

Cisco MDS 9000 Family Multilayer Directors and Fabric Switches

The Cisco® MDS 9000 Family of Multilayer Directors and Fabric Switches lowers the total cost of ownership (TCO) for storage networking by combining a robust and flexible hardware architecture with multiple layers of network and storage intelligence. This powerful combination helps organizations to build highly available, scalable storage networks with comprehensive security and unified management.

Figure 1 shows the Cisco MDS 9000 Family of multilayer directors and fabric switches

Figure 1. Cisco MDS 9000 Family Multilayer Directors and Fabric Switches



COMPREHENSIVE FAMILY OF MULTILAYER STORAGE NETWORKING PRODUCTS

The Cisco MDS 9000 Family, consisting of Cisco MDS 9500 Series multilayer directors, Cisco MDS 9100 and MDS 9200 series multilayer fabric switches, and the Cisco MDS 9020 Series Fabric Switch, provides a full line of products to meet requirements for storage networks of all sizes and architectures. The Cisco MDS 9000 Family delivers intelligent network services such as virtual storage area networks (VSANs), comprehensive security, advanced traffic management, sophisticated diagnostics, and unified SAN management. In addition, Cisco MDS 9500 Series multilayer directors and Cisco MDS 9200 Series multilayer fabric switches provide multiprotocol and multitransport integration and an open platform for embedding intelligent storage services such as network-based volume management. With its multilayer approach to network and storage intelligence, the Cisco MDS 9000 Family ushers in a new era in storage networking.

CISCO MDS 9500 SERIES—DEFINING THE MULTILAYER DIRECTOR

The Cisco MDS 9500 Series multilayer directors elevate the standard for director-class switches. Providing industry-leading availability, scalability, security, and management, the Cisco MDS 9500 Series allows you to deploy high-performance SANs with low TCO. Layering a rich set of intelligent features onto a high-performance, protocol-independent switch fabric, the Cisco MDS 9500 Series addresses the stringent requirements of large data center storage environments. Available in 6-slot, 9-slot, and 13-slot configurations, the Cisco MDS 9500 Series supports 1-Gbps, 2-Gbps, 4-Gbps, and 10-Gbps Fibre Channel port speeds, up to 528 1/2/4-Gbps autosensing Fibre Channel ports in a single chassis, and up to 1584 Fibre Channel ports per rack. And with up to 2.2 Tbps of fully redundant system bandwidth, Cisco MDS 9500 Series multilayer directors deliver maximum system performance, even in the event of a crossbar failure.

CISCO MDS 9200 SERIES—MULTILAYER FABRIC SWITCHES WITH ROOM TO GROW

The Cisco MDS 9200 Series brings new features and investment protection to the fabric switch market. Sharing a consistent architecture with the Cisco MDS 9500 Series, the Cisco MDS 9200 Series combines multilayer intelligence with a modular chassis, making it among the industry's most intelligent and flexible fabric switches. The Cisco MDS 9200 Series is offered in two base configurations. Starting with either sixteen 2-Gbps Fibre Channel ports or fourteen 2-Gbps Fibre Channel ports and two Gigabit Ethernet ports, the expansion slot of the Cisco MDS 9200 Series multilayer fabric switches allows for the addition of any Cisco MDS 9000 Family module for up to 64 total ports. As the storage network expands further, Cisco MDS 9000 Family modules can be removed from Cisco MDS 9200 Series multilayer fabric switches and migrated into Cisco MDS 9500 Series multilayer directors, providing smooth migration, common sparing, and outstanding investment protection.

CISCO MDS 9100 SERIES—BUILDING COST-EFFECTIVE INTELLIGENT FABRICS

The Cisco MDS 9100 Series brings intelligent networking to small and medium-scale SANs and data-center edge applications. The Cisco MDS 9100 Series provides the ideal balance of cost, performance, and enterprise-class features in a compact, one rack-unit (1-RU) form factor. Available in 20- and 40-port configurations, the Cisco MDS 9100 Series offers the port densities required for a wide variety of storage environments. Providing class-leading scalability, availability, security, and management, the Cisco MDS 9100 Series allows you to deploy high-performance SANs with low TCO. Layering a rich set of intelligent features onto a cost-effective, small-profile switching platform, the Cisco MDS 9100 Series addresses the cost, performance, ease-of-management, and connectivity requirements of medium-sized storage environments and provides full-feature compatibility with Cisco MDS 9500 Series multilayer directors for transparent, end-to-end service delivery in large data-center core-edge deployments.

CISCO MDS 9020 FABRIC SWITCH

The most cost-effective switch in the Cisco MDS 9000 Family, the Cisco MDS 9020 Fabric Switching, is a 20-port Fibre Channel switch offering line-rate performance at 4 Gbps, 2 Gbps, and 1 Gbps, in a compact enclosure. Integrated management includes the powerful and easy-to-use Cisco MDS 9000 Fabric Manager and Device Manager GUI and command-line interface (CLI) access similar to that of Cisco IOS[®] Software. It also includes the Cisco MDS 9000 FabricWare Software, with a complete set of security features, a full suite of maintenance and diagnostics tools, and nondisruptive firmware upgrade capability. The Cisco MDS 9020 offers easy configuration and management and a high-performance Fibre Channel switching fabric. The Cisco MDS 9020 can be effectively deployed in a wide variety of applications.

CISCO MDS 9000 PORT ANALYZER ADAPTER—REDUCING TIME TO PROBLEM RESOLUTION

The Cisco MDS 9000 Port Analyzer Adapter enables effective, low-cost analysis of Fibre Channel traffic anywhere in the network at any time, simplifying debugging of network problems and reducing time to problem resolution. The device is a ready-to-use accessory for the Cisco MDS 9000 Family of directors and fabric switches that enables simple, transparent analysis of Fibre Channel traffic in a switched fabric, eliminating the need for expensive standalone protocol analyzers. The Cisco MDS 9000 Port Analyzer Adapter encapsulates the Fibre Channel frames from a Cisco MDS 9000 Switched Port Analyzer (SPAN) destination port into Ethernet frames that can be analyzed using a locally attached PC running open source Ethereal software that has been enhanced by Cisco Systems[®] to enable decoding of Fibre Channel and Small Computer System Interface (SCSI) protocols.

CISCO MDS 9000 OPTICAL MODULES—OPTIMIZING SAN INTERCONNECT

Cisco MDS 9000 Family optical interface modules offer a broad range of SAN connectivity solutions for both local and extended reach. Small Form-Factor Pluggable (SFP) modules supporting port speeds up to 4-Gbps are available for the Cisco MDS 9000 Family in either short-wave or long-wave options, supporting Fibre Channel and Gigabit Ethernet connections over distances of up to 500 meters and 10 kilometers, respectively. X2 optical transceivers are available for Cisco MDS 9000 Family 10-Gbps Fibre Channel switching modules in either short-wave or long-wave options, supporting connections over distances of up to 300 meters and 10 kilometers, respectively. Cisco coarse wavelength-division multiplexing (CWDM) products provide cost-effective, multiprotocol, extended-distance connectivity by optimizing the use of the existing optical infrastructure. The Cisco CWDM SFP solution has two main components: wavelength-specific SFPs and a passive optical multiplexer. The Cisco CWDM solution increases the data capacity of existing fiber by up to eight times that of standard optical modules while extending the reach of Inter-Switch Links (ISLs) to up to 100 kilometers, significantly lowering the cost of SAN connectivity.

CISCO MDS 9000 FAMILY HIGHLIGHTS

- **High-availability director**—The Cisco MDS 9500 Series combines nondisruptive software upgrades, stateful process restart and failover, and full redundancy of all major components for best-in-class availability. Supporting up to 528 Fibre Channel ports in a single chassis, 1584 Fibre Channel ports in a single rack, and 2.2 Tbps of system bandwidth, the Cisco MDS 9500 Series leads the industry in scalability and is designed to meet the requirements of the largest data center storage environments.
- **1/2/4-Gbps and 10-Gbps Fibre Channel directors with full bandwidth redundancy**—Delivers highest available Fibre Channel performance with fully redundant bandwidth in all MDS 9500 Series products. Each crossbar module offers full system bandwidth such that the loss or removal of a single crossbar module does not affect system performance. Ensures 100 percent system throughput even in the event of a crossbar failure.
- **Flexible fabric switch**—The Cisco MDS 9200 Series supports up to 64 Fibre Channel ports in a fabric switch configuration. Its modular design provides a 3-RU base system consisting of either sixteen Fibre Channel ports or fourteen Fibre Channel ports and two Gigabit Ethernet ports, and it can be expanded with a variety of optional Cisco MDS 9000 Family switching modules, including 4-Gbps and 10-Gbps Fibre Channel modules.
- **Enterprise features in a small profile**—The Cisco MDS 9100 Series provides the ideal balance of cost, performance, and enterprise-class features in a compact, 1-RU form factor. Available in 20- and 40-port configurations, the Cisco MDS 9100 Series addresses the cost, performance, ease-of-management, and connectivity requirements of small and medium-sized storage environments while providing full-feature compatibility with Cisco MDS 9500 Series multilayer directors for transparent, end-to-end service delivery in large data center core-edge deployments.
- **Cost-effective midrange fabrics**—The Cisco MDS 9020 Fabric Switch meets the needs of fast-growing small and medium-sized IT organizations. This 20-port Fibre Channel switch offers line-rate performance at 4 Gbps, 2 Gbps, and 1 Gbps, in a compact enclosure. Integrated management includes the powerful and easy-to-use Cisco MDS 9000 Fabric Manager and Device Manager GUI and CLI access similar to that of Cisco IOS Software.
- **Advanced architecture**—The Cisco MDS 9000 Family architecture provides common switching modules that can be migrated to any chassis in the Cisco MDS 9500 Series or the Cisco MDS 9200 Series.
- **Cost-effective design**—The Cisco MDS 9000 Family offers advanced management tools for overall low TCO. It includes VSAN technology for hardware-enforced, isolated environments within a single physical fabric for secure sharing of physical infrastructure, further decreasing TCO.
- **Multiprotocol and multitransport architecture**—The multilayer architecture of the Cisco MDS 9000 Family enables a consistent feature set over a protocol-independent switch fabric. Cisco MDS 9500 Series and MDS 9200 Series switches transparently integrate Fibre Channel, IBM Fiber Connection (FICON), SCSI over IP (iSCSI), and Fibre Channel over IP (FCIP) in one system.
- **Integrated hardware-based VSANs and Inter-VSAN Routing (IVR)**—Enables deployment of large-scale multisite and heterogeneous SAN topologies. Integration into port-level hardware allows any port within a system or fabric to be partitioned into any VSAN. Integrated hardware-based inter-VSAN routing provides line-rate routing between any ports within a system or fabric without the need for external routing appliances.
- **Intelligent network services**—The Cisco MDS 9100, 9200 and 9500 series switches include VSAN technology, access control lists (ACLs) for hardware-based intelligent frame processing, and advanced traffic management features such as Fibre Channel Congestion Control (FCC) and fabric-wide quality of service (QoS) to enable migration from SAN islands to enterprise-wide storage networks.
- **Open platform for intelligent storage applications**—Provides the intelligent services necessary for hosting and/or accelerating storage applications such as network-hosted volume management, data migration and backup.

- **Integrated mainframe support**—Cisco MDS 9500 Series and MDS 9200 Series multilayer fabric switches are mainframe-ready, with full support for IBM zSeries FICON and Linux environments. The switches support cascaded FICON fabrics, as well as intermix of FICON and open systems FCP (Fibre Channel Protocol) traffic on the same switch.
- **Comprehensive security framework**—All Cisco MDS 9000 Family products support RADIUS authentication, role-based access control, ACLs, Secure Shell (SSH) Protocol and WWN-based zoning. Additionally, all MDS 9100, 9200 and 9500 series switches include TACACS+ authentication, Simple Network Management Protocol Version 3 (SNMPv3) Secure File Transfer Protocol (SFTP), Fibre Channel Security Protocol (FC-SP), VSANs, hardware-enforced zoning, logical unit number (LUN) zoning, read-only zones, ACLs, port security, and VSAN-based access control. This functionality, in conjunction with management access and control plane security, makes the Cisco MDS 9000 Family an extremely secure platform.
- **Sophisticated diagnostics**—The Cisco MDS 9000 Family provides 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.
- **Unified SAN management**—The Cisco MDS 9000 Family includes built-in SAN management, with all features available through a CLI or Cisco Fabric Manager, a centralized management tool that simplifies management of multiple switches and fabrics.
- **High-performance ISLs**—The Cisco MDS 9000 Family supports up to 16 links in a single PortChannel—links can span any speed-matched ports on any module within a chassis for added scalability and resilience.
- **Flexibility and investment protection**—The Cisco MDS 9000 Family shares common switching modules across all Cisco MDS 9500 Series products as well as Cisco MDS 9200 Series multilayer fabric switches.

SERVICES FOR CISCO STORAGE NETWORKING

Delivered through an ecosystem of best-in-class storage service partners or directly by Cisco, storage networking services provide high-touch services to enable you to successfully assess, plan, design, implement, and operate storage networks while helping to ensure high availability.



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