

Designed for tiered SAN infrastructure simplification and global business continuity solutions



IBM TotalStorage SAN256M enterprise director



Space saving design with 256-ports in 14U rack height

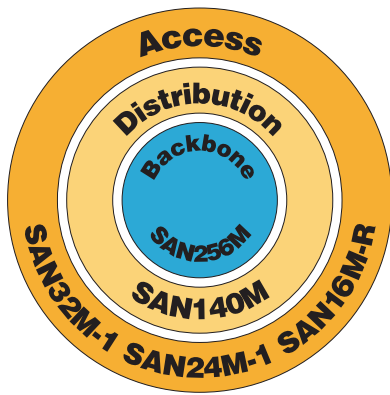
Highlights

- **Easy-to-manage tiered enterprise infrastructure simplification and business continuity solutions for IBM System i™, System p™, System x™ and System z™ servers**
- **Highly-scalable 64 to 256-port switching backbone for tiered global enterprise storage area networks (SANs)**
- **Designed to provide high availability with concurrent hardware and firmware upgrades and call-home with McDATA® Enterprise Fabric Connectivity Manager, EFCM**
- **Director LPAR and Open VSAN, designed to provide dynamic application network provisioning, can help simplify Fibre Channel and mainframe IBM FICON® SAN consolidation**
- **Helps to provide global business continuity solutions with 10 Gigabit per second (Gbps) links up to 190 km**
- **EFCM and FICON Management Server (CUP) software can help simplify management of complex SAN infrastructures**

IBM TotalStorage tiered enterprise SAN solutions

A wide range of IBM TotalStorage® enterprise storage area network (SAN) infrastructure simplification and business continuity solutions can be created with the IBM TotalStorage SAN256M enterprise director.

Infrastructure simplification solutions for IBM System i, System p and System x Fibre Channel servers and IBM System z mainframe FICON servers include storage consolidation, high availability server clustering and SAN island consolidation with IBM System Storage™ DS4000™, DS6000™ and DS8000™ series disk storage.



Tiered SAN infrastructure simplification solution

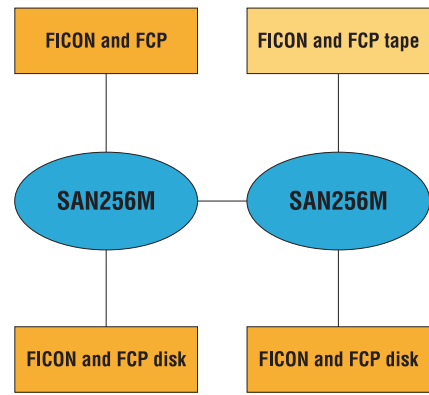
Business continuity solutions include data protection with IBM TotalStorage Ultrium™ 2 Linear Tape-Open™ (LTO™) and IBM TotalStorage 3592 Tape Drives and tape libraries with IBM Tivoli® Storage Manager data protection software. Standard director features and capabilities may be combined with IBM TotalStorage disk, tape and software products to create metro mirroring and global mirroring solutions to support disaster tolerance. Enterprise-to-edge SAN management features help simplify management of large enterprise solutions.

Infrastructure simplification solutions

High-availability storage consolidation solutions with server clustering can be created with redundant directors. Storage consolidation solutions begin with 60 Fibre Channel Protocol (FCP)

and FICON servers, each with dual channel adapters and disk storage arrays with eight adapters that are cross-connected to two 64-port IBM TotalStorage SAN256M directors. These server clustering solutions can be scaled up to attach 248 servers and disk arrays with sixteen adapters, cross connected to two 256-port directors by non-disruptively adding 32-port line modules.

A tiered SAN infrastructure simplification solution may be created by adding a distribution connectivity tier and an access connectivity tier to the backbone connectivity tier. IBM TotalStorage SAN256M enterprise directors, with ultra-high bandwidth, Director LPAR intelligence and high availability capabilities, are designed to provide backbone connectivity tier services. IBM TotalStorage SAN140M directors, with cost effective enterprise connectivity for single fabric configurations, are designed to provide distribution connectivity tier services. IBM TotalStorage SAN32M-1 and SAN24M-1 fabric switches and IBM TotalStorage SAN16M-R routers are designed to provide low cost departmental Fibre Channel and iSCSI access connectivity tier services (mainframe FICON director cascading is limited to one connection between two switches).



Metro mirror solution at 10 Gbps with up to 190 km between sites

Business continuity solutions

Metro mirror business continuity solutions, designed to help protect data and support disaster tolerance, can be created by replicating these local site solutions in a remote site. The local site and remote site storage networks are connected with two or more longwave inter-switch links (ISLs) to help provide resiliency. These ISLs support up to 35 km distances at 2 Gbps; up to 10 km at 4 Gbps; and up to 40 km at 10 Gbps with standard director features. These links may be extended up to 190 km at 10 Gbps and up to 1,000 km at 2 Gbps with repeaters. IBM TotalStorage SAN16M-R routers may be used for high performance global mirroring solutions over IP networks.

High-availability design

Enterprise SAN users require high-availability for tiered SAN director backbone solutions. The high-availability capabilities of the IBM TotalStorage SAN256M director are designed to provide redundancy for critical active electronic components, helping support data access and high performance in the event of a single component failure.

The SAN256M director is designed with redundant power supplies and cooling fans, along with redundant processors that help support automatic failover. It is designed to provide hot swapping capability for all field replaceable units, HotCAT™ online code activation and automatic fault detection and isolation. Together, these capabilities help support non-disruptive maintenance and upgrades.

In addition, McDATA EFCM software call-home and e-mail capabilities can alert support and maintenance personnel to help accelerate problem resolution. Redundant directors are commonly deployed for high-availability clustering applications.

Enterprise Fabric Connectivity Manager

McDATA Enterprise Fabric Connectivity Manager (EFCM) software is designed to help simplify management of a tiered enterprise SAN infrastructure.

The **SAN256M Element Manager** (standard feature) is designed to enable enterprise-to-edge management of SAN256M directors when interconnected with multiple IBM TotalStorage SAN m-type switches and directors in an enterprise SAN solution. EFCM software, with the 1U Rack Mount Management Server, is designed to centralize the management of multiple, distributed switches and directors in an enterprise-wide Fibre Channel fabric.

EFCM software is designed to provide advanced functions such as non-disruptive code activation, call-home and e-mail alerts as events occur. The director is connected through an Ethernet hub to the 1U Rack Mount Management Server with EFCM software.

FICON Management Server and FICON

Cascading

The **FICON Management Server** feature, a.k.a. Control Unit Port (CUP), supports in-band management of the director by mainframe system automation for the IBM z/OS® or OS/390® operating system. System automation for z/OS or OS/390 is designed to enable concurrent management of IBM ESCON® and FICON-based directors.

SANtegrity Binding (standard feature)

is required to enable cascading between two directors for mainframe FICON protocol applications. This enhanced security feature, which is designed to provide fabric integrity checking by binding particular directors to the fabric, can also be used to help provide advanced open systems security. Standards-based **SANtegrity Authentication** is designed to force each device in the SAN to prove what it is in order to avoid unauthorized access and unauthenticated devices.

High performance for backbone connectivity tier

The IBM SAN256M director is designed to provide up to 256-port 4 Gbps full duplex throughput. The high-performance architecture is designed to extend up to 1,024 ports and provide for 4 Gbps connectivity, in addition to 1 and 2 Gbps devices and 10 Gbps ISLs. **Remote Fabric** (standard feature) provides buffer credit management required to support 2 Gbps dark fiber links up to 1,000 km and 10 Gbps links up to 190 km.

The scalable backplane bandwidth design offers two to four **switch modules**. Each backplane switch module provides approximately one quarter of the total bandwidth required for full 4 Gbps 256-port performance. While four switch modules are required for full bandwidth FICON requirements, two or three switch modules may provide sufficient bandwidth when lower performance open servers and storage devices are attached.

Open Trunking is designed to optimize the total throughput between two switches automatically by redirecting traffic from high utilization links to links with available bandwidth. Open Trunking is designed to continuously monitor loads on all links, detect congestion and automatically balance traffic across available ISLs without operator interaction. Based on constant traffic monitoring, Open Trunking acts to help improve throughput and reroute traffic efficiently.

Configuration flexibility

The IBM SAN256M enterprise director provides scalability with two to eight **line module** features. A 64-port entry configuration consists of two 32-port 4 Gbps line modules. This configuration is designed to scale-up non-disruptively to 256 ports by adding 32-port 4 Gbps line modules.

Each 4 Gbps line module has 32-ports with 4 Gbps Small Form-factor Pluggable, SFP optical transceivers.

- *Thirty-two 4 Gbps shortwave SFPs*
- *Thirty-two 4 Gbps longwave 4 km SFPs*

- *Thirty-two 4 Gbps longwave 10 km SFPs*

Each 2 Gbps line module has four paddles with 2 Gbps Small Form-factor Pluggable, SFP or 10 Gbps XFP optical transceivers. Four paddle types are offered with:

- *Eight 2 Gbps shortwave SFPs*
- *Two 10 Gbps shortwave XFPs*
- *Eight 2 Gbps longwave SFPs*
- *Two 10 Gbps longwave XFPs*

Six line module features, each with four paddles, are offered with either all shortwave or all longwave transceivers:

- *Thirty-two 2 Gbps shortwave SFPs*
- *Twenty-four 2 Gbps shortwave SFPs and two 10 Gbps shortwave XFPs*
- *Sixteen 2 Gbps shortwave SFPs and four 10 Gbps shortwave XFPs*
- *Thirty-two 2 Gbps longwave SFPs*
- *Twenty-four 2 Gbps longwave SFPs and two 10 Gbps longwave XFPs*
- *Sixteen 2 Gbps longwave SFPs and four 10 Gbps longwave XFPs*

Director configurations with up to 256 4 Gbps ports or up to thirty-two 10 Gbps ports are offered.

Director LPAR for SAN consolidation

The IBM SAN256M Director LPAR

(standard feature) enables the director to be segmented into sub-directors, which can help simplify consolidation of application-based SAN island consolidation and provisioning. Each Director LPAR acts like an independent director with separate fabric services and isolation of fabric events. Up to four Director LPARs may be enabled, on a line module basis. Director LPAR architecture is designed to provide improved granularity at the port level which can help support auto provisioning of network resources by application.

Open VSAN (standard feature) is designed to provide the ability to create multiple “virtual switches” and assign individual ports as members of the virtual switch participating in a virtual fabric. Virtual fabrics can also be used in conjunction with the director LPAR to help provide additional flexibility in management, configuration and fault isolation for SANs. Virtual Fabrics are

designed to provide stable and robust configuration options, and prevent the need to unnecessarily scale individual fabrics simply to avoid purchasing additional hardware.

High port density, rack space savings

Rapidly growing enterprise SAN infrastructures place a premium on rack space. The IBM TotalStorage SAN256M director uses SFP LC optical connectors and advanced packaging that requires only 14U of rack height for 256 ports. The IBM TotalStorage SANC40M cabinet supports up to two SAN256M directors with 512 ports in a single footprint.

Mainframe and open server connectivity

The IBM SAN256M enterprise director provides FICON and IBM Enterprise Storage Server® (ESS) 3582 Tape Library and Channel connectivity to:

- *IBM System z*
- *IBM System p*
- *IBM System i*

- *IBM System x*
- *Other Intel® processor-based servers with Windows NT®, Windows® and selected 2000 Server, Windows Server™ 2003 and Linux®*
- *Selected Sun and HP servers*
- *IBM System Storage DS8000 and DS6000 series*
- *IBM TotalStorage Enterprise Storage Server® (ESS)*
- *IBM System Storage DS4000 series*
- *IBM TotalStorage 3592 Tape Drives and 3494 Tape Libraries*
- *IBM TotalStorage 3582 and 3583 Tape Library and IBM TotalStorage 3584 Tape Library*
- *IBM TotalStorage SAN m-type and selected McDATA switches and directors under McDATA EFCM management*

IBM TotalStorage SAN256 enterprise director at a glance

Physical characteristics

2027 Model 256—IBM TotalStorage SAN256M enterprise director	
Dimensions	67.2 cm H x 44.3 cm W x 86.4 cm D (24.5 in [14U] x 17.5 in x 34.0 in)
Weight	152 kg (335 lb)

Operating environment

Temperature:	0.0° C to 40.0° C (32° F to 104.0° F)
Relative humidity:	8% to 80%
Power range:	200-240V AC, 50 to 60 Hz

Product numbers

2027 Model 256—IBM TotalStorage SAN256M enterprise director with eight line module slots (no line modules), dual control processor modules, four power supplies with two power cords, four fan trays. SAN256M Element Manager, SANtegrity Binding, Director LPAR, Open VSAN and Remote Fabric firmware included.

FC 1105—SNS Open System Package with Open Trunking and SANtegrity Authentication

FC 1125—SNS Mainframe Cascading Package with FICON Management Server, Open Trunking, and SANtegrity Authentication

FC 1511—FICON Management Server (CUP)

FC 1521—Open Trunking

FC 1524—SANtegrity Authentication

FC 1530—Shortwave 2 Gbps 32-port line module

FC 1531—Shortwave 10 Gbps 4-port and 2 Gbps 16-port line module

FC 1532—Shortwave 10 Gbps 2-port and 2 Gbps 24-port line module

FC 1533—Longwave 2 Gbps 32-port line module

FC 1534—Longwave 10 Gbps 4-port and 2 Gbps 16-port line module

FC 1535—Longwave 10 Gbps 2-port and 2 Gbps 24-port line module

FC 1536—Line module filler panel

FC 1540—Switching module

FC 1537—Shortwave 4 Gbps 32-port line module

FC 1538—Longwave 4 km 4 Gbps 32-port line module

FC 1539—Longwave 10 km 4 Gbps 32-port line module

FC 1541—Switching module filler panel

FC 1542—Switching module

FC 1568—XFP longwave 40 km 10 Gbps optical transceiver

FC 3421—Longwave 4 Gbps 4 km SFP optical transceiver

FC 3422—Longwave 4 Gbps 10 km SFP optical transceiver

For more information

Contact your IBM representative or IBM Business Partner or visit:

ibm.com/totalstorage/san/m-type



© Copyright IBM Corporation 2006

IBM Systems Group
Route 100
Somers, NY 10589

Produced in the USA
October 2006
All Rights Reserved

IBM, the IBM logo, DS4000, DS6000, DS8000, Enterprise Storage Server, ESCON, FICON, OS/390, System i, System p, System x, System z, System Storage, Tivoli, TotalStorage and z/OS are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries or both.

Intel is a registered trademark of Intel Corporation in the United States, other countries or both.

Linux is a registered trademark of Linus Torvalds in the United States, other countries or both.

Linear Tape-Open, LTO, the LTO logo, Ultrium and the Ultrium 2 logo are trademarks or registered trademarks of International Business Machines Corporation, Hewlett-Packard and Certance.

McDATA is a registered trademark of McDATA Corporation.

Microsoft, Windows, Windows NT and Windows Server are trademarks or registered trademarks of Microsoft Corporation in the United States, other countries or both.

Other company, product and service names may be trademarks or service marks of others.

This document could include technical inaccuracies or typographical errors. IBM may make changes, improvements or alterations to the products, programs and services described in this document, including termination of such products, programs and services, at any time and without notice. Any statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only. The information contained in this document is current as of the initial date of publication only and is subject to change without notice. IBM shall have no responsibility to update such information.

IBM is not responsible for the performance or interoperability of any non-IBM products discussed herein. Performance data for IBM and non-IBM products and services contained in this document was derived under specific operating and environmental conditions. The actual results obtained by any party implementing such products or services will depend on a large number of factors specific to such party's operating environment and may vary significantly. IBM makes no representation that these results can be expected or obtained in any implementation of any such products or services.

TSD00927-USEN-02

MB, GB and TB equal 1,000,000, 1,000,000,000 and 1,000,000,000,000 bytes, respectively, where referring to storage capacity. Actual storage capacity will vary based upon many factors and may be less than stated. Some numbers given for storage capacities give capacity in native mode followed by capacity using data compression technology.

THE INFORMATION IN THIS DOCUMENT IS PROVIDED "AS-IS" WITHOUT ANY WARRANTY, EITHER EXPRESSED OR IMPLIED. IBM EXPRESSLY DISCLAIMS ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NONINFRINGEMENT. IBM products are warranted according to the terms and conditions of the agreements (e.g., IBM Customer Agreement, Statement of Limited Warranty, International Program License Agreement, etc.) under which they are provided.

References in this document to IBM products, programs or services does not imply that IBM intends to make such products, programs or services available in all countries in which IBM operates or does business. Any reference to an IBM program or product in this document is not intended to state or imply that only that program may be used. Any functionally equivalent program or product that does not infringe IBM's intellectual property rights may be used instead. It is the user's responsibility to evaluate and verify the operation of any non-IBM product, program or service.