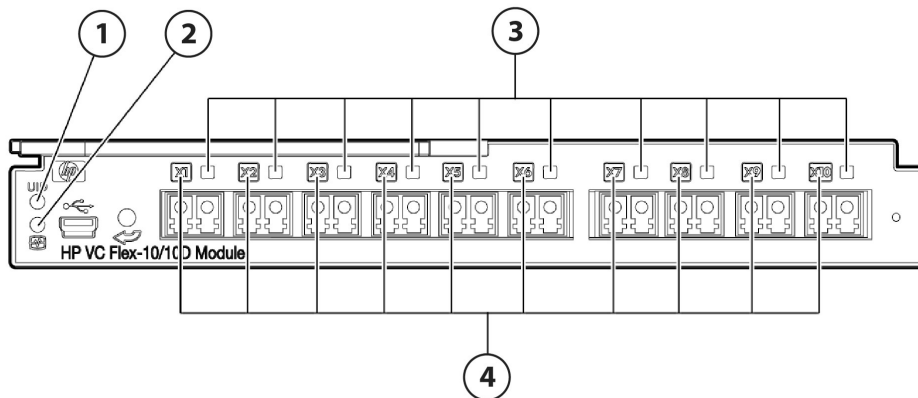## Overview

Simplify and make your data center change-ready. The HP Virtual Connect Flex-10/10D Module for the c-Class BladeSystem is the simplest, most flexible connection to your networks. The Virtual Connect Flex-10/10D 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-10/10D Module for c-Class BladeSystem is an innovative, new class of integrated interconnects from HP.

Virtual Connect Flex-10/10D Module Front Bezel

1. Module locator UID
2. Module status indicator
3. Link/Port activity
4. Port Status

What's New

- Virtual Connect v4.01 highlights for the Virtual Connect FlexFabric 10Gb/24-Port Module
  - Extending convergence with Dual-hop FCoE
  - Prioritizing critical application traffic with QoS
  - Min/Max Bandwidth optimization for efficient allocation of bandwidth in virtualized environment with Flex-10 based adapters
  - Improved SNMP MIBs with detailed traps
  - Role based customization
  - CLI TAB completion
  - CLI and GUI session time
  - Configurable LACP timeout

Overview

Models

HP Virtual Connect Flex-10/10D Module for c-Class BladeSystem   638526-B21
HP Virtual Connect Flex-10/10D Module Enterprise Edition for BLc7000 Option   662048-B21

NOTE: Includes 2 x HP Virtual Connect Flex-10/10D modules plus 1 x VCEM 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 v4.01 supports the following hardware. (HP Integrity BL8x0c i2 servers require VC FW 3.0 or higher and HP Integrity BL8x0c i4 servers require VC FW 3.70 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

- **ProLiant Server blades and workstation blades**
  - HP ProLiant BL2x220c G5 Server Blade
  - HP ProLiant BL2x220c G7 Server Blade
  - HP ProLiant BL260c G5 Server Blade
  - HP ProLiant BL280c G6 Server Blade
  - HP ProLiant BL420c Gen8 Server Blade
  - HP ProLiant BL460c Server Blade
  - HP ProLiant BL460c G5 Server Blade
  - HP ProLiant BL460c G6 Server Blade
  - HP ProLiant BL460c G7 Server Blade
  - HP ProLiant BL460c Gen8 Server Blade
  - HP ProLiant BL465c Server Blade
  - HP ProLiant BL465c G5 Server Blade
  - HP ProLiant BL465c G6 Server Blade
  - HP ProLiant BL465c G7 Server Blade
  - HP ProLiant BL465c Gen8 Server Blade
  - HP ProLiant BL480c Server Blade
  - HP ProLiant BL490c Server Blade
  - HP ProLiant BL495c G5 Server Blade or greater
  - HP ProLiant BL620c G7 Server Blade
  - HP ProLiant BL660c Gen8 Server Blade
  - HP ProLiant BL680c G5 Server Blade or greater
  - HP ProLiant BL685c Server Blade
  - HP ProLiant BL685c G5 Server Blade
  - HP ProLiant BL685c G6 Server Blade
  - HP ProLiant BL685c G7 Server Blade
  - HP ProLiant xw460c Blade Workstation
  - HP ProLiant xw2x220c Blade Workstation
  - HP ProLiant WS460c G6 Workstation
- **Integrity Server Blades**
  - HP Integrity BL860c Server Blade
  - HP Integrity BL860c i2 Server series
  - HP Integrity BL860c i4 Server series
  - HP Integrity BL870c Server Blade
  - HP Integrity BL870c i2 Server series
  - HP Integrity BL870c i4 Server series
  - HP Integrity BL890c i2 Server series
  - HP Integrity BL890c i4 Server series
- **Virtual Connect Modules**
  - 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
- **Integrated Network Interfaces and mezzanine cards**

Supported Products

- 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
- 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
- HP FlexFabric 10Gb 2-port 554M Adapter
- HP FlexFabric 10Gb 2-port 554FLB Adapter
- HP Flex-10 10Gb 2-port 530FLB Adapter
- HP Flex-10 10Gb 2-port 530M Adapter
- HP Flex-10 10Gb 2-port 552M Adapter
- HP Ethernet 1Gb 2-port 361FLB Adapter
- HP Ethernet 1Gb 4-port 366M Adapter

NOTE: For optimal operation of HP Virtual Connect Manager, use the following recommended firmware version for the Onboard Administrator and iLO.
NOTE: For Integrity i4 server blades, recommended Onboard Administrator version is 3.60 or higher.
NOTE: Some of the servers and/or options listed above may be discontinued.

Virtual Connect Firmware Virtual Connect Firmware v4.00 is recommended with the following release sets for HP ProLiant and HP Integrity environments:

HP ProLiant server blades:
HP Service Pack for ProLiant : Version 2013.02.0 or greater
The HP Service Pack for ProLiant (SPP) with HP Smart Update Manager (HP 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 HP ProLiant servers, controllers, storage, blades and enclosures, and other options. It is available on all supported HP ProLiant Gen 8 servers (HP ProLiant SL/ML/DL/BL 100, 200, 300, 500, 700, 900 servers, and HP CloudSystem Matrix) in addition to earlier generation HP ProLiant servers. The SPP is released with most major HP ProLiant server releases.

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, 26.35

Supported Products

To access latest HP Smart Update Firmware, click here:
http://h18004.www1.hp.com/products/blades/integrity-release-sets.html

HP Integrity Server Blades
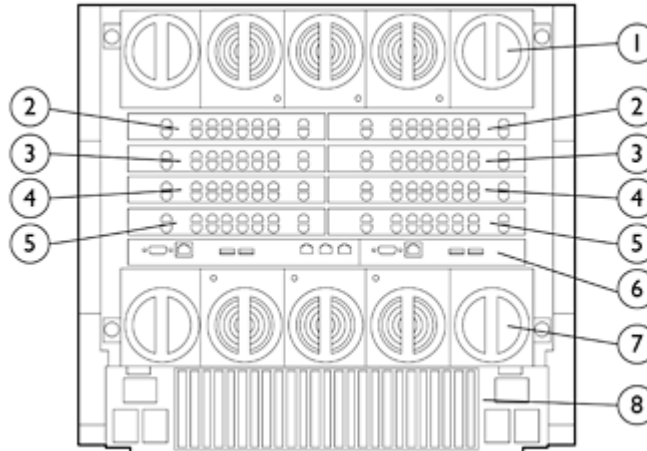For HP Integrity BL860c and BL870c use System Firmware 04.26

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 Configurations

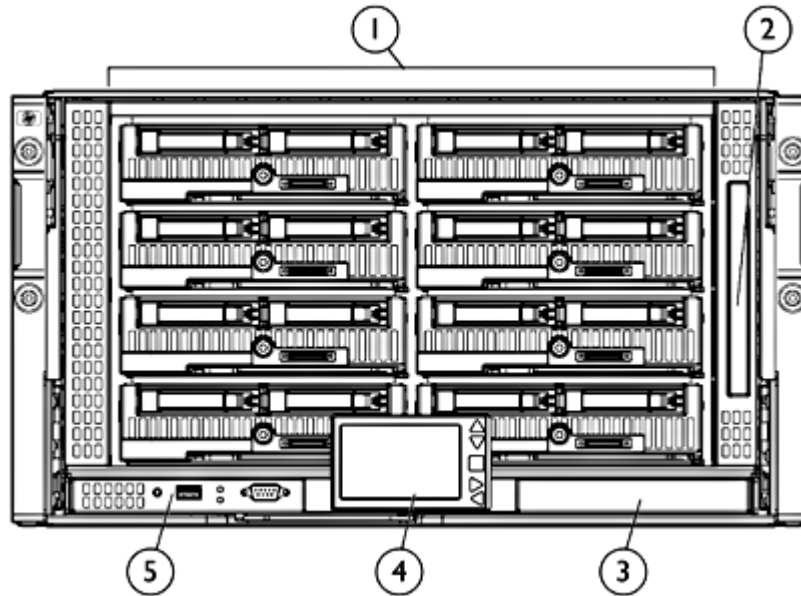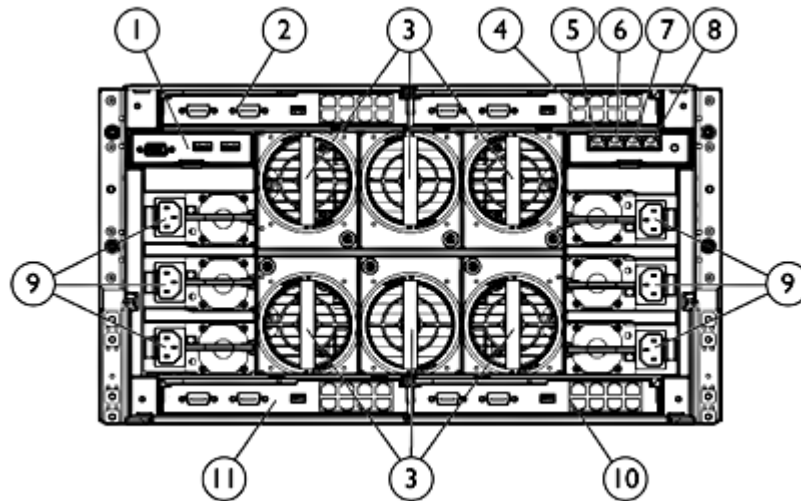**HP BladeSystem c7000 Enclosure - Rear View**

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

Supported Products

HP BladeSystem c3000 Enclosure - Front View

1. Device Bays 1 thru 8
2. Enclosure DVD Drive
3. Standby Onboard Administrator (reserved for Future)

4. Insight Display
5. Active Onboard Administrator

HP BladeSystem c3000 Enclosure - Rear View

1. Local KVM interface (reserved for future)
2. Interconnect Bay 1
3. Active Cool Fans
4. Interconnect Bay 2
5. Enclosure Up-link and Service Port
6. Enclosure Down-link

7. iLO/Onboard Administrator Port
8. iLO/Onboard Administrator Port 2 (reserved for future)
9. Power Supplies
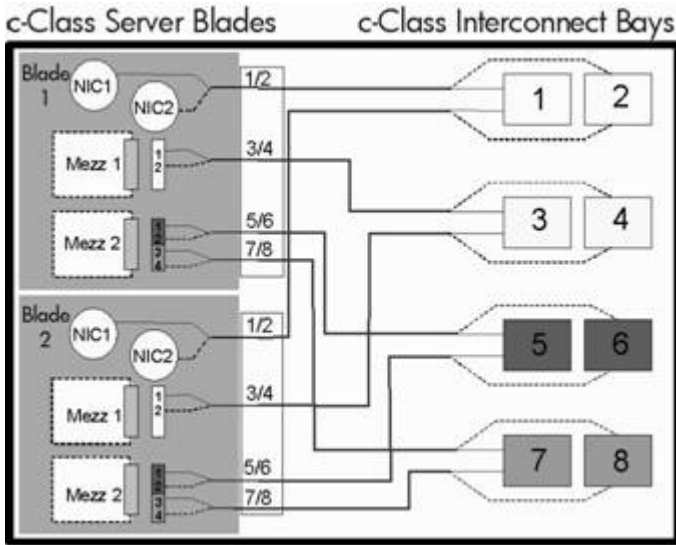10. Interconnect Bay 4
11. Interconnect Bay 3

Supported Products

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.

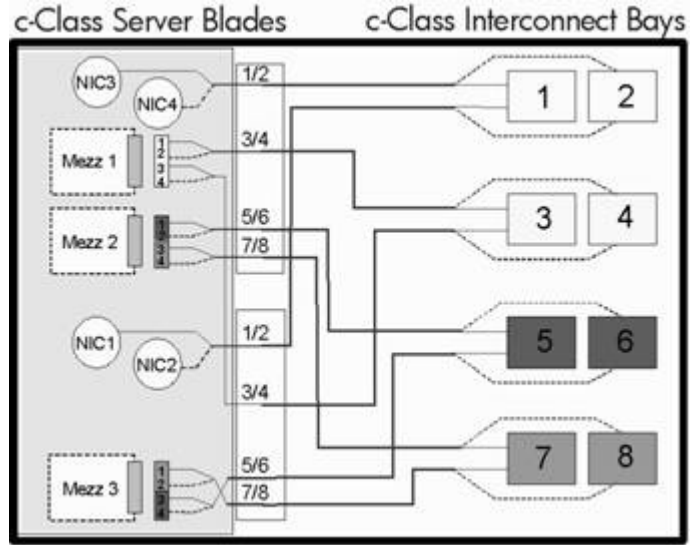**Half Height Server Blade**   **Full Height Sever Blade**

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.
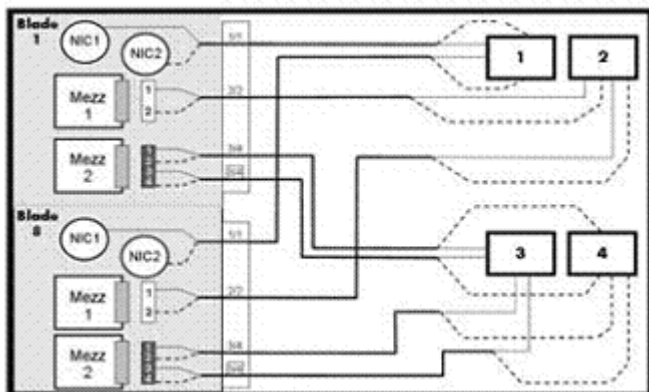

Half Height Server Blade   **Full Height Sever Blade**
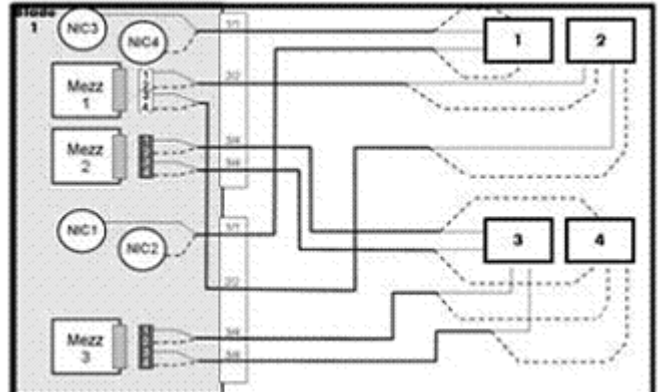
Supported Products

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

[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

Supported Products

[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

[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

Supported Products

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.

Required Cabling

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/rnd/pdfs/10gig_cabling_technical_brief.pdf

Supported Products

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

Standard Features

Product Features

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 including NC554FLB Dual Port FlexFabric Adapter
- 4 x 10Gb cross connects for redundancy and stacking
- 10 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 600 Gbps bridging fabric
- 0.9 µs latency
- MTU up to 9216 Bytes - Jumbo Frames
- Supports up to 128,000 MAC addresses and 1000 IGMP groups
- VLAN Tagging, Pass-Thru and Link Aggregation supported on all uplinks
- A VLAN Tunnel will support up to 4096 VLANs, and 1000 mapped VLANs are supported
- Stack multiple Virtual Connect Flex-10/10D modules with other VC Flex-10/10D, VC FlexFabric or VC Flex-10 across up to 4 BladeSystem enclosures allowing any server Ethernet port to connect to any Ethernet uplink

Management

- Virtual Connect Manager is included with every module
- HTTPS 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.
- 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
- Remotely update Virtual Connect firmware on multiple modules using Virtual Connect Support Utility 1.7.0 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

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

Standard Features

- 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
- The Fibre Channel Virtual Connect Module included provides a complete LAN and SAN Virtual Connect solution
- 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

Service and Support, HP Care Pack and Warranty Information

Service and Support	**HP Technology Services for Industry Standard Servers and BladeSystem** Capitalizing on HP ProLiant server and HP 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 HP infrastructure hardware and software best - the experienced professionals at HP Services. **Protect your business beyond warranty with HP Care Pack Services** HP Care Pack services offer complete care and support expertise with committed response choices designed to meet your IT and business needs. HP Foundation Care services offer scalable reactive support-packages for HP servers and software. You can choose the type and level of service that is most suitable for your IT and business needs. HP Proactive Care delivers high levels of system availability through proactive service management and advanced technical response. HP Datacenter Care provides highly flexible environmental support to address unique customer business needs. Choose a recommended service appropriate to your product or contact your HP sales representative or authorized HP ServiceOne partner for additional HP Care Pack services information.

Recommended HP Care Pack Services for your HP product

Optimized Care	**3-Year HP 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. http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855EEE.pdf **HP Installation and Startup Service for HP 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), HP Insight Control and Server Deployment (formerly RDP). http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA0-5964ENW.pdf **HP Installation and Startup Service for HP BladeSystem c-Class Enhanced Network** HP 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. http://h20195.www2.hp.com/V2/GetPDF.aspx/4aa0-5969ENW.pdf
Standard Care	**3-Year HP 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 HP's vast global resources. http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855EEE.pdf **HP Installation and Startup Service for HP 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

Service and Support, HP Care Pack and Warranty Information

Infrastructure in a single enclosure including deployment of OS (two servers), HP Insight Control and Server Deployment (formerly RDP).
http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA0-5964ENW.pdf

HP Installation and Startup Service for HP BladeSystem c-Class Enhanced Network
HP 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.
http://h20195.www2.hp.com/V2/GetPDF.aspx/4aa0-5969ENW.pdf

Related Services	**HP 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 HP Proactive Care Support. **HP Proactive Select Service** Provides a flexible way to purchase HP 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. http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA2-3842ENN.pdf Additional HP Care Pack services can be found at: http://www.hp.com/go/cpc
Insight Online/Insight Remote Support	HP Insight Remote Support provides 24 X 7 remote monitoring, proactive notifications, and problem resolution. This comes at no additional cost with your HP solution. Learn more about Insight Remote Support http://www.hp.com/go/insightremotesupport and Insight Online http://www.hp.com/go/insightonline **NOTE:** Insight Remote Support is a prerequisite for Proactive Care. All blades within a single HP BladeSystem enclosure must be at the same service level
HP Support Center	Personalized online support portal with access to information, tools and experts to support HP business products. Submit support cases online, chat with HP experts, access support resources or collaborate with peers. Learn more http://www.hp.com/go/hpsc HP's 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. HP Insight Remote Support and HP Support Center are available at no additional cost with a HP warranty, HP Care Pack or HP contractual support agreement. **NOTE:** HP Support Center Mobile App is subject to local availability.
Parts and materials	HP will provide HP-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 quick-specs, 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 HP due to malfunction
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://h18004.www1.hp.com/products/servers/platforms/warranty/index.html

Service and Support, HP Care Pack and Warranty Information

For more information To learn more on HP ProLiant servers and HP BladeSystem servers, please contact your HP sales representative or HP Authorized Channel Partner. Or visit:

www.hp.com/services/bladesystem

Related Options

Cabling and Transceiver Options	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 C-series SFP+ to SFP+ Active Copper 7.0m Direct Attach Cable	QK701A
	HP C-series SFP+ to SFP+ Active Copper 10.0m Direct Attach Cable	QK702A
	HP X240 10G SFP+ SFP+ 7m Direct Attach Copper Cable	JC784C
	HP X240 10G SFP+ to SFP+ 5m Direct Attach Copper Cable	JG081C
	HP X240 10G SFP+ to SFP+ 3m Direct Attach Copper Cable	JD097C
	HP X240 10G SFP+ to SFP+ 1.2m Direct Attach Copper Cable	JD096C
	HP X242 10G SFP+ to SFP+ 1m Direct Attach Copper Cable	J9281B
	HP X242 10G SFP+ to SFP+ 3m Direct Attach Copper Cable	J9283B
	HP X242 10G SFP+ to SFP+ 7m Direct Attach Copper Cable	J9285B
	HP X244 10G XFP to SFP+ 1m Direct Attach Copper Cable	J9300A
	HP 10G X244 XFP to SFP+ 3m Direct Attach Copper Cable	J9301A
	HP 10G X244 XFP to SFP+ 5m Direct Attach Copper Cable	J9302A
	HP C-Series SFP+ to SFP+ Copper 3.0m Direct Attach Cable	AP784A
	HP C-Series SFP+ to SFP+ Copper 5.0m Direct Attach Cable	AP785A
	HP B-series SFP+ to SFP+ Active Copper 1.0m Direct Attach Cable	AP818A
	HP B-series SFP+ to SFP+ Active Copper 3.0m Direct Attach Cable	AP819A
	HP B-series SFP+ to SFP+ Active Copper 5.0m Direct Attach Cable	AP820A

Ethernet Optical Transceivers

HP BladeSystem c-Class 10Gb Short Range Small Form-Factor Pluggable Option	455883-B21
HP BladeSystem c-Class 10Gb Long Reach Multimode Mode Small Form-Factor Pluggable Option **NOTE:** Requires single-mode fiber.	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
HP LC to LC Multi-mode OM3 2-Fiber 0.5m 1-Pack Fiber Optic Cable	AJ833A
HP LC to LC Multi-mode OM3 2-Fiber 1.0m 1-Pack Fiber Optic Cable	AJ834A
HP LC to LC Multi-mode OM3 2-Fiber 2.0m 1-Pack Fiber Optic Cable	AJ835A
HP LC to LC Multi-mode OM3 2-Fiber 5.0m 1-Pack Fiber Optic Cable	AJ836A
HP LC to LC Multi-mode OM3 2-Fiber 15.0m 1-Pack Fiber Optic Cable	AJ837A
HP LC to LC Multi-mode OM3 2-Fiber 30.0m 1-Pack Fiber Optic Cable	AJ838A
HP LC to LC Multi-mode OM3 2-Fiber 50.0m 1-Pack Fiber Optic Cable	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

Related Options

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:** HP Care Pack services for the c7000 and c3000 Enclosures cover the enclosure, power supplies and fans. HP Virtual Connect Flex-10/10D Modules for c-Class BladeSystem are also covered by the c7000 and c3000 enclosures Care Pack services.

NOTE: Some options, including Fibre Channel and InfiniBand switches for the HP 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

HP 3y 4h 24x7 c7000 Proactive Care Service	U3C33E
HP 3y 6h CTR 24x7 c7000 Proactive Care SVC	U3C36E
HP 3y 4h 24x7 c7000 w/IC Proactive Care Service	U3P10E
HP 3y 6h CTR 24x7 c7000 w/IC Proactive Care SVC	U3P13E

Proactive Care Services for the c3000 Enclosure

HP 3 year 4 hour 24x7 c3000 Enclosure Proactive Care Service	U3C42E
HP 3 year 6 hour Call To Repair 24x7 c3000 Enclosure Proactive Care Service	U3C45E
HP 3 year 4 hour 24x7 c3000 Enclosure with Insight Control Proactive Care Service	U3P19E
HP 3 year 6 hour Call To Repair 24x7 c3000 Enclosure with Insight Control Proactive Care Service	U3P22E

HP Proactive Care Personalized Support (Environmental Option)

HP 3y ISS Proactive Care Personalized Support	U6W98E

Installation & Start-up Services recommended for the c7000

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

Installation & Start-up Services recommended for the c3000

HP Startup BladeSystem c3000 + IC + OS SVC	UF817E
HP Startup BladeSystem c3000 + OS SVC	UF818E
HP Startup BladeSystem c3000 Enhanced Network Service	UF814E

Additional HP Care Pack services can be found at:
http://www.hp.com/go/cpc

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 600Gbps bridging fabric	
		Non-blocking architecture	
		Maximum transmission unit (MTU) of up to 9216 bytes (jumbo frames)	
	Connectors and Cabling	16 x 10Gb downlinks midplane 4x 10Gb cross connect 10 x 10Gb SR, LR, or LRM fiber uplinks SFP+ Ethernet and RS-232 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 SFP+-port, green/amber	
	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%

* 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 @ 5.83A (70W

Technical Specifications

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.

Administrator controlled password length and strength requirements

TACACS+ authentication, authorization and accounting
RADIUS authentication and authorization

Private VLAN's for secure connectivity between servers within a domain

Configurable filtering of multicast traffic

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

GUI and CLI session timeout |
| | **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,or10Gb 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.

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

Technical Specifications

Management Features	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 a partner 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.

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 v7.2 and higher. Provides centralized network connection management and workload mobility for thousands of servers. Learn more at: www.hp.com/go/vcem

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

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 FC-BB5
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
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	
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. 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.