Cisco BTS 10200 Softswitch Operations and Maintenance Guide

Release 4.5.x

July 21, 2009

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Text Part Number: OL-4495-10

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Preface

Revised: July 21, 2009, OL-4495-10

Introduction

This preface describes the objectives, audience, organization, and conventions of this document and explains how to find additional information on related Cisco products and services.

Document Objective

This guide provides instructions for operating, and maintaining the Cisco BTS 10200 Softswitch for release 4.5.1. You should read the other documentation supplied with your system before using this guide. A complete list of these documents is included in the Documentation Suite, page xix section of this guide.

Audience

This guide is intended for system administrators, system operators, and system technicians.

- The system administrator manages the host administrative functions, including configuring and maintaining system parameters, granting group and user IDs, and managing all Cisco MGC files and directories. The system administrator should have an in-depth knowledge of UNIX and a basic knowledge of data and telecommunications networking.
- The system technician should be familiar with telecommunication protocols, basic computer software operations, computer terminology and concepts, hierarchical file systems, common UNIX shell commands, log files, the configuration of telephony switching systems, the use of electrical and electronic telephony test equipment, and basic troubleshooting techniques.

Document Change History

Table 1 describes the change history for this document.

Table 1 Document Change History

Release, Change Date	Subject	Change Summary
4.5.x, 07/21/2009	Updated Chapter 7	• Updated Chapter 7 to include the Enabling NMS to Query Solaris SNMP Agent section.
4.5.x, 01/12/2008	Updated Chapter 2	• Updated Chapter 2 information to include Managing Users and Managing Commands sections
4.5.1, 11/24/2008	Chapter 5, Maintenance and Diagnostics for External Resources and updated Chapter 3, Changing Subscriber DN	• Added note on service states and provided additional information on changing the subscriber directory number
4.5.1, 8/4/2008	Chapter 6, Operations	• Added steps to change subscriber DN.
4.5.1, 6/12/2008	Chapter 6, Operations	• Added Oracle replication queue verification steps to “Archiving Your Database” section.
4.5.1, 10/13/2006	Chapter 6, Traffic Measurements	• Updated measurements tables. • Updated the chapter with measurement data specification information.
4.5.1, 10/13/2006	Chapter 3, Operations	• Revised the “Displaying Active Call Information” section—Referred to the command input and output parameters in the CLI document, and included an example of a call-trace query display. • Revised the “Creating an Archive” procedure. • Revised value for target state in control command example.
4.5.1, 5/15/2006	Chapter 4, Maintaining the BTS 10200 Softswitch	• Updated the section “Checking Mirroring on the Disk”: replaced the grep command with egrep, and added new examples. • Added information on Active Call Information Display. • Added information on Support of 30 OPCs. • Added information on Call Forwarding Combination.
4.5.1, 5/15/2006	Chapter 6, Traffic Measurements	• Added information on Call Forwarding Combination measurements • Updated measurements tables. • Updated the chapter with measurement data specification information.

Table 1 Document Change History (continued)

Release, Change Date	Subject	Change Summary
4.5.1, 5/15/2006	Chapter 5, Maintenance and Diagnostics for External Resources	• In the section "SS7 Trunk Termination Tests," added information on output fields for test=5. • In the section "SS7 Trunk Termination Tests," added a note for diag ss7-trunk-termination test=7.
4.5.1, 5/15/2006	Chapter 4, Maintaining the BTS 10200 Softswitch	• Updated the section " EMS Database Backup" by removing reference to shared memory data from the CA/FS.
4.5.1, 2/212006	Chapter 5, Maintenance and Diagnostics for External Resources	• In the section "Trunk Terminations", added a note regarding using the **control trunk termination** command to control all trunk terminations for a particular CIC group to INS. The **forced** option brings the circuits to INS by using the reset procedure. • In the section "SS7 Trunk Termination Tests," added information on output fields for test=5.
4.5.1, 2005	All Chapters	• Reorganized this Guide and updated information for the 4.5.1 release. • Chapter 11, "Disaster Recovery Procedures" has been moved to the *Cisco BTS 10200 Softswitch Troubleshooting Guide* for Release 4.5.1.

Document Conventions

This section describes the directory structure in which the Cisco BTS 10200 Softswitch software is installed. Refer to the *Cisco BTS 10200 Softswitch Release 4.5.1 Software Installation Guide* for a more detailed description of configuring the Softswitch environment.

Note Refer to the *Cisco BTS 10200 Softswitch Command Line Interface Reference Guide* for a detailed description of all commands and tokens discussed in this document.

Typographic conventions used in this guide are shown in Table 2.

Table 2 Conventions Used in this Guide

Convention	Meaning	Description / Comments
Boldface	Commands and keywords you enter as shown.	**offset-list**
Italics	Variables for which you supply values.	**command** *type interface* You replace the variable with specific information. In contexts that do not allow italics, such as online help, arguments are enclosed in angle brackets (< >).
Square brackets ([ ])	Optional elements.	**command** [abc] abc is optional (not required), but you can choose it.
Vertical bars (|)	Separated alternative elements.	**command** [abc | def] You can choose either abc or def, or neither, but not both.
Braces ({ })	Required choices.	**command** { abc | def } You **must** choose either abc **or** def, but not both.
Braces and vertical bars within square brackets ([{ | }])	A required choice within an optional element.	**command** [abc { def | ghi }] You have three options: nothing abc def abc ghi
Caret character (^)	Control key.	The key combinations ^D and Ctrl-D are equivalent: Both mean “hold down the Control key while you press the D key.” Keys are indicated in capital letters and are not case sensitive.
A non-quoted set of characters	A string.	For example, when setting an SNMP community string to *public*, do not use quotation marks around the string; otherwise, the string will include the quotation marks.
`System prompts`	Denotes interactive sessions, indicates that the user enters commands at the prompt.	The system prompt indicates the current command mode. For example, the prompt `Router (config) #` indicates global configuration mode.
`Screen` font	Terminal sessions and information the system displays.	

Table 2 Conventions Used in this Guide (continued)

Convention	Meaning	Description / Comments
Angle brackets (< >)	Non-printing characters such as passwords.	
Exclamation point (!) at the beginning of a line	A comment line.	Comments are sometimes displayed by the Cisco IOS software.

Caution Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Timesaver Means *reader may be able to save some time.* Taking the action described could achieve a result in less time than might be achieved otherwise.

Note Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the manual.

Conventions used in the Cisco BTS 10200 Softswitch software are shown in Table 3.

Table 3 Data Type Conventions

Data Type	Definition	Example

Integer	A series of decimal digits from the set of 0 through 9 that represents a positive integer. An integer may have one or more leading zero digits (0) added to the left side to align the columns. Leading zeros are always valid as long as the number of digits is less than or equal to ten digits. Values of this type have a range of zero through 4294967295.	`123`
		`000123`
		`4200000000`

Signed integer	The same basic format as the integer but can be either positive or negative. When negative, it is preceded by the sign character (-). As with the integer data type, this data type can be as many as ten digits in length, not including the sign character. The value of this type has a range of minus 2147483647 through 2147483647.	`123`
		`-000123`
		`-21000000001`

Hexadecimal	A series of 16-based digits from the set of 0 through 9, a through f, or A through F. The hexadecimal number may have one or more leading zeros (0) added to the left side. For all hexadecimal values, the maximum size is 0xffffffff (eight hexadecimal digits).	`1f3` `01f3000`
Text	A series of alphanumeric characters from the ASCII character set, where defined. Tab, space, and double quote (“ ”) characters cannot be used. Text can be as many as 255 characters; however, it is recommended that you limit the text to no more than 32 characters for readability.	`EntityID` `LineSES_Threshold999`
String	A series of alphanumeric characters and white-space characters. A string is surrounded by double quotes (“ “). Strings can be as many as 255 characters; however, it is recommended that you limit the strings to no more than 80 characters for readability.	`“This is a descriptive string.”`

Note Hexadecimal and integer fields in files may have different widths (numbers of characters) for column alignment.

Documentation Suite

The documents that make up the Cisco BTS 10200 Softswitch documentation set are listed in Table 4.

Table 4 Cisco BTS 10200 Softswitch Documentation

Functional Area	Publication	Description and Audience
Hardware Installation	*Cisco BTS 1200 Softswitch Site Surveys and Cabling Procedures*	Describes the hardware components of the Cisco BTS 10200 Softswitch. Includes detailed information on the environmental requirements for all the components. Also provides a checklist of the hardware you should have before starting the installation and a checklist of all the connections for the components. The audience for these publications is the engineering personnel responsible for installing the components and verifying the hardware installation.
Software Release Notes	*Cisco BTS 1200 Softswitch Software Release Notes for Release 4.5.1*	Provides information that is specific to a particular release of the Cisco BTS 10200 Softswitch software. The audience for these publications is the engineering personnel responsible for installing, configuring, and upgrading software for the respective solutions.
Software Installation	*Cisco BTS 1200 Softswitch Release 4.5.1 Application Installation Procedures*	Describes the steps necessary to install the software components of the Cisco BTS 10200 Softswitch. The audience for this publication is the engineering personnel responsible for installing and configuring software for the Cisco BTS 10200 Softswitch.
Software Upgrade	*Cisco BTS 1200 Softswitch Release 4.5.1 Software Upgrade Procedures*	Describes the steps necessary to upgrade the software components of the Cisco BTS 10200 Softswitch from any previous release to Release 4.5.1. The audience for this publication is the engineering personnel responsible for upgrading and configuring software for the Cisco BTS 10200 Softswitch.
Reference	*Cisco BTS 1200 Softswitch Release 4.5.1 Command Line Interface Reference Guide*	Provides reference information for the hardware and software of the Cisco BTS 10200 Softswitch. The audience for this publication is the engineering personnel responsible for installing, configuring, operating, and upgrading the software for the respective components of the system.
Provisioning	Cisco BTS 10200 Softswitch Provisioning Guide	Provides procedures for provisioning your Cisco BTS 10200 Softswitch. The audience for this document is Cisco BTS 10200 Softswitch users, network operators, and administrators.

Table 4 Cisco BTS 10200 Softswitch Documentation (continued)

Functional Area	Publication	Description and Audience
Provisioning	*Cisco BTS 10200 Softswitch Release 4.5.1 ISDN Provisioning and Troubleshooting Guide,*	Describes ISDN Provisioning and Troubleshooting for the Cisco BTS 10200 Softswitch. This document is intended for use by service provider management, system administration, and engineering personnel who are responsible for designing, installing, provisioning, and maintaining networks that use the Cisco BTS 10200 Softswitch.
Billing	*Cisco BTS 1200 Softswitch Billing Interface Guide*	Provides billing interface information for the Cisco BTS 10200 Softswitch software. This guide is intended for network operators and administrators who have experience with telecommunications networks, protocols, and equipment and who have familiarity with data communications networks, protocols, and equipment.

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS Version 2.0.

CHAPTER 1

Cisco BTS 10200 Softswitch Startup and Shutdown Procedures

Revised: July 21, 2009, OL-4495-10

Introduction

This chapter describes the startup and shutdown procedures for the Cisco BTS 10200 Softswitch.

Note This document assumes that all Cisco BTS 10200 Softswitch hardware and software are installed and fully operational.

Caution To meet high availability requirements for the Cisco BTS 10200 Softswitch, Cisco strongly recommends that you comply with the following:

1. You must use uninterruptible power supply (UPS) for both AC and DC systems. The uninterruptible supply must be one that is designed to support system operation through any possible power interruption. The power supply must have sufficient battery backup to maintain service in the event of commercial power failure (both power supplies of the redundant pair should be able to do this).

2. There must be no common components in the power feeds to the redundant hardware that can be a common single point of failure.

For AC-powered installations, two separate (redundant) circuits are required. The AC circuits must be sourced from separate transformer phases on separate breakers such that a single breaker trip will not disable both.

For DC-powered installations, the power must come from two separate dedicated DC branches (redundant A and B feeds) for each DC-powered Cisco BTS 10200 Softswitch.

Starting the Cisco BTS 10200 Hardware

Perform the following procedure to power on the hardware for the Cisco BTS 10200 Softswitch.

Note Boot completion times vary with system type (CA/EMS) as well as size of database.

Step 1 Ensure that all power cables are properly connected to the correct ports.

Step 2 Power on the catalyst switch routers by plugging them into a viable power source.

Note The catalyst switch routers do not have a power button.

Step 3 Power on the Side A and Side B EMS.

Step 4 Power on the CA and FS units.

The hardware for the Cisco BTS 10200 Softswitch is now powered on.

Shutting Down the Cisco BTS 10200 Hardware

Perform the following procedure to power off the Cisco BTS 10200:

Step 1 Check the status of your system and ensure that the Side A CA and Side A EMS are active, and the Side B CA and Side B EMS are in standby.

Step 2 Using Secure Shell (SSH), log in to the Side A CA, Side B CA, Side A EMS, and Side B EMS.

Note Shut down the system according to the following order:
1. Standby EMS
2. Standby CA
3. Active CA
4. Active EMS

Step 3 Enter the following command to begin the platform shutdown process:

```
platform stop all
```

When the prompt (#>) returns, the operating system is ready for shutdown.

Step 4 To shut down the FRUs, enter one of the following commands for each node (Sun Microsystems recommends both as graceful shutdowns).

```
shutdown -i5 -g0 -y
```

Or:

```
sync;sync; init5
```

You will see when the SSH sessions are disconnected. If you are connected via a local console to the host machines, you will see the system shut down.

The unit is ready to power off when the LCD on the FRU reads “HALTED” or “Coma.”

When all the FRUs have reached the HALTED or Coma state, continue to Step 5.

Step 5 Power off the primary and secondary Call Agents and Feature Server by pulling on the switch to the left of the LEDs and putting it in the OFF position.

When you hear the fans turn off in the unit, you can release the knob to its neutral position.

Step 6 Power off the primary and secondary EMS by pulling on the switch to the left of the LEDs and putting it in the OFF position.

When you hear the fans turn off in the unit, you can release the knob to its neutral position.

Step 7 To power off the catalyst switch routers, unplug the unit from its power source.

Note The catalyst switch routers do not have a power button.

The hardware for the Cisco BTS 10200 Softswitch is now powered off.

Starting the Cisco BTS 10200 Software

The Cisco BTS 10200 software automatically starts when the server is powered on. Check the system status using the nodestat command. Do the following steps:

Step 1 Log in as **root**.

Step 2 Enter the following command to start the platform:

```
platform start
```

Step 3 Once all components start, enter the nodestat command to check the system.

CHAPTER 2

Managing Access and Users

Revised: July 21, 2009, OL-4495-10

Introduction

This chapter describes the operator interfaces used for communication with the Cisco BTS 10200 Softswitch, and the procedures for managing access and users.

Note After entering any of the commands in this chapter, press the Return or Enter key.

Figure 2-1 illustrates the Cisco BTS 10200 Softswitch operator interfaces of the Element Management System (EMS). These interfaces support several types of communications:

- Local Operations Console—the following options are available:
  - Interactive CLI session—operator connects to the EMS using Secure Shell (SSH) and uses the command line interface (CLI) in an interactive session
  - Bulk Provisioning—operator connects to the EMS using FTP for batch-mode provisioning (requires highest privilege levels)

  SFTP is used as of Release 4.1. The /opt/ems/ftp/deposit directory checks for files every 7 seconds and then deletes them. A report is generated and can be viewed at *https://<ems ip>* (see the HTML file listed in the reports index). You can move the files to a deposit directory. The file must be owned by a valid Cisco BTS 10200 user (such as optiuser or btsadmin). If you are logged in as root, you must use the command **unix -p** when putting the file in the deposit directory.

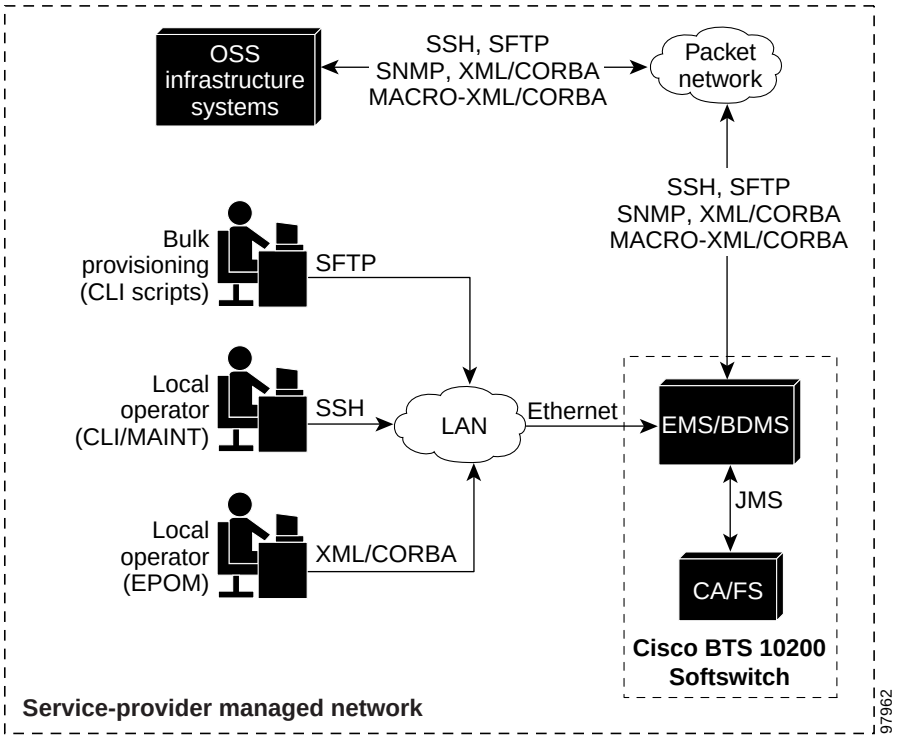
  Note See the *Cisco BTS 10200 Softswitch Provisioning Guide* for Bulk Provisioning information.

- Network Management System—provides events, alarms, thresholds and traffic monitoring management commands into the EMS using SNMP
- CORBA Client—provides events, alarms, thresholds and traffic monitoring management commands into the EMS via Common Object Request Broker Architecture (CORBA)

The EMS database holds up to 100 operator logins, and up to 50 user sessions can be active at any time.

The EMS interfaces internally with the Call Agent (CA) and Feature Server (FS) using the Java Message Service (JMS) protocol over IP Protocol.

Figure 2-1 Operator Interfaces (Billing interfaces also shown)



System Administrator Access

When logging in for the first time, log in as **btsadmin** (the default password is **btsadmin)**. You must change the password when you take possession of the system.

Logging into the EMS Using CLI

SSH is a way to access the BTS CLI or maintenance (MAINT) modes. SSH provides encrypted communication between a remote machine and the EMS/CA for executing CLI or MAINT commands. The SSH server runs on EMSs and CAs. To connect the client and server sides run the secure shell daemon (SSHD). With SSH, new users must enter a new password and reenter that password during the first login. In future logins they are prompted once for a password only.

When logging in for the first time, system administrators log in as **`btsadmin`** (the default password is **`btsadmin`**). Change the password.

Step 1 To log in from the client side for the first time: **`ssh btsadmin@<ipaddress>`**.

Note If you are logged in to the system as **`root`**, enter: **`btsadmin@0`**

On the first SSH login from the client side, expect a message like this:

```
The authenticity of host [hostname] can't be established.
Key fingerprint is 1024 5f:a0:0b:65:d3:82:df:ab:42:62:6d:98:9c:fe:e9:52.
Are you sure you want to continue connecting (yes/no)?
```

Step 2 Enter **yes**.

The password prompt appears, now all communications are encrypted.

Step 3 Enter your password.

The system responds with a CLI> prompt. You can now send commands to the EMS.

Step 4 Enter provisioning commands.

Step 5 To log off, enter **exit** .

Managing Users

You must have a user privilege level of 9 or higher to add, show, change, or delete a user.

Caution Do not add, change, or delete username ***root***, this prevents proper EMS access.

Table 2-1 Managing Users

Task	Sample Command
Adding a user	1. **add user name=UserABC; command-level=9; warn=10; days-valid=30; workgroups=somegroup;** 2. Supply a default password: **reset password name=<user name>; new-password=<user password>;**
Viewing a user	**show user name=UserABC;**
Viewing user activity	**show ems;**
Changing a user	**change user name=UserABC; command-level=1; workgroups=some-group;**
Deleting a user	**delete user name=UserABC;** You cannot delete ***optiuser***.

Table 2-1 Managing Users (continued)

Task	Sample Command
Changing a user's password	**reset password name=username; days-valid=<number of days the new password will be valid>; warn=<number of days before password expiration to warn user>;** **reset password name=username; days-valid=30; warn=4;** A password must: • Have 6-8 characters • Have at least two alphabetic characters • Have at least one numeric or special character • Differ from the user's login name and any combination of the login name • Differ from the old password by at least three characters Change the password for user ***optiuser*** on each BTS.
Adding a new work-group	**change command-table noun=mgw; verb=add; work-groups=latex;**
Adding a user to a work-group	**change user name=trs80nut; work-groups=+rubber;**
Removing a user from a work-group	**change user name=trs80nut; work-groups=-latex;**
Viewing all currently active users	**show session**
Viewing an active user	**show session terminal**

Table 2-1 Managing Users (continued)

Task	Sample Command
Blocking an active user	1. Select operation mode: • MAINTENANCE—(default) for regular maintenance • UPGRADE—for upgrades 2. **`block session terminal=USR16;`** **Note** You cannot block the session of a user with higher privileges than yours. Prevent BTS provisioning during an upgrade or maintenance window from the following interfaces: • CLI • FTP • CORBA • SNMP **Note** The software will support blocking HTTP interfaces in a future release. If you block provisioning before performing an SMG restart or EMS reboot, blocking is still enforced when these applications return to in-service state. There are two levels of blocking: • PROVISION—Prevents all provisioning commands from executing • COMPLETE—Prevents all commands from executing Only terminal type MNT users can use these blocking and unblocking commands. MNT users are never blocked. MNT users issue these commands from either active or standby EMS. A blocking command applies to all non-MNT users on terminals on either active or standby EMS. Commands do not execute for: • Logged-in users • Users who login after the block command Commands are not queued for execution after unblock. The CLI user prompt changes when blocked, notifying the user their commands will not execute.
Unblocking a user	**`unblock session terminal=USR16;`** **Note** You cannot unblock the session of a user with higher privileges.
Resetting a user's idle time	Idle time is how many minutes (1-30) a user can be idle before being logged off the BTS. **`change session idle-time=30;`**
Stopping a user's session	**`stop session terminal=USR16;`**

Managing Commands

Each command (verb-noun combination) has a security class of 1-10; 1 is lowest, 10 is highest. Each time a user enters a command, the system compares the user's privilege level to the command's security class. EMS denies the command if the user level is less than the command level.

The Command Level (command-level) table shows the 10 command security classes. BTS has the following presets:

- 1 (lowest level)
- 5 (mid-level)
- 10 (highest level)—These commands require a system administrator with a security level of 10 to execute.

Table 2-2 Managing Commands

Task	Sample Command
Viewing a command's security class	`show command-level id=10;`
Adding a description to a command's security class	`change command-level id=10; description=This is the highest level administration access;`
Changing a command's privilege level	`change command-table noun=mgw; verb=add; sec-level=9;`
Resetting a command's privilege level	`reset command-table noun=mgw; verb=add;`
Viewing all executed commands	`show history;`
Sending all executed commands to a report file	`report history;`
Viewing the report of all executed commands	1. In a web browser enter http://server name. 2. Click Reports. 3. Click *history.html*.
Viewing a security summary	`report security-summary start-time=2002-09-26 00:00:00; end-time=2002-09-27 00:00:00; source=all;`
Viewing security summary reports	In a web browser enter https:// <ems ip addr>.

CHAPTER 3

Operations

Revised: July 21, 2009, OL-4495-10

Introduction

This chapter contains recommended operating procedures for the Cisco BTS 10200 Softswitch. In these procedures, the assumption is that all components have been correctly installed, configured, and provisioned in accordance with the instructions provided in the relevant documentation. All components are assumed to have been successfully started, as described in Chapter 1, "Cisco BTS 10200 Softswitch Startup and Shutdown Procedures".

Note Operation of the Cisco BTS 10200 Softswitch should be performed by a system administrator who has been trained in the complexities of the system and has some experience administering the system.

Administering and Monitoring System Components

The Cisco BTS 10200 Softswitch provides a user interface for administering and monitoring the following internal system components:

- Call Agent (CA)
- Feature Server (FS)
- Element Management System (EMS)
- Bulk Data Management System (BDMS)

Using Status and Control States

This section describes the use of status and control states, and includes the following topics:

- Determining the Status of and Controlling the Feature Server
- Reporting and Controlling the EMS Status with the Status and Control Commands
- Determining and Controlling Bulk Data Management System Status with the Status and Control Commands
- Additional BDMS Status and Control Examples

Displaying Operational States of Components with the Status Command

The operational (status) states of the components are displayed using the *status* command. Typical examples of the command are:

```
status element-manager id=EM01;
status element-manager id=BDMS01;
status call-agent id=CA146;
status feature-server=FSPTC235;
status feature-server=FSAIN205;
```

Status states can be in either Normal or Forced mode. Table 3-1 lists status state modes and descriptions.

Table 3-1 Status State Modes

State Mode	Description
STARTUP	During platform startup, the two sides are communicating to determine which side will come up active.
INIT-NORMAL	Primary will be Active, Secondary will be Standby; switchover allowed.
INIT-FORCED	Primary will be forced to Active or Standby, Secondary will be forced to Standby or Active; no switchover allowed.
ACTIVE-NORMAL	Primary is Active, Secondary is Standby; switchover allowed.
ACTIVE-FORCED	Primary or Secondary has been forced to Active; no switchover allowed.
STANDBY-NORMAL	Primary should be Active, Secondary should be Standby; switchover allowed.
STANDBY-FORCED	Primary or Secondary has been forced to Standby; no switchover allowed.
TRANSITION-TO-ACTIVE-NORMAL	Primary is going to Active, Secondary is going to Standby; switchover allowed.
TRANSITION-TO-ACTIVE-FORCED	Primary has been forced to Active or Standby; Secondary has been forced to Standby or Active; no switchover allowed.
TRANSITION-TO-STANDBY-NORMAL	Primary is going to Standby, Secondary is going to Standby; switchover allowed.
TRANSITION-TO-STANDBY-FORCED	Primary has been forced to Active or Standby; Secondary has been forced to Standby or Active; no switchover allowed.

Switching Administrative Service States of Internal Component Pairs with the Control Command

The operator can use the *control* commands to switch the administrative service state (target state, or control state) of each internal component pair—EMS pair, BDMS pair, CA pair and FS pair. Each switching command will take approximately 20 seconds to complete on the system.

Following are typical examples of the command:

```
control call-agent id=CA146; target-state=FORCED-STANDBY-ACTIVE;
Invalid parameter value.
target_state=FORCED_STANDBY_ACTIVE;
```

Enter one of the following values:

- ACTIVE_STANDBY
- STANDBY_ACTIVE

Control states can be in either Normal or Forced mode. Table 3-2 lists control state modes and descriptions.

Table 3-2 Control State Modes

Control State	Description
NORMAL	Primary is active and secondary is standby.
FORCED-ACTIVE-STANDBY	Primary has been forced to active and secondary is standby.
FORCED-STANDBY-ACTIVE	Primary has been forced to standby and secondary is active.

One of the following messages is returned when a control command is successful:

```
Reconfigured Successfully
Already in this configuration
```

One of the following messages is returned when a control command fails:

```
Mate Changeover Timeout
Mate Refused Changeover
If this command is executed it will cause a System Outage
Invalid Configuration
Local Changeover Timeout
Local Changeover Failure
```

Showing the State of an Application with the Status Application Command

The **status application** command shows the state of any Cisco BTS 10200 Softswitch application (CA, FS, EMS, BDMS), including uptime, side indications and additional qualifying reason information.

Tip The **status application** command is a CLI command that provides more detail than the status <element-manager, call-agent, feature-server, or bdms> commands, including, for example, time stamps and restart counters. The **status application** command provides information similar to the nodestat command without using a root command.

Command Types Status

Examples

```
status application id=CA146;
status application id=EM01;
```

Syntax Description

ID	Type of application. VARCHAR(8): 1–8 ASCII characters. Permitted values are: CAnnn (or cannn)—CA EMnn (or emnn)—EMS BDMSnn (or bdms)—BDMS FSPTCnnn (or fsptcnnn)—FSPTC FSAINnnn (or fsainnnn)—FSAIN

Controlling the State of an Application with the Control Application Command

The **control application** command controls the state of an application instance. This command takes the application specified either in service or out of service.

Tip The **control application** command is a CLI command that provides functionality similar to the platform stop/start commands without using a root command.

Caution Use this command with extreme caution, because it has a significant affect on operation of the host machine.

Command Types

Control

Examples

```
control application id=CA146; action=star;node=prica06
control application id=CA146; action=stop;node=prica06
control application id=EM01; action=start;node=prica06
control application id=EM01; action=stop;node=prica06
```

Syntax Description

ID	Type of application. VARCHAR(8): 1–8 ASCII characters. Permitted values are: CAnnn (or cannn)—CA EMnn (or emnn)—EMS BDMSnn (or bdms)—BDMS FSnnn (or fsnnn)—FS
ACTION	Activity to perform. Permitted values are: START—Start a CA, EMS, BDMS, or FS. STOP—Stop a CA, EMS, BDMS, or FS.

Determining the Status of a Call Agent with the Status and Control Commands

This section describes the status and control commands for the Cisco BTS 10200 Softswitch Call Agent.

Status Command

The status command reports the status of a Call Agent.

Command Types

Status

Examples

```
status call-agent id=CA146;
```

Reply Example:

```
APPLICATION INSTANCE -> Call Agent [CA146]
PRIMARY STATUS -> ACTIVE
SECONDARY STATUS -> STANDBY

Reply : Success:
```

Control Command

The control command puts the Call Agent into a specific mode (state).

Command Types

Control

Examples

```
control call-agent id=CA146; target-state=standby-active;
control call-agent id=CA146; target-state=active-standby;
```

Reply Example:

```
Request was successful
REPLY=CONFIGURATION COMMAND EXECUTED->Reconfigured successfully.
```

Determining the Status of and Controlling the Feature Server

This section describes the status and control commands for the Cisco BTS 10200 Softswitch Feature Server.

Status Command

The status command reports the status of a Feature Server.

Command Types Status

Examples

```
status feature-server id=FSAIN205.Cisco.com;
```

Reply Example:

```
target-state=active-standby;
```

Control Command

The control command puts a Feature Server into a specific mode (state).

Command Types Control

Examples

```
control feature-server id=FSAIN205.Cisco.com; target-state=standby-active;
```

Reply Example:

```
Request was successful
REPLY=CONFIGURATION COMMAND EXECUTED->control feature-server LOCAL STATUS
```

Reporting and Controlling the EMS Status with the Status and Control Commands

This section describes the status and control commands for the Cisco BTS 10200 Softswitch Element Management System (EMS). These commands are specific to the EMS. For Billing commands, see the "Determining and Controlling Bulk Data Management System Status with the Status and Control Commands" section on page 3-7.

Status Command

The status command reports the status of an EMS.

Command Types Status

Examples

```
status element-manager id=EM01;
```

Reply Example:

```
Reply : Success:

        ELEMENT MANAGER STATUS IS... ->

        APPLICATION INSTANCE -> Element Manager [EM01]
        PRIMARY STATUS -> ACTIVE_NORMAL
        SECONDARY STATUS -> FAULTY

        EMS MYSQL STATUS IS ... -> Daemon is running!

        ORACLE STATUS IS... -> Daemon is running! Control Command
```

Control Command

The control command puts an EMS into a specific mode (state).

Command Types Control

Examples

```
control element-manager id=EM01; target-state=active-standby;
```

Reply Example:

```
Request was successful
REPLY=CONFIGURATION COMMAND EXECUTED->CONTROL EMS LOCAL STATUS
```

Determining and Controlling Bulk Data Management System Status with the Status and Control Commands

This section describes the status and control commands for the Cisco BTS 10200 Softswitch Bulk Data Management System (BDMS).

Status Command

The status command reports the status of the BDMS.

Command Types Status

Examples

```
status bdms id=BDMS01;
```

Reply Example:

```
Reply : Success:
BILLING SERVER STATUS IS... ->

APPLICATION INSTANCE -> Bulk Data Management Server [BDMS01]
PRIMARY STATUS -> ACTIVE
SECONDARY STATUS -> STANDBY

BILLING MYSQL STATUS IS... -> Daemon is running!
```

Control Command

The control command puts the BDMS into a specific state (mode).

Command Types

Control

Examples

control bdms id=BDMS01; target-state=active-standby;

Reply Example:

```
Reply : Success:

APPLICATION INSTANCE -> Bulk Data Management Server [BDMS01]
REASON -> CONFIGURATION COMMAND EXECUTED->CONTROL BDMS LOCAL STATUS System
```

Additional BDMS Status and Control Examples

Use the following steps to verify the status of the BDMS and switch the administrative states.

Step 1 Verify the status of the BDMS. Enter the following command:

status bdms; id=BDMS01;

Reply Example:

```
BILLING SERVER STATUS IS... ->

APPLICATION INSTANCE -> Bulk Data Management Server [BDMS01]
PRIMARY STATUS -> ACTIVE_NORMAL
SECONDARY STATUS -> FAULTY

BILLING ORACLE STATUS IS... -> Daemon is running!

Reply : Success:
```

Step 2 Modify the status of the BDMS. Enter the following command:

control bdms id=BDMS01; target-state=FORCED_ACTIVE_STANDBY

Reply Example:

```
Success:

APPLICATION INSTANCE -> Bulk Data Management Server [BDMS01]
REASON -> Application instance reconfigured successfully
```

Step 3 Verify the status of the BDMS. Enter the following command:

status bdms; id=BDMS01;

Reply Example:

```
Success:

REPLY=CONFIGURATION COMMAND EXECUTED -> status billing_server
PRIMARY STATUS -> ACTIVE_FORCED
SECONDARY STATUS -> STANDBY_FORCED
```

Step 4 Modify the status of the BDMS. Enter the following command:

```
control bdms id=BDMS01; target-state=FORCED_STANDBY_ACTIVE
```

Reply Example:

```
Request was successful.

REPLY=CONFIGURATION COMMAND EXECUTED -> Reconfigured Successfully
```

Step 5 Verify the status of the BDMS. Enter the following command:

```
status bdms id=BDMS01;
```

Reply Example:

```
Request was successful.

REPLY=CONFIGURATION COMMAND EXECUTED -> status billing_server
PRIMARY STATUS -> STANDBY_FORCED
SECONDARY STATUS -> ACTIVE_FORCED
```

Step 6 Modify the status of the BDMS. Enter the following command:

```
control bdms id=BDMS01; target-state=FORCED-ACTIVE-STANDBY;
```

Reply Example:

```
Request was successful.

REPLY=CONFIGURATION COMMAND EXECUTED -> Reconfigured Successfully
```

Determining System Status with the Status Command

The status system command returns the status of all applicable components of the system.

Command Types

Status

Examples

```
status system;
```

Reply Example:

```
  Checking Call Agent status ...
  Checking Feature Server status ......
  Checking Billing Server status ...
  Checking Billing Oracle status ...
  Checking Element Manager status ...
  Checking EMS MySQL status ...
  Checking ORACLE status ...


  CALL AGENT STATUS IS... ->

  APPLICATION INSTANCE -> Call Agent [CA146]
  PRIMARY STATUS -> ACTIVE
  SECONDARY STATUS -> STANDBY

  FEATURE SERVER STATUS IS... ->
```

```
APPLICATION INSTANCE -> Feature Server [FSPTC235]
PRIMARY STATUS -> ACTIVE
SECONDARY STATUS -> STANDBY

FEATURE SERVER STATUS IS... ->

APPLICATION INSTANCE -> Feature Server [FSAIN205]
PRIMARY STATUS -> ACTIVE
SECONDARY STATUS -> STANDBY

BILLING SERVER STATUS IS... ->

APPLICATION INSTANCE -> Bulk Data Management Server [BDMS01]
PRIMARY STATUS -> ACTIVE
SECONDARY STATUS -> STANDBY

BILLING ORACLE STATUS IS... -> Daemon is running!

ELEMENT MANAGER STATUS IS... ->

APPLICATION INSTANCE -> Element Manager [EM01]
PRIMARY STATUS -> ACTIVE
SECONDARY STATUS -> STANDBY

EMS MYSQL STATUS IS ... -> Daemon is running!

ORACLE STATUS IS... -> Daemon is running!

Reply : Success:
```

Activating a Media Gateway

The **control** command is used to change the state of the media gateway to "in service." You should monitor the Cisco BTS 10200 Softswitch transaction queue to verify that the media gateway has been successfully added before trying to activate the media gateway.

To verify that the media gateway has been added and to activate the media gateway, complete the following steps:

Step 1 Execute the following command, using the transaction-id of the command that added the media gateway. Enter the following command:

```
show transaction-queue transaction-id=1029944382523

Reply: Success: Database is void of entries.
```

Step 2 If the above response is received, you can execute the **control** command to activate the media gateway. Enter the following command:

```
control mgw id=<mgw-id>; target-state=ins; mode=forced;
```

Data elements specified in this command are:

- **mgw id**—The unique identifier of the voice port on the subscriber's MTA, which is created by taking the voice port's MAC address and stripping out all the hyphens.
- **target-state**—Use "ins" to indicate "in service" for all activations.

- **mode**—Use “forced” for all activations.

Archiving Your Database

Step 1 Login as **root**.

Step 2 Switch from user **root** to user **oracle**:

```
su - oracle
```

Step 3 Verify the Oracle replication queue is empty:

```
dbadm -r dbadm -r get_unpushed_trans
```

You should see the following:

```
================================================
Transaction statements (calls) not been pushed
================================================
no rows selected
```

If the output shows unpushed transactions, wait a few seconds and repeat this step until the queue is empty.

Step 4 Switch from user **oracle** to user **root** by exiting:

```
exit
```

Step 5 Stop all platforms. If this is a primary node, use the CLI command to control the standby forced active.

Step 6 Verify that “/var/yp” exists. Enter:

```
ls -l /var/yp
```

If the result is “no such file or directory”, enter:

```
mkdir -p /var/yp
```

Step 7 Mount the NFS server. Enter:

```
mount <nfsserver hostname/ip>:/<share directory> /mnt
```

Example:

```
mount 10.89.183.253:/opt/archive /mnt
```

Step 8 Back up all interfaces. Enter:

```
tar -cvf  /mnt/<local_hostname>.tar host*
```

Example:

```
<hostname>#tar -cvf bts-prica.tar host.*
```

Step 9 Restore the Solaris “**date**” command to create the system Flash Archive. Enter:

```
mv /bin/date /bin/date.orig
mv /bin/.date /bin/date
```

Step 10 Create the archive. Enter:

```
<hostname>#flarcreate -n <archive name> -x /opt -S -c /mnt/<file name>
```

Note Example archive name: flarcreate -n **CCPU-EMS** -x /opt -S -c /mnt/secems04.archive

Step 11 Back up the **/opt** directory. Enter:

```
tar -cvf - /opt/* |gzip -c >/opt/<hostname_release>.tar.gz
```

Step 12 Restore the original configuration. Enter:

```
mv /bin/date /bin/.date
mv /bin/date.orig /bin/date
```

Step 13 Unmount the NFS server. Enter:

```
umount /mnt
```

Show and Change Database Usage Commands

This section describes the following:

- **show** command paging capability for batch data retrieval
- **show** command for database usage
- **change db-usage** command

Retrieving Batch Data with the Show Command Paging Capability

The **show** command paging capability is used for retrieving subscriber related records (such as SUBSCRIBERS, TERMINATIONS, SUBSCRIBER_SERVICE_PROFILES) in batches.

The following parameters apply to all show commands that operate on provisioning data. These parameters are particularly useful when displaying tables containing large amounts of data such as SUBSCRIBERS and TERMINATIONS.

- **limit** specifies the page size for the maximum number of rows (or lines) returned in response to the query.
- **start_row** specifies the location in the data set where to start the page to be displayed. (The data set is the entire set of data that can be displayed as a result of the **show** command.)

Note The default value for **start_row** is **1** (or the first row of data).

- **display** shows only the columns of data requested. The display is a comma-separated list of the desired columns.
- **order** provides a key for ordering or sorting the data. More than one item can be specified for the sort.

Example: Controlling the Volume and Format of Data

In the following example, the **show** command parameters are used to control the volume and format of data to be displayed:

```
show subscriber limit=1000; start_row=<next page value>;
```

Where:

- **subscriber limit=1000** specifies the page size as 10 rows. The first page contains the total size of the display (such as 12,000 rows).
- **start_row=<next page value>** specifies the location in the data set where to start the page to be displayed.

Example: Ordering and Displaying Specific Data

In the following example, the **show** command parameters are used to order and display only the desired data:

```
show subscriber limit=1000; start_row=<next page value>; display=id,sub_service_profile;
order=id;
```

Where:

- **subscriber limit=1000** indicates that 1000 is the maximum number of rows in a page. The first page contains the total size of the display (such as 12,000 rows).
- **start_row=<next page value>** specifies the location in the data set where to start the page to be displayed.
- **display=id,sub_service_profile** indicates that the data is sorted by **id** column. The subscribers can be alphabetized by sorting according to the **name** or another parameter. The **display** parameter is a comma-separated list of parameters used to sort the returned data. In this example, only the **id** and **sub_profile_id** columns of data are displayed from the subscriber table.
- **order=id** means that the data is sorted by **id** column.

Show Database Usage Command

The **show db-usage** command returns and modifies the maximum number of records allowed, as well as the number of licensed and current database records. Records can be shown and changed but cannot be deleted.

The EMS updates the *current number of records* field in real time. The db-usage command also uses the Database Threshold (db-thresholds) table, which contains default alarm threshold parameters that are provisioned during installation. Parameters can be changed and shown. The default threshold parameters are:

- 80 percent minor
- 85 percent major
- 90 percent critical

Note Do not use a hyphen (-) in the actual name of a table when using this command. Use the underscore (_). For example, dial_plan is correct; dial-plan is not correct.

Use the following command example to show db-usage statistics:

```
show db-usage table-name=dial_plan;
```

Change db-usage

Use the following command example to change db-usage tokens and values:

```
change db-usage table-name=dial-plan; minor-threshold=70;major-threshold=80;
critical-threshold=95;
```

Viewing and Manipulating Transactions

This section describes the commands and tables for viewing and manipulating transactions.

Transaction Queue Command

The transaction-queue command allows users to view and delete entries in a transaction queue, if any exist.

The Transaction Queue table tracks updates into the database, as well as into the shared memory of the Call Agent and Feature Servers. Entries should never remain in the transaction queue for more than a few seconds, unless an Element Management System (EMS), Call Agent, or Feature Server is in an error state. In case of an error state, the transaction queue continues to store entries for later updates.

Note Transaction queue entries can be deleted but not changed.

Showing Entries with the Show Transaction Queue Command

Use the following command example to show any entries in a transaction queue:

```
show transaction-queue target=CA146
```

Deleting Entries with the Delete Transaction Queue Command

Use the following command example to delete any entries in a transaction queue.

```
delete transaction-queue target=CA146
```

Caution The ***delete transaction-queue*** command causes a database inconsistency. Call the Cisco Systems Technical Assistance Center (Cisco TAC) to determine the necessity of using this command.

Blocking Provisioning

Prevent BTS provisioning during an upgrade or maintenance windowfrom the following interfaces:

- CLI
- FTP
- CORBA
- SNMP

Note The software will support blocking HTTP interfaces in a future release.

If you block provisioning before performing an SMG restart or EMS reboot, blocking is still enforced when these applications return to in-service state.

There are two levels of blocking:

- PROVISION—prevents all provisioning commands from executing
- COMPLETE—prevents all commands from executing

Who Can Block?

Only terminal type “MNT” users can use these blocking and unblocking commands. “MNT” users are never blocked. “MNT” users issue these commands from either Active or Standby EMS.

Who Can Be Blocked?

A blocking command applies to all non-“MNT” users on terminals on either Active or Standby EMS. Commands do not execute for:

- logged-in users
- users who login after the block command

Commands are not queued for execution after unblock. The CLI user prompt changes when blocked, notifiying the user their commands will not execute.

Using Block and Unblock Commands

Step 1 Select operation mode:

- MAINTENANCE—(default) for regular maintenance
- UPGRADE—for upgrades

Step 2 Use block/unblock commands.

Step 3 Exit the blocked mode using the “unblock session” command.

Viewing a Call Trace Summary

The Call Trace Summary command reports the information gathered when a customer activates a trace by pressing *57 on the telephone. This command logs information pertaining only to the most recently received call. Report is the only command type. Using the command without any tokens returns all entries in the table.

Use the following command example to report call trace information:

```
report call-trace-summary
```

Note Table information is logged from the switch. If the system cannot decipher the information from the switch, it returns the value UNKNOWN in the applicable field.

The report appears on the screen. No HTML report is generated.

Using the Command Scheduler to Schedule Command Executions

The Command Scheduler allows you to schedule a command to execute daily, weekly, or monthly at a specific time. Once a command is scheduled, the Scheduler allows you to remove a command from the schedule. Regardless of whether the command previously executed, the command can be removed at any time. If the command is scheduled to recur and is currently executing within the Element Management System (EMS), the command completes in a normal fashion but is removed from the list from that point forward.

It is often necessary to schedule commands to occur during periods of least system activity. Using the start-time and recurrence command tokens, you can schedule commands at any time and at any frequency. The recurrence token schedules a command daily, weekly, or monthly. Scheduling a command without the recurrence token causes the Command Scheduler to execute the command only once.

The characteristics of a scheduled command are read once at execution time. During execution, the characteristics can be changed but do not affect the command that is running.

Showing a Scheduled Command

Use the following command example to show a particular scheduled command:

Note A command must be added before it can be shown.

```
show scheduled-command id=1234;
```

Adding a Scheduled Command

Use the following command example to add a scheduled command:

```
add scheduled-command start-time=2001-10-01 12:22:22; noun=database; verb=audit;
```

Changing a Scheduled Command

Use the following command example to change a scheduled command:

```
change scheduled-command id=1234; start-time=2001-10-02 20:00:00;
```

Deleting a Scheduled Command

Use the following command example to delete a scheduled command:

```
delete scheduled-command id=1234;
```

Controlling the Subsystem Group In or Out of Service

The Subsystem Group table has a status associated with it. The operator can control a subsystem group in or out of service. Controlling the subsystem group out of service has the same affect as controlling all the subsystems in the subsystem group out of service. Controlling the subsystem group in service puts all subsystems in the group in service.

The following CLI command controls both subsystem/OPC combinations out of service:

```
control subsystem_grp id=CNAM; mode=forced; target_state=UOS;

SUBSYSTEM GRP ID -> CNAM

INITIAL STATE -> User in service

RESULT STATE -> User out of service

REQUEST STATE -> User out of service

FAIL REASON -> ADM found no failure

REASON -> ADM executed successfully

RESULT -> ADM configure result in success

Reply : Success: CLI change successfully
```

Note If a subsystem/OPC combination is taken out of service individually, the state of the subsystem group may be in service while some members of the group are out of service.

Requesting the Status of a Subsystem Group

The operator may request the status of the subsystem group table. The following example CLI command requests status:

```
status subsystem_grp id=CNAM

SUBSYSTEM GRP ID -> CNAM
```

```
REASON -> ADM executed successfully

RESULT -> ADM configure result in success

ADMIN STATE -> User in service

OPER STATE -> Subsystem Group allowed

Reply : Success:
```

Monitoring the Host Operating System Time

The Solaris Operating System (OS) obtains the system time automatically through network time protocol (NTP) services.

Caution Users should never attempt to modify the system date or time in their Cisco BTS 10200 Softswitch host machines while system components (CA, FS, EMS, and BDMS) are running. This could cause the system to have serious problems. Allow the Solaris OS to obtain the time automatically through NTP services.

Performing Local Number Portability Functions

This section describes local number portability (LNP) operation on the Cisco BTS 10200 Softswitch in the following subsections:

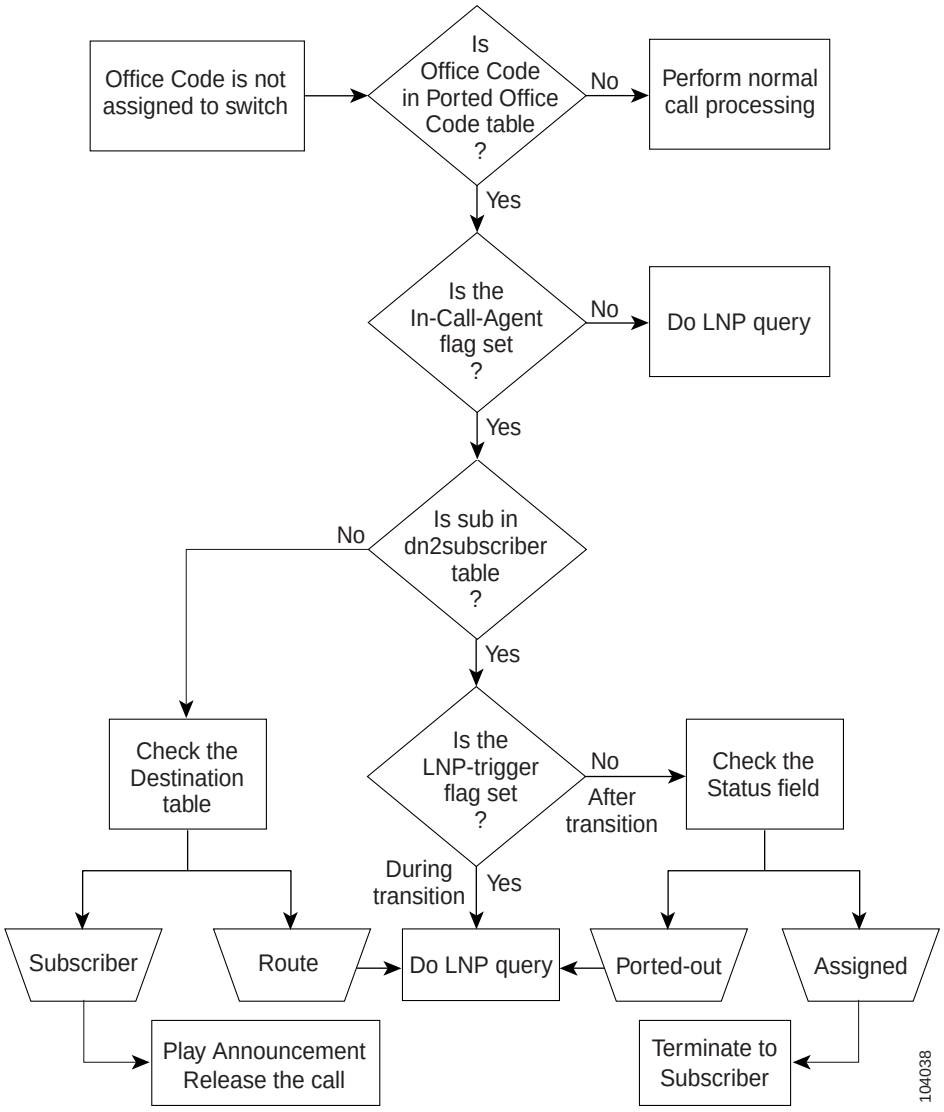
- LNP Call Flow, page 3-18
- Disconnecting Service to a Subscriber with a Ported Telephone Number, page 3-23

To perform LNP functions, start with establishing a CLI session. See Logging into the EMS Using CLI, page 2-2 for information.

LNP Call Flow

Figure 3-1 shows the processing of a call in which the office code is not one that is normally assigned to the switch. This chart points out the various parameters and flags that must be set to ensure that calls are processed correctly before, during, and after a subscriber's number is ported-in or ported-out of a switch.

Figure 3-1 Ported-in Call Processing for Originating Calls



The porting-in process is complete when:

- The subscriber's line is physically connected to the switch.
- The subscriber's office code is added to the OFFICE-CODE table.
- The subscriber's number is added to the DN2**SUBSCRIBER** table.
- The **in-call-agent** flag is set to Y (ported-in) in the **PORTED-OFFICE-CODE** table.
- The **lnp-trigger** flag is set to N in the DN2SUBSCRIBER table.

Porting-out a Subscriber

In some cases, subscribers will want to discontinue their service, but take their telephone number with them to their new service provider. This is similar to the port-in case described previously, where the **lnp-trigger** is set to Y at the beginning of the porting process to ensure that all calls are routed according to the national LNP databases. This is necessary because the national LNP database has authority on when and where to route calls to a ported number, although the number may still exist in the local DN2SUBSCRIBER table.

When subscribers want to move their service to another service provider and request LNP service, log in to the Cisco BTS 10200 Softswitch as described in the "Logging into the EMS Using CLI" section on page 2-2, and enter the CLI commands as described in the following sections:

- Changing lnp-trigger to Y (Yes), page 3-21
- Changing DN Status to Ported-Out, page 3-22
- Deactivating a Customer's Service, page 3-22

Activating a Subscriber

Use the **control** command to change the state of the subscriber to "in service." Monitor the Cisco BTS 10200 Softswitch transaction queue to verify that the subscriber has been successfully added before trying to activate the subscriber.

To verify that the subscriber has been added and to activate the subscriber, complete the following steps:

Step 1 Enter the following command, using the transaction-id of the command that added the subscriber:

```
show transaction-queue transaction-id=1029944382524
```

Text similar to the following is displayed:

```
Success: Database is void of entries.
```

Step 2 If the above response is received, enter the **control** command to activate the subscriber:

```
control subscriber-termination id=<subscriber id>; target-state=INS; mode=FORCED;
```

The data elements specified in this command are described as follows:

subscriber-termination id	The unique identifier of the subscriber's VoIP service, formed by concatenating the subscriber's identifier from the division billing system and the number of the voice port used for the service on the MTA (for example, 8223130012388228_01).
target-state	Use "ins" to indicate in service for all activations.
mode	Use "forced" for all activations.

Changing lnp-trigger to N (No)

After the activation for a ported-in number is complete, the Cisco BTS 10200 Softswitch must be updated so that calls to this number from MTAs on this switch are routed directly to the subscriber's MTA, instead of having the switch perform an LNP query and route the call to the CLEC switch, only to have it route the call back to the Cisco BTS 10200. To accomplish this, reset the **lnp-trigger** flag to N.

To reset the **lnp-trigger** flag to N, complete the following steps:

Step 1 Retrieve the office-code-index by entering the following command:

```
show office-code digit-string=<NPA-NXX of the ported TN>;
```

The Cisco BTS 10200 Softswitch returns the office-code-index.

Step 2 Change the **lnp-trigger** flag to N by entering the following command:

```
change dn2subscriber office-code-index=
    <office-code-index of ported TN's NPA-NXX>;
dn=<XXXX of the ported TN>; lnp-trigger=N;
```

Note Setting the **lnp-trigger** flag to N (No) prevents the initiation of unconditional LNP queries.

Changing lnp-trigger to Y (Yes)

When a service order to port out a number has been issued, change the **lnp-trigger** to Y (Yes) to ensure the routing of calls to the number is done according to the NPAC SMS national LNP databases.

To change the **lnp-trigger** to Y (Yes), perform the following steps:

Step 1 To retrieve the office-code-index, enter the following command:

```
show office-code digit-string=<NPA-NXX of the ported TN>;
```

The Cisco BTS 10200 returns the office-code-index.

Step 2 Change the **lnp-trigger** to Y (Yes) by entering the following command:

```
change dn2subscriber office-code-index=
    <office-code-index of ported TN's NPA-NXX>;
dn=<XXXX of the ported TN>; lnp-trigger=y;
```

Changing the **lnp-trigger** to Y (Yes) results in calls to this DN initiating an unconditional LNP query.

Leave the status of the DN=ASSIGNED in the DN2SUBSCRIBER table because initially, calls to the DN may have to be routed to the porting-out subscriber's MTA, based on the results of the LNP queries. Wait until the CLEC reports a Completed state for the transfer before changing the status of the DN.

Changing DN Status to Ported-Out

After the CLEC reports a Completed state, change the status of the number in the DN2SUBSCRIBER table to “ported-out” by completing the following steps:

Step 1 To retrieve the office-code-index, enter the following command:

```
show office-code digit-string=<NPA-NXX of the porting TN>;
```

The Cisco BTS 10200 Softswitch returns the office-code-index.

Step 2 Change the status of the DN to ported-out by entering a command similar to the following:

```
change dn2subscriber office-code-index=
    <office-code-index of porting TN's NPA-NXX>;
dn=<XXXX of the porting TN>; status=ported-out; sub-id=null;
```

Deactivating a Customer’s Service

To deactivate a customer’s service, complete the following steps:

Step 1 To change the status of the subscriber’s termination to out of service, enter the **control** command:

```
control subscriber-termination target-state=oos; mode=forced; id=<subscriber id>;
```

Data elements specified in this command are:

- **target-state**—Use “oos” to indicate out of service for all deactivations.
- **mode**—Use “forced” for all deactivations.
- **subscriber id** —Unique identifier of the subscriber’s VoIP service.

Step 2 To deactivate the subscriber's MTA (media gateway), enter the **control** command:

```
control mgw id=<mgw-id>; target-state=oos; mode=forced;
```

The data elements specified in this command are:

- **mgw id**—The unique identifier of the voice port on the subscriber's MTA, which is created by taking the voice port's MAC address and stripping out all the hyphens.
- **target-state**—Use “oos” to indicate out of service for all deactivations.
- **mode**—Use “forced” for all deactivations.

Step 3 To remove the association between the subscriber and the VoIP service ID, enter the **delete** command:

```
delete subscriber-service-profile sub-id=<subscriber id>; service-id=1;
```

Data elements specified in this command are:

- **subscriber id**—Unique identifier of the subscriber’s VoIP service.
- **service-id**—Identifies the “bundle” of CLASS features enabled for the subscriber.

Step 4 To remove the subscriber from the Cisco BTS 10200 Softswitch database, enter the **delete** command:

```
delete subscriber id=<subscriber-id>;
```

The only data element specified in this command is:

- **subscriber id**—Unique identifier of the subscriber's VoIP service.

Step 5 To remove the VoIP service from the MTA (media gateway), enter the **delete** command:

```
delete termination prefix=aaln/; port-start=1; port-end=2; mgw_id=<mgw-id>;
```

Data elements specified by this command are:

- **termination prefix**—Use "aaln/" for all subscribers, indicating "analog line".
- **port-start**—Use 1 for all subscribers. Ensure that this is consistent with MTA configuration files.
- **port-end**—Use 2 for all subscribers. Ensure that this is consistent with MTA configuration files.
- **mgw-id**—The unique identifier of the voice port on the subscriber's MTA, which is created by taking the voice port's MAC address and stripping out all the hyphens.

Step 6 To remove the subscriber's MTA from the Cisco BTS 10200 database, enter the **delete** command:

```
delete mgw id=<mgw-id>;
```

The only data element specified by this command is:

- **mgw-id**—The unique identifier of the voice port on the subscriber's MTA, which is created by taking the voice port's MAC address and stripping out all the hyphens.

Disconnecting Service to a Subscriber with a Ported Telephone Number

Disconnecting service to a subscriber who has a ported telephone number requires interaction with the NPAC SMS, as illustrated in Figure 3-2.

To disconnect a subscriber who has a ported telephone number, complete the following steps:

Step 1 As the service provider, set a time and date with the subscriber to disconnect service.

Step 2 Send an update indicating the service disconnection to the appropriate NPAC SMS. The following events occur:

a. When the service disconnection notification is received, NPAC SMS broadcasts the update to all service providers.

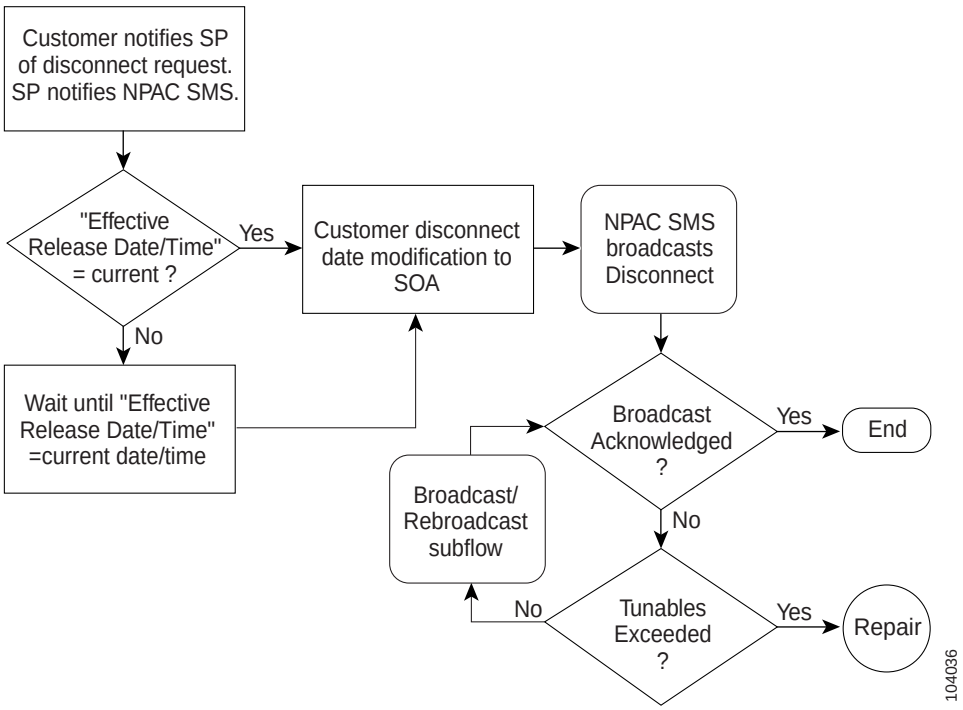
b. On the effective date, NPAC SMS removes the ported telephone number from its database of ported numbers.

Note If you (the service provider) need to change the Customer Disconnect Date (CDD) or Effective Release Date (ERD) of the disconnect, the you must send a modify request to the NPAC SMS.

Step 3 When an update is received, all service providers must remove the telephone number from their LNP databases.

NPAC SMS logs the update in a history file, and calls to the telephone number are routed as if it were a non-ported number.

Figure 3-2 Disconnect Ported Number Work Flow



Changing Subscriber DN

The change number feature enables you to change the directory number of a subscriber. The following procedures enable you to change a directory number of a subscriber and to remove the old directory number announcement.

Changing a Subscribers Directory Number

To change the directory number of a subscriber, do the following:

Step 1 Change the subscriber DN to the new DN.

```
change sub id=<id>; dn1=<new-DN>;
```

Example:

```
change sub id=sub1; dn1=206-222-1841;
```

Step 2 Use the show subscriber command to verify the new DN.

```
show sub id=<id>
```

Example:

```
show sub id=sub1;

Dn1 indicates 206-222-1841
```

Step 3 Verify that the changed number (old DN) of the subscriber is being tracked in the changed-number table.

```
show changed-number old-dn=<old-dn>
```

Example:

```
show changed-number OLD-DN=206-222-2345
```

Step 4 Use the dn2subscriber table to verify that the old DN is in the changed number (CN) state and new DN is in assigned state. Check if the status of the old DN is CN.

```
show dn2subscriber FDN=<old-DN>;
```

Example:

```
show dn2subscriber FDN=206-222-2345;
```

Check if the status of the new DN is assigned.

```
show dn2subscriber FDN=<new-DN>;
```

Example:

```
show dn2subscriber FDN=206-222-1841;
```

Step 5 Place an incoming call to the new DN and verify the call is setup successfully.

Step 6 Place an incoming call to the old DN and verify that the announcement played is "<old DN> has been changed to <new DN>."

If an announcement is not played, do the following:

- Verify if the release cause id maps to annc-id=118.

  ```
  show release-cause id=22;
  ```

- Verify if the announcement id maps to announcement-number 301.

  ```
  show annc id=118;
  ```

Old Directory Number Announcement Removal

If you do not want to play an announcement for the old DN anymore, do the following:

Step 1 Delete the changed-number entry.

```
delete changed-number old-DN=<old-DN>;
```

Step 2 Change the status of the old DN to DISC in the dn2subscriber table.

```
change dn2subscriber DN=<old-DN>; status=DISC;
```

Troubleshooting LNP Problems

See the *Cisco BTS 10200 Troubleshooting Guide* for details on troubleshooting LNP problems.

Problems can arise when porting a subscriber's telephone number from one service provider to another. The Network Interconnection Interoperability Forum (NIIF), a part of the ATIS organization, has published a document (ATIS/NIIF-0017) that includes detailed steps that service providers should follow when LNP problems are encountered. The document is titled *Guidelines for Reporting Local Number Portability Troubles in a Multiple Service Provider Environment*, and it is available at http://www.atis.org/atis/clc/NIIF/niifdocs.htm.

The NIIF also maintains the National LNP Contact Directory, a protected document that provides telephone numbers of 24x7 LNP-qualified contacts for each service provider. The directory is located at the URL given above. You can download and submit an application for a password at the same URL.

Managing Billing Interface and Billing Records

See the *Cisco BTS 10200 Softswitch Billing Interface Guide for details on managing the billing interface and billing records.*

The billing subsystem on the EMS gathers all billing related call events from call processing, formats them into a standard format, and transmits them to an external collection device. The interface to the billing mediation device can vary from carrier to carrier, thus this subsystem supports a flexible profiling system.

The billing subsystem includes the following functions:

- Provides SFTP transfer of call data records to a remote billing server
- Supports batch record transmission via FTP
- Issues events and alarms as appropriate including potential billing data overwrites
- Saves billing data according to available disk space in Oracle
- Support for user-provisionable billing subsystem tokens
- Support for on-demand Call Detail Block (CDB) queries based on ranges of timestamps, ranges of sequence numbers, a calling number, a called number, or last record written

Record Retention Mechanisms in the EMS

A "worst case number of records required" is determined, based on predicted call capacities and call type mixtures. Once this number of records has been reached, the next entry rolls over to the first record in the database and starts overwriting from this record onwards.

The following sample calculation is used to predict the number of records needed to store 48 hours of records:

100 calls/second in busy hour yields an average daily mean of **45 calls/second X 60 seconds/ minute X 60 minutes/hour X 48 hours = 7,776,600 records.**

Billing Alarm Tracking Mechanisms

The billing manager process in the EMS tracks the total number of records the billing database can store, the number of unacknowledged records, and the current percentage of the database that is occupied by unacknowledged records. This information is then compared against the threshold levels set in the billing

alarm database. If the current amount of billing data exceeds thresholds in the database, then the billing manager issues alarms. The billing manager resets the alarms as the storage levels drop below the thresholds.

Call Detail Block Correlation and Format

CDBs are produced from the current information sent from the billing generator in the CA to the billing manager in the EMS. An indication that the call has completed all signaling activities can be detected and used as a marker that all billing for the given call is now complete. Each of the billing event messages (BEM) that are portions of a call in progress, are stored in a staging area in the billing generator, waiting for call completion. Once the complete call content is present, the CDB is constructed from the individual BEMs and sent to the billing manager in the EMS.

Northbound Billing Data Transport

Billing data is transported to the customer's OSS network via FTP of batch files containing the Call Detail Blocks.

Note Contact Cisco TAC for billing questions for your specific softswitch system.

Displaying Active Call Information

Active Call Information Display displays the call information of a currently active call.

Query Command

The operator uses a CLI command (**query call-trace**) and enters the subscriber phone number or other suitable input to retrieve information about a subscriber call in progress based on an input parameter, then views the call information from the output. It applies either to originating or terminating calls.

- **Input parameter** means any subscriber-specific information such as DN or FQDN. Global parameters such as NPA-NXX-**** or aaln/*@* or 135.25.156.* are acceptable.
- **Call processing information** that is displayed includes the following:
  - Originating number
  - Terminating number
  - Media gateway(s)
  - SDP IP addresses involved
  - Trunk group number
  - CIC (such as off-net calling).
  - Other information pertaining to the call made by the subject.

The list of input parameters and the list of displayed output fields are both documented in the "Query" section of the *Cisco BTS 10200 Softswitch Command Line Reference Guide*.

Error Message

A query is rejected with an error message in the following cases:

- If there is no match for the DN in the DN2SUBSCRIBER table.
- If the subscriber's TERM-TYPE is not TERM, H323 or SIP.
- If it is an error based on the subscriber status.

Displaying Information on Forwarded Calls

Forwarded calls are handled as shown in the following scenario:

- A calls B and the call is forwarded to C (CFU/CFB/CFNA/CFC).
- If the query is made on A, the output will show that A is connected to C and provide C's information.
- Similarly, if the query is made on C, the output will show that C is connected to A and provide A's information.
- However, if the query is made on B, the output will show that A is calling C and the call is forwarded through B.

Note Note that even when the call is forwarded through B, B could also be originating another call. It is also possible that multiple calls are being forwarded through B.

Displaying Information on Three-Way Call and Call Waiting

If a caller is involved in more than one call at the same time, such as a three-way call or a call-waiting scenario, the output gives the details of both calls.

Display of Query Results

Following are examples of displays from call-trace queries for a POTS subscriber (brief mode selected):

CALL-STATE=CONNECTED (CLG):POTS-SUB 469-555-1234 (CLD):POTS-SUB 469-255-4567

CALL-STATE=CALL-SETUP (CLG):POTS-SUB 469-555-1234 (CLD):SIP-SUB 469-255-4568

CALL-STATE=ALERTING (CLG):POTS-SUB 469-555-1234 (CLD):H323-SUB 469-255-4569

CALL-STATE=CONNECTED (CLG):POTS-SUB 469-555-1234 (CLD):POTS-MLHG MLHG-ID=mlhg1 TERMINAL=23

CALL-STATE=CALL_SETUP (CLG):POTS-SUB 469-555-1234 (CLD):POTS-CTXG CTXG-ID=ctxg1 EXT=1234

CALL-STATE=ALERTING (CLG):POTS-SUB 469-555-1234 (CLD):SS7 TGN-ID=123 TRUNK-ID=456

CALL-STATE=CONNECTED (CLG):POTS-SUB 469-555-1234 (CLD):ISDN TGN-ID=123 TRUNK-ID=456

CALL-STATE=CALL-SETUP (CLG):POTS-SUB 469-555-1234 (CLD):CAS TGN-ID=123 TRUNK-ID=456

CALL-STATE=ALERTING (CLG):POTS-SUB 469-555-1234 (CLD):SIP_TG SIP-CALL-ID=<sip-call-id>

CALL-STATE=CONNECTED (CLG):POTS-SUB 469-555-1234 (CLD):H323-TG H323-CALL-ID=<h323-call-id>

Assigning Three-Digit Vertical Service Codes (VSC)

To assign three-digit VSCs:

Step 1 Replace ***xx** in the applicable digit map to ***[4-9]x|*[2-3]xx**.

Note Make sure that the "REFRESH_DIGIT_MAP" flag is set to "Y" in the mgw-profile table for the media gateway to which the subscriber is associated.

Step 2 Add the three-digit access codes to the VSC table.

Step 3 Add the three-digit access codes to the CDP table.

Changing NTP or DNS Server

To change either the NTP or DNS server:

Step 1 Execute a platform stop on the standby side.

Step 2 Make the changes to the NTP or DNS server setting on the standby side and verify.

Step 3 Shutdown and restart the standby side.

Step 4 Platform a start on the standby side if it is not already started.

Step 5 Perform a manual switchover.

Step 6 Repeat Step 1 through Step 4 on the new standby side.

Step 7 Perform a manual switchover to normalize the system

CHAPTER 4

Monitoring and Backing Up the BTS

Revised: July 21, 2009, OL-4495-10

Introduction

This chapter includes overall BTS maintenance strategies.

Detecting and Preventing BTS Congestion

When congested the BTS automatically does the following:

- Detects internal messaging congestion caused by traffic overload or other extraordinary events.
- Takes preventive action to avoid system failure (including shedding of traffic).
- Generates alarms when it detects internal messaging.
- Clears the alarms when congestion abates.
- Places the access control list (ACL) parameter (indicating congestion) into release messages sent to the SS7 network when the BTS internal call processing engine is congested.
- Routes emergency messages. Exact digit strings for emergency calls differ, specify up to ten digit strings (911 and 9911 are included by default). Contact Cisco TAC to do this, it involves a CA restart.
- Generates a SS7 termination cause code 42 for billing.
- Generates the cable signaling stop event with cause code “resource unavailable” for billing.

See the *Cisco BTS 10200 Softswitch Troubleshooting Guide, Release 6.0.x* for congestion alarms.

Monitoring BTS Hardware

BTS tracks devices and facilities that exceed their settings.

- A process exceeds 70 percent of the CPU.
- The Call Agent CPU is over 90 percent busy (10 percent idle).
- The load average exceeds 5 for at least a 5-minute interval.
- Memory is 95 percent exhausted and swap is over 50 percent consumed.

- Partitions consumed:
  - A partition 70 percent consumed generates a minor alarm.
  - A partition 80 percent consumed generates a major alarm.
  - A partition 90 percent consumed generates a critical alarm.

Table 4-1 Managing Hardware

Task	Sample Command
Running node reports	`report node node=prica42;` **Note** Results may take a few minutes to display.
Viewing nodes	`status node node=prica42;`
Rebooting the host machines	`control node node=prica42; action=REBOOT;` ⚠ **Caution** Use this command with extreme caution.
Setting the host machine for maintenance	`control node node=prica42; action=HALT;` ⚠ **Caution** Use local consoleaccess or a power cycle to restart the node.

Checking BTS System Health

Do the following tasks as listed or more frequently if your system administrator recommends it.

Table 4-2 BTS System Health Checklist

Tasks		Frequency
☐	Moving Core Files	as alarms are receieved
☐	Using BTS System-Health Reports	Daily
☐	Checking BTS System Time	Daily
☐	Checking Traffic Measurements See Chapter 6, "Traffic Measurements."	Daily
☐	Checking Event and Alarm Reports See *Cisco BTS 10200 Softswitch Troubleshooting Guide, Release 6.0.x.*	Daily
☐	Checking the OS Log of Each Host Machine	Daily
☐	Backing up the EMS Database	Daily
☐	Checking Disk Mirroring on Each Host Machine	Weekly

Table 4-2 BTS System Health Checklist

☐	Auditing Databases and Tables	Monthly
☐	Cleaning Filters See equipment manufacturer's documentation.	Monthly
☐	Archiving Your Database	See your system administrator
☐	Backing Up the Software Image	Monthly
☐	Examining Heap Usage	Quarterly
☐	Running Diagnostic Procedures on Trunk Groups See Chapter 5, "Maintenance and Diagnostics for External Resources"	Quarterly
☐	Running Diagnostic Procedures on Subscriber Terminations See Chapter 5, "Maintenance and Diagnostics for External Resources"	Quarterly
☐	Running Network Loopback Tests for NCS/MGCP Endpoints See equipment manufacturer's documentation.	Quarterly
☐	Creating Numbering Resource Utilization/Forecast (NRUF) Reports	Biannually

Using BTS System-Health Reports

The BTS allows you to gather data and create a report on its overall state. Use this data to find problems like hardware failures or traffic congestion.

Table 4-3 Using BTS System-Health Reports

Task	Sample Command
Viewing scheduled reports	`show scheduled-command verb=report; noun=system_health`
Viewing reports by ID number	`show scheduled-command ID=1`
Scheduling reports	`add scheduled-command verb=report; noun=system_health; start-time=2003-10-01 12:22:22; recurrence=DAILY; keys=period; key-values=<1 ... 720>;` where: **`start-time`**—When BTS creates report, yyyy-mm-dd hh:mm:ssss. **`recurrence`**—How often to run report (**`none`** (only once), **`daily`**, **`weekly`**, **`monthly`** **`keys=period; key-values=<1 ... 720>;`**—How many hours back to collect data. If not specified, BTS uses default of 24 (last 24 hours worth of data).
Changing reports	`change scheduled-command id=881958666704177006; start-time=2003-10-01 14:14:14; recurrence=DAILY; keys=period; key-values=24;`

Table 4-3 Using BTS System-Health Reports

Task	Sample Command
Deleting reports	`delete scheduled-command id=881958666704177006;`
Viewing completed reports	In a web browser enter `https://<active EMS IP addr or FQDN>:/report/system_health`
Generating a report immediately	`report system-health period=<1 ... 720>;` **Note** Results may take a few minutes to display.

Checking BTS System Time

BTS clocks must be accurate to 2 seconds.

Caution Do not change the date or time in your BTS host machines while CA, FS, EMS, and BDMS are running. Instead allow the Solaris OS to get the time automatically through NTP services.

Step 1 Log in to the primary and secondary EMSs as `root`.

Step 2 Enter `<hostname># date`.

Step 3 On each EMS ensure the following are correct:

- **a.** The time does not deviate more than +/- 2 seconds.
- **b.** Day, month, year, time zone

Step 4 Log in to both the primary and secondary CA as `root`.

Step 5 Enter `<hostname># date`.

Step 6 On each CA ensure the following are correct:

- **a.** The time is accurate to within +/-2 seconds of the correct time.
- **b.** Day, month, year, time zone

Checking the OS Log of Each Host Machine

Monitor the OS logs on all four host machines (primary and secondary EMS, primary and secondary CA) for errors or warnings. This report shows you recent messages like memory hits, disk errors, and frequent process restarts.

Step 1 Log in as `root`.

Step 2 Enter `dmesg`.

Step 3 For more history edit the /var/adm/messages file.

Checking Disk Mirroring on Each Host Machine

Each procedure takes about 30 minutes.

CA/FS Side A

Before doing this procedure, ensure your BTS platform is connected to controller 1 or controller 0.

Step 1 Log in as **root** to CA/FS side A using telnet.

Step 2 Enter one of the following:

```
<hostname># metastat | grep c0
```

Or:

```
<hostname># metastat | grep c1
```

Step 3 Verify the return matches the following:

```
c1t0d0s1          0     No            Okay   Yes
c1t1d0s1          0     No            Okay   Yes
c1t0d0s5          0     No            Okay   Yes
c1t1d0s5          0     No            Okay   Yes
c1t0d0s6          0     No            Okay   Yes
c1t1d0s6          0     No            Okay   Yes
c1t0d0s0          0     No            Okay   Yes
c1t1d0s0          0     No            Okay   Yes
c1t0d0s3          0     No            Okay   Yes
c1t1d0s3          0     No            Okay   Yes
c1t1d0   Yes    id1,sd@SSEAGATE_ST373307LSUN72G_3HZ9JG7800007518H8WV
c1t0d0   Yes    id1,sd@SSEAGATE_ST373307LSUN72G_3HZ9JC9N00007518Y15K
```

If the results differ synchronize the disk mirroring:

```
<hostname># cd /opt/setup
<hostname># sync_mirror
```

Verify the results using Step 1 through Step 3.

Caution In case of a mismatch, synchronize once. If the mismatch continues, contact Cisco TAC.

CA/FS Side B

Step 1 Log in as **root** to CA/FS side B using telnet.

Step 2 Enter **<hostname># metastat | grep c0**.

Step 3 Verify the return matches the following:

```
c0t0d0s6 0 No Okay
c0t1d0s6 0 No Okay
c0t0d0s1 0 No Okay
c0t1d0s1 0 No Okay
c0t0d0s5 0 No Okay
c0t1d0s5 0 No Okay
```

```
c0t0d0s7 0 No Okay
c0t1d0s7 0 No Okay
c0t0d0s0 0 No Okay
c0t1d0s0 0 No Okay
c0t0d0s3 0 No Okay
c0t1d0s3 0 No Okay
```

If the results differ synchronize the disk mirroring:

```
<hostname># cd /opt/setup
<hostname># sync_mirror
```

Verify the results using Step 1 through Step 3.

Caution In case of a mismatch, synchronize once. If the mismatch continues contact Cisco TAC.

EMS Side A

Step 1 Log in as **root** to EMS side A using telnet.

Step 2 Enter **<hostname># metastat | grep c0**.

Step 3 Verify the return matches the following:

```
c0t0d0s6 0 No Okay
c0t1d0s6 0 No Okay
c0t0d0s1 0 No Okay
c0t1d0s1 0 No Okay
c0t0d0s5 0 No Okay
c0t1d0s5 0 No Okay
c0t0d0s7 0 No Okay
c0t1d0s7 0 No Okay
c0t0d0s0 0 No Okay
c0t1d0s0 0 No Okay
c0t0d0s3 0 No Okay
c0t1d0s3 0 No Okay
```

If the results differ synchronize the disk mirroring:

```
<hostname># cd /opt/setup
<hostname># sync_mirror
```

Verify the results using Step 1 through Step 3.

Caution In case of a mismatch, synchronize once. If the mismatch continues contact Cisco TAC.

EMS Side B

Step 1 Log in as **root** to EMS side B using telnet.

Step 2 Enter **<hostname># metastat | grep c0.**

Step 3 Verify the return result matches the following:

```
c0t0d0s6 0 No Okay
c0t1d0s6 0 No Okay
c0t0d0s1 0 No Okay
c0t1d0s1 0 No Okay
c0t0d0s5 0 No Okay
c0t1d0s5 0 No Okay
c0t0d0s7 0 No Okay
c0t1d0s7 0 No Okay
c0t0d0s0 0 No Okay
c0t1d0s0 0 No Okay
c0t0d0s3 0 No Okay
c0t1d0s3 0 No Okay
```

If the results differ synchronize the disk mirroring:

```
<hostname># cd /opt/setup
<hostname># sync_mirror
```

Verify the results using Step 1 through Step 3.

Caution In case of a mismatch, synchronize once. If the mismatch continues contact Cisco TAC.

Auditing Databases and Tables

Audit either the complete database or entries in every provisionable table in both the Oracle database and shared memory. See the *Cisco BTS 10200 Softswitch Troubleshooting Guide, Release 6.0.x*.

Caution Audits are time-intensive. Do only during a maintenance window. Completion time varies with database or table entries.

Table 4-4 Auditing Databases and Tables

Task	Sample Command
Auditing individual tables	**audit trunk type=row-count;**
Auditing every entry in each provisionable table	**audit database;**
Auditing provisionable tables based on **type**	**audit database type=row-count;** **Note** **type** defaults to **full**
Auditing provisionable tables based on **platform state**	**audit database platform-state=active;** **Note** **platform-state** defaults to **active**

Table 4-4 Auditing Databases and Tables

Task	Sample Command
Auditing mismatches across network elements	1. Log in as **root**. 2. Enter: `bts_audit -ems priems01 -ca prica01 -platforms CA146,FSAIN205 -tables SUBSCRIBER,MGW_PROFILE` **Note** bts_audit cannot work in certain scenarios, for example, when a termination record points to an invalid mgw

Resolving mismatches across network elements	If a table references a missing row, the mismatch is not resolved. Only synchronize data mismatches between active network elemens.
	1. Audit mismatches using **bts_audit**.
	2. Enter:
	`bts_sync /opt/ems/report/Audit_CA146_root.sql`
	`bts_sync applies updates directly to the databases.`

Exporting Provisioned Data

Export data entered into the BTS using CLI before a software upgrade or a maintenance activity that might cause you to lose that data. When you enter the **export** command the following occurs:

1. An input file reads and filters through the data on the BTS.
2. All provisioning data on that BTS populates an output file.

Using the Input File

The input file is in xml. It comes populated with all provisioning-related nouns and their corresponding verbs (operation type, **add** and **change**) for the current BTS release. The BTS uses this input file to locate these noun and verb pairs and export their associated data off of the BTS.

The input file also lists which attributes to exclude from the export. Verbs like **equip**, **audit**, and**sync** are ignored because these verbs are not associated with provisioned data.

Update the input file with new or modified nouns in later BTS releases.

Using the Output File

Create the output file as a blank ASCII text file, naming it intuitively. Save it in the /opt/ems/export directory. When you run the **export** command, the output file populates with start/end timestamps, hostname, and user-id as well as all the provisioned BTS data.

Running the Export Command

Before running the export command ensure you have enough free space in the export directory (7500000 ~ 700 MB).

In the following sample command, the name of the file is “BTS_Provisioned_Data_Export”:

```
CLI > export database outfile = BTS_Provisioned_Data_Export
```

Creating Numbering Resource Utilization/Forecast (NRUF) Reports

The North American Numbering Plan Association (NANPA) collects, stores, and maintains how telephone numbers are used by 19 countries. Companies, like carriers, that hold telephone numbers must report to NANPA twice a year using the NRUF report. Go to http://www.nanpa.com for more information and job aids on submitting reports.

The BTS creates an NRUF report using the Number Block table. This table:

- Is a single table that is the sole reference for NANPA audits
- Can be customized
- Can be updated from data imported from other tables, changes from office-code updates, or manually
- Has the following fields:
  - Number Block: NPA to NPA-NXX-XXXX—For FCC-required NANPA audit compliance, the report input is NPANXX. In markets outside of NANPA, the input can be based on either the combination of the national destination code (NDC) and the exchange code (EC), or just the EC.
  - Code Holder = Y/N
  - Block Holder = Y/N
  - Native = Y/N
  - Non-Native = Y/N

To generate the following reports, use **`report dn-summary`**:

- All DNs in NDC and EC
- Thousands group in NDC and EC
- Operating company number (OCN)
- Switch Common Language Location Identifier (CLLI) code
- OCN + CLLI code—entries must match LERG data

Creating Reports for Nonrural Primary and Intermediate Carriers

NRUF reporting for nonrural primary and intermediate carriers:

- Occurs at a thousands-block level (NPA-NXX-X)
- Applies only to NANP

The report returns the following based on the DN2SUBSCRIBER table's STATUS token:

Table 4-5 NRUF Report Data for Nonrural Carriers

Data Groups	Matching Data from the DN2SUBSCRIBER Table

Assigned DNs	• Individual DNs:
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9][0-9]; (status=assigned) AND ADMIN-DN=N`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9][0-9]; (status=ported-out) AND ADMIN-DN=N`
	• DID DNs:
	`ndc=<npa>; ec=<nxx>; DN=xxxx; (status=assigned) AND ADMIN-DN=N; X 10000`
	`ndc=<npa>; ec=<nxx>; DN=xxxx; (status=ported-out) AND ADMIN-DN=N; X 10000`
	`ndc=<npa>; ec=<nxx>; DN=[0-9]xxx; (status=assigned) AND ADMIN-DN=N; X 1000`
	`ndc=<npa>; ec=<nxx>; DN=[0-9]xxx; (status=ported-out) AND ADMIN-DN=N; X 1000`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9]xx; (status=assigned) AND ADMIN-DN=N; X 100`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9]xx; (status=ported-out) AND ADMIN-DN=N; X 100`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9][0-9]x; (status=assigned) AND ADMIN-DN=N; X 10`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9][0-9]x; (status=ported-out) AND ADMIN-DN=N; X 10`
	• PORTED-OUT DNs

Intermediate Telephone Directory Numbers	0
Reserved DNs	0

Table 4-5 NRUF Report Data for Nonrural Carriers

Data Groups	Matching Data from the DN2SUBSCRIBER Table

Aging DNs	• DISC DNs:
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9][0-9][0-9]; (status=DISC)`
	• Changed Number DNs:
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9][0-9][0-9]; (status=CN)`
	• DISC DID DNs:
	`ndc=<npa>; ec=<nxx>; DN=xxxx; (status=DISC) X 10000`
	`ndc=<npa>; ec=<nxx>; DN=[0-9]xxx; (status=DISC) X 1000`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9]xx; (status=DISC) X 100`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9][0-9]x; (status=DISC) X 10`
	• Changed Number DID DNs:
	`ndc=<npa>; ec=<nxx>; DN=xxxx; (status=CN) X 10000`
	`ndc=<npa>; ec=<nxx>; DN=[0-9]xxx; (status=CN) X 1000`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9]xx; (status=CN) X 100`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9][0-9]x; (status=CN) X 10`

Administrative DNs	• Administrative DNs:
	`ndc=<npa>; ec=<nxx>; status=LRN;`
	`ndc=<npa>; ec=<nxx>; status=CLRN`
	`ndc=<npa>; ec=<nxx>; status=RACF-DN;`
	`ndc=<npa>; ec=<nxx>; status=ANNC;`
	`ndc=<npa>; ec=<nxx>; status=TEST-LINE;`
	`ndc=<npa>; ec=<nxx>; (ADMIN-DN=Y AND (status=ASSIGNED))`
	`ndc=<npa>; ec=<nxx>; (ADMIN-DN=Y AND (status=PORTED-OUT))`
	• Administrative DID DNs:
	`ndc=<npa>; ec=<nxx>; DN=xxxx; (ADMIN-DN=Y AND (status=ASSIGNED)) X 10000`
	`ndc=<npa>; ec=<nxx>; DN=xxxx; (ADMIN-DN=Y AND (status=PORTED-OUT)) X 10000`
	`ndc=<npa>; ec=<nxx>; DN=[0-9]xxx (ADMIN-DN=Y AND (status=ASSIGNED)) X 1000`
	`ndc=<npa>; ec=<nxx>; DN=[0-9]xxx (ADMIN-DN=Y AND (status=PORTED-OUT)) X 1000`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9]xx; (ADMIN-DN=Y AND (status=ASSIGNED)) X 100`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9]xx; (ADMIN-DN=Y AND (status=PORTED-OUT)) X 100`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9][0-9]x; (ADMIN-DN=Y AND (status=ASSIGNED)) X 10`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9][0-9]x; (ADMIN-DN=Y AND (status=PORTED-OUT)) X 10`
	• Changed Number administrative DNs

Creating Reports for Rural Primary and Intermediate Carriers

This section identifies the DN information that is reported at the NPA-NXX level when the service provider is a code holder. NRUF reporting at the “ndc, ec” level includes dn-groups of varying length. Some countries might support dn-groups of length 1, 2, 3 or 4.

- The Rural Primary Carrier (U2 form) NPA-NXX report has:
  - NPA-NXX (input as ndc, ec)
  - Rate Center (read from LERG)
  - State (read from LERG)
  - Number of Assigned DNs
  - Number of Intermediate DNs
  - Number of Reserved DNs
  - Number of Aging DNs
  - Number of Administrative DNs
  - Donated to Pool (always 0)

- The Rural Intermediate Carrier (U4 form) report has:
  - NPA-NXX (input as ndc, ec)
  - Rate Center (read from LERG)
  - State (read from LERG)
  - Number of Assigned DNs
  - Number of Intermediate DNs
  - Number of Reserved DNs
  - Number of Aging DNs
  - Number of Administrative DNs
  - Numbers Received (always 0)

The report returns the following based on the DN2SUBSCRIBER table's STATUS token:

Table 4-6 NRUF Report Data for Rural Carriers

Data Groups	Matching Data from the DN2SUBSCRIBER Table

Assigned DNs	• Individual DNs:
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9][0-9]; (status=assigned) AND ADMIN-DN=N`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9][0-9]; (status=ported-out) AND ADMIN-DN=N`
	• DID DNs:
	`ndc=<npa>; ec=<nxx>; DN=xxxx; (status=assigned) AND ADMIN-DN=N; X 10000`
	`ndc=<npa>; ec=<nxx>; DN=xxxx; (status=ported-out) AND ADMIN-DN=N; X 10000`
	`ndc=<npa>; ec=<nxx>; DN=[0-9]xxx; (status=assigned) AND ADMIN-DN=N; X 1000`
	`ndc=<npa>; ec=<nxx>; DN=[0-9]xxx; (status=ported-out) AND ADMIN-DN=N; X 1000`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9]xx; (status=assigned) AND ADMIN-DN=N; X 100`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9]xx; (status=ported-out) AND ADMIN-DN=N; X 100`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9][0-9]x; (status=assigned) AND ADMIN-DN=N; X 10`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9][0-9]x; (status=ported-out) AND ADMIN-DN=N; X 10`

Intermediate Telephone Directory Numbers	0
Reserved DNs	0

Table 4-6 NRUF Report Data for Rural Carriers

Data Groups	Matching Data from the DN2SUBSCRIBER Table

Aging DNs	• DISC DNs:
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9][0-9][0-9]; (status=DISC)`
	• Changed Number DNs:
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9][0-9][0-9]; (status=CN)`
	• DISC DID DNs:
	`ndc=<npa>; ec=<nxx>; DN=xxxx; (status=DISC) X 10000`
	`ndc=<npa>; ec=<nxx>; DN=[0-9]xxx; (status=DISC) X 1000`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9]xx; (status=DISC) X 100`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9][0-9]x; (status=DISC) X 10`
	• Changed Number DID DNs:
	`ndc=<npa>; ec=<nxx>; DN=xxxx; (status=CN) X 10000`
	`ndc=<npa>; ec=<nxx>; DN=[0-9]xxx; (status=CN) X 1000`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9]xx; (status=CN) X 100`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9][0-9]x; (status=CN) X 10`

Administrative DNs	• Administrative DNs:
	`ndc=<npa>; ec=<nxx>; status=LRN;`
	`ndc=<npa>; ec=<nxx>; status=CLRN`
	`ndc=<npa>; ec=<nxx>; status=RACF-DN;`
	`ndc=<npa>; ec=<nxx>; status=ANNC;`
	`ndc=<npa>; ec=<nxx>; status=TEST-LINE;`
	`ndc=<npa>; ec=<nxx>; (ADMIN-DN=Y AND (status=ASSIGNED))`
	`ndc=<npa>; ec=<nxx>; (ADMIN-DN=Y AND (status=PORTED-OUT))`
	• Administrative DID DNs:
	`ndc=<npa>; ec=<nxx>; DN=xxxx; (ADMIN-DN=Y AND (status=ASSIGNED)) X 10000`
	`ndc=<npa>; ec=<nxx>; DN=xxxx; (ADMIN-DN=Y AND (status=PORTED-OUT)) X 10000`
	`ndc=<npa>; ec=<nxx>; DN=[0-9]xxx (ADMIN-DN=Y AND (status=ASSIGNED)) X 1000`
	`ndc=<npa>; ec=<nxx>; DN=[0-9]xxx (ADMIN-DN=Y AND (status=PORTED-OUT)) X 1000`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9]xx; (ADMIN-DN=Y AND (status=ASSIGNED)) X 100`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9]xx; (ADMIN-DN=Y AND (status=PORTED-OUT)) X 100`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9][0-9]x; (ADMIN-DN=Y AND (status=ASSIGNED)) X 10`
	`ndc=<npa>; ec=<nxx>; DN=[0-9][0-9][0-9]x; (ADMIN-DN=Y AND (status=PORTED-OUT)) X 10`

Backing Up the Software Image

To back up the software image do the following three procedures:

1. Full Database Auditing, page 4-15
2. Checking Shared Memory, page 4-15
3. Backing Up the Full BTS, page 4-17

Full Database Auditing

Step 1 Log in as CLI user on EMS side A.

Step 2 Enter **audit database type=full;**.

Step 3 Check the audit report and verify that there is no mismatch or error. If errors are found, try to correct the errors. If you cannot make the correction, contact Cisco TAC.

Checking Shared Memory

This task checks shared memory to detect potential data problems.

From CA/FS Side A

Step 1 Log in as **root**.

Step 2 Enter:

```
<hostname># cd /opt/OptiCall/CAxxx/bin
<hostname># ca_tiat data
```

Press **Enter**.

The result should match the following:

```
All tables are OK.
For details, see ca_tiat.out
```

Caution If the result is not"All tables are OK", stop and contact Cisco TAC. If the result is "All tables are OK", go to Step 3.

Step 3 Enter:

```
<hostname># cd /opt/OptiCall/FSPTCzzz/bin <Return>
<hostname># potsctx_tiat data <Return>
```

Press **Enter**.

The result should match the following:

```
All tables are OK.
For detail, see potsctx_tiat.out
```

Caution If the result is not"All tables are OK", stop and contact Cisco TAC. If the result is "All tables are OK", go to Step 4.

Step 4 Enter:

```
<hostname>#cd /opt/OptiCall/FSAINyyy/bin
<hostname>#ain_tiat data
```

Step 5 Press **Enter**.

The result should match the following:

```
All tables are OK.
For detail, see ain_tiat.out
```

Caution If the result is not"All tables are OK", stop and contact Cisco TAC.

From CA/FS Side B

Step 1 Log in as **root**.

Step 2 Enter:

```
<hostname>#cd /opt/OptiCall/CAxxx/bin
<hostname>#ca_tiat data
```

Step 3 Press **Enter**.

The result should match the following:

```
All tables are OK.
For detail, see ca_tiat.out
```

Caution If the result is not"All tables are OK", stop and contact Cisco TAC. If the result is "All tables are OK", go to Step 3.

Step 4 Enter:

```
<hostname>#cd /opt/OptiCall/FSPTCzzz/bin
<hostname>#potsctx_tiat data
```

Step 5 Press **Enter**:

The result match the following:

```
All tables are OK.
For detail, see potsctx_tiat.out
```

Caution If the result is not"All tables are OK", stop and contact Cisco TAC. If the result is "All tables are OK", go to Step 6.

Step 6 Enter:

```
<hostname>#cd /opt/OptiCall/FSAINyyy/bin
<hostname>#ain_tiat data
```

Step 7 Press **Enter**:

The result should match the following:

```
All tables are OK.
For detail, see ain_tiat.out
```

Caution If the result is not“All tables are OK”, stop and contact Cisco TAC.

Backing Up the Full BTS

Do this before and after software upgrades or as routine, always during a maintenance window. Before starting the provisioning process ensure you have the following:

Pre-Provisioning Checklist	
☐	NFS server hostname or ip address
☐	Shared directory from NFS server
☐	Root user access
☐	Provisioning blocked

Backing Up the CA/FS

Perform the following steps to back up the secondary CA/FS. Then repeat the procedure on the primary CA/FS.

Step 1 Log in as **root** on the secondary CA/FS.

Step 2 Verify all platforms are in STANDBY mode, enter **<hostname>#nodestat**.

Step 3 Remove unnecessary files or directories like /opt/Build and application tar files.

Step 4 Mount the NFS server to the **/mnt** directory, enter **<hostname>#mount <nfs server ip or hostname>:/<share dire> /mnt**.

Step 5 Stop all platforms; enter **<hostname>#platform stop all**.

Step 6 Save all platforms data directory (shared memory) to nfs server

```
<hostname>#tar -cf - /opt/OptiCall/CAxxx/bin/data |gzip -fast - > /mnt/data.<hostname>.CA
<<hostname>#tar -cf - /opt/OptiCall/CAxxx/bin/data |gzip --fast - >
/mnt/data.<hostname>.CA.gz
<hostname>#tar -cf - /opt/OptiCall/FSAINxxx/bin/data |gzip --fast - >
/mnt/data.<hostname>.FSAIN.gz
<hostname>#tar -cf /opt/OptiCall/FSPTCxxx/bin/data |gzip --fast - >
/mnt/data.<hostname>.FSPTC.gz
```

where xxx is the instance number

Step 7 Start all platforms by entering **<hostname>#platform start**.

Step 8 Verify all platforms are in STANDBY mode, enter **<hostname>#nodestat**.

Step 9 Create an excluded directories file for the flash archive, enter:

```
<hostname>#vi /tmp/excluded_dir
/opt/OptiCall/CAxxx/bin/data
/opt/OptiCall/CAxxx/bin/logs
```

```
/opt/OptiCall/FSAINxxx/bin/data
/opt/OptiCall/FSAINxxx/bin/logs
/opt/OptiCall/FSPTCxxx/bin/data
/opt/OptiCall/FSPTCxxxx/bin/logs
```

where **xxx** is the instance number

Step 10 Back up the system, enter:

```
<hostname>#mv /bin/date /bin/date.archive
<hostname>#mv /bin/.date /bin/date
<hostname>#flarcreate -n <hostname> -X /tmp/excluded_dir -c /mnt/<hostname>.archive
<hostname>#mv /bin/date /bin/.date
<hostname>#mv /bin/date.archive /bin/date
```

Step 11 Unmount the NFS server, enter:

```
<hostname>#umount /mnt
```

Step 12 From the active EMS switch over all platforms, enter:

```
<hostname>#ssh optiuser@<hostname>
cli>control feature-server id=FSAINxxx;target-state=standby-active;
cli>control feature-server id=FSPTCxxx;target-state=standby-active;
cli>control call-agent id=CAxxx;target-state=standby-active;
```

where **xxx** is the instance number of each platform

Step 13 Repeat this procedure for the primary CA/FS.

Backing up the EMS/BDMS

Do the following to back up the STANDBY EMS/BDMS system.

Step 1 Log in as **root**.

Step 2 Verify all platforms are in STANDBY mode, enter **<hostname>#nodestat**.

Step 3 Remove unnecessary files or directories like /opt/Build and application tar files.

Step 4 Mount the NFS server to the **/mn**t directory, enter **<hostname>#mount <nfs server ip or hostname>:/<share dire> /mnt**.

Step 5 Stop all platforms, enter **<hostname>#platform stop all**.

Step 6 Save the Oracle database and MySQL directories, enter:

```
<hostname>#tar -cf - /data1/oradata |gzip --fast - >/mnt/oradata.<hostname>.gz
<hostname>#tar -cf - /opt/ems/db |gzip --fast - >/mnt/db.<hostname>.gz
```

Step 7 Create an excluded directories file for the flash archive, enter:

```
<hostname>#vi /tmp/excluded_dir
           /data1/oradata
```

Step 8 Start all platforms **<hostname>#platform start**.

Step 9 Verify all platforms are in STANDBY mode, enter **<hostname>#nodestat**.

Step 10 Back up the system, enter:

```
<hostname>#mv /bin/date /bin/date.archive
<hostname>#mv /bin/.date /bin/date
```

```
<hostname>#flarcreate -n <hostname> -X /tmp/excluded_dir -c /mnt/<hostname>.archive
<hostname>#mv /bin/date /bin/.date
<hostname>#mv /bin/date.archive /bin/date
```

Step 11 Unmount the NFS server, enter **<hostname>#umount /mnt**.

Step 12 From the active EMS switch over all platforms, enter:

```
<hostname>#ssh optiuser@<hostname>
cli>control bdms id=BDMS01;target-state=standby-active;
cli>control element-manager id=EM01;target-state=standby-active;
```

Step 13 Repeat the procedure starting with Step 3 to back up the PRIMARY EMS/BDMS.

Backing up the EMS Database

This procedure is for experienced UNIX users. It tells you how to save the provisioning database from the EMS to a remote server. The remote server must be:

- **Connected to a corporate LAN.**
- **Backed up daily** by default, the daily hot backup is not turned on at installation

The back up processes:

- ora_hot_backup.ks—Backs up database data files, control files, and archive logs
- ora_arch_backup.ksh—Backs up archive logs

The target backup directory on both primary and secondary EMS systems is **/opt/oraback**. Backup files in **/opt/oraback** directory are later transferred to the **/opt/backup** directory in a remote archive site. After the files are transferred, they are purged from **/opt/oraback**.

Step 1 Cross check the databases on the primary and secondary EMSs before backing up.

Caution Cross check before ora_hot_backup.ksh and ora_arch_backup.ksh are scheduled. This validates database and archived log files for RMAN processes.

a. Log in as **oracle**, or **su - oracle**.

b. Enter **dbadm -E backup_crosscheck**..

c. Ensure the log file has no errors (except the “validation failed for archived log” messages). Ignore these messages of the /data1/arch/opticalx_yyy.arc files because the validation directs RMAN not to look for *.arc files. ora_purge_archlog.ksh purges *.arc files.

```
RMAN-06157: validation failed for archived log
RMAN-08514: archivelog filename=/data1/arch/optical1_25.arc recid=1 stamp=461878656
```

Step 2 Remove the archive log purge process and schedule the backup processes.

Note Do this on the primary and secondary EMSs.

a. Disable the ora_purge_archlog.ksh process.

b. Enable the ora_hot_backup.ksh process.

c. Optional: Enable the ora_arch_backup.ksh process.

d. Log in as **oracle**, or **su - oracle**.

e. Enter **crontab -e**.

f. Modify the crontab file as follows. This is on the primary EMS site, database name *optical1*.

```
# Daily Oracle Hot backup - this also include archive log backup
#       Note: Set hot backup process to run at 2:00am every day.
#
0 2 * * * /opt/oracle/admin/scripts/ora_hot_backup.ksh optical1 > /opt/oracle/t
mp/ora_hot_backup.log 2>&1
#
# Oracle archive log backups, in addition to daily hot backup.
#       Note: Set one additional archive log backup to run at 6:00pm every day.
#
0 18 * * * /opt/oracle/admin/scripts/ora_arch_backup.ksh optical1 > /opt/
oracle/tmp/ora_arch_backup.log 2>&1
#
# Purge archive log files
#     Note: Delete or uncomment this line to stop purging archive log files.
#
#0 1,3,…,23  * * * /opt/oracle/admin/scripts/ora_purge_archlog.ksh optical1 >
/opt/oracle/tmp/ora_purge_archlog.log 2>&1
```

g. Repeat Step f by replacing *optical1* with *optical2* on the secondary EMS site.

Step 3 To setup daily file transfer to the remote archive site using FTP, see Using FTP to Setup File Transfer. To setup daily file transfer to the remote archive site using SFTP, see Using SFTP to Setup File Transfer.

Using FTP to Setup File Transfer

Step 1 Configure the remote site.

a. Verify the oracle user access and create backup directory on FTP server site.

```
Primary EMS hostname:           priems
Secondary EMS hostname:      secems
  FTP server hostname:              ftpserver
  FTP server Oracle password:  ora00
  FTP server backup directory:    /opt/backup
```

First, test the connection to the remote FTP server using the *oracle* user access. If the password of *oracle* is not 'ora00', update the ORA_PW variable in the **/opt/oracle/admin/etc/dba.env** file.

b. Do this on the primary and secondary EMSs:

```
telnet ftpserver
```

c. Log in as **oracle** and enter the password (in this case, **ora00**).

d. Create the ***/opt/backup*** directory. Ensure the **oracle** user has write permission to this directory.

```
mkdir /opt/backup
```

Note It is your responsibility to archive backup files from the ftp server ***/opt/backup*** directory to a tape device or enterprise tape library.

Step 2 Schedule the FTP process.

a. Do this on the primary and secondary EMSs:

Log in as **oracle**, or **su - oracle** and enter the following command: **crontab -e**

b. Add the following line to the Oracle crontab on the primary EMS.

```
#
# FTP backup files from primary (optical1) to /opt/backup directory of ftpserver.
#
0 6 * * * /opt/oracle/admin/scripts/ora_ftp_backup.ksh optical1 ftpserver /opt/backup >
/opt/oracle/tmp/ora_ftp_backup.log 2>&1
```

c. Replace **ftpserver** with the correct host name of the remote FTP server. Replace /opt/backup with the correct target directory name, if they are different.

Note The ***0 6 *** /opt/oracle/admin/scripts/ora_ftp_backup.ksh ……. ora_ftp_backup.log 2>&1*** are all typed in the same line.

d. Edit the oracle crontab on secondary EMS site by replacing *optical1* with *optical2*.

Step 3 Verify the backup files, enter:

cd /opt/oraback	**EMS systems**
cd /opt/backup	**Remote FTP system**

Using SFTP to Setup File Transfer

The following steps generate an SSH key from the primary EMS. Key files are copied to the secondary EMS and remote SFTP server. On the remote SFTP server the "oracle" user is created for login.

Step 1 Generate SSH secure key from primary EMS:

a. Login to the primary EMS:

```
#  su - oracle
#  /opt/BTSossh/bin/ssh-keygen -t rsa
```

b. Generating public/private rsa key pair.

c. Enter file in which to save the key (/opt/orahome/.ssh/id_rsa).

d. Enter passphrase (empty for no passphrase).

e. Enter same passphrase.
Your identification has been saved in /opt/orahome/.ssh/id_rsa.
Your public key has been saved in /opt/orahome/.ssh/id_rsa.pub.
The key fingerprint is: d8:4f:b1:8b:f4:ac:2f:78:e9:56:a4:55:56:11:e1:40 oracle@priems79

f. Enter:

```
#  ls -l /opt/orahome/.ssh
```

-rw-------1 oracleorainst1675 Mar 10 15:42 id_rsa
-rw-r--r--1 oracleorainst397 Mar 10 15:42 id_rsa.pub

Step 2 From the secondary EMS, sftp both "id_ssa" and "id_rsa.pub" files from the primary EMS to the secondary EMS **/opt/orahome/.ssh** directory. Make the files with "oracle:orainst" ownership.

Step 3 Login to the secondary EMS:

```
# su - oracle
$ cd /opt/orahome/.ssh
$ sftp root@priems
sftp> cd /opt/orahome/.ssh
sftp> get id_rsa*
sftp> quit
$ ls -l /opt/orahome/.ssh/id_rsa*
```

-rw-------1 oracleorainst1675 Mar 10 15:42 id_rsa
-rw-r--r--1 oracleorainst397 Mar 10 15:42 id_rsa.pub
Now both primary and secondary EMSs have the same "id_rsa" and "id_rsa.pub" files in **/opt/orahome/.ssh** directory.

Step 4 Create an oracle user and **/opt/backup** directory on the remote SFTP server.

a. Login to remote SFTP server as root.

b. Create a user "oracle" with group "orainst" and home directory "/opt/orahome".

c. Create a repository directory "/opt/backup".

mkdir -p /opt/orahome

groupadd orainst

useradd -g orainst -d /opt/orahome -s /bin/ksh oracle

chown oracle:orainst /opt/orahome

passwd oracle

New Password: <Enter password>

Re-enter new Password: <Re-enter password>

mkdir -p /opt/backup

chown oracle:orainst /opt/backup

su - oracle

$ mkdir -p /opt/orahome/.ssh

$ chmod 700 /opt/orahome/.ssh

$ chown oracle:orainst /opt/orahome/.ssh

Step 5 Sftp the "id_rsa" and "id_rsa.pub" files generated in Step 1 to remote SFTP server /opt/orahome/.ssh directory. Make the file owned by "oracle:orainst" owner and group.

Login to remote SFTP server:

su - oracle

$ cd .ssh

$ sftp root@priems

sftp> cd /opt/orahome/.ssh

sftp> get id_rsa*

sftp> quit

$ cat id_rsa.pub >> authorized_keys

$ chmod 600 id_rsa* authorized_keys

$ ls -l

-rw-------1 oraoragrp788 Mar 10 16:52 authorized_keys

-rw-------1 oraoragrp1675 Mar 10 16:48 id_rsa

```
-rw-------1 oraoragrp394 Mar 10 16:48 id_rsa.pub
```

Step 6 Sftp the "id_rsa" and "id_rsa.pub" files generated in Step 1 to remote SFTP server /opt/orahome/.ssh directory. Make the file owned by "oracle:orainst" owner and group.

Step 7 Test SSH and SFTP from both the primary and secondary EMSs to the remote SFTP server:

a. From BTS primary EMS:

```
#  su - oracle
$ sftp_ping oracle SFTPserverName
Connecting to SFTPserverName...
      sftp> quit
      SFTP_PING=OK
```

Note At the first login, the following message may display:"Warning: Permanently added the RSA host key for IP address '10.xx.xxx.xxx' to the list of known hosts."

Step 8 To schedule the ora_sftp_backup.ksh process to execute at 5:30am every day in oracle crontab on both the primary and secondary EMS:

a. Log in as oracle, or su - oracle and enter the following:

```
crontab -e
```

b. Add the following line to the Oracle crontab on the primary EMS:

```
#
# SFTP backup files from primary (optical1) to /opt/backup directory of SFTPserver.
#
0 6 * * * /opt/oracle/admin/scripts/ora_sftp_backup.ksh optical1 oracle SFTPserver
/opt/backup > /opt/oracle/tmp/ora_sftp_backup.log 2>&1
```

Note Enter 0 6 *** /opt/oracle/admin/scripts/ora_sftp_backup.ksh…ora_sftp_backup.log 2>&1 in the same line.

Step 9 Replace SFTPserver with the correct host name of the remote SFTP server.

Step 10 Replace **/opt/backup** with the correct target directory name, if different.

Step 11 Edit the oracle crontab on secondary EMS site by replacing optical1 with optical2.

Archiving Your Database

Step 1 Log in as **root.**

Step 2 Stop all platforms. If this is a primary node, use the CLI command to control the standby forced active.

Step 3 Verify that /var/yp exists. Enter `ls -l /var/yp`.

If the result is no such file or directory, enter mkdir -p /var/yp

Step 4 Mount the NFS server. Enter **mount <nfsserver hostname/ip>:/<share directory> /mnt**. Example:

```
mount 10.89.183.253:/opt/archive /mnt
```

Step 5 Back up all interfaces. Enter **tar -cvf /mnt/<local_hostname>.tar host***. Example:

```
<hostname>#tar -cvf bts-prica.tar host.*
```

Step 6 Restore the Solaris "**date**" command to create the system Flash Archive. Enter:

```
mv /bin/date /bin/date.orig
mv /bin/.date /bin/date
```

Step 7 Create the archive. Enter **<hostname>#flarcreate -n <archive name> -x /opt -S -c /mnt/<file name>**

Note Example archive name: flarcreate -n **CCPU-EMS** -x /opt -S -c /mnt/secems04.archive

Step 8 Back up the /opt directory. Enter **tar -cvf - /opt/* |gzip -c >/opt/<hostname_release>.tar.gz**

Step 9 Restore the original configuration. Enter:

```
mv /bin/date /bin/.date
mv /bin/date.orig /bin/date
```

Step 10 Unmount the NFS server. Enter **umount /mnt**

Examining Heap Usage

Heap is memory BTS reserves for data it creates as its applications execute. BTS audits heap usage of all the processes started by a platform, CA, AIN, POTS, EMS and BDMS. Heap auditing is added to the ADP process.

When heap usage of a process goes beyond certain threshold level, BTS generates an alarm. The alarm clears when heap usage goes below the threshold level.

Heap audit does the following:

- Monitors traces of heap usage in the last four periods for each process
- Measures heap usage of each process started by the platform once a day at 4 a.m
- Issues a minor alarm if the heap usage of a process exceeds 70% of its max heap size limit
- Clears a minor alarm if the heap usage of a process drops below 68% of its max heap size limit
- Issues a major alarm if the heap usage of a process exceeds 80% its max heap size limit
- Clears a major alarm if the heap usage of a process drops below 78% its max heap size limit
- Issues a critical alarm if the heap usage of a process exceeds 90% its max heap size limit
- Clears a critical alarm if the heap usage of a process drops below 88% its max heap size limit
- Reports, via trace logs, the last twenty heap measurements, including the time and the value for each process
- Clears heap usage alarms when process restarts

Checking the DNS Server

To check the DNS server, do this for all nodes.

Step 1 Log in as **root** on the active CA.

Step 2 Enter more /etc/resolv.conf.

Note nameserver <ip address>

Step 3 Enter **nslookup**

This defaults to the first DNS server.

Step 4 Enter a valid gateway name and press **Enter**.

An IP address associated to gateway appears.

Step 5 Enter **server <second dns server ip>**

Step 6 Enter a valid gateway name and press Enter.

An IP address associated to gateway appears.

Step 7 Enter **exit** to quit.

Moving Core Files

BTS creates and stores core files in the bin directory for the binary executable that generated the core. Core files are large (2–4 GB) and eventually cause a disk full condition resulting in a switchover. When a BTS platform system generates a core file, the BTS creates an alarm. The Core File Present—Audit 25 (major) alarm indicates a core is present in the BTS. The primary cause of this alarm is that a network element process crashed.

The BTS automatically removes these core files when disk space is critically low or the core file has aged beyond a maximum allowable time. However, to ensure proper BTS performance move these core files off the BTS to another storage area as soon as they are generated. Refer to the Directory Containing Core Files dataword for the location of the core file.

Use the settings in the cfm.cfg file to configure how to monitor and manage core files.

Table 4-7 Core File Monitor Configuration File Parameters and Conditions

Parameter	Condition
CORE_FILE_MONITOR_DISABLE	If set to true, the core file monitor audit is not performed. Default setting is false.
CORE_FILE_ALARM_ENABLE	If set to false, the core file monitor alarm is not issued when a core file is found in the network element bin directory. Default setting is true.
CORE_FILE_MINIMUM_SPACE	This is the minimum free file space in megabytes which will trigger the automatic deletion of the oldest core files. Default is 5 GB.
CORE_FILE_AGE_TO_DELETE	This is the maximum time in hours that a core file can exist before it is automatically deleted. Default is 72 hours.

Table 4-7 Core File Monitor Configuration File Parameters and Conditions

Parameter	Condition
CORE_FILE_AGE_DELETE_ENABLE	If set to true, core files are deleted automatically when their maximum age is reached. Default is true.
CORE_FILE_SPACE_DELETE_ENABLE	If set to to true, the oldest core files are deleted when free file space is low. Default is true.

CHAPTER 5

Maintenance and Diagnostics for External Resources

Revised: July 21, 2009, OL-4495-10

Introduction

This chapter describes the administration, diagnostic, and maintenance (ADM) commands for external resources accessed by the Cisco BTS 10200 Softswitch. These include, status and control commands.

Note This chapter explains how to perform maintenance and diagnostics on external resources that have already been entered into the database. The procedures for entering these resources into the database are provided in the *Cisco BTS 10200 Softswitch Provisioning Guide*. For example, refer to Chapter 11, "SS7 Provisioning", in the *Cisco BTS 10200 Softswitch Provisioning Guide* for the procedure to add SS7 resources.

Service States—Overview

ADM commands control or show the status of an external resource. The Cisco BTS 10200 Softswitch monitors and administers resource states, and accesses the following external resources:

- Aggregation routers
- Media gateways (MGWs), including the following gateway types:
  - Residential gateways (RGWs)
  - Trunking gateways (TGWs)
- Trunk groups (TGs)
- Trunks
- Subscriber terminations

The following resources have dependencies:

- Allowed subscriber states depend upon the current RGW or IAD state.
- Allowed trunk states for ISDN depend upon the current TG state, which in turn depends upon the current TGW state.

- Allowed trunk states depend upon the TGW.

There are two types of service states for external resources:

- Administrative—The state that the Cisco BTS 10200 Softswitch operator has provisioned for the link to that resource
- Operational—The physical condition of the link to the resource (or the physical condition of the resource)

These two types of service states are independent of each other. This is illustrated with the following example:

> A Cisco BTS 10200 Softswitch operator executes the control command to place an MGW connection in service. The administrative state is now “In Service” (ADMIN_INS). However, the link between the Softswitch and the MGW might be out (cut, damaged, or placed out of service by the owner/operator of the MGW) or the MGW itself might be physically removed or placed out of service. Thus, the operational state of the MGW link is MGW_STATUS_DOWN. A status report of the MGW lists both the administrative state and operational state of the link to the MGW.

Status, Control, and Administrative Commands

This section explains how to use status, control, and other administrative commands applicable to external resources, including:

SIP Phone Address of Record and Registered Contact

This section describes the status and control commands related to SIP phone contact information.

Note The system automatically creates an Address of Record (AOR) to subscriber (aor2sub) record when a subscriber is created.

Use the **change** command to update the status of aor2sub and the **show** command to display the status of aor2sub.

The SIP register contact (**status sip-reg-contact**) command queries the status of the registered contact for the particular AOR (SIP phone subscriber). Calls can be originated from or terminated to a SIP subscriber only if the AOR has a currently registered contact. Calls cannot be originated or terminated if the registered contact for the AOR is expired or freed.

SIP-REG-CONTACT

Use the **status sip-reg-contact** command to display the operational status of the dynamic contact for a specific AOR.

Examples

```
status sip-reg-contact aor-id=4695551885@SYS44CA146.boston3.com;
```

Note In this example, the registered contact for this AOR ID has expired, and calls cannot be originated from or terminated to this host.

Example of system response:

```
AOR ID -> 4695551885@SYS44CA146.boston3.com;
USER -> 4692551885
HOST -> 64.101.150.141
PORT -> 5062
USER TYPE -> USER_IP_TYPE
EXPIRES -> 1800
EXPIRETIME -> Wed Jun 4 11:08:33 2003

STATUS -> EXPIRED CONTACT

Reply : Success:
```

```
status sip-reg-contact aor-id=7135551833@SYS12CA146.houston2.com;
```

Note In this example, the registered contact for this AOR ID is valid, and calls can be originated from and terminated to this host.

Example of system response:

```
AOR ID -> 7135551833@SYS12CA146.houston2.com;
USER -> 7132551833
HOST -> 64.100.120.125
PORT -> 5060
USER TYPE -> USER_IP_TYPE
EXPIRES -> 3600
EXPIRETIME -> Wed Jun 4 11:37:44 2003

STATUS -> REGISTERED CONTACT

Reply : Success:
```

Aggregation Status

This section describes the status command for an aggregation (aggr) router. Aggregation routers are used in cable and network-based call signaling (NCS) markets. In cable markets, they are used as cable modem termination systems (CMTSs). In NCS markets, they are used as edge routers.

Status Aggr Command

Use the following example to check the status of an aggregation router:

```
status aggr id=CMTS1
```

Reply Example:

```
Reply : Success:

AGGR ID -> CMTS1
OPER STATE -> AGGR IN Service
RESULT -> ADM configure result in success
REASON -> ADM executed successful
```

The following table provides the AGGR operational-state values and possible responses for the command:

AGGR Operational-state Value	Description	CLI Output
IN SERVICE	The TCP connection to the AGGR is up.	AGGR IN SERVICE
CONNECTING	The TCP connection to the AGGR is being set up.	AGGR CONNECTING
INITIALIZING	Identifies the initial state of the AGGR before a Call Agent (CA) attempts to connect to it.	AGGR INITIALIZING (This is a transitional state, which is rarely seen).
OUT OF SERVICE	The AGGR is out of service.	AGGR OUT OF SERVICE

Destination Point Code

This section describes the ADM status command for destination point codes (DPCs).

Examples

```
status dpc id=dpc1;
```

H.323 Gateway

This section describes the status and control commands for H.323 gateways.

The following table contains the RAS states for H.323 gateways:

RAS State	Description
CCH323_RAS_STATE_NONE	The H.323 gateway operational state is ADMIN OOS.
CCH323_RAS_STATE_GRQ	The H.323 gateway is in the Gatekeeper Discovery state.
CCH323_RAS_STATE_RRQ	The H.323 gateway is in the Gateway Registration state.
CCH323_RAS_STATE_IDLE	The H.323 gateway is ready for calls.
CCH323_RAS_STATE_URQ	The H.323 gateway is in the Un-registration state.

Status Command

This section describes the status command for H.323 gateways.

Command Types

Status

Examples

```
status h323-gw id=CHINA-1;
```

Reply Example:

```
Reply : Success:

ADMIN_STATE -> ADMIN_INS
H3A PROCESS NUMBER -> 30
H3A PROCESS NAME -> H3A1
ENDPOINT ID ->
ACTIVE CALLS -> 0
RAS STATE -> CCH323_RAS_STATE_GRQ
RAS PORT -> 35881
IP ADDRESS -> 10.89.224.125
REGISTERED GATEKEEPER ID ->
PRIMARY GATEKEEPER ID ->
PRIMARY GATEKEEPER PORT -> 0
PRIMARY GATEKEEPER IP ->
H323 VERSION -> 4
TIME TO LIVE -> 0
NUM ALT GATEKEEPERS -> 0
ALT GATEKEEPER PERMANENT -> TRUE
THRESHOLD_ENABLED -> FALSE
OUT_OF_RESOURCES -> FALSE
ALT GATEKEEPER LIST ->
```

Control Command

This section describes the control command for H.323 gateways.

Examples

```
control h323-gw id=CHINA_1; target-state=INS;
```

Reply Example:

```
Reply : Failure:

INITIAL STATE -> ADMIN_INS
REQUEST STATE -> ADMIN_INS
RESULT STATE -> ADMIN_INS
FAIL REASON -> ADM entity in desired state
REASON -> ADM is in request state
RESULT -> ADM configure result in warning
H323GW ID -> CHINA_1
```

ISDN Switchover

This section describes the control command for ISDN switchover. For ISDN status, use the status trunk group command described in the "Trunk Group" section on page 5-18. This command is only applicable to nonfacility-associated signaling (NFAS). It switches the D channel that is active to standby, and the D channel that is standby to active.

Step 1 Use the following example to display the current TGs with ISDN D channels.

```
show isdn-dchan
```

Following is an example of the display:

```
TGN_ID=1700
DCHAN_TYPE=PRIMARY
SET_ID=backset1
DCHAN_SLOT=3
DCHAN_PORT=0
DCHAN_INTF=0

TGN_ID=1701
DCHAN_TYPE=PRIMARY
SET_ID=backset1
DCHAN_SLOT=3
DCHAN_PORT=1
DCHAN_INTF=0
```

Reply Example:

```
Reply : Success:  Entries 1-2 of 2 returned.
```

Step 2 Use the following example to switch over an ISDN D channel.

```
control isdn-dchan tgn-id=1;
```

Reply Example:

```
Reply : Success
```

Media Gateway

This section describes the status and control commands for media gateways.

Status Command

This section describes how to check the status of a media gateway.

Step 1 The following example checks the status of a media gateway:

```
status mgw id=c5300_197;
```

Reply Example:

```
Reply : Success:

MGW ID -> c5300_197
RESULT -> ADM configure result in success
REASON -> ADM executed successful
ADMIN STATE -> ADMIN_INS
OPER STATE -> Media gateway in working status
```

Table 5-1 lists the administrative states the system can return.

Table 5-1 Returnable Administrative States

State	Definition
ADMIN-INS	In-service
ADMIN-OOS	Out of service
ADMIN-MAINT	Maintenance Mode
ADMIN-OOS-PENDING	Transitioning to out of service
ADMIN-MAINT-PENDING	Transitioning to Maintenance Mode

The system can report the following MGW operational states:

- Media gateway in unknown status
- Media gateway in working status
- Media gateway in down status
- Media gateway cannot be reached

Control Command

This section shows how to control a media gateway in service. Modes can be either forced or graceful. Forced mode tears down all calls immediately; graceful mode allows calls in progress to complete before teardown.

Step 1 Use the following example to control a media gateway in service:

```
control mgw id=c5300_162; mode=forced; target-state=INS;
```

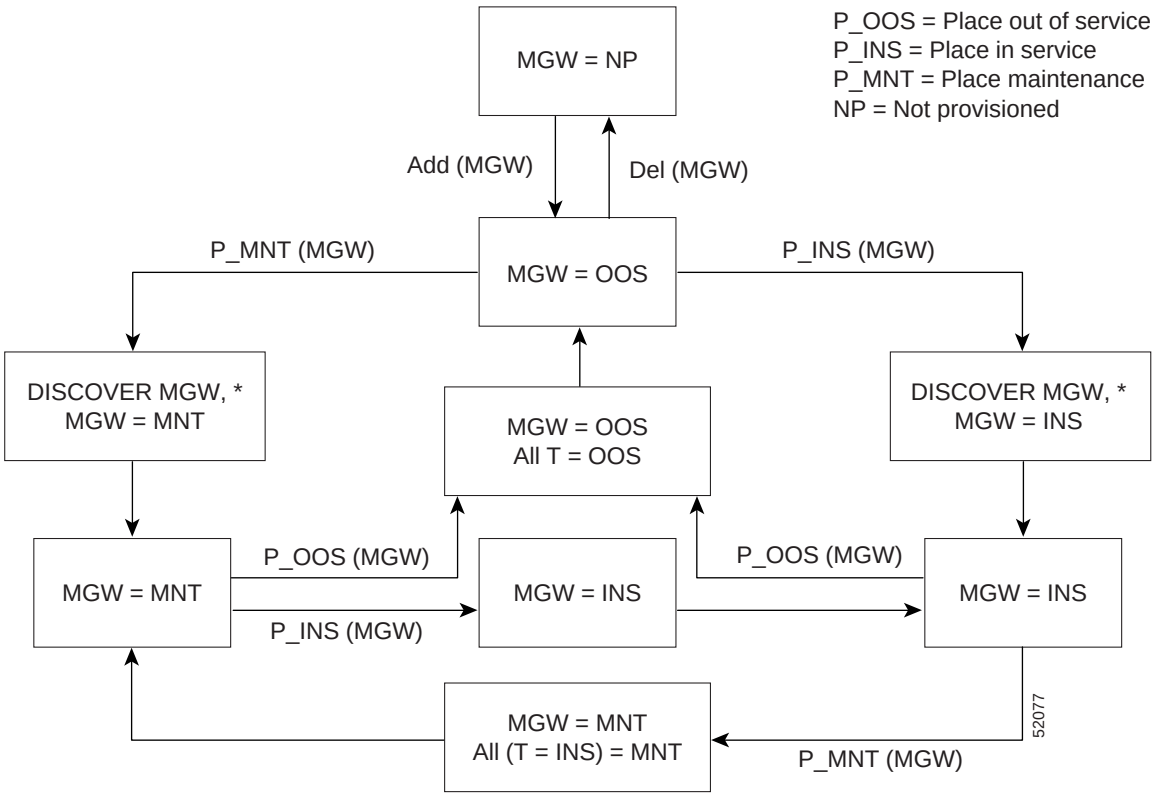
Reply Example:

```
Reply : Success: CLI change successful

MGW ID -> c5300_162
INITIAL STATE -> ADMIN_OOS
REQUEST STATE -> ADMIN_INS
RESULT STATE -> ADMIN_INS
FAIL REASON -> ADM found no failure
REASON -> ADM executed successful
RESULT -> ADM configure result in success
```

Note The rules for placing an MGW into the OOS, INS, and MAINT states are shown in Figure 5-1.

Figure 5-1 Administrative and Operational Maintenance States for MGW



* "Discover" means to establish MGCP communication with MGW

Signaling Gateway Process

This section describes the status command for the signaling gateway process (SGP) table.

Status Command

The SGP status command returns the state of the SGP.

Examples

```
status sgp id=sgp1;
```

Where sgp-id is the ID of the selected signaling gateway process in the sgp table. For example, sgp222. This is an optional token.

Stream Control Transmission Protocol Association

This section details the **status** and **control** commands for the Stream Control Transmission Protocol (SCTP) Association table. Use the **status** command to check the status of an SCT association. Use the **control** command to control an SCTP that is out of service. Forced is the only permitted mode—this mode immediately tears down all calls.

Status Command

Use the following command example to check the status of an SCTP association.

Examples

```
status sctp-assoc id=sctpassoc1;
```

Control Command

The following command example shows how to control an SCTP out of service. Forced mode tears down all calls immediately.

Examples

```
control sctp-assoc id=sctpassoc1; target-state=INS; mode=FORCED;
```

Subscriber Termination

This section describes the status and control commands for subscriber terminations. Either a range of subscribers can be specified by using *@mgw-id for the ID parameter, or a single subscriber can be specified (for example: sub-ctx1@Cisco.com).

Note When first provisioned, all subscriber terminations are in the unequipped (UEQP) state. A subscriber termination must also be in the UEQP state before it can be deleted.

Individual subscriber terminations can be placed into any of three administrative service states: INS, OOS, and MNT. The relationship between subscriber termination states and the residential gateway (RGW) state is provided in Table 5-2.

Table 5-2 RGW and Subscriber Termination States

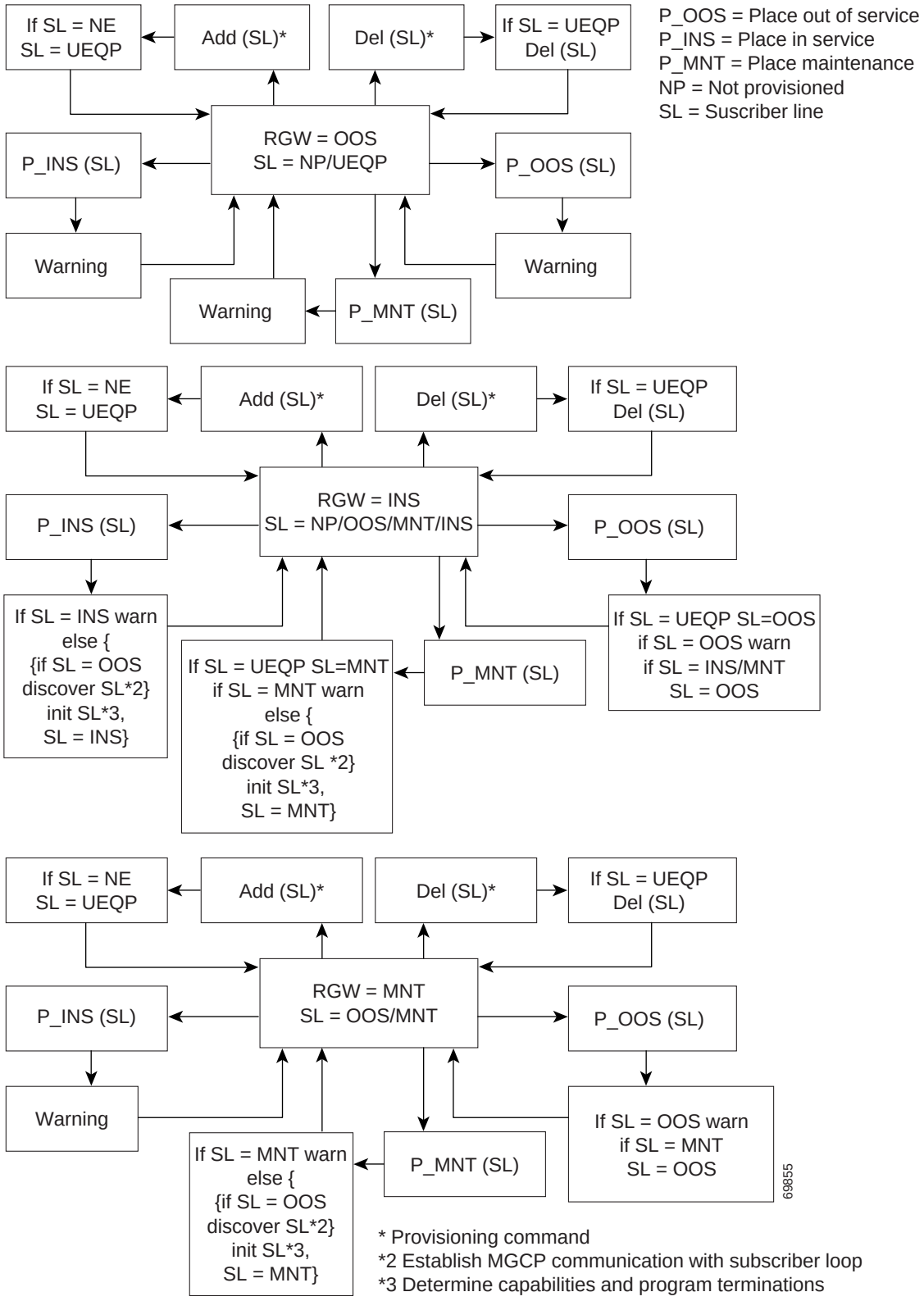
RGW State	Allowed Subscriber Termination States
OOS	• OOS • UEQP
INS	• OOS • MAINT • INS • UEQP
MAINT	• OOS • MAINT • UEQP

Where:

- OOS means out of service.
- MAINT means maintenance.
- INS means in-service.
- UEQP means unequipped.

The rules for placing RGW subscriber terminations into the OOS, INS, and MAINT states (which depend upon the RGW state) are shown in Figure 5-2.

Figure 5-2 Administrative and Operational Maintenance States for Residential Gateways



Status Command

This section describes how to show the status of subscriber terminations. It is organized as follows:

Single Subscriber Termination Status

This section describes how to check the status of a single subscriber termination.

The following example checks the status of a single subscriber termination:

```
status subscriber-termination id=ubr204_1;
```

Reply Example:

```
RESULT -> ADM configure result in success
REASON -> ADM executed successful
ADMIN STATE -> ADMIN_INS
OPER STATE -> Termination is idle
SUBCRIBER DN -> ubr204_1
FAULT REASON -> No fault reason available
```

Note Table 5-3 lists the administrative states the system can return.

Table 5-3 Returnable Administrative States

State	Definition
ADMIN-UEQP	Unequipped
ADMIN-INS	In-service
ADMIN-OOS	Out of service
ADMIN-MAINT	Maintenance Mode
ADMIN-OOS-PENDING	Transitioning to out of service
ADMIN-MAINT-PENDING	Transitioning to Maintenance Mode

All Subscriber Terminations Status

This section describes how to show the status of all subscriber-terminations on a particular gateway.

The following example shows the status of all subscriber-terminations on a particular gateway:

```
status subscriber-termination id=*@ubr235;
```

Reply Example:

```
SUBCRIBER DN -> ubr235_1
ADMIN STATE -> ADMIN_UEQP
```

```
OPER STATE -> Termination is unequiped
REASON -> ADM executed successful
RESULT -> ADM configure result in success
FAULT REASON -> No fault reason available

SUBCRIBER DN -> ubr235_2
ADMIN STATE -> ADMIN_UEQP
OPER STATE -> Termination is unequiped
REASON -> ADM executed successful
RESULT -> ADM configure result in success
FAULT REASON -> No fault reason available

Reply : Success:
```

Administrative State Token

The Administrative State (admin-state) token returns the administrative state of the subscriber termination. Valid values are:

- UEQP—Unequipped; resource is not commissioned. Resource is not registered.
- OOS—Termination was manually controlled out of service.
- INSQ Termination was manually controlled in service, but operationally may be available or unavailable.
- OOS-PENDING—Termination was manually controlled out of service with mode graceful, termination is still involved in a call.
- MAINT—Termination was in maintenance mode, can run diagnostic commands.
- MAINT-PENDING—Termination was manually controlled to MAINT state, but termination is still involved in call.
- ALL—Return all possible states.

The following command example returns only those trunk terminations that are in administrative state OOS (if any), and operating state IDLE (if any):

```
status trunk-termination tgn-id=12; cic=1-1000; admin-state=OOS; oper-state=idle
```

Operating State Token

The Operating State (oper-state) token expands the range of useful information returned by the status subscriber-termination command.

Valid values for the oper-state token are:

- FA—Faulty
- NF—Not faulty
- IDLE—Termination idle
- ACTIVE—Termination active
- DOWN—Termination down
- TERM-FA—Termination fault
- TEMP-DOWN—Termination temporarily down
- UNREACH—Termination unreachable
- INT-MAINT—Termination internal maintenance

- UEQP—Termination unequipped
- ALL—All states, same as executing command without oper-state token

The following example returns only those subscriber terminations that are FA (if any):

```
status subscriber-termination id=*@ubr235; oper-state=FA;
```

Note If the media gateway keep-alive is disabled the connectivity status (reachable/unreachable) in termination status command output is only last known status, however all other status information is the latest.

Table 5-4 Returnable Operational States

State	Definition
UNKNOWN	• The termination is not being audited for connectivity. • Capabilities, termination, and connection are not being synchronized with the termination. • When KEEPALIVE-METHOD=NONE in MGW-PROFILE, the termination status is UNKNOWN even if the transaction becomes UNREACHABLE. • Newly-provisioned terminations are in this state.
ACTIVE	• The termination is being audited for connectivity. • Capabilities, termination, and connection are being synchronized with the termination.
UNREACHABLE	• The termination is unreachable. • This occurs when MGW KEEPALIVE declares an MGW unreachable. • This changes to ACTIVE when MGW KEEPALIVE detects an MGW is reachable or any termination previously UNREACHABLE starts sending MGCP messages (NTFY, RSIP).
FAULTY	• The termination returneda permanent error code, making it unusable for future calls. **Note** The error code may occur only in certain circumstances and re-audit/auto-recovery may succeed. This does not mean the termination recovered from that condition. • The flag MGCP-MAX-FAULT-COUNT controls how many times BTS tries to recover the fault (performing re-audit/auto-recovery) before putting it in this state.
MTRANS	• Maintenance Transient, the termination is in the middle of anaudit/re-audit/auto-recovery. • This state may go along with other states (MTRANS-UNREACH).
IDLE	The termination is not involved in transient/active call
BUSY	• The termination is involved in Active/Transient call. • This state may go along with CTRANS state.

Table 5-4 Returnable Operational States

State	Definition
CTRANS	• Call Transient, the termination is involved in a Transient call. • This state always goes with BUSY.
RESERVED	The termination is reserved for a call during Busy Line Verification
SERV_EFFC_TEST	The termination is in a Service Effecting Network loopback or Network Continuity test.

Source Token

The source token specifies whether to query the Call Agent, or the EMS, for status information. It is an optional token.

Valid values for the source token are:

- EMS (Default)—Query the local EMS database for most current status.
- AGENT—Query the remote Call Agent database for most current status.

The following example returns the current status of a Call Agent:

```
status subscriber-termination id=*@ubr235; source=AGENT;
```

Control Command

This section describes how to control subscriber terminations on a particular gateway. To control a subscriber termination to the unequipped or equipped state, use the equip or unequip commands in the "Equip Command" section on page 5-16 and the "Unequip Command" section on page 5-16. This section is organized as follows:

Control a Single Subscriber Termination

Use the **control** command to control one subscriber-termination on a particular gateway.

Note To control a subscriber termination to the unequipped or equipped state, use the **equip** or **unequip** commands.

The following example controls a single subscriber termination into service:

```
control subscriber-termination id=*@c3810_167; mode=forced; target-state=INS;
```

Reply Example:

```
Reply : Success: CLI change successful

ID -> c3810_167
REQUEST STATE -> ADMIN_INS
RESULT STATE -> ADMIN_INS
```

```
FAIL REASON -> ADM found no failure
REASON -> ADM executed successful
RESULT -> ADM configure result in success
```

Control All Subscriber Terminations

This section describes how to control all subscriber-terminations on a particular gateway.

The following example controls to MAINT all subscriber-terminations on a particular gateway:

```
control subscriber-termination id=*@ubr235; mode=forced; target-state=MAINT
```

Reply Example:

```
Reply : Success: CLI change successful

ID -> ubr235
REASON -> ADM executed successful
RESULT -> ADM configure result in success
REQUEST STATE -> ADMIN_MAINT
RESULT STATE -> ADMIN_MAINT
FAIL REASON -> ADM found no failure
CLI>diag subscriber-termination
Reply : Success: Diagnostic Subscriber Menu.
```

Equip Command

The **equip** command changes the administrative state of terminations that are in the UEQP state to OOS state. It ignores the terminations in the states INS, MAINT, or OOS.

Use the following example to equip a subscriber termination:

```
equip subscriber-termination id=97_8@ipclab.cisco.com;
```

Reply Example:

```
Reply : Success: CLI change successful

ID -> Subcriber ID -> 97_8@ipclab.cisco.com
REASON -> ADM executed successful
RESULT -> ADM configure result in success
FAIL REASON -> ADM found no failure
```

Unequip Command

The unequip command changes the administrative state of subscriber terminations that are in OOS state into UEQP state. It ignores the terminations in the INS, MAINT, or UEQP states.

Use the following command to unequip a subscriber termination:

```
unequip subscriber-termination id=97_8@ipclab.cisco.com;
```

Reply Example:

```
Reply : Success: CLI change successful

ID -> Subcriber ID -> 97_8@ipclab.cisco.com
REASON -> ADM executed successful
RESULT -> ADM configure result in success
FAIL REASON -> ADM found no failure
FAIL REASON -> ADM found no failure
```

Subsystem Table

This section describes the **show**, **status** and **control** commands for the Subsystem table. This table holds the information for all the subsystems using signaling connection control part (SCCP). Because the Cisco BTS 10200 Softswitch supports multiple origination point codes (OPCs), both the subsystem ID and OPC_ID are required to determine subsystem information.

Show Command

Use the **show** command to display information about the provisioned subsystem(s), including IDs and OPC_IDs.

```
show subsystem;
```

Typical system response:

```
ID=LNP_SSN
LOCAL_SSN=248
REMOTE_SSN=248
SCCP_NW_ID=1
OPC_ID=opc
SCCP_VERSION=ANS92
TCAP_VERSION=ANS92
APPLICATION_VERSION=AIN01
STATUS=UIS
Reply : Success:  Entries 1-1 of 1 returned.
```

Status Command

The **status subsystem** command returns the state of a subsystem. You must enter the ID and OPC_ID in this command.

```
status subsystem id=LNP_SSN; opc_id=opc;
```

Typical system response:

```
SUBSYSTEM ID -> LNP_SSN
OPC ID -> opc
ADMIN STATE -> User in service
OPER STATE -> Subsystem allowed
REASON -> ADM executed successful
RESULT -> ADM configure result in success

Reply : Success:
```

Control Command

The following example shows how to control a subsystem out of service in forced mode:

```
control subsystem id=LNP_SSN; opc_id=opc; target-state=OOS; mode=FORCED;
```

Trunk Group

This section describes the **status** and **control** commands for trunk groups (TGs). Individual TGs can be placed into any of three administrative service states: INS, OOS, and MAINT. The relationship between TGW and TG state is provided in Table 5-5.

Table 5-5 ISDN TGW/TG State Relationships

TGW State	Allowed TG States
INS	• OOS • MAINT • INS
MAINT	• OOS • MAINT

Status Command

This section describes how to show the status of one TG ID.

The following example shows the status of a single TG ID:

```
status trunk-grp id=2;
```

Reply Example:

```
RESULT -> ADM configure result in success
REASON -> ADM executed successful
ADMIN STATE -> ADMIN_INS
OPER STATE -> Trunk group in-service
TGN ID -> 2
```

Table 5-6 lists the administrative states that the system can return.

Table 5-6 Returnable Administrative States

State	Definition
ADMIN-INS	In service.
ADMIN-OOS	Out of service.
ADMIN-MAINT	Maintenance Mode.
ADMIN-OOS-Pending	Transitioning to out of service.
ADMIN-MAINT-Pending	Transitioning to Maintenance Mode.
ACL	Congestion is at level 1
ACL	Congestion is at level 2
ACL	Congestion is at level 3
TFC	Congestion is at level 1
TFC	Congestion is at level 2
TFC	Congestion is at level 3

The system can return the following operating states:

- Trunk group in-service
- Trunk group out of service
- Trunk group manually busy
- Trunk group operate in wait state
- Trunk group operate in standby state
- Trunk group restore session request normal
- Trunk group restore session request switchover
- Trunk group restore session request maintenance
- Trunk group restore session fail normal
- Trunk group restore session fail switch-over
- Trunk group restore session fail maintenance
- Trunk group restore establish request normal
- Trunk group restore establish request switchover
- Trunk group restore establish request maintenance
- Trunk group restore establish fail normal
- Trunk group restore establish fail switchover
- Trunk group restore establish fail maintenance
- Trunk group in maintenance state
- Trunk group down session set fail soft normal
- Trunk group down session set fail hard normal
- Trunk group down session set fail soft maintenance
- Trunk group down session set fail hard maintenance
- Trunk group down establish request soft normal
- Trunk group down establish request hard normal
- Trunk group down establish request soft maintenance
- Trunk group down establish request hard maintenance
- Trunk group down establish fail soft normal
- Trunk group down establish fail hard normal
- Trunk group down establish fail soft maintenance
- Trunk group down establish fail hard maintenance
- Trunk group delete graceful
- Trunk group request remove release
- Trunk group request remove session set
- Trunk group remove graceful in-service and maintenance state
- DPC is inaccessible

Control Command

This section describes how to control one trunk group ID.

Note When performing the following commands in immediate succession, always wait at least one second before performing the second command:

control trunk-grp tgn-id=129; mode=forced; target-state=oos;
control trunk-grp tgn-id=129; mode=forced; target-state=ins;

The following example controls a single trunk group ID into service:

```
control trunk-grp id=2; mode=forced; target-state=INS;
```

Reply Example:

```
Reply : Success: CLI change successful

INITIAL STATE -> ADMIN_OOS
REQUEST STATE -> ADMIN_INS
RESULT STATE -> ADMIN_INS
FAIL REASON -> ADM found no failure
REASON -> ADM executed successful
RESULT -> ADM configure result in success
TGN ID -> 2
```

Caution When you control an ISDN trunk in-service, the media gateway must be in-service.
When you control an ISDN trunk group, all ISDN trunks in that trunk group are controlled to the same state.

Trunk Termination

This section describes the status and control commands for trunk terminations. Either a range (for example, cic=1-24;) or a single value (for example, cic=1;) for the CIC parameter can be specified for the status and control of trunk terminations.

Individual ISDN trunks and trunking groups can be placed into any of three administrative service states:

- INS
- OOS
- MAINT

Note Use the following command to control all trunk terminations for a particular CIC group to INS. This command resets the circuits. The **forced** option brings the circuits to INS by using the reset procedure.

```
control trunk-termination tgn-id=17; cic=1-23; target-state=ins; mode=forced;
```

The relationship between trunk/trunk group state and the TGW state is provided in Table 5-7. For all other trunk types, the trunk state and trunk group state are independent.

Table 5-7 ISDN TGW/TG State Relationships

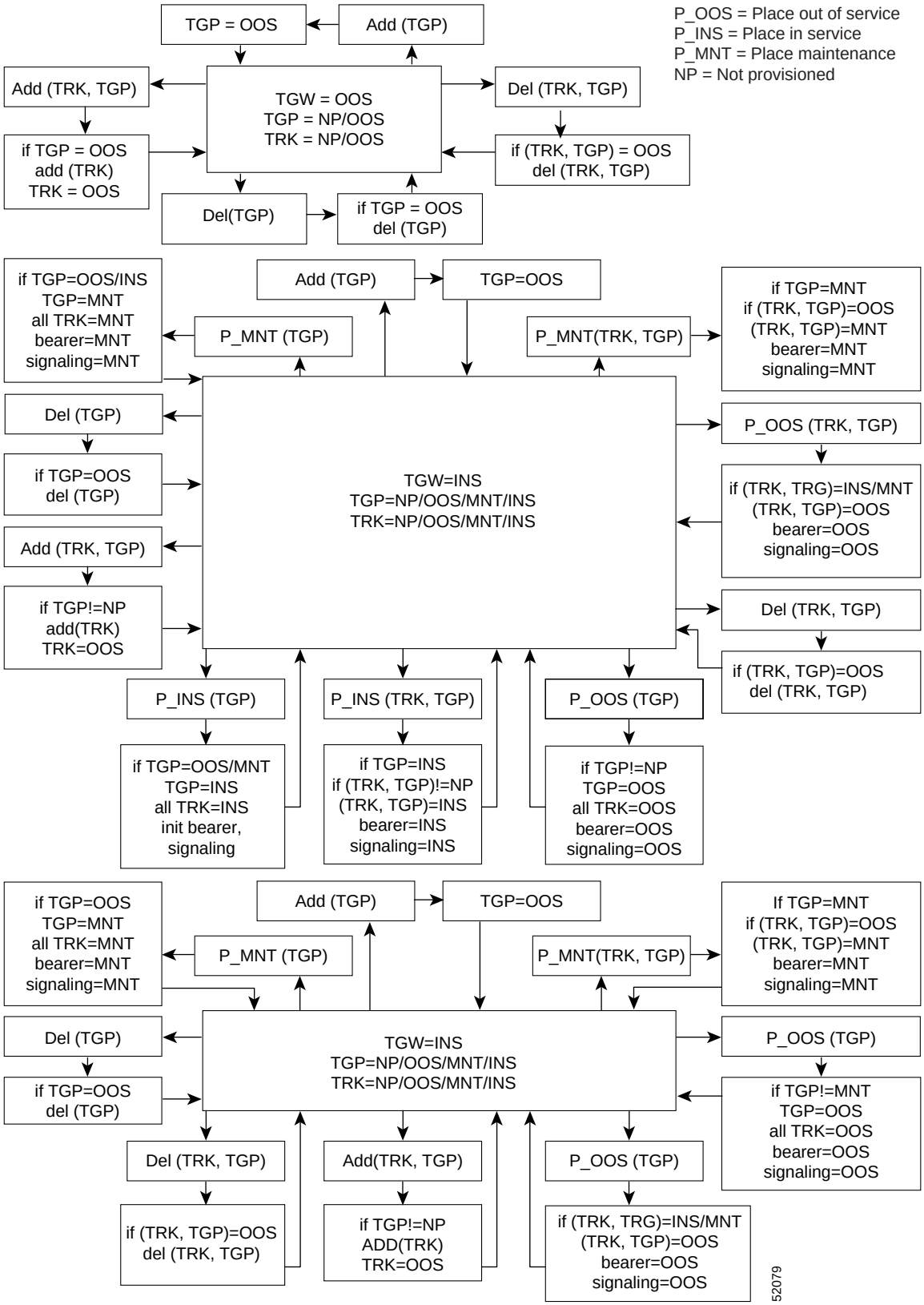
TGW State	Allowed TG States	Allowed Trunk States
INS	• OOS • MAINT • INS	• UEQP OOS • UEQP OSS, MAINT • UEQP OOS, MAINT, INS
MAINT	• OOS • MAINT	• UEQP OOS • UEQP OSS, MAINT

Where:

- TGW—trunking gateway
- TG—trunk group
- OOS—out of service
- MAINT—maintenance
- INS—in service
- UEQP—unequipped

The rules for placing trunks and TG into the OOS, INS, and MAINT states (which depend upon the TGW state) are shown in Figure 5-3.

Figure 5-3 ISDN Administrative and Operational Maintenance States for a Trunking Gateway



Using the Status Command to Check Trunk Termination Status

This section describes how to check trunk termination status. This section is organized as follows:

- Trunk Termination Status—Basic Command
- Trunk Termination Status—Optional Tokens
- Trunk Termination Status—"status tt" Command

Trunk Termination Status—Basic Command

This section describes how to check the status of one trunk termination. This command can be executed for one CIC (for example, cic=1;), a range of CICs (for example, cic=1-12;) or for all CICs (cic=all;).

Use the following example to check the status of one trunk termination:

```
status trunk-termination tgn-id=2; cic=8;
```

Reply Example:

```
Reply : Success:

RESULT -> ADM configure result in success
REASON -> ADM executed successful
TGN ID -> 2
CIC -> 8
TERM ADMIN STATE -> ADMIN_INS
TERM OPER STATE -> Termination is idle
TERM REASON -> No fault reason available
TRUNK STATIC STATE -> ACTV
TRUNK DYNAMIC STATE -> TRNS
TRUNK REASON -> NON_FAULTY
```

Note Table 5-8 lists the administrative states the system can return for the *term admin status* response.

Table 5-8 Returnable Administrative States

State	Definition
ADMIN-UNEQP	Unequipped.
ADMIN-INS	In Service.
ADMIN-OOS	Out of Service.
ADMIN-MAINT	Maintenance Mode.
ADMIN-OOS-PENDING	Transitioning to Out of Service.
ADMIN-MAINT-PENDING	Transitioning to Maintenance Mode.
ADMIN-NULL	Resource does not exist.

Trunk Termination Status—Optional Tokens

The following optional tokens can be used with the status trunk-termination command. They expand the range of useful information returned. Either all, or none of the tokens can be used, with the exception of the off-normal token, which must be used by itself (without any other tokens).

- Administrative State (admin-state). Valid values are:
  - UEQP—Unequipped; resource is not commissioned. Resource is not registered.
  - OOS—Termination was manually controlled out of service.
  - INS—Termination was manually controlled in service, but operationally may be available or unavailable.
  - OOS-PENDING—Termination was manually controlled out of service with the graceful mode, termination is still involved in a call.
  - MAINT—Termination was in maintenance mode, can run diagnostic commands.
  - MAINT-PENDING—Termination was manually controlled to the MAINT state, but termination is still involved in call.
  - ALL—Return all possible states.

  The following command example returns only those trunk terminations that are in administrative state OOS (if any), and operating state IDLE (if any):

  ```
  status trunk-termination tgn-id=12; cic=1-1000; admin-state=OOS; oper-state=idle
  ```

- Operating State (oper-state). Valid values for the oper-state token are:
  - FA—Includes FAULTY, UNREACH, TEMP-DOWN, and DOWN.
  - FAULTY—The MGCP endpoint returned a permanent error code.
  - UNREACH—The MGCP endpoint was declared as not reachable. This indicates gateway connectivity problems.
  - TEMP-DOWN—The MGCP endpoint is temporarily down.
  - DOWN—MGCP endpoint is down because GW termination has sent an RSIP-down message.
  - NF—Includes INT-MAINT, IDLE, BUSY, and ACTIVE.
  - INT-MAINT—Internal error recovery is in progress.
  - IDLE—Termination is not involved in a call, but is available.
  - BUSY— Termination is involved in transient call.
  - ACTIVE—Termination is involved in stable call.
  - UEQP—Termination is not equipped.
  - ALL—Returns all possible operational states.

  The following command example returns only those trunk terminations that are FA (if any):

  ```
  status trunk-termination tgn-id=12; cic=ALL; oper-state=FA;
  ```

- Static State (static-state). Valid values for the static-state token are:
  - UEQP—Unequipped resource is not commissioned. Resource is not registered.
  - LBLK—Termination is locally blocked: either manually taken OOS/MAINT (block reason can be MANUAL-OOS, MAINT-OOS), or automatically went out of service.
  - RBLK—Termination is remotely blocked (blocked by remote side).
  - ACTV—Available.
  - All—Returns all possible static states.

  The following command example returns only those terminations that are locally blocked (if any):

```
status trunk-termination tgn-id=101; cic=1-24; static-state=lblk;1
```

- Dynamic State (dynamic-state). Valid values for the dynamic-state token are:
  - IBSY—Trunk-termination is involved in an incoming active call.
  - OBSY—Trunk-termination is involved in an outgoing active call.
  - TRNS—Transient maintenance state (sent maintenance signaling message and waiting for response).
  - IDLE—Termination is not involved in a call.
  - IBSY-TRNS—Termination is involved in an incoming transient call.
  - OBSY-TRNS—Termination is involved in an outgoing transient call.
  - ALL—All possible dynamic states.

  The following command example returns only those terminations that are idle (if any):

  ```
  status trunk-termination tgn-id=101; cic=1-24; dynamic-state=idle;
  ```

- Off-normal State (off-normal)
  - Yes—Return all terminations in off-normal state.
  - No—Return all terminations in normal state.

  The following command example returns only those terminations in an off-normal state (if any).

  ```
  status trunk-termination tgn-id=101; cic=1-24; off-normal=yes;
  ```

  A termination is in an off-normal state when it is *not* in one of the state combinations shown in Table 5-9.
- Source (source)—Specifies whether to query the Call Agent or the Element Management System (EMS) for status information. It is an optional token.
  - EMS (Default)—Query the local EMS database for most current status.
  - AGENT—Query the remote Call Agent database for most current status.

  The following command example returns the current status of the Call Agent:

  ```
  status trunk-termination tgn-id=101; cic=1-24; source=AGENT;
  ```

Table 5-9 Valid Normal Trunk Termination States

State/Token	ADMIN-STATE	OPER-STATE	STATIC-STATE	DYNAMIC-STATE
UNEQP	UNEQP	ANY	UEQP	IDLE
MANUALLY OOS	OOS	ANY	LBLK	IDLE
MANUALLY MAIN	MAINT	IDLE	LBLK	IDLE
IDLE	INS	IDLE	ACTV	IDLE
ACTIVE INCOMING	INS	IDLE	ACTV	IDLE
ACTIVE OUTGOING	INS	ACTIVE	ACTV	OBSY
TRANSIENT INCOMING	INS	ACTIVE	ACTV	IBY-TRNS
TRANSIENT OUTGOING	INS	BUSY	ACTV	OBSY-TRNS

Trunk Termination Status—"status tt" Command

The following command example (**status tt**) returns current status in a tabular format.

```
CLI>status tt tgn_id=6004;cic=all;
```

6004	1	ADMIN_INS	TERM_ACTIVE_CTRANS_BUSY	ACTV	TRNS_IBSY	NON_FAULTY

```
 6004  1   ADMIN_INS     TERM_ACTIVE_CTRANS_BUSY   ACTV   TRNS_IBSY   NON_FAULTY
 6004  2   ADMIN_INS     TERM_ACTIVE_BUSY      ACTV   IBSY   NON_FAULTY
 6004  3   ADMIN_INS     TERM_ACTIVE_BUSY      ACTV   IBSY   NON_FAULTY
 6004  4   ADMIN_INS     TERM_ACTIVE_BUSY      ACTV   IBSY   NON_FAULTY
 6004  5   ADMIN_INS     TERM_ACTIVE_BUSY      ACTV   IBSY   NON_FAULTY
 6004  6   ADMIN_INS     TERM_ACTIVE_BUSY      ACTV   IBSY   NON_FAULTY
 6004  7   ADMIN_INS     TERM_ACTIVE_CTRANS_BUSY   ACTV   TRNS_IBSY   NON_FAULTY
 6004  8   ADMIN_INS     TERM_ACTIVE_BUSY      ACTV   IBSY   NON_FAULTY
 6004  9   ADMIN_INS     TERM_ACTIVE_BUSY      ACTV   IBSY   NON_FAULTY
 6004  10   ADMIN_INS     TERM_ACTIVE_CTRANS_BUSY   ACTV   IBSY   NON_FAULTY
 6004  11   ADMIN_INS     TERM_ACTIVE_BUSY      ACTV   IBSY   NON_FAULTY
 6004  12   ADMIN_INS     TERM_ACTIVE_BUSY      ACTV   IBSY   NON_FAULTY
 6004  13   ADMIN_INS     TERM_ACTIVE_IDLE      ACTV   IDLE   NON_FAULTY

PROPOSED COMMAND OUTPUT
TGN ID  CIC  ADMIN_STATE   OPER_STATE   STATIC_STATE     DYNAMIC_STATE      REASON
 6004   1   ADMIN_INS     TERM_ACTIVE_CTRANS_BUSY       ACTV TRNS_IBSY     NON_FAULTY
 6004   2   ADMIN_INS     TERM_ACTIVE_BUSY              ACTV IBSY          NON_FAULTY
 6004   3   ADMIN_INS     TERM_ACTIVE_BUSY              ACTV IBSY          NON_FAULTY
 6004   4   ADMIN_INS      TERM_ACTIVE_BUSY             ACTV IBSY          NON_FAULTY
 6004   5       ADMIN_INS    TERM_ACTIVE_BUSY                        ACTV
IBSY               NON_FAULTY
 6004   6       ADMIN_INS    TERM_ACTIVE_BUSY                        ACTV
IBSY               NON_FAULTY
 6004    7        ADMIN_INS     TERM_ACTIVE_CTRANS_BUSY            ACTV
TRNS_IBSY          NON_FAULTY
```

```
 6004    8       ADMIN_INS     TERM_ACTIVE_BUSY                        ACTV
IBSY                 NON_FAULTY
 6004    9       ADMIN_INS     TERM_ACTIVE_BUSY                        ACTV
IBSY                 NON_FAULTY
 6004   10        ADMIN_INS     TERM_ACTIVE_CTRANS_BUSY            ACTV
IBSY                 NON_FAULTY
```

Reply Example:

TGN ID	CIC	ADMIN_STATE	OPER_STATE	STATIC_STATE	DYNAMIC_STATE	REASON
6004	1	ADMIN_INS	TERM_ACTIVE_CTRANS_BUSY			NON_FAULTY
						NON_FAULTY

```
994   1    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY
994   2    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY
994   3    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY
994   4    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY
994   5    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY
994   6    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY
994   7    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY
994   8    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY
994   9    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY
994   10    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY
994   11    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY
994   12    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY
994   13    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY
994   14    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY
994   15    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY
994   16    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY
994   17    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY
994   18    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY
994   19    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY
994   20    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY
994   21    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY
994   22    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY
994   23    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY
994   24    ADMIN_INS      TERM_ACTIVE_IDLE       ACTV    IDLE    NON_FAULTY

Reply : Success:
```

Control Command—Trunk Terminations

This section describes how to control trunk terminations. The section is organized as follows:

- Controlling One Trunk Termination
- Controlling All Trunk Terminations

Controlling One Trunk Termination

This section describes how to control a trunk termination.

Use the following example to control one trunk termination into OOS:

```
control trunk-termination tgn-id=22; cic=1; target-state=OOS; mode=forced;
```

Reply Example:

```
Reply : Success: CLI change successful

TGN ID -> 22
REASON -> ADM executed successful
RESULT -> ADM configure result in success
CIC START -> 1
CIC END -> 1
FAIL REASON -> ADM found no failure
REQUEST STATE -> ADMIN_OOS
RESULT STATE -> ADMIN_OOS
```

Controlling All Trunk Terminations

This section describes how to control all trunk terminations for a group of circuit identification codes (CICs).

Use the following example to control all trunk terminations for a particular CIC group to OOS:

```
control trunk-termination tgn-id=17; cic=1-23; target-state=oos; mode=forced;
```

Reply Example:

```
Reply: Request was successful.
TGN ID -> 17
REASON -> ADM executed successful
RESULT -> ADM configure result in success
CIC START -> 1
CIC END -> 24
FAIL REASON -> ADM found no failure
REQUEST STATE -> ADMIN_OOS
RESULT STATE -> ADMIN_OOS
```

Reset Command to Clear Manual and Blocked States

The **reset** command clears all manual and blocked states as well as any active/transient calls on a trunk termination, with the exception of SS7 trunk terminations. It brings a trunk into INS mode. This section is organized as follows:

- Reset a Single CIC
- Reset a Range of CICs
- Reset All CICs

Reset a Single CIC

This section describes how to reset a single CIC.

The following example resets a single CIC on a specific trunk:

```
reset trunk-termination tgn-id=22; cic=1
```

Reply Example:

```
Reply : Success:

TGN ID -> 22
REASON -> ADM executed successful
RESULT -> ADM configure result in success
CIC START -> 1
CIC END -> 1
FAIL REASON -> ADM found no failure
```

Reset a Range of CICs

This section describes how to reset a range of CICs.

The following example resets a range of CICs on a specific trunk:

```
reset trunk-termination tgn-id=13; cic=1-6;
```

Reply Example:

```
TGN ID -> 13
REASON -> ADM executed successful
RESULT -> ADM configure result in success
CIC START -> 1
CIC END -> 6
FAIL REASON -> ADM found no failure
```

Reset All CICs

This section describes how to reset all CICs.

The following example resets all CICs on a specific trunk:

```
reset trunk-termination tgn-id=13; cic=all;
```

Reply Example:

```
TGN ID -> 13
REASON -> ADM executed successful
RESULT -> ADM configure result in success
CIC START -> 1
CIC END -> 24
FAIL REASON -> ADM found no failure
```

Equip Command

The **equip** command changes the administrative state of terminations that are in the UEQP state to the OOS state. It ignores the terminations in the INS, MAINT, or OOS states.

Use the **equip** command or the **control trunk-grp** command to change the termination state for a subscriber to an ISDN trunk. The control trunk-grp command changes all trunks in the specified trunk group to the specified state. For trunk types other than ISDN, use the equip command to set the subscriber termination state. Thereafter, to change the termination state, use the control command.

A subscriber termination state must set to unequipped before it can be deleted.

You cannot use the control command to change a termination state to UEQP. Furthermore, you cannot use the control command to change the state of any subscriber termination that is already in the UEQP state.

For example, consider a case in which 24 CICs in a trunk group are in the following initial states:

- CICs 1–10 in OOS state
- 11–15 in UEQP state
- 16–24 in MAINT state

For this case, issuing the **control**, **equip**, or **unequip** commands will affect the initial state of the CICs as follows:

- If a **control** command is used with target-state = ins, the final states of all the CICs are:
  - CICs 1–10 in INS state
  - CICs 11–15 in UEQP state
  - CICs 16–24 in INS state
- If an **equip** command is applied to the CICs in the initial states, the final states of all the CICs are:
  - CICs 1–10 in OOS state
  - CICs 11–15 in OOS state
  - CICs 16–24 in MAINT state
- If an **unequip** command is applied to the CICs in the initial states, the final states of the CICs are:
  - CICs 1–10 in UEQP state
  - CICs 11–15 in UEQP state
  - CICs 16–24 in MAINT state

Use the following example to equip a trunk termination:

```
equip trunk-termination tgn-id=13; cic=all;
```

Reply Example:

```
Reply : Success: CLI change successful

TGN ID -> 13
REASON -> ADM executed successful
RESULT -> ADM configure result in success
CIC START -> 1
CIC END -> 24
FAIL REASON -> ADM found no failure
```

Unequip Command

The **unequip** command changes the administrative state of terminations that are in the OOS state into the UEQP state. It ignores the terminations in the INS, MAINT, or UEQP states.

Use the following example to unequip terminations:

```
unequip trunk-termination tgn-id=13; cic=all;
```

Reply Example:

```
Reply : Success: CLI change successful
```

```
TGN ID -> 13
REASON -> ADM executed successful
RESULT -> ADM configure result in success
CIC START -> 1
CIC END -> 24
```

Diagnostic Tests

This section describes diagnostic tests that can be performed on media gateways, subscriber terminations, and trunk terminations. All media gateways, subscriber and trunk terminations must be in the MAINT state for testing. The following tests are described in this section:

- Media Gateway Tests
- Subscriber Termination Tests
- SS7 Trunk Termination Tests
- ISDN Trunk Termination Tests
- CAS Trunk Termination Tests
- Announcement Trunk Termination Tests

Media Gateway Tests

This section describes the tests that can be performed on media gateways. A gateway must be in the MAINT state.

Step 1 Force the media gateway into MAINT state. Enter the following command:

```
control mgw id=c2421.65; mode=forced; target-state=maint;
```

Reply Example:

```
Reply : Success: CLI change successful

MGW ID -> c2421.65
INITIAL STATE -> ADMIN_INS
REQUEST STATE -> ADMIN_MAINT
RESULT STATE -> ADMIN_MAINT
FAIL REASON -> ADM found no failure
REASON -> ADM executed successful
RESULT -> ADM configure result in success
```

Step 2 Display the Test Menu. Enter the following command:

```
diag mgw
```

Reply Example:

```
Reply: Diagnostic MGW Menu.
===
(1) MGW Network Connectivity Test
(2) MGW MGCP Connectivity Test
(3) ALL
```

Note Test #1 tests if there is a path to the device (ping).
Test #2 tests if MGCP has access to the device.
Test #3 performs tests 1 and 2.

Step 3 To perform a specific test, use the following examples as guides.

```
diag mgw id=ubr-03; test=1;
```

Reply Example:

```
MEDIA GATEWAY LINE DIAGNOSTIC TEST EXECUTED -> diag mgw
ID -> ubr-03
TEST-TYPE -> ADM-MGW-NETW-CONNECTIVITY-TEST
TEST-DURATION -> 0
RESULT -> TEST-SUCCESS
REASON -> PASSED
Reply: Diagnostic command executed.
```

```
diag mgw id=ubr-03; test=2;
```

Reply Example:

```
MEDIA GATEWAY LINE DIAGNOSTIC TEST EXECUTED -> diag mgw
ID -> ubr-03
TEST-TYPE -> ADM-MGW-MGCP-CONNECTIVITY-TEST
TEST-DURATION -> 0
RESULT -> TEST-SUCCESS
REASON -> PASSED
Reply: Diagnostic command executed.
```

```
diag mgw id=ubr-03; test=3;
```

Reply Example:

```
MEDIA GATEWAY LINE DIAGNOSTIC TEST EXECUTED -> diag mgw
ID -> ubr-03
TEST-TYPE -> ADM-MGW-NETW-CONNECTIVITY-TEST
TEST-DURATION -> 11
RESULT -> TEST-SUCCESS
REASON -> PASSED

MEDIA GATEWAY LINE DIAGNOSTIC TEST EXECUTED -> diag mgw
ID -> ubr-03
TEST-TYPE -> ADM-MGW-MGCP-CONNECTIVITY-TEST
TEST-DURATION -> 0
RESULT -> TEST-SUCCESS
REASON -> PASSED
Reply: Diagnostic command executed.
```

Subscriber Termination Tests

This section describes the tests that can be performed on subscriber terminations. All terminations must be in the MAINT state.

Step 1 Force the subscriber termination into MAINT state. Enter the following command:

```
control subscriber-termination id=sub2-ctx2; mode=forced; target-state=maint;
```

Step 2 Display the Test Menu. Enter the following command:

```
diag subscriber-termination;
```

Reply Example:

```
Reply: Diagnostic Subscriber Menu.
===
(1) Subscriber MGCP Connectivity Test
(2) Subscriber Termination Connection Test
(3) Subscriber Termination Ring Test
(4) ALL
```

Note Test #1 tests if MGCP has access to the termination.
Test #2 tests if there is a path to the device (ping).
Test #3 tests if the subscriber can be rung. The Ring parameter must be specified in seconds for this test. The default is 5 seconds.
Test #4 performs tests 1 through 3.

Step 3 To perform a specific test, use the following examples as guides.

```
diag subscriber-termination id=sub2-ctx2; test=1;
```

Reply Example:

```
SUBSCRIBER LINE DIAGNOSTIC TEST EXECUTED -> diag subscriber-termination
ID -> sub2-ctx2
TEST-TYPE -> ADM-MGW-MGCP-CONNECTIVITY-TEST
TEST-DURATION -> 10
RESULT -> TEST-SUCCESS
REASON -> PASSED: Reason: AUEP-NACK received with RespCode = 510
Reply: Diagnostic command executed.
```

```
diag subscriber-termination id=sub-ubr3-1@cisco.com; test=2;
```

Reply Example:

```
SUBSCRIBER LINE DIAGNOSTIC TEST EXECUTED -> diag subscriber-termination
ID -> sub-ubr3-1@Cisco.com
TEST-TYPE -> ADM-TERM-CONNECTION-TEST
TEST-DURATION -> 55
RESULT -> TEST-SUCCESS
REASON -> PASS successfully.
Reply: Diagnostic command executed.
```

```
diag subscriber-termination id=sub-ubr3-1@cisco.com; test=3; ring-duration=10;
```

Reply Example:

```
SUBSCRIBER LINE DIAGNOSTIC TEST EXECUTED -> diag subscriber-termination
ID -> sub-ubr3-1@Cisco.com
TEST-TYPE -> ADM-TERM-RING-TEST
TEST-DURATION -> 9989
RESULT -> TEST-SUCCESS
REASON -> PASSED
Reply: Diagnostic command executed.
```

Note Ring-duration values are 0–999 (Default = 5). Maximum ring time is 30 seconds regardless of whether the duration is set higher than or equal to 31.

SS7 Trunk Termination Tests

This section describes the tests that can be performed on SS7 trunk terminations. All terminations must be in the MAINT state for testing.

Note In Release 4.4.0, diag ss7-trunk-termination test=7 will not execute all tests successfully because Test 1 and Test 2 require the trunk to be in MAINT state while Test 3 through Test 6 require the trunk to be in INS state. Test 7 will not execute successfully regardless of the trunk state.

Step 1 Force the SS7 trunk termination into MAINT state. Enter the following command:

```
control ss7-trunk-termination tgn-id=103; mode=forced; target-state=maint;
```

Note Set COT, CVM, and CQM on the terminating gateway or switch to perform these tests. Otherwise, the test or tests will fail.

Step 2 Display the Test Menu. Enter the following command:

```
diag ss7-trunk-termination
```

Reply Example:

```
Reply: Diagnostic SS7 Trunk Group Menu.
===
(1) SS7 MGCP Connectivity Test
(2) SS7 Termination Connection Test
(3) SS7 COT Test
(4) SS7 CQM Test
(5) SS7 CVT Test
(6) ALL
```

Note Test #1 tests if MGCP has access to the SS7 trunk termination.
Test #2 tests if there is a path to the device (ping).
Test #3 tests the integrity of the SS7 Bearer Path.
Test #4 queries the SS7 circuit (or group of circuits) status. A range of CICs can be specified (to a maximum of 24). Both remote and local trunk states are displayed in the results.
Test #5 tests to ensure that each end of the circuit has sufficient and consistent information for using the circuit in call connections. CLLI names are included.
Test #6 performs tests 1 through 5.

Step 3 To perform a specific test, use the following examples as guides:

```
diag ss7-trunk-termination tgn-id=103; cic=13; test=1;
```

Reply Example:

```
TRUNK DIAGNOSTIC TEST EXECUTED -> diag trunk
TG-NUM -> 103
CIC -> 13
TEST-TYPE -> ADM-MGW-MGCP-CONNECTIVITY-TEST
TEST-DURATION -> 0
RESULT -> TEST-SUCCESS
REASON -> PASSED: Reason: AUEP-NACK received with RespCode = 510
Reply: Diagnostic command executed.
```

diag ss7-trunk-termination tgn-id=103; cic=13; test=2;

Reply Example:

```
TRUNK DIAGNOSTIC TEST EXECUTED -> diag trunk
TG-NUM -> 103
CIC -> 13
TEST-TYPE -> ADM-TERM-CONNECTION-TEST
TEST-DURATION -> 33
RESULT -> TEST-SUCCESS
REASON -> PASS successfully.
Reply: Diagnostic command executed.
```

diag ss7-trunk-termination tgn-id=103; cic=14; test=3;

Reply Example:

```
TRUNK DIAGNOSTIC TEST EXECUTED -> diag trunk
TG-NUM -> 103
CIC -> 14
TEST-TYPE -> ADM-SS7-COT-TEST
TEST-DURATION -> 0
RESULT -> TEST-FAILURE
REASON -> ADM-MAINT-STATE-REQUIRED
Reply: Diagnostic command executed.
```

diag ss7-trunk-termination tgn-id=2;cic=1-24;test=4

Reply Example:

```
Reply : Success:

TGN ID -> 2
START CIC -> 1
END CIC -> 24
TEST TYPE -> ADM running SS7 circuit query message test
TEST DURATION -> 0
RESULT -> ADM ran test successfully
REASON -> CQM test pass
CIC COUNT -> 24
CIC STATES ->

        Remote State         Local State

        CIC 1 -> CS_IDLE     ACTV    IDLE

        CIC 2 -> CS_IDLE     ACTV    IDLE

        CIC 3 -> CS_IDLE     ACTV    IDLE

        CIC 4 -> CS_IDLE     ACTV    IDLE

        CIC 5 -> CS_IDLE     ACTV    IDLE
```

```
CIC 6 -> CS_IDLE    ACTV   IDLE

CIC 7 -> CS_IDLE    ACTV   IDLE

CIC 8 -> CS_IDLE    ACTV   IDLE

CIC 9 -> CS_IDLE    ACTV   IDLE

CIC 10 -> CS_IDLE   ACTV   IDLE

CIC 11 -> CS_IDLE   ACTV   IDLE

CIC 12 -> CS_IDLE   ACTV   IDLE

CIC 13 -> CS_IDLE   ACTV   IDLE

CIC 14 -> CS_IDLE   ACTV   IDLE

CIC 15 -> CS_IDLE   ACTV   IDLE

CIC 16 -> CS_IDLE   ACTV   IDLE

CIC 17 -> CS_IDLE   ACTV   IDLE

CIC 18 -> CS_IDLE   ACTV   IDLE

CIC 19 -> CS_IDLE   ACTV   IDLE

CIC 20 -> CS_IDLE   ACTV   IDLE

CIC 21 -> CS_IDLE   ACTV   IDLE

CIC 22 -> CS_IDLE   ACTV   IDLE

CIC 23 -> CS_IDLE   ACTV   IDLE

CIC 24 -> CS_IDLE   ACTV   IDLE
```

diag ss7-trunk-termination tgn_id=78;cic=3;test=5

Reply Example:

```
TGN ID -> 78
REASON -> CV_FAIL_GLARE_NOT_ALL_CCT
RESULT -> ADM ran test fail
START CIC -> 3
END CIC -> 3
TEST TYPE -> ADM running SS7 circuit validation test
TEST DURATION -> 0
CLLI ->
```

```
                Local State                 Remote State

COT CHECK       CP_COT_REQS_STATISTICAL     CP_COT_REQS_NONE
->

ALARM           CP_ALARM_CARR_UNKNOWN       CP_ALARM_CARR_UNKNOWN
CARRIER->

DOUBLE SEIZE    CP_DUAL_SEIZE_NO_CONTROL    CP_DUAL_SEIZE_NO_CONTROL
->

GROUP           CP_CCT_GRP_CARR_DIGITAL     CP_CCT_GRP_CARR_DIGITAL
CARRIER->

TRUNK NUMBER    0003
->

OFFICE A        ***********
->

OFFICE Z        ***********
```

ISDN Trunk Termination Tests

This section describes the tests that can be performed on ISDN trunk terminations. All terminations must be in the MAINT state for testing.

Step 1 Force the ISDN trunk termination into MAINT state. Enter the following command:

```
control isdn-trunk-termination tgn-id=17; mode=forced; target-state=maint;
```

Step 2 Display the Test Menu. Enter the following command:

```
diag isdn-trunk-termination
```

Reply Example:

```
Reply: Diagnostic ISDN Trunk Group Menu.
===
(1) ISDN MGCP Connectivity Test
(2) ISDN Termination Connection Test
(3) ALL
```

Note Test #1 tests if MGCP has access to the ISDN termination.
Test #2 tests if there is a path to the device (ping).
Test #3 performs tests 1 and 2.

Step 3 To perform a specific test, use the following examples as guides. Enter the following command:

```
diag isdn-trunk-termination test=1; tgn-id=17; cic=1;
```

Reply Example:

```
TRUNK DIAGNOSTIC TEST EXECUTED -> diag trunk
TG-NUM -> 17
CIC -> 1
TEST-TYPE -> ADM-MGW-MGCP-CONNECTIVITY-TEST
```

```
TEST-DURATION -> 0
RESULT -> TEST-SUCCESS
REASON -> PASSED: Reason: AUEP-NACK received with RespCode = 510
Reply: Diagnostic command executed.
```

diag isdn-trunk-termination test=2; tgn-id=17; cic=1;

Reply Example:

```
TRUNK DIAGNOSTIC TEST EXECUTED -> diag trunk
TG-NUM -> 17
CIC -> 1
TEST-TYPE -> ADM-TERM-CONNECTION-TEST
TEST-DURATION -> 0
RESULT -> TEST-SUCCESS
REASON -> PASSED: Reason: AUEP-NACK received with RespCode = 510
Reply: Diagnostic command executed.
```

CAS Trunk Termination Tests

This section describes the tests that can be performed on CAS trunk terminations. All terminations must be in the MAINT state for testing.

Step 1 Force the CAS trunk termination into MAINT state. Enter the following command:

control cas-trunk-termination tgn-id=64; mode=forced; target-state=maint;

Step 2 Display the Test Menu. Enter the following command:

diag cas-trunk-termination

Reply Example:

```
Reply: Diagnostic CAS Trunk Group Menu.
===
(1) CAS MGCP Connectivity Test
(2) CAS Termination Connection Test
(3) ALL
```

Note Test #1 tests if MGCP has access to the CAS termination.
Test #2 tests if there is a path to the device (ping).
Test #3 performs tests 1 and 2.

Step 3 To perform a specific test, use the following examples as guides:

diag cas-trunk-termination tgn-id=64;cic=1;test=1;

Reply Example:

```
TRUNK DIAGNOSTIC TEST EXECUTED -> diag trunk
TG-NUM -> 64
CIC -> 1
TEST-TYPE -> ADM-MGW-MGCP-CONNECTIVITY-TEST
TEST-DURATION -> 0
RESULT -> TEST-SUCCESS
REASON -> PASSED: Reason: AUEP-NACK received with RespCode = 510
Reply: Diagnostic command executed.
```

diag cas-trunk-termination tgn-id=64;cic=1;test=2;

Reply Example:

```
TRUNK DIAGNOSTIC TEST EXECUTED -> diag trunk
TG-NUM -> 64
CIC -> 1
TEST-TYPE -> ADM-TERM-CONNECTION-TEST
TEST-DURATION -> 32
RESULT -> TEST-SUCCESS
REASON -> PASS successfully.
Reply: Diagnostic command executed.
```

```
diag cas-trunk-termination tgn-id=64;cic=1;test=3;
```

Reply Example:

```
TRUNK DIAGNOSTIC TEST EXECUTED -> diag trunk
TG-NUM -> 64
CIC -> 1
TEST-TYPE -> ADM-MGW-MGCP-CONNECTIVITY-TEST
TEST-DURATION -> 11
RESULT -> TEST-SUCCESS
REASON -> PASSED: Reason: AUEP-NACK received with RespCode = 510

TRUNK DIAGNOSTIC TEST EXECUTED -> diag trunk
TG-NUM -> 64
CIC -> 1
TEST-TYPE -> ADM-TERM-CONNECTION-TEST
TEST-DURATION -> 32
RESULT -> TEST-SUCCESS
REASON -> PASS successfully.
Reply: Diagnostic command executed.
```

Announcement Trunk Termination Tests

This section describes the tests that can be performed on Announcement trunk terminations. All terminations must be in the MAINT state for testing.

Step 1 Force the Announcement trunk termination into MAINT state. Enter the following command:

control annc-trunk-termination tgn-id=13; mode=forced; target-state=maint;

Step 2 Display the Test Menu. Enter the following command:

diag annc-trunk-termination:

Reply Example:

```
Reply: Diagnostic ANC Trunk Group Menu.
===
(1) ANC MGCP Connectivity Test
(2) ANC Termination Connection Test
(3) ALL
```

Note Test #1 tests if MGCP has access to the ANC termination.
Test #2, tests if there is a path to the device (ping).
Test #3 performs tests 1 and 2.

Step 3 To perform a specific test, use the following examples as guides.

```
diag annc-trunk-termination;test=1;tgn-id=13;cic=1
```

Reply Example:

```
TRUNK DIAGNOSTIC TEST EXECUTED -> diag trunk
TG-NUM -> 13
CIC -> 1
TEST-TYPE -> ADM-MGW-MGCP-CONNECTIVITY-TEST
TEST-DURATION -> 0
RESULT -> TEST-SUCCESS
REASON -> PASSED: Reason: AUEP-NACK received with RespCode = 510
Reply: Diagnostic command executed.
```

```
diag annc-trunk-termination;test=2;tgn-id=13;cic=1
```

Reply Example:

```
TRUNK DIAGNOSTIC TEST EXECUTED -> diag trunk
TG-NUM -> 13
CIC -> 1
TEST-TYPE -> ADM-TERM-CONNECTION-TEST
TEST-DURATION -> 33
RESULT -> TEST-SUCCESS
REASON -> PASS successfully.
Reply: Diagnostic command executed.
```

```
diag annc-trunk-termination;test=3;tgn-id=13;cic=1
```

Reply Example:

```
TRUNK DIAGNOSTIC TEST EXECUTED -> diag trunk
TG-NUM -> 13
CIC -> 1
TEST-TYPE -> ADM-MGW-MGCP-CONNECTIVITY-TEST
TEST-DURATION -> 11
RESULT -> TEST-SUCCESS
REASON -> PASSED: Reason: AUEP-NACK received with RespCode = 510

TRUNK DIAGNOSTIC TEST EXECUTED -> diag trunk
TG-NUM -> 13
CIC -> 1
TEST-TYPE -> ADM-TERM-CONNECTION-TEST
TEST-DURATION -> 33
RESULT -> TEST-SUCCESS
REASON -> PASS successfully.
Reply: Diagnostic command executed.
```

Command Responses

This section describes success and failure responses to commands, as well as values for the term-reason and trunk-reason responses. The topics in this section include:

Generic Responses to Status or Control Command Failures

Generic **status** and **control** commands apply to all MGWs, subscribers, trunks, and TGs. If a command fails, it can return one of the following generic failure reasons, as well as ones specific to the command (shown in following sections).

- Subscriber, media gateway, trunk group *or* trunk database was not found in shared memory.
- Component is already in the requested state.
- Graceful mode only. Appears when a command is executed and operation is INS going OSS or INS going MAINT.
- A required resource is not available.

  If the MGW for a subscriber is down, the subscriber cannot be added.

  For ISDN

  – A trunk cannot be added unless *both* the MGW and trunk group are available.

  – A trunk group cannot be added unless the MGW is available, and vice versa.

  For SS7, CAS, Announcement

  – A trunk cannot be added unless *both* the MGW and trunk group are available.

  – A trunk group does *not* require the MGW to be available, and vice versa.
- An associated resource of the database cannot be found.
- An assigned resource is not valid (supported). For example: A subscriber is assigned to a PBX and the PBX is not supported.

Generic Success and Failure Responses

The following message is returned upon the success of a command:

- Configuration Command Executed.

One of the following messages can be returned upon the failure of a command:

- ADM found no failure.
- ADM MGW(s) cannot be found.
- ADM subscriber(s) cannot be found.
- ADM trunk group(s) cannot be found.
- ADM trunk(s) cannot be found.

- ADM no termination(s) found in MGW.
- ADM no trunk group(s) found in trunking gateway.
- ADM no trunk(s) found in trunk group.
- ADM fail while in termination table.
- ADM fail while in trunk group table.
- ADM fail while in trunk table.
- ADM fail while looking to find trunk index.
- ADM fail while getting MGW administration state.
- ADM fail while getting trunk group administration state.
- ADM fail while looking for MGW index.
- ADM administration state invalid.
- ADM failed to allocate IPC message(s).
- ADM failed to dispatch IPC message(s).
- ADM operational state invalid.
- ADM MGW(s) state change and pending.
- ADM subscriber(s) state change and pending.
- ADM trunk group(s) state change and pending.
- ADM trunk(s) state change and pending.
- ADM found subscriber category invalid.
- ADM found trunk group type invalid.
- ADM found trunk group state invalid.
- ADM found MGW admin state not ready.
- ADM found trunk group admin state not ready.
- ADM entity in desired state.
- ADM not allow trunk to reset.
- ADM not allow subscriber to reset.
- ADM change to out-of-service state required.
- ADM change to request graceful mode error.
- ADM found entity unequipped in initial state.
- ADM operation not allowed because D Channel(s) is down.
- The H.323 Gateway was not found in DBM.
- ADM found unknown failure reason(s).

System Error Response

The following error message applies to system processes, not to processes for individual databases:

- *Shared memory conflict between processes*

Termination Reason Responses

The following values can be returned for the termination reason (term-reason) response for subscriber termination and trunk termination commands:

- The media gateway is down.
- The media gateway is unreachable.
- The media gateway is in a faulty state.
- The media gateway is transitioning to another state.
- The transaction could not be executed due to a transient error.
- The transaction could not be executed because the endpoint is unknown.
- The transaction could not be executed because the endpoint is not ready.
- The transaction could not be executed, endpoint does not have enough resources available.
- The transaction could not be executed because a protocol error was detected.
- The transaction could not be executed because the command contained an unrecognized extension.
- The transaction could not be executed because the gateway is not equipped to detect one of the requested events.
- The transaction could not be executed because the gateway is not equipped to generate one of the requested signals.
- The transaction could not be executed because the gateway cannot send the specified announcement.
- Invalid conn identifier.
- Invalid call ID.
- Unsupported mode or invalid mode.
- Unsupported or unknown package.
- Endpoint does not have a digit map.
- The transaction could not be executed because the endpoint is restarting.
- Endpoint redirected to another Call Agent.
- No such event or signal.
- Unknown action or illegal combination of actions.
- Internal consistency in local connection options.
- Unknown extensions in local connection options.
- Insufficient bandwidth.
- Missing remote connection descriptor.
- Incompatible protocol version.
- Internal hardware failure.
- CAS signaling protocol error.
- Failure of a group of trunks.
- Unsupported values on local connection options.
- Response too big.
- Endpoint malfunctioning.

- Loss of lower connectivity.
- Endpoint taken out of service.
- No fault reason available.

Trunk Reason Responses

The following statements can be returned for the trunk reason (trunk-reason) response. One or more statements can be returned, depending upon the operating conditions of the Call Agent.

- NON-FAULTY—Not blocked, available for service.
- MAINT-OOS—trunk-termination is manually controlled OOS.
- MAINT-BUSY—trunk-termination is in maintenance state; controlled to MAINT.
- TERM-FAULT—Bearer termination is in faulty condition.
- SIGNALLING-FAULT—Signaling link (for example, SS7 link, or ISDN D-channel) is faulty.
- MAINT-BLOCK—trunk-termination is manually controlled OOS (controlled mode=GRACE).
- HARDWARE-BLOCK—trunk-termination is manually controlled OOS (controlled mode=FORCED).
- OUTGOING_RESTRICTED—the outgoing call is not allowed
- DPC_INACCESSIBLE—the DPC is not accessible.
- ACL_CONGESTION_LEVEL_1—Automatic Congestion Level (ACL) congestion is at level 1.
- ACL_CONGESTION_LEVEL_2—ACL congestion is at level 2.
- ACL_CONGESTION_LEVEL_3—ACL congestion is at level 2.
- TFC_CONGESTION_LEVEL_1—Transfer Controlled (TFC) congestion is at level 1.
- TFC_CONGESTION_LEVEL_2—TFC congestion is at level 2.
- TFC_CONGESTION_LEVEL_3—TFC congestion is at level 3.

Trunk Termination Reason Responses—SS7 Only

The following values can be returned for the trunk terminations on SS7 trunks. One or more values can be returned, depending upon the operating conditions of the Call Agent, in addition to the reason responses listed under "Trunk Reason Responses".

- ACT_LOC_INIT_RESET—Reset circuit at startup.
- ACT_LOC_MML_RESET—Craft reset request.
- ACT_LOC_QUERY—Circuit query.
- ACT_LOC_UPU—Action to perform user part unavailable.
- ACT_LOC_VALIDATE—Circuit validation.
- ACT_LOC_COTTEST—COT test.
- ACT_LOC_STOP—Action to stop the call.
- BLK_LOC_UPU—Trunk is blocked because user part is unavailable.
- DES_LOC_GRACE—Local hardware RSIP graceful.

- DES_LOC_SIG—SS7 signaling fault (link fail).
- DES_LOC_FORCE—Local hardware RSIP forced.
- DES_LOC_MML—MML; also used for unsolicited blocks from MDL due to circuit query reservation (CQR).
- DES_LOC_UPU—Trunk needs to be blocked because of user part unavailability.
- JOB_PENDING—Ongoing job in progress.
- JOB_REC—Job was received by the MDL component and is being processed.
- OPER_ACTIVE—Trunk is available for calls.
- REMOTE_GRACE—Trunk is blocked remotely because of a CLI command on the remote switch.
- REMOTE_FORCE—Trunk is blocked remotely because of a hardware failure on the remote switch.
- RESERVE_SPARE1—Reserved for future use.
- RESERVE_SPARE2—Reserved for future use.
- TERM_GRACE—Trunk is gracefully blocked because of an RSIP graceful from the MGW.

Fault Reason Responses

The following statements can be returned for the fault reason (fault-reason) response for a subscriber termination command. One or more statements can be returned, depending upon the operating conditions of the Call Agent.

- The media gateway is down.
- The media gateway is unreachable.
- The media gateway is in a faulty state.
- The media gateway is transitioning to another state.
- The transaction could not be executed, due to a transient error.
- The transaction could not be executed because the endpoint is unknown.
- The transaction could not be executed because the endpoint is not ready.
- The transaction could not be executed, endpoint doesn't have enough resources available.
- The transaction could not be executed because a protocol error was detected.
- The transaction could not be executed because the command contained an unrecognized extension.
- The transaction could not be executed because the gateway is not equipped to detect one of the requested events.
- The transaction could not be executed because the gateway is not equipped to generate one of the requested signals.
- The transaction could not be executed because the gateway cannot send the specified announcement.
- Invalid conn identifier.
- Invalid call ID.
- Unsupported mode or invalid mode.
- Unsupported or unknown package.
- Endpoint does not have a digit map.

- The transaction could not be executed because the endpoint is restarting.
- Endpoint redirected to another Call Agent.
- No such event or signal.
- Unknown action or illegal combination of actions.
- Internal consistency in local connection options.
- Unknown extensions in local connection options.
- Insufficient bandwidth.
- Missing remote connection descriptor.
- Incompatible protocol version.
- Internal hardware failure.
- CAS signaling protocol error.
- Failure of a group of trunks.
- Unsupported values on local connection options.
- Response too big.
- Endpoint malfunctioning.
- Loss of lower connectivity.
- Endpoint taken out of service.
- No fault reason available.

Status Update Processor

The Status Update Processor (SUP) configuration table stores configurable values used by the SUP process to poll various components on the CA/FS. Each value is used to "tweak" the SUP so that the collection of statuses is least intrusive depending on the number of MGWs, trunk groups, and terminations. Most of the values are used for performance tuning.

Note This table is initially provisioned with default values at installation. During upgrades the values in these tables are not maintained.

Examples

show sup-config

change sup-config type= refresh-rate; value=600

Usage Guidelines

Primary Key Token(s): type

Table Lock Set: None

Change Rules: None

"*" in the table below indicates token is mandatory

Syntax Description

*TYPE	Identifies the configurable property of the SUP process to change or show. Primary key. VARCHAR: 1–64 ASCII characters. Permitted values are: REFRESH-RATE—Specifies the interval between each collection period in seconds. The valid range is an integer from 30 to MAXINT, and the default value is 600. **Note** MAXINT is defined as the largest possible 4-byte integer, [2 to the power 32] - 1 = 2,147,483,647. PRIORITY—Specifies the inner priority of the Collection Thread. The value can range from 1 to 10 and the default value is 5. Modifying this value has a minor effect in changing the CPU utilization of the SUP. SUBTERM-MGW-BLOCK—Specifies the block of sub terms within a gateway to retrieve and update at a time. The range is 0 to MAXINT. The default value is 5 SUB term blocks at a time. SUBTERM-BLOCK-PAUSE—Specifies the time to pause between each sub term block from each subterm-mgw-block retrieved. The value is in milliseconds. The range is 0 to MAXINT, and the default value is 9000 milliseconds (9 seconds). SUBTERM-STATUS-PAUSE—Specifies the time to pause between each bulk subterm status command. The value is in milliseconds. The range is 0 to MAXINT, and the default value is 0 milliseconds. TRUNKTERM-TG-BLOCK—Specifies the block of trunk terms within a trunk group to retrieve and update at a time. The range is 0 to MAXINT. The default value is 5 Trunk Term blocks at a time. TRUNKTERM-BLOCK-PAUSE—Specifies the time to pause between each trunk term block for each trunkterm-tg-block retrieved. The value is in milliseconds. The range is 0 to MAXINT, and the default value is 9000 milliseconds (9 seconds). TRUNKTERM-STATUS-PAUSE—Specifies the time to pause between each bulk trunk term status command. The value is in milliseconds. The range is 0 to MAXINT, and the default value is 0 milliseconds. TRUNKTERM-RANGE-BLOCK—Specifies the range of CICs to retrieve on each bulk trunk term status. The range is 0 to MAXINT, and the default value is 1000 CICs per query. TRUNKTERM-RANGE-PAUSE—Specifies the time to pause between each block of the trunkterm-range-block retrieved. The value is in milliseconds. The range is 0 to MAXINT, and the default value is 20000 milliseconds (20 seconds).
*VALUE	Identifies the values of the configurable property specified in the type token. VARCHAR: 1–64 ASCII characters.

CHAPTER 6

Traffic Measurements

Revised: July 21, 2009, OL-4495-10

Introduction

This chapter describes the traffic measurement information provided by the Cisco BTS 10200 Softswitch, and explains how to manage the generation of this data.

The Cisco BTS 10200 Softswitch provides the following capabilities:

- Collection of all statistics in 5-, 15-, 30-, or 60-minute intervals
- Clearance of counters after each interval without loss of ongoing counts
- Saving 48 hours of statistical data in 5-, 15-, 30-, or 60-minute increments in persistent store
- Display of summary report of past 48-hour period
- On-demand report queries keyed by collection interval
- Issuance of events when appropriate

Filtering Traffic Measurements

Use one of the following commands to specify the types of measurements to be stored in the system:

```
show measurement-prov type=<type>;

change measurement-prov type=<type>; enable=<yes or no>; time-interval=<time
interval>;
```

Valid values for **<type>** are:

- ISDN—ISDN signaling protocol related information
- CALLP—Call processing specific information
- MGCP—MGCP signaling protocol related information
- SIM—Service interaction manager related information
- POTS-FS—POTS/Centrex/Tandem Feature Service related information
- AINSVC—AIN Feature Service related information
- SCCP—SCCP protocol related information

- TCAP—TCAP related protocol information
- INAP—INAP related protocol information

Caution The INAP protocol measurements are not used in Release 4.1. They are disabled (enable=no) by default. The TCAP measurements (see "TCAP Protocol Measurements" section on page 6-41) cover the information formerly available from INAP. Information that could show in the INAP counters can be misleading, and should be ignored.

- SUA—SUA signaling protocol related information
- M3UA—M3UA signaling protocol related information
- SCTP—SCTP signaling protocol related information
- ISUP—ISDN User Part (ISUP) SS7 signaling protocol related information, applicable in a signaling gateway configuration
- AUDIT—Auditing related information
- SIA—Signaling interface adapter related information
- BILLING—Call detail block (CDB) data-related information
- EM—Event messaging billing-related information
- DQOS—Dynamic quality of service related information
- SNMP—SNMP agent protocol related information
- TG-USG—Trunk group usage information
- ANM—Announcement server related information
- H323—H.323 signaling protocol related information

The valid values for **enable** are YES and NO. This string specifies whether or not to perform collection on the specified measurement type. This is an optional token that is preprovisioned with a value of YES at the factory. You must enter either this token or the time-interval token.

The valid values for time-interval are listed below. These values indicate the number of minutes each reporting interval is to span for the given report type. The reporting interval is always synchronized to 0 (zero) minutes after the hour for consistency. This is an optional token that is preprovisioned with a value of 15 at the factory. Changing this value does not take effect until the completion of the current collection interval based on the previous time-interval setting. You must enter either this token or the enable token.

- 5
- 15
- 30
- 60

Note These commands are not case-sensitive. See the *Cisco BTS 10200 Command Line Interface Reference* for additional details on these commands and report types.

Traffic Measurement Data Transport and Access

The measurement data collected on the Cisco BTS 10200 Softswitch can be accessed via several different mechanisms:

- Command-line interface (CLI), which runs over a Telnet or secure shell (SSH) session
- Comma-separated value (CSV) or Extensible Markup Language (XML) format via FTP or SFTP interface
- SNMP MIB (the supported version of SNMP on the Cisco BTS 10200 Softswitch is v2c)

Retrieving Traffic Measurement Report Summaries

Use one of the commands listed in this section to retrieve specific types of measurement summaries from the data that is stored in the system. These commands allow you to specify a time interval, a specific type of data, and the source of data. The system supports the following methods for retrieving summaries:

- Displaying Report Summaries on an Operator's Terminal Screen
- Generating Reports from Historical Measurement Data
- Reporting Current Interval Counts

Note Any measurement counters that do not contain data for a given interval are suppressed out of the reports generated by the Cisco BTS 10200 Softswitch. Only counters that were pegged are included in the reports.

Note When executing a **report measurement-<xyz>-summary output=<abc>; output-type=csv (or xml)** command an out of memory error may occur if the data file output is large (over 2 megabits). This error can occur when large amount of data is collected by specifying a full 24 hours or more worth of TMM data to be gathered. If the out of memory error occurs, break the collection period into a shorter time span. For instance, collect 6 hours worth of data instead of collecting 24 hours worth of data and contact Cisco TAC.

Displaying Report Summaries on an Operator's Terminal Screen

Report summaries can be generated for measurements collected from the designated Cisco BTS 10200 Softswitch platforms between the specified start time and end time. The time interval specified must be prior to the current collection interval.

Examples of Command Line Queries

The following are examples of command line queries to display report summaries on the operator's terminal screen.

Note See Table 6-1 on page 6-5 for the definitions of the tokens used in these examples.

Note In the following examples, the <time> value can be any time during the 5-, 15-, 30-, and 60-minute interval for which the summary is requested. Each 30-minute collection interval starts on the hour or half-hour.

If busy-hour data is needed, measurement summaries can be taken at 10:00–10:30 a.m. and 10:30–11:00 a.m., Monday through Friday, or at the provider's own busy hour.

report measurement-isdn-summary start-time=<start time>; end-time=<end time>; call-agent-id=<CA ID>;

report measurement-callp-summary start-time=<start time>; end-time=<end time>; call-agent-id=<CA ID>;

report measurement-mgcp-summary start-time=<start time>; end-time=<end time>; call-agent-id=<CA ID>;

report measurement-sim-summary start-time=<start time>; end-time=<end time>; call-agent-id=<CA ID>;

report measurement-pots-local-summary start-time=<start time>; end-time=<end time>; feature-server-id=<FSPTC ID>;

report measurement-pots-misc-summary start-time=<start time>; end-time=<end time>; feature-server-id=<FSPTC ID>;

report measurement-pots-sle-summary start-time=<start time>; end-time=<end time>; feature-server-id=<FSPTC ID>;

report measurement-pots-acar-summary start-time=<start time>; end-time=<end time>; feature-server-id=<FSPTC ID>;

report measurement-pots-cos-summary start-time=<start time>; end-time=<end time>; feature-server-id=<FSPTC ID>;

report measurement-pots-cot-summary start-time=<start time>; end-time=<end time>; feature-server-id=<FSPTC ID>;

report measurement-ainsvc-summary start-time=<start time>; end-time=<end time>; feature-server-id=<FSAIN ID>;

report measurement-sccp-summary start-time=<start time>; end-time=<end time>; feature-server-id=<FSAIN ID>;

report measurement-tcap-summary start-time=<start time>; end-time=<end time>; feature-server-id=<FSAIN ID>;

report measurement-inap-summary start-time=<start time>; end-time=<end time>; feature-server-id=<FSAIN ID>;

report measurement-sua-summary start-time=<start time>; end-time=<end time>; sgp-id=<SGP ID>;

report measurement-m3ua-summary start-time=<start time>; end-time=<end time>; sgp-id=<SGP ID>;

report measurement-sctp-summary start-time=<start time>; end-time=<end time>; sctp-assoc-id=<SCTP ASSOCIATION ID>;

report measurement-isup-summary start-time=<start time>; end-time=<end time>; tgn-id=<TGN ID>;

report measurement-audit-summary start-time=<start time>; end-time=<end time>; call-agent-id=<CA ID>;

report measurement-sia-summary start-time=<start time>; end-time=<end time>; call-agent-id=<CA ID>;

report measurement-billing-summary start-time=<start time>; end-time=<end time>; call-agent-id=<CA ID>;

report measurement-em-summary start-time=<start time>; end-time=<end time>; call-agent-id=<CA ID>;

report measurement-dqos-summary start-time=<start time>; end-time=<end time>; aggr-id=<AGGR ID>;

report measurement-snmp-summary start-time=<start time>; end-time=<end time>;

report measurement-tg-usage-summary start-time=<start time>; end-time=<end time>; call-agent-id=<CA ID>; tgn-id=<TGN ID>;

report measurement-anm-summary start-time=<start time>; end-time=<end time>; call-agent-id=<CA ID>;

report measurement-h323-summary start-time=<start time>; end-time=<end time>; call-agent-id=<CA ID>;

Table 6-1 Descriptions of Tokens Used in Command Line Queries to Display Report Summaries

Token	Description / Comments
start-time	A timestamp value in the format **yyyy-mm-dd hh:mm:ss**. This value indicates the starting interval time to search within the EMS database. This is an optional token; when it is omitted from the command, the system displays the last collected interval.
end-time	A timestamp value in the format **yyyy-mm-dd hh:mm:ss**. This value indicates the stopping interval time to search within the EMS database. This is an optional token; when it is omitted from the command, the system displays the last collected interval.
call-agent-id	**T**he ID of the selected CA in the call-agent table. Example: CA146 This is an optional token that defaults to all CAs.

Table 6-1 Descriptions of Tokens Used in Command Line Queries to Display Report Summaries

Token	Description / Comments
feature-server-id	This is one of the following IDs: • ID of the selected POTS/Centrex/Tandem FS (FSPTC) in the feature-server table. Example: FSPTC235 • ID of the selected Advanced Intelligent Network (AIN) FS (FSAIN) in the feature-server table. Example: FSAIN205 This is an optional token that defaults to all FSs.
sgp-id	The ID of the selected signaling gateway process in the sgp table. Example: sgp222 This is an optional token.
sctp-assoc-id	**T**he ID of the selected SCTP association in the sctp-assoc table. Example: sctp-assoc3 This is an optional token.
tgn-id	**T**he ID of the selected TG as provisioned in the trunk-grp table. Example: chicago01 This is an optional token that defaults to all tgn-id.
aggr-id	The ID of the selected aggregation device (CMTS in PacketCable networks) in the aggr table, for example AGGR01. This is an optional token.

Generating Reports from Historical Measurement Data

This section describes how to use command line queries to generate reports from historical measurement data that can be retrieved from the local EMS. Measurement data is placed into CSV or XML files for viewing or for FTP/SFTP transfer. The time interval specified in this command must be prior to the current collection interval.

Tip To create a report summary file, you must specify both the output token and the output-type token.

Note The tokens used in the following examples are described in Table 6-2 on page 6-7.

The examples below show measurement data that was collected from 10 am until 12 noon on March 27, 2003, and placed into CSV files for viewing or for FTP transfer.

Note These examples are for illustration purposes, and are not intended to provide a complete list of the measurement summary types. See the "Displaying Report Summaries on an Operator's Terminal Screen" section on page 6-3 for a complete list of measurement summary types.

Examples:

report measurement-sim-summary start-time=2003-03-27 10:00:00; end-time=2003-03-27 12:00:00; call-agent-id=CA146; output=sim-report; output-type=csv;

report measurement-pots-local-summary start-time=2003-03-27 10:00:00; end-time=2003-03-27 12:00:00; feature-server-id=FSPTC235; output=pots-local-report; output-type=csv;

report measurement-em-summary start-time=2003-03-27 10:00:00; end-time=2003-03-27 12:00:00; call-agent-id=CA146; output=em-report; output-type=csv;

report measurement-dqos-summary start-time=2003-03-27 10:00:00; end-time=2003-03-27 12:00:00; aggr-id=AGGR01; output=dqos-report; output-type=csv;

Table 6-2 Descriptions of Tokens Used in Command Line Queries to Display Historical Measurement Data

Token	Description / Comments
interval	This token generates a report with: • CURRENT—the interval currently collecting – Enter a call-agent-id or feature-server-id. – Use CURRENT with non-instance-based counters; ian interval has more than one set of counters, CURRENT is not valid. For example, use CURRENT with measurement-callp-summary which has one instance. Do not use CURRENT with measurement-dqos-summary, which has more than one instance; there can be more than one aggr-id reporting per interval. • ALL—all collected intervals If you do not enter this token, the BTS returns the last collected interval.
sum	This token lets you set the report to return: • N—(default) individual interval reports • Y—a summary of all interval reports You cannot use this token with the trunk group category.
output	This token names the file that will contain the report. BTS prepends it with “Tm_” and puts it in **/opt/ems/report** on the active EMS.
output-type	This token allows you to set the report file format: • CSV • XML
display	This token sets which data columns appear in a report.

Note Additional token descriptions are listed in the “Displaying Report Summaries on an Operator’s Terminal Screen” section on page 6-3.

Reporting Current Interval Counts

The Cisco BTS 10200 Softswitch provides a CLI command to query in-progress partial interval counts of measurement data from the actual source of the data. This mechanism provides the ability to specify the current collection interval and the particular type and source of data.

Tip To display or create a report summary file, the reporting component (for example, call-agent-id or feature-server-id) must be specified and interval=current must also be specified. (SNMP is an exception, because there is no reporting component to specify.)

The following are examples of the command line queries to generate reports on the various types of measurements currently being collected from call agents and feature servers during the current interval.

Note These examples are for illustration purposes only, and are not intended to provide a complete list of the measurement summary types. See the "Displaying Report Summaries on an Operator's Terminal Screen" section on page 6-3 for a complete list of measurement summary types. and token descriptions.

Note This command is not supported for the tg-usage measurement types.

Examples:

report measurement-isdn-summary call-agent-id=CA146; output=isdn-partial-report; output-type=csv; interval=current;

report measurement-pots-acar-summary feature-server-id=FSPCT235; output=pots-acar-partial-report; output-type=csv; interval=current;

report measurement-ainsvc-summary call-agent-id=FSAIN205; output=ainsvc-partial-report; output-type=csv; interval=current;

report measurement-snmp-summary output=snmp-partial-report; output-type=csv; interval=current;

report measurement-h323-summary call-agent-id=CA146; output=h323-partial-report; output-type=csv; interval=current;

Clearing Current Interval Counts

The Cisco BTS 10200 Softswitch provides a CLI command to clear partial counts of measurement data that are in progress at the actual source of the data. This mechanism provides the ability to specify the particular type and source of data.

Caution This is a destructive command that will erase the partial counts for the current interval permanently. Use this command with caution.

The following examples clear all of the currently accumulating counters in CAs and FSs.

clear measurement-isdn-summary call-agent-id=CA146;

clear measurement-callp-summary call-agent-id=CA146;

clear measurement-mgcp-summary call-agent-id=CA146;

clear measurement-sim-summary call-agent-id=CA146;

clear measurement-pots-local-summary feature-server-id= FSPTC235;

clear measurement-pots-misc-summary feature-server-id= FSPTC235;

clear measurement-pots-sle-summary feature-server-id= FSPTC235;

clear measurement-pots-acar-summary feature-server-id= FSPTC235;

clear measurement-pots-cos-summary feature-server-id= FSPTC235;

clear measurement-pots-cot-summary feature-server-id= FSPTC235;

clear measurement-ainsvc-summary feature-server-id=FSAIN205;

clear measurement-sccp-summary feature-server-id=FSAIN205;

clear measurement-sccp-summary feature-server-id=FSAIN205;

clear measurement-inap-summary feature-server-id=FSAIN205;

clear measurement-tcap-summary feature-server-id=FSAIN205;

clear measurement-audit-summary call-agent-id=CA146;

clear measurement-sia-summary call-agent-id=CA146;

clear measurement-billing-summary call-agent-id=CA146;

clear measurement-em-summary call-agent-id=CA146;

clear measurement-snmp-summary

clear measurement-anm-summary call-agent-id=CA146;

clear measurement-h323-summary call-agent-id=CA146;

Format of Traffic Measurement Summaries

A traffic measurement summary lists the counters of the type requested in the report command, followed by the count. An example of a report is shown below.

>====================== Start Traffic Report ==============<

TIMESTAMP	20040206135919
NODENAME	CA146
CONDITION	NORMAL

ANM_TPM_CKT_UNAVAIL	25
ANM_TPM_CALL_REJECTED	3
ANM_TPM_ADDR_INCOMPLETE	11
ANM_TPM_FAC_REJECTED	0
ANM_TPM_PRE_0_1_ABSENT	8
ANM_TPM_PRE_0_1_PRESENT	21
ANM_TPM_HNPA_ABSENT	30
ANM_TPM_NO_ROUTE_DEST	17
ANM_TPM_UNALLOCATED_NUM	0
ANM_TPM_NUM_CHANGED	3
ANM_TPM_DEST_OUTOFORDER	8
ANM_TPM_TEMP_DISCONNECT	15
ANM_TPM_FEAT_NOT_SUBS	2
ANM_TPM_AUTHCODE_INVALID	23
ANM_TPM_NO_RTE_TRANSITNW	8
ANM_TPM_CAUSE_UNKNOWN	11

>====================== End Traffic Report =============<

Events and Alarms for Traffic Measurement

The system issues events and alarms applicable to traffic measurement functions. These events and alarms are labeled “STATISTICS”, and are described in the *Cisco BTS 10200 Troubleshooting Guide*.

List of Traffic Measurements (Counters)

The tables in this section list the various types of measurements (counters) that are collected by the Cisco BTS 10200 Softswitch. The measurements are grouped into logical categories for easy identification.

It is useful to monitor the measurements that are most important to your operation. Some of the measurements are particularly useful in alerting you to potential problems in the system. In some cases a rapid buildup of counts might indicate a problem such as congestion, processing failures, and so forth. In the tables below, an asterisk (*) is used to identify measurements for which a rapid increase in counts indicates a potential problem.

In addition, some potential network problems can be noticed by looking at specific *pairs of measurements that should normally be equal.* The greater the difference between two measurements (when those two measurements *should* be equal), the more likely it is that there could be a problem in the system.

Example:

SIP_TOTAL_INCOMING_MSG and SIP_TOTAL_SUCCESS_INCOMING_MSG

In this case, the total number of successful incoming messages should be about equal to the total number of incoming messages. Any difference between the two counts, especially a rapidly growing difference, can indicate a problem.

Resources and Definitions

The following reference materials are available to assist you in interpreting and using these tables:

- For information on SIP terminology (methods and response codes), refer to Internet Engineering Task Force (IETF) Recommendation RFC2543.
- For information on subscriber features, refer to the "Subscriber Features" section in the *Cisco BTS 10200 Softswitch System Description* document
- For a list of acronyms, see the Glossary in the *Cisco BTS 10200 Softswitch System Description* document.

ISDN Measurements

Table 6-3 lists the ISDN measurements.

Table 6-3 ISDN Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
ISDN_SETUP_TX	The number of ISDN SETUP messages sent from the reporting call agent
ISDN_SETUP_RX	The number of ISDN SETUP messages received by the reporting call agent
ISDN_SETUP_ACK_TX	The number of ISDN SETUP ACK messages sent from the reporting call agent
ISDN_SETUP_ACK_RX	The number of ISDN SETUP ACK messages received by the reporting call agent
ISDN_CALL_PROCEED_TX	The number of ISDN CALL PROCEED messages sent from the reporting call agent
ISDN_CALL_PROCEED_RX	The number of ISDN CALL PROCEED messages received by the reporting call agent
ISDN_ALERTING_TX	The number of ISDN ALERTING messages sent from the reporting call agent
ISDN_ALERTING_RX	The number of ISDN ALERTING messages received by the reporting call agent
ISDN_PROGRESS_TX	The number of ISDN PROGRESS messages sent from the reporting call agent
ISDN_PROGRESS_RX	The number of ISDN PROGRESS messages received by the reporting call agent
ISDN_CONNECT_TX	The number of ISDN CONNECT messages sent from the reporting call agent
ISDN_CONNECT_RX	The number of ISDN CONNECT messages received by the reporting call agent
ISDN_CONNECT_ACK_TX	The number of ISDN CONNECT ACK messages sent from the reporting call agent
ISDN_CONNECT_ACK_RX	The number of ISDN CONNECT ACK messages received by the reporting call agent
ISDN_DISCONNECT_TX	The number of ISDN DISCONNECT messages sent from the reporting call agent
ISDN_DISCONNECT_RX	The number of ISDN DISCONNECT messages received by the reporting call agent
ISDN_RELEASE_TX	The number of ISDN RELEASE messages sent from the reporting call agent
ISDN_RELEASE_RX	The number of ISDN RELEASE messages received by the reporting call agent

Table 6-3 ISDN Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
ISDN_RELEASE_COMPLETE_TX	The number of ISDN RELEASE COMPLETE messages sent from the reporting call agent
ISDN_RELEASE_COMPLETE_RX	The number of ISDN RELEASE COMPLETE messages received by the reporting call agent
ISDN_RESTART_TX	The number of ISDN RESTART messages sent from the reporting call agent
ISDN_RESTART_RX	The number of ISDN RESTART messages received by the reporting call agent
ISDN_RESTART_ACK_TX	The number of ISDN RESTART ACK messages sent from the reporting call agent
ISDN_RESTART_ACK_RX	The number of ISDN RESTART ACK messages received by the reporting call agent
ISDN_INFORMATION_TX	The number of ISDN INFORMATION messages sent from the reporting call agent
ISDN_INFORMATION_RX	The number of ISDN INFORMATION messages received by the reporting call agent
ISDN_NOTIFY_TX	The number of ISDN NOTIFY messages sent from the reporting call agent
ISDN_NOTIFY_RX	The number of ISDN NOTIFY messages received by the reporting call agent
ISDN_STATUS_TX	The number of ISDN STATUS messages sent from the reporting call agent
ISDN_STATUS_RX	The number of ISDN STATUS messages received by the reporting call agent
ISDN_STATUS_ENQUIRY_TX	The number of ISDN STATUS ENQUIRY messages sent from the reporting call agent
ISDN_STATUS_ENQUIRY_RX	The number of ISDN STATUS ENQUIRY messages received by the reporting call agent
ISDN_SRVC_TX	The number of ISDN SERVICE messages sent from the reporting call agent
ISDN_SRVC_RX	The number of ISDN SERVICE messages received by the reporting call agent
ISDN_SRVC_ACK_TX	The number of ISDN SERVICE ACK messages sent from the reporting call agent
ISDN_SRVC_ACK_RX	The number of ISDN SERVICE ACK messages received by the reporting call agent
ISDN_FACILITY_TX	The number of ISDN FACILITY messages sent from the reporting call agent
ISDN_FACILITY_RX	The number of ISDN FACILITY messages received by the reporting call agent

Call Processing Measurements

Table 6-4 lists the call processing measurements.

Table 6-4 Call Processing Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
CALLP_ORIG_ATTMP	The number of originating call attempts of all types on the reporting call agent
CALLP_TERM_ATTMP	The number of terminating call attempts of all types on the reporting call agent
CALLP_ORIG_FAIL	The number of originating call attempts of all types that failed on the reporting call agent
CALLP_TERM_FAIL	The number of terminating call attempts of all types that failed on the reporting call agent

Table 6-4 Call Processing Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
CALLP_CALL_SUCC	The number of successful originating and terminating call attempts of all types on the reporting call agent
CALLP_CALL_ABAND	The number of originating call attempts of all types that were abandoned on the reporting call agent
CALLP_ISDN_ORIG_ATTMP	The number of originating ISDN call attempts on the reporting call agent
CALLP_ISDN_TERM_ATTMP	The number of ISDN terminating call attempts on the reporting call agent
CALLP_ISDN_ORIG_FAIL	The number of ISDN originating call attempts that failed on the reporting call agent
CALLP_ISDN_TERM_FAIL	The number of ISDN terminating call attempts that failed on the reporting call agent
CALLP_ISDN_CALL_SUCC	The number of successful ISDN originating and terminating call attempts on the reporting call agent
CALLP_ISDN_CALL_ABAND	The number of ISDN originating call attempts that were abandoned on the reporting call agent
CALLP_SS7_ORIG_ATTMP	The number of originating SS7 call attempts on the reporting call agent
CALLP_SS7_TERM_ATTMP	The number of SS7 terminating call attempts on the reporting call agent
CALLP_SS7_ORIG_FAIL	The number of SS7 originating call attempts that failed on the reporting call agent
CALLP_SS7_TERM_FAIL	The number of SS7 terminating call attempts that failed on the reporting call agent
CALLP_SS7_CALL_SUCC	The number of successful SS7 originating and terminating call attempts on the reporting call agent
CALLP_SS7_CALL_ABAND	The number of SS7 originating call attempts that were abandoned on the reporting call agent
CALLP_SIP_ORIG_ATTMP	The number of originating SIP call attempts on the reporting call agent
CALLP_SIP_TERM_ATTMP	The number of SIP terminating call attempts on the reporting call agent
CALLP_SIP_ORIG_FAIL	The number of SIP originating call attempts that failed on the reporting call agent
CALLP_SIP_TERM_FAIL	The number of SIP terminating call attempts that failed on the reporting call agent
CALLP_SIP_CALL_SUCC	The number of successful SIP originating and terminating call attempts on the reporting call agent
CALLP_SIP_CALL_ABAND	The number of SIP originating call attempts that were abandoned on the reporting call agent
CALLP_MGCP_ORIG_ATTMP	The number of originating MGCP call attempts on the reporting call agent
CALLP_MGCP_TERM_ATTMP	The number of MGCP terminating call attempts on the reporting call agent
CALLP_MGCP_ORIG_FAIL	The number of MGCP originating call attempts that failed on the reporting call agent
CALLP_MGCP_TERM_FAIL	The number of MGCP terminating call attempts that failed on the reporting call agent
CALLP_MGCP_CALL_SUCC	The number of successful MGCP originating and terminating call attempts on the reporting call agent
CALLP_MGCP_CALL_ABAND	The number of MGCP originating call attempts that were abandoned on the reporting call agent
CALLP_CAS_ORIG_ATTMP	The number of originating CAS call attempts on the reporting call agent
CALLP_CAS_TERM_ATTMP	The number of CAS terminating call attempts on the reporting call agent

Table 6-4 Call Processing Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
CALLP_CAS_ORIG_FAIL	The number of CAS originating call attempts that failed on the reporting call agent
CALLP_CAS_TERM_FAIL	The number of CAS terminating call attempts that failed on the reporting call agent
CALLP_CAS_CALL_SUCC	The number of successful CAS originating and terminating call attempts on the reporting call agent
CALLP_CAS_CALL_ABAND	The number of CAS originating call attempts that were abandoned on the reporting call agent
CALLP_ISDN_SS7_CALL	The number of successfully completed calls from an ISDN originator to an SS7 terminator on the reporting call agent
CALLP_ISDN_ISDN_CALL	The number of successfully completed calls from an ISDN originator to an ISDN terminator on the reporting call agent
CALLP_ISDN_SIP_CALL	The number of successfully completed calls from an ISDN originator to an SIP terminator on the reporting call agent
CALLP_ISDN_MGCP_CALL	The number of successfully completed calls from an ISDN originator to an MGCP terminator on the reporting call agent
CALLP_ISDN_CAS_CALL	The number of successfully completed calls from an ISDN originator to an CAS terminator on the reporting call agent
CALLP_SS7_SS7_CALL	The number of successfully completed calls from an SS7 originator to an SS7 terminator on the reporting call agent
CALLP_SS7_ISDN_CALL	The number of successfully completed calls from an SS7 originator to an ISDN terminator on the reporting call agent
CALLP_SS7_SIP_CALL	The number of successfully completed calls from an SS7 originator to an SIP terminator on the reporting call agent
CALLP_SS7_MGCP_CALL	The number of successfully completed calls from an SS7 originator to an MGCP terminator on the reporting call agent
CALLP_SS7_CAS_CALL	The number of successfully completed calls from an SS7 originator to an CAS terminator on the reporting call agent
CALLP_SIP_SS7_CALL	The number of successfully completed calls from a SIP originator to an SS7 terminator on the reporting call agent
CALLP_SIP_ISDN_CALL	The number of successfully completed calls from a SIP originator to an ISDN terminator on the reporting call agent
CALLP_SIP_SIP_CALL	The number of successfully completed calls from a SIP originator to an SIP terminator on the reporting call agent
CALLP_SIP_MGCP_CALL	The number of successfully completed calls from a SIP originator to an MGCP terminator on the reporting call agent
CALLP_SIP_CAS_CALL	The number of successfully completed calls from a SIP originator to an CAS terminator on the reporting call agent
CALLP_MGCP_SS7_CALL	The number of successfully completed calls from an MGCP originator to an SS7 terminator on the reporting call agent
CALLP_MGCP_ISDN_CALL	The number of successfully completed calls from an MGCP originator to an ISDN terminator on the reporting call agent

Table 6-4 Call Processing Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
CALLP_MGCP_SIP_CALL	The number of successfully completed calls from an MGCP originator to an SIP terminator on the reporting call agent
CALLP_MGCP_MGCP_CALL	The number of successfully completed calls from an MGCP originator to an MGCP terminator on the reporting call agent
CALLP_MGCP_CAS_CALL	The number of successfully completed calls from an MGCP originator to an CAS terminator on the reporting call agent
CALLP_CAS_SS7_CALL	The number of successfully completed calls from an CAS originator to an SS7 terminator on the reporting call agent
CALLP_CAS_ISDN_CALL	The number of successfully completed calls from an CAS originator to an ISDN terminator on the reporting call agent
CALLP_CAS_SIP_CALL	The number of successfully completed calls from an CAS originator to an SIP terminator on the reporting call agent
CALLP_CAS_MGCP_CALL	The number of successfully completed calls from an CAS originator to an MGCP terminator on the reporting call agent
CALLP_CAS_CAS_CALL	The number of successfully completed calls from an CAS originator to an CAS terminator on the reporting call agent
CALLP_INTERLA_ATTMP	The number of Interlata call attempts on the reporting call agent
CALLP_INTERLA_FAIL	The number of Interlata call attempts that failed on the reporting call agent
CALLP_INTERLA_SUCC	The number of Interlata call attempts that completed successfully on the reporting call agent
CALLP_INTERLA_ABAND	The number of Interlata call origination attempts that were abandoned on the reporting call agent
CALLP_INTRALA_ATTMP	The number of Intralata call attempts on the reporting call agent
CALLP_INTRALA_FAIL	The number of Intralata call attempts that failed on the reporting call agent
CALLP_INTRALA_SUCC	The number of Intralata call attempts that completed successfully on the reporting call agent
CALLP_INTRALA_ABAND	The number of Intralata call origination attempts that were abandoned on the reporting call agent
CALLP_INTL_ATTMP	The number of International call attempts on the reporting call agent
CALLP_INTL_FAIL	The number of International call attempts that failed on the reporting call agent
CALLP_INTL_SUCC	The number of International call attempts that completed successfully on the reporting call agent
CALLP_INTL_ABAND	The number of International call origination attempts that were abandoned on the reporting call agent
CALLP_EMGNCY_ATTMP	The number of Emergency call attempts on the reporting call agent
CALLP_EMGNCY_FAIL	The number of Emergency call attempts that failed on the reporting call agent
CALLP_EMGNCY_CALL_SUCC	The number of Emergency call attempts that completed successfully on the reporting call agent
CALLP_EMGNCY_CALL_ABAND	The number of Emergency call origination attempts that were abandoned on the reporting call agent

Table 6-4 Call Processing Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
CALLP_LOCAL_ATTMP	The number of Local call attempts on the reporting call agent
CALLP_LOCAL_FAIL	The number of Local call attempts that failed on the reporting call agent
CALLP_LOCAL_SUCC	The number of Local call attempts that completed successfully on the reporting call agent
CALLP_LOCAL_ABAND	The number of Local call origination attempts that were abandoned on the reporting call agent
CALLP_TOLL_FREE_ATTMP	The number of Toll Free call attempts on the reporting call agent
CALLP_TOLL_FREE_FAIL	The number of Toll Free call attempts that failed on the reporting call agent
CALLP_TOLL_FREE_SUCC	The number of Toll Free call attempts that completed successfully on the reporting call agent
CALLP_TOLL_FREE_ABAND	The number of Toll Free call origination attempts that were abandoned on the reporting call agent
CALLP_H323_ORIG_ATTMP	The number of originating H323 call attempts on the reporting call agent
CALLP_H323_TERM_ATTMP	The number of terminating H323 call attempts on the reporting call agent
CALLP_H323_ORIG_FAIL	The number of originating H323 call attempts that failed on the reporting call agent
CALLP_H323_TERM_FAIL	The number of terminating H323 call attempts that failed on the reporting call agent
CALLP_H323_CALL_SUCC	The number of originating and terminating H323 call attempts that completed successfully on the reporting call agent
CALLP_H323_CALL_ABAND	The number of terminating and originating H323 call attempts that were abandoned on the reporting call agent
CALLP_ISDN_H323_CALL	The total number of successfully completed calls from an ISDN originator to an H323 terminator on the reporting call agent
CALLP_SS7_H323_CALL	The total number of successfully completed calls from an SS7 originator to an H323 terminator on the reporting call agent
CALLP_SIP_H323_CALL	The total number of successfully completed calls from a SIP originator to an H323 terminator on the reporting call agent
CALLP_MGCP_H323_CALL	The total number of successfully completed calls from an MGCP originator to an H323 terminator on the reporting call agent
CALLP_CAS_H323_CALL	The total number of successfully completed calls from a CAS originator to an H323 terminator on the reporting call agent
CALLP_H323_SIP_CALL	The total number of successfully completed calls from an H323 originator to a SIP terminator on the reporting call agent
CALLP_H323_ISDN_CALL	The total number of successfully completed calls from an H323 originator to an ISDN terminator on the reporting call agent
CALLP_H323_SS7_CALL	The total number of successfully completed calls from an H323 originator to an SS7 terminator on the reporting call agent
CALLP_H323_MGCP_CALL	The total number of successfully completed calls from an H323 originator to an MGCP terminator on the reporting call agent
CALLP_H323_CAS_CALL	The total number of successfully completed calls from an H323 originator to a CAS terminator on the reporting call agent

Table 6-4 Call Processing Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
CALLP_H323_H323_CALL	The total number of successfully completed calls from an H323 originator to an H323 terminator on the reporting call agent
CALLP_NAS_AUTH_SUCC	The total number of successful NAS Authentication Requests on the reporting call agent
CALLP_NAS_AUTH_FAIL	The total number of failed NAS Authentication Requests on the reporting call agent
CALLP_NAS_OP_FAIL	The total number of operation failures that occurred on the reporting call agent - typically indicative of a modem failure
CALLP_NAS_ISP_PORT_LIMIT	The total number of NAS calls that failed on the reporting call agent due to the port limit of a modem being exceeded
CALLP_NAS_NO_MODEMS	The total number of NAS calls that failed on the reporting call agent due to the unavailability of a modem
CALLP_NAS_CLG_UNACC	The total number of NAS calls that failed on the reporting call agent due to the calling party number being blocked
CALLP_NAS_CLD_UNACC	The total number of NAS calls that failed on the reporting call agent due to the called party number being blocked
CALLP_NAS_USER_REQUEST	The total number of User Requests - Reason Code 801 - that are received in the DLCX messages on the reporting call agent
CALLP_NAS_LOST_CARRIER	The total number of Lost Carrier - Reason Code 802 - that are received in the DLCX messages on the reporting call agent
CALLP_NAS_LOST_SERVICE	The total number of Lost Service - Reason Code 803 - that are received in the DLCX messages on the reporting call agent
CALLP_NAS_IDLE_TIMEOUT	The total number of Idle Timeout - Reason Code 804 - that are received in the DLCX messages on the reporting call agent
CALLP_NAS_SESSION_TIMEOUT	The total number of Session Timeout - Reason Code 805 - that are received in the DLCX messages on the reporting call agent
CALLP_NAS_ADMIN_RESET	The total number of Admin Reset - Reason Code 806 - that are received in the DLCX messages on the reporting call agent
CALLP_NAS_ADMIN_REBOOT	The total number of Admin Reboot - Reason Code 807 - that are received in the DLCX messages on the reporting call agent
CALLP_NAS_PORT_ERROR	The total number of Port Error- Reason Code 808 - that are received in the DLCX messages on the reporting call agent
CALLP_NAS_NAS_ERROR	The total number of NAS Error- Reason Code 809 - that are received in the DLCX messages on the reporting call agent
CALLP_NAS_NAS_REQUEST	The total number of NAS Request - Reason Code 810 - that are received in the DLCX messages on the reporting call agent
CALLP_NAS_NAS_REBOOT	The total number of NAS Reboot- Reason Code 811 - that are received in the DLCX messages on the reporting call agent
CALLP_NAS_PORT_UNNEEDED	The total number of Port Unneeded - Reason Code 812 - that are received in the DLCX messages on the reporting call agent
CALLP_NAS_PORT_PREEMPTED	The total number of Port Pre-empted - Reason Code 813 - that are received in the DLCX messages on the reporting call agent

Table 6-4 Call Processing Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
CALLP_NAS_PORT_SUSPENDED	The total number of Port Suspended - Reason Code 814 - that are received in the DLCX messages on the reporting call agent
CALLP_NAS_SERVICE_UNAVAIL	The total number of Service Unavailable - Reason Code 815 - that are received in the DLCX messages on the reporting call agent
CALLP_NAS_CALLBACK	The total number of NAS Callback - Reason Code 816 - that are received in the DLCX messages on the reporting call agent
CALLP_NAS_USER_ERROR	The total number of User Error - Reason Code 817 - that are received in the DLCX messages on the reporting call agent
CALLP_NAS_HOST_REQUEST	The total number of Host Request - Reason Code 818 - that are received in the DLCX messages on the reporting call agent
CALLP_IVR_NETWORK_REQ	The total number of requests for network based IVR service on the reporting call agent
CALLP_IVR_NATIVE_REQ	The total number of requests for native IVR service on the reporting call agent
CALLP_IVR_RESOURCE_FAIL	The total number of IVR sessions that could not be established on the reporting call agent
CALLP_TOTAL_TDISC_ORIG_ATTMP	The total number of origination attempts by subscribers that are marked as temporarily disconnected, detected by the reporting call agent.
CALLP_ NLB_TEST_SUCC	The total number of successful Network Loop Back Tests completed by the reporting call agent.
CALLP_ NLB_TEST_FAIL	The total number of unsuccessful Network Loop Back Tests completed by the reporting call agent. This counter includes both call setup failures and resource failures. These are test calls abnormally released by the call agent due to reasons such as resource priorities.
CALLP_NCT_TEST_SUCC	The total number of successful Network Continuity Tests completed by the reporting call agent.
CALLP_ NCT_TEST_FAIL	The total number of unsuccessful Network Continuity Tests completed by the reporting call agent. This counter includes both call setup failures and resource failures. These are test calls abnormally released by the call agent due to reasons such as resource priorities.
CALLP_LB_TEST_SUCC	The total number of successful TDM Loop Back 108 Tests completed by the reporting call agent.
CALLP_TEST_ROUTE_SUCC	The total number of successful TDM Loop Back 108 Tests with DN dialed out in outgoing message completed by the reporting call agent.
CALLP_T38_FAX_MEDIA_SETUP_SUCC	This counter is incremented when the T.38 media connection is established successfully between the endpoints for T.38 fax transmission.
CALLP_T38_FAX_MEDIA_SETUP_FAIL	This counter is incremented when a T.38 media connection is not established successfully between the endpoints for T.38 fax transmission.
CALLP_TOT_TDISC_CALLS_ORIG_ATTEMPTS	This counter is incremented when a temporarily-disconnected subscriber goes off-hook and receives dial-tone.

MGCP Adapter Measurements

Table 6-5 lists measurements for the MGCP Adapter.

Table 6-5 MGCP Adapter Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
MGCP_DECODE_ERROR	The number of MGCP messages received that failed decoding on the reporting call agent
MGCP_ENCODE_ERROR	The number of MGCP messages to be sent that failed encoding on the reporting call agent
MGCP_UNREACHABLE	The number of MGCP messages sent from the reporting call agent that failed due to the target gateway being unreachable
MGCP_SEND_FAILED	The number of MGCP messages sent from the reporting call agent that failed while being sent to the target gateway
MGCP_CRCX_ACK_RX	The number of MGCP CRCX acknowledgement messages received by the reporting call agent
MGCP_CRCX_NACK_RX	The number of MGCP CRCX non-acknowledgement messages received by the reporting call agent
MGCP_CRCX_TX	The number of MGCP CRCX messages sent by the reporting call agent
MGCP_MDCX_ACK_RX	The number of MGCP MDCX acknowledgement messages received by the reporting call agent
MGCP_MDCX_NACK_RX	The number of MGCP MDCX non-acknowledgement messages received by the reporting call agent
MGCP_MDCX_TX	The number of MGCP MDCX messages sent by the reporting call agent
MGCP_DLCX_RX	The number of MGCP DLCX messages received from gateways by the reporting call agent
MGCP_DLCX_TX	The number of MGCP DLCX messages sent by the reporting call agent
MGCP_DLCX_ACK_RX	The number of MGCP DLCX acknowledgement messages received by the reporting call agent
MGCP_DLCX_NACK_RX	The number of MGCP DLCX non-acknowledgement messages received by the reporting call agent
MGCP_RQNT_ACK_RX	The number of MGCP RQNT acknowledgement messages received by the reporting call agent
MGCP_RQNT_NACK_RX	The number of MGCP RQNT non-acknowledgement messages received by the reporting call agent
MGCP_RQNT_TX	The number of MGCP RQNT messages sent by the reporting call agent
MGCP_AUEP_ACK_RX	The number of MGCP AUEP acknowledgement messages received by the reporting call agent
MGCP_AUEP_NACK_RX	The number of MGCP AUEP non-acknowledgement messages received by the reporting call agent
MGCP_AUEP_TX	The number of MGCP AUEP messages sent by the reporting call agent
MGCP_NTFY_RX	The number of MGCP NTFY messages received from gateways by the reporting call agent

Table 6-5 MGCP Adapter Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
MGCP_RSIP_RX	The number of MGCP RSIP messages received from gateways by the reporting call agent
MGCP_RSIP_ACK_TX	The number of MGCP RSIP acknowledgement messages sent by the reporting call agent
MGCP_AUCX_TX	The number of AUCX (Audit Connection) messages that were sent by the reporting call agent. **Note** This counter is enabled in a future release.
MGCP_AUCX_ACK_RX	The number of AUCX ACK (Audit Connection Acknowledgement) messages that were received by the reporting call agent. **Note** This counter is enabled in a future release.
MGCP_AUCX_NACK_RX	The number of AUCX NACK (Audit Connection NotAcknowlegement) messages that were received by the reporting call agent. **Note** This counter is enabled in a future release.

Session Initiation Protocol Measurements

Table 6-6 lists measurements for the Session Initiation Protocol (SIP). These counters are common to several reporting types including: SIM, AIN-SVC, POTS-MISC, and SIA.

Table 6-6 Session Initiation Protocol (SIP) Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
SIS_TOTAL_INCOM_MSG	The number of SIP messages the reporting call agent or feature server attempted to receive
SIS_TOTAL_SUCC_INCOM_MSG	The number of SIP messages the reporting call agent or feature server successfully received
SIS_TOTAL_OUTG_MSG_ATTMP	The number of SIP messages the reporting call agent or feature server attempted to send
SIS_TOTAL_SUCC_OUTG_MSG	The number of SIP messages the reporting call agent or feature server successfully sent
SIS_REQ_RETRAN_RX	The number of SIP request retransmission messages the reporting call agent or feature server received
SIS_REQ_RETRAN_TX	The number of SIP request retransmission messages the reporting call agent or feature server sent
SIS_RSP_RETRAN_RX	The number of SIP response retransmission messages the reporting call agent or feature server received

Table 6-6 Session Initiation Protocol (SIP) Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
SIS_RSP_RETRAN_TX	The number of SIP response retransmission messages the reporting call agent or feature server sent
SIS_T1_TIMER_EXPIRED	The number of SIP T1 Timer expirations that occurred on the reporting call agent or feature server received over the collection interval
SIS_T2_TIMER_REACHED	The number of SIP T2 Timer expirations that occurred on the reporting call agent or feature server received over the collection interval
SIS_INVITE_RX	The number of SIP INVITE messages the reporting call agent or feature server received
SIS_INVITE_TX	The number of SIP INVITE messages the reporting call agent or feature server sent
SIS_CANCEL_RX	The number of SIP CANCEL messages the reporting call agent or feature server received
SIS_CANCEL_TX	The number of SIP CANCEL messages the reporting call agent or feature server sent
SIS_BYE_RX	The number of SIP BYE messages the reporting call agent or feature server received
SIS_BYE_TX	The number of SIP BYE messages the reporting call agent or feature server sent
SIS_ACK_RX	The number of SIP ACK messages the reporting call agent or feature server received
SIS_ACK_TX	The number of SIP ACK messages the reporting call agent or feature server sent
SIS_OPTIONS_RX	The number of SIP OPTIONS messages the reporting call agent or feature server received
SIS_OPTIONS_TX	The number of SIP OPTIONS messages the reporting call agent or feature server sent
SIS_REGISTER_RX	The number of SIP REGISTER messages the reporting call agent or feature server received
SIS_REGISTER_TX	The number of SIP REGISTER messages the reporting call agent or feature server sent
SIS_INFO_RX	The number of SIP INFO messages the reporting call agent or feature server received
SIS_INFO_TX	The number of SIP INFO messages the reporting call agent or feature server sent
SIS_NOTIFY_RX	The number of SIP NOTIFY messages the reporting call agent or feature server received
SIS_NOTIFY_TX	The number of SIP NOTIFY messages the reporting call agent or feature server sent
SIS_100_RX	The number of 100 class (TRYING) messages the reporting call agent or feature server received
SIS_100_TX	The number of 100 class (TRYING) messages the reporting call agent or feature server sent
SIS_18x_RX	The number of 18x class (INFORMATIONAL) messages the reporting call agent or feature server received
SIS_18x_TX	The number of 18x class (INFORMATIONAL) messages the reporting call agent or feature server sent

Table 6-6 Session Initiation Protocol (SIP) Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
SIS_200_RX	The number of 200 class (SUCCESS) messages the reporting call agent or feature server received
SIS_200_TX	The number of 200 class (SUCCESS) messages the reporting call agent or feature server sent
SIS_3xx_RX	The number of 3xx class (REDIRECTION) messages the reporting call agent or feature server received
SIS_3xx_TX	The number of 3xx class (REDIRECTION) messages the reporting call agent or feature server sent
SIS_4xx_RX	The number of 4xx class (REQUEST FAILURES) messages the reporting call agent or feature server received
SIS_4xx_TX	The number of 4xx class (REQUEST FAILURES) messages the reporting call agent or feature server sent
SIS_5xx_RX	The number of 5xx class (SERVER FAILURES) messages the reporting call agent or feature server received
SIS_5xx_TX	The number of 5xx class (SERVER FAILURES) messages the reporting call agent or feature server sent
SIS_6xx_RX	The number of 6xx class (GLOBAL FAILURES) messages the reporting call agent or feature server received
SIS_6xx_TX	The number of 6xx class (GLOBAL FAILURES) messages the reporting call agent or feature server sent
SIS_7xx_RX	The number of 7xx class (RESERVED) messages the reporting call agent or feature server received
SIS_7xx_TX	The number of 7xx class (RESERVED) messages the reporting call agent or feature server sent
SIS_PROV_RSP_RETRAN_RX	The number of SIP provisioning response retransmission messages the reporting call agent or feature server received
SIS_PROV_RSP_RETRAN_TX	The number of SIP provisioning response retransmission messages the reporting call agent or feature server sent
SIS_PRACK_RX	The number of SIP PRACK messages the reporting call agent or feature server received
SIS_PRACK_TX	The number of SIP PRACK messages the reporting call agent or feature server sent
SIS_SUBSCRIBE_RX	The number of SIP SUBSCRIBE messages the reporting call agent or feature server received
SIS_SUBSCRIBE_TX	The number of SIP SUBSCRIBE messages the reporting call agent or feature server sent
SIS_REFER_RX	The number of SIP REFER messages the reporting call agent or feature server received
SIS_REFER_TX	The number of SIP REFER messages the reporting call agent or feature server sent
SIS_REFER_W_REPLACES_RX	The number of SIP REFER with REPLACES messages the reporting call agent or feature server received

Table 6-6 Session Initiation Protocol (SIP) Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
SIS_INVITE_REPLACES_TX	The number of SIP INVITE REPLACES messages the reporting call agent or feature server sent
SIS_INVITE_REPLACES_RX	The number of SIP INVITE REPLACES messages the reporting call agent or feature server received
SIS_REL100_RX	The number of REL100 class (TRYING) messages the reporting call agent or feature server received
SIS_REL100_TX	The number of REL100 class (TRYING) messages the reporting call agent or feature server sent
SIS_UNSUPPORTED_RX	The number of unsupported SIP messages the reporting call agent or feature server received
SIS_UPDATE_RX	The number of SIP UPDATE messages the reporting call agent or feature server received
SIS_UPDATE_TX	The number of SIP UPDATE messages the reporting call agent or feature server sent

Service Interaction Manager Measurements

Table 6-7 lists measurements for the Service Interaction Manager Measurements (SIM).

Table 6-7 Service Interaction Manager Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
SIM_BCM_MSG	The number of messages received by call processing from a feature server in the reporting call agent
SIM_RELATIONS	The number of TDP-Rs received from call processing by SIM in the reporting call agent
SIM_TDP_N	The number of Trigger Detection Point messages received from call processing in the reporting call agent that do not require a response from the target feature server
SIM_TDP_R	The number of Trigger Detection Point messages received from call processing in the reporting call agent that do require a response from the target feature server
SIM_EDP_N	The number of Event Detection Point messages received from call processing in the reporting call agent that do not require a response from the target feature server
SIM_EDP_R	The number of Event Detection Point messages received from call processing in the reporting call agent that do require a response from the target feature server
SIM_INSTRUCT	The number of INSTRUCT messages sent to feature servers by the reporting call agent
SIM_INSTRUCT_RSP	The number of INSTRUCT messages received from feature servers by the reporting call agent
SIM_TERMINATE_RX	The number of TERMINATE messages received from feature servers by the reporting call agent

Table 6-7 Service Interaction Manager Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
SIM_TERMINATE_TX	The number of TERMINATE messages sent to feature servers by the reporting call agent
SIM_FS_MSG_TX	The number of FCP messages sent to feature servers by the reporting call agent
SIM_FS_MSG_RX	The number of FCP messages received from feature servers by the reporting call agent
SIM_FS_PING_MSG_TX	The number of PING messages sent to feature servers by the reporting call agent
SIM_FS_PING_NO_RSP_FAULTY	The number of times no response was received from the target feature server when sent a PING message by the reporting call agent
SIM_FS_RESTART_MSG_TX	The number of RESTART messages sent to feature servers by the reporting call agent
SIM_FS_ASYNC_MSG_TX	The number of ASYNC messages sent to feature servers by the reporting call agent
SIM_AUDIT_CCB_FREED	The total number of SIM relationships terminated with SSF due to the SIM memory audit on the reporting call agent
SIM_AUDIT_SIP_CCB_FREED	The total number of SIM to SIP relationships released with the feature server do to the SIM memory audit on the reporting call agent

POTS Local Feature Server Measurements

Table 6-8 lists local POTS measurements.

Table 6-8 Local POTS Local Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
POTS_CFU_ACT_ATTMP	The number of Call Forward Unconditional activation attempts on the reporting feature server
POTS_CFU_DEACT_ATTMP	The number of Call Forward Unconditional deactivation attempts on the reporting feature server
POTS_CFU_ACT_REFUSED	The number of Call Forward Unconditional activation attempts refused on the reporting feature server
POTS_CFU_ACT_ANSWERED	The number of Call Forward Unconditional activation attempts answered by the called party on the reporting feature server
POTS_CFU_ACT_SECOND	The number of Call Forward Unconditional second activation attempts on the reporting feature server
POTS_CFU_FORWARD_FAIL	The number of Call Forward Unconditional service instances that failed on the reporting feature server
POTS_CFU_FORWARD_SUCC	The number of Call Forward Unconditional service instances that succeeded on the reporting feature server
POTS_CFB_ACT_ATTMP	The number of Call Forward Busy activation attempts on the reporting feature server
POTS_CFB_DEACT_ATTMP	The number of Call Forward Busy deactivation attempts on the reporting feature server
POTS_CFB_ACT_REFUSED	The number of Call Forward Busy activation attempts refused on the reporting feature server

Table 6-8 Local POTS Local Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
POTS_CFB_FORWARD_FAIL	The number of Call Forward Busy service instances that failed on the reporting feature server
POTS_CFB_FORWARD_SUCC	The number of Call Forward Busy service instances that succeeded on the reporting feature server
POTS_CFNA_ACT_ATTMP	The number of Call Forward No Answer activation attempts on the reporting feature server
POTS_CFNA_DEACT_ATTMP	The number of Call Forward No Answer deactivation attempts on the reporting feature server
POTS_CFNA_ACT_REFUSED	The number of Call Forward No Answer activation attempts refused on the reporting feature server
POTS_CFNA_FORWARD_FAIL	The number of Call Forward No Answer service instances that failed on the reporting feature server
POTS_CFNA_FORWARD_SUCC	The number of Call Forward No Answer service instances that succeeded on the reporting feature server
POTS_CFC_ACT_SUCC	The number of successful Call Forward Combination activation attempts on the reporting feature server
POTS_CFC_ACT_FAIL	The number of unsuccessful Call Forward Combination activation attempts on the reporting feature server
POTS_CFC_ACT_ATTMP	The number of total Call Forward Combination activation attempts on the reporting feature server
POTS_CFC_DN_CHG_ACT_SUCC	The number of successful Call Forward Combination directory number change activation attempts on the reporting feature server
POTS_CFC_DN_CHG_ACT_FAIL	The number of unsuccessful Call Forward Combination directory number change activation attempts on the reporting feature server
POTS_CFC_DN_CHG_ACT_ATTMP	The number of total Call Forward Combination directory number change activation attempts on the reporting feature server
POTS_CFC_DEACT_SUCC	The number of successful Call Forward Combination deactivation attempts on the reporting feature server
POTS_CFC_DEACT_FAIL	The number of unsuccessful Call Forward Combination deactivation attempts on the reporting feature server
POTS_CFC_DEACT_ATTMP	The number of total Call Forward Combination deactivation attempts on the reporting feature server
POTS_CFC_INTERROG_SUCC	The number of successful Call Forward Combination interrogation attempts on the reporting feature server
POTS_CFC_INTERROG_FAIL	The number of unsuccessful Call Forward Combination interrogation attempts on the reporting feature server
POTS_CFC_INTERROG_ATTMP	The number of total Call Forward Combination interrogation attempts on the reporting feature server
POTS_CFC_FORWARD_SUCC	The number of successful Call Forward Combination forwarding attempts on the reporting feature server

Table 6-8 Local POTS Local Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
POTS_CFC_FORWARD_FAIL	The number of unsuccessful Call Forward Combination forwarding attempts on the reporting feature server
POTS_CFC_FORWARD_ATTMP	The number of total Call Forward Combination forwarding attempts on the reporting feature server
POTS_NSA_INVOKE_SUCC	The number of No Solicitation Announcement successful invocations detected on the reporting feature server
POTS_NSA_INVOKE_FAIL	The number of No Solicitation Announcement unsuccessful invocations detected on the reporting feature server
POTS_NSA_INVOKE_ABANDON	The number of No Solicitation Announcement invocations detected on the reporting feature server that were abandoned after the NSA announcement started but before the terminating endpoint began ringing
POTS_CW_ATTMP	The number of Call Waiting service instance attempts on the reporting feature server
POTS_CW_ANSWERED	The number of Call Waiting service instance attempts answered by the called party on the reporting feature server
POTS_CW_NOT_ANSWERED	The number of Call Waiting service instance attempts not answered by the called party on the reporting feature server
POTS_CW_REJECT_NO_RSRC	The number of Call Waiting service instance attempts that were rejected due to a lack of available resources on the reporting feature server
POTS_CW_REJECTE_INTERACT	The number of Call Waiting service instance attempts that were rejected due to feature interactions on the reporting feature server
POTS_CCW_ATTMP	The number of Cancel Call Waiting attempts on the reporting feature server
POTS_CCW_REJECT_NO_RSRC	The number of Cancel Call Waiting attempts that were rejected due to a lack of available resources on the reporting feature server
POTS_CCW_REJECT_BY_CCW	The number of Cancel Call Waiting attempts that were rejected due to Call Waiting not already being active on the reporting feature server
POTS_CCW_LENGTH	The total time in subscriber-seconds that Cancel Call WAITING was active on the reporting feature server
POTS_CHD_ATTMP	The number of Call Hold service instance attempts on the reporting feature server
POTS_CHD_ANSWER	The number of Call Hold service instance attempts resulting in reconnection on the reporting feature server
POTS_CHD_NOT_ANSWER	The number of Call Hold service instance attempts that were not reconnected on the reporting feature server
POTS_CHD_REJECT_NO_RSRC	The number of Call Hold service instance attempts that were rejected due to a lack of available resources on the reporting feature server
POTS_CHD_REJECT_INTERACT	The number of Call Hold service instance attempts that were rejected due to feature interactions on the reporting feature server
POTS_MDC_ATTMP	The number of Mid Call Trigger attempts made by subscribers on the reporting feature server
POTS_MDC_REJECT_NO_RSRC	The number of Mid Call Trigger attempts made by subscribers that were rejected due to a lack of available resources on the reporting feature server

Table 6-8 Local POTS Local Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
POTS_MDC_REJECT_INTERACT	The number of Mid Call Trigger attempts made by subscribers that were rejected due to feature interactions on the reporting feature server
POTS_MDC_REJECT_OTHERS	The number of Mid Call Trigger attempts made by subscribers that were rejected due to unknown reasons on the reporting feature server
POTS_CT_ATTMP	The number of Call Transfer service instance attempts on the reporting feature server
POTS_CT_ANSWER	The number of Call Transfer service instance attempts answered by the called party on the reporting feature server
POTS_CT_TRANSFER	The number of Call Transfer service instance attempts resulting in a successfully transferred call on the reporting feature server
POTS_CT_CONF	The number of Call Transfer service instance attempts resulting in a successfully setup conference call on the reporting feature server
POTS_CT_FAIL	The number of Call Transfer service instance attempts that failed on the reporting feature server
POTS_TWC_ATTMP	The number of Three Way Call service instance attempts on the reporting feature server
POTS_TWC_ANSWERED	The number of Three Way Call service instance attempts answered by the called party on the reporting feature server
POTS_TWC_CONF	The number of Three Way Call service instance attempts resulting in a successfully setup conference call on the reporting feature server
POTS_TWC_FAIL	The number of Three Way Call service instance attempts that failed on the reporting feature server
POTS_DRCW_ATTMP	The number of Distinctive Ring Call Waiting service instance attempts on the reporting feature server
POTS_DRCW_REJECT_NO_RSRC	The number of Distinctive Ring Call Waiting attempts that were rejected due to a lack of available resources on the reporting feature server
POTS_DRCW_SUCC	The number of Distinctive Ring Call Waiting attempts that were successful on the reporting feature server
POTS_RACF_ATTMP	The number of Remote Activation Call Forward attempts on the reporting feature server
POTS_RACF_REFUSE	The number of Remote Activation Call Forward service instances refused by the reporting feature server
POTS_RACF_REJECT_NO_RSRC	The number of Remote Activation Call Forward service instances refused due to a lack of available resources on the reporting feature server
POTS_RACF_CFU_ACT	The number of Remote Activation Call Forward activation attempts that were successful on the reporting feature server
POTS_RACF_CFU_DEACT	The number of Remote Activation Call Forward deactivation attempts that were successful on the reporting feature server
POTS_RACF_CFU_UNCHANGED	The number of Remote Activation Call Forward service instances that were successful but resulted in no change to the forwarding-to number on the reporting feature server
POTS_RACF_PIN_ATTMP	The number of Remote Activation Call Forward PIN input attempts on the reporting feature server
POTS_RACF_PIN_REFUSE	The number of Remote Activation Call Forward PIN input attempts that were refused on the reporting feature server

Table 6-8 Local POTS Local Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
POTS_RACF_PIN_REJECT_NO_RSRC	The number of Remote Activation Call Forward PIN input attempts that were refused due to a lack of resources on the reporting feature server
POTS_RACF_PIN_CHANGE	The number of Remote Activation Call Forward PIN input attempts that resulted in a change to the previous PIN for that subscriber on the reporting feature server
POTS_RACF_PIN_UNCHANGE	The number of Remote Activation Call Forward PIN input attempts that resulted in no change to the previous PIN for that subscriber on the reporting feature server
POTS_CPRK_SUCC_ATTMP	The number of Call Park Attempts that were successful during the collection interval
POTS_CPRK_FAIL_ATTMP	The number of Call Park Attempts that failed during the collection interval
POTS_CPRK_SUCC_RET_ATTMP	The number of Call Park Retrieval Attempts that were successful during the collection interval
POTS_CPRK_FAIL_RET_ATTMP	The number of Call Park Retrieval Attempts that failed during the collection interval
POTS_CPRK_FORWARD	The number of Call Park Attempts to forward a call during the collection interval
POTS_CPRK_CLEAR	The number of Call Park Attempts to clear during the collection interval
POTS_SC_1_DIGIT_ATTMP	The number of Speed Call 1 digit attempts during the collection interval
POTS_SC_2_DIGIT_ATTMP	The number of Speed Call 2 digit attempts during the collection interval
POTS_SC_SUCC_CCSC	The number of CCSC successful attempts during the collection interval
POTS_DND_ACT_SUCC	The number of Do Not Disturb activation attempts during the collection interval
POTS_DND_ACT_FAIL	The number of Do Not Disturb deactivation attempts during the collection interval
POTS_DND_DEACT_SUCC	The number of Do Not Disturb activation attempts that failed due to a lack of resources during the collection interval
POTS_DND_DEACT_ FAIL	The number of Do Not Disturb deactivation attempts during the collection interval
POTS_DND_REJECT	The number of Do Not Disturb activation attempts that were successful during the collection interval
POTS_RC_SUCC	The number of Return Call attempts that were successful during the collection interval
POTS_CWD_ATTMP	The number of Call Waiting Deluxe service instance attempts on the reporting feature server
POTS_CWD_ANSWER	The number of Call Waiting Deluxe service instance attempts answered by the called party on the reporting feature server
POTS_CWD_ACT_SUCC	The number of Call Waiting Deluxe successful service activation attempts on the reporting feature server
POTS_CWD_ACT_FAIL	The number of Call Waiting Deluxe unsuccessful service activation attempts on the reporting feature server
POTS_CWD_DEACT_SUCC	The number of Call Waiting Deluxe successful service deactivation attempts on the reporting feature server
POTS_CWD_DEACT_FAIL	The number of Call Waiting Deluxe unsuccessful service deactivation attempts on the reporting feature server
POTS_CWD_INTERROG_SUCC	The number of Call Waiting Deluxe successful service interrogation attempts on the reporting feature server

Table 6-8 Local POTS Local Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
POTS_CWD_INTERROG_FAIL	The number of Call Waiting Deluxe unsuccessful service interrogation attempts on the reporting feature server
POTS_TWCD_ATTMP	The number of Three Way Calling Deluxe service instance attempts on the reporting feature server. Incremented when a subscriber in a stable two-way call presses flash button followed by DN of a third party
POTS_TWCD_CONF	The number of Three Way Calling Deluxe service instance conferencing attempts on the reporting feature server. Incremented when a subscriber attempts to bridge all three parties (flash button followed by digit 3)
POTS_OCB_LOCAL_BLOCK	The number of local calls that were blocked on the reporting feature server via Outward Call Barring
POTS_OCB_NATL_BLOCK	The number of national calls that were blocked on the reporting feature server via Outward Call Barring
POTS_OCB_INTL_BLOCK	The number of international calls that were blocked on the reporting feature server via Outward Call Barring
POTS_OCB_INVOCATION	The number of Outward Call Barring invocation attempts on the reporting feature server
POTS_OCB_ACT_SUCC	The number of Outward Call Barring successful activation attempts on the reporting feature server
POTS_OCB_DEACT_SUCC	The number of Outward Call Barring successful deactivation attempts on the reporting feature server
POTS_OCB_INTERROG_SUCC	The number of Outward Call Barring successful interrogation attempts on the reporting feature server
POTS_OCB_INVALID_PASSWORD	The number of Outward Call Barring attempts that were unsuccessful due to invalid password entry by the user on the reporting feature server
POTS_CFU_INTERROG_ATTMP	The number of Call Forward Unconditional interrogation attempts on the reporting feature server
POTS_CFB_INTERROG_ATTMP	The number of Call Forward Busy interrogation attempts on the reporting feature server
POTS_CFNA_INTERROG_ATTMP	The number of Call Forward No Answer interrogation attempts on the reporting feature server
POTS_CNDB_ATTMP	The number of Calling Number Delivery Blocking attempts made on the reporting feature server
POTS_CNAB_ATTMP	The number of Calling Name Delivery Blocking attempts made on the reporting feature server
POTS_CIDS_ATTMP	The number of Calling Identity Delivery attempts made on the reporting feature server
POTS_CIDSS_ATTMP	The number of Calling Identity Delivery Suppression attempts made on the reporting feature server
POTS_REFER_ATTMP	The number of REFER attempts made on the reporting feature server
POTS_REFER_FAIL	The number of REFER failed attempts made on the reporting feature server
POTS_REFER_SUCC	The number of REFER successful attempts made on the reporting feature server
POTS_TOTAL_CNAM_QUERY	The number of CNAM translation queries attempted on the reporting feature server

Table 6-8 Local POTS Local Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
POTS_EXT_CNAM_QUERY	The number of CNAM translation queries that resulted in an external query to a network database attempted on the reporting feature server
POTS_EXT_CNAM_QUERY_SUCC	The number of CNAM translation queries that resulted in a successful external query to a network database attempted on the reporting feature server
POTS_EXT_CNAM_FAIL_APP	The number of CNAM translation queries that resulted in a failed external query to a network database due to an application failure from the reporting feature server
POTS_EXT_CNAM_FAIL_NETW	The number of CNAM translation queries that resulted in a failed external query to a network communication failure from the reporting feature server

POTS Miscellaneous Feature Server Measurements

Table 6-9 lists the miscellaneous POTS measurements.

Table 6-9 Miscellaneous POTS Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
POTS_HOTLINE_ATTMP	The number of Hotline service instance attempts on the reporting feature server
POTS_WARMLINE_ATTMP	The number of Warmline service instance attempts on the reporting feature server
POTS_BLV_ATTMP	The number of Busy Line Verification service instance attempts on the reporting feature server
POTS_OP_INTERRUPT_ATTMP	The number of Operator Interrupt service instance attempts on the reporting feature server
POTS_CTX_SFG_OVERFLOW	The number of Centrex SFG counters that overflowed during the collection interval on the reporting feature server
POTS_HOTV_ATTMP	The number of successful Hotline Variable instance attempts on the reporting feature server
POTS_HOTV_ACT_SUCC	The number of successful Hotline Variable activation attempts on the reporting feature server
POTS_HOTV_DEACT_SUCC	The number of successful Hotline Variable deactivation attempts on the reporting feature server
POTS_HOTV_INTERROG_SUCC	The number of successful Hotline Variable interrogation attempts on the reporting feature server
POTS_PS_SUCC	The number of Privacy Screening Invocations detected on the reporting feature server. This is indicative of the external application server having answered the call and sent a 200 OK to the BTS.
POTS_PS_FAIL	The number of Privacy Screening Invocations failures detected on the reporting feature server. This is indicative of the external application server not answering the call or the trunk between the app server and the BTS is out of service.

Table 6-9 Miscellaneous POTS Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
POTS_PS_MANAGE_SUCC	The number of successful Managed Privacy Screening Activations/Deactivations detected on the reporting feature server. This is indicative of the external application server having answered the call and sent a 200 OK to the BTS for PS Manage feature invocations.
POTS_PS_MANAGE_FAIL	The number of unsuccessful Managed Privacy Screening Activations/Deactivations detected on the reporting feature server. This is indicative of the external application server not answering the call or the trunk between the app server and the BTS is out of service for PS Manage feature invocations.
POTS_VM_ACT_SUCC	The number of successful Voice Mail Redirect Activations detected on the reporting feature server
POTS_VM_ACT_FAIL	The number of unsuccessful Voice Mail Redirect Activations detected on the reporting feature server
POTS_VM_DEACT_SUCC	The number of successful Voice Mail Redirect Deactivations detected on the reporting feature server
POTS_VM_DEACT_FAIL	The number of unsuccessful Voice Mail Redirect Deactivations detected on the reporting feature server
POTS_VM_ACCESS	The number of Voice Mail Redirect Accesses detected on the reporting feature server
POTS_VM_ATTMP	The number of Voice Mail Redirect Invocations detected on the reporting feature server
POTS_LCD_AUTH_ATTMP	The number of authorization attempts made for Limited Call Duration feature invocations on the reporting feature server
POTS_LCD_AUTH_SUCC	The number of successful authorization attempts made for Limited Call Duration feature invocations on the reporting feature server
POTS_LCD_AUTH_FAIL	The number of unsuccessful authorization attempts made for Limited Call Duration feature invocations on the reporting feature server
POTS_LCD_REAUTH_FAIL	The number of unsuccessful re-authorization attempts made for Limited Call Duration feature invocations on the reporting feature server
POTS_LCD_FORCED_DISC	The number of forced call disconnections made for Limited Call Duration calls on the reporting feature server

POTS Class of Service Feature Server Measurements

Table 6-10 lists the POTS class of service (COS) measurements.

Table 6-10 POTS Class of Service Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
POTS_COS_ANI_ATTMP_SUCC	The number of Automatic Number Identification directory number lookups that were successfully attempted on the reporting feature server. An ANI attempt is successful when the ANI DN is available on the reporting FS, and ANI status is allowed as per provisioning. In the case of casual calls, ALL ANI attempts are successful if the Casual Code is valid and allowed on reporting feature server.
POTS_COS_ANI_BLOCKED_CALL	The number of calls that were blocked based on Automatic Number Identification directory number lookups on the reporting feature server. In the case of Casual calls, ANI does also get blocked if Casual Codes are invalid.
POTS_COS_NANP_BLOCKED_BW	The number of NANP based calls that were blocked due to a match on a black list or an exclusion from a white list on the reporting feature server
POTS_COS_INTL_BLOCKED_BW	The number of International based calls that were blocked due to a match on a black list or an exclusion from a white list on the reporting feature server
POTS_COS_900_BLOCKED	The number of calls denied due to subscriber based 900 restrictions on the reporting feature server
POTS_COS_976_BLOCKED	The number of calls denied due to subscriber based 976 restrictions on the reporting feature server
POTS_COS_NANP_RESTRICT	The number of calls denied due to subscriber based NANP restrictions on the reporting feature server
POTS_COS_INTL_RESTRICT	Not currently used.
POTS_COS_CASUAL_RESTRICT	The number of calls denied due to subscriber based casual dialing restrictions on the reporting feature server
POTS_COS_DA_BLOCKED	The number of calls denied due to subscriber based directory assistance restrictions on the reporting feature server
POTS_COS_NANP_OP_BLOCKED	The number of calls denied due to subscriber based NANP operator restrictions on the reporting feature server
POTS_COS_INTL_OP_BLOCKED	The number of calls denied due to subscriber based international operator restrictions on the reporting feature server
POTS_COS_AUTH_CODE_SUCC	The number of successful authentication code validations on the reporting feature server
POTS_COS_AUTH_CODE_FAIL	The number of unsuccessful authentication code validations on the reporting feature server
POTS_COS_ACCT_CODE_SUCC	The number of successful account code validations on the reporting feature server. Account codes do not get validated - any dialed account code entered by the user is considered valid - including an empty account code.
POTS_COS_ACCT_CODE_FAIL	Not currently used.

Table 6-10 POTS Class of Service Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
POTS_COS_TOLLFREE_BLOCKED	The number of calls that were screened based on class of service restrictions on making toll free calls.
POTS_TDISC_CALLS_OUTG_BLOCKED	The number of calls blocked because the subscriber is temporarily disconnected. This applies to POTS, Centrex, MLHG, and PBX based subscribers.
POTS_COS_TOT_AUTH_IVR_SESSION	The total number of Class of Service Authorization Code IVR sessions established on the reporting feature server
POTS_COS_TOT_ACCT_IVR_SESSION	The total number of Class of Service Account Code IVR sessions established on the reporting feature server
POTS_COS_TOT_IVR_FAIL	The total number of Class of Service IVR sessions that failed to established due to an IVR related failure on the reporting feature server

POTS Screen List Editing Feature Server Measurements

Table 6-11 lists the POTS screen list editing (SLE) measurements.

Table 6-11 POTS Screen List Editing Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
POTS_SCR_ATTMP	The number of Selective Call Rejection service instance attempts on the reporting feature server
POTS_SCA_ATTMP	The number of Selective Call Acceptance service instance attempts on the reporting feature server
POTS_SCR_REJECT_NO_RSRC	The number of Selective Call Rejection attempts made by subscribers that were rejected due to a lack of available resources on the reporting feature server
POTS_SCA_REJECT_NO_RSRC	The number of Selective Call Acceptance attempts made by subscribers that were rejected due to a lack of available resources on the reporting feature server
POTS_SCR_SUCC	The number of Selective Call Rejection service instance attempts resulting in successful rejections of the call on the reporting feature server
POTS_SCA_SUCC	The number of Selective Call Acceptance service instance attempts resulting in successful acceptance of the call on the reporting feature server
POTS_SCF_ATTMP	The number of Selective Call Forwarding service instance attempts on the reporting feature server
POTS_SCF_REJECT_NO_RSRC	The number of Selective Call Forwarding attempts that were rejected due to a lack of available resources on the reporting feature server
POTS_SCF_SUCC	The number of Selective Call Forwarding attempts that were successful on the reporting feature server

POTS Customer Originated Trace Feature Server Measurements

Table 6-12 lists the POTS customer originated trace (COT) measurements.

Table 6-12 POTS Customer Originated Trace Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
POTS_COT_ACCESS	The number of times the Caller Originated Trace star code was dialed by the subscriber (feature accesses and activations)
POTS_COT_DENY	The number of times the Caller Originated Trace data was unsuccessfully accessed on the reporting feature server
POTS_COT_ACT	Same as POTS_COT_ACCESS in this release. When 2-level COT (the digit “1” dialed) is available - this counter would include both those and the current 1-level activations tracked in POTS_COT_ACCESS.
POTS_COT_ABAND	The number of Caller Originated Trace service activation abandonments that occurred on the reporting feature server
POTS_COT_DN_UNAVAIL	The number of Caller Originated Trace service activation that failed due to the calling party directory number not be available on the reporting feature server
POTS_COT_TRACE_CONFIRM	The number of Caller Originated Trace service instances that were successfully completed on the reporting feature server
POTS_COT_TRACE_OUTPUT	The number of Caller Originated Trace service instances that were successfully completed and the data was stored persistently on the reporting feature server

POTS Automatic Callback, Recall, and Call Return Feature Server Measurements

Table 6-13 lists the POTS automatic callback, recall, and call return (ACAR) measurements.

Table 6-13 POTS Automatic Callback, Recall, and Call Return Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
POTS_AC_ACT_ATTMP	The number of Automatic Callback service activation attempts on the reporting feature server
POTS_AC_OVERFLOW	The number of Automatic Callback service activation attempts resulting in an overflow on the reporting feature server
POTS_AC_IMMEDIATE_PROC	The number of Automatic Callback service activation attempts that resulted in immediate connection on the reporting feature server
POTS_AC_DELAYED_PROC	The number of Automatic Callback service activation attempts that resulted in delayed connection on the reporting feature server

Table 6-13 POTS Automatic Callback, Recall, and Call Return Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
POTS_AC_DEACT_BY_SYSTEM	The number of Automatic Callback service activation attempts that were deactivated by the system on the reporting feature server
POTS_AC_DEACT_ATTMP	The number of Automatic Callback service activation attempts that were deactivated by the requesting subscriber on the reporting feature server
POTS_AC_INTERLATA_ATTMP	The number of Automatic Callback service activation attempts performed on an interlata basis on the reporting feature server
POTS_AR_ACT_ATTMP	The number of Automatic Recall service activation attempts on the reporting feature server
POTS_AR_OVERFLOW	The number of Automatic Recall service activation attempts resulting in an overflow on the reporting feature server
POTS_AR_IMMEDIATE_PROC	The number of Automatic Recall service activation attempts that resulted in immediate connection on the reporting feature server
POTS_AR_DELAYED_PROC	The number of Automatic Recall service activation attempts that resulted in delayed connection on the reporting feature server
POTS_AR_DEACT_BY_SYSTEM	The number of Automatic Recall service activation attempts that were deactivated by the system on the reporting feature server
POTS_AR_DEACT_ATTMP	The number of Automatic Recall service activation attempts that were deactivated by the requesting subscriber on the reporting feature server
POTS_AR_INTERLATA_ATTMP	The number of Automatic Recall service activation attempts performed on an interlata basis on the reporting feature server
POTS_ACART_QUEUED_REQ	The number of Automatic Callback and Automatic Recall service requests that were queued on the reporting feature server
POTS_ACART_TERM_SCAN_REQ	The number of Automatic Callback and Automatic Recall service requests that were queued for terminators on the reporting feature server
POTS_ACART_ORIG_SCAN_REQ	The number of Automatic Callback and Automatic Recall service requests that were queued for originators on the reporting feature server
POTS_ACART_REJECT_NO_RSRC	The number of Automatic Callback and Automatic Recall service requests that were rejected due to a lack of resources on the reporting feature server
POTS_ACR_ACT_ATTMP	The number of Anonymous Call Rejection activation attempts during the collection interval
POTS_AR_2LEVEL_ACC_CODE_ATTMP	The number of Automatic Callback service activation attempts on the reporting feature server
POTS_AR_2LEVEL_ACT_CODE_ATTMP	The number of times the activation code (*69) is dialed for the two level Automatic Recall activation procedure on the reporting feature server
POTS_ACR_DEACT_ATTMP	The number of Anonymous Call Rejection deactivation attempts during the collection interval
POTS_ACR_ACT_REJECT_NO_RSRC	The number of Anonymous Call Rejection activation attempts that failed due to a lack of resources during the collection interval

Table 6-13 POTS Automatic Callback, Recall, and Call Return Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
POTS_ACR_DEACT_ REJECT_NO_RSRC	The number of Anonymous Call Rejection deactivation attempts during the collection interval
POTS_ACR_SUCC	The number of Anonymous Call Rejection attempts that were successful during the collection interval

POTS Limited Call Duration (Prepaid/Postpaid) with RADIUS Interface to AAA Measurements

Table 6-14 lists the POTS Limited Call Duration measurements.

Table 6-14 POTS Limited Call Duration (Prepaid/Postpaid) with RADIUS Interface to AAA

Measurement	Description (* = rapid count could mean a potential problem in the system)
POTS_LCD_AUTH_ATTMP	The number of authorization attempts made for Limited Call Duration feature invocations on the reporting feature server. **Note** For three-leg calls, each call is authorized separately.
POTS_LCD_AUTH_SUCC	The number of successful authorization attempts made for Limited Call Duration feature invocations on the reporting feature server.
POTS_LCD_AUTH_FAIL	The number of unsuccessful authorization attempts made for Limited Call Duration feature invocations on the reporting feature server.
POTS_LCD_REAUTH_FAIL	The number of unsuccessful reauthorization attempts made for Limited Call Duration feature invocations on the reporting feature server.
POTS_LCD_FORCED_DISC	The number of forced call disconnections made for Limited Call Duration calls on the reporting feature server.

Table 6-15 POTS Call Forwarding Combination Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
POTS_CFC_ACT_SUCC	CFC Activation Successful
POTS_CFC_ACT_ATTMP	CFC Activation Attempt
POTS_CFC_ACT_FAIL	CFC Activation Failure
POTS_CFC_DN_CHG_ACT_SUCC	CFC DN change Activation Successful
POTS_CFC_DN_CHG_ACT_ATTMP	CFC DN Change Activation Attempt
POTS_CFC_DN_CHG_ACT_FAIL	CFC DN change Activation Failure

Table 6-15 POTS Call Forwarding Combination Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
POTS_CFC_DEACT_SUCC:	CFC Deactivation Successful
POTS_CFC_DEACT_ATTMP	CFC Deactivation Attempt
POTS_CFC_DEACT_FAIL	CFC Deactivation Failure
POTS_CFC_INTERROG_SUCC	CFC Interrogation Success
POTS_CFC_INTERROG_ATTMP	CFC Interrogation Attempt
POTS_CFC_INTERROG_FAIL	CFC Interrogation Failure
POTS_CFC_FORWARD_SUCC	CFC Invocation Successful
POTS_CFC_FORWARD_FAIL	CFC Invocation Failure

AIN Services Feature Server Measurements

Table 6-16 lists the AIN services (AIN SVC) measurements.

Table 6-16 AIN Services Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
AINSVC_TOTAL_QUERY	The total number of queries attempted on the reporting feature server.
AINSVC_8XX_QUERY	The number of 8XX translation queries attempted on the reporting feature server.
AINSVC_EXT_8XX_QUERY	The number of 8XX translation queries that resulted in an external query to a network database attempted on the reporting feature server.
AINSVC_EXT_8XX_QUERY_SUCC	The number of 8XX translation queries that resulted in a successful external query to a network database attempted on the reporting feature server.
AINSVC_EXT_8XX_FAIL_APP	The number of 8XX translation queries that resulted in a failed external query to a network database due to an application failure from the reporting feature server.
AINSVC_EXT_8XX_FAIL_NETW	The number of 8XX translation queries that resulted in a failed external query to a network database due to a network communication failure from the reporting feature server.
AINSVC_LOC_8XX_QUERY	The number of 8XX translation queries attempted to be processed locally on the reporting feature server.
AINSVC_LOC_8XX_QUERY_SUCC	The number of 8XX translation queries successfully processed locally on the reporting feature server.
AINSVC_LOC_8XX_ANI_BLOCK	The number of 8XX translation queries that were blocked due to ANI screening processed locally on the reporting feature server.
AINSVC_LOC_8XX_II_BLOCK	The number of 8XX translation queries that were blocked due to II screening processed locally on the reporting feature server.

Table 6-16 AIN Services Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
AINSVC_LOC_8XX_DNIS_SUCC	The number of 8XX DNIS translation queries successfully processed locally on the reporting feature server.
AINSVC_LOC_8XX_ROUTING_SUCC	The number of 8XX routing translation queries successfully processed locally on the reporting feature server.
AINSVC_LOC_8XX_REROUTE	The number of 8XX translation queries successfully processed locally on the reporting feature server that resulted in re-routing.
AINSVC_LOC_8XX_FAIL_APP	The number of 8XX translation queries that resulted in a failure due to an application error on the reporting feature server.
AINSVC_TOTAL_LNP_QUERY	The number of LNP translation queries attempted on the reporting feature server.
AINSCV_LOC_LNP_QUERY	Total number of times an attempt was made to look up a DN in local LNP database.
AINSCV_LOC_LNP_QUERY_SUCC	Total number of successful queries to the local LNP database.
AINSCV_LOC_LNP_FAIL_APP	Total number of failures in querying the local LNP database.
AINSCV_LOC_LNP_QUERY_RN_ FOUND	Total number of successful queries to the local LNP database that returned an RN corresponding to the DN.
AINSVC_EXT_LNP_QUERY	The number of LNP translation queries that resulted in an external query to a network database attempted on the reporting feature server.
AINSVC_EXT_LNP_QUERY_SUCC	The number of LNP translation queries that resulted in a successful external query to a network database attempted on the reporting feature server.
AINSVC_EXT_LNP_FAIL_APP	The number of LNP translation queries that resulted in a failed external query to a network database due to an application failure from the reporting feature server.
AINSVC_EXT_LNP_FAIL_NETW	The number of LNP translation queries that resulted in a failed external query to a network database due to a network communication failure from the reporting feature server.
AINSVC_EXT_8XX_QUERY_FAIL	The number of 8XX queries that failed due to an SCP timeout when attempted by the reporting feature server.
AINSVC_EXT_LNP_QUERY_LRN	The number of LNP queries that resulted in a successful response from the SCP with an LRN when attempted by the reporting feature server.
AINSVC_EXT_LNP_QUERY_FAIL	The number of LNP queries that failed due to an SCP timeout when attempted by the reporting feature server.
AINSVC_LOC_LNP_QUERY	The total number of times an attempt was made to look up a DN in the local LNP database by the reporting feature server.
AINSVC_LOC_LNP_QUERY_SUCC	The total number of successful attempts to look up a DN in the local LNP database by the reporting feature server.
AINSVC_LOC_LNP_FAIL_APP	The total number of failed attempts to look up a DN in the local LNP database by the reporting feature server.

Table 6-16 AIN Services Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
AINSVC_LOC_LNP_QUERY_RN_FOUND	The total number of successful attempts to look up a DN in the local LNP database by the reporting feature server that returned a corresponding RN.
AINSVC_LOC_LNP_QUERY_NO_RN	The total number of successful attempts to look up a DN in the local LNP database by the reporting feature server that did not return a corresponding RN.

SCCP Protocol Measurements

Table 6-17 lists the SCCP protocol measurements.

Table 6-17 SCCP Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
SCCP_NO_TRANS_ADDR_FAIL	The total number of routing errors due to no translation for address of such nature on the reporting feature server
SCCP_NO_TRANS_SPEC_ADDR_FAIL	The total number of routing errors due to no translation for this specific address on the reporting feature server
SCCP_NETWORK_FAIL	The total number of routing errors due to a network failure from the point code being unavailable on the reporting feature server
SCCP_NETWORK_CONGEST_FAIL	The total number of routing errors due to network congestion on the reporting feature server
SCCP_SUBSYS_FAIL	The total number of routing errors due to a subsystem failure on the reporting feature server
SCCP_SUBSYS_CONGEST_FAIL	The total number of routing errors due to subsystem congestion on the reporting feature server
SCCP_UNEQUIP_USER_FAIL	The total number of routing errors due to an unequipped user on the reporting feature server
SCCP_HOP_COUNTER_FAIL	The total number of routing errors due to a hop counter violation on the reporting feature server
SCCP_SYNTAX_ERR	The total number of syntax errors on the reporting feature server
SCCP_UNKNOWN_FAIL	The total number of routing errors due to an unknown reason on the reporting feature server
SCCP_TOTAL_UDATA_TX	The total number of unit data sent on the reporting feature server
SCCP_TOTAL_UDATA_SVC_TX	The total number of unit data service sent on the reporting feature server
SCCP_TOTAL_UDATA_RX	The total number of unit data received on the reporting feature server
SCCP_TOTAL_UDATA_SVC_RX	The total number of unit data service received on the reporting feature server
SCCP_TOTAL_EXT_UDATA_TX	The total number of extended unit data sent on the reporting feature server
SCCP_TOTAL_EXT_UDATA_SVC_TX	The total number of extended unit data service sent on the reporting feature server

Table 6-17 SCCP Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
SCCP_TOTAL_EXT_UDATA_RX	The total number of extended unit data received on the reporting feature server
SCCP_TOTAL_EXT_UDATA_SVC_RX	The total number of extended unit data service received on the reporting feature server
SCCP_TOTAL_LONG_UDATA_TX	The total number of long unit data sent on the reporting feature server
SCCP_TOTAL_LONG_UDATA_SVC_TX	The total number of long unit data service sent on the reporting feature server
SCCP_TOTAL_LONG_UDATA_RX	The total number of long unit data received on the reporting feature server
SCCP_TOTAL_LONG_UDATA_SVC_RX	The total number of long unit data service received on the reporting feature server
SCCP_TOTAL_MSG	The total number of messages handled on the reporting feature server
SCCP_TOTAL_LOCAL_MSG	The total number of messages intended for local subsystems on the reporting feature server
SCCP_TOTAL_GLOBAL_ADDR_TRAN	The total number of messages requiring global address translation on the reporting feature server
SCCP_TOTAL_CLASS_0_TX	The total number of class 0 messages sent on the reporting feature server
SCCP_TOTAL_CLASS_1_TX	The total number of class 1 messages sent on the reporting feature server
SCCP_TOTAL_CLASS_0_RX	The total number of class 0 messages received on the reporting feature server
SCCP_TOTAL_CLASS_1_RX	The total number of class 1 messages received on the reporting feature server
SCCP_SUBSYS_OOS_REQ_GRANT	The total number of subsystem out-of-service requests granted on the reporting feature server
SCCP_SUBSYS_OOS_REQ_DENY	The total number of subsystem out-of-service requests denied on the reporting feature server
SCCP_MSG_TX_BACKUP_SUBSYS	The total number of messages sent to a backup subsystem on the reporting feature server
SCCP_USAP_TOTAL_CLASS_0_TX	The total number of class 0 messages sent on the reporting feature server
SCCP_USAP_TOTAL_CLASS_1_TX	The total number of class 1 messages sent on the reporting feature server
SCCP_USAP_TOTAL_CLASS_0_RX	The total number of class 0 messages received on the reporting feature server
SCCP_USAP_TOTAL_CLASS_1_RX	The total number of class 1 messages received on the reporting feature server
SCCP_NSAP_ALLOW_MSG_RX	The total number of subsystem allowed messages received on the reporting feature server
SCCP_NSAP_OOS_GRANT_RX	The total number of subsystem out-of-service grant messages received on the reporting feature server
SCCP_NSAP_OOS_REQ_RX	The total number of subsystem out-of-service request messages received on the reporting feature server
SCCP_NSAP_PROHIBIT_RX	The total number of subsystem prohibited messages received on the reporting feature server
SCCP_NSAP_STAT_TEST_RX	The total number of subsystem status test messages received on the reporting feature server
SCCP_NSAP_CONGEST_RX	The total number of subsystem congested messages received on the reporting feature server

Table 6-17 SCCP Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
SCCP_NSAP_ALLOW_MSG_TX	The total number of subsystem allowed messages sent on the reporting feature server
SCCP_ NSAP_OOS_GRANT_TX	The total number of subsystem out-of-service grant messages sent on the reporting feature server
SCCP_ NSAP_OOS_REQ_TX	The total number of subsystem out-of-service request messages sent on the reporting feature server
SCCP_ NSAP_PROHIBIT_TX	The total number of subsystem prohibited messages sent on the reporting feature server
SCCP_ NSAP_STAT_TEST_TX	The total number of subsystem status test messages sent on the reporting feature server
SCCP_NSAP_CONGEST_TX	The total number of subsystem congested messages sent on the reporting feature server

TCAP Protocol Measurements

Table 6-16 lists the TCAP protocol measurements.

Table 6-18 TCAP Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
TCAP_TOTAL_MSG_RX	The total number of messages received by the reporting feature server
TCAP_TOTAL_MSG_TX	The total number of messages sent by the reporting feature server
TCAP_TOTAL_UNI_MSG_RX	The total number of unidirectional messages received by the reporting feature server
TCAP_TOTAL_UNI_MSG_TX	The total number of unidirectional messages sent by the reporting feature server
TCAP_ABORT_MSG_RX	The total number of abort messages received on the reporting feature server
TCAP_ABORT_MSG_TX	The total number of abort messages sent by the reporting feature server
TCAP_BEGIN_MSG_RX	The total number of begin messages received on the reporting feature server
TCAP_BEGIN_MSG_TX	The total number of begin messages sent by the reporting feature server
TCAP_CONT_MSG_RX	The total number of continue messages received on the reporting feature server
TCAP_CONT_MSG_TX	The total number of continue messages sent by the reporting feature server
TCAP_END_MSG_RX	The total number of end messages received on the reporting feature server
TCAP_END_MSG_TX	The total number of end messages sent by the reporting feature server
TCAP_PERMISS_QUERY_RX	The total number of query with permission messages received on the reporting feature server
TCAP_PERMISS_QUERY_TX	The total number of query with permission messages sent by the reporting feature server

Table 6-18 TCAP Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
TCAP_NO_PERMISS_QUERY_RX	The total number of query without permission messages received on the reporting feature server
TCAP_NO_PERMISS_QUERY_TX	The total number of query without permission messages sent by the reporting feature server
TCAP_PERMISS_CONVERS_RX	The total number of conversation with permission messages received on the reporting feature server
TCAP_PERMISS_CONVERS_TX	The total number of conversation with permission messages sent by the reporting feature server
TCAP_NO_PERMISS_CONVERS_RX	The total number of conversation without permission messages received on the reporting feature server
TCAP_NO_PERMISS_CONVERS_TX	The total number of conversation without permission messages sent by the reporting feature server
TCAP_RSP_RX	The total number of response messages received on the reporting feature server
TCAP_RSP_TX	The total number of response messages sent by the reporting feature server
TCAP_TOTAL_COMP_RX	The total number of components received on the reporting feature server
TCAP_TOTAL_COMP_TX	The total number of components sent by the reporting feature server
TCAP_INVOKE_COMP_RX	The total number of invoke components received on the reporting feature server
TCAP_INVOKE_COMP_TX	The total number of invoke components sent by the reporting feature server
TCAP_RETURN_RESULT_COMP_RX	The total number of return-result components received on the reporting feature server
TCAP_RETURN_RESULT_COMP_TX	The total number of return-result components sent by the reporting feature server
TCAP_RETURN_ERR_COMP_RX	The total number of return-error components received on the reporting feature server
TCAP_RETURN_ERR_COMP_TX	The total number of return-error components sent by the reporting feature server
TCAP_REJECT_COMP_RX	The total number of reject components received on the reporting feature server
TCAP_REJECT_COMP_TX	The total number of reject components sent by the reporting feature server
TCAP_ACT_TRANSACTIONS	The total number of active transactions on the reporting feature server
TCAP_ACT_INVOCATIONS	The total number of active invocations on the reporting feature server
TCAP_TRANSACTION_IDS_INUSE	The total number of transaction ids in use on the reporting feature server
TCAP_TOTAL_DROPPED_MSG_RX	The total number of received messages dropped on the reporting feature server
TCAP_UNRECOG_MSG_TYPE_RX	The total number of unrecognized messages types received on the reporting feature server
TCAP_UNRECOG_MSG_TYPE_TX	The total number of unrecognized messages types sent by the reporting feature server
TCAP_INCORRECT_TRANS_PORT_RX	The total number of incorrect transaction portions received on the reporting feature server
TCAP_INCORRECT_TRANS_PORT_TX	The total number of incorrect transaction portions sent by the reporting feature server

Table 6-18 TCAP Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
TCAP_BAD_STRUCT_TRANS_PORT_RX	The total number of badly structured transaction portions received on the reporting feature server
TCAP_BAD_STRUCT_TRANS_PORT_TX	The total number of badly structured transaction portions sent by the reporting feature server
TCAP_UNRECOG_TRANS_ID_RX	The total number of unrecognized transaction ids received on the reporting feature server
TCAP_UNRECOG_TRANS_ID_TX	The total number of unrecognized transaction ids sent by the reporting feature server
TCAP_RSCR_LIMIT_RX	The total number of resource limitations received on the reporting feature server
TCAP_RSCR_LIMIT_TX	The total number of resource limitations sent by the reporting feature server
TCAP_TRANS_PORT_PERM_REL_RX	The total number of transaction portion permission to release problems received on the reporting feature server
TCAP_TRANS_PORT_PERM_REL_TX	The total number of transaction portion permission to release problems sent by the reporting feature server
TCAP_UNRECOG_DIALOG_PORT_ID_RX	The total number of unrecognized dialog portion ids received on the reporting feature server
TCAP_UNRECOG_DIALOG_PORT_ID_TX	The total number of unrecognized dialog portion ids sent by the reporting feature server
TCAP_BAD_STRUCT_DIALOG_PORT_RX	The total number of badly structured dialog portions received on the reporting feature server
TCAP_BAD_STRUCT_DIALOG_PORT_TX	The total number of badly structured dialog portions sent by the reporting feature server
TCAP_MISSING_DIALOG_PORT_RX	The total number of missing dialog portions received on the reporting feature server
TCAP_MISSING_DIALOG_PORT_TX	The total number of missing dialog portions sent by the reporting feature server
TCAP_INCONSIST_DIALOG_PORT_RX	The total number of inconsistent dialog portions received on the reporting feature server
TCAP_INCONSIST_DIALOG_PORT_TX	The total number of inconsistent dialog portions sent by the reporting feature server
TCAP_UNRECOG_COMP_RX	The total number of unrecognized components received on the reporting feature server
TCAP_UNRECOG_COMP_TX	The total number of unrecognized components sent by the reporting feature server
TCAP_INCORRECT_COMP_PORT_RX	The total number of incorrect component portions received on the reporting feature server
TCAP_INCORRECT_COMP_PORT_TX	The total number of incorrect component portions sent by the reporting feature server
TCAP_BAD_STRUCT_COMP_PORT_RX	The total number of badly structured component portions received on the reporting feature server
TCAP_BAD_STRUCT_COMP_PORT_TX	The total number of badly structured component portions sent by the reporting feature server

Table 6-18 TCAP Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
TCAP_DUP_INVOKE_ID_RX	The total number of duplicate invoke ids received on the reporting feature server
TCAP_DUP_INVOKE_ID_TX	The total number of duplicate invoke ids sent by the reporting feature server
TCAP_UNRECOG_OPCODE_RX	The total number of unrecognized opcodes received on the reporting feature server
TCAP_UNRECOG_OPCODE_TX	The total number of unrecognized opcodes sent by the reporting feature server
TCAP_INCORRECT_PARAM_RX	The total number of incorrect parameters received on the reporting feature server
TCAP_INCORRECT_PARAM_TX	The total number of incorrect parameters sent by the reporting feature server
TCAP_UNRECOG_LINK_ID_RX	The total number of unrecognized link ids received on the reporting feature server
TCAP_UNRECOG_LINK_ID_TX	The total number of unrecognized link ids sent by the reporting feature server
TCAP_INIT_REL_RX	The total number of initiating releases received on the reporting feature server
TCAP_INIT_REL_TX	The total number of initiating releases sent by the reporting feature server
TCAP_UNEXPECT_LINK_ RSP_RX	The total number of unexpected link responses received on the reporting feature server
TCAP_UNEXPECT_LINK_ RSP_TX	The total number of unexpected link responses sent by the reporting feature server
TCAP_UNEXPECT_LINK_ OPER_RX	The total number of unexpected link operations received on the reporting feature server
TCAP_UNEXPECT_LINK_OPER_TX	The total number of unexpected link operations sent by the reporting feature server
TCAP_UNRECOG_RE_INVOKE_ ID_RX	The total number of unrecognized invoke ids on return-error received on the reporting feature server
TCAP_UNRECOG_RE_INVOKE_ ID_TX	The total number of unrecognized invoke ids on return-error sent by the reporting feature server
TCAP_UNEXPECT_RR_RX	The total number of unexpected return-results received on the reporting feature server
TCAP_UNEXPECT_RR_TX	The total number of unexpected return-results sent by the reporting feature server
TCAP_INCORRECT_PARAM_RR_RX	The total number of incorrect parameters on return-results received on the reporting feature server
TCAP_INCORRECT_PARAM_RR_TX	The total number of incorrect parameters on return-results sent by the reporting feature server
TCAP_UNRECOG_INVOKE_ ID_RX	The total number of unrecognized invoke ids on return-results received on the reporting feature server
TCAP_UNRECOG_INVOKE_ ID_TX	The total number of unrecognized invoke ids on return results sent by the reporting feature server
TCAP_UNEXPECT_RE_RX	The total number of unexpected return error received on the reporting feature server
TCAP_UNEXPECT_RE_TX	The total number of unexpected return error sent by the reporting feature server

Table 6-18 TCAP Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
TCAP_INCORRECT_COMP_ ENCODE_RX	The total number of incorrect component encoding errors received on the reporting feature server
TCAP_ INCORRECT_COMP_ ENCODE_TX	The total number of incorrect component encoding errors sent by the reporting feature server
TCAP_INVOKE_RSCR_LIMIT_ PROB_RX	The total number of resource limitation invoke problems received on the reporting feature server
TCAP_ INVOKE_RSCR_LIMIT_ PROB_TX	The total number of resource limitation invoke problems sent by the reporting feature server
TCAP_UNRECOG_ERR_CODE_ RX	The total number of unrecognized error codes on return-error received on the reporting feature server
TCAP_UNRECOG_ERR_CODE_ TX	The total number of unrecognized error codes on return-error sent by the reporting feature server.
TCAP_UNEXPECT_ERR_CODE_ RX	The total number of unexpected error codes on return-error received on the reporting feature server.
TCAP_UNEXPECT_ERR_CODE_ TX	The total number of unexpected error codes on return-error sent by the reporting feature server.
TCAP_INCORRECT_PARAM_RE_RX	The total number of incorrect parameters on return errors received on the reporting feature server.
TCAP_INCORRECT_PARAM_RE_TX	The total number of incorrect parameters on return errors sent by the reporting feature server.
TCAP_OPERATION_REQ_RX	The total number of operation request messages received on the reporting feature server.
TCAP_OPERATION_CONFIRM_RX	The total number of operation confirm messages received on the reporting feature server.
TCAP_OPERATION_IND_RX	The total number of operation indication messages received on the reporting feature server.
TCAP_COMPONENT_REQ_RX	The total number of component request messages received on the reporting feature server.
TCAP_COMPONENT_CONFIRM_RX	The total number of component confirm messages received on the reporting feature server.
TCAP_COMPONENT_IND_RX	The total number of component indication messages received on the reporting feature server.
TCAP_DATA_IND_RX	The total number of data indication messages received on the reporting feature server.
TCAP_UDATA_IND_RX	The total number of udata indication messages received on the reporting feature server.
TCAP_DATA_REQ_RX	The total number of data request messages received on the reporting feature server.
TCAP_DELIMITER_REQ_RX	The total number of delimiter request messages received on the reporting feature server.

Table 6-18 TCAP Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
TCAP_DELIMITER_IND_RX	The total number of delimiter indication messages received on the reporting feature server.
TCAP_OPEN_IND_RX	The total number of open indication messages received on the reporting feature server.
TCAP_OPEN_CONFIRM_RX	The total number of open confirm messages received on the reporting feature server.
TCAP_STATUS_IND_RX	The total number of status indication messages received on the reporting feature server.
TCAP_DIALOG_CONFIRM_RX	The total number of dialog confirm messages received on the reporting feature server.
TCAP_CLOSE_IND_RX	The total number of close indication messages received on the reporting feature server.
TCAP_ABORT_IND_RX	The total number of abort indication messages received on the reporting feature server.
TCAP_BIND_CONFIRM_RX	The total number of TCAP bind confirm messages received on the reporting feature server.
TCAP_STAT_CONFIRM_RX	The total number of TCAP statistics confirm messages received on the reporting feature server.
TCAP_NOTICE_IND_RX	The total number of TCAP notice indication messages received on the reporting feature server.
TCAP_STAT_IND_RX	The total number of TCAP statistics indication messages received on the reporting feature server.

SUA Measurements

Table 6-19 lists the SUA measurements.

Table 6-19 SUA Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
SUA_ERR_TX	The total number of errors sent on the reporting signaling gateway process
SUA_ERR_RX	The total number of errors received on the reporting signaling gateway process
SUA_NOTIFY_TX	The total number of NOTIFYs sent on the reporting signaling gateway process
SUA_NOTIFY_RX	The total number of NOTIFYs received on the reporting signaling gateway process
SUA_DUNA_RX	The total number of DUNAs received on the reporting signaling gateway process
SUA_DAVA_RX	The total number of DAVAs received on the reporting signaling gateway process
SUA_DAUD_TX	The total number of DAUDs sent on the reporting signaling gateway process
SUA_SCON_TX	The total number of SCONs sent on the reporting signaling gateway process

Table 6-19 SUA Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
SUA_SCON_RX	The total number of SCONs received on the reporting signaling gateway process
SUA_DRST_RX	The total number of DRSTs received on the reporting signaling gateway process
SUA_DUPU_RX	The total number of DUPUs received on the reporting signaling gateway process
SUA_UP_TX	The total number of UPs sent on the reporting signaling gateway process
SUA_DOWN_TX	The total number of DOWNs sent on the reporting signaling gateway process
SUA_BEAT_TX	The total number of BEATs sent on the reporting signaling gateway process
SUA_BEAT_RX	The total number of BEATs received on the reporting signaling gateway process
SUA_UP_ACK_RX	The total number of UP Acknowledges received on the reporting signaling gateway process
SUA_DOWN_ACK_RX	The total number of DOWN Acknowledges received on the reporting signaling gateway process
SUA_BEAT_ACK_TX	The total number of BEAT Acknowledges sent on the reporting signaling gateway process
SUA_BEAT_ACK_RX	The total number of BEAT Acknowledges received on the reporting signaling gateway process
SUA_ACTIVE_TX	The total number of ACTIVEs sent on the reporting signaling gateway process
SUA_INACTIVE_TX	The total number of ACTIVEs received on the reporting signaling gateway process
SUA_ACTIVE_ACK_RX	The total number of ACTIVE Acknowledges received on the reporting signaling gateway process
SUA_INACTIVE_ACK_RX	The total number of INACTIVE Acknowledges received on the reporting signaling gateway process
SUA_CLDT_TX	The total number of CLDTs sent on the reporting signaling gateway process
SUA_CLDT_RX	The total number of CLDTs received on the reporting signaling gateway process
SUA_CLDR_TX	The total number of CLDRs sent on the reporting signaling gateway process
SUA_CLDR_RX	The total number of CLDRs received on the reporting signaling gateway process
SUA_DATA_BYTES_TX	The total number of data bytes sent on the reporting signaling gateway process
SUA_DATA_BYTES_RX	The total number of data bytes received on the reporting signaling gateway process
SUA_INVALID_SCTP_SIGNALS	The total number of invalid SCTP signals on the reporting signaling gateway process
SUA_SINCE_LAST_RESET_ASSOC	The total number of SCTP errors since last reset of association on the reporting signaling gateway process
SUA_ASSOC_FAIL	The total number of association failures on the reporting signaling gateway process
SUA_SCTP_TX_FAIL	The total number of SCTP send failures on message processing errors on the reporting signaling gateway process
SUA_MSG_INVALID_LENGTH_RX	The total number of messages of invalid length received on the reporting signaling gateway process
SUA_NO_MEMORY_FAIL	The total number of no memory for message errors on the reporting signaling gateway process
SUA_VERSION_ERR	The total number of version errors on the reporting signaling gateway process
SUA_MSG_CLASS_ERR	The total number of message class errors on the reporting signaling gateway process
SUA_MSG_TYPE_ERR	The total number of message type errors on the reporting signaling gateway process

Table 6-19 SUA Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
SUA_STREAM_ID_ERR	The total number of stream id errors on the reporting signaling gateway process
SUA_UNEXPECT_MSG_ ERR	The total number of unexpected message errors on the reporting signaling gateway process
SUA_PROTOCOL_ERR	The total number of protocol errors on the reporting signaling gateway process
SUA_PARAM_VALUE_ ERR	The total number of parameter value errors on the reporting signaling gateway process
SUA_PARAM_FIELD_ERR	The total number of parameter field errors on the reporting signaling gateway process
SUA_UNEXPECT_PARAM _ERR	The total number of unexpected parameter errors on the reporting signaling gateway process
SUA_NETWORK_APPEAR _ERR	The total number of network appearance errors on the reporting signaling gateway process
SUA_ROUTING_ CONTEXT_ERR	The total number of routing context errors on the reporting signaling gateway process

M3UA Protocol Measurements

Table 6-16 lists the M3UA protocol measurements.

Table 6-20 M3UA Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
M3UA_SGP_ID	The id of the signaling gateway process that these counters are associated with.
M3UA_ERR_TX	The total number of errors sent on the reporting signaling gateway process
M3UA_ERR_RX	The total number of errors received on the reporting signaling gateway process
M3UA_NOTIFY_TX	The total number of NOTIFYs sent on the reporting signaling gateway process
M3UA_NOTIFY_RX	The total number of NOTIFYs received on the reporting signaling gateway process
M3UA_DUNA_RX	The total number of DUNAs received on the reporting signaling gateway process
M3UA_DAVA_RX	The total number of DAVAs received on the reporting signaling gateway process
M3UA_DAUD_TX	The total number of DAUDs sent on the reporting signaling gateway process
M3UA_SCON_TX	The total number of SCONs sent on the reporting signaling gateway process
M3UA_SCON_RX	The total number of SCONs received on the reporting signaling gateway process
M3UA_DRST_RX	The total number of DRSTs received on the reporting signaling gateway process
M3UA_DUPU_RX	The total number of DUPUs received on the reporting signaling gateway process
M3UA_UP_TX	The total number of UPs sent on the reporting signaling gateway process
M3UA_DOWN_TX	The total number of DOWNs sent on the reporting signaling gateway process
M3UA_BEAT_TX	The total number of BEATs sent on the reporting signaling gateway process
M3UA_BEAT_RX	The total number of BEATs received on the reporting signaling gateway process

Table 6-20 M3UA Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
M3UA_UP_ACK_RX	The total number of UP Acknowledges received on the reporting signaling gateway process
M3UA_DOWN_ACK_RX	The total number of DOWN Acknowledges received on the reporting signaling gateway process
M3UA_BEAT_ACK_TX	The total number of BEAT Acknowledges sent on the reporting signaling gateway process
M3UA_BEAT_ACK_RX	The total number of BEAT Acknowledges received on the reporting signaling gateway process
M3UA_ACTIVE_TX	The total number of ACTIVEs sent on the reporting signaling gateway process
M3UA_INACTIVE_TX	The total number of ACTIVEs received on the reporting signaling gateway process
M3UA_ACTIVE_ACK_RX	The total number of ACTIVE Acknowledges received on the reporting signaling gateway process
M3UA_INACTIVE_ACK_RX	The total number of INACTIVE Acknowledges received on the reporting signaling gateway process
M3UA_DATA_TRANS_TX	The total number of data transfers sent on the reporting signaling gateway process
M3UA_DATA_TRANS_RX	The total number of data transfers received on the reporting signaling gateway process
M3UA_DATA_BYTES_TX	The total number of data bytes sent on the reporting signaling gateway process
M3UA_DATA_BYTES_RX	The total number of data bytes received on the reporting signaling gateway process
M3UA_INVALID_SCTP_SIGNALS	The total number of invalid SCTP signals on the reporting signaling gateway process
M3UA_SINCE_LAST_RESET_ASSOC	The total number of SCTP errors since last reset of association on the reporting signaling gateway process
M3UA_ASSOC_FAIL	The total number of association failures on the reporting signaling gateway process
M3UA_SCTP_TX_FAIL	The total number of SCTP send failures on message processing errors on the reporting signaling gateway process
M3UA_MSG_LENGTH_ERR	The total number of messages of invalid length received on the reporting signaling gateway process
M3UA_NO_MEMORY_ERR	The total number of no memory for message errors on the reporting signaling gateway process
M3UA_VERSION_ERR	The total number of version errors on the reporting signaling gateway process
M3UA_MSG_CLASS_ERR	The total number of message class errors on the reporting signaling gateway process
M3UA_MSG_TYPE_ERR	The total number of message type errors on the reporting signaling gateway process
M3UA_STREAM_ID_ERR	The total number of stream id errors on the reporting signaling gateway process
M3UA_UNEXPECT_MSG_ERR	The total number of unexpected message errors on the reporting signaling gateway process
M3UA_PROTOCOL_ERR	The total number of protocol errors on the reporting signaling gateway process
M3UA_PARAM_VALUE_ERR	The total number of parameter value errors on the reporting signaling gateway process

Table 6-20 M3UA Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
M3UA_PARAM_FIELD_ERR	The total number of parameter field errors on the reporting signaling gateway process
M3UA_UNEXPECT_PARAM_ERR	The total number of unexpected parameter errors on the reporting signaling gateway process
M3UA_NETWORK_APPEAR_ERR	The total number of network appearance errors on the reporting signaling gateway process
M3UA_ROUTING_CONTEXT_ERR	The total number of routing context errors on the reporting signaling gateway process
M3UA_MSG_RX_OTHER_ERR	The total number of messages received with other errors on the reporting call agent or feature server

SCTP Protocol Measurements

Table 6-21 lists the SCTP protocol measurements.

Table 6-21 SCTP Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
SCTP_SCTP_ASSOC_ID	The id of the SCTP association that the measurement counter block is associated with.
SCTP_DATA_CHUNK_RX	The total number of data chunks received on the reporting sctp association
SCTP_DATA_CHUNK_RX_SEQ_ERR	The total number of out-of-sequence data chunks received on the reporting sctp association
SCTP_DATA_CHUNK_RX_ORDER	The total number of ordered data chunks received on the reporting sctp association
SCTP_DATA_CHUNK_RX_UNORDER	The total number of unordered data chunks received on the reporting sctp association
SCTP_DATA_CHUNK_TX	The total number of data chunks sent on the reporting sctp association
SCTP_DATA_CHUNK_TX_ORDER	The total number of ordered data chunks sent on the reporting sctp association
SCTP_DATA_CHUNK_TX_UNORDER	The total number of unordered data chunks sent on the reporting sctp association
SCTP_DATA_CHUNK_DISCARD	The total number of received duplicate data chunks that were discarded on the reporting sctp association
SCTP_DATA_CHUNK_RETRAN	The total number of data chunks that were retransmitted on the reporting sctp association
SCTP_DATA_CHUNK_TX_BUNDLE	The total number of bundled data chunks that were sent on the reporting sctp association
SCTP_DATA_CHUNK_RX_BUNDLE	The total number of bundled data chunks that were received on the reporting sctp association
SCTP_DATA_BYTE_TX	The total number of data bytes sent over SCTP on the reporting sctp association

Table 6-21 SCTP Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
SCTP_DATA_BYTE_RX	The total number of data bytes received over SCTP on the reporting sctp association
SCTP_CONTROL_CHUNK_TX	The total number of control chunks sent on the reporting sctp association
SCTP_CONTROL_CHUNK_RX	The total number of control chunks received on the reporting sctp association
SCTP_ULP_TX	The total number of ULP datagrams sent on the reporting sctp association
SCTP_ULP_READY	The total number of received datagrams that are ready to be sent to upper layer processes on the reporting sctp association
SCTP_ULP_RX	The total number of received upper layer process datagrams on the reporting sctp association
SCTP_ULP_QUEUE	The total number of upper layer process datagrams queued to be transmitted on the reporting sctp association
SCTP_SCTP_DATAG_TX	The total number of datagrams sent on the reporting sctp association
SCTP_SCTP_DATAG_RX	The total number of datagrams received on the reporting sctp association
SCTP_INVALID_DATAG_LENGTH	The total number of datagrams received with an invalid length on the reporting sctp association
SCTP_PARTIAL_CHUNK_ERR	The total number of partial chunks that were received in a datagram on the reporting sctp association
SCTP_EMPTY_DATAG_ERR	The total number of datagrams received with no data chunks on the reporting sctp association
SCTP_INVALID_CHECKSUM	The total number of SCTP datagrams received with an invalid checksum on the reporting sctp association
SCTP_INVALID_BUNDLE_CHUNK	The total number of invalid bundle chunks received on the reporting sctp association
SCTP_INVALID_VERIF_TAG	The total number of datagrams with invalid verification tags received on the reporting sctp association
SCTP_OOTB	The total number of out of the blue packets received on the reporting sctp association
SCTP_INVALID_STREAM	The total number of datagrams with invalid stream ids received on the reporting sctp association
SCTP_ASSOC_COMM_LOST	The total number of times the SCTP association communication was lost on the reporting sctp association
SCTP_DEST_ADDR_FAIL	The total number of times a destination address failed on the reporting sctp association
SCTP_CHUNK_ORDER_ERR	The total number of ordered chunks that were in error on the reporting sctp association
SCTP_ECNE_CHUNK_RX	The total number of ECNE chunks received on the reporting sctp association
SCTP_CWR_CHUNK_RX	The total number of CWR chunks received on the reporting sctp association
SCTP_UNKNOWN_CHUNK_TYPE	The total number of datagrams with an unknown chunk type received on the reporting sctp association

Table 6-21 SCTP Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
SCTP_UNKNOWN_INIT_PARAM	The total number of INIT datagrams with an unknown parameter received on the reporting sctp association
SCTP_INVALID_COOKIE_SIG	The total number of invalid cookie signals received on the reporting sctp association
SCTP_EXPIRED_COOKIE_ERR	The total number of times a cookie echo was received after the cookie timer expired on the reporting sctp association
SCTP_STALE_COOKIE_ERR	The total number of times other endpoint indicates that the cookie echo was received after the cookie time expired on the reporting sctp association
SCTP_PEER_RESTART_ERR	The total number of times the SCTP peer restarted on the reporting sctp association
SCTP_V6_ADDR_PARAM_RX	The total number of packets received with version 6 parameters on the reporting sctp association
SCTP_INVALID_STREAM_ERR_RX	The total number of times an SCTP peer reported receiving a data chunk on a non-existing stream on the reporting sctp association
SCTP_MISSING_PARAM_ERR_RX	The total number of times an INIT or INIT ACK was missing one or more mandatory parameters received on the reporting sctp association
SCTP_STALE_COOKIE_ERR_RX	The total number of times an SCTP peer received a valid cookie that had expired on the reporting sctp association
SCTP_OUT_OF_RSCR_ERR_RX	The total number of times an SCTP peer reported it was out of resources on the reporting sctp association
SCTP_UNRESOLV_ADDR_ERR_RX	The total number of times an SCTP reported that it received a packet with an address it could not resolve on the reporting sctp association
SCTP_UNRECOG_CHUNK_ERR_RX	The total number of times an SCTP peer reported that it received a chunk that it could not understand on the reporting sctp association.
SCTP_INVALID_PARAM_ERR_RX	The total number of times an SCTP peer reported that it received an INIT or INIT ACK chunk containing one or more mandatory parameters that were set to an invalid value on the reporting sctp association.
SCTP_UNRECOG_PARAM_ERR_RX	The total number of times an SCTP peer reported that it received an INIT ACK containing one or more parameters that were unrecognized on the reporting sctp association.
SCTP_NO_USER_DATA_ERR_RX	The total number of times an SCTP peer reported that it received a data chunk with no user data in it on the reporting sctp association.
SCTP_COOKIE_IN_SHUTDOWN_ERR_RX	The total number of times an SCTP peer reported that is received a COOKIE ECHO while in the SHUTDOWN_ACK_SENT state on the reporting sctp association.
SCTP_CHUNK_TOO_SMALL_ERR	The total number of data chunks received that were too small on the reporting sctp association.
SCTP_CHUCK_TOO_LARGE_ERR	The total number of data chunks received that were too big on the reporting sctp association.

Table 6-21 SCTP Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
SCTP_MISSING_PARAM_ERR	The total number of times that an INIT or INIT ACK chunk was received with one or more mandatory parameters missing on the reporting sctp association.
SCTP_NO_SPACE_INCOM_ERR	The total number of data chunks that were dropped due to no space being available in the local receive window on the reporting sctp association.

ISUP Protocol Measurements

The following table identifies the Signaling Gateway-based ISUP protocol measurements provided in Release 4.3 and their respective meanings. This is a super set of all the possible measurements across all the supported ISUP variants.

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Table 6-22 ISUP Protocol Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
ISUP_MSG_TX	The total number of messages sent on the reporting trunk group.
ISUP_MSG_RX	The total number of messages received on the reporting trunk group.
ISUP_ACM_TX	The total number of Address Complete messages sent on the reporting trunk group.
ISUP_ACM_RX	The total number of Address Complete messages received on the reporting trunk group.
ISUP_ANM_TX	The total number of Answer messages sent on the reporting trunk group.
ISUP_ANM_RX	The total number of Answer messages received on the reporting trunk group.
ISUP_ARR_TX	The total number of Automatic Re-Route messages sent on the reporting trunk group.
ISUP_ARR_RX	The total number of Automatic Re-Route messages received on the reporting trunk group.
ISUP_BLA_TX	The total number of Blocking Acknowledge messages sent on the reporting trunk group.
ISUP_BLA_RX	The total number of Blocking Acknowledge messages received on the reporting trunk group.
ISUP_BLO_TX	The total number of Blocking messages sent on the reporting trunk group.
ISUP_BLO_RX	The total number of Blocking messages received on the reporting trunk group.
ISUP_CCL_TX	The total number of Calling Party Clear messages sent on the reporting trunk group.
ISUP_CCL_RX	The total number of Calling Party Clear messages received on the reporting trunk group.
ISUP_CCR_TX	The total number of Continuity Check Request messages sent on the reporting trunk group.

Table 6-22 ISUP Protocol Measurements (continued)

ISUP_CCR_RX	The total number of Continuity Check Request messages received on the reporting trunk group.
ISUP_CFN_TX	The total number of Confusion messages sent on the reporting trunk group.
ISUP_CFN_RX	The total number of Confusion messages received on the reporting trunk group.
ISUP_CGB_TX	The total number of Circuit Group Blocking messages sent on the reporting trunk group.
ISUP_CGB_RX	The total number of Circuit Group Blocking messages received on the reporting trunk group.
ISUP_CGBA_TX	The total number of Circuit Group Blocking Acknowledgement messages sent on the reporting trunk group.
ISUP_CGBA_RX	The total number of Circuit Group Blocking Acknowledgement messages received on the reporting trunk group.
ISUP_CGU_TX	The total number of Circuit Group Unblocking messages sent on the reporting trunk group.
ISUP_CGU_RX	The total number of Circuit Group Unblocking messages received on the reporting trunk group.
ISUP_CGUA_TX	The total number of Circuit Group Unblocking Acknowledgement messages sent on the reporting trunk group.
ISUP_CGUA_RX	The total number of Circuit Group Unblocking Acknowledgement messages received on the reporting trunk group.
ISUP_CON_TX	The total number of Connect messages sent on the reporting trunk group.
ISUP_CON_RX	The total number of Connect messages received on the reporting trunk group.
ISUP_COT_TX	The total number of Continuity messages sent on the reporting trunk group.
ISUP_COT_RX	The total number of Continuity messages received on the reporting trunk group.
ISUP_CPG_TX	The total number of Call Progress messages sent on the reporting trunk group.
ISUP_CPG_RX	The total number of Call Progress messages received on the reporting trunk group.
ISUP_CQM_TX	The total number of Circuit Query messages sent on the reporting trunk group.
ISUP_CQM_RX	The total number of Circuit Query messages received on the reporting trunk group.
ISUP_CQR_TX	The total number of Circuit Query Response messages sent on the reporting trunk group.
ISUP_CQR_RX	The total number of Circuit Query Response messages received on the reporting trunk group.
ISUP_CRA_TX	The total number of Circuit Reservation Acknowledgement messages sent on the reporting trunk group.
ISUP_CRA_RX	The total number of Circuit Reservation Acknowledgement messages received on the reporting trunk group.
ISUP_CRM_TX	The total number of Circuit Reservation messages sent on the reporting trunk group.
ISUP_CRM_RX	The total number of Circuit Reservation messages received on the reporting trunk group.

Table 6-22 ISUP Protocol Measurements (continued)

ISUP_CRG_TX	The total number of Charge Information messages sent on the reporting trunk group.
ISUP_CRG_RX	The total number of Charge Information messages received on the reporting trunk group.
ISUP_CVR_TX	The total number of Circuit Validation Response messages sent on the reporting trunk group.
ISUP_CVR_RX	The total number of Circuit Validation Response messages received on the reporting trunk group.
ISUP_CVT_TX	The total number of Circuit Validation Test messages sent on the reporting trunk group.
ISUP_CVT_RX	The total number of Circuit Validation Test messages received on the reporting trunk group.
ISUP_EXM_TX	The total number of Exit messages sent on the reporting trunk group.
ISUP_EXM_RX	The total number of Exit messages received on the reporting trunk group.
ISUP_FAA_TX	The total number of Facility Accepted messages sent on the reporting trunk group.
ISUP_FAA_RX	The total number of Facility Accepted messages received on the reporting trunk group.
ISUP_FAC_TX	The total number of Facility messages sent on the reporting trunk group.
ISUP_FAC_RX	The total number of Facility messages received on the reporting trunk group.
ISUP_FAR_TX	The total number of Facility Request messages sent on the reporting trunk group.
ISUP_FAR_RX	The total number of Facility Request messages received on the reporting trunk group.
ISUP_FOT_TX	The total number of Forward Transfer messages sent on the reporting trunk group.
ISUP_FOT_RX	The total number of Forward Transfer messages received on the reporting trunk group.
ISUP_FRJ_TX	The total number of Facility Reject messages sent on the reporting trunk group.
ISUP_FRJ_RX	The total number of Facility Reject messages received on the reporting trunk group.
ISUP_FWT_TX	The total number of Forward Transfer messages sent on the reporting trunk group.
ISUP_FWT_RX	The total number of Forward Transfer messages received on the reporting trunk group.
ISUP_GRA_TX	The total number of Circuit Group Reset Acknowledge messages sent on the reporting trunk group.
ISUP_GRA_RX	The total number of Circuit Group Reset Acknowledge messages received on the reporting trunk group.
ISUP_GRS_TX	The total number of Circuit Group Reset messages sent on the reporting trunk group.
ISUP_GRS_RX	The total number of Circuit Group Reset messages received on the reporting trunk group.
ISUP_IAM_TX	The total number of Initial Address messages sent on the reporting trunk group.

Table 6-22 ISUP Protocol Measurements (continued)

ISUP_IAM_RX	The total number of Initial Address messages received on the reporting trunk group.
ISUP_IDR_TX	The total number of Identification Request messages sent on the reporting trunk group.
ISUP_IDR_RX	The total number of Identification Request messages received on the reporting trunk group.
ISUP_INF_TX	The total number of Information messages sent on the reporting trunk group.
ISUP_INF_RX	The total number of Information messages received on the reporting trunk group.
ISUP_INR_TX	The total number of Information Request messages sent on the reporting trunk group.
ISUP_INR_RX	The total number of Information Request messages received on the reporting trunk group.
ISUP_IRS_TX	The total number of Identification Response messages sent on the reporting trunk group.
ISUP_IRS_RX	The total number of Identification Response messages received on the reporting trunk group.
ISUP_ITX_TX	The total number of Charge Unit messages sent on the reporting trunk group.
ISUP_ITX_RX	The total number of Charge Unit messages received on the reporting trunk group.
ISUP_LPA_TX	The total number of Loop Prevention Acknowledgement messages sent on the reporting trunk group.
ISUP_LPA_RX	The total number of Loop Prevention Acknowledgement messages received on the reporting trunk group.
ISUP_LPM_TX	The total number of Loop Prevention messages sent on the reporting trunk group.
ISUP_LPM_RX	The total number of Loop Prevention messages received on the reporting trunk group.
ISUP_NRM_TX	The total number of Network Resource Management messages sent on the reporting trunk group.
ISUP_NRM_RX	The total number of NRM messages received on the reporting trunk group.
ISUP_OLM_TX	The total number of Overload messages sent on the reporting trunk group.
ISUP_OLM_RX	The total number of Overload messages received on the reporting trunk group.
ISUP_OPR_TX	The total number of Operator messages sent on the reporting trunk group.
ISUP_OPR_RX	The total number of Operator messages received on the reporting trunk group.
ISUP_PAM_TX	The total number of Pass Along messages sent on the reporting trunk group.
ISUP_PAM_RX	The total number of Pass Along messages received on the reporting trunk group.
ISUP_PRI_TX	The total number of Pre-Release Information messages sent on the reporting trunk group.
ISUP_PRI_RX	The total number of Pre-Release Information messages received on the reporting trunk group.
ISUP_REL_TX	The total number of Release messages sent on the reporting trunk group.
ISUP_REL_RX	The total number of Release messages received on the reporting trunk group.
ISUP_RES_TX	The total number of Resume messages sent on the reporting trunk group.

Table 6-22 ISUP Protocol Measurements (continued)

ISUP_RES_RX	The total number of Resume messages received on the reporting trunk group.
ISUP_RLC_TX	The total number of Release Complete messages sent on the reporting trunk group.
ISUP_RLC_RX	The total number of Release Complete messages received on the reporting trunk group.
ISUP_RSC_TX	The total number of Reset Circuit messages sent on the reporting trunk group.
ISUP_RSC_RX	The total number of Reset Circuit messages received on the reporting trunk group.
ISUP_SAM_TX	The total number of Subsequent Address messages sent on the reporting trunk group.
ISUP_SAM_RX	The total number of Subsequent Address messages received on the reporting trunk group.
ISUP_SGM_TX	The total number of Segmentation messages sent on the reporting trunk group.
ISUP_SGM_RX	The total number of Segmentation messages received on the reporting trunk group.
ISUP_SUS_TX	The total number of Suspend messages sent on the reporting trunk group.
ISUP_SUS_RX	The total number of Suspend messages received on the reporting trunk group.
ISUP_TXA_TX	The total number of Charging Acknowledgement messages sent on the reporting trunk group.
ISUP_TXA_RX	The total number of Charging Acknowledgement messages received on the reporting trunk group.
ISUP_UBA_TX	The total number of Unblocking Acknowledge messages sent on the reporting trunk group.
ISUP_UBA_RX	The total number of Unblocking Acknowledge messages received on the reporting trunk group.
ISUP_UBL_TX	The total number of Unblocking messages sent on the reporting trunk group.
ISUP_UBL_RX	The total number of Unblocking messages received on the reporting trunk group.
ISUP_UPA_TX	The total number of User Part Acknowledgement messages sent on the reporting trunk group.
ISUP_UPA_RX	The total number of User Part Acknowledgement messages received on the reporting trunk group.
ISUP_UPT_TX	The total number of User Part Test messages sent on the reporting trunk group.
ISUP_UPT_RX	The total number of User Part Test messages received on the reporting trunk group.
ISUP_USR_TX	The total number of User To User messages sent on the reporting trunk group.
ISUP_USR_RX	The total number of User To User messages received on the reporting trunk group
ISUP_ABNORMAL_REL_TX	The total number of Release messages sent with a cause other than NORMAL on the reporting trunk group.
ISUP_ABNORMAL_REL_RX	The total number of Release messages received with a cause other than NORMAL on the reporting trunk group.
ISUP_UNEXPECT_MSG_RX	The total number of unexpected messages received on the reporting trunk group.
ISUP_UNRECOG_MSG_RX	The total number of unrecognized messages received on the reporting trunk group.

The following table illustrates the message measurements applicable to a given ISUP variant, the total message, abnormal release, unexpected and unrecognized message measurements that apply to all variants:

Table 6-23 Message Measurements Applicable to ISUP Variants

Message	ANSI	China	Mexico	Thailand	Hong-Kong	Chile	Australia	Israel	ETSIv2	Hungary	France
ACM	X	X	X	X	X	X	X	X	X	X	X
ANM	X	X	X	X	X	X	X	X	X	X	X
ARR				X							
BLA	X	X	X	X	X	X	X	X	X	X	X
BLO	X	X	X	X	X	X	X	X	X	X	X
CCL		X	X				X	X	X		
CCR	X	X	X	X		X	X	X	X	X	X
CFN	X		X	X	X					X	X
CGB	X	X	X	X	X	X	X	X	X	X	X
CGBA	X	X	X	X	X	X	X	X	X	X	X
CGU	X	X	X	X	X	X	X	X	X	X	X
CGUA	X	X	X	X	X	X	X	X	X	X	X
CON		X	X	X	X	X	X	X	X	X	X
COT	X	X	X	X	X	X	X	X	X	X	X
CPG	X	X	X	X	X	X	X	X	X	X	X
CQM	X		X	X							
CQR	X		X	X							
CRA	X										
CRM	X										
CRG						X					
CVR	X										
CVT	X										
EXM	X										
FAA									X	X	X
FAC	X				X					X	X
FAR						X					
FOT	X										
FRJ						X					
FWT						X					

Table 6-23 Message Measurements Applicable to ISUP Variants (continued)

GRA	X	X	X	X	X	X	X	X	X	X	X
GRS	X	X	X	X	X	X	X	X	X	X	X
IAM	X	X	X	X	X	X	X	X	X	X	X
IDR						X				X	X
INF	X		X	X	X	X				X	X
INR			X	X	X	X				X	X
IRS						X				X	X
ITX											X
LPA	X										
LPM						X					
NRM					X	X					
OLM										X	X
OPR		X					X	X	X		
PAM	X				X	X					
PRI						X					
REL	X	X	X	X	X	X	X	X	X	X	X
RES	X	X	X	X	X	X	X	X	X	X	X
RLC	X	X	X	X	X	X	X	X	X	X	X
RSC	X	X	X	X	X	X	X	X	X	X	X
SAM		X	X	X	X	X	X	X	X	X	X
SGM		X			X	X	X	X	X	X	X
SUS	X	X	X	X	X	X	X	X	X	X	X
TXA											X
UBA	X	X		X	X	X	X	X	X	X	X
UBL	X	X	X	X		X	X	X	X	X	X
UCIC	X		X	X		X					
UPA										X	X
UPT										X	X
USR	X					X				X	X

ISUP (ANSI) Measurements

Table 6-24 lists the ISUP (ANSI) measurements.

Table 6-24 ISUP (ANSI) Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
SGA_MSG_TX	The total number of messages sent on the reporting trunk group
SGA_MSG_RX	The total number of messages received on the reporting trunk group
SGA_ACM_TX	The total number of ACM messages sent on the reporting trunk group
SGA_ACM_RX	The total number of ACM messages received on the reporting trunk group
SGA_ANM_TX	The total number of ANM messages sent on the reporting trunk group
SGA_ANM_RX	The total number of ANM messages received on the reporting trunk group
SGA_BLO_TX	The total number of BLO messages sent on the reporting trunk group
SGA_BLO_RX	The total number of BLO messages received on the reporting trunk group
SGA_BLA_TX	The total number of BLA messages sent on the reporting trunk group
SGA_BLA_RX	The total number of BLA messages received on the reporting trunk group
SGA_CCR_TX	The total number of CCR messages sent on the reporting trunk group
SGA_CCR_RX	The total number of CCR messages received on the reporting trunk group
SGA_CFN_TX	The total number of CFN messages sent on the reporting trunk group
SGA_CFN_RX	The total number of CFN messages received on the reporting trunk group
SGA_CPG_TX	The total number of CPG messages sent on the reporting trunk group
SGA_CPG_RX	The total number of CPG messages received on the reporting trunk group
SGA_CGB_TX	The total number of CGB messages sent on the reporting trunk group
SGA_CGB_RX	The total number of CGB messages received on the reporting trunk group
SGA_CGU_TX	The total number of CGU messages sent on the reporting trunk group
SGA_CGU_RX	The total number of CGU messages received on the reporting trunk group
SGA_CGBA_TX	The total number of CGBA messages sent on the reporting trunk group
SGA_CGBA_RX	The total number of CGBA messages received on the reporting trunk group
SGA_CGUA_TX	The total number of CGUA messages sent on the reporting trunk group
SGA_CGUA_RX	The total number of CGUA messages received on the reporting trunk group
SGA_COT_TX	The total number of COT messages sent on the reporting trunk group
SGA_COT_RX	The total number of COT messages received on the reporting trunk group
SGA_CQM_TX	The total number of CQM messages sent on the reporting trunk group
SGA_CQM_RX	The total number of CQM messages received on the reporting trunk group
SGA_CQR_TX	The total number of CQR messages sent on the reporting trunk group
SGA_CQR_RX	The total number of CQR messages received on the reporting trunk group
SGA_CRA_TX	The total number of CRA messages sent on the reporting trunk group
SGA_CRA_RX	The total number of CRA messages received on the reporting trunk group

Table 6-24 ISUP (ANSI) Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
SGA_CRM_TX	The total number of CRM messages sent on the reporting trunk group
SGA_CRM_RX	The total number of CRM messages received on the reporting trunk group
SGA_CVR_TX	The total number of CVR messages sent on the reporting trunk group
SGA_CVR_RX	The total number of CVR messages received on the reporting trunk group
SGA_CVT_TX	The total number of CVT messages sent on the reporting trunk group
SGA_CVT_RX	The total number of CVT messages received on the reporting trunk group
SGA_EXM_TX	The total number of EXM messages sent on the reporting trunk group
SGA_EXM_RX	The total number of EXM messages received on the reporting trunk group
SGA_FAC_TX	The total number of FAC messages sent on the reporting trunk group
SGA_FAC_RX	The total number of FAC messages received on the reporting trunk group
SGA_FOT_TX	The total number of FOT messages sent on the reporting trunk group
SGA_FOT_RX	The total number of FOT messages received on the reporting trunk group
SGA_GRS_TX	The total number of GRS messages sent on the reporting trunk group
SGA_GRS_RX	The total number of GRS messages received on the reporting trunk group
SGA_GRA_TX	The total number of GRA messages sent on the reporting trunk group
SGA_GRA_RX	The total number of GRA messages received on the reporting trunk group
SGA_IAM_TX	The total number of IAM messages sent on the reporting trunk group
SGA_IAM_RX	The total number of IAM messages received on the reporting trunk group
SGA_INF_TX	The total number of INF messages sent on the reporting trunk group
SGA_INF_RX	The total number of INF messages received on the reporting trunk group
SGA_INR_TX	The total number of INR messages sent on the reporting trunk group
SGA_INR_RX	The total number of INR messages received on the reporting trunk group
SGA_LPA_TX	The total number of LPA messages sent on the reporting trunk group
SGA_LPA_RX	The total number of LPA messages received on the reporting trunk group
SGA_PAM_TX	The total number of PAM messages sent on the reporting trunk group
SGA_PAM_RX	The total number of PAM messages received on the reporting trunk group
SGA_REL_TX	The total number of REL messages sent on the reporting trunk group
SGA_REL_RX	The total number of REL messages received on the reporting trunk group
SGA_RLC_TX	The total number of RLC messages sent on the reporting trunk group
SGA_RLC_RX	The total number of RLC messages received on the reporting trunk group
SGA_RSC_TX	The total number of RSC messages sent on the reporting trunk group
SGA_RSC_RX	The total number of RSC messages received on the reporting trunk group
SGA_RES_TX	The total number of RES messages sent on the reporting trunk group
SGA_RES_RX	The total number of RES messages received on the reporting trunk group
SGA_SUS_TX	The total number of SUS messages sent on the reporting trunk group

Table 6-24 ISUP (ANSI) Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
SGA_SUS_RX	The total number of SUS messages received on the reporting trunk group
SGA_UBL_TX	The total number of UBL messages sent on the reporting trunk group
SGA_UBL_RX	The total number of UBL messages received on the reporting trunk group
SGA_UBA_TX	The total number of UBA messages sent on the reporting trunk group
SGA_UBA_RX	The total number of UBA messages received on the reporting trunk group
SGA_UCIC_TX	The total number of UCIC messages sent on the reporting trunk group
SGA_UCIC_RX	The total number of UCIC messages received on the reporting trunk group
SGA_USR_TX	The total number of USR messages sent on the reporting trunk group
SGA_USR_RX	The total number of USR messages received on the reporting trunk group
SGA_ABNORMAL_REL_RX	The total number of RELs received with a cause other than NORMAL on the reporting trunk group
SGA_UNEXPECT_MSG_RX	The total number of unexpected messages received on the reporting trunk group
SGA_UNRECOG_MSG_RX	The total number of unrecognized messages received on the reporting trunk group

ISUP (France) Measurements

Table 6-27 lists the ISUP (France) measurements.

Table 6-25 ISUP (France) Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
SGA_TXA_RX	The total number of Charging Acknowledgement (TXA) messages received on the reporting trunk group.
SGA_TXA_TX	The total number of TXA messages sent on the reporting trunk group.
SGA_ITX_RX	The total number of Charge Unit (ITX) message received on the reporting trunk group.
SGA_ITX_TX	The total number of ITX messages sent on the reporting trunk group.

ISUP (Poland) Measurements

Table 6-26 lists the ISUP (Poland) measurements.

Table 6-26 ISUP (Poland) Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
SGA_CRG_RX	The number of Charging Information messages received on the reporting trunk group.
SGA_CRG_TX	The number of Charging Information messages transmitted on the reporting trunk group.

ISUP (ITU-China) Measurements

Table 6-27 lists the ISUP (ITU-China) measurements.

Table 6-27 ISUP (ITU-China) Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
SGA_MSG_TX	The total number of messages sent on the reporting trunk group
SGA_MSG_RX	The total number of messages received on the reporting trunk group
SGA_ACM_TX	The total number of ACM messages sent on the reporting trunk group
SGA_ACM_RX	The total number of ACM messages received on the reporting trunk group
SGA_ANM_TX	The total number of ANM messages sent on the reporting trunk group
SGA_ANM_RX	The total number of ANM messages received on the reporting trunk group
SGA_BLO_TX	The total number of BLO messages sent on the reporting trunk group
SGA_BLO_RX	The total number of BLO messages received on the reporting trunk group
SGA_BLA_TX	The total number of BLA messages sent on the reporting trunk group
SGA_BLA_RX	The total number of BLA messages received on the reporting trunk group
SGA_CCL_TX	The total number of CCL messages sent on the reporting trunk group
SGA_CCL_RX	The total number of CCL messages received on the reporting trunk group
SGA_CCR_TX	The total number of CCR messages sent on the reporting trunk group
SGA_CCR_RX	The total number of CCR messages received on the reporting trunk group
SGA_CPG_TX	The total number of CPG messages sent on the reporting trunk group
SGA_CPG_RX	The total number of CPG messages received on the reporting trunk group
SGA_CGB_TX	The total number of CGB messages sent on the reporting trunk group
SGA_CGB_RX	The total number of CGB messages received on the reporting trunk group
SGA_CGU_TX	The total number of CGU messages sent on the reporting trunk group
SGA_CGU_RX	The total number of CGU messages received on the reporting trunk group
SGA_CGBA_TX	The total number of CGBA messages sent on the reporting trunk group
SGA_CGBA_RX	The total number of CGBA messages received on the reporting trunk group
SGA_CGUA_TX	The total number of CGUA messages sent on the reporting trunk group
SGA_CGUA_RX	The total number of CGUA messages received on the reporting trunk group
SGA_CON_TX	The total number of CON messages sent on the reporting trunk group
SGA_CON_RX	The total number of CON messages received on the reporting trunk group
SGA_COT_TX	The total number of COT messages sent on the reporting trunk group
SGA_COT_RX	The total number of COT messages received on the reporting trunk group
SGA_GRS_TX	The total number of GRS messages sent on the reporting trunk group
SGA_GRS_RX	The total number of GRS messages received on the reporting trunk group
SGA_GRA_TX	The total number of GRA messages sent on the reporting trunk group
SGA_GRA_RX	The total number of GRA messages received on the reporting trunk group

Table 6-27 ISUP (ITU-China) Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
SGA_IAM_TX	The total number of IAM messages sent on the reporting trunk group
SGA_IAM_RX	The total number of IAM messages received on the reporting trunk group
SGA_OPR_TX	The total number of OPR messages sent on the reporting trunk group
SGA_OPR_RX	The total number of OPR messages received on the reporting trunk group
SGA_REL_TX	The total number of REL messages sent on the reporting trunk group
SGA_REL_RX	The total number of REL messages received on the reporting trunk group
SGA_RLC_TX	The total number of RLC messages sent on the reporting trunk group
SGA_RLC_RX	The total number of RLC messages received on the reporting trunk group
SGA_RSC_TX	The total number of RSC messages sent on the reporting trunk group
SGA_RSC_RX	The total number of RSC messages received on the reporting trunk group
SGA_RES_TX	The total number of RES messages sent on the reporting trunk group
SGA_RES_RX	The total number of RES messages received on the reporting trunk group
SGA_SAM_TX	The total number of SAM messages sent on the reporting trunk group
SGA_SAM_RX	The total number of SAM messages received on the reporting trunk group
SGA_SGM_TX	The total number of SGM messages sent on the reporting trunk group
SGA_SGM_RX	The total number of SGM messages received on the reporting trunk group
SGA_SUS_TX	The total number of SUS messages sent on the reporting trunk group
SGA_SUS_RX	The total number of SUS messages received on the reporting trunk group
SGA_UBL_TX	The total number of UBL messages sent on the reporting trunk group
SGA_UBL_RX	The total number of UBL messages received on the reporting trunk group
SGA_UBA_TX	The total number of UBA messages sent on the reporting trunk group
SGA_UBA_RX	The total number of UBA messages received on the reporting trunk group
SGA_ABNORMAL_REL_TX	The total number of RELs sent with a cause other than NORMAL on the reporting trunk group
SGA_ABNORMAL_REL_RX	The total number of RELs received with a cause other than NORMAL on the reporting trunk group
SGA_UNEXPECT_MSG_RX	The total number of unexpected messages received on the reporting trunk group
SGA_UNRECOG_MSG_RX	The total number of unrecognized messages received on the reporting trunk group

ISUP (ITU-Mexico) Measurements

Table 6-28 lists the ISUP (ITU-Mexico) measurements.

Table 6-28 ISUP (ITU-Mexico) Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
SGA_MSG_TX	The total number of messages sent on the reporting trunk group
SGA_MSG_RX	The total number of messages received on the reporting trunk group
SGA_ACM_TX	The total number of ACM messages sent on the reporting trunk group
SGA_ACM_RX	The total number of ACM messages received on the reporting trunk group
SGA_ANM_TX	The total number of ANM messages sent on the reporting trunk group
SGA_ANM_RX	The total number of ANM messages received on the reporting trunk group
SGA_BLO_TX	The total number of BLO messages sent on the reporting trunk group
SGA_BLO_RX	The total number of BLO messages received on the reporting trunk group
SGA_BLA_TX	The total number of BLA messages sent on the reporting trunk group
SGA_BLA_RX	The total number of BLA messages received on the reporting trunk group
SGA_CCL_TX	The total number of CCL messages sent on the reporting trunk group
SGA_CCL_RX	The total number of CCL messages sent on the reporting trunk group
SGA_CCR_TX	The total number of CCR messages sent on the reporting trunk group
SGA_CCR_RX	The total number of CCR messages received on the reporting trunk group
SGA_CFN_TX	The total number of CFN messages sent on the reporting trunk group
SGA_CFN_RX	The total number of CFN messages received on the reporting trunk group
SGA_CPG_TX	The total number of CPG messages sent on the reporting trunk group
SGA_CPG_RX	The total number of CPG messages received on the reporting trunk group
SGA_CGB_TX	The total number of CGB messages sent on the reporting trunk group
SGA_CGB_RX	The total number of CGB messages received on the reporting trunk group
SGA_CGU_TX	The total number of CGU messages sent on the reporting trunk group
SGA_CGU_RX	The total number of CGU messages received on the reporting trunk group
SGA_CGBA_TX	The total number of CGBA messages sent on the reporting trunk group
SGA_CGBA_RX	The total number of CGBA messages received on the reporting trunk group
SGA_CGUA_TX	The total number of CGUA messages sent on the reporting trunk group
SGA_CGUA_RX	The total number of CGUA messages received on the reporting trunk group
SGA_CON_TX	The total number of CON messages sent on the reporting trunk group
SGA_CON_RX	The total number of CON messages received on the reporting trunk group
SGA_COT_TX	The total number of COT messages sent on the reporting trunk group
SGA_COT_RX	The total number of COT messages received on the reporting trunk group
SGA_CQM_TX	The total number of CQM messages sent on the reporting trunk group
SGA_CQM_RX	The total number of CQM messages received on the reporting trunk group
SGA_CQR_TX	The total number of CQR messages sent on the reporting trunk group
SGA_CQR_RX	The total number of CQR messages received on the reporting trunk group

Table 6-28 ISUP (ITU-Mexico) Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
SGA_GRS_TX	The total number of GRS messages sent on the reporting trunk group
SGA_GRS_RX	The total number of GRS messages received on the reporting trunk group
SGA_GRA_TX	The total number of GRA messages sent on the reporting trunk group
SGA_GRA_RX	The total number of GRA messages received on the reporting trunk group
SGA_IAM_TX	The total number of IAM messages sent on the reporting trunk group
SGA_IAM_RX	The total number of IAM messages received on the reporting trunk group
SGA_INF_TX	The total number of INF messages sent on the reporting trunk group
SGA_INF_RX	The total number of INF messages received on the reporting trunk group
SGA_INR_TX	The total number of INR messages sent on the reporting trunk group
SGA_INR_RX	The total number of INR messages received on the reporting trunk group
SGA_REL_TX	The total number of REL messages sent on the reporting trunk group
SGA_REL_RX	The total number of REL messages received on the reporting trunk group
SGA_RLC_TX	The total number of RLC messages sent on the reporting trunk group
SGA_RLC_RX	The total number of RLC messages received on the reporting trunk group
SGA_RSC_TX	The total number of RSC messages sent on the reporting trunk group
SGA_RSC_RX	The total number of RSC messages received on the reporting trunk group
SGA_RES_TX	The total number of RES messages sent on the reporting trunk group
SGA_RES_RX	The total number of RES messages received on the reporting trunk group
SGA_SAM_TX	The total number of SAM messages sent on the reporting trunk group
SGA_SAM_RX	The total number of SAM messages received on the reporting trunk group
SGA_SUS_TX	The total number of SUS messages sent on the reporting trunk group
SGA_SUS_RX	The total number of SUS messages received on the reporting trunk group
SGA_UBL_TX	The total number of UBL messages sent on the reporting trunk group
SGA_UBL_RX	The total number of UBL messages received on the reporting trunk group
SGA_UBA_TX	The total number of UBA messages sent on the reporting trunk group
SGA_UBA_RX	The total number of UBA messages received on the reporting trunk group
SGA_UCIC_TX	The total number of UCIC messages sent on the reporting trunk group
SGA_UCIC_RX	The total number of UCIC messages received on the reporting trunk group
SGA_ABNORMAL_REL_TX	The total number of RELs sent with a cause other than NORMAL on the reporting trunk group
SGA_ABNORMAL_REL_RX	The total number of RELs received with a cause other than NORMAL on the reporting trunk group
SGA_UNEXPECT_MSG_RX	The total number of unexpected messages received on the reporting trunk group
SGA_UNRECOG_MSG_RX	The total number of unrecognized messages received on the reporting trunk group

ISUP (ITU-HongKong) Counters

Table 6-29 lists the ISUP (ITU-HongKong) measurements provided in Release 4.2.

Table 6-29 ISUP (ITU-HongKong) Counters

Measurement	Description (* = rapid count could mean a potential problem in the system)
SGA_MSG_TX	The total number of messages sent on the reporting trunk group
SGA_MSG_RX	The total number of messages received on the reporting trunk group
SGA_ACM_TX	The total number of ACM messages sent on the reporting trunk group
SGA_ACM_RX	The total number of ACM messages received on the reporting trunk group
SGA_ANM_TX	The total number of ANM messages sent on the reporting trunk group
SGA_ANM_RX	The total number of ANM messages received on the reporting trunk group
SGA_BLO_TX	The total number of BLO messages sent on the reporting trunk group
SGA_BLO_RX	The total number of BLO messages received on the reporting trunk group
SGA_BLA_TX	The total number of BLA messages sent on the reporting trunk group
SGA_BLA_RX	The total number of BLA messages received on the reporting trunk group
SGA_CFN_TX	The total number of CFN messages sent on the reporting trunk group
SGA_CFN_RX	The total number of CFN messages received on the reporting trunk group
SGA_CPG_TX	The total number of CPG messages sent on the reporting trunk group
SGA_CPG_RX	The total number of CPG messages received on the reporting trunk group
SGA_CGB_TX	The total number of CGB messages sent on the reporting trunk group
SGA_CGB_RX	The total number of CGB messages received on the reporting trunk group
SGA_CGU_TX	The total number of CGU messages sent on the reporting trunk group
SGA_CGU_RX	The total number of CGU messages received on the reporting trunk group
SGA_CGBA_TX	The total number of CGBA messages sent on the reporting trunk group
SGA_CGBA_RX	The total number of CGBA messages received on the reporting trunk group
SGA_CGUA_TX	The total number of CGUA messages sent on the reporting trunk group
SGA_CGUA_RX	The total number of CGUA messages received on the reporting trunk group
SGA_CON_TX	The total number of CON messages sent on the reporting trunk group
SGA_CON_RX	The total number of CON messages received on the reporting trunk group
SGA_COT_TX	The total number of COT messages sent on the reporting trunk group
SGA_COT_RX	The total number of COT messages received on the reporting trunk group
SGA_FAC_TX	The total number of FAC messages sent on the reporting trunk group
SGA_FAC_RX	The total number of FAC messages received on the reporting trunk group
SGA_GRS_TX	The total number of GRS messages sent on the reporting trunk group
SGA_GRS_RX	The total number of GRS messages received on the reporting trunk group
SGA_GRA_TX	The total number of GRA messages sent on the reporting trunk group
SGA_GRA_RX	The total number of GRA messages received on the reporting trunk group

Table 6-29 ISUP (ITU-HongKong) Counters

Measurement	Description (* = rapid count could mean a potential problem in the system)
SGA_IAM_TX	The total number of IAM messages sent on the reporting trunk group
SGA_IAM_RX	The total number of IAM messages received on the reporting trunk group
SGA_INF_TX	The total number of INF messages sent on the reporting trunk group
SGA_INF_RX	The total number of INF messages received on the reporting trunk group
SGA_INR_TX	The total number of INR messages sent on the reporting trunk group
SGA_INR_RX	The total number of INR messages received on the reporting trunk group
SGA_PAM_TX	The total number of PAM messages sent on the reporting trunk group
SGA_PAM_RX	The total number of PAM messages received on the reporting trunk group
SGA_NRM_TX	The total number of NRM messages sent on the reporting trunk group
SGA_NRM_RX	The total number of NRM messages received on the reporting trunk group
SGA_REL_TX	The total number of REL messages sent on the reporting trunk group
SGA_REL_RX	The total number of REL messages received on the reporting trunk group
SGA_RLC_TX	The total number of RLC messages sent on the reporting trunk group
SGA_RLC_RX	The total number of RLC messages received on the reporting trunk group
SGA_RSC_TX	The total number of RSC messages sent on the reporting trunk group
SGA_RSC_RX	The total number of RSC messages received on the reporting trunk group
SGA_RES_TX	The total number of RES messages sent on the reporting trunk group
SGA_RES_RX	The total number of RES messages received on the reporting trunk group
SGA_SAM_TX	The total number of SAM messages sent on the reporting trunk group
SGA_SAM_RX	The total number of SAM messages received on the reporting trunk group
SGA_SGM_TX	The total number of SGM messages sent on the reporting trunk group
SGA_SGM_RX	The total number of SGM messages received on the reporting trunk group
SGA_SUS_TX	The total number of SUS messages sent on the reporting trunk group
SGA_SUS_RX	The total number of SUS messages received on the reporting trunk group
SGA_UBA_TX	The total number of UBA messages sent on the reporting trunk group
SGA_UBA_RX	The total number of UBA messages received on the reporting trunk group
SGA_ABNORMAL_REL_TX	The total number of RELs sent with a cause other than NORMAL on the reporting trunk group
SGA_ABNORMAL_REL_RX	The total number of RELs received with a cause other than NORMAL on the reporting trunk group
SGA_UNEXPECT_MSG_RX	The total number of unexpected messages received on the reporting trunk group
SGA_UNRECOG_MSG_RX	The total number of unrecognized messages received on the reporting trunk group

Audit Measurements

Table 6-30 lists the audit measurements.

Table 6-30 Audit Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
AUDIT_SS7_TRUNK_STATE_SYNCED	The total number of SS7 trunks that had their local and remote states synchronized on the reporting trunk group.
AUDIT_SS7_LONG_DUR_EXCEEDED	The total number of SS7 calls that exceeded the long duration threshold on the reporting trunk group.
AUDIT_FS_TOTAL_SIP_RESP_TMO	The total number of CCB audits initiated due to a SIP Request that has timed out that is detected by the reporting feature server.
AUDIT_FS_TOTAL_SIP_NOACK_TMO	The total number of CCB audits initiated due to a SIP Invite that was not acknowledged that is detected by the reporting feature server.
AUDIT_FS_TOTAL_CA_SWITCHOVER	The total number of audits to check all active CCBs in response to a call agent platform switchover occurring. This is only applicable when the standby call agent becomes active.

SIP Interface Adapter Measurements

Table 6-31 lists the SIP interface adapter measurements.

Table 6-31 SIP Interface Adapter Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
SIA_OUTG_INIT	The number of outgoing SIP call initializations on the reporting call agent.
SIA_OUTG_SUCC	The number of successful outgoing SIP calls on the reporting call agent.
SIA_OUTG_FAIL	The number of failed outgoing SIP calls on the reporting call agent.
SIA_INCOM_INIT	The number of incoming SIP call initializations on the reporting call agent.
SIA_INCOM_SUCC	The number of successful incoming SIP calls on the reporting call agent.
SIA_INCOM_FAIL	The number of failed incoming SIP calls on the reporting call agent.
SIA_TOTAL_SUCC	The total number of successfully completed SIP calls on the reporting call agent (DEPRECATED - always will contain a value of ZERO).
SIA_TOTAL_FAIL	The total number of unsuccessfully completed SIP calls on the reporting call agent (DEPRECATED - always will contain a value of ZERO).
SIA_TOTAL_OUTG_MSG_FAIL	The number of outgoing SIP message attempts that were not successfully transmitted by the reporting call agent (DEPRECATED - always will contain a value of ZERO).

Table 6-31 SIP Interface Adapter Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
SIA_TOTAL_INCOM_MSG_FAIL	The number of incoming SIP message attempts that were not successfully received by the reporting call agent (DEPRECATED - always will contain a value of ZERO).
SIA_REFRESHES_TX	The number of SIP message refreshes that occurred on the reporting call agent.
SIA_TOTAL_SESS_TIMER_FAIL	The number of call failures due to session timer expiry that occurred on the reporting call agent.
SIA_CALL_FAIL_BY_EXPIRED_REG	The number of call failures due to a registration expiration on the reporting call agent.
SIA_MWI_NOTIFY_TX	The number of SIP Notify MWIs sent to SIP phones by the reporting call agent.
SIA_MWI_NOTIFY_TX_FAIL	The number of SIP Notify MWIs that failed to be sent to SIP phones by the reporting call agent.
SIA_MWI_NOTIFY_RX	The number of SIP Notify MWIs received from SIP subscribers by the reporting call agent.
SIA_AUDIT_CCB_FREED	The total number of Call Control Blocks freed due to the SIA audit on the reporting call agent.
SIA_AUDIT_CALL_RELEASED	The total number of SIP side calls released due to the SIA memory audit when the BCM side of the call is already released on the reporting call agent.
SIA_AUDIT_BCM_CALL_RELEASED	The total number of calls released when the SIP side is inactive on the reporting call agent.
SIA_AUDIT_REGCONTACT_FREED	The total number of SIP Registration Contacts freed as a result of the SIA Memory Audit on the reporting call agent.
SIA_SECURE_FQDN_VIOLATION_REQ	The total number of times that a SIP request fails the validation for a secure SIP endpoint on the reporting call agent.
SIA_SECURE_FQDN_VIOLATION_RESP	The total number of times that a SIP response fails the validation for a secure SIP endpoint on the reporting call agent.

Call Detail Block Measurements

Table 6-32 lists the call detail block measurements.

Table 6-32 Call Detail Block Measurements

Measurement	Description (* = rapid count could mean a potential problem in the system)
BILLING_TOTAL_NULL	The number call detail block of type “null” (non-routed calls) created by the reporting element management system.
BILLING_TOTAL_TEST	The number call detail block of type test call created by the reporting element management system - this includes all subtypes of test calls performed by the call agent.
BILLING_TOTAL_INTL	The number call detail block of type international created by the reporting element management system

Table 6-32 Call Detail Block Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
BILLING_TOTAL_LOCAL	The number call detail block of type local created by the reporting element management system
BILLING_TOTAL_TOLL	The number call detail block of type toll created by the reporting element management system
BILLING_TOTAL_INTERLATA	The number call detail block of type interlata created by the reporting element management system
BILLING_TOTAL_TANDEM	The number call detail block of type tandem created by the reporting element management system
BILLING_TOTAL_EMG	The number call detail block of type emergency created by the reporting element management system
BILLING_TOTAL_NON_EMG	The number call detail block of type non-emergency created by the reporting element management system
BILLING_TOTAL_DA	The number call detail block of type directory assistance created by the reporting element management system
BILLING_TOTAL_DA_TOLL	The number call detail block of type directory assistance toll created by the reporting element management system
BILLING_TOTAL_REPAIR	The number call detail block of type repair created by the reporting element management system
BILLING_TOTAL_RELAY	The number call detail block of type relay created by the reporting element management system
BILLING_TOTAL_BUSINESS	The number call detail block of type business created by the reporting element management system
BILLING_TOTAL_TOLL_FREE	The number call detail block of type toll free created by the reporting element management system
BILLING_TOTAL_900	The number call detail block of type 900 created by the reporting element management system
BILLING_TOTAL_500	The number call detail block of type 500 created by the reporting element management system
BILLING_TOTAL_700	The number call detail block of type 700 created by the reporting element management system
BILLING_TOTAL_976	The number call detail block of type 976 created by the reporting element management system
BILLING_TOTAL_VACANT	The number call detail block of type vacant created by the reporting element management system
BILLING_TOTAL_PCS	The number call detail block of type pcs created by the reporting element management system
BILLING_TOTAL_INVALID	The number call detail block of type invalid created by the reporting element management system
BILLING_TOTAL_NONE	The number call detail block of type none created by the reporting element management system

Table 6-32 Call Detail Block Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
BILLING_TOTAL_LRN	The number call detail block of type LRN created by the reporting element management system
BILLING_TOTAL_EXTENSION	The number call detail block of type extension created by the reporting element management system
BILLING_TOTAL_CUT_THRU	The number call detail block of type cut thru created by the reporting element management system
BILLING_TOTAL_OP	The number call detail block of type cut operator created by the reporting element management system
BILLING_TOTAL_CARRIER_OP	The number call detail block of type carrier operator created by the reporting element management system
BILLING_TOTAL_OP_ASSIST	The number call detail block of type operator assisted created by the reporting element management system
BILLING_TOTAL_BLV	The number call detail block of type busy line verification created by the reporting element management system
BILLING_TOTAL_SPEED_DIAL	The number call detail block of type speed dial created by the reporting element management system
BILLING_TOTAL_NATIONAL	The number call detail block of type national (NANP) created by the reporting element management system
BILLING_TOTAL_TW	The number call detail block of type time and weather created by the reporting element management system
BILLING_TOTAL_INFO	The number call detail block of type information (i.e. 976 calls) created by the reporting element management system
BILLING_TOTAL_PREMIUM	The number call detail block of type premium (i.e. 900 calls) created by the reporting element management system
BILLING_TOTAL_ATTENDANT	The number call detail block of type attendant created by the reporting element management system
BILLING_TOTAL_NAS	The number call detail block of type NAS created by the reporting element management system
BILLING_TOTAL_POLICE	The number call detail block of type police created by the reporting element management system
BILLING_TOTAL_FIRE	The number call detail block of type fire created by the reporting element management system
BILLING_TOTAL_AMBULANCE	The number call detail block of type ambulance created by the reporting element management system
BILLING_TOTAL_TIME	The number call detail block of type time created by the reporting element management system.
BILLING_TOTAL_WEATHER	The number call detail block of type weather created by the reporting element management system.
BILLING_TOTAL_TRAFFIC	The number call detail block of type traffic created by the reporting element management system.

Table 6-32 Call Detail Block Measurements (continued)

Measurement	Description (* = rapid count could mean a potential problem in the system)
BILLING_TOTAL_LB_TEST	The number call detail blocks of type Loopback Test created by the reporting element management system.
BILLING_TOTAL_INTL_OPR	The number call detail blocks of type International Operator created by the reporting element management system.
BILLING_TOTAL_NAT_OPR	The number call detail blocks of type National Operator created by the reporting element management system.
BILLING_TOTAL_AIRLINES	The number call detail blocks of type Airlines created by the reporting element management system.
BILLING_TOTAL_RAILWAYS	The number call detail blocks of type Railways created by the reporting element management system.
BILLING_TOTAL_SVC_CODE	The number call detail blocks of type Service Code created by the reporting element management system.
BILLING_TOTAL_INTL_WZ1	The number call detail blocks of type International World Zone 1 created by the reporting element management system.
BILLING_TOTAL_CNA	The number call detail blocks of type Calling Number Announcement created by the reporting element management system.
BILLING_TOTAL_DA_INTER	The number call detail blocks of type Directory Assistance Interlata created by the reporting element management system.
BILLING_TOTAL_DA_INTL	The number call detail blocks of type Directory Assistance International created by the reporting element management system.
BILLING_TOTAL_UAN	The number call detail blocks of type Universal Access Number created by the reporting element management system.
BILLING_TOTAL_MOBILE	The number call detail blocks of type Mobile created by the reporting element management system.
CALLP_NLB_TEST_SUCC	The number of call detail block of test calls of the “network loopback” type created by the reporting element management system.
CALLP_NLB_TEST_FAIL	The number of call detail block of test calls of the “network loopback” type that are abnormally released by the BTS 10200 Softswitch (due to reasons such as resource priority should be given to regular calls).
CALLP_NCT_TEST_SUCC	The number of call detail block of type test calls of type “network continuity” created by the reporting element management system.
CALLP_NCT_TEST_FAIL	The number of call detail block of test calls of the “network continuity” type that are abnormally released by the BTS 10200 Softswitch (due to reasons such as resource priority should be given to regular calls).
CALLP-LB-TEST-SUCC	The number of call detail block of test calls of the “TDM loop back 108 test” type created by the reporting element management system.
CALLP-TEST-ROUTE-SUCC	The number of call detail block of test calls of the “TDM loop back 108 test” type and the DN dialed out in an outgoing message.
BILLING_TOTAL_TEST	This existing counter is incremented for calls of the network loopback test type (based on the CALL-TYPE field in the destination table).

Event Messaging Measurements

Table 6-33 lists the event messaging measurements.

Table 6-33 Event Messaging Measurements

Measurement	Description (*=rapid count could mean a potential problem in the system)
BILLING_EM_ACKED	The number of event messages acknowledged by the Record Keeping System.
BILLING_EM_LOGGED	The number of event messages written to disk but not sent to any RKS.
BILLING_EM_RETRANS	The number of event messages that were transmitted to an alternate RKS due to a lack of response from a previously tried RKS, excluding retries. The counter is incremented when an event message is first sent to an alternate RKS. Any retries that occur at the RADIUS stack level (as provisioned in the “radius-profile” table) will not be included in this count.

Dynamic QoS Measurements

Table 6-34 lists the dynamic quality of service (QoS) measurements.

Table 6-34 Dynamic QoS Measurements

Measurement	Description (*=rapid count could mean a potential problem in the system)
DQOS_GATESET_ATTMP	The number of DQOS gate set attempts of all types on the reporting aggregator.
DQOS_GATESET_SUCC	The number of successful DQOS gate set attempts of all types on the reporting aggregator.
DQOS_GATE_COMMIT	The number of successfully committed DQOS gates of all types on the reporting aggregator.

SNMP Protocol Measurements

Table 6-35 lists the SNMP protocol measurements.

Table 6-35 SNMP Protocol Measurements

Measurement	Description (*=rapid count could mean a potential problem in the system)
SNMP_TRAP_TX	The total number of SNMP TRAPs generated by the reporting element management system
SNMP_SET_RX	The total number of SNMP SETs received by the reporting element management system
SNMP_SET_TX	The total number of SNMP SETs transmitted by the reporting element management system
SNMP_GET_RX	The total number of SNMP GETs received by the reporting element management system
SNMP_GET_TX	The total number of SNMP GETs transmitted by the reporting element management system

Table 6-35 SNMP Protocol Measurements (continued)

Measurement	Description (*=rapid count could mean a potential problem in the system)
SNMP_GET_NEXT_RX	The total number of SNMP GET NEXTs received by the reporting element management system
SNMP_GET_NEXT_TX	The total number of SNMP GET NEXTs transmitted by the reporting element management system

Trunk Group Usage Measurements

Table 6-36 lists the trunk group usage measurements.

Table 6-36 Trunk Group Usage Measurements

Measurement	Description (*=rapid count could mean a potential problem in the system)
TRKGRP_TYPE	The signaling type of the reporting trunk group.
TRKGRP_EXCHANGE	The CLLI code from the POP table of the reporting trunk group.
TRKGRP_NAME	The remote switch CLLI code and trunk group type of the reporting trunk group.
TGN_ID	The identification number of the reporting trunk group.
TRKGRP_INCOM_ATTMP	The number of times the system recognizes an incoming seizure for any trunk within the reporting trunk group: • In the case of a SIP trunk, this is incremented for every Invite received on a trunk. • In the case of an H.323 trunk, this is incremented for each Incoming Setup received on a trunk when not associated with a H.323 subscriber.
TRKGRP_OUTG_ATTMP	The number of times the system tries to access any trunk for an outbound call within the reporting trunk group: • In the case of a SIP trunk, this is incremented for each received SetupReq request for a SIP trunk. • In the case of an H.323 trunk, this is incremented for each Outgoing Setup sent on a trunk when not associated with a H.323 subscriber.
TRKGRP_OUTBOUND_FAIL	The number of times the system tries to access any trunk for an outbound call unsuccessfully within the reporting trunk group: • In the case of a SIP trunk, this is incremented for each outgoing initial Invite request failure over a SIP trunk. For each failure response received over a trunk for any other failure causing failure of the outbound call setup. If an Invite is cancelled, the counter for failure is not incremented as this includes just an outbound call. • In the case of an H.323 trunk, this is incremented for each Outgoing Setup sent on a trunk that failed when not associated with a H.323 subscriber.
TRKGRP_TOTAL_OVERFLOW	The number of outbound trunk call attempt failures due to all trunks within the reporting trunk group being in a busy state. This counter is not incremented for SIP or H.323 trunk groups.
TRKGRP_TOTAL_TRK	The number of trunks within the reporting trunk group

Table 6-36 Trunk Group Usage Measurements (continued)

Measurement	Description (*=rapid count could mean a potential problem in the system)
TRKGRP_INCOM_BUSY_TRK	Summation (CCS based) of the number of trunk circuits within the reporting trunk group marked as busy with terminating calls taken every 100 seconds during the interval. This counter is not incremented for SIP or H323 trunk groups.
TRKGRP_OUTG_BUSY_TRK	Summation (CCS based) of the number of trunk circuits within the reporting trunk group marked as busy with originating calls taken every 100 seconds during the interval. This counter is not incremented for SIP or H323 trunk groups.
TRKGRP_TOTAL_OOS_TRK	This measurement is a summation of the following measurements for this reporting trunk group: • TRKGRP_MAINT_TRK_USAGE • TRKGRP_OOS_TRK_USAGE • TRKGRP_UEQP_TRK_USAGE • TRKGRP_LBLK_TRK_USAGE • TRKGRP_RBLK_TRK_USAGE This measurement is not incremented for SIP or H323 trunk groups.
TRKGRP_INCOM_USAGE	Summation (CCS based) of the number of trunk circuits within the reporting trunk group marked as busy or in the maintenance state with terminating calls taken every 100 seconds during the interval. This measurement is mapped to the same value as the TRKGRP_INCOM_BUSY_TRK in this release. This measurement will be re-implemented to account for the MAINT state in a later release.
TRKGRP_OUTG_USAGE	Summation (CCS based) of the number of trunk circuits within the reporting trunk group marked as busy or in the maintenance state with originating calls taken every 100 seconds during the interval. This measurement is mapped to the same value as the TRKGRP_OUTG_BUSY_TRK in this release. This measurement will be re-implemented to account for the MAINT state in a later release.
TRKGRP_TOTAL_USAGE	Summation (CCS based) of the incoming usage and the outgoing usage measurements for the reporting trunk group. This measurement is not incremented for SIP or H323 trunk groups.
TRKGRP_AVERAGE_USAGE	The total usage measurement divided by the number of trunks in the reporting trunk group. This measurement is not incremented for SIP or H.323 trunk groups.
TRKGRP_OOS_TRK_USAGE	The CCS value for trunks that are OOS, UEQP in the reporting trunk group for this reporting period. This counter is not incremented for SIP or H323 trunk groups.
TRKGRP_GLARE_COUNT	The total number of attempts by the local and remote switch to use the same CIC on a 2-way trunk group. When glare is encountered and pegged here, the TRKGRP_OUTGOING_ATTMP counter is NOT pegged. This counter is not incremented for SIP or H323 trunk groups.
TRKGRP_TOTAL_INS_TRK	The CCS value for trunks with a status of INS in the reporting trunk group. This counter is not incremented for SIP or H323 trunk groups.
TRKGRP_MAINT_TRK_USAGE	The CCS value for trunks that are MAINT in the reporting trunk group for this reporting period. This counter is not incremented for SIP or H323 trunk groups.

Table 6-36 Trunk Group Usage Measurements (continued)

Measurement	Description (*=rapid count could mean a potential problem in the system)
TRKGRP_UEQP_TRK_USAGE	The CCS value for trunks that are UEQP, in the reporting trunk group for this reporting period. This counter is not incremented for SIP or H323 trunk groups.
TRKGRP_LBLK_TRK_USAGE	The CCS value for trunks that are Local Blocked in the reporting trunk group for this reporting period. This counter is not incremented for SIP or H323 trunk groups.
TRKGRP_RBLK_TRK_USAGE	The CCS value for trunks that are Remote Blocked in the reporting trunk group for this reporting period. This counter is not incremented for SIP or H323 trunk groups.

Announcement Measurements

Table 6-37 lists the announcement measurements.

Table 6-37 Announcement Measurements

Measurement	Description (*=rapid count could mean a potential problem in the system)
ANM_CKT_UNAVAIL	The number of calls resulting in the playing of the circuit unavailable announcement by the reporting call agent
ANM_CALL_REJECTED	The number of calls resulting in the playing of the call rejected announcement by the reporting call agent
ANM_ADDR_INCOMPLETE	The number of calls resulting in the playing of the address incomplete announcement by the reporting call agent
ANM_FAC_REJECTED	The number of calls resulting in the playing of the facility rejected announcement by the reporting call agent
ANM_PRE_0_1_ABSENT	The number of calls resulting in the playing of the prefix of 0 or 1 absent announcement by the reporting call agent
ANM_PRE_0_1_PRESENT	The number of calls resulting in the playing of the prefix 0 or 1 present announcement by the reporting call agent
ANM_HNPA_ABSENT	The number of calls resulting in the playing of the HNPA area code announcement by the reporting call agent
ANM_NO_ROUTE_DEST	The number of calls resulting in the playing of the no route to destination announcement by the reporting call agent
ANM_UNALLOCATED_NUM	The number of calls resulting in the playing of the unallocated directory number announcement by the reporting call agent
ANM_NUM_CHANGED	The number of calls resulting in the playing of the directory number changed announcement by the reporting call agent
ANM_DEST_OUTOFORDER	The number of calls resulting in the playing of the destination out of order announcement by the reporting call agent
ANM_TEMP_DISCONNECT	The number of calls resulting in the playing of the temporarily disconnected announcement by the reporting call agent
ANM_FEAT_NOT_SUBS	The number of calls resulting in the playing of the feature not subscribed to announcement by the reporting call agent

Table 6-37 Announcement Measurements (continued)

Measurement	Description (*=rapid count could mean a potential problem in the system)
ANM_AUTHCODE_INVALID	The number of calls resulting in the playing of the authorization code invalid announcement by the reporting call agent
ANM_NO_RTE_TRANSITNW	The number of calls resulting in the playing of the no route to specified network announcement by the reporting call agent
ANM_CAUSE_UNKNOWN	The number of calls resulting in the playing of the cause unknown announcement by the reporting call agent
ANM_EMG_CKT_UNAVAIL	The number of calls resulting in the playing of the “No Emergency Circuit Available” announcement by the reporting call agent.

H.323 Protocol Measurements

Table 6-38 lists the H.323 protocol measurements.

Table 6-38 H.323 Protocol Measurements

Measurement	Description (*=rapid count could mean a potential problem in the system)
H323_SETUP_RX	The total number of H323 SETUPs received by the reporting call agent
H323_SETUP_TX	The total number of H323 SETUPs transmitted by the reporting call agent
H323_SETUP_FAIL	The total number of H323 SETUPs that failed. The failure is due to one of the following scenarios: unable to send due to full socket queue, unable to compose message due to invalid socket, or lack of available memory.
H323_CONNECT_RX	The total number of H323 CONNECTs received by the reporting call agent
H323_CONNECT_TX	The total number of H323 CONNECTs transmitted by the reporting call agent
H323_CONNECT_FAIL	The total number of H323 CONNECT CONFIRMs that failed. The failure is due to one of the following scenarios: unable to send due to full socket queue, unable to compose message due to invalid socket, or lack of available memory.
H323_ALERT_RX	The total number of H323 ALERTs received by the reporting call agent
H323_ALERT_TX	The total number of H323 ALERTs transmitted by the reporting call agent
H323_ALERT_FAIL	The total number of H323 ALERTs that failed. The failure is due to one of the following scenarios: unable to send due to full socket queue, unable to compose message due to invalid socket, or lack of available memory.
H323_IN_PROGRESS_RX	The total number of H323 IN PROGRESSs received by the reporting call agent
H323_IN_PROGRESS_TX	The total number of H323 IN PROGRESSs transmitted by the reporting call agent
H323_IN_PROGRESS_FAIL	The total number of H323 IN PROGRESSs that failed. The failure is due to one of the following scenarios: unable to send due to full socket queue, unable to compose message due to invalid socket, or lack of available memory.
H323_CALL_PROCEEDING_RX	The total number of H323 CALL PROCEEDINGs received by the reporting call agent

Table 6-38 H.323 Protocol Measurements (continued)

Measurement	Description (*=rapid count could mean a potential problem in the system)
H323_CALL_PROCEEDING_TX	The total number of H323 CALL PROCEEDINGs transmitted by the reporting call agent
H323_CALL_PROCEEDING_FAIL	The total number of H323 CALL PROCEEDINGs that failed. The failure is due to one of the following scenarios: unable to send due to full socket queue, unable to compose message due to invalid socket, or lack of available memory.
H323_RELEASE_COMPLETE_RX	The total number of H323 RELEASEs received by the reporting call agent
H323_RELEASE_COMPLETE_TX	The total number of H323 RELEASEs transmitted by the reporting call agent
H323_RELEASE_COMPLETE_FAIL	The total number of H323 RELEASEs that failed. The failure is due to one of the following scenarios: unable to send due to full socket queue, unable to compose message due to invalid socket, or lack of available memory.
H323_REJECT_RX	The total number of H323 REJECTs received by the reporting call agent
H323_REJECT_TX	The total number of H323 REJECTs transmitted by the reporting call agent
H323_REJECT_FAIL	The total number of H323 REJECTs that failed. The failure is due to one of the following scenarios: unable to send due to full socket queue, unable to compose message due to invalid socket, or lack of available memory.
H323_INFORMATION_RX	The total number of H323 INFOs received by the reporting call agent
H323_INFORMATION_TX	The total number of H323 INFOs transmitted by the reporting call agent
H323_INFORMATION_FAIL	The total number of H323 INFOs that failed. The failure is due to one of the following scenarios: unable to send due to full socket queue, unable to compose message due to invalid socket, or lack of available memory.
H323_USER_INFO_RX	The total number of H323 USER INFOs received by the reporting call agent
H323_USER_INFO_TX	The total number of H323 USER INFOs transmitted by the reporting call agent
H323_USER_INFO_FAIL	The total number of H323 USER INFOs that failed. The failure is due to one of the following scenarios: unable to send due to full socket queue, unable to compose message due to invalid socket, or lack of available memory.
H323_FACILITY_RX	The total number of H323 FACILITYs received by the reporting call agent
H323_FACILITY_TX	The total number of H323 FACILITYs transmitted by the reporting call agent
H323_FACILITY_FAIL	The total number of H323 FACILITYs that failed. The failure is due to one of the following scenarios: unable to send due to full socket queue, unable to compose message due to invalid socket, or lack of available memory.
H323_NOTIFY_RX	The total number of H323 NOTIFYs received by the reporting call agent
H323_NOTIFY_TX	The total number of H323 NOTIFYs transmitted by the reporting call agent
H323_NOTIFY_FAIL	The total number of H323 NOTIFYs that failed. The failure is due to one of the following scenarios: unable to send due to full socket queue, unable to compose message due to invalid socket, or lack of available memory.
H323_PASSTHROU_RX	The total number of H323 PASS THROUGHs received by the reporting call agent
H323_PASSTHROU_TX	The total number of H323 PASS THROUGHs transmitted by the reporting call agent

Table 6-38 H.323 Protocol Measurements (continued)

Measurement	Description (*=rapid count could mean a potential problem in the system)
H323_PASSTHROU_FAIL	The total number of H323 PASS THROUGHs that failed. The failure is due to one of the following scenarios: unable to send due to full socket queue, unable to compose message due to invalid socket, or lack of available memory.
H323_GRQ_TX	The total number of H323 GRQs transmitted by the reporting call agent
H323_GRQ_RX	The total number of H323 GRQs received by the reporting call agent
H323_GCF_TX	The total number of H323 GCFs transmitted by the reporting call agent
H323_GCF_RX	The total number of H323 GCFs received by the reporting call agent
H323_GRJ_TX	The total number of H323 GRJs received by the reporting call agent
H323_GRJ_RX	The total number of H323 GRJs transmitted by the reporting call agent
H323_RRQ_TX	The total number of H323 RRQs transmitted by the reporting call agent
H323_RRQ_RX	The total number of H323 RRQs received by the reporting call agent
H323_RCF_TX	The total number of H323 RCFs transmitted by the reporting call agent
H323_RCF_RX	The total number of H323 RCFs received by the reporting call agent
H323_RRJ_TX	The total number of H323 RRJs transmitted by the reporting call agent
H323_RRJ_RX	The total number of H323 RRJs received by the reporting call agent
H323_RIP_TX	The total number of H323 RIPs transmitted by the reporting call agent
H323_RIP_RX	The total number of H323 RIPs received by the reporting call agent
H323_RAI_TX	The total number of H323 RAIs transmitted by the reporting call agent
H323_RAI_RX	The total number of H323 RAIs received by the reporting call agent
H323_RAC_TX	The total number of H323 RACs transmitted by the reporting call agent
H323_RAC_RX	The total number of H323 RACs received by the reporting call agent
H323_ARQ_TX	The total number of H323 ARQs transmitted by the reporting call agent
H323_ARQ_RX	The total number of H323 ARQs received by the reporting call agent
H323_ACF_TX	The total number of H323 ACFs transmitted by the reporting call agent
H323_ACF_RX	The total number of H323 ACFs received by the reporting call agent
H323_ARJ_TX	The total number of H323 ARJs transmitted by the reporting call agent
H323_ARJ_RX	The total number of H323 ARJs received by the reporting call agent
H323_URQ_RX	The total number of H323 URQs received by the reporting call agent
H323_URQ_TX	The total number of H323 URQs transmitted by the reporting call agent
H323_UCF_RX	The total number of H323 UCFs received by the reporting call agent
H323_UCF_TX	The total number of H323 UCFs transmitted by the reporting call agent
H323_URJ_RX	The total number of H323 URJs received by the reporting call agent
H323_URJ_TX	The total number of H323 URJs transmitted by the reporting call agent
H323_BRQ_RX	The total number of H323 BRQs received by the reporting call agent
H323_BRQ_TX	The total number of H323 BRQs transmitted by the reporting call agent
H323_BCF_RX	The total number of H323 BCFs received by the reporting call agent

Table 6-38 H.323 Protocol Measurements (continued)

Measurement	Description (*=rapid count could mean a potential problem in the system)
H323_BCF_TX	The total number of H323 BCFs transmitted by the reporting call agent
H323_BRJ_RX	The total number of H323 BRJs received by the reporting call agent
H323_BRJ_TX	The total number of H323 BRJs transmitted by the reporting call agent
H323_DRQ_RX	The total number of H323 DRQs received by the reporting call agent
H323_DRQ_TX	The total number of H323 DRQs transmitted by the reporting call agent
H323_DCF_RX	The total number of H323 DCFs received by the reporting call agent
H323_DCF_TX	The total number of H323 DCFs transmitted by the reporting call agent
H323_DRJ_RX	The total number of H323 DRJs received by the reporting call agent
H323_DRJ_TX	The total number of H323 DRJs transmitted by the reporting call agent

Call Tools Measurements

Table 6-39 lists the Call Tools measurements.

Table 6-39 Call Tools Measurements

Measurement	Description (*=rapid count could mean a potential problem in the system)
TOOLS_TRUNK_TRANS_ATTMP	The total number of times the TVT process on the reporting call agent received a request to perform a trunk based translation.
TOOLS_TRUNK_TRANS_SUCC	The total number of times the TVT process on the reporting call agent received a request to perform a trunk based translation and completed it successfully.
TOOLS_LINE_TRANS_ATTMP	The total number of times the TVT process on the reporting call agent received a request to perform a line based translation.
TOOLS_LINE_TRANS_SUCC	The total number of times the TVT process on the reporting call agent received a request to perform a line based translation and completed it successfully.

AIN Tools Measurements

Table 6-40 lists the AIN feature server tools measurements.

Table 6-40 AIN Tools Measurements

Measurement	Description (*=rapid count could mean a potential problem in the system)
TOOLS_LNP_QUERY_ATTMP	The total number of times the reporting feature server received a request to perform an LNP query from the QVT tool.
TOOLS_LNP_QUERY_SUCC	The total number of times the reporting feature server received a request to perform an LNP query from the QVT tool and completed it successfully.

Table 6-40 AIN Tools Measurements (continued)

Measurement	Description (*=rapid count could mean a potential problem in the system)
TOOLS_TOLLFREE_QUERY_ATTMP	The total number of times the reporting feature server received a request to perform a Toll Free query from the QVT tool.
TOOLS_TOLLFREE_QUERY_SUCC	The total number of times the reporting feature server received a request to perform a Toll Free query from the QVT tool and completed it successfully.

PCT Tools Measurements

Table 6-41 lists the PCT feature server tools measurements.

Table 6-41 PCT Tools Measurements

Measurement	Description (*=rapid count could mean a potential problem in the system)
TOOLS_LIDB_QUERY_ATTMP	The total number of times the reporting feature server received a request to perform an LIDB query from the QVT tool.
TOOLS_LIDB_QUERY_SUCC	The total number of times the reporting feature server received a request to perform an LIDB query from the QVT tool and completed it successfully.

Measurement Data Report Formats

The BTS 10200 Softswitch provides statistical reports through the command line interface. The construction of the reports are similar— only the titles and respective measurement labels differ to facilitate searching the reports for analysis. The following sections depict a sample report from each of the various measurement types. Each report header contains information specifying the location where the data was reported from, and the condition of the data (either normal or suspect).

ISDN Protocol Summary Report Example

```
CLI>report measurement-isdn-summary

TIMESTAMP                                       2003-02-20 10:30:00
CALL_AGENT_ID                                   CA146
CONDITION                                       Normal
ISDN_SETUP_TX                                   1
ISDN_SETUP_RX                                   1
ISDN_SETUP_ACK_TX                               1
ISDN_SETUP_ACK_RX                               1
ISDN_CALL_PROCEED_TX                            1
ISDN_CALL_PROCEED_RX                            1
ISDN_ALTERTING_TX                               1
ISDN_ALTERTING_RX                               1
ISDN_PROGRESS_TX                                1
ISDN_PROGRESS_RX                                1
ISDN_CONNECT_TX                                 1
ISDN_CONNECT_RX                                 1
ISDN_CONNECT_ACK_TX                             1
```

```
ISDN_CONNECT_ACK_RX                                1
ISDN_DISCONNECT_TX                                 1
ISDN_DISCONNECT_RX                                 1
ISDN_RELEASE_TX                                    1
ISDN_RELEASE_RX                                    1
ISDN_RELEASE_COMPLETE_TX                           1
ISDN_RELEASE_COMPLETE_RX                           1
ISDN_RESTART_TX                                    1
ISDN_RESTART_RX                                    1
ISDN_RESTART_ACK_TX                                1
ISDN_RESTART_ACK_RX                                1
ISDN_INFORMATION_TX                                1
ISDN_INFORMATION_RX                                1
ISDN_NOTIFY_TX                                     1
ISDN_NOTIFY_RX                                     1
ISDN_STATUS_TX                                     1
ISDN_STATUS_RX                                     1
ISDN_STATUS_ENQUIRY_TX                             1
ISDN_STATUS_ENQUIRY_RX                             1
ISDN_NUM_OF_SRVC_TX                                1
ISDN_NUM_OF_SRVC_RX                                1
ISDN_NUM_OF_SRVC_ACK_TX                            1
ISDN_NUM_OF_SRVC_ACK_RX                            1
ISDN_FACILITY_TX                                   1
ISDN_FACILITY_RX                                   1
ISDN_SUSPEND_TX                                    1
ISDN_SUSPEND_RX                                    1
ISDN_SUSPEND_ACK_TX                                1
ISDN_SUSPEND_ACK_RX                                1
ISDN_SUSPEND_REJ_TX                                1
ISDN_SUSPEND_REJ_RX                                1
ISDN_RESUME_TX                                     1
ISDN_RESUME_RX                                     1
ISDN_RESUME_ACK_TX                                 1
ISDN_RESUME_ACK_RX                                 1
ISDN_RESUME_REJ_TX                                 1
ISDN_RESUME_REJ_RX                                 1
ISDN_USER_INFO_TX                                  1
ISDN_USER_INFO_RX                                  1
ISDN_CONGEST_CNTL_TX                               1
ISDN_CONGEST_CNTL_RX                               1
ISDN_SEGMENT_TX                                    1
ISDN_SEGMENT_REJ_RX                                1

Reply : Success: Entry 1 of 1 returned.
```

Call Processing Summary Report Example

```
CLI>report measurement-callp-summary

TIMESTAMP                                          2003-02-20 10:30:00
CALL_AGENT_ID                                      CA146
CONDITION                                          Normal
CALLP_ORIG_ATTMP                                   1
CALLP_TERM_ATTMP                                   1
CALLP_ORIG_FAIL                                    1
CALLP_TERM_FAIL                                    1
CALLP_CALL_SUCC                                    1
CALLP_CALL_ABAND                                   1
CALLP_ISDN_ORIG_ATTMP                              1
CALLP_ISDN_TERM_ATTMP                              1
```

CALLP_ISDN_ORIG_FAIL	1
CALLP_ISDN_TERM_FAIL	1
CALLP_ISDN_CALL_SUCC	1
CALLP_ISDN_CALL_ABAND	1
CALLP_SS7_ORIG_ATTMP	1
CALLP_SS7_TERM_ATTMP	1
CALLP_SS7_ORIG_FAIL	1
CALLP_SS7_TERM_FAIL	1
CALLP_SS7_CALL_SUCC	1
CALLP_SS7_CALL_ABAND	1
CALLP_SIP_ORIG_ATTMP	1
CALLP_SIP_TERM_ATTMP	1
CALLP_SIP_ORIG_FAIL	1
CALLP_SIP_TERM_FAIL	1
CALLP_SIP_CALL_SUCC	1
CALLP_SIP_CALL_ABAND	1
CALLP_MGCP_ORIG_ATTMP	1
CALLP_MGCP_TERM_ATTMP	1
CALLP_MGCP_ORIG_FAIL	1
CALLP_MGCP_TERM_FAIL	1
CALLP_MGCP_CALL_SUCC	1
CALLP_MGCP_CALL_ABAND	1
CALLP_CAS_ORIG_ATTMP	1
CALLP_CAS_TERM_ATTMP	1
CALLP_CAS_ORIG_FAIL	1
CALLP_CAS_TERM_FAIL	1
CALLP_CAS_CALL_SUCC	1
CALLP_CAS_CALL_ABAND	1
CALLP_H323_ORIG_ATTEMPTS	1
CALLP_H323_TERM_ATTEMPTS	1
CALLP_H323_ORIG_FAILURES	1
CALLP_H323_TERM_FAILURES	1
CALLP_H323_CALLS_SUCCESS	1
CALLP_H323_CALLS_ABANDON	1
CALLP_ISDN_SS7_CALL	1
CALLP_ISDN_ISDN_CALL	1
CALLP_ISDN_SIP_CALL	1
CALLP_ISDN_MGCP_CALL	1
CALLP_ISDN_CAS_CALL	1
CALLP_SS7_ISDN_CALL	1
CALLP_SS7_SS7_CALL	1
CALLP_SS7_SIP_CALL	1
CALLP_SS7_MGCP_CALL	1
CALLP_SS7_CAS_CALL	1
CALLP_SIP_SS7_CALL	1
CALLP_SIP_ISDN_CALL	1
CALLP_SIP_SIP_CALL	1
CALLP_SIP_MGCP_CALL	1
CALLP_SIP_CAS_CALL	1
CALLP_MGCP_SIP_CALL	1
CALLP_MGCP_ISDN_CALL	1
CALLP_MGCP_SS7_CALL	1
CALLP_MGCP_MGCP_CALL	1
CALLP_MGCP_CAS_CALL	1
CALLP_CAS_SIP_CALL	1
CALLP_CAS_ISDN_CALL	1
CALLP_CAS_SS7_CALL	1
CALLP_CAS_MGCP_CALL	1
CALLP_CAS_CAS_CALL	1
CALLP_ISDN_H323_CALLS	1
CALLP_SS7_H323_CALLS	1
CALLP_SIP_H323_CALLS	1
CALLP_MGCP_H323_CALLS	1
CALLP_CAS_H323_CALLS	1

CALLP_H323_SIP_CALLS	1
CALLP_H323_ISDN_CALLS	1
CALLP_H323_SS7_CALLS	1
CALLP_H323_MGCP_CALLS	1
CALLP_H323_CAS_CALLS	1
CALLP_H323_H323_CALLS	1
CALLP_INTERLA_ATTMP	1
CALLP_INTERLA_FAIL	1
CALLP_INTERL_SUCC	1
CALLP_INTERLA_ABAND	1
CALLP_INTRALA_ATTMP	1
CALLP_INTRALA_FAIL	1
CALLP_INTRAL_SUCC	1
CALLP_INTRALA_ABAND	1
CALLP_INTL_ATTMP	1
CALLP_INTL_FAIL	1
CALLP_INTL_SUCC	1
CALLP_INTL_ABAND	1
CALLP_EMGNCY_ATTMP	1
CALLP_EMGNCY_FAIL	1
CALLP_EMGNCY_SUCC	1
CALLP_EMGNCY_ABAND	1
CALLP_LOCAL_ATTMP	1
CALLP_LOCAL_FAIL	1
CALLP_LOCAL_SUCC	1
CALLP_LOCAL_ABAND	1
CALLP_TOLL_FREE_ATTMP	1
CALLP_TOLL_FREE_FAIL	1
CALLP_TOLL_FREE_SUCC	1
CALLP_TOLL_FREE_ABAND	1
CALLP_NAS_AUTH_SUCC	1
CALLP_NAS_AUTH_FAIL	1
CALLP_NAS_OP_FAIL	1
CALLP_NAS_ISP_PORT_LIMIT	1
CALLP_NAS_NO_MODEMS	1
CALLP_NAS_CLG_UNACC	1
CALLP_NAS_CLD_UNACC	1
CALLP_NAS_USER_REQUEST	1
CALLP_NAS_LOST_CARRIER	1
CALLP_NAS_LOST_SERVICE	1
CALLP_NAS_IDLE_TIMEOUT	1
CALLP_NAS_SESSION_TIMEOUT	1
CALLP_NAS_ADMIN_RESET	1
CALLP_NAS_ADMIN_REBOOT	1
CALLP_NAS_PORT_ERROR	1
CALLP_NAS_NAS_ERROR	1
CALLP_NAS_NAS_REQUEST	1
CALLP_NAS_NAS_REBOOT	1
CALLP_NAS_PORT_UNNEEDED	1
CALLP_NAS_PORT_PREEMPTED	1
CALLP_NAS_PORT_SUSPENDED	1
CALLP_NAS_SERVICE_UNAVAIL	1
CALLP_NAS_CALLBACK	1
CALLP_NAS_USER_ERROR	1
CALLP_NAS_HOST_REQUEST	1
CALLP_IVR_NETWORK_REQ	1
CALLP_IVR_NATIVE_REQ	1
CALLP_IVR_RESOURCE_FAIL	1
CALLP_TDISC_ORIG_ATTMP	1
CALLP_NLB_TEST_SUCC	1
CALLP_NLB_TEST_FAIL	1
CALLP_NCT_TEST_SUCC	1
CALLP_NCT_TEST_FAIL	1
CALLP_LB_TEST_SUCC	1

```
CALLP_TEST_ROUTE_SUCC                                   1
CALLP_T38_FAX_MEDIA_SETUP_SUCC                          1
CALLP_T38_FAX_MEDIA_SETUP_FAIL                          1

Reply : Success: Entry 1 of 1 returned.
```

MGCP Signaling Adapter Summary Report Example

```
CLI>report measurement-mgcp-summary

TIMESTAMP                                               2003-02-20 10:30:00
CALL_AGENT_ID                                           CA146
CONDITION                                               Normal
MGCP_DECODE_ERROR                                       1
MGCP_ENCODE_ERROR                                       1
MGCP_UNREACHABLE                                        1
MGCP_SEND_FAIL                                          1
MGCP_CRCX_ACK_RX                                        1
MGCP_CRCX_NACK_RX                                       1
MGCP_CRCX_TX                                            1
MGCP_MDCX_ACK_RX                                        1
MGCP_MDCX_NACK_RX                                       1
MGCP_MDCX_TX                                            1
MGCP_DLCX_RX                                            1
MGCP_DLCX_TX                                            1
MGCP_DLCX_ACK_RX                                        1
MGCP_DLCX_NACK_RX                                       1
MGCP_RQNT_ACK_RX                                        1
MGCP_RQNT_NACK_RX                                       1
MGCP_RQNT_TX                                            1
MGCP_AUEP_ACK_RX                                        1
MGCP_AUEP_NACK_RX                                       1
MGCP_AUEP_TX                                            1
MGCP_NTFY_RX                                            1
MGCP_RSIP_RX                                            1
MGCP_RSIP_ACK_TX                                        1
MGCP_AUCX_TX                                            1
MGCP_AUCX_ACK_RX                                        1
MGCP_AUCX_NACK_RX                                       1

Reply : Success: Entry 1 of 1 returned.
```

Service Interaction Manager Summary Report Example

```
CLI>report measurement-sim-summary

TIMESTAMP                                               2003-02-20 10:30:00
CALL_AGENT_ID                                           CA146
CONDITION                                               Normal
SIS_TOTAL_INCOM_MSG                                     1
SIS_TOTAL_SUCC_INCOM_MSG                                1
SIS_TOTAL_OUTG_MSG                                      1
SIS_TOTAL_SUCC_OUTG_MSG                                 1
SIS_REQ_RETRAN_RX                                       1
SIS_REQ_RETRAN_TX                                       1
SIS_RSP_RETRAN_RX                                       1
SIS_RSP_RETRAN_TX                                       1
```

SIS_T1_TIMER_EXPIRED	1
SIS_T2_TIMER_REACHED	1
SIS_INVITE_RX	1
SIS_INVITE_TX	1
SIS_CANCEL_RX	1
SIS_CANCEL_TX	1
SIS_BYE_RX	1
SIS_BYE_TX	1
SIS_ACK_RX	1
SIS_ACK_TX	1
SIS_OPTIONS_RX	1
SIS_OPTIONS_TX	1
SIS_REGISTER_RX	1
SIS_REGISTER_TX	1
SIS_INFO_RX	1
SIS_INFO_TX	1
SIS_NOTIFY_RX	1
SIS_NOTIFY_TX	1
SIS_100_RX	1
SIS_100_TX	1
SIS_18X_RX	1
SIS_18X_TX	1
SIS_200_RX	1
SIS_200_TX	1
SIS_3XX_RX	1
SIS_3XX_TX	1
SIS_4XX_RX	1
SIS_4XX_TX	1
SIS_5XX_RX	1
SIS_5XX_TX	1
SIS_6XX_RX	1
SIS_6XX_TX	1
SIS_7XX_RX	1
SIS_7XX_TX	1
SIS_PROV_RSP_RETRAN_RX	1
SIS_PROV_RSP_RETRAN_TX	1
SIS_PRACK_RX	1
SIS_PRACK_TX	1
SIS_SUBSCRIBE_RX	1
SIS_SUBSCRIBE_TX	1
SIS_REFER_RX	1
SIS_REFER_TX	1
SIS_REFER_W_REPLACES_RX	1
SIS_INVITE_REPLACES_TX	1
SIS_INVITE_REPLACES_RX	1
SIS_REL100_RX	1
SIS_REL100_TX	1
SIS_UNSUPPORTED_RX	1
SIS_UPDATE_RX	1
SIS_UPDATE_TX	1
SIM_BCM_MSG	1
SIM_RELATIONS	1
SIM_TDP_N	1
SIM_TDP_R	1
SIM_EDP_N	1
SIM_EDP_R	1
SIM_INSTRUCT	1
SIM_INSTRUCT_RSP	1
SIM_TERMINATE_RX	1
SIM_TERMINATE_TX	1
SIM_FS_MSG_TX	1
SIM_FS_MSG_RX	1
SIM_FS_PING_MSG_TX	1
SIM_FS_PING_NO_RSP_FAULTY	1

```
SIM_FS_RESTART_MSG_TX                                   1
SIM_FS_ASYNC_MSG_TX                                     1
SIM_AUDIT_CCB_FREED                                     1
SIM_AUDIT_SIP_CCB_FREED                                 1

Reply : Success: Entry 1 of 1 returned.
```

POTS Local Feature Server Summary Report Example

```
CLI>report measurement-pots-local-summary

TIMESTAMP                                               2003-02-20 10:30:00
FEATURE_SERVER_ID                                       PCT01
CONDITION                                               Normal
POTS_CFU_ACT_ATTMP                                      1
POTS_CFU_DEACT_ATTMP                                    1
POTS_CFU_ACT_REFUSED                                    1
POTS_CFU_ACT_ANSWERED                                   1
POTS_CFU_ACT_SECOND                                     1
POTS_CFU_FORWARDED_FAIL                                 1
POTS_CFU_FORWARDED_SUCC                                 1
POTS_CFU_INTERROG_ATTMP                                 1
POTS_CFB_ACT_ATTMP                                      1
POTS_CFB_DEACT_ATTMP                                    1
POTS_CFB_ACT_REFUSED                                    1
POTS_CFB_FORWARDED_FAIL                                 1
POTS_CFB_FORWARDED_SUCC                                 1
POTS_CFB_INTERROG_ATTMP                                 1
POTS_CFNA_ACT_ATTMP                                     1
POTS_CFNA_DEACT_ATTMP                                   1
POTS_CFNA_ACT_REFUSED                                   1
POTS_CFNA_FORWARDED_FAIL                                1
POTS_CFNA_FORWARDED_SUCC                                1
POTS_CFNA_INTERROG_ATTMP                                1
POTS_CFC_ACT_SUCC                                       1
POTS_CFC_ACT_FAIL                                       1
POTS_CFC_ACT_ATTMP                                      1
POTS_CFC_DEACT_SUCC                                     1
POTS_CFC_DEACT_FAIL                                     1
POTS_CFC_DEACT_ATTMP                                    1
POTS_CFC_DN_CHG_ACT_SUCC                                1
POTS_CFC_DN_CHG_ACT_FAIL                                1
POTS_CFC_DN_CHG_ACT_ATTMP                               1
POTS_CFC_INTERROG_SUCC                                  1
POTS_CFC_INTERROG_FAIL                                  1
POTS_CFC_INTERROG_ATTMP                                 1
POTS_CFC_FORWARD_SUCC                                   1
POTS_CFC_FORWARD_FAIL                                   1
POTS_CFC_FORWARD_ATTMP                                  1
POTS_NSA_INVOKE_SUCC                                    1
POTS_NSA_INVOKE_FAIL                                    1
POTS_NSA_INVOKE_ABANDON                                 1
POTS_CW_ATTMP                                           1
POTS_CW_ANSWERED                                        1
POTS_CW_NOT_ANSWERED                                    1
POTS_CW_REJECT_NO_RSRC                                  1
POTS_CW_REJECT_INTERACT                                 1
POTS_CCW_ATTMP                                          1
POTS_CCW_REJECT_NO_RSRC                                 1
POTS_CCW_REJECT_BY_CCW                                  1
POTS_CCW_LENGTH                                         1
```

POTS_CHD_ATTMP	1
POTS_CHD_ANSWER	1
POTS_CHD_NOT_ANSWER	1
POTS_CHD_REJECT_NO_RSRC	1
POTS_CHD_REJECT_INTERACT	1
POTS_MDC_ATTMP	1
POTS_MDC_REJECT_NO_RSRC	1
POTS_MDC_REJECT_INTERACT	1
POTS_MDC_REJECT_OTHERS	1
POTS_CT_ATTMP	1
POTS_CT_ANSWER	1
POTS_CT_TRANSFER	1
POTS_CT_CONF	1
POTS_CT_FAIL	1
POTS_TWC_ATTMP	1
POTS_TWC_ANSWER	1
POTS_TWC_CONF	1
POTS_TWC_FAIL	1
POTS_DRCW_ATTMP	1
POTS_DRCW_REJECT_NO_RSRC	1
POTS_DRCW_SUCC	1
POTS_RACF_ATTMP	1
POTS_RACF_REFUSE	1
POTS_RACF_REJECT_NO_RSRC	1
POTS_RACF_CFU_ACT	1
POTS_RACF_CFU_DEACT	1
POTS_RACF_CFU_UNCHANGED	1
POTS_RACF_PIN_ATTMP	1
POTS_RACF_PIN_REFUSE	1
POTS_RACF_PIN_REJECT_NO_RSRC	1
POTS_RACF_PIN_CHANGE	1
POTS_RACF_PIN_UNCHANGE	1
POTS_CPRK_SUCC_ATTMP	1
POTS_CPRK_FAIL_ATTMP	1
POTS_CPRK_SUCC_RET_ATTMP	1
POTS_CPRK_FAIL_RET_ATTMP	1
POTS_CPRK_FORWARD	1
POTS_CPRK_CLEAR	1
POTS_SC_1_DIGIT_ATTMP	1
POTS_SC_2_DIGIT_ATTMP	1
POTS_SC_1_SUCC_CCSC	1
POTS_DND_ACT_SUCC	1
POTS_DND_ACT_FAIL	1
POTS_DND_DEACT_SUCC	1
POTS_DND_DEACT_FAIL	1
POTS_DND_SUCC	1
POTS_CWD_ATTMP	1
POTS_CWD_ANSWER	1
POTS_CWD_ACT_SUCC	1
POTS_CWD_ACT_FAIL	1
POTS_CWD_DEACT_SUCC	1
POTS_CWD_DEACT_FAIL	1
POTS_CWD_INTERROG_SUCC	1
POTS_CWD_INTERROG_FAIL	1
POTS_TWCD_ATTMP	1
POTS_TWCD_CONF	1
POTS_OCB_LOCAL_BLOCK	1
POTS_OCB_NATL_BLOCK	1
POTS_OCB_INTL_BLOCK	1
POTS_OCB_INVOCATION	1
POTS_OCB_ACT_SUCC	1
POTS_OCB_DEACT_SUCC	1
POTS_OCB_INTERROG_SUCC	1
POTS_OCB_INVALID_PASSWORD	1

```
POTS_CNDB_ATTMP                                  1
POTS_CNAB_ATTMP                                  1
POTS_CIDS_ATTMP                                  1
POTS_CIDSS_ATTMP                                 1
POTS_REFER_ATTMP                                 1
POTS_REFER_FAIL                                  1
POTS_REFER_SUCC                                  1
POTS_TOTAL_CNAM_QUERY                            1
POTS_EXT_CNAM_QUERY                              1
POTS_EXT_CNAM_QUERY_SUCC                         1
POTS_EXT_CNAM_FAIL_APP                           1
POTS_EXT_CNAM_FAIL_NETW                          1

Reply : Success: Entry 1 of 1 returned.
```

POTS Miscellaneous Feature Server Summary Report Example

```
CLI>report measurement-pots-misc-summary

TIMESTAMP                                        2003-02-20 10:30:00
FEATURE_SERVER_ID                                PCT01
CONDITION                                        Normal
SIS_TOTAL_INCOM_MSG                              1
SIS_TOTAL_SUCC_INCOM_MSG                         1
SIS_TOTAL_OUTG_MSG                               1
SIS_TOTAL_SUCC_OUTG_MSG                          1
SIS_REQ_RETRAN_RX                                1
SIS_REQ_RETRAN_TX                                1
SIS_RSP_RETRAN_RX                                1
SIS_RSP_RETRAN_TX                                1
SIS_T1_TIMER_EXPIRED                             1
SIS_T2_TIMER_REACHED                             1
SIS_INVITE_RX                                    1
SIS_INVITE_TX                                    1
SIS_CANCEL_RX                                    1
SIS_CANCEL_TX                                    1
SIS_BYE_RX                                       1
SIS_BYE_TX                                       1
SIS_ACK_RX                                       1
SIS_ACK_TX                                       1
SIS_OPTIONS_RX                                   1
SIS_OPTIONS_TX                                   1
SIS_REGISTER_RX                                  1
SIS_REGISTER_TX                                  1
SIS_INFO_RX                                      1
SIS_INFO_TX                                      1
SIS_NOTIFY_RX                                    1
SIS_NOTIFY_TX                                    1
SIS_100_RX                                       1
SIS_100_TX                                       1
SIS_18X_RX                                       1
SIS_18X_TX                                       1
SIS_200_RX                                       1
SIS_200_TX                                       1
SIS_3XX_RX                                       1
SIS_3XX_TX                                       1
SIS_4XX_RX                                       1
SIS_4XX_TX                                       1
SIS_5XX_RX                                       1
SIS_5XX_TX                                       1
SIS_6XX_RX                                       1
```

```
SIS_6XX_TX                                          1
SIS_7XX_RX                                          1
SIS_7XX_TX                                          1
SIS_PROV_RSP_RETRAN_RX                              1
SIS_PROV_RSP_RETRAN_TX                              1
SIS_PRACK_RX                                        1
SIS_PRACK_TX                                        1
SIS_SUBSCRIBE_RX                                    1
SIS_SUBSCRIBE_TX                                    1
SIS_REFER_RX                                        1
SIS_REFER_TX                                        1
SIS_REFER_W_REPLACES_RX                             1
SIS_INVITE_REPLACES_TX                              1
SIS_INVITE_REPLACES_RX                              1
SIS_REL100_RX                                       1
SIS_REL100_TX                                       1
SIS_UNSUPPORTED_RX                                  1
SIS_UPDATE_RX                                       1
SIS_UPDATE_TX                                       1
POTS_HOTLINE_ATTMP                                  1
POTS_WARMLINE_ATTMP                                 1
POTS_BLV_ATTMP                                      1
POTS_OP_INTERRUPT_ATTMP                             1
POTS_CTX_SFG_OVERFLOW                               1
POTS_HOTV_ATTMP                                     1
POTS_HOTV_ACT                                       1
POTS_HOTV_DEACT                                     1
POTS_HOTV_INTERROG                                  1
POTS_VM_ACT_SUCC                                    1
POTS_VM_ACT_FAIL                                    1
POTS_VM_DEACT_SUCC                                  1
POTS_VM_DEACT_FAIL                                  1
POTS_VM_ACCESS                                      1
POTS_VM_ATTMP                                       1
POTS_PS_SUCC                                        1
POTS_PS_FAIL                                        1
POTS_PS_MANAGE_SUCC                                 1
POTS_PS_MANAGE_FAIL                                 1
POTS_LCD_AUTH_ATTMP                                 1
POTS_LCD_AUTH_SUCC                                  1
POTS_LCD_AUTH_FAIL                                  1
POTS_LCD_REAUTH_FAIL                                1
POTS_LCD_FORCED_DISC                                1

Reply : Success: Entry 1 of 1 returned.
```

POTS Class of Service Feature Server Summary Report Example

```
CLI>report measurement-pots-cos-summary

TIMESTAMP                                           2003-02-20 10:30:00
FEATURE_SERVER_ID                                   PCT01
CONDITION                                           Normal
POTS_COS_ANI_ATTMP_SUCC                             1
POTS_COS_ANI_BLOCKED_CALL                           1
POTS_COS_NANP_BLOCKED_BW                            1
POTS_COS_INTL_BLOCKED_BW                            1
POTS_COS_900_BLOCKED                                1
POTS_COS_976_BLOCKED                                1
POTS_COS_NANP_RESTRICT                              1
POTS_COS_INTL_RESTRICT                              1
```

```
POTS_COS_CASUAL_RESTRICT                          1
POTS_COS_DA_BLOCKED                               1
POTS_COS_NANP_OP_BLOCKED                          1
POTS_COS_INTL_OP_BLOCKED                          1
POTS_COS_AUTH_CODE_SUCC                           1
POTS_COS_AUTH_CODE_FAIL                           1
POTS_COS_ACCT_CODE_SUCC                           1
POTS_COS_ACCT_CODE_FAIL                           1
POTS_COS_TOLLFREE_BLOCKED                         1
POTS_TDISC_CALLS_OUTG_BLOCKED                     1
POTS_COS_TOT_AUTH_IVR_SESSION                     1
POTS_COS_TOT_ACCT_IVR_SESSION                     1
POTS_COS_TOT_IVR_FAIL                             1

Reply : Success: Entry 1 of 1 returned.
```

POTS Screening List Editing Feature Server Summary Report Example

```
CLI>report measurement-pots-sle-summary

TIMESTAMP                                         2003-02-20 10:30:00
FEATURE_SERVER_ID                                 PCT01
CONDITION                                         Normal
POTS_SCR_ATTMP                                    1
POTS_SCA_ATTMP                                    1
POTS_SCF_ATTMP                                    1
POTS_SCR_REJECT_NO_RSRC                           1
POTS_SCA_REJECT_NO_RSRC                           1
POTS_SCF_REJECT_NO_RSRC                           1
POTS_SCR_SUCC                                     1
POTS_SCA_SUCC                                     1
POTS_SCF_SUCC                                     1

Reply : Success: Entry 1 of 1 returned.
```

POTS Customer Originated Trace (COT) Feature Server Summary Report Example

```
CLI>report measurement-pots-cot-summary

TIMESTAMP                                         2003-02-20 10:30:00
FEATURE_SERVER_ID                                 PCT01
CONDITION                                         Normal
POTS_COT_ACCESS                                   1
POTS_COT_DENY                                     1
POTS_COT_ACT                                      1
POTS_COT_ABAND                                    1
POTS_COT_DN_UNAVAIL                               1
POTS_COT_TRACE_CONFIRM                            1
POTS_COT_TRACE_OUTPUT                             1

Reply : Success: Entry 1 of 1 returned.
```

POTS Auto Callback/Recall/Call Rejection Feature Server Summary Report Example

```
CLI>report measurement-pots-acar-summary

TIMESTAMP                                       2003-02-20 10:30:00
FEATURE_SERVER_ID                               PCT01
CONDITION                                       Normal
POTS_AC_ACT_ATTMP                               1
POTS_AC_OVERFLOW                                1
POTS_AC_IMMEDIATE_PROC                          1
POTS_AC_DELAYED_PROC                            1
POTS_AC_DEACT_BY_SYSTEM                         1
POTS_AC_DEACT_ATTMPT                            1
POTS_AC_INTERLATA_ATTMP                         1
POTS_AR_ACT_ATTMP                               1
POTS_AR_OVERFLOW                                1
POTS_AR_IMMEDIATE_PROC                          1
POTS_AR_DELAYED_PROC                            1
POTS_AR_DEACT_BY_SYSTEM                         1
POTS_AR_DEACT_ATTMP                             1
POTS_AR_INTERLATA_ATTMP                         1
POTS_AR_2LEVEL_ACC_CODE_ATTMP                   1
POTS_AR_2LEVEL_ACT_CODE_ATTMP                   1
POTS_ACART_QUEUED_REQ                           1
POTS_ACART_TERM_SCAN_REQ                        1
POTS_ACART_ORIG_SCAN_REQ                        1
POTS_ACART_REJECT_NO_RSRC                       1
POTS_ACR_ACT_ATTMP                              1
POTS_ACR_DEACT_ATTMP                            1
POTS_ACR_ACT_REJECT_NO_RSRC                     1
POTS_ACR_DEACT_REJECT_NO_RSRC                   1
POTS_ACR_SUCC                                   1

Reply : Success: Entry 1 of 1 returned.
```

AIN Services Summary Report Example

```
CLI>report measurement-ainsvc-summary

TIMESTAMP                                       2003-02-20 10:30:00
FEATURE_SERVER_ID                               AIN01
CONDITION                                       Normal
SIS_TOTAL_INCOM_MSG                             1
SIS_TOTAL_SUCC_INCOM_MSG                        1
SIS_TOTAL_OUTG_MSG                              1
SIS_TOTAL_SUCC_OUTG_MSG                         1
SIS_REQ_RETRAN_RX                               1
SIS_REQ_RETRAN_TX                               1
SIS_RSP_RETRAN_RX                               1
SIS_RSP_RETRAN_TX                               1
SIS_T1_TIMER_EXPIRED                            1
SIS_T2_TIMER_REACHED                            1
SIS_INVITE_RX                                   1
SIS_INVITE_TX                                   1
SIS_CANCEL_RX                                   1
SIS_CANCEL_TX                                   1
SIS_BYE_RX                                      1
SIS_BYE_TX                                      1
```

SIS_ACK_RX	1
SIS_ACK_TX	1
SIS_OPTIONS_RX	1
SIS_OPTIONS_TX	1
SIS_REGISTER_RX	1
SIS_REGISTER_TX	1
SIS_INFO_RX	1
SIS_INFO_TX	1
SIS_NOTIFY_RX	1
SIS_NOTIFY_TX	1
SIS_100_RX	1
SIS_100_TX	1
SIS_18X_RX	1
SIS_18X_TX	1
SIS_200_RX	1
SIS_200_TX	1
SIS_3XX_RX	1
SIS_3XX_TX	1
SIS_4XX_RX	1
SIS_4XX_TX	1
SIS_5XX_RX	1
SIS_5XX_TX	1
SIS_6XX_RX	1
SIS_6XX_TX	1
SIS_7XX_RX	1
SIS_7XX_TX	1
SIS_PROV_RSP_RETRAN_RX	1
SIS_PROV_RSP_RETRAN_TX	1
SIS_PRACK_RX	1
SIS_PRACK_TX	1
SIS_SUBSCRIBE_RX	1
SIS_SUBSCRIBE_TX	1
SIS_REFER_RX	1
SIS_REFER_TX	1
SIS_REFER_W_REPLACES_RX	1
SIS_INVITE_REPLACES_TX	1
SIS_INVITE_REPLACES_RX	1
SIS_REL100_RX	1
SIS_REL100_TX	1
SIS_UNSUPPORTED_RX	1
SIS_UPDATE_RX	1
SIS_UPDATE_TX	1
AINSVC_TOTAL_QUERY	1
AINSVC_8XX_QUERY	1
AINSVC_EXT_8XX_QUERY	1
AINSVC_EXT_8XX_QUERY_SUCC	1
AINSVC_EXT_8XX_FAIL_APP	1
AINSVC_EXT_8XX_FAIL_NETW	1
AINSVC_LOC_8XX_QUERY	1
AINSVC_LOC_8XX_QUERY_SUCC	1
AINSVC_LOC_8XX_ANI_BLOCK	1
AINSVC_LOC_8XX_II_BLOCK	1
AINSVC_LOC_8XX_DNIS_SUC	1
AINSVC_LOC_8XX_ROUTING_SUCC	1
AINSVC_LOC_8XX_REROUTE	1
AINSVC_LOC_8XX_FAIL_APP	1
AINSVC_TOTAL_LNP_QUERY	1
AINSVC_EXT_LNP_QUERY	1
AINSVC_EXT_LNP_QUERY_SUCC	1
AINSVC_EXT_LNP_FAIL_APP	1
AINSVC_EXT_LNP_FAIL_NETW	1
AINSVC_EXT_8XX_QUERY_FAIL	1
AINSVC_EXT_LNP_QUERY_LRN	1
AINSVC_EXT_LNP_QUERY_FAIL	1

```
AINSVC_LOC_LNP_QUERY                                1
AINSVC_LOC_LNP_QUERY_SUCC                           1
AINSVC_LOC_LNP_FAIL_APP                             1
AINSVC_LOC_LNP_QUERY_RN_FOUND                       1
AINSVC_LOC_LNP_QUERY_NO_RN                          1

Reply : Success: Entry 1 of 1 returned.
```

SCCP Protocol Summary Report Example

```
CLI>report measurement-sccp-summary

TIMESTAMP                                           2003-02-20 10:30:00
FEATURE_SERVER_ID                                   AIN01
CONDITION                                           Normal
SCCP_NO_TRANS_ADDR_FAIL                             1
SCCP_NO_TRANS_SPECIFIC_ADDR_FAIL                    1
SCCP_NETWORK_FAIL                                   1
SCCP_NETWORK_CONGEST_FAIL                           1
SCCP_SUBSYS_FAIL                                    1
SCCP_SUBSYS_CONGEST_FAIL                            1
SCCP_UNEQUIP_USER_FAIL                              1
SCCP_HOP_COUNTER_FAIL                               1
SCCP_SYNTAX_ERR                                     1
SCCP_UNKNOWN_FAIL                                   1
SCCP_TOTAL_UDATA_TX                                 1
SCCP_TOTAL_UDATA_SVC_TX                             1
SCCP_TOTAL_UDATA_RX                                 1
SCCP_TOTAL_UDATA_SVCX_RX                            1
SCCP_TOTAL_EXT_UDATA_TX                             1
SCCP_TOTAL_EXT_UDATA_SVC_TX                         1
SCCP_TOTAL_EXT_UDATA_RX                             1
SCCP_TOTAL_EXT_UDATA_SVC_RX                         1
SCCP_TOTAL_LONG_UDATA_TX                            1
SCCP_TOTAL_LONG_UDATA_SVC_TX                        1
SCCP_TOTAL_LONG_UDATA_RX                            1
SCCP_TOTAL_LONG_UDATA_SVC_RX                        1
SCCP_TOTAL_MSG                                      1
SCCP_TOTAL_LOCAL_MSG                                1
SCCP_TOTAL_GLOBAL_ADDR_TRAN                         1
SCCP_TOTAL_CLASS_0_TX                               1
SCCP_TOTAL_CLASS_1_TX                               1
SCCP_TOTAL_CLASS_0_RX                               1
SCCP_TOTAL_CLASS_1_RX                               1
SCCP_SUBSYS_OOS_REQ_GRANT                           1
SCCP_SUBSYS_OOS_REQ_DENY                            1
SCCP_MSG_TX_BACKUP_SUBSYS                           1
SCCP_USAP_TOTAL_CLASS_0_TX                          1
SCCP_USAP_TOTAL_CLASS_1_TX                          1
SCCP_USAP_TOTAL_CLASS_0_RX                          1
SCCP_USAP_TOTAL_CLASS_1_RX                          1
SCCP_NSAP_ALLOW_MSG_RX                              1
SCCP_NSAP_OOS_GRANT_RX                              1
SCCP_NSAP_OOS_REQ_RX                                1
SCCP_NSAP_PRHIBIT_RX                                1
SCCP_NSAP_STAT_TEST_RX                              1
SCCP_NSAP_CONGEST_RX                                1
SCCP_NSAP_ALLOW_MSG_TX                              1
SCCP_NSAP_OOS_GRANT_TX                              1
SCCP_NSAP_OOS_REQ_TX                                1
SCCP_NSAP_PROHIBIT_TX                               1
```

```
SCCP_NSAP_STAT_TEST_TX                                  1
SCCP_NSAP_CONGEST_TX                                    1

Reply : Success: Entry 1 of 1 returned.
```

TCAP Protocol Summary Report Example

```
CLI>report measurement-tcap-summary

TIMESTAMP                                               2003-02-20 10:30:00
FEATURE_SERVER_ID                                       AIN01
CONDITION                                               Normal
TCAP_TOTAL_MSG_RX                                       1
TCAP_TOTAL_MSG_TX                                       1
TCAP_TOTAL_UNI_MSG_RX                                   1
TCAP_TOTAL_UNI_MSG_TX                                   1
TCAP_ABORT_MSG_RX                                       1
TCAP_ABORT_MSG_TX                                       1
TCAP_BEGIN_MSG_RX                                       1
TCAP_BEGIN_MSG_TX                                       1
TCAP_CONT_MSG_RX                                        1
TCAP_CONT_MSG_TX                                        1
TCAP_END_MSG_RX                                         1
TCAP_END_MSG_TX                                         1
TCAP_PERMISS_QUERY_RX                                   1
TCAP_PERMISS_QUERY_TX                                   1
TCAP_NO_PERMISS_QUERY_RX                                1
TCAP_NO_PERMISS_QUERY_TX                                1
TCAP_PERMISS_CONVERS_RX                                 1
TCAP_PERMISS_CONVERS_TX                                 1
TCAP_NO_PERMISS_CONVERS_RX                              1
TCAP_NO_PERMISS_CONVERS_TX                              1
TCAP_RSP_RX                                             1
TCAP_RSP_TX                                             1
TCAP_TOTAL_COMP_RX                                      1
TCAP_TOTAL_COMP_TX                                      1
TCAP_INVOKE_COMP_RX                                     1
TCAP_INVOKE_COMP_TX                                     1
TCAP_RETURN_RESULT_COMP_RX                              1
TCAP_RETURN_RESULT_COMP_TX                              1
TCAP_RETURN_ERR_COMP_RX                                 1
TCAP_RETURN_ERR_COMP_TX                                 1
TCAP_REJECT_COM_RX                                      1
TCAP_REJECT_COM_TX                                      1
TCAP_ACT_TRANSACTIONS                                   1
TCAP_ACT_INVOCATIONS                                    1
TCAP_TRANSACTION_IDS_INUSE                              1
TCAP_TOTAL_DROPPED_MSG_RX                               1
TCAP_UNRECOG_MSG_TYPE_RX                                1
TCAP_UNRECOG_MSG_TYPE_TX                                1
TCAP_INCORRECT_TRANS_PORT_RX                            1
TCAP_INCORRECT_TRANS_PORT_TX                            1
TCAP_BAD_STRUCT_TRANS_PORT_RX                           1
TCAP_BAD_STRUCT_TRANS_PORT_TX                           1
TCAP_UNRECOG_TRANS_ID_RX                                1
TCAP_UNRECOG_TRANS_ID_TX                                1
TCAP_RSCR_LIMIT_RX                                      1
TCAP_RSCR_LIMIT_TX                                      1
TCAP_TRANS_PORT_PERM_REL_RX                             1
TCAP_TRANS_PORT_PERM_REL_TX                             1
TCAP_UNRECOG_DIALOG_PORT_ID_RX                          1
```

TCAP_UNRECOG_DIALOG_PORT_ID_TX	1
TCAP_BAD_STRUCT_DIALOG_PORT_RX	1
TCAP_BAD_STRUCT_DIALOG_PORT_TX	1
TCAP_MISSING_DIALOG_PORT_RX	1
TCAP_MISSING_DIALOG_PORT_TX	1
TCAP_INCONSIST_DIALOG_PORT_RX	1
TCAP_INCONSIST_DIALOG_PORT_TX	1
TCAP_UNRECOG_COMP_RX	1
TCAP_UNRECOG_COMP_TX	1
TCAP_INCORRECT_COMP_PORT_RX	1
TCAP_INCORRECT_COMP_PORT_TX	1
TCAP_BAD_STRUCT_COMP_PORT_RX	1
TCAP_BAD_STRUCT_COMP_PORT_TX	1
TCAP_DUP_INVOKE_ID_RX	1
TCAP_DUP_INVOKE_ID_TX	1
TCAP_UNRECOG_OPCODE_RX	1
TCAP_UNRECOG_OPCODE_TX	1
TCAP_INCORRECT_PARAM_RX	1
TCAP_INCORRECT_PARAM_TX	1
TCAP_UNRECOG_LINK_ID_RX	1
TCAP_UNRECOG_LINK_ID_TX	1
TCAP_INIT_REL_RX	1
TCAP_INIT_REL_TX	1
TCAP_UNEXPECT_LINK_RSP_RX	1
TCAP_UNEXPECT_LINK_RSP_TX	1
TCAP_UNEXPECT_LINK_OPER_RX	1
TCAP_UNEXPECT_LINK_OPER_TX	1
TCAP_UNRECOG_RE_INVOKE_ID_RX	1
TCAP_UNRECOG_RE_INVOKE_ID_TX	1
TCAP_UNEXPECT_RR_RX	1
TCAP_UNEXPECT_RR_TX	1
TCAP_INCORRECT_PARAM_RR_RX	1
TCAP_INCORRECT_PARAM_RR_TX	1
TCAP_UNRECOG_INVOKE_ID_RX	1
TCAP_UNRECOG_INVOKE_ID_TX	1
TCAP_UNEXPECT_RE_RX	1
TCAP_UNEXPECT_RE_TX	1
TCAP_INCORRECT_COMP_ENCODE_RX	1
TCAP_INCORRECT_COMP_ENCODE_TX	1
TCAP_INVOKE_RSCR_LIMIT_PROB_RX	1
TCAP_INVOKE_RSCR_LIMIT_PROB_TX	1
TCAP_UNRECOG_ERR_CODE_RX	1
TCAP_UNRECOG_ERR_CODE_TX	1
TCAP_UNEXPECT_ERR_CODE_RX	1
TCAP_UNEXPECT_ERR_CODE_TX	1
TCAP_INCORRECT_PARAM_RE_RX	1
TCAP_INCORRECT_PARAM_RE_TX	1
TCAP_OPERATION_REQ_RX	1
TCAP_OPERATION_CONFIRM_RX	1
TCAP_OPERATION_IND_RX	1
TCAP_COMPONENT_REQ_RX	1
TCAP_COMPONENT_CONFIRM_RX	1
TCAP_COMPONENT_IND_RX	1
TCAP_DATA_IND_RX	1
TCAP_UDATA_IND_RX	1
TCAP_DATA_REQ_RX	1
TCAP_DELIMITER_REQ_RX	1
TCAP_DELIMITER_IND_RX	1
TCAP_OPEN_IND_RX	1
TCAP_OPEN_CONFIRM_RX	1
TCAP_STATUS_IND_RX	1
TCAP_DIALOG_CONFIRM_RX	1
TCAP_CLOSE_IND_RX	1
TCAP_ABORT_IND_RX	1

```
TCAP_BIND_CONFIRM_RX                                    1
TCAP_STAT_CONFIRM_RX                                    1
TCAP_NOTICE_IND_RX                                      1
TCAP_STAT_IND_RX                                        1

Reply : Success: Entry 1 of 1 returned.
```

M3UA Protocol Summary Report Example

The following is a sample M3UA protocol Summary Report for signaling gateway processes.

```
CLI>report measurement-m3ua-summary

TIMESTAMP                                               2003-02-20 10:30:00
SGP_ID                                                  4
CONDITION                                               Normal
M3UA_ERR_TX                                             1
M3UA_ERR_RX                                             1
M3UA_NOTIFY_TX                                          1
M3UA_NOTIFY_RX                                          1
M3UA_DUNA_RX                                            1
M3UA_DAVA_RX                                            1
M3UA_DAUD_TX                                            1
M3UA_SCON_TX                                            1
M3UA_SCON_RX                                            1
M3UA_DRST_RX                                            1
M3UA_DUPU_RX                                            1
M3UA_UP_TX                                              1
M3UA_DOWN_TX                                            1
M3UA_BEAT_TX                                            1
M3UA_BEAT_RX                                            1
M3UA_UP_ACK_RX                                          1
M3UA_DOWN_ACK_RX                                        1
M3UA_BEAT_ACK_TX                                        1
M3UA_BEAT_ACK_RX                                        1
M3UA_ACTIVE_TX                                          1
M3UA_INACTIVE_TX                                        1
M3UA_ACTIVE_ACK_RX                                      1
M3UA_INACTIVE_ACK_RX                                    1
M3UA_DATA_TRANS_TX                                      1
M3UA_DATA_TRANS_RX                                      1
M3UA_DATA_BYTES_TX                                      1
M3UA_DATA_BYTES_RX                                      1
M3UA_INVALID_SCTP_SIGNALS                               1
M3UA_SINCE_LAST_RESET_ASSOC                             1
M3UA_ASSOC_FAIL                                         1
M3UA_SCTP_TX_FAIL                                       1
M3UA_MSG_INVALID_LENGTH_RX                              1
M3UA_NO_MEMORY_FAIL                                     1
M3UA_VERSION_ERR                                        1
M3UA_MSG_CLASS_ERR                                      1
M3UA_MSG_TYPE_ERR                                       1
M3UA_MSG_LENGTH_ERR                                     1
M3UA_STREAM_ID_ERR                                      1
M3UA_UNEXPECT_MSG_ERR                                   1
M3UA_PROTOCOL_ERR                                       1
M3UA_PARAM_VALUE_ERR                                    1
M3UA_PARAM_FIELD_ERR                                    1
M3UA_UNEXPECT_PARAM_ERR                                 1
M3UA_NETWORK_APPEAR_ERR                                 1
```

```
M3UA_ROUTING_CONTEXT_ERR                          1
M3UA_MSG_RX_OTHER_ERR                             1

Reply : Success: Entry 1 of 1 returned.
```

SUA Protocol Feature Server Summary Report Example

```
CLI>report measurement-sua-summary

TIMESTAMP                                         2003-02-20 10:30:00
SGP_ID                                            4
CONDITION                                         Normal
SUA_ERR_TX                                        1
SUA_ERR_RX                                        1
SUA_NOTIFY_TX                                     1
SUA_NOTIFY_RX                                     1
SUA_DUNA_RX                                       1
SUA_DAVA_RX                                       1
SUA_DAUD_RX                                       1
SUA_SCON_TX                                       1
SUA_SCON_RX                                       1
SUA_DRST_RX                                       1
SUA_DUPU_RX                                       1
SUA_UP_TX                                         1
SUA_DOWN_TX                                       1
SUA_BEAT_TX                                       1
SUA_BEAT_RX                                       1
SUA_UP_ACK_RX                                     1
SUA_DOWN_ACK_RX                                   1
SUA_BEAT_ACK_TX                                   1
SUA_BEAT_ACK_RX                                   1
SUA_ACTIVE_TX                                     1
SUA_INACTIVE_TX                                   1
SUA_ACTIVE_ACK_RX                                 1
SUA_INACTIVE_ACK_RX                               1
SUA_CLDT_TX                                       1
SUA_CLDT_RX                                       1
SUA_CLDR_TX                                       1
SUA_CLDR_RX                                       1
SUA_DATA_BYTES_TX                                 1
SUA_DATA_BYTES_RX                                 1
SUA_INVALID_SCTP_SIGNALS                          1
SUA_SINCE_LAST_RESET_ASSOC                        1
SUA_ASSOC_FAIL                                    1
SUA_SCTP_TX_FAIL                                  1
SUA_MSG_INVALID_LENGTH_RX                         1
SUA_NO_MEMORY_FAIL                                1
SUA_VERSION_ERR                                   1
SUA_MSG_CLASS_ERR                                 1
SUA_MSG_TYPE_ERR                                  1
SUA_STREAM_ID_ERR                                 1
SUA_UNEXPECT_MSG_ERR                              1
SUA_PROTOCOL_ERR                                  1
SUA_PARAM_VALUE_ERR                               1
SUA_PARAM_FIELD_ERR                               1
SUA_UNEXPECT_PARAM_ERR                            1
SUA_NETWORK_APPEAR_ERR                            1
SUA_ROUTING_CONTEXT_ERR                           1

Reply : Success: Entry 1 of 1 returned.
```

SCTP Protocol Feature Server Summary Report Example

```
CLI>report measurement-sctp-summary

TIMESTAMP                                       2003-02-20 10:30:00
SCTP_ASSOC_ID                                   5
CONDITION                                       Normal
SCTP_DATA_CHUNK_RX                              1
SCTP_DATA_CHUNK_RX_SEQ_ERR                      1
SCTP_DATA_CHUNK_RX_ORDER                        1
SCTP_DATA_CHUNK_RX_UNORDER                      1
SCTP_DATA_CHUNK_TX                              1
SCTP_DATA_CHUNK_TX_ORDER                        1
SCTP_DATA_CHUNK_TX_UNORDER                      1
SCTP_DATA_CHUNK_DISCARD                         1
SCTP_DATA_CHUNK_RETRAN                          1
SCTP_DATA_CHUNK_TX_BUNDLE                       1
SCTP_DATA_CHUNK_RX_BUNDLE                       1
SCTP_DATA_BYTE_TX                               1
SCTP_DATA_BYTE_RX                               1
SCTP_CONTROL_CHUNK_TX                           1
SCTP_CONTROL_CHUNK_RX                           1
SCTP_ULP_TX                                     1
SCTP_ULP_READY                                  1
SCTP_ULP_RX                                     1
SCTP_ULP_QUEUE                                  1
SCTP_SCTP_DATAG_TX                              1
SCTP_SCTP_DATAG_RX                              1
SCTP_INVALID_DATAG_LENGTH                       1
SCTP_PARTIAL_CHUNK_ERR                          1
SCTP_EMPTY_DATAG_ERR                            1
SCTP_INVALID_CHECKSUM                           1
SCTP_INVLAID_VERIF_TAG                          1
SCTP_OOTB                                       1
SCTP_INVALID_STREAM                             1
SCTP_ASSOC_COMM_LOST                            1
SCTP_DEST_ADDR_FAIL                             1
SCTP_CHUNK_UNORDER_ERR                          1
SCTP_ECNE_CHUNK_RX                              1
SCTP_CWR_CHUNK_RX                               1
SCTP_UNKNOWN_CHUNK_TYPE                         1
SCTP_UNKNOWN_INIT_PARAM                         1
SCTP_INVALID_COOKIE_SIG                         1
SCTP_EXPIRED_COOKIE_ERR                         1
SCTP_STALE_COOKIE_ERR                           1
SCTP_PEER_RESTART_ERR                           1
SCTP_UNORDER_DATAG_ERR                          1
SCTP_V6_ADDR_PARAM_RX                           1
SCTP_INVALID_STREAM_ERR_RX                      1
SCTP_MISSING_PARAM_ERR_RX                       1
SCTP_STALE_COOKIE_ERR_RX                        1
SCTP_OUT_OF_RSCR_ERR_RX                         1
SCTP_UNRESOLV_ADDR_ERR_RX                       1
SCTP_UNRECOG_CHUNK_ERR_RX                       1
SCTP_INVALID_PARAM_ERR_RX                       1
SCTP_UNRECOG_PARAM_ERR_RX                       1
SCTP_NO_USER_DATA_ERR_RX                        1
SCTP_COOKIE_IN_SHUTDOWN_ERR_RX                  1
SCTP_CHUNK_TOO_SMALL_ERR                        1
SCTP_CHUNK_TOO_BIG_ERR                          1
SCTP_MISSING_PARAM_ERR                          1
SCTP_NO_SPACE_INCOM_ERR                         1
```

```
Reply : Success: Entry 1 of 1 returned.
```

ISUP Protocol Summary Report Example

The following example is a Signaling Gateway-based ANSI ISUP Protocol summary report created on the BTS 10200 Softswich. Each of the other support ISUP variants will contain only the measurements that are applicable to them.

```
CLI>report measurement-isup-summary tgn-id=dal-001;

TIMESTAMP                                       2003-02-20 10:30:00
TRUNK_GROUP_ID            DAL-001
CONDITION                                       Normal
VARIANT                       ANSI
ISUP_MSG_TX                                     1
ISUP_MSG_RX                                     1
ISUP_ACM_TX                                     1
ISUP_ACM_RX                                     1
ISUP_ANM_TX                                     1
ISUP_ANM_RX                                     1
ISUP_BLA_TX                                     1
ISUP_BLA_RX                                     1
ISUP_BLO_TX                                     1
ISUP_BLO_RX                                     1
ISUP_CCR_TX                                     1
ISUP_CCR_RX                                     1
ISUP_CFN_TX                                     1
ISUP_CFN_RX                                     1
ISUP_CPG_TX                                     1
ISUP_CPG_RX                                     1
ISUP_CGB_TX                                     1
ISUP_CGB_RX                                     1
ISUP_CGU_TX                                     1
ISUP_CGU_RX                                     1
ISUP_CGBA_TX                                    1
ISUP_CGBA_RX                                    1
ISUP_CGUA_TX                                    1
ISUP_CGUA_RX                                    1
ISUP_COT_TX                                     1
ISUP_COT_RX                                     1
ISUP_CQM_TX                                     1
ISUP_CQM_RX                                     1
ISUP_CQR_TX                                     1
ISUP_CQR_RX                                     1
ISUP_CRA_TX                                     1
ISUP_CRA_RX                                     1
ISUP_CRM_TX                                     1
ISUP_CRM_RX                                     1
ISUP_CVR_TX                                     1
ISUP_CVR_RX                                     1
ISUP_CVT_TX                                     1
ISUP_CVT_RX                                     1
ISUP_EXM_TX                                     1
ISUP_EXM_RX                                     1
ISUP_FAA_TX                                     1
ISUP_FAA_RX                                     1
ISUP_FAC_TX                                     1
ISUP_FAC_RX                                     1
ISUP_FOT_TX                                     1
```

```
ISUP_FOT_RX                                    1
ISUP_GRS_TX                                    1
ISUP_GRS_RX                                    1
ISUP_GRA_TX                                    1
ISUP_GRA_RX                                    1
ISUP_IAM_TX                                    1
ISUP_IAM_RX                                    1
ISUP_INF_TX                                    1
ISUP_INF_RX                                    1
ISUP_INR_TX                                    1
ISUP_INR_RX                                    1
ISUP_LPA_TX                                    1
ISUP_LPA_RX                                    1
ISUP_PAM_TX                                    1
ISUP_PAM_RX                                    1
ISUP_REL_TX                                    1
ISUP_REL_RX                                    1
ISUP_RLC_TX                                    1
ISUP_RLC_RX                                    1
ISUP_RSC_TX                                    1
ISUP_RSC_RX                                    1
ISUP_RES_TX                                    1
ISUP_RES_RX                                    1
ISUP_SUS_TX                                    1
ISUP_SUS_RX                                    1
ISUP_UBL_TX                                    1
ISUP_UBL_RX                                    1
ISUP_UBA_TX                                    1
ISUP_UBA_RX                                    1
ISUP_UCIC_TX                                   1
ISUP_UCIC_RX                                   1
ISUP_USR_TX                                    1
ISUP_USR_RX                                    1
ISUP_ABNORMAL_REL_RX                           1
ISUP_ABNORMAL_REL_TX                           1
ISUP_UNEXPECT_MSG_RX                           1
ISUP_UNRECOG_MSG_RX                            1

Reply : Success: Entry 1 of 1 returned.
```

Audit Summary Report Example

```
CLI>report measurement-audit-summary

TIMESTAMP                                      2003-02-20 10:30:00
CALL_AGENT_ID                                  CA146
CONDITION                                      Normal
AUDIT_SS7_TRUNK_STATE_SYNCED                   1
AUDIT_SS7_LONG_DUR_EXCEEDED                    1
AUDIT_FS_TOTAL_SIP_RESP_TMO                    1
AUDIT_FS_TOTAL_SIP_NOACK_TMO                   1
AUDIT_FS_TOTAL_CA_SWITCHOVERS                  1

Reply : Success: Entry 1 of 1 returned.
```

SIP Interface Adapter Summary Report Example

```
CLI>report measurement-sia-summary

TIMESTAMP                                       2003-02-20 10:30:00
CALL_AGENT_ID                                   CA146
CONDITION                                       Normal
SIS_TOTAL_INCOM_MSG                             1
SIS_TOTAL_SUCC_INCOM_MSG                        1
SIS_TOTAL_OUTG_MSG                              1
SIS_TOTAL_SUCC_OUTG_MSG                         1
SIS_REQ_RETRAN_RX                               1
SIS_REQ_RETRAN_TX                               1
SIS_RSP_RETRAN_RX                               1
SIS_RSP_RETRAN_TX                               1
SIS_T1_TIMER_EXPIRED                            1
SIS_T2_TIMER_REACHED                            1
SIS_INVITE_RX                                   1
SIS_INVITE_TX                                   1
SIS_CANCEL_RX                                   1
SIS_CANCEL_TX                                   1
SIS_BYE_RX                                      1
SIS_BYE_TX                                      1
SIS_ACK_RX                                      1
SIS_ACK_TX                                      1
SIS_OPTIONS_RX                                  1
SIS_OPTIONS_TX                                  1
SIS_REGISTER_RX                                 1
SIS_REGISTER_TX                                 1
SIS_INFO_RX                                     1
SIS_INFO_TX                                     1
SIS_NOTIFY_RX                                   1
SIS_NOTIFY_TX                                   1
SIS_100_RX                                      1
SIS_100_TX                                      1
SIS_18X_RX                                      1
SIS_18X_TX                                      1
SIS_200_RX                                      1
SIS_200_TX                                      1
SIS_3XX_RX                                      1
SIS_3XX_TX                                      1
SIS_4XX_RX                                      1
SIS_4XX_TX                                      1
SIS_5XX_RX                                      1
SIS_5XX_TX                                      1
SIS_6XX_RX                                      1
SIS_6XX_TX                                      1
SIS_7XX_RX                                      1
SIS_7XX_TX                                      1
SIS_PROV_RSP_RETRAN_RX                          1
SIS_PROV_RSP_RETRAN_TX                          1
SIS_PRACK_RX                                    1
SIS_PRACK_TX                                    1
SIS_SUBSCRIBE_RX                                1
SIS_SUBSCRIBE_TX                                1
SIS_REFER_RX                                    1
SIS_REFER_TX                                    1
SIS_REFER_W_REPLACES_RX                         1
SIS_INVITE_REPLACES_TX                          1
SIS_INVITE_REPLACES_RX                          1
SIS_REL100_RX                                   1
SIS_REL100_TX                                   1
SIS_UNSUPPORTED_RX                              1
```

```
SIS_UPDATE_RX                                   1
SIS_UPDATE_TX                                   1
SIA_OUTG_INIT                                   1
SIA_OUTG_SUCC                                   1
SIA_OUTG_FAIL                                   1
SIA_ICOM_INIT                                   1
SIA_ICOM_SUCC                                   1
SIA_ICOM_FAIL                                   1
SIA_TOTAL_SUCC                                  0
SIA_TOTAL_FAIL                                  0
SIA_TOTAL_OUTG_MSG_FAIL                         0
SIA_TOTAL_INCOM_MSG_FAIL                        0
SIA_REFRESHES_TX                                1
SIA_TOTAL_SESS_TIMER_FAIL                       1
SIA_CALL_FAIL_BY_EXPIRED_REG                    1
SIA_MWI_NOTIFY_TX                               1
SIA_MWI_NOTIFY_TX_FAIL                          1
SIA_MWI_NOTIFY_RX                               1
SIA_AUDIT_CCB_FREED                             1
SIA_AUDIT_CALL_RELEASED                         1
SIA_AUDIT_BCM_CALL_RELEASED                     1
SIA_AUDIT_REGCONTACT_FREED                      1
SIA_SECURE_FQDN_VIOLATION_REQ                   1
SIA_SECURE_FQDN_VIOLATION_RESP                  1

Reply : Success: Entry 1 of 1 returned.
```

Call Detail Block Summary Report Example

```
CLI>report measurement-billing-summary

TIMESTAMP                                       2003-02-20 10:30:00
CALL_AGENT_ID                                   CA146
CONDITION                                       Normal
BILLING_TOTAL_NULL                              1
BILLING_TOTAL_INTL                              1
BILLING_TOTAL_LOCAL                             1
BILLING_TOTAL_TOLL                              1
BILLING_TOTAL_INTERLATA                         1
BILLING_TOTAL_TANDEM                            1
BILLING_TOTAL_EMG                               1
BILLING_TOTAL_NON_EMG                           1
BILLING_TOTAL_DA                                1
BILLING_TOTAL_DA_TOLL                           1
BILLING_TOTAL_REPAIR                            1
BILLING_TOTAL_RELAY                             1
BILLING_TOTAL_BUSINESS                          1
BILLING_TOTAL_TOLL_FREE                         1
BILLING_TOTAL_900                               1
BILLING_TOTAL_500                               1
BILLING_TOTAL_700                               1
BILLING_TOTAL_976                               1
BILLING_TOTAL_VACANT                            1
BILLING_TOTAL_PCS                               1
BILLING_TOTAL_INVALID                           1
BILLING_TOTAL_NONE                              1
BILLING_TOTAL_LRN                               1
BILLING_TOTAL_EXTENSION                         1
BILLING_TOTAL_CUT_THRU                          1
BILLING_TOTAL_OPERATOR                          1
BILLING_TOTAL_CARRIER_OPERATOR                  1
```

```
BILLING_TOTAL_OPERATOR_ASSISTED                    1
BILLING_TOTAL_BLV                                  1
BILLING_TOTAL_SPEED_DIAL                           1
BILLING_TOTAL_NATIONAL                             1
BILLING_TOTAL_TW                                   1
BILLING_TOTAL_INFO                                 1
BILLING_TOTAL_PREMIUM                              1
BILLING_TOTAL_ATTENDANT                            1
BILLING_TOTAL_NAS                                  1
BILLING_TOTAL_POLICE                               1
BILLING_TOTAL_FIRE                                 1
BILLING_TOTAL_AMBULANCE                            1
BILLING_TOTAL_TIME                                 1
BILLING_TOTAL_WEATHER                              1
BILLING_TOTAL_TRAFFIC                              1
BILLING_TOTAL_LB_TEST                              1
BILLING_TOTAL_INTL_OPR                             1
BILLING_TOTAL_NAT_OPR                              1
BILLING_TOTAL_AIRLINES                             1
BILLING_TOTAL_RAILWAYS                             1
BILLING_TOTAL_SVC_CODE                             1
BILLING_TOTAL_INTL_WZ1                             1
BILLING_TOTAL_CNA                                  1
BILLING_TOTAL_DA_INTER                             1
BILLING_TOTAL_INTL                                 1
BILLING_TOTAL_UAN                                  1
BILLING_TOTAL_BILLING                              1

Reply : Success: Entry 1 of 1 returned.
```

Event Messaging Summary Report Example

```
CLI>report measurement-em-summary

TIMESTAMP                                          2003-02-20 10:30:00
CALL_AGENT_ID                                      CA146
CONDITION                                          Normal
BILLING_EM_ACKED                                   1
BILLING_EM_LOGGED                                  1
BILLING_EM_RETRANS                                 1

Reply : Success: Entry 1 of 1 returned.
```

Dynamic QoS Summary Report Example

```
CLI>report measurement-dqos-summary

TIMESTAMP                                          2003-02-20 10:30:00
AGGR_ID                                            2
CONDITION                                          Normal
DQOS_GATESET_ATTMP                                 1
DQOS_GATESET_SUCC                                  1
DQOS_GATE_COMMIT                                   1

Reply : Success: Entry 1 of 1 returned.
```

SNMP Protocol Summary Report Example

```
CLI>report measurement-snmp-summary

TIMESTAMP                                          2003-02-20 10:30:00
EMS_ID                                             0
CONDITION                                          Normal
SNMP_TRAP_TX                                       1
SNMP_SET_RX                                        1
SNMP_SET_TX                                        1
SNMP_GET_RX                                        1
SNMP_GET_TX                                        1
SNMP_GET_NEXT_RX                                   1
SNMP_GET_NEXT_TX                                   1

Reply : Success: Entry 1 of 1 returned.
```

Trunk Group Usage Summary Report Example

```
CLI>report measurement-tg-usage-summary trkgrp-exchange=RONLVA31GT0;
trkgrp-name=RONKVACSDS0_LC;

TIMESTAMP                                          2003-02-20 10:30:00
CALL_AGENT_ID                                      CA146
CONDITION                                          Normal
TRKGRP_EXCHANGE                                    RONLVA31GT0
TRKGRP_NAME                                        RONKVACSDS0_LC
TGN_ID                                             1
TRKGRP_TYPE                                        SS7
TRKGRP_INCOM_ATTMP                                 1
TRKGRP_OUTG_ATTMP                                  1
TRKGRP_OUTBOUND_FAIL                               1
TRKGRP_TOTAL_OVERFLOW                              1
TRKGRP_TOTAL_TRUNK                                 1
TRKGRP_INCOM_BUSY_TRK                              1
TRKGRP_OUTG_BUSY_TRK                               1
TRKGRP_TOTAL_OOS_TRK                               1
TRKGRP_INCOM_USAGE                                 1
TRKGRP_OUTG_USAGE                                  1
TRKGRP_TOTAL_USAGE                                 1
TRKGRP_AVERAGE_USAGE                               1
TRKGRP_GLARE_COUNT                                 1
TRKGRP_TOTAL_INS_TRK                               1
TRKGRP_MAINT_TRK_USAGE                             1
TRKGRP_OOS_TRK_USAGE                               1
TRKGRP_UEQP_TRK_USAGE                              1
TRKGRP_LBLK_TRK_USAGE                              1
TRKGRP_RBLK_TRK_USAGE                              1
```

Announcement Summary Report Example

```
CLI>report measurement-anm-summary;

TIMESTAMP                                          2003-02-20 10:30:00
CALL_AGENT_ID                                      CA146
CONDITION                                          Normal
ANM_CKT_UNAVAIL                                    1
```

```
ANM_CALL_REJECT                                  1
ANM_ADDR_INCOMPLETE                              1
ANM_FAC_REJECT                                   1
ANM_PRE_0_1_ABSENT                               1
ANM_PRE_0_1_PRESENT                              1
ANM_HNPA_ABSENT                                  1
ANM_NO_ROUTE_DEST                                1
ANM_UNALLOCATED_NUMBER                           1
ANM_NUM_CHANGED                                  1
ANM_DEST_OUTOFORDER                              1
ANM_TEMP_DISCONNECT                              1
ANM_FEAT_NUT_SUBS                                1
ANM_AUTHOCODE_INVALID                            1
ANM_NO_RTE_TRANSITNW                             1
ANM_CAUSE_UNKNOWN                                1
ANM_EMG_CKT_UNAVAIL                              1

Reply : Success: Entry 1 of 1 returned.
```

H.323 Summary Report Example

```
CLI>report measurement-h323-summary;

TIMESTAMP                                        2003-02-20 10:30:00
CALL_AGENT_ID                                    CA146
CONDITION                                        Normal
H323_GRQ_TX                                      1
H323_GCF_TX                                      1
H323_GRJ_TX                                      1
H323_RRQ_TX                                      1
H323_RCF_TX                                      1
H323_RRJ_TX                                      1
H323_ARQ_TX                                      1
H323_ACF_TX                                      1
H323_ARJ_TX                                      1
H323_BRQ_TX                                      1
H323_BCF_TX                                      1
H323_BRJ_TX                                      1
H323_DRQ_TX                                      1
H323_DCF_TX                                      1
H323_DRJ_TX                                      1
H323_URQ_TX                                      1
H323_UCF_TX                                      1
H323_URJ_TX                                      1
H323_RIP_TX                                      1
H323_RAI_TX                                      1
H323_RAC_TX                                      1
H323_GRQ_RX                                      1
H323_GCF_RX                                      1
H323_GRJ_RX                                      1
H323_RRQ_RX                                      1
H323_RCF_RX                                      1
H323_RRJ_RX                                      1
H323_ARQ_RX                                      1
H323_ACF_RX                                      1
H323_ARJ_RX                                      1
H323_BRQ_RX                                      1
H323_BCF_RX                                      1
H323_BRJ_RX                                      1
H323_DRQ_RX                                      1
H323_DCF_RX                                      1
```

```
H323_DRJ_RX                                     1
H323_URQ_RX                                     1
H323_UCF_RX                                     1
H323_URJ_RX                                     1
H323_RIP_RX                                     1
H323_RAI_RX                                     1
H323_RAC_RX                                     1
H323_SETUP_TX                                   1
H323_SETUP_CONFIRM_TX                           1
H323_ALERT_TX                                   1
H323_IN_PROGRESS_TX                             1
H323_CALL_PROCEED_TX                            1
H323_NOTIFY_TX                                  1
H323_INFORMATION_TX                             1
H323_USER_INFO_TX                               1
H323_FACILITY_TX                                1
H323_RELEASE_COMPLETE_TX                        1
H323_REJECT_TX                                  1
H323_PASSTHROU_TX                               1
H323_SETUP_RX                                   1
H323_SETUP_CONFIRM_RX                           1
H323_ALERT_RX                                   1
H323_IN_PROGRESS_RX                             1
H323_CALL_PROCEED_RX                            1
H323_NOTIFY_RX                                  1
H323_INFORMATION_RX                             1
H323_USER_INFO_RX                               1
H323_FACILITY_RX                                1
H323_RELEASE_COMPLETE_RX                        1
H323_REJECT_RX                                  1
H323_PASSTHROU_RX                               1
H323_SETUP_FAIL                                 1
H323_CONNECT_FAIL                               1
H323_ALERT_FAIL                                 1
H323_IN_PROGRESS_FAIL                           1
H323_CALL_PROCEED_FAIL                          1
H323_NOTIFY_FAIL                                1
H323_INFORMATION_FAIL                           1
H323_USER_INFO_FAIL                             1
H323_FACILITY_FAIL                              1
H323_RELEASE_COMPLETE_FAIL                      1
H323_REJECT_FAIL                                1
H323_PASSTHROU_FAIL                             1

Reply : Success: Entry 1 of 1 returned.
```

Call Tools Summary Report Example

```
CLI>report measurement-call-tools-summary;

TIMESTAMP                                       2003-02-20 10:30:00
CONDITION                                       Normal
TOOLS_TRUNK_TRANS_ATTMP                         1
TOOLS_TRUNK_TRANS_SUCC                          1
TOOLS_LINE_TRANS_ATTMP                          1
TOOLS_LINE_TRANS_SUCC                           1

Reply : Success: Entry 1 of 1 returned.
```

AIN Tools Summary Report Example

```
CLI>report measurement-ain-tools-summary;

TIMESTAMP                                          2003-02-20 10:30:00
CONDITION                                          Normal
TOOLS_LNP_QUERY_ATTMP                              1
TOOLS_LNP_QUERY_SUCC                               1
TOOLS_TOLLFREE_QUERY_ATTMP                         1
TOOLS_TOLLFREE_QUERY_SUCC                          1

Reply : Success: Entry 1 of 1 returned.
```

PCT Tools Summary Report Example

```
CLI>report measurement-pct-tools-summary;

TIMESTAMP                                          2003-02-20 10:30:00
CONDITION                                          Normal
TOOLS_LIDB_QUERY_ATTMP                             1
TOOLS_LIDB_QUERY_SUCC                              1

Reply : Success: Entry 1 of 1 returned.
```

CHAPTER 7

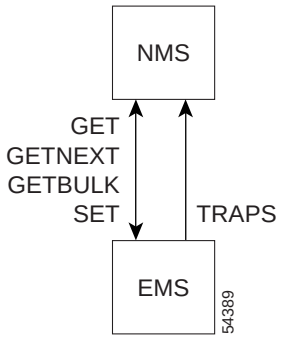
SNMP Interface

Revised: July 21, 2009, OL-4495-10

Introduction

The Cisco BTS 10200 Softswitch supports Simple Network Management Protocol (SNMP) operations that allow communications between the Element Management System (EMS) and a service provider's network management system (NMS). The EMS sends SNMP traps to the NMS, and the NMS can query the EMS for specific data elements (see Figure 7-1). Status and control operations as well as traffic and statistics query operations are supported.

Figure 7-1 NMS/EMS Interaction Via SNMP



Element Management System (SNMP Agent)

The Softswitch SNMP Agent supports SNMPv2c operations defined by the opticall.mib Management Information Base (MIB). The MIB is located in the directory /opt/BTSsnmp/etc on the EMS. The MIB opticall.mib uses variables from three other MIBs: IPCELL-TC, SNMPv2-TC, and SNMPv2-SMI. The NMS needs to load the main MIB (opticall.mib), that will in turn import the three other MIBs.

SNMP Agent Functions

The following functions are supported by the Softswitch SNMP Agent:

- MIB-II System branch information
- Collection of statistics and traffic management data
- Status and control
- Bulk Status and control
- SNMP trap reports
- SNMP trap retransmission

Read access to the SNMP agent is required for the statistics and traffic management queries and for status queries. Write access is required for the control commands. Trap reports do not involve read/write access.

Read/write access to the SNMP agent is restricted by requiring the NMS to pass a valid community string to the agent. The community string passed on by the NMS message is authenticated against a list of community strings maintained by the SNMP agent. The SNMP agent uses each string as a password, and disallows access if the password is not valid.

In addition, to perform Status/Control via SNMP, the community string used must also be at a minimum level to perform those commands as defined by the BTS 10200 Command Line Interface (CLI) security privileges. For example, if the community string used to control a termination in service (INS) is below the minimum level in the CLI, then the SNMP request fails with *General Error.*

The SNMP community table in the Softswitch database provides persistent storage of community strings for the SNMP agent. The default value for both the read and write communities is “public”. This default value can be deleted by the user and replaced with specific communities using the following CLI commands:

- To show all read communities-show snmpconfig type=readcommunity
- To show all write communities-show snmpconfig type=writecommunity
- To add read community-add snmpconfig type=readcommunity; value=.....; key1=command_level; value1=8;
- To add write community-add snmpconfig type=writecommunity; value=.....; key1=command_level; value1=8;
- To delete read community-delete snmpconfig type=readcommunity; value=.....
- To delete write community-delete snmpconfig type=writecommunity; value=.....

The provisioned values must be ASCII strings and can be up to 64 characters long.

Statistics/Traffic Measurement

Statistical data (traffic measurements) are collected for the following components of the Softswitch:

- AINSVC
- Announcement
- Audit
- Billing
- Call Processing
- DQOS
- Element Manager
- H323

- INAP
- ISDN
- ISUP SGA
- M3UA
- MGCP Adapter
- POTS-Feature Server
- SCCP
- SCTP
- SIA
- SIM
- SNMP
- SUA
- TCAP
- Trunk group usage
- TSA

SNMP Trap Reports

Traps are sent from the Softswitch SNMP agent to the NMS. Traps are mapped to all alarms generated from the EMS. Any alarms that cannot be mapped to a specific trap are mapped to a generic trap. Mapped traps and generic traps contain one or more of the following information types, depending upon availability of the information:

- Severity level
- Alarm ID associated with the trap
- Alarm category
- Set/Cleared flag
- Component (instance) ID
- Component type
- Details of the trap
- Time that trap was generated

An operator of an NMS who would like to receive traps from the SNMP agent needs to add an entry to SNMPTRAPDEST via CLI. For the specific CLI command, refer to the *CLI Reference Guide*.

- IP address or hostname of the NMS
- Port number on which to receive traps
- Community string (currently not used)
- Owner string (currently not used)
- Filter Types - Ranges from 0-32767. Default is 32767. A bitmask that specifies which subsystem types of the events to filter or permitted to be sent to this address. This is used in combination with Filterlevels to provide a granular filter for traps from the SNMP Agent side. From right to left the following bits specifies the following subsystem types: Bit #1: BILLING (right-most bit) Bit #2:

CALLP Bit #3: CONFIG Bit #4: DATABASE Bit #5: MAINTENANCE Bit #6: OSS Bit #7: SECURITY Bit #8: SIGNALING Bit #9: STATISTICS Bit #10: SYSTEM Bit #11: AUDIT (left-most bit) For example, in order to receive only CONFIG, DATABASE, and SIGNALING traps, then the filter in binary would be (0010001100) which converts to integer value of (140) to be entered as the token value. If all types are to be received then the binary would be (1111111111) which converts to (1023) as the token value. And likewise if no types are to be received then the binary would be (0000000000) which converts to (0) as the token value.

- Filter Levels - Ranges from 0-63. Default is 56. A bitmask that specifies which levels of the events to filter or permitted to be sent to this address. This is used in combination with Filtertypes to provide a granular filter for traps from the SNMP Agent side. From right to left the following bits specifies the following levels: Bit #1: DEBUG (right-most bit) Bit #2: INFO Bit #3: WARNING Bit #4: MINOR Bit #5: MAJOR Bit #6: CRITICAL (left-most bit). For example, in order to receive only INFO, MINOR, and MAJOR traps, then the filter in binary would be (011010) which converts to integer value of (26) to be entered as the token value. If all levels are to be received then the binary would be (111111) which converts to (63) as the token value. And likewise if no levels are to be received then the binary would be (000000) which converts to (0) as the token value. WARNING: Any filter that permits levels DEBUG and/or INFO traps will cause a high number of traps to be sent and tax the system resources on the SNMP Agent on the EMS; care must be taken when specifying numbers that converts to binary containing bits 1 or 2 turned on such as (49-51), (57-59), (61-63), etc.

Once this is done, the NMS will start receiving traps.

Note It is the responsibility of the NMS operator to filter the traps that are displayed on the NMS and those that are discarded.

Status and Controls

Querying and Controlling EMS, BDMS, CA and FS

Status queries on the following components can be performed by simple GET/GETNEXT operations:

- Primary and secondary EMS
- Primary and secondary BDMS
- Primary and secondary CA
- Primary and secondary POTS/Centrex/Tandem FS
- Primary and secondary AIN FS

Controls can be performed on these components using the SET operation, but only on the primary component (primary EMS, primary CA and primary FS). The primary component, in turn, controls the secondary component. If the operator tries to perform a SET operation on the secondary component, the agent returns an error.

Querying and Controlling Various Components

Status queries on the current status of the following components can be performed by GET/GETNEXT operations on the variousState columns in the MIB.

- Media Gateway (MGW)

- Trunk Group (TG)
- Subscriber Termination
- Trunk Termination
- SGP
- DPC
- SCTP Association

In addition, controls can be performed on the following components by SETs on various columns in the MIB.

- Media Gateway (MGW)
- Trunk Group (TG)
- Subscriber Termination
- Trunk Termination
- SCTP Association

Controls can be performed as follows:

Step 1 Perform SET operations on all the necessary fields (Mode column and TargetState column, and so forth).

Step 2 Perform a SET operation on the ControlState column, using the value of **1** (commit) to actually put the component into its target state.

If you perform a GET/GETNEXT operation on the ControlState when all necessary fields are NOT set, then a value of **2** (insufficient-data) is returned. If all necessary fields ARE set, then a value of **3** (ready-to-commit) is returned.

Querying and Controlling Bulk Status of Various Components

Bulk Status queries on the current status of the following components can be performed by GET/GETNEXT operations on the following branch: .iso.org.dod.internet.private.enterprises.ipcell.opticall.statusControlBulk. The results return from querying these components are a Page Number column and a Status Value column. The Status Value column specifies each component id and the statuses in enumerated value correlating to the statuses of those components above.

- Media Gateway (MGW) - The Status Value column specifies delimited string of X number of MGWs. The delimiters are: ';' = delimits each MGW. '|' = delimits status fields. The protocol of which is: 'MGW_ID|admin_state|oper_state;MGW_ID|admin_state...' And example: 'MGW_ABC|1|3;MGW_XYZ|1|3...' The enumerated states are the same as that of mediaGatewayOAMPTable.
- Trunk Group (TG) - The Status Value column specifies delimited string of X number of Trunk Groups. The delimiters are: ';' = delimits each Trunk Group. '|' = delimits status fields. The protocol of which is: 'TGN_ID|admin_state|oper_state;TGN_ID|admin_state...' And example: '232|1|3;233|1|3...' The enumerated states are the same as that of trunkGroupOAMPTable.

- Subscriber Termination - The Status Value column specifies delimited string of X number of Subscriber Terminations. The delimiters are: ';' = delimits each Subscriber Termination. '|' = delimits status fields. The protocol of which is: 'SUB_ID|admin_state|oper_state;SUB_ID|admin_state...' And example: 'SUB_ABC|1|3;SUB_XYZ|1|3...' The enumerated states are the same as that of subscrLineTermOAMPTable.
- Trunk Termination - The Status Value column specifies delimited string of X number of Trunk Terminations. The delimiters are: ';' = delimits each Trunk Termination. '|' = delimits status fields. '.' = delimits CIC and TGN_ID. The protocol of which is: 'TGN_ID.CIC|admin_state|oper_state|static_state|dynamic_state;CIC.TGN_ID|admin_state...' And example: '232.22|1|3|1|1;233.22|1|3|1|1...' The enumerated states are the same as that of trunkTermOAMPTable.

Accessing the Sun Solaris SNMP Agent

There are two possible methods to access and query the Sun Solaris SNMP Agent:

1. Directly through a non-standard SNMP port.

Note The Cisco BTS 10200 Softswitch SNMP Master Agent cannot be full when accessing or querying through a non-standard SNMP port.

2. Through the Cisco BTS 10200 Softswitch SNMP Master Agent using standard port 161.

Note You must be SNMPv2c compliant because the Cisco BTS 10200 Softswitch SNMP Agent proxies queries to the Sun Solaris Agent, which only supports SNMPv1. You must specify SNMPv1 as the SNMP version when accessing or querying using standard port 161.

Accessing and Querying a Non-Standard SNMP Port Directly

Perform the following steps to access and query the Sun Solaris SNMP Agent using a non-standard SNMP port:

Step 1 Modify following parameters in /etc/snmp/conf/snmpd.conf file:

a. read-community

- specify a user-defined community string for read access
- enter only one value

b. managers

- specify the IP or hostname for querying the entity (NMS)
- you can specify multiple entries delimited by spaces

Note You must retain the localhost as one of the entries in order to retain communication with BTS SNMP Master Agent.

Step 2 Restart Sun Solaris SNMP Agent

```
/etc/init.d/S98mibiisa stop
/etc/init.d/S98mibiisa start
```

Step 3 Begin directly querying Sun Solaris SNMP Agent with the specified read-community string using port 13230.

Accessing and Querying the Sun Solaris SNMP Agent

Perform the following steps to access and query the Sun Solaris SNMP Agent through the Cisco BTS 10200 Softswitch SNMP Master Agent Using Port 161:

Step 1 Modify following parameters in /etc/snmp/conf/snmpd.conf file:

a. read-community

- specify a user-defined community string for read access

- enter only one value

b. managers

- verify that the localhost is one of the entries

Step 2 Modify the SNMP configuration type and value:

```
add snmpconfig type=SETTING; value=COUPLE_SUN_AGENT
```

Step 3 Restart BTS SNMP Master Agent.

Step 4 Log in as root.

```
kill `ps -ef | grep -i sad | grep -v grep | awk '{print $2}'`
```

Step 5 Begin querying the Sun Solaris SNMP Agent object id (OID) with the specified read-community string using standard port 161.

Enabling NMS to Query Solaris SNMP Agent

The EMS runs two SNMP agents as follows:

- SAD (SNMP agent adapter)
- Solaris SNMP agent

The active EMS node runs the SAD process, which converts the BTS 10200 specific events/alarms into SNMP traps and sends them to the configured SNMP Trap listeners or the NMSes. The SAD process handles the SNMPWALK/GET/GETNEXT/SET on the OIDs that are defined in the opticall.mib file. The SAD process also runs on the standby EMS, but does not perform any function.

Note The SAD process does not run on the CA nodes.

Note The CA runs only the standard Solaris SNMP agent.

The standard Solaris SNMP agent runs on both the active and standby EMS and CA nodes. The name of the standard Solaris SNMP agent is **mibiisa**, which runs on port number 13230. The Solaris SNMP agent can be used to collect the sun box related statistics and/or traps. Note that the **mibiisa** supports only those OIDs (object identifiers) that are defined in the SUN MIB.

To enable the NMS to directly query the Solaris SNMP agent for a range of OIDs specified by SUN MIBs, and receive Solaris box-level traps, do the following:

1. Open the /etc/snmp/conf/snmpd.conf file.
2. Define the read-community as “public”.
3. In the “Managers” field, enter the IP address or hostname of the NMS from where the user needs to send the SNMP query. Enter multiple addresses separated by spaces, but leave the “localhost” entry as is.
4. In the Trap field, configure the IP address or hostname of the NMS where the traps have to be sent.
5. Restart the SNMP agent, enter:

```
/etc/init.d/S98mibiisa stop
/etc/init.d/S98mibiisa start
```

6. Query the SNMP agent (using SNMPGET/SNMPWALK) from the Manager using the read-community and port 13230. For example, to get the system up time, enter the following command:

```
snmpwalk -c public -p 13230 prica07 system
```

The output appears as given below:

```
system.sysDescr.0 = Sun SNMP Agent
system.sysObjectID.0 = OID: enterprises.42.2.1.1
system.sysUpTime.0 = Timeticks: (279199168) 32 days, 7:33:11.68
system.sysContact.0 = System administrator
system.sysName.0 = prica07
system.sysLocation.0 = System administrators office
system.sysServices.0 = 72
```

CHAPTER 8

Congestion Detection and Protection

Revised: July 21, 2009, OL-4495-10

Introduction

This chapter describes the congestion detection and protection feature, which includes the following capabilities:

- The system detects internal messaging congestion caused by traffic overload or other extraordinary events, and takes preventive action to avoid system failure (including shedding of traffic)
- The system generates alarms when internal messaging congestion is detected, and clears the alarms when congestion abates
- When the internal call processing engine is congested, the system places the access control list (ACL) parameter (indicating congestion) into the release messages sent to the SS7 network.

This feature functions automatically, and is not provisionable via command line interface (CLI) commands.

Special Treatment for Emergency Messages

When the Cisco BTS 10200 Softswitch is in a congested state, emergency messages are given special treatment, and are allowed to pass through. The dialed digit strings for emergency calls are specific to each region. Up to ten digit strings can be specified (911 and 9911 are included by default). Your Cisco account team can provide additional information about how your Cisco BTS 10200 Softswitch is set up to detect dialed digit strings for emergency calls.

Tip The emergency.lst file is described in the following paragraph. Note that this file should be filled out prior to bringing your system into service. If you need to make changes to this file after your system is in service and carrying live traffic, it will be necessary to modify the list and then restart the CA. Do not attempt to make these modifications on your own. Instead, contact Cisco TAC for assistance.

Caution Do not modify the emergency.lst file on a live traffic-carrying system until you have an approved procedure, applicable to your specific installation, from Cisco TAC.

The Cisco BTS 10200 Softswitch uses emergency numbers stored in the emergency.lst file to determine which calls to force through to the destination. The emergency.lst file is stored in the **/opt/OptiCall/CA146/bin** directory. The default emergency.lst file, containing the default 911 and 9911 dialed digits, is shown below. Note that each digit pattern is listed on a separate line.

```
### Copyright (c) 2002, 2003 by Cisco Systems, Inc.
#
# This file contains the possible dialed digit-patterns
# for emergency calls.
# Each line should contain only one digit-pattern.
# Line started with '#' is considered as comment.
# There could be up to 10 (at most) digit-patterns included
# in this file.
# Each digit-pattern could have at most 15 digits.
911
9911
```

Billing Records

The following billing records are created when a call is rejected due to overload conditions:

- SS7 termination cause code 42
- Cable signaling stop event cause code “resource unavailable”

Note Calls rejected by the signaling adapter will not generate a billing record.

Events and Alarms

Table 8-1 lists the alarms and events the Cisco BTS 10200 Softswitch can generate for congestion detection and protection events.

See the *Cisco BTS 10200 Softswitch Troubleshooting Guide* for a complete description of all alarms and events generated by the Cisco BTS 10200 Softswitch.

Table 8-1 Alarms for Congestion Detection and Protection Events

Alarm	Severity	Comments
Maintenance(97)	Critical	The indicated thread is not able to process its IPC[1] input messages fast enough. The input queue has grown too large and is using up too much of the IPC memory pool resource.
Maintenance(98)	Minor	The indicated thread is not able to process its IPC input messages fast enough. The input queue has grown too large and is at 25% of the level at which it will enter the throttle state.

Maintenance(99)	Major	The indicated thread is not able to process its IPC input messages fast enough. The input queue has grown too large and is at 50% of the level at which it will enter the throttle state.
Maintenance(100)	Critical	The indicated thread is not able to process its IPC input messages fast enough. The input queue has grown too large and is at 75% of the level at which it will enter the throttle state.

1. IPC = Interprocess communications (an internal Cisco BTS 10200 Softswitch process)

Additional References

For additional information on the industry standard for this feature, refer to Telcordia LSSGR document GR-317-CORE /3.1.4.12, *Automatic Congestion Control Procedures.*

For additional information related to Cisco BTS 10200 Softswitch billing functions, refer to the following documents:

- *Cisco BTS 10200 Softswitch Release 4.5 Billing Interface Guide*—Management procedures and contents of the call detail blocks (CDBs) generated by the Call Agent for billing
- *Cisco BTS 10200 Softswitch Release 4.5 PacketCable Feature Guide*—Management procedures and contents of the event messages (EMs) generated by the Call Agent for billing (typically used in PacketCable-based networks)

APPENDIX A

Feature Tones

Revised: July 21, 2009, OL-4495-10

Introduction

The Cisco BTS 10200 Softswitch supports special tones on various subscriber and operator features by sending MGCP messages to the gateways. These tones are based on the information in the following documents:

- Telcordia document *GR-506-CORE, Signaling for Analog Interfaces*
- Telcordia document *TR-NWT-506, Issue 3, Signaling*
- Telcordia document *GR-590-CORE, Call Pickup Features (FSD 01-02-2800)*
- Telcordia document *GR-317-CORE, Switching System Generic Requirements for Call Control Using the Integrated Services Digital Network User Part (ISDNUP)*
- Telcordia document *GR-219-CORE, Distinctive Ringing/Call Waiting (FSD 01-01-1110).*
- IETF document *RFC 2705, Media Gateway Control Protocol (MGCP) Version 1.0*

List of Tones Applicable to Specific Features

Table A-1 lists the tones used with each feature, and the condition that triggers the sending of each tone.

Note See the Glossary for the meaning of acronyms used in this table.

Table A-1 Feature Tones

Feature	Tone	Condition(s) That Cause the Specified Tone To Be Played [1]
AC	ALERTING PATTERN 3	
ACR	No special tone delivered	

Table A-1 Feature Tones (continued)

Feature	Tone	Condition(s) That Cause the Specified Tone To Be Played [1]
ACRA ACRD	CONFIRMATION TONE	Anonymous call rejection (ACR) was successfully activated or deactivated by user actions.
	REORDER TONE	ACR was not successfully activated or deactivated by user actions.
AR	ALERTING PATTERN 3	
BLV/OI	REORDER TONE	Normal access is not available. There is a local office problem. The line is momentarily unavailable. No-test access is not available.
	BUSY VERIFICATION	CFU is activated on the terminating line. Terminating line is a data-only line or a denied line.
	PERMANENT SIGNAL TONE	Line up to receiver off-hook tone. Terminating line receiving a permanent signal announcement. Terminating line is high and wet (battery and ground shorted) or high and dry (off hook for an extended period).

Table A-1 Feature Tones (continued)

Feature	Tone	Condition(s) That Cause the Specified Tone To Be Played [1]
CW CIDCW	CW TONE	If called party has MDN feature: primary DN matched. If called party is in Centrex system with DACWI: there is no extension for the number dialed. If called party has DRCW feature: calling party is not on the DRCW screening list.[2]
	CW TYPE 2	If called party has MDN feature: second DN matched. If called party is in Centrex system with DACWI: extension exists for the number dialed.
	CW TYPE 3	If called party has MDN feature: third DN matched.
	CW TYPE 4	If called party has DRCW feature: calling party is on the DRCW screening list.[2]
	STUTTER TONE	For Centrex subscriber with CHD feature and currently on an active call: A third party calls in, and the called party hears a call-waiting tone. The called party presses Flash button or switchhook to place the current remote station on hold, and hears the stutter tone. The called party has the following options: • Press Flash button or switchhook again to return to the original call. • Dial a designated vertical service code (VSC)—typically *52—to be connected to the new calling party; the first calling party is kept on hold.
	TONES OFF	No tones are played for CW or CIDCW. (Tones are turned off under certain special circumstances.)
	ALERTING PATTERN 1	Alerting pattern (ringing) is provided to the calling party and called party, as applicable, for all reconnect, re-ring, callback and recall scenarios.
CCW	CONFIRMATION TONE	User in two-way call cancels call waiting.
	DIAL TONE	POTS or Centrex user picks up phone to cancel call waiting.
	STUTTER TONE	User places the other party on hold (CHD) and then activates CCW while call is still on hold.
	ALERTING PATTERN 1	User goes on hook with the other party still on hold; the system provides alerting pattern (ringing).
CDP	DIAL TONE	User is granted access to an outside (public) line, typically after dialing 9.
	ALERTING PATTERN 3	Member of a Centrex group receives an incoming call from the group attendant.
CFU	REMINDER RING TONE	Alerting pattern (ringing) is provided on the called station to indicate that a call has been received and automatically forwarded.

Table A-1 Feature Tones (continued)

Feature	Tone	Condition(s) That Cause the Specified Tone To Be Played [1]
CFU-ACT	STUTTER TONE	User has successful activated CFU from the handset.
	DIAL TONE	User has dialed the CFU-ACT star code, and the system is ready to receive digits for the forward-to DN. 1-second timer elapses following the confirmation tone.
	CONFIRMATION TONE	Centrex user successfully activates extension forwarding. If the user has multiple call forwarding (MCF), the user has successfully activated a chain call forwarding scenario POTS user receives ROUTE SELECTED DIALING PLAN.
	REORDER TONE	The CFU-ACT attempt was not successful due to • Attempt to activate CFU when it was already activated • Attempt to forward calls to a DN that could not be reached • Attempt to forward call from a DN to itself.
CFU-DEACT	CONFIRMATION TONE	User successfully deactivates CFU.
	DIAL TONE	1-second timer elapses following the confirmation tone.
	REORDER TONE	User attempts to deactivate CFU when it was already deactivated
CFB-ACT and CFNA-ACT	DIAL TONE	User has dialed the CFB-ACT or CFNA-ACT star code, and the system is ready to receive digits for the forward-to DN.
	CONFIRMATION TONE	User successfully activates CFB or CFNA.
	DIAL TONE	1-second timer elapses following the confirmation tone.
CFB-DEACT and CFNA-DEACT	CONFIRMATION TONE	User has dialed the CFB-DEACT or CFNA-DEACT star code, and CFB or CFNA has been deactivated.
	DIAL TONE	Issued after a 1-second timer elapses following the confirmation tone.
CHD	STUTTER TONE	For Centrex subscriber (controlling party) currently on an active call: The controlling party places the other party on hold by pressing the Flash button or switchhook, and hears the stutter tone. Controlling party has the following options: • Press Flash button or switchhook again to return to the original call. • Dial a designated vertical service code (VSC)—typically *52—hear the stutter tone again, then dial the number of a third party. The first calling party is kept on hold.
	ALERTING PATTERN 1	Alerting pattern (ringing) is provided to the calling party and called party, as applicable, for all reconnect, re-ring, callback and recall scenarios.
CNAM CND	No special tone delivered	

Table A-1 Feature Tones (continued)

Feature	Tone	Condition(s) That Cause the Specified Tone To Be Played [1]
CNDB CNAB CIDB CIDS	DIAL TONE	User has dialed the star code for the identity blocking feature, and the system is ready to receive digits for the DN to be called.
COS: Account Codes	CONFIRMATION TONE	The system prompts the user to enter the account code.
COS: Authorization Codes	CONFIRMATION TONE	The system prompts the user to enter the authorization code.
CPRK	REORDER TONE	User has dialed the call park (CPRK) access code, but is not subscribed to the CPRK feature. The user is subscribed to the CPRK feature, and has dialed the CPRK access code, but the CPRK attempt was not successful. **Note** In this case (CPRK attempt was not successful), the reorder tone is played for two seconds, and then the user is reconnected to the original call.
	STUTTER TONE	User presses Flash button or switchhook to park the call.
CPRK_RET	REORDER TONE	The user is subscribed to the CPRK feature, and has dialed the CPRK access code, but is unable to retrieve the call.
	STUTTER TONE	The user enters the CPRK_RET access code, and the system is waiting for the user to dial the extension against which the parked call should be retrieved.
CT/TWC	ALERTING PATTERN 1	User hangs up with one party on hold.
DACWI	ALERTING PATTERN 3	Distinctive ring pattern.
DPN	STUTTER TONE	User has dialed DPN access code, and DPN access has been granted.
	REORDER TONE	Reorder tone is returned to the user who initiated a DPN request when any of the following occurs: • The DPN feature has not been assigned to the requesting line. • The dialed extension is not assigned in the business group dialing plan. • The line associated with the dialed extension is not being rung. (Note that “being rung” should not include being given call-waiting treatment.) • The call has been answered, picked up, or abandoned. • The requesting line is not allowed to pick up the particular call because of being assigned the fully restricted terminating or the denied termination feature.

Table A-1 Feature Tones (continued)

Feature	Tone	Condition(s) That Cause the Specified Tone To Be Played [1]
DPU	STUTTER TONE	User has dialed DPU access code, and DPU access has been granted.
	REORDER TONE	Reorder tone is returned to the user who initiated a DPU request when any of the following occurs: • The dialed extension is not assigned in the business group dialing plan. • The line associated with the dialed extension is not assigned the DPU feature. • The line associated with the dialed extension is neither being rung nor involved in a stable two-way call. (Note that "being rung" should not include being given call-waiting treatment. Note also that DPU should not allow a user to barge-in on the controller of a multiway connection, that is, a call-waiting configuration, a call-hold configuration, or a conference call.) • The call is abandoned by the caller before the DPU request is recognized or has been picked up by a line without DPU assigned. • The requesting line is not allowed to pick up the particular call because of being assigned the fully restricted terminating or the denied termination feature.
	CONFIRMATION TONE	Barge-in connection is being processed and connection will occur within one second. **Note** Confirmation tone is repeated twice.
DRCW	ALERTING PATTERN 1	DN of incoming call is *not* on the DRCW screening list.
	ALERTING PATTERN 6	DN of incoming call is on the DRCW screening list.
	CW TONE	DN of incoming call is *not* on the DRCW screening list.
	CW TYPE 4	DN of incoming call is on the DRCW screening list.
Emergency—911	ALERTING PATTERN 1	After a normal two-party call, the user presses the Flash button or hookswitch, dials 911, and then hangs up before the 911 operator answers.
MDN	ALERTING PATTERN 1	Station is on hook and there is an incoming call to primary DN.
	ALERTING PATTERN 4	Station is on hook and there is an incoming call to secondary DN.
	ALERTING PATTERN 5	Station is on hook and there is an incoming call to the third DN.
	CW TONE	Station is off hook and there is an incoming call to primary DN.
	CW TYPE 2	Station is off hook and there is an incoming call to secondary DN.
	CW TYPE 3	Station is off hook and there is an incoming call to the third DN.
MWI [3]	MWI TONE	User, who is subscribed to MWI service, has a message waiting.
MIDCALL	STUTTER TONE	After pressing Flash button or hookswitch and the system acknowledges it is as a valid midcall action.
	ALERTING PATTERN 1	User goes on hook with the other party still on hold; the system provides alerting pattern (ringing).

Table A-1 Feature Tones (continued)

Feature	Tone	Condition(s) That Cause the Specified Tone To Be Played [1]
SC1D-ACT SC2D-ACT	STUTTER TONE	Stutter tone is used once after the user enters the *74 (SC1D activation) or *75 (SC2D activation) to begin the process of collecting the information required to provision one of the speed call slots. After a speed call slot has been successfully provisioned, the user will again receive the stutter tone to signify that the speed call slot was successfully provisioned.
VMWI [3]	STUTTER TONE	User, who is subscribed to VMWI service, has a message waiting, but the serving MGW does not have a visual indicator.

1. When more than one condition is listed for a single tone, any one of the conditions can cause the tone to be played.
2. For more information on the screening list, refer to the *Cisco BTS 10200 Softswitch System Description*.
3. MWI = message waiting indicator; VMWI = visual message waiting indicator.

Tone Frequencies and Cadences

Table A-2 lists the frequency and cadence for tones applicable to subscriber and operator features. Tones are requested by the Cisco BTS 10200 Softswitch and delivered to the subscriber or operator by the MGW. Some MGWs can be provisioned to play tone cadences different than the ones described in this table.

Table A-2 Subscriber and Operator Tone Descriptions

Tone	Frequency (Hz)	Cadence Played by MGW
Alerting pattern (ringing) 1	440 + 480	2 sec on, 4 sec off, repeating
Alerting pattern (ringing) 2	440 + 480	0.8 sec on, 0.4 sec off, 0.8 sec on, 4.0 sec off, repeating
Alerting pattern (ringing) 3	440 + 480	0.4 sec on, 0.2 sec off, 0.4 sec on, 0.2 sec off, 0.8 sec on, 4 seconds off, repeating
Alerting pattern (ringing) 4	440 + 480	0.3 sec on, 0.2 sec off, 1 sec on, 0.2 sec off, 0.3 sec on, 4 sec off, repeating
Alerting pattern (ringing) 5	440 + 480	0.5 sec on once
Alerting pattern (ringing) 6	440 + 480	1 sec on, 3sec off, repeating
Busy verification (used for operator BLV [1])	440	2 sec burst, followed by 0.5 sec burst every 10 sec
CW tone	440	0.3 sec on once
CW Type 1	440	0.3 sec on once
CW Type 2	440	0.1 sec on, 0.1 sec off, 2 times
CW Type 3	440	0.1 sec on, 0.1 sec off, 3 times
CW Type 4	440	0.1 sec on, 0.1 sec off, 0.3 sec on, 0.1 sec off, 0.1 sec on
Confirmation tone	350 + 440	0.1 sec on, 0.1 sec off, 3 times
Dial tone	350 + 440	steady on
Line busy tone	480 + 620	0.5 sec on, 0.5 sec off, repeating
Message waiting indicator tone	350 + 440	10 bursts (0.1 sec on, 0.1 sec off), then steady on

Table A-2 Subscriber and Operator Tone Descriptions (continued)

Tone	Frequency (Hz)	Cadence Played by MGW
Off-hook warning tone (receiver off-hook tone)	1400 + 2060 + 2450 + 2600	0.1 sec on, 0.1 sec off, repeating
Permanent signal (used for operator BLV [1])	480	Steady on
Reminder ring tone (ring splash)	440 + 480	0.5 sec ring
Reorder tone	480 + 620	0.25 sec on, 0.25 sec off, repeating
Ringback tone (audible ringing)	440 + 480	2 sec on, 4 sec off (repeated)
Stutter (recall) dial tone	350 + 440	3 bursts (0.1 sec on, 0.1 sec off), then steady on

1. BLV = busy line verification

Table A-3 lists the maintenance tones used for continuity testing. See the Telcordia document GR-317-CORE for additional details.

Table A-3 Maintenance Tone Descriptions

Tone	Frequency (Hz)	Description
2010-Hz continuity tone	2010	Used for single-tone test under either of the following conditions: • The circuit is a 4-wire circuit at both the transceiver end and the distant end • The circuit is a 2-wire circuit at the transceiver end
1780-Hz continuity tone	1780	Used for dual-tone test with a 4-wire circuit at the transceiver end and a 2-wire circuit at the distant end