CNM Proxy Agent
User's Guide

Ascend Communications, Inc.

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About This Guide

The *CNM Proxy Agent User's Guide* is a task-oriented guide that describes how to install and run the CNM Proxy Agent.

This guide is intended for system administrators who are responsible for the installation and setup of the CNM Proxy Agent and service providers who provide CNM to their customers. Throughout this guide, the term "you" refers to the service providers; the terms "end-user" and "customer" refer to the service provider's customer.

What You Need to Know

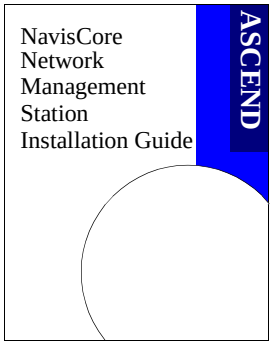
As a reader of this guide, you should be familiar with basic UNIX operating system commands. You should also possess a working knowledge of relational database software to properly maintain Sybase.

Customer Comments

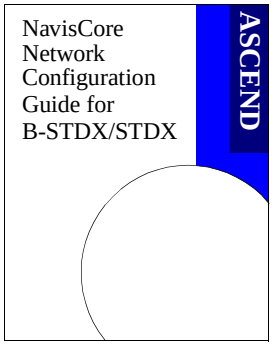
Customer comments are welcome. Please fill out the Customer Comment Form located at the back of this guide and return it to us.

Documentation Reading Path

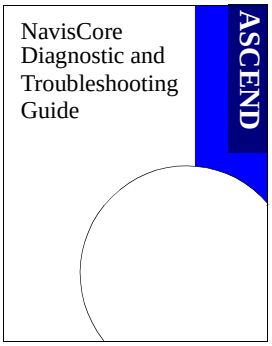
The following Ascend manuals provide the complete document set for the NMS platform. Use this document set with the *CNM Proxy Agent User's Guide.*



This guide describes how to set up the Network Management Station (NMS), prerequisite tasks, hardware and software requirements, and installation instructions.



After setting up your NMS, use this guide to define your network, configure switches, and download your configuration from the NMS to the switch. *This guide assumes that you have already installed NavisCore.*



After configuring your network, use this guide to monitor and troubleshoot your network. *This guide assumes that you have already installed NavisCore.*

How to Use This Guide

The *CNM Proxy Agent User's Guide* describes the features supported in the CNM Proxy Agent, Release 1.1. The manual is organized as follows:

Read	To Learn About
Chapter 1	CNM overview, service provider requirements, hardware and software requirements, and installation.
Chapter 2	Sybase preinstallation tasks, which include partitioning the second disk and setting the environment variables.
Chapter 3	Installing Sybase.
Chapter 4	Installing the CNM Proxy Agent.
Chapter 5	Manually configuring the switches.
Chapter 6	Starting, stopping, and testing the CNM Proxy Agent.
Chapter 7	Viewing trap alarm information.
Appendix A	Information required for the Sybase and the CNM Proxy Agent installation.
Appendix B	CNM Proxy Agent MIBs.

Before you begin the tasks described in this guide, read the Software Release Notice (SRN) that accompanies the software.

What's New in This Guide

The CNM Proxy Agent 1.1 includes the following new product features:

CNM Proxy Agent 1.1 New Features	Enables You to...	Described In/On
Multiprocessor capability	Enhance the performance of the CNM Proxy Agent.	page 1-3
In addition to Class C, support for Class B network addresses	Use the CNM Proxy Agent on networks that have large numbers of switches.	page 1-3
Automated CNM database updating	Automatically update the CNM database on a daily basis.	page 1-3
Support for multiple CNM gateways	Allow more customers to access the CNM Proxy Agent.	page 1-2
Trap validation	Filter traps. Trap validation ensures that the trap information forwarded by the proxy agent is from a circuit or logical port in the CNM database.	page 1-3
Database caching	Improve CNM performance.	page 4-13
Sybase 11 installation script	Install Sybase more easily.	Chapter 2 & Chapter 3
CNM Proxy Agent installation utility	Install the CNM Proxy Agent more easily.	Chapter 4

Conventions

This guide uses the following conventions to emphasize types of information, such as user input, screen prompts and output, and menu selections:

Convention	Indicates	Example
`Courier bold`	User input on a separate line.	**eject cdrom**
Courier	Screen output and system messages.	Please wait...
[*Bold italics*]	Variable parameters to enter (in body text).	**[*your IP address*]**
[*Courier bold italics*]	Variable parameters to enter (in command line).	**[***your IP address***]**
`<Key name>`	A keyboard entry.	`<Return>`
Boldface	User input in text.	Type **cd install**
Menu ⇒ Option	Select an option from the menu.	CascadeView ⇒ Logon
Black boxes surrounding text	Notes and warnings.	See examples below.
Italics	UNIX filenames, pathnames, and directories. Also book titles, new terms, and emphasized text.	*/usr/opt/sybase* *Network Management Station Installation Guide*

Notes provide helpful suggestions or reference to materials not contained in this manual.

Cautions alert the reader to proceed carefully in order to avoid equipment damage or data loss.

Related Documents

This section lists the related Ascend and third-party documentation that may be useful to reference.

Ascend

- *Networking Services Technology Overview* (Product Code: 80001)
- *Network Management Station Installation Guide* (Product Code: 80014)
- *Network Configuration Guide for B-STDX/STDX* (Product Code: 80017)
- *Diagnostic and Troubleshooting Guide* (Product Code: 80074)

Third Party

- *HP OpenView Windows User's Guide* (for Sun SPARCstation)
- *Sybase Command Reference Manual*
- *Sybase System Administration Guide*

1

Overview

Customer Network Management (CNM) is a technology that enables customers (end-users) to access a subscribed portion of their service provider's network. The CNM Proxy Agent extends a customer's network management view, allowing customers to access information about network devices and connections, performance statistics, and switch configuration. Customers use this information to manage their traffic patterns and peak usage on the service provider's network.

The CNM Proxy Agent, which is currently available on Frame Relay networks, supports Network-to-Network Interface (NNI) and User-to-Network Interface (UNI-DCE) logical ports. Ascend's CNM implementation supports the Frame Relay Forum standard FRF.6 and the following Request for Comment (RFC) standards and MIBs:

- RFC 1604 Frame Relay (Service MIB)
- RFC 1232 (DS1 MIB) [1] (Not supported on the Channelized DS3 card)
- RFC 1213 MIB II (System and Interfaces Group)

[1] Ascend implements the DS1 MIB under the "transmission" branch, whereas RFC 1232 implements the MIB under the "experimental" branch. This modification is based on the suggestions stated in RFC 1239. See */opt/CascadeView/snmp_mibs/rfc1232.mib.*

CNM Components

To run the CNM Proxy Agent, you must set up the following components:

- The CNM gateway, which is provided by the service provider.
- NavisCore, which includes the NavisCore Sybase database.
- The CNM Proxy Agent, which includes the CNM Sybase database.

CNM Gateway

The basic function of a CNM gateway is to give the customers of service providers a way to communicate with the CNM Proxy Agent via Simple Network Management Protocol (SNMP). CNM now allows service providers to use up to nine gateways with each CNM Proxy Agent.

When a customer sends a request to the CNM gateway, the gateway authenticates the request and determines the customer's access level. The gateway also provides flow control on the number of end-user requests.

If the customer's request is validated, the gateway sends the request to the CNM Proxy Agent. The CNM Proxy Agent retrieves the information and sends it to the gateway. The CNM gateway, then, forwards the information to the customer.

The service provider is responsible for the design and implementation of the CNM gateway. Ascend does not support the gateway.

NavisCore

The CNM Proxy Agent works with the NavisCore NMS. The proxy agent retrieves information about network devices and configurations from the NavisCore Sybase database and stores the information in the CNM Sybase database. The proxy agent updates the CNM database daily.

CNM Proxy Agent

The CNM Proxy Agent acts as an external SNMP agent by responding to the CNM gateway's SNMP requests. Customers can use the CNM Proxy Agent to retrieve configuration information from the CNM database and statistical information and SNMP traps directly from the switch. The CNM Proxy Agent supports networks with Class B and Class C IP addressing.

The CNM Proxy Agent allows read-only access to the network. Customers cannot use the proxy agent to modify configurations.

The CNM Proxy Agent listens on two ports, the *SNMP port* and the *Trap port*.

- The SNMP port receives *GET* or *GETNEXT* requests from the CNM gateway.
- The TRAP port receives SNMP traps directly from the switch.

When the CNM Proxy Agent receives a GET or GETNEXT request, it retrieves the requested information and then forwards the information to the CNM gateways.

If the proxy agent receives SNMP traps directly from the switch, it verifies that the trap is from a circuit or logical port in the CNM database. The proxy agent filters out the traps that are not specified in the CNM database and then broadcasts the information to the gateways.

CNM Sybase Database

The CNM Sybase database stores CNM tables and network configuration information retrieved from the NavisCore Sybase database. CNM automatically updates the CNM database on a daily basis so that it stays synchronized with the NavisCore database. During the installation process, you specify the exact time that CNM should perform the daily update. You can also manually update the CNM database at any time.

CNM and Multiprocessor Support

To enhance the performance of the proxy agent, service providers can run the CNM Proxy Agent on multiprocessor workstations. During installation, you define the number of processors.

How CNM Works

This is how CNM works:

- The customer sends a management request to the service provider's CNM gateway.
- The CNM gateway authenticates the customer's access.
- The CNM gateway generates an SNMP request *(GET/GETNEXT)* to the CNM Proxy Agent.
- The CNM Proxy Agent does one of the following, depending on the request:

  Configuration request — The proxy agent retrieves information from the CNM database.

  Switch status request — The proxy agent retrieves information from the switch.
- The CNM Proxy Agent returns the requested information to the CNM gateway.
- The proxy agent also receives SNMP traps directly from the switch. The proxy agent filters out traps that are not from a circuit or logical port in the CNM database and broadcasts the remaining traps to the CNM gateways.
- The CNM gateway forwards the information received from the CNM Proxy Agent to the customer.

Figure 1-1 illustrates this process.

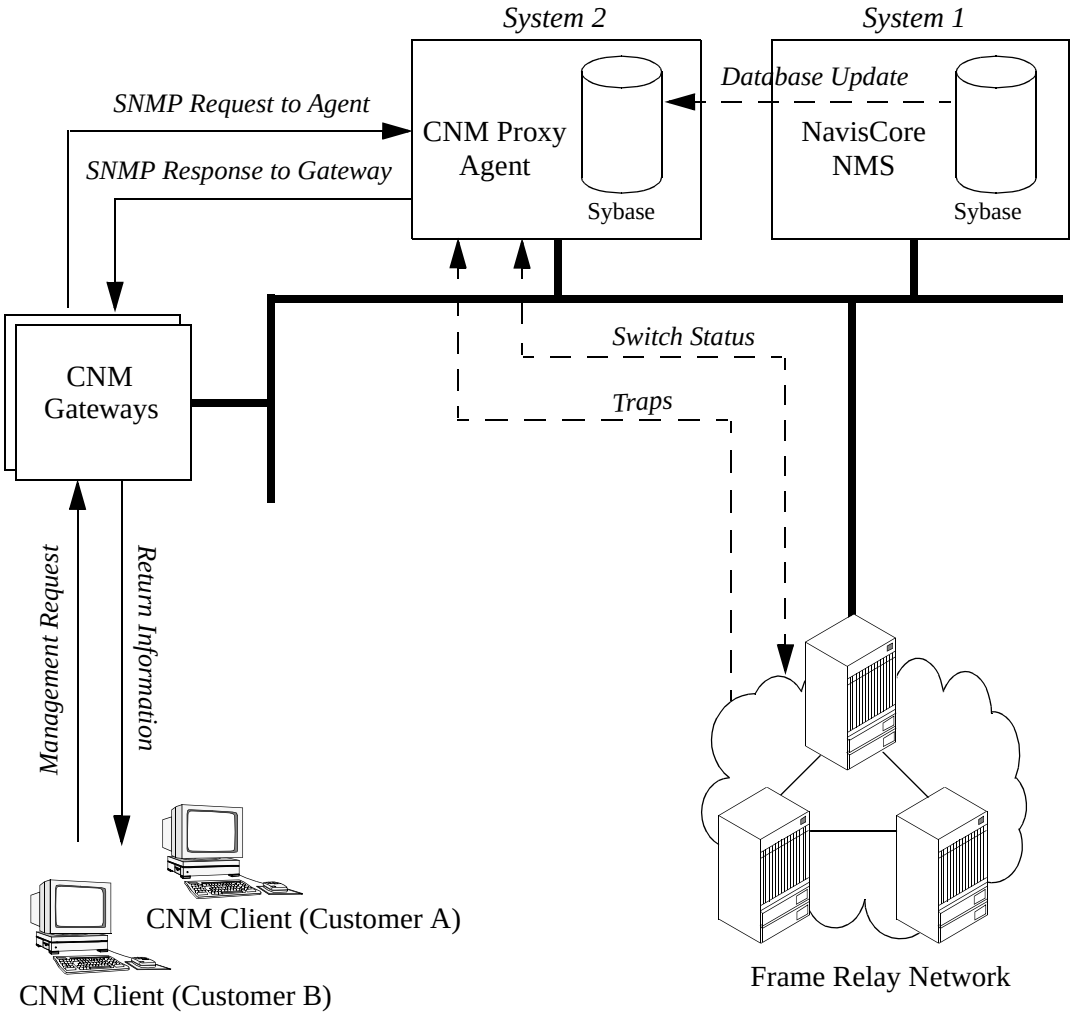


Figure 1-1. CNM Workflow Process

Implementation Requirements

There are various ways to set up CNM components. Although this section illustrates two different implementations, you can set up CNM components in other ways as long as you meet the CNM implementation requirements.

These are the two basic requirements for setting up CNM components:

- The CNM and NavisCore databases can reside on *any* workstation as long as the required disk space is available.
- The NavisCore NMS, CNM Proxy Agent, and the CNM gateway must reside on their own separate workstations.

The CNM Proxy Agent and NavisCore cannot reside on the same workstation because the applications use the same SNMP trap port 162.

Sample Implementations

You can set up the CNM components in various ways depending on where you locate the CNM and NavisCore Sybase databases. Since the databases can reside on any system, many configurations are possible.

Figure 1-2 and Figure 1-3 illustrate two types of implementation.

- In Figure 1-2, the CNM database resides locally on the CNM Proxy Agent system (*System 2*) and the NavisCore database resides on the NavisCore system (*System 1*).
- In Figure 1-3, both the CNM and NavisCore databases reside on the same Sybase server (*System 3*).

If the illustrated implementations do not fit your needs, you can set up CNM components in other ways. For example, the CNM Sybase database and the NavisCore Sybase database can reside on two different remote systems. The CNM database can even reside on the CNM gateway.

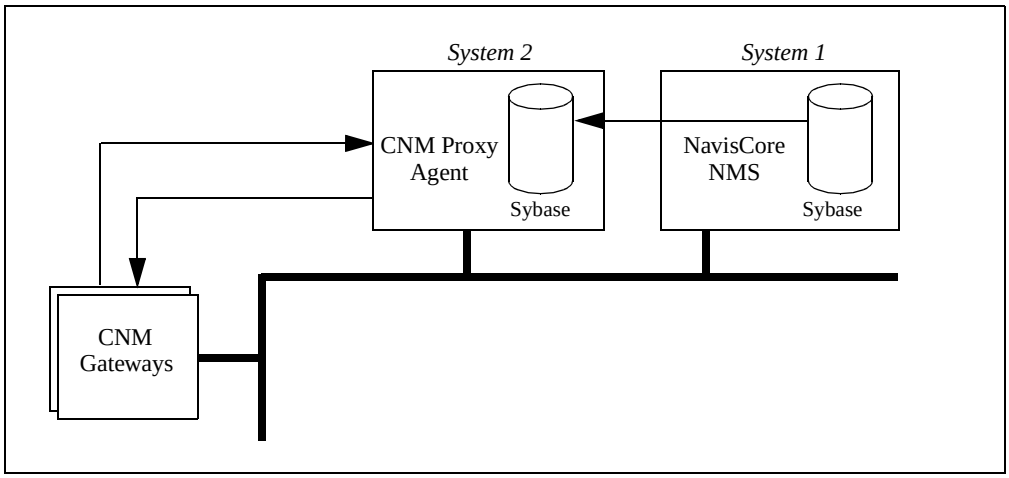


Figure 1-2. Local CNM Database Implementation

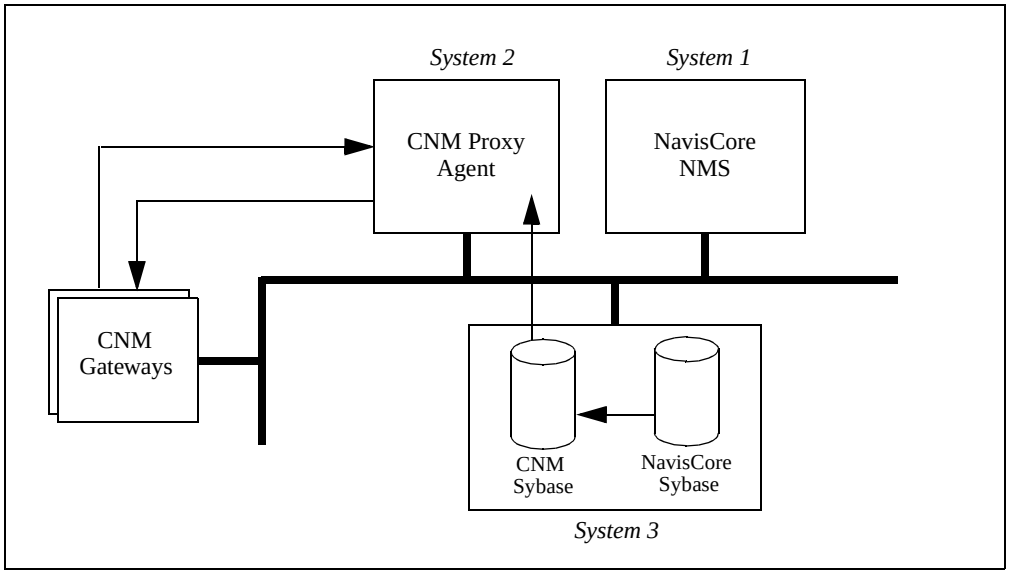


Figure 1-3. Remote CNM Database Implementation

General Requirements

This section describes the software and hardware requirements for the CNM gateway workstations, the CNM Proxy Agent workstation (*System 2*), and the NavisCore NMS workstation (*System 1*).

Requirements for the CNM Gateway

The service provider is responsible for the configuration and implementation of CNM gateways. The only requirements are as follows:

- CNM gateways must use SNMP to communicate with the CNM Proxy Agent.
- The CNM Proxy Agent can support up to nine CNM gateways.
- A CNM gateway must reside on its own workstation. It cannot be located on either the CNM Proxy Agent or NavisCore workstations.

Software Requirements for Running CNM 1.1

CNM Proxy Agent Version 1.1 works with NavisCore. Table 1-1 lists the software requirements for both of these applications. Table 1-1 assumes that the CNM and NavisCore databases reside on the CNM and NavisCore workstations, respectively. (If you install a database on a remote workstation, that workstation also requires the Solaris 2.4 or 2.5 operating system.)

Table 1-1. Software Requirements for Running CNM 1.1

NavisCore Requirements	CNM Requirements
Solaris 2.4 or 2.5	Solaris 2.4 or 2.5
Sybase 11 or 4.9.2	Sybase 11
NavisCore 2.0 or higher	CNM Proxy Agent 1.1

If you are not running NavisCore Version 2.0 (or higher), read the CNM Software Release Notice before you proceed to the next chapter.

Hardware Requirements for the CNM Workstation

Table 1-2 lists the recommended hardware configuration for the CNM workstation (*System 2*).

Table 1-2. Recommended Hardware Configuration for the CNM System

Workstation	Hard Drive	RAM
UltraSPARC 1 (1 processor)	(2) 1.05 GB hard drives	128 MB RAM

Service providers may run the CNM Proxy Agent on less powerful workstations such as the SunSPARC 20 or on more powerful workstations such as the UltraSPARC 2. To determine whether the recommended hardware configuration in Table 1-2 is appropriate for your needs, refer to the benchmark information in the next section.

Benchmark Information for the Recommended Hardware Configuration

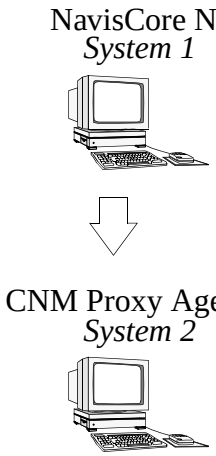
With the recommended hardware configuration in Table 1-2 and with database caching enabled, the CNM Proxy Agent can process requests as follows:

- Configuration data for circuits or logical ports — 1200 requests per second
- Status data for circuits or logical ports (switch access) — 200 requests per second
- SNMP GET and GETNEXT requests to DS1 tables — 80 and 0.1 requests per second, respectively

These performance statistics are based on a network configuration of 20,000 logical ports, 20,000 circuits, and 19,000 DS1 ports. The actual response time may vary depending on the size of the network, the data requested, and the configuration of the CNM Proxy Agent. Call Ascend for more specific benchmark information.

CNM Installation Overview

Figure 1-4 outlines the CNM installation process and lists the software programs that you must install. Perform installation tasks in the sequence outlined below.



Step 1

Install Solaris and NavisCore NMS on *System 1*. Install NavisCore Sybase on *System 1* or an alternate system. (Refer to the *Network Management Station Installation Guide*.)

Step 2

Install Solaris on the CNM workstation, *System 2*. (Refer to the *Network Management Station Installation Guide*.)

After you complete the installation worksheets in Appendix A, perform Sybase and CNM Proxy Agent installation tasks in this sequence:

On the CNM Sybase system (*System 2 or other):*

- Partition disks (Chapter 2).
- Perform Sybase 11 setup tasks with the Sybase installation script (Chapter 2).
- Install Sybase 11 with the Sybase installation script (Chapter 3).

On the CNM Proxy Agent workstation (*System 2*):

- Install the CNM 1.1 Proxy Agent with the pkgadd installation utility (Chapter 4).

On the NavisCore workstation (*System 1*):

- Manually configure switches (Chapter 5).

Figure 1-4. CNM Installation Process

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Preparing for Sybase 11 Installation

This chapter describes how to prepare the CNM Sybase workstation for the Sybase 11 installation. In this chapter you perform these tasks:

- Shut down existing Sybase processes.
- Partition the second disk using raw partitions.
- Load the Ascend-supplied Sybase 11 tape and extract the script.
- Run the Sybase 11 installation script to perform prerequisite tasks.

Before you begin the Sybase prerequisite tasks, verify the following tasks are complete:

☑ Review the CNM implementation requirements (page 1-6).

☑ Review the CNM installation overview (page 1-10).

☑ Fill out the Sybase installation worksheets (Appendix A).

Reviewing the Sybase Installation Worksheet

Before you begin the tasks in this chapter, complete the Sybase 11 worksheets in Appendix A. The installation script asks for worksheet information when you are setting up your system for Sybase 11 and when you are installing Sybase 11.

Deinstallation Tasks

Do not perform these tasks if you are using the same Sybase server for both the CNM and NavisCore databases and this server has Sybase 4.9.2 installed on it. Refer to the Ascend Sybase 11 SQL Server Upgrade Guide for upgrade procedures.

If you are installing CNM Sybase 11 on a system that has the CNM Sybase 11 or 4.9.2 on it, you need to shut down any CNM Sybase processes that are running. If you are reinstalling Sybase 11, you must also remove Sybase activation/deactivation files.

Follow these deinstallation procedures:

1. To find out if Sybase processes are running, log on the CNM Sybase workstation and enter the following command:

   ```
   ps -aef | egrep -i 'run|data|syb'
   ```

   The system displays the Sybase processes that are running in this format:

   ```
   root 97  21  2 Jan 07  ?  10:25 /opt/sybase/bin/dataserver
   ```

2. Note the process ID number located in the second column of output (97 in the example) and enter the following command to shut down the Sybase processes:

   `kill - 9 [`*`process ID`*`] [`*`process ID`*`] [`*`process ID`*`]`

3. If you are reinstalling Sybase 11 and changing Sybase environment variables, you also need to remove three Sybase activation/deactivation files. Enter:

   ```
   cd /etc
   rm  rc2.d/S97sybase   rc0.d/K01sybase    rc2.d/S98sybase
   ```

Partitioning the Second Disk Using Raw Partitions

If your CNM Sybase workstation has two disks (as recommended) and you partitioned the first disk using file systems during the Solaris installation, you now need to partition the second disk using raw partitions. Continue with the procedures in this section.

If your CNM Sybase workstation has one disk and you partitioned the first disk using file systems during the Solaris installation, you cannot partition a second disk. Proceed to "Loading the Ascend-supplied Sybase Tape" on page 2-9.

This section shows you how to partition the second disk with the recommended settings listed in Table 2-1.

Table 2-1. Recommended Partition Settings

Partition(s)	Function
1 and 3	These partitions are not used.
0	Master device for Sybase.
4	System Procs device for Sybase.
5	Data device for Sybase.
6	Log device for Sybase.
7	Partition used for remainder of unallocated space.

Before you partition the second disk, make sure the disk you are about to partition is not the same disk you partitioned during the Solaris install. If you did not use the recommended partition settings, consult your UNIX Administrator before completing this section.

Follow these steps to partition the second disk:

1. Log on the CNM Sybase workstation. Type **su - root** and press Return to become root. At the prompt, enter the root password.
2. In a command tool window, type **format** and press Return.
3. When prompted to specify a disk, enter the number of the disk that you did *not* partition during the Solaris installation.

   The Format menu appears listing the format options.

If you specify the partitioned disk, the following message is displayed:
Warning: Current Disk has mounted partitions.
Enter **quit**. Return to step 3 and select the disk that you did not partition.

4. At the Format prompt, enter **partition**.

The Partition menu appears. You are now ready to begin partitioning the disk.

Defining Partitions 1 and 3

Perform the following steps for both partitions 1 and 3. Accept the default settings in brackets [default] by pressing Return when indicated. Do not make any changes to partition 2.

1. At the Partition prompt, enter **[*partition number, 1 or 3*]**.
2. At the following prompts, press Return to accept the defaults:

```
Enter partition id tag [unassigned]: <Return>
Enter partition permission flags [wm]: <Return>
Enter new starting cyl [0]: <Return>
Enter partition size [0b, 0c, 0.00mb]: <Return>
```

If you are using a default label and you did not relabel the drive, enter 0 at the partition size prompt.

3. Repeat Steps 1 and 2 to define partition 3.

Creating a Master Device on Partition 0

Complete the following steps to create a Master device for Sybase on partition 0. Accept the default settings in brackets [default] by pressing Return when indicated.

1. At the Partition prompt, enter **0** for partition 0.
2. At the following prompts, press Return to accept the defaults:

```
Enter partition id tag [unassigned]: <Return>
Enter partition permission flags [wm]: <Return>
```

3. At the New Starting Cylinder prompt, enter **1**.
4. At the Partition Size prompt, enter **40mb**. Do not accept the default of zero.

If you accept the default value of zero for the partition size, the database will be corrupt after you complete the installation and reboot the system.

5. At the Partition prompt, enter **print** to display the current partition table. A table, similar to Table 2-2, appears. Record the ending cylinder number for partition 0. (In the sample partition table, this is 54.) You need this information to define the new starting cylinder for the next partition.

Table 2-2. Sample Partition Table

Part	Tag	Flag	Cylinders	Size	Blocks
0	unassigned	wm	1 - 54	40.08MB	(54/0/0)
1	unassigned	wm	0	0	(0/0/0)
2	backup	wm	0 - 1366	1GB	(1366/0/0)
3	unassigned	wm	0	0	(0/0/0)
4	unassigned	wm	55 - 88	25MB	(34/0/0)
5	unassigned	wm	89 - 493	300.23MB	(405/0/0)
6	unassigned	wm	494 - 898	50MB	(405/0/0)
7	unassigned	wm	899 - 1366	335MB	(467/0/0)

Creating a System Procs Device on Partition 4

Complete the following steps to create a System Procs device for Sybase on partition 4. Accept the default settings in brackets [default] by pressing Return when indicated.

1. At the Partition prompt, enter **4** for partition 4.
2. At the following prompts, press Return to accept the defaults:

   ```
   Enter partition id tag [unassigned]: <Return>
   Enter partition permission flags [wm]: <Return>
   ```

3. At the New Starting Cylinder prompt, enter **[*a number equal to the ending cylinder from partition 0 plus 1*]**.
4. At the Partition Size prompt, enter **25mb**.
5. At the Partition prompt, enter **print** to display the current partition table. Record the ending cylinder value for partition 4. You need this information to define the new starting cylinder for the next partition.

Creating a Data Device on Partition 5

Complete the following steps to create a Data device for Sybase on partition 5. Accept the default settings in brackets [default] by pressing Return when indicated.

1. At the Partition prompt, enter **5** for partition 5.
2. At the following prompts, press Return to accept the defaults:

   ```
   Enter partition id tag [unassigned]: <Return>
   Enter partition permission flags [wm]: <Return>
   ```

3. At the New Starting Cylinder prompt, enter [***a number equal to the ending cylinder from partition 4 plus 1***].
4. At the Partition Size prompt, enter **300mb**.
5. At the Partition prompt, enter **print** to view the current partition table. Record the ending cylinder value for partition 5. You need this information to define the new starting cylinder for the next partition.

Creating a Log Device on Partition 6

Complete these steps to create a log device for Sybase on partition 6.

1. At the Partition prompt, enter **6** for partition 6.
2. At the following prompts, press Return to accept the defaults:

   ```
   Enter partition id tag [unassigned]: <Return>
   Enter partition permission flags [wm]: <Return>
   ```

3. At the New Starting Cylinder prompt, enter [***a number equal to the ending cylinder from partition 5 plus 1***].
4. At the Partition Size prompt, enter **50mb**.
5. At the Partition prompt, enter **print** to view both the current partition table and the information about the total disk cylinders available.
6. Record the ending cylinder value for partition 6. You need this information to define the new starting cylinder for the next partition.
7. Record the number of total disk cylinders available. You need this information to calculate the remaining unallocated space for the next partition.

   The entry describing the total disk cylinders available is located directly above the partition table. The entry has this format:

   ```
   Total disk cylinders available: 1866 + 2 (reserved
   cylinders)
   ```

   In the example above, 1866 is the value you would record. (Do not add the 2 to the 1866 value.)

Defining Partition 7

Perform the following steps to define partition 7.

1. At the Partition prompt, enter **7** for partition 7.
2. At the following prompts, press Return to accept the defaults:

   ```
   Enter partition id tag [unassigned]: <Return>
   Enter partition permission flags [wm]: <Return>
   ```

3. At the New Starting Cylinder prompt, enter [***a number equal to the ending cylinder from the partition 6 plus 1***].
4. At the Partition Size prompt, enter [***remaining unallocated space on drive after all other settings have been set***]. Append the suffix **c** to the value to indicate cylinders (150c, for example).

To calculate the remaining unallocated space, subtract the number of the ending cylinder of partition 6 from the number of total disk cylinders available. Refer to step 5 through step 7 on page 2-7.

5. At the Partition prompt, enter **quit** to exit the partition mode.
6. At the Format prompt, enter **label** to label and save the partitions.
7. At the Label Disk prompt, enter **y**.
8. At the Format prompt, enter **quit**.

You have now partitioned the second disk. Continue to the next section to load the Ascend-supplied Sybase tape and extract the installation scripts.

Loading the Ascend-supplied Sybase Tape

Follow these steps to load the tape and extract the scripts:

1. On the CNM Sybase workstation, verify that you are root. You should see the # prompt. If you are not root, enter **su - root**. At the prompt, enter the root password.

If you are logged in via a remote connection (rlogin/rsh/telnet), set your DISPLAY variable to the value of the local host. Enter the following:
DISPLAY=*[local hostname]*:0.0
export DISPLAY
(This example uses the Korn shell syntax.)
In addition, open a new command tool window and enter **xhost +** as the user who controls the system console. The xhost + command enables you to open the window that displays the installation log.

2. Insert the Ascend-supplied Sybase tape into the tape drive and close the latch.
3. In the command tool window, enter **cd /opt** to move to the */opt* directory.
4. Enter the following command:

   `tar -xvpf [`*`media device pathname`*`] cv_scripts`

   Refer to your Sybase 11 installation worksheet in Appendix A for the pathname of the tape device.

   This command copies the tar file from the tape device, extracts the scripts from the tar file, and places the scripts in a directory called *cv_scripts* in the */opt* directory. The whole process takes about 10 minutes.

You are now ready to set up your system for the Sybase 11 installation.

Setting Up the System for Sybase 11

Follow these steps to set up your system for Sybase 11:

1. Move to the */opt/cv_scripts* directory. Since you are already in the */opt* directory, type **cd cv_scripts** and press Return.
2. Enter the following command to start the Sybase script:

   ```
   ./install_sybase
   ```

   The following message appears:

   ```
   Verifying super user privileges...
   Would you like to view (tail -f) the install log (default=y)?
   ```

   The Tail window allows you to view a log of the installation process.
3. Press Return to accept the default (yes).

   The Tail (Installation Log) window appears in front of the Sybase installation window.
4. Move the Tail window behind the Sybase installation window so you can continue with the installation prompts. Whenever necessary, refer to the Tail window to see a list of installation events.

   The Sybase installation window now displays the Sybase Installation menu. See Figure 2-1.

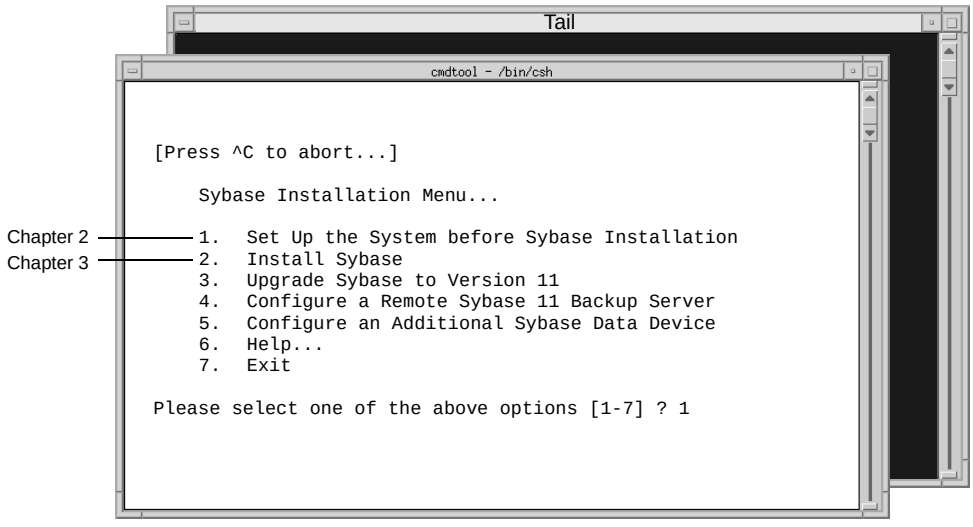

Figure 2-1. Sybase Installation Menu

The Sybase Installation menu enables you to perform various Sybase installation tasks. However, only the first two options in the menu are applicable to the CNM Sybase installation:

- In this chapter (Chapter 2), you specify Option 1 to set up the system for the Sybase installation.
- In Chapter 3, you run the Sybase script again and select Option 2 to install Sybase.

5. At the Sybase Installation Menu, enter **1** to set up the system.

The following message appears:

```
Complete all prerequisite tasks before continuing. See
Ascend's installation documentation for more information.

Do you wish to continue? <y|n> [default=y]:
```

6. Since you have performed all prerequisite tasks, press Return to continue.

The following message appears:

```
Setting up your system for the Sybase Install
-----------------------------------------------
Creating the dba group for database system administrator.
Successfully added group 'dba' with gid 300

Creating a user account for sybase
------------------------------------
Enter User's home directory [default : /opt/sybase] ?
```

Refer to your Sybase 11 installation worksheet in Appendix A to complete the following steps.

7. When prompted for the user's home directory, do one of the following:

- Press Return to accept the default of **/opt/sybase**.
- Enter [***Sybase 11 home directory***].

The following message appears:

```
Adding user sybase. Please wait...
Successfully added user sybase...
Configuring the user account with environment files.
-----------------------------------------------------
Enter the Database Server Name (default=CASCADE) ?
```

8. When prompted for the database server name, do one of the following:

- Enter the recommended value **CASCCNM**.
- Enter [***database server name***].

9. When prompted for the name of the error log, do one of the following:
   - Enter the recommended value **CASCCNM_err.log**.
   - Enter [***error log filename***].
10. When prompted for the database SA password, do one of the following:
   - Enter the recommended password **superbase**. When prompted again for the password, re-enter the password.
   - Enter [***database SA password***]. When prompted again for the password, re-enter the password.

   The following message appears:

```
Creating /etc/rc2.d/S97sybase...Done.
Creating /etc/rc0.d/K01sybase...Done.
Creating /etc/rc2.d/S98sybase...Done.
```

The install script creates the three files listed above. These files are used to activate and de-activate the Sybase server.

```
You must add at least one more user account.
Enter name of the user [default : nms] ?
```

11. When prompted for the name of the user, do one of the following:
   - Press Return to accept the default of **nms**.
   - Enter [***NMS user's name***].
12. When prompted for the user's group, do one of the following:
   - Press Return to accept the default of **staff**.
   - Enter [***NMS user's group name***].

   Assuming your user name is nms, the following message appears:

```
Creating a user account for nms
---------------------------------------
Enter user's home directory [default : /opt/nms] ?
```

13. When prompted for the user's home directory, do one of the following:
   - Press Return to accept the default of **/opt/nms**.
   - Enter [***NMS user's home directory***].

   Assuming your user name is nms, the following message appears:

```
Adding user nms. Please wait ...
Successfully added user nms ...
Configuring the user account with environment files.
-----------------------------------------------------
Setting Shared Memory Allocations
```

The script increases Sybase's shared memory. The script accomplishes this by appending the line **set shmsys:shminfo_shmmax=131072000** to the */etc/system* file.

The system displays the following:

```
Making a backup copy of '/etc/system' in '/etc/system.cv'
Setting TCP Socket device for Sybase
------------------------------------
The Socket Number for Sybase is 1025
The Socket Number for Sybase BACKUP is 1026
```

If the sockets are available, the script assigns the TCP socket number 1025 to Sybase and 1026 to the Backup Server. If the system is already using these sockets, the script chooses the next available numbers.

The following message appears:

```
Do you wish to continue? <y|n> [default=y]:
```

14. Press Return to continue.

The following message appears:

```
Creating Additional User Accounts
---------------------------------
1. Create User Account.
2. Proceed to the Next Step.
```

15. Because CNM allows only one user account, enter **2** to proceed to the next step.

The Device Installation menu appears. See Figure 2-2. This menu allows you to define the device that uses the Sybase database.

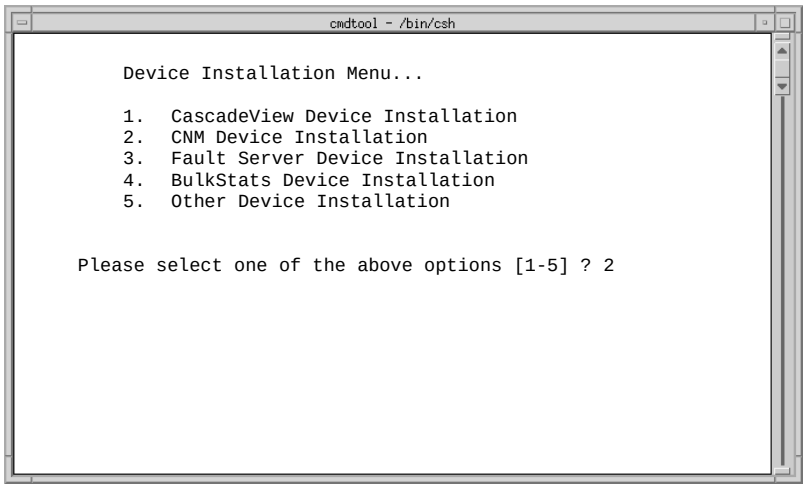

Figure 2-2. Device Installation Menu

16. Enter **2** to select CNM Device Installation.

The following message appears:

```
The CNM Device Installation selected.
```

The following menu appears:

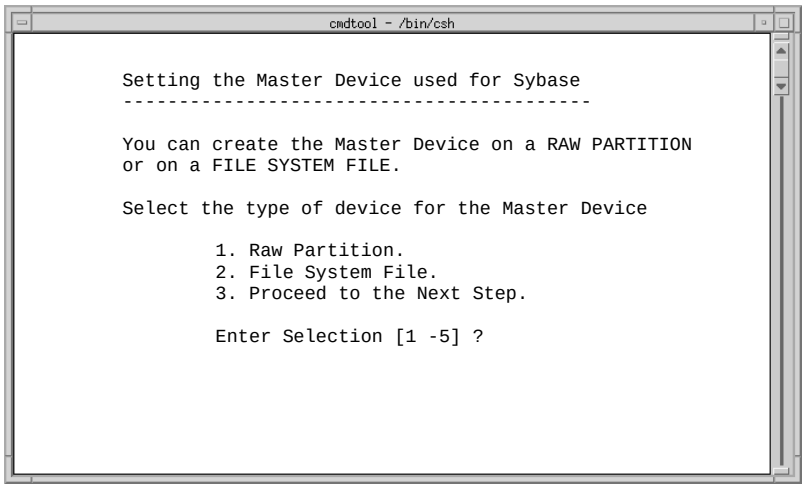

Figure 2-3. Setting the Master Device Used for Sybase Menu

17. At the Setting the Master Device menu, do one of the following:

- To select Raw Partitions, enter **1** and proceed to "If You Selected Raw Partitions for the Master Device" on page 2-16.
- To select File-System Files, enter **2** and proceed to "If You Selected File-System Files for the Master Device" on page 2-18.

Select the Raw Partition option if you partitioned the second disk with raw partitions, as described on page 2-3 to page 2-8. Select the File System File option if you did not partition the second disk because the CNM Sybase workstation has only one disk.

If You Selected Raw Partitions for the Master Device

The following message appears if you selected Raw Partitions in the Setting the Master Device menu:

```
WARNING: IF YOU INSTALL THE SQL SERVER ON A RAW PARTITION,
ANY EXISTING FILES ON THAT PARTITION WILL BE OVERWRITTEN.

Do you wish to continue? [default=y]:
```

1. Press Return to continue.

Refer to your Sybase 11 installation worksheet in Appendix A for the following prompts. If you partitioned the second disk with the recommended partition settings in Table 2-1 on page 2-3, be sure to enter the recommended values for the pathname and size of devices.

The following message appears:

```
Setting up Raw Partition Devices
--------------------------------
Enter the Master Device Pathname (e.g. /dev/rdsk/c0t1d0s0):
```

2. At the Master Device Pathname prompt, do one of the following:
   - Enter the recommended value **/dev/rdsk/c0t1d0s0**.
   - Enter [***master device pathname***].

   A message, similar to the following, appears:

```
Setting device permissions. Please wait ...
Device /dev/rdsk/c0t1d0s0 has been set.

Enter the Procs Device Pathname (e.g. /dev/rdsk/c0t1d0s4):
```

3. At the Procs Device Pathname prompt, do one of the following:
   - Enter the recommended value **/dev/rdsk/c0t1d0s4**.
   - Enter [***procs device pathname***].

   A message, similar to the following, appears:

```
Setting device permissions. Please wait ...
Device /dev/rdsk/c0t1d0s4 has been set.

Enter the Cascade Device Pathname (e.g. /dev/rdsk/c0t1d0s5):
```

4. At the Cascade Device Pathname prompt, do one of the following:
   - Enter the recommended value **/dev/rdsk/c0t1d0s5**.
   - Enter [***Cascade device pathname***].

   A message, similar to the following, appears:

```
Setting device permissions. Please wait...
Device /dev/rdsk/c0t1d0s5 has been set.

Enter the Log Device Pathname (e.g. /dev/rdsk/c0t1d0s6):
```

5. At the Log Device Pathname prompt, do one of the following:
   - Enter the recommended value **/dev/rdsk/c0t1d0s6**.
   - Enter [***log device pathname***].

   A message, similar to the following, appears:

```
Setting device permissions. Please wait...

Device /dev/rdsk/c0t1d0s6 has been set. The maximum value
for your Master Device has been calculated to maximize the
size of your raw partition. By accepting the default you will
be utilizing the whole raw device. A minimum value has been
established at 40 Mbytes. You will not be allowed to go below
that threshold.

NOTE: It is recommended that you accept the maximum value.
Otherwise, the space left over will be wasted.

Enter size of your Master Device in Megabytes:
```

6. At the Master Device Size prompt, do one of the following:
   - Press Return to accept the default value 40.
   - Enter [***master device size***].

   The following message appears:

```
Press Enter to return...
```

7. Press Return to continue.

The following message appears:

```
If you have completed the initial Sybase setup successfully,
please REBOOT the workstation now.
```

8. To reboot the workstation and enable the new parameters, enter the following command at the # prompt:

   `init 6`

   The init 6 command reboots the system.

When the system is up and running again, you can install Sybase 11. Proceed to Chapter 3.

If You Selected File-System Files for the Master Device

The following message appears if you selected file-system files in the Setting the Master Device menu:

```
Warning: Do not create Sybase master devices as regular UNIX
files on 'Production' SQL Servers. I/O to operating system
files is buffered I/O, so your data may not be recoverable in
the case of a system crash or other failure.

Avoid remote mounted file systems. Do not create or use
devices on remote NFS-mounted or RFS-mounted directories.

You also need to determine if there is enough space in the
file system for master device.

NOTE: Consult your Cascade manual for recommended space
requirements.

Press Return to continue...
```

1. Press Return to continue.

   The following report appears:

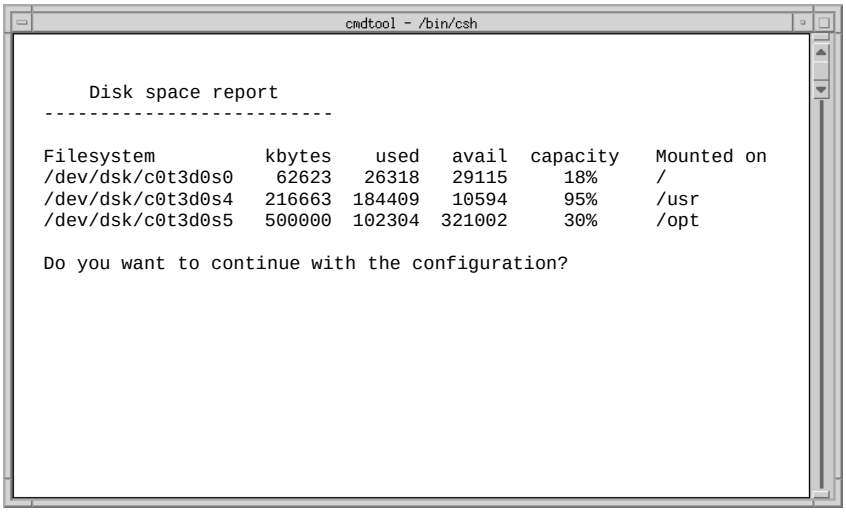

Figure 2-4. Disk Space Report

2. When you are prompted to continue, enter **y**.
3. At the Database Device Directory prompt, do one of the following:
   - Press Return to accept the default of **/opt/databases**.
   - Enter [***database device directory***].

   The follow message appears:

   ```
   The minimum value for your Master Device has been
   established at 40 MBytes. By accepting the default you will
   be assigning the minimum space allowed for an initial
   CascadeView Installation.

   NOTE: Consult your Cascade manual for recommended sizes.
   Enter the size of the Master Device in Megabytes
   [default=40]:
   ```

Refer to your Sybase 11 installation worksheet in Appendix A for the following prompts.

4. At the Master Device Size prompt, do one of the following:
   - Press Return to accept the default value 40.
   - Enter [***master device size***].
5. At the System Procs Device Size prompt, do one of the following:
   - Press Return to accept the default value 25.
   - Enter [***system procs device size***].

6. At the Data Device Size prompt, do one of the following:
   - Enter the recommended value **300**.
   - Enter [***data device size***].
7. At the Log Device Size prompt, do one of the following:
   - Press Return to accept the default value **50**.
   - Enter [***log device size***].

   The following message appears:

   ```
   Creating Master Device file...
   Making directory for the master device...

   Press Enter to return...
   ```

8. Press Return to continue.

   The following message appears:

   ```
   If you have completed the initial Sybase setup successfully,
   please REBOOT the workstation now.
   ```

9. To reboot the workstation and enable the parameters, enter the following command at the # prompt:

   `init 6`

   The init 6 command reboots the system.

When the system is up and running again, you can install Sybase 11. Proceed to Chapter 3.

3

New Sybase 11 Installation

This chapter describes how to install Sybase 11 with the same installation script you used for the Sybase setup tasks in Chapter 2.

Before you begin the Sybase installation, verify the following tasks are complete:

- ☑ Shut down existing Sybase processes (page 2-2).
- ☑ Fill out the Sybase installation worksheets (Appendix A).
- ☑ Perform the Sybase prerequisite tasks (Chapter 2).

▶ This manual describes a new installation of Sybase 11, not an upgrade. Because the proxy agent regularly updates the CNM database from the NavisCore database, you do not need to be concerned about losing CNM information when you install a new Sybase. After installation, you simply update the CNM database from the NavisCore database.

Installing Sybase 11

Follow these steps to install Sybase 11:

1. When the system is up and running again, enter **root** at the User Name prompt. When prompted for the password, enter the root password.
2. Enter the following command to move to the */opt/cv_scripts* directory:

   ```
   cd /opt/cv_scripts
   ```

If you are logged in via a remote connection (rlogin/rsh/telnet), set your DISPLAY variable to the value of the local host. Enter the following:
DISPLAY=[*local hostname*]:0.0
export DISPLAY
(This example uses the Korn shell syntax.)
In addition, open a new command tool window and enter **xhost +** as the user who controls the system console. The xhost + command enables you to open the window that displays the installation log.

3. Enter the following command to run the Ascend-supplied Sybase script:

   ```
   ./install_sybase
   ```

   The following message appears:

   ```
   Verifying super user privileges...
   Would you like to view (tail -f) the install log (default=y)?
   ```

   The Tail window allows you to view a log of the installation process.
4. Press Return to accept the default (yes) so the log is displayed during installation.

   The Tail window appears in front of the Sybase installation window.
5. Move the Tail window behind the Sybase installation window so you can continue with the installation prompts.

The installation window now contains the Sybase Installation menu. See Figure 3-1.

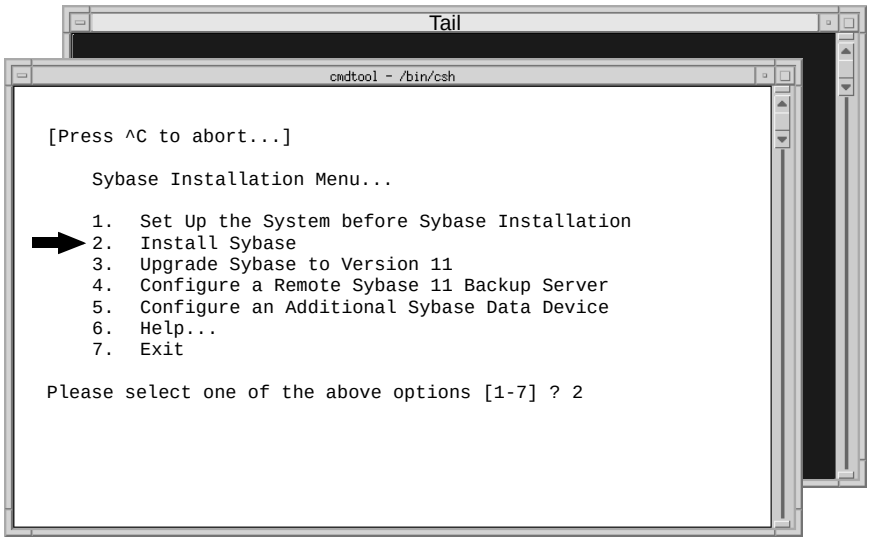

Figure 3-1. The Sybase Installation Menu

6. At the Sybase Installation Menu, enter **2** to install Sybase.

The system prompts you to make sure Sybase prerequisite tasks are completed and then prompts you to confirm the installation.

7. Press Return at each prompt.

The system displays the Sybase installation parameters. See Figure 3-2. The parameters have the values that you entered in Chapter 2.

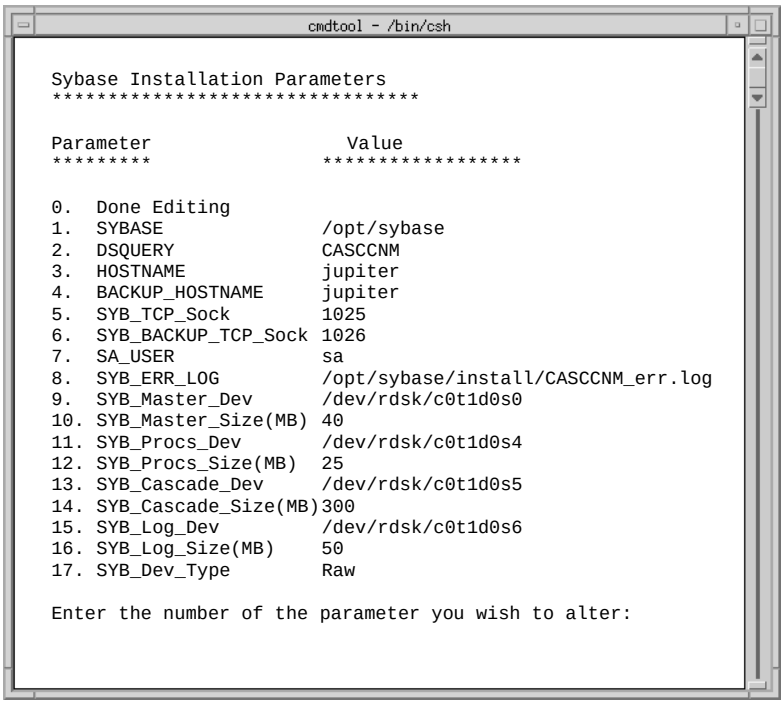

Figure 3-2. Sybase Installation Parameters

8. If you want to change parameter values, review the parameter descriptions in Table 3-1, then enter the parameter number and make the appropriate changes.

- If you change the values of parameters 11-17, the Setting the Master Device menu reappears. Follow the instructions beginning with step 17 on page 2-14.
- If you change the value of parameter 1, the script prompts you to change parameter 8.

You cannot change the values of these parameters once you complete the Sybase installation. If you need to change these values after installation, you must re-install Sybase 11.

Table 3-1. Sybase Configuration Parameters

Sybase Parameter	Description
SYBASE	Target directory for Sybase installation. Default: /opt/sybase
DSQUERY	Sybase server name. Recommended value: CASCCNM
HOSTNAME	Name of CNM Sybase workstation.
BACKUP_HOSTNAME	Name of CNM Sybase workstation (same as HOSTNAME).
SYB_TCP_Sock	TCP socket number for Sybase. Default: 1025
SYB_BACKUP_TCP_Sock	TCP socket number for backup Sybase. Default: 1026
SA_USER	Default Sybase system administrator user name. Default: sa
SYB_ERR_LOG	Default pathname of log file that contains all SQL Sybase errors. Default: /opt/sybase/install/[*DSQUERY value*]_err.log
SYB_Master_Dev	Pathname of Sybase Master device (partition 0). Sample format: /dev/rdsk/c0t1d0s0
SYB_Master_Size (MB)	Size (in megabytes) of Master device. Default: 40
SYB_Procs_Dev	Pathname of Sybase Procs device (partition 4). Sample format: /dev/rdsk/c0t1d0s4
SYB_Procs_Size (MB)	Size (in megabytes) of Sybase Procs device. Default: 25
SYB_Cascade_Dev	Pathname of data device (CNM) (partition 5). Sample format: /dev/rdsk/c0t1d0s5
SYB_Cascade_Size (MB)	Size (in megabytes) of data device (CNM). Recommended value: 300
SYB_Log_Dev	Pathname of Sybase log device (partition 6). Sample format: /dev/rdsk/c0t1d0s6
SYB_Log_Size (MB)	Size (in megabytes) of Sybase log device. Default: 50
SYB_Dev_Type	Type of installation of Sybase devices (FileSystem or Raw). The install program sets this value automatically.

9. When you have finished making changes in the Sybase Installation Parameters menu, enter **0** to continue.

The following message appears:

```
Install the media in your local device now.
*****************************************
Enter the full path of the media device:
```

10. When you are prompted for the media (tape) device pathname, enter:

[*media device pathname*]

Refer to your Sybase 11 installation worksheets in Appendix A for this information.

The following message appears:

```
The device was found and is ready for extraction.
Press Return to Continue...
```

11. Press Return to continue.

The following message appears:

```
Extracting Sybase Installation media from the device...Done.

Running 'sybinit' and creating the sybase server...Done
Successfully.
```

Running the sybinit utility takes approximately 15 minutes.

```
Running 'alter' commands to expand the master device and the
tempdb file. This may take a few moments.
Please Wait...Done Successfully.

Increasing the Memory allocations to 20480 for improved
performance...
```

Because the system has insufficient byte memory, the script increases memory allocation so that Sybase can execute basic commands. For more information, refer to your Sybase SQL Server Installation and Configuration Guide.

The screen displays the following:

```
Increasing the Number of Remote Users
-------------------------------------

By Default, the Sybase installation sets the number of user
connections to 25. If you need to increase the total
connections above 25, then enter the number of connections
you require.

Enter the number of user connections [default=25] ?
```

12. At the Number of User Connections prompt, do one of the following:

- Press Return to accept the default of 25.
- Enter [***number of user connections***].

The following message appears:

```
Press Return to continue...
```

13. Press Return to continue.

The following message appears:

```
Restarting Server with increased options.
```

The Sybase server shuts down and restarts, enabling the new configuration parameters.

If you encounter errors during the Sybase Server startup, call the Technical Response Center at **1-800-DIAL-WAN**.

When the system is up and running again, the script automatically configures a local Backup Server even though the Backup Server is not used by CNM. The script displays the message:

```
Configuring Local Backup Server
*********************************

Running 'sybinit' and creating the sybase server...Backup
Server Install Successful....
```

The Sybase Installation Menu appears.

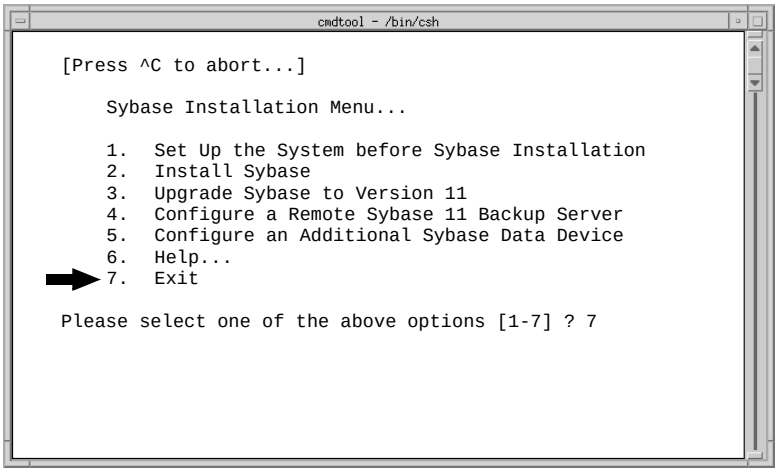

Figure 3-3. The Sybase Installation Menu

14. At the Sybase Installation Menu, enter **7** to exit the program.

The following message appears:

```
Cleaning up temporary files......Done.
Exiting Installation script.
```

The installation is complete and Sybase 11 is running. You are now ready to install the CNM Proxy Agent. Proceed to Chapter 4.

4

Installing the Proxy Agent

This chapter shows you how to:

- Start the NavisCore and CNM Sybase servers and the NFS server utility.
- Install the CNM Proxy Agent and configure the CNM environment.

Before you begin the CNM Proxy Agent installation, verify the following tasks are complete:

☑ Perform Sybase 11 prerequisite installation tasks (Chapter 2).

☑ Install Sybase 11 (Chapter 3).

☑ Complete the CNM installation worksheets (Appendix A).

Starting the Sybase Servers and the NFS Server Utility

During the CNM installation process, you specify database information for both the NavisCore and CNM Sybase servers. It is necessary, then, to make sure that the NavisCore Sybase workstation and the CNM Sybase workstation are running *before* you start the CNM installation.

It is also important to make sure the UNIX NFS server utility is running so that the CNM installation program can NFS mount directories during the installation.

- If your CNM and NavisCore databases are on two different systems, perform the following steps on *both* Sybase systems.
- If your databases are on a single system, perform the following steps on the one Sybase server.

Follow these steps to set up the Sybase workstation(s):

1. Log on the Sybase workstation. Enter **su - root** to become root. When prompted, enter the root password.
2. Follow these steps to make sure the Sybase server is running:
   a. Enter the following command:

      ```
      ps -aef | egrep -i 'run|data|syb'
      ```

      The system displays a list of all Sybase processes that are running.

   b. Look for a process called **dataserver**. If the dataserver process is listed, as in the following example, Sybase is up and running:

      ```
      root 40 27 80 Dec30 ? 40.45 /opt/sybase/bin/dataserver
      ```

3. If the dataserver process is *not* listed, enter the following command to start the Sybase server:

   ```
   /etc/rc2.d/S98sybase
   ```

4. Follow these steps to set up the NFS server utility:
   a. As root, enter the following command to open the */etc/dfs/dfstab* file:

      ```
      vi /etc/dfs/dfstab
      ```

   b. While holding down the Shift key, type **$G** to go to the end of the file.
   c. While holding down the Shift key, type **A** to append a line to the file.
   d. Add the following line to the end of the file:

      ```
      share -F nfs -o rw [Sybase 11 home directory]
      ```

   e. To save and close the file, press the Escape key and enter:

      ```
      :wq!
      ```

5. Enter the following command to start the NFS server:

   ```
   /etc/init.d/nfs.server start
   ```

6. If the NavisCore and CNM Sybase servers are on different systems, repeat Steps 1 through 5 for the other Sybase server.

You are now ready to begin the CNM installation. Continue to the next section.

UNIX Software Package Tools

The CNM Proxy Agent is installed with the pkgadd command, one of several UNIX package tools. This command enables you to extract the files from the tape and install the application.

Before you begin the installation, review these package commands:

- To install the CNM package from a specific device, enter:

  `pkgadd -d [`*`media device pathname`*`]`

  (For example, pkgadd -d /dev/rmt/#mn)

- To remove the CNM package after or during installation, enter:

  `pkgrm CASCcnm`

- To view information such as version numbers and installation dates for CNM and other packaged applications on the system, enter:

  `pkginfo CASCcnm`

There are other package commands such as *pkgask* and *pkgchk*. To learn more about these commands, enter **man [*command*]** to bring up the man pages for that command.

Installing and Configuring the CNM Proxy Agent

Follow these steps to install the CNM Proxy Agent:

1. Log on the CNM workstation (*System 2*). Enter **su - root** to become root. At the prompt, enter the root password.
2. Insert the CNM tape into the tape drive and close the latch.
3. To install CNM with the pkgadd command, enter:

   pkgadd -d [*media device pathname*]

   Refer to your installation worksheets in Appendix A for the pathname of the media (tape) device.

   The pkgadd menu appears, listing the applications that you can install. The menu and prompts are similar to the following:

   ```
   The following packages are available:
      1 CASCcnm     Cascade CNM Proxy Agent
                   (Sparc) 01.01.00.00

   Select package(s) you wish to process (or 'all' to process
   all packages). (default: all) [?,??,q]:
   ```

4. Enter the number that indexes the Ascend CNM Proxy Agent application (in this example, **1**).

   The installation utility performs various verification functions and then displays the message:

   ```
   This package contains scripts which will be executed with
   super-user permission during the process of installing this
   package.

   Do you want to continue with the installation of this
   package? [y,n,?]:
   ```

5. Enter **y** to continue.

   A message states that the Sybase servers for both CNM and NavisCore must be running before you proceed with the installation and then prompts:

   ```
   Do you wish to continue? <y|n> [default=y]:
   ```

6. Press Return to accept the default (yes) since you already verified that the NavisCore and the CNM Sybase servers were running in the previous section.

The pkgadd command begins the installation and displays the files being installed.

```
## Installing part 1 of 1.
/opt/CascadeView/bin/casccnm
/opt/CascadeView/bin/cnmdboutput_pb
/opt/CascadeView/bin/cnmsetup
/opt/CascadeView/bin/start-casccnm
...
...
[ verifying class <none> ]
## Executing postinstall script.
```

When the files are installed, the CNM Proxy Agent Setup Main menu appears. See Figure 4-1. You are now ready to configure CNM components.

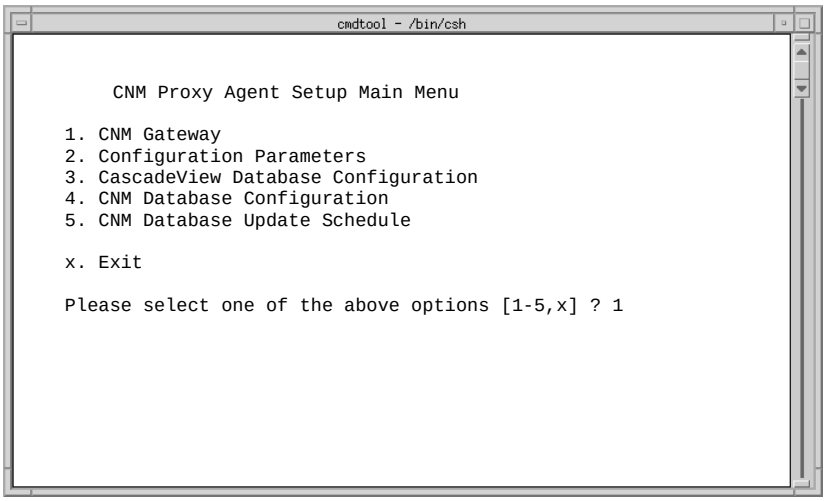

Figure 4-1. CNM Proxy Agent Setup Main Menu

General Rules for Defining CNM Parameters

The CNM Proxy Agent Setup Main menu enables you to specify configuration values for the various CNM components—the CNM gateways, the CNM workstation, and the CNM and NavisCore databases. You can also specify the CNM database update schedule.

Follow these general rules when you use the Setup Main menu:

- Move sequentially through the five options in the Setup Main menu. Make sure you configure each component.
- If necessary, return to a section and redefine your entries.
- Enter **x** to exit the Setup Main menu.

Follow these general rules when defining parameter values for the various CNM components:

- Enter the number of the parameter you want to change. Then enter a value to define the parameter value.
- Do not leave any parameter values blank. Use empty quotes ("") when there are no values. (Do not include a space within the quotation marks.)
- Enter **s** to save your entries and return to the Setup Main menu.
- Enter **x** to cancel your entries and return to the Setup Main menu.

If necessary, you can redefine the settings for the various CNM components after the installation. Refer to "Redefining CNM Parameter Values" on page 6-5.

Setting Up CNM Gateways

The first CNM components that you configure are the CNM gateways. The CNM Proxy Agent can support up to nine gateways.

Follow these steps to define each gateway:

1. At the CNM Proxy Agent Setup Main menu, enter **1** to define the CNM gateway component.

   The CNM Gateway Setup menu appears. See Figure 4-2.

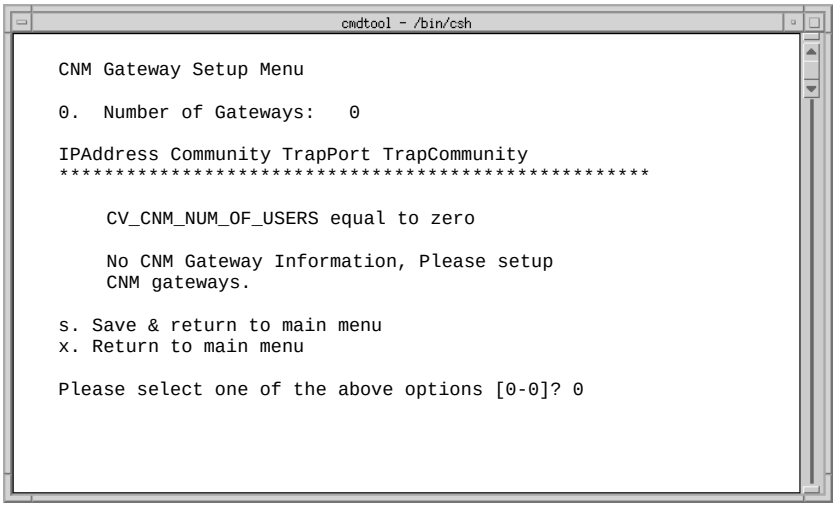

Figure 4-2. CNM Gateway Setup Menu

   The options in the CNM Gateway Setup menu enable you to define the gateways that have access to the CNM Proxy Agent. Make sure you specify information for at least one gateway. You can specify up to nine gateways.

2. Define the number of gateways as follows:

   a. Enter **0** to select the Number of Gateways option.

   b. After the Number of Gateways prompt, enter the appropriate number (**1-9**).

   A numbered line appears for each gateway.

3. Define each gateway as follows:

   a. Enter the gateway number (indicated by the numbered line).

   b. Enter the appropriate information after the prompts. (The system prompts you for the gateway's IP address, community name, trap port, and trap community name.)

4. Repeat step 3 for each additional gateway.

   Figure 4-3 illustrates the completed CNM gateway parameters.

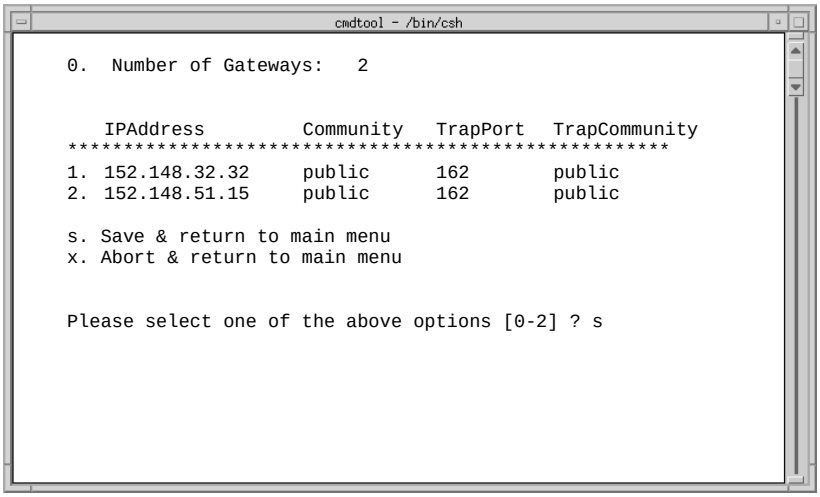

Figure 4-3. CNM Gateway Parameters (Completed)

5. Repeat Steps 2 and 3 if you need to edit these entries.

6. When you are finished, enter **s** to save the values and return to the Setup Main menu.

You are now ready to define the parameters for the CNM Proxy Agent workstation.

Setting Up CNM Configuration Parameters

The CNM configuration parameters define the environment of the CNM Proxy Agent workstation (*System 2*).

Follow these steps to define CNM Proxy Agent configuration parameters:

1. At the CNM Proxy Agent Setup Main menu, enter **2**.

The CNM Configuration Parameters menu appears. The installation script provides default values for all the parameters except the first parameter, CV_CNM_NETWORK_NUMBER. See Figure 4-4.

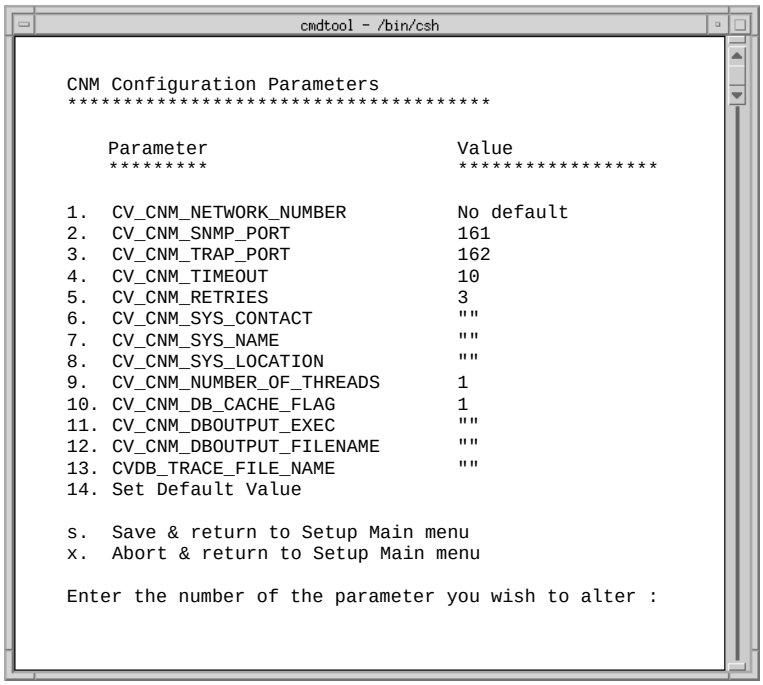

Figure 4-4. CNM Configuration Parameters Menu

2. Define the CV_CNM_NETWORK_NUMBER (the IP address of the switch network that CNM will monitor) as follows:

   a. Enter **1** to specify the CV_CNM_NETWORK_NUMBER parameter.

      A message describes this parameter and the correct format for the entry.

   b. At the parameter prompt, enter the switch network IP address.

      The installation utility checks to see if the entry is a Class B or Class C network address and prompts you for confirmation of your entry.

   c. At the confirmation prompt, press Return to accept the default (yes).

      The IP address appears in the parameters list along with the Class B or C tag.

3. You do not have to define values for the remaining 12 parameters because default values are provided. But if you need to change any default value, follow these steps:

   a. Refer to Table 4-1 and Table 4-2 for information about parameters.

   b. Enter the number of any parameter you want to define.

   c. At the parameter prompt, enter the parameter value.

4. To reset all the parameters to their default values, enter **14**.

5. When you are finished, enter **s** to save the configuration and return to the CNM Proxy Agent Setup Main menu.

CNM Configuration Parameters

There are two types of CNM configuration parameters—those that are used by CNM (Table 4-1) and those that provide additional features or information for the user (Table 4-2). Refer to these tables when you define CNM configuration parameters.

Table 4-1. CNM Configuration Parameters (Used by CNM

CNM Configuration Variable	Values to Enter	Description
CV_CNM_NETWORK_ NUMBER	IP address	IP address of the switch network that CNM will be monitoring.
CV_CNM_SNMP_PORT	Accept the default value 161.	Port used to receive SNMP requests from the CNM gateway.
CV_CNM_TRAP_PORT	Accept the default value 162.	Port on the CNM system used to receive traps from the switch.
CV_CNM_TIMEOUT	Accept the default value 10, which equals 1 second.	Timeout interval in 0.10 seconds. If no response is received, CNM waits for this interval before sending another GET command to the switch.
CV_CNM_RETRIES	Accept the default value 3.	The number of times the CNM Proxy Agent will retry the GET command if no response is received.

Table 4-2. CNM Configuration Parameters (Provided for the User

CNM Configuration Variable	Values to Enter	Description
CV_CNM_SYS_CONTACT	Contact name	The name of the person responsible for maintaining the CNM Proxy Agent.
CV_CNM_SYS_NAME	CNM hostname	The name of the system on which CNM is running.
CV_CNM_SYS_LOCATION	Location name	CNM Proxy Agent location.
CV_CNM_NUMBER_OF_ THREADS	Number of processors minus 1 (value must be 1 or greater)	Number of CNM threads.
CV_CNM_DB_CACHE_ FLAG	0 or 1 (0=OFF, 1=ON)	Cache flag that allows users who have limited memory to turn cache off.
CV_CNM_DBOUTPUT_ EXEC	Pathname	A customer-specific executable that extracts and formats data from the CNM database.
CV_CNM_DBOUTPUT_ FILENAME	Pathname	A user-defined file to which CV_CNM_DBOUTPUT_EXEC outputs data.
CVDB_TRACE_FILE_ NAME	Pathname No entry in this field turns tracing off Entry in this field turns tracing on	Pathname of trace file for database activities. This parameter also turns tracing on or off. Tracing is helpful for troubleshooting database problems.

Setting Up the NavisCore Database

At installation, you have to specify various database parameters so that CNM can automatically update the CNM database with information from the NavisCore database.

Follow these steps to define NavisCore database parameters:

1. At the CNM Proxy Agent Setup Main menu, enter **3**.

The NavisCore Database Configuration Parameters menu appears. The installation script provides default values for the parameters. See Figure 4-5.

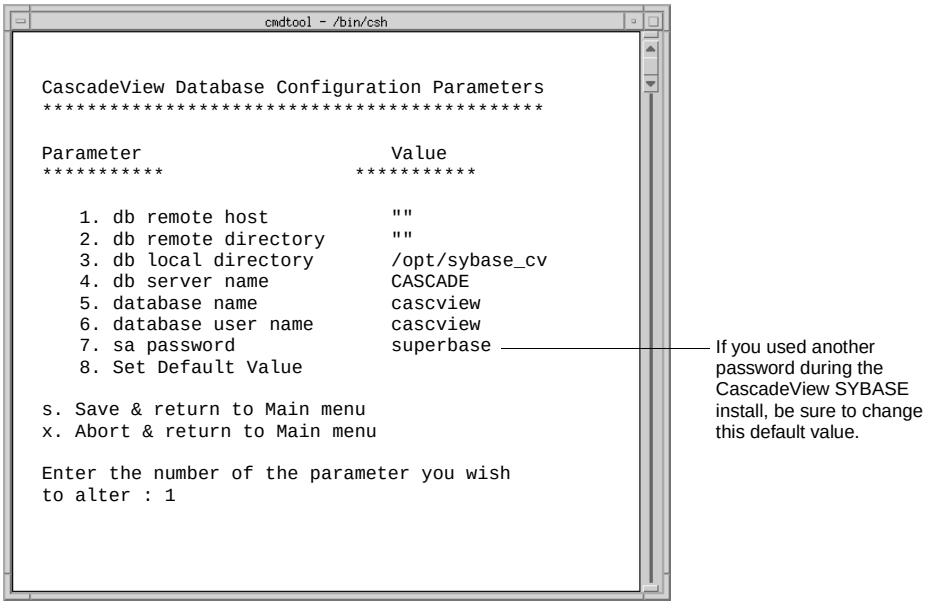

Figure 4-5. NavisCore Database Configuration Parameters Menu

2. Follow these steps to enter parameter values:

a. Review the requirements for each NavisCore database parameter in Table 4-3.

b. Enter the number of the parameter you want to define.

c. At the parameter prompt, enter the value. Do not leave any values blank.

3. Follow these steps to edit existing parameter values:

   a. Enter the number of the parameter.

   b. At the parameter prompt, enter the value (or empty quotes for no value). Do not leave any values blank.

   Figure 4-6 illustrates a completed NavisCore database configuration.

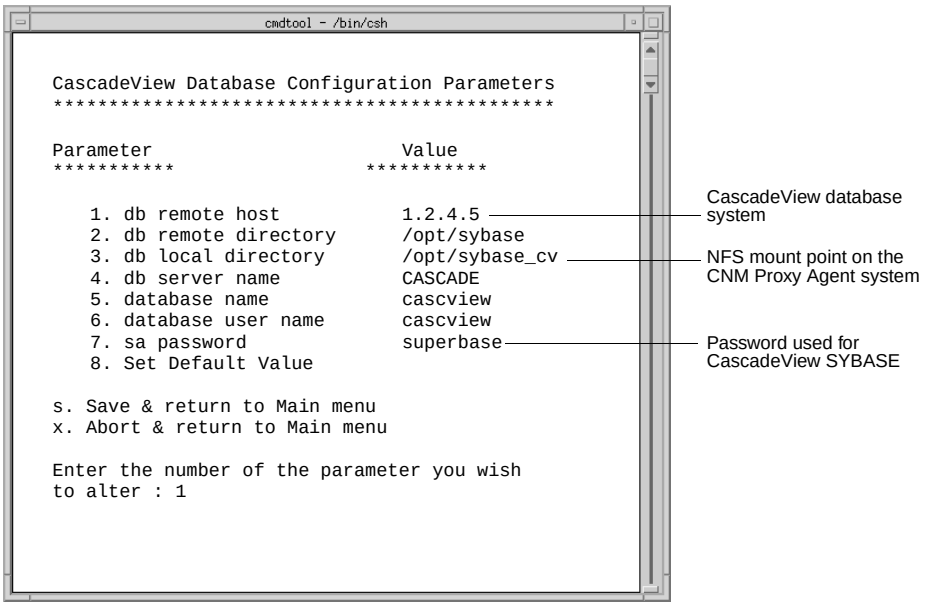

Figure 4-6. NavisCore Database Configuration (Completed)

4. When you are finished defining parameter values, enter **s** to save the configuration and return to the CNM Proxy Agent Setup Main menu.

   The system displays various messages, depending on your system configuration.

5. When you are prompted, press Return to continue with the installation.

NavisCore Database Parameters

For NavisCore database parameters, the word “remote” refers to the NavisCore database workstation and “local” refers to the CNM Proxy Agent workstation.

Table 4-3. NavisCore Database Parameters

Database Parameter	Values to Enter	Description
db remote host	IP address or hostname	IP address or name of the NavisCore database workstation.
db remote directory	Directory pathname Default: /opt/sybase	The directory where the NavisCore database is installed.
db local directory	NFS mount point Default: /opt/sybase_cv	The NFS mount point on the CNM workstation. CNM mounts the NavisCore db remote directory to the CNM db local directory.
db server name	Database server name Default: CASCADE	The name you gave the server when you created the NavisCore Sybase database.
database name	Database name Default: cascview	The name of the NavisCore database. See note following the table.
database user name	User name Default: cascview	The NavisCore database user name. See note following the table.
sa password	Password Default: superbase	The Sybase password entered during the NavisCore Sybase install.

The database name and database user name values and are defined in the /opt/cascadeview/etc/cvdb.cfg file on the NavisCore system. To view these parameters, log on the NavisCore system and enter the following command:

```
more   /opt/cascadeview/etc/cvdb.cfg
```

Setting Up the CNM Database

Follow these steps to define CNM database parameters:

1. At the CNM Proxy Agent Setup Main menu, enter **4**.

   The CNM Database Configuration Parameters menu appears. The installation script provides default values for the parameters.

2. Review the requirements for each CNM database parameter in Table 4-4. Notice that the values differ slightly from the NavisCore database parameters even though the parameter names are the same.

3. Enter the number of the parameter you want to define. At the parameter prompt, enter the value.

4. When you are finished, enter **s** to save the configuration and return to the CNM Proxy Agent Setup Main menu.

   Figure 4-7 illustrates a completed CNM database configuration.

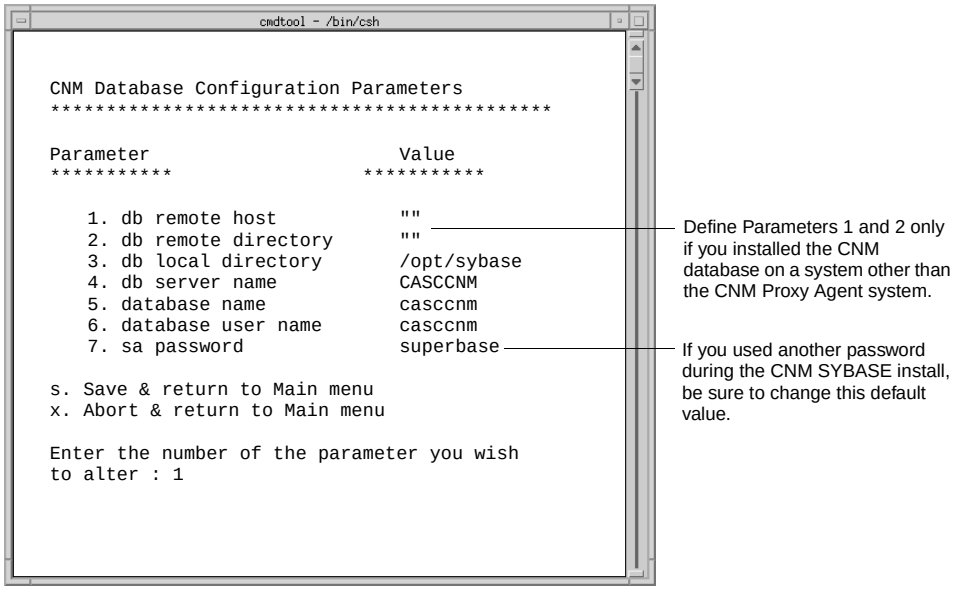

Figure 4-7. CNM Database Configuration (Completed)

CNM Database Parameters

When you define CNM database parameters, “remote” now refers to the remote CNM database workstation and “local” refers to the CNM Proxy Agent workstation.

Table 4-4. CNM Database Parameters

Parameters	Values to Enter	Description
db remote host	Accept the default of empty quotes ("") if the CNM database is installed on the CNM Proxy Agent system.	IP address or name of the remote CNM database workstation. Specify a value only if you have installed the CNM database on a system other than the CNM Proxy Agent system.
db remote directory	Accept the default of empty quotes ("") if the CNM database is installed locally.	The directory where the remote CNM database is installed. Specify a value only if the CNM database is installed on a remote system.
db local directory	Either database pathname or NFS mount point Default: /opt/sybase	The CNM database directory if the CNM database is installed locally. The NFS mount point on the CNM Proxy Agent workstation if the CNM database is installed remotely.
db server name	Server name Default: CASCCNM	The server name you specified during the Sybase installation. Refer to the installation worksheets in Appendix A.
database name	Database name Default: casccnm	CNM database name.
database user name	User name Default: casccnm	CNM database user name. (The name must be six letters or longer.)
sa password	Password Default: superbase	The Sybase password entered during the CNM Sybase install.

Defining the CNM Database Update Schedule

CNM automatically updates its database daily and logs the information in the */tmp/cnmdb.log* file. During the installation, you define the time for the update.

Follow these steps to define the CNM database update schedule:

1. At the CNM Proxy Agent Setup Main menu, enter **5**.

   The following message appears.

   ```
   CNM database will be updated once a day from CascadeView
   database. Please enter the time for the CNM database update.

   Please enter the time in HH:MM format here [0:0] ==>
   ```

2. Specify the update time in one of the following ways:

   - Press Return to accept the default [0:0], 12:00 midnight.
   - Enter a specific time (hours 0-23, minutes 0-59) in the HH:MM format.

   The CNM Proxy Agent Setup Main menu reappears. Since you have defined all the CNM components, you can now exit the installation program.

Exiting the Installation Program

1. At the CNM Proxy Agent Setup Main menu, enter **x** to exit the pkgadd utility.

   The following message appears.

   ```
   Installation of <CASCcnm> was successful.
   ```

   The pkgadd utility displays the list of applications that you can install. At the bottom of the list is the following prompt:

   ```
   Select package(s) you wish to process (or 'all' to process
   all packages). (default: all) [?,??,q]: q
   ```

2. Enter **q** to exit the program.

You have now completed the CNM Proxy Agent installation. Continue to the next chapter to manually configure switches.

5

Manually Configuring Switches

Once you have completed the CNM installation, you must manually setup and configure each switch in the Ascend network for communication with the CNM Proxy Agent. These configurations enable the proxy agent to request and receive status information from the switches in the network. They also enable the switches to forward traps to the proxy agent.

This chapter shows you how to:

- Add the CNM community name and IP address to each switch.
- Set the NMS path for the gateway switch.
- Add a static route to the gateway switch.

Before you begin the tasks in this chapter, verify the following tasks are complete:

☑ Install Sybase 11 (Chapter 3).

☑ Install the CNM Proxy Agent (Chapter 4).

Adding the CNM Community Name and IP Address to Each Switch

To add the CNM Proxy Agent community name and IP address to a switch, perform the following steps:

1. Log on the NavisCore workstation (*System 1*), open NavisCore, and bring up the map for the switch network that CNM will monitor.
2. From the Misc menu, select CascadeView ⇒ Logon. Enter your operator password.
3. Select the switch object, starting with the gateway switch.
4. From the Administer menu, select Cascade Parameters ⇒ Set Parameters.

   The Switch Back Panel dialog box appears. This dialog box displays the configuration of the selected switch. Figure 5-1 illustrates a sample B-STDX 8000 configuration.

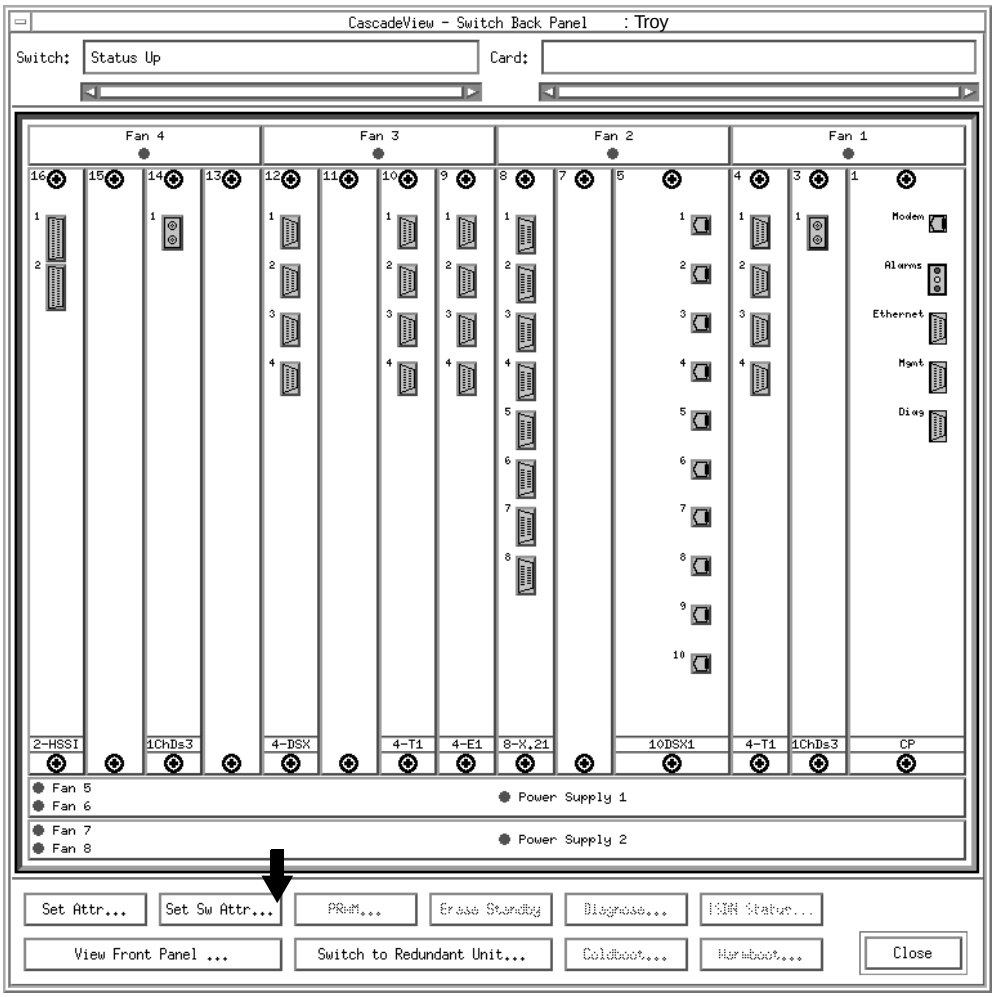

Figure 5-1. Switch Back Panel Dialog Box

5. To add the IP Address and community name of the CNM Proxy Agent workstation, choose the Set Sw Attr button.

The Set Switch Attributes dialog box appears. See Figure 5-2.

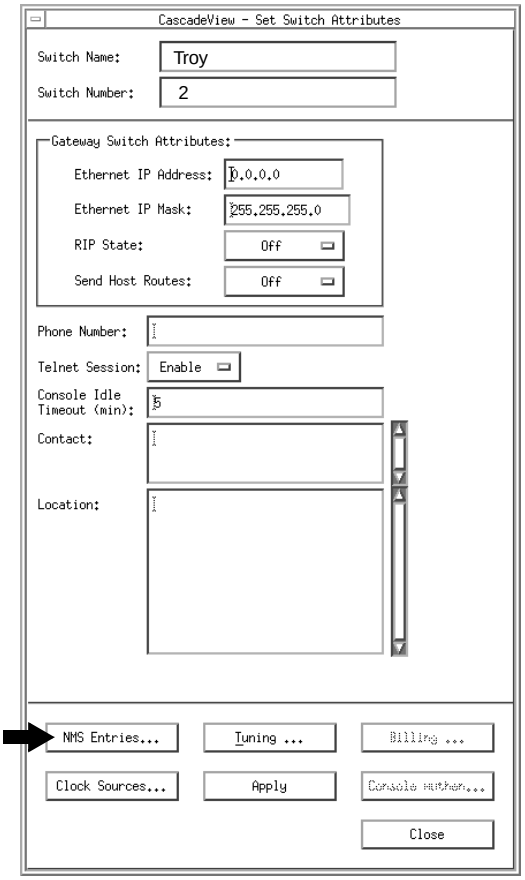

Figure 5-2. Set Switch Attributes Dialog Box

6. In the Set Switch Attributes dialog box, choose the NMS Entries button.

The Set NMS Entries dialog box appears, displaying the current NMS entries. This dialog box allows you to give additional NMS workstations read/write or read-only access to the same switch. See Figure 5-3.

The CNM Proxy Agent supports read-only access to the switch.

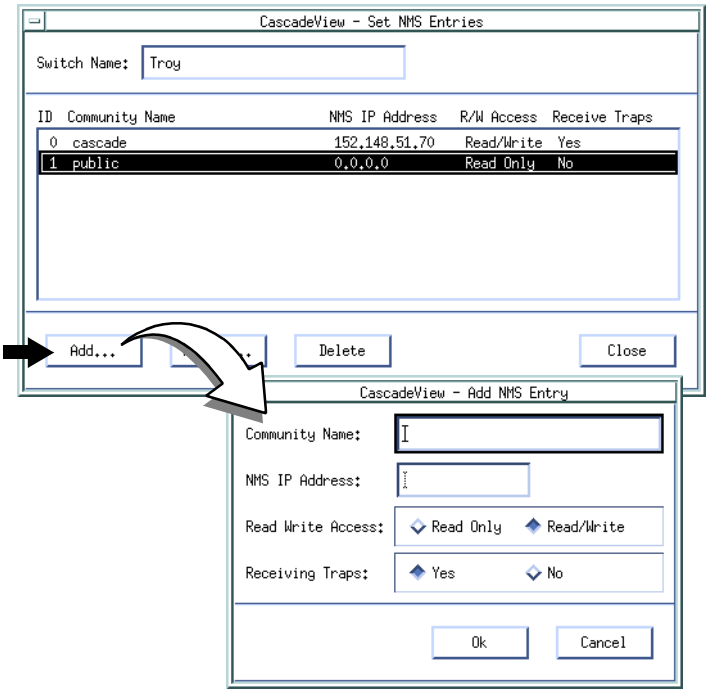

Figure 5-3. Set NMS Entries and Add NMS Entry Dialog Boxes

7. In the Set NMS Entries dialog box, choose the Add button.

The Add NMS Entry dialog box appears. See Figure 5-3.

8. Complete the appropriate fields in the Add NMS Entry dialog box as follows:

a. Enter the community name of the CNM Proxy Agent workstation.

b. Enter the NMS IP address of the CNM Proxy Agent workstation. (Remember that the CNM Proxy Agent supports only Class B and Class C IP addressing.)

c. Set the read/write access for this entry to Read Only. (The CNM Proxy Agent supports only read access to the switch and the CNM database.)

d. Choose Yes to enable the CNM Proxy Agent to receive traps. (Trap alarm conditions notify the operator of events taking place on the switch.)

9. Choose OK to enter the parameters and close the Add NMS Entry dialog box.

A Confirmation Request dialog box appears.

10. Choose OK in the Confirmation Request dialog box.

11. Close the open dialog boxes until you are once again at the Switch Back Panel dialog box.

The CP module on the switch now appears yellow because it is out of sync with the switch.

12. Synchronize the PRAM on the CP module. Follow these steps:

a. In the Switch Back Panel dialog box, choose the PRAM button.

The Pram Sync dialog box appears. See Figure 5-4.

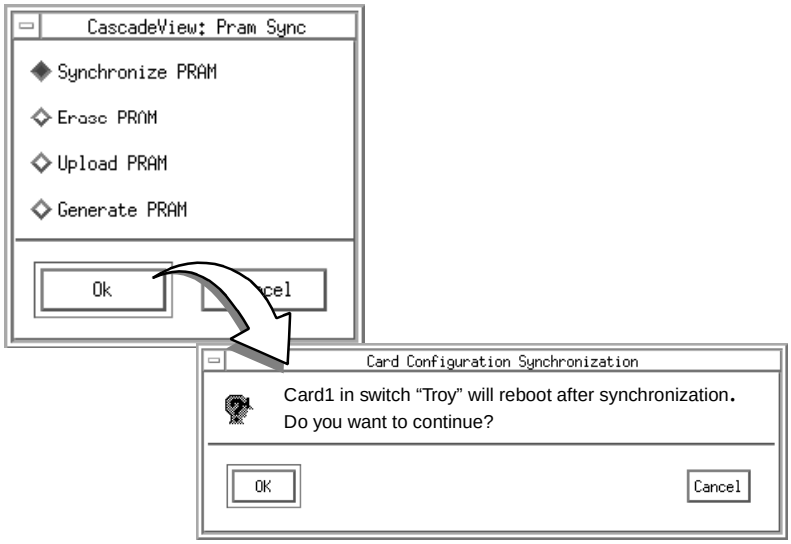

Figure 5-4. PRAM Sync Dialog Box

b. In the Pram Sync dialog box, choose Synchronize PRAM and then OK.

The Card Configuration Synchronization dialog box appears, prompting you for confirmation before rebooting the system.

c. Choose OK.

The program reboots the system.

d. When the system is up and running again, close the Switch Back Panel dialog box by choosing the Close button.

The CNM network map is now visible. You are ready to configure the next switch.

13. Repeat Steps 3 through 12 for each switch that CNM will monitor.

Defining the NMS Path for the Gateway Switch

When you define the NMS path, you configure the IP address and access attributes for the CNM Proxy Agent workstation. The NMS path maps the gateway switch to the Proxy Agent and specifies the type of physical connection to use. If you do not specify the NMS IP address, the CNM Proxy Agent cannot receive switch status information.

About NMS Connections

The NMS path configuration is node-specific and identifies each NMS that attaches via the gateway switch. You only need to define the NMS path for the switch that contains one of the following connections for sending management-protocol requests and responses through the management ports:

Serial (SLIP) — The NMS workstation connects to the switch's Serial Network Management Port on either the Packet Processor (PP) on the STDX 3000/6000 or the Control Processor (CP) on the B-STDX 8000/9000. The NMS IP address must be the same as the IP address you configured for the NavisCore workstation (*System 1*).

Direct Ethernet — The NMS connects to the same LAN as the switch's Ethernet connection. You can only use direct Ethernet if the switch can reach the NMS address without going through a gateway router connection.

Indirect Ethernet — This connection indicates that the NMS and the switch's Ethernet IP address are on two separate LANs and communicate via one or more gateway router(s). For this connection method, you enter both the NMS IP address and the IP address of the gateway router used to communicate with the NMS.

Management DLCI — This connection is used when the NMS connects to a LAN that contains a router with a Frame Relay connection to the switch. The switch does not need an Ethernet module in the PP or CP for this type of NMS connection. Network traffic is tunneled through the attached Frame Relay UNI-DCE connector as a permanent virtual circuit (PVC).

If you plan to use Management DLCI, refer to the *NavisCore Network Configuration Guide* to define the logical ports for a Frame Relay network.

Management Address (SMDS In-band Management) — This connection indicates that the NMS has a remote connection to the Ascend network and uses SMDS services to transport the SNMP/UDP/IP protocol packets.

If you plan to use SMDS In-Band Management, refer to the *NavisCore Network Configuration Guide* to define the logical ports for an SMDS network.

Setting the NMS Path

To set the NMS path from the gateway to the CNM Proxy Agent, perform these steps:

1. On the NavisCore workstation (*System 1)*, open the NavisCore network map and select the gateway switch to be connected to the CNM Proxy Agent.
2. From the Administer menu, select Cascade Parameters ? Set NMS Paths.

   The Set NMS Paths dialog box appears. See Figure 5-5.
3. In the NMS Paths dialog box, choose the Add button.

   The Add NMS Path dialog box appears. Figure 5-5 shows an Ethernet (Direct) NMS Path.

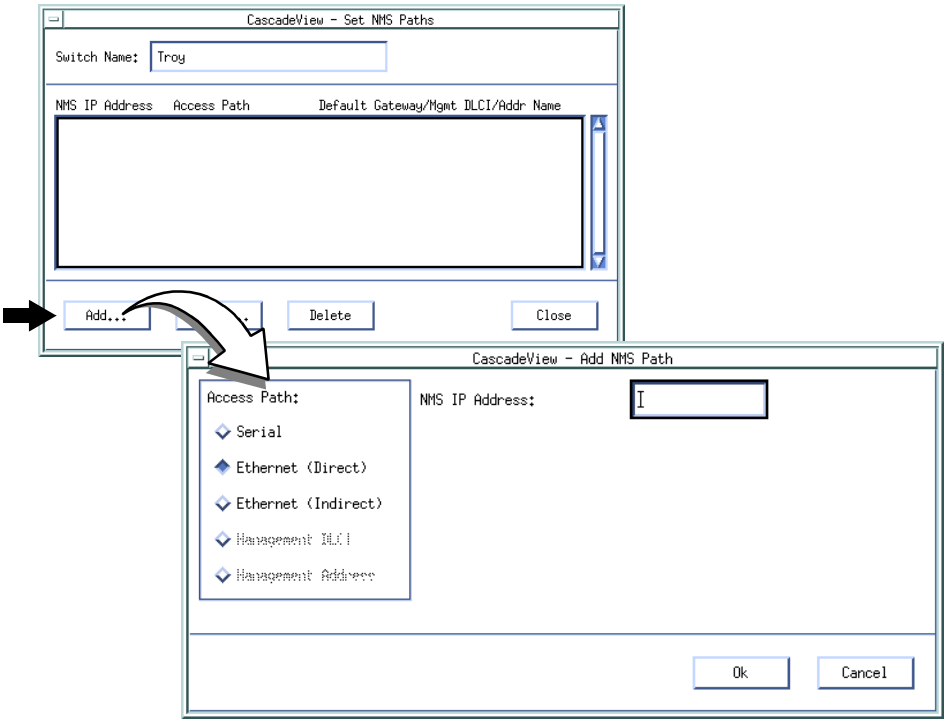

Figure 5-5. Set NMS Paths and Add NMS Path Dialog Boxes

4. Complete the Add NMS Path dialog box fields as follows:

   a. In the Access Path field, select the connectivity method you used to connect the NMS to the switch. (Refer to page 5-7.)

      If you select one of the following, complete the additional fields that appear:

      Ethernet (Indirect) — In the Default Gateway IP Address field, enter the IP address of the gateway router that connects the CNM Proxy Agent to the switch.

      Management DLCI — In the Management DLCI Name field, select the name of the Management DLCI.

      Management Address — In the Management Port Name field, select the name of the logical port that has the In-Band Management Address defined.

   b. In the NMS IP Address field, enter the NMS IP address. This should be the IP address of the CNM Proxy Agent.

5. Choose OK to enter your changes or Cancel to exit without saving.

6. In the Set NMS Path dialog box, choose Close to return to the network map.

Adding a Static Route to the Gateway Switch

To communicate with your network and manage your switches, you must add a static route from the CNM Proxy Agent to your gateway switch. The gateway switch acts as a master switch. Once CNM can communicate with the gateway switch, it can communicate with all the switches on the Ascend network.

Figure 5-6 illustrates a static route connection between a switch network and CNM.

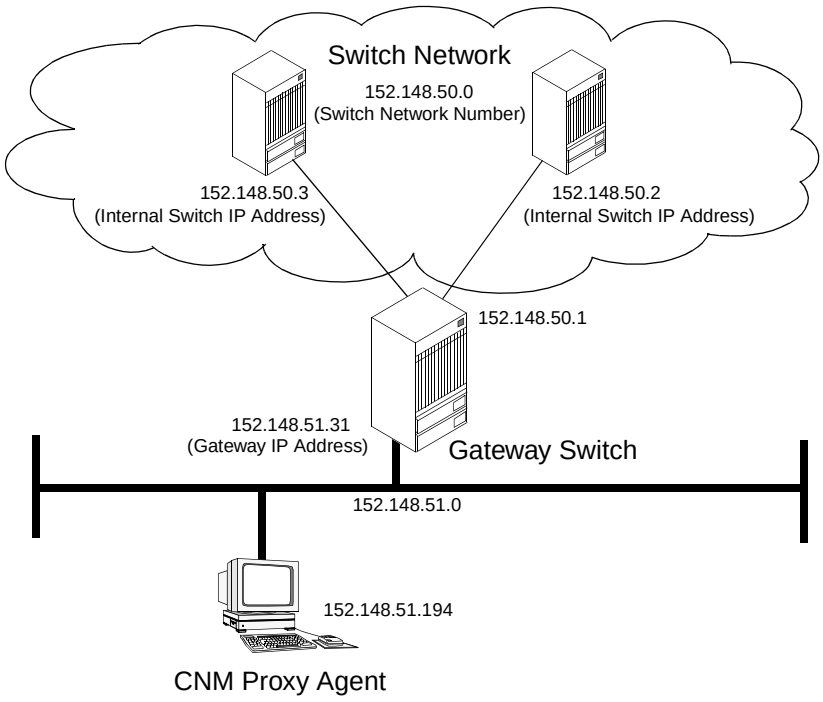

Figure 5-6. Sample Static Route Connection

Follow these steps to set up a static route from the CNM Proxy Agent workstation to the gateway switch.

1. Log on the CNM Proxy Agent workstation (*System 2*). Enter **su - root** to become root. When prompted, enter the root password.
2. Enter the following command:

   vi /etc/rc2.d/S98netmgt
3. While holding down the Shift key, type **$G** to go to the end of the file.
4. While holding down the Shift key, type **A** to append a line to the file.
5. Add the following lines to the end of the file:

   /usr/sbin/ndd -set /dev/ip ip_ire_pathmtu_interval 5000 <Return>

   /usr/sbin/ndd -set /dev/ip ip_ire_cleanup_interval 5000 <Return>

   /usr/sbin/route add net [*switch network number*] [*gateway IP address*] 1 <Return>

   For example if you have an internal network ID of 152.148.50.0 and a switch Ethernet port of 152.148.51.31, you would enter the latter command as:

   /usr/sbin/route add net 152.148.50.0 152.148.51.31 1

The internal network address 152.148.50.0 is a valid address that Ascend uses to communicate with OSPF. Ascend recommends using the default address.

6. To save and close the file, press the Escape key and enter:

   :wq!
7. At the # prompt, enter **init 6**.

   The init 6 command reboots the system and enters the changes.

8. When the system is up and running again, try to access one of the switches in the switch network (not the gateway switch) to see if the static route has been established. Enter:

   `/usr/sbin/ping [`*`internal switch IP address`*`]`

   For example, if you have an internal switch with an IP address of 152.148.50.2 as illustrated in Figure 5-6, you would enter:

   `/usr/sbin/ping 152.148.50.2`

   The static route connection has been established if you receive the following message:

   ```
   152.148.50.2 is alive
   ```

You have now finished all the necessary switch configurations. The CNM installation is complete.

6

Using the CNM Proxy Agent

This chapter shows you how to:

- Start and stop the CNM Proxy Agent.
- Manually update the CNM database.
- Redefine CNM parameters.
- Test the CNM Proxy Agent to see if it is running correctly.

Before you begin the procedures in this chapter, verify the following tasks are complete:

☑ Install Sybase and the CNM Proxy Agent (Chapters 2, 3, 4).

☑ Make sure both the CNM and NavisCore Sybase servers are running (page 4-2).

Starting the CNM Proxy Agent

After you install the CNM Proxy Agent, start the proxy agent with the *./start-casccnm -u* command. This command starts the proxy agent and updates the CNM Sybase database.

When you do *not* need to update the CNM Sybase database, use the *./start-casccnm* command without the -u option. This command starts the proxy agent without updating the CNM Sybase database.

Follow these steps to start the CNM Proxy Agent:

1. Log on the CNM Proxy Agent system, and enter **su - root** to become root. At the prompt, enter the root password.
2. Move to the */opt/CascadeView/bin* directory by entering the following command:

   ```
   cd /opt/CascadeView/bin
   ```

3. Start the CNM Proxy Agent in one of the following ways:
   - To start the CNM Proxy Agent and update the database, enter:

     ```
     ./start-casccnm -u &
     ```

     (The -u option specifies the database update. The ampersand (&) tells the system to run the command in the background.)
   - To start the CNM Proxy Agent without updating the database, enter:

     ```
     ./start-casccnm &
     ```

The CNM Proxy Agent runs continuously until you manually stop the process.

Stopping the CNM Proxy Agent

Follow these steps to stop the CNM Proxy Agent:

1. Become root by entering **su - root**. At the prompt, enter the root password.
2. Determine the process ID of the proxy agent by entering:

   `ps -aef | grep casccnm`

   The system displays output similar to the following:

   ```
   root   2978  1  32  Jan 07  ?   0:00 casccnm
   ```

3. Note the CNM process ID in the second field of the output (2978 in the example).
4. Stop the CNM Proxy Agent by entering:

   `kill -9 [`*`CNM Proxy Agent process ID`*`]`

   For example, if the process ID is 2978, you would enter **`kill -9  2978`**.

Manually Updating the CNM Database

The proxy agent updates the CNM database daily at the time that you specified during installation. If you need to manually update the database at some other time, follow these steps:

1. Log on the CNM Proxy Agent workstation (*System 2*). Enter **su - root** to become root. At the prompt, enter the root password.
2. If CNM is not yet running (for example, after the CNM installation), start up CNM and update the database by entering the following command:

   ```
   ./start-casccnm -u &
   ```

3. If CNM is running, find the process ID of the CNM Proxy Agent and use the kill -USR2 command to send a signal to the proxy agent to update the database.

   a. To find the process ID, enter:

      ```
      ps -aef | grep casccnm
      ```

      The system displays output similar to the following:

      ```
      root   2978  1  32  Jan 07  ?   0:00 casccnm
      ```

   b. Note the CNM process ID in the second field of the output (2978 in the example).

   c. To update the CNM database, enter:

      `kill -USR2 [`*`CNM Proxy Agent process ID`*`]`

   The CNM Proxy Agent updates the CNM database and logs the database update information to the */tmp/cnmdb.log* file.

4. To view the CNM database update log, enter the following command:

   ```
   more /tmp/cnmdb.log
   ```

Redefining CNM Parameter Values

To redefine CNM environment variables after the CNM installation, follow these steps:

1. Log on the CNM workstation (*System 2*). Enter **su - root** to become root. At the prompt, enter the root password.
2. Move to the */opt/CascadeView/bin* directory by entering:

   `cd /opt/CascadeView/bin`

3. Enter the following command:

   `./cnmsetup`

   The CNM Proxy Agent Setup Main menu appears. See Figure 6-1.

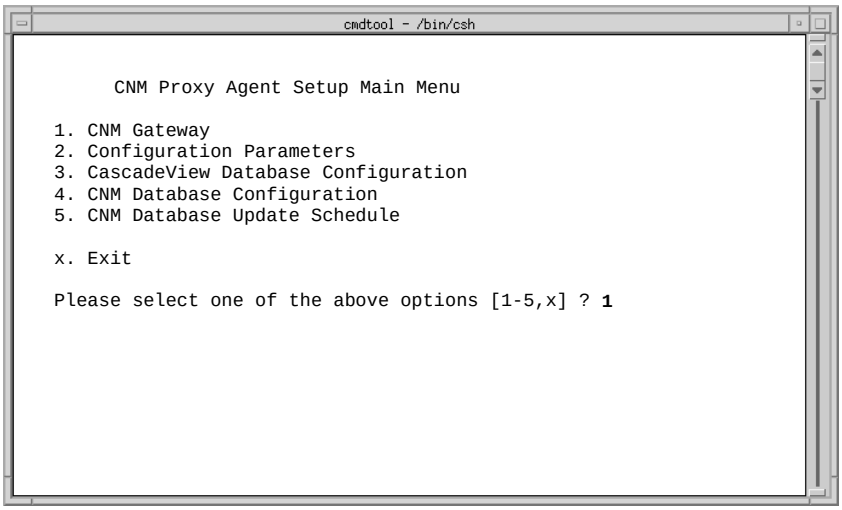

Figure 6-1. CNM Proxy Agent Setup Main Menu

4. Specify the appropriate CNM component in the CNM Setup Main menu and redefine the values. Refer to the instructions beginning on page 4-6.
5. Stop and start CNM so that the proxy agent uses the new parameter values.

Testing the CNM Proxy Agent

If you are familiar with HP OpenView, you can perform the optional tests in this section to see if the CNM Proxy Agent can communicate with the CNM gateway, the switch, and the CNM database.

These are the basic tasks that you perform:

- Copy the CNM MIBs from the CNM Proxy Agent workstation to a workstation that simulates the CNM gateway. The simulated workstation must have HP OpenView installed on it. (The NavisCore workstation would be appropriate.)
- Use HP OpenView to download the CNM MIBs to the HP OpenView database.
- Use HP OpenView to see if the proxy agent can communicate with the CNM gateway, the switch, and the CNM database.

Copying the CNM MIBs to the Simulated Gateway

To test the CNM Proxy Agent, you must copy the RFC 1604 and 1232 MIBs to the simulated gateway. Both of these MIBs are provided with the CNM release. Even if HP OpenView includes these MIBs, you must still copy the CNM MIBs to the HP OpenView database.

To copy the MIBs to the simulated gateway workstation, follow these steps:

1. Log on the CNM gateway workstation. Enter **su - root** to become root and then enter the root password when prompted.
2. Copy the two MIB files (listed below) on the CNM Proxy Agent workstation to the */opt/CascadeView/snmp_mibs* directory on your simulated gateway system. The full pathnames of the CNM MIB files are:
   - */opt/CascadeView/snmp_mibs/rfc1604.mib*
   - */opt/CascadeView/snmp_mibs/rfc1232.mib*

If you have problems copying the files, have your system administrator edit the appropriate host files so that you can copy files from the CNM system to the gateway.

Loading the MIBs to the HP OpenView Database

Follow these steps to load the RFC 1232 and 1604 MIBs to the HP OpenView database:

1. Open HP OpenView on the gateway system.
2. From the HP OpenView menu, select Options ⇒ Load/Unload MIBs: SNMP...

   The MIB Load/Unload MIBs dialog box appears.
3. In the MIB Load/Unload dialog box, choose the Load button. (You do not select any MIB because the CNM MIBs are not yet loaded.)

   The Load MIB From File dialog box appears. See Figure 6-2.

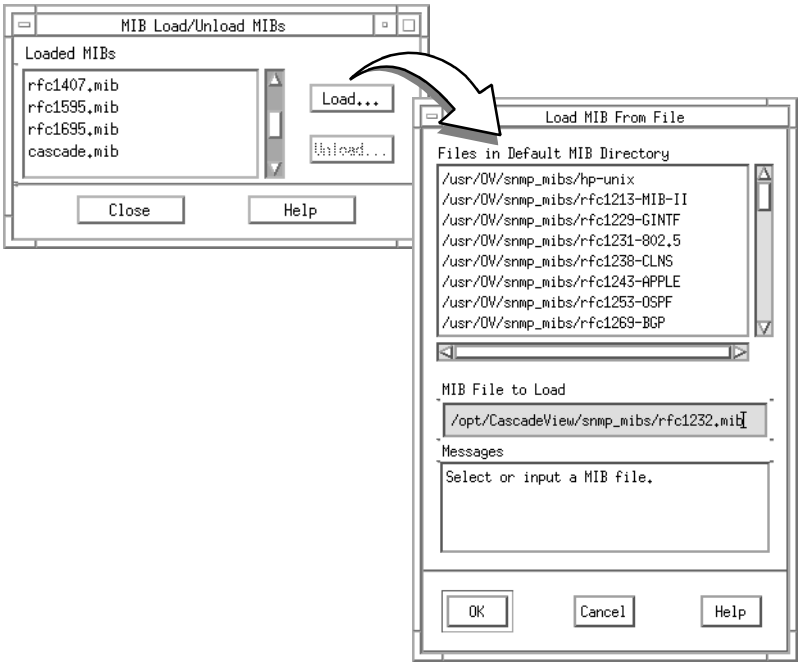

Figure 6-2. Load/Unload MIBs and Load MIB from File Dialog Boxes

4. Type the following path in the MIB File to Load field:

   `/opt/CascadeView/snmp_mibs/[`*`rfc1232.mib or rfc1604.mib`*`]`

5. Choose OK.

   The program loads the MIB and closes the Load MIB from File dialog box. The loaded MIB now appears in the Loaded MIBs list of the Load/Unload MIBs dialog box.

6. Repeat Steps 3 through 5 for the RFC1604 MIB.

7. When you are finished, close the Load/Unload MIBs dialog box by choosing the Close button.

   You are returned to the HP OpenView window.

You are now ready to test the CNM components.

Testing CNM Connections

The tests in this section use the HP MIB Browser to simulate CNM gateway software because the MIB Browser can send out SNMP requests to CNM components.

This section shows you how to test the following connections:

- Gateway to CNM Proxy Agent connection
- Proxy Agent to CNM database connection
- Proxy Agent to switch connection

Follow these steps to test CNM Proxy Agent connections:

1. From the HP OpenView Menu, select:

   Monitor ⇒ MIB Values, Browse MIB: SNMP...

   The Browse MIB dialog box appears. See Figure 6-3.

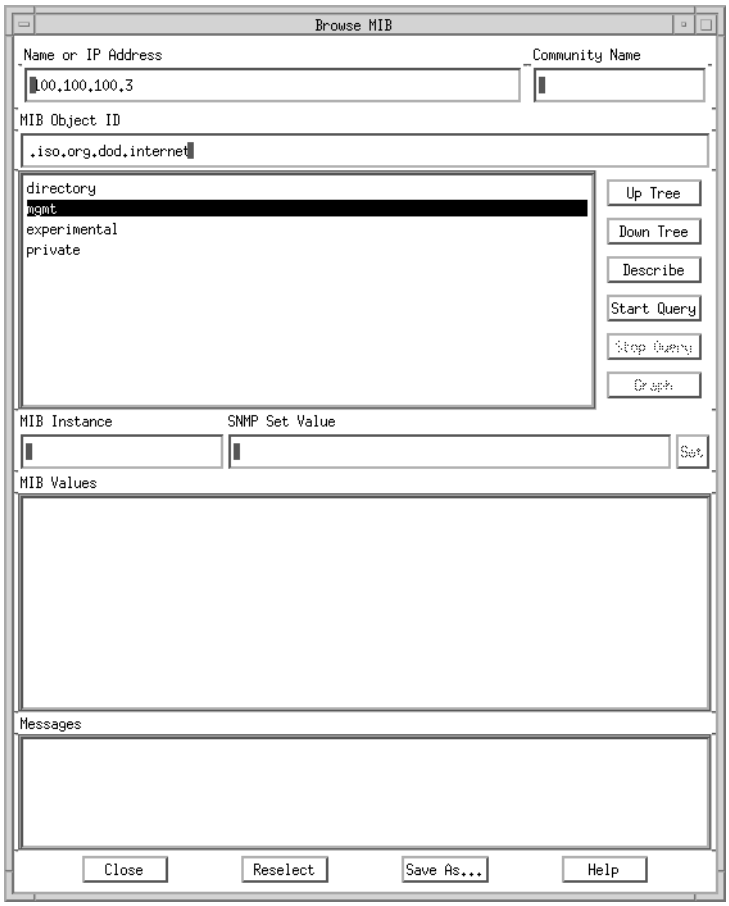

Figure 6-3. Browse MIB Dialog Box

2. Enter the IP address (or name) and community name of the CNM Proxy Agent workstation in the appropriate fields of the Browse MIB dialog box.
3. Highlight **mgmt** and choose the Down Tree button.
4. Highlight **mib-2** and choose the Down Tree button.

You are now ready to test the various CNM connections.

To Test the Gateway to Proxy Agent Connection:

1. Highlight **system** and choose the Down Tree button.
2. Highlight **sysDescr** and choose the StartQuery button to issue an SNMP request to the proxy agent.

   You know the connection is open if descriptive information about the CNM Proxy Agent appears in the MIB Values field.
3. Choose the Up Tree button to move up one level.

To Test the Proxy Agent to CNM Database Connection:

1. Highlight **interfaces** and choose the Down Tree button.
2. Highlight **ifTable** and choose the Down Tree button.
3. Highlight **ifEntry** and choose the Down Tree button.
4. Highlight **ifIndex** and choose the StartQuery button to issue an SNMP request to the CNM database.

   You know the connection is open if the interface index appears in the MIB Values field.

To Test the Proxy Agent to Switch Connection:

1. Highlight **ifOperStatus** and choose the StartQuery button to issue an SNMP request to the switch.

   You know the connection is open if switch status data appears in the MIB Values field.
2. Exit from HP OpenView.

7

Viewing Trap Alarms

Trap alarm conditions notify the operator about events taking place on switches that are configured to report to the NMS. This chapter describes the types of CNM trap alarms that are sent to the CNM gateway and shows you how to view trap-alarm information in HP OpenView.

The HP OpenView Event Categories window gives you access to trap-alarm information. From this window, you select the Events option to view the list of currently logged trap alarm conditions or the All Events option to view details about each trap alarm.

This chapter assumes that you have HP OpenView on your CNM gateway or that you are simulating a CNM gateway on your NavisCore system.

Types of CNM Traps

After receiving traps directly from the switch, the proxy agent verifies that the traps are from a circuit or logical port in the CNM database and then records the trap information.

The CNM Proxy Agent sends the following traps (defined in RFC 1604) to the CNM gateway:

coldStart — The CNM Proxy Agent starts.

linkUp — Logical port resumes normal operation. (This trap displays the **interface number of the affected logical port.)**

linkDown — Logical port goes down. (This trap displays the interface number of the affected logical port.)

frPVCConnectStatusChange — The circuit state changes. (The CNM Proxy Agent receives a cktDlciStatusChange or cktGrpStatusChange trap from the switch. When the logical port goes down, all circuits on each logical port are consolidated into one trap from the switch (cktGrpStatusChange). The CNM Proxy Agent generates one trap for each circuit on that logical port.)

Viewing Trap Alarms

The Event Categories window appears each time you run HP OpenView and notifies you of any significant trap alarm conditions. This window has a button that corresponds to each of the event categories. See Figure 7-1.

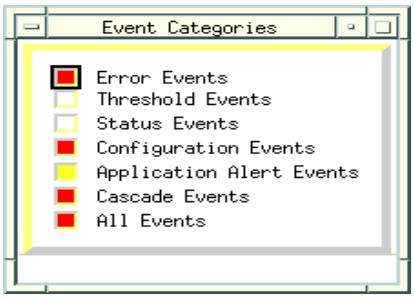

Figure 7-1. Event Categories Window

When a button in the Event Categories window changes color, it indicates that an event in that category occurred on the network. The color of the button indicates the level of severity in the category. Through the Network Node Manager (NNM) internal processes, the event is sent to a predefined category in the Events Browser. You can view the events in the All Events Browser window.

HP OpenView allows you to customize the Event Categories window by adding categories to the window. For example, you may want to add a category that holds all acknowledged events or one that holds all canceled events. Refer to the *NavisCore Diagnostic and Troubleshooting Guide* for information about adding new event categories.

For information about operational states and status colors, select Help ⇒ Display Legend from the HP OpenView menu.

Accessing the All Events Browser Window

To access the OpenView All Events Browser window, choose All Events from the Event Categories window. The system displays the All Events Browser window illustrated in Figure 7-2.

The All Events Browser window lists the following information about each trap alarm:

Severity — The trap alarm's level of severity. Possible values: Critical, Major, Minor, Warning, or Normal.

Date/Time — The date and time the trap alarm occurred.

Source — The name of the system on which the trap alarm occurred.

Message — A message that describes the trap alarm condition.

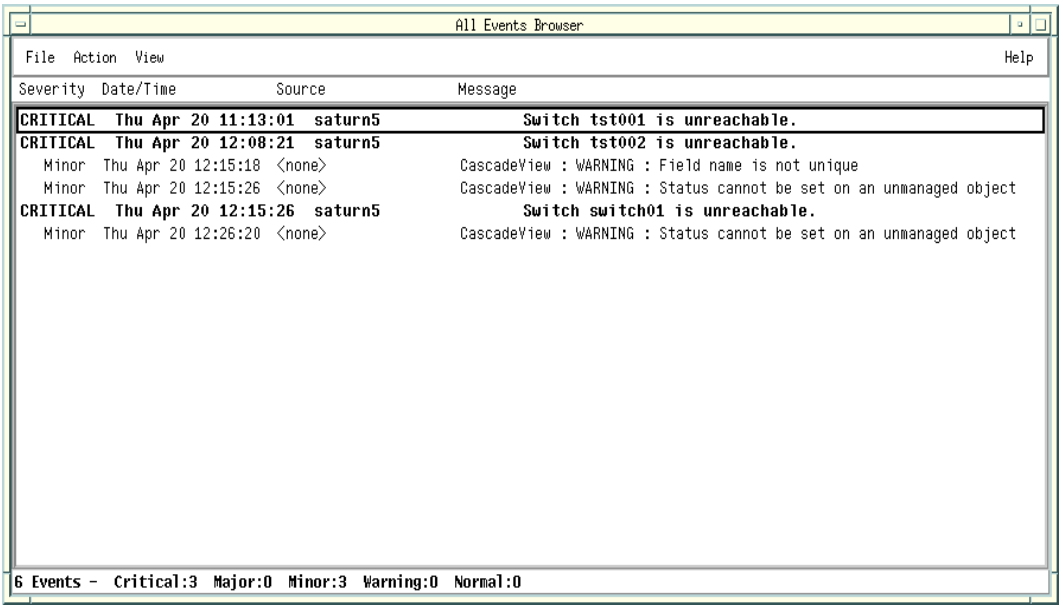

Figure 7-2. All Events Browser Window

A

Installation Worksheets

The worksheets in this appendix list the parameters that you need to specify during the Sybase 11 and CNM Proxy Agent installations. If you establish the values of these parameters before the installation, the installation process will be easier.

New Sybase 11 Installation Worksheet

Complete this form before you start the Sybase installation.

General Installation Parameter

1. Media (tape) device pathname: _____

Setting Up the System for Sybase 11 Installation

2. Sybase 11 home directory: _____

   Recommended value: /opt/sybase

3. Database server name:_____

   Recommended value: CASCCNM

4. Error log filename: _____

   Recommended value: CASCCNM_err.log

5. Database SA password:_____

6. NMS user's name:_____

   Recommended value: nms

7. NMS user's group name:_____

   Recommended value: staff

8. NMS user's home directory: _____

   Recommended value: /opt/nms

Using Raw Partitions for the Master Device

9. Master device pathname (Partition 0): _____

   Recommended value: /dev/rdsk/c0t1d0s0

10. Procs device pathname (Partition 4):_____

    Recommended value: /dev/rdsk/c0t1d0s4

11. Cascade device pathname (Partition 5): _____

    Recommended value: /dev/rdsk/c0t1d0s5

12. Log device pathname (Partition 6):_____

    Recommended value: /dev/rdsk/c0t1d0s6

13. Master device size: _____

    Recommended value: 40 MB (This is a minimum value.)

Using File System Files for the Master Device

14. Database device directory: _____

    Recommended value: /opt/databases

15. Master device size: _____

    Recommended value: 40 MB (This is a minimum value.)

16. Procs device size: _____

    Recommended value: 25 MB (This is a minimum value.)

17. Data device size: _____

    Recommended value: 300 MB (This is a minimum value.)

18. Log device size:_____

    Recommended value: 50 MB (This is a minimum value.)

Installing Sybase 11

19. Number of user connections:_____

    Recommended value: 25 (This is a minimum value.)

CNM Installation Worksheet

During the CNM Proxy Agent installation, you have to define parameter values for all the CNM components—the CNM Proxy Agent system, the CNM gateways, and the CNM and CascadeView database systems. Complete this form before you begin the installation.

General Installation Parameter

1. Media (tape) device pathname: _____

CNM Gateway Parameters

2. Number of gateways (1-9): _____

3. Gateway information

IP Address	Community Name	Trap Port	Trap Community Name

CNM Configuration Parameter

4. CV_CNM_NETWORK_NUMBER: _____

   The IP address of the switch network that CNM will monitor.

CascadeView Database Parameters

5. db remote host: _____

   IP address or name of the CascadeView database workstation.

6. db remote directory: _____

   Directory where the CascadeView database is installed. Default: /opt/sybase

7. db local directory: _____

   NFS mount point on the CNM workstation. CNM mounts the CascadeView db remote directory to the CNM db local directory. Default: /opt/sybase_cv

8. db server name: _____

   The name you gave the server when you created the CascadeView Sybase database. Default: CASCADE

9. database name: _____

   CascadeView database name. (See the following note.) Default: cascview

10. database user name: _____

    CascadeView database user name. (See the following note.) Default: cascview

11. sa password: _____

    Sybase password entered during the CascadeView Sybase installation. Default: superbase

The database name and database user name values are defined in the /opt/cascadeview/etc/cvdb.cfg file on the CascadeView system. To view these parameters, log on the CascadeView system and enter the following command:

more /opt/cascadeview/etc/cvdb.cfg

CNM Database Parameters

Although CNM and CascadeView database-parameter names are the same, the values are slightly different. When you work with CNM database parameters, “remote” refers to the remote CNM database system, “local” refers to the CNM Proxy Agent system.

12. db remote host: _____

    IP address or name of the remote CNM database workstation. Specify a value only if you have installed the CNM database on a system other than the CNM Proxy Agent system. Default: ""

13. db remote directory: _____

    Directory where the remote CNM database is installed. Specify a value only if the CNM database is installed on a remote system. Default: ""

14. db local directory: _____

    CNM database directory if the CNM database is installed locally. The NFS mount point on the CNM Proxy Agent workstation if the CNM database is installed remotely. Default: /opt/sybase

15. db server name: _____

    The server name you specified during the Sybase installation. (Refer to Parameter 3 in the Sybase 11 Installation Worksheet.) Default: CASCCNM

16. database name: _____

    CNM database name. Default: casccnm

17. database user name: _____

    CNM database user name. (The name must be six letters or longer.)
    Default: casccnm

18. sa password: _____

    Sybase password entered during the CNM Sybase installation.
    Default: superbase

B

CNM Proxy Agent MIBs

This chapter describes how CNM responds to requests for variables defined in MIB-II. CNM supports the MIB groups defined in RFC 1604. The CNM Proxy Agent supports MIB-II (RFCs 1213, 1215, and 1573) as well as the DS1 MIB defined in RFC 1232.[1] CNM does not support the PVC Accounting Group or the Logical Port Accounting Group.

[1] Cascade implements the DS1 MIB under the “transmission” branch, whereas RFC 1232 implements the MIB under the “experimental” branch. This modification is based on the suggestions stated in RFC 1239. See */opt/CascadeView/snmp_mibs/rfc1232.mib.*

MIB-II

This section lists the MIB variables defined in MIB-II (RFC 1213, 1215, and 1573).

System Group

The system group describes the CNM Proxy Agent. Table B-1 lists and describes the System Group variables.

Table B-1. System Group

MIB Variable	Description
sysDescr	Hardcoded to “Cascade Customer Network Manager (CNM) Version X.XX.”
sysUpTime	Elapsed time (in 1/100 sec) since the proxy agent came on line.
sysObjectID	Always { cascade casc-cnm(11) }.
sysContact	From the CNM configuration file.
sysName	Fully qualified hostname (for example, alpo.casc.com) from the configuration file.
sysLocation	From the CNM configuration file.
sysServices	The value 2, implying subnetwork level service, as recommended in RFC 1604.

Interfaces Group (RFC 1573)

The interface table contains one entry for each Frame Relay UNI DCE or NNI port in the configuration.

With the exception of *ifIndex*, the values of these variables correspond exactly to the same variables retrieved directly from the MIB. Table B-2 lists and describes the Interfaces Group variables.

Cascade's switch does not support the variables marked with an asterisk (*) in Table B-2.

Table B-2. Interfaces Group

MIB Variable	Description
ifNumber	Count of all logical ports with type frame relay UNI DCE or NNI obtained from the database. (This value cannot be retrieved from the switch MIB without polling each switch in turn.)
ifIndex <index>	First two bytes: switch ID; next two bytes: interface number.
ifDescr	String representing the physical port type, as returned by the switch. The port type is retrieved from the configuration.
ifType	Always frameRelayService(44), as specified by RFC 1604.
ifMtu	Always 8192.
ifSpeed	Configured data rate for the logical port, in bps.
ifPhysAddress	Not used. Always "".
ifAdminStatus	As configured.
ifOperStatus	Retrieved from switch.
ifLastChange	Retrieved from switch.
ifInOctets	Retrieved from switch.
ifInUcastPkts	Retrieved from switch.
ifInDiscards	Retrieved from switch.
ifInErrors	Retrieved from switch.
ifInUnknownProtos	Always 0, as specified by RFC 1604.

Table B-2. Interfaces Group (Continued)

MIB Variable	Description
ifOutOctets	Retrieved from switch.
ifOutUcastPkts	Retrieved from switch.
ifOutDiscards	Retrieved from switch.
ifOutErrors	Retrieved from switch.
ifOutQLen	Retrieved from switch.
*ifName	Set to “”, as recommended by RFC 1604. (This variable is not supported by the switch.)
ifInMulticastPkts	Retrieved from switch.
*ifInBroadcastPkts	Always 0, as specified by RFC 1604. (This variable is not supported by the switch.)
ifOutMulticastPkts	Retrieved from switch.
*ifOutBroadcastPkts	Always 0, as specified by RFC 1604. (This variable is not supported by the switch.)
*ifHCInOctets	Always 0; used only for DS3 and greater. (This variable is not supported by the switch.)
ifHCOutOctets	Always 0; used only for DS3 and greater. (This variable is not supported by the switch.)
*ifLinkUpDownTrapEnble	Always true. (This variable is not supported by the switch.)
*ifHighSpeed	User data rate in Mbps (or 0 if < 1 Mbps); retrieved from configuration. (This variable is not supported by the switch.)
*ifPromiscuousMode	false(2), as recommended by RFC 1604. (This variable is not supported by the switch.)
*ifConnectorPresent	false(2), as recommended by RFC 1604. (This variable is not supported by the switch.)
ifSpecific	Always { transmission frameRelayService(44) }.

The ifIndex <index> MIB variable is used to generate the *ifIndex* when you issue a Set to the CNM Proxy Agent. The ifIndex MIB does not conform to MIB-II.

Frame Relay Service MIB (RFC 1604)

This section lists the MIB variables defined in the Frame Relay Service MIB (RFC 1604).

Logical Ports Group

This group acts as an extension to the MIB-II interface table. There is one entry in this table for each Frame Relay UNI DCE or NNI logical port in the configuration. Table B-3 lists and describes the Logical Ports Group variables.

Table B-3. Logical Ports Group

MIB Variable	Description
frLportNumPlan	Always none(4). (This variable is not supported by the switch.)
frLportContact	Network contact for this port — the contact string configured for the switch on which this port resides. (This corresponds to sysContact on the switch.)
frLportLocation	Network location for this port — <switchName.slotID.pportID> (<switch location>), all from configuration. (This corresponds to the variables sysName, lportSlotId, lportPportId, and sysLocation on the switch.)
frLportType	uni(1) or nni(2), as configured. (This can be mapped from lportSignal on the switch.)
frLportAddrDLCILen	As configured. (The enumeration values are the same as those used by variable lportDlciAddrLen on the switch, and by CascadeView.)
frLportVCSigProtocol	As configured, unless the configured value is auto-detect, in which case the actual protocol used will be retrieved from the switch. (The enumeration values will be mapped from those used by the switch for the variable lportDlcmiStd, and by CascadeView to those defined in the MIB.)
frLportVCSigPointer	Pointer to the VC signalling table. (Always { frMgtVCSigTable }; not supported by the switch.)

VC Signalling Group

This group acts as an extension to the MIB-II interface table. There is one entry in this table for each UNI DCE or NNI logical port that does not have its DLCMI standard set to none. You can retrieve the configured values for the DCE and DTE parameters from the corresponding MIB variables in the switch's lportTable. Table B-4 lists and describes the VC Signalling Group variables.

Table B-4. VC Signalling Group

MIB Variable	Description
frMgtVCSigProced	u2nnet(1) for UNI DCE, bidirect(2) for NNI; based on the port type in the configuration. (The port type can be retrieved from lportSignal.)
frMgtVCSigUserN391	If the port type is NNI and the DLCMI std. is Q.933-A or T1.617-D, the configured value of the DTE full status polling interval. Otherwise, noSuchName. (This corresponds to the Cascade MIB variable lportDteFullCounter.)
frMgtVCSigUserN392	If the port type is NNI and the DLCMI std. is Q.933-A or T1.617-D, the configured value of the DTE error threshold. Otherwise, noSuchName. (This corresponds to the Cascade MIB variable lportDteErrorThresh.)
frMgtVCSigUserN393	If the port type is NNI and the DLCMI std. is Q.933-A, T1.617-D, the value of the DTE monitored events count, retrieved from the switch. Otherwise, noSuchName. (This corresponds to the Cascade MIB variable lportDteEventCount.)
frMgtVCSigUserT391	If the port type is NNI and the DLCMI std. is Q.933-A or T1.617-D, the configured value of the DTE link status polling timer. Otherwise, noSuchName. (This corresponds to the Cascade MIB variable lportDtePollTimer.)
frMgtVCSigNetN392	If the DLCMI std. is Q.933-A, T1.617-D, or LMI, the configured value of the DCE error threshold value. Otherwise, noSuchName.
frMgtVCSigNetN393	If the DLCMI std. is Q.933-A, T1.617-D, or LMI, the value of the DCE monitored events count, retrieved from the switch. Otherwise, noSuchName. (This corresponds to the Cascade MIB variable lportDceEventCount.)

Table B-4. VC Signalling Group (Continued)

MIB Variable	Description
frMgtVCSigNetT392	If the DLCMI std. is Q.933-A, T1.617-D, or LMI, the configured value of the DCE polling verification timer. Otherwise, noSuchName. (This corresponds to the Cascade MIB variable lportDceVerifTimer.)
frMgtVCSigNetnN4	If the DLCI std. is LMI, always 5, as specified by RFC 1604. Otherwise, noSuchName. (This corresponds to the Cascade MIB variable lportDCEnN4.)
frMgtVCSigNetnT3	Not used; always 20 (the default specified by RFC 1604). (This corresponds to the Cascade MIB variable lportDCEnT3.)
frMgtVCSigUserLinkRelErrors	If the port type is NNI, the value of Cascade MIB variable lportDTEPollErrorCounts. Otherwise, noSuchName.
frMgtVCSigUserProtErrors	If the port type is NNI, the value of Cascade MIB variable lportDTEInErrorFrames. Otherwise, noSuchName.
frMgtVCSigUserChanInactive	If the port type is NNI, the value of Cascade MIB variable lportDTEFailCounts.
frMgtVCSigNetLinkRelErrors	The value of Cascade MIB variable lportDCEPollErrorCounts.
frMgtVCSigNetProtErrors	The value of Cascade MIB variable lportDCEInErrorFrames.
frMgtVCSigNetChanInactive	The value of Cascade MIB variable lportDCEFailCounts.

PVC Endpoints Group

This group contains traffic parameters and statistics for PVC endpoints. There are two entries in the PVC endpoint table for each configured circuit that has both endpoints on user links (for example, type is UNI DCE or NNI), and one entry for each configured circuit that has only one endpoint on a user link. The index to this table consists of the ifIndex described in Table B-2 on page B-3, and the frPVCEndptDLCIIndex described in Table B-5 on page B-8.

You can retrieve the configured values for the circuit endpoint parameters from the corresponding MIB variables in the switch's cktTable. Table B-5 lists and describes the Endpoints Group variables.

Table B-5. Endpoints Group

MIB Variable	Description
frPVCEndptDLCIIndex	Configured DLCI ID. (Not accessible.) (This corresponds to the Cascade MIB variable cktSrcDlci.)
frPVCEndptInMaxFrameSize	Always 8192.
frPVCEndptInBc	Circuit's configured BC value. (This corresponds to the Cascade MIB variable cktBc.)
frPVCEndptInBe	Circuit's configured BE value. (This corresponds to the Cascade MIB variable cktBe.)
frPVCEndptInCIR	Circuits configured CIR value. (This corresponds to the Cascade MIB variable cktCir.)
frPVCEndptOutMaxFrameSize	Always 8192.
frPVCEndptOutBc	Circuit's configured BC value. (This corresponds to the Cascade MIB variable cktBc.)
frPVCEndptOutBe	Circuit's configured BE value. (This corresponds to the Cascade MIB variable cktBe.)
frPVCEndptOutCIR	Circuit's configured CIR value. (This corresponds to the Cascade MIB variable cktCir.)
frPVCEndptConnectIdentifier	An index into the PVC connection table. (This variable is assigned by the CNM proxy and does not correspond to any variable in the Cascade switch MIB.)
frPVCEndptRowStatus	Always active(1).
frPVCEndptRcvdSigStatus	If the port type is NNI, the value of the Cascade MIB variable cktDceState; otherwise, always none(4).

Table B-5. Endpoints Group (Continued)

MIB Variable	Description
frPVCEndptInFrames	Retrieved from the switch. (This corresponds to the Cascade MIB variable cktInFrames.)
frPVCEndptOutFrames	Retrieved from the switch. (This corresponds to the Cascade MIB variable cktOutFrames.)
frPVCEndptInDEFrames	Retrieved from the switch. (This corresponds to the Cascade MIB variable cktInDEFrames.)
frPVCEndptInExcessFrames	If graceful discard is off: (cktInDEFrames). If graceful discard is on: (cktInDEFrames + cktInODEFrames)
frPVCEndptOutExcessFrames	cktOutDEFrames + cktOutODEFrames, both retrieved from the switch.
frPVCEndptInDiscards	Retrieved from the switch. (This corresponds to the Cascade MIB variable cktInDiscards)
frPVCEndptInOctets	Retrieved from the switch. (This corresponds to the Cascade MIB variable cktInOctets.)
frPVCEndptOutOctets	Retrieved from the switch. (This corresponds to the Cascade MIB variable cktOutOctets.)

PVC Connections Group

This group enables PVC endpoints to be connected together to form circuits. There is one entry in the PVC connection table for each configured circuit that has one or both endpoints on user links (for example, type is UNI DCE or NNI). The PVC connection table is indexed by the following MIB variables: frPVCConnectIndex, frPVCConnectLowIfIndex, frPVCConnectLowDLCIIndex, frPVCConnectHighIfIndex, and frPVCConnectHighDLCIIndex. You can retrieve the configured values for the circuit connection parameters from the corresponding MIB variables in the switch's cktTable. Table B-6 lists and describes the PVC Connections Group variables.

Table B-6. PVC Connections Group

MIB Variable	Description
frPVCConnectIndexValue	Always 0, indicating that entries cannot be added.
frPVCConnectIndex <index>	The CircuitKey from the database. (Not accessible.) (This variable is assigned by the CNM proxy and cannot be retrieved from the Cascade switch MIB.)

Table B-6. PVC Connections Group (Continued)

MIB Variable	Description
frPVCConnectLowIfIndex	The lower-numbered of the interface numbers of the two endpoints. If this port does not have type UNI DCE or NNI, 0. (Not accessible.) (This corresponds to the lower of the Cascade MIB variables cktSrcIfIndex and cktDestIfIndex.)
frPVCConnectLowDLCIIndex	The DLCI ID of the endpoint at the low ifIndex. If this endpoint is not of type frame relay (for example, it is a translation type), 0. (Not accessible.) (This corresponds to either cktSrcDlci or cktDestDlci.)
frPVCConnectHighIfIndex	The interface number of the port at the other endpoint. (Not accessible.) (This corresponds to the higher of the Cascade MIB variables cktSrcIfIndex and cktDestIfIndex.)
frPVCConnectHighDLCIIndex	The DLCI ID of the endpoint at the high ifIndex. (Not accessible.) (This corresponds to either cktSrcDlci or cktDestDlci.)
frPVCConnectAdminStatus	As configured: active(1) or inactive(2). (The value testing(3) is not supported.) (This can be mapped to the Cascade MIB variable cktAdminStatus.)
frPVCConnectL2hOperStatus	The operational status retrieved from the lower-numbered endpoint; mapped from cktOperStatus to active(1) or inactive(2). If the status cannot be obtained, unknown(4). (The value testing(3) is not supported.)
frPVCConnectH2lOperStatus	The operational status retrieved from the higher-numbered endpoint; mapped from cktOperStatus to active(1) or inactive(2). If the status cannot be obtained, unknown(4). (The value testing(3) is not supported.)
frPVCConnectL2hLastChange	The value of cktLastTimeChange at the lower-numbered endpoint.
frPVCConnectH2lLastChange	The value of cktLastTimeChange at the higher-numbered endpoint.
frPVCConnectRowStatus	Always active(1).

DS1 MIB (RFC 1232)

This section lists the MIB variables defined in the DS1 MIB (RFC 1232). Notice that the CNM Proxy Agent has implemented this MIB on the “transmission” branch.

DS1 Configuration Group

This group contains one entry for each DS1 (T1, E1 or DSX-1) physical port in the configuration that has a UNI DCE or NNI defined port. The DS1 configuration table is indexed by ds1CSUIndex. All variables in this table (except for ds1CircuitIdentifier) correspond to values in the dsx1ConfigTable on the switch (for example, ds1TimeElapsed maps to dsx1TimeElapsed; ds1ValidIntervals maps to dsx1ValidIntervals). Table B-7 lists and describes the DS1 Configuration Group variables.

Table B-7. DS1 Configuration Group

MIB Variable	Description
ds1CSUIndex <index>	First two bytes: switch ID; third byte: slot ID; fourth byte: physical port ID.
ds1Index	If the port is fractional T1 or E1, 0; otherwise, the ifIndex of the logical port assigned to this port.
ds1TimeElapsed	Retrieved from the switch.
ds1ValidIntervals	Retrieved from the switch.
ds1LineType	As configured. (Enumeration values are mapped to those defined in the MIB.)
ds1ZeroCoding	As configured. (Enumeration values will be mapped to those defined in the MIB.)
ds1Loopback	Always ds1NoLoop(1), until supported in CascadeView/UX and on the switch.
ds1SendCode	Retrieved from the switch.
ds1YellowAlarm	Retrieved from the switch.
ds1RedAlarm	Retrieved from the switch.
ds1CircuitIdentifier	<switchName>.<slotID>.<portID> (These values can be retrieved from the variables sysName, pportSlotId, and pportId.)

DS1 Interval Group

This group contains statistics collected over the past 24 hours. This group can have up to 96 entries for each port in the DS1 configuration. All variables in this group are retrieved from similarly named variables in the switch's dsx1IntervalTable.

The DS1 interval table is indexed as follows:

ds1IntervalIndex — Identifies valid value of ds1CSUIndex for one entry in the configuration table.

ds1IntervalNumber — Identifies one of up to 96 time intervals collected by the switch.

Table B-8 lists and describes the DS1 Interval Group variables.

Table B-8. DS1 Interval Group

MIB Variable	Description
dsIntervalIndex	If the port is fractional T1 or E1, value is 0; otherwise, the ifIndex of the logical port assigned to this port.
ds1IntervalNumber	A number between 1 and 96.
ds1IntervalESs	Retrieved from the switch (dsx IntervalESs).
ds1IntervalSESs	Retrieved from the switch (dsx IntervalSESs).
ds1IntervalSEFs	Retrieved from the switch (dsx IntervalSEFs).
ds1IntervalUASs	Retrieved from the switch (dsx IntervalUASs).
ds1IntervalCSSs	Retrieved from the switch (dsx IntervalCCSs).
ds1IntervalBPVs	This variable is not supported by the switch.
ds1IntervalCVs	This variable is not supported by the switch.

DS1 Current Group

This group contains statistics collected for the current 15-minute interval. There is one entry in this table for each port in the DS1 configuration table.

The DS1 interval table is indexed by ds1CurrentIndex, which is a valid value of ds1CSUIndex for one entry in the configuration table.

All variables in this group are retrieved from similarly named variables in the switch's dsx1CurrentTable. Table B-9 lists and describes the DS1 Current Group variables.

Table B-9. DS1 Current Group

MIB Variable	Description
dsCurrentIndex	If the port is fractional T1 or E1, value is 0; otherwise, the ifIndex of the logical port assigned to this port.
ds1CurrentESs	Retrieved from the switch (dsx CurrentESs).
ds1CurrentSESs	Retrieved from the switch (dsx CurrentSESs).
ds1CurrentSEFs	Retrieved from the switch (dsx CurrentSEFs).
ds1CurrentUASs	Retrieved from the switch (dsx CurrentUASs).
ds1CurrentCSSs	Retrieved from the switch (dsx CurrentCCSs).
ds1CurrentBPVs	This variable is not supported by the switch.
ds1CurrentCVs	This variable is not supported by the switch.

DS1 Total Group

This group contains totals for statistics collected over the previous 24-hour interval. There is one entry in this table for each port in the DS1 configuration table.

The DS1 interval table is indexed by ds1TotalIndex, which is a valid value of ds1CSUIndex for one entry in the configuration table.

All variables in this group are retrieved from similarly named variables in the switch's dsx1TotalTable. Table B-10 lists and describes the DS1 Total Group variables.

Table B-10. DS1 Total Group

MIB Variable	Description
ds1TotalIndex	If the port is fractional T1 or E1, value is 0; otherwise, the ifIndex of the logical port assigned to this port.
ds1TotalESs	Retrieved from the switch (dsx TotalESs).
ds1TotalSESs	Retrieved from the switch (dsx TotalSESs).
ds1TotalSEFs	Retrieved from the switch (dsx TotalSEFs).
ds1TotalUASs	Retrieved from the switch (dsx TotalUASs).
ds1TotalCSSs	Retrieved from the switch (dsx TotalCCSs).
ds1TotalBPVs	This variable is not supported by the switch.
ds1TotalCVs	This variable is not supported by the switch.

DS1 Fractional Group

This group maps channels to logical ports. There is one entry in this table for each channel (of a channelized DS1 port) that has a logical port defined on it (channels without logical ports are not in the table). The DS1 fractional group is indexed by ds1FracIndex, which is a valid value of ds1CSUIndex for one entry in the configuration table, and ds1FracNumber, which is a channel number. For T1 and DSX-1 ports, legal channel numbers are 1 through 24; for E1 ports, channel numbers are 2 through 16 and 18 through 32. The configuration determines the contents of this table. The contents are determined indirectly through the variables lPortSlotId, lportPportId, and lportFt1Ds0s. Table B-11 lists and describes the DS1 Fractional Group variables.

Table B-11. DS1 Fractional Group

MIB Variable	Description
ds1FracIndex <index>	Index into the DS1 configuration table.
ds1FracNumber <index>	Channel number (1..32).
ds1FracIfIndex	Index into the interface table for the logical port defined on this channel.

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