Cisco Nexus 7000 F2-Series 48-Port 1 and 10 Gigabit Ethernet Module

Overview

The Cisco Nexus® 7000 F2-Series 48-Port 1 and 10 Gigabit Ethernet Module enables the deployment of high-density, low-latency, scalable data center architectures. Designed for mission-critical data center networks, the Cisco Nexus 7000 F2-Series module (Figure 1) delivers exceptional performance, density, and flexibility with a comprehensive Layer 2 and 3 feature set for the data center:

- **Performance:** Provides line-rate performance on all ports with a forwarding rate of 720 million packets per second (mpps), with the same performance for IPv4 and IPv6, and 480 Gbps of data throughput

- **Scalability:** Enables the highest-density 10 Gigabit Ethernet system in the industry, with up to 768 wire-rate 10 Gigabit Ethernet ports (with the Cisco Nexus 7000 18-Slot Switch)

- **Comprehensive feature set:** Provides comprehensive Layer 2 and 3 forwarding capabilities for intra-data center switching[1]

- **Cisco Nexus 2000 Series Fabric Extender support:** Provides top-of-rack (ToR) flexibility and simplified operation for high-density 1 and 10 Gigabit Ethernet deployments

- **Cisco® FabricPath support:** Delivers highly reliable, flexible, and scalable Layer 2 networks

- **Fibre Channel over Ethernet (FCoE) support:** Converges the LAN and SAN over a lossless Ethernet network

- **Flexibility:** Provides dual-speed 1- and 10-Gbps connections on a per-port basis for easy migration to Gigabit Ethernet

- **Power efficiency:** Uses less than 9 watts (W) per port

- **Low latency:** Has a latency of about 6 microseconds

Figure 1. Cisco Nexus 7000 F2-Series Module
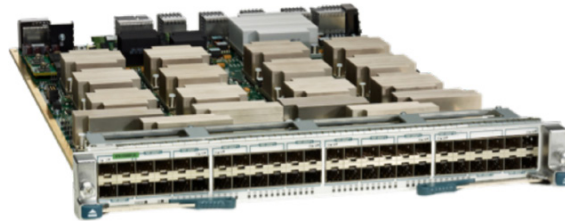
Use Cases and Design Recommendations

Data Center Aggregation Layer

In every data center network, the aggregation layer plays a critical role. The robustness and flexibility requirements on both the data plane and control plane are rigorous, especially when the aggregation layer is the Layer 2 and 3 boundary of the data center network.

The Cisco Nexus 7000 F2-Series module meets these requirements with a comprehensive set of Layer 2 and 3 functions, including virtual PortChannel (vPC), Spanning Tree Protocol, Cisco FabricPath, a broad set of routing protocols (Open Shortest Path First [OSPF], Enhanced Interior Gateway Routing Protocol [EIGRP], Intermediate System-to-Intermediate System [IS-IS], Border Gateway Protocol [BGP], and Routing Information Protocol [RIP]), Virtual Route Forwarding Lite (VRF-Lite), and First Hop Redundancy Protocol (FHRP; Hot Standby Router Protocol [HSRP], Gateway Load Balancing Protocol [GLBP], and Virtual Router Redundancy Protocol [VRRP]). The Cisco Nexus 7000 F2-Series module also supports a broad set of IPv6 features with no performance degradation with respect to IPv4.

The density, performance, and feature comprehensiveness make the Cisco Nexus 7000 F2-Series module an excellent choice for the aggregation layer.

Reliable Layer 2 in Modern Data Centers with Cisco FabricPath

Besides its classic Layer 2 and 3 forwarding capabilities, the Cisco Nexus 7000 F2-Series module delivers Cisco FabricPath technology based on the IETF TRILL standard. Cisco FabricPath consists of a set of multipath Ethernet technologies, combining the reliability and scalability benefits of Layer 3 routing with the flexibility and "plug-and-play" aspects of Layer 2 Ethernet networks. With Cisco FabricPath, organizations can now build resilient and flexible Layer 2 networks that no longer rely on Spanning Tree Protocol and its inherent bisectional bandwidth limitations (Figure 2).

Figure 2. Data Center Design Based on Cisco FabricPath
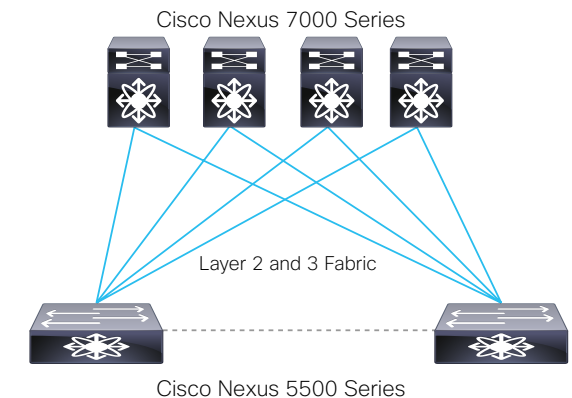
Cisco FabricPath offers investment protection to enterprises by allowing existing Ethernet infrastructures to be connected to a Cisco FabricPath network.

[1] For a complete list of features, see the product literature at http://www.cisco.com/en/US/products/ps9402/prod_literature.html.

Enhanced vPC (vPC+) technology is part of Cisco FabricPath and allows the redundant interconnection of classic Spanning Tree Protocol–based Layer 2 environments to a Cisco FabricPath cloud.

Data Center Access Layer with Cisco Nexus 2000 Series and 7000 F2-Series

The Cisco Nexus 7000 F2-Series Module supports the Cisco Nexus 2000 Series Fabric Extenders (Figure 3). The Cisco Nexus 2000 Series enables an architectural approach that draws on both the flexibility and simplified cabling of a ToR design and the simplified management and efficient utilization of an end-of-row (EoR) design. The fabric extender is essentially an extension of the parent Cisco Nexus switch fabric. Logically, it behaves like a remote line card, with the fabric extender and the parent Cisco Nexus switch together forming a distributed modular system.

Figure 3. Cisco Nexus 7000 Series Switches Populated with Cisco Nexus 7000 F2-Series Modules Managing Up to 64 Cisco Nexus 2000 Series Fabric Extenders

Cisco Nexus 2000 Series
ToR Fabric Extenders

Director-Class Multihop FCoE

The Cisco Nexus 7000 F2-Series module delivers integrated FCoE[2], greatly simplifying the network infrastructure and reducing costs by enabling the deployment of a unified data center fabric that consolidates data center traffic onto a single, general-purpose, high-performance, highly available network.

## Putting It All Together: Providing Deployment Options

Cisco continues its unified fabric innovation leadership with the next-generation Cisco Nexus 7000 Series by offering exceptional architectural flexibility and revolutionary scale to meet the requirements of modern data centers, empowering IT departments to gain operation efficiency and agility and promote business innovation and differentiation. The Cisco Nexus 7000 F2-Series module complements and enriches the module portfolio of the Cisco Nexus 7000 Series Switches[3], by far the most complete switching solution for today's data center networks (Figure 4).

Why Cisco?

Cisco solutions offer customer success, delivered through a combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. For more information, visit:

· http://www.cisco.com/go/nexus7000

· http://www.cisco.com/en/US/products/ps9402/prod_literature.html

Figure 4. The Complete Network View

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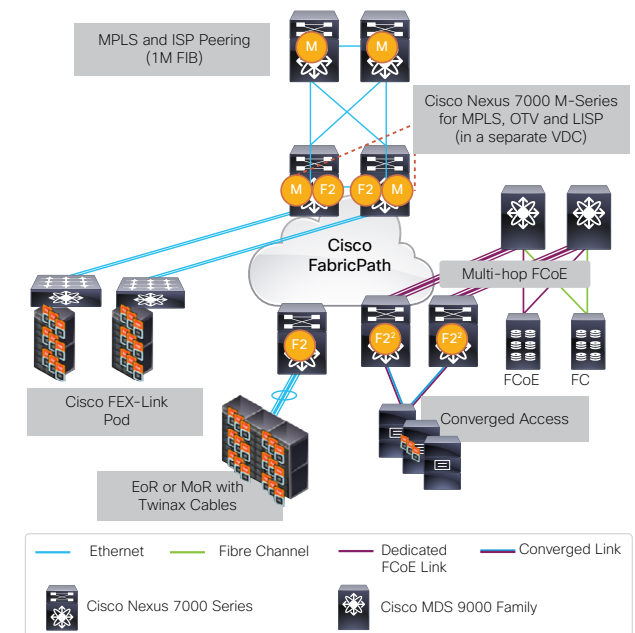
[2] FCoE is supported on the Cisco Nexus 7000 F2-Series card for Cisco NX-OS Software Release 6.1.(1) and later.
[3] The Cisco Nexus 7000 Series can support different families of modules in the same physical chassis because of the Cisco NX-OS Software virtual device context (VDC) feature. By placing the Cisco Nexus 7000 F2-Series and M-Series modules in separate VDCs, customers can now consolidate on the same physical chassis network functions that before required separate networking equipment.