Simplifying SAN Storage for the Dell PowerEdge M1000e Blade Enclosure

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.

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.
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 multi-tenancy 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 3B4 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**

<table>
<thead>
<tr>
<th></th>
<th>Enterprise 24-Port</th>
<th>Mid-Level 24-Port</th>
<th>Entry-Level 12-Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active ports</td>
<td>24</td>
<td>24</td>
<td>12 (12-port upgrade)</td>
</tr>
<tr>
<td>Included optics</td>
<td>Eight 16 Gbps SFP+</td>
<td>Four 16 Gbps SFP+</td>
<td>Two 16 Gbps SFP+</td>
</tr>
<tr>
<td>ISL Trunking</td>
<td>Included</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>Adaptive Networking</td>
<td>Included</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>Advanced Performance Monitoring</td>
<td>Included</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>Fabric Watch</td>
<td>Included</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>Extended Fabrics</td>
<td>Included</td>
<td>Optional</td>
<td>Optional</td>
</tr>
</tbody>
</table>

**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_Ports, F_Ports, 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**
  - 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)

**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, FQpinq 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

<table>
<thead>
<tr>
<th>Size</th>
<th>Width: 272.75 mm (10.74 in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Height: 272.75 mm (10.74 in.)</td>
</tr>
<tr>
<td></td>
<td>Depth: 307.24 mm (12.09 in.)</td>
</tr>
</tbody>
</table>

| System weight | 2.10 kg (4.65 lb) without media |

### Environment

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Operating: 0°C to 40°C (32°F to 104°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-operating: −20°C to 70°C (−4°F to 158°F)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Humidity</th>
<th>Operating: 10% to 90%, non-condensing at 29°C (84.2°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-operating: 5% to 95%, non-condensing at 38°C (100.4°F)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operating altitude</th>
<th>Up to 3048 m (10,000 ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage altitude</td>
<td>Up to 10,668 km (35,000 ft)</td>
</tr>
<tr>
<td>Operating shock</td>
<td>20 G for 6 ms</td>
</tr>
<tr>
<td>Non-operating shock</td>
<td>50 G with a velocity change of 4216 mm/sec²</td>
</tr>
<tr>
<td>Vibration</td>
<td>Operating: 0.4 G at 5 Hz to 500 Hz for 60 minutes</td>
</tr>
<tr>
<td></td>
<td>Non-operating: 0.5 G at 2 Hz to 200 Hz for 15 minutes</td>
</tr>
</tbody>
</table>

### Power

<table>
<thead>
<tr>
<th>DC input</th>
<th>12 V and 3.3 V from chassis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power consumption</td>
<td>30 W (normal) to 40 W (maximum)</td>
</tr>
</tbody>
</table>