BROCADE 5100 SWITCH

STORAGE AREA NETWORK

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

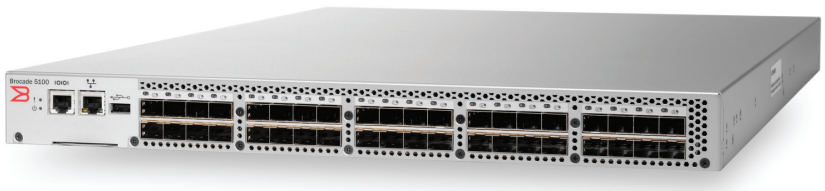
HIGHLIGHTS

- Delivers full 8 Gbps 1:1 performance for up to 40 ports in an energy-efficient, optimized 1U form factor
- Offers best-in-class port density and scalability for midrange enterprise SAN switches along with redundant, hot-pluggable components and non-disruptive software upgrades
- Features Ports on Demand capabilities for fast, easy, and cost-effective scalability from 24 to 40 ports in 8-port increments
- Provides Adaptive Networking services, such as Quality of Service (QoS), to help optimize application performance in consolidated, virtual environments
- Supports Fibre Channel Integrated Routing for selective device sharing while maintaining remote fabric isolation for higher levels of scalability and fault isolation
- Enables logical partitioning of switches and fabrics into virtual data and management domains through Virtual Fabrics
- Offers dual functionality as either a full-fabric SAN switch or as an NPIV-enabled Brocade Access Gateway that simplifies server connectivity in heterogeneous enterprise fabrics
- Utilizes the Brocade EZSwitchSetup wizard to simplify deployment, and is Microsoft Simple SAN-compatible (Brocade DCFM Professional is included for fabric-wide SAN monitoring and management)

As the value and volume of business data continue to rise, organizations need technology solutions that are easy to implement and manage, and that can grow and change with minimal disruption. The Brocade® 5100 Switch is designed for rapidly growing storage requirements in mission-critical environments—combining 1, 2, 4, and 8 Gbps Fibre Channel technology in configurations of 24, 32, or 40 ports in an efficiently designed 1U package. As a result, it provides low-cost access to industry-leading SAN technology as well as "pay-as-you-grow" scalability for consolidating storage and maximizing the value of virtual server deployments.

The Brocade 5100 features a flexible architecture that operates seamlessly with existing Brocade switches through native E_Port connectivity into Brocade Fabric OS® (FOS) or M-Enterprise OS (M-EOS)* environments. With the highest port density of any midrange enterprise Fibre Channel switch, the Brocade 5100 is designed for a broad range of SAN architectures. The evolutionary design consumes less than 2.5 watts of power per port for exceptional power and cooling efficiency, and features consolidated power and fan assemblies to improve environmental performance and reduce ownership costs. These capabilities help make the Brocade 5100 a cost-effective building block for standalone networks or the edge of enterprise core-to-edge fabrics.

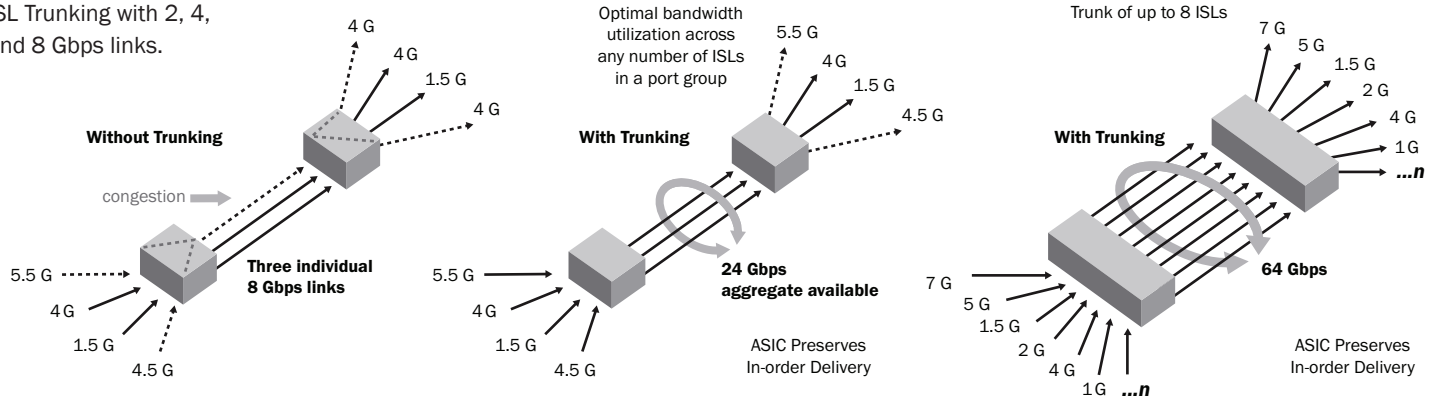
To consolidate server connectivity using Fibre Channel over Ethernet (FCoE) and Converged Enhanced Ethernet (CEE), the Brocade 5100 is compatible with Brocade CEE/FCoE solutions.



* *Brocade M-EOS fabrics are McDATA switches and directors running McDATA Enterprise OS in McDATA Fabric mode or McDATA Open Fabric mode.*

BROCADE

Figure 1.
ISL Trunking with 2, 4, and 8 Gbps links.



INDUSTRY-LEADING PERFORMANCE

To support mission-critical environments, the Brocade 5100 provides best-in-class performance for midrange SAN switches. It features a non-blocking architecture with as many as 40 ports concurrently active at 8 Gbps to provide an overall bandwidth of 320 Gbps. The Brocade 5100 also enables organizations to use 4 Gbps SFPs today and upgrade to 8 Gbps SFPs when required.

The Brocade 5100 utilizes sixth-generation ASIC technology featuring five 8-port groups. Within these groups, an Inter-Switch Link (ISL) trunk can supply up to 64 Gbps of balanced data throughput (see Figure 1). In addition to reducing congestion and increasing bandwidth, enhanced Brocade ISL Trunking utilizes ISLs more efficiently to preserve the number of usable switch ports.

Additional performance capabilities include the following:

- 32 virtual channels on each ISL enhance QoS 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 5100 and Brocade M-Series devices enabled with Brocade Open Trunking.

ENTERPRISE-CLASS AVAILABILITY FOR BUSINESS CONTINUANCE

The Brocade 5100 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 help 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 establish a highly available SAN environment.

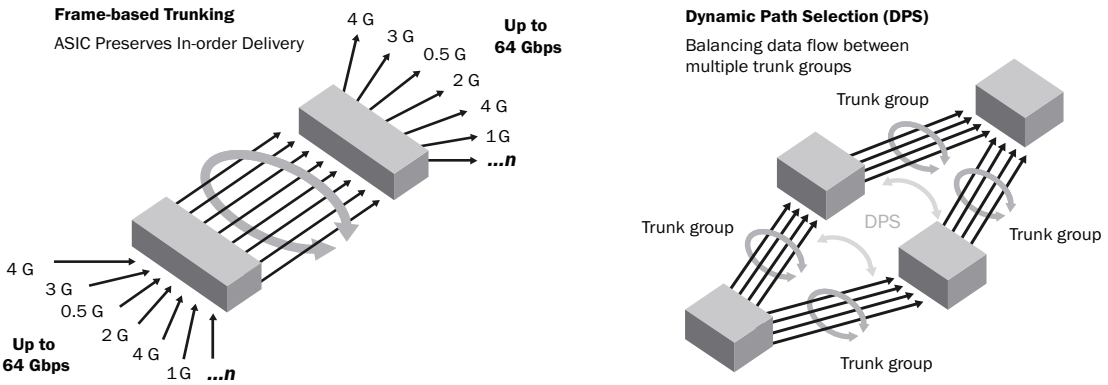
To support SAN extension, the Brocade 5100 enables servers and storage devices to reside 600 kilometers apart or more (up to 3400 kilometers), enabling organizations to create highly available, high-performance clustered systems that support the most sophisticated business continuance and disaster recovery initiatives.

TRAFFIC MEASUREMENT AND ADAPTIVE NETWORKING

The Brocade 5100 offers Bottleneck Detection, Top Talkers (part of Brocade Advanced Performance Monitoring) and Adaptive Networking, a suite of tools including Ingress Rate Limiting, Traffic Isolation, and Quality of Service (QoS). These advanced capabilities help optimize fabric behavior and ensure ample bandwidth for mission-critical applications.

Bottleneck Detection identifies and alerts administrators to "slow drain" storage devices causing latency and I/O timeouts, particularly in highly virtualized server environments. Top Talkers measures the top bandwidth-consuming traffic (including by individual virtual machine) in real time over a physical device connection or throughout a network switch. Ingress Rate Limiting restricts data flow from less-critical hosts

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



at preset bandwidths. Traffic Isolation dedicates paths in the fabric to high-bandwidth data flows. And QoS expedites critical traffic in the event of congestion while keeping all traffic flowing.

SUPERIOR INVESTMENT PROTECTION

The Brocade 5100 utilizes the same Fabric OS that supports the entire Brocade product family—from the 8-port Brocade 300 Switch to the 768-port Brocade DCX® Backbone. This helps ensure forward and backward compatibility among Brocade solutions while simplifying maintenance and field upgrades. Moreover, organizations can monitor and manage the Brocade 5100 with fabric-wide management applications such as Brocade Data Center Fabric Manager (DCFM™).

ADVANCED CAPABILITIES

As an option for connecting switches in different, unique fabrics, the Brocade 5100 provides Fibre Channel Integrated Routing capabilities. Integrated Routing leverages the latest generation of Brocade ASICs to provide native Fibre Channel Routing on a per-port basis rather than limiting routing capabilities to special-purpose switches. Integrated Routing uses EX_Ports to import/export devices between fabrics, enabling selective device sharing while maintaining remote fabric isolation for higher levels of scalability and fault isolation.

The Brocade 5100 includes a Virtual Fabrics feature that enables the partitioning of a physical SAN into logical fabrics. This provides fabric isolation by application, business group, customer, or traffic type without sacrificing performance, scalability, security, or reliability.

OPEN SAN MANAGEMENT

By enabling Fibre Channel switches such as the Brocade 5100 to operate under a common platform, Fabric OS simplifies management through standard interfaces and support for third-party management applications. The Brocade 5100 supports switch management through Brocade DCFM, Brocade Web Tools, or a command line interface.

To facilitate deployment, the Brocade 5100 includes EZSwitchSetup—providing simplified setup through a 3-step wizard. It integrates easily into heterogeneous server environments such as Windows, UNIX, Linux, Solaris, and AIX, as well as virtual server environments. It is also designed to provide FICON® support on a flexible port-by-port basis in IBM System z environments. FICON-ready capabilities include FICON intermix modes, cascaded FICON fabrics, and CUP support for monitoring tools.

HIGHER FABRIC SECURITY FOR CRITICAL INFORMATION

The Brocade 5100 is designed for the highest level of 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 5100 supports Active Directory with LDAP.

MAXIMIZING INVESTMENTS

To help optimize technology investments, Brocade and its partners offer complete solutions that include education, support, and services. For more information, contact a Brocade sales partner or visit www.brocade.com.

BROCADE ACCESS GATEWAY MODE

The Brocade 5100 can be deployed as a full-fabric switch or as a Brocade Access Gateway, which provides simplified server connectivity into heterogeneous SANs (the default mode setting is a switch). Access Gateway mode utilizes N_Port ID Virtualization (NPIV) switch standards to present physical and virtual servers directly to the core of SAN fabrics. This makes it transparent to the SAN fabric, greatly reducing management of the network edge. The Brocade 5100 in Access Gateway mode can connect servers to NPIV-enabled Brocade B-Series, Brocade M-Series, or other SAN fabrics.

Organizations can easily enable Access Gateway mode via Brocade DCFM, Brocade Web Tools, or a command line interface. Key benefits of Access Gateway mode include:

- Improved scalability for large or rapidly growing server and virtual server environments
- Reduced management of the network edge since Access Gateway does not have a domain identity and appears transparent to the core fabric
- Support for heterogeneous SAN configurations without reduced functionality for server connectivity

Note: Access Gateway mode for the Brocade 5100 is supported only in 40-port configurations.

BROCADE 5100 SPECIFICATIONS

Systems Architecture	
Fibre Channel ports	Switch mode (default): 24-, 32-, and 40-port configurations (8-port increments through Ports on Demand licenses); universal (E, F, M, EX, FL) ports Access Gateway default port mapping: 32 F_Ports, 8 N_Ports
Scalability	Full fabric architecture with 239 switches maximum
Certified maximum	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 Gbps line speed (full duplex); 2.125 Gbps line speed (full duplex); 4.25 Gbps line speed (full duplex); 8.5 Gbps line speed (full duplex); auto-sensing of 1, 2, 4, and 8 Gbps port speeds; optionally programmable to fixed port speed; speed matching between 1, 2, 4, and 8 Gbps ports
ISL Trunking	Frame-based trunking with up to eight 8 Gbps ports per ISL trunk with optional license; up to 64 Gbps per ISL trunk (8 ports × 8 Gbit/sec [data rate]) Exchange-based load balancing across ISLs with DPS included in Fabric OS
Aggregate bandwidth	320 Gbps: 40 ports × 8 Gbps (data rate)
Maximum fabric latency	Locally switched ports 700 ns with no contention, cut-through routing at 8 Gbit/sec
Maximum frame size	2112-byte payload
Frame buffers	2048 dynamically allocated, 1692 maximum per port
Classes of service	Class 2, Class 3, Class F (inter-switch frames)
Port types	FL_Port, F_Port, M_Port (Mirror Port), E_Port, EX_Port (Fibre Channel Integrated Routing); self-discovery based on switch type (U_Port); optional port type control Brocade Access Gateway mode: F_Port and NPIV-enabled N_Port
Data traffic types	Fabric switches supporting unicast, multicast (255 groups), and broadcast

BROCADE 5100 SPECIFICATIONS (CONTINUED)

Media types	8 Gbps: Requires Brocade hot-pluggable SFP+, LC connector; 8 Gbps Short-Wavelength Laser (SWL); 8 Gbps Long-Wavelength Laser (LWL); distance depends on fiber-optic cable and port speed 4 Gbps: Requires Brocade hot-pluggable, Small Form-factor Pluggable (SFP), LC connector; 4 Gbps Short-Wavelength Laser (SWL); 4 Gbps Long-Wavelength Laser (LWL); 4 Gbps Extended Long-Wavelength Laser (ELWL); distance depends on fiber-optic cable and port speed
USB	1 USB port for firmware download, support save, and configuration upload/download
Fabric services *Note: Some fabric services do not apply or are unavailable in Brocade Access Gateway mode*	Advanced Performance Monitoring (including Top Talkers); Adaptive Networking (Ingress Rate Limiting, Traffic Isolation, QoS); BB credit recovery; Brocade Advanced Zoning (default zoning, port/WWN zoning, broadcast zoning); Bottleneck Detection; Dynamic Path Selection (DPS); Extended Fabrics; EX_Port Trunking; F_Port Trunking; Fabric Watch; FDMI; Frame Redirection; FSPF; Integrated Routing; IPoFC; ISL Trunking; Management Server; NPIV; NTP v3; Port Fencing; Registered State Change Notification (RSCN); Reliable Commit Service (RCS); Simple Name Server (SNS); Virtual Fabrics
FICON	FICON, FICON cascading (FOS and M-EOS), and FICON CUP
Options	Rack-mount rail kits (fixed, slide, mid-mount)
Management	
Management	HTTP, SNMP v1/v3 (FE MIB, FC Management MIB), Telnet; auditing, change Management tracking, Syslog; Brocade Advanced Web Tools, Brocade Fabric Watch; EZSwitchSetup wizard, Brocade Data Center Fabric Manager (DCFM), Brocade Fabric Manager (optional, FOS environments only), Brocade EFCM 9.x (optional), command line interface; SMI-S compliant, SMI-S scripting toolkit; Administrative Domains; trial licenses for add-on capabilities
Security	DH-CHAP (between switches and end devices), HTTPS, IPsec, IP Filtering, LDAP, Port Binding, RADIUS, Role-Based Access Control (RBAC), Secure Copy (SCP), Secure RPC, SSH v2, SSL, Switch Binding, Trusted Switch
Management access	10/100 Ethernet (RJ-45), in-band over Fibre Channel; serial port (RJ-45); USB; call-home integration enabled through Brocade DCFM, EFCM, and Fabric Manager
Diagnostics	POST and embedded online/offline diagnostics, including RAStrace logging, environmental monitoring, non-disruptive daemon restart, FCping and Pathinfo (FC traceroute), port mirroring (SPAN port)

* *Brocade M-EOS fabrics are McDATA switches and directors running McDATA Enterprise OS in McDATA Fabric mode or McDATA Open Fabric mode.*

Mechanical	
Enclosure	Non-port to port side airflow; 1U, 19-inch EIA-compliant, power from non-port side
Size	Width: 42.88 cm (16.88 in) Height: 4.29 cm (1.69 in) Depth: 61.05 cm (24.00 in)
System weight	9.34 kg (20.60 lbs) with dual power supplies, without SFP/SFP+ media
Environment	
Temperature	Operating: 0°C to 40°C (32°F to 104°F) Non-operating and storage: 25°C to 70°C (–13°F to 158°F)
Humidity	Operating: 10% to 85% non-condensing Non-operating and storage: 10% to 95% non-condensing
Altitude	Operating: Up to 3000 meters (9842 feet) Non-operating and storage: Up to 12 kilometers (39,370 feet)
Shock	Operating: 20 g, 6 ms half-sine Non-operating and storage: Half sine, 33 g 11 ms, 3/eg Axis
Vibration	Operating: 0.5 g sine, 0.4 grms random, 5 to 500 Hz Non-operating and storage: 2.0 g sine, 1.1 grms random, 5 to 500 Hz
Heat dissipation	Maximum 40 ports: 311 BTU/hr
CO_2 emissions	335 kg per year (with 40 ports at 0.42 kg/kWh) 1.05 kg per Gbps per year
Airflow	Dual, hot-swappable redundant fans integrated into power supply unit Maximum 29 CFM (cu. ft./min.); nominal 22 CFM
Power	
Power supply	Dual, hot-swappable redundant power supplies with integrated system cooling fans
Power inlet	C13
Input voltage	85 to 264 VAC nominal
Input line frequency	47 to 63 Hz
Inrush current	Maximum of 35 amps for period between 10 to 150 ms at 50° C (122° F)
Power consumption	Nominal 84 watts; maximum 91 watts with 40 ports at 8 Gbps

For information about supported SAN standards, visit www.brocade.com/sanstandards

For information about switch and device interoperability, visit www.brocade.com/interoperability

For information about hardware regulatory compliance, visit www.brocade.com/regulatorycompliance

Corporate Headquarters
San Jose, CA USA
T: +1-408-333-8000
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

BROCADE