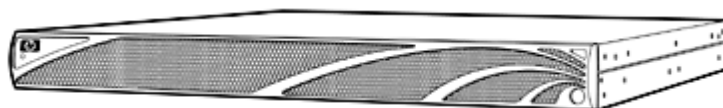


# QuickSpecs

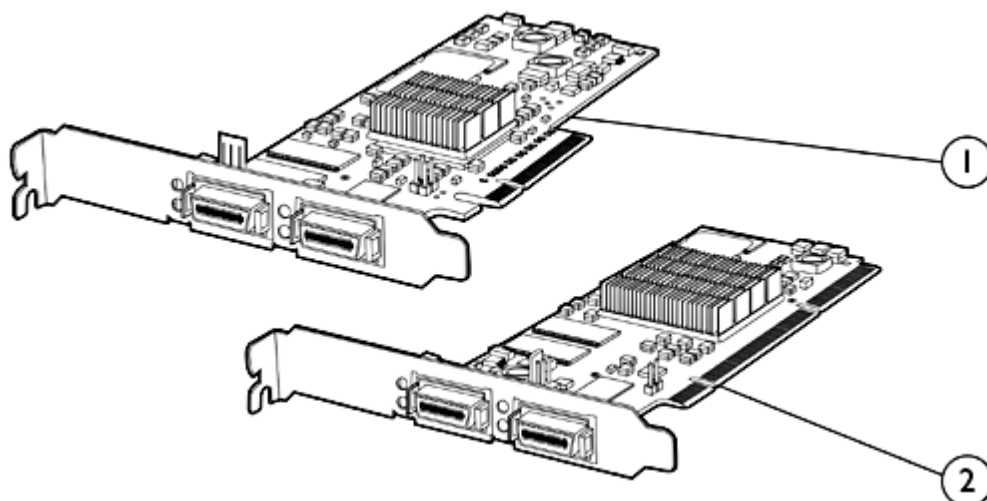
## HP InfiniBand Options

### Overview

The HP InfiniBand™ options are the highest performing, standards-based interconnect solutions available across HP ProLiant, HP 9000, and Integrity servers. With the HP InfiniBand offering, a complete InfiniBand cluster solution can be created on a variety of HP platforms including 2-way to 4-way HP ProLiant DL servers. Supported options on HP ProLiant DL and ML servers include 4x InfiniBand (10 Gbps) dual-port PCI-X and PCI Express host channel adapters, a 24-port 4x InfiniBand intelligent switch, and a variety of InfiniBand cables. A comprehensive suite of management tools are provided including a subnet manager embedded in the switch, full featured web and command line interfaces, and Java-based Element Fabric Manager.



HP 24-Port 4x Fabric Copper Switch



1. HP NC571C PCI Express Dual-port 4x Fabric Adapter

2. HP NC570C PCI-X Dual-port 4x Fabric Adapter

### Models

HP 24-Port 4x Fabric Copper Switch	376227-B21
HP NC570C PCI-X Dual-port 4x Fabric Adapter	376158-B21
HP NC571C PCI Express Dual-port 4x Fabric Adapter	376160-B21
HP 1m 4x Fabric Copper Cable	376232-B21
HP 3m 4x Fabric Copper Cable	376232-B22
HP 5m 4x Fabric Copper Cable	376232-B23

### HP InfiniBand-Specific Care Pack Services

Next Business Day On-site Service, 5-Day x 9-Hour, 3 Years	HA101A3#7FS
4-Hour On-site Service, 5-Day x 13-Hour, 3 Years	HA103A3#7FS
4-Hour On-site Service, 7-Day x 24-Hour, 3 Years	HA104A3#7FS
6-Hour Call to Repair, On-site Service, 7-Day x 24-Hour, 3 Years	HA105A3#7FS
System Installation	HA113A1#5BZ

### Overview

#### HP ProLiant Server Support

- HP ProLiant DL140\*
- HP ProLiant DL140 G2
- HP ProLiant DL145\*
- HP ProLiant DL145 G2
- HP ProLiant DL320 G3
- HP ProLiant DL360 G4
- HP ProLiant DL360 G4p
- HP ProLiant DL380 G4
- HP ProLiant DL385\*
- HP ProLiant DL580 G2\*
- HP ProLiant DL580 G3
- HP ProLiant DL585\*
- HP ProLiant DL740\*
- HP ProLiant DL760 G2\*
- HP ProLiant ML570 G3

\*NOTE: Excludes support for the NC571C PCI Express adapter. These HP ProLiant servers do not offer PCI Express slots.

### Standard Features

#### Multi-platform Support

**HP ProLiant, Integrity, and HP 9000 Consistency** The HP InfiniBand options are supported across select HP ProLiant DL, Integrity, and HP 9000 servers allowing a consistent InfiniBand framework to be built across the datacenter. Host bus adapters share a common technology base that are optimized and qualified on specific HP server platforms and operating systems. Likewise, HP 24-Port 4x Copper Switch is a common offering supported across these server platforms.

#### Common Management

The HP InfiniBand options are based on a technology partnership with TopSpin Communication. Switches and adapters purchased directly from TopSpin may be integrated into the cluster with a common set of management interfaces and tools. HP Integrity and 9000-based clusters even share a common command line interface with the systems based on HP ProLiant DL. Therefore, IT administrators need learn only one management system for all their InfiniBand datacenter needs.

#### Standards Based

The family of HP InfiniBand options meets the standards-based InfiniBand Architecture Specification Release 1.1. This ensures consistency and interoperability across multi-vendor clustered server systems. A supported HP ProLiant DL server with NC570C or NC571C adapter installed can be connected to an alternate vendor's v1.1 compliant InfiniBand switch. Likewise, another vendor's server with their v1.1 adapter may be added to a fabric consisting of the HP 24-Port 4x Copper Switch.

#### Performance

##### 4x InfiniBand (10 Gbps) Throughput

The InfiniBand 1.1 compliant 24-port intelligent switch and the NC570C and NC571C adapters support InfiniBand 4x technology providing 10 Gbps throughput per port per direction.

- The non-blocking design of the HP 24 port 4x Fabric Copper Switch provides 480 Gbps aggregate switch bandwidth (24 ports x 10 Gbps/port x 2 for full duplex).
- The NC570C and NC571C adapters each offer two 4x InfiniBand 10 Gbps ports providing an aggregate 40 Gbps InfiniBand bandwidth full duplex (2 ports x 10 Gbps/port x 2 for full duplex).

##### PCI Express and PCI-X Adapter Data Path

The InfiniBand adapters offer the latest speeds available in a PCI-based architecture. The NC571C is an x8 v1.0a PCI Express adapter allowing up to 40 Gbps full throughput (8 serial lanes x 2.5 Gbps/lane x 2 for full duplex) supporting the line speed of its two 4x 10 Gbps InfiniBand ports. Measured throughput of up to approximately 8 Gbps per port is possible, configuration dependant. The NC70C is a 64-bit PCI-X v2.2 adapter operating at speeds up to 133Mhz providing observed per port data transfer rates to 7 Gbps.

##### RDMA Latency

The InfiniBand technology incorporates remote direct memory access (RDMA). RDMA allows a server to place data directly in the memory on another server without kernel intervention. This results in lower CPU utilization and reduced latency. The NC570C and NC571C adapters provide latency as low as  $<6 \mu\text{s}$  and  $<5 \mu\text{s}$ , respectively, configuration dependant. The 24-Port 4x Fabric Copper Switch provides ultra low cut-through port latency of less than 200 ns.

##### Multi-protocol Support

Available on a variety of operating systems, the HP InfiniBand solution supports the industry standard protocols necessary for unified fabric and technical computing applications including MPI, IPoIB, SDP, SRP, and uDAPL.

### Standard Features

#### High Availability

##### Dual Port Adapters

The NC570C and NC571C host channel adapters are each equipped with dual 4x (10 Gbps) InfiniBand ports. Data may be load balanced between the ports with Automatic Path Migration for failover between ports (protocol dependant). Performed transparently to the application, in-process communications are reissued according to the failure and protocol involved. Servers may be configured with two adapters with HCA to HCA failover providing the level of redundancy. Server nodes may even be dynamically added and removed to and from the fabric.

##### Hot-plug Redundant Power and Fans

The HP 24-Port 4x Fabric Copper Switch includes as standard hot-swappable redundant power and cooling with dual independent AC power feeds.

##### Automatic Subnet Manager Failover

A subnet manager (SM) is embedded in every HP 24-Port 4x Fabric Copper Switch. One or more hot standby back-up SMs can be configured. Subnet Manager database synchronization provides non-disruptive rapid failover in case of primary SM failover. All ports rejoin multicast groups, re-advertise services, re-request event forwarding, and Re-establish connections. An event trap is automatically generated to trigger any necessary processing by external management systems.

##### Redundant Switch Configurations and Firmware

Multiple operating system images and configuration files can be stored within the non-volatile memory of the 24-port InfiniBand switch. Configuration file back-up and restore capabilities are available via FTP; an embedded FTP server is included. The configuration file is in a human read/write file format for viewing, printing, and editing via a text editor. Switch operating system image upgrades are performed using TFTP or FTP. The configuration settings are retained after a switch operating system upgrade. The switch supports the ability to restore its configuration to the factory default settings and the ability to recover from unsuccessful or corrupt operating system install.

#### Security

##### Data Encryption

Both secure shell (SSH v2) and secure socket layer (SSL) are supported for secure encrypted console and web interface sessions to the 24-port switch. SNMP v3 is further supported for secure management and monitoring from an SNMP-based network manager such as [HP OpenView](#).

##### Password Protection

To prevent unauthorized users from altering the 24-port switch configuration, password protected multi-level user accounts can be configured on the management interfaces. Configurable roles can be combined with multiple levels of read/write access for flexible control. SNMP access is authorized through a community string; a unique SNMP community string is associated per user with configurable user logon privilege levels.

#### RADIUS

The 24-port switch supports the Remote Authentication Dial-in User Service (RADIUS) providing authentication and authorization security of remote users from a centralized location (the RADIUS server). Transactions between the RADIUS client (the switch) and the RADIUS server are authenticated using a shared key that is not sent over the network. In addition, the remote administrator passwords are sent encrypted between the RADIUS client and the RADIUS server.

### Standard Features

**InfiniBand Partitioning** To ensure that data is sent only to permitted locations, InfiniBand partitioning creates a set of nodes within the fabric that are allowed to communicate with each other. The embedded subnet manager on the 24-port switch permits partitioning on a per port basis. Each port may be included in one or more partition with full and partial membership participation. The partitioning configuration is automatically transferred in case of active to standby subnet manager failover.

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### Management

**Pre-installed User Interfaces** Full featured web browser-based (BBI) and a command line (CLI) interfaces are pre-installed in the switch firmware for simplified configuration, management, and monitoring of the switch chassis and embedded subnet manager. Using the provided 10/100T Ethernet and console ports, out-of-band access to the switch management interfaces are supported locally and remotely from anywhere on an IP-based network. IP over InfiniBand (IPoB) is supported for in-band access from any switch InfiniBand port.

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**Element Manager** The Java-based, graphical Element Manager allows the IT administrator to manage the entire fabric as whole rather than an individual collection of switches and HCAs. Included with the 24-port switch, the Element Manager is installed on an IP-based management station that communicates via SNMP. The Element Manager allows administration of multiple switches, HCAs, and subnet managers as well as the ability to configure the back-up subnet managers. For rapid deployment, simultaneous upgrades of firmware and configuration parameters on multiple switches may be performed.

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**Topology Manager** The Element Manager includes a topology manager providing a fabric-wide graphical view of external ports, switches and adapters. Adapter and switch naming, port numbers, and GUID data are available.

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**SNMP Support** The 24-port switch supports simple network management protocol (SNMP) version 3 for secure management and monitoring from an SNMP-based network manager such as HP OpenView. A HP OpenView 6.0 or greater installer is included for automatic discovery of the 24-port switch, graphical representation within the OpenView Topology Map, and integrated point-and-click launching of the Element Manager.

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**Advanced Diagnostics** The BBI, CLI, and Element Manager provide extensive diagnostics and monitoring of the switch chassis, HCA, and InfiniBand fabric. Statistical and graphical performance monitoring and reporting is displayed via configurable graphical and tabular formats. Graphical representations of switch and HCA data comparisons are available in a variety of line, bar, and pie charts. Switch and adapter hardware problems are identified and displayed in text and graphical formats. Network pings may be performed to test network connectivity. Local log files may be stored in non-volatile memory or remote syslog streaming can be enabled to a specified remote host.

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

#### Warranty

Information regarding worldwide limited warranty and technical support is available at:  
<http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html>

#### Support Services

HP provides a range of life cycle support options that let you choose the service levels that meet your business requirements, from basic to mission-critical.

A full range of HP hardware and software services are available including:

- Installation and start-up
- Education courses
- Extended onsite hardware coverage hours from same business day 13 ours, 5 day to 24 hours, 7 days call window with options including 4-hour response or 6-hour Call-To-Repair.
- Comprehensive range of software technical support for your IT solutions helping to deliver high level of application availability. Response times ranging from 30 minutes for critical problems to 2 hours.
- System Management, Performance Services and Mission Critical Support Solution

**NOTE:** For more information on HP services, contact any of our worldwide sales offices or resellers or visit our Web site at <http://www.hp.com/hps/index.html>.

# QuickSpecs

## HP InfiniBand Options

### Technical Specifications

HP NC570C and  
NC571C Dual-port 4x  
InfiniBand Adapters

<b>Compliance</b>	InfiniBand v1.1		
	MPI v1.2		
<b>General Specifications</b>	IPoB IEFT draft, IPv4 compatible		
	SDP IBTA v1.1		
	uDAPL v1.2		
	SRP 1.6revA		
	PCI-X 1.0 (NC570C)		
	PCI Express 1.0a (NC571C)		
	<b>Processor</b>	NC570C: Mellanox MT23108 InfiniHost™	
		NC571C: Mellanox MT25208 InfiniHost™ III	
	<b>Line rate bandwidth</b>	4x (10 Gbps) per port (40 Gbps aggregate full duplex)	
	<b>Observed bandwidth</b> (configuration dependant)	Single port, half-duplex	NC570C : 7 Gbps
			NC571C : 8 Gbps
		Single port, full-duplex	NC570C : 7 Gbps
			NC571C : 13 Gbps
		Dual port, half-duplex	NC570C : 7 Gbps
		NC571C : 13 Gbps	
	Dual port, full-duplex	NC570C : 7 Gbps	
		NC571C : 22 Gbps	
<b>Latency</b> (configuration dependant)	NC570C: < 6 μs		
	NC571C: < 5 μs		
<b>On-board memory</b>	128 MB		
<b>Bus</b>	64-bit 133 MHz PCI-X; x8 PCI Express		
<b>Ports</b>	Dual InfiniBand 4x copper		
<b>Connectors</b>	Two InfiniBand 4x copper		
<b>Cabling</b>	Up to 15 m (50 ft) with 4x InfiniBand copper cabling		
<b>Dimensions (LxW)</b>	NC570C: 6.6 x 2.5 in (16.77 cm x 6.40 cm)		
	(without bracket)		
	NC571C: 6.6 x 2.5 in (16.77 cm x 6.40 cm)		
	(without bracket)		
<b>Power and Environmental Specifications</b>	<b>Operating</b>	Temperature	32° to 131° F (0° to 55° C)
		Humidity	5% to 85% non-condensing
	<b>Non-operating</b>	Temperature	-40° to 149° F (-40° to 65° C)
		Humidity	5% to 95%
	<b>Power requirement</b>	3640 mA @ 3.3 V maximum	
	<b>Emissions standards</b>	FCC Class B	
		CISPR 22 Class B	
	<b>Safety compliance</b>	UL 60950	
		CSA 60950	
		IEC/EN 60950	

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## HP InfiniBand Options

### Technical Specifications

<b>Operating System Support</b>	32-Bit Linux: <ul style="list-style-type: none"> <li>• Red Hat Enterprise Linux AS 2.1, 3, 4</li> <li>• SuSE LINUX Enterprise Server 8, 9</li> </ul>
	64-Bit Linux: <ul style="list-style-type: none"> <li>• Red Hat Enterprise Linux AS 3, 4</li> <li>• SuSE LINUX Enterprise Server 8, 9</li> </ul>
<b>Kit Contents</b>	One (1) dual-port host channel adapter Drivers and user guides- web downloadable Quick install card Product warranty statement Safety information booklet

### 24-Port 4x Fabric Copper Switch Compliance

InfiniBand v1.1  
RADIUS, Telnet, TFTP, FTP, SSH v2, SSL, NTP, and DNS  
SNMP v3, MIB-II, Bridge MIB, Interface MIB, IP Forwarding MIB, Ethernet-like MIB, IB SM InfiniBand Subnet Manager MIB, IB SM InfiniBand Subnet Manager Agent, and private enterprise MIBs

<b>General Specifications</b>	<b>Processor</b>	Mellanox InfiniScale™ III
	<b>Performance</b>	Non blocking, cut-through architecture 480 Gbps aggregate switch bandwidth (24 ports x 10 Gbps/port at 2 for full duplex) Cut-through port latency of less than 200 ns
	<b>Ports</b>	Twenty-four (24) 4x (10 Gbps) InfiniBand copper One (1) 10/100T Management (RJ-45) One (1) Console Management port (RJ-45)
	<b>Cabling</b>	Up to 15 m (50 ft) with 4x InfiniBand copper cabling
	<b>Form Factor</b>	19 inch rack mounted, 1U (1.75 in) height, 15 in (38.1 cm) deep
	<b>Weight</b>	Approximately 16 lb (7.3 kg)
<b>Power and Environmental Specifications</b>	<b>Operating</b>	Temperature 32° to 113° F (0° to 45° C) Humidity 8% to 80% non-condensing
	<b>Non-operating</b>	Temperature -40° to 158° F (-40° to 70° C) Humidity 5% to 90%
	<b>Power requirement</b>	65 watts @ 90-132VAC or 180-264VAC auto-ranging, 47-63 Hz
	<b>Emissions standards</b>	FCC Class A CISPR 22 Class A
	<b>Safety compliance</b>	UL 60950 CSA 60950 IEC/EN 60950



### Technical Specifications

#### Kit Contents

- One (1) 24-port 4x InfiniBand switch
- Two (2) IEC C14, 10A, 8 ft (2.5 m) power cables
- One (1) DB-9, 10 ft (3 m) serial management cable
- Mounting rails for rack installations
- Embedded subnet manager, CLI and web-based interfaces
- Element Manager- web downloadable
- User guides- web downloadable
- Quick install card
- Product warranty statement
- Safety information booklet

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