

BROCADE 8470 SWITCH MODULE FOR IBM BLADECENTER



CONVERGED NETWORK

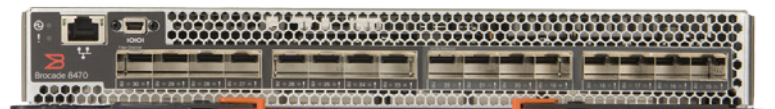
A Highly Integrated Converged Switch Module for IBM BladeCenter

HIGHLIGHTS

- Provides unprecedented deployment flexibility as a Layer 2 Ethernet switch, native Fibre Channel switch, or as a full-function DCB/FCoE switch for LAN and SAN connectivity
- Maximizes I/O consolidation in IBM BladeCenter chassis by eliminating the need for multiple external switches and additional mezzanine I/O adapters
- Utilizes a cut-through, non-blocking architecture to deliver the highest performance across all 10 GbE ports and 8 Gbps Fibre Channel ports
- Is the only IBM BladeCenter switch module to offer external Fibre Channel and Ethernet ports
- Meets growing bandwidth needs with the innovative Dynamic Ports on Demand (DPoD) capability
- Integrates seamlessly into existing IP and Fibre Channel environments to provide superior investment protection and scalability
- Simplifies management with a unified 10 GbE converged solution for IP and Fibre Channel connectivity that reduces capital and operating expenses

The Brocade® 8470 Switch Module for IBM BladeCenter provides the industry's leading integrated I/O solution for IBM BladeCenter chassis. Its compact design incorporates 10 Gigabit Ethernet (GbE) Data Center Bridging (DCB) external ports and 8 Gbps Fibre Channel external ports to provide seamless connectivity to LANs

and Fibre Channel Storage Area Networks (SANs). Built for tight integration with IBM BladeCenter chassis, the Brocade 8470 enables organizations to meet their current and future networking and storage I/O requirements with a single switch module.



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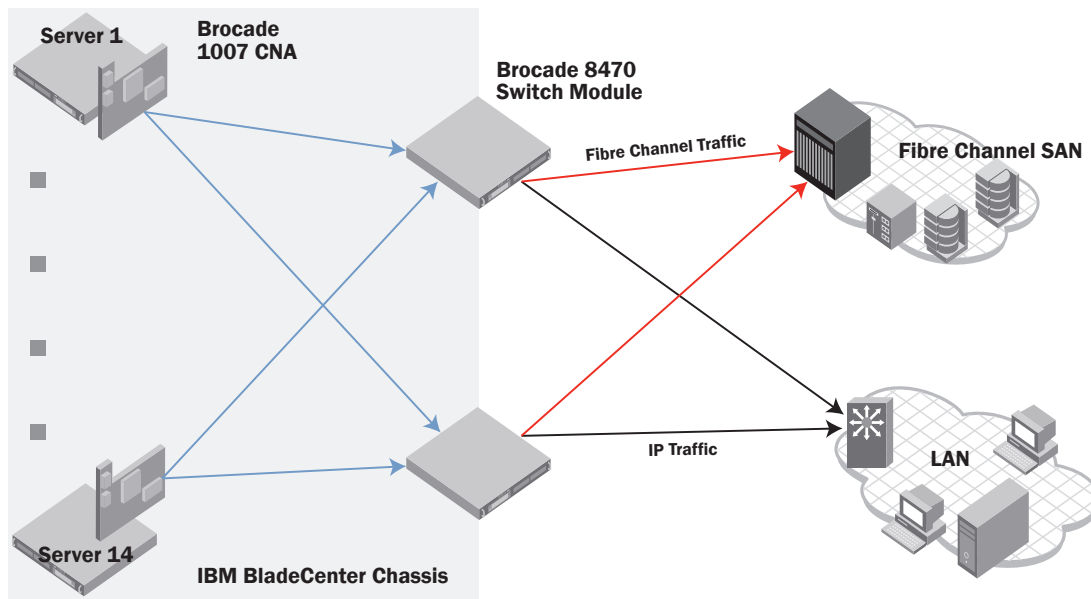


Figure 1. The Brocade 8470 is a converged switch module for IBM BladeCenter that enables connectivity to LANs and SANs using external Ethernet and Fibre Channel ports.

INDUSTRY-LEADING DEPLOYMENT FLEXIBILITY

The Brocade 8470 leverages an innovative Dynamic Ports on Demand (DPoD) capability that enables organizations to activate any combination of internal or external ports for maximum deployment and configuration flexibility. Organizations can enable 10 GbE ports for networking needs, Fibre Channel ports for storage support, or any combination of Ethernet and Fibre Channel ports.

In addition, they can enable any combination of internal (backplane) or external (faceplate) ports. As a result, they can balance server and I/O port assignments to accommodate new application workloads and satisfy growing business needs. Moreover, they can reassign port licenses as their bandwidth and application workloads change.

Flexible internal port assignment makes it possible to allocate servers to match specific combinations of 10 GbE or Fibre Channel ports. Server allocation provides a convenient and effective way of meeting increased application workloads with the powerful capabilities of the Brocade 8470.

The flexibility of DPoD enables a “pay-as-you-grow” option to meet future needs. Organizations can initially deploy the switch module with only 16 ports enabled. As data center bandwidth needs and workloads grow, they can enable the remaining 14 ports to achieve the full 30-port capacity.

HIGH BANDWIDTH AND LOW LATENCY

By utilizing a cut-through, non-blocking architecture, the Brocade 8470 delivers high performance and low latency for the most demanding virtualized environments. It delivers up to 288 Gbps of throughput in full-duplex mode, making it the highest-bandwidth switch module for IBM BladeCenter.

With a total bandwidth of 144 Gbps (80 Gbps Ethernet and 64 Gbps Fibre Channel) accessible through external ports, the Brocade 8470 can support highly demanding applications and storage solutions. In addition to the high bandwidth available on external ports, the switch module supports an additional 140 Gbps on 14 internal backplane 10 GbE ports.

LOWEST TCO AMONG BLADECENTER SWITCH MODULES

The Brocade 8470 offers a highly integrated and innovative design that delivers the lowest Total Cost of Ownership (TCO) compared to competitive offerings. With the Brocade 8470, organizations have two switches (Ethernet and Fibre Channel) in one, reducing acquisition costs—especially when combined with Brocade mezzanine Converged Network Adapters (CNAs), which include both a Network Interface Controller (NIC) and Host Bus Adapter (HBA) in a single device.

The Brocade 8470 gives organizations a lower-cost entry point while allowing them to add ports as their business needs increase. The switch module also comes with two 10 GbE Small Form-Factor Pluggable (SFP+) ports to further reduce initial investment costs.

Designed for seamless integration into existing networking and storage environments, the Brocade 8470 truly protects existing investments. Moreover, by utilizing the Brocade integrated switch module, organizations will require fewer hardware components, further reducing costs and TCO while improving reliability.

COMPREHENSIVE LAYER 2 LAN CAPABILITIES

Leveraging deep Brocade expertise in Ethernet technologies, the Brocade 8470 provides broad, standards-based Data Link Layer (Layer 2) capabilities covering Quality of Service (QoS), security, and a comprehensive set of Layer 2 protocols. Notable among these features are sFlow, port mirroring, and IGMP. The eight 10 GbE DCB ports provide uplink connections to conventional 10 GbE port aggregation layer Ethernet switches (Brocade or third-party devices). Layer 2 functions are configured and administered accordingly at the access layer. In addition, the Brocade 8470 supports Layer 3 static IP routes for greater flexibility.

ENTERPRISE-CLASS AVAILABILITY FOR BUSINESS CONTINUITY

The Brocade 8470 provides a reliable foundation for business continuity by employing enterprise-class availability features such as hot-swappable optics and failover functions. Combined with a wide range of diagnostic and monitoring functions, these features help ensure highly available LAN and SAN environments.

FABRIC OS-POWERED, NON-DISRUPTIVE SAN CONNECTIVITY

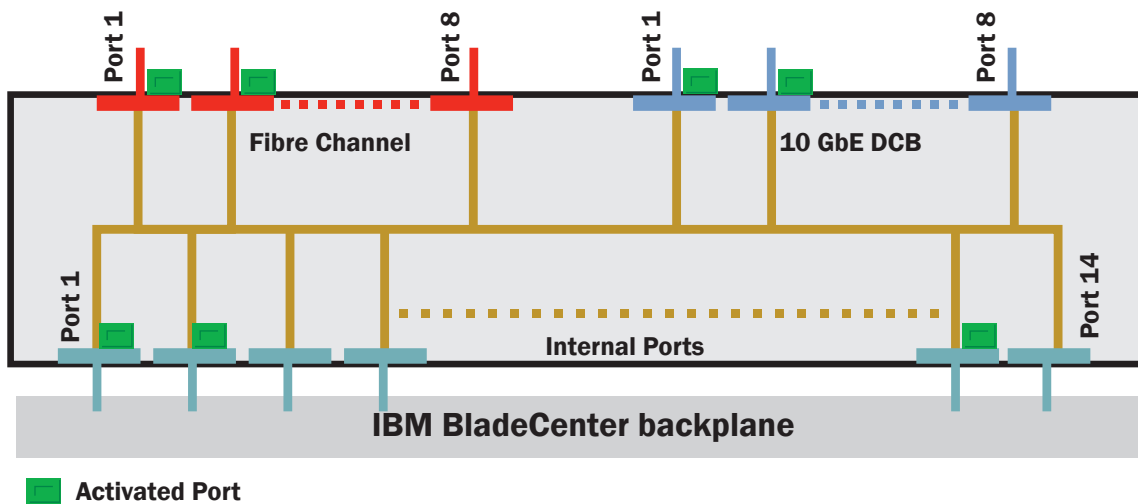
The Brocade 8470 utilizes the same Brocade Fabric OS® that powers the entire Brocade SAN product family, from fixed port switches to the Brocade DCX® Backbone. This helps ensure backward and forward compatibility, and enables seamless and non-disruptive integration with Brocade Fibre Channel SANs.

OPEN SAN MANAGEMENT

By bringing Fibre Channel switches, CNAs, and the Brocade 8470 under a common management platform, Brocade Data Center Fabric Manager (DCFM®) simplifies management through standard interfaces and support for third-party management applications, including IBM Systems Director and IBM Tivoli Network Manager. The Brocade 8470 supports switch management through a Command Line Interface (CLI), Brocade Web Tools, or Brocade DCFM, which manages Fibre Channel, DCB, and Fibre Channel over Ethernet (FCoE) resources.

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.



Entry Level Model - 16 Ports

Figure 2. The Brocade 8470 switch module offers the innovative Dynamic Ports on Demand (DPoD) capability for flexible server and port allocation.

BROCADE 8470 SPECIFICATIONS

System Architecture	
Performance	<p>Total of 30 ports with 288 Gbps full-duplex bandwidth in a single module</p> <ul style="list-style-type: none"> • 80 Gbps throughput on eight external 10 GbE ports • 64 Gbps throughput on eight external Fibre Channel ports • 140 Gbps on 14 internal 10 GbE ports • Maximum ISL Trunk Bandwidth: 64 Gbps (128 Gbps full duplex) on Fibre Channel ports <p>Forwarding capacity: 120 MPPS on eight 10 GbE ports</p> <p>Low latency: 600 nanoseconds</p>
Scalability	<p>VLANs: 4096</p> <p>MAC addresses: 32,000 MAC address table entries</p> <p>ACLs: 5000</p> <p>QoS queues per port: 8</p> <p>Link aggregation: Eight links per group, 28 link groups per switch</p>
Maximum frame size	2112-byte Fibre Channel payload; 9048-byte Ethernet frame
Data traffic types	Brocade Fabric switches supporting unicast, multicast, and broadcast
Operating modes	<ul style="list-style-type: none"> • Brocade Fabric OS Native mode • Brocade Access Gateway mode (NPIV mode)
Deployment options	<ul style="list-style-type: none"> • Base model: Brocade 8470 (IBM 68Y1909) with 16 ports enabled. These ports can be any combination of backplane 10 GbE ports or faceplate external 8 Gbps Fibre Channel or 10 GbE ports. • Fully configured model: Brocade 8470 with all 30 ports activated. Eight 10 GbE DCB ports, eight Fibre Channel ports, and FCoE support enabled (requires optional licenses to activate ports not enabled in the base model). • Both models include Brocade Web Tools and enhanced group management to allow management through Brocade DCFM, IBM Systems Director, or IBM Tivoli Network Manager.
Interfaces	
External faceplate ports	<p>Ethernet: Eight ports with 10 GbE speed and DCB support</p> <p>Fibre Channel: Eight Fibre Channel universal (E, F, M, and FL) ports with 2, 4, and 8 Gbps full duplex</p>
Internal backplane ports	<p>14 auto negotiated 1 GbE or 10 GbE ports</p> <p>Wake on LAN (WoL) support</p> <p>IBM BladeCenter features:</p> <ul style="list-style-type: none"> • Serial over LAN (SoL) • Concurrent KVM (cKVM)
Other ports	<p>One external RS232 console port with a mini-USB interface for serial console management</p> <p>One external 10/100/1000 Mbps RJ45 Ethernet copper port for management</p> <p>Two internal full-duplex 100 Mbps Ethernet interfaces for management purposes</p>
Layer 2 Networking and DCB Features	
DCB features	<p>Priority-based Flow Control (PFC): IEEE 802.1Qbb</p> <p>Enhanced Transmission Selection (ETS): IEEE 802.1Qaz</p> <p>Data Center Bridging eXchange (DCBX)</p>
Data Link Layer (Layer 2) features	<p>Layer 2 Virtual Local Area Networks (VLANs): 4096</p> <p>Default management VLAN is 4095</p> <p>VLAN Tagging (802.1Q)</p> <p>Spanning Tree Protocol (STP, 802.1D)</p> <p>Rapid Spanning Tree Protocol (RSTP, 802.1w)</p> <p>Multiple Spanning Tree Protocol (MSTP, 802.1s): 16 instances</p> <p>Link Aggregation Control Protocol (LACP) IEEE 802.3ad</p> <p>Link Layer Discovery Protocol (LLDP) IEEE 802.1AB</p> <p>Brocade enhanced frame-based trunking</p> <p>Advanced PortChannel hashing based on Layer 2, 3, and 4 information</p> <p>Flow Control (Pause Frames) (802.3x)</p> <p>Storm Control (unicast, multicast, and broadcast)</p> <p>Address Resolution Protocol (ARP) RFC 826</p> <ul style="list-style-type: none"> • Up to 1024 ARPs can be configured • Both Static and Dynamic ARPs supported • Proxy ARP can be enabled per-interface
Layer 2 security	<p>Ingress Access Control Lists (ACLs): 5000</p> <p>Standard and extended Layer 2 ACLs</p> <p>VLAN-based ACLs (VACLs)</p> <p>Port-based ACLs (PACLs)</p> <p>ACL statistics</p> <p>Port-based Network Access Control: IEEE 802.1x</p> <p>Secure Shell (SSHv2)</p> <p>sFlow, RFC 3176</p> <ul style="list-style-type: none"> • sFlow samples per second: Up to 128 samples • Statistical packet-based sampling of packet flows • Time-based sampling of interface counters <p>Port Mirroring or Switched Port Analyzer (SPAN)</p> <ul style="list-style-type: none"> • Input, output, and bidirectional port SPAN support • Max number of SPAN sessions: 12

Layer 2 Quality of Service (QoS)	<ul style="list-style-type: none"> Eight priority levels for QoS Class of Service (CoS) IEEE 802.1p Eight hardware queues per port Per-port QoS configuration CoS trust: IEEE 802.1p Per-port Virtual Output Queuing CoS-based egress queuing Egress strict priority queuing Egress port-based scheduling: Weighted Round-Robin (WRR)
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IGMP snooping	<ul style="list-style-type: none"> Internet Group Management Protocol (IGMP) Snooping v1 and v2 <ul style="list-style-type: none"> • MAC-Based Multicast Forwarding • Topology Change Aware (STP port block/unblock) • IGMP Snooping Querier • IGMP snooping groups on the switch: 1000 • IGMP snooping groups learnable per VLAN: 1000 • IGMP snooping-enabled VLANs on the switch: 128 • IGMP snooping entries: 32,000
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Layer 3 Networking

Layer 3 features	<ul style="list-style-type: none"> Static IP Routes <ul style="list-style-type: none"> • 2048 routes can be configured • 256 IP addresses on up to 255 Layer 3 interfaces • Supported interface types: <ul style="list-style-type: none"> – VLANs (SVIs) – LAG interfaces (port-channels) – Router ports (external ports only) • Layer 3 scalability: <ul style="list-style-type: none"> – Layer 3 interfaces per switch: 256 – IP addresses per interface: 256 – Static routes: 2000 – Next hops for static routes: 2000 – ECMPs per static route: 4 – Recursion for static route: 2 – Dynamic ARP entries: 2000 – Static ARP entries: 2000 <p style="margin-left: 20px;">Ingress ACL: 1000</p> <p style="margin-left: 20px;">IPv4/IPv6 multicast groups: 4000</p>
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DCB services	<ul style="list-style-type: none"> Spanning Tree Protocol (STP, MSTP, RSTP) VLAN Tagging (802.1q) MAC address learning and aging Native FCoE switching IEEE 802.3ad Link Aggregation (LACP) Access control lists based on VLAN, source, destination address, and port Eight priority levels for QoS and approximately 4000 VLANs Priority-based Flow Control (PFC) Enhanced Transmission Selection (ETS) Data Center Bridging eXchange (DCBX)-Capabilities Exchange
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FCoE

FCoE features	<ul style="list-style-type: none"> FC-BB5-compliant Fibre Channel Forwarder (FCF) Native FCoE forwarding FCoE to Fibre Channel and Fibre Channel to FCoE translation End-to-end FCoE (initiator to FCoE storage target) FCoE Initialization Protocol (FIP) v1 support for FCoE devices login and initialization <ul style="list-style-type: none"> • FCoE logins up to 1000 FPMA Address Discovery FCoE VLANs: 1 FCoE VF_Ports: 22 ports per switch module FCoE Access Control List (ACL): enabled FCoE Provisioning <ul style="list-style-type: none"> • FCoE VLAN and CEE map are automatically configures
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Fibre Channel

Fibre Channel port types	F_Port (Fabric Ports), FL_Port (Fabric Loop Ports), M_Port (Mirror Port), or E_Port (Expansion Ports)
Fibre Channel classes of service	Class 2, Class 3, Class F (inter-switch frames)
Fibre Channel fabric services	<ul style="list-style-type: none"> Simple Name Server (SNS) Registered State Change Notification (RSCN) Dynamic Path Selection (DPS) Reliable Commit Service (RCS) N_Port ID Virtualization (NPIV): Brocade Access Gateway Mode <ul style="list-style-type: none"> • NPIV logins per port: 255 <p>Optional services available on Fibre Channel ports include:</p> <ul style="list-style-type: none"> • Brocade ISL Trunking • Brocade Advanced Performance Monitoring • Brocade Fabric Watch • Brocade Extended Fabrics • Adaptive Networking. The QoS SID/DID Prioritization and Ingress Rate Limiting features are included with this license.

ISL Trunking	<p>One or four trunks supported</p> <p>Frame-based ISL Trunking (optional license) enables up to eight ports between a pair of switches to be combined into a logical ISL with speeds of up to 64 Gbps (128 Gbps full duplex) for optimal bandwidth utilization and load balancing; exchange-based load balancing across ISLs with DPS (included in Brocade Fabric OS)</p> <p>External trunk failover:</p> <ul style="list-style-type: none"> • Up to eight external interfaces/LAGs can be tracked from an internal interface. • Up to 16 links can be configured for a LAG. Default is one.
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Management and Diagnostics

Management software	<p>Web interface through Brocade Web Tools</p> <p>Command Line Interface (CLI) through the Telnet program</p> <p>A terminal emulation program connection to the mini-USB port interface</p> <p>Switch SNMP agent</p> <p>EZ Switch Wizard</p> <p>Brocade DCFM Professional, DCFM Professional Plus, and DCFM Enterprise:</p> <ul style="list-style-type: none"> • Brocade DCFM uses HTTP/HTTPS and SNMP protocols to communicate with the Brocade 8470 to manage and monitor DCB features • Brocade DCFM enhancements support the following FCoE/DCB functionality: <ul style="list-style-type: none"> – Discovery, connectivity map, and product list – Configuration management – Performance management – Fault management – Security management <p>Enhanced Group Management (EGM)</p> <p>IBM Systems Director</p> <p>IBM Tivoli Network Manager</p> <p>IBM Chassis Advanced Management Module (AMM)</p>
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Management protocols	<p>Industry-common CLI</p> <p>Security Shell (SSH) v2</p> <p>Authentication, Authorization, and Accounting (AAA)</p> <p>Simple Network Management Protocol (SNMP) v1, v2, and v3</p> <p>Unified username and passwords across CLI and SNMP</p> <p>Syslog</p> <p>Microsoft Challenge Handshake Authentication Protocol (MS-CHAP)</p> <p>Remote Monitoring (RMON)</p> <p>Per-port ingress and egress counters</p> <p>Role-Based Access Control (RBAC)</p> <p>Power-On Self-Test (POST)</p> <p>Comprehensive bootup diagnostics</p> <p>Ethernet-like Interface MIB, RFC 1643</p> <p>RFC 1213 MIB-II</p> <p>RADIUS, RFC 2865</p>
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Management access	<p>One external RS232 console port with a mini-USB interface for serial console management</p> <p>One external 10/100/1000 Mbps RJ45 Ethernet copper port or debugging and field support</p> <p>Two internal full-duplex 100 Mbps Ethernet interfaces for management purposes</p>
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Diagnostics	<p>POST diagnostics and status reporting</p> <p>POST and embedded online/offline diagnostics, including FCping and Pathinfo (FCtracroute)</p>
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Media Types and Cabling

Media types	<p>Fibre Channel media type: Hot-pluggable, industry-standard Small Form-Factor Pluggable (SFP) and SFP+, LC connector; Short-Wavelength Laser (SWL) and Long-Wavelength Laser (LWL); distance depends on fiber-optic cable and port speed; supports SFP+ (2, 4, and 8 Gbps) optical transceivers</p> <p>Brocade parts:</p> <ul style="list-style-type: none"> • 8 Gbps SWL: 57-1000012-01 • 8 Gbps 10 km LWL: 57-1000027-01 <p>IBM part number :</p> <ul style="list-style-type: none"> • 8 Gbps SFP+ SW: 44X1962 <p>10 GbE media type: Hot-pluggable, Brocade 10 GbE SFP+ supports any combination of Short-Reach (SR) and Long-Reach (LR) optical transceivers; Brocade active copper Twinax cables of one, three, or five meters</p> <p>Brocade parts:</p> <ul style="list-style-type: none"> • 10 GbE SR SFP+: 57-0000075-01 • 10 GbE LR SFP+: 57-0000076-01 <p>IBM part number:</p> <ul style="list-style-type: none"> • 10 GbE SFP+ SR: 49Y4216
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Network cabling	<p>Approximate maximum distances:</p> <p>Fibre Channel: 8 Gbps Fibre Channel ports when operating at 8 Gbps speed</p> <ul style="list-style-type: none"> • 850 nanometer wavelength, multimode fiber • 50 μ (150 meters maximum) • 62.5 μ (21 meters maximum), with LC duplex connector <p>10 GbE: 10GBASE-SR for 10 GbE ports</p> <ul style="list-style-type: none"> • 850 nanometer wavelength, multimode fiber, 50 μ or 62.5 μ (300 meters maximum), with LC duplex connector • 1000BASE-T for RJ-45 port • UTP Category 6 (100 meters maximum) • UTP Category 5e (100 meters maximum) • UTP Category 5 (100 meters maximum) • EIA/TIA-568B 100-ohm STP (100 meters maximum) <p>Brocade Twinax active copper cables parts</p> <ul style="list-style-type: none"> • 1 m: 58-1000026-01 • 3 m: 58-1000027-01 • 5 m: 58-1000023-01
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For information about supported SAN standards, visit www.brocade.com/sanstandards.

For information about switch and device interoperability, visit www.brocade.com/interoperability.

For information about hardware regulatory compliance, visit www.brocade.com/regulatorycompliance.

Mechanical	
Enclosure	Non-port to port side airflow; 1U, 19-inch EIA-compliant, power from non-port side
Size	<p>Approximate width: 29.38 cm (11.57 inches)</p> <p>Approximate height: 4.10 cm (1.61 inches)</p> <p>Approximate depth: 25.70 cm (10.12 inches)</p>
System weight	Approximate weight: 2.13 kg (4.70 lb)
Environmental	
Temperature	<p>Operating: 0° to 40° C (32° to 104° F)</p> <p>Non-operating: -20° to 70° C (-4° F to 158° F)</p>
Humidity	<p>Operating: 10% to 90% (non-condensing) at 29° C</p> <p>Non-operating: 5% to 95% (non-condensing) at 38° C</p>
Altitude	<p>Operating: Up to 3048 meters (10,000 feet)</p> <p>Non-operating: Up to 10,688 kilometers (35,000 feet)</p>
Shock	<p>Operating: 20G, 6 ms half-sine</p> <p>Non-operating: 50G with a velocity change of 4216 mm/s²</p>
Vibration	<p>Operating: 0.4G, 5-500 Hz, 60 minutes</p> <p>Non-operating: 0.5G, 2-200 Hz, 15 minutes; 1.04 GRMS Random for 15 minutes</p>
Power	Maximum: 90 watts

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