BROCADE VDX 6710 SWITCH

DATA CENTER

Revolutionizing the Way Data Center Networks Are Built

HIGHLIGHTS

- Delivers high performance and ultra-low latency through wire-speed ports with 600-nanosecond port-to-port latency and automated hardware-based Inter-Switch Link (ISL) trunking
- Simplifies and automates network architectures and enables elastic cloud networking with Brocade VCS Fabric technology
- Optimizes network design 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, and multiple Layer 3 gateways
- Manages an entire VCS fabric as a single switch with Brocade VCS Logical Chassis

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 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 with low power consumption, 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).

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 time. In addition, the Brocade VDX 6710 connects to iSCSI and NAS storage* and simplifies virtualization server management, making the Brocade VDX 6710 ideal for demanding data centers.

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** The 1 GbE ports do not support Data Center Bridging (DCB).*

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.

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 more efficiently manage the entire fabric. Learn more about Brocade VCS Fabric technology at www.brocade.com/vcs.

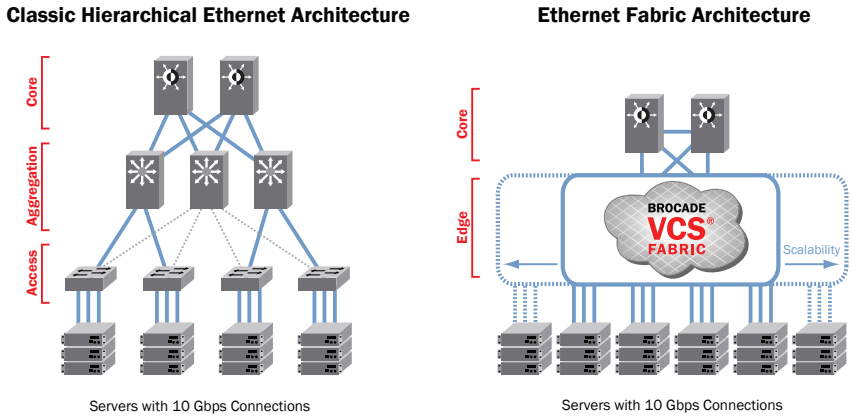

Figure 1.
Compared to classic Ethernet architectures, Ethernet fabrics—such as Brocade VCS fabrics—allow all paths to be active and provide greater scalability while reducing management complexity.

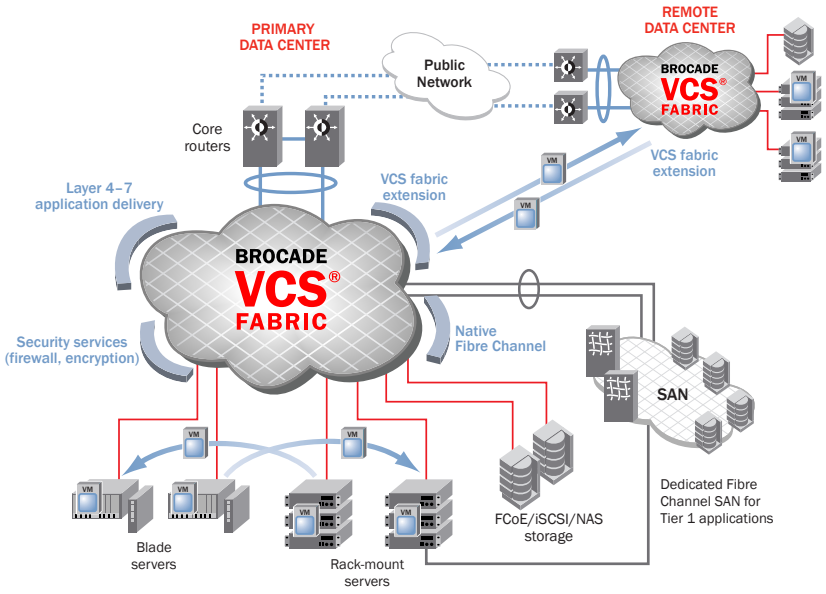

Figure 2.
Brocade VCS Fabric technology simplifies the network architecture, enables unified storage connectivity, improves VM mobility, and allows the seamless insertion of services.

UNMATCHED SIMPLICITY AND AUTOMATION

Brocade VCS Fabric technology helps streamline network operations and speed deployment with embedded features that enable automatic configuration and management. These features include:

- **Brocade VCS Logical Chassis:** Brocade VCS Logical Chassis enables organizations to manage an entire VCS fabric as a single switch, upgrade software across the fabric with one command, and centralize monitoring and troubleshooting to enhance the overall availability and reliability of the network. The single point of management eliminates the need to manually configure and manage each switch, simplifying management, lowering operational costs, and reducing configuration errors. In addition, it offers the ability to push software upgrades across the fabric with a single command, accelerating deployment. VCS Logical Chassis also provides a single view of the fabric for easy monitoring and troubleshooting that minimizes time to repair network issues. For more information about VCS Logical Chassis, read the white paper *An Overview of Brocade VCS Logical Chassis*.

- **Self-forming and self-healing fabric:** Configuration is simplified with self-forming fabrics. Configuration and device information is known by all switches, allowing fabric switches to be added or removed, and physical or virtual servers to be relocated—without the fabric requiring manual reconfiguration. In addition, fabrics are self-healing, increasing network resiliency. The fabric redirects traffic if a link fails, helping to ensure uninterrupted traffic flow and prevent data loss.

MAXIMUM EFFICIENCY

Brocade VCS Fabric technology provides the foundation for a flexible and responsive network infrastructure while delivering maximum efficiency.

Optimized East-West Traffic

Traditional data centers are architected with a rigid, three-tier tree topology, optimized for a client-server computing environment in which traffic travels north to south. This compromises performance, increases latency, and creates bottlenecks. With the increased prevalence of virtualization and distributed applications, data center network traffic is now predominantly east-west or server-server. The Brocade VCS fabric was specifically designed and optimized to address these traffic patterns by moving traffic through any of the active paths and avoiding the multiple hops required in other tiered topologies.

Multiple Load-Balanced Paths at Layers 1–3

Brocade VCS Fabric technology enables highly elastic domains with extremely efficient load balancing in Layers 1–3. Innovative Brocade ISL Trunking load balances traffic across all the links in a trunk for improved performance at Layer 1. In Layer 2, Equal Cost Multi-Path (ECMP) uses all available network bandwidth, allowing all links to be fully active and utilized. In the event of a failure, traffic is automatically routed to the closest path, providing higher resilience and greater application uptime. In Layer 3, the fabric automatically load balances all flows among a number of Layer 3 instances that collectively act as a single Layer 3 gateway. Multilayer multipathing helps improve network utilization, reduce latency, and increase overall network performance.

Read the white paper *Setting a New Standard for Network Efficiency with VCS Fabric Multilayer Multipathing Capabilities* to learn more.

Optimized for Virtualization

Brocade VCS Fabric technology offers unique features to support virtualized server and storage environments (see Figure 2), including:

- **Zero-touch VM discovery:** Brocade VM-Aware Network Automation eliminates the manual configuration of port profiles when a VM is added to the fabric or moved, providing an additional level of automation. The VCS fabric directly communicates with VMware vCenter, automatically downloading all port profile information and the associated MAC address, and distributes the VM-specific information to all switches within the fabric. When the VM moves, no additional configuration is required.
- **Automatic Migration of Port Profiles:** During a VM migration, network switch ports must be dynamically configured to ensure that the VM traffic experiences consistent policies and configurations. The Brocade Automatic Migration of Port Profiles (AMPP) feature enables a seamless migration, since the VCS fabric is aware of port profiles and automatically tracks them as they move. Implemented in a hypervisor-agnostic manner, 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 address move and automatically activates the port profile configuration within a single fabric or across separate fabrics.

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 lifecycle. 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.

AFFORDABLE ACQUISITION OPTIONS

Brocade Capital Solutions helps organizations easily address their IT requirements by offering flexible network acquisition and support alternatives. Organizations can select from purchase, lease, Brocade Network Subscription, and Brocade Subscription Plus 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.

BROCADE VDX 6710 FEATURE OVERVIEW

	Brocade VDX 6710-54
Switching bandwidth (data rate, full duplex)	216 Gbps
Switch performance	161 Mpps
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†	
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	4,096
Maximum MAC addresses	32,000
Maximum port profiles (AMPP)	256
Maximum Layer 2 multicast groups	2,000
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	32
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	9,208 bytes
Queues per port	8
DCB Priority Flow Control (PFC) classes	8
Maximum Layer 2 ACLs	1,000
Maximum Layer 3 ACLs	1,000
Maximum ARP entries	12,000
Maximum IPv4 routes	2,000
Operating system	Brocade Network OS 4.1.0‡
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+) • Private VLAN (PVLAN) • STP PortFast and PortFast BPDU Guard • STP Root Guard • STP over VCS • Layer 2 Access Control Lists (ACLs) • IGMP v1/v2 Snooping • Pause Frames IEEE 802.3x

† *Please refer to the latest version of the release notes for the most up-to-date scalability numbers.*

‡ *Brocade Network OS 4.1 is planned for release in 1H2014. Please refer to the current version of the release notes for the most up-to-date feature support.*

Layer 3 switching features	• DHCP Helper‡ • OSPF • Border Gateway Protocol (BGP)	• 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) • DHCP Option 66/67‡ • 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) • Netconf API • Brocade VCS Plugin for OpenStack • Remote lights out management (future update) • In-band management (standalone mode) • Link Layer Discovery Protocol (LLDP) IEEE 802.1AB • Logical chassis management • 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 Copy 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 3,000 meters (9,842 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 Network OS 4.1 is planned for release in 1H2014. Please refer to the current version of the release notes for the most up-to-date feature support.

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 250 W AC power supply/fan, non-port side exhaust airflow	Base SKU
XBR-250WPSAC-R	FRU 250 W AC power supply/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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