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Datasheet
Brocade X6 Directors

HIGHLIGHTS

- Enhances operational stability, maximizes application performance, and increases business agility with enterprise-class Gen 6 directors
- Accelerates application response time by up to 71 percent across 32 Gbps links
- Consolidates infrastructure with 128 Gbps Brocade UltraScale ICL connectivity for simpler, flatter, low-latency fabrics
- Simplifies end-to-end management of large-scale environments by automating monitoring and diagnostics
- Automatically detects degraded application or device performance through integrated network sensors
- Simplifies configuration automation and enables integrated advanced services across the Fabric with standard REST APIs
- Seamlessly integrates next-generation NVMe over Fabrics with Gen 6 Fibre Channel networks without a disruptive rip and replace
- Mitigates risk with backward-compatibility while further protecting future investments with Gen 7-ready support

Network Innovation for the Virtualized, All-Flash Data Center

Digital transformation is pushing mission-critical storage environments to the limit, with users expecting data to be accessible from anywhere, at any time, on any device. Faced with exponential data growth, the network must evolve to enable businesses to thrive in this new era. To meet these dynamic and growing business demands, organizations need to deploy infrastructure that can deliver greater consistency, predictability, and performance. Legacy infrastructure, however, was not designed to support the performance requirements of evolving workloads and flash-based storage technology. In fact, an aging network will impede the performance of an all-flash data center. A new approach to storage networking is needed to enable databases, virtual servers, desktops, and critical applications, and to unlock the full capabilities of flash. By treating the network as a strategic part of a storage environment, organizations can maximize their productivity and efficiency even as they rapidly scale their environments.

The Brocade® X6 Director with Brocade Fabric Vision™ technology combines innovative hardware, software, and integrated network sensors to ensure the industry's highest level of operational stability and redefine application performance. It provides a modular building block for increased scalability to accommodate growth for large-scale enterprise infrastructures.

Fabric Vision technology enhances visibility into the health of storage environments, delivering greater control and insight to quickly identify problems and achieve critical Service Level Agreements (SLAs). Breakthrough 32 Gbps performance accelerates application response time by up to 71 percent, eliminating IO bottlenecks, and unleashes the full performance of flash and next-generation Non-Volatile Memory Express (NVMe)-based storage. And with diverse deployment options, organizations can seamlessly adapt and optimize their businesses to meet next-generation storage requirements.

Features and benefits

GEN 6 FIBRE CHANNEL

Brocade Gen 6 Fibre Channel is the purpose-built network infrastructure for mission-critical storage, delivering operational stability, breakthrough performance, and increased business agility to accelerate data access, adapt to evolving requirements, and drive always-on business operations. The Brocade X6 Director with Gen 6 Fibre Channel, Brocade Fabric Vision technology, and IO Insight delivers unmatched 32 Gbps performance, data center-proven availability, and seamless scalability to ensure greater consistency, predictability, and performance.

Purpose-Built for Enterprise Deployments

Designed to meet relentless growth and mission-critical application demands, Brocade X6 Directors are the right platform for large enterprise environments that require increased capacity, greater throughput, and higher levels of resiliency.

The Brocade X6 Director is available in two modular form factors. This modular chassis design increases business agility with seamless storage connectivity and flexible deployment offerings. Built for large enterprise networks, the 14U Brocade X6-8 has eight vertical blade slots to provide up to 384 32 Gbps Fibre Channel device ports and 32 additional 128 Gbps Brocade UltraScale Inter-Chassis Link (ICL) ports. Built for midsize networks, the 8U Brocade X6-4 has four horizontal blade slots to provide up to 192 32 Gbps Fibre Channel device ports and 16 additional 128 Gbps UltraScale ICL ports. Each blade slot can be populated with two optional blades. For device connectivity, the Brocade FC32-48 Fibre Channel device port blade provides 48 32 Gbps Fibre Channel ports.

Brocade directors build upon years of innovation and leverage the core technology of Brocade systems to consistently deliver five-nines availability in the world's most demanding data centers. And with non-disruptive, hot-pluggable components and a no-single-point-of-failure design, the Brocade X6 is truly the enterprise-class director for today's storage infrastructure.

Enhanced Operational Stability for Always-on Business Operations

The Brocade X6 Director with Fabric Vision technology provides a breakthrough hardware and software solution that helps simplify monitoring, increase operational stability, and dramatically reduce costs. Fabric Vision technology now includes IO Insight, which provides organizations with deeper visibility into the performance of their environments. This enhanced visibility enables quick identification of degraded application performance at host and storage tiers, reducing time to resolution.

IO Insight proactively monitors IO performance and behavior through integrated network sensors, providing deep insight into problems and helping to ensure service levels. This capability non-disruptively and non-intrusively gathers IO statistics from any device port, which feeds a monitoring policy that measures thresholds and generates alerts. Integrated application- and device-level IO latency and IOPS monitoring provides the ability to baseline application performance and detect degraded performance. Integrated network sensors provide IO performance management that is designed to avoid dependence on invasive and disruptive physical taps.

Innovative Fabric Vision monitoring, management, and diagnostic capabilities enable administrators to avoid problems before they impact operations. Additional Fabric Vision capabilities include:

- **Monitoring and Alerting Policy Suite (MAPS)**
  Simplifies fabric-wide threshold configuration, monitoring, and alerting with prebuilt, rule-/policy-based templates. Administrators can configure the entire fabric (or multiple fabrics) at one time using common rules and policies, or customize policies for specific ports or switch elements. In addition, administrators can include IO Insight metrics in MAPS policies to understand the IO profile as well as to be notified of storage IO performance degradation

- **Fabric Performance Impact (FPI) Monitoring**
  Leverages predefined MAPS policies to automatically detect and alert administrators to different latency severity levels, and to identify slow drain devices that could impact network performance. This feature identifies various latency severity levels, pinpointing exactly which devices are causing or are impacted by a bottlenecked port, and quarantines slow drain devices automatically to prevent buffer credit starvation.

- **Dashboards**
  Provides integrated at-a-glance views that display an overall SAN health view, along with details on out-of-range conditions, to help administrators easily identify trends and quickly pinpoint issues occurring on a switch or in a fabric.

- **Configuration and Operational Monitoring Policy Automation Services Suite (COMPASS)**
  Simplifies deployment, safeguards consistency, and increases operational efficiencies of larger environments with automated switch and fabric configuration services. Administrators can configure a template or adopt an existing configuration to seamlessly deploy a configuration across the fabric. In addition, they can ensure settings do not drift over time with COMPASS configuration and policy violation monitoring within Brocade Network Advisor dashboards.

- **Brocade ClearLink® Diagnostics**
  Ensures optical and signal integrity for Fibre Channel optics and cables, simplifying deployment and support of high-performance fabrics. ClearLink Diagnostic Port (D_Port) is an advanced capability of Fibre Channel platforms.

- **Flow Vision**
  Enables administrators to identify, monitor, and analyze specific application flows in order to simplify troubleshooting, maximize performance, avoid congestion, and optimize resources. Flow Vision includes

  - **Flow Monitor**
    Provides comprehensive visibility into flows within the fabric, including the ability to automatically learn flows and non-disruptively monitor flow performance. Administrators can monitor all flows from a specific host to multiple targets/LUNs, from multiple hosts

to a specific target/LUN, or across a specific ISL or IFL. Additionally, they can perform LUN-level monitoring of specific frame types to identify resource contention or congestion that is impacting application performance.

- **Flow Learning**
  Enables administrators to non-disruptively discover all flows that go to or come from a specific host port or a storage port, or traverse ISLs/IFLs or FCIP tunnels to monitor fabric-wide application performance. In addition, administrators can discover top and bottom bandwidth-consuming devices and manage capacity planning.

- **Flow Generator**
  Provides a built-in traffic generator for pretesting and validating the data center infrastructure for robustness—including route verification and integrity of optics, cables, ports, back-end connections, and ISLs—before deploying applications.

- **Flow Mirroring**
  Enables administrators to non-disruptively create copies of specific application and data flows or frame types that can be captured for in-depth analysis.

■ **Forward Error Correction (FEC)**
  Enables recovery from bit errors in device connections and ISLs, enhancing transmission reliability and performance. Although mandated by the Gen 6 standard, Brocade FEC will also work with Gen 5 devices that support FEC.

■ **Credit Loss Recovery**
  Automatically detects and recovers buffer credit loss at the Virtual Channel (VC) level, providing protection against performance degradation and enhancing application availability.

BROCADE FABRIC VISION TECHNOLOGY

Brocade Fabric Vision technology with IO Insight, an extension of Gen 6 Fibre Channel, provides unprecedented insight and visibility across the storage network with powerful integrated monitoring, management, and diagnostic tools that enable organizations to:

■ **Simplify monitoring**
  - Deploy more than 20 years of storage networking best practices with a single click
  - Leverage visibility into storage IO health and performance with key latency and performance metrics to maintain SLA compliance
  - Gain comprehensive visibility into the fabric using browser-accessible dashboards with drill-down capabilities

■ **Increase operational stability**:
  - Avoid 50 percent of common network problems with proactive monitoring
  - Identify hot spots and automatically mitigate network problems—before they impact application performance
  - Identify IOs that deviate from expected behavior to facilitate fault isolation and troubleshooting

■ **Dramatically reduce costs**
  - Eliminate nearly 50 percent of maintenance costs through automated testing and diagnostic tools
  - Save up to millions of dollars on CapEx costs by eliminating the need for expensive third-party tools through integrated network sensors, monitoring, and diagnostics
  - Tune device configurations with integrated IO metrics to optimize storage performance and increase ROI

Brocade Network Advisor
  Brocade Network Advisor simplifies Gen 6 Fibre Channel management and helps organizations dramatically reduce deployment and configuration times by allowing fabrics, switches, and ports to be managed as groups. Customizable dashboards graphically display performance and health indicators out of the box, including all data captured using Brocade Fabric Vision technology. To accelerate troubleshooting, administrators can use dashboard playback to quickly review past events and identify problems in the fabric. Dashboards and reports also can be configured to show only the most relevant data, enabling administrators to more efficiently prioritize their actions and maintain network performance.

  Brocade Network Advisor provides organizations with a programmable Web-based interface through a standard REST API to reduce operational tasks by automating zoning, scripting, and reporting. To further simplify management tasks, administrators can quickly search through events, historical data, and base inventory, and apply filters. In addition, the standard REST API leverages Brocade Fabric Vision technology to gain fabric-wide health and performance visibility via easy-to-read dashboards.

Maximum Performance for Mission-Critical and Highly Virtualized Workloads
  Evolving critical workloads and higher density virtualization are continuing to demand greater, more predictable performance. The Brocade X6 Director features industry-leading Gen 6 Fibre Channel that increases performance for demanding workloads across 32 Gbps line-speed links and up to 16.2 Tbps of chassis bandwidth to address next-generation I/O- and bandwidth-intensive applications. Gen 6 Fibre Channel technology provides up to 566 million frames switched per second per ASIC, unlocking the full capability of flash storage. This breakthrough performance speeds up data-intensive application response times, allows more transactions in less time, and enables improved SLAs. In addition, the Brocade X6 Director increases scalability with double the throughput for high-density VM deployments and larger fabrics. This allows organizations to support more storage devices and meet bandwidth requirements using the same number of Fibre Channel links.

  Brocade X6 Directors provide unmatched chassis, slot-to-slot, and port performance and bandwidth. In addition, local switching capabilities ensure that data traffic within the same port group does not consume slot bandwidth, maximizing the number of line-rate ports while reducing latency. Performance capabilities include

•Brocade X6-8: Non-blocking architecture
 - Up to 384 ports (equivalent to 512 with UltraScale ICLs) at 32 Gbps
     > 16 Tbps aggregate chassis bandwidth
     > 12 Tbps Fibre Channel port bandwidth
     >   4 Tbps UltraScale ICL bandwidth
 - 1.5 Tbps bandwidth per slot, providing line-rate performance for the Brocade FC32-48 blade

・Brocade X6-4: Non-blocking architecture
- Up to 192 ports (equivalent to 256 with UltraScale ICLs) at 32 Gbps
  > 8 Tbps aggregate chassis bandwidth
  > 6 Tbps Fibre Channel port bandwidth
  > 2 Tbps UltraScale ICL bandwidth
- 1.5 Tbps bandwidth per slot, providing line-rate performance for the Brocade FC32-48 blade

Simplified, Scale-out Network Design

Organizations need to adapt to continuous data growth and seamlessly scale-out their storage environments. Brocade UltraScale chassis connectivity leverages optical Inter-Chassis Links (ICLs), which provide 128 Gbps bandwidth through a QSFP link. These links can support up to 2 kilometers and connect up to 12 Brocade X6 Directors, enabling flatter, faster, and simpler fabrics that increase consolidation while reducing network complexity and costs.

UltraScale ICLs enable scalable core-edge and active-active mesh chassis topologies. These high-density chassis topologies reduce inter-switch cabling by 75 percent and free up to 25 percent of ports for servers and storage. This maximizes overall port density within the smallest amount of rack space while freeing up front-facing device ports for server and storage connectivity.

The Brocade X6-8 supports32 UltraScale ICL ports, providing the equivalent of 128 32 Gbps ports(4.096 Tbps), and the Brocade X6-4 supports 16 UltraScale ICL ports, providing the equivalent of 64 32 Gbps ports (2.048 Tbps). Gen 6 UltraScale ICLs are backward-compatible and can connect to Gen 5 ICL ports, including connectivity with 2 km QSFPs at Gen 5 speeds of 16 Gbps (4×16).

Adapting to Next-Gen Storage Requirements with Flexible Deployment Options

To realize the full benefits of flash, organizations will need to transition their high-performance, latency-sensitive workloads to flash-based storage with NVMe. The simplicity and efficiency of NVMe over Fibre Channel enable significant performance gains for flash storage. Moreover, NVMe over Fabrics enables users to achieve faster application response times and harness the performance of hundreds of solid state drives for better scalability across virtual data centers with flash.

Organizations can seamlessly integrate Brocade Gen 6 Fibre Channel networks with next-generation NVMe over Fabrics without a disruptive rip and replace. Leveraging the efficiency of NVMe over Fibre Channel, combined with the high performance and low latency of Brocade Gen 6 Fibre Channel, organizations can accelerate IOPS to deliver the performance, application response time, and scalability needed for next-generation data centers.

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Brocade Global Services

Brocade Global Services has the expertise to help organizations build scalable, efficient cloud infrastructures. Leveraging 20 years of expertise in storage, networking, and virtualization, Brocade Global Services delivers world-class professional services, technical support, and education services, 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, Fujitsu and its partners offer complete solutions that include professional services, technical support, and education.

Technical details

BROCADE X6 Director Specifications	
System Architecture	
Chassis	Single chassis: The Brocade X6-8 provides up to 384 32 Gbps ports or a 512-port equivalent with 128 Gbps (4×32 Gbps) UltraScale ICL ports (32 Gbps×4 QSFP ports). The Brocade X6-4 provides up to 192 32 Gbps ports or a 256-port equivalent with 16 UltraScale ICL ports.
	Each provides support for (E, F, D, M, SIM, AE, and EX) Fibre Channel ports using 48-port 32 Gbps Fibre Channel blades.
Control processor	Redundant (active/standby) control processor modules
Scalability	Full-fabric architecture of 239 switches
Certified maximum	6,000 active devices per switch; 56 switches, 19 hops in Brocade Fabric OS® (FOS) fabrics; larger fabrics certified as required
Fibre Channel blades	Brocade FC32-48 port blade provides 48 ports of 32 Gbps Gen 6 Fibre Channel
Performance	Fibre Channel:
	· 4 Gbps line speed, full duplex
	· 8 Gbps line speed, full duplex
	· 16 Gbps line speed, full duplex
	· 32 Gbps line speed, full duplex
	Autosensing of 4, 8, 16, and 32 Gbps port speeds depending on SFPs used. Speed matching between 4, 8, 16, and 32 Gbps port speeds.
ISL trunking	Frame-based trunking with up to eight 32 Gbps ports per ISL trunk; up to 256 Gbps per ISL trunk
	Exchange-based load balancing across ISLs with DPS included in Brocade FOS
UltraScale ICL trunking	Chassis-to-chassis linkage through connectors on the Core Routing (CR) blade
	Can configure the following maximum QSFPs per trunk depending on blade type, connecting:
	· Up to four 4×32 Gbps QSFP ports in a trunk group to form a 512 Gbps trunk between two Brocade CR32-4 blades. For trunks containing four or fewer QSFP ports, ports in a trunk must be located in the same port group on each blade.
	· Up to four 4×32 Gbps QSFP ports in a trunk group to form a 512 Gbps trunk between a Brocade CR32-4 and CR32-8 blade. For trunks containing four or fewer QSFP ports, ports in a trunk must be located in the same port group on each blade.
	A minimum of two QSFP connections are required for a trunk, and up to four 4×16 Gbps QSFP trunks between pairs of Brocade CR32-8 (CR32-4) and CR16-8 (CR16-4).
Multichassis with UltraScale ICL ports	Up to 4,608 non-blocking 32 Gbps Fibre Channel ports; UtraScale ICL ports (32 for 8-slot or 16 per 4-slot chassis, optical QSFP) connect up to nine chassis in a full mesh topology or up to 12 chassis in a core-edge topology.
UltraScale ICL bandwidth[*1]	Brocade X6-8: 4.096 Tbps; 32 UltraScale ICL ports provide the equivalent of 128 32 Gbps ports. Each UltraScale ICL port provides 128 Gbps bandwidth over a QSFP (32 Gbps×4) link.
	Brocade X6-4: 2.048 Tbps; 16 UltraScale ICL ports provide the equivalent of 64 32 Gbps ports. Each UltraScale ICL port provides 128 Gbps bandwidth over a QSFP (32 Gbps×4) link.
	Both models: Frame-based trunking is enabled between four UltraScale ICLs. DPS distributes exchanges across all frame trunks.
Chassis bandwidth[*1]	Brocade X6-8: 12.2 Tbps per chassis (384 ports×32 Gbps) data rate + 4.096 Tbps UltraScale ICL bandwidth (32×128 Gbps)
	Brocade X6-4: 6.1 Tbps per chassis (192 ports×32 Gbps) data rate + 2.048 Tbps UltraScale ICL bandwidth (16×128 Gbps)
Slot bandwidth	1,536 Gbps (line rate)32 Gbps: Brocade G620 requires Brocade hot-pluggable SFP+, LC

*1: ICL option which supports QSFP (32Gbps) is planned to be released at May 2017.

BROCADE X6 Director Specifications(Continued)

Switch latency	Brocade FC32-48 blade at Gen 6 32 Gbps speeds: <900 ns (including FEC); any-port-to-any-port local switching and 2.7 µs blade to blade at 32 Gbps, cut-through routing
Maximum frame size	2,112-byte payload
Frame buffers	15,000 per switching ASIC
Classes of service	Class 2, Class 3, Class F (inter-switch frames)
Fibre Channel port types	Brocade FC32-48 port blade: F_Port, E_Port, EX_Port, M_Port, SIM, and D_Port NOTE: Self-discovery is based on switch type (U_Port) with an optional port-type control.
Data traffic types	Fabric switches supporting unicast, multicast (255 groups), and broadcast
Media types	Brocade FC32-48 port blade: Supports hot-pluggable Brocade Fibre Channel SFP+ at 32 Gbps SWL/LWL and SFP+ at 16 Gbps SWL/LWL Core Routing (CR) blades, Brocade CR32-4 and CR32-8: Support hot-pluggable Brocade Fibre Channel QSFP at 4×32 Gbps SWL for ICL connections
USB	One USB port per control processor for firmware download, support save, and configuration upload or download
Fabric services	Adaptive Networking (Traffic Isolation, QoS); BB credit recovery; Brocade Advanced Zoning (default zoning, port/WWN zoning, peer zoning, target-driven zoning, broadcast zoning); Dynamic Path Selection (DPS); Extended Fabrics; FDMI; Flow Vision; Frame Redirection; FSPF; Integrated Routing; ISL Trunking; Management Server; Monitoring and Alerting Policy Suite (MAPS); Configuration and Operational Monitoring Policy Automation Services Suite (COMPASS); N_Port Trunking; NPIV; NTP v3; Port Fencing; Registered State Change Notification (RSCN); Reliable Commit Service (RCS); Simple Name Server; Virtual Fabrics (Logical Switch, Logical Fabric)

System Components

Fibre Channel ports	Brocade X6-8: Up to 384 32-Gbps ports, universal (E_Port, F_Port, EX_Port, M_Port, D_Port, SIM Port) Brocade X6-4: Up to 192 32-Gbps ports, universal (F_Port, E_Port, EX_Port, M_Port, D_Port, SIM Port)
Classes of service	Class 2, Class 3, Class F (inter-switch frames)
ANSI Fibre Channel protocol	FC-PH (Fibre Channel Physical and Signaling Interface standard)
Fabric initialization	Complies with FC-SW 5.0
Port to port latency	Local switching: 900 ns Blade to blade: 2.7 µs
Switching capacity	An aggregate switching capacity of 13.5 billion frames per second (for Class 2, Class 3, and Class F frames for a 384-port chassis)

High Availability

Architecture	Non-blocking shared memory; passive backplane; redundant active/passive control processor; redundant ive core switching blades; redundant WWN cards
Chassis power	**Brocade X6-8**: · Two power supplies required for AC High Line (200 VAC to 240 VAC). · Device ships with three PSUs or empty (3 for 2+1 redundancy). Two provide system power, but four must be installed to provide power efficiency and 2+2 redundancy. **Brocade X6-4**: · One power supply required for AC High Line (200 VAC to 240 VAC). · The device ships with two power supplies. One provides system power, but both must be installed to provide power efficiency and 1+1 redundancy.
Cooling	**Brocade X6-8**: · Requires three fan tray assemblies. A failure condition is one failed fan from any fan tray. · Each assembly contains two fans for operation in the Brocade X6-8. One fan tray assembly can be hot-swapped and should be replaced immediately in the event of a failure. **Brocade X6-4**: · Requires two fan tray assemblies. A failure condition is one failed fan from any fan tray. · Each assembly contains two fans for operation in the Brocade X6-4. One fan assembly can be hot-swapped and should be replaced immediately in the event of a failure.
Airflow	Non-port-side intake to port-side exhaust is available.
Solution availability	Designed to provide 99.999 percent uptime capabilities; hot-pluggable redundant power supplies, fans, WWN cards, processors, core switching, port blades, and optics; online diagnostics; non-disruptive firmware download and activation

Management

Management	HTTP, SNMP v1/v3 (FE MIB, FC Management MIB), SSH; Auditing, Syslog; Brocade Advanced Web Tools, Brocade Network Advisor SAN Enterprise or Brocade Network Advisor SAN Professional Plus; Command Line Interface (CLI); SMI-S compliant; RESTful API; trial licenses for add-on capabilities
Security	DH-CHAP (between switches and end devices), FCAP switch authentication, FIPS 140-2 L2-compliant, HTTPS, IPsec, IP filtering, LDAP with IPv6, OpenLDAP, Port Binding, RADIUS, user-defined Role-Based Access Control (RBAC), Secure Copy (SCP), Secure RPC, SFTP, SSH v2, SSL/TLS, Switch Binding, TACACS+, Trusted Switch
Management access	10/100/1000 Ethernet (RJ-45) per control processor, in-band over Fibre Channel; serial port (RJ-45) and one USB per control processor module; DHCP/DHCPv6; call-home integration enabled through Brocade Network Advisor
Diagnostics	IO Insight for IO monitoring; ClearLink optics and cable diagnostics, including electrical/optical loopback, link traffic/latency/distance; built-in flow generator; POST and embedded online/offline diagnostics, including environmental monitoring, FCping and Pathinfo (FC traceroute), flow mirroring, frame viewer, non-disruptive daemon restart, optics health monitoring, power monitoring, RAStrace logging, and Rolling Reboot Detection (RRD)

Mechanical Specifications

Enclosure	Brocade X6-8 12-blade slots: 14U rack-mountable chassis; 27 in. to 31 in. and 22 in. rail kits for the four-post rack; mid-mount kit for the two-post rack Brocade X6-4 8-blade slots: 8U rack-mountable chassis; 27 in. to 31 in. rail, 18 in. to 24 in. rail, and airflow diversion rack mount kits for the four-post rack; mid-mount kit for the two-post rack
Mounting	Rack-mountable in a standard 19-inch EIA cabinet
Size	Brocade X6-8 Height: 61.23 cm (24.11 in., 14U) Width: 43.74 cm (17.23 in.) Depth: 61.04 cm (24.04 in.) Brocade X6-4 Height: 34.45 cm (13.56 in., 8U) Width: 43.74 cm (17.23 in.) Depth: 61.04 cm (24.04 in.) Brocade X6-4 with airflow diversion rack-mount kit Height: 40.00 cm (15.75 in., 9U) Width: 43.74 cm (17.23 in.) Depth: 61.29 cm (24.09 in.)
System weight	Brocade X6-8 35.61 kg (78.5 lb) for chassis 145.8 kg (321.5 lb) for 384-port configuration, fully populated Brocade X6-4 24.5 kg (54 lb) for chassis 68.95 kg (152.0 lb) for 192-port configuration, fully populated

Environment

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 humidity: 5% to 93% RH non-condensing at 40°C (104°F) with a maximum gradient of 10% per hour Non-operating humidity: 10% to 93% RH non-condensing at 70°C (158°F)
Altitude	Up to 3,000 meters (9,842 feet)
Shock	Operating: 10 g, 11 ms, half sine wave Non-operating: 20 g, 11 ms, half sine wave
Vibration	Operating: 5 Hz to 10 Hz @ +5 db/Oct; 10 Hz to 200 Hz @ 0.0005 Grms; 200 Hz to 500 Hz @ −5 db/Oct; scale 0.05 Grms Non-operating: 3 Hz to 10 Hz @ +5 db/Oct; 10 Hz to 200 Hz @ 0.0065 Grms; 200 Hz to 500 Hz @ −5db/Oct; scale 1.12 Grms
Heat dissipation	Brocade X6-8 384-port configuration: Typical: 8,836 BTU/hr; Max: 14,485 BTU/hr Power consumed: Typical: 2,589 W; Max: 4,244 W Note: Input power is at 200 VAC with full PSU redundancy. Brocade X6-4 192-port configuration: Typical: 4,696 BTU/hr; Max: 8,139 BTU/hr Power consumed: Typical: 1,376 W; Max: 2,385 W Note: Input power is at 200 VAC with full PSU redundancy.

Power

Supported power range	Input voltage Standard AC input: Range: 180 VAC to 264 VAC Auto-volt Nominal: 200 VAC to 240 VAC Power 180 to 264 VAC: 2,870 W
In-rush current	35 Amps maximum, peak
Frequency	50 Hz to 60 Hz (Nominal: 50 Hz to 60 Hz)

Input voltage
Standard AC input:

More information

Fujitsu platform solutions

In addition to Brocade X6 Directors Switch, Fujitsu provides a range of platform solutions. They combine reliable Fujitsu products with the best in services, know-how and worldwide partnerships.

Dynamic Infrastructures
With the Fujitsu Dynamic Infrastructures approach, Fujitsu offers a full portfolio of IT products, solutions and services, ranging from clients to datacenter solutions, Managed Infrastructure and Infrastructure-as-a-Service. How much you benefit from Fujitsu technologies and services depends on the level of cooperation you choose. This takes IT flexibility and efficiency to the next level.

Computing products
www.fujitsu.com/global/services/computing/
- PRIMERGY: Industry standard server
- SPARC Enterprise: UNIX server
- PRIMEQUEST: Mission-critical IA server
- ETERNUS: Storage system
Software
www.fujitsu.com/software/
- Interstage: Application infrastructure software
- Systemwalker: System management software

More information

Learn more about Brocade X6 Directors Switch, please contact your Fujitsu sales representative, Fujitsu business partner, or visit our website.
www.fujitsu.com/eternus/

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