

### Overview

HP supports 56 Gbps Fourteen Data rate (FDR), 40Gbps 4x Quad Data Rate (QDR) InfiniBand products that include Host Channel Adapters (HCA), HP FlexLOM adaptors, switches, and cables for HP ProLiant servers, and HP Integrity servers.

For details on the InfiniBand support for HP BladeSystem c-Class and server blades, please refer to the HP InfiniBand for HP BladeSystem c-Class QuickSpecs at: [http://h18000.www1.hp.com/products/quickspecs/12586\\_na/12586\\_na.html](http://h18000.www1.hp.com/products/quickspecs/12586_na/12586_na.html).

HP supports InfiniBand products from InfiniBand technology partners Mellanox and QLogic.

The following InfiniBand adaptor products based on Mellanox technologies are available from HP

- HP IB FDR/EN 10/40Gb 2P 544QSFP Adaptor (Dual IP/IB)
- HP IB FDR/EN 10/40Gb 2P 544FLR-QSFP Adaptor (Dual IP/IB)
- HP IB QDR/EN 10Gb 2P 544FLR-QSFP Adaptor (Dual IP/IB)
- HP IB 4X QDR CX-2 PCI-e G2 Dual-port HCA

The HP IB FDR/EN 10/40Gb 2P 544QSFP Adaptor, HP IB FDR/EN 10/40Gb 2P 544FLR-QSFP Adaptor and HP IB QDR/EN 10Gb 2P 544FLR-QSFP Adaptor are based on the Mellanox ConnectX-3 IB technology. The HP IB 4X QDR PCI-e Dual-port is based on the Mellanox ConnectX-2 IB technology. The FDR IB HCA delivers low-latency and up to 56Gbps (FDR) bandwidth for performance-driven server and storage clustering applications in High-Performance Computing (HPC) and enterprise data centers. The HP IB FDR/EN 10/40Gb 2P Adaptors are also capable of dual 40 or 10 Gb Ethernet ports. The HP IB FDR/EN 10/40Gb 2P 544 HCA card is designed for PCI Express 3.0 x8 connectors on HP Gen8 servers.

InfiniBand host stack software (driver) is required to run on servers connected to the InfiniBand fabric. For HCAs based on Mellanox technologies, HP supports Mellanox OFED driver stacks on Linux 64-bit operating systems, and Mellanox WinOF driver stack on Microsoft Windows (HPC) server 2008.

An InfiniBand fabric is constructed with one or more InfiniBand switches connected via inter-switch links. The most commonly deployed fabric topology is a fat tree or its variations. 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. Mellanox OFED software stack includes OpenSM for Linux, and Mellanox WinOF includes OpenSM for Windows. For comprehensive management and monitoring capabilities, Mellanox FabricIT™ is recommended for managing the InfiniBand fabric based on Mellanox InfiniBand products.

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

- 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)
- Voltaire IB QDR 36-port switch (front-to-rear cooling)
- Voltaire IB QDR 36-port switch with reversed airflow fan unit (rear-to-front cooling)
- Voltaire IBQDR 162-port (144 ports fully non-blocking) director switch
- Voltaire IB QDR 324-port director switch
- Mellanox IB QDR/FDR 648, 324 and 216 port Modular Switches

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.

For HCAs based on Mellanox technologies, HP also supports Mellanox OFED driver stacks on Linux 64-bit operating system. A subnet

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manager is required to manage an InfiniBand fabric. For comprehensive management and monitoring capabilities, Mellanox Unified Fabric Manager™ (UFM) is recommended for managing the InfiniBand fabric based on Voltaire InfiniBand switch products and Mellanox HCA products with Mellanox OFED stack.

The following Mellanox software for InfiniBand switches and adaptors is available from HP

- Mellanox Unified Fabric Manager (UFM)
- Mellanox Unified Fabric Manager Advanced (UFM Advanced)
- Mellanox Acceleration Software (VMA)

Mellanox Unified Fabric Manager™ (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.

Mellanox UFM Advanced adds a number of enterprise features to UFM. This includes the ability to save historical information, to send alerts to external systems and to activate user made scripts based on system events.

Mellanox Acceleration Software consists of Mellanox Messaging Accelerator (VMA) technology for minimum latency communication. VMA performs multicast, unicast and TCP acceleration using OS bypass, and is implemented via a BSD-socket compliant dynamically linked library so that no application changes are required.

The following InfiniBand products based on QLogic technologies are available from HP

- QLogic IB 4X QDR PCI-e G2 Dual-port HCA
- QLogic IB 4X QDR 36-port Switch
- QLogic IB 4X QDR 324-Port Switch
- QLogic IB 4X QDR 648-Port Switch

The QLogic IB 4X QDR HCA is part of the QLogic family of InfiniBand Host Channel Adapters based on the TrueScale ASIC architecture. It has a unique hardware architecture that delivers unprecedented levels of performance, reliability, and scalability, making it an ideal solution for highly scaled High Performance Computing (HPC) and high throughput, low-latency enterprise applications.

InfiniBand host stack software (driver) is required to run on servers connected to the InfiniBand fabric. For HCAs based on QLogic technology, HP supports QLogic OFED driver stacks on Linux 64-bit operating systems.

QLogic IB 4X QDR 36 Port Switch, QLogic IB 4X QDR 324 Port Switch and QLogic IB 4X QDR 648 Port Switch are based on QLogic TrueScale™ technology. The QLogic 36-port switch supports QLogic BLC 4X QDR IB Management Module (505959-B21). QLogic 324- and 648-port switch chassis are configurable: with the QLogic 18-port high performance leaf modules, they can be configured to support up to 324 and 648 ports, respectively; with the QLogic 24-port high density leaf modules, they can be configured to support up to 432 and 864 ports, respectively, with 2:1 oversubscribed bandwidth on the backplane.

An InfiniBand fabric is constructed with one or more InfiniBand switches connected via inter-switch links. The most commonly deployed fabric topology is a fat tree or its variations. 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. QLogic OFED software stack includes OpenSM for Linux. For comprehensive management and monitoring capability, QLogic InfiniBand Fabric Suite (IFS) is recommended for managing the InfiniBand fabric based on QLogic InfiniBand products.

HP supports InfiniBand copper and fiber optic cables with QSFP to QSFP connectors.

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- 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 either DDR or QDR speed (please note that QLogic QDR switches only support up to 5 meters at QDR speed) , and up to 10M at DDR speed.
- QSFP to QSFP QDR fiber optic cables range from 3M to 30M for HCA to switch, or inter-switch links at either DDR or QDR speed.

### What's New

- Mellanox 36 Port QDR/FDR10 InfiniBand Switches (four models)

### At A Glance

- **Dual Function Ethernet/InfiniBand HCA cards based on Mellanox CX-3 technologies**
  - HP IB FDR/EN 10/40Gb 2P 544QSFP Adaptor
    - Dual QSFP ports Dual function PCI-e gen 3 card based on ConnectX-3 technology
    - Support PCI Express 3.0 x8
    - Single or dual port FDR InfiniBand
    - Single or dual port 40 or 10 Gbps Ethernet
    - Single port FDR IB and single port Ethernet
    - Support the following ProLiant servers: DL160 Gen8 , DL320e Gen8, DL360e Gen8, DL360 G7, DL360p Gen8, DL380e Gen8, DL380 G7, DL380p Gen8, DL385 Gen8, DL560 Gen8, ML350p Gen8, SL140s Gen8, SL230 Gen8, SL250 Gen8, SL270 Gen8
  - HP IB FDR/EN 10/40Gb 2P 544FLR-QSFP Adaptor
    - Dual QSFP ports Dual function HP Flexible LOM Adaptor based on ConnectX-3 technology
    - Support PCI Express 3.0 x8
    - Single or dual port FDR InfiniBand
    - Single or dual port 40 or 10 Gbps Ethernet
    - Single port FDR IB and single port Ethernet
    - Support the following ProLiant servers: DL160 Gen8 , DL360p Gen8, DL380p Gen8, DL385 Gen8, DL560 Gen8, SL230 Gen8, SL250 Gen8, SL270 Gen8
  - HP IB QDR/EN 10Gb 2P 544FLR-QSFP Adaptor
    - Dual QSFP ports Dual function HP Flexible LOM Adaptor based on ConnectX-3 technology
    - Support PCI Express 3.0 x8
    - Single or dual port QDR InfiniBand
    - Single or dual port 10 Gbps Ethernet
    - Single port QDR IB and single port Ethernet
    - Support the following ProLiant servers: DL160 Gen8 , DL360p Gen8, DL380p Gen8, DL385 Gen8, DL560 Gen8, SL230 Gen8, SL250 Gen8, SL270 Gen8
- **InfiniBand HCA cards based on Mellanox technologies**
  - HP IB 4X QDR CX-2 PCI-e G2 Dual-port HCA
    - Dual QSFP ports 4X QDR InfiniBand card based on ConnectX-2 technology
    - Support PCI Express 2.0 x8
    - Support the following ProLiant servers:
      - DL160 G6, DL160 Gen8, DL160se G6 (DISC), DL165 G7, DL170e G6, DL170h G6 (DISC), DL180 G6, DL180se G6, DL360 G7, DL360e Gen8, DL360p Gen8, DL380e Gen8, DL380 G7, DL380 G7SE, DL380 G7 X5698, DL380p Gen8, DL385 G7, DL385 Gen8, DL580 G7, DL585 G7, DL980 G7, ML350p Gen8, ML/DL370 G6, SE1170sG6, SE2170sG6, , SL160s G6, , SL160z G6, SL165s G7, SL165z G7, SL170s G6, SL170z G6, SL230 Gen8, SL250 Gen8,, , SL2x170z G6, SL390s G7, SWD X9300 G2, SWD X9300 G3
    - Support Mellanox OFED Linux driver stacks, and Mellanox WinOF on Microsoft Windows HPC server 2008
- **Mellanox Software**

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- Mellanox Unified Fabric Manager (UFM)
  - Can run on one server, or on two servers for high availability
  - 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
    - Manage alarms
    - Perform firmware and software upgrades
- Mellanox Unified Fabric Manager Advanced (UFM Advanced)
  - Includes all features of Mellanox Unified Fabric Manager
  - 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
- Mellanox Acceleration Software for Mellanox network adaptors (VMA)
  - Requires ConnectX-3 based 544 FlexibleNetwork Adapters
  - 56G InfiniBand and 10/40Gb Ethernet support
  - PCI Express 3.0 support

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- Comprehensive support for UDP/TCP socket API
  - TCP and UDP unicast and multicast offload
- **InfiniBand HCA cards based on QLogic technology**
  - QLogic IB 4X QDR PCI-e G2 Dual-port HCA
    - Dual QSFP ports 4X QDR InfiniBand card based on QLogic TrueScale InfiniBand
    - Support PCI Express 2.0 x8
    - Support the following ProLiant servers:
      - DL160 G6, DL165 G7, DL170e G6, DL170h G6 (DISC), DL180 G6, DL180se G6, DL360 G7, DL380 G7, DL380 G7SE, DL380 G7 X5698, DL385 G7, DL580 G7, DL585 G7, ML/DL370 G6, " SE1170sG6, SE2170sG6, SL160s G6, SL160z G6, SL165s G7, SL165z G7, SL170s G6, SL170z G6, SL2x170z G6, SL390s G7
    - Support QLogic OFED Linux driver stack
- **InfiniBand switches based on Mellanox SwitchX technology**
  - Mellanox IB FDR 36-port unmanaged switch
    - 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
    - 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
    - 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
    - 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 switches based on Mellanox SwitchX-2 technology**
  - Mellanox IB QDR/FDR10 36-port unmanaged switch
    - 36 QSFP ports, support QDR/FDR10 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 QDR/FDR10 36-port unmanaged switch with reversed airflow fan unit
    - 36 QSFP ports, support QDR/FDR10 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 QDR/FDR10 36-port managed switch
    - 36 QSFP ports, support QDR/FDR10 InfiniBand copper and fiber optic cables
    - cooling fan that has air flow from the front to the rear (ports side).
    - Integrated management module for Fabric Management
    - Dual power supplies for redundancy.
  - Mellanox IB QDR/FDR10 36-port managed switch with reversed airflow fan unit
    - 36 QSFP ports, support QDR/FDR10 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 switches based on Voltaire technology**

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- Voltaire IB 4X QDR 36-port internally managed switch
  - 36 4X QDR QSFP ports, support 4X QDR InfiniBand copper and fiber optic cables
  - Dual power supplies for redundancy.
- Voltaire IB 4X QDR 36-port internally managed switch with reversed airflow fan unit
  - 36 4X QDR QSFP ports, support 4X QDR 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.
- Voltaire IB 4X QDR 162-port (144 ports fully non-blocking) director switch
  - 11U, 19" rack mountable chassis with up to 4 fabric boards, up to 9 18-port line boards, up to 2 redundant management modules, up to 4 redundant power supplies, and 2 fan units
  - Up to 162 4X QDR QSFP ports (with up to 144 ports fully non-blocking when up to 16 ports are used per line board), support 4X QDR InfiniBand copper and fiber optic cables.
- Voltaire IB 4X QDR 324-port director switch
  - 19U, 19" rack mountable chassis with up to 9 fabric boards, up to 18 18-port line boards, up to 2 redundant management modules, up to 6 redundant power supplies, 3 fan units
  - Up to 324 4X QDR QSFP ports with 324P fabric boards, or up to 648 4X QDR QSFP ports with 648P fabric boards with 108 CPX cables, support 4X QDR InfiniBand copper and fiber optic cables
- **InfiniBand / Ethernet Gateway switches based on Voltaire technology**
  - Voltaire 34P QDR IB 2P 10G internally managed switch
    - 34 4X QDR QSFP ports, support 4X QDR InfiniBand copper and fiber optic cables
    - 2 10 GbE SFP+ ports, support SFP+ copper cables and SFP+ optical transceivers.
  - Voltaire 34P QDR IB 2P 10G internally managed switch with reversed airflow fan unit
    - 34 4X QDR QSFP ports, support 4X QDR InfiniBand copper and fiber optic cables,
    - 2 10 GbE SFP+ ports, support SFP+ copper cables and SFP+ optical transceivers.
    - With the rear-to-front cooling fan that has air flow from the rear (ports side) to the front.
  - Voltaire 34P QDR IB 2P 10G internally managed switch HPC version
    - 34 4X QDR QSFP ports, support 4X QDR InfiniBand copper and fiber optic cables
    - 2 10 GbE SFP+ ports, support SFP+ copper cables and SFP+ optical transceivers.
    - Lower memory model for HPC clusters
  - Voltaire 34P QDR IB 2P 10G internally managed switch HPC Version with reversed airflow fan unit
    - 34 4X QDR QSFP ports, support 4X QDR InfiniBand copper and fiber optic cables,
    - 2 10 GbE SFP+ ports, support SFP+ copper cables and SFP+ optical transceivers.
    - With the rear-to-front cooling fan that has air flow from the rear (ports side) to the front.
    - Lower memory model for HPC clusters
- **InfiniBand switch based on QLogic technology**
  - QLogic IB 4X QDR 36 Port Switch
    - 36 4X QDR QSFP ports, support 4X QDR InfiniBand copper and fiber optics cables.
    - **NOTE:** This switch supports [QLogic BLc 4X QDR IB Management Module option](#).
  - QLogic IB 4X QDR 324 Port Switch
    - QLogic 12800-180 switch chassis with up to 2 redundant management modules, 6 power supplies
    - Up to 324 4X QDR QSFP ports with 18 18-port leaf modules in a 1:1 none oversubscribed bandwidth configuration, or up to 432 4X QDR QSFP ports with 18 24-port leaf modules in a 2:1 oversubscribed bandwidth configuration.
  - QLogic IB 4X QDR 648 Port Switch
    - QLogic 12800-360 switch chassis with up to 2 redundant management modules, 12 power supplies.
    - Up to 648 4X QDR QSFP ports with 36 18-port leaf modules in a 1:1 none oversubscribed bandwidth configuration, or up to 864 4X QDR QSFP ports with 36 24-port leaf modules in a 2:1 oversubscribed bandwidth configuration.

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- **InfiniBand cables**

- Copper cables from 0.5 meter to 3 meters at FDR speed
- Fiber optic cables from 3 meters up to 30 meters at FDR speed
- Copper cables from 0.5 meter to 7 meters at QDR speed
- Fiber optic cables from 3 meters up to 30 meters at QDR speed

- **Ethernet cables**

- The Dual Function cards support most HP Ethernet cables
- 10 Gb Ethernet requires the use of a QSFP to SFP+ adaptor 655874-B21
- Copper cables from 0.5 meter to 7 meters at 10 GbE speed
- Fiber optic transceivers SR and LR at 10 GbE speed

### Models

<b>HP Dual Function Adaptors Ethernet/InfiniBand</b>	HP InfiniBand FDR/EN 10/40Gb Dual Port 544QSFP Adapter	649281-B21
	HP InfiniBand FDR/EN 10/40Gb Dual Port 544FLR-QSFP Adapter	649282-B21
	HP InfiniBand QDR/EN 10Gb Dual Port 544FLR-QSFP Adapter	649283-B21
	<b>NOTE:</b> The HCA cards listed in this section are based on Mellanox technology.	
	<b>NOTE:</b> FLR Indicates new HP FlexLOM Adapter series	
	<b>NOTE:</b> 10 Gb Ethernet requires the use of the QSFP to SFP+ adapter 655874-B21.	
<b>HP IB PCIe HCA cards and options</b>	HP InfiniBand 4X QDR ConnectX-2 PCIe G2 Dual Port HCA	592520-B21
<b>QLogic IB PCIe HCA cards</b>	QLogic InfiniBand 4X QDR PCI-E G2 Dual Port HCA	583211-B21
<b>Mellanox IB switch and options</b>	Mellanox IB QDR/FDR10 36P Switch	712495-B21
	Mellanox IB QDR/FDR10 36P RAF Switch	712496-B21
	Mellanox IB QDR/FDR10 36P Managed Switch	712497-B21
	Mellanox IB QDR/FDR10 36P RAF Mgd Switch	712498-B21
	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 IB QDR/FDR 648P Switch Chassis	674277-B21
	<b>NOTE:</b> 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 IB QDR/FDR 324P Switch Chassis	674278-B21
	<b>NOTE:</b> 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 IB QDR/FDR 216P Switch Chassis	674279-B21
	<b>NOTE:</b> 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 IB QDR/FDR Modular Mgmt Board	674280-B21
	Mellanox IB QDR Modular Fabric Board	674281-B21
	Mellanox IB FDR Modular Fabric Board	674282-B21
	Mellanox IB QDR Modular Line Board	674283-B21
	Mellanox IB FDR Modular Line Board	674284-B21
<b>Mellanox Software Licenses</b>	Mellanox UFM 1yr 24x7 Flex Lic	BD569A
	Mellanox UFM 3yr 24x7 Flex Lic	BD570A
	Mellanox UFM Advanced 1yr 24x7 Flex Lic	BD571A
	Mellanox UFM Advanced 3yr 24x7 Flex Lic	BD572A
	Mellanox Accel SW 1 yr 24x7 Flex Lic	BD573A

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Mellanox Accel SW 3 yr 24x7 Flex Lic BD574A

**NOTE:** These part numbers can be used to purchase multiple licenses with a single activation key. Each license is for one node (a.k.a. server). Customer will receive a printed end user entitlement certificate via physical shipment. The entitlement certificate must be redeemed online in order to obtain a license key and registration for one or three years of support depending on the part number.

**NOTE:** Only one certificate is shipped for multiple-quantity licenses.

**NOTE:** This is a perpetual license.

### QLogic IB switches and options

QLogic InfiniBand QDR 36-port Switch 589478-B21

QLogic InfiniBand 4X QDR Management Module for c-Class BladeSystem 505959-B21

**NOTE:** This management module is an option for the QLogic 4X QDR 36 Port Switch.

QLogic InfiniBand QDR 324-port Switch Chassis 589479-B21

**NOTE:** QLogic 12800-180 4X QDR IB switch chassis contains: 1 management board (589481-B21, 2 max), 4 double QDR spine fabric boards, 1 single QDR spine fabric board, 0 leaf module (589482-B21 for 24-port leaf module or 589483-B21 for 18-port leaf module, 18 max. Leaf module types cannot be mixed), 4 power supplies (6 max), 4 power cords, rack kit.

QLogic InfiniBand QDR 648-port Switch Chassis 589480-B21

**NOTE:** QLogic 12800-360 4X QDR IB switch chassis contains: 1 management board (589481-B21, 2 max), 9 double QDR spine fabric boards, 0 leaf module (589482-B21 for 24-port leaf module or 589483-B21 for 18-port leaf module, 36 max. Leaf module types cannot be mixed), 8 power supplies (12 max), 8 power cords, rack kit.

QLogic InfiniBand QDR Management Module 589481-B21

**NOTE:** QLogic redundant management board for the 12800 series switch chassis.

QLogic InfiniBand QDR/DDR 24-port Line Board 589482-B21

**NOTE:** QLogic 12800 series switch line card with 24 QSFP ports.

QLogic InfiniBand QDR 18-port Line Board 589483-B21

**NOTE:** QLogic 12800 series switch line card with 18 QSFP ports.

QLogic InfiniBand QDR Power Supply 589484-B21

QLogic InfiniBand Fabric Suite (IFS) QL470A

**NOTE:** Right to use (RTU) License for QLogic IFS, 1 per node for every node connected to the QLogic InfiniBand fabric.

### Cabling Options

**NOTE:** Maximum length of 12 meters; cable length support may depend on the actual configuration. Please consult a HPC expert on specifics.

#### InfiniBand QSFP FDR Optical Cables

HP 3M FDR Quad Small Form Factor Pluggable InfiniBand Optical Cable 670760-B21

HP 5M FDR Quad Small Form Factor Pluggable InfiniBand Optical Cable 670760-B22

HP 7M FDR Quad Small Form Factor Pluggable InfiniBand Optical Cable 670760-B23

HP 10M FDR Quad Small Form Factor Pluggable InfiniBand Optical Cable 670760-B24

HP 12M FDR Quad Small Form Factor Pluggable InfiniBand Optical Cable 670760-B25

HP 15M FDR Quad Small Form Factor Pluggable InfiniBand Optical Cable 670760-B26

HP 20M FDR Quad Small Form Factor Pluggable InfiniBand Optical Cable 670760-B27

HP 30M FDR Quad Small Form Factor Pluggable InfiniBand Optical Cable 670760-B28

#### InfiniBand QSFP FDR Copper Cables

HP 0.5M FDR Quad Small Form Factor Pluggable InfiniBand Copper Cable 670759-B21

HP 1M FDR Quad Small Form Factor Pluggable InfiniBand Copper Cable 670759-B22

HP 1.5M FDR Quad Small Form Factor Pluggable InfiniBand Copper Cable 670759-B23

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HP 2M FDR Quad Small Form Factor Pluggable InfiniBand Copper Cable	670759-B24
HP 3M FDR Quad Small Form Factor Pluggable InfiniBand Copper Cable	670759-B25
<b>InfiniBand QSFP DDR/QDR Copper Cables</b>	
HP 1M 4X DDR/QDR Quad Small Form Factor Pluggable InfiniBand Copper Cable	498385-B21
HP 2M 4X DDR/QDR Quad Small Form Factor Pluggable InfiniBand Copper Cable	498385-B22
HP 3M 4X DDR/QDR Quad Small Form Factor Pluggable InfiniBand Copper Cable	498385-B23
HP 5M 4X DDR/QDR Quad Small Form Factor Pluggable InfiniBand Copper Cable	498385-B24
HP 7M 4X DDR/QDR Quad Small Form Factor Pluggable InfiniBand Copper Cable	498385-B25
<b>InfiniBand QSFP DDR/QDR Optical Cables</b>	
HP 3M 4X DDR/QDR Quad Small Form Factor Pluggable InfiniBand Optical Cable	498386-B23
HP 5M 4X DDR/QDR Quad Small Form Factor Pluggable InfiniBand Optical Cable	498386-B24
HP 10M 4X DDR/QDR Quad Small Form Factor Pluggable InfiniBand Optical Cable	498386-B25
HP 15M 4X DDR/QDR Quad Small Form Factor Pluggable InfiniBand Optical Cable	498386-B26
HP 20M 4X DDR/QDR Quad Small Form Factor Pluggable InfiniBand Optical Cable	498386-B27
HP 30M 4X DDR/QDR Quad Small Form Factor Pluggable InfiniBand Optical Cable	498386-B28

### Performance

**Bandwidth**

All ports on 4X 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 4X QDR HCA card and switch are capable of supporting 40Gbps signaling rate, with a peak data rate of 32 Gbps in each direction

### Scalability and Reliability

#### Standards support

- Dual-port 4X FDR FlexLOM HCA: PCI Express revision 3.0x8
- Dual-port 4X QDR FlexLOM HCA: PCI Express revision 3.0x8
- Dual-port 4X FDR PCI-e HCA: PCI Express revision 3.0x8
- Dual-port 4X QDR PCI-e HCA: PCI Express revision 2.0x8
- IBTA version 1.2 compatible

#### Operating systems support

- Mellanox OFED 1.5.3\_3.0.0 for Linux (64 bit)
  - RHEL 5, U5, U6, U7 in G7 servers U7 in Gen8 servers
  - RHEL 6 U1, U2
  - SLES 10 SP4,
  - SLES 11 SP1, SP2
- Mellanox WinOF 3.0 for Microsoft Windows HPC server 2008 (64-bit)
  - Microsoft Windows 2008
  - Microsoft Windows HPC server 2008
  - Microsoft Windows HPC server 2008 R2
- Mellanox EN (Ethernet Only) 1.5.7.2
  - RHEL 5, U5, U6, U7 in G7 servers U7 in Gen8 servers
  - RHEL 6 U1, U2
  - SLES 10 SP4,
  - SLES 11 SP1, SP2
- Mellanox OFED for VMware (InfiniBand Only) 1.7.0
  - VMware ESXi 5.0
- Mellanox EN (Ethernet Only) for VMware 1.5.7.0
  - VMware ESX 4.1
- Mellanox EN (Ethernet Only) for VMware 1.6.1.2-1
  - VMware ESXi 5.0
- QLogic OFED+ 7.0.1.0.43 for Linux (64-bit)
  - RHEL 5 U4, U5, U6, U7
  - RHEL 6 U1, U2
  - SLES 10 SP3, SP4
  - SLES 11 SP1
  - CentOS (Rocks) 5.4, 5.5, 5.6, 6.0
  - Scientific Linux 5.4, 5.5, 5.6, 6.0

### InfiniBand Fabric Management

**Auto-negotiation/  
self-discovery**

InfiniBand QDR ports support auto-negotiation down to DDR/SDR, InfiniBand DDR ports support auto-negotiation down to SDR. For example, external uplink ports of a DDR switch blade will negotiate down to SDR speed if they are connected to a device which can only operate at SDR.

Self-discovery is supported by subnet manager. Check the documents of the specific subnet manager for more details: <http://www.docs.hp.com>.

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**Management**

Mellanox OFED, Voltaire OFED and QLogic OFED+ include 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 HPC 2008 environment.

InfiniBand fabric has to be set up with a subnet manager: see the subnet manager discussion above.

### Service and Support

#### Service and Support

#### HP Technology Services

HP 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 HP Care Pack Services**

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

HP Foundation Care services deliver scalable support-packages for HP industry-standard servers and software. You can choose the type and level of service that is most suitable for your business needs. New to this portfolio is HP Collaborative Support. If you are running business critical environments, HP offers Proactive Care or Critical Advantage. 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, HP can work with you to tailor a service solution for your unique support requirements using broader services portfolio of Foundation Care and Proactive Care.

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#### Recommended Services

#### **Recommended HP Care Pack Services for optimal satisfaction with your HP product**

##### **3-Year HP 24x7 4 hour Response, Hardware Support Onsite Service**

Provides you with rapid remote support and if required an HP authorized representative who will arrive on site any time and day of the year to begin hardware maintenance service within 4 hours of the service request being logged.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EEE.pdf>

##### **3-Year HP 24x7 4 hour Response, HP Collaborative Support**

Offers customers a single point of contact for server problem diagnosis, hardware problem resolution, and basic software problem diagnosis, fault isolation, and resolution if available to HP. If the problem is with HP HW, the representative will arrive on site any time and day of the year to begin hardware maintenance service within 4 hours of the service request being logged. In case, the issue is with HP or supported third-party software product and cannot be resolved by applying known fixes, HP will contact the third-party vendor and create a problem incident on your behalf.

HP ProLiant Server Hardware Installation

Provides for the basic hardware installation of HP branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN.pdf>

### Service and Support

#### Related Services

#### Related HP Care Pack Services to enhance your HP product experience

##### **3-Year HP 24x7 4 hour Response, Proactive Care or Critical Advantage**

Helps optimize your systems and delivers high levels of application availability through proactive service management and advanced technical response. A skilled Technical Manager will own your query or issue end to end until resolved, delivering a single point of contact for you.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA3-2140ENW.pdf>

##### **3-Year HP 6-hour Onsite Call-to-Repair, HP Collaborative Support**

Offers customers a single point of contact for server problem diagnosis, hardware problem resolution to return the hardware in operating condition within 6 hours of the initial service request to the HP Global Solution Center, and basic software problem diagnosis, fault isolation, and resolution if available to HP. In case, the issue is with HP or supported third-party software product and cannot be resolved by applying known fixes, HP will contact the third-party vendor and create a problem incident on your behalf.

##### **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>

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#### Insight Remote Support

Provides 24 X 7 remote monitoring, proactive notifications, and problem resolution. Learn more

<http://www.hp.com/go/insightremotesupport>

### Technical Specifications

<b>Compliance</b>	<b>InfiniBand HCA cards</b>	<p>HP IB 4X QDR CX-2 PCI-e G2 Dual-port HCA, HP IB 4X DDR CX-2 PCI-e G2 Dual-port HCA</p> <p>HP IB 4X DDR PCI-e Dual-port HCA</p> <p>IBTA version 1.2 compatible</p> <p>ROHS-R5</p> <p>QLogic 4X QDR IB PCI-e G2 Dual-port HCA</p> <p>IBTA version 1.2 compatible, RoHS 6</p>	<p>PCI Express 2.0 x8 (1.1 compatible)</p> <p>PCI Express 1.0a x8 compatible</p> <p>PCI Express 2.0 x8 (1.1 compliant)</p>
<b>Power and Environmental Specification</b>	<b>Operating</b>	<b>Temperature</b>	<p>HCA cards: 0 to 55° C.</p> <p>Switches: <b>NOTE:</b> Please refer to Voltaire product specifications for Voltaire switch models. <b>NOTE:</b> Please refer to Mellanox product specification for Mellanox MTS3610Q. <b>NOTE:</b> Please refer to QLogic product specification for QLogic InfiniBand switches.</p>
		<b>Humidity</b> (non-condensing)	<p><b>NOTE:</b> Please refer to Voltaire product specifications for Voltaire switch models. <b>NOTE:</b> Please refer to Mellanox product specifications for Mellanox MTS3610Q. <b>NOTE:</b> Please refer to QLogic product specifications for QLogic InfiniBand switches.</p>
	<b>Power requirement</b>	<p>HCA cards:</p> <p>Switches:</p>	<p>HP IB 4X QDR CX-2 PCI-e G2 Dual-port HCA , typical 8.7W, max 9.8W</p> <p>HP IB 4X DDR CX-2 PCI-e G2 Dual-port HCA, typical 8.1W, max 8.3W</p> <p>QLogic 4X QDR IB PCI-e G2 Dual-port HCA, max 8.1W.</p> <p><b>NOTE:</b> Please refer to Voltaire product specifications for Voltaire switch models. <b>NOTE:</b> Please refer to Mellanox product specifications for Mellanox MTS3610Q. <b>NOTE:</b> Please refer to QLogic product specifications for QLogic InfiniBand switches.</p>
	<b>Emissions Classifications</b>	HCA cards:	<p>HP IB 4X QDR CX-2 PCI-e G2 Dual-port HCA</p> <p>HP IB 4X DDR CX-2 PCI-e G2 Dual-port HCA</p> <p>HP IB 4X DDR PCI-e Dual- port HCA</p> <p>USA: FCC, Class A</p> <p>Canada: ICES, Class A</p> <p>EU: EN55022, Class A</p> <p>EU: EN55024, Class A</p> <p>EU : EN61000-3-2, Class A</p>

### Technical Specifications

EU : EN61000-3-3, Class A  
Japan : VCCI, Class A  
Korea: MIC, Class A  
Taiwan: BSMI, Class A  
QLogic 4X QDR IB PCI-e G2 Dual-port HCA  
US/Canada: FCC Part 15, Subpart B  
ICES-003  
Europe: EN55022:1994+A1+A2  
EN55024:1998+A1+A2 EN6100-3-2:2000  
(Harmonic Current) EN61000-3-3:1995+A1  
(Voltage Fluctuation & Flicker)  
Japan: VCCI V-3/2004.4  
New Zealand/Australia: AN/NZS CISPR  
22:2002  
Korea: MIC (KN22, KN24)  
Taiwan: BSMI (CNS 13438)  
China: CCC

Switches:

**NOTE:** Please refer to Voltaire product specifications for Voltaire switch models.

**NOTE:** Please refer to Mellanox product specification for Mellanox MTS3610Q.

**NOTE:** Please refer to QLogic product specifications for QLogic InfiniBand switches.

#### 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.

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