

BROCADE 7800 EXTENSION SWITCH

DATA CENTER

Industry-Leading SAN Extension for Remote Data Replication, Backup, and Migration

HIGHLIGHTS

- Leverages advanced Fibre Channel and FCIP technology to enable fast, reliable, and cost-effective remote data replication, backup, and migration
- Maximizes flexibility with an extensible hardware platform and flexible software licensing to support a broad range of SAN extension requirements
- Offers a purpose-built FCIP SAN extension solution with up to sixteen 8 Gbps Fibre Channel ports and six 1 GbE ports in a 1U space
- Maximizes replication, backup, and migration throughput over distance using advanced Fibre Channel frame compression, disk and tape protocol acceleration, and QoS-aware FCIP networking technology
- Offers FCIP Trunking and Adaptive Rate Limiting to maximize WAN link utilization and resiliency
- Enables consolidation while providing traffic isolation in mixed environments with Brocade Virtual Fabrics
- Simplifies management through Brocade Fabric Vision technology, reducing operational costs, maximizing uptime, and optimizing application performance

IT organizations continue to face unprecedented data growth as more platforms, applications, and users connect to the data center network. In turn, the storage network infrastructure must continue evolving to enable fast, continuous, and cost-effective access to mission-critical data from anywhere in the world.

To address this challenge, the Brocade® 7800 Extension Switch provides a fast, highly reliable, and cost-effective network infrastructure for remote data replication, backup, and migration. Leveraging advanced Fibre Channel and Fibre Channel over IP (FCIP) technology, the Brocade 7800 provides a flexible and extensible platform to move more data faster and farther than ever before.

Whether configured for simple point-to-point or comprehensive multisite SAN extension, the Brocade 7800 addresses the most demanding business continuity, compliance,

and global data access requirements. Up to sixteen 8 Gbps Fibre Channel ports and six 1 Gigabit Ethernet (GbE) ports provide the Fibre Channel and FCIP bandwidth, port density, and throughput required for maximum application performance over WAN links.

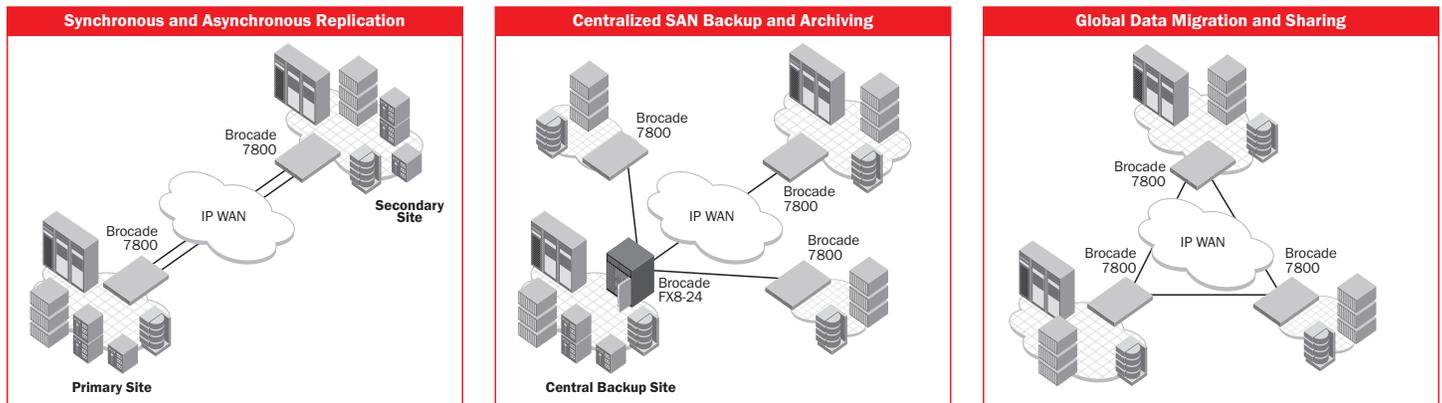
A SCALABLE, FLEXIBLE SAN EXTENSION PLATFORM

The Brocade 7800 is an ideal platform for building or expanding a high-performance SAN extension infrastructure for disaster recovery, data protection, and data mobility storage solutions (see Figure 1). It leverages cost-effective IP WAN transport to extend open systems and mainframe disk and tape storage applications over distances that would otherwise be impossible, impractical, or too expensive with standard Fibre Channel connections.



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Figure 1. The Brocade 7800 provides flexible deployment options to extend disaster recovery, data protection, and data mobility storage solutions across any distance.



Available in two configurations (the Brocade 7800 16/6 Extension Switch and the Brocade 7800 4/2 Extension Switch), the Brocade 7800 supports a variety of architectures and deployment models to address current and future SAN extension requirements. A broad range of optional advanced extension, FICON®, and SAN fabric services are available to address the most challenging extension and storage networking requirements.

The Brocade 7800 16/6 Extension Switch is a robust platform for data centers and multisite environments implementing disk and tape solutions for open systems and mainframe environments. Organizations can optimize bandwidth and throughput through sixteen 8 Gbps Fibre Channel ports and six 1 GbE ports. The Brocade 7800 16/6 Extension Switch is ideal for:

- Open systems and mainframe disk and tape extension
- Multisite synchronous and asynchronous storage replication
- Centralized SAN backup, recovery, and archiving
- Global data and storage resource migration, distribution, and sharing

The Brocade 7800 4/2 Extension Switch is a cost-effective option for smaller data centers and remote offices, for open systems and mainframe environments. Organizations can optimize bandwidth and throughput through four 8 Gbps Fibre Channel ports and two 1 GbE ports. The Brocade 7800 4/2 can be easily upgraded to the Brocade 7800 16/6 through software licensing, providing scalability and investment protection for growing environments. The Brocade 7800 4/2 Extension Switch is ideal for:

- Point-to-point synchronous and asynchronous open systems disk replication
- Point-to-point IBM z/OS Global Mirror (zGM, formerly known as eXtended Remote Copy or XRC) and mainframe tape extension
- Global data and storage resource migration, distribution, and sharing

SIMPLIFIED DISASTER RECOVERY AND DATA PROTECTION

Today's organizations depend on fast, reliable access to data wherever and whenever needed, regardless of location. As a result, the ramifications and potential business impact of an inadequate disaster recovery and data protection infrastructure are greater than ever.

The advanced performance and network optimization features of the Brocade 7800 enable replication and backup applications to send more data over FCIP links in less time, protecting time-sensitive synchronous or other high-priority traffic, and optimizing available WAN bandwidth.

Acceleration for SCSI writes (FastWrite) and IBM zGM maximize replication performance and enable cost-effective synchronous and asynchronous replication across any distance. In addition, Tape Pipelining for open systems and mainframe tapes utilizes unique read and write tape processing to significantly reduce backup and recovery times over distance anywhere in the world. Optional FCIP Trunking provides FCIP tunnel redundancy for lossless path failover and guaranteed in-order data delivery in the event of a failure.

The Brocade 7800 leverages the core technology of Brocade SAN fabric platforms, consistently delivering 99.9999 percent uptime in the world's most demanding data centers. It combines enterprise-class availability features such as hot-pluggable redundant power supplies and fans with non-disruptive software upgrades to maximize application uptime and minimize outages. These unique capabilities enable a high-performance and highly reliable network infrastructure for disaster recovery and data protection.

UNMATCHED PERFORMANCE AND OPTIMIZATION

Purpose-built Fibre Channel and FCIP switch port density, bandwidth, and throughput address today's dynamic I/O and workload requirements, and are designed to meet the evolving requirements of highly virtualized data centers. Supporting up to 350 ms Round-Trip Time (RTT) of latency, the Brocade 7800 enables cost-effective SAN extension solutions over distances up to 17,500 kilometers (nearly 11,000 miles).

The Brocade 7800 maximizes replication, backup, and migration throughput over distance using advanced Fibre Channel

frame compression, disk and tape protocol acceleration, and FCIP networking technology. Unique features and technologies include the following:

- FCIP Trunking combines multiple IP source and destination address pairs into a single logical high-bandwidth FCIP trunk spanning multiple physical ports to provide load balancing and network failure resiliency.
- Adaptive Rate Limiting dynamically adjusts bandwidth between minimum and maximum rate limits to optimize bandwidth utilization and sharing.
- FCIP Quality of Service (QoS) provides high-, medium-, and low-priority handling of initiator-target flows within the same FCIP tunnel for transmission over the WAN with individual TCP sessions per QoS class.
- IPSec support ensures secure transport over WAN links by encrypting data-in-flight with standard 256-bit AES algorithm.
- Advanced compression architecture provides multiple modes to optimize compression ratios for various throughput requirements.
- FCIP Fast Write accelerates SCSI write processing, maximizing performance of synchronous and asynchronous replication applications across high-latency WAN connections.
- Open Systems Tape Pipelining accelerates read and write tape processing over distance, minimizing backup and restore windows.
- Brocade Advanced Accelerator for FICON uses advanced networking technologies, data management techniques, and protocol intelligence to accelerate IBM zGM, mainframe tape read and write operations, and z/OS host connection to Teradata warehousing systems over distance.
- Storage-Optimized TCP optimizes TCP window size and flow control, accelerating TCP transport for storage applications.
- Brocade Virtual Fabrics allows fabrics that are configured with specific characteristics for open systems or z/OS environments to share the same platform and even the same Gigabit Ethernet interface, enabling consolidation and greater resource utilization.

SIMPLIFIED MANAGEMENT AND ROBUST NETWORK ANALYTICS

Brocade Fabric Vision technology introduces a breakthrough hardware and software technology that maximizes uptime, simplifies SAN management, and provides unprecedented visibility and insight across the storage network. Offering innovative diagnostic, monitoring, and management capabilities, the Brocade 7800 with Fabric Vision technology helps administrators avoid problems, maximize application performance, and reduce operational costs. The Brocade 7800 supports the following Brocade Fabric Vision technology features:

- **Flow Monitor:** Provides comprehensive visibility into flows in the fabric, including the ability to automatically learn (discover) flows and non-disruptively monitor flow performance. Users can monitor all flows from a specific host to multiple targets/LUNs or from multiple hosts to a specific target/LUN; monitor all flows across a specific ISL; or perform LUN-level monitoring of specific frame types to identify resource contention or congestion that is impacting application performance.
- **Monitoring and Alerting Policy Suite (MAPS):** Simplifies fabric-wide threshold configuration and monitoring. By leveraging pre-built rule/policy-based templates, applying thresholds and alerts to ports is a simple two-step process. Organizations can configure the entire fabric (or multiple fabrics) at one time using common rules and policies, or customize policies for specific ports—all through a single dialog. The integrated dashboard displays an overall switch

health report, along with details on out-of-policy conditions, to help administrators quickly pinpoint potential issues.

- **Bottleneck Detection:** Identifies and alerts administrators to device or ISL congestion as well as abnormal levels of latency in the fabric. This feature works in conjunction with Brocade Network Advisor to automatically monitor and detect network congestion and latency in the fabric, providing visualization of bottlenecks in a connectivity map and product tree, and identifying exactly which devices and hosts are impacted by a bottlenecked port.
- **Integration into Brocade Network Advisor:** Provides customizable health and performance dashboard views to pinpoint problems faster, simplify SAN configuration and management, and reduce operational costs.
- **Critical diagnostic and monitoring capabilities:** Help ensure early problem detection and recovery.
- **Non-intrusive and non-disruptive monitoring on every port:** Provides a comprehensive end-to-end view of the entire fabric using capabilities integrated into hardware, allowing sophisticated monitoring without imposing an additional burden on switches with frequent polling activity.

INTEGRATED ARCHITECTURE AND MANAGEMENT

The Brocade 7800 utilizes the same Brocade Fabric OS® that supports the entire Brocade SAN product family—from the Brocade 6505 Switch to the Brocade DCX® 8510 Backbone with Gen 5 Fibre Channel. This helps ensure

seamless interoperability with advanced features such as Brocade Integrated Routing, Brocade ISL Trunking, Brocade Fabric Vision technology, Brocade Adaptive Networking, Brocade Server Application Optimization (SAO), Brocade Advanced Performance Monitoring, Brocade Fabric Watch, and Brocade Extended Fabrics.

In addition, organizations can perform management and administrative tasks through familiar Brocade management tools, including Brocade Network Advisor, Brocade Web Tools, and the Command Line Interface (CLI). Moreover, optional FICON Control Unit Port (CUP) capabilities enable legacy management applications to seamlessly support Brocade FICON environments.

BROCADE GLOBAL SERVICES

Brocade Global Services has the expertise to help organizations build scalable, efficient cloud infrastructures. Leveraging 15 years of expertise in storage, networking, and virtualization, Brocade Global Services delivers world-class professional services, technical support, network monitoring services, and education, enabling organizations to maximize their Brocade investments, accelerate new technology deployments, and optimize the performance of networking infrastructures.

MAXIMIZING INVESTMENTS

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

BROCADE 7800 SPECIFICATIONS

System Architecture	
Fibre Channel ports	16 ports; E, F, M, EX, and FL ports
FCIP ports	6 ports, 1 GbE (VE, VEX)
Scalability	Full fabric architecture with 239 switches maximum
Certified maximum	Single fabric: 56 domains, 7 hops Multiprotocol routing fabric: 19 hops
Fibre Channel 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 Gbps, 2 Gbps, 4 Gbps, and 8 Gbps port speeds; optionally programmable to fixed port speed. Speed matching between 1 Gbps, 2 Gbps, 4 Gbps, and 8 Gbps ports.
FCIP performance	1 Gbps line speed
ISL Trunking	Up to eight 8 Gbps ports per ISL trunk; up to 64 Gbps per ISL trunk. There is no limit to how many trunk groups can be configured in the switch.
Fibre Channel aggregate bandwidth	128 Gbps: 16 ports × 8 Gbps data rate
FCIP aggregate bandwidth	6 Gbps: 6 ports × 1 Gbps data rate
Fabric latency	700 ns with no contention, cut-through routing at 8 Gbps
Maximum frame size	2112-byte payload
Maximum MTU size	1500-byte Ethernet packets with FCIP
Classes of service	Class 2, Class 3, Class F (inter-switch frames)
Port types	FL_Port, F_Port, E_Port, EX_Port, and M_Port (Mirror Port). For FCIP, VE_Port (Virtual E_Port), VEX_Port (Virtual EX_Port).
Data traffic types	Fabric switches supporting unicast, multicast (255 groups), and broadcast
USB	One USB port for system log file downloads or firmware upgrades

Media types	<p>Fibre Channel: Brocade hot-pluggable 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</p> <p>1 GbE: Brocade hot-pluggable optical SFP, Short-Wave Laser (SWL) and Long-Wave Laser (LWL); GbE Copper SFP; built-in RJ-45 copper (two GbE ports); distance depends on fiber-optic or copper cable and port speed</p>
Fabric services	<p>Brocade Advanced Zoning, Dynamic Path Selection (DPS), FDMI, Enhanced Group Management (EGM), Frame Redirection, Registered State Change Notification (RSCN), Reliable Commit Service (RCS), Simple Name Server (SNS), Virtual Fabrics (Logical Switch), Bottleneck Detection, Brocade Adaptive Networking, and Brocade Server Application Optimization (SAO)</p> <p>Optional fabric services include: Monitoring and Alerting Policy Suite (MAPS), Flow Monitor, Brocade Advanced Performance Monitoring, Brocade Fabric Watch, Brocade Integrated Routing, Brocade Extended Fabrics, and Brocade ISL Trunking.</p>
Licensing options	<p>The following optional extension features can be enabled via license keys:</p> <ul style="list-style-type: none"> • Advanced Extension: Enables FCIP Trunking and Adaptive Rate Limiting • Brocade 7800 Upgrade License: Enables all ports, additional FCIP tunnels, and open systems tape read/write pipelining • FICON Management Server: Control Unit Port (CUP) enables host control of switches in mainframe environments • Advanced Accelerator for FICON: Accelerates IBM zGM, mainframe tapes, and z/OS host connection to Teradata systems over distance

BROCADE 7800 SPECIFICATIONS (CONTINUED)

Management	
Supported management software	SSH v2, HTTP/HTTPS, SNMP v1/v3, Telnet; SNMP (FE MIB, FC Management MIB); Brocade Web Tools; Brocade Network Advisor SAN Enterprise or Brocade Network Advisor Professional/Professional Plus; Command Line Interface (CLI); SMI-S
Security	DH-CHAP (between switches and end devices), HTTPS, IPsec, IP Filtering, LDAP, OpenLDAP, Port Binding, RADIUS, Role-Based Access Control (RBAC), TACACS+, Secure Copy (SCP), Secure RPC, SSH v2, SSL, Switch Binding, Trusted Switch
Management access	10/100/1000 Ethernet (RJ-45), in-band over Fibre Channel ports; serial port (RJ-45) and one USB port
Diagnostics	POST and embedded online/offline diagnostics, including FCping, Pathinfo (FCtraceroute), etc.

Mechanical	
Enclosure	Back-to-front airflow; 1U, 19-inch EIA-compliant, power from back
Size	Width: 43.2 cm (17.0 in.) Height: 4.5 cm (1.8 in.) Depth: 64.1 cm (25.2 in.)
System weight	10.9 kg (24.0 lbs) with two power supplies, without SFP/SFP+

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 m (9842 ft) Storage: Up to 12 km (39,370 ft)
Shock	Operating: 20 g, 6 ms half-sine Non-operating: 33 g, 11 ms, half-sine, 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
Heat dissipation	Maximum 22 ports: 590 BTU/hr
Airflow	Maximum 60 CFM; nominal 44 CFM

Power	
Power supply	Dual hot-swappable redundant power supplies
Power inlet	C13
Input voltage	85 to 264 VAC nominal
Input line frequency	47 to 63 Hz
Inrush current	Maximum of 60 amps for period of 10 to 150 ms
Power	Nominal 145 watts; maximum 173 watts

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

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

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

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