IBM Storage Networking b-type Gen 6 switch and directors enable faster flash, high-density virtualization, and advanced analytics

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At a glance

IBM® Storage Networking SAN64B-6 ultra-dense and highly scalable enterprise-class storage networking switch offers the following:

- Delivers high scalability in an ultra-dense, 1U, 64-port switch to support high-density server virtualization, cloud architectures, and flash-based storage environments
- Increases performance for demanding workloads across 32 Gbps links, shattering application performance barriers with up to 100 million input/output operations per second (IOPS)
- Enables pay-as-you-grow scalability with 24 to 64 ports for on-demand flexibility
- Detects degraded application performance with built-in device latency and IOPS metrics
- Optimizes end-to-end performance and availability tuning with IO Insight intelligence
- Increases resiliency by automatically discovering and recovering from device or network errors
- Leverages Fabric Vision technology to simplify administration, quickly resolve problems, increase uptime, and reduce costs
- Simplifies troubleshooting with real-time and historical visibility in a single dashboard
- Validates the physical infrastructure to ensure predictable performance prior to deployment

IBM Storage Networking SAN256B-6 and SAN512B-6 help deliver network innovation for the virtualized, all-flash data center:

- Enhance operational stability, maximize application performance, and increase business agility with enterprise-class, b-type Gen 6 directors
- Shatter application performance barriers across 32 Gbps links and support up to 1 billion IOPS without oversubscription
- Consolidate infrastructure with high-density solutions built with 128 Gbps UltraScale Inter-Switch Links (ICL) connectivity for simpler, flatter, low-latency fabrics
- Simplify end-to-end management of large-scale environments by automating monitoring and diagnostics
- Detect degraded application or device performance automatically with built-in monitoring
- Extend distance and replication with a highly scalable, multiprotocol extension solution
- Seamlessly integrate next-generation flash storage based on nonvolatile memory express (NVMe) flash memory with current and future b-type Gen 6 Fibre Channel networks
- Mitigate risk with backward-compatibility

**Overview**

**IBM Storage Networking SAN64B-6**

IBM Storage Networking SAN64B-6 switch is designed to meet the demands of hyper-scale virtualization, larger cloud infrastructures, and growing, flash-based storage environments by delivering market-leading Gen 6 Fibre Channel technology and capabilities.

SAN64B-6 delivers a high-density, storage networking building block with increased scalability to support growth, demanding workloads, and data center consolidation in small to large enterprise infrastructures. Delivering outstanding 32/128 Gbps performance, industry-leading port density, and built-in instrumentation, SAN64B-6 accelerates data access and drives always-on business.

SAN64B-6 is built for maximum flexibility, scalability, and ease of use. Organizations can scale from 24 to 64 ports with 48 enhanced, small-form-factor pluggable (SFP+) ports and four Q-Flex ports, all in a 1U package. A simple deployment process and a point-and-click user interface make the switch easy to use. With SAN64B-6, organizations gain high-performance access to industry-leading storage technology and pay-as-you-grow scalability to support an evolving storage environment.

**IBM Storage Networking SAN256B-6 and SAN512B-6**

Digital transformation is pushing mission-critical storage environments to the limit, with users expecting data to be accessible from anywhere, at any time, and on any device. Faced with exponential data growth, the network must evolve to enable businesses to thrive in this new era. To meet these dynamic and growing business demands, organizations need to deploy an infrastructure that can deliver greater consistency, predictability, and performance. Legacy infrastructures, however, were not designed to support the performance requirements of evolving workloads and flash-based storage technology. In fact, an aging network will impede the performance of an all-flash data center.

A new approach to storage networking is needed to enable databases, virtual servers, desktops, and critical applications, and to unlock the full capabilities of flash. By treating the network as a strategic part of a storage environment, organizations can maximize their productivity and efficiency even as they rapidly scale their environments.

IBM Storage Networking SAN256B-6 and SAN512B-6 directors with Fabric Vision technology combine innovative hardware, software, and built-in instrumentation to ensure the industry’s highest level of operational stability and redefine application performance. They provide a modular building block for increased scalability to accommodate growth for large-scale enterprise infrastructures.

Fabric Vision technology enhances visibility into the health of storage environments, delivering greater control and insight to quickly identify problems and achieve critical service level agreements. Breakthrough 32/128 Gbps performance shatters application performance barriers and delivers support for more than 1 billion IOPS for flash-based storage workloads. With diverse deployment options, organizations can smoothly adapt and optimize their businesses to meet next-generation storage requirements.

**Key prerequisites**

The IBM Storage Networking b-type switch and director family supports Fibre Channel connectivity for servers and storage.
Planned availability date

Fourth quarter 2016

Previews provide insight into IBM plans and direction. Availability, prices, ordering information, and terms and conditions will be provided when these products are formally announced.

Description

**IBM Storage Networking SAN64B-6**

Today's mission-critical storage environments require greater consistency, predictability, and performance to keep pace with growing business demands. Faced with explosive data growth, data centers need more input/output (I/O) capacity to accommodate massive amounts of data, applications, and workloads. In addition to this surge in data, collective expectations for availability continue to rise. Users expect applications to be available and accessible from anywhere, at any time, and on any device.

To meet these dynamic and growing business demands, organizations need to deploy and scale up applications quickly. As a result, many are moving to higher virtual machine densities to enable rapid deployment of new applications and deploying flash storage to help those applications scale to support thousands of users. To realize the full benefits of these architectures, organizations need the network to deliver the performance required by today's server and storage environments. By treating the network as a strategic part of a highly virtualized environment, organizations can increase optimization and efficiency as they rapidly scale their environments.

The IBM Storage Networking SAN64B-6 switch is designed to meet the demands of hyper-scale virtualization, larger cloud infrastructures, and growing, flash-based storage environments by delivering market-leading, Gen 6 Fibre Channel technology and capabilities.

SAN64B-6 delivers a high-density, storage networking building block for increased scalability to support growth, demanding workloads, and data center consolidation in small to large enterprise infrastructures. Delivering outstanding 32/128 Gbps performance, industry-leading port density, and built-in instrumentation, SAN64B-6 accelerates data access and drives always-on business.

SAN64B-6 is built for maximum flexibility, scalability, and ease of use. Organizations can scale from 24 to 64 ports with 48 enhanced SFP+ ports and 4 Q-Flex ports, all in a 1U package. A simple deployment process and a point-and-click user interface make the switch easy to use. With SAN64B-6, organizations gain high-performance access to industry-leading storage technology and pay-as-you-grow scalability to support an evolving storage environment.

**Maximize performance for application and solid-state storage architectures**

Faced with unpredictable virtualized workloads and growing flash storage environments, organizations need to ensure that the network does not become a bottleneck. SAN64B-6 delivers increased performance for dynamic workloads through a combination of market-leading throughput and low latency across 32 Gbps and 128 Gbps links. The SAN64B-6 switch shatters application performance barriers with up to 100 million IOPS and 700 nanoseconds latency to meet the demands of flash-based storage workloads. At the same time, port-to-port latency is minimized through the use of cut-through switching at 32 Gbps. The 48 SFP+ ports enable 32 Gbps connections and each Q-Flex port is capable of 128 Gbps parallel Fibre Channel for device or ISL connectivity, simplifying cabling infrastructure.

Administrators can achieve optimal bandwidth utilization, high availability, and load balancing by combining ISL connections in a 256 Gbps framed-based trunk
with eight individual 32 Gbps SFP+ ports or two 128 Gbps quad small-form-factor pluggable (QSFP) ports. Exchange-based Dynamic Path Selection optimizes fabric-wide performance and load balancing by automatically routing data to the most efficient, available path in the fabric.

**Simplify scalability and management complexity**

SAN64B-6 delivers up to 64 Fibre Channel ports in an efficiently designed 1U form factor for industry-leading space utilization for simple scalability and consolidation, reducing costs and complexity.

This enterprise-class switch offers pay-as-you-grow scalability with ports on demand (PoD) capability for quick, easy, and cost-effective scaling from 24 to 64 ports with a combination of 12-port SFP+ PoD and 16-port Q-Flex PoD upgrades. The 48 SFP + ports support 4, 8, 10, 16, and 32 Gbps Fibre Channel speeds, while each of the four Q-Flex ports support 128 Gbps Fibre Channel speeds using QSFP optics to deliver 4 to 1 cable consolidation. With its flexible PoD capability, SAN64B-6 delivers excellent overall value and the agility needed to deliver rapid deployments to meet user demands and support higher growth.

Along with simplifying scalability, SAN64B-6 simplifies end-to-end network management by automating monitoring and diagnostics through Fabric Vision technology, deploying with the EZSwitchSetup wizard and validating cables, ports, and optics with the ClearLink Diagnostic Ports (D_Ports).

**Gain control and insight to quickly identify problems and meet critical service level agreements (SLAs)**

With its Gen 6 technology built-in instrumentation, SAN64B-6 offers organizations the insight and control necessary to meet critical SLAs. The IO Insight monitoring feature gathers statistics, including device latency and IOPS metrics, for early detection of application and device-level performance degradations. Administrators can proactively monitor against SLAs, reduce time to resolution, obtain crucial insight for troubleshooting, and take action to optimize the end-to-end performance that ensures high availability.

IO Insight monitoring enables administrators to:

- Gain deep insights into performance and availability across physical and virtual infrastructures
- Identify issues quickly and understand key performance, health, and utilization trends
- Monitor application flows with no physical taps, no downtime, and no disruption
- Optimize performance and safeguard operational stability

**Fabric Vision technology**

Fabric Vision simplifies storage network monitoring by:

- Deploying over 20 years of best practices with predefined thresholds and actions with a single click
- Enabling real-time monitoring, alerting, and deep visibility into storage I/O health, performance, and latency metrics
- Automatically detecting and alerting administrators to degraded storage performance to maintain SLA compliance
- Displaying visibility into network health, performance, latency, and congestion issues

Fabric Vision increases operational stability by:

- Avoiding up to 50% of common network problems with proactive monitoring and diagnostic tools
- Identifying hotspots proactively and automatically mitigate network problems through intuitive reporting, trend analysis, and integrated actions
• Reporting I/O patterns that deviate from expected behaviors for fault isolation and troubleshooting
• Pinpointing resource contention, congestion, and errant devices to resolve application performance problems

Fabric Vision reduces costs by:

• Eliminating nearly 50% of maintenance costs through automated testing and diagnostic tools that validate the health, reliability, and performance of the network prior to deployment
• Saving up to millions of dollars on capital expense with instrumentation, monitoring, and diagnostics integrated in the b-type network, eliminating the need for expensive third-party tools
• Validating IT infrastructure to accelerate deployment, simplify support, and reduce costs
• Optimizing storage performance by tuning device configurations with integrated I/O metrics

Simplified management and robust network analytics

Fabric Vision technology enables administrators to avoid problems before they impact operations, helping their organizations meet SLAs. Fabric Vision technology includes:

• IO Insight proactively monitors application- and device-level I/O to gain deep insights into performance and availability, ensuring predictable performance and operational stability.
• Monitoring and Alerting Policy Suite (MAPS) leverages prebuilt, rule- and policy-based templates within MAPS to simplify fabric-wide threshold configuration, monitoring and alerting.
• Fabric Performance Impact (FPI) monitoring automatically detects and alerts administrators to different latency severity levels and identifies devices that could impact network performance.
• Dashboards display an overall storage area network (SAN) health view, along with details on out-of-range conditions, to help administrators easily identify trends and quickly pinpoint issues.
• Configuration and Operational Monitoring Policy Automation Services Suite (COMPASS) simplifies deployment, safeguards consistency, and increases operational efficiencies of larger environments with automated switch and fabric configuration services.
• ClearLink Diagnostics ensures optical and signal integrity for Fibre Channel optics and cables, simplifying deployment and support of high-performance fabrics.
• Flow Vision identifies, monitors, and analyzes specific application flows to simplify troubleshooting, maximize performance, avoid congestion, and optimize resources and includes:
  • Flow Monitor delivers comprehensive visibility into data flows within the fabric between server hosts and storage targets, and across inter-switch links (ISLs), automatically learning the monitor flow performance to identify congestion impacting application performance.
  • Flow Generator is a built-in traffic generator for pretesting and validating the data center infrastructure for robustness, including optics, cables, ports, and ISL connections.
  • Flow Mirroring creates copies of specific application and data flows or frame types and forwards them to be captured for in-depth analysis.
• Forward Error Correction (FEC) enables recovery from bit errors in device and ISL connections, enhancing transmission reliability and performance.
• Credit Loss Recovery helps overcome performance degradation and congestion.

A building block for virtualized, private cloud storage
SAN64B-6 provides a critical building block for today's highly virtualized and cloud environments by meeting the high-throughput demands of solid-state disks (SSDs), supporting multitenancy capabilities required in cloud environments, increasing security and efficiency with in-flight encryption, and data compression over ISL connections.

Access gateway mode

The SAN64B-6 can be deployed as a full-fabric switch or as an access gateway using the N_Port ID Virtualization (NPIV) standards. Access Gateway mode simplifies topologies and heterogeneous connectivity to other SAN fabrics by making the switch transparent to the SAN fabric, greatly reducing device management and allowing greater SAN scalability.

IBM Storage Networking SAN256B-6 and SAN512B-6

IBM Storage Networking SAN256B-6 and SAN512B-6 directors with Fabric Vision technology combine innovative hardware, software, and built-in instrumentation to ensure high levels of operational stability and redefine application performance. They provide a modular building block for increased scalability to accommodate growth for large-scale enterprise infrastructures.

Fabric Vision technology enhances visibility into the health of storage environments, delivering greater control and insight to quickly identify problems and achieve critical SLAs. Breakthrough 32/128 Gbps performance shatters application performance barriers and provides support for more than 1 billion IOPS for flash-based storage workloads. With diverse deployment options, organizations can seamlessly adapt and optimize their businesses to meet next-generation storage requirements.

Purpose-built for enterprise deployments

Designed to meet relentless growth and mission-critical application demands, SAN256B-6 and SAN512B-6 directors are an ideal platform for mid-size networks that require increased capacity, greater throughput, and higher levels of resiliency.

SAN256B-6 director (8U) has four horizontal blade slots to deliver up to 192 x 32 Gbps Fibre Channel device ports and sixteen additional 128 Gbps UltraScale ICL ports. SAN512B-6 Director (14U) has eight vertical blade slots to deliver up to 384 32 Gbps Fibre Channel device ports and 32 additional 128 Gbps UltraScale ICL ports. For device connectivity, the 48 Fibre Channel port blade provides forty-eight 32 Gbps Fibre Channel ports. To support disaster-recovery and data protection storage solutions over long distances, the 32 Gbps Extension Blade provides sixteen 32 Gbps Fibre Channel ports, sixteen 1/10-Gigabit Ethernet (GbE) ports, and two 40-GbE ports for Fibre Channel and IP replication traffic. This modular chassis design increases business agility with seamless storage connectivity and flexible deployment offerings.

Enhanced operational stability for always-on business operations

SAN256B-6 and SAN512B-6 directors with Fabric Vision technology deliver a breakthrough hardware and software solution that helps simplify monitoring, increase operational stability, and dramatically reduce costs. Fabric Vision technology now includes IO Insight that provides organizations with deeper visibility into the performance of their environments. This enhanced visibility enables quick identification of degraded application performance at host and storage tiers, helping reduce time to resolution.

Innovative Fabric Vision monitoring, management, and diagnostic capabilities enable administrators to avoid problems before they impact operations. Additional Fabric Vision capabilities include:

- **IO Insight**: Proactively monitors application- and device-level I/O to gain deep insights into performance and availability, ensuring predictable performance and operational stability.
• **MAPS**: Simplifies fabric-wide threshold configuration, monitoring and alerting with prebuilt, rule- and policy-based templates.

• **FPI monitoring**: Leverages predefined MAPS policies to automatically detect and alert administrators to different latency severity levels, and to identify slow-drain devices that could impact network performance.

• **Dashboards**: Provide integrated, at-a-glance views that display an overall SAN health view, along with details on out-of-range conditions, to help administrators easily identify trends and quickly pinpoint issues occurring on a switch or in a fabric.

• **COMPASS**: Simplifies deployment, safeguards consistency and increases operational efficiencies of larger environments with automated switch and fabric configuration services.

• **ClearLink Diagnostics**: Ensures optical and signal integrity for Fibre Channel optics and cables, simplifying deployment and support of high-performance fabrics.

• **Flow Vision**: Enables administrators to identify, monitor and analyze specific application flows in order to simplify troubleshooting, maximize performance, avoid congestion and optimize resources. Flow Vision includes:
  - **Flow Monitor**: Provides comprehensive visibility into flows within the fabric, including the ability to automatically learn flows and nondisruptively monitor flow performance. Administrators can monitor all flows from a specific host to multiple targets/logical unit numbers (LUNs), from multiple hosts to a specific target/LUN, or across a specific inter-switch link (ISL) or inter-facility link (IFL). Additionally, they can perform LUN-level monitoring of specific frame types to identify resource contention or congestion that is impacting application performance.
  - **Flow Learning**: Enables administrators to nondisruptively discover all flows that go to or come from a specific host port or a storage port, or traverse ISLs and IFLs or Fibre Channel over IP (FCIP) tunnels to monitor fabric-wide application performance. In addition, administrators can discover top and bottom bandwidth-consuming devices and manage capacity planning.
  - **Flow Generator**: Provides a built-in traffic generator for pretesting and validating the data center infrastructure for robustness (including route verification and integrity of optics, cables, ports, back-end connections and ISLs) before deploying applications.
  - **Flow Mirroring**: Enables administrators to nondisruptively create copies of specific application and data flows or frame types that can be captured for in-depth analysis.

• **FEC**: Enables recovery from bit errors in device connections and ISLs, enhancing transmission reliability and performance.

• **Credit Loss Recovery**: Automatically detects and recovers buffer credit loss at the virtual channel level, providing protection against performance degradation and enhancing application availability.

**Simplified Fibre Channel management with IBM Network Advisor**

IBM Network Advisor simplifies Gen 6 Fibre Channel management and helps organizations dramatically reduce deployment and configuration times by allowing fabrics, switches, and ports to be managed as groups. Customizable dashboards graphically display performance and health indicators at initial setup, including all data captured using Fabric Vision technology.

**Maximum performance for highly virtualized workloads**

Evolving critical workloads and higher density virtualization are continuing to demand greater, more predictable performance. SAN256B-6 and SAN512B-6 directors feature industry-leading Gen 6 Fibre Channel that increases performance for demanding workloads across 32 Gbps line-speed links and up to 16 Tbps of chassis bandwidth to address next-generation I/O and bandwidth-intensive applications. In addition, the SAN256B-6 and SAN512B-6 directors increase scalability with double the throughput for high-density virtual machine deployments and larger fabrics. This enables organizations to support more storage devices and meet bandwidth requirements using the same number of Fibre Channel links.
SAN256B-6 and SAN512B-6 directors provide outstanding chassis, slot-to-slot, and port performance and bandwidth. Local switching capabilities ensure that data traffic within the same port group does not consume slot bandwidth, maximizing the number of line-rate ports while reducing latency. Performance capabilities include:

**SAN256B-6: Nonblocking architecture**

- Up to 192 ports (equivalent to 256 with UltraScale ICLs) at 32 Gbps
  - 8 Tbps aggregate chassis bandwidth
  - 6 Tbps Fibre Channel port bandwidth
  - 2 Tbps UltraScale ICL bandwidth
- 1.5 Tbps bandwidth per slot, providing line-rate performance for the 32 Gbps 48 port blade

**SAN512B-6: Nonblocking architecture**

- Up to 384 ports (equivalent to 512 with UltraScale ICLs) at 32 Gbps
  - 8 Tbps aggregate chassis bandwidth
  - 6 Tbps Fibre Channel port bandwidth
  - 2 Tbps UltraScale ICL bandwidth
- 1.5 Tbps bandwidth per slot, providing line-rate performance for 32 Gbps 48 port blades

**Simplified, scale-out network design**

Organizations need to adapt to continuous data growth and seamlessly scale out their storage environments. UltraScale chassis connectivity leverages optical ICLs, which provide 128 Gbps bandwidth through a QSFP link. These links can support up to 2 kilometers and connect up to 12 directors, enabling flatter, faster, and simpler fabrics that increase consolidation while reducing network complexity and costs.

UltraScale ICLs enable scalable core-edge and active-active mesh chassis topologies. These high-density chassis topologies can reduce inter-switch cabling by up to 75% and free up to 25% of ports for servers and storage. This maximizes overall port density within the smallest amount of rack space while freeing up front-facing device ports for server and storage connectivity.

SAN512B-6 supports 32 UltraScale ICL ports, providing the equivalent of 128 32-Gbps ports (4.096 Tbps), and SAN256B-6 supports 16 UltraScale ICL ports, providing the equivalent of 64 32-Gbps ports (2.048 Tbps). Gen 6 UltraScale ICLs are backward-compatible and can connect to Gen 5 ICL ports, including connectivity with 2 km QSFPs at Gen 5 speeds of 16 Gbps (4 x 16).

**Extended distance and replication with a scalable, multiprotocol extension solution**

Connecting distributed data centers enables data mobility for advanced data protection. Enterprise data centers need their disaster-recovery infrastructure to ensure fast, continuous, and easy replication of mission-critical data to anywhere in the world. Storage administrators need to replicate large amounts of data quickly, securely, reliably, and simply, while minimizing operational and capital expenses.

With a 32 Gbps Extension Blade, SAN256B-6 and SAN512B-6 directors provide integrated metro and global connectivity with a purpose-built data center extension solution for Fibre Channel and IP storage environments. This solution delivers unprecedented performance, strong security, continuous availability, and simplified management to handle the unrelenting transfer of data between data centers and maintain SLAs. Additionally, native 10 Gbps Fibre Channel connections are also available on the 48 port blade and include in-flight compression, as well as optional support for 10 Gbps Fibre Channel over dense wavelength division multiplexing (DWDM) and dark fiber.
SAN256B-6 and SAN512B-6 directors can scale up to four 32 Gbps Extension Blades per chassis. Each 32 Gbps Extension Blade provides sixteen 32 Gbps Fibre Channel/IBM FICON® ports, sixteen 1/10-GbE ports, and two 40-GbE ports to deliver the high bandwidth, port density and throughput required for maximum application performance over wide area network (WAN) connections, and to address the most demanding disaster-recovery requirements.

Extending Fabric Vision technology between data centers provides unprecedented insight and visibility across the storage network. With its powerful, built-in monitoring, management, and diagnostic tools, Fabric Vision technology enables organizations to minimize the impact of disruptions and outages for nonstop business operations. Consolading Fibre Channel/FICON flows and IP storage flows into a single tunnel contributes significantly to operational excellence. By using custom, browser-accessible dashboards for combined Fibre Channel and IP storage, storage administrators have a centralized management tool to monitor the health and performance of their networks.

**IBM Fabric Vision technology**

Fabric Vision technology with IO Insight, an extension of b-type Gen 6 Fibre Channel, delivers unprecedented insight and visibility across the storage network with powerful built-in monitoring, management, and diagnostic tools that enable organizations to:

**Simplify monitoring:**
- Deploy 20 years of storage networking best practices with a single click
- Leverage visibility into storage I/O health and performance with key latency and performance metrics to maintain SLA compliance
- Gain comprehensive visibility into the fabric using browser-accessible dashboards with drill-down capabilities

**Increase operational stability:**
- Avoid many common network problems with proactive monitoring
- Identify hot spots and automatically mitigate network problems before they impact application performance
- Identify I/Os that deviate from expected behavior to facilitate fault isolation and troubleshooting

**Dramatically reduce costs:**
- Eliminate a significant amount of maintenance costs through automated testing and diagnostic tools
- Save up to millions of dollars on capital expenditure costs by eliminating the need for expensive third-party tools through built-in instrumentation, monitoring, and diagnostics
- Tune device configurations with integrated I/O metrics to optimize storage performance and increase return on investment

**Flexible deployment options for next-generation storage requirements**

To realize the full benefits of flash, organizations must transition their high-performance, latency-sensitive workloads to flash-based storage with NVMe. The simplicity and efficiency of NVMe enables significant performance gains for flash storage. Moreover, NVMe over fabrics enables users to achieve faster application response times and harness the performance of hundreds of solid-state drives for better scalability across virtual data centers with flash.

Organizations also can seamlessly integrate b-type Gen 6 Fibre Channel networks with next-generation NVMe flash storage over fabrics. The efficiency of Fibre Channel-NVMe, combined with the high performance and low latency of Gen 6 Fibre Channel, enables administrators to accelerate IOPS to deliver the performance, application response time, and scalability needed for next-generation data centers.
Also, when looking for investment protection, SAN256B-6 and SAN512B-6 directors offer three generations of backward-compatibility support for connectivity to 4, 8, and 16 Gbps Fibre Channel products.

**Outstanding mainframe technology innovation and leadership**

SAN256B-6 and SAN512B-6 directors deliver seamless FICON connectivity for mainframe storage environments. They complements IBM z Systems™ by offering a fast, reliable, and scalable FICON infrastructure, along with innovative features. SAN256B-6 and SAN512B-6 directors are built on mainframe leadership that includes designing the FICON standard and authoring many FICON patents.

**Statement of good security practices**

IT system security involves protecting systems and information through prevention, detection, and response to improper access from within and outside your enterprise. Improper access can result in information being altered, destroyed, or misappropriated or can result in misuse of your systems to attack others. Without a comprehensive approach to security, no IT system or product should be considered completely secure and no single product or security measure can be completely effective in preventing improper access. IBM systems and products are designed to be part of a comprehensive security approach, which will necessarily involve additional operational procedures, and may require other systems, products, or services to be most effective. IBM does not warrant that systems and products are immune from the malicious or illegal conduct of any party.

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Electronic Service Agent™ and the IBM Electronic Support web portal are dedicated to providing fast, exceptional support to IBM Systems customers. The IBM Electronic Service Agent tool is a no-additional-charge tool that proactively monitors and reports hardware events, such as system errors, performance issues, and inventory. The Electronic Service Agent tool can help you stay focused on your company’s strategic business initiatives, save time, and spend less effort managing day-to-day IT maintenance issues. Servers enabled with this tool can be monitored remotely around the clock by IBM Support, all at no additional cost to you.

Now integrated into the base operating system of AIX® V5.3, AIX V6.1, and AIX V7.1, Electronic Service Agent is designed to automatically and electronically report system failures and utilization issues to IBM, which can result in faster problem resolution and increased availability. System configuration and inventory information collected by the Electronic Service Agent tool also can be viewed on the secure Electronic Support web portal, and used to improve problem determination and resolution by you and the IBM support team. To access the tool main menu, simply type smitty esa_main, and select Configure Electronic Service Agent. In addition, ESA now includes a powerful web user interface, giving the administrator easy access to status, tool settings, problem information, and filters. For more information and documentation on how to configure and use Electronic Service Agent, go to the IBM Electronic Support website.

The IBM Electronic Support portal is a single Internet entry point that replaces the multiple entry points traditionally used to access IBM Internet services and support. This portal enables you to gain easier access to IBM resources for assistance in resolving technical problems. The My Systems and Premium Search functions make it even easier for Electronic Service Agent tool-enabled customers to track system inventory and find pertinent fixes.

**Benefits**

**Increased uptime:** The Electronic Service Agent™ tool is designed to enhance the Warranty or Maintenance Agreement by providing faster hardware error reporting
and uploading system information to IBM Support. This can translate to less wasted
time monitoring the symptoms, diagnosing the error, and manually calling IBM
Support to open a problem record. Its 24 x 7 monitoring and reporting mean human
intervention is not required to report errors.

**Security:** The Electronic Service Agent tool is designed to be secure in monitoring,
reporting, and storing the data at IBM. The Electronic Service Agent tool is designed
to securely transmit either through the Internet (HTTPS or VPN) or modem to
provide customers a single point of exit from their site. Communication is one way.
Activating Electronic Service Agent does not enable IBM to call into a customer's
system.

For additional information, go to the IBM Electronic Service Agent website.

**More accurate reporting:** Because system information and error logs are
automatically uploaded to the IBM Support Center in conjunction with the service
request, you are not required to find and send system information, decreasing the
risk of misreported or misdiagnosed errors. Once inside IBM, problem error data
is run through a data knowledge management system and knowledge articles are
appended to the problem record.

**Customized support:** Using the IBM ID entered during activation, customers
can view system and support information in the *My Systems and Premium Search*
sections of the IBM Electronic Support page.

My Systems provides valuable reports of installed hardware and software using
information collected from the systems by Electronic Service Agent. Reports are
available for any system associated with your IBM ID. Premium Search combines the
function of search and the value of Electronic Service Agent information, providing
advanced search of the technical support knowledge base. Using Premium Search
and the Electronic Service Agent information that has been collected from your
system, you are able to see search results that apply specifically to your systems.

For more information on how to utilize the power of IBM Electronic Services, contact
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website.

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**Announcement countries**

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