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

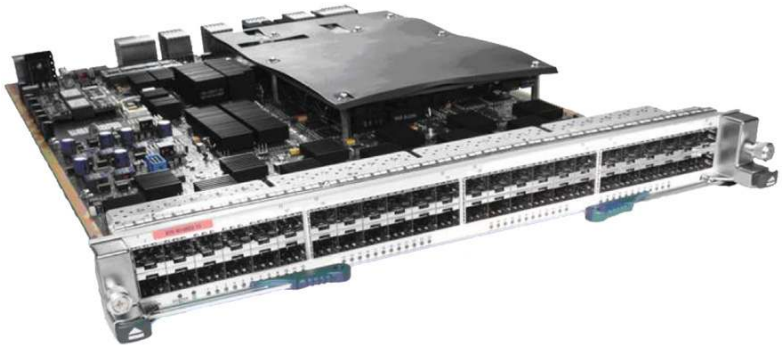
Product Overview

The Cisco Nexus® 7000 M1-Series 48-Port Gigabit Ethernet Modules are highly scalable modules designed for performance-based mission-critical Ethernet networks. Cisco Nexus 7000 M1-Series 48-Port modules have both copper and fiber options for Gigabit Ethernet modules. The copper module is a 48-port 10/100/1000 Ethernet module with RJ-45 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 the proven Cisco® NX-OS Software 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 M1-Series 48-Port 10/100/1000 Ethernet Module

Figure 2. Cisco Nexus 7000 M1-Series 48-Port Gigabit Ethernet SFP Module



Features and Benefits

The Cisco Nexus 7000 M1-Series 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 Cisco Nexus 7000 18-Slot Switch chassis with these modules delivers up to 768 ports of Gigabit Ethernet in a single chassis. Populating the Cisco Nexus 7000 10-Slot Switch chassis with these modules delivers up to 384 ports of Gigabit Ethernet in a single chassis. The Cisco Nexus 7000 M1-Series 48-Port Gigabit Ethernet Modules provide 48 Gbps of local switching and are excellent for the access layer of a data center network, in which 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 M1-Series 48-Port Gigabit Ethernet Modules are part of the Cisco Nexus 7000 M-Series 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 degradation of 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 M1-Series 48-Port gigabit Ethernet Modules offer exceptional security, with integrated hardware support for Cisco TrustSec® technology. This security 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 feature removes dependencies on IP addresses, thus improving scalability and simplifying manageability.

The fabric interface on the Cisco Nexus 7000 M1-Series 48-Port Gigabit Ethernet Modules deliver 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. The installation of two fabric modules in the chassis delivers fabric fault tolerance with no loss of bandwidth.

The Cisco Nexus 7000 M1-Series 48-Port Gigabit Ethernet Modules buffer data in virtual output queues (VOQs) 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 M1-Series 48-Port Gigabit Ethernet Modules.

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
VOQ and centralized arbiter	Enables fairness when one or more destinations are congested and future support for lossless unified I/O
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 line cards with a comprehensive feature set, supports MPLS in the hardware
Integrated hardware support for Cisco TrustSec technology	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

* Initial software releases may support a subset of the overall hardware capabilities. Refer to Cisco Nexus 7000 Series NX-OS release notes for up-to-date software version information and feature support details.

Product Specifications

Table 2 lists the productions specifications for the Cisco Nexus 7000 M1-Series 48-Port 10/100/1000 Ethernet Module and Cisco Nexus 7000 M1-Series 48-port Gigabit Ethernet Module with SFP Optics.

Table 2. Product Specifications

Items	Specifications	
	48-Port 10/100/1000 Ethernet Module (Copper)	**48-Port 1 Gigabit 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 Cisco Nexus 7000 Series 9-, 10-, and 18-slot chassis • Supported Fabric-1 or Fabric-2 fabric modules • Supported SUP1, SUP2 or SUP2E Supervisor modules	
Memory	1 GB DRAM	
Front-panel LEDs	• 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	• XML • Scriptable command-line interface (CLI) • Cisco Data Center Network Manager (DCNM) GUI	
Network management	• Cisco DCNM 4.0	
Reliability and availability	• OIR	• 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

Items	Specifications	
	48-Port 10/100/1000 Ethernet Module (Copper)	48-Port 1 Gigabit Ethernet Module (Fiber)
Time domain reflectometry (TDR)	Helps find cable faults	-
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	• 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)	
Scheduler	DWRR and Shaped Round-Robin (SRR)	
Port buffers	Ingress: 7.56 MB per port Egress: 6.15 MB 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	
Online insertions and removal (OIR)	Online insertion and removal	
Environmental		
Physical dimensions	• 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 lb (6.4 kg)	• 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 lb (7.0 kg)
Power consumption	• Typical: 358 watts (W) • Maximum: 400W	• Typical: 358W • Maximum: 400W
Environmental conditions	• Operating temperature: 32 to 104℉ (0 to 40℃) • Operational relative humidity: 5 to 90%, noncondensing • Storage temperature: -40F to 158℉ (-40 to 70℃) • Storage relative humidity: 5 to 95%, noncondensing	
Regulatory compliance	• 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	

Items	Specifications	
	48-Port 10/100/1000 Ethernet Module (Copper)	48-Port 1 Gigabit Ethernet Module (Fiber)
	• EN61000-6-1 • EN300 386	
Environmental standards	• 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/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, cabling specifications, and distances supported by the Cisco Nexus 7000 M1-Series 48-Port Gigabit Ethernet Module (SFP Optics). Not all optics are supported in the first software release. Refer to the Cisco Nexus 7000 Series NX-OS Release Notes for up-to-date software version information and optics support details.

Table 3. Gigabit Ethernet Interface Distances and Options[1]

Gigabit Ethernet SFP Part Number	Wavelength (nanometers)	Fiber and Cable Type	Core Size (microns)	Modal Bandwidth (MHz*km)[2]	Cable Distance
GLC-SX-MM **SFP-GE-S** **GLC-SX-MMD**	850	• Multimode fiber (MMF) (FDDI-grade) • MMF (OM1) • MMF (400/400) • MMF (OM2) • MMF (OM3)	• 62.5 • 62.5 • 50.0 • 50.0 • 50.0	• 160 • 200 • 400 • 500 • 2000	• 220m • 275m • 500m • 550m • 1000m
GLC-LH-SM **SFP-GE-L** **GLC-LH-SMD**	1310	• MMF[3]	• 62.5 • 50.0 • 50.0	• 500 • 400 • 500	• 550m • 550m • 550m
		• Single-mode fiber (SMF)	• G.652	-	• 10 km
GLC-EX-SMD	1310	• SMF	• G.652	-	• 40km
GLC-ZX-SM **SFP-GE-Z** **GLC-ZX-SMD**	1550	• SMF	• G.652	-	• 70 km
GLC-T **SFP-GE-T**	-	• Category[5]	-	-	• 100m
GLC-BX-D	1310	• SMF	• G.652	-	• 10 km
GLC-BX-U	1490	• SMF	• G.652	-	• 10 km
CWDM-SFP-1xxx=	1470 - 1610[4]	• SMF	-	-	-
DWDM-SFP-1xxx=	1530.33 - 1561.42[5]	• SMF	-	-	-

[1] See the Cisco Gigabit Ethernet SFP Modules Data Sheet for additional information: http://www.cisco.com/en/US/prod/collateral/modules/ps5455/ps6577/product_data_sheet0900aecd8033f885.html.

[2] Bandwidth is specified at transmission wavelength.

[3] A mode-conditioning patch is required for use over legacy MMF types such as FDDI-grade, OM1, and OM2. Please refer to the product bulletin at http://www.cisco.com/en/US/prod/collateral/modules/ps5455/product_bulletin_c25-530836.html.

[4] Multiple wavelengths are offered. See the Cisco Coarse Division Multiplexing (CWDM) SFP Modules Data Sheet for additional product numbers and information: http://www.cisco.com/en/US/prod/collateral/modules/ps5455/ps6575/product_data_sheet09186a00801a557c.html.

[5] Multiple wavelengths are offered. See the Cisco Dense Wavelength-Division Multiplexing (DWDM) SFP Modules Data Sheet for additional product numbers and information: http://www.cisco.com/en/US/prod/collateral/modules/ps5455/ps6576/product_data_sheet0900aecd80582763.html.

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

Service 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. 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 uses an architecture-led approach to help you align your data center infrastructure with your business goals and provide 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 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/nexus7000 or contact your local account representative.

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