

High availability director supports highly scalable fabrics for large enterprise SANs



## IBM TotalStorage SAN Switch M12



High port density packaging saves space

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### Highlights

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- **Enterprise-level scalability and high availability with Enterprise Fabric OS 4.1**
- **FICON Director switching with Fibre Channel/FICON intermix and FICON cascading**
- **Designed to provide superior performance with up to 2 Gigabit/sec (Gbps) throughput and Inter-Switch Link (ISL) Trunking with aggregate speed up to 8 Gbps**
- **Scalable from one 32-port switch to two 64-port switches with 128 ports**
- **Offers advanced security with comprehensive, policy-based security capabilities**
- **Offers advanced fabric services such as end-to-end performance monitoring and fabric-wide health monitoring**

### IBM TotalStorage SAN Switch M12

The IBM® TotalStorage® SAN Switch M12 (M12 Director) provides 2 Gbps Fibre Channel capability and performance and advanced functions to address demands for improved security, performance and manageability as the SAN fabric grows. It is based on next-generation switch technology that is designed to be interoperable with other IBM TotalStorage SAN Switches. You can configure scalable solutions that address your needs for high performance, high availability and advanced security for environments ranging from small workgroups to very large, integrated enterprise SANs.

### High availability with Enterprise Fabric OS 4.1

The M12 Director is designed to provide Director-class high availability with redundant, hot-pluggable components and no single points of failure. Redundant control processors, power supplies, power inputs and cooling provide a design for concurrent hardware and firmware maintenance and upgrade without disruptive network operation. Enterprise Fabric OS 4.1

firmware enables non-disruptive control processor failover and concurrent firmware activation. Advanced Security enforces fabric-wide change control policies that can reduce the potential SAN downtime due to operator errors. Fabric Manager V4 provides Call Home capabilities. Installed M12 Directors may be field upgraded from Fabric OS 4.0 to Enterprise Fabric OS 4.1 at no additional price.

### **FICON Director Operation**

FICON Director switching includes FICON servers, intermixed FICON and Open servers and FICON cascading between two Directors. The Director is designed for future enhancements including FICON Control Unit Port (CUP) which enables zOS automated operations. Enhanced Call Home and RAS capabilities can help simplify management. Hardware enforced FICON and FCP port zoning enhances separation with intermix operation. ISL Trunking,

with self optimizing traffic management, can enhance performance and availability of FICON cascading. Advanced Security Activation is required for FICON cascading.

### **Industry-standard Fibre Channel**

The M12 Director is designed to provide Fibre Channel connectivity to:

- *IBM @server® iSeries™*
- *IBM @server zSeries® servers and selected s/390® servers*
- *IBM @server pSeries® and selected RS/6000® servers*
- *IBM @server xSeries® and selected Netfinity® servers*
- *Other Intel®-based servers with Windows NT® and Windows 2000®, Netware and Linux*
- *Selected Sun and HP Servers*
- *IBM TotalStorage® Enterprise Storage Server™ (ESS)*
- *IBM TotalStorage EAStT Storage Servers*

- *IBM TotalStorage Enterprise Tape Subsystem 3590 and 3592 and IBM TotalStorage Enterprise Tape Library 3494*
- *IBM TotalStorage Ultrium Tape Libraries and IBM TotalStorage Enterprise Tape Library 3584*
- *IBM TotalStorage SAN Switch F32, F16, F08, S16, and S08*

The M12 Director supports the interconnection of multiple IBM SAN Switches. The interconnection of IBM and compatible (Brocade® SilkWorm® 2400, 2800, 3200, 3800, 3900 and 12000) switches can support the creation of scalable, dual redundant core-to-edge SAN fabrics that can support high performance, scalability, and fault tolerance required e-business applications and enterprise storage management applications—such as storage consolidation, data protection, disaster tolerance and data sharing.

### **IBM TotalStorage SAN Switches**

The M12 Director is built upon a next-generation switch technology that provides link speeds of 1 and 2 Gbps. Each port supports either 100MB/sec or 200MB/sec, full-duplex data transfers. Auto-sensing ports are capable of automatically negotiating to the highest speed supported by the attached server, storage or switch.

M12 Directors can be used to expand an existing core-to-edge SAN fabric infrastructure. As M12 Directors are added to the core, installed F16, S16 and S08 Switches can be migrated to the edge. This approach helps support scalable network growth in a modular, cost-effective and non-disruptive manner while customers continue to derive benefit from installed switches.

### **Common SAN Switch functions and features**

IBM TotalStorage SAN Switches include universal ports that can automatically determine the port type when connected to a fabric port (F\_port), fabric loop port (FL\_port) or expansion port (E\_port). Fabric services include automatic self-discovery of new devices and dynamic path selection based upon Fabric Shortest Path First (FSPF) which is designed to select the most efficient routing in a SAN fabric. A mixture of shortwave and longwave ports can be configured.

### **Common firmware functions and features**

The common IBM SAN Switch firmware simplifies SAN fabric expansion. Standards-based Management Server and Simple Name Server support in-band discovery of SAN fabric changes. Management access of

SNMP information is provided via an external Ethernet interface or in-band over a Fibre Channel link through a single fabric connection.

Device-level zoning of the SAN fabric enables an administrator to create separate segments or zones within the SAN fabric to separate different application servers and devices in heterogeneous SAN environments. Zones may be dynamically created and changed from any switch in the fabric. Basic security functions such as hardware-enforced zoning are standard.

**Extended Fabric Activation** extends SAN fabrics beyond the Fibre Channel standard 10 km. This enables high performance applications over extended distances for storage consolidation, data protection, disaster tolerance and data sharing. Extended distance longwave

SFP transceivers are available for 35 km and 80 km distances. Extended Fabrics Activation helps optimize switch buffering to support high gateway switch ISL performance.

**Remote Switch Activation** extends the distance of SAN fabrics by enabling two Fibre Channel switches to interconnect over an ATM Wide Area Network (WAN). With this feature, one can stage and manage data transfers across a pair of Fibre Channel switches connected to a pair of CNT Open System Gateways.

**QuickLoop** enables servers with Fibre Channel Arbitrated Loop (FC-AL) private loop Host Bus Adapters (HBAs) to communicate with FC-AL storage devices through IBM SAN Switches. The M12 Director does not provide QuickLoop capability. However, IBM SAN Switches with QuickLoop enabled may be used to attach private loops devices to M12 Directors.

### **Switch configuration options**

A minimum switch with two 16-port switch blades and thirty-two universal ports is scalable up to two 64-port switches, each with four switch blades. A mixture of shortwave and longwave ports can be configured by adding up to 128 SFP optical transceivers.

Inter-Switch Link (ISL) Trunking, a standard capability, enables as many as four Fibre Channel links between next-generation switch technology M12, F32, F16 and F08 Switches to be combined to form a single logical ISL with an aggregate speed of up to 8 Gbps. These high-speed trunks help optimize bandwidth utilization and enhance availability.

Load balancing can help balance the load across all of the ISLs through trunking. This enables administrators to focus on overall network performance rather than individual link congestion from multiple higher performance devices sharing a single link. Administrators need only to monitor the trunk performance rather than specific devices being routed across

it. Increased network reliability and performance is supported because failed links do not require rerouting of traffic.

### **End-to-end performance monitoring**

Next-generation switching technology enables Frame Filtering, which is based upon additional information in several fields in both the packet header and payload. Frame Filtering enables new intelligent fabric services such as end-to-end performance analysis.

M12 Directors, with Frame Filtering, provide detailed information at the switch, port and frame levels. This information can be used to monitor performance end-to-end across the entire core-to-edge SAN fabric—from a specific server to a specific storage device port.

Performance Monitoring, a standard capability, provides support for Frame Filtering-based Performance Monitoring tools for enhanced end-to-end performance monitoring. As core-to-edge SAN fabrics scale up to thousands of devices, ISL

Trunking and Frame Filtering can help to simplify storage management and reduce the overall cost of the storage infrastructure.

### **Advanced security**

As entry level and departmental SAN islands evolve into large enterprise SANs, which may be interconnected over Wide Area Networks (WANs), advanced security is required to control and manage fabric access.

External threats and internal operational events can compromise valuable enterprise data assets and create data integrity exposures.

Advanced Security Activation feature can help create a secure storage networking infrastructure required for multiple protocol operation and SAN island consolidation. Advanced Security extends basic fabric security provided by Advanced Zoning hardware-enforced WWN zoning. It provides a comprehensive, policy based security system for IBM SAN Switch fabrics with Fabric OS versions 3.1 and 4.1. Prior generation switch investment protection is provided with support for Fabric OS version 2.6.1. All switches in an Advanced Security fabric must be upgraded before Advanced Security can be deployed.

### **Open fabric management**

IBM SAN Switch management framework is designed to support the widest range of solutions—from the very small workgroup SANs up to very large enterprise SAN fabrics with thousands of devices. Small SANs require rapid deployment and plug-and-play simplicity. Very large SAN fabrics require centralized management and automated administration. IBM SAN Switch management options include browser-based WEBTOOLS, Fabric Manager V3 and open standards-based interfaces to enterprise SAN managers.

WEBTOOLS is designed to provide a comprehensive set of management tools that support a Web browser interface for flexible, easy-to-use integration into existing enterprise storage management structures. The WEBTOOLS supports security and data integrity by limiting (zoning) host system attachment to specific storage systems and devices.

Fabric Watch is a standard function on M12, F32, F16, F08 (Full-Fabric), S16 and S08 Switches. Fabric Watch threshold monitoring tracks the health of switches and SAN fabric. Fabric Watch monitors fabric resources, port traffic, switch environmental values and operational values for GigaBit Interface Converters (GBIC) and optical transceivers. This information is accessible from the WEBTOOLS and Fabric Manager. When used with IBM SAN Switches, WEBTOOLS provides an easy-to-use interface to intelligent fabric features such as end-to-end performance monitoring and ISL Trunking.

### **Fabric Manager**

Fabric Manager 4.1 can help simplify management, reduce cost of administration and accelerate deployment and provisioning. It builds upon Fabric Manager V3 by offering new capabilities:

- *Configuration change management with fabric snapshot and compare*
- *Secure Fabric OS management including security policy control, audit and reporting*

- *SAN topology visualization and at-a-glance views*
- *Call home facility sends email notification to support personnel as events occur.*
- *Flexible security and policy administration and enhanced RAS and Call Home capabilities for simplified FICON operation and management.*

Fabric Manager provides a Java-based application that can simplify management of a complex, multiple switch fabrics. WEBTOOLS and Fabric Manager work together on the

same management server which can be attached to any switch in the core/edge fabric. Fabric Manager requires a Windows NT/2000 or Sun Solaris 7 server with a Netscape or Internet Explorer Web browser. Fabric Manager 4.1 with ten domains (switches) is included. Upgrade to 4.1 maximum domains is optional.

#### **IBM SAN Cabinet C36**

The C36 Cabinet is based upon a standard 19-inch rack and offers 36U vertical space. It is specifically designed to support two M12

Switches with two power distribution units, each with three power outlets. A Ruggedized Rack feature provides enhanced rigidity and stability for locations with earthquake concerns. A PDU, power distribution unit pair feature enables installation of up to three F16 and two F32 Switches with a single M12 Director.

For specific availability dates, configuration options, server models, operating system levels and attachment capabilities, please consult the Web at: **[ibm.com/storage/FCSwitch](http://ibm.com/storage/FCSwitch)**

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## IBM TotalStorage SAN Switch M12 at a glance

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Physical characteristics	M12 Director	C36 Cabinet
Height	61.24 cm/24.11 in (14U)	180.4 cm/71.0 in (36U)
Width	43.74 cm/17.22 in	64.4 cm/25.4 in
Depth	74.20 cm/29.20 in	109.8 cm/43.3 in
Weight (fully populated)	113 kg/248 lb	One M12 357 kg/784 lb Two M12s 470 kg/1032 lb
Operating environment		
Temperature	0° to 40° C/32° to 104° F	0° to 40° C/50° to 104° F
Relative humidity	20% to 85% at 40° C/104° F	8% to 80% at 40° C/104° F
Power requirements		
Power range	180 to 264 VAC, 47 to 63 Hz	200 to 240 VAC, 50 to 60 Hz

### Product numbers

2109 M12—IBM TotalStorage SAN Switch M12, a 32-port director with enclosure includes four power supplies, three fans, two control processors and two 16-port, 2 Gbps switch blades.

The base configuration includes Fabric OS Version 4.1, WEBTOOLS, Advanced Zoning, FabricWatch, ISL-Trunking, Performance Monitoring, Fabric Manager 4.1 10 domains and space for two 64-port fabrics

FC 2310—M12 Short wave SFP transceiver

FC 2320—M12 Longwave SFP transceiver

FC 2335—35 Km extended distance longwave SFP transceiver

FC 2380—80 Km extended distance longwave SFP transceiver

FC 3216—16 Port Switch Blade

### Fiber Optic Cables:

Multimode, 50u fiber optical cables and couplers with SC and/or LC connectors are available

### Advanced Fabric Features:

FC 7201—Fabric Manager 3 Max domains

FC 7250—Fabric Manager 4.1 10 domains

FC 7251—Fabric Manager 4.1 Max domains

FC 7252—Fabric Manager 4.1 upgrade to Max domains

FC 7253—Fabric Manager 3 upgrade to 4.1 Max domains

FC 7603—Extended Fabric Activation

FC 7623—M12 Advanced Security Activation

2109 C36—IBM TotalStorage SAN Cabinet C36, 19-inch rack with 36U space, designed to support two M12 Directors with two power distribution units, each with three power outlets

FC 6080—Ruggedized Rack

FC 6081—PDU pair for F32 and F16 Switch installation

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**For more information**

For more information, contact your  
IBM representative or IBM Business  
Partner. Or visit

**ibm.com**/storage/FCSwitch



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