

Cisco Nexus 7000 M1-Series 48-Port Gigabit Ethernet Modules

Product Overview

The Cisco Nexus™ 7000 Series 48-Port Gigabit Ethernet Modules are highly scalable modules designed for performance driven mission-critical Ethernet networks. Cisco Nexus 7000 Series has both copper and fiber options for Gigabit Ethernet modules. The copper module is a 48-port 10/100/1000 Ethernet module with RJ45 connectors (Figure 1) and the fiber module is a 48-port Gigabit Ethernet module with SFP optics (Figure 2).

The Cisco Nexus 7000 Series Switches comprise a modular data center-class product line designed for highly scalable 10 Gigabit Ethernet networks with a fabric architecture that scales beyond 15 terabits per second (Tbps). Designed to meet the requirements of the most mission-critical data centers, it delivers continuous system operation and virtualized pervasive services. The Cisco Nexus 7000 Series is based on a proven operating system, with enhanced features to deliver real-time system upgrades with exceptional manageability and serviceability. Its innovative design is purpose built to support end-to-end data center connectivity, consolidating IP, storage, and interprocess communication (IPC) networks onto a single Ethernet fabric.

Figure 1. Cisco Nexus 7000 Series 48-Port 10/100/1000 Ethernet Module

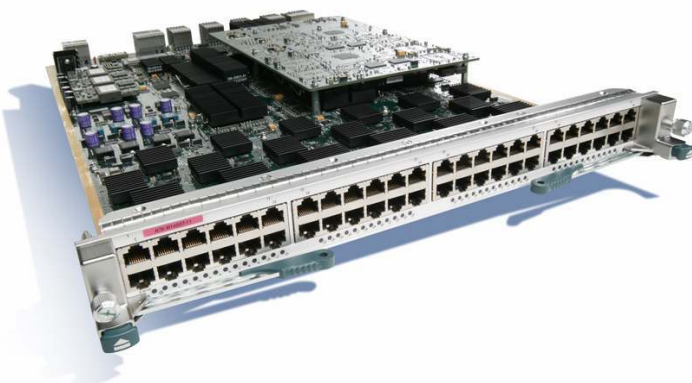
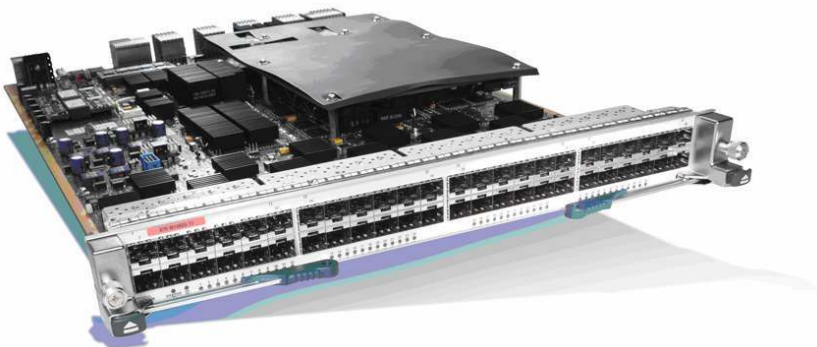


Figure 2. Cisco Nexus 7000 Series 48-Port Gigabit Ethernet SFP Module



Features and Benefits

The Cisco Nexus 7000 48-Port Gigabit Ethernet Modules with 46 Gbps of bandwidth to the fabric are high-performance, highly scalable modules designed for mission-critical Ethernet networks. Populating the 18-slot chassis with these modules delivers up to 768 ports of Gigabit Ethernet in a single chassis. Populating the 10-slot chassis with these modules delivers up to 384 ports of Gigabit Ethernet in a single chassis. The Cisco Nexus 7000 48-Port Gigabit Ethernet Modules provide 48Gbps of local switching and are ideal for the access layer of a data center network, where high density, high performance, and continuous system operation are crucial.

All Cisco Nexus 7000 Series I/O modules contain an integrated forwarding engine. This architecture scales the forwarding performance of the chassis linearly by the number of I/O modules employed. The forwarding engine on the Cisco Nexus 7000 48-Port Gigabit Ethernet Modules are part of the Cisco Nexus 7000 M Series of forwarding engines.

The M Series forwarding engine on the Gigabit Ethernet modules delivers 60 million packets per second (Mpps) of Layer 2 and 3 IPv4 unicast forwarding or 30 Mpps of IPv6 unicast forwarding across all ports on a single I/O module. A 10-slot chassis with eight M Series I/O modules delivers up to 480 Mpps of forwarding. Multicast forwarding is built into the I/O module performing egress replication. The M Series forwarding engine also delivers access control list (ACL) filtering, marking, rate limiting, and NetFlow with no effect on performance. Powerful ACL processing supports up to 64,000 entries per module, where entries can address Layer 2, 3, and 4 fields in addition to new Cisco[®] metadata fields that employ security group tags (SGTs).

The Cisco Nexus 7000 48-Port gigabit Ethernet Module offers exceptional security with integrated hardware support for Cisco TrustSec. This includes line rate data confidentiality, data integrity and ACL processing for Security Group Tags. Data confidentiality and integrity conform to the IEEE MAC security standard (IEEE 802.1AE [MACsec]). All 48 ports on the module support the Advanced Encryption Standard (AES) cipher using a 128-bit key. New security ACLs are enhanced through hardware support for Cisco metadata headers capable of carrying SGTs. Security group ACLs (SGACLs) use SGT information to provide hardware-based enforcement of security policies. This removes dependencies on IP addresses thus improving scalability and simplifying manageability.

The fabric interface on the Cisco Nexus 7000 48-Port Gigabit Ethernet Module delivers 46 Gbps of bandwidth in each direction. Traffic destined for a different module is distributed across up to five fabric modules. At least one fabric module is required in the chassis. Two fabric modules installed in the chassis delivers fabric fault tolerance with no loss of bandwidth.

The Cisco Nexus 7000 48-Port gigabit Ethernet Module buffers data in virtual output queues before the data flows to the fabric. The data flow is controlled by a central arbiter on the supervisor module using a credit-based buffer design. This architecture offers a lossless fabric that delivers quality of service (QoS) and fairness across all ports, even during congestion.

Table 1 summarizes the features and benefits of the Cisco Nexus 7000 48-Port Gigabit Ethernet Module.

Table 1. Features and Benefits

Feature	Benefit
High-density 48-port Gigabit Ethernet module	Offers up to 768 Gigabit Ethernet ports in the 18-slot chassis and 384 Gigabit Ethernet ports in the 10-slot chassis for efficient and scalable network designs
Virtual output queuing and centralized arbiter	Enables fairness when one or more destinations are congested and future support for lossless unified I/O

Feature	Benefit
Load sharing across all fabric modules	Through its high-availability design, shares bandwidth across all fabric modules simultaneously for optimal performance
Distributed forwarding	Through its fully distributed data plane, offers high-performance parallel forwarding
Multiprotocol Label Switching (MPLS)	M1-based feature rich line cards support MPLS in the hardware and these MPLS functionalities will be enabled in future with software upgrades
Integrated hardware support for Cisco TrustSec	Simplifies and scales access control by using SGTs and SGACLs and delivers data confidentiality and data integrity on all 48-Ports using the IEEE 802.1AE standard
Online insertion and removal (OIR)	Supports hot insertion and removal for continuous system operation
Identification (ID) LED	Through the beacon feature, allows the administrator to clearly identify the module for a service condition; ports on the I/O module can send beacons as well

Note: Not all Cisco Nexus 7000 Series 48-Port Gigabit Ethernet Module features are enabled in the first software release. Refer to the release notes for up-to-date software version information to see what features are supported.

Product Specifications

Table 2 lists the production specifications for the Cisco Nexus 7000 48-Port 10/100/1000 Ethernet Module and Cisco Nexus 7000 48-port Gigabit Ethernet Module with SFP optics.

Table 2. Product Specifications

Items	Specifications	
	48 port 10/100/1000 Ethernet module (copper)	48 port 1GE Ethernet module (fiber)
Systems		
Software compatibility	Cisco NX-OS Software Release 4.0 or later (minimum requirement)	Cisco NX-OS Software Release 4.1 or later (minimum requirement)
Product compatibility	Supported in all Cisco Nexus 7000 Series chassis	
Memory	1 GB DRAM	
Front-panel LEDs	<ul style="list-style-type: none"> • Status: Green (operational), red (faulty), or orange (module booting) • Link: Green (port enabled and connected), orange (port disabled), off (port enabled and not connected), or blinking green and orange in conjunction with ID LED blue (port flagged for identification; beacon) • ID: Blue (operator has flagged this card for identification; beacon) or off (module not flagged) 	
Programming interfaces	<ul style="list-style-type: none"> • Extensible Markup Language (XML) • Scriptable command-line interface (CLI) • Cisco Data Center Network Manager (DCNM) GUI 	
Network management	<ul style="list-style-type: none"> • Cisco DCNM 4.0 	
Reliability and Availability	<ul style="list-style-type: none"> • Mean Time between failure (MTBF) 75,116 hours • Online insertion and removal (OIR) 	<ul style="list-style-type: none"> • MTBF 75,064 hours • Online insertion and removal (OIR)
Physical Interfaces		
Connectivity	48-Ports of 10/100/1000 Ethernet using RJ-45 connectors	48-Ports of Gigabit Ethernet using SFP optics
Maximum port density	384 ports of 10/100/1000 Ethernet for 10-slot chassis and 768 ports of 10/100/1000 Ethernet for 18-slot chassis	384 ports of Gigabit Ethernet for 10-slot chassis and 768 ports of Gigabit Ethernet for 18-slot chassis
Time Domain Reflectometry (TDR)	Helps find cable faults	NA
MAC security	All 48-Ports have built-in IEEE 802.1AE MAC security and an AES cipher with a 128-bit key (requires a software license to enable)	
Queues per port	<ul style="list-style-type: none"> • Input: 2 queues and 4 thresholds (RX: 2q4t) • Output: 1 strict priority queue, 3 Deficit-Weighted Round-Robin (DWRR) queues, and 4 thresholds (TX: 1p3q4t) 	

Items	Specifications
Scheduler	Deficit-Weighted Round-Robin (DWRR) and Shaped Round-Robin (SRR)
Port buffers	7.56 MB ingress and 6.15 MB egress per port
Jumbo frame support for bridged and routed packets	Up to 9216 bytes
Forwarding Engine: M Series	
Performance	60 Mpps Layer 2 and 3 IPv4 unicast and 30 Mpps IPv6 unicast
MAC entries	128,000
Forwarding Information Base (FIB) entries	128,000
NetFlow entries	512,000 shared (ingress plus egress)
VLANs	16,384 bridge domains and 4096 simultaneous VLANs per virtual device context (VDC)
ACLs	64,000
Policers	16,000
Fabric Interface	
Switch fabric interface	46 Gbps in each direction (92 Gbps full duplex) distributed across up to five fabric modules
OIR	Online insertion and removal
Environmental	
Physical dimensions	<ul style="list-style-type: none"> • Occupies one I/O Module slot in a Cisco Nexus 7000 Series chassis • Dimensions (H x W x D): 1.733 x 15.3 x 21.9 in (4.4 x 38.9 x 55.6 cm) • Weight: 14 lbs
Environmental conditions	<ul style="list-style-type: none"> • Occupies one I/O Module slot in a Cisco Nexus 7000 Series chassis • Dimensions (H x W x D): 1.733 x 15.3 x 21.9 in (4.4 x 38.9 x 55.6 cm) • Weight: 15.5 lbs
Regulatory compliance	<ul style="list-style-type: none"> • Operating temperature: 32 to 104°F (0 to 40°C) • Operational relative humidity: 5 to 90%, noncondensing • Storage temperature: -40F to 158°F (-40 to 70°C) • Storage relative humidity: 5 to 95%, noncondensing • EMC compliance • FCC Part 15 (CFR 47) (USA) Class A • ICES-003 (Canada) Class A • EN55022 (Europe) Class A • CISPR22 (International) Class A • AS/NZS CISPR22 (Australia and New Zealand) Class A • VCCI (Japan) Class A • KN22 (Korea) Class A • CNS13438 (Taiwan) Class A • CISPR24 • EN55024 • EN50082-1 • EN61000-3-2 • EN61000-3-3 • EN61000-6-1 • EN300 386

Items	Specifications
Environmental standards	<ul style="list-style-type: none"> • NEBS criteria levels • SR-3580 NEBS Level 3 (GR-63-CORE, issue 3, and GR-1089-CORE, issue 4) • Verizon NEBS compliance • Telecommunications Carrier Group (TCG) Checklist • Qwest NEBS requirements • Telecommunications Carrier Group (TCG) Checklist • ATT NEBS requirements • ATT TP76200 level 3 and TCG Checklist • ETSI • ETSI 300 019-1-1, Class 1.2 Storage • ETSI 300 019-1-2, Class 2.3 Transportation • ETSI 300 019-1-3, Class 3.2 Stationary Use
Safety	<ul style="list-style-type: none"> • UL/CSA/IEC/EN 60950-1 • AS/NZS 60950
Warranty	Cisco Nexus 7000 Series Switches come with the standard Cisco 1-Year Limited Hardware Warranty

Interface Distances

Table 3 summarizes the interfaces and distances supported by the Gigabit Ethernet modules in the Cisco Nexus 7000 Series.

Table 3. Interfaces and Distances Supported by Gigabit Ethernet Modules in the Cisco Nexus 7000 Series

Module	SFP	Wavelength (nm)	Fiber and Cable Type	Core Size (microns)	Model Bandwidth (MHz/km)	Cable Distance
N7K-M148GS-11	1000BASE-SX	850	MMF	<ul style="list-style-type: none"> • 62.5 • 62.5 • 50.0 • 50.0 	<ul style="list-style-type: none"> • 160 • 200 • 400 • 500 	<ul style="list-style-type: none"> • 220m (722 ft) • 275m (902 ft) • 500m (1640 ft) • 550m (1804 ft)
	1000BASE-LX/LH	1300	<ul style="list-style-type: none"> • MMF* • SMF 	<ul style="list-style-type: none"> • 62.5 • 50.0 • 50.0 • 9/10 	<ul style="list-style-type: none"> • 500 • 400 • 500 	<ul style="list-style-type: none"> • 550 m (1804 ft) • 550 m (1804 ft) • 550 m (1804 ft) • 10 km (32,810 ft)
	1000BASE-ZX	1550	SMF	9/10	-	43.4 to 62 miles (70 to 100 km)**
	1000BASE-T	-	Category 5	-	-	100 m (328 ft)
	CWDM	1470 - 1610	SMF	-	-	-
	DWDM	1530.33 - 1561.42	SMF	-	-	-

* Mode-conditioning patch is required. Using an ordinary patch cord with MMF, 1000BASE-LX/LH SFPs, and a short link distance (10s of meters) can cause transceiver saturation resulting in an elevated bit error rate (BER). In addition, when using the LX/LH SFP with 62.5 micron diameter MMF, you must install a mode-conditioning patch cord between the SFP and the MMF cable on both the transmit and receive ends of the link. The mode-conditioning patch cord is required for link distances greater than 300 m (984 ft).

** 1000BASE-ZX-SFP can reach up to 100 km by using dispersion-shifted SMF or low attenuation SMF; the distance depends on fiber quality, number of splices and connectors.

For more information refer to Cisco SFP datasheets.

Ordering Information

To place an order, visit the [Cisco Ordering Homepage](#). To download software, visit the [Cisco Software Center](#).

Table 4 provides ordering information.

Table 4. Ordering Information

Product Name	Part Number
Cisco Nexus 7000 Series 48-Port 10/100/1000 Ethernet Module	N7K-M148GT-11
Cisco Nexus 7000 Series 48-Port Gigabit Ethernet Module (SFP)	N7K-M148GS-11
1000Base-SX SFP (DOM)	SFP-GE-S [*]
1000Base-LX/LH SFP (DOM)	SFP-GE-L [*]
1000Base-ZX Gigabit Ethernet SFP (DOM)	SFP-GE-Z [*]
1000Base-T Gigabit Ethernet SFP (DOM)	SFP-GE-T [*]
GE SFP, LC connector SX transceiver	GLC-SX-MM [*]
1000Base-SX SFP Transceiver Module, MMF, 850nm, DOM	GLC-SX-MMD [*]
GE SFP, LC connector LX/LH transceiver	GLC-LH-SM [*]
1000Base-LX/LH SFP Transceiver Module, MMF/SMF, 1310nm, DOM	GLC-LH-SMD [*]
GE SFP, LC connector ZX transceiver	GLC-ZX-SM [*]
GE SFP, copper twisted pair	GLC-T [*]
1000Base-BX10 SFP Module, SMF, 1490nm TX/1310nm RX	GLC-BX-D [*]
1000Base-BX10 SFP Module, SMF, 1310nm TX/1490nm RX	GLC-BX-U [*]
Coarse Wavelength-Division Multiplexing (CWDM) SFP	CWDM-SFP-1470= ^{**}
Dense Wavelength-Division Multiplexing (DWDM) SFP	DWDM-SFP-3033= ^{***}

^{*} See the SFP optics data sheet for additional information:

http://cisco.com/en/US/prod/collateral/modules/ps5455/ps6577/product_data_sheet0900aecd8033f885.html.

^{**} Also offered in other wavelengths. See the CWDM SFP optics data sheet for additional product numbers and information: http://cisco.com/en/US/prod/collateral/modules/ps5455/ps6575/product_data_sheet09186a00801a557c.html.

^{***} Also offered in other wavelengths. See the DWDM SFP optics data sheet for additional product numbers and information: http://cisco.com/en/US/prod/collateral/modules/ps5455/ps6576/product_data_sheet0900aecd80582763.html.

Service and Support

Cisco offers a wide range of services to help accelerate your success deploying and optimizing Cisco Nexus 7000 Series Switches in your data center. Our innovative services are delivered through a unique combination of people, processes, tools, and partners, and are focused on helping you increase operational efficiency and improve your data center network. Cisco Advanced Services use an architecture-led approach to help you align your data center infrastructure to your business goals and provide long-term value. Cisco SMARTnet[®] Service helps you resolve mission critical problems with direct access anytime to Cisco network experts and award-winning resources. With this service, you can take advantage of the Smart Call Home service capability that offers proactive diagnostics, and real-time alerts on your Cisco Nexus 7000 switches. Spanning the entire network lifecycle, Cisco Services help maximize investment protection, optimize network operations, provide migration support, 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 the Cisco Nexus 7000 Series, visit the product homepage at:

<http://www.cisco.com/go/nexus> or contact your local account representative.




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