

Designed for high-performance, scalable and simple-to-use midrange and enterprise SAN solutions



IBM TotalStorage SAN32B-2



High port density design with 32 ports in 1U height helps save rack space

Highlights

- **Simple-to-use midrange and enterprise infrastructure simplification and business continuity solutions for IBM System i™, System p™, System x™ and System z™ servers**
- **Provides broad range of open server Fibre Channel and main-frame FICON® switching including FICON/Fibre Channel Intermix, FICON CUP (Control Unit Port) and FICON cascading**
- **Designed for high-performance with 4 Gbps ports and enhanced Inter-Switch Link (ISL) trunking with up to 32 Gbps per data path**
- **Multiple management options for first-time storage area network (SAN) users and complex enterprise SAN consolidation solutions**
- **Pay-as-you-grow scalability with Ports on Demand features**
- **Interoperability with the IBM TotalStorage® SAN b-type switch family helps protect switch investment**
- **Designed to support high availability with redundant, hot-swappable fans and power supplies and non-disruptive software upgrades**

IBM TotalStorage midrange solutions

A wide range of IBM TotalStorage midrange and enterprise storage area network (SAN) infrastructure simplification and business continuity solutions can be created with the IBM TotalStorage SAN32B-2 fabric switch. Infrastructure simplification solutions for IBM System i, System p, System x and System z include storage consolidation and high-availability server clustering with IBM TotalStorage and System Storage™ disk storage arrays. Business continuity solutions include data protection with IBM System Storage tape libraries and devices and IBM Tivoli® Storage Manager data protection software.

Infrastructure simplification solutions

A mid-level storage consolidation solution consists of up to 14 servers attached to one 16-port SAN32B-2 switch with two disk storage arrays. Ports on Demand feature is designed to enable this solution to scale-up to a midrange 32-port switch without taking the switch offline.

A high-availability server clustering solution can be created with redundant switches, as shown in Diagram #1. A midrange server clustering solution consists of up to 30 servers—each with dual Fibre Channel adapters—cross-connected to redundant SAN32B-2 switches with two disk storage arrays, each with dual adapters.

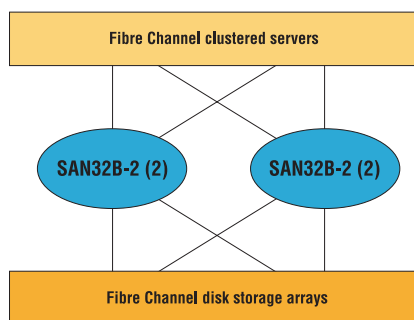


Diagram #1: High-availability server clustering solution with redundant switch fabrics

This server clustering solution can be scaled-up to 60 servers by cascading two additional SAN32B-2 switches, each with two 4 Gbps Inter-Switch Links (ISLs) for optimum performance and resiliency. Additional IBM TotalStorage SAN b-type switches (IBM 2005 and IBM 2109) can be added for almost unlimited scalability.

Data protection solutions

A mid-level data protection solution consists of up to 14 servers attached to one 16-port SAN32B-2 switch, with one disk storage array and a library with one tape drive.

Diagram #2 on the next page shows an expanded Metro Mirror solution designed to help protect data and provide disaster tolerance which can be created by cascading two 32-port SAN32B-2 switches, each with two 4 Gbps shortwave or longwave ISLs to

support resiliency, in both sites. The local and recovery sites are connected with two longwave ISLs that can be supported at 10 km, 35 km or 80 km distances with standard transceiver features. The Extended Fabric Activation feature helps maintain full 4 Gbps operation at distances up to 100 kilometers. Connectivity via a router (such as the IBM System Storage SAN18B-R which can convert Fibre Channel Protocol to Internet Protocol) enables business continuity solutions over wide area networks (WANs).

The local site and the remote site can support a combination of up to 60 server, disk storage array and tape library drive connections. Additional IBM TotalStorage SAN b-type switches can be added for almost unlimited scalability.

IBM TotalStorage enterprise solutions

A wide range of IBM TotalStorage enterprise SAN infrastructure simplification and business continuity solutions can be created with the IBM TotalStorage SAN32B-2 fabric switch. The SAN32B-2 switch can be used as a high-performance core switch for enterprise SANs. The switch may also be used as an edge switch with larger IBM b-type directors in large enterprise SANs. Fabric Manager with core-to-edge SAN management is offered for advanced enterprise solutions including tape and disk SAN island consolidation.

Tape and disk SAN consolidation can be especially attractive when extended-distance links between local and remote sites can be shared. For example, IBM TotalStorage business continuity Metro Mirror solutions and solutions designed to help protect data and provide disaster tolerance can share links in an enterprise SAN environment.

High-performance

The IBM TotalStorage SAN32B-2 switch provides 4 Gbps performance on all ports. Each switch port auto-negotiates to 1 Gbps, 2 Gbps or 4 Gbps depending upon the device

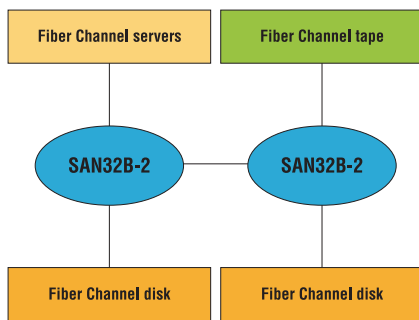


Diagram #2: Disaster tolerant solutions with 4 Gbps operation up to 100 kilometers between sites

attachment. With 32-port configurations, up to 256 Gbps throughput is possible. Up to full 4 Gbps throughput at extended distances of up to 100 km is enabled with additional buffer credits and Extended Fabric Activation.

Pay-as-you-grow scalability

Ports on Demand features are designed to support scalable switch upgrades. All Ports on Demand features provide an activation key that upgrades the switch in eight-port increments while helping avoid fabric disruption. Shortwave and/or longwave small form-factor pluggable (SFP) transceiver features are required for each upgrade. The ability to increase switch capacity while maintaining service helps customers implement a pay-as-you-grow strategy.

High-availability features

Midrange and enterprise SAN users require high-availability switch fabric solutions. The IBM TotalStorage SAN32B-2 fabric switch uses advanced application-specific integrated circuits (ASICs) to help minimize the number of components and improve reliability. The SAN32B-2 switch provides hot-swappable, load-sharing dual power supplies that are designed to allow the switch to remain online if one power supply fails. Dual power cords allow attachment to separate power sources to help improve availability. Hot-swappable power and cooling components help eliminate downtime for service when replacing a failed component and help reduce or eliminate the risk of erroneously cabling a replacement switch because of a simple component failure. Hot-pluggable optical transceivers are designed to be replaced without taking the switch offline.

FICON Switch Operation

FICON switching includes FICON servers, intermixed FICON and Open servers and FICON cascading between

two switches. FICON CUP Activation provides Control Unit Port (CUP) in-band management functions which is designed to allow mainframe applications to perform configuration, monitoring and statistics collection. These applications include System Automation for OS/390 (SA/390), Dynamic Channel Management Facility (DCM) and Resource Measurement Facility (RMF). 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 the performance and availability of FICON cascading. Advanced Security Activation is required for FICON cascading. FICON CUP and Security Activation Bundle provides an affordable bundle of these features.

N_Port ID Virtualization (NPIV)

N_Port ID Virtualization (NPIV) provides support for attached IBM System Z9™ Fibre Channel Protocol (FCP) channels and is designed to allow the sharing of a single physical FCP channel among operating system images, whether in LPARs or as z/VM guests in virtual machines.

NPIV helps to improve I/O performance with increased resource sharing and channel utilization of FCP channels among operating system images in LPARs or virtual machines and helps to facilitate infrastructure simplification with virtual channel administration and management.

Switch investment protection

IBM TotalStorage SAN b-type switches use common switch firmware—from the eight-port IBM TotalStorage SAN switch up to the 256-port SAN director—which helps simplify SAN fabric expansion. Common firmware supports forward and backward interoperability of the SAN32B-2 switch and helps simplify deployment. Auto-sensing 1, 2 and 4 Gbps ports help simplify switch deployment with existing SAN infrastructures. IBM SAN32B-2 ISL trunking can interoperate with existing 2 Gbps switches. The SAN32B-2 switch is 4 Gbps-ready to help take advantage of upgrading to higher-performance servers, storage and switches.

Multiple management options

The IBM TotalStorage SAN32B-2 switch provides several options to help manage the SAN.

WEBTOOLS is provided for first-time SAN users with minimum SAN expertise. WEBTOOLS is integrated with the IBM TotalStorage SAN32B-2 switch to help simplify monitoring and configuration management. 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. WEBTOOLS is designed to support security and data integrity by limiting (zoning) host system attachment to specific storage systems and devices. WEBTOOLS capabilities and functionality can help simplify management of your SAN solution.

Fabric Watch is a standard function on IBM SAN b-type switches. Fabric Watch threshold monitoring is designed to track the health of switches and the SAN fabric. Fabric Watch monitors fabric resources, port traffic, switch environmental values and operational values for optical transceivers. This information is accessible from WEBTOOLS.

Performance Bundle Activation provides support for enhanced ISL trunking and frame filtering-based performance monitoring tools for enhanced end-to-end performance monitoring.

WEBTOOLS provides an easy-to-use interface designed to allow end-to-end performance monitoring and ISL trunking. ISL trunking and frame filtering can help simplify storage management and reduce the overall cost of the storage infrastructure.

IBM SAN32B-2 switch enhanced ISL trunking enables as many as eight 4 Gbps links between SAN32B-2 switches with an aggregate speed of up to 32 Gbps.

IBM SAN32B-2 switches may also fully interoperate with existing 2 Gbps IBM SAN b-type switches and directors, which can combine up to four 2 Gbps ISLs 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 distribute the workload across all the ISLs through trunking. This enables administrators to focus on overall network performance rather than individual link congestion from multiple high-performance devices sharing a single link.

Advanced security

As entry-level and departmental SAN islands evolve into large enterprise SANs, which may be interconnected over WANs, advanced security is required to help 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 is designed to help secure storage networking infrastructure required for multiple-protocol operation and SAN island consolidation. Advanced Security Activation extends basic fabric security features provided by Advanced Zoning hardware-enforced worldwide name (WWN) zoning. It is designed to provide a comprehensive, policy-based security system for IBM SAN b-type switch fabrics with Fabric OS V3 and V4. Support for Fabric OS V2.6.2 helps protect prior generation switch investment. All switches in an advanced security fabric must be upgraded before Advanced Security Activation can be deployed.

Enterprise SAN fabric management

Fabric Manager V5 is designed to help simplify management, reduce administration costs and accelerate deployment and provisioning. It builds upon previous versions of Fabric Manager by offering new capabilities:

- *Configuration change management with fabric snapshot and compare*
- *Secure Fabric OS management features include security policy control, audit and reporting*
- *SAN topology visualization and at-a-glance views*
- *Call-home facility is designed to send e-mail notification to support personnel as certain events occur*

Fabric Manager provides an application based on Java™ technology that can help simplify management of 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-to-edge fabric. In addition, Fabric Manager V5 can manage up to 80 switches or up to 2,300 ports. Fabric Manager V5 is supported on Windows® 2000, Windows 2003, Windows XP, Sun™ Solaris 8 or 9 server platforms and is available through IBM as a separate software program.

Open fabric management

The IBM SAN b-type switch management framework is designed to support a wide range of solutions—from very small workgroup SANs 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 b-type switch management options include browser-based WEBTOOLS and open standards-based interfaces to enterprise SAN managers.

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

Extended Fabric Activation extends SAN fabrics beyond the Fibre Channel standard of 10 km. This is designed to enable business continuity solutions to maintain high performance 4 Gbps operation over extended distances up to 100 km. Extended-distance long-wave SFP transceivers are available for 35 km and 80 km distances. Extended Fabric Activation helps optimize switch buffering to provide high performance by configuring switch ISLs with additional buffer credits.

Remote Switch Activation is designed to extend the distance of SAN fabrics by enabling two Fibre Channel switches to support asynchronous data transfers across WANs. This feature is designed to allow one to stage and manage data transfers across a pair of CNT Open System Gateways across an asynchronous transfer mode WAN.

Flexible Fibre Channel connectivity

The TotalStorage SAN32B-2 switch is designed to provide Fibre Channel connectivity to:

- *IBM System x and selected Netfinity® servers*
- *Other Intel® processor-based servers running Microsoft Windows NT®, Windows 2000, Windows Server™ 2003, Red Hat Enterprise Linux® 3, SUSE Linux or Novell NetWare*
- *IBM System p servers and selected RS/6000® servers*
- *IBM System i models*

- *Selected Sun and HP servers*
- *IBM System z servers and selected S/390 servers*
- *IBM TotalStorage Enterprise Storage Server® systems*
- *IBM TotalStorage DS4000 series (formerly EAStT Storage Servers)*
- *IBM TotalStorage DS8000 series and DS6000 series*
- *IBM TotalStorage 3590 and 3592 Tape Drives and IBM TotalStorage 3494 Tape Library*
- *IBM TotalStorage 3582, 3583 and 3584 Tape Libraries*
- *IBM TotalStorage NAS Gateway 500*
- *IBM TotalStorage SAN Volume Controller*
- *IBM TotalStorage SAN b-type and Brocade switches and directors*

For the most current and complete information, refer to **ibm.com/totalstorage/san/b-type**.

IBM TotalStorage SAN32B-2 fabric switch at a glance

Physical characteristics

Height (rack mount)	42.4 mm/1.67 in (1U)
Width	429 mm/16.9 in
Depth	584 mm/23 in
Weight	10.2 kg/22.4 lbs

Operating environment

Temperature	0° C to 40° C/32° F to 104° F
Relative humidity	20% to 85%

Electrical requirements

Power	110–230 V AC, 47–63Hz
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Product numbers

2005 Model B32—IBM TotalStorage SAN32B-2 fabric switch with 32 ports, 16 ports activated (0 to 15), no transceivers (minimum of 16 required), embedded WEBTOOLS management, Advanced Zoning, Fabric Watch, dual replaceable power supplies and power cords, rack mount kit

FC 2220—2 Gbps longwave transceiver

FC 2224—2 Gbps longwave transceiver, 4-pack

FC 2235—4 Gbps extended longwave 35 km transceiver

FC 2280—2 Gbps extended longwave 80 km transceiver

FC 2410—4 Gbps shortwave transceiver

FC 2414—4 Gbps shortwave transceiver, 4-pack

FC 2420—4 Gbps 10 km longwave transceiver

FC 2424—4 Gbps 10 km longwave transceiver, 4-pack

FC 2430—4 Gbps 4 km longwave transceiver

FC 2434—4 Gbps 4 km longwave transceiver, 4-pack

FC 4745—N_Port ID Virtualization

FC 7510—Ports on Demand, 8 ports, field upgrade, 16 to 23

FC 7511—Ports on Demand, 8 ports, field upgrade, 24 to 31

FC 7512—Ports on Demand, 16 ports, plant only, 16 to 31

FC 7513—Ports on Demand, 16 ports, field upgrade, 16 to 31

FC 7530—B32 FICON with CUP Activation

FC 7531—B32 FICON with CUP and Advanced Security Bundle

FC 7551—Fabric Manager V4 maximum domains

FC 7552—Remote Switch Activation

FC 7553—Extended Fabric Activation

FC 7554—Advanced Security Activation

FC 7555—Performance Bundle, plant only

FC 7556—Performance Monitoring, field upgrade

FC 7557—ISL Trunking Activation, field upgrade

Fiber-optic cables

Multimode and single-mode cables and couplers are available in various lengths.

Power cords

Country-specific power cords are also available for desktop installation.

For more information

Contact your IBM representative or IBM Business Partner or visit:

ibm.com/totalstorage/san/b-type



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MB, GB and TB equal 1,000,000, 1,000,000,000 and 1,000,000,000,000 bytes, respectively, where referring to storage capacity. Actual storage capacity will vary based upon many factors and may be less than stated. Some numbers given for storage capacities give capacity in native mode followed by capacity using data compression technology.

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