

Cisco Nexus 3636C-R Switch

Product overview

The Cisco Nexus[®] 3636C-R switch is a high-speed, high-density 10-, 25-, 40-, or 100-Gigabit Ethernet (GE) switch designed for the data center spine. The large buffers and routing table sizes of the 3636C-R also make this switch an alternative for a wide range of applications, such as IP storage, demilitarized zone (DMZ), big data, and edge routing. The switch comes in a compact 1-Rack-Unit (1RU) form factor and provides extensive Layer 2 and Layer 3 functions. It is part of the R-Series family and runs industry-leading Cisco[®] NX-OS Software.

The comprehensive programmability features enable organizations to run today's applications while also preparing them for demanding and changing application needs. The Cisco Nexus 3636C-R switch supports both forward and reverse (port-side exhaust and port-side intake) airflow schemes with AC and DC power inputs.

The 3636C-R (Figure 1) is a Quad Small Form-Factor Pluggable (QSFP) switch with 36 QSFP28 ports. Each QSFP28 can operate at 100 or 40 Gigabit Ethernet or in a breakout cable configuration.

Figure 1. Cisco Nexus 3636C-R switch



Main benefits

The Cisco Nexus 3636C-R switch provides:

- Wire-rate Layer 2 and 3 switching on all ports with up to 7.2 Terabits per second (Tbps) and up to 3.34 billion packets per second (bpps)
- Programmability with support for the 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 an 8-core CPU, 32 GB of DRAM, and 16 GB of dynamic buffer allocation, making the switch excellent for massively scalable data centers and big-data applications
- MACSec capability
- Higher TCAM capability
- Flexibility:
 - Fiber cabling solutions are available for 10-, 25-, 40-, 50-, and 100-Gbps connectivity, including Active
 Optical Cable (AOC) and Direct-Attached Cable (DAC).
 - Configurable QSFP28 Uplinks to work as 4 x 25-Gbps or 4 x 10-Gbps port.

· High availability:

- Virtual Port Channel (VPC) technology provides Layer 2 multipathing by eliminating the Spanning Tree
 Protocol. It also enables fully used bisectional bandwidth and simplified Layer 2 logical topologies without the need to change the existing management and deployment models.
- Advanced maintenance capabilities include hot and cold patching and Graceful Insertion and Removal (GIR) mode.
- The switch uses hot-swappable Power-Supply Units (PSUs) and fans.

• 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.
- EtherAnalyzer 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).

Configuration

The Cisco Nexus 3636C-R has the following configuration:

- 36 QSFP28 ports operating at 40 or 100 Gigabit Ethernet
- 8 ports that can be used for MACSec
- Locator LED
- Environment LED
- Status LED
- · Dual redundant power supplies
- 3 redundant fans
- One 10-, 100-, or 1000-Mbps management port (copper or fiber)
- One RS-232 serial console port
- One USB port

Transceiver and cabling options

The Cisco Nexus 3636C-R has 36 QSFP28 ports that support a wide range of speed, from 10- or 25- Gbps with breakout cable.

The Cisco Nexus 3636C-R QSFP28 technology allows a smooth transition from 40- to 100-Gigabit Ethernet infrastructure in data centers. Each of the switch's QSFP28 ports can operate in native 100- or 40-Gigabit Ethernet mode or 4 x 10 or 4 x 25 Gigabit Ethernet mode.

Please refer to the latest compatibility matrix for information on all supported optics:

• 100-Gigabit Ethernet compatibility matrix:

https://www.cisco.com/c/en/us/td/docs/interfaces_modules/transceiver_modules/compatibility/matrix/100GE
_Tx_Matrix.html

• 40-Gigabit Ethernet compatibility matrix:

https://www.cisco.com/c/en/us/td/docs/interfaces_modules/transceiver_modules/compatibility/matrix/40GE_Tx_Matrix.html

• 25-Gigabit Ethernet compatibility matrix:

https://www.cisco.com/c/en/us/td/docs/interfaces_modules/transceiver_modules/compatibility/matrix/25GE_
Tx_Matrix.html

• 10-Gigabit Ethernet compatibility matrix:

https://www.cisco.com/c/en/us/td/docs/interfaces_modules/transceiver_modules/compatibility/matrix/10GE_ Tx_Matrix.html

For more information about the transceiver types, visit:

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

Cisco NX-OS software benefits

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

Focused on the requirements of the data center, 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 like that of the Cisco IOS[®] Software solution, NX-OS provides state-of-the-art implementations of relevant networking standards as well as a variety of true data center-class Cisco innovations.

Table 1 summarizes the benefits that NX-OS offers, and Table 2 lists the NX-OS packages available for the Cisco Nexus 3636C-R switch.

Table 1. Benefits of Cisco NX-OS Software

Feature Benefit Software compatibility: NX-OS interoperates with Cisco products running • Transparent operation with existing network infrastructure any variant of Cisco IOS Software and also with any networking OS that Open standards conforms to the networking standards listed as supported in this data · No compatibility concerns Modular software design: NX-OS is designed to support distributed Robust software multithreaded processing. Its modular processes are instantiated on Fault tolerance demand, each in a separate protected memory space. Thus processes are Increased scalability started and system resources allocated only when a feature is enabled. A real-time preemptive scheduler that helps ensure timely processing of · Increased network availability critical functions governs the modular processes. Troubleshooting and diagnostics: NX-OS is built with innovative · Quick problem isolation and resolution serviceability functions to enable network operators to take early action · Continuous system monitoring and proactive notifications based on network trends and events, enhancing network planning and · Improved productivity of operations teams improving Network-Operations-Center (NOC) and vendor response times. Ease of management: NX-OS provides a programmatic XML interface Rapid development and creation of tools for enhanced based on the NETCONF industry standard. The NX-OS XML interface management provides a consistent API for devices. NX-OS also supports Simple Comprehensive SNMP MIB support for efficient remote Network Management Protocol (SNMP) Versions 1, 2, and 3 MIBs. In monitoring addition, NX-API and Linux Bash are now supported.

Feature	Benefit
Role-Based Access Control (RBAC): With RBAC, 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

 Table 2.
 Cisco NX-OS Software packages available for Cisco Nexus 3636C-R^{*}

Packaging	Chassis Based	Part Number	Supported Features
Cisco Nexus 3636C-R Enhanced Layer 3 license	Chassis	N3K-LAN1K9	Layer 3 including full OSPF, EIGRP, BGP

Cisco Nexus 3636C-R uses the Cisco Nexus 9000 licensing scheme. For more information please refer to https://www.cisco.com/c/en/us/td/docs/switches/datacenter/sw/nx-os/licensing/guide/b Cisco NX-OS_Licensing_Guide_chapter_01.html.

Product specifications

Table 3 lists the specifications for the Cisco Nexus 3636C-R.

Table 3. Specifications

Description	Specification	
Physical	 1RU fixed-form-factor switch 36 QSFP28 ports; each supports native 2 redundant power supplies 3 redundant fans Lane select LED button Management, console, and USB flash-m 	
Performance	 7.2-Tbps switching capacity Forwarding rate of up to 3.34 bpps Line-rate traffic throughput (both Layer 2 and 3) on all ports for packet size larger than 115 bytes Configurable Maximum Transmission Unit (MTU) of up to 9216 bytes (jumbo frames) 	
Hardware tables and	Number of MAC addresses	750,000
scalability	Number of Virtual LANs (VLANs)	4096
	Number of spanning-tree instances	 Rapid Spanning Tree Protocol (RSTP): 512 Multiple Spanning Tree Protocol (MSTP): 64
	Number of Access Control List (ACL) entries	• 7000 ingress
	Routing table	 Maximum number of Longest-Prefix-Match (LPM) routes: 128,000 Maximum number of IP host entries:750,000 Maximum number of MAC address entries: 192,000 Maximum number of Layer 3 multicast entries: 64,000
	Number of EtherChannels	256 (with VPC)
	Number of ports per EtherChannel	32
	Buffer size	16 GB
	System memory	32 GB
	Boot-flash memory	128 GB
	Frequency	50 to 60 Hz
Power	Power-supply types	AC (forward and reverse airflow) DC (port-side exhaust)
	Typical operating power	921 Watt (W)
	Maximum power	1,341W
	AC Power-Supply Units (PSUs) Input voltage Frequency	• 100 to 240 VAC • 50 to 60 Hz
	Power-supply efficiency	• 89–91% at 220V

Description	Specification	Specification	
	Maximum heat dissipation	2,631 MBtuTU	
	Forward and reverse airflow schemes		
	 Forward airflow: Port-side exhaust (air enters through fan tray and power supplies and exits through ports) 		
	 Reverse airflow: Port-side intake (air enters through ports and exits through fan tray and power supplies) 		
	Redundant fans		
	Hot-swappable (must swap within 31 minutes)		
	Measured sound power (maximum)		
	Fan speed (PE): 50% duty cycle	• 74.6 dBA	
	• Fan speed (PE): 90% duty cycle	• 87.5 dBA	
	 Fan speed (PI) 50% duty cycle Fan speed (PI) 90% duty cycle 	76.2 dBA 90.0 dBA	
	Fan speed: 100% duty cycle	- 90.0 dBA	
Cooling	 Dimensions (height x width x depth) 1.65 x 17.3 x 31.22 in. (4.2 x 44 x 79.3 cm) 	1.72 x 17.3 x 26.85 in. (4.4 x 43.9 x 68.2 cm)	
Sound	Weight	• 35.627.1 lb (12.316.1 kg)	
Environment	Temperature: Operating	32 to 104°F (0 to 40°C)	
	Temperature: Storage	-40 to 158°F (-40 to 70°C)	
	Relative humidity: Operating	• 10– to 85% noncondensing	
		Up to 5 days at maximum (85%) humidity	
		Recommend American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) data center environment	
	Relative humidity: Storage	5 -to 95% noncondensing	
	Altitude	• 0– to 10,000 ft (0 to 3000m)	
	Mean Time Between Failures (MTBF)	194,870 hours	

Denotes Application-Specific Integrated Circuit (ASIC) capabilities; please refer to Cisco Nexus 3000 Series Verified Scalability Guide documentation for exact scalability numbers validated for specific software releases: https://www.cisco.com/en/US/products/ps11541/products_installation_and_configuration_guides_list.html.

Software features

Please refer to the latest release notes for a list of software features supported by the Cisco Nexus 3000 platform: https://www.cisco.com/c/en/us/support/switches/nexus-3000-series-switches/products-release-notes-list.html.

Standards

Table 4 lists management standards supported by the Cisco Nexus 3000 platform.

 Table 4.
 Management and standards support

Description	Specification	
MIB support	Generic MIBs	Monitoring MIBs
	SNMPv2-SMI	NOTIFICATION-LOG-MIB
	CISCO-SMI	CISCO-SYSLOG-EXT-MIB
	SNMPv2-TM	CISCO-PROCESS-MIB
	SNMPv2-TC	RMON-MIB
	• IANA-ADDRESS-FAMILY-NUMBERS-MIB	CISCO-RMON-CONFIG-MIB
	IANA-Type-MIB	CISCO-HC-ALARM-MIB
	IANA iprouteprotocol-MIB	Security MIBs
	HCNUM-TC	CISCO-AAA-SERVER-MIB

Description	Specification	
	• CISCO-TC	CISCO-AAA-SERVER-EXT-MIB
	SNMPv2-MIB	CISCO-COMMON-ROLES-MIB
	SNMP-COMMUNITY-MIB	CISCO-COMMON-MGMT-MIB
	SNMP-FRAMEWORK-MIB	CISCO-SECURE-SHELL-MIB
	SNMP-NOTIFICATION-MIB	Miscellaneous MIBs
	SNMP-TARGET-MIB	CISCO-LICENSE-MGR-MIB
	SNMP-USER-BASED-SM-MIB	CISCO-FEATURE-CONTROL-MIB
	SNMP-VIEW-BASED-ACM-MIB	CISCO-CDP-MIB
	CISCO-SNMP-VACM-EXT-MIB	CISCO-RF-MIB
	CISCO-CLASS-BASED-QOS-MIB	Layer 3 and Routing MIBs
	Ethernet MIBs	• UDP-MIB
	CISCO-VLAN-MEMBERSHIP-MIB	• TCP-MIB
	• LLDP-MIB	OSPF-MIB
	IP-MULTICAST-MIB	BGP4-MIB
	Configuration MIBs	CISCO-HSRP-MIB
	• ENTITY-MIB	CICCO FICIAL INID
	• IF-MIB	
	CISCO-ENTITY-EXT-MIB CISCO-ENTITY-EDIL CONTROL MID	
	CISCO-ENTITY-FRU-CONTROL-MIB	
	CISCO-ENTITY-SENSOR-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	
Standards	IEEE 802.1D: Spanning Tree Protocol	
	• IEEE 802.1p: Class-of-Service (CoS) Prioritization	
	IEEE 802.1Q: VLAN Tagging	
	IEEE 802.1s: Multiple VLAN Instances of Spanning Tree	ee Protocol
	• IEEE 802.1w: Rapid Reconfiguration of Spanning Tree	Protocol
	IEEE 802.3z: Gigabit Ethernet	
	IEEE 802.3ad: Link Aggregation Control Protocol (LAC)	P)
	IEEE 802.3ae: 10 Gigabit Ethernet	
	IEEE 802.1ab: Link Layer Discovery Protocol (LLDP)	
RFC	BGP	
	RFC 1997: BGP Communities Attribute	
	RFC 2385: Protection of BGP Sessions with the TCP M	ID5 Signature Option
	RFC 2439: BGP Route Flap Damping	
	RFC 2519: A Framework for Inter-Domain Route Aggre	egation
	RFC 2545: Use of BGPv4 Multiprotocol Extensions	
	RFC 2858: Multiprotocol Extensions for BGPv4	
	RFC 3065: Autonomous System Confederations for BC	GP .
	RFC 3392: Capabilities Advertisement with BGPv4	
	• RFC 4271: BGPv4	
	RFC 4273: BGPv4 MIB: Definitions of Managed Object	ts for BGPv4
	RFC 4456: BGP Route Reflection	
	RFC 4486: Subcodes for BGP Cease Notification Mess	sage
	RFC 4724: Graceful Restart Mechanism for BGP	
	RFC 4893: BGP Support for Four-Octet AS Number Sp.	pace
	RFC 5549: BGP IPv4 NLRIs with an IPv6 next hop	
	OSPF	
	RFC 2328: OSPF Version 2	
	8431RFC 3101: OSPF Not-So-Stubby-Area (NSSA) Open Stubby-Area (NSSA) Open	ption
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Description	Specification
	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: 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
	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

Regulatory standards compliance

Table 5 summarizes regulatory standards compliance for the Cisco Nexus 3000 platform.

 Table 5.
 Regulatory standards compliance: Safety and electromagnetic compatibility (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 CAN/CSA-C22.2 No. 60950-1EN 60950-1 IEC 60950-1AS/NZS 60950-1GB4943
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

Specification	Description
EMC: Immunity	• EN50082-1
	• EN61000-6-1
	• EN55024
	• CISPR24
	• EN300386
	• KN 61000-4 series

Ordering information

Table 6 provides ordering information for the Cisco Nexus 3636C-R.

Table 6. Ordering information

Part Number	Description
Chassis	
N3K-C3636C-R	Nexus 3636C-R switch, 36p QSFP28 MACSEC
NXA-FAN-65CFM-PI	Nexus Fan, 65CFM, port side intake airflow
NXA-FAN-65CFM-PE	Nexus Fan, 65CFM, port side exhaust airflow
NXA-PAC-2KW-PI	Nexus 9000 2KW AC Power Supply, Port-side Intake
NXA-PAC-2KW-PE	Nexus 9000 2KW AC Power Supply, Port-side Exhaust
NXA-PDC-2KW-PI	Nexus 9000 2KW DC Power Supply, Port-side Intake
NXA-PDC-2KW-PE	Nexus 9000 2KW DC Power Supply, Port-side Exhaust
Software Licenses	
N3K-LAN1K9XL	Nexus 3000 Layer 3 LAN Enterprise License
Spares	
N3K-C3636C-R=	Nexus 36180YC-R, 48p 10/25G and 6p QSFP28, Spare
NXA-FAN-65CFM-PI=	Nexus Fan, 65CFM, port side intake airflow
NXA-FAN-65CFM-PE=	Nexus Fan, 65CFM, port side exhaust airflow
NXA-PAC-2KW-PI=	Nexus 9000 2KW AC Power Supply, Port-side Intake
NXA-PAC-2KW-PE=	Nexus 9000 2KW AC Power Supply, Port-side Exhaust
NXA-PDC-2KW-PI=	Nexus 9000 2KW DC Power Supply, Port-side Intake
NXA-PDC-2KW-PE=	Nexus 9000 2KW DC Power Supply, Port-side Exhaust

Services and support

Cisco offers a wide range of services to help accelerate your success in deploying and optimizing the Cisco Nexus 3600 platform switches in your data center. The innovative Cisco Services offerings are delivered through a unique combination of people, processes, tools, and partners, and they focus on helping you increase operation efficiency and improve your data center network. Cisco Advanced Services use 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 3600 platform switches. Spanning the entire network lifecycle, Cisco Services help increase investment protection, optimize network operations, support migration operations, and strengthen your IT expertise.

Cisco Capital

Financing to help you achieve your objectives

Cisco Capital[®] financing can help you acquire the technology you need to achieve your objectives and stay competitive. We can help you reduce CapEx. Accelerate your growth. Optimize your investment dollars and ROI. Cisco Capital financing gives you flexibility in acquiring hardware, software, services, and complementary third-party equipment. And there's just one predictable payment. Cisco Capital is available in more than 100 countries. Learn more.

For more information

For more information, please visit https://www.cisco.com/go/nexus3000.



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