Overview Guide

Software Version 7.50, Site Manager Version 1.50
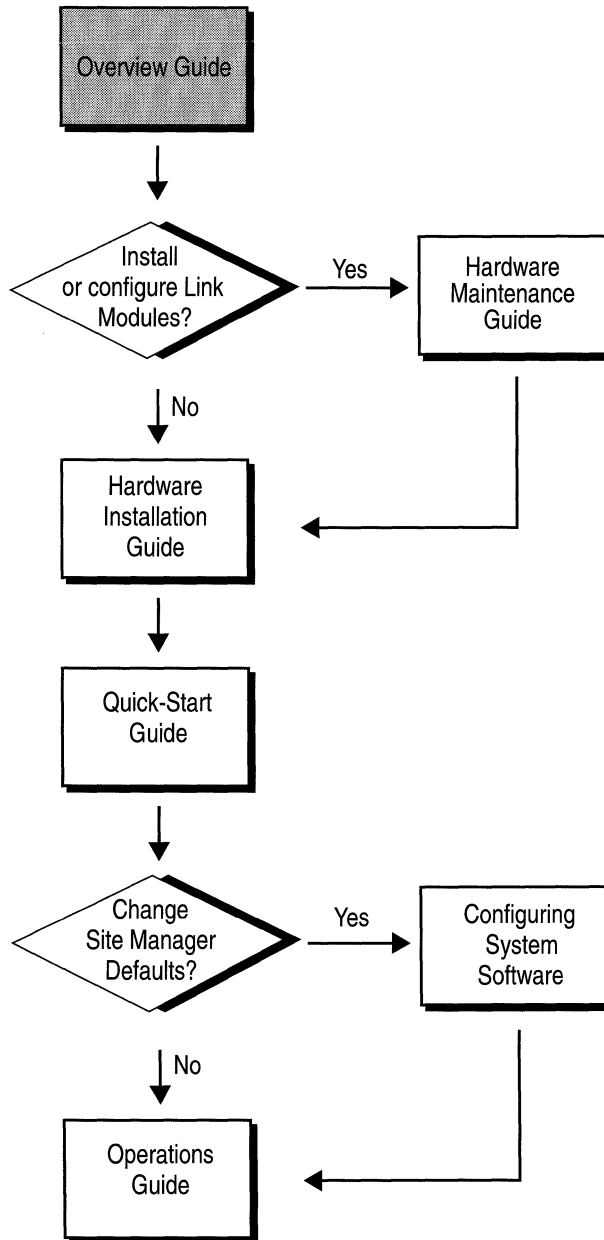
WELLFLEET
communications

Reading Path

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                    │  Overview Guide │
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The following notice regarding compliance with Federal Communications Rules pertain to the Backbone Node.

This equipment generates, uses, and can radiate radio-frequency energy. If you do not install and use this equipment according to the instruction manual, this product may interfere with radio communications. This product has been tested and found to comply with the limits for a Class A computing device, pursuant to Subpart J of Part 15 of FCC Rules; compliance with these limits provides reasonable protection against radio interference when such equipment is operated in a commercial environment. Operating this equipment in a residential area is likely to interfere with radio communications; in which case, the user, as his/her own expense, must correct the interference.

Wellfleet shielded cables must be used with this unit to ensure compliance with the Class A limits.

Canadian Department of Communications Radio Interference Regulations

This digital apparatus (the Backbone Node) does not exceed the Class A limits for radio-noise emissions from digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique (le Feeder Node, le Link Node, et le Concentrator Node) n'émet pas de bruits radioélectriques dépassant les limites applicables au appareils numériques de Classe A prescrites dans Le Réglement sur Le Brouillage Radioélectrique Édité par Le Ministère des Communications du Canada.

SITE MANAGER SOFTWARE

SITE MANAGER SOFTWARE IS AVAILABLE FOR INSTALLATION ON EITHER SUN SPARCSTATIONS OR DOS-BASED PERSONAL COMPUTERS (PCs). SITE MANAGER MAY BE INSTALLED ON AN UNLIMITED NUMBER OF CUSTOMER SUN SPARCSTATIONS. HOWEVER, SITE MANAGER FOR DOS PCs INCLUDES DISTINCT CORPORATION'S IP RUNTIME SOFTWARE WHICH CAN BE COPIED AND INSTALLED ON UP TO 15 PCs PER NETWORK IN CONJUNCTION WITH WELLFLEET SITE MANAGER FOR DOS PCs.

Table of Contents

Chapter 1

Backbone Node User Interface

Chapter 2

Backbone Node Overview

Chapter 3

Backbone Node System Software

About this Guide

Audience and Scope

This guide is intended for customers who have purchased any of Wellfleet's Backbone Node(BN) models. This guide introduces the Backbone Node (BN) user interface, called the Site Manager, and provides an overview of the BN hardware and system software.

Document Set

The following guides complete this document set:

Overview Guide

Describes the user interface, called the Site Manager application, the system software, and the router hardware.

Hardware Installation Guide

Describes how to physically install the router hardware.

Quick-Start Guide

Describes how to configure the router's initial IP network interface, install the Site Manager application software, and remotely create a pilot configuration for the Wellfleet router using the Site Manager.

Configuring System Software, Volumes I and II

Describes how to use the Site Manager's Configuration Manager application to set Wellfleet router parameters in one of three modes: local, remote, or dynamic.

Operations Guide

Describes how to use the Site Manager to perform day-to-day operations and how to use the Technician Interface to perform software maintenance.

Hardware Maintenance Guide

Describes how to access the interior of the Wellfleet router, replace the hardware, and how to read the LEDs.

If you are missing any guides, contact Wellfleet Customer Support at 1-800-2LANWAN.

Chapter 1

Backbone Node User Interface

List of Figures

Backbone Node User Interface

About this Chapter

The Backbone Node (BN) user interface is an SNMP-based application, called the Site Manager, which you use to monitor and control one or more BNs. The Site Manager runs on a workstation or personal computer (PC) and features an intuitive, window-based, graphical user interface (GUI) with point-and-click access. This chapter describes the features and functions of the Site Manager application.

Management Applications

The Site Manager integrates five management applications:

- Configuration Manager

    Provides dynamic and static configuration functions.

- Events Manager

    Provides event-monitoring functions.

- Trap Monitor

    Provides real-time trap-monitoring functions.

- File System Manager

    Provides BN Flash file-system management functions.

- Statistics Manager

    Provides performance-management functions.

You access the management applications from the Wellfleet Site Manager Window (see Figure 1-1), which is the window displayed at Site Manager start up. The Site Manager allows you to run all management applications simultaneously, and allows you to run more than one instance of a management application simultaneously.

Configuration Manager

The Configuration Manager operates in one of three modes:

❏ Local

Use local mode when you cannot or do not wish to access the BN over the network, but wish to create a configuration file for it, or when you wish to edit a configuration file stored locally on the Site Manager workstation.

❏ Remote

Use remote mode when you can access the BN over the network, but wish to implement your configuration changes at a later time.

❏ Dynamic

Use dynamic mode when you can access the BN over the network and want to configure the BN in real-time.

The Configuration Manager allows you to configure network connections quickly — Site Manager provided defaults minimize the parameters you must specify. You simply select the connector for which you wish to configure a network connection from a graphic display of the BN's hardware, and specify a few parameters for each supported protocol. For example, Figure 1-2 depicts the sequence of windows displayed when you configure a circuit to support the IP and DECnet protocols. The Configuration Manager allows you to edit all protocol attributes after you configure a connection.

Events
Manager
&
Trap
Monitor

Configuration
Manager

File System
Manager

Statistics
Manager

Backbone
Node
Administrative
Commands

Wellfleet Site Manager

File Options Config   Events   Remote Files...Stats...   Admin

System Name/IP Address:192.32.6.4

SNMP ID (Community): public

System_Record

System Name: | Backbone Node |

Contact: | Joe Network |

Location: | Boston |

Description: | |

Figure 1-1.   Wellfleet Site Manager Window

Add Circuit

Configuration Mode: local
SNMP Agent: LOCAL FILE

Save   Cancel

Circuit Name: E21

Select line from available connec

Slot   Connectors

2   XCVR1   XCVR2

3

Window 1
Select connector and click on the
Save button.

Select Protocols

Protocol Interfaces

Save   Cancel

☐   Bridge

☐   Spanning Tree

■   IP

Window 2
Select protocols
to be supported
and click on
the Save button.

IP CONFIGURATION
Configuration Mode: local
SNMP Agent: LOCAL FILE

Save   Details...   Help...   Cancel

IP Configuration Parameters

IP Address

Subnet Mask

Transmit Bcast Addr

Configure RIP

Configure OSPF

Windows 3 and 4
Specify protocol-specific parameters
and click on the Save button.

DECNET CONFIGURATION
Configuration Mode: local
SNMP Agent: LOCAL FILE

Save   Details...   Help...   Cancel
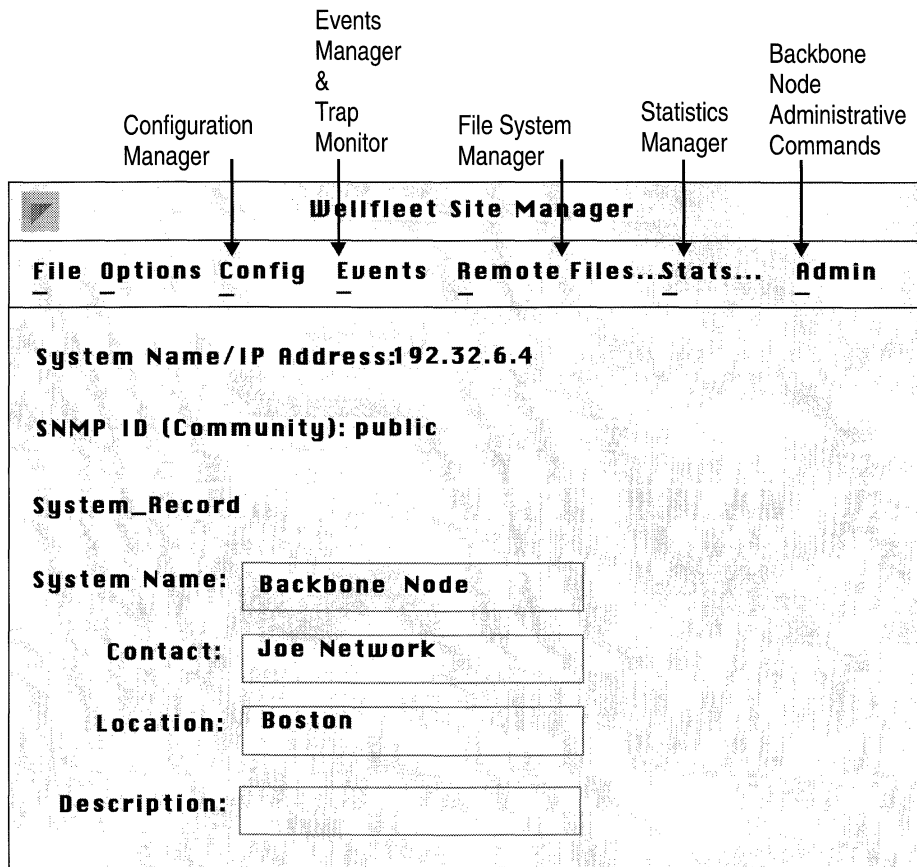
Area ID   45

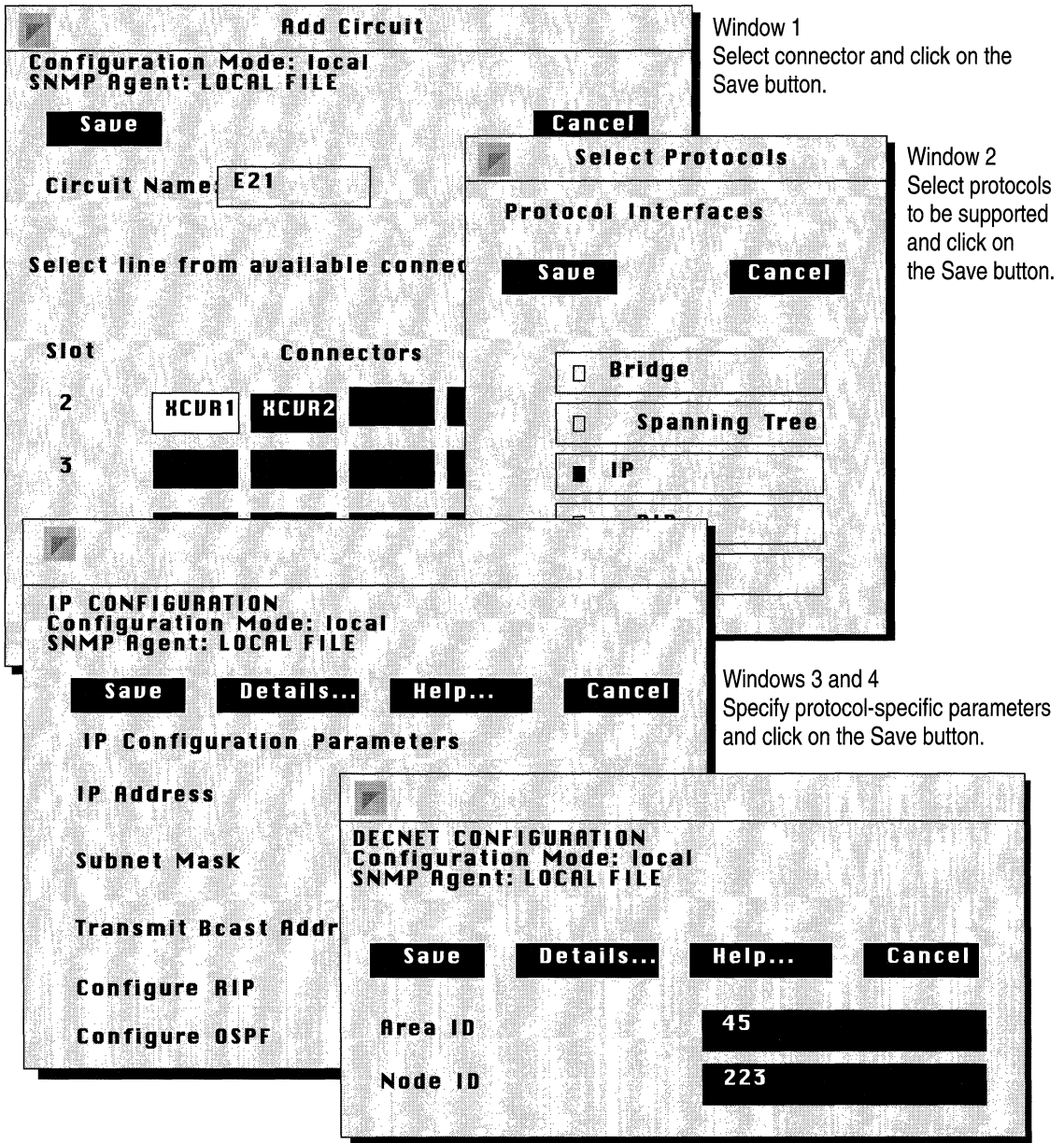Node ID   223

Figure 1-2. Windows for IP and DECnet Circuit Configuration

Events Manager

The Events Manager retrieves the log file from a specified BN, and then displays the log file in a scrollable window. You can filter the events displayed based on event type. Figure 1-3 shows a sample event-log file display. To inspect an updated version of the log file, you again instruct the Events Manager to retrieve and display the log file. The Events Manager allows you to save the retrieved log file locally on the Site Manager workstation so that you can inspect the file's contents at a later time.
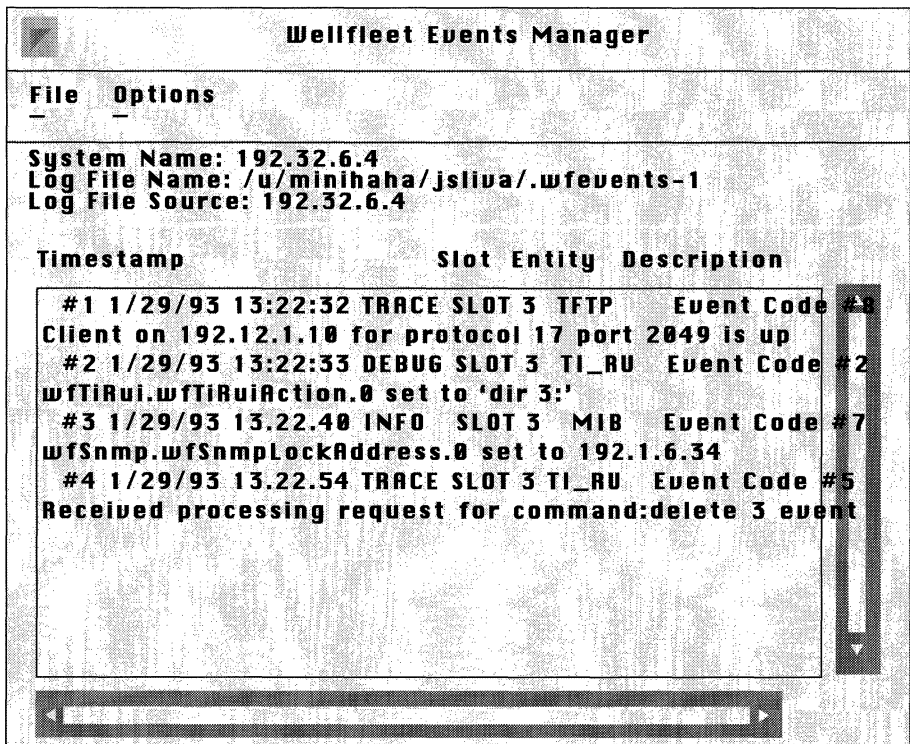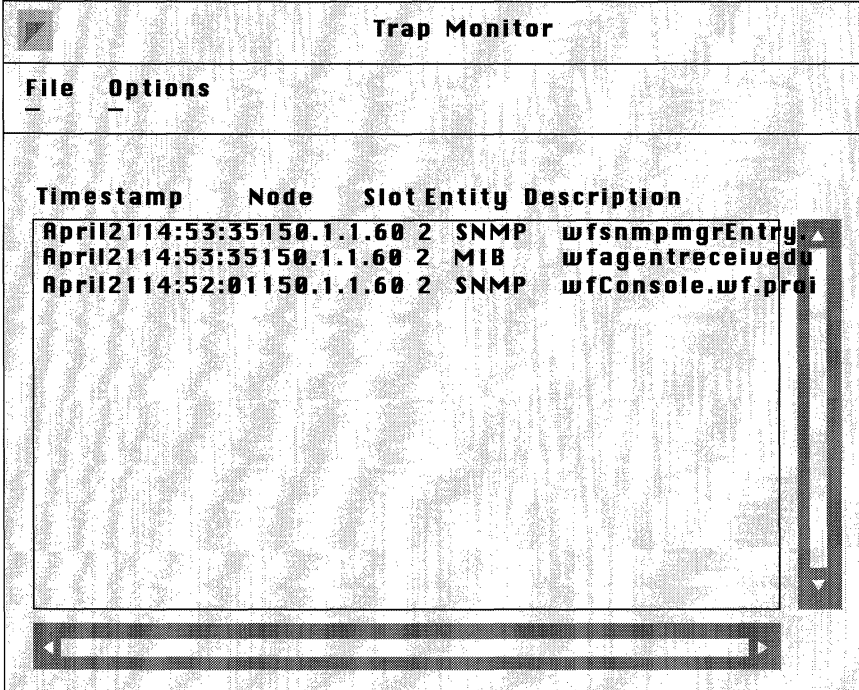
```
┌────────────────────────────────────────────────────────────┐
│  ▓               Wellfleet Events Manager                    │
├────────────────────────────────────────────────────────────┤
│  File   Options                                              │
│  ─      ─                                                     │
├────────────────────────────────────────────────────────────┤
│  System Name: 192.32.6.4                                     │
│  Log File Name: /u/minihaha/jsliva/.wfevents-1              │
│  Log File Source: 192.32.6.4                                │
│                                                              │
│  Timestamp                      Slot Entity  Description     │
│  ┌──────────────────────────────────────────────────────┐   │
│  │  #1 1/29/93 13:22:32 TRACE SLOT 3  TFTP     Event Code #3│
│  │ Client on 192.12.1.10 for protocol 17 port 2049 is up  ││  │
│  │  #2 1/29/93 13:22:33 DEBUG SLOT 3  TI_RU   Event Code #2│
│  │ wfTiRui.wfTiRuiAction.0 set to 'dir 3:'                ││  │
│  │  #3 1/29/93 13.22.40 INFO  SLOT 3   MIB    Event Code #7│
│  │ wfSnmp.wfSnmpLockAddress.0 set to 192.1.6.34           ││  │
│  │  #4 1/29/93 13.22.54 TRACE SLOT 3 TI_RU   Event Code #5│
│  │ Received processing request for command:delete 3 event ││  │
│  │                                                        ││  │
│  │                                                        ││  │
│  │                                                        │▼ │
│  └──────────────────────────────────────────────────────┘   │
│  ◄─────────────────────────────────────────────────────► │
└────────────────────────────────────────────────────────────┘
```

Figure 1-3. Events Manager Window

Trap Monitor

The Trap Monitor displays in real-time SNMP trap messages received by the Site Manager. In order for the Site Manager to receive trap messages from a BN, you must configure the BN to support an SNMP community that includes a manager having the IP address of the Site Manager workstation. When you run the Trap Monitor, the Site Manager automatically receives traps from the BN. Figure 1-4 depicts a sample Trap Monitor Window.

```
┌────────────────────────────────────────────────────────┐
│  ▛            Trap Monitor                              │
├────────────────────────────────────────────────────────┤
│  File   Options                                         │
├────────────────────────────────────────────────────────┤
│                                                        │
│   Timestamp       Node     Slot Entity Description      │
│   April2114:53:35150.1.1.60 2  SNMP   wfsnmpmgrEntry ▲ │
│   April2114:53:35150.1.1.60 2  MIB    wfagentreceivedu │
│   April2114:52:01150.1.1.60 2  SNMP   wfConsole.wf.pro i │
│                                                      ▼ │
│   ◄                                              ►      │
└────────────────────────────────────────────────────────┘
```

Figure 1-4. Trap Monitor Window

File System Manager

The File System Manager provides remote access to the BN Flash file system, allowing you to access all disk volumes (Flash cards) in a specified BN and do the following:

- ❏ Compact the files on a disk volume.
- ❏ Copy files between disk volumes.
- ❏ TFTP files between a disk volume and the Site Manager workstation.
- ❏ Display the files in a disk volume.
- ❏ Delete files on a disk volume.
- ❏ Format a disk volume.

Statistics Manager

The Statistics Manager provides real-time data-link and network-layer protocol data. The Statistics Manager uses an SNMP-based, user-configurable polling mechanism to request circuit and/or protocol data from the BN, and then aggregates, formats, and displays the data in a statistics window.

Data-link-specific statistical packages allow you to see data transmission and reception across circuits. Each circuit type is also supported by a specific Errors reporting mechanism. For each routing protocol, a protocol-specific statistical window allows you to see routing tables, interface-specific traffic, network topology, and protocol errors. Figure 1-5 shows a sample Circuit Statistics Window.

Figure 1-5. Circuit Statistics Window

Backbone Node Administrative Commands

The Site Manager provides BN administrative commands that allow
you to reset a single slot, boot the entire system, and instruct the BN to
ping another network device to test the other device's reachability. The
Administrative menu in the Wellfleet Site Manager Window (see
Figure 1-1) provides these command options.

Managing Multiple Backbone Nodes

You can use the Site Manager to manage multiple BNs simultaneously, and you can run several versions of each management application simultaneously.

For example, while you use the Configuration Manager to configure a particular BN, you can use the Statistics Manager to monitor a different BN's DECnet traffic, and use the Events Manager to display a third BN's log file. Simultaneous with these management functions, the Traps Monitor can be receiving SNMP traps from specified BNs, and another instance of the Statistics Manager can be displaying a forth BN's IP traffic.

To access each BN, you configure SNMP options that specify the IP address or host name of the target BN and an SNMP community with access to the BN. The target BN must be configured with an active IP interface, and with SNMP and TFTP enabled.

Out-Of-Band Access

The RS-232 console port on the SRM-L in the BN supports a modem (9600 Baud or less) for dial-up access to the Technician Interface (TI). The TI is a command-line interface used as a backup when the Site Manager is not available. The *Backbone Node System Software* chapter describes the TI.

Chapter 2

Backbone Node Overview

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Backbone Node Overview

About this Chapter

This chapter provides background information on the symmetric multiprocessor architecture used in the Wellfleet Backbone Node (BN) product line and goes on to describe how the BN hardware builds on this architecture.

Wellfleet's Symmetric Multiprocessor Architecture

All Wellfleet routers are based on a symmetric multiprocessor architecture (see Figure 2-1), which incorporates three major components:

❏ Link Modules

❏ Processor Modules

❏ Processor Interconnect

The Link Modules provide network-specific interfaces that physically connect the BN to LANs and WANs. Inside the BN, a Private Processor/Link Module Interconnect attaches each Link Module to its own processor module, forming an Intelligent Link Interface (ILI); the dedicated processor module performs all bridging and routing functions for the connected Link Module. The third architectural component, the processor interconnect, provides interprocessor communication between all processor modules in the BN.
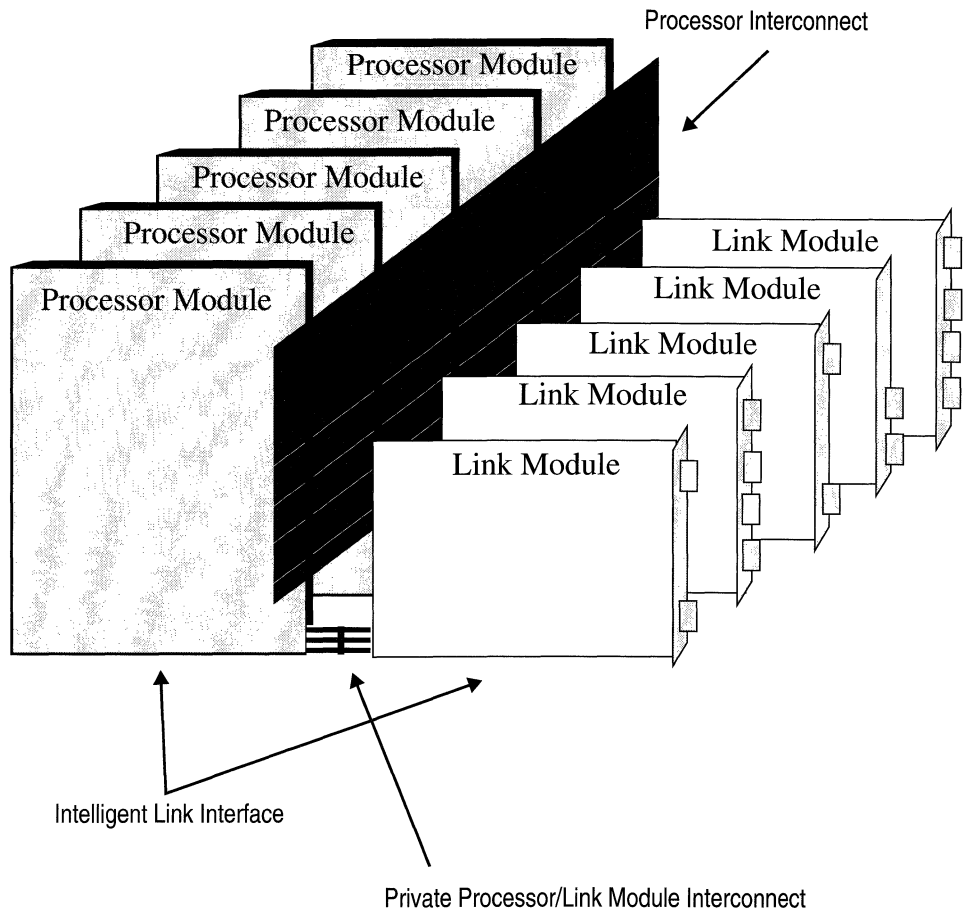
Figure 2-1.   Symmetric Multiprocessor Architecture

When a network interface on a Link Module receives a packet, it sends the packet through the Private Processor/Link Module Interconnect to the attached processor module. The processor module then determines the outbound network interface and either, forwards the packet to another network interface on the directly attached Link Module, or forwards the packet over the processor interconnect to the ILI containing the outbound network interface.

Wellfleet designed the symmetric multiprocessor architecture so that all processor modules function as peers. No central processor limits BN reliability or performance. If one processor fails in a BN with multiple ILIs, the BN continues to operate, impacting only those networks connected to the failed module.

The symmetric multiprocessor architecture enables the BN to maintain high performance regardless of the number of supported protocols or the number of supported networks, because performance is a scalable function of the number of ILIs. Since each ILI consists of a Link Module and its own dedicated processor module, there is a linear growth in aggregate system-level forwarding performance as you add ILIs to the BN. In addition, the direct connection between each Link Module and its dedicated processor module further maximizes performance by ensuring that only packets traveling between different Link Modules traverse the processor interconnect.

Backbone Node Hardware Architecture

Building on the strength of Wellfleet's symmetric multiprocessor architecture, the BN incorporates two new hardware components:

- Fast Routing Engine (FRE)

  Wellfleet's new processor module which raises forwarding performance to 75,000 packets per second (pps).

- Parallel Packet Express (PPX)

  Wellfleet's new processor interconnect which consists of four parallel, load-sharing data rails that together provide one Gigabit per second (Gbps) of bandwidth.

Figure 2-2 shows the BN's symmetric multiprocessor architecture, the new processor modules (FREs), and the new processor interconnect (the PPX). The figure also details the System Resource Modules (SRM-F and SRM-L) that arbitrate the PPX rails, and associated Link Modules that provide network connections.
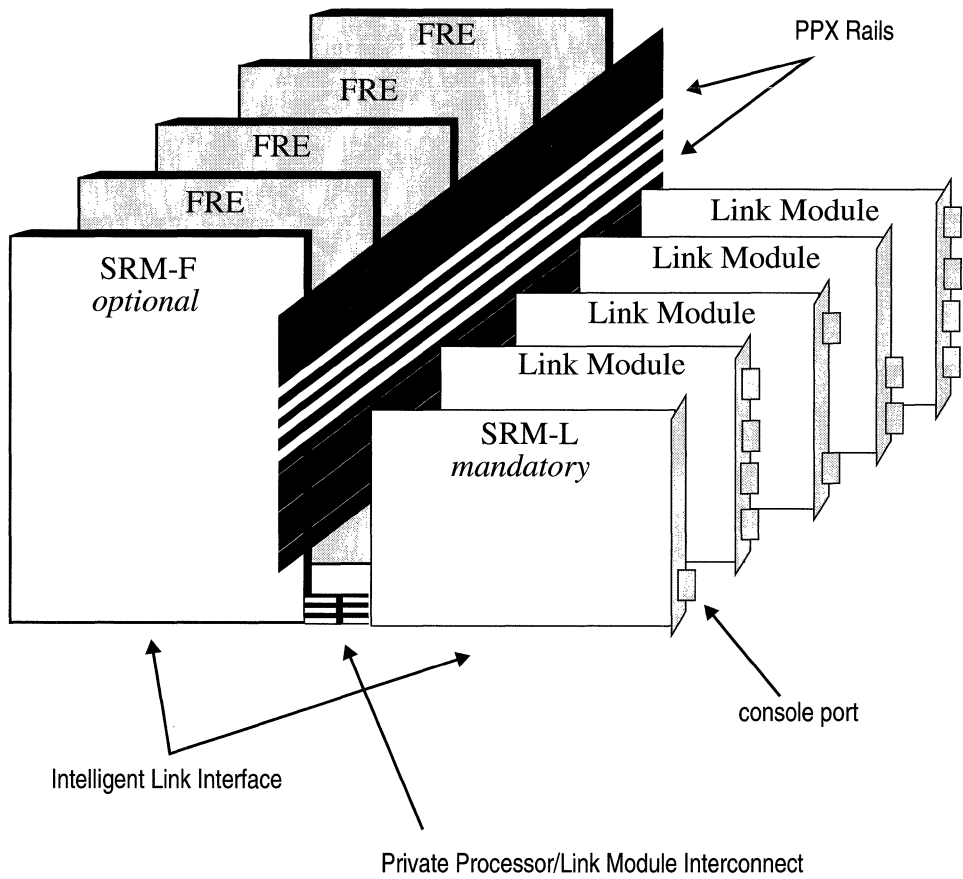
Figure 2-2. Backbone Link Node Symmetric Multiprocessor Architecture

Fast Routing Engine (FRE)

Wellfleet's new processor module is the Fast Routing Engine (FRE). Based on a 33MHz MC68040 microprocessor, the FRE forwards up to 75K pps. Figure 2-3 shows a logical layout of the FRE.
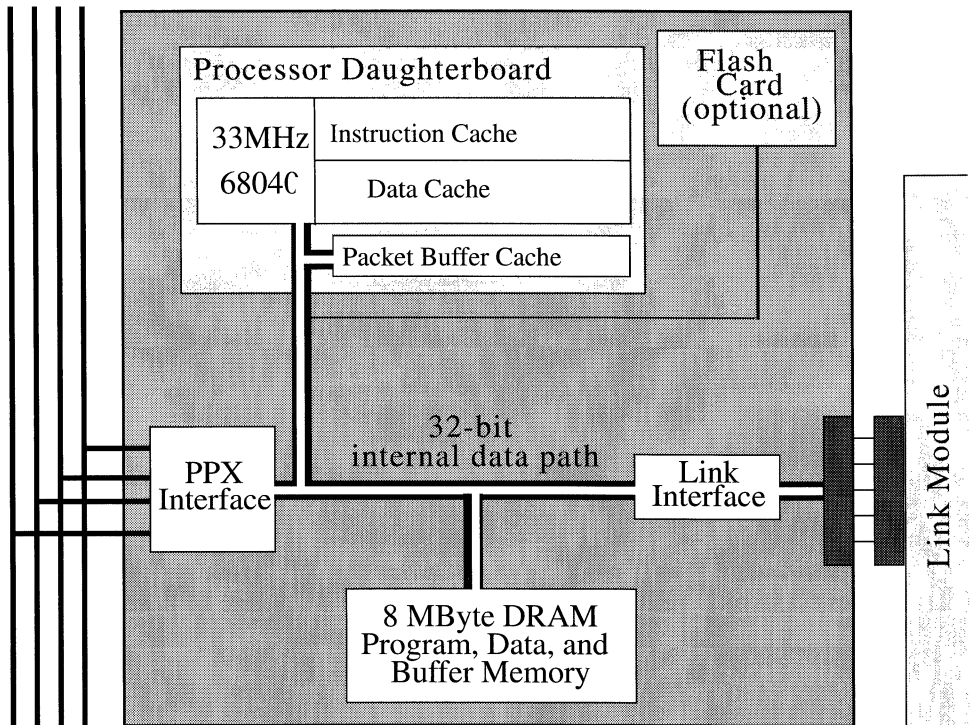
Figure 2-3. Fast Routing Engine

Specifically, Figure 2-3 shows the following:

❏ The 33 MHz 68040, with its on-board instruction cache and data cache, resides on a modular daughterboard, along with high-speed memory used for packet buffer caching.

❏ The FRE motherboard contains three tightly coupled subsystems connected by 32-bit internal data paths: Dynamic Random Access Memory (DRAM), the Link Interface, and the PPX Interface (PPI).

❏ The FRE can accept one optional Flash card, Wellfleet's new non-volatile file-storage media.

The MC68040 microprocessor runs at 33 MHz and has on-board 4K-byte instruction cache and 4K-byte data cache for storing critical instructions and data for the new software platform.

The FRE motherboard contains three tightly coupled subsystems:

◻ Link Interface

The Link Interface connects to the Private Processor/Link Module interconnect, which physically connects the FRE to the attached Link Module. The Link Interface supports virtually all Wellfleet Link Modules.

◻ Dynamic Random Access Memory (DRAM)

The DRAM is 8 Mbytes of program, data, and packet-buffer memory. At boot time, the FRE reads the software image from a Flash card into its DRAM.

◻ Parallel Packet Express Interface (PPXI)

The PPXI physically connects the FRE to the PPX and manages traffic going out to and coming in from the four PPX rails. Figure 2-4 shows the logical layout of the PPXI, which contains the following:

— One Transmitter

The single transmitter has four PPX connections, one for each rail. Only one connection at a time is active.

— Four Receivers

Each receiver connects to one of the four PPX rails.

— Control Logic

The control logic manages FIFO buffer inputs/outputs and arbitrates the 32-bit path connecting the PPXI to the DRAM. Packet buffers are stored in DRAM, where the PPXI and the CPU share separate receive and transmit queues.
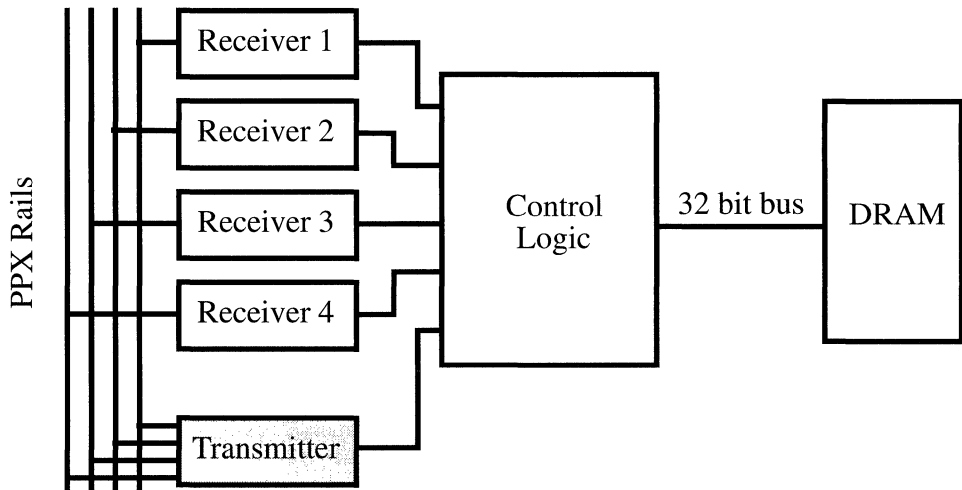
Figure 2-4. Logical Layout of the Parallel Packet Express Interface

Flash Card

The Flash card is Wellfleet's new non-volatile file-storage media. Slightly larger and thicker than a credit card, the Flash card slips into a slot on the FRE processor module. The card uses Flash EEPROM (Electrically Erasable Programmable Read Only Memory) technology to provide 2 Mbytes of memory for storing software images and configuration files.

A minimum of one installed Flash card is required for the BN to boot. Optionally, additional Flash cards can be installed on any and all other FREs to provide redundancy. If redundant boot capability is desired, one or more of the additional Flash cards must contain a common software image and configuration file.

In BNs with multiple Flash cards, the file system treats each card as a separate *disk volume* containing an assortment of files, and allows you to copy files from one volume to another.

Parallel Packet Express (PPX)

The Parallel Packet Express (PPX) is a one Gigabit per second (Gbps) processor interconnect made up of four, independent load-sharing 256-Mbps data rails for full fault tolerance and high performance.

The PPX operates like a high-speed LAN inside the BN. The FREs function as peer processors with a packet-based network interface to the PPX. The PPX is full duplex so a FRE can receive data from one PPX rail, while it sends data on another PPX rail.

System Resource Modules (SRMs)

The System Resource Modules (SRMs) are located in slot one of the BN chassis. Each SRM provides centralized arbitration and power-supply termination for two PPX rails. The PPX requires only one SRM to operate.

With one SRM installed, the PPX provides 500 Mbps of bandwidth. Installing two SRMs doubles the PPX bandwidth to one Gbps and provides a higher level of redundancy. If one or more PPX rails on an SRM fails, the second SRM operating is not impaired and continues to arbitrate its two rails. Likewise, if an SRM fails, the second SRM operating is not impaired and the PPX continues to transmit traffic over the other two rails. Hot swapping the failed SRM restores the full one Gbps bandwidth without stopping router operation.

The SRM in the Link Module side of the BN, the SRM-L, is standard in every BN system and provides the serial communications console port for the Technician Interface (TI) connection. The TI provides diagnostics, operational, and basic configuration functions. The SRM in the FRE processor side of the BN chassis, the SRM-F, is optional and provides no external connectors.

Private Processor/Link Module Interconnect

The Private Processor/Link Module Interconnect is a 32-bit data path that connects the Link Interface subsystem in a FRE motherboard to a Link Module. The FRE/Link Module pair forms an ILI. The Private Processor/Link Module Interconnect supports connections with virtually all Wellfleet Link Modules, and allows data to pass between the FRE and Link Module of an ILI without traversing the PPX.

Chapter 3

Backbone Node System Software

List of Figures

Backbone Node System Software

About this Chapter

This chapter describes the Backbone Node system software, which features the following:

- ❏ High-speed packet forwarding and filtering
- ❏ Distributed management processing
- ❏ SNMP-based management
- ❏ Software fault recovery and partial boot
- ❏ Fault isolation
- ❏ Dynamic reconfiguration
- ❏ Hot swap of FREs and Link Modules
- ❏ Local user interface by means of the Technician Interface (TI)

Software Architecture

The system software uses a layered architecture that includes the following elements (see Figure 3-1):

- ❏ Operating system

  Manages basic system resources such as the CPU and memory and supports fault management and recovery. The new operating system is called GAME, for Gate Access Management Entity.

❐ Device drivers

Control the Link Module interfaces for Ethernet, FDDI, and synchronous network connections.

❐ Data path service

Supports circuit management and the media-access control (MAC) layer functions of inbound/outbound frame formatting.

❐ Table management

Integrates packet forwarding and filtering operations. Features a highly optimized table look-up service and a general-purpose uniform filter service used by all routing protocols.

❐ System management

Provides direct support for SNMP-based management, dynamic reconfiguration, the Flash-based file system, and the Technician Interface (TI), a simple command line interpreter provided for installation and maintenance operations.
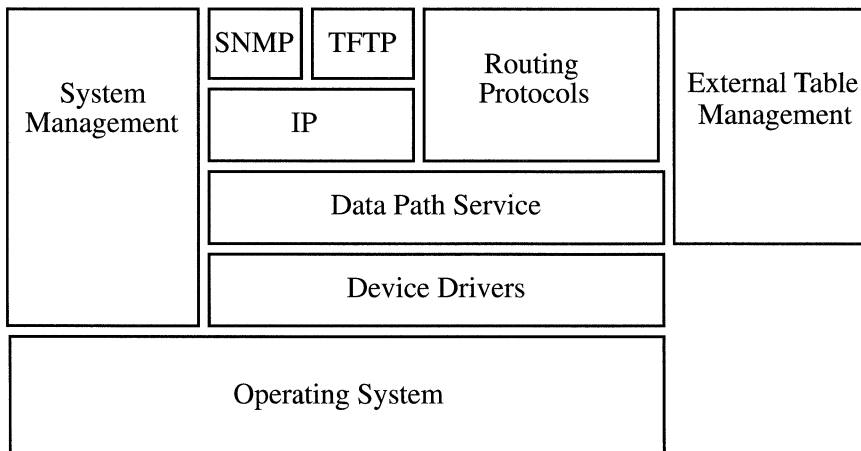
```
┌──────────────┐ ┌──────┬──────┐ ┌────────────┐ ┌──────────────┐
│              │ │ SNMP │ TFTP │ │  Routing   │ │External Table│
│   System     │ ├──────┴──────┤ │ Protocols  │ │ Management   │
│ Management   │ │     IP      │ │            │ │              │
│              │ └─────────────┘ └────────────┘ │              │
│              │ ┌──────────────────────────┐   │              │
│              │ │    Data Path Service     │   │              │
│              │ ├──────────────────────────┤   │              │
│              │ │      Device Drivers      │   │              │
└──────────────┘ └──────────────────────────┘   └──────────────┘
┌─────────────────────────────────────────────┐
│             Operating System                │
└─────────────────────────────────────────────┘
```

Figure 3-1. Backbone Node System Software Architecture

High-Speed Packet Forwarding and Filtering

The system software provides enhanced packet forwarding and filtering capabilities. Packet-forwarding and routing-update computation functions are fully distributed among multiple peer processors, and the traffic filter service provides a uniform filter mechanism common to all bridging and routing protocols. Forwarding and filtering operations are integrated so that when filtering occurs on the same field used for packet forwarding, there is no degradation in performance. Filtering on additional fields in a packet is also highly efficient.

Packets follow one of two paths through the system:

❐ In/Out on the same Link Module

In which case, the CPU on the connected FRE handles arbitration within the Link Module itself.

❐ In/Out on different Link Modules

In which case, the CPUs of both involved Link Modules handle the arbitration. Packets flow across the PPXI, across one of the four PPX rails, and across Link Module interfaces.

PPX rail selection is load balanced because paths are randomly selected. If any rail fails, the others remain active, preventing connectivity loss.

The following steps refer to Figure 3-2 and trace the different paths a packet can follow through the system:

1. A network-specific link controller on Link Module A receives an inbound packet from Port 1, and the packet is sent through the Link Interface to the packet buffer in DRAM on FRE A.
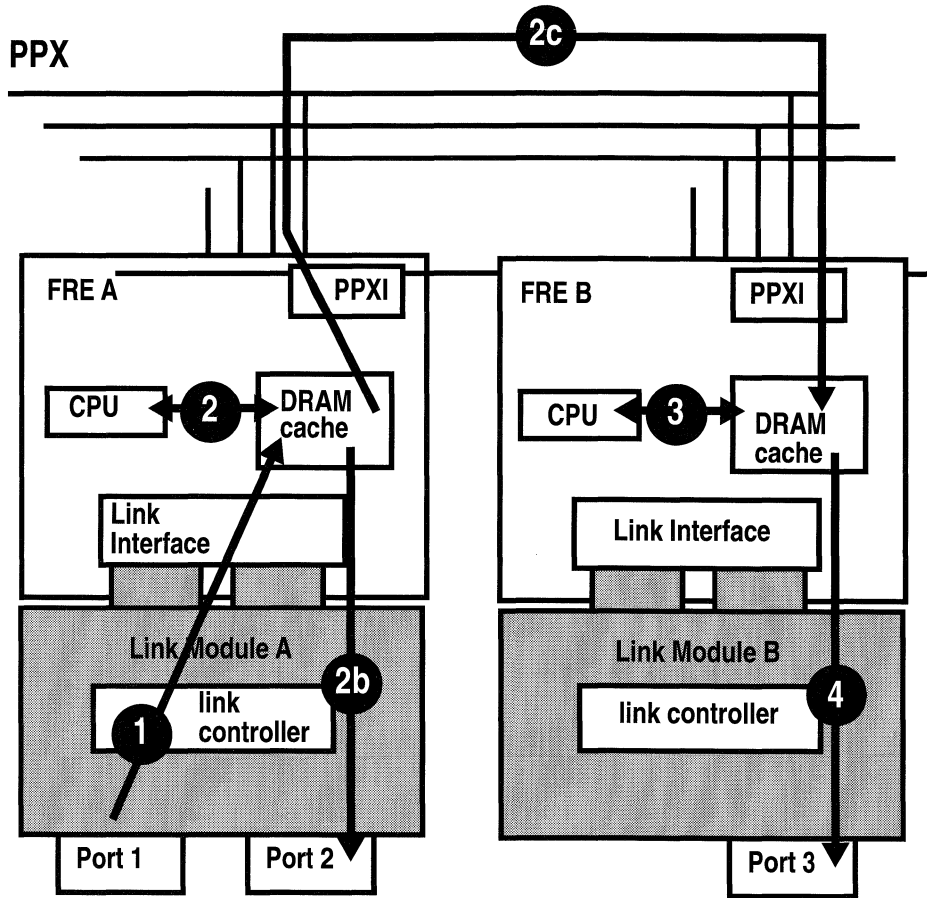
2a Drops packet.

Figure 3-2. Tracing a Packet through the System

2. The CPU on FRE A polls memory for packets to process, performs a forwarding/filtering table look-up action when a packet requires processing, and chooses one of three actions:

2a. Filter action

CPU drops packet.

2b. In/Out on the same Link Module action

CPU sends packet through the I/O interface on FRE A to Link Module A, where it is transmitted out Port 2.

2c. In/Out on different Link Module action

CPU sends the packet through the PPXI to the PPX for forwarding to Link Module B, where the CPU queues the packet on the PPXI. The PPXI receives the packet and places it in packet buffer in DRAM on FRE B.

3. On FRE B, the CPU does additional processing to format and prepare the packet for forwarding to its destination on Link Module B.

4. On FRE B, the packet leaves DRAM, is sent through the Link Interface and out to Link Module B, where it is sent through the link controller and out Port 3.

Distributed Management Processing

The symmetric multiprocessor architecture supports distributed management processing so that there is no single point of failure. The distributed management processing provides one SNMP agent, which can respond to GET/SET requests independently, on each FRE. There is also one TFTP client/server on each FRE. The system distributes MIB variables across the FREs, and each FRE can access the MIB variables on all other FREs.

SNMP-Based Management

Backbone Node System software management is directly supported by SNMP through the GET, GET NEXT, SET, and TRAP operations. Support is provided for Wellfleet's extensive, enterprise-specific MIB. Wellfleet's MIB is distributed in ASN.1 concise MIB format.

Software Fault Recovery and Partial Boot

The architecture supports software fault recovery. Software tasks can fail independently without affecting other tasks' operation, and the operating system automatically restarts failed software tasks without disrupting other tasks. The hierarchy of software fault recovery is task restart, system software restart, and processor reboot.

The software architecture supports a partial boot capability that ensures maximum system availability. Power-up diagnostics determine the status of each FRE and Link Module, and the system copes automatically with hardware failure and software configuration errors. The system will not boot failed FREs and will configure around failed or improperly configured hardware. Failures are identified to the FRE module, Link Module, or I/O interface level.

Fault Isolation

The Backbone Node system software ensures maximum availability because fault management is built into the system. If there is a hardware failure, the software isolates the failed component and the system remains operational. The software isolates hardware failures to the FRE processor, Link Module, SRM, PPX Rail, and network-interface level.

Dynamic Reconfiguration

The software architecture supports the ability to change dynamically, by means of SNMP, the value of any configuration parameter. If the reconfigured entity must be restarted in order to reconfigure the system based on the new setting, some services might be disrupted temporarily. Any changes made with SNMP SET are volatile and will be lost when the BN or processor reboots. To preserve SNMP-SET changes, you must save the configuration to a file in the Flash file system.

Hot Swap

The software architecture supports a hot-swap capability. You can remove and insert FREs, SRMs, and Link Modules while the BN is running. The system automatically boots FREs upon insertion using an algorithm which ensures the hot-swapped FRE is booted with the right software image and configuration file.

Technician Interface (TI)

The Technician Interface (TI) is a TTY interface that can be used locally or remotely for installation and maintenance purposes. The TI is based on a simple command line interpreter which supports SNMP-based access to the MIB. You can use the TI to display the event log. In addition, the TI supports file-system management and other administrative commands. Security is ensured with a two-level password mechanism (read versus read/write). The TI also supports out-of-band access to the BN through a modem connection.

Overview Guide   Revision A

What did you find most useful about this guide?

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