

Overview

Simplify and make your data center change-ready. The HP Virtual Connect Flex-10 10Gb Ethernet Module for the c-Class BladeSystem is the simplest, most flexible connection to your networks. The Virtual Connect Flex-10 Ethernet Module is a new class of blade interconnect that simplifies server connections by cleanly separating the server enclosure from LAN, simplifies networks by reducing cables without adding switches to manage, allows you to change servers in just minutes, not days, and tailors network connections and speeds based on application needs. HP Flex-10 technology significantly reduces infrastructure costs by increasing the number of NICs per connection without adding extra blade I/O modules, and reducing cabling uplinks to the data center network. The HP Virtual Connect Flex-10 10Gb Ethernet Module for c-Class BladeSystem is an innovative, new class of integrated interconnects from HP.

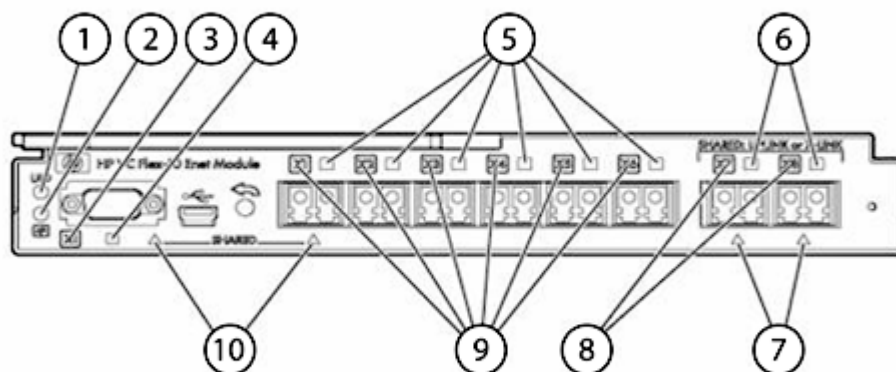


Figure 1 Virtual Connect Ethernet Module Front Bezel

- | | |
|--|---|
| 1. Module locator UUID | 6. Link indicator |
| 2. Module status indicator | 7. Active multiplexed port indicator |
| 3. 10Gb CX4 Backlit port number and status indicator | 8. Backlit port number and status indicator LED |
| 4. 10Gb CX4 link indicator | 9. Backlit port number and status indicator LED |
| 5. Link indicator | 10. Active multiplexed port indicator |

What's New

- Virtual Connect v3.30 highlights for the Virtual Connect Flex-10 Module
 - CLI commands provide essential system, configuration and network troubleshooting information
 - Configure simultaneous tunneled and mapped VLANs in a single VC domain
 - Connect up to 1,000 networks per Shared Uplink Set and 162 networks per 10Gb server port
 - TACACS+ and RADIUS role-based security compatibility
 - Network access groups prevent connection of specific network combinations in the same server profile
 - iSCSI boot assistant simplifies boot parameter configuration
 - Server side network loop prevention

At A Glance



Overview

Performance

- 16 x 10Gb downlinks to server NICs
- Each 10Gb downlink supports up to 4 FlexNICs or 3 FlexNICs and 1 iSCSI FlexHBA
- Each iSCSI FlexHBA can be configured to transport Accelerated iSCSI protocol.
- Each FlexNIC and iSCSI 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 HP 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
- 2 x 10Gb cross connects for redundancy and stacking
- 1 x 10Gb copper uplinks CX-4 for stacking to Virtual Connect Modules or uplinking to data center switches
- 8 x 10Gb SR, LR, or LRM fiber and copper SFP+ uplinks
- Supports up to 4 FlexNICs per 10Gb server connections.
- Each FlexNIC is recognized by the server as a PCI-e physical function device with customizable speeds from 100Mb to 10Gb.
- Line Rate, full-duplex 480 Gbps bridging fabric
- 1.5 μ s latency
- MTU up to 9216 Bytes - Jumbo Frames
- Configurable up to 8192 MAC addresses and 1000 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
- Up to 4,096 VLANs supported in Tunneled mode and 1000 VLANs in mapped mode VC Domain

Management

- Virtual Connect Manager is included with every module
- HTTP and a secure, scriptable CLI interface is ready out of the box. Easy setup and management via the Onboard Administrator interface
- SNMP v.1 and v.2, provide ease of administration and maintenance.
- Role-based security for network and server administration with LDAP compatibility
- 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
- Role-based security for network and server administration with LDAP, TACACS+ and RADIUS compatibility
- Recognizes and directs Server-Side VLAN tags
- Appears as a Pass-Thru device to the LAN Manager
- Remotely update Virtual Connect firmware on multiple modules using Virtual Connect Support Utility 1.5.0 or greater (Firmware update is no longer accomplished via GUI or CLI with VC v3.01)

Virtual Connect Server Profiles

- Create up to 4 individual FlexNICs with their own dedicated, customized bandwidth per 10Gb downlink connection.
- Set FlexNIC speeds from 100Mb to 10Gb per connection
- Allows setup of server connectivity prior to server installation for easy deployment
- Ability to move, add, or change server network connections on the fly
- Once defined, LAN and SAN administrators don't have to be involved in server changes

Options

- Stack multiple Virtual Connect Ethernet modules together in an enclosure to allow any server Ethernet port to connect to any uplink



Overview

- The Fibre Channel Virtual Connect Module provides a complete LAN and SAN Virtual Connect solution
- HP CX4 Ethernet cables are available in .5m, 1m, 3m, and 15m lengths
- Optional HP SFP+ SR, LR, and LRM modules and SFP+ Copper cables in 0.5m, 1m, 3m, and 7m lengths
- Supports all 1Gb Server NICs including LOM and Mezzanine card options and the latest 10Gb KR NICs

Models

HP Virtual Connect Flex-10 10Gb Ethernet Module for c-Class BladeSystem

455880-B21

HP Virtual Connect Flex-10 Ethernet Module with Enterprise Manager License

591973-B21

NOTE: Includes 2 x HP Virtual Connect Flex-10 10Gb Ethernet 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

HP ProLiant and Integrity Servers and Network options

NOTE: The HP BladeSystem c-Class Virtual Connect Firmware v3.X supports the following hardware. (HP Integrity BL8x0c i2 servers require VC FW 3.0 or higher) For the HP Virtual Connect Manager Release Notes and Compatibility Matrix and the full listing of recommended and minimum firmware versions, see the [HP website](#).

- Virtual Connect Modules
 - HP 1/10Gb Virtual Connect Ethernet Module
 - HP 1/10Gb-F Virtual Connect Ethernet Module
 - HP Virtual Connect FlexFabric 10Gb/24-port Module
 - HP 4Gb Virtual Connect Fibre Channel Module
 - HP Virtual Connect 8Gb 24-Port Fibre Channel Module
 - HP Virtual Connect 8Gb 20-Port Fibre Channel Module
- Server blades and workstation blades
 - HP ProLiant BL2x220c G5 Server Blade or greater
 - HP ProLiant BL260c G5 Server Blade
 - HP ProLiant BL280c G6 Server Blade or greater
 - HP ProLiant BL460c Server Blade
 - HP ProLiant BL460c G5 Server Blade or greater
 - HP ProLiant BL465c Server Blade
 - HP ProLiant BL465c G5 Server Blade or greater
 - HP ProLiant BL480c Server Blade
 - HP ProLiant BL490c Server Blade
 - HP ProLiant BL495c G5 Server Blade or greater
 - HP ProLiant BL680c G5 Server Blade or greater
 - HP ProLiant BL685c Server Blade
 - HP ProLiant BL685c G5 Server Blade or greater
 - HP ProLiant xw460c Blade Workstation
 - HP ProLiant xw2x220c Blade Workstation
 - HP ProLiant WS460c G6 Workstation or greater
 - HP Integrity BL860c Server Blade
 - HP Integrity BL860c i2 Server series
 - HP Integrity BL870c Server Blade
 - HP Integrity BL870c i2 Server series
 - HP Integrity BL890c i2 Server series
- Integrated Network Interfaces and mezzanine cards
 - HP NC325m PCI Express Quad Port 1Gb server adapter
 - HP NC326i Integrated Dual Port PCI Express Gigabit Server Adapter
 - HP NC326m PCI Express Dual Port Multifunction Gigabit Server Adapter
 - HP NC360m Dual Port 1GbE BL-c Adapter
 - HP NC364m Quad Port 1GbE BL-c Adapter
 - HP NC370i Dual Port Multifunction Gigabit Network Adapter
 - HP NC373i Dual Port Multifunction Gigabit Network Adapter
 - HP NC373m Dual Port Multifunction Gigabit Network Adapter
 - HP NC382i Integrated Dual Port PCI Express Gigabit Server Adapter
 - HP NC382m Integrated Dual Port PCI Express Gigabit Server Adapter
 - HP NC522m Dual Port Flex-10 10GbE Multifunction BL-c Adapter
 - HP NC532i Dual Port Flex-10 10GbE Multifunction BL-c Adapter
 - HP NC532m Dual Port Flex-10 10GbE Multifunction BL-c Adapter
 - HP NC542m Dual Port Flex-10 10GbE BL-c Adapter
 - HP NC550m 10Gb 2-port PCIe x8 Flex-10 Ethernet Adapter



Supported Products

- HP NC551i Dual Port FlexFabric 10Gb Converged Network Adapter
- HP NC551m Dual Port FlexFabric 10Gb Converged Network Adapter
- HP NC553i 10Gb 2-port FlexFabric Converged Network Adapter
- HP NC553m 10Gb 2-port FlexFabric Converged Network Adapter

NOTE: For optimal operation of HP Virtual Connect Manager, use the following recommended firmware version for the Onboard Administrator and iLO.

NOTE: Some of the servers and/or options listed above may be discontinued.

Virtual Connect Firmware

Virtual Connect Firmware v3.30 is recommended with the following release sets for HP ProLiant and HP Integrity environments:

HP ProLiant server blades:

HP Service Pack for ProLiant : Version 2011.06.0 or greater

The new HP Service Pack for ProLiant is an enhanced, re-packaging of ProLiant systems software and firmware based on the rich legacy of ProLiant Support Packs (PSPs) and HP Smart Update Firmware DVD. It contains the first comprehensive collection of firmware and system software components, all tested together including drivers, agents, non-agents, utilities, firmware packages for servers, controllers, storage, HP BladeSystem enclosures and components (including Virtual Connect, Onboard Administrator), and all components and options supported by HP ProLiant Support Packs for Windows and Linux version 8.70. In addition, VMware offline firmware updates are included.

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

www.hp.com/go/server/service_packs

HP Integrity i2 Server Blades

Recommended HP Smart Update Firmware:

HP Smart Update Firmware-HP Integrity BL860c/870c/890c i2 System Firmware Bundle for Linux/Windows, 26.05

To access latest HP Smart Update Firmware, click here:

<http://h18004.www1.hp.com/products/ blades/integrity-release-sets.html>

HP Integrity Server Blades

Virtual Connect v3.30 Onboard Administrator in c7000 and iLO: Recommended version K15.05
c3000 Enclosures: Recommended or higher
version 3.31 or higher

HP BladeSystem c-Class Enclosures

The HP BladeSystem c3000 and c7000 Enclosure has been designed up front with the Virtual Connect Architecture in mind incorporating the HP Onboard Administrator, ILO Management, and HP Management tools inside the Virtual Connect framework.

Enclosures:

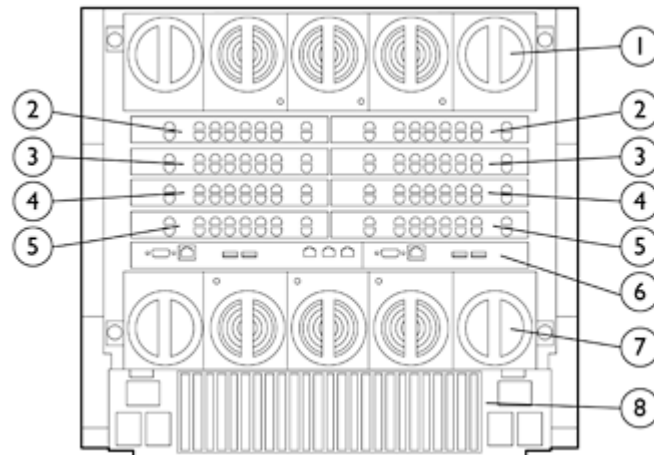
- HP BladeSystem c-Class c7000 Enclosure with Onboard Administrator

HP BladeSystem c-Class c3000 Enclosure with Onboard Administrator



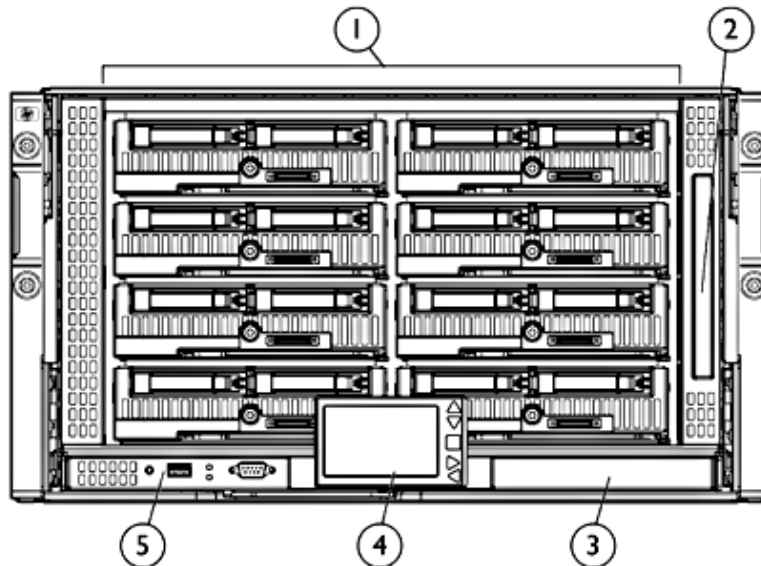
Supported Products

Supported Configurations



HP BladeSystem c7000 Enclosure - Rear View

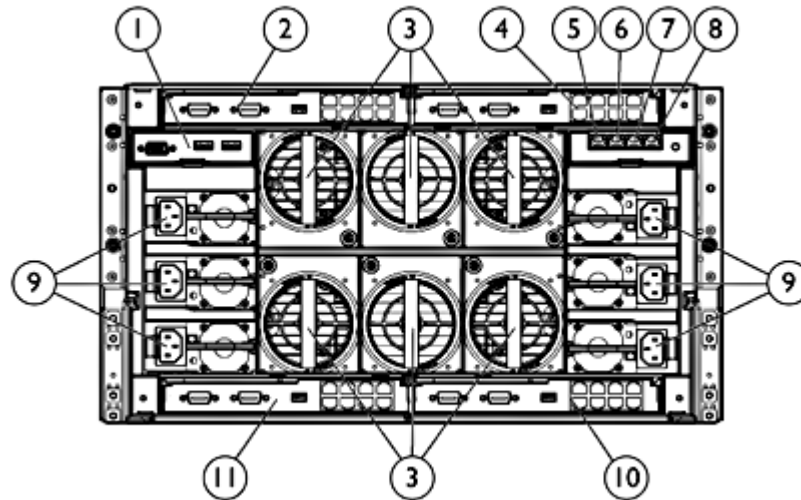
- | | |
|----------------------------|---------------------------------|
| 1. Upper Fan System | 5. Interconnect Bays 7 / 8 |
| 2. Interconnect Bays 1 / 2 | 6. On Board Administrator |
| 3. Interconnect Bays 3 / 4 | 7. Lower Fan System |
| 4. Interconnect Bays 5 / 6 | 8. Rear Redundant Power Complex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



HP BladeSystem c3000 Enclosure - Front View

- | | |
|--|---------------------------------|
| 1. Device Bays 1 thru 8 | 4. Insight Display |
| 2. Enclosure DVD Drive | 5. Active Onboard Administrator |
| 3. Standby Onboard Administrator (reserved for Future) | |

Supported Products



HP BladeSystem c3000 Enclosure - Rear View

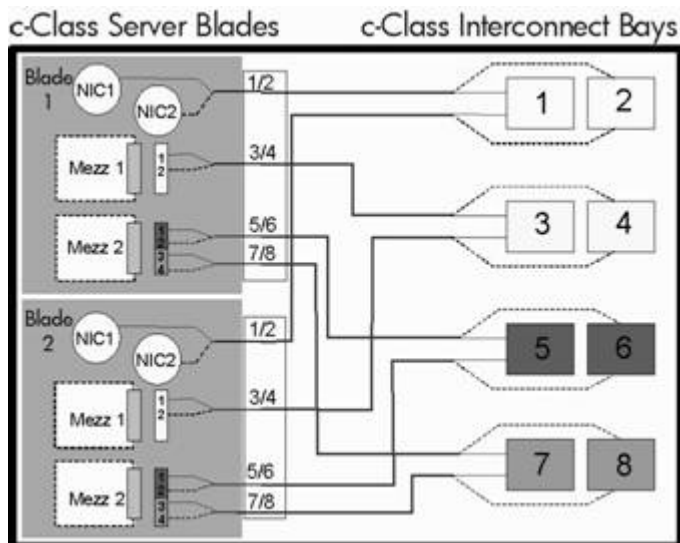
- | | |
|--|---|
| 1. Local KVM interface (reserved for future) | 7. iLO/Onboard Administrator Port |
| 2. Interconnect Bay 1 | 8. iLO/Onboard Administrator Port 2 (reserved for future) |
| 3. Active Cool Fans | 9. Power Supplies |
| 4. Interconnect Bay 2 | 10. Interconnect Bay 4 |
| 5. Enclosure Up-link and Service Port | 11. Interconnect Bay 3 |
| 6. Enclosure Down-link | |

Mezzanines

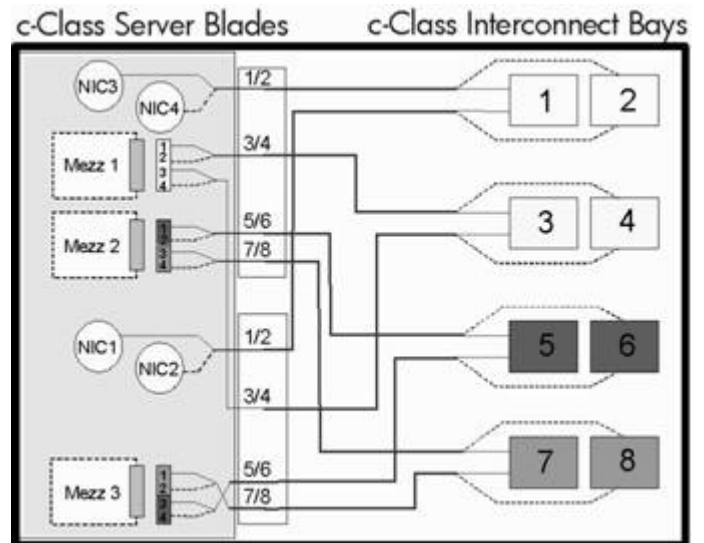
c-7000 Port Mapping

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.

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



Half Height Server Blade



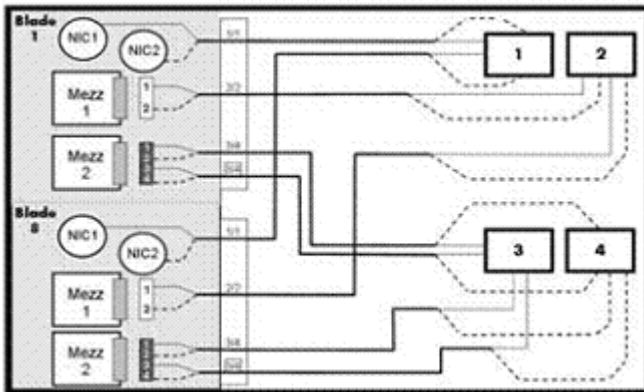
Full Height Server Blade

Supported Products

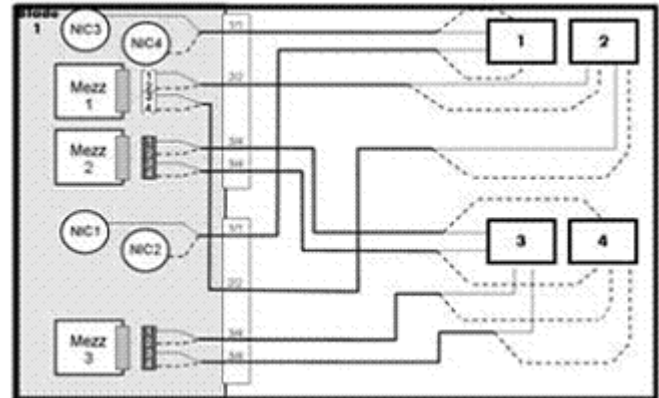
c-3000 Port Mapping

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.

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



Half Height Server Blade



Full Height Server Blade

The following are supported configurations for the Virtual Connect Flex-10 Ethernet Module. Please note that other interconnect options can be installed in the enclosure, but they do not inherit the benefits of Virtual Connect. Switches and Pass-Thru modules will operate per their default configurations. Any moves, adds, or changes to servers which are connected to non-Virtual Connect modules will require reconfiguration on the LAN and/or SAN. The Virtual Connect Manager will only manage Virtual Connect Modules.

HP BladeSystem c7000 Enclosure

NOTE: The following tables show a number of typical, supported configurations for an HP BladeSystem c7000 Enclosure.

[Bay 1] VC-Enet	[Bay 2] Empty
[Bay 3] Other/empty	[Bay 4] Other/empty
[Bay 5] Other/empty	[Bay 6] Other/empty
[Bay 7] Other/empty	[Bay 8] Other/empty

[Bay 1] VC-Enet	[Bay 2] VC-Enet
[Bay 3] Other/empty	[Bay 4] Other/empty
[Bay 5] Other/empty	[Bay 6] Other/empty
[Bay 7] Other/empty	[Bay 8] Other/empty

[Bay 1] VC-Enet	[Bay 2] VC-Enet
[Bay 3] VC-Enet	[Bay 4] VC-Enet
[Bay 5] Other/empty	[Bay 6] Other/empty
[Bay 7] Other/empty	[Bay 8] Other/empty

Supported Products

[Bay 1] VC-Enet	[Bay 2] VC-Enet
[Bay 3] Other/empty	[Bay 4] Other/empty
[Bay 5] VC-Enet	[Bay 6] VC-Enet
[Bay 7] Empty	[Bay 8] Empty

[Bay 1] VC-Enet	[Bay 2] VC-Enet
[Bay 3] VC-Enet	[Bay 4] VC-Enet
[Bay 5] VC-Enet	[Bay 6] VC-Enet
[Bay 7] Empty	[Bay 8] Empty

[Bay 1] VC-Enet	[Bay 2] Empty
[Bay 3] VC-FC	[Bay 4] Empty
[Bay 5] Other/empty	[Bay 6] Other/empty
[Bay 7] Other/empty	[Bay 8] Other/empty

[Bay 1] VC-Enet	[Bay 2] VC-Enet
[Bay 3] VC-FC	[Bay 4] VC-FC
[Bay 5] Other/empty	[Bay 6] Other/empty
[Bay 7] Other/empty	[Bay 8] Other/empty

[Bay 1] VC-Enet	[Bay 2] VC-Enet
[Bay 3] VC-Enet	[Bay 4] VC-Enet
[Bay 5] VC-FC	[Bay 6] VC-FC
[Bay 7] Empty	[Bay 8] Empty

[Bay 1] VC-Enet*	[Bay 2] VC-Enet
[Bay 3] VC-Enet	[Bay 4] VC-Enet
[Bay 5] VC-FC	[Bay 6] VC-FC
[Bay 7] VC-FC	[Bay 8] VC-FC

* This configuration is only applicable for enclosures with full-height servers.

[Bay 1] VC-Enet	[Bay 2] VC-Enet
[Bay 3] VC-FC	[Bay 4] VC-FC
[Bay 5] VC-Enet	[Bay 6] VC-Enet
[Bay 7] Empty	[Bay 8] Empty

[Bay 1] VC-Enet	[Bay 2] VC-Enet
[Bay 3] VC-FC	[Bay 4] VC-FC
[Bay 5] VC-Enet	[Bay 6] VC-Enet
[Bay 7] VC-Enet	[Bay 8] VC-Enet



Supported Products

[Bay 1] VC-Enet	[Bay 2] VC-Enet
[Bay 3] Other/empty	[Bay 4] Other/empty
[Bay 5] VC-FC	[Bay 6] VC-FC
[Bay 7] Empty	[Bay 8] Empty

[Bay 1] VC-Enet	[Bay 2] VC-Enet
[Bay 3] VC-FC	[Bay 4] VC-FC
[Bay 5] VC-FC	[Bay 6] VC-FC
[Bay 7] Empty	[Bay 8] Empty

[Bay 1] VC-Enet	[Bay 2] VC-Enet
[Bay 3] VC-Enet	[Bay 4] VC-Enet
[Bay 5] VC-Enet	[Bay 6] VC-Enet
[Bay 7] VC-Enet	[Bay 8] VC-Enet

NOTE: When using VC Flex-10 Modules with Flex-10 NICs on server blades, only VC Ethernet modules may be used for Ethernet connections in the same enclosure.

HP BladeSystem c3000 Enclosure

NOTE: The following tables show a number of typical, supported configurations for an HP BladeSystem c3000 Enclosure.

[Bay 1] VC-Enet	[Bay 2] VC-Enet
[Bay 3] Empty	[Bay 4] Empty

[Bay 1] VC-Enet	[Bay 2] Empty
[Bay 3] Empty	[Bay 4] Empty

[Bay 1] VC-Enet	[Bay 2] VC-Enet
[Bay 3] VC-Enet	[Bay 4] VC-Enet

[Bay 1] VC-Enet	[Bay 2] VC-Enet
[Bay 3] VC-FC	[Bay 4] VC-FC

NOTE: When using VC Flex-10 Modules with Flex-10 NICs on server blades, only VC Ethernet modules may be used for Ethernet connections in the same enclosure.

Supported Products

Required Cabling	10GBASE-CX4	Twinax CX4 (0.5 to 15m)		
	NOTE: For available cables; please see the "Options" section below of this QuickSpecs.			
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	

* 26m at 160MHz and 33m at 200MHz.

NOTE: For additional information on 10Gb cable specifications go to: http://www.hewlett-packard.com/md/pdfs/10gig_cabling_technical_brief.pdf

Stacking Configuration

Stacking links are used to interconnect Virtual Connect Ethernet Modules when using more than one enclosure or when using more than two Virtual Connect Ethernet Modules in a single enclosure. All Virtual Connect Modules within the VC Domain must be interconnected. Any combination of 1Gb and 10Gb cables can be used to interconnect the Virtual Connect Modules; however the following provides recommended configurations (note that a built-in 10Gb link is provided between modules in horizontally adjacent bays). Supported cable lengths on 10Gb uplinks are 3 to 15 meters and supported 10Gb stacking links (connecting between two HP Virtual Connect Ethernet Modules) are 0.5 to 7 meters. Interconnecting the modules allows all Ethernet NICs on all server blades in the Virtual Connect domain to have access to any Virtual Connect uplink port. By using these module-to-module links, a single pair of uplinks can be used as the data center network connections for the entire Virtual Connect domain, and allows any server blade to be connected to any Ethernet network.

NOTE: Supported module-to-module and multi-enclosure stacking configurations may be found in the [HP Virtual Connect for c-Class BladeSystem Setup and Installation Guide](#) which can be downloaded at the following address: [HP Virtual Connect for c-Class BladeSystem and Installation Guide](#)



Service and Support, HP Care Pack and Warranty Information

Service and Support

This product is covered by a global limited warranty and supported by HP Services and a worldwide network of HP Authorized Channel Partners. Hardware diagnostic support and repair is available for three years from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Additional support may be covered under the warranty or available for an additional fee. Enhancements to warranty services are available through HP Care Pack services or customized service agreements.

NOTE: 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://h18004.www1.hp.com/products/servers/platforms/warranty/index.html>

HP services provide total care and support expertise with committed response designed to meet your IT and business needs.

To fully capitalize on your HP BladeSystem servers' capabilities requires a service partner who thoroughly understands your server technology and systems environment. HP Services, an industry leader in provision of multi vender support solutions provides a range of support services designed to meet the varying needs of business. Whether an SMB or large global corporation HP has a HP BladeSystem server support offer to help you speedily deploy and maximize system uptime.

Recommended Service - Simplify ProLiant solution implementation, maintenance and management.

- **Support Service** - 4-Hour Response Coverage, 3-Year, 24 x 7, Same Business Day
- **Deployment Service - BladeSystem c3000/c7000 Infrastructure (ICE + OS) Installation & Startup** - Provides for the installation and startup of a BladeSystem c3000/c7000 Infrastructure in a single blade enclosure including hardware and software (HP SIM, RDP, RDP deployment of OS, PMP and VPM)

Enhanced Service - Optimize service level to increase IT performance and availability

- **Enhanced Network Installation & Startup for BladeSystem Switches** - Provide for the configuration and testing of BladeSystem Ethernet interconnect switches to facilitate proper implementation of network protocols and access to advanced features. (This service has been updated to include coverage for the VC FlexFabric features.)
- **Support Service- 3-Year, either 6 hour or 24 hour call to repair** HP Hardware Support Onsite 6-Hour or 24-hour Call-to-Repair Service provides you with a team of support specialists who will quickly begin troubleshooting your system to ensure the hardware is operational within a maximum of 6 hours or 24 hours from your initial service request
- **Support Service - 3-Year, 24x7 Same-Business-Day, On-site. 4-Hour response coverage, including holidays** Hardware Onsite Service delivers round the clock, fast reliable 4 hour response-Get product expertise from HP for fast and accurate problem resolution with integrated high quality remote monitoring and problem diagnosis, maintaining predictable service levels reducing unplanned downtime
- **Proactive Select** - A flexible way to purchase HP best-in-class consultancy and services. You can buy Proactive Select Service Credits when you purchase your hardware then use the credits over the next 12 months, or 3-5 years.

Installation & Start-Up service for HP BladeSystem Infrastructure plus HP BladeSystem Enhanced Network Installation and Start-UP as per the Customer Description and/or Data Sheet. To be delivered on a scheduled basis 8am-5pm, M-F, excluding HP holidays.

For a complete listing of service offerings and information visit:



Service and Support, HP Care Pack and Warranty Information

<http://www.hp.com/services/blade-system-services>

<http://www.hp.com/go/proliant/carepack>



Related Options

Cabling and Transceiver Options	HP BladeSystem c-Class .5m 10-GbE CX4 Cable Option	444477-B21
	HP BladeSystem c-Class 1m 10-GbE CX4 Cable Option	444477-B22
	HP BladeSystem c-Class 3m 10-GbE CX4 Cable Option	444477-B23
	HP BladeSystem c-Class 15m 10-GbE CX4 Cable Option	444477-B27
	HP BladeSystem c-Class Small Form-Factor Pluggable .5m 10GbE Copper Cable	487649-B21
	HP BladeSystem c-Class Small Form-Factor Pluggable 1m 10GbE Copper Cable	487652-B21
	HP BladeSystem c-Class Small Form-Factor Pluggable 3m 10GbE Copper Cable	487655-B21
	HP BladeSystem c-Class Small Form-Factor Pluggable 5m 10GbE Copper Cable	537963-B21
	HP BladeSystem c-Class Small Form-Factor Pluggable 7m 10GbE Copper Cable	487658-B21
	HP X240 10G SFP+ SFP+ 0.65m DA Cable	JD095B
	HP X240 10G SFP+ SFP+ 1.2m DA Cable	JD096B
	HP X240 10G SFP+ SFP+ 3m DA Cable	JD097B
	HP 3m C-series Passive Copper SFP+ Cable	AP784A
	NOTE: Equivalent to Cisco 3-m 10G SFP+Copper Twinax Cable (PN SFP-H10GB-CU3M).	
	HP 5m C-series Passive Copper SFP+ Cable	AP785A
	NOTE: Equivalent to Cisco 5-m 10G SFP+Copper Twinax Cable (PN SFP-H10GB-CU5M).	
	HP 1m B-series Active Copper Cable with Integrated SFP+ Transceiver	AP818A
	NOTE: Equivalent to Brocade 10Gbps Direct Attached SFP+Copper Cable - 1m (PN XBR-TWX-0101).	
	HP 3m B-series Active Copper Cable with Integrated SFP+ Transceiver	AP819A
	NOTE: Equivalent to Brocade 10Gbps Direct Attached SFP+Copper Cable -3m (PN XBR-TWX-0301).	
HP 5m B-series Active Copper Cable with Integrated SFP+ Transceiver	AP820A	
NOTE: Equivalent to Brocade 10Gbps Direct Attached SFP+Copper Cable-5m (PN XBR-TWX-0501).		
Ethernet Optical Transceivers		
HP BladeSystem c-Class 10Gb Short Range Small Form-Factor Pluggable Option	455883-B21	
HP BladeSystem c-Class 10Gb Long Range Small Form-Factor Pluggable Option	455886-B21	
HP BladeSystem c-Class 10Gb Long Range Mode Small Form-Factor Pluggable Option	455889-B21	
HP BLc Virtual Connect 1Gb SX Small Form Factor Pluggable Option Kit	453151-B21	
HP BLc Virtual Connect 1Gb RJ-45 Small Form Factor Pluggable Option Kit	453154-B21	
Optional Cables		
2m LC-LC FC Cable Kit	221692-B21	
5m LC-LC FC Cable Kit	221692-B22	
15m LC-LC FC Cable Kit	221692-B23	
30m LC-LC FC Cable Kit	221692-B26	
50m LC-LC FC Cable Kit	221692-B27	
HP .5m Multi-mode OM3 50/125um LC/LC 8Gb FC and 10GbE Laser-enhanced Cable 1 Pk	AJ833A	



Related Options

HP 1m Multi-mode OM3 50/125um LC/LC 8Gb FC and 10GbE Laser-enhanced Cable 1 Pk	AJ834A
HP 2m Multi-mode OM3 50/125um LC/LC 8Gb FC and 10GbE Laser-enhanced Cable 1 Pk	AJ835A
HP 5m Multi-mode OM3 50/125um LC/LC 8Gb FC and 10GbE Laser-enhanced Cable 1 Pk	AJ836A
HP 15m Multi-mode OM3 50/125um LC/LC 8Gb FC and 10GbE Laser-enhanced Cable 1 Pk	AJ837A
HP 30m Multi-mode OM3 50/125um LC/LC 8Gb FC and 10GbE Laser-enhanced Cable 1 Pk	AJ838A
HP 50m Multi-mode OM3 50/125um LC/LC 8Gb FC and 10GbE Laser-enhanced Cable 1 Pk	AJ839A

NOTE: In addition to the supported HP and non-HP Copper Twinax and Active Copper SFP+ 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 HP, a DAC from the supported list above must be used to verify a cable issue is not involved.

Service and Support Offerings

NOTE: The HP Care Pack service part numbers below for ProLiant BL c-Class server blades, cover the server blade and all HP branded hardware options qualified for the server, purchased at the same time or afterwards, internal to the server.

Hardware Services On-site Service

HP 3year 4hour 13x5 c-Class Server Blade HW Support	UE458E
HP 3year 4hour 24x7 c-Class Server Blade Hardware Support	UE459E
HP 3year 6hour 24x7 Call to Repair c-Class Server Blade Hardware Support	UE460E

NOTE: HP Care Pack services for the c7000 and c3000 Enclosures cover the enclosure, power supplies and fans. HP qualified rack options are covered by these services when installed within the same rack. HP supported c-Class enclosure devices including pass thru, Ethernet interconnect and virtual connect modules are also covered by the c7000 and c3000 enclosures Care Pack services.

NOTE: SAN/Fabric switches for the HP c-Class BladeSystem are not covered under the c7000 and c3000 enclosures Care Packs, SAN/Fabric switches carry separate Care Packs. SAN/Fabric Switch Care Pack service level support should always be uplifted to match existing storage or server service level.

Hardware Services On-site Service

HP 3 year Next business day c7000 Enclosure Hardware Support	UE477E
NOTE: Uplifts the Ethernet devices to the same level of service as the c-class enclosure.	
HP 3 year 4 hour 13x5 c7000 Enclosure Hardware Support	UE478E
HP 3 year 4 hour 24x7 c7000 Enclosure Hardware Support	UE479E
HP 3 year 6 hour 24x7 Call to Repair c7000 Enclosure Hardware Support	UE480E

Installation & Start-up Services

HP Startup Blade System c-Class Infrastructure Service	UE602E
HP Startup Blade System c-Class Enhanced Network Service	UE603E



Related Options

HP Install c-Class Server Blade Service

UE493E

HP Install c-Class Enclosure & ServerBlade Service

UE494E

NOTE: For additional information; please visit:

<http://www.hp.com/services/bladessystemservices>



Technical Specifications

Shipping Dimensions	Length	13.88 in (352.55 mm)
	Width	10.63 in (270.00 mm)
	Height	4.75 in (120.65 mm)
Shipping Weight		4.4 lbs (2.0 kg)
Product Specifications Hardware	Performance	Line Rate, full-duplex 240Gbps bridging fabric Non-blocking architecture Maximum transmission unit (MTU) of up to 9216 bytes (jumbo frames)
	Connectors and Cabling	16 x 10Gb downlinks midplane 2 x 10Gb cross connect 1 x 10Gb copper uplinks CX-4 8 x 10Gb SR, LR, or LRM fiber uplinks SFP+ 1 management USB port 1 internal interface to c-Class Onboard Administrator Module
Indicators		Recessed Momentary Reset Switch Momentary Next/Step Switch Backlit port number and status indicator LED, one per bulkhead port, blue/amber/green Module status indicator, amber/green Module locator (UID), blue Link indicator, one per CX4-port, green Link indicator, one per SFP+-port, green/amber USB port (covered) Active multiplexed port indicator, green
	Dimensions	Length 10.5 in (267.7 mm) Width 7.5 in (92.79 mm) Height 1.1 in (27.94 mm)
Weight		1.27Kg (2.8 Lbs)
Environmental Ranges	Temperature Range	
	Specification	10C to 35C (50F to 95F)
	Temperature Range*	
	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)
	Relative Humidity (noncondensing)**	
	Operating	10% to 90%
	Shipping	10% to 90%
Storage	10% to 95%	



Technical Specifications

* 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 @ 8.75A (105 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)
LDAP Authentication services provide role based security via an LDAP SSL Directory Server connection.

TACACS+ authentication, authorization and accounting
RADIUS authentication and authorization

Private VLAN's 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](#)

Trunking and Failover 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.

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.

VLAN Features

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



Technical Specifications

Management Features

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.

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, and Server Profiles

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

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 HP 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.

VC manager runs as a high-availability pair when an HP 1/10Gb VC-Enet Module is installed in adjacent bays. 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.

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

Supported by HP Virtual Connect Enterprise Management v6.20 and higher. Provides centralized network connection management and workload mobility for thousands of servers. Learn more at: www.hp.com/go/vcem



Technical Specifications

Management and Standards Support	Standards	802.1AB LLDP 802.1Q (VLAN, 1024 maximum, includes Native VLAN support and server side VLAN tag mapping) IEEE 802.2 LLC 802.3ad Link Aggregation IEEE 802.3ae 10Gb Fiber Ethernet IEEE 802.3ak 10Gb CX-4 Ethernet IEEE 802.3aq 10Gb LRM Ethernet SNMP v.1, v.2 IGMP v1, v2, v3
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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 offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green . To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.
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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 web site at: <http://www.hp.com/go/green>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

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