Cisco Nexus 7000 Next-Generation Hardware and NX-OS Software Release 6.0

PB688075

Product Overview

Cisco continues its Unified Fabric innovations with the introduction of next-generation Cisco Nexus 7000 platform hardware. With this release, Cisco offers greater architectural flexibility and revolutionary scale to meet requirements of the next-generation data centers. IT organizations globally can gain operational efficiency and agility, and increase business innovation and differentiation.

This product bulletin introduces Cisco Nexus® 7000 next-generation hardware and Cisco® NX-OS Software Release 6.0 for Cisco Nexus 7000 Series Switches (Figure 1). It summarizes the new features offered.

Figure 1. Cisco Nexus 7000 Series Switches

Cisco Nexus 7000 Next-Generation Hardware

The next-generation hardware on the Cisco Nexus 7000 platform includes the following.

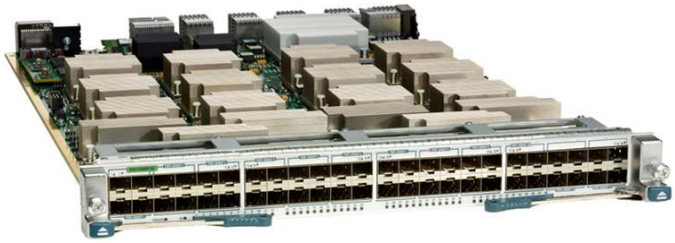
- Cisco Nexus 7000 48 Port 1/10GbE, SFP/SFP+ Module (F2-Series)
- Cisco Nexus 7000 9-Slot Chassis, 110Gbps/Slot Fabric 2 Module
- Cisco Nexus 7000 10-Slot Chassis, 110Gbps/Slot Fabric 2 Module
- Cisco Nexus 7000 18-Slot Chassis, 110Gbps/Slot Fabric 2 Module

Cisco Nexus 7000 9-slot chassis along with Fabric 2 module is supported on Cisco NX-OS Software Release 5.2 or later. Support for Fabric 2 modules 7010 and 7018 chassis, along with F2 module, is introduced in NX-OS Software Release 6.0.

Cisco Nexus 7000 48 Port 1/10 GbE, SFP/SFP+ F2-Series Module

The Cisco Nexus 7000 48-Port 1 and 10 Gigabit Ethernet F2-Series Module (referred to as the Cisco Nexus 7000 F2-Series Module) offers outstanding flexibility and wire-rate performance on each port. The next-generation Nexus 7000 platform comes to life with the F2-Series Modules, which deliver unmatched performance with Layer 2 and Layer 3 feature sets for the data center.

Figure 2. Cisco Nexus 7000 F2-Series 48 Port 1/10GbE SFP/SFP+ Module



Features include:

- Performance: Line rate on all 48 ports with 720 Mpps (IPv4 or IPv6) and 480 Gbps of data throughput
- Scalability: Enables highest density 10GE system in the industry with up to 768 10 GE ports
- Feature-Rich: Comprehensive Layer 2 and Layer 3 forwarding functionality
- Nexus 2000 support: provides top-of-rack (ToR) flexibility and simplified operation for high-density 1/10GE deployments
- Cisco FabricPath support: Delivers highly reliable, flexible and scalable Layer 2 networks
- Fibre Channel over Ethernet (FCoE) support: Converges LAN and SAN over a single Ethernet network
- Flexibility: Dual-speed 1G/10G on a per-port basis [SFP and SFP+ options] for easy migration to 10GE
- Power-efficient: Less than 9W per port
- Deployment targets:
  - Data center access, aggregation and core layer
  - Gradual migration from 1 to 10GE for the access layer
  - Access layer solutions with support for Cisco Nexus 2000 Series Fabric Extenders (FEX)
  - Multi-hop FCoE environments

Cisco Nexus 7000 9-Slot, 10-Slot and 18-Slot Chassis, 110 Gbps Fabric 2 Modules

The Cisco Nexus 7000 Series Fabric-2 Modules for the Cisco Nexus 7000 Series chassis are separate fabric modules that provide parallel fabric channels to each I/O and supervisor module slot. Up to five simultaneously active fabric modules work together delivering up to 550 Gbps per slot. Through the parallel forwarding architecture, a system capacity of more than 15 Tbps is achieved with the five fabric modules. The fabric module provides the central switching element for fully distributed forwarding on the I/O modules.

Figure 3. Cisco Nexus 7000 9-Slot, 10-Slot and 18-Slot Chassis, 110 Gbps Fabric 2 Modules

Features include:

- High availability and redundancy: The fabrics support multilevel redundancy, where all available fabrics are active, and provide redundancy for all other fabric modules. All I/O module slots receive a fair share of the total fabric bandwidth, helping to ensure lossless forwarding in the event of failover.
- Scalable fabric: The combined fabric modules deliver 10 channels per I/O module and five channels per supervisor module, for a scalable capacity of more than 15 Tbps for forwarding performance. This can be increased as a company's needs grow.
- Non-disruptive addition and removal of fabric modules: The switch capacity can scale with the addition of modules, with transparent upgrades for continuous operations.
- Arbitrated crossbar for unicast: Class-of-service-aware forwarding is delivered in a fully distributed forwarding system that allows future enhancements to Ethernet to support unified I/O.
- Virtual output queing (VOQ): In conjunction with the supervisor module, VOQ provides a quality-of-service (QoS) aware lossless fabric, avoiding the problems associated with head-of-line blocking.
- Multistage crossbar fabric: System forwarding performance is enhanced by a combination of local fabric switching between ports on the same module and centralized forwarding through the fabric for ports on different modules.
- Superframing and frame segmentation: Crossbar efficiency is optimized by the use of superframing and frame segmentation to provide deterministic latency and throughput. ID LED: Using the beacon feature, the administrator can clearly identify the chassis and fabric module.

Software Support

Cisco NX-OS Software Release 6.0 supports all the software features previously supported on the Cisco Nexus 7000 Series Switches up through Cisco NX-OS Software Release 5.2. Cisco NX-OS 6.0 is compatible using In-Service Software Upgrade (ISSU) with Releases 5.2 or higher. In addition, Cisco NX-OS 6.0 supports the new software features described in Table 4.

For more detailed information about features and ISSU, refer to the Cisco NX-OS 6.0 release notes (see "For More Information" at the end of this document).

Table 1. New Software Features in Cisco NX-OS Release 6.0

Software Features	Description
Border Gateway Protocol (BGP) best path as-path multipath-relax	When BGP multi-pathing is enabled, BGP load-balances user traffic within a single autonomous system (AS). The criteria are that all attributes must match (weight, AS P path, etc). However when a device is multi-homed to multiple AS(es), BGP cannot load balance traffic between the two AS(es) by default. In order to enable load-balancing of traffic among the multi-homed AS(es), the "bgp bestpath as-path multipath-relax" feature needs to be applied. The criteria required for this is that the AS-path length should be equal.

Software Features	Description
Simple Network Management Protocol (SNMP)	• Per-community SNMP object identifier (OID) access restriction: Provides fine granularity for role-based access control (RBAC) to control access at any OID level. • Tunnel MIB: Addition of IP-TUNNEL-MIB.
Layer 2 Protocol support for the F2-Series 48-Port 1/10 GbE Module	Spanning Tree Protocol (STP), (Multiple Spanning Tree (MST) and RPVST+), virtual PortChannel (vPC), Link Aggregate Control Protocol (LACP) (up to 16 total links, including active and hot-standby), VLAN Trunk Protocol (VTP).
Layer 3 unicast support for the F2-Series 48-Port 1/10GbE module	IPv4 and IPv6, Web Cache Communication Protocol Version 2 (WCCPv2) Routing, Open Shortest Path First (OSPF) (v4 and v6), Enhanced Interior Gateway Routing Protocol (EIGRP), Intermediate System-to-Intermediate System (IS-IS, Border Gateway Protocol (BGP) [v 4 and v 6], Routing Information Protocol (RIP), Policy Based Routing (PBR), Hot Standby Router Protocol (HSRP) (v 4 and v 6), Gateway Load Balancing Protocol (GLBP), Virtual Router Redundancy Protocol (VRRP), Object Tracking, Bidirectional Forwarding Detection (BFD, 16-way Equal Cost Multipath (ECMP).
Multicast support for the F2-Series 48 Port 1/10GbE Module	Internet Group Management Protocol (IGMP) Snooping, IGMP, MLD, Protocol Independent Multicast (PIM) (Any Source Multicast [ASM]., Source Specific Multicast [SSM]), PIMv6, Multicast Source Discovery Protocol (MSDP).
Security support for the F2-Series 48-Port 1/10GbE Module	Security ACLs, 802.1x, Port-security, TrustSec SGACL, DHCP Snooping, Dynamic ARP Inspection, IP Source Guard, URPF, Storm control, Packet Rate-limiting, CoPP.
Management support for the F2-Series 48-Port 1/10GbE Module	SPAN, NTP, CDP, LLDP, Rollback, Session Manager, EEM, PONG, IEEE 1588/PTP, AAA, Radius, TACACS, VDC F2-Only Type.
QoS support for the F2-Series 48-Port 1/10GbE Module	Classification, Marking, Mutation, Policing, Queuing and scheduling.
Cisco FabricPath support for the F2-Series 48-Port 1/10GbE Module	DCBXP, VPC+, Cisco FabricPath IS-IS, 16-way ECMP.
Cisco Nexus Fabric Extender support for the F2-Series 48-Port 1/10GbE Module	Cisco Nexus 2248TP GE Fabric Extender, the Cisco Nexus 2224TP GE Fabric Extender, and the Cisco Nexus 2232PP 10GE.

Ordering Information

To place an order, visit the Cisco Ordering homepage. To download software, visit the Cisco Software Center. Table 2 provides ordering information.

Table 2. Cisco Nexus 7000 Next Generation Hardware

Description	Part Number
Cisco Nexus 7000 48-Port 1/10GbE, SFP/SFP+ Module (F2-Series)	N7K-F248XP-25[1]
Cisco Nexus 7000 10-Slot Chassis, 110Gbps/Slot Fabric 2 Module	N7K-C7010-FAB-2
Cisco Nexus 7000 18-Slot Chassis, 110Gbps/Slot Fabric 2 Module	N7K-C7018-Fab-2
Cisco Nexus 7000 Series 9-Slot Chassis[2]	N7K-C7009
Cisco Nexus 7000 9-Slot Chassis, 110Gbps/Slot Fabric 2 Module[2]	N7K-C7009-FAB-2

Support for Cisco Nexus 2000 Series Fabric Extenders on F2 Module

The following Cisco Fabric Extenders are supported on the F2 module.

Table 3. Cisco Fabric Extenders Supported in Cisco NX-OS Release 6.0

Cisco Fabric Extenders with N7K-F248XP-25	Part Number
Cisco Nexus 2224TP - 24 x 100/1000BASE-T + 2 x 10 GE (SFP+)	N2K-C2224TP-1GE
Cisco Nexus 2248TP - 48 x 100/1000BASE-T + 4 x 10 GE (SFP+)	N2K-C2248TP-1GE
Cisco Nexus 2232PP - 32 x 1/10 GE (SFP+) + 8x 10 GE (SFP+)	N2K-C2232PP-10GE

[1] A separate VDC is needed when deploying the N7K-F248XP-25 modules in a chassis that also contains other families of modules (i.e. N7K-M1xxx and N7K-F1xxx).The VDC feature is enabled by the N7K-ADV1K9 license.
A separate VDC is **NOT** required when the chassis contains only N7K-F248XP-25 modules.
[2] Supported on NX-OS 5.2 or later releases. The rest are supported in NX-OS 6.0 or later releases.

The following new optics are supported in Cisco NX-OS Release 6.0.

Table 4. New Optics Supported in Cisco NX-OS Release 6.0

For Cisco Nexus F2 Series 48-Port 1/10GbE Module with SFP/SFP+ (N7K-F248XP-25)	Part Number
SFP+	
10GBASE-SR (“short range”) up to 300m	SFP-10G-SR
10GBASE-LR (“long reach”) up to 10km	SFP-10G-LR
10GBASE-ER (“extended reach”) up to 40km	SFP-10G-ER
10GBASE-LRM, (Long Reach Multimode) up to 300m	SFP-10G-LRM
FET-10G Fabric Extender Transceiver support link lengths up to 100m	FET-10G
SFP+ Copper Passive Twinax cable up to 1m	SFP-H10GB-CU1M
SFP+ Copper Passive Twinax cable up to 3m	SFP-H10GB-CU3M
SFP+ Copper Passive Twinax cable up to 5m	SFP-H10GB-CU5M
SFP+ Copper Passive Twinax cable up to 7m	SFP-H10GB-ACU7M
SFP+ Copper Passive Twinax cable up to 10m	SFP-H10GB-ACU10M
SFP	
1000BASE-T Gigabit Ethernet SFP (DOM)	SFP-GE-T
1000BASE-SX Gigabit Ethernet SFP (DOM)	SFP-GE-S
1000BASE-LX/LH Gigabit Ethernet SFP (DOM)	SFP-GE-L
1000BASE-ZX Gigabit Ethernet SFP (DOM)	SFP-GE-Z
1000BASE-LX/LH Gigabit Ethernet SFP	GLC-LH-SM
1000BASE-SX Gigabit Ethernet SFP	GLC-SX-MM
1000BASE-ZX Gigabit Ethernet SFP	GLC-ZX-SM
1000BASE-T Gigabit Ethernet SFP	GLC-T
Coarse Wavelength-Division Multiplexing (CWDM) SFP	CWDM-SFP-xxxx
Dense Wavelength-Division Multiplexing (DWDM) SFP	DWDM-SFP-xxxx

More information about the transceivers is available at http://www.cisco.com/en/US/docs/interfaces_modules/transceiver_modules/installation/note/78_15160.html.

Cisco NX-OS is available in nine license levels

- **Base license:** A comprehensive feature set is provided with the Base license, which is bundled with the hardware at no additional cost.
- **Enterprise license:** The Enterprise license enables incremental functions that are applicable to many enterprise deployments.
- **Advanced LAN Enterprise license:** The Advanced LAN Enterprise license enables next-generation functions such as VDCs and Cisco TrustSec® security.
- **Scalable Feature license:** This license enables XL capabilities on the line cards. The Scalable Feature license is applied on a per-chassis basis.
- **Transport Services license:** This license enables OTV functions. The license to enable LISP is included in this license in Cisco NX-OS Release 6.0.
- **Enhanced Layer 2 license:** This license enables the Cisco FabricPath feature. The license to enable Pong is included in this license in Cisco NX-OS Release 6.0.

- **MPLS license:** This single license enables all MPLS features, including MPLS forwarding, QoS, L3VPN, 6PE/VPE, and OAM.
- **FCoE license:** This single license enables all FCoE features on the Cisco Nexus 7000 Series Switches.
- **Storage license:** This license enables VSAN routing and access control.

Additional information about the license packages can be found on Cisco's website at: http://www.cisco.com/en/US/prod/collateral/iosswrel/ps9494/ps9372/data_sheet_c78-437306.html.

Cisco Services and Support

Cisco offers a wide range of services to help accelerate your success in deploying and optimizing Cisco Nexus 7000 Series Switches in your data center. Cisco's innovative services are delivered through a unique combination of people, processes, tools, and partners and are focused on helping you increase your operating 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 7000 Series Switches. Spanning the entire network lifecycle, Cisco Services helps protect your investment, optimize network operations, support migration, and strengthen your IT expertise. For more information about Cisco Data Center Services, visit http://www.cisco.com/go/dcservices.

For More Information

For more information about Cisco NX-OS, visit the product homepage at http://www.cisco.com/go/nxos or contact your local account representative.

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