DATA SHEET

Brocade 6520 Switch

HIGHLIGHTS

- Provides high scalability in an ultra-dense 96-port switch to support highly virtualized, private cloud storage and data center consolidation
- Enables "pay-as-you-grow" flexibility from 48 to 96 ports with speeds up to 16 Gbps
- Leverages Brocade Fabric Vision technology's powerful monitoring, management, and diagnostic tools to simplify administration, increase uptime, and reduce costs
- Helps pinpoint problems faster and simplify SAN configuration and management with Brocade Network Advisor
- Simplifies deployment with the Brocade EZSwitchSetup wizard and supports high-performance fabrics by using Brocade ClearLink D_Ports to identify optic and cable issues
- Provides up to eight in-flight encryption and compression ports, delivering data center-to-data center security and bandwidth savings

Scalable Enterprise-Class SAN Switch for Highly Virtualized, Cloud Environments

To meet dynamic and growing business demands, data centers are evolving into highly virtualized environments and cloud-based architectures. This approach enables organizations to consolidate and simplify their IT resources, resulting in increased business agility and lower capital and operating expenses. However, enterprise data centers must keep pace with the changes driven by increasingly virtualized workloads and storage resources. Selecting the right network is therefore key to realizing the full benefits of these cloud-based architectures. By treating the network as a strategic part of a highly virtualized environment, organizations can increase optimization and efficiency even as they rapidly scale their environments.

Today, Brocade® Fibre Channel switches are the de facto storage networking standard for mission-critical workloads and highly virtualized environments. Based on years of successful deployment in enterprise data centers around the globe, Brocade Fibre Channel SANs provide highly resilient, scalable, and simplified network infrastructure for storage.

The Brocade 6520 Switch meets the demands of growing, dynamic workloads and private cloud storage environments by delivering market-leading Gen 5 Fibre Channel technology and capabilities. The Brocade 6520 is a high-density, purpose-built, foundational building block for large and growing Storage Area Network (SAN) infrastructures. It provides industry-leading scalability, reliability, and 16 Gbps performance in a flexible, easy-to-deploy enterprise-class switch, enabling greater data center consolidation, operational efficiency, and business continuity. In addition to increased throughput, it helps improve bandwidth utilization, security, and network visibility and management through in-flight data compression and encryption and advanced diagnostics. It's an ideal switch for bandwidth-intensive workloads, evolving virtualized data centers, and private cloud architectures.

GEN 5 FIBRE CHANNEL

Gen 5 Fibre Channel is the purpose-built, data center-proven network infrastructure for storage, delivering unmatched reliability, simplicity, and 16 Gbps performance. The Brocade 6520 with Gen 5 Fibre Channel and Brocade Fabric Vision technology unleashes the full potential of high-density server virtualization, cloud architectures, and next-generation storage.

Exceptional Scalability for Demanding Workloads and Data Center Consolidation

The Brocade 6520 features 96 Fibre Channel ports in a 2U form factor, delivering industry-leading port density and space utilization for data center consolidation. Designed for maximum flexibility, this enterprise-class switch offers "pay-as-you-grow" scalability with Ports on Demand (PoD). Organizations can quickly, easily, and cost-effectively scale from 48 to 96 ports in 24-port increments, each supporting 2, 4, 8, 10, or 16 Gbps. In addition, flexible, high-speed 16 Gbps and 8 Gbps optics allow organizations to deploy bandwidth on demand to meet growing data center needs. For maximum flexibility, the switch also features dual-direction airflow options to support the latest hot aisle/cold aisle configurations.

Industry-Leading Performance for Growing Workloads

The Brocade 6520 delivers exceptional performance for growing and dynamic workloads through a combination of market-leading throughput and bandwidth utilization. With the unpredictability of virtualized workloads and cloud services, throughput becomes critical to ensuring that the network does not become the bottleneck. With 96 ports, the Brocade 6520 provides an aggregate 1,536 Gbps full-duplex throughput. Up to eight ISLs can be combined together in a 128 Gbps framed-based trunk. In addition, 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). This augments Brocade ISL Trunking to provide more effective load balancing in certain configurations.

Moreover, the enterprise-class capabilities of this switch yield 40 percent higher performance compared to 10 Gigabit Ethernet (GbE) alternatives at a similar cost.

Simplified Management and Robust Network Analytics

Brocade Fabric Vision™ technology provides a breakthrough hardware and software solution that helps simplify monitoring, maximize network availability, and dramatically reduce costs. Featuring innovative monitoring, management, and diagnostic capabilities, Fabric Vision technology enables administrators to avoid problems before they impact operations, helping their organizations meet Service Level Agreements (SLAs). Fabric Vision technology includes:

- **Monitoring and Alerting Policy Suite (MAPS):** Provides an easy-to-use solution for pre-built, policy-based threshold monitoring and alerting. MAPS proactively monitors the health and performance of the SAN infrastructure to ensure application uptime and availability. By leveraging pre-built, rule-/policy-based templates, MAPS simplifies fabric-wide threshold configuration, monitoring, and alerting. Administrators can configure the entire fabric (or multiple fabrics) at one time using common rules and policies, or customize policies for specific ports or switch elements.
- **Fabric Performance Impact (FPI) Monitoring:** Leverages pre-defined MAPS policies to automatically detect and alert administrators to different latency severity levels, and identifies slow drain devices that could impact network performance. This feature uses advanced monitoring capabilities and intuitive MAPS dashboard reporting to indicate various latency severity levels, pinpointing exactly which devices are causing or are impacted by a bottlenecked port.

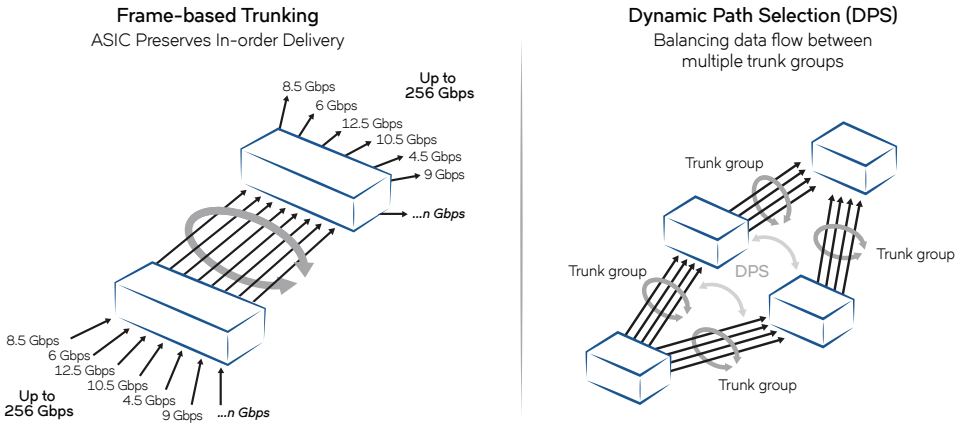

Figure 1: Dynamic Path Selection (DPS) augments Brocade ISL Trunking to route data efficiently between multiple trunk groups.

- **Dashboards:** Provides integrated dashboards that display an overall SAN health view, along with details on out-of-range conditions, to help administrators easily identify trends and quickly pinpoint issues occurring on a switch or in a fabric.
- **Configuration and Operational Monitoring Policy Automation Services Suite (COMPASS):** Simplifies deployment, safeguards consistency, and increases operational efficiencies of larger environments with automated switch and fabric configuration services. Administrators can configure a template or adopt an existing configuration as a template and seamlessly deploy the configuration across the fabric. In addition, they can ensure that settings do not drift over time with COMPASS configuration and policy violation monitoring within Brocade Network Advisor dashboards.
- **Brocade ClearLink Diagnostics:** Ensures optical and signal integrity for Gen 5 Fibre Channel optics and cables, simplifying deployment and support of high-performance fabrics. ClearLink Diagnostic Port (D_Port) is an advanced capability of Gen 5 Fibre Channel platforms.
- **Flow Vision:** Enables administrators to identify, monitor, and analyze specific application flows in order to simplify troubleshooting, maximize performance, avoid congestion, and optimize resources. Flow Vision includes:
  - **Flow Monitor:** Provides comprehensive visibility into flows within the fabric, including the ability to automatically learn flows and non-disruptively monitor flow performance. Administrators can monitor all flows from a specific host to multiple targets/LUNs, from multiple hosts to a specific target/LUN, or across a specific ISL. Additionally, they can perform LUN-level monitoring of specific frame types to identify resource contention or congestion that is impacting application performance.
  - **Flow Generator:** Provides a built-in traffic generator for pre-testing and validating the data center infrastructure—including route verification and integrity of optics, cables, ports, back-end connections, and ISLs—for robustness before deploying applications.
- **Forward Error Correction (FEC):** Enables recovery from bit errors in ISLs, enhancing transmission reliability and performance.
- **Credit Loss Recovery:** Helps overcome performance degradation and congestion due to buffer credit loss.

Brocade Network Advisor

Brocade Network Advisor simplifies Gen 5 Fibre Channel management and helps users proactively diagnose and resolve issues to maximize uptime, increase operational efficiency, and reduce costs. The wizard-driven interface dramatically reduces deployment and configuration times by allowing fabrics, switches, and ports to be managed as groups. Customizable dashboards graphically display performance and health indicators out of the box, including all data captured using Brocade Fabric Vision technology. To accelerate troubleshooting, administrators can use dashboard playback to quickly review past events and identify problems in the fabric. In addition, dashboards and reports can be configured to show only the most relevant data, enabling administrators to more efficiently prioritize their actions and maintain network performance.

BROCADE FABRIC VISION TECHNOLOGY

Brocade Fabric Vision technology, an extension of Gen 5 Fibre Channel, provides unprecedented insight and visibility across the storage network with powerful built-in monitoring, management, and diagnostic tools that enable organizations to:

Simplify monitoring:

- *Deploy more than 15 years of SAN best practices in one click to simplify the deployment of monitoring with pre-defined, threshold-based rules, actions, and policies*
- *Gain comprehensive visibility into network health, performance, latency, and congestion issues in the fabric using browser-accessible dashboards with drill-down and point-in-time playback capabilities*

Increase availability:

- *Avoid 50 percent of common network problems with proactive monitoring and advanced diagnostic tools that address problems before they impact operations*
- *Identify hot spots and automatically mitigate network problems—before they impact application performance—through intuitive reporting, trend analysis, and integrated actions*

Dramatically reduce costs:

- *Eliminate nearly 50 percent of maintenance costs through automated testing and diagnostic tools that validate the health, reliability, and performance of the network prior to deployment*
- *Save up to millions of dollars on CapEx costs by eliminating the need for expensive third-party tools through built-in monitoring and diagnostics*

A Building Block for Virtualized, Private Cloud Storage

The Brocade 6520 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 6520 also supports multitenancy in cloud environments through Virtual Fabrics, Quality of Service (QoS), and fabric-based zoning features.

The Brocade 6520 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 to optimize bandwidth and minimize the risk of unauthorized access. With four times more in-flight encryption and compression ports than the Brocade 6510 Switch, the Brocade 6520 supports higher data volumes over long distance. 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 Global Services

Brocade Global Services has the expertise to help organizations build scalable, efficient cloud infrastructures. Leveraging 15 years of expertise in storage, networking, and virtualization, Brocade Global Services delivers world-class professional services, technical support, network monitoring services, and education, enabling organizations to maximize their Brocade investments, accelerate new technology deployments, and optimize the performance of networking infrastructures.

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 6520 Specifications

System Architecture	
Fibre Channel ports	Switch mode (default): 48-, 72-, and 96-port configurations (24-port increments through Ports on Demand [PoD] licenses); E, F, M, D, EX ports
Scalability	Full fabric architecture with a maximum of 239 switches
Certified maximum	6,000 active nodes; 56 switches, 19 hops in Brocade Fabric OS® fabrics; larger fabrics certified as required
Performance	Fibre Channel: 2.125 Gbps line speed, full duplex; 4.25 Gbps line speed, full duplex; 8.5 Gbps line speed, full duplex; 10.53 Gbps line speed, full duplex; 14.025 Gbps line speed, full duplex; auto-sensing of 2, 4, 8, and 16 Gbps port speeds; 10 Gbps 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 Brocade Fabric OS.
Aggregate bandwidth	1,536 Gbps: 96 ports × 16 Gbps data rate
Maximum fabric latency	Latency for locally switched ports is 700 ns; latency between port groups is 2.1 µsec, cut-through routing at 16 Gbps between locally switched groups. Encryption/compression is 5.5 µsec per node; Forward Error Correction (FEC) adds 400 ns between E_Ports (enabled by default).
Maximum frame size	2,112-byte payload
Frame buffers	8,192 dynamically allocated
Classes of service	Class 2, Class 3, Class F (inter-switch frames)
Port types	D_Port (ClearLink Diagnostic Port), E_Port, EX_Port, F_Port, M_Port (Mirror Port); optional port type control
Data traffic types	Fabric switches supporting unicast

Brocade 6520 Specifications *(continued)*

Media types	16 Gbps: Brocade 6520 requires Brocade hot-pluggable SFP+, LC connector; 16 Gbps SWL, LWL, ELWL 10 Gbps: Brocade 6520 requires Brocade hot-pluggable SFP+, LC connector; 10 Gbps SWL, LWL 8 Gbps: Brocade 6520 requires Brocade hot-pluggable SFP+, LC connector; 8 Gbps SWL, LWL, ELWL Fibre Channel distance subject to fiber-optic cable and port speed
USB	One USB port for system log file downloads or firmware upgrades
Fabric services	Monitoring and Alerting Policy Suite (MAPS); Flow Vision; 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; Enhanced Group Management (EGM); FDMI; Frame Redirection; Frame-based Trunking; FSPF; Integrated Routing; 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); Virtual Fabrics (Logical Switch, Logical Fabric)
Extension	Fibre Channel, in-flight compression (Brocade LZO) and encryption (AES-GCM-256); integrated optional 10 Gbps Fibre Channel for DWDM MAN connectivity
Management	
Supported management software	HTTP, SNMP v1/v3 (FE MIB, FC Management MIB), SSH v2; Auditing, Syslog; Brocade Advanced Web Tools; 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, OpenLDAP, Port Binding, RADIUS, TACACS+, User-defined Role-Based Access Control (RBAC), Secure Copy (SCP), Secure RPC, SFTP, SSH v2, SSL, Switch Binding, Trusted Switch
Management access	10/100/1000 Mbps Ethernet (RJ-45), in-band over Fibre Channel, serial port (RJ-45), and one USB port
Diagnostics	ClearLink optics and cable diagnostics, including electrical/optical loopback, link traffic/latency/distance; flow mirroring; built-in flow generator; 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)
Mechanical	
Enclosure	Front-to-back airflow; power from back, 2U Back-to-front airflow; power from back, 2U
Size	Width: 429.25 mm (16.90 in.) Height: 86.74 mm (3.42 in.) Depth: 609.75 mm (24.01 in.)
System weight	16.92 kg (37.3 lb) with two power supply FRUs, without transceivers
Environment	
Operating environment	Temperature: 0°C to 40°C/32°F to 104°F Humidity: 10% to 85% (non-condensing)
Non-operating environment	Temperature: -25°C to 70°C/-13°F to 158°F Humidity: 10% to 90% (non-condensing)
Operating altitude	Up to 3,000 m (9,842 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

Brocade 6520 Specifications *(continued)*

Vibration	Operating: 0.5 g sine, 0.4 grms random, 5 Hz to 500 Hz Non-operating: 2.0 g sine, 1.1 grms random, 5 Hz to 500 Hz
Heat dissipation	96 ports at 1,582 BTU/hr
Airflow	Three hot-swappable, redundant fans; reversible airflow options (front-to-back and back-to-front); maximum 109 CFM (cu. ft./min); nominal 33 CFM
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	464 W with all 96 ports populated with 16 Gbps SWL optics 183 W 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.

Corporate Headquarters
San Jose, CA USA
T: +1-408-333-8000
info@brocade.com

European Headquarters
Geneva, Switzerland
T: +41-22-799-56-40
emea-info@brocade.com

Asia Pacific Headquarters
Singapore
T: +65-6538-4700
apac-info@brocade.com

© 2017 Brocade Communications Systems, Inc. All Rights Reserved. 03/17 GA-DS-1722-05

Brocade, the B-wing symbol, and MyBrocade are registered trademarks of Brocade Communications Systems, Inc., in the United States and in other countries. Other brands, product names, or service names mentioned of Brocade Communications Systems, Inc. are listed at www.brocade.com/en/legal/brocade-Legal-intellectual-property/brocade-legal-trademarks.html. Other marks may belong to third parties.

Notice: This document is for informational purposes only and does not set forth any warranty, expressed or implied, concerning any equipment, equipment feature, or service offered or to be offered by Brocade. Brocade reserves the right to make changes to this document at any time, without notice, and assumes no responsibility for its use. This informational document describes features that may not be currently available. Contact a Brocade sales office for information on feature and product availability. Export of technical data contained in this document may require an export license from the United States government.