

# Brocade® 5100 Switch

A flexible, easy-to-use switch for a variety of SAN environments.



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 Gb/s 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.

## Highlights

- Delivers full 8 Gb/s 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
- Protects existing device investments with auto-sensing 1, 2, 4, and 8 Gb/s capabilities and native operation with Brocade and Brocade M-Series fabrics
- 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
- Utilizes the Brocade EZSwitchSetup wizard to simplify installation and management, and is Microsoft Simple SAN-compatible

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 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.

### 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 Gb/s full duplex to provide an aggregate bandwidth of 680 Gb/s. The Brocade 5100 also enables organizations to use 4 Gb/s SFPs today and upgrade to 8 Gb/s SFPs when required.

The Brocade 5100 utilizes ASIC technology featuring five 8-port groups. Within these groups, an Inter-Switch Link (ISL) trunk can supply up to 68 Gb/s 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.

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

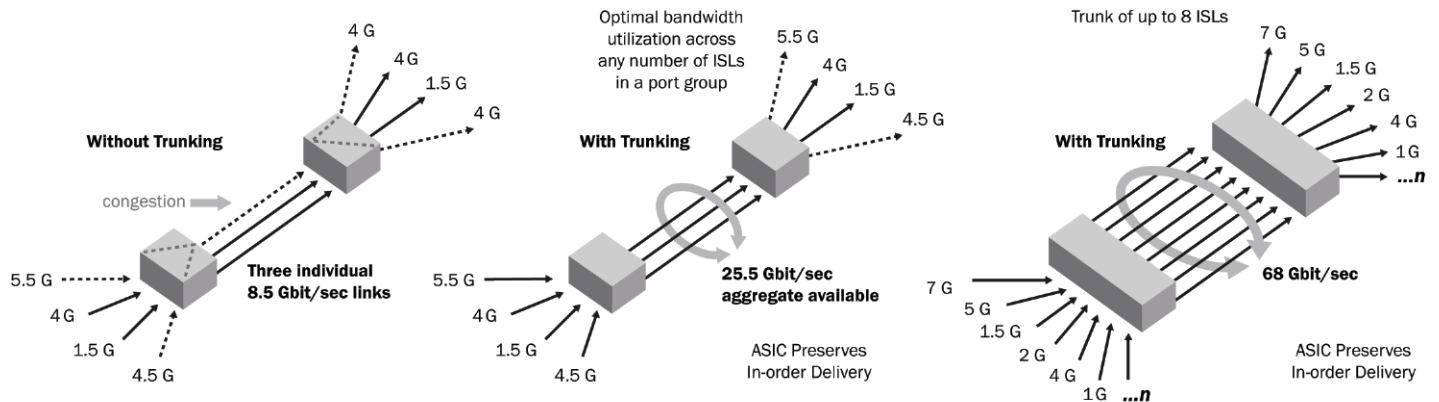


Figure 1. ISL Trunking with 2, 4, and 8 Gb/s links.

**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 provide 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.

**Adaptive Networking services**

The Brocade 5100 utilizes Brocade Adaptive Networking services, a suite of tools for optimizing fabric behavior and ensuring ample bandwidth for mission-critical applications. These tools currently include QoS, Ingress Rate Limiting, Traffic Isolation, and Top Talkers.

By assigning zones a high, medium, or low priority, QoS allocates bandwidth in the event of congestion to expedite high-priority traffic and keep all traffic flowing. Ingress Rate Limiting

restricts data flow from less critical hosts at preset bandwidths. Traffic Isolation assigns high-bandwidth data flows to specific ISLs. And Top Talkers measures the top bandwidth-consuming traffic in real time for a specific physical or virtual device, or end to end across the fabric.

**Superior ROI and 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 manage the Brocade 5100

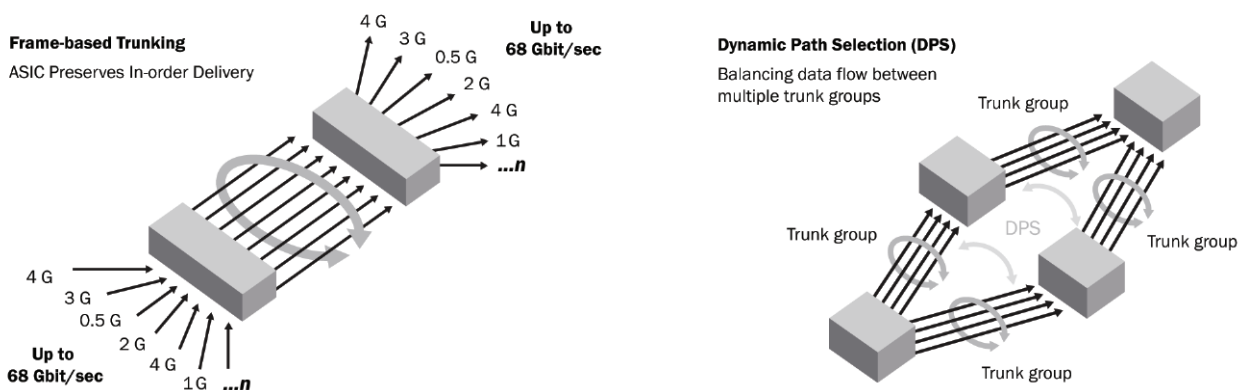


Figure 2. Dynamic Path Selection augments ISL Trunking to route data efficiently between multiple trunk groups.

with existing management applications such as Brocade Enterprise Fabric Connectivity Manager (EFCM) and Brocade Fabric Manager.

### Integrated routing

As an option for connecting switches in a fabric, 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 to special-purpose routing 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.

### Open SAN management

By networking Fibre Channel switches such as the Brocade 5100 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 a command line interface, Brocade Web Tools, EFCM, or Fabric Manager.

To facilitate deployment, the Brocade 5100 integrates easily into heterogeneous environments with operating systems such as Windows NT, 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.

## Brocade 5100 Switch Specifications

### Systems architecture

#### Fibre Channel ports

- 40 ports, universal (E, F, M, EX, 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 Sun's SAN design documents for configuration details

#### Performance

- 1.063 Gb/s line speed, full duplex
- 2.125 Gb/s line speed, full duplex
- 4.25 Gb/s line speed, full duplex
- 8.50 Gb/s line speed, full duplex
- Auto-sensing of 1, 2, 4, and 8 Gb/s port speeds; optionally programmable to fixed port speed; speed matching between 1, 2, 4, and 8 Gb/s ports

#### ISL Trunking

- Frame-based trunking with up to eight 8 Gb/s ports per ISL trunk with optional license; up to 68 Gb/s per ISL trunk (8 ports x 8.5 Gb/s [line rate])
- Exchange-based load balancing across ISLs with DPS included in Fabric OS

#### Aggregate bandwidth

- 680 Gb/s: 40 ports x 8.5 Gb/s (line rate) x 2 (full duplex)

#### Fabric latency

- Locally switched ports 700 ns with no contention, cut-through routing at 8 Gb/s

#### 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

#### Data traffic types

- Fabric switches supporting unicast, multicast (255 groups), and broadcast

#### Media types

- 4 Gb/s: Requires Brocade hot-pluggable, Small Form-factor Pluggable (SFP), LC connector; 4 Gb/s Short-Wavelength Laser (SWL); 4 Gb/s Long-Wavelength Laser (LWL); 4 Gb/s Extended Long-Wavelength Laser (ELWL); distance depends on fiber-optic cable and port speed
- 8 Gb/s: Requires Brocade hot-pluggable SFP+, LC connector; Short-Wavelength Laser (SWL); distance depends on fiber-optic cable and port speed

#### USB

- 1 USB port for firmware download, support save, and configuration upload/download

## Fabric services

- Simple Name Server (SNS); Registered State Change Notification (RSCN); NTP v3; Reliable Commit Service (RC S); Dynamic Path Selection (DPS); Brocade Advanced Zoning (default zoning, port/WW N zoning, broadcast zoning); NPIV; N\_Port Trunking; FDMI; Management Server; FSPF; Fabric Watch; Extended Fabrics; ISL Trunking; Advanced Performance Monitoring; Adaptive Networking (per data flow QoS, Ingress Rate Limiting, Traffic Isolation, Top Talkers; licensing varies); IPoFC, Frame Redirection; Port Fencing; BB credit recovery

## FICON

- FICON, FICON cascading (FOS and M-EOS), and FICON CUP

## Options

- Rack-mount rail kits (fixed, slide, mid-mount)

## Management

## Management

- Telnet, HTTP, SNMP v1/v3 (FE MIB, FC Management MIB); Auditing, Syslog, Change Management tracking; EZSwitchSetup wizard; Brocade Advanced Web Tools; Brocade EFCM Standard/Enterprise 9.x (optional); Brocade Fabric Manager (optional: FOS environments only); SMI-S compliant, SMI-S scripting toolkit, Administrative Domains; trial licenses for select add-on capabilities

## Security and management

- SSL, SSH v2, HTTPS, LDAP, RADIUS, Role-Based Access Control (RBAC), DH-CHAP (between switches and end devices), Port Binding, Switch Binding, Secure RPC, Secure Copy (SCP), Trusted Switch, IPSec, IP Filtering

## Management access

- 10/100 Ethernet (RJ-45), in-band over Fibre Channel; serial port (RJ-45); USB; call-home integration enabled through Brocade EFCM and Brocade Fabric Manager

## Diagnostics

- POST and embedded online/offline diagnostics, including RAStace logging, environmental monitoring, non-disruptive daemon restart, FCping and Pathinfo (FC traceroute), port mirroring (SPAN port)

## Mechanical Specifications

## 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

## 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
- Non-operating: 10% to 95% non-condensing

## Altitude

- Operating: Up to 3000 meters (9800 feet)
- Storage: Up to 12 km (39,370 feet)

## Shock

- Operating: 20 g, 6 ms, half-sine
- Non-operating: half sine, 33 g 11 ms, 3/eg Axis

## Vibration

- Operating: 0.5 g sine, 0.4 grms random, 5 to 500 H z
- Non-operating: 2.0 g sine, 1.1 grms random, 5 to 500 H z

## Learn More

To learn more about the Brocade 5100 Switch visit [sun.com/storagetek/networking](http://sun.com/storagetek/networking)

## Heat dissipation

- Maximum 40 ports: 311 BTU/hr

CO<sub>2</sub> emissions

- 335 kg per year (with 40 ports at 0.42 kg/kWh)
- 1.05 kg per Gb/s per year

## Airflow

- Maximum 29 CFM (cu. ft./min.); nominal 22 CFM

## Power

## Power inlet

- C13

## Input voltage

- 85 to 264 VAC nominal

## Input frequency

- 47 to 63 H z

## 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 Gb/s



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