Cisco MDS 9222i Multiservice Modular Switch

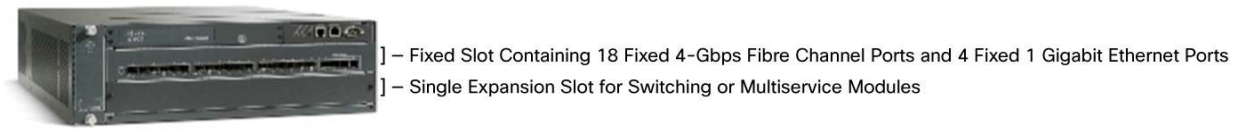
Product Overview

The Cisco® MDS 9222i Multiservice Modular Switch (Figure 1), the next generation of the highly flexible, industry-leading, proven Cisco MDS 9200 Series Multilayer Switches, is an optimized platform for deploying high-performance SAN extension solutions, distributed intelligent fabric services, and cost-effective multiprotocol connectivity for both open systems and mainframe environments. With a compact form factor, modularity, and advanced capabilities normally available only on director-class switches, the Cisco MDS 9222i is an ideal solution for departmental and remote branch-office SANs.

Sharing a consistent architecture with the Cisco MDS 9500 Series Multilayer Directors, the Cisco MDS 9222i offers 18 4-Gbps Fibre Channel ports and 4 1-Gigabit Ethernet IP storage services ports as standard in a fixed slot plus a modular expansion slot to host optional Cisco MDS 9000 Family switching and services modules. The SAN Extension over IP application package license is enabled as standard on the 4 fixed Gigabit Ethernet IP storage services ports, enabling features such as Fibre Channel over IP (FCIP) and compression on the switch without the need for additional licenses.

As the storage network continues to expand, the Cisco MDS 9000 Family switching or service module installed in the expansion slot can be removed from the Cisco MDS 9222i modular switch and migrated to Cisco MDS 9500 Series Multilayer Directors, providing high flexibility, smooth migration, common sparing, and outstanding investment protection.

Figure 1. Cisco MDS 9222i Multiservice Modular Switch



Main Features and Benefits

The Cisco MDS 9222i provides unique multilayer and multiprotocol functions in a compact three-rack-unit (3RU) form factor:

- SAN Consolidation with integrated multiprotocol support: The Cisco MDS 9222i provides as standard 18 fixed 4-Gbps Fibre Channel ports for high-performance SAN connectivity and 4 fixed Gigabit Ethernet ports for Fibre Channel over IP (FCIP) and Small Computer System Interface over IP (iSCSI) storage services.
- High-density Fibre Channel switch with 8-Gbps connectivity: The Cisco MDS 9222i supports the Cisco MDS 9000 4/44-Port 8-Gbps Host-Optimized Fibre Channel Switching Module in the expansion slot, with four of the Fibre Channel ports capable of running at 8 Gbps. Thus, the Cisco MDS 9222i cost-effectively scales up to 66 ports for both open systems and IBM Fiber Connection (FICON) mainframe environments. The Cisco MDS 9222i also supports a Cisco MDS 9000 4-Port 10-Gbps Fibre Channel Switching Module in the expansion slot.

- Intelligent application services engines: The Cisco MDS 9222i includes as standard a single application services engine in the fixed slot that enables the included SAN Extension over IP software solution package to run on the four fixed 1 Gigabit Ethernet storage services ports. The Cisco MDS 9222i can add a second services engine when a Cisco MDS 9000 18/4-Port Multiservice Module (MSM) is installed in the expansion slot. This additional engine can run a second advanced software application solution package such as Cisco MDS 9000 I/O Accelerator (IOA) to further improve the SAN Extension over IP performance and throughput running on the standard services engine. If even more intelligent services applications need to be deployed, the Cisco MDS 9000 16-Port Storage Services Node (SSN) can be installed in the expansion slot to provide four additional services engines for simultaneously running application software solution packages such as Cisco Storage Media Encryption (SME). Thus, the Cisco MDS 9222i switch platform scales from a single application service solution in the standard offering to a maximum of five heterogeneous or homogeneous application services, depending on the choice of optional service module that is installed in the expansion slot.
- Hardware-based virtual fabric isolation with virtual SANs (VSANs) and Fibre Channel routing with Inter-VSAN Routing (IVR): VSANs and IVR enable deployment of large-scale multisite and heterogeneous SAN topologies. Integration into port-level hardware allows any port in a system or in a fabric to be partitioned into any VSAN. Included in the optional Cisco MDS 9000 Enterprise advanced software package, IVR provides line-rate routing between any of the ports in a system or in a fabric without the need for external routing appliances.
- Remote SAN extension with high-performance FCIP:
  - Simplifies data protection and business continuance strategies by enabling backup, remote replication, and other disaster-recovery services over WAN distances using open-standards FCIP tunneling.
  - Optimizes utilization of WAN resources for backup and replication by enabling hardware-based compression, hardware-based encryption, FCIP write acceleration, and FCIP tape read and write acceleration; up to 16 virtual Inter-Switch Link (ISL) connections are provided on the 4 Gigabit Ethernet port through tunneling.
  - Preserves Cisco MDS 9000 Family enhanced capabilities, including VSANs, IVR, advanced traffic management, and network security across remote connections.
- Cost-effective iSCSI connectivity to Ethernet-attached servers:
  - Extends the benefits of Fibre Channel SAN-based storage to Ethernet-attached servers at a lower cost than is possible using Fibre Channel interconnect alone.
  - Increases storage utilization and availability through consolidation of IP and Fibre Channel block storage.
  - Through transparent operation, preserves the capability of existing storage management applications.
- Advanced FICON services: The Cisco MDS 9222i supports FICON environments, including cascaded FICON fabrics, VSAN-enabled intermix of mainframe and open systems environments, and N-port ID virtualization (NPIV) for mainframe Linux partitions. IBM Control Unit Port (CUP) support enables in-band management of Cisco MDS 9200 Series switches from the mainframe management console. FICON tape acceleration reduces latency effects for FICON channel extension over FCIP for FICON tape read and write operations to mainframe physical or virtual tape. This feature is sometimes referred to as tape pipelining. The Cisco MDS 9000 XRC Acceleration feature enables acceleration of dynamic updates for IBM z/OS Global Mirror, formerly known as XRC.

- Cisco Storage Media Encryption (SME) as distributed fabric service: Cisco SME encrypts data at rest on heterogeneous tape drives, virtual tape libraries (VTLs), and disk storage arrays in a SAN environment using secure IEEE standard Advanced Encryption Standard (AES) 256-bit algorithms. Cisco MDS 9222i helps ensure ease of deployment, scalability, and high availability by using innovative technology to transparently offer Cisco SME capabilities to any device connected to the fabric without the need for reconfiguration or rewiring. Cisco SME provisioning and key management are both integrated into the Cisco Data Center Network Manager (DCNM) for SAN Essentials Edition (formerly Cisco Fabric Manager); no additional software is required.
- Cisco Data Mobility Manager (DMM) as a distributed fabric service: Cisco DMM is a fabric-based data migration solution that transfers block data nondisruptively across heterogeneous storage volumes and across distances, whether the host is online or offline.
- Platform for intelligent fabric applications: The Cisco MDS 9222i provides an open platform that delivers the intelligence and advanced features required to make multilayer intelligent SANs a reality, including hardware-enabled innovations to host or accelerate applications for data migration, storage backup, data replication, and storage media encryption. Hosting or accelerating these applications in the network can dramatically improve scalability, availability, security, and manageability of the storage environment, resulting in increased utility and lower total cost of ownership (TCO).
- In Service Software Upgrade (ISSU) for Fibre Channel interfaces: Cisco MDS 9222i promotes high serviceability by allowing Cisco MDS 9000 NX-OS Software to be upgraded while the Fibre Channel ports are carrying traffic.
- Intelligent network services: Cisco MDS 9222i uses 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 fabric-wide quality of service (QoS) to facilitate migration from SAN islands to enterprise-wide storage networks.
- High-performance ISLs: Cisco MDS 9222i supports up to 16 Fibre Channel inter-switch links (ISLs) in a single PortChannel. Links can span any port on any module in a chassis for added scalability and resilience. Up to 4095 buffer-to-buffer credits can be assigned to a single Fibre Channel port to extend storage networks over very long distances.
- Comprehensive network security framework: The Cisco MDS 9222i supports RADIUS and TACACS+, Fibre Channel Security Protocol (FC-SP), Secure File Transfer Protocol (SFTP), Secure Shell (SSH) Protocol, Simple Network Management Protocol Version 3 (SNMPv3) implementing AES, VSANs, hardware-enforced zoning, ACLs, and per-VSAN role-based access control (RBAC). Additionally, the Gigabit Ethernet ports offer IP Security (IPsec) authentication, data integrity, and hardware-assisted data encryption for FCIP and iSCSI.
- IP Version 6 (IPv6) capable: The Cisco MDS 9222i supports IPv6 as mandated by the U.S. Department of Defense (DoD), Japan, and China. IPv6 support is provided for FCIP, iSCSI, and management traffic routed in-band and out-of-band.
- Sophisticated diagnostics: The Cisco MDS 9222i 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.

VSANs

Ideal for efficient, secure SAN consolidation, VSANs enable more efficient storage network utilization by creating hardware-based isolated environments with 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 helping ensure complete segregation of traffic and retaining independent control of configuration on a VSAN-by-VSAN basis.

IVR

In another step toward deploying efficient, cost-effective, consolidated storage networks, the Cisco MDS 9222i supports IVR, the industry's first routing function for Fibre Channel. IVR allows selective transfer of data 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. IVR is one of the feature enhancements provided with the Cisco MDS 9000 Enterprise advanced software package and eliminates the need for external routing appliances, greatly increasing routing scalability while delivering line-rate routing performance, simplifying management, and eliminating the challenges associated with maintaining separate systems. Deploying IVR means lower total cost of SAN ownership.

FCIP for Remote SAN Extension

Data distribution, data protection, and business continuance services are significant components of today's information-centric businesses. The capability to efficiently replicate critical data on a global scale not only helps ensure a higher level of data protection for valuable corporate information, but also increases utilization of backup resources and lowers total cost of storage ownership.

- Building on Cisco expertise and knowledge of IP networks, the Cisco MDS 9222i switch uses open-standards FCIP to break the distance barrier of current Fibre Channel solutions, enabling interconnection of SAN islands over extended distances.
- The Cisco MDS 9222i dramatically enhances hardware-based FCIP compression performance for both high-bandwidth and low-bandwidth links, providing immediate cost savings for expensive WAN infrastructure. The Cisco MDS 9222i achieves up to a 43:1 compression ratio, with typical ratios of 4:1 to 5:1 over a wide variety of data sources.
- The Cisco MDS 9222i supports hardware-based IPsec encryption for secure transmission of sensitive data over extended distances. Hardware enablement of IPsec helps ensure high throughput. Used together, hardware-based compression and hardware-based encryption provide high-performance, highly secure SAN extension capabilities.

I/O Accelerator Services

The Cisco MDS 9222i supports Cisco MDS 9000 I/OA services, an advanced software package that can significantly improve application performance when storage traffic is extended across long distances. When Fibre Channel and FCIP write acceleration is enabled, WAN throughput is optimized through reduced latency for command acknowledgments. Similarly, the Cisco MDS 9222i supports Fibre Channel and FCIP tape write acceleration, which allows operation at nearly full throughput over WAN links for remote tape backup and restore operations.

Cisco MDS 9000 IOA can be deployed in conjunction with disk data replication solutions to extend the distance between data centers or reduce the effects of latency. Cisco MDS 9000 IOA can also be used to enable remote tape backup and restore operations without significant throughput degradation. The main features of Cisco MDS 9000 IOA include:

- Extends acceleration service as a fabric service to any port in the fabric regardless of where it is attached
- Fibre Channel write acceleration (FC-WA) and Fibre Channel tape acceleration (FC-TA)
- FCIP write acceleration (FCIP-WA) and FCIP tape acceleration (FCIP-TA)
- Fibre Channel and FCIP compression
- High availability using PortChannels with acceleration over Fibre Channel and FCIP
- Unified solution for disk and tape I/O acceleration over metropolitan area networks (MANs) and WANs
- Speed-independent acceleration that accelerates 1/2/4/8/10-Gbps links and consolidates traffic over 8/10-Gigabit ISLs

Cisco SME

Cisco SME services offer solutions that enable companies to address Payment Card Industry (PCI) Data Security Standards (DSS) 2.0 compliance and other legislative regulations such as the Health Insurance Portability and Accountability Act (HIPAA) that require companies to store and protect data at rest for a specified number of years while publicly disclosing security breaches.

Cisco has services such as IP Security (IPsec) and the Cisco TrustSec® solution to address data security while data is in motion. Cisco SME addresses data security for data at rest. Cisco SME is a fabric-based service that is scalable, nonintrusive and addresses heterogeneous environments.

- Cisco SME enables data on tapes and in VTLs to be compressed, encrypted, and authenticated for centralized security management and data management and recovery.
- Cisco SME enables encryption of data for disk storage arrays.
- Cisco SME (tape or disk) is supported in the fixed slot of the Cisco MDS 9222i, and its performance can be scaled by adding a Cisco MDS 9000 18/4-Port MSM in the expansion slot.
- For ultra-high throughput, the Cisco MDS 9000 16-Port SSN is recommended because it has four encryption engines.
- Cisco SME services employ clustering technology to create a highly available solution. The cryptographic cluster formed enhances reliability and availability, provides automated load balancing and failover capabilities, and simplifies provisioning as a single SAN fabric service rather than as individual switches or modules.
- The Cisco Key Management Center (KMC) provides comprehensive key management for Cisco SME, with support for single- and multiple-site deployments. Cisco KMC provides essential features such as key archival, secure export and import and translation for distribution, and key shredding. It can also work in conjunction with the RSA RKM Appliance. For increased operational security, Smart Card readers and media are optionally available to protect master keys, facilitate master key storage, and help prevent unauthorized cryptographic cluster formation and key recovery.
- The Cisco SME license can be used to enable encryption of either tapes or storage disk arrays. You should use a separate engine and license for each.

Cisco DMM

Cisco DMM is an advanced software package comprising a fabric-based data migration solution that transfers block data nondisruptively across heterogeneous storage volumes and across distances, whether the host is online or offline. This data center-class solution helps mitigate the challenges experienced in migrating data, such as downtime, the need to add data migration software to servers, and the potential for data loss and corruption. By simply enabling the Cisco DMM feature on a Cisco MDS 9222i located anywhere in the SAN, data migration can be configured without host agents, without re-wiring, without effecting performance, and without downtime.

Mainframe Support

The Cisco MDS 9222i is mainframe-ready, with full support for IBM zSeries FICON and Linux environments provided with the Cisco MDS 9000 Mainframe advanced software package. Qualified by IBM for attachment to all FICON-enabled devices in an IBM zSeries operating environment, Cisco MDS 9222i switches support transport of the FICON protocol in both cascaded and non-cascaded fabrics, as well as an intermix of FICON and open systems Fibre Channel Protocol traffic on the same switch. VSANs simplify intermixing of SAN resources among IBM z/OS, mainframe Linux, and open systems environments, enabling increased SAN utilization and simplified SAN management. VSAN-based intermix mode eliminates the uncertainty and instability often associated with zoning-based intermix techniques. VSANs also eliminate the possibility that a misconfiguration or component failure in one VSAN will affect operation in other VSANs. VSAN-based management access controls simplify partitioning of SAN management responsibilities between mainframe and open systems environments, enhancing security. FICON VSANs can be managed using the standard Cisco DCNM for SAN Essentials Edition, the Cisco command-line interface (CLI), or IBM CUP-enabled management tools, including SA/390, Resource Measurement Facility (RMF), and Dynamic Channel Path Management (DCM).

The Cisco MDS 9000 Mainframe package is required for all Cisco MDS 9222i integrated FICON channel extension features. In combination with SAN extension capabilities, it enables FICON tape read and write acceleration. In combination with SAN extension and the Cisco MDS 9000 XRC Acceleration package, it enables acceleration of IBM z/OS Global Mirror (XRC) dynamic updates.

Advanced Traffic Management

The following advanced traffic-management capabilities are integrated as standard on the Cisco MDS 9222i:

- Virtual output queuing: Helps ensure line-rate performance on each port, independent of traffic pattern, by eliminating head-of-line blocking.
- 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 speed-matched ports 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, in the event of a switch failure, dynamically reroute traffic.

The following additional advanced traffic-management capabilities are available on the Cisco MDS 9222i with the optional Cisco MDS 9000 Enterprise advanced software package to simplify deployment and optimization of large-scale fabrics:

- Up to 4095 buffer-to-buffer credits: Can be assigned to an individual port for optimal bandwidth utilization across long distances.

- Quality of service (QoS): Can be used to manage bandwidth and control latency, to prioritize critical traffic for specific applications.
- IVR: Eliminates the need for external routing appliances, greatly increasing routing scalability while delivering line-rate routing performance, simplifying management, and eliminating the challenges associated with maintaining separate systems.
- Small Computer System Interface (SCSI) flow statistics: Collects logical unit number (LUN) - level SCSI flow statistics, including read, write, and error statistics, for any combination of initiators and targets.

Comprehensive Solution for Robust Network Security

To address the need for failure-proof security in storage networks, the Cisco MDS 9222i includes as standard an extensive security framework to protect highly sensitive data crossing today's enterprise networks:

- Smart Zoning: When the Smart Zoning feature is enabled, Cisco MDS 9000 Family fabrics provision the hardware access control entries specified by the zone set more efficiently, avoiding the superfluous entries that would allow servers (initiators) to talk to other servers, or allow storage devices (targets) to talk to other storage devices. This feature makes larger zones with multiple initiators and multiple targets feasible without excessive consumption of hardware resources. Thus, smart zones can correspond to applications, application clusters, hypervisor clusters, or other data center entities, saving the time that administrators previously spent creating many small zones, and enabling the automation of zoning tasks.
- Intelligent packet inspection is provided at the port level, including the application of ACLs for hardware enforcement of zones, VSANs, and advanced port security features.
- Extended zoning capabilities are provided to help ensure that LUNs can be accessed only by specific hosts (LUN zoning), to limit SCSI read commands for a certain zone (read-only zoning), and to restrict broadcasts to only selected zones (broadcast zones).

The following additional advanced security-management capabilities are available on the Cisco MDS 9222i with the Cisco MDS 9000 Enterprise advanced software package to further ensure the security of large-scale fabrics:

- Switch-to-switch and host-to-switch authentication helps eliminate disruptions that may occur because of unauthorized devices connecting to a large enterprise fabric.
- Port security locks down the mapping of an entity to a switch port to help ensure that SAN security is not compromised by connection of unauthorized devices to a switch port.
- VSAN-based access control allows customers to define roles in which the scope of the roles is limited to certain VSANs.
- FC-SP provides switch-switch and host-switch Diffie-Hellman Challenge Handshake Authentication Protocol (DH-CHAP) authentication supporting RADIUS and TACACS+ to help ensure that only authorized devices access protected storage networks.
- Comprehensive IPsec protocol suite delivers secure authentication, data integrity, and hardware-based encryption for both FCIP and iSCSI deployments.
- Digital certificates are issued by a trusted third party and are used as electronic passports to prove the identity of certificate owners.
- Fabric binding for open systems helps ensure that the ISLs are enabled only between switches that have been authorized in the fabric binding configuration.
- Cisco TrustSec Fibre Channel link encryption helps ensure data integrity and privacy.

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, which are included as standard on the Cisco MDS 9222i. Power-on self-test (POST) and online diagnostics provide proactive health monitoring. The Cisco MDS 9222i implements diagnostic capabilities such as Fibre Channel traceroute to detail the exact path and timing of flows, and Switched Port Analyzer (SPAN) to intelligently capture network traffic. After traffic has been captured, it can 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. With the Cisco MDS 9000 Family, Cisco delivers a comprehensive toolset for troubleshooting and analysis of storage networks.

Ease of Management

To meet the needs of all users, the Cisco MDS 9222i provides three principal modes of management: the Cisco MDS 9000 Family CLI, Cisco DCNM for SAN Essentials and Advanced Editions, and integration with third-party storage management tools.

- The Cisco MDS9222i presents a consistent, logical CLI. Adhering to the syntax of the widely known Cisco IOS® Software CLI, the Cisco MDS 9000 Family CLI is easy to learn and delivers broad management capabilities. It is an extremely efficient and direct interface designed to provide optimal functions for administrators in enterprise environments.
- Cisco DCNM can be licensed for managing a combination of SAN and LAN environments. Cisco DCNM streamlines the provisioning of the unified fabric and proactively monitors the LAN and SAN components. Cisco DCNM for SAN Essentials Edition (formerly Cisco Fabric Manager), standard with the Cisco MDS 9222i, is an easy-to-use application that simplifies management across multiple switches and converged SAN fabrics. Focused on supporting efficient operations and management of virtual machine - aware fabrics, Cisco DCNM for SAN Essentials provides a robust framework and rich feature set that fulfils the routing, switching, and storage administration needs of present and future virtualized data centers. The optional Cisco DCNM for SAN Advanced Edition (formerly Cisco Fabric Manager Server) extends the standard Cisco DCNM for SAN Essentials software by providing server federation, historical performance monitoring for network traffic hot-spot analysis, centralized management services, and advanced application integration. All standard Cisco DCNM for SAN Essentials features and functions are fully integrated with the Cisco DCNM for SAN Advanced capabilities.
- Cisco Data Center Network Manager for SAN Essentials and Advanced Editions can be used independently or in conjunction with third-party management applications. Cisco provides an extensive API for integration with third-party and user-developed management tools.

Advanced Software Packages

The Cisco MDS 9222i can be further enhanced through additional optional licensed software packages that offer advanced intelligence and functions (summarized in Tables 1, 2, 3 and 4). Currently available software packages include the following:

- Cisco MDS 9000 Enterprise package: This package includes a set of traffic engineering and advanced security features, such as extended-distance buffer-to-buffer (B2B) credits, IVR, QoS, switch-to-switch and

host-to-switch authentication, LUN zoning, and read-only zones, that are recommended for enterprise SANs.

- Cisco DCNM for SAN Advanced Edition package: This package extends Cisco DCNM for SAN Essentials Edition by providing server federation, historical performance monitoring for network traffic hot-spot analysis, centralized management services, and advanced application integration.
- Cisco MDS 9000 Mainframe package: This package is a comprehensive collection of features required for using the Cisco MDS 9500 Series and MDS 9200 Series switches in mainframe storage networks, including FICON protocol, FICON tape acceleration (read and write), CUP management, switch cascading, fabric binding, and intermixing.
- Cisco MDS 9000 XRC Acceleration package: In conjunction with the SAN Extension over IP and Mainframe packages, this package provides acceleration (channel extension) over IP for the IBM z/OS Global Mirror replication solution, reducing the effects of latency at distances of up to 20,000 km.
- Cisco MDS 9000 SME package: Separate packages for the fixed slot on the Cisco MDS 9222i and for either the Cisco MDS 9000 18/4-Port Multiservice Module or Cisco MDS 9000 16-Port SSN in the expansion slot enable Cisco SME to secure data stored on heterogeneous tapes, VTLs, and disks.
- Cisco MDS 9000 DMM package: Separate packages for the fixed slot on the Cisco MDS 9222i and the Cisco MDS 9000 18/4-Port MSM in the expansion slot enable Cisco DMM to perform fabric-based data migration that transfers block data nondisruptively across heterogeneous storage volumes and across distances, regardless of whether the host is online or offline.
- Cisco MDS 9000 IOA Services package: The Cisco MDS 9222i supports IOA services, an advanced software package that can significantly improve application performance when storage traffic is extended across long distances. When Fibre Channel and FCIP write acceleration is enabled, WAN throughput is optimized through reduced latency for command acknowledgments.
- Cisco MDS 9000 SAN Extension over IP package: The features in this package are enabled as standard on the four fixed-slot 1 Gigabit Ethernet ports with the base Cisco MDS 9222i by default without the need of an additional license. This package can scale further to multiple application copies by acquiring additional SAN extension software package licenses in conjuction with an optional Cisco MDS 9000 18/4-Port MSM or Cisco MDS 9000 16-Port SSN inserted in the expansion slot. For these optional IP storage services-enabled modules, the Cisco MDS 9000 SAN Extension over IP package provides an integrated, cost-effective, and reliable business continuance solution that uses IP infrastructure by offering FCIP for remote SAN extension, along with a variety of advanced features to optimize the performance and manageability of FCIP links.

Table 1. Advanced Software Packages Not Requiring Application Services Engine

Advanced Software Packages Not Requiring Application Services Engine	Included or Optional
Cisco DCNM for SAN Essentials Edition	Included
Cisco DCNM for SAN Advanced Edition	Optional
Cisco MDS 9000 Enterprise	Optional
Cisco MDS 9000 Mainframe	Optional
Cisco MDS 9000 XRC Acceleration	Optional[1]

Table 2. Advanced Software Packages Requiring Application Services Engine

Advanced Software Packages Requiring Application Services Engine	Standard Cisco MDS 9000 18/4-Port Engine in Fixed Slot	Cisco MDS 9000 18/4-Port MSM Engine in Expansion Slot	Cisco MDS 9000 16-Port Engine in Expansion Slot
Cisco MDS 9000 SAN Extension over IP	Included[2]	Optional	Optional
Cisco MDS 9000 IOA Services	Optional[3]	Optional[3]	Optional[3]
Cisco DMM	Optional	Optional	Possible future support
Cisco SME	Optional	Optional	Optional
Cisco Storage Services Enabler (SSE)	Optional[4]	Optional[4]	Possible future support

Notes:
1. XRC requires a Mainframe license and at least one SAN Extension over IP software license; a single XRC Acceleration license will enable XRC on any number of SAN Extension over IP licenses.
2. The single SAN Extension over IP software license included as standard cannot be used on modules in expansion slot (another copy of the license is required).
3. A single Cisco MDS 9000 IOA application can accelerate multiple SAN Extension over IP applications running concurrently on the same or different Cisco MDS 9222i switches and Cisco MDS 9500 Series Multilayer Directors with installed Cisco MDS 9000 18/4-Port MSMs or 16-Port SSNs.
4. SSE, which provides SANTap support, is available from and supported by only by certain original storage manufacturers (OSMs).

Table 3. Combinations of Advanced Software Packages Currently Supported on Cisco MDS 9000 16-Port SSN

Cisco MDS 9000 16-Port SSN	Combination 1	Combination 2
Cisco MDS 9000 16-Port SSN Engine 1	Cisco MDS 9000 IOA	Cisco SME
Cisco MDS 9000 16-Port SSN Engine 2	SAN Extension over IP	Cisco SME
Cisco MDS 9000 16-Port SSN Engine 3	SAN Extension over IP	Cisco SME
Cisco MDS 9000 16-Port SSN Engine 4	SAN Extension over IP	Cisco SME

Table 4. Ordering Summary for Application Services Package Product Ids (PIDs)

PID Type	Configure-To-Order PIDs		
Hardware Location	**Fixed Slot**	**Expansion Slot**	
Application Engines	**One**	**One**	**Four**
Software Package/Hardware	**18/4-base**	**18/4-MSM**	**SSN-16 (1 per engine)**
SAN Extension over IP	Included	M9200EXT1AK9	M92EXTSSNK9
I/O Accelerator (IOA) Services	M9222IIOA	M92IOA184	M92IOASSN
Data Mobility Manager (DMM)	M9222IDMMK9	M92DMM184K9	-
Storage Media Encryption (SME)	M9200SME1FK9	M9200SME1MK9	M92SMESSNK9
Storage Services Enabler (SSE)	M9222ISSE1K9	M9200SSE184K9	-

PID Type	Spare PIDs		
Hardware Location	**Fixed Slot**	**Expansion Slot**	
Application Engines	**One**	**One**	**Four**
Software Package/Hardware	**18/4-base**	**18/4-MSM**	**SSN-16 (1 per engine)**
SAN Extension over IP	Included	M9200EXT1AK9=	M92EXTSSNK9=
I/O Accelerator (IOA) Services	M9222IIOA=	M92IOA184=	M92IOASSN=
Data Mobility Manager (DMM)	M9222IDMMK9=	M92DMM184K9=	-
Storage Media Encryption (SME)	M9200SME1FK9=	M9200SME1MK9=	M92SMESSNK9=
Storage Services Enabler (SSE)	M9222ISSE1K9=	M9200SSE184K9=	-

Product Specifications

Table 5 lists the product specifications for the Cisco MDS 9222i.

Table 5. Product Specifications

Feature	Description
Product compatibility	Cisco MDS 9000 Family
Software compatibility	• Cisco MDS 9000 SAN-OS Release 3.2(1) or later (Note: SAN-OS 3.x releases are End-of-Life but still supported) • Cisco MDS 9000 NX-OS Release 4.1(1) or later • Cisco MDS 9000 NX-OS Release 5.0(1) or later • Cisco MDS 9000 NX-OS Release 5.2(1) or later for DCNM for SAN support
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-PI-2, Revision 10 (ANSI INCITS 404-2006) ◦ FC-PI-3, Revision 4 (ANSI INCITS 460-2011) ◦ FC-PI-4, Revision 8 (ANSI INCITS 450-2008) ◦ FC-PI-5, Revision 6 (ANSI INCITS 479-2011) ◦ FC-FS, Revision 1.9 (ANSI INCITS 373-2003) ◦ FC-FS-2, Revision 1.01 (ANSI INCITS 424-2007) ◦ FC-FS-2, Amendment 1 (ANSI INCITS 424-2007/AM1-2007) ◦ FC-FS-3, Revision 1.11 (ANSI INCITS 470-2011) ◦ FC-LS, Revision 1.62 (ANSI INCITS 433-2007) ◦ FC-LS-2, Revision 2.21 (ANSI INCITS 477-2011) ◦ FC-SW-2, Revision 5.3 (ANSI INCITS 355-2001) ◦ FC-SW-3, Revision 6.6 (ANSI INCITS 384-2004) ◦ FC-SW-4, Revision 7.5 (ANSI INCITS 418-2006) ◦ FC-SW-5, Revision 8.5 (ANSI INCITS 461-2010) ◦ FC-GS-3, Revision 7.01 (ANSI INCITS 348-2001) ◦ FC-GS-4, Revision 7.91 (ANSI INCITS 387-2004) ◦ FC-GS-5, Revision 8.51 (ANSI INCITS 427-2007) ◦ FC-GS-6, Revision 9.4 (ANSI INCITS 463-2010) ◦ FCP, Revision 12 (ANSI INCITS 269-1996) ◦ FCP-2, Revision 8 (ANSI INCITS 350-2003) ◦ FCP-3, Revision 4 (ANSI INCITS 416-2006) ◦ FCP-4, Revision 2 ◦ FC-SB-2, Revision 2.1 (ANSI INCITS 349-2001) ◦ FC-SB-3, Revision 1.6 (ANSI INCITS 374-2003) ◦ FC-SB-3, Amendment 1 (ANSI INCITS 374-2003/AM1-2007) ◦ FC-SB-4, Revision 3.0 (ANSI INCITS 466-2011) ◦ FC-BB-2, Revision 6.0 (ANSI INCITS 372-2003) ◦ FC-BB-3, Revision 6.8 (ANSI INCITS 414-2006) ◦ FC-BB-4, Revision 2.7 (ANSI INCITS 419-2008) ◦ FC-BB-5, Revision 2.0 (ANSI INCITS 462-2010) ◦ FC-VI, Revision 1.84 (ANSI INCITS 357-2002) ◦ FC-SP, Revision 1.8 (ANSI INCITS 426-2007) ◦ FAIS, Revision 1.03 (ANSI INCITS 432-2007) ◦ FAIS-2, Revision 2.23 (ANSI INCITS 449-2008) ◦ FC-IFR, Revision 1.06 (ANSI INCITS 475-2011) ◦ FC-FLA, Revision 2.7 (INCITS TR-20-1998)

Feature	Description
	◦ 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-MI-2, Revision 2.6 (INCITS TR-39-2005) ◦ FC-DA, Revision 3.1 (INCITS TR-36-2004)Class of service: Class 2, Class 3, and Class F • Fibre Channel standard port types: E, F, FL, and B • Fibre Channel enhanced port types: SD, ST, and TE • IP over Fibre Channel (RFC 2625)
Protocols (continued)	• IPv6, IPv4, and Address Resolution Protocol (ARP) over Fibre Channel (RFC 4338) • Extensive IETF-standards based TCP/IP, SNMPv3, and remote monitoring (RMON) MIBs • IP standards ◦ RFC 791 IPv4 ◦ RFC 793 and 1323 TCP ◦ RFC 894 IP/Ethernet ◦ RFC 1041 IP/802 ◦ RFC 792, 950, and 1256 ICMP ◦ RFC 1323 TCP performance enhancements ◦ RFC 2338 VRRP ◦ RFC 2460 and 4291 IPv6 ◦ RFC 2463 and 4443 ICMPv6 ◦ RFC 2461 and 2462 IPv6 neighbor discovery and stateless autoconfiguration ◦ RFC 2464 IPv6/Ethernet ◦ RFC 3270 and 3980 iSCSI ◦ RFC 3643 and 3821 FCIP • Ethernet standards ◦ IEEE Std 802.3-2005 Ethernet ◦ IEEE Std 802.1Q-2005 VLAN ◦ IPsec ◦ RFC 2401 and 4301 security architecture for IP ◦ RFC 2403 and 2404 HMAC ◦ RFC 2405, 2406, 2451, and 4303 IP ESP ◦ RFC 2407 and 2408 ISAKMP ◦ RFC 2412 OAKLEY Key Determination Protocol ◦ RFC 3566, 3602, and 3686 AES ◦ Internet Key Exchange (IKE) ◦ RFC 2409 IKEv1 ◦ RFC 4306 IKEv2
Cards, ports, and slots	• Base (fixed slot): 18 fixed autosensing 1/2/4-Gbps Fibre Channel ports and 4 fixed 1-Gbps Ethernet ports • Expansion slot: 1 empty expansion slot with support for the following: ◦ Cisco 4/44-Port 8/4-Gbps Host-Optimized Fibre Channel Switching Module ◦ Cisco MDS 9000 4-Port 10-Gbps Fibre Channel Switching Module ◦ Cisco MDS 9000 16-Port Storage Services Node (SSN)
Features and Functions	
Fabric services	• Name server • Internet Storage Name Server (iSNS) • Registered State Change Notification (RSCN) • Login services • Fabric Configuration Server (FCS) • Public loop • Broadcast • In-order delivery

Feature	Description
Advanced functions	• VSAN • IVR • PortChannel with multipath load balancing • Flow-based and zone-based QoS • FCIP tape read and write acceleration • FICON over FCIP tape read and write acceleration (pipelining) • FICON XRC (z/OS Global Mirror) acceleration • Cisco SME for tape, virtual tape, and disk
Diagnostics and troubleshooting tools	• POST diagnostics • Online diagnostics • Internal port loopbacks • SPAN and Remote SPAN (RSPAN) • Fibre Channel traceroute • Fibre Channel ping • Fibre Channel debug • Cisco Fabric Analyzer • Syslog • Online system health • Port-level statistics • Real-Time Protocol (RTP) debug
Network security	• VSANs • ACLs • Per-VSAN RBAC • Fibre Channel zoning • N-port worldwide name (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 • iSCSI zoning • iSCSI name • IP address • FC-SP • DH-CHAP switch-to-switch authentication • DH-CHAP host-to-switch authentication • Port security and fabric binding • IPsec for FCIP and iSCSI • IKEv1 and IKEv2 • Management access • SSHv2 implementing AES • SNMPv3 implementing AES • SFTP
FICON	• FC-SB-3 compliant • Cascaded FICON fabrics • Intermix of FICON and Fibre Channel Protocol traffic • CUP management interface
Serviceability	• Configuration file management • ISSU for Fibre Channel interfaces • Call home • Power-management LEDs • Port beaconing • System LED • SNMP traps for alerts

Feature	Description		
	• Network boot		
Performance	• Port speed: 1/2/4-Gbps autosensing, optionally configurable • Buffer credits: 16 per port (shared-mode ports), up to 250 per port (dedicated-mode ports), and up to 4095 on an individual port (dedicated-mode ports with optional Cisco MDS 9000 Enterprise package license activated) • Ports per chassis: 18 to 66 Fibre Channel ports and up to 20 Gigabit Ethernet ports • Ports per rack: Up to 980 • PortChannel: Up to 16 physical links • FCIP tunnels: Up to 3 per port		
	Speed	**Media**	**Distance**
Supported Cisco optics, media, and transmission distances (4-Gbps optics modules)	• 1-Gbps SW, LC SFP • 1-Gbps SW, LC SFP • 1-Gbps SW, LC SFP • 1-Gbps LW, LC SFP • 2-Gbps SW, LC SFP • 2-Gbps SW, LC SFP • 2-Gbps SW, LC SFP • 2-Gbps LW, LC SFP • 4-Gbps SW, LC SFP • 4-Gbps SW, LC SFP • 4-Gbps SW, LC SFP • 4-Gbps MR, LC SFP • 4-Gbps LW, LC SFP	• 50/125-micron multimode (OM3) • 50/125-micron multimode • 62.5/125-micron multimode • 9/125-micron single mode • 50/125-micron multimode (OM3) • 50/125-micron multimode • 62.5/125-micron multimode • 9/125-micron single mode • 50/125-micron multimode (OM3) • 50/125-micron multimode • 62.5/125-micron multimode • 9/125-micron single mode • 9/125-micron single mode	• 860m • 500m • 300m • 10 km • 500m • 300m • 150m • 10 km • 380m • 150m • 70m • 4 km • 10 km
Supported Cisco optics, media, and transmission distances (8-Gbps optics modules, supported on 4/44-Port Host Optimized 8G Fibre Channel Module only)	• 2-Gbps SW, LC SFP • 2-Gbps SW, LC SFP • 2-Gbps SW, LC SFP • 2-Gbps LW, LC SFP • 4-Gbps SW, LC SFP • 4-Gbps SW, LC SFP • 4-Gbps SW, LC SFP • 4-Gbps LW, LC SFP • 8-Gbps SW, LC SFP • 8-Gbps SW, LC SFP • 8-Gbps SW, LC SFP • 8-Gbps LW, LC SFP	• 50/125-micron multimode (OM3) • 50/125-micron multimode (OM2) • 62.5/125-micron multimode • 9/125-micron single mode • 50/125-micron multimode (OM3) • 50/125-micron multimode (OM2) • 62.5/125-micron multimode • 9/125-micron single mode • 50/125-micron multimode (OM3) • 50/125-micron multimode (OM2) • 62.5/125-micron multimode • 9/125-micron single mode	• 500m • 300m • 150m • 10km • 380m • 150m • 70m • 10km • 150m • 50m • 21m • 10km
Supported Cisco optics, media, and transmission distances (4-Gbps coarse wavelength-division multiplexing [CWDM] optics modules)	• 4-Gbps CWDM, LC SFP	• 9/125-micron single mode	• Up to 25 km (40 km in point-to-point application)
Supported Cisco optics, media, and transmission distances (Ethernet transceivers for Gigabit Ethernet ports)	• 1-Gbps SX, LC SFP • 1-Gbps SX, LC SFP • 1-Gbps LX/LH, LC SFP	• 50/125-micron multimode • 62.5/125 micron multimode • 9/125 or 10/125 micron single mode	• 550m • 275m • 10km
Supported Cisco optics, media, and transmission distances (2-Gbps CWDM optics modules)	• 1-Gbps CWDM, LC SFP • 2-Gbps CWDM, LC SFP	• 9/125-micron single mode • 9/125-micron single mode	• Up to 100 km • Up to 100 km
Supported Cisco optics, media, and transmission distances (2-Gbps dense wavelength-division multiplexing [DWDM] optics modules)	• 1-Gbps DWDM, LC SFP • 2-Gbps DWDM, LC SFP	• 9/125-micron single mode • 9/125-micron single mode	• Up to 200 km • Up to 200 km
Supported Cisco optics, media, and transmission distances (10-Gbps optics modules	• 10-Gbps SR, SC X2 • 10-Gbps SR, SC X2	• 50/125-micron multimode (OM3) • 62.5/125-micron multimode	• 300m • 33m

Feature	Description		
supported for Cisco MDS 9000 4-Port 10-Gbps Fibre Channel Switching Module only)	• 10-Gbps LR, SC X2 • 10-Gbps ER, SC X2	• 9/125-micron single mode • 9/125-micron single mode	• 10 km • 40 km
Reliability and availability	• ISSU • Hot-swappable, 1+1 redundant power supplies • Hot-swappable fan tray with integrated temperature and power management • Hot-swappable Small Form-Factor Pluggable (SFP) optics • Hot-swappable switching module • Passive backplane • Stateful process restart • Any module and any port configuration for PortChannels • Fabric-based multipathing • Per-VSAN fabric services • Port tracking • VRRP for management and FCIP or iSCSI connections • Online diagnostics		
Network management	• Access methods • Out-of-band 10/100 Ethernet port • RS-232 serial console port • In-band IP over Fibre Channel • DB-9 COM port • In-band FICON CUP over Fibre Channel • Access protocols • CLI using the console and Ethernet ports • SNMPv3 using the Ethernet port and in-band IP over Fibre Channel access • Storage Networking Industry Association (SNIA) Storage Management Initiative Specification (SMI-S) • FICON CUP • Distributed Device Alias service • Network security • Per-VSAN RBAC using RADIUS and TACACS+-based authentication, authorization, and accounting (AAA) functions • SFTP • SSHv2 implementing AES • SNMPv3 implementing AES • Management applications • Cisco MDS 9000 Family CLI • Cisco DCNM for SAN Essentials Edition • Cisco DCNM for SAN Advanced Edition (optional software license) • Cisco Device Manager • CiscoWorks Resource Manager Essentials (RME) and Device Fault Manager (DFM)		
Programming interfaces	• Scriptable CLI • Cisco DCNM web services API • Cisco Device Manager GUI		
Environmental	• Temperature, ambient operating: 32 to 104°F (0 to 40°C) • Temperature, ambient nonoperating and storage: 40 to 158°F (-40 to 75°C) • Relative humidity, ambient (noncondensing) operating: 10 to 90% • Relative humidity, ambient (noncondensing) nonoperating and storage: 10 to 95% • Altitude, operating: -197 to 6500 ft (-60 to 2000m)		
Physical dimensions	• Dimensions (H x W x D): 5.25 x 17.32 x 22.66 in. (13.34 x 43.99 x 57.56 cm), 3RUs; all units rack mountable in standard 19-inch Electronic Industries Alliance [EIA] rack) • Weight of fully configured chassis with optional switching module: 62 lb (28.2 kg)		
Power and cooling	• Power supply: 845W AC • Power Cord: notched C15 female connector mating to C16 male socket on power supply • AC input characteristics ◦ 100 to 240V AC (10% range)		

Feature	Description
	◦ 50 to 60 Hz (nominal) • Airflow (side to side) ◦ 200 linear feet per minute (LFM) through system fan assembly • Cisco recommends maintaining a minimum air space of 2.5 in. (6.4 cm) between walls and chassis air vents and a minimum horizontal separation of 6 in. (15.2 cm) between two chassis to prevent overheating
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 6 lists ordering information for the Cisco MDS 9222i.

Table 6. Ordering Information

Part Number	Description
DS-C9222i-K9	Cisco MDS 9222i Multiservice Modular Switch
Optional Components: Configure-To-Order (See Notes 1, 2 & 3)	
DS-X9316-SSNK9	Cisco MDS 9000 16-Port Storage Services Node (SSN-16)
DS-X9304-18K9	Cisco MDS 9000 Family 18/4-Port Multiservice Module
DS-X9704	Cisco MDS 9000 Family 10-Gbps 4-Port Fibre Channel Switching Module
DS-X9248-48K9	Cisco MDS 9000 Family 4/44-Port Host Optimized Fibre Channel Module
DS-SFP-FCGE-SW	Cisco MDS 9000 Family Gigabit Ethernet, 1/2-Gbps Fibre Channel-Shortwave, SFP, LC (Supported only with IP Services ports)
DS-SFP-FCGE-LW	Cisco MDS 9000 Family Gigabit Ethernet, 1/2-Gbps Fibre Channel-Longwave, SFP, LC (Supported only with IP Services ports)
DS-SFP-GE-T	Gigabit Ethernet Copper SFP, RJ-45 (Supported only with IP Services ports)
DS-SFP-FC4G-SW	Cisco MDS 9000 Family 1/2/4-Gbps Fibre Channel-Shortwave, SFP, LC (Supported only with 1/2/4-Gbps FC ports)
DS-SFP-FC4G-LW	Cisco MDS 9000 Family 1/2/4-Gbps Fibre Channel-Longwave, SFP, LC (10-km reach) (Supported only with 1/2/4-Gbps FC ports)
DS-SFP-FC8G-SW	Cisco MDS 9000 Family 2/4/8-Gbps Fibre Channel-Shortwave, SFP+, LC, (Supported on 4/44-Port Host Optimized 8G Fibre Channel Module only)
DS-SFP-FC8G-LW	Cisco MDS 9000 Family 2/4/8-Gbps Fibre Channel-Longwave, SFP+, LC (10-km reach), (Supported on 4/44-Port

Part Number	Description
	Host Optimized 8G Fibre Channel Module only)
DS-X2-FC10G-SR	10-Gbps Fibre Channel-SR X2 Transceiver (Supported only with 10-Gbps FC ports)
DS-X2-FC10G-LR	10-Gbps Fibre Channel-LR X2 Transceiver (Supported only with 10-Gbps FC ports)
DS-X2-FC10G-ER	10-Gbps Fibre Channel-ER X2 Transceiver (Supported only with 10-Gbps FC ports)
CAB-9K10A-AR	Power Cord, 250VAC 10A IRAM 2073 Plug, Argentina
CAB-9K10A-AU	Power Cord, 250VAC 10A 3112 Plug, Australia
CAB-9K10A-CH	Power Cord, 250VAC 10A GB1002 Plug, China
CAB-9K10A-EU	Power Cord, 250VAC 10A CEE 7/7 Plug, EU
CAB-9K10A-ISR	Power Cord, 250VAC 10A SI16S3 Plug, Israel
CAB-9K10A-IT	Power Cord, 250VAC 10A CEI 23-16/VII Plug, Italy
CAB-9K10A-KOR	Power Cord, 125VAC 13A KSC8305 Plug, Korea
CAB-9K10A-SA	Power Cord, 250VAC 10A SABS 164/1 Plug, South Africa
CAB-9K10A-SW	Power Cord, 250VAC 10A, Straight C15, MP232 Plug, SWITZ
CAB-9K10A-TWN	Power Cord, 125VAC 15A CNS10917-2, Taiwan
CAB-9K10A-UK	Power Cord, 250VAC 13A BS1363 Plug (13 A fuse), UK
CAB-9K12A-NA	Power Cord, 125VAC 15A NEMA 5-15 Plug, North America
CAB-C15-CBN	Cabinet Jumper Power Cord, 250 VAC 16A, C14-C15 Connectors
DS-9200-KIT-CCO	MDS 9200 Accessory Kit for Cisco
DS-9200-KIT-DM	MDS 9200 Accessory Kit for Demo
DS-9200-KIT-EMC	MDS 9200 Accessory Kit for EMC
DS-9200-KIT-HDS	MDS 9200 Accessory Kit for HDS
DS-9200-KIT-HP	MDS 9200 Accessory Kit for HP
DS-9200-KIT-IBM	MDS 9200 Accessory Kit for IBM
DS-9200-KIT-SUN	MDS 9200 Accessory Kit for SUN
Optional Advanced Software Packages: Configure-To-Order	
M9200ENT1K9	Cisco MDS 9200 Series Enterprise Package
DCNM-SAN-M92-K9	Cisco MDS 9200 Data Center Network Manager (DCNM) for SAN Advanced Edition (See Note 5)
M9200FIC1K9	Cisco MDS 9200 Series Mainframe Package
M9200EXT1AK9	Cisco MDS 9200 SAN Extension over IP Package for 18/4-Port Multiservice Module in expansion slot
M92EXTSSNK9	Cisco MDS 9200 SAN Extension over IP Package (1 engine) for the 16-Port Storage Services Node (SSN-16) module in expansion slot
M9222IIOA	Cisco MDS 9200 I/O Accelerator Services package for Cisco MDS 9222i Multiservice Switch fixed slot
M92IOA184	Cisco MDS 9200 I/O Accelerator Services package for 18/4-Port Multiservice Module in expansion slot
M92IOASSN	Cisco MDS 9200 I/O Accelerator Services package (1 engine) for Cisco MDS 9222i SSN-16 Module in expansion slot
M9222IDMMK9	Cisco MDS 9200 Data Mobility Manager package for Cisco MDS 9222i Multiservice Switch fixed slot
M92DMM184K9	Cisco MDS 9200 Data Mobility Manager package for 18/4-Port Multiservice Module in expansion slot
M9222ISSE1K9	Cisco MDS 9200 Storage Services Enabler Package for the Cisco MDS 9222i Switch fixed slot
M9200SSE184K9	Cisco MDS 9200 Storage Services Enabler Package for the Cisco MDS 18/4-Port Multiservice Module in expansion slot
M9200SME1FK9	Cisco MDS 9200 Storage Media Encryption package for Cisco MDS 9222i Multiservice Switch fixed slot
M9200SME1MK9	Cisco MDS 9200 Storage Media Encryption package for 18/4-Port Multiservice Module in expansion slot
M92SMESSNK9	Cisco MDS 9200 Storage Media Encryption package (1 engine) for Cisco MDS 9222i SSN-16 Module in expansion slot
Spare Components (See Notes 1, 2 & 3)	
DS-2SLOT-FAN=	Cisco MDS 9200 Fan Module, spare

Part Number	Description
DS-CAC-845W=	Cisco MDS 9200 AC power supply-845W, spare
DS-X9316-SSNK9=	Cisco MDS 9000 16-Port Storage Services Node (SSN-16), spare
DS-X9304-18K9=	Cisco MDS 9000 Family 18/4-Port Multiservice Module, spare
DS-X9704=	Cisco MDS 9000 Family 10-Gbps 4-Port Fibre Channel Switching Module, spare
DS-SFP-FCGE-SW=	Cisco MDS 9000 Family 1-Gbps Ethernet, 1/2-Gbps Fibre Channel-Shortwave, SFP, LC, spare (Supported only with 1/2-Gbps FC ports and IP Services ports)
DS-SFP-FCGE-LW=	Cisco MDS 9000 Family 1-Gbps Ethernet, 1/2-Gbps Fibre Channel-Longwave, SFP, LC, spare (Supported only with 1/2-Gbps FC ports and IP Services ports)
DS-SFP-GE-T=	Gigabit Ethernet Copper SFP, RJ-45, spare (Supported only with Gigabit Ethernet ports)
DS-SFP-FC4G-SW=	Cisco MDS 9000 Family 1/2/4-Gbps Fibre Channel-Shortwave, SFP, LC, spare (Supported only with 1/2/4-Gbps FC ports)
DS-SFP-FC4G-LW=	Cisco MDS 9000 Family 1/2/4-Gbps Fibre Channel-Longwave, SFP, LC (10-km reach), spare (Supported only with 1/2/4-Gbps FC ports)
DS-SFP-FC8G-SW=	Cisco MDS 9000 Family 2/4/8-Gbps Fibre Channel-Shortwave, SFP+, LC, Spare (Supported on 4/44-Port Host Optimized 8G Fibre Channel Module only)
DS-SFP-FC8G-LW=	Cisco MDS 9000 Family 2/4/8-Gbps Fibre Channel-Longwave, SFP+, LC (10-km reach), Spare (Supported on 4/44-Port Host Optimized 8G Fibre Channel Module only)
DS-X2-FC10G-SR=	10-Gbps Fibre Channel-SR X2, spare (Supported only with 10-Gbps FC ports)
DS-X2-FC10G-LR=	10-Gbps Fibre Channel-LR X2, spare (Supported only with 10-Gbps FC ports)
DS-X2-FC10G-ER=	10-Gbps Fibre Channel-ER X2, spare (Supported only with 10-Gbps FC ports)
DS-X2-E10G-SR=	10-Gbps Ethernet-SR X2, spare (Supported only with 10-Gbps FC ports)
DS-CWDM-XXXX=	Cisco XXXX NM CWDM Gigabit Ethernet and 1/2-Gbps Fibre Channel SFP, spare (where XXXX=1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610)
DS-CWDM4GXXXX=	Cisco XXXX NM CWDM 4-Gbps Fibre Channel SFP, spare (where XXXX=1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610)
DWDM-SFP-XXXX=	Cisco XXXX NM DWDM 1/2-Gbps Fibre Channel SFP, spare (where XXXX=6061, 5979, 5898, 5817, 5655, 5575, 5494, 5413, 5252, 5172, 5092, 5012, 4851, 4772, 4692, 4612, 4453, 4373, 4294, 4214, 4056, 3977, 3898, 3819, 3661, 3582, 3504, 3425, 3268, 3190, 3112, 3033)
DS-SCR-K9=	Cisco MDS 9000 Family Smart Card Reader, spare
DS-SC-K9=	Cisco MDS 9000 Family Smart Cards, spare
CAB-9K10A-AR=	Power Cord, 250VAC 10A IRAM 2073 Plug, Argentina, spare
CAB-9K10A-AU=	Power Cord, 250VAC 10A 3112 Plug, Australia, spare
CAB-9K10A-CH=	Power Cord, 250VAC 10A GB1002 Plug, China, spare
CAB-9K10A-EU=	Power Cord, 250VAC 10A CEE 7/7 Plug, EU, spare
CAB-9K10A-ISR=	Power Cord, 250VAC 10A SI16S3 Plug, Israel
CAB-9K10A-IT=	Power Cord, 250VAC 10A CEI 23-16/VII Plug, Italy, spare
CAB-9K10A-KOR=	Power Cord, 125VAC 13A KSC8305 Plug, Korea, spare
CAB-9K10A-SA=	Power Cord, 250VAC 10A SABS 164/1 Plug, South Africa, spare
CAB-9K10A-SW=	AC Power Cord, 250VAC 10A, Straight C15, MP232 Plug, SWITZ, spare
CAB-9K10A-TWN=	Power Cord, 125VAC 15A CNS10917-2, Taiwan, spare
CAB-9K10A-UK=	Power Cord, 250VAC 13A BS1363 Plug (13 A fuse), UK, spare
CAB-9K12A-NA=	Power Cord, 125VAC 15A NEMA 5-15 Plug, North America, spare
CAB-C15-CBN=	Cabinet Jumper Power Cord, 250 VAC 16A, C14-C15 Connectors, spare
DS-9200-KIT-CCO=	MDS 9200 Accessory Kit for Cisco, spare
DS-9200-KIT-DM=	MDS 9200 Accessory Kit for Demo, spare
DS-9200-KIT-EMC=	MDS 9200 Accessory Kit for EMC, spare
DS-9200-KIT-HDS=	MDS 9200 Accessory Kit for HDS, spare
DS-9200-KIT-HP=	MDS 9200 Accessory Kit for HP, spare

Part Number	Description
DS-9200-KIT-IBM=	MDS 9200 Accessory Kit for IBM, spare
DS-9200-KIT-SUN=	MDS 9200 Accessory Kit for SUN, spare
M9200ENT1K9=	Cisco MDS 9200 Series Enterprise Package, spare
DCNM-SAN-M92-K9=	Cisco MDS 9200 Data Center Network Manager (DCNM) for SAN Advanced Edition, spare
DCNM-SAN-PAK=	Cisco DCNM for SAN Advanced Edition Configurable Pack for MDS 9000 Series, spare (See Note 6)
L-DCNM-S-M92-K9=	Cisco E-delivery Data Center Network Manager (DCNM) for SAN Advanced Edition, spare
L-DCNM-S-PAK=	Cisco E-Delivery DCNM for SAN Advanced Edition Configurable Pack for MDS 9000 Series, spare (See Note 6)
M9200FIC1K9=	Cisco MDS 9200 Series Mainframe Package, spare
M9200XRC=	Cisco MDS 9200 XRC Acceleration Package for IBM series z, spare
M9200EXT1AK9=	Cisco MDS 9200 SAN Extension over IP Package for 18/4-Port Multiservice Module in expansion slot, spare
M92EXTSSNK9=	Cisco MDS 9200 SAN Extension over IP Package (1 engine) for the 16-Port Storage Services Node (SSN-16) module in expansion slot, spare
M9222iSSE1K9=	Cisco MDS 9200 Storage Services Enabler Package for the Cisco MDS 9222i Multiservice Modular Switch fixed slot, spare
M9200SSE184K9=	Cisco MDS 9200 Storage Services Enabler Package for the Cisco MDS 9000 Family MSM-18/4 in expansion slot, spare
M9200SSE1K9=	Cisco MDS 9200 Storage Services Enabler Package for the End-of-Life Cisco MDS 9000 Family Storage Services Module (SSM) in expansion slot, spare
M9222IIOA=	Cisco MDS 9200 I/O Accelerator Services License for the Cisco MDS 9222i Multiservice Modular Switch fixed slot, spare
M92IOA184=	Cisco MDS 9200 I/O Accelerator Services License for MSM-18/4 in expansion slot, spare
M92IOASSN=	Cisco MDS 9200 I/O Accelerator Services License (1 engine) for the SSN-16 in expansion slot, spare
M9200SME1FK9=	Cisco MDS 9200 Storage Media Encryption Package for Cisco MDS 9222i Multiservice Modular Switch fixed slot, spare
M9200SME1MK9=	Cisco MDS 9200 Storage Media Encryption Package for 18/4-Port Multiservice Module in expansion slot, spare
M92SMESSNK9=	Cisco MDS 9200 Storage Media Encryption Package for SSN-16 (1 engine) in expansion slot, spare
M9222IDMMK9=	Cisco MDS 9200 Data Mobility Manager (DMM) License for the Cisco MDS 9222i Multiservice Modular Switch fixed slot, spare
M92DMM184K9=	Cisco MDS 9200 Data Mobility Manager (DMM) License for 18/4-port Multiservice Module in expansion slot, spare

Note 1: For detailed information about all supported transceivers, see Cisco MDS 9000 Family pluggable transceivers.

Note 2: For detailed information about the optional Cisco MDS 9000 Family Enterprise Package Software and the Cisco DCNM software, see http://www.cisco.com/en/US/prod/collateral/ps4159/ps6409/ps6029/product_data_sheet09186a00801ca6ac.html and http://www.cisco.com/go/dcnm, respectively.

Note 3: Bundled and configure-to-order optical transceivers are shipped in the box with the product unit, but are not installed in the port cages on the unit. Spares ship separately.

Note 4: License documentation ships with switch unit in Accessory Kit for customer installation on switch.

Note 5: License documentation ships with switch unit in Accessory Kit for customer installation on management server.

Note 6: Cisco DCNM for SAN Advanced Edition Configurable Packs have additional Configure-To-Order Part Numbers not shown here which are detailed in the Cisco Dynamic Configuration Tool.

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For More Information

For more information about the Cisco MDS 9222i, visit http://www.cisco.com/en/US/products/hw/ps4159/ps4358/index.html or contact your local account representative.

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