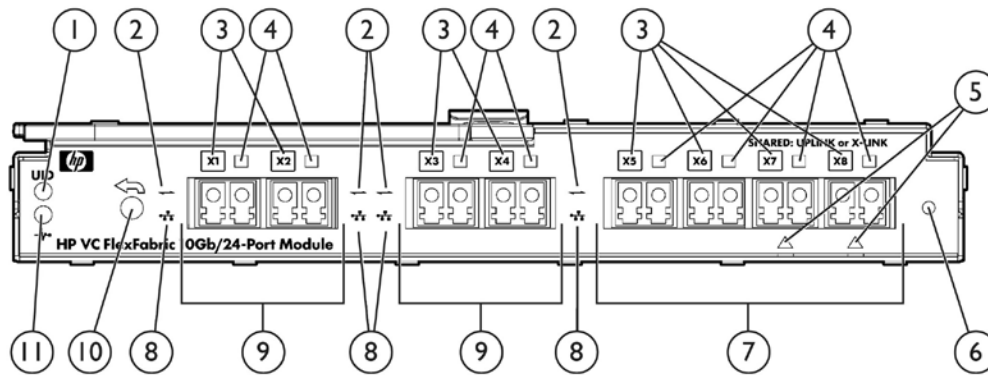


### Overview

### HPE Virtual Connect FlexFabric 10Gb/24-Port Module for c-Class BladeSystem

HPE Virtual Connect FlexFabric 10Gb/24-port Modules are the simplest, most flexible way to connect virtualized server blades to data or storage networks. VC FlexFabric modules eliminate up to 95% of network sprawl at the server edge with one device that converges traffic inside enclosures and directly connects to external LANs and SANs. Using Flex-10 technology with Fibre Channel over Ethernet and accelerated iSCSI, these modules converge traffic over high speed 10Gb connections to servers with HPE FlexFabric Adapters (HPE NC551i or HPE NC551m Dual Port FlexFabric 10Gb Converged Network Adapters or HPE NC553i 10Gb 2-port FlexFabric Converged Network Adapter). Each redundant pair of Virtual Connect FlexFabric modules provide 8 adjustable downlink connections ( six Ethernet and two Fibre Channel, or six Ethernet and 2 iSCSI or eight Ethernet) to dual port 10Gb FlexFabric Adapters on servers. Up to eight uplinks are available for connection to upstream Ethernet and Fibre Channel switches. VC 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. Also, Virtual Connect wire-once connection management is built-in enabling server adds, moves and replacement in minutes instead of days or weeks.



**Figure 1 Virtual Connect FlexFabric Module Front Bezel**

- |   |  |
|---|--|
| 1. Unit Identification Display LED              | 7. 4x 1/10Gb Ethernet (SFP+)                         |
| 2. Backlit Fibre Channel mode indicator         | 8. Backlit Ethernet mode indicator                   |
| 3. Backlit port number and status indicator LED | 9. 2x 10Gb Ethernet or 2/4/8 Gb Fibre Channel (SFP+) |
| 4. Port Link/Activity/Speed indicator           | 10. Enter button                                     |
| 5. Backlit up or X-link indicator               | 11. Module status indicator                          |
| 6. Reset button                                 |  |

### What's New

- Virtual Connect v4.40 highlights for the Virtual Connect FlexFabric -10Gb/24-port Module
  - SR-IOV management allows assigning Virtual Functions to any Physical Functions

### Models

HPE Virtual Connect FlexFabric 10Gb/24-port Module for c-Class BladeSystem

571956-B21

HPE Virtual Connect FlexFabric 10/24 Enterprise Edition BLc7000 Option

605865-B21

**NOTE:** Includes 2 x HPE Virtual Connect FlexFabric 10Gb/24-port modules plus 1 x VCEM BL-c7000 enclosure license. Customer will receive a printed license entitlement certificate and 2 Virtual Connect modules as a single deliverable. The license entitlement certificate must be redeemed online or via fax to obtain the VCEM license activation key.

## Supported Products

### Compatibility

HPE BladeSystem c-Class Virtual Connect Firmware v4.50 and the HPE Virtual Connect FlexFabric 10Gb/24-port Module support the following hardware.

**Hewlett Packard Enterprise servers** All HPE ProLiant and Integrity server blades with their supported Ethernet adapters and the following server blades with supported FlexFabric (integrated or mezzanine) and Ethernet Adapters

#### HPE ProLiant Server Blades

- HPE ProLiant BL2x220c G6 Server Series
- HPE ProLiant BL2x220c G7 Server Series
- HPE ProLiant BL280c G6 Server Series
- HPE ProLiant BL420c Gen8 Server Blade
- HPE ProLiant BL460c G6 Server Series
- HPE ProLiant BL460c G7 Server Series
- HPE ProLiant BL460c Gen8 Server Blade
- HPE ProLiant BL460c Gen8 Server Blade with Intel E5-2600 v2 series Processors
- HPE ProLiant BL460c Gen9 Server Blade
- HPE ProLiant BL465c G6 Server Series
- HPE ProLiant BL465c G7 Server Series
- HPE ProLiant BL465c Gen8 Server Blade
- HPE ProLiant BL490c G6 Server Series
- HPE ProLiant BL490c G7 Server Series
- HPE ProLiant BL495c G6 Server Series
- HPE ProLiant BL620c G7 Server Series
- HPE ProLiant BL660c Gen8 Server Blade
- HPE ProLiant BL660c Gen9 Server Blade
- HPE ProLiant BL680c G7 Server Series
- HPE ProLiant BL685c G6 Server Series
- HPE ProLiant BL685c G7 Server Series
- HPE ProLiant WS460c Gen9 Graphics Server Blade
- HPE ProLiant WS460c Gen8 Graphics Server Blade

#### Integrity Server Blades

- HPE Integrity BL860c i2 Server Blade
- HPE Integrity BL860c i4 Server Blade
- HPE Integrity BL870c i2 Server Blade
- HPE Integrity BL870c i4 Server Blade
- HPE Integrity BL890c i2 Server Blade
- HPE Integrity BL890c i4 Server Blade

**NOTE:** Some servers listed above may be discontinued.

**NOTE:** HPE Integrity BL8x0c i2 servers require VC FW 3.00 or higher. HPE Integrity BL8x0c i4 servers require VC FW 3.70 or higher.

#### HPE Network Adapters

FlexFabric adapter:

- HPE FlexFabric 20Gb 2-port 650FLB Adapter (Only at 10Gb downlinks)
- HPE FlexFabric 20Gb 2-port 650M Adapter (Only at 10Gb downlinks)
- HPE FlexFabric 20Gb 2-port 630FLB Adapter (Only at 10Gb downlinks)
- HPE FlexFabric 20Gb 2-port 630M Adapter (Only at 10Gb downlinks)
- HPE FlexFabric 10Gb-2 port 536FLB Adapter
- HPE NC551i Dual Port FlexFabric 10Gb Converged Network Adapter

## Supported Products

- HPE NC551m Dual Port FlexFabric 10Gb Converged Network Adapter
- HPE NC553i 10Gb 2-port FlexFabric Converged Network Adapter
- HPE NC553m 10Gb 2-port FlexFabric Converged Network Adapter
- HPE NC 554 M/FLB 10Gb 2 port Converged Network Adapter
- HPE FlexFabric 10Gb 2-port 554M Adapter
- HPE FlexFabric 10Gb 2-port 554FLB Adapter
- HPE FlexFabric 10Gb 2-port 534FLB Adapter
- HPE FlexFabric 10Gb 2-port 534M Adapter

Ethernet and Flex-10 Ethernet adapters:

- HPE NC325m PCI Express Quad Port 1Gb server adapter
- HPE NC326i Integrated Dual Port PCI Express Gigabit Server Adapter
- HPE NC326m PCI Express Dual Port Multifunction Gigabit Server Adapter
- HPE NC360m Dual Port 1GbE BL-c Adapter
- HPE NC364m Quad Port 1GbE BL-c Adapter
- HPE NC370i Dual Port Multifunction Gigabit Network Adapter
- HPE NC382i Integrated Dual Port PCI Express Gigabit Server Adapter
- HPE NC382m Integrated Dual Port PCI Express Gigabit Server Adapter
- HPE NC522m Dual Port Flex-10 10GbE Multifunction BL-c Adapter
- HPE NC532i Dual Port Flex-10 10GbE Multifunction BL-c Adapter
- HPE NC532m Dual Port Flex-10 10GbE Multifunction BL-c Adapter
- HPE NC542m Dual Port Flex-10 10GbE BL-c Adapter
- HPE NC550m 10Gb 2-port PCIe x8 Flex-10 Ethernet Adapter
- HPE NC522m Dual Port Flex-10 10GbE Multifunction BL-c Adapter
- HPE Flex-10 10Gb 2-port 530FLB Adapter
- HPE Flex-10 10Gb 2-port 530M Adapter
- HPE Flex-10 10Gb 2-port 552M Adapter
- HPE Ethernet 1Gb 2-port 361FLB Adapter
- HPE Ethernet 1Gb 4-port 366M Adapter

**NOTE:** Consult individual server blade QuickSpecs for specific adapter support.

**NOTE:** Some options listed above may be discontinued.

**NOTE:** For IPv6 management, Onboard Administrator version 4.00 or higher is required.

**HPE BladeSystem c-Class Enclosures** HPE BladeSystem c-Class c7000 Enclosure with Onboard Administrator  
**NOTE:** VC FlexFabric modules are not supported in BladeSystem c3000 enclosures.

**Virtual Connect Firmware** Virtual Connect Firmware v4.40 is recommended with the following release sets for HPE ProLiant and HPE Integrity environments

### HPE ProLiant server blades

#### HPE Service Pack for ProLiant: Version SPP 2014.09.0 or greater

The HPE Service Pack for ProLiant (SPP) with HPE Smart Update Manager (HPE SUM) as the deployment engine provides a comprehensive approach to firmware and system software maintenance. The SPP is a comprehensive collection of firmware and system software components, all tested together as a single solution stack that include drivers, agents, utilities, firmware packages for HPE ProLiant servers, controllers, storage, blades and enclosures, and other options. It is available on all supported HPE ProLiant Gen 8 servers (HPE ProLiant SL/ML/DL/BL 100, 200, 300, 500, 700, 900 servers, and HPE CloudSystem Matrix) in addition to earlier generation HPE ProLiant servers. The SPP is released with most major HPE ProLiant server releases.

To access the latest HPE Service Pack for ProLiant click here:

<https://www.hpe.com/us/en/product-catalog/detail/pip.service-pack-for-proLiant.5104018.html>

### HPE Integrity Server Blades

To access latest HPE Smart Update Firmware, click here:

## Supported Products

<https://www.hpe.com/us/en/products/servers/smart-update.html>

### HPE Integrity i4 Server Blades

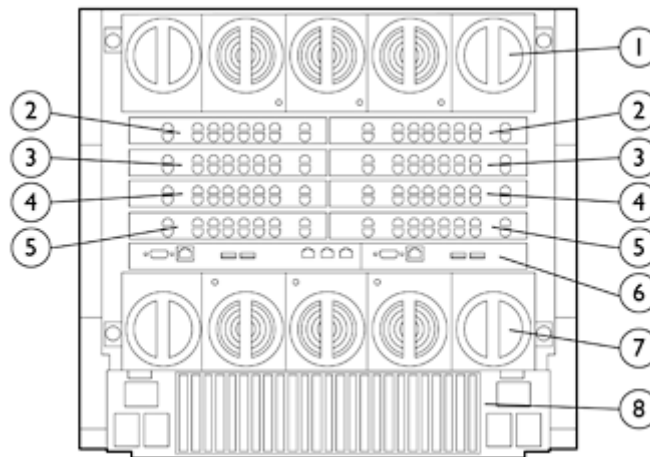
#### Recommended HPE Smart Update Firmware:

HPE Smart Update Firmware-HPE Integrity BL860c/870c/890c i4 System Firmware Bundle for Linux/Windows, 44.01

### HPE Integrity i2 Server Blades

HPE Smart Update Firmware-HPE Integrity BL860c/870c/890c i2 System Firmware Bundle for Linux/Windows, 26.36

## Supported Configurations



**HPE BladeSystem c7000 Enclosure - Rear View**

- |                            |                                 |
|----------------------------|---------------------------------|
| 1. Upper Fan System        | 5. Interconnect Bays 7 / 8      |
| 2. Interconnect Bays 1 / 2 | 6. On Board Administrator       |
| 3. Interconnect Bays 3 / 4 | 7. Lower Fan System             |
| 4. Interconnect Bays 5 / 6 | 8. Rear Redundant Power Complex |

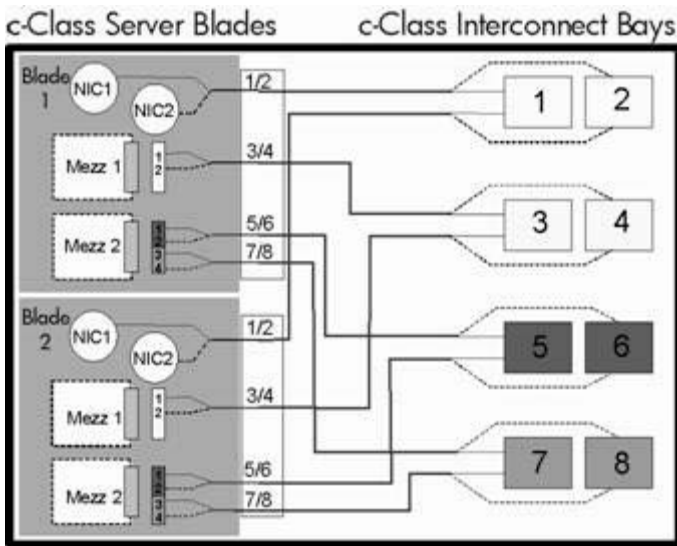
## Mezzanines

### c7000 Port Mapping

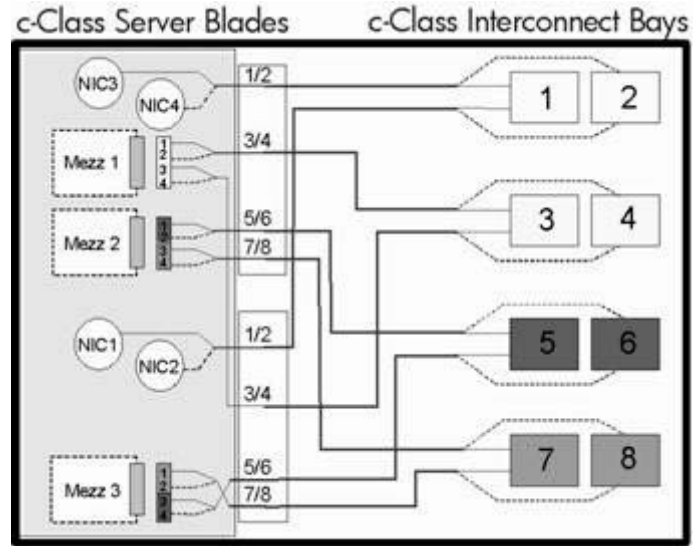
Port mapping differs slightly between full height and half height server blades due to the support for additional Mezzanine cards on the full height version.

Hewlett Packard Enterprise has simplified the processes of mapping Mezzanine ports to switch ports by providing intelligent management tools via the Onboard Administrator and HPE Insight Manager Software. The Onboard Administrator Guide and Enclosure Setup and Installation Guide provide detailed information on port mapping.

Supported Products



Half Height Server Blade



Full Height Server Blade

HPE BladeSystem c7000 Enclosure

**NOTE:** The following tables show a number of supported configurations for an HPE BladeSystem c7000 Enclosure with Virtual Connect FlexFabric Modules. Not all possible combinations are shown here.

**NOTE:** VC FlexFabric modules are not supported in HPE BladeSystem c3000 enclosures.

Interconnect Module Configurations				Server Network Adapters Used	
[Bay 1]	VC FlexFabric	->	VC FlexFabric or Empty	[Bay 2]	Integrated FlexFabric Adapter <sup>1</sup>
[Bay 3]	Empty	->	Empty	[Bay 4]	
[Bay 5]	Empty	->	Empty	[Bay 6]	
[Bay 7]	Empty	->	Empty	[Bay 8]	

[Bay 1]	VC FlexFabric	->	VC FlexFabric or Empty	[Bay 2]	FLEXFABRIC ADAPTER Integrated FlexFabric Adapter <sup>1</sup>
[Bay 3]	VC FlexFabric	->	VC FlexFabric or Empty	[Bay 4]	FlexFabric Adapter Mezzanine
[Bay 5]	Empty	->	Empty	[Bay 6]	
[Bay 7]	Empty	->	Empty	[Bay 8]	

[Bay 1]	VC FlexFabric	->	VC FlexFabric or Empty	[Bay 2]	Integrated FlexFabric Adapter <sup>1</sup>
[Bay 3]	VC FlexFabric	->	VC FlexFabric or Empty	[Bay 4]	FlexFabric Adapter Mezzanine
[Bay 5]	VC FlexFabric	->	VC FlexFabric or Empty	[Bay 6]	FlexFabric Adapter Mezzanine
[Bay 7]	Empty	->	Empty	[Bay 8]	

[Bay 1]	VC FlexFabric	->	VC FlexFabric or Empty	[Bay 2]	Integrated FlexFabric Adapter <sup>1</sup>
[Bay 3]	VC FlexFabric	->	VC FlexFabric or Empty	[Bay 4]	FlexFabric Adapter Mezzanine
[Bay 5]	VC FlexFabric	->	VC FlexFabric or Empty	[Bay 6]	FlexFabric Adapter Mezzanine
[Bay 7]	VC FlexFabric	->	VC FlexFabric or Empty	[Bay 8]	FlexFabric Adapter Mezzanine

## Supported Products

[Bay 1]	VC FlexFabric	->	VC FlexFabric or Empty	[Bay 2]	Integrated FlexFabric Adapter <sup>1</sup>
[Bay 3]	VC Flex-10 VC Flex-10/10D VC FC	-> -> ->	VC Flex-10 or Empty VC Flex-10/10D or Empty VC FC or Empty	[Bay 4]	Flex-10/Enet or FC HBA Mezzanine
[Bay 5]	Empty	->	Empty	[Bay 6]	
[Bay 7]	Empty	->	Empty	[Bay 8]	

[Bay 1]	VC FlexFabric	->	VC FlexFabric or Empty	[Bay 2]	Integrated FlexFabric Adapter <sup>1</sup>
[Bay 3]	VC Flex-10 VC Flex-10/10D VC FC	-> -> ->	VC Flex-10 or Empty VC Flex-10/10D or Empty VC FC or Empty	[Bay 4]	Flex-10/Enet or FC HBA Mezzanine
[Bay 5]	VC Flex-10 VC Flex-10/10D VC FC	-> -> ->	VC Flex-10 or Empty VC Flex-10/10D or Empty VC FC or Empty	[Bay 6]	Flex-10/Enet or FC HBA Mezzanine
[Bay 7]	Empty	->	Empty	[Bay 8]	

[Bay 1]	VC FlexFabric	->	VC FlexFabric or Empty	[Bay 2]	Integrated FlexFabric Adapter <sup>1</sup>
[Bay 3]	VC Flex-10 VC Flex-10/10D VC FC	-> -> ->	VC Flex-10 or Empty VC Flex-10/10D or Empty VC FC or Empty	[Bay 4]	Flex-10/Enet or FC HBA Mezzanine
[Bay 5]	VC Flex-10 VC Flex-10/10D VC FC	-> -> ->	VC Flex-10 or Empty VC Flex-10/10D or Empty VC FC or Empty	[Bay 6]	Flex-10/Enet or FC HBA Mezzanine
[Bay 7]	VC Flex-10 VC Flex-10/10D VC FC <sup>3</sup>	-> -> ->	VC Flex-10 or Empty VC Flex-10/10D or Empty VC FC <sup>3</sup> or Empty	[Bay 8]	Flex-10/Enet or FC HBA Mezzanine

[Bay 1]	Empty	->	Empty	[Bay 2]	
[Bay 3]	VC FlexFabric	->	VC FlexFabric or Empty	[Bay 4]	FlexFabric Adapter Mezzanine
[Bay 5]	Empty	->	Empty	[Bay 6]	
[Bay 7]	Empty	->	Empty	[Bay 8]	

[Bay 1]	VC Flex-10	->	VC Flex-10 or Empty	[Bay 2]	Flex-10/Enet LOM
[Bay 3]	VC FlexFabric	->	VC FlexFabric or Empty	[Bay 4]	FlexFabric Adapter Mezzanine
[Bay 5]	Empty	->	Empty	[Bay 6]	
[Bay 7]	Empty	->	Empty	[Bay 8]	

[Bay 1]	VC Flex-10	->	VC Flex-10 or Empty	[Bay 2]	Flex-10/Enet LOM
[Bay 3]	VC FlexFabric	->	VC FlexFabric or Empty	[Bay 4]	FlexFabric Adapter Mezzanine
[Bay 5]	VC Flex-10 VC Flex-10/10D VC FC VC FlexFabric	-> -> -> ->	VC Flex-10 or Empty VC Flex-10/10D or Empty VC FC or Empty VC FlexFabric or Empty	[Bay 6]	Flex-10/Enet, FC HBA or FlexFabric Adapter Mezzanine
[Bay 7]	Empty	->	Empty	[Bay 8]	

[Bay 1]	VC Flex-10	->	VC Flex-10 or Empty	[Bay 2]	Flex-10/Enet LOM
---------	------------	----	---------------------	---------	------------------

## Supported Products

	VC FlexFabric <sup>2</sup>	->	VC FlexFabric <sup>2</sup> or Empty		
[Bay 3]	VC FlexFabric	->	VC FlexFabric or Empty	[Bay 4]	FlexFabric Adapter Mezzanine
[Bay 5]	VC Flex-10	->	VC Flex-10 or Empty	[Bay 6]	Flex-10/Enet, FC HBA or FlexFabric Adapter Mezzanine
	VC Flex-10/10D	->	VC Flex-10/10D or Empty		
	VC FC	->	VC FC or Empty		
	VC FlexFabric	->	VC FlexFabric or Empty		
[Bay 7]	VC Flex-10	->	VC Flex-10 or Empty	[Bay 8]	Flex-10/Enet, FC HBA or FlexFabric Adapter Mezzanine
	VC Flex-10/10D	->	VC Flex-10/10D or Empty		
	VC FC <sup>3</sup>	->	VC FC <sup>3</sup> or Empty		
	VC FlexFabric	->	VC FlexFabric or Empty		

**NOTE:**<sup>1</sup> Requires HPE ProLiant BL G7 server blades with HPE NC551i or HPE NC553i Dual Port FlexFabric 10Gb Converged Network Adapter.

**NOTE:**<sup>2</sup> Supports Ethernet only when connected to server blades without embedded NC551i Dual Port FlexFabric 10Gb Converged Network Adapter.

**NOTE:**<sup>3</sup> Requires full-height servers.

## Required Cabling

**NOTE:** Twinax direct attach copper (0.5 to 7m). 7m is not supported on ports X1-X4

**NOTE:** Direct Attach Copper cables listed in the options section below is fully supported by HPE. Hewlett Packard Enterprise recommends use of these cables. If not identified as a "supported" DAC, VC will allow the connection to proceed if the discovery process indicates the cable meets the following criteria: connector=copper pigtail; transceiver code=active cable or passive cable; speed >=10Gb; length between 1m and 7m, inclusive. The connection is logged as an unsupported cable. Prior to requesting support from HPE, a DAC from the supported list must be used to validate the issue.

Maximum Distances	Multimode OM1 62.5/125 micron	Multimode OM2 50/125 micron	Multimode OM3 50/125 micron	Singlemode 9 micron
SR	2 - 26m/33m*	2 - 82m	2 - 300m	
LR				2 -10km
LRM	0.5 - 220m	0.5 - 220m	0.5 - 220m	

Table below lists distance for various cables types for Fibre Channel interface

Maximum Cable Distance (Meters) for Multi-mode Fiber Shortwave

Fiber Channel Data Rate (Gbps)	Multimode Fiber Type			
	OM1	OM2	OM3	OM4
8Gbps	21m	50m	150m	190m
4Gbps	70m	150m	380m	400m
2Gbps	150m	300m	500m	500m

## Stacking Configuration

Stacking links are used to interconnect Virtual Connect Ethernet/FlexFabric Modules when using more than one enclosure or when using more than two Virtual Connect Ethernet/FlexFabric Modules in a single enclosure. All Virtual Connect Modules within the VC Domain must be interconnected. The following provides recommended configurations.

Interconnecting the modules allows all Ethernet NICs or CNAs on all server blades in the Virtual Connect domain to have access to any Virtual Connect Ethernet uplink port. By using these module-to-module links, a single pair of uplinks can be used as the data center Ethernet network connections for the entire Virtual Connect domain, and allows any server blade to be connected to any Ethernet network.

## Supported Products

For additional stacking configuration information go to: [HPE Virtual Connect for c-Class BladeSystem and Installation Guide](#)

**NOTE:** Two (2) internal 10Gb links are provided between Virtual Connect modules in horizontally adjacent bays. Also, VC FlexFabric and VC Flex-10 configuration requires a HPE ProCurve XFP to SFP+ 1m Direct Attach Copper Cable to connect an HPE Virtual Connect FlexFabric Module and HPE Virtual Connect Flex-10 Ethernet Module.



## Standard Features

### Product Features Performance

- 16 x 10Gb Ethernet downlinks to server blade NICs and FlexFabric Adapters
- Each 10Gb downlink supports up to 3 FlexNICs and 1 FlexHBA or 4 FlexNICs
- Each FlexHBA can be configured to transport either Fiber Channel over Ethernet/CEE or Accelerated iSCSI protocol.
- Each FlexNIC and FlexHBA is recognized by the server as a PCI-e physical function device with adjustable speeds from 100Mb to 10Gb in 100Mb increments when connected to a HPE NC553i 10Gb 2-port FlexFabric Converged Network Adapter or any Flex-10 NIC and from 1Gb to 10Gb in 100Mb increments when connected to a NC551i Dual Port FlexFabric 10Gb Converged Network Adapter or NC551m Dual Port FlexFabric 10Gb Converged Network Adapter
- 4 SFP+ external uplink ports configurable as either 10Gb Ethernet or 2/4/8Gb auto-negotiating Fibre Channel connections to external LAN or SAN switches
- 4 SFP+ external uplink ports configurable as 1/10Gb auto-negotiating Ethernet connected to external LAN switches
- 8 x 10Gb SR, LR fiber and copper SFP+ uplink ports (4 ports also support 10Gb LRM fiber SFP+)
- Extended list of direct attach copper cable connections supported
- 2 x 10Gb shared internal cross connects for redundancy and stacking
- HBA aggregation on FC configured uplink ports using ANSI T11 standards-based N\_Port ID Virtualization (NPIV) technology
- Allows up to 255 virtual machines running on the same physical server to access separate storage resources
- Low latency (1.5  $\mu$ s Ethernet ports and 2.0  $\mu$ s Enet/Fibre Channel ports) throughput provides switch-like performance.
- Line Rate, full-duplex 480 Gbps bridging fabric
- MTU up to 9216 Bytes - Jumbo Frames
- Supports up to 32K L2 MAC entries and 1K IGMP groups
- VLAN Tagging, Pass-Thru and Link Aggregation supported on all uplinks
- In tunneled VLAN mode, up to 4,096 networks are supported per network uplink and server downlink. In mapped VLAN mode, up to 1,000 networks are supported on network uplinks per Share Uplink Set, domain or module and on server downlinks up to 162 networks are supported per 10Gb physical port (VC v3.30 or later).
- Stack multiple Virtual Connect FlexFabric modules with other VC FlexFabric, VC Flex-10 or VC Ethernet Modules across up to 4 BladeSystem enclosures allowing any server Ethernet port to connect to any Ethernet uplink

### Management

- Integrated Virtual Connect Manager included with every module, providing out-of-the-box, secure HTTP and scriptable CLI interfaces for individual Virtual Connect domain configuration and management.
- Pre-configure server I/O configurations prior to server installation for easy deployment
- Move, add, or change server network connections on the fly without impacting LAN and SAN administrator  
Monitoring and management via industry standard SNMP v.1, v.2 and v.3
- Supported by Virtual Connect Enterprise Manager (VCEM) v7.3.2 and higher for centralized connection and workload management for hundreds of Virtual Connect domains. Learn more at: <http://www.hpe.com/info/vcem>
- CLI commands provide access to essential system status, resource utilization, MAC forwarding tables, interfaces, and throughput to assist datacenter network troubleshooting
- Displays Fibre Channel and Ethernet port statistics via the VCM CLI, GUI and SNMP interfaces
- Port Mirroring on any uplink provides network troubleshooting support with Network Analyzers
- IGMP Snooping optimizes network traffic and reduces bandwidth for multicast applications such as streaming applications
- LDAP, RADIUS, TACACS+ compatible role based authentication, authorization and accounting

## Standard Features

- (RADIUS and TACACS+ require v3.30 or greater. Accounting supported in LDAP and TACACS+)
- Recognizes and directs Server-Side VLAN tags
  - Network access groups prevent enabling specific network combinations in the same server profile
  - Provisioned storage resource is associated directly to a specific virtual machine - even if the virtual server is re-allocated within the BladeSystem
  - Server-side NPIV removes storage management constraint of a single physical HBA on a server blade  
Does not add to SAN switch domains or require traditional SAN management
  - Centralized configuration of boot from iSCSI or Fibre Channel network storage via Virtual Connect Manager GUI and CLI
  - Remotely update Virtual Connect firmware on multiple modules using Virtual Connect Support Utility 1.11.0 or greater
  - CLI auto-filling with TAB key
  - GUI and CLI session timeout for security
  - QoS configurable based on DOT1P and DSCP
  - Configurable filtering of multicast traffic
  - sFlow monitoring

### Options

- Virtual Connect Enterprise Manager (VCEM), provides a central console for multiple VC domains including up to 250 domains with 1,000 HPE BladeSystem c-Class enclosures
- Optional HPE 10Gb SFP+ SR, LR, and LRM modules and 10Gb SFP+ Copper cables in 0.5m, 1m, 3m, 5m, and 7m lengths
- Optional HPE 8 Gb SFP+ and 4 Gb SFP optical transceivers
- Supports all Ethernet-NICs, Flex-10 NICs and FlexFabric adapters for BladeSystem c-Class server blades (Supported functionality defined by each adapter)
- Supports use with other VC modules within the same enclosure (VC Flex-10/10D and Flex-10 Ethernet Module, VC 4 and 8 Gb and 16 Gb Fibre Channel Modules).

## Service and Support, HPE Care Pack and Warranty Information

### Service and Support

#### **HPE Technology Services for Industry Standard Servers and BladeSystem**

Capitalizing on HPE ProLiant server and HPE BladeSystem capabilities requires a service partner who understands your increasingly complex business technology environment. That's why it makes sense to team up with the people who know Hewlett Packard Enterprise infrastructure hardware and software best - the experienced professionals at HPE Services.

#### **Protect your business beyond warranty with HPE Care Pack Services**

HPE Care Pack services offer complete care and support expertise with committed response choices designed to meet your IT and business needs.

HPE Foundation Care services offer scalable reactive support-packages for Hewlett Packard Enterprise servers and software. You can choose the type and level of service that is most suitable for your IT and business needs. HPE Proactive Care delivers high levels of system availability through proactive service management and advanced technical response. HPE Datacenter Care provides highly flexible environmental support to address unique customer business needs.

Choose a recommended service appropriate to your product or contact your Hewlett Packard Enterprise sales representative or authorized HPE ServiceOne partner for additional HPE Care Pack services information.

## Recommended HPE Care Pack Services for your HPE product

### Optimized Care

#### **3-Year HPE 6 hour Call to Repair Response, Proactive Care**

Combined reactive and proactive support for hardware and software helping optimize your systems and delivering high levels of availability through proactive service management and advanced technical response. Hardware problem resolution to return the hardware in operating condition within 6 hours of the initial service request. A Technical Account Manager, as your single point of contact, will own your call or issue end to end until resolved.

<https://www.hpe.com/h20195/v2/getpdf.aspx/4aa3-8855eee.pdf>

#### **HPE Installation and Startup Service for HPE BladeSystem c-Class Infrastructure for c7000 enclosure**

Provides for hardware installation (c-Class ProLiant and Integrity server blades, storage blades, Ethernet Interconnects and Virtual Connect) and software installation and startup of a BladeSystem c7000 Infrastructure in a single enclosure including deployment of OS (two servers), HPE Insight Control and Server Deployment (formerly RDP).

<https://www.hpe.com/h20195/v2/getpdf.aspx/4aa0-5964enw.pdf>

#### **HPE Installation and Startup Service for HPE BladeSystem c-Class Enhanced Network**

Hewlett Packard Enterprise provides for the configuration and testing of BladeSystem Ethernet interconnect switches and Virtual Connect to facilitate proper implementation of network protocols and access to advanced features.

<https://www.hpe.com/h20195/v2/getpdf.aspx/4aa0-5969enw.pdf>

### Standard Care

#### **3-Year HPE 24x7 4 hour response, Proactive Care Service**

This service gives you combined reactive and proactive support including rapid access to our Advanced Solution Center to manage and prevent problems and a Technical Support Specialist with a broad level of technical knowledge that will engage with additional technical expertise as needed from HPE's vast global resources.

<https://www.hpe.com/h20195/v2/getpdf.aspx/4aa3-8855eee.pdf>

#### **HPE Installation and Startup Service for HPE BladeSystem c-Class Infrastructure for c7000 enclosure**

Provides for hardware installation (c-Class ProLiant and Integrity server blades, storage blades, Ethernet

## Service and Support, HPE Care Pack and Warranty Information

Interconnects and Virtual Connect) and software installation and startup of a BladeSystem c7000 Infrastructure in a single enclosure including deployment of OS (two servers), HPE Insight Control and Server Deployment (formerly RDP).

<https://www.hpe.com/h20195/v2/getpdf.aspx/4aa0-5964enw.pdf>

### HPE Installation and Startup Service for HPE BladeSystem c-Class Enhanced Network

Hewlett Packard Enterprise provides for the configuration and testing of BladeSystem Ethernet interconnect switches and Virtual Connect to facilitate proper implementation of network protocols and access to advanced features.

<https://www.hpe.com/h20195/v2/getpdf.aspx/4aa0-5969enw.pdf>

### Related Services **HPE Proactive Care Personalized Support - Environmental Option**

The Personalized Support option provides an assigned Account Support Manager who can bring best practices from across the industry plus extra technical skills to your IT team. This option is only available as an add-on to HPE Proactive Care Support.

### HPE Proactive Select Service

Provides a flexible way to purchase HPE best-in-class consultancy and technical services. You can buy Proactive Select Service Credits when you purchase your hardware and then use the credits over the next 12 months. <https://www.hpe.com/h20195/v2/GetPDF.aspx/4AA3-8855enw.pdf>

Additional HPE Care Pack services can be found at: <http://ssc.hpe.com/portal/site/ssc/>

### Insight Online/Insight Remote Support

HPE Insight Remote Support provides 24 X 7 remote monitoring, proactive notifications, and problem resolution. This comes at no additional cost with your HPE solution. Learn more about Insight Remote Support <http://www.hpe.com/info/insightremotesupport/docs> and Insight Online <http://www.hpe.com/info/insightonline>

**NOTE: Insight Remote Support is a prerequisite for Proactive Care. All blades within a single HPE BladeSystem enclosure must be at the same service level.**

### HPE Support Center

Personalized online support portal with access to information, tools and experts to support Hewlett Packard Enterprise business products. Submit support cases online, chat with HPE experts, access support resources or collaborate with peers. Learn more <http://www.hpe.com/info/hpesc>

The HPE Support Center Mobile App allows you to resolve issues yourself or quickly connect to an agent for live support. Now, you can get access to personalized IT support anywhere, anytime.

HPE Insight Remote Support and HPE Support Center are available at no additional cost with a HPE warranty, HPE Care Pack or Hewlett Packard Enterprise contractual support agreement.

**NOTE: HPE Support Center Mobile App is subject to local availability.**

### Parts and materials

Hewlett Packard Enterprise will provide HPE-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements.

Parts and components that have reached their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual, product QuickSpecs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services.

The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by HPE due to malfunction.

## Service and Support, HPE Care Pack and Warranty Information

**Warranty**

Server Blade Interconnect Limited Warranty includes 1 year Parts, 1 year Labor, 1-year on-site support. Additional information regarding worldwide limited warranty and technical support is available at: <http://h17007.www1.hp.com/us/en/enterprise/servers/warranty/>

**For more information**

To learn more on HPE ProLiant servers and HPE BladeSystem servers, please contact your Hewlett Packard Enterprise sales representative or Hewlett Packard Enterprise Authorized Channel Partner. Or visit: <http://www.hp.com/services/bladeSystem>

## Related Options

### Cabling and Transceiver Options

#### Copper Cables

HPE BladeSystem c-Class 10GbE SFP+ to SFP+ 0.5m Direct Attach Copper Cable	487649-B21
HPE BladeSystem c-Class 10GbE SFP+ to SFP+ 1m Direct Attach Copper Cable	487652-B21
HPE BladeSystem c-Class 10GbE SFP+ to SFP+ 3m Direct Attach Copper Cable	487655-B21
HPE BladeSystem c-Class 10GbE SFP+ to SFP+ 5m Direct Attach Copper Cable	537963-B21
HPE BladeSystem c-Class 10GbE SFP+ to SFP+ 7m Direct Attach Copper Cable	487658-B21
HPE C-series SFP+ to SFP+ Active Copper 7.0m Direct Attach Cable	QK701A
HPE C-series SFP+ to SFP+ Active Copper 10.0m Direct Attach Cable	QK702A
HP X242 10G SFP+ to SFP+ 10m Direct Attach Copper Cable	J9286B
HP X242 10G SFP+ to SFP+ 15m Direct Attach Copper Cable	J9287B
HPE X242 10G SFP+ to SFP+ 1m Direct Attach Copper Cable	J9281B
HPE X242 10G SFP+ to SFP+ 3m Direct Attach Copper Cable	J9283B
HPE X242 10G SFP+ to SFP+ 7m Direct Attach Copper Cable	J9285B
HPE FlexNetwork X240 10G SFP+ to SFP+ 0.65m Direct Attach Copper Cable	JD095C
HPE FlexNetwork X240 10G SFP+ to SFP+ 1.2m Direct Attach Copper Cable	JD096C
HPE FlexNetwork X240 10G SFP+ to SFP+ 3m Direct Attach Copper Cable	JD097C
HPE FlexNetwork X240 10G SFP+ to SFP+ 5m Direct Attach Copper Cable	JG081C
HPE FlexNetwork X240 10G SFP+ SFP+ 7m Direct Attach Copper Cable	JC784C
HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable	JG329A
HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable	JG330A
HPE B-series SFP+ to SFP+ Active Copper 1.0m Direct Attach Cable	AP818A
<b>NOTE: Equivalent to Brocade 10Gbps Direct Attached SFP+Copper Cable - 1m (PN XBR-TWX-0101).</b>	
HPE B-series SFP+ to SFP+ Active Copper 3.0m Direct Attach Cable	AP819A
<b>NOTE: Equivalent to Brocade 10Gbps Direct Attached SFP+Copper Cable -3m (PN XBR-TWX-0301).</b>	
HPE B-series SFP+ to SFP+ Active Copper 5.0m Direct Attach Cable	AP820A
<b>NOTE: Equivalent to Brocade 10Gbps Direct Attached SFP+Copper Cable-5m (PN XBR-TWX-0501).</b>	

#### 10GBase-T SFP+ Transceivers

HPE 10GBase-T SFP+ Transceiver	813874-B21
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#### Ethernet Optical Transceivers

HPE BladeSystem c-Class 10Gb SFP+ SR Transceiver	455883-B21
HPE BladeSystem c-Class 10Gb SFP+ LR Transceiver	455886-B21
<b>NOTE: Requires single-mode fiber.</b>	
HPE BladeSystem c-Class 10Gb SFP+ LRM Transceiver	455889-B21
HPE BladeSystem c-Class Virtual Connect 1G SFP SX Transceiver	453151-B21
HPE BladeSystem c-Class Virtual Connect 1G SFP RJ-45 Transceiver	453154-B21
HPE X132 10G SFP+ LC SR Transceiver	J9150A
HPE X132 10G SFP+ LC LR Transceiver	J9151A
<b>NOTE: Requires single-mode fiber</b>	
HPE X132 10G SFP+ LC LRM Transceiver	J9152A

## Related Options

### Fibre Channel Optical Transceivers

HPE 8Gb Shortwave B-series Fibre Channel 1 Pack SFP+ Transceiver	AJ716B
HPE 8Gb Long Wave B-series 10km Fibre Channel 1 Pack SFP+ Transceiver	AJ717A
HPE 8Gb Short Wave Fibre Channel SFP+ 1 Pack	AJ718A
HPE 4Gb Short Wave B-series Fibre Channel 1 Pack SFP Transceiver	AJ715A
HPE LC to LC Multi-mode OM3 2-Fiber 0.5m 1-Pack Fiber Optic Cable	AJ833A
HPE LC to LC Multi-mode OM3 2-Fiber 1.0m 1-Pack Fiber Optic Cable	AJ834A
HPE LC to LC Multi-mode OM3 2-Fiber 2.0m 1-Pack Fiber Optic Cable	AJ835A
HPE LC to LC Multi-mode OM3 2-Fiber 5.0m 1-Pack Fiber Optic Cable	AJ836A
HPE LC to LC Multi-mode OM3 2-Fiber 15.0m 1-Pack Fiber Optic Cable	AJ837A
HPE LC to LC Multi-mode OM3 2-Fiber 30.0m 1-Pack Fiber Optic Cable	AJ838A
HPE LC to LC Multi-mode OM3 2-Fiber 50.0m 1-Pack Fiber Optic Cable	AJ839A

**NOTE:** 7m DAC (P/N J9285B) length is supported on VC FlexFabric module ports X5-X8. Ports X1-X4 support up to 5m DAC lengths.

**NOTE:** In addition to the supported HPE and non-HPE Copper cables above, Virtual Connect provides "allowed" connections using third party cables that meet the following criteria: connector=copper pigtail; transceiver code=active cable or passive cable; speed equal or less than 10Gb; length between 1m and 7m, inclusive. All "allowed" DACs are connected and logged. Prior to requesting support from HPE, a DAC from the supported list above must be used to verify a cable issue is not involved.

**NOTE:** Two 8Gb Shortwave FC transceivers are offered to allow consistency with those used in other VC 8Gb Fibre Channel Modules in your environment. HPE 8Gb Shortwave B-series Fibre Channel 1 Pack SFP+ Transceivers (AJ716A) supports VC FC 8Gb 24-port modules. HPE 8Gb Short Wave Fibre Channel SFP+ 1 Pack Transceivers (AJ718A) also supports VC FC 8Gb 20-port modules.

### Service and Support Offerings

**NOTE:** HPE Care Pack services for the c7000 and c3000 Enclosures cover the enclosure, power supplies and fans. HPE Virtual Connect FlexFabric 10Gb/24-Port Modules are also covered by the c7000 and c3000 enclosures Care Pack services

**NOTE:** Some options, including Fibre Channel and InfiniBand switches for the HPE c-Class BladeSystem, are not covered under the c7000/c3000 enclosure Care Packs and carry separate Care Packs. Care Pack service level support for these options should always be uplifted to match existing storage or server service level

#### Proactive Care Services for the c7000 Enclosure

HPE 3 year Proactive Care 24x7 c7000 Enclosure Service	U3C33E
HPE 3 year Proactive Care Call to Repair c7000 Enclosure Service	U3C36E
HPE 3 year Proactive Care 24x7 c7000 Enclosure with Insight Control Service	U3P10E
HPE 3 year Proactive Care Call to Repair c7000 Enclosure with Insight Control Service	U3P13E

#### Proactive Care Services for the c3000 Enclosure

HPE 3 year Proactive Care 24x7 c3000 Enclosure Service	U3C42E
HPE 3 year Proactive Care Call to Repair c3000 Enclosure Service	U3C45E
HPE 3 year Proactive Care 24x7 c3000 Enclosure with Insight Control Service	U3P19E
HPE 3 year Proactive Care Call to Repair c3000 Enclosure with Insight Control Service	U3P22E

#### Installation & Start-up Services recommended for the c7000

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**Related Options**

HPE BladeSystem c7000 Infrastructure Startup Service	UE602E
HPE BladSys c7000 Encd Network Startup Service	UE603E

**Installation & Start-up Services recommended for the c3000**

HPE BladeSystem c3000 Infrastructure Startup Service	UF817E
HPE BladeSystem c3000 + OS Startup Service	UF818E
HPE BladSys c3000 Encd Network Startup Service	UF814E

Additional HPE Care Pack services can be found at: <http://www.hpe.com/info/cpc>



## Technical Specifications

<b>Shipping Dimensions</b>	<b>Length</b>	10.55 in (267.97 mm)
	<b>Width</b>	7.58 in (192.53 mm)
	<b>Height</b>	1.10 in (27.94 mm)
<b>Shipping Weight</b>		Approximately 1.27Kg (2.8 Lbs)
<b>Product Specifications Hardware</b>	<b>Performance</b>	Line Rate, full-duplex 240Gbps bridging fabric Non-blocking architecture Maximum transmission unit (MTU) of up to 9216 bytes (jumbo frames)
	<b>Connectors and Cabling</b>	16 x 10Gb downlinks through the midplane 2 x 10Gb cross connect links 4 x 10Gb SR, LR fiber and copper uplinks SFP+ 4 x 10Gb SR, LRM and LR fiber and copper uplinks SFP+ 1 internal interface to c-Class Onboard Administrator Module
	<b>Indicators</b>	Recessed Momentary Reset Switch Momentary Next/Step Switch Backlit port number, configuration and status indicator LED, one per bulkhead port, blue/amber/green Module status indicator, amber/green Module locator (UID), blue Link indicator, one per SFP+-port, green/amber/orange Active multiplexed port indicator, green
	<b>Weight</b>	1.27Kg (2.8 Lbs)
<b>Latency</b>		1.2 $\mu$ s on Ethernet only ports 1.7u $\mu$ s Enet/FC ports
<b>External FC Port Type</b>		Configured as Node ports (N_Port), 2Gb, 4Gb or 8Gb auto-negotiating SFP ports
<b>Classes of Service</b>		Class 2 and Class 3 Fibre Channel services
<b>Scalability</b>		Does not contribute to the total switch limit.
<b>Buffer Credits</b>		8 buffer credits per port, ASIC embedded memory
<b>Environmental Ranges</b>	<b>Temperature Range</b>	
	Specification	10C to 35C (50F to 95F)
	<b>Temperature Range*</b>	
	Operating	10C to 35C (50F to 95F)
Shipping	Shipping -40C to 60C (-40F to 140F)	
Storage	-20°C to 60°C (-4F to 140°F)	
Maximum wet bulb temperature	30C (80F)	

## Technical Specifications

### Relative Humidity

(noncondensing)\*\*

Operating 10% to 90%

Shipping 10% to 90%

### NOTES:

\* All temperature ratings shown are for sea level. An altitude derating of 1°C per 304.8 m (1.8°F per 1,000 ft) to 3048 m (10,000 ft) is applicable. No direct sunlight allowed. Upper operating limit is 3,048m (10,000 ft) or 70 Kpa/10.1 psia. Upper non-operating limit is 9,144 m (30,000 ft) or 30.3 KPa/4.4 psia.

\*\* Storage maximum humidity of 95% is based on a maximum temperature of 45°C (113°F). Altitude maximum for storage corresponds to a pressure minimum of 70 KPa.

**Power Specification** 12V @ 9.17A (110 W)

### Product Specifications Software

#### Security Features

HTTPS (HTTP exchanged over an SSL-encrypted session) is required for access to the Virtual Connect Manager. Access to the Virtual Connect Manager is via the system Onboard Administrator. Each user account can be configured for a combination of four access privileges to control and/or view elements in the Virtual Connect Manager. User verification by account name and password (Case Sensitive).

Each user account can be configured for a combination of four access privileges to control and/or view elements in the Virtual Connect Manager.

Role based customization to assign various privileges to Server Admin, Network Admin and Storage Admin.

LDAP Authentication services provide role based security via an LDAP SSL Directory Server connection.

TACACS+ authentication, authorization and accounting

RADIUS authentication and authorization

Administrator controlled password length and strength requirements.

Private VLANs for secure connectivity between servers within a domain.

Compliant with United States Department of Defense **Policy on Use of Department of Defense (DoD) Information Systems Standard Consent Banner and User Agreement.**

Configurable filtering of multicast traffic

GUI and CLI session timeout

#### Trunking, Failover and Other Networking Features

Shared Uplink Sets using Link Aggregation Control Protocol (LACP) allows the creation of Ethernet channeling with upstream switches that conform to IEEE 802.3ad. Ports can alternatively be configured for failover only.

External ports within a Port Set can be on the same VC Ethernet module or on multiple VC modules within the VC domain.

In the event of an uplink failure to a data center switch, the next highest performance uplink connection or aggregation will become active.

## Technical Specifications

Fast MAC Cache failover enables rapid recovery of network connections when a standby module becomes active.

Smart Link network senses a failed upstream switch connection and allows teamed NICs to properly failover.

Configure uplink speeds to Auto, 1Gb, or 10Gb on the associated uplinks

### VLAN Features

802.1Q VLAN supported on uplinks.

Uplink ports can be configured for VLAN tagging at egress or pass-thru of tagged VLAN packets from Server ports.

Native VLAN support for untagged packets on a shared uplink set. Packets can be targeted to a specific server ports.

Simultaneous tunneled and mapped VLAN connections to a single domain.

### Industry Standard NPIV Support

The Virtual Connect FlexFabric module works by first converting FCoE traffic from multiple FLEXFABRIC ADAPTER ports to native Fibre Channel and then aggregating it over a single N-port uplink through the use of N\_port\_ID virtualization (NPIV). NPIV allows multiple distinguishable identities (multiple port WWNs or port IDs) over a single N-port connection. All Fibre Channel SAN switch vendors have support for NPIV in their latest firmware release. By conforming to the NPIV standard, SAN equipment interoperability simplified. The Virtual Connect FlexFabric Module can aggregate traffic from up to 255 physical and virtual servers per Fibre Channel uplink port and up to 255 virtual server connections per single downlink port.

### Data Center Connectivity

Each Virtual Connect FlexFabric module supports up to 4 SAN fabrics and is typically connected to Fibre Channel switches that have been configured to run in NPIV mode. The 4 FC configurable uplink ports are speed selectable from 2, 4, or 8Gb/s.

The setup wizard allows SAN administrators to name the fabric that servers will connect into and set the oversubscription rate. Fibre Channel boot parameters and WWN administration are configurable options that can be integrated into server profiles.

In an NPIV environment, there is an initial brief login function between the Virtual Connect FlexFabric Module's uplink port and the data center SAN switch. Once completed, all FlexHBA connections appear as though they are directly connected between the server and the SAN switch. The Virtual Connect FlexFabric Module appears as a pass-thru device to the SAN, yet cables are reduced as much as 16:1

### Management Features

Simple and intuitive Graphical User Interface (GUI) for defining, configuring, and managing all elements of the Virtual Connect Domain.

Setup Wizards for server profile creation and initial domain installation and configuration and network configuration.

Comprehensive administration, definition, and management of Ethernet Network, Shared Uplink Set, SAN Fabric management and Server Profiles

Embedded SNMP v1, v2, v3 and SMI-S agents allow Network Management applications to query Virtual Connect for statistics and trap information.

sFlow v5 for flow monitoring and capacity planning.

## Technical Specifications

A robust, scriptable and secure Command Line Interface simplifies management and enables macros to control common Virtual Connect tasks

Any uplink port can be used as a dedicated mirrored port for traffic analysis and troubleshooting by a Network Analyzer or Sniffer.

Domain Management of user accounts, enclosure, Virtual Connect domain settings, and firmware updates

The location and status of Virtual Connect Modules in the HPE c-Class Enclosure and Onboard Administrator can be viewed from the Hardware Status page. Including at-a-glance detailed information of the hardware elements via mouse-over pop-up windows.

MAC Address Administration allows local administration of predefined or user-defined MAC address ranges.

WWN Address Administration allows local administration of predefined WWN addresses ranges to allow pre-provisioning of SAN volumes

VC manager runs as a high-availability pair when an HPE VC Module is installed in the adjacent bay. All configuration data is stored in flash memory and checkpointed to the standby module. Configurations can also be backed up to a workstation via the GUI.

A VC Ethernet module is not required in enclosure interconnect bay 1 or 2 when a VC FlexFabric Module is used in any bay as the primary VC module.

Up to 128 Network Access Groups can be defined to prevent enabling specific network combinations in the same server profile.

Supported by HPE Virtual Connect Enterprise Management v7.3.2 and higher. Provides centralized network connection management and workload mobility for thousands of servers. Learn more at: <http://www.hpe.com/info/vcem>

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### Management and Standards Support

- INCITS FC-BB-5 Rev 2.00
- IEEE 802.1Qbb
- IEEE 802.1Qaz
- IEEE 802.1AB LLDP
- IEEE 802.1Q (VLAN includes Native VLAN support and server side VLAN tag mapping)
- IEEE 802.2 LLC
- IEEE 802.3ad Link Aggregation
- IEEE 802.3ae 10Gb Fiber Ethernet
- IEEE 802.3aq 10Gb LRM Ethernet
- SNMP v.1, v.2, v.3
- IGMP v1, v2, v3
- ANCI T11 N\_Port ID Virtualization
- FC-PH Rev. 4.3
- FC-PH-2
- FC-PH-3
- FC-FLA
- FC-GS
- FC-GS-2
- FC-GS-3
- FC-FG
- FC-VI

## Technical Specifications

- FC Element MIB RFC 2837
- Fibre Alliance MIB Version 4.0
- FC-BB5 aka FIP Snooping on uplinks
- sFlow v5

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### Safety and Compliance

**Safety Certifications** UL/CUL Recognition to UL/CSA 60950-1  
TUV to EN 60950-1  
CB report and certificate to IEC 60950-1 with all country deviations  
CE Marking

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### Electromagnetic Emissions Certifications FCC Part 15 Class A

FCC Part 15 Class A  
EN 55022 Class A (CISPR22 Class A)  
VCCI Class A  
AS/NZS 3548 Class A or AS/NZS CISPR22 Class A  
MIC Class A  
CE Marking

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### Environment-friendly Products and Approach

#### End-of-life Management and Recycling

Hewlett Packard Enterprise offers end-of-life Hewlett Packard Enterprise product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: <http://www.hpe.com/info/recycle>. To recycle your product, please go to: <http://www.hpe.com/info/recycle> or contact your nearest Hewlett Packard Enterprise sales office. Products returned to Hewlett Packard Enterprise will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard Enterprise web site at: <http://www.hpe.com/info/recycle>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HPE OEM customers who integrate and re-sell Hewlett Packard Enterprise equipment.

## Summary of Changes

Date	Version History	Action	Description of Change
08-May-2017	From Version 27 to 28	Changed	Supported Products, and Related Options sections were updated. URLs updated to hpe.com
16-Dec-2016	From Version 26 to 27	Changed	Related Options section was updated.
		Added	SKU added in Related Options section
21-Oct-2016	From Version 25 to 26	Changed	Rebranding edition
13-Feb-2015	From Version 24 to 25	Changed	Overview and Supported Products sections were updated
10-Oct-2014	From Version 23 to 24	Changed	Hewlett Packard Enterprise servers and HPE Networks Adapters in supported products, and standard features sections were updated.
13-Aug-2014	From Version 22 to 23	Changed	What's new section, Compatibility, Supported products and Standard Features sections were updated. SKUs added on Cabling and Transceiver Options: JG329A, JG330A
18-Apr-2014	From Version 21 to 22	Changed	Compatibility and product descriptions were revised.
03-Mar-2014	From Version 20 to 21	Changed	Change made in the standard features.
05-Nov-2013	From Version 19 to 20	Changed	Change made in the Required cabling section only.
13-Sep-2013	From Version 18 to 19	Changed	Compatibility, Required cabling, Product Features, Product Specifications Software, and Management and Standards Support were revised.
20-Aug-2013	From Version 17 to 18	Changed	Changes were made to correct the North America version.
14-Jun-2013	From Version 16 to 17	Removed	Mentions of sFlow support was removed.
10-Jun-2013	From Version 13 to 16	Removed	Removed At A Glance.
		Added	Added Standard Features section.
		Changed	Changes were made in Overview, Supported Products, Service and Support, HPE Care Pack and Warranty Information, Related Options and Technical Specifications section.
09-Nov-2012	From Version 12 to 13	Changed	Changes were made in Related Options section.
13-Aug-2012	From Version 11 to 12	Changed	Changes were made in Overview, Supported Products, Related Options and Technical Specifications sections.
13-Apr-2012	From Version 10 to 11	Changed	Corrected a spelling error.
09-Dec-2011	From Version 9 to 10	Changed	Changes made in the Related Options section only.
14-Nov-2011	From Version 8 to 9	Changed	Virtual Connect Firmware, Recommended Services and Cabling and Transceiver Options were revised.
30-Aug-2011	From Version 7 to 8	Changed	What's New was added to the Overview HPE Integrity BL860c i2, BL870c i2 and BL890c i2 Server Blades were added to Hewlett Packard Enterprise servers Compatibility FC-AL Rev 4.6 and FC-AL-2 Rev 7.0 were removed from Management and Standards Support
07-Apr-2011	From Version 6 to 7	Added	Added 3 new servers to the Compatibility section.
11-Feb-2011	From Version 5 to 6	Changed	L2 MAC entries was increased to support up to 32000 in At A Glance Performance Note was updated in Cabling and Transceiver Options With Virtual Connect firmware v3.15 was removed from HPE BladeSystem c-Class Enclosures HPE Startup BladeSystem c3000 Enclosed Network Service was removed from Service and Support Offerings
14-Jan-2011	From Version 4 to 5	Changed	HPE Virtual Connect FlexFabric 10/24 Enterprise Edition for BL-c7000, No Media, 1-enclosure License including 1 year of 24x7 Technical Support and Updates was added to Models HPE ProLiant BL620c G7 and BL680x G7 Server Series or greater were added to Hewlett Packard Enterprise servers HPE NC553m 10Gb 2-port FlexFabric Converged Network Adapter was added to HPE Network Adapters

Summary of Changes

			VC FlexFabric Module Configurations image was removed from Supported Products
17-Dec-2010	From Version 3 to 4	Added	Added Service and Support information.
18-Nov-2010	From Version 2 to 3	Changed	Corrected broken link in the Compatibility section.
12-Nov-2010	From Version 1 to 2	Changed	Models, Cabling and Transceiver Options and Service and Support Offerings product descriptions were revised HPE BladeSystem c-Class Virtual Connect Firmware was changed to version 3.15 HPE BladeSystem c7000 Enclosure Server Network Adapters Used was updated VC FlexFabric Module Configurations was revised and Mixed VC Module Configurations was removed from Supported Products HPE NC542m Dual Port 10 10GbE BL-c Adapter and HPE NC552m Dual Port Flex-10 10GbE Multifunction BL-c Adapter were added to HPE Network Adapters



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