BROCADE M6505 16 GBPS FIBRE CHANNEL SAN I/O MODULE

STORAGE AREA NETWORK

Simplifying SAN Storage for the Dell PowerEdge M1000e Blade Enclosure

HIGHLIGHTS

- Provides exceptional price/performance value, combining flexibility, simplicity, and enterprise-class functionality in a 24-port switch for virtualized data centers and private cloud architectures

- Easily integrates Dell PowerEdge M1000e Blade Enclosures into any SAN fabric

- Simplifies server connectivity and SAN scalability by offering dual functionality as either an NPIV-enabled Brocade Access Gateway or a full-fabric SAN switch

- Accelerates deployment and trouble-shooting time with critical monitoring and advanced diagnostic features

- Eliminates the space, power, and cooling requirements of an external switch

- Enables fast, easy, and cost-effective scaling from 12 to 24 ports using Ports on Demand (PoD) capabilities

- Provides flexible product configuration options, from entry-level to enterprise-class SAN fabric services fully populated with 16 Gbps SFP+ optics

The Brocade One® strategy helps simplify networking infrastructures through innovative technologies and solutions. The Brocade M6505 16 Gbps Fibre Channel SAN I/O Module supports this strategy by delivering industry-leading reliability within a flexible, cost-effective, and easy-to-use integrated form factor.

To keep pace with growing business demands, data centers are transitioning to highly virtualized, private cloud storage environments. This approach enables organizations to consolidate and simplify their IT resources, resulting in increased business agility and lower capital and operating expenses. But virtualization is not without its challenges. Data centers must keep up with the explosive data growth and dynamic changes driven by virtualized workloads. Selecting the right compute and storage infrastructure is key to realizing the full benefits of these cloud-based architectures.

The Dell PowerEdge M1000e Blade Enclosure and Brocade® M6505 16 Gbps Fibre Channel SAN I/O Module combine next-generation blade server and Fibre Channel switch technology to simplify

IT complexity and eliminate data center sprawl. The Brocade M6505 simplifies SAN connectivity and delivers substantial cost-savings, improved reliability, and increased flexibility to address evolving storage requirements for enterprise data centers.

A simplified deployment process and a point-and-click user interface make the Brocade M6505 both powerful and easy to use. Moreover, the Brocade M6505 offers low-cost access to industry-leading Storage Area Network (SAN) technology while providing "pay-as-you-grow" scalability to meet the needs of an evolving storage environment.

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SAN CONNECTIVITY SIMPLIFIED

Cable aggregation is a significant benefit of blade systems. Servers have traditionally connected to a SAN one physical box at a time, resulting in higher costs and increased complexity as more switches, cables, and optics are added to the fabric. The Brocade M6505 is an integrated Fibre Channel switch for the Dell M1000e chassis that provides Fibre Channel port and cable aggregation. The integrated design eliminates the space, cooling, and power requirements of an external switch. In addition, it consolidates I/O from all of the blade servers in up to eight shared switch ports.

The Brocade M6505 can be deployed as a Brocade Access Gateway or as a full-fabric switch, which simplifies fabric topologies and heterogeneous fabric connectivity (the default mode setting is Access Gateway). Access Gateway mode utilizes N_Port ID Virtualization (NPIV) switch standards to present physical and virtual servers directly to the core of SAN fabrics. This makes Access Gateway transparent to the SAN fabric, greatly reducing management of the network edge. The Brocade M6505 in Access Gateway mode can connect servers to NPIV-enabled Brocade B-Series, Brocade M-Series, and other SAN fabrics.

Key benefits of Access Gateway mode include:

- Improved scalability for large or rapidly growing server and virtual server environments
- Reduced management of the network edge, since Access Gateway does not have a domain identity and appears transparent to the core fabric
- Support for heterogeneous SAN configurations without reduced functionality for server connectivity

INDUSTRY-LEADING TECHNOLOGY THAT IS FLEXIBLE, SIMPLE, AND EASY TO USE

The Brocade M6505 delivers industry-leading SAN technology within a flexible, simple, and easy-to-use solution. The base configuration includes 12 ports, with up to 24 ports on demand. The Brocade M6505 is easy to deploy and includes the new Diagnostic Ports (D_Ports) feature for verifying the performance and health of cables and optics.

D_Ports are a new port type that enables administrators to quickly identify and isolate optics and cable problems, reducing fabric deployment and diagnostic times. Organizations also can use D_Ports to run a variety of tests through Brocade Network Advisor or Command Line Interface (CLI) to test ports, Small Form-Factor Pluggables (SFPs), and cables for faults, latency, and distance.

A BUILDING BLOCK FOR VIRTUALIZED, PRIVATE CLOUD STORAGE

The Brocade M6505 provides a critical building block for today's highly virtualized, private cloud storage environments. It simplifies server virtualization and Virtual Desktop Infrastructure (VDI) management while meeting the high-throughput demands of Solid State Disks (SSDs). The Brocade M6505 also supports multitenancy in cloud environments through Quality of Service (QoS) and fabric-based zoning features.

The Brocade M6505 combines market-leading throughput, making it ideal for growing SAN workloads. The 24 ports produce an aggregate 384 Gbps full-duplex throughput; the eight external ports can be trunked for a 128 Gbps Inter-Switch Link (ISL). Enterprise-class capabilities combined with a low Total Cost of Ownership (TCO) yield 40 percent higher performance compared to 10 Gigabit Ethernet (GbE) alternatives at a similar cost.

ENTERPRISE-CLASS FEATURES IN AN INTEGRATED SWITCH

The Brocade M6505 features advanced monitoring, diagnostics, RAS, and redundancy capabilities in an entry-level switch to maximize availability, optimize performance, and simplify administration. These enterprise-class features include:

- Critical diagnostic and monitoring capabilities to help ensure early problem detection and recovery
- Non-intrusive and non-disruptive monitoring on every port to provide a comprehensive end-to-end view of the entire fabric
- Forward Error Correction (FEC) to recover from bit errors in ISLs, enhancing transmission reliability and performance

- Additional buffers to overcome performance degradation and congestion due to buffer credit loss
- Real-time bandwidth consumption by hosts/applications on ISLs to easily identify hot spots and potential network congestion

ADVANCED FABRIC SERVICES FOR ENTERPRISE DATA CENTERS

The Enterprise Performance Pack is optional software that adds robust SAN fabric services and value for 16 Gbps Brocade fabrics. It is available bundled with the Brocade M6505 or as a standalone option. The software package includes:

- **Brocade ISL Trunking:** Combines up to eight ISLs into a single, logical 128 Gbps trunk to optimize performance, bandwidth, and availability
- **Brocade Adaptive Networking:** Specifies traffic flow control between individual hosts and targets using QoS priorities to improve overall SAN performance
- **Brocade Advanced Performance Monitoring:** Provides end-to-end performance visibility into the fabric for more effective design, planning, tuning, and optimization
- **Brocade Fabric Watch:** Provides health monitoring and proactive notification of changes in the fabric, simplifying the detection of failure and disruption
- **Brocade Extended Fabrics:** Extends Fibre Channel links beyond traditional distance limitations to over 400 km for business continuity solutions

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 M6505 SAN I/O MODULE PRODUCT CONFIGURATIONS

	Enterprise 24-Port	Mid-Level 24-Port	Entry-Level 12-Port
Active ports	24	24	12 (12-port upgrade)
Included optics	Eight 16 Gbps SFP+	Four 16 Gbps SFP+	Two 16 Gbps SFP+
ISL Trunking	Included	Optional	Optional
Adaptive Networking	Included	Optional	Optional
Advanced Performance Monitoring	Included	Optional	Optional
Fabric Watch	Included	Optional	Optional
Extended Fabrics	Included	Optional	Optional

BROCADE M6505 FOR M1000e-SERIES BLADE ENCLOSURES SPECIFICATIONS

System Architecture

Fibre Channel ports	Switch mode: 12- and 24-port configurations (12-port increment through Ports on Demand [PoD] license); universal (E, F, M, D) ports Brocade Access Gateway default port mapping: 16 F_Ports, 8 N_Ports
Scalability	Full fabric architecture with 239 switches maximum
Certified maximum	6000 active nodes; 56 switches, 19 hops in Brocade Fabric OS® fabrics; 31 switches, three hops in Brocade M-EOS fabrics; larger fabrics certified as required
Interoperability	Brocade 3XXX, 4XXX, 5XXX, and 6XXX switches; Brocade DCX® and Brocade DCX 8510 Backbones Access Gateway mode supports Brocade, McDATA, and Cisco fabrics
Performance	Auto-sensing of 2, 4, 8, and 16 Gbps port speeds
Aggregate bandwidth	384 Gbps end-to-end, full duplex
Fabric latency	Latency for locally switched ports is 700 ns; Forward Error Correction (FEC) adds 400 ns between E_Ports (enabled by default)
Maximum frame size	2112-byte payload
Classes of service	Class 2, Class 3, Class F (inter-switch frames)
Port types	D_Port (Diagnostic Port), E_Port, F_Port, M_Port (Mirror Port); self-discovery based on switch type (U_Port); optional port type control Brocade Access Gateway mode: F_Port and NPIV-enabled N_Port
Data traffic types	Fabric switches supporting unicast
Media types	Requires Brocade hot-pluggable, Small Form-Factor Pluggable (SFP+), LC connector; Short-Wavelength (SWL), Long-Wavelength (LWL); Extended Long-Wavelength (ELWL); distance depends on fiber optic cable and port speed. Supports SFP+ (8 and 16 Gbps) optical transceivers.
Fabric services Note: Some fabric services do not apply or are unavailable in Brocade Access Gateway mode.	Brocade Advanced Performance Monitoring (including Top Talkers for E_Ports, F_Ports, and Fabric mode); Brocade Adaptive Networking (Ingress Rate Limiting, Traffic Isolation, QoS); Bottleneck Detection; Brocade Advanced Zoning (default zoning, port/WWN zoning, broadcast zoning); Dynamic Fabric Provisioning (DFP); Dynamic Path Selection (DPS); Brocade Extended Fabrics; Enhanced BB credit recovery; Brocade Fabric Watch; FDMI; Frame Redirection; Frame-based Trunking; FSPF; IPoFC; Brocade ISL Trunking; Management Server; NPIV; NTP v3; Port Fencing; Registered State Change Notification (RSCN); Reliable Commit Service (RCS); Server Application Optimization (SAO); Simple Name Server (SNS)
Options	SFP media, Ports on Demand (12-port upgrade) Enterprise Performance Pack: ISL Trunking, Adaptive Networking, Advanced Performance Monitoring, Fabric Watch, and Extended Fabrics

Management

Supported management software	HTTP, SNMP v1/v3 (FE MIB, FC Management MIB), SSH; Auditing, Syslog; Brocade Advanced Web Tools, Advanced Performance Monitoring, Brocade Fabric Watch; Brocade Network Advisor SAN Enterprise or Brocade Network Advisor SAN Professional/Professional Plus; Command Line Interface (CLI); SMI-S compliant; Administrative Domains; trial licenses for add-on capabilities
Security	SSL, SSH v2, HTTPS, LDAP, RADIUS, Role-Based Access Control (RBAC), DH-CHAP (between switches and end devices), Port Binding, Switch Binding, Secure RPC, Secure Copy (SCP), Trusted Switch, IPSec, IP Filtering
Management access	In-band over Fibre Channel; serial port (RJ-45)
Diagnostics	D_Port offline diagnostics, including electrical/optical loopback, link traffic/latency/distance; POST and embedded online/offline diagnostics, including environmental monitoring, FCping and Pathinfo (FC traceroute), frame viewer, non-disruptive daemon restart, port mirroring, optics health monitoring, power monitoring, RAStrace logging, and Rolling Reboot Detection (RRD)

BROCADE M6505 FOR M1000e-SERIES BLADE ENCLOSURES SPECIFICATIONS (CONTINUED)

Mechanicals	
Size	Width: 272.75 mm (10.74 in.)
	Height: 272.75 mm (10.74 in.)
	Depth: 307.24 mm (12.09 in.)
System weight	2.10 kg (4.65 lb) without media

Environment	
Temperature	Operating: 0°C to 40°C (32°F to 104°F)
	Non-operating: −20°C to 70°C (−4°F to 158°F)
Humidity	Operating: 10% to 90%, non-condensing at 29°C (84.2°F)
	Non-operating: 5% to 95%, non-condensing at 38°C (100.4°F)
Operating altitude	Up to 3048 m (10,000 ft)
Storage altitude	Up to 10,668 km (35,000 ft)
Operating shock	20 G for 6 ms
Non-operating shock	50 G with a velocity change of 4216 mm/sec^2
Vibration	Operating: 0.4 G at 5 Hz to 500 Hz for 60 minutes
	Non-operating: 0.5 G at 2 Hz to 200 Hz for 15 minutes

Power	
DC input	12 V and 3.3 V from chassis
Power consumption	30 W (normal) to 40 W (maximum)

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