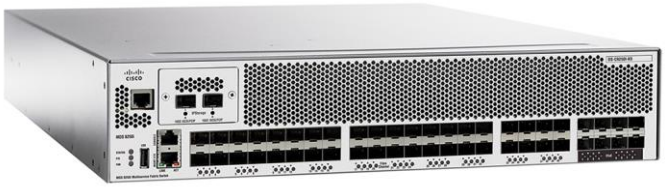
Cisco MDS 9000 Mainframe Package for Cisco MDS 9250i Multiservice Fabric Switch

Product Overview

The Cisco® MDS 9000 Mainframe Package for the Cisco MDS 9250i Multiservice Fabric Switch enables high-performance SAN extension in coordination with specialized FICON channel-extension features. Today's System z application data centers often span multiple physical locations for security and resiliancy reasons. By combining the features of the new Cisco MDS 9700 Series Multilayer Directors and the MDS 9250i switch with Cisco's robust FICON feature set, the package provides a best-in-class solution for the IBM System z data center.



Cisco MDS 9250i

Cisco MDS 9250i Features

The MDS 9250i switch provides the following hardware and software features:

- **High-density 16-Gbps FICON and Fibre Channel switching:** The MDS 9250i scales to up to forty 16-Gbps line-rate ports in a compact 2-rack-unit (2RU) fixed form factor. The base configuration comes with 20 ports of 16-Gbps FICON and Fibre Channel enabled for high-performance SAN connectivity, with an additional 20 ports of 16-Gbps FICON and Fibre Channel available with the purchase of an optional port-activation license. All ports support 4/8/16-Gbps and 2/4/8-Gbps connections in either long-wave or short-wave mode depending on the optics used.
- **Remote SAN extension with high-performance Fibre Channel over IP (FCIP):** The MDS 9250i ships with two 10 Gigabit Ethernet storage services ports and includes the Cisco SAN extension-over-IP software solution. The Cisco MDS 9250i FCIP solution includes:
  - Up to four standards-based FCIP links per 10 Gigabit Ethernet storage services port supporting long-distance System z and disk replication applications. The FCIP interfaces fully support IP quality of service (QOS) enabling traffic prioritization on the MDS 9250i and within the WAN to help ensure that the most critical applications are serviced first.
  - Hardware-based FCIP compression, providing significant cost savings on WAN Infrastructures: The MDS 9250i achieves significant compression ratios, with typical ratios of 2:1 to 5:1 over a wide range of data sources. Exact compression ratios are data dependent.
  - Hardware-based IP Security (IPSec) encryption for secure transmission of sensitive data over extended distances.

- Full interoperability with FCIP links on the Cisco MDS 9222i Multiservice Modular Switch, MDS 9000 18/4-Port Multiservice Module (MSM), and MDS 9000 16-Port Storage Services Node (SSN).

The combination of hardware-based compression and encryption and the 10 Gigabit Ethernet interfaces on the MDS 9250i provides a robust solution for extending FICON SANs for long-distance replication and access from the System z.

- **System z Specific Acceleration for remote FICON tapes and disks:** The MDS 9250i supports mainframe-specific acceleration technologies to allow remote real tapes, virtual tapes, and IBM Extended Remote Copy (XRC) mirrored disks to perform as if they were local.
  - The FICON Tape Acceleration feature on the MDS 9250i enables the FCIP links to pipeline strings of read and write operations to distant System z tape devices. For tape write operations, host-side local acknowledgments allow System z applications to write continuously without the need to wait for multiple round-trips for each FICON write operation. System z read operations are pipelined by performing an initial learning phase during early read operations and then transitioning to device-side logic that performs pre-read operations for the data. Both algorithms are designed to moderate the traffic flow on the basis of dynamic monitoring of the WAN link speed and the distance between the System z hardware and the tapes. Specialized flow control and recovery logic help ensure that the System z channels do not experience timeouts and that channel utilization is optimized. The FICON Tape Acceleration feature on the MDS 9250i has no added license cost; it is included as part of the Mainframe and SAN Extension licenses.
  - The FICON XRC Acceleration feature on the MDS 9250i enables the status updates associated with IBM z/OS Global Mirror (also known as XRC) to be pipelined so that only a single round trip occurs for each I/O operation. The XRC Acceleration logic is designed so that FCIP PortChannels can be used between the adjacent MDS 9250i switches. Similarly, multiple fabrics can operate in parallel, enabling highly scaled z/OS Global Mirror deployments. XRC Acceleration is a separately licensed feature for the MDS 9250i.

  The FICON Tape Acceleration and XRC Acceleration features are both fully interoperable with the hardware compression and encryption on the MDS 9250i.
- **Robust management:** In addition to the IBM FICON Control Unit Port (CUP) management capabilities specific to IBM System z built into the product (discussed later in this document), the MDS 9250i has a robust combination of Cisco Data Center Network Manager (DCNM) SAN and Cisco Device Manager available for FICON management. DCNM SAN provides fabric-level views and control of the FICON fabric along with time-saving wizards to simplify configuration. Device Manager provides a highly FICON-centric view for each switch individually, greatly simplifying the configuration and daily management of the FICON infrastructure.
- **Cisco In Service Software Upgrade (ISSU) for FICON and Fibre Channel interfaces:** The MDS 9250i promotes high availability by allowing Cisco MDS 9000 NX-OS Software to be upgraded while the FICON and Fibre Channel ports are carrying traffic.
- **Switch cascading:** Switch cascading supports a topology for FICON devices in which Cisco Inter-Switch Links (ISLs) can be used between a host and an I/O device. Thus, switch cascading facilitates creation of mainframe storage networks consisting of multiple switches.

Cisco MDS 9000 Mainframe Package Features

The Cisco MDS 9000 Mainframe Package on the Cisco MDS 9250i provides the following features:

- **Virtual SANs (VSANs):** Like logical partitions (LPARs) on IBM System z, VSANs provide hardware-based partitioning of a single physical infrastructure into multiple logical SANs. VSANs provide isolation of traffic, segregation of management, and management of fault domains. VSANs can be used to separate production environments from test or development environments, FICON from Fibre Channel Protocol (FCP) applications, and disk storage from tape storage. This separation can be achieved without compromising scalability, availability, manageability, or network security. Cisco FICON directors support up to eight FICON VSANs, each with its own CUP device.
- **Dynamic port number assignment:** All FICON port numbers are virtualized in the MDS 9250i FICON switch, allowing any port address to be allocated on any port within the FICON VSAN using the full defined range of 0x00 to 0xFD. When multiple FICON VSANs are used for workload segregation, ports for each VSAN can be allocated on a per-port basis with no restrictions regarding line-card allocation or use of duplicate port numbers.
- **FICON CUP:** Implementation of the FICON control device (CUP) in the MDS 9250i enables in-band management of the switch from System z servers. The CUP device also provides periodic performance information to the System z I/O subsystem, which creates IBM Resource Management Facility (RMF) Type 74, Subtype 7 records that are logged to the IBM System Management Facility (SMF) database. This allows host performance management software (such as RMF) to create FICON director activity reports in time-synchronization with the rest of the System z performance reports. On the MDS 9250i, the FICON VSAN also allocates special logical FICON port numbers for Fibre Channel over IP (FCIP) links and PortChannels so that performance of these special link types can be tracked at the IBM System z level.
- **FICON switch and director cascading:** Switch cascading supports a topology for FICON devices in which ISLs can be used between IBM System z and I/O devices. Cisco's fabric binding feature, which is required for cascaded FICON, allows only preauthorized directors and switches to participate in the FICON fabric, thus helping ensure high integrity for Cisco FICON fabrics. Multiple cascaded FICON configurations are supported, including several specific to the use of FCIP links for FICON. For more information about the topologies that IBM System z supports, see the IBM Qualification Letters at http://www.cisco.com/go/ficon. The MDS 9250i is fully interoperable with dense wavelength-division multiplexing (DWDM) solutions in addition to offering 8-Gbps extended-reach optics to facilitate metropolitan-area applications.
- **FICON Dynamic Routing and Cisco originator exchange ID (OXID) - based routing:** In the past, all Cisco FICON directors supported only ISL routing based on the source and destination addresses for each FICON channel and control-unit combination. The Cisco MDS 9000 Family has long supported a more efficient ISL routing algorithm that uses the source and destination addresses and also the Fibre Channel OXID as factors in the load-balancing decision. The OXID value changes with each new I/O operation between the channel and the control unit, thus providing much better balancing across the available ISLs. This mechanism is the default (and preferred) ISL balancing algorithm for non-FICON environments. With the new System z13 processor, IBM is introducing the FICON Dynamic Routing feature, which is the same as Cisco's OXID-based routing feature.

- **Enhanced ISL aggregation:** The MDS 9250i, as well as all earlier FICON-capable directors and switches, supports the no-cost PortChannel feature. PortChannels are virtual interfaces that consist of multiple physical ISLs. PortChannels have two valuable attributes:
  - The member links can span any available ports on the installed line cards, with no port group or application-specific integrated circuit (ASIC) limitations.
  - The member links of a PortChannel can be different lengths.

  Given these two attributes, PortChannels provide an excellent mechanism for interconnecting metropolitan-area data centers with disparate-length site-to-site links. This flexibility also provides high availability by reducing the size of failure domains.
- **Lossless in-order delivery:** When PortChannels are used for cascaded FICON VSANs, member links of the PortChannel can be nondisruptively disabled or enabled. New links can even be added to or removed from an active PortChannel without causing IBM System z experiencing a single error.

Software Release

The Cisco MDS 9000 Mainframe Package for the MDS 9250i was first supported in MDS 9000 NX-OS 6.2(11c).

License Information

The Cisco MDS 9000 Mainframe Package is licensed per director for all the ports on the director. For cascaded FICON environments, all directors in the FICON VSAN must have a mainframe package.

Ordering Information

Table 1 provides ordering information for the Cisco MDS 9000 Mainframe Package for the MDS 9250i.

Table 1. Ordering Information

Part Number	Description
M9200FIC1K9	MDS 9200 Mainframe Package License for one MDS 9250i switch
M9200FIC1K9=	MDS 9200 Mainframe Package License for one MDS 9250i switch Spare
L-M92FIC1K9=	E-Delivery MDS 9200 Mainframe Package License for one MDS 9250i switch Spare
M9200XRC	MDS 9200 Extended Remote Copy Acceleration (XRCA) Package License for one MDS 9250i switch
M9200XRC=	MDS 9200 Extended Remote Copy Acceleration (XRCA) Package License for one MDS 9250i switch Spare

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For More Information

For more information about Cisco MDS 9000 Series FICON directors and switches, visit http://www.cisco.com/go/storage or contact your local account representative.

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Printed in USA C78-735576-00 09/15