

# Cisco Nexus 7700 F3-Series 48-Port Fiber 1 and 10 Gigabit Ethernet Module

## Product Overview

The Cisco Nexus® 7700 F3-Series 48-Port Fiber 1 and 10 Gigabit Ethernet Module (referred to as the Cisco Nexus 7700 F3-Series module in this document) offers wire-rate performance on each port. As a result, enterprises can use it to deploy a high-density, low-latency, scalable architecture for powering a mission-critical data center.

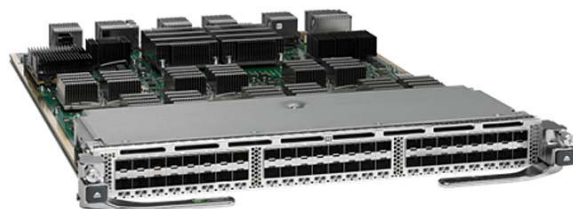
## Powering Cisco Unified Fabric Architecture

The Cisco Nexus 7000 Series Switches are the foundation of the Cisco® Unified Fabric solution. The switches deliver exceptional availability and scalability and run the proven and comprehensive Cisco NX-OS Software data center switching feature set. The Cisco Nexus 7700 platform is the latest extension to the Cisco Nexus 7000 Series modular switches. With more than 83 terabits per second (Tbps) of overall switching capacity, the Cisco Nexus 7700 platform delivers the highest-capacity 10, 40, and 100 Gigabit Ethernet ports in the industry, with up to 768 native 10-Gbps ports, 384 40-Gbps ports, and 192 100-Gbps ports. This high system capacity is designed to meet the scalability requirements of the largest cloud environments.

The Cisco Nexus 7700 platform's operation and features are consistent with the existing Cisco Nexus 7000 Series Switches. Both platforms use the same system architecture, the same application-specific integrated circuit (ASIC) technology, and the same proven Cisco NX-OS Software releases.

The Cisco Nexus 7700 F3-Series module (Figure 1) is a low-latency, high-performance, high-density 1 and 10 Gigabit Ethernet module designed for the Cisco Nexus 7700 platform. It delivers up to 768 wire-rate 10 Gigabit Ethernet ports in a single Cisco Nexus 7700 18-Slot Switch chassis (Table 1).

**Figure 1.** Cisco Nexus 7700 F3-Series Module



**Table 1.** Cisco Nexus 7700 Platform Switches 10 Gigabit Ethernet Maximum Port Density

Cisco Nexus 7700 Chassis	Maximum Wire-Rate Port Density
Cisco Nexus 7700 18-Slot Switch	768
Cisco Nexus 7700 10-Slot Switch	384
Cisco Nexus 7700 6-Slot Switch	192

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The Cisco Nexus 7700 F3-Series module is based on the Cisco Nexus F3-Series switch-on-chip (SoC) ASIC. This type of design increases performance while lowering the power and cooling requirements of the module. The Cisco Nexus F3-Series SoC is an innovative ASIC designed by Cisco and powered by a flexible packet engine that makes it particularly suitable for building the network infrastructure of public and private cloud environments. The Cisco Nexus F3-Series engine supports all the foundational networking protocols needed to build Layer 2 and Layer 3 networks, but it also can support highly virtualized environments. It can thus enable virtual overlay networking with hardware support for Cisco Virtual Extensible LAN (VXLAN) and Locator/ID Separation Protocol (LISP) technologies. Cisco Nexus 7700 F3-Series hardware enables customers to transparently interconnect their data centers with protocols such as Overlay Transport Virtualization (OTV) and Multiprotocol Label Switching (MPLS) and Virtual Private LAN Service (VPLS).

The module delivers 720 million packets per second (mpps) of distributed Layer 2 and Layer 3 forwarding and up to 480 Gbps of data throughput. A Cisco Nexus 7700 18-Slot Switch fully populated with the Cisco Nexus 7700 F3-Series module can deliver up to 11.5 billion packets per second (bpps) and 15.4 terabits per second (Tbps) of switching performance.

## Features and Benefits

The Cisco Nexus 7700 F3-Series module integrates a broad set of data center switching technologies, including industry standards and Cisco's own innovations. It combines the benefits of classic fabric interface line cards with the advanced routing features of edge interface modules. With this integration, the module provides exceptional investment protection for organizations consolidating their data center environments while migrating to dense, multiservice 10 Gigabit Ethernet networks.

- The Cisco Nexus 7700 F3-Series module is powered by the proven and comprehensive Cisco NX-OS feature set. This extremely comprehensive set of Layer 2 and Layer 3 functions makes this module excellent for data center networks, in which density, performance, and continuous system operation are critical.
- The Cisco Nexus 7700 F3-Series module is a critical enabler of Cisco FabricPath. With Cisco FabricPath, organizations can build resilient, flexible, and if needed, massively scalable Layer 2 networks. Cisco FabricPath protects enterprises' investments by allowing existing spanning-tree-based deployments to be connected to a Cisco FabricPath network.
- The Cisco Nexus 7700 F3-Series module can be used in conjunction with the Cisco Nexus 2000 Series Fabric Extenders (FEX). The Cisco Nexus 2000 Series is designed to simplify data center architecture and operations by dramatically reducing the number of points of management.
- The Cisco Nexus 7700 F3-Series module delivers integrated Fibre Channel over Ethernet (FCoE), greatly simplifying the network infrastructure and reducing costs by enabling the deployment of unified data center fabrics to consolidate data center traffic onto a single, general-purpose, high-performance, highly available network. With the Cisco Nexus 7700 F3-Series module, FCoE can be deployed in director-class modular platforms for the access layer and core of converged networks.
- The Cisco Nexus 7700 F3-Series module provides support for wire-rate VXLAN, offering the architectural flexibility needed to expand cloud deployments with repeatable pods in different Layer 2 domains. VXLAN can also enable migration of virtual machines between servers across Layer 3 networks.
- The support of advanced data center interconnect (DCI) protocols such as Cisco OTV and VPLS makes the module excellent for helping customers simplify the extension of applications across geographically dispersed data center sites.

- The Cisco Nexus 7700 F3-Series module supports high-performance MPLS for 10 Gigabit Ethernet data center deployments.
- Support of Cisco LISP enables enterprises and service providers to simplify multi-homed routing and facilitates scalable any-to-any WAN connectivity while supporting data center virtual machine mobility.
- The virtual device context (VDC) feature helps enable the virtualization of a single physical device in one or more logical devices. Each provisioned logical device is configured and managed as if it were a separate physical device.
- The Cisco Nexus 7700 F3-Series module offers exceptional security with integrated hardware support for:
  - Configurable Control-Plane Policing (CoPP), which protects the supervisor CPU from excessive traffic.
  - Access control list (ACL) counters and logging capability to provide deeper packet visibility.
  - Layer 2 to Layer 4 ACL for both IPv4 and IPv6 traffic.
  - Cisco TrustSec<sup>®</sup> technology, including line-rate data confidentiality, data integrity, and ACL processing for security group tags (SGTs); data confidentiality and integrity conforming to the IEEE MAC security standard (IEEE 802.1AE MACsec) is supported on a subset of ports: more specifically, ports 41 to 48 (the leftmost eight ports) on the module support the Advanced Encryption Standard (AES) cipher, using a 128-bit key.

**Note:** This document describes capabilities of the Cisco Nexus F3-Series module hardware. Please consult your Cisco representative to confirm the appropriate Cisco NX-OS Software release required to enable these features.

## Product Specifications

Table 2 lists product specifications for the Cisco Nexus 7700 F3-Series module. Tables 3 and 4 list specifications for Cisco transceivers installed in the module's Small Form-Factor Pluggable (1-Gbps SFP and 10-Gbps Enhanced SFP [SFP+]) ports to enable connectivity over multimode fiber (MMF), single-mode fiber (SMF), or copper cabling. Refer to the release notes for up-to-date software version information to see which optics and copper assemblies are supported. Complete information about supported transceivers can be found at [http://www.cisco.com/en/US/products/hw/modules/ps5455/prod\\_models\\_home.html](http://www.cisco.com/en/US/products/hw/modules/ps5455/prod_models_home.html).

**Table 2.** Product Specifications

Item	Specification
<b>System</b>	
<b>Product compatibility</b>	Supported in all Cisco Nexus 7700 chassis
<b>Software compatibility</b>	Contact your local account representative for software release availability
<b>Front-panel LEDs</b>	<ul style="list-style-type: none"> <li>• Status: Green (operational), red (faulty), or orange (module booting)</li> <li>• 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)</li> <li>• ID: Blue (operator has flagged this card for identification; beacon) or off (module not flagged)</li> </ul>
<b>Programming interfaces</b>	<ul style="list-style-type: none"> <li>• XML</li> <li>• Scriptable command-line interface (CLI)</li> <li>• Cisco Data Center Network Manager (DCNM) web services</li> <li>• Python</li> <li>• Tool Command Language (TCL) Interpreter</li> <li>• Cisco Embedded Event Manager (EEM)</li> <li>• Cisco Open Network Environment (ONE) Platform Kit (onePK)</li> <li>• OpenFlow</li> </ul>

Item	Specification
<b>Physical Interfaces</b>	
<b>Connectivity</b>	48 ports of 1 and 10 Gigabit Ethernet (SFP and SFP+)
<b>Maximum port density</b>	<ul style="list-style-type: none"> <li>• 768 ports of 10 Gigabit Ethernet in Cisco Nexus 7700 18-Slot chassis</li> <li>• 384 ports of 10 Gigabit Ethernet in Cisco Nexus 7700 10-Slot chassis</li> <li>• 192 ports of 10 Gigabit Ethernet in Cisco Nexus 7700 6-Slot chassis</li> </ul>
<b>Queues per port</b>	4 ingress and 8 egress
<b>Virtual output queue (VOQ) buffer</b>	72 MB per module
<b>Jumbo frame support for bridged and routed packets</b>	Up to 9216 bytes
<b>SoC</b>	
<b>Forwarding performance</b>	720 mpps of Layer 2 and Layer 3 forwarding capacity for both IPv4 and IPv6 packets
<b>MAC address entries</b>	64,000
<b>VLAN</b>	4096 simultaneous VLANs per VDC
<b>IPv4 entries</b>	64,000
<b>IPv6 entries</b>	32,000
<b>Adjacency entries</b>	64,000
<b>ACLs</b>	16,000
<b>CoPP</b>	Supported
<b>Environmental</b>	
<b>Physical dimensions</b>	<ul style="list-style-type: none"> <li>• Occupies one I/O module slot in a Cisco Nexus 7700 chassis</li> <li>• Dimensions: 1.75 x 15.9 x 21.8 in. (4.4 x 40.39 x 55.37 cm)</li> <li>• Weight: 18.5 lb (8.4 kg)</li> </ul>
<b>Environmental conditions</b>	<ul style="list-style-type: none"> <li>• Operating temperature: 32 to 104°F (0 to 40°C)</li> <li>• Operational relative humidity: 5 to 90%, noncondensing</li> <li>• Storage temperature: -40 to 158°F (-40 to 70°C)</li> <li>• Storage relative humidity: 5 to 95%, noncondensing</li> </ul>
<b>Regulatory compliance</b>	<ul style="list-style-type: none"> <li>• EMC compliance</li> <li>• FCC Part 15 (CFR 47) (USA) Class A</li> <li>• ICES-003 (Canada) Class A</li> <li>• EN55022 (Europe) Class A</li> <li>• CISPR22 (International) Class A</li> <li>• AS/NZS CISPR22 (Australia and New Zealand) Class A</li> <li>• VCCI (Japan) Class A</li> <li>• KN22 (Korea) Class A</li> <li>• CNS13438 (Taiwan) Class A</li> <li>• CISPR24</li> <li>• EN55024</li> <li>• EN50082-1</li> <li>• EN61000-3-2</li> <li>• EN61000-3-3</li> <li>• EN61000-6-1</li> <li>• EN300 386</li> </ul>

Item	Specification
<b>Environmental standards</b>	<ul style="list-style-type: none"> <li>• NEBS criteria levels<sup>*</sup></li> <li>• SR-3580 NEBS Level 3 (GR-63-CORE and GR-1089-CORE)</li> <li>• Verizon NEBS compliance<sup>*</sup></li> <li>• Telecommunications Carrier Group (TCG) Checklist</li> <li>• Century Link NEBS requirements<sup>*</sup></li> <li>• Telecommunications Carrier Group (TCG) Checklist</li> <li>• ATT NEBS requirements<sup>*</sup></li> <li>• ATT TP76200 level 3</li> <li>• ETSI<sup>*</sup></li> <li>• ETSI 300 019-2-1, Class 1.2 Storage</li> <li>• ETSI 300 019-2-2, Class 2.3 Transportation</li> <li>• ETSI 300 019-2-3, Class 3.2 Stationary Use</li> </ul> <sup>*</sup> Validation in progress
<b>Safety</b>	<ul style="list-style-type: none"> <li>• UL/CSA/IEC/EN 60950-1</li> <li>• AS/NZS 60950</li> </ul>
<b>Warranty</b>	Cisco Nexus 7700 platform switches come with the standard Cisco 1-year limited hardware warranty.

**Table 3.** 10 Gigabit Ethernet Interface Distances and Options

10 Gigabit Ethernet SFP+ Part Number	Wavelength (nanometers)	Fiber and Cable Type	Core Size (microns)	Model Bandwidth (MHz per km) <sup>1</sup>	Cable Distance <sup>2</sup>
<b>SFP-10G-SR</b>	• 850	<ul style="list-style-type: none"> <li>• MMF (FDDI-grade)</li> <li>• MMF (OM1)</li> <li>• MMF (400/400)</li> <li>• MMF (OM2)</li> <li>• MMF (OM3)</li> <li>• MMF (OM4)</li> </ul>	<ul style="list-style-type: none"> <li>• 62.5</li> <li>• 62.5</li> <li>• 50.0</li> <li>• 50.0</li> <li>• 50.0</li> <li>• 50.0</li> </ul>	<ul style="list-style-type: none"> <li>• 160</li> <li>• 200</li> <li>• 400</li> <li>• 500</li> <li>• 2000</li> <li>• 4700</li> </ul>	<ul style="list-style-type: none"> <li>• 26m</li> <li>• 33m</li> <li>• 66m</li> <li>• 82m</li> <li>• 300m</li> <li>• 400m</li> </ul>
<b>SFP-10G-LRM</b>	• 1310	<ul style="list-style-type: none"> <li>• MMF<sup>6</sup></li> </ul>	<ul style="list-style-type: none"> <li>• 62.5</li> <li>• 50</li> <li>• 50</li> </ul>	<ul style="list-style-type: none"> <li>• 500</li> <li>• 400</li> <li>• 500</li> </ul>	<ul style="list-style-type: none"> <li>• 220m</li> <li>• 100m</li> <li>• 220m</li> </ul>
		• SMF	• G.652	• -	• 300m
<b>SFP-10G-LR</b>	• 1310	• SMF	• G.652	• -	• 10 km
<b>FET-10G</b>	• 850	<ul style="list-style-type: none"> <li>• MMF (OM2)</li> <li>• MMF (OM3, OM4)</li> </ul>	<ul style="list-style-type: none"> <li>• 50</li> <li>• 50</li> </ul>	<ul style="list-style-type: none"> <li>• 500</li> <li>• 2000</li> </ul>	<ul style="list-style-type: none"> <li>• 25m</li> <li>• 100m</li> </ul>
<b>SFP-10G-ER</b>	• 1550	• SMF	• G.652	• -	• 40 km <sup>3</sup>
<b>SFP-10G-ZR</b>	• 1550	• SMF	• G.652	• -	• 80 km
<b>DWDM-SFP10G-xx.xx=</b>	• <sup>4</sup>	• SMF	• -	• -	• <sup>5</sup>
<b>SFP-H10GB-CUxM (x=1, 3, or 5)</b>	• -	• Twinax cable assembly, passive	• -	• -	• 1, 3, or 5m
<b>SFP-H10GB-ACUxM (x=7 or 10)</b>	• -	• Twinax cable assembly, active	• -	• -	• 7 or 10m
<b>SFP-10G-AOCxM (x=1, 2, 3, 5, 7, or 10)</b>	• -	• Active optical cable assembly	• -	• -	• 1, 2, 3, 5, 7, or 10m

<sup>1</sup> Bandwidth is specified at the transmission wavelength.

<sup>2</sup> Minimum cabling distance for -SR, -LRM, -LR, and -ER modules is 2m, according to IEEE 802.3ae.

<sup>3</sup> Links longer than 30 km are considered engineered links according to IEEE 802.3ae.

<sup>4</sup> 40 different wavelengths are offered. See the dense wavelength-division multiplexing (DWDM) SFP optics data sheet for additional product numbers and information:

[http://www.cisco.com/en/US/prod/collateral/modules/ps5455/ps6576/data\\_sheet\\_c78-711186.html](http://www.cisco.com/en/US/prod/collateral/modules/ps5455/ps6576/data_sheet_c78-711186.html).

<sup>5</sup> FCoE traffic is supported up to 80 km.

<sup>6</sup> A mode-conditioning patch is required for use over traditional MMF types such as FDDI-grade, OM1, and OM2. Please refer to the product bulletin: [http://www.cisco.com/en/US/prod/collateral/modules/ps5455/product\\_bulletin\\_c25-530836.html](http://www.cisco.com/en/US/prod/collateral/modules/ps5455/product_bulletin_c25-530836.html).

**Table 4.** Gigabit Ethernet Interface Distances and Options

Gigabit Ethernet SFP Part Number	Wavelength (nm)	Fiber and Cable Type	Core Size (microns)	Model Bandwidth (MHz per km)	Cable Distance
GLC-SX-MMD	• 850	<ul style="list-style-type: none"> <li>• MMF (FDDI-grade)</li> <li>• MMF (OM1)</li> <li>• MMF (400/400)</li> <li>• MMF (OM2)</li> <li>• MMF (OM3 and OM4)</li> </ul>	<ul style="list-style-type: none"> <li>• 62.5</li> <li>• 62.5</li> <li>• 50</li> <li>• 50</li> <li>• 50</li> </ul>	<ul style="list-style-type: none"> <li>• 160</li> <li>• 200</li> <li>• 400</li> <li>• 500</li> <li>• 2000</li> </ul>	<ul style="list-style-type: none"> <li>• 220m</li> <li>• 275m</li> <li>• 500m</li> <li>• 550m</li> <li>• 1000m</li> </ul>
GLC-LH-SMD	• 1310	• MMF <sup>1</sup>	<ul style="list-style-type: none"> <li>• 62.5</li> <li>• 50</li> <li>• 50</li> </ul>	<ul style="list-style-type: none"> <li>• 500</li> <li>• 400</li> <li>• 500</li> </ul>	<ul style="list-style-type: none"> <li>• 550m</li> <li>• 550m</li> <li>• 550m</li> </ul>
		• SMF	• G.652	• -	• 10 km
GLC-EX-SMD	• 1310	• SMF	• G.652	• -	• 40 km
GLC-ZX-SMD	• 1550	• SMF	• G.652	• -	• 70 to 100 km <sup>2</sup>
GLC-T SFP-GE-T	• -	• Category 5	• -	• -	• 100m
GLC-BX-U	• 1310	• SMF	• G.652	• -	• 10 km
GLC-BX-D	• 1490	• SMF	• G.652	• -	• 10 km
CWDM-SFP-1xxx=	• <sup>3</sup>	• SMF	• -	• -	• -
DWDM-SFP-xxxx=	• <sup>4</sup>	• SMF	• -	• -	• -

<sup>1</sup> A mode-conditioning patch is required for use over traditional MMF types such as FDDI-grade, OM1, and OM2. Please refer to the product bulletin: [http://www.cisco.com/en/US/prod/collateral/modules/ps5455/product\\_bulletin\\_c25-530836.html](http://www.cisco.com/en/US/prod/collateral/modules/ps5455/product_bulletin_c25-530836.html).

<sup>2</sup> 1000BASE-ZX SFP can reach up to 100 km by using dispersion-shifted SMF or low-attenuation SMF; the distance depends on the fiber quality, number of splices, and connectors.

<sup>3</sup> This option is also offered in other wavelengths. See the coarse wavelength-division multiplexing (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](http://cisco.com/en/US/prod/collateral/modules/ps5455/ps6575/product_data_sheet09186a00801a557c.html).

<sup>4</sup> This option is also offered in other wavelengths. See the dense wavelength-division multiplexing (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](http://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 5 provides ordering information.

**Table 5.** Ordering Information

Description	Part Number
Nexus 7700 F3-Series 48-Port Fiber 1 and 10G Ethernet Module (req. SFP/SFP+ modules)	N77-F348XP-23 N77-F348XP-23=

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## Service and Support

Cisco offers a wide range of services to help accelerate your success in deploying and optimizing the Cisco Nexus 7700 platform 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 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 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 7700 switch. Spanning the entire network lifecycle, Cisco Services helps increase investment protection, 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 the Cisco Nexus 7700 platform, visit the product homepage at <http://www.cisco.com/go/nexus> or contact your local account representative.



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