

# HP ProLiant BL p-Class SAN storage connectivity

technology brief



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# Abstract

This paper describes the hardware and software that are required to connect the HP ProLiant BL20p G2, BL30p, and BL40p server blades to Fibre Channel Storage Area Networks (SANs).<sup>1</sup>

## Introduction

The HP ProLiant BL p-Class server blades provide high performance and high availability for multi-tiered data center architectures. The ProLiant BL p-Class family includes the dual-processor ProLiant BL20p G2 and BL30p server blades and the four-processor BL40p server blade.

The ProLiant BL20p G2, BL30p, and BL40p server blades deliver "out-of-the-box" support for Network-Attached Storage (NAS) through embedded network adapters. The ProLiant BL p-Class server blades have the optional ability to quickly access enterprise data in Fibre Channel SANs. Fibre Channel SANs provide robust, consolidated, and manageable storage environments. This paper identifies the hardware and software that are required to connect these server blades to Fibre Channel SANs.

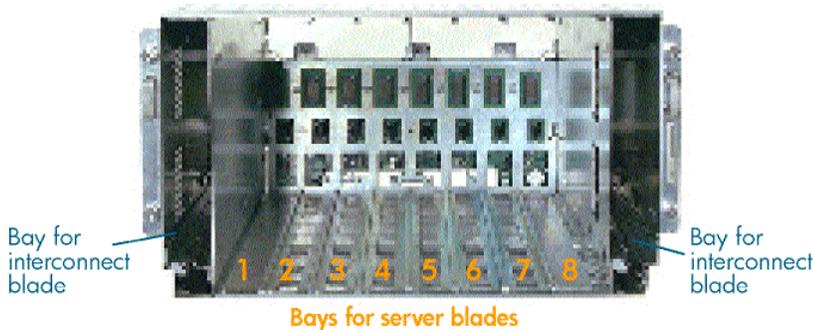
## Hardware for SAN connectivity

This section describes the hardware required to connect HP ProLiant BL20p G2, BL30p, and BL40p server blades to Fibre Channel SANs. This section does not include information about selecting the BL p-Class power enclosure, power supplies, and power distribution devices. For that information, please refer to the QuickSpecs for the appropriate server blade.

### ProLiant BL p-Class enclosure

The ProLiant BL p-Class server blade enclosure (Figure 1) is a 6U (10.5-inch high) chassis with ten bays for server blades and interconnect modules. The two outside bays are for interconnect modules, either the RJ-45 Patch Panel 2 or Gigabit Ethernet 2 (GbE2) interconnect switch, which are described in subsequent sections. The eight interior bays can house 2 ProLiant BL40p server blades, 8 ProLiant BL20p G2 server blades, or 16 half-height BL30p server blades (or combinations of the three models). The bays are designed so that the server blades and interconnect modules slide in and connect to the server blade enclosure backplane for power and data connections, including Fibre Channel connections for the ProLiant BL20p G2 and BL30p. The enclosure backplane routes both Ethernet and Fibre Channel signals from the server blades to the interconnect bays. The ProLiant BL40p server blade does not require Fibre Channel signals to be routed to the interconnect bays.

**Figure 1.** BL p-Class 6U enclosure with eight bays for server blades and two bays for interconnect modules



<sup>1</sup> For information on supported HP StorageWorks SAN configurations, refer to the "HP StorageWorks SAN design reference guide" at: <http://h18000.www1.hp.com/products/storageworks/san/documentation.html>.

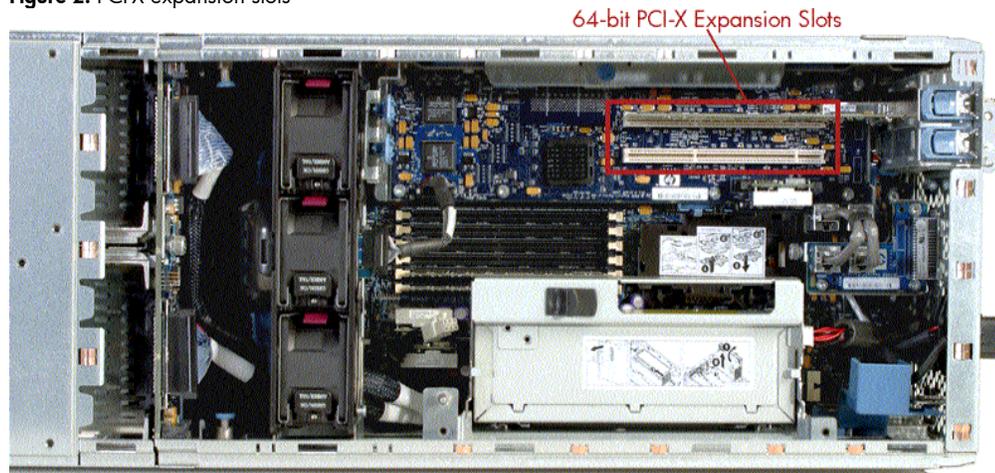
## ProLiant BL40p server blade

The ProLiant BL40p server blade features four Xeon MP sockets and two 64-bit PCI-X expansion slots. The ProLiant BL40p server blade provides optional SAN connectivity through the two 64-bit PCI-X expansion slots (Figure 2) where customers can install up to two Fibre Channel Host Bus Adapters (HBAs). If desired, the HBAs can be configured for redundancy when connected to a SAN designed with dual paths. To connect the ProLiant BL40p server blade to a Local Area Network (LAN), customers can install two interconnect switches (the GbE or GbE2 Interconnect Switch Kit) or two patch panels (the RJ-45 Patch Panel Kit or the RJ-45 Patch Panel 2 Kit) in the interconnect bays of the blade enclosure.

HP ProLiant BL40p server blade



**Figure 2.** PCI-X expansion slots



### Fibre Channel HBA Support

The two ProLiant BL40p PCI-X slots support up to two PCI-compliant Fibre Channel HBAs. To connect the ProLiant BL40p server blade to StorageWorks SAN switches and SAN devices, HP recommends using StorageWorks Fibre Channel HBAs. For the most up to date and complete listing of StorageWorks SAN switches and Fibre Channel HBAs, visit the StorageWorks SAN Infrastructure Web page at <http://h18006.www1.hp.com/storage/saninfrastructure.html>.

Alternatively, the ProLiant BL40p offers EMC, Hitachi Data Systems (HDS), and IBM SAN customers the choice to connect to their third-party SANs using existing Fibre Channel HBAs. These customers should consult their SAN provider for details on configurations and devices to use.

## ProLiant BL20p G2 server blade

The ProLiant BL20p G2 is a high-performance dual-processor server blade that provides up to 8 GB of PC 2100 DDR memory, three embedded gigabit NICs (standard), and SAN storage capability.

HP ProLiant BL20p G2 server blade



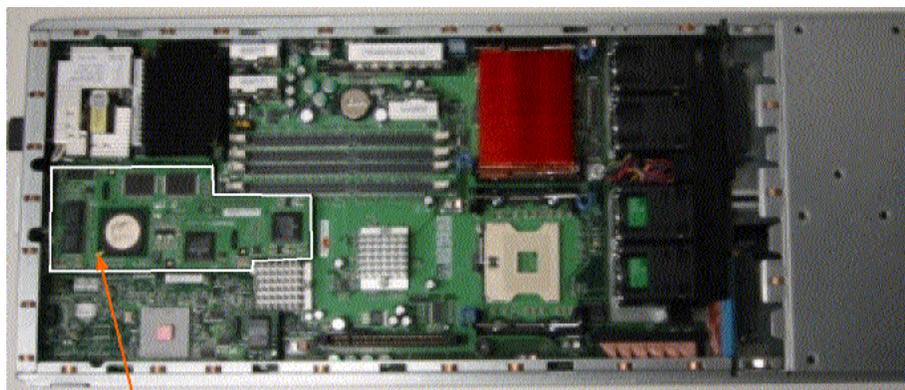
### Fibre Channel SAN support

The ProLiant BL20p G2 server blade supports Fibre Channel SAN connectivity utilizing the Dual Port Fibre Channel Mezzanine Card (Figure 5). The Fibre Channel Mezzanine Card is a combination network and Fibre Channel HBA. It is optimized for HP StorageWorks products, but it is also compatible with EMC, Hitachi, and IBM SANs (see "Supported SAN storage systems").

The Mezzanine Card provides two Fibre Channel ports using a dual-port controller chip. The two ports may be configured as active-active or active-passive, depending on the architecture of the attached SAN and customer preference. The Fibre Channel ports provide a maximum data transfer rate of 2 Gb/s per port (per direction). Both ports support auto-negotiation so that the transfer rate decreases for backward compatibility with existing 1-Gb/s Fibre Channel equipment. When the server blade is installed in the enclosure bay, the ports on the Mezzanine Card connect directly to the enclosure backplane. Once customers install the ProLiant BL20p G2 server blade with the Fibre Channel Mezzanine Card, they have two interconnect options to link the server blade to a SAN. The first option is to use the BL p-Class Patch Panel 2 Kit. The second option is to use the GbE2 Interconnect Switch Kit along with the GbE2 Storage Connectivity Kit.

Two industry-standard Small Form-factor Pluggable (SFP) Fibre Channel optical transceivers are included with each Fibre Channel Mezzanine Card. The subsequent sections describe how these transceivers are used with the RJ-45 Patch Panel 2 or the GbE2 Interconnect Switch.

**Figure 5.** Dual Port Fibre Channel Mezzanine Card for ProLiant BL20p G2 SAN connectivity



Dual Port Fibre Channel Mezzanine Card

Customers can order the ProLiant BL20p G2 server blade with the Fibre Channel Mezzanine Card installed, or they can order the card separately as an option kit. The Mezzanine Card cannot be used in the first-generation ProLiant BL20p or BL 30p server blade.

## ProLiant BL30p server blade

The ProLiant BL30p includes dual Intel® Xeon™ processors. It is optimized to deliver high performance with minimal or no local storage. The half-height design of the BL30p server blade allows inserting up to two of the servers into an enclosure sleeve, which installs into a single server bay in the BL p-Class enclosure. Thus, one BL p-Class enclosure can hold up to 16 BL30p server blades (32 processors).

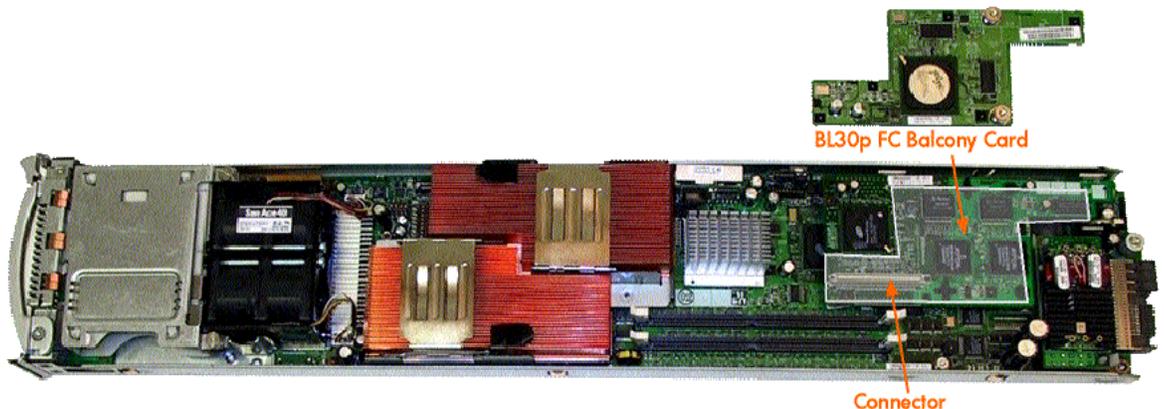
HP ProLiant BL30p server blade



### Fibre Channel SAN support

The HP ProLiant BL 30p server blade offers optional dual-port Fibre Channel support for SAN implementations and clustering capabilities, enabling data center consolidation, high availability, and rapid application deployment. The BL30p server blade supports the dual-port Fibre Channel Balcony Card, which has the same components as used on the BL20 G2 Fibre Channel Mezzanine Card. The Fibre Channel Balcony Card attaches to a connector on the BL30p Mezzanine Card (Figure 4). The BL30p supports the HP StorageWorks SANs and select third-party Fibre Channel SANs (see “Supported SAN storage systems”).

Figure 4. Dual-port Fibre Channel Balcony card for ProLiant BL30p server blade



With the BL30p server blade and Fibre Channel Balcony Card, Fibre Channel port aggregation is required to accommodate the increased number of server Fibre Channel HBA ports and to maintain compatibility with the available enclosure backplane signals and interconnect ports. The BL30p server blade enclosure sleeve aggregates the four signal paths from two BL30p blades into two physical paths. Up to sixteen physical Fibre Channel ports connect from the RJ-45 Patch Panel 2 or GbE2 Interconnect Switch directly to an external Fibre Channel SAN switch. These BL30p Fibre Channel implementations require the Fibre Channel SAN switch to support Fibre Channel Arbitrated Loop (FCAL) public loop login. Many Fibre Channel switches provide this support; however, some SAN vendors carry models that do not provide FCAL support. For a list of SAN switches that support FCAL public loop login, contact the SAN vendor.

## ProLiant BL p-Class interconnects

This section describes interconnect options for Fibre Channel SAN connectivity—the RJ-45 Patch Panel 2 Kit and GbE2 Interconnect Kit. It also shows connection schemes using these two interconnect kits.

### Interconnect decision matrix

Table 2 is an interconnect decision matrix to assist in choosing the appropriate interconnect to use with ProLiant BL20p G2 and BL30p server blades.

If SAN connectivity is required but Ethernet networking cable reduction is not required, the RJ-45 Patch Panel 2 Kit is the correct choice. When using the RJ-45 Patch Panel 2 Kit, the Fibre Channel cables will terminate on the front of the Patch Panel 2 Interconnect.

If reducing the number of Ethernet networking cables is important, the GbE2 Interconnect Kit is the correct choice. To add FC SAN connectivity, the GbE2 Storage Connectivity Kit must be used with the GbE2 Interconnect Kit. In this case, the Fibre Channel cables will terminate on the GbE2 Interconnect Switch at the rear of the rack. The GbE2 Interconnect Switch can be removed or replaced without disconnecting and reconnecting the Ethernet or Fibre Channel cables.

**Table 2.** Interconnect decision matrix

		Provides network cable reduction	Supports FC pass through for BL20p G2 & BL30p	Supported NIC speeds from server blade
Patch Panels	Patch Panel	No	No	10/100/1000
	Patch Panel 2	No	Yes	10/100/1000
Switches	GbE Switch (with copper or fiber uplinks)	Yes	No	10/100
	GbE2 Switch (with copper or fiber uplinks)	Yes	Yes with GbE2 Storage Connectivity Kit	10/100/1000

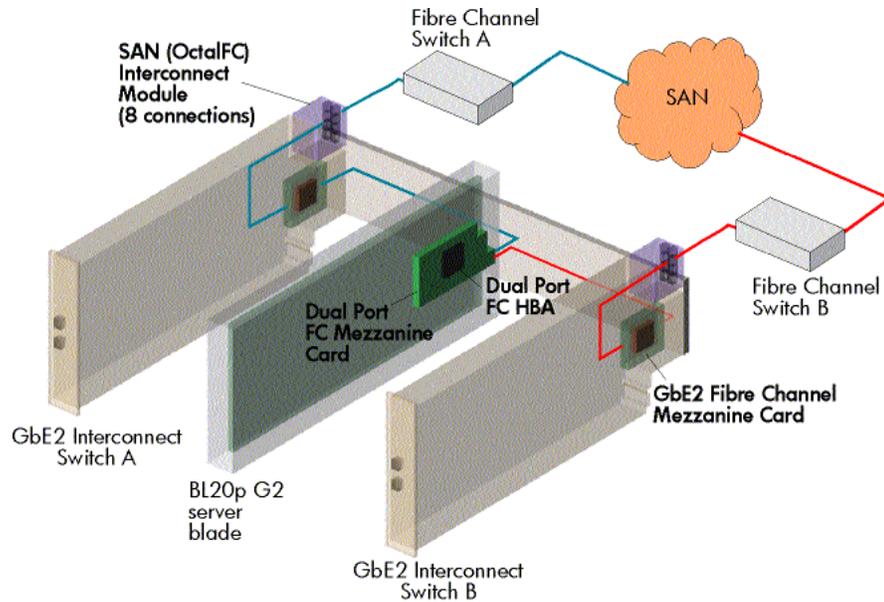
### GbE2 Interconnect Kit

The GbE2 Interconnect Kits offer the ability to pass through BL20p and BL30p series Fibre Channel signals using the optional GbE2 Storage Connectivity Kit. Therefore, both Ethernet LAN signal consolidation and Fibre Channel SAN signal pass-through are now possible with a single interconnect. The GbE2 Interconnect Switch chassis is simply used as a carrier to pass through the Fibre Channel signals. The Ethernet LAN and the Fibre Channel SAN signals are completely isolated from each other even though they share the common GbE2 Interconnect chassis. Figure 6 shows a front view of the GbE2 Interconnect Switch.

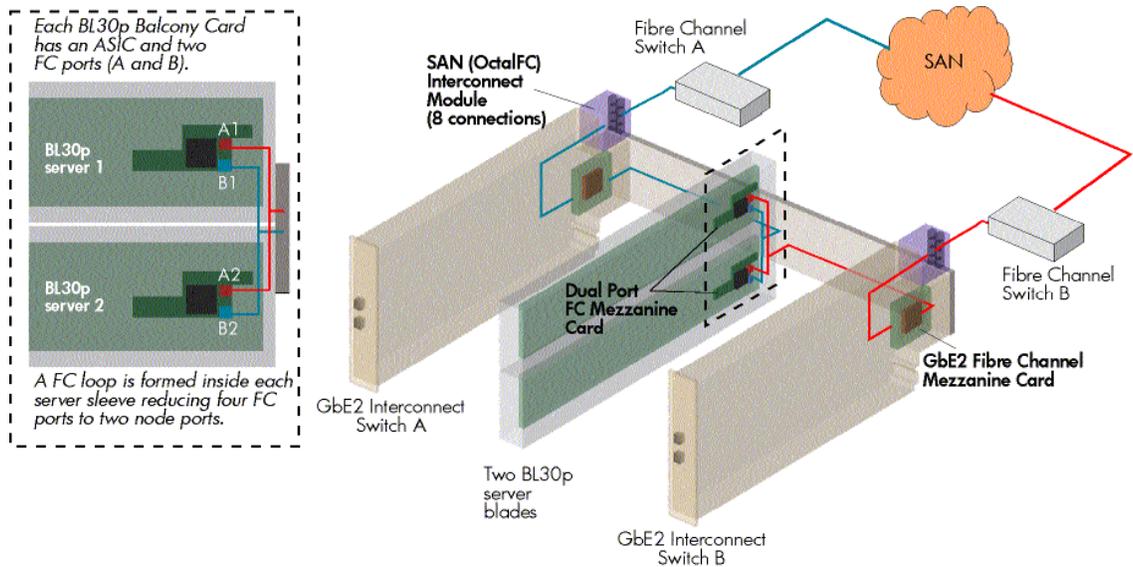


Each ProLiant server blade has two Fiber Channel ports. The Fibre Channel signals from each port are routed through the enclosure backplane and to the chassis of each GbE2 Interconnect Switch, thus providing redundant, independent path access to the SAN. The Fibre Channel signals travel through the GbE2 Fibre Channel Mezzanine Card (for signal conditioning) and then directly to the OctalFC interconnect module. The GbE2 Storage Connectivity Kit supports Fibre Channel port pass-through from 8 BL20p (Figure 8) or 16 BL30p server blades (Figure 9) for a total of up to 32 Fibre Channel ports per server blade enclosure. Half of the Fibre Channel ports are routed through each GbE2 Interconnect Switch chassis. The GbE2 Storage Connectivity Kit is not used with the ProLiant BL40p series servers; the BL40p does not require routing the Fibre Channel ports to the interconnect bays.

**Figure 8.** Fibre Channel signal routing with the GbE2 Interconnect Switch and the BL20p G2 server blade

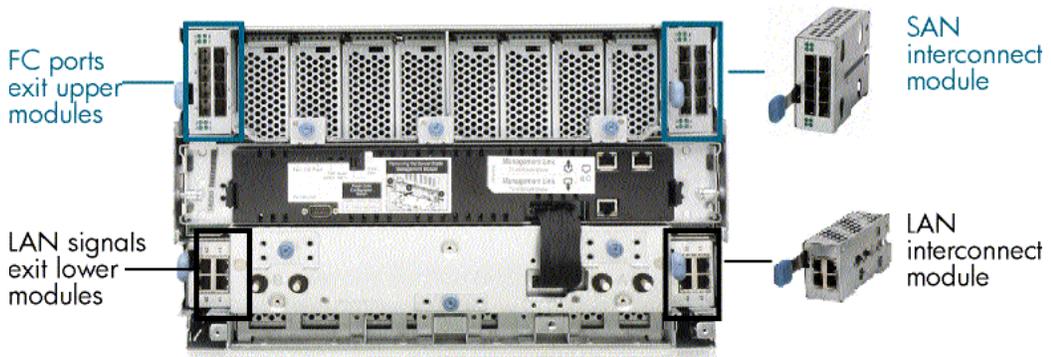


**Figure 9.** Fibre Channel signal routing with the GbE2 Interconnect Switch and the BL30p server blade



With the GbE2 Storage Connectivity Kit installed, both Fibre Channel SAN and Ethernet LAN ports are accessible at the rear of the server blade enclosure. Each port type exits on its dedicated interconnect module (Figure 10). The SAN OctalFC interconnect module has a robust connector assembly and it includes a guide pin to ensure that the module is properly aligned as it is inserted. This unique modular design allows the switch to be hot-swapped in seconds without re-cabling.

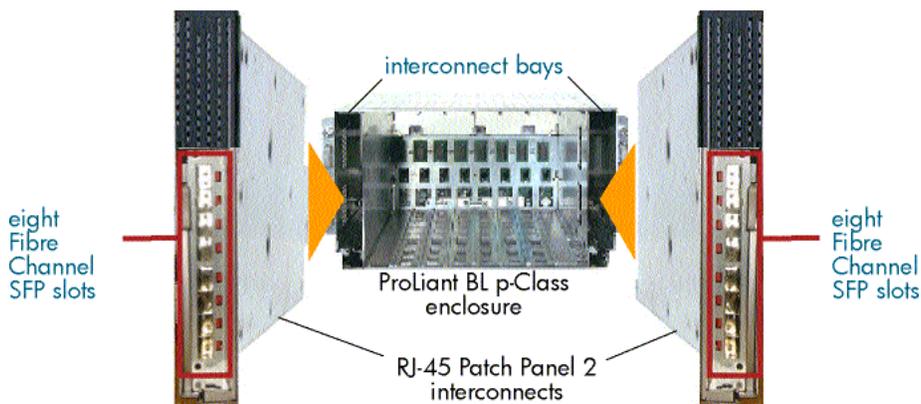
**Figure 10.** Rear of server blade enclosure with both SAN and LAN interconnect modules installed



### RJ-45 Patch Panel 2 Kit

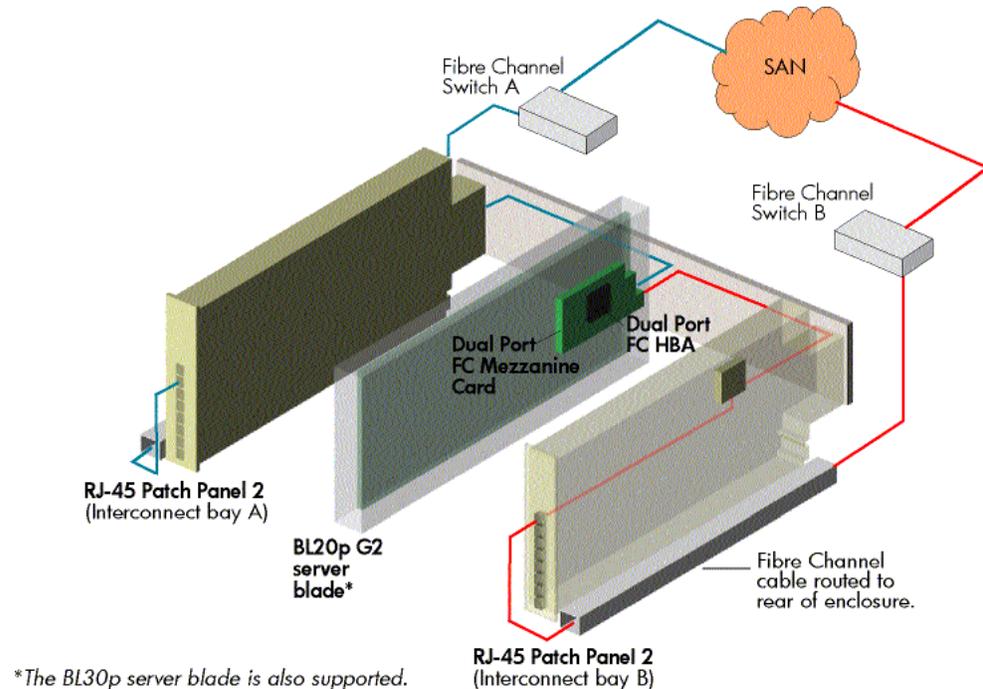
Another option to connect the ProLiant BL20p G2 and BL30p server blades to a SAN is to use the RJ-45 Patch Panel 2 Kit. The kit contains two Patch Panel 2 interconnects for one server blade enclosure (Figure 11). Each Patch Panel 2 interconnect allows both Ethernet LAN and Fibre Channel SAN ports to pass through to third-party LAN and SAN devices, respectively. This gives customers maximum flexibility in choosing their own network and storage switches or other devices.

**Figure 11.** RJ-45 Patch Panel 2 Kit



The RJ-45 Patch Panel 2 Kit provides 32 Ethernet ports and 16 Fibre Channel ports to support up to 8 ProLiant BL20p G2 or 16 BL30p server blades. The Ethernet ports are terminated at the rear of each Patch Panel 2 as RJ-45 connections. Each Patch Panel 2 routes the Fibre Channel signals to eight slots on the front panel for installation of the SFP Fibre Channel transceivers that are included with the Dual Port Fibre Channel option for the BL20p G2 and BL30p server blades.

Figure 12. RJ-45 Patch Panel 2 Fibre Channel signal routing



## Supported SAN storage systems

The ProLiant BL20p G2, BL30p, and BL40p server blades are optimized to work with HP StorageWorks devices and arrays, including Enterprise Virtual Array (EVA), MSA, and XP.

For information on supported HP StorageWorks SAN configurations, refer to the *HP StorageWorks SAN design reference guide* at:

<http://h18000.www1.hp.com/products/storageworks/san/documentation.html>.

In addition to HP StorageWorks SANs, select third-party SANs from EMC, HDS, and IBM support ProLiant BL p-Class server blades.

## Software for SAN connectivity

The *HP ProLiant Integration Module for Altiris Express User Guide* contains a procedure for creating an event to connect server blades running Microsoft® Windows® or Linux® operating system to an HP StorageWorks SAN.

The HP ProLiant Essentials Rapid Deployment Pack facilitates the installation, configuration, and deployment of high-volumes of server blades via a drag-and-drop graphic user interface (GUI)-based console. For example, IT personnel can install operating systems, service packs, virus patches, and other software on computers using either scripting or imaging technology. The Rapid Deployment Pack combines two powerful products: Altiris eXpress Deployment Solution and the ProLiant Integration Module. Rapid Deployment Pack - Windows Edition 1.60 or later and Rapid Deployment Pack - Linux Edition 1.10 or later provide enhanced SAN support. For more information, consult the RDP Knowledge Base at <http://www.hp.com/servers/rdp/kb>.

## Conclusion

The HP ProLiant BL20p G2, BL 30p, and BL40p server blades offer customers flexibility in choosing SAN connectivity solutions. The ProLiant BL40p allows the customer to connect Fibre Channel equipment directly to a traditional HBA installed in the server. The ProLiant BL20p G2 and BL30p server blades and BL p-Class interconnect options (the Patch Panel 2 Kit and GbE2 Interconnect Kit) provide industry-standard SFP transceivers with LC optical connectors so that customers can connect to any Fibre Channel switch or other device that they prefer to use.

## For more information

For additional information, refer to the resources detailed below.

Resource description	Web address
<i>ProLiant BL p-Class Networking Overview</i> white paper	<a href="http://wws1pro.compaq.com/support/reference_library/viewdocument.asp?source=5982-2202EN.xml&amp;dt=21">http://wws1pro.compaq.com/support/reference_library/viewdocument.asp?source=5982-2202EN.xml&amp;dt=21</a>
<i>ProLiant BL p-Class GbE2 Interconnect Switch Overview</i> white paper	<a href="http://wws1pro.compaq.com/support/reference_library/viewdocument.asp?source=5982-2175EN.xml&amp;dt=21">http://wws1pro.compaq.com/support/reference_library/viewdocument.asp?source=5982-2175EN.xml&amp;dt=21</a>
<i>Connecting ProLiant BL p-Class server blades to a third-party SAN</i>	<a href="http://wws1pro.compaq.com/support/reference_library/viewdocument.asp?source=5982-2494EN.xml&amp;dt=21">http://wws1pro.compaq.com/support/reference_library/viewdocument.asp?source=5982-2494EN.xml&amp;dt=21</a>
<i>HP ProLiant Integration Module for Altiris Express User Guide</i>	<a href="ftp://ftp.compaq.com/pub/supportinformation/techpubs/user_reference_guides/259028-001_rev1_us.pdf">ftp://ftp.compaq.com/pub/supportinformation/techpubs/user_reference_guides/259028-001_rev1_us.pdf</a>
Care Pack (for hardware and software information and for orderable part numbers)	<a href="http://www.hp.com/hps/carepack/servers/">http://www.hp.com/hps/carepack/servers/</a>
Rapid Deployment Pack Knowledge Base	<a href="http://www.hp.com/servers/rdp/kb">http://www.hp.com/servers/rdp/kb</a>

## Call to action

To help us better understand and meet your needs for ISS technology information, please send comments about this paper to: [TechCom@HP.com](mailto:TechCom@HP.com).

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