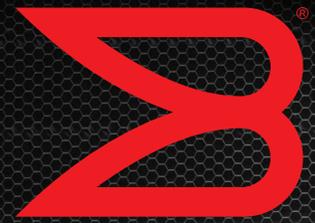


# BROCADE M5424 8 GBIT/SEC FIBRE CHANNEL SWITCH FOR M1000E-SERIES BLADE ENCLOSURES



## STORAGE AREA NETWORK

## Simplifying SAN Storage for Dell PowerEdge Blade Solutions

### HIGHLIGHTS

- Simplifies SAN connectivity and leverages next-generation 8 Gbit/sec technology to reduce costs, improve reliability and increase flexibility
- Easily integrates Dell PowerEdge M1000e blade enclosures into any SAN fabric
- Reduces up to 80% of the SAN components and more than 40% of the costs of a pass-through solution
- Eliminates the space, power and cooling requirements of an external switch
- Leverages industry-proven switch technology to maximize reliability and resiliency
- Expands from 12 to 24 ports with flexible "pay-as-you-grow" port licensing
- Integrates next-generation Brocade Data Center Fabric technology for end-to-end performance, Quality of Service (QoS), and availability management

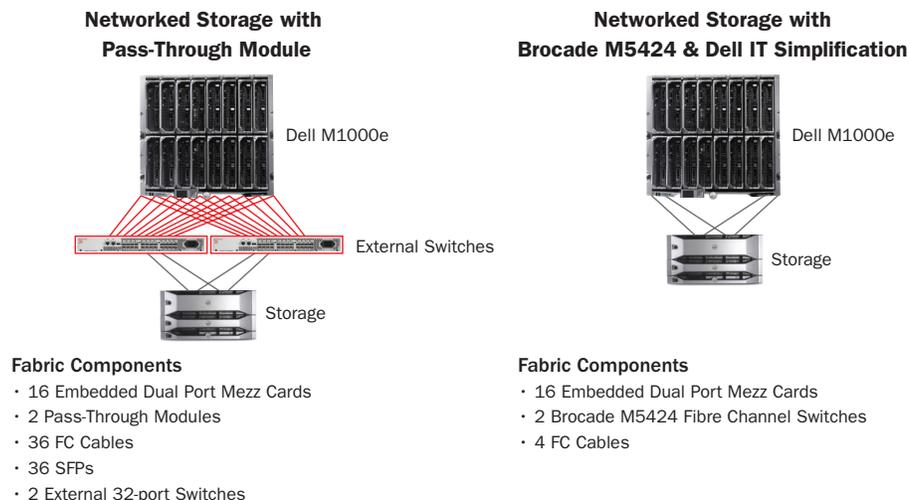
Enterprises are deploying high density blade servers and leveraging virtualization technology in order to maximize the benefits of consolidation: reduce capital and operational costs, simplify management complexity, lower power, cooling and space requirements and eliminate cable sprawl. As more applications and servers are virtualized and consolidated on fewer physical servers, IT organizations must deploy computing resources capable of keeping up with workload demands without impacting performance or service levels.

The Dell PowerEdge M1000e-Series Blade Enclosure and Brocade M5424 8 Gbit/sec Fibre Channel Switch combine next-generation blade server and Fibre Channel switch technology to simplify IT complexity and eliminate data center sprawl. The Brocade M5424 simplifies SAN connectivity and delivers substantial cost-savings, improved reliability and better flexibility to address evolving storage requirements for enterprise data centers.



**Figure 1.**

Brocade 5424 reduces the complexity of deploying a Dell PowerEdge M1000e to a SAN Fabric



### **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 increasing complexity as more switches, cables and optics are added to the fabric. Blade systems using Fibre Channel pass-through modules simply continue this legacy approach with the same results.

The Brocade M5424 is an integrated Fibre Channel switch for the Dell M1000e chassis and the only solution providing 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. This eliminates up to 80% of the port, optical and cabling components and more than 40% of the costs of a pass-through solution (See figure 1).

### **FUTURE-READY TECHNOLOGY**

Next-generation 8 Gbit/sec technology powers the Brocade M5424 to handle the dynamic I/O requirements for blade servers and virtualized environments. At twice the speed of legacy 4 Gbit/sec networks, half of the number of ports and Inter-Switch Links (ISLs) are required to support current workloads with plenty of headroom for growth and expansion.

In addition to individual port performance, the Brocade M5424 supports Inter-Switch Link (ISL) Trunking, an optional feature, to optimize performance, bandwidth utilization and availability. ISL Trunking consolidates up to eight external ports into a single, logical ISL with full-duplex throughput of 128 Gbit/sec.

### **DATA CENTER-PROVEN RELIABILITY**

In a consolidated infrastructure, any disruptions or failures will impact more applications and users. With fewer SAN components and no additional fans or power supplies, the Brocade M5424 reduces complexity and potential points of failure. In addition, it leverages data center-proven switch technology to proactively overcome network congestion or hardware failure. Advanced SAN management, hot-pluggable design and redundant I/O paths ensure the highest availability and resiliency for Dell M1000e enclosures.

### **SERVER VIRTUALIZATION SIMPLIFIED**

Blade servers and Fibre Channel SANs are an ideal infrastructure for server virtualization combining high compute density and scalable networked storage. However, consolidating Virtual Machines (VMs) on blades intensifies I/O requirements for storage resources.

The Brocade M5424 delivers next-generation performance and simplified management to address dynamic and growing server virtualization deployments. This enhances server virtualization with opportunities for more aggressive consolidation and cost savings.

With 8 Gbit/sec bandwidth, each blade can host more virtual machines without degrading performance or availability. This maximizes the number of physical and virtual servers that can connect to a SAN fabric utilizing fewer ports.

The Brocade M5424 and Dell FlexAddress virtualize storage I/O to simplify storage management and improve agility for virtualized environments. A persistent storage identity is created to provision, upgrade or replace blades without disrupting the SAN fabric.

## FLEXIBLE DEPLOYMENT

The Brocade M5424 combines cost-effective deployment with highly scalable Ports on Demand capabilities for up to 24 8 Gbit/sec Fibre Channel ports. It has a minimum of 12 ports enabled and is easily expandable to 24 through software license upgrade. The Brocade M5424 provides a modular “pay-as-you-grow” approach for dynamic and expanding environments.

## ADVANCED FABRIC SERVICES FOR ENTERPRISES

The Enterprise Performance Pack is optional software that adds robust SAN fabric services and value for 8 Gbit/sec Brocade fabrics. It is available bundled with the Brocade M5424 or as a standalone option. The software package includes:

- **ISL Trunking:** Combines up to eight ISLs into a single, logical 64 Gbit/sec trunk to optimize performance, bandwidth and availability
- **Adaptive Networking:** Specify traffic flow control between individual hosts and targets using QoS priorities to improve overall SAN performance
- **Advanced Performance Monitoring:** End-to-end performance visibility into the fabric for more effective design, planning, tuning and optimization
- **Fabric Watch:** Health Monitoring and proactive notification of changes in fabric simplifies failure and disruption detection

## BROCADE ACCESS GATEWAY, INNOVATIVE FLEXIBILITY

The Brocade M5424 can be configured as a full-fabric switch or Access Gateway mode. Brocade Access Gateway is an innovative solution for blade systems to overcome heterogeneous network and fabric complexity challenges. Brocade Access Gateway leverages N\_Port ID Virtualization (NPIV) switch standards to virtualize physical and logical devices connected to the SAN fabric.

## Interoperability Simplified

Brocade Access Gateway eliminates traditional heterogeneous switch-to-switch interoperability challenges. It utilizes NPIV to present server Fibre Channel connections as logical devices directly to SAN fabrics. This enables Brocade Access Gateway to connect Dell blades to heterogeneous NPIV-enabled switches and directors for seamless interoperability with Brocade, McDATA, Cisco and other SAN fabrics.

## Fabric Complexity Simplified

Each Dell M1000e blade enclosure connected to a SAN in full-fabric switch mode adds two switch domains to the fabric. In large fabrics, additional switch domains can create complexity and disrupt fabric operations during the deployment process.

To address this challenge, Brocade Access Gateway simplifies server-to-SAN connectivity by presenting Fibre Channel connections (rather than switch domains) to the SAN fabric. In this mode, the Brocade M5424 is managed as a logical device, eliminating switch configuration and fabric changes.

By increasing the number of logical device ports that can be connected to a single fabric port, the Brocade Access Gateway enables a much larger fabric with a greater number of blade servers and enclosures. Unlike Fibre Channel pass-through solutions, it can do so without substantially increasing the number of switches.

## PRODUCT OPTIONS

| Brocade M5424 Product Configurations |                       |                      |                      |
|--------------------------------------|-----------------------|----------------------|----------------------|
|                                      | Enterprise 24-Port    | Mid-Level 24-Port    | Entry-Level 12-Port  |
| Active Ports                         | 24                    | 24                   | 12 (12-port upgrade) |
| Included Optics                      | Eight 8 Gbit/sec SFP+ | Four 8 Gbit/sec SFP+ | Two 8 Gbit/sec SFP+  |
| Adaptive Networking                  | Included              | Optional             | Optional             |
| ISL Trunking                         | Included              | Optional             | Optional             |
| Advance Performance Monitoring       | Included              | Optional             | Optional             |
| Fabric Watch                         | Included              | Optional             | Optional             |

**BROCADE M5424 FOR M1000E-SERIES BLADE ENCLOSURES SPECIFICATIONS**

| System Architecture  |   | Management              |  |
|--|---|-------------------------|--|
| Fibre Channel ports  | 24 ports available in twelve port increments through Ports on Demand  | Supported Mgmt Software | Telnet, HTTP, SNMP v1/v3 (FE MIB, FC Management MIB); Auditing, Syslog, Change Management tracking; EZSwitchSetup wizard; Brocade Advanced Web Tools; Brocade DCFM Professional/Enterprise; SMI-S compliant, SMI-S scripting toolkit, Administrative Domains |
| Scalability  | Full fabric architecture with 239 switches max.   | 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   |
| Certified Maximum  | Single Brocade FOS fabric: 56 domains, 19 hops<br>Single Brocade M-EOS fabric: 31 domains, 3 hops<br>Larger fabrics certified as required; consult Brocade or OEM SAN design documents for configuration details  | Management access       | In-band over Fibre Channel; serial port (RJ-45); call-home integration enabled through Brocade DCFM  |
| Interoperability   | Brocade 2XXX, 3XXX, 4XXX, 5XXX and Director family switches<br>AG Mode supports Brocade, McDATA and Cisco fabrics   | Diagnostics             | POST and embedded online/offline diagnostics, including RAStrace logging, environmental monitoring, non-disruptive daemon restart, FCping and Pathinfo (FC traceroute), port mirroring (SPAN port)   |
| Performance  | 8.5 Gbit/sec line speed, full duplex;<br>4.25 Gbit/sec line speed, full duplex;<br>2.125 Gbit/sec line speed, full duplex<br>1.063 Gbit/sec line speed, full duplex;<br>auto-sensing of 8, 4, 2, and 1 Gbit/sec port speeds; optionally programmable to fixed port speed; speed matching between 8, 4, 2, and 1 Gbit/sec ports  | Mechanicals             |  |
| Aggregate bandwidth  | 128 Gbit/sec end to end, full-duplex  | Size                    | Width: 272.75 mm<br>Height: 32.48 mm<br>Depth: 307.24 mm   |
| Fabric latency   | 700 ns with no contention, cut-through routing at 8 Gbit/sec  | System Weight           | 4.65 Pounds – without media  |
| Maximum frame size   | 2112-byte payload   | Environment             |  |
| Classes of service   | Class 2, Class 3, Class F (inter-switch frames)   | Temperature             | Operating: 0 °C to 40 °C (32 °F to 104 °F)<br>Non-operating: -20 °C to 70 °C (-4 °F to 158 °F)   |
| Port types   | FL_Port, F_Port, M_Port (Mirror Port), and E_Port; self-discovery based on switch type (U_Port); optional port type control in Brocade Access Gateway mode: F_Port and NPIV-enabled N_Port  | Humidity                | Operating: 10% to 90%, non-condensing at 29 °C<br>Non-operating: 5% to 95%, non-condensing at 38 °C  |
| Data traffic types   | Fabric switches supporting unicast and broadcast  | Operating altitude      | Up to 3,048 m (10,000 ft)  |
| Media types  | 8 Gbit/sec: Requires Brocade hot-pluggable SFP+, LC connector; 8 Gbit/sec Short-Wavelength Laser (SWL); 8 Gbit/sec Long-Wavelength Laser (LWL); distance depends on fiber-optic cable and port speed<br>4 Gbit/sec: Requires Brocade hot-pluggable Small Form-factor Pluggable (SFP), LC connector; 4 Gbit/sec Short-Wavelength Laser (SWL); 4 Gbit/sec Long-Wavelength Laser (LWL); 4 Gbit/sec Extended Long-Wavelength Laser (ELWL); distance depends on fiber-optic cable and port speed | Storage altitude        | Up to 10.668km (35,000ft)  |
| Fabric services  | Simple Name Server (SNS); Registered State Change Notification (RSCN), NTP v3, Reliable Commit Service (RCS), Dynamic Path Selection (DPS), Brocade Advanced Zoning (default zoning, port/WWN zoning, broadcast zoning), NPIV, FDMI,  | Operating Shock         | 20G for 6ms  |
| <i>Note: Some fabric services do not apply or are unavailable in Brocade Access Gateway mode</i> |   | Non-operating Shock     | 50G with a velocity change of 4216 mm/sec squared  |
| Options  | SFP media, Ports on Demand (12-port upgrade) Enterprise Performance Pack: ISL Trunking, Adaptive Networking, Advanced Performance Monitoring, and Fabric Watch  | Vibration               | Operating: 0.4G at 5 Hz to 500 Hz for 60 minutes<br>Non-operating: 0.5G at 2 Hz to 200 Hz for 15 minutes; 1.04 grms random for 15 minutes  |
| Power  |   | DC Input                | 12V and 3.3V from chassis  |
|  |   | Power consumption       | About 32 Watts normally, 39 Watts maximum measured   |

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