BROCADE 6510 SWITCH

DATA CENTER

Flexible, Easy-to-Use Enterprise-Class SAN Switch for Private Cloud Storage

HIGHLIGHTS

- Delivers 16 Gbps performance with up to 48 ports in an energy-efficient, 1U form factor, providing maximum flexibility for diverse deployment and cooling strategies
- Features Ports on Demand (PoD) capabilities for fast, easy, and cost-effective scaling from 24 to 48 ports in 12-port increments
- Provides a flexible, simple, and easy-to-use SAN solution with industry-leading technology
- Utilizes the Brocade EZSwitchSetup wizard for simple and easy deployment, and is Microsoft Windows 7 compatible
- Supports highly virtualized, private cloud storage with multi-tenancy and non-stop operations
- Offers best-in-class port density and scalability for midrange enterprise SAN switches, along with redundant, hot-pluggable components and non-disruptive software upgrades
- Yields exceptional price/performance value, exceeding comparable Ethernet storage-based alternatives

The Brocade One™ strategy helps simplify networking infrastructures through innovative technologies and solutions. The Brocade 6510 Switch supports this strategy by delivering industry-leading 16 Gbps performance within a flexible, cost-effective, and easy-to-use 1U form factor.

To remain competitive, IT organizations must keep pace with ever-increasing workloads without a similar increase in their budgets or resources. While virtualization has provided some relief by enabling the benefits of faster deployment and consolidation, it also tends to put additional stress on data center networks. In addition, the move toward cloud computing, which promises greater efficiency and a more service-oriented business model, means that these networks will face even greater demands.

The Brocade® 6510 Switch meets the demands of hyper-scale, private cloud storage environments by delivering market-leading 16 Gbps Fibre Channel technology and capabilities that support highly virtualized environments. Designed to enable maximum flexibility and investment protection, the Brocade 6510 is configurable in 24, 36, or 48 ports and supports 2, 4, 8, 10, or 16 Gbps speeds in an efficiently designed 1U package. It also provides a simplified deployment process and a point-and-click user interface—making it both powerful and easy to use. The Brocade 6510 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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ACCELERATING FABRIC DEPLOYMENT WITH DIAGNOSTIC PORTS

Diagnostic Ports (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, SFPs, and cables for faults, latency, and distance.

SIMPLIFYING SERVER DEPLOYMENT WITH DYNAMIC FABRIC PROVISIONING

Dynamic Fabric Provisioning (DFP) allows organizations to eliminate fabric reconfiguration when adding or replacing servers through the virtualization of host World Wide Names (WWNs). It also reduces or eliminates the need to modify zoning or Logical Unit Number (LUN) masking. In addition, DFP enables pre-provisioning of virtual WWNs, helping organizations eliminate time-consuming steps when deploying new equipment or moving devices within a switch.

EXCEPTIONAL PRICE/PERFORMANCE FOR GROWING SAN WORKLOADS

The Brocade 6510 delivers exceptional price/performance for growing SAN workloads through a combination of market-leading throughput and an affordable switch form factor. The 48 ports produce an aggregate 768 Gbps full-duplex throughput; any eight ports can be trunked for 128 Gbps Inter-Switch Links (ISLs). Exchange-based Dynamic Path Selection (DPS) optimizes fabric-wide performance and load balancing by automatically routing data to the most efficient available path in the fabric (see Figure 1). It augments ISL trunking to provide more effective load balancing in certain configurations.

Moreover, a 24-port base configuration, easy administration, 1U footprint, and low-energy consumption—0.14 watts per Gbps and 2.3 watts per port—provide a low Total Cost of Ownership (TCO). Enterprise-class capabilities combined with a low TCO yield 40 percent higher performance compared to 10 Gigabit Ethernet (GbE) storage alternatives at a similar cost.

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

The Brocade 6510 delivers industry-leading SAN technology within a flexible, simple, and easy-to-use solution. The base configuration includes 24 ports, with up to 48 ports on demand. In addition to providing best-in-class scalability, the Brocade 6510 is easy to deploy with the Brocade EZSwitchSetup wizard and new "D_Port" feature, which simplifies setup. For maximum flexibility, the switch also features a 1U case less than 18 inches deep and dual-direction airflow options to support the latest hot aisle/cold aisle configurations.

A BUILDING BLOCK FOR VIRTUALIZED, PRIVATE CLOUD STORAGE

The Brocade 6510 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 6510 also supports multi-tenancy in cloud environments through Virtual Fabrics, Quality of Service (QoS), and fabric-based zoning features.

The Brocade 6510 enables secure metro extension to virtual private or hybrid clouds with 10 Gbps Dense Wavelength Division Multiplexing (DWDM) link support, as well as in-flight encryption and data compression. The switch also features on-board data security and acceleration, minimizing the need for separate acceleration appliances to support distance extension. Internal fault-tolerant and enterprise-class RAS features help minimize downtime to support mission-critical cloud environments.

BROCADE ACCESS GATEWAY MODE

The Brocade 6510 can be deployed as a full-fabric switch or as a Brocade Access Gateway, which simplifies fabric topologies and heterogeneous fabric connectivity (the default mode setting is a switch). Access Gateway mode utilizes N_Port ID Virtualization (NPIV) switch standards to present physical and virtual servers directly

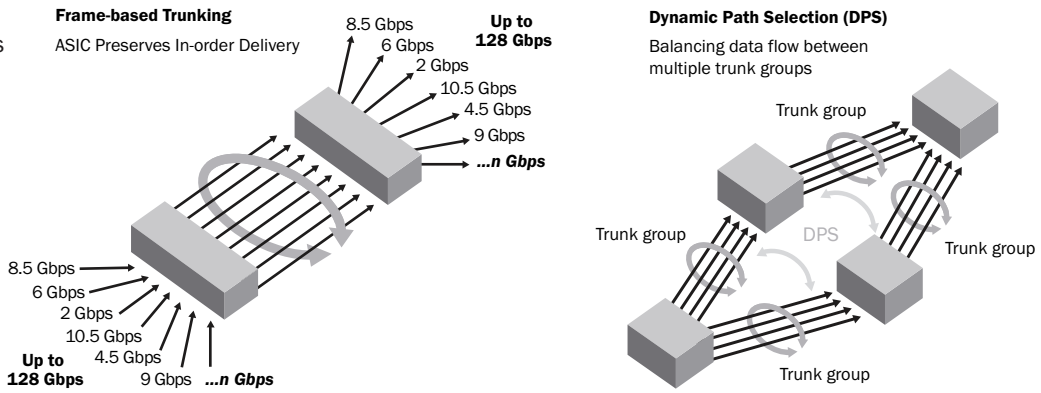

Figure 1.
Dynamic Path Selection (DPS) augments ISL Trunking to route data efficiently between multiple trunk groups.

to the core of SAN fabrics. This makes it transparent to the SAN fabric, greatly reducing management of the network edge. The Brocade 6510 in Access Gateway mode* can connect servers to NPIV-enabled Brocade B-Series, Brocade M-Series, or other SAN fabrics.

Organizations can easily enable Access Gateway mode via Brocade Network Advisor or a CLI. 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

* *Note: Access Gateway mode for the Brocade 6510 is supported only in 48-port configurations.*

BROCADE GLOBAL SERVICES

Brocade Global Services delivers world-class professional services and technical support to enable the transition to virtualized data centers and cloud-optimized architectures. Brocade Professional Services offers assessment, design, and implementation services to help organizations optimize their SAN architectures in cloud-optimized data centers. Brocade Premier Support and onsite residencies help organizations maximize availability of mission-critical data in SAN environments through personalized, preferential, and proactive technical support.

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 6510 SPECIFICATIONS

Systems Architecture	
Fibre Channel ports	Switch mode (default): 24-, 36-, and 48-port configurations (12-port increments through Ports on Demand [PoD] licenses); universal (E, F, M, D, EX) ports Brocade Access Gateway default port mapping: 40 F_Ports, 8 N_Ports
Scalability	Full fabric architecture with a maximum of 239 switches
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
Performance	Auto-sensing of 2, 4, 8, and 16 Gbps port speeds; 10 Gbps and optionally programmable to fixed port speed.
ISL trunking	Frame-based trunking with up to eight 16 Gbps ports per ISL trunk; up to 128 Gbps per ISL trunk. Exchange-based load balancing across ISLs with DPS included in Fabric OS. There is no limit to how many trunk groups can be configured in the switch.
Aggregate bandwidth	768 Gbps end-to-end full duplex
Maximum fabric latency	Latency for locally switched ports is 700 ns; encryption/compression is 5.5 µsec per node; Forward Error Correction (FEC) adds 400 ns between E_Ports (enabled by default).
Maximum frame size	2112 byte payload
Frame buffers	8192 dynamically allocated
Classes of service	Class 2, Class 3, Class F (inter-switch frames)
Port types	D_Port (Diagnostic Port), E_Port, EX_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	Hot-pluggable, industry-standard 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+ (2, 4, 8, 10, 16 Gbps) optical transceivers.
USB	One USB port for system log file downloads or firmware upgrades
Fabric services *Note: Some fabric services do not apply or are unavailable in Brocade Access Gateway mode.*	Brocade Advanced Performance Monitoring (APM) (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); Extended Fabrics; Enhanced BB credit recovery; Brocade Fabric Watch; FDMI; Frame Redirection; Frame-based Trunking; FSPF; Integrated Routing; IPoFC; 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); Virtual Fabrics (Logical Switch, Logical Fabric)
Extension	Fibre Channel, in-flight compression (Brocade LZO) and encryption (AES-GCM-256); integrated 10 Gbps Fibre Channel for DWDM MAN connectivity
FICON	FICON® cascading; support for lossless DLS; FICON CUP

BROCADE 6510 SPECIFICATIONS (CONTINUED)

Management	
Supported management software	HTTP, SNMP v1/v3 (FE MIB, FC Management MIB), SSH; Auditing, Syslog; Brocade Advanced Web Tools, APM, 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	AES-GCM-256 encryption on ISLs; DH-CHAP (between switches and end devices), FCAP switch authentication; FIPS 140-2 L2-compliant, HTTPS, IPsec, IP filtering, LDAP with IPv6, Port Binding, RADIUS, User-defined Role-Based Access Control (RBAC), Secure Copy (SCP), Secure RPC, SFTP, SSH v2, SSL, Switch Binding, Trusted Switch
Management access	10/100 Mbps Ethernet (RJ-45), in-band over Fibre Channel, serial port (RJ-45), and one USB port
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 (SPAN port), optics health monitoring, power monitoring, RAStrace logging, and Rolling Reboot Detection (RRD)

Mechanical	
Enclosure	Front-to-back airflow; power from back, 1U Back-to-front airflow; power from back, 1U
Size	Width: 438 mm (17.23 in.) Height: 43 mm (1.7 in.) Depth: 443 mm (17.45 in.)
System weight	9.16 kg (20.20 lb) with two power supply FRUs, without transceivers

Environment	
Operating environment	Temperature: 0 to 40°C Humidity: 10% to 85% (non-condensing)
Non-operating environment	Temperature: –25 to 70°C Humidity: 10% to 90% (non-condensing)
Operating altitude	Up to 3000 m (9842 ft)
Storage altitude	Up to 12 km (39,370 ft)
Shock	Operating: Up to 20 G, 6 ms half-sine Non-operating: Half sine, 33 G 11 ms, 3/eg axis
Vibration	Operating: 0.5 g sine, 0.4 grms random, 5 to 500 Hz Non-operating: 2.0 g sine, 1.1 grms random, 5 to 500 Hz
Heat dissipation	48 ports at 338 BTU/hr

Power	
Power supply	Dual, hot-swappable redundant power supplies with integrated system cooling fans
AC input	85 V to 264 V ~5 A to 2.5 A
Input line frequency	47 Hz to 63 Hz
Power consumption	110 watts with all 48 ports populated with 16 Gbps SWL optics 72 watts for empty chassis with no optics

For information about supported SAN standards, visit www.brocade.com/sanstandards.

For information about switch and device interoperability, visit www.brocade.com/interoperability.

For information about hardware regulatory compliance, visit www.brocade.com/regulatorycompliance.

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