BROCADE VDX 6720 DATA CENTER SWITCHES

DATA CENTER

Revolutionizing the Way Data Center Networks Are Built

HIGHLIGHTS

- Simplifies network architectures and enables cloud computing by delivering virtual cluster switching technology

- Provides Ports on Demand flexibility with 16-, 24-, 40-, 50-, and 60-port 10 Gigabit Ethernet (GbE) models built on Brocade sixth-generation fabric switching technology

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

- Provides multihomed active-active server connections for Ethernet networks

- Creates scale-out Ethernet fabrics for virtualized data centers

- Enables end-to-end convergence of Fibre Channel over Ethernet (FCoE), iSCSI, and NAS storage traffic along with IP LAN data traffic

- Simplifies management by maintaining network policies as virtual machines move throughout the data center with Automatic Migration of Port Profiles (AMPP)

- Helps reduce operational costs and complexity by enabling the entire fabric to be managed as a single switch

As IT organizations look for better ways to build clouds and virtualized data centers, they are turning to high-performance networking solutions that increase flexibility through leading-edge technologies. Brocade® VDX™ 6720 Data Center Switches are specifically designed to improve network utilization, maximize application availability, increase scalability, and dramatically simplify network architecture in virtualized data centers. By delivering Brocade VCS™ technology, the Brocade VDX 6720 helps organizations 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, deploy flatter scale-out fabrics for virtualized data centers, or converge networks, the Brocade VDX 6720 delivers the innovative technology to enhance and simplify their networks.

For 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 the network design, provide Virtual Machine (VM) mobility without network reconfiguration, and manage the entire fabric as a single logical chassis.

For data centers that can take advantage of a converged LAN/SAN environment, Brocade VCS technology provides end-to-end Data Center Bridging (DCB) capabilities, enabling traditional IP and storage traffic to exist on the same network. Organizations can also use Brocade VCS technology to prioritize Fibre Channel over Ethernet (FCoE) and iSCSI traffic to make sure it receives sufficient bandwidth and remains lossless.

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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 Operating System (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 Gigabit Ethernet (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 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.
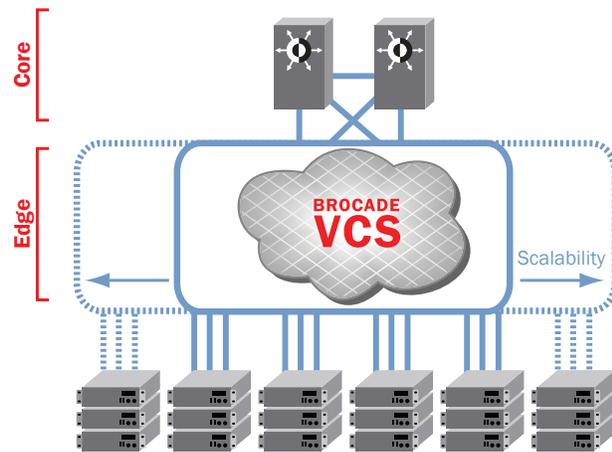
Figure 1.

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

Classic Hierarchical Ethernet Architecture
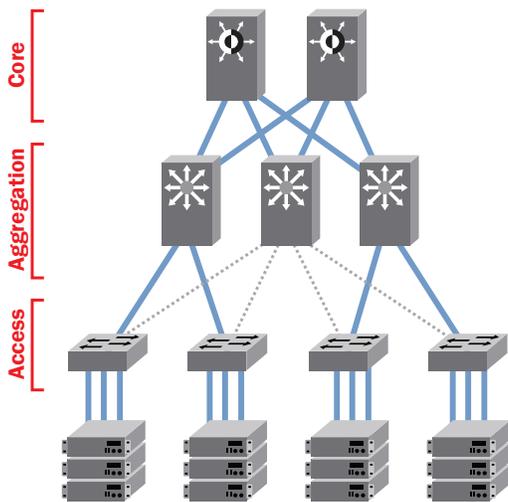
Servers with 10 Gbps Connections

Ethernet Fabric Architecture

Servers with 10 Gbps Connections

BROCADE VIRTUAL CLUSTER SWITCHING

Brocade Network OS delivers Brocade VCS technology, which includes four pillars of innovation:

- Ethernet Fabric
- Distributed Intelligence
- Logical Chassis
- Dynamic Services

Ethernet Fabric

Based on current and emerging open standards such as DCB and Transparent Interconnection of Lots of Links (TRILL), the Ethernet fabric provides fully active multipathing, rapid link reconvergence, and the ability to converge SAN and LAN traffic. Organizations designing a multipath Layer 2 Ethernet network do not need STP when using Brocade VCS technology. This helps double network utilization while dramatically increasing resiliency.

Distributed Intelligence

Brocade fabric technology actively distributes intelligence across all members of the fabric. Configuration and device information is known by all the connected switches, enabling fabric switches to be added or removed, and physical or virtual servers to be relocated—without the fabric requiring manual reconfiguration.

Distributed intelligence allows the Ethernet fabric to be "self-forming." When two Brocade switches with VCS capabilities are connected, the fabric is automatically created, and the switches discover the common fabric configuration. Scaling bandwidth in the fabric is as simple as connecting another link between switches or adding a new switch as required.

WHAT IS AN ETHERNET FABRIC?

Compared to classic hierarchical Ethernet architectures, Ethernet fabrics provide higher levels of performance, utilization, availability, and simplicity. Brocade Ethernet fabrics have the following characteristics:

- Ethernet fabrics are self-aggregating, enabling a flatter network design.
- Switches in the fabric always know about each other and all connected devices.
- All paths are available for high performance and high reliability.
- Traffic automatically travels across the shortest path.
- The fabric is managed as a single logical entity.

Figure 2.
Brocade VCS technology simplifies the network architecture, enables convergence, improves VM mobility, and allows the seamless insertion of services.
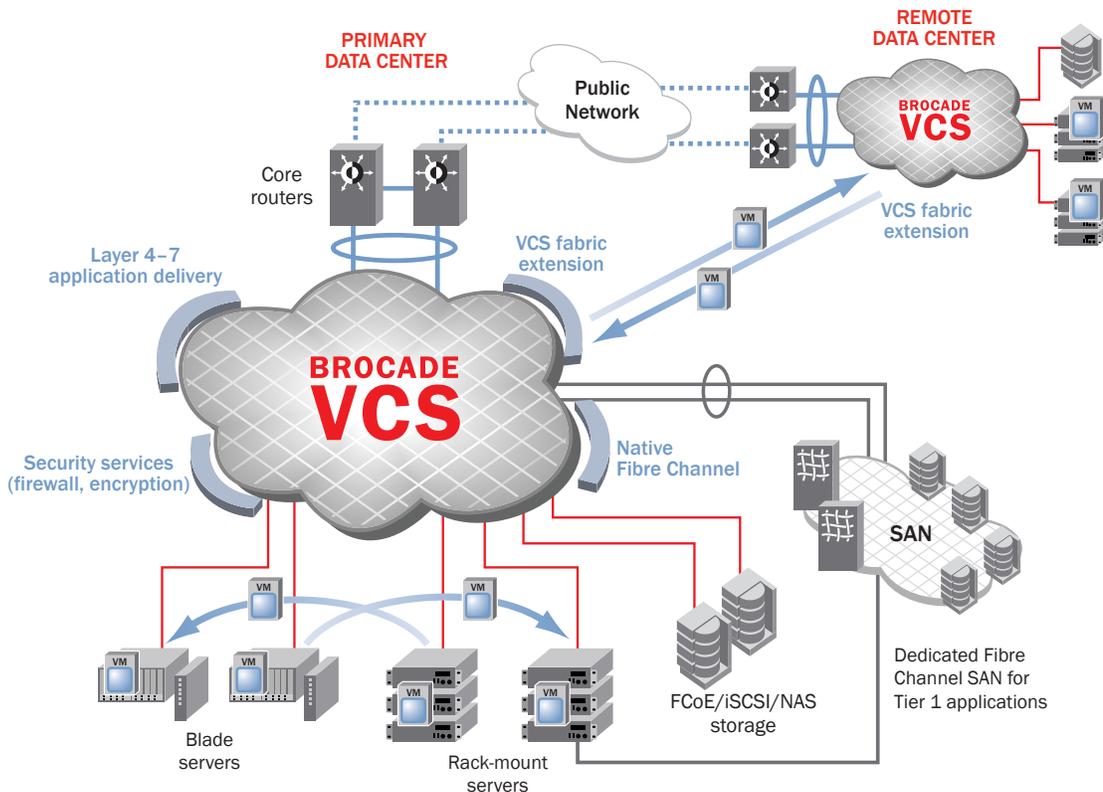
The Ethernet fabric does not mandate a specific topology, so it does not dictate oversubscription ratios. As a result, organizations can create a topology that best meets specific application requirements. Unlike other technologies, Brocade VCS technology enables different end-to-end subscription ratios to be created or fine-tuned as application demands change over time.

Logical Chassis

All switches in an Ethernet fabric behave as a logical chassis and are managed as a single switch. Instead of each top-of-rack switch being managed individually, each physical switch in the fabric is managed as if it were a port module in a chassis. This enables fabric scalability without manual configuration.

Brocade VCS technology eliminates the need for separate aggregation switches because the fabric is "self-aggregating." This approach enables flatter network architecture, dramatically reducing cost and management complexity. Organizations can leverage Brocade VCS technology to reduce the number of network tiers, simplifying their designs while reducing capital and operating expenses. This further optimizes the network in the virtualized data center, enabling a cloud computing model.

Dynamic Services

Future Dynamic Services will extend the capabilities of Brocade VCS technology for maximum investment protection and the incremental addition of new network services. Examples of these services include fabric extension over distance, native Fibre Channel connectivity, Layer 4-7 services such as Brocade Application Resource Broker, and enhanced security services such as firewalls and data encryption. Switches with these unique capabilities can join the Ethernet fabric, adding a network service layer that is available across the entire fabric.

COMPREHENSIVE LAYER 2 LAN CAPABILITIES

Along with the 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. Utilizing best practices and deep technical expertise in storage, networking, and virtualization, Brocade Professional Services can assess and design a resilient infrastructure, and implement a next-generation solution for virtualized data centers. With Premier Support and residencies, organizations receive personal, preferential, and proactive support to accelerate problem resolution and escalation management.

MAXIMIZING INVESTMENTS

To help optimize technology investments, Brocade and its partners offer complete solutions that include education, support, and services. 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
Forwarding bandwidth (data rate, full duplex)	358 Mpps	896 Mpps
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)	Width: 42.88 cm (16.88 in)
	Height: 4.32 cm (1.70 in)	Height: 8.89 cm (3.50 in)
	Depth: 38.10 cm (15.00 in)	Depth: 43.18 cm (17.00 in)
	Weight: 7.30 kg (16.10 lbs)	Weight: 15.88 kg (35.00 lbs)
1/10 Gigabit Ethernet SFP+ ports	24	60
Ports on Demand 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), 10/20 m active optical, 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 Media Access Control (MAC) addresses	32,000
Maximum VLANs	4096
Maximum STP (Spanning Tree instances)	16
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	9600 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)	• Transparent Interconnection of Lots of Links (TRILL) • Equal Cost Multi-Path (ECMP) • Fibre Channel over Ethernet (FCoE) • Automatic Migration of Port Profiles (AMPP)
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)
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

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)

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