BROCADE
A Broadcom Company

Product Brief

Brocade® 7850 Extension Switch

Cyber-Resilient Replication Connectivity for Enterprise Storage

Highlights

- Handles more replication traffic and maximizes modern 25/100GbE WAN connections
- Consolidates high-speed Fibre Channel and IP storage replication workloads
- Secures data flows over distance with strong Quantum Safe AES 256-bit hardware encryption without a performance penalty
- Provides load balancing and failover across multiple WAN connections, protecting against WAN link failures
- Ensures always-on storage replication with non-disruptive firmware and security updates
- Pre-validates the WAN infrastructure with a built-in WAN Test Tool (Wtool) to ensure a worry-free deployment
- Detects WAN anomalies and avoids unplanned downtime with proactive monitoring

Overview

As businesses increasingly embrace digital business, data becomes more valuable than ever and users expect that data to be accessible from anywhere, at any time, with uninterrupted service. Any downtime or disruption to that data can result in significant financial losses, damaged reputations, and in some cases, regulatory fines. This puts tremendous pressure on organizations to ensure that critical business operations can continue in the face of adverse events such as natural disasters, ransomware, cyber attacks, or system failures. Data center outages happen, and organizations need to be prepared for malicious intrusion and unexpected disasters to ensure their valuable information is protected. Data replication between data centers is critical for disaster recovery, but it can also be challenging, particularly when dealing with large volumes of data. Companies need their disaster recovery infrastructure to ensure the fast, continuous, and secure replication of mission-critical data anywhere in the world, to prevent data loss or data breaches when in-flight across the WAN.

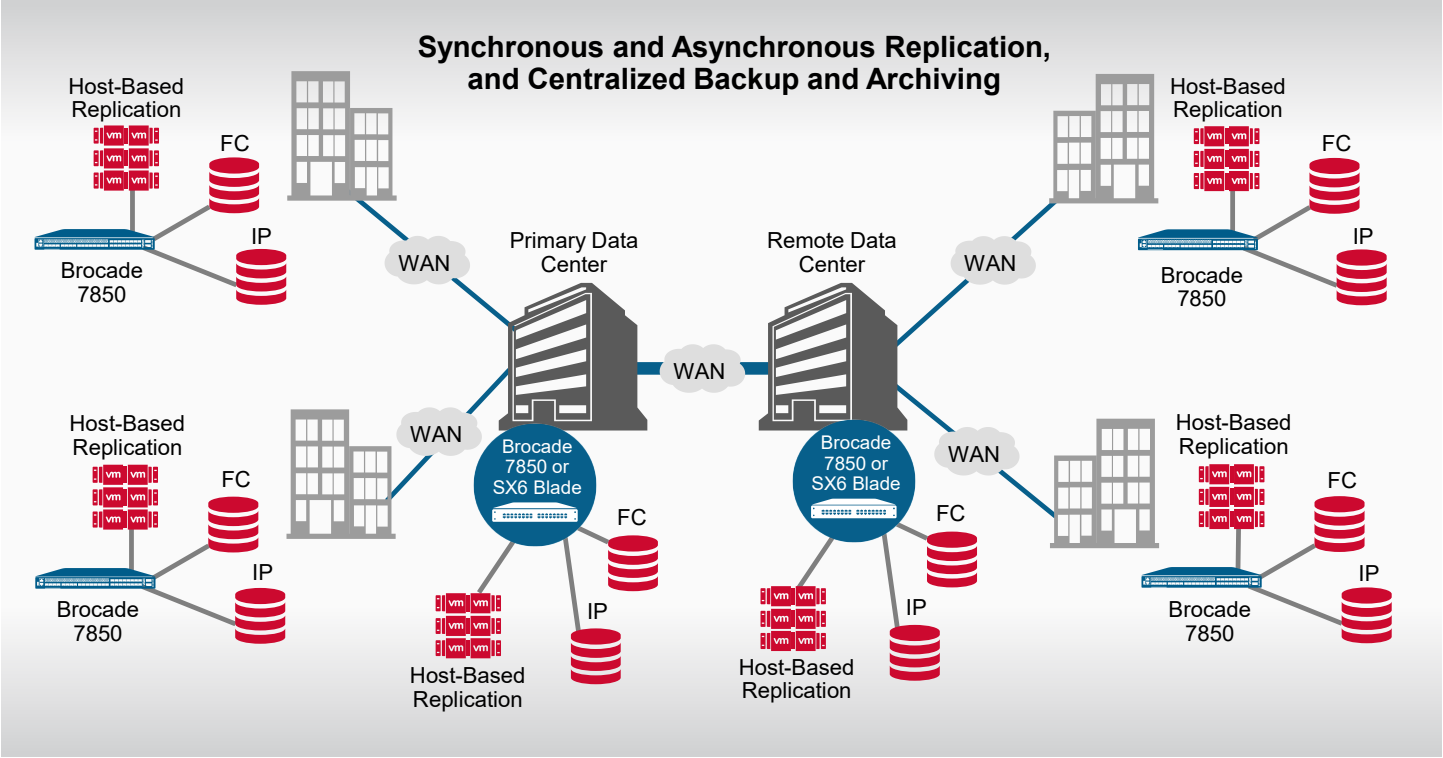
The Brocade® 7850 Extension Switch addresses these challenges by providing a powerful, reliable, secure solution for disaster recovery. This cyber-resilient replication connectivity solution for enterprise storage securely moves more data, faster, over distance for continuous data protection. With ample replication performance, up to 100Gb/s over distance, and built-in technology that overcomes the inherent challenges of latency and packet loss over long distance, the Brocade 7850 provides high-speed connectivity between locations to dramatically speed up replication performance – even over intercontinental distances. This makes it easier for organizations to move large amounts of data quickly and efficiently, to ensure critical data is available in the event of a disaster. In addition, the Brocade 7850 includes a suite of features, from pre-deployment validation to advanced network failure recovery technologies, to protect data from WAN disruptions and outages for continuous availability over the WAN. Moreover, data-in-flight security, coupled with the Brocade hardware and software robust security features, secures connections between data centers to safeguard data from threats over the WAN and to protect data from unauthorized access. The Brocade 7850 is an excellent choice for businesses looking to protect their critical data from cyber threats and ensure business continuity in the event of a disaster.

Purpose-Built for Data Replication between Data Centers

The Brocade 7850 is purpose-built to handle the replication demands of large enterprise customers. This switch is designed to deliver the most outstanding data protection and performance regardless of distance. With twenty-four 64G Fibre Channel ports, sixteen 1/10/25GbE ports, and two 100GbE ports, data centers can achieve the bandwidth, port density, and throughput needed for maximum replication performance over 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 throughput. In addition, it includes an innovative collection of software capabilities that optimize WAN utilization and protect data from WAN disruptions and outages, including Brocade Fabric Vision® technology, Extension Trunking, Adaptive Rate Limiting (ARL), encryption (IPsec), and integrated routing.

The Brocade 7850 is a robust platform for high-scale, multisite data center environments implementing block, file, and tape data protection solutions. It is an ideal platform for building a high-performance data-center-to-data-center infrastructure for multisite asynchronous and synchronous storage replication and centralized tape backup, recovery, and archiving solutions (see Figure 1). Brocade Extension maximizes replication and backup throughput over distance, using WAN-optimized TCP, disk and tape protocol acceleration, and data compression. Without the use of extension, the long distance required for disaster recovery often makes it impossible or impractical for organizations to achieve sufficient replication throughput to meet their recovery point objectives (RPOs) and recovery time objectives (RTOs). The Brocade 7850 platform offers simultaneous replication from both Fibre Channel and IP storage arrays to consolidate high-speed replication workloads over WAN connections. The consolidation of replication from various heterogeneous FC-based and IP-based storage platforms into a single, managed tunnel between data centers across the WAN has real operational, availability, security, and performance value.

Figure 1: The Brocade 7850 Enables High-Scale and Flexible Deployments for Fibre Channel and IP Replication over Long Distance



Whether supporting point-to-point connections, a multisite SAN, or remote offices, the Brocade 7850 offers enterprise-class capabilities to meet demanding disaster recovery requirements and improve RPOs and RTOs.

Industry-Leading Gen 7 Extension Solution

The Brocade 7850 Extension Switch is an industry-leading Gen 7 solution that provides cyber-resilient replication connectivity for enterprise storage. This powerful platform securely moves more data, faster, over distance for continuous data protection. It is purpose-built to handle the most demanding disaster recovery requirements and the unrelenting growth of data traffic between data centers in Fibre Channel, FICON, and IP storage environments.

Move More Data, Faster, over Distance

Storage arrays with native replication applications generally do not handle latency and packet loss well. The Brocade 7850 provides a robust extension solution that delivers local performance at long distance—along with strong Quantum Safe encryption—for comprehensive disaster recovery. It leverages Brocade TCP Acceleration to help achieve the fastest replication speeds possible from storage devices, and Brocade WAN-optimized TCP to ensure the in-order, lossless transmission of extension data.

The advanced performance and network optimization features of the Brocade 7850 enable replication and backup applications to send more data over metro and WAN links in less time, and to optimize available WAN bandwidth. Brocade FCIP uses high-efficiency encapsulation to encapsulate Fibre Channel into TCP/IP for transport over a long-distance WAN from anywhere, to anywhere—across the state and around the globe. Supporting up to 250-ms round-trip time (RTT) latency, the Brocade 7850 enables efficient extension solutions over distances up to 25,500 kilometers (15,845 miles). The actual supported distance may vary depending on service provider.

The Brocade 7850 maximizes replication and backup throughput over distance using data compression, disk and tape protocol acceleration, WAN-optimized TCP, and other extension networking technologies. These technologies, combined with the following advanced features, enable the most predictable, stable, and high performance replication fabrics so organizations can reliably protect their most critical asset, their data:

- **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.
- **Lossless Link Loss (LLL):** Part of Extension Trunking, provides recovery of data lost in-flight when a link goes offline. From the perspective of the storage applications, nothing ever occurred because all data is delivered, and is delivered in order.
- **Failover/failback with failover groups:** Circuits are assigned metrics and put in a failover group. If all circuits of the lower metric within the failover group go offline, the higher metric circuits take over. This uses LLL, and all data is delivered and delivered in order. The storage application will not know that a failover/failback has occurred.
- **ARL:** Dynamically adjusts bandwidth sharing between minimum and maximum rate limits to optimize bandwidth utilization and maintain maximum WAN performance during disruptions.
- **IPsec:** Ensures secure transport of data over WAN links at full line rate. Security is turned on without a performance penalty or excessive added latency. With a hardware-implemented, standard 256-bit AES algorithm, data-in-flight is encrypted.
- **Unparalleled, extremely efficient architecture:** Uniquely permits the high-speed, low-latency processing of IP datagrams and Fibre Channel, making extension of synchronous applications possible.
- **WAN-optimized TCP:** An aggressive TCP stack, optimizing TCP window size and flow control and accelerating TCP transport for high-throughput storage applications.

- **Streams:** A feature of WAN-optimized TCP used with Brocade IP extension to prevent head-of-line blocking.
- **Per-priority TCP quality of service:** Provides high-priority, medium-priority, and low-priority handling of Fibre Channel and IP extension flows within the same tunnel for transmission over the WAN using autonomous TCP sessions per QoS priority.
- **Advanced compression architecture:** Provides multiple modes to optimize compression ratios for various throughput requirements.
- **FCIP FastWrite:** Accelerates SCSI write processing, maximizing performance of synchronous and asynchronous replication applications 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.

In addition, the Brocade 7850 helps significantly increase the performance of IP storage applications across the WAN—even with encryption turned on. The more latency and packet loss between the data centers, the greater the performance gain using these solutions. This Extension switch can move more data than native TCP/IP stacks to meet rigorous recovery objectives. These performance gains enable use cases that were previously unattainable.

Offering more benefits, the Brocade 7850 supports and manages Fibre Channel and IP-based data flows, allowing storage administrators to consolidate I/O flows from heterogeneous storage devices and multiple protocols. The consolidation of IP storage flows, or both Fibre Channel and IP storage flows, into a single, managed tunnel between data centers across the WAN has significant operational, availability, security, and performance value. Operational advantages are gained with Fabric Vision, Monitoring Alerting Policy Suite (MAPS), WAN Test Tool (Wtool), and Brocade SAN management software. Using custom, browser-accessible dashboards for IP storage, or combined Fibre Channel and IP storage, empowers storage administrators with a centralized management tool to monitor the health and performance of their networks.

Brocade extension supports a range of common storage applications, including array-native IP remote data replication, IP-based centralized backup, virtual machine replication, host-based and database replication over IP, NAS head replication between data centers, and data migration between data centers.

Protect Data from WAN Disruptions and Outages

Today's organizations depend on fast, reliable access to data, regardless of location. The ramifications and potential business impact of an unreliable disaster recovery and data protection infrastructure are greater than ever.

The Brocade 7850 leverages the core technology of Brocade Gen 7 Fibre Channel platforms, consistently delivering 99.9999% uptime in the world's most demanding data centers. It combines enterprise-class availability with innovative features and the industry's only WAN-side, non-disruptive firmware upgrades to achieve always-on business operations and maximize application uptime. The Brocade 7850 provides a suite of features, from pre-deployment validation to advanced network failure recovery technologies, to ensure a high-performance and highly reliable network infrastructure for disaster recovery and data protection.

The Brocade 7850 has built-in tools to validate the condition of WAN links and network paths to ensure a worry-free deployment, as well as to validate the proper setup of configurations prior to deployment. Administrators can validate and troubleshoot the physical infrastructure with the built-in Flow Generator and Wtool, thereby easing deployment and avoiding potential issues.

Extension Trunking protects against WAN link failures with tunnel redundancy for lossless path failover and guaranteed in-order data delivery using LLL. It allows multiple network paths to be used simultaneously. When there is a failure for a network path, Extension Trunking retransmits the lost packets to maintain overall data integrity. The storage application is shielded from WAN network problems and experiences no disruption.

With ARL, organizations can optimize bandwidth utilization and maintain full WAN performance of the link during periods when a path is offline by using alternate WAN paths or adapting rate limiting to the existing conditions. ARL uses dynamic bandwidth sharing between floor (minimum) and ceiling (maximum) rate limits to achieve maximum available performance during failure situations.

Brocade Fabric Vision technology extends proactive monitoring between data centers to automatically detect WAN anomalies and avoid unplanned downtime. By utilizing MAPS, administrators can quickly identify and resolve issues, resulting in simpler troubleshooting and quicker resolution.

Utilizing Brocade SANnav™ makes TCP flows visible across the network, providing comprehensive visibility into disaster recovery and business continuity network health and performance conditions. Through a modern graphical user interface (GUI) with investigative capabilities, information about specific flows and TCP statistics are contextualized into visual dashboards, enabling administrators to quickly detect and isolate points of interest for both troubleshooting and performance optimization.

Safeguard Data from Threats over the WAN
Growing concerns about potential damage to brand reputation, class-action lawsuits, and costly downtime cause executives to pay greater attention to the security practices of their organizations. Leaving data exposed in-flight over distance while replicating to a remote location can result in data breaches and unwanted publicity. With security-related outages on the rise, organizations do not want to leave themselves exposed and must ensure that all data leaving the confines of their data center is secure.

The Brocade 7850 uses unbreakable Quantum Safe network encryption to ensure that data-in-flight is protected from threats over the WAN. This switch features robust, hardware-based IPsec with AES 256-bit encryption to keep data secure and meet security compliance requirements. In addition, hardware-based IPsec encrypts data flows over distance without a performance penalty.

With Brocade Gen 7 hardware and software, the Brocade 7850 offers robust security features to protect against malicious attacks. Brocade Fabric OS® (FOS) 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 SANnav Management Portal. Brocade TruFOS Certificates ensure that enterprises running Brocade directors and switches 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. TruFOS, FC optics, and secure EPROMs mitigate security vulnerabilities by automatically validating the integrity of the platform hardware and the operating system. Enterprise LDAP services protect against malicious cyber attacks with authentication, authorization, and accounting (AAA) and role-based access control (RBAC) integration, allowing only trusted users while maintaining detailed audit logs. Other security features include secure protocols, hardened operating system, IP filters, fabric security policies, TLS services, and password quality enforcement. The Brocade 7850 includes IPsec and the Gen 7 integrated security features with no additional cost or license required.

Enterprises using Brocade SANnav Management Portal have the ability to automatically distribute SSL certificates across the SAN to ensure authenticity and encryption settings. In addition, Brocade SANnav Management Portal has built-in security features to help protect the network. With Brocade SANnav, administrators can set up monitoring and alerting for security configuration changes, customize security thresholds, give proper access control to individual admins, and view switch security events.

Simplified Management and Robust Network Analytics

Brocade Fabric Vision technology provides a breakthrough hardware and software solution that helps simplify monitoring, maximize network availability, and dramatically reduce costs. Featuring innovative monitoring, management, and diagnostic capabilities, Fabric Vision technology enables administrators to avoid problems before they impact operations, helping their organizations meet SLAs. The Brocade 7850 supports the following Fabric Vision technology features for storage extension management:

- MAPS
- Fabric Performance Impact Monitoring
- Integrated dashboards
- Configuration and Operational Monitoring Policy Automation Services Suite (COMPASS)
- Brocade ClearLink™ Diagnostics
- Forward Error Correction (FEC)
- Credit Loss Recovery

For disaster recovery, it is important to have visibility and insight for greater control of WAN traffic to guarantee that RPO and RTO are met.

Brocade Global Support

Brocade Global Support has the expertise to help organizations build resilient, efficient SAN infrastructures. Leveraging more than 25 years of storage networking expertise, Global Support delivers world-class technical support, implementation, and migration services to enable organizations to maximize their hardware and software investments, accelerate new technology deployments, and optimize the overall performance of their network.

Maximizing Investments

To help optimize technology investments, Brocade, a Broadcom® company, 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.broadcom.com/brocade

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

Brocade 7850 Extension Switch Specifications

System Architecture	
Enclosure	1U chassis designed to be mounted in a 19-in. cabinet
Fibre Channel Ports	24 ports, 64G, universal (E, F, M, D, and EX ports): • 8 physical SFP+ Fibre Channel ports • 8 physical SFP-DD Fibre Channel ports
Ethernet Ports	16 ports of 1GbE/10GE/25GbE for LAN and WAN connectivity 2 ports of 100GbE for WAN connectivity
Scalability	Full fabric architecture with 239 switches maximum
Certified Maximum	Single fabric: 56 domains, 7 hops Multiprotocol routing fabric: 19 hops
Fibre Channel Performance	8.5Gb/s line speed, full duplex; 14.025Gb/s line speed, full duplex; 28.05Gb/s line speed, full duplex; 57.8Gb/s line speed, full duplex; auto-sensing of 8, 16, 32 and 64G port speeds
Ethernet Interfaces	1GbE, 10GbE, 25GbE and 100GbE
Brocade Trunking	Up to eight 64Gb/s ports per Brocade Trunk; up to 512 Gb/s per trunk There is no limit to how many trunk groups can be configured in the switch
Fabric Latency	460 ns with no contention, cut-through routing at 64Gb/s
Maximum Fibre Channel Frame Size	2112-byte payload
Maximum IP MTU	Jumbo Frames at 9216 bytes
Classes of Service	Class 2, Class 3, Class F (inter-switch frames)
Port Types	F_Port, E_Port, EX_Port, FCR E_Port, D_Port (Diagnostic), M_Port (Mirror), and self-discovery based on switch type (U_Port); VE_Port (FCIP and IP)
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	Fibre Channel: 64G FC SFP+ LC connector (supports 16/32/64G): SWL, LWL, ELWL 32G FC SFP+ LC connector (supports 8/16/32G): SWL, LWL 2x64G FC SFP-DD SN connector (supports 16/32/64G): SWL Ethernet: 10GbE SFP/SFP+ LC connector (supports 1/10GbE): SR 25GbE SFP/SFP+ LC connector (supports 10/25GbE): SR, LR 100GbE QSFP MPO connector (supports 100GbE): SR4 100GbE QSFP LC connector (supports 100GbE): LR4 40GbE connectivity can be supported through 4x10GbE breakout using four 10GbE ports on the Brocade 7850 platform All Brocade transceivers are PC/UPC compatible
Fabric Services	Name Server; Registered State Change Notification (RSCN); NTP; RADIUS; Reliable Commit Service (RCS); Dynamic Path Selection (DPS); Exchange-based routing; Device-based routing; Port-based routing; Lossless; Brocade Advanced Zoning; Web Tools; Brocade Trunking; Extended Fabrics; Fabric Vision; Traffic Optimizer; SDDQ; Integrated Routing (FCR); FICON CUP; FICON Management Server (FMS)
Extension Services	Extension Trunking, Adaptive Rate Limiting (ARL), WAN Test Tool (Wtool), Open Systems Tape Pipelining (OSTP), FastWrite (FCIP-FW), QoS Marking, Bandwidth Enforcement, PerPriority TCP QoS, PTQ, Adaptive Networking with QoS, and Advanced Extension and Integrated Routing (FCR), and Advanced Accelerator for FICON

Management	
Supported Management Software	SSH v2, HTTP/HTTPS, SNMP v1/v3, Telnet; SNMP (FE MIB, FC Management MIB); Brocade Web Tools; Brocade SANnav Management Portal and SANnav Global View; Command Line Interface (CLI); LDAP
Security	Quantum Safe AES-GCM-256 encryption on FC ISLs (E_Port), Quantum Safe AES-GCM-256 IPsec encryption (VE_Port), PKI, IKEv2, DH-CHAP (between switches and end devices), FCAP switch authentication; HTTPS, IP filter, AAA, Audit Logging, LDAP, Port Binding, RADIUS, TACACS+, Role-Based Access Control (RBAC), Secure Copy (SCP), Secure RPC, SFTP, SSH v2, TLS 1.3, Switch Binding, Trusted Switch, Login Banners, Secure Syslog
Management Access	1000Mb/s Ethernet (RJ-45), serial port (RJ-45), one USB port
Diagnostics	POST and embedded online/offline diagnostics including D_Port, FCIP ping, FCIP traceroute, FCping, Pathinfo (FCtraceroute), Wtool, Ftrace
Mechanical	
Enclosure	Back-to-front airflow/non-port-side intake; 1U, 19 in., EIA-compliant, power from back
Size	Width: 44 cm (17.32 in.) Height: 4.4 cm (1.73 in.) Depth: 59.03 cm (23.24 in.)
System Weight	12 kg (26.46 lb) with two power supplies, fans, without transceivers 12.91 kg (28.46 lb) with two power supplies, fans, fully populated with 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 3000m (9842 ft) Storage: Up to 12 km (39,370 ft)
Shock	Operating: 20g, 6 ms, half-sine wave Non-operating: 33g, 11 ms, half-sine wave, 3G axis
Vibration	Operating: 0.25G sine, 0.4g random, 5 Hz to 500 Hz Non-operating: 5 Hz at 0.5g, 10 Hz to 500 Hz at 1.0g (sine vibration); 3 Hz to 500 Hz at 1.12g (random vibration)
Airflow	Maximum: 100 CFM
Power	
Power Supply	Dual hot-swappable redundant AC power supplies
Power Inlet	C14; requires C13 plug
Input Voltage	90 VAC to 264 VAC nominal
Input Line Frequency	47 Hz to 63 Hz nominal
Inrush Current	Maximum of 40 amps for period of 10 ms to 150 ms
Power Consumption	Maximum power draw: • 585W with all ports operating at full line-rate: 8 Fibre Channel ports populated with 64G SWL transceivers, 16 Fibre Channel ports populated with 8x 64G SFP-DD SWL transceivers, 16 Ethernet ports populated with 25GE SWL transceivers, and 2 Ethernet ports populated with 100GE SWL transceivers Minimum power draw: • 315W for an empty chassis with no transceivers Typical power draw: • 366W with 50% populated ports running at 50% traffic rate • 450W with 100% populated ports running at 50% traffic rate

For product information and a complete list of distributors, visit broadcom.com

BROCADE
A Broadcom Company

For more product information: broadcom.com

7850-Extension-PB102 June 17, 2024