

# IBM Storage Networking SAN768C-6

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## Highlights

- Leverage up to 768 32-Gbps FC ports per chassis
- Enable large, scalable deployment of SAN extension solutions
- Deliver high availability with fully redundant components
- Deploy VSANs while maintaining logical boundaries
- Provide inter-VSAN routing (IVR) for sharing resources across VSANs
- Deploy intelligent network features
- Achieve outstanding SAN performance
- Utilize 48-port 32-Gbps switching modules
- Optimize the use of valuable data center floor space

## Support high data growth and operational flexibility for business consolidation

IBM Storage Networking SAN768C-6 has the industry's highest port density for a SAN director, featuring 768 line-rate 32-Gbps Fibre Channel ports. Designed to support multiprotocol workloads, SAN768C-6 enables SAN consolidation and collapsed-core solutions for large enterprises, thereby reducing the number of managed switches and leading to easy-to-manage deployments. By reducing the number of front-panel ports used on Inter-Switch Links (ISLs), it also offers room for future growth. SAN768C-6 addresses the mounting storage requirements of today's large virtualized data centers.

As a director-class SAN switch, SAN768C-6 uses the same operating system and management interface as other IBM Storage Networking c-type data center switches. It brings intelligent capabilities to a high-performance, protocol-independent switch fabric—delivering uncompromising availability, security, scalability, simplified management, and the flexibility to integrate new technologies. In fact, SAN768C-6 lets you transparently deploy unified fabrics with Fibre Channel connectivity to achieve low total cost of ownership (TCO).<sup>1</sup>

For mission-critical enterprise storage networks that require secure, robust, cost-effective business-continuance services, the Fibre Channel over IP (FCIP) extension module is designed to deliver outstanding SAN extension performance, reducing latency for disk and tape operations with FCIP acceleration features, including FCIP write acceleration and FCIP tape write and read acceleration.

## Lower TCO with SAN consolidation

With exponential data growth and the pressures to do more with less, organizations need to deploy large-scale SANs in the most efficient, cost-effective way possible. SAN768C-6 can meet both scalability and TCO requirements. It offers industry-leading port densities of up to 768 32-Gbps Fibre Channel ports per chassis—so there's plenty of room to grow in the future.

Using SAN768C-6, organizations can consolidate and collapse from edge-core-edge to edge-core or collapsed core architectures. Performance can reach up to 1.5 terabits per second (Tbps) front-panel Fibre Channel capacity per slot—extending up to 48 Tbps front-panel Fibre Channel, line-rate, nonblocking system-level switching capacity. By consolidating data into fewer, larger, and more manageable SANs, you can reduce your total hardware footprint as well as related capital and operating expenses.

## Enterprise-class availability

SAN768C-6 is designed for high availability. Beyond meeting the basic requirements of nondisruptive software upgrades and redundancy of critical hardware components, the SAN768C-6 software architecture offers outstanding availability. Its supervisor modules automatically restart failed processes, making SAN768C-6 exceptionally robust. In the rare event that a supervisor module is reset, complete synchronization between the active and standby supervisor modules helps ensure stateful failover with no disruption of traffic.



## Business transformation with enterprise cloud deployment

Enterprise clouds provide organizations with elastic compute and network capabilities, enabling IT to scale up or scale down resources on an as-needed basis in a quick and cost-efficient manner. SAN768C-6 meets the needs of enterprise clouds by providing:

- Outstanding scalability and pay-as-you-grow flexibility
- Robust security for multi-tenant cloud applications
- Consistent high performance to meet stringent service-level agreements (SLAs)
- Resilient connectivity for no-downtime cloud infrastructures
- Advanced traffic management capabilities, such as quality of service (QoS), to quickly and cost-efficiently allocate elastic network capabilities to cloud applications

Furthermore, Data Center Network Manager for SAN (DCNM-SAN) provides resource monitoring and capacity planning on a per-virtual machine basis. This enables efficient, consolidated enterprise cloud deployments, federation of up to 10 IBM DCNM servers for ease of management of large-scale clouds, and access to resource usage information through Storage Management Initiative Specification (SMI-S)-based application programming interfaces (APIs) to deliver IT as a service.

## Ease of management

To meet the needs of all users, SAN768C-6 supports management via NX-API, the Family command-line interface (CLI), DCNM and third-party storage management tools.

NX-API is a Representational State Transfer (REST) API-based framework for NX-OS. It provides output of CLIs in an easy-to-read Extensible Markup Language (XML) or JavaScript Object Notation (JSON) format for simple scriptability. NX-API is considerably faster than Simple Network Management Protocol (SNMP) queries in terms of data collection time from a switch, and it can be leveraged by DCNM and third-party management tools.

SAN768C-6 also has a consistent, logical CLI. The CLI is easy to learn and delivers broad management capabilities. It is an extremely efficient and direct interface designed to streamline tasks in enterprise environments.

DCNM is an easy-to-use application that simplifies management across multiple switches and converged fabrics. Focused on supporting efficient operations and management of virtual machine-aware fabrics, DCNM provides a robust framework and rich feature set that meet the

routing, switching, and storage administration needs of present and future virtualized data centers. It streamlines provisioning of the unified fabric and proactively monitors the SAN components. DCNM can also be used with third-party management applications.

## **Comprehensive solution for robust security**

The extensive security framework of SAN768C-6 protects sensitive data crossing enterprise networks. It features intelligent, port-level packet inspection, including the use of access control lists (ACLs) for hardware enforcement of zones, VSANs and advanced port security features.

## **Advanced diagnostics and troubleshooting tools**

Management of large-scale storage networks requires proactive diagnostics, tools to verify connectivity and route latency, and mechanisms for capturing and analyzing traffic. Comprehensive port-based and flow-based statistics enable sophisticated performance analysis and SLA accounting. In addition, integrated Call Home capability is provided for added reliability, faster problem resolution, and reduced service costs. With SAN768C-6, IBM delivers a comprehensive toolset for troubleshooting, analysis and debugging of storage networks.

## **Investment protection with future readiness**

The SAN768C-6 switch can be used with either Fabric-1 and Fabric-3 modules. Switches currently running Fabric-1 can be upgraded online and in-place to Fabric-3. Each Fabric-3 module provides double the bandwidth of Fabric-1. Thus three Fabric-3 can support 768 Fibre Channel ports running at 32 Gbps line-rate. With the new Fabric-3 modules, the switch can be upgraded to additionally support 64 Gbps modules when available.

<sup>1</sup> For more information, please refer to the [IBM Storage Networking SAN768C-6 Redbooks Product Guide](#).

### SAN768C-6 Specifications

Model	8978-E16
Chassis slot configuration	<ul style="list-style-type: none"> <li>• Line-card slots: 16</li> <li>• Supervisor slots: 2</li> <li>• Crossbar switching fabric slots: 6</li> <li>• Fan trays: 3 fan trays at the back of the chassis</li> <li>• Power supply bays: 16</li> </ul>
Hot-swappable components	Power supplies, fan modules, small form-factor pluggables, supervisor modules, fabric modules
Warranty	One year, IBM On-Site Limited, 24x7 same-day maintenance; service options available
Optional features	48-port 32Gbps FC Module and 16G SW Bundle (#AJL2), 48-port 32Gbps FC Switching Module (#AJL4), 24/10-port SAN Extension Module (#AJL5), Fabric-1 Switching Module (#AJKE), Enterprise Package (#AJJ9), DCNM SAN Advanced Edition (#AJJA), Mainframe Package (#AJJB), 3000W AC power supply (#AJKF), small form-factor pluggables, fans*
Dimensions (H x W x D)	<p>Chassis dimensions (26RU): 114.9 cm (45.25 in.) x 43.9 cm (17.3 in.) x 88.9 cm (35 in.)</p> <ul style="list-style-type: none"> <li>• 48-Port 32-Gbps Fibre Channel Switching Module: 4.4 cm x 40.39 cm x 55.37 cm (1.75 in. x 15.9 in. x 21.8 in.)</li> <li>• Power supply (3,000 W AC): 55.98 cm x 10.03 cm x 4.06 cm (22.04 in. x 3.95 in. x 1.6 in.)</li> <li>• Fabric-1 module: 82.3 cm x 5.13 cm x 25.96 cm (32.40 in. x 2.02 in. x 10.22 in.)</li> <li>• Supervisor-1E module: 5.18 cm x 20.17 cm x 55.5 cm (2.04 in. x 7.94 in. x 21.85 in.)</li> <li>• Fan tray: 91.87 cm x 13.08 cm x 4.75 cm (36.17 in. x 5.15 in. x 1.87 in.)</li> <li>• SFP+: 1.25 cm x 1.36 cm x 5.65 cm (0.49 in. x 0.54 in. x 2.22 in.)</li> </ul>
Weight	<ul style="list-style-type: none"> <li>• Chassis (includes fans): 136 kg (300 lb.)</li> <li>• 48-port 32-Gbps Fibre Channel line card: 7.94 kg (17.5 lb)</li> <li>• Power supply (3,000 W AC): 2.7 kg (6 lb)</li> <li>• Fabric-1 module: 9.07 kg (20 lb)</li> <li>• Supervisor-1E module: 3.86 kg (8.5 lb)</li> <li>• Fan tray: 5.76 kg (12.7 lb)</li> <li>• Supervisor blank cover: 0.5 kg (1.1 lb)</li> <li>• Line-card blank cover: 2.04 kg (4.5 lb)</li> </ul>
Recycling Parts	IBM does not recommend the removal of its product batteries due to safety reasons. Please utilize the IBM Product Collection and Recycling Take Back Programs.

\* For more information, please refer to the [IBM Storage Networking SAN768C-6 Redbooks Product Guide](#).



## 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 SAN768C-6, please contact your IBM representative or IBM Business Partner, or visit:

[ibm.com/systems/storage/san/ctype/9718/](https://ibm.com/systems/storage/san/ctype/9718/)

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