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FAQ

Brocade® Extension
Frequently Asked Questions

Overview

Brocade® Extension switches and Extension blades for Brocade Directors ensure the fast, continuous, and secure replication of mission-critical data anywhere in the world. These platforms help organizations safeguard their data from a disaster and prevent loss or breaches when data is in-flight across the WAN. This document answers frequently asked questions about the Brocade Extension portfolio.

For product information, visit www.broadcom.com/products/fibre-channel-networking/extension

General Questions and Answers

What is the Brocade 7850 Extension Switch?

The Brocade 7850 Extension Switch is purpose-built to handle the replication demands of large enterprise customers. This switch is designed to deliver outstanding data protection and performance, maximizing modern 25GbE and 100GbE WAN connections. The Brocade 7850 provides ample replication throughput with up to 100Gb/s to meet the most demanding disaster recovery objectives. With 24 x 64G Fibre Channel ports, 16 x 1/10/25GbE ports, and 2 x 100GbE ports, data centers can achieve the bandwidth, port density, and throughput needed for maximum replication performance over high-speed WAN connections. Industry-leading port density and performance packed into a 1U form factor enables organizations to consolidate high-speed Fibre Channel, FICON, and IP storage replication traffic between data centers, while ensuring plenty of headroom for future growth. The Brocade 7850 comes unlocked with full bandwidth and all ports enabled, leaving no limitations on capacity.

With Brocade Gen 7 technology, the Brocade 7850 offers robust security features to protect against malicious attacks, and adds additional security enhancements to validate the integrity and security of Brocade hardware and software. These features include Secure Boot, Brocade Trusted FOS (TruFOS) Certificates, FOS hardening with removal of root access, and automated distribution of SSL certificates via Brocade SANnav™ Management Portal. Brocade TruFOS Certificates ensure that enterprises running Brocade products are currently covered with support and securely enabled to perform critical operations without having to worry about whether the operating system has been tampered with.

What is the Brocade 7810 Extension Switch?

The Brocade 7810 Extension Switch is a cost-effective solution that enables organizations to replicate data between data centers using less expensive WAN connections. With twelve 32G Fibre Channel ports, six 1/10GbE ports, and a 2.5Gb/s WAN tunnel, this switch is ideal for small-scale to medium-scale, multisite data center environments implementing block, file, and tape data protection. Designed to be affordable, the Brocade 7810 Extension Switch offers flexible configurations, meeting current and future requirements. Organizations can purchase a full configuration with 2.5Gb/s WAN capacity or pay as they grow with an on-demand upgrade license to quickly and cost-effectively scale their WAN bandwidth. With aggressive compression, organizations can scale up to 10Gb/s replication throughput, depending on data and WAN characteristics.

The Brocade 7810 base configuration provides 4 x 32G Fibre Channel ports, 6 x 1/10GbE ports, and two tunnels with Adaptive Rate Limiting (ARL) and encryption (IPsec).

The on-demand upgrade license enables 12 Fibre Channel ports, four tunnels, Brocade Fabric Vision® technology, Brocade Extension Trunking, Brocade Fibre Channel Trunking, and Integrated Routing (FCR).

The full configuration is a comprehensive bundle enabling all ports and includes Brocade Fabric Vision technology, Brocade Extension Trunking, Fibre Channel Trunking, ARL, IPsec, and Integrated Routing.

What is the Brocade SX6 Extension Blade?

The Brocade SX6 Extension Blade provides flexible Fibre Channel and IP storage replication deployment options for the Brocade X7 and X6 Directors to deliver business resiliency at scale. The Brocade SX6 blade accelerates performance over distance with up to 80Gb/s of FCIP throughput and up to 40Gb/s of IP Extension throughput to meet stringent disaster recovery objectives. The Brocade X7 or X6 Director can scale up to four Brocade SX6 blades per chassis, integrating seamlessly with Fibre Channel blades or providing standalone extension services for implementing block, file, and tape data protection solutions. Each Brocade SX6 Extension Blade provides 16 x 32G Fibre Channel/FICON ports, 16 x 1/10GbE ports, and 2 x 40GbE ports, delivering the high bandwidth, port density, and throughput required for large-scale, multisite data center environments. In addition, a broad range of advanced extension, FICON, and storage fabric services are available to address the most challenging extension and storage networking requirements.

What are the key Brocade Extension features?

The Brocade 7850, Brocade 7810, and Brocade SX6 maximize replication and backup throughput over distance using advanced compression, disk and tape protocol acceleration for open systems and mainframe environments, and extension networking technology. Advanced features and technologies include the following:

- **WAN-optimized TCP:** An aggressive TCP stack that optimizes data transmission in enterprise WAN environments. WO-TCP handling of end-to-end flow control, fast retransmits, and slow starts, results in a dramatically accelerated transport for both FCIP and IP replication traffic, providing much higher replication throughput than a storage array can do on its own, anytime there is meaningful latency and/or packet loss over a WAN connection.
- **Extension Trunking:** Combines multiple WAN connections into a single, logical, high-bandwidth trunk, providing active load balancing and network resilience to protect against WAN link failures.
- **Adaptive Rate Limiting (ARL):** Dynamically adjusts bandwidth sharing between the minimum and maximum rates to optimize bandwidth utilization and maintain maximum WAN performance during disruptions.
- **IPsec:** Ensures secure line-rate transport of data over the WAN network. Encryption is enabled without a performance penalty or excessive added latency. Brocade IPsec is hardware-implemented, CNSA and Suite B compliant, standards based IKEv2 and 256-bit AES in-flight encryption.
- **Lossless Link Loss (LLL):** Part of Brocade Extension Trunking, LLL recovers data lost in-flight when a link goes offline. From the perspective of the storage applications, nothing occurred because all data is delivered, and is delivered in order.
- **Failover/failback with failover groups:** Circuits are assigned metrics and failover groups. If all metric-0 circuits within a failover group go offline, the metric-1 circuits take over. LLL is used; all data is delivered, and is delivered in order. The storage application will not know that a failover/failback event occurred.
- **Per-priority TCP quality of service:** Provides autonomous TCP sessions per QoS; high-priority, medium-priority, and low-priority handling of Fibre Channel and IP Extension flows in the same tunnel.
- **Advanced compression:** Provides multiple modes to optimize compression ratios for various throughput requirements.
- **FCIP FastWrite:** Accelerates SCSI write processing, maximizing the performance of synchronous and asynchronous replication across high-latency WAN connections over any distance.

- **Open Systems Tape Pipelining:** Accelerates read and write tape processing over distance, significantly reducing backup and recovery times.
- **Brocade Advanced Accelerator for FICON:** Accelerates IBM z/OS Global Mirror (zGM, formerly known as eXtended Remote Copy, or XRC), mainframe tape read and write operations, and z/OS host connection to Teradata warehousing systems, maximizing performance over distance. FICON is not available on the Brocade 7810 Extension Switch.

What are the use cases for Brocade Extension solutions?

Brocade Extension solutions leverage cost-effective and sophisticated IP WAN transport to deploy high-performance disaster recovery and data protection solutions. They extend open systems and mainframe storage applications over distances that would otherwise be impossible, impractical, unsecure, or too expensive with standard connections.

Brocade Extension solutions are unique in their ability to do FCIP and IP extension and are ideal for a variety of use cases:

- Data protection for both open systems and mainframe
- Multisite synchronous and asynchronous storage replication
- Accelerating IP storage traffic across the WAN
- Operational excellence with bandwidth management of IP storage and FCIP across the WAN (includes MAPS and diagnostic tools)
- Enhancing the availability of FCIP and IP extension by leveraging Brocade Extension Trunking across multiple WAN network paths
- Securing IP storage, Fibre Channel, and FICON data-in-flight across WAN infrastructure; FICON is not available on the Brocade 7810 Extension Switch
- Centralized tape backup, recovery, and archiving for NAS, Fibre Channel, FICON, and IP-based backups; FICON is not available on the Brocade 7810 Extension Switch
- Consolidation of replication from heterogeneous arrays and multiple protocols

Are the Brocade extension switches and blades compatible with each other?

The Brocade 7810 Extension Switch, Brocade 7850 Extension Switch, and Brocade SX6 Extension Blade are compatible. The same Brocade Fabric OS® version is required on both ends of a tunnel. The Brocade 7810 and Brocade SX6 on Brocade Fabric OS (FOS) 8.2.1 and above or the Brocade 7810, Brocade 7850, and Brocade SX6 on Brocade FOS 9.2 and above can be connected via extension tunnels, providing flexible deployment options to address scalability, performance, and cost requirements for multisite extension deployments.

NOTE: The older Brocade 7840 Extension Switches are not compatible with Brocade 7850 Extension Switches.

What is the minimum version of Brocade FOS required on the Extension Platforms?

- The Brocade SX6 requires Brocade FOS 8.0.1 or higher.
- The Brocade 7810 requires Brocade FOS 8.2.1 or higher.
- The Brocade 7850 requires Brocade FOS 9.2 or higher.

What is FCIP?

FCIP was designed as a simple tunneling protocol to link Fibre Channel over distance across standard IP networks. Used primarily for remote replication and tape backup, FCIP provides Fibre Channel connectivity over an IP network between Fibre Channel devices. FCIP leverages special high-speed and WAN-optimized TCP processing, which is essential for storage applications to be reliable and available, and to maintain data integrity over long distances. Table 1 outlines how FCIP is designed and used.

Table 1: FCIP Protocol

Use Case	Enables replication, data migration and mobility, backup, storage access, accelerated performance, flow visibility, monitoring, alerting, encryption, bandwidth management, and high availability over long-distance connections
Benefit	Moves more data faster, farther, securely, and reliably for disaster recovery, data protection, and data mobility solutions
Network	WAN/MAN
Transport	Tunnel/TCP/IP/Ethernet
Encapsulation	Brocade uses High-Efficiency Encapsulation technology. Fibre Channel data sequences are compressed and batches are formed. Those batches fill TCP segments to their maximum size and then IP datagrams are formed.
IP-Routable	Yes

What is Brocade IP Extension?

Brocade IP Extension dramatically accelerates IP storage flows between data centers, while also providing benefits of strong encryption and high availability across multiple WAN circuits

Brocade IP Extension is primarily for IP storage applications, such as remote host-based or database-based replication, NAS replication, IP backups, and tape grids. It leverages special high-speed and WAN-optimized TCP processing, which is essential for storage applications to be reliable, available, and maintain data integrity over long distances. Table 2 outlines how Brocade IP Extension is designed and used.

Brocade IP Extension includes several key advantages:

- Much higher replication throughput than what a storage array can achieve on its own
- High availability through active load balancing and failover between multiple WAN circuits
- Strong encryption performed in hardware without performance penalty
- Easier management of multiple IP storage flows, managed in a single tunnel so that oversubscribed WAN bandwidth is optimized and made more reliable

Table 2: Brocade IP Extension Protocol

Use Case	Enables replication, data migration and mobility, backup, storage access, accelerated performance, flow visibility, monitoring, alerting, encryption, bandwidth management, and high availability over long-distance connections
Benefit	Moves more data faster, farther, securely, and reliably for disaster recovery, data protection, and data mobility solutions
Network	WAN/MAN
Transport	Tunnel/TCP/IP/Ethernet
Encapsulation	Brocade uses High-Efficiency Encapsulation technology. Fibre Channel data sequences are compressed and batches are formed. Those batches fill TCP segments to their maximum size and then IP datagrams are formed.
IP-Routable	Yes

Does Brocade support mainframe solutions?

Brocade provides as much as 95% of the total extension infrastructure used by the mainframe market, which includes FICON for local switching or remote business solutions. With more than 20 years of experience and thousands of customers around the globe, Brocade offers valued products and services to help organizations meet their critical business objectives.

What Brocade products support mainframe extension solutions?

The Brocade 7850 Extension Switch and the Brocade SX6 Extension Blade provide unique solutions for mainframe storage applications, including FICON disk emulation for IBM z/OS Global Mirror (zGM, formerly known as eXtended Remote Copy, or XRC), as well as FICON Tape Pipelining for write and read operations for IBM and Oracle virtual and standalone tape offerings. Brocade supports a wide range of array replication applications used in mainframe environments that are not FICON based, including EMC SRDF, Hitachi Universal Replicator (HUR), and IBM GM (PPRC). System z writes to the volume via FICON, but the array replicates those volumes using Fibre Channel. Additionally, Brocade IP Extension supports the acceleration and encryption of IP flows from IBM TS7770 Grid, Oracle VSM Grid, EMC DLm replication, and Luminex replication.

What licenses are required for FICON functionality?

The mainframe versions of the Brocade 7850 Extension Switch and Brocade SX6 Extension Blade include all functional capabilities required to support FICON:

- **Brocade Advanced Accelerator for FICON:** Enables high-performance FICON tape and zGM replication over distance.
- **Brocade FICON Management Server (FMS):** Control Unit Port (CUP) enables host control of switches in mainframe environments.
- **LWL SMF FC optics:** The mainframe version of these platforms include LWL SMF FC optics.

What is Control Unit Port (CUP)?

Control Unit Port (CUP) is an in-band management function that enables mainframe applications to perform configuration, monitoring, management, and statistics collection functions. Several IBM mainframe management applications require CUP functionality on FICON directors and switches. The Brocade FICON Management Server (FMS) license enables CUP functionality.

Can FICON be intermixed with Open Systems?

Yes. Brocade Virtual Fabrics is supported on the Brocade 7850 with Brocade FOS 9.2, and the Brocade SX6 with Brocade FOS 8.0.1. Brocade Virtual Fabrics allows fabrics that are each configured with specific characteristics for open systems or z/OS environments to share the same platform—and even the same Ethernet interface—enabling consolidation while providing traffic isolation in mixed environments. The Brocade 7850 supports up to four logical switches and two CUP instances. The Brocade SX6 supports up to eight logical switches and four CUP instances.

What tools are available to simplify management of Brocade switches?

Brocade products provide easy-to-use tools to help manage a single switch or your whole fabric at once, from deployment to configuration and ad hoc management.

- **Brocade Web Tools** is a product that is embedded into the Fabric OS firmware. Ideal for small environments, it provides a new and improved Java-free GUI for fast, easy management of individual switches or small fabrics. It can be launched directly from a web browser or accessed via Brocade SANnav Management Portal.
- **Brocade SANnav Management Portal** is the preferred option for medium or larger environments, since it provides a complete view of the network, including traffic flows and health conditions across the SAN. Its intuitive, drill-down interface leverages Brocade autonomous SAN technology and presents data within clear dashboards, enabling a faster, more comprehensive SAN management experience. It also streamlines management workflows to accelerate the deployment of new applications, switches, hosts, and targets. For more information on Brocade SANnav Management Portal, visit https://www.broadcom.com/sannav