

Scalable core-to-edge SAN fabrics for small workgroups to large enterprise SANs



IBM TotalStorage™ SAN Switch F16



High port density packaging saves rack space

Highlights

- Provides superior performance with up to 2 Gbit/sec throughput and Inter-Switch Link (ISL) Trunking with aggregate speed up to 8 Gbit/sec
- Provides broadest range of IBM open server and storage support including fabric, loop and private loop attachments
- Enables Fibre Channel connectivity to open server, disk, tape and gateway devices
- Offers 16-port Fibre Channel switch with rack space saving
- Offers advanced fabric services such as end-to-end performance monitoring
- Provides enterprise-level scalability and a fault-tolerant IBM TotalStorage SAN Switch fabric containing thousands of Fibre Channel devices
- Uses IBM TotalStorage SAN Switch Specialist to manage core-to-edge SAN fabrics
- Open fabric interfaces for centralized enterprise SAN management

IBM TotalStorage Enterprise Storage Area Network products

The IBM TotalStorage Enterprise Storage Area Network (SAN) products create a high-speed, interconnected switch fabric of centrally managed, multi-vendor heterogeneous servers and storage systems. An enterprise SAN built upon IBM SAN technology can help companies derive greater value from their business information by enabling improved IT resource management and information sharing anytime, anywhere across the enterprise.

IBM TotalStorage SAN Switch F16

The IBM TotalStorage SAN Switch F16 provides 2 Gbit Fibre Channel capability and performance and advanced functions to support demands for improved security, performance and manageability as the SAN fabric grows to include thousands of devices. It is based on next-generation switch technology that is designed to be fully interoperable with IBM TotalStorage SAN Switch S08 and S16. You can configure scalable solutions that address your needs for high performance and reliability for environments ranging from small workgroups to very large, integrated enterprise SANs.



SAN Switch Specialist Switch View

Industry-standard Fibre Channel

The IBM SAN Switch F16 is designed to provide Fibre Channel connectivity to:

- *Intel[®]-based servers running Windows NT[®]/2000 and Novell[®] NetWare[®] including IBM @server xSeries[™] and Netfinity[®] (for the most current list of supported servers and storage, visit www.ibm.com/storage/fcswitch)*
- *UNIX[®]-based servers including IBM @server pSeries[™] and selected RS/6000[®], Sun and Hewlett-Packard servers*
- *IBM @server iSeries[™] servers*
- *IBM TotalStorage Network Attached Storage 300G*
- *IBM Enterprise Storage Server[®], IBM EASiT200 and EASiT500 Storage Servers*
- *IBM Magstar[®] 3590 Subsystems and 3494 Tape Libraries*
- *IBM Ultrium and UltraScalable Tape Libraries*
- *IBM TotalStorage SAN Managed Hubs and IBM SAN Storage Hubs*

The F16 Switch supports the interconnection of multiple IBM TotalStorage SAN Switch F16s, S16s and S08s. The interconnection of IBM and compatible (Brocade[®] SilkWorm[®] 2400, 2800 and 3800) switches can create a scalable core-to-edge SAN fabric that can provide high performance, scalability, and fault tolerance required by the most demanding e-business applications and enterprise storage management

applications—such as storage consolidation, data protection, disaster tolerance and data sharing.

IBM TotalStorage SAN Switches

IBM SAN Switch S08 and S16 support ANSI-standard Fibre Channel protocol at 1 Gbit/sec. The F16 Switch is built upon a next-generation switch technology that provides link speeds of 1 and 2 Gbit/sec. Each port supports either 100 MB/sec or 200 MB/sec, full-duplex data transfers. Auto-sensing ports automatically negotiate to the highest speed supported by the attached server, storage or switch.

The F16 Switch is ideally suited for disaster tolerance solutions such as remote tape vaulting and remote disk mirroring. F16 Switches can provide up to twice the throughput of S16 Switches. This performance capability can be used to either reduce the number of expensive extended distance ISL connections or to improve the performance with the same number of connections.

F16 Switch fabrics can provide up to twice the performance of S16 Switch fabrics. Customers can now deploy F16 Switches that are ready to exploit the performance potential of newer servers and storage devices with 2 Gbit/sec capabilities.

F16 Switches can be used to expand an existing core-to-edge SAN fabric infrastructure. As F16 Switches are

added to the core, installed S16 Switches can be migrated to the edge. This approach supports scalable network growth in a modular, cost-effective and non-disruptive manner with investment protection for 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 short-wave and long-wave ports can be configured. Rack-mounted installation is standard, and desktop installation is available. High availability is supported by hot pluggable cooling fans and optics. An additional power supply provides redundant power and dual line cords.

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 Fabrics 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. ISLs using extended long-wave transceivers, Fibre Channel repeaters and Dense Wave Division Multiplexing (DWDM) devices can provide Metropolitan Area Network (MAN) connectivity distances. Extended Fabrics Activation helps optimize switch buffering to provide high performance by configuring gateway switch ISLs with additional buffer credits.

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. Individual switch ports may be designated as FL_Ports, allowing a private host initiator to communicate with FC-AL storage devices as though they were all contained in one logical loop.

Switch configuration options

Eight short-wave (500 M at 1 Gbit/sec, 300 M at 2 Gbit/sec) universal ports are standard. In addition, a mixture of short-

wave and long-wave (10 km) ports can be configured by adding up to eight SFP optical transceivers. SFP LC connectors provide higher port density and cut rack space height requirements in half.

Inter-Switch Link (ISL) Trunking enables as many as four Fibre Channel links between F16 Switches to be combined to form a single logical ISL with an aggregate speed of up to 8 Gbit/sec. 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.

IBM S08 and S16 Switches provide performance information at the switch or port level. IBM F16 Switches with Frame Filtering provide detailed information at the frame level. 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. This enhanced performance monitor can enable more detailed Service Level Agreement (SLA) monitoring and billing.

Performance Bundle Activation provides support for ISL Trunking- and 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 greatly simplify storage management and reduce the overall cost of the storage infrastructure.

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 a browser-based IBM TotalStorage SAN Switch Specialist and open standards-based interfaces to enterprise SAN managers. With an industry-standard SNMP interface, customers know that IBM TotalStorage SAN Switches can gain the benefits of being centrally managed with Tivoli® SAN management software.

IBM TotalStorage SAN Switch Specialist 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 Switch Specialist supports security and data integrity by limiting (zoning) host system attachment to specific storage systems and devices.

Fabric Watch is a standard function on F16, S16* and S08* Switches. Fabric Watch threshold monitoring tracks the health of switches and SAN fabric. Fabric

IBM TotalStorage SAN Switch F16 at a glance

Physical characteristics

Height (rack-mount)	4.33 cm/1.72 in (1U)
Height (table-top)	4.72 cm/1.86 in (1U)
Width	42.9 cm/16.9 in
Depth	62.2 cm/24.5 in
Weight (single power)	10.65 kg/23.5 lb
(dual power supply)	12.7 kg/28.0 lb

Operating environment

Temperature	10° to 40° C/50° to 104° F
Relative humidity	5% to 80% at 40° C/104° F

Power requirements

Power range	85 to 264 VAC, 47 to 63 Hz
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Product numbers

2109 F16 (PN 2109F16)—IBM TotalStorage SAN Switch with eight short-wave transceivers. One to eight additional short-wave or long-wave transceivers are optional.

FC 2210 (PN 19K 1271)—Shortwave Transceiver

FC 2220 (PN 19K 1272)—Longwave Transceiver

FC 9205—Non-rack mount install

FC 5602 (PN 19K 1247)—Fibre Channel cable, LC/LC, multimode optical, 50.0u, 2 (1) meters

FC 5607 (PN 19K 1248)—Fibre Channel cable, LC/LC, multimode optical, 50.0u, 7 (5) meters

FC 5631 (PN 19K 1249)—Fibre Channel cable, LC/LC, multimode optical, 50.0u, 31 (25) meters

FC 5702 (PN 19K 1250)—Fibre Channel LC/SC coupling cable, multimode optical, 50.0u, 2 (2) meters

FC 6203 (PN 18P3576)—Additional power supply

FC 7302 (PN 18P3579)—Remote Switch Activation

FC 7303 (PN 18P3580)—Extended Fabric Activation

FC 7421 (PN 18P3590)—Performance Bundle

RPQ 8S0521—QuickLoop

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 Switch Specialist. When used with F16 Switches, the Specialist provides an easy-to-use interface to intelligent fabric features such as end-to-end performance monitoring and ISL Trunking.

Enterprise SAN fabric management

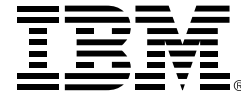
Fabric Watch can send alerts to enterprise SAN fabric management software from vendors such as Computer Associates, Hewlett Packard, Tivoli, and VERITAS.

Brocade Fabric Access Layer API server agents are available on IBM SAN

Switches. Only a single connection to the fabric is required to access any switch or fabric-wide resource. Brocade intends to extend this API to offer multiple-fabric management capabilities and persistence of information such as configuration, event history and performance statistics. A fabric-attached host server with a Fabric Service agent is expected to be the foundation for managing multiple independent fabrics under a common set of policies and procedures. Fabric Access Layer API is accessible by Brocade Fabric Access Partners.

For more information

For more information, contact your IBM representative or IBM Business Partner. Or visit ibm.com/storage/fcswitch.



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IBM Corporation
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02-02
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* Models S08 and S16 shipped after March 23, 2001.

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