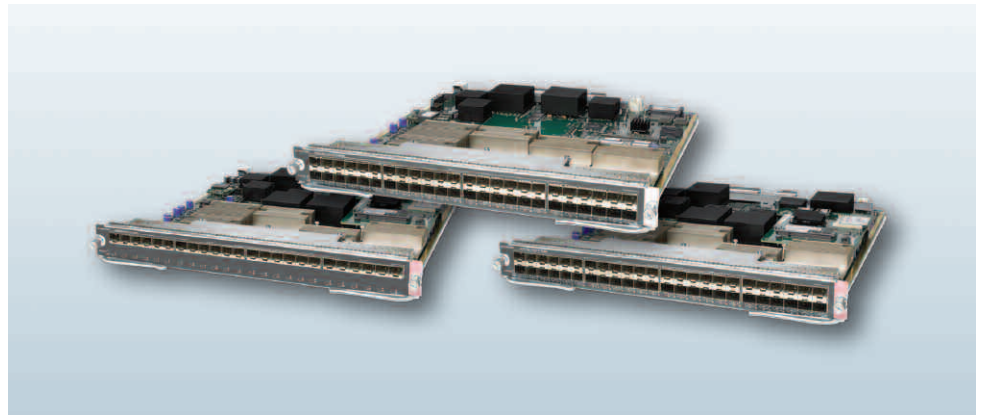


Cisco® MDS 9000 Family 8 Gb/sec Fibre Channel Switching Modules

A high performance, intelligent foundation for large scale SAN consolidation



Cisco® MDS 9000 Family 8 Gb/sec Fibre Channel switching modules deliver the intelligence and the high performance required to support the most demanding storage applications, providing the foundation for large scale storage area network (SAN) consolidation.

Delivering up to 528 8 Gb/sec ports per chassis and twice the bandwidth of previous switching modules, the 8 Gb/sec Fibre Channel switching modules enable you to build consolidated SANs with fewer chassis for dramatic savings in space, power and cooling, and total cost of ownership (TCO).

Highlights

- Autosensing 1/2/4/8 Gb/sec interfaces that provide high performance and compatibility with existing devices
- High-performance ISLs support up to 16 links in a single PortChannel; links can span any port on any module within a chassis for added scalability and resilience
- Intelligent network services that offer integrated support for VSAN technology, access control lists (ACLs) for hardware-based intelligent frame processing, and advanced traffic-management features
- Integrated hardware-based VSANs and inter-VSAN routing (IVR) that enable deployment of large-scale multisite and heterogeneous SAN topologies
- Sophisticated diagnostics provide intelligent diagnostics, protocol decoding, and network analysis tools as well as integrated Call Home capability for added reliability, faster problem resolution, and reduced service costs

Cisco MDS 9000 family 8 Gb/sec Fibre Channel switching modules are available in three configurations:

- **The 24-port 8 Gb/sec Fibre Channel switching module** delivers the highest performance for high-end storage subsystems and for inter switch link (ISL) connectivity
- **The 48-port 8 Gb/sec Fibre Channel switching module** provides optimized performance and port density for connection of high-performance and virtualized servers
- **The 4/44-port 8 Gb/sec host-optimized Fibre Channel switching module** offers a very cost-effective solution for consolidating standard servers into the smallest number of SAN switches, in many cases eliminating the need for core-edge topologies

The 8 Gb/sec Fibre Channel switching modules are compatible with all MDS 9500 Series Multilayer Directors, enabling you to continue to use your existing 2 and 4 Gb/sec MDS 9000 family Fibre Channel switching modules and gradually phase in 8 Gb/sec technology as your network demands it.

Family overview

24-port 8 Gb/sec Fibre Channel switching module

For the most demanding storage networking environments, the Cisco MDS 9000 family 24-port 8 Gb/sec Fibre Channel switching module delivers uncompromising performance. The front panel ports deliver up to 192 Gb/sec of full-duplex bandwidth, making this module best suited for attachment of 4 and 8 Gb/sec-enabled storage subsystems and for ISL connectivity. With its multiprotocol capability, the 24-port 8 Gb/sec Fibre Channel switching module transparently integrates FICON protocol, FICON control unit port (CUP) management, and switch cascading to enable mainframe connectivity. Virtual SANs (VSANs) allow hardware-based separation of Fibre Channel and FICON traffic switched on a single physical SAN, lowering overall TCO without compromising your network's scalability, availability, manageability, and security.

48-port 8 Gb/sec Fibre Channel switching module

For high-performance storage networking environments, the Cisco MDS 9000 family 48-port 8 Gb/sec Fibre Channel switching module delivers an ideal balance of performance and scalability. Its 48 autosensing 1/2/4/8 Gb/sec ports deliver a total of 192 Gb/sec of full-duplex bandwidth to meet the performance demands of enterprise-class or highly virtualized servers. Through easy-to-use traffic engineering capabilities, the 48-port 8 Gb/sec Fibre Channel switching module offers the flexibility to provide predictable high-performance storage and inter-switch connectivity, fully utilizing the available bandwidth.

4/44-port 8 Gb/sec host-optimized Fibre Channel switching module

Optimized for host connectivity, the Cisco MDS 9000 family 4/44-port 8 Gb/sec host-optimized Fibre Channel switching module enables storage network consolidation with high-density, cost-effective connectivity. Four 8 Gb/sec ports and 44 4 Gb/sec ports deliver 96 Gb/sec of full-duplex bandwidth, sufficient for the majority of today's standard servers.

Cisco MDS 9000 family 8 Gb/sec Fibre Channel switching modules

Port Bandwidth Reservation, available on all Cisco MDS 9000 Fibre Channel switching modules, enables switching bandwidth to be dedicated to specific ports. This unique Cisco feature gives you great flexibility in bandwidth allocation to support a mix of applications within a single module, including high-performance ISLs. By combining Cisco 24-port, 48-port, and 4/44-port host-optimized 8 Gb/sec Fibre Channel switching modules in a single modular chassis, you can design storage networks optimized for cost and performance in a wide range of application environments.

This application-optimized approach to port deployment can reduce the number of switches and ISLs required in a storage network, in many cases eliminating the need for core-edge network topologies. Using these switching modules, the Cisco MDS 9513 Multilayer Director can scale up to 528 ports per chassis or 1584 ports per rack: fewer switches simplify management and reduce deployment and operational costs, resulting in significantly lower TCO.

Cisco 8 Gb/sec Fibre Channel switching modules are hot-swappable and 1/2/4/8 Gb/sec autosensing compatible, and support hot-swappable, small form-factor pluggable (SFP) and enhanced small form-factor pluggable (SFP+) LC interfaces. Individual ports can be configured with Cisco 4 and 8 Gb/sec short-wave or long wave SFPs and SFP+s for connectivity up to 10 kilometers. Additionally, ports can be configured with Cisco 2 and 4 Gb/sec coarse wave division multiplexing (CWDM) SFPs for connectivity up to 100 kilometers at 2 Gb/sec, or 40 kilometers at 4 Gb/sec. Each port supports 250 buffer credits for maximum extensibility without requiring additional licensing. With the Cisco Enterprise Package, up to 4095 buffer credits can be allocated to an individual port, enabling full link bandwidth over thousands of kilometers with no degradation in link utilization.

Intelligent scalability

The Cisco MDS 9000 Family offers high port density, scaling from 4 to 528 ports per chassis. Because building a large-scale storage network requires more than just high port density, Cisco has introduced innovative features that make multilayer storage networks a reality. VSANs, Inter-VSAN Routing on every port, advanced traffic management, hardware-enabled service-ability, and comprehensive security features

make the Cisco MDS 9000 Family the platform of choice when you require high scalability and low TCO.

Virtual machine transparency

Server virtualization means that a SAN must concurrently support thousands of diverse, tiered applications, each with unique performance requirements. These applications and the virtual machines they run on are not bounded by physical servers and network ports. The Cisco MDS 9000 Family provides deterministic hardware performance and a rich feature set that allows VMs to have the same SAN attributes as a physical server. On a per-VM basis, the MDS 9000 Family NX-OS offers VSAN isolation, QoS policies, access control, performance monitoring, and data protection to enable scalability and mobility of VMs.

Virtual SANs

Ideal for efficient, secure SAN consolidation, ANSI T11 compliant VSANs allow more efficient storage network utilization by creating hardware-based isolated environments within a single physical SAN fabric or switch. Each VSAN can be zoned as a typical SAN, maintaining its own fabric services for added scalability and resilience. VSANs allow the cost of SAN infrastructure to be shared among more users, while ensuring absolute segregation of traffic and retaining independent control of configuration on a VSAN-by-VSAN basis. Through unique industry-first virtualization features, VSANs benefits can be extended to virtualized servers, providing the foundation for an end-to-end virtualized datacenter.

Integrated SAN Routing

In another step toward deploying the most efficient, cost-effective, consolidated storage networks, the Cisco MDS 9000 Family 8 Gb/sec Fibre Channel switching modules support IVR functionality on every port for Fibre Channel.

IVR allows selective transfer of data traffic between specific initiators and targets on different VSANs while maintaining isolation of control traffic within each VSAN, thereby maintaining fabric stability and availability. Integrated IVR lowers TCO by eliminating the need for external routing appliances, greatly increasing routing scalability while delivering line-rate performance, simplifying management, and nearly eliminating the challenges associated with maintaining separate systems.

Advanced traffic management

Advanced traffic management capabilities integrated into every Cisco MDS 9000 family 8 Gb/sec Fibre Channel switching module simplify deployment and optimization of large-scale fabrics.

- **Virtual output queuing** – Helps ensure line-rate performance on each port, independent of traffic pattern, by eliminating head-of-line blocking
- **Up to 4095 buffer-to-buffer credits** – Can be assigned to any individual port for optimal bandwidth utilization across distance
- **PortChannels** – Allow you to aggregate up to 16 physical ISLs into a single logical bundle, providing optimized bandwidth utilization across all links. The bundle can be a mix of any port from any module in the chassis, helping ensure that the bundle can remain active even in the event of a module failure
- **Fabric shortest path first (FSPF)-based multipathing** – Provides the intelligence to load balance across up to 16 equal cost paths and dynamically reroute traffic in the event of a switch failure
- **Quality of service (QoS)** – Helps manage bandwidth and control latency to prioritize critical traffic, available on every port
- **Fibre Channel congestion control (FCC)** – Augments the Fibre Channel buffer-to-buffer credit mechanism for enhanced traffic management, through end-to-end feedback-based mechanism
- **Port bandwidth reservation** – Allows you to define dedicated bandwidth on a per-port basis

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