

IBM System Storage SAN06B-R extension switch

Designed for fast, reliable and cost-effective remote data replication and backup over long distance



Highlights

- Designed for high performance with up to sixteen 8 Gbps Fibre Channel ports and six 1 Gigabit Ethernet (GbE) ports for faster data replication, backup and recovery
 - Utilizes existing IP-based Metropolitan Area Network (MAN) or Wide Area Network (WAN) infrastructures for cost-effective replication, backup and recovery
 - “Pay-as-you-grow” scalability
 - Integration with IBM System Storage Data Center Fabric Manager (DCFM) simplifies configuration.
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The IBM® System Storage® SAN06B-R extension switch accelerates and optimizes replication, backup and data migration over any distance using next generation Fibre Channel (FC) and Fibre Channel over IP (FCIP) networking technologies. It combines industry-leading performance and reliability, “pay-as-you-grow” scalability, and flexible deployment options to address the most demanding disaster recovery, compliance and data mobility requirements.

A wide range of System Storage midrange and enterprise Storage Area Network (SAN) infrastructure simplification and business continuity solutions can be created with the System Storage SAN06B-R extension switch. Infrastructure simplification solutions for the IBM Power Systems™ and IBM System x® families include disaster tolerance over metropolitan and global IP networks with System Storage disk arrays, tape libraries and IBM Tivoli® Storage Manager data protection software. Separate SAN islands can also be consolidated using FC routing. Support for IBM System z® servers is provided via the optional 8 Gbps Advanced Extension, IBM FICON® Accelerator and FICON CUP Activation features.

Local site infrastructure simplification solutions may be extended to one or more remote sites for enhanced data protection and disaster tolerance. The System Storage SAN06B-R extension switch provides FCIP and FCIP Tunneling Services for distance extension, which can enable cost-effective and manageable metro and global business continuity solutions. This extended distance connectivity can help create consolidated remote tape vaulting data protection plus metro mirror and global mirror disk-based, disaster-tolerant solutions.



Since the introduction of SANs, customers have built multiple SAN networks (or islands) for different applications, often with fabric switch components from different manufacturers. Some islands were built by different departments within a company, while other islands resulted from mergers, acquisitions or reorganizations. Dissimilar SAN equipment with different capabilities, or a desire to isolate important applications, has constrained opportunities for enhanced infrastructure simplification and vital business continuity solutions.

The optional System Storage SAN06B-R extension switch Integrated Routing feature can provide Fibre Channel Routing Service, which allows the interconnection of multiple SAN islands without requiring that the separate fabrics be merged into a single large fabric. This capability can help create a tiered or extended enterprise SAN infrastructure without having to redesign or reconfigure the entire environment. The Server Application Optimization (SAO) license is now available as an optional feature.

High performance network infrastructure to support business continuity

The System Storage SAN06B-R extension switch is designed to maximize replication, backup and migration throughput over distance. Best-in-class FC and FCIP switch port density, bandwidth and throughput address today's dynamic I/O and workload requirements, and are designed to meet tomorrow's evolving requirements for virtual data centers. The SAN06B-R provides up to sixteen 8 Gbps FC ports and six 1 GbE ports for scalable bandwidth and performance requirements. Each FC port auto-negotiates to 8, 4, 2 or 1 Gbps depending on the speed of the optical transceiver (SFP).



Efficient package with up to 16 active 8 Gbps Fibre Channel ports and six 1 GbE ports

Unique performance and optimization technologies include the following:

- FCIP trunking combines multiple IP source and destination address pairs into a logical high-bandwidth FCIP trunk of up to 4 Gbps that includes load balancing and network failure resiliency.
- Adaptive Rate Limiting dynamically adjusts bandwidth between minimum and maximum rate limits to optimize bandwidth utilization and sharing.
- FCIP Quality of Service (QoS) is available on all b-type platforms that support 8 Gbps link speeds, provides high-, medium-, and low-priority handling of initiator-target flows within the same FCIP tunnel for transmission over the WAN.
- Enhanced compression architecture provides multiple modes to optimize compression ratios for various throughput requirements.
- FCIP Fast Write accelerates SCSI write processing, maximizing performance of synchronous and asynchronous replication applications across high-latency WAN connections.
- FCIP Tape Pipelining utilizes unique read/write tape processing to significantly reduce backup and recovery times.

- Open Systems Tape Pipelining accelerates read/write tape processing over distance, minimizing backup and restore windows.
- FICON Accelerator uses advanced networking technologies, data management techniques and protocol intelligence to accelerate FICON Global Mirror, formerly XRC, and tape read/write operations over distances well beyond 300 Km.
- Storage-Optimized TCP optimizes TCP window size and flow control, accelerating TCP transport for storage applications.

The SAN06B-R uses the core technology of SAN extension systems, performing at greater than 99.999 percent uptime in the world's most demanding data centers. It uses next generation advanced application-specific integrated circuit (ASIC) electronic components to minimize components and hot-pluggable redundant power supplies and fans to maximize availability.

The SAO feature is designed to enhance overall application performance and virtual machine (VM) scalability by extending b-type data center fabric technologies to the server infrastructure. SAO enables individual traffic flows to be specifically configured, prioritized, and optimized from end-to-end throughout the data center. SAO is enabled via software licensing on the b-type 8 Gbps switches and directors, and is deployed along with Brocade Fibre Channel Host Bus Adapters (HBAs) to help IT organizations more easily manage true end-to-end SAN services across next generation data centers.

The FICON Accelerator Activation feature is an optional software license that is designed to use advanced networking technologies, data management techniques and protocol intelligence to accelerate FICON disk and tape read/write

operations over distance, while maintaining the integrity of command and acknowledgment sequences. FICON Accelerator can provide improved application performance across long-distance IP WANs.

FICON Accelerator, in conjunction with the SAN06B-R Extension Switch, is designed to enable high-performance and robust mainframe extension solutions over virtually any distance. The combined solution supports strategic business initiatives, such as business continuance, disaster recovery, consolidation, data migration, and global data access.

High availability features

Midsized SAN users require high availability fabric solutions. The SAN06B-R extension switch is designed to provide hot-swappable, load-sharing dual redundant power supply/dual-fan modules that allow the switch to remain online if one power supply/dual-fan module fails. Dual power cords allow attachment to separate power sources for improved availability. Hot-swappable power supply/dual-fan modules and redundant cooling fans help eliminate downtime for service when replacing a failed component. Hot-pluggable SFP optical transceivers are designed to be replaced without taking the switch offline.

High availability solutions require redundant components, including clustered servers with dual host bus adapters, dual independent fabrics and disk storage arrays with dual controllers each with dual adapters. Dual IBM System Storage SAN06B-R extension switches may be configured in a high availability solution to create a resilient extended SAN infrastructure.

End-to-end disaster recovery solutions

The ramifications and potential business impact of an inadequate disaster recovery and data protection infrastructure are greater than ever. The SAN06B-R extends open systems and mainframe disk and tape storage applications over distances that would otherwise be impossible, impractical or too expensive with native FC connections. This extended distance connectivity enables metro and global mirror disk-based, disaster tolerant solutions as well as consolidated remote tape vaulting data protection solutions.

The advanced performance and network optimization features and proven hardware reliability of the System Storage SAN06B-R enable replication and backup applications to send more data in less time across a highly reliable network infrastructure.

Configuration flexibility

The System Storage SAN06B-R supports a variety of architectures and deployment models to address current and future SAN extension requirements. A broad range of optional advanced extension, FICON and SAN fabric services are available to address the most challenging extension and storage networking requirements. The SAN06B-R is a robust platform for data centers and multisite environments implementing disk and tape extension solutions for open systems and mainframe environments.

The SAN06B-R with a basic configuration of four FC ports and two GbE ports is a cost-effective option for smaller data centers and remote offices implementing point-to-point disk replication for open systems. Additional capacity up to a total of sixteen FC ports and 6 GbE ports and optional advanced functionality can be easily added through “pay-as-you-grow” software licensing, providing scalability and investment protection for growing environments.

Fabric operating system

The System Storage SAN06B-R extension switches utilize the same Brocade Fabric OS (FOS) that supports the entire Systems Storage b-type SAN family. This helps ensure seamless interoperability with optional advanced features such as ISL Trunking, Adaptive Networking, Advanced Performance Monitoring, Fabric Watch, Integrated Routing or Server Application Optimization (SAO).

In addition, organizations can perform management and administrative tasks through familiar management tools, including System Storage Data Center Fabric Manager (DCFM), Web Tools, and the command line interface.

The SAN06B-R extension switch requires FOS level 6.3 or higher. FOS level 6.4.0, or higher, is required for some optional features. FOS offers the following “pay-as-you-grow” advanced functions:

- **8 Gbps Advanced Extension license** enables two features: FCIP Trunking and Adaptive Rate Limiting (ARL). FCIP Trunking allows multiple IP source and destination address pairs (defined as FCIP circuits) via multiple interfaces to provide a high-bandwidth FCIP tunnel and failover resiliency. Up to four IP source and destination pairs are supported in FOS V6.3. The Adaptive Rate Limiting feature provides a minimum bandwidth guarantee for each tunnel with full utilization of the available network bandwidth without impacting throughput performance under high traffic load.
- **Adaptive Networking** activates FC and FCIP QoS functionality, providing high-, medium-, and low-priority handling of initiator-target flows within the same FCIP tunnel for transmission over the WAN.
- **SAN06B-R Upgrade license** enables all 16 FC and 6 GbE ports and support for additional advanced functionality. The base SAN06B-R includes activation of four FC ports and two GbE ports. The SAN06B-R Upgrade is required for open systems tape pipelining.

- **Advanced Performance Monitoring** helps identify end-to-end bandwidth usage by host/target pairs and is designed to provide for capacity planning.
- **Integrated Routing** isolates local or remote fabrics for higher levels of scalability and fault isolation.
- **Extended Fabric** extends SAN fabrics beyond the FC standard 10 km by optimizing the internal switch buffers to help maintain performance on inter-switch links (ISLs) at distances up to 3,000 km (depending on the platform).
- **Fabric Watch** enables real-time proactive awareness of the health, performance and security of each switch. Fabric Watch also includes port fencing capabilities. It automatically alerts network managers to problems and helps avoid costly failures by providing:
 - Real-time tracking of numerous fabric and switch elements.
 - Automatic event notifications when switch and fabric elements exceed thresholds.
 - Security, availability and congestion monitoring thresholds and alerts.
- **FICON Accelerator** uses advanced networking technologies, data management techniques and protocol intelligence to accelerate FICON disk and tape read/write operations over distance. FOS v6.4.0c or later is required for this functionality.
- **FICON with control unit port (CUP)** is designed to enable in-band management for IBM OS/390® or IBM z/OS® on IBM System z10®, EC, z10™ BC, z9® EC, z9 BC, zSeries® 990, 900 890 and 800 servers. To enable in-band management on multiple routers, switches and directors, each router, switch or director must be licensed. In addition, 8 Gbps Advanced Extension must be enabled prior to enabling FICON with CUP Activation.
- **ISL Trunking** enables FC packets to be efficiently distributed across multiple ISLs between two IBM SAN b-type fabric switches or directors while preserving in-order delivery. Both SAN b-type devices must have trunking activated.
- **Server Application Optimization (SAO)** is designed to bring QoS enhancements for server consolidation and virtualization. It isolates and prioritizes individual VM data flow for end-to-end QoS, preserving individual service level agreements (SLAs) from each VM through the SAN. SAO and adaptive networking features must be both activated on the SAN switches.
- **Enterprise Bundle** offers a convenient package of advanced FOS functions. It includes Advanced Performance Monitor, ISL Trunking Activation, Adaptive Networking and Fabric Watch.

IBM System Storage SAN06B-R at a glance

Product characteristics

Product Number	2498-R06
Base fabric switch	IBM System Storage SAN06B-R extension switch with 4 active FC ports, 2 Ethernet IP ports and Brocade Fabric OS (FOS) 6.3 or later, hardcopy Installation Guide, CD-ROM (with manuals), service and wrap tools, SFP extraction tool, two 110 volt power cords for rack installation, rail kit, Advanced Zoning, FCIP Activation, Full Fabric Activation and Web Tools. All active ports must be populated with SFPs
Fibre Channel interface	For FC: E_Port, EX: Port, F_Port, EL Port, M Port, U Port For FCIP: VE_Port (virtual E_Port)
Media types	<ul style="list-style-type: none"> Fibre Channel: Hot-pluggable SFP and SFP+, LC connector; Short-Wave Laser (SWL) and Long-Wave Laser (LWL); distance depends on fiber-optic cable and port speed; supports SFP+ (2, 4, and 8 Gbps) and SFP (1, 2, and 4 Gbps) optical transceivers 1 GbE: Hot-pluggable optical SFP, SWL and LWL; GbE copper SFP; built-in RJ-45 copper (two GbE ports); distance depends on fiber-optic or copper cable and port speed
Fans and power supplies	Dual redundant, hot-swappable power supplies with dual fans
Hot-swappable components	SFP transceivers, power supply/dual-fan modules
Non-rack support	Nonrack installation is supported; country-specific power cords are required and must be ordered
Servers supported*	<ul style="list-style-type: none"> Power Systems, IBM System i® and selected IBM AS/400® servers, IBM System p® and selected IBM RS/6000® servers System x, selected IBM Netfinity® servers and other Intel processor-based servers System z servers Select Sun and HP servers
Operating systems supported*	<ul style="list-style-type: none"> Microsoft Windows 2003, Windows 2008 Red Hat Linux, Red Hat Linux Advanced Server SUSE Linux, SUSE Linux Enterprise Server IBM AIX®, IBM HACMP™, IBM i5/OS® and IBM OS/400® IBM z/OS Other selected operating systems

IBM System Storage SAN06B-R at a glance

Storage products supported*	<ul style="list-style-type: none"> • IBM System Storage DS8000®, DS6000™, DS5000 and DS4000® storage systems • IBM TotalStorage Enterprise Storage Server® systems • TotalStorage FAST Family of storage servers • System Storage N Series NAS Filers and Gateways • TotalStorage 3580, 3588, 3590, and 3592 tape drives • TotalStorage 3494, 3582, 3583 and 3584 tape libraries • TotalStorage 3581 Tape Autoloader • TotalStorage 3584 High Availability Frame Model HA1 • TotalStorage SAN Volume Controller • Other selected storage systems
Fibre Channel switches supported	Current System Storage and TotalStorage SAN b-type and m-type switches and directors (must be running current firmware)
Fibre optic cable	Fibre optic cables are required and are available in various lengths in single-mode and multimode formats
Power cords	Jumper cables are included for rack installation; country-specific power cords must be ordered for desktop/standalone installation
Warranty	1-year; customer replaceable unit (CRU) and onsite; next business day response, warranty service upgrades are available.
Optional features	<ul style="list-style-type: none"> • Optional SAN extension licenses include: 8 Gbps Advanced Extension, SAN06B-R Upgrade, Adaptive Networking, FICON Accelerator, Extended Fabric and SAO license. • Optional SAN fabric services include: Fabric Watch, Trunking Activation, Advanced Performance Monitoring, Integrated Routing, FICON with CUP Activation, Enhanced Group Management (EGM) and Enterprise Bundle.

Physical characteristics

Height	4.45 cm/1.75 in.
Width	43.18 cm/17.0 in.
Depth	64 - 14 cm/25.25 in.
Weight	10.9 kg/24 lb (with two power supplies and zero SFPs)
Temperature	Operating: 0° to 40°C (32° to 104°F) Nonoperating: -25° to 70°C (-13° to 158°F)
Humidity	Operating: 10% to 85% noncondensing at 40°C (104°F) Nonoperating: 10% to 90% noncondensing at 70°C (158°F)
Power	85 - 264 V ac (Universal), 47 - 63 Hz

For more information

To learn more about the IBM System Storage SAN06B-R, please contact your IBM marketing representative or IBM Business Partner, or visit:

ibm.com/systems/storage/san/b-type/



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