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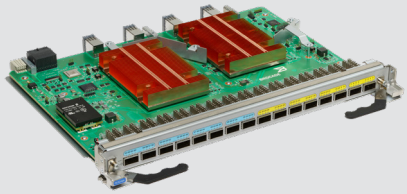
Product Brief

Brocade® FC32-64 Port Blade

Increase Scalability and Maximize Space Utilization with the Highest-Density Port Blade

Organizations are transitioning to the all-flash data center in order to gain the performance, scalability, and agility required to address exponential data growth and dynamic business demands. To keep pace with these innovations, the network must evolve to unlock the full capabilities of compute and storage resources. Brocade, A Broadcom Inc. Company, can help organizations modernize their storage networks to maximize productivity and increase the efficiency of their storage investments—even as they rapidly scale their environments. The Brocade X6 Director provides the tools to optimize NVMe storage, simplify operations, and automate SAN management tasks, while serving as a modular building block to accommodate growth in large-scale enterprise infrastructures.



Highlights

- Scales the Brocade X6 Director to 512 ports while maximizing space utilization with 33% more device connectivity in a high-density blade
- Increases agility by enabling flexible architectures with concurrent Fibre Channel, NVMe, or FCoE connectivity
- Handles more workloads with Gen 6 Fibre Channel performance and by increasing total system bandwidth up to 20 Tb/s
- Reduces complexity with 75% fewer cables and increases port density with Q-Flex connections
- Drives IT innovation by optimizing NVMe performance through integrated real-time latency monitoring with IO Insight

With the Brocade FC32-64 high-density port blade, the Brocade X6 Director can now scale even further—up to 512 ports—offering 33% more device ports while increasing total system bandwidth up to 20 Tb/s. This blade provides 64 Fibre Channel ports in an elegant, high-density form factor designed with Q-Flex connections, enabling administrators to simplify cabling infrastructure. As a result, organizations can effectively scale to build high-density fabrics to meet data growth demands, handle more workloads, and drive efficiency by maximizing rack space.

Combining Brocade's robust Gen 6 capabilities with multiprotocol flexibility and enhanced latency monitoring of NVMe over Fibre Channel traffic, the Brocade FC32-64 Port Blade enables a seamless transition to the all-flash data center and drives IT innovation.

Reducing Complexity with Simplified Connectivity

To reduce complexity, the Brocade FC32-64 Port Blade uses flexible Q-Flex ports that provide a space-efficient, compact design for more connectivity with four-channel Quad Small Form-Factor Pluggable (QSFP) optics. This delivers a 4 to 1 cabling reduction and reduces failure points, improving reliability. Each Q-Flex port is capable of supporting 128 Gb/s parallel Fibre Channel for device or ISL connectivity with MTP/MPO cables, MTP/MPO to LC breakout cables, and patch panels. This design supports a large number of device ports with simplified cable connectivity and enables the Brocade X6 Director to integrate seamlessly into a structured cabling infrastructure.

Gen 6 Fibre Channel

Brocade Gen 6 Fibre Channel is the modern storage network for mission-critical environments, delivering NVMe-ready performance, advanced automation, and comprehensive management to accelerate application performance and drive always-on business operations. The Brocade X6 Director with Gen 6 Fibre Channel and the Brocade FC32-64 Port Blade delivers unmatched 32 Gb/s performance, industry-leading port density, and multiprotocol flexibility to support storage growth, demanding workloads, and data center consolidation.

Simplify and Consolidate Cabling with Flexible Q-Flex Ports

Q-Flex ports are available for device and ISL connectivity with industry-leading 32 Gb/s speeds. These ports are designed to support single QSFP connections or fan out to four standard SFP+ connections, enabling administrators to simplify cabling infrastructure. With the Brocade FC32-64 Port Blade, all Q-Flex ports are enabled.

Q-Flex ports with QSFP modules increase port density by four times over SFP+ modules and reduce the number of cables per blade from 64 to 16. As a result, 75% fewer cables are required, simplifying cable management. The MTP/MPO connector form factor has been widely deployed across the industry, making cabling options readily available with improved serviceability. The result is an end-to-end solution that is easier to maintain, helping to improve the availability of mission-critical data centers.

Each Q-Flex port is capable of 4×32 Gb/s, 4×16 Gb/s, 4×8 Gb/s, or 4×4 Gb/s Fibre Channel speeds. Q-Flex ports can be used to aggregate edge switches into a core to form a high-density fabric with high-performance ISLs between the Brocade FC32-64 Port Blade in a Brocade X6 Director and Brocade G620 or G630 Switches.

Adapting to Next-Gen Storage Requirements with Flexible Deployment Options

To realize the full benefits of flash, organizations need to transition their high-performance, latency-sensitive workloads to flash-based storage with NVMe over Fibre Channel. The Brocade FC32-64 Port Blade increases flexibility with multiprotocol connectivity, allowing administrators to seamlessly adapt to next-generation requirements and design architectures with concurrent Fibre Channel, NVMe, or FCoE connectivity options.

The simplicity and efficiency of NVMe enable significant performance gains for flash storage. Moreover, NVMe 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 without a disruptive rip-and-replace. By leveraging the efficiency of NVMe, 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.

Enhanced Operational Stability for Always-on Business Operations

The Brocade X6 Director with Brocade Fabric Vision® technology delivers a breakthrough hardware and software solution that helps simplify monitoring, increase operational stability, and dramatically reduce costs. Fabric Vision technology includes IO Insight and VM Insight, which provides organizations with deeper visibility throughout a storage fabric or into the performance of their environments at a VM level. This enhanced visibility enables administrators to quickly identify the source of degraded application or VM performance at the host and storage tiers, reducing time to resolution. With the Brocade FC32-64 Port Blade, the Brocade X6 Director can optimize the performance of NVMe over Fibre Channel by leveraging integrated, non-intrusive, real-time monitoring and alerts. This proactive monitoring of NVMe over Fibre Channel traffic and VMs provides administrators with key insights for maintaining optimal network health and performance.

IO Insight proactively monitors I/O 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 I/O statistics from any device port, then feeds them to a monitoring policy that sets thresholds and generates alerts. VM Insight applies IO Insight visibility for each VM. Integrated VM, application-, and device-level I/O latency and IOPS monitoring enables administrators to set the baseline for application performance and identify the VM or physical layer responsible for the degraded performance.

Simplified Management and Robust Network Analytics

Brocade Fabric Vision technology helps simplify monitoring, maximize network availability, and dramatically reduce costs. Beyond IO Insight and VM Insight, Fabric Vision features innovative monitoring, management, and diagnostic capabilities that enable administrators to avoid problems before they impact operations, helping their organizations meet Service Level Agreements (SLAs). The Brocade FC32-64 Port Blade supports the Fabric Vision technology features integrated within the Brocade X6 Director.

Brocade Global Support

Brocade Global Support has the expertise to help organizations build resilient, efficient SAN infrastructures. Leveraging 20+ years of expertise in storage networking, 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 Inc. 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

Brocade FC32-64 Port Blade Specifications

System Architecture	
Fibre Channel ports	16 QSFP ports (64 total ports); E_Ports, F_Ports, M_Ports, EX_Ports, D_Ports, and VE_Ports.
Scalability	Full-fabric architecture with 239 switches maximum.
Certified maximum	6,000 active nodes; 56 switches, 19 hops in Brocade Fabric OS® fabrics; 31 switches, larger fabrics certified as required.
Fibre Channel performance	Fibre Channel: 4.25 Gb/s line speed, full duplex; 8.5 Gb/s line speed, full duplex; 14.025 Gb/s line speed, full duplex; 28.05 Gb/s line speed, full duplex; auto-sensing of 4, 8, 16, and 32 Gb/s port speeds. Support for 4 Gb/s and 8 Gb/s speeds requires the use of a 16 Gb/s QSFP transceiver.
FCoE connectivity	10GbE, 25GbE, or 40GbE FCoE speeds. Support for 10GbE, 25GbE, and 40GbE speeds requires the use of the appropriate QSFP transceiver.
ISL trunking	Frame-based trunking with up to eight 32 Gb/s ports per ISL trunk; up to 256 Gb/s per ISL trunk Exchange-based load balancing across ISLs with DPS included in Brocade Fabric OS.
Fibre Channel aggregate bandwidth	1800 Gb/s (data rate)
Switch latency	Locally switched port latency is <780 ns with Forward Error Correction (FEC) (enabled by default); blade-to-blade latency is 2.6 µs
Maximum frame size	2112-byte payload
Frame buffers	Up to 15,360 per 32-port group on the 64-port blade, dynamically allocated.
Classes of service	Class 2, Class 3, Class F (inter-switch frames)
Fibre Channel port types	E_Port, EX_Port, F_Port, M_Port (Mirror Port), and D_Port (optical E-wrap or O-wrap in 4×32 Gb/s QSFP only); self-discovery based on switch type (U_Port); optional port type control (limited Brocade ClearLink® Diagnostic port capabilities with 4×16 Gb/s QSFP); 10GbE, 25GbE, or 40GbE FCoE ports.
Cables supported	QSFP (MTP/MPO) to SFP+ (LC) break-out cables and QSFP (MTP/MPO) to QSFP (MTP/MPO) standard cables. 2 km 4×32 Gb/s QSFP (requires QSFP-to-QSFP SMF LC cable).
Data traffic types	Fabric switches supporting unicast.
Media types	Brocade hot-pluggable QSFP connector; 4×32 Gb/s SWL and 4×16 Gb/s SWL, MPO 1×12 ribbon cable connector (66m OM3, 100m OM4); 4×32 Gb/s 2 km QSFP (fixed 4×32 Gb/s speed and SMF LC); Brocade FC32-64 QSFPs support only 4/8/16/32 Gb/s (no 10 Gb/s Fibre Channel); 10GbE, 25GbE, or 40GbE FCoE QSFP.
Fabric services	Brocade Fabric Vision technology; Monitoring and Alerting Policy Suite (MAPS); Flow Vision; Brocade Adaptive Networking (Ingress Rate Limiting, Traffic Isolation, QoS); Fabric Performance Impact (FPI) Monitoring; Slow Drain Device Quarantine (SDDQ); Brocade Advanced Zoning (default zoning, port/WWN zoning, broadcast zoning, peer zoning, target driven zoning); Dynamic Fabric Provisioning (DFP); Dynamic Path Selection (DPS); Brocade Extended Fabrics; Enhanced BB Credit Recovery; FDMI; Frame Redirection; Frame-based Trunking; FSPF; Integrated Routing; IPoFC; Brocade ISL Trunking; Management Server; NPIV; Time Server; Registered State Change Notification (RSCN); Reliable Commit Service (RCS); Simple Name Server (SNS); Virtual Fabrics (Logical Switch, Logical Fabric); Read Diagnostics Parameter (RDP).
Diagnostics	IO Insight for I/O monitoring of Fibre Channel and NVMe over Fibre Channel traffic; 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	
Size	Width: 3.88 cm (1.53 in.) Height: 42.06 cm (16.56 in.) Depth: 33.32 cm (13.12 in.) Occupies one slot in a Brocade X6 Director family chassis
System weight	3.95 kg (8.71 lb) without QSFP

Brocade FC32-64 Port Blade Specifications (con't)

Environment	
Temperature	Operating: 0°C to 40°C (32°F to 104°F) Non-operating: –40°C to 70°C (–40°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	Operating: Up to 3048m (10,000 ft) Non-operating: 12,192m (40,000 ft)
Shock	Operating: 10g, 11 ms, half-sine wave Non-operating: 20g, 6 ms, half-sine wave
Vibration	Operating, sine sweep vibration: 5 Hz to 500 Hz at 1.0 grms Non-operating, sine sweep vibration: 5 Hz to 500 Hz at 2.4 grms Operating, random vibration: 5 Hz to 500 Hz at 0.4 grms Non-operating, random vibration: 5 Hz to 500 Hz at 1.12 grms
Power	
Maximum power	Typical power consumption: 203 watts when fully populated with 16 standard 4×32 Gb/s SWL QSFPs Maximum power consumption: 387 watts maximum power consumption when fully populated with 16 standard 32 Gb/s SWL QSFPs

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For product information and a complete list of distributors, visit our website at: broadcom.com

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