

Overview

HPE InfiniBand Options for HPE ProLiant and Apollo Servers

Hewlett Packard Enterprise supports InfiniBand (IB) products that include Host Channel Adapters (HCA), HPE FlexLOM Adapters, switches, and cables for HPE ProLiant servers and HPE Apollo Servers. This QuickSpecs covers 56Gbps FDR InfiniBand products. For 100Gbps EDR InfiniBand adapter products, please refer to <https://www.hpe.com/us/en/product-catalog/servers/server-adapters.html>; for 100Gbps EDR InfiniBand switch products, please refer to <https://www.hpe.com/us/en/product-catalog/servers/server-switches.html>.

For details on the InfiniBand support for HPE BladeSystem c-Class and server blades, please refer to the HPE InfiniBand for HPE BladeSystem c-Class QuickSpecs at: <https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04126044>.

Hewlett Packard Enterprise supports InfiniBand products from InfiniBand technology partner Mellanox.

The following InfiniBand Adapter products based on Mellanox technologies are available from HPE

- HPE IB FDR/EN 10/40Gb 2P 544+QSFP Adapter (Based on Mellanox ConnectX-3 Pro technology)
- HPE IB FDR/EN 10/40Gb 2P 544+FLR-QSFP Adapter (Based on Mellanox ConnectX-3 Pro technology)
- HPE IB QDR/EN 10Gb 2P 544+FLR-QSFP Adapter (Based on Mellanox ConnectX-3 Pro technology)
- HPE IB FDR 2P 545QSFP Adapter (Based on Mellanox Connect-IB technology)
- HPE IB FDR 2P 545FLR-QSFP Adapter (Based on Mellanox Connect-IB technology)

The 544+ adapters are based on the Mellanox ConnectX-3 Pro technology. The 544+ adapters utilize the PCI Express 3.0 x8 interface. The 544+ adapters are dual function adapters that also are capable of supporting single or dual Ethernet ports and a mix of InfiniBand on Port 1 and Ethernet on Port 2. The 544+QSFP adapter is designed for PCI Express 3.0 x8 expansion slots on HPE Gen 9 servers. The 544+FLR-QSFP adapters are designed for PCI Express 3.0 x8 FlexibleLOM expansion slots on HPE Gen 9 servers.

The 545 adapters are based on the Mellanox Connect-IB technology. Both utilize a PCI Express 3.0 x16 interface and two ports of FDR InfiniBand to provide more than 100Gb/s of throughput (dual port) and low latency for performance driven server and storage clustering application. Additional application acceleration is achieved with a 4X improvement in message rate compared with previous generations of InfiniBand cards. The 545QSFP adapter is designed for PCI Express 3.0 x16 expansion slots on HPE Gen8 and Gen9 servers. The 545FLR-QSFP adapter is designed for PCI Express 3.0 x16 FlexibleLOM expansion slots on HPE Gen8 and Gen9 servers.

InfiniBand host stack software (driver) is required to run on servers connected to the InfiniBand fabric. For HCAs based on Mellanox technologies, Hewlett Packard Enterprise supports Mellanox OFED driver stacks on Linux 64-bit operating systems, and Mellanox WinOF driver stack on Microsoft Windows Operating System.

An InfiniBand fabric is constructed with one or more InfiniBand switches connected via inter-switch links. A subnet manager is required to manage an InfiniBand fabric. OpenSM is a host-based subnet manager that runs on a server connected to the InfiniBand fabric. The Mellanox OFED software stack includes OpenSM for Linux. For comprehensive management and monitoring capabilities, Mellanox Unified Fabric Manager Advanced is recommended for managing the InfiniBand fabric based on Mellanox InfiniBand products.

The following InfiniBand switch products based on Mellanox technologies are available from HPE

- Mellanox IB FDR 36-port Managed switch (front-to-rear cooling)
- Mellanox IB FDR 36-port Managed switch with reversed airflow fan unit (rear-to-front cooling)
- Mellanox IB FDR 36-port switch (front-to-rear cooling)
- Mellanox IB FDR 36-port switch with reversed airflow fan unit (rear-to-front cooling)
- Mellanox IB QDR/FDR 648, 324 and 216 port Modular Switches

Overview

The front-to-rear cooling switch has air flow from the front (Power side) to the rear (ports side), and the rear-to-front cooling switch has air flow from the rear (ports side) to the front.

The following Mellanox software for InfiniBand switches and adapters is available from HPE

- Mellanox Unified Fabric Manager Advanced (UFM)

Mellanox Unified Fabric Manager™ Advanced (UFM™) is a powerful platform for managing scale-out computing environments. UFM enables data center operators to efficiently provision, monitor and operate the modern data center fabric.

UFM runs on a server and is used to monitor and analyze Mellanox fabrics health and performance. UFM also can be used to automate provisioning and device management tasks. For example, UFM can communicate with devices, to reset or shut down ports or devices, perform firmware and software upgrades, etc. UFM's extensive API enables it to easily integrate with existing management tools for a unified cluster view. UFM also includes the ability to save historical information, to send alerts to external systems and to activate user made scripts based on system events.

Hewlett Packard Enterprise supports InfiniBand copper and fiber optic cables with QSFP to QSFP connectors.

- QSFP to QSFP FDR copper cables range from .5M to 3M for HCA to switch, or inter-switch links at FDR speed.
- QSFP to QSFP FDR fiber optic cables range from 3M to 30M for HCA to switch, or inter-switch links at FDR speed.
- QSFP to QSFP QDR copper cables range from .5M to 7M for HCA to switch, or inter-switch links at QDR speed.

What's New

- Support for HPE IB FDR/EN 10/40Gb 2P 544+QSFP Adapter
- Support for HPE IB FDR/EN 10/40Gb 2P 544+FLR-QSFP Adapter
- Support for HPE IB QDR/EN 10Gb 2P 544+FLR-QSFP Adapter

At A Glance

- **Dual function InfiniBand/Ethernet cards based on Mellanox ConnectX-3 Pro technology**
 - HPE IB FDR/EN 10/40Gb 2P 544+QSFP Adapter (part number: 764284-B21)
 - Dual QSFP ports PCI Express 3.0 card based on ConnectX-3 Pro technology
 - Support PCI Express 3.0 x8
 - Single or dual ports FDR InfiniBand
 - Single or dual ports 10/40Gb Ethernet
 - FDR IB on port 1 and Ethernet on port 2
 - Support the following Hewlett Packard Enterprise servers: DL120 Gen9, DL160 Gen9, DL180 Gen9, DL360 Gen9, DL380 Gen9, DL560 Gen9, DL580 Gen8, DL580 Gen9, DL60 Gen9, DL80 Gen9, Apollo 2000/XL1x0 Node, Apollo 4200, Apollo 4500/XL450 Gen9, Apollo 6000/XL230b Gen9
 - For firmware release notes, please visit [the support website](#) by select your operating system
 - HPE IB FDR/EN 10/40Gb 2P 544+FLR-QSFP Adapter (part number: 764285-B21)
 - Dual QSFP ports HPE Flexible LOM Adapter based on ConnectX-3 Pro technology
 - Support PCI Express 3.0 x8
 - Single or dual port FDR InfiniBand
 - Single or dual port 10/40Gb Ethernet
 - FDR IB on port 1 and Ethernet on port 2
 - Support the following Hewlett Packard Enterprise servers: DL180 Gen9, DL360 Gen9, DL380 Gen9, DL560 Gen9, DL580 Gen8, DL580 Gen9, Apollo 2000/XL1x0 Node, Apollo 4200, Apollo 4500/XL450 Gen9, Apollo 6000/XL230a Gen9, Apollo 6000/XL230b Gen9, Apollo 6000/XL250a Gen9
 - For firmware release notes, please visit [the support website](#) then select your operating system
 - HPE IB QDR/EN 10Gb 2P 544+FLR-QSFP Adapter (part number: 764286-B21)
 - Dual QSFP ports HPE Flexible LOM Adapter based on ConnectX-3 Pro technology
 - Support PCI Express 3.0 x8
 - Single or dual port QDR InfiniBand

Overview

- Single or dual port 10Gb Ethernet
 - QDR IB on port 1 and Ethernet on port 2
 - Support the following Hewlett Packard Enterprise servers: DL180 Gen9, DL360 Gen9, DL380 Gen9, DL560 Gen9, DL580 Gen8, DL580 Gen9, Apollo 2000/XL 1x0 Node, Apollo 4200, Apollo 4500/XL450 Gen9, Apollo 6000/XL230a Gen9, Apollo 6000/XL230b Gen9, Apollo 6000/XL250a Gen9
 - For firmware release notes, please visit [the support website](#) then select your operating system
- **InfiniBand HCA cards based on Mellanox Connect-IB technology**
 - HPE IB FDR 2P 545QSFP Adapter (part number: 702211-B21)
 - Dual QSFP ports PCI Express 3.0 card based on Connect-IB technology
 - Support PCI Express3.0 x16
 - Single or dual port FDR InfiniBand
 - Support the following Hewlett Packard Enterprise servers: DL120 Gen9, DL160 Gen9, DL180 Gen9, DL360 Gen9, , DL380p gen8, DL380 Gen9, DL385p gen8, DL580 Gen8, DL580 Gen9, , Apollo 2000/XL1x0 Node, Apollo 4200, Apollo 4500/XL450 Gen9, Apollo 6000/XL230b Gen9
 - For firmware release notes, please visit [the support website](#) then select your operating system
 - HPE IB FDR 2P 545FLR-QSFP Adapter (part number: 702212-B21)
 - Dual QSFP ports HPE Flexible LOM Adapter based on Connect-IB technology
 - Supports PCI Express 3.0 x16
 - Single or dual port FDR InfiniBand
 - Support the following Hewlett Packard Enterprise servers: Apollo 6000/XL230a Gen9, Apollo 6000/XL230b Gen9, Apollo 6000 XL250 Gen 9
 - For firmware release notes, please visit [the support website](#) then select your operating system
- **Mellanox Software**
 - Mellanox Unified Fabric Manager Advanced (UFM)
 - Can run on one server, or on two servers for high availability.
NOTE: Supported on 64 bit Linux operating systems only.
 - Physical Fabric topology view
 - Automatic fabric discovery
 - Drill down to each device and port
 - Racking and grouping
 - Central dashboard
 - Health and performance snapshot
 - Congestion analysis map
 - Per logical entity/service bandwidth utilization graph
 - Advanced Monitoring Engine
 - Monitor each device / data counter combination
 - Both health and performance data
 - Aggregate and correlate to physical racks to logical entities
 - Event Management
 - Threshold based alerts
 - Fully configurable - threshold, criticality, action
 - Correlated to physical and to business entities
 - Fabric Health Reports
 - Fabric Health Tab for quick deployment and maintenance analysis
 - Increased fabric robustness
 - Formatted reports for process/improvement management
 - Logical / Service Oriented fabric management
 - Group devices into service oriented entities such as applications or departments
 - Deploy fabric policy such as partitioning and QoS based on application/service needs
 - Aggregate and correlate health and performance data to the service oriented layer
 - Perform tasks on single or multiple devices
 - Establish an SSH session to the device
 - Resetting or shutting down the port or device

Overview

- Manage alarms
 - Perform firmware and software upgrades
 - Monitoring history
 - Monitor history sessions from the GUI
 - Periodic fabric snapshots
 - Monitoring templates for saving user/task monitoring scenarios
 - Advanced event management
 - Sends SNMP traps to central monitoring systems
 - Activates user made scripts based on system events
 - Advanced multicast optimizations through multicast tree management
 - User management with control and authorization groups
 - Multicast tree routing optimizations
 - User authorization management
- **InfiniBand switches based on Mellanox SwitchX-2 technology**
 - Mellanox IB FDR 36-port unmanaged switch (part number: 670767-B21)
 - 36 FDR QSFP ports, support FDR InfiniBand copper and fiber optic cables, with the front-to-rear cooling fan that has air flow from the front to the rear (ports side).
 - Dual power supplies for redundancy.
 - Mellanox IB FDR 36-port unmanaged switch with reversed airflow fan unit (part number: 670768-B21)
 - 36 FDR QSFP ports, support FDR InfiniBand copper and fiber optic cables, with the rear-to-front cooling fan that has air flow from the rear (ports side) to the front.
 - Dual power supplies for redundancy.
 - Mellanox IB FDR 36-port managed switch (part number: 670769-B21)
 - 36 FDR QSFP ports, support FDR InfiniBand copper and fiber optic cables
 - Integrated management module for Fabric Management
 - Dual power supplies for redundancy.
 - Mellanox IB FDR 36-port managed switch with reversed airflow fan unit (670770-B21)
 - 36 FDR QSFP ports, support FDR InfiniBand copper and fiber optic cables, with the rear-to-front cooling fan that has air flow from the rear (ports side) to the front.
 - Integrated management module for Fabric Management
 - Dual power supplies for redundancy.
- **InfiniBand cables**
 - For InfiniBand cables, please see the cables section below. Please also consult product's firmware release notes for list of support cables.
- **Ethernet cables**
 - The Dual Function cards support most HPE Ethernet cables. Consult product's firmware release notes for list of supported cables.
 - 10 Gb Ethernet requires the use of a QSFP to SFP+ Adapter 655874-B21

Models

| | | |
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| HPE Dual Function Adapters | HPE InfiniBand FDR/Ethernet 10Gb/40Gb 2-port 544+QSFP Adapter | 764284-B21 |
| InfiniBand/Ethernet based on Mellanox ConnectX-3 Pro technology | HPE InfiniBand FDR/Ethernet 10Gb/40Gb 2-port 544+FLR-QSFP Adapter | 764285-B21 |
| | HPE InfiniBand QDR/Ethernet 10Gb 2-port 544+FLR-QSFP Adapter | 764286-B21 |
| | NOTE: FLR Indicates HPE FlexibleLOM Adapter series | |
| | NOTE: 10 Gb Ethernet requires the use of the QSFP to SFP+ adapter 655874-B21 | |
| HPE IB HCA cards and options | HPE InfiniBand FDR 2-port 545QSFP Adapter | 702211-B21 |
| | HPE InfiniBand FDR 2-port 545FLR-QSFP Adapter | 702212-B21 |
| | NOTE: The 545 cards require a PCI-e Gen 3 x16 slot. | |
| Mellanox IB switch and options | Mellanox InfiniBand FDR 36P Switch | 670767-B21 |
| | Mellanox InfiniBand FDR 36P RAF Switch | 670768-B21 |
| | Mellanox InfiniBand FDR 36P Managed Switch | 670769-B21 |
| | Mellanox InfiniBand FDR 36P RAF Managed Switch | 670770-B21 |
| | Mellanox InfiniBand QDR/FDR 648 Port Switch Chassis | 674277-B21 |
| | NOTE: 648 port QDR/FDR InfiniBand switch chassis. 29 U high, Contains: 10 power supplies (N+N redundant), 10 C13/C14 2 Meter power cords, 0 Management module (674280-B21, one is required, two are possible), 0 fabric boards (674281-B21 or 674282-B21, 18 are possible), 0 line boards (674283-B21 or 674284-B21 36 are possible), redundant fan units (8 fan units), Rack Kit and cable management kit. ROHS 6 compliant. | |
| | Mellanox InfiniBand QDR/FDR 324 Port Switch Chassis | 674278-B21 |
| | NOTE: 324 port QDR/FDR InfiniBand switch chassis. 16 U high, Contains: 6 power supplies (N+N redundant), 6 C13/C14 2 Meter power cords, 0 Management module (674280-B21, one is required, two are possible), 0 fabric boards (674281-B21 or 674282-B21, nine are possible), 0 line boards (674283-B21 or 674284-B21 18 are possible), redundant fan units, Rack Kit and cable management kit. ROHS 6 Compliant. | |
| | Mellanox InfiniBand QDR/FDR 216 Port Switch Chassis | 674279-B21 |
| | NOTE: 216 port QDR/FDR InfiniBand switch chassis. 9 U high, Contains: 4 power supplies (N+N redundant), 4 C13/C14 2 Meter power cords, 0 Management module (674280-B21, one is required, two are possible), 0 fabric boards (674281-B21 or 674282-B21, six are possible), 0 line boards (674283-B21 or 674284-B21 12 are possible), redundant fan units, Rack Kit and cable management kit. ROHS 6 Compliant. | |
| | Mellanox InfiniBand QDR/FDR Modular Management Board | 674280-B21 |
| | Mellanox InfiniBand FDR Modular Fabric Board | 674282-B21 |
| | Mellanox InfiniBand FDR Modular Line Board | 674284-B21 |
| Mellanox Software Licenses | Mellanox Unified Fabric Manager Advanced 1yr 24x7 Updates and Technical Support Flex License | BD571A |
| | Mellanox Unified Fabric Manager Advanced 3yr 24x7 Updates and Technical Support Flex License | BD572A |
| Cabling Options | NOTE: Cable length support may depend on the actual configuration. Please consult a HPC expert on specifics and refer to adapter firmware release notes for more details (see the support website link in adapters section above) | |

Models

InfiniBand QSFP FDR Optical Cables

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| HP 3 Meter InfiniBand FDR QSFP V-series Optical Cable | 808722-B21 |
| HP 5 Meter InfiniBand FDR QSFP V-series Optical Cable | 808722-B22 |
| HP 7 Meter InfiniBand FDR QSFP V-series Optical Cable | 808722-B23 |
| HP 10 Meter InfiniBand FDR QSFP V-series Optical Cable | 808722-B24 |
| HP 12 Meter InfiniBand FDR QSFP V-series Optical Cable | 808722-B25 |
| HP 15 Meter InfiniBand FDR QSFP V-series Optical Cable | 808722-B26 |
| HP 20 Meter InfiniBand FDR QSFP V-series Optical Cable | 808722-B27 |
| HP 30 Meter InfiniBand FDR QSFP V-series Optical Cable | 808722-B28 |

InfiniBand QSFP FDR Copper Cables

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| HPE 0.5M FDR Quad Small Form Factor Pluggable InfiniBand Copper Cable | 670759-B21 |
| HPE 1M FDR Quad Small Form Factor Pluggable InfiniBand Copper Cable | 670759-B22 |
| HPE 1.5M FDR Quad Small Form Factor Pluggable InfiniBand Copper Cable | 670759-B23 |
| HPE 2M FDR Quad Small Form Factor Pluggable InfiniBand Copper Cable | 670759-B24 |
| HPE 3M FDR Quad Small Form Factor Pluggable InfiniBand Copper Cable | 670759-B25 |

InfiniBand QSFP DDR/QDR Copper Cables

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| HPE 0.5M 4X DDR/QDR Quad Small Form Factor Pluggable InfiniBand Copper Cable | 498385-B26 |
| HPE 1M 4X DDR/QDR Quad Small Form Factor Pluggable InfiniBand Copper Cable | 498385-B21 |
| HPE 1.5M 4X DDR/QDR Quad Small Form Factor Pluggable InfiniBand Copper Cable | 498385-B27 |
| HPE 2M 4X DDR/QDR Quad Small Form Factor Pluggable InfiniBand Copper Cable | 498385-B22 |
| HPE 3M 4X DDR/QDR Quad Small Form Factor Pluggable InfiniBand Copper Cable | 498385-B23 |
| HPE 5M 4X DDR/QDR Quad Small Form Factor Pluggable InfiniBand Copper Cable | 498385-B24 |
| HPE 7M 4X DDR/QDR Quad Small Form Factor Pluggable InfiniBand Copper Cable | 498385-B25 |

Ethernet cables

NOTE: The Dual Function cards support most HPE Ethernet cables. Consult product's firmware release notes for list of supported cables.

NOTE: 10 Gb Ethernet requires the use of a QSFP to SFP+ Adapter(655874-B21)

40GbE Ethernet cables

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| HPE FlexNetwork X240 40G QSFP+ QSFP+ 1m Direct Attach Copper Cable | JG326A |
| HPE FlexNetwork X240 40G QSFP+ QSFP+ 3m Direct Attach Copper Cable | JG327A |
| HPE FlexNetwork X240 40G QSFP+ QSFP+ 5m Direct Attach Copper Cable | JG328A |

10/1GbE Ethernet cables

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|--|------------|
| HPE QSFP/SFP+ Adapter Kit | 655874-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 |

Models

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| 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 BladeSystem c-Class 10Gb SFP+ SR Transceiver | 455883-B21 |
| HPE BladeSystem c-Class 10Gb SFP+ LR Transceiver | 455886-B21 |

Performance

Bandwidth

All ports on FDR HCA card and switch are capable of supporting 56Gbps signaling rate, with a peak data rate of 52 Gbps in each direction.

All ports on QDR HCA card and switch are capable of supporting 40Gbps signaling rate, with a peak data rate of 32 Gbps in each direction

Operating Systems Support

Operating systems support The 544+ series devices configured as IB only mode, Ethernet only mode, or Port 1 IB and Port 2 Ethernet mode are supported on MLNX_OFED 3.1-1.0.3 on the following Linux operating systems:

- **RHEL:** 6.5; 6.6; 6.7; 7.0; 7.1
- **CentOS:** 6.5; 6.6; 6.7; 7.0; 7.1
- **SLES:** 11 SP1; SP2; SP3; SP4; 12
- **OEL:** 6.3; 6.4; 6.5; 6.6; 6.7; 7.0; 7.1
- **Ubuntu:** 12.04; 14.04; 14.10; 15.04

The 544+ series devices configured as Ethernet mode are supported on WinOF 5.10 on the following Windows operating systems:

- **Windows Server 2012 R2 (x64 only)**
- **Windows Server 2012 (x64 only)**
- **Windows Server 2008 R2 (x64 only)**

The 544+ series devices configured as Ethernet only mode (with VMware 4.15.2.0 or VMware 1.9.10-0) are also supported in the following virtualized environments:

- **ESXI** 6.x
- **ESX** 5.5
- **ESX** 5.1

The 545 series devices are supported on MLNX_OFED 3.1-1.0.3 on the following Linux operating systems:

- **RHEL:** 6.5; 6.6; 6.7; 7.0; 7.1
- **CentOS:** 6.5; 6.6; 6.7; 7.0; 7.1
- **SLES:** 11 SP1; SP2; SP3; SP4; 12
- **OEL:** 6.3; 6.4; 6.5; 6.6; 6.7; 7.0; 7.1
- **Ubuntu:** 12.04; 14.04; 14.10; 15.04

InfiniBand Fabric Management

**Auto-negotiation/
self-discovery** InfiniBand ports support auto-negotiation down to lower rate. For example, ports of a FDR switch will negotiate down to QDR speed if they are connected to a device which can only operate at QDR. Self-discovery is supported by subnet manager.

Management Mellanox OFED includes drivers and utilities to configure and manage the HCA in a Linux environment and Mellanox WinOF includes drivers and utilities to configure and manage the HCA in the Microsoft Windows server environment.

InfiniBand fabric requires a subnet manager: see the subnet manager discussion above.

Service and Support

Service and Support

HPE Technology Services

HPE Technology Services offers you consultants and support experts to solve your most complex infrastructure problems. We help keep your business running, boost availability and avoid downtime.

Protect your business beyond warranty with HPE Pointnext operational services

When you buy HPE Options, it's also a good time to think about what level of service you may need. HPE Pointnext operational services provide total care and support expertise with committed response choices designed to meet your IT and business need.

HPE Foundation Care services deliver scalable support-packages for Hewlett Packard Enterprise industry-standard servers and software. You can choose the type and level of service that is most suitable for your business needs. If you are running business critical environments, Hewlett Packard Enterprise offers Proactive Care. These services help you deliver high levels of application availability through proactive service management and advanced technical response.

Here is the support service recommendation from the Foundation Care and Proactive Care portfolio. For customized support service solution, Hewlett Packard Enterprise can work with you to tailor a service solution for your unique support requirements using broader services portfolio of Foundation Care and Proactive Care.

Recommended Services

Recommended HPE Pointnext operational services for optimal satisfaction with your HPE product

Hewlett Packard Enterprise recommends Proactive Care for your servers, enclosures and components to prevent problems with proactive advice and assistance, resolve issues and rapidly recover by connecting to The Hewlett Packard Enterprise enhanced call experience and advanced technical expertise.

Related Services

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. <http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA2-3842ENN.pdf>

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 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 Hewlett Packard Enterprise due to malfunction.

Technical Specifications

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|--|----------------------------------|---|
| Compliance | InfiniBand HCA cards | PCI Express 3.0 IBTA Specification 1.2.1 compliant RoHS-R6 |
| Power and Environmental Specification | Operating | <p data-bbox="568 396 724 430">Temperature</p> <p data-bbox="568 438 1037 472">HCA cards: 0 to 55° C.</p> <p data-bbox="568 480 1532 543">Switches: NOTE: Please refer to Mellanox product specification for Mellanox switch models.</p> <p data-bbox="568 581 1532 646">Humidity (non-condensing) NOTE: Please refer to Mellanox product specifications for Mellanox switch models.</p> |
| | Power requirement | <p data-bbox="568 684 692 718">HCA cards:</p> <ul style="list-style-type: none"> <li data-bbox="938 684 1532 848">• HPE IB FDR/EN 10/40G 2P 544+QSFP Adapter: <ul style="list-style-type: none"> <li data-bbox="1011 722 1532 785">– With Active Optical Cables: typical 13.6W, max 14.2W <li data-bbox="1011 789 1532 848">– With Passive Copper Cables: typical 8.7W, max 10.6W <li data-bbox="938 852 1532 1050">• HPE IB FDR/EN 10/40G 2P 544+FLR-QSFP Adapter: <ul style="list-style-type: none"> <li data-bbox="1011 915 1532 978">– With Active Optical Cables: typical 13.6W, max 14.2W <li data-bbox="1011 982 1532 1045">– With Passive Copper Cables: typical 8.7W, max 10.6W <li data-bbox="938 1054 1532 1213">• HPE IB QDR/EN 10Gb 2P 544+FLR-QSFP: <ul style="list-style-type: none"> <li data-bbox="1011 1087 1532 1150">– With Active Optical Cables: typical 9.3W, max 11.8W <li data-bbox="1011 1155 1532 1213">– With Passive Copper Cables: typical 7.6W, max 9.7W <li data-bbox="938 1218 1532 1314">• HPE IB FDR 2P 545QSFP Adapter: <ul style="list-style-type: none"> <li data-bbox="1011 1251 1532 1314">– With Active Optical Cables: typical 19W, max 22W <li data-bbox="938 1318 1532 1415">• HPE IB FDR 2P 545QSFP Adapter: <ul style="list-style-type: none"> <li data-bbox="1011 1352 1532 1415">– With Active Optical Cables: typical 19W, max 22W <li data-bbox="938 1419 1532 1516">• HPE IB FDR 2P 545FLR-QSFP Adapter: <ul style="list-style-type: none"> <li data-bbox="1011 1453 1532 1516">– With Active Optical Cables: typical 18W, max 20W <p data-bbox="568 1520 1532 1583">Switches: NOTE: Please refer to Mellanox product specifications for Mellanox switch models.</p> |
| | Emissions Classifications | <p data-bbox="568 1621 692 1654">HCA cards:</p> <p data-bbox="916 1621 1222 1906">USA: FCC, Class A Canada: ICES, Class A EU: EN55022, Class A EU: EN55024, Class A EU : EN61000-3-2, Class A EU : EN61000-3-3, Class A Japan : VCCI, Class A Korea: MIC, Class A Taiwan: BSMI, Class A</p> <p data-bbox="568 1940 1532 1971">Switches: NOTE: Please refer to Mellanox product specification</p> |

Technical Specifications

for Mellanox switch models.

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 HEWLETT PACKARD ENTERPRISE OEM customers who integrate and re-sell Hewlett Packard Enterprise equipment.

Summary of Changes

| Date | Version History | Action | Description of Change |
|-------------|-----------------------|---------|--|
| 23-Oct-2017 | Version 28 | Changed | Care Pack naming and Service and Support- Parts and Materials updated. |
| 06-Mar-2017 | From Version 26 to 27 | Changed | Overview, Models, Operating Systems Support, InfiniBand Fabric Management, and Technical Specifications sections were updated. |
| | | Removed | Obsolete SKUs were deleted: 649281-B21, 649282-B21, 649283-B21, 592520-B21, 583211-B21, 589478-B21, 505959-B21, 589479-B21, 589480-B21, 589481-B21, 589482-B21, 589483-B21, 589484-B21, 670760-B21, 670760-B22, 670760-B23, 670760-B25, 670760-B26, 670760-B27, 670760-B28, 674281-B21, 674283-B21, 712495-B21, 712496-B21, 712497-B21, 712498-B21. |
| 29-Apr-2016 | From Version 25 to 26 | Changed | Models and Operating Systems Support |
| | | Removed | Obsolete SKU was removed: 670760-B24 |
| 05-Jan-2016 | From Version 24 to 25 | Changed | Information in QuickSpecs sections was updated. |
| | | Added | SKUs added in Models section: 764284-B21, 764285-B21, 764286-B21, 808722-B21, 808722-B22, 808722-B23, 808722-B24, 808722-B25, 808722-B26, 808722-B27, 808722-B28, 498385-B26, 498385-B27, JG325A, JG326A, JG327A, JG328A, 655874-B21, 453151-B21, 453154-B21, 487649-B21, 487652-B21, 487655-B21, 537963-B21, 487658-B21, 455883-B21, 455886-B21 |
| | | Removed | Obsolete SKUs were deleted: BD569A, BD573A, BD574A, 498386-B23, 498386-B24, 498386-B25, 498386-B26, 498386-B27, 498386-B28, JG325A. |
| 18-Apr-2014 | From Version 23 to 24 | Changed | Changes made in Service and Support section. |
| 18-Feb-2014 | From Version 22 to 23 | Changed | Changes made throughout the QuickSpecs. |
| 25-Mar-2013 | From Version 21 to 22 | Removed | Models: Removed Voltaire IB Swatches and Options section. |
| 04-Dec-2012 | From Version 20 to 21 | Changed | Changes were made in Overview and Models sections. |
| 13-Aug-2012 | From Version 19 to 20 | Changed | Changes made throughout the QuickSpecs. |
| 26-Mar-2012 | From Version 18 to 19 | Changed | Changes made in the Models section only. |
| 06-Mar-2012 | From Version 17 to 18 | Changed | Changes made throughout the QuickSpecs. |
| 10-Feb-2012 | From Version 16 to 17 | Removed | Removed several part numbers from the At A Glance and Models sections. |
| 12-Aug-2011 | From Version 15 to 16 | Changed | Model descriptions were revised. |
| 23-Jun-2011 | From Version 14 to 15 | Changed | Link was corrected in Service and Support. |
| 29-Apr-2011 | From Version 13 to 14 | Removed | Removed part number 450716-B21 from the Models section. |
| 08-Apr-2011 | From Version 12 to 13 | Changed | Part number was changed for QLogic InfiniBand Fabric Suite (IFS) in QLogic IB switches and options and Service and Support was completely revised. |
| 12-Nov-2010 | From Version 11 to 12 | Changed | InfiniBand/Ethernet Gateway switches were added and all mentions of active copper were removed. |
| 03-Sep-2010 | From Version 10 to 11 | Changed | Additional Features was changed to Service and Support and HPE 2-Port DDR/QDR QSFP/CX4 IB Cu Cable - 2 Meter was removed from InfiniBand QSFP/CX4 Copper Cables in Models. |
| 21-Jun-2010 | From Version 9 to 10 | Added | Voltaire IB 2-Port DDR 36-port internally managed switch with reversed airflow fan, Voltaire IB 2-Port QDR 162-Port switch chassis and Voltaire IB 2-Port QDR 162-Port switch fabric board were added to Models. |
| 08-Dec-2009 | From Version 8 to 9 | Added | Voltaire 1500 Watt Power Supply was added to Voltaire IB switches and options and QLogic BLc 2-Port QDR IB Management Module was added to QLogic IB switches and options. |

Summary of Changes

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|-------------|---------------------|---------|---|
| 16-Nov-2009 | From Version 7 to 8 | Changed | Changes were made throughout the QuickSpecs. |
| 25-Sep-2009 | From Version 6 to 7 | Added | HPE 2-Port DDR/QDR QSFP IB Cu Cable - 7 meter Mellanox OFED for Linux and Mellanox WinOF for Microsoft Windows HPC server 2008 |
| 02-Jun-2009 | From Version 5 to 6 | Added | 40Gbps (QDR) and 20Gbps (DDR) InfiniBand products to the Introduction in the Overview DL160 G6 throughout At A Glance in the Overview section Mellanox IB QDR 324P Switch Chassis throughout the QuickSpecs InfiniBand QSFP Active Copper Cables to the Models section |
| 13-Apr-2009 | From Version 4 to 5 | Changed | Edits were made throughout the Overview section Completely revised the Scalability and Reliability section and Auto-negotiation/self-discovery and Management in the InfiniBand fabric Management section Updated InfiniBand HCA cards and Power requirement in the Technical Specifications section |
| | | Removed | Cisco IB OFED-based driver per node software license from HPE IB PCI HCA cards and drivers for ProLiant and Integrity servers in the Models section Subnet Manager from the InfiniBand Fabric Management section Standard Support section from HPE Services and Support in the Additional Features |
| 03-Apr-2009 | From Version 3 to 4 | Added | HPE IB 2-Port QDR Conn-X PCI-e Dual-port HCA to HPE IB PCI HCA cards, and drives for ProLiant and Integrity servers and Voltaire IB 2-Port QDR 36-port Internally Managed Switch to Voltaire Switches and host-based subnet manager from HPE in the Models section. |
| 30-Jan-2009 | From Version 2 to 3 | Changed | Changed Power Supply amounts in the NOTE for Voltaire IB DDR Rev B96-port Switch Chassis and removed "with 3 yrs software support" from Voltaire Gridstack per HCA software license and Cisco IB OFED-based driver per node software license in the Models section. |
| 15-Sep-2008 | From Version 1 to 2 | Added | What's New section to the Overview Voltaire 22P IB 10GE Line board to the Voltaire switches and host-based subnet manager from HPE section of the Models InfiniBand QSFP/CX4 Copper Cables and InfiniBand QSFP Copper Cables sections to the Models |
| | | Changed | NOTEs section of Voltaire IB DDR Rev B 96-port Switch Chassis, Voltaire IB DDR Rev b 288-port Switch Chassis and Voltaire IB DDR Rev b 24-port Line Board to the Voltaire switches and host-based subnet manager from HPE section of the Models InfiniBand CX4 Copper Cables and InfiniBand CX4 Fiber Optic Cables section in the Models |



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