

BROCADE 8000 SWITCH

SERVER I/O CONSOLIDATION

A Versatile Top-of-Rack Switch for Server I/O Consolidation

HIGHLIGHTS

- Delivers Converged Enhanced Ethernet (CEE) and Fibre Channel over Ethernet (FCoE) for top-of-rack server I/O consolidation
- Offers deployment flexibility, initially as a Layer 2 Ethernet switch with Fibre Channel capabilities activated later, or as a full-function CEE/FCoE switch
- Utilizes a cut-through, non-blocking architecture to deliver line-rate performance across twenty-four 10 Gbps CEE ports with eight 8 Gbps Fibre Channel ports
- Provides rich Layer 2 Ethernet functionality for LAN traffic and advanced Fibre Channel functionality for SAN traffic
- Utilizes Brocade Link Aggregation Control Protocol (LACP) and Brocade frame-based trunking to maximize network bandwidth
- Improves energy efficiency, operating at 350 watts with redundant power supplies and cooling fan FRUs
- Combines with Brocade Converged Network Adapters (CNAs) and Brocade Data Center Fabric Manager (DCFM) to provide a unified CEE/FCoE solution that reduces capital and operating expenses

Supporting Windows and Linux environments, the Brocade® 8000 Switch enables access to LAN and SAN environments over a common server connection by utilizing Converged Enhanced Ethernet (CEE) and Fibre Channel over Ethernet (FCoE) protocols. LAN traffic is forwarded to aggregation layer Ethernet switches using conventional 10 Gigabit Ethernet (GbE) connections, and storage traffic is forwarded to Fibre Channel SANs over 8 Gbps Fibre Channel connections. Part of a unified CEE/FCoE solution unique to Brocade, the Brocade 8000 helps organizations reduce their capital and operating expenses in enterprise data centers.

UNIFIED CEE/FCOE SOLUTION TO REDUCE COSTS

The Brocade 8000 connects to servers utilizing Brocade 1010/1020 Converged Network Adapters (CNAs) or third-party CNAs. Consolidating server I/O reduces the number

of server adapters which, in turn, reduces cabling and switch ports. This approach results in lower infrastructure costs and less power and cooling.

Moreover, consolidation is not limited to hardware components. Because FCoE preserves Fibre Channel constructs and services, it integrates seamlessly into existing Fibre Channel environments, enabling organizations to introduce CEE/FCoE into their data centers without disrupting existing SAN operations or IT management practices (see Figure 1).

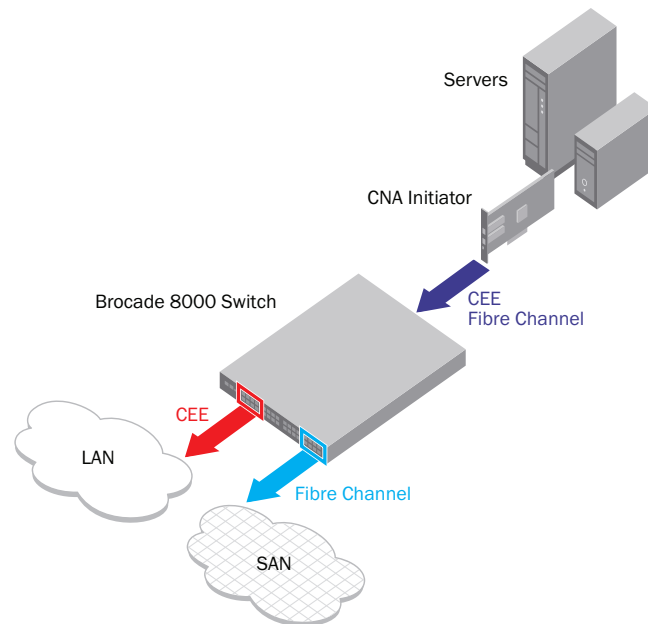
To further reduce complexity and administrative overhead, organizations can manage the Brocade 8000, Brocade CNAs, and Brocade Fibre Channel SAN infrastructures using Brocade Data Center Fabric Manager (DCFM™) as part of a unified CEE/FCoE solution that is unique in the industry.



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Figure 1.

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



INDUSTRY-LEADING PERFORMANCE AND DEPLOYMENT FLEXIBILITY

The Brocade 8000 provides best-in-class performance using a cut-through, non-blocking architecture. The low-profile 1U design features twenty-four 10 Gbps CEE ports for server and LAN connections, and eight 8 Gbps Fibre Channel ports for SAN connectivity.

The advanced ASIC technology of the Brocade 8000 provides unique frame-based trunking of server connections at up to 40 Gbps of combined throughput. The switch also features standards-based Link Aggregation Control Protocol (LACP) for LAN connections, as well as frame-based trunking of SAN connections at up to 64 Gbps of throughput (see Figure 2).

To meet current and future needs, organizations have the flexibility of activating both the CEE ports and Fibre Channel ports, with full FCoE support enabled. Alternatively, they can initially deploy the Brocade 8000 as a 10 GbE Layer 2 Ethernet switch and activate only the CEE ports. For SAN connectivity in the future, they can add optional licenses to activate the Fibre Channel ports and FCoE capabilities, providing a seamless path to server I/O consolidation.

COMPREHENSIVE LAYER 2 LAN CAPABILITIES

Leveraging deep Brocade expertise in Ethernet technologies, the Brocade 8000 provides broad, standards-based Data Link Layer (Layer 2) capabilities covering Quality of Service (QoS), security, and Layer 2 protocols. The 24 CEE ports provide uplink connections to conventional 10 GbE port aggregation layer Ethernet switches (Brocade or third-party devices). Layer 2 functions are configured and administered accordingly at the access layer.

FABRIC OS-POWERED, NON-DISRUPTIVE SAN CONNECTIVITY

The Brocade 8000 utilizes the same Brocade Fabric OS® that powers the entire Brocade SAN product family—from fixed port switches to the Brocade DCX® Backbone. This helps ensure backward and forward compatibility, and enables seamless and non-disruptive integration with Brocade Fibre Channel SANs.

HIGHER FABRIC SECURITY

To help organizations safeguard their critical information, the Brocade 8000 is designed for the highest level of fabric security. It utilizes advanced port and switch Access Control Lists (ACLs) to simplify administration and significantly increase control over data access. To enhance access security, the Brocade 8000 supports Active Directory with LDAP and 802.1x security and authentication.

ENTERPRISE-CLASS AVAILABILITY FOR BUSINESS CONTINUITY

The Brocade 8000 provides a reliable foundation for business continuity by employing enterprise-class availability features such as hot-swappable and redundant fan and power supply assemblies. Combined with a wide range of diagnostic and monitoring functions, these features help ensure highly available LAN and SAN environments.

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 supports Fibre Channel, FCoE, and CEE).

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.

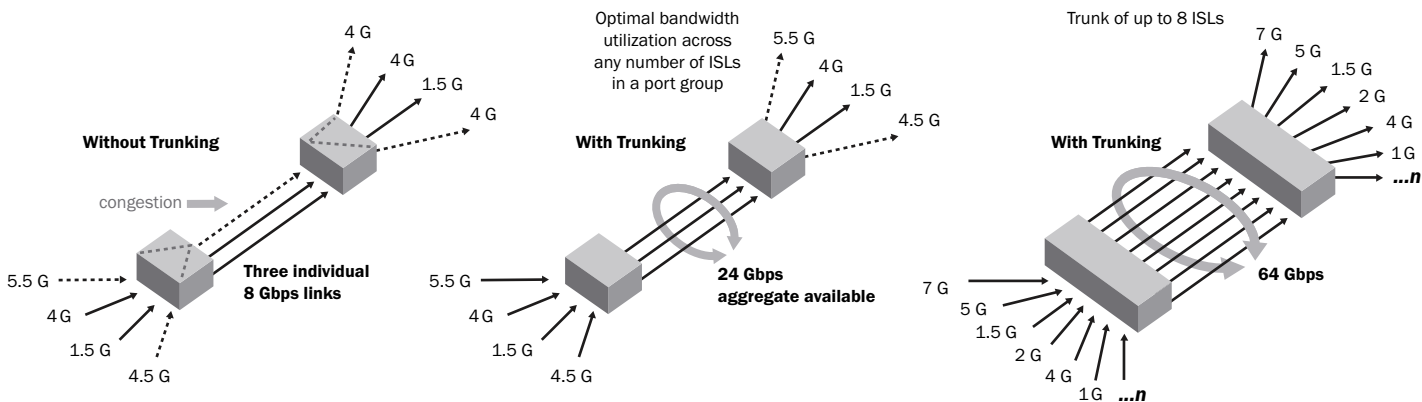


Figure 2.
The Brocade 8000 combines high performance with efficient server I/O consolidation.

BROCADE 8000 SPECIFICATIONS

System Architecture		Data Link Layer (Layer 2) features (continued)	Link Aggregation Control Protocol (LACP) IEEE- 802.3ad
Deployment options	Brocade 8000 with 24 CEE ports, eight Fibre Channel ports, and FCoE support enabled (includes 8 Gbps Fibre Channel SFP+) Brocade 8000 with only 24 CEE ports enabled (requires optional licenses to enable Fibre Channel and FCoE support)	(continued)	Brocade enhanced frame-based trunking Advanced PortChannel hashing based on Layer 2, 3, and 4 information Pause Frames (802.3x) Storm Control (unicast, multicast, and broadcast) Address Resolution Protocol (ARP) RFC 826
CEE ports	24 ports with 10 Gigabit Ethernet (GbE) line speed	Layer 2 security	Ingress Access Control Lists (ACLs) Standard and extended Layer 2 ACLs VLAN-based ACLs (VACLs) Port-based ACLs (PACLs) Named ACLs ACL statistics Optimized ACL distribution Port-based Network Access Control: IEEE 802.1X
Fibre Channel ports	Eight Fibre Channel universal (E, F, M, and FL) ports with 1, 2, 4, and 8 Gbps full duplex	Layer 2 Quality of Service (QoS)	Eight priority levels for QoS IEEE 802.1p Class of Service (CoS) Eight hardware queues per port Per-port QoS configuration CoS trust: IEEE 802.1p Modular QoS CLI (MQC) compliance Per-port Virtual Output Queuing CoS-based egress queuing Egress strict priority queuing Egress port-based scheduling: Weighted Round-Robin (WRR)
Maximum frame size	2112-byte Fibre Channel payload; 9048-byte Ethernet frame	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 Gbps (128 Gbps full duplex) for optimal bandwidth utilization and load balancing; exchange-based load balancing across ISLs with DPS (included in Fabric OS)
Data traffic types	Fabric switches supporting unicast, multicast (255 groups), and broadcast	Fibre Channel port types	FL_Port, F_Port, M_Port (Mirror Port), E_Port; self-discovery based on switch type (U_Port); optional port type control
MAC address table entries	32,000 MAC addresses	Fibre Channel classes of service	Class 2, Class 3, Class F (inter-switch frames)
USB	One USB port for firmware download, support save, and configuration upload/download		
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 Gbps) and SFP (1, 2, and 4 Gbps) optical transceivers CEE media type: Hot-pluggable, Brocade 10 GbE SFP+ supports any combination of Short-Reach (SR) and Long-Reach (LR) optical transceivers; Brocade copper Twinax cables of one, three, or five meters		
CEE features	Priority-based Flow Control (PFC): IEEE 802.1Qbb Enhanced Transmission Selection (ETS): IEEE 802.1Qaz Data Center Bridging eXchange (DCBX)		
Data Link Layer (Layer 2) features	Layer 2 Virtual Local Area Networks (VLANs): 4096 VLAN Encapsulation 802.1Q Rapid Spanning Tree Protocol (RSTP) Multiple Spanning Tree MSTP (802.1s): 16 instances STP PortFast and PortFast Guard STP Root Guard		

BROCADE 8000 SPECIFICATIONS (CONTINUED)

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	Management access	One 10/100/1000 Megabit Ethernet, in-band over Fibre Channel, one serial port, and one USB port
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)	Diagnostics	POST and embedded online/offline diagnostics, including FCping and Pathinfo (FCtraceroute)
Management software	<p>Brocade Data Center Fabric Manager (DCFM) Professional, DCFM Professional Plus, and DCFM Enterprise:</p> <ul style="list-style-type: none"> DCFM uses HTTP/HTTPS and SNMP protocols to communicate with the Brocade 8000 to manage and monitor CEE features DCFM enhancements support the following FCoE/CEE functionality: <ul style="list-style-type: none"> Discovery, connectivity map, and product list Configuration management Performance management Fault management Security management <p>HTTP/HTTPS, Telnet; SNMP (FE MIB, FC Management MIB, and IF-MIB for CEE); Web Tools; SMI-S; RADIUS</p>	Mechanical	
Management protocols	<p>Industry-common Command Line Interface (CLI) Security Shell (SSH) v2</p> <p>Authentication, Authorization, and Accounting (AAA)</p> <p>Simple Network Management Protocol (SNMP) v1, v2, and v3</p> <p>Unified username and passwords across CLI and SNMP</p> <p>Syslog</p> <p>Microsoft Challenge Handshake Authentication Protocol (CHAP)</p> <p>Remote Monitoring (RMON)</p> <p>Per-port ingress and egress counters</p> <p>Role-Based Access Control (RBAC)</p> <p>Power-On Self-Test (POST)</p> <p>Comprehensive bootup diagnostics</p>	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 Gbps per year
		Airflow	Maximum: 42 CFM Nominal (65% speed): 35 CFM
		Heat dissipation	32 ports: 1044 BTU/hr
		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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