DATA SHEET

CISCO MDS 9000 FAMILY MULTIPROTOCOL SERVICES MODULE

HIGHLIGHTS

The Cisco® MDS 9000 Family Multiprotocol Services Module is designed for mission-critical enterprise storage networks that require robust, cost-effective business-continuance services. Leveraging Fibre Channel and Internet Protocol (IP) in a single module, Cisco MDS 9000 Family Multiprotocol Services Module offers the following key features:

- Integrated Fibre Channel, FICON and IP Storage Services in an optimized form factor—Supports fourteen 2-Gbps Fibre Channel interfaces for high performance SAN and mainframe connectivity and two Gigabit Ethernet ports for Fibre Channel over IP (FCIP) and Small Computer System Interface over IP (iSCSI) storage services.
- Industry's highest performance Inter-Switch Links (ISLs)—Supports up to sixteen 2-Gbps Fibre Channel links in a single PortChannel—links may span any port on any module within a chassis for added scalability and resilience. Up to 3,500 buffer-to-buffer credits can be assigned to a single Fibre Channel port to extend storage networks over unprecedented distances.
- Intelligent network services—Uses virtual SAN (VSAN) technology for hardware-enforced, isolated environments within a single physical fabric; 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 facilitate migration from SAN islands to enterprise-wide storage networks.
- Comprehensive network security framework—Supports RADIUS and TACACS+, Fibre Channel Security Protocol (FC-SP), Secure File Transfer Protocol (SFTP), Secure Shell (SSH), and Simple Network Management Protocol Version 3 (SNMPv3) implementing Advanced Encryption Standard (AES), VSANs, hardware-enforced zoning, ACLs, and per-VSAN role-based access control. Additionally, the Gigabit Ethernet ports offer IP security (IPsec) authentication, data integrity, and hardware-assisted data encryption for FCIP and iSCSI.
- Sophisticated diagnostics—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.

Figure 1. The Cisco MDS 9000 Family Multiprotocol Services Module

- FCIP for remote SAN extension:
  - Simplifies data protection and business-continuance strategies by enabling backup, remote replication, and other disaster-recovery services over WAN distances using open-standard FCIP tunneling.
  - Optimizes utilization of WAN resources for backup and replication by tunneling up to three virtual ISLs on a single Gigabit Ethernet port, and enabling hardware-based compression, FCIP Write Acceleration, and FCIP Tape Acceleration.
  - Preserves Cisco MDS 9000 Family enhanced capabilities including VSANs, advanced traffic management, and security across remote connections.

- iSCSI for extension of SAN to Ethernet attached servers:
  - Extends the benefits of Fibre Channel SAN-based storage to Ethernet-attached servers at a lower cost than possible using Fibre Channel interconnect alone.
  - Increases storage utilization and availability through consolidation of IP and Fibre Channel block storage.
  - Transparent operation preserves the capability of existing management storage applications.

PRODUCT OVERVIEW

Cisco MDS 9000 Family Multiprotocol Services Module

The Cisco MDS 9000 Family Multiprotocol Services Module delivers the intelligence and advanced features required to make multilayer storage area networks a reality. Supported in the Cisco MDS 9200 Series and Cisco MDS 9500 Series and offering 14 Fibre Channel ports and two Gigabit Ethernet ports, the Cisco Multiprotocol Services Module enables FCIP for long-distance SAN extension and iSCSI for Ethernet-attached servers without sacrificing Fibre Channel port density. With its multiprotocol capability, the module also integrates FICON protocol, FICON Control Unit Port (CUP) management, and switch cascading to enable mainframe connectivity.

The Cisco Multiprotocol Services Module includes hardware-enabled innovations designed to dramatically improve scalability, availability, network security, and manageability of storage networks, resulting in increased utility and lower total cost of ownership (TCO). Hardware-assisted compression and encryption on the Gigabit Ethernet ports ensure optimal utilization of available IT infrastructure and highly reliable and secure data exchange.

The module is hot-swappable and includes hot-swappable, Small Form-Factor Pluggable (SFP), LC interfaces for both Fibre Channel and Gigabit Ethernet. Individual ports can be configured with short-wave, long-wave, or extended-reach SFPs for connectivity up to 100 kilometers. All Fibre Channel interfaces can be configured to operate in the following modes: E port, F port, FL port, TE port, TL port, SD port, ST port, and B port. The Gigabit Ethernet interfaces are configurable for both FCIP and iSCSI operation; the ports designated to work as FCIP can be further configured to support up to three virtual ISL connections.

KEY FEATURES AND BENEFITS

FCIP for Remote SAN Extension

Data distribution, data protection, and business-continuance services are significant components of today's information-centric businesses. The ability to efficiently replicate critical data on a global scale not only ensures a higher level of data protection for valuable corporate information, but also increases utilization of backup resources and lowers total cost of storage ownership. The Cisco MDS 9000 Family Multiprotocol Services Module uses the open-standard FCIP protocol to break the distance barrier of current Fibre Channel solutions and enable interconnection of SAN islands over extended distances.

Advanced FCIP Features to Facilitate Business Continuance and Disaster Recovery

The Cisco MDS 9000 Family Multiprotocol Services Module is designed to support robust business-continuance services using FCIP for remote connectivity in conjunction with a suite of advanced features, such as VSANs and Inter-VSAN Routing (IVR), hardware-assisted FCIP compression and encryption, FCIP Write Acceleration, and FCIP Tape Acceleration.

VSANs and IVR Enhance SAN Security and Stability

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 and maintains 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. With its integrated FCIP capability, the Cisco MDS 9000 Family Multiprotocol Services Module enables the extension of VSANs over dedicated or existing IP infrastructure.

The Cisco Multiprotocol Services Module supports Inter-VSAN Routing, the industry's first routing functionality 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. With IVR, data can transit VSAN boundaries while maintaining control plane isolation, thereby maintaining fabric stability and availability.

In addition, the Cisco Multiprotocol Services Module secures and protects sensitive traffic through IPsec authentication, data integrity, and hardware-assisted encryption.

High-Performance SAN Extension with Compression and FCIP Write Acceleration

The Cisco MDS 9000 Family Multiprotocol Services Module supports FCIP compression to maximize the effective WAN bandwidth of SAN extension solutions. The Cisco Multiprotocol Services Module achieves up to a 30:1 compression ratio, with typical ratios of 2:1 over a wide variety of data sources. With the addition of hardware-based compression, the Cisco Multiprotocol Services Module is able to provide optimal levels of compressed throughput for implementations across low- to high-bandwidth links.

The Cisco Multiprotocol Services module also supports FCIP Write Acceleration, a feature that can significantly improve application performance when storage traffic is extended across distance. When FCIP Write Acceleration is enabled, WAN throughput is optimized by reducing the latency of command acknowledgements. Similarly, the Cisco Multiprotocol Services module supports FCIP Tape Acceleration, which significantly improves throughput over WAN links for remote tape backup operations.

Together, FCIP Compression, FCIP Write Acceleration, and FCIP Tape Acceleration enable optimal performance of business-continuance services.

ADVANCED TRAFFIC MANAGEMENT FOR HIGH-PERFORMANCE, RESILIENT FABRICS

The following advanced traffic management capabilities integrated into every Cisco MDS 9000 Family Multiprotocol Services Module simplify deployment and optimization of large-scale fabrics.

- Virtual Output Queuing ensures line rate performance on each port, independent of traffic pattern, by eliminating head-of-line blocking.
- 255 buffer-to-buffer credits are assigned to each port for optimal bandwidth utilization across distance. When extended distances are required, up to 3,500 credits can be allocated to a single port within a group of four Fibre Channel ports.
- PortChannels allow users to aggregate up to 16 physical ISLs into a single logical bundle, providing optimized bandwidth utilization across all links. The bundle can consist of any port from any module in the chassis, ensuring that the bundle remains 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, in the event of a switch failure, dynamically reroute traffic.
- Quality of service can be used to manage bandwidth and control latency, to prioritize critical traffic.
- Fibre Channel Congestion Control (FCC), an end-to-end, feedback-based congestion control mechanism, augments the Fibre Channel's buffer-to-buffer credit mechanism to provide enhanced traffic management.

INDUSTRY'S MOST ADVANCED DIAGNOSTICS AND TROUBLESHOOTING TOOLS

Management of large-scale storage networks requires proactive diagnostics, tools to verify connectivity and route latency, and mechanisms for capturing and analyzing traffic. The Cisco MDS 9000 Family integrates the industry's most advanced analysis and diagnostic tools. Power-on self test (POST) and online diagnostics provide proactive health monitoring. The Cisco MDS 9000 Family Multiprotocol Services Module implements diagnostic capabilities such as Fibre Channel Traceroute for detailing the exact path and timing of flows and Switched Port

Analyzer (SPAN) to intelligently capture network traffic. Once traffic has been captured, it can then be analyzed with the Cisco Fabric Analyzer, an embedded Fibre Channel analyzer. Comprehensive port and flow-based statistics facilitate sophisticated performance analysis and service-level agreement (SLA) accounting. With the Cisco MDS 9000 Family, Cisco Systems® delivers the most comprehensive toolset for troubleshooting and analysis of storage networks.

COMPREHENSIVE SOLUTION FOR ROBUST NETWORK SECURITY

Addressing the need for airtight security in storage networks, the Cisco MDS 9000 Family Multiprotocol Services Module offers an extensive security framework to protect highly sensitive data crossing today's enterprise networks. The Cisco Multiprotocol Services Module employs intelligent packet inspection at the port level, including the application of ACLs for hardware enforcement of zones, VSANs, and advanced Port Security features.

Extended zoning capabilities are enabled to ensure that LUNs are accessible only by specific hosts (LUN zoning), to limit SCSI read command for a certain zone (read-only zoning), and to restrict broadcasts to only the selected zones (broadcast zones). VSANs are used to achieve higher security and greater stability by providing complete isolation among devices that are connected to the same physical SAN. In addition, Fibre Channel Security Protocol (FC-SP) provides switch-switch and host-switch Diffie-Hellman Challenge Handshake Authentication Protocol (DH-CHAP) authentication supporting RADIUS or TACACS+, to ensure that only authorized devices access protected storage networks. Finally, for both FCIP and iSCSI deployments, the comprehensive IPsec protocol suite delivers secure authentication, data integrity, and hardware-based encryption.

This functionality, in conjunction with management access and control plane security, makes the Cisco MDS 9000 Family the most secure platform of its kind.

iSCSI FOR COST-EFFECTIVE EXTENSION OF SAN STORAGE TO ETHERNET ATTACHED SERVERS

Many IT managers have been hesitant to extend SAN access beyond their mission-critical applications to midrange data center applications because of the complexity and cost involved in upgrading large numbers of midrange servers to Fibre Channel. The Cisco MDS 9000 Family Multiprotocol Services Module addresses these limitations by enabling IT organizations to extend their storage networks using cost-effective Ethernet infrastructure. All the benefits of SAN, including increased storage utilization, centralized backups, easier addition of incremental storage capacity, management simplification, and reduced overall total cost of ownership (TCO), can be extended to a new range of applications. Because the Cisco Multiprotocol Services Module is an integral component of the Cisco MDS 9000 Family, Ethernet-attached servers will enjoy the same SAN scalability, availability, manageability, and intelligent services as those servers connected using Fibre Channel, while maintaining the cost and ease-of-use benefits of Ethernet and IP.

PRODUCT SPECIFICATIONS

Table 1 lists the product specifications for the Cisco MDS 9000 Family Multiprotocol Services Module.

Table 1. Product Specifications

Product Compatibility	Cisco MDS 9000 Family
Software Compatibility	Cisco MDS SAN-OS Release 2.0(1) or later
Protocols	• Fibre Channel standards – FC-PH, Revision 4.3 (ANSI/INCITS 230-1994) – FC-PH, Amendment 1 (ANSI/INCITS 230-1994/AM1-1996) – FC-PH, Amendment 2 (ANSI/INCITS 230-1994/AM2-1999)

- FC-PH-2, Revision 7.4 (ANSI/INCITS 297-1997)
- FC-PH-3, Revision 9.4 (ANSI/INCITS 303-1998)
- FC-PI, Revision 13 (ANSI/INCITS 352-2002)
- FC-FS, Revision 1.9 (ANSI/INCITS 373-2003)
- FC-AL, Revision 4.5 (ANSI/INCITS 272-1996)
- FC-AL-2, Revision 7.0 (ANSI/INCITS 332-1999)
- FC-AL-2, Amendment 1 (ANSI/INCITS 332-1999/AM1-2003)
- FC-SW-2, Revision 5.3 (ANSI/INCITS 355-2001)
- FC-SW-3, Revision 6.6 (ANSI/INCITS 384-2004)
- FC-GS-3, Revision 7.01 (ANSI/INCITS 348-2001)
- FC-GS-4, Rev. 7.91 (ANSI/INCITS 387-2004)
- FC-BB, Revision 4.7 (ANSI/INCITS 342-2001)
- FC-BB-2, Revision 6.0 (ANSI/INCITS 372-2003)
- FCP, Revision 12 (ANSI/INCITS 269-1996)
- FCP-2, Revision 8 (ANSI/INCITS 350-2003)
- FC-SB-2, Revision 2.1 (ANSI/INCITS 349-2001)
- FC-SB-3, Revision 1.6 (ANSI/INCITS 374-2003)
- FC-VI, Revision 1.84 (ANSI/INCITS 357-2002)
- FC-FLA, Revision 2.7 (INCITS TR-20-1998)
- FC-PLDA, Revision 2.1 (INCITS TR-19-1998)
- FC-Tape, Revision 1.17 (INCITS TR-24-1999)
- FC-MI, Revision 1.92 (INCITS TR-30-2002)
- FC-SP, Revision 1.6
- FC-DA, Revision 3.1

• IP over Fibre Channel (RFC 2625)
• Extensive IETF-standards based TCP/IP, SNMPv3, and Remote Monitoring (RMON) MIBs
• Class of Service: Class 2, Class 3, Class F
• Fibre Channel standard port types: E, F, FL, B
• Fibre Channel enhanced port types: SD, ST, TE, TL
• IP standards
  - RFC 791 IPv4
  - RFC 793, 1323 TCP
  - RFC 894 IP/Ethernet
  - RFC 1041 IP/802
  - RFC 792, 950, 1256 ICMP
  - RFC 1323 TCP performance enhancements
  - RFC 2338 VRRP
• Ethernet standards
  - IEEE 802.3z Gigabit Ethernet
  - IEEE 802.1Q VLAN

	• IPsec – RFC 2401 Security Architecture for IP – RFC 2403, 2404 HMAC – RFC 2405, 2406, 2451 IP ESP – RFC 2407, 2408 ISAKMP – RFC 2412 OAKLEY Key Determination Protocol – RFC 3566, 3602, 3686 AES • Internet Key Exchange (IKE) – RFC 2409 IKEv1 – IKEv2, draft
Cards/Ports/Slots	Fourteen fixed auto-sensing 1 / 2-Gbps Fibre Channel ports and two fixed 1-Gbps Ethernet ports
Features and Functions	• Fabric Services – Name server – Internet Storage Name Server (iSNS) – Registered State Change Notification (RSCN) – Login services – Fabric Configuration Server (FCS) – iSCSI Network Boot (iNBP) – Private loop – Public loop – Translative loop – Broadcast – In-order delivery • Advanced Functionality – VSAN – Inter-VSAN Routing – PortChannel with Multipath Load Balancing – QoS—flow-based, zone-based – Fibre Channel Congestion Control – Extended Buffer-To-Buffer Credits – Hardware-based FCIP compression – Hardware-based Encryption – Hardware-based Data Integrity – FCIP Write Acceleration – FCIP Tape Acceleration • Diagnostics and troubleshooting tools – Power-on-self-test (POST) diagnostics – Online diagnostics – Internal port loopbacks

- SPAN and Remote SPAN
- Fibre Channel Traceroute
- Fibre Channel Ping
- Fibre Channel Debug
- Cisco Fabric Analyzer
- Syslog
- Online system health
- Port-level statistics
- Real Time Protocol Debug

• Network security
- VSANs
- Access Control Lists
- Per-VSAN role-based access control
- Fibre Channel Zoning
  - N_Port WWN
  - N_Port FC-ID
  - Fx_Port WWN
  - Fx_Port WWN and interface index
  - Fx_Port domain ID and interface index
  - Fx_Port domain ID and port number
  - LUN
  - Read-only
  - Broadcast
- iSCSI zoning
  - iSCSI name
  - IP address
- Fibre Channel Security Protocol (FC-SP)
  - DH-CHAP switch-switch authentication
  - DH-CHAP host-switch authentication
- Port Security and Fabric Binding
- IPsec for FCIP and iSCSI
- IKEv1 and IKEv2
- Management access
  - SSH v2 implementing AES
  - SNMPv3 implementing AES
  - SFTP

• Serviceability
- Configuration file management
- Non-disruptive software upgrades for Fibre Channel interfaces
- Call Home
- Power-management LEDs

	– Port beaconing – System LED – SNMP traps for alerts – Network boot

Performance

- Port speed: 1 / 2-Gbps auto-sensing, optionally configurable
- Buffer credits: Up to 3,500 per port
- PortChannel: Up to 16 2-Gbps ports
- FCIP tunnels: up to 3 per port
- Supported optics, media, and transmission distances:

Optics	Media	Distance
1-Gbps—SW, LC SFP	50/125 micron multimode	500 m
1-Gbps—SX, LC SFP	50/125 micron multimode	550 m
1-Gbps—SW, LC SFP	62.5/125 micron multimode	300 m
1-Gbps—SX, LC SFP	62.5/125 micron multimode	275 m
1-Gbps—LW, LC SFP	9/125 micron single-mode	10 km
1-Gbps—LX/LH, LC SFP	9/125 or 10/125 micron single-mode	10 km
1-Gbps—CWDM, LC SFP	9/125 micron single-mode	Up to 100 km
2-Gbps—SW, LC SFP	50/125 micron multimode	300 m
2-Gbps—SW, LC SFP	62.5/125 micron multimode	10 km
2-Gbps—LW, LC SFP	9/125 micron single-mode	150 m
2-Gbps—CWDM, LC SFP	9/125 micron single-mode	Up to 100 km

Reliability and Availability

- Hot-swappable module
- Hot-swappable SFP optics
- Online diagnostics
- Stateful Process Restart
- Non-disruptive Supervisor Failover
- Any module, any port configuration for PortChannels
- Fabric-based multipathing
- Per-VSAN fabric services
- Port Tracking
- Virtual Routing Redundancy Protocol (VRRP) for management and FCIP or iSCSI connections

Network Management

- Access methods through Cisco MDS 9500 Series Supervisor module
  - Out-of-band 10/100 Ethernet port
  - RS-232 serial console port
  - In-band IP-over-Fibre Channel
  - DB-9 COM port
- Access protocols
  - CLI—via console and Ethernet ports
  - SNMPv3—via Ethernet port and in-band IP-over-Fibre Channel access
  - Storage Networking Industry Association (SNIA) Storage Management Initiative Specification (SMI-S)
- Distributed Device Alias service

	• Network security – Per-VSAN role-based access control using RADIUS and TACACS+ based authentication, authorization, and accounting (AAA) functions – SFTP – SSH v2 implementing AES – SNMPv3 implementing AES • Management applications – Cisco MDS 9000 Family CLI – Cisco Fabric Manager – Cisco Device Manager • CiscoWorks Resource Manager Essentials (RME) and Device Fault Manager (DFM)
Programming Interfaces	• Scriptable CLI • Fabric Manager GUI • Device Manager GUI
Environmental	• Temperature, ambient operating – 32 to 104°F (0 to 40°C) • Temperature, ambient non-operating and storage – 40 to 167°F (-40 to 75°C) • Relative humidity, ambient (non-condensing) operating – 10 to 90 percent • Relative humidity, ambient (non-condensing) non-operating and storage – 10 to 95 percent • Altitude, operating – -197 to 6500 feet (-60 to 2000 meter)
Physical Dimensions	• Dimensions (H x W x D) – 1.75 x 14.4 x 16 inches (3.0 x 35.6 x 40.6 centimeter) – Occupies one slot in a Cisco MDS 9200 Series or MDS 9500 Series chassis • Weight – Multiprotocol Services Module only: 10 pound (4.5 kilogram)
Approvals and Compliance	• **Safety Compliance** – CE Marking – UL 60950 – CAN/CSA-C22.2 No. 60950 – EN 60950 – IEC 60950 – TS 001 – AS/NZS 3260 – IEC60825 – EN60825 – 21 CFR 1040

	• **EMC Compliance** – FCC Part 15 (CFR 47) Class A – ICES-003 Class A – EN 55022 Class A – CISPR 22 Class A – AS/NZS 3548 Class A – VCCI Class A – EN 55024 – EN 50082-1 – EN 61000-6-1 – EN 61000-3-2 – EN 61000-3-3

ORDERING INFORMATION

Table 2 provides ordering information for the Cisco MDS 9000 Family Multiprotocol Services Module.

Table 2. Ordering Information

Part Number	Product Description
DS-X9302-14K9	Cisco MDS 9000 Family 14/2-port Multiprotocol Services Module
DS-SFP-FC-2G-SW	Cisco MDS 9000 Family 1 / 2-Gbps Fibre Channel-SW, SFP, LC
DS-SFP-FC-2G-LW	Cisco MDS 9000 Family 1 / 2-Gbps Fibre Channel-LW, SFP, LC
DS-SFP-FCGE-SW	Cisco MDS 9000 Family 1-Gbps Ethernet, 1 / 2-Gbps Fibre Channel-SW, SFP, LC
DS-SFP-FCGE-LW	Cisco MDS 9000 Family 1-Gbps Ethernet, 1 / 2-Gbps Fibre Channel-LW, SFP, LC
Advanced Software Packages	
M9200EXT12K9	Cisco MDS 9200 SAN Extension over IP Package for the Cisco MDS 9000 Family Multiprotocol Services Module
M9200ENT1K9	Cisco MDS 9200 Enterprise Package
M9200FMS1K9	Cisco MDS 9200 Fabric Manager Server Package
M9200FIC1K9	Cisco MDS 9200 Mainframe Package
M9500EXT12K9	Cisco MDS 9500 SAN Extension over IP Package for the Cisco MDS 9000 Family Multiprotocol Services Module
M9500ENT1K9	Cisco MDS 9500 Enterprise Package
M9500FMS1K9	Cisco MDS 9500 Fabric Manager Server Package
M9500FIC1K9	Cisco MDS 9500 Mainframe Package
Spare Components	
DS-X9302-14K9=	Cisco MDS 9000 Family 14 / 2-port Multiprotocol Services Module, Spare
DS-SFP-FC-2G-SW=	Cisco MDS 9000 Family 1 / 2-Gbps Fibre Channel-SW, SFP, LC, Spare
DS-SFP-FC-2G-LW=	Cisco MDS 9000 Family 1 / 2-Gbps Fibre Channel-LW, SFP, LC, Spare

Part Number	Product Description
DS-SFP-FCGE-SW=	Cisco MDS 9000 Family 1-Gbps Ethernet, 1 / 2-Gbps Fibre Channel-SW, SFP, LC, Spare
DS-SFP-FCGE-LW=	Cisco MDS 9000 Family 1-Gbps Ethernet, 1 / 2-Gbps Fibre Channel-LW, SFP, LC, Spare
DS-CWDM-1470=	Cisco 1470 NM CWDM Gigabit Ethernet and 1 / 2-Gbps Fibre Channel SFP, Spare
DS-CWDM-1490=	Cisco 1490 NM CWDM Gigabit Ethernet and 1 / 2-Gbps Fibre Channel SFP, Spare
DS-CWDM-1510=	Cisco 1510 NM CWDM Gigabit Ethernet and 1 / 2-Gbps Fibre Channel SFP, Spare
DS-CWDM-1530=	Cisco 1530 NM CWDM Gigabit Ethernet and 1 / 2-Gbps Fibre Channel SFP, Spare
DS-CWDM-1550=	Cisco 1550 NM CWDM Gigabit Ethernet and 1 / 2-Gbps Fibre Channel SFP, Spare
DS-CWDM-1570=	Cisco 1570 NM CWDM Gigabit Ethernet and 1 / 2-Gbps Fibre Channel SFP, Spare
DS-CWDM-1590=	Cisco 1590 NM CWDM Gigabit Ethernet and 1 / 2-Gbps Fibre Channel SFP, Spare
DS-CWDM-1610=	Cisco 1610 NM CWDM Gigabit Ethernet and 1 / 2-Gbps Fibre Channel SFP, Spare
M9200EXT12K9=	Cisco MDS 9200 SAN Extension over IP Package for the Cisco MDS 9000 Family Multiprotocol Services Module, Spare
M9200ENT1K9=	Cisco MDS 9200 Enterprise Package, Spare
M9200FMS1K9=	Cisco MDS 9200 Fabric Manager Server Package, Spare
M9200FIC1K9=	Cisco MDS 9200 Mainframe Package, Spare
M9500EXT12K9=	Cisco MDS 9500 SAN Extension over IP Package for the Cisco MDS 9000 Family Multiprotocol Services Module, Spare
M9500ENT1K9=	Cisco MDS 9500 Enterprise Package, Spare
M9500FMS1K9=	Cisco MDS 9500 Fabric Manager Server Package, Spare
M9500FIC1K9=	Cisco MDS 9500 Mainframe Package, Spare

SERVICE AND SUPPORT

Cisco offers a wide range of services programs to accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco services help you to protect your network investment, optimize network operations, and prepare the network for new applications to extend network intelligence and the power of your business. For more information about Cisco Services, see Cisco Technical Support Services or Cisco Advanced Services.

FOR MORE INFORMATION

For more information about the Cisco MDS 9000 Family Multiprotocol Services Module, visit http://www.cisco.com/en/US/products/hw/ps4159/ps4358/index.html or contact your local account representative.

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