

## Cisco® MDS 9506 Multilayer Director



The Cisco MDS 9506 Multilayer Director offers dual Supervisor Modules with up to 128 Fibre Channel ports in a 7U enclosure

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### Highlights

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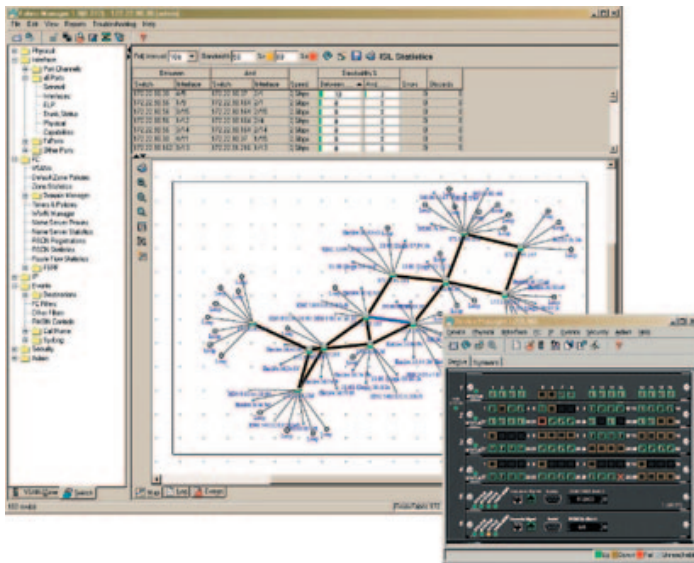
- **Provides throughput of up to 2Gbps per port and up to 32Gbps with each PortChannel Inter-Switch Link connection**
- **Offers scalability from 16 to 128 Fibre Channel ports**
- **Offers 8 to 24 Gigabit Ethernet ports for iSCSI or FCIP connectivity**
- **Includes Virtual SAN (VSAN) capability for SAN consolidation into virtual SAN islands on a single physical fabric**
- **Uses intelligent network services to help simplify Storage Area Network (SAN) management**
- **Helps provide security for large enterprise SANs**
- **Includes high-availability design with nondisruptive firmware upgrades**
- **Offers compatibility with a broad range of IBM servers as well as disk and tape storage devices**

### High performance and manageability for SANs

The Cisco MDS 9506 Multilayer Director supports 1Gbps and 2Gbps Fibre Channel switch connectivity and intelligent network services to help improve the security, performance and manageability required to consolidate geographically dispersed storage devices into a large enterprise SAN. Administrators can use the Cisco MDS 9506 to help address the needs for high performance and reliability in SAN environments ranging from small workgroups to very large, integrated enterprise SANs. Up to six Cisco MDS 9506 Multilayer Director switches may be installed in a single 42U rack, with up to 768 ports in a single footprint.

### Routing and load balancing capabilities

The Cisco MDS 9506 Multilayer Director includes two Supervisor Modules designed for high availability and performance. The Supervisor Module combines an intelligent control module and a high-performance crossbar switch fabric in a single unit. It uses Fabric Shortest Path First



Cisco Fabric Manager provides flexible views of the SAN

(FSPF) multipath routing, which provides intelligence to load balance across a maximum of 16 equal-cost paths and to dynamically reroute traffic if a switch fails.

A single Supervisor Module has 720Gbps of internal nonblocking switching capacity; a dual Supervisor Module configuration provides a total bandwidth of 1.44Tbps. Because this bandwidth capability is more than twice that required for current 2Gbps modules, the Cisco MDS 9506 has built-in capacity to support future 10Gbps modules.

### Connectivity, compatibility and traffic management

Switching modules are designed to optimize performance, flexibility and density. The Cisco MDS 9506 Multilayer Director requires a minimum of one and allows a maximum of four switching modules. These modules are available in either a 16- or 32-port configuration, allowing the Cisco MDS 9506 to support 16 to 128 Fibre Channel ports per chassis.

The Fibre Channel switching modules provide autosensing 1Gbps and 2Gbps interfaces for high-performance connectivity and compatibility with legacy devices. Switching modules are hot-swappable with small

form-factor pluggable (SFP) optic transceivers and support LC interfaces. Individual ports can be configured with either shortwave SFPs for connectivity up to 300 meters at 2Gbps (500 meters at 1Gbps) or longwave SFPs for connectivity up to 10 km (at either 1 Gbps or 2Gbps). Ports can be configured to operate in standard expansion port (E\_Port), fabric port (F\_Port) and fabric loop port (FL\_Port) modes as well as in unique Cisco port modes.

Advanced traffic management capabilities are integrated into the switching modules to help simplify deployment and to optimize performance across a large fabric. The PortChannel capability allows users to aggregate up to 16 physical 2Gbps Inter-Switch Links into a single logical bundle, providing optimized bandwidth utilization across all links. The bundle may span any port from any 16-port switching module within the chassis, providing up to 32 Gbps throughput.

### 16- and 32-port switching modules: configuring the switch for the application environment

The 16-port switching module is designed to deliver high performance for demanding storage networking

applications. Autosensing 1Gbps and 2Gbps ports deliver up to 64Gbps of continuous aggregate bandwidth, which provides up to 200MB/sec and 255 buffer credits per port. The 16-port switching module is well suited for attaching high-performance servers and storage subsystems as well as to connect to other switches using Inter-Switch Link (ISL) connections.

The 32-port switching module is designed to deliver an optimal balance of performance and port density. It provides high line-card port density along with 32Gbps of total bandwidth. Bandwidth is allocated across eight 4-port groups, supporting 4Gbps (200 MB/sec) of sustained bandwidth per port-group. This module provides a low-cost means of attaching lower performance servers and storage subsystems to the high-performance crossbar switch fabric without requiring ISLs.

By combining 16- and 32-port switching modules in a single, modular chassis, administrators can configure price/performance-optimized storage networks for a wide range of application environments.

### **A switch designed for high availability**

The Cisco MDS 9506 Multilayer Director combines support for nondisruptive software upgrades, stateful process restart/failover and redundancy of active hardware components to support director-class availability.

The Supervisor Module has the ability to automatically restart failed processes, making it highly robust. If a Supervisor Module is reset, complete synchronization between the active and standby Supervisor Modules helps support stateful failover without disruption to traffic.

The basic Cisco MDS 9506 configuration includes redundant Supervisor Modules and redundant power supplies and requires selection of at least one switching module. Hot-swappable components include Supervisor Modules, switching modules, SFP optics, power supplies and a fan tray with integrated temperature and power management.

### **Simplified storage network management**

The Cisco MDS 9506 supports three principal modes of management: the Cisco MDS 9000 Family command-line interface (CLI), Cisco Fabric Manager and integration with third-party storage management tools.

The Cisco MDS 9506 presents the user with a consistent, logical CLI. Adhering to the syntax of the widely known Cisco IOS® CLI, the Cisco MDS 9000 Family CLI has broad functionality. It is an efficient and direct interface, designed to provide optimal functionality to administrators in enterprise environments.

Cisco Fabric Manager is a responsive, Java™ application that helps simplify management across multiple switches and fabrics. It allows administrators to perform vital tasks such as topology discovery; fabric configuration; and verification, provisioning, monitoring and fault resolution. All functions are available through an interface, which supports remote management from any location.

Cisco Fabric Manager may be used independently or in conjunction with third-party management applications. Cisco provides an extensive application programming interface (API) for integration with third-party and user-developed management tools.

### **Multiprotocol support and traffic management features**

The unique architecture of the Cisco MDS 9506 Multilayer Director allows integration of new transport protocols

for greater flexibility. For example, the Cisco MDS 9506 is designed to support Fibre Channel, Internet SCSI (iSCSI) and Fibre Channel over IP (FCIP).

IP Storage Services Module features offer eight to twenty-four Gigabit Ethernet ports for iSCSI or FCIP connectivity, software configurable on a port-by-port basis. The IP Storage Services Module feature provides eight iSCSI ports. A Tri-Rate SPF Transceiver feature is required for each port to be used. The FCIP Activation for 8 Port IP Services Module feature adds Fibre Channel over IP support.

Many of today's users are likely to implement 2Gbps Fibre Channel for high-performance applications. However, as users migrate to new technologies, they also may use iSCSI over Ethernet for cost-effective connectivity to shared storage pools and FCIP for connectivity between data centers. The Cisco MDS 9506 is designed to be compatible with future 10Gbps modules.

### **Security for large enterprise SANs**

Because storage networks require security, the Cisco MDS 9506 Multilayer Director utilizes a comprehensive security framework. It is

designed to provide extensive security measures at possible points of attack to help prevent unauthorized management access and snooping. These measures include Secure Shell (SSHv2), Simple Network Management Protocol (SNMPv3), RADIUS (Remote Authentication Dial-In User Service) authentication and Role-Based Access Control (RBAC).

Additionally, data plane traffic is secured through VSANs, which are designed to segregate traffic between multiple virtual fabrics within the single physical fabric infrastructure, and through hardware-enforced zoning, which further segregates traffic within each VSAN.

### **Advanced security and management**

The Cisco MDS 9000 Enterprise Package is designed to provide advanced security and management capabilities. The package includes LUN Zoning, Read-only zones and Port lockdown.

### **IBM TotalStorage Virtualization Family**

Cisco MDS 9000 Caching Service Modules are designed to provide advanced virtualization technology for use with IBM TotalStorage SAN

Volume Controller software for Cisco MDS 9000. The modules provide scalable, in-band storage virtualization services within the network. This solution combines two modules into a high availability cluster with 16 GB of mirrored cache memory.

### **Capabilities to help reduce TCO**

VSAN capability is designed to allow more efficient SAN utilization by creating multiple isolated environments within a single SAN fabric. Each VSAN can be zoned as a typical SAN. It maintains its own fabric services for added scalability and resilience. VSANs allow the cost of the SAN infrastructure to be shared among more users, while helping to provide segregation and security of traffic and retaining independent control of configurations on a VSAN-by-VSAN basis.

Another example of the cost-effectiveness of the Cisco MDS 9506 is its compatibility with other Cisco switches. It shares common switching modules across all Cisco MDS 9000 Directors as well as the Cisco MDS 9216 Multilayer Fabric Switch. This functionality allows customers to relocate switching modules as their requirements change.

## Cisco MDS 9506 Multilayer Director at a glance<sup>1</sup>

### Physical characteristics

Dimensions	31.11 cm H x 44.12 cm W x 55.25 cm D (12.25 in x 17.37 in x 21.75 in)
Rack height	7U
Depth including cable guide	67.9 cm (26.75 in)
Weight (fully configured chassis)	56 kg (124 lb)
Director is rack mountable in a standard 19-inch EIA rack, meeting Cisco requirements defined in the recommended installation procedures. <sup>2</sup>	

### Operating environment

Temperature	0° to 40° C (32° to 104° F)	
Relative humidity	10% to 90%	
Power supplies	<b>D04 Model:</b>	<b>T04 Model:</b>
Input	1900 W AC	1900 W DC
	100 to 240 V AC	-48 to -60V DC
	50-60 Hz nominal	
Output	1050 W at 100 to 100 V AC	1900W (50 VDC)
	1900 W at 200 VAC	

### IBM product numbers

2062-D04<sup>3</sup>—Cisco MDS 9506 Multilayer Director designed for IT data centers, includes dual AC power supplies and one year, 24x7, same day, on-site warranty

2062-T04<sup>3</sup>—Cisco MDS 9506 Multilayer Director designed for telco environments, includes dual AC power supplies and one year, 24x7, same day, on-site warranty

FC 2010—Supervisor Module with one Compact Flash Memory drive (two required)

FC 2116—16-port 1Gbps and 2Gbps Fibre Channel Switching Module (no optics)

FC 2132—32-port 1Gbps and 2Gbps Fibre Channel Switching Module (no optics)

FC 2208—8 Port IP Services Module (no optics)

FC 2300 and 2301—Caching Services Modules (both required)

FC 2210—FCIP Activation for 8 Port IP Services Module

FC 5210—Tri-Rate SW SPF Transceiver ( 1 & 2 Gbps FC and Gig Ethernet)

FC 5220—Tri-Rate LW SPF Transceiver ( 1 & 2 Gbps FC and Gig Ethernet)

FC 5230—Fibre Channel port shortwave SFP transceiver

FC 5240—Fibre Channel port longwave SFP transceiver

FC 5810—Cisco Flash Memory Card

FC 5811—Cisco Spare Flash Memory Card

FC 7020—MDS 9000 Enterprise Package

One and two year warranty extensions are available

### Fiber optic cables:

Multimode, 50u fiber optical cables with SC and/or LC connectors are available

### Supported systems<sup>4</sup>

IBM @server pSeries™ and selected IBM RS/6000® servers; IBM @server xSeries™ and selected IBM Netfinity® servers; other Intel® processor-based servers running the Linux®, Microsoft® Windows NT® or Microsoft Windows® 2000 operating systems; selected Sun™ and HP servers; IBM TotalStorage™ Enterprise Storage Server™ (ESS); IBM TotalStorage FASTT storage servers; IBM TotalStorage Enterprise Tape System 3590 and 3592; Enterprise Tape Library 3494; IBM 3532, 3583 Ultrium® Tape Libraries and IBM 3584 UltraScalable Tape Library; and other selected storage systems

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- <sup>1</sup> For complete and current Cisco specifications, please visit [www.cisco.com/go/ibm/storage](http://www.cisco.com/go/ibm/storage).
- <sup>2</sup> Because this switch is designed with side-to-side airflow, Cisco recommends a minimum air space of 16 cm (6 in) between walls and the chassis air vents, and a minimum separation of 30.5 cm (12 in) between two chassis to prevent overheating.
- <sup>3</sup> Each model includes four slots for 16- or 32-port switching modules, IP service modules, or both. The base configuration requires selection of a minimum of one switching module and two Supervisor Modules. Two power supplies, a fan tray and firmware support for Cisco Fabric Manager, VSAN and PortChannel are included.
- <sup>4</sup> For the most current list of supported servers and storage, please visit **ibm.com**/storage/cisco.