

BROCADE FX8-24 EXTENSION BLADE

DATA CENTER

HIGHLIGHTS

- Leverages 8 Gbps Fibre Channel, FCIP, and 10 GbE technology to enable fast, reliable, and cost-effective remote data replication, backup, and migration
- Maximizes flexibility and scalability with a modular blade platform and simple software licensing to support a broad range of SAN extension requirements
- Offers best-in-class Fibre Channel and FCIP port density, bandwidth, and throughput with twelve 8 Gbps Fibre Channel ports, ten 1 GbE ports, and up to two optional 10 GbE ports
- 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
- Introduces FCIP Trunking and Adaptive Rate Limiting to maximize WAN link utilization and resiliency

The Brocade One™ strategy helps simplify networking infrastructures through innovative technologies and solutions. The Brocade FX8-24 Extension Blade supports this strategy by extending and optimizing Storage Area Network (SAN) fabric connectivity over distance to support business continuity and disaster recovery applications.

Next-Generation SAN Extension for Remote Data Replication, Backup, and Migration

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® FX8-24 Extension Blade, designed specifically for the Brocade DCX® Backbone family, helps provide the fastest, most reliable, and most cost-effective network infrastructure for remote data replication, backup, and migration. Leveraging next-generation 8 Gbps Fibre Channel, 10 Gigabit Ethernet (GbE), and advanced Fibre Channel over IP (FCIP) technology, the Brocade FX8-24 provides a flexible and extensible platform to move more data faster and further than ever before.

Whether configured for synchronous or asynchronous replication between data centers or centralized backup across multiple sites, the Brocade FX8-24 addresses the most demanding business continuity, compliance, and global data access requirements. Twelve 8 Gbps Fibre Channel ports, ten 1 GbE ports, and up to two optional 10 GbE ports provide

unmatched Fibre Channel and FCIP bandwidth, port density, and throughput for maximum application performance over WAN links.

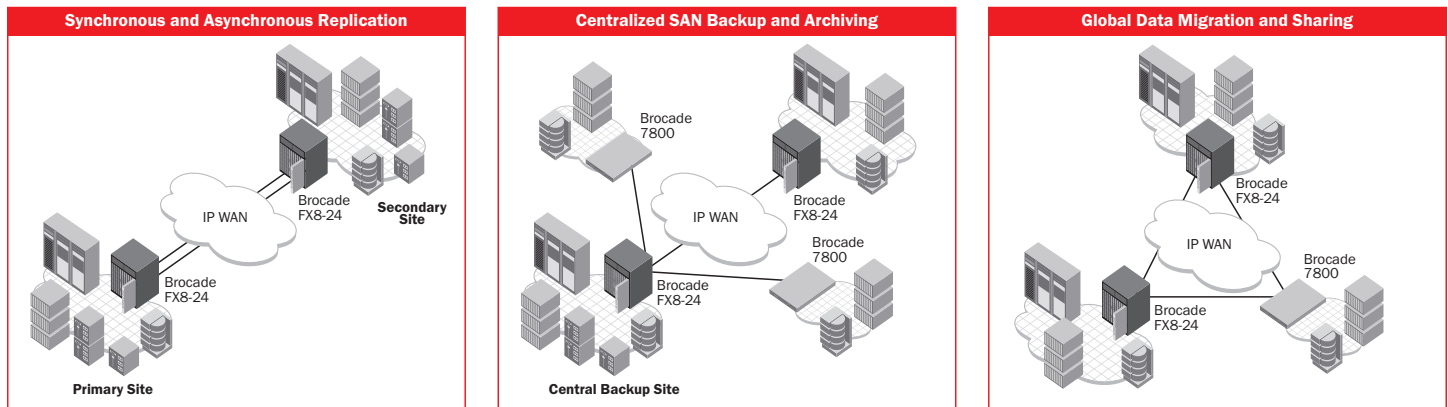
A SCALABLE, FLEXIBLE SAN EXTENSION PLATFORM

The Brocade FX8-24 is an ideal foundation 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



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Figure 1. The Brocade FX8-24 is a scalable SAN extension platform that extends disaster recovery, data protection, and data mobility storage solutions across any distance.



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.

Organizations can install up to four Brocade FX8-24 blades in a Brocade DCX 8510-8, Brocade DCX 8510-4, Brocade DCX, or Brocade DCX-4S, providing scalable Fibre Channel and FCIP bandwidth for larger enterprise data centers and multisite environments. Activating the optional 10 GbE ports doubles the aggregate bandwidth to 20 Gbps and enables additional FCIP port configurations (ten 1 GbE ports and one 10 GbE port, or two 10 GbE ports).

The Brocade FX8-24 provides flexible deployment options within the Brocade DCX and Brocade DCX 8510 chassis, integrating seamlessly with Fibre Channel and application blades or providing standalone extension services. In addition, 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 FX8-24 is ideal for:

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

Organizations can deploy both the Brocade FX8-24 and the Brocade 7800 Extension Switch in a data center-to-edge architecture

as a cost-effective option for connecting primary data centers with remote data centers and offices. The Brocade 7800 provides up to sixteen 8 Gbps Fibre Channel ports and six GbE ports for SAN and FCIP connectivity.

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 FX8-24 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 z/OS Global Mirror (zGM, formerly known as eXtended Remote Copy or XR) 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 DCX, Brocade DCX 8510, and the Brocade FX8-24 leverage the core technology of Brocade systems performing at greater than 99.999 percent uptime in the world's most demanding data

centers. The Brocade DCX Backbone family 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

Best-in-class Fibre Channel and FCIP switch port density, bandwidth, and throughput address today's dynamic I/O and workload requirements and are designed to meet tomorrow's evolving requirements for virtual data centers. Each Brocade FX8-24 provides aggregate bandwidth of up to 96 Gbps for Fibre Channel and up to 20 Gbps for FCIP. Supporting up to 350 ms Round-Trip Time (RTT) of latency, the Brocade FX8-24 enables cost-effective SAN extension solutions over distances up to 17,500 kilometers (nearly 11,000 miles).

The Brocade FX8-24 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—including 10 GbE 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.

INTEGRATED ARCHITECTURE AND MANAGEMENT

The Brocade FX8-24 utilizes the same Fabric OS® that supports the entire Brocade SAN product family—from the Brocade 300 Switch to the Brocade DCX Backbone family. This helps ensure seamless interoperability with optional advanced features such as Brocade Integrated Routing, Brocade ISL Trunking, 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 Data Center Fabric Manager (DCFM®), 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 FX8-24 SPECIFICATIONS

System Architecture			
Fibre Channel ports	12 ports, universal (E, F, M, EX, and FL)	Fabric latency	700 ns with no contention, cut-through routing at 8 Gbps
FCIP ports	12 ports (VE, VEX): ten 1 GbE ports and two optional 10 GbE ports	Maximum frame size	2112-byte payload
Standard FCIP port configuration	Ten 1 GbE ports	Maximum MTU size	1500-byte Ethernet packets with FCIP
Optional FCIP 10 GbE port configurations	Ten 1 GbE ports and one 10 GbE port; two 10 GbE ports	Classes of service	Class 2, Class 3, Class F (inter-switch frames)
Scalability	Full fabric architecture with 239 switches maximum	Port types	FL_Port, F_Port, E_Port, Ex_Port, M_Port (Mirror Port), and self-discovery based on switch type (U_Port). For FCIP, VE_Port (Virtual E_Port), VEX_Port (Virtual EX_Port).
Certified maximum	Single fabric: 56 domains, 7 hops Multiprotocol routing fabric: 19 hops	Data traffic types	Fabric switches supporting unicast, multicast (255 groups), and broadcast
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.	Media types	<u>Fibre Channel</u> : 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 <u>1 GbE</u> : Brocade hot-pluggable optical SFP, Short-Wave Laser (SWL) and Long-Wave Laser (LWL); GbE Copper SFP; distance depends on fiber-optic or copper cable and port speed <u>10 GbE</u> : Brocade hot-pluggable optical 10 GbE SFP+, Short-Reach (SR) and Long-Reach (LR); distance depends on fiber-optic cable and port speed
FCIP performance	1 Gbps line speed; 10 Gbps line speed		
System scalability	Up to four Brocade FX8-24 blades per Brocade DCX Backbone family chassis		
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 on the blade.		
Fibre Channel aggregate bandwidth	96 Gbps: 12 ports at 8 Gbps (data rate)		
FCIP aggregate bandwidth (supported port configurations)	10 Gbps: 10 ports at 1 Gbps (data rate); 20 Gbps: 10 ports at 1 Gbps (data rate) and one port at 10 Gbps (data rate); 20 Gbps: two ports at 10 Gbps (data rate)		

BROCADE FX8-24 SPECIFICATIONS (CONTINUED)

Fabric services	Brocade Advanced Zoning, Dynamic Path Selection (DPS), FDMI, Enhanced Group Management (EGM), Frame Redirection, Registered State Change Notification (RSCN), Reliable Commit Service (RCS), and Simple Name Server (SNS). Optional fabric services include Brocade Adaptive Networking, Brocade Advanced Performance Monitoring, Brocade Fabric Watch, Brocade Integrated Routing, Brocade Server Application Optimization (SAO), Brocade Extended Fabrics, and Brocade ISL Trunking.
Licensing options	The following optional extension features can be enabled via license keys: <ul style="list-style-type: none"> 10 GbE License: Enables the two 10 GbE ports and optional 10 GbE port configurations Advanced Extension: Enables FCIP Trunking and Adaptive Rate Limiting Adaptive Networking: Activates Fibre Channel and FCIP QoS functionality 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 connection to Teradata systems over distance
Management	
Supported management software	SSH v2, HTTP/HTTPS, SNMP v1/v3, Telnet; SNMP (FE MIB, FC Management MIB); Brocade Web Tools; Brocade Network Advisor; Brocade DCFM Professional, Professional Plus, and Enterprise (optional); SMI-S, RADIUS, and LDAP
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
Diagnostics	POST and embedded online/offline diagnostics, including FCping, Pathinfo (FCtracroute), etc.

Mechanical	
Size	Width: 3.6 cm (1.4 in) Height: 42.1 cm (16.6 in) Depth: 29.9 cm (11.8 in) Occupies one slot in a Brocade DCX Backbone family chassis
System weight	4.3 kg (9.4 lbs) 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
Power	
Maximum power	250 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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