

# BROCADE 6520 SWITCH

## DATA CENTER

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

### HIGHLIGHTS

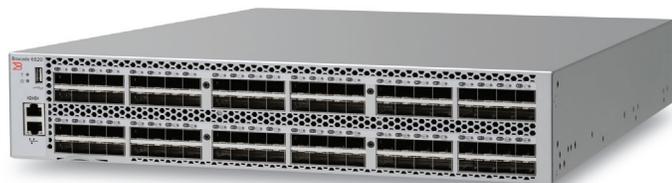
- Provides high scalability in an ultra-dense 96-port switch to support highly virtualized, private cloud storage and data center consolidation
- Enables “pay-as-you-grow” flexibility from 48 to 96 ports using Ports on Demand (PoD) capabilities with speeds up to 16 Gbps
- Provides up to eight in-flight encryption and compression ports, delivering data center-to-data center security and bandwidth savings
- Optimizes link and bandwidth utilization with Brocade ISL Trunking and Dynamic Path Selection (DPS)
- Helps maximize application uptime and performance while reducing overall operational expenses with D\_Ports
- Accelerates deployment and troubleshooting with Dynamic Fabric Provisioning (DFP), monitoring, and advanced diagnostics
- Simplifies and centralizes management through Brocade Network Advisor, reducing operational costs and complexity

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

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 (16 Gbps) technology and capabilities. The Brocade 6520 is a high-density, purpose-built, foundational building block for large and growing Storage Area Network (SAN) infrastructures.



# BROCADE

It provides industry-leading scalability, reliability, and 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.

### 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.

### ENTERPRISE-CLASS RELIABILITY, AVAILABILITY, AND SERVICEABILITY

The Brocade 6520 leverages proven enterprise-class Gen 5 Fibre Channel technology to deliver unmatched reliability to support non-stop operations for mission-critical workloads. It features advanced

monitoring, diagnostics, and RAS capabilities to maximize availability, optimize performance, and simplify administration. These enterprise-class features include:

- Critical diagnostic and monitoring capabilities to help ensure early problem detection and recovery
- Non-intrusive and non-disruptive monitoring on every port to provide a comprehensive end-to-end view of the entire fabric
- Forward Error Correction (FEC) to recover from bit errors on links, enhancing transmission reliability and performance
- Additional buffers to overcome performance degradation and congestion due to buffer credit loss
- Monitoring of real-time bandwidth consumption by hosts/applications on Inter-Switch Links (ISLs) to easily identify hot spots and potential network congestion

### 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 1536 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 DEPLOYMENT AND CENTRALIZED MANAGEMENT

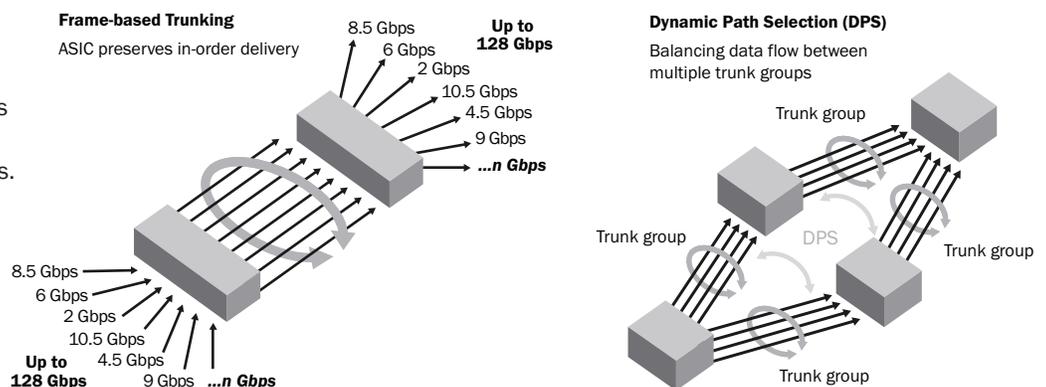
Automating and simplifying SAN management enables data centers to quickly adapt to change and overcome disruptions in a private cloud infrastructure. Brocade 6520 advanced diagnostics, monitoring, and management reduce end-to-end SAN management complexity and costs.

The Brocade 6520 helps reduce operating costs through simplified server provisioning and change management, advanced cable and optics diagnostics, and comprehensive management. Several technologies support these capabilities, including:

- **Dynamic Fabric Provisioning (DFP):** Combines Brocade switch and adapter technology to reduce or eliminate the need to reconfigure zoning and Logical Unit Number (LUN) masking when adding or replacing servers.
- **Diagnostic Ports (D\_Ports):** Help identify and isolate optics and cable problems, reducing fabric deployment and diagnostic times.
- **Brocade Network Advisor:** Provides comprehensive management of data center fabrics, including configuration, monitoring, and management of Brocade backbones, switches, and adapters.

Figure 1.

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



## 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](http://www.brocade.com).

## ACCELERATING FABRIC DEPLOYMENT WITH DIAGNOSTIC PORTS

Diagnostic Ports (D\_Ports) are a 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 combines Brocade switch and adapter technology to reduce or eliminate the need to modify zoning or Logical Unit Number (LUN) masking when replacing a server (or an HBA). In addition, DFP enables pre-provisioning of virtual WWNs, helping organizations eliminate time-consuming steps when deploying new equipment.

## BROCADE 6520 SPECIFICATIONS

| System Architecture |  | Port types         | D_Port (Diagnostic Port), E_Port, EX_Port, F_Port, M_Port (Mirror Port); optional port type control  |
|---------------------|--|--------------------|--|
| 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  | Data traffic types | Fabric switches supporting unicast   |
| Scalability         | Full fabric architecture with a maximum of 239 switches  | Media types        | <b>16 Gbps:</b> Brocade 6520 requires Brocade hot-pluggable SFP+, LC connector; 16 Gbps SWL, LWL, ELWL<br><b>10 Gbps:</b> Brocade 6520 requires Brocade hot-pluggable SFP+, LC connector; 10 Gbps SWL, LWL<br><b>8 Gbps:</b> Brocade 6520 requires Brocade hot-pluggable SFP+, LC connector; 8 Gbps SWL, LWL, ELWL<br>Fibre Channel distance subject to fiber-optic cable and port speed   |
| Certified maximum   | 6000 active nodes; 56 switches, 19 hops in Brocade Fabric OS® fabrics; larger fabrics certified as required  | USB                | One USB port for system log file downloads or firmware upgrades  |
| 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 and optionally programmable to fixed port speed | Fabric services    | 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); Brocade Extended Fabrics; Enhanced BB credit recovery; Enhanced Group Management (EGM); Brocade Fabric Watch; 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) |
| 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 | 1536 Gbps: 96 ports × 16 Gbps data rate  |                    |  |
| 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.<br>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)  |                    |  |

**BROCADE 6520 SPECIFICATIONS (CONTINUED)**

|                               |  |
|-------------------------------|--|
| Extension                     | Fibre Channel, in-flight compression (Brocade LZO) and encryption (AES-GCM-256); integrated optional 10 Gbps Fibre Channel for DWDM MAN connectivity   |
| <b>Management</b>             |  |
| Supported management software | HTTP, SNMP v1/v3 (FE MIB, FC Management MIB), SSH v2; 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, 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                   | 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, optics health monitoring, power monitoring, RAStrace logging, and Rolling Reboot Detection (RRD) |
| <b>Mechanical</b>             |  |
| Enclosure                     | Front-to-back airflow; power from back, 2U<br>Back-to-front airflow; power from back, 2U   |
| Size                          | Width: 429.25 mm (16.90 in.)<br>Height: 86.74 mm (3.42 in.)<br>Depth: 609.75 mm (24.01 in.)  |
| System weight                 | 16.92 kg (37.3 lb) with two power supply FRUs, without transceivers  |

|                           |  |
|---------------------------|--|
| <b>Environment</b>        |  |
| Operating environment     | Temperature: 0° C to 40° C/32° F to 104° F<br>Humidity: 10% to 85% (non-condensing)  |
| Non-operating environment | Temperature: -25° C to 70° C/-13° F to 158° F<br>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<br>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<br>Non-operating: 2.0 g sine, 1.1 grms random, 5 Hz to 500 Hz                             |
| Heat dissipation          | 96 ports at 1582 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 |
| <b>Power</b>              |  |
| 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         | 450 W with all 96 ports populated with 16 Gbps SWL optics<br>350 W for empty chassis with no optics  |

For information about supported SAN standards, visit [www.brocade.com/sanstandards](http://www.brocade.com/sanstandards).

For information about switch and device interoperability, visit [www.brocade.com/interoperability](http://www.brocade.com/interoperability).

For information about hardware regulatory compliance, visit [www.brocade.com/regulatorycompliance](http://www.brocade.com/regulatorycompliance).

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