



HPE Virtual Connect and Networking for BladeSystem

HPE Virtual Connect FlexFabric 20/40 F8 Modules

As the simplest, most flexible way to connect virtualized server blades to data or storage networks, HPE Virtual Connect FlexFabric 20/40 F8 Modules eliminate up to 95 percent¹ of network sprawl at the server edge—using one device that converges traffic inside enclosures and directly connects to external LANs and SANs. Utilizing Flex-20 technology with Fibre Channel over Ethernet (FCoE) and accelerated iSCSI, these modules converge traffic over the industry's first high-speed 20 Gb connections to servers with HPE FlexFabric Adapters (HPE FlexFabric 20 Gb 2-port 630FLB/650FLB and 630 M/650 M Adapters). Each redundant pair of Virtual Connect FlexFabric modules provides eight adjustable downlink connections (six Ethernet and two Fibre Channel, or six Ethernet and two iSCSI, or eight Ethernet) to dual-port 20 Gb FlexFabric Adapters on servers. Up to eight uplinks are available for connection to upstream Ethernet (up to 40GbE) and Fibre Channel switches. Virtual Connect FlexFabric modules avoid the confusion of traditional and other converged network solutions by eliminating the need for multiple Ethernet and Fibre Channel switches, extension modules, cables, and software licenses. In addition, Virtual Connect wire-once connection management is built-in—enabling server adds, moves, and replacements in minutes instead of days or weeks.

FlexFabric bridges the convergence gap between server and network with single-hop and dual-hop FCoE to provide maximum flexibility. Single-hop brings convergence to servers without changing the existing LAN and SAN. Dual-hop FCoE brings convergence from the server to the aggregation layer.

Proven wire-once simplicity

By simplifying and converging your server edge connections, HPE Virtual Connect makes server changes transparent to storage and networks, and delivers four times the number of connections per physical network link. Virtual Connect enables you to dynamically optimize and control bandwidth using fewer physical ports for the same performance, while also reducing server edge infrastructure—switches, host bus adapters (HBAs), network interface cards (NICs), and cables—up to 95 percent, lowering hardware costs up to 65 percent, and consuming up to 40 percent less power. HPE Virtual Connect FlexFabric Ethernet and Fibre Channel Modules connects servers and virtual machines to data and storage networks over Ethernet, Fibre Channel, and iSCSI protocols. With more than 10 million ports shipped, Virtual Connect continues to deliver proven simplified operations for HPE BladeSystem c-Class and HPE ProLiant blade servers through Gen10.

HPE Virtual Connect

Easy operations deployment

- Server blades are change-ready—you can add, move, replace, or upgrade server blades, as well as move workloads without affecting your LAN or SAN.
- You can wire once, and then add, move, and change network connections in minutes instead of days. You can also manage connections to thousands of servers from a single console.
- Offering both single- and dual-hop FCoE capabilities, HPE Virtual Connect simplifies your network; you can use one module for all your data and storage connection needs. Single-hop FCoE enables a converged fabric at the server end without impacting traditional LAN and SAN. Dual-hop FCoE bridges the gap between a converged fabric at the server end and the aggregation layer.
 - The HPE Virtual Connect FlexFabric family supports both single- and dual-hop FCoE.
 - The HPE Virtual Connect Flex-10/10D Module supports dual-hop FCoE.
 - The HPE Virtual Connect Fibre Channel Modules support native 16 G and 8 G Fibre Channel connectivity.

- HPE Virtual Connect modules are compatible with existing data and storage networks, protocols, and procedures, as well as with all other standards-based switch products. Virtual Connect modules provide high-performance and end-to-end optical or copper connections with HPE Networking and other brands of aggregation or core switches.
- HPE Virtual Connect modules are edge-safe. Any changes to the server are transparent to its associated network. This clearly separates the server blades from your LAN/SAN and relieves LAN/SAN administrators from server maintenance.
- FlexFabric 2-port adapters support hypervisor best practice configurations, with six HPE FlexNIC and two HPE FlexHBA standard connections on each adapter. With specific FlexFabric adapters, VC 4.50 and HPE OneView 3.x, up to 8 connections can be supported per port.
- The HPE Virtual Connect FlexFabric family supports Flat SAN solutions by directly attaching to Fibre Channel (FC) storage with HPE 3PAR StoreServ Storage Systems. Doing so removes the need for a SAN fabric between servers and HPE 3PAR Storage Arrays—resulting in operational simplicity and reduced total cost of ownership (TCO) when connecting to FC storage in a virtualized environment.

Easy operations deployment

- Requiring up to 95 percent² fewer network cards, switches, and cables to buy, install, qualify, and maintain, HPE Virtual Connect Converged Networking helps significantly reduce power, cooling, and equipment costs.
- Make the most efficient use of your network by using only the capacity you need.
- Increase uptime with high-availability features such as NIC teaming, trunk failover, and dual redundant Virtual Connect FlexFabric modules.
- Optimize network traffic using direct uplink connections to your LAN and SAN, rather than rerouting SAN traffic to the LAN.
- Leverage built-in standards-based data center connectivity, including port-based VLANs, VLAN Tagging, Internet Group Management Protocol (IGMP) Snooping, N_Port ID Virtualization (NPIV), and uplink port aggregation with up to 1,000 VLANs per shared uplink set.
- Fine-tune the performance of each data and storage connection to meet the needs of each virtual machine (VM) and workload.

Security and management

- The Virtual Connect Manager (VCM) web-based console is embedded in each Virtual Connect FlexFabric and Converged Networking/Ethernet module. You can define available LANs, SANs, and server connections, as well as manage server connection profiles for individual BladeSystem enclosures.
- Virtual Connect can also be managed by HPE OneView—a fresh approach to converged infrastructure management. Offering with a single integrated view of IT infrastructure based on templates, HPE OneView can manage compute, network, storage, and power.
- Virtual Connect supports both SNMP v1 and SNMP v2 traps, traps for key pre-defined threshold conditions, and per-destination configuration of traps.
- You can configure additional role-based privileges for user accounts for domain, server, networking, and storage administrators.
- Multi-enclosure stacking enables all Virtual Connect modules (up to four connected HPE BladeSystem c7000 Enclosures) to function as a single Virtual Connect domain.

^{1, 2} HP (now Hewlett Packard Enterprise) internal calculations comparing the number of hardware components of traditional infrastructure vs. HPE BladeSystem with two Virtual Connect FlexFabric modules, June 2013.

HPE Virtual Connect Ethernet

Ease of operations and deployment

- You can preconfigure the enclosures for easy, drop-in server installations, either locally or remotely.
- Server blades are change-ready; you can add, move, replace, or upgrade server blades, as well as move workloads, without affecting your LAN.
- The standards-based HPE VC Ethernet modules are compatible with all other standards-based Ethernet switch products. These modules provide high-performance, end-to-end optical or copper connections with HPE Networking and other brands of core switches.
- HPE Virtual Connect Ethernet modules appear as pass-thru devices to the network. Any changes to the server are transparent to its associated network. Doing so clearly separates the server blades from your LAN and relieves LAN administrators from server maintenance.
- FIP Snooping enables Virtual Connect FlexFabric and Flex-10/10D to connect with Nexus 5000.
- Please refer to **SPOCK** for upstream FCoE switches supported.

Enterprise-class performance availability

- You can choose from: 1/10/20 Gb downlink connections to server-embedded and mezzanine NICs and CNAs; up to 480 Gb full-duplex uplink bandwidth through 10/40GbE and 2/4/8 Gb Fibre Channel uplinks for providing non-blocking bandwidth to data center networks. Standards-based data center connectivity is built-in, using features such as port-based virtual LANs (VLANs), VLAN Tagging, IGMP Snooping, NPIV, and uplink port aggregation with up to 1,000 VLANs per shared uplink set. Starting with Virtual Connect 4.50, eight physical functions are supported per port (requires HPE OneView 3.0 and only on VC FlexFabric-20/40 F8 module).
- Virtual Connect server profiles are shared and continually updated between Virtual Connect Manager high-availability pairs.
- Support for SR-IOV functionality improves I/O performance by up to 30 percent.

Security and management

- Embedded VCM web-based console runs on either Virtual Connect Ethernet or FlexFabric modules. You can define available LANs and server connections, as well as manage server connection profiles for individual HPE BladeSystem enclosures.
- Role-based privileges for the administrator account are defined by default; the privileges can be modified by the server administrator and integrated with Lightweight Directory Access Protocol (LDAP) servers.
- For networking environments that have implemented TACACS+ and RADIUS protocols for security, Virtual Connect Ethernet supports these protocols in addition to LDAP.
- Additional role-based privileges for user accounts can be created for domain, server blade, networking, and storage.

Learn more at hpe.com/info/virtualconnect

Virtual Connect Interconnect Modules for HPE BladeSystem c-Class servers



HPE Virtual Connect FlexFabric 20/40 F8 Module



HPE Virtual Connect FlexFabric 10 Gb/24-port Module



HPE Virtual Connect Flex-10/10D Module

Module type	Single bay	Single bay	Single bay
Network connections	<ul style="list-style-type: none"> • 16 x 10/20 Gb downlinks to servers • 2 x 20 Gb cross-connects • 4 x 40 Gb SR, LR fiber, DAC, and AOC QSFP+ including DAC splitter cable uplinks • 8 x 10 Gb external SR, LR fiber, and copper uplinks SFP+ (Ethernet/FC) • One internal interface to BladeSystem c-Class Onboard Administrator Module 	<ul style="list-style-type: none"> • 16 x 10 Gb downlinks to servers • 2 x 2 x 10 Gb cross-connects • 4 x 10 Gb external SR, LR fiber, and copper uplinks SFP+ (Ethernet/FC) • 4 x 10 Gb external SR, LRM, and LR fiber and copper uplinks SFP+ (Ethernet) • One internal interface to BladeSystem c-Class Onboard Administrator Module 	<ul style="list-style-type: none"> • 16 x 10 Gb downlinks mid-plane • 4 x 10 Gb cross-connects • 10 x 10 Gb SR, LR, or LRM fiber uplinks SFP+ • One internal interface to BladeSystem c-Class Onboard Administrator Module
Media types	<ul style="list-style-type: none"> • FC SFP/SFP+ • 2/4/8 Gb short wave up to 500 m • 1/2/4 Gb long wave up to 10 km • Ethernet SFP/SFP+/QSFP+ • 10GbE SR, LR, and LRM • 10GbE copper direct-attached cable • 40GbE SR, LR, and direct attached cable both DAC and AOC • HPE 10 m C-series Active Copper SFP+ Cable • HPE BLc 40G QSFP+ to QSFP+ 7 m, 10 m, 15 m AOC Cable • HPE BLc QSFP+ 4 to 4 x 10 SFP+ 7 m, 10 m, 15 m AOC Splitter Cable • HPE X242 SFP+ 3 m, 5 m, 7 m DAC Cable • HPE X242 QSFP+ 1 m, 3 m, 5 m DAC Cable • HPE X242 QSFP+ 4 to 4 x 10 SFP+ 1 m, 3 m, 5 m DAC Splitter Cable • HPE 10Gbase-T SFP+ transceiver 	<ul style="list-style-type: none"> • FC SFP/SFP+ • 2/4/8 Gb short wave up to 500 m • 1/2/4 Gb long wave up to 10 km • Ethernet SFP/SFP+ • 10GbE SR, LR, and LRM, 10GbE copper direct-attached cable • 1GbE SX • 1GbE 1000BASE-T copper HPE 7 m C-series Active Copper SFP+ Cable • HPE 10 m C-series Active Copper SFP+ Cable • HPE X242 SFP+ 7 m DAC Cable • HPE 10Gbase-T SFP+ transceiver 	<ul style="list-style-type: none"> • SFP+ SR, LR, LRM SFP SX, RJ45, SFP+ Copper • HPE 7 m C-series Active Copper SFP+ Cable • HPE 10 m C-series Active Copper SFP+ Cable • HPE X242 SFP+ 7 m DAC Cable • HPE 10Gbase-T SFP+ transceiver
Performance	<ul style="list-style-type: none"> • Line rate, full-duplex 1.2 TB/s bridging fabric • 1.0 μs on Ethernet-only ports • 1.8 μs on Ethernet/FC ports • Maximum Ethernet frame size 9,216 (jumbo frame) • Maximum FC frame size 2,148 bytes (2,112 byte payload) • Buffer-to-buffer flow control management • Packet prioritization 	<ul style="list-style-type: none"> • Line rate, full-duplex 480 Gbps bridging fabric • 1.2 μs on Ethernet-only ports • 2.0 μs Ethernet/FC ports • Maximum Ethernet frame size 9,216 (jumbo frame) • Maximum FC frame size 2,148 bytes (2,112 byte payload) • Buffer-to-buffer flow control management • Packet prioritization 	<ul style="list-style-type: none"> • Line rate, full-duplex 600 Gbps bridging fabric • 1.0 μs with Ethernet-only ports • Maximum Ethernet frame size 9,216 (jumbo frame)
Protocol support	<ul style="list-style-type: none"> • IEEE 802.1Qbb (preliminary), 802.1Qaz (preliminary), 802.1AB, 802.1D, 802.1Q • IEEE 802.2 • IEEE 802.3ad INCITS FC-BB5 Rev 2.00 INCITS T11 NPIV • SR-IOV • FC-BB5 (single-hop and dual-hop) 	<ul style="list-style-type: none"> • FC-BB5 (single-hop and dual-hop) • IEEE 802.1Qbb (preliminary), 802.1Qaz (preliminary), 802.1AB, 802.1D, 802.1Q • IEEE 802.2 • IEEE 802.3ad • SR-IOV • FC-BB5 (dual-hop only) 	<ul style="list-style-type: none"> • IEEE 802.1Qbb (preliminary), 802.1Qaz (preliminary), 802.1AB, 802.1D, 802.1Q • IEEE 802.2 • IEEE 802.3ad INCITS FC-BB5 Rev 2.00 INCITS T11 NPIV • SR-IOV

Virtual Connect Interconnect Modules for HPE BladeSystem c-Class servers (continued)

Management	Simple and intuitive GUI and setup wizards, embedded SNMP v1, v2, v3; SMI-S, Virtual Connect Manager, HPE OneView, IPv6 and sFlow®	Simple and intuitive GUI and setup wizards, embedded SNMP v1, v2, v3; SMI-S, Virtual Connect Manager, HPE OneView; IPv6, and sFlow	Simple and GUI and setup wizards, embedded SNMP v1, v2, v3; SMI-S, Virtual Connect Manager, HPE OneView; IPv6, and sFlow
Extended management features	Virtual Connect Manager supports PXE, WOL, port VLAN, VLAN Tagging, VLAN pass-thru, IGMP Snooping, NIC Teaming integrated with Onboard Administrator, HPE Systems Insight Manager, HPE Storage Essentials (FC Management MIB), Telnet, SNMP, FC port telemetry via GUI, telemetry support for port utilization including memory, and CPU performance measurement including FlexNICs telemetry. Converged Infrastructure Management with HPE OneView; can be used for complete infrastructure management; Virtual Connect modules are also managed by HPE OneView. Refer to hpe.com/info/oneview for more information	Virtual Connect Manager supports PXE, WOL, port VLAN, VLAN Tagging, VLAN pass-thru, IGMP Snooping, NIC Teaming integrated with Onboard Administrator, HPE Systems Insight Manager, HPE Storage Essentials (FC Management MIB), Telnet, SNMP, FC port telemetry via GUI, telemetry support for port utilization including memory, and CPU performance measurement including FlexNICs telemetry. Converged Infrastructure Management with HPE OneView; can be used for complete infrastructure management; Virtual Connect modules are also managed by HPE OneView. Refer to hpe.com/info/oneview for more information.	Virtual Connect Manager supports PXE, WOL, port VLAN, VLAN Tagging, VLAN pass-thru, IGMP Snooping, NIC Teaming integrated with Onboard Administrator, HPE Systems Insight Manager, Telnet, SNMP, Telemetry support for port utilization including memory, and CPU performance measurement including FlexNICs telemetry. Converged Infrastructure Management with HPE OneView; can be used for complete infrastructure management; Virtual Connect modules are also managed by HPE OneView. Refer to hpe.com/info/oneview for more information.
High-availability features	<ul style="list-style-type: none"> • Link aggregation protocol automatic • Loop protection • Mirrored profile database • Multi-path heartbeat between redundant modules 	<ul style="list-style-type: none"> • Link aggregation protocol automatic • Loop protection • Mirrored profile database • Multi-path heartbeat between redundant modules 	<ul style="list-style-type: none"> • Link aggregation protocol automatic • Loop protection • Mirrored profile database • Multi-path heartbeat between redundant modules
Security	<ul style="list-style-type: none"> • LDAP, SSL, TACACS+, and RADIUS • Role-based management • GUI and CLI session timeout 	<ul style="list-style-type: none"> • LDAP, SSL, TACACS+, and RADIUS • Role-based management • GUI and CLI session timeout 	<ul style="list-style-type: none"> • LDAP, SSL, TACACS+, and RADIUS • Role-based management • GUI and CLI session timeout
Diagnostics	Troubleshoot network performance and monitor health in terms of CPU and memory, FlexNIC and LAG stats; mirroring—any uplink port can be used as a dedicated mirrored port from the server port(s)	Troubleshoot network performance and monitor health in terms of CPU and memory, FlexNIC and LAG stats; mirroring—any uplink port can be used as a dedicated mirrored port from the server port(s)	Troubleshoot network performance and monitor health in terms of CPU and memory, FlexNIC and LAG stats; mirroring—any uplink port can be used as a dedicated mirrored port from the server port(s)
Maximum per enclosure	Six	Eight	Eight
Direct attach with FC storage	With HPE 3PAR StoreServ 7000/8000 Series	With HPE 3PAR StoreServ 7000/8000 Series	N/A
Part number	691367-B21 691367-B22 (TAA compliant SKU)	571956-B21 605865-B21 (dual modules with VCEM)	638526-B21 662048-B21 (dual module with VCEM)
Warranty in year(s) (parts/labor/on-site)	1/1/1	1/1/1	1/1/1

HPE Virtual Connect Fibre Channel

Ease of operations and deployment

- With NPIV and HPE Virtual Connect Fibre Channel technology, storage management is no longer limited to a single HBA Worldwide Name (WWN) on the physical server. NPIV provides the ability to share a single physical Fibre Channel HBA port among multiple virtual ports, each with its own unique identifiers. This approach allows control of virtual machine access to LUNs on a per-virtual-machine basis.
- The standards-based HPE Virtual Connect Fibre Channel Module interoperates with other SAN switch products. NPIV allows you to scale, gaining immediate benefits without having to add domain IDs. Consider a blade server environment, such as an HPE BladeSystem c7000 chassis that has Fibre Channel switches in the back of the chassis. By using NPIV, you can add these switches to your fabric without assigning a domain ID to each one—resulting in high-performance end-to-end connections with your available options of core switches.

Enterprise-class performance availability

- Storage resources can be provisioned and associated directly to a specific virtual machine in a virtualized server environment.
- High-availability features such as dual modules and automatic failover increase uptime.
- VC server blade profiles are shared and continually updated between high-availability pairs.
- Enhanced NPIV capability supports multiple virtual machines per server blade and provides a separate storage resource to each virtual machine—up to 128 per server blade.

HPE Virtual Connect 16 Gb 24-port Fibre Channel Module

This module offers the highest bandwidth in the Virtual Connect Fibre Channel line-up. This standards-based module is compatible with all other NPIV standards-based switch products—enabling high-performance and end-to-end connections with your available 16 Gb, 8 Gb, and 4 Gb SAN switches.

The 16 Gb Fibre Channel interconnect enables greater performance and server consolidation. Eight SAN-facing ports and 16 server ports help reduce oversubscription for high-throughput applications. In addition, separate storage resources are available for each virtual machine—up to 255 per server blade. The interconnect is manageable with HPE OneView 3.0.

HPE Virtual Connect 8 Gb/24-port Fibre Channel Module

Look to the HPE Virtual Connect 8 Gb/24-port Fibre Channel for 8 Gb bandwidth and high port density. This standards-based module is compatible with all other NPIV standards-based switch products—enabling high-performance and end-to-end connections with your available options of core switches.

The 8 Gb Fibre Channel interconnect enables greater performance and server consolidation. Eight SAN-facing ports and 16 server ports help reduce oversubscription for high-throughput applications. In addition, separate storage resources are available for each virtual machine—up to 255 per server blade.

HPE Virtual Connect 8 Gb/20-port Fibre Channel Module

Simplify your data center and make it change-ready with the HPE Virtual Connect 8 Gb/20-port Fibre Channel Module for BladeSystem c-Class. The HPE Virtual Connect 8 Gb/20-port FC Module offers enhanced support for server-side NPIV and Virtual Connect capabilities—allowing up to 128 virtual machines to run on the same physical server and to access separate storage resources.

Provisioned storage resources are directly associated to a specific virtual machine—even if the virtual server is re-allocated within the BladeSystem enclosure. Storage management of virtual machines is no longer limited by the single physical HBA on a server blade. SAN administrators can now manage virtual HBAs with the same methods and viewpoint of physical HBAs.

The HPE VC 16 Gb and 8 Gb Fibre Channel Module for HPE BladeSystem c-Class are the simplest, most flexible connection to your SAN fabrics. The modules simplify server connections by cleanly separating the server enclosure from SAN, simplifies SAN fabrics by reducing cables without adding switches to the domain, and allows you to change servers in just minutes, not days.

Virtual Connect Fibre Channel Modules for HPE BladeSystem c-Class servers



HPE Virtual Connect 16 Gb/24-port Fibre Channel Module



HPE Virtual Connect 8 Gb/20-port Fibre Channel Module



HPE Virtual Connect 8 Gb/24-port Fibre Channel Module

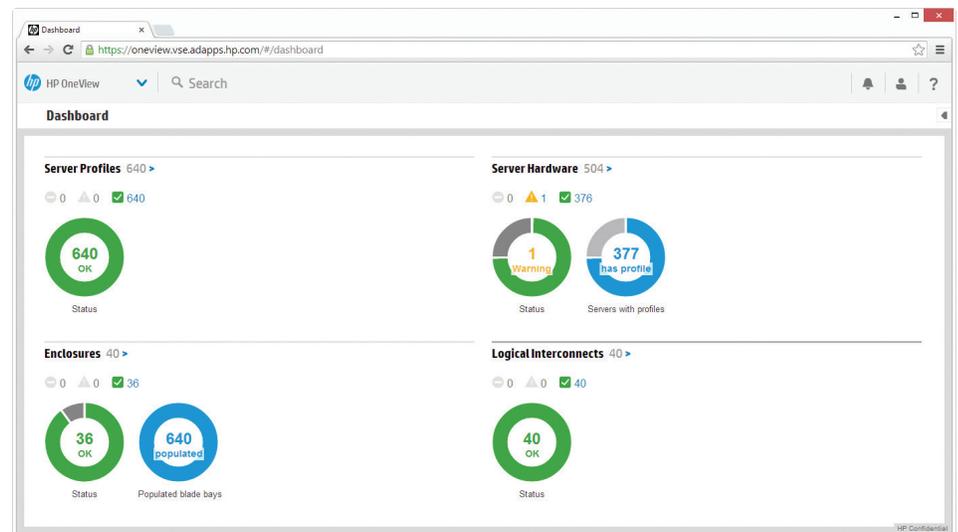
Blade type	Single bay	Single bay	Single bay
Network connections	16 internal 16/8 Gb downlinks presented as F-Ports Eight external 16/8/4 Gb uplinks presented as N-Ports	16 internal 8 Gb downlinks presented as F-Ports Four external 8 Gb uplinks presented as N-Ports	16 internal 8 Gb downlinks presented as F-Ports Eight external 8 Gb uplinks presented as N-Ports
Media types	<ul style="list-style-type: none"> • Small form-factor pluggable (SFP) laser • HPE B-series 16 Gb SFP+ Short Wave Transceiver • HPE B-series 8 Gb SFP+ Short Wave Transceiver 	<ul style="list-style-type: none"> • Small form-factor pluggable (SFP) laser • 2/4/8 Gb short wave, up to 500 m (1,640 ft.) • 1/2/4 Gb long wave, up to 10 km 	<ul style="list-style-type: none"> • Small form-factor pluggable (SFP) laser • SFP laser • 1/2/4 Gb short wave, long wave • SFP+ 2/4/8 Gb short wave, long wave
Performance	<ul style="list-style-type: none"> • 16 Gbps line speed, full duplex • 700 ns latency • Maximum frame size 2,112-byte payload • Buffer-to-buffer flow control management packet prioritization 	<ul style="list-style-type: none"> • 8 Gbps line speed, full duplex • 1.2 µs latency • Maximum frame size 2,112-byte payload • Buffer-to-buffer flow control management packet prioritization 	<ul style="list-style-type: none"> • 8 Gb/sec line speed, full duplex • 700 ns latency • Maximum frame size 2,148 bytes (2,112-byte payload)
Protocol support	INCITS T11 NPIV	INCITS T11 NPIV	INCITS T11 NPIV
Management	<ul style="list-style-type: none"> • Simple and intuitive GUI and setup wizards accessible through VC Ethernet module • CLI accessible through VC Ethernet module • Embedded SNMP v1 and v2 • SMI-S, Virtual Connect Manager, HPE OneView 	<ul style="list-style-type: none"> • Simple and intuitive GUI and setup wizards accessible through VC Ethernet module • CLI accessible through VC Ethernet module • Embedded SNMP v1 and v2 • SMI-S, Virtual Connect Manager, HPE OneView 	<ul style="list-style-type: none"> • Simple and intuitive GUI and setup wizards accessible through VC Ethernet module • CLI accessible through VC Ethernet module • Embedded SNMP v1 and v2 • SMI-S, Virtual Connect Manager, HPE OneView
Extended management features	Virtual Connect Manager supports HPE Storage Essentials (FC Management MIB)	Virtual Connect Manager supports HPE Storage Essentials (FC Management MIB)	Virtual Connect Manager supports HPE Storage Essentials (FC Management MIB)
High-availability features	<ul style="list-style-type: none"> • N-Port trunking support for uplinks when connecting with Brocade SAN switches • Automatic loop protection • Mirrored profile database • Multi-path heartbeat between redundant modules 	<ul style="list-style-type: none"> • Link aggregation protocol • Automatic loop protection • Mirrored profile database • Multi-path heartbeat between redundant modules 	<ul style="list-style-type: none"> • N-Port trunking for uplink ports • Link aggregation protocol • Automatic loop protection • Mirrored profile database • Multi-path heartbeat between redundant modules
Security	LDAP, SSL, role-based management	LDAP, SSL, role-based management	LDAP, SSL, role-based management
Maximum per enclosure	Six	Six	Six
Part number	751465-B21 778720-B21 (TAA-compliant)	572018-B21	466482-B21
Warranty in year(s) (parts/labor/on-site)	1/1/1	1/1/1	1/1/1

Next-generation infrastructure management

Designed for the way you work

Shifting the focus from “devices” to “how people work,” HPE OneView offers a fresh approach to converged infrastructure management. HPE OneView features an innovative architecture and a consumer-inspired experience that aligns with how users interact with complex and highly dynamic systems—making tasks and collaboration much more automated, natural, and streamlined. As a result, HPE OneView simplifies the management of compute, network, and storage resources in physical and virtual environments.

HPE OneView’s software-defined approach to infrastructure management is designed to automate the delivery of IT services, so they are much faster, cost-effective, and reliable. This open and programmable platform is very extensible. It integrates seamlessly with Hewlett Packard Enterprise, partner and third-party management tools to efficiently orchestrate IT service delivery workflows. HPE OneView can do the work of many current management tools.



Transform the way you manage your IT infrastructure

- Use the visual mapping of virtualized workloads to physical resources to troubleshoot network problems in 30 seconds instead of two hours.³
- Get an instant bird’s-eye view of all infrastructure resources with the comprehensive HPE OneView dashboard.
- Quickly find what you’re looking for in your environment, and then act on it with Smart Search.
- Perform anytime, anywhere management using a contemporary web-based management platform that is mobile-friendly HTML5.
- Support intuitive power management with 3D power/thermal mapping.

Software-defined management

- Server profile templates can be used to enforce configuration consistency in monitoring and updating multiple servers.
- Profile Dashboard enables users quick access to additional details from Storage and Networking.
- Software updates at scale using template-driven firmware and device driver management.

³ Based on HP (now Hewlett Packard Enterprise) internal testing comparing HPE OneView v1 vs. Cisco UCS as of September 2013. Test was to identify services that will be affected when a network needs to be retired in an environment of 160 servers—HPE OneView takes about 30 seconds and four steps vs. UCS takes about two hours and >480 steps.

- Profile mobility for simple migration and recovery of workloads across compute platforms and generations.
- Push-button builds allow you to instantly deliver resources without mistakes or variations in configuration profiles; provision a VMware® ESX® infrastructure more than 20X faster.⁴
- Workflow templates capture best practices and policies, helping to boost productivity, compliance, and consistency.
- Server profiles and enclosure groups can be created once and rolled out to hundreds of enclosures and systems.
- Starting with HPE OneView 3.0, migrate to HPE OneView more easily than ever with new online in-service Virtual Connect migration. No more enclosure outages or time consuming virtual machine migrations.

Open, extensible platform

- Orchestrate your operations and project execution.
- Easily customize workflows and scripts with a fully programmable interface.
- Replace the hodge-podge approach of traditional systems consistent APIs by using a common data model and message bus.
- Work faster—integrate with other applications, processes, and devices in minutes vs. hours.
- Streamline management—a single instance of HPE OneView can manage up to 640 servers.

To learn more visit: hpe.com/info/oneview

Ethernet blade switches

Simplify your network

Hewlett Packard Enterprise is redefining the data center. We started with the BladeSystem c-Class—a simple, modular infrastructure designed to help you save time, energy, and money, regardless of what you put inside. BladeSystem also helps you create an efficient data center that can access and disseminate data instantaneously, securely, and reliably—and the Hewlett Packard Enterprise portfolio of Ethernet switching products makes it happen.

HPE BladeSystem c-Class switches provide a rich set of networking features that can lower maintenance and operating costs—while also increasing network reliability—by sharing the same redundant power and cooling resources with the server blades, aggregating cables and reducing wiring clutter.

An Ethernet switch for every application

Whether you need basic network connectivity for a remote office, or a high-bandwidth, low-latency link for a high-performance computing cluster, you can count on HPE Ethernet switches to provide the solution. You can choose from simple-to-configure 1 Gb switches, 1 Gb/10 Gb hybrid switches designed especially for data centers in transition, or a powerful 40 Gb switch designed for handling data from today's multiprocessor virtualized servers.

If your data center has an ever-increasing appetite for bandwidth, look to Hewlett Packard Enterprise for help. When coupled with our high-performance server blades and mezzanine cards, HPE Ethernet switches also support FCoE standards—all from a single network connection. These protocols are designed to move data more efficiently and with less overhead than standard methods. Redefining the data center and simplifying your job—as well as offering greater value, reliability, connectivity, and scalability—is what the HPE Ethernet Blade Switch portfolio is all about.

⁴ Based on HP (now Hewlett Packard Enterprise) internal testing of HP (now Hewlett Packard Enterprise) OneView vs. previous HPE tools as of September 2013.

HPE 6125/6127 Blade Switch Series

Designed from the ground up with the latest switching technology, and configured with processing power and memory usually reserved for higher-density rack switches, the HPE 6125 and HPE 6127 Switch series brings a new level of network access to the BladeSystem c-Class enclosure.

All Hewlett Packard Enterprise Switches run on Comware, a common operating system for blade, top-of-rack aggregation, and core Ethernet switches from HPE Networking. Using a common operating system means that today's demanding data centers can be managed and configured from edge-to-core under a single stream of firmware using common configuration scripts, troubleshooting procedures, and upgrade policies. HPE Blade Switches can be combined into a single virtual switch using the HPE Intelligent Resilient Framework (IRF).

HPE 6125 and 6127 Switches provide Layer 3 routing, and are IPv6 compatible

Similar to all HPE Networking top-of-rack switches, these blade switches can be managed through the HPE Intelligent Management Center (IMC). HPE IMC is next-generation management software that provides your data center operations team with a comprehensive single-console management platform that integrates network technologies and provides full fault tolerance, configuration, accounting, performance, and security management functionality.

Announcing the HPE 6127XLG Blade Switch

Today's complex data centers require a demanding networking infrastructure. It all starts at the edge and that's where the HPE 6127XLG Ethernet Blade Switch excels. The HPE 6127XLG Switch is designed to support virtualized server environments with exceptional bandwidth of 20 Gb to each and every server, while providing a mix of 40 Gb and 10 Gb links (with an astounding aggregate of 240 Gb) to the core network. Combined with hardware support for VXLAN encapsulation, this provides the perfect switch for Private/Public/Hybrid Cloud applications. Enterprise customers will not be disappointed with the HPE 6127XLG which also provides a converged fabric solution that supports Ethernet, iSCSI, RoCE, Fibre Channel over Ethernet (FCoE), and Fibre Channel Forwarder (FCF) protocols that enables connectivity for multiple storage topologies. The HPE 6127XLG supports the HPE Software-defined Network (SDN) ecosystem that delivers simple, open, and enterprise ready benefits to automate the data center network. Just like the other HPN blade switches, the HPE 6127XLG supports Intelligent Resilient Framework (IRF) allowing multiple switches to be virtualized and managed as a single entity with HPE Intelligent Management Center (IMC). A full complement of Layer 2/3 protocols and the latest in network security features round out this most capable of blade switches.

To learn more visit: hpe.com/servers/blades/interconnects

Ethernet Interconnect Modules for HPE BladeSystem c-Class servers



**HPE 6127XLG
Ethernet Blade Switch**



**HPE 6125XLG
Ethernet Blade Switch**



**HPE 6125G/XG
Ethernet Blade Switch**



**HPE 6125G Ethernet
Blade Switch**

Blade type	Single bay	Single bay	Single bay	Single bay
Network connections	16 internal 1/10/20 Gb downlinks Four external 40 Gb Eight external 10 Gb Four internal 10 Gb cross-link IRF support up to eight devices One management console port	16 internal 1/10 Gb downlinks Four external 40 Gb Eight external 10 Gb Four internal 10 Gb cross-link IRF support up to eight devices One management console port	16 internal 1 Gb downlinks Four external RJ45 (1 Gb) Four external SFP/SFP+ (1 Gb) Four IRF at 10 Gb (IRF up to 10 devices) One internal 10 Gb cross-link One management console port	16 internal 1 Gb downlinks Four external RJ45 (1 Gb) Four external SFP (1 Gb) Two IRF at 10 Gb (IRF up to 10 devices) One internal 10 Gb cross-link One management console port
Media types	SFP+ SR/LR/LRM optical QSFP+	SFP+ SR/LR/LRM optical QSFP+	Copper RJ45 SFP SX optical SFP+ SR/LR/LRM optical	Copper RJ45 SFP SX optical
Performance	240 Gbps uplink port bandwidth; 320 Gbps downlink (server) port bandwidth; 40 Gbps cross-link bandwidth. Forwarding rate 1.5 million pps per Gigabit port (64-byte packets), 14.8 million pps per 10 Gb port, and 59.3 million pps per 40 Gb port.	240 Gbps uplink port bandwidth; 160 Gbps downlink (server) port bandwidth; 40 Gbps cross-link bandwidth. Forwarding rate 1.5 million pps per Gigabit port (64-byte packets), 14.8 million pps per 10 Gb port, and 59.3 million pps per 40 Gb port.	44 Gbps uplink port bandwidth; 16 Gbps downlink (server) port bandwidth; 10 Gbps cross-link bandwidth. Forwarding rate 1.5 million pps per Gigabit port (64-byte packets), and 14.8 million pps per 10 Gb port.	26 Gbps uplink port bandwidth; 16 Gbps downlink (server) port bandwidth; 10 Gbps cross-link bandwidth. Forwarding rate 1.5 million pps per Gigabit port (64-byte packets), and 14.8 million pps per 10 Gb port.
Protocol support	SSHv2, TACACS, TACACS+, RADIUS; IEEE 802.3, 802.3ab, 802.1ad, 802.1s, 802.1w, 802.1p, 802.1x, 802.1Qbg (VEPA) 802.3ad (static), 802.1Q, IGMP and 1588 Snooping, BOOTP, FCoE, FCF, TRILL, SPB; VXLAN	SSHv2, TACACS, TACACS+, RADIUS; IEEE 802.3, 802.3ab, 802.1ad, 802.1s, 802.1w, 802.1p, 802.1x, 802.1Qbg (VEPA) 802.3ad (static), 802.1Q, IGMP and 1588 Snooping, BOOTP, FCoE, FCF, TRILL, SPB	SSHv2, TACACS, TACACS+, RADIUS; IEEE 802.3, 802.3ab, 802.1D, 802.1s, 802.1w, 802.1p, 802.1x, 802.3ad (static), and 802.1Q, IGMP Snooping, and BOOTP	SSHv2, TACACS, TACACS+, RADIUS; IEEE 802.3, 802.3ab, 802.1D, 802.1s, 802.1w, 802.1p, 802.1x, 802.3ad (static), and 802.1Q, IGMP Snooping, and BOOTP
Management	CLI SNMP v1, v2c, and v3 OOBM via OA GUI management via IMC RJ45 console port sFlow and RMON networking monitoring NTP OAM (802.3ah) CFD (802.1ag) Virtual Application Network (VAN), ISSU, SDN with OpenFlow	CLI SNMP v1, v2c, and v3 OOBM via OA GUI management via IMC RJ45 console port sFlow and RMON networking monitoring NTP OAM (802.3ah) CFD (802.1ag) Virtual Application Network (VAN), ISSU, SDN with OpenFlow	Web browser or CLI, HTTPS SNMP v1, v2c, and v3 OOBM via OA GUI management via IMC RJ45 console port sFlow and RMON networking monitoring NTP OAM (802.3ah) CFD (802.1ag)	Web browser or CLI, HTTPS SNMP v1, v2c, and v3 OOBM via OA GUI management via IMC RJ45 console port sFlow and RMON networking monitoring NTP OAM (802.3ah) CFD (802.1ag)
High-availability features	IRF, LACP Spanning Tree, ECMP, DLDP, RRRPP, Smart Link, VRRP	IRF, LACP Spanning Tree, ECMP, DLDP, RRRPP, Smart Link, VRRP	IRF, LACP Spanning Tree, ECMP, DLDP, RRRPP, Smart Link, VRRP	IRF, LACP Spanning Tree, ECMP, DLDP, RRRPP, Smart Link, VRRP
Maximum per HPE BladeSystem c7000 Enclosure	Eight	Eight	Eight	Eight
Part number	787635-B21; 787635-B22 (TAA)	711307-B21; 737230-B21 (TAA)	658250-B21; 737226-B21 (TAA)	658247-B21; 737220-B21 (TAA)
Warranty in year(s) (parts/labor/on-site)	1/1/1	1/1/1	1/1/1	1/1/1

Mellanox SX1018HPE Ethernet Switch

The extensive HPE BladeSystem switch portfolio now includes the world's fastest Ethernet Blade Switch. Another industry first, the Mellanox SX1018HPE Ethernet Switch provides the lowest port-to-port latency of any blade switch—more than four times faster than previous switches. Hewlett Packard Enterprise is the first to provide 40 Gb downlinks to each blade server, enabling InfiniBand-like performance in an Ethernet Blade Switch. When combined with the space, power, and cooling benefits of blade servers, the Mellanox SX1018HPE Ethernet Switch provides the perfect network interface for financial applications and high-performance clusters.

The Mellanox SX1018HPE Ethernet Switch delivers up to 1.36 TB/s of non-blocking throughput to support high-performance computing, high-frequency trading, and enterprise data center applications.

Utilizing Mellanox SwitchX-2 ASIC technology, the SX1018HPE is an ultra-low latency switch serving as an access switch with 16 x 10 Gb/40 Gb server side downlinks and 18 x 40 Gb QSFP+ uplinks to the core, with port-to-port latency as low as 230 ns.

In addition to a rich set of Layer 2/3 networking and security features, the Mellanox SX1018HPE Ethernet Switch also supports faster application performance and enhanced server CPU utilization with RDMA over Converged Ethernet (RoCE)—making this switch an excellent choice for any high-performance Ethernet network.

Cisco Fabric Extender for HPE BladeSystem

Providing an extension of the Cisco Nexus switch fabric to the HPE server edge, the Cisco Fabric Extender for HPE BladeSystem behaves like a remote line card to a parent Cisco Nexus 5000, 6000, 7000, or 9000 series switch. The Cisco Fabric Extender and the parent Nexus switch form a distributed modular system. The Fabric Extender for HPE BladeSystem forwards traffic to the Cisco Nexus switches over eight 10GbE uplinks.

The Cisco Fabric Extender can switch Ethernet, FCoE, or iSCSI traffic according to policies established by the parent Nexus switch—all from a single point of management.

Ethernet Interconnect Modules for HPE BladeSystem c-Class servers



Mellanox SX1018HPE



Cisco B22 HPE Fabric Extender

Blade type	Double bay	Single bay
Network connections	<ul style="list-style-type: none"> • 16 internal 10 Gb/40 Gb downlinks • 18 40 Gb QSFP+ uplinks • One management console port (double bay width interconnect) 	<ul style="list-style-type: none"> • 16 internal 1/10 Gb downlinks • Eight external SFP+ 10 Gb uplinks
Media types	<ul style="list-style-type: none"> • QSFP+ 	<ul style="list-style-type: none"> • SFP+ SR/LR/optical DAC copper cables • Cisco Fabric Extender Transceivers
Performance	<ul style="list-style-type: none"> • 1,440 Gbps uplink port bandwidth; 640 Gbps downlink (server) port bandwidth; 230 ns latency at 40 Gb; 270 ns latency at 10 Gb; 2 Gb main, 2 MB flash memory 	<ul style="list-style-type: none"> • 48 Gb switching fabric • 128 MB DDR SDRAM • 16 MB flash memory
Protocol support	SSHv2, TACACS, TACACS+, RADIUS, IEEE, 802.3, 802.3u, 802.3ab, 802.1D, 802.1s, 802.1w, 802.1p, 802.3ac, and 802.1x	IEEE 802.1p: CoS prioritization, 802.1Q, 802.3, 802.3ae, 802.3ap, SFF 8431 SFP+ support, RMON, SFF 8461
Management	<ul style="list-style-type: none"> • Web browser or CLI, HTTPS • GUI management via UFM • SNMP v1, v2c, and v3 • OOBM via OA • IGMP v1 and v2, IGMP Querier • NTP • RADIUS/TACACS+ • LLDP Discovery protocol • sFlow • OpenFlow 	<ul style="list-style-type: none"> • Fabric extender management using in-band management; Cisco DCNM and standard SNMP and XML interfaces, and CLI
High-availability features	<ul style="list-style-type: none"> • Rapid spanning tree protocol (RSTP) • Multiple spanning tree protocol (MSTP) • Link aggregation control protocol and MLAG 	<ul style="list-style-type: none"> • Uplink traffic management through Cisco EtherChannel hashing or static port pinning
Maximum per HPE BladeSystem c7000 Enclosure	Two	Eight
Part number	689638-B21	641146-B21 657787-B21
Warranty in year(s) (parts/labor/on-site)	1/1/1	1/1/1

Pass-through Modules for HPE BladeSystem c-Class servers



HPE 10Gb Ethernet Pass-Thru Module II for c-Class BladeSystem



HPE 1Gb Ethernet Pass-Thru Module for c-Class BladeSystem



HPE 4Gb Fibre Channel Pass-Thru Module for c-Class BladeSystem

Blade Type	single bay	single bay	single bay
Network Connections	16 external 1/10Gb uplinks	16 external 1Gb uplinks	16 external 4Gb SFP ports
Part number	854194-B21	406740-B21	403626-B21
Warranty	1/1/1	1/1/1	1/1/1

Adapters for HPE BladeSystem c-Class servers



**HPE FlexFabric 20 Gb
2-port 650FLB adapter**



**HPE FlexFabric 20 Gb
2-port 650M adapter**



**HPE FlexFabric 20 Gb
2-port 630FLB adapter**



**HPE FlexFabric 20 Gb
2-port 630M adapter**

Hardware features

Server type	Blade (Gen8, ⁵ Gen9, Gen10)	Blade (Gen8, ⁶ Gen9, Gen10)	Blade (Gen8, Gen9, Gen10)	Blade (Gen8, Gen9, Gen10)
IEEE compliance	802.3ae, 802.1Q, 802.3x, 802.1p, 802.3ad/LACP, 802.1AB (LLDP), 802.1Qbg, 802.1Qbb, 802.1Qaz, 802.3ap	802.3ae, 802.1Q, 802.3x, 802.1p, 802.3ad/LACP, 802.1AB (LLDP), 802.1Qbg, 802.1Qbb, 802.1Qaz, 802.3ap	802.3, 802.1AB, 802.3x, 802.3ad, 802.3p, 802.1Q, 802.3ae, 802.1au, 802.3ap, 802.1AS, 802.1Qaz, 802.1Qbb, and IEEE 1588	IEEE 802.3, 802.1AB, 802.3x, 802.3ad, 802.3p/802.1Q, 802.3ae, 802.1Qau, 802.3ap, 802.1AS, 802.1Qaz, and 802.1Qbb
Ports/type	2 x 10 Gb/20 Gb	2 x 10 Gb/20 Gb	2 x 10 Gb/20 Gb	2 x 10 Gb/20 Gb
Form factor	FlexibleLOM	Mezzanine	FlexibleLOM	Mezzanine
Network controller	Emulex XE-104	Emulex XE-104	QLogic 57840S	QLogic 57840S
Protocol support	RoCE, VXLAN, Tunnel Offload, iSCSI/FCoE	RoCE, VXLAN, Tunnel Offload, iSCSI/FCoE	RoCE, VXLAN, Tunnel Offload, iSCSI/FCoE	RoCE, VXLAN, Tunnel Offload, iSCSI/FCoE
Adapter teaming	Yes	Yes	Yes	Yes
PXE (pre-boot execution environment)	Yes	Yes	Yes	Yes
TOE	No	No	Yes	Yes
Accelerated iSCSI	Yes	Yes	Yes	Yes
iSCSI boot	Yes	Yes	Yes	Yes
Jumbo frames	Yes	Yes	Yes	Yes
FlexibleLOM compatible	Yes	Yes	Yes	No
Part number	700763-B21	700767-B21	700065-B21	700076-B21
Warranty in year(s) (parts/labor/on-site)	1/0/0	1/0/0	1/0/0	1/0/0

⁵, ⁶ Supported in BL460c Gen8

Adapters for HPE BladeSystem c-Class servers (continued)



HPE NC553m 10 Gb 2-port FlexFabric adapter



HPE NC542m dual-port Flex-10 10 GbE multifunction adapter

Server type	Blade (Gen8)	Blade (Gen8)
IEEE compliance	802.1p, 802.1Q, 802.1Qau, 802.3u, 802.3ad, 802.3ae, 802.3ap (10GBASE-KX4), 802.3x, and 802.3z	802.1p, 802.1Q, 802.3u, 802.3ad, 802.3ae, 802.3x, 802.3z, and 802.3ap (10GBASE-KX4)
Ports/type	2 x 10 Gb	2 x 10 Gb
Form factor	x8 PCIe 2.0 type I card	x8 PCIe 2.0 type I card
Network controller	Emulex BE3	Mellanox ConnectX-2 EN
Software features		
Adapter teaming	N/A	N/A
PXE (pre-boot execution environment)	N/A	N/A
TOE (TCP/IP offload engine)	Yes	N/A
Accelerated iSCSI	Yes	N/A
iSCSI boot	Yes	N/A
Jumbo frames	Yes	Yes
Part number	613431-B21	539857-B21
Warranty in year(s) (parts/labor/on-site)	1/0/0	1/0/0

Adapters for HPE BladeSystem c-Class servers (continued)



HPE NC532m dual-port Flex-10 10 GbE multifunction adapter



HPE NC382m PCI express dual-port multifunction adapter



HPE NC364m quad-port 1 GbE adapter



HPE NC360m quad-port 1 GbE adapter



HPE NC325m PCI Express quad-port adapter

Hardware features

Server type	Blade	Blade	Blade	Blade	Blade
IEEE compliance	802.3u, 802.3x, 802.3ad, 802.1p, 802.1Q, 802.3z, 802.3ae, and 802.3ap (10GBASE-KX4)	802.1p, 802.1Q, 802.3, 802.3ad, and 802.3x			
Ports/type	2 x 10 Gb	2 x 1 Gb	4 x 1 Gb	4 x 1 Gb	4 x 1 Gb
Form factor	x8 PCIe 2.0 type I card	x8 PCIe 2.0 type I card	x8 PCIe 2.0 type I card	x8 PCIe 2.0 type I card	x8 PCIe 2.0 type I card
Network controller	Broadcom 57711	Broadcom 5709S	Dual Intel 82571EB	Intel 82571EB	Dual Broadcom 5715S
Protocol support	Ethernet	Ethernet	Ethernet	Ethernet	Ethernet

Software features

Adapter teaming	N/A	Yes	N/A	N/A	Yes
PXE (pre-boot execution environment)	Yes	Yes	PXE boot with VC modules only	PXE boot with VC modules only	Yes
TOE (TCP/IP offload engine)	Yes	Yes (Microsoft® Windows®)	Yes (Windows)	Yes (Windows)	N/A
Accelerated iSCSI	Yes (Windows)	Yes	Yes (Windows and Linux®)	N/A	N/A
iSCSI boot	Yes (Windows and Linux)	Yes (Windows and Linux)	N/A	N/A	N/A
Jumbo frames	Yes	Yes	Yes	Yes	Yes
Part number	467799-B21	453246-B21	447883-B21	445978-B21	416585-B21
Warranty in year(s) (parts/labor/on-site)	1/0/0	1/0/0	1/0/0	1/0/0	1/0/0

Fibre Channel Switches for HPE BladeSystem c-Class servers



Brocade 16 Gb SAN Switch



Brocade 8 Gb SAN Switch

Performance	896 Gbps (full duplex)	384 Gbps (end-to-end)
Port configuration	16 Gbps, non-blocking, and auto-sensing 8/16 Gb for internal ports and 4/8/16 Gb for external ports	8 Gbps, non-blocking, and auto-sensing 2/4/8 Gb
Management features	SAN Network Advisor (optional); Web tools; advanced zoning; Power Pack+ (bundled or optional); ISL Trunking, Advanced Performance Monitoring, Fabric Watch, Extended Fabrics, Adaptive Networking and Server Application Optimization included in Firmware	Web tools; advanced zoning; Power Pack+ (bundled or optional); Adaptive Networking, Server Application Optimization, ISL Trunking, Advanced Performance Monitoring, Fabric Watch, Extended Fabrics; SAN Network Advisor (optional)
High-availability features	Hot-pluggable; non-disruptive software upgrades; diagnostic ports	Redundant switches; hot-pluggable; non-disruptive software upgrades
Protocols supported	Fibre Channel	Fibre Channel
Part number	C8S45A, C8S46A, and C8S47A	AJ820B, AJ821B, and AJ822B
Warranty in year(s) (parts/labor/on-site)	1/1/1	1/1/1

InfiniBand Switches for HPE BladeSystem c-Class servers



HPE BLc 4X QDR IB Switch



HPE BLc 4X DDR IB G2 Switch

Performance	40 Gbps (QDR) per port, 2.5 TB/s switching capacity	20 Gbps (DDR) per port, 1.28 TB/s switching capacity
Port configuration	16 4X QDR QSFP uplink ports	16 4X DDR QSFP uplink ports
Management features	Externally managed	Externally managed
Protocols supported	IBTA	IBTA
Warranty in year(s) (parts/labor/on-site)	1/0/0	1/0/0

InfiniBand Mezzanine Adapters for HPE BladeSystem c-Class servers



HPE 4X QDR IB Dual-port Mezzanine HCA



HPE IB 4X DDR Dual-port Mezzanine HCA

Server type	Blade	Blade
Performance	4X quad data rate (40 Gbps)	4X double data rate (20 Gbps)
Port configuration	Dual port	Dual port
Warranty in year(s) (parts/labor/on-site)	1/0/0	1/0/0

HPE Services

Proactive, personalized, and simplified

HPE Technology Services offers a comprehensive portfolio of HPE Care Pack Services to help design, deploy, manage, and support your blades-based virtualized environment. The HPE Technology Support Services portfolio is:

- Proactive to help reduce issues and save time
- Personalized to give you the right balance of coverage and control
- Simplified to keep your team productive

Enhanced optimum service-level HPE Care Pack offerings

HPE Proactive Care offers six-hour call-to-repair hardware on-site support with three-year coverage. HPE Proactive Care Services are designed to meet the needs of today's IT environments, combining a carefully designed mix of proactive advice, automated alerts, proactive reports, and rapid expert support.

Offered as HPE Care Pack Services or as a support contract, HPE Proactive Care provides:

- Proactive advice and reporting, which includes tailored reporting, reviews, analyses, and recommendations
- A superior call experience with rapid connection to advanced technical expertise and start to finish case management
- A choice of reactive hardware support levels
- If you want to work with an assigned local Account Support Manager for highly personalized support then consider HPE Proactive Care Advanced support

For more on HPE Proactive Care, visit: hpe.com/services/ProactiveCare

To round out your HPE support experience, you can choose:

- Blade Infrastructure plus Enhanced Network Installation and Startup services to ensure your BladeSystem environment is configured and ready when you are.
- HPE Software Support for industry-leading software such as Microsoft, Red Hat®, SUSE Linux, and VMware®. Buy your subscriptions and support from Hewlett Packard Enterprise for the life of your BladeSystem to further simplify your operations. Make the first call to Hewlett Packard Enterprise.

Connecting devices to Hewlett Packard Enterprise

It is key to connect products to Hewlett Packard Enterprise. Connecting to Hewlett Packard Enterprise to help achieve up to 77 percent reduction⁷ in downtime and near 100 percent diagnostic⁸ accuracy while providing a single consolidated view of their environment. By connecting, customers receive 24x7 monitoring, pre-failure alerts, automatic call logging, and automatic parts dispatch. HPE Proactive Care Services customers will need to connect to Hewlett Packard Enterprise to receive personalized proactive reports.

Minimum recommended HPE Care Pack offerings

HPE Proactive Care with 24x7 hardware support, four-hour response, three-year coverage.

⁷ IDC white paper: The Business Value of Being Connected Document #254594, March 2015

⁸ HP (now Hewlett Packard Enterprise) Customer Support Center reports, 2014–2015

Family data sheet

HPE Factory Express provides customization and deployment services along with your storage and server purchases. You can customize hardware to your exact specifications in the factory—helping speed deployment. hpe.com/go/factoryexpress

Gain the skills you need with ExpertOne training and certification from Hewlett Packard Enterprise. With HPE ProLiant, training, you will accelerate your technology transition, improve operational performance, and get the best return on your Hewlett Packard Enterprise investment. Our training is available when and where you need it, through flexible delivery options and a global training capability. certification-learning.hpe.com/TR/Index.html

Customize your IT lifecycle management, from acquisition of new IT, management of existing assets, and removal of unneeded equipment. hpe.com/go/hpfinancialservices

Transform your data center and make it future-ready. To understand how HPE Virtual Connect solutions can help, visit: hpe.com/info/virtualconnect

Other support options

HPE Datacenter Care

HPE Datacenter Care service is designed to provide an environment-wide support solution tailored to your customer's needs. HPE Datacenter Care is a flexible, comprehensive, relationship-based approach to personalized support and management of heterogeneous data centers. Datacenter Care offers options for multivendor environments, spare parts, infrastructure automation, and more.

HPE Flexible Capacity

As an option of HPE Datacenter Care, HPE Flexible Capacity delivers a public cloud experience with the benefits of public and/or on-premises IT. With this pay-as-you-grow solution, customers can scale instantly to handle their growth needs without the usual wait for the procurement process. Capacity never runs out, and customers don't need to use additional capital.

- **HPE Proactive Select**—A flexible, customizable way to obtain technical expertise and best practices to meet the ongoing and changing needs of your customers' IT environment. Sell Proactive Select credits for technical and operational services for your customer to use as needed.
- **HPE Lifecycle Event Services**—Sold on a per-event basis, Lifecycle Event Services provide expertise at every step, including strategy, design, deployment, operations, and education services. These services help deploy technologies, solutions, and assessments to help enhance and operate the IT infrastructure.
- **HPE Education Services**—Providing comprehensive training designed to expand customers' skills and keep them up to speed with the latest technologies.

Important note about support for options in this family guide

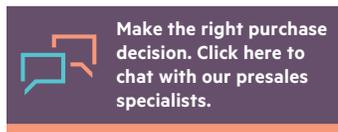
To receive support services (beyond warranty) for certain hardware server options, you must purchase a support service for each individual option. These support services are available for purchase with the primary product. For a list of components that require separate support, please visit: hpe.com/services/excludedoptions.

HPE Care Pack Services benefits

- Deploy your infrastructure quickly, speeding your return on investment
- Increase server uptime, performance, and availability to your business
- Detect and diagnose problems automatically, resulting in quick repairs—saving time, money, and resources

For more information visit: hpe.com/services

Learn more at
hpe.com/info/bladesystem



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