Data Sheet

# Cisco MDS 9000 Family Storage Services Module

## PRODUCT OVERVIEW

The Cisco® MDS 9000 Family Storage Services Module incorporates all the capabilities of the Cisco MDS 9000 Family 32-Port 2-Gbps Fibre Channel Switching Module, plus a variety of innovative storage services. The Storage Services Module is available in a 32-port configuration and accepts the Cisco 2-Gbps Fibre Channel Small Form-Factor Pluggable (SFP) optical modules.

The Cisco MDS 9000 Family Storage Services Module (Figure 1) includes the following features:

- Fibre Channel switching
- Fibre Channel Write Acceleration (FC-WA) and Small Computer System Interface (SCSI) flow-statistics monitoring
- Network-Accelerated Serverless Backup with standards-based SCSI-2 EXTENDED COPY command.
- Network-Assisted Storage Applications with the SANTap protocol
- Network-Hosted Storage Applications with the Fabric Application Interface Standard (FAIS)-based Intelligent Storage Application Programmatic Interface (ISAPI)

**Figure 1.** Cisco MDS 9000 Family Storage Services Module

## KEY FEATURES AND BENEFITS

### Fibre Channel Switching

Includes 32 ports of Fibre Channel switching so no compromise between port density and I/O performance is necessary.

### Fibre Channel Write Acceleration

Designed for synchronous data replication, FC-WA reduces the effective latency between data centers to dramatically enhance the performance and/or increase the distance of synchronous data-replication deployments. Additionally, with the embedded SCSI flow services, SCSI flows are monitored for statistics gathering.

### Network-Accelerated Serverless Backup

The Cisco Storage Services Module provides a high-speed network-accelerated serverless backup interface through SCSI-2 EXTENDED COPY to allow backup and recovery applications to use the network for the data movement, without changing the existing backup environment. The I/O and processing is offloaded from the media server, resulting in more efficient backups, fewer media servers, and reduced server and administration tasks.

### Network-Assisted Storage Applications

SANTap is a protocol between a Cisco MDS 9000 Family switch and an appliance that allows the appliance to get an I/O copy for data replication, continuous data protection and data migration without impacting the integrity, availability, and performance of the primary I/O between servers and storage. Thus, customers can deploy network-assisted storage applications without having appliances residing in the primary data path. SANTap reduces implementation risk by facilitating gradual introduction of services for staging.

Easy insertion and provisioning of appliance-based storage applications is achieved by eliminating the service disruption caused by inserting appliances in-band. SANTap also reduces or eliminates host-side agents and makes appliance-based storage applications work across heterogeneous operating systems without creating a separate agent for each OS.

SANTap offers deployment flexibility and investment protection by enabling appliance-based storage application for any server or storage device in the SAN without rewiring. Moreover, multiple appliance-based storage applications can be concurrently added to servers and storage.

In addition, SANTap provides a scalability solution for appliance-based storage applications by allowing for distribution of workload to multiple appliances based on application and source-and-target combinations. The following storage applications intend to take advantage of these benefits:

- Kashya KBX5000
- Topio TDPS Fabric Edition
- Xiotech TimeScale™ Replication Appliance
- FalconStor IPStor with SANTap Option

### Network-Hosted Storage Applications

The Cisco MDS 9000 Family network-hosted storage applications architecture overcomes the inherent bottlenecks associated with other virtualization architectures. Virtualization performance can be easily scaled to the level required by even the largest organizations. Simply adding Cisco MDS 9000 Family Storage Services Modules adds virtualization performance and host connectivity in increments of 32 ports. Because Cisco MDS 9000 Family network-hosted storage applications are switch-based, any host can access any virtual volume from anywhere in the fabric, independent of the host's attachment point in the storage area network (SAN). In addition to virtualization services, the Cisco MDS 9000 Family Storage Services Module takes advantage of all of the Fibre Channel features and services offered by other Cisco MDS 9000 Family Switching Modules, and all of the advanced SAN-OS features available on the Cisco MDS 9000 Family platform—simplifying security, diagnostics, and management. With hosts and storage devices connecting anywhere in the network, virtualization provides a single point of management, transparent data mobility and migration, improved storage utilization, and a single set of copy services across heterogeneous storage. The Cisco Storage Services Module hosts EMC Invista®.

### Integrated Network Services

Cisco MDS 9000 Family intelligent fabric applications provide a level of integration with intelligent SAN services that is unavailable to host based virtualization and storage solutions. The Cisco MDS 9000 Family platform with the integrated Cisco Storage Services Module delivers the intelligence and advanced features required to make multilayer, intelligent SANs a reality, including hardware-enabled innovations that dramatically improve scalability, availability, security, and manageability of storage networks—resulting in increased utility and lower total cost of ownership (TCO).

### Multiprotocol Intelligence

The Cisco MDS 9000 Family multiprotocol platform is designed for cost-optimized, high-performance, and highly available storage networks. It uses disk pooling, replication, data migration, continuous data protection, and Network-Accelerated Serverless Backup that is enabled through the Cisco MDS 9000 Family Storage Services Module. With support of the IETF standard Small Computer System Interface over IP (iSCSI) protocol over Ethernet, and Fibre Channel over IP (FCIP), intelligent fabric applications using the Cisco MDS 9000 Family platform can take full advantage of SAN extension and cost-effective connectivity. Organizations can provide virtualization and storage services to clients attached either directly through Fibre Channel or by using the iSCSI protocol for cost-effective connectivity to shared storage pools. The Cisco MDS 9000 Family FCIP capability simplifies deployment of virtualization and storage services over extended distances, eliminating the need for separate channel-extension devices. The Cisco MDS 9000 Family platform is designed to support future storage protocols so that users can migrate to new technologies while retaining a consistent set of features, services, and management tools.

### Virtual SANs and IVR Enhance SAN Security and Stability

Virtual SANs (VSANs) allow more efficient SAN utilization by creating hardware-based isolated environments within a single physical fabric or switch. Each VSAN can be zoned as a typical SAN and each maintains its own network services for added scalability and resilience. VSANs allow the cost of SAN infrastructure to be shared among more users, while helping ensure absolute segregation of traffic and retaining independent control of configuration on a VSAN-by-VSAN basis. VSANs provide a protective barrier between application hosts (host VSANs) and physical storage (disk VSANs), enhancing data integrity in a virtualized storage environment.

The Cisco MDS 9000 Family Storage Services Module supports Inter-VSAN Routing, the industry's first routing function for Fibre Channel. Inter-VSAN Routing allows selective transfer of data traffic between specific initiators and targets on different VSANs while maintaining isolation of control traffic within each VSAN. With Inter-VSAN Routing, data can transit VSAN boundaries while maintaining control-plane isolation, thereby maintaining network stability and availability.

### Comprehensive Solution for Robust Network Security

Addressing the need for failproof security in storage networks, the Cisco MDS 9000 Family Storage Services Module and the various enabled storage applications seamlessly integrate into the Cisco MDS 9000 Family security infrastructure. The Cisco Storage Services Module employs intelligent packet inspection at the port level, including the application of access control lists (ACLs) for hardware enforcement of zones, VSANs, and advanced port-security features.

Extended zoning capabilities are enabled to ensure that logical unit numbers (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, the 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.

### 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 Storage Services Module implements diagnostic capabilities such as Fibre Channel traceroute for detailing the exact path and timing of flows, and it uses Switched Port Analyzer (SPAN) and Remote Switched Port Analyzer (RSPAN) to efficiently capture network traffic. After traffic has been captured, it can then be analyzed with Cisco Fabric Analyzer, an embedded Fibre Channel analyzer. Comprehensive port-based and flow-based statistics facilitate sophisticated performance analysis and service-level agreement (SLA) accounting. Integrated call-home capability is provided for added reliability, faster

problem resolution, and reduced service costs. The Cisco MDS 9000 Family with the integrated Storage Services Module delivers a comprehensive toolset for troubleshooting and analysis of an organization's virtualized storage environment.

### High Availability

Like all other Cisco MDS 9000 Family modules, the Cisco Storage Services Module is hot-swappable and fully integrates into the Cisco MDS 9000 Family high-availability architecture. Additionally, the distributed processing design of the intelligent fabric applications extends the availability and accessibility in the event of a hardware failure, helping ensure maximum uptime.

Fabric-level availability through Cisco PortChannel capability allows users to aggregate up to 16 physical links into one logical bundle. The bundle can consist of any port in the chassis, ensuring that the bundle remains active if a port, application-specific integrated circuit (ASIC), or module fails. The bundle can sustain the failure of any physical link without causing a reset.

## CISCO MDS 9000 FAMILY STORAGE SERVICES MODULE HIGHLIGHTS

Table 1 lists the features and benefits of the Cisco MDS 9000 Family Storage Services Module.

**Table 1.** Features and Benefits

| Features | Benefits |
|---|---|
| **Fibre Channel Write Acceleration** | |
| FC-WA | • Reduces the latency and increases the operational performance for SCSI writes over a distance<br>• Increases the distance for Fibre Channel-based synchronous replication |
| **Network-Accelerated Serverless Backup** | |
| High-Speed Data Mover | • Offloads I/O from the server into the storage network<br>• Removes backup-related I/O interrupt processing and I/O bus traffic<br>• Helps enable consolidation of backups and shrinking backup window<br>• Facilitates regulatory compliance<br>• Reduces number of backup servers and issues with software upgrades across many systems<br>• Minimizes security risk with too many components to manage |
| **Network-Assisted Storage Applications Through SANTap** | |
| Proxy Mode | • Allows easy insertion of SANTap into existing SAN network without any rewiring |
| No Disruption to Primary I/O | • Does not compromise the performance, integrity, or availability of the SAN |
| Network-Based SANTap Interface | • Allows multiple appliance-based applications to run concurrently without special or conflicting host software or drivers, providing flexibility to choose the storage applications and appliances to satisfy the business and operational needs |
| Logging | • Provides fast recovery |
| **Network-Hosted Storage Applications Through FAIS-Based ISAPI** | |
| Disk Pooling and Volume Management | • Helps consolidate heterogeneous storage environment<br>• Facilitates capacity on demand |
| Data Mobility | • Seamlessly updates to a new storage tier reflecting new availability or performance characteristics |
| Data Migration | • Helps Eliminate need for planned downtime and insulates servers when migrating to new storage |
| Copy Services | • Enables lower-cost storage for backups, data warehousing, and reporting |

| Features | Benefits |
|---|---|
| Consistent Management Across Heterogeneous Platforms | • With a platform-independent GUI, reduces training costs and increases IT productivity<br>• Increases the amount of storage an administrator can manage uniformly |
| **Advanced Multilayer Storage Platform** | |
| VSANs | • Provides high availability by maintaining isolation of network services, separating host access from physical storage |
| Security | • Applies extensive security measures at possible points of network attack with RADIUS authentication, unified users and passwords, Simple Network Management Protocol Version 3 (SNMPv3), VSANs, role-based access control (RBAC), VSAN-based roles, Secure Shell (SSH) Protocol, Secure File Transfer Protocol (SFTP), FC-SP, IPSec for FCIP and iSCSI, fabric-level authentication, port security, hardware-enforced zoning, LUN zoning, read-only zones, and ACLs |
| Intelligent SAN Services | • Includes access control lists (ACLs) for hardware-based intelligent frame processing, and advanced traffic-management features such as Fibre Channel Congestion Control and fabric wide quality of service (QoS) to facilitate migration from SAN islands to multilayer storage networks |
| Port Channels | • Ensures that the connectivity remains active in the event of a port, ASIC, or module failure |
| iSCSI and FCIP | • Provides multiprotocol access to clients attached either directly through Fibre Channel or by using the iSCSI protocol over Ethernet for cost-effective connectivity to shared storage pools; FCIP simplifies virtualization and storage services over extended distances |
| Sophisticated Diagnostics | • Provides intelligent diagnostics, protocol decoding, and fabric-analysis tools, as well as integrated call-home capability for added reliability, faster problem resolution, and reduced service costs |
| Built-In Device Manager and Fabric Manager | • Offers responsive, easy-to-use Java application that helps administrators to perform vital tasks such as topology discovery, fabric configuration and verification, provisioning, monitoring, and fault resolution |

## PRODUCT SPECIFICATIONS

Table 2 lists the product specifications for the Cisco MDS 9000 Family Storage Services Module.

**Table 2.** Product Specifications

| Feature | Description |
|---|---|
| **Product Compatibility** | • Cisco MDS 9000 Family |
| **Software Compatibility** | • Cisco MDS SAN-OS Release 2.0(2b) or later |
| **Protocols** | • Fibre Channel standards<br>– FC-PH, Revision 4.3 (ANSI/INCITS 230-1994)<br>– FC-PH, Amendment 1 (ANSI/INCITS 230-1994/AM1 1996)<br>– FC-PH, Amendment 2 (ANSI/INCITS 230-1994/AM2-1999)<br>– FC-PH-2, Revision 7.4 (ANSI/INCITS 297-1997)<br>– FC-PH-3, Revision 9.4 (ANSI/INCITS 303-1998)<br>– FC-PI, Revision 13 (ANSI/INCITS 352-2002)<br>– FC-PI-2, Revision 10 (ANSI/INCITS 404-2006)<br>– FC-FS, Revision 1.9 (ANSI/INCITS 373-2003)<br>– FC-FS-2, Revision 0.91<br>– FC-LS, Revision 1.2 |

| Feature | Description |
| --- | --- |
| | – FC-AL, Revision 4.5 (ANSI/INCITS 272-1996)<br>– FC-AL-2, Revision 7.0 (ANSI/INCITS 332-1999)<br>– FC-AL-2, Amendment 1 (ANSI/INCITS 332-1999/AM1-2003)<br>– FC-AL-2, Amendment 2 (ANSI/INCITS 332-1999/AM2-2006)<br>– FC-SW-2, Revision 5.3 (ANSI/INCITS 355-2001)<br>– FC-SW-3, Revision 6.6 (ANSI/INCITS 384-2004)<br>– FC-SW-4, Revision 7.5 (ANSI/INCITS 418-2006)<br>– FC-GS-3, Revision 7.01 (ANSI/INCITS 348-2001)<br>– FC-GS-4, Revision 7.91 (ANSI/INCITS 387-2004)<br>– FC-GS-5, Revision 8.2<br>– FC-BB, Revision 4.7 (ANSI/INCITS 342-2001)<br>– FC-BB-2, Revision 6.0 (ANSI/INCITS 372-2003)<br>– FC-BB-3, Revision 6.8 (ANSI/INCITS 414-2006)<br>– FCP, Revision 12 (ANSI/INCITS 269-1996)<br>– FCP-2, Revision 8 (ANSI/INCITS 350-2003)<br>– FCP-3, Revision 4 (ANSI/INCITS 416-2006)<br>– FC-SB-2, Revision 2.1 (ANSI/INCITS 349-2001)<br>– FC-SB-3, Revision 1.6 (ANSI/INCITS 374-2003)<br>– FC-VI, Revision 1.84 (ANSI/INCITS 357-2002)<br>– FC-FLA, Revision 2.7 (INCITS TR-20-1998)<br>– FC-PLDA, Revision 2.1 (INCITS TR-19-1998)<br>– FC-Tape, Revision 1.17 (INCITS TR-24-1999)<br>– FC-MI, Revision 1.92 (INCITS TR-30-2002)<br>– FC-MI-2, Revision 2.6 (INCITS TR-39-2005)<br>– FC-SP, Revision 1.6<br>– FC-DA, Revision 3.1 (INCITS TR-36-2004)<br>– FAIS, Revision 0.7<br>• IP over Fibre Channel (RFC 2625)<br>• IPv6, IPv4 and ARP over FC (RFC 4338)<br>• Extensive IETF-standards based TCP/IP, SNMPv3, and remote monitoring (RMON) MIBs<br>• Class of Service: Class 2, Class 3, Class F<br>• Fibre Channel standard port types: E, F, FL, B<br>• Fibre Channel enhanced port types: SD, ST, TE |
| **Cards, Ports, Slots** | • Thirty-two fixed auto-sensing 1/2 Gbps Fibre Channel ports |

| Feature | Description |
| --- | --- |
| **Features and Functions** | • Fabric services<br>– Name server<br>– Internet Storage Name Service (iSNS)<br>– Registered State Change Notification (RSCN)<br>– Login services<br>– Fabric Configuration Server (FCS)<br>– Private loop<br>– Public loop<br>– Translative loop<br>– Broadcast<br>– In-order delivery<br>• Advanced capability<br>– VSAN<br>– Inter-VSAN Routing<br>– PortChannel with Multipath Load Balancing<br>– QoS—flow-based, zone-based<br>– Fibre Channel Congestion Control<br>– FC Write Acceleration<br>– Network-accelerated serverless backups<br>– Network-assisted storage applications through SANTap<br>– Network-hosted storage applications through FAIS-based ISAPI<br>• Diagnostics and troubleshooting tools<br>– Power-on-self-test (POST) diagnostics<br>– Online diagnostics<br>– Internal port loopbacks<br>– SPAN and Remote SPAN<br>– Fibre Channel Traceroute<br>– Fibre Channel Ping<br>– Fibre Channel Debug<br>– Cisco Fabric Analyzer<br>– Syslog<br>– Online system health<br>– Port-level statistics<br>– Real Time Protocol Debug<br>• Network security<br>– VSANs<br>– ACLs<br>– Per-VSAN role-based access control |

<table>
<tr><th>Feature</th><th>Description</th></tr>
<tr><td></td><td>
– Fibre Channel Zoning<br>
– N_Port WWN<br>
– N_Port FC-ID<br>
– Fx_Port WWN<br>
– Fx_Port WWN and interface index<br>
– Fx_Port domain ID and interface index<br>
– Fx_Port domain ID and port number<br>
– LUN<br>
– Read-only<br>
– Broadcast<br>
– Fibre Channel Security Protocol (FC-SP)<br>
– DH-CHAP switch-switch authentication<br>
– DH-CHAP host-switch authentication<br>
– Port Security and Fabric Binding<br>
– Management access<br>
– SSH v2 implementing Advanced Encryption Standard (AES)<br>
– SNMPv3 implementing AES<br>
– Secure FTP<br>
• Serviceability<br>
– Configuration file management<br>
– Nondisruptive software upgrades for Fibre Channel interfaces<br>
– Call home<br>
– Power-management LEDs<br>
– Port beaconing<br>
– System LED<br>
– SNMP traps for alerts<br>
– Network boot
</td></tr>
<tr><td>Performance</td><td>
• Port speed: 1/2 Gbps autosensing, optionally configurable<br>
• Buffer credits: Up to 255 per port<br>
• PortChannel: Up to sixteen 2 Gbps ports<br>
• Supported optics, media, and transmission distances:
<table>
<tr><th>Optics</th><th>Media</th><th>Distance</th></tr>
<tr><td>1 Gbps—SW, LC SFP</td><td>50/125 micron multimode</td><td>500 m</td></tr>
<tr><td>1 Gbps—SW, LC SFP</td><td>62.5/125 micron multimode</td><td>300 m</td></tr>
<tr><td>1 Gbps—LW, LC SFP</td><td>9/125 micron single-mode</td><td>10 km</td></tr>
<tr><td>1 Gbps—CWDM, LC SFP</td><td>9/125 micron single-mode</td><td>Up to 100 km</td></tr>
<tr><td>2 Gbps—SW, LC SFP</td><td>50/125 micron multimode</td><td>300 m</td></tr>
</table>
</td></tr>
</table>

| Feature | Description | | |
|---|---|---|---|
| | 2 Gbps—SW, LC SFP | 62.5/125 micron multimode | 150 m |
| | 2 Gbps—LW, LC SFP | 9/125 micron single-mode | 10 km |
| | 2 Gbps—CWDM, LC SFP | 9/125 micron single-mode | Up to 100 km |
| **Reliability and Availability** | • Hot-swappable module<br>• Hot-swappable SFP optics<br>• Online diagnostics<br>• Nondisruptive supervisor failover<br>• Any-module, any-port configuration for PortChannels<br>• Fabric-based multipathing<br>• Per-VSAN fabric services<br>• Port tracking<br>• Virtual Routing Redundancy Protocol (VRRP) for management and FCIP or iSCSI connections | | |
| **Network Management** | • Access methods through Cisco MDS 9500 Family Supervisor module<br>– Out-of-band 10/100 Ethernet port (Supervisor-1)<br>– Out-of-band 10/100/1000 Ethernet port (Supervisor-2)<br>– RS-232 serial console port<br>– In-band IP over Fibre Channel<br>– DB-9 COM port<br>• Access protocols<br>– Command-line interface (CLI)—through console and Ethernet ports<br>– SNMPv3—through Ethernet port and in-band IP-over-Fibre Channel access<br>– Storage Networking Industry Association (SNIA) Storage Management Initiative Specification (SMI-S)<br>• Distributed Device Alias service<br>• Network security<br>– Per-VSAN, role-based access control using RADIUS and TACACS+ based authentication, authorization, and accounting (AAA) functions<br>– Secure FTP<br>– SSH v2 implementing AES<br>– SNMPv3 implementing AES<br>• Management applications<br>– Cisco MDS 9000 Family CLI<br>– Cisco Fabric Manager<br>– Cisco Device Manager<br>– CiscoWorks Resource Manager Essentials (RME) and Device Fault Manager (DFM) | | |
| **Programming Interfaces** | • Scriptable CLI<br>• Fabric Manager GUI<br>• Device Manager GUI | | |

| Feature | Description |
| --- | --- |
| **Environmental** | • Temperature, ambient operating<br>– 32 to 104°F (0 to 40°C)<br>• Temperature, ambient non-operating and storage<br>– -40 to 167°F (-40 to 75°C)<br>• Relative humidity, ambient (non-condensing) operating<br>– 10 to 90 percent<br>• Relative humidity, ambient (non-condensing) non-operating and storage<br>– 10 to 95 percent<br>• Altitude, operating<br>– -197 to 6500 feet (-60 to 2000 meter) |
| **Physical Dimensions** | • Dimensions (H x W x D)<br>– 1.75 x 14.4 x 16 in. (3.0 x 35.6 x 40.6 cm)<br>– Occupies one slot in a Cisco MDS 9200 or Cisco MDS 9500 chassis<br>• Weight<br>– Storage Services Module only: 10 lbs (4.5 kg) |
| **Approvals and Compliance** | • Safety Compliance<br>– CE Marking<br>– UL 60950<br>– CAN/CSA-C22.2 No. 60950<br>– EN 60950<br>– IEC 60950<br>– TS 001<br>– AS/NZS 3260<br>– IEC60825<br>– EN60825<br>– 21 CFR 1040<br>• EMC Compliance<br>– FCC Part 15 (CFR 47) Class A<br>– ICES-003 Class A<br>– EN 55022 Class A<br>– CISPR 22 Class A<br>– AS/NZS 3548 Class A<br>– VCCI Class A<br>– EN 55024<br>– EN 50082-1<br>– EN 61000-6-1<br>– EN 61000-3-2 |

| Feature | Description |
|---|---|
| | – EN 61000-3-3 |

## ORDERING INFORMATION

Table 3 provides ordering information for the Cisco MDS 9000 Family Storage Services Module.

**Table 3.** Ordering Information

| Part Number | Product Description |
|---|---|
| DS-X9032-SSM | Cisco MDS 9000 Family 32-port Storage Services Module |
| DS-SFP-FC-2G-SW | Cisco MDS 9000 Family 1/2 Gbps Fibre Channel—Shortwave, SFP optics, LC |
| DS-SFP-FC-2G-LW | Cisco MDS 9000 Family 1/2 Gbps Fibre Channel—Longwave, SFP optics, LC |
| **Advanced Software Packages** | |
| M9200SSE1K9 | Cisco MDS 9200 Storage Services Enabler Package for the Cisco MDS 9000 Family Storage Services Module |
| M9200ENT1K9 | Cisco MDS 9200 Enterprise Package |
| M9200FMS1K9 | Cisco MDS 9200 Fabric Manager Server Package |
| M9500SSE1K9 | Cisco MDS 9500 Storage Services Enabler Package for the Cisco MDS 9000 Family Storage Services Module |
| M9500ENT1K9 | Cisco MDS 9500 Enterprise Package |
| M9500FMS1K9 | Cisco MDS 9500 Fabric Manager Server Package |
| **Spare Components** | |
| DS-X9032-SSM= | Cisco MDS 9000 Family 32-port Storage Services Module, Spare |
| DS-SFP-FC-2G-SW= | Cisco MDS 9000 Family 1/2 Gbps Fibre Channel—Shortwave, SFP optics, LC, Spare |
| DS-SFP-FC-2G-LW= | Cisco MDS 9000 Family 1/2 Gbps Fibre Channel—Longwave, SFP optics, LC, Spare |
| DS-CWDM-1470= | Cisco CWDM 1470 NM Gigabit Ethernet and 1/2 Gbps Fibre Channel SFP optics, Spare |
| DS-CWDM-1490= | Cisco CWDM 1490 NM Gigabit Ethernet and 1/2 Gbps Fibre Channel SFP optics, Spare |
| DS-CWDM-1510= | Cisco CWDM 1510 NM Gigabit Ethernet and 1/2 Gbps Fibre Channel SFP optics, Spare |
| DS-CWDM-1530= | Cisco CWDM 1530 NM Gigabit Ethernet and 1/2 Gbps Fibre Channel SFP optics, Spare |
| DS-CWDM-1550= | Cisco CWDM 1550 NM Gigabit Ethernet and 1/2 Gbps Fibre Channel SFP optics, Spare |
| DS-CWDM-1570= | Cisco CWDM 1570 NM Gigabit Ethernet and 1/2 Gbps Fibre Channel SFP optics, Spare |
| DS-CWDM-1590= | Cisco CWDM 1590 NM Gigabit Ethernet and 1/2 Gbps Fibre Channel SFP optics, Spare |
| DS-CWDM-1610= | Cisco CWDM 1610 NM Gigabit Ethernet and 1/2 Gbps Fibre Channel SFP optics, Spare |
| M9200SSE1K9= | Cisco MDS 9200 Storage Services Enabler Package for the Cisco MDS 9000 Family Storage Services Module, Spare |
| M9200ENT1K9= | Cisco MDS 9200 Enterprise Package, Spare |
| M9200FMS1K9= | Cisco MDS 9200 Fabric Manager Server Package, Spare |
| M9500SSE1K9= | Cisco MDS 9500 Storage Services Enabler Package for the Cisco MDS 9000 Family Storage Services Module, Spare |

| Part Number | Product Description |
| --- | --- |
| M9500ENT1K9= | Cisco MDS 9500 Enterprise Package, Spare |
| M9500FMS1K9= | Cisco MDS 9500 Fabric Manager Server Package, Spare |

## SOLUTION COMPONENTS

Table 4 lists the available components for Cisco MDS 9000 Family storage solution.

**Table 4.** Storage Solution Components

| Software | Description |
|---|---|
| **EMC Invista** | Contact EMC for a Quote |
| **Kashya KBX5000** | Contact Kashya for a Quote |
| **Topio TDPS Fabric Edition** | Contact Topio for a Quote |
| **FalconStor IPStor with SANTap Option** | Contact FalconStor for a quote |


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