Cisco Nexus 3048 Switch

Product Overview

The Cisco Nexus® 3048 Switch (Figure 1) is a line-rate Gigabit Ethernet top-of-rack (ToR) switch and is part of the Cisco Nexus 3000 Series Switches portfolio. The Cisco Nexus 3048, with its compact one-rack-unit (1RU) form factor and integrated Layer 2 and 3 switching, complements the existing Cisco Nexus family of switches. This switch runs the industry-leading Cisco® NX-OS Software operating system, providing customers with robust features and functions that are deployed in thousands of data centers worldwide. The Cisco Nexus 3048 is ideal for big data customers that require a Gigabit Ethernet ToR switch with local switching that connects transparently to upstream Cisco Nexus switches, providing an end-to-end Cisco Nexus fabric in their data centers. This switch supports both forward and reversed airflow schemes with AC and DC power inputs.

Figure 1. Cisco Nexus 3048 Switch

Main Benefits

The Cisco Nexus 3048 provides the following main benefits:

- Wire-rate Layer 2 and 3 switching
  - Layer 2 and 3 switching of up to 176 Gigabit per second (Gbps) and more than 132 million packets per second (mpps) in a compact 1RU form-factor switch
- Robust and purpose-built Cisco NX-OS operating system for end-to-end Cisco Nexus fabric
  - Transparent integration with the Cisco Nexus family of switches to provide a consistent end-to-end Cisco Nexus fabric
  - Modular operating system built for resiliency
  - Integration with Cisco Data Center Network Manager (DCNM) and XML management tools
- Comprehensive feature set and innovations for next-generation data centers
  - Virtual PortChannel (vPC) provides Layer 2 multipathing through the elimination of Spanning Tree Protocol and enables fully utilized bisectional bandwidth and simplified Layer 2 logical topologies without the need to change the existing management and deployment models.
  - 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.
- The 64-way equal-cost multipath (ECMP) routing enables Layer 3 fat tree designs and allows organizations to prevent network bottlenecks, increase resiliency, and add capacity with little network disruption.
- 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.
- Precision Time Protocol (PTP; IEEE 1588) provides accurate clock synchronization and improved data correlation with network captures and system events.
- Full 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).

- Network traffic monitoring with Cisco Nexus Data Broker
  - Build simple, scalable and cost-effective network tap or Cisco Switched Port Analyzer (SPAN) aggregation for network traffic monitoring and analysis.

Configuration

- 48 fixed 10/100/1000-Mbps Ethernet ports
- 4 fixed Enhanced Small Form-Factor Pluggable (SFP+) ports
- Locator LED
- Dual redundant power supplies
- Fan tray with redundant fans
- Two 10/100/1000-Mbps management ports*
- One RS-232 serial console port
- One USB port
- Locator LED and button

Support for both forward (port-side exhaust) and reversed (port-side intake) airflow schemes is available.

Transceiver and Cabling Options

For uplink connectivity, the Cisco Nexus 3048 supports SFP+ direct-attach 10 Gigabit Ethernet copper, an innovative solution that integrates transceivers with Twinax cables into an energy-efficient and low-cost solution. For longer cable runs, multimode and single-mode optical SFP+ transceivers are supported. Table 1 lists the supported 10 Gigabit Ethernet transceiver options.

Table 1. Cisco Nexus 3048 10 Gigabit Transceiver Support Matrix[1]

Part Number	Description
SFP-10G-SR	10GBASE-SR SFP+ module (multimode fiber [MMF])
SFP-10G-SR-S	Cisco 10GBASE-SR SFP+ Module for MMF
SFP-10G-LR	10GBASE-LR SFP+ module (single-mode fiber [SMF])

* Only one Management port is enabled and active with no plan to enable both.

Part Number	Description
SFP-10G-LRM	Cisco 10GBASE-LRM SFP+ Module for MMF and SMF
SFP-10G-ZR	Cisco multirate 10GBASE-ZR, 10GBASE-ZW and OTU2e SFP+ Module for SMF
SFP+ DWDM	Cisco 10GBASE DWDM SFP+, Type 40
SFP-H10GB-CU1M	10GBASE-CU SFP+ cable 1m (Twinax cable)
SFP-H10GB-CU3M	10GBASE-CU SFP+ cable 3m (Twinax cable)
SFP-H10GB-CU5M	10GBASE-CU SFP+ cable 5m (Twinax cable)
SFP-H10GB-ACU7M	10GBASE-CU SFP+ Cable 7 Meter, active
SFP-H10GB-ACU10M	10GBASE-CU SFP+ Cable 10 Meter, active
SFP-10G-AOC1M-10M	10GBASE-AOC SFP+ Cable 1 Meter – 10 Meter

For more information about the transceiver types, see http://www.cisco.com/en/US/products/hw/modules/ps5455/prod_module_series_home.html.

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 enables exceptional operation 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.

Cisco NX-OS Software Benefits

Table 2 summarizes the benefits that Cisco NX-OS offers.

Table 2. Benefits of Cisco NX-OS Software

Feature	Benefit
Common software throughout the data center: Cisco NX-OS runs on all Cisco data center switch platforms: Cisco Nexus 7000, 5000, 4000, 3000, 2000, and 1000V Series.	• Simplification of data center operating environment • End-to-end Cisco Nexus and Cisco NX-OS fabric • No retraining necessary for data center engineering and operations teams
Software compatibility: Cisco NX-OS interoperates with Cisco products running any variant of Cisco IOS Software and also with any networking OS that conforms to the networking standards listed as supported in this data sheet.	• Transparent operation with existing network infrastructure • Open standards • No compatibility concerns
Modular software design: Cisco NX-OS is designed to support distributed multithreaded processing. Cisco NX-OS modular processes are instantiated on demand, each in a separate protected memory space. Thus, processes are started and system resources allocated only when a feature is enabled. The modular processes are governed by a real-time preemptive scheduler that helps ensure timely processing of critical functions.	• Robust software • Fault tolerance • Increased scalability • Increased network availability
Troubleshooting and diagnostics: Cisco NX-OS is built with unique serviceability functions to enable network operators to take early action based on network trends and events, enhancing network planning and improving network operations center (NOC) and vendor response times. Cisco Smart Call Home and Cisco Online Health Management System (OHMS) are some of the features that enhance the serviceability of Cisco NX-OS.	• Quick problem isolation and resolution • Continuous system monitoring and proactive notifications • Improved productivity of operations teams

Feature	Benefit
Ease of management: Cisco NX-OS provides a programmatic XML interface based on the NETCONF industry standard. The Cisco NX-OS XML interface provides a consistent API for devices. Cisco NX-OS also supports Simple Network Management Protocol (SNMP) Versions 1, 2, and 3 MIBs.	• Rapid development and creation of tools for enhanced management • Comprehensive SNMP MIB support for efficient remote monitoring
Using the Cisco Nexus Data Broker software and Cisco Plug-in for OpenFlow agent, the Cisco Nexus 3048 Switch can be used to build a scalable, cost-effective, and programmable tap or SPAN aggregation infrastructure. This approach replaces the traditional purpose-built matrix switches with these switches. You can interconnect these switches to build a multilayer topology for tap or SPAN aggregation infrastructure.	• Scalable and cost effective • Robust traffic filtering capabilities • Traffic aggregation from multiple input ports across different switches • Traffic replication and forwarding to multiple monitoring tools
Role-based access control (RBAC): With RBAC, Cisco NX-OS enables administrators to limit access to switch operations by assigning roles to users. Administrators can customize access and restrict it to the users who require it.	• Tight access control mechanism based on user roles • Improved network device security • Reduction in network problems arising from human errors

Cisco NX-OS Software Packages for Cisco Nexus 3048

The Cisco NX-OS Software package for the Cisco Nexus 3048 offers flexibility and a comprehensive feature set along with consistency with Cisco Nexus access switches. The default system software has a comprehensive Layer 2 feature set with extensive security and management features. To enable Layer 3 IP unicast and multicast routing functions, additional licenses need to be installed. Table 3 lists the software licensing details.

Table 3. Cisco NX-OS Software Package in the Cisco Nexus 3048

System default (no license required)	• Comprehensive Layer 2 feature set: VLAN, IEEE 802.1Q Trunking, vPC, Link Aggregation Control Protocol (LACP), Unidirectional Link Detection (UDLD; standard and aggressive), Multiple Spanning Tree Protocol (MSTP), Rapid Spanning Tree Protocol (RSTP), Spanning Tree Protocol guards, and Transparent VLAN Trunk Protocol (VTP) • Security: Authentication, authorization, and accounting (AAA); Dynamic Host Configuration Protocol (DHCP) snooping; storm control; configurable Control-Plane Policing (CoPP); and private VLAN (PVLAN) • Management features: Cisco DCNM support, console, Secure Shell Version 2 (SSHv2) access, Cisco Discovery Protocol, SNMP, and syslog
Base license (N3K-C3048-BAS1K9)	• Layer 3 IP routing: Inter-VLAN routing (IVR), static routes, RIPv2, access control list (ACLs), OSPFv2 (limited to 256 routes), EIGRP stub, Hot Standby Router Protocol (HSRP), Virtual Router Redundancy Protocol (VRRP), and Unicast Reverse-Path Forwarding (uRPF) • Multicast: PIM-SM, SSM, and MSDP
LAN Enterprise license (N3K-C3048-LAN1K9)*	• Advanced Layer 3 IP routing: OSPFv2, EIGRP, BGP, and Virtual Route 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; only the Base license is needed for this feature

* The Base license (N3K-C3048-BAS1K9) is required to take advantage of LAN Enterprise license (N3K-C3048-LAN1K9) features. Table 5 later in this document provides a complete feature list.

Cisco Data Center Network Manager

The Cisco Nexus 3048 is supported in Cisco DCNM. Cisco DCNM is designed for hardware platforms enabled for Cisco NX-OS, which consist of the Cisco Nexus Family of products. Cisco DCNM is a Cisco management solution that increases overall data center infrastructure uptime and reliability, hence improving business continuity. Focused on the management requirements of the data center network, Cisco DCNM provides a robust framework and comprehensive feature set that meets the routing, switching, and storage administration needs of present and future data centers. In particular, Cisco DCNM automates the provisioning process, proactively monitors the LAN by detecting performance degradation, secures the network, and streamlines the diagnosis of dysfunctional network elements.

Cisco Nexus Data Broker

The Cisco Nexus 3048 Switch with Cisco Nexus Data Broker can be used to build a scalable and cost-effective traffic monitoring infrastructure using network taps and SPAN. This approach replaces the traditional purpose-built matrix switches with one or more OpenFlow-enabled Cisco Nexus switches. You can interconnect these switches to build a scalable tap or SPAN aggregation infrastructure. You also can combine tap and SPAN sources to bring the copy of the production traffic to this tap or SPAN aggregation infrastructure. In addition, you can distribute these sources and traffic monitoring and analysis tools across multiple Cisco Nexus switches. For more details, visit http://www.cisco.com/go/nexusdatabroker.

Product Specifications

Table 4 lists the specifications for the Cisco Nexus 3048, Table 5 lists software features, and Table 6 lists management standards and support.

Table 4. Specifications

Description	Specification	
Physical	• 1RU fixed form-factor switch • 48 10/100/1000-Mbps RJ-45 ports • 4 1/10 Gbps SFP+ uplink ports • 2 redundant power supplies • 1 fan tray with redundant fans • 1 I/O module with management, console, and USB flash memory ports	
Performance	• 176-Gbps switching capacity • Forwarding rate of 132 mpps • Line-rate traffic throughput (both Layer 2 and 3) on all ports • Configurable maximum transmission units (MTUs) of up to 9216 bytes (jumbo frames)	
Hardware tables and scalability	MAC addresses	128,000
	Number of VLANS	4096
	Spanning-tree instances	• RSTP: 512 • MSTP: 64
	ACL entries	2000 ingress 1000 egress
	Routing table	16,000 prefixes and 16,000 host entries* 8000 multicast routes*
	Number of EtherChannels	52 (with vPC)
	Number of ports per EtherChannel	16
	Buffers	9 MB shared
	Boot flash memory	2 GB
Power	Number of power supplies	2 (redundant)
	Typical operating power	120 watts (W) (48p of 1G and 4p of 10G/SR at 100% load, with 2 power supply units [PSUs])
	Maximum power	124W
	AC PSUs Input voltage Frequency Efficiency	 100 to 240 VAC 50 to 60 Hz 89 to 91% at 220V

Description	Specification	
	DC PSUs	
	Input voltage	-40 to -72 VDC
	Maximum current	33A
	Efficiency	85 to 88%
	Typical heat dissipation	409 BTU/hr (48p of 1G and 4p of 10G/SR at 100% load, with 2 PSUs)
	Maximum heat dissipation	423 BTU/hr
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) Single fan tray with redundant fans Hot swappable (must swap within 1 minute)	
Sound	Measured sound power (maximum)	
	Fan speed: 40% duty cycle	63.9 dBA
	Fan speed: 60% duty cycle	64.7 dBA
	Fan speed: 100% duty cycle	66.4 dBA
Environment	Dimensions (height x width x depth)	1.72 x 17.3 x 19.7 in. (4.4 x 43.9 x 50.5 cm)
	Weight	20.5 lb (9.3 kg)
	Operating temperature	32 to 104°F (0 to 40°C)
	Storage temperature	-40 to 158°F (-40 to 70°C)
	Operating relative humidity	10 to 85% noncondensing Up to 5 days at maximum (85%) humidity Recommend ASHRAE data center environment
	Storage relative humidity	5 to 95% noncondensing
	Altitude	0 to 10,000 ft (0 to 3000m)

* Please refer to Cisco Nexus 3000 Series Verified Scalability Guide for scalability numbers validated for specific software releases: http://www.cisco.com/en/US/products/ps11541/products_installation_and_configuration_guides_list.html.

Table 5. Software Features

Description	Specification
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 • vPC • Cisco EtherChannel technology (up to 16 ports per EtherChannel) • LACP: IEEE 802.3ad • Advanced PortChannel hashing based on Layer 2, 3, and 4 information • Jumbo frames on all ports (up to 9216 bytes) • Storm control (unicast, multicast, and broadcast) • PVLANs
Layer 3	• Layer 3 interfaces: Routed ports on interfaces, switch virtual interfaces (SVIs), PortChannels, and subinterfaces (total = 1024) • 32-way ECMP • 2000 ingress and 1000 egress ACL entries • Routing protocols: Static, RIP v2, EIGRP, OSPFv2, and BGP • Bidirectional Flow Detection (BFD) for BGP

Description	Specification
	• 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 • uRPF with ACL; strict and loose modes • Jumbo frame support (up to 9216 bytes)
Multicast	Multicast: PIM-SM Version 2 and SSM Bootstrap router (BSR), Automatic Rendezvous Point (Auto-RP), and Static RP MSDP and Anycast-RP Internet Group Management Protocol (IGMP) Versions 2, and 3
Quality of service (QoS)	Layer 2 IEEE 802.1p (class of service [CoS]) 8 hardware queues per port Per-port QoS configuration CoS trust Port-based CoS assignment Modular QoS CLI (MQC) compliance ACL-based QoS classification (Layers 2, 3, and 4) MQC CoS marking Differentiated services code point (DSCP) marking Weighted Random Early Detection (WRED) CoS-based egress queuing Egress strict-priority queuing Egress port-based scheduling: Weighted Round-Robin (WRR) Explicit Congestion Notification (ECN)
Security	• Ingress ACLs (standard and extended) on Ethernet • Standard and extended Layer 3 to 4 ACLs: IPv4, Internet Control Message Protocol (ICMP), TCP, User Datagram Protocol (UDP), etc. • VLAN-based ACLs (VACLs) • Port-based ACLs (PACLs) • Named ACLs • ACLs on virtual terminals (vtys) • DHCP snooping with Option 82 • Port number in DHCP Option 82 • DHCP relay • Dynamic Address Resolution Protocol (ARP) inspection • CoPP
Cisco Nexus Data Broker	• Topology support for tap and SPAN aggregation • Support for QinQ to tag input source tap and SPAN ports • Traffic load balancing to multiple monitoring tools • Traffic filtering based on Layer 1 through Layer 4 header information • Traffic replication and forwarding to multiple monitoring tools • Robust RBAC • Northbound Representational State Transfer (REST) API for all programmability support
Management	• 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 • Port-based locator and beacon LEDs • Configuration rollback • SSHv2 • Telnet • AAA • AAA with RBAC • RADIUS • TACACS+ • Syslog

Description	Specification
	• Syslog generation on system resources (for example, FIB tables) • 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 • 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 • Cisco Switched Port Analyzer (SPAN) on physical, PortChannel and VLAN interfaces • Encapsulated Remote Switched Port Analyzer (ERSPAN) • Ingress and egress packet counters per interface • PTP (IEEE1588) boundary clock • Network Time Protocol (NTP) • Cisco OHMS • Comprehensive bootup diagnostic tests • Cisco Call Home • Cisco DCNM • Advanced buffer monitoring

Table 6. 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 • LLDP-MIB • IP-MULTICAST-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	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 • BGP4-MIB • CISCO-HSRP-MIB

Description	Specification
	● CISCO-IP-IF-MIB ● CISCO-IF-EXTENSION-MIB ● CISCO-NTP-MIB ● CISCO-IMAGE-MIB ● CISCO-IMAGE-UPGRADE-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 ● IEEE 802.3z: Gigabit Ethernet ● IEEE 802.3ad: Link Aggregation Control Protocol (LACP) ● IEEE 802.3ae: 10 Gigabit Ethernet ● IEEE 802.1ab: LLDP ● IEEE 1588-2008: Precision Time Protocol (Boundary Clock)
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: 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

Description	Specification
	• 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 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 7 summarizes regulatory standards compliance for the Cisco Nexus 3000 Series.

Table 7. 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

Ordering Information

Table 8 provides ordering information for the Cisco Nexus 3048.

Table 8. Ordering Information

Part Number	Description
Chassis	
N3K-C3048TP-1GE	Nexus 3048TP-1GE 1RU 48 10/100/1000 Mbps and 4 10Gbps ports
N3K-C3048-FAN	Nexus 3048 Fan Module, Forward airflow (port side exhaust)
N3K-C3048-FAN-B	Nexus 3048 Fan Module, Reversed airflow (port side intake)
N2200-PAC-400W	N2K/3K 400W AC Power Supply, Forward airflow (port side exhaust)
N2200-PAC-400W-B	N2K/3K 400W AC Power Supply, Reversed airflow (port side intake)
N2200-PDC-400W	N2K/3K 400W DC Power Supply, Forward airflow (port side exhaust)
N3K-PDC-350W-B	N3K Series 350W DC Power Supply, Reversed airflow (port side intake)
Software Licenses	
N3K-C3048-BAS1K9	Nexus 3048 Layer 3 Base License
N3K-C3048-LAN1K9	Nexus 3048 Layer 3 LAN Enterprise License (Requires N3K-C3048-BAS1K9 License)
NDB-FX-SWT-K9	License for Tap/SPAN aggregation using Cisco Nexus Data Broker
Spares	
N3K-C3048-FAN=	Nexus 3048 Fan Module, Forward airflow (port side exhaust), Spare
N3K-C3048-FAN-B=	Nexus 3048 Fan Module, Reversed airflow (port side intake), Spare
N2000-PAC-400W=	N2K/3K 400W AC Power Supply, Std airflow (port side exhaust), Spare
N2000-PAC-400W-B=	N2K/3K 400W AC Power Supply, Reversed airflow (port side intake), Spare
N2200-PDC-400W=	N2K/3K 400W DC Power Supply, Forward airflow (port side exhaust), Spare
N3K-PDC-350W-B=	N3K Series 350W DC Power Supply, Reversed airflow (port side intake), Spare
N3K-C3064-ACC-KIT=	Nexus 3000 Accessory Kit
Bundles	
N3K-C3048-FA-L3	Nexus 3048, Forward Airflow (port side exhaust), AC P/S, Base & LAN Ent Lic Bundle
N3K-C3048-BA-L3	Nexus 3048, Reversed Airflow (port side intake), AC P/S, Base & LAN Ent Lic Bundle
N3K-C3048-FD-L3	Nexus 3048, Forward Airflow (port side exhaust), DC P/S, Base & LAN Ent Lic Bundle
N3K-C3048-BD-L3	Nexus 3048, Reversed Airflow (port side intake), DC P/S, Base & LAN Ent Lic Bundle
Cables and Optics	
SFP-10G-SR(=)	10GBASE-SR SFP+ Module
SFP-10G-LR(=)	10GBASE-LR SFP+ Module
SFP-H10GB-CU1M(=)	10GBASE-CU SFP+ Cable 1 Meter
SFP-H10GB-CU3M(=)	10GBASE-CU SFP+ Cable 3 Meter
SFP-H10GB-CU5M(=)	10GBASE-CU SFP+ Cable 5 Meter

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.

For More Information

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

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