Bulk Statistics Collector for B-STDX/STDX User's Guide Release 2.5

Ascend Communications, Inc.

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About This Guide

The *Bulk Statistics Collector for B-STDX/STDX User's Guide* guide contains all of the procedures you need to successfully install, upgrade, and use the Bulk Statistics Collector for B-STDX/STDX application.

What You Need to Know

As a reader of this guide, you should be familiar with basic UNIX operating-system commands. You should possess a working knowledge of relational database software if you plan to use SYBASE to store the statistical data that the Bulk Statistics Collector for B-STDX/STDX produces.

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

Before you read this guide, read the *Bulk Statistics Collector for B-STDX/STDX Software Release Notice (SRN)* that accompanies the software. The *Bulk Statistics Collector for B-STDX/STDX SRN* will alert you to any documentation updates or special conditions that you should be aware of.

This section highlights the chapters and contents in this guide.

Read	To Learn About
Getting Started	
Chapter 1	An overview of the Bulk Statistics Collector for B-STDX/STDX application and suggested configurations.
Chapter 2	The *Cascade-recommended* instructions for installing and upgrading the Bulk Statistics Collector for B-STDX/STDX.
Chapter 3	How to run the Bulk Statistics Collector for B-STDX/STDX application.
4.2 Collection Processing	
Chapter 4	The collection process that Bulk Statistics uses for statistics collected from switches using Release 4.2 of the switch software.
Chapter 5	Translated trunk statistics collected from switches using Release 4.2 of the switch software.
Chapter 6	Translated frame relay circuit and logical port statistics collected from switches using Release 4.2 of the switch software.
Chapter 7	Translated SMDS logical port statistics for switches using Release 4.2 of the switch software.

Read	To Learn About
Pre-4.2 Collection Processing	
Chapter 8	The collection process that Bulk Statistics uses for statistics collected from B-STDX 8000/9000 switches using Release 4.0.18 and higher (but not 4.2) of the switch software, and STDX 3000/6000 switches using Version 2.3 and higher of the switch software.
Chapter 9	Translated trunk statistics for B-STDX 8000/9000 switches using Release 4.0.18 and higher (but not 4.2) of the switch software, and STDX 3000/6000 switches using Version 2.3 and higher of the switch software.
Chapter 10	Translated frame relay circuit statistics for B-STDX 8000/9000 switches using Release 4.0.18 and higher (but not 4.2) of the switch software, and STDX 3000/6000 switches using Version 2.3 and higher of the switch software.
Troubleshooting	
Chapter 11	Troubleshooting problems that can occur when you install and run the Bulk Statistics Collector for B-STDX/STDX. This chapter also provides customer assistance information for contacting Cascade's Technical Response Center (TRC).
SYBASE 11	
Chapter 12	Installing SYBASE 11 for Bulk Statistics if you do not currently use SYBASE SQL Server, Release 4.9.2 with Bulk Statistics.
Chapter 13	Upgrading to SYBASE 11 for Bulk Statistics if you currently use SYBASE SQL Server, Release 4.9.2 with Bulk Statistics.
Appendices	
Appendix A	The database schema for all of the SYBASE tables.
Appendix B	The formulas you use to determine your system's disk space requirements for Bulk Statistics data.
Appendix C	Bulk Statistics error messages.
Appendix D	The definitions for specific Bulk Statistics Collector for B-STDX/STDX terms.
Appendix E	The parameters you will need to fill in while running the SYBASE installation script.
Appendix F	Backing up SYBASE 11 databases.

What's New in This Guide

This section lists the product features in this release, as well as the enhancements and changes made to this guide.

Table 1. B-STDX Bulk Statistics Features

New Features / Functions	Enables you to	Described in
5-minute peak for B-STDX switches running Version 4.2 of the switch software.	Measure 5-minute sample periods within a collection period and determine the maximum value during the collection period.	Chapter 4 Chapter 8
Configurable collection period for B-STDX switches using release 4.2 of the switch software.	Set the collection period for an individual switch to 5, 15, 20, 30, or 60 minutes.	Chapter 3 Chapter 4
Calculations done at the switch	Obtain calculations for the peak and the total collection period, which are done at the switch.	Chapter 4 Chapter 8
Frame Relay logical port statistics	Obtain peak and total collection period values for Frame Relay UNI and NNI ports.	Chapter 6
SMDS Statistics	Obtain peak and total collection period values for SMDS DXI and SSI.	Chapter 7
Immediate Translation	Specify at installation whether you want immediate translation and archival of raw statistics or if you want to defer translation and archival until the nightly processing.	Chapter 2 Chapter 4 Chapter 8
Decimal format for translated data for switches using Release 4.2 of the switch software	More easily comprehend data and counters.	Chapter 4
Archived files are compressed	Use less disk space for archived files.	Chapter 4
Translated files are archived at the end of each day	Retrieve the translated files from a previous day.	Chapter 3 Chapter 4 Chapter 8

Table 1. B-STDX Bulk Statistics Features (Continued)

New Features / Functions	Enables you to	Described in
Backwards compatibility	Collect bulk statistics on B-STDX 8000/9000 switches using Release 4.0.18 and higher of the switch software, and STDX 3000/6000 switches using Version 2.3 and higher of the switch software. In addition, users of the previous version of Bulk Statistics can continue to use existing data with this newer version of the product.	Chapter 8
Script to purge old database entries	Choose at installation whether or not to delete database entries that are more than a specified number of days old.	Chapter 2 Chapter 4 Chapter 8
Script to purge old archived raw statistics	Choose at installation whether or not to delete archived raw statistics that are more than a specified number of days old.	Chapter 2 Chapter 4 Chapter 8
Counters to support high speed trunks	Support the ATM UNI DS3 Interworking Module and the ATM UNI E3 Interworking IO Module, and use trunk counters that have been increased to 64 bits.	Chapter 6 Chapter 7
Automatically sets the environment variable, and updates the cvbulkstat.cfg file.	Specify values for the cvbulkstat.cfg file when you use the installation script, so you don't have to edit the file.	Chapter 2

Table 2. Enhancements to this Guide

Changes/Enhancements to this Guide	Described in
HP OpenView SNMP Management Platform, Version 4.11 menu options. In HP OpenView, 4.11, CascadeView/UX menu options appear on different menus than in HP OpenView, 3.3.1. This guide references the location of the menu options for HP OpenView, Version 4.11.	Chapter 2 Chapter 3

Related Documents

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

Ascend

- *STDX 6000 Hardware Installation Guide (80006)*
- *B-STDX 8000/9000 Hardware Installation Guide (80005)*
- *Cascade Networking Services Technology Overview (80001)*
- *Network Management Station Installation Guide (80014)*
- *Network Configuration Guide for B-STDX/STDX (80017)*
- *Diagnostic and Troubleshooting Guide for B-STDX/STDX (80018)*
- *Cascade Enterprise MIB Definitions (80015)*
- *SYBASE 11 SQL Server Upgrade Guide (80040)*

Third Party

- *Solaris 2.4 System Configuration and Installation Guide* or *Solaris 2.5 System Configuration and Installation Guide* (depending on the version of Solaris that you are using)
- *HP OpenView Windows User's Guide* (for HP 9000 Series and Sun SPARCstation)
- *SYBASE Commands Reference Manual*
- *SYBASE System Administration Guide*

Conventions

This guide uses the following conventions to emphasize certain information, such as user input, screen options and output, and menu selections. For example:

Convention	Indicates	Example
`Courier Bold`	User input on a separate line.	**`eject cdrom`**
[bold italics]	Variable parameters to enter.	***[your IP address]***
`Courier Normal`	Output from a program to the screen	`Please wait ...`
Boldface	User input in text.	Type **cd install** and press Return.
Menu ⇒ Option	Select an option from the menu.	CascadeView ⇒ Logon
Black border surrounding text	Notes and warnings.	See examples below.
Italics	File names, path names, directories, book titles, new terms, and emphasized text.	*Network Management Station Installation Guide*

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

Warns the reader to proceed carefully in order to avoid equipment damage or personal harm.

1

Overview

The Bulk Statistics Collector for B-STDX/STDX Release 2.5 application gathers and stores switch-specific statistical information for selected Cascade B-STDX and STDX switches.

Bulk Statistics Release 2.5 Features for 4.2 Switches

The following list outlines the features that the Bulk Statistics application provides for selected B-STDX 8000/9000 switches using Release 4.2 of the switch software. Throughout this guide, these switches are referred to as 4.2 switches, and the collection of statistics from these switches are referred to as 4.2 collection processing.

- Configurable collection period for each 4.2 switch
- Total collection period and 5-minute peak statistics for Frame Relay trunks and circuits
- Total collection period and 5-minute peak statistics for Frame Relay UNI and NNI logical ports as well as SMDS DXI and SSI logical ports
- A purge utility that provides the ability to delete archived raw statistics files and database records that are older than a specified date. You specify the purge options required for your system at the time of Bulk Statistics installation.
- Collection statistic calculation directly at the switch rather than at the Bulk Statistics collection station
- Hourly translation and bulk copy of statistics

Chapter 4, “4.2 Collection Processing” details the process used to collect switch data and produce statistics for 4.2 switches.

Bulk Statistics Release 2.5 Features for Pre-4.2 Switches

Bulk Statistics also provides backwards compatibility for Bulk Statistics collection on the following switches:

- B-STDX 8000/9000 that supports Version 4.0.18 and higher (but not 4.2 and higher) of the switch software.
- STDX 3000/6000 that use Version 2.3 and higher of the switch software.

Throughout this guide, these switches will be referred to as pre-4.2 switches, and the collection of statistics from these switches will be referred to as pre-4.2 collection processing.

The Bulk Statistics application features for pre-4.2 switches include:

- The same process for statistics collection, translation, calculation, and nightly processing as it used in the Bulk Statistics For UNIX Release 2.0.x application.
- A new purge utility that provides the ability to delete archived raw statistics files and database records that are older than a specified date. You specify the purge options required for your system at the time of Bulk Statistics installation.

Chapter 8, “Pre-4.2 Collection Processing” details the process used to collect switch data and produce statistics for Pre-4.2 switches.

Previous Version of Bulk Statistics

If you have Version 2.0 of Bulk Statistics, it will continue to perform statistics collection, translation, calculation, and nightly processing on the following switches:

- B-STDX 8000/9000 that supports Version 4.0.18 and higher (but not 4.2 and higher) of the switch software.
- STDX 3000/6000 that use Version 2.3 and higher of the switch software.

Version 2.0 of Bulk Statistics *will not* collect statistics from B-STDX 8000/9000 switches using Release 4.2 of the switch software.

Configuration Examples

Table 1-1 specifies a variety of common Bulk Statistics Collector for B-STDX/STDX configurations. Configuration 2 is the most commonly used configuration. Configuration 3 is recommended if you have more than one collection station or you are also running Bulk Statistics Collector for CBX 500.

Bulk Statistics Collector for CBX 500 and Bulk Statistics Collector for B-STDX/STDX can use the same database. Solaris and the Common Desktop Environment (CDE) are preliminary requirements on every workstation listed in the matrix.

The configuration that you select depends on your system's

- Plan for using the Bulk Statistics Collector for B-STDX/STDX
- The amount of data that your collections will generate

Table 1-1. Bulk Statistics Configuration Matrix

Config	Workstation 1	Workstation 2	Workstation 3	Workstation 4
1	- CascadeView/UX - NMS database - Bulk Statistics Application - Bulk Statistics database - SYBASE Server			
2	- CascadeView/UX - NMS database - SYBASE Server	- Bulk Statistics Application - Bulk Statistics database - SYBASE Server		
3	- CascadeView/UX - NMS database - SYBASE Server	- Bulk Statistics database - SYBASE Server	- Bulk Statistics Application	- Bulk Statistics Application (optional)
4	- CascadeView/UX	- NMS database - SYBASE Server	- Bulk Statistics Application	- Bulk Statistics database - SYBASE Server

Hardware and Software Requirements for Bulk Statistics

Hardware Requirements

The following list outlines the minimum hardware requirements for using the Bulk Statistics Collector for B-STDX/STDX application on a UNIX platform:

- Sun Ultra Enterprise 2. The workstation should be configured with:
  - 128 MB onboard memory
  - 1/4-inch cartridge (QIC) tape drive
  - 2.1 GByte internal disk drive

The amount of disk space that you will need depends upon a number of factors, including the polling interval, number of nodes, number of trunks, number of circuits, and your system's configuration. See Appendix B for more information about calculating disk space for your system.

Software Requirements

The following outlines the software minimum requirements to make use of Bulk Statistics.

- Minimum of Solaris 2.4 with cluster patch *2.4_Recommended.tar.Z.*
- If Solaris 2.4 is being used, Motif 1.2.4 for Solaris 2.4 is required. If you have installed OpenWindows or Motif in a non-default location, you should always have the **$MOTIFHOME** and **$OPENWINHOME** environment variables set when you run the Bulk Statistics application.
- If Solaris 2.5 is being used, the latest version of cluster patch *2.5_Recommended.tar.Z* and either Motif 1.2.5 or the Common Desktop Environment (CDE) are required.
- If Solaris 2.5.1 is being used, the latest version of cluster patch *2.5.1_Recommended.tar.Z* and either Motif 1.2.5 or the Common Desktop Environment (CDE) are required.
- SYBASE Open Server, version 11 (Required if you are using SYBASE to store your statistical data. SYBASE 4.9.2 is not supported.)

For more information on obtaining the Solaris cluster patch files, call Sun at 1-800-USA-4SUN.

Hardware and Software Requirements for SYBASE 11

Hardware Requirements

The workstation on which SYBASE 11 is installed must be equipped with the following:

- 1/4-inch Tape Drive
- SCSI device addresses

Verify that the SCSI device addresses (on the back of each device) are set as shown in Table 1-2.

Table 1-2. SCSI Device Addresses

SCSI Device	Address
Tape drive	4
First hard disk	0
Second hard disk	1

Software Requirements

The software minimum requirements for SYBASE 11 are:

- Minimum of Solaris 2.4 with cluster patch *2.4_Recommended.tar.Z.*
- If Solaris 2.4 is being used, Motif 1.2.4 for Solaris 2.4 is required. If you have installed OpenWindows or Motif in a non-default location, you should always have the **$MOTIFHOME** and **$OPENWINHOME** environment variables set when you run the Bulk Statistics application.
- If Solaris 2.5 is being used, the latest version of cluster patch *2.5_Recommended.tar.Z* and either Motif 1.2.5 or the Common Desktop Environment (CDE) are required.
- If Solaris 2.5.1 is being used, the latest version of cluster patch *2.5.1_Recommended.tar.Z* and either Motif 1.2.5 or the Common Desktop Environment (CDE) are required.

For more information on obtaining the Solaris cluster patch files, call Sun at 1-800-USA-4SUN.

Supported Cascade Switches

B-STDX 8000/9000

Hardware

The Bulk Statistics Collector for B-STDX/STDX application supports all B-STDX 8000/9000 hardware, except that ATM I/O Modules are supported for trunk statistics only.

Software

The Bulk Statistics Collector for B-STDX/STDX application has the following minimum requirements for the B-STDX 8000/9000 software:

- Versions 4.0.18 and higher of the switch software

STDX 3000/6000

Hardware

The Bulk Statistics Collector for B-STDX/STDX application supports all STDX 3000/6000 hardware.

Software

The Bulk Statistics Collector for B-STDX/STDX application has the following minimum requirement for the STDX 3000/6000 software:

- Version 2.3.15 and higher, but not versions numbered 3.x.x

2

Installation and Upgrade

Before installing or upgrading the Bulk Statistics Collector for B-STDX/STDX application, you should check the hardware and software configurations that Chapter 1 describes.

The Bulk Statistics Collector for B-STDX/STDX media supplies the following software:

- Bulk Statistics Collector for B-STDX/STDX application
- CascadeView tftpserv - the CascadeView/UX tftp daemon

The SYBASE 11 medium is also provided with Bulk Statistics.

Overview of Installation/Upgrade and Configuration

Figure 2-1 depicts the installation/upgrade and configuration process for Bulk Statistics Collector for B-STDX/STDX.

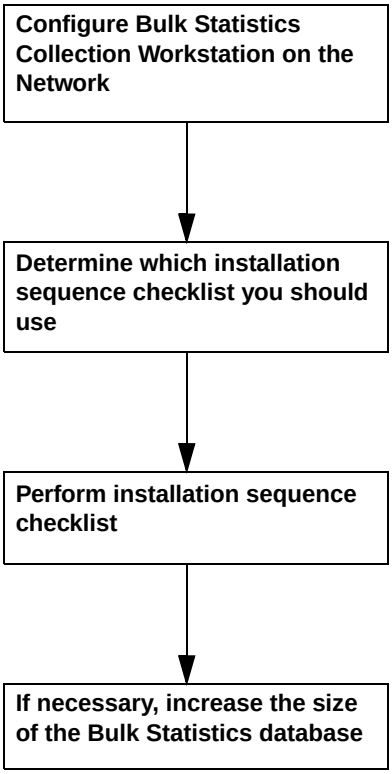

Figure 2-1. Overview of Installation/Upgrade and Configuration Process

Configuring Bulk Statistics Collection Workstations on the Network

Before you install or upgrade Bulk Statistics, you must perform the following procedures so that the Bulk Statistics collection workstation can communicate with the switch network:

- If you have a large Frame Relay network (5 or more switches and/or more than 4000 PVCs), we recommend you utilize a management DLCI in your network. See your network consultant, and follow the directions in "Defining a Management DLCI on the Bulk Statistics Collector Gateway Switch" on page 2-3. That section defines how to configure the system to direct bulk statistics and traps to pass through the network as regular data via PVCs so that the gateway control processor (CP) is not involved.
- If you are connecting the Bulk Statistics collection workstation to the switch network via SMDS in-band management, you must perform "Defining an SMDS In-Band Management Port" on page 2-5.
- Perform "Creating Routes from the Switch Network to Bulk Statistics Collection Workstations" on page 2-8.
- Perform "Disabling the SNMP Trap Mechanism" on page 2-10. This prevents NMS SNMP traps from being sent to the Bulk Statistics collection workstations in your network.
- Perform "Creating and Saving a Route from the Bulk Statistics Collection Workstation to the Switch Network" on page 2-13.

Defining a Management DLCI on the Bulk Statistics Collector Gateway Switch

Use the steps in the following section if you plan to use the Bulk Statistics application in an environment that has 5 or more switches and/or more than 4000 PVCs. The following section defines how to configure the system to direct bulk statistics and traps to pass through the network as regular data via PVCs so that the gateway control processor (CP) is not involved.

See the Network Configuration Guide for B-STDX/STDX for more information about how to use the NMS to perform each of these steps.

1. Define an NMS entry for the Bulk Statistics collection station on each switch (including remote switches). See "Generating the Switch List Data File" on page 2-49 for more information. *You must use a workstation other than the CascadeView/UX NMS workstation as the Bulk Statistics collection station.*

   You can connect the Bulk Statistics collection station to the network through any switch (including the NMS gateway switch).

2. Create a FR-UNI-DCE logical port on the Bulk Statistics gateway switch.
3. Create a Management DLCI (on a FR-UNI-DCE logical port) in the gateway switch for the Bulk Statistics collection station.
4. Create one NMS path for the Bulk Statistics collection station that you specified in step 3 (i.e. on the switch where the router is connected).
5. Attach the router that connects the local area network (LAN) containing the Bulk Statistics collection station to the logical port that you created instep 2.
6. Create a FR-UNI-DTE logical port on each remote switch.
7. Loop the FR-UNI-DTE logical port to the Management DLCI (on a FR-UNI-DCE logical port) on each switch.
8. Define a PVC between the FR-UNI-DTE logical port on each remote switch and the FR-UNI-DCE logical port on the Bulk Statistics gateway switch.

This configuration eliminates any gateway switch limitations. All bulk statistics are sent to the Management DLCI and looped back as data. The statistics travel through the PVC to the gateway switch and directly to the router.

Figure 2-2 illustrates this configuration using a V.35 or DSX-1 card. Figure 2-3 illustrates this configuration using a Channelized T1 card.

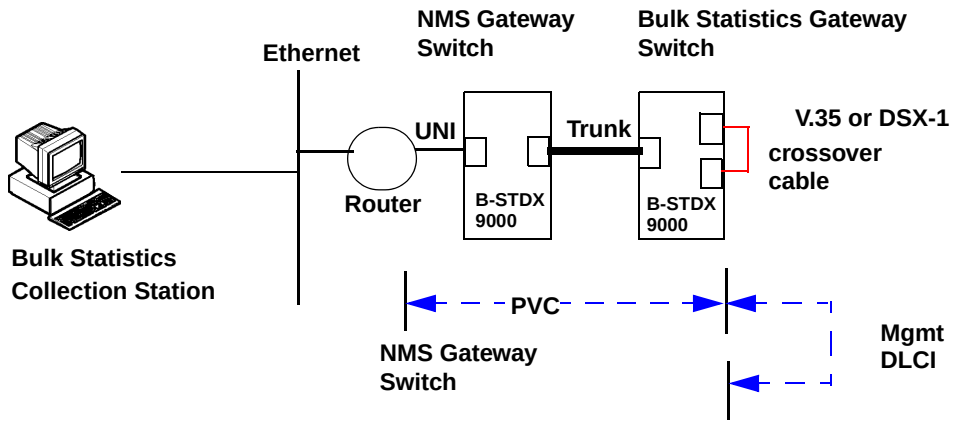

Figure 2-2. Configuration for a Large Network — V.35 or DSX-1

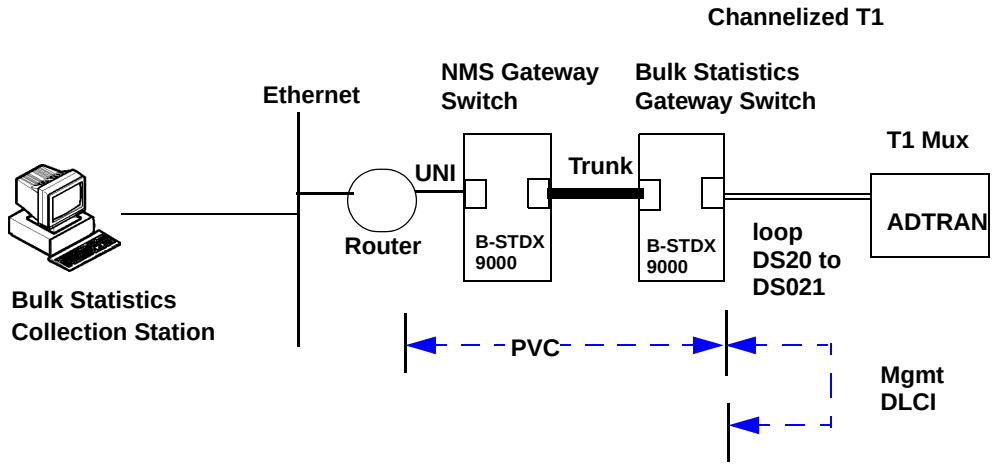

Figure 2-3. Configuration for a Large Network — Channelized T1

Defining an SMDS In-Band Management Port

You need to follow the instructions in this section if the switches will be sending statistics data to the Bulk Statistics collection station via SMDS in-band management. This section describes how to configure the SMDS logical port that the bulk statistics collection station will use to communicate with the switches it services. This enables a Bulk Statistics collection station that is remotely connected to the network via SMDS services to receive Bulk Statistics data from the switches without having to send the Bulk Statistics data through the CP of the gateway switch.

The instructions in this section assume that your SMDS logical ports have already been configured in CascadeView. For complete logical port configuration instructions, see the *Network Configuration Guide for B-STDX/STDX*.

To define an SMDS in-band management port:

1. On an NMS workstation, bring up the CascadeView network map for the switching system on which Bulk Statistics is installed. (If you have to start CascadeView, see the *Network Configuration Guide for B-STDX/STDX*.
2. Select Misc ⇒ CascadeView Logon and log in to the network map.
3. On the network map, select the gateway switch for this switch network.
4. From the Administer menu, choose Cascade Parameters ⇒ Set All SMDS Parameters ⇒ Set All Management Addresses. The Set All SMDS Management Address dialog box appears (see Figure 2-4).

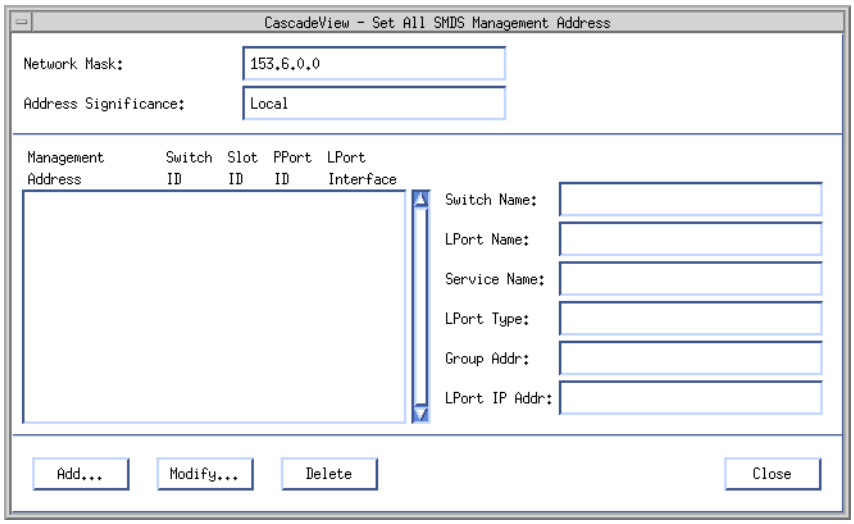

Figure 2-4. Set All SMDS Management Address Dialog Box

5. Choose Add. The Select End Logical Port dialog box appears (see Figure 2-5).

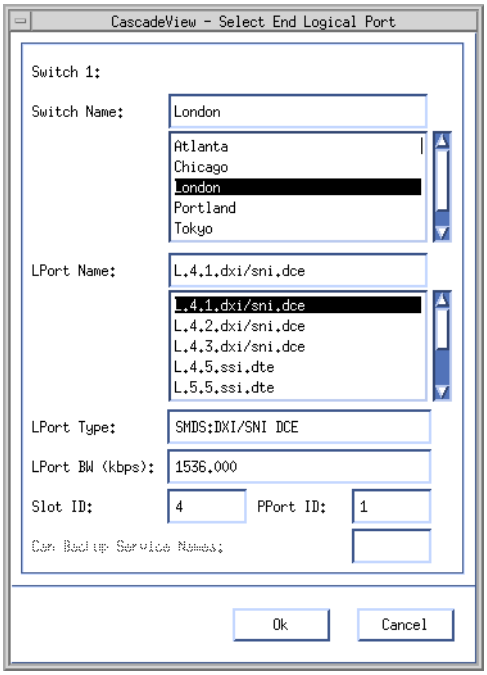

Figure 2-5. Select End Logical Port Dialog Box

6. Complete the Select End Logical Port dialog box fields as follows:

   Switch Name — Select the name of the switch that is used for in-band management.

   LPort Name — Select the name of the logical port for which you are defining the In-Band management address.

   The following message may be displayed:

   ```
   Cannot define management address before the feeder address
   is defined.
   ```

   If the message was displayed, define the feeder address (see the *Network Configuration Guide for B-STDX/STDX*).

   LPort Type — Displays the logical port type.

   LPort Bandwidth — Displays the logical port bandwidth.

   Slot ID — Displays the I/O slot number in which the card resides.

   PPort ID — Displays the port number for the port you are configuring.

7. Choose OK. The Add SMDS Management Address dialog box appears (see Figure 2-6).

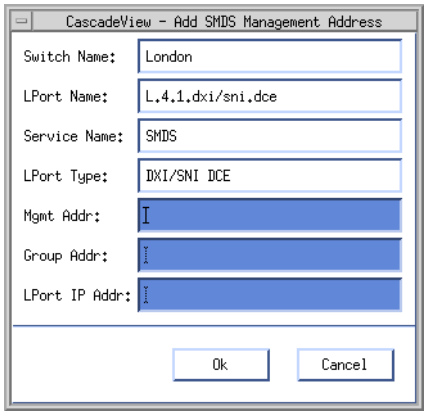

Figure 2-6. Add SMDS Management Address Dialog Box

8. Complete the Add SMDS Management Address dialog box as follows:

   Switch Name — Displays the name of the selected switch.

   Service Name — Displays the type of service (SMDS).

   LPort Name — Displays the name of the SSI-DTE logical port configuration.

   LPort Type — Displays the type of logical port configuration (SMDS DTE).

   Mgmt Addr — If the LPort Type is SSI, the management address is already entered automatically in this field. If the LPort Type is DXI, you have to manually enter the individual address to which the logical port subscribes.

   Group Address — If applicable, enter the Group address configured on the router to which the management address is provisioned.

   LPort IP Address — Enter the configured IP address of the selected logical port.

9. Choose OK. The Set All SMDS Management Address dialog box reappears and displays the SMDS Management Address you just defined.

You can now add the Bulk Statistics collection workstation addresses to the Set NMS Path dialog box, as described in the next section.

Creating Routes from the Switch Network to Bulk Statistics Collection Workstations

In order for your Bulk Statistics collection workstation to communicate properly with the switch network, you have to create routes from the switch network to each Bulk Statistics collection workstation that is servicing that network. This is currently done via the NMS Path function of CascadeView.

If the Bulk Statistics collection station is remotely connected to the network via SMDS services, you must first perform "Defining an SMDS In-Band Management Port" on page 2-5.

1. On an NMS workstation, bring up the CascadeView network map for the switching system on which the Bulk Statistics collection workstation is installed. (If you have to start CascadeView, see the *Network Configuration Guide for B-STDX/STDX*).
2. Select Misc ⇒ CascadeView Logon and log in to the network map.
3. On the network map, select the switch you are using as the gateway switch (this is the switch on which you have defined the NMS path).
4. From the Administer menu, choose Cascade Parameters ⇒ Set NMS Paths. The Set NMS Paths dialog box appears (see Figure 2-7).

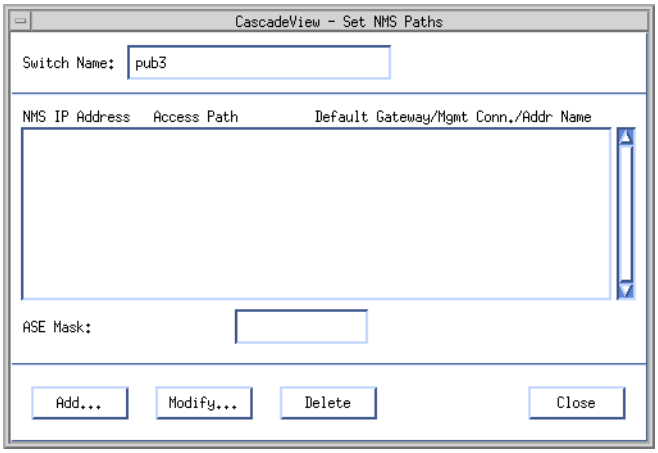

Figure 2-7. Set NMS Paths Dialog Box

5. Choose Add. The Add NMS Path dialog box appears (see Figure 2-8).

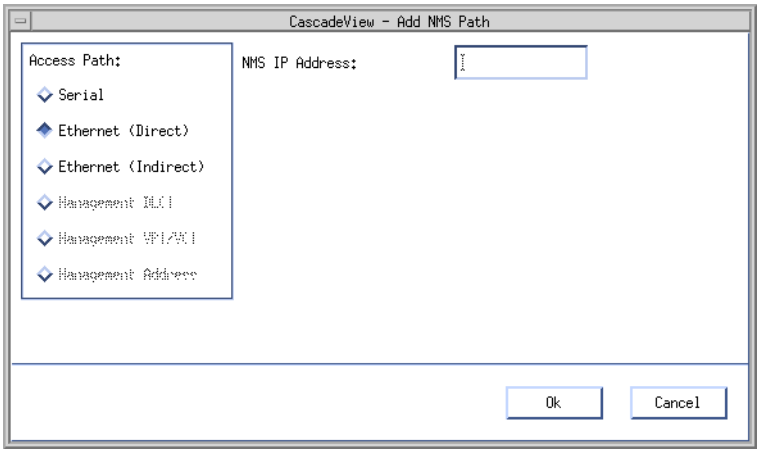

Figure 2-8. Add NMS Path Dialog Box

6. To complete the Add NMS Path dialog box:
   a. In the Access Path field, select the connection method you used to connect the Bulk Statistics collection workstation to the switch network (direct Ethernet, indirect Ethernet, or Management Address).
   b. In the NMS IP Address field, enter the IP address of the Bulk Statistics collection workstation.
   c. If you connected the Bulk Statistics collection workstation via indirect Ethernet, enter the IP address of the router in the Default Gateway IP Address field.

      If you connected the Bulk Statistics collection workstation via SMDS in-band management, select the management address from the displayed list.
   d. Choose OK to add the Bulk Statistics collection workstation to the NMS Path list.
7. Repeat step 6 for each Bulk Statistics collection workstation that is connected to this switch network. When done, choose Close from the Set NMS Path screen to return to the network map.

Disabling the SNMP Trap Mechanism

Because you have added your Bulk Statistics collection workstations to the NMS Path screen, CascadeView will attempt to send SNMP trap messages to each Bulk Statistics collection workstation, as if they were NMS workstations. You have to disable this mechanism to prevent the SNMP trap messages from being sent to your Bulk Statistics collection workstations. To do so, you have to modify the NMS entry that was automatically created when you added the Bulk Statistics collection workstation to the NMS Path screen, by doing the following:

1. On the network map, select the switch you are using as the gateway switch (this is the switch on which you have defined the NMS path).
2. From the Administer menu in CascadeView, choose Cascade Parameters ⇒ Set Parameters.

The Switch Back Panel dialog box appears (see Figure 2-9).

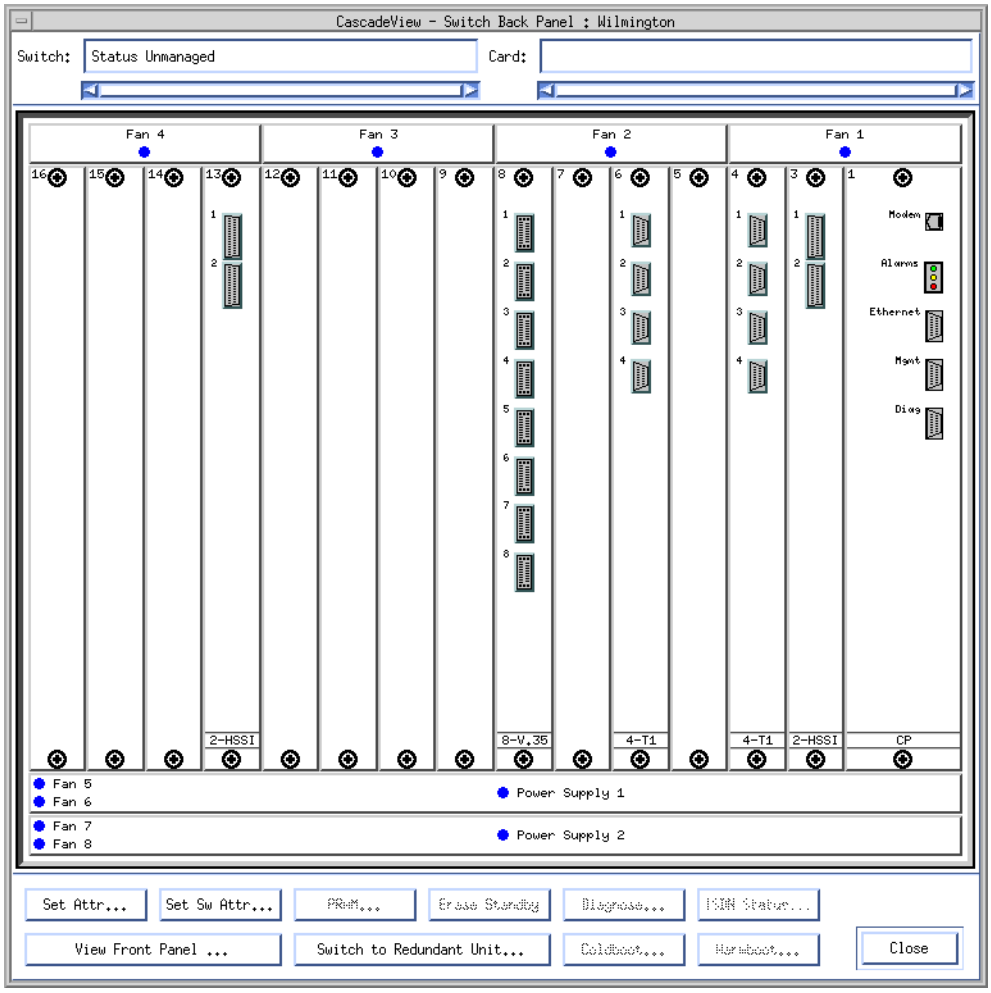

Figure 2-9. Switch Back Panel Dialog Box

3. From the Switch Back Panel screen, choose the Set Sw Attr command button.

The Set Switch Attributes dialog box appears (see Figure 2-10).

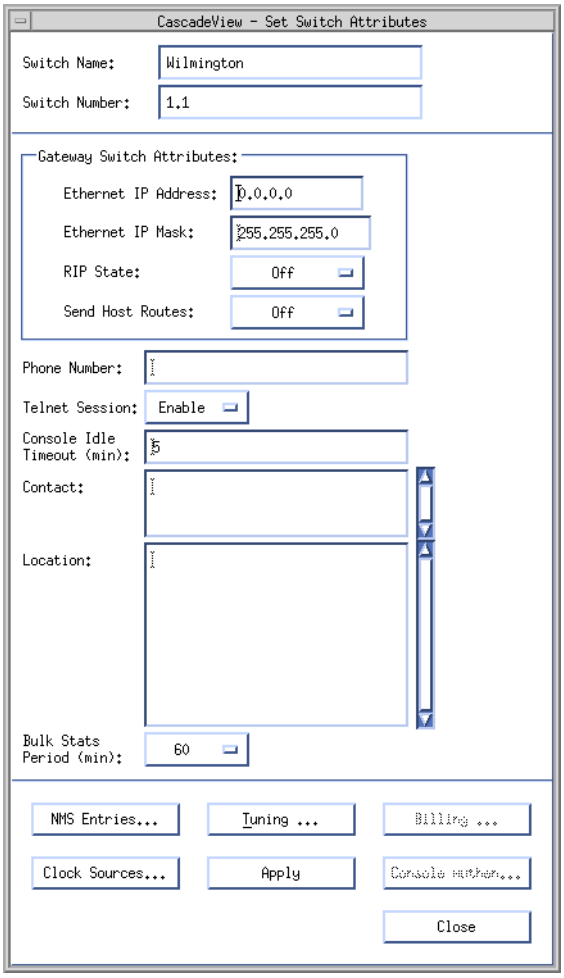

Figure 2-10. Set Switch Attributes Dialog Box

4. Choose the NMS Entries command button.

The Set NMS Entries dialog box appears (see Figure 2-11).

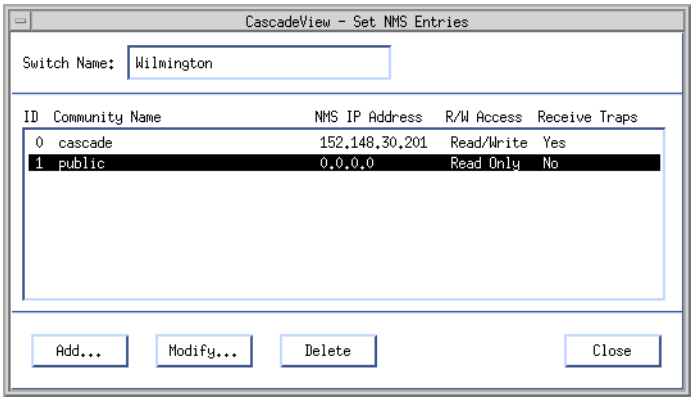

Figure 2-11. Set NMS Entries Dialog Box

5. For each Bulk Statistics collection workstation address listed on this screen, do the following:

   a. Choose the entry for the Bulk Statistics collection workstation.

   b. Choose the Modify command button.

   c. Choose No in the Receive Traps field.

   d. Choose OK, then choose Close until you are back to the network map.

Creating and Saving a Route from the Bulk Statistics Collection Workstation to the Switch Network

Creating the Route

Create a network route from each Bulk Statistics collection workstation to the switch network it will receive statistics from as follows:

1. On each Bulk Statistics collection workstation, type the following command:

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

   where:

   [switch network address] is the IP address of the network that includes the switches being serviced by the Bulk Statistics collection workstation, and

   [gateway address] is the IP address of the router or gateway switch through which the Bulk Statistics collection workstation is connected to the switch network.

Example: If the gateway is 162.32.92.1 and the switch network is 152.148.0.0, then type

```
/usr/sbin/route add net 152.148.0.0 162.32.92.1 1 <Return>
```

Enter a router address if you used indirect Ethernet or SMDS in-band management to connect the Bulk Statistics collection workstation to the network; enter a gateway switch address if you used direct Ethernet to connect the Bulk Statistics collection workstation to the network.

In order to avoid recreating these routes each time you restart Bulk Statistics, you now have to add the Bulk Statistics collection workstation routes to a file on the Bulk Statistics collection workstation, as described in the next section.

Saving Route Entries

To save each routing entry so that it is automatically reloaded into the Sun operating system routing table when you restart Bulk Statistics, add the routing entries you created in the previous section to the file **/etc/rc3.d/S99bsc.routes**.

The commands in this file will be executed each time you restart Bulk Statistics. If the routing entries are not recorded in this file, the configured route will be lost when the Bulk Statistics is restarted, and communication from the Bulk Statistics collection workstation to the switch network will fail unless you manually enter the routes after the restart (as described in the previous section).

Installation/Upgrade Overview

New Installations

Figure 2-12 depicts the Bulk Statistics installation sequence. New installations differ from upgrades as follows:

- For new installations, set the TFTP configuration.
- For new installations, generate a switch list data file if the collection workstation does not have access to the NMS at runtime.

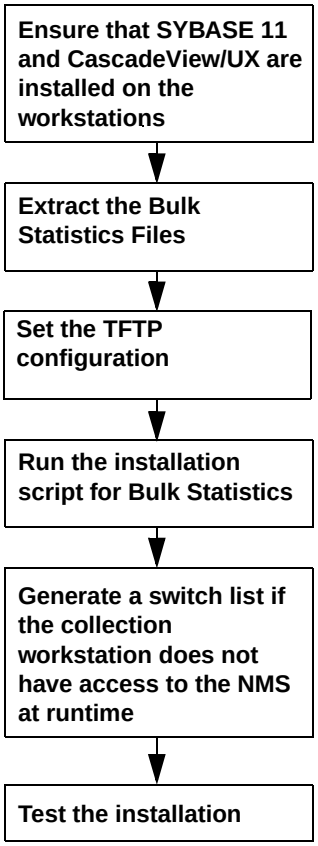

Figure 2-12. Bulk Statistics Installation Sequence

Upgrades

Figure 2-13 depicts the Bulk Statistics upgrade sequence. Upgrades differ from new installations as follows:

- For upgrades, generate a switch list data file only if the network configuration has changed (see "When to Regenerate a Switch List Data File" on page 2-52).
- For upgrades, do not set the TFTP configuration.

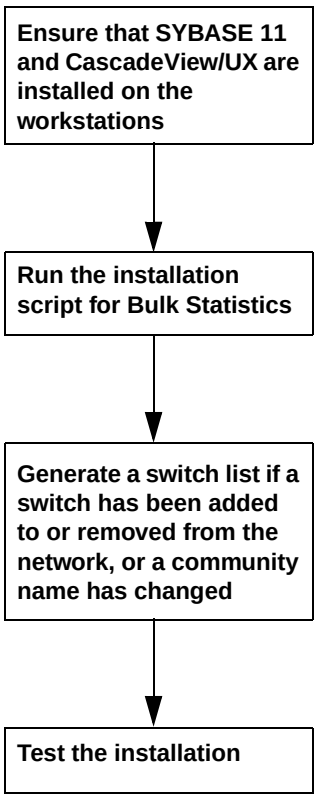

Figure 2-13. Bulk Statistics Upgrade Sequence

Selecting the Appropriate Bulk Statistics Installation/Upgrade Sequence Checklist

The sequence of steps that you use to install or upgrade Bulk Statistics differs depending on your use of the Bulk Statistics Collector for B-STDX/STDX. The following pages contain four different checklists that specify the installation/upgrade procedures that you should follow for the four most common types of Bulk Statistics installations. Table 2-1 lists these four different installation types and indicates the installation checklist that you should use for each type.

Follow these checklists for both new installations and upgrades. When a step applies only to a new installation, this is indicated.

Table 2-1. Installation/Upgrade Sequence Checklists

For this type of configuration	Use this checklist
One workstation. • **Workstation 1** CascadeView/UX HP OpenView SYBASE 11 NMS database Bulk Statistics application Bulk Statistics database. This is configuration 1 in Table 1-1.	Checklist 1, page 2-19
Two workstations. • **Workstation 1** CascadeView/UX HP OpenView SYBASE NMS database • **Workstation 2** Bulk Statistics application SYBASE 11 Bulk Statistics database. This is configuration 2 in Table 1-1.	Checklist 2, page 2-21

Table 2-1. Installation/Upgrade Sequence Checklists (Continued)

For this type of configuration	Use this checklist
Three workstations. • **Workstation 1** CascadeView/UX SYBASE HP Open View NMS database • **Workstation 2** SYBASE 11 Bulk Statistics database • **Workstation 3 to n** Bulk Statistics application on each of these workstations This is configuration 3 in Table 1-1.	Checklist 3, page 2-23
Four workstations. • **Workstation 1** CascadeView/UX HP Open View • **Workstation 2** SYBASE NMS database • **Workstation 3** SYBASE 11 Bulk Statistics database • **Workstation 4 to n** Bulk Statistics application on each of these workstations This is configuration 4 in Table 1-1.	Checklist 4, page 2-27

Checklist 1
Single System Installation/Upgrade Sequence

Figure 2-15 illustrates this configuration type.

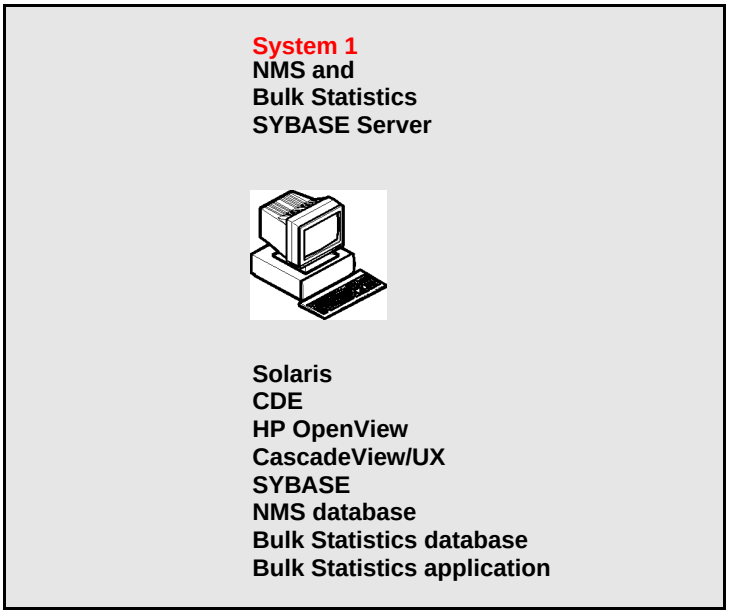

Figure 2-14. Checklist 1 Configuration

1. If CascadeView/UX, Solaris, CDE, and HP OpenView are already installed, proceed to step 4. If not, see the *Network Management Station Installation Guide* for instructions on how to install these products.
2. Extract the files from the Bulk Statistics medium. See "Extracting the Files" on page 2-33.
3. If you will be using SYBASE to store your statistical data, then upgrade to or install SYBASE 11.
   - To upgrade to SYBASE 11, see the *SYBASE 11 SQL Server Upgrade Guide*.
   - To install SYBASE 11, see the *Network Management Station Installation Guide*.
4. If this is a new installation, set the TFTP configuration. See "Setting the TFTP Server Configuration" on page 2-31.

5. If you are using SYBASE to store Bulk Statistics data, make sure that the SYBASE server is running before you proceed to step 6. Type the following command to verify that the SYBASE server is running:

   <SYBASE pathname>/install/showserver

   where

   <*SYBASE pathname*> is the pathname for SYBASE, for example */opt/sybase*.

   If SYBASE is running, the system displays the SYBASE process status.

   If SYBASE is not running, type the following command:

   ```
   cd <SYBASE pathname>/install
   startserver -f RUN_CASCADE
   ```

6. Start the Bulk Statistics installation script. See "The Installation Script" on page 2-36.

7. If this is a new installation, or you are going to monitor more switches than before, define an NMS entry for the Bulk Statistics collection station on each switch. See"Defining an NMS Entry" on page 2-45.

Testing the Configuration

Before starting Bulk Statistics collection from the Bulk Statistics collection station make sure that you can use the ping command to access the following:

- Bulk Statistics collection station
- NMS SYBASE Server (if it is different)
- Ethernet IP address of the gateway switch
- The internal IP address of a switch from which you will be gathering statistics

If you cannot ping these devices, the Bulk Statistics application software will fail.

Running Bulk Statistics

To run Bulk Statistics, refer to "Collecting Bulk Statistics" on page 3-6.

Checklist 2
Dual System Installation/Upgrade Sequence

Figure 2-15 illustrates this configuration type.

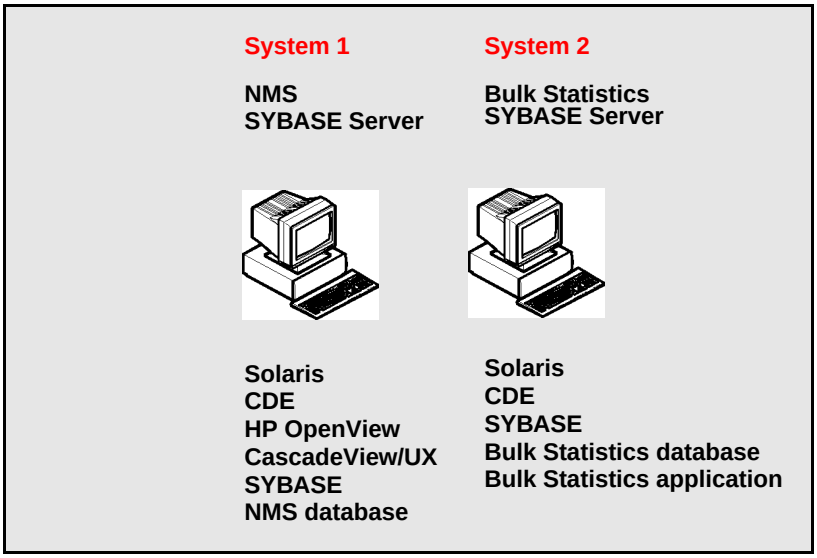

Figure 2-15. Checklist 2 Configuration

1. Install Solaris, CDE, SYBASE, HP Open View, and CascadeView/UX on System 1 if not already done. See the *Network Management Station Installation Guide* for instructions on how to install these products.)
2. Install Solaris and CDE on System 2 if not already done. This system is referred to as the Bulk Statistics SYBASE Server.
3. Extract the files from the Bulk Statistics medium. See "Extracting the Files" on page 2-33.
4. If you will be using SYBASE to store your statistical data, then upgrade to or install SYBASE 11 on System 2.
   - To upgrade to SYBASE 11, refer to Chapter 13, "Upgrading to SYBASE 11".
   - To install SYBASE 11, refer to Chapter 12, "SYBASE 11 Installation".
5. If this is a new installation, set the TFTP configuration on System 2. See "Setting the TFTP Server Configuration" on page 2-31.

6. Make sure that the SYBASE server is running before you proceed to step 7. Type the following command to verify that the SYBASE server is running:

   <SYBASE pathname>/install/showserver

   where

   <*SYBASE pathname*> is the pathname for SYBASE, for example */opt/sybase*.

   If SYBASE is running, the system displays the SYBASE process status.

   If SYBASE is not running, type the following command:

   ```
   cd <SYBASE pathname>/install
   startserver -f RUN_CASCBSTAT
   ```

7. Review the following installation prerequisites:

   - Use CASCBSTAT as the Bulk Statistics SYBASE Server name rather than CASCADE.

8. Start the Bulk Statistics installation script on System 2 (the Bulk Statistics Collection Workstation. See "The Installation Script" on page 2-36.

9. If this is a new installation, or you are going to monitor more switches than before, define an NMS Entry for the Bulk Statistics collection workstation on each switch that you plan to collect statistics from. See "Defining an NMS Entry" on page 2-45.

10. If this is a new installation, or you are going to monitor more switches than before, create a switch list data file. See "The Switch List Data File" on page 2-48.

Testing the Configuration

Before starting Bulk Statistics collection from the Bulk Statistics collection station make sure that you can use the ping command to access the following:

- Bulk Statistics collection station
- NMS SYBASE Server (if it is different)
- Ethernet IP address of the gateway switch
- The internal IP address of a switch from which you will be gathering statistics

If you cannot ping these devices, the Bulk Statistics application software will fail.

Running Bulk Statistics

To run Bulk Statistics, refer to "Collecting Bulk Statistics" on page 3-6.

Checklist 3
Three System Installation/Upgrade Sequence

Figure 2-16 illustrates this configuration type.

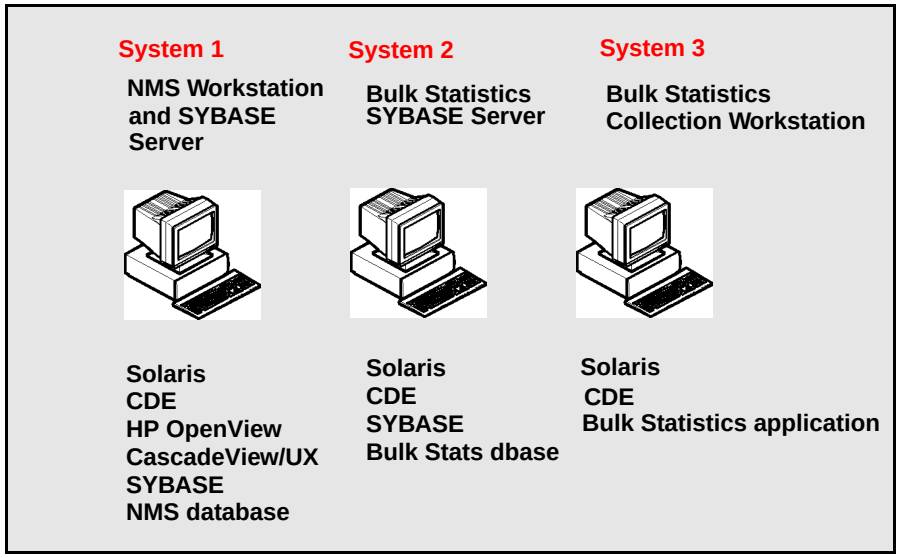

Figure 2-16. Checklist 3 Configuration

Use the following steps to perform this type of installation/upgrade:

1. Install Solaris, CDE, SYBASE, HP Open View, and CascadeView/UX on System 1 if not already done. This system is referred to as the NMS SYBASE server. See the *Network Management Station Installation Guide* for instructions on how to install these products.
2. Install Solaris and CDE on System 2 if not already done. This system is referred to as the Bulk Statistics SYBASE Server.
3. Install Solaris and CDE on System 3 if not already done.
4. Perform "On the Bulk Statistics SYBASE Server (System 2)" on page 2-24.
5. Perform "On Each Bulk Statistics Collection Workstation" on page 2-24.
6. If you will be using SYBASE to store your statistical data, then upgrade to or install SYBASE 11 on System 2.
   - To upgrade to SYBASE 11, refer to Chapter 13, "Upgrading to SYBASE 11".
   - To install SYBASE 11, refer to Chapter 12, "SYBASE 11 Installation".
7. Perform "Continuing with Bulk Statistics Installation/Upgrade" on page 2-26.
8. Perform "Testing the Configuration" on page 2-26.
9. To run Bulk Statistics, refer to "Collecting Bulk Statistics" on page 3-6.

On the Bulk Statistics SYBASE Server (System 2)

1. Verify that you are logged in as the sybase user by typing:

   whoami <Return>

2. Type the following command to verify that the SYBASE server is running:

   $SYBASE/install/showserver <Return>

   If the server is not running, type the following commands:

   cd install <Return>
   startserver -f RUN_CASCBSTAT <Return>

3. Edit the following file to set up network file system (NFS) mounts and export the file system:

   vi /etc/dfs/dfstab <Return>

4. While holding down the Shift key, type **$G** to go to the end of the file.
5. While holding down the Shift key, type **A** and press Return to append a line onto the file.
6. Type the following command:

   share -f nfs -o rw -d "sybase 11" <SYBASE pathname> <Return>

   where

   <SYBASE pathname> is the pathname for SYBASE, for example */opt/sybase*.

7. Press the Escape key.
8. While holding down the Shift key, type **:wq!** to save and end the file.
9. At the command prompt, type:

   shareall <Return>

On Each Bulk Statistics Collection Workstation

1. Verify that you are logged in as the root user. You should see a # prompt.
2. Edit the following file to mount the file system:

   vi /etc/vfstab <Return>

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** and press Return to append a line onto the file.

5. Type the following command:

   [SYBASE host name]:<SYBASE pathname> - <SYBASE pathname> nfs - yes - <Return>

   where

   <*SYBASE pathname*> is the pathname for SYBASE, for example */opt/sybase*.

6. Press the Escape key.]
7. While holding down the Shift key, type **:wq!** to save and end the file.
8. At the command prompt, type

   mkdir <SYBASE pathname> <Return>

   mount <SYBASE pathname> <Return>

   where

   <*SYBASE pathname*> is the pathname for SYBASE, for example */opt/sybase*.

9. To add the SYBASE host IP address and SYBASE host name to the host file, type the following command:

   vi /etc/hosts <Return>

10. While holding down the Shift key, type **$G** to go to the end of the file.
11. While holding down the Shift key, type **A** and press Return to append a line onto the file.
12. Add the following line to the file:

    [SYBASE host IP] [SYBASE host name]

13. Press the Escape key.
14. While holding down the Shift key, type **:wq!** to save and end the file.
15. Use the ping command to make sure that System 3 can access System 2:

    ping -s [SYBASE host name]

16. Extract the files from the Bulk Statistics medium to the Bulk Statistics collection workstation. See "Extracting the Files" on page 2-33.
17. If this is a new installation of the Bulk Statistics Collector for B-STDX/STDX, set the TFTP configuration. See "Setting the TFTP Server Configuration" on page 2-31.

Continuing with Bulk Statistics Installation/Upgrade

Perform the following steps on each Bulk Statistics Collection workstation.

1. Start the Bulk Statistics installation script on the Bulk Statistics collection workstation. See "The Installation Script" on page 2-36.
2. If this is a new installation of the Bulk Statistics Collector for B-STDX/STDX, or you are going to monitor more switches than before, define an NMS Entry for the Bulk Statistics collection workstation on each switch that you plan to collect statistics from. See "Defining an NMS Entry" on page 2-45.
3. If this is a new installation of the Bulk Statistics Collector for B-STDX/STDX, or you are going to monitor more switches than before, create a switch list data file. See "The Switch List Data File" on page 2-48.

Testing the Configuration

Before starting Bulk Statistics collection from the Bulk Statistics collection station make sure that you can use the ping command to access the following:

- Bulk Statistics collection station
- NMS SYBASE Server (if it is different)
- Ethernet IP address of the gateway switch
- The internal IP address of a switch from which you will be gathering statistics

If you cannot ping these devices, the Bulk Statistics application software will fail.

Running Bulk Statistics

To run Bulk Statistics, refer to "Collecting Bulk Statistics" on page 3-6.

Checklist 4
Four System Installation/Upgrade Sequence

Figure 2-17 illustrates this configuration type.

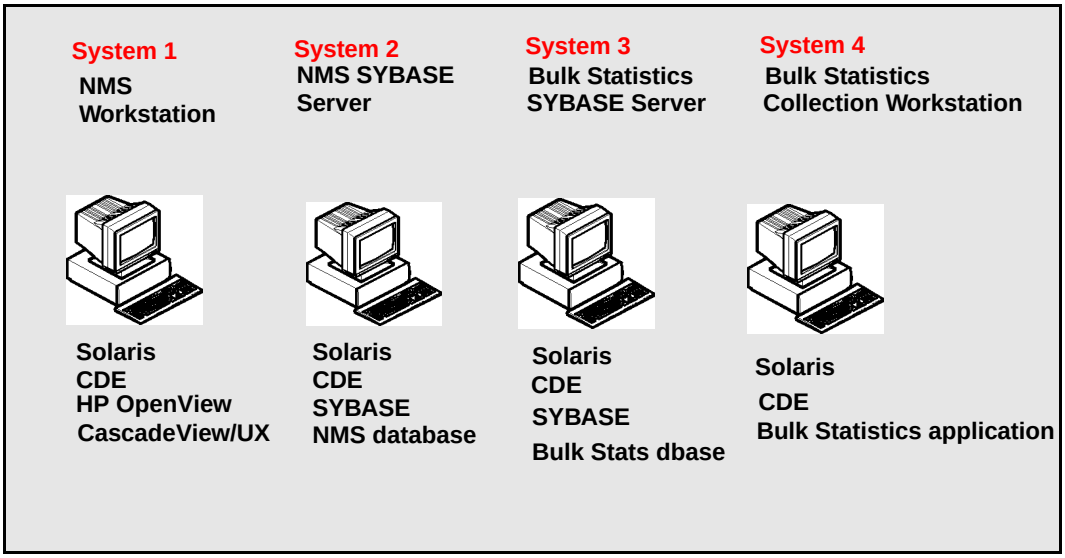

Figure 2-17. Checklist 4 Configuration

Use the following steps to perform this type of installation/upgrade:

1. Solaris, CDE, HP Open View, and CascadeView/UX should already be installed on System 1. If not, see the *Network Management Station Installation Guide* for instructions on how to install these products.
2. Solaris, CDE, and SYBASE should already be installed on System 2. If not, see the *Network Management Station Installation Guide* for instructions on how to install these products.
3. Install Solaris and CDE on System 3 if not already done. This system is referred to as the Bulk Statistics SYBASE Server.
4. Install Solaris and CDE on System 4 if not already done.
5. Perform "On the Bulk Statistics SYBASE Server (System 3)" on page 2-28.
6. Perform "On Each Bulk Statistics Collection Workstation" on page 2-29.

7. If you will be using SYBASE to store your statistical data, then upgrade to or install SYBASE 11 on System 3.
   - To upgrade to SYBASE 11, refer to Chapter 13, “Upgrading to SYBASE 11”.
   - To install SYBASE 11, refer to Chapter 12, “SYBASE 11 Installation”.
8. Perform “Continuing with Bulk Statistics Installation/Upgrade” on page 2-30.
9. Perform “Testing the Configuration” on page 2-30.
10. To run Bulk Statistics, refer to “Collecting Bulk Statistics” on page 3-6.

On the Bulk Statistics SYBASE Server (System 3)

1. Verify that you are logged in as the sybase user by typing:

   whoami <Return>

2. Type the following command to verify that the SYBASE server is running:

   $SYBASE/install/showserver <Return>

   If the server is not running, type the following commands:

   cd install <Return>
   startserver -f RUN_CASCBSTAT <Return>

3. Edit the following file to set up network file system (NFS) mounts and export the file system:

   vi /etc/dfs/dfstab <Return>

4. While holding down the Shift key, type **$G** to go to the end of the file.
5. While holding down the Shift key, type **A** and press Return to append a line onto the file.
6. Type the following command:

   share -f nfs -o rw -d “sybase 11” <SYBASE pathname> <Return>

   where

   <*SYBASE pathname*> is the pathname for SYBASE, for example */opt/sybase*.

7. Press the Escape key.
8. While holding down the Shift key, type **:wq!** to save and end the file.
9. At the command prompt, type:

   shareall <Return>

On Each Bulk Statistics Collection Workstation

1. Verify that you are logged in as the root user. You should see a # prompt.
2. Edit the following file to mount the file system:

   vi /etc/vfstab <Return>
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** and press Return to append a line onto the file.
5. Type the following command:

   [SYBASE host name]:<SYBASE pathname> - <SYBASE pathname> nfs - yes - <Return>

   where

   <*SYBASE pathname*> is the pathname for SYBASE, for example */opt/sybase*.
6. Press the Escape key.
7. While holding down the Shift key, type **:wq!** to save and end the file.
8. At the command prompt, type

   mkdir <SYBASE pathname> <Return>

   mount <SYBASE pathname> <Return>

   where

   <*SYBASE pathname*> is the pathname for SYBASE, for example */opt/sybase*.
9. To add the SYBASE host IP address and SYBASE host name to the host file, type the following command:

   vi ./host <Return>
10. While holding down the Shift key, type **$G** to go to the end of the file.
11. While holding down the Shift key, type **A** and press Return to append a line onto the file.
12. Add the following line to the file:

    [SYBASE host IP] [SYBASE host name]
13. Press the Escape key.
14. While holding down the Shift key, type **:wq!** to save and end the file.

15. Use the ping command to make sure that System 2 can access System 1:

    ```
    ping -s [SYBASE host name]
    ```

16. Extract the files from the Bulk Statistics medium. See "Extracting the Files" on page 2-33.

17. If this is a new installation of the Bulk Statistics Collector for B-STDX/STDX, set the TFTP configuration. See "Setting the TFTP Server Configuration" on page 2-31.

Continuing with Bulk Statistics Installation/Upgrade

Perform the following steps on each Bulk Statistics collection workstation.

1. Start the Bulk Statistics installation script on the Bulk Statistics collection workstation. See "The Installation Script" on page 2-36.

2. If this is a new installation of the Bulk Statistics Collector for B-STDX/STDX, or you are going to monitor more switches than before, define an NMS Entry for the Bulk Statistics collection workstation on each switch that you plan to collect statistics from. See "Defining an NMS Entry" on page 2-45.

3. If this is a new installation of the Bulk Statistics Collector for B-STDX/STDX, or you are going to monitor more switches than before, create a switch list data file. See "The Switch List Data File" on page 2-48.

Testing the Configuration

Before starting Bulk Statistics collection from the Bulk Statistics collection station make sure that you can use the ping command to access the following:

- Bulk Statistics collection station
- NMS SYBASE Server (if it is different)
- Ethernet IP address of the gateway switch
- The internal IP address of a switch from which you will be gathering statistics

If you cannot ping these devices, the Bulk Statistics application software will fail.

Running Bulk Statistics

To run Bulk Statistics, refer to "Collecting Bulk Statistics" on page 3-6.

Setting the TFTP Server Configuration

Perform the following steps to set the TFTP server configuration so that it automatically executes when you bring up the workstation.

When you install/upgrade the Bulk Statistics Collector for B-STDX/STDX application software, a copy of tftpserv is copied to **/opt/BulkStats/bin**. If you are using Bulk Statistics on a SPARCStation that also has CascadeView/UX, your system will already have a copy of tftpserv and the TFTP configuration will have already been specified. However, you should use the steps in this section to set the TFTP configuration to the version of tftpserv in /opt/BulkStats/bin. The reason for this is to ensure that you are using the most current version of tftpserv.

If your configuration has the collection station separate from the NMS workstation, perform these steps on the Bulk Statistics collection station.

1. Logon as the **root user** and enter the root password. You should see a # prompt in the command line.
2. Type the following command:

   `vi /etc/inetd.conf` `<Return>`
3. Locate the comment statement(s) for tftpboot. Use the following steps to do this:
   a. Type the following command:

      `/tftpboot` `<Return>`

      The vi editor then displays the first instance of tftpboot. (Pressing the *n* character causes the editor to search for any additional instances of tftpboot comment statements.)
4. Verify that a pound sign (#) appears at the beginning of the statement.
   - If a pound sign (#) appears at the beginning of the statement:
     – Press the Escape key.
     – Type **:quit!** <Return>
     – Proceed to Step 10.
   - If a pound sign (#) does not appear at the beginning of the statement:
     – Add a # to the beginning of the line.
     – Complete all of the remaining steps.
5. Press the Escape key.
6. Type the following command:

   `:wq!` `<Return>`
7. Type the following command (this command produces output):

ps -ef <Return>

8. Locate the inetd process and write down the process id (pid) that is listed for that process.
9. Type the following command:

   kill -HUP *[the process id you located in step 8]* <Return>

Using a KILL option other than -HUP may cause the system to halt.

10. To verify that the inetd process is running, type:

    ps -ef <Return>

    At this point, no tftp daemon is running on your host.
11. Type the following command:

    vi /etc/inittab <Return>
12. While holding down the **Shift key**, type **$G** to move to the end of the file.
13. While holding down the **Shift key**, type **A** and press Return to append a line onto this file.
14. Add the following statement to the end of the file:

    tf:3:respawn:/opt/BulkStats/bin/tftpserv > /dev/null <Return>

    These commands invoke the Cascade tftp daemon to listen to the default tftp port for requests, rather than being started by inetd. No tracing is turned on.

    If you see the following line:

    tf:3:respawn:/opt/CascadeView/bin/tftpserv > /dev/null

    delete the line, so that the system uses the Bulk Statistics pathname for tftpserv.
15. Press the Escape key.
16. Type the following command:

    :wq! <Return>
17. At the # prompt, type **init Q** and press Return to force the system to read the inittab file. The system then starts the Cascade tftp daemon.

The system console window may display the following message: INIT: Command is respawning too rapidly. Check for possible errors id: tf "/opt/BulkStats/bin/tftpserv > /dev/null. Ignore this message, it will not display after you extract the Bulk Statistics files.

Checking the TFTP Server

1. Type the following command to make sure that the TFTP Server is active:

   ps -ef | grep -i tftp <Return>

2. The system should respond by displaying the following line:

   /opt/BulkStats/bin/tftpserv

   If the system does not display this line, the TFTP server is not running.

Installing/Upgrading the Bulk Statistics Collector for B-STDX/STDX

Use the steps in the following sections to install or upgrade the Bulk Statistics Collector for B-STDX/STDX application software.

Extracting the Files

If you are using the Bulk Statistics Collector for B-STDX/STDX on a multi-system configuration, perform these steps on each Bulk Statistics collection station.

You must be the root user in order to extract the files from the medium.

Use the following steps to extract the files on the medium.

1. Insert the Bulk Statistics Collector for B-STDX/STDX tape into the 1/4-inch cartridge tape drive.
2. Type the following command at the # prompt:

   cd /opt <Return>

3. Type the following command to extract the files from the medium:

   /bin/tar xvpf /dev/[*tape device name*]<Return>

   For example:

   /bin/tar xvpf /dev/rmt/0n

4. The system then creates the following directories:**/opt/BulkStats, /opt/BulkStats/bin, /opt/BulkStats/etc, /opt/BulkStats.var, /opt/BulkStats/data/bcp, /opt/BulkStats/data/current, /opt/BulkStats/data/previous, and /opt/BulkStats/data/raw.**

The Configuration File

The Bulk Statistics installation script automatically updates the configuration file with the configuration values that you specify when you run the installation script. If you install Bulk Statistics for the first time, the system uses a configuration file template (named cvbulkstat.cfg.new) and then changes the name of the cvbulkstat.cfg.new file to cvbulkstat.cfg during installation. If you install Bulk Statistics as an upgrade, the install script uses the existing configuration file and appends any new values to the file, and saves the old configuration file as cvbulkstat.cfg.old. The cvbulkstat.cfg file is included in the **/opt/BulkStats/etc** directory. Figure 2-18 illustrates an example of the cvbulkstat.cfg file.

The DSQUERY variable in the cvbulkstat.cfg file will vary depending on your system's configuration. DSQUERY is set to CASCADE for configurations 1 and 3 in Table 1-1 on page 1-3 and is set to CASCBSTAT for configurations 2 and 4. The installation script prompts you for this server name.

The CVBULKSTAT_CONFIG_FILE environment variable specifies the cvbulkstat.cfg configuration file that the system uses during installation. You do not have to set the environment variable since Bulk Statistics automatically sets the variable as a part of installation.

Figure 2-18 illustrates the contents of the cvbulkstat.cfg file.

```
#  @(#)cvbulkstat.cfg  (version: 2.5)
#  Cascade Bulk Statistics for UNIX configuration file template
#  Copyright 1997 Cascade Communications Corp.
#  All rights reserved.
#
#  Default path to Sybase directory
SYBASE=/opt/sybase
#  Default Bulk Statistics Sybase database server name
DSQUERY=CASCBSTAT
#  Default Bulk Statistics Sybase database configuration
#  - perform bulkcopy (0 = don't do bulkcopy)
#  - database name
#  - username
#  - password
#  - purge age (i.e., maximum lifetime of data in database)
CVBSTAT_DB=0
CVBSTAT_DB_NAME=cascstat
CVBSTAT_DB_USER=
CVBSTAT_DB_PASSWORD=
CVBSTAT_DB_LIFETIME=30
#  Default archive directory
#  Must specify the full path to the archive directory
CVBSTAT_ARC_DIR=/opt/BulkStats.var
#
#  User defined shell script to run after the archive
operation
#  Must specify the full path to the shell script
CVBSTAT_ARC_FUNC=
# Translation of BSTDX_RAW_STATS files
# Value of 0 = perform translation at midnight
#          1 = perform translation when raw stats file arrives
CVBSTAT_XLATE_IMMEDIATE=1
# Archived files lifetime (in days)
CVBSTAT_ARC_LIFETIME=30
export SYBASE DSQUERY CVBSTAT_DB_NAME CVBSTAT_ARC_DIR
export CVBSTAT_ARC_FUNC
export CVBSTAT_ARC_LIFETIME CVBSTAT_DB_LIFETIME
export CVBSTAT_DB_USER CVBSTAT_DB_PASSWORD
export CVBSTAT_XLATE_IMMEDIATE CVBSTAT_DB
```

Figure 2-18. cvbulkstat.cfg file

The Installation Script

The following sections describe how to run the Bulk Statistics Collector for B-STDX/STDX installation script. This script is included in the **/opt/BulkStats/bin** directory. You can use the steps in the following sections to install the Bulk Statistics Collector for B-STDX/STDX for the first time or to perform an upgrade from an earlier version of Bulk Statistics For UNIX. Before using the installation script, be sure to check the *Bulk Statistics Collector for B-STDX/STDX Software Release Notes (SRN)*. The SRN notes any special conditions that may have resulted in changes to the script.

Before you run the installation script, you should familiarize yourself with the current or planned processing configuration for your installation. For example:

- If you will be collecting statistics from pre-4.2 switches, do you want decimal output for trunk and circuit delta and peak calculations, in addition to the hexadecimal output? (For 4.2 switches, decimal is the only output.)
- Are you using SYBASE to store Bulk Statistics data?
- Do you want the system to perform a user-defined shell script after the execution of the nightly archiving? Examples of such of such a shell script are:
  - Script to move archived files to another machine
  - Script to save logfiles (to keep logs for more than one day)
  - Script to archive translated files or move them to another machine for post-processing (e.g., report production)

The installation script prompts you to specify these configuration options at the time of first installation and also for upgrades.

The installation script prompts in the following sections display sample default values. The installation script that you use may display different defaults for your system. The system obtains the default values from the cvbulkstat.cfg file (if this is an upgrade and this file exists).

Running the Installation Script

You must be a root user in order to start the Bulk Statistics Collector for B-STDX/STDX installation script.

If you are running the Bulk Statistics Collector for B-STDX/STDX, you must stop it before you can run the installation script.

Starting the Script

1. To run the installation script, type the following command from the **/opt/BulkStats/bin** directory.

   `./cvBulkStatInstall` `<Return>`

2. If your system *already has* a /tftpboot/bulkstats directory, the following prompt is not displayed. Proceed to step 3 on page 2-37.

   If your system *does not* have a **/tftpboot/bulkstats** directory, the system displays the following prompt:

   ```
   Bulk statistics for Unix requires the directory
   /tftpboot/bulkstats.

   This directory does not exist in this system.

   Do you want this directory created automatically? [y/n]
   ```

   Type **Y** to create the directory, and press <Return>.

3. The installation script opens the **/tftpboot/bulkstats** directory with world read, write, and execute access.

   If your system's **/tftpboot/bulkstats** directory *has* world read, write, and execute access, the following prompt is not displayed:

   If your system *does not* already have world read/write/execute access for the **/tftpboot/bulkstats** directory, the system displays the following prompt:

   ```
   Bulk statistics for Unix requires /tftpboot/bulkstats to
   have world read/write/executable permission, mode 777.
   Installation program is changing /tftpboot/bulkstats to that
   permission mode.
   ```

SYBASE Use

1. The following prompt displays:

   ```
   Will you be using Sybase to store your delta and peak
   calculations? [y/n]
   ```

2. Perform one of the following steps:

   a. Type **Y** to indicate that you will be using SYBASE Bulk Copy to import the delta and peak calculations to the Bulk Statistics SYBASE database.

   b. Type **N** to indicate that you do not plan to use SYBASE to store the delta and peak calculations. Proceed to "Immediate Translation" on page 2-41.

If you later decide to use the SYBASE Bulk Copy utility to import the delta and peak calculations, you must redo the installation/upgrade procedure and answer Y in response to the prompt shown in step 2.

3. The system displays the following message to prompt you for the SYBASE directory name.

   ```
   Enter the directory where Sybase is installed
   (default: /opt/sybase):
   ```

4. Press Enter to accept the default SYBASE directory location or enter an alternate directory path. The system then prompts you for the database server name.

   ```
   Enter the name of the database server
   (default:CASCBSTAT):
   ```

5. The database server name that you specify differs depending on your configuration. Check Table 1-1 on page 1-3 to see which configuration you are using. Perform one of the following steps:

   a. If you are using configuration 2 or 4, press Enter to accept CASCBSTAT as the database server name.

   b. If you are using configuration 1 or 3, specify CASCADE as the database server name.

   The system then prompts you for the system administrator user name.

   ```
   Enter the Sybase system administrator user name
   (default: sa):
   ```

6. Press Enter to accept the default SYBASE system administrator user name or enter an alternate name. The system then prompts you for the system administrator password.

   ```
   Enter the Sybase system administrator password
   (default is no password):
   ```

7. Press Enter to accept the default SYBASE system administrator password or enter an alternate password. *If you are using Bulk Statistics on the same server as CascadeView/UX, use superbase* as the password. The system then prompts you for the name of the Bulk Statistics database.

   ```
   Enter the name of the database that will store the Bulk
   Statistics data
   (default: cascstat):
   ```

8. Press Enter to accept the default database name or enter an alternate name.

9. Perform one of the following steps:

   a. If the Bulk Statistics database name that you specified in step 8 *does not already exist*, proceed to step 11.

   b. If the Bulk Statistics database name that you specified in step 8 *already exists*, the following message displays:

   ```
   A Sybase database with the name <database name> already
   exists.

   Creating the Bulk Statistic Sybase database using this name
   will erase all of its existing data.

   Do you want to overwrite it? [y/n]
   ```

10. Perform one of the following steps:

    a. Type **Y** to overwrite the existing database. **When the database is overwritten, all existing data is deleted.** The system displays the following message:

    ```
    Existing Sybase database <database name> being overwritten.
    Hangon .. this might take several minutes.
    ```

    Proceed to step 13 on page 2-40.

    b. Type **N** if you do not want to overwrite the existing database. The system then displays the following messages:

    ```
    Existing Sybase database <database name> not overwritten ...
    continuing.
    ```

    Proceed to "Database Purging" on page 2-41.

11. If you specified a Bulk Statistics database that *does not* currently exist, the system displays the following prompt:

    ```
    <database name> does not exist as a Sybase database.
    Create <database name> ? [y/n]
    ```

12. Perform one of the following steps:

a. Type **Y** to create the database. The following message displays:

```
Creating <database name> as the Bulk Statistics Sybase
database.
```

The database creation process may take a few minutes.

b. Type **N** if you do not want to create the database. The script then aborts the installation.

13. The script then displays SYBASE installation information and a message to indicate that the installation process is complete. If SYBASE encounters fatal errors, the errors are displayed. The system displays the following messages.

```
Verify no fatal Sybase errors were encountered while
creating the Bulk Statistics database.
Enter y if no fatal errors occurred. Otherwise, enter n and
you will need to fix the error(s) and re-run the installation
program.

Would you like to continue with the installation ? [y/n]
```

14. Perform one of the following steps:

a. Type **Y** to continue with the installation/upgrade if you did not receive any fatal SYBASE errors. If you receive the following message:

```
Msg: 3706 Level 11, State 6: Line 1:

Cannot drop the database 'cascstat' because it doesn't
   exist in the system catalogs.
```

Ignore the message. This message is for information only and indicates that SYBASE has checked to see if 'cascstat' currently exists in the system catalogs.

b. Type **N** to discontinue the installation/upgrade if you received fatal SYBASE errors. The installation script then aborts the installation.You will need to resolve the SYBASE errors before you can continue with the installation/upgrade process. See the *SYBASE SQL Server Error Message Reference* for more details about SYBASE error messages.

Database Purging

1. The following prompt displays:

   ```
   In order to conserve space, the database will be purged each
   night of entries whose collection dates are a specified
   number of days in the past.

   Enter the number of days before an entry is to be purged.
   (default:30 days)
   ```

2. Perform one of the following steps:

   a. Press Enter to accept the default of 30 days. Bulk Statistics will purge the Bulk Statistics SYBASE database of any entries that have dates that are more than 30 days in the past.

   b. Enter a number to specify the number of days that will pass before an entry is purged from the Bulk Statistics database.

Immediate Translation

1. The following prompt displays:

   ```
   For data that is collected from B-STDX switches running
   release 4.2 or above, the collector can translate the data
   and store it in the database once each hour. Otherwise
   translation can be performed nightly as is now performed for
   switches running pre-4.2 releases.

   Immediate translation is currently enabled.

   Do you wish to enable immediate translation? [y/n]
   ```

2. Perform one of the following steps:

   a. Type **Y** if you want to use the default option and enable immediate translation. Proceed to "Decimal Format Translation - Pre-4.2 Switch Software Only" on page 2-42.

   b. Type **N** if you do not want to enable immediate translation and instead want to translate all statistics at midnight. The system displays the following prompt to confirm your selection of nightly translation:

   ```
   Translation will be performed nightly.
   ```

Decimal Format Translation - Pre-4.2 Switch Software Only

1. The following prompt displays:

   ```
   Decimal format translation is not supported for data that is
   collected from B-STDX switches executing firmware release
   4.2 and above.

   The next two questions concerning decimal translation are
   applicable only if you plan on executing this version of the
   Bulk Statistics Collector with one or more B-STDX switches
   running pre-4.2 firmware.

   Do you wish to continue? [y/n]
   ```

   If you are collecting statistics from any pre-4.2 switches, when the Bulk Statistics translation is complete, the system reads the two files that the Hexadecimal translator produces and calculates the trunk and circuit hourly deltas and hourly peak deltas. The system maintains this information by default in hexadecimal format. For more information, see "Decimal Translator (Optional)" on page 8-5.

2. Perform one of the following steps:

   a. Type **Y** if you are collecting statistics from any pre-4.2 switches and want to maintain the trunk and circuit delta and delta peak calculations in decimal as well as hexadecimal format.

   b. Type **N** if you are not collecting statistics from any pre-4.2 switches or if you want to maintain the trunk and circuit delta and peak calculation for pre-4.2 switches in only hexadecimal format. Proceed to "Resetting the SNMP Set Log File" on page 2-43.

3. The following prompt displays:

   ```
   By default, the trunk and circuit delta and peak calculation
   output are in hexadecimal.

   You have the option of producing decimal output that is
   compatible with the existing DOS translator. Would you like
   decimal output also? [y/n]
   ```

4. Perform one of the following steps:

   a. Type **Y** if you would like to have the system translate the trunk and circuit delta and peak calculations from hexadecimal to decimal.

   b. Type **N** if you want to maintain the trunk and circuit delta and peak calculation only in hexadecimal format. Proceed to "Resetting the SNMP Set Log File" on page 2-43.

5. The following prompt displays:

```
Would you like to execute the decimal format translator
nightly?
[y/n]
```

6. Perform one of the following steps:

   a. Type **Y** if you are collecting statistics from any pre-4.2 switches and want to execute the decimal format translator during the nightly processing (rather than immediately executing the decimal format translator).

   b. Type **N** if you want the decimal translator to translate statistics immediately at the end of each hour's collection.

Resetting the SNMP Set Log File

1. The following prompt displays:

```
Each SNMP set request to initiate a transfer to the collection
station is logged to a file. Would you like this log file reset
nightly? If so, the file will be reset and the current day's log
will be stored for one full day.
[y/n]
```

   Bulk Statistics maintains the following two log files to record every SNMP set request that Bulk Statistics makes when it polls all enabled switches for statistics.

   BulkStatSet.log — contains messages for SNMP set requests to pre-4.2 switches.

   BulkStatSetP2.log — contains messages for SNMP set requests to 4.2 switches.

   The log file records the number of SNMP retries (in the event of an error condition). The system maintains the log files in the following location:

   /opt/BulkStats/etc/

2. Perform one of the following steps:

   a. Type **Y** if you want the system to delete the log files each night. This option causes the system to append a *.old* extension onto the current day's log file during the nightly processing. So that:

   BulkStatSet.log changes to **BulkStatSet.log.old,** and

   BulkStatSetP2.log changes to **BulkStatSetP2.log.old**

   After you type **Y**, proceed to the next section, "Deletion of Archived Files" on page 2-44.

   b. Type **N** if you want the system to keep the log files. Information from the next day's collection will be appended to this file each day.

Deletion of Archived Files

1. The system displays the following prompt:

   ```
   In order to conserve space, archived files that are older
   than a specified number of days will be deleted nightly.

   Enter the number of days that an archived file is to remain
   in the system (default: 30 days):
   ```

2. Perform one of the following steps:

   - Press Enter to accept the default of 30 days. Bulk Statistics will delete any Bulk Statistics archived files that have dates that are more than 30 days in the past.
   - Enter a number to specify the number of days that will pass before the system deletes an entry from the Bulk Statistics database.

User-Defined Shell Script

1. The system displays the following prompt:

   ```
   Do you wish to execute a user-defined shell-script after the
   execution of the nightly archive process?
   ```

   If you are re-installing the Bulk Statistics Collector for B-STDX/STDX, the following prompt is also displayed:

   ```
   The following script is already defined in the configuration:
         <pathname>
   Answering no [n] below will remove this script from the
   configuration.

   [y/n]
   ```

2. Perform one of the following steps:

   a. Press Y if you want the system to execute a shell script at the end of the nightly processing (see "The Installation Script" on page 2-36). The system then displays the following prompt:

   ```
   Enter the full path and name of the script to be executed:
   ```

   Enter the full path and name of the script, or press Enter to accept the default path.

   b. Press N if you do not want to use a shell script (this will remove the user-defined shell script from the configuration file if one exists).

Installation/Upgrade Completion

1. If the installation of Bulk Statistics was an upgrade, the following message is displayed:

   ```
   Saving existing configuration file to
   /opt/BulkStats/etc/cvbulkstat.cfg.old
   ```

2. The install script displays the following message to confirm that installation is complete:

   ```
   Bulk Statistics for UNIX installation completed.
   ```

If you abort the installation process at any time before completion of the installation, you must rerun the entire installation. If you do not do this, you will not be able to start the Bulk Statistics Collector for B-STDX/STDX.

Defining an NMS Entry

On each switch that you plan to collect statistics from, you must define an NMS entry for the Bulk Statistics collection workstation. Use the following steps to do this.

1. Start CascadeView/UX and access the network map.
2. Select the switch object and from the Misc menu, choose CascadeView ⇒ Logon. Enter your operator password.
3. From the Administer menu, choose Cascade Parameters ⇒ Set Parameters. The Switch Back Panel dialog box appears for the selected switch.
4. Choose *Set Sw Attr.* The Set Switch Attributes dialog box appears (see Figure 2-19).

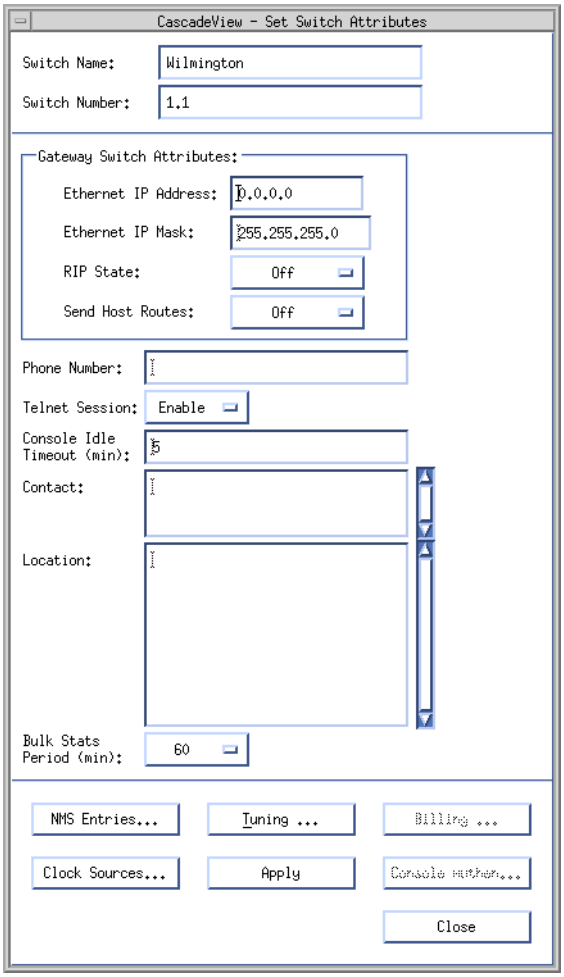

Figure 2-19. Set Switch Attributes Dialog Box

5. Choose the NMS Entries command. The Set NMS Entries dialog box appears, displaying the current NMS entries (see Figure 2-20).

This dialog box also contains commands that enable you to modify or delete a selected NMS entry.

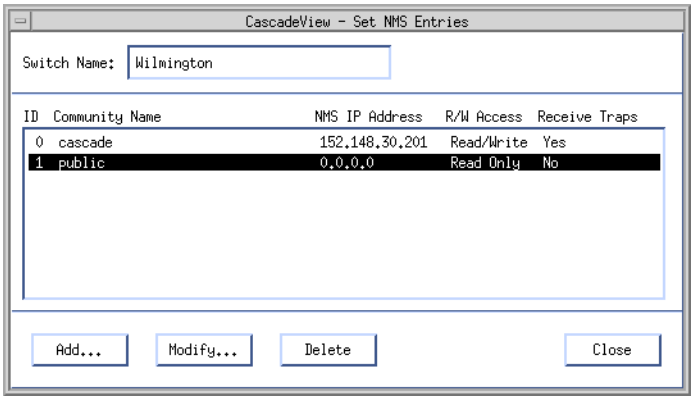

Figure 2-20. Set NMS Entries Dialog Box

6. Choose Add. The Add NMS Entry dialog box appears (see Figure 2-21).

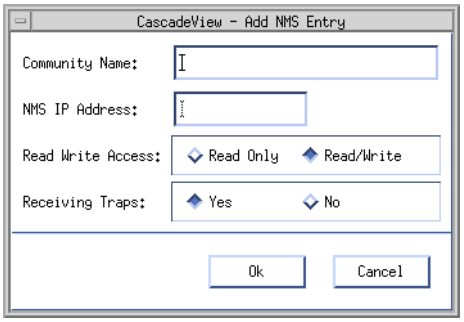

Figure 2-21. Add NMS Entry Dialog Box

7. Enter a unique community name and NMS IP address for the target Bulk Statistics Collection workstation.

8. Select Read/Write as the access rights for this collection workstation.

9. Select No if the workstation is used only for Bulk Statistics collection so that the Bulk Statistics collection workstation does not receive traps. Select Yes if the collection workstation is also used as an NMS workstation.

10. Choose OK to set the parameters.

11. PRAM sync the CP on the switch (see the *Network Configuration Guide for B-STDX/STDX*).

The Switch List Data File

If you are using the Bulk Statistics Collector for B-STDX/STDX on a SPARCstation that does not have access to the NMS configuration database during runtime, you can create a switch list data file that supplies the NMS switch configuration information to the Bulk Statistics Collector for B-STDX/STDX. The switch list data file has the following format:

Switch Name, Switch ID, Collection Station IP Address, Collection Station Name, Network Number, Community Name

Each line in the switch list data file represents a switch that you are using the Bulk Statistics Collector for B-STDX/STDX to monitor.

The process of generating a switch list data file involves the following tasks:

- Defining an NMS Entry for the Bulk Statistics Collection workstation on each switch. See "Defining an NMS Entry" on page 2-45.
- Generating the switch list data file. See "Generating the Switch List Data File" on page 2-49.

Generating the Switch List Data File

Use the following steps to generate a switch list data file that you can use as input to the Bulk Statistics Collector for B-STDX/STDX application.

You must define an NMS entry for the Bulk Statistics collection workstation on every switch that you plan to include in the switch list data file before you generate the switch list data file.

You must perform these steps from a SPARCstation that has access to the NMS configuration database. These instructions refer to this SPARCstation as the NMS workstation.

It is not necessary to have a copy of the Bulk Statistics Collector for B-STDX/STDX on the NMS workstation in order to create the switch list data file. However, you do need access to the cvGenSwList executable file that is included with the Bulk Statistics Collector for B-STDX/STDX. You can use a variety of different methods (such as using a symbolic link or by copying the cvGenSwList file) to obtain access to cvGenSwList.

When you try to copy the cvGenSwList file, make sure that you have write access to the file and directory to which you are writing to and copying from. If you do not, the system denies permission to write and/or copy the file.

The switch list data file only contains STDX 3000/6000 and B-STDX 8000/9000 switches.

Use the following steps to generate the switch list data file.

1. Copy /opt/BulkStats/bin/cvGenSwList from the Bulk Statistics collection workstation to the NMS Sybase Server.

2. To create the switch list data file, type the following command at the NMS workstation to display the list of cvGenSwList options:

   `cvGenSwList -c [`*`collection station name]`*` -o `*`[output file or directory name]`*` -h` `<Return>`

   Type the following command to create the switch list data file:

   **`cvGenSwList -c [`*`collection station name]`*` -o `*`[output file or directory name]`* `<Return>`

   Where:

   -c [collection station name] — Specifies the Bulk Statistics collection station name. This is the name of the host where the Bulk Statistics application is running. This name must be the host name and not its IP address. If you do not use this parameter to specify the collection station name, cvGenSwList uses the current host as the collection station name.

   -o [output file or directory name] — Specifies the location of the switch list data file that cvGenSwList creates. If you omit the -o option, cvGenSwList uses the filename **switch_list** and creates the file in the current directory.

   The cvGenSwList command extracts the necessary NMS configuration information from the NMS configuration database and creates the switch list data file in the specified directory on the NMS workstation.

You must have access to the cvGenSwList executable file in order to run cvGenSwList.

The access table in the CascadeView/UX NMS database must have an entry for the collection station or the IP address used to invoke cvGenSwList. To make the entry, see "Defining an NMS Entry" on page 2-45.

Example

For example, if the Bulk Statistics collection station name was OpCenter1 and you were executing cvGenSwList from a workstation other than OpCenter1, you would enter:

`cvGenSwList -c OpCenter1`

This command specifies OpCenter1 as the collection station name. It creates a switch list data file called **<current directory>/switch_list**.

If you use cvGenSwList and receive an error message indicating that the collection station is an invalid argument or cannot contact the name server, you must add the Bulk Statistics collection station to the NMS workstation's /etc/hosts/ file.

3. Copy or move the file from the NMS workstation's directory to opt/BulkStats/etc on the Bulk Statistics collection station.
4. After you perform these steps, check to make sure that the switch list is not empty. If it is, see"The generated switch list from cvGenSwList is empty and no errors were given" on page 11-6 of the Common Problems section.

Limiting the Number of Switches in Collection

There are times when you may want to limit the number of switches from which Bulk Statistics collects. For example, you may have 100 switches in the network but only want a specified collector to collect from 20 of these switches. You can any of the following methods to limit the scope of the collection:

- Edit the switch list data file to contain fewer switches. You can edit the switch list data file so that it only contains the 20 selected switches.
- Use the Bulk Statistics Application dialog box (refer to "Collecting Bulk Statistics" on page 3-6) to disable 80 of the switches from collecting statistics.
- Set the collection period of any 4.2 switches to zero (refer to "Setting the Collection Period for 4.2 Switches" on page 3-3).

When to Regenerate a Switch List Data File

You must regenerate the switch list data file if any of the following conditions occur.

- You add a switch to the network and want to use the Bulk Statistics Collector for B-STDX/STDX to monitor the switch. You must regenerate the switch list data file and replace the old file (that did not reference the added switch) with the new switch list data file.

  If you have more than one Bulk Statistics collection station, you do not need to regenerate the switch list data file for every Bulk Statistics collection station. The new switch list data file is required only for the workstation that is to collect data from the new switch.

- You delete a switch that was included in a switch list data file. You must regenerate the switch list data file and replace the old file (that referenced the deleted switch) with the new switch list data file, or the SNMP set will retry the switch three times during every collection period.

- When there is a change to the community name that is associated with a switch from which you are collecting data.

A Multi-Home Collection Station

A multi-home workstation is a collection station that has more than one network interface. When the Bulk Statistics collection station is a multi-home workstation you must generate a switch list data file that specifies the hostname that is managing the switches as the argument. This must be done before you run the Bulk Statistics Collector for B-STDX/STDX. In addition, when you run the Bulk Statistics Collector for B-STDX/STDX, **you must use the -f option,** as you do whenever you use a switch list data file with the Bulk Statistics Collector for B-STDX/STDX.

See "The Switch List Data File" on page 2-48 for more information about the switch list data file.

Increasing the Size of the Database

When you install/upgrade the Bulk Statistics Collector for B-STDX/STDX, the system creates the Bulk Statistics database using the name specified by the **CVBSTAT_DB_NAME** environment variable in **CVBULKSTAT_CONFIG_FILE**. If you are using Bulk Statistics to collect statistics from a large network, you may need to increase the size of the Bulk Statistics database (see "Estimating SYBASE Database Size" on page B-8). The default database size is 20 MB, and the default transaction log size is 20 MB.

Use the following steps to increase the size of the database.

1. Verify that you are logged on as the SYBASE user.
2. Type the following command to initiate an interactive SQL session:

   isql -U <*sa user name*> -P <*sa password*> <Return>

   Where:

   sa user name — Specifies the system administrator user name.

   sa password — Specifies the system administrator password.
3. Type the following commands to change the size of the database and the transaction log:

   1> alter database [*database name*] on [*cascview_device=X*] <Return>

   2> alter database [*database name*] on [*log_device=X*] <Return>

   3> go <Return>

   Where:

   database name — Specifies the name of the Bulk Statistics database name.

   cascview_device — Specifies the name of the device that maintains the database.

   X — Specifies the new database size in Megabytes.

   log_device — Specifies the name of the log device that maintains the database.

3

Collecting Bulk Statistics

This chapter gives instructions for collecting Bulk Statistics from B-STDX and STDX switches.

Bulk Statistics Collection Overview

Starting Bulk Statistics

Figure 3-1 illustrates the process that you use to start Bulk Statistics collection.

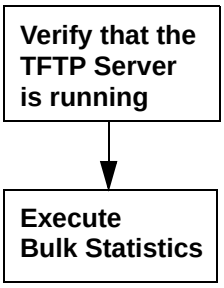

Figure 3-1. Starting Bulk Statistics

Collection Processing Overview

The Bulk Statistics Collector for B-STDX/STDX gathers and stores switch-specific statistical information for the trunk and circuit traffic on selected switch(es). When you select a switch for bulk statistics retrieval, the following events occur:

1. The Bulk Statistics Collector issues an SNMP request for data to the switch.
2. In response to the SNMP request, the switch generates a memory resident table containing statistical data for all active trunks and circuits.
3. The switch TFTP client is notified of the table generation.
4. The switch TFTP client initiates a transfer of the table to the collection station's TFTP Server.
5. Once the transfer completes, the file is stored on the collection station as one of the following files:
   - Data from Release 4.2 switches is stored in BSTDX_RAW_STAT.*IPtime*, where *IP* is the IP address of the switch from which the data was extracted and *time* is a timestamp that includes the day and time. For example,

     `BSTDX_RAW_STAT.153.26.1.2.10Jul1996180000`

     In this example, the IP address is 153.26.1.2, the date is July 10, 1996, and the time is 6:00 PM.
   - Data from Pre-4.2 switches is stored in RAW_STAT.*xxx*, where *xxx* represents the switch ID of the switch from which the data was extracted.

See Chapter 4, "4.2 Collection Processing" for further details about Bulk Statistics processing for 4.2 switches. See Chapter 8, "Pre-4.2 Collection Processing" for further details about Bulk Statistics processing for pre-4.2 switches.

Prerequisites

Complete the following prerequisites before you start the Bulk Statistics Collector for B-STDX/STDX application:

- Set any switch collection periods that you want to change (refer to "Setting the Collection Period for 4.2 Switches" on page 3-3).
- Make sure that the TFTP Server is active.
- If you are using Bulk Statistics on a SPARCstation that does not have access to the NMS configuration database during runtime, you must create a switch list data file, that supplies the NMS switch configuration information to Bulk Statistics. See Chapter 2, "The Switch List Data File" for more details about how to create this file.

Checking the TFTP Server

Type the following command to make sure that the TFTP Server is active:

```
ps -ef | grep -i tftp <Return>
```

The system should respond by displaying the following line:

```
/opt/BulkStats/bin/tftpserv
```

If the system does not display this line, see "Setting the TFTP Server Configuration" on page 2-31.

Setting the Collection Period for 4.2 Switches

Purpose

This procedure describes how to set the collection period for a B-STDX 8000/9000 switch running 4.2 switch software. The default value is 60 minutes. You can set the collection period to 0, 5, 15, 20, 30, or 60 minutes. You can set the collection period for only one switch at a time.

The collection period for a switch is the period that the switch uses to generate statistics. The Bulk Statistics Collector then collects the statistics from the switch at the end of each collection period.

Refer to Chapter 4, "4.2 Collection Processing" for more details.

When to Set the Collection Period

You can set the collection period while Bulk Statistics is either running or not running. If you set the collection period while Bulk Statistics is running, the switch first finishes any active transfer of its statistics to the collector, and begins to collect statistics for the new collection time period.

To Set the Collection Period for a 4.2 Switch

To set the collection period for a 4.2 switch:

1. On the network map, select the switch object.
2. From the Misc menu, choose CascadeView ⇒ Logon. Enter the operator or provisioning password and choose OK.
3. From the Administer menu, choose Cascade Parameters ⇒ Set Parameters.

The Switch Back Panel dialog box appears (see Figure 3-2).

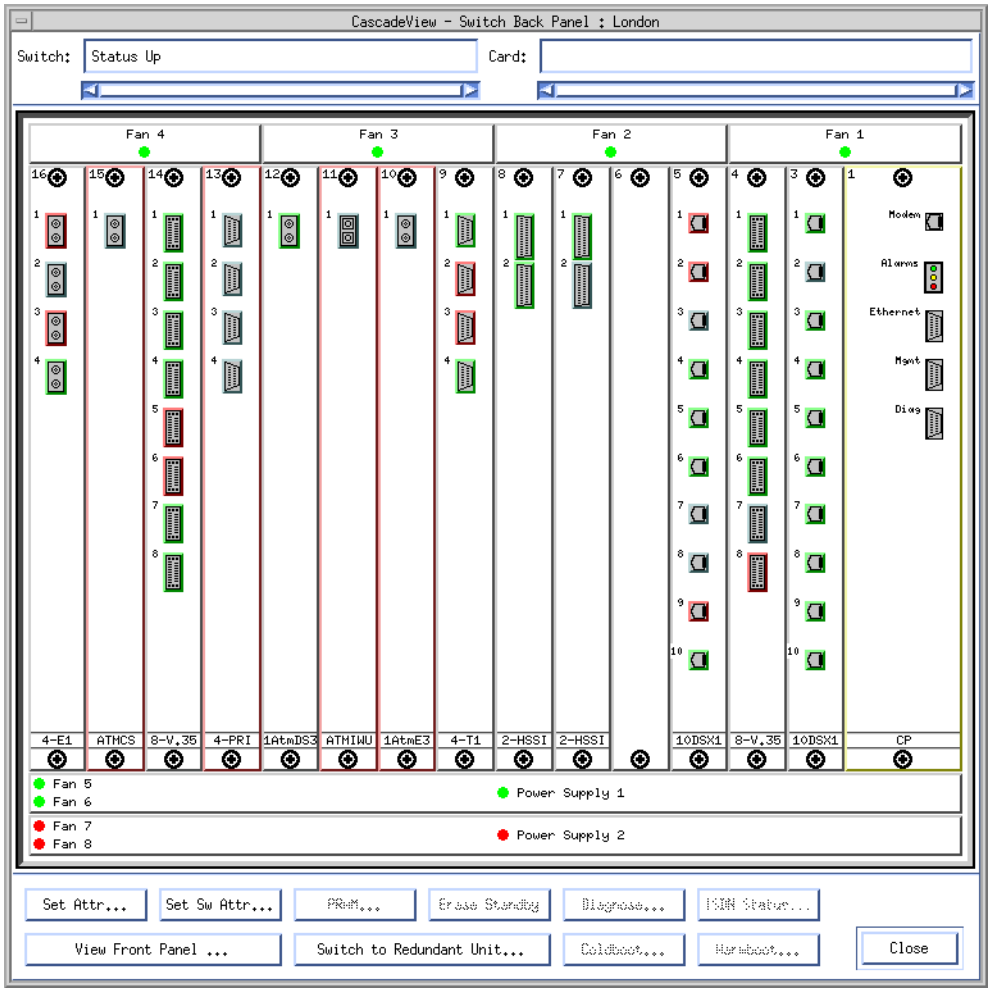

Figure 3-2. Switch Back Panel Dialog Box

4. Choose the Set Attr... button.

The Set Switch Attributes dialog box appears (see Figure 3-3).

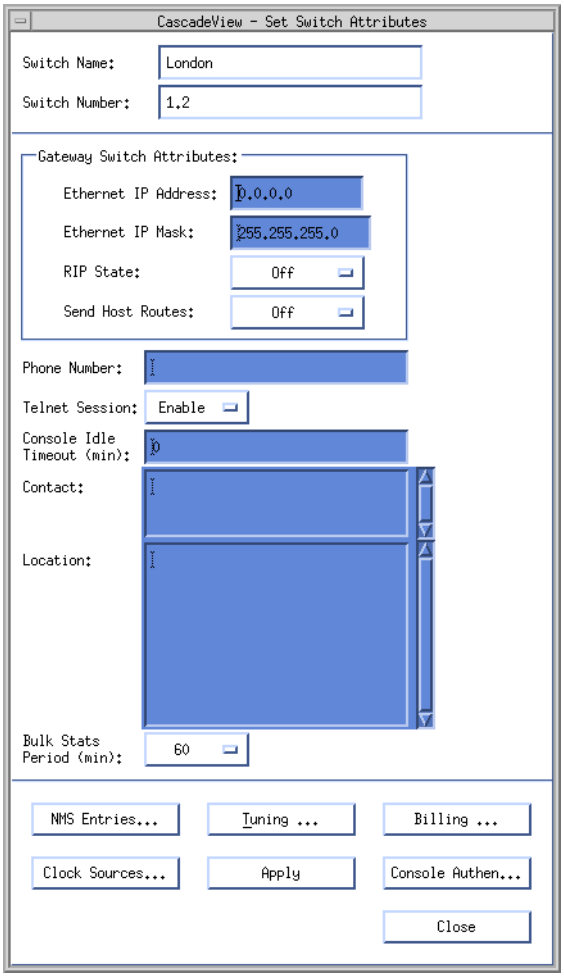

Figure 3-3. Set Switch Attributes Dialog Box

5. Select the Bulk Stats Period.
6. Select Close to return to the Switch Back Panel dialog box.
7. Select Close to return to the network map.

Collecting Bulk Statistics

This section describes how to

- Access the Bulk Statistics dialog box (used for starting and stopping Bulk Statistics and for enabling and disabling switches for collection)
- Enable or Disable Switches for Collection
- Start Bulk Statistics
- Stop Bulk Statistics

To Access the Bulk Statistics Dialog Box

To access the Bulk Statistics dialog box:

1. From the command line, perform the applicable step:

- If you are running Bulk Statistics from a SPARCstation that has access to the NMS configuration database and have not generated a switch list file, enter the following command:

  `/opt/BulkStats/bin/BulkStat`

  The Bulk Statistics application accesses SYBASE and creates its own switch list.

  The Bulk Statistics dialog box shown in Figure 3-4 appears. No collection processing will occur until “start” is pressed.

- If you are running Bulk Statistics from a SPARCstation that does not have access to the NMS configuration database, or if you have generated a switch list file, enter the following command:

  `/opt/BulkStats/bin/BulkStat -f <`*`switch list data file path`*`>`

  Where:

  switch list data file path — Specifies the full path and file name of the switch list data file.

  The Bulk Statistics dialog box shown in Figure 3-4 appears. No collection processing will occur until “start” is pressed.

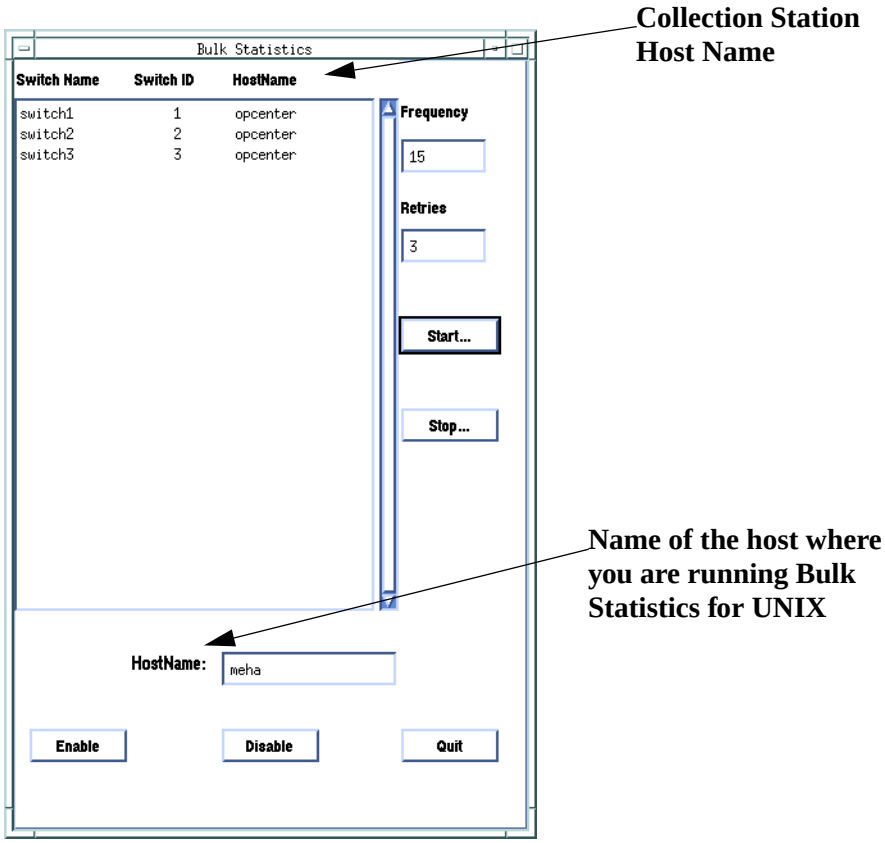

Figure 3-4. Bulk Statistics Application Dialog Box

To Enable or Disable Switches for Collection

When you start Bulk Statistics, statistics will be collected from the switches that are enabled on the Bulk Statistics Application dialog box. (When you start the Bulk Statistics program the first time, all switches defined in the switch list data file or in the NMS database are enabled.)

To enable or disable a switch for collection:

1. At the Bulk Statistics Application dialog box, select the switch and choose Enable or Disable.

   If you disable or enable a switch after you start Bulk Statistics collection, you must stop and then restart the collection in order for the change to be in effect.

To Start Bulk Statistics

The Bulk Statistics Application dialog box (Figure 3-4) shows which switches are enabled for collection. If you want to disable or enable any of these switches before starting Bulk Statistics, refer to "To Enable or Disable Switches for Collection" on page 3-7.

If Bulk Statistics was abnormally terminated after a collection had already started, then the next time that you initiate Bulk Statistics collection, the system will stop the previous collection.

To start Bulk Statistics:

1. At the Bulk Statistics Application dialog box, select Start...

   If you receive the following message, another user has already started Bulk Statistic, and you cannot start it until that user has stopped it.

   `Bulk Stats is already running on collection station <station name>. Its process ID is <ID number> and is owned by <user name>. Program exiting.`

2. If this is the first time that you have run the Bulk Statistics application program, check the SNMP log files to make sure that the SNMP set commands are accessing the switch (refer to "Bulk Statistics SNMP Log Files" on page 3-9).

To Stop Statistics Collection

Only the user who started Bulk Statistics can stop Bulk Statistics. To stop Bulk Statistics:

1. At the Bulk Statistics Application dialog box, select the Stop command.

   If you need to terminate the Bulk Statistics Collector for B-STDX/STDX by using a signal, use the TERM signal. Do not use KILL -9 because this signal does not enable the Bulk Statistics Collector for B-STDX/STDX to clean up properly.

Bulk Statistics SNMP Log Files

The system maintains three Bulk Statistics log files that you can check to determine the status of the collector's collection of data, the translation process, bulk copies, and nightly archival of the files.

BulkStatSetP2.log

The system maintains a file named BulkStatSetP2.log to record every SNMP Set request that Bulk Statistics makes when it polls all enabled 4.2 switches for statistics. The BulkStatSetP2.log file records the number of SNMP retries in the event of an error condition. If there are more than three retries, the SNMP Set request is unsuccessful. BulkStatSetP2.log is located in the **/opt/BulkStats/etc** directory.

An unsuccessful response to an SNMP Set request has the form:

```
Sending SNMP set to <switch name> <switch IP> Retry is 2
```

BulkStatSet.log

The system maintains a file named BulkStatSet.log to record every SNMP Set request that Bulk Statistics makes when it polls all enabled pre-4.2 switches for statistics. The BulkStatSet.log file records the number of SNMP retries in the event of an error condition. If there are more than three retries, the SNMP Set request is unsuccessful. BulkStatSet.log is located in the **/opt/BulkStats/etc/** directory.

An unsuccessful response to an SNMP Set request has the form:

```
Sending SNMP set to <switch name> <switch IP> Retry is 2
```

cvBulkStatCron.log

The system maintains a file named cvBulkStatCron.log to record every translation process, bulk copy, and nightly archival of the files for 4.2 switches. The cvBulkStatCron.log file is located in the **/opt/BulkStats/etc** directory.

Manual Translation of Archived Files

Overview

Use one of the following manual translation procedures if you need to regenerate translated files from an archived raw statistics file. For example, you might need to regenerate translated files that were lost or corrupted.

Follow the appropriate procedure for 4.2 switches or pre-4.2 switches.

Manual Translation of Archived Files From 4.2 Switches

A procedure is given for each of the following situations:

- The system is configured for immediate translation
- The system is configured for deferred translation

The manual translation will result in the following:

- Translated statistics will be appended to the current day's set of translated statistics files in **/opt/BulkStats/data/current**.
- The data will be bulk-copied into the Bulk Statistics database if SYBASE is being used to store statistics data.

To avoid interfering with scheduled collections and translations, manual translations should not be performed between 5 minutes and 30 minutes past the hour.

Manual Translation if System is Configured for Immediate Translation

Use the following steps to generate statistics for archived files:

1. Copy the archived raw statistics file to /tftpboot/bulkstats. For example:

   ```
   cp /opt/BulkStats.var/bstdx_raw_stats.1.2.3.4@22Nov1996.Z
   /tftpboot/bulkstats
   ```

2. cd to /tftpboot/bulkstats and decompress the file. For example:

   ```
   cd /tftpboot/bulkstats
   ```

   ```
   uncompress bstdx_raw_stats.1.2.3.4@22Nov1996
   ```

3. Rename the file to remove the archive date. For example:

   ```
   mv bstdx_raw_stats.1.2.3.4@22Nov1996 bstdx_raw_stats.1.2.3.4
   ```

4. Execute the translation script for 4.2 files:

   sh /opt/BulkStats/bin/cvBulkStatXlateP2.sh <ipaddr> <filename>

   Where:

   <*ipaddr*> is the IP address of the switch whose statistics are being translated, and

   <*filename*> is the name of the raw statistics file (with no directory path)

   For example,

   sh /opt/BulkStats/bin/cvBulkStatXlateP2.sh 1.2.3.4 bstdx_raw_stats.1.2.3.4

5. Delete the raw statistics file. For example:

   rm bstdx_raw_stats.1.2.3.4

Manual Translation if System is Configured for Deferred Translation

Use the following steps to generate statistics for archived files:

1. Copy the archived raw statistics file to /opt/BulkStats/data/raw. For example:

   cp /opt/BulkStats.var/bstdx_raw_stats.1.2.3.4@22Nov1996.Z /opt/BulkStats/data/raw

2. Change to the raw directory and decompress the file. For example:

   cd /opt/BulkStats/data/raw

   uncompress bstdx_raw_stats.1.2.3.4@22Nov1996

3. If the raw directory already contains a raw statistics file for the switch, then you should save that raw statistics file to a different filename before performing step 4. This is to prevent the existing raw statistics file from being overwritten and the current day's raw statistics from being lost. For example,

   mv bstdx_raw_stats.1.2.3.4 bstdx_raw_stats.1.2.3.4.sv

4. Rename the file to remove the archive date. For example:

   mv bstdx_raw_stats.1.2.3.4@22Nov1996 bstdx_raw_stats.1.2.3.4

5. Execute the translation script for 4.2 files:

   sh /opt/BulkStats/bin/cvBulkStatXlateP2.sh <ipaddr> <filename>

   Where:

   <*ipaddr*> is the IP address of the switch whose statistics are being translated, and

   <*filename*> is the name of the raw statistics file (with no directory path)

For example,

```
sh /opt/BulkStats/bin/cvBulkStatXlateP2.sh 1.2.3.4
bstdx_raw_stats.1.2.3.4
```

6. Restore the current day's raw statistics file if you changed it in step 3. For example:

```
mv bstdx_raw_stats.1.2.3.4.sv bstdx_raw_stats.1.2.3.4
```

Manual Translation of Archived Files From Pre-4.2 Switch

Use the following steps to generate statistics for archived files for pre-4.2 switches:

1. Locate the copy of the archived file that you want to translate. The archived file is located in a user-defined directory that is specified in the following configuration file:

   /opt/BulkStats/etc/cvbulkstat.cfg

   The archived file has the following format:

   raw_stat.*xxx*.*date*

   Where:

   xxx is the switch ID (e.g. 005)

   date is the archive date

2. Create a directory for the archived file and move a copy of the archived file to the empty directory.
3. Rename the archive file from raw_stat.xxx.date to the following format:

   raw_stat.*xxx*

   Where

   xxx is the switch ID (e.g. 005)

4. Modify the name of the directory that contains the raw_stat.xxx file to be translated in the nightly script named *cvBulkStat24HrScript.sh.*
5. Translate the statistics files using the UNIX format translator by using the following command:

   /opt/BulkStats/bin/nbst raw_stat.xxx

6. Translate the statistics files using the DOS format translator by using the following command:

   /opt/BulkStats/bin/bst raw_stat.xxx

   The output is in decimal format.

7. Calculate the delta and peak values by using the following commands:

   `/opt/BulkStats/bin/CalcCktDelta -x -d xxx`

   `/opt/BulkStats/bin/CalcTrkDelta -x -d xxx`

   Where

   -x produces hexadecimal output

   -d produces decimal output

   xxx specifies the switch ID (e.g. 005)

8. Calculate the utilization values by using the following command:

   `/opt/BulkStats/bin/CalcCktUtil xxx`

   `/opt/BulkStats/bin/CalcTrkUtil xxx`

   Where

   xxx specifies the switch ID (e.g. 005)

4

4.2 Collection Processing

Processing Overview

Figure 4-1 on page 4-2 illustrates the collection process and nightly processing that Bulk Statistics uses for statistics collected from B-STDX 8000/9000 switches that use Release 4.2 of the switch software. These switches are referred to as 4.2 switches in this guide, and the collection of statistics from these switches will be referred to as 4.2 collection processing.

See Chapter 8, “Pre-4.2 Collection Processing” for detailed information about the collection process for B-STDX 8000/9000 switches using Release 4.0.18 and higher (but not 4.2) of the switch software, and STDX 3000/6000 switches using Version 2.3 and higher of the switch software.

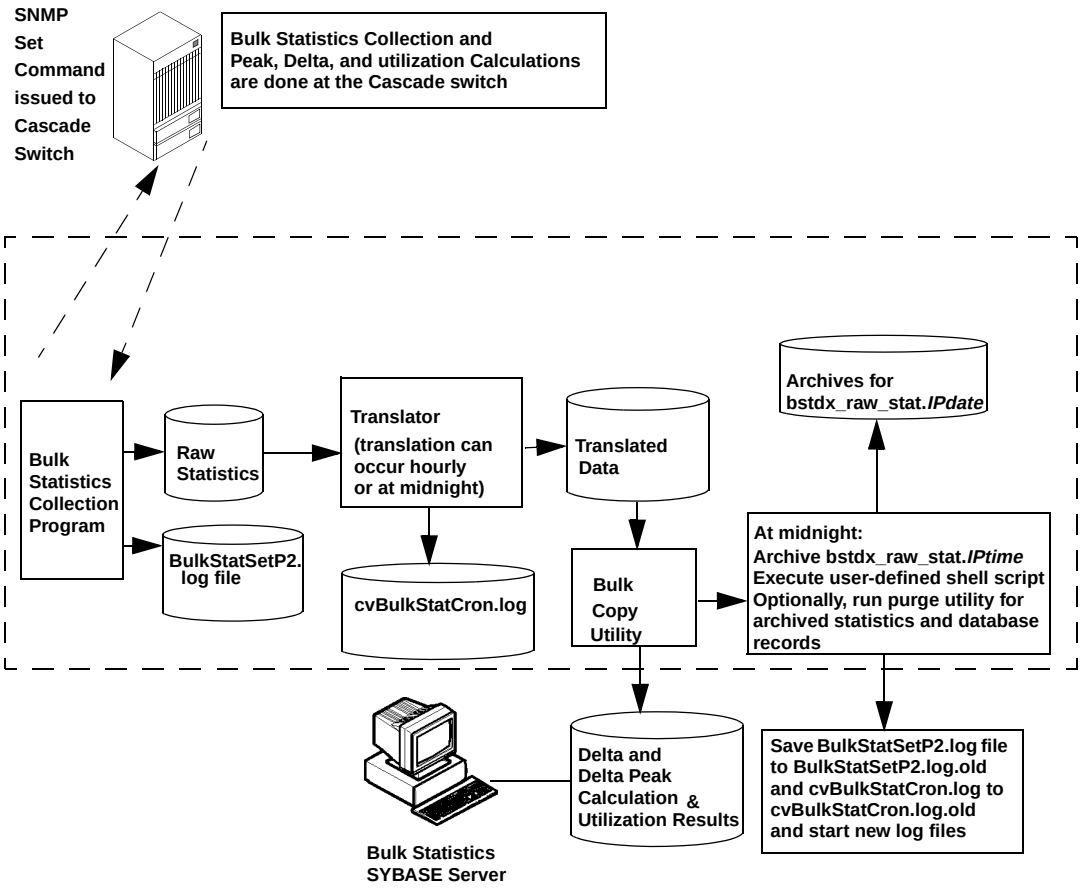

Figure 4-1. Bulk Statistics 4.2 Switch Collection Processing

Bulk Statistics Collection

As Figure 4-2 illustrates, after you start the Bulk Statistics Collector for B-STDX/STDX, the Bulk Statistics Collector issues an SNMP request for data to all switches that are enabled for Bulk Statistics collection.

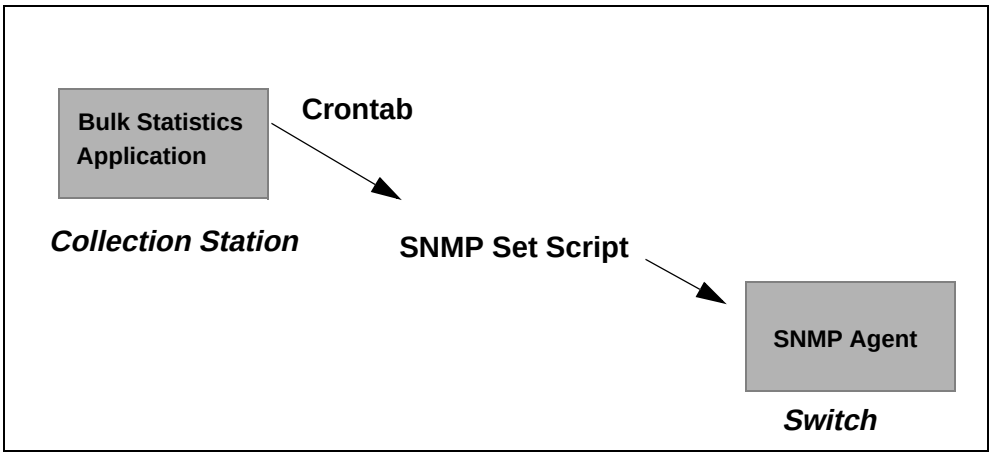

Figure 4-2. Bulk Statistics Collection Initiation

How Switches are Enabled for Collection

When you start the Bulk Statistics program, all switches defined in the switch list data file or the NMS database are enabled for collection, but no collection occurs until "Start" is pressed. You can use the Enable and Disable option buttons from the Bulk Statistics Application dialog box to enable and disable switches for Bulk Statistics collection. Refer to "To Enable or Disable Switches for Collection" on page 3-7.

Statistics Collection

All switches directly calculate the 5-minute peak and the delta values for the total period as the collection period unfolds (even if they are not enabled by the Bulk Statistics collection workstation.) The switch maintains two collection periods of statistics: one set for the previous period and a second set for the current period. The Bulk Statistics Collector only polls enabled switches for this data.

Each enabled switch creates a raw statistics data file containing the previous collection period's 5-minute peak and delta values. The raw statistics data file is in a Cascade proprietary format. The name of the file is BSTDX_RAW_STAT.*IPtime* where:

IP = the entire IP address of the switch

time = a timestamp that includes the date and time of the start of the collection period

For example,

```
BSTDX_RAW_STAT.153.26.1.2.10jul1996180000
```

In this example, the IP address is 153.26.1.2, the date is July 10, 1996, and the time is 6:00 PM.

Collection Period

The collection period for a 4.2 switch can be set to 0, 5, 15, 20, 30, or 60 minutes via CascadeView (refer to "Setting the Collection Period for 4.2 Switches" on page 3-3). The zero setting results in the collector not collecting from the switch.

The value for the collection period is stored in the switch, not on the Bulk Statistics Collector.

Polling Intervals

The Bulk Statistics collector polls each switch at five-minute intervals to determine the switch's collection period. If the collection period matches the current minute of the hour, the collector retrieves the previous period's BSTDX_RAW_STAT.*IPtime* file from the switch via a TFTP file transfer. If the collection period does not match the current minute of the hour, the collector does not initiate the transfer.

Each time the Bulk Statistics Collector transfers the BSTDX_RAW_STAT.*IPtime* file from the switch, it concatenates the new collection data to a cumulative raw statistics file named bstdx_raw_stat.*IP*. The file bstdx_raw_stat.*IP* is stored in /opt/BulkStats/data/raw.

Setting the Collection Period While Bulk Statistics is Running

If you set the collection period while Bulk Statistics is running, the switch finishes any active TFTP transfer of the BSTDX_RAW_STAT.*IPtime* file, and begins to collect statistics for the new collection time period.

Bulk Statistics Log Files

BulkStatSetP2.log

The system maintains a file named BulkStatSetP2.log to record every SNMP Set request that Bulk Statistics makes when it polls all enabled 4.2 switches for statistics. The BulkStatSetP2.log file records the number of SNMP retries in the event of an error condition. If there are more than three retries, the SNMP Set request is unsuccessful. BulkStatSetP2.log is located in the **/opt/BulkStats/etc directory**.

An unsuccessful response to an SNMP Set request has the form:

```
Sending SNMP set to <switch name> <switch IP> Retry is 2
```

cvBulkStatCron.log

The system maintains a file named cvBulkStatCron.log to record every translation process, bulk copy, and nightly archival of the 4.2 switch files. The cvBulkStatCron.log file is located in the **/opt/BulkStats/etc directory**.

Bulk Statistics Translation

The translation process either can execute hourly or can be deferred until midnight. The translation option that you choose is selected at the time of Bulk Statistics installation. The translation process includes the following:

- Translation of the BSTDX_RAW_STAT.*IPtime* file to ASCII comma-delimited file format
- Copying the data to SYBASE via the Bulk Copy utility

Immediate Translation

If you select the immediate translation option, the translation process executes at the end of each hour. The translator appends the new data to the end of the translated files every hour. If a file does not exist, the translator creates it. If you delete a translation file during the day, the next execution of the translation process creates a new file that starts with the current period's data. Immediate translation enables you to freely access the data in the translated files throughout the day.

Deferred Translation

If you select the deferred translation option, the translation process executes at midnight when the system translates the BSTDX_RAW_STAT.*IPtime* file.

Translated Files

During the translation process, the system converts the following values (which were calculated at the switch) to an ASCII comma delimited file format. See "Translated File Format" on page 4-8 for more information.

- 5-minute peak values for trunks, Frame Relay circuits, Frame Relay logical ports (UNI and NNI), and SMDS logical ports (DXI and SSI). This value specifies the maximum value of the statistic as measured during the 5-minute sample periods within the collection period.

- Delta values for trunks, Frame Relay circuits, Frame Relay logical ports (UNI and NNI), and SMDS logical ports (DXI and SSI). Delta is the difference between the current and the previous collection period. The switch keeps track of the count at the beginning of the collection period and at the end, and then reports the difference. For example, if counter A has a value of 10 at the end of the previous collection period and a value of 30 at the end of this collection period, then the switch would report a value of 20 for the delta value.

In addition, the Bulk Statistics collector calculates utilization based on the delta and 5-minute peak counts from the switch.

The files that the Bulk Statistics translation process produces for each switch will differ depending on the type of switches that you are polling. Figure 4-3 on page 4-7 illustrates the translated files that Bulk Statistics generates for switches that use Release 4.2 and later of the switch software. In the filenames, *IP* = the entire IP address of the switch, and *date* = the day, month and year (for example, .11Jul1996).

See Chapter 8 for details about the translated files for B-STDX 8000/9000 switches using Release 4.0.18 and higher (but not 4.2) of the switch software, and STDX 3000/6000 switches using Version 2.3 and higher of the switch software.

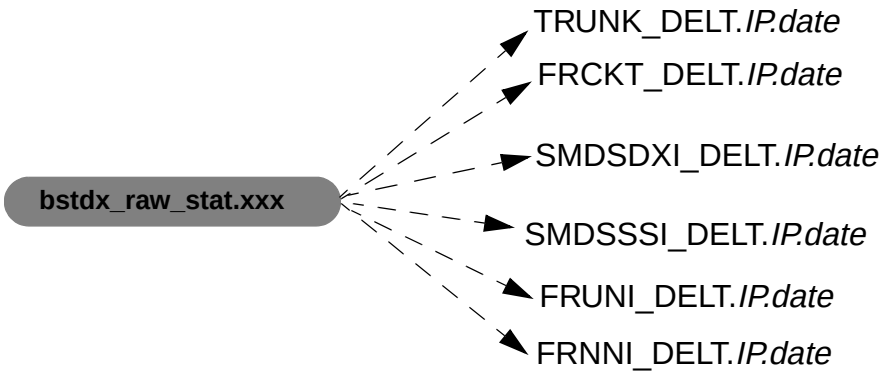

Figure 4-3. Translated Files

Directory Structure for Translated Files

The data files are contained within /opt/BulkStats/data/ in the following directories:

/opt/BulkStats/data/bcp

This directory holds the files containing translated data that need to be bulk-copied into SYBASE. As data collected from a switch is translated, it is stored here before being bulk-copied. The data is deleted once it has been bulk-copied.

The directory should normally be empty; if there's a problem with SYBASE, this directory will contain files containing data that has not been bulk-copied yet. The data is broken into 500-line files, with file extensions "aa," "ab," etc. Once the problem with SYBASE has been resolved, the Bulk Statistics Collector will automatically bulk-copy this data during the next collection process.

/opt/BulkStats/data/current

This directory contains the current day's translated files with the following filename format:

xxxx_a.b.c.d.ddMMMyyyy

where:

a.b.c.d is the IP address of the switch, and

ddMMMyyyy is the date that the file was created

For example, a 9000 Frame Relay Circuit file for switch 1.2.3.4 is *FRCKT_DELT.1.2.3.4.10Nov1996*

At midnight, as part of the archive process, the files in this directory are moved to the previous directory so that data from the new day can be partitioned separately from the 'previous' day's data.

/opt/BulkStats/data/previous

This directory contains yesterday's translated files.

At midnight, as part of the archive process, the following takes place:

1. The files in this directory are moved to the archive directory and compressed. The filenames are not changed.
2. The set of translated files in the current directory are moved to here.

Translated File Format

Each of the files shown in Figure 4-3 is an ASCII comma delimited file format with all statistics in base 10 decimal. Each comma separation within the file indicates a statistical field. You can use the data in these files as input for reports or analysis that suit your specific requirements. Table 4-1 on page 4-9 lists and describes each of the Translated Files.

Chapters 5, 6, and 7 provide further description about the statistics that are included in the translated data.

Table 4-1. Translated File Descriptions

File Name	Contains ASCII comma-delimited formats for the results of...	For Detailed Description see...
TRUNK_DELT.IP.date	Trunk calculations. These calculation results include: 5-minute peak values, delta values between the current and previous collection periods, and utilization values.	page 5-3 to page 5-4
FRCKT_DELT.IP.date	Frame Relay circuit calculations. These calculation results include: 5-minute peak values, delta values between the current and previous collection periods, and utilization values.	page 6-6 and page 6-8
FRUNI_DELT.IP.date	Frame Relay UNI logical port calculations. These calculation results include: 5-minute peak values and delta values between the current and previous collection periods.	page 6-8
FRNNI_DELT.IP.date	Frame Relay NNI logical port calculations. These calculation results include: 5-minute peak values and delta values between the current and previous collection periods.	page 6-8
SMDSDXI_DELT.IP.date	SMDS DXI logical port calculations. These calculation results include: 5-minute peak values and delta values between the current and previous collection periods.	page 7-3 to page 7-5
SMDSSSI_DELT.IP.date	SMDS SSI logical port calculations. These calculation results include: 5-minute peak values and delta values between the current and previous collection periods.	page 7-3

Storage

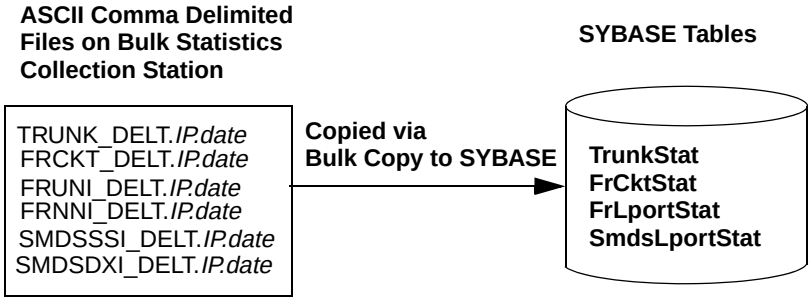

Figure 4-4. SYBASE Tables

As part of the translation process, the SYBASE Bulk Copy utility is used to transfer all of the translated files listed in Table 4-1 on page 4-9 to the Bulk Statistics SYBASE database.

See Appendix A, “Database Schema” for more detailed information about the contents of each SYBASE table. You can use the SYBASE isql utility to view the data after these files are transferred to the Bulk Statistics SYBASE database. (See the SYBASE documentation for further details about using isql). The Bulk Statistics SYBASE database is specified by the CVBSTAT_DB_NAME environment variable in the following file.

/opt/BulkStats/etc/cvbulkstat.cfg.

Archival

As a part of the nightly processing that occurs at midnight, the system compresses and archives the current day's cumulative raw statistics file (bstdx_raw_stat.IPtime) and the translated files from the day before.

The current day's raw statistics file that is archived is taken from the directory /opt/BulkStats/data/raw.

The translated files that are archived are taken from /opt/BulkStats/data/previous, which holds the translated files from the day before. Once these files are archived, the current day's translated files are moved from /opt/BulkStats/data/current to /opt/BulkStats/data/previous.

The files are archived in a user-defined directory that is specified in the following configuration file:

```
/opt/BulkStats/etc/cvbulkstat.cfg
```

For example, the following line in a cvbulkstat.cfg file specifies BulkStats.var as the archive directory:

```
# Archive directory
CVBSTAT_ARC_DIR=/opt/BulkStats.var
```

At installation you can also specify that the system should remove the BulkStatSetP2.log file each night. The system maintains the BulkStatSetP2.log file in the following location:

```
/opt/BulkStats/etc/BulkStatSetP2.log
```

Archive File Purging

After the nightly archive process is complete, the Bulk Statistics application automatically purges archived raw statistics and translated files that are more than a specified number of days old. You specify the number of days that an archived statistics file will be maintained in the archives when you install Bulk Statistics. (Thirty days is the default value for archived raw statistics files). Purging is done for 4.2 archived raw statistics files as well as pre-4.2 archived files.

The environment variable that specifies the number of days that an archived file will be maintained is the CVBSTAT_ARC_LIFETIME variable in cvbulkstat.cfg.

Purging SYBASE Database Entries

After the nightly archive process is complete, the Bulk Statistics application automatically purges any Bulk Statistics database files that have are more than a specified number of days old. You specify the number of days that a database entry will be maintained in the SYBASE Bulk Statistics database when you install the Bulk Statistics application. (Thirty days is the default value for stored database entries). The environment variable that specifies the number of days that a database entry will be maintained is the CVBSTAT_DB_LIFETIME variable in cvbulkstat.cfg.

Creating a Shell Script

You may want to create a shell script to perform a variety of nightly tasks, such as backing up any files that are not included in the Bulk Statistics archival process. If you do create a shell script, specify the name of the script in the **/opt/BulkStats/etc/cvbulkstat.cfg** configuration file.

Specify the shell script after the archive directory entry as shown in the following example:

```
# Archive directory
CVBSTAT_ARC_DIR=/opt/BulkStats.var
# Shell script to execute after performing nightly archive
CVBSTAT_ARC_FUNC=<complete path to user shell script>
```

5

Trunk Statistics

This chapter provides the following information about trunk statistics for 4.2 switches:

- Trunk statistics calculations
- The TRUNK_DELT.*IP.date* file format

Figure 5-1 on page 5-1 illustrates the translation and storage process for trunk statistics collected from 4.2 switches.

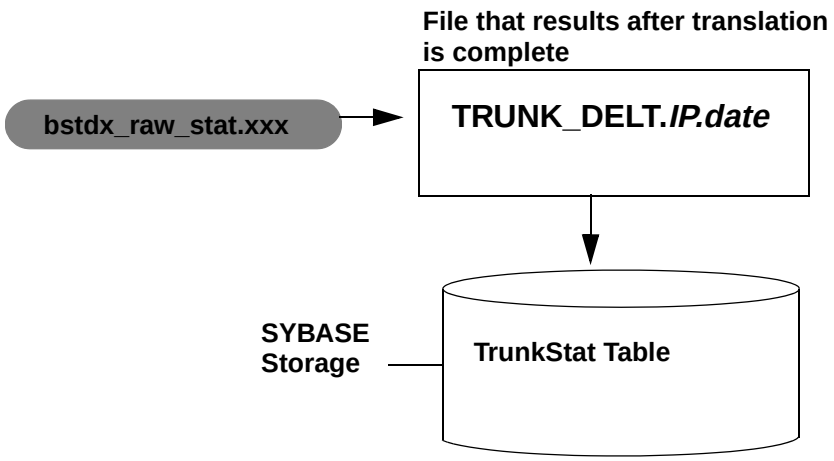

Figure 5-1. Translation and Storage Process for 4.2 Trunk Statistics (Calculation Performed in the 4.2 Switch)

See the *Cascade Enterprise MIB Definitions* reference for more information about specific statistic values. Reference Appendix A for a listing of the TrunkStat table that stores the peak, delta peak, and utilization calculations in SYBASE.

Trunk Calculations

The calculations used to produce trunk statistics provided for 4.2 switches are performed directly at the 4.2 switch. The switch provides the following calculation results to the Bulk Statistics collector. All calculation results are included in the TRUNK_DELT.*IP.date* file. The switch calculates the following trunk values:

- 5-minute peak values
- Delta values

See "Translated Files" on page 4-6 for a complete description of how the switch calculates 5-minute peak and delta values. The Bulk Statistics Collector then calculates the following value based on the 5-minute peak and delta values.

- Utilization

Trunk Utilization Calculation

The following formula determines the trunk utilization values:

$$\frac{\text{octets} \times 8}{\text{mperiod} \times \text{ifSpeed}} \times 100\%$$

Where:

```
mperiod = the measurement period in seconds
octets = ifoutoctets outbound utilization
         ifoutoctets for outbound peak utilization
         ifinoctets for inbound utilization
         ifinoctets for inbound peak utilization
```

Trunk Statistic Translation

The trunk statistic translation process includes the following:

- Translation of the BSTDX_RAW_STAT.*IP* file to the TRUNK_DELT.*IP.date* ASCII comma-delimited file format. See page 5-3 for a listing of the TRUNK_DELT.*IP.date* format.
- Copying the TrunkStat table to SYBASE via the Bulk Copy utility. See Appendix A, "Database Schema" for a listing of the TrunkStat table format.

TRUNK_DELT.*IP.date* File Format

The following list indicates the fields that are included in the TRUNK_DELT.*IP.date* file.

```
Switch IP Address,
Year, (Measurement period start time in UTC)
Month,
Day,
Hour,
Minute,
Second,
Measurement Period Start time, (in decimal seconds)
Measurement Period Length,
Peak Period Length,
ifIndex,
ifOperStatus,
ifSpeed,
privateNet
customerID
Ingress Utilization, (inbound)
Ingress Peak Utilization, (inbound)
Egress Utilization, (outbound)
Egress Peak Utilization (outbound)
ifInOctets,
ifInOctetsPeak,
ifInUcastPkts,
ifInUcastPktsPeak,
ifInNUcastPkts,
ifInNUcastPktsPeak,
ifInDiscards,
ifInDiscardsPeak,
ifInErrors,
ifInErrorsPeak,
ifInUnknownProtos,
ifInUnknownProtosPeak,
ifOutOctets,
ifOutOctetsPeak,
ifOutUcastPkts,
ifOutUcastPktsPeak,
ifOutNUcastPkts,
ifOutNUcastPktsPeak,
ifOutDiscards,
ifOutDiscardsPeak,
ifOutErrors,
ifOutErrorsPeak,
<new line>
```

Trunk Statistic Descriptions

Table 5-1 on page 5-4 lists and describes the trunk statistics that the system produces for 4.2 switches. The trunk statistics that the system produces for 4.2 switches are identical to the trunk statistics that the system produces for pre-4.2 switches.

The table is organized according to object type as follows:

- Identifier Objects indicate non-counter objects such as unique instance identifiers, state, and configuration information.
- Delta/Peak Objects include the statistics that report collection period totals and five-minute peak values.

Table 5-1. Trunk Statistics for 4.2 and Pre-4.2 Switches

Variable	Description
Identifier Objects	
Switch IP Address	The IP address of the switch.
Year	The current year. The full year including the century.
Month	The current month (a value from 1 to 12).
Day	The current day date (a value from 1 to 31).
Hour	The current hour (a value from 00 to 23).
Minute	The current minute (a value from 0 to 59).
Second	The current second (a value from 0 to 59).
Measurement period start time (in seconds)	The measurement period start time reported as the number of seconds since January 1, 1970 00:00:00.00 UTC.
Measurement period length	The length of the measurement period in seconds. For example, a one-hour measurement period is reported as 3600 seconds.
Peak period length	The length of the peak measurement period in seconds. For example, a five-minute peak measurement period is reported as 300 seconds.
ifIndex	The interface identifier that is unique by switch. This identifier corresponds to a logical port.
ifOperStatus	The current operational status of the interface specified by the ifIndex code.
ifSpeed	The configured bandwidth, in bits per second, for the interface noted in the ifIndex code

Table 5-1. Trunk Statistics for 4.2 and Pre-4.2 Switches (Continued)

Variable	Description
privateNet	If non-zero, this field indicates the private network that this trunk belongs to. If zero, this trunk has access to the entire public portion of the network.
customerID	A decimal number that identifies the customer that owns this trunk; this field is used for Virtual Private Networking.
Delta/Peak Objects	
ifInOctets	The total number of octets received on the interface, including framing characters, errors, and discards.
ifInUcastPkts	The number of unicast frames that the system verified as good and forwarded to the switch.
ifInNUcastPkts	The number of non-unicast frames that the system verified as good and forwarded to the switch. This statistic is not currently used.
ifInDiscards	The number of inbound packets that were not delivered to a higher-layer protocol because they were discarded due to layer two inconsistencies. Layer two inconsistencies include conditions such as a wrong DLCI and red frames when graceful discard is off.
ifInErrors	The number of inbound packets that were not delivered to a higher-level protocol because they contain errors due to layer one inconsistencies. Layer one inconsistencies include the following conditions: Bad CRC, frame abort, and short frames. On a T1 port this code reflects the number of errors associated with the mapped DS0 channels. On a serial port, this value is 0.
ifInUnknownProtos	The number of inbound packets that were not delivered to a higher-level protocol because they contain errors due to an unknown or unsupported protocol.
ifOutOctets	The total number of octets transmitted out of the interface, including framing characters, errors, and discards.
ifOutUcastPkts	The total number of packets that higher-level protocols requested for transmission to a unicast frame relay address. This value includes packets (or multicast services) that were discarded or not sent.
ifOutNUcastPkts	The total number of packets that higher-level protocols requested for transmission to a non-unicast frame relay address. This value includes packets (or multicast services) that were discarded or not sent.

Table 5-1. Trunk Statistics for 4.2 and Pre-4.2 Switches (Continued)

Variable	Description
ifOutDiscards	The number of outbound packets that were chosen for discard (and therefore, counted as errors) even though no errors were detected to prevent their transmission. Buffer overload is one condition that would cause this discard type.
ifOutErrors	The number of outbound packets that could not be transmitted because of errors.
Utilization objects	
Ingress utilization	The utilization value for the inbound side of the trunk.
Ingress peak utilization	The utilization value for the inbound side of the trunk during the reported peak.
Egress utilization	The utilization value for the outbound side of the trunk.
Egress peak utilization	The utilization value for the outbound side of the trunk during the peak reported period.

6

Frame Relay Statistics

This chapter provides the following information about Frame Relay statistics for 4.2 switches:

- Translated files used to create Frame Relay circuit statistics, Frame Relay UNI logical port statistics, and Frame Relay NNI logical port statistics
- Frame Relay calculations
- The following file formats that result from the translation of the BSTDX_RAW_STAT.IP file to the following files:
  - FRCKT_DELT.*IP.date*
  - FRUNI_DELT.*IP.date*
  - FRNNI_DELT.*IP.date*

Figure 6-1 on page 6-2 illustrates the translation and storage process for Frame Relay circuit statistics collected from 4.2 switches.

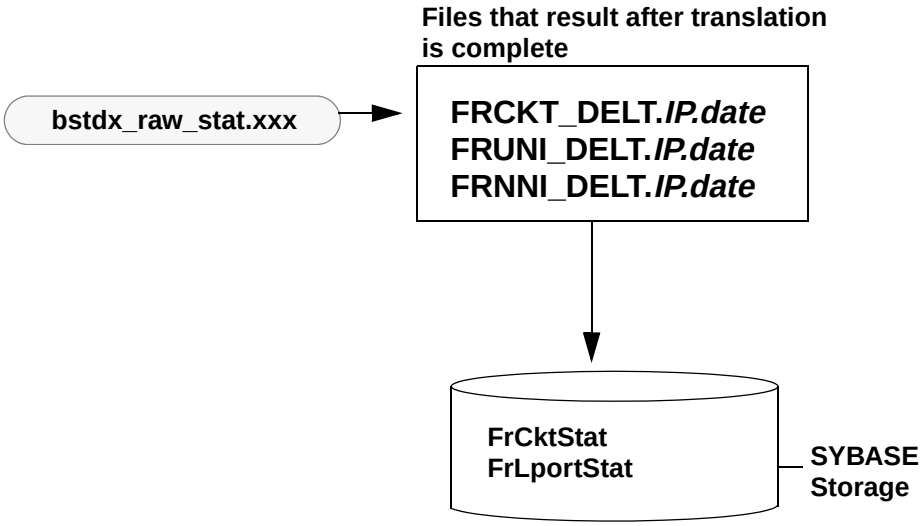

Figure 6-1. Translation and Storage Process for 4.2 Frame Relay Statistics (Calculation Performed in the 4.2 Switch)

Reference Appendix B for a listing of the following SYBASE tables that store the peak, delta peak, and utilization calculations:

- FrCktStat
- FrLportStat
- FrNniStat

Frame Relay Calculations

The calculations used to produce Frame Relay statistics for 4.2 switches are performed directly at the 4.2 switch. The switch provides the following calculation results to the Bulk Statistics collector. Calculation results are included in the following files:

FRCKT_DELT.*IP.date* — This file contains the translated Frame Relay circuit statistics in ASCII comma delimited format.

FRUNI_DELT.*IP.date* — This file contains the translated Frame Relay UNI logical port statistics in ASCII comma delimited format.

FRNNI_DELT.*IP.date* — This file contains the translated Frame Relay NNI logical port statistics in ASCII comma delimited format.

The values that the switch calculates for Frame Relay circuits and logical ports include the following:

- 5-minute peak values
- Delta values

See "Translated Files" on page 4-6 for a complete description of how the switch calculates 5-minute peak and delta values. The Bulk Statistics Collector then calculates the following value based on the 5-minute peak and delta values:

- Utilization

Circuit Utilization

Each line of text in the Frame Relay circuit utilization file (FRCKT_DELT.*IP.date*) represents the respective utilization in the past time interval. The Utilization data (both inbound and outbound) in the file is for each circuit in that node. All circuit utilization integers are floating point numbers (with two digits after the decimal point) between 0.00% and 100.00%.

Circuit Utilization Calculations

The inbound circuit utilization for the total period is determined by the following calculation:

$$\frac{\text{cktInOctets x 8}}{\text{mperiod x [cktCir + [cktBe * (cktCir/cktBc)]]}} \text{X } 100\%$$

Where

mperiod = the measurement period in seconds

The outbound circuit utilization is determined by the following calculation:

$$\frac{\text{cktOutOctets x 8}}{\text{mperiod x [cktRevCir + [cktRevBe * (cktRevCir/cktRevBc)]]}} \text{X } 100\%$$

Where

mperiod = the measurement period in seconds

The factor of eight is for unit conversion assuming that cktCir(t) is in the unit of bits per second.

Circuit Peak Utilization Calculations

The inbound circuit utilization for the peak period is determined by the following calculation:

$$\frac{\text{cktInOctetsPk x 8}}{\text{300 seconds x [cktCir + [cktBe * (cktCir/cktBc)]]}} \text{X } 100\%$$

Where the length of the period is 300 seconds.

The outbound circuit utilization is determined by the following calculation:

$$\frac{\text{cktOutOctetsPk x 8}}{\text{300 seconds x [cktRevCir + [cktRevBe * (cktRevCir/cktRevBc)]]}} \text{X } 100\%$$

Where the length of the period is 300 seconds.

The factor of eight is for unit conversion assuming that cktCir(t) is in the unit of bits per second.

Logical Port Utilization

The logical port utilization values are maintained in the following files:

- FRUNI_DELT.*IP.date*
- FRNNI_DELT.*IP.date*

Each utilization value in these files represents the respective utilization in the past time interval. All logical port utilization integers are floating point numbers (with two digits after the decimal point) between 0.00% and 100.00%.

Logical Port Utilization Calculations

The logical port utilization is determined by the following calculation:

$$\frac{\text{octets} \times 8}{\text{mperiod} \times \text{ifSpeed}} \times 100\%$$

Where:

```
mperiod = the measurement period in seconds
octets = inOctets for ingress utilization
       =  outOctets for egress utilization
```

The factor of eight is for unit conversion assuming that ifSpeed is in the unit of bits per second.

File Formats

FRCKT_DELT.*IP.date*

The following output is the format for the FRCKT_DELT.*IP.date* file which contains the Frame Relay circuit peak, delta, and utilization values. See Table on page 6-9 for a description of each of the fields in this file.

```
Switch IP Address,
Year, (measurement period start time in UTC)
Month,
Day,
Hour,
Minute,
Second,
Measurement Period Start-time (in decimal seconds)
Measurement Period Length,
Peak Period Length
cktSrcIfIndex,
cktSrcDlci,
cktOde,
cktCir,
cktBc,
cktBe,
cktRevCir,
cktRevBc,
cktRevBe,
cktPrivateNet,
cktCustomerID,
cktOperStatus,
Ingress Utilization, (inbound)
Ingress Peak Utilization, (inbound)
Egress Utilization, (outbound)
Egress Peak Utilization (outbound)
cktInFrames,
cktInFramesPeak,
cktInDiscards,
cktInDiscardsPeak,
cktInOctets,
cktInOctetsPeak,
cktInDEOctets,
cktInDEOctetsPeak,
cktInODEOctets,
cktInODEOctetsPeak,
cktOutFrames,
cktOutFramesPeak,
cktOutOctets,
```

```
cktOutOctetsPeak,
cktOutFECNFrames,
cktOutFECNFramesPeak,
cktOutBECNFrames,
cktOutBECNFramesPeak,
cktOutLostFrames,
cktOutLostFramesPeak,
cktOutLostDEFrames,
cktOutLostDEFramesPeak,
cktOutLostODEFrames,
cktOutLostODEFramesPeak,
cktOutLostOctets,
cktOutLostOctetsPeak,
cktOutLostDEOctets,
cktOutLostDEOctetsPeak,
cktOutLostODEOctets
cktOutLostODEOctetsPeak,
cktOutDEOctets,
cktOutDEOctetsPeak,
cktOutODEOctets,
cktOutODEOctetsPeak,
cktRtMinDelay,
cktRtMaxDelay,
cktRtAvgDelay,
<new line>
```

FRUNI_DELT.*IP.date* and FRNNI_DELT.*IP.date*

The output format for the FRUNI_DELT.*IP.date* and the FRNNI_DELT.*IP.date* files is identical. FRUNI_DELT.*IP.date* contains the Frame Relay UNI logical port statistics. FRNNI_DELT.*IP.date* contains the NNI logical port statistics. See Table 6-2 on page 6-13 for a description of each of the fields in this file.

```
Switch IP Address,
Year, (measurement period start time in UTC)
Month,
Day,
Hour,
Minute,
Second,
Measurement Period Start-time (in decimal seconds)
Measurement Period Length,
Peak Period Length,
ifIndex,
portType,
ifOperStatus,
ifSpeed,
privateNet,
customerID,
ingressUtil,
ingressPeakUtil,
egressUtil,
egressPeakUtil,
inFrames,
inFramesPeak,
inOctets,
inOctetsPeak,
inErrors,
inErrorsPeak,
inDiscards,
inDiscardsPeak,
outFrames,
outFramesPeak,
outOctets,
outOctetsPeak,
outErrors,
outErrorsPeak,
outDiscards,
outDiscardsPeak
<endline>
```

Frame Relay Statistics for 4.2 Switches

Table lists and describes each of the Frame Relay circuit statistics that the system collects from 4.2 switches. This table also specifies the order in which the data collection is organized. Table 6-2 on page 6-13 lists and describes each of the Frame Relay UNI/NNI logical port statistics that the system collects from 4.2 switches.

Both tables are organized according to object type as follows:

- Identifier Objects indicate non-counter objects such as unique instance identifiers, state, and configuration information.
- Delta/Peak Objects include the statistics that report collection period totals and five-minute peak values.
- Utilization Objects include the utilization values that the Bulk Statistics collector calculates based on the delta and 5-minute peak values.

Some parameters listed in Table 6-1 are used internally by the translation process and are not reported to the customer. These parameters appear italicized in the table.

Table 6-1. Frame Relay Circuit Statistics for 4.2 Switches

Variable	Description
Identifier Objects	
Switch IP Address	The switch IP address, recorded in dotted decimal notation (for example, 152.148.1.2).
Year	The full year including the century.
Month	The month number (a value from 1 through 12).
Day	The day of the month (a value from 1 through 31).
Hour	The hour of the day (a value from 00 through 23).
Minute	The minute within the hour (a value from 0 to 59).
Second	The second within the minute (a value from 0 to 59).
Measurement period start time (in seconds)	The measurement period start time reported as the number of seconds since January 1, 1970 00:00:00.00 UTC.
Measurement period length	The length of the measurement period in seconds. For example, a one-hour measurement period is reported as 3600 seconds.

Table 6-1. Frame Relay Circuit Statistics for 4.2 Switches (Continued)

Variable	Description
Peak period length	The length of the peak measurement period in seconds. For example, a 5-minute peak period is reported as 300 seconds.
cktSrcIfIndex	The interface number of the logical port to which the circuit is associated.
cktSrcDlci	The DLCI on the interface number of the logical port to which the circuit is associated.
cktOde	The Graceful Discard configuration option setting for this circuit.
cktCir	The average number of user data (bits) that the network agrees to transfer over the circuit in the forward direction, during time interval T. T = cktBc/cktCir.
cktBc	The maximum amount of data (bits) that the network agrees to transfer over the circuit in the forward direction under normal conditions, during time interval T. T=cktBc/cktCir.
cktBe	The maximum amount of uncommitted data (bits) that the network will attempt to transfer over the circuit in the forward direction during time interval T. T=cktBc/cktCir.
cktRevCir	The average number of user data (bits) that the network agrees to transfer over the circuit in the reverse direction, measured over the measurement interval: T=cktBc / cktCir.
cktRevBc	The maximum amount of data (bits) that the network agrees to transfer in the reverse direction of the circuit under normal conditions.
cktRevBe	The maximum amount of uncommitted data (bits) that the network attempts to transfer in the reverse direction of the circuit.
cktPrivateNet	If non-zero, this field indicates the private network that this circuit belongs to. If zero, this field has access to the entire public portion of the network.
cktCustomerID	A decimal number that identifies the customer that owns this circuit; this field is used for Virtual Private Networking.
cktOperStatus	The current operational status of the circuit.

Table 6-1. Frame Relay Circuit Statistics for 4.2 Switches (Continued)

Variable	Description
Delta/Peak Objects	
cktInFrames[a]	The total number of frames that the switch receives from the circuit since the last reset.
cktInDEOctets	The number of inbound DE-marked octets since the last reset.
cktInDiscards	The number of frames that the switch receives from the circuit that were discarded due to rate enforcement.
cktInODEOctets	The number of inbound ODE-marked octets since the last reset.
cktInOctets[a]	The total number of octets received on the interface since the last reset.[a]
cktOutFrames[a]	The number of outbound frames transmitted via the egress port of the switch onto the circuit since the last reset.
cktOutFECNFrames	The number of outbound frames transmitted via the egress port of the switch with the FECN bit set since the last reset. This indicates forward congestion.
ckOutBECNFrames	The number of outbound BECN-marked frames since the last reset. This indicates backward congestion.
cktOutOctets[a]	The total number of octets transmitted out of the interface, including framing characters, errors, and discards since the last reset.
cktOutLostFrames[a,d]	The number of frames transmitted via the egress port of the switch that have been lost since the last reset. This statistic is measured only on inter-switch (trunk-dependent) PVCs.
cktOutLostDEFrames[b,d]	The number of DE-marked frames transmitted via the egress port of the switch that have been lost since the last reset. This statistic is measured only on inter-switch (trunk-dependent) PVCs.
cktOutLostODEFrames[c,d]	The number of ODE-marked frames transmitted via the egress port of the switch that have been lost since the last reset. This statistic is measured only on inter-switch (trunk-dependent) PVCs.
cktOutLostOctets[d]	The number of outbound octets transmitted via the egress port of the switch that have been lost since the last reset. This statistic is measured only on inter-switch (trunk-dependent) PVCs.

Table 6-1. Frame Relay Circuit Statistics for 4.2 Switches (Continued)

Variable	Description
cktOutLostDEOctets[d]	The number of DE-marked octets transmitted via the egress port of the switch that have been lost since the last reset. This statistic is measured only on inter-switch (trunk-dependent) PVCs.
cktOutLostODEOctets[d]	The number of ODE-marked octets transmitted via the egress port of the switch that have been lost since the last reset. This statistic is measured only on inter-switch (trunk-dependent) PVCs.
cktOutDEOctets	The number of outbound DE-marked octets since the last reset
cktOutODEOctets	The number of outbound ODE-marked octets since the last reset
cktRtMinDelay	[d]The minimum round-trip delay, displayed in micro-seconds.
cktRtMaxDelay[d]	The maximum round-trip delay, displayed in micro-seconds.
cktRtAvgDelay[d]	The average round-trip delay, displayed in micro-seconds.
Utilization objects	
Ingress utilization	The circuit utilization on the inbound side during the reported period.
Ingress peak	Circuit utilization during the reported peak period.
Egress utilization	Circuit utilization of the outbound side during the reported period.
Egress peak utilization	Circuit utilization on the outbound side during the reported peak period.

[a] This statistic includes all frames (green, amber, and red).

b. This statistic includes all amber frames.

c. This statistic refers to all red frames. Note that the system calculates the total number of green frames by using the following formula:

```
cktInFrame - (cktInDEFrames + cktInODEFrames)
```

d. See the "Quality of Service Information" on page 6-13 for more information about this statistic.

Quality of Service Information

Quality of Service (QOS) information for a circuit is distributed in the circuit structures of the two endpoint switches. The system uses the following QOS counters:

QOS Statistics

- Total Frames Lost
- Green Frames Lost
- Amber Frames Lost
- Red Frames Lost
- Total Octets Lost
- Green Octets Lost
- Amber Octets Lost
- Red Octets Lost

Round Trip Delay Statistics

- Minimum Delay (ms)
- Maximum Delay (ms)
- Average Delay (ms)

QOS information is maintained only for circuits with endpoints that are at distinct switches. QOS information is not maintained for circuits that are contained within a single switch because frames are assumed never to be lost and the round trip delay is approximately zero for circuits that are contained within a single switch.

Table 6-2. Frame Relay Logical Port Statistics for 4.2 Switches

Variable	Description
Identifier object	
Switch IP Address	The switch IP address, recorded in dotted decimal notation (for example, 152.148.1.2).
Year	The full year, including the century.

Table 6-2. Frame Relay Logical Port Statistics for 4.2 Switches (Continued)

Variable	Description
Month	The month number (a value from 1 through 12).
Day	The day of the month (a value from 1 through 31).
Hour	The hour of the day (a value from 00 through 23).
Minute	The minute within the hour (a value from 0 to 59).
Second	The second within the minute (a value from 0 to 59).
Measurement period start time (in seconds)	The measurement period start time reported as the number of seconds since January 1, 1970 00:00:00.00 UTC.
Measurement period length	The length of the measurement period in seconds. For example, a one-hour measurement period is reported as 3600 seconds.
Peak period length	The length of the peak measurement period in seconds. For example, a 5-minute peak period is reported as 300 seconds.
ifIndex	The interface number of the logical port.
ifOperStatus	The current operational status of the logical port.
ifSpeed	The logical port's configured bandwidth in bits per second.
privateNet	If non-zero, this field indicates the private network that this logical port belongs to. If zero, this port has access to the entire public portion of the network.
customerID	A decimal number that identifies the customer that owns this logical port; this field is used for Virtual Private Networking.
Delta/Peak object	
inFrames	The total number of frames received from the interface.
inOctets	The total number of octets received from the interface.
inDiscards	The number of inbound packets that were chosen to be discarded to prevent them from being delivered to a higher-layer protocol, even though no errors had been detected.
inErrors	The number of inbound packets that contained errors that prevented them from being delivered to a higher-level protocol.
outFrames	The total number of frames transmitted out the interface.
outOctets	The total number of octets transmitted out of the interface.

Table 6-2. Frame Relay Logical Port Statistics for 4.2 Switches (Continued)

Variable	Description
outDiscards	The number of outbound packets that were chosen for discard even though no errors were detected to prevent their transmission.
outErrors	The number of outbound packets that could not be transmitted because of errors.
Utilization object	
Ingress utilization	The logical port utilization on the inbound side (from the CPE or the network) during the reported period.
Ingress peak utilization	The logical port utilization during the reported peak period.
Egress utilization	The logical port utilization of the outbound side during the reported period (to the CPE or the network).
Egress peak utilization	The logical port utilization on the outbound side during the reported peak period.

7

SMDS Statistics

This chapter provides the following information about SMDS logical port statistics for 4.2 switches:

- Translated files used to create SMDS DXI and SSI logical port statistics
- Peak and delta calculations
- The formats that result from the translation of the BSTDX_RAW_STAT.*IP* file to the following files:
  - SMDSDXI_DELT.*IP.date*
  - SMDSSSI_DELT.*IP.date*
- Descriptions of the SMDS logical port statistic variables

Figure 7-1 on page 7-2 illustrates the translation and storage process for SMDS logical port statistics collected from 4.2 switches.

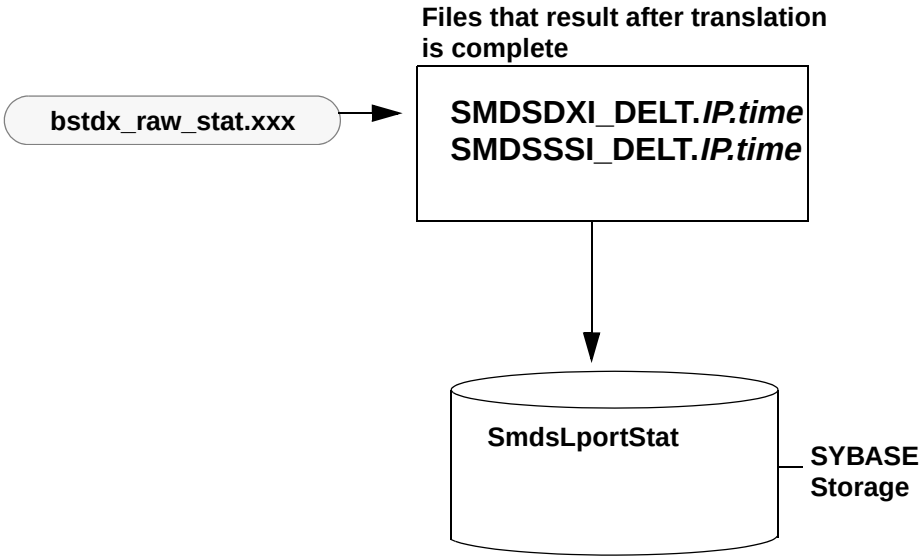

Figure 7-1. Translation and Storage Process for 4.2 SMDS Statistics (Calculation Performed in the 4.2 Switch)

Reference Appendix A, "Database Schema" for a listing of the SmdsLportStat table.

SMDS Calculations

The calculations used to produce SMDS statistics for 4.2 switches are performed directly at the 4.2 switch. Calculation results are included in the following files:

SMDSDXI_DELT.*IP.date* — This file contains the translated SMDS DXI logical port statistics in ASCII comma delimited format.

SMDSSSI_DELT.*IP.date* — This file contains the translated SMDS SSI logical port statistics in ASCII comma delimited format.

The values that the switch calculates for Frame Relay circuits and logical ports include the following:

- 5-minute peak values
- Delta values

See "Translated Files" on page 4-6 for a complete description of how the switch calculates 5-minute peak and delta values. The Bulk Statistics Collector then calculates the following value based on the 5-minute peak and delta values:

- Utilization

SMDS Statistic Translation

The translation process for SMDS statistics collected from 4.2 switches includes the following:

- Translation of the BSTDX_RAW_STAT.*IPtime* file to the following files:
  - SMDSDXI_DELT.*IP.date*
  - SMDSSSI_DELT.*IP.date*
- Copying the data to SYBASE via the Bulk Copy utility and storing the data in the following tables:
  - SmdsLportStat

File Format

SMDSDXI_DELT.*IP.date* and SMDSSSI_DELT.*IP.date*

The following output is the format for the SMDSDXI_DELT.*IP.date* and SMDSSSI_DELT.*IP.date* files. The format of the two files is identical and contains the peak and delta values for statistics that are collected for SMDS DXI or SSI logical port on a 4.2 switch.

```
Switch  IP Address,
Year,    (Measurement period start-time in UTC)
Month,
Day,
Hour,
Minute,
Second,
Measurement Period Start-time, (in decimal seconds)
Measurement Period Length,
Peak Period Length,
ifIndex,
PortType,   (DXI or SSI)
ifOperStatus,
ifSpeed,
privateNet
customerID
Ingress Utilization,(inbound)
Ingress Peak Utilization,(inbound)
Egress Utilization (outbound)
Egress Peak Utilization (outbound)
lportSmdsCntInFrSip3s,
lportSmdsCntInFrSip3sPeak,
lportSmdsCntInByteSip3s,
lportSmdsCntInByteSip3sPeak,
```

```
lportSmdsCntOutFrSip3s,
lportSmdsCntOutFrSip3sPeak,
lportSmdsCntOutByteSip3s,
lportSmdsCntOutByteSip3sPeak,
lportSmdsTotalDiscards,
lportSmdsTotalDiscardsPeak,
lportSmdsCntInFramesIA,
lportSmdsCntInFramesIAPeak,
lportSmdsCntInBytesIA,
lportSmdsCntInBytesIAPeak,
lportSmdsCntInFramesGA,
lportSmdsCntInFramesGAPeak,
lportSmdsCntInBytesGA,
lportSmdsCntInBytesGAPeak,
lportSmdsCntOutFramesIA,
lportSmdsCntOutFramesIAPeak,
lportSmdsCntOutBytesIA,
lportSmdsCntOutBytesIAPeak,
lportSmdsCntOutFramesGA,
lportSmdsCntOutFramesGAPeak,
lportSmdsCntOutBytesGA,
lportSmdsCntOutBytesGAPeak,
lportSmdsCntSaNotFounds,
lportSmdsCntSaValidationFails,
lportSmdsCntSaDaOnSamePorts,
lportSmdsCntDstIaNotFounds,
lportSmdsCntDstGaNotFounds,
lportSmdsCntSrcIaScrnFails,
lportSmdsCntSrcDstIaScrnFails,
lportSmdsCntSrcDstGaScrnFails,
lportSmdsCntInFrDxi2HbPolls,
lportSmdsCntInByteDxi2HbPolls,
lportSmdsCntOutFrDxi2HbPolls,
lportSmdsCntOutByteDxi2HbPolls
<new line>
```

SMDS Statistic Descriptions

Table 7-1 on page 7-5 lists and describes each of the SMDS DXI and SSI logical port statistics. The table is organized according to object type as follows:

- Identifier Objects indicate non-counter objects such as unique instance identifiers, state, and configuration information.
- Delta/Peak Objects include the statistics that report collection period totals and five-minute peak values.

Table 7-1. SMDS DXI Logical Port Statistic Descriptions

Variable	Description
Identifier Object	
Switch IP Address	The switch IP address, recorded in dotted decimal notation (for example, 152.148.1.2).
Year	The full year including the century.
Month	The month number (a value from 1 through 12).
Day	The day of the month (a value from 1 through 31).
Hour	The hour of the day (a value from 00 through 23).
Minute	The minute within the hour (a value from 0 to 59).
Second	The second within the minute (a value from 0 to 59).
Measurement period start time (in seconds)	The measurement period start time reported as the number of seconds since January 1, 1970 00:00:00.00 UTC.
Measurement period length	The length of the measurement period in seconds. For example, a one-hour measurement period is reported as 3600 seconds.
Peak period length	The length of the peak measurement period in seconds. For example, a 5-minute peak period is reported as 300 seconds.
ifIndex	The interface identifier for the logical port.

Table 7-1. SMDS DXI Logical Port Statistic Descriptions (Continued)

Variable	Description
privateNet	If non-zero, this field indicates the private network that this circuit belongs to. If zero, this logical port has access to the entire public portion of the network.
customerID	A decimal number that identifies the customer that owns this logical port; this field is used for Virtual Private Networking.
Delta/Peak Object Definition	
lportSmdsCntOutFrSip3s	Number of Data Frames transmitted
lportSmdsCntOutFrSip3sPeak	Five-minute peak value for the number of Data Frames transmitted
lportSmdsCntInFrSip3s	Number of Data Frames received
lportSmdsCntInFrSip3sPeak	Five-minute peak value for the number of Data Frames received
lportSmdsCntOutByteSip3s	Number of Data Bytes transmitted
lportSmdsCntOutByteSip3sPeak	Five-minute peak value for the number of Data Bytes transmitted
lportSmdsCntInByteSip3s	Number of Data Bytes received
lportSmdsCntInByteSip3sPeak	Five-minute peak value for the number of Data Bytes received
lportSmdsTotalDiscards	Total Discard Count
lportSmdsTotalDiscardsPeak	Five-minute peak value for the total Discard count.
lportSmdsCntSaNotFounds	SA not found count
lportSmdsCntSaValidationFails	SA validation format count
lportSmdsCntSaDaOnSamePorts	SA DA port error count4
lportSmdsCntDstIaNotFounds	Destination IA not found count
lportSmdsCntDstGaNotFounds	Destination GA not found count
lportSmdsCntSrcIaScrnFails	Source IA screen fail count
lportSmdsCntSrcDstIaScrnFails	Destination IA screen fail count
lportSmdsCntOutFrDxi2HbPolls	Number of management frames transmitted

Table 7-1. SMDS DXI Logical Port Statistic Descriptions (Continued)

Variable	Description
lportSmdsCntInFrDxi2HbPolls	Number of management frames received
lportSmdsCntOutByteDxi2HbPolls	Number of management bytes transmitted
lportSmdsCntInByteDxi2HbPolls	Number of management bytes received
lportSmdsCntSrcDstGaScrnFails	Destination GA screen fail count
Utilization Object	
Ingress utilization	The utilization value for the inbound side of the logical port.
Ingress peak utilization	The logical port utilization value on the inbound side during the reported peak period.
Egress utilization	The utilization value for the outbound side of the logical port.
Egress peak utilization	The logical port utilization value on the outbound side during the reported peak period.

8

Pre-4.2 Collection Processing

Processing Overview

Figure 8-1 on page 8-2 illustrates the collection process and nightly processing that Bulk Statistics uses for statistics collected from the following switches

- B-STDX 8000/9000 that supports cp.rom, ioptypea.rom, ioptypeb.rom, Version 4.0.18 and higher (but not 4.2 and higher) of the switch software. See "Collecting Bulk Statistics" on page 3-6 for details about the collection process for 4.2 switch statistics.
- STDX 3000/6000, Version 2.3 and higher of the switch software.

These switches are referred to as pre-4.2 switches in this guide, and the collection of statistics from these switches will be referred to as pre-4.2 collection processing.

Bulk Statistics for pre-4.2 switches still collects from the switch every 15 minutes and translates and bulk copies files once a day.

However, the archived files and the database files are purged nightly.

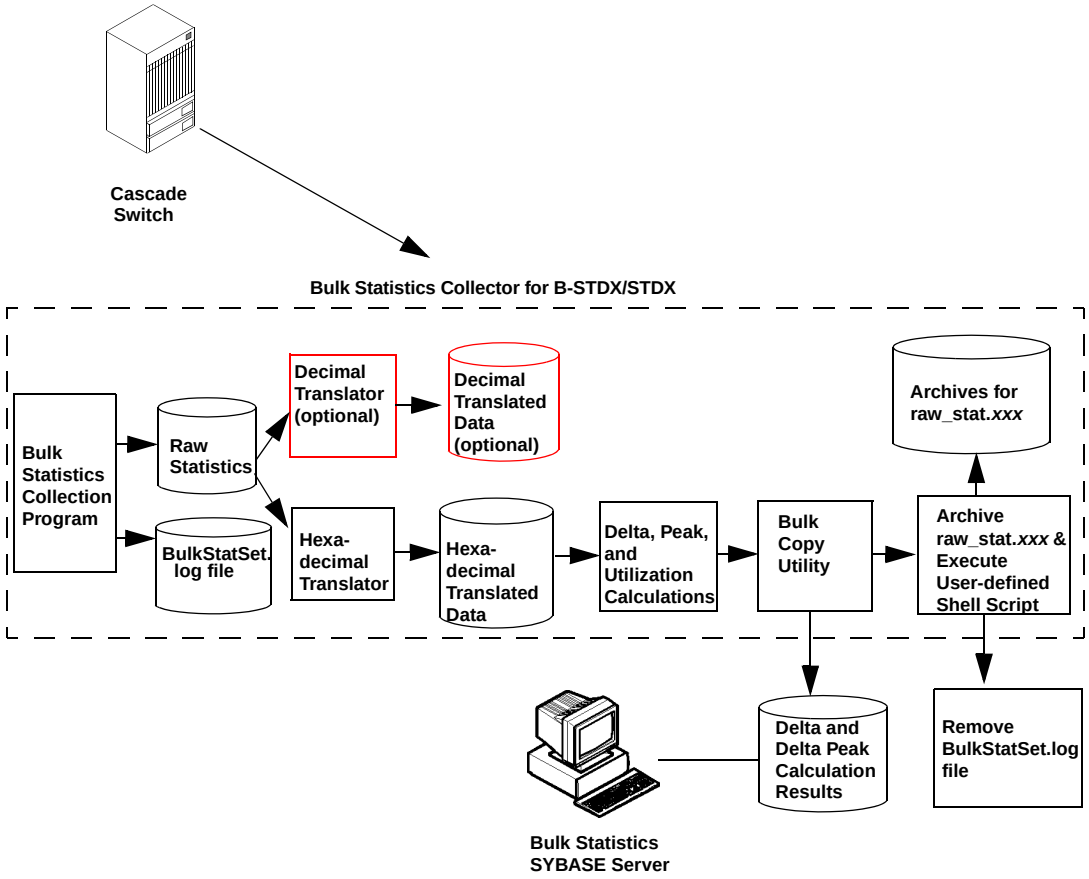

Figure 8-1. Bulk Statistics Pre-4.2 Switch Collection Processing

Bulk Statistics Processing Overview

As Figure 8-2 illustrates, after you start the Bulk Statistics Collector for B-STDX/STDX, the NMS issues an SNMP request for data to all switches that are enabled for Bulk Statistics collection.

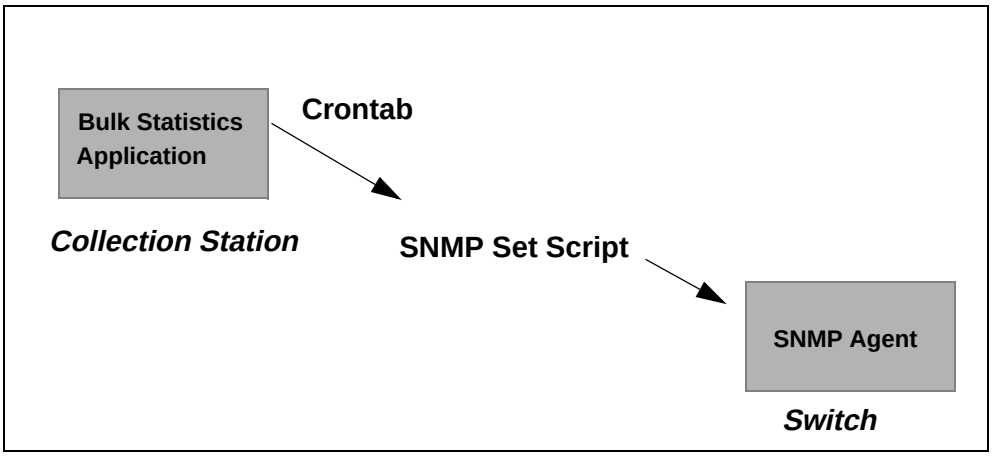

Figure 8-2. Bulk Statistics Collection Initiation

How are Switches Enabled for Collection

When you start the Bulk Statistics program, all switches defined in the NMS database or in the switch list data file are enabled for collection. You can use the Enable and Disable option buttons from the Bulk Statistics Application dialog box to enable and disable switches for Bulk Statistics collection. See Chapter 2, "The Switch List Data File" for details about creating a switch list data file. See "Collecting Bulk Statistics" on page 3-6 for details about displaying the Bulk Statistics application dialog box.

Polling Intervals

After you start the Bulk Statistics Collector for B-STDX/STDX, the system polls all enabled switches for statistics and creates a raw statistics data file of new collection data for each switch. The raw statistics data file is in a Cascade proprietary format. The name of the file is RAW_STAT.*xxx* where *xxx* specifies the switch ID.

Bulk Statistics polls switches at fifteen-minute intervals based on the collection station system clock. For example, if you initiate Bulk Statistics collection at 8:03 AM, the next four collections would be done at 8:15, 8:30, 8:45, and 9:00. At each collection interval after the switch is polled, Bulk Statistics concatenates the new collection data (from the file RAW.STAT.xxx) to a cumulative raw statistics file named raw_stat.*xxx*.

This process continues until midnight when the system translates the raw_stat.*xxx* file. The system stores the RAW_STAT.*xxx* and raw_stat.*xxx* files (along with all of the other files produced during the nightly processing) in the following directory.

```
/tftpboot/bulkstats
```

The files in the tftpboot/bulkstats directory belong to login “root” and group “other”. For this reason, users who are not part of the group “other” cannot access the files produced during nightly processing.

The system also maintains a file named BulkStatSet.log to record every SNMP Set request that Bulk Statistics makes when it polls all enabled switches for statistics. The BulkStatSet.log file records the number of SNMP retries in the event of an error condition. If there are more than three retries, the SNMP Set request is unsuccessful. BulkStatSet.log is located in the **/opt/BulkStats/etc directory**.

The following example illustrates a successful response to an SNMP Set request:

```
Sending SNMP set to call (switchIP=152.148.50.3) Retry is 0
```

Bulk Statistics Translation

Bulk Statistics uses two different translators to translate the Cascade proprietary raw statistics to translated data. *At installation* you can specify whether you want to use only the hexadecimal translator or both the hexadecimal and decimal translators in the nightly processing. The following sections describe the output that each of these translators produce.

- Chapter 9, “Trunk Statistics for Pre-4.2 Switches”
- Chapter 10, “Frame Relay Statistics for Pre-4.2 Switches”
- Appendix A, “Database Schema”

Hexadecimal Translator

The hexadecimal translator creates the following two translated files. The *xxx* at the end of each file name specifies the switch ID and corresponds to the *xxx* from the raw statistics file input.

- **NCKTstat.*xxx*** — This file contains the translated circuit statistics in hexadecimal format.
- **NTRKstat.*xxx*** — This file contains the translated trunk statistics in hexadecimal format.

These are comma delimited files and each comma separation indicates a statistical field. You can use the data in these files as input for reports or analysis that suit your specific requirements.

Decimal Translator (Optional)

The decimal translator creates the following two translated files.The *xxx* at the end of each file name specifies the switch ID and corresponds to the *xxx* from the raw statistics file input.

CKT_stat.*xxx* — This file contains the translated circuit statistics in decimal format.

TRK_stat.*xxx* — This file contains the translated trunk statistics in decimal format.

These are comma delimited files and each comma separation indicates a statistical field. You can use the data in these files as input for reports or analysis that suit your specific requirements. This file format is compatible with the existing DOS Bulk Statistics translator.

Bulk Statistics Calculations

During the nightly processing, when the translation is complete, the system reads the two files that the hexadecimal translator produces and performs the following calculations:

- Trunk and circuit hourly delta
- Trunk and circuit hourly delta peak
- Trunk and circuit utilization

Hourly delta is the difference between the current hour's first sample and the next hour's first sample or the difference between the current hour's first sample and the last sample (if this is the last hour of collecting data). Hourly delta peak is the largest difference between consecutive samples within an hour.

The system produces the following four files when these calculations are complete. The *xxx* at the end of each file name specifies the switch ID.

CKT_DELT.*xxx* — The result of the circuit hourly deltas and hourly delta peak calculations.

TRK_DELT.*xxx* — The result of the trunk hourly deltas and hourly delta peak calculations.

CKT_UTIL.*xxx* — The result of the circuit utilization calculations.

TRK_UTIL.*xxx* — The result of the trunk utilization calculations.

The results of these files are in hexadecimal format by default.

In addition, at installation you can optionally choose to output decimal format of the following two files.

CKT_DELT_DECIMAL.*xxx* — The result of the circuit hourly deltas and hourly delta peak calculations in decimal.

TRK_DELT_DECIMAL.*xxx* — The result of the trunk hourly deltas and hourly delta peak calculations in decimal.

Storage

After the process of translation and calculation is complete, the SYBASE Bulk Copy utility transfers the following hexadecimal trunk and circuit delta and peak calculation files to the Bulk Statistics SYBASE database.

- CKT_DELT.*xxx*
- TRK_DELT.*xxx*

You can use the SYBASE isql utility to view the data after these files are transferred to the Bulk Statistics SYBASE database. The Bulk Statistics SYBASE database is specified by the CVBSTAT_DB_NAME environment variable in the following file.

/opt/BulkStats/etc/cvbulkstat.cfg.

Purging SYBASE Database Entries

After the nightly archive process is complete, the Bulk Statistics application automatically purges any Bulk Statistics database files that are more than a specified number of days old. You specify the number of days that a database file will be maintained in the SYBASE Bulk Statistics database when you install the Bulk Statistics application. (Thirty days is the default value for stored database entries).

Archival

After the Bulk Copy operation is complete, the system archives the cumulative raw statistics file (raw_stat.*xxx*) to a user-defined directory that is specified in the following configuration file:

```
/opt/BulkStats/etc/cvbulkstat.cfg
```

For example, the following lines in a cvbulkstat.cfg file specify BulkStats.var as the archive directory:

```
# Archive directory
CVBSTAT_ARC_DIR=/opt/BulkStats.var
```

The effect of the archival is to move each day's cumulative statistics to a specified location.

At installation you can also specify that the system should remove the BulkStatSet.log file each night. The system maintains the BulkStatSet.log file in the following location:

```
/opt/BulkStats/etc/BulkStatSet.log
```

Files Not Included in the Archival

The system does not archive the following files if they are produced during the nightly processing.

- CKT_UTIL.*xxx*
- TRK_UTIL.*xxx*
- CKT_stat.*xxx*
- TRK_stat.*xxx*
- NCKTstat.*xxx*
- NTRKstat.*xxx*
- CKT_DELT.*xxx*

- CKT_DELT_DECIMAL.*xxx*
- TRK_DELT.*xxx*
- TRK_DELT_DECIMAL.*xxx*

However, these files remain on the system for a 24-hour period until they are overwritten by the next night's nightly processing. If you want to retain a copy of these files, you should make a backup copy of the files before they are overwritten. You can include instructions for backup in a user-defined shell script that performs any of the nightly tasks that your system may require after the Bulk Statistics archival process is complete.

Archive File Purging

After the nightly archive process is complete, the Bulk Statistics application automatically purges any archived raw statistics files that have are more than a specified number of days old. You specify the number of days that an archived raw statistics file will be maintained in the archives when you install Bulk Statistics. (Thirty days is the default value for archived raw statistics files).

Creating a Shell Script

You may want to create a shell script to perform a variety of nightly tasks, such as backing up any files that are not included in the Bulk Statistics archival process. If you do create a shell script, specify the name of the script in the **/opt/BulkStats/etc/cvbulkstat.cfg** configuration file.

Specify the shell script after the archive directory as shown in the following example:

```
# Archive directory
CVBSTAT_ARC_DIR=/opt/BulkStats.var
# Shell script to execute after performing nightly archive
CVBSTAT_ARC_FUNC=<complete path to user shell script>
```

9

Trunk Statistics for Pre-4.2 Switches

This chapter provides the following information about trunk statistics for pre-4.2 switches:

- Translated files used to create trunk statistics
- Trunk statistics calculations
- File formats that result from the trunk statistics calculations

Figure 9-1 illustrates the translation, calculation, and storage process for Phase 1 Trunk Statistics.

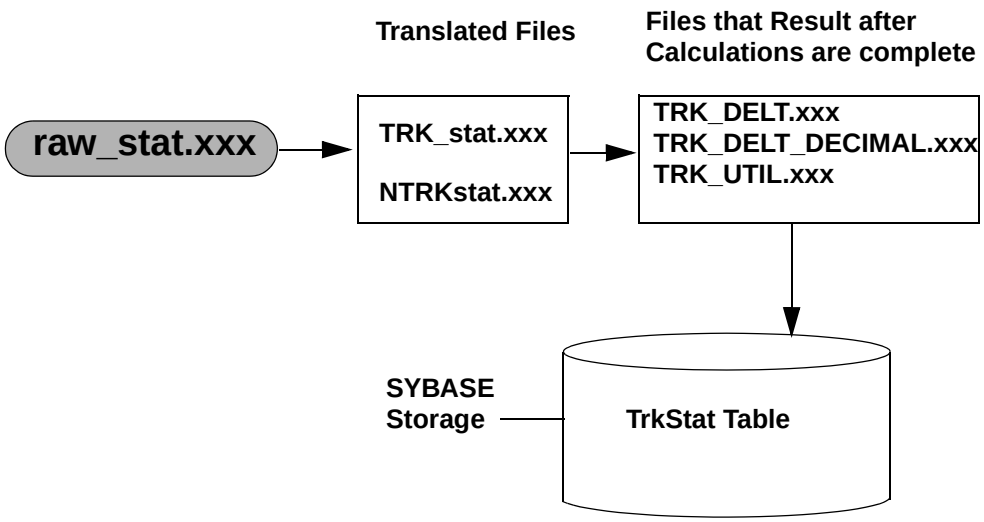

Figure 9-1. Translation, Calculation, and Storage Process for Phase 1 Trunk Statistics

This chapter describes the following file formats shown in Figure 9-1:

- TRK_stat
- NTRKstat.xxx
- TRK_DELT.xxx
- TRK_DELT_DECIMAL.xxx
- TRK_UTIL.xxx

See the *Cascade Enterprise MIB Definitions* reference for more information about specific statistic values. Values for trunk statistics counters are included in the MIB2 Interface Group MIB.

Reference Appendix B for a listing of the TrkStat table that stores the trunk delta and peak calculations in SYBASE.

Translated Files

The Bulk Statistics application process for pre-4.2 switches translates all trunk statistics to hexadecimal format. In addition, you can optionally select (at the time of installation) to use the decimal format translator. The translation process occurs at midnight and produces the following files:

- **TRK_stat.*xxx*** — This file contains the translated trunk statistics in decimal format.
- **NTRKstat.*xxx*** — This file contains the translated trunk statistics in hexadecimal format.

The *xxx* at the end of each file name specifies the switch ID.

These two files are comma delimited files and each comma separation indicates a statistical field. The following sections list the fields that comprise each of these files.

TRK_stat.*xxx*

The following list indicates the fields that are included in the TRK_stat.*xxx* file.The file contains a header describing the fields separated by a comma. Fields are listed in the order that they appear in the file.

Collection Date in month/day/year without century,

Collection Time in Hour:minute:seconds,

Switch uptime,

ifIndex,

ifOperStatus,

ifSpeed,

ifInOctets,

ifInUcastPkts,

ifInNUcastPkts,

ifInDiscards,

ifInErrors,

ifInUnknownProtos,

ifOutOctets,

ifOutUcastPkts,

ifOutNUcastPkts,

ifOutDiscards,

ifOutErrors

NTRKstat.*xxx*

The following fields are included in the NTRKstat.*xxx* file. No header information is included in the file. Fields are listed in the order that they appear in the file.

switch ID,

ifIndex,

collection time in number of seconds since epic,

collection year without century,

collection month,

collection day,

collection hour,

collection minute,

collection second,

switch uptime,

ifOperStatus,

ifSpeed,

ifInOctets,

ifInUcastPkts,

ifInNUcastPkts,

ifInDiscards,

ifInErrors,

ifInUnknownProtos,

ifOutOctets,

ifOutUcastPkts,

ifOutNUcastPkts,

ifOutDiscards,

ifOutErrors

Trunk Calculations

The Bulk Statistics application process for pre-4.2 switches uses the information from the TRK_stat.xxx translation file to calculate the following trunk values:

- Hourly Delta
- Hourly Delta Peak
- Utilization

Trunk Hourly Delta and Hourly Delta Peak

Hourly delta is the difference between the current hour's first sample and the next hour's first sample or the difference between the current hour's first sample and the last sample (if this is the last hour of collecting data). Hourly delta peak is the largest difference between consecutive samples within an hour. There is also consideration for switch reboot, card reboot, and counter rollover. For every hour or interface index change, an output is generated.

For trunk statistics, only the inbound and outbound octets peak value is calculated.

The system produces the following file when the trunk hourly delta and hourly delta peak calculations are completed. The *xxx* at the end of the file name specifies the switch ID.

TRK_DELT.*xxx* — The result of the trunk hourly deltas and hourly delta peak calculations.

In addition, at installation you can optionally choose to output decimal format of the following file.

TRK_DELT_DECIMAL.*xxx* — The result of the trunk hourly deltas and hourly delta peak calculations in decimal.

Hourly Delta Calculation

The following calculation is used to determine the hourly delta:

```
HourlyDelta = inbound octets [Hour t+1, 1st entry] - inbound
octets [Hour t, 1st entry];
```

The Time(t) used in Utilization calculations is the system uptime of the switch, by default.

Hourly Delta Peak Calculation

The following example assumes the 15 minutes sampling frequency which provides four data samples per hour and calculates the delta peak value for inbound octets.

Consider the following example which assumes the 15 minutes sampling frequency, giving four data samples per hour and calculating the delta peak value for inbound octets. In the circuit statistics file, there is:

Hour t 1st entry: ...inbound Octets ...\n

Hour t 2nd entry: ...inbound Octets ...\n

Hour t 3rd entry: ...inbound Octets...\n

Hour t 4th entry: ...inbound Octets...\n

Hour t+1 1st entry: ...inbound Octets...\n

The following calculation is used to determine the hourly delta peak:

```
Delta1 = inbound octets [Hour t , 2nd entry] - inbound octets
[Hour t, 1st entry];

Delta2 = inbound octets [Hour t, 3rd entry] - inbound octets
[Hour t, 2nd entry];

HourlyDeltaPeak = (Delta1 > Delta 2) ? Delta1 : Delta 2;

Delta3 = inbound octets [Hour t, 4th entry]- inbound octets
[Hour t, 3rd entry];

HourlyDeltaPeak = (Delta3 > HourlyDeltaPeak) ? Delta3 :
HourlyDeltaPeak;

Delta4 = inbound octets[Hour t+1, 1st entry] - inbound
octets [Hour t, 4th entry];

HourlyDeltaPeak = (Delta4 > HourlyDeltaPeak) ? Delta4 :
HourlyDeltaPeak;
```

Trunk Utilization

The system produces the following file when the utilization calculations are complete. The *xxx* at the end of the file name specifies the switch ID.

TRK_UTIL.*xxx* — The result of the trunk utilization calculations.

This file is in hexadecimal format by default.

Each line of text in the Trunk Utilization files represents the respective utilization in the past time interval. The Utilization data (both inbound and outbound) in the file is for each trunk in that node. All trunk utilization integers are floating point numbers (with two digits after the decimal point) between 0.00% and 100.00%.

Trunk Utilization Calculation

Utilization is calculated between two consecutive collected statistics samples. The following example illustrates two consecutive statistics samples for a trunk.

```
Time t-1:
...,ifSpeed(t-1),...,ifInOctets(t-1),...,ifOutError\r\n
Time t: ...,ifSpeed(t),...,ifInOctets(t),...,ifOutError\r\n
```

The following formula calculates the Trunk Utilizations:

$$\frac{[ifOutOctets(t) - ifOutOctets(t-1)] \times 8}{[Time(t) - Time\ (t-1)] \times ifSpeed\ (t)} \times 100\%$$

The factor of eight is for unit conversion assuming that ifSpeed is in the unit of bits per second.

File Formats

Trunk Statistics File Format

The following example illustrates the output format of the TRK_DELT.xxx and the TRK_DELT_DECIMAL.xxx files. The format of each of these files is virtually identical, however, the TRK_DELT_DECIMAL.xxx file includes a heading at the top of the listing.

Switch ID,
ifIndex,
Year,
Month,
Day,
Hour,
Minute,
Collection time,
Switch uptime,
ifOperStatus,
ifSpeed
ifInOctets
ifInUcastPkts
ifInNUcastPkts,
ifInDiscards,
ifInErrors,
ifInUnknownProtos,
ifOutOctets,
ifOutUcastPkts,
ifOutNUcastPkts,
ifOutDiscards,
ifOutErrors,
ifInPeakOctets,
ifOutPeakOctets,
<new line>

Trunk Utilization File Format

The following example illustrates the format of the Trunk Utilization file (TRK_UTIL.xxx):

Switch ID,
ifIndex,
Switch uptime,
Year,
Month,

Day,
Hour,
Minute,
Collection time,
Trunk Utilization (inbound)
Trunk Utilization (outbound)
<new line>

Trunk Descriptions

Table 5-1 on page 5-4 lists and describes the trunk statistics that the system produces for pre-4.2 switches. The trunk statistics that the system produces for 4.2 switches are identical to the trunk statistics that the system produces for pre-4.2 switches.

10

Frame Relay Statistics for Pre-4.2 Switches

This chapter provides the following information about frame relay circuit statistics for pre-4.2 switches:

- Translated files used to create frame relay circuit statistics
- Frame relay circuit statistics calculations.
- File formats that result from the frame relay circuit statistics calculations

Figure 10-1 on page 10-2 illustrates the translation, calculation, and storage process for the pre-4.2 frame relay circuit statistics.

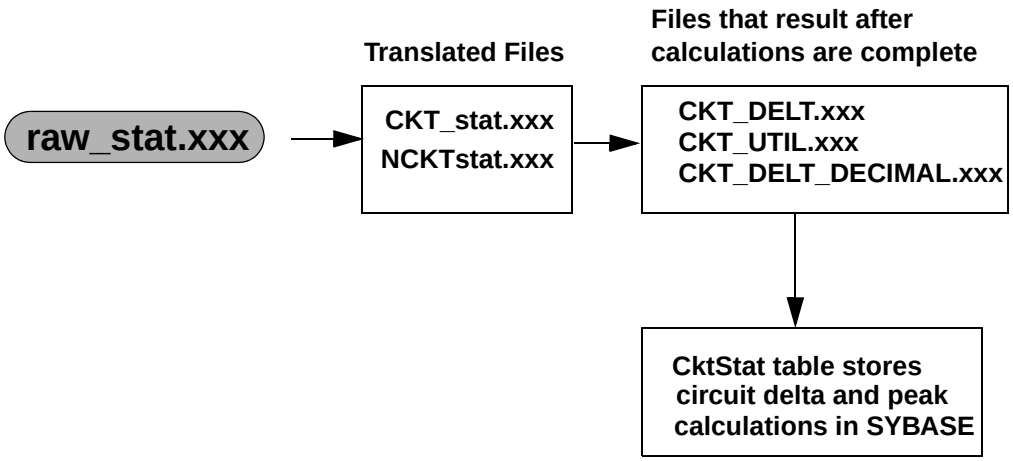

Figure 10-1. Translation, Calculation, and Storage Process for Pre-4.2 Frame Relay Circuit Statistics

This chapter describes the following file formats shown in Figure 10-1:

- CKT_stat.xxx
- NCKTstat.xxx
- CKT_DELT.xxx
- CKT_UTIL.xxx
- CKT_DELT_DECIMAL.xxx

See the *Cascade Enterprise MIB Definitions* reference for more information about specific statistic values. Values for circuit statistics counters are included in the Circuit Group MIB.

Reference Appendix B for a listing of the CktStat table that stores the circuit delta and peak calculations in SYBASE.

Translated Files

The Bulk Statistics application process for pre-4.2 switches translates all trunk statistics to hexadecimal format. In addition, you can optionally select (at the time of installation) to use the decimal format translator. The translation process occurs at midnight and produces the following files:

- **CKT_stat.*xxx*** — This file contains the translated circuit statistics in decimal format.
- **NCKTstat.*xxx*** — This file contains the translated circuit statistics in hexadecimal format.

The *xxx* at the end of each file name specifies the switch ID.

These two files are comma delimited files and each comma separation indicates a statistical field. The following sections list the fields that comprise each of these files.

CKT_stat.*xxx*

The following list indicates the fields that are included in the CKT_stat.*xxx* file. The file contains a header describing the fields separated by a comma. Fields are listed in the order that they appear in the file.

Collection Date in month/day/year without century,

Collection Time in Hour:minute:seconds,

Switch uptime,

cktSrcIfIndex,

cktSrcDlci,

cktVcState,

cktPriority,

cktOde,

cktCir,

cktBc,

cktBe,

cktInFrames,

cktInDEFrames,

cktInODEFrames,

cktInFECNFrames,

cktInBECNFrames,

cktInDiscards,

cktInOctets,

cktInDEOctets,

cktInODEOctets,

cktOutFrames,

cktOutDEFrames,

cktOutODEFrames,

cktOutFECNFrames,

cktOutBECNFrames,

cktOutOctets,

cktOutDEOctets,

cktOutODEOctets,

cktOutLostFrames,

cktOutLostDEFrames,

cktOutLostODEFrames,

cktOutLostOctets,

cktOutLostDEOctets,

cktOutLostODEOctets,

cktRtMinDelay,

cktRtMaxDelay,

cktRtAvgDelay

NCKTstat.*xxx*

The following fields are included in the NCKTstat.xxx file. No header information is included in the file. Fields are listed in the order that they appear in the file.

Switch ID,

cktSrcIfIndex,

cktSrcDlci,

collection time in number of seconds since epic,

collection year without century,

collection month,

collection day,

collection hour,

collection minute,

collection second,

switch uptime,

cktVcState,

cktPriority,

cktOde,

cktCir,

cktBc,

cktBe,

cktInFrames,

cktInDEFrames,

cktInODEFrames,

cktInFECNFrames,

cktInBECNFrames,

cktInDiscards,

cktInOctets,

cktInDEOctets,

cktInODEOctets,

cktOutFrames,

cktOutDEFrames,

cktOutODEFrames,

cktOutFECNFrames,

cktOutBECNFrames,

cktOutOctets,

cktOutDEOctets,

cktOutODEOctets,

cktOutLostFrames,

cktOutLostDEFrames,

cktOutLostODEFrames,

cktOutLostOctets,

cktOutLostDEOctets,

cktOutLostODEOctets,

cktRtMinDelay,

cktRtMaxDelay,

cktRtAvgDelay

Frame Relay Circuit Calculations

The Bulk Statistics application process for pre-4.2 switches uses the information from the translated files to calculate the following frame relay circuit values:

- Hourly Delta
- Hourly Delta Peak
- Utilization

Circuit Hourly Delta and Hourly Delta Peak

Hourly delta is the difference between the current hour's first sample and the next hour's first sample or the difference between the current hour's first sample and the last sample (if this is the last hour of collecting data). Hourly delta peak is the largest difference between consecutive samples within an hour. There is also consideration for switch reboot, card reboot, and counter rollover. For every hour or interface index change, an output is generated.

For circuit statistics, inbound and outbound octets and frames are calculated.

The system produces the following file when the circuit hourly delta and hourly delta peak calculations are completed. The *xxx* at the end of the file name specifies the switch ID.

CKT_DELT.*xxx* — The result of the circuit hourly deltas and hourly delta peak calculations.

In addition, at installation you can optionally choose to output decimal format of the following file.

CKT_DELT_DECIMAL.*xxx* — The result of the circuit hourly deltas and hourly delta peak calculations in decimal.

Hourly Delta Calculation

The following calculation is used to determine the hourly delta:

```
HourlyDelta = inbound octets [Hour t+1, 1st entry] - inbound
octets [Hour t, 1st entry];
```

The Time(t) used in Utilization calculations is the system uptime of the switch, by default.

Hourly Delta Peak Calculation

The following example assumes the 15 minutes sampling frequency which provides four data samples per hour and calculates the delta peak value for inbound octets.

Consider the following example which assumes the 15 minutes sampling frequency, giving four data samples per hour and calculating the delta peak value for inbound octets. In the circuit statistics file, there is:

Hour t 1st entry: ...inbound Octets ...\n

Hour t 2nd entry: ...inbound Octets ...\n

Hour t 3rd entry: ...inbound Octets...\n

Hour t 4th entry: ...inbound Octets...\n

Hour t+1 1st entry: ...inbound Octets...\n

The following calculation is used to determine the hourly delta peak:

```
Delta1 = inbound octets [Hour t , 2nd entry] - inbound octets
[Hour t, 1st entry];

Delta2 = inbound octets [Hour t, 3rd entry] - inbound octets
[Hour t, 2nd entry];

HourlyDeltaPeak = (Delta1 > Delta 2) ? Delta1 : Delta 2;

Delta3 = inbound octets [Hour t, 4th entry]- inbound octets
[Hour t, 3rd entry];

HourlyDeltaPeak = (Delta3 > HourlyDeltaPeak) ? Delta3 :
HourlyDeltaPeak;

Delta4 = inbound octets[Hour t+1, 1st entry] - inbound
octets [Hour t, 4th entry];

HourlyDeltaPeak = (Delta4 > HourlyDeltaPeak) ? Delta4 :
HourlyDeltaPeak;
```

Circuit Utilization

The system produces the following file when the utilization calculations are complete. The *xxx* at the end of each file name specifies the switch ID.

CKT_UTIL.*xxx* — The result of the circuit utilization calculations.

The results of these files are in hexadecimal format by default.

Each line of text in the Circuit Utilization file represents the respective utilization in the past time interval. The Utilization data (both inbound and outbound) in the file is for each trunk or circuit in that node. All trunk and circuit utilization integers are floating point numbers (with two digits after the decimal point) between 0.00% and 100.00%.

Circuit Utilization Calculation

Utilization is calculated between two consecutive collected statistics samples. The following example illustrates two consecutive statistics samples for a circuit.

```
Time t-1: ...,cktSrcIfIndex,...
,cktCir(t-1),...,cktInOctets(t-1),...\r\n
Time t: ...,cktSrcIfIndex,
...,cktCir(t),...,cktInOctets(t),...\r\n
```

The following formula calculates the Circuit Utilization:

$$\frac{[cktInOctets(t) - cktInOctets(t-1)] \times 8}{[Time(t) - Time(t-1)] \times cktCir(t)} \times 100\%$$

and

$$\frac{[cktOutOctets(t) - cktOutOctets(t-1)] \times 8}{[Time(t) - Time(t-1)] \times cktCir(t)} \times 100\%$$

If your system has bursty traffic, you may want to use the following calculation for determining Circuit Utilization:

$$\frac{[cktInOctets(t) - cktInOctets(t-1)] \times 8 \times 100\%}{[Time(t)-Time(t-1)]x[cktCir(t)+(cktBe(t))x(cktCir(t)/cktBc(t))]}$$

The factor of eight is for unit conversion assuming that cktCir(t) is in the unit of bits per second.
The Time(t) used in Utilization calculations is the system uptime of the switch, by default.

File Formats

Circuit Statistics Delta and Delta Peak File Format

The following example illustrates the output format of a circuit statistics delta and peak calculation. This output can be from the CKT_DELT.xxx or CKT_DELT_DECIMAL.xxx file.

Switch ID,
cktSrcIfIndex,
cktSrcDlci,
Year,
Month,
Day,
Hour,
Minute,
Switch uptime,
cktVcState,
cktPriority,
cktOde,
cktCir,
cktBc,
cktBe,
cktInFrames,
cktInDEFrames,
cktInODEFrames,
cktInFECNFrames,
cktInBECNFrames,
cktInDiscards,
cktInOctets,
cktInDEOctets,
cktInODEOctets,
cktOutFrames,
cktOutDEFrames,
cktOutODEFrames,
cktOutFECNFrames,
cktOutBECNFrames,
cktOutOctets,
cktOutDEOctets,
cktOutODEOctets,
cktOutLostFrames,
cktOutLostDEFrames,
cktOutLostODEFrames,
cktOutLostOctets,
cktOutLostDEOctets,

cktOutLostODEOctets,
cktRtMinDelay,
cktRtMaxDelay,
cktRtAvgDelay,
cktInPeakFrames,
cktInPeakOctets,
cktOutPeakFrames,
cktOutPeakOctets,
<new line>

Circuit Utilization File Format

The following example illustrates the format of a the CKT_UTIL.*xxx* file:

Switch ID,
cktSrcIfIndex,
cktSrcDlci,
Switch uptime,
Year,
Month,
Day,
Hour,
Minute,
Collection time,
Circuit Utilization (inbound)
Circuit Utilization (outbound)
<new line>

Frame Relay Circuit Statistics for Pre-4.2 Switches

Table 10-1 on page 10-12 lists and describes each of the Frame Relay circuit statistics that the system collects from pre-4.2 switches. These statistics are identical to the statistics that were reported in the Bulk Statistics For UNIX Version 2 product.

This table also specifies the order in which the data collection is organized.

The table is organized according to object type as follows:

- Identifier Objects indicate non-counter objects such as unique instance identifiers, state, and configuration information.
- Hourly/Peak Objects include the statistics that report hourly totals and five-minute peak values.

Table 10-1. Frame Relay Circuit Statistics for Pre-4.2 Switches

Variable	Description
Identifier Objects	
cktSrcIfIndex	The interface number of the logical port to which the circuit is associated.
cktSrcDlci	The DLCI on the interface number of the logical port to which the circuit is associated.
cktVcState	The current state of the circuit that resides within the Cascade Network. If either termination point is a UNI-DTE or UNI-NNI, this value does not reflect the state of the circuit beyond the Cascade network.
cktPriority	The priority level of this circuit. Priority levels can be set at 1, 2, 3, or 4. The highest priority level is 1.
cktOde	The Graceful Discard configuration option setting for this circuit.
cktCir	The average number of user data (bits) that the network agrees to transfer over the circuit in one direction, during time interval T. T = cktBc/cktCir.
cktBc	The maximum amount of data (bits) that the network agrees to transfer over the circuit under normal conditions, during time interval T. T=cktBc/cktCir.
cktBe	The maximum amount of uncommitted data (bits) that the network will attempt to transfer over the circuit during time interval T. T=cktBc/cktCir.
Hourly/Peak Objects	
cktInFrames[a]	The total number of frames that the switch receives from the circuit since the last reset.
cktInDEFrames[b]	The number of DE-marked frames that the switch receives from the circuit since the last reset.
cktInODEFrames[c]	The number of inbound ODE marked frames that the switch receives from the circuit since the last reset.
cktInFECNFrames	The number of frames that the switch receives from the circuit with the FECN bit set since the last reset. This indicates forward congestion.
cktInBECNFrames	The number of frames that the switch receives from the circuit with the BECN bit set since the last reset. This indicates backward congestion.

Table 10-1. Frame Relay Circuit Statistics for Pre-4.2 Switches (Continued)

Variable	Description
cktInDiscards	The number of frames that the switch receives from the circuit that were discarded due to rate enforcement.
cktInOctets[a]	The total number of octets received on the interface since the last reset.
cktInDEOctets[b]	The total number of inbound DE-marked octets received on the interface since the last reset.
cktInODEOctets[c]	The total number of inbound ODE-marked octets received on the interface since the last reset.
cktOutFrames[a]	The number of outbound frames transmitted via the egress port of the switch onto the circuit since the last reset.
cktOutDEFrames[b]	The number of DE-marked frames transmitted via the egress port of the switch onto the circuit since the last reset.
cktOutODEFrames[c]	The number of ODE marked frames transmitted via the egress port of the switch onto the circuit since the last reset.
cktOutFECNFrames	The number of outbound frames transmitted via the egress port of the switch with the FECN bit set since the last reset. This indicates forward congestion.
ckOutBECNFrames	The number of outbound BECN-marked frames since the last reset. This indicates backward congestion.
cktOutOctets[a]	The total number of octets transmitted out of the interface, including framing characters, errors, and discards since the last reset.
cktOutDEOctets[b]	The number of DE-marked octets transmitted via the egress port of the switch since the last reset.
cktOutODEOctets[b]	The number of ODE-marked octets transmitted via the egress port of the switch since the last reset.
cktOutLostFrames[a,d]	The number of frames transmitted via the egress port of the switch that have been lost since the last reset. This statistic is measured only on inter-switch (trunk-dependent) PVCs.
cktOutLostDEFrames[b,d]	The number of DE-marked frames transmitted via the egress port of the switch that have been lost since the last reset. This statistic is measured only on inter-switch (trunk-dependent) PVCs.

Table 10-1. Frame Relay Circuit Statistics for Pre-4.2 Switches (Continued)

Variable	Description
cktOutLostODEFrames[c,d]	The number of ODE-marked frames transmitted via the egress port of the switch that have been lost since the last reset. This statistic is measured only on inter-switch (trunk-dependent) PVCs.
cktOutLostOctets[d]	The number of outbound octets transmitted via the egress port of the switch that have been lost since the last reset. This statistic is measured only on inter-switch (trunk-dependent) PVCs.
cktOutLostDEOctets[d]	The number of DE-marked octets transmitted via the egress port of the switch that have been lost since the last reset. This statistic is measured only on inter-switch (trunk-dependent) PVCs.
cktOutLostODEOctets[d]	The number of ODE-marked octets transmitted via the egress port of the switch that have been lost since the last reset. This statistic is measured only on inter-switch (trunk-dependent) PVCs.
cktRtMinDelay[d]	The minimum round-trip delay, displayed in micro-seconds.
cktRtMaxDelay[d]	The maximum round-trip delay, displayed in micro-seconds.
cktRtAvgDelay[d]	The average round-trip delay, displayed in micro-seconds.

[a] This statistic includes all frames (green, amber, and red).

[b] This statistic refers to all amber frames.

[c] This statistic refers to all red frames. Note that the system calculates the total number of green frames by using the following formula:

```
cktInFrame - (cktInDEFrames + cktInODEFrames)
```

d. See the "Quality of Service Information" on page 10-15 for more information about this statistic.

Quality of Service Information

Quality of Service (QOS) information for a circuit is distributed in the circuit structures of the two endpoint switches. The system uses the following QOS counters:

QOS Statistics

- Total Frames Lost
- Green Frames Lost
- Amber Frames Lost
- Red Frames Lost
- Total Octets Lost
- Green Octets Lost
- Amber Octets Lost
- Red Octets Lost

Round Trip Delay Statistics

- Minimum Delay (ms)
- Maximum Delay (ms)
- Average Delay (ms)

QOS information is maintained only for circuits with endpoints that are at distinct switches. QOS information is not maintained for circuits that are contained within a single switch because frames are assumed never to be lost and the round trip delay is approximately zero for circuits that are contained within a single switch.

11

Resolving Problems

This chapter provides general troubleshooting solutions for resolving problems with the Bulk Statistics Collector for B-STDX/STDX application. If you suspect hardware problems, or problems with CascadeView/UX, refer to the appropriate hardware and/or software manual for instructions.

- For CascadeView/UX software problems, refer to the “Resolving Problems” chapter in the *Diagnostic and Troubleshooting Guide for B-STDX/STDX*.
- For STDX 3000 or 6000 hardware problems, refer to the “Troubleshooting” chapter in the *STDX 6000 Hardware Installation Guide*.
- For B-STDX 8000/9000 hardware problems, refer to the “Troubleshooting” chapter in the *B-STDX 8000/9000 Hardware Installation Guide*.

Technical Response Center Checklist

To isolate the cause of problems or failures in a previously working environment, check the items in the following checklist.

☑ If you are having trouble configuring a PVC, check and note the following:

- Physical and logical port configurations; LMI Type; CIR; Be; Bc; Clock speeds.

☑ If you are trying to diagnose physical port level problems, check and note the following:

- Physical attributes configured on the ports
- Cables, pinouts, and DSU/CSU equipment and its configurations
- Admin status

☑ If you are trying to diagnose logical port level problems, check and note the following:

- LMI configuration that is set for the port
- Poll timers and Verification timers that are configured for the port
- DSU/CSU equipment and its configuration, etc.
- Admin status

Contacting the Cascade Technical Response Center

You can contact the Cascade Technical Response Center by phone, e-mail, or fax.

Calling by Phone

Cascade offers customer support 24 hours a day, 7 days a week. To contact the Cascade Technical Response Center by phone, call one of the following numbers:

1-800-DIAL-WAN (or 1-508-692-2600) (in the United States and Canada)

1-508-952-1299 (outside the U.S., Canada, and United Kingdom)

0-800-96-2229 (in the United Kingdom)

Sending Electronic Messages or Faxes

To contact the Cascade Technical Response Center by e-mail, address your requests to

cs@casc.com

To contact the Cascade Technical Response Center by fax, call

1-508-692-1218

Include the following information when requesting support through electronic mail or a fax message.

- Your name and telephone number
- Name of contact person and telephone number (if different from above)
- Brief description of the problem
- List of identifiable symptoms
- Any information that you gathered as a result of reviewing the "Technical Response Center Checklist" on page 11-2.

Common Problems

Bulk Statistics does not see the statistics files that were uploaded to the collection station

If you start a collection on Switch X, and the Bulk Statistics Collector for B-STDX/STDX does not see the statistics files that were uploaded to the collection station, check the following possible causes.

1. Check to make sure that the tftp server running. See Chapter 3, “Collecting Bulk Statistics” for more information.
2. If the tftp server is running, check the following file for a tftp server error:

   `/tmp/tftpd.error.log_<`*`pid of the tftp server`*`>`

   It is possible that the **`/tftpboot/bulkstats`** directory does not have world write permission.
3. If the tftp server is running, check the following SNMP set log files:

   `/opt/BulkStats/etc/BulkStatSet.Log`

   `/opt/BulkStats/etc/BulkStatSetP2.Log`

   If the retry interval for switch X is 3, it is likely that the SNMP set failed.

4. To resolve this problem, you should review the following file:

   `/opt/BulkStats/bin/BulkStatSet.sh`

   Manually perform the SNMP set for switch X in a shell. Then check for either of the SNMP error conditions noted in the SNMP problem descriptions that follow. Use the following steps to manually perform the SNMP set:

   a. Check to make sure that you have udp service enabled on the **/etc/services** file. If you do, the end of the file includes the following line:

      ```
      snmp      161/udp    # Simple Network Management Protocol
      ```

   b. Check the console time out parameter value for the switch by using the following console command:

      `get node.56.0`

   c. Execute the following command to change the value of the console time out parameter to an integer value of 60:

      `/opt/BulkStats/bin/CMUsnmpset -t 5 -h <`*`switch IP address`*`> -c <`*`community name`*`> 1.3.6.1.4.1.277.1.3.56.0 Integer 60`

      The 1.3.6.1.4.1.277.1.3.56.0 command is a MIB command that specifies the console time out value is to change to the value that follows the command (in this example, an integer value of 60).

   d. Repeat step b to check to make sure that the console time out value is now a value of 60.

An SNMP set failed with a read-only error

This problem is usually related to the community name identified in the SNMP set request. Either the community name identified in the set request does not exist on the switch or the community name does not have write permission on the switch. To resolve this problem check the switch and make sure that:

- The community name identified in the SNMP set is in the switch.
- The community name is associated with the collection station's IP address
- The community name has write privileges

The SNMP set failed with a request timed out

This problem is usually related to a missing NMS entry on the switch or a missing netstat entry on the collection station. Either the collection station is not in the NMS entry table on the switch or the netstat table on the collection station does not have a routing entry to the Bulk Statistics gateway switch.

To resolve the problem, ping the switch.

If the result is "no answer from ...", then the collection station is missing from the switch's NMS entry table. See the *Network Configuration Guide for B-STDX/STDX* for more information about how to add the NMS entry for the collection station.

If the result is "Host unreachable ...", then the collection station cannot reach the switch. You will need to add an entry to route to the Bulk Statistics gateway switch. See the UNIX man page for netstat and route for more details about how to use netstat and route to do this.

The generated switch list from cvGenSwList is empty and no errors were given

There are three possible causes for this problem:

1. You have errors in the CascadeView/UX NMS database configuration file. To resolve the problem:
   - Check that the CVDB_CONFIG_FILE environment variable is set to the correct CascadeView/UX NMS database configuration file.
   - Check that the CVDB_DB_NAME environment variable is set to the correct database name.
2. You have a multi-home collection station. To resolve this problem:
   - See "A Multi-Home Collection Station" on page 2-52.
3. The access table in the CascadeView/UX NMS database does not have an entry for the collection station or the IP address used to invoke cvGenSwList. This causes the switch list data file to be empty since the specified collection station is not currently managing a switch. To resolve this problem:
   - Check that the access table in the CascadeView/UX NMS database has either an entry for the collection station or the IP address used to invoke cvGenSwList. Use the CascadeView/UX NMS Set NMS Entry dialog box to make an entry for the collection station IP address in the NMS access table. See the *Network Configuration Guide for B-STDX/STDX* for detailed instructions about how to set an IP address in the NMS access table.

When I run cvGenSwList, the system displays the following message: invalid collection station argument or can not contact name server

Add the Bulk Statistics collection station to the CascadeView/UX workstation's **/etc/hosts** file.

The translated files are empty or have no entries

If the translated files such as CKT_STAT.*xxx* or NCKT_STAT.*xxx* are empty or have no entries, it is likely that no circuits were configured on switch *xxx*.

No data is stored in the bulk statistics SYBASE database

This problem is usually related to a communication problem or a configuration mistake in one of the following files:

```
CVBULKSTAT_CONFIG_FILE
```

or

```
/opt/BulkStats/etc/cvbulkstat.cfg
```

To resolve this problem:

- Check that the collection station can communicate with the SYBASE server.
- Check that the following environment variables are correctly set in the cvbulkstat.cfg file:
  - SYBASE
  - DSQUERY
  - CVBSTAT_DB_NAME
  - CVBSTAT_DB is set to 1 (if set to 0, the bcp operation is disabled)

The raw statistics file is not archived each night

Check that the CVBSTAT_ARC_DIR environment variable (specified in the **`/opt/BulkStats/etc/cvbulkstat.cfg`** file) is pointing to a valid directory and has proper permission.

The raw statistics file in /tftpboot/bulkstats only contains one day's statistics

This condition is usually related to the nightly archiving of the raw statistics files. Currently, the raw statistics files are automatically archived every night so that each day's statistics are stored in a separate file.

The specified shell script in cvbulkstat.cfg is not being executed

This problem is caused by an incorrect path specification or a problem with the execution permission. Use the following steps to resolve this problem:

1. Check to ensure that the environment variable CVBSTAT_ARC_FUNC in **cvbulkstat.cfg** specifies a complete path to the shell script.
2. Check to ensure that the shell script has execute permission turned on.

Error: no such name

There is a typographical error in the community name that was defined for the Bulk Statistics Collection workstation. See Chapter 2, "The Switch List Data File".

INIT: Command is respawning too rapidly. Check for possible errors id: tf "/opt/BulkStats/bin/tftpserv > /dev/null

The TFTP server configuration is not set to automatically execute when you bring up the workstation. Follow the instructions for "Setting the TFTP Server Configuration" on page 2-31.

The /opt/BulkStats/bin/BulkStatSet.log file is empty

The network has no pre-4.2 switches, or Bulk Statistics is not collecting from the switches.

12

SYBASE 11 Installation

Introduction

Who Requires SYBASE 11

SYBASE 11 SQL Server is a relational database application that manages backup and recovery of database files. If you want to use SYBASE to store the translated files that are generated with the Bulk Statistics Collector for B-STDX/STDX Version 2.5, you must have SYBASE 11 installed on your system.

Overview of Chapter

This chapter describes how to install SYBASE 11 for Bulk Statistics if you do not currently use SYBASE SQL Server, Release 4.9.2 with Bulk Statistics. If you are using the same SYBASE server to support both Bulk Statistics and the Network Management Station, then follow the SYBASE installation directions in the *Network Management Station Installation Guide* instead of the directions in this chapter.

The chapter includes:

- How to prepare for a SYBASE 11 installation (page 12-2)
- How to install SYBASE 11 and configure the local backup server (page 12-22)

When to Install SYBASE 11

Install SYBASE 11 when the Bulk Statistics installation procedure tells you to (refer to "Selecting the Appropriate Bulk Statistics Installation/Upgrade Sequence Checklist" on page 2-17).

Upgrading to SYBASE 11

If you need SYBASE 11 and currently use SYBASE SQL Server, Release 4.9.2 with Bulk Statistics, refer to Chapter 13, "Upgrading to SYBASE 11".

Hardware and Software Requirements

Before you begin the SYBASE 11 installation, verify that your machine meets the hardware and software requirements listed in Chapter 1 on page 1-5.

Backing Up SYBASE 11 Databases

After you have finished installing SYBASE 11, refer to Appendix E for instructions on how to backup SYBASE 11 databases.

Preparing for a SYBASE 11 Installation

Overview

Preparing for a SYBASE 11 installation includes the following tasks:

- Review the SYBASE 11 installation worksheet (page 12-2)
- Partition the second disk using raw partitions (page 12-3)
- Load the Cascade-supplied SYBASE media and extract the scripts (page 12-8)
- Set up the system before SYBASE 11 installation (page 12-11)

Reviewing the SYBASE 11 Installation Worksheet

Review the SYBASE 11 worksheet in Appendix D. In addition, fill out the applicable blank lines. You will need this information during the installation.

Partitioning the Second Disk Using Raw Partitions

When to Partition

If you are installing SYBASE on a machine with two drives and you partitioned the boot drive with file systems, you now need to partition the second disk using raw partitions. If you are installing SYBASE on a machine with one drive and you partitioned that drive using file systems, proceed to "Loading the Cascade-Supplied SYBASE Media" on page 12-8.

Overview of Partitioning Procedures

Perform these procedures in the order they appear. The procedures describe how to:

- Access the Partition menu
- Enter the settings for each partition

Table 12-1 summarizes the function that these procedures assign to each partition. If you do not use the recommended partition settings in Table 12-1, consult your UNIX Administrator.

Table 12-1. 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	Bulk Statistics device for SYBASE
6	Log device for SYBASE
7	Partition used for remainder of unallocated space

Accessing the Partition Menu

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.

To access the Partition Menu:

1. Verify you are logged in as root user. You should see a # prompt in the window.

   If you are not logged in as root, enter **su - root**. When prompted, enter **[*root password*]**.

2. At the # prompt, enter **format**.
3. At the "Specify disk (enter its number)" prompt, enter **[*disk not partitioned during the Solaris installation*]**.

- If the format menu appears (see Figure 12-1), go to step 4.
- If the system displays the message "Warning: Current Disk has mounted partitions," you incorrectly chose the disk that was already partitioned. Enter **quit** at the format prompt, and return to step 2.

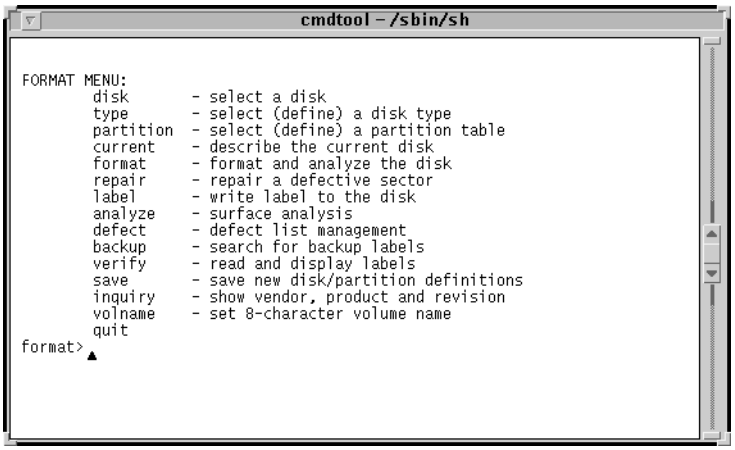

Figure 12-1. Format Menu

4. At the "format" prompt, enter **partition**.

   The Partition menu appears (see Figure 12-2).

5. Proceed to "Defining Partitions 1 and 3".

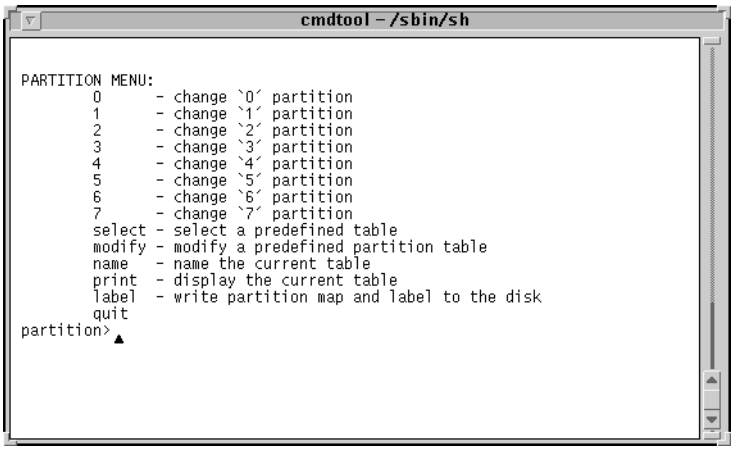

Figure 12-2. Partition Menu

Defining Partitions 1 and 3

To define partitions 1 and 3:

1. At the “partition” prompt, enter the partition number (**1** the first time you perform this step).
2. Press Return to accept the defaults for the following prompts:

   ```
   Enter partition id tag [unassigned]:
   Enter partition permission flags [wm]:
   Enter new starting cyl [0]:
   ```

3. At the “Enter partition size [0b, 0c, 0.00mb]:” prompt, perform the appropriate step:
   - If you are using a default label and did not re-label the drive, enter **0**.
   - If you re-labeled the drive, press Return to accept the default.
4. Repeat Step 1 through step 3 for partition 3.
5. Partitions 1 and 3 are complete. Proceed to “Creating a Master Device on Partition 0”.

Creating a Master Device on Partition 0

To create a master device for SYBASE on Partition 0:

1. At the “partition” prompt, enter **0**.
2. Press Return to accept the defaults for the following prompts:

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

3. At the “Enter new starting cy1[1]:” prompt, enter **1**.

Do not accept the default value of zero(0) for the partition size, otherwise the database will become corrupt after installation and reboot.

4. At the “Enter partition size” prompt, enter **40mb**.
5. Partition 0 is complete. Proceed to “Creating a System Procs Device on Partition 4”.

Creating a System Procs Device on Partition 4

To create a System Procs device for SYBASE on Partition 4:

1. Make a note of the ending cylinder from partition 0 (refer to “Viewing the Partition Table” on page 12-8).
2. At the “partition” prompt, enter **4**.
3. Press Return to accept the defaults for the following prompts:

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

4. At the “Enter new starting cy1[1]:” prompt, enter **[*the number from step 1 plus 1*]**.
5. At the “Enter partition size” prompt, enter **25mb**.
6. Partition 4 is complete. Proceed to “Creating a Bulk Statistics Device on Partition 5”.

Creating a Bulk Statistics Device on Partition 5

To create a Bulk Statistics device for SYBASE on Partition 5:

1. Make a note of the ending cylinder from partition 4 (refer to “Viewing the Partition Table” on page 12-8).
2. At the “partition” prompt, enter **5**.
3. Press Return to accept the defaults for the following prompts:

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

4. At the “Enter new starting cy1[1]:” prompt, enter **[*the number from step 1 plus 1*]**.
5. At the “Enter partition size” prompt, enter **300mb**.
6. Partition 5 is complete. Proceed to “Creating a Log Device on Partition 6”.

Creating a Log Device on Partition 6

To create a log device for SYBASE on Partition 6:

1. Make a note of the ending cylinder from partition 5 (refer to "Viewing the Partition Table" on page 12-8).
2. At the "partition" prompt, enter **6**.
3. Press Return to accept the defaults for the following prompts:

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

4. At the "Enter new starting cy1[1]:" prompt, enter **[*the number from step 1 plus 1*]**.
5. At the "Enter partition size" prompt, enter **300mb**.
6. Partition 6 is complete. Proceed to "Defining Partition 7".

Defining Partition 7

To define partition 7:

1. Make a note of the number that appears next to the "Total disk cylinders available" line in the partition table (refer to "Viewing the Partition Table" on page 12-8). Do not use the "Reserved cylinders" number.
2. Make a note of the ending cylinder from partition 6 (refer to "Viewing the Partition Table" on page 12-8).
3. Subtract the number you noted in step 2 from the number you noted in step 1. This is the unallocated drive space. Make a note of this number.
4. At the "partition" prompt, enter **7**.
5. Press Return to accept the defaults for the following prompts:

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

6. At the "Enter new starting cy1[1]:" prompt, enter **[*the number from step 2 plus 1*]**.
7. At the "Enter partition size" prompt, enter **[*the number from step 3*]c**.
8. Partition 7 is complete. Proceed to "Label and Save Partitions".

Label and Save Partitions

To label and save partitions:

1. At the “partition” prompt, enter **quit**.
2. At the “format” prompt, enter **label** to label and save the partitions.
3. At the “Ready to label disk” prompt, enter **y**.
4. At the “format” prompt, enter **quit**.

   The partitioning of the second disk is complete. Proceed to “Loading the Cascade-Supplied SYBASE Media” on page 12-8.

Viewing the Partition Table

Perform these steps to view the partition table.

1. At the “partition” prompt, enter **print**.

   The partition table is displayed (see Figure 12-3).

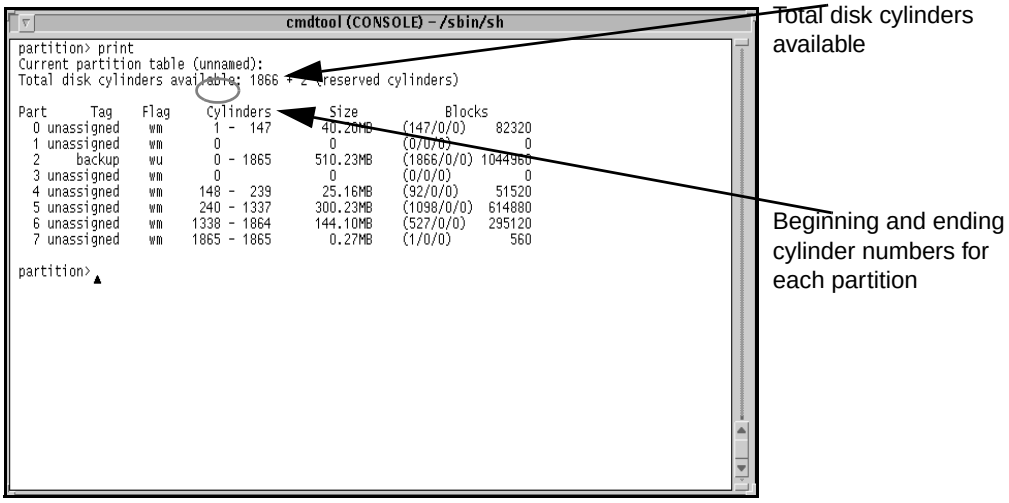

Figure 12-3. Partition Table

Loading the Cascade-Supplied SYBASE Media

Complete the following steps to load the Cascade-supplied SYBASE media and extract the scripts from the media:

1. Verify you are logged in as root user. You should see a # prompt in the window.

   If you are not logged in as root, enter **su - root**. When prompted, enter ***[root password]*.**

2. If you are logged into the system via a remote connection:

   a. Enter the following command:

   ```
   DISPLAY=[enter local hostname]:0.0
   export DISPLAY
   ```

   b. In a new window on the local system, run "**xhost +**" as the user who controls the system console.

   Executing this command enables you to display the installation log on the local system.

3. Insert the Cascade-supplied SYBASE media into the media drive and close the latch.

4. At the system prompt, enter

   ```
   cd /opt
   ```

5. To extract the scripts from the media device, enter

   ```
   tar -xvf [media device pathname] cv_scripts
   ```

   Refer to the SYBASE 11 worksheet in Appendix D for the name of the media device. The extraction process takes approximately five minutes.

6. Move to the *cv_scripts* directory by entering

   ```
   cd cv_scripts
   ```

7. Enter the following command to run the Cascade-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)?
   ```

8. To view an example of the Tail window, press Return to accept the default (yes). The Tail window allows users to view a log of the extraction process.

The Tail window appears (see Figure 12-4).

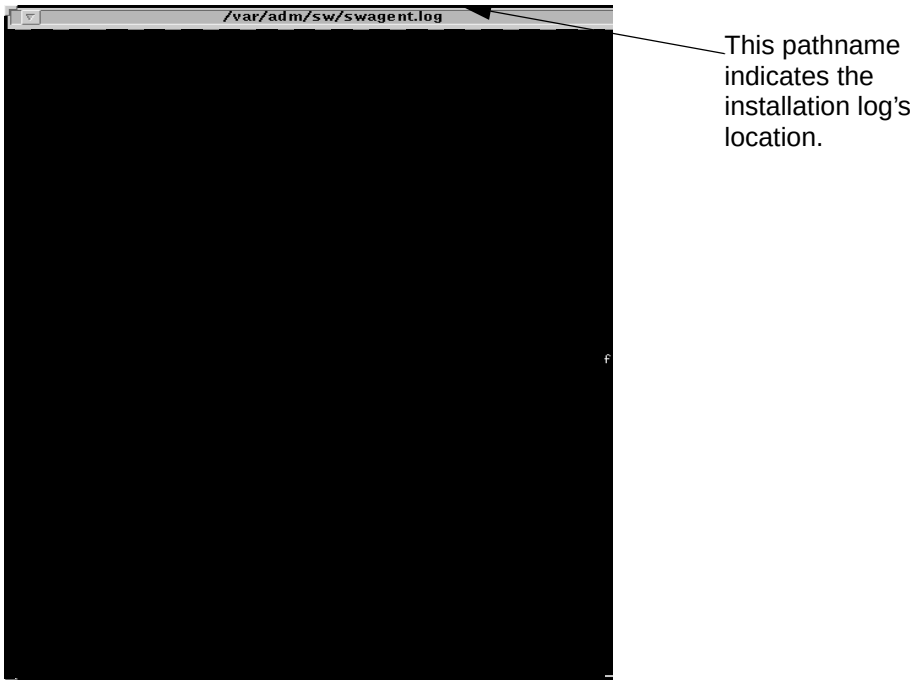

Figure 12-4. Tail Window

The SYBASE Installation Menu appears (see Figure 12-5).

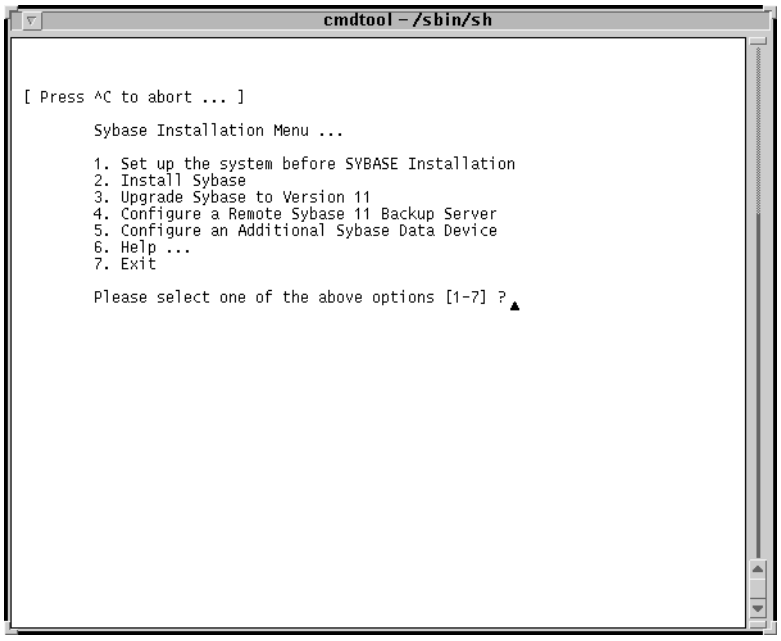

Figure 12-5. SYBASE Installation Menu

The loading of the Cascade-supplied SYBASE installation script is complete. Proceed to "Setting Up the System" before installing the SYBASE 11 software.

Setting Up the System

Purpose

Before you install SYBASE, you must run the "Set up the system . . ." option from the SYBASE Installation menu to:

- Create the SYBASE and NMS user accounts
- Create additional user accounts
- Assign TCP socket numbers to SYBASE and Backup Server
- Set the Bulk Statistics device name
- Set the Master, System Procs, and Log devices

Overview

Use the following sequence to set up your system:

Step 1. Begin the setup (page 12-11).

Step 2. Create the master device in one of the following ways:

- Use raw partitions for the master device (page 12-18).
- Use a file system file for the master device (page 12-20).

Begin the Setup

To set up your system:

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

The following message appears:

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

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

2. 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 the SYBASE 11 worksheet in Appendix D to complete the following steps.

3. Press Return to accept the default of */opt/sybase*.

   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) ?
```

4. Enter **CASCBSTAT**.
5. At the “Enter the name of the error log” prompt, press Return to accept the default of *CASCBSTAT_err.log*.

6. At the “Enter the Database SA Password” prompt, enter **[*your Database SA password*]**. When prompted, re-enter the password.

Choose a password that you can remember (for example, **superbase**).

The following message appears:

```
Creating /etc/rc2.d/S97sybase..Done.

Creating /etc/rc0.d/k01sybase..Done.

Creating /etc/rc2.d/S98sybase..Done.
```

The script creates three files (listed above) that activate and deactivate the SYBASE 11 Server and the Backup Server. The script uses these files later in the installation to shut down and start up the SYBASE Server. The following message appears:

```
You must add at least one more user account.

Enter name of the new user [default : nms] ?
```

7. Press Return to accept the default of nms.
8. At the “Enter group to which new user belongs” prompt, press Return to accept the default of staff.

The following message appears:

```
Creating a user account for nms
---------------------------------------

Enter User’s home directory [default : /opt/nms] ?
```

9. Press Return to accept the default of */opt/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 Cascade 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
```

The Cascade script assigns TCP socket numbers to SYBASE and the Backup Server. 1025 is assigned to SYBASE and 1026 is assigned to Backup Server. If these numbers are already in use, the script assigns the next available numbers.

The system displays the following:

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

10. Press Return to continue.

The following message appears:

```
Creating Additional User Accounts
---------------------------------

1. Create User Account.
2. Proceed to the Next Step.
```

11. Go to the appropriate step:

- If you want to create additional user accounts, go to step 12.
- If you do not want to create additional user accounts, go to step 13.

12. To create additional user accounts:

a. Enter **1**.

The following message appears:

```
Enter name of the new user [default : nms] ?
```

b. Enter the new user name.

c. At the "Enter group to which new user belongs" prompt, press Return to accept the default of staff.

The following message appears:

```
Creating a user account for <username>
--------------------------------------

Enter User's home directory [default : /opt/nms] ?
```

d. Enter the user's home directory.

The following message appears:

```
Adding user <username>. Please Wait...

Successfully added user <username>...
```

The following message appears:

```
Creating Additional User Accounts
---------------------------------

1. Create User Account.
2. Proceed to the Next Step.
```

e. Go to the appropriate step:

– If you want to create additional user accounts, go to step 12.

– If you do not want to create additional user accounts, go to step 13.

13. Enter **2**.

The Device Installation menu appears (see Figure 12-6).

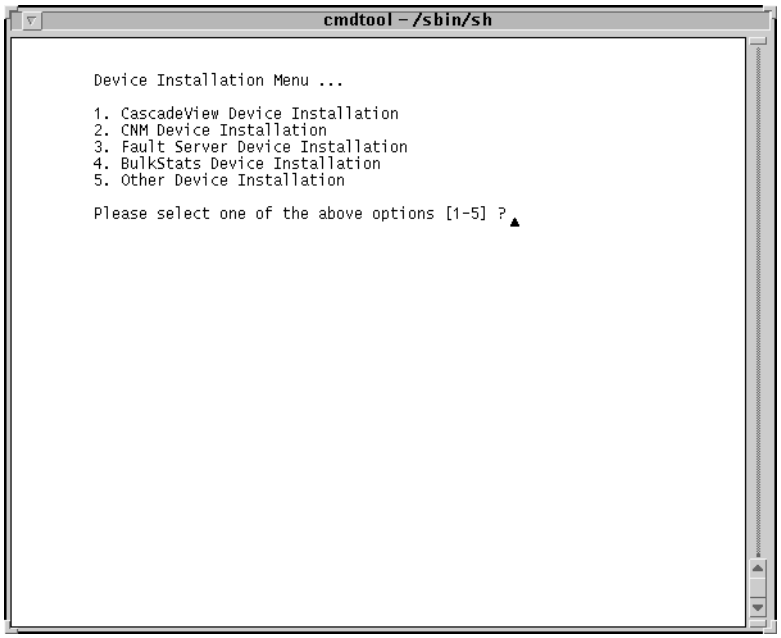

Figure 12-6. Device Installation Menu

14. Enter **4** to set the Bulk Statistics Device name.

The following message appears:

```
The BulkStats Device Installation has been selected.
```

The SYBASE Master Device menu appears (see Figure 12-7).

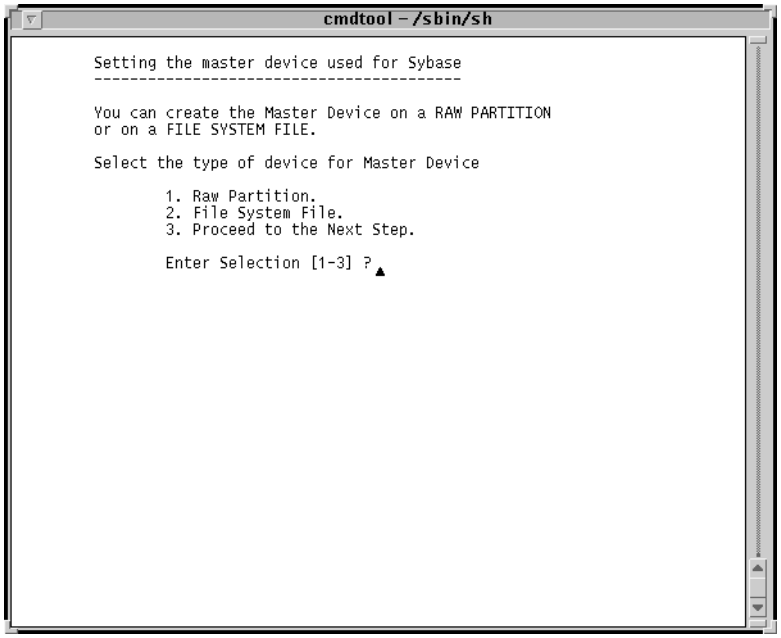

Figure 12-7. SYBASE Master Device Menu

15. Select a Master device as follows:

- To select Raw Partitions, proceed to "Using Raw Partitions for the Master Device" on page 12-18.
- To select File System Files, proceed to "Using File System Files for the Master Device" on page 12-20.

Using Raw Partitions for the Master Device

To use raw partitions for the master device:

1. At the SYBASE Master Device menu, enter **1**.

   The following message appears:

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

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

2. Press Return to continue.

The Cascade script does not provide defaults for the following prompts because customer configurations vary. Refer to the SYBASE 11 worksheet in Appendix D for pathname information.

   The following message appears:

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

3. Enter **/dev/rdsk/c0t1d0s0**.

   The following message appears:

   ```
   Setting device permissions. Please Wait..

   Device /dev/rdsk/c0t1d0s0 has been set.

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

4. Enter **/dev/rdsk/c0t1d0s4**.

   The following message appears:

   ```
   Setting device permissions. Please Wait..

   Device /dev/rdsk/c0t1d0s4 has been set

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

5. Enter **/dev/rdsk/c0t1d0s5**.

   The following message appears:

   ```
   Setting device permissions. Please Wait..

   Device /dev/rdsk/c0t1d0s5 has been set.

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

6. Enter **/dev/rdsk/c0t1d0s6**.

   The following message 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:
   ```

7. Press Return to accept the default of 40.

   The following message appears:

   ```
   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. At the # prompt, enter **init 6** to reboot the system.

10. Proceed to "Installing SYBASE 11" on page 12-22.

Using File System Files for the Master Device

To use file system files for the master device:

1. At the SYBASE Master Device menu, enter **2**.

   The Warning Window shown in Figure 12-8 appears:

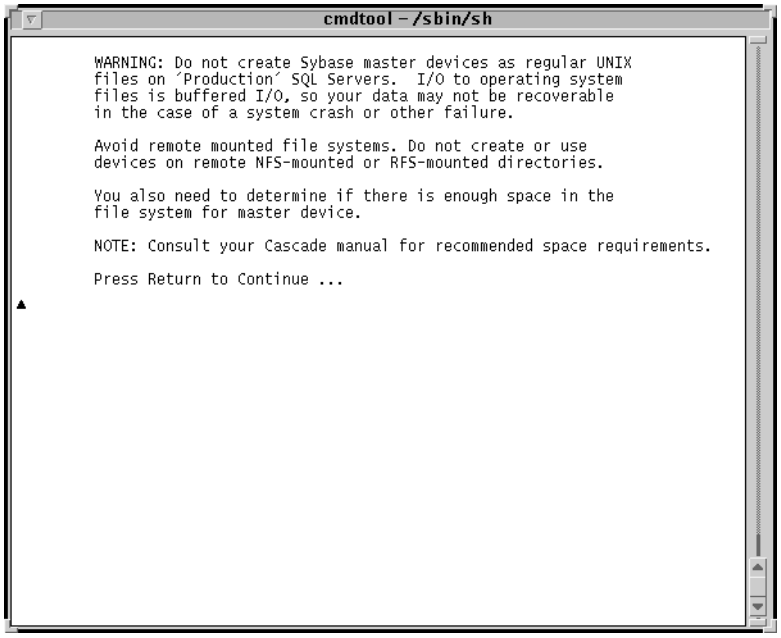

Figure 12-8. Warning Window

2. Press Return to continue.

   The Disk Space Report screen appears (see Figure 12-9).

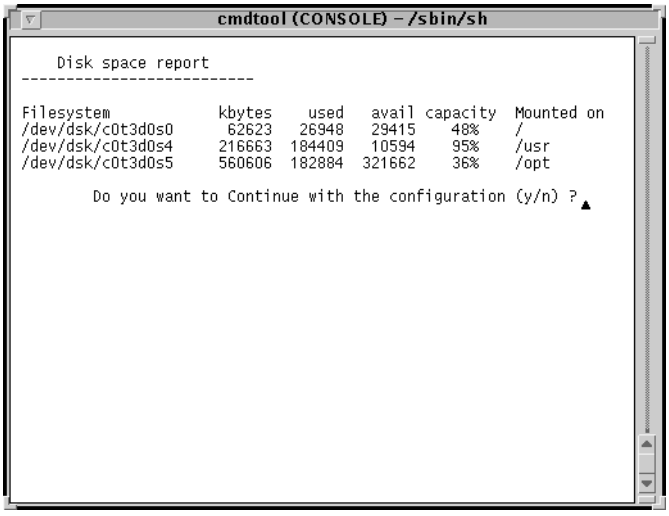

Figure 12-9. Disk Space Report Screen

3. Enter **y** to continue.

Refer to the SYBASE 11 worksheet in Appendix D and to Appendix B, "Calculating Disk Space" to complete the following steps.
"CascadeView Installation" in the message in step 4 refers to the Bulk Statistics installation.

4. At the "Enter name for database device directory" prompt, press Return to accept the default of */opt/databases*.

   The following 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]:

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

   The message applies to the Bulk Statistics installation, even though it states "CascadeView Installation."

5. Press Return to accept the default of 40.
6. At the "Enter the size of your System Procs Device in Megabytes" prompt, press Return to accept the default of 25.
7. At the "Enter the size of your Data Device in Megabytes" prompt, enter a value.
8. At the "Enter the size of your Log Device in Megabytes" prompt, enter a value.

   The following message appears:

   ```
   Creating Master Device file...

   Making directory for the master device...

   Press Enter to return...
   ```

9. Press Return to continue.

   The following message appears:

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

10. At the # prompt, enter **init 6** to reboot the system.

    The SYBASE prerequisite tasks are complete.

11. Proceed to "Installing SYBASE 11" on page 12-22.

Installing SYBASE 11

Overview

This section provides instructions for:

- Running the installation script, which includes configuration of a local backup server (page 12-22)
- Exiting the installation script (page 12-27)

Before You Begin

This section provides instructions for installing SYBASE 11 and configuring the local Backup server. Before installing SYBASE 11, verify that you have completed the following tasks:

☑ Reviewed the SYBASE 11 installation worksheet (page 12-2)

☑ Partitioned the second disk using raw partitions (page 12-3)

☑ Loaded the Cascade-supplied SYBASE media (page 12-8)

☑ Set up the system for SYBASE installation (page 12-11)

Running the SYBASE 11 Installation Script

To run the installation script:

1. At the console login:

- If you installed Solaris 2.4 and Motif 1.2.5, enter **root**. When prompted, enter **[*root password*]**.

  Start OpenWindows by entering **/usr/openwin/bin/openwin**.
- If you installed Solaris 2.5.1 and CDE, enter **root.** When prompted, enter **[*root password*].**

2. If you are logged into the system via a remote connection:

   a. Enter the following command:

   ```
   DISPLAY=[enter local hostname]:0.0
   export DISPLAY
   ```

   b. In a new window on the local system, run "**xhost +**" as the user who controls the system console.

   Executing this command enables you to display the installation log on the local system.

3. In the window, change to the scripts directory by entering

   ```
   cd /opt/cv_scripts
   ```

4. Enter the following command to run the Cascade script:

   ```
   ./install_sybase
   ```

   The following message appears:

   ```
   Verifying super user privileges...

   Would you like to view (tail -f) the install log (default=y)?
   ```

5. To view an example of the Tail window, press Return to accept the default (yes). The Tail window allows users to view a log of the installation process.

   The Tail window appears (see Figure 12-10).

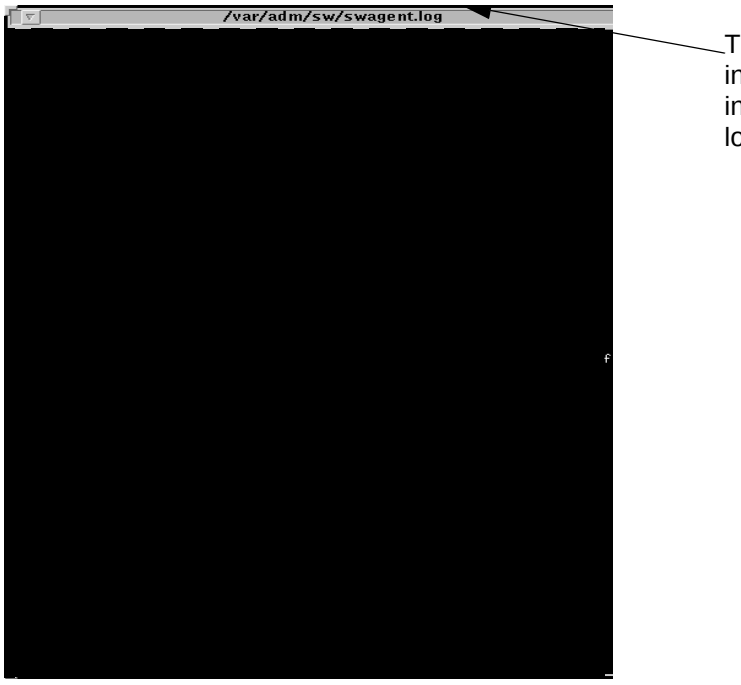

Figure 12-10. Tail Window

The SYBASE Installation menu appears (see Figure 12-11).

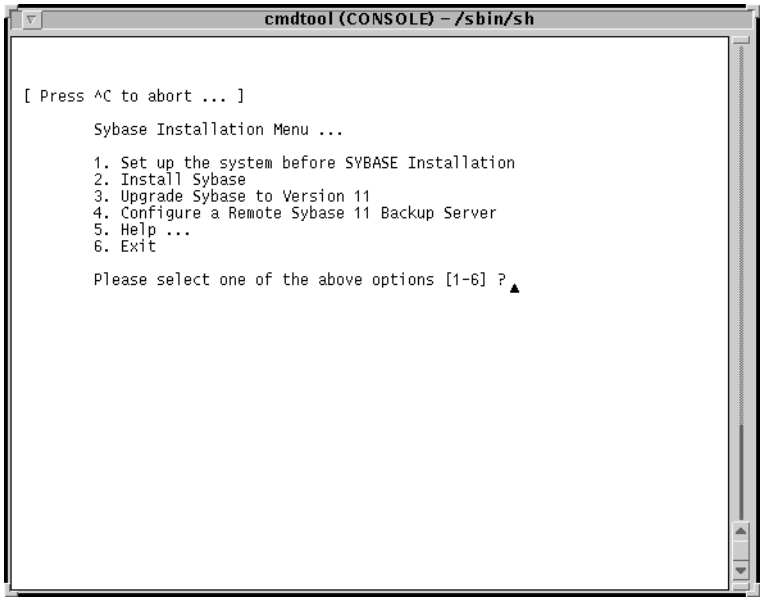

Figure 12-11. SYBASE Installation Menu

6. At the SYBASE Installation Menu, enter **2**.

The following message appears:

```
The following items are required to be completed before
performing this step.

1. Space requirements must be clarified.
2. Step 1 from the Sybase menu must be completed.

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

7. Press Return to continue.

The system displays the parameters you entered and prompts you to make any necessary changes. The Raw Partition Parameters Window shown in Figure 12-12 is an example of raw partition parameters.

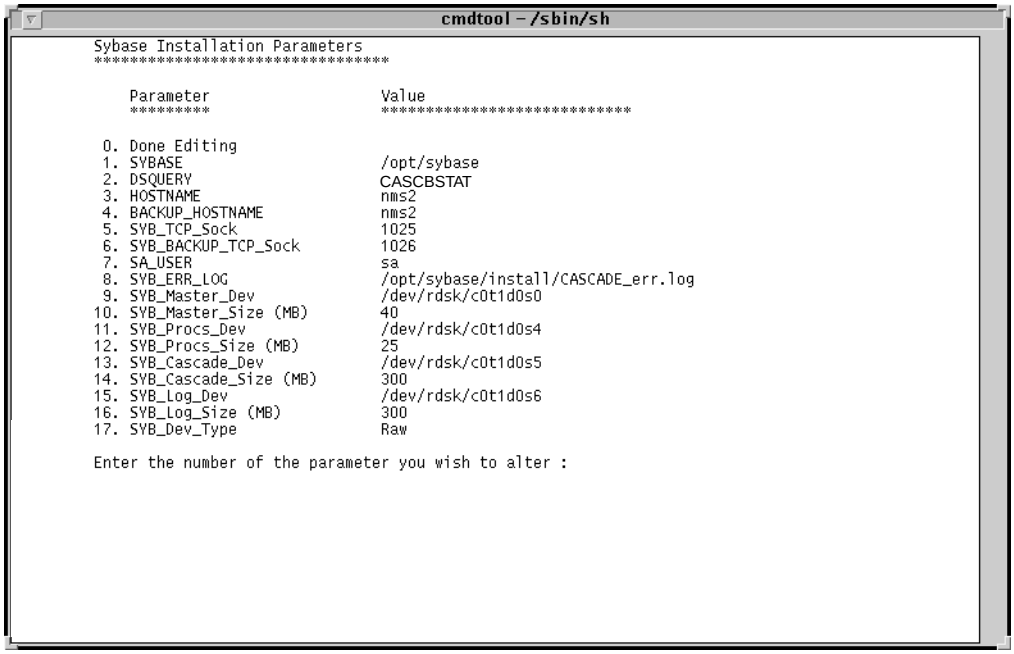

Figure 12-12. Raw Partition Parameters Window

8. To change any device parameters, enter the parameter number and make the appropriate changes.

- If you enter any parameter between 11 and 17, the SYBASE Master Device Menu reappears. Select a Master device as follows:
  - To select Raw Partitions, proceed to "Using Raw Partitions for the Master Device" on page 12-18.
  - To select File System Files, proceed to "Using File System Files for the Master Device" on page 12-20.
- If you change parameter 1, the script prompts you to change 8.

9. Once you have finished making your changes, 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. Enter **[*media device pathname*]** from the SYBASE 11 Worksheet in Appendix D.

The following messages appear:

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

11. Press Return to continue.

The following messages appear:

```
Extracting Sybase 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...
```

The Cascade script increases memory allocation to allow basic SYBASE commands to execute. The script does so because the system has insufficient byte memory for SYBASE commands. For more information, refer to the 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. Do one of the following:

- Press Return to accept the default of 25.
- Enter **[*Number of remote users*]**.

The following message appears:

```
Press Enter to Continue...
```

13. Press Return to continue.

    ```
    Restarting Server with increased options
    ```

    The script shuts down and restarts the SYBASE Server, enabling the new configuration parameters to take effect.

    The script automatically configures a local Backup Server and displays the message:

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

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

    The SYBASE Installation Menu appears.

Exiting the Installation Script

To exit the installation script:

1. At the SYBASE Installation Menu, enter **7**.

   The following message appears:

   ```
   Cleaning up temporary files......Done.

   Exiting Installation script.
   ```

2. Close the Tail window by placing the mouse pointer in the window and typing **<Ctrl> c**.

   The SYBASE installation is complete.

3. Refer to Appendix E to backup the SYBASE 11 databases.

13

Upgrading to SYBASE 11

Introduction

Who Requires SYBASE 11

SYBASE 11 SQL Server is a relational database application that manages backup and recovery of database files. If you want to use SYBASE to store the translated files that are generated with the Bulk Statistics Collector for B-STDX/STDX Version 2.5, you must have SYBASE 11 installed on your system.

Overview of Chapter

This chapter describes how to upgrade to SYBASE 11 for Bulk Statistics if you currently use SYBASE SQL Server, Release 4.9.2 with Bulk Statistics. If you are using the same SYBASE server to support both Bulk Statistics and the Network Management Station, then follow the upgrade directions in the *SYBASE 11 SQL Server Upgrade Guide* instead of the directions in this chapter.

This chapter includes:

- How to complete prerequisite tasks for a SYBASE 11 installation (page 13-2)
- How to install SYBASE 11 and configure the local backup server (page 13-15)

When to Upgrade to SYBASE 11

Upgrade to SYBASE 11 when the Bulk Statistics installation procedure tells you to (refer to “Selecting the Appropriate Bulk Statistics Installation/Upgrade Sequence Checklist” on page 2-17).

Installing SYBASE 11

If you need SYBASE 11 and do not currently use SYBASE SQL Server, Release 4.9.2 with Bulk Statistics, refer to Chapter 12, "SYBASE 11 Installation".

Hardware and Software Requirements

Before you begin the SYBASE 11 upgrade, verify that your machine meets the hardware and software requirements listed in Chapter 1 on page 1-5.

Backing Up SYBASE 11 Databases

After you have finished installing SYBASE 11, refer to Appendix E for instructions on how to backup SYBASE 11 databases.

Completing Prerequisite Tasks

Overview

The prerequisite tasks you must complete before upgrading to SYBASE 11 are listed below. Cascade recommends that you perform these steps in the given sequence:

- Complete the SYBASE 11 Upgrade Worksheet (page 13-2)
- Bulk copy your databases (page 13-3)
- Log off all SYBASE users (page 13-4)
- Back up and verify your databases (page 13-5)
- Use the disk check script to ensure that your databases are ready for an upgrade (page 13-8)

Completing the SYBASE 11 Upgrade Worksheet

Fill out the SYBASE 11 Upgrade Worksheet in Appendix D. You will need this information during the upgrade.

Bulk Copying Your Databases

Purpose

Bulk copying a database creates a copy of every table in your database. The copy can then be restored in a different version of SYBASE. This feature enables you to restore SYBASE 4.9.2 into a SYBASE 11 environment, if necessary.

The SYBASE 11 upgrade procedures do not require such a restoration. However, having a bulk copy does provide an alternate upgrade path if problems occur. After performing the bulk copy, any changes you make to the database will not appear in the bulk copy output.

Before You Begin

Before you bulk copy the Bulk Statistics database, you must have extracted the Bulk Statistics files. Refer to "Extracting the Files" on page 2-33.

For More Information

For further information on bulk copying your databases, refer to your *SYBASE Administrator's Manual*.

To Bulk Copy the Bulk Statistics Database

To bulk copy the Bulk Statistics database:

1. Log in as sybase user by entering **su - sybase**.
2. At the prompt, enter **[*sybase password*]**.
3. Move to the install directory by entering **cd install**.
4. Enter **showserver** to verify that the SYBASE 4.9.2 Server is running.
5. If the SYBASE 4.9.2 Server is not running, enter the following:

   ```
   startserver -f  RUN_CASCBSTAT
   ```

6. Enter the following command to create a directory named storeBsdb to store a backup copy of your Bulk Statistics database:

   ```
   mkdir /opt/Bulkstats/bin storeBsdb
   ```

7. Enter the following command to copy your Bulk Statistics database files to the storage directory that you created in step 6.

   ```
   /opt/BulkStats/bin/cv_bst20_bulkcopy_out.sh  storeBsdb
   ```

Logging Off All SYBASE Users

To log off all SYBASE users:

1. Log in as the sybase user by entering

   `su - sybase`

2. At the prompt, enter **[*sybase password*]**.

3. Verify the SYBASE 4.9.2 Server is running by entering **showserver** .

   The Showserver window appears (see Figure 13-1).

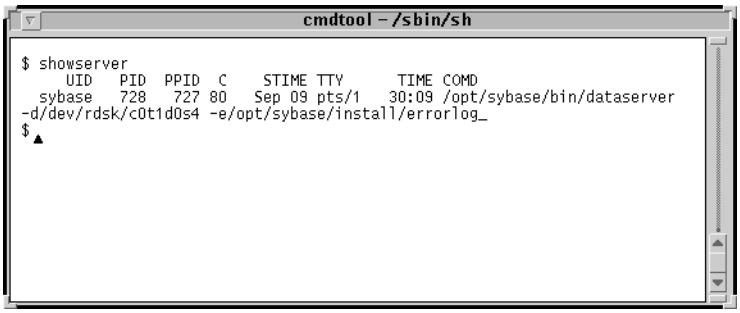

Figure 13-1. Showserver Window

   If the server is not running, proceed to step 6 on page 13-4.

4. Log into isql by entering

   `isql -U sa -P superbase`

5. Enter the following commands to shut down the SYBASE 4.9.2 Server:

   ```
   1> shutdown
   2> go
   ```

   The following message appears:

   ```
   Server SHUTDOWN by request
   The SQL Server is terminating this process.
   DB-LIBRARY error:
            Unexpected EOF from SQL Server.
   ```

6. Move to the install directory by entering

   `cd install`

7. Restart the SYBASE 4.9.2 Server by entering

   `startserver -f RUN_CASCBSTAT`

   The screen displays several lines of output, ending with the line `'iso_1' (ID = 1).`

Backing Up and Verifying Your Databases

Purpose

Backing up your databases before performing the upgrade enables you to restore SYBASE 4.9.2 if necessary. In addition, you verify the integrity of your databases before performing the upgrade.

Overview of Procedures

There are two procedures for backing up your databases:

- If this is your *first* database backup, follow the instructions in "Backing Up the SYBASE 4.9.2 Server the First Time" on page 13-5.
- If you routinely back up your databases, follow the instructions in "Backing Up the SYBASE 4.9.2 Server" on page 13-7.

Backing Up the SYBASE 4.9.2 Server the First Time

Use the following steps the first time you back up the SYBASE Server:

1. Log in as the sybase user by entering

   ```
   su - sybase
   ```

2. Create a backup directory by entering

   ```
   mkdir backup
   ```

3. Create two files for the backup process by entering

   ```
   touch backup/masterbackup
   touch backup/cascbackup
   ```

4. Log into isql by entering

   ```
   isql -U sa -P superbase
   ```

   The system displays the 1> prompt.

5. Enter the following commands:

   ```
   1> sp_addumpdevice "disk", "masterbackup",
   "/opt/sybase/backup/masterbackup",2
   2> go
   ```

   ```
   1> sp_addumpdevice "disk", "cascbackup",
   "/opt/sybase/backup/cascbackup",2
   2> go
   ```

6. Enter the following commands:

   ```
   1> dump transaction cascstat to cascbackup
   2> go
   ```

7. Exit isql by entering

   ```
   1> quit
   ```

   The system displays the $ prompt.

8. Make a backup copy of the file by entering

   ```
   cp backup/cascbackup backup/tempcascbackup
   ```

9. Re-enter isql by entering

   ```
   isql -U sa -P superbase
   ```

   The system displays the 1> prompt.

10. Check the integrity of the databases by entering

    ```
    1> dbcc checkdb(master)
    2> go
    ```

    ```
    1> dbcc checkdb(cascstat)
    2> go
    ```

    The system displays several screens of information, including the size of each table and additional information. This information includes the condition of the databases.

11. If any database is marked “suspect” or “read only,” its integrity is not good. Do not proceed any further; contact the Cascade Technical Response Center (refer to “Contacting the Cascade Technical Response Center” on page 11-3).

12. After the commands in step 10 complete successfully, dump the databases by entering

    ```
    1> dump database master to masterbackup
    2> go
    ```

    ```
    1> dump database cascstat to cascbackup
    2> go
    ```

    ```
    1> quit
    ```

13. To back up everything to tape, insert the tape in the tape drive and close the latch. Enter the following:

    ```
    cd
    tar -cvf /[Tape device] backup/*
    ```

    The system creates an archive of the files in backup and stores them on the tape.

Backing Up the SYBASE 4.9.2 Server

Use the following steps if you have backed up the server at least once. (If you are backing up for the first time, refer to "Backing Up the SYBASE 4.9.2 Server the First Time".)

1. Log in as the sybase user by entering

   ```
   su - sybase
   ```

2. Log into isql by entering

   ```
   isql -U sa -P superbase
   ```

   The system displays a 1> prompt.

3. Enter the following commands:

   ```
   1> dump transaction cascstat to cascbackup
   2> go
   ```

4. Exit isql by entering

   ```
   1> quit
   ```

   The system then displays the $ prompt.

5. Make a backup copy of the file by entering

   ```
   cp backup/cascbackup backup/tempcascbackup
   ```

6. Re-enter isql by entering

   ```
   isql -U sa -P superbase
   ```

   The system then displays the 1> prompt.

7. Check the integrity of the databases by entering

   ```
   1> dbcc checkdb(master)
   2> go
   ```

   ```
   1> dbcc checkdb(cascstat)
   2> go
   ```

   The system displays several screens of information, including the size of each table and additional information. This information includes the condition of the databases.

8. If any database is marked "suspect" or "read only," its integrity is not good. Do not proceed any further; contact the Cascade Technical Response Center (refer to "Contacting the Cascade Technical Response Center" on page 11-3).

9. Dump the databases by entering:

```
1> dump database master to masterbackup
2> go

1> dump database cascstat to cascbackup
2> go

1> quit
```

10. If you complete step 1 through step 9 without errors, proceed to step 11. If you receive errors, call the Technical Response Center.

11. To back up everything to tape, insert the tape in the tape drive and close the latch. Enter the following:

```
cd
tar -cvf /[Tape device] backup/*
```

The system creates an archive of the files in backup and stores them on the tape.

Using the Disk Check Script

Purpose

The disk check script checks critical information about your databases to ensure that they are ready for an upgrade.

If You Need Help

When you save the output of the Disk Check Script (step 11 on page 13-10) to a file, the output is also saved to another file with the same name plus a *.cascade* extension. Send this file via email to Cascade at syb@casc.com for support and troubleshooting.

Overview of Procedures

The procedures describe how to:

- Run the disk check script (page 13-9)
- Check the SYBASE database size (page 13-11)
- Check the file system (page 13-13)
- Validate the database integrity (page 13-14)

Running the Disk Check Script

To run the disk check script:

1. Log in as root by entering **su - root**.
2. Insert the SYBASE tape into the tape drive and close the door.
3. In a new window, change to the directory to which you will extract the scripts. Make a note of the directory name, which you will need when you run the upgrade script. For example, enter

   ```
   cd /opt
   ```

4. To extract the tar file from the tape device, enter

   ```
   tar -xvf /dev/[Tape device pathname] cv_scripts
   ```

   Refer to your SYBASE 11 Upgrade Worksheet for the name of the tape device. The extraction takes five minutes.

5. Move to the scripts directory by entering

   ```
   cd cv_scripts
   ```

6. Run the disk check script by entering

   ```
   ./check_sys
   ```

Refer to your SYBASE 11 Upgrade Worksheet to complete the following steps.

7. At the “What is your Sybase Home Directory [default=/opt/sybase]” prompt, do one of the following:
   - Press Return to accept the default of /opt/sybase.
   - Enter **[*SYBASE 4.9.2 release path*]**.
8. At the “What is the Database Server Name [default=CASCBSTAT]” prompt, do one of the following:
   - Press Return to accept the default of CASCBSTAT.
   - Enter **[*Existing Database Server Name*]**.
9. At the “What is your Sybase SA Passwd” prompt, enter **[*4.9.2 Database SA Password*]**.
10. At the “Do you wish to run the database consistency utility (e.g. dbcc) [Y]” prompt, press Return.

11. At the "Where would you like to save the output to [default=/tmp/check_sys.21105]" prompt, do one of the following:

- Press Return to accept the default of /tmp/check_sys.21105.

  At the end of the filename, the script appends a unique number specific to the output, for example "21105."

- Enter **[*filename*]**.

The script begins checking the system, and the following lines appear:

```
This may take a few minutes
.....................................................................
.....................................................................
.................................................
```

After several minutes, the SYBASE configuration information appears, which can be several hundred lines of text (see Figure 13-2).

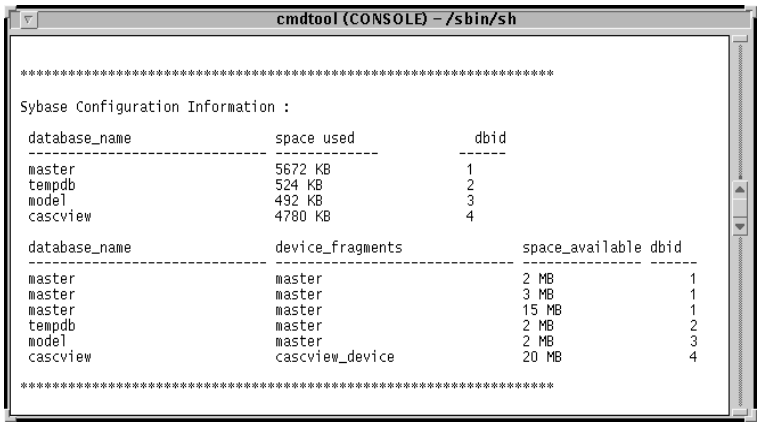

Figure 13-2. Check_Sys Script Output

When the output is complete, the check_sys script has finished. Proceed to the following sections to interpret the results and validate the condition of the databases.

Checking the SYBASE Database Size

To check the SYBSASE database size:

1. In Table 1 (refer to Figure 13-3), find the space used for each database. Make note of this number, rounding to the next highest whole integer. In the example below, the space used for the master database is 5672 KB.

```
database_namespace useddbid
-------------------------
master      5672 KB1
tempdb      524 KB2
model       492 KB3
cascstat    4780 KB4
```

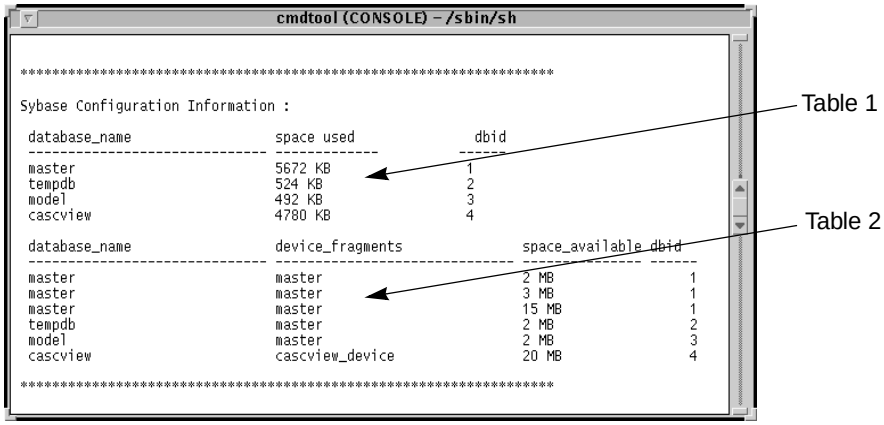

Figure 13-3. Check_Sys Script Output

2. Convert the space used to megabytes by dividing by 1000, rounding to the next highest whole integer. Make note of this number. In the example above, the converted space used for the master database is 6 MB (5672/1000 = 5.672 or 6).

3. In Table 2 (refer to Figure 13-3), to calculate the total space available for each database, add the sizes of the individual device fragments listed in the "**space_available"** column. Add only those fragments that have the same database ID (in the "**dbid**" column). Make note of the total space available. In the example below, the total space available for the master database is 20 MB (2 + 3 + 15).

```
database_namedevice_fragmentsspace_available dbid
-----------------------------------------  ------
master      master2 MB           1
master      master3 MB           1
master      master15 MB          1
tempdb      master2 MB           2
model       master2 MB           3
cascstat    cascview_device20 MB          4
```

4. To upgrade to SYBASE 11, the file system requires 30% free space. Test each database for the required space by multiplying the space used by 1.3. This number should be less than the total size available for the database, or **space used x 1.3 <= space available.**

   For example, using the information for the master database, the calculation is 6x1.3<=20. This indicates there is enough available space on the master database for the upgrade.

5. Perform the appropriate step:

   - If each database (cascstat, master) passes the space test, proceed to "Checking the File System".
   - If any database fails this test, go to step 6.

6. Delete the transaction log as follows:

   a. Enter the following to log into isql:

   ```
   isql -U sa -P superbase
   ```

   The system displays a 1> prompt.

   b. Enter the following commands:

   ```
   1> dump transaction cascstat with truncate_only
   2> go
   ```

   c. Enter the following to exit isql:

   ```
   1> quit
   ```

7. If this is the second time a database has failed the test, increase the size of the database before proceeding to step 8 (refer to "Increasing the Size of the Database" on page 2-53).

8. Run the Disk Check Script (page 13-9) again, and check the SYBASE database size again (page 13-11).

Checking the File System

To check the file system:

1. Find the “Report disk space configurations of the local system” section of the Check Disk Script output (see Figure 13-4).

   The information shown in Figure 13-4 lists the disk space used on your local file systems. This information includes file system name, size in kbytes, space used, space available, capacity, and mounted on information.

2. Verify the local file system has 75 MB of free space. (The SYBASE 11 tar file requires 50 MB and the SYBASE System Procs device requires 25 MB.)

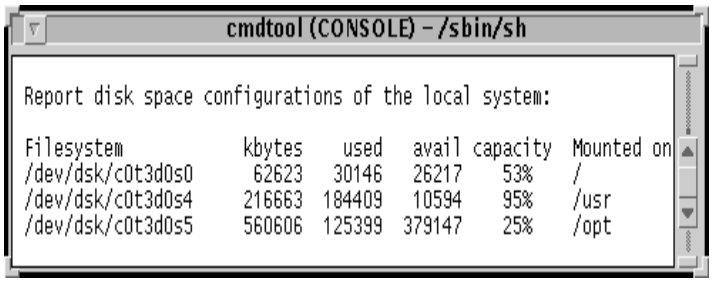

Figure 13-4. Local System Disk Space Window

Validating Database Integrity

To check the file system:

1. Find the “What is the Consistency of the Sybase Databases” section of the Check Disk Script output (see Figure 13-5).

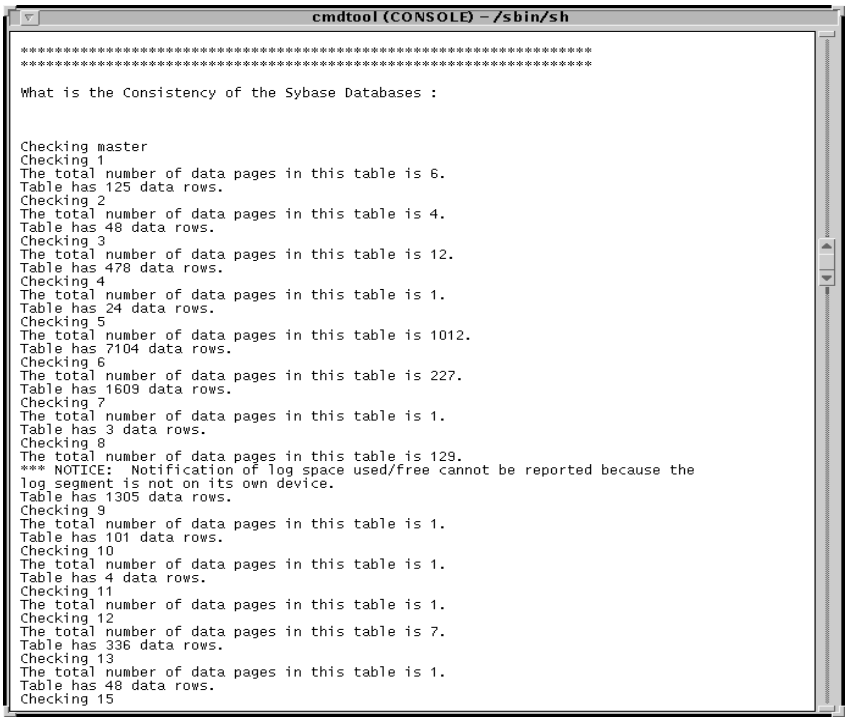

Figure 13-5. SYBASE Database Consistency Window

2. For each database, read the description of each table.
   - If all the table entries include a size, then the database is suitable for the upgrade.
   - If any of the tables are marked “suspect” or “read only,” then the database integrity is not suitable for the upgrade. Contact the Cascade Technical Response Center (refer to “Contacting the Cascade Technical Response Center” on page 11-3).

Upgrading to SYBASE 11

Overview

The tasks you must complete to upgrade from SYBASE 4.9.2 to SYBASE 11 are listed below:

- Run the upgrade script (page 13-15)
- Exit the Installation Script (page 13-22)
- Copy Bulk Statistics Files into the SYBASE 11 Database (page 13-22)

Before You Begin

Before upgrading to SYBASE 11, verify that the following tasks are complete:

- ☑ Bulk copy your databases (page 13-3)
- ☑ Log off all SYBASE users (page 13-4)
- ☑ Back up all your databases (page 13-5)
- ☑ Use the Disk Check script to check databases (page 13-8)

Running the Upgrade Script

Purpose

The upgrade script performs the following tasks during the installation:

- Installs the SYBASE 11 software on the system.
- Saves the SYBASE 4.9.2 software in a tar and compressed image called sybase492.tar.Z.
- Converts all SYBASE 4.9.2 databases to SYBASE 11 format.
- Configures a local backup server

If the Upgrade Fails

If the upgrade fails, contact the Cascade Technical Response Center (refer to "Contacting the Cascade Technical Response Center" on page 11-3).

To Run the Upgrade Script

To run the upgrade script:

1. Log in as root by entering

   ```
   su - root
   ```

2. If you are logged into the system via a remote connection:

   a. Enter the following command:

   ```
   DISPLAY=[enter local hostname]:0.0
   export DISPLAY
   ```

   b. In a new window on the local system, run "**xhost +**" as the user who controls the system console.

   Executing this command enables you to display the installation log on the local system.

3. Move to the directory to which you extracted the scripts. For example, if you extracted the scripts to /opt, enter:

   ```
   cd /opt
   ```

4. Change to the scripts directory by entering

   ```
   cd cv_scripts
   ```

5. Enter the following command to run the Cascade 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 users to view a log of the installation process.

6. Press Return to accept the default (yes).

The SYBASE Installation menu appears (see Figure 13-6).

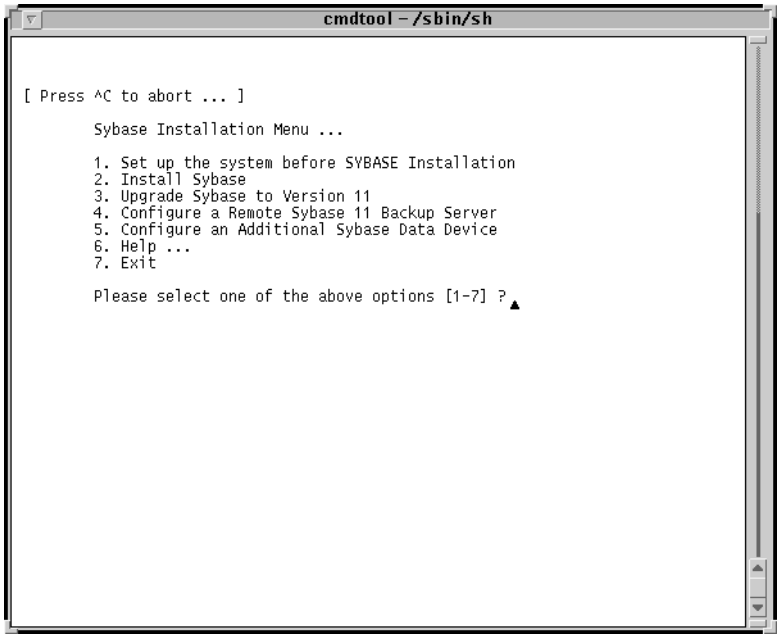

Figure 13-6. Sybase Installation Menu

Once the install_sybase script runs, you can exit at any time by entering <Ctrl> C. The script cleans any "work in progress."

7. At the SYBASE Installation menu, enter **3**.

The following message appears:

```
Complete all upgrade prerequisites before continuing. See
Sybase 11 Upgrade Documentation.

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

8. Press Return to continue, or enter **n** to exit the script.

If you pressed Return, the following message appears:

```
Sybase 11 Upgrade Information Request
**************************************
```

Refer to your SYBASE 11 Upgrade Worksheet to complete step 9 through step 14.

9. At the “Enter the Sybase 4.9.2 release path” prompt, do one of the following:
   - Press Return to accept the default of /opt/sybase.
   - Enter **[*SYBASE 4.9.2 release path*]**.
10. At the “Enter the Sybase 11 install path” prompt, do one of the following:
   - Press Return to accept the default of /opt/sybase11.
   - Enter **[*SYBASE 11 install path*]**.
11. At the “Enter the Database Server Name” prompt, do one of the following:
   - Press Return to accept the default of CASCBSTAT.
   - Enter **[*Existing Database Server Name*]**.
12. At the “Enter the name for the error log” prompt, do one of the following:
   - Press Return to accept the default of CASCBSTAT_err.log.
   - Enter **[*SYBASE 11 Error log pathname*]**.
13. At the “Enter the Database SA Password” prompt, enter **[*4.9.2 Database SA Password*]**. When prompted, re-enter the password and press Return.
   - If the password fails, the script exits. Restart the script using the procedures in “Running the Upgrade Script” on page 13-15.
14. Perform the appropriate step:
   - If the following message is displayed:

     ```
     Setting TCP Socket Numbers for Sybase
     -------------------------------------

     The Socket Number for SYBASE is 1025
     The Socket Number for SYBASE BACKUP is 1026

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

     The script located the TCP socket number in /etc/services. After verifying the TCP socket number is correct, press Return.
   - If the following message is displayed:

     ```
     Searching for the TCP Socket Numbers under /opt/sybase/
     interfaces. It’s possible that multiple entries exist.
     You will need to enter the current selection.

     I’ve found the following TCP Socket Numbers.

     1025
     1026

     Enter the correct TCP Socket Number from the list above :
     ```

     The script located the TCP socket number in the SYBASE interfaces file. Enter **[*TCP Socket Number of SYBASE 4.9.2*]**.

     The script enters it in the /etc/services file.

15. Perform the appropriate step:

- If the following message is displayed:

```
Getting the Master Device currently being upgraded
-----------------------------------------------------

Searching......Found.

Master Partition Device=[master device pathname]
Do you wish to continue? <y|n> [default=y]:
```

  Go to step 16.

- If a message prompts you for the correct path, the script could not locate the master device. Enter the correct path and repeat step 15.

16. Press Return to continue.

The following message appears:

```
Configuring Sybase System Procs Device
**************************************

Enter name for System Procs device directory
[default=/opt/databases]?
```

17. At the “Enter name for System Procs device directory” prompt, do one of the following:

- Press Return to accept the default of /opt/databases.
- Enter **[*SYBASE 11 System Procs device directory*]** and press Return.

The following message appears:

```
Creating Database Directory...

Making directory for the master device

Enter the size of your System Procs Device in MegaBytes
[default=25]:
```

18. At the “Enter the size of your System Procs Device in MegaBytes” prompt, do one of the following:

- Press Return to accept the default of 25.
- Enter **[*SYBASE 11 System Procs device size*]** and press Return.

The system displays the parameters you entered (see Figure 13-7).

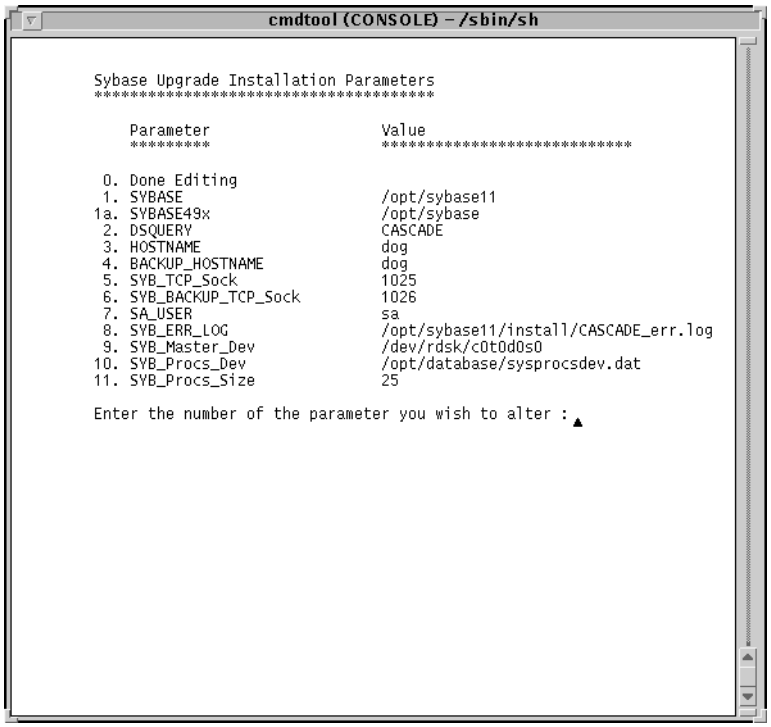

Figure 13-7. Sybase Upgrade Installation Parameters Window

19. To change any device parameters, enter the number of the parameter and make the appropriate changes.

20. Once you have made your changes, enter **0** (Done Editing) and press Return to continue.

The following message appears:

```
Installing Sybase Installation Media...

Install the media in your local device now.
*********************************************
```

21. At the “Enter the full path of tape device” prompt, enter **[*Tape device pathname*]**.

Refer to your SYBASE 11 Upgrade Worksheet for the name of the tape device.

The following message appears:

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

22. Press Return to continue.

Do not interrupt this process. The upgrade time varies according to your databases sizes.

The system displays the following:

```
Extracting Sybase Installation Media from the Device...Done.
```

```
Running ’sybinit’ and creating the sybase server...00:
96/08/20 15:16:52.80 server: SQL Server shutdown by
request.00: 96/08/20 15:16:52.81 kernel: ueshutdown: exiting
Install sybase successful...
```

At this time, the sybinit utility shuts down the SYBASE 4.9.2 Server, and the SYBASE 11 Server takes over.

When the upgrade completes, the system displays the following:

```
To convert from Sybase 4.9.2 to Sybase 11 the script will
now backup the sybase 492 directory into a file called
/opt/sybase/sybase492.tar.Z
```

```
Shutting down the Sybase Server temporarily.
```

```
Relocating the Sybase 11 Media to /opt/sybase........Done
Successfully.
```

```
Restarting server...
```

The script shuts down the SYBASE 11 Server, and moves the SYBASE 4.9.2 directory from /opt/sybase to a tar and compressed image file called sybase492.tar.Z. The script moves the SYBASE 11 directory to /opt/sybase.

The script automatically configures a local Backup Server and displays the message:

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

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

```
The Sybase Upgrade Process is Complete...
*****************************************
```

The SYBASE Installation Menu appears.

Exiting the Installation Script

To exit the installation script:

1. At the SYBASE Installation Menu, enter **7**.

   The following message appears:

   ```
   Cleaning up temporary files......Done.

   Exiting Installation script.
   ```

2. Close the Tail window by placing the mouse pointer in the window and typing **<Ctrl> c**.

   The SYBASE installation is complete.

Copy Bulk Statistics Files into the SYBASE 11 Database

To copy the SYBASE 4.9.2 Bulk Statistics files into the SYBASE 11 database:

1. Use the following command to copy all of your Bulk Statistics files into the SYBASE 11 database:

   ```
   /opt/BulkStats/bin/cv_bst20_bulkcopy_in.sh storeBsdb
   ```

2. Refer to Appendix E to backup the SYBASE 11 databases.

A

Database Schema

This appendix describes each of the SYBASE tables that Bulk Statistics produces. Table A-1 lists and describes each of the SYBASE tables that Bulk Statistics creates for data collected from 4.2 switches. Table A-2 on page A-2 lists and describes each of the SYBASE tables that Bulk Statistics creates for data collected from pre-4.2 switches.

This database schema is supported by version 2.2 of the CascadeView/UX Network Management System (NMS). If you are using a later version of the NMS, your Bulk Statistics database schema may be different.

Table A-1. SYBASE Tables for 4.2 Switches

Table Name	Description	For more information see...
TrunkStat	Frame Relay trunk delta and 5-minute peak calculation values. Each column name maps directly to a field in TRUNK_DELT.*IP.date*	Table A-3 on page A-3
FrCktStat	Frame Relay circuit delta and 5-minute peak calculation values. Each column name maps directly to a field in FRCKT_DELT.*IP.date.*	Table A-4 on page A-5
FrLportStat	Frame Relay logical port delta and 5-minute peak calculation values. Each column name maps directly to a field in FRUNI_DELT.*IP.date* and FRNNI_DELT.*IP.date.*	Table A-5 on page A-8
SmdsLportStat	SMDS logical port delta and 5-minute peak calculation values. Each column name maps directly to a field in SMDSDXI_DELT.*IP.date* and SMDSDXI_DELT.*IP.date*.	Table A-6 on page A-10

Table A-2. SYBASE Tables for Pre-4.2 Switches

Table Name	Description	For more information see...
CktStat	Frame Relay circuit delta and delta peak calculation values.	Table A-7 on page A-13
TrkStat	Frame Relay trunk delta and delta peak calculation values.	Table A-8 on page A-15

TrunkStat Table

Table A-3 lists the column names and type of data in the TrunkStat table. The TrunkStat table stores Frame Relay trunk delta and 5-minute peak calculation values. The column name indicates the field name and the type indicates the SYBASE data type associated with the field. Each column name listed in the TrunkStat table maps directly to a field in the TRUNK_DELT.*IP.date* ASCII file listed on page 5-3.

Table A-3. TrunkStat Table

Column Name	Type
switchIPAddr	char (15)
year	smallint
month	smallint
day	smallint
hour	smallint
minute	smallint
second	smallint
startTime	int
msrmtPdLength	smallint
peakPdLength	smallint
ifIndex	smallint
ifOperStatus	smallint
ifSpeed	int
privateNet	smallint
customerID	int
ingressUtil	real
ingressPeakUtil	real
egressUtil	real
egressPeakUtil	real
ifInOctets	numeric (12,0)
ifInOctetsPeak	numeric (12,0)
ifInUCastPkts	numeric (12,0)

Table A-3. TrunkStat Table (Continued)

Column Name	Type
ifInUCastPktsPeak	numeric (12,0)
ifInNUCastPkts	numeric (12,0)
ifInNUCastPktsPeak	numeric (12,0)
ifInDiscards	numeric (12,0)
ifInDiscardsPeak	numeric (12,0)
ifInErrors	numeric (12,0)
ifInErrorsPeak	numeric (12,0)
ifInUnknownProtos	numeric (12,0)
ifInUnknownProtosPeak	numeric (12,0)
ifOutOctets	numeric (12,0)
ifOutOctetsPeak	numeric (12,0)
ifOutUCastPkts	numeric (12,0)
ifOutUCastPktsPeak	numeric (12,0)
ifOutNUCastPkts	numeric (12,0)
ifOutNUCastPktsPeak	numeric (12,0)
ifOutDiscards	numeric (12,0)
ifOutDiscardsPeak	numeric (12,0)
ifOutErrors	numeric (12,0)
ifOutErrorsPeak	numeric (12,0)

FrCktStat Table

Table A-4 lists the column names and type of data in the FrCktStat table. The FrCktStat table stores Frame Relay circuit delta and 5-minute peak calculation values. The column name indicates the field name and the type indicates the SYBASE data type associated with the field. Each column name listed in the FrCktStat table maps directly to a field in the FRCKT_DELT.*IP.date* ASCII file listed on page 6-6.

Table A-4. FrCktStat Table

Column Name	Type
switchIPAddr	char (15)
year	smallint
month	smallint
day	smallint
hour	smallint
minute	smallint
second	smallint
startTime	int
msrmtPdLength	smallint
peakPdLength	smallint
cktSrcIfIndex	smallint
cktSrcDlci	smallint
cktOde	int
cktCir	int (4)
cktBc	int (4)
cktBe	int
cktRevCir	int
cktRevBc	int
cktRevBe	int
cktPrivateNet	smallint
cktCustomerID	int
cktOperStatus	smallint

Table A-4. FrCktStat Table (Continued)

Column Name	Type
ingressUtil	real
ingressPeakUtil	real
egressUtil	real
egressPeakUtil	real
cktInFrames	numeric(10,0)
cktInFramesPeak	numeric(10,0)
cktInDiscards	numeric(10,0)
cktInDiscardsPeak	numeric(10,0)
cktInOctets	numeric(10,0)
cktInOctetsPeak	numeric(10,0)
cktInDEOctets	numeric(10,0)
cktInDEOctetsPeak	numeric(10,0)
cktInODEOctets	numeric(10,0)
cktInODEOctetsPeak	numeric(10,0)
cktOutFrames	numeric(10,0)
cktOutFramesPeak	numeric(10,0)
cktOutOctets	numeric(10,0)
cktOutOctetsPeak	numeric(10,0)
cktOutFECNFrames	numeric(10,0)
cktOutFECNFramesPeak	numeric(10,0)
cktOutBECNFrames	numeric(10,0)
cktOutBECNFramesPeak	numeric(10,0)
cktOutLostFrames	numeric(10,0)
cktOutLostFramesPeak	numeric(10,0)
cktOutLostDEFrames	numeric(10,0)
cktOutLostDEFramesPeak	numeric(10,0)

Table A-4. FrCktStat Table (Continued)

Column Name	Type
cktOutLostODEFrames	numeric(10,0)
cktOutLostODEFramesPeak	numeric(10,0)
cktOutLostOctets	numeric(10,0)
cktOutLostOctetsPeak	numeric(10,0)
cktOutLostDEOctets	numeric(10,0)
cktOutLostDEOctetsPeak	numeric(10,0)
cktOutLostODEOctets	numeric(10,0)
cktOutLostODEOctetsPeak	numeric(10,0)
cktOutDEOctets	numeric(10,0)
cktOutDEOctetsPeak	numeric(10,0)
cktOutODEOctets	numeric(10,0)
cktOutODEOctetsPeak	numeric(10,0)
cktRtMinDelay	numeric(10,0)
cktRtMaxDelay	numeric(10,0)
cktRtAvgDelay	numeric(10,0)

FrLportStat Table

Frame Relay logical port statistics for both UNI and NNI are recorded in the same table (FrLportStat). Table A-5 lists the column names and type of data in the FrLportStat table. The FrLportStat table stores Frame Relay logical port delta and 5-minute peak calculation values. The column name indicates the field name and the type indicates the SYBASE data type associated with the field. Each column name listed in the FrLportStat table maps directly to a field in the FRUNI_DELT.*IP.date* and FRNNI_DELT.*IP.date* ASCII file format listed on page 6-8.

Table A-5. FrLportStat Table

Column Name	Type
switchIPAddr	char (15)
year	smallint
month	smallint
day	smallint
hour	smallint
minute	smallint
second	smallint
startTime	int
msrmtPdLength	smallint
peakPdLength	smallint
ifIndex	smallint
portType	char (3)
ifOperStatus	smallint
ifSpeed	int

Table A-5. FrLportStat Table (Continued)

Column Name	Type
privateNet	smallint
customerID	int
ingressUtil	real
ingressPeakUtil	real
egressUtil	real
egressPeakUtil	real
inFrames	numeric (12,0)
inFramesPeak	numeric (10,0)
inOctets	numeric (12,0)
inOctetsPeak	numeric (10,0)
inErrors	numeric (12,0)
inErrorsPeak	numeric (10,0)
inDiscards	numeric (12,0)
inDiscardsPeak	numeric (10,0)
outFrames	numeric (12,0)
outFramesPeak	numeric (10,0)
outOctets	numeric (12,0)
outOctetsPeak	numeric (10,0)
outErrors	numeric (12,0)
outErrorsPeak	numeric (10,0)
outDiscards	numeric (12,0)
outDiscardsPeak	numeric (10,0)

SmdsLportStat Table

SMDS logical port statistics for both DXI and SSI are recorded in the same table (SmdsLportStat). Table A-6 lists the column names and type of data in the SmdsLportStat table. The SmdsLportStat table stores SMDS logical port delta and 5-minute peak calculation values. The column name indicates the field name and the type indicates the SYBASE data type associated with the field. Each column name listed in the SmdsLportStat table maps directly to a field in the SMDSDXI_DELT.*IP.date* and SMDSDXI_DELT.*IP.date* ASCII file format listed on page 7-3.

Table A-6. SmdsLportStat Table

Column Name	Type
switchIPAddr	char (15)
year	smallint
month	smallint
day	smallint
hour	smallint
minute	smallint
second	smallint
startTime	int
msrmtPdLength	smallint
peakPdLength	smallint
ifIndex	smallint
portType	char (3)
ifOperStatus	smallint
ifSpeed	int
privateNet	smallint
customerID	int
ingressUtil	real
ingressPeakUtil	real
egressUtil	real
egressPeakUtil	real

Table A-6. SmdsLportStat Table (Continued)

Column Name	Type
inFrSip3s	numeric(12,0)
inFrSip3sPeak	numeric(10,0)
inByteSip3s	numeric(12,0)
inByteSip3sPeak	numeric(10,0)
outFrSip3s	numeric(12,0)
outFrSip3sPeak	numeric(10,0)
outByteSip3s	numeric(12,0)
outByteSip3sPeak	numeric(10,0)
totalDiscards	numeric(12,0)
totalDiscardsPeak	numeric(10,0)
inFramesIA	numeric(12,0)
inFramesIAPeak	numeric(10,0)
inBytesIA	numeric(12,0)
inBytesIAPeak	numeric(10,0)
inFramesGA	numeric(12,0)
inFramesGAPeak	numeric(10,0)
inBytesGA	numeric(12,0)
inBytesGAPeak	numeric(10,0)
outFramesIA	numeric(12,0)
outFramesIAPeak	numeric(10,0)
outBytesIA	numeric(12,0)
outBytesIAPeak	numeric(10,0)
outFramesGA	numeric(12,0)
outFramesGAPeak	numeric(10,0)
outBytesGA	numeric(12,0)
outBytesGAPeak	numeric(10,0)

Table A-6. SmdsLportStat Table (Continued)

Column Name	Type
saNotFounds	numeric(12,0)
saValidationFails	numeric(12,0)
saDaOnSamePorts	numeric(12,0)
dstIaNotFounds	numeric(12,0)
dstGaNotFounds	numeric(12,0)
srcIaScrnFails	numeric(12,0)
dstIaScrnFails	numeric(12,0)
dstGaScrnFails	numeric(12,0)
inFrDxi2HbPolls	numeric(12,0)
inByteDxi2HbPolls	numeric(12,0)
outFrDxi2HbPolls	numeric(12,0)
outByteDxi2HbPolls	numeric(12,0)

CktStat Table

Table A-7 lists the column names and type of data in the CktStat table. The CktStat table stores circuit delta and peak calculations. The column name indicates the field name and the type indicates the SYBASE data type associated with the field.

Table A-7. CktStat Table Column Names

Column Name	Type
switchNumber	smallint
cktSrcIfIndex	smallint
cktSrcDlci	smallint
year	smallint
month	smallint
day	smallint
hour	smallint
minute	smallint
sysUpTime	binary
cktVcState	binary
cktPriority	binary
cktOde	binary
cktCir	binary
cktBc	binary
cktBe	binary
cktInFrames	binary
cktInDEFrames	binary
cktInODEFrames	binary
cktInFECNFrames	binary
cktInBECNFrames	binary
cktInDiscards	binary
cktInOctets	binary
cktInDEOctets	binary

Table A-7. CktStat Table Column Names (Continued)

Column Name	Type
cktInODEOctets	binary
cktOutFrames	binary
cktOutDEFrames	binary
cktOutODEFrames	binary
cktOutFECNFrames	binary
cktOutBECNFrames	binary
cktOutOctets	binary
cktOutDEOctets	binary
cktOutODEOctets	binary
cktOutLostFrames	binary
cktOutLostDEFrames	binary
cktOutLostODEFrames	binary
cktOutLostOctets	binary
cktOutLostDEOctets	binary
cktOutLostODEOctets	binary
cktRtMinDelay	binary
cktRtMaxDelay	binary
cktRtAvgDelay	binary
cktInPFrames	binary
cktInPOctets	binary
cktOutPFrames	binary
cktOutPOctets	binary

TrkStat Table

Table A-8 lists the column names and type of data in the TrkStat table. The TrkStat table stores trunk delta and peak calculations. The column name indicates the field name and the type indicates the SYBASE data type associated with the field.

Table A-8. TrkStat Table Column Names

Column Name	Type
switchNumber	smallint
ifIndex	smallint
year	smallint
month	smallint
day	smallint
hour	smallint
minute	smallint
pcTime	binary
sysUpTime	binary
ifOperStatus	binary
ifSpeed	binary
ifInOctets	binary
ifInUCastPkts	binary
ifInNUcastPkts	binary
ifInDiscards	binary
ifInErrors	binary
ifInUnknownProtos	binary
ifOutOctets	binary
ifOutUcastPkts	binary
ifOutNUcastPkts	binary
ifOutDiscards	binary
ifOutErrors	binary
ifInPOctets	binary

Table A-8. TrkStat Table Column Names (Continued)

Column Name	Type
ifOutPOctets	binary

B

Calculating Disk Space

Estimating Disk Space to Store Raw and Translated Statistics for 4.2 Switches

This section describes the formulas for calculating the amount of disk space your system will need to store raw and translated statistics for B-STDX switches that run version 4.2 of the switch software.

Number of Circuits and Trunks

If each end of a trunk or circuit is on a switch that Bulk Statistics collects data from, then you should count that trunk or circuit twice in the formulas.

Formula 1: Raw Statistics

Size of raw statistics file for a single measurement period for a given switch:

R = (# trunks * 196) + (# circuits * 264) + (# frame relay lports * 112) + (# SMDS lports * 268)

Total disk space to store raw statistics for a single day for a single switch:

r(D) = R * (number of collection periods per day)

Formula 2: Archived Raw Statistics

Archived raw statistics files are stored in compressed format. Thus, the total amount of disk space to store archived raw statistics files for N days can be estimated as follows:

r(A) = r(D) * .40

where

.40 is the typical compression ratio for the Unix compress utility

Formula 3: Translated Statistics

The size estimates for translated files assume that all counts are at maximum field width, and thus, the estimates are inflated.

Size of translated statistics files for a single measurement period for a given switch:

T = (# trunks * 250) + (# circuits * 460) + (# frame relay lports * 182) + (# SMDS lports * 550)

Total disk space to store translated statistics for a single day for a single switch:

t(D) = T * (number of collection periods per day)

Formula 4: Archived Translated Statistics

Archived translated statistics files are stored in compressed format. Thus, the total amount of disk space to store archived translated statistics files for N days can be estimated as follows:

t(A) = t(D) * .40

where

.40 is the typical compression ratio for the Unix compress utility

Formula 5: Total Space Required for a Single Day

The size of the disk partition for the data directory in /opt/BulkStats is then determined as the sum of the sizes of the translated statistics for the current and previous day plus the size of the raw statistics file:

T(D) = 2 * t(D) + r(D)

Formula 6: Total Space Required for the Archive

The size of the disk partition for the archive directory is then determined as the sum of the sizes of the archived files:

$$T(A) = t(A) + r(A)$$

Formula 7: Total Disk Space Required for all Statistics

The total amount of disk space required to store raw, translated and archived statistics is determined as the sum of the total space required to store the current day's statistics plus the total space required to store the archived statistics:

$$T = T(D) + T(A)$$

Estimating Disk Space to Store Raw and Translated Statistics for Pre-4.2 Switches

This section describes the formulas for calculating the amount of disk space your system will need to Store Raw and Translated Statistics for pre-4.2 switches, which include:

- B-STDX switches using Version 4.0.18 or higher of the switch software but lower than Version 4.2
- STDX switches using Version 2.3 and higher of the switch software

Formulas 1 through 3 indicate the amount of space required for a 24-hour period.

Number of Circuits and Trunks

If each end of a trunk or circuit is on a switch that Bulk Statistics collects data from, then you should count that trunk or circuit twice in the formulas.

Formula 1 - Raw Statistics

Use this formula to calculate the amount of space (in bytes) required to maintain the raw statistics.

Raw Statistics = # of Samples x [(24 + (# Circuits x 175) + (# Trunks x 76)]

Formula 1 Parameters

# of Samples — The number of times that the Bulk Statistics Collector for B-STDX/STDX application polls the switch network for statistics in a 24-hour period. By default, Bulk Statistics polls the switch every 15 minutes, therefore you would use a value of 96 for this parameter.

 # Trunks — The number of trunks in your collected data.

 # Circuits — The number of circuits in your collected data.

24 — Specifies the number of bytes required for header information overhead.

76 — Specifies the number of bytes required for each trunk statistic.

175 — Specifies the number of bytes required for each circuit statistic.

Formula 2 - Translated Data

Use this formula to calculate the amount of space (in bytes) required to maintain the translated data.

Translated Data = (# Circuits x 409) + (# Trunks x 184)

Formula 2 Parameters

 # Trunks — The number of trunks in your collected data.

 # Circuits — The number of circuits in your collected data.

184 — Specifies the number of bytes required for each trunk statistic.

409 — Specifies the number of bytes required for each circuit statistic.

Formula 3 - Delta Calculation Files

Use this formula to calculate the amount of disk space (in bytes) required for delta calculations. The Bulk Statistics Collector for B-STDX/STDX always uses the Hexadecimal Output Format. The Decimal Output Format is optional. It is only used if you selected decimal output as an option when you installed the Bulk Statistics Collector for B-STDX/STDX application.

Hexadecimal Delta Calculation

Hexadecimal Delta Calculation = (# Circuits x 465) + (# Trunks x 255)

Formula 3 Hexadecimal Delta Calculation Parameters

 # Trunks — The number of trunks in your collected data.

 # Circuits — The number of circuits in your collected data.

465 — Specifies the number of bytes required for each circuit statistic.

255 — Specifies the number of bytes required for each trunk statistic.

Decimal Delta Calculation

Decimal Delta Calculation = 572 + (# Circuits x 539) + 268 + (# Trunks x 287)

Formula 3 Decimal Parameters

 # Trunks — The number of trunks in your collected data.

 # Circuits — The number of circuits in your collected data.

572 — Specifies the header of decimal format output for circuit delta calculation.

539 — Specifies the number of bytes required for each circuit statistic.

268 — Specifies the header of decimal format output for the trunk delta calculation.

287 — Specifies the number of bytes required for each trunk statistic.

Formula 4 - Utilization Calculation Files

Use this formula to calculate the amount of disk space (in bytes) required for utilization calculations.

Utilization Calculation Data = (# Circuits x 145) + (# Trunks x 133)

Formula 4 Parameters

 # Trunks — The number of trunks in your collected data.

 # Circuits — The number of circuits in your collected data.

145 — Specifies the number of bytes required for each circuit statistic.

133 — Specifies the number of bytes required for each trunk statistic.

In addition to these formulas you will need to check the size of your system's archived statistics file in the archive directory.

Total Space Required to Store Raw and Translated Statistics for Pre-4.2 Switches

Use the following formulas to calculate the total disk space (in bytes) required to maintain the raw data, translated data, and delta and utilization calculation files for pre-4.2 switches. The formula that you use for total space required will differ depending on whether or not you use the optional Decimal Translator.

Total Space Required If You are Not Using the Decimal Translator

Total Disk Space = (Raw Statistics + Translated Data + Hexadecimal Delta Calculation Data + Utilization Calculation) x # of collection days + size of the archived raw statistics file

Total Space Required If You are Using the Decimal Translator

Total Disk Space = (Raw Statistics + Translated Data + Hexadecimal Delta Calculation Data + Decimal Delta Calculation Data + Utilization Calculation) x # of collection days + size of the archived raw statistics file

Estimating SYBASE Database Size

The calculation for SYBASE data specifies the amount of space that the Bulk Statistics Collector for B-STDX/STDX requires for storage of SYBASE data. To determine the total amount of space that you require for information that you store on the SYBASE server you must determine your system's SYBASE database requirements and add this number to the SYBASE data result.

The Sybase stored procedure sp_estspace was used to determine the following formulas for estimating the Sybase database size.

The following formulas are specified in multiples of 1000 rows (or 1000 statistics samples).

Use 1 for any multiple less than 1.

Number of Circuits and Trunks

If each end of a trunk or circuit is on a switch that Bulk Statistics collects data from, then you should count that trunk or circuit twice in the formulas.

SYBASE Data Size (in megabytes) to Store One Hour's Worth of Data

If S is the data size required for SYBASE to store one hour's worth of data,

S = (size of pre-4.2 tables) + (size of 4.2 tables).

Size of Pre-4.2 Tables for One Hour

The size of pre-4.2 tables is

(trunks4.1 * .23) + (ckts4.1 * .19)

where

trunks4.1 = the number of trunks from pre-4.2 switches, as a multiple of 1000

ckts4.1 = the number of Frame Relay circuits from pre-4.2 switches, as a multiple of 1000

Use 1 for any multiple less than 1.

Size of 4.2 Tables for One Hour

The size of 4.2 tables is

(trunks * .11) + (ckts * .34) + (frlports * .20) + (smdslports * .33)

where

trunks = the number of trunks, as a multiple of 1000

ckts = the number of Frame Relay circuits, as a multiple of 1000

frlports = the number of Frame Relay lports, as a multiple of 1000

smdslports = the number of SMDS DXI and SSI lports, as a multiple of 1000

Use 1 for any multiple less than 1.

SYBASE Database Size to Store N Days Worth of Data

If S is the data size required for SYBASE to store one hour's worth of data, then

the data size to store N days worth of data = S * 24 * N

The size of the transaction log should be at least .5 * S, so the total amount of disk space (in megabytes) for the SYBASE data should be at least

1.5 * S * 24 * N = 36 * S * N

Example Calculation for SYBASE Database Size

For example, a network has the following:

- 50 trunks (assuming, for simplicity that all trunks evenly connect 4.1 and 4.2 switches)
- 2000 circuits (assuming, for simplicity, that all circuits originate on 4.1 switches and terminate on 4.2 switches)
- 1000 Frame Relay logical ports
- 2000 SMDS logical ports

The data size required to save one hour's worth of data is

S = (1 * .23) + (2 * .19) + (1 * .11) + (2 * .34) + (1 * .20) + (2 * .33)

= .23 + .38 + .11 + .68 + .20 + .66

= 2.26 MB

To store the data for 30 days, the total disk space required is

36 * 2.26 * 30

= 2440 MB

= 2.4 GB

where the actual size of the database should be at least

2.26 * 24 * 30

= 1627 MB

and the actual size of the transaction log should be at least

1627 *.5

= 813 MB

C

Error Messages

Error Messages for 4.2 Switches

The following error messages for 4.2 switches (B-STDX switches running Version 4.2 of the switch software) are sent to the Bulk Statistics log file /opt/BulkStats/etc/BulkStatSetP2.log. These error messages are *not* e-mailed to the user.

Failed to initiate bulk collection on <switch Name> (<switch IP address>).
Verify that the NMS Entry on <switch Name> for this collector is set to read-write.

Cause: This message may occur when the collector is initiating a raw statistics transfer from a switch.

The collection script (BulkStatSetP2.sh) failed to send the SNMP set to the specified switch because the NMS Entry for the collector on the switch is set to Read Only.

Solution: Change the NMS Entry for the collector to read-write.

Cannot communicate with < Switch Name> (<switch IP address>). Collection aborted. Verify that the collector has the correct community name for <switch name> and that there is connectivity between the switch and collector.

Cause: This message may occur when the collector is initiating a raw statistics transfer from a switch.

The collection script (BulkStatSetP2.sh) failed to send the SNMP set to the specified switch. This is possibly due to:

1. There is no connectivity between the switch and collector.
2. The community name specified in the switch_list file does not match the community name defined for the Bulk Statistics collector in the NMS Entry on the switch.

Solution:

1. Verify that there is connectivity by pinging the switch. If not, make sure that there is an NMS Entry on the switch for the collector and that there is a path from the switch to the collector.
2. Verify that the community name defined in the switch_list file matches the community name in the NMS Entry on the switch. If they are different, either change the NMS Entry on the switch or rerun the cvGenSwitchList procedure to regenerate the switch_list file.

Bulk Statistics archive failed. Specified archive directory does not exist: <directory name>

Cause: The archive directory specified by the user during the installation does not exist.

Solution: Create the directory or re-execute the installation procedure and provide the correct name for the archive directory.

Pre-4.2 Concatenation Error Messages

The following messages are generated by the pre-4.2 concatenation procedure (cvBulkStatMain), which is responsible for concatenating the RAW_STAT.xxx file to the end of the raw_stat.xxx file after each 15 minute polling period. They DO NOT apply to the 4.2 processing.

These messages are sent to the file raw_stat.<switch number>.err, which is located in /opt/BulkStats/etc. Every time an error message is sent to this file, the message is also e-mailed to the user, with the subject line of:

```
<hostname> Bulk Statistics: Concatenation Error
```

where <*hostname*> is the name of the collector generating the error.

Messages

Warning: waiting for the raw statistic file (size=n) from switch xxx

This messages will occur if the concatenation process is trying to concatenate a raw statistics file that has not been completely transferred from the switch at the time that cvBulkStatMain was attempting to concatenate the file.

Error: timeout on uploading the raw statistic file from the switch xxx

This message will follow the previous message if the cvBulkStatMain timed-out and failed to concatenate the file. The cvBulkStatMain application will make three attempts to concatenate the file; it will timeout after the third attempt and issue this error. The RAW_STATS file from the switch will most likely be lost since the next collection will overwrite the file.

The previous concatenation of the raw file <filename> has not finished.

This message will occur if the cvBulkStatMain application cannot concatenate the raw statistics file because another instance of the concatenation process is running.

D

SYBASE 11 Worksheet

During the SYBASE installation, the script prompts you for the parameters on this worksheet.

Prerequisites

1. Media Device pathname:
2. SYBASE Home Directory:
3. Database Server name:
4. Error Log Pathname:
5. Database SA Password:
6. Name of additional user:

   User's group:

   Home directory:
7. TCP Socket Number of SYBASE 11:

8. TCP Socket Number of Local Backup Server:
9. Number of Remote Users:

Using Raw Partitions for the Master Device

1. Master Device Pathname:
2. SYBASE System Procs Device Pathname:
3. Cascade Device Pathname:
4. Log Device Pathname:
5. Master Device size:

Using File System Files for the Master Device

1. Database Device Directory:
2. Master Device:
3. System Procs Device size:
4. Data Device size:
5. Log Device size:

Configuring Additional Cascade Devices

Complete this information if you configure an additional Cascade Device

1. Data Device:

Using Raw Partitions for the New Device

2. Data Device pathname:

Using File System Files for the New Device

3. Database Device directory:
4. Size of the /opt/databases/[*device name*]_device.dat:

   where *device name* is the name of the device you are configuring

E

SYBASE 11 Backups

Introduction

Overview

This chapter describes how to perform SYBASE 11 backups to the local backup server. The procedures describe how to:

- Back up the SYBASE 11 Server to the Local Backup Server the first time (page E-2)
- Perform subsequent SYBASE 11 backups to the Local Backup Server (page E-4)

Frequency of Backups

The Cascade Technical Response Center recommends that you perform daily backups of the SYBASE 11 Server.

To Recover Bulk Statistics Data in the SYBASE Database

If you need to recover Bulk Statistics data from the SYBASE database, contact the Technical Response Center for specific instructions (refer to page 11-3). Do not attempt to restore this database without Cascade's help.

For More Information

For more information on SYBASE 11 backup procedures, refer to the *SYBASE SQL Server System Administrator's Guide* and the *SYBASE SQL Reference Manual*, Volumes 1 and 2.

Backing Up the SYBASE 11 Server to the Local Backup Server the First Time

Before You Begin

Before backing up your SYBASE 11 databases:

- Make sure that all SYBASE 4.9.2 databases have been backed up to tape (refer to "Backing Up and Verifying Your Databases" on page 13-5).
- Rename or delete any SYBASE 4.9.2 backup files that are still on the server.

If you do not rename or delete all SYBASE 4.9.2 backup files that are still on the server, the SYBASE 11 backup process will hang.

To Back Up the SYBASE 11 Server the First Time

To back up the SYBASE 11 Server to the Local Backup Server the *first* time:

1. Log in as the SYBASE user by entering

   ```
   su - sybase
   ```

2. Create a backup directory by entering

   ```
   mkdir backup
   ```

3. Log into isql by entering

   ```
   isql -U sa -P superbase
   ```

   The system displays the 1> prompt.

4. Enter the following commands:

   ```
   1> sp_addumpdevice "disk", "masterbackup",
   "/opt/sybase/backup/masterbackup"
   2> go
   ```

   ```
   1> sp_addumpdevice "disk", "cascbackup",
   "/opt/sybase/backup/cascbackup"
   2> go
   ```

5. Check the consistency of the database by entering

   ```
   1> dbcc checkdb(master)
   2> go
   ```

   ```
   1> dbcc checkdb(cascstat)
   2> go
   ```

The system displays several screens of information including the size of each table and additional information. This information includes the condition of the databases.

6. If any database is marked “suspect” or “read only,” its integrity is not good. Do not proceed any further; contact the Cascade Technical Response Center (refer to “Contacting the Cascade Technical Response Center” on page 11-3).

7. To back up your databases, enter the following:

```
1> dump database master to masterbackup
2> go

1> dump database cascstat to cascbackup
2> go

1> quit
```

8. If you received errors backing up the databases, contact the Cascade Technical Response Center (refer to “Contacting the Cascade Technical Response Center” on page 11-3).

Performing Subsequent SYBASE 11 Backups to the Local Backup Server

Before You Begin

Before you use this procedure to perform regular backups of the SYBASE 11 server, you must have:

- Performed an initial backup (refer to "Backing Up the SYBASE 11 Server to the Local Backup Server the First Time" on page E-2).
- Made sure that all SYBASE 4.9.2 databases have been backed up to tape (refer to "Backing Up and Verifying Your Databases" on page 13-5).
- Renamed or deleted any SYBASE 4.9.2 backup files that are still on the server.

If you do not rename or delete all SYBASE 4.9.2 backup files that are still on the server, the SYBASE 11 backup process will hang.

Frequency of Backup

The Cascade Technical Response Center strongly recommends that you back up the SYBASE Server daily.

To Backup SYBASE 11 Server to Local Backup Server

To back up the SYBASE 11 Server to the Local Backup Server on a regular basis:

1. Log in as the SYBASE user by entering

   ```
   su - sybase
   ```

2. Log into isql by entering

   ```
   isql -U sa -P superbase
   ```

   The system displays a 1> prompt.

3. Enter the following commands:

   ```
   1> dump transaction cascstat to cascbackup
   2> go
   ```

4. Exit isql by entering

   ```
   1> quit
   ```

   The system displays the $ prompt.

5. To make a backup copy of the file, enter

```
cp backup/cascbackup backup/tempcascbackup
```

6. Re-enter isql by entering

   ```
   isql -U sa -P superbase
   ```

   The system displays the 1> prompt.

7. To check the consistency of the database, enter

   ```
   1> dbcc checkdb(master)
   2> go

   1> dbcc checkdb(cascstat)
   2> go
   ```

   The system displays several screens of information including the size of each table and additional information. This information includes the condition of the databases.

8. If any database is marked “suspect” or “read only,” its integrity is not good. Do not proceed any further; contact the Cascade Technical Response Center (refer to “Contacting the Cascade Technical Response Center” on page 11-3).

9. To back up your databases, enter the following:

   ```
   1> dump database master to masterbackup
   2> go

   1> dump database cascstat to cascbackup
   2> go

   1> quit
   ```

10. If you received errors backing up the databases, contact the Cascade Technical Response Center (refer to “Contacting the Cascade Technical Response Center” on page 11-3).

11. To back up the files to tape:

    a. Insert the tape in the tape drive and close the latch. Make sure to rotate your tapes. Each time you use a tape, the system deletes the previous backup that was on the tape.

    b. At the $ prompt, enter

       ```
       cd
       tar -cvf [Tape device] backup/*
       ```

       The system changes directories, creates an archive of the files in backup, and stores them on tape.

Glossary

4.2 switches — B-STDX 8000/9000 switches using Release 4.2 of the switch software.

Archive program — A program that moves the current day's raw_stat.*xxx* file, and the previous day's translation files for 4.2 switches, into a user-defined archive directory after all of the translations and calculations are done at midnight.

Bulk copy — A SYBASE utility that the system uses to copy large amounts of data into a SYBASE database. This utility copies the Bulk Statistics delta and delta peak calculations.

BulkStatSet.log — A log file that the system maintains to record every SNMP set request that Bulk Statistics makes when it polls all enabled pre-4.2 switches for statistics. The log file records the number of retries by SNMP in the event of an error condition. The system maintains the BulkStatSet.log file in the following location:

`/opt/BulkStats/etc/BulkStatSet.log`

At installation you can specify whether or not the system should delete this file at midnight. If the file is not deleted, information from the next day's collection will be appended to the file each day.

BulkStatSetP2.log — A log file that the system maintains to record every SNMP set request that Bulk Statistics makes when it polls all enabled 4.2 switches for statistics. The log file records the number of retries by SNMP in the event of an error condition. The system maintains the BulkStatSet.log file in the following location:

`/opt/BulkStats/etc/BulkStatSetP2.log`

At installation you can specify whether or not the system should delete this file at midnight. If the file is not deleted, information from the next day's collection will be appended to the file each day.

Bulk Statistics Collector for B-STDX/STDX application — The application that gathers and stores switch-specific statistical information from Frame Relay networks for the trunk and circuit traffic on selected Cascade switches.

Bulk Statistics SYBASE database — A SYBASE database that stores Bulk Statistics delta and peak calculations.

Bulk Statistics Translator(s) — Decimal and Hexadecimal format translators that translate the raw statistics into meaningful data. The Decimal translator is optional and can be selected at the time of installation.

CKT_stat.xxx — A decimal format comma delimited file that contains circuit statistics. The Decimal translator generates this file.

Collection station — The workstation that is running the Bulk Statistics application. The SNMP set request to initiate a raw statistics file transfer is sent from this workstation. In addition, the system uploads and processes raw statistics files from this workstation.

Comma delimited file — The result of the Decimal or Hexadecimal translator.

Concatenation program — A program that concatenates the RAW_STAT.*xxx* file into the cumulative raw statistics file, named raw_stat.*xxx*.

Cumulative raw statistics file — A file named raw_stat.*xxx* that contains cumulative trunk and circuit statistics. A concatenation program concatenates RAW_STAT.*xxx* files into the cumulative raw statistics file named raw_stat.*xxx*.

cvBulkStatCron.log—Records every translation process, bulk copy, and nightly archival of the files for 4.2 switches. The cvBulkStatCron.log file is located in the **/opt/BulkStats/etc** directory.

Decimal translator — Translates a raw statistics file (raw_stat.*xxx*) into meaningful data. The translated information is in the form of trunk and circuit comma delimited files that are in decimal format. The Decimal translator is an option that you specify at the time of installation.

Delta — This statistic is for 4.2 switch data, and is the difference between the current collection period's last sample and the previous collection period's last sample.

Delta Peak — This statistic is for 4.2 switch data, and is the maximum 5-minute value within the collection period.

Hexadecimal translator — Translates a raw statistics file (raw_stat.*xxx*) into meaningful data. The translated information is in the form of trunk and circuit comma delimited files that are in hexadecimal format.

Hourly Delta — This statistic is for pre-4.2 switch data, and is the difference between the current hour's last sample and the previous hour's last sample.

Hourly Delta Peak — This statistic is for pre-4.2 switch data, and is the maximum 15-minute value within an hour.

NCKT_stat.xxx — A hexadecimal format comma delimited file that contains circuit statistics. The Hexadecimal translator generates this file.

NMS station — The workstation that is running CascadeView/UX.

NTRK_stat.xxx — A hexadecimal format comma delimited file that contains trunk statistics. The Hexadecimal translator generates this file.

Pre-4.2 switches — B-STDX 8000/9000 switches using Release 4.0.18 and higher (but not 4.2) of the switch software, and STDX 3000/6000 switches using Version 2.3 and higher of the switch software.

Raw statistics file — A Binary format file named RAW_STAT.*xxx* that contains trunk and circuit statistics for the current Bulk Statistics polling sample of all active cards in the switch.

SNMP set shell script — The shell script containing all of the SNMP sets to the switches to initiate uploads. Bulk Statistics installs the SNMP set shell script into the crontab and executes it at a 15-minute interval based on the system clock.

switch list data file — A data file that supplies the NMS switch configuration information to Bulk Statistics. A switch list data file is required if you are using Bulk Statistics on a SPARCstation that does not have access to the NMS configuration database during runtime.

Switch configuration database — A CascadeView/UX SYBASE database that stores NMS configuration information. The Bulk Statistics Collector for B-STDX/STDX uses this database to obtain the NMS switch configuration information.

TRK_stat.xxx — A Decimal format comma delimited file that contains trunk statistics. The Bulk Statistics Decimal translator generates this file.

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