HP Virtual Connect and networking for BladeSystem

September 2014

Proven wire-once simplicity

By simplifying and converging your server edge connections, HP 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. HP Virtual Connect FlexFabric 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.

HP Virtual Connect

Introducing HP Virtual Connect FlexFabric 20/40 F8 Modules
As the simplest, most flexible way to connect virtualized server blades to data or storage networks, HP Virtual Connect FlexFabric 20/40 F8 Modules eliminate up to 95 percent[1] 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 HP FlexFabric Adapters (HP FlexFabric 20 Gb 2-port 630FLB and 630M 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.

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, HP 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 HP Virtual Connect FlexFabric family supports both single- and dual-hop FCoE.

– The HP Virtual Connect Flex-10/10D Module supports dual-hop FCoE.

• HP 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 HP Networking and other brands of aggregation or core switches.

• HP 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 adapters support hypervisor best practice configurations, with six HP FlexNIC and two HP FlexHBA standard connections on each adapter.

• The HP Virtual Connect FlexFabric family supports Flat SAN solutions by directly attaching to Fibre Channel (FC) storage with HP 3PAR StoreServ Storage Systems. Doing so removes the need for a SAN fabric between servers and HP 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 percent[1] fewer network cards, switches, and cables to buy, install, qualify, and maintain, HP 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.

[1] HP internal calculations comparing the number of hardware components of traditional infrastructure vs. HP BladeSystem with two Virtual Connect FlexFabric modules, June 2013.

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 HP OneView—a fresh approach to converged infrastructure management. Offering with a single integrated view of IT infrastructure based on templates, HP 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 HP BladeSystem c7000 Enclosures) to function as a single Virtual Connect domain.

HP 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 HP 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 HP Networking and other brands of core switches.

- HP 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 5K. 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.

- 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 HP 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.

HP Virtual Connect Flex 10/10D Module
An innovative new class of integrated interconnects, the HP Virtual Connect Flex-10/10D Module for HP BladeSystem c-Class simplifies your data center and makes it change-ready. The simplest, most flexible connection to your networks, the Virtual Connect Flex-10/10D Module:

- Simplifies server connections by cleanly separating the server enclosure from the LAN
- Simplifies networks by reducing cables without adding switches to manage
- Allows you to change servers in just minutes, not days
- Tailors network connections and speeds based on application needs
- Bridges the convergence fabric gap between servers and network with the dual-hop feature

HP Flex-10 technology significantly reduces infrastructure costs by increasing the number of NICs per connection without adding extra blade I/O modules, as well as reducing cabling uplinks to the data center network.

Virtual Connect Interconnect Modules for HP BladeSystem c-class servers

	HP Virtual Connect FlexFabric 20/40 F8 Module	HP Virtual Connect FlexFabric 10 Gb/24-port Module	HP Virtual Connect Flex 10/10D Module
Module type	Single bay	Single bay	Single bay
Network connections	• 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	• 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	• 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	• FCSFP/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 • HP 10 m C-series Active Copper SFP+ Cable • HP X242 SFP+ 15 m DAC Cable HP X242 SFP+ 3 m, 5 m 7 m DAC Cable • HP X242 QSFP+ 1 m, 3 M, 5 M DAC Cable • HP X242 QSFP+ 4 to 4 x 10 SFP+ 1 m, 3 m, 5 m DAC splitter Cable	• FCSFP/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 HP 7 m C-series Active Copper SFP+ Cable • HP 10 m C-series Active Copper SFP+ Cable • HP X242 SFP+ 15 m DAC Cable • HP X242 SFP+ 7 m DAC Cable	• SFP+ SR, LR, LRM SFP SX, RJ-45, SFP+ Copper • HP 7 m C-series Active Copper SFP+ Cable • HP 10 m C-series Active Copper SFP+ Cable • HP X242 SFP+ 15 m DAC Cable • HP X242 SFP+ 7 m DAC Cable
Performance	• 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	• 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	• 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	• 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)	• 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 • SRIOV • FC-BB5 (dual-hop only)	• 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 • SRIOV

Virtual Connect Interconnect Modules for HP BladeSystem c-class servers (continued)

Management	• Simple and intuitive GUI and setup wizards, embedded SNMP v1, v2 • SMI-S port, mirroring; any uplink port can be used as a dedicated mirrored port from the server port(s), IPv6, and sFlow	• Simple and intuitive GUI and setup wizards, embedded SNMP v1, v2 • SMI-S port, mirroring; any uplink port can be used as a dedicated mirrored port from the server port(s), IPv6, and sFlow	• Simple and GUI and setup wizards, embedded SNMP, v1, v2 • SMI-S CLI port mirroring; any uplink port can be used as a dedicated mirrored port from the server port(s), 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, HP Systems Insight Manager, HP 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 HP OneView; can be used for complete infrastructure management; Virtual Connect modules are also managed by HP OneView. Refer to hp.com/go/oneview/docs for more information.	Virtual Connect Manager supports PXE, WOL, port VLAN, VLAN Tagging, VLAN pass-thru, IGMP Snooping, NIC Teaming integrated with Onboard Administrator, HP Systems Insight Manager, HP 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 HP OneView; can be used for complete infrastructure management; Virtual Connect modules are also managed by HP OneView. Refer to hp.com/go/oneview/docs for more information.	Virtual Connect Manager supports PXE, WOL, port VLAN, VLAN Tagging, VLAN pass-thru, IGMP Snooping, NIC Teaming integrated with Onboard Administrator, HP Systems Insight Manager, Telnet, SNMP, Telemetry support for port utilization including memory, and CPU performance measurement including FlexNICs telemetry. Converged Infrastructure Management with HP OneView; can be used for complete infrastructure management; Virtual Connect modules are also managed by HP OneView. Refer to hp.com/go/oneview/docs for more information.
High-availability features	• Link Aggregation protocol automatic • Loop protection • Mirrored profile database • Multipath heartbeat between redundant modules	• Link Aggregation protocol automatic • Loop protection • Mirrored profile database • Multipath heartbeat between redundant modules	• Link Aggregation protocol automatic • Loop protection • Mirrored profile database • Multipath heartbeat between redundant modules
Security	• LDAP, SSL, TACACS+, and Radius • Role-based management • GUI and CLI session timeout	• LDAP, SSL, TACACS+, and Radius • Role-based management • GUI and CLI session timeout	• 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	Troubleshoot network performance and monitor health in terms of CPU and memory, FlexNIC and LAG stats	Troubleshoot network performance and monitor health in terms of CPU and memory, FlexNIC and LAG stats
Maximum per enclosure	Six	Eight	Eight
Direct attach with FC storage	With HP 3PAR StoreServ 72xx/74xx Series	With HP 3PAR StoreServ 72xx/74xx Series	N/A
Part number	• 691367-B21 • 691380-B21 (dual modules with VCEM) • 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/onsite)	1/1/1	1/1/1	1/1/1

HP Virtual Connect Fibre Channel

Ease of operations and deployment

• With NPIV and HP Virtual Connect Fibre Channel technology, storage management is no longer
limited to a single HBA World Wide 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 HP 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 HP 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.

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

Look to the HP Virtual Connect 8 Gb/24-port Fibre Channel for the highest port density 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 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.

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

Simplify your data center and make it change-ready with the HP Virtual Connect 8 Gb/20-port
Fibre Channel Module for BladeSystem c-Class. As the next-generation successor to the current
HP 4 Gb Virtual Connect Fibre Channel Module, the HP 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 HP Virtual Connect 8 Gb/20-port Fibre Channel Module for HP BladeSystem c-Class is the
simplest, most flexible connection to your SAN fabrics. The module simplifies 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 HP BladeSystem c-class servers

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

**HP Virtual Connect 8 Gb/24-port Fibre Channel Module**

	HP Virtual Connect 8 Gb/20-port Fibre Channel Module	HP Virtual Connect 8 Gb/24-port Fibre Channel Module
Blade type	Single bay	Single bay
Network connections	• 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	• 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	• SFP laser • 1/2/4 Gb short wave, long wave • SFP+ 2/4/8 Gb short wave, long wave
Performance	• 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	• Line rate, full duplex 600 Gbps bridging fabric • Less than 0.9 μs with Ethernet-only ports • Maximum Ethernet frame size 9,216 (jumbo frame)
Protocol support	NCITS T11 NPIV	NCITS T11 NPIV
Management	• Simple and intuitive GUI and setup wizards accessible through Virtual Connect Ethernet Module • CLI accessible through Virtual Connect Ethernet Module • Embedded SNMP v1 and v3 • SMI-S	• Simple and intuitive GUI and setup wizards accessible through Virtual Connect Ethernet Module • CLI accessible through Virtual Connect Ethernet Module • Embedded SNMP v1 and v3 • SMI-S
Extended management features	Virtual Connect Manager supports HP Storage Essentials (FC Management MIB)	Virtual Connect Manager supports HP Storage Essentials (FC Management MIB)
High-availability features	• Link Aggregation protocol • Automatic loop protection • Mirrored profile database • Multipath heartbeat between redundant modules.	• Link Aggregation protocol • Automatic loop protection • Mirrored profile database • Multipath heartbeat between redundant modules
Security	LDAP, SSL, role-based management	LDAP, SSL, role-based management
Maximum per enclosure	Six	Six
Part number	572018-B21	466482-B21
Warranty in year(s) (parts/labor/onsite)	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," HP OneView offers a fresh approach to converged infrastructure management. 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, HP OneView simplifies the management of compute, network, and storage resources in physical and virtual environments.

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 HP, partner and third-party management tools to efficiently orchestrate IT service delivery workflows. HP OneView can do the work of many current management tools.
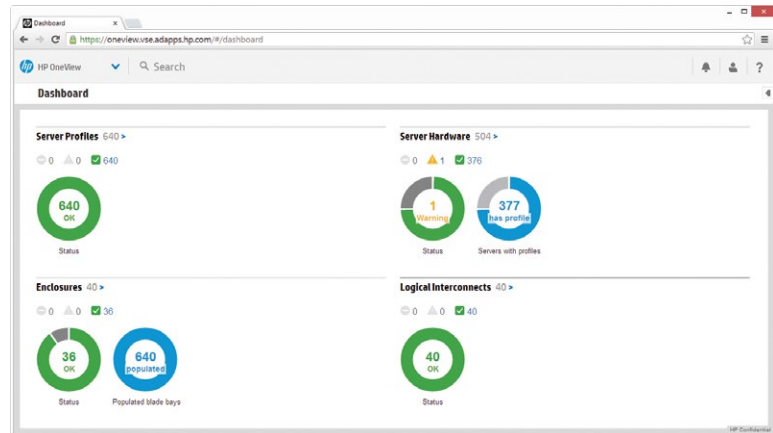
Transform the way you manage your IT infrastructure
- Use the visual mapping of virtualized workloads to physical resources to troubleshoot network problems in 30 seconds instead of two hours.[2]

- Get an instant bird's-eye view of all infrastructure resources with the comprehensive HP 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
- 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.[3]

- 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.

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 HP OneView[4] can manage up to 640 servers.

To learn more visit: hp.com/go/oneview

[2] Based on HP internal testing comparing HP 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—HP OneView takes about 30 seconds and four steps vs. UCS takes about two hours and >480 steps.
[3] Based on HP internal testing of HP OneView vs. previous HP tools as of September 2013.
[4] HP OneView support for HP ProLiant Gen9 rack (DL) and blade (BL) servers will be available with HP OneView 1.20 in December 2014. Customers may purchase HP OneView licenses now, and will be granted rights to use HP Insight Control software and transition to HP OneView with a free upgrade, when available. Customers also have the option to purchase HP Insight Control.

Ethernet blade switches

Simplify your network

HP 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 HP portfolio of Ethernet switching products makes it happen.

HP 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 HP 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 10/40 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 HP for help. When coupled with our high-performance server blades and mezzanine cards, HP Ethernet switches can 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 HP Ethernet Blade Switch portfolio is all about.

HP 6125 Blade Switch Series

Introducing the next-generation Ethernet blade switches from HP Networking. 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 HP 6125 Switch series brings a new level of network access to the BladeSystem c-Class enclosure.

All HP 6125 Switches run on Comware, a common operating system for blade, top-of-rack aggregation, and core Ethernet switches from HP 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. HP 6125 Switches can be combined into a single virtual switch using the HP Intelligent Resilient Framework (IRF).

HP 6125 Switches provide Layer 3 routing, and they are IPv6 compatible.

Similar to all HP Networking switches, the HP 6125 Switch series can be managed through the HP Intelligent Management Center (IMC). HP 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 HP 6125XLG Blade Switch

Delivering next-generation blade switching technology for data center environments, the HP 6125XLG Ethernet Blade Switch provides feature-rich, high-performance, and low-latency 10/40GbE data center-class networking. The HP 6125XLG supports converged fabric networks, allowing Ethernet and FCoE traffic to pass seamlessly across your network— simplifying network design and operation.

The HP 6125XLG supports advanced features such as SDN/OpenFlow, VEPA, TRILL, SPB, MPLS/VPLS, and full Layer 3 routing, making this switch the ideal solution for cloud applications or provisioning virtual server networks, especially when used with HPN's Virtual Application Network (VAN) controller.

Ethernet Interconnect Modules for HP BladeSystem c-Class Servers

	HP 6125XLG Ethernet Blade Switch	HP 6125G/XG Ethernet Blade Switch	HP 6125G Ethernet Blade Switch
Blade type	Single bay	Single bay	Single bay
Network connections	16 internal 1/10 Gb downlinks Four external 40 Gb Eight external 10 Gb Four internal 10 Gb cross-link Eight IRF at 10 Gb (IRF 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+ SR4	Copper RJ45 SFP SX optical SFP+ SR/LR/LRM optical	Copper RJ45 SFP SX optical
Performance	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	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	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, RRPPP, Smart Link, VRRP	IRF, LACP Spanning Tree, ECMP, DLDP, RRPPP, Smart Link, VRRP	IRF, LACP Spanning Tree, ECMP, DLDP, RRPPP, Smart Link, VRRP
Maximum per HP BladeSystem c700 Enclosure	Eight	Eight	Eight
Part number	711307-B21	658250-B21	658247-B21
Warranty in year(s) (parts/labor/onsite)	1/1/1	1/1/1	1/1/1

Mellanox SX1018HP Ethernet Switch

The extensive HP blade switch portfolio now includes the world's fastest Ethernet Blade Switch. Another industry first, the Mellanox SX1018HP Ethernet Switch provides the lowest port-to-port latency of any blade switch—more than four times faster than previous switches. HP 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 SX1018HP Ethernet Switch provides the perfect network interface for financial applications and high-performance clusters.

The Mellanox SX1018HP 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 SX1018HP 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 SX1018HP 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 Catalyst 3120 Blade Switch series

Designed to meet the rigorous requirements of blade server environments, the Cisco Catalyst 3120 Blade Switch series is built on Cisco's hardware and IOS software.

The Catalyst 3120 Blade Switch uses a stacking technology that allows multiple switches to act as a single entity. This switch-stacking technology treats the individual physical switches within a rack as a single logical switch. This built-in ability enables the Catalyst 3120 Blade Switch to simplify operations and management. Functionality such as Layer 3 routing is available through the IP Services upgrade option.

Cisco Fabric Extender for HP BladeSystem

Providing an extension of the Cisco Nexus switch fabric to the HP server edge, the Cisco Fabric Extender for HP BladeSystem behaves like a remote line card to a parent Cisco Nexus 5000 series switches or Nexus 6000 series switch. The Cisco Fabric Extender and the parent Nexus switch form a distributed modular system. The Fabric Extender for HP BladeSystem forwards traffic to the Cisco Nexus 5000/6000 series 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 HP BladeSystem c-Class Servers

	Mellanox SX1018HP	Cisco Catalyst 3120G/3120X	Cisco Fabric Extender for HP
Blade type	Double bay	Single bay	Single bay
Network connections	• 16 internal 10 Gb/40 Gb downlinks • 18 40 Gb QSFP+ uplinks • One management console port (double bay width interconnect)	• 16 internal 1 Gb downlinks • Four external 1000BASE-T uplinks • Two internal cross-connects • Four optional external 1 Gb SFP uplinks • Two external 10 Gb X2 uplinks (3120X only)	• 16 internal 1/10 Gb downlinks • Eight external SFP+ 10 Gb uplinks
Media types	• QSFP+	• Copper RJ45 • Fiber SFP-SR/LR • X2-SR, LRM, LX4, CS4 (3120X only)	• SFP+ SR/LR/optical DAC copper cables • Cisco Fabric Extender Transceivers
Performance	• 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	• 256 MB SDRAM • 64 MB flash memory	• 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	SSHv2, 802.1s, 802.1w, 802.1x, 802.3ad, 802.3x, 802.1D, 802.1p, 802.1Q, 802.3, 802.3u, 802.3ab, and 802.3z	IEEE 802.1p: CoS prioritization, 802.1Q, 802.3, 802.3ae, 802.3ap, SFF 8431 SFP+ support, RMON, SFF 8461
Management	• Web browser or CLI, HTTPS • GUI management via UFM • SNMP v1, v2c, and v3 • OOBM via OA • IGMP v1 and v2 • NTP • RADIUS/TACACS+ • LLDP Discovery protocol • sFlow • OpenFlow	• CLI CiscoWorks • SNMP v1, v2c, and v3 • Telnet	• Fabric extender management using in-band management; Cisco DCNM and standard SNMP and XML interfaces, and CLI
High-availability features	• Rapid spanning tree protocol (RSTP) • Multiple spanning tree protocol (MSTP) • Link aggregation control protocol	• Per VLAN spanning tree plus • Uplink fast, port fast • Bridge protocol data unit	• Uplink traffic management through Cisco EtherChannel hashing or static port pinning
Maximum per HP BladeSystem c700 Enclosure	Two	Eight	Eight
Part number	689638-B21	(3120G) 451438-B21 (3120X) 451439-B21	641146-B21 657787-B21
Warranty in year(s) (parts/labor/onsite)	1/1/1	1/1/1	1/1/1

Adapters for HP BladeSystem c-Class Servers

	HP FlexFabric 20Gb 2-port 650FLB adapter	HP FlexFabric 20Gb 2-port 650M adapter	HP FlexFabric 20 Gb 2-port 630FLB adapter	HP FlexFabric 20 Gb 2-port 630M adapter
Hardware features				
Server type	Blade (Gen9)	Blade (Gen9)	Blade (Gen8, 9)	Blade (Gen8, 9)
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 57804S
Protocol support	RoCE, VXLAN, Tunnel Offload, iSCSI/FCoE	RoCE, VXLAN, Tunnel Offload, iSCSI/FCoE	L2 Networking + FCoE/iSCSI	L2 Networking + FCoE/iSCSI
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/onsite)	1/0/0	1/0/0	1/0/0	1/0/0

Adapters for HP BladeSystem c-Class servers (continued)

	HP Ethernet 10 Gb 2-port 560FLB adapter	HP Ethernet 10 Gb 2-port 560M adapter	HP FlexFabric 10 Gb 2-port 554M adapter	HP FlexFabric 10 Gb 2-port 554FLB adapter	HP Flex-10 10 Gb 2-port 552M adapter
Hardware features					
Server type	Blade (Gen8)	Blade (Gen8)	Blade (Gen8)	Blade (Gen8)	Blade (Gen8)
IEEE compliance	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	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	802.1p, 802.1q, 802.1qau, 802.3ad, 802.3ae, 802.3ap (10GBASE-KX4), and 802.3x	802.1p, 802.1q, 802.1qau, 802.3ad, 802.3ae, 802.3ap (10GBASE-KX4), and 802.3x	802.1p, 802.1q, 802.1qau, 802.3ad, 802.3ae, 802.3ap (10GBASE-KX4), and 802.3x
Ports/type	2 x 10 Gb	2 x 10 Gb	2 x 10 Gb	2 x 10 Gb	2 x 10 Gb
Form factor	FlexibleLOM	x8 PCI2 2.0 type A card	x8 PCIe 2.0 type A card	x8 PCIe 2.0 FlexibleLOM	x8 PCIe 2.0 type A card
Network controller	Intel® 82599	Intel 82599	Emulex BE3	Emulex BE3	Emulex BE3
Protocol support	L2 Networking	L2 Networking	L2 Networking + FCoE/iSCSI	L2 Networking + FCoE/iSCSI	L2 Networking
Software features					
Adapter teaming	Yes	Yes	Yes	Yes	Yes
PXE (pre-boot execution environment)	Yes	Yes	Yes	Yes	Yes
TOE (TCP/IP offload engine)	No	Yes	Yes	Yes	Yes
Accelerated iSCSI	No		Yes	Yes	
iSCSI boot	No		Yes	Yes	
Jumbo frames	Yes	Yes	Yes	Yes	Yes
FlexibleLOM compatible	Yes			Yes	
Part number	655639-B21	665246-B21	647590-B21	647586-B21	674764-B21
Warranty in year(s) (parts/labor/onsite)	1/0/0	1/0/0	1/0/0	1/0/0	1/0/0

Adapters for HP BladeSystem c-Class servers (continued)

	HP FlexFabric 10 Gb 2-port 536FLB adapter	HP FlexFabric 10 Gb 2-port 534M adapter	HP FlexFabric 10 Gb 2-port 534FLB adapter	HP Flex-10 10 Gb 2-port 530M adapter	HP Flex-10 10 Gb 2-port 530FLB adapter	HP Ethernet 1 Gb 4-port 366M adapter	HP Ethernet 1 Gb 2-port 361FLB adapter
Hardware features							
Server type	Blade (Gen 9)	Blade (Gen8, 9)	Blade (Gen8)	Blade (Gen8)	Blade (Gen8)	Blade (Gen8, 9)	Blade (Gen8)
IEEE compliance	802.1p, 802.1Q, 802.3, 802.3ad, and 802.3x, 1588, and 802.1AS	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 1588	802.1p, 802.1Q, 802.3, 802.3ad, and 802.3x, 1588, and 802.1AS	802.3, 802.3ab, 802.3u, 802.3x, 802.3ad, 802.3p, 802.1q, 802.3ae, and 802.3ap	802.3, 802.1ab, 802.3x, 802.3ad, 802.3p, 802.1q, 802.3ae, 802.1au, and 802.3ap	802.1p, 802.1Q, 802.3, 802.3ad, and 802.3x, 1588, and 802.1AS	802.1p, 802.1Q, 802.3, 802.3ad, and 802.3x, IEEE 1588, and 802.1AS
Ports/type	2 x 10 Gb	2 x 10 Gb	2 x 10 Gb	2 x 10 Gb	2 x 10 Gb	4 x 1 Gb	2 x 1 Gb
Form factor	FlexibleLOM	x8 PCIe, type I card	FlexibleLOM	x8 PCIe 2.0 type A card	x8 PCIe 2.0 FlexibleLOM	X4 PCIe, type I card	FlexibleLOM
Network controller	QLogic 57840S	QLogic 57810S	QLogic 57810S	QLogic 57810S	QLogic 57810S	Intel i350	Intel i350
Protocol support	L2 Networking + FCoE/iSCSI	L2 Networking + FCoE/iSCSI	L2 Networking + FCoE/iSCSI	L2 Networking	L2 Networking	L2 Networking	L2 Networking
Software features							
Adapter teaming	Yes	Yes	Yes	Yes	Yes	Yes	
PXE (pre-boot execution environment	Yes	Yes	Yes	Yes	Yes	Yes	
TOE (TCP/IP offload engine)	Yes	Yes	Yes	Yes	Yes	No	No
Accelerated iSCSI	Yes	No	No	No	No	No	No
iSCSI boot	Yes	Yes	Yes	No	No	No	No
Jumbo frames	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FlexibleLOM compatible	Yes	Yes	Yes	No	Yes	No	Yes
Part number	766490-B21	700748-B21	700741-B21	631884-B21	656590-B21	615729-B21	652500-B21
Warranty in year(s) (parts/labor/onsite)		1/0/0	1/0/0	1/0/0	1/0/0	1/0/0	

Adapters for HP BladeSystem c-Class servers

	HP NC553m 10 Gb 2-port FlexFabric adapter	HP NC542m dual-port Flex-10 10 GbE multifunction adapter	HP Ethernet 10Gb 2-port 570FLB adapter	HP Ethernet 10Gb 2-port 570M adapter
Server type	Blade (Gen8)	Blade (Gen8)	Blade	Blade
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)	802.3, 802.3x, 802.3ad, 802.3p, 802.1q, 802.3ae	802.3, 802.3x, 802.3ad, 802.3p/802.1q, 802.3ae
Ports/type	2 x 10 Gb	2 x 10 Gb	2 x 10 Gb	2 x 10 Gb
Form factor	x8 PCIe 2.0, type I card	x8 PCIe 2.0 type I card	x8 PCIe 2.0, FlexibleLOM	x8 PCIe 2.0, FlexibleLOM
Network controller	Emulex BE3	Mellanox ConnectX-2 EN	Solarflare SFC9120	Solarflare SFC9120
Software features				
Adapter teaming	N/A	N/A	N/A	N/A
PXE (pre-boot execution environment	N/A	N/A	N/A	N/A
TOE (TCP/IP offload engine)	Yes	N/A	N/A	N/A
Accelerated iSCSI	Yes	N/A	N/A	N/A
iSCSI boot	Yes	N/A	N/A	N/A
Jumbo frames	Yes	Yes	Yes	Yes
Part number	613431-B21	539857-B21	728992-B21	718935-B21
Warranty in year(s) (parts/labor/onsite)	1/0/0	1/0/0	1/0/0	1/0/0

Adapters for HP BladeSystem c-Class servers (continued)

	HP NC532m dual-port Flex-10 10GbE multifunction adapter	HP NC382m PCI express dual-port multifunction adapter	HP NC364m quad-port 1GbE adapter	HP NC360m quad-port 1GbE adapter	HP 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	802.1p, 802.1Q, 802.3, 802.3ad, and 802.3x	802.1p, 802.1Q, 802.3, 802.3ad, and 802.3x	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 PCI2 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	L2 Networking	L2 Networking	L2 Networking	L2 Networking	L2 Networking
Software features					
Adapter teaming		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)	
Accelerated iSCSI	Yes (Windows)	Yes	Yes (Windows and Linux®)		N/A
iSCSI boot	Yes (Windows and Linux)	Yes (Windows and Linux)			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/onsite)	1/0/0	1/0/0	1/0/0	1/0/0	1/0/0

Fibre Channel Switches for HP BladeSystem c-Class servers

	Brocade 16 Gb SAN Switch	Brocade 8 Gb SAN Switch	Cisco MDS 8 Gb Fabric Switch
Performance	896 Gbps (full duplex)	384 Gbps (end-to-end)	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	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)	Cisco MDS 9000 Family Command Line Interface (CLI), Cisco Fabric Manager, Cisco Fabric Manager Server for HP BladeSystem c-Class (optional), Cisco Enterprise Package for HP BladeSystem c-Class (optional), Cisco Fabric Manager Server Enterprise Package Bundle for HP BladeSystem c-Class (optional)
High-availability features	Hot-pluggable; non-disruptive software upgrades; diagnostic ports	Redundant switches; hot-pluggable; non-disruptive software upgrades	Redundant switches; hot pluggable; non-disruptive software upgrades
Protocols supported	Fibre Channel	Fibre Channel	Fibre Channel
Part number	C8S45A, C8S46A, and C8S47A	AJ820B, AJ821B, and AJ822B	AW563A and AW564A
Warranty in year(s) (parts/labor/onsite)	1/1/1	1/1/1	1/1/1

Fibre Channel Mezzanine Adapters for HP BladeSystem c-Class servers

	HP QMH2672 16 Gb FC HBA	HP BLc Emulex LPe1205-HP 8 Gb/s FC HBA	HP LPe1205A 8 Gb FC HBA	QLogic QMH2562 8 Gb FC HBA	HP QMH2572 8 Gb FC HBA7	HP LPe16705 16 Gb FC HBA
Hardware features						
HP ProLiant BL server type	Gen8	G6/G7	Gen8	G6/G7	Gen8	Gen8
Performance	Up to 500,000 IOPS per channel	Up to 200,000 IOPS per channel	Up to 200,000 IOPS per channel	Up to 200,000 IOPS per channel	Up to 115,000 IOPS per channel	Up to 500,000 IOPS per channel
Port configuration	Dual 16 Gb Fibre Channel ports	Dual 8 Gb Fibre Channel ports	Dual 8 Gb Fibre Channel ports	Dual 8 Gb Fibre Channel ports	Dual 8 Gb Fibre Channel ports	Dual 16 Gb Fibre Channel ports
Protocols supported	Full support for both FC service class 2 and 3	Full support for both FC service class 2 and 3	Full support for both FC service class 2 and 3	Full support for both FC service class 2 and 3	Full support for both FC service c lass 2 and 3	Full support for both FC service class 2 and 3
Chipset	QLogic	Emulex	Emulex	QLogic	QLogic	Emulex
Form factor	Mezzanine Type A	Mezzanine Type 1	Mezzanine Type A	Mezzanine Type 1	Mezzanine Type A	Mezzanine Type A
Media types	62.5/125 multi-mode fiber optic cable with LC type connector	62.5/125 multi-mode fiber optic cable with LC type connector	62.5/125 multi-mode fiber optic cable with LC type connector	62.5/125 multi-mode fiber optic cable with LC type connector	62.5/125 multi-mode fiber optic cable with LC type connector	62.5/125 multi-mode fiber optic cable with LC type connector
Other features						
Management features	QLogic Converge Console management utility for centralized management and remote control of distributed HBAs	Emulex installation and management tools automate installation and provide local and remote HBA configuration and management	Emulex installation and management tools automate installation and provide local and remote HBA configuration and management	QLogic Converge Console management utility for centralized management and remote control of distributed HBAs	QLogic Converge Console management utility for centralized management and remote control of distributed HBAs	Emulex installation and management tools automate installation and provide local and remote HBA configuration and management
High-availability features	Multi-path support for redundant HBAs and paths	Multi-path support for redundant HBAs and paths	Multi-path support for redundant HBAs and paths	Multi-path support for redundant HBAs and paths	Multi-path support for redundant HBAs and paths	Multi-path support for redundant HBAs and paths
NPIV	Yes	Yes	Yes	Yes	Yes	Yes
VPorts	256	255	255	256	256	256
Part number	710608–B21	456972–B21	659818–B21	451871–B21	651281–B21	718203–B21
Warranty in year(s) (parts/labor/onsite)	1/1/1	1/1/1	1/1/1	1/1/1	1/1/1	1/1/1

InfiniBand Switches for HP BladeSystem c-Class servers

	HP BLc 4X QDR IB Switch	**HP 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/onsite)	1/0/0	1/0/0

InfiniBand Mezzanine Adapters for HP BladeSystem c-Class servers

	HP 4X QDR IB Dual-Port Mezzanine HCA	HP 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/onsite)	1/0/0	1/0/0

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• Personalized to give you the right balance of coverage and control

• Simplified to keep your team productive

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• A choice of reactive hardware support levels

• HP Proactive Care Personalized Support option, assigning a local account support manager to your account.

For more on HP Proactive Care, visit: hp.com/services/ProactiveCare

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• HP Software Support for industry-leading software such as Microsoft, Red Hat®, SUSE Linux, and VMware. Buy your subscriptions and support from HP for the life of your BladeSystem to further simplify your operations. Make the first call to HP.

Minimum recommended HP Care Pack offerings
HP Proactive Care with 24x7 hardware support, four-hour response, three-year coverage.

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: hp.com/services/excludedoptions

HP 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: hp.com/services/bladesystem

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