Cisco Nexus 3408-S Switch

Cisco Nexus 3400-S overview

The Cisco Nexus® 3400-S is the first 400G programmable switch series in the Nexus 3000 portfolio with 50 Gbps PAM4 Serial-Deserializers (SerDes), designed for data centers with industry-leading performance-per-watt power efficiency at low latency, offering leading analytics.

Main benefits of the Cisco Nexus 3400-S switches:

- With the 12.8-Tbps ASIC, the Cisco Nexus 3408-S series provides 128 ports of 100G or 32 ports of 400G, allowing customers to grow at scale with fewer numbers of switches in their fabric, simplifying management and reducing cost and number of hops.
- At 400G, the Cisco Nexus 3400-S offers the lowest latency in the industry, of 370ns at high-power efficiency
- The Cisco Nexus 3400-S offers a programmable pipeline translated to flexible profiles, whether Longest-Prefix-Matching (LPM)-optimized or layer 3 host-optimized. Customers can choose the profile to match their deployment needs.
- The Cisco Nexus 3400-S supports comprehensive encapsulation and tunneling technologies, Virtual Extensible LAN (VXLAN), VXLAN routing, Multiprotocol Label Switching (MPLS), Generic Protocol Extension (GPE), Geneve, Network Virtualization Using Generic Routing Encapsulation (NVGRE), and more.
- Cisco Nexus 3400-S switches enable deep network analytics, offering per flow monitoring, queue forensics, and drop-packet forensics to help monitor customer networks.

The Cisco Nexus 3408-S (Figure 1) is a 4-Rack-Unit (RU), 8-slot chassis with the flexibility of 100G or 400G Line-Card Expansion Modules (LEMs) offering 128 ports of 100G or 32 ports of 400G. The Cisco Nexus 3408-S is the industry's highest port radix in a compact and energy-efficient form factor. The Cisco Nexus 3408-S supports HVAC/DC power inputs with forward airflow direction.

Figure 1.   Cisco Nexus 3408-S

The Cisco Nexus 3408-S has the following hardware configuration:

- 4RU, 8-slot chassis
- NXM-X16C LEM with 16 ports of Quad-Small-Form-Factor 28 (QSFP28)
- NXM-X4D LEM with 4 ports of Quad Small Form-Factor Pluggable – Double Density (QSFP-DD)
- Beacon LED
- Status LED
- Dual-redundant power supplies
- Redundant (2+1) fans
- Two 100/1000-Mbps SFP ports
- One RS-232 console port
- One RJ45 and one SFP Management port
- One USB port

Figure 2.   Cisco Nexus NXM-X16C, 16 ports of 100G

The 100G LEMs are 16 ports of QSFP28 supporting 100, 50, 40, 25, and 10G speeds.

The 400G LEMs are 4 ports of QSFP-DD that are backward-compatible with QSFP+, QSFP28, and QSFP56. Each QSFP-DD port can operate at 400, 100, 50, 40, and 25 Gbps.

Cisco NX-OS Software overview

Cisco NX-OS is a data center-class operating system built with modularity, resiliency, and serviceability at its foundation. Cisco NX-OS helps ensure continuous availability and sets the standard for mission-critical data center environments. The self-healing and highly modular design of Cisco NX-OS makes zero-impact operations a reality and provides exceptional operational flexibility.

Focused on the requirements of the data center, Cisco NX-OS provides a robust and comprehensive feature set that meets the networking requirements of present and future data centers. With an XML interface and a Command-Line Interface (CLI) like that of Cisco IOS® Software, Cisco NX-OS provides state-of-the-art implementations of relevant networking standards as well as a variety of true data-center-class Cisco innovations.

The Cisco Nexus 3400-S provides:

Wire-rate layer 2 and 3 switching on all ports, with up to 25.6 Terabits per second (Tbps), with 7.2 Bpps at ingress and 10 Bpps at egress.

Robust programmability, with support for Cisco NX-API, Linux containers, XML, and JavaScript Object Notation (JSON) APIs, the OpenStack plugin, Python, and Puppet and Chef configuration and automation tools.

High performance and scalability, with a four-core CPU, 16 GB of DRAM, and 70 MB of dynamic buffer allocation, making the switch excellent for massively scalable data centers and big data applications.

Flexibility

- The Cisco Nexus 3408-S supports break out for 2x200/50G, 4x100/50G/25G, and 8x50G, supporting up to 128 ports of 100G or up to 168 ports of 50G.
  - The NXM-X16C supports break out for 2x50G
  - The NXM-X4D supports break out for 2x200/50G or 4x100/50/25G
- Both fiber and copper cabling solutions are available for 10-, 25-, 40-, 50-, and 100-Gbps connectivity, including an Active Optical Cable (AOC) and Direct-Attached Cable (DAC).

High availability

- Virtual Port Channel (vPC) technology provides layer 2 multipath 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 512-way equal-cost multipath (ECMP) routing enables the use of layer 3 fat-tree designs. This feature allows organizations to prevent network bottlenecks, increase resiliency, and add capacity with little network disruption.
- Advanced reboot capabilities include hot and cold patching.
- The switch uses hot-swappable Power-Supply Units (PSUs) and fans.

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

- Power-On Auto Provisioning (POAP) enables touchless bootup and configuration of the switch, drastically reducing provisioning time.
- Cisco Embedded Event Manager (EEM) and Python scripting enable automation and remote operations in the data center.
- Advanced buffer monitoring reports real-time buffer utilization per port and per queue, which allows organizations to monitor traffic bursts and application traffic patterns.
- EtherAnalyzer is a built-in packet analyzer for monitoring and troubleshooting control-plane traffic and is based on the popular Wireshark open-source network protocol analyzer.
- Complete layer 3 unicast and multicast routing protocol suites are supported, including Border Gateway Protocol (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).

Table 1. Software Licensing for Cisco Nexus 3408-S switches

Software package	Features supported
System default (no license required)	• Comprehensive layer 2 feature set: VLAN, IEEE 802.1Q trunking, Link Aggregation Control Protocol (LACP), Unidirectional Link Detection (UDLD; Standard and Aggressive), Multiple Spanning Tree Protocol (MSTP), Rapid Spanning Tree Protocol (RSTP), and Spanning Tree Protocol (STP) guard • Security: Authentication, Authorization, and Accounting (AAA), Access Control Lists (ACLs), storm control, and configurable Control-Plane Policing (CoPP) • Management features: Cisco Data Center Network Manager (DCNM) support, Secure Shell Version 2 (SSHv2) access, Cisco Discovery Protocol, Simple Network Management Protocol (SNMP), syslog • Monitoring features: Advanced buffer monitoring, SPAN, and ERSPAN
Base license	• Layer 3 IP routing: Inter-VLAN Routing (IVR), static routes, Routing Information Protocol Version 2 (RIPv2), ACLs, Open Shortest Path First Version 2 (OSPFv2; limited to 256 routes), Enhanced Interior Gateway Routing Protocol (EIGRP) stub, Hot Standby Router Protocol (HSRP), and Virtual Router Redundancy Protocol (VRRP) • Multicast: Protocol-Independent Multicast Sparse Mode (PIM-SM), Source-Specific Multicast (SSM), and Multicast Source Discovery Protocol (MSDP)
LAN Enterprise license (N3K-LAN3K9)	• Advanced layer 3 IP routing: OSPFv2, EIGRP, Border Gateway Protocol (BGP), and Virtual Routing and Forwarding Lite (VRF-Lite)
Cisco Nexus Data Broker license (NDB-FX-SWT-K9)	• License for using the tap and SPAN aggregation functions with Cisco Nexus Data Broker; supported on the Essential License.

Transceiver and cabling options

The Cisco Nexus 3400-S are Quad Small Form factor pluggable - Double Density (QSFP-DD) platforms that support the full range of optical transceivers, starting from Active Optical Cables (AOC), Direct Attach Cables (DAC)

Learn more details about the optical modules available and the minimum software release required for each supported optical module via the Transceiver Module Group (TMG) Compatibility Matrix.

Product specifications

The following table lists the product specification for Cisco Nexus 3408-S.

Table 2. Product specifications

Specification	Cisco Nexus 3408-S
Physical	• 4 RU, 8-slot chassis • Beacon LED • Status LED • Dual-redundant power supplies • Redundant (2+1) fans • Two 100/1000Mbps SFP ports • One RS-232 serial console port • One RJ45 and one SFP management port • One USB port
Performance	25.6-Tbps switching capacity

Table 3. Hardware specifications common to all Nexus 3804-S Switches

	Mode	Normal mode
Hardware tables and scalability	Number of MAC addresses	120K
	Number of IPv4/IPv6 unicast routes	440K / 360K
	Number of IPv4/IPv6 hosts	192K / 96K
	Number of IPv4 multicast routes	Up to 96K with 8K groups
	Number of VLANS	4K
	Number of ACL entries	3.5K ingress and 1.5K egress
	Number of spanning-tree instances	Rapid Spanning Tree Protocol (RSTP): 123 Multiple Spanning Tree (MST) Protocol: 64
	Number of EtherChannels	512
	Number of ports per EtherChannel	up to 128
	Buffer size	70 Mb
	Boot flash memory	128 GB
	Latency	370 nsec
Power	Number of power supplies	2 (redundant)
	Power supply types	AC (forward airflow)
	Input voltage	100 to 240 VAC
	Frequency	50 to 60 Hz
	Power supply efficiency	89 to 91% at 220V
Cooling	Forward airflow: Port-side intake (air enters through ports and exits through fan tray and power supplies) Six individual, hot-swappable fans (5+1 redundant)	
Environment	Dimensions (height x width x depth)	6.97 in. x 17.3 in. x 31.6 in.
	Weight	N3K-C3408-S weight across configurations: • 68 lb (without LEMs, PSUs, or fans) • 107.7 lb (with eight 100G LEMs, PSUs, and fans) • 104.5 lb (with eight 400G LEMs, PSUs, and fans) Individual LEMs: • NXM-X16C (100G LEM) – 3.6 lb • NXM-X4D (400G LEM) – 3.2 lb
	Operating temperature	32 to 104° F (0 to 40°C)
	Storage temperature	-40 to 158° F (-40 to 70°C)
	Relative humidity	5 to 95% non-condensing
	Altitude (operating)	Designed to meet: -500 ft to 13,123 ft
	Altitude (non-operating)	-1000 ft to 30,000 ft

Table 4. Software features common to all Nexus 3000 switches

Description	Specifications
Layer 2	• Layer 2 switch ports and VLAN trunks • IEEE 802.1Q VLAN encapsulation • Support for up to 4096 VLANs • Rapid Per-VLAN Spanning Tree Plus (PVRST+) (IEEE 802.1w compatible) • MSTP (IEEE 802.1s): 64 instances • Spanning Tree PortFast • Spanning Tree Root Guard • Spanning Tree Bridge Assurance

Description	Specifications
	• Cisco EtherChannel technology (up to 24 ports per EtherChannel) • LACP: IEEE 802.3ad, IEEE 802.1ax • Advanced PortChannel hashing based on layer 2, 3, and 4 information • Jumbo frames on all ports (up to 9216 bytes) • Link-level flow control (IEEE 802.3x) • vPC
Layer 3	• Layer 3 interfaces: Routed ports on interfaces, Switch Virtual Interfaces (SVIs), PortChannels, and subinterfaces (total: 1024) • 64-way equal-cost multipath (ECMP) • 4096 ACL entries • Routing protocols: Static, RIPv2, EIGRP, OSPF, and BGP • HSRP and VRRP • ACL: Routed ACL with layer 3 and 4 options to match ingress and egress ACLs • VRF: VRF-Lite (IP VPN), VRF-aware unicast (BGP, OSPF, and RIP), and VRF-aware multicast • VRF route leaking • Jumbo frame support (up to 9216 bytes)
Multicast	• Multicast: PIMv2, PIM Sparse Mode (PIM-SM), SSM, and BiDir (not supported at first customer ship [FCS]) • Bootstrap router (BSR), Auto-RP, and Static RP • Internet Group Management Protocol (IGMP) Versions 2 and 3
Security	• Ingress ACLs (standard and extended) on Ethernet • Standard and extended layer 3 to 4 ACLs include IPv4, Internet Control Message Protocol (ICMP), Transmission Control Protocol (TCP), and User Datagram Protocol (UDP) • VLAN-based ACLs (VACLs) • Port-based ACLs (PACLs) • ACLs on virtual terminals (VTYs) • Dynamic Host Configuration Protocol (DHCP) relay • Control Plane Policing (CoPP)
Cisco Nexus Data Broker	• Topology support for tap and SPAN aggregation • Traffic load balancing to multiple monitoring tools • Packet truncation • Traffic filtering based on layer 1 through layer 4 header information • Traffic replication and forwarding to multiple monitoring tools • Robust Role-Based Access Control (RBAC) • Northbound Representational State Transfer (REST) API for all programmability support
Management	• Power On Auto Provisioning (POAP) • Python scripting • Switch management using 10/100/1000-Mbps management or console ports • CLI-based console to provide detailed out-of-band management • In-band switch management • Locator and beacon LEDs • Configuration rollback • SSHv2 • Telnet • AAA • AAA with RBAC • RADIUS • TACACS+ • Syslog • Embedded packet analyzer • SNMP v1, v2, and v3 • Enhanced SNMP MIB support • XML (NETCONF) support • Remote monitoring (RMON) • Advanced Encryption Standard (AES) for management traffic

Description	Specifications
	• Unified username and passwords across CLI and SNMP • Microsoft Challenge Handshake Authentication Protocol (MS-CHAP) • Digital certificates for management between switch and RADIUS server • Cisco Discovery Protocol Versions 1 and 2 • RBAC • SPAN on physical, PortChannel, and VLAN • ERSPAN Versions 2 and 3 • Ingress and egress packet counters per interface • Network Time Protocol (NTP) • Cisco Online Health Management System (OHMS) • Comprehensive bootup diagnostic tests • Cisco DCNM • Active buffer monitoring

Table 5.   Management and standards support

Description	Specification	
MIB support	Generic MIBs • SNMPv2-SMI • CISCO-SMI • SNMPv2-TM • SNMPv2-TC • IANA-ADDRESS-FAMILY-NUMBERS-MIB • IANAifType-MIB • IANAiprouteprotocol-MIB • HCNUM-TC • CISCO-TC • SNMPv2-MIB • SNMP-COMMUNITY-MIB • SNMP-FRAMEWORK-MIB • SNMP-NOTIFICATION-MIB • SNMP-TARGET-MIB • SNMP-USER-BASED-SM-MIB • SNMP-VIEW-BASED-ACM-MIB • CISCO-SNMP-VACM-EXT-MIB Ethernet MIBs • CISCO-VLAN-MEMBERSHIP-MIB Configuration MIBs • ENTITY-MIB • IF-MIB • CISCO-ENTITY-EXT-MIB • CISCO-ENTITY-FRU-CONTROL-MIB • CISCO-ENTITY-SENSOR-MIB • CISCO-SYSTEM-MIB • CISCO-SYSTEM-EXT-MIB • CISCO-IP-IF-MIB • CISCO-IF-EXTENSION-MIB • CISCO-NTP-MIB • CISCO-IMAGE-MIB • CISCO-IMAGE-UPGRADE-MIB	Monitoring MIBs • NOTIFICATION-LOG-MIB • CISCO-SYSLOG-EXT-MIB • CISCO-PROCESS-MIB • RMON-MIB • CISCO-RMON-CONFIG-MIB • CISCO-HC-ALARM-MIB Security MIBs • CISCO-AAA-SERVER-MIB • CISCO-AAA-SERVER-EXT-MIB • CISCO-COMMON-ROLES-MIB • CISCO-COMMON-MGMT-MIB • CISCO-SECURE-SHELL-MIB Miscellaneous MIBs • CISCO-LICENSE-MGR-MIB • CISCO-FEATURE-CONTROL-MIB • CISCO-CDP-MIB • CISCO-RF-MIB Layer 3 and Routing MIBs • UDP-MIB • TCP-MIB • OSPF-MIB • OSPF-TRAP-MIB • BGP4-MIB • CISCO-HSRP-MIB • PIM-MIB
Standards	• IEEE 802.1D: Spanning Tree Protocol • IEEE 802.1p: CoS Prioritization • IEEE 802.1Q: VLAN Tagging • IEEE 802.1s: Multiple VLAN Instances of Spanning Tree Protocol • IEEE 802.1w: Rapid Reconfiguration of Spanning Tree Protocol	

Description	Specification
	• IEEE 802.3z: Gigabit Ethernet • IEEE 802.3ad: Link Aggregation Control Protocol (LACP) • IEEE 802.1ax: Link Aggregation Control Protocol (LACP) • IEEE 802.3ae: 10 Gigabit Ethernet • IEEE 802.3ba: 40 Gigabit Ethernet • IEEE 802.1ab: LLDP
RFC	BGP • RFC 1997: BGP Communities Attribute • RFC 2385: Protection of BGP Sessions with the TCP MD5 Signature Option • RFC 2439: BGP Route Flap Damping • RFC 2519: A Framework for Inter-Domain Route Aggregation • RFC 2545: Use of BGPv4 Multiprotocol Extensions • RFC 2858: Multiprotocol Extensions for BGPv4 • RFC 3065: Autonomous System Confederations for BGP • RFC 3392: Capabilities Advertisement with BGPv4 • RFC 4271: BGPv4 • RFC 4273: BGPv4 MIB: Definitions of Managed Objects for BGPv4 • RFC 4456: BGP Route Reflection • RFC 4486: Subcodes for BGP Cease Notification Message • RFC 4724: Graceful Restart Mechanism for BGP • RFC 4893: BGP Support for Four-Octet AS Number Space OSPF • RFC 2328: OSPF Version 2 • 8431RFC 3101: OSPF Not-So-Stubby-Area (NSSA) Option • RFC 3137: OSPF Stub Router Advertisement • RFC 3509: Alternative Implementations of OSPF Area Border Routers • RFC 3623: Graceful OSPF Restart • RFC 4750: OSPF Version 2 MIB RIP • RFC 1724: RIPv2 MIB Extension • RFC 2082: RIPv2 MD5 Authentication • RFC 2453: RIP Version 2 • IP Services • RFC 768: User Datagram Protocol (UDP) • RFC 783: Trivial File Transfer Protocol (TFTP) • RFC 791: IP • RFC 792: Internet Control Message Protocol (ICMP) • RFC 793: TCP • RFC 826: Address Resolution Protocol (ARP) • RFC 854: Telnet • RFC 959: FTP • RFC 1027: Proxy ARP • RFC 1305: Network Time Protocol (NTP) Version 3 • RFC 1519: Classless Interdomain Routing (CIDR) • RFC 1542: BootP Relay • RFC 1591: Domain Name System (DNS) Client • RFC 1812: IPv4 Routers • RFC 2131: DHCP Helper • RFC 2338: VRRP IP Multicast • RFC 2236: Internet Group Management Protocol, version 2 • RFC 3376: Internet Group Management Protocol, Version 3 • RFC 3446: Anycast Rendezvous Point Mechanism Using PIM and MSDP • RFC 3569: An Overview of SSM • RFC 3618: Multicast Source Discovery Protocol (MSDP)

Description	Specification
	• RFC 4601: Protocol Independent Multicast - Sparse Mode (PIM-SM): Protocol Specification (Revised)
	• RFC 4607: Source-Specific Multicast for IP
	• RFC 4610: Anycast-RP using PIM
	• RFC 5015: PIM BiDir
	• RFC 5132: IP Multicast MIB

Regulatory standards compliance

The following table summarizes regulatory standards compliance for the Cisco Nexus 3000 Series.

Table 6.   Regulatory standards compliance: Safety and EMC

Specification	Description
Regulatory compliance	• Products should comply with CE Markings per 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
EMC: Immunity	• EN55024 • CISPR24 • EN300386 • KN24
RoHS	RoHS 5 compliant except for lead press-fit connectors

Ordering information

The following table provides ordering information for Cisco Nexus 3408-S.

Table 7.   Ordering information

Part number	Description
Chassis	
N3K-C3408-S	Nexus 3408-S switch with 32 ports of QSFP-DD
NXM-X16C	Nexus 100G Line Expansion Module
NXM-X4D	Nexus 400G Line Expansion Module
NXM-XBLNK	Nexus Blank Line Expansion Module
NXA-FAN-300CFM-PI	Nexus fan, forward airflow (port-side intake)
NXA-PHV-2KW-PI	Nexus 2KW HV power supply, forward airflow (port-side intake)
NXA-PDC-2KW-PI	Nexus 2KW DC power supply, forward airflow (port-side intake)
NXA-PAC-2KW-PI	Nexus 2KW AC power supply, forward airflow (port-side intake)

Part number	Description
Software Licenses	
N3K-LAN3K9	Nexus 3408-S layer 3 LAN Enterprise License
Spares	
N3K-C3408-S=	Nexus 3408-S switch with 32 ports of QSFP-DD spare
NXM-X16C=	Nexus 100G Line Expansion Module spare
NXM-X4D=	Nexus 400G Line Expansion Module spare
NXM-XBLNK=	Nexus Blank Line Expansion Module spare
NXA-FAN-300CFM-PI=	Nexus fan, forward airflow (port-side intake) spare
NXA-PHV-2KW-PI=	Nexus 2KW HV power supply, forward airflow (port-side intake) spare
NXA-PDC-2KW-PI=	Nexus 2KW DC power supply, forward airflow (port-side intake) spare
NXA-PAC-2KW-PI=	Nexus 2KW AC power supply, forward airflow (port-side intake) spare

Warranty

The Cisco Nexus 3000 Series 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).

Service and support

Cisco offers a wide range of services to help accelerate your success in deploying and optimizing the Cisco Nexus 3000 Series 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 operational 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. With this service, you can take advantage of the Cisco Smart Call Home service capability, which offers proactive diagnostics and real-time alerts on your Cisco Nexus 3000 Series Switches. Spanning the entire network lifecycle, Cisco Services helps increase investment protection, optimize network operations, support migration operations, and strengthen your IT expertise.

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.

For more information

For more information, visit https://www.cisco.com/go/nexus3000. For information about Cisco Nexus Data Broker, visit https://www.cisco.com/go/nexusdatabroker.

[2] Wire rate on all ports for packets greater than 200 bytes

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