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Cisco Nexus 9300-FX3 Series Switch

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Product overview

Based on the [Cisco Cloud Scale technology](#) the Cisco Nexus® 9300-FX3 Series is the latest generation of access switches. Building on the successful Nexus 9300-FX series, the platform supports cost-effective cloud-scale deployments, an increased number of endpoints, and is capable of wire-rate security and telemetry. The platform is built on modern system architecture designed to provide high performance and meet the evolving needs of highly scalable data centers and growing enterprises.

Cisco provides two modes of operation for Cisco Nexus 9000 Series Switches. Organizations can deploy Cisco Application Centric Infrastructure (Cisco ACI®) or Cisco NX-OS mode.

Cisco ACI is a holistic, intent-driven architecture with centralized automation and policy-based application profiles. It provides a robust, transport network for dynamic workloads and 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.

Designed for the programmable network, the Cisco NX-OS operating system automates configuration and management for customers who want to take advantage of the DevOps operation model and tool sets.

Switch model

Table 1. Cisco Nexus 9300-FX3 Series Switch

Model	Description
Cisco Nexus 93180YC-FX3S	48 x 1/10/25-Gbps fiber ports and 6 x 40/100-Gbps QSFP28 ports

The Cisco Nexus 93180YC-FX3S Switch (Figure 1) is a 1RU switch that supports 3.6 Tbps of bandwidth and 1.2 bpps. The 48 downlink ports on the 93180YC-FX3S are capable of supporting 1-, 10-, or 25-Gbps Ethernet, offering deployment flexibility and investment protection. The 6 uplink ports can be configured as 40 and 100-Gbps Ethernet, offering flexible migration options. Please see the Licensing guide section to enable features on the platform. Cisco Nexus 93180YC-FX3S switch supports standard PTP Telecom profiles with SyncE and PTP boundary clock functionality for Telco data center edge environments.



Figure 1.
Cisco Nexus 93180YC-FX3S Switch

Features and benefits

The Cisco Nexus 9300-FX3 series provide the following features and benefits:

- **PTP Telecom Profile**
 - Precision Time Protocol (PTP) is a protocol for distributing precise time and frequency over packet networks. PTP is defined in the IEEE Standard 1588. It defines an exchange of timed messages. The G.8275.1 profile is also used in telecom networks where phase or time-of-day synchronization is required and where each network device participates in the PTP protocol.
 - Support for PTP Telecom profile 8275.1 with SyncE
 - PTP Boundary clock
 - PTP Profile G.8273.2 - Class B
- **Architectural Flexibility**
 - Industry leading Software Defined Networking Solution Cisco ACI™ support.
 - Support for standards based VXLAN EVPN fabrics, inclusive of hierarchical multi-site support (refer to [VXLAN Network with MP-BGP EVPN Control Plane](#) for more information).
 - Three-tier BGP architectures, enabling horizontal, non-blocking IPv6 network fabrics at web-scale.
 - Segment routing allows the network to forward Multiprotocol Label Switching (MPLS) packets and engineer traffic without Resource Reservation Protocol (RSVP) Traffic Engineering (TE). It provides a control-plane alternative for increased network scalability and virtualization.
 - Comprehensive protocol support for Layer 3 (v4/v6) unicast and multicast routing protocol suites, including 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).
 - The switch also supports a software “FEX mode” [\[1\]](#). The switch can be converted to a Fabric Extender by the use of a command.
- **Extensive Programmability**
 - Day zero automation through Power On Auto Provisioning, drastically reducing provisioning time.
 - Industry leading integrations for leading devops configuration management applications – Ansible, Chef, Puppet, SALT. Extensive Native YANG and industry standard OpenConfig model support through RESTCONF/NETCONF.
 - Pervasive API’s for all switch CLI functions (JSON based RPC over HTTP/HTTPS).
- **High Scalability, Flexibility, and Security**
 - Flexible forwarding tables support up to 2 million shared entries on FX3 model. Flexible use of TCAM space allows for custom definition of Access Control List (ACL) templates.
 - IEEE 802.1ae MAC Security (MACsec) [\[2\]](#) and Cloudsec [\[2\]](#) (VTEP to VTEP encryption) support on all ports of 9300-FX2 models with speed greater than or equal to 1-Gbps, allows traffic encryption at the physical layer and provides secure server, border leaf, and leaf-to-spine connectivity.

- **Intelligent Buffer Management**

- The platform offers Cisco's innovative [intelligent buffer management](#), that offers capability to distinguish mice and elephant flows and apply different queue management schemes to them based on their network forwarding requirements in the event of link congestion.
- Intelligent buffer management functions are:
 - Approximate Fair Dropping (AFD) with Elephant Trap (ETRAP). AFD distinguishes long-lived elephant flows from short-lived mice flows, by using ETRAP. AFD exempts mice flows from the dropping algorithm so that mice flows will get their fair share of bandwidth without being starved by bandwidth-hungry elephant flows. Also, AFD tracks elephant flows and subjects them to the AFD algorithm in the egress queue to grant them their fair share of bandwidth.
 - ETRAP measures the byte counts of incoming flows and compares this against the user defined ETRAP threshold. After a flow crosses the threshold, it becomes an elephant flow.
 - Dynamic Packet Prioritization (DPP) provides the capability of separating mice flows and elephant flows into two different queues so that buffer space can be allocated to them independently. Mice flows, sensitive to congestion and latency can take priority queue and avoid re-ordering that allows to elephant flows to take full link bandwidth.

- **RDMA over Converged Ethernet - RoCE Support**

- Platform offers lossless transport for RDMA over Converged Ethernet with support of DCB protocols:
- Priority-based Flow Control - (PFC) to prevent drops in the network and pause frame propagation per priority class.
- Enhanced Transmission Selection - (ETS) to reserve bandwidth per priority class in network contention situation.
- Data Center Bridging Exchange Protocol - (DCBX) to discover and exchange priority and bandwidth information with end points.
- Platform also supports Explicit Congestion Notification - (ECN) that provides end-to-end notification per IP flow by marking packets that experienced congestion, without dropping traffic. The platform is capable to track ECN statistics of number of marked packet that have experienced congestion.

- **Hardware and Software High Availability**

- Virtual Port-Channel (vPC) technology provides Layer 2 multipathing 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 model.
- The 64-way Equal-Cost MultiPath (ECMP) routing enables the use of Layer 3 fat-tree designs. This feature helps organizations prevent network bottlenecks, increase resiliency, and add capacity with little network disruption.
- Advanced reboot capabilities include hot and cold patching.
- The switch use hot-swappable Power-Supply Units (PSUs) and fans with N+1 redundancy.

- **Purpose-Built Cisco NX-OS Software Operating System with Comprehensive, Proven Innovations**
 - Single binary image that supports every switch in the Cisco Nexus 9000 series, simplifying image management. The operating system is modular, with a dedicated process for each routing protocol: a design that isolates faults while increasing availability. In the event of a process failure, the process can be restarted without loss of state. The operating system supports hot and cold patching and online diagnostics.
 - Data Center Network Manager (DCNM) is the network management platform for all NX-OS-enabled deployments, spanning new fabric architectures, IP Fabric for Media, and storage networking deployments for the Cisco Nexus[®]-powered data center. Accelerate provisioning from days to minutes, and simplify deployments from day zero through day N. Reduce troubleshooting cycles with graphical operational visibility for topology, network fabric, and infrastructure. Eliminate configuration errors and automate ongoing change in a closed loop, with templated deployment model and configuration compliance alerting with automatic remediation. Real-time health summary for fabric, devices, and topology. Correlated visibility for fabric (underlay, overlay, virtual and physical endpoints), including compute visualization with VMware.
 - Network traffic monitoring with Cisco Nexus Data Broker builds simple, scalable, and cost-effective network Test Access Points (TAPs) and Cisco Switched Port Analyzer (SPAN) aggregation for network traffic monitoring and analysis.
- **Cisco Data Center Network Assurance and Insights**
 - Support to Intelligent automation to Day 2 Operations with Cisco Data Center Network Assurance and Insights. Click [here](#) to learn more.

Product specifications

The Cisco Nexus 9300-FX3 series offer industry-leading density and performance with flexible port configurations that can support existing copper and fiber cabling (Tables 2).

Table 2. Cisco Nexus 9300-FX3 Series Switch specifications

Feature	Cisco Nexus 93180YC-FX3S
Ports	48 x 1/10/25-Gbps and 6 x 40/100-Gbps QSFP28 ports
Downlink supported speeds	1/10/25-Gbps Ethernet
CPU	6 cores
System memory	Upto 32 GB
SSD drive	128 GB
System buffer	40 MB
Management ports	1 RJ-45 port
USB ports	1
1PPS	GPS 1PPS input or output

Feature	Cisco Nexus 93180YC-FX3S
10MHz	GPS 10Mhz input or output.
Time of Date (TOD)	1 RJ-45
ANT	Antenna for GNSS
RS-232 serial ports	1
Power supplies (up to 2)	650W AC, 930W DC, or 1200W HVAC/HVDC
Typical power (AC/DC)*	375W
Maximum power (AC/DC)*	600W
Input voltage (AC)	100 to 240V
Input voltage (High-Voltage AC [HVAC])	200 to 277V
Input voltage (DC)	-48 to -60V
Input voltage (High-Voltage DC [HVDC])	-240 to -380V
Frequency (AC)	50 to 60 Hz
Fans	4
Airflow	Port-side intake and exhaust
Physical dimensions (H x W x D)	1.72 x 17.3 x 19.6 in. (4.4 x 43.9 x 49.6 cm)
Acoustics	Port Side Exhaust : Fan speed at 50%:63.4 dBA Fan speed at 70%:74.3 dBA Fan speed at 100%: 83.4 dBA Port Side Intake: Fan speed at 50%:64.6 dBA Fan speed at 70%:76.1 dBA Fan speed at 100%: 85.4 dBA
RoHS compliance	Yes
MTBF	288,760 Hours
Minimum ACI image	Roadmap
Minimum NX-OS image	NXOS-9.3.5

* 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 3 lists the performance and scalability specifications for the Cisco Nexus 9300-FX3 series switch. (Check the software release notes for feature support information).

Table 3. Hardware performance and scalability specifications*

Item	Cisco Nexus 9300-FX Series Switches
Maximum number of Longest Prefix Match (LPM) routes**	1,792,000
Maximum number of IP host entries**	1,792,000
Maximum number of MAC address entries**	512,000
Maximum number of multicast routes	128,000
Number of Interior Gateway Management Protocol (IGMP) snooping groups	Shipping: 8,000 Maximum: 32,000
Maximum number of Cisco Nexus 2000 Series Fabric Extenders per switch	16
Maximum number of Access Control List (ACL) entries	Single-slice forwarding engine: 5000 ingress 2000 egress
Maximum number of VLANs	4096**
Number of Virtual Routing and Forwarding (VRF) instances	Shipping: 1,000 Maximum: 16,000
Maximum number of ECMP paths	64
Maximum number of port channels	512
Maximum number of links in a port channel	32
Number of active SPAN sessions	4
Maximum number of VLAN's in Rapid per-VLAN Spanning Tree (RPVST) instances	3,967
Maximum number of Hot-Standby Router Protocol (HSRP) groups	490
Number of Network Address Translation (NAT) entries	1,023
Maximum number of Multiple Spanning Tree (MST) instances	64
Flow-table size used for Cisco Tetration Analytics platform***	64,000
Number of Queues	8

* More templates and greater scalability are on the roadmap. Refer to the [Cisco Nexus 9000 Series Verified Scalability Guide](#) documentation for the latest exact scalability values validated for specific software

*** 27 VLANs out of 4096 are reserved

** Raw capacity of flow table

Table 4 lists the environmental properties, and Table 5 lists the weight for the Cisco Nexus 9300-FX3 series switch.

Table 4. Environmental properties

Property	Description
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 5. Weight

Component	Weight
Cisco Nexus 93180YC-FX3S without power supplies or fans	21 lb (9.52 kg)
650W AC power supply	2.42 lb (1.1 kg)
930W DC power supply	2.42 lb (1.1 kg)
1200W HVDC/HVAC power supply	2.42 lb (1.1 kg)
Fan tray: NXA-FAN-35CFM-F or NXA-FAN-35CFM-B	0.26 lb (0.12 kg)

Table 6 summarizes regulatory standards compliance for the Cisco Nexus 9300-FX3 series switch.

Table 6. 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	<p>NEBS</p> <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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.

Software licensing and optics supported

The software packaging for the Cisco Nexus 9000 Series offers flexibility and a comprehensive feature set. The default system software has a comprehensive Layer 2 security and management feature set. To enable additional functions, including Layer 3 IP unicast and IP multicast routing and Cisco Nexus Data Broker, you must install additional licenses. To meet customer requirements, licensing is available as both subscription and perpetual. The [licensing guide](#) illustrates the software packaging and licensing available to enable advanced features. For the latest software release information and recommendations, refer to the product bulletin at <https://www.cisco.com/go/nexus9000>.

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

Ordering information

Table 7 presents ordering information for the Cisco Nexus 9300-FX3 series switch.

Table 7. Ordering information

Part Number	Product Description
Base Part Numbers	
N9K-C93180YC-FX3S	Nexus 9300 with 48p 1/10G/25G SFP and 6p 40G/100G QSFP28
Power Supplies	
NXA-PAC-650W-PE	Nexus 9000 650W AC PS, Port-side Exhaust
NXA-PAC-650W-PI	Nexus 9000 650W AC PS, Port-side Intake

Part Number	Product Description
NXA-PDC-930W-PI	Nexus 9000 930W DC PS, Port-side Intake
NXA-PDC-930W-PE	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
Fans	
NXA-FAN-35CFM-F	Nexus Single Fan, 30CFM, port side exhaust airflow
NXA-FAN-35CFM-B	Nexus Single Fan, 30CFM, port side intake airflow
Licenses on Nexus 9300-FX3	
C1E1TN9300XF-3Y	ACI & NX-OS Subscription Essential package for 10/25/40G+ Nexus 9K Leaf, 3 Year Term
C1E1TN9300XF-5Y	ACI & NX-OS Subscription Essential package for 10/25/40G+ Nexus 9K Leaf, 5 Year Term
C1A1TN9300XF-3Y	ACI & NX-OS Subscription Advantage package for 10/25/40G+ Nexus 9K Leaf, 3 Year Term
C1A1TN9300XF-5Y	ACI & NX-OS Subscription Advantage package for 10/25/40G+ Nexus 9K Leaf, 5 Year Term
ACI-ES-XF	ACI Essential SW license for a 10/25/40G+ Nexus 9K Leaf
ACI-AD-XF	ACI Advantage SW license for a 10/25/40G+ Nexus 9K Leaf
NX-OS-ES-XF	NX-OS Essential SW license for a 10/25/40G+ Nexus 9K Leaf
NX-OS-AD-XF	NX-OS Advantage SW license for a 10/25/40G+ Nexus 9K Leaf
DCN-SYNCE-XF	SyncE Add on license
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)

Part Number	Product Description
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)
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)
CAB-HVAC-SD-0.6M	HVAC Power cable for Anderson-LS-25
CAB-HVAC-C14-2M	HVAC power cable for C14, 2 meters (no more than 240 V)
CAB-HVAC-RT-0.6M	HVAC Power cable with right angle connector for RF-LS-25
Accessories on Nexus 9300-FX3 Series	
NXK-ACC-KIT-1RU	Nexus Fixed Accessory Kit with 4-post rack mount kit

Warranty, service and support

The Cisco Nexus 9300-FX3 series 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).

Cisco offers a range of professional, solution, and product support services for each stage of your Cisco Nexus 9300-FX3 series deployment:

- Cisco Data Center Quick Start Service for Cisco Nexus 9000 Series Switch: This offering provides consulting services that include technical advice and assistance to help deploy Cisco Nexus 9000 Series Switch.
- Cisco Data Center Accelerated Deployment Service for Cisco Nexus 9000 Series Switch: This service delivers planning, design, and implementation expertise to bring your project into production. The service also provides recommended next steps, an architectural high-level design, and operation-readiness guidelines to scale the implementation to your environment.
- Cisco Migration Service for Cisco Nexus 9000 Series Switch: This service helps you migrate from Cisco Catalyst® 6000 Series Switch to Cisco Nexus 9000 Series Switch.
- Cisco Product Support: Support service is available globally 24 hours a day, 7 days a week, for Cisco software and hardware products and technologies associated with Cisco Nexus 9000 Series Switch. Enhanced support options delivered by Cisco also include solution support for Cisco ACI, Cisco SMARTnet™ Service, and Cisco Smart Net Total Care™* service.
- For more information, visit <https://www.cisco.com/go/services>.

* For Cisco products only

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 [Corporate Social Responsibility](#) (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	Materials
Information on electronic waste laws and regulations, including products, batteries, and packaging	WEEE compliance

Reference links to **product-specific environmental sustainability information** that is mentioned in relevant sections of this data sheet are provided in the following table:

Sustainability Topic	Reference
General	
Product Compliance	Table 6. Safety and Compliance Information
Power	
Power Supply	Table 2. Product specifications: Power Supplies. Typical and Max power specification
Material	
Unit Weight	Table 5. Weight
Dimensions and Mean Time between Failures Metrics	Table 2. Product specifications

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For more information

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

[1] Capabilities to enable FEX mode, please see latest software release notes for details.

[2] Capabilities to enable MACsec needs feature license, please see the Cisco Nexus 9000 Licensing Guide and release notes for details

Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV Amsterdam,
The Netherlands

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