoCE support

- The platform offers lossless transport for Remote Direct Memory Access (RDMA) over converged Ethernet with support of Data Center Bridging (DCB) protocols:
 - Priority-based Flow Control (PFC) prevents drops in the network and pause-frame propagation per priority class
 - 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
- 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 is capable of tracking ECN statistics, including the number of marked packets that have
 experienced congestion

LAN and SAN convergence

 Fibre Channel over Ethernet (FCoE) N-Port Virtualization (NPV) support enables the network administrator to control domain IDs and points of management on a Fibre Channel network as it scales. This feature enables LAN and SAN-converged networks on a lossless, reliable Ethernet network

Hardware and software high availability

- Virtual Port-Channel (vPC) technology provides Layer 2 multipathing through the elimination of Spanning Tree Protocol (STP). It also enables fully utilized bisectional bandwidth and simplified Layer 2 logical topologies without the need to change the existing management and deployment models
- The 64-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
- Advanced reboot capabilities include hot and cold patching
- The switches use hot-swappable Power-Supply Units (PSUs) and fans with N+1 redundancy

Purpose-built Cisco NX-OS Software operating system with comprehensive, proven innovations

- A single binary image supports every switch in the Cisco Nexus 9000 Series, simplifying image management. The operating system is modular, with a dedicated process for each routing protocol: a design that isolates faults while increasing availability. In the event of a process failure, the process can be restarted without loss of state. The operating system supports hot and cold patching and online diagnostics
- Data Center Network Manager (DCNM) is the network management platform for all Cisco NX-OS-enabled deployments, spanning new fabric architectures, IP Fabric for Media, and storage networking deployments for the Cisco Nexus-powered data center. Accelerate provisioning from days to minutes and simplify deployments from day zero through day N. Reduce troubleshooting cycles with graphical operational visibility for topology, network fabric, and infrastructure. Eliminate configuration errors and automate ongoing change in a closed loop, with templated deployment models and configuration compliance alerting with automatic remediation. Enjoy a real-time health summary for fabric, devices, and topology. Correlated visibility for fabric (underlay, overlay, virtual and physical endpoints), including compute visualization with VMware

 Network traffic monitoring with Cisco Nexus Data Broker builds simple, scalable, and cost-effective network Test Access Points (TAPs) and Cisco Switched Port Analyzer (SPAN) aggregation for network traffic monitoring and analysis

Cisco Network Assurance Engine (NAE)

Cisco NAE continuously verifies if the network infrastructure is operating as per policy intent. It leverages the power of mathematical models to reason on behalf of the operator in policy, configuration, and dynamic state level. NAE can precisely indicate problems in the network, identify which application or part of network is impacted, identify the root cause of the problem, and suggest how to fix it. Its continuous verification approach transforms day-2 operations from reactive to proactive mode and it does so without using any packet data. NAE helps avoid outages by predicting the impact of changes, reducing network-related IT incidents and shrinking the mean time to repair by up to 66 percent. NAE also helps assure network security and segmentation compliance. To learn more about NAE, visit: https://www.cisco.com/c/en/us/products/data-center-analytics/network-assurance-engine/index.html

Specifications

Table 2 lists the specifications for the Cisco Nexus GX Series fixed switches.

Table 2. Cisco Nexus 9300-GX Series switch specifications

Item	Specifications		
Device	N9K-C9316D-GX	N9K-C93600CD-GX	N9K-C9364C-GX
Ports	• 16 x 400/100/40-Gbps QSFP-DD ports	 28 x 100/40-Gbps QSFP28 ports and 8 x 400/100-Gbps QSFP-DD ports 	• 64 x 100/40-Gbps QSFP28 ports
Supported speeds	 40/100/400-Gbps Ethernet Breakout supported on all ports, 1-16: 4x100, 8x50, 2x50, 4x25, 4x10 10G w/QSA 	 40/100-Gbps on downlinks 40/100/400-Gbps on uplinks Breakout supported on ports, 25-36: 2x50, 4x10, 4x25G 10G w/QSA 	 40/100-Gbps Breakout supported: 2x50, 2x25, 2x10 on all ports 4x10, 4x25G on all odd numbered ports 10G w/QSA
CPU	• 4 cores	• 4 cores	• 4 cores
System memory	• 32 GB	• 32 GB	• Up to 32 GB
SSD Drive	• 128 GB	• 128 GB	• 128 GB
System buffer	• 80 MB	• 80 MB	• 80 MB
Management ports	• 2 ports: 1 RJ-45 and 1 SFP	• 2 ports: 1 RJ-45 and 1 SFP	• 2 ports: 1 RJ-45 and 1 SFP
USB Ports	• 1	• 1	• 1
RS-232 serial ports	• 1	• 1	• 1
Power Supplies	• 1100W AC, 1100W DC, 1100W HVAC/HVDC	• 1100W AC, 1100W DC, 1100W HVAC/HVDC	• 2000W AC, 2000W DC, 2000W HVAC/HVDC

Item	Specifications		
Typical power (AC)	• 420W	• 586W	• 811W
Maximum power (AC)	• 1010W	• 1071W	• 1622W
Input voltage (AC)	• 100 to 240V	• 100 to 240V	• 100 to 240V
Input voltage (High- Voltage AC [HVAC])	• 100 to 277V	• 100 to 277V	• 100 to 277V
Input voltage (DC)	• -40 to -72V	• -40 to -72V	• -40 to -72V
Input voltage (High- Voltage DC [HVDC])	• -240 to -380V	• -240 to -380V	• -240 to -380V
Frequency (AC)	• 50 to 60 Hz	• 50 to 60 Hz	• 50 to 60 Hz
Fans	• 5+1 redundancy	• 5+1 redundancy	• 3+1 redundancy
Airflow	Port-side intake and exhaust	Port-side intake and exhaust	Port-side intake and exhaust
Physical dimensions (H x W x D)	• (H x W x D): 1.72 x 17.37 x 25.5 in. (4.37 x 44.13 x 64.8 cm)	• (H x W x D): 1.72 x 17.37 x 25.5 in. (4.37 x 44.13 x 64.8 cm)	• Dimensions (H x W x D): 3.39 x 17.41 x 22.59 in. (8.61 x 44.23 x 57.4 cm)
Acoustics	• 73.2 dBA at 50% fan speed, 81.8 dBA at 70% fan speed, and 88.8 dBA at 100% fan speed	 73.2 dBA at 50% fan speed, 81.8 dBA at 70% fan speed, and 88.8 dBA at 100% fan speed 	 77.3 dBA at 50% fan speed, 88.6 dBA at 70% fan speed, and 95.8 dBA at 100% fan speed
RoHS compliance	• Yes	• Yes	• Yes
Mean Time Between Failure (MTBF)	• 323,140 hours	• 295,515 hours	• 237,760 hours
Minimum ACI image	• ACI-N9KDK9-14.2(2e)	• ACI-N9KDK9-14.2(2e)	• ACI-N9KDK9-14.2(3)
Minimum NX-OS image	• NXOS-9.3.3	• NXOS-9.3.3	• NXOS-9.3.3

The Cisco Nexus GX Series also introduces support of single-chip ACI spine-and-leaf functionality to enable customers to use a given GX series device, either in ACI spine or ACI leaf deployment for fully flexible deployments.

 Table 3.
 ACI support

Item	N9K-C9316D-GX	N9K-C93600CD-GX	N9K-C9364C-GX
ACI spine	Yes	Yes	Yes
ACI leaf	Yes	Yes	Yes

Performance and scalability

Table 4 lists the performance and scalability specifications for the Cisco Nexus GX Series Switches.

Table 4. Performance and scalability specifications*

Item	Cisco Nexus 9300-GX Series Switches
Maximum number of IPv4 Longest Prefix Match (LPM) routes**	896,000
Maximum number of IPv4 host entries**	896,000
Maximum number of MAC address entries**	256,000
Maximum number of multicast routes	32,000
Number of Interior Gateway Management Protocol (IGMP) snooping groups	Shipping: 8000 Maximum: 32,000
Maximum number of Access-Control-List (ACL) entries	Per slice of the forwarding engine: • 5000 ingress • 2000 egress • Max: 20,000 ingress, 8000 egress
Maximum number of VLANs	4096***
Number of Virtual Routing and Forwarding (VRF) instances	Shipping: 1000 Maximum: 16,000
Maximum number of ECMP paths	64
Maximum number of port channels	512
Maximum number of links in a port channel	32
Number of active SPAN sessions	4
Maximum number of VLANs in Rapid per-VLAN Spanning Tree (RPVST) instances	3967
Maximum number of Hot-Standby Router Protocol (HSRP) groups	490
Maximum number of Multiple Spanning Tree (MST) instances	64
Flow-table size used for Cisco Tetration Analytics platform	64,000
Number of Network Address Translation (NAT) entries	1023

^{*}More templates and greater scalability are on the roadmap. Refer to the <u>Cisco Nexus 9000 Series Verified Scalability Guide</u> and <u>Cisco Application Policy Infrastructure Controller</u> for the latest, exact scalability numbers validated for specific software.

^{*}Raw capacity of flow table

^{** 127} VLANs out of 4096 are reserved

Table 5. Weight

Component	Weight
Cisco Nexus 9316D-GX without power supplies or fans	28.8 lbs (13 kg)
Cisco Nexus 93600CD-GX without power supplies or fans	28 lbs (12.7 kg)
Cisco Nexus 9364C-GX without power supplies or fans	29.2 lbs (13.2 kg)
2000W AC power supply	2.2 lbs (1 kg)
2000W DC power supply	2.2 lbs (1 kg)
2000W HVAC/HVDC power supply	2.42 lbs (1.1 kg)
1100W AC power supply	2.42 lbs (1.1 kg)
1100W DC power supply	2.45 lbs (1.11 kg)
1100W HVAC/HVDC power supply	2.46 lbs (1.12 kg)
Fan tray: NXA-FAN-35CFM-PE or NXA-FAN-35CFM-PI	0.25 lbs (0.1 kg)
NXA-FAN-160CFM2PI or NXA-FAN-160CFM2PE	1.3 lbs (0.59 kg)

Regulatory standards compliance

Table 6 summarizes regulatory standards compliance for the platform.

 Table 6.
 Regulatory standards compliance: Safety and EMC

Specification	Description
Regulatory compliance	Products should comply with CE Markings according to directives 2004/108/EC and 2006/95/EC.
Safety	 UL 60950-1 Second Edition CAN/CSA-C22.2 No. 60950-1 Second Edition EN 60950-1 Second Edition IEC 60950-1 Second Edition AS/NZS 60950-1 GB4943
EMC: Emissions	 47CFR Part 15 (CFR 47) Class A AS/NZS CISPR22 Class A CISPR22 Class A EN55022 Class A ICES003 Class A VCCI Class A EN61000-3-2 EN61000-3-3 KN22 Class A CNS13438 Class A Note: Cisco Nexus N9K-C9364C passes EMC Radiated Emissions standards in all configurations, with the only exception being if more than 40 pluggable optics of Cisco part number 10-3142-02 (or 10-3142-01) are used.

Specification	Description
EMC: Immunity	 EN55024 CISPR24 EN300386 KN 61000-4 series
RoHS	The product is RoHS-6 compliant with exceptions for leaded Ball Grid-Array (BGA) balls and lead press-fit connectors.

Supported optics: Pluggable

For details about the optical modules available and the minimum software release required for each supported optical module, visit:

https://www.cisco.com/en/US/products/hw/modules/ps5455/products_device_support_tables_list.html.

Ordering information

Tables 7, 8, and 9 present ordering information for the Cisco Nexus GX Series switches.

 Table 7.
 N93-C9316D-GX ordering information

Part number	Product description
Hardware	
N9K-C9316D-GX	Nexus 9316D Spine switch with 16p 400/100G QSFP-DD
Fan options	
NXA-FAN-35CFM-PI	Nexus Fan, Nexus 2000, 3000, 9000 Single Fan, 35CFM, port side intake airflow
NXA-FAN-35CFM-PE	Nexus Fan, Nexus 2000, 3000, 9000 Single Fan, 35CFM, port side exhaust airflow
Power supply options	
NXA-PAC-1100W-PI2	Nexus AC 1100W PSU Spare - port side intake
NXA-PAC-1100W-PE2	Nexus AC 1100W PSU Spare - port side exhaust
NXA-PDC-1100W-PI	Nexus 1100W Platinum DC PS, port side intake
NXA-PDC-1100W-PE	Nexus 1100W Platinum DC PS, port side exhaust
NXA-PHV-1100W-PI	Nexus 1100W Platinum HV-AC-DC PS, port side intake
NXA-PHV-1100W-PE	Nexus 1100W Platinum HV-AC-DC PS, port side exhaust
Accessories	
NXK-ACC-KIT-1RU	Nexus 9000 Fixed Accessory Kit

 Table 8.
 N93-C93600CD-GX ordering information

Part number	Product description
Hardware	
N9K-C93600CD-GX	Nexus 93600CD Spine and Leaf switch with 28p 100/40G QSFP28 and 8p 400/100G QSFP-DD
Fan options	
NXA-FAN-35CFM-PI	Nexus Fan, Nexus 2000, 3000, 9000 Single Fan, 35CFM, port side intake airflow
NXA-FAN-35CFM-PE	Nexus Fan, Nexus 2000, 3000, 9000 Single Fan, 35CFM, port side exhaust airflow
Power supply options	
NXA-PAC-1100W-PI2	Nexus AC 1100W PSU Spare - port side intake
NXA-PAC-1100W-PE2	Nexus AC 1100W PSU Spare - port side exhaust
NXA-PDC-1100W-PI	Nexus 1100W Platinum DC PS, port side intake
NXA-PDC-1100W-PE	Nexus 1100W Platinum DC PS, port side exhaust
NXA-PHV-1100W-PI	Nexus 1100W Platinum HV-AC-DC PS, port side intake
NXA-PHV-1100W-PE	Nexus 1100W Platinum HV-AC-DC PS, port side exhaust
Accessories	
NXK-ACC-KIT-1RU	Nexus 9000 Fixed Accessory Kit

 Table 9.
 N93-C9364C-GX ordering information

Part number	Product description
Hardware	
N9K-C9364C-GX	Nexus 9364C Spine and Leaf switch with 64p 100/40G QSFP28
Fan options	
NXA-FAN-160CFM2PI	Nexus Fan, Nexus 2000, 3000, 9000 Single Fan, 160CFM, port side intake airflow
NXA-FAN-160CFM2PE	Nexus Fan, Nexus 2000, 3000, 9000 Single Fan, 160CFM, port side exhaust airflow
Power supply options	
NXA-PAC-2KW-PI	Nexus AC 2000W PSU Spare - port side intake
NXA-PAC-2KW-PE	Nexus AC 2000W PSU Spare - port side exhaust
NXA-PDC-2KW-PI	Nexus 2000W Platinum DC PS, port side intake

Part number	Product description	
NXA-PDC-2KW-PE	Nexus 2000W Platinum DC PS, port side exhaust	
NXA-PHV-2KW-PI	Nexus 2000W Platinum HV-AC-DC PS, port side intake	
Accessories		
N9K-C9300-RMK	Nexus 9000 Fixed Rack Mount Kit	
N9K-C9300-ACK	Nexus 9000 Fixed Accessory Kit	

Warranty

The Cisco Nexus 9300 platform switches have 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 environmental sustainability

Information about Cisco's environmental sustainability policies and initiatives for our products, solutions, operations, and extended operations or supply chain is provided in the "Environment Sustainability" section of Cisco's <u>Corporate Social Responsibility</u> (CSR) Report.

Reference links to information about key environmental sustainability topics (mentioned in the "Environment Sustainability" section of the CSR Report) are provided in the following table:

Sustainability topic	Reference
Information on product material content laws and regulations	<u>Materials</u>
Information on electronic waste laws and regulations, including products, batteries, and packaging	WEEE compliance

Cisco makes the packaging data available for informational purposes only. It may not reflect the most current legal developments, and Cisco does not represent, warrant, or guarantee that it is complete, accurate, or up to date. This information is subject to change without notice.

Service and support

Cisco offers a range of professional, solution, and product support services for each stage of your Cisco Nexus 9300 platform deployment:

- Cisco Data Center Quick Start Service for Cisco Nexus 9000 Series Switches This offering provides consulting services that include technical advice and assistance to help deploy Cisco Nexus 9000 Series Switches
- Cisco Data Center Accelerated Deployment Service for Cisco Nexus 9000 Series Switches This
 service delivers planning, design, and implementation expertise to bring your project into
 production. The service also provides recommended next steps, an architectural high-level design,
 and operation-readiness guidelines to scale the implementation to your environment

- Cisco Migration Service for Cisco Nexus 9000 Series Switches This service helps you migrate from Cisco Catalyst® 6000 Series Switches to Cisco Nexus 9000 Series Switches
- Cisco product support Our support service is available globally 24 hours a day, 7 days a week, for
 Cisco software and hardware products and technologies associated with Cisco Nexus 9000 Series
 Switches. Enhanced support options delivered by Cisco also include solution support for Cisco ACI,
 Cisco SMARTnet™ Service, and Cisco Smart Net Total Care®* Service

For more information, visit https://www.cisco.com/go/services.

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For more information

For more information about the Cisco Nexus 9000 Series and for the latest software release information and recommendations, visit https://www.cisco.com/go/nexus9000.

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