BROCADE VDX 6710 SWITCH

DATA CENTER

Revolutionizing the Way Data Center Networks Are Built

HIGHLIGHTS

- Supports existing 1 Gigabit Ethernet (GbE) data center server connectivity

- Maximizes performance through 48 wire-speed 1 GbE ports with 600 nanosecond port-to-port latency and hardware-based Inter-Switch Link (ISL) trunking

- Simplifies network architectures and enables cloud computing by delivering Brocade VCS Fabric technology

- Simplifies networking infrastructure by eliminating STP and providing multi-homed active-active server connections for Ethernet networks

- Simplifies virtualized server management by providing Virtual Machine (VM) mobility with dynamic server profile configuration and migration

- Provides efficiently load-balanced multipathing at Layers 1, 2, and 3, with multiple Layer 3 gateways

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. The Brocade® VDX® 6710 Switch is a high-performance 1 Gigabit Ethernet (GbE) fixed configuration switch that provides a reliable, scalable, and flexible foundation for supporting the most demanding business applications. It features 48 1 GbE copper interfaces and six 10 GbE SFP+ interfaces, making the Brocade VDX 6710 with Brocade VCS® Fabric technology an ideal platform for Top-of-Rack (ToR) fabric deployments in existing 1 GbE server environments (see Figure 1).

AN INTELLIGENT FOUNDATION FOR CLOUD COMPUTING

Brocade VCS Fabric technology is an innovative technology that enables organizations to build high-performance, cloud-optimized data centers while preserving existing network designs and cabling, and gaining active-active server connections. For scale-out fabric architectures, Brocade VCS Fabric technology allows organizations to flatten network designs, provide Virtual Machine (VM) mobility without network reconfiguration, and manage the entire fabric more efficiently. Learn more about Brocade VCS Fabric technology at www.brocade.com/vcs.

The Brocade One® strategy helps simplify networking infrastructures through innovative technologies and solutions. Brocade VDX 6710 Switches support this strategy by simplifying network architecture while increasing network performance and resiliency with Ethernet fabrics.

BROCADE

Unique VCS Fabric Features for High-Performance Data Centers

The Brocade VDX 6710 with Brocade VCS Fabric technology provides the following unique features for building access-layer fabrics optimized for the needs of modern workloads:

- **Elastic, self-healing fabrics:** Brocade VCS fabrics are self-forming and self-healing, providing a highly resilient, operationally scalable foundation for very large or dynamic cloud deployments. Multi-node fabrics can be managed as a single logical element, and fabrics can be deployed and easily re-deployed in a variety of configurations optimized to the needs of particular workloads.

- **Efficient multipathing across Layers 1-3:** With Network OS 3.0, Brocade VCS Fabric technology delivers efficiently load-balanced multipathing at Layers 1-3, with multiple Layer 3 gateways. The result is very elastic Layer 2 and Layer 3 domains with more effective link utilization and, ultimately, a more flexible, agile network that helps organizations rapidly adapt to changing business conditions.

- **Lowest power consumption:** The Brocade VDX 6710 provides the industry's lowest power consumption in a port-dense, 1U form factor—imperative in today's data centers.

- **Scale-out solution for virtualized data centers:** VCS fabrics enable dynamic, large-scale server virtualization deployments in private and public clouds with proven zero-touch VM discovery, network configuration, and VM mobility.

- **Local switching:** The Brocade VDX 6710 delivers high performance for intra-rack traffic in virtualized environments, providing ultra-low latency of 600 nanoseconds for the same ASIC on the switch. This helps organizations design a network with no oversubscription for deterministic network performance and improved application response times, making the Brocade VDX 6710 ideal for performance-demanding environments.

ETHERNET STORAGE CONNECTIVITY

The Brocade VDX 6710 connects to iSCSI and NAS storage[1], and simplifies virtualization server management.

Server and Storage Virtualization Automation Support

Brocade VCS Fabric technology offers unique features to support virtualized server and storage environments. Brocade VM-aware network automation, for example, provides secure connectivity and full visibility to virtualized server resources with dynamic learning and activation of port profiles. By communicating directly with VMware vCenter, it eliminates manual configuration of port profiles and supports VM mobility across VCS fabrics within a data center.

During a VM migration, network switch ports must be dynamically configured to ensure that the VM traffic experiences consistent policies and configurations (see Figure 2). The Brocade Automatic Migration of Port Profiles (AMPP) feature enables a seamless migration. Port profiles and MAC address mapping are created on any switch in the fabric. This 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.

In addition to providing protection against VM MAC spoofing, VM-aware network automation and AMPP enable organizations to fully align virtual server and network infrastructure resources and management, and realize the full benefits of server virtualization.

PROACTIVE MONITORING

Brocade Fabric Watch is an innovative switch health monitoring feature available on the Brocade VDX 6710. Fabric Watch monitors the health of certain switch components and, based on the threshold set, declares each component as marginal or down.

EASE OF USE AUGMENTED BY BROCADE NETWORK ADVISOR

Brocade Network Advisor is an easy-to-use network management platform for advanced management of Brocade VCS fabrics and Brocade VDX switches across the entire network life cycle. Organizations can use Brocade Network Advisor to manage a VCS fabric as a single entity or to drill down to individual Brocade VDX switches for fault, inventory, or performance management—and to manage multiple VCS fabrics in parallel.

Brocade Network Advisor also provides simplified management of AMPP configurations, and integrity checks can be performed across physical Brocade VDX configurations, either in the same fabric or across different VCS fabrics. In addition, Brocade Network Advisor enables VM-level monitoring and can help identify top-talker applications leveraging sFlow across the fabric. Finally, Brocade Network Advisor provides VCS fabric diagnostics, including visualization of VCS fabric traffic paths and network latency monitoring that enables fault isolation via hop-by-hop inspection. For details, visit www.brocade.com/management.

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.
To learn more, visit www.Brocade.com/CapitalSolutions.

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.

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[1] The 1 GbE ports do not support Data Center Bridging (DCB).
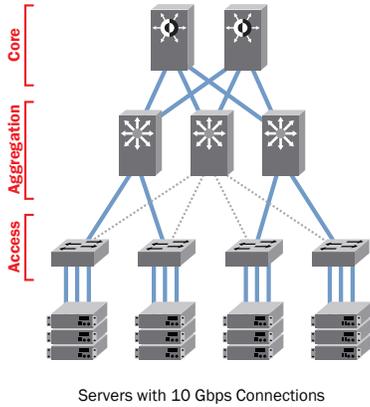
Classic Hierarchical Ethernet Architecture   **Ethernet Fabric Architecture**

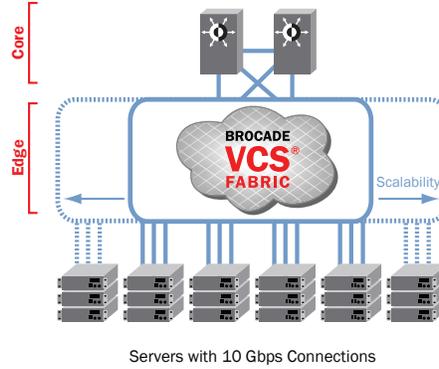Servers with 10 Gbps Connections   Servers with 10 Gbps Connections

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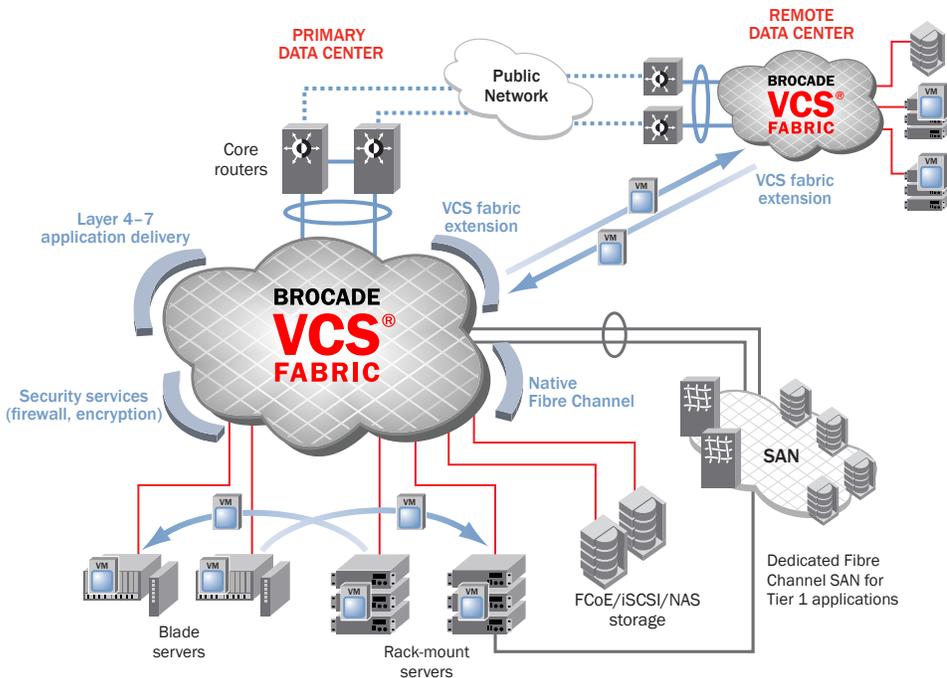
Learn more about Ethernet fabrics at www.brocade.com/ethernet-fabric.

BROCADE VDX 6710 FEATURE OVERVIEW

	Brocade VDX 6710-54
Switching bandwidth (data rate, full duplex)	216 Gbps
Port-to-port latency 10 GbE to 10 GbE ports	600 nanoseconds
Port-to port latency 1 GbE to 1 GbE/10 GbE	1 microsecond
Form factor	1U
Dimensions and weight	Width: 44.0 cm (17.32 in.)
	Height: 4.37 cm (1.72 in.)
	Depth: 40.97 cm (16.13 in.)
	Weight: 8.57 kg (18.90 lb)
1 GbE RJ45 ports	48
1/10 GbE SFP+ ports	6
Power supplies	Two hot-swappable, load-sharing
Cooling fans	N+1 redundant, integrated into power supplies

BROCADE VDX 6710 SPECIFICATIONS

Scalability Information[2]	
Connector options	1 GbE RJ45
	1000Base-SX and 1000Base-LX
	10 GbE SR and 10 GbE LR
	10 Gbps SFP+ options: 1/3/5 m direct-attached copper (Twinax)
	Out-of-band Ethernet management: RJ-45 (fixed)
	Console management: RJ-45 to RS-232 (fixed)
	Firmware and diagnostic: USB
Maximum VLANs	4096
Maximum MAC addresses	32,000
Maximum port profiles (AMPP)	256
Maximum Layer 2 multicast groups	2000
Maximum Spanning Tree instances	32
Maximum per-port priority pause level	8
Maximum LAG groups in a VCS fabric	512
Maximum members in a standard LAG	16
Maximum MAC addresses in a VCS fabric	30,000
Maximum switches in a VCS fabric	24
Maximum ECMP paths in a VCS fabric	8
Maximum trunk members for VCS fabric ports	8
Maximum switches across which a vLAG can span	4
Maximum members in a vLAG	32
Maximum jumbo frame size	9208 bytes
Queues per port	8
DCB Priority Flow Control (PFC) classes	8
Maximum Layer 2 ACLs	1000
Maximum Layer 3 ACLs	1000
Maximum ARP entries	12,000
Maximum IPv4 routes	2000
Operating system	Brocade Network OS
Layer 2 switching features	• MAC Learning and Aging • Static MAC Configuration • Link Aggregation Control Protocol (LACP) IEEE 802.3ad/802.1AX • Virtual Local Area Networks (VLANs) • VLAN Encapsulation 802.1Q • Rapid Spanning Tree Protocol (RSTP) IEEE 802.1w • Multiple Spanning Tree Protocol (MSTP) IEEE 802.1s • STP IEEE 802.1D	• Per-VLAN Spanning Tree (PVST+/PVRST+) • STP PortFast and PortFast BPDU Guard • STP Root Guard • Layer 2 Access Control Lists (ACLs) • IGMP v1/v2 Snooping • Pause Frames IEEE 802.3x

[2] Please refer to the latest version of the release notes for the most up-to-date scalability numbers.

Layer 3 switching features	• OSPF • VRRP and VRRP-E support	• Static routes
Brocade VCS Fabric technology 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) IEEE 802.1Qbb • Enhanced Transmission Selection (ETS) IEEE 802.1Qaz	• Data Center Bridging Exchange (DCBX) • DCBX Application Type-Length-Value (TLV) for iSCSI
Quality of Service (QoS)	• Eight priority levels for QoS • Class of Service (CoS) IEEE 802.1p • DSCP Trust • DSCP to Traffic Class Mutation • Random Early Discard	• Per-port QoS configuration • Scheduling: Strict Priority (SP), Shaped Deficit Weighted Round-Robin (SDWRR) - DSCP to CoS Mutation - DSCP to DSCP Mutation
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 (standalone mode) • Link Layer Discovery Protocol (LLDP) IEEE 802.1AB • MIB II RFC 1213 MIB • Switch Beaconing • Switched Port Analyzer (SPAN)	• Telnet • SNMP v1, v2C, v3 • sFlow RFC 3176 • Out-of-band management • RMON-1, RMON-2 • NTP • Management Access Control Lists (ACLs) • Role-Based Access Control (RBAC)
Security	• Port-based Network Access Control IEEE 802.1X • RADIUS • TACACS+ • Secure Shell (SSHv2) • BPDU Drop • Lightweight Directory Access Protocol (LDAP) • Secure Control Protocol	

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	Maximum: 60 CCFM Nominal: 44 CFM
Heat dissipation	443.5 BTU/hr

Power

Power supplies	Two internal, redundant, field-replaceable, load-sharing AC power supplies
Power inlet	C13
Input voltage	100 V to 240 V ~5 A to 2.5 A
Input line frequency	47 to 63 Hz
Inrush current	50 amps max
Maximum current	3.5 amps max (54-port switch)
Maximum power consumption	130 W

BROCADE VDX 6710 SPECIFICATIONS (CONTINUED)

Safety Compliance

- Bi-Nat UL/CSA 60950-1 Second Edition
- CAN/CSA-C22.2 No. 60950-1 Second Edition
- EN 60950-1 Second Edition
- IEC 60950-1 Second Edition
- GB4943-2001 and GB9254-1998
- CNS 14336(94)

EMC

- FCC Class A
- ICES A
- VCCI-Class A
- CE
- C
- BSMI
- GOST
- KC Class A
- CCC

Immunity

- ANSI C63.4
- ICES-003 Class A
- CISPR22 and JEIDA (Harmonics)
- EN55022 Class A and EN55024
- CISPR22
- AS/NZS CISPR22
- CNS 13438(95)
- 51318.22-99 and 51318.24-99
- KN22 and KN24
- GB17625.1-2003

Environmental Regulatory Compliance

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

Standards Compliance

Brocade VDX 6710 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)
- IEEE 802.3ab 1000BASE-T
- IEEE 802.3z 1000BASE-X

RFC Support	
RFC 768	User Datagram Protocol (UDP)
RFC 783	TFTP Protocol (revision 2)
RFC 791	Internet Protocol (IP)
RFC 792	Internet Control Message Protocol (ICMP)
RFC 793	Transmission Control Protocol (TCP)
RFC 826	ARP
RFC 854	Telnet Protocol Specification
RFC 894	A Standard for the Transmission of IP Datagram over Ethernet Networks
RFC 1027	Using ARP to Implement Transparent Subnet Gateways (Proxy ARP)
RFC 1112	IGMP v1
RFC 1157	Simple Network Management Protocol (SNMP) v1 and v2
RFC 1492	TACACS+
RFC 1519	Classless Interdomain Routing (CIDR)
RFC 1584	Multicast Extensions to OSPF
RFC 1765	OSPF Database Overflow
RFC 1812	Requirements for IP Version 4 Routers
RFC 2068	HTTP Server
RFC 2131	Dynamic Host Configuration Protocol (DHCP)
RFC 2154	OSPF with Digital Signatures (Password, MD-5)
RFC 2236	IGMP v2
RFC 2267	Network Ingress Filtering
RFC 2328	OSPF v2 (edge mode)
RFC 3768	VRRP
RFC 2370	OSPF Opaque Link-State Advertisement (LSA) Option—Partial Support
RFC 2474	Definition of the Differentiated Services Field in the IPv4 and IPv6 Headers
RFC 2571	An Architecture for Describing SNMP Management Frameworks
RFC 2865	Remote Authentication Dial In User Service (RADIUS)
RFC 3101	The OSPF Not-So-Stubby Area (NSSA) Option
RFC 3176	sFLOW
RFC 3137	OSPF Stub Router Advertisement
RFC 4510	Lightweight Directory Access Protocol (LDAP): Technical Specification Road Map
RFC 4292	IP Forwarding MIB
RFC 4293	Management Information Base for the Internet Protocol (IP)
RFC 3411	An Architecture for Describing SNMP Frameworks
RFC 3412	Message Processing and Dispatching for the SNMP
RFC 3413	Simple Network Management Protocol (SNMP) Applications
RFC 2460	Internet Protocol, Version 6 (v6) Specification (on management interface)
RFC 2464	Transmission of IPv6 Packets over Ethernet Networks (on management interface)
RFC 2474	Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 Headers (only for IPv4)

BROCADE VDX 6710 ORDERING INFORMATION

SKU	Description	Comments
BR-VDX6710-54-F	Brocade VDX 6710, 48P GbE, 6P SFP+, AC, non-port side exhaust airflow	Base SKU
BR-VDX6710-54-R	Brocade VDX 6710, 48P GbE, 6P SFP+, AC, port side exhaust airflow	Base SKU
XBR-250WPSAC-F	FRU 250W ACPS/FAN, non-port side exhaust airflow	Base SKU
XBR-250WPSAC-R	FRU 250W ACPS/FAN, port side exhaust airflow	Base SKU
XBR-VDX6710-54-F	Brocade VDX 6710, 48P GbE, 6P SFP+, FRU, AC, non-port side exhaust airflow	Base SKU
XBR-VDX6710-54-R	Brocade VDX 6710, 48P GbE, 6P SFP+, FRU, AC, port side exhaust airflow	Base SKU
BR-VDX6710-54VCS-01	VCS software license for Brocade VDX 6710-54	Software orderable
E1MG-SX-OM (1-pack) E1MG-SX-OM-8 (8-pack)	1 Gbps 1000Base-SX	Optics
E1MG-LX-OM (1-pack) E1MG-LX-OM-8 (8-pack)	1 Gbps 1000Base-LX	Optics
10G-SFPP-SR (1-pack) 10G-SFPP-SR-8 (8-pack)	10 Gbps SR optic	Optics
10G-SFPP-LR (1-pack) 10G-SFPP-LR-8 (8-pack)	10 Gbps LR optic	Optics
10G-SFPP-TWX-0101 (1-pack) 10G-SFPP-TWX-0108 (8-pack)	10 Gbps SFP+ direct-attached cables, 1 m Twinax copper cable	Optics
10G-SFPP-TWX-0301 (1-pack) 10G-SFPP-TWX-0308 (8-pack)	10 Gbps SFP+ direct-attached cables, 3 m Twinax copper cable	Optics
10G-SFPP-TWX-0501 (1-pack) 10G-SFPP-TWX-0508 (8-pack)	10 Gbps SFP+ direct-attached cables, 5 m Twinax copper cable	Optics

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