BROCADE 8000 SWITCH

STORAGE AREA NETWORK

A Versatile FCoE Switch for Server I/O Consolidation

HIGHLIGHTS

- Delivers high performance with a cut-through, non-blocking switch architecture
- Features a top-of-rack, 1U, multiprotocol design that supports Fibre Channel over Ethernet (FCoE), Fibre Channel, Converged Enhanced Ethernet (CEE), and traditional Ethernet protocols
- Provides up to 8 Gbit/sec performance with eight Fibre Channel ports and line-rate performance for 24 CEE ports with 10 Gigabit Ethernet
- Improves energy efficiency, operating at 350 watts with redundant power supplies and cooling fan FRUs
- Utilizes Brocade ISL Trunking for Fibre Channel and Link Aggregation Control Protocol (LACP) for CEE
- Streamlines management by utilizing Brocade Data Center Fabric Manager (DCFM), Brocade Fibre Channel services, and extensions for FCoE and CEE

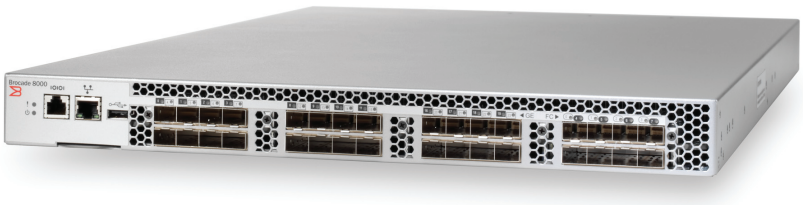
As IT organizations continue to face the increased complexity of system configuration and ever-rising operational costs, they are looking for new ways to simplify their IT environments. To address this challenge, Brocade® offers a versatile switch that supports both Fibre Channel and Fibre Channel over Ethernet (FCoE) to help organizations simplify their growing infrastructures.

The Brocade 8000 Switch provides a reliable platform that helps reduce cable clutter, equipment acquisition costs, and operational costs associated with power consumption and cooling. This unique top-of-rack switch features a low-profile 1U form factor and low power consumption (a maximum 350 watts), leading the way toward a “greener” data center.

The Brocade 8000 features eight 8 Gbit/sec Fibre Channel ports along with 24 Converged Enhanced Ethernet (CEE) ports with 10 Gigabit Ethernet capabilities. The CEE ports are capable of transporting both storage and LAN traffic—eliminating the need for separate SAN and LAN adapters and cables.

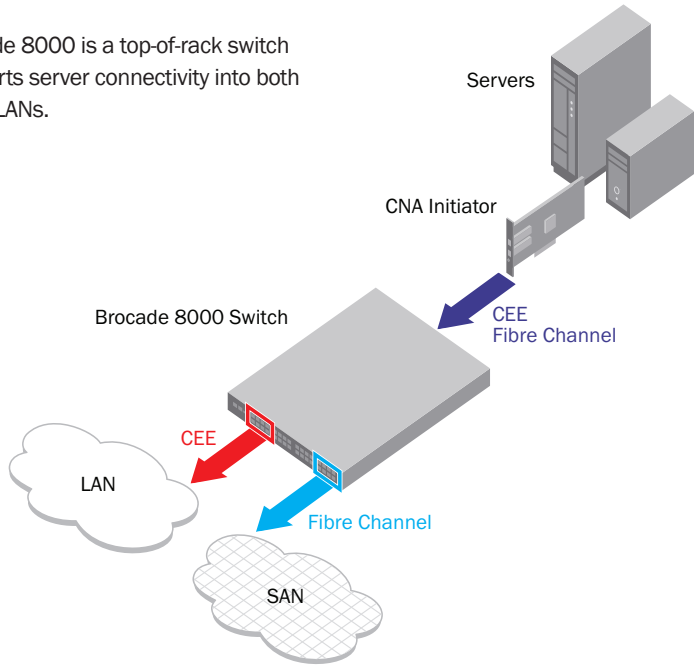
The top-of-rack Brocade 8000 connects to servers through Converged Network Adapters (CNAs) such as the Brocade 1010 and Brocade 1020. The consolidated SAN and LAN server ports and corresponding cables simplify configuration and cabling in server cabinets to reduce acquisition costs. With fewer components using power or requiring cooling, organizations can save significant operating costs as well.

Moreover, consolidation is not limited to hardware components. Because FCoE preserves Fibre Channel constructs and



BROCADE

Figure 1.
The Brocade 8000 is a top-of-rack switch that supports server connectivity into both SANs and LANs.



services, it integrates seamlessly into existing Fibre Channel environments, enabling organizations to maximize the value of their current investments. In addition, FCoE extends the reach of Fibre Channel management applications and tools, enabling organizations to manage FCoE-attached devices under a single, unified management umbrella (see Figure 1).

INDUSTRY-LEADING PERFORMANCE

To support the most data-intensive applications, the Brocade 8000 provides best-in-class performance for Fibre Channel delivery in a top-of-rack FCoE switch. It features a non-blocking architecture with eight Fibre Channel ports concurrently active at 8 Gbit/sec and 24 CEE ports with 10 Gigabit Ethernet.

The switch utilizes ASIC technology that supports port trunking for Fibre Channel and link aggregation for Ethernet. For Fibre Channel, an Inter-Switch Link (ISL) trunk can supply up to 64 Gbit/sec of balanced data throughput (see Figure 2). In addition to reducing congestion and increasing bandwidth, Brocade ISL Trunking utilizes ISLs more efficiently to preserve the number of usable switch ports. For Ethernet, the Brocade 8000 supports standards-based Link Aggregation Control Protocol (LACP).

Additional performance capabilities include 32 virtual channels on each ISL, enabling antistarvation capabilities at the port level to avoid performance degradation. In addition, 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. DPS further augments ISL Trunking to provide more effective load balancing in certain configurations.

ENTERPRISE-CLASS AVAILABILITY FOR BUSINESS CONTINUANCE

The Brocade 8000 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. Combined with a wide range of diagnostic and monitoring functions, these capabilities help ensure highly available SAN environments.

In conjunction with Brocade SAN extension products, the Brocade 8000 enables servers and storage devices to reside remotely, giving organizations a reliable way to create highly available environments that support the most sophisticated business continuance and disaster recovery initiatives.

SUPERIOR ROI AND INVESTMENT PROTECTION

The Brocade 8000 utilizes the same Brocade Fabric OS® that supports the entire Brocade Fibre Channel product family—from fixed port switches to the Brocade DCX® Backbone. This helps ensure backward compatibility that enables the Brocade 8000 to seamlessly integrate with existing Fibre Channel investments.

This design also enables forward compatibility among Brocade solutions, simplifying maintenance and field upgrades while providing peace of mind for future data center expansion. Moreover, organizations can monitor and manage the Brocade 8000 with fabric robust management applications such as Brocade Data Center Fabric Manager (DCFM™).

OPEN SAN MANAGEMENT

By networking Fibre Channel switches and the Brocade 8000 under a common management platform, Fabric OS simplifies management through standard interfaces and support for third-party management applications. The Brocade 8000 supports switch management through a Command Line Interface (CLI), Brocade Web Tools, or Brocade DCFM, which includes support for FCoE and CEE.

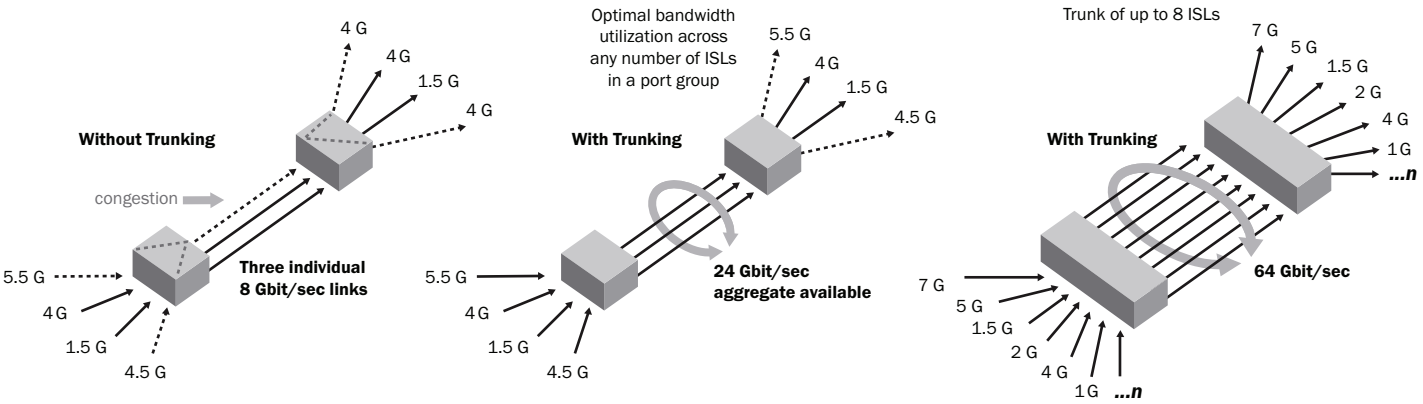
HIGHER FABRIC SECURITY FOR MISSION-CRITICAL INFORMATION

The Brocade 8000 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 8000 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.

Figure 2.
The Brocade 8000 combines high performance with efficient server I/O consolidation.



BROCADE 8000 SPECIFICATIONS

System Architecture	
Fibre Channel ports	Eight Fibre Channel universal (E, F, M, and FL) ports with 1, 2, 4, and 8 Gbit/sec
CEE ports	24 ports with 10 Gigabit Ethernet
FCoE features	Complete T11 FCoE entity and FCoE bridging The FCoE translation entity built into the hardware engine provides: • Detection of Fibre Channel encapsulation and redirection of FCoE fabric login frames • Encapsulation of Fibre Channel frames in FCoE Ethernet packets (FC > FCoE) • Extraction of Fibre Channel frames from FCoE Ethernet packets (FCoE > FC) • Mapping of Fibre Channel destination Virtual Fabrics and destination FC_ID to Ethernet Virtual LAN and destination MAC addresses Fabric-Provided MAC Addresses (FPMAs) enable new Ethernet MAC addresses to be created using the FC_ID assigned by the fabric
CEE features	Data Center Bridging eXchange (DCBX) Priority-based Flow Control (PFC) – IEEE 802.1Qbb Enhanced Transmission Selection (ETS) – IEEE 802.1Qaz
Performance	Fibre Channel: 1, 2, 4, and 8 Gbit/sec line speed full duplex CEE: 10 Gbit/sec line speed
ISL Trunking	Frame-based ISL Trunking (optional license) enables up to eight ports between a pair of switches to be combined into a logical ISL with speeds of up to 64 Gbit/sec (128 Gbit/sec full duplex) for optimal bandwidth utilization and load balancing; exchange-based load balancing across ISLs with DPS (included in Fabric OS)
Link aggregation (10 Gigabit Ethernet)	Link Aggregation Control Protocol (LACP), Brocade-enhanced and 802.3ad standards-based
Maximum frame size	2112-byte Fibre Channel payload; 9048-byte Ethernet frame
Classes of service	Class 2, Class 3, Class F (inter-switch frames)
Port types	FL_Port, F_Port, M_Port (Mirror Port), E_Port; 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	Fibre Channel media type: Hot-pluggable, industry-standard Small Form Factor Pluggable (SFP) and SFP+, LC connector; Short-Wave Laser (SWL) and Long-Wave Laser (LWL); distance depends on fiber optic cable and port speed; supports SFP+ (2, 4, and 8 Gbit/sec) and SFP (1, 2, and 4 Gbit/sec) optical transceivers CEE media type: Hot-pluggable, Brocade 10 Gigabit Ethernet SFP+ supports any combination of Short-Reach (SR) and Long-Reach (LR) optical transceivers; Brocade copper twinax cables of one, three, or five meters
USB	One USB port for firmware download, support save, and configuration upload/download
Fibre Channel fabric services	Simple Name Server (SNS), Registered State Change Notification (RSCN), NTP, RADIUS, LDAP, Reliable Commit Service (RCS), Dynamic Path Selection (DPS), Enhanced Group Management (EGM), and Web Tools; optional fabric services include Fabric Watch, ISL Trunking, and Advanced Performance Monitoring

BROCADE 8000 SPECIFICATIONS (CONTINUED)

CEE services	Spanning Tree Protocol (STP, MSTP, RSTP), VLAN Tagging (802.1q), MAC address learning and aging; native FCoE switching; IEEE 802.3ad Link Aggregation (LACP); access control lists based on VLAN, source, destination address, and port; eight priority levels for QoS and approximately 4000 VLANs; Priority-based Flow Control (PFC); Data Center Bridging eXchange (DCBX)-Capabilities Exchange; Enhanced Transmission Selection (ETS)
Licensing options	Fabric OS 6.1.2_cee includes the following optional features that can be enabled via license keys and are applicable only to the Fibre Channel ports of the Brocade 8000: • Brocade Fibre Channel ISL Trunking • Brocade Advanced Performance Monitoring • Brocade Fabric Watch

Management	
Management software	SSH v2, HTTP/HTTPS, SNMP v1/v3, Telnet; SNMP (FE MIB, FC Management MIB, RMON, and IF-MIB for CEE); Web Tools; Data Center Fabric Manager (DCFM) Professional and Enterprise; SMI-S; RADIUS
Management access	One 10/100/1000 Megabit Ethernet, in-band over Fibre Channel, one serial port, and one USB port
Diagnostics	POST and embedded online/offline diagnostics, including FCping and Pathinfo (FCtraceroute)

Mechanical	
Enclosure	Non-port to port side airflow; 1U, 19-inch EIA-compliant, power from non-port side
Size	Width: 42.9 cm (16.9 in) Height: 4.3 cm (1.7 in) Depth: 63.4 cm (25.0 in)
System weight	13.0 kg (28.6 lbs) with two power supply FRUs, without transceivers

Environmental	
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 90% non-condensing
Altitude	Operating: Up to 3000 meters (9842 feet) Storage: Up to 12 kilometers (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 Hz Non-operating: 2.0 g sine, 1.1 grms random, 5 to 500 Hz
CO_2 emissions	335 kg per year (with 40 ports at 0.42 kg/kWh) 1.05 kg per Gbit/sec per year
Airflow	Maximum: 42 CFM Nominal (65% speed): 35 CFM
Heat dissipation	32 ports: 1044 BTU/hr

Power	
Power	Maximum: 350 watts Consumption: 306 watts
Input voltage	85 to 264 VAC nominal
Input line frequency	47 to 63 Hz
Inrush current	60 amps maximum
Maximum current	29 amps at 12V DC

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

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