

IBM Storage Networking SAN64B-7

Highlights

- Provide high scalability with 56 ports in a 1U switch
- Automate repetitive, administrative tasks
- Maximize NVMe, FICON, and high transaction workloads with lower latency
- Enable pay-as-you-grow scalability from 24 to 56 ports
- Simplify troubleshooting by identifying and isolating issues
- Collect telemetry data across for powerful analytics
- Visualize SAN health and performance data

Modern storage infrastructure built for flash, NVMe and FICON

With the growing adoption of flash and the ramp-up of NVMe-based storage, organizations will move more data through a SAN than ever before, requiring an increase in I/O capacity to keep up with ever-increasing demand. Coupled with rising complexity and higher expectations for availability, organizations need a network that is capable of maximizing performance while simplifying and automating management. These capabilities are required to help enterprises increase the productivity and efficiency of their storage investments and resources.

To meet these requirements, the network needs to evolve. An IBM® b-type Fibre Channel infrastructure unleashes the performance of NVMe workloads with reduced latency and increased bandwidth. In addition, this infrastructure lays the foundation for an autonomous SAN by combining powerful analytics and advanced automation capabilities to maximize performance and ensure reliability. With autonomous SAN technology, organizations can realize a self-learning, self-optimizing, and self-healing storage network.

The IBM® Storage Networking SAN64B-7, with unmatched 64Gb/s performance and industry-leading port density, provides a building block that supports data growth, demanding workloads, and data-center consolidation. With a 50% latency reduction compared to the previous generation, the SAN64B-7 Switch enables the maximum performance of traditional Fibre Channel, NVMe, and FICON storage.

The SAN64B-7 Switch utilizes built-in analytics to optimize performance and eliminate disruptions. This Gen 7 switch collects comprehensive telemetry data across the fabric to enable advanced analytics. To visualize the data, IBM®

SANnav™ Management Portal enables organizations to easily understand the health and performance of the SAN. By leveraging automation, SAN admins gain the ability to automate repetitive tasks to save time and mitigate disruptions with limited expertise. The SAN64B-7 simplifies deployment, configuration, and management of SAN resources with a collection of easy-to-use tools.

To further simplify operations and increase visibility, the SAN64B-7 includes Fabric Vision® technology to monitor and analyze the SAN. This technology provides visibility and insight to quickly identify problems and achieve critical service-level agreements (SLAs). To streamline management workflows, organizations can leverage IBM® SANnav Management Portal to accelerate the deployment of new applications, switches, servers, and storage. Furthermore, a modernized graphical user interface (GUI) improves operational efficiencies with visual dashboards for instant visibility and faster troubleshooting.

Scale Out Flash Storage Environments

The SAN64B-7 is built for maximum flexibility, scalability, and ease of use. Organizations can scale from 24 to 56 SFP+ ports in an efficient 1U form factor that delivers industry-leading port density and space utilization. Enterprises are quickly moving their high-performance, latency-sensitive workloads to NVMe flash-based storage. The SAN64B-7 Switch supports NVMe over Fibre Channel, enabling organizations to integrate IBM® b-type Fibre Channel networks with next-generation flash storage, without a disruptive rip-and-replace. This enables enterprises to achieve faster application response times and harness the performance innovation inherent in NVMe storage. NVMe, combined with the high performance and low latency of IBM® b-type Fibre Channel, delivers the performance, application response time, and scalability needed for next-generation data centers.

Autonomous SAN Innovation

The SAN64B-7 Switch with Fabric Vision technology provides a robust analytics architecture that delivers autonomous SAN technology through self-learning, self-optimizing, and self-healing capabilities. IBM® b-type Fabric Vision technology is a suite of features that leverage comprehensive data collection capabilities with powerful analytics to quickly understand the health and performance of the environment and identify any potential impacts or trending problems.

Analyze the SAN to Optimize Performance and Reliability

IT organizations are responsible for delivering non-stop performance and reliability to ensure that SLAs are met. They need analytics to help extract actionable intelligence from their environment, and they need simplified management tools to quickly and easily understand the state of their environment. This requires an infrastructure that can automatically learn its performance and health characteristics, identify potential risks, and provide recommended actions to resolve issues. Gen 7 technology enables a self-learning SAN that gathers and transforms millions of data points into actionable intelligence to make fast, informed decisions to optimize performance and ensure reliability. IBM® b-type products proactively monitor I/O performance and behavior data points through integrated network sensors to gain deep insight into the environment. The information that is captured is displayed in IBM® SANnav Management Portal to quickly identify and isolate problems before they impact application availability. With built-in best practice recommendations, organizations can simplify troubleshooting by identifying and isolating issues to resolve them as fast as possible. Combining these tools with automation, IBM® b-type technology can detect abnormal traffic behavior and degraded performance to automatically take corrective action, eliminating the potential impact of these issues. These new autonomous SAN technologies simplify management and enable unparalleled network performance and reliability.

Automate the SAN to Simplify Management Complexity

IT organizations spend nearly half of their time performing repetitive daily management tasks, such as zoning, inventory reporting, and operational validation checks. By automating these repetitive tasks, IT administrators can significantly improve their efficiency and dramatically decrease the risk of operational mistakes. Automation in large-scale IT environments integrates diverse infrastructure components with consistency and predictability to deliver greater operational efficiency and agility. The SAN64B-7 Switch can automate actions to simplify management and resolve issues without intervention to avoid network disruptions and outages. Through open DevOps automation technology, organizations can reliably perform resource-intensive tasks, such as infrastructure deployment and provisioning, in a fraction of the time to expedite IT services while eliminating human error. In addition, automation proactively monitors the network to self-optimize performance and automatically mitigate fabric-related issues with self-healing capabilities.

With self-optimizing capabilities, IBM® b-type utilizes actionable intelligence to maximize performance. Real-time monitoring of health and performance characteristics enables the

network to make smarter decisions on traffic prioritization, congestion management, and notification to ensure optimal network performance for applications and storage. Gen 7 delivers a traffic optimizer that guarantees critical application performance by automatically prioritizing traffic. This advanced capability classifies and separates traffic with similar characteristics.

IBM® Gen 7 raises the bar for network availability through automatic avoidance and recovery features, delivering a self-healing SAN. When potential disruptions are detected, the network will automatically mitigate or resolve issues without intervention. The Fabric OS (FOS) software identifies abnormal or unexpected behavior and automatically takes action to avoid a degradation in performance. If congestion occurs, it instantly notifies end devices of the congestion problem through an alerting and signaling process. Once the end devices are alerted, the software ensures data delivery with automatic failover or adjustment of traffic to mitigate the impact of the problem. IBM® SANnav management tools can identify various latency severity levels, pinpointing exactly which devices are causing the issues or which devices are impacted by a bottleneck, and they can quarantine misbehaving devices automatically.

Instant Visibility with IBM® SANnav

IBM® SANnav Management Portal and SANnav Global View empower IT administrators with comprehensive visibility across the entire SAN, from a global view down to local environments. SANnav contextualizes data into visual dashboards and topology views, which allows administrators to quickly detect and isolate points of interest to increase operational efficiencies. In addition, IBM® SANnav streamlines management workflows to accelerate the deployment of new applications, switches, servers, and storage.

Access Gateway Mode

The SAN64B-7 can be deployed as a full-fabric switch or as an Access Gateway, which simplifies fabric topologies and allows heterogeneous fabric connectivity. Access Gateway mode utilizes N_Port ID Virtualization (NPIV) switch standards to present physical and virtual servers directly to the core of SAN fabrics, allowing you to configure your fabric to handle additional devices without increasing the number of switch domains.

Key benefits of Access Gateway

- Improved scalability for large or rapidly growing server and virtual server environments
- Reduced management since Access Gateway appears transparent to the SAN fabric
- Support for heterogeneous SAN configurations with reduced functionality

SAN64B-7 System Architecture

Fibre Channel ports	Switch mode (default): Minimum of 24 ports and maximum of 56 ports. Ports are enabled in increments of 8 ports up to 56 ports via Ports on Demand (PoD) licenses; E_Ports, M_Ports, F_Ports, D_Ports, EX_Ports. Access Gateway default port mapping: 56 SFP+ F_Ports, 8 SFP+ N_Ports.
Scalability	Full-fabric architecture with a maximum of 239 switches.
Certified maximum	4K active nodes; 56 switches, 19 hops in Fabric OS® fabrics
Performance	Fibre Channel: 8.5Gb/s line speed, full duplex; 10.53Gb/s line speed, full duplex; 14.025Gb/s line speed, full duplex; 28.05Gb/s line speed, full duplex; 57.8Gb/s line speed, full duplex; auto-sensing of 8, 10, 16, 32, and 64Gb/s port speeds. 10Gb/s optionally programmable to fixed port speed.
Load balancing	Frame-based ISL Trunking load balances up to eight SFP+ ports per ISL trunk; up to 512Gb/s per ISL trunk when using 64Gb/s optics. Dynamic Path Selection (DPS) provides exchange-based load balancing across all available ISLs.
Aggregate bandwidth	3.584Tb/s
Maximum fabric latency	Latency for locally switched ports is 460 ns (including FEC).
Maximum frame size	2112-byte payload
Frame buffers	24K per switching ASIC
Classes of service	Class 2, Class 3, Class F (inter-switch frames)
Port types	D_Port (ClearLink® Diagnostic Port), E_Port, EX_Port, F_Port; optional port-type control Access Gateway mode: F_Port and NPIV-enabled N_Port
Data traffic types	Fabric switches supporting unicast.
Media types	64Gb/s: SAN64B-7 requires hot-pluggable SFP+, LC connector; 64Gb/s SWL. 32Gb/s: SAN64B-7 requires hot-pluggable SFP+, LC connector; 32Gb/s SWL, LWL 10 km, ELWL 25 km. 10Gb/s: SAN64B-7 requires hot-pluggable SFP+, LC connector; 10Gb/s SWL, LWL 10 km. Fibre Channel distance is subject to fiber-optic cable and port speed.
USB	One standard USB port for firmware download, support save, and configuration upload or download.
Fabric Services	Fabric Vision; Monitoring and Alerting Policy Suite (MAPS); Flow Vision; Adaptive Networking (QoS); Fabric Performance Impact (FPI) Monitoring; Slow Drain Device Quarantine (SDDQ); Advanced Zoning (default zoning, port/WWN zoning, broadcast zoning, peer zoning, target-driven zoning); Dynamic Fabric Provisioning (DFP); Dynamic Path Selection (DPS); Extended Fabrics; Enhanced BB Credit Recovery; FDMI; Frame Redirection; Frame-based Trunking; FSPF; Integrated Routing; IPoFC; ISL Trunking; Management Server; NPIV; Time Server; Registered State Change Notification (RSCN); Reliable Commit Service (RCS); Simple Name Server (SNS); Virtual Fabrics (Logical Switch, Logical Fabric); Read Diagnostics Parameter (RDP).
Extension	Fibre Channel, in-flight compression (LZO) and encryption (AES-GCM-256); integrated optional 10Gb/s Fibre Channel for DWDM MAN connectivity.
FICON	FICON cascading; support for lossless DLS; FICON CUP; Advanced Accelerator for FICON (IBM z/OS Global Mirror and read/write Tape Pipelining).

Management

Supported management software	HTTP; SNMP v1/v3 (FE MIB, FC Management MIB); SSH; Auditing; Syslog; NTP v3; Advanced Web Tools; IBM® SANnav Management Portal and SANnav Global View; Command Line Interface (CLI); SMI-S compliant; REST API; Administrative Domains; trial licenses for add-on capabilities.
Security	DH-CHAP (between switches and end devices); FCAP switch authentication; HTTPS; IP filtering; LDAP with IPv6; OpenLDAP; Port Binding; RADIUS; TACACS+; user-defined Role-Based Access Control (RBAC); Secure Copy (SCP); Secure Syslog; SFTP; SSH v2; SSL; Switch Binding; Trusted Switch.
Management Access	10/100/1000Mb/s Ethernet (RJ-45), serial console port (mini-USB).
Diagnostics	ClearLink optics and cable diagnostics, including electrical/optical loopback, link traffic/latency/ distance; flow mirroring; built-in flow generator; POST and embedded online/offline diagnostics, including environmental monitoring; FCping and Pathinfo (FC traceroute); frame viewer; non-disruptive daemon restart; optics health monitoring; power monitoring; RAStace logging; and Rolling Reboot Detection (RRD).

Mechanical

Enclosure	Front-to-back airflow; non-port-side exhaust; power from back, 1U Back-to-front airflow; non-port-side intake; power from back, 1U
Size	Width: 440.00 mm (17.32 in.) Height: 43.90 mm (1.73 in.) Depth: 355.60 mm (14.00 in.)
System Weight	7.17 kg (15.8 lb) with two power supply FRUs, without transceivers

Environment

Operating environment	Temperature: 0°C to 40°C (32°F to 104°F) Humidity: 8% to 90% (non-condensing)
Non-operating environment	Temperature: -25°C to 70°C (-13°F to 158°F) Humidity: 8% to 90% (non-condensing)
Operating Altitude	Up to 3000 m (9842 ft)
Storage altitude	Up to 12 km (39,370 ft)
Shock	Operating: Up to 20G, 6 ms half-sine Non-operating: Half-sine, 33G, 11 ms, 3/eg axis
Vibration	Operating: 0.25 Grms sine, 0.40 Grms random, 5 Hz to 500 Hz Non-operating: 5 Hz at 0.5 Grms; 10-500 Hz at 1.0 Grms (sine vibration); 3-500 Hz at 1.12 Grms (random vibration)
Heat dissipation	56 ports at 901 Btu/hr

Power

Power supply	Dual, hot-swappable redundant power supplies with integrated system cooling fans. 80 Plus Gold.
AC input	90V to 264V, 4.5A
AC input line frequency	50 Hz to 60 Hz nominal, 47 Hz to 63 Hz range
AC power consumption	318W with all 56 ports operating at 64G (56 ports populated with 64G SWL optics) 264W with all 56 ports operating at 32G (56 ports populated with 32G SWL optics) 58W for an empty chassis with no optics

Why IBM?

Innovative technology, open standards, excellent performance, and a broad portfolio of proven storage software, hardware and solutions offerings—all backed by IBM with its recognized industry leadership—are just a few of the reasons to consider storage solutions from IBM. In addition, IBM delivers some of the best storage products, technologies, services and solutions in the industry without the complexity of dealing with different hardware and software vendors.

For more information

To learn more about IBM Storage Networking b-type family, please contact your IBM representative or IBM Business Partner or visit: <https://www.ibm.com/it-infrastructure/storage/san/b-type>

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