BROCADE 6505 SWITCH

DATA CENTER

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

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 using Ports on Demand (PoD) capabilities

- Simplifies management through Brocade Fabric Vision technology, reducing operational costs and optimizing application performance

- Simplifies deployment and supports high-performance fabrics by using Brocade ClearLink Diagnostic Ports (D_Ports) to identify optic and cable issues

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

- Simplifies deployment with the Brocade EZSwitchSetup wizard

- Simplifies server connectivity by deploying as a full-fabric switch or a Brocade Access Gateway

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 unleashes the full potential of high-density server virtualization, cloud architectures, and next-generation 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.

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.

BROCADE

Brocade Fabric Vision Technology

Brocade Fabric Vision technology, an extension of Gen 5 Fibre Channel, delivers breakthrough technologies that dramatically simplify SAN deployment and management, drive down costs, and offer unprecedented visibility and insight across the storage network. Key advantages include:

Dramatically reduced costs:

• Automates the deployment of threshold-based rules and policies for proactive monitoring and management, reducing operational costs

• Pre-tests and validates the SAN infrastructure to accelerate deployments and simplify ongoing support

• Eliminates the need for expensive third-party monitoring, diagnostics, and test equipment through built-in flow monitoring, flow mirroring, and traffic generator tools

Maximum infrastructure uptime:

• Provides a customizable dashboard that displays the overall health of the SAN, helping to pinpoint problems faster and enabling trend analysis

• Features critical diagnostic and monitoring capabilities, helping to ensure early problem detection and recovery

• Validates the health, reliability, and performance of the network prior to deployment and for ongoing support, reducing downtime risk

Optimized application performance:

• Provides comprehensive visibility into flows in the fabric, including the ability to automatically learn (discover) flows and non-disruptively monitor flow performance

• Instantly identifies congestion or abnormal levels of latency in the fabric, and identifies exactly which devices and hosts are impacted by the bottleneck

• Provides a customizable performance dashboard with all critical information in one screen to easily identify hot spots and potential network congestion

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 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.

BROCADE ACCESS GATEWAY MODE

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

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

SIMPLIFIED MANAGEMENT AND ROBUST NETWORK ANALYTICS

Brocade Fabric Vision technology, an extension of Brocade Gen 5 Fibre Channel, introduces a breakthrough hardware and software solution that maximizes uptime, simplifies SAN management, and provides unprecedented visibility and insight across the storage network. Offering innovative diagnostic, monitoring, and management capabilities, the Brocade 6505 with Fabric Vision technology helps administrators avoid problems, maximize application performance, and reduce operational costs. Brocade Fabric Vision technology includes:

• **Flow Vision:** Enables administrators to identify, monitor, and analyze specific application and data flows in order to maximize performance, avoid congestion, and optimize resources. Flow Vision includes:

  – **Flow Monitor:** Provides comprehensive visibility into flows in the fabric, including the ability to automatically learn (discover) flows and non-disruptively monitor flow performance. Organizations 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. They also can perform LUN-level monitoring of specific frame types to identify resource contention or congestion that is impacting application performance.

  – **Flow Mirror:** Provides the ability to non-disruptively create copies of specific application and data flows or frame types that can be captured for deeper analysis.

  – **Flow Generator:** Provides a built-in test traffic generator for pre-testing and validating the SAN infrastructure—including verification of routes and integrity of optics, cables, ports, and ISLs—for robustness before deploying applications.

• **Monitoring and Alerting Policy Suite (MAPS):** Simplifies fabric-wide threshold configuration and monitoring. MAPS allows organizations to leverage pre-built rule/policy-based templates. The result is a simple, two-step process for applying thresholds and alerts to ports and switches. Organizations 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—all through a single dialog. The integrated dashboard displays an overall switch health report, along with details on out-of-policy conditions, to help administrators quickly pinpoint potential issues and easily identify trends and other behaviors occurring on a switch or fabric.

Figure 1.

Dynamic Path Selection (DPS) augments Brocade ISL Trunking to route data efficiently between multiple trunk groups.
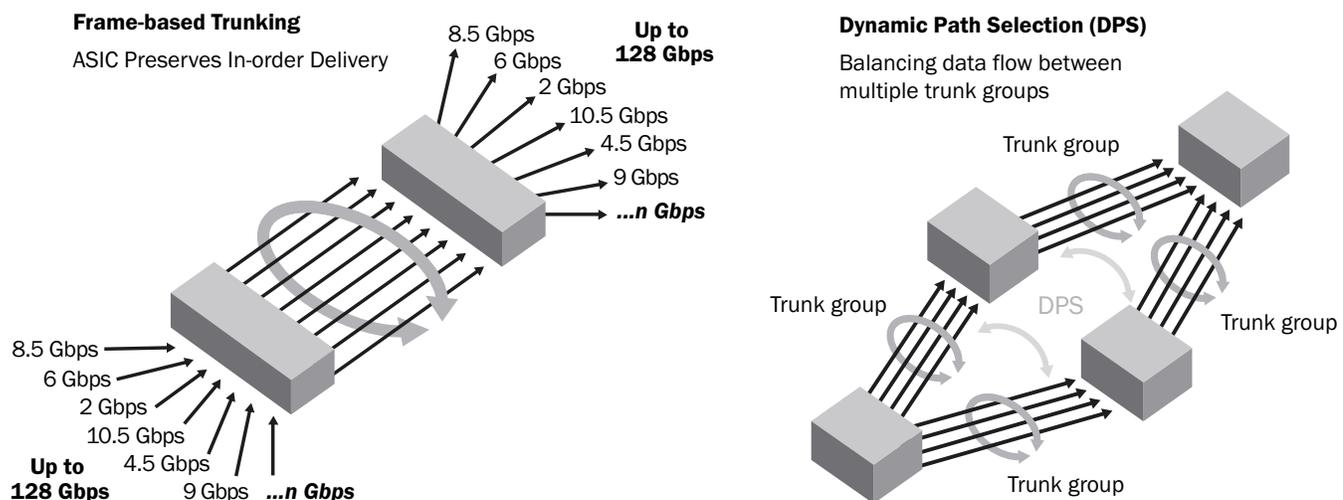
- **Brocade ClearLink Diagnostics:** Ensures optical and signal integrity for Gen 5 Fibre Channel optics and cables, simplifying deployment and support of high-performance fabrics. It leverages ClearLink Diagnostic Port (D_Port) capabilities of Gen 5 Fibre Channel platforms.

- **Bottleneck Detection:** Identifies and alerts administrators to device or ISL congestion as well as abnormal levels of latency in the fabric. This feature works in conjunction with Brocade Network Advisor to automatically monitor and detect network congestion and latency in the fabric, providing visualization of bottlenecks in a connectivity map and product tree, and identifying exactly which devices and hosts are impacted by a bottlenecked port.

- **Integration into Brocade Network Advisor:** Provides customizable health and performance dashboard views to pinpoint problems faster, simplify SAN configuration and management, and reduce operational costs.

- **Critical diagnostic and monitoring capabilities:** Help ensure early problem detection and recovery.

- **Non-intrusive and non-disruptive monitoring on every port:** Provides an end-to-end view of the entire fabric using capabilities integrated into the hardware. This allows sophisticated monitoring without imposing an additional burden on switches with frequent polling activity.

- **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.

- **Real-time bandwidth consumption by hosts/applications on ISLs:** Helps easily identify hot spots and potential network congestion.

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
Scalability	Full-fabric architecture with a maximum of 239 switches
Certified maximum	6000 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; 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.
Aggregate bandwidth	384 Gbps end-to-end full duplex
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	2112 byte payload
Frame buffers	8192 dynamically allocated
Classes of service	Class 2, Class 3, Class F (inter-switch frames)
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

Data traffic types	Fabric switches supporting unicast
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
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.*	Monitoring and Alerting Policy Suite (MAPS); Flow Vision; 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)

BROCADE 6505 SPECIFICATIONS (CONTINUED)

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	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 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 3000 m (9843 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

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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