



Cisco Nexus 3264C-E Switch

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Cisco Nexus 3000 Series Switches overview

The Cisco Nexus® 3000 Series Switches are a comprehensive portfolio of 1,10/25,40,50,100G Gigabit Ethernet switches built from a Switch-on-a-Chip (SoC) architecture. Introduced in April 2011, this series of switches provides line-rate Layer 2 and 3 performance and is suitable for Top-of-the-Rack (ToR) architecture.

Cisco Nexus 3264C-E product overview

The Cisco Nexus 3264C-E switch is a dense, high-performance, power-efficient, 100-Gbps switch designed for the data center. This 2-Rack-Unit (2RU) model offers wire-rate Layer 2 and 3 switching on all ports with latency of 450ns. Cisco Nexus 3264C-E introduces MACsec to the 3200 family, offering 16 ports of MACsec.

The Cisco Nexus 3264C-E supports both forward and reverse (port-side exhaust and port-side intake) airflow schemes with AC and DC power inputs.

The Cisco Nexus 3264C-E (Figure 1) is a Quad Small Form-Factor Pluggable (QSFP) switch with 64 QSFP28 ports. Each QSFP28 port can operate at 10, 25, 40, 50, and 100 Gbps, up to a maximum of 128 x 25-Gbps ports.



Figure 1. Cisco Nexus 3264C-E switch

The Cisco Nexus 3264C-E switch has the following hardware configuration:

- 64 fixed 100-Gigabit Ethernet QSFP28 ports
- 16 fixed MACsec enabled ports
- Beacon LED
- Environment LED
- Status LED
- Lane-selected LED
- Dual redundant power supplies
- Redundant (3+1) fans
- 2 1/10G SFP+ ports (port 65 and port 66 in-front)
- 1 RS-232 console port
- 1 RJ45 and 1 SFP Management port
- 1 USB port

Colored handles on each fan or power supply clearly indicate the airflow direction, as seen in Figures 2 and 3.



Figure 2.
Cisco Nexus 3264C-E with red handles indicating port-side intake airflow

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 Software 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 Software 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.

Main benefits

The Cisco Nexus 3264C-E provides the following:

- Wire-rate Layer 2 and 3 switching on all ports¹ at up to 12.8 terabits per second and up to 4.3 billion packets per second.
- Robust programmability with support for Cisco NX-API, Linux containers, XML and JavaScript Object Notation (JSON) APIs, the OpenStack plug-in, Python, and Puppet and Chef configuration and automation tools.
- **High performance and scalability** with a 4-core CPU, 16 GB of DRAM, and 42 MB of dynamic buffer allocation, making the switch excellent for massively scalable data centers and big data application.
- Flexibility:
 - The QSFP28 port can be configured to work as 4 x 25-Gbps ports, 2x50-Gbps offering deployment flexibility, with up to a maximum of 128 x 25-Gbps ports.
 - Both fiber and copper cabling solutions are available for 10-, 25-, 40-, 50-, and 100-Gbps connectivity, including Active Optical Cable (AOC) and Direct-Attached Cable (DAC).

¹ Wire rate on all ports for packets greater than 250 bytes

· High availability:

- Virtual PortChannel (vPC) technology provides Layer 2 multipath through the elimination of Spanning Tree Protocol. 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 allows organizations to prevent network bottlenecks, increase resiliency, and add capacity
 with little network disruption.
- Advanced reboot capabilities include hot and cold patching and fast reboot capabilities.
- The switch uses hot-swappable Power-Supply Units (PSUs) and fans.

Purpose-built 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 IOS 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.
- Ethanalyzer is a built-in packet analyzer for monitoring and troubleshooting control-plane traffic that 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 3264C-E

| 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 Protocol (UDLD; standard and aggressive), Multiple Spanning Tree Protocol (MSTP), Rapid Spanning Tree Protocol (RSTP), and Spanning Tree Protocol guard |
| | Security: Authentication, Authorization, and Accounting (AAA); Access Control Lists (ACLs); storm control; and configurable control-plane policing |
| | Management features: Cisco Data Center Network Manager support, Secure Shell version 2 (SSHv2) access, Cisco Discovery Protocol, Simple Network Management Protocol (SNMP), syslog, and IEEE 1588 PTP |
| | Monitoring features: Advanced buffer monitoring, Switched Port Analyzer (SPAN), and Encapsulated Remote SPAN |
| Base license | Layer 3 IP routing: Inter-VLAN routing, static routes, RIPv2, ACLs, Open Shortest Path First version 2 (OSPFv2; limited to 256 routes), EIGRP stub, Hot Standby Router Protocol (HSRP), and Virtual Router Redundancy Protocol (VRRP) |
| | Multicast: PIM-SM, SSM, and MSDP |

| Software Package | Features Supported |
|---|---|
| LAN Enterprise license: N3K- LAN1K9 (requires Base license) | Advanced Layer 3 IP routing: OSPFv2, EIGRP, BGP, and Virtual Routing and Forwarding Lite (VRF-Lite) |
| Cisco Nexus Data Broker license: NDB-FX-SWT-K9 | • License for using the Test Access Port (TAP) and SPAN aggregation functions with Cisco Nexus Data Broker (only the Base license is needed for this feature) |

Transceiver and cabling options

The Cisco Nexus 3264C-E has 64 QSFP28 ports. QSFP28 technology allows a smooth transition from 40 to 100 Gigabit Ethernet infrastructure in data centers. Each of the Cisco Nexus 3264C-E switch's QSFP28 ports can operate in either native 100-Gigabit Ethernet mode or 4 x 25, 2 x 50-Gigabit Ethernet mode. This switch supports both fiber and copper cabling solutions for these two modes.

For low-cost cabling, copper-based 40-Gbps twin-axial cables can be used, and for longer cable reaches, short-reach optical transceivers are excellent. Connectivity can be established from the QSFP28 ports to 10-Gigabit Ethernet switches or hosts using a splitter cable that has an Enhanced QSFP (QSFP+) transceiver on one end and four SFP+ transceivers on the other end. Similar capability can be achieved on the fiber solution by using QSFP+ SR4 transceivers on both ends and procuring third-party fiber splitter MPO-to-LC cables. Table 2 lists the transceiver types supported.

Table 2. Cisco Nexus 3264C-E QSFP28 transceiver support

| Part Number | Description |
|------------------------|--|
| QSFP-100G-AOC (1m-30m) | QSFP 100-Gbps to QSFP 100-Gbps AOC: 1, 2, 3, 5, 7, 10, 15, and 30m |
| QSFP-100G-CU (1m-5m) | QSFP 100-Gbps to QSFP 100-Gbps copper DAC: 1, 2, 3, and 5m |
| QSFP-100G-SR4-S | 100GBASE SR4 transceiver module with MPO-12 connector, multimode fiber up to 100m |
| QSFP-100G-LR4-S | 100GBASE LR4 transceiver module for Single-Mode Fiber (SMF) with LC connector, 10km |
| QSFP-100G-CWDM4-S | 100GBASE CWDM4 transceiver module for Single-Mode Fiber (SMF) with LC connector, 2km |
| QSFP-100G-PSM4-S | 100GBASE PSM4 transceiver module with MPO-12 connector, single-mode fiber up to 500m |

Product specifications

Table 3 lists the product specifications for the Cisco Nexus 3264C-E switch.

 Table 3.
 Cisco Nexus 3264C-E switch specifications

| Specification | Cisco Nexus 3264C-E |
|--------------------------|--|
| Physical | 64 fixed 100-Gigabit Ethernet QSFP28 ports 16 fixed ports of MACsec Beacon LED Environment LED Status LED Lane-selected LED Dual redundant power supplies Redundant (3+1) fans 2 1/10G SFP+ ports (port 65 and port 66 in-front) 1 RS-232 serial console port 1 RJ45 and 1 SFP Management port 1 USB port |
| Performance | Line-rate traffic throughput (both Layer 2 and 3) on all ports 12.8 -Tbps switching capacity Configurable Maximum Transmission Units (MTUs) of up to 9416 bytes (jumbo frames) |
| Typical operating power | 392W |
| Maximum power | 1263W |
| Typical heat dissipation | 1337 BTUs/hour |
| Maximum heat dissipation | 4309 BTUs/hour |

Table 4. Cisco Nexus 3264C-E Hardware specifications

| | | Host Mode (urpf disabled) | L2 (urpf disabled) |
|--|----------------------------------|---------------------------|--------------------|
| Hardware tables and scalability ² | Max Mac Addresses | 73K | 200K |
| | Max IPv4 Host routes | 200K | 73K |
| | Max IPv6 Host routes | 100K | 36K |
| | Max IPv4 LPM routes | 28K | 28K |
| | Max IPv6 LPM routes (<=64) | 12K | 12K |
| | Max IPv4 LPM routes (>64 & <128) | 1024 | 1024 |

² Demotes ASIC Capabilities, please refer to the Cisco Nexus 3000 series Verified Scalability Guide documentation for the exact scalability numbers validated for specific software releases

| | | Host Mode (urpf disabled) | L2 (urpf disabled) |
|-------------|--|--|--------------------|
| | Number of VLANs | 4096 | |
| | Number of ACL entries | 6000 Ingress | |
| | | 1000 Egress | |
| | Number of spanning-tree instances | Rapid Spanning Tree Protocol (RSTP): 512 | |
| | | Multiple Spanning Tree (MST) Protocol: 64 | |
| | Number of EtherChannels | 256 | |
| | Number of ports per EtherChannel | 32 | |
| | Buffer size | 42 Mb | |
| | Boot flash memory | 128 GB | |
| Power | Number of power supplies | 2 (redundant) | |
| | Power supply types | AC (forward and reversed airflow) | |
| | Input voltage | 100 to 240 VAC | |
| | Frequency | 50 to 60 Hz | |
| | Power supply efficiency | 89 to 91% at 220V | |
| Cooling | Forward and reversed airflow schemes Forward airflow: Port-side exhaust (air enters through fan tray and power supplies and exits through ports) Reversed airflow: Port-side intake (air enters through ports and exits through fan tray and power supplies) 4 individual, hot-swappable fans (3+1 redundant) | | |
| Environment | Dimensions (height x width x depth) | 3.39 x 17.4 x 23.5 in. (8.6 x 44.2 x 59.7 cm) | |
| | Weight | 34.82 lbs (15.79kg) | |
| | 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% noncondensing | |
| | Altitude (operating) | Up to 13,123 ft. | |
| | Altitude (Nonoperating) | Up to 16,000 ft. | |

Table 5 lists the MIBs and standards supported by Cisco Nexus 3200 platform

 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-NOTIFICATION-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-FXT-MIB CISCO-ENTITY-FXT-MIB CISCO-SYSTEM-MIB CISCO-SYSTEM-MIB CISCO-SYSTEM-EXT-MIB CISCO-IP-IF-MIB CISCO-IF-EXTENSION-MIB CISCO-INAGE-MIB CISCO-IMAGE-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-COMMON-ROLES-MIB CISCO-COMMON-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 TCPS-MIB OSPF-TRAP-MIB BGP4-MIB CISCO-HSRP-MIB CISCO-HSRP-MIB PIM-MIB |

| Description | Specification |
|-------------|---|
| 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 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 | 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 2519: A Framework for Inter-Domain Route Aggregation RFC 2588: 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 4273: BGPv4 MIB: Definitions of Managed Objects for BGPv4 RFC 4476: 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 2082: RIPv2 MD5 Authentication RFC 2653: Trivial File Transfer Protocol (UDP) RFC 783: Trivial File Transfer Protocol (ICMP) RFC 793: TCP RFC 793: TCP RFC 979: TCP RFC 886: ARP |

| Description | Specification |
|-------------|---|
| | 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) |
| | 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 |

Software requirements

Cisco Nexus 3000 Series Switches are supported by Cisco NX-OS Software Release 5.0 and later. Cisco NX-OS interoperates with any networking OS, including Cisco IOS Software, that conforms to the networking standards mentioned in this data sheet.

Regulatory standards compliance

Table 6 summarizes regulatory standards compliance for the Cisco Nexus 3000 Series.

 Table 6.
 Regulatory standards compliance: Safety and electromagnetic compatibility (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 |

| Specification | Description |
|----------------|---|
| 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 | EN55024CISPR24EN300386KN24 |
| RoHS | RoHS 5 compliant except for lead press-fit connectors |

Ordering information

Table 7 provides ordering information for the Cisco Nexus 3264C-E switch.

 Table 7.
 Ordering information

| Part Number | Description | |
|------------------------------|--|--|
| Chassis | | |
| N3K-C3264C-E | Nexus 3264C-E switch with 64 QSFP28 | |
| NXA-FAN-160CFM-PE | Nexus Fan, Forward airflow (port side exhaust) | |
| NXA-FAN-160CFM-PI | Nexus Fan, Reversed airflow (port side intake) | |
| NXA-PAC-1200W-PE | Nexus 1200W AC Power Supply, Forward airflow (port side exhaust) | |
| NXA-PAC-1200W-PI | Nexus 1200W AC Power Supply, Reversed airflow (port side intake) | |
| NXA-PDC-930W-PE ³ | Nexus 930W DC Power Supply, Forward airflow (port side exhaust) | |
| NXA-PDC-930W-PI | Nexus 930W DC Power Supply, Reversed airflow (port side intake) | |
| N9K-PUV-1200W | Nexus 1200W DC Power Supply | |

³ 930W-DC PSU is supported in redundancy mode if 3.5W QSFP+ modules or Passive QSFP cables are used & the system is used in 40C ambient temp or less; for other optics or higher ambient temps, 930W-DC is supported with 2 PSU's in non-redundancy mode only

| Part Number | Description |
|--------------------|--|
| Software licenses | |
| N3K-LAN2K9 | Nexus 3264C-E Layer 3 LAN Enterprise License |
| Spares | |
| N3K-C3264C-E= | Nexus 3264C-E switch with 64 QSFP28 spare |
| NXA-FAN-160CFM-PE= | Nexus Fan, Forward airflow (port side exhaust) spare |
| NXA-FAN-160CFM-PI= | Nexus Fan, Reversed airflow (port side intake) spare |
| NXA-PAC-1200W-PE= | Nexus 1200W AC Power Supply, Forward airflow (port side exhaust) spare |
| NXA-PAC-1200W-PI= | Nexus 1200W AC Power Supply, Reversed airflow (port side intake) spare |
| NXA-PDC-930W-PE= | Nexus 930W DC Power Supply, Forward airflow (port side exhaust) spare |
| NXA-PDC-930W-PI= | Nexus 930W DC Power Supply, Reversed airflow (port side intake) spare |
| N9K-PUV-1200W= | Nexus 1200W DC Power Supply spare |

Warranty

The Cisco Nexus 3000 Series Switches have a one-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 |

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

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