HP ProLiant BL p-Class GbE Interconnect Switch User Guide

February 2003 (Second Edition)
Part Number 263680-002

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Contents

About This Guide

This guide can be used for reference when servicing the HP ProLiant BL p-Class GbE Interconnect Switches.

WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, only authorized service technicians should attempt to repair this equipment. Improper repairs can create conditions that are hazardous.

Technician Notes

WARNING: Only authorized technicians trained by HP should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module-level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.

WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, do not exceed the level of repairs specified in these procedures. Because of the complexity of the individual boards and subassemblies, do not attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create conditions that are hazardous.

WARNING: To reduce the risk of electric shock or damage to the equipment:

- **Disconnect power from the system by unplugging all power cords from the power supplies.**
- **Do not disable the power cord grounding plug. The grounding plug is an important safety feature.**
- **Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.**

CAUTION: To properly ventilate the system, you must provide at least 7.6 cm (3.0 in.) of clearance at the front and back of the server.

CAUTION: The computer is designed to be electrically grounded (earthed). To ensure proper operation, plug the AC power cord into a properly grounded AC outlet only.

NOTE: Any indications of component replacement or printed wiring board modifications may void any warranty.

Where to Go for Additional Help

In addition to this guide, the following information sources are available:

- *HP ProLiant BL p-Class GbE Interconnect Switch Menu-driven Interface Reference Guide*
- *HP ProLiant BL p-Class GbE Interconnect Switch Command Line Interface Reference Guide*
- *HP ProLiant BL p-Class GbE Interconnect Switch Web-based Interface Reference Guide*
- *Service Quick Reference Guide*
- Service training guides
- Service advisories and bulletins
- QuickFind information services
- Insight Manager software

Telephone Numbers

For the name of your nearest HP authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.

For HP technical support:

- In the United States and Canada, call 1-800-652-6672.
- Outside the United States and Canada, refer to

  www.hp.com

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Introduction

Overview

This user guide provides installation and reference information for the HP ProLiant BL p-Class C-GbE Interconnect Kit and the HP ProLiant BL p-Class F-GbE Interconnect Kit.

Configuration and management information provided in this guide applies to GbE Interconnect Switches running firmware version 2.0.0 and higher and includes new features such as:

- A command line interface (CLI) that provides standard scripting capabilities as well as enhanced systems management and deployment
- Simple Network Time Protocol (SNTP) capability that allows the GbE Interconnect Switch to obtain the current date and time through a primary or secondary SNTP server
- The capability to manually set the system time
- Simple Network Management Protocol (SNMP) Management Information Base (MIB) enhancements

Additional References

Once the GbE Interconnect Switch is installed, you are ready to configure it. Detailed information about how to configure the GbE Interconnect Switch using the various user interfaces is available in the following reference guides. These guides are located on the ProLiant BL p-Class GbE Interconnect Switch Management System Utilities and User Documentation CD.

- *HP ProLiant BL p-Class GbE Interconnect Switch Menu-driven Interface Reference Guide*
- *HP ProLiant BL p-Class GbE Interconnect Switch Command Line Interface Reference Guide*
- *HP ProLiant BL p-Class GbE Interconnect Switch Web-based Interface Reference Guide*

ProLiant BL p-Class C-GbE Interconnect Kit

The ProLiant BL p-Class C-GbE Interconnect Kit contains two GbE Interconnect Switches and two QuadT Interconnect Modules. The ProLiant BL p-Class GbE Interconnect Switch and interconnect modules use 10Base-T/100Base-TX/1000Base-T Gigabit Layer 2 switching technology to provide up to a 32-to-1 (blocking) or 32-to-4 (non-blocking) reduction in the number of networking cables per BL p-Class server enclosure.

Each GbE Interconnect Switch and QuadT Interconnect Module reduces sixteen 10Base-T/100Base-TX server networking ports to one or two RJ-45 100Base-TX/1000Base-T and one or two RJ-45 10Base-T/100Base-TX uplink ports.

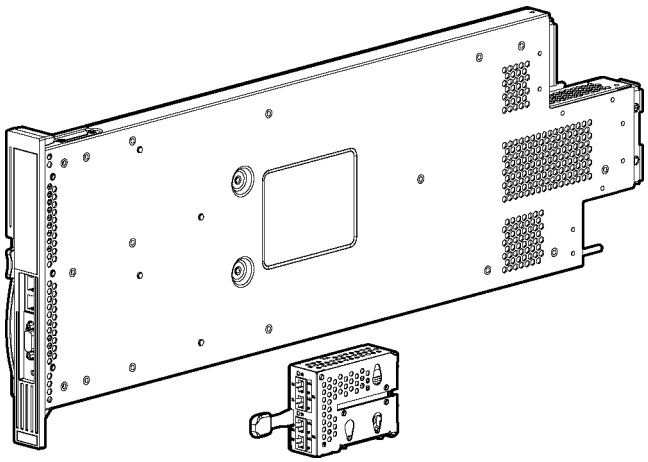


Figure 1-1: ProLiant BL p-Class GbE Interconnect Switch and QuadT Interconnect Module

ProLiant BL p-Class F-GbE Interconnect Kit

The ProLiant BL p-Class F-GbE Interconnect Kit contains two GbE Interconnect Switches and two DualTSX Interconnect Modules. The ProLiant BL p-Class GbE Interconnect Switch and interconnect module use 10Base-T/100Base-TX/1000Base-SX Gigabit Layer 2 switching technology to provide up to a 32-to-1 (blocking) or 32-to-4 (non-blocking) reduction in the number of networking cables per BL p-Class server enclosure.

Each GbE Interconnect Switch and DualTSX Interconnect Module reduces sixteen 10Base-T/100Base-TX server networking ports to one or two LC 1000Base-SX and one or two RJ-45 10Base-T/100Base-TX uplink ports.

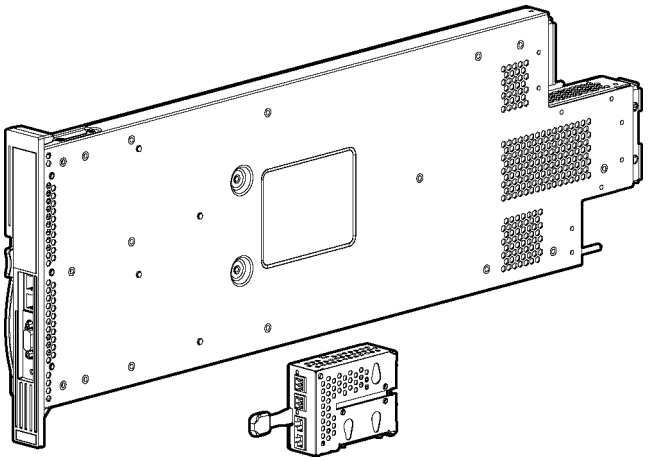


Figure 1-2: ProLiant BL p-Class GbE Interconnect Switch and DualTSX Interconnect Module

Features

The ProLiant BL p-Class GbE Interconnect Switch and interconnect modules are designed for easy installation and high performance in an environment where traffic on the network and the number of users increases continually.

Enterprise Class Performance

ProLiant BL p-Class GbE Interconnect Switch features include:

- Up to a 16-to-1 reduction in networking cables and connections
  - — Concentration of sixteen 10/100 Ethernet networking ports down to as little as one Gigabit Ethernet port, or up to two Gigabit Ethernet ports plus two 10/100 Ethernet networking ports for additional bandwidth and redundant connections to the network backbone.
  - — Integration for a ProLiant BL p-Class server blade enclosure with redundant switching modules that provides redundant networking paths to each server blade.
- Preconfiguration for immediate use with a ProLiant BL p-Class server blade enclosure
- Industry-standard protocols compatible with other widely-used networking components
- Support for a total of 255 IEEE 802.1Q VLANs (including user configureable and/or dynamic register), for server grouping and isolation
- A variety of management interfaces
- Support for saving and downloading switch configurations to a TFTP server, thus allowing for rapid deployment of multiple systems, and backup and restore capabilities
- Failover and redundancy features and components
- Front panel link activity and speed indicators
- Extra ports for management, debugging, and port mirroring

GbE Interconnect Switch Redundancy

The ProLiant BL p-Class GbE Interconnect Switch offers several redundancy and failover features. With these features, the network configuration can be designed to allow for continued network access to each server blade in case of a component or link failure. GbE Interconnect Switch redundancy and failover features include:

- Two separate GbE Interconnect Switches per one ProLiant BL p-Class server blade enclosure
- Two Gigabit Ethernet uplink ports and two 10/100 Ethernet uplink ports per GbE Interconnect Switch for designing fully meshed uplink paths to the network backbone
- Server networking connections routed to each of the separate GbE Interconnect Switches for redundant paths to tolerate a switch or port malfunction

- Redundant data path 10/100 Ethernet cross connections between GbE Interconnect Switches
- Spanning Tree Protocol (STP) support that eliminates potential problems caused by redundant networking paths and provides for failover with a secondary path in case of primary path failure
- Power and cooling by redundant power supplies and redundant cooling fans within the server blade enclosure

Configuration and Management

The ProLiant BL p-Class GbE Interconnect Switch provides the following configuration and management interfaces and tools:

- A command line interface (CLI) and a menu-driven interface allow local, Telnet, or Serial Line Internet Protocol (SLIP) access.
- A browser-based GUI allows remote access using a Web browser such as Microsoft® Internet Explorer or Netscape Navigator.
- Simple Network Management Protocol (SNMP) and Remote Monitoring (RMON) manageability and monitoring are supported. An SNMP-based scripting utility allows remote configuration of the GbE Interconnect Switch.
- The GbE Interconnect Switch functionality allows you to save and download interconnect switch configurations to a TFTP server, thus allowing the rapid deployment of multiple server blade systems, and providing robust backup and restore capabilities.
- Simple Network Time Protocol (SNTP) is supported allowing the interconnect switch to display and record the accurate date and time as provided by an SNTP server.
- The GbE Interconnect Switch functionality allows you to manually set the system time.

Diagnostic Tools

The hardware, software, and firmware diagnostic tools that are available include:

- *Insight Manager 7*
- Power-On Self-Test (POST) built into the interconnect switch boot process
- GbE Interconnect Switch management suite of tools and interfaces
- GbE Interconnect Switch port mirroring
- GbE Interconnect Switch LEDs for port status and speed
- Medium Access Control (MAC)-based backdoor password provision (contact HP technical support)

GbE Interconnect Switch Architecture

The ProLiant BL p-Class system provides integrated switching technology for network cable reduction.

GbE Interconnect Switch with the QuadT Interconnect Module

The following Ethernet connectivity block diagram shows how the Ethernet ports are connected within the server blade enclosure.

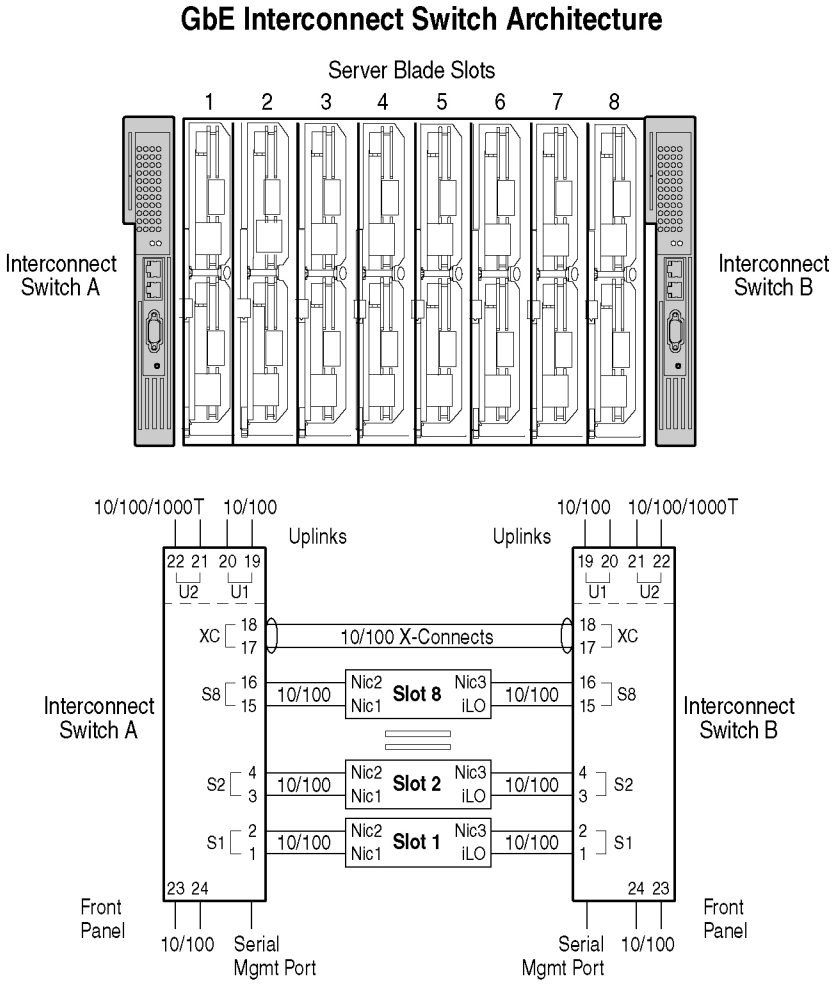


Figure 1-3: ProLiant BL p-Class GbE Interconnect Switch with the QuadT Interconnect Module

GbE Interconnect Switch with the DualTSX Interconnect Module

The following Ethernet connectivity block diagram shows how the Ethernet ports are connected within the server blade enclosure.

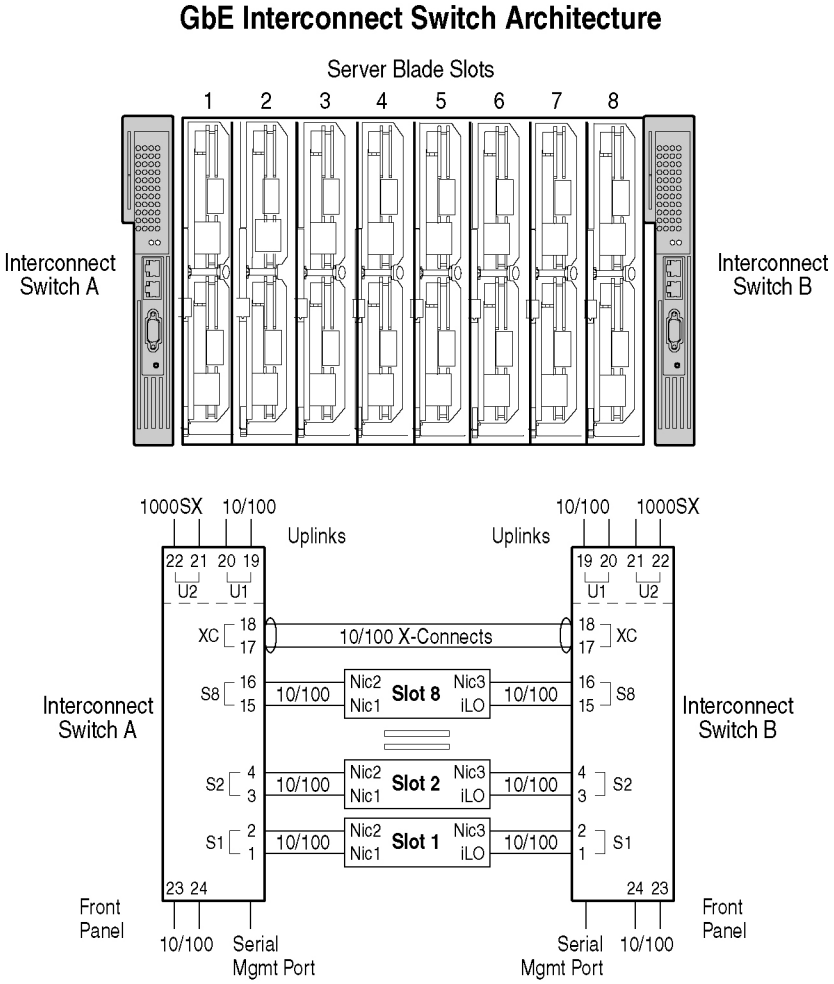


Figure 1-4: ProLiant BL p-Class GbE Interconnect Switch with the DualTSX Interconnect Module

GbE Interconnect Switches

Two GbE Interconnect Switches in the ProLiant BL p-Class server blade enclosure provide switch redundancy and redundant paths to the network ports on the server blades. Each GbE Interconnect Switch has two Gigabit and two 10/100 Ethernet uplink ports and direct connections to two of the four network controllers per server blade slot. The four network controllers per server blade slot are NIC1, NIC2, NIC3, and Integrated Lights-Out (iLO). Each pair of GbE Interconnect Switches consolidates up to thirty-two 10/100 Ethernet controllers on eight servers into one-to-four Gigabit ports and one-to-four 10/100 uplink ports on the back of the system. This design eliminates up to 31 network cables from the back of the server blade enclosure.

Refer to the server Setup and Installation Guide for more information about Integrated Lights-Out (iLO) management.

Redundant Crosslinks

The two GbE Interconnect Switches are connected through redundant 100-Mb/s crosslinks. These two crosslinks provide an aggregate throughput of 200 Mb/s for traffic between the GbE Interconnect Switches.

Redundant Paths to Servers

The three 10/100 NIC ports and the one iLO controller per server blade slot are routed through the enclosure backplane to different GbE Interconnect Switches. NIC1 and NIC2 are routed to Switch A. NIC 3 and iLO are routed to Switch B. This configuration provides redundant paths to each server.

On a heavily used system, using a single uplink port for all 24 NICs and 8 iLOs can cause a traffic bottleneck. For example, if uplink 1 on Switch A is the only uplink used, all traffic to and from NIC 3 and the iLO on any of the server blades must travel over the crosslinks between Switch A and Switch B. The crossover links are intended as a failover route on the switch management link and should not be used as a primary path. For optimum performance, use the uplink ports from both GbE Interconnect Switches.

Supported Technologies

The ProLiant BL p-Class GbE Interconnect Switch supports the following technologies.

Layer 2 Switching

The ProLiant BL p-Class GbE Interconnect Switch uses 10/100/1000 Gigabit Layer 2 switching technology. Layer 2 refers to the Data Link layer of the Open Systems Interconnection (OSI) model, which is concerned with moving data packets across a network by enforcing Carrier Sense Multiple Access with Collision Detection (CSMA/CD). This layer performs the following tasks:

- Ethernet packet framing
- MAC addressing
- Physical medium transmission error detection
- Medium allocation (collision avoidance)
- Contention resolution (collision handling)

Layer 2 switching technology allows the GbE Interconnect Switch to look into data packets and redirect them based on the destination MAC address. This reduces traffic congestion on the network because packets, instead of being transmitted to all ports, are transmitted to the destination port only.

IEEE 802.1Q Based Virtual Local Area Network

The ProLiant BL p-Class GbE Interconnect Switch provides support for a total of 255 IEEE 802.1Q Virtual Local Area Networks (VLANs) (including user configurable and/or dynamic registered), for server grouping and isolation. A VLAN is a network segment configured according to a logical scheme rather than a physical layout. VLANs can be used to combine any collection of LAN segments into an autonomous user group that appears as a single LAN. VLANs also logically segment the physical network into different broadcast domains so that packets are forwarded only between ports within the VLAN. This technology enhances performance by conserving bandwidth and improves security by limiting traffic to specific domains.

IMPORTANT: The greater the number of VLANs, the greater the GbE Interconnect Switch CPU utilization. For maximum interconnect switch performance, HP recommends that you be judicious when configuring the number of VLANs.

For example, you may want to isolate the server blade iLO ports from the rest of the NICs. The iLO ports on Interconnect Switch B can be assigned to their own VLAN and go to a dedicated uplink or share an uplink using VLAN tagging. Refer to the “Configuring VLANs” section in the management interface reference guides for more information.

Spanning Tree Protocol

The GbE Interconnect Switch supports IEEE 802.1d Spanning Tree Protocol (STP), which allows the blocking of links that form loops between switches in a network. When multiple links between switches are detected, a primary link is established. Duplicated links are blocked from use and become standby links. If the primary link fails, the standby link is activated. Refer to Appendix E for more information.

Simple Network Management Protocol and Remote Monitoring

Each GbE Interconnect Switch can be configured and monitored remotely from a Simple Network Management Protocol (SNMP)/Remote Monitoring (RMON)-based network management station. The GbE Interconnect Switch supports industry-standard SNMP Management Information Bases (MIBs), proprietary HP Switch MIBs, and RMON groups 1 (Statistics), 2 (History), 3 (Alarm), and 9 (Event) for fault detection, configuration, and monitoring of switch functionality. In addition, the GbE Interconnect Switch supports various environmental traps such as temperature and fan failure traps.

To secure the management interface, the switch administrator can configure community strings with two levels of access. Access can be restricted to a limited number of management stations by configuring a list of IP addresses of those stations that can access the GbE Interconnect Switch. Refer to Appendix F for more information.

Port Mirroring

The GbE Interconnect Switch allows you to mirror a port to another port for network monitoring and troubleshooting purposes. This technology offers a way for network packet analyzers to view the traffic moving through the GbE Interconnect Switches by providing a copy of the traffic that is currently being passed through any other port. The packets are normally sent to a network packet analyzer or other monitoring device attached to the mirror port.

Port Trunking and Load Balancing

The GbE Interconnect Switch port trunking feature allows several ports to be grouped together and act as a single logical link called a trunk. This feature provides a bandwidth that is a multiple of the bandwidth of a single link. It also improves reliability since a configurable type of load balancing is automatically applied to the ports in the trunked group. A link failure within the group causes the network traffic to be directed to the remaining links in the group.

Trivial File Transfer Protocol Support

Trivial File Transfer Protocol (TFTP) support allows the GbE Interconnect Switch firmware to be upgraded by downloading a new firmware file from a TFTP server to the GbE Interconnect Switch. A configuration file can also be loaded into a GbE Interconnect Switch from a TFTP server, configuration settings can be saved to the TFTP server, and a history log can be uploaded from the switch to the TFTP server.

Store and Forward Switching Scheme

The ProLiant BL p-Class GbE Interconnect Switch provides a store and forward switching scheme that allows each packet to be buffered (stored) before it is forwarded to its destination. While this method creates latency, it improves reliability in a heavily used interconnect switch. Packets that cannot be forwarded are saved immediately, rather than dropped, so that packets behind them are less likely to be dropped in periods of heavy usage.

IEEE 802.1p Based Class of Service for Packet Prioritization

Class of Service (CoS) for packet prioritization allows switch administrators to set priority levels on the GbE Interconnect Switch for forwarding packets based on the priority setting information in the packets. The GbE Interconnect Switch supports four classes of traffic (buffers or queues) for implementing priority and allows administrators to map eight priority levels to the four classes. Traffic from a specific server port can be given priority over packets from other devices according to this range of priority levels. For example, with multiple packets in a buffer, the packet with the highest priority would be forwarded first, regardless of when it was received.

Internet Group Management Protocol Snooping

Internet Group Management Protocol (IGMP) snooping, when enabled and configured properly, manages multicast traffic in a GbE Interconnect Switch by allowing directed switching of the IP multicast traffic. The GbE Interconnect Switch can use IGMP snooping to configure ports dynamically, so that IP multicast traffic is forwarded only to those ports associated with IP multicast hosts.

IGMP snooping allows the GbE Interconnect Switch to recognize IGMP queries and reports sent between network stations or devices and an IGMP host that belongs to a specific multicast group. When enabled for IGMP Snooping, the GbE Interconnect Switch can open or close a port to a specific device based on IGMP messages passing through the module. This feature further limits unnecessary broadcasts. The GbE Interconnect Switch can be configured to use either IGMP version 1 or version 2 when making queries.

Dynamic Host Configuration Protocol or Bootstrap Protocol

The GbE Interconnect Switch can be configured to obtain an IP address from a Dynamic Host Configuration Protocol (DHCP) or Bootstrap Protocol (BOOTP) server during the boot process. By default, the GbE Interconnect Switch is configured for DHCP. The IP settings can also be manually configured by means of the console interface. The IP settings are also configurable from other interfaces, such as the Web, but because the connection is based on an IP address for these interfaces, users will have to reconnect with the newly assigned IP address.

Simple Network Time Protocol

The GbE Interconnect Switch can maintain the current date and time. This information displays on the management interfaces and is used to record the date and time of switch events. Current date and time information can be manually set on the GbE Interconnect Switch or can be obtained through Simple Network Time Protocol (SNTP). SNTP allows the GbE Interconnect Switch to send a request to a primary or secondary SNTP server in each polling period asking for Greenwich Mean Time (GMT). If the primary SNTP server is not available, the request is sent to a secondary SNTP server.

User Account Management

For increased security, separate user accounts can be set up with various levels of permission.

External Components

This section describes the front panel of the ProLiant BL p-Class GbE Interconnect Switch, the QuadT Interconnect Module Panel, and the DualTSX Interconnect Module Panel.

GbE Interconnect Switch Front Panel

The front panel of the GbE Interconnect Switch has LEDs to indicate link activity, link speed, power status, and management status. It has two RJ-45 connectors for 10/100 Ethernet management ports, one RS-232 (DB-9) serial management console port, and a power or reset button.

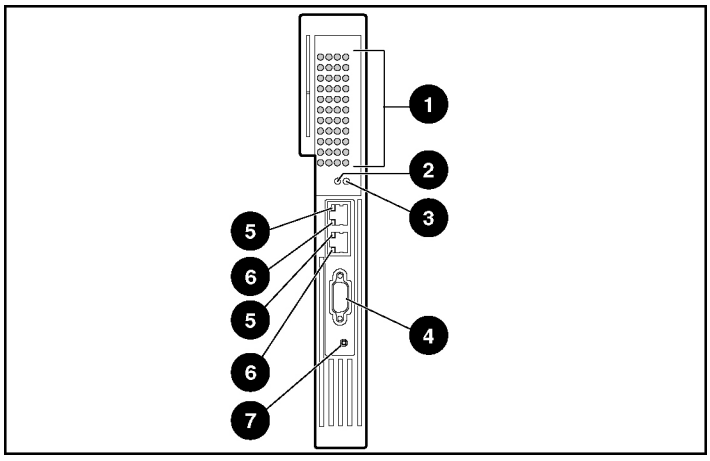


Figure 1-5: GbE Interconnect Switch front panel

Table 1-1: GbE Interconnect Switch Front Panel

Item	Description	Status
1	Link activity and speed LEDs	Refer to the following figures and tables for link activity and speed LED assignments and functions.
2	Power status LED	Green = Power on Amber = Standby mode Off = Power off
3	Management status LED	Flashing = Management session active Off = No management session active
4	RS-232 serial connector	Accesses the local management console.
5	Management RJ-45 connector link speed LED	Green = 100 Mb/s Off = 10 Mb/s
6	Management RJ-45 connector link activity LED	Green = Link and no activity Green flashing = Link and activity Amber = Port disabled Off = No link
7	**Pwr/Rst** button	Forces the GbE Interconnect Switch to power up or reboot.

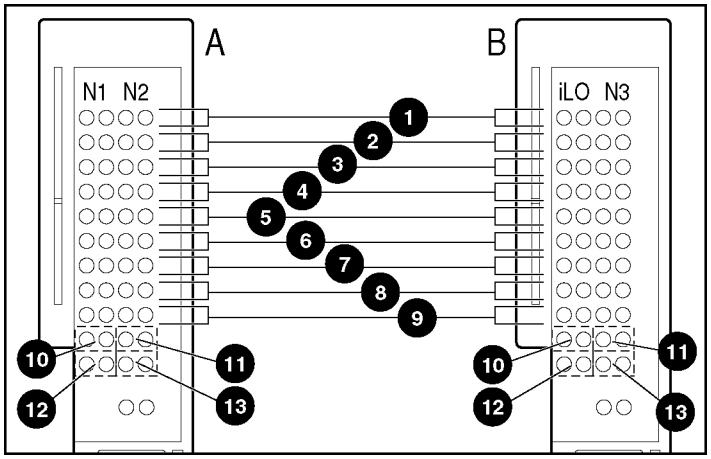


Figure 1-6: GbE Interconnect Switch front panel NIC LED assignments

Table 1-2: GbE Interconnect Switch Front Panel NIC LED Assignments

Item	Description
1	Server blade slot 1 Ethernet ports
2	Server blade slot 2 Ethernet ports
3	Server blade slot 3 Ethernet ports
4	Server blade slot 4 Ethernet ports
5	Server blade slot 5 Ethernet ports
6	Server blade slot 6 Ethernet ports
7	Server blade slot 7 Ethernet ports
8	Server blade slot 8 Ethernet ports
9	Interswitch X-connect ports
10	Port (19x) RJ-45 uplink connector for rear panel uplink ports
11	Port (20x) RJ-45 uplink connector for rear panel uplink ports
12	Port (21x) RJ-45 (or LC)* uplink connector for rear panel uplink ports
13	Port (22x) RJ-45 (or LC)* uplink connector for rear panel uplink ports
*Ports 21x and 22x are RJ-45 uplink connectors on the QuadT Interconnect Module and LC uplink connectors on the DualTSX Interconnect Module.	

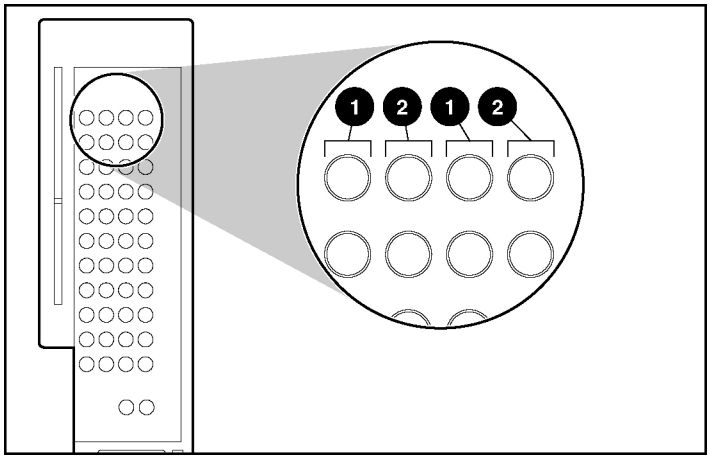


Figure 1-7: GbE Interconnect Switch front panel NIC LED functions

Table 1-3: GbE Interconnect Switch Front Panel NIC LED Functions

Item	LED Description	Status
1	Link speed	Amber = 1000 Mb/s
		Green = 100 Mb/s
		Off = 10 Mb/s
2	Link activity	Green = Link and no activity
		Green flashing = Link and activity
		Amber = Port disabled
		Off = No link

QuadT Interconnect Module Panel

One QuadT Interconnect Module is inserted into the rear side of each GbE Interconnect Switch. Each QuadT Interconnect Module has four RJ-45 connectors with link activity and speed LEDs for uplink network cabling. Two RJ-45 connectors support Gigabit Ethernet connections and two support 10/100 Ethernet connections for uplink connectivity.

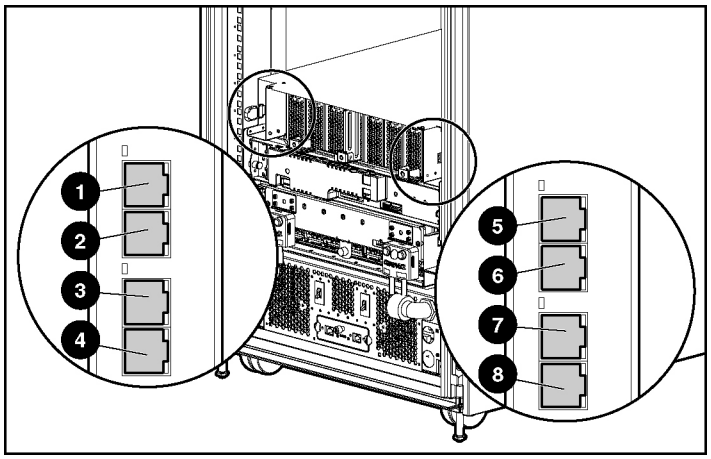


Figure 1-8: QuadT Interconnect Module connectors

Table 1-4: QuadT Interconnect Module Connectors

Item	Description
1	Port (22x) RJ-45 connector for 10/100/1000Base-T uplink on Switch B
2	Port (21x) RJ-45 connector for 10/100/1000Base-T uplink on Switch B
3	Port (20x) RJ-45 connector for 10/100Base-T uplink on Switch B
4	Port (19x) RJ-45 connector for 10/100Base-T uplink on Switch B
5	Port (22x) RJ-45 connector for 10/100/1000Base-T uplink on Switch A
6	Port (21x) RJ-45 connector for 10/100/1000Base-T uplink on Switch A
7	Port (20x) RJ-45 connector for 10/100Base-T uplink on Switch A
8	Port (19x) RJ-45 connector for 10/100Base-T uplink on Switch A

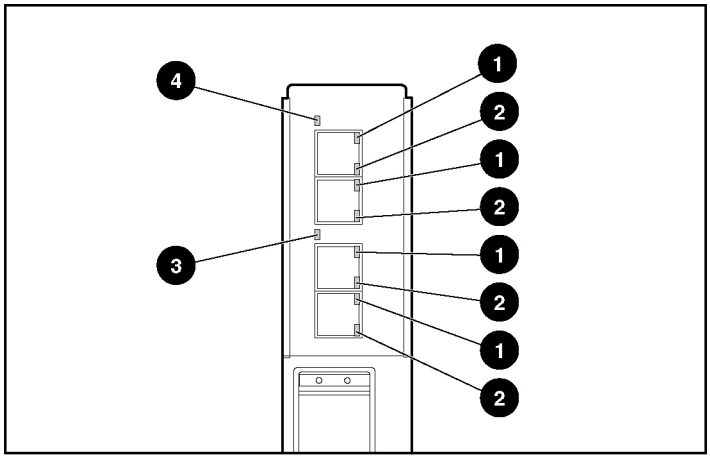


Figure 1-9: QuadT Interconnect Module LEDs

Table 1-5: QuadT Interconnect Module LEDs

Item	LED Description	Status
1	Link activity	Green = Link and no activity Green flashing = Link and activity Amber = Port disabled Off = No link
2	Link speed	Amber = 1000 Mb/s Green = 100 Mb/s Off = 10 Mb/s
3	Port 21	Reserved for future use
4	Port 22	Reserved for future use

DualTSX Interconnect Module Panel

One DualTSX Interconnect Module is inserted into the rear side of each GbE Interconnect Switch. Each DualTSX Interconnect Module has two RJ-45 connectors with link activity and speed LEDs and two LC connectors with only link activity LEDs for uplink network cabling. Two LC connectors support 1000 SX Ethernet short-haul fiber connections, and two RJ-45 connectors support 10/100 Ethernet copper connections for uplink connectivity.

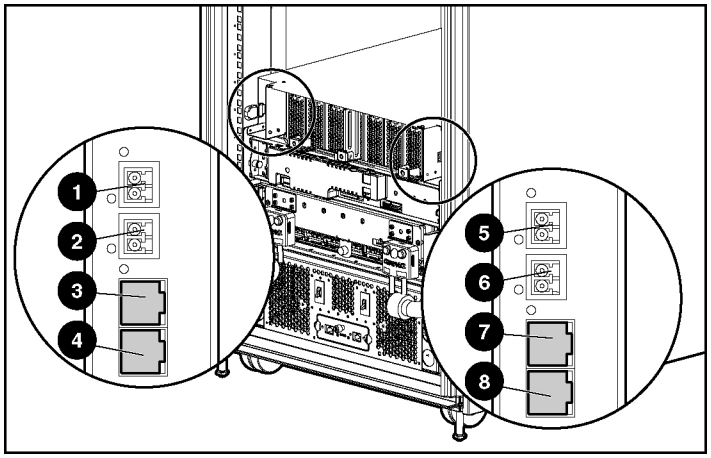


Figure 1-10: DualTSX Interconnect Module connectors

Table 1-6: DualTSX Interconnect Module Connectors

Item	Description
1	Port (22x) LC connector for 1000Base-SX uplink on Switch B
2	Port (21x) LC connector for 1000Base-SX uplink on Switch B
3	Port (20x) RJ-45 connector for 10/100Base-T uplink on Switch B
4	Port (19x) RJ-45 connector for 10/100Base-T uplink on Switch B
5	Port (22x) LC connector for 1000Base-SX uplink on Switch A
6	Port (21x) LC connector for 1000Base-SX uplink on Switch A
7	Port (20x) RJ-45 connector for 10/100Base-T uplink on Switch A
8	Port (19x) RJ-45 connector for 10/100Base-T uplink on Switch A

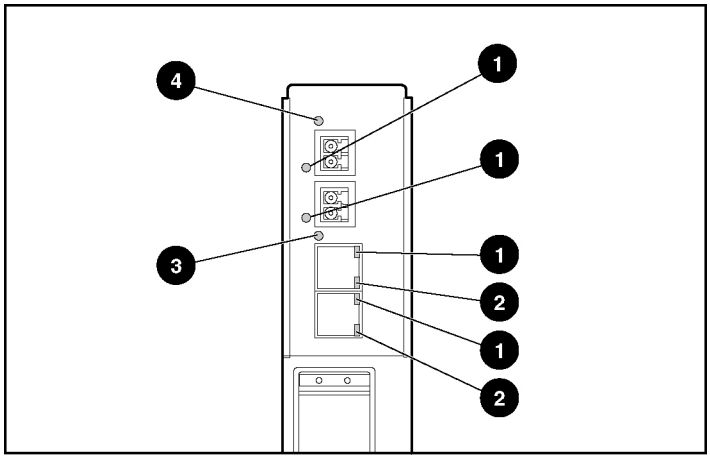


Figure 1-11: DualTSX Interconnect Module LEDs

Table 1-7: DualTSX Interconnect Module LEDs

Item	LED Description	Status
1	Link activity	Green = Link and no activity Green flashing = Link and activity Amber = Port disabled Off = No link
2	Link speed	Green = 100 Mb/s Off = 10 Mb/s
3	Port 21	Reserved for future use
4	Port 22	Reserved for future use

2

Setting Up and Installing the GbE Interconnect Switch

Overview

This chapter describes how to set up and install the ProLiant BL p-Class GbE Interconnect Switches and the interconnect modules.

The setup and installation process includes the following tasks:

1. Installing the GbE Interconnect Switches and interconnect modules
2. Planning the GbE Interconnect Switch configuration
3. Cabling the GbE Interconnect Switch to the network
4. Powering up the GbE Interconnect Switch
5. Accessing the GbE Interconnect Switch
6. Logging on and configuring the GbE Interconnect Switch

Installing the GbE Interconnect Switches and Interconnect Modules

This section describes how to install the hardware in a new GbE Interconnect Switch deployment, a replacement for an existing GbE Interconnect Switch, or an upgrade from an RJ-45 Patch Panel.

IMPORTANT: Record the switch MAC address printed on the MAC address label attached to your GbE Interconnect Switch. The MAC address can be used to find the IP address from a DHCP server.

Installation Guidelines

Observe the following guidelines:

- Always install GbE Interconnect Switches in pairs. Each server blade enclosure requires two GbE Interconnect Switches for proper connectivity. Both GbE Interconnect Switches are identical. They get their identities (Switch A or Switch B) from the server blade enclosure.
- Always install the interconnect modules in the top-left and top-right bays on the rear side of the server blade enclosure.

- Be sure that each interconnect module is fully seated. The latch/handle drops into place when the module is firmly seated.
- Always install the GbE Interconnect Switches into the interconnect bays, which are the left-most (side A) and right-most (side B) bays on the front side of the server blade enclosure.

Installing a New GbE Interconnect Switch for a New Deployment

1. Insert the interconnect modules into the top-left and top-right module bays on the rear side of the ProLiant BL p-Class server blade enclosure.

   IMPORTANT: Be sure that the interconnect modules are fully seated. The latch/handle will drop into place when the module is firmly seated.

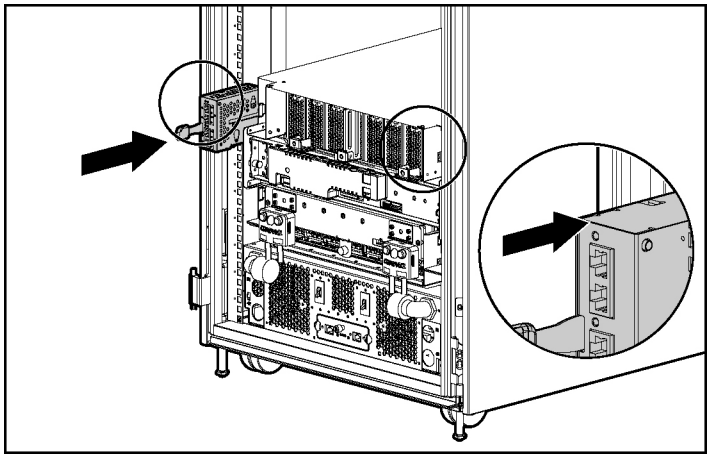


Figure 2-1: Installing the QuadT or DualTSX Interconnect Modules

2. Slide the GbE Interconnect Switch into the right interconnect bay in the front side of the ProLiant BL p-Class server blade enclosure (1).
3. Lock the ejector lever (2).

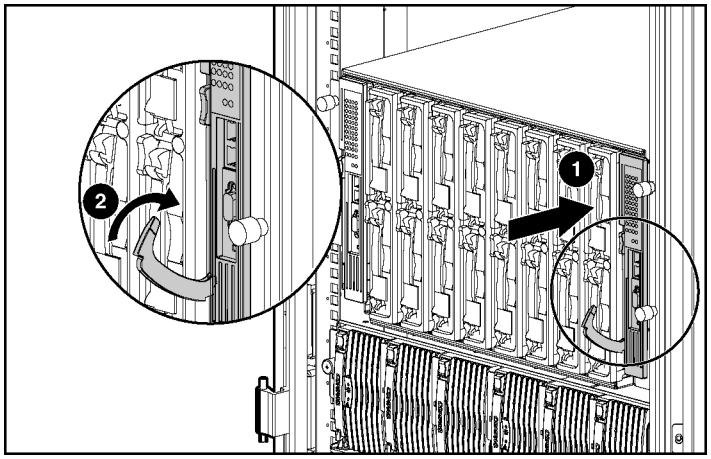


Figure 2-2: Installing the GbE Interconnect Switches

4. Repeat steps 2 and 3 for the second GbE Interconnect Switch in the left interconnect bay.

Replacing an Existing GbE Interconnect Switch

CAUTION: Removing a GbE Interconnect Switch from a powered enclosure **will** result in the loss of network communications between the server blade and the network infrastructure.

IMPORTANT: If you are replacing an existing GbE Interconnect Switch or upgrading from an RJ-45 Patch Panel, and have strict security requirements:

- Do not cable the GbE Interconnect Switch until after configuration.

Or

- Connect the GbE Interconnect Switch to the optional Diagnostic Station. The Diagnostic Station enables you to power up, configure, and diagnose a ProLiant p-Class server blade or a ProLiant p-Class GbE Interconnect Switch outside of the rack environment.

To replace an existing GbE Interconnect Switch:

1. If possible, save the configuration file to a TFTP server for later retrieval. For more information on saving a configuration file to a TFTP server, refer to the management interface reference guides.
2. On the front side of the ProLiant BL p-Class server blade, release the ejector lever for the GbE Interconnect Switch.
3. Pull down on the ejector lever to unlock the GbE Interconnect Switch from the enclosure.
4. Slide the GbE Interconnect Switch out of the interconnect bay.
5. Slide the new GbE Interconnect Switch fully into the interconnect bay.
6. Close the ejector lever.
7. If you saved the configuration file to a TFTP server, download the configuration. For more information on downloading a configuration file, refer to the management interface reference guides.

Upgrading from RJ-45 Patch Panels

CAUTION: Removing an RJ-45 patch panel from a powered enclosure **will** result in the loss of network communications between the server blade and the RJ-45 patch panel.

IMPORTANT: If you are replacing an existing GbE Interconnect Switch or upgrading from an RJ-45 Patch Panel, and have strict security requirements:

- Do not cable the GbE Interconnect Switch until after configuration.

Or

- Connect the GbE Interconnect Switch to the optional Diagnostic Station. The Diagnostic Station enables you to power up, configure, and diagnose a ProLiant p-Class server blade or a ProLiant p-Class GbE Interconnect Switch outside of the rack environment.

1. From the front side of the ProLiant BL p-Class server blade enclosure, unlock the ejector lever and slide out the Patch Panels from the left and right interconnect bays.
2. From the rear side of the server blade enclosure, slide out the top and bottom patch panel RJ-45 modules (four total) from the left and right module bays and unplug the cables.
3. From the rear side of the server blade enclosure, insert the new interconnect modules (two total) that came with the GbE Interconnect Switches into the top-left and top-right module bays.
4. From the front side of the server blade enclosure, slide the GbE Interconnect Switch into the left interconnect bay.
5. Lock the ejector lever.
6. Repeat steps 4 and 5 to install the second GbE Interconnect Switch in the right interconnect bay.

Planning the GbE Interconnect Switch Configuration

Before you configure the GbE Interconnect Switch, HP recommends that you plan the configuration. As you plan, consider your default settings, security issues and privileges, and whether you want to configure each GbE Interconnect Switch manually or configure multiple GbE Interconnect Switches at the same time.

Default Settings

The GbE Interconnect Switches ship with a default configuration in which all ports are enabled and assigned a default virtual LAN (VLAN) with a VLAN ID (VID) equal to 1. This default configuration simplifies your initial setup by allowing you to use a single uplink cable (from any external Ethernet connector) to connect your server blade enclosure to your network. You need to assess your particular server environment to determine any requirements for other considerations.

When planning the configuration, consider the default settings for the following parameters:

- Switch IP settings
- Virtual Local Area Network (VLAN) and GARP VLAN Registration Protocol (GVRP) settings
- Spanning Tree Protocol (STP) settings
- Port names and types
- Port trunking settings
- Class of Service (CoS) settings
- Interswitch X-connect port settings
- Simple Network Management Protocol (SNMP)/Remote Monitoring (RMON) settings
- User name and password settings
- Default access to various management interfaces

- Internet Group Management Protocol (IGMP) Snooping settings
- Simple Network Time Protocol (SNTP) settings

IMPORTANT: Refer to Appendix D for a complete list of default configuration settings.

GbE Interconnect Switch Security

When planning the configuration for a GbE Interconnect Switch, to secure access to the management interface:

- Create users with various access levels to the local console, remote Telnet, and Web interface. Refer to Table 2-1 for the three levels of user access privileges.
- Enable or disable access to various management interfaces to fit the security policy.
- Change default SNMP/RMON community strings for read-only and read-write access.

Root, User+, and User Access Rights

There are three levels of user access rights: Root, User+, and User. Some menu selections available to users with Root privileges may not be available to those with User+ and User privileges.

The following table summarizes user access rights.

Table 2-1: User Access Rights

Privilege	Root	User+	User
Configuration	Yes	Read-only	Read-only
Network Monitoring	Yes	Read-only	Read-only
Community Strings and Trap Stations	Yes	Read-only	Read-only
Update Firmware and Configuration Files	Yes	No	No
System Utilities	Yes	Ping-only	Ping-only
Factory Reset	Yes	No	No
Reboot Switch	Yes	Yes	No
Add/Update/Delete User Accounts	Yes	No	No
View User Accounts	Yes	No	No

Manually Configuring a GbE Interconnect Switch

A GbE Interconnect Switch can be configured manually using a local console interface, a remote Telnet console interface, a command line interface, a Web interface, or an SNMP interface. Refer to the management interface reference guides for information on how to use these management interfaces to configure the GbE Interconnect Switch.

After a GbE Interconnect Switch is configured, you can back up the configuration as a binary file to a TFTP server. The backup configuration file can then be downloaded from the TFTP server to restore the switch back to the original configuration. This restoration may be necessary under one of the following conditions:

- The switch configuration becomes corrupted during operation.
- The switch must be replaced because of a hardware failure.

Configuring Multiple GbE Interconnect Switches

You can configure multiple GbE Interconnect Switches by using scripted Command Line Interface (CLI) commands through Telnet or by downloading a configuration file using a TFTP server.

Using Scripted CLI Commands through Telnet

The CLI, provided with the GbE Interconnect Switch, allows you to execute customized configuration scripts on multiple switches. A configuration script can be tailored to one of the multiple switches, and then that configuration can be deployed to other switches from a central deployment server.

Using a Configuration File

If you plan for the base configuration of multiple switches in your network to be the same, you can manually configure one GbE Interconnect Switch, upload the configuration to a TFTP server, and use that configuration as a base configuration template file. This base configuration file can then be downloaded to multiple GbE Interconnect Switches.

Small configuration changes can be pushed out to multiple GbE Interconnect Switches by creating a configuration file with just the configuration items desired. The configuration file can be downloaded to each GbE Interconnect Switch needing the change. Appendix I, XML Configuration, for additional information regarding the XML configuration file.

GbE Interconnect Switch IP addresses are acquired by default using DHCP, therefore, each GbE Interconnect Switch has a unique IP address. Each GbE Interconnect Switch can be remotely accessed from a central deployment server and an individual interconnect switch configuration can be downloaded to meet specific network requirements. Refer to the management interface reference guides for additional information on using a TFTP server to upload and download configuration files.

Cabling the GbE Interconnect Switch

After installing the GbE Interconnect Switch hardware and planning the configuration, cable the GbE Interconnect Switch to your network.

IMPORTANT: If you are replacing an existing GbE Interconnect Switch or upgrading from an RJ-45 Patch Panel, and have strict security requirements:

- Do not cable the GbE Interconnect Switch until after configuration.

Or

- Connect the GbE Interconnect Switch to the optional Diagnostic Station. The Diagnostic Station enables you to power up, configure, and diagnose a ProLiant p-Class server blade or a ProLiant p-Class GbE Interconnect Switch outside of the rack environment.

To connect the interconnect modules to the network:

1. Connect your network cables to the interconnect modules. For connector locations, refer to the section "QuadT Interconnect Module Panel" or "DualTSX Interconnect Module Panel" in Chapter 1.
2. Gather your network cables for the right side of the rack.
3. Insert the end of the cable retaining bracket (provided with the bus bar and power bus boxes) into the cable bracket (1).
4. Tighten the thumbscrew to secure the cable retaining bracket over the cables (2).

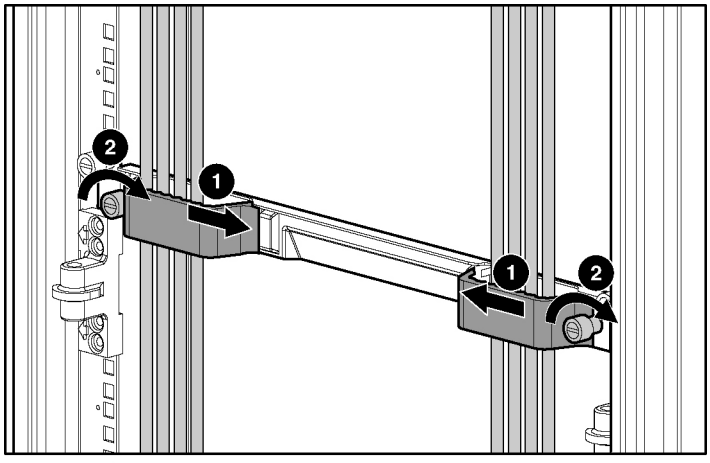


Figure 2-3: Installing the cable-retaining bracket

5. Repeat steps 2 through 4 for the network cables on the left side of the rack.

Powering Up the GbE Interconnect Switch

If the server blade enclosure has power applied, the GbE Interconnect Switch automatically begins to power up when installed. The power status LED on the front of the GbE Interconnect Switch starts out as amber to indicate that power is connected to the GbE Interconnect Switch. After a few seconds, the power status LED turns to green to indicate that the GbE Interconnect Switch is powered up. After the built in self-test flashes all LEDs, the active links are illuminated and the power status LED stays green.

You can manually force the GbE Interconnect Switch to power up by pressing the **Pwr/Rst** button through the access hole in the front panel of the GbE Interconnect Switch while the power status LED is amber. HP recommends using a small blunt object for this purpose.

CAUTION: Pressing the **Pwr/Rst** button while the power status LED is green will reset the GbE Interconnect Switch.

IMPORTANT: If the server blade enclosure does not have power applied, refer to the System Setup and Installation Guide for the server blade enclosure.

Accessing the GbE Interconnect Switch

The GbE Interconnect Switch can be accessed using the serial (DB-9) management port or an Ethernet connection.

- To access the GbE Interconnect Switch locally, use the front panel serial management port.
- To access the GbE Interconnect Switch through an Ethernet connection, use either the GbE Interconnect Switch front panel RJ-45 ports or one of the following:
  - The uplink RJ-45 ports in the QuadT Interconnect Module
  - The uplink LC or RJ-45 ports in the DualTSX Interconnect Module

To access the GbE Interconnect Switch via an Ethernet connection, you need to assign it an IP address. By default, the GbE Interconnect Switch is set up to obtain its IP address from a DHCP server existing on the attached network.

To access the GbE Interconnect Switch remotely:

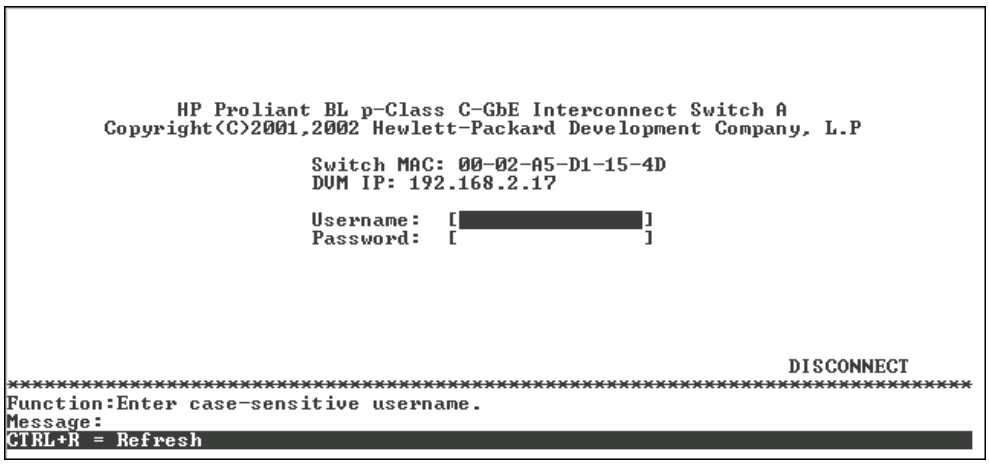
1. Go to the DHCP server and use the GbE Interconnect Switch MAC address to obtain the switch IP address. The MAC address is printed on the MAC address label attached to the GbE Interconnect Switch.
2. From a computer connected to the same network, access the GbE Interconnect Switch using a Web browser or Telnet application. Use the switch IP address obtained in step 1 to access the switch using the Web or console interface. The GbE Interconnect Switch logon screen is displayed.

If the GbE Interconnect Switch does not obtain the IP address assigned by means of the DHCP service, you can access the IP address locally by using the following instructions. After assigning the IP address to the switch, you can then access the switch remotely.

To access the GbE Interconnect Switch locally:

1. Connect the GbE Interconnect Switch DB-9 serial connector, using the null-modem serial cable (provided with the following option kits: Scalable Busbar, Mini Busbar, and Power Bus Box), to a local client device (such as a laptop computer) with VT100 terminal emulation software (such as Microsoft® Windows® HyperTerminal).

2. Open a VT100 terminal emulation session with the following settings: **9600 baud rate, eight data bits, no parity,** and **one stop bit.** The GbE Interconnect Switch logon screen is displayed.

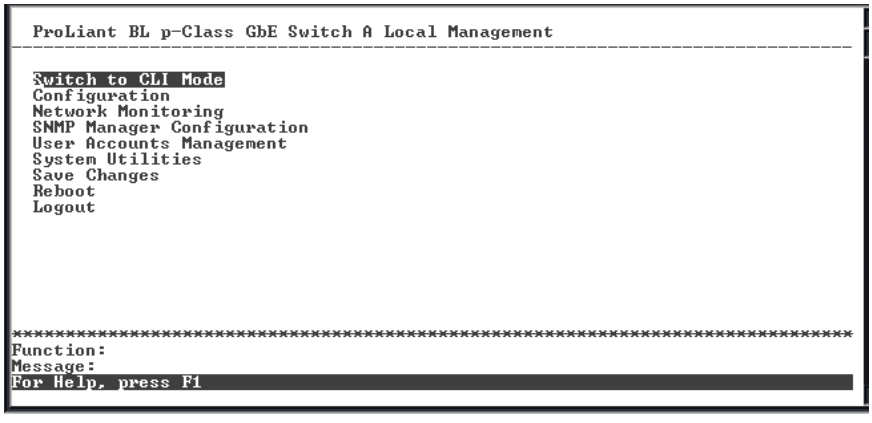


Logging On and Configuring the GbE Interconnect Switch

NOTE: The GbE Interconnect Switch logon screen does not have any initial user names or passwords set.

On the GbE Interconnect Switch logon screen:

1. Leave the **User name** field blank, and press the **Tab** key.
2. Leave the **Password** field blank, and press the **Enter** key. The main menu is displayed.



3. Perform the following recommended tasks from the main menu:
   a. Set up users, passwords, and access privileges.
   b. Change default SNMP community strings for read-write and read-only.
   c. Set up network configurations including the IP address (if required). After you configure the IP address, the GbE Interconnect Switch can be accessed using Telnet, SNMP, or a Web browser.

Refer to the command line interface and menu-driven interface reference guides for information on how to configure the IP address, change configuration settings, and monitor switch operation using one of the following:

- Local RS-232 serial console management interface
- Remote Telnet console management interface

Refer to the Web-based interface reference guide for information on how to use the embedded Web-based (HTML) interface to manage the GbE Interconnect Switch from anywhere on the network using a standard browser, such as Netscape Navigator or Microsoft Internet Explorer.

Appendix F of this guide provides information regarding the SNMP and RMON Agents, along with the MIBs supported. This appendix also describes how to use these MIBs to configure and monitor the GbE Interconnect Switch using a generic SNMP manager, such as HP Openview.

Supporting Software and Special Considerations

The following supporting software is available to assist you in configuring and managing the GbE Interconnect Switch.

- Server Blade and Power Management Module Firmware – Version 1.1—Provides firmware and installation instructions required for proper rack location operation.
- Utilities package and documentation—Provides firmware and installation instructions required for proper rack location operation. The utilities package and documentation are located on the utilities and user documentation CD included in the interconnect kit and at the following website.
- GbE Interconnect Switch Firmware Upgrade Smart Component (for Microsoft Windows only)—Provides quick and easy installation of the GbE Interconnect Switch firmware, firmware upgrade tool, and readme file. A SoftPaq is available for use with Linux operating systems.

The software and the SoftPaq listed above are available at

www.compaq.com/support/servers

A

Regulatory Compliance Notices—ProLiant p-Class C-GbE Interconnect Kit

Class A Equipment

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

Canadian Notice (Avis Canadien)

Class A Equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union Notice

CE

Products bearing the CE marking comply with the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community and if this product has telecommunication functionality, the R&TTE Directive (1999/5/EC).

Compliance with these directives implies conformity to the following European Norms (in parentheses are the equivalent international standards and regulations):

- EN 55022 (CISPR 22)—Electromagnetic Interference
- EN55024 (IEC61000-4-2, 3, 4, 5, 6, 8, 11)—Electromagnetic Immunity
- EN 60950 (IEC 60950)—Product Safety

BSMI Notice

警告使用者：

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Japanese Notice

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

B

Regulatory Compliance Notices—ProLiant BL p-Class F-GbE Interconnect Kit

Class A Equipment

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

Canadian Notice (Avis Canadien)

Class A Equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union Notice

CE

Products bearing the CE marking comply with the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community and if this product has telecommunication functionality, the R&TTE Directive (1999/5/EC).

Compliance with these directives implies conformity to the following European Norms (in parentheses are the equivalent international standards and regulations):

- EN 55022 (CISPR 22)—Electromagnetic Interference
- EN55024 (IEC61000-4-2, 3, 4, 5, 6, 8, 11)—Electromagnetic Immunity
- EN 60950 (IEC 60950)—Product Safety

BSMI Notice

警告使用者：

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Japanese Notice

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Laser Compliance

The fiber optic module contains a laser that is classified as a "Class 1 Laser Product" in accordance with US FDA regulations and the IEC 60825-1. The product does not emit hazardous laser radiation.

WARNING: Use of controls or adjustments or performance of procedures other than those specified herein or in the laser product's installation guide may result in hazardous radiation exposure. To reduce the risk of exposure to hazardous radiation:

- **Do not try to open the module enclosure. There are no user-serviceable components inside.**
- **Do not operate controls, make adjustments, or perform procedures to the laser device other than those specified herein.**
- **Allow only HP Authorized Service technicians to repair the unit.**

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2, 1976. These regulations apply to laser products manufactured from August 1, 1976. Compliance is mandatory for products marketed in the United States. This device is classified as a Class 1 laser product as defined by IEC 60825-1.

C

Technical Specifications

Table C-1: General Specifications

Standards	IEEE 802.1D Spanning Tree
	IEEE 802.1p QoS prioritization
	IEEE 802.1Q VLAN
	IEEE 802.3 10Base-T Ethernet
	IEEE 802.3ab 1000Base-T Ethernet
	IEEE 802.3z 1000Base-SX Ethernet
	IEEE 802.3ac Frame Extensions for VLAN
	IEEE 802.3ad Link Aggregation Protocol (No LACP support)
	IEEE 802.3u 100Base-TX Fast Ethernet
	IEEE 802.3x Full-Duplex Flow Control
	ANSI/IEEE 802.3 Nway Auto-Negotiation
Protocols	CSMA/CD
Data Transfer Rates	
Ethernet	Half-Duplex: 10 Mb/s
	Full-Duplex: 20 Mb/s
Fast Ethernet	Half-Duplex: 100 Mb/s
	Full-Duplex: 200 Mb/s
Gigabit Ethernet	Full-Duplex: 2000 Mb/s
Connectors	
GbE Interconnect Switch	2 RJ-45, 1 DB-9
QuadT Interconnect Module	4 RJ-45
DualTSX Interconnect Module	2 RJ-45, 2 LC fiber

continued

Table C-1: General Specifications *continued*

Network Cables	
10Base-T	Two Pair UTP Category 3,4,5 (100 m) EIA/TIA-568 100-ohm STP (100 m)
100Base-TX	Two Pair or Four Pair UTP Category 5 (100 m) EIA/TIA-568 100-ohm STP (100 m)
1000Base-T	Four Pair UTP Category 5e (100 m) EIA/TIA-568 100-ohm STP (100 m)
1000Base-SX	50/125 μm Multimode Fiber with 400 MHz/Km rating has a maximum distance of 500 meters. 50/125 μm Multimode Fiber with 500 MHz/Km rating has a maximum distance of 550 meters. 62.5/125 μm Multimode Fiber with 160 MHz/Km rating has a maximum distance of 220 meters. 62.5/125 μm Multimode Fiber with 200 MHz/Km rating has a maximum distance of 275 meters.
Number of Ports per GbE Interconnect Switch	16 x 10/100-Mb/s Nway Ports dedicated to server blade for GbE Interconnect Switch communications 2 x 10/100-Mb/s Nway Ports dedicated to communications between GbE Interconnect Switches A and B 2 x 10Base-T/100Base-TX/1000Base-T uplink Ethernet ports or 2 1000Base-SX uplink Ethernet ports (depending on C-GbE or F-GbE kit options) 2 x 10Base-T/100Base-TX uplink Ethernet ports 2 x 10Base-T/100Base-TX front-panel management ports, or additional uplink ports 1 x serial RS232 front-panel management port

Table C-2: Physical and Environmental Specifications

DC Inputs	-48V: 1050 mA maximum per GbE Interconnect Switch
Power Consumption	50W maximum per GbE Interconnect Switch
Operating Temperature	10 to 35 degrees Celsius
Storage Temperature	-30 to 60 degrees Celsius
Operating Humidity	20% to 80% RH noncondensing
Storage Humidity	5% to 95% RH noncondensing
GbE Interconnect Switch Dimensions	28.0 in. x 10.4 in. x 1.6 in.
Interconnect Module Dimensions	7.4 in. x 3.5 in. x 1.6 in.
Weight	11.5 lb (GbE Interconnect Switch and Interconnect Module)
EMI	FCC Class A ICES-003 Class A AS/NZS 3548 Class A VCCI Class A
Safety	UL/CUL Listed Accessory CE

Table C-3: Performance Specifications

Transmission Method	Store-and-forward
Memory	32MB Main, 8MB flash, and 16MB packet buffer per GbE Interconnect Switch
Filtering Address Table	8K per GbE Interconnect Switch
Packet Filtering/Forwarding Rate	Full-wire speed for all connections 148,809.5 pps per port (for 100 Mb/s) per GbE Interconnect Switch 1,488,095 pps per port (for 1000 Mb/s) per GbE Interconnect Switch
MAC Address Learning	Automatic update
Forwarding Table Age Time	Maximum age: 10 to 9999 seconds Default: 300 seconds
Maximum Number of VLANs	255 (including default VLAN plus user configurable and/or dynamic registered), per GbE Interconnect Switch

D

Runtime Switching Software Default Settings

This section provides the default settings for the GbE Interconnect Switch:

- Table D-1 contains general default settings for both Switch A and Switch B
- Table D-2 contains Port Names, VLANs, STP/ByPass, Trunking Default Settings for Switch A
- Table D-3 contains Port Names, VLANs, STP/ByPass, Trunking Default Settings for Switch B

Switch A and Switch B: General Default Settings

Switch A and Switch B are configured with the following general default settings:

Table D-1: Switch A and Switch B: General Default Settings

Setting	Value
User Name	None
Password	None
DHCP Service	Enabled
BootP Service	Disabled
IP Address (if manual IP option is selected)	Switch A = 10.90.90.90 Switch B = 10.90.90.91
Subnet Mask (if manual IP option is selected)	255.0.0.0
Default Gateway (if manual IP option is selected)	0.0.0.0
Management VID	1
System Name	None
System Location	None
System Contact	None
Auto Logout	10 minutes
MAC Address Aging Time	300 seconds

continued

Table D-1: Switch A and Switch B: General Default Settings *continued*

Setting	Value
IGMP Snooping—Globally	Disabled
Switch GVRP	Disabled
Telnet Status	Enabled
Web Status	Enabled
Telnet/RS232 Interface	Menu
Group Address Filter Mode	Forward all unregistered
Scheduling Mechanism for CoS Queues	Strict
Trunk Load Sharing Algorithm	Src Address
Backpressure	Disabled
Port State	Enabled
Port Speed/Duplex	Auto
Flow Control	Off
Setup Restart Ingress Bandwidth	None
Setup Restart Egress Bandwidth	None
Switch STP	Enabled
Bridge Max Age	20 seconds
Bridge Hello Time	2 seconds
Bridge Forward Delay	15 seconds
Bridge Priority	32768
Port Priority	128
Port Cost	19 for ports 1-20 and 20-24 4 for ports 21-22
Static Unicast Filtering Table	None
Static Multicast Filtering Table	None
Static VLAN Entry	Default VLAN (VID = 1)
Port VID	1
Port Ingress Rule Filtering	Off
Port GVRP Setting	Off
IGMP Snooping—VLAN ID	1
IGMP Snooping—State	Enabled
IGMP Snooping—Querier State	Non-querier
IGMP Snooping—Robustness Variable	2
IGMP Snooping—Query Interval	125 seconds
IGMP Snooping—Max Response	10 seconds

continued

Table D-1: Switch A and Switch B: General Default Settings *continued*

Setting	Value
Port Trunking	Xconnect (Port 17–18)
Port Mirroring—Source Port	1
Port Mirroring—Source Direction	Either (ingress and egress)
Port Mirroring—Target Port	11
Port Mirroring—Mirror Status	Disabled
Broadcast Storm Monitoring	Disabled
Multicast Storm Monitoring	Disabled
DA Unknown Storm Monitoring	Disabled
Storm Threshold	500 packets/second
Class of Service—Max Packets	10
Class of Service—Max Latency	0
Default Port Priority	0
Class of Traffic	• Priority 0, 1: Class 0 • Priority 2, 3: Class 1 • Priority 4, 5: Class 2 • Priority 6, 7: Class 3
Port Security—Admin State	Disabled
Port Security—Max Address	1
Port Security—Mode	DeleteOnReset
Priority MAC Address	None
SNMP Community String	• public • private
SNMP Community String Access Right	• public = read-only • private = read/write
SNMP Trap Manager IP	None
Security IP	0.0.0.0
User Account	None
TFTP Local IP Address	0.0.0.0
TFTP Port Number	69
Firmware Update	File name = none

continued

Table D-1: Switch A and Switch B: General Default Settings *continued*

Setting	Value
Configuration File on TFTP Server	File name = none
Save Setting to TFTP Server	File name = none
Save History Log to TFTP Server	File name = none
PING Test	Target address = Undefined Repeat = Infinite
Serial Port	Console (RS-232)
SLIP	Disabled Local address = 0.0.0.0 Remote address = 0.0.0.0
MTU	1006
Serial Port Baud Rate	9600
Data Bit	8
Parity Bit	None
Stop Bit	1
VLAN Mode	IEEE 802.1Q
SNTP	Disabled
SNTP Server 1	0.0.0.0
SNTP Server 2	0.0.0.0
SNTP Poll Interval	720 seconds
Time Zone	-06.00
Daylight Saving Time (DST)	Disabled
Offset in Minutes	60
Boot Time	0 days 00 :00 :00
Current Time (System Uptime)	Unknown (based on the elapsed time since boot)
Time Source	System Clock

Switch A: Port Names, VLANs, STP/ByPass, Trunking Default Settings

IMPORTANT: If you have the ProLiant BL p-Class F-GbE Interconnect Kit option with the DualTSX Interconnect Modules, the management interface supports only 1000M/Full and Auto options for the Speed/Duplex fields for Gigabit uplink ports. The fiber DualTSX Interconnect Module supports **only 1000-Mb/s (Gigabit) speed**, and **not** 10-Mb/s or 100-Mb/s.

Switch A is configured with the following factory default settings for Port Names, VLANs, STP/ByPass, and Trunking.

Table D-2: Switch A: Port Names, VLANs, STP/ByPass, Trunking Default Settings

Port Type	UI Port No.	Speed	VID	VLAN Member AS	VLAN Name	Port Name	STP/ ByPass Enabled	Port Trunk
Server	1	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server1_Port1	Yes	
Server	2	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server1_Port2	Yes	
Server	3	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server2_Port1	Yes	
Server	4	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server2_Port2	Yes	
Server	5	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server3_Port1	Yes	
Server	6	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server3_Port2	Yes	
Server	7	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server4_Port1	Yes	
Server	8	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server4_Port2	Yes	
Server	9	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server5_Port1	Yes	
Server	10	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server5_Port2	Yes	
Server	11	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server6_Port1	Yes	
Server	12	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server6_Port2	Yes	
Server	13	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server7_Port1	Yes	
Server	14	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server7_Port2	Yes	

continued

Table D-2: Switch A: Port Names, VLANs, STP/ByPass, Trunking Default Settings *continued*

Port Type	UI Port No.	Speed	VID	VLAN Member AS	VLAN Name	Port Name	STP/ ByPass Enabled	Port Trunk
Server	15	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server8_Port1	Yes	
Server	16	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server8_Port2	Yes	
X-Connect	17	10/100 (Auto)	1	Egress	DEFAULT_VLAN	XConnect_1	No	XConnect
X-Connect	18	10/100 (Auto)	1	Egress	DEFAULT_VLAN	XConnect_2	No	XConnect
M Uplink	19	10/100 (Auto)	1	Egress	DEFAULT_VLAN	U1_Port_19	No	
M Uplink	20	10/100 (Auto)	1	Egress	DEFAULT_VLAN	U1_Port_20	No	
D Uplink	21	10/100 /1000 (Auto)	1	Egress	DEFAULT_VLAN	U2_Port_21	No	
D Uplink	22	10/100 /1000 (Auto)	1	Egress	DEFAULT_VLAN	U2_Port_22	No	
Front Panel	23	10/100 (Auto)	1	Egress	DEFAULT_VLAN	FrontPanel1	No	
Front Panel	24	10/100 (Auto)	1	Egress	DEFAULT_VLAN	FrontPanel2	No	

Switch B: Port Names, VLANs, STP/ByPass, Trunking Default Settings

IMPORTANT: If you have the ProLiant BL p-Class F-GbE Interconnect Kit option with the DualTSX Interconnect Modules, the management interface supports only 1000M/Full and Auto options for the Speed/Duplex fields for Gigabit uplink ports. The fiber DualTSX Interconnect Module supports **only 1000-Mb/s (Gigabit) speed**, and **not** 10-Mb/s or 100-Mb/s.

Switch B is configured with the following factory default settings for Port Names, VLANs, STP/ByPass, and Trunking.

Table D-3: Switch B: Port Names, VLANs, STP/ByPass, Trunking Default Settings

Port Type	UI Port No.	Speed	VID	VLAN Member AS	VLAN Name	Port Name	STP/ ByPass Enabled	Port Trunk
Server	1	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server1_iLO	Yes	
Server	2	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server1_Port3	Yes	
Server	3	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server2_iLO	Yes	
Server	4	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server2_Port3	Yes	
Server	5	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server3_iLO	Yes	
Server	6	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server3_Port3	Yes	
Server	7	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server4_iLO	Yes	
Server	8	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server4_Port3	Yes	
Server	9	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server5_iLO	Yes	
Server	10	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server5_Port3	Yes	
Server	11	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server6_iLO	Yes	
Server	12	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server6_Port3	Yes	
Server	13	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server7_iLO	Yes	

continued

Table D-3: Switch B: Port Names, VLANs, STP/ByPass, Trunking Default Settings *continued*

Port Type	UI Port No.	Speed	VID	VLAN Member AS	VLAN Name	Port Name	STP/By Pass Enabled	Port Trunk
Server	14	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server7_Port3	Yes	
Server	15	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server8_iLO	Yes	
Server	16	10/100 (Auto)	1	Egress	DEFAULT_VLAN	Server8_Port3	Yes	
X-Connect	17	10/100 (Auto)	1	Egress	DEFAULT_VLAN	XConnect_1	No	XConnect
X-Connect	18	10/100 (Auto)	1	Egress	DEFAULT_VLAN	XConnect_2	No	XConnect
M Uplink	19	10/100 (Auto)	1	Egress	DEFAULT_VLAN	U1_Port_19	No	
M Uplink	20	10/100 (Auto)	1	Egress	DEFAULT_VLAN	U1_Port_20	No	
D Uplink	21	10/100 /1000 (Auto)	1	Egress	DEFAULT_VLAN	U2_Port_21	No	
D Uplink	22	10/100 /1000 (Auto)	1	Egress	DEFAULT_VLAN	U2_Port_22	No	
Front Panel	23	10/100 (Auto)	1	Egress	DEFAULT_VLAN	FrontPanel1	No	
Front Panel	24	10/100 (Auto)	1	Egress	DEFAULT_VLAN	FrontPanel2	No	

IMPORTANT: By default, the processor port is assigned to DEFAULT_VLAN. XConnect1 and XConnect2 between GbE Interconnect Switch A and GbE Interconnect Switch B are bundled in to a Port Trunk.

E

Spanning Tree Protocol

Introduction

When Spanning Tree Protocol (STP) determines that a port should be transitioned to the forwarding state, the following occurs:

- The port is put into the listening state where it receives Bridge Protocol Data Units (BPDUs) and passes them to the processor of the GbE Interconnect Switch.
- If no BPDUs that suggest the port should go to the blocking state are received, the BPDU packets from the processor are processed.
  - — The port waits for the expiration of the forward delay timer. The port then moves to the learning state.
  - — In the learning state, the port learns station location information from the source addresses of packets and adds this information to its forwarding database.
  - — The expiration of the forwarding delay timer moves the port to the forwarding state, where both learning and forwarding are enabled. At this point, the port forwards packets.

Blocking State

A port in the blocking state does not forward packets. When the switch is booted, a BPDU is sent to each port in the switch putting these ports into the blocking state.

A switch initially assumes it is the root switch for a network. When the switch begins to exchange BPDUs with other switches, the switch that is the best choice for the root switch is determined. If there is only one switch on the network, no BPDU exchange occurs, the forward delay timer expires, and the ports move to the listening state. All STP-enabled ports enter the blocking state following switch boot.

A port in the blocking state:

- Discards packets received from the network segment to which it is attached.
- Discards packets sent from another port on the switch for forwarding.
- Does not add addresses to its forwarding database.
- Receives BPDUs and directs them to the processor.

- Does not transmit BPDUs received from the processor.
- Receives and responds to network management messages.

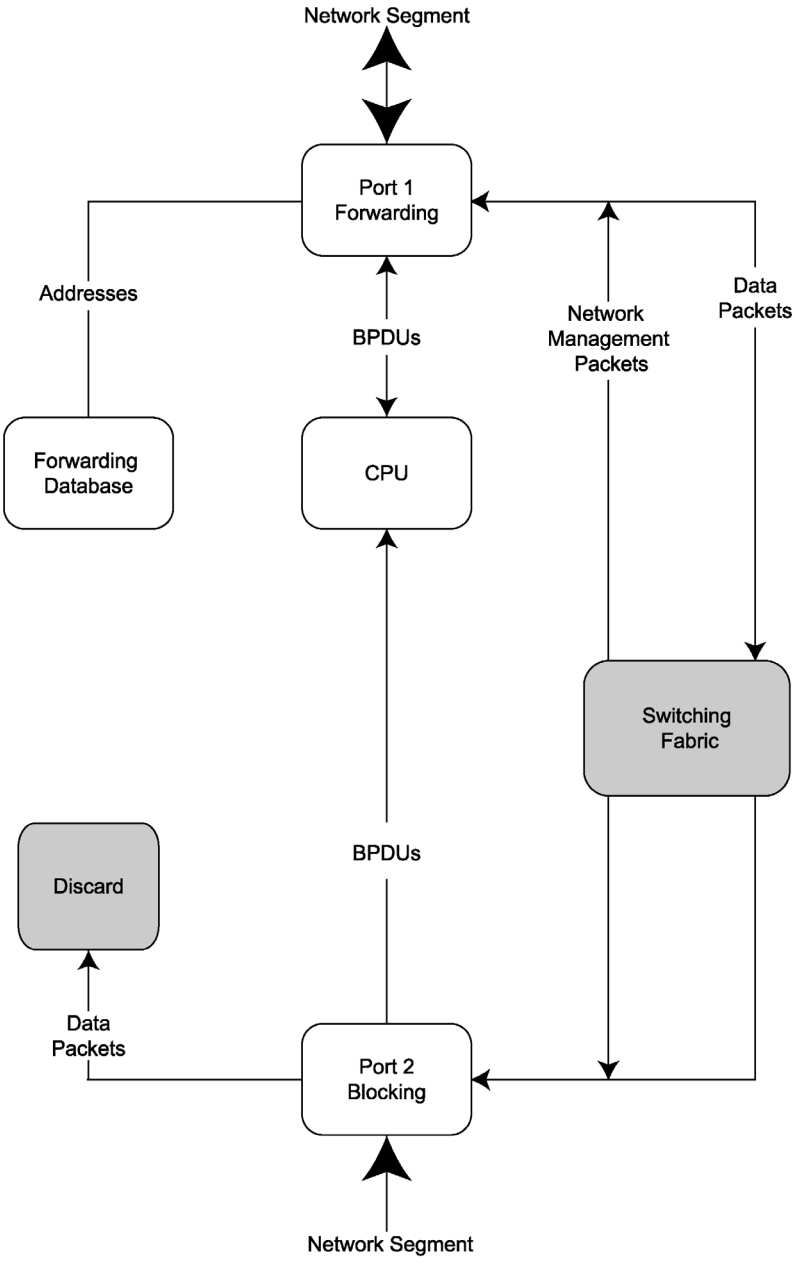


Figure E-1: Blocking state

Listening State

The listening state is the first transition for a port from the blocking state. Listening is an opportunity for the switch to receive BPDUs that may tell the switch that the port should not continue to transition to the forwarding state, but should return to the blocking state (that is, a different port is a better choice).

There is no address learning or packet forwarding from a port in the listening state.

A port in the listening state:

- Discards frames received from the network segment to which it is attached.
- Discards packets sent from another port on the switch for forwarding.
- Does not add addresses to its forwarding database.
- Receives BPDUs and directs them to the processor.
- Processes BPDUs received from the processor.
- Receives and responds to network management messages.

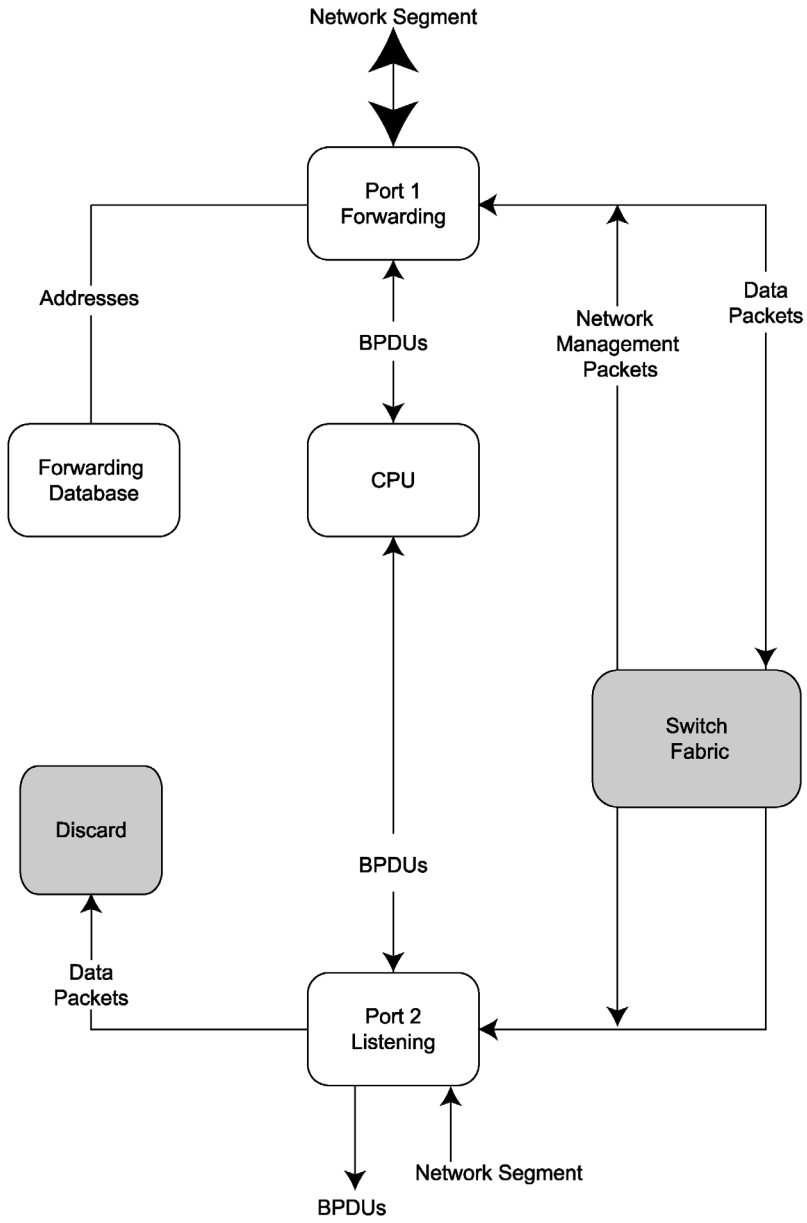


Figure E-2: Listening state

Learning State

A port in the learning state prepares to participate in frame forwarding. The port enters the learning state from the listening state.

A port in the learning state:

- Discards frames received from the network segment to which it is attached.
- Discards packets sent from another port on the switch for forwarding.

- Adds addresses to its forwarding database.
- Receives BPDUs and directs them to the processor.
- Processes and transmits BPDUs received from the processor.
- Receives and responds to network management messages.

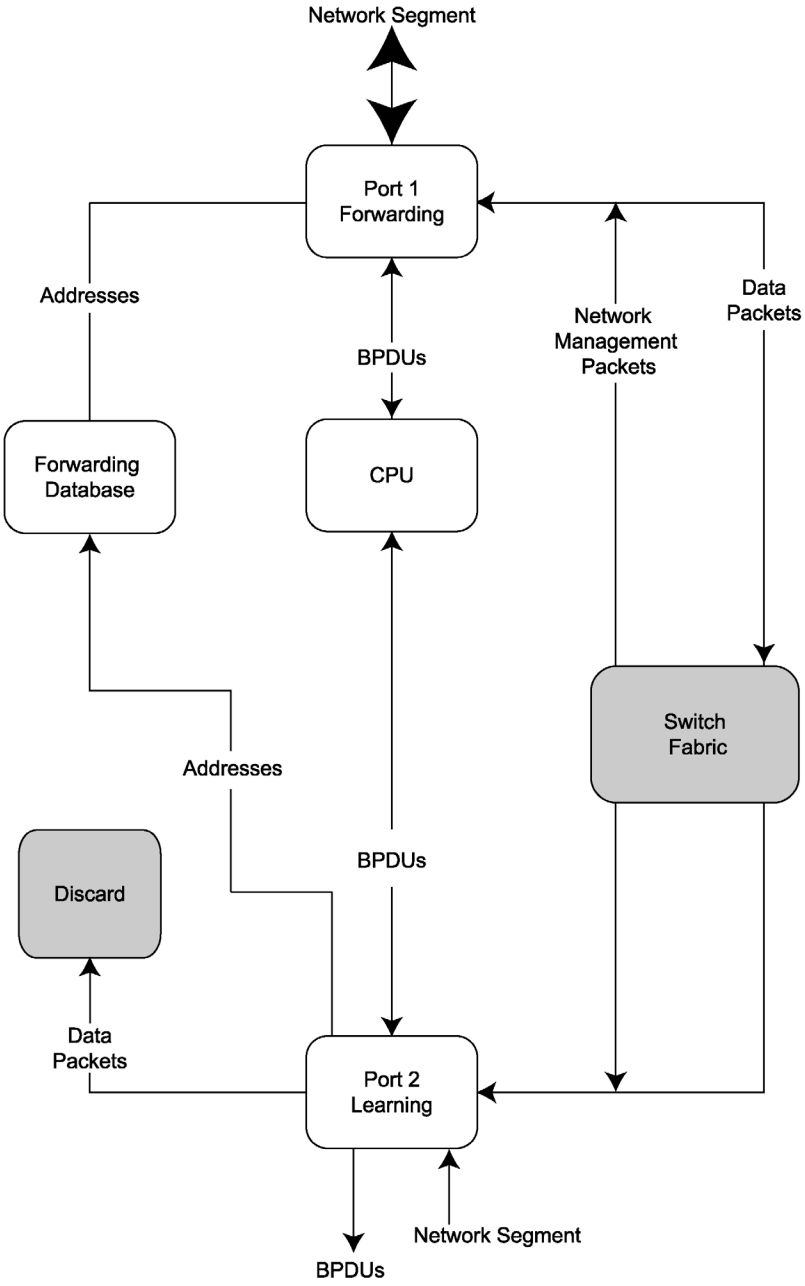


Figure E-3: Learning state

Forwarding State

A port in the forwarding state forwards packets. The port enters the forwarding state from the learning state when the forward delay timer expires.

A port in the forwarding state:

- Forwards packets received from the network segment to which it is attached.
- Forwards packets sent from another port on the switch.
- Incorporates station location information into its address database.
- Receives BPDUs and directs them to the system processor.
- Receives and responds to network management messages.

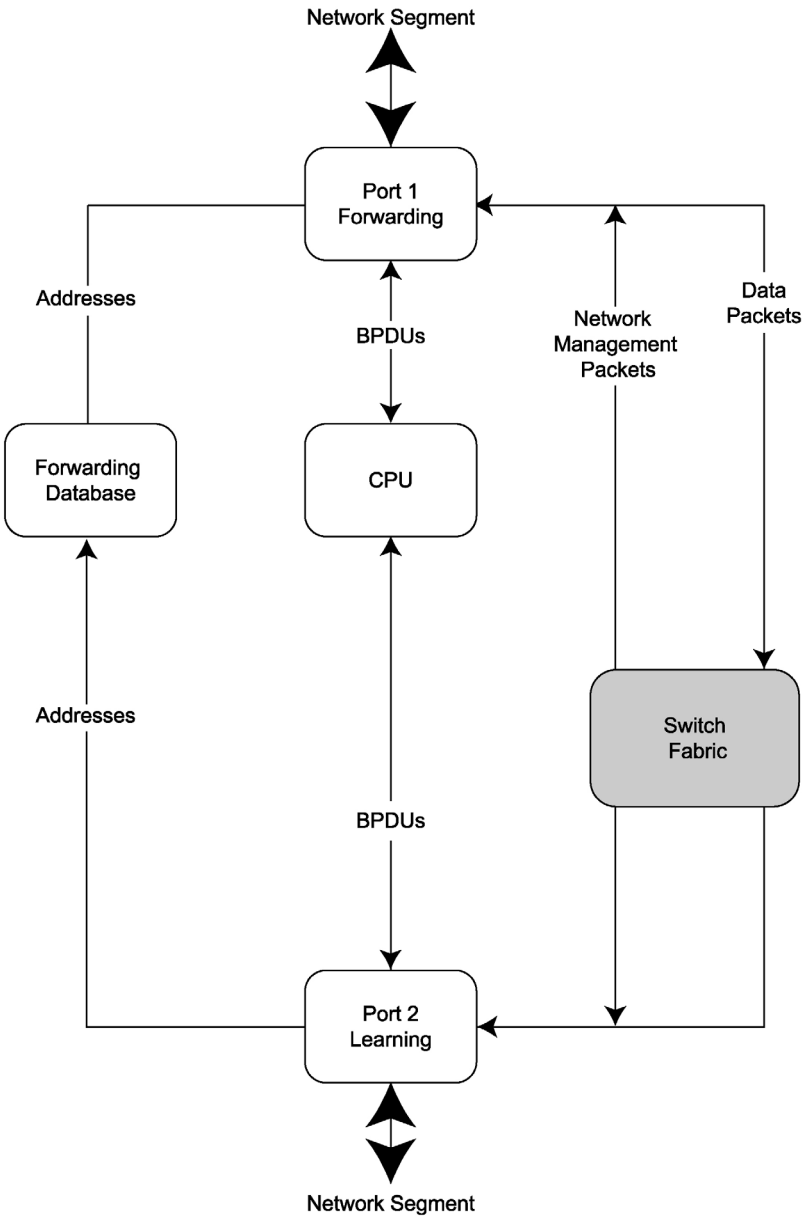


Figure E-4: Forwarding state

Disabled State

A port in the disabled state does not participate in frame forwarding or STP. A port in the disabled state is virtually nonoperational.

A disabled port:

- Discards packets received from the network segment to which it is attached.
- Discards packets sent from another port on the switch for forwarding.

- Does not add addresses to its forwarding database.
- Receives BPDUs, but does not direct them to the system processor.
- Does not receive BPDUs for transmission from the system processor.
- Receives and responds to network management messages.

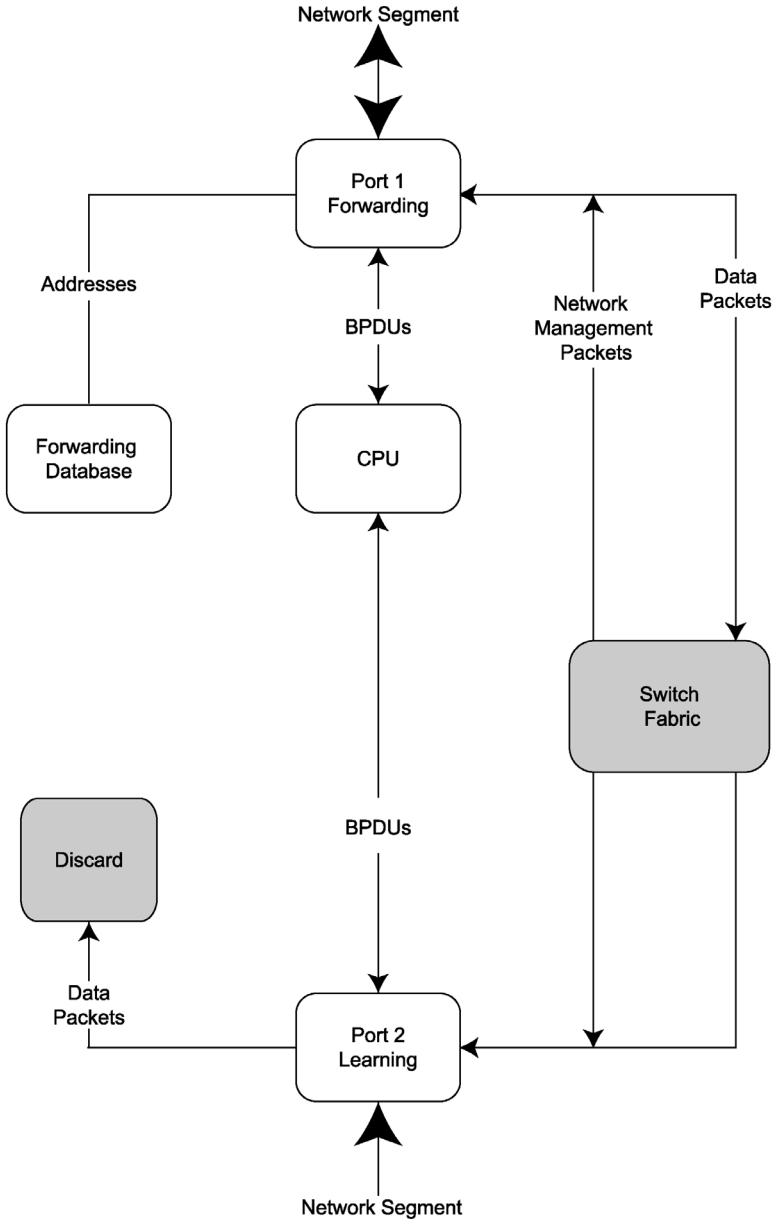


Figure E-5: Disabled state

Troubleshooting STP

This section describes several troubleshooting tips.

Spanning Tree Protocol Failure

A failure in STP generally leads to a bridging loop. A bridging loop in an STP environment comes from a port that should be in the blocking state, but is forwarding packets.

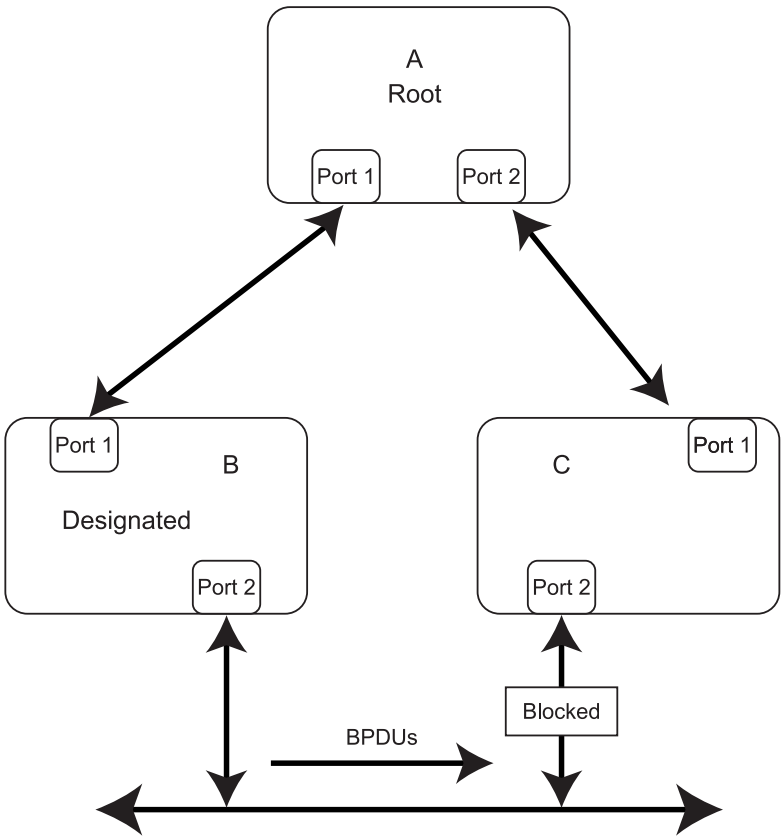


Figure E-6: Example of Spanning Tree Protocol failure

In the example, switch B has been elected as the designated bridge, and port 2 on switch C is in the blocking state. The election of switch B as the designated bridge is determined by the exchange of BPDUs between switches B and C. Switch B continues sending BPDUs advertising its superiority over the other bridges on the LAN. If switch C fails to receive these BPDUs for longer than the max age (default of 20 seconds), it could start to transition its port 2 from the blocking state to the forwarding state.

IMPORTANT: A port must continue to receive BPDUs advertising superior paths to remain in the blocking state.

There are a number of circumstances in which STP can fail, mostly related to the loss of a large number of BPDUs. These situations will cause a port in the blocking state to transition to the forwarding state.

Full/Half Duplex Mismatch

A mismatch in the duplex state of two ports is a very common configuration error for a point-to-point link. If one port is configured as full-duplex, and the other port is left in auto-negotiation mode, the second port will end up in half-duplex because ports configured as half- or full-duplex do not negotiate.

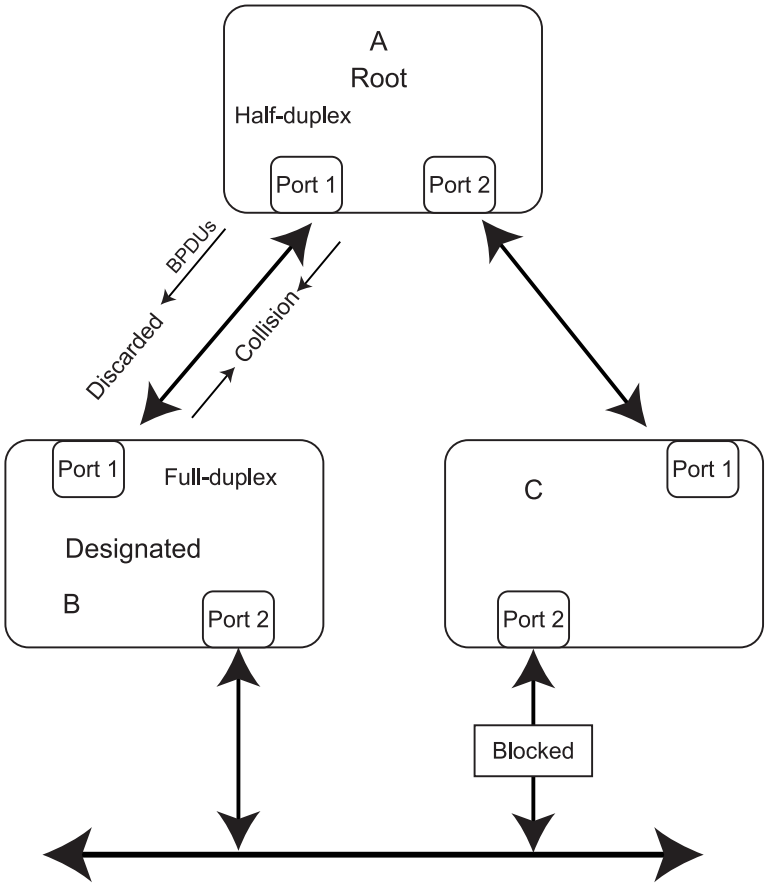


Figure E-7: Example of full- and half-duplex mismatch

In the example, port 1 on switch B is configured as a full-duplex port, and port 1 on switch A is either configured as a half-duplex port or left in auto-negotiation mode. Because port 1 on switch B is configured as a full-duplex port, it does not perform carrier sense when accessing the link. Switch B will then start sending packets even if switch A is using the link. Switch A will then detect collisions and begin to run the flow control algorithm. If there is enough traffic between switches B and A, all packets (including BPDUs) will be dropped. If the BPDUs sent from switch A to switch B are dropped for longer than the max age, switch B will lose its connection to the root (switch A) and will unblock its connection to switch C. This will lead to a data loop.

Unidirectional Link

Unidirectional links can be caused by an undetected failure in one side of a fiber cable or a problem with the transceiver of a port. Any failure that allows a link to remain operational while providing one-way communication is very dangerous for STP.

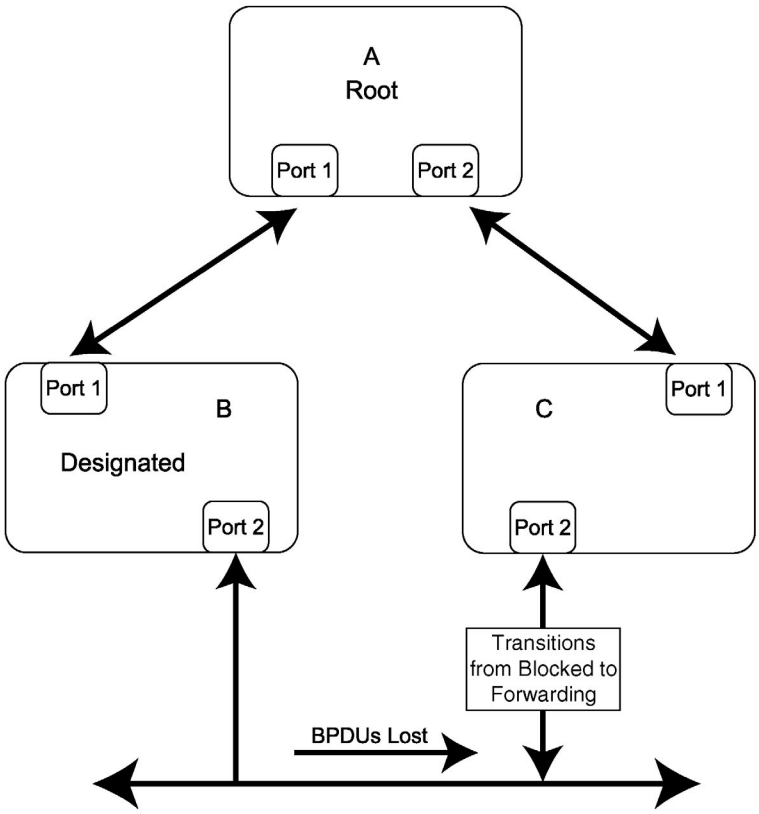


Figure E-8: Example of unidirectional link

In this example, port 2 on switch B can receive but not transmit packets. Port 2 on switch C should be in the blocking state, but because it can no longer receive BPDUs from port 2 on switch B, it will transition to the forwarding state. If the failure exists at boot, STP will not converge and rebooting the bridges will have no effect.

This type of failure is difficult to detect because the link-state LEDs for Ethernet links rely on the transmit side of the cable to detect a link. If a unidirectional failure on a link is suspected, you must go to the console or other management software and look at the packets received and transmitted for the port. For example, a unidirectional port will have many packets transmitted but none received, or vice versa.

Packet Corruption

Packet corruption can also lead to Spanning Tree Protocol failure. If a link is experiencing a high rate of physical errors, a large number of consecutive BPDUs can be dropped. If the BPDUs are dropped for 50 seconds (at the default setting) a port in the blocking state would transition to the forwarding state. If the max age is set too low, the transition time is reduced.

Resource Errors

The ProLiant BL p-Class GbE Interconnect Switch performs its switching and routing functions primarily in hardware, using specialized ASICs. STP is implemented in software so it relies on the speed of the processor and other factors in order to converge. If the processor is overutilized, the BPDUs may not be sent in a timely fashion. STP generally is not processor intensive and is given priority over other processes, so this type of error is rare.

Very low values for the max age and the forward delay can result in an unstable spanning tree. The loss of BPDUs can lead to data loops.

The diameter of the network can also cause problems. The default values for STP give a maximum network diameter of seven hops. This means that two switches in the network cannot be more than seven hops apart. Part of this diameter restriction is the BPDU age field. As BPDUs are propagated from the root bridge to the leaves of the spanning tree, each bridge increments the age field. When this field is beyond the maximum age, the packet is discarded. For large diameter networks, STP convergence can be very slow.

Identifying a Data Loop

Broadcast storms have a similar effect on the network to data loops, but broadcast storm controls in modern switches (along with subnetting and other network practices) have been very effective in controlling broadcast storms. The best way to determine if a data loop exists is to capture traffic on a saturated link and check if similar packets are seen multiple times.

Generally, if all the users of a given domain are having trouble connecting to the network at the same time, a data loop can be suspected. The port utilization data in the console of the switch will show unusually high values in this case.

The priority for most loop situations is to restore connectivity as soon as possible. The simplest remedy is to manually disable all of the ports that provide redundant links. If time allows, disabling the ports one at a time, and then checking for a restoration of the user's connectivity will identify the link that is causing the problem. Connectivity will be restored immediately after disabling a data loop.

Avoiding Trouble

Following are some tips for avoiding STP network problems.

Know Where the Root Is Located

Although the STP can elect a root bridge, a well-designed network will have an identifiable root for each VLAN. Careful setup of the STP parameters will lead to the selection of the preferred interconnect switch as the root for each VLAN. Redundant links can then be built into the network. STP is well suited to maintaining connectivity in the event of a device failure or removal, but is poorly suited to designing networks.

Know Which Links Are Redundant

Organize the redundant links and tune the port cost parameter of STP to force those ports to be in the blocking state.

For each VLAN, know which ports should be blocked in a stable network. A network diagram that shows each physical loop in the network and the ports that break each loop is extremely helpful.

Minimize the Number of Ports in the Blocking State

A single blocking port transitioning to the forwarding state at an inappropriate time can cause a large part of a network to fail. Limiting the number of blocked ports helps to minimize the risk of an inappropriate transition.

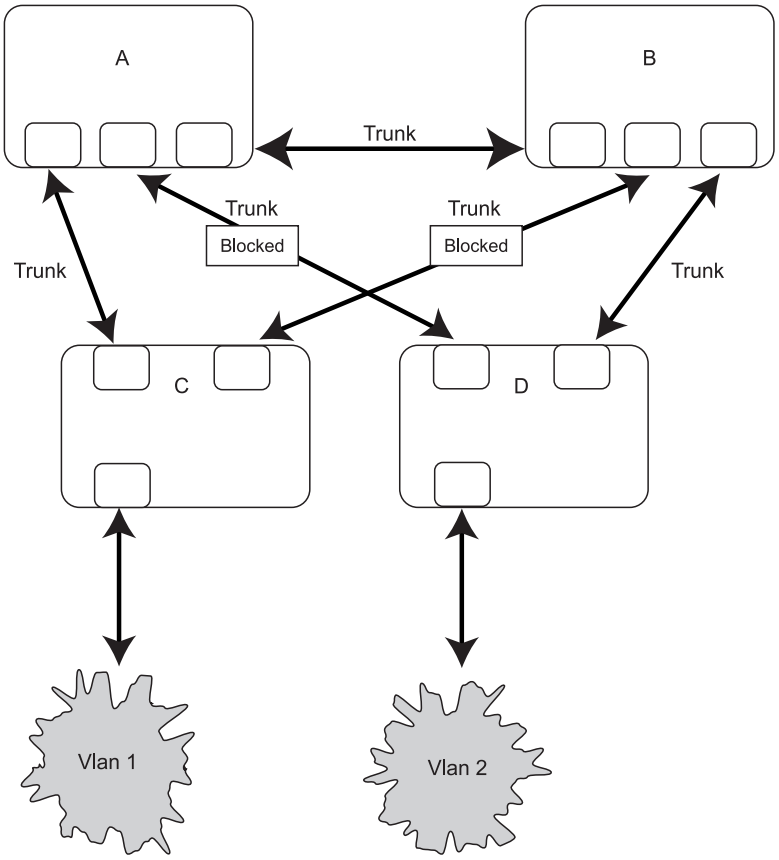


Figure E-9: Common network design example 1

The preceding graphic is an example of a common network design. The switches C and D have redundant links to the backbone switches A and B using trunks. Trunks, by default, carry all the VLAN traffic from VLAN 1 and VLAN 2. So switch C is not only receiving traffic for VLAN 1, but it is also receiving unnecessary broadcast and multicast traffic for VLAN 2. It is also blocking one port for VLAN 2. Thus, there are three redundant paths between switches A and B and two blocked ports per VLAN. This increases the chance of a data loop.

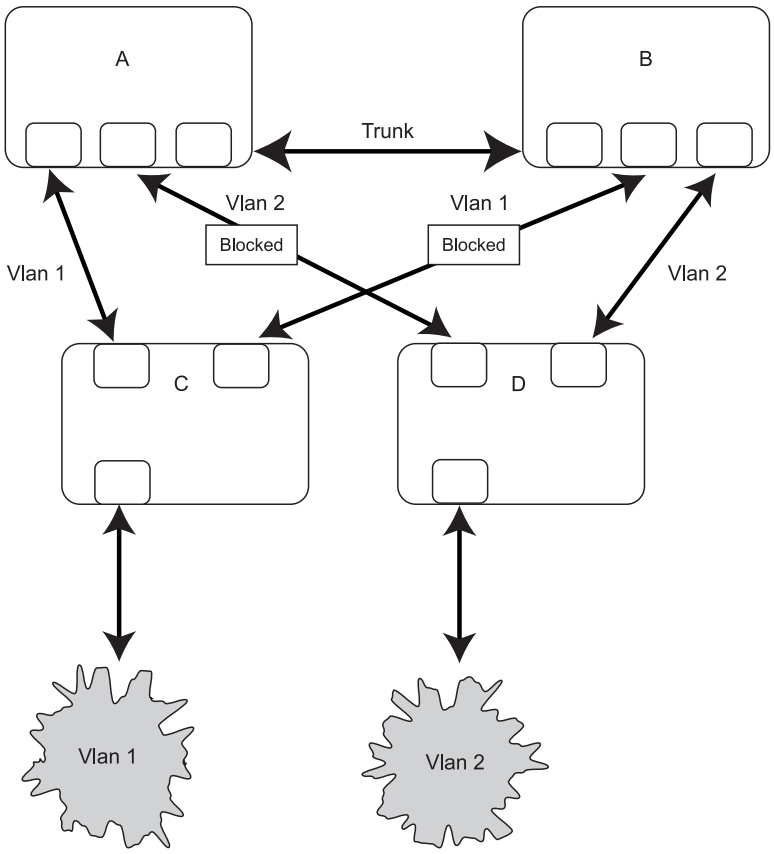


Figure E-10: Common network design example 2

In the second network design example, the VLAN definitions are extended to switches A and B. This configuration has only one blocked port per VLAN and allows the removal of all redundant links by removing switch A or B from the network.

F

SNMP/RMON MIBs Support

Introduction

Management and statistics information is stored in the GbE Interconnect Switch in the Management Information Base (MIB). The GbE Interconnect Switch supports several standard MIBs. Values for MIB objects can be retrieved with any SNMP-based network management software.

In addition to the standard MIBs, the switch also supports its own proprietary enterprise MIB as an extended Management Information Base. The proprietary MIB is retrieved by specifying the MIB Object-Identifier (OID) at the network manager station.

MIB values can be either read-only or read/write variables.

- Read-only MIB variables can be constants that are programmed into the switch or variables that change while the switch is in operation. Examples of read-only constants include the number and types of ports. Examples of read-only variables are the statistics counters, such as the number of errors that have occurred or how many kilobytes of data have been received and forwarded through a port.
- Read/write MIB variables are usually related to user-customized configurations. Examples include the IP address of the switch, Spanning Tree Algorithm parameters, and port status.

SNMP Manager Software

If you use third-party vendor SNMP software to manage the switch, you can access proprietary enterprise MIBs for the switch. The MIBs can be found on the ProLiant BL p-Class GbE Interconnect Switch Management System Utilities and User Documentation CD or with the GbE Interconnect Switch utilities on the following website:

www.compaq.com/support/servers

If your software provides functions to browse or modify MIBs, you can also change the MIB values (if the MIB attributes permit the write operation). This process can be quite involved, however, because you must know the MIB OIDs and retrieve them one by one.

Use an SNMP manager, such as HP OpenView or IBM Tivoli NetView, to access the enterprise-specific MIBs. Compile the MIBs into the MIB database and then use a MIB browser to navigate through them. For detailed information, access the individual descriptions of each MIB or refer to the documentation that came with your SNMP manager software.

Standard MIBs

The SNMP agent for the switch supports the following standard MIBs:

- Bridge MIB (RFC 1493)
- MIB-II (RFC 1213)
- Mini-RMON MIB (RFC 1757)—Groups 1 (Statistics), 2 (History), 3 (Alarm), and 9 (Event)
- 802.1p MIB (RFC 2674)
- 802.1q MIB (RFC 2674)
- Entity MIB (RFC 2737)
- IF-MIB (RFC 2233)
- Ethernet-like MIB (RFC 2358)—dot3StatsTable

Enterprise-Specific MIBs

The SNMP agent for the switch supports the following enterprise-specific MIBs:

- cpqAgent.mib
  - agentBasicInfo—Basic information for the switch
  - agentBasicConfig—Basic configuration management
  - agentIpProtoConfig—IP-related configuration management
  - agentIpTrapManager—Setting of the trap manager IP
- cpql2mgt.mib
  - swPortTrunkPackage—Management of the port trunk function
  - swPortMirrorPackage—Management of the port mirroring function
  - swIGMPPackage—Management of the IGMP function

- vesubio.mib
  - — swL2BwMgmt—Management of the ingress and egress bandwidth
  - — swL2CosMgmt—Management of Class of Service
  - — swL2PortSecurityMgmt—Management of port security
  - — dswL2DevMgmt—Management of device advanced settings
  - — swL2PortMgmt—Management of the port link
- CIMTRAPS.mib—Redefining of the entConfigChange trap in SNMP

SNMP Traps

The GbE Interconnect Switch may generate the following SNMP traps (event notifications). Refer to the MIBs for detailed information.

- coldStart
- warmStart
- authenticationFailure
- topologyChange
- newRoot
- linkDown
- linkUp
- entConfigChange
- switchFirmwareTransferred
- switchConfigFileTransferred
- switchTFTPTransferSucceeded
- switchTFTPTransferFailed
- switchFileInvalid
- switchFanFailed
- switchFanOk
- switchTempSensorDegraded
- switchTempSensorFailed
- switchTempSensorOk
- switchPostSuccess

- switchLoginFailure
- switchLocationChange
- switchCubeTypeChange
- switchSNTPServiceUnavailable

G

Upgrading Firmware by Means of the Serial Port

The system firmware of a GbE Interconnect Switch can be upgraded by connecting a computer to the serial console port on the front of GbE Interconnect Switch and using terminal emulation software that supports the ZModem or XModem protocols. This procedure is only necessary if your GbE Interconnect Switch does not have access to a TFTP server, or if the firmware procedure was previously interrupted and the switch will not boot properly.

To download system firmware using the current download baud rate and current download protocol, follow steps 1 through 4 and steps 11 through 16.

To change the default download baud rate of 115200 and the default download protocol of ZModem, follow steps 5 through 9.

IMPORTANT: Because some required actions are time sensitive, it is recommended that you read through all the steps and become familiar with the terminal emulation software before trying to download firmware or change the boot configuration.

To download a firmware file to a GbE Interconnect Switch, do the following:

1. From a PC using Microsoft® Windows® HyperTerminal or any other terminal emulation program, connect to the serial console interface on the GbE Interconnect Switch using the default values of 9600 baud, 8 data bits, no parity and 1 stop bit.

IMPORTANT: For faster data transfers, change the speed of your console connection from 9600 to 115200. Remember to also change the baud rate of your terminal emulation session to match the console speed settings. Refer to the section titled “Configuring GbE Interconnect Switch Serial Port” in the menu-driven interface, web-based interface, and command line interface reference guides.

2. Reboot the GbE Interconnect Switch by using the **Reboot** menu option or by pressing the **Pwr/Rst** button on the front panel of the GbE Interconnect Switch. The boot procedure will run the Power-On Self-Test (POST) and a screen similar to the following will be displayed.

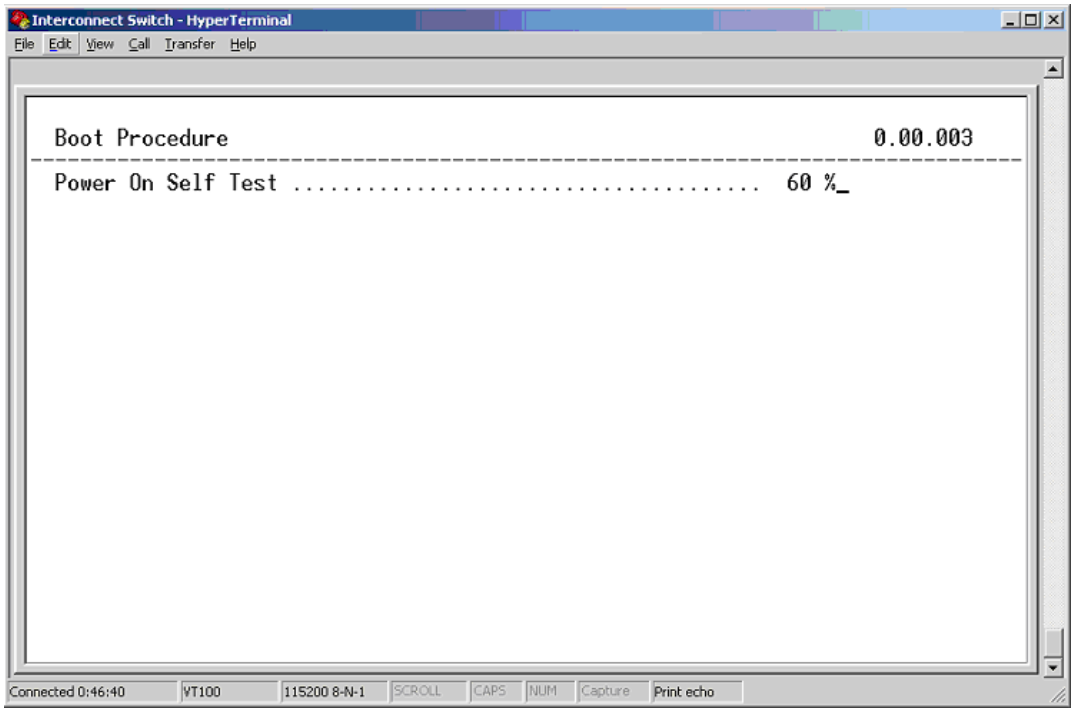


Figure G-1: POST message screen

3. Press the pound (**#**) key (**Shift+3**) as soon as you see the Boot Procedure header and before the POST line reads 100%. This action forces the GbE Interconnect Switch into the download mode. A screen similar to the following should display. If this screen does not display, repeat step 2.

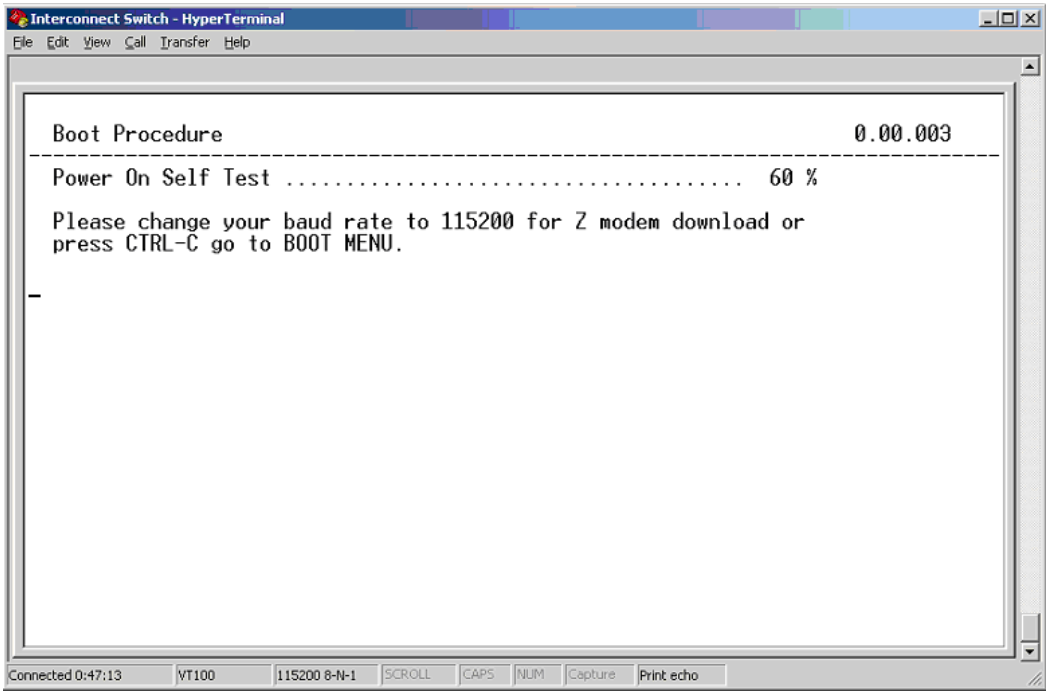


Figure G-2: Download mode message screen

4. At this point, one of the following two actions can be selected:
   - To download firmware using the current boot configuration, go to step 11.
   - To change the baud rate and download protocol of the boot configuration, go to step 5.

5. To change the download parameters, press the **Ctrl+C** keys within two seconds of pressing the pound (**#**) key (**Shift+3**) to display the **Boot Configuration Menu.** A screen similar to the following is displayed.

   NOTE: If HyperTerminal displays unusual characters on the screen, it has skipped the Boot Configuration mode and is in the firmware download mode. Wait for it to display "Please change your baud rate to …" (This is repeated until the download is started or it is in the Boot Configuration mode). At this point, try pressing the **Ctrl+C** keys again.

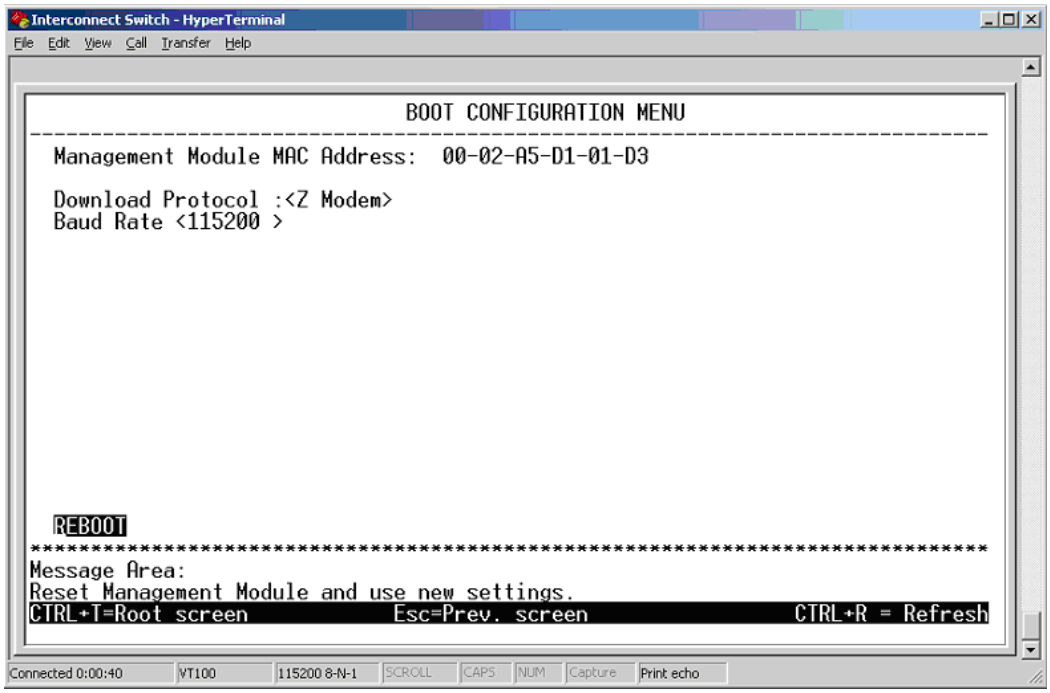


Figure G-3: Boot Configuration Menu

6. Select the download protocol by using the space bar to toggle between **XModem** and **ZModem.** Use the down arrow to highlight the baud rate.
7. Select the baud rate by using the space bar to toggle between **9600, 19200, 38400,** and **115200.**
8. Use the down arrow to highlight **Reboot.**
9. Press the **Enter** key. The GbE Interconnect Switch will reboot.
10. To continue with the system firmware download, press the pound (**#**) key (**Shift+3**) as soon as you see the Boot Procedure header and before the POST line reads 100%. This forces the GbE Interconnect Switch into the download mode. A screen similar to Figure F-2 should be displayed. If this screen does not display, reboot the GbE Interconnect Switch using the instructions in step 2.

11. While the GbE Interconnect Switch is in the download mode, change the baud rate of the HyperTerminal session to match the baud rate of the GbE Interconnect Switch shown in the display window. (The default is 115200, which is the fastest. If you need to change the baud rate of the GbE Interconnect Switch, refer to steps 5 through 9 for instructions.)

    To change the baud rate:

    a. Disconnect the HyperTerminal session by selecting **Call** from the **Interconnect Switch – HyperTerminal** window menu, and then selecting **Disconnect.**

    b. From the **Interconnect Switch – HyperTerminal** window menu, select **File** then **Properties.**

    c. Click **Configure**.

    d. Make the necessary changes to the baud rate and click **OK.**

    e. After connecting HyperTerminal, a connection established message is displayed, as shown in Figure F-4.

    IMPORTANT: If the following screen displays unusual characters, this indicates a mismatched baud rate configuration somewhere in the network. Check HyperTerminal to determine if the baud rate setting on the GbE Interconnect Switch console interface and the HyperTerminal are mismatched.

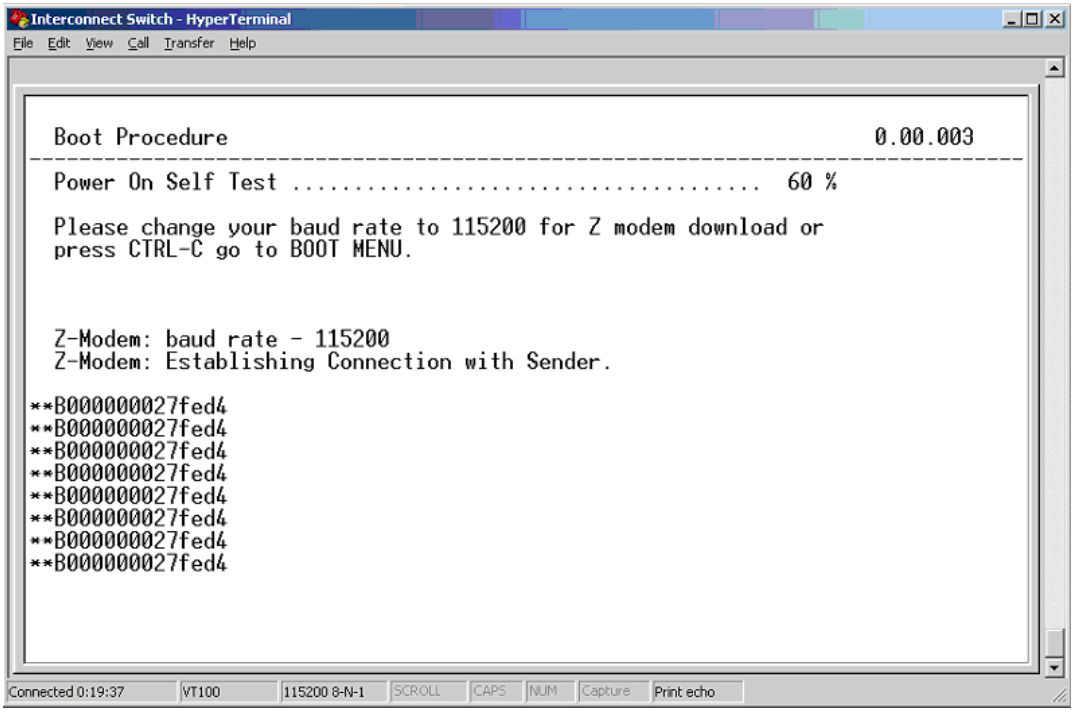


Figure G-4: Connection established message screen

12. From the **Interconnect Switch – HyperTerminal** window menu, select **Transfer** then **Send File.** The following window is displayed.

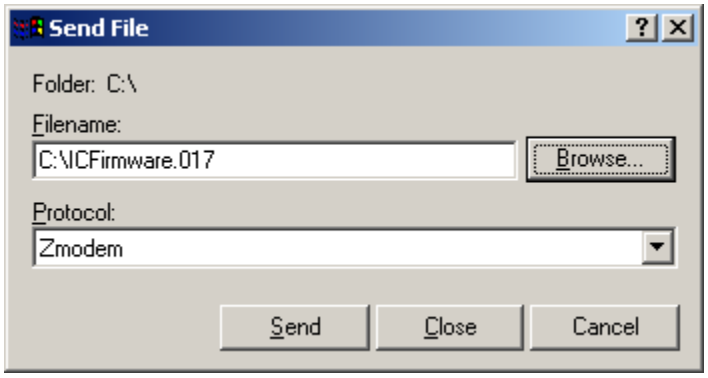


Figure G-5: Send File window

13. Click **Browse** and select the firmware file to be downloaded to the GbE Interconnect Switch.
14. Click the drop-down button to select the download protocol that is shown in the **Interconnect Switch – HyperTerminal** display window (ZModem or XModem).
15. Click **Send** to start the download process. The following screen is displayed.

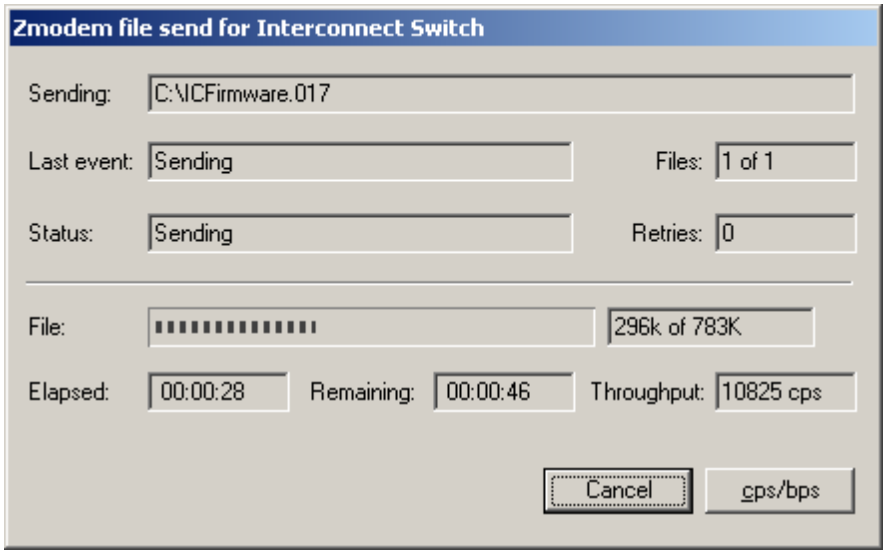


Figure G-6: ZModem file send for Interconnect Switch window

After the firmware file transfer is complete, a download completed message is displayed.

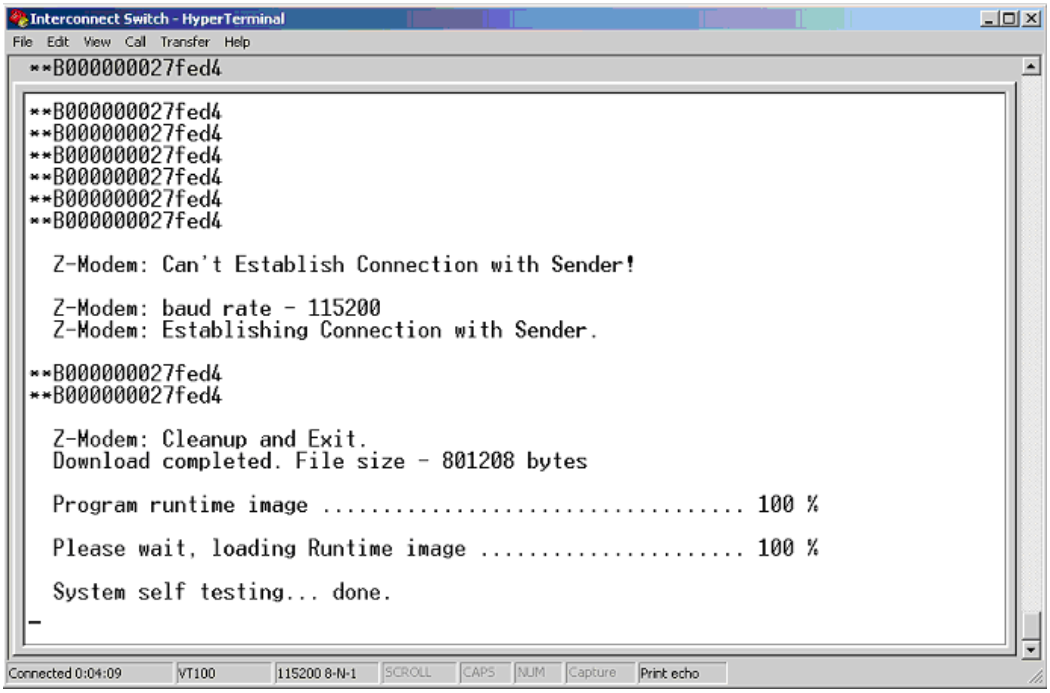


Figure G-7: Download completed message screen

16. Set your HyperTerminal session baud rate to match the console interface settings in runtime mode if they are different and press any key.

    The GbE Interconnect Switch login screen is displayed. This completes the firmware download procedure.

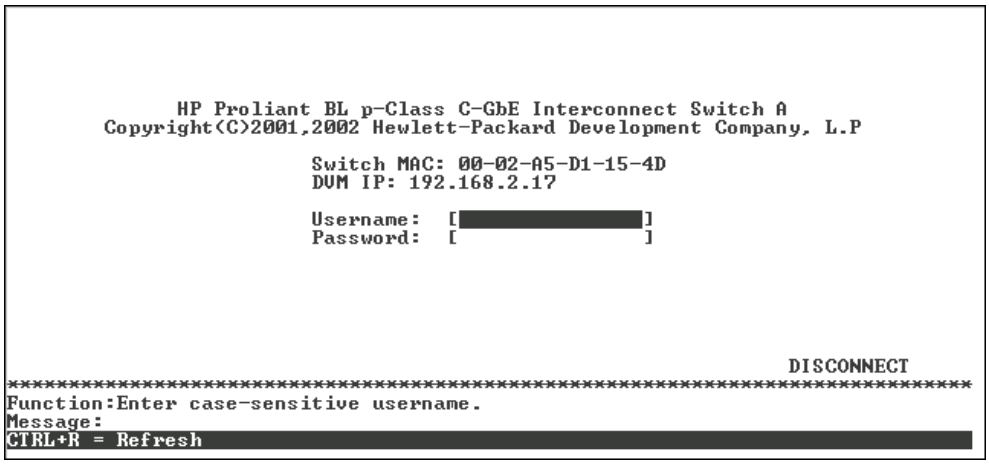


Figure G-8: ProLiant BL p-Class GbE Interconnect Switch login screen

H

Port Trunking and Load Balancing in Blade Switches

Introduction

IEEE 802.3ad and EtherChannel compatible port trunks allow multiple physical Ethernet links to be combined into one logical channel/trunk. This allows load sharing of traffic among the links in the port trunk as well as redundancy in the event that one or more links in the port trunk should fail. Port trunks can be used to interconnect local-area network (LAN) switches, routers, servers, and clients via unshielded twisted-pair (UTP) wiring or single-mode and multi-mode fiber.

A port trunk aggregates the bandwidth of up to eight compatibly configured ports into a single logical link. Blade switches support a maximum of six port trunks. All Ethernet ports support port trunks with no requirement that the ports be contiguous, but do require that they must be the same speed.

NOTE: Dynamic Link Aggregation Control Protocol (LACP) is not supported.

Load Balancing: Determining which Link to Send Traffic Across

The load-balancing policy (frame distribution) can be based on MAC address (Layer 2). You can configure these frame distribution policies to be based on source MAC address (SA), destination MAC address (DA), or both source and destination MAC addresses (SA XOR DA) in the frame to be forwarded across the port trunk.

A port trunk distributes frames across the links by reducing the last three lower order bits of the binary pattern formed from the MAC addresses in the frame to a numerical value. In addition, the port trunk calculates the modulus of that numerical value against the number of available links in that port trunk, to determine which one of the links to send traffic across. IEEE 802.3ad/Port trunk frame distribution policies are based on hashing algorithms that use formulas mentioned below with examples. The algorithm is deterministic; given the same addresses and session information, you always hash to the same port in the port trunk, preventing out-of-order packet delivery.

The selected mode applies to all port trunks configured on the switch. Use the option that provides the greatest variety in your configuration.

For example, if the traffic on a port trunk is going only to a single MAC address, using the destination MAC address always chooses the same link in the port trunk; using the source addresses or IP addresses might result in better load balancing.

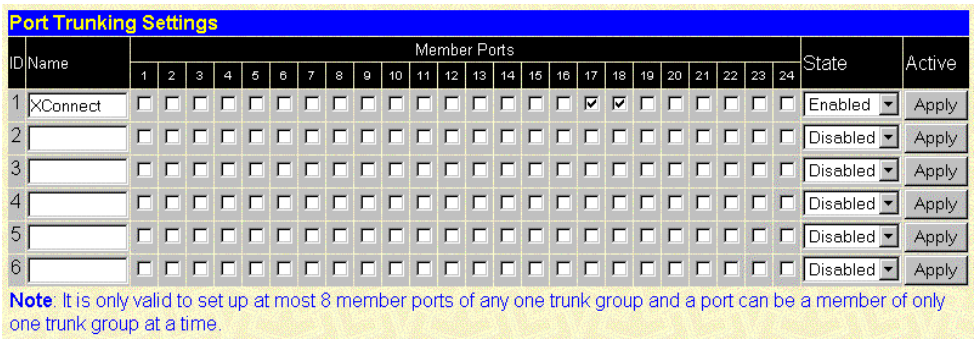
Circumstances can occur where one address in the source/destination pair is a constant. For example, the destination might be a server or, even more likely, a router. In that case, if both the source address and destination address option is selected, you will still see statistical load balancing, because the source address is always different.

Default Settings for Load Balancing

The default for the GbE Interconnect Switch is to use the source MAC address-based load balancing. This means that all packets the switch receives on a non-trunk port with the same source MAC address (SA), and that are destined to MAC addresses on the other side of the port trunk, will use the same link in the port trunk. Source-based forwarding should be used when many stations attached to the switch are sending to a few stations (such as a single router) on the other side of the port trunk. This better distributes traffic across all links in the port trunk.

Also, switches maintain a notion of a "primary" port on which to transmit traffic such as Spanning Tree Protocol, multicasts, and unknown unicasts. The properties of this primary port determine the properties of how the port trunk works with features like Spanning Tree, VLAN, multicasting, and so on.

By default, XConnects between Switch A and Switch B in the chassis form a port trunk "XConnect' with two links, as shown in the following figure.

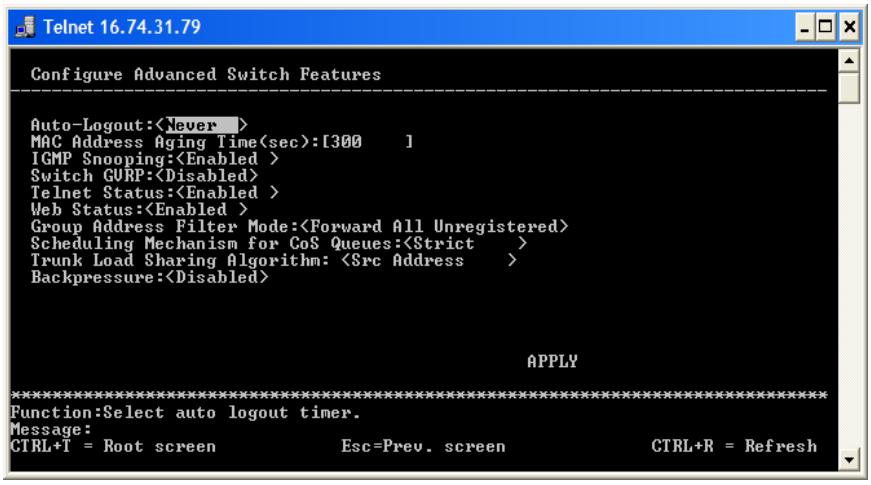


With source-MAC address forwarding, when packets are forwarded to a port trunk, they are distributed across the ports in the port trunk based on the source-MAC address (SA) of the incoming packet. Therefore, to provide load balancing, packets from different hosts use different ports in the port trunk, but packets from the same host use the same port in the port trunk.

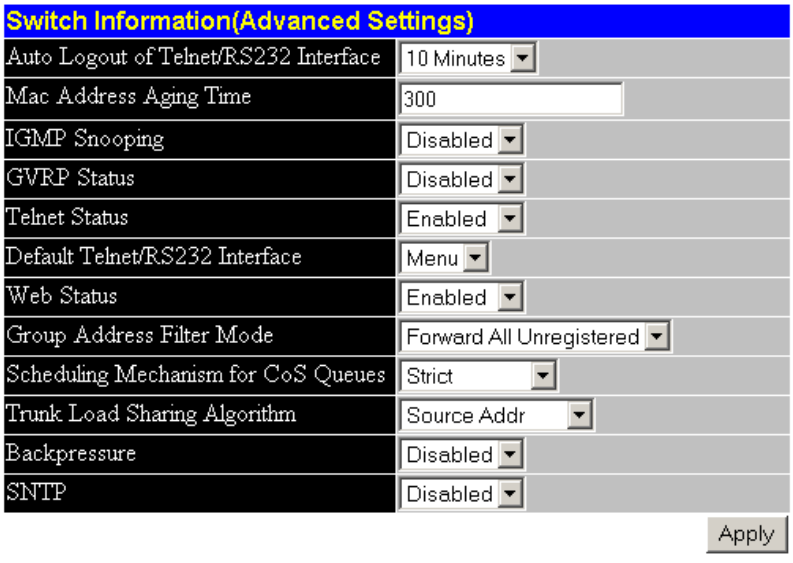
With destination-MAC address forwarding, when packets are forwarded to a port trunk, they are distributed across the ports in the port trunk based on the destination host's MAC address (DA) of the incoming packet. Therefore, packets to the same destination are forwarded over the same port, and packets to a different destination are sent on a different port in the port trunk.

Configuring Load Balancing on Blade Switches

To configure the load balancing and forwarding method using the menu-driven interface, access the **Configure Advanced Switch Features** screen. Toggle the **Trunk Load Sharing Algorithm** field to the appropriate selection.



To configure the load balancing and forwarding method using the Web-based interface, access the **Switch Information (Advanced Settings)** screen. Choose the appropriate selection in the **Trunk Load Sharing Algorithm** field.



Hashing Algorithms for Load Balancing

The hashing algorithms use the last three least significant bits (LSB) of the destination MAC address (DA), source MAC address (SA), or destination and source MAC address (DA XOR SA) and the number of links that are available to forward frames in that port trunk group as operators.

There are three algorithms that are supported to decide the outgoing port of frames, depending on how the load balancing option is configured.

1. For the source MAC address option, N = (Last three LSB of SA) MOD (Number of links up in the port trunk)
2. For the destination MAC address option, N = (Last three LSB of DA) MOD (Number of links up in the port trunk).
3. For both source and destination MAC addresses option, N = (Last three LSB of DA XOR SA) MOD (Number of links up in the port trunk).

If N is the remainder of the equation and N is not equal to 0, then the Nth link that is up in the port trunk is the outgoing port. If N is the remainder of the equation and N is equal to 0, then N + 1 link that is up in the port trunk is the outgoing port.

For example: There is a port trunk group with eight member ports, and there is a frame with SA=0x0080C800000B DA=0x0080C800000C.

- SA last three bits is 0b011
- DA last three bits is 0b100
- SA XOR DA is 0b111

In the following example, four trunk ports are link up in the port trunk.

- For algorithm 1, N = 0b011 MOD 4 = 3

  The outgoing port would be the fourth link up in the port trunk.
- For algorithm 2, N = 0b100 MOD 4 = 0

  The outgoing port would be the first link up in the port trunk.
- For algorithm 3, N = 0b111 MOD 4 = 3

  The outgoing port would be the fourth link up in the port trunk.

The following table shows the relationship between the remainder and outgoing ports

Link up port	1st	2nd	3rd	4th	5th	6th	7th	8th
Last three LSB	0b000	0b001	0b010	0b011	X	X	X	X
Last three LSB	0b100	0b101	0b110	0b111	X	X	X	X

In the following example, 6 trunk ports are link up in the port trunk.

- For algorithm 1, N = 0b011 MOD 6 = 3

  The outgoing port would be the fourth link up in the port trunk.

- For algorithm 2, N = 0b100 MOD 6 = 4

  The outgoing port would be the fifth link up in the port trunk.

- For algorithm 3, N = 0b111 MOD 6 = 1

  The outgoing port would be the second link up in the port trunk.

The following table shows the relationship between the remainder and outgoing ports.

Link up port	1st	2nd	3rd	4th	5th	6th	7th	8th
Last three LSB	0b000	0b001	0b010	0b011	0b100	0b101	X	X
Last three LSB	0b110	0b111	X	X	X	X	X	X

Redundancy: What Happens When One Link in the Port Trunk Fails?

If a segment within the port trunk fails, traffic previously carried over the failed link switches to the remaining segments within the port trunk. Inbound broadcast and multicast packets on one segment in a port trunk are blocked from returning on any other segment of the port trunk.

802.1Q Tagging/Trunking Supported on Port Trunks

In a port trunk, member ports can be configured with or without IEEE 802.1Q trunking/tagging if they are members of a VLAN. After a port trunk is formed, configuring the primary/first port in that port trunk as tagged applies the configuration to all remaining ports in that port trunk. Similarly, configured trunk ports can be configured as a port trunk.

802.1Q encapsulation, if enabled, takes place independently of the source/destination load-balancing mechanism of a port trunk. The virtual LAN (VLAN) ID has no bearing on which link a packet takes. 802.1Q simply enables that trunk to belong to multiple VLANs. If trunking is not enabled, all ports associated with the port trunk must belong to the same VLAN.

XML Configuration

Introduction

Beginning in firmware version 2.0.0, GbE Interconnect Switch firmware configuration files are specified in eXtensible Markup Language (XML) format. In previous versions, the configuration file was stored in binary format. Binary configuration files saved from previous versions cannot be downloaded into firmware version 2.0.0. However, previous configuration settings are preserved during the firmware upgrade to version 2.0.0.

Trivial File Transfer Protocol (TFTP) services continue to be used to upload and download configuration files. See the TFTP sections in the Web-based, CLI, or menu-driven interface reference guides.

When XML formatted configuration files are downloaded to the GbE Interconnect Switch, the GbE Interconnect Switch interprets the contents and applies it to the system immediately. The configuration settings are saved to NVRAM and become the current settings for the GbE Interconnect Switch. These settings are then used every time the GbE Interconnect Switch is rebooted.

IMPORTANT: The TFTP server must be running TFTP server software to perform a file transfer. TFTP server software is included as part of the Windows utilities package.

User Account Information

User account information is not saved in the XML configuration file for security reasons and must be managed by the GbE Interconnect Switch administrator. User account information can be manually added to the XML configuration file after it is uploaded, or it can be re-entered using the CLI, menu-driven interface, or Web-based interface.

"root" is a special user name and is preserved even if `<USER_ACCOUNTS_LIST RESET="True">`. Any other user name, such as "Administrator" with root privileges is deleted along with all other users.

Safe Mode

When inserting a new or replacement GbE Interconnect Switch into a production environment, you must be certain that the GbE Interconnect Switch configuration is compatible with the production network. Compatibility with a network can include items such as:

- Non-corruption of the network in general—Corruption, such as loops, can occur within the network without enabling Spanning Tree Protocol (STP).
- Security of connected network entities—Security issues can arise as a result of configuration items, including such attributes as subnet-to-subnet communication and blade-to-blade communication where communication between these entities is not acceptable.
- Security of the GbE Interconnect Switch itself—These attributes include controlled access to the GbE Interconnect Switch such as user-password and SNMP read-write community string.
- Other configuration attributes such as VLAN settings.

The GbE Interconnect Switch factory default, as well as previously configured GbE Interconnect Switches, may not have configurations that are compatible with the production network.

If the configuration of the GbE Interconnect Switch is not compatible with the production network, the GbE Interconnect Switch may be pre-configured in a private network environment

There are several preconfiguration options. For example, the GbE Interconnect Switch may be configured for its exact position in the production network. Another option is to partially configure the GbE Interconnect Switch so that is is compatible with multiple positions in the production network. The configuration can then be completed for the GbE Interconnect Switch through scripting, manual operation, or a configuration download. This more globally appropriate configuration is called a "safe mode" configuration. Note that a single safe mode configuration may or may not be appropriate for all production environments. A spare GbE Interconnect Switch, however, configured to a "safe mode" may be appropriate for multiple production environments.

GbE Interconnect Switch Replacement Scenario using a "Safe Mode" Configuration

When an in-production GbE Interconnect Switch fails:

1. Remove the failed GbE Interconnect Switch.
2. Insert the spare GbE Interconnect Switch that was previously configured for safe operation.
3. Upgrade to new firmware if appropriate.
4. Download the correct configuration for that particular GbE Interconnect Switch.

Safe Mode Configuration File Templates

Two example template configuration files have been provided as a basis to create an appropriate safe mode configuration. Each file is delivered with the Switch Management Utilities package specific to a particular type of GbE Interconnect Switch.

- esafe_ex.xml
- psafe_ex.xml

NOTE: The templates provided are only examples, and should not be used in a production environment without modifications rquired for your specific production network. These templates have commented sections for IP configuration, password protection, and port selection.

Safe Mode Configuration File Template Modification

Copy the example "Safe Mode" template to a new name. Perform modifications appropriate for your production environment. While the list below describes some of the most common modifications, your environment may require additional settings such as VLAN configuration. These basic areas are preceded by comments that include "SM:". Use an editor such as WordPad or a standard Linux editor.

- Change the following settings if "Manual" IP settings are required.

```
<!--                                                              -->
<!-- SM: Change the following settings if "Manual" IP settings are
required. -->
<IP_ADDRESS>
<GET_IP_FROM VALUE="DHCP"/>
<IP_ADDRESS VALUE="10.90.90.90"/>
<SUBNET_MASK VALUE="255.0.0.0"/>
<DEFAULT_GATEWAY VALUE="0.0.0.0"/>
<MANAGEMENT_VID VALUE="1"/>
</IP_ADDRESS>
```

- Change the following settings to match the remote TFTP server.

```
<!--                                                              -->
<!-- SM: Change the following settings to match the remote TFTP
server -->
<TFTP_SETTINGS>
<SERVER_PORT_NUMBER VALUE="69"/>
<SERVER_IP VALUE="10.90.90.90"/>
<FIRMWARE_FILE_PATH VALUE="yourfirmware.bin"/>
<HISTORY_LOG_FILE_PATH VALUE=""/>
<CONFIGURATION_FILE_PATH VALUE="yoursparecfg.xml"/>
</TFTP_SETTINGS>
```

- Port 19 has been left Enabled on p-Class GbE Interconnect Switches (port 23 on e-Class). This port may be Disabled and another Enabled per your environment. Multiple uplink ports may be Enabled.

```
<PORT_CONFIGURATION VALUE="23">
<NAME VALUE="IA Mgmt Module"/>
<STATE VALUE="Enabled"/>
<FLOW_CONTROL VALUE="Enabled"/>
<SPEED VALUE="Auto"/>
<PRIORITY VALUE="0"/>
<RESTART_EGRESS_BANDWIDTH_IN_UNITS VALUE="0"/>
<RESTART_INGRESS_BANDWIDTH_IN_UNITS VALUE="0"/>
<STP_PORT_SETTINGS>
<PRIORITY VALUE="128"/>
<COST VALUE="19"/>
<BYPASS VALUE="Yes"/>
<STATE VALUE="Enabled"/>
</STP_PORT_SETTINGS>
<PORT_VLAN>
<PVID VALUE="1"/>
<INGRESS VALUE="Off"/>
<GVRP VALUE="Off"/>
</PORT_VLAN>
<SECURITY>
<MAX_LEARNING_ADDRESS VALUE="1"/>
<MODE VALUE="DeleteOnTimeout"/>
<STATE VALUE="Disabled"/>
</SECURITY>
</PORT_CONFIGURATION>
```

- You may wish to allow only a single IP address (management station) access.

```
<SECURITY_IP_ACCESS_LIST RESET="True">
<!--                                                          -->
<!-- SM: Add an item for each management station that can access
the switch  -->
<!-- SM: Example: <IPACCESS VALUE="192.168.0.1"/>          -->
</SECURITY_IP_ACCESS_LIST>
```

- Change the read-write community string per your environment.

```
<!--                                                          -->
<!-- SM: Change the read-write community string per your
environment. -->
<SNMP_ACCESS_LIST RESET="True">
<SNMP_ACCESS_ITEM COMMUNITY="public">
<TYPE VALUE="RO"/>
<STATUS VALUE="Valid"/>
</SNMP_ACCESS_ITEM>
<SNMP_ACCESS_ITEM COMMUNITY="yoursnmprw">
<TYPE VALUE="RW"/>
<STATUS VALUE="Valid"/>
</SNMP_ACCESS_ITEM>
</SNMP_ACCESS_LIST>
```

- Set up the root user account, which will be used to complete the interconnect switch configuration.

```
<!--                                                           -->
<!-- SM: Change the root user for reconfiguration          -->
<!-- SM: Change per your environment.                      -->
<!--  SET USER ACCOUNTS to BIOS DEFAULTS if RESET is True.-->
<!--  Remove the comment sign pairs, then add or modify user
accounts.    -->
<!--  Notice : ACCESS VALUE must be Root/User+/User.      -->
<USER_ACCOUNTS_LIST RESET="True">
<USER_ACCOUNT_ITEM USER="yourUser">
<PASSWORD VALUE="yourPassword"/>
<ACCESS VALUE="Root"/>
</USER_ACCOUNT_ITEM>
</USER_ACCOUNTS_LIST>
```

J

Troubleshooting

This section provides information on solutions to problems that may occur during the configuration and operation of a Proliant BL p-Class GbE Interconnect Switch. The following tables provide steps to take before calling your service representative.

Following are four tables with basic troubleshooting information:

- **Setting Up and Accessing**—Table J-1 contains general troubleshooting information about setting up and accessing the GbE Interconnect Switch. Topics covered include LEDs, cables, failure of the GbE Interconnect Switch to get IP settings, failure to connect to the GbE Interconnect Switch remotely, and what to do if you forget your administrator user name and password.
- **Configuring**—Table J-2 contains general troubleshooting information about configuring the GbE Interconnect Switch. Topics covered include configuring VLANs, XConnect ports, and SLIP settings.
- **Using a TFTP Server**—Table J-3 contains general troubleshooting information about using a TFTP server to back up GbE Interconnect Switch configuration or to configure multiple GbE Interconnect Switches.
- **Upgrading Firmware Using the Serial Port**—Table J-4 contains general troubleshooting information about upgrading system firmware using the serial console port.

For additional troubleshooting information, refer to

- Appendix E, Spanning Tree Protocol
- Appendix G, Upgrading Firmware by Means of the Serial Port
- Appendix H, Port Trunking and Load Balancing in Blade Switches
- Appendix I, XML Configuration
- The following website:

  www.compaq.com/support/

Table J-1: Troubleshooting: Setting Up and Accessing

Problem	Possible Cause	Possible Solution
Forgot the administrator user name and password that you configured on the GbE Interconnect Switch.	Unknown	Call HP technical support at 1-800-652-6672 or your service representative and provide your GbE Interconnect Switch MAC address (available on the MAC address label attached to your GbE Interconnect Switch) to obtain a unique switch password. This password gives you Root privileges. After receiving the password, do the following: 1. Reboot the GbE Interconnect Switch. 2. Access the menu-driven interface. 3. Within 60 seconds of when the Logon screen displays, type the password in the **Password** field. 4. Leave the **Username** field blank. 5. Press the **Enter** key. The main menu will be displayed. 6. Access the **User Accounts Management** option and set a new Administrator password.
The GbE Interconnect Switch does not respond and will not boot.	Corrupted configuration file	**IMPORTANT: Performing the following procedure sets the GbE Interconnect Switch configuration to the factory defaults and resets the switch Administrator name and password to null.** 1. Connect to the GbE Interconnect Switch console from the async port on the front of the GbE Interconnect Switch. 2. Do one of the following: • If possible, reboot the GbE Interconnect Switch from one of the user management interfaces. • Insert a small, blunt object in to the **Pwr/Rst** button on the front of the GbE Interconnect Switch. • Remove and reinsert the interconnect switch from the enclosure. 3. When “System self test 10%” displays on the screen, press the pound (**#**) key. The following message displays, ”Do you want to load the default configuration? (y/n)”. 4. Type **y** to load the factory default configuration.

continued

Table J-1: Troubleshooting: Setting Up and Accessing *continued*

Problem	Possible Cause	Possible Solution
The Power LED on the GbE Interconnect Switch is not on.	The GbE Interconnect Switch is not seated properly.	Make sure that the GbE Interconnect Switch is inserted completely and seated properly.
	The server blade enclosure is not powered up.	Make sure that the server blade enclosure is powered up and all the power connections are intact.
	There is a faulty LED.	Check console to see if GbE Interconnect Switch is booted.
The Power LED on the GbE Interconnect Switch stays amber for more than 30 seconds and GbE Interconnect Switch does not boot.	The standby mode time out function is malfunctioning.	Force the GbE Interconnect Switch to boot by pressing the **Pwr/Rst** button.
No link LED displays, even after you plug the Category 5 cable in the RJ-45 connector of the external port.	The cable is not properly plugged in.	Check the cable at both ends to ensure that it is plugged in and seated properly.
	The cable or connector heads are faulty.	Replace the cable with another tested cable.
	The RJ-45 connector on the switch or LED is faulty.	After checking and replacing the cable, if no link LED displays, check whether the port is transferring data. If yes, the LED is faulty. If no, it could be a faulty RJ-45 connector. Call your service representative.
Cannot access the GbE Interconnect Switch serial console interface using null modem connection from a PC Terminal Emulation Program.	The null modem cable is faulty.	Make sure that you use the null modem cable provided by HP with this hardware.
	The connection settings do not match the GbE Interconnect Switch serial settings.	Make sure that the PC Terminal Emulation session settings match the GbE Interconnect Switch serial settings. **IMPORTANT:** Refer to the menu-driven interface reference guide for default serial settings if you are connecting to the GbE Interconnect Switch for the first time.
An error message that the GbE Interconnect Switch failed to complete the system self-testing is displayed on the serial console screen.	The system diagnostic tests failed.	Note the reason for the failure from the serial console screen message and call your service representative.
The keyboard locks up when using HyperTerminal to log on to the GbE Interconnect Switch through the console interface.	Scroll lock is on.	Press the **Scroll Lock** key on the keyboard and make sure that the scroll lock is off.

continued

Table J-1: Troubleshooting: Setting Up and Accessing *continued*

Problem	Possible Cause	Possible Solution
The GbE Interconnect Switch fails to get its IP settings from the DHCP server, even though by default it is configured for DHCP. **IMPORTANT:** If you are running in spanning tree mode, it can take up to 90 seconds for the GbE Interconnect Switch to get its IP settings.	The GbE Interconnect Switch is not connected properly to the network.	Check the cable and connections and make sure that there is network connectivity between the GbE Interconnect Switch and the DHCP server.
	The DHCP server is not available on the network or VLAN that is attached to the switch management port.	Make sure that the DHCP server is present on the network or VLAN attached to the GbE Interconnect Switch.
	The DHCP server cannot offer IP settings to the GbE Interconnect Switch because no IP addresses are available.	Add additional IP addresses as necessary.
	The GbE Interconnect Switch timed out its request for IP settings.	• Go to the **Switch IP Settings** screen and click **Apply** to make the GbE Interconnect Switch retry DHCP. • Reset and reboot the GbE Interconnect Switch.
Cannot connect to the GbE Interconnect Switch console interface remotely using Telnet.	The GbE Interconnect Switch IP address may not be configured or correct.	• From the serial console interface on the **Switch IP Settings** screen, make sure that the GbE Interconnect Switch IP address is configured and valid on your network. • Use the correct IP address to establish the Telnet connection with the GbE Interconnect Switch.
	The setting allowing access to the GbE Interconnect Switch using the Telnet interface is disabled.	From the serial console interface on the **Advanced Switch Settings** screen, make sure that the Telnet interface is enabled.
	The Security IP list (if used) does not contain the IP address of your management station.	From the **SNMP Manager Configuration** screen, make sure that the Security IP list or Management IP Station list has the IP address of your management station.
	The internal switch processor port (meant for supporting switch management interfaces) and the port to which you have connected to access the switch from the Telnet, Web, or SNMP interfaces are not in the same VLAN.	Make sure that the Management VLAN ID on the **Switch IP Settings** screen is the same as the VLAN ID of the port that is trying to make the Telnet, Web, or SNMP connection. If not, change it to match.

continued

Table J-1: Troubleshooting: Setting Up and Accessing *continued*

Problem	Possible Cause	Possible Solution
Cannot connect to the GbE Interconnect Switch remotely using the Web interface.	The GbE Interconnect Switch IP address may not be configured or correct.	• From the serial console interface on the **Switch IP Settings** screen, make sure that the GbE Interconnect Switch IP address is configured and valid on your network. • Use the correct IP address to establish the Web connection with the GbE Interconnect Switch.
	Access to the GbE Interconnect Switch using the Web interface is disabled.	From the serial console interface on the **Advanced Switch Settings** screen, make sure that the Web interface is enabled.
	The Proxy server settings are configured on your Internet browser and your proxy server does not know the GbE Interconnect Switch IP address.	Disable the manual proxy settings on your Internet browser and let it automatically find Web servers using the IP address.
	The Security IP list (if used) does not contain the IP address of your management station.	From the **SNMP Manager Configuration** screen, make sure that the Security IP list or Management IP Station list has the IP address of your management station.
	The internal switch processor port (meant for supporting switch management interfaces) and the port to which you have connected to access the switch from the Telnet, Web, or SNMP interfaces are not in the same VLAN.	Make sure that the Management VLAN ID on the **Switch IP Settings** screen is the same as the VLAN ID of the port that is trying to make the Telnet, Web, or SNMP connection. If not, change it to match.
Cannot connect to the GbE Interconnect Switch SNMP interface.	The GbE Interconnect Switch IP address may not be configured or correct.	• From the serial console interface on the **Switch IP Settings** screen, make sure that the GbE Interconnect Switch IP address is configured and valid on your network. • Use the correct IP address to establish the SNMP connection with the GbE Interconnect Switch.
	The Security IP list (if used) does not contain the IP address of your management station.	From the **SNMP Manager Configuration** screen, make sure that the security IP list or Management IP Station list has the IP address of your management station.
	The internal switch processor port (meant for supporting switch management interfaces) and the port to which you have connected to access the switch from the Telnet, Web, or SNMP interfaces are not in the same VLAN.	Make sure that the Management VLAN ID on the **Switch IP Settings** screen is the same as the VLAN ID of the port that is trying to make the Telnet, Web, or SNMP connection. If not, change it to match.

Table J-2: Troubleshooting: Configuring

Problem	Possible Cause	Possible Solution
After connecting more than one port to another switch or destination device, the port activity LEDs continuously indicate activity.	Because there are multiple links across this device and the destination device, they form loops, which cause broadcast storms.	From the **Configure Spanning Tree settings** screen, enable STP at switch level. From the **Port Spanning Tree settings** screen, enable STP at port level if you want multiple links. Make sure that the Bypass setting is disabled. This setting prevents loops and maintains standby links for resilience in case the primary links go down.
While configuring VLANs, you cannot enable a port in multiple VLANs.	A port can be part of only one VLAN unless the port is a tagged port.	Make sure that your VLANs are 802.1Q VLANs and enable the port as a tagged port from the **802.1Q Static VLAN Settings** screen on the console interface or from the **VLAN settings** screen on the Web-based interface.
After assigning a port to multiple 802.1Q VLANs by configuring it as a tagged port, you check the PVID. It is equal to the first VLAN ID.	For port-based VLANs, ports belong to only one VLAN and only one PVID can be assigned. Port-based VLANs can be extended to other switches by cross connecting ports that have the same PVID (the same port-based VLAN).	By default, all the ports have PVID 1. The switch assigns to the port a PVID that is equal to the VLAN ID of the first VLAN that the port was enabled in. To manually configure a Port VLAN, refer the management interface reference guides.
Changing the first XConnect port settings changes the next XConnect port settings. But changes to the second XConnect port settings cannot be applied or saved.	By default, XConnect ports are bundled into a Port Trunk.	Because they are bundled in to a trunk, the settings of the first port are referenced and applied to the rest of the ports. So in a trunk, only the first port (reference port) is configurable and defines the characteristics of the other ports in the trunk.
While assigning the ports to VLANs, the GbE Interconnect Switch does not let the user enable two adjacent ports into two different VLANs.	The ports could be two adjacent ports that are bundled in a Port Trunk.	Two ports that are assigned to a Port Trunk cannot be assigned to two different VLANs. Either break the trunk to assign it two different VLANs or assign the ports to one VLAN.
While configuring SLIP settings, you cannot apply the setting after making the local IP address the same as the GbE Interconnect Switch IP address.	Local IP addresses cannot be same as the GbE Interconnect Switch IP address. Local IP addresses should be a different IP address from the same subnet range.	Make sure that the SLIP local IP address is not configured to be same as the GbE Interconnect Switch IP address. Make sure that it is from the same subnet range so that SLIP can function properly.
After forcing the speed, duplex, and flow control on the port, the link does not come up and transfer data properly.	Both sides need to be forced to the same settings. In case of auto-negotiation, both sides will negotiate and match the setting to make the correct link.	• From the **Configure Ports** screen, make sure that the ports are forced to the same setting as the setting on the other end of the link. • Use a crossover cable in case of forced 10/100 speeds.

Table J-3: Troubleshooting: Using a TFTP Server

Problem	Possible Cause	Possible Solution
While using TFTP to download firmware, the GbE Interconnect Switch fails to connect to the TFTP server, or after connection the download fails.	The TFTP server is not available to connect to or there is connectivity failure between the switch and TFTP server.	• Make sure that the IP address of the TFTP server is correct. • Make sure that the TFTP server exists on the same network and VLAN as the GbE Interconnect Switch. • Make sure that you can ping the TFTP server from the GbE Interconnect Switch and vice versa.
	The firmware file is not found on the TFTP server. The file name could be wrong.	• Make sure that a valid firmware file exists on the TFTP server to download to the GbE Interconnect Switch. • On the GbE Interconnect Switch, check the file name you configured to download.
	The TFTP server was started with a configured directory.	The GbE Interconnect Switch must be configured using the full path name, if it is not in the directory specified in the TFTP server.
While using TFTP to download or upload a configuration file, the GbE Interconnect Switch fails to connect to the TFTP server, or after connection the download or upload fails.	The TFTP server is not available to connect or there is a connectivity failure between the GbE Interconnect Switch and the TFTP server.	• Make sure that the TFTP server exists on the same network or VLAN as that of the switch. • Make sure that you can ping the TFTP server from the switch and vice versa. • Make sure that the IP address of the TFTP server is correct.
	The configuration file is not found on the TFTP server. The file name could be wrong.	• Make sure that a valid configuration file exists on the TFTP server to download to the GbE Interconnect Switch. • On the GbE Interconnect Switch, check the file name you configured to download or upload.
	The TFTP server was started with a configured directory.	The GbE Interconnect Switch must be configured using the full path name, if it is not in the directory specified in the TFTP server.

continued

Table J-3: Troubleshooting: Using a TFTP Server *continued*

Problem	Possible Cause	Possible Solution
While using TFTP to save the history log, the GbE Interconnect Switch fails to connect to the TFTP server, or after connection the download fails.	The TFTP server is not available to connect to or there is connectivity failure between the GbE Interconnect Switch and the TFTP server.	• Make sure that the IP address of the TFTP server is correct. • Make sure that the TFTP server and the GbE Interconnect Switch are on the same network or VLAN. • Make sure that you can ping the TFTP server from the GbE Interconnect Switch and vice versa.
	The TFTP server was started with a configured directory.	The GbE Interconnect Switch must be configured using the full path name, if it is not in the directory specified in the TFTP server.

Table J-4: Troubleshooting: Upgrading Firmware Using the Serial Port

Problem	Possible Cause	Possible Solution
On the serial console screen, a message that GbE Interconnect Switch failed to load runtime image (firmware) is displayed.	The Runtime image (firmware file) is corrupt.	Download the new runtime image (firmware file) using the procedure in Appendix G.
	The Flash file system is partially corrupted.	Call your service representative.
From the serial console, pressing the pound (#) key during the boot procedure does not force the GbE Interconnect Switch into the download mode.	You did not press the pound (#) key during the time the boot procedure responds to this special key.	Press the pound (#) key immediately when you see the boot procedure starting the Power-On Self-Test. Pressing the pound (#) key in the middle of the Power-On Self-Test process puts the GbE Interconnect Switch into the download mode instead of the runtime mode.
After forcing the GbE Interconnect Switch into the download mode, the console screen displays a message to change the baud rate for your terminal emulation session for ZModem transfer and also displays unusual characters.	Your terminal emulation session baud rate does not match the GbE Interconnect Switch serial console baud rate in the download mode.	Change the baud rate of your terminal emulation session to match the GbE Interconnect Switch serial console baud rate in the download mode. **IMPORTANT:** The baud rate for the GbE Interconnect Switch serial console in the download mode and runtime mode are two separate settings.
After starting to download the firmware file, the download fails.	The firmware file is not the correct one or is corrupt.	Obtain the latest firmware file that is specified for this GbE Interconnect Switch.
The GbE Interconnect Switch configuration is corrupt.	An error was made when saving the GbE Interconnect Switch configuration.	Reboot the GbE Interconnect Switch and reload the factory settings. This action clears all settings and restores them to the initial values that were present when the GbE Interconnect Switch was purchased. Refer to the management interface reference guides for more information. After reloading the factory settings, reconfigure the GbE Interconnect Switch settings. **IMPORTANT:** When rebooting, you have the option to reset all settings except the IP address.

K

RJ-45 Pin Specification

When connecting the HP ProLiant BL p-class GbE Interconnect Switch to a switch, bridge, or hub, an Ethernet cable is necessary.

Figure K-1 displays the standard RJ-45 receptacle/connector for 10/100 Mb/s and Gigabit over Copper ports. Table K-1 indicates the pin number and wire color assignments for the switch-to-network adapter card connection, and the Ethernet cable for the switch-to-switch, switch-to-hub, or switch-to-bridge connection. Table K-2 provides the same information for the Gigabit over Copper ports.

NOTE: A cable configured for Gigabit over Copper can also be used on a 10/100-Mb/s connection.

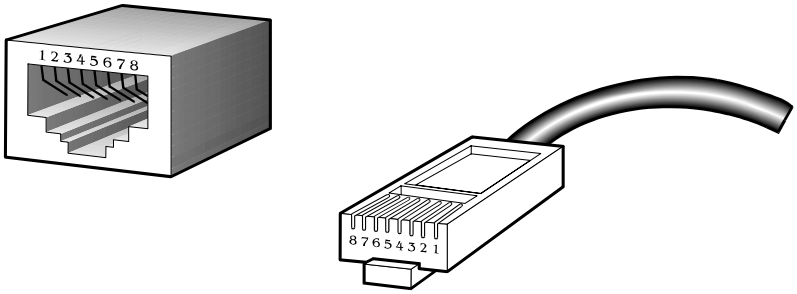


Figure K-1: Standard RJ-45 receptacle/connector for 10/100 Mb/s and Gigabit over Copper

Table K-1: RJ-45 Connector Pin Assignment for 10/100-Mb/s

Contact	Media Direct Interface Signal	Color Match
1	Tx + (transmit)	White/Orange
2	Tx - (transmit)	Orange/White
3	Rx + (receive)	White/Green
4	Not used	Blue/White
5	Not used	White/Blue
6	Rx – (receive)	Green/White
7	Not used	White/Brown
8	Not used	Brown/White

Table K-2: RJ-45 Connector Pin Assignment for Gigabit over Copper

Contact	Media Direct Interface Signal	Color Match
1	BI_DA+	White/Orange
2	BI_DA-	Orange/White
3	BI_DB+	White/Green
4	BI_DC+	Blue/White
5	BI_DC-	White/Blue
6	BI_DB-	Green/White
7	BI_DD+	White/Brown
8	BI_DD-	Brown/White

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