BROCADE VDX 6720 DATA CENTER SWITCH

DATA CENTER

Revolutionizing the Way Data Center Networks Are Built

HIGHLIGHTS

- Simplifies network architectures and enables cloud computing by delivering Brocade VCS technology
- Maximizes performance through wire-speed ports with 600 nanosecond port-to-port latency and hardware-based Inter-Switch Link (ISL) Trunking
- Provides multi-homed active-active server connections for Ethernet networks
- Creates scale-out Ethernet fabrics for virtualized data centers
- Provides Ethernet storage connectivity for Fibre Channel over Ethernet (FCoE), iSCSI, and NAS
- Simplifies management by maintaining network policies as Virtual Machines (VM) move throughout the data center with Automatic Migration of Port Profiles (AMPP)
- Provides dynamic configuration and secure communication to VMware vCenter via Brocade VM-aware network automation

The Brocade One™ strategy helps simplify networking infrastructures through innovative technologies and solutions. Brocade VDX 6720 Data Center Switches support this strategy by simplifying network architecture while increasing network performance and resiliency with Ethernet fabrics.

Seeking better ways to build clouds and virtualized data centers, today's IT organizations are turning to high-performance networking solutions that increase flexibility through leading-edge technologies. Brocade® VDX™ Data Center Switches are specifically designed to improve network utilization, maximize application availability, increase scalability, and dramatically simplify network architecture in virtualized data centers. Brocade VDX Data Center Switches with Brocade VCS™ fabric technology enable organizations to build data center Ethernet fabrics—revolutionizing the design of Layer 2 networks and providing an intelligent foundation for cloud computing.

Whether organizations want to enhance their classic hierarchical network architectures or deploy flatter scale-out fabrics for virtualized data centers, the Brocade VDX family delivers the innovative technology to enhance and simplify their networks. Without disrupting classic Ethernet architectures, Brocade VCS technology enables organizations to preserve existing network designs and cabling, and to gain active-active server connections without employing Spanning Tree Protocol (STP). For scale-out fabric architectures, Brocade VCS technology allows organizations to flatten network designs, provide Virtual Machine (VM) mobility without network reconfiguration, and manage the entire fabric more efficiently.

BROCADE

INVESTMENT PROTECTION AND UNMATCHED SIMPLICITY

Brocade VDX Data Center Switches provide a flexible choice for building an Ethernet fabric. Organizations can start with two switches, then scale to add switches as demand increases. IT managers also can mix and match 1 Gigabit Ethernet (GbE) and 10 GbE fixed switches in the fabric, using the Brocade VDX 6710 for cost-effective 1 GbE and the Brocade VDX 6720 and Brocade VDX 6730 for high-bandwidth 10 GbE connectivity.

The Brocade VDX switch portfolio provides Ethernet storage connectivity for Fibre Channel over Ethernet (FCoE), iSCSI, and NAS storage solutions on a single product family. IT organizations can protect their Fibre Channel investments by connecting Fibre Channel Storage Area Networks (SANs) to Ethernet fabrics with the new Brocade VDX 6730 switch.

Proactive Monitoring

Brocade Fabric Watch is an innovative switch health monitoring feature available on the Brocade VDX Data Center Switch with Brocade Network OS 2.1. Fabric Watch monitors the health of certain switch components and, based on the threshold set, declares each component as marginal or down. Monitored components can include fans, power supplies, temperature sensors, compact flash cards, WWN cards, ports missing Single Form-Factor Pluggables (SFPs), and faulty ports. Once a component is declared marginal or down, Fabric Watch notifies users via a system-log message, e-mail, or both mechanisms.

ENABLING CLOUD-OPTIMIZED NETWORKING

Available in models with 16, 24, 40, 50, and 60 ports, these data center switches are designed to exceed the requirements of emerging cloud computing architectures. A new hardware design, combined with Brocade Network OS, supports higher-performance networks, greater network utilization, and added flexibility for the entire data center. These capabilities are critical for scaling out virtual server environments that require seamless movement, addition, and removal of application resources.

Maximum Performance

To support mission-critical environments, the Brocade VDX 6720 delivers wire-speed 10 GbE performance across all ports, with port-to-port latency as low as 600 nanoseconds—making it one of the fastest Ethernet switches available.

For maximum performance within the fabric, Brocade hardware-based Inter-Switch Link (ISL) Trunking is automatically used between switches. Up to eight links can be included in a trunk group, for up to 80 Gbps of balanced throughput. This feature uses links very efficiently to increase the number of usable switch ports for greater device connectivity.

Configuration Flexibility

The Brocade VDX 6720 is also designed for maximum flexibility. Each port supports both 10 GbE and 1 GbE connections, providing the bandwidth needed for new servers while supporting existing servers. In addition, multiple cabling options are available, enabling a more cost-efficient network design. For example, organizations can use direct-attached copper cables for server connections within the rack, direct-attached optical cables for switch-to-switch fabric connections, and optics and fiber-optic cabling for uplinks to the network core.

Ports on Demand (PoD) capabilities are available for fast, easy, and cost-effective scalability, with switch models ranging from 16 to 60 ports. Organizations can purchase only the number of ports that they currently need and seamlessly scale up later by simply applying a software license.

To support modern, high-density server designs, the 24- and 60-port models have switch depths of only 15 and 17 inches, respectively. With reversible front-to-rear or rear-to-front airflow, the Brocade VDX 6720 also supports high-density server racks that have specific airflow requirements and are designed to leverage advanced cooling technologies and optimize utilization of floor space.

BROCADE VCS TECHNOLOGY

Brocade VCS technology allows IT organizations to create efficient data center networks that just work. Ethernet fabric architectures built on Brocade VCS technology share information across nodes, greatly simplifying management and reducing operational overhead. Brocade VCS technology offers unmatched VM awareness and automation versus traditional architectures and competitive fabric solutions, and supports storage over a unified fabric.

Only Brocade VCS technology, backed by a heritage of proven fabric innovations, delivers IT agility and assures reliability, with a cost-effective point of entry to allow IT organizations to transition gracefully to elastic, highly automated, mission-critical networks in their virtualized data centers.

Brocade VCS technology is embedded in the Brocade VDX Data Center Switch portfolio. Using Brocade VDX Data Center Switches, today's IT organizations can build Ethernet fabrics to support cloud-optimized networking and greater enterprise agility.

Learn more about Brocade VCS technology at www.brocade.com/vcs.

Network Virtualization

Brocade VCS technology offers features to support a virtualized server and storage environment. During a VM migration, network switch ports must be dynamically configured to ensure that the VM traffic experiences consistent policies and configurations. Brocade Automatic Migration of Port Profiles (AMPP) enables such a seamless migration. Port profiles and MAC address mapping are created on any switch in the fabric. The mapping provides the logical flow for traffic from the source port to the destination port. As a VM migrates, the destination port in the fabric learns of the MAC move and automatically activates the port profile configuration.

Brocade VM-aware network automation provides secure connectivity and full visibility to virtualized resources with dynamic learning and activation of port

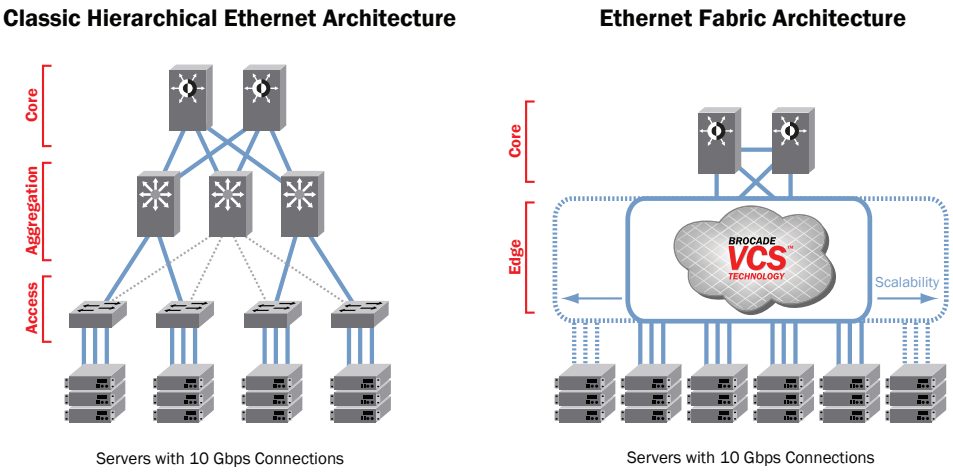

Figure 1.
Compared to classic Ethernet architectures, Ethernet fabrics allow all paths to be active and provide greater scalability—while reducing management complexity.

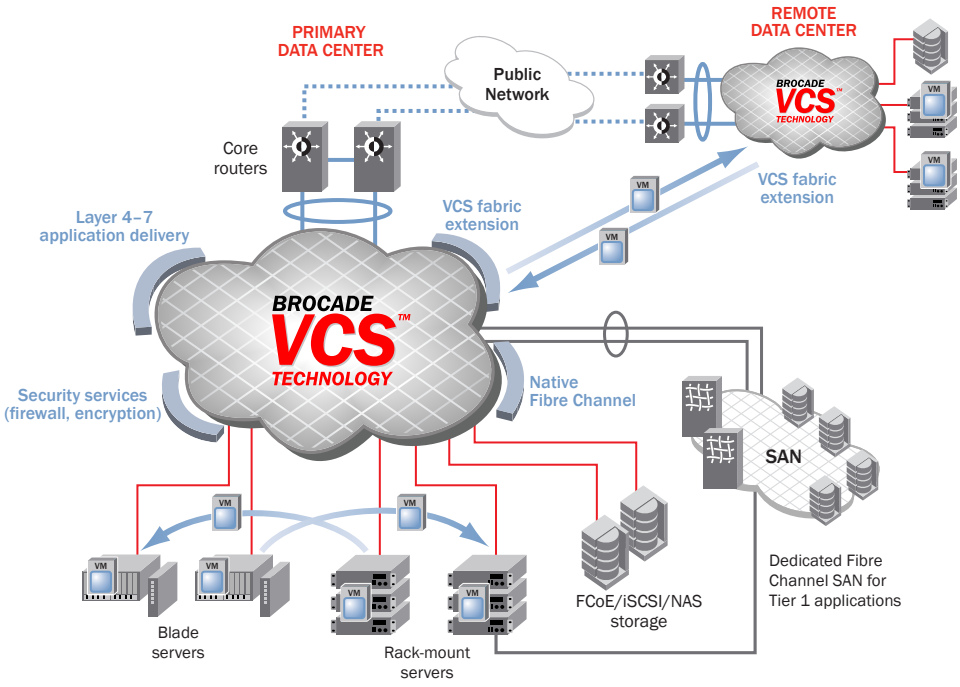

Figure 2.
Brocade VCS technology simplifies the network architecture, enables unified storage connectivity, improves VM mobility, and allows the seamless insertion of services.

WHAT IS AN ETHERNET FABRIC?

Compared to classic hierarchical Ethernet architectures, Ethernet fabrics provide higher levels of performance, utilization, availability, and simplicity. They are designed to be:

- **Flatter:** Eliminates the need for Spanning Tree Protocol (STP), while being completely interoperable with existing Ethernet networks
- **Flexible:** Can be architected in any topology to best meet the needs of any variety of workloads
- **Resilient:** Uses multiple "least cost" paths for high performance and high reliability
- **Elastic:** Scales easily up and down as needed

More advanced Ethernet fabrics borrow further from Fibre Channel fabric constructs:

- They are self-forming and function as a single logical entity, in which all switches automatically know about each other and all connected physical and logical devices.
- Management can then be domain-based rather than device-based, and defined by policy rather than repetitive procedures.
- These features, along with virtualization-specific enhancements, make it easier to explicitly address the challenges of VM automation within the network, thereby facilitating better IT automation.

Protocol convergence, such as Fibre Channel over Ethernet (FCoE), may also be a feature, intended as a means of better bridging LAN and Storage Area Network (SAN) traffic.

Learn more about Ethernet fabrics at www.brocade.com/ethernet-fabric.

profiles. By communicating directly with VMware vCenter, VM-aware network automation eliminates manual configuration of port profiles and supports VM mobility across VCS fabrics while providing protection against VM MAC spoofing. AMPP and VM-aware network automation features enable organizations to fully align virtual server and network infrastructure resources, and realize the full benefits of server virtualization.

COMPREHENSIVE LAYER 2 LAN CAPABILITIES

In addition to Brocade VCS fabric technology, the Brocade VDX 6720 includes a rich set of traditional Layer 2 Ethernet protocols and features. When communicating to the rest of the network, it uses protocols such as Link Aggregation Control Protocol (LACP) and 802.1Q.

The Brocade VDX 6720 is also ready for IPv4/IPv6 Layer 3 routing capabilities that can be implemented in a future Brocade Network OS release.

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, and education services, enabling organizations to maximize their Brocade investments, accelerate new technology deployments, and optimize the performance of networking infrastructures.

CLOUD-OPTIMIZED NETWORK ACQUISITION

Brocade helps organizations easily address their information technology requirements by offering flexible network acquisition and support alternatives to meet their financial needs. Organizations can select from purchase, lease, and Brocade Network Subscription options to align network acquisition with their unique capital requirements and risk profiles.

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 VDX 6720 FEATURE OVERVIEW

	Brocade VDX 6720-24	Brocade VDX 6720-60
Switching bandwidth (data rate, full duplex)	480 Gbps	1200 Gbps
Port-to-port latency	600 ns	600 ns within 10-port group
Form factor	1U	2U
Dimensions and weight	Width: 42.88 cm (16.88 in.) Height: 4.32 cm (1.70 in.) Depth: 38.10 cm (15.00 in.) Weight: 7.30 kg (16.10 lb)	Width: 42.88 cm (16.88 in.) Height: 8.89 cm (3.50 in.) Depth: 43.18 cm (17.00 in.) Weight: 15.88 kg (35.00 lb)
1/10 GbE SFP+ ports	24	60
Ports on Demand (PoD) increments	16, 24	40, 50, 60
Power supplies	Two hot-swappable, load-sharing	Two hot-swappable, load-sharing
Cooling fans	N+1 redundant, integrated into power supplies	N+1 redundant, three hot-swappable fan units

BROCADE VDX 6720 SPECIFICATIONS

System architecture	
Connector options	10 Gbps SFP+ options: 1/3/5 m direct-attached copper (Twinax), SR, LR 1 Gbps SFP options: TX Out-of-band Ethernet management: RJ-45 (fixed) Out-of-band remote lights out management: RJ-45 (fixed) Console management: RJ-45 to RS-232 (fixed) Firmware and diagnostic: USB
Maximum MAC addresses	32,000
Maximum VLANs	4096
Maximum Spanning Tree instances	32
Maximum multicast groups	256
Link aggregation	Maximum ports per group: 16 Maximum groups: 64
ISL Trunking	Maximum ports per trunk: 8
Maximum jumbo frame size	9208 bytes
Queues per port	8
DCB Priority Flow Control (PFC) classes	8

System architecture (continued)		
Operating system	Brocade Network OS	
Layer 2 switching features	• MAC Learning and Aging • Static MAC Configuration • Link Aggregation Control Protocol (LACP) 802.3ad/802.1AX • Virtual Local Area Networks (VLANs) • VLAN Encapsulation 802.1Q • Rapid Spanning Tree Protocol (RSTP) 802.1D • Multiple Spanning Tree Protocol (MSTP) 802.1s • Per-VLAN Spanning Tree (PVST+/PVRST+)	• STP PortFast and PortFast BDPU Guard • STP Root Guard • Layer 2 Access Control Lists (ACLs) • Address Resolution Protocol (ARP) RFC 826 • IGMP v1/v2 Snooping • Pause Frames 802.3x
Brocade VCS features	• Automatic Fabric Formation • Distributed Fabric Services • Transparent LAN Services • Virtual Link Aggregation Group (vLAG) spanning multiple physical switches • Switch Beaconing	• Distributed Configuration Management • Transparent Interconnection of Lots of Links (TRILL) • Equal Cost Multi-Path (ECMP) • Automatic Migration of Port Profiles (AMPP) • VM-aware network automation
DCB features	• Priority-based Flow Control (PFC) 802.1Qbb • Enhanced Transmission Selection (ETS) 802.1Qaz	• Data Center Bridging eXchange (DCBX) • DCBX Application Type-Length-Value (TLV) for FCoE and iSCSI
FCoE features	• Multihop Fibre Channel over Ethernet (FCoE); requires Brocade VCS technology • FC-BB5 compliant Fibre Channel Forwarder (FCF) • Native FCoE forwarding	• End-to-end FCoE (initiator to target) • FCoE Initialization Protocol (FIP) v1 support for FCoE devices login and initialization
Quality of Service (QoS)	• Eight priority levels for QoS • Class of Service (CoS) 802.1p	• Per-port QoS configuration • Scheduling: Strict Priority (SP), Shaped Deficit Weighted Round-Robin (SDWRR)
Switch health monitoring	• Fabric Watch monitoring and notification	
Management		
Management and control	• IPv4/IPv6 management • Industry-standard Command Line Interface (CLI) • Remote lights out management (future update) • In-band management • Link Layer Discovery Protocol (LLDP) 802.1AB	• Switched Port Analyzer (SPAN) • Telnet • SNMP v1/v2 • sFlow RFC 3176
Security	• Port-based Network Access Control 802.1X • RADIUS • TACACS+ • Secure Shell (SSHv2)	
Mechanical		
Enclosure	Front-to-rear, rear-to-front airflow; 1U, 19-inch EIA-compliant; power from non-port side	
Environmental		
Temperature	Operating: 0°C to 40°C (32°F to 104°F) Non-operating and storage: –25°C to 70°C (–13°F to 158°F)	
Humidity	Operating: 10% to 85% non-condensing Non-operating and storage: 10% to 90% non-condensing	
Altitude	Operating: Up to 3000 meters (9842 feet) Non-operating and storage: Up to 12 kilometers (39,370 feet)	
Shock	Operating: 20 g, 6 ms half-sine Non-operating and storage: 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 and storage: 2.0 g sine, 1.1 grms random, 5 to 500 Hz	
Airflow	Brocade VDX 6720-24 Maximum: 53 CFM Nominal: 35 CFM Brocade VDX 6720-60 Maximum: 115 CFM Nominal: 76 CFM	
Heat dissipation	417.7 BTU/hr (24-port switch); 1037 BTU/hr (60-port switch)	

Power	
Power supplies	Two internal, redundant, field-replaceable, load-sharing AC power supplies
Power inlet	C13
Input voltage	85 to 256 VAC nominal
Input line frequency	47 to 63 Hz
Inrush current	50 amps max
Maximum current	4 amps max (24-port switch); 7 amps max (60-port switch)
Maximum power consumption	146.2 watts (24-port switch); 360.0 watts (60-port switch)

Safety Compliance

- UL 60950-1 Second Edition
- CAN/CSA-C22.2 No. 60950-1 Second Edition
- EN 60950-1 Second Edition
- IEC 60950-1 Second Edition
- AS/NZS 60950-1
- GB4943
- GB9254

Electromagnetic Emission

- 47CFR Part 15 (CFR 47) Class A
- AS/NZS CISPR22 Class A
- CISPR22 Class A
- EN55022 Class A
- ICES003 Class A
- VCCI Class A
- EN61000-3-2
- EN61000-3-3
- KN22 Class A

Immunity

- EN55024
- CISPR24
- EN300386
- KN 61000-4 series

Environmental Regulatory Compliance

- RoHS-6 (with lead exemption) Directive 2002/95/EC

Standards Compliance

The Brocade VDX 6720 products conform to the following Ethernet standards:

- IEEE 802.1D Spanning Tree Protocol
- IEEE 802.1s Multiple Spanning Tree
- IEEE 802.1w Rapid reconfiguration of Spanning Tree Protocol
- IEEE 802.3ad Link Aggregation with LACP
- IEEE 802.3ae 10G Ethernet
- IEEE 802.1Q VLAN Tagging
- IEEE 802.1p Class of Service Prioritization and Tagging
- IEEE 802.1v VLAN Classification by Protocol and Port
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- IEEE 802.3x Flow Control (Pause Frames)

The following draft versions of the Data Center Bridging (DCB) and Fibre Channel over Ethernet (FCoE) standards are also supported on the Brocade VDX 6720:

- IEEE 802.1Qbb Priority-based Flow Control
- IEEE 802.1Qaz Enhanced Transmission Selection
- IEEE 802.1 DCB Capability Exchange Protocol (Proposed under the DCB Task Group of IEEE 802.1 Working Group)
- FC-BB-5 FCoE (Rev 2.0)

BROCADE VDX 6720 ORDERING INFORMATION

SKU	Description	Comments
BR-VDX6720-16-F	Brocade VDX 6720, 16P SFP+, AC, non-port side exhaust airflow	Base SKU
BR-VDX6720-16-R	Brocade VDX 6720, 16P SFP+, AC, port side exhaust airflow	Base SKU
BR-VDX6720-24-F	Brocade VDX 6720, 24P SFP+, AC, non-port side exhaust airflow	Base SKU
BR-VDX6720-24-R	Brocade VDX 6720, 24P SFP+, AC, port side exhaust airflow	Base SKU
BR-VDX6720-40-F	Brocade VDX 6720, 40P SFP+, AC, non-port side exhaust airflow	Base SKU
BR-VDX6720-40-R	Brocade VDX 6720, 40P SFP+, AC, port side exhaust airflow	Base SKU
BR-VDX6720-60-F	Brocade VDX 6720, 60P SFP+, AC, non-port side exhaust airflow	Base SKU
BR-VDX6720-60-R	Brocade VDX 6720, 60P SFP+, AC, port side exhaust airflow	Base SKU
BR-VDX6720-24POD-01	8-port PoD license for Brocade VDX 6720-32	Software orderable
BR-VDX6720-60POD-01	10-port PoD license for Brocade VDX 6720-76	Software orderable
BR-VDX6720-24VCS-01	VCS software license for Brocade VDX 6720-16, Brocade VDX 6720-24	Software orderable
BR-VDX6720-60VCS-01	VCS software license for Brocade VDX 6720-40, Brocade VDX 6720-60	Software orderable
XBR-250WPSAC-F	FRU 250W ACPS/FAN, non-port side exhaust airflow	FRU
BR-VDX 6720-24FCOE-01	FCoE software license for 16- and 24-port SKU	Software orderable
BR-VDX 6720-60FCOE-01	FCoE software license for 40- and 60-port SKU	Software orderable
XBR-250WPSAC-R	FRU 250W ACPS/FAN, port side exhaust airflow	FRU
XBR-250WPSAC-F	FRU 250W ACPS/FAN, non-port side exhaust airflow	FRU
XBR-500WPSAC-R	FRU 500W ACPS, port side exhaust airflow	FRU
XBR-500WPSAC-F	FRU 500W ACPS, non-port side exhaust airflow	FRU
XBR-FAN-80-F	FRU FAN, 80MM, non-port side exhaust airflow	FRU
XBR-FAN-80-R	FRU FAN, 80MM, port side exhaust airflow	FRU
RPS9	500 W AC power supply with integrated fan with rear-to-front airflow for 40- and 60-port Brocade VDX 6720	FRU

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