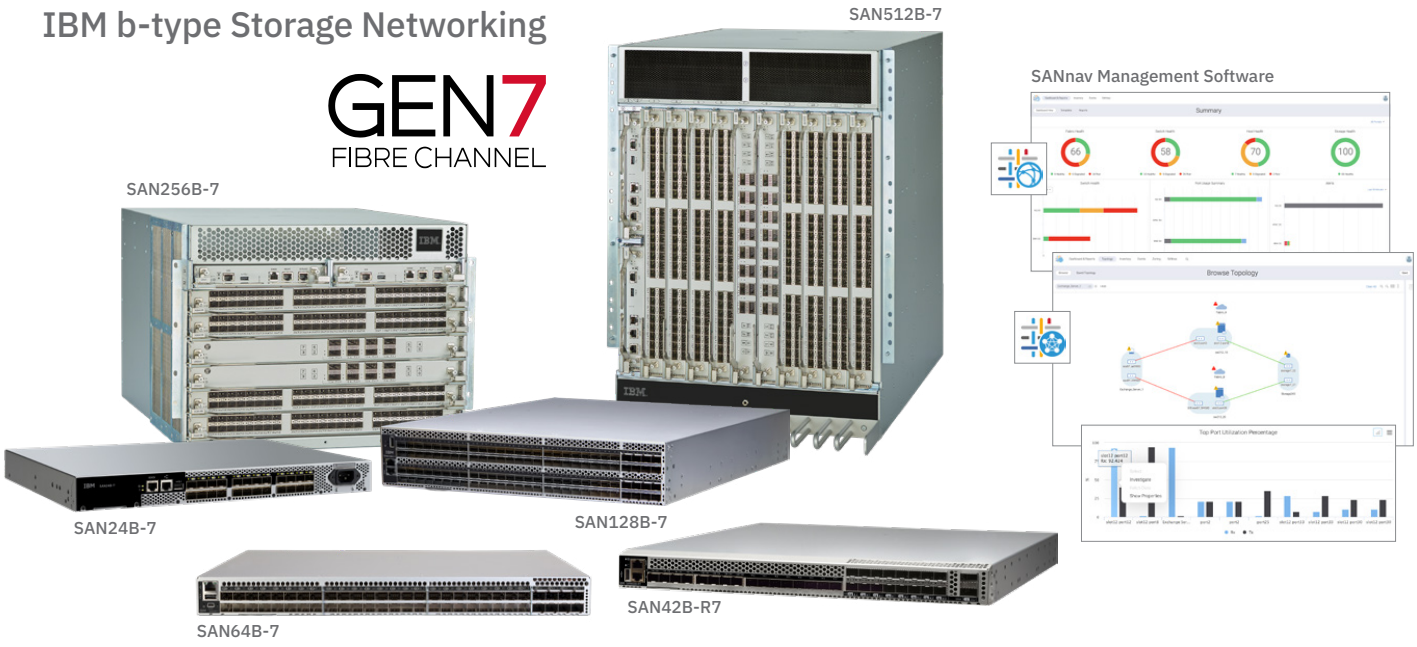
IBM b-type Storage Networking

GEN7
FIBRE CHANNEL



Simple and Secure:

IBM® b-type Gen 7
Makes Managing Your Environment Easy

Enjoy enterprise-ready performance, uptime and security, without the need for active management.

You probably find yourself dealing with the impact of new business processes, increased digital adoption and more security vulnerabilities every day. Managing data growth, combined with the need for rock-solid reliability, and the requirement to maintain high levels of security can be cumbersome. **Now is the time to make investments in your data center that will pay dividends for years to come.**

IBM b-type Gen 7 Storage Networking delivers far more than just speed and latency improvements. It can take the pain out of protecting and managing your data center altogether. Integrated security and autonomous SAN technology enables a cyber-resilient network that safeguards your SAN against cyber attacks, IT disruptions, and disasters, while learning, optimizing, and healing on its own. These capabilities automate processes to ensure optimal performance and enable non-stop operations. At the same time, they strengthen the level of security in your network to protect against security threats around the clock. Read on to see what you could gain by upgrading.

Bulletproof reliability for always-on operations

IBM b-type Gen 7 SAN raises the bar for network availability and performance through its autonomous SAN capabilities. First, the Gen 7 SAN uses built-in telemetry to track, “learn,” and baseline traffic patterns. This allows the SAN to make smarter decisions about traffic and congestion management and deliver high availability with consistent performance and reliability.

If an event occurs that may risk application performance, the Gen 7 SAN works intelligently with end devices to pinpoint and resolve issues, in many cases, without human intervention and much faster than a human could respond. For example, if a credit-stall results in slowed traffic between devices, the Gen 7 SAN can autonomously take immediate action to identify and quarantine the misbehaving device while redirecting traffic flows to resume normal operation.

Integrated security protects operations

Fibre Channel fabrics are secure by design, based on controlled access between servers and storage, and isolation within the data center. IBM b-type Gen 7 technology provides integrated security that further reduces vulnerabilities from malware and hijacking attacks by automatically validating the integrity of the switch operating system, security settings, and hardware.

The IBM b-type Fabric OS (FOS) automatically provides the added level of security that's needed to ensure your operations are protected and additional security enhancements to validate the integrity and security of your IBM hardware and software. These features are integrated and turned on automatically. Features include Secure Boot, Trusted FOS (TruFOS) Certificates, FOS hardening with removal of root access, and automated distribution of SSL certificates via IBM SANnav Management Portal. The IBM b-type TruFOS Certificates ensure that enterprises running IBM b-type directors and switches are currently covered by support, validated, and securely enabled to perform critical operations without having to worry about whether the operating system has been tampered with.

Easy management and control

IBM b-type Gen 7 doesn't require active management to maintain optimal conditions in the SAN. Autonomous SAN technology equips your infrastructure with the tools and insight to solve many common issues on its own, and self-optimize to maximize performance.

If an issue occurs that the SAN can't resolve autonomously, it will first mitigate the impact then provide clear guidance about the cause and the remediation required, enabling you to fix it as soon as practically possible with minimal impact to business applications.

IBM also provides easy-to-use tools to help you manage a single switch or your whole fabric at once, from deployment to configuration and ad hoc management.

Webtools is a product that is embedded into the Fabric OS® firmware. Ideal for small environments, it provides a new and improved Java-free GUI for fast and easy management of individual switches or small fabrics. It can be launched directly from a web browser or accessed via the IBM SANnav™ Management Portal mentioned below.

IBM SANnav Management Portal is the preferred option for medium or larger environments as it provides a complete view of the network including traffic flows and health conditions across the SAN. Its intuitive, drill down interface leverages IBM b-type Autonomous SAN technology and presents data in clear dashboards enabling a faster, more comprehensive SAN management experience. It also streamlines management workflows to accelerate the deployment of new applications, switches, hosts, and targets.

In addition, security features are built into SANnav Management Portal to help administrators protect their network. With SANnav, administrators can set up monitoring and alerting for security configuration changes, customize security thresholds, give proper access control to individual admins, view switch security events, and automatically distributing SSL certificates across the SAN to ensure authenticity and encryption settings.

Flexibility for true investment protection

With Gen 7, you can get the most out of the infrastructure you have now while easing your migration to new storage technologies. Delivering 64G speeds and ultra-low latency, **Gen 7 technology provides an instant performance boost for data-intensive applications and can handle anything you want to throw at it**—FICON, Storage Class Memory (SCM), All Flash Arrays (AFAs), or NVMe.

Not yet ready to modernize your entire network? **IBM b-type Gen 7 allows you to run multiple generations of SAN technology without sacrificing performance.** It's backwards compatible with 8G, 16G and 32G Fibre Channel solutions. You can also seamlessly run NVMe and SCSI concurrently on the same network for migration at your pace, or as your business demands. To support this, IBM b-type Traffic Optimizer, a key feature of Gen 7, automates the segregation of traffic by characteristics such as speed or protocol, like NVMe or SCSI. This optimizes the performance of the network. It also eliminates the risk of oversubscription or congestion issues caused by mismatched speeds while allowing you to upgrade your infrastructure as your time and budget allows. Only with Gen 7 can you achieve performance and efficiency gains that could never be achieved manually.

Gain much deeper insight into your SAN

Take advantage of built-in Gen 7 tools for faster, in-depth analysis of the health and performance of your SAN. Providing comprehensive data collection and advanced analytics, these tools speed the identification of issues and recognize patterns that require attention—they're the foundation of a self-learning, self-optimizing, and self-healing autonomous SAN.

Monitoring and Alerting Policy Suite (MAPS)

Using prebuilt, pre-validated rule and policy-based templates, MAPS takes the guesswork out of defining appropriate rules and actions, simplifying threshold configuration, monitoring, and alerting.

Fabric Performance Impact (FPI) Monitoring

Takes predefined MAPS policies and automatically detects which devices are causing congestion or are impacted by the congested port, and quarantines those devices that are misbehaving.

IO Insight

Proactively monitors I/O performance and behavior data points through integrated network sensors to set baseline application performance and ensure operational stability.

VM Insight

An integrated tool that is an extension of IO Insight, VM Insight enables the same visibility of IO statistics with granularity all the way down to the virtual machine (VM) level. Storage admins will have visibility into performance issues of individual VMs. With VMID+ in FOS 9.1, VM Insight is available end-to-end across the fabric regardless of the array type involved.

Upgrade to a resilient, autonomous SAN

Legacy infrastructure can limit performance gains from next-generation technologies and leave you exposed to cybersecurity vulnerabilities. Addressing technology obsolescence by simply adding faster switching technology is not enough. Your SAN needs to be able to **act autonomously to quickly and efficiently maintain optimal conditions**, **maximize the performance of your storage resources**, and **ensure the highest levels of resiliency**.

IBM b-type Gen 7 Fibre Channel does just this. It transforms your current storage network into an autonomous SAN. Gen 7 also hardens your SAN against cybersecurity and other business-continuity challenges that threaten to disrupt data center operations. Thanks to its built-in autonomous SAN capabilities, Gen 7 not only monitors application and network performance, it can also take action to resolve issues and optimize application performance for the highest availability and reliability.

Make the smart choice for your data center

Talk to your local representative about upgrading today.

To learn more, download the IBM Redbook:
IBM b-type Gen 7 Installation, Migration, and Best Practices Guide

DOWNLOAD NOW

IBM Storage Networking Directors	GEN 7 DIRECTORS	
	SAN256B-7	SAN512B-7
Features		
Model #	8961-F74	8961-F78
Fibre Channel (FC) SFP Ports	Up to 256 ports at 32G or 64G	Up to 512 ports at 32G or 64G
Inter-Chassis Link QSFP Ports	Up to 16 Gen 7 ICLs	Up to 32 Gen 7 ICLs
Oversubscription Configurations	256 Ports at 64G at 1.33:1 256 Ports at 32G line rate	512 Ports at 64G at 1.33:1 512 Ports at 32G line rate
Routing Architecture	Cut Through Routing	Cut Through Routing
Latency - Local Switching	460 ns	460 ns
Latency - Maximum	1.4 µs	1.4 µs
FC Frame Level Load Balancing	Yes, Automatic, up to 8 links	Yes, Automatic, up to 8 links
FC Exchange Level Load Balancing	Yes, Exchange Based Routing (EBR) across all ISLs	Yes, Exchange Based Routing (EBR) across all ISLs
Redundancy Architecture	Full Redundant Design (including Core Routing Blades)	Full Redundant Design (including Core Routing Blades)
SAN Analytics Support	Yes (IT, ITL, ITN)[1]	Yes (IT, ITL, ITN)[1]
NVMe-FC Analytics	Yes	Yes
Analytics Flow Learning	Yes	Yes
FCIP Extension Technology	Gen 6 Extension Blade	Gen 6 Extension Blade
CRC Error Handling	Frame marked with error for end device to drop[2]	Frame marked with error for end device to drop[2]
Traffic Flow Optimization	Traffic Optimizer	Traffic Optimizer
Slow Drain Device Quarantine	Auto Quarantine & Auto Un-Quarantine	Auto Quarantine & Auto Un-Quarantine
Fabric Performance Impact Monitoring/ Alerting	Automatic	Automatic
FICON Port Decommission/ Recommission	Yes	Yes
Maximum Power (Watts)	1,738 W	3,184 W
Weight	24.5 kg (54 lbs) for chassis 68.95 kg (152.0 lb) maximum fully populated configuration	35.61 kg (78.5 lbs) for chassis 145.8 kg (321.5 lb) maximum fully populated configuration
Director Dimensions	Height: 34.45 cm (13.56 in, 8U) Width: 43.74 cm (17.23 in) Depth: 61.04 cm (24.04 in)	Height: 61.23 cm (24.11 in, 14U) Width: 43.74 cm (17.23 in) Depth: 61.04 cm (24.04 in)
Airflow	Front-to-back or Back-to-front	Front-to-back or Back-to-front

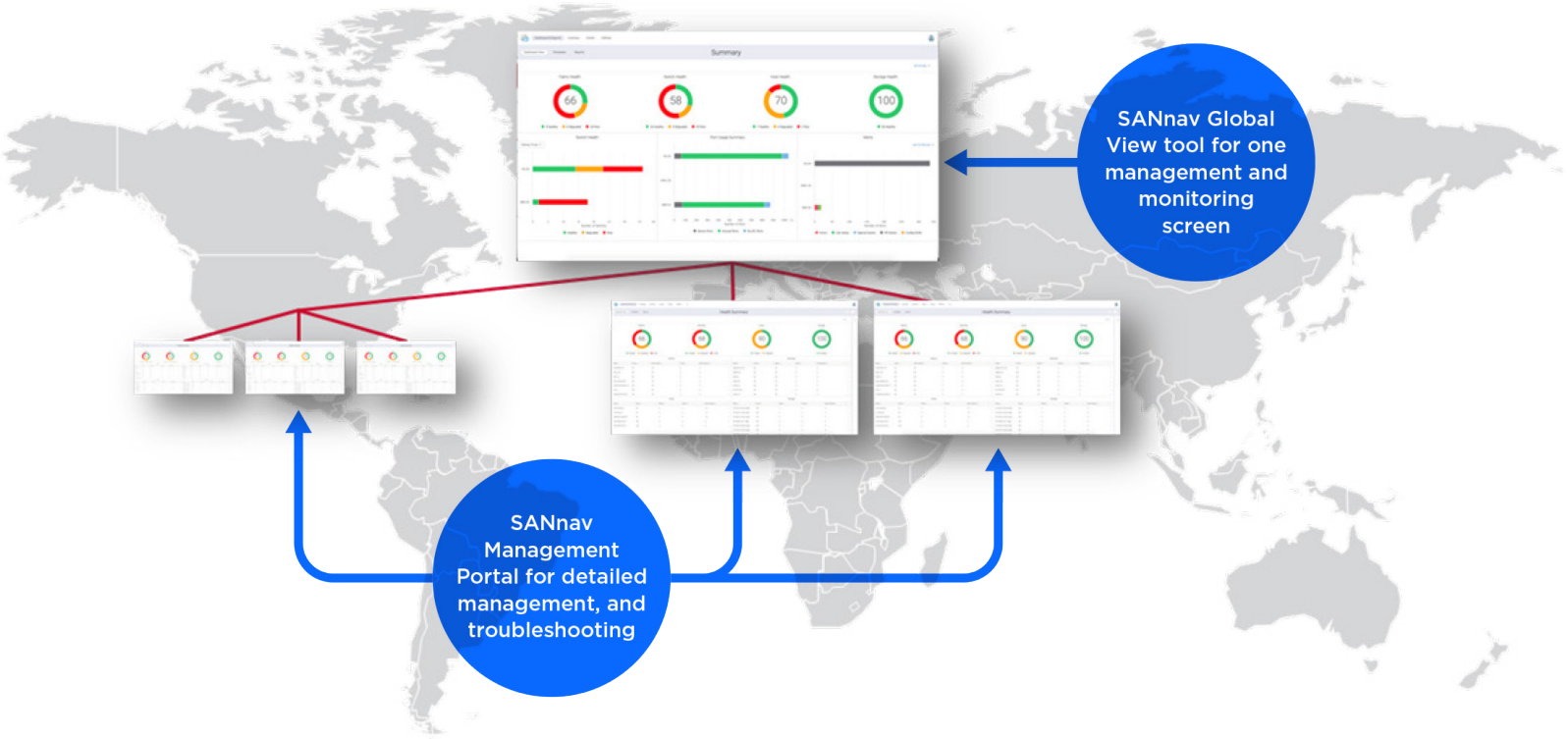
1 - SAN Analytics Support includes IT (Initiator-Target), ITL (Initiator-Target-LUN), ITN (Initiator-Target-Namespace ID).
2 - Both options for CRC error handling are based on FC standard.

IBM Storage Networking Switches	ENTRY SWITCH		MID RANGE SWITCH	ENTERPRISE SWITCH	
	SAN24B-6	SAN24B-7	SAN64B-7	SAN128B-6	SAN128B-7
Features					
Model #	8969-F24	8969-P24	8960/8969-P64/R64	8960-F97/N97	8969-P96/R96
Fibre Channel (FC) SFP Ports	8, 16 and 24 ports at 32G	8, 16 and 24 ports at 64G	24, 32, 40, 56, and 64[1] ports at 64G	48, 72, 96, and 128[1] ports at 32G	48, 72, 96, and 128[1] ports at 64G
Oversubscription Configurations	None	None	None	None	None
Routing Architecture	Cut Through Routing	Cut Through Routing	Cut Through Routing	Cut Through Routing	Cut Through Routing
Latency - Local	< 780 ns	460 ns	460 ns	< 780 ns	460 ns
Latency - Maximum	< 780 ns	460 ns	460 ns	2.3 µs	1.4 µs
FC Frame Level Load Balancing	Yes, Automatic, up to 8 links	Yes, Automatic, up to 8 links	Yes, Automatic, up to 8 links	Yes, Automatic, up to 8 links	Yes, Automatic, up to 8 links
FC Exchange Level Load Balancing	Yes, Exchange Based Routing (EBR) across all ISLs	Yes, Exchange Based Routing (EBR) across all ISLs	Yes, Exchange Based Routing (EBR) across all ISLs	Yes, Exchange Based Routing (EBR) across all ISLs	Yes, Exchange Based Routing (EBR) across all ISLs
Power/Cooling Redundancy	Integrated Power/Cooling	Integrated Power/Cooling	Redundant, How Swappable	Redundant, How Swappable	Redundant, How Swappable
SAN Analytics Support	Limited	Yes	Yes	Limited	Yes
NVMe-FC Analytics	Yes (IT)[3]	Yes (IT, ITL, ITN)[2]	Yes (IT, ITL, ITN)[3]	Yes (IT)[3]	Yes (IT, ITL, ITN)[3]
Analytics Flow Learning	Yes	Yes	Yes	Yes	Yes
CRC Error Handling	Frame marked with error for end device to drop[2]	Frame marked with error for end device to drop[†]	Frame marked with error for end device to drop[2]	Frame marked with error for end device to drop[2]	Frame marked with error for end device to drop[2]
Traffic Flow Optimization	QoS Zoning	Traffic Optimizer	Traffic Optimizer	QoS Zoning	Traffic Optimizer
Slow Drain Device Quarantine	Auto Quarantine & Auto Un-Quarantine	Auto Quarantine & Auto Un-Quarantine	Auto Quarantine & Auto Un-Quarantine	Auto Quarantine & Auto Un-Quarantine	Auto Quarantine & Auto Un-Quarantine
Fabric Performance Impact Monitoring/ Alerting	Automatic	Automatic	Automatic	Automatic	Automatic
FICON Port Decommission/ Recommission	Not Supported	Not Supported	Supported	Not Supported	Not Supported
Maximum Power (Watts)	76 W	105 W	349 W	942 W	969 W
Weight	4.80 kg (10.58 lb)	4.84 kg (10.67 lb)	7.17 kg (15.8 lbs)	21.31 kg (47 lbs)	18.92 kg (41.71 lbs)
Switch Dimensions	Width: 428.80 mm (16.88 in) Height: 42.90 mm (1.69 in) Depth: 306.60 mm (12.07 in)	Width: 428.00 mm (16.8 in.) Height: 42.90 mm (1.69 in.) Depth: 306.60 mm (12.07 in.)	Width: 440.00 mm (17.32 in) Height: 43.90 mm (1.73 in) Depth: 355.60 mm (14.00 in)	Width: 440.00 mm (17.32 in) Height: 86.70 mm (3.41 in) Depth: 609.60 mm (24.00 in)	Width: 440.00 mm (17.32 in) Height: 86.70 mm (3.41 in) Depth: 609.60 mm (24.00 in)
Airflow	Back-to-front	Back-to-front	Front-to-back or Back-to-front	Front-to-back or Back-to-front	Front-to-back or Back-to-front

1 - The Quad-SFP (QSFP) Ports or Double Density-SFP (DD-SFP) are required to reach the maximum port count for these switches.
2 - Both options for CRC error handling are based on FC standard.
3 - SAN Analytics Support includes IT (Initiator-Target), ITL (Initiator-Target-LUN), ITN (Initiator-Target-Namespace ID).

IBM Storage Networking Extension Switches	EXTENSION SWITCHES	
	IBM SAN42B-R7	IBM SAN18B-6
Features		
Model #	8969-R42	8960-R18
Fibre Channel (FC) Ports	up to 24 ports at 64G[1]	12 ports at 32G
Ethernet Ports	16 x 25/10/1GbE (LAN/WAN) 2 x 100GbE (WAN)	6 ports of 1GbE/10GbE for LAN and WAN connectivity
Oversubscription Configurations	None	None
Routing Architecture	Cut Through Routing	Cut Through Routing
Latency - Local Switching	460 ns	900 ns
Latency - Switch	460 ns	900 ns
FC Frame Level Load Balancing	Yes, Automatic, up to 8 links	Yes, Automatic, up to 8 links
FC Exchange Level Load Balancing	Yes, Exchange Based Routing (EBR) across all ISLs	Yes, Exchange Based Routing (EBR) across all ISLs
Enhanced Extension Technology	Extension Trunking, Adaptive Rate Limiting (ARL), WAN Test Tool (Wtool), Open Systems Tape Pipelining (OSTP), FastWrite (FCIP-FW), QoS Marking, Bandwidth Enforcement, PerPriority TCP QoS, PTQ, Adaptive Networking with QoS, Advanced Extension Integrated Routing (FCR)	Extension Trunking, Adaptive Rate Limiting (ARL), WAN Test Tool (Wtool), Open Systems Tape, Pipelining (OSTP), FastWrite (FCIP-FW), QoS Marking, Bandwidth Enforcement, PerPriority TCP QoS, Adaptive Networking with QoS, Integrated Routing (FCR)
Power/Cooling Redundancy	Redundant, Hot Swappable	Redundant, Hot Swappable
CRC Error Handling	Frame marked with error for end device to drop[2]	Frame marked with error for end device to drop[2]
Fibre Channel Encryption	AES-GCM-256 on ISLs	AES-GCM-256 on ISLs
Extension Encryption	AES-GCM-256 IPsec	AES-GCM-256 IPsec
Mainframe Model Features	64G LWL SFP+ transceivers, FICON CUP, FICON Mgmt Server (FMS), Advanced Accelerator for FICON	Not supported with FICON
Maximum Power (Watts)	585 W	130 W
Weight	12 kg (26.5 lbs)	8.35 kg (18.4 lb)
Dimensions	Width: 44 cm (17.32 in.) Height: 4.4 cm (1.73 in.) Depth: 59.03 cm (23.24 in.)	Width: 44.0 cm (17.32 in) Height: 4.4 cm (1.73 in, 1U) Depth: 45.7 cm (17.74 in)
Airflow	Back-to-front	Back-to-front

1 - 64G Double Density-SFP (SFP-DD) optics are required to reach the maximum port count for this extension switch.
2 - Both options for CRC error handling are based on FC standard.



IBM Storage Networking	IBM B-TYPE MANAGEMENT	
	IBM SANnav Management Portal	IBM SANnav Global View
Description	**Base version** monitors up to 600 ports, switches only, no directors. **Enterprise version** monitors up to 15,000 ports, switches, directors, extension.	**IBM Global View** supports up to 20 SANnav Management Portal instances as a “manager of managers”
1 Year Support	Base version 9239-B01 Enterprise version 9239-E01	9239-G01
3 Year Support	Base version 9240-B03 Enterprise version 9240-E03	9240-G03
5 Year Support	Base version 9241-B05 Enterprise version 9241-E05	9241-G05