

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 storage area network (SAN) extension solutions, distributed intelligent fabric services, and cost-effective multiprotocol connectivity for both open 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 and powered by Cisco MDS 9000 NX-OS Software, the Cisco MDS 9222i offers 18 4-Gbps Fibre Channel ports and 4 Gigabit Ethernet IP storage services ports, and an expansion slot to host Cisco MDS 9000 Family switching and services modules.

With the modularity provided by the expansion slot, the Cisco MDS 9222i has the flexibility to scale up to a 66-port Fibre Channel switch with the Cisco MDS 9000 Family 48-port 4-Gbps Fibre Channel Switching Module or to host and accelerate storage applications such as network-hosted volume management, network-assisted data protection, data migration, and backup with the Cisco MDS 9000 Family 32-port Storage Services Module. MDS 9222i is also capable of High-density connectivity through 8Gbps Fibre Channel ports—Cisco MDS 9222i supports the 4/44-Port 8-Gbps Host-Optimized Fibre Channel Switching Module which delivers a high density, cost effective connectivity option.

The Cisco MDS 9222i enables virtual fabric isolation with virtual SANs (VSANs), Fibre Channel routing with Inter-VSAN Routing (IVR), and high availability with In Service Software Upgrade (ISSU), stateful process restart, and PortChannels. Cisco MDS 9222i provides for cost-optimization through Small Computer System Interface over IP (iSCSI) connectivity to Ethernet-attached servers.

Building on Cisco expertise and knowledge of IP networks, the Cisco MDS 9222i delivers exceptional SAN extension performance, minimizes latency for disk and tape access with Fibre Channel over IP (FCIP) acceleration features, and secures sensitive traffic through hardware-based encryption with IP Security (IPsec). The Cisco MDS 9222i dramatically enhances hardware-based compression performance for both high-and low-speed links, providing immediate cost savings for expensive WAN infrastructure.

With integrated support for Intelligent Fabric Applications, the Cisco MDS 9222i provides the platform for distributed fabric services such as Cisco MDS Storage Media Encryption (SME), transparently available to any device connected to the fabric. Cisco MDS SME enables data on tapes and virtual tape libraries (VTLs) to be compressed, encrypted, and authenticated for centralized security management and data management. Integrated Cisco MDS Data Mobility Manager (DMM) is natively supported on the Cisco MDS 9222i. This enables data migration between heterogeneous targets.

As the storage network continues to expand, the Cisco MDS 9000 Family switching modules can be removed from the Cisco MDS 9222i modular switches and migrated to Cisco MDS 9500 Series directors, providing high flexibility, smooth migration, common sparing, and outstanding investment protection.

Figure 1. Cisco MDS 9222i Multiservice Modular Switch



Table 1 provides an overview of the Cisco MDS 9222i.

Table 1. Cisco MDS 9222i Multiservice Modular Switch

Description	Modular, multiservice, multiprotocol three-rack-unit (3RU) chassis with 18 4-Gbps Fibre Channel ports, 4 Gigabit Ethernet ports, and an expansion slot
Main SAN Services	<ul style="list-style-type: none"> High-density Fibre Channel switch; scales up to 66 Fibre Channel ports Virtual fabric isolation with VSANs and Fibre Channel routing with IVR High-performance FCIP SAN extension Cisco MDS SME as distributed fabric service Multiprotocol cost-optimized connectivity through Fibre Channel, iSCSI, and IBM Fibre Connection (FICON) Platform for Intelligent Fabric such as Network-hosted volume management, SANTap-enabled third-party applications, Fibre Channel Write Acceleration, and Cisco MDS Data Mobility Manager (DMM)
Modules Supported in Expansion Slot	Cisco MDS 9000 Family 4- and 10-Gbps Fibre Channel switching modules, Cisco MDS 18/4-port Multiservice Module (MSM), Cisco MDS 18/4-port Multiservice Federal Information Processing Standards (FIPS) Module (MSFM), Cisco MDS 9000 32-Port Storage Services Module (SSM), Cisco MDS 9000 8-Port IP Storage Services Module (IPS-8)
Target Deployment	Departmental SAN or remote branch office



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At-A-Glance

Key Features and Benefits

- **Integrated Fibre Channel and IP storage services in an optimized form factor:** Supports 18 4-Gbps Fibre Channel interfaces for high-performance SAN connectivity and 4 Gigabit Ethernet ports for FCIP and iSCSI storage.
- **Integrated hardware-based virtual fabric isolation with VSANs and Fibre Channel routing with IVR:** VSANs and IVR enable deployment of large-scale multisite and heterogeneous SAN topologies. Integrated VSANs in port-level hardware allow any port in a system or in a fabric to be partitioned into any VSAN. Integrated 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-standard FCIP tunneling; optimizes WAN resource utilization for backup and replication by enabling hardware-based compression, hardware-based encryption, FCIP Write Acceleration, and FCIP Tape Acceleration; and preserves 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 interconnection alone.
- **Advanced FICON services:** Supports FICON environments, including cascaded FICON fabrics, VSAN-enabled intermix of mainframe and open systems environments, and N-port ID virtualization 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.
- **High-density connectivity through 8Gbps Fibre Channel ports:** Cisco MDS 9222i supports the 4/44-Port 8-Gbps Host-Optimized Fibre Channel Switching Module which delivers a high density, cost effective connectivity option.
- **Integrated Cisco MDS SME:** Encrypts data at rest on heterogeneous tape drives and VTLs 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 MDS SME capabilities to any device connected to the fabric without the need for reconfiguration or rewiring. Cisco MDS SME provisioning and key management are both integrated into the Cisco Fabric Manager; no additional software is required.
- **Platform for intelligent fabric applications:** Provides hosting, assisting, and acceleration of storage applications such as volume management, data migration, data protection, and backup with Cisco MDS 9000 Family SSMs.

- **Intelligent network services:** 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 Fibre Channel Congestion Control and fabric-wide quality of service (QoS) to facilitate migration from SAN islands to enterprise-wide storage networks.
- **Natively supported on the Cisco MDS 9222i.** Cisco MDS 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. This data-center class solution helps to minimize 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 DMM feature on the Cisco MDS 9222i located anywhere in the SAN, data migration can be configured without host agents, without rewiring, with minimal performance impact, and without downtime.
- **High-performance Inter-Switch Links (ISLs):** Supports up to 16 Fibre Channel links in a single PortChannel, with links spanning any port on any module in the chassis for added scalability and resilience.
- **In Service Software Upgrade (ISSU) for Fibre Channel interfaces:** Promotes high serviceability by allowing Cisco MDS 9000 NX-OS Software to be nondisruptively upgraded without affecting the Fibre Channel traffic.
- **Comprehensive network security framework:** 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). RBAC provides separate control over management functions and access on a per-VSAN basis, enabling separation of duties between administrators on the same physical switch. Gigabit Ethernet ports support IPsec authentication, data integrity, and hardware-assisted data encryption.
- **IP Version 6 (IPv6) capable:** 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:** 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.





Cisco MDS 9000 Family Software License Packages

Table 2 lists the Cisco MDS 9000 Family software license packages.

Table 2. Software License Packages

License Type	Cisco MDS 9000 Family SAN Extension over IP Package	Cisco MDS 9000 Family SME Package	Cisco MDS 9000 Family Enterprise License Package	Cisco MDS 9000 Family Mainframe Package	Cisco MDS 9000 Fabric Manager Server (FMS) Package
Description	Included at no charge with Cisco MDS 9222i, the Cisco MDS 9000 Family 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.	The Cisco MDS 9000 Family SME Package allows encryption of storage media (data at rest).	The Cisco MDS 9000 Family Enterprise Package includes advanced traffic engineering and advanced security features for enterprise SANs.	The Cisco MDS 9000 Family Mainframe Package is a comprehensive collection of features required for using the Cisco MDS 9200 Series switches in mainframe storage networks, including IBM FICON protocol and CUP management, switch cascading, fabric binding, and intermixing.	The Cisco MDS 9000 Fabric Manager Server (FMS) Package extends Cisco Fabric Manager by providing historical performance monitoring for network traffic hot-spot analysis, centralized management services, and advanced application integration.
Features	FCIP support, FCIP compression, Inter-VSAN Routing for FCIP, FCIP Write Acceleration, FCIP Read/Write Tape Acceleration, SAN Extension Tuner.	Strong, standard IEEE AES-256 encryption for heterogeneous tape devices and VTLs as well as tape data compression are provided as a distributed fabric service.	Advanced traffic management (Inter-VSAN Routing, QoS, Extended Credits) and security features (switch-to-switch and host-to-switch authentication, LUN Zoning, Read-Only Zones, Port Security, VSAN-Based Access Control, IPsec for iSCSI and FCIP), Internet Key Exchange (IKE) digital certificates, and Fabric Binding for Fibre Channel.	VSAN for FICON and FCP intermixing, FICON CUP, Fabric Binding, Switch Cascading, IBM TotalStorage Virtual Tape Server, IBM TotalStorage Extended Remote Copy (XRC), FICON Native Mode and Native Mode Channel-to-Channel Operation, Persistent FICON FCID assignment, Port Swapping for host-channel cable connectors, and FICON Tape Acceleration.	Fibre Channel statistics monitoring, reporting and graphing, intelligent setup, performance database, management server, multiple fabric management, continuous health and event monitoring, common discovery, roaming user profiles, Cisco Traffic Analyzer integration, performance threshold, Web client, Cisco FMS proxy services. Data collection auto-update; customized analytics, performance charts, and reporting; and filtering by user-defined groups.



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Cisco MDS 9000 Family Switching Modules

Table 3 lists the main features of the Cisco MDS 9000 Family switching modules.

Table 3. Switching Modules



Switching Modules	Cisco MDS 9000 Family 12-port, 24-port, and 48-port 4-Gbps Fibre Channel Switching Modules	Cisco MDS 9000 Family 18/4-port Multiservice Module and 18/4-port Multiservice FIPS Module	Cisco MDS 9000 Family 4-Port 10-Gbps Fibre Channel Switching Module	Cisco MDS 9000 Family 32-Port SSM	Cisco MDS 9000 Family 8-Port IP Storage Services Module
Features	<ul style="list-style-type: none"> • 12, 24, or 48 1/2/4-Gbps Fibre Channel autosensing ports • Ability to configure 4 ports as 8Gbps Fibre Channel ports with the 4/44 Host Optimized Module • Buffer credits: 16 per port (shared mode), up to 250 per port (dedicated mode), and up to 4095 on an individual port (dedicated mode with optional Cisco MDS 9000 Family Enterprise License Package) • PortChannel: Up to 16 ports • FICON: FC-SB-3 compliant, cascaded FICON fabrics, intermix of FICON and Fibre Channel FCP traffic, and CUP management 	<ul style="list-style-type: none"> • 18 1/2/4-Gbps Fibre channel autosensing ports • 4 Gigabit Ethernet ports for long-distance SAN extension • Hardware-based compression and encryption • IPsec authentication • FCIP Write Acceleration for enhanced remote copy operation • FCIP Tape Acceleration for improved tape extension • Up to 12 FCIP tunnels • FIPS 140-2 Level-3 supported on the Cisco MDS 18/4-port Multiservice FIPS Module. 	<ul style="list-style-type: none"> • 4 10-Gbps Fibre Channel ports • Buffer credits: 16 per port (shared mode), up to 750 per port (dedicated mode), and up to 4095 on an individual port (dedicated mode with optional Cisco MDS 9000 Family Enterprise License Package) • PortChannel: Up to 16 ports • FICON: FC-SB-3 compliant, cascaded FICON fabrics, intermix of FICON and Fibre, Channel FCP traffic, and CUP management 	<ul style="list-style-type: none"> • 32 1/2-Gbps Fibre Channel autosensing ports • Fibre Channel write Acceleration and SCSI flow-statistics monitoring • Network-assisted applications with the SANTap protocol • Network-hosted applications • Network-Accelerated Serverless Backup with standards-based extended copy operation 	<ul style="list-style-type: none"> • 8 Gigabit Ethernet ports • IP storage services: FCIP, iSCSI, and Internet Storage Name Service (iSNS) • FCIP Write Acceleration for enhanced remote copy operation • FCIP Tape Acceleration for improved tape extension • Support for FICON SAN Extension over IP • 3 FCIP tunnels per port • Support for Cisco EtherChannel® technology

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