Cisco Nexus 9300-EX and 9300-FX Platform Leaf Switches for Cisco Application Centric Infrastructure

Product Overview

The Cisco® Application Centric Infrastructure (Cisco ACI™) solution in the data center is a holistic architecture with centralized automation and policy-based application profiles. The Cisco ACI solution provides a robust transport network for today's dynamic workloads. Cisco ACI 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.

The Cisco ACI fabric consists of three major components:

- Cisco Application Policy Infrastructure Controller (APIC)
- Spine switches
- Leaf switches

Building on the success of first-generation Cisco Nexus® 9300 platform switches, the latest Cisco Nexus 9300-EX and 9300-FX platforms can collect comprehensive Cisco Tetration Analytics™ telemetry information at line rate across all ports without adding any latency to the packets or negatively affecting switch performance. This telemetry information is exported every 100 milliseconds (ms) by default directly from the switch's application-specific integrated circuit (ASIC). This information consists of three types of data:

- **Flow information:** This information contains information about endpoints, protocols, ports, when the flow started, how long the flow was active, etc.
- **Interpacket variation:** This information captures any interpacket variations within the flow. Examples include variation in time to live (TTL), IP and TCP flags, payload length, etc.
- **Context details:** Context information is derived outside the packet header, including variation in buffer utilization, packet drops within a flow, association with tunnel endpoints, etc.

The Cisco Tetration Analytics platform consumes this telemetry data, and by using unsupervised machine learning and behavior analysis it can provide outstanding pervasive visibility across everything in your data center in real time. By using algorithmic approaches, the Cisco Tetration Analytics platform provides deep insights into applications and interactions, enabling dramatically simplified operations, a zero-trust model, and migration of applications to any programmable infrastructure. To learn more, go to http://www.cisco.com/go/tetration.

These Layer 2 and 3 nonblocking switches support 1, 10, 25, 40, 50 and 100 Gigabit Ethernet; Fibre Channel over Ethernet (FCoE)[1]; and 8-, 16-, and 32-Gbps Fibre Channel[1] (native Fibre Channel support is available on 9300-FX Small Form-Factor Pluggable (SFP) models only), with up to 3.6 terabits per second (Tbps) of internal bandwidth. In addition, the 9300-FX switches support the IEEE 802.1ae MAC Security (MACsec) standard on all downlink and uplink ports, allowing traffic encryption at the physical layer and providing secure server, border leaf, and leaf-to-spine connectivity.

Models

Table 1 lists the Cisco Nexus 9300-EX platform switches that support the Cisco ACI solution.

Table 1. Cisco Nexus 9300-EX Platform Leaf Switches for Cisco ACI Solution

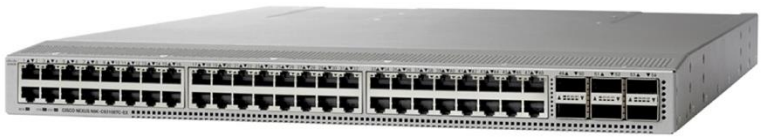
Model	Description
Cisco Nexus 93180YC-EX	48 x 10/25-Gbps fiber ports and 6 x 40/100-Gbps Quad SFP (QSFP28) ports
Cisco Nexus 93108TC-EX	48 x 10GBASE-T ports and 6 x 40/100-Gbps QSFP28 ports
Cisco Nexus 93180LC-EX	24 x 40/50-Gbps Enhanced QSFP (QSFP+) ports and 6 x 40/100-Gbps QSFP28 ports

The Cisco Nexus 93180YC-EX Switch (Figure 1) is a 1-rack-unit (1RU) switch with latency of less than 1 microsecond that supports 3.6 Tbps of bandwidth and over 2.6 billion packets per second (bpps). The 48 downlink ports on the 93180YC-EX can be configured to work as 1-, 10-, or 25-Gbps ports, offering deployment flexibility and investment protection. The 6 uplinks ports can be configured as 40- and 100-Gbps ports, offering flexible migration options. All ports support FCoE.

Figure 1. Cisco Nexus 93180YC-EX Switch

The Cisco Nexus 93108TC-EX Switch (Figure 2) is a 1RU switch that supports 2.16 Tbps of bandwidth and over 1.5 bpps. The 48 10GBASE-T downlink ports on the 93108TC-EX can be configured to work as 100-Mbps, 1-Gbps, or 10-Gbps ports. The 6 uplinks ports can be configured as 40- and 100-Gbps ports, offering flexible migration options. With 1/10GBASE-T support, the platform can deliver 10 Gigabit Ethernet over existing copper wire, enabling a low-cost upgrade from Cisco Catalyst 6500 Series Switches when the switch is used in a middle-of-rack (MoR) or end-of-row (EoR) configuration.

Figure 2. Cisco Nexus 93108TC-EX Switch



[1] Check software release notes for the latest support.

The Cisco Nexus 93180LC-EX Switch is the industry's first 50-Gbps capable 1RU switch that supports 3.6 Tbps of bandwidth and over 2.6 bpps across 24 fixed 40/50-Gbps QSFP+ ports. Ports numbered 25, 27, 29, 30, 31, and 32 are the 6 uplinks ports, which can be configured as 40- and 100-Gbps ports, offering flexible migration options (Figure 3). This switch is capable of supporting flexible port configurations.[2]

Figure 3. Cisco Nexus 93180LC-EX Switch

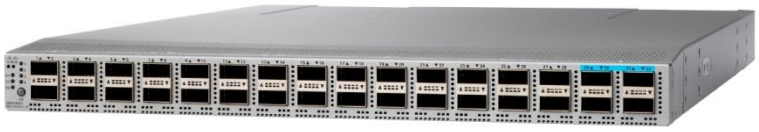


Table 2 lists the Cisco Nexus 9300-FX platform switches that support the Cisco ACI solution.

Table 2. Cisco Nexus 9300-FX Platform Leaf Switches for Cisco ACI Solution

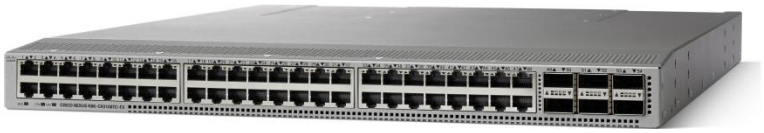
Model	Description
Cisco Nexus 93180YC-FX	48 x 10/25-Gbps fiber ports and 6 x 40/100-Gbps QSFP28 ports
Cisco Nexus 93108TC-FX	48 x 10GBASE-T ports and 6 x 40/100-Gbps QSFP28 ports

The Cisco Nexus 93180YC-FX Switch (Figure 4) is a 1RU switch with latency of less than 1 microsecond that supports 3.6 Tbps of bandwidth. The 48 downlink ports on the 93180YC-FX can be configured to work as 1-, 10-, or 25-Gbps Ethernet or FCoE ports or as 8-, 16-, 32-Gbps Fibre Channel ports, converging primary storage and compute servers, back-end storage, and policy-based switching on the leaf node. The 6 uplinks ports can be configured as 40- and 100-Gbps Ethernet or FCoE ports, offering flexible migration options. All ports support wire-rate MACsec encryption.

Figure 4. Cisco Nexus 93180YC-FX Switch

The Cisco Nexus 93108TC-FX Switch (Figure 5) is a 1RU switch that supports 2.16 Tbps of bandwidth and over 1.5 bpps. The 48 10GBASE-T downlink ports on the 93108TC-FX can be configured to work as 100-Mbps, 1-Gbps, or 10-Gbps ports. The 6 uplinks ports can be configured as 40- and 100-Gbps Ethernet or FCoE ports, offering flexible migration options. With 1/10GBASE-T support, the platform can deliver 10 Gigabit Ethernet over existing copper wire, enabling a low-cost upgrade from Cisco Catalyst 6500 Series Switches when the switch is used in a MoR or EoR configuration. All ports support wire-rate MACsec encryption.

Figure 5. Cisco Nexus 93108TC-FX Switch



[2] Capabilities to enable templates for different port configurations are on the software roadmap.

Features and Benefits

The Cisco Nexus 9300 platform switches are high-density, nonblocking, low-power switches designed to work well in leaf-and-spine deployment in enterprise data centers, service provider facilities, and large virtualized and cloud computing environments.

The platform offers industry-leading density, performance, and capabilities with flexible port configurations that can support existing copper and fiber cabling (Tables 3 and 4). Please consult the Cisco ACI release notes and scalability guides for a detailed description of the differences between the 9300–EX and 9300-FX platforms.

Table 3. Specifications for Cisco Nexus 9300 EX Platform Leaf Switches for Cisco ACI Solution

Feature	Cisco Nexus 93180YC-EX	Cisco Nexus 93108TC-EX	Cisco Nexus 93180LC-EX
Ports	48 x 10/25-Gbps and 6 x 40/100-Gbps QSFP28 ports	48 x 10GBASE-T and 6 x 40/100-Gbps QSFP28 ports	24 x 40/50-Gbps and 6 x 40/100-Gbps QSFP28 ports
Downlink supported speeds	1/10/25-Gbps speeds	100-Mbps and 1/10-Gbps speeds	40/50-Gbps speeds
CPU	4 cores	4 cores	4 cores
System memory	24 GB	24 GB	24 GB
SSD drive	64 GB	64 GB	64 GB
System buffer	40 MB	40 MB	40 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 (up to 2)	650 watts (W) AC, 930W DC, or 1200W HVAC/HVDC	650W AC, 930W DC, or 1200W HVAC/HVDC	500W AC, 930W DC, or 1200W HVAC/HVDC
Typical power* (AC/DC)	210W	290W	220W
Maximum power* (AC/DC)	470W	499W	500W
Input voltage (AC)	100 to 240V	100 to 240V	100 to 240V
Input voltage (high-voltage AC [HVAC])	200 to 277V	200 to 277V	200 to 277V
Input voltage (DC)	–48 to –60V	–48 to –60V	–48 to –60V
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	4	4	4
Airflow	Port-side intake and exhaust	Port-side intake and exhaust	Port-side intake and exhaust
Physical dimensions (H x W x D)	1.72 x 17.3 x 22.5 in. (4.4 x 43.9 x 57.1 cm)	1.72 x 17.3 x 22.5 in. (4.4 x 43.9 x 57.1 cm)	1.72 x 17.3 x 22.5 in. (4.4 x 43.9 x 57.1 cm)
Acoustics	48.5 dBA at 40% fan speed, 64.9 dBA at 70% fan speed, and 77.8 dB at 100% fan speed	48.6 dBA at 40% fan speed, 65.2 dBA at 70% fan speed, and 76.5 dB at 100% fan speed	49.9 dBA at 50% fan speed, 66 dBA at 70% fan speed, and 73.9 dB at 100% fan speed
RoHS compliance	Yes	Yes	Yes

* Typical and maximum power values are based on input drawn from the power circuit. The power supply value (for example, 650W AC power supply: NXA-PAC-650W-PI) is based on the output rating to the inside of the switch.

Table 4. Specifications for Cisco Nexus 9300 FX Platform Leaf Switches for Cisco ACI Solution

Feature	Cisco Nexus 93180YC-FX	Cisco Nexus 93108TC-FX
Ports	48 x 10/25-Gbps and 6 x 40/100-Gbps QSFP28 ports	48 x 10GBASE-T and 6 x 40/100-Gbps QSFP28 ports
Downlink supported speeds	1/10/25-Gbps Ethernet 8/16/32-Gbps Fibre Channel	100-Mbps and 1/10-Gbps speeds
CPU	6 cores	4 cores
System memory	64 GB	24 GB
SSD drive	128 GB	128 GB
System buffer	40 MB	40 MB
Management ports	1 RJ-45 port L1 and L2 ports are not used in ACI	2 ports: 1 RJ-45 and 1 SFP+
USB ports	1	1
RS-232 serial ports	1	1
Power supplies (up to 2)	500W AC, 930W DC, or 1200W HVAC/HVDC	500W AC, 930W DC, or 1200W HVAC/HVDC
Typical power* (AC/DC)	260W	276W
Maximum power* (AC/DC)	425W	460W
Input voltage (AC)	100 to 240V	100 to 240V
Input voltage (high-voltage AC [HVAC])	200 to 277V	200 to 277V
Input voltage (DC)	-48 to -60V	-48 to -60V
Input voltage (high-voltage DC [HVDC])	-240 to -380V	-240 to -380V
Frequency (AC)	50 to 60 Hz	50 to 60 Hz
Fans	4	4
Airflow	Port-side intake and exhaust	Port-side intake and exhaust
Physical dimensions (H x W x D)	1.72 x 17.3 x 22.5 in. (4.4 x 43.9 x 57.1 cm)	1.72 x 17.3 x 22.5 in. (4.4 x 43.9 x 57.1 cm)
Acoustics	57 dBA at 40% fan speed, 68.9 dBA at 70% fan speed, and 77.4 dB at 100% fan speed	64.2 dBA at 40% fan speed, 68.9 dBA at 70% fan speed, and 77.8 dB at 100% fan speed
RoHS compliance	Yes	Yes

Table 5 summarizes the features and benefits of the Cisco Nexus 9300 platform.

Table 5. Features of Cisco Nexus 9300 Platform Leaf Switches for Cisco ACI Solution

Feature	Benefit
Predictable high performance	Low latency with up to 3.6 Tbps of bandwidth enables customers to build a robust switch fabric scaling from as few as 200 10-Gbps server ports to more than 200,000 10-Gbps server ports.
Increased integrated buffer space	Up to a total of 40 MB of integrated shared buffer space allows better management of speed mismatch between access and uplink ports.
Designed for availability	Hot-swappable, redundant power supplies and fan trays increase availability.
Flexible airflow configuration	Both port-side intake and port-side exhaust airflow configurations are supported.
Power efficiency	All Cisco Nexus 9000 Series power supplies are 80 Plus Platinum rated, providing at least 90% efficiency with 20% utilization.
Advanced optics	Cisco offers a pluggable 40 Gigabit Ethernet QSFP+ transceiver that enables customers to use existing 10 Gigabit Ethernet data center cabling to support 40 Gigabit Ethernet connectivity. This technology facilitates adoption of 40 Gigabit Ethernet with no cable infrastructure upgrade cost.
Unified ports	Fibre Channel interfaces are supported for back-end storage connectivity (93180YC-FX only).
Security	Wire-rate MACsec encryption is available on all ports (9300-FX models only).

Power and Cooling

The switches are designed to adapt to any data center hot-aisle and cold-aisle configuration. The switches can be installed with ports facing the rear, simplifying cabling of server racks by putting the ports closest to the servers they support. The switches can be installed with the ports facing the front, simplifying the upgrade of existing racks of switches in which network cables are wired to the front of the rack. The two deployment modes support front-to-back cooling through a choice of power supplies and fan trays designed with opposite airflow directions, denoted by red and blue tabs.

These two deployment modes are available with AC power supplies. Additionally, a 930W DC power supply (with port-side intake and port-side exhaust) can be used for deployments with –48 to –60V DC power. For high-voltage AC or DC environments, customers can also choose the N9K-PUV-1200W, which supports either 90 to 277V AC or –200 to –380V DC power and both airflow directions in one power supply unit.

To enhance availability, the platform supports 1+1 redundant hot-swappable 80 Plus Platinum-certified power supplies and hot swappable N+1 redundant fan trays.

Software Requirements

The Cisco Nexus 9300 platform leaf switches run on Cisco ACI software on a 64-bit Linux kernel (Release 3.4.10) with a single binary image that supports both Cisco ACI modular spine switches (Cisco Nexus 9500 platform) and fixed-port switches (Cisco Nexus 9300 platform). The single image incorporates both the Linux kernel and Cisco ACI software so that the switch can be booted through a standard Linux kickstart process.

For the latest software release information and recommendations, please refer to the product bulletin at http://www.cisco.com/go/aci and the Cisco Feature Navigator.

Environmental Properties

Table 6 lists the environmental properties of the Cisco Nexus 9300 platform switches, and Table 7 lists the weights of Cisco Nexus 9300 platform switches.

Table 6. Environmental Properties

Property	Cisco Nexus 9300 Platform
Operating temperature	32 to 104°F (0 to 40°C)
Nonoperating (storage) temperature	-40 to 158°F (-40 to 70°C)
Humidity	5 to 95% (noncondensing)
Altitude	0 to 13,123 ft (0 to 4000m)

Table 7. Weight

Component	Weight
Cisco Nexus 93180YC-EX without power supplies or fans	17.2 lb (7.8 kg)
Cisco Nexus 93108TC-EX without power supplies or fans	17.7 lb (8.0 kg)
Cisco Nexus 93180LC-EX without power supplies or fans	17.2 lb (7.8 kg)
Cisco Nexus 93180YC-FX without power supplies or fans	17.4 lb (7.9 kg)
Cisco Nexus 93108TC-FX without power supplies or fans	17.4 lb (7.9 kg)
500W AC power supply	2.42 lb (1.1 kg)

Component	Weight
650W AC power supply	2.42 lb (1.1 kg)
1200W AC power supply	2.64 lb (1.2kg)
930W DC power supply	2.42 lb (1.1 kg)
1200W HVDC/HVAC power supply	2.42 lb (1.1 kg)

Regulatory Standards Compliance

Table 8 summarizes regulatory standards compliance for the Cisco Nexus 9300 platform.

Table 8. 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
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 optics modules available and the minimum software release required for each supported optics module, visit http://www.cisco.com/en/US/products/hw/modules/ps5455/products_device_support_tables_list.html

Ordering Information

Table 9 presents ordering information for the Cisco Nexus 9300 platform. Note that you can order the Cisco Nexus 2000 Series Fabric Extenders either separately or along with the Cisco Nexus 9300 platform switches.

Table 9. Ordering Information

Part Number	Product Description
Hardware	
N9K-C93180YC-EX	Nexus 9300 with 48p 1/10G/25G SFP+ and 6p 40G/100G QSFP28
N9K-C93108TC-EX	Nexus 9300 with 48p 10G BASE-T and 6p 40G/100G QSFP28
N9K-C93180LC-EX	Nexus 9300 with 24p 40/50G QSFP+ and 6p 40G/100G QSFP28

Part Number	Product Description
N9K-C93180YC-FX	Nexus 9300 with 48p 1/10G/25G SFP+ and 6p 40G/100G QSFP28, MACsec, and Unified Ports
N9K-C93108TC-FX	Nexus 9300 with 48p 10G BASE-T and 6p 40G/100G QSFP28, MACsec
NXA-PAC-500W-PI	Nexus 9000 500W AC PS, Port-side Intake
NXA-PAC-500W-PE	Nexus 9000 500W AC PS, Port-side Exhaust
NXA-PAC-650W-PI	Nexus 9000 650W AC PS, Port-side Intake, NEBs complaint
NXA-PAC-650W-PE	Nexus 9000 650W AC PS, Port-side Exhaust, NEBs complaint
NXA-PDC-930W-PE	Nexus 9000 930W DC PS, Port-side Exhaust
NXA-PDC-930W-PI	Nexus 9000 930W DC PS, Port-side Intake
UCSC-PSU-930WDC	930W DC PS, Port-side Intake
UCS-PSU-6332-DC	Nexus 9000 930W DC PS, Port-side Exhaust
N9K-PUV-1200W	Nexus 9300 1200W Universal Power Supply, Bi-directional air flow and Supports HVAC/HVDC
NXA-FAN-30CFM-F	Nexus 9300 Fan, Forward airflow (Port-side Exhaust)
NXA-FAN-30CFM-B	Nexus 9300 Fan, Reverse airflow (Port-side Intake)
Cisco Tetration Analytics License	
N93-TTR1K9	Telemetry License for Nexus 9300 Platform
Cisco APIC Leaf Software Licenses	
ACI-N9K-48X	ACI SW license for a 48p 1/10G Nexus 9K
ACI-N9K-96X	ACI SW license for a 96p 1/10G Nexus 9K
ACI-N9K-32Q	ACI SW license for a 32p 40G Nexus 9K
Cisco ACI Fabric Extender Software Licenses	
ACI-F48X	ACI SW license for a 48p 1/10G Nexus 2K
ACI-F32X	ACI SW license for a 32p 1/10G Nexus 2K
ACI-F16X	ACI SW license for a 16p 1/10G Nexus B22 FEX
ACI-F48G	ACI SW license for a 48p 1G Nexus 2K
Cisco Application Virtual Switch (AVS)	
ACI-AVS-48	ACI Software License for AVS: 48 Instances
ACI-AVS-96	ACI Software License for AVS: 96 Instances
Power Cords	
CAB-250V-10A-AR	AC Power Cord - 250V, 10A - Argentina (2.5 meter)
CAB-250V-10A-BR	AC Power Cord - 250V, 10A - Brazil (2.1 meter)
CAB-250V-10A-CN	AC Power Cord - 250V, 10A - PRC (2.5 meter)
CAB-250V-10A-ID	AC Power Cord - 250V, 10A, South Africa (2.5 meter)
CAB-250V-10A-IS	AC Power Cord - 250V, 10A - Israel (2.5 meter)
CAB-9K10A-AU	Power Cord, 250VAC 10A 3112 Plug, Australia (2.5 meter)
CAB-9K10A-EU	Power Cord, 250VAC 10A CEE 7/7 Plug, EU (2.5 meter)
CAB-9K10A-IT	Power Cord, 250VAC 10A CEI 23-16/VII Plug, Italy (2.5 meter)
CAB-9K10A-SW	Power Cord, 250VAC 10A MP232 Plug, SWITZ (2.5 meter)
CAB-9K10A-UK	Power Cord, 250VAC 10A BS1363 Plug (13 A fuse), UK (2.5 meter)
CAB-9K12A-NA	Power Cord, 125VAC 13A NEMA 5-15 Plug, North America (2.5 meter)
CAB-AC-L620-C13	North America, NEMA L6-20-C13 (2.0 meter)
CAB-C13-C14-2M	Power Cord Jumper, C13-C14 Connectors, 2 Meter Length (2 meter)
CAB-C13-C14-AC	Power cord, C13 to C14 (recessed receptacle), 10A (3 meter)

Part Number	Product Description
CAB-C13-CBN	Cabinet Jumper Power Cord, 250 VAC 10A, C14-C13 Connectors (0.7 meter)
CAB-IND-10A	10A Power cable for India (2.5 meter)
CAB-N5K6A-NA	Power Cord, 200/240V 6A North America (2.5 meter)
Accessories	
N3K-C3064-ACC-KIT	Nexus 3K/9K Accessory Kit

Warranty

The Cisco Nexus 9300 platform has 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 9300 platform 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 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 9300 platform. Spanning the entire network lifecycle, Cisco Services offerings 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 capital expenditures (CapEx), accelerate your growth, and 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 financing is available in more than 100 countries. Learn more.

For More Information

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

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