DATA SHEET

Brocade 6505 Switch

Flexible, Easy-to-Use Entry-Level SAN Switch for Private Cloud Storage

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 network is key to realizing the full benefits of these cloud-based architectures.

HIGHLIGHTS

• Provides exceptional price/performance value, combining flexibility, simplicity, and enterprise-class functionality in a 24-port, 1U entry-level switch

• Enables fast, easy, and cost-effective scaling from 12 to 24 ports

• 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

• Maximizes resiliency with non-disruptive software upgrades and an optional redundant power supply

The Brocade® 6505 Switch with Gen 5 Fibre Channel provides exceptional price/performance value, combining flexibility, simplicity, and enterprise-class functionality in an entry-level switch. Designed to enable maximum flexibility and reliability, the Brocade 6505 is configurable in 12 or 24 ports and supports 2, 4, 8, or 16 Gbps speeds in an efficiently designed 1U package. It comes standard with a single power supply with integrated fans. A second, optional power supply provides additional redundancy for increased resiliency.

A simplified deployment process and a point-and-click user interface make the Brocade 6505 both powerful and easy to use. Moreover, the Brocade 6505 offers low-cost access to industry-leading Gen 5 Fibre Channel technology while providing "pay-as-you-grow" scalability to meet the needs of an evolving storage environment.

Exceptional Price/Performance for Growing SAN Workloads

The Brocade 6505 combines market-leading throughput with an affordable switch form factor, making it ideal for growing SAN workloads. The 24 ports produce an aggregate 384 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 and available path in the fabric (see Figure 1). It augments Brocade ISL Trunking to provide more effective load balancing in certain configurations.

In addition, the Brocade 6505 provides a low Total Cost of Ownership (TCO) thanks to a 12-port base configuration, easy administration, 1U footprint, and low-energy consumption—0.22 watts

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 6505 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.

per Gbps and 3.3 watts per port. Enterprise-class capabilities combined with a low TCO yield 40 percent higher performance compared to 10 Gigabit Ethernet (GbE) alternatives at a similar cost.

Industry-Leading Technology That Is Flexible, Simple, and Easy to Use

The Brocade 6505 delivers industry-leading Gen 5 Fibre Channel technology within a flexible, simple, and easy-to-use solution. The base configuration includes 12 ports, with up to 24 ports on demand. In addition to providing best-in-class scalability, the Brocade 6505 is easy to deploy with the Brocade EZSwitchSetup wizard and the ClearLink Diagnostic Ports (D_Ports) feature, which simplifies setup.

A Building Block for Virtualized, Private Cloud Storage

The Brocade 6505 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 6505 also supports multi-tenancy in cloud environments through Quality of Service (QoS) and fabric-based zoning features.

The Brocade 6505 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). Brocade 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 Brocade Access Gateway transparent to the SAN fabric, greatly reducing management of the network edge. The Brocade 6505 in Brocade Access Gateway mode* can connect servers to NPIV-enabled Brocade B-Series, Brocade M-Series, and other SAN fabrics.

Organizations can easily enable Brocade Access Gateway mode via Brocade Network Advisor or a CLI. Key benefits of Brocade Access Gateway mode include:

- Improved scalability for large or rapidly growing server and virtual server environments

- Reduced management of the network edge, since Brocade 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

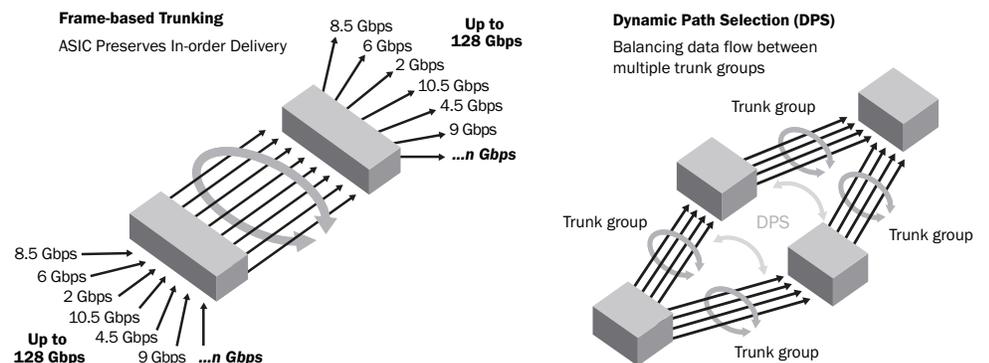## Simplified Management and

Brocade Access Gateway Mode

Frame-based Trunking
ASIC Preserves In-order Delivery
8.5 Gbps
6 Gbps
2 Gbps
10.5 Gbps
4.5 Gbps
9 Gbps
...n Gbps
Up to 128 Gbps

8.5 Gbps
6 Gbps
2 Gbps
10.5 Gbps
4.5 Gbps
9 Gbps
Up to 128 Gbps
...n Gbps

Dynamic Path Selection (DPS)
Balancing data flow between multiple trunk groups
Trunk group
Trunk group
DPS
Trunk group
Trunk group

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

* Brocade Access Gateway mode for the Brocade 6505 is supported only in 24-port configurations.

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.

- **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

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

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 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 6505 SPECIFICATIONS

System Architecture

Fibre Channel ports	**Switch mode (default):** 12- and 24-port configurations (12-port increment through Ports on Demand [PoD] license); E, F, M, D ports **Brocade Access Gateway default port mapping:** 16 F_Ports, 8 N_Ports	Port types	D_Port (ClearLink Diagnostic Port), E_Port, F_Port, M_Port (Mirror Port); optional port type control Brocade Access Gateway mode: F_Port and NPIV-enabled N_Port
Scalability	Full-fabric architecture with a maximum of 239 switches	Data traffic types	Fabric switches supporting unicast
Certified maximum	6,000 active nodes; 56 switches, 19 hops in Brocade Fabric OS® fabrics; larger fabrics certified as required	Media types	**16 Gbps:** Brocade 6505 requires Brocade hot-pluggable SFP+, LC connector; 16 Gbps SWL, LWL, ELWL **8 Gbps:** Brocade 6505 requires Brocade hot-pluggable SFP+, LC connector; 8 Gbps SWL, LWL, ELWL Fibre Channel distance subject to fiber-optic cable and port speed
Performance	Fibre Channel: 2.125 Gbps line speed, full duplex; 4.25 Gbps line speed, full duplex; 8.5 Gbps line speed, full duplex; 14.025 Gbps line speed, full duplex; auto-sensing of 2, 4, 8, and 16 Gbps port speeds		
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.	USB	One USB port for system log file downloads or firmware upgrades
Aggregate bandwidth	384 Gbps end-to-end full duplex	Fabric services Note: Some fabric services do not apply or are unavailable in Brocade Access Gateway mode.	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, peer zoning); Dynamic Fabric Provisioning (DFP); Dynamic Path Selection (DPS); Brocade Extended Fabrics; Enhanced BB credit recovery; 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)
Maximum 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	2,112-byte payload		
Frame buffers	8,192 dynamically allocated		
Classes of service	Class 2, Class 3, Class F (inter-switch frames)		

BROCADE 6505 SPECIFICATIONS (Continued)

Management

Supported management software	HTTP, SNMP v1/v3 (FE MIB, FC Management MIB), SSH; 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	DH-CHAP (between switches and end devices), FCAP switch authentication; 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 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	Back-to-front airflow (port-side exhaust); power from back, 1U
Size	**Width:** 437.64 mm (17.23 in.) **Height:** 43.18 mm (1.7 in.) **Depth:** 443.23 mm (17.45 in.)

System weight	7.82 kg (17.25 lb) with one power supply, without transceivers 9.16 kg (20.19 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 (9,843 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 Hz to 500 Hz **Non-operating:** 2.0 g sine, 1.1 grms random, 5 Hz to 500 Hz
Heat dissipation	24 ports at 338 BTU/hr

Power

Power supply	Base switch includes a single, hot-swappable power supply with integrated system cooling fans. Optional dual redundant hot-swappable power supply.
AC input	85 V to 264 V ~5 A to 2.5 A
Input line frequency	47 Hz to 63 Hz
Power consumption	80 W with all 24 ports populated with 16 Gbps SWL optics 60 W for empty chassis with no optics

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