



By Nivetha Balakrishnan

Aditya G.

DEPLOYING FLEXIBLE BROCADE 5000 AND 4900 SAN SWITCHES

Brocade® storage area network (SAN) switches are designed to meet the needs of rapidly growing enterprise IT environments. As the first Brocade switch to support both the Brocade Fabric OS® and McDATA Enterprise OS platforms, the Brocade 5000 offers flexible interoperability in a scalable, high-performance switch, while the port-dense Brocade 4900 facilitates cost-effective consolidation.

As enterprise organizations face the major challenge of continuous data growth and limited energy resources in their data centers, they are turning to flexible, scalable, energy-efficient devices to help reduce their power usage and overall storage costs. Brocade has made designing highly efficient data infrastructure solutions a key focus, including participating in key industry initiatives such as the Green Grid consortium and the Green Storage Initiative of the Storage Networking Industry Association.

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The acquisition of McDATA by Brocade in 2006 has also made merging the Brocade Fabric OS (FOS) and McDATA Enterprise OS (M-EOS) platforms a top priority. The Brocade 5000 is the first Brocade switch that supports both FOS and M-EOS in either native or open mode, enabling enterprises to integrate it with devices using either platform. Intended as a replacement for the Brocade 4100 and Brocade M4700 (formerly McDATA Sphereon ES-4700) switches, the Brocade 5000 is well suited for use as a stand-alone switch in small SANs or as an edge switch in large SANs, particularly for midsize organizations, departments, and branch offices. The Brocade 4900 switch, meanwhile, is designed as a port-dense switch to facilitate switch consolidation, helping simplify the SAN fabric and reduce costs.

Brocade anticipates that future products will continue to expand options for SAN administrators to help maximize flexibility for fabric connectivity.

THE BROCADE 5000: INTEROPERABLE, HIGH-PERFORMANCE FABRICS

The Brocade 5000 switch is designed to meet the rapidly growing storage requirements of enterprise data centers, supporting seamless connectivity and high levels of energy efficiency in FOS or M-EOS environments. Combining 1 Gbps, 2 Gbps, and 4 Gbps Fibre Channel technology, it can serve as a midrange switch, enterprise edge switch, or small stand-alone SAN. The Brocade 5000 is designed for flexible interoperability, high performance, and enterprise-class availability and scalability. Figure 1 outlines key features and specifications of the Brocade 5000 switch; Figure 2 compares features and specifications of the Brocade 5000 with those of the Brocade 4900, Brocade 4100, and Brocade M4700.

Flexible interoperability

Interoperability between devices can be critical in enterprise IT infrastructures. Because SANs typically consist of heterogeneous devices such as host bus adapters, tape libraries, and storage arrays, vendors typically produce interoperability matrices to help

Specifications	
Enclosure	Back-to-front airflow (non-Fibre Channel port side to Fibre Channel port side), with power from rear
Maximum power output	70 W
Power consumption	70 W maximum, 60 W typical
Nominal input voltage	90-264 VAC, universal
Input line frequency	47-63 Hz
Input voltage	90 VAC minimum, 264 VAC maximum
Systems architecture	
Fibre Channel ports	32 ports, universal (E_Port, F_Port, M_Port, and FL_Port)
Scalability	Comprehensive fabric architecture supporting up to 239 switches
Certified maximum number of domains and hops	<ul style="list-style-type: none"> ■ <i>Single FOS fabric:</i> 56 domains, 7 hops ■ <i>Single M-EOS fabric:</i> 31 domains, 3 hops*
Performance	<ul style="list-style-type: none"> ■ Supports up to 1.063 Gbps line speed over 1 Gbps Fibre Channel, up to 2.125 Gbps line speed over 2 Gbps Fibre Channel, and up to 4.25 Gbps line speed over 4 Gbps Fibre Channel (full duplex) ■ Auto-sensing of 1 Gbps, 2 Gbps, and 4 Gbps port speeds, with speed matching between 1 Gbps, 2 Gbps, and 4 Gbps ports; optionally programmable to a fixed port speed
Brocade ISL Trunking	Up to eight 4.25 Gbps ports per ISL trunk, for a total bandwidth of up to 32 Gbps per ISL trunk
Aggregate end-to-end bandwidth	256 Gbps
Fabric latency	0.8 ms, cut-through routing at 4 Gbps
Maximum frame size	2,112-byte payload
Classes of service	Class 2, Class 3, and Class F (inter-switch frames)
Port types	E_Port, F_Port, M_Port, and FL_Port, with self-discovery based on switch type (U_Port)
Data traffic types	Unicast and broadcast
Media types and supported distances**	<ul style="list-style-type: none"> ■ Hot-pluggable, industry-standard, small form-factor pluggable (SFP) Lucent connector ■ Short-wavelength laser (SWL) supporting distances of up to 500 m (1,640 feet) ■ Long-wavelength laser (LWL) supporting distances of up to 10 km (6.2 miles) ■ Extended long-wavelength laser (ELWL) supporting distances of up to 40 km (24.8 miles) and 80 km (49.7 miles) at 2 Gbps
Fabric services	<ul style="list-style-type: none"> ■ <i>Included fabric services:</i> Simple Name Server (SNS), Registered State Change Notification (RSCN), Brocade Advanced Zoning, and Brocade Web Tools ■ <i>Optional fabric services:</i> Brocade Fabric Watch, Brocade Extended Fabrics, Brocade ISL Trunking (available between devices running FOS), Brocade Advanced Performance Monitoring, and Fiber Connection (FICON) Control Unit Port (CUP)***
Additional options	SFP media
Management	
Supported management software	<ul style="list-style-type: none"> ■ Secure Shell (SSH), Telnet, HTTP over Secure Sockets Layer (HTTPS), Remote Authentication Dial-In User Service (RADIUS), and Simple Network Management Protocol version 3 (SNMPv3), including Fabric Element in Fibre Channel management information base (Fibre Channel-FE-MIB) and Fibre Channel Management MIB (FC-MGMT-MIB) ■ Brocade Advanced Web Tools, Brocade Enterprise Fabric Connectivity Manager (EFCM) Standard and Enterprise 9.x (optional), and Brocade Fabric Manager (optional, and available in FOS environments only) ■ Third-party applications utilizing the Brocade Storage Management Initiative (SMI) Agent
Management access	10/100 Ethernet port (RJ-45), serial port (RS-232), and in-band access through a management server

* Larger fabrics can be certified as required; consult Brocade or original equipment manufacturer SAN design documents for configuration details.

** Actual distances depend on fiber-optic cable and speed as well as coarse wavelength division multiplexing (CWDM) SFPs (8 lambdas).

*** Advanced Performance Monitoring and FICON CUP are not available in M-EOS environments.

Figure 1. Key specifications of the Brocade 5000

	Brocade 5000	Brocade 4900	Brocade 4100	Brocade M4700
Height	1U	2U	1U	1U
Depth	26.4 cm (10.4 inches)	61 cm (24.02 inches)	61 cm (24 inches)	39.4 cm (15.5 inches)
Weight	4.9 kg (10.8 pounds)*	13.7 kg (30.2 pounds)	10.2 kg (22.4 pounds)	6.8 kg (15 pounds)
Supported platforms	FOS and M-EOS	FOS	FOS	M-EOS
Number of supported ports	16, 24, or 32	32, 48, or 64	16, 24, or 32	16, 24, or 32
Console port type	RJ-45	RJ-45	DB-9	DB-9
Typical power consumption	60 W	240 W	75 W	70 W
Number of fans	2	8	8	6
Auto-sensing of 1 Gbps, 2 Gbps, and 4 Gbps port speeds	✓	✓	✓	✓
Redundant fans and power supplies	✓	✓	✓	✓
Integrated fans and power supplies	✓			✓
Frame-based trunking	✓	✓	✓	
Secure FOS	✓ (included with FOS)	✓	✓	
Hot code loading and activation	✓	✓	✓	✓
Enhanced trunking, up to 32 Gbps	✓	✓	✓	
FICON CUP	✓ (FICON ready)	✓	✓	✓

*Weight includes dual power supplies but no SFP modules.

Figure 2. Comparison of the Brocade 5000 with the Brocade 4900, Brocade 4100, and Brocade M4700

administrators deploy devices that can work together. Such matrices are less common for fabric interoperability, in which host and storage nodes connected to switches from different vendors can communicate with each other. When these switches connect to each other, they must recognize each other as well as the devices connected to the other switches by exchanging information to form the fabric.

The Brocade 5000 is designed to protect existing investments in Brocade and legacy McDATA devices by supporting FOS, M-EOS, and M-EOS Native Interop (NI) platforms in native and open mode and facilitating direct E_Port interoperability, which involves directly connecting Brocade switches and legacy McDATA switches together to form a fabric (see

Figure 3). Direct E_Port interoperability is typically useful when a SAN already includes each type of switch and administrators need to integrate them into a single fabric. Administrators might interconnect either stand-alone switches or multi-switch fabrics for a variety of reasons, including a lack of ports on one

fabric or an organizational change. Direct E_Port interoperability can also be useful temporarily during a SAN migration.

The Brocade 5000 provides comprehensive compatibility with Brocade 1 Gbps, 2 Gbps, and 4 Gbps Fibre Channel devices. In addition, because it is designed for comprehensive backward and forward

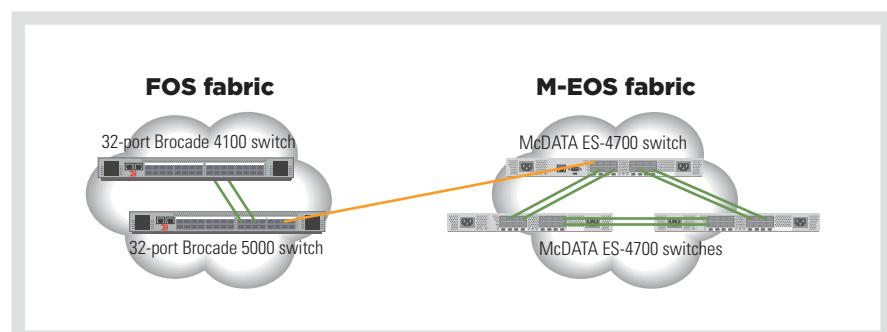


Figure 3. Example Brocade 5000 deployment with both FOS and M-EOS platforms

compatibility and can facilitate seamless migrations as storage needs grow, it can help enterprises take advantage of existing investments while scaling to support future needs.

High performance

The Brocade 5000 is based on a non-blocking architecture that can support up to 32 concurrently active ports using 4 Gbps Fibre Channel, providing a total bandwidth of up to 256 Gbps to help reduce congestion and increase throughput. To further enhance performance, it supports up to eight virtual channels of Inter-Switch Link (ISL) quality-of-service traffic prioritization and anti-starvation capabilities at the port level.

When used for backup and restore processes, SANs can help dramatically reduce LAN traffic and can provide a wide range of other advantages. The 4 Gbps speed of the Brocade 5000 helps reduce backup times through high-speed disk-to-tape or disk-to-disk backups and helps increase data availability through backups to remote locations.

Administrators can take advantage of the interoperability of the Brocade 5000 to enable heterogeneous host systems to access pools of shared storage, enhancing storage utilization rates and helping reduce the amount of captive storage—that is, arrays that are using all available ports but still have available capacity. Support for 4 Gbps Fibre Channel enables a single 4 Gbps port on a storage system to support twice the number of servers as a 2 Gbps port.

Enterprise-class availability and scalability

The Brocade 5000 supports redundant SAN switch configurations and multiple data paths to storage and hosts to help increase data availability. By increasing the number of channels to a storage device, redundant paths also help protect data and enhance performance. Other enterprise-class availability features include hot-swappable, redundant fans

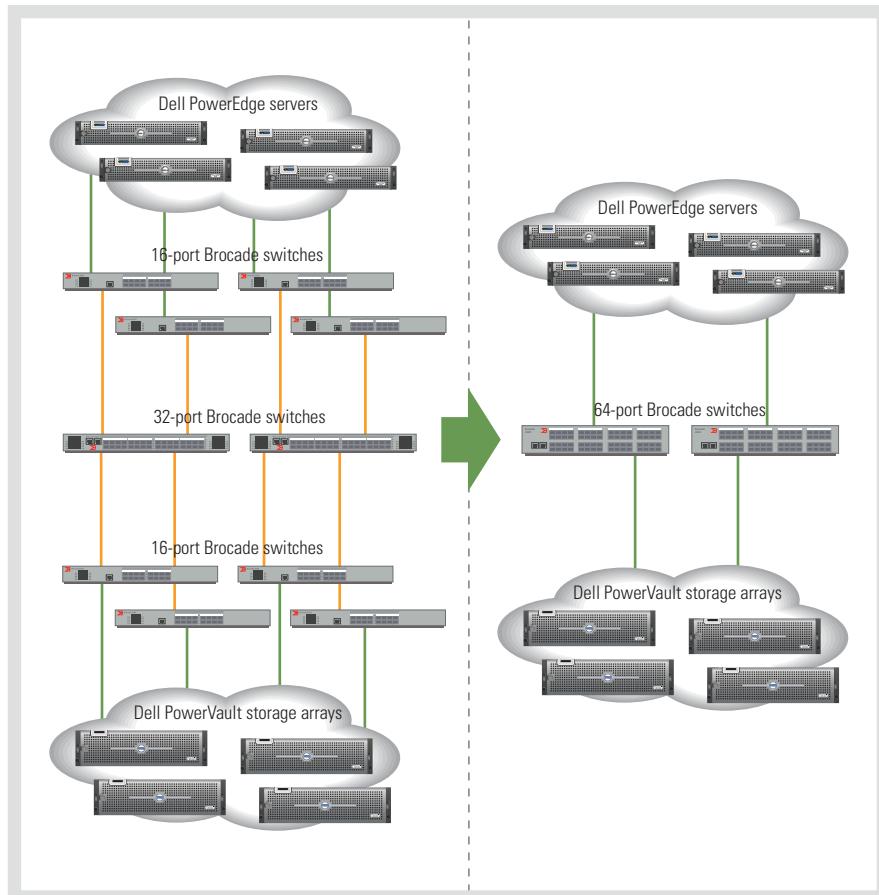


Figure 4. Example consolidation using the port-dense Brocade 4900

and power supplies as well as hot code loading and activation to help maximize application uptime and accelerate system upgrades and maintenance. To facilitate long-distance SANs, the Brocade 5000 supports distances of up to 500 km at 1 Gbps or up to 100 km at 4 Gbps.

The Brocade 5000 is also designed for scalability. The Ports on Demand (POD) feature enables administrators to scale the switch from 16 ports to 24 or 32 ports, supporting a modular approach to expansion.

THE BROCADE 4900: SIMPLIFIED, COST-EFFECTIVE SCALABILITY

The Brocade 4900 supports 32, 48, or 64 ports in a single domain in a 2U enclosure, helping administrators create easily managed SAN fabrics with fewer domains than their environment might otherwise require. Its high port density

and simplified, cost-effective scalability facilitates switch consolidation to help increase utilization, reduce fabric complexity, and reduce ongoing operational expenses (see Figure 4).

Like the Brocade 5000, the Brocade 4900 is designed for comprehensive backward and forward compatibility and supports 1 Gbps, 2 Gbps, and 4 Gbps Fibre Channel technology. The enhanced Brocade ISL Trunking feature provides a high-speed data path of up to 32 Gbps per ISL trunk to help increase network performance. The switch's non-blocking architecture can support up to 64 concurrently active ports using 4 Gbps Fibre Channel, providing a total bandwidth of up to 512 Gbps.

Other enterprise-class features include hot-swappable, redundant fans and power supplies, helping provide a reliable foundation for disaster recovery and business

continuity. Hot code loading and activation help maximize application uptime and accelerate system upgrades and maintenance. The Brocade 4900 supports distances of up to 500 km at 1 Gbps or up to 100 km at 4 Gbps, helping facilitate deployment of high-performance, long-distance SANs for consolidation and disaster recovery.

For enterprises seeking to limit the cost and complexity of their SANs, the high port count of the Brocade 4900 makes it well suited for deployment as a core switch. Compared with a highly redundant SAN built with many ports for ISLs to provide failover capabilities, the Brocade 4900 can also provide more usable ports in a large core-to-edge design, requiring deployment of fewer switches and therefore fewer ISLs.

FLEXIBLE SWITCHES FOR ENTERPRISE SANs

Brocade 5000 and Brocade 4900 SAN switches offer enterprises the flexibility and scalability to meet their needs while supporting high levels of performance and energy efficiency. By supporting both FOS and M-EOS, the Brocade 5000 enables IT administrators to combine

devices based on both platforms into a single fabric, while the Brocade 4900 provides a port-dense switch to facilitate consolidation. Enterprises can take advantage of the benefits of each switch to help create versatile, scalable SAN environments in a cost-effective way. 

Nivetha Balakrishnan is a Product Group test engineer analyst in the Storage Group at the Dell Bangalore Development Center. She has a degree in Computer Science.

Aditya G. is a Product Group test engineer senior analyst in the Storage Group at the Dell Bangalore Development Center. He has a degree in Computer Science.



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