BROCADE 5000 SWITCH



STORAGE AREA NETWORK

A Flexible, Easy-to-Use Switch for a Variety of SAN Environments

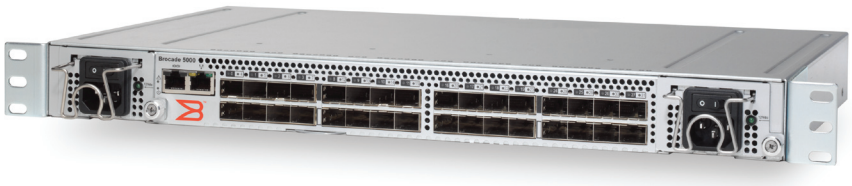
HIGHLIGHTS

- Delivers up to 32 ports in an optimized form factor that does not require a rail kit for deployment in a 19-inch rack
- Protects existing investments in Brocade Fabric OS and M-EOS*-based environments through native E_Port switch interoperability
- Provides industry-leading power and cooling efficiency to reduce Total Cost of Ownership (TCO) and improve availability
- Utilizes Brocade EFCM 9.x and Brocade Fabric Manager for easy deployment within new and existing fabrics
- Features Ports on Demand capabilities for fast, easy, and cost-effective scalability from 16 to 32 ports in 8-port increments
- Protects existing device investments with auto-configuring 1, 2, and 4 Gbit/sec capabilities
- Meets high-availability requirements with redundant, hot-pluggable components and non-disruptive software upgrades
- Utilizes the Brocade EZSwitchSetup wizard, simplifying installation and management

The Brocade® 5000 Switch is a high-performance Fibre Channel Storage Area Network (SAN) switch designed for rapidly growing storage requirements in mission-critical environments. It combines 1, 2, and 4 Gbit/sec technology in configurations of 16, 24, or 32 ports in an efficiently designed 1U package. As a result, it provides low-cost access to industry-leading SAN technology as well as support for "pay-as-you-grow" scalability through flexible Ports on Demand capabilities.

The Brocade 5000 features a flexible architecture that supports native E_Port interoperability for seamless connectivity into Brocade Fabric OS® (FOS) or M-Enterprise OS (M-EOS)* environments. It is the first switch that can operate in SAN fabrics running FOS native, FOS open, M-EOS native, and M-EOS open modes. This enables non-disruptive expansion of any fabric using these operating modes.

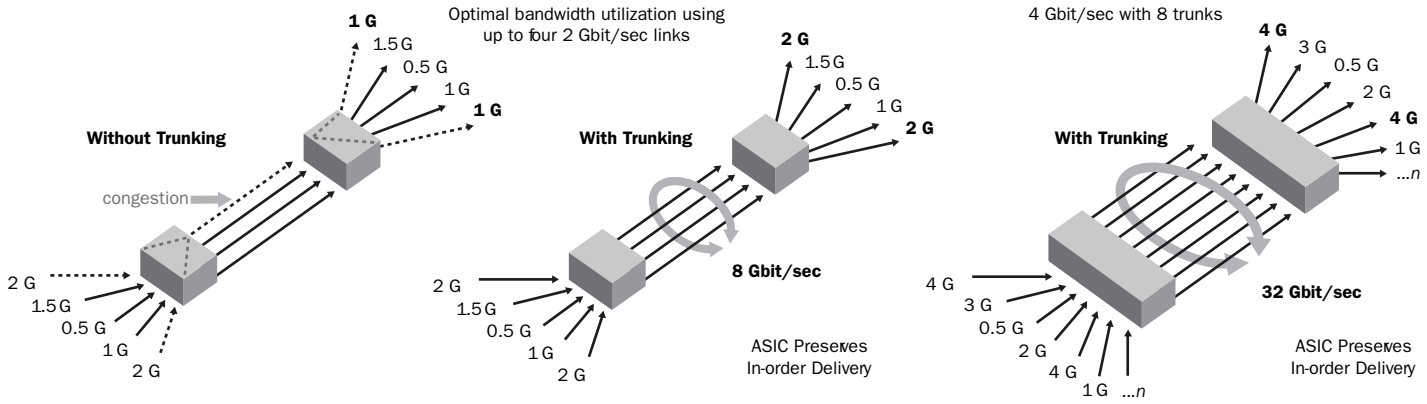
To reduce deployment and maintenance costs, IT organizations can manage the Brocade 5000 with a variety of tools and methods. For SAN users familiar with Brocade Enterprise Fabric Connectivity Manager (EFCM), the Brocade 5000 is designed to be an easy addition to M-EOS fabrics since there is no steep learning curve for new management tools or interoperability settings. For SAN users familiar with Brocade Fabric Manager, the Brocade 5000 is designed to be an easy addition to FOS fabrics.



* *Brocade M-EOS fabrics are McDATA switches and directors running McDATA Enterprise OS*

BROCADE

Figure 1.
ISL Trunking with 2 and 4 Gbit/sec links.



The Brocade 5000 is designed to protect both Brocade and McDATA technology investments. It is fully compatible with Brocade 1, 2, and 4 Gbit/sec devices and provides native E_Port interoperability for existing McDATA devices. The Brocade 5000 is also backed by FOS and M-EOS engineering, test, and support expertise to provide reliable operation in SAN fabrics using any of the supported configurations.

In addition, the switch features lower power dissipation as well as consolidated power and fan assemblies to improve environmental performance and reduce ownership costs. These capabilities help make the Brocade 5000 a cost-effective solution for a wide range of SAN environments, including the edge of enterprise core-to-edge networks.

INDUSTRY-LEADING PERFORMANCE

To support mission-critical environments, the Brocade 5000 provides best-in-class performance for midrange SAN switches. It features a non-blocking architecture with as many as 32 ports concurrently active at 4 Gbit/sec full duplex to provide an aggregate bandwidth of 256 Gbit/sec.

The Brocade 5000 utilizes ASIC technology featuring four 8-port groups. Within these groups, an Inter-Switch Link (ISL) trunk can supply up to 32 Gbit/sec of data throughput (see Figure 1). In addition to reducing congestion and increasing bandwidth, enhanced Brocade ISL Trunking utilizes ISLs more efficiently to free up the number of usable switch ports.

Additional performance capabilities include:

- Eight virtual channels on each ISL enhance Quality of Service traffic prioritization and anti-starvation capabilities at the port level to avoid performance degradation.
- Exchange-based Dynamic Path Selection (DPS) optimizes fabric-wide performance and load balancing by automatically routing data to the most efficient available path in the fabric (see Figure 2). It augments ISL Trunking to provide more effective load balancing in certain configurations. In addition, DPS can balance traffic between the Brocade 5000 and McDATA devices enabled with Brocade Open Trunking.

ENTERPRISE-CLASS AVAILABILITY FOR BUSINESS CONTINUANCE

The Brocade 5000 provides a reliable foundation for disaster recovery and business continuance by employing enterprise-class availability features such as hot-swappable, redundant, and integrated fan and power supply assemblies. Moreover, hot code load and activation helps maximize application uptime with faster system upgrades and maintenance to reduce the dependency on scheduled outages. Combined with a wide range of diagnostic and monitoring functions, these capabilities help provide a highly available SAN environment.

To support business continuance operations, the Brocade 5000 enables industry-leading distances between servers and storage devices. Support for distances up to 500 kilometers at 1 Gbit/sec and 125 kilometers at 4 Gbit/sec facilitates the deployment of high-performance, long-distance SAN initiatives such as data center consolidation.

HIGH SCALABILITY WITH PORTS ON DEMAND

Delivering up to 32 ports in a 1U form factor, the Brocade 5000 combines cost-effectiveness with highly scalable Ports on Demand capabilities. It has a minimum of 16 ports enabled, and organizations can easily expand to 24 or 32 ports by activating a license as their requirements change. As a result, the Brocade 5000 provides a modular "pay-as-you-grow" approach to business expansion.

SUPERIOR ROI AND INVESTMENT PROTECTION

The Brocade 5000 combines performance, availability, interoperability, and scalability advantages with investment protection. As a result, it is designed to enable rapid installation in existing SAN environments—reducing both deployment cost and complexity.

The Brocade 5000 utilizes the same Fabric OS that supports the entire Brocade SAN product family—from the 8-port Brocade 200E Switch to the 768-port Brocade DCX Backbone. This helps ensure forward and backward compatibility among Brocade SAN switches while simplifying maintenance and field upgrades. Moreover, organizations can manage the Brocade 5000 with existing management applications such as Brocade EFCM 9.x and Brocade Fabric Manager.

OPEN SAN MANAGEMENT

By networking Fibre Channel switches such as the Brocade 5000 under a common platform, Fabric OS simplifies SAN management through standard management interfaces and support for third-party management applications. The Brocade 5000 supports switch management through a command line interface, Brocade Web Tools, EFCM, or Fabric Manager.

To facilitate deployment, the Brocade 5000 integrates easily into heterogeneous environments with operating systems such as Windows NT, UNIX, Linux, Solaris, and AIX. It is also designed to provide FICON® support on a flexible port-by-port basis in IBM mainframe environments. FICON-ready capabilities include FICON intermix modes, cascaded FICON fabrics (supported only in FOS environments), and CUP support for monitoring tools.

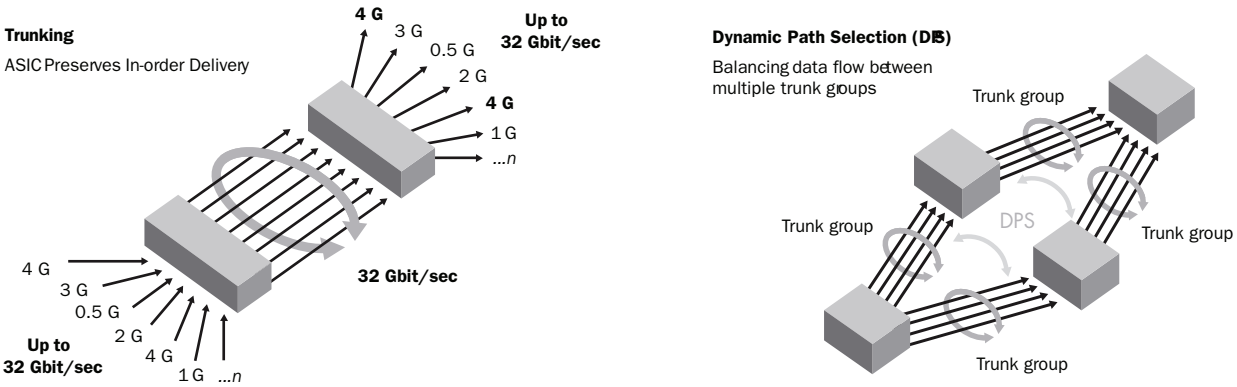
HIGHER FABRIC SECURITY FOR CRITICAL INFORMATION

The Brocade 5000 is designed for the highest level of SAN fabric security to help organizations safeguard their critical information. It utilizes Brocade Advanced Zoning as well as advanced port and switch Access Control Lists (ACLs) to simplify administration and significantly increase control over data access. To simplify management access security, the Brocade 5000 supports Active Directory with LDAP.

MAXIMIZING SAN INVESTMENTS

Brocade and its partners offer complete SAN solutions to meet a wide range of technology and business requirements. These solutions include education and training, support, and services to help optimize SAN investments. For more information, contact an authorized Brocade sales partner or visit www.brocade.com.

Figure 2.
Dynamic Path Selection augments ISL Trunking to route data efficiently between multiple trunk groups.



BROCADE 5000 SPECIFICATIONS

Systems Architecture	
Fibre Channel ports	32 ports, universal (E, F, M, and FL)
Scalability	Full fabric architecture with 239 switches maximum
Certified maximum	Single Brocade FOS fabric: 56 domains, 19 hops Single Brocade M-EOS fabric: 31 domains, 3 hops Larger fabrics certified as required; consult Brocade or OEM SAN design documents for configuration details
Performance	1.063 Gbit/sec line speed (full duplex); 2.125 Gbit/sec line speed (full duplex); 4.25 Gbit/sec line speed (full duplex); auto-sensing of 1 Gbit/sec, 2 Gbit/sec, and 4 Gbit/sec port speeds; optionally programmable to fixed port speed; speed matching between 1, 2, and 4 Gbit/sec ports
ISL Trunking	Up to eight 4.25 Gbit/sec ports per ISL trunk; up to 32 Gbit/sec per ISL trunk
Aggregate bandwidth	256 Gbit/sec end to end
Fabric latency	0.8 microseconds, cut-through routing at 4 Gbit/sec
Maximum frame size	2112-byte payload
Classes of service	Class 2, Class 3, Class F (inter-switch frames)
Port types	FL_Port, F_Port, E_Port, M_Port (Mirror Port); self-discovery based on switch type (U_Port)
Data traffic types	Fabric switches supporting unicast and broadcast
Media types	Hot-pluggable, industry-standard Small Form-factor Pluggable (SFP), LC connector; Short-Wavelength Laser (SWL) up to 500 meters (1640 feet); Long-Wavelength Laser (LWL) up to 10 km (6.2 mi); Extended Long-Wavelength Laser (ELWL) up to 40 km (24.8 mi), and 80 km (49.6 mi) at 2 Gbit/sec; distance depends on fiber-optic cable and port speed, CWDM SFPs (8 lambdas)
Fabric services	Simple Name Server, Registered State Change Notification (RSCN), Brocade Advanced Zoning, and Brocade Web Tools. Optional fabric services include Brocade Fabric Watch, Brocade Extended Fabrics, Brocade ISL Trunking (available between devices running FOS), Brocade Advanced Performance Monitoring, and FICON CUP (Advanced Performance Monitoring and FICON CUP are not available in M-EOS environments).
Options	SFP media
Management	
Management software supported	SSH, Telnet, HTTPS/SSL, RADIUS; SNMP v3 (FE MIB, FC Management MIB); Brocade Advanced Web Tools; Brocade EFCM Standard/Enterprise 9.x (optional); Brocade Fabric Manager (optional: FOS environments only); third-party applications utilizing the Brocade SMI Agent
Management access	10/100 Ethernet port (RJ-45); serial port (RS-232); in-band through Management Server
Diagnostics	POST and embedded online/offline diagnostics

Mechanicals	
Enclosure	Back-to-front airflow (non-Fibre Channel port side to Fibre Channel port side). Power from rear. 1.0U, 19-inch EIA compliant
Size	Width: 42.9 cm (16.9 in) Height: 4.4 cm (1.7 in) Depth: 26.4 cm (10.4 in)
System weight	4.9 kg (10.8 lbs) with dual power supplies, no SFP
Environmentals	
Temperature	Operating: 0°C to 40°C (32°F to 104°F) Non-operating: –25°C to 70°C (–13°F to 158°F)
Humidity	Operating: 10% to 85% non-condensing at 40°C (104°F); Non-operating: 10% to 90%, non-condensing at 40° C (104° F)
Altitude	Operating: up to 3000 meters (9842 feet) Storage: up to 12 km (39,370 feet)
Shock	Operating: 20 g, 6 ms half-sine Non-operating: Half sine, 33G 11ms, 3/eg Axis
Vibration	Operating: 0.5 g sine, 0.4 grms random, 5 to 500 Hz Non-operating: 2.0 g sine, 1.1 grms random, 5 to 500 Hz
Heat dissipation	60 W, 205 BTU/hr
CO_2 emissions	221 kg per year (with 32 ports at 0.42 kg/kWh) 1.73 kg per Gbit/sec per year
Airflow	High speed: 9300 RPM: 20.8 CFM (cu. ft./min) Low speed: 7200 RPM: 15.4 CFM (cu. ft./min)
Power	
Maximum output	70 Watts
System power consumption	70 Watts max, 60 Watts typical
Nominal input voltage	90 to 264 VAC, universal
Input line frequency	47 to 63 Hz
Input voltage	90 VAC minimum; 264 VAC maximum
Inrush current	Maximum of 15 amps for period between 10 to 150 ms at 50°C (122°F)

Safety

The Brocade 5000 complies with the following safety certifications:

- CSA NRTL Certification to UL 60950-1: 2003, First Edition
- CSA Certification to CSA 60950-1-03 (Canadian Standards Association)
- CB Certification to IEC 60950-1 (2001) (including all National Deviations)
- Nemko Certification to EN60950-1:2001
- TUV Certification to EN60950-1+ A11
- GOST Certification (Russia)
- TUV Argentina Certification to IEC60950-1(2001)
- Low Voltage Directive (73/23/EEC) for CE Marking in European Union

** Brocade M-EOS fabrics are McDATA switches and directors running McDATA Enterprise OS.*

For information about supported SAN standards, visit www.brocade.com/sanstandards
For information about switch and device interoperability, visit www.brocade.com/interoperability

Corporate Headquarters
San Jose, CA USA
T: (408) 333-8000
info@brocade.com

European Headquarters
Geneva, Switzerland
T: +41 22 799 56 40
emea-info@brocade.com

Asia Pacific Headquarters
Singapore
T: +65-6538-4700
apac-info@brocade.com

© 2008 Brocade Communications Systems, Inc. All Rights Reserved. 01/08 GA-DS-893-01

Brocade, Fabric OS, File Lifecycle Manager, MyView, and StorageX are registered trademarks and the Brocade B-wing symbol, DCX, and SAN Health are trademarks of Brocade Communications Systems, Inc., in the United States and/or in other countries. All other brands, products, or service names are or may be trademarks or service marks of, and are used to identify, products or services of their respective owners.

Notice: This document is for informational purposes only and does not set forth any warranty, expressed or implied, concerning any equipment, equipment feature, or service offered or to be offered by Brocade. Brocade reserves the right to make changes to this document at any time, without notice, and assumes no responsibility for its use. This informational document describes features that may not be currently available. Contact a Brocade sales office for information on feature and product availability. Export of technical data contained in this document may require an export license from the United States government.

BROCADE