Framework 7.6

Management Layer

User's Guide

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Table of Contents

Preface

Welcome to the *Framework 7.6 Management Layer User's Guide.* This document introduces you to the concepts, terminology, and procedures relevant to this layer of the Genesys Framework.

Use this document only after you have read through the *Framework 7.6 Deployment Guide* and the Release Notes for the Management Layer components.

This document is valid only for the 7.6 release of this product.

Note: For releases of this document created for other releases of this product, please visit the Genesys Technical Support website or request the Documentation Library CD, which you can order by e-mail from Genesys Order Management at orderman@genesyslab.com.

This chapter provides an overview of this document, identifies the primary audience, introduces document conventions, and lists related reference information:

The Management Layer is the Genesys software that provides numerous functions to control and monitor your Genesys installation.

Intended Audience

This guide is intended primarily for system architects and system administrators.

In general, this document assumes that you have a basic understanding of and familiarity with:

- Computer-telephony integration concepts, processes, terminology, and applications.

- Network design and operation.
- Your own network configurations.
- Genesys Framework architecture and functions.
- Configuration Manager interface, terminology, and object-managing operations.
- Architecture and functions of the Genesys solutions that you are using.

Reading Prerequisites

You must read the *Framework 7.6 Deployment Guide* before using this guide. This book contains information about the Genesys software you must deploy before deploying the Management Layer and instructions on how to deploy this Framework layer. In addition, the *Framework 7.6 Deployment Guide* provides a sample worksheet that helps you successfully configure and install the Management Layer components.

Chapter Summaries

In addition to this opening chapter, this guide contains these chapters and appendixes:

- Chapter 1, "Overview," on page 15, briefly introduces the Management Layer 7.6.
- Chapter 2, "Architecture," on page 23, discusses the Management Layer architecture and describes each component. It also provides component recommendations you can use while planning your overall Genesys installation.
- Chapter 3, "Management Layer Functionality," on page 27, describes the Management Layer capabilities that help you optimally manage the Genesys software serving your contact center.
- Chapter 4, "Using the Management Layer," on page 45, describes how to put a particular Management Layer function to work. This chapter also gives hands-on tips on how to use the particular functions, including information about related applications and reference documents.
- Chapter 5, "Stuck Calls Management," on page 73, describes new functionality for handling stuck calls, including the various methods used to detect and handle them.
- Chapter 6, "E-Mail Alarm-Signaling Interface," on page 83, describes how the Management Layer processes alarm reactions of the E-Mail type and how to configure an e-mail system for this function.
- Chapter 7, "SNMP Interface," on page 87, describes Management Layer built-in support for network management systems (NMS) that comply with the Simple Network Management Protocol (SNMP). It also describes how

to activate this function. In particular, this chapter focuses on how the Management Layer distributes SNMP commands from an NMS and how it processes alarm reactions of the SNMP Trap type. It also describes the layout of the Genesys Management Information Base (MIB) file and the format of the SNMP traps, including the abbreviations for the Genesys application types.

- Chapter 8, "Managing Third-Party Applications," on page 121, describes which Management Layer functions you can use with third-party applications and how the Management Layer processes the related commands. It also lists the software prerequisites for and describes how to configure these applications.
- Chapter 9, "Log Format," on page 129, describes the formats of log records stored in the Centralized Log Database.
- Chapter 10, "Predefined Alarm Conditions," on page 139, describes alarm conditions that are preconfigured by Genesys and become available immediately after you set up Framework 7.6. The conditions under which alarms are generated, the actions automatically taken by the system to cope with or recover from the failure, and the maintenance actions appropriate in each situation are discussed for each alarm condition.
- Chapter 11, "Troubleshooting," on page 153, contains suggestions on how to identify and handle the most common mistakes made when you are enabling the Management Layer functionality.
- Appendix A, "Genesys MIB File," on page 161, presents the content of the Genesys 7 MIB that enables the Management Layer 7.6 to support the Simple Network Management Protocol.
- Appendix B, "Changes in MIB File," on page 213, describes updates to the MIB for the 6.5, 7.0, 7.1, 7.5, and 7.6 releases.

Document Conventions

This document uses certain stylistic and typographical conventions—introduced here—that serve as shorthands for particular kinds of information.

Document Version Number

A version number appears at the bottom of the inside front cover of this document. Version numbers change as new information is added to this document. Here is a sample version number:

76fr_us-ml_10-2007_v7.6.001.00

You will need this number when you are talking with Genesys Technical Support about this product.

Type Styles

Italic

In this document, italic is used for emphasis, for documents' titles, for definitions of (or first references to) unfamiliar terms, and for mathematical variables.

Examples:

- Please consult the *Genesys 7 Migration Guide* for more information.
- *A customary and usual practice* is one that is widely accepted and used within a particular industry or profession.
- Do *not* use this value for this option.
- The formula, $x + 1 = 7$ where x stands for . . .

Monospace Font

A monospace font, which looks like `teletype or typewriter text`, is used for all programming identifiers and GUI elements.

This convention includes the *names* of directories, files, folders, configuration objects, paths, scripts, dialog boxes, options, fields, text and list boxes, operational modes, all buttons (including radio buttons), check boxes, commands, tabs, CTI events, and error messages; the values of options; logical arguments and command syntax; and code samples.

Examples:

- Select the `Show variables on screen` check box.
- Click the `Summation` button.
- In the `Properties` dialog box, enter the value for the host server in your environment.
- In the `Operand` text box, enter your formula.
- Click `OK` to exit the `Properties` dialog box.
- The following table presents the complete set of error messages T-Server distributes in `EventError` events.
- If you select `true` for the `inbound-bsns-calls` option, all established inbound calls on a local agent are considered business calls.

Monospace is also used for any text that users must manually enter during a configuration or installation procedure, or on a command line:

Example:

- Enter `exit` on the command line.

Screen Captures Used in This Document

Screen captures from the product GUI (graphical user interface), as used in this document, may sometimes contain a minor spelling, capitalization, or grammatical error. The text accompanying and explaining the screen captures corrects such errors *except* when such a correction would prevent you from

installing, configuring, or successfully using the product. For example, if the name of an option contains a usage error, the name would be presented exactly as it appears in the product GUI; the error would not be corrected in any accompanying text.

Square Brackets

Square brackets indicate that a particular parameter or value is optional within a logical argument, a command, or some programming syntax. That is, the parameter's or value's presence is not required to resolve the argument, command, or block of code. The user decides whether to include this optional information. Here is a sample:

```
smcp_server -host [/flags]
```

Angle Brackets

Angle brackets indicate a placeholder for a value that the user must specify. This might be a DN or port number specific to your enterprise. Here is a sample:

```
smcp_server -host <confighost>
```

Related Resources

Consult these additional resources as necessary:

- *Framework 7.6 Architecture Help,* which will help you view the place of the Management Layer in the Framework architecture.
- *Framework 7.6 Deployment Guide,* which will help you configure, install, start, and stop the Management Layer components.
- *Framework 7.6 Configuration Options Reference Manual,* which will provide you with descriptions of configuration options for the Management Layer components.
- *Framework 7.6 Configuration Manager Help,* which will help you use Configuration Manager.
- *Framework 7.6 Solution Control Interface Help,* which will help you use Solution Control Interface.
- *Genesys 7.6 Transport Layer Security Deployment Guide*, which describes the Transport Layer Security (TLS) support that is new in release 7.5, and provides detailed instructions for deploying it.
- The *Genesys Technical Publications Glossary,* which ships on the Genesys Documentation Library CD and which provides a comprehensive list of the Genesys and CTI terminology and acronyms used in this document.

- The *Genesys 7 Migration Guide*, also on the Genesys Documentation Library CD, which provides a documented migration strategy from Genesys product releases 5.1 and later to all Genesys 7.x releases. Contact Genesys Technical Support for additional information.
- The Release Notes and Product Advisories for this product, which are available on the Genesys Technical Support website at http://genesyslab.com/support.

Information about supported hardware and third-party software is available on the Genesys Technical Support website in the following documents:

- *Genesys Supported Operating Systems and Databases*
- *Genesys Supported Media Interfaces*

Genesys product documentation is available on the:

- Genesys Technical Support website at http://genesyslab.com/support.
- Genesys Documentation Library CD, which you can order by e-mail from Genesys Order Management at orderman@genesyslab.com.

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Chapter

1 Overview

This chapter briefly introduces the Management Layer 7.6.

This chapter contains the following sections:

Overview of Management Layer Functions

The Management Layer of Genesys Framework 7.6 provides the following functions:

- **Solution and application control and monitoring**—you control and monitor all solutions and applications from a single point. The Management Layer displays the real-time status of every configured Solution object, and you can activate and deactivate solutions and single applications from this layer. This control and monitoring also includes user-defined solutions.
- **Centralized logging**—applications log maintenance events in the unified log format and the events are recorded in one central location. That format enables easy selection of required log records and centralized log storage for convenient access and solution-level troubleshooting. With centralized logging, you can also track individual interactions, audit activities in your contact center, and store alarm history.
- **Alarm signaling**—flexible alarm signaling triggers alarms based on application maintenance events, thresholds for system performance variables, or Simple Network Management Protocol (SNMP) variables. Solution Control Server communicates alarms to Solution Control Interface and can write alarms to system logs. You can configure the system to convert alarms into SNMP traps and send them as e-mails to a specified e-mail address. (The latter automatically enables paging

notifications.) The Management Layer automatically associates alarms with the solutions they affect and stores alarms as active conditions in the system until either they are removed by another maintenance event or you clear them. Alarms are visible only if you have access to the application that generated the alarms.

- **Application failure management**—fault-management functions consist of detection, isolation, and correction of application failures. For nonredundant configurations, the Management Layer automatically restarts applications that fail. For redundant configurations, this layer supports a switchover to the standby applications and also automatically restarts failed applications.
- **Built-in SNMP functionality**—extended SNMP support enables both alarm processing and SNMP data exchange with an SNMP-compliant network management system (NMS). This means you can integrate a third-party NMS with a Genesys system to serve as an end-user interface for system control and monitoring and for alarm signaling.

> **Note:** The SNMP functionality of the Management Layer is controlled by the Genesys licensing system. Refer to the *Genesys 7 Licensing Guide* for information about ordering licenses that activate this functionality.

- **Individual host monitoring**—host parameters are monitored, including records of CPU and memory usage and information about currently running processes and services.
- **Support for geographically distributed environments**—a special mode in Genesys Solution Control Server simplifies the operation of a geographically distributed installation that uses a single Configuration Database.

> **Note:** The Management Layer support for geographically distributed environments is controlled by the Genesys licensing system. Refer to the *Genesys 7 Licensing Guide* for information about ordering licenses that activate this functionality.

See “Architecture” on page 23 for information about the Management Layer components and “Management Layer Functionality” on page 27 for more detailed information about the Management Layer functions.

Refer to the *Framework 7.6 Deployment Guide* for configuration and installation instructions.

New in This Release

This section highlights the new features, listed by release, included in the Management Layer.

Release 7.6

- You can now customize log events for an application by changing their default log levels or disabling them completely. See "How to Customize Log Events" on page 54.
- Solution Control Interface now supports new security measures, including a user-defined Security Banner, and forcing a logged-in user to log in again after a period of inactivity.

Release 7.5

- The Management Layer now supports Genesys Security using the Transport Layer Security (TLS) Protocol.
- The Alarm Reaction Wizard now enables you to customize the `Subject` line and content of e-mail alarm reactions. See "Alarm Reactions of the E-Mail Type" on page 63.
- SCS and Local Control Agent (LCA) logs now include date and time stamps.
- Alarm reaction parameters now include the Host name. See "Alarm Reactions of the OS Command Type" on page 64.
- Alarms are now visible only if you have access to the application that generated the alarms.
- SCS now processes the log messages and alarms that it generates, without using the Message Server.
- You can now control the number of log messages in the queue when the connection between Message Server and Log DB Server is unavailable. See "Centralized Logging" on page 32.
- You can now control how many messages Message Server sends to Log DB Server without waiting for a response. See "Message Server" on page 24.

Release 7.1

- With release 7.1.1, Configuration Manager, Genesys Wizard Manager, and Solution Control Interface display a new Login dialog that includes backup information and a check box. See Appendix C, "Login Procedure" in the *Framework 7.1 Deployment Guide*.

- SCI now connects to the Configuration Server backup, after a lost connection, without requesting login information.
- The Management Layer supports Genesys Enterprise Telephony Software (GETS) functionality, including:
  - Integration with Microsoft Operational Manager (MOM) technology.
  - The Genesys Generic Server type.
- The Management Layer supports new SNMP Trap functionality:
  - SNMP Master Agent supports the "Clearance" alarm level (the ability to map the existing trap to the clearance trap so no addition check would require to understand if the problem still exists). The level "Clearance" is specified in the SNMP trap sent upon alarm clearance.
  - SNMP Trap messages generated Solution Control Server (and appearing in the Alarm Browser window) now include host information.
- You can now output an Advanced Disconnect Detection Protocol (ADDP) trace for LCA and SCS to a log file; previously it was available only in `stdout`.
- You can now name a non-default configuration file, in the command line, when you start Local Control Agent. See the chapter "Local Control Agent" in the *Configuration Options Reference Manual*.
- You can control delivery of specified log events from specified applications and application types. See "DB Filter Section" in Chapter 6 of the *Genesys 7.1 Configuration Options Reference Manual*.

Release 7.0

- Management Layer now more accurately manages statuses of the monitored hosts. When connection between Solution Control Server and Local Control Agent (LCA) running on a given host cannot be established or is lost, SCS provides an appropriate descriptive status for the host.
- Management Layer now offers more details for process status monitoring, which includes detection of the process's initialization phase and service availability.
- Solution Control Server now supports geographically distributed management environments. Running SCS in so-called *Distributed* mode allows you to have multiple instances of SCS within the same configuration environment to ease the solution control and monitoring tasks in geographically distributed installations.
- New log level—*Interaction*—is introduced. This level is used for interaction-tracing capabilities.
- Logging functionality now includes support for Audit Trail records generation and their storage in the Centralized Log Database.

- SCS now generates Audit Trail records for control actions performed over processes, solutions, and alarms.
- SCS now generates more detailed Alarm History records for alarms activation and clearance. Alarm History records are also stored in the Centralized Log Database.
- Through SCI, you can retrieve and display from the Centralized Log Database log records associated with interaction tracing, auditing, and alarm history.
- SCS now provides more robust application switchover capabilities, including the ability to account for a variety of failover scenarios, in particular, those based on service availability.
- Alarming functionality is extended. New methods of alarm detection include those based on thresholds for system performance variables and SNMP variables. Capability to execute Alarm Reactions at alarm clearance is added.
- MIB (Management Information Base) file is extended. This change offers you the following new functionality through the SNMP interface:
  - You can now monitor multiple servers simultaneously. The change in the MIB file also offers the possibility of configurable and selective data retrieval from multiple servers.
  - You can now monitor the status of additional objects, including Solutions (a given list of Solutions) and Hosts (a list of Hosts, including the Host name, IP address, status, and operating system).
- Management Layer now provides authorized users with graceful contact-center-shutdown capability. You can customize this function, which operates through the SNMP interface. It allows you to gracefully shut down all currently running T-Servers. If you shut down T-Servers in this way, the Management Layer provides you with information about on-going interactions and offers you the choice either to stop the shutdown or continue with it. After T-Servers are down and no new interactions are coming to the applications, you can use the Management Layer to shut down the rest of Genesys applications.
- Management Layer also provides new Predefined Alarm Conditions.

Component Compatibility

Table 1 on page 20 highlights the Management Layer functionality available in various releases of the Genesys configuration environment. Consult this table to verify how Management Layer components of a particular release would operate in the environment of the same or a different release.

To operate correctly, all Management Layer components must be of the same major release (such as 6.1).

Note: The Management Layer does not work with the 5.0 and 5.1 releases of Genesys products.

Table 1: Functionality Supported in Different Environments

Management Layer Release	6.1 Environment	6.5 Environment	7.0 Environment	7.1 Environment	7.5 Environment	7.6 Environment
Management Layer Components Release 6.1	**Full compatibility:** • **Full 6.1 functionality**	Forward compatibility: • Full 6.1 functionality • No 6.5 features	Forward compatibility: • Full 6.1 functionality • No 6.5 or 7.0 features	Forward compatibility: • Full 6.1 functionality • No 6.5, 7.0, or 7.1 features	Forward compatibility: • Full 6.1 functionality • No 6.5, 7.0, 7.1, or 7.5 features	Forward compatibility: • Full 6.1 functionality • No 6.5, 7.0, 7.1, 7.5, or 7.6 features
Management Layer Components Release 6.5	Backward compatibility: • Full 6.1 functionality[a] • No 6.5 features	**Full compatibility:** • **Full 6.5 functionality**	Forward compatibility: • Full 6.5 functionality • No 7.0 features	Forward compatibility: • Full 6.5 functionality • No 7.0, 7.1 features	Forward compatibility: • Full 6.5 functionality • No 7.0, 7.1, or 7.5 features	Forward compatibility: • Full 6.5 functionality • No 7.0, 7.1, 7.5, or 7.6 features
Management Layer Components Release 7.0	Backward compatibility: • Full 6.1 functionality[a b] • No 6.5 or 7.0 features	Backward compatibility: • Full 6.5 functionality[b] • No 7.0 features	**Full compatibility:** • **Full 7.0 functionality**	Forward compatibility: • Full 7.0 functionality • No 7.1 features	Forward compatibility: • Full 7.0 functionality • No 7.1 or 7.5 features	Forward compatibility: • Full 7.0 functionality • No 7.1, 7.5, or 7.6 features

Table 1: Functionality Supported in Different Environments (Continued)

Management Layer Release	6.1 Environment	6.5 Environment	7.0 Environment	7.1 Environment	7.5 Environment	7.6 Environment
Management Layer Components Release 7.1	Backward compatibility: • Full 6.1 functionality[a] [b] • No 6.5, 7.0, or 7.1 features	Backward compatibility: • Full 6.5 functionality[b] • No 7.0 or 7.1 features	Backward compatibility: • Full 7.0 functionality • No 7.1 features	**Full compatibility:** • **Full 7.1 functionality**	Forward compatibility: • Full 7.1 functionality • No 7.5 features	Forward compatibility: • Full 7.1 functionality • No 7.5 or 7.6 features
Management Layer Components Release 7.5	Backward compatibility: • Full 6.1 functionality[a] [b] • No 6.5, 7.0, 7.1, or 7.5 features	Backward compatibility: • Full 6.5 functionality[b] • No 7.0, 7.1, or 7.5 features	Backward compatibility: • Full 7.0 functionality • No 7.1 or 7.5 features	Backward compatibility: • Full 7.1 functionality • No 7.5 features	**Full compatibility:** • **Full 7.5 functionality**	Forward compatibility: • Full 7.5 functionality • No 7.6 features
Management Layer Components Release 7.6	Backward compatibility: • Full 6.1 functionality[a] [b] • No 6.5, 7.0, 7.1, or 7.5 features	Backward compatibility: • Full 6.5 functionality[b] • No 7.0, 7.1, or 7.5 features	Backward compatibility: • Full 7.0 functionality • No 7.1 or 7.5 features	Backward compatibility: • Full 7.1 functionality • No 7.5 features	Backward compatibility: • Full 7.5 functionality • No 7.6 features	**Full compatibility:** • **Full 7.6 functionality**

a) Because of the architectural changes in the SNMP functionality implementation, release 7.x and the latest 6.5 releases of Solution Control Server no longer support PATROL SNMP Master Agent. See Chapter 7 on page 87 for information about current SNMP implementation.

b) Release 7.x of Solution Control Server operating in a 6.x environment requires a license to be able to perform a high-availability switchover. See the *Genesys 7 Licensing Guide* for more information.

Chapter

2 Architecture

This chapter discusses the Management Layer architecture and describes each component. It also provides component recommendations you can use while planning your overall Genesys installation.

This chapter contains the following sections:

Management Layer Architecture

Figure 1 on page 24 shows interactions between Management Layer components and an application. To enable the Management Layer's solution-control and fault-management capabilities, you must install Local Control Agent on each host where a monitored application (whether a Genesys server or a third-party application) is running. To enable the Management Layer's centralized-logging and alarm-signaling capabilities, you must configure each Genesys server application with a connection to Message Server.

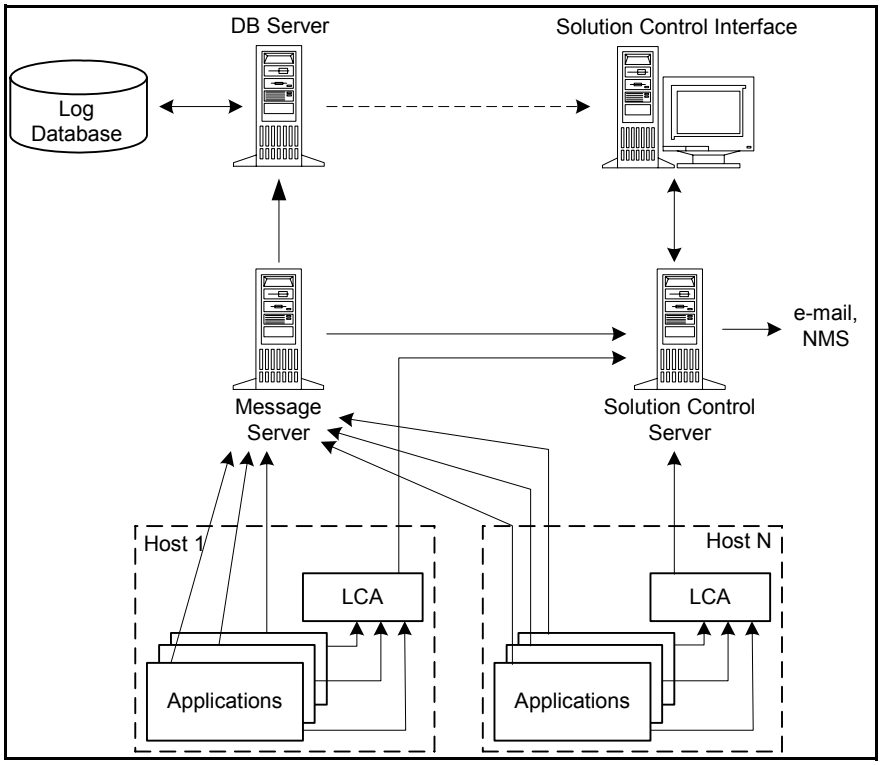


Figure 1: Management Layer Architecture

Components Description

Local Control Agent

Local Control Agent (LCA) is a daemon component that monitors, starts, and stops Genesys server applications as well as third-party server applications that you have configured in the Genesys configuration environment. In addition, LCA detects failures of Genesys servers and communicates their roles in redundancy context.

Message Server

Message Server provides centralized processing and storage of all maintenance events that Genesys server applications generate. Events are stored as log records in the Centralized Log Database (also referred to as *Log Database*) where they are available for further centralized processing. Message Server also checks for log events configured to trigger alarms. If it detects a match, it sends the alarm to Solution Control Server (SCS) for immediate processing.

Note: Some solution components may also exchange messages via Message Server. You can find more details on this Message Server function in solution-specific documentation.

Solution Control Server

Solution Control Server (SCS) is the processing center of the Management Layer. It uses Local Control Agents to start solution components in the proper order, monitor their status, and provide a restart or switchover in case of application failure. SCS also processes user-specified alarms.

Solution Control Interface

Solution Control Interface (SCI) provides a user-friendly interface for managing Genesys solutions. SCI displays the status and configuration of all installed Genesys solutions and information about detected alarms and maintenance logs. You can start and stop solutions or single-server applications, including third-party applications, through this interface. SCI also allows advanced handling of maintenance logs and advanced viewing of host processes.

SCI also incorporates the forced re-login feature, which protects data by minimizing all open dialog boxes and forcing a logged-in user to log back into the system after an extended period of inactivity. For further information about using this feature, refer to the *Framework 7.6 Deployment Guide* and to the *Genesys 7.6 Security Deployment Guide*.

Log DB Server

Log DB Server interfaces the Management Layer components with the DBMS (database management system) where the Log Database is installed.

Log Database

The Log Database stores all log records, including interaction-related records, alarm history records, and audit records.

SNMP Master Agent

SNMP Master Agent is an interface between the Management Layer and an SNMP-compliant network management system (NMS). It distributes:

- SNMP traps, which are converted from alarms, from Solution Control Server to NMS.
- SNMP commands, which a user enters from an NMS interface, back to SCS for further processing.

For more information, refer to Chapter 7 on page 87.

Chapter

3 Management Layer Functionality

This chapter describes the Management Layer capabilities that help you optimally manage the Genesys software serving your contact center.

This chapter contains the following sections:

Note: You can also manage the Management Layer components such as DB Server for the Log Database, Message Server, Solution Control Server, and Genesys SNMP Master Agent via the Management Layer as discussed in this chapter.

Solution Control and Monitoring Functions

Use the Management Layer's control and monitoring functions to:

- Start single applications or entire solutions through a single control operation from Solution Control Interface (SCI).
- Shut down single applications or entire solutions in the same manner.
- Start all or a set of configured solutions.
- View the current runtime status of applications and entire solutions in SCI.
- View all processes currently running on any host via SCI.
- View CPU and memory usage data for any host via SCI.
- Manually switch operations from a primary server to its backup.

For efficient solution maintenance, you should also use the monitoring functions for both solutions and applications. However, under normal circumstances, Genesys recommends that you always perform control functions over entire solutions as opposed to single applications. This ensures the correct logical order of application startup and shutdown and eliminates unnecessary error log events. In redundant configurations, the solution-level control operations also take into account the configured backup servers and start them up or shut them down automatically along with the primary servers.

Regardless of what level of control—applications or entire solutions—you choose to implement, the same architecture provides the control and monitoring functions. It consists of:

- Solution Control Server (SCS).
- As many instances of Local Control Agent (LCA) as there are computers with Genesys servers and/or with Management Layer–controlled third-party servers.
- Any number of instances of SCI, through which the control and monitoring capabilities are available directly to a user.

Manual Switchover

The Management Layer provides an additional control function, a *manual switchover* of an application's operations to its backup application. Use this function, for example, for test purposes, during application upgrades, or during some hardware maintenance procedures. You can perform a manual switchover for any pair of redundant applications where both primary and backup are running. During the switchover, the Management Layer changes the mode of the selected backup application to primary and the mode of the primary application to backup. The switchover mechanism is described in detail in "Application Failure Management Functions" on page 40.

You *cannot* manually switch over applications of these types:

- Configuration Server
- Database Access Point
- Solution Control Server

Permissions

To use SCI to monitor solutions and applications, the user must have `Read` permission for the corresponding objects in the Configuration Database. To perform any control operations with respect to solutions and applications, the user must have `Execute` permission with respect to the corresponding objects. To receive alarm reactions related to applications and hosts, the user must have `Read` permission for the corresponding objects in the Configuration Database. For more information about security settings, see the *Framework 7.6 Deployment Guide.*

Remember that the Management Layer is a multiclient environment that makes solution-control functions available to an unlimited number of users simultaneously. The proper and responsible use of these functions is crucial for normal solution operations. Consider using the security capabilities of the Configuration Layer to limit access to these control functions to the trained personnel directly responsible for the contact center environment. Furthermore, schedule all control operations to occur during off-peak hours, preferably when the contact center is not processing any interactions, to ensure the availability of the customer interaction functions.

Controlling Third-Party Applications

You can apply the Management Layer control and monitoring functions to third-party applications that meet the prerequisites listed on page 121.

These applications include, but are not limited to:

- SQL servers.
- CRM services.
- ERP services.

Warning! Windows users, please note that the Management Layer attempts to start an application without analyzing whether the application can run on an unattended machine (for instance, on a Windows computer with no user currently logged in) or whether the application can operate without a console window. Because the LCA that starts applications is always installed as a Windows Service, all processes start without a console window.

Logging Functions

The Management Layer collects Genesys application logs of defined levels and stores them in a centralized database.

Log Levels

Genesys applications can report log events at five levels of detail: *Alarm, Standard, Interaction, Trace,* and *Debug.* Only the first four are intended for on-site analysis by a user. Log events of the Alarm, Standard, Interaction, and Trace levels feature the same unified log record format and can be stored in the Centralized Log Database.

Logging During Normal Operation

For complete specifications of log events reported at the Alarm, Standard, Interaction, and Trace levels, see *Genesys 7 Combined Log Events Help.*

Alarm Log Level

The Alarm-level logs contain only log records of the Alarm level. SCS generates Alarm log events on behalf of other applications when receiving from them log events configured as Detection Events in Alarm Conditions. Using this level, Solution Control Server reports the occurrence and removal of all alarms to the Centralized Log Database.

This level contains the Management Layer translations of log events of other levels into Alarms.

Standard Log Level

Permanently enable *only* the Standard level of logging during solution operation in regular production mode. It contains high-level events that report both major problems and normal operations of in-service solutions.

An event is reported at the Standard level if it satisfies one of these criteria:

- Indicates that an attempt to perform any external operation has failed
- Indicates that the latest attempt to perform an external operation that previously failed has succeeded
- Indicates detection of a condition that has a negative impact on operations, actual or projected
- Indicates that a previously detected condition, which had a negative impact on operations, no longer exists
- Indicates a security violation of any kind
- Indicates a high-level data exchange that cannot be recognized or does not follow the expected logical sequence
- Indicates inability to process an external request
- Indicates successful completion of a logical step in an initialization process
- Indicates a transition of an Application from one operational mode to another
- Indicates that the value of a parameter associated with a configurable threshold has exceeded that threshold
- Indicates that the value of a parameter associated with a configurable threshold that earlier exceeded the threshold has returned to its normal range

Interaction Log Level

The Interaction-level logs report the details of an interaction processed by Solution components that handle interactions. The log contains information about the processing steps for each interaction by each Solution component.

An event is reported at the Interaction level if it:

- Is a recognizable high-level data exchange with another Application about an interaction.
- Indicates a change in real-time state of an interaction handled by the Application (unless such a change is visible from the high-level data exchange).

The specific criteria depend on a particular component and its role in interaction processing.

Use the Interaction-level log records to analyze and troubleshoot new interaction-processing scenarios, especially when you introduce new Solutions or enable new functions within existing Solutions. Note that Interaction-level records contain the interaction attributes, such as Interaction ID, that you can use to search for log events related to the same interaction but generated by different applications.

Warning! Using the Interaction level generates a higher number of logging events on the network and that may adversely affect the performance of the DBMS, Message Servers, and interaction-processing components.

Trace Log Level

The Trace-level logs report the details of communications between the various Solution components. The log contains information about the processing steps for each interaction by each Solution component.

An event is reported at the Trace level if it satisfies one of these criteria:

- It is a recognizable high-level data exchange with another Application.
- It is a recognizable high-level data exchange with an external system.
- It indicates a change in real-time state of user-level objects that the Application handles (unless such a change can be seen from the high-level data exchange).

Use the Trace-level log records to analyze and troubleshoot new interaction-processing scenarios, especially when you introduce new Solutions or enable new functions within existing Solutions.

Warning! Using the Trace level generates a higher number of logging events on the network and that may adversely affect performance of the DBMS, Message Servers, and interaction-processing components.

Logging During Irregular Operation

Standard-level, Interaction-level, and Trace-level log events do not contain all the details you or someone else may need to analyze and troubleshoot solutions malfunctions. That's why Genesys Technical Support might ask you to provide relevant Debug-level logs when you request their assistance.

Because the Debug-level log events do not have a unified format, are not documented, and can only be stored in a text file, they are only useful to Genesys Technical Support. Logging at this level is likely to adversely affect application performance. Enable this log level only when a Genesys representative requests it. Keep in mind that running Genesys servers with the Debug level of logging is highly resource-intensive and, as such, is not recommended when you are in production mode.

Before you set a logging level more detailed than the Standard level, carefully consider whether a situation (such as the initial deployment or first signs of technical problems) really calls for it. Then, test for how more-detailed logging affects the network loads in a lab or controlled environment.

Note that changing the log level of a running application does not interrupt solution operations.

In addition to asking for Debug-level log records when you report a problem to them, Genesys Technical Support might also request that you reproduce the problem because:

1. During regular operations, many contact-center systems, such as DBMSs, IVRs, and switches, do not employ logging at the level of detail required to diagnose serious technical issues.
2. Reasons other than application failure can contribute to interaction-handling errors. For example, a call can be misrouted (delivered to a wrong DN) despite the fact that applications are functioning properly.

Centralized Logging

The centralized logging function provides a number of advantages over the more traditional logging to a text file:

- Keeping log records of all applications in one place and presenting them in the unified log record format provides for a comprehensive view of the solutions' operations history.
- Using a relational DBMS such as the central log storage enables quick access to the required records and allows for advanced record selections, which you can base on a variety of search criteria.
- Viewing, via SCI, the logs stored in a Centralized Log Database gives you an integrated view of the solutions' maintenance history and complements the solution-control and alarming capabilities.

- Deleting, via a wizard in SCI, the obsolete logs or logs of a particular solution, host, or application makes the Log Database management more convenient.

Given these advantages, Genesys recommends using the centralized logging as the primary method for storing Standard-level log events of all applications. When enabling the log output of the Interaction and Trace level (as directed in the section "Log Levels"), store log events of both levels in the Centralized Log Database in addition to log events of the Standard level. Genesys does not recommend the simultaneous use of both local and centralized logging options except for some special, temporary purpose.

The centralized logging system consists of:

- One or more Message Servers that collect log events from applications.
- One or more Log Databases.
- One or more DB Servers, which interface Message Server with the DBMS where the Log Database is set up.
- One or more Solution Control Interfaces (SCI).

Provided that the Standard level of log output is routinely used under normal production conditions, always limit the centralized logging system to one Message Server and one Log Database for all but large and geographically distributed interaction management networks.

If any part of the centralized logging system becomes unavailable, the log outputs of the affected applications are temporarily redirected to local binary files. Upon restoration of normal functioning, the applications automatically resume logging to the Centralized Log Database. The log records accumulated in the local binary files are automatically transferred to the Log Database.

If the connection between the Message Server and the Log DB Server is unavailable, messages are stored in a queue. When the connection is restored, the messages in the queue are written to the Log Database. See the "Message Server" section of the *Framework 7.6 Configuration Options Reference Manual* for more information.

Note: The format of records kept in the Log Database is specified in Chapter 9 on page 129.

Viewing Log Database Entries

Although you can use any general-purpose DBMS client to make advanced selections from the Log Database, SCI's log-viewing capabilities may actually meet your needs just as well. You can view an entire log with SCI. It also provides a number of predefined selections from the Log Database, which are based on the most typical maintenance-selection criteria:

- Records generated by components of a selected solution.
- Records generated by applications located on a selected host.

- Records of a specified output level.
- Records containing a specified combination of symbols in text.
- Records generated within a specified time interval.
- Records containing specified values of certain extended attributes.

You can use these predefined selection criteria in any combination.

In SCI you can also save selected log records in a regular text file or an XML (Extensible Markup Language) file. Use the instructions in *Framework 7.6 Solution Control Interface Help*.

Finally, SCI has a wizard for easy deletion of obsolete log records.

Logging and Application Performance

Follow these recommendations to increase an application's performance while enabling the application's logging:

- Always enable buffering of the log output when sending logs to a log file. (Refer to the "Common Log Options" chapter in the *Framework 7.6 Configuration Options Reference Manual*.)
- Store log files on the local disk of the computer running the application rather than storing them using network file systems. Such systems may not perform very well and the added network traffic for this storage can affect application performance.
- Configure only log events of the Standard level to be sent to the Log Database. For log events of other levels, consider using the `memory` output as the safest output in terms of application performance.
- Directing log output to the console (by using the `stdout` or `stderr` settings) can affect application performance. Avoid using these log output settings in a production environment.

Alarms

The Management Layer uses the Centralized Log Database to store detailed and structured information about Alarm activation and clearance. (See "Alarm-Signaling Functions" on page 36 for more information about how alarms are generated.) Solution Control Server generates alarm-related information as log events of the Alarm level for each Alarm activation and clearance event. Solution Control Server attaches a set of extended attributes to each Alarm log event; in particular, the `ID` attribute uniquely identifies each Alarm.

For complete specifications of Alarm log events that SCS reports and for information about extended attributes for each log event, see *Genesys 7 Combined Log Events Help.*

SCI provides a special view in which to display Alarm History records from the Centralized Log Database. In this view, SCI displays a summary of all information available for each recorded Alarm.

For detailed information about viewing Alarm-History records with SCI, see Chapter 4 on page 45 and *Framework 7.6 Solution Control Interface Help.*

Audit Trail

The Management Layer also uses the Centralized Log Database to store Audit-Trail records (from here on referred to as *Audit records*) that Framework components (in particular, Configuration Server and SCS) generate for configuration changes and control actions performed over processes, solutions, and alarms.

Framework components generate Audit records as log events and, if available, attach extended attributes to Audit log events.

For complete specifications of Audit log events that Framework components report and for information about extended attributes for each log event, see *Genesys 7 Combined Log Events Help.*

Solution Control Interface provides a special view to display Audit records from the Centralized Log Database.

For detailed information about viewing Audit records with SCI, see Chapter 4 on page 45 and *Framework 7.6 Solution Control Interface Help.*

Interaction Trace

You can configure Framework components to send Interaction-level log events to the Centralized Log Database. You can later retrieve from the database all records related to a certain interaction, enabling you to trace its progress in the contact center.

Note: Storing Interaction-level log events in the Log Database might affect application performance, so Genesys does not recommend it in production environments.

Framework components might attach a set of extended attributes to each Interaction log event. In particular, each such event contains a unique identifier of the contact center interaction in the `IID` extended attribute.

Note: The set of extended attributes for Interaction-level log events may vary depending on a particular interaction's properties and the component that generates the log event.

For complete specifications of Interaction-level log events that Framework components report and for information about extended attributes for each log event, see *Genesys 7 Combined Log Events Help.*

Use SCI to display all Interaction-level records from the Centralized Log Database. Use SCI's predefined selection criteria to search for all records with a particular Interaction ID.

For detailed information about viewing Interaction-level log records with SCI, see Chapter 4 on page 45, and *Framework 7.6 Solution Control Interface Help.*

Alarm-Signaling Functions

Maintenance events that the user may want to become aware of and react to immediately are communicated as Standard-level log events that Genesys applications generate. Each log event is assigned a unique number, which identifies the situation being reported. Thus, the alarm-signaling function of the Management Layer is based on the capability to detect the log events that have been preconfigured to trigger alarms and to send them to an alarm-processing center. In addition, the Management Layer monitors certain system and SNMP variables, which you can also use for alarm signaling.

Alarm Detection

The Management Layer detects alarms by matching the following against the alarm conditions you have configured:

- Log events coming from all applications
- The thresholds of the system performance variables (such as CPU or memory usage) and of local or remote SNMP variables. (The SNMP threshold monitoring is available only when you have enabled SNMP functionality.)

SCS provides the same alarm-reaction processing for both Alarm-detection mechanisms.

Using Log Events for Alarm Detection

To use a Standard-level log event to trigger an alarm, you must configure an object of the `Alarm Condition` type and associate it with the log event ID in the Configuration Layer. In configuring this object, you would:

- Specify the log event that should trigger this alarm at runtime.
- Assign an alarm category.
- Define the source of the alarm.
- Set conditions for automatic alarm clearance.

You can define a source of an alarm as a specific application, all applications of a particular type, or all applications of the interaction management network. In each case, the resulting alarm message contains the application name. So, you can always analyze the content of the alarm message and know the alarm's exact source.

Note: You can also use log events of the Interaction and Trace levels to trigger an alarm message.

Warning! When you create Alarm Condition objects for log events of any level, you must also configure applications to send log events of this level to Message Server. Otherwise, the Management Layer won't be able to detect them.

Once configured, an alarm condition automatically triggers an alarm in response to an occurrence of the log event on which the alarm condition is based. If the same log event occurs subsequently while the alarm is active, the clearance timeout is reset.

As previously noted, the alarm detection takes place in Message Server, so you must connect the potential sources of alarms to Message Server for alarm signaling to operate. If you are planning to use the recommended centralized logging function (see "Centralized Logging" on page 32), your applications should already be connected to Message Server. Otherwise, you need to set up Message Servers and configure your applications to connect to them specifically for alarm-detection purposes.

The easiest way to configure a new alarm condition is through the Alarm Condition Wizard available in Solution Control Interface. For more information, see the "Configuring Alarm Conditions" section of the *Framework 7.6 Solution Control Interface Help.*

Note that the Configuration Layer provides a number of preconfigured alarm conditions based on the events that cause service degradation in any environment. Before configuring your own alarm conditions, see if they may have been predefined in the Configuration Layer. For more information about predefined alarm conditions, see Chapter 10 on page 139.

Using System Parameters and SNMP Thresholds for Alarm Detection

The alarm-detection mechanism for thresholds for system performance variables or SNMP variables is similar in many respects to the log-event-based mechanism. In particular, you must configure certain alarm conditions in the Configuration Database that indicate the values for the Management Layer to monitor.

When you are using thresholds for system performance variable, the Management Layer detects an alarm by periodically comparing the current value of the specified performance variable with the specified limits. If a change in the variable's value exceeds the specified limit, the Management Layer triggers an alarm.

When you are using SNMP variables thresholds, the Management Layer detects an alarm by periodically comparing the current value of the specified SNMP variable, as identified by OID, with the specified limits. If a change in

the variable's value exceeds the maximum limit of the specified minimum to maximum value range, an alarm is triggered. When the variable's value falls below the minimum limit of the specified range, the active alarm is cleared.

The Rising Threshold, which triggers an alarm when crossed *only if the value is rising*, must be a higher number than the Falling Threshold, which clears the alarm when crossed *only if the value is falling*. For example, if the Rising Threshold is 300 then the Falling Threshold must be less than 300.

This mechanism provides alarm signaling with both local SNMP variables—that is, variables from the Genesys MIB file, implemented locally in SCS—and with remote SNMP variables—that is, variables provided by third-party SNMP agents.

To monitor a variable of either type, use the Alarm Detection Wizard to create:

- An Alarm Detection Script.
- A new Alarm Condition based on the Alarm Detection Script.

For more information, see the "Configuring Alarm Conditions" section of the *Framework 7.6 Solution Control Interface Help.*

Default Alarm Processing

Once it detects an alarm, Message Server sends it to Solution Control Server for processing. SCS processes the detected alarm in this way:

1. Stores the alarm in the system as `active` until it is removed manually, expires based on the configurable timeout, or is cleared by another log event, which you can optionally define in the Alarm Condition object as an automatic removal condition.
2. Generates log messages about every alarm detection and its removal.
3. Passes the alarm information and a list of all the running solutions that the alarm may affect to Solution Control Interface to display them for the user. SCS only passes alarm information about objects (such as Applications or Hosts) that the user currently logged in to SCI has permissions to view. If necessary, the user can then take the appropriate action.

Note that for alarm processing to take place, you must connect SCS to the Message Servers that detect the alarms.

Since SCS maintains active alarms as runtime states, you do not have to permanently connect Solution Control Interface to SCS to display alarm information. Whenever you start any instance of SCI, it automatically displays all active alarms currently registered in SCS as long as you have permissions to view the objects associated with the active alarms.

For more information, see the "Managing Active Alarms" section in *Framework 7.6 Solution Control Interface Help.*

Customized Alarm Processing

In addition to relying on the default alarm-processing actions, you can configure other actions (called *alarm reactions*) that the Management Layer is to take when it detects a specified alarm, including:

- Shutdown a specified application.
- Start up a specified application.
- Restart the application that reported the alarm.
- Start up a specified solution.
- Send an e-mail message with detailed information about the alarm to specified Internet addresses.
- Switchover operations from the application that reported the alarm to its backup application, for applications running in primary, backup, or either mode.
- Send an SNMP trap with detailed information about the alarm to a general-purpose network management system.
- Execute an operating system command.
- Change the value of a configuration option of a specified Application, including the Application that reported the alarm. (If the proposed change to an option is for a section or option that does not exist, the system creates both.)

Most of these reactions do not require any special arrangements. However, the switchover reaction type requires that the application in question have a backup application configured and running. The application restart and switchover mechanisms are described in detail in "Application Failure Management Functions" on page 40.

If you wish to use SNMP trap capabilities, you must install an SNMP master agent and configure your Solution Control Server to connect to it. You can use Genesys SNMP Master Agent or a third-party SNMP master agent you already have within you network management system—as long as it is compliant with the AgentX protocol. For instructions on these procedures and for detailed specification of the SNMP trap to which the Management Layer converts the alarms, see Chapter 7 on page 87.

Though the Management Layer itself does not provide paging notifications, you can arrange these through the supported e-mail or SNMP interfaces using your e-mail server or network management system, respectively.

An alarm reaction is configured in the Configuration Database as a Script object of the `Alarm Reaction` type. For runtime execution of a particular alarm, you must associate the alarm reaction with the corresponding Alarm Condition object. You can configure any combination of supported reactions with respect to any alarm condition. The easiest way to do this is through the Alarm Condition Wizard available in Solution Control Interface.

Starting with the initial 7.0 release, you can configure alarms in the Management Layer that execute alarm reactions not only at alarm activation, but also at alarm clearance. To achieve this, add the alarm reaction Scripts that should be executed when the alarm is cleared to the `Clearance Scripts` list of the corresponding Alarm Condition object. You can also use the Alarm Condition Wizard to accomplish this.

Application Failure Management Functions

Faults—accidental and unplanned events causing a system to fail—present the biggest challenge to solution availability. The functions that detect, isolate, and correct various types of faults are partly incorporated into every Genesys component and partly implemented in the Management Layer of the Genesys Framework. The role of the Management Layer in application failure management is described in detail in the following subsections.

Application Failures

A complete application failure may be a result of either an internal defect (for example, an infinite loop) or an external event (for example, a power failure). It may manifest as either a process nonresponse or termination. Typically, if a solution component stops working, the solution is no longer available to process customer interactions.

Since the application that fails cannot perform any functions, you must employ an external mechanism for both detection and correction of faults of this type. The Management Layer serves as such a mechanism. To detect an application failure, the Management Layer employs a simple monitoring component called Local Control Agent (LCA), which continuously maintains a connection with the application, confirming both its existence and ability to communicate. To make sure an application failure is never confused with a connection failure, the LCA that monitors a specific application always resides on the computer where the application itself is running.

LCA is installed on a one-per-host basis and can connect to all Genesys applications located on the host. When a connection is broken, LCA generates a message to Solution Control Server, where an appropriate recovery action is chosen and executed according to the system configuration. SCS uses the Advanced Disconnect Detection Protocol (ADDP) to recognize a loss of connection with LCA. A loss of connection is interpreted as a failure of the host (that is, as failures of all Genesys components running on that host).

Note: ADDP is by default enabled for the connection between SCS and LCA, with the ADDP timeout set to 9 seconds. You can modify ADDP parameters for the connection between SCS and LCA in the `Properties` window of the Host object configured for the computer that runs LCA. For more information about these settings, refer to the *Framework 7.6 Deployment Guide*, or to the "Hosts Annex Tab" topic of *Framework 7.6 Configuration Manager Help*. For more information about ADDP, refer to the *Framework 7.6 Deployment Guide*.

If you have not configured a backup application for the failed component, the correction procedure normally consists of attempts to restart the failed process, if so configured. The same LCA component that detects application failures starts any Genesys application located on the host upon a command from SCS. If the application in question is a server, the clients automatically reconnect to this server once it is restarted and initialized.

Genesys recommends that you configure an automatic application restart procedure for all daemon applications.

Warning! Stopping an application via the Management Layer is not considered an application failure. Therefore, the Management Layer does not restart applications that it has stopped unless you have configured an appropriate alarm condition and alarm reaction for them.

If a backup application is configured and started, the Management Layer automatically switches operations over to that application, given that you have a so-called *high-availability* license. If the application is a server, the clients automatically connect to the backup server.

The Management Layer currently supports `warm standby` between redundant components within the layer. It also supports switchovers between redundant client applications, regardless of the redundancy type specified by those applications. Starting with Management Layer 7.0.1, you must have a high-availability (HA) license to support either type of redundancy.

Warning! The Management Layer does not support `cold standby` redundancy type.

Starting with release 7.0, the Management Layer provides more robust switchover capabilities, and, in particular, allows detection of situations when a running application is unable to provide service and treats this situation as an application failure. The `Service Unavailable` application status serves this purpose.

When an application reports that its status has changed to `Service Unavailable`, and a backup server for this application is configured and started, the Management Layer automatically switches operations over to the backup

server. Respectively, when both primary and backup applications are running with the `Service Unavailable` status, the backup application may report that it can now provide the service (that is, the backup application status changes to `Started`). In this case, the Management Layer automatically switches operations over to the backup application. As with a switchover resulting from an application failure, you must have an HA license to perform a switchover related to service unavailability.

Note: While some applications support the `Service Unavailable` status and report it under appropriate circumstances, others do not. (For instance, when T-Server loses its connection to the CTI Link, T-Server changes its status to `Service Unavailable`). The Management Layer operates based on the information supplied by an application and cannot automatically detect an application's inability to provide service. Refer to the application-specific documentation to determine if the `Service Unavailable` status is supported on the application side.

Warm Standby Redundancy Type

Genesys uses the term *warm standby* to describe the redundancy type with which a backup server application remains initialized and ready to take over the operations of the primary server. Inability to process interactions that may have originated during the time it took to detect the failure is reduced to a minimum. `Warm standby` redundancy type also eliminates the need to bring a standby server online, thereby increasing solution availability.

The standby server recognizes its role as a backup and does not process client requests until its role is changed to primary by the Management Layer. When a connection is broken between the primary server and the LCA running on the same host, a failure of the primary process is reported. As a result, the Management Layer instructs the standby process to change its role from standby to primary, and the former standby starts processing all new requests for service.

Note: To switch to `Primary` mode, the backup Configuration Server must have an active connection to the Configuration Database during the failure of the primary Configuration Server.

While normal operations are restored as soon as the standby process takes over, the fault management effort continues. It consists of repeated attempts to restart the process that failed. Once successfully restarted, the process is assigned the standby role.

If Solution Control Server detects a loss of connection with the LCA of a host, SCS performs switchover for all applications located on the host, if backup applications are configured. There are two exceptions to this:

- A Configuration Server in backup mode ignores the switchover command if it detects another Configuration Server in primary mode. In other words, if the LCA residing on a host with a Configuration Server in primary mode goes down, the SCS requests that a Configuration Server in backup mode, on another host with an available LCA, switch over to primary mode. When the request is received, this Configuration Server checks whether the Configuration Server in primary mode is down, as indicated by a lost connection between the two Configuration Servers. The Configuration Server in backup mode switches over to primary mode only if this connection is down. If the connection still exists, no switchover occurs.
- An SCS in backup mode does not try to switch itself over if it can still detect the SCS that is in primary mode. In other words, if an SCS in backup mode loses its connection to an LCA residing on a remote host with an SCS in primary mode—either because the LCA went down or a network timeout caused the SCS to drop its connection—the SCS in backup mode checks whether it is still connected to the remote SCS in primary mode. If that connection is also lost, the SCS switches over and runs in primary mode.

Hot Standby Redundancy Type

Genesys uses the term *hot standby* to describe the redundancy type with which a backup server application remains initialized, clients connect to both the primary and the backup servers at startup, and the backup server data is synchronized from the primary server. Data synchronization and existing client connections to the backup guarantee higher availability of a component. Configuration Layer and Management Layer components do not support `hot standby` between pairs of redundant components. They do support switchover between client applications configured with this type.

Hot standby redundancy type with client connection support is only implemented in T-Servers for most types of switches and is not implemented in applications of other types. For a complete description of the hot standby redundancy type, refer to the *Framework 7.6 T-Server Deployment Guide* for your specific T-Server.

Built-in SNMP Support Functions

The Management Layer provides you, as a network administrator, with a way to monitor and control Genesys applications when using an SNMP-compliant third-party network management systems (NMS) user interface. Built-in support for an SNMP-compliant NMS means that Solution Control Server not

only converts Genesys alarms into SNMP traps, but also processes various NMS commands and generates SNMP traps based on changes in the current status of an individual application.

The following requirements apply to the components that integrate Genesys 7 with an SNMP-compliant third-party NMS:

- Solution Control Server must contain built-in SNMP functionality, which was the case for all 7.0 releases.
- An SNMP master agent application must be compliant with the AgentX protocol. Use either Genesys SNMP Master Agent or one provided by a third-party. The Genesys SNMP Master Agent is available on the latest Management Framework 7.6 product CD.
- The license file must contain licenses that enable the SNMP functionality of the Management Layer. Refer to the *Genesys 7 Licensing Guide* for information about how to order licenses and set up the licensing system.

Depending on the type of NMS you are using, you may also need to modify it to ensure a successful integration. For example:

- Make sure that your NMS knows the communication port number of the SNMP master agent.
- If you use several SNMP master agent applications, make sure their communication port numbers are unique and are known to the NMS.

In addition, check documentation for your NMS to find out if:

- You must load a copy of the Genesys MIB file into NMS so that your NMS can monitor and control Genesys applications.
- You must modify your NMS as needed so that it can display and process SNMP traps that an SNMP master agent generates on behalf of Genesys applications, including SCS.

Chapter

4 Using the Management Layer

As described in Chapter 2, the Management Layer consists of a number of components. In addition, using various functions of the Management Layer often involves Configuration Layer components. As a result of this complex architecture, some users may find it difficult to put a Management Layer function to work. This chapter gives hands-on tips on how to use these various functions, including information about involved applications and reference documents.

This chapter contains the following sections:

Warning! The Management Layer is designed to operate with one Configuration Server (one primary-backup pair of Configuration Servers). That is, you must connect the Management Layer components and all applications it controls to the same Configuration Server.

How to Monitor Solutions, Applications, and Hosts

The monitoring function of the Management Layer allows a user to view the current runtime status of configured hosts, daemon applications, and entire solutions. As mentioned in "Solution Control and Monitoring Functions" on page 27, the monitoring function requires the installation of:

- Solution Control Server (SCS).
- An instance of Local Control Agent (LCA) for each Genesys host machine.
- An instance of Solution Control Interface (SCI) for each user who performs the monitoring.

Note: For SCS to monitor an application, you must specify the name of the application's executable file on the `Start Info` tab of the Application object's `Properties` dialog box.

The monitoring is available via SCI, which is a graphical user interface of the Management Layer. You can categorize the views displayed in SCI by subject and by level of detail. For example, a subject-based List View (such as the Solution List View, the Application List View, or the Host List View) lists all configured Solutions, Applications, or Hosts, and their current statuses. In addition, you can use List View, the Details pane, and the Details window to display each subject (such as a Solution, an Application, or a Host) with a lesser or greater level of detail. In any view, the current subject status is both written in words and signified by the icon color.

Framework 7.6 Solution Control Interface Help, which you can launch from SCI, provides detailed instructions on how to display each view for a subject and describes the type of information each view presents.

How to View System Performance

Starting with release 6.5, the monitoring function of the Management Layer also allows a user to view the performance characteristics of configured hosts. The system performance viewing requires the installation of the same components as for host monitoring (see page 46). You can monitor a host

computer that runs any Genesys-supported operating system as long as Local Control Agent is running on that computer.

Solution Control Interface displays system characteristics that include a list of all currently running processes, with their process identification numbers and the command lines used for starting the applications. You can view memory and CPU usage for each process and the host as a whole in tabular or graphical format. In addition, for hosts that run Windows operating systems, you'll be able to view a list of Windows Services and their status. To display this information, open the Host Details window.

Framework 7.6 Solution Control Interface Help provides detailed instructions on how to display the Host Details window and describes the tabs that present the system performance characteristics.

How to Start and Stop Applications and Solutions

With the control function of the Management Layer, you can start and stop individual applications through a single control operation from SCI. You can also use the same control function to start and stop solutions, with one exception: you can only use SCI to start and stop a solution of type `Default Solution Type` or `Framework` if the solution was created by the Solution Wizard that is available with a Genesys application; otherwise, you cannot change the active status (`Started` or `Stopped`) through by the control function in SCI.

As mentioned in "Solution Control and Monitoring Functions" on page 27, the control function requires the installation of:

- Solution Control Server (SCS).
- An instance of LCA for each Genesys host machine.
- An instance of SCI for each person who starts and stops applications and solutions.

The start and stop commands are accessible in SCI via the:

- Actions menu.
- Start and Stop buttons on the main toolbar.
- Start and Stop buttons on the subject's Details pane or Details window.
- File menu on the subject's Details window.
- Shortcut menus for selected objects.

Note: Genesys recommends starting and stopping entire solutions as opposed to starting and stopping single applications.

Framework 7.6 Solution Control Interface Help provides detailed instructions on how to start and stop solutions and applications.

Processing the Start Command for Applications

When the Management Layer receives a request to start a particular application, SCS generates a command line and passes it to LCA, which executes the command. The command line contains:

- The application's working directory exactly as specified in the Application object's `Properties` window.
- The name of the application's executable or startup file exactly as specified in the Application object's `Properties` window.
- The host name of Configuration Server currently running in Primary mode.
- The port number of Configuration Server currently running in Primary mode.

> **Note:** If you are using Configuration Server Proxy, SCS substitutes the host and port parameters of Configuration Server Proxy where appropriate. For more information, see "How to Manage Environments with Configuration Server Proxy" on page 69.

- The application name exactly as specified in the Application's `Properties` window.
- The startup timeout exactly as specified in the Application's `Properties` window.

Be sure that the working directory, executable (or startup) file name, application name, and startup timeout parameters are correctly specified on the `Start Info` tab of the Application's `Properties` window; otherwise, the Management Layer will be unable to start the application.

Unless an application is explicitly configured with a connection to Configuration Server Proxy, SCS starts the application against the Configuration Server to which SCS is currently connected. The port for connection to Configuration Server which SCS provides to the application is determined as follows:

- If the application is configured with a connection to Configuration Server, SCS starts the application using the same `PortID` as that is configured between the application and Configuration Server.
- If the application is not configured with a connection to Configuration Server, SCS starts the application using `PortID = default`. This provides backward compatibility for pre-release 7.6 applications.

Processing the Start Command for Solutions

When the Management Layer receives a request to start a particular solution, SCS via LCA starts all applications included in the solution, in the order specified in the Solution configuration object. The solution is considered Started when all mandatory applications that belong to it or their backup

applications start successfully. When a mandatory solution component does not start, SCS determines if the solution configuration contains a backup server configured for this application. Then, one of the following happens:

- If the solution configuration does not contain a backup server, SCS interrupts the solution startup procedure and the solution status remains Stopped.
- If the solution configuration contains a backup server, SCS attempts to start the backup application:
  - If successful, the solution startup procedure continues through completion. After which, the Management Layer applies the restart mechanism to applications that could not start.
  - If unsuccessful, SCS interrupts the solution startup procedure and the solution status remains Stopped.

Note that after starting a mandatory application, Solution Control Server attempts to start a backup server configured for this application. This only happens when the backup server is included in the same solution. If the backup server application does not start while the primary server application is running, SCS proceeds by starting the next mandatory component.

Starting Applications Automatically

Starting with release 7.0.1, Solution Control Server starts applications without a user command (that is, automatically) when:

- SCS starts.
- The computer running the applications is restarted.

The following subsections describe this process and necessary configuration.

Required Configuration

This section describes how to enable SCS to start an application automatically every time SCS establishes a connection with LCA and the latter does not report the `Started` status for the application. If you do not modify an Application configuration object as described, SCS automatically starts the application only at the application's host restart, given that the application has been running prior to the host restart.

To automatically start an application in every supported scenario:

1. Open the Application object's `Properties` dialog box in Configuration Manager.
2. Click the `Annex` tab.

> **Note:** If the `Annex` tab is not visible, go to `View > Options` and select `Show Annex tab in object properties.`

3. Create a new configuration section called `sml` or open the section with this name if it already exists.
4. Within this section, create a new configuration option named `autostart` and set its value to `true`.

Note: To disable an automatic application startup in scenarios where SCS starts or where an application was not running prior to its computer restart, either delete the `autostart` option or set its value to `false`.

At SCS Startup

When SCS starts, it:

1. Establishes connections with all LCAs in the system and receives current statuses of all configured applications.
2. Checks the applications' configurations in the Configuration Database to determine whether you have enabled the `autostart` option.
3. For applications that have `Stopped` status and have the `autostart` option enabled, SCS:
   a. Waits for the interval specified in the `Startup Timeout` property of a particular Application object.
   b. Checks whether the application's status changes after the timeout has expired. If not, SCS starts the application as described in "Processing the Start Command for Applications" on page 48.

At Computer Restart

When a computer restarts on which Management Layer–controlled applications are installed, SCS:

1. Establishes a connection with the LCA running on that computer.
2. For applications that were running (that is, had `Started` or equivalent status) prior to the computer restart, SCS:
   a. Waits for the interval specified in the `Startup Timeout` property of a particular Application object.
   b. Checks whether the application's status changes after the timeout has expired. If not, SCS starts the application as described in "Processing the Start Command for Applications" on page 48.
3. Identifies applications that were not running (that is, had `Stopped` status) prior to the computer restart.
4. Checks the applications' configurations in the Configuration Database to determine whether you have enabled the `autostart` option (see page 49).

5. For applications that have `Stopped` status and have the `autostart` option enabled, SCS:
   a. Waits for the interval specified in the `Startup Timeout` property of a particular Application object.
   b. Checks whether the application's status has changed after the timeout expires. If not, SCS starts the Application as described in "Processing the Start Command for Applications" on page 48.

As a result, both the applications that were running prior to a computer restart and the applications that were not running but whose configuration contained the `autostart` option set to `true` are started automatically after you restart a computer.

Starting Third-Party Applications Automatically

Management Layer supports the automatic start-up of third-party applications as described above. However, control and monitoring of third-party applications is performed in a different manner than that for Genesys Applications. For details about how third-party applications are controlled, refer to Chapter 8 on page 121.

How to Use Startup Files

Startup files are files named (or having an extension) `run.sh` (on UNIX) or `startServer.bat` (on Windows). During installations, installation scripts create and place these files into the applications' directories. This section describes how to modify the application configuration and startup file content so that you can use the Management Layer to run applications from their startup files on Windows operating systems.

Modifying Application Properties

Modify the following on the `Start Info` tab of the Genesys Application `Properties` dialog box:

1. Instead of the application executable file or startup file name, specify the command prompt name (`cmd.exe`) with the full path to it in the `Command Line` property. For example:
   `D:\Windows\system32\cmd.exe`
2. Instead of the Configuration Server parameters and application name, specify the startup file name (`startServer.bat`) with the full path to it, preceded with the `/c` command line parameter, in the `Command Line Arguments` property. For example, specify:
   `/c D:\GCTI\MessageServer\startServer.bat`

3. Click Apply and OK to save the configuration updates and close the Properties dialog box.

Modifying a Startup File

A startup file must contain one line specifying the application's executable file name with the full path to it, followed by this sequence of symbols:

```
%1 %2 %3 %4 %5 %6
```

For example, for a Message Server application installed to a GCTI directory on the D drive, the content of a startup file to use with the Management Layer looks like this:

```
D:\GCTI\MessageServer\MessageServer.exe %1 %2 %3 %4 %5 %6
```

How to Manage Third-Party Applications

You can use the control and monitoring function of the Management Layer to manage third-party applications configured in the Genesys Configuration Database. You can use the Management Layer to start and stop third-party applications. Even if you did not use the Management Layer to start a particular application, the application's runtime status is displayed. For managing third-party applications, install the same components as for monitoring and starting Genesys application (see page 46 and page 47).

The monitoring views and control commands are available via SCI, just as with managing Genesys applications.

Refer to *Framework 7.6 Solution Control Interface Help* for detailed instructions for displaying each view for an application, and starting and stopping applications.

For more information about how the Management Layer handles third-party applications, see Chapter 8.

How to Configure Logging

Although you can still configure log options for a single application via Configuration Manager, you can use the Management Layer to do that, as well as configure logging functions for all applications installed on a single host, for a set of applications you select, and for entire solutions. This functionality is possible because log configuration options are unified for all Genesys server applications starting with release 6. As mentioned in "Logging Functions" on page 29, the logging function requires the installation of one or more Message Servers that collect log events from applications, one or more Log Databases, and one or more DB Servers, which interface Message Server with the DBMS where you have set up the Log Database.

The log levels are defined in "Logging Functions" on page 29.

To configure logging via the Management Layer, launch the Log Wizard accessible via SCI. You can launch this Wizard from the main SCI toolbar using the `Run a Wizard` button or from shortcut menus of the objects displayed in SCI. When started for an Application object, the Log Wizard sets up log configuration options for the corresponding application. When started for a set of applications, the Wizard sets up log configuration options for all applications you select. When started for a Solution object, the Wizard sets up log configuration options for all applications included in the corresponding solution. When started for a Host object, the Wizard sets up log configuration options for all applications installed on the corresponding host.

Note that changing the log level of a running application does not interrupt solution operations. The exceptions to this rule are Configuration Server and DB Server for the Configuration Database:

- You must configure options for these two applications in their configuration files.
- You have to restart these two applications for the new values to take effect.
- You cannot use the Log Wizard for these two applications.

Refer to the *Framework 7.6 Configuration Options Reference Manual* for descriptions of log configuration options. Refer to *Framework 7.6 Solution Control Interface Help* for more information about the Log Wizard. For complete specifications of log events reported at the Alarm, Standard, Interaction, and Trace levels, see *Genesys 7 Combined Log Events Help.*

LCA Logging

Unlike other server applications, you do not configure an Application object for LCA. However, starting with release 7.0, you can change the default settings for common log options for Local Control Agent.

To do that, create a configuration file called `lca.cfg` or save the sample configuration file, `lca.cfg.sample`, which the installation creates, as `lca.cfg`. Within this file, specify new values for appropriate options. The configuration file only contains the `log` section. You must locate this file in the same directory as the LCA executable file.

Note: You can also specify a custom name for the configuration file. To start LCA with a custom name use the following format:
<executable name> <port> `-c` *<configuration file name>*
For example (UNIX): `lca 7117 -c` *lca_custom.cfg*
Where *lca_custom.cfg* is the user defined configuration file.

The LCA configuration file must have the following format:

```
[log]
<log option name>=<log option value>
<log option name>=<log option value>
```

For more information about the common log options and for the LCA configuration file sample, refer to the *Framework 7.6 Configuration Options Reference Manual.*

How to Customize Log Events

Log levels are defined in "Logging Functions" on page 29. Each log event has a default log level. Starting in release 7.6, you can customize log events for any 7.6 application by changing the default log level of an event to a more appropriate level, or by disabling the event completely.

You can toggle the customizations on and off, without deleting them. This enables you to specify the customized log levels at any time, but only use them when appropriate. Note that this option enables or disables all of the customizations; it cannot be applied to specific ones.

Customizations are unique to the application in which they are created. For example, Application A customizes a set of log events. Application B does not customize any log events. If the feature is activated, the log events will have the customized properties of the application which generated them—if generated by application A, the log events will be customized as specified by A; if generated by application B, the log events will not be customized. If Application B was to customize the same set of log events, but with different custom definitions, the log events generated by Application B would be customized as specified by B.

Warning! Use caution when making these changes in a production environment.

Depending on the log configuration, changing the log level to a higher priority may cause the log event to be logged more often or to a greater number of outputs. This could affect system performance.

Likewise, changing the log level to a lower priority may cause the log event to be not logged at all, or not logged to specific outputs, thereby losing important information. The same applies to any alarms associated with that log event.

In addition to the precautionary message above, take note of the following:

- When the log level of a log event is changed to any level except none, it is subject to the other settings in the `log` section at its new level. If set to none, it is not logged and therefore not subject to any log configuration.
- Changing the log level of a log using this feature changes only its priority; it does not change how that log is treated by the system. For example, increasing the priority of a log to Alarm level does not mean that an alarm will be associated with it.

- Each application in an HA pair can define its own unique set of log customizations, but the two sets are not synchronized with each other. This can result in different log behavior depending on which application is currently in primary mode.
- This feature is not the same as a similar feature in Universal Routing Server, version 7.2 or later. In this Framework feature, the priority of log events are customized. In the URS feature, the priority of debug messages only are customized. Refer to the *URS 7.5 Reference Manual* for more information about the URS feature.
- You cannot customize any log event that is not in the unified log record format. Log events of the Alarm, Standard, Interaction, and Trace levels feature the same unified log record format.

> **Note:** Pre-defined log events of the Debug level are also in the unified log record format, and therefore can be assigned to another log level. However, any Application can generate a raw text stream and call it a debug log event. Such non-unified log messages cannot be reassigned.

Refer to *Framework 7.6 Solution Control Interface Help* and the *Framework 7.6 Configuration Options Reference Manual* for instructions for customizing logs, and detailed examples.

How to View Centralized Logs

With the Management Layer logging function, you can view the log records stored in Centralized Log Database, filter log records by their level, and search for records meeting the specified criteria. The log-viewing function requires the installation of:

- One or more Message Servers that collect log events from applications.
- One or more Log Databases.
- One or more DB Servers, which interface Message Server with the DBMS where you have set up the Log Database.
- An instance of SCI for each person who performs the log viewing. For SCI to display log records, you must connect it to the Database Access Point configured for the DB Server that provides access to the Centralized Log Database.

The SCI's Log View displays the log records stored in the Centralized Log Database and enables a user to filter log records by level, for instance, to display only Standard or Interaction records.

Use the `Find` command to retrieve particular database records or use the Log Advanced Search Wizard. The `Find` command, which is accessible from the Action menu when the Log View is displayed, enables a search for a particular

log record by a log level, a host name, an application name, or a record text. The Wizard, which is accessible via the `Run a Wizard` button on the main SCI toolbar, enables a search based on a custom SQL statement or on user-specified criteria. Criteria for a Wizard search include log level, log generation time, log source, or extended attributes. Log source can be a particular application, applications that belong to a particular solution, or applications that run on a particular host computer.

You can view log records related to a particular object on the appropriate tabs of the object's Details window. For example, an Application Details window displays log records generated by the application; a Host Details window displays log records generated by all applications installed on the host computer; and a Solution Details window displays log records generated by all applications included in the solution.

You can save the selected log records in a regular text file or an XML (Extensible Markup Language) file. See Chapter 9, for information about the formats of these files.

Refer to *Framework 7.6 Solution Control Interface Help* for a complete description of the log-viewing functionality. For complete specifications of log events reported at the Alarm, Standard, Interaction, and Trace levels, see *Genesys 7 Combined Log Events Help.*

How to View Real-Time Logs

With the Management Layer logging function, you can enable and disable the real-time viewing of log messages that applications send to the network log output. Log messages differ from log records in that real-time log messages are displayed in SCI immediately when applications send them. Log messages are only displayed as text in SCI. Because Message Server collects log messages from applications and passes them directly to SCI, the real-time log-viewing function requires the installation of one or more Message Servers and an instance of SCI for each person who performs the log viewing.

To view real-time logs, enable the application real-time log with the `Start Real-Time Log` command, which is accessible from the `Log` menu of the `Application Details` window in SCI. Once activated, real-time logs display on the `Real-Time Log` tab of that window.

For SCI to display an application's real-time logs:

- The selected application must be started.
- The selected application must have the `network` log output configured.
- The selected application must have a configured connection to the Message Server, and this Message Server must be started.

Refer to *Framework 7.6 Solution Control Interface Help* for detailed instructions for enabling, disabling, and viewing real-time logs.

How to Manage Log Records

You can manage records in the Log Database either using SCI tools or creating your own scripts for automated database purging.

Using Genesys Wizard

Starting with release 6.5, you can use the Management Layer logging function to manage log records stored in the Centralized Log Database. With the Log Database Maintenance Wizard, available in Solution Control Interface, you can specify criteria—via a custom SQL statement or individual selections—for the search and removal of log records from the database. Criteria include log level, log generation time, the log source, or extended attributes. Log source can be a particular application, applications that belong to a particular solution, or applications that run on a particular host computer.

Note: Log records also contain alarm history. You should be careful not to delete current alarm history records when removing log records from the Log Database.

The log-managing function requires the installation of the same components as for the log-viewing function (see page 55).

Launch the Log Database Maintenance Wizard using the `Run a Wizard` button on the SCI toolbar. *Framework 7.6 Solution Control Interface Help* contains detailed instructions on how to start the Wizard.

Automating the Purging Functionality

This section describes how to automate the removal of obsolete log records from the Log Database. Database purging involves the periodic, automated execution of appropriate SQL statements within your SQL server. To enable automated purging:

1. Prepare SQL statements that remove log records.
2. Schedule automated execution of the SQL statements.

Preparing SQL Statements

As you create SQL statements that delete records from the Log Database tables, keep in mind that these SQL statements must contain one or more criteria for selecting the log records you want to remove. You can base the selection criteria on the values of the log record fields, such as log record generation time, application name, host name, and so forth. For example, you might remove older log messages from the `G_LOG_MESSAGES` table and their

corresponding attributes, if any, from the G_LOG_ATTRS table with the following SQL statements (in the order specified):

```
DELETE FROM G_LOG_ATTRS
WHERE LRID IN (SELECT G_LOG_MESSAGES.ID
   FROM G_LOG_MESSAGES
   WHERE (TIMEGENERATED > <start datetime>)
   AND (TIMEGENERATED < <end datetime>)
)
DELETE FROM G_LOG_MESSAGES
   WHERE (TIMEGENERATED > <start datetime>)
   AND (TIMEGENERATED < <end datetime>)
```

Refer to the Log Database structure description in "Database Format" on page 131 for more information about Log Database tables and fields. Combine the selection criteria to achieve the level of purging that suits your environment.

Check the Log Database Maintenance Wizard, available in SCI, for examples of the records-removal SQL statements that the Wizard prepares. The Wizard provides the graphical interface through which you specify various log-records selection criteria, and it displays the resulting SQL statements.

Scheduling the Execution of SQL Statements

To enable automated purging of log records, schedule the periodic, automatic execution of the SQL statements you have prepared (for example, once a week). The simplest way to do this is using either SQL server utilities or operating system services.

Using SQL Server Utilities

If you decide to use SQL server utilities, refer to your SQL server documentation to determine whether that server provides tools for automatic execution of SQL statements.

Using OS Services

If you decide to use scheduling tools available in your operating system, you should:

1. Prepare a command (either an executable file or a batch/shell file) that executes your SQL statement(s).
2. Use an operating system tool that enables you to schedule the specified command for execution.

To prepare a command that executes your SQL statement(s), use either a batch file or shell script. A command like this usually calls an SQL server–specific tool to execute command-line SQL statements and passes an SQL statement to

this tool as a parameter. For example, you can use the following tools to execute command-line SQL statements:

- `isql.exe` (a Microsoft SQL tool)
- `sqlplus` (an Oracle tool)

To schedule a specified command for execution with the required frequency, consider using these tools:

- `cron` on UNIX platforms.
- `at` on Windows platforms.

How to Trace Interactions

Solution Control Interface provides Interaction View (available under the general Log View) in which you can display Interaction-level log records stored in the Centralized Log Database. In addition to the common log-record parameters, you can see the `Interaction ID` attribute associated with each log record. Also, when you display the Interaction view, you can search the log records by their `Interaction ID` to display all records related to the same interaction, regardless of what application each log event came from.

The `Details` pane in this view displays general information for the Interaction-level log record you select in the `List` view. It also displays extended attributes attached to the record that might give additional details about a particular interaction.

Note: The installation requirements for enabling the Interaction View are the same as for the Centralized Log. (See “How to View Centralized Logs” on page 55.)

How to View Audit Records

Solution Control Interface provides `Audit View` in which you can display a list of all Audit log records from the Centralized Log Database.

The `Details` pane in this view displays general information for the Audit record you select in the `List` view. It also displays extended attributes attached to the record that might give additional details about a particular audited action.

Note: The installation requirements for enabling the `Audit View` are the same as for the Centralized Log. (See “How to View Centralized Logs” on page 55.)

How to View Alarm History

Solution Control Interface provides `Alarm History View` in which you can display the Alarm-History records. This view displays a record for each single Alarm triggered by Solution Control Server.

The `Details` pane in this view displays general information for the Alarm-History record you select in the `List` view. It also displays details about the related Alarm, such as:

- Whether the alarm has been cleared.
- The reason for alarm clearance.

The `Alarm History View` provides a summary about alarms. SCI produces this summary based on the Alarm-related log events that SCS generates and stores in the Centralized Log Database. You can also view Alarms-related log events directly through the `Log View` in SCI.

Note: The installation requirements for enabling the `Alarm History View` are the same as for the Centralized Log. (See "How to View Centralized Logs" on page 55.)

How to Configure Alarm Conditions and Alarm Reactions

Although you can manually configure Alarm Condition objects and Alarm Reaction scripts via Configuration Manager, the Management Layer provides an automated procedure.

You can configure new Alarm Conditions based on either source for their detection:

- Log Events—these Alarm Conditions trigger an alarm when an application or applications generate a specified log event.
- Alarm Detection Scripts—these Alarm Conditions trigger an alarm when a certain system variable changes in a specified manner.

As mentioned in "Alarm-Signaling Functions" on page 36, for alarms based on log events, alarm detection takes place in Message Server. Thus, you must configure your applications to connect to Message Server if you configure log event–based Alarm Conditions.

Using Log Events for Alarm Detection

To configure alarm conditions or alarm reactions via the Management Layer, launch, respectively, the Alarm Condition Wizard or the Alarm Reaction Wizard accessible via SCI. You can launch either wizard from the main toolbar

using the Run a Wizard button. You can also launch the Alarm Condition Wizard from shortcut menus of the log records displayed in the Log View. When started from a shortcut menu, the Alarm Condition Wizard takes the ID of a currently selected log record as a value for the Detection Log Event ID.

You can use the Alarm Condition Wizard to launch the Alarm Reaction Wizard and to associate Alarm Reactions with the Alarm Condition you are configuring. When launched from the shortcut menu of either a previously configured Alarm Condition or a set of Alarm Conditions, the Alarm Condition Wizard associates the selected Alarm Condition(s) with configured Alarm Reaction scripts.

For complete specifications of log events reported at the Alarm, Interaction, Standard, and Trace levels, see *Genesys 7 Combined Log Events Help*. *Framework 7.6 Solution Control Interface Help* contains detailed instructions on how to start wizards. Also, see Chapter 10, "Predefined Alarm Conditions," on page 139, for more information about Alarm Condition objects preconfigured in the Configuration Database.

Using Detection Scripts for Alarm Detection

Starting with release 7.0, Management Layer provides an additional alarm-detection mechanism, called *Advanced Alarm Detection*. Through this mechanism, you can configure Alarm Conditions:

- Based on the threshold for a system performance variable (CPU or memory usage).
- Based on the threshold for a local or remote SNMP variable (available only when you have enabled SNMP functionality).

Set alarms based on the Advanced Alarm-Detection methods using Alarm-Detection scripts. These scripts are Script configuration objects of the Alarm Detection type. Use the Alarm Detection Wizard (introduced in release 7.0) to configure them. You can access this Wizard via SCI: launch it either from the main toolbar using the Run a Wizard button or from the Alarm Condition Wizard, which supports configuring Alarm Conditions for both Log-Based and Advanced Alarm Detection. If the latter, the Alarm Condition Wizard calls the Alarm Detection Wizard to configure an Alarm Detection Script object and associates it with the Alarm Condition object that you are currently configuring.

You must associate Alarm-Detection Scripts with Alarm Conditions. When an Alarm Condition object refers to an Alarm-Detection Script, the alarm detection for this Alarm Condition is performed according to the specified Alarm-Detection Script, regardless of whether any log event is specified as a Detection Event.

Note: To add a large number of Alarm Condition, Alarm Reaction, and Alarm Detection Script objects, consider using the Genesys Configuration Import Wizard. The Wizard helps you import such objects into the Configuration Database, either from an XML file that you create or from an XML file you export from another Configuration Database. Refer to the *Framework 7.6 Imported Configuration Data Formats Reference Manual* for details.

Notes on Alarm Reaction Configuration

You can configure alarm reactions of the following types:

- `Start a specified application.`
- `Stop a specified application.`
- `Restart the application that generated the alarm.`
- `Start a specified solution.`
- `Send an e-mail.`
- `Send an SNMP trap.`
- `Switch over to the backup application.`
- `Execute OS command.`
- `Change application option.`

Warning! You can only use as alarm reactions the Alarm Reaction Scripts that you have created with the Genesys Alarm Reaction Wizard.

The configuration procedure for most of the alarm reactions is self-explanatory in the Alarm Reaction Wizard. You'll have to supply information for these configuration parameters:

- A unique name for the Alarm Reaction configuration object (for all types of alarm reactions).
- A name of the application or solution the alarm reaction is configured for (for alarm reactions of such types as `Start a specified application`, `Stop a specified application`, `Start a specified solution`, and `Restart the application that generated the alarm`).

You'll have to provide additional information for alarm reactions of the following types:

- `Switchover` (see recommendations on page 63).
- `Send an e-mail` (see recommendations on page 63).
- `Send an SNMP trap` (see recommendations on page 63).
- `Execute OS command` (see recommendations on page 64).
- `Change application option` (see recommendations on page 66).

Starting with release 7.0, the Management Layer allows execution of Alarm Reactions not only at Alarm activation, but also at Alarm clearance. To achieve this, add the Alarm Reactions that are to be executed when the Alarm is cleared to the Clearance Scripts list of the corresponding Alarm Condition object. You can also use the Alarm Condition Wizard to accomplish this.

Alarm Reactions of the Switchover Type

Warning! You must have a high-availability (HA) license to enable Solution Control Server to successfully process an alarm reaction of the `Switchover` type. The lack of the license prevents the switchover between primary and backup applications of any type.

When configuring an alarm reaction of the `Switchover` type, you can specify whether Solution Control Server should perform the switchover when an application, which generates an alarm, is running in a particular mode:

- Select `primary` if you want SCS to perform a switchover only if the application that has generated an alarm is currently operating in Primary mode.
- Select `backup` if you want SCS to perform a switchover only if the application that has generated an alarm is currently operating in Backup mode.
- Select `perform switchover always` if you want SCS to perform a switchover regardless of the operating mode of the application that generates the alarm.

You might use these options, for instance, when associating an alarm reaction of the `Switchover` type for T-Server with the `CTI Link Disconnected` log event. Selecting `primary` for the alarm reaction configuration may prevent an unwanted switchover if the T-Server that produced this log event currently operates in Backup mode.

Alarm Reactions of the E-Mail Type

To configure an alarm reaction of type `Send an E-Mail`, specify the recipients of the e-mail in the Alarm Reaction Wizard. Then, compose the subject and text of the e-mail message, by using reserved variables.

See *Framework 7.6 Solution Control Interface Help* for detailed instructions on configuring the e-mail script, as well as an example. See Chapter 6 for more information about the e-mail interface itself.

Alarm Reactions of the SNMP Trap Type

To configure an alarm reaction of the `Send an SNMP Trap` type, specify a Name for the Alarm Reaction configuration object. All necessary information is

automatically provided by SCS, given that the SNMP Master Agent application is configured correctly.

See Chapter 7 on page 87, for more information about enabling the SNMP alarm signaling.

Alarm Reactions of the OS Command Type

To configure an Alarm Reaction of the `Execute OS Command` type, specify the name of the operating system command that is to be executed when an alarm is detected. If necessary, include the full path to the executed command.

Warning! Although you can specify any valid command name, use alarm reactions of this type with caution. To avoid unauthorized actions, limit access to Solution Control Server and Solution Control Interface to the administrators' group.

SCS executes all alarm reactions. In the case of an alarm reaction of the `Execute OS Command` type, SCS executes the specified command on its own host computer. Therefore, a currently logged in user must have sufficient permissions to execute the specified operating system command.

SCS passes information about a detected alarm to the operating system command to be executed. For this purpose, SCS adds command-line arguments (listed in Table 2) to the command line you specify in the `Command` property when you configure the alarm reaction.

Note: Some applications started as a result of the Execute OS Command alarm reaction may not recognize the command-line arguments added by SCS. This means, these applications might not work properly in this circumstance; for instance, they might exit. To make them work, you can call such applications indirectly; for instance, from within a script that passes correct command-line parameters to these applications. You then specify name of this script in the `Command` property of the alarm reaction.

Table 2: Additional Command-Line Parameters

Parameter	Description
-msgid	ID of the log event that resulted in the alarm
-msgtext	Text of the log event that resulted in the alarm
-condid	Alarm Condition `ID`
-condname	Alarm Condition `Name`
-conddesc	Alarm Condition `Description`

Table 2: Additional Command-Line Parameters (Continued)

Parameter	Description
-appid	ID of the application that generated the log event that resulted in the alarm
-appname	Name of the application that generated the log event that resulted in the alarm
-hostname	Name of the application host that generated the log event that resulted in the alarm

Examples

The following are three examples using Alarm Reactions of OS Type to filter specific alarms:

Filtering by type of log event

To log occurrences of certain log events to a database other than the Genesys Log Database, create a *.bat file that provides logging in to your independent database. Name this file `process_alarm.bat`. Then using the Alarm Reaction Wizard, configure an Alarm Reaction of the `Execute OS Command` type and set the `Command` property to
`"/home/Genesys/SCServer/scripts/process_alarm.bat"`

When a corresponding alarm is detected, SCS executes the following operating system command:

```
"/home/Genesys/SCServer/scripts/process_alarm.bat"
-msgid 20002 -msgtext "CTI Link disconnected" -condid 103 -condname
"CTI Link Failure" -conddesc "Failure of connection between any
T-Server and a switch." -appid 120 -appname "T-Server_Application" -
hostname "NameOfHost"
```

Note: If a specified operating system command would normally result in a screen display, the alarm reaction is performed, but the screen output cannot be enabled and, therefore, cannot be seen.

Collecting information about alarms

A script called `react_script.sh`, for bash UNIX shell, saves information about each alarm in the `reaction.log` text file located in the `/home/genesys/logs/` directory:

```
echo `date|cut -c4-16` : msgid=$2 : msgtext=$4 : condid=$6 :
condname=$8 :
conddesc=${10} : appid=${12} : appname=${14} >>
/home/genesys/logs/reactions.log
```

Filtering by the host that generated the alarm:

To save information about alarms generated by a specific host, you must create a script which writes only those logs generated by a specific host. The following sample script, `HostA_alarms.sh` for the bash UNIX shell, writes only those alarms generated by `HostA` to the `HostA_reactions.log` text file located in the `/home/genesys/logs/` directory.

```
while [ 0 -lt "$#" ]; do

case "$1" in
 "-msgid") shift; MSGID="$1" ;;
 "-msgtext") shift; MSGTEXT="$1" ;;
 "-condid") shift; CONDID="$1" ;;
 "-condname") shift; CONDNAME="$1" ;;
 "-conddesc") shift; CONDDESC="$1" ;;
 "-appid") shift; APPID="$1" ;;
 "-appname")shift; APPNAME="$1" ;;
 "-hostname")shift; HOSTNAME="$1" ;;
esac
shift
done

if [ $HOSTNAME = "HostA" ]; then
echo `date|cut -c4-16` : msgid=$MSGID : msgtext=$MSGTEXT :
condid=$CONDID : condname=$CONDNAME : conddesc=$CONDDESC :
appid=$APPID : appname=$APPNAME >> HostA_reactions.log
fi
```

Alarm Reactions of the Type Change Application Option

To configure an Alarm Reaction of the type `Change Application Option`, specify:

- The name of the application for which you want to change a value of a configuration option.

  Note: If you don't specify the application name, the Management Layer updates the option configuration of the application that triggers the alarm.

- The name of the configuration section to which the option belongs.
- The name of the configuration option the value for which you want to change.
- The new value to which to set the configuration option.

Warning! The account under which you run SCS must have appropriate permissions for the application whose option configuration you want to change.

You might configure this alarm reaction, for example, so that an application changes its log level to a more detailed one once the application reports the first signs of a critical situation in a particular log event.

How to Avoid an Unnecessary Switchover

Starting with release 7.0.1, you can minimize the chance that a network problem causes a switchover between a functioning primary server and its backup. When disconnected from an LCA running on any host, SCS initiates a switchover for all applications running on the same host with the LCA. However, the disconnect can result from either long-term issues (such as the host being down or LCA terminating) or temporary issues (such as slowness of the network or a temporary network problem).

You can configure SCS to verify the connection status in a few seconds to confirm whether the connection issue is resolved. To do so, create the `disconnect-switchover-timeout` option in the `general` section on the `Options` tab of the SCS `Properties` dialog box. Set the option value to any positive integer, which means the number of seconds and depends on your typical network conditions. When SCS initiates a switchover process, it waits for the interval you specified and checks the LCA connection:

- If the problem has been temporary, the connection is restored and the applications on the LCA host are in running status. In this case, SCS does not perform a switchover.
- If the problem is serious, the LCA remains disconnected and the status of the applications on the LCA host is unknown. In this case, SCS proceeds with the switchover.

Note: The `disconnect-switchover-timeout` option setting has no effect on a manual switchover, a switchover resulting from an alarm reaction, or a switchover resulting from service unavailability at the primary server.

Refer to the *Framework 7.6 Configuration Options Reference Manual* for detailed option descriptions.

How to Check the Configuration

You can also use the Management Layer to perform an automatic check of the configuration and to generate a report listing potential configuration problems and suggested solutions. The *Configuration Checker* verifies the configuration stored in the Configuration Database against various rules and conditions.

To check the existing configuration via the Management Layer, launch the Configuration Checker from the SCI's main toolbar using the `Run a Wizard` button. Then analyze the generated Check Report to fill configuration gaps and make all functions operable.

Note: The Configuration Checker projects how to maximize the Management Layer functionality for the existing configuration objects. If you don't plan to use a particular Management Layer function or if you don't plan to use a redundant component for this function, ignore the Configuration Checker warnings for it when analyzing the Check Report.

Refer to *Framework 7.6 Solution Control Interface Help* for detailed instructions for starting the Configuration Checker.

How to Troubleshoot the Management Layer

Use the *Management Layer Troubleshooter* to troubleshoot Management Layer functions that do not work. The Troubleshooter presents the most commonly asked questions about enabling Management Layer functionality and suggestions for what actions to undertake in a particular situation.

The Troubleshooter presents information about five areas of Management Layer functionality:

- Alarming and alarm reactions
- Logging
- Status monitoring
- Solutions and applications management
- Distributed solution management

Launch the Management Layer Troubleshooter from the SCI's main toolbar using the `Run a Wizard` button. Select a problem summary that describes the issue you are experiencing and follow the on-screen instructions to find and correct the cause of the problem.

Refer to *Framework 7.6 Solution Control Interface Help* for detailed instructions for starting the Troubleshooter.

In addition, Chapter 11, contains suggestions on how to identify and handle the most common mistakes made when enabling the Management Layer functionality.

How to Manage Environments with Two Configuration Servers

The Management Layer is designed to operate with one Configuration Server (one primary-backup pair of Configuration Servers). That is, you must connect

the Management Layer components and all the applications that it controls to the same Configuration Server.

If you need to use the Management Layer capabilities in an environment with two Configuration Servers (two primary-backup pairs of Configuration Servers), you must use an independent Management Layer installation for each Configuration Server (each primary-backup pair). To make two Management Layer installations independent when a host computer serves two configurations, install two Local Control Agent applications on such a computer, one LCA communicating to one Management Layer installation and the other LCA communicating to the other, and make the LCA port numbers unique.

How to Manage Environments with Configuration Server Proxy

The Management Layer fully supports the geographically distributed configuration environment available when using Configuration Server Proxy.

Note: Starting with release 7.0, the term *Configuration Server Proxy* is used to identify a Configuration Server instance running in so-called *Proxy* mode. Refer to the *Framework 7.6 Deployment Guide* for more information.

This support means that:

1. The Management Layer displays the current real-time status of Configuration Server Proxy and performs its startup, shutdown, or automatic switchover to the backup application just as for any other Genesys application.

   Note: You cannot manually switch over Configuration Server Proxy applications.

2. The Management Layer correctly starts applications that are clients of Configuration Server Proxy.

When receiving a request to start an application, the Management Layer determines whether the application is configured as a client of Configuration Server or of Configuration Server Proxy. For this purpose, the Management Layer checks the list of connections configured for an application.

The application is considered a client of Configuration Server Proxy when both of these conditions are met:

- The application's configuration contains a connection to an application of the Configuration Server type.

- In its turn, the application of the Configuration Server type contains in its configuration a connection to another application of the Configuration Server type.

The application is considered a client of Configuration Server when either of these conditions is met:

- The application's configuration contains no connection to an application of the Configuration Server type.
- The application's configuration does contain a connection to an application of the Configuration Server type, but this latter application's configuration does not contain a connection to an application of the Configuration Server type.

Note: Genesys recommends that you configure connections to Configuration Server for applications that are clients of Configuration Server in an environment with Configuration Server Proxy.

If the Management Layer finds the application to be a client of Configuration Server, the Management Layer uses the Configuration Server parameters to start the application. For more information, see "Processing the Start Command for Applications" on page 48.

If the Management Layer finds the application to be a client of Configuration Server Proxy, the Management Layer also checks the configuration to determine whether a backup application is configured for this Configuration Server Proxy:

- If no backup application is configured, the stand-alone Configuration Server Proxy is considered to be running in Primary mode.
- If a backup application is configured, the Management Layer identifies which Configuration Server Proxy of the primary-backup redundancy pair is currently running in Primary mode.

Then, the Management Layer starts the application that is a client of Configuration Server Proxy. SCS generates a command line and passes it to LCA, which executes the command. The command line contains:

- The application's working directory exactly as specified in the Application object's `Properties` window.
- The host name of Configuration Server Proxy currently running in Primary mode.
- The port number of Configuration Server Proxy currently running in Primary mode.
- The application name exactly as specified in the Application's `Properties` window.
- The startup timeout exactly as specified in the Application's `Properties` window.

Note: Make sure that Configuration Server Proxy is running during its client startup.

Chapter

5 Stuck Calls Management

This chapter new functionality for handling stuck calls, including the various methods used to detect and handle them.

This chapter contains the following sections:

Overview

A stuck call occurs when information about the release of a call in the communication system fails to reach one or more of the components of a CTI solution. One possible cause is the temporary loss of communication between CTI applications and devices, such as switching and interactive voice response systems, in the communication infrastructure.

Having missed the call release information, CTI applications continue to treat such calls as active, which results in less efficient operation and inaccurate reporting.

Because T-Servers are directly involved in communications with the switching systems, they play a critical role in detecting and handling stuck calls. This chapter describes the procedures related to detecting and ways of dealing with calls that appear to be stuck.

Stuck calls can be handled by any of three methods:

1. Using the T-Server switch-specific functionality (page 76)
2. Using the SNMP interface in the Management Layer (page 78)
3. Using stuck calls scripts in the Management Layer (page 79)

Which Method To Use?

T-Server switch-specific functionality

This method offers stuck calls detection and cleanup built-in to T-Server.

This is the basic form of using the stuck call feature in T-Server that provides for minimum customization and management options from user's perspective.

Characteristics:

- A simple, timeout-based detection mechanism is used internally in T-Server
- This method does not utilize Management Layer capabilities—no automatic reactions to be executed upon detection of stuck calls.
- You must set up and manage each T-Server manually and individually, using Configuration Manager.
- Unwieldy for managing multiple T-Servers.

SNMP Interface in the Management Layer

This method provides an SNMP interface, good for SNMP-based installations and in an SNMP-oriented application

Characteristics:

- Relies on external SNMP-aware applications (such as SNMP Perl scripts) to monitor and detect stuck calls in T-Server.
- Stuck call detection logic is highly customizable; information such as filters and timestamp properties lies in the new SNMP tables.
- The script provides for a central point of management, and can be tailored to manage a single or multiple T-Server applications.
- Does not utilize the Management Layer capability to monitor and react to alarm events; the script must do it.
- Requires SNMP licensing.

Stuck calls scripts

This method has the advantages of the second method but does not require SNMP.

Characteristics:

- The stuck call detection logic is highly customizable.
- This method is integrated with the Management Layer. A stuck calls event can be configured and reacted upon when corresponding log message are received by SCS.
- This method does not require an SNMP license.

- These scripts generate an XML file with a summary of all calls retrieved from T-Server, which makes it useful as a quick-look diagnostic tool.

See "Using the Stuck Calls Scripts" on page 79.

Prerequisites

Perl

The Stuck Calls functionality requires that Perl be installed on the SCS host computer. Table 3 lists the names and minimum versions of Perl extension modules required. Users may need to install some or all of them, depending on their current Perl installation.

Table 3: Perl Extension Modules

Module	Recommended version
HTML::Parser	3.25 and higher
SOAP::Lite	0.60 and higher
XML::DOM	1.43 and higher
XML::Parser	2.34 and higher
XML::SAX	0.12 and higher
XML::NamespaceSupport	1.08 and higher
XML::RegExp	0.03 and higher
HTTP::Cookies	1.39 and higher

These modules are available from the Comprehensive Perl Archive Network (CPAN) web site:

`http://www.CPAN.org`.

The Framework 7.6.0 stuck calls functionality—including the Perl scripts `GStuckCallsDetect.pl` and `GStuckCallsClear.pl` and the above modules—were tested using Perl version 5.6.1.

SOAP

The Perl scripts `GStuckCallsDetect.pl` and `GStuckCallsClear.pl` require Configuration Server to start with the SOAP (Simple Object Access Protocol) port enabled, a setting which is not the default in the Configuration Server configuration file. See "Soap Section" in the Configuration Server chapter of the *Framework 7.6 Configuration Server Reference Manual.*

Using T-Server

To support the stuck calls handling in T-Server, a set of configuration options has been introduced. These options control stuck call detection, notification, and automatic cleanup. See "T-Server Common Configuration Options" in the *Framework 7.6 T-Server Deployment Guide* for more information.

To support the stuck calls handling in the Management Layer, a set of log messages have been added to the T-Server Common part. See "T-Server Common Log Events" in *Framework 7.6 Combined Log Events Help* for more information.

To support the stuck calls handling in client applications of T-Server, a new property has been added to the T-Server events that define the end of the call (EventReleased and Event Abandoned). See the *Genesys 7 Events and Models Reference Manual* for more information.

Based on a specified timeout, T-Server waits for a call information being updated. After the timeout is expired, T-Server considers a call as a stuck call and reports a standard log message.

Processing of timeouts and notifications is implemented in T-Server Common Part, but the actual call cleanup involves interaction with the switch-dependent part for each T-Server.

Configuration Options Summary

Three new options are introduced in the new section `call-cleanup`.

notify-idle-tout

This option specifies the time interval that T-Server waits for a call being updated from its last update, after which, if no updates are received, T-Server reports this call as a stuck call.

cleanup-idle-tout

This option specifies the time interval that T-Server waits for a call being updated from its last update, after which, if no updates are received, T-Server clears this call as a stuck call either by querying the switch (if a CTI link provides such capabilities), or by deleting call information from memory unconditionally. The option description for each T-Server in the *Framework 7.6 Deployment Guide* reflects the actual implementation in that particular T-Server.

periodic-check-tout

This option specifies the time interval for periodic checks for stuck calls (affects both notification and cleanup functionality) by checking the T-Server's own call information with call information available in the switch. For

performance reasons, T-Server does not verify whether the `notify-idle-tout` or `cleanup-idle-tout` option is expired before performing this checking.

T-Server Common Log Events

Three T-Server Common Log Events support stuck calls management: 01-20020, 01-20021, and 01-20022.

01-20020

Level	Standard
Text	Call [connID] was idle since [timestamp] on DN(s) [DN]
Attributes	[connID] - Connection ID of the call [timestamp] - timestamp of the last update [DN] - DN or DNs, where the call is believed to be located (in case of multiple internal parties, all of them are merged into one string, separated by the / (slash mark) symbol)
Description	Reports that the call with the specified Connection ID has been idle since the specified time at the specified DN. You might consider setting an Alarm Condition for it.
Action	

01-20021

Level	Trace
Text	Call [connID] cleared with [value]
Attributes	[connID] - Connection ID of the call [value] - the value of the AttributeReliability
Description	Reports that the call with the specified Connection ID was cleared with an AttributeReliability value.
Action	

01-20022

Level	Trace
Text	Call [connID] was not cleared: [reason]
Attributes	[connID] - Connection ID of the call [reason] - the reason: either “feature not supported” or “still alive”
Description	Reports that the call with the specified ConnectionID was not cleared for the specified reason.
Action	

EventReleased on special DN

A new value is added into `TReliability`, indicating that update was forced by external request:

```
TReliabilityExternal = 3
TReliabilityExternal - cleared by an external SNMP request
```

Using the SNMP Interface

To support management of stuck calls using the SNMP Interface in the Management Layer, two new tables have been added to the T-Server-Specific SNMP Objects: `tsCallFilterTable` and `tsCallInfoTable`.

SNMP Tables

The `tsCallFilterTable` and `tsCallInfoTable` tables allow you to retrieve only those call instances that were defined by the filters in the `tsCallFilterTable` table thus reducing network traffic and increasing application performance.

- `tsCallFilterTable` provides the interface for setting call filter criteria for the `tsCallInfoTable` table. Also provides the interface for clearing calls by the call’s Connection ID. See Table 13 on page 102.
- `tsCallInfoTable` stores the latest snapshot of active calls from a given T-Server, contains information about active calls filtered by conditions set in the `tsCallFilterTable`. See Table 14 on page 102.

Using the Stuck Calls Scripts

Two stuck calls management scripts, `GStuckCallsDetect.pl` and `GStuckCallsClear.pl` have been added to support detecting and automatic clearing stuck calls. Both scripts use the `gstuckcallsscript.cfg` configuration file.

How to Install the Scripts

Installing System Control Server (SCS) automatically installs both scripts to the same directory as SCS. (See Figure 2 on page 81.)

How to Run the Scripts

GStuckCallsDetect.pl script

The `GStuckCallsDetect.pl` script performs these functions:

1. Retrieves all the information about all T-Servers from the configuration.
2. Queries each T-Server for stuck calls according to the specified filter using the `gstuckcalls` utility.
3. If stuck calls are found, sends log message 9500 on behalf of the T-Server.
4. If stuck calls are not found, sends log message 9501 on behalf of the T-Server.

If you require alarming for stuck calls, schedule this script for periodic execution, by using tools Operating System such as `Scheduled Tasks` for Windows and `Cron` for UNIX.

In Windows, you can run the scripts manually with the command line utility `gstuckcalls.exe`.

GStuckCallsClear.pl script

The `GStuckCallsClear.pl` script clears stuck calls in the specified T-Server. If you need to clear stuck calls automatically, use this script as an alarm reaction for the active alarm `Stuck Calls Detected`. This script performs the following:

1. Connects to the specified T-Server.
2. Uses the `gstuckcalls` utility to clear all stuck calls according to the specified filter.

The gstuckcallsscript.cfg Configuration File

The GStuckCallsDetect.pl and GStuckCallsClear.pl scripts use this configuration file. It has the following format:

```
[cfgserver]
host=<host>
port=<port>
username = <username>
password = <password>

[msgserver]
host=<host>
port=<port>

[filter]
createdbefore=<seconds>
createdafter=<seconds>
updatedbefore=<seconds>
updatedafter=<seconds>
```

Stuck Calls Alarm Log Messages

The following alarm log messages have been added to support detection and automatic clearance of stuck calls:

```
43-09500: Stuck calls detected
43-09501: Stuck calls not detected
```

Configuring the Alarm Condition

To enable automatic stuck calls detection, configure the corresponding Alarm Condition with the following settings:

For Detect Event:

- Log Event ID set to 9500
- Selection Mode set to Select By Application Type
- Type set to T-Server

For Cancel Event:

- Log Event ID set to 9501

See “Using Log Events for Alarm Detection” on page 60 for more information.

The active alarm Stuck Calls Detected is communicated when log message 9500 is received. This happens when the GStuckCallsDetect.pl script detects stuck calls in a T-Server. Scheduling the GStuckCallsDetect.pl script for periodic execution (for instance, once per day) ensures automatic stuck calls detection and alarming.

To clear stuck calls automatically, follow these steps:

1. Configure the alarm reaction type `Execute OS Command` for the Alarm Condition `Stuck Calls Detected`.
2. Configure this alarm reaction to execute the `GStuckCallsClear.pl.` script.

The script clears stuck calls at the corresponding T-Server and sends log message `9501` to the Management Layer, which then clears the active alarm Stuck `Calls Detected`.

Stuck Calls Scripts Flow Chart

This flow chart may give you a better understanding of the scripts.

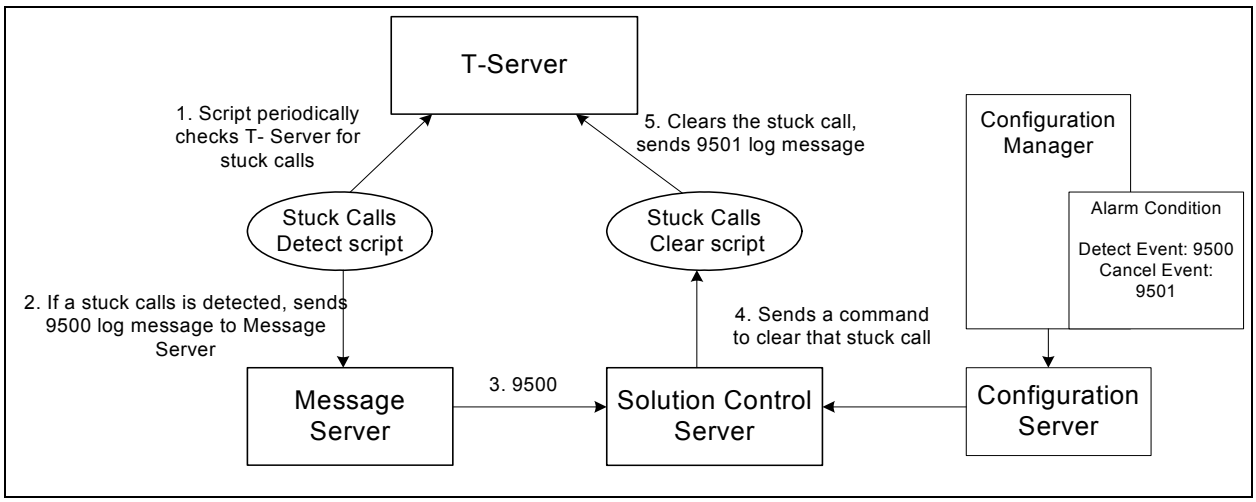


Figure 2: Stuck Calls Scripts Flow Chart

Chapter

6 E-Mail Alarm-Signaling Interface

This chapter describes how the Management Layer processes alarm reactions of the *E-Mail* type and how to configure an e-mail system for this function.

This chapter contains the following sections:

Alarm Reactions of the E-Mail Type

You can configure the Management Layer to send the content of an alarm as an e-mail message to one or more e-mail addresses. Simply create an alarm reaction of the `Send an e-mail` type for a corresponding alarm condition. See "How to Configure Alarm Conditions and Alarm Reactions" on page 60 for recommendations on configuring alarm reactions.

Note: An *alarm* is a message generated by a Genesys application when a certain alarm condition is met. For more information, refer to "Alarm-Signaling Functions" on page 36.

Figure 3 on page 84 illustrates the message flow through the Management Layer when such an alarm is triggered. That flow includes the e-mail system for your environment, which you must configure for the host running Solution Control Server. (See next section for more information.)

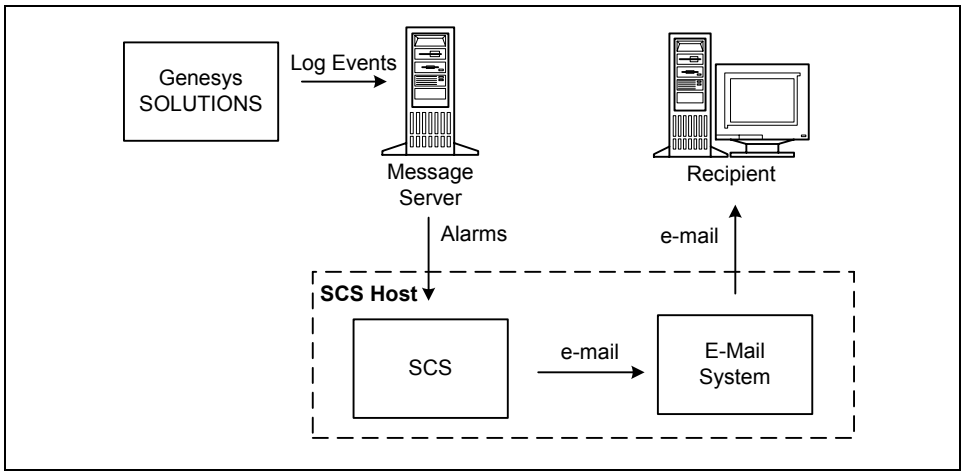


Figure 3: E-Mail Alarm Reaction in Management Layer

Configuring E-Mail Systems

This section describes how to configure a UNIX- and a Windows-based e-mail systems to send the content of an alarm message in an e-mail.

On UNIX

On UNIX operating systems, Solution Control Server can use either the `sendmail` command or Simple Mail Transfer Protocol (SMTP) to send e-mail messages. Depending on the protocol you prefer:

- You must correctly configure the `sendmail` command on the host computer running SCS.
- You must configure SMTP server host and port for SCS as values for the `smtp_host` and `smtp_port` configuration options.

Note: For more information about Solution Control Server configuration options, refer to the *Framework 7.6 Configuration Options Reference Manual.*

On Windows

On Windows operating systems, Solution Control Server can use either the Messaging Application Programming Interface (MAPI) or Simple Mail Transfer Protocol (SMTP).

MAPI

To enable the operation of e-mail alarm reactions via an MAPI e-mail system, you must install the system and configure it properly on the host computer running Solution Control Server. Also install Microsoft's CDO (Collaboration Data Objects).

The simplest way to set an MAPI e-mail system is to install Microsoft Outlook on the host computer for SCS. SCS then uses the default MAPI profile to connect to the system and send messages.

If you have installed SCS and are running it as a regular application (as opposed to a Windows Service), SCS uses the credentials of the user who is currently logged into Windows to open the default MAPI profile. So you must set permissions that allow users to use the default MAPI profile.

If you have installed SCS as a Windows Service, you must explicitly specify a user account to log on to Windows for this service. That account must have sufficient permissions to use the default MAPI profile. To set up this account:

1. Open the `Control Panel` window.
2. Double-click the `Services` button to open the `Service` window.
3. Select the `Genesys Solution Control Server` service.
4. Click the `Startup` button.
5. Select `This Account` and specify user account information.
6. Click `OK` and close the `Service` window.

SMTP

To enable the operation of e-mail alarm reactions via an SMTP e-mail system, you must configure the `mailer` section. Specify the SMTP server host for SCS as the value for the configuration option `smtp_host`, and specify the SMTP server port for SCS as the value for the configuration option `smtp_port`.

Note: For more information about Solution Control Server configuration options, refer to the section E-mail System Section of the "Solution Control Server" chapter in the *Framework 7.6 Configuration Options Reference Manual.*

Chapter

7 SNMP Interface

This chapter describes Management Layer built-in support for network management systems (NMS) that comply with the Simple Network Management Protocol (SNMP). It also describes how to activate this function. In particular, this chapter focuses on how the Management Layer distributes SNMP commands from an NMS and how it processes alarm reactions of the *SNMP Trap* type. It also describes the layout of the Genesys Management Information Base (MIB) file and the format of the SNMP traps, including the abbreviations for the Genesys application types.

This chapter contains the following sections:

Built-in SNMP Support

The Management Layer provides a built-in support for SNMP-compliant third-party NMS. Solution Control Server (SCS) processes various NMS commands and generates SNMP traps based on changes in the current status of an individual application. With this built-in support for SNMPv1–v3, you can access Management Layer functions through your existing NMS interface.

Note: The Genesys built-in SNMP implementation for SNMPv1 passed all the tests developed and published by CERT/CC for this sort of application. For information about tests with which you can check your system against vulnerability to SNMPv1 malformed SNMP packets, go to `http://www.cert.org/advisories/CA-2002-03.html`.

The following subsections describe the architecture of the SNMP support. The Management Layer provides you, as a network administrator, with three ways to monitor and control Genesys products via an NMS user interface:

- You can start, stop, and monitor the status of any Genesys or third-party application that the Management Layer monitors and controls. In addition, you can modify log options for Genesys server applications.
- You can retrieve application-specific SNMP statistics and data as defined in the MIB file for those Genesys server applications that support application-specific SNMP requests.
- You can receive alarms from any Genesys server application in the form of SNMP traps.

With all three options, the communications between SCS and NMS require an SNMP master agent application that is compliant with the AgentX protocol. If your NMS does not contain such an application, you can use Genesys SNMP Master Agent to integrate the Management Layer into your NMS. The Genesys MIB file, which the NMS uses, defines the communication interface between the Management Layer and the NMS. Refer to Appendix A on page 161 for more information about the Genesys MIB file.

Note: In Framework releases 6.0, 6.1, and early 6.5, PATROL SNMP Master Agent was required for the Management Layer to generate SNMP traps. With SNMP support built into the Management Layer, the SNMP Option 5.1 CD is no longer required to interface with an NMS.

Compatibility

When migrating from the latest 6.5 releases, the only item you must update on the NMS side is the Genesys MIB file.

For information about how to migrate from SNMP Option 5.1 to SNMP built-in support, see "Migrating from Old SNMP Implementations" on page 119.

SNMP Command Processing

Figure 4 on page 89 illustrates how the Management Layer processes the SNMP commands it receives from an NMS. The commands include:

- Start and stop commands for any Genesys or third-party application that the Management Layer monitors and controls.
- Change of log options settings for Genesys server applications.

With this architecture, you can also:

- View the configuration of any Genesys or third-party product that the Management Layer monitors and controls.
- Monitor the current status of an application (see if it is running or not) and, for redundant configurations, view the current redundancy mode (Primary or Backup) of a running application.

- View the configuration and status of any host registered as a Host object in the Configuration Database, including the LCA configuration of that Host.
- View configured Solutions and their statuses (see if Solutions are running).

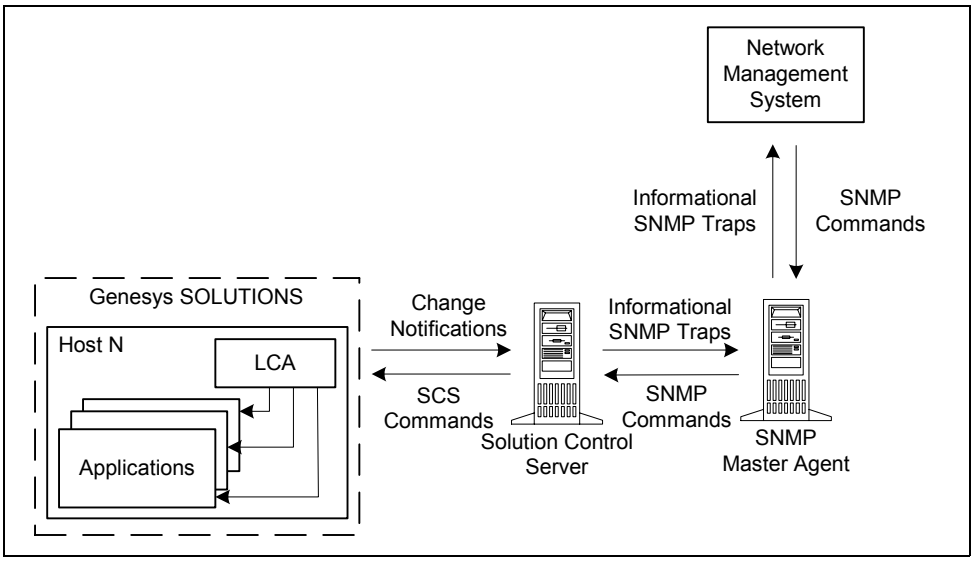


Figure 4: Management Layer Processing of an SNMP Command from an NMS

Requesting SNMP Data

In addition to its application-monitoring functions, you can use the Management Layer to retrieve some SNMP data particular to applications of a given type. For example, you can request from T-Server the number of calls it is currently handling.

You can only retrieve SNMP data and prompt application-specific SNMP traps for applications built with the Genesys management library. Here is a list of these applications:

- Call Concentrator
- Configuration Server
- DB Server
- Universal Routing Server
- T-Server

Figure 5 on page 90 illustrates how these applications interact with an NMS. As you can see, all requests from the NMS as well as data and traps from the applications come through Solution Control Server.

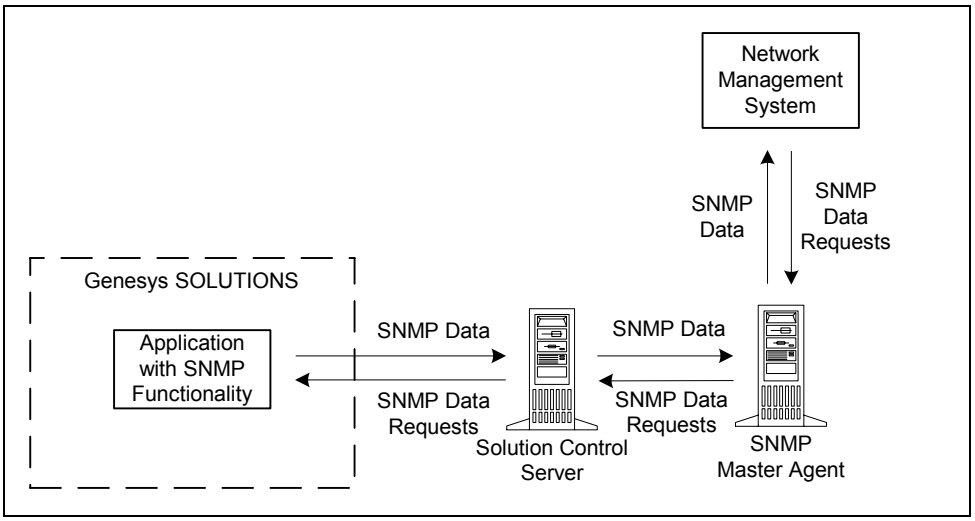


Figure 5: SNMP Information Exchange Between Some Servers and NMS

Alarms and SNMP Trap Processing

To transmit the content of an alarm message to an SNMP-compliant third-party NMS, the Management Layer converts that information into an SNMP trap. An *alarm* is a message generated by a Genesys application when a certain Alarm Condition is met. For more information about alarm signalling, see Chapter 3 on page 27, and *Framework 7.6 Solution Control Interface Help.*

Figure 6 illustrates how the Management Layer reacts to an alarm of type `Send an SNMP trap`.

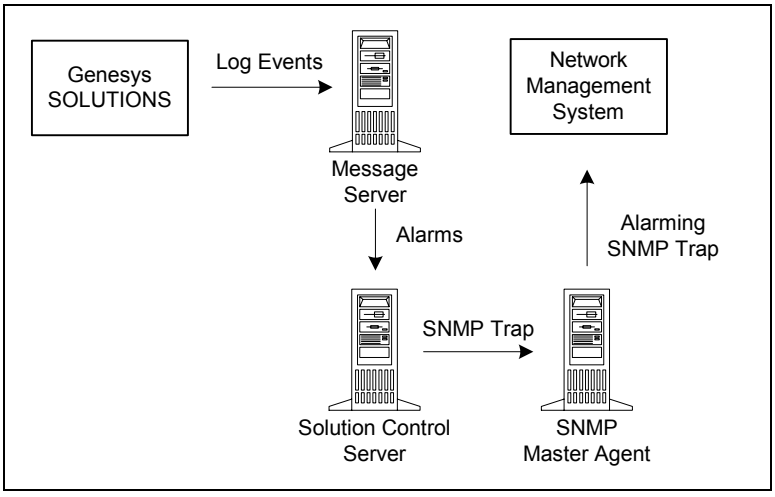


Figure 6: Management Layer Processing of an SNMP Trap Alarm Reaction

SNMP-Managed Objects

The Genesys MIB file contains all SNMP objects available to the NMS.

Starting with release 7.0, Genesys MIB utilizes the SMI-v2 Row-Status mechanism and the control/data-tables concept to facilitate management of multiple Genesys servers simultaneously.

RowStatus—a TEXTUAL-CONVENTION defined in IETF's SNMPv2-TC—is commonly used to control the dynamic creation and deletion of rows in SMIv2 defined tables.

A conceptual SMIv2 table using Row-Status also acts as a control table or configuration table. Using the control table, the NMS application configures the information to be monitored. A separated data table holds the information that is gathered.

One control entry (one row) is linked to the data that is gathered. Each control entry contains control parameters that specify which data or statistics you want to access and collect.

Genesys MIB 7.0 uses one control table and several data tables. Data tables are organized based on their functional areas and divided into two main groups: *server-generic* data tables and *server-specific* data tables.

Each data table, whether it is server-generic or server-specific, is assigned a unique identifier. (Refer to TableID Textual Convention in the Genesys MIB file, for the complete list of tables and their identifiers.)

This table identifier along with the Genesys server identifier (`server DBID` number) is used as an index in the control table. Thus, each row in the control table gathers particular data from a particular Genesys server.

Starting with release 7.0.1, you can enable an automatic refresh of MIB tables. When you set up a row to gather data from a particular table, you have a choice of automatic or manual refresh for the table. If you select `Automatic Refresh` mode, specify the time period, in seconds, after which Solution Control Server is to refresh the table.

In addition to control and data tables, you can access a group of server standard objects independently of the control/data-table mechanism.

The following sections presents information about each object set:

- "Standard SNMP Objects" on page 92 describes the standard Genesys SNMP objects.
- "The gServerControlTable Table" on page 93 describes the Control Table objects.
- "T-Server-Specific SNMP Objects" on page 100 describes the SNMP objects specific to T-Server.

For information about supported traps, see "SNMP Traps" on page 106.

Standard SNMP Objects

Tables in this section describe standard Genesys SNMP objects by object group.

The gServersTable Table

Table 4 describes objects that belong to gServersTable, which contains information about server environments.

Table 4: gServersTable Table of Standard SNMP Objects

Object Name	Value Type	Access Level	Description
gsCleanupTimeout	Unsigned 32	read/write	The time, in minutes, the agent should keep rows in the gsControlTable and consequently in related data tables if there were no requests to objects of this row or corresponding rows from data table(s). After the timeout, the agent should automatically delete unattended rows. Value 0 set for this object specifies that MIB clean up should not be performed.
gServersTable	sequence	read	Specifies a sequence of the following objects.
gServerId	integer	read	Uniquely identifies a Genesys server. Corresponds to the number assigned to an object in the Configuration Database to identify the object among all objects of the same type. The gpServerCurrent object uses this value to switch from one Genesys server to another.
gServerName	string	read	Specifies the application name of a server application as configured in the Configuration Database.
gServerStatus	string	read	Specifies the current operational status of a server. The possible settings are UP or DOWN, which indicates if the server is running or not.
gServerType	string	read	Indicates the type of a server; that is, the application type specified for this application in the Configuration Database.

Table 4: gServersTable Table of Standard SNMP Objects (Continued)

Object Name	Value Type	Access Level	Description
gServerVersion	string	read	Specifies the current version of the running server; that is, the application version specified for this application in the Configuration Database.
gServerWorkDir	string	read	Specifies the server's working directory; that is, the working directory specified for this application in the Configuration Database.
gServerCommandLine	string	read	Indicates the full command line used to start this server, as specified in the Configuration Database. For example: scs -host host1 -port 4135 -app SCS_Primary
gServerPID	string	read	Specifies the process ID of the server that is currently running.
gServerCommand	integer	read/write	Specifies the command to start, shut down or gracefully shut down a server. Accepts the following values: • 1 start • 2 shutDown • 3 shutDownGracefully
gServerDeleteClient	integer	read/write	Sends a delete-client command to the server. Enter the socket number of a client as the value

The gServerControlTable Table

Table 5 on page 94 describes objects that belong to gServerControlTable, which configures the information to be monitored and controls the data-refresh process.

Table 5: gServerControlTable Table of Standard SNMP Objects

Object Name	Value Type	Access Level	Description
gServerControlTable	sequence	read	Specifies a sequence of the following objects.
gsCtrlServerID	integer	not-accessible	An index. Specifies the DBID of the server to be managed by this control row. The valid DBID number used to set rows in this control table is retrieved from the gServersTable.
gsCtrlTableID	integer	not-accessible	An index. Specifies the data to be gathered for this server. Valid values and the tables they represent are as follows: • gsLogTable(1) • gsInfoTable(2) • gsClientTable(3) • gsPollingTable(4) • tsInfoTable(5) • tsCallTable(6) • tsDtaTable(7) • tsLinkTable(8) Detailed information about these tables is provided in the subsequent sections.
gsCtrlRefreshStatus	integer	read-only	Indicates refresh status of corresponding data table as specified by gsCtrlTableID. The following refresh statuses are reported: • dataNotReady(1) • dataRefreshInProgress(2) • dataReady(3) • mgmtIsNotAvailable(4) • dataRefreshFailed(5) Refer to the Genesys MIB file for detailed descriptions of these statuses.

Table 5: gServerControlTable Table of Standard SNMP Objects (Continued)

Object Name	Value Type	Access Level	Description
gsCtrlLastRefreshed	timetick	read-only	Specifies the time in hundredths of seconds since the row was last successfully refreshed.
gsCtrlRowStatus	RowStatus	read/create	Controls and manages row creation and row deletion. Initiates data-refresh process for a data table managed by this control row, and reports the status of this row. Refer to the Genesys MIB file for a detailed description of the way this object is manipulated.

The gsInfoTable Table

Table 6 describes objects that belong to gsInfoTable, which contains miscellaneous statistics and data about a managed server.

Table 6: gsInfoTable Table of Standard SNMP Objects

Object Name	Value Type	Access Level	Description
gsInfoTable	sequence	read	Specifies a sequence of the following objects. Indexed by the gsCtrlServerID.
gsClientsExistNum	Unsigned32	read	Indicates the number of clients currently connected to a server.
gsClientsTotalNum	Unsigned32	read	Indicates the total number of clients connected so far to a server.
gsServerConfigFile	string	read	Indicates configuration file name, if any, used to start a server.

The gsPollingTable Table

Table 7 on page 96 describes objects that belong to gsPollingTable, which specifies a *heart-beat* feature; that is, a periodic signal sent over a network to the NMS.

Table 7: gsPollingTable Table of Standard SNMP Objects

Object Name	Value Type	Access Level	Description
gsPollingTable	sequence	read	Specifies a sequence of the following objects. Indexed by the gsCtrlServerID.
gsPollingID	Unsigned32	read/write	Specifies the amount by which each polling signal increases over the last one. The initial polling event equals the same integer. For more information about this variable, see Table 17 on page 106.
gsPollingInterval	Unsigned32	read/write	Specifies the interval, in seconds, between two subsequent polling signals sent from a server. May be set to any integer.
gsPollingLastTrap	string	read	Specifies the last trap value of a polling signal sent to the NMS. For more information about this variable, see Table 17 on page 106.
gsPollingStatus	string	read/write	Activates or deactivates the server polling feature. Values are ON and OFF. Value ON causes a server to send periodic SNMP signals to SCS, which, in turn, converts these signals into SNMP traps.

The gsLogTable Table

Table 8 on page 97 describes objects that belong to gsLogTable, which contains information about log option settings. Values of the SNMP objects in this table correspond to values of configuration options specified in the log section on the `Options` tab of an Application object's `Properties` window in Configuration Manager. Check information in the Description column for the name of the particular option to which an object corresponds.

Permission Requirements

To change log option settings for a particular application via SNMP, you must first associate both the Application and Solution Control Server objects with the account in the Configuration Database having permissions to modify configuration object properties. In other words, the account must have Change permissions for Application object(s).

To associate Solution Control Server with such an account:

1. Log into Configuration Manager under a user account having `Full Control` permissions.

2. Go to the SCS Application Properties window in Configuration Manager.
3. On the Security tab, change the Log On As setting to This Account and select any user account (Person object). This can be one of the following:
   - An account that belongs to the Administrators default access group.
   - An account that belongs to the role-specific Access Group with the Change permissions you have created for this purpose.
   - An individual account to which you will grant Change permissions in any Access Group.
4. Click OK to save configuration changes.

To associate application(s) with the same account you designated for SCS:

1. Select the Application object, log options for which you will be changing via SNMP. (You can select a folder or subfolder that contains Application objects, in which case permissions change for all Application objects in the selected folder.)
2. Open the Application object's Properties window (or folder's Properties window) and click the Security tab.
3. Click the Permissions command button and add the user account you designated as This Account for SCS to this object's permissions. Be sure to set Type of Access to Change for this account.
4. Click OK to save changes in the Add dialog box, Permissions dialog box, and Application Properties window (or folder Properties window).

You could grant change permissions for Application objects to the SYSTEM account, but doing so (and making all servers to connect to Configuration Server with change permissions) might impact data security.

Table 8: gsLogTable Table of Standard SNMP Objects

Object Name	Value Type	Access Level	Description
gsLogTable	sequence	read	Specifies a sequence of the following objects. Indexed by the gsCtrlServerID.
logVerbose	string	read/write	Log level. Filters output of messages by their priorities. Corresponds to the verbose log option.
logTrace	string	read/write	Lists the set of log outputs for the log messages of the Trace level. Corresponds to the trace log option.
logStandard	string	read/write	Lists the set of log outputs for the log messages of the Standard level. Corresponds to the standard log option.

Table 8: gsLogTable Table of Standard SNMP Objects (Continued)

Object Name	Value Type	Access Level	Description
logDebug	string	read/write	Lists the set of log outputs for the log messages of the Debug level. Corresponds to the `debug` log option.
logAll	string	read/write	Lists the set of log outputs for the log messages of all levels. Corresponds to the `all` log option.
logBuffering	string	read/write	Turns on/off OS file buffering. Buffering increases performance of file output; however, log messages may appear in the log with a delay after they have been logged. Corresponds to the `buffering` log option.
logSegment	string	read/write	Sets the mode of log output segmentation. Currently implemented only for the file output. When a currently opened log segment exceeds the size set by this option, the current segment is closed and a new one is created (an empty new segment). Corresponds to the `segment` log option.
logExpire	string	read/write	Sets the expiration mode for old files (segments); that is, specifies whether to remove old files when new ones are created. Corresponds to the `expire` log option.
logMessageFile	string	read/write	Sets the name of the file that defines log messages specific to applications of this type. Corresponds to the `messagefile` log option.
logMessageFormat	string	read/write	Specifies the format of log record headers that an application uses when writing logs in the log file. Corresponds to the `message_format` log option.
logTimeFormat	string	read/write	Specifies how to represent in a log file the time when an application generates log records. Corresponds to the `time_format` log option.
logTimeConvert	string	read/write	Specifies in which system an application calculates the log record time when generating a log file. Corresponds to the `time_convert` log option.

The gsClientTable Table

Table 9 describes objects that belong to gsClientTable, which gathers statistics about server clients.

Table 9: gsClientTable Table of Standard SNMP Objects

Object Name	Value Type	Access Level	Description
gsClientTable	sequence	read	Specifies a sequence of the following objects. Indexed by the gsCtrlServerID.
gsClientAppName	string	read	Specifies the client's application name.
gsClientAuthorized	string	read	Specifies the client's level of authorization.
gsClientGotEvents	Unsigned32	read	Specifies the number of events the client has received.
gsClientSentReqs	Unsigned32	read	Specifies the number of requests the client has sent.
gsClientSocket	Unsigned32	read	Specifies the socket number through which the client is connected to the server.
gsClientType	integer	read	Specifies the client's type.

The gsAlarmObjects Table

Table 10 describes objects that belong to gsAlarmObjects, which specifies how the Management Layer converts the alarms it generates to SNMP traps and sends them to the NMS. Table 19 on page 109 lists Genesys application types as they appear in alarm-related traps.

Table 10: gsAlarmObjects Table of Standard SNMP Objects

Object Name	Value Type	Access Level	Description
gsServersLastAlarm	string	read	Specifies the last trap value sent to the NMS. For information about traps that use this variable, see Table 17 on page 106.
gsServersLastTrap	string	read	Specifies the last server-status (server up or down) trap sent to NMS.
gsAlarmID	Unsigned32	read	The unique identifier of the Alarm Condition name as configured in the Configuration Database.

Table 10: gsAlarmObjects Table of Standard SNMP Objects (Continued)

Object Name	Value Type	Access Level	Description
gsAlarmLogText	string	read	The text of the log event that triggered this alarm.
gsAlarmMessagesIds	string	read	The unique identifier of the log event that triggered or removed this alarm.
gsAlarmApplicationName	string	read	The name of the application that reported this alarm as specified in the Configuration Database.
gsAlarmApplicationType	string	read	The type of application that reported this alarm as specified in the Configuration Database.
gsAlarmCategory	string	read	The alarm category as specified in the Configuration Database: Critical, Major, or Minor.

T-Server-Specific SNMP Objects

The following tables summarize the SNMP objects specific to T-Server. These objects give you access to internal T-Server tables that contain information about call states, addresses, and CTI links.

The tsInfoTable Table

Table 11 describes objects that belong to tsInfoTable, which collects miscellaneous data and statistics specific to T-Server.

Table 11: tsInfoTable Table of T-Server-Specific SNMP Objects

Object Name	Value Type	Access Level	Description
tsInfoTable	sequence	read	Specifies a sequence of the following objects. Indexed by the gsCtrlServerID.
tsCallsExistNum	Unsigned32	read	Specifies the current number of calls being handled by T-Server.
tsCallsTotalNum	Unsigned32	read	Specifies the number of calls T-Server has handled since it started.

Table 11: tsInfoTable Table of T-Server-Specific SNMP Objects (Continued)

Object Name	Value Type	Access Level	Description
tsLinksCommand	string	read/write	Specifies the command to be sent to T-Server. **Note:** Reserved for future use.
tsLastChangedLink-Status[a]	string	read	Specifies the server name, link name, and link's new status. **Note:** Reserved for future use.

a. This object is specific to environments with X.25 links.

The tsCallFilterTable

Table 12 supports stuck calls functionality by describing objects that belong to `tsCallFilterTable`, which provides the interface for setting call filter criteria for the `tsCallInfoTable`, and for cleaning calls by their ConnectionID.

Table 12: tsCallFilterTable Table of T-Server-Specific SNMP Objects

Object Name	Value Type	Access Level	Description
gsCtrlServerId	ServerDBID	not-accessible	Uniquely identifies a T-Server application.
fltCallCreatedBefore	Unsigned32	read-write	Reports the calls that were created earlier than a specified number of seconds counting from the time of the request. The `0` (zero) value means the filter is not used.
fltCallCreatedAfter	Unsigned32	read-write	Reports the calls that were created later than a specified number of seconds counting from the time of the request.
fltCallUpdatedBefore	Unsigned32	read-write	Reports the calls that were last time updated earlier than a specified number of seconds counting from the time of the request.
fltCallUpdatedAfter	Unsigned32	read-write	Reports the calls that were last time updated later than a specified number of seconds counting from the time of the request.
clearCallByConnId	DisplayString	read-write	Connection ID (converted to string by connid_to_str function) of the call to be cleared.

The tsCallInfoTable Table

Table 13 supports stuck calls functionality by describing objects that belong to `tsCallInfoTable`, which stores the latest snapshot of active calls from a given T-Server, and contains a set of attributes that facilitates the discovery of stuck calls.

Table 13: tsCallFilterTable Table of T-Server-Specific SNMP Objects

Object Name	Value Type	Access Level	Description
gsCtrlServerId	ServerDBID	not-accessible	Uniquely identifies a T-Server application.
callInfoInstanceID	Unsigned32	not-accessible	Reports the call instance ID.
callInfoType	Unsigned32	read-only	Reports a call type.
callInfoCreationTimestamp	Unsigned32	read-only	Reports a call creation timestamp.
callInfoLastUpdatedTimestamp	Unsigned32	read-only	Reports a timestamp of the last update on this call.
callInfoInternalParties	DisplayString	read-only	Reports an Internal DN.

The tsCallTable Table

Table 14 describes objects that belong to tsCallTable, which contains data about telephony calls being processed by T-Server.

Table 14: tsCallTable Table of T-Server-Specific SNMP Objects

Object Name	Value Type	Access Level	Description
tsCallTable	sequence	read	Specifies a sequence of the following objects. Indexed by the gsCtrlServerID and callInstanceID.
callANI	string	read	Automatic Number Identification. Provides calling party information (typically, the telephone number or billing account number) to the called party.
callCallID	string	read	Specifies the current call identifier that the switch has assigned to a call.

Table 14: tsCallTable Table of T-Server-Specific SNMP Objects (Continued)

Object Name	Value Type	Access Level	Description
callConnID	string	read	Specifies the identifier that T-Server has assigned to a call.
callCustomerID	string	read	Specifies the Customer (Tenant) identifier used when a call was initiated.
callDNIS	string	read	Directory Number Identification Service. Identifies to the called system the last three or four digits of the number actually dialed by the caller.
callFirstTransferDN	string	read	Specifies the DN on a remote T-Server from which a call was first made.
callFirstTransfer-Location	string	read	Specifies the location of the remote T-Server from which a call was first transferred.
callInstanceID	counter	read	Specifies the instance number for each call.
callLastTransferDN	string	read	Specifies the DN on a remote T-Server from which a call was last transferred.
callLastTransfer-Location	string	read	Specifies the location of the remote T-Server from which a call was last transferred.
callNumParties	string	read	Specifies the number of parties currently involved in a call.
callPartiesList	string	read	Specifies a list of parties involved in a call.
callReferenceID	string	read	Specifies the reference ID of a call.
callTimeStamp	string	read	Specifies the timestamp of when the call was created, in seconds starting from January 1, 1970.
callType	string	read	Specifies the type of a call.
callState	string	read	Specifies the current state of the call in question.

The tsDtaTable Table

Table 15 describes objects that belong to tsDtaTable, which holds information about all registered DNs.

Table 15: tsDtaTable Table of T-Server-Specific SNMP Objects

Object Name	Value Type	Access Level	Description
tsDtaTable	sequence	read	Specifies a sequence of the following objects. Indexed by the gsCtrlServerID and tsDtaInstanceID.
tsDtaDigits	string	read	Specifies the digits field of the DTA structure.
tsDtaInstanceID	counter	read	Specifies the instance field of the DTA structure.
tsDtaMode	string	read	Specifies the mode field of the DTA structure.
tsDtaState	string	read	Specifies the state field of the DTA structure.
tsDtaType	string	read	Specifies the type field of the DTA structure.

The tsLinkTable Table

Table 16 describes objects that belong to tsLinkTable, which contains information about the CTI links that exist between T-Server and switch(es) and the links' attributes.

Table 16: tsLinkTable Table of T-Server-Specific SNMP Objects

Object Name	Value Type	Access Level	Description
tsLinkTable	sequence	read	Specifies a sequence of the following objects. Indexed by the gsCtrlServerID and tsLinkID.
tsLinkAddress	string	read	Specifies the address of the link.
tsLinkDelay[a]	string	read	Specifies a link reconnect delay in the case of an unsuccessful attempt to reconnect to the line.
tsLinkDTEClass[a]	string	read	Specifies the DTE class for the X.25 connection.
tsLinkName	string	read	Specifies the name of the link.

Table 16: tsLinkTable Table of T-Server-Specific SNMP Objects (Continued)

Object Name	Value Type	Access Level	Description
tsLinkID[a]	integer	read	Specifies the link identifier. **Note:** Reserved for future use.
tsLinkMode[a]	string	read	Specifies the mode of the link.
tsLinkPID[a]	string	read	Specifies the link's process ID.
tsLinkPort	string	read	Specifies the physical port number of the link.
tsLinkProtocol	string	read	Specifies a protocol type.
tsLinkSocket[a]	string	read	Specifies the socket number through which the server is connected to the link. **Note:** Reserved for future use.
tsLinkStatus	string	read	Specifies the current status of the link. The *status* property is used in fault monitoring, providing the NMS with information about which links are currently established and which links have lost physical or logical connection. Here are the valid values: • `0` Link is not configured properly. • `1` No physical or TCP/IP connection between T-Server and the switch. • `2` Both physical and logical connections are OK. • `3` Physical connection exists between T-Server and switch, but the logical connection is missing.
tsLinkTemplate	string	read	Specifies a template for the connection.
tsLinkX25Device[a]	string	read	Specifies the X.25 device connected to the link.
tsLinkX25LocalAddress[a]	string	read	Specifies the local address for an X.25 connection.

a. This object is specific to environments with X.25 links.

SNMP Traps

This section discusses the SNMP trap messages you can receive from Genesys applications:

- Table 17 on page 106 lists SNMP traps that only server applications built with the management library can generate. (See the list on page 89).
- Table 18 on page 108 lists alarm-related SNMP traps that SCS generates on behalf of any Genesys server it monitors.

Table 17: Application-Generated SNMP Traps

Trap	Variable Name	String Format and Valid Values	Description
gsServerUpTrap	gsServersLastTrap	String format: <server name>:"server is UP"	Reports that a server was down but is running again. The <server name> in the message is the server's application name in the Configuration Database. For example: tserver_1:server is UP
gsServerDownTrap	gsServersLastTrap	String format: <server name>:"server is DOWN"	Reports that a server has gone down. The <server name> in the message is the server's application name in the Configuration Database. For example: tserver_1:server is DOWN
gsAlarm	gsServersLastAlarm	String format: <server name>: 0:<alarm code>: <alarm message>	Reports that a server has encountered an alarm situation. A server itself generates this trap. Do not confuse with gSmlSCserverAlarm which is generated by Solution Control Server based on log events it receives from other servers.

Table 17: Application-Generated SNMP Traps (Continued)

Trap	Variable Name	String Format and Valid Values	Description
tsLinkStatusTrap	tsLastChangedLinkStatus	String format: `server <server name> (<server number>) - link <link name> status changed - <0,1>` (<DOWN,UP>)	Reports that T-Server link status has been changed.
gsPollingSignal	gsPollingLastTrap	String format: `<server name>:<value>` Valid Value: Any positive integer	Sent in response to a polling signal from the server. If the polling ID status is on (see Table 7 on page 96), the server's polling ID increases by a set amount every time the server sends the polling signal. The server then sends the new value to SCS. The new value becomes the value inside of the variable gpPollingLastTrap, which SCS sends to NMS as the trap gpPollingSignal. The `server name` in the message is the server's application name in the Configuration Database. For example: `tserver_1:122` This message means that the last SNMP polling signal, which the T-Server application named tserver_1 sent to the SCS, was number 122.

Table 18: Alarm-Related SNMP Trap

Trap	Variable Name	String Format and Valid Values	Description
gsMLAlarm	gsAlarmId	integer	The unique identifier of the Alarm Condition name as configured in the Configuration Database.
	gsAlarmLogText	string	The text of the log event that triggered this alarm.
	gsAlarmMessagesIds	string	The unique identifier of the log event that triggered or removed this alarm.
	gsAlarmApplicationName	string	The name of the application that reported this alarm as specified in the Configuration Database.
	gsAlarmApplicationType	string	The type of application that reported this alarm as specified in the Configuration Database.
	gsAlarmAppHostName	string	The host name of the application that reported this alarm.
	gsAlarmCategory	string	The alarm category as specified in the Configuration Database: Critical, Major, or Minor.
	gsAlarmGUID	string	The unique identifier of the Alarm Clearance Trap with Alarm Creation Trap.

Application Types in SNMP Traps

Table 19 on page 109 lists application types for server applications—their database IDs and abbreviations—as these types are displayed in alarm-related SNMP traps. The table also presents the application type names as displayed in the Configuration Layer.

Table 19: Application Type Representations

Type ID	Type Abbreviation	Type Name
01	TServer	T-Server
01	N/A	Programmable Gateway Framework
02	StatServer	Stat Server
03	BillingServer	Billing Server
06	VoiceTreatmentServer	Voice Treatment Server
08	DBServer	Database Access Point
09	CallConcentrator	Call Concentrator
10	SDialer	CPD Server
11	ListManager	List Manager
12	OSServer	Outbound Contact Server
15	RouterServer	Universal Routing Server
21	ConfigurationServer	Configuration Server
23	ThirdPartyServer	Third Party Server
26	DARTServer	Obsolete
28	CustomServer	Custom Server
29	ExternalRouter	External Router
31	VirtualRP	Virtual Routing Point
32	Database	Obsolete
33	NetVector	Web Option
34	DetailBiller	Detail Biller
35	SummaryBiller	Summary Biller
36	NACD	Network Overflow Manager
37	BackUpControlClient	Backup Control Client
38	InfomartStatCollector	CC Analyzer Data Sourcer
40	IVRInterfaceServer	IVR Interface Server

Table 19: Application Type Representations (Continued)

Type ID	Type Abbreviation	Type Name
41	IServer	I-Server
42	MessageServer	Message Server
43	SCS	Solution Control Server
45	SNMPAgent	SNMP Agent
46	RealDBServer	DB Server
48	WFMDataAggregator	WFM Data Aggregator
50	WFMScheduleServer	WFM Schedule Server
54	GVCServer	GVP-Voice Communication Server
55	VSSSystem	VSS System
58	CCAnalyzerDataMart	CC Analyzer Data Mart
59	ChatServer	Chat Server
60	CallbackServer	Callback Server
61	CoBrowsingServer	Co-Browsing Server
62	ISTransportServer	IS Transport Server
63	ContactServer	Contact Server
64	EmailServer	E-Mail Server
65	MediaLink	MediaLink
66	WebInteractionRequestsServer	Web Interaction Requests Server
67	WebStatServer	Web Stat Server
68	WebInteractionServer	Web Interaction Server
69	WebOptionRoutePoint	Web Option Route Point
74	VoIPController	Voice over IP Controller
77	HAProxy	High Availability Proxy
78	VoIPStreamManager	Voice over IP Stream Manager
79	VoIPDMXServer	Voice over IP DMX Server

Table 19: Application Type Representations (Continued)

Type ID	Type Abbreviation	Type Name
80	WebAPIServer	Web API Server
81	LoadBalancer	Load Balancer
82	ApplicationCluster	Application Cluster
83	LoadDistributionServer	Load Distribution Server
84	GProxy	G-Proxy
85	GIS	Genesys Interface Server
86	AgentDesktopDeliveryServer	GCN Delivery Server
88	IVRDT	IVR DirectTalk Server
89	GCNThinServer	GCN Thin Server
90	ClassificationServer	Classification Server
91	TrainingServer	Training Server
92	UniversalCallbackServer	Universal Callback Server
93	CPDServerProxy	CPD Server Proxy
94	XLinkController	XLink Controller
95	KWorkerPortal	K-Worker Portal
96	WFMServer	WFM Server
97	WFMBuilder	WFM Builder
98	WFMReports	WFM Reports
99	WFMWeb	WFM Web
100	KnowledgeManager	Knowledge Manager
101	IVRDriver	IVR Driver
102	IVRLibrary	IVR Library
103	LCSAdapter	LCS Adapter
104	DesktopNETServer	Desktop NET Server
105	Siebel7ConfSynchComponent	Siebel7 ConfSynchComponent

Table 19: Application Type Representations (Continued)

Type ID	Type Abbreviation	Type Name
106	Siebel7CampSynchComponent	Siebel7 CampSynchComponent
107	GenericServer	Generic Server
108	GenericClient	Generic Client
109	CallDirector	Call Director
110	SIPCommunicationServer	SIP Communication Server
111	InteractionServer	Interaction Server
112	IntegrationServer	Integration Server
113	WFMDaemon	WFM Daemon
114	GVPPolicyManager	GVP Policy Manager
115	GVPCiscoQueueAdapter	GVP Cisco Queue Adapter
116	GVPTextToSpeechServer	GVP Text To Speech Server
117	GVPASRLogManager	GVP ASR Log Manager
118	GVPBandwidthManager	GVP Bandwidth Manager
119	GVPEventsCollector	GVP Events Collector
120	GVPCacheServer	GVP Cache Server
121	GVPASRLogServer	GVP ASR Log Server
122	GVPASRPackageLoader	GVP ASR Package Loader
123	GVPIPCommunicationServer	GVP IP Communication Server
124	GVPResourceManager	GVP Resource Manager
125	GVPSIPSessionManager	GVP SIP Session Manager
126	GVPMediaGateway	GVP Media Gateway
127	GVPSoftSwitch	GVP Soft Switch
128	GVPCoreService	GVP Core Service
129	GVPVoiceCommunicationServer	GVP Voice Communication Server
130	GVPUnifiedLoginServer	GVP Unified Login Server

Table 19: Application Type Representations (Continued)

Type ID	Type Abbreviation	Type Name
131	GVPCallStatusMonitor	GVP Call Status Monitor
132	GVPReporter	GVP Reporter
133	GVPH323SessionManager	GVP H323 Session Manager
134	GVPASRLogManagerAgent	GVP ASR Log Manager Agent
135	GVPGenesysQueueAdapter	GVP Genesys Queue Adapter
136	GVPIServer	GVP IServer
137	GVPSCPGateway	GVP SCP Gateway
138	GVPSRPServer	GVP SRP Server
139	GVPMRCPTTSServer	GVP MRCP TTS Server
140	GVPCCSServer	GVP CCS Server
141	GVPMRCPASRServer	GVP MRCP ASR Server
142	GVPNetworkMonitor	GVP Network Monitor
143	GVPOBNManager	GVP OBN Manager
144	GVPSelfServiceProvisioningServer	GVP Self Service Provisioning Server

How to Activate SNMP Support

This section describes what changes you must make in your Genesys installation to enable SNMP communications between the Management Layer and your Network Management System.

As already mentioned, the communications between SCS and NMS require an AgentX-compliant SNMP master agent application:

- If your NMS already contains such an application, configure an Application object for it in the Genesys Configuration Database. See "Configuring SNMP Master Agent" for instructions.
- If you would like to use Genesys SNMP Master Agent, configure it as described in "Configuring SNMP Master Agent" on page 114, and install it as described in "Installing Genesys SNMP Master Agent" on page 116.

For either configuration, order licenses that enable the SNMP functionality of the Management Layer and modify the licensing system as needed. Refer to the *Genesys 7 Licensing Guide* for more information.

Configuring SNMP Master Agent

For the Management Layer to communicate with an SNMP master agent, provided by either a third-party or Genesys, you must configure an Application object of the SNMP Agent type in the Configuration Database, and configure a connection to this Application object in the `Properties` window of Solution Control Server.

The Management Layer also supports configuration with a redundant pair of SNMP master agents. Redundant configuration assumes the presence of two SNMP master agent applications, one primary and one backup. When Solution Control Server loses a connection with the primary SNMP master agent, SCS switches all NMS communications to the backup SNMP master agent.

- If you do not want to use a redundant configuration or your SNMP master agent application does not support redundant configuration, configure your SNMP master agent as a stand-alone application (see the next subsection).
- If your SNMP master agent application can operate in a redundant mode (as does, for example, Genesys SNMP Master Agent), and you would like to deploy this configuration, follow the instructions in "Configuring Redundant SNMP Master Agents" on page 115.

Configuring a Stand-Alone SNMP Master Agent

If you use the Management Layer Wizard to configure Alarm-Signaling functions, the Wizard:

1. Prompts you to enter all necessary information about the location of the SNMP master agent.
2. Creates an SNMP Agent Application based on the provided information.
3. Automatically configures the connection between SCS and SNMP Agent application.

To manually configure an Application object for an SNMP master agent:

1. Start Configuration Manager or open its window if it is already running.
2. Locate a template for SNMP Master Agent in the `Templates` folder of the Management Framework 7.6 product CD.
3. Using this template, create an Application object of the SNMP Agent type. On the `Server Info` tab, specify:
   a. The host where you plan to install and run your SNMP master agent.
   b. The port that SNMP master agent must use for communications with NMS.
4. On the `Options` tab, specify appropriate configuration options. See "Setting Configuration Options" on page 116 for some guidelines.

After you create the SNMP Master Agent application, in Configuration Manager:

1. Open the SCS `Properties` window.
2. On the `Connections` tab, click `Add` and set the connection to the created Application object of the SNMP Agent type.
3. Click `Apply` and `OK` to save the configuration change.

Configuring Redundant SNMP Master Agents

The Management Layer also supports configuration with the primary and backup SNMP master agents. If your SNMP master agent application can operate in a redundant mode (as does, for example, Genesys SNMP Master Agent), and you would like to deploy this configuration, follow the instructions in this section.

To manually configure SNMP support with redundant SNMP master agents:

1. Start Configuration Manager or open its window if it is already running.
2. Locate a template for the SNMP Master Agent in the `Templates` folder of the Management Framework 7.6 product CD.
3. Using this template, create an Application object of the SNMP Agent type. On the `Server Info` tab, specify:
   a. The host where you plan to install and run the backup SNMP master agent.
   b. The port that the backup SNMP master agent must use for communications with NMS.
4. On the `Options` tab, specify appropriate configuration options. See "Setting Configuration Options" on page 116 for some guidelines.
5. Using the same template as you used for the SNMP agent, create another Application of the `SNMP Agent` type. On the `Server Info` tab, specify:
   a. The host where you plan to install and run the primary SNMP master agent.
   b. The port that the primary SNMP master agent must use for communications with NMS.
   c. The Backup Server. This must be the Application created in Step 3.
6. On the `Options` tab, specify the same configuration options as for the backup application. See "Setting Configuration Options" on page 116 for some guidelines.

After you create Application objects for both SNMP master agents, in Configuration Manager:

1. Open the SCS `Properties` window.
2. On the `Connections` tab, click `Add` and set the connection to the created primary Application object of the SNMP Agent type.

3. Click `Apply` and `OK` to save the configuration change.

Setting Configuration Options

The *Framework 7.6 Configuration Options Reference Manual* describes configuration options for Genesys SNMP Master Agent and their values. When deciding which options to configure, keep in mind the following:

- If you do not configure a particular option explicitly or you specify an invalid value for it, the default value for this option applies.
- If you do not configure a particular section explicitly, default values for the options that belong to this section apply.
- You can alter trap configuration (target host, port, community, and multiple trap destinations) by modifying `SNMP_TARGET_MIB`, which you maintain externally with SNMP commands through Genesys Master Agent. Refer to RFC 2273 (SNMPv3 Applications) for further information about how to configure traps via standard management MIBs.

Solution Control Server reads the configuration settings of the SNMP Master Agent Application object and uses option values from the `agentx` configuration section to connect to SNMP Master Agent. This is true for both Genesys SNMP Master Agent and a third-party SNMP master agent. Therefore, if you are using a third-party SNMP master agent, make sure that the option values configured for the SNMP Master Agent Application object in the Configuration Database match the actual configuration settings in your third-party SNMP master agent.

Installing Genesys SNMP Master Agent

The procedures for installing Genesys SNMP Master Agent on UNIX and Windows are described in this section. If you use a redundant pair of the SNMP Master Agents, install two applications, primary and backup, in any order on different hosts.

The Genesys SNMP Master Agent installation files are provided on the Management Framework 7.6 product CD, in the `management_layer/snmp_master_agent/[operating_system]` directory.

After installing SNMP Master Agent, you can start it using standard startup procedures as described in the *Framework 7.6 Deployment Guide.*

On UNIX

1. Insert the product CD into the CD-ROM drive of the application host computer.
2. In the appropriate directory, locate the shell script called `install.sh`.

   Run this script from the command prompt by typing:
   ```
   sh install.sh
   ```

3. When prompted, specify the Host Name of the computer on which this server is to run.
4. When prompted, specify the:
   - Host Name of the computer on which Configuration Server is running.
   - Port used by client applications to connect to Configuration Server.
   - User Name used to log in to the Configuration Layer.
   - Password used to log in to the Configuration Layer.
5. The installation displays the list of Applications of the SNMP Agent type configured for this Host. Type the number of the SNMP Master Agent Application that is to be installed.
6. Specify the destination directory into which Genesys SNMP Master Agent is to be installed, with the full path to it.

   If the installation script finds that the destination directory is not empty, it prompts that you do one of the following:
   - Back up all files in the directory.
   - Overwrite only the files contained in this package.
   - Wipe the directory clean.

   Type the number that corresponds to your selection and confirm your choice.
7. If asked which version of the product to install, either the 32-bit or the 64-bit, choose the one appropriate to your environment.

As soon as the installation process is finished, a message appears announcing that installation was successful. The process places the Genesys SNMP Master Agent application in the directory you specified during the installation.

On Windows

1. From the product CD, open the appropriate directory.
2. Locate and double-click `Setup.exe` to start installation.
3. When prompted, specify the Host and Port of Configuration Server. Accept `ITCUtility` as the name of the Installation Configuration Utility Application.
4. When prompted, specify the User Name used to log in to the Configuration Layer and the Password used to log in to the Configuration Layer.
5. Confirm the Host Name of the computer on which SNMP Master Agent is to run.
6. From the list of Applications of the SNMP Agent type configured for this Host, select the server Application to install.
7. Specify the destination directory into which Genesys SNMP Master Agent is to be installed. By default, it is installed in a directory called `\GCTI\SNMP\master`.

8. Specify the Program folder to which Genesys SNMP Master Agent is to be added.
9. Decide whether you want to install Genesys SNMP Master Agent as a Windows Service.
10. When icons for this server appear, click `Finish` to complete the installation.

How to Use Graceful Contact-Center Shutdown Script

Starting with 7.0 release, the Management Layer provides authorized users with capability to gracefully shut down contact-center software. This functionality, implemented in the form of a PERL script, operates through the Management Layer SNMP Interface.

The Contact-Center Graceful Shutdown script (called `ccgs.pl`) does the following:

1. Enumerates all currently running T-Servers.
2. Determines if there are ongoing interactions in the contact center by querying the number of active calls from each T-Server.
3. If there are active calls, waits one minute and then checks again.
4. When there are no more active calls, shuts down T-Servers.

The script is packaged with Solution Control Server. The SCS installation package also includes all additional PERL modules necessary to utilize the Management Layer SNMP Interface with PERL scripts.

Start the script file with the command line in this format:

```
ccgs.pl [<flag> <value>] [<flag> <value>] ...
```

The script accepts the following command-line parameters:

`-h`	Master Agent host name or IP address Default: localhost
`-p`	Master Agent SNMP port Default: 161
`-c`	Community string Default: public
`-v`	SNMP version (v1 or v2c) Default: v2c
`-pt`	Polling timeout—the time, in seconds, the script waits for the end of data tables refresh. Should be equal to or greater than 5 Default: 60

`-mic`	Maximum number of idle polling cycles the script waits before exit. An *idle polling cycle* is one when no shutdown requests are sent. Should be equal to or greater than 1 Default: 100
`-st`	SNMP timeout—the timeout, in seconds, during which the script waits for a response after a request is sent. Note that when a request is retried, the timeout is increased by the SNMP backoff factor (see below). Should be equal to or greater than 1. Default: 2
`-sr`	SNMP retries—number of attempts that the script prompts for a reply to the SNMP request. If no response is received within the timeout specified in value `-st`, the request is resent and a new response awaited with a longer timeout. Should be equal to or greater than 1. Default: 5
`-sb`	SNMP backoff—factor used to increase the timeout every time an SNMP request is retried. Should be equal to or greater than 1. Default: 1

Separate flags from their values with a word space.

Migrating from Old SNMP Implementations

Genesys has provided different tools for integration with third-party network management systems in different releases. In release 5.1, you could use SNMP Option 5.1, which consisted of Genesys G-Proxy and PATROL SNMP Master Agent. In release 6.0, 6.1, and early 6.5, you could use Solution Control Server and PATROL SNMP Master Agent.

To upgrade from your previous SNMP implementation to the one built into the Management Layer, you must:

- Configure and install components of the Management Layer, or, if you already use the Management Layer, install the latest release of SCS.
- Configure and install either Genesys SNMP Master Agent or a third-party SNMP master agent that is AgentX-compliant.
- Update the Genesys MIB file in your NMS. You can find the latest Genesys MIB file in the directory where SCS is installed.
- After testing the new implementation, uninstall obsolete components (such as G-Proxy, PATROL SNMP Master Agent, or a previous release of SCS).

Refer to the *Genesys 7 Migration Guide* for more information.

Chapter

8 Managing Third-Party Applications

This chapter describes which Management Layer functions you can use with third-party applications and how the Management Layer processes the related commands. It also lists the software prerequisites for and describes how to configure these applications.

This chapter contains the following sections:

Prerequisites

In Genesys terms, a *third-party application* is an application not instrumented with Genesys libraries. The Management Layer can monitor, start, and stop a third-party application as long as that application:

- Supports a startup from a command line.
- Starts if the machine it runs on is unattended (for instance, on a Windows machine with no user logged in); however, this is not mandatory.
- Works without a console window on Windows; however, this is not mandatory.
- Is registered in the Configuration Database as an Application of the Third Party Server type.
- Runs on an operating system that Genesys supports.

Note: You cannot perform the centralized logging and alarm-signaling functions (including switchover) over a third-party application because they require built-in support on the application side.

Required Components and Configuration

If you have configured third-party applications in the Genesys Configuration Database, Management Layer can control and monitor them, including starting and stopping them. Even if you do not use the Management Layer to start a particular application, the application's runtime status is displayed. This functionality is also supported for:

- Third-party applications installed as Windows Services.
- Third-party applications started with a script.

Managing third-party applications requires the installation of:

- Solution Control Server (SCS).
- An instance of Local Control Agent (LCA) for each host machine running third-party applications.
- An instance of Solution Control Interface (SCI) for each user who performs the monitoring and control functions.
- Message Server, if you want to set up Alarm Conditions on SCS's log events that report application startup, failure, termination, and so on. This enables alarms for third-party applications along with alarms for Genesys servers.

The monitoring views and control commands are available via SCI, just as they are for managing Genesys applications.

Framework 7.6 Solution Control Interface Help provides detailed instructions on how to display each view for an application and on how to start and stop applications.

Configuring Third-Party Applications

If you only want to monitor third-party applications:

1. Register each application in the Configuration Database as an Application object of the `Third Party Server` type.
2. On the `Start Info` tab of the Application object's `Properties` window, specify:
   - `Working Directory`— the full path to the directory from which the application starts.
   - `Command Line`— the command line used for starting the application; usually, it is the name of the executable file.

If you also want to start and stop third-party applications as well as monitor them:

1. Repeat Steps 1 and 2 above and provide a value for one additional field:
   - `Command Line Arguments`—additional parameters, if any, used for starting the application.
2. If the application is started with a batch file or script, specify the name of the command used for launching that file or script. On the `Annex` tab of the Application `Properties` window, create a section named `start_stop` and create an option named `start_command`.

   As a value for this option, specify the command that launches the batch file or script, including the full path to the executed file or script. (The `start_command` option may as well contain the command to start the executable file.)
3. If the application is stopped with a batch file or script that performs the correct shutdown of the application, specify the name of the command used for launching that file or script. On the `Annex` tab of the Application `Properties` window, create (or open) a section named `start_stop` and create an option named `stop_command`. For its value, specify the command that launches the batch file or script, including the full path to the executed file or script.

See an example on page 127.

Monitoring Third-Party Applications

Monitoring functionality is provisioned by the ability of Local Control Agent to determine whether:

- A third-party application is started.
- A third-party application is stopped.

Determining Whether Applications Are Started

LCA uses the so-called command–line matching mechanism to determine if a third-party application is started. This means that LCA periodically retrieves a list of all currently running processes, and then compares command lines of all processes from that list with possible command lines of the third-party applications being checked.

LCA uses the following command–line matching rules for this comparison:

- The command line of a process is equal to the set of these elements:
  `Working Directory + Command Line [+ Command Line Arguments]`

  where `Working Directory`, `Command Line`, and `Command Line Arguments` are the properties of the Application object in the Configuration Database. If the `Command Line Arguments` property is empty, it is not used.

The processes started with the full path specification are evaluated based on this rule.

- The command line of a process is equal to the set of these elements:
  `Command Line [+ Command Line Arguments]`

  where `Command Line` and `Command Line Arguments` are the properties of the Application object in the Configuration Database. If the `Command Line Arguments` property is empty, it is not used.

  The processes started without the full path specification are evaluated based on this rule.
- For Windows operating systems only, the command line of a process is equal to the set of these elements:
  `" + Working Directory + Command Line + " [+ Command Line Arguments]`

  where `Working Directory`, `Command Line`, and `Command Line Arguments` are the properties of the Application object in the Configuration Database. If the property `Command Line Arguments` is empty, it is not used.

  The processes started with the full path specification are evaluated based on this rule when the path contains spaces.

If LCA finds a process whose command line matches that of a third-party application, LCA assumes that the application has started and then:

1. Stores the PID (process identifier) for that application.
2. Sets the application status to Started.
3. Sends a notification to SCS.

Determining Whether Applications Are Stopped

LCA uses the so-called PID-check mechanism to determine if a third-party application is stopped. This means that LCA tracks the PIDs (process identifiers) for all currently running processes. Using relevant operating system commands, LCA determines if a process with a particular PID is running. If not, LCA considers the corresponding third-party application stopped and:

1. Sets the application status to Stopped.
2. Sends a notification to SCS.

Starting Third-Party Applications

The following actions result in a start of a third-party application:

- User command from the SCI
- Alarm Reaction
- Autorestart

When the Management Layer receives a request to start a particular third-party application, SCS generates a command line and passes it to LCA, which executes the required operating system function.

SCS generates the command line based on the parameters you configured for a specific third-party Application object in the Configuration Database, which may include:

- Working Directory—this value is specified on the `Start Info` tab of the Application `Properties` window.
- Command Line—this value is specified on the `Start Info` tab of the Application `Properties` window.
- Command Line Arguments—these values are specified on the `Start Info` tab of the Application `Properties` window.
- Start Command—this value is specified in the `start_command` option on the `Annex` tab of the Application `Properties` window.

If you have not specified values for the first three listed parameters or have not created a `start_command` option and provided a value for it, the Management Layer cannot start the application. For more information about these parameters, refer to “Configuring Third-Party Applications” on page 122.

Solution Control Server forms the command line as follows:

- If you have specified the `start_command` option, SCS uses its value to form the command line and ignores the other parameters.
- If you have not specified the `start_command` option, SCS uses the values of the `Command Line` and `Command Line Arguments` to form the command line while LCA executes an appropriate operating system function in the directory specified as the `Working Directory` for this application.

LCA passes all required parameters to the operating system function (`CreateProcess` on Windows or `execvp` on UNIX) and calls the function, after which two scenarios can occur:

- The operating system function returns an error. In this case, LCA passes the error to SCS, which retains the Stopped status for the third-party application.
- The operating system function does not return an error. In this case, LCA determines the status of the third-party application and passes the status to SCS. (See “Determining Application Status” on page 126 for a description of the methods LCA uses to determine the application status.)

Whichever scenario occurs, the startup process is then considered finished.

Starting Third-Party Applications Automatically

Management Layer supports the automatic start-up of third-party applications. You must be aware of, and correct if necessary, the configuration of the startup timeout for automatically started third-party applications.

The Management Layer must know the correct status of the third-party application at the exact moment when determining if the application is stopped and is to be started, that is, when the startup timeout for the third-party application expires.

Incorrect configuration of the automatic third-party application start-up configuration can cause multiple instances of the same application to be started.

Determining Application Status

The method LCA uses to determine the current status of a third-party application depends on the method SCS uses for forming the startup command line:

- If you have not configured the `start_command` option, SCS uses the values of the `Command Line` and `Command Line Arguments` to form the command line. In this case, LCA stores the PID returned by the operating system function and immediately passes the Started status to SCS.
- If you have configured the `start_command` option, SCS uses the value of this option to form the command line. In this case, LCA passes the Pending status to SCS and determines if the application has started successfully, as described in “Determining Whether Applications Are Started” on page 123.

Ensuring Command Line Correctness

If you want to monitor a third-party application in SCI, use the running process and its arguments as a model for the command line and command line arguments in Configuration Manager. Follow these steps:

1. Use a system tool (for example, the UNIX tool `ps`) to display the running process and its arguments.
2. In Configuration Manager, go to the `Start Info` tab of the `Properties` dialog box for the third-party server.
3. Enter the exact value of the running process into the `Command Line` field.
4. Enter the exact value of the running process arguments into the `Command Line Arguments` field.

Stopping Third-Party Applications

The following actions result in a shutdown of a third-party application:

- User command from the Solution Control Interface
- Alarm Reaction

The Management Layer can only stop a third-party application that has the Started status; that is, LCA knows the PID for this application.

When the Management Layer receives a request to stop a particular third-party application, SCS passes it to LCA, which executes the required operating system function.

LCA processes the request as follows:

- If you have not specified the `stop_command` option in the Application `Properties` window and the application runs on UNIX, LCA sends the `SIGINT` signal to the process with the PID corresponding to the third-party application. Then, LCA sets the application status to Stopped and notifies SCS.

  Note: For more information about the `stop_command` option, refer to "Configuring Third-Party Applications" on page 122.

- If you have not specified the `stop_command` option in the Application `Properties` window and the application runs on Windows, LCA calls the `TerminateProcess` function for the process with the PID corresponding to the third-party application. Then, LCA sets the application status to Stopped and notifies SCS.
- If you have specified the `stop_command` option, LCA either executes the specified operating system command or launches the specified script or batch file. LCA sets the status of the third-party application to Pending and then determines the actual status of the application, which, when determined, it passes to SCS. (See "Determining Whether Applications Are Stopped" on page 124 for a description of the methods LCA uses to determine the application status.)

At this point, the process of stopping a third-party application is considered finished.

Example

This section demonstrates how you can use the Management Layer to control a third-party application such as License Manager running on a Windows-based computer.

1. Install License Manager to directory `d:\flexlm`. Use the License Manager installation procedure for Windows described in the *Genesys 7 Licensing Guide* document.
2. Create two *.bat files, one (named `lmgrd_run.bat`) for starting License Manager and the other (named `lmgrd_stop.bat`) for shutting down the application. The file content should be as described in "Start Script and Stop Script Content" on page 128.

   Save both files to the `d:\flexlm` directory.

3. Create an Application object of the Third Party Server type and name it `FLEXlm`. Refer to the configuration procedure in "Configuring Third-Party Applications" on page 122.

   On the `Startup Info` tab, set the parameters as follows:

   a. Specify `d:\flexlm` as a value for `Working Directory`.

   b. Specify `lmgrd` as a value for `Command Line`.

   c. Specify `-c d:\flexlm\license.dat` as a value for `Command Line Arguments`.

   Note: Make sure that the combined string `<Working directory> + <Command Line> + <space> + <Command Line Arguments>` matches the command line in the `lmgrd_run.bat` file, which is `d:\flexlm\lmgrd -c d:\flexlm\license.dat`.

4. Start `lmgrd_run.bat` manually. After 20 or so seconds, check the Applications view in Solution Control Interface. The status of the FLEXlm application should be Started.

5. In the Configuration Manager main window, open the FlexLM Application `Properties` window. On the `Annex` tab:

   a. Create a section called `start_stop`.

   b. Create two options, `start_command` and `stop_command`, in this new section. Specify full paths to the appropriate *.bat files as the option values:

   ```
   start_command = d:\flexlm\lmgrd_run.bat
   stop_command = d:\flexlm\lmgrd_stop.bat
   ```

   Save configuration changes.

6. Try to stop and start the FLEXlm application using appropriate commands in Solution Control Interface.

Start Script and Stop Script Content

The content of the `lmgrd_run.bat` and `lmgrd_stop.bat` files depends on whether you run License Manager as a regular application or as a Windows Service.

For a regular application, the file content should be as follows:

lmgrd_run.bat

```
@echo "Starting FLEXlm License Manager"
d:\flexlm\lmgrd -c d:\flexlm\license.dat
```

lmgrd_stop.bat

```
@echo "Stopping FLEXlm License Manager"
d:\flexlm\lmutil lmdown -q -c d:\flexlm\license.dat
```

For a Windows Service, the file content should be as follows:

lmgrd_run.bat

```
net start <FLEXlm Service Name>
d:\flexlm\lmgrd -c d:\flexlm\license.dat
```

lmgrd_stop.bat

```
net stop <FLEXlm Service Name>
```

Chapter

9 Log Format

A *log record* is a data record that stores information communicated in a single log event. In SCI, you can store log records in plain text format or in XML (Extensible Markup Language) format. This chapter describes these formats, and the format of the Centralized Log Database.

This chapter contains the following sections:

Plain Text Format

Log records stored in the plain text format contain the following fields separated from each other by three spaces:

- `Timestamp:` the date and time when the reported event occurred, in the time format specified for the operating system on which the application runs.
- `Level:` the log level of the reported event. The Standard level of logging contains high-level events that report both major problems and normal operations of in-service solutions. The Interaction level of logging reports the details of an interaction process by solution components that handle interactions and contains information about the processing steps for each interaction by each solution component. The Trace level of logging reports the details of communication between the various solution components and contains information about the processing steps for each interaction by each solution component. The Alarm level of logging reports the events related to alarm detection, processing, and removal.
- `Host Name:` the name of the host, as specified in the Configuration Database, where an application that reported the event runs.
- `Application Name:` the name of the application, as specified in the Configuration Database, that reported the event.

- `Log Event ID:` the unique identifier of the event in the form of *YY-XXXXX,* where *YY* is the origin (identifier of the `*.lms` file) and *XXXXX* is the event ID uniquely identifying the event within the origin.
- `Text:` the text describing and specifying the event.

Sample

```
01/30/02 18:40:33  Standard  localhost  StatServer2 00-04502  Cannot
connect to T-Server M1 at host alpha, port 3000
```

XML Format

A log record in an XML file has the following format:

```
<logmessage>
   <id>Log Event ID</id>
   <timegenerated>Time</timegenerated>
   <priority>Level</priority>
   <hostname>Host Name</hostname>
   <appname>Application Name</appname>
   <text>Text</text>
</logmessage>
```

Log records stored in the XML format contain these fields:

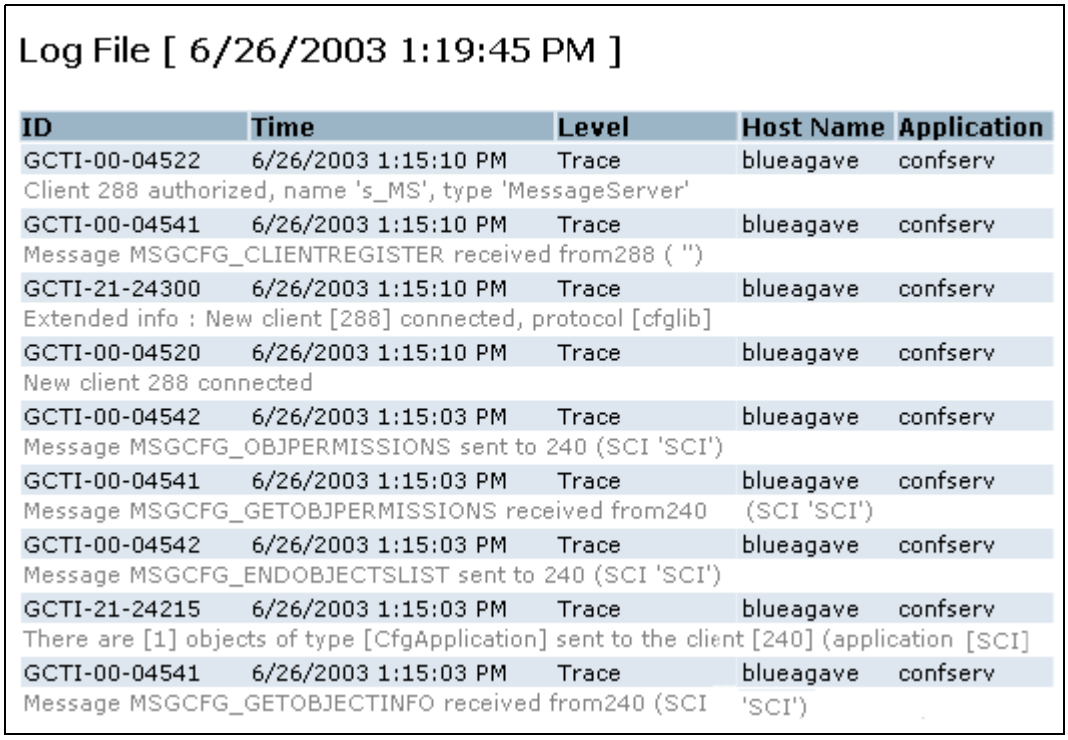
- `Log Event ID:` the unique identifier of the event in the form of *YY-XXXXX,* where *YY* is the origin (identifier of the `*.lms` file) and *XXXXX* is the event ID uniquely identifying the event within the origin.
- `Time:` the date and time when the reported event occurred, in the time format specified for the operating system on which the application runs.
- `Level:` the log level of the reported event. The Standard level of logging contains high-level events that report both major problems and normal operations of in-service solutions. The Interaction level of logging reports the details of an interaction process by solution components that handle interactions and contains information about the processing steps for each interaction by each solution component. The Trace level of logging reports the details of communication between the various solution components and contains information about the processing steps for each interaction by each solution component. The Alarm level of logging reports the events related to alarm detection, processing, and removal.
- `Host Name:` the name of the host, as specified in the Configuration Database, where an application that reported the event runs.
- `Application Name:` the name of the application, as specified in the Configuration Database, that reported the event.
- `Text:` the text defining and describing the event.

Sample

```
<logmessage>
   <id>42-23000</id>
   <timegenerated>1/14/02 11:17:41</timegenerated>
   <priority>Trace</priority>
   <hostname>localhost</hostname>
   <appname>Message_Server_1</appname>
   <text>Message ID=252 of type 1101 received from client 276</text>
</logmessage>
```

Sample Screenshot

Figure 7 shows how log records look when exported in an XML file.



Log File [6/26/2003 1:19:45 PM]

ID	Time	Level	Host Name	Application
GCTI-00-04522	6/26/2003 1:15:10 PM	Trace	blueagave	confserv
Client 288 authorized, name 's_MS', type 'MessageServer'				
GCTI-00-04541	6/26/2003 1:15:10 PM	Trace	blueagave	confserv
Message MSGCFG_CLIENTREGISTER received from288 ('')				
GCTI-21-24300	6/26/2003 1:15:10 PM	Trace	blueagave	confserv
Extended info : New client [288] connected, protocol [cfglib]				
GCTI-00-04520	6/26/2003 1:15:10 PM	Trace	blueagave	confserv
New client 288 connected				
GCTI-00-04542	6/26/2003 1:15:03 PM	Trace	blueagave	confserv
Message MSGCFG_OBJPERMISSIONS sent to 240 (SCI 'SCI')				
GCTI-00-04541	6/26/2003 1:15:03 PM	Trace	blueagave	confserv
Message MSGCFG_GETOBJPERMISSIONS received from240 (SCI 'SCI')				
GCTI-00-04542	6/26/2003 1:15:03 PM	Trace	blueagave	confserv
Message MSGCFG_ENDOBJECTSLIST sent to 240 (SCI 'SCI')				
GCTI-21-24215	6/26/2003 1:15:03 PM	Trace	blueagave	confserv
There are [1] objects of type [CfgApplication] sent to the client [240] (application [SCI]				
GCTI-00-04541	6/26/2003 1:15:03 PM	Trace	blueagave	confserv
Message MSGCFG_GETOBJECTINFO received from240 (SCI 'SCI')				

Figure 7: Sample Log File in the XML Format

Database Format

In release 7.0, the database format was extended. In particular, a table was added to the Centralized Log Database and some data types are changed. The table, `G_LOG_ATTRS`, stores extended log attributes, which applications sometimes attach to log events they generate.

G_LOG_MESSAGES Table Structure

The structure of the G_LOG_MESSAGES table is described in Table 20:

Table 20: Structure of G_LOG_MESSAGES Table

Field Name	Type	Description
ID	numeric	The unique identifier of the record stored in this table.
MESSAGE_ID	integer	The unique identifier of the event.
TIMEGENERATED	datetime	The time when the record was written to the database, in GMT format.
TIMEWRITTEN	datetime	The time when the record was written to the database, in GMT format.
PRIORITY	integer	The log level of the reported event. The Standard level of logging contains high-level events that report both major problems and normal operations of in-service solutions. The Interaction level of logging reports the details of an interaction process by solution components that handle interactions and contains information about the processing steps for each interaction by each solution component. The Trace level of logging reports the details of communication between the various solution components and contains information about the processing steps for each interaction by each solution component. The Alarm level of logging reports the events related to alarm detection, processing, and removal. The PRIORITY field can have one of the following values: 2—for Trace-level events 3—for Interaction-level events 4—for Standard-level events 5—for Alarm-level events
ORIGIN	integer	Reserved for future use.
CATEGORY	integer	Identifies the type of the log record and can have one of the following values: 0—for application-related log events 2—for audit-related log events
DATALEN	integer	Reserved for future use.
APPDBID	integer	Reserved for future use.
APPTYPE:	integer	The type of application that reported the event. Refer to Table 21 on page 133 for a list of the valid values.

Table 20: Structure of G_LOG_MESSAGES Table (Continued)

Field Name	Type	Description
APPNAME	string	The name of the application, as specified in the Configuration Database, that reported the event.
HOSTNAME	string	The name of the host, as specified in the Configuration Database, where an application that reported the event runs.
MESSAGETEXT:	string	The text defining and describing the event.

Table 21: Application Types for APPTYPE Field in G_LOG_MESSAGES Table

Value	Application Type
00	Applications of all types when reporting log events common to all Genesys applications
01	T-Server
02	Stat Server
06	Voice Treatment Server
09	Call Concentrator
10	CPD (Call Progress Detection) Server
12	Outbound Contact Server
15	Universal Routing Server
21	Configuration Server
23	Third Party Server
28	Custom Server
31	Virtual Routing Point
33	Web Option
38	CC Analyzer Data Sourcer
40	IVR Interface Server
41	I-Server
42	Message Server

Table 21: Application Types for APPTYPE Field in G_LOG_MESSAGES Table (Continued)

Value	Application Type
43	Solution Control Server
46	DB Server
48	WFM Data Aggregator
50	WFM Schedule Server
52	ETL Proxy
54	GVP-Voice Communication Server
55	VSS System
58	CC Analyzer Data Mart
59	Chat Server
60	Callback Server
61	Co-Browsing Server
62	IS Transport Server
63	Contact Server
64	E-Mail Server
65	Media Link
66	Web Interaction Requests Server
67	Web Stat Server
68	Web Interaction Server
69	Web Option Route Point
74	Voice over IP Controller
77	HA Proxy
78	Voice over IP Stream Manager
79	Voice over IP DMX Server
80	Web API Server
81	Load Balancer

Table 21: Application Types for APPTYPE Field in G_LOG_MESSAGES Table (Continued)

Value	Application Type
82	Application Cluster
83	Load Distribution Server
85	Genesys Interface Server
86	GCN Delivery Server
88	IVR DirectTalk Server
89	GCN Thin Server
90	Classification Server
91	Training Server
92	Universal Callback Server
93	CPD Server Proxy
94	XLink Controller
95	K-Worker Portal
96	WFM Server
97	WFM Builder
98	WFM Reports
99	WFM Web
100	Knowledge Manager
101	IVR Driver
102	IVR Library
103	LCS Adapter
104	Desktop NET Server
105	Siebel7 ConfSynchComponent
106	Siebel7 CampSynchComponent
107	Generic Server
108	Generic Client

Table 21: Application Types for APPTYPE Field in G_LOG_MESSAGES Table (Continued)

Value	Application Type
109	Call Director
110	SIP Communication Server
111	Interaction Server
112	Integration Server
113	WFM Daemon
114	GVP Policy Manager
115	GVP Cisco Queue Adapter
116	GVP Text To Speech Server
117	GVP ASR Log Manager
118	GVP Bandwidth Manager
119	GVP Events Collector
120	GVP Cache Server
121	GVP ASR Log Server
122	GVP ASR Package Loader
123	GVP IP Communication Server
124	GVP Resource Manager
125	GVP SIP Session Manager
126	GVP Media Gateway
127	GVP Soft Switch
128	GVP Core Service
129	GVP Voice Communication Server
130	GVP Unified Login Server
131	GVP Call Status Monitor
132	GVP Reporter
133	GVP H323 Session Manager

Table 21: Application Types for APPTYPE Field in G_LOG_MESSAGES Table (Continued)

Value	Application Type
134	GVP ASR Log Manager Agent
135	GVP Genesys Queue Adapter
136	GVP IServer
137	GVP SCP Gateway
138	GVP SRP Server
139	GVP MRCP TTS Server
140	GVP CCS Server
141	GVP MRCP ASR Server
142	GVP Network Monitor
143	GVP OBN Manager
144	GVP Self Service Provisioning Server

G_LOG_ATTRS Table Structure

The structure of the `G_LOG_ATTRS` table is described in Table 22:

Table 22: Structure of G_LOG_ATTRS Table

Field Name	Type	Description
ID	numeric	The unique identifier of the record stored in this table.
LRID	numeric	The unique identifier of the log record stored in the `G_LOG_MESSAGES` table to which this extended attribute belongs
MESSAGE_ID	integer	The unique identifier of the event
ATTR_NAME	string	The name of the extended attribute.
ATTR_VALUE	string	The value of the extended attribute in string format.

Chapter

10 Predefined Alarm Conditions

This chapter describes alarm conditions that are preconfigured by Genesys and become available immediately after you set up Framework 7.6. The conditions under which alarms are generated, the actions automatically taken by the system to cope with or recover from the failure, and the maintenance actions appropriate in each situation are discussed for each alarm condition:

Connection Failure

This section describes the `Connection Failure` predefined alarm condition.

Configuration

Name	Connection Failure
Description	The connection between any two Genesys components has been lost.

Category	Major
Detect Event	00-04504: Connection to [server type] [server name] at host [host name] port [port number] lost
Selection Mode	Select by any
Cancel Event	00-04503: Connected to [server type] [server name] at host [host name] port [port number]
Cancel Timeout	48 hours
Reaction Scripts	None
Clearance Scripts	None
State Enabled	True

Detailed Description

Reports that the specified connection between any two applications has been lost. Always reported by the client application and might indicate one of the following:

- The connection was intentionally closed by the server (for example, in response to an overload situation).
- The connection was closed by a networking software (for example, in response to a long interval without any data exchange through the given connection).
- The server terminated.
- The server stopped responding.
- The server host failed.
- A network connectivity problem occurred between the computers that run the given client application and the server.

Automatic Recovery Actions

- If a backup server for the specified server is not configured, the client application that reported the connection failure periodically attempts to reconnect to the specified server.
- If a backup server for the specified server is configured, the client application that reported the connection failure attempts to connect interchangeably to the specified server and the backup server.

Note: The number of reconnect attempts is unlimited.

- After a successful reconnect attempt, the alarm condition is automatically cleared.

Suggested Maintenance Actions

1. Check the condition of the server host computer.
2. Check the condition of the server.
3. Check the server log to see if the given application has disconnected intentionally. Look for log events with ID 4523.
4. Check the network connectivity between the computers that run the given application and the server.

Application Failure

This section describes the `Application Failure` predefined alarm condition.

Configuration

Name	Application Failure
Description	Failure of any daemon Genesys component monitored by the Management Layer
Category	Major
Detect Event	00-05064: Application terminated due to internal condition
Selection Mode	Select by any
Cancel Event	00-05090: Application start detected by Management Layer
Cancel Timeout	48 hours
Reaction Scripts	None
Clearance Scripts	None
State Enabled	True

Detailed Description

Reports that the specified application has either terminated or stopped responding. It might indicate one of the following:

- The application terminated because of an internal condition.

- The application was closed by means other than the Management Layer (for example, with an operating system command).
- The application entered a no-response condition.

Automatic Recovery Actions

- If a backup application for the specified application is not configured and the autorestart function is enabled, the Management Layer attempts to restart the specified application.
- If a backup application for the specified application is not configured and the autorestart function is disabled, no automatic recovery action takes place.
- If a backup application for the specified application is configured and the autorestart function is enabled, the Management Layer switches operations over to the backup application and attempts to restart the specified application in the Standby mode.
- Upon a successful attempt to restart the specified application, the alarm is automatically cleared.

Suggested Maintenance Actions

1. Using Solution Control Interface (SCI), locate the exact source of the alarm and check the current status of the application. It is likely that the fault has been eliminated through an automatic recovery action.
2. If the alarm is still active, check the status of the application through the operating system tools.
3. If the application is running but not responding, restart the application with an operating system command.
4. If the application is not running, start the application with an operating system command.
5. Ensure that SCI shows the status of the application correctly.
6. Verify that the `Auto-Restart` check box for this application is selected.

Licensing Error

This section describes the `Licensing Error` predefined alarm condition.

Configuration

Name	Licensing Error
Description	Any licensing error identified by any Genesys component
Category	Critical
Detect Event	00-07100: Licensing violation is identified, the violation type [type]
Selection Mode	Select by any
Cancel Event	None
Cancel Timeout	48 hours
Reaction Scripts	None
Clearance Scripts	None
State Enabled	True

Detailed Description

Reports that a licensing error occurred. Possible violation types are as follows:

1. License information is invalid.
2. Licensable feature has expired.
3. Feature usage level has been exceeded.
4. Licensing system has experienced a general failure.

Automatic Recovery Actions

None

Suggested Maintenance Actions

Depending on the value of the error code:

- Check the condition of License Manager. If the type of license you have requires License Manager, it should be running and accessible by the Genesys applications. Check that the host and port of License Manager are specified correctly.

- Make sure that the actual location of the license file or license server corresponds to the location specified in the command-line parameter used for application startup.
- Make sure that the specified license file is the exact copy of the license file received from Genesys.
- Locate the exact source of the alarm and apply to Genesys for an extension of the license.
- Locate the exact source of the alarm and check the current usage level against the usage level stipulated in the license. Either decrease the usage level or apply to Genesys for a new license that covers the increased usage needs.

CTI Link Failure

This section describes the `CTI Link Failure` predefined alarm condition.

Configuration

Name	CTI Link Failure
Description	Failure of connection between any T-Server and its switch
Category	Major
Detect Event	01-20002: CTI Link disconnected
Selection Mode	Select by Application type T-Server
Cancel Event	01-20001: CTI Link connected
Cancel Timeout	48 hours
Reaction Scripts	None
Clearance Scripts	None
State Enabled	True

Detailed Description

Reports that the connection between the specified T-Server and its switch has been lost. Always reported by T-Server and might indicate one of the following:

- The connection was intentionally closed on the switch side (for example, as an automatic defense action).

- The control system of the switch failed.
- A network connectivity problem occurred between the T-Server host and the switch.

Automatic Recovery Actions

T-Server attempts to reconnect to the CTI link.

Suggested Maintenance Actions

- Check the condition of the control system of the switch and of its CTI link.
- Check the network connectivity between the control system of the switch and the computer running T-Server.

Notes: If you are using redundant T-Servers to increase solution availability, and if your T-Server is of a pre-7.0 release, consider creating an alarm reaction Script object of the `Switchover` type for this alarm condition. If you associate such a script with the CTI Link Failure Alarm Condition object, a switchover to the backup T-Server is performed when the primary T-Server reports a CTI link failure. The efficiency of this measure depends on the availability of redundant CTI links in your switch.

If you are using redundant T-Servers of release 7.0 or later and Management Layer 7.1.1 and later, you do not need to configure `Switchover` alarm reactions. Starting with Management Framework 7.1.1, switchover to backup T-Server in case of CTI Link failure is performed automatically because any T-Server of release 7.0 or later changes its status to `Service Unavailable` in this scenario.

Host Inaccessible

This section describes the `Host Inaccessible` predefined alarm condition.

Configuration

Name	Host Inaccessible
Description	The Management Layer cannot access a host computer where Genesys daemon applications run.
Category	Major

Detect Event	00-08000: Host [host name] inaccessible. LCA is not listening on port [port number].
Selection Mode	Select by any
Cancel Event	00-08001: Host [host name] operates in normal condition.
Cancel Timeout	48 hours
Reaction Scripts	None
Clearance Scripts	None
State Enabled	True

Detailed Description

Reports that the Management Layer cannot contact the Local Control Agent on the host where Genesys daemon applications are running. Might indicate one of the following (in the order of probability of occurrence in a typical production environment):

- The connection between SCS and the LCA of the specified host failed.
- LCA is not started on the specified host.
- LCA is listening on a port that is different from the one specified in the configuration.
- The LCA of the specified host has terminated or stopped responding.

Automatic Recovery Actions

By default, this failure is treated by the Management Layer as a failure of every Genesys application running on the given host. For the applications located on the given host that have redundancy, the Management Layer makes their backup applications primary. After that, Solution Control Server makes repeated attempts to restore connection with the LCA of the specified host. Once the connection is restored, the Management Layer attempts to start all applications that were running before the alarm occurred.

Suggested Maintenance Actions

1. Check the condition of LCA. If LCA terminated or stopped responding, restart LCA. Notify Genesys Technical Support about the LCA failure.
2. Verify the LCA command line parameters and make sure that LCA listens on the same port as the one specified in the Configuration Database.

Service Unavailable

This section describes the `Service Unavailable` predefined alarm condition.

Configuration

Name	Service Unavailable
Description	A Genesys component is unable to provide service for some internal reasons.
Category	Major
Detect Event	00-05094: Application is not able to provide service.
Selection Mode	Select by any
Cancel Event	00-05093: Application is ready to provide service.
Cancel Timeout	48 hours
Reaction Scripts	None
Clearance Scripts	None
State Enabled	True

Detailed Description

Reports that a Genesys component cannot provide service for some internal reasons.

Automatic Recovery Actions

If a backup application for the specified application is configured, the Management Layer switches operations over to the backup application.

Suggested Maintenance Actions

1. This alarm occurs because of internal application reasons. Examine the log of the application that signaled the alarm to determine and eliminate the source of problem.

Host Unavailable

This section describes the `Host Unavailable` predefined alarm condition.

Configuration

Name	Host Unavailable
Description	A host where Genesys daemon applications are running is unavailable (turned off).
Category	Major
Detect Event	00-08002: Host [host name] unavailable.
Selection Mode	Select by any
Cancel Event	00-08001: Host [host name] operates in normal condition.
Cancel Timeout	48 hours
Reaction Scripts	None
Clearance Scripts	None
State Enabled	True

Detailed Description

Reports that a Host where Genesys daemon applications are running is unavailable (turned off). Might indicate one of the following (in the order of probability of occurrence in a typical production environment):

- Specified host has failed or has been turned off.
- Network problems prevents SCS from connecting to LCA at the specified host.

Automatic Recovery Actions

This failure may occur when an SCS attempt to connect to the LCA at the specified host fails. This failure is determined based on the error code returned by the networking subsystem. No automatic recovery actions are performed when this failure occurs.

Suggested Maintenance Actions

1. Check the condition of the host. If the host failed, take measures to restore its normal operating condition. Once the normal condition is restored, the Management Layer automatically brings up all Genesys applications that are supposed to be running.
2. Check the condition of the network. Make sure that it is possible to reach the host of interest from the host where SCS is running.

Host Unreachable

This section describes the `Host Unreachable` predefined alarm condition.

Configuration

Name	Host Unreachable
Description	The Management Layer cannot reach the host where Genesys daemon applications are running (no route to the host).
Category	Major
Detect Event	00-08003: Host [host name] unreachable.
Selection Mode	Select by any
Cancel Event	00-08001: Host [host name] operates in normal condition.
Cancel Timeout	48 hours
Reaction Scripts	None
Clearance Scripts	None
State Enabled	True

Detailed Description

Reports that the Management Layer cannot reach the host where Genesys daemon applications are running (no route to the host). Might indicate the following:

- Network configuration is incorrect: there is no route to the host of interest from the host where SCS is running.

Automatic Recovery Actions

This failure may occur when an SCS attempt to connect to the LCA at the specified host fails. This failure is determined based on the error code returned by the networking subsystem. No automatic recovery actions are performed when this failure occurs.

Suggested Maintenance Actions

1. Check the condition of the network. Make sure that routing is configured correctly in the network and that it is possible to reach the host of interest from the host where SCS is running.

Unplanned Solution Status Change

This section describes the `Unplanned Solution Status Change` predefined alarm condition.

Configuration

Name	Unplanned Solution Status Change
Description	Solution status has changed from Started to Pending without any requests to stop the Solution. This may indicate a failure of one of the Solution components.
Category	Major
Detect Event	43-10385: Solution [solution name] nonplanned change of state from Started to Pending.
Selection Mode	Select by any
Cancel Event	43-10370: Solution [solution name] is started.
Cancel Timeout	48 hours
Reaction Scripts	None
Clearance Scripts	None
State Enabled	True

Detailed Description

Reports that a Solution status has changed from Started to Pending without any requests to stop the Solution. Might indicate the following:

- Failure of one or more of the Solution components.

Automatic Recovery Actions

If this alarm occurred because of the failure of one or more of the Solution components, the Management Layer performs the same automatic recovery actions for each failed application as described for the `Application Failure` alarm condition.

Suggested Maintenance Actions

1. For each failed Solution component, perform the same Maintenance Actions as suggested for the `Application Failure` alarm condition.

Message Server Loss of Database Connection

This section describes the `Message Server Loss of Database Connection` predefined alarm condition.

Configuration

Name	Message Server Loss of Database Connection
Description	Message Server has lost connection to the Centralized Log Database.
Category	Major
Detect Event	00-11051: Connection with DB Cluster lost.
Selection Mode	Select by Application type Message Server
Cancel Event	00-11050: Connection with DB Cluster established ([host name]:[port number]).
Cancel Timeout	48 hours
Reaction Scripts	None
Clearance Scripts	None
State Enabled	True

Detailed Description

Reports that Message Server has lost connection to the Centralized Log Database. Might indicate one of the following (in the order of probability of occurrence in a typical production environment):

- Failure of the DB Server used by Message Server to access the Centralized Log Database.
- Failure of the DBMS that stores the Centralized Log Database.

Automatic Recovery Actions

If this alarm occurred because of the failure of DB Server used by Message Server to access the Centralized Log Database, the Management Layer performs the same automatic recovery actions for DB Server as described for the `Application Failure` alarm condition.

Suggested Maintenance Actions

1. In the case of Log DB Server failure, perform the same Maintenance Actions as suggested for the `Application Failure` alarm condition.
2. Otherwise, make sure that the DBMS that stores the Centralized Log Database is operating in normal condition.

Chapter

11 Troubleshooting

This chapter contains suggestions on how to identify and handle the most common mistakes made when you are enabling the Management Layer functionality.

This chapter contains the following sections:

Major Checkpoints

The Management Layer must be correctly configured to function properly. Wizards provide this correct configuration. When you are configuring the Management Layer manually, you can ensure that it operates properly by using the following checklist:

- SQL server is running and configured properly.
- Log DB Server is running.
- Configuration Server is running.
- Solution Control Server (SCS) is running.
- Local Control Agent (LCA) is running with sufficient permissions on each monitored host.
- At least one instance of Message Server is running.
- Message Server, used for centralized logging, has the `dbstorage` configuration option set to `true`. (Check the `messages` section on the `Options` tab of the Message Server `Properties` window.)

- The Log Database scripts have been executed successfully.
- The user account that is specified in the `Properties` window of the Database Access Point Application (the `DB Info` tab) and used for accessing the Log Database has `Write` permissions configured in the Database Management System (DBMS).
- All monitored applications have the `verbose` configuration option set to a value other than `none`. (Check the `log` section on the `Options` tab of an Application object's `Properties` window.)
- All monitored applications have the `network` output type specified. (Check the `log` section on the `Options` tab of an Application object's `Properties` window.)
- Connection to Message Server is configured on the `Connections` tab of an Application's `Properties` window.
- Connection to Message Server is configured on the `Connections` tab of the SCS `Properties` window.
- Connection to SCS is configured on the `Connections` tab of the Solution Control Interface (SCI) `Properties` window.
- The same Database Access Point Application is specified on the `Connections` tab of both the SCI and Message Server `Properties` windows.

Note: Refer to the *Framework 7.6 Configuration Options Reference Manual* for configuration option descriptions and information about their valid values.

Alarming

This section suggests what actions to take if you have difficulty enabling Management Layer's alarm-signaling functionality.

No Active Alarms in SCI

- Check the configuration of the Alarm Condition object and make sure that the correct `Detect Log Event ID` is specified.
- Make sure that the log message appears in a local log file.
- Make sure that all monitored applications have the `network` output type. (Check the `log` section on the `Options` tab of an Application object's `Properties` window.)
- Make sure that the `verbose` configuration option is set to send log messages of the needed level.
- Check the Message Server log to make sure that Message Server receives log messages.

- Make sure that the correct Message Server is specified on the Connections tab of the SCS Properties window.
- Check the Message Server log to make sure that Message Server sends messages to SCS.
- Make sure that the correct SCS is specified on the Connections tab of the SCI Properties window.
- Check the SCI log to make sure that SCI receives alarms. To enable SCI log, start SCI from the command prompt using the --debug command-line parameter:

```
sci.exe --debug
```

No Alarm Reactions Executed

- Make sure that the alarm is triggered (see "No Active Alarms in SCI" on page 154).
- Make sure that a Script object of the Alarm Reaction type is specified on the Reaction Scripts tab of the Alarm Condition's Properties window.

No Alarm Reactions "Send SNMP Trap" Executed

- Make sure that the alarm is triggered (see "No Active Alarms in SCI" on page 154).
- Make sure that a Script object of the Alarm Reaction type is specified on the Reaction Scripts tab of the Alarm Condition's Properties window.
- Make sure that the Genesys or a third-party SNMP Master Agent is installed and configured as required. (See Chapter 7.)

No Alarm Reactions "Send E-Mail" Executed

- Make sure that the alarm is triggered (see "No Active Alarms in SCI" on page 154).
- Make sure that a Script object of the Alarm Reaction type is specified on the Reaction Scripts tab of the Alarm Condition's Properties window.
- Make sure that the e-mail system is installed and configured as required. (See Chapter 6.)
- Make sure that the correct e-mail address is specified for the Alarm Reaction Script object. To do so, go to the SCI List view and select Alarm Reaction Wizard from the Script shortcut menu and identify the configuration in the Details pane. To change the configuration, launch the Alarm Reaction Wizard from the Script shortcut menu in the SCI List view and check the Script configuration.

Logging

This section suggests what actions to take if you have difficulty enabling Management Layer's logging functionality.

No Application Logs

- Check the `log` section on the `Options` tab of the Application object's `Properties` window and make sure that the `verbose` configuration option is set to a value other than `none`.
- Check the `log` section on the `Options` tab of the Application object's `Properties` window and make sure that at least one output type is specified.

No Log Messages in SCI

- Check the `log` section on the `Options` tab of the Application object's `Properties` window and make sure that the `verbose` configuration option is set to a value other than `none`. Then check the value of the configuration option corresponding to the value of `verbose` and make sure that it is set `network`.
- Make sure that Message Server is specified on the `Connections` tab of the Application object's `Properties` window.
- Check the `messages` section on the `Options` tab of the Message Server `Properties` window and make sure that the `dbstorage` configuration option is set to `true`.
- Make sure that a user with `Write` permission is configured in the DBMS and that the same user account is specified on the `DB Info` tab of the Database Access Point `Properties` window.
- Make sure that the same Database Access Point Application is specified on the `Connections` tab of both the SCI and Message Server `Properties` windows.

Too Many Log Segments in Folders

- If the log segmentation is turned on, but the number of log segments in a folder exceeds the configured number of log files, wait until the size of the current segment grows bigger than the segment size set by the `segment` configuration option in the `log` section. (See the `Options` tab of the Application object's `Properties` window.) Extra log segments are automatically deleted when a new segment is created.

Application Start/Stop

This section suggests what actions to take if you have difficulty enabling Management Layer's control functionality.

Applications Cannot Be Started

- Make sure that LCA is running on the host on which the application is installed.
- Check the SCS log to make sure that connection to the LCA running on the application's host is established.
- Make sure that the command-line parameters are specified correctly on the `Start Info` tab of the Application object's `Properties` window.
- Make sure LCA has sufficient permissions to start an application.
- Make sure that the application is installed on the host specified on the `Server Info` tab of the Application object's `Properties` window.

Applications Cannot Be Stopped

- Make sure LCA has sufficient permissions to stop an application.

Connectivity Failure and Microsoft's Media-Sense Feature

For the operating systems Windows 2000 and Windows XP, when a host is disconnected from the network, Local Control Agent (LCA) may start second instances of Solution Control Server (SCS) and Configuration Server (CS) even though these components are already running. That in itself is harmless because Framework detects and terminates the additional CS instance and the additional SCS instance never connects to Framework.

The probable cause of this effect is Microsoft's `media-sense` feature.

Windows 2000 introduced (and Windows XP includes) the feature `media-sense`, which enables a NIC (Network Interface Card) to detect if a network cable is connected to it. The default setting of this feature (`on`) has these effects:

- If any cable is disconnected, Windows disables the protocols on the adapter, which affects TCP/IP (although loopback of 127.0.0.1 in your HOSTS file still works). This affects applications that require IP connectivity to remain constant; for example, laptops.
- If a network cable is disconnected, Windows also disables the entire network protocol stack, which means that you cannot reach network addresses on your own system.

If you find these effects undesirable, you should disable media-sense. To do this for systems that use TCP/IP:

1. Start the registry editor (regedit).
2. Move to HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Tcpip\Parameters.
3. From the Edit menu select New - DWORD value.
4. Name the new item DisableDHCPMediaSense and press Enter.
5. Double click the new value and set it to 1.
6. Click OK
7. Reboot the computer.

Point your browser to http://www.microsoft.com, and search for media-sense to read more information about disabling this feature.

Alarm Reaction

This section suggests what actions to take if you have difficulty enabling alarm reactions of the Send an e-mail and Send an SNMP Trap types.

E-Mail

- Make sure the host where SCS is running has an e-mail system, which is installed, configured, and running correctly.

See also Chapter 6.

SNMP Traps

- Make sure that the SNMP Master Agent Application is specified on the Connections tab of the SCS Properties window.
- Make sure that the host and port parameters are specified correctly on the Server Info tab of the SNMP Master Agent Application Properties window.
- Make sure that the configuration options are set correctly on the Options tab of the SNMP Master Agent Application Properties window.

See also Chapter 7.

Distributed SCS Functionality

This section suggests what actions to take if you have difficulty enabling Distributed mode for Solution Control Servers that control your environment.

Incorrect Message Server Configuration

- Make sure you have a Message Server dedicated to support communications among Distributed SCSs. Verify that the `signature` configuration option is set to the `scs_distributed` value in the `MessageServer` section on the `Options` tab of the Application object's `Properties` dialog box for that Message Server application.

Incorrect SCS Configuration

- Make sure that the `distributed_mode` configuration option is set to the `ON` value in the `general` section on the `Options` tab of the Application object's `Properties` dialog box for each configured SCS application.
- Make sure that the Message Server Application that you dedicated to support Distributed SCS communications is specified on the `Connections` tab of the `Properties` dialog box for each configured SCS application.

Incorrect SCS Role Configuration

- If you decide not to have a main Distributed SCS control all unassigned configuration objects, make sure that the `distributed_rights` configuration option is either not configured or not set to the `MAIN` value in the `general` section on the `Options` tab of the `Properties` dialog box for each configured SCS application.
- If you decide to have a main Distributed SCS control all unassigned configuration objects, make sure that the `distributed_rights` configuration option in the `general` section is set to:
  - The `MAIN` value on the `Options` tab of the `Properties` dialog box for the SCS application you designate as the main Distributed SCS.
  - The `DEFAULT` value on the `Options` tab of the `Properties` dialog box for the rest of SCS applications.

Incorrect Configuration of Controlled Objects

- If you decide not to have a main Distributed SCS control all unassigned configuration objects, make sure that you assign a particular SCS to each Host, Application, and Solution object:
  - For Hosts, specify a Distributed SCS in the Host object's `Properties` dialog box.
  - For Applications, specify a Distributed SCS in the `Properties` dialog box of the Host with which the Application is associated.
  - For Solutions, specify a Distributed SCS in the Solution object's `Properties` dialog box.

Appendix

A Genesys MIB File

This appendix presents the content of the Genesys 7 MIB (Management Information Base) file used for the SNMP (Simple Network Management Protocol) support built into the latest release of Management Layer. See also Appendix B on page 213.

```
GENESYS-SML-MIB-G71 DEFINITIONS ::= BEGIN

--- Genesys Solutions Management Layer MIB v7.1

IMPORTS
  DisplayString,
  RowStatus,
  TEXTUAL-CONVENTION  FROM SNMPv2-TC
  MODULE-IDENTITY,
  OBJECT-TYPE,
  NOTIFICATION-TYPE,
  enterprises,
  Unsigned32,
  Integer32,
  TimeTicks           FROM SNMPv2-SMI
  MODULE-COMPLIANCE,
  NOTIFICATION-GROUP,
  OBJECT-GROUP        FROM SNMPv2-CONF;

---
--- MIB High Level description
---

genesys MODULE-IDENTITY
  LAST-UPDATED "200302071000Z"
  ORGANIZATION "Genesys Telecommunications Labs, Inc. An Alcatel Company"
  CONTACT-INFO
     "Postal: 2001 Junipero Serra Blvd
              Daly City, CA 94014
```

```
              US

              Tel:    +1 888 GENESYS
              Fax:    +1 415 437 1260

      email:  support@genesyslab.com"

  DESCRIPTION
    "Collection of managed objects that provides for remote
     management of Genesys Call Center server applications."

  REVISION "200303281500Z"
  DESCRIPTION
    "Initial version."

  REVISION "200304141830Z"
  DESCRIPTION
    "Syntax of some of the managed objects changed from DisplayString to an enumerated
     INTEGER."

  REVISION "200304160630Z"
  DESCRIPTION
    "Included Integer32 into imports.

    Reverted tsDtaType from INTEGER to DisplayString.

    Changed names of enumerated values to begin with lowercase letter.

    Added 'Unknown' values to some enumerators.

    Added 'debug' as possible value for logVerbose object.

    Revised some description clauses to improve managed
    objects specification."

  REVISION "200304230630Z"
  DESCRIPTION
    "Changed definition of gsCtrlRefreshStatus object - the value
     dataRefreshCanceled is removed, dataNotReady is used instead;
     description of the object is changed accordingly.

     Changed definition of gServerStatus object. Syntax changed to
     enumerated INTEGER and description is refined accordingly.

     Removed objects gServerStartup, gServerShutdown, and gServerGracefulShutdown.
     Added object gServerCommand instead that provides functionality
     formerly performed by removed objects.

     Moved object gsCmndDeleteClient from gsInfoEntry to gServersEntry
     and renamed it to gServerDeleteClient."
```

```
  REVISION "200305120630Z"
  DESCRIPTION
    "Changed dataRefreshCanceled to dataNotReady in description of gsCtrlRowStatus
   object."

  REVISION "200305150630Z"
  DESCRIPTION
    "Changed MAX-ACCESS of gsCtrlRefreshStatus and gsCtrlLastRefreshed to read-only."

  REVISION "200309100000Z"
  DESCRIPTION
    "Added gsCtrlAutomaticRefresh object to the gServerControlTable table."

  REVISION "200311140700Z"
  DESCRIPTION
    "Descriptions of gsAlarmLogText and gsAlarmCategory objects were changed."

  REVISION "200409291800Z"
  DESCRIPTION
    "Added new tables tsCallFilterTable and tsCallInfoTable.
     Consequently extended TableID with new values.

     Added two new variables to the gsMLAlarm's variables-bind
     gsAlarmAppHostName and gsAlarmGUID."

  ::= { enterprises 1729 }


--- Textual Conventions

TableID ::= TEXTUAL-CONVENTION
  STATUS current
  DESCRIPTION
    "An integer value representing a conceptual data table defined in this MIB module.
     Along with ServerDBID used as an index into the gsControlTable."
  SYNTAX INTEGER
  {
    gsLogTable(1),
    gsInfoTable(2),
    gsClientTable(3),
    gsPollingTable(4),
    tsInfoTable(5),
    tsCallTable(6),
    tsDtaTable(7),
    tsLinkTable(8),
    tsCallFilterTable(9),
    tsCallInfoTable(10)
   }

ServerDBID ::= TEXTUAL-CONVENTION
  STATUS current
```

```
  DESCRIPTION
    "An unique identifier for a Genesys managed server as assigned
    by the Configuration Server."
  SYNTAX Unsigned32

HostDBID ::= TEXTUAL-CONVENTION
  STATUS current
  DESCRIPTION
    "An unique identifier for a host as assigned
     by the Configuration Server."
  SYNTAX Unsigned32

SolutionDBID ::= TEXTUAL-CONVENTION
  STATUS current
  DESCRIPTION
    "An unique identifier for a solution as assigned
    by the Configuration Server."
  SYNTAX Unsigned32



-- ###########################################################################
-- Object Identifiers
-- ###########################################################################

servers OBJECT IDENTIFIER
  ::= { genesys 100 }

hosts OBJECT IDENTIFIER
  ::= { genesys 101 }

solutions OBJECT IDENTIFIER
  ::= { genesys 102 }

notifications OBJECT IDENTIFIER
  ::= { genesys 104 }

genericServer OBJECT IDENTIFIER
  ::= { servers 1 }

specificServer OBJECT IDENTIFIER
  ::= { servers 2 }

tServer OBJECT IDENTIFIER
  ::= { specificServer 1 }

--ursServer OBJECT IDENTIFIER
--  ::= { specificServer x }

--sipServer OBJECT IDENTIFIER
--  ::= { specificServer x }
```

```
-- ##############################################################################
-- Genesys alarms
-- ##############################################################################

gsAlarm NOTIFICATION-TYPE
  OBJECTS { gsServersLastAlarm }
  STATUS  current
  DESCRIPTION
    "Notification message reporting that a Genesys server
     has encountered an alarm situation."
  ::= {notifications 1}

gsMLAlarm NOTIFICATION-TYPE
  OBJECTS
  {
    gsAlarmId,
    gsAlarmLogText,
    gsAlarmMessagesIds,
    gsAlarmApplicationName,
    gsAlarmApplicationType,
    gsAlarmAppHostName,
    gsAlarmCategory,
    gsAlarmGUID
  }

  STATUS current
  DESCRIPTION
    "An alarm message from Management Layer to NMS that a pre-configured alarm condition
     has been detected.
     The details of this alarm are described by the variable list attached to this
     notification message."
  ::= {notifications 2}

gsServerUpTrap NOTIFICATION-TYPE
  OBJECTS { gsServersLastTrap }
  STATUS  current
  DESCRIPTION
    "Notification message reports that a Genesys server has been started up."
  ::=  {notifications 3}

gsServerDownTrap NOTIFICATION-TYPE
  OBJECTS { gsServersLastTrap }
  STATUS  current
  DESCRIPTION
    "Notification message reports that a Genesys server
    has ceased operation or has failed to restart."
  ::= {notifications 4}
```

```
gsPollingSignal NOTIFICATION-TYPE
  OBJECTS { gsPollingLastTrap }
  STATUS  current
  DESCRIPTION
    "Notification message reporting that a polling signal has been
    received from a server.
    The notification message has the following format:
    <server name>:<polling ID>."
  ::=  {notifications 5}

tsLinkStatusTrap NOTIFICATION-TYPE
  OBJECTS { tsLastChangedLinkStatus }
  STATUS current
  DESCRIPTION
    "Notification message reporting that TServer CTI link status has been changed."
  ::= { notifications 6 }


gsCleanupTimeout  OBJECT-TYPE
  SYNTAX       Unsigned32
  MAX-ACCESS   read-write
  STATUS       current
  DESCRIPTION
    "The time in minutes the agent should keep rows in the
    gsControlTable and consequently in related data tables if there were no
    requests to objects of this row or corresponding rows from data
    table(s) and no automatic refresh is activated for this particular row.
    After that time the agent should automatically delete unattended rows.

    Value 0 of this object specifies that MIB clean up should not be performed.
    NOTE: this automatic clean up mechanism applies to the following
    server data tables:

      gsLogTable
      gsInfoTable
      gsClientTable
      tsInfoTable
      tsCallTable
      tsDtaTable
      tsLinkTable
      tsCallFilterTable
      tsCallInfoTable

    NOTE: this automatic clean up mechanism does not apply to the gsPollingTable.
    The gsPollingTable is used to activate (and deactivate) servers heart-bit
   notification
    messages (propagated as TRAP messages) and one cannot assume this was the intent of
    the management station to stop receiving such notifications. Note also that one of
   the
    columnar objects of this table, gsPollingLastTrap, is used as a variable in the
   variable binding
```

```
    list of the mentioned notification."
  DEFVAL { 60 }
  ::= { genericServer 1 }


-- ###########################################################################
-- Genesys servers Table (list of servers)
-- ###########################################################################

gServersTable OBJECT-TYPE
  SYNTAX SEQUENCE OF GServersEntry
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    "This table populates the servers that are currently registered with the
     Genesys configuration layer.

     This table has several purposes:

     (a) Provides general information about servers working environment
     (b) Allows to start or stop an individual server
     (c) Provides information about DBID numbers assigned to servers.
     These DBID numbers are needed when creating entries in control table.
     Each entry in control table is set to monitor a particular
     server. A DBID number is used to identify that server.

     Note that since server configuration objects can be added or deleted
     to or from configuration database throughout a lifetime of
     the agent, a management station might want to walk this table
     frequently in order to keep the servers list updated."

  ::= { genericServer 2 }

gServersEntry OBJECT-TYPE
  SYNTAX      GServersEntry
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    "A conceptual row in the gServersTable.
     Each deamon application object in configuration database has an entry in
     this table."
  INDEX { gServerId }
  ::= { gServersTable 1 }

GServersEntry ::= SEQUENCE
{
  gServerId                ServerDBID,
  gServerName              DisplayString,
  gServerStatus            INTEGER,
  gServerType              DisplayString,
  gServerVersion           DisplayString,
```

```
  gServerWorkDir           DisplayString,
  gServerCommandLine       DisplayString,
  gServerPID               Integer32,
  gServerCommand           INTEGER,
  gServerDeleteClient      Unsigned32
}

gServerId OBJECT-TYPE
  SYNTAX      ServerDBID
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    "An index that uniquely identifies a server in the gServersTable.
    Server DBIDs are generated by the Configuration Server when new
    server configuration objects are created and added to the configuration database
    and are unique within a given configuration environment.
    DBID numbers of deleted servers are not reused again but only across power
    cycles of the Configuration Server."
  ::= { gServersEntry 1 }

gServerName OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "A human-readable description of the server as assigned by a user
    that created this server in configuration database.
    This object is used to provide a mapping of a server name to a
    DBID number. The index portion of object identifier represents the
    DBID assigned to this server: gServerName.<index> = <value>
    where index == DBID and value == server name.
    By walking all instances of this object a manager
    can retrieve an updated list of all currently configured servers,
    their names and DBIDs."
  ::= { gServersEntry 2 }

gServerStatus OBJECT-TYPE
  SYNTAX INTEGER
  {
    statusUnknown(1),
    statusStopped(2),
    statusPending(3),
    statusRunning(4),
    statusInitializing(5),
    statusServiceUnavailable(6)
  }
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Indicates server status:
```

```
      - statusUnknown: Indicates that the Management Layer is unable to provide reliable
       information about the current server status. It does not necessarily mean that
       the server is unable to perform its function.

       - statusStopped: Indicates that a server is installed and configured in the
    system,
       but has not started. This status indicates that the server either has not been
       activated or has failed.

       - statusPending: Indicates one of the following:

         (a) The server is in the process of being activated. This status only exists
         for the interval between the instruction to start the server and the actual
         readiness of the server to perform its function. Typically, the Pending stage
         involves starting the server, reading configuration data from the Configuration
         Layer, checking this data for integrity and completeness, and establishing
         connections with all the resources according to the given configuration data.

         (b) The server is in the process of being shut down. This status only exists
         for the interval between the instruction to stop the server and its actual
         termination. Typically, the Pending stage involves some server-specific
         wrap-up functions, closure of all open connections, termination, and detection
         of the termination by Local Control Agent.

      - statusRunning: Assigned from the moment a server is completely initialized; that
    is,
        when the server has read and checked its configuration and established connections
       with all the required resources. This status does not necessarily mean that
       the server is actually performing its function.

       - statusInitializing: Server is starting and performing initialization. Server is
       connected to LCA. On initialization phase server is not able to provide service.

       - statusServiceUnavailable: Server is running but unable to provide service due
       to unavailability of some resource."

  ::= { gServersEntry 3 }

gServerType OBJECT-TYPE
  SYNTAX      DisplayString (SIZE(1..256))
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Indicates server type.
     Displayed text is based on mapping of server type index
     to human readable representation as provided by Configuration Server.
     For example: T-Server"
  ::= { gServersEntry 4 }

gServerVersion OBJECT-TYPE
  SYNTAX      DisplayString
```

```
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Indicates server version as specified in Configuration Server."
  ::= { gServersEntry 5 }

gServerWorkDir OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Indicates server working directory as specified in Configuration Server."
  ::= { gServersEntry 6 }

gServerCommandLine OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Indicates full command-line used to start this server as specified
    in Configuration Server.
    For example: scs -host enigma -port 4135 -app TServer_Meridian."
  ::= { gServersEntry 7 }

gServerPID OBJECT-TYPE
  SYNTAX      Integer32
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Indicates process ID assigned to this server by operating system.
     It is positive integer for running server, -1 for stopped server
     or 0 if PID is unknown. The latter may happen, for instance, when
     LCA is not running on the server's host."
  ::= { gServersEntry 8 }

gServerCommand OBJECT-TYPE
  SYNTAX INTEGER
  {
    start(1),
    shutDown(2),
    shutDownGracefully(3)
  }
  MAX-ACCESS  read-write
  STATUS      current
  DESCRIPTION
    "This object is used to start, shutdown or gracefully shutdown server with dbid
   equal
     to this object instance id.

     When this object is set value the agent either attempts to perform corresponding
```

```
     operation, or rejects it if the operation is impossible or does not make sense,
     e.g. if value start(1) is set for server that the agent knows to be running.
     In any case the agent returns to NMS corresponding result (success or failure)
     immediatly.

     Result 'success' does not necessarily means success of the operation. The NMS
     should check the value of object gServerStatus to determine whether
     the operation succeeded or failed."

  ::= { gServersEntry 9 }

gServerDeleteClient OBJECT-TYPE
  SYNTAX      Unsigned32
  MAX-ACCESS  read-write
  STATUS      current
  DESCRIPTION
    "Sends 'delete client' command to this server.
    To delete a client enter its socket number."
  ::= { gServersEntry 10 }



-- ##############################################################################################
-- Servers Control Table
-- ##############################################################################################

gServerControlTable OBJECT-TYPE
  SYNTAX SEQUENCE OF GServerControlEntry
  MAX-ACCESS not-accessible
  STATUS current
  DESCRIPTION
    "Control table containing a set of parameters to set up and
     control data collection from Genesys server(s).
     This table facilitates the monitoring of multiple Genesys servers.

     The following data tables defined in this MIB module are controlled by the
     gsControlTable:

     - gsLogTable
     - gsInfoTable
     - gsClientTable
     - gsPollingTable
     - tsInfoTable
     - tsCallTable
     - tsDtaTable
     - tsLinkTable
     - tsCallFilterTable
     - tsCallInfoTable

     Entries in the above tables are created on behalf of an entry in
     the gServerControlTable.
```

```
     If a control row is destroyed, then corresponding row in the respective data table
     is destroyed too.

     Some tables defined in this MIB module may just be used to perform
     some management function on a server (e.g.,gsPollingTable).
     When a management station creates a row in the control table for such a table, the
     agent will create a row in the corresponding table thus making it ready to be used
   to
     perform a management function for a selected server.
     This way, we are allowed to create multiple instances of a management object that
   can
     be used to perform a management function for multiple servers.
     For example, in case of gsPollingTable a manager will be able to perform reconfig
   command
     for multiple Stat Servers."

  ::= { genericServer 3 }

gServerControlEntry OBJECT-TYPE
  SYNTAX GServerControlEntry
  MAX-ACCESS not-accessible
  STATUS current
  DESCRIPTION
    "A conceptual row in the gServerControlTable."
  INDEX { gsCtrlServerID, gsCtrlTableID }
  ::= {gServerControlTable 1 }

GServerControlEntry ::= SEQUENCE
{
  gsCtrlServerID         ServerDBID,
  gsCtrlTableID          TableID,
  gsCtrlRefreshStatus    INTEGER,
  gsCtrlLastRefreshed    TimeTicks,
  gsCtrlAutomaticRefresh Unsigned32,
  gsCtrlRowStatus        RowStatus
}

gsCtrlServerID OBJECT-TYPE
  SYNTAX ServerDBID
  MAX-ACCESS not-accessible
  STATUS current
  DESCRIPTION
    "A server that is to be managed by this control row."
  ::= { gServerControlEntry 1 }

gsCtrlTableID OBJECT-TYPE
  SYNTAX TableID
  MAX-ACCESS not-accessible
  STATUS current
  DESCRIPTION
    " A particular data table to be refreshed by this control row."
```

```
  ::= { gServerControlEntry 2 }

gsCtrlRefreshStatus OBJECT-TYPE
  SYNTAX INTEGER
  {
    dataNotReady(1),
    dataRefreshInProgress(2),
    dataReady(3),
    mgmtIsNotAvailable(4),
    dataRefreshFailed(5)
  }
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Indicates refresh status of corresponding data table as specified by gsCtrlTableID.

          dataNotReady - indicates that data table refresh has not been attempted yet
                 (the row was just created with createAndWait RowStatus value),
                or data table was not refreshed because the user has set gsCtrlRowStatus
                 to notInService while refresh was in progress
         dataRefreshInProgress - indicates that data table refresh has been started but
   not finished yet
          dataReady - indicates that data table has been successfully refreshed
          mgmtIsNotAvailable - indicates that data table refresh failed for one of the
   following reasons:
                 (a) no mgmt port is configured for this server
                 (b) this server does not provide for mgmt instrumentation
                 (c) this server does not provide for requested data (like if config
   server is requested for tsCallsList)
                 (d) LCA is not started (or terminated) on host where this server
                 is running
        dataRefreshFailed - indicates that refresh failed for any reason other then
   described above;
                 this situation may typically arise when mgmt connection could not be
   established
                 or was lost during refresh"
  DEFVAL {1}
  ::= { gServerControlEntry 3 }

gsCtrlLastRefreshed OBJECT-TYPE
  SYNTAX TimeTicks
  MAX-ACCESS read-only
  STATUS current
  DESCRIPTION
    "The time in hundredths of seconds since the row was last successfully refreshed
    (gsCtrlRefreshStatus was set to dataReady) or 0 for the rest of refresh states"
  ::= { gServerControlEntry 4 }

gsCtrlAutomaticRefresh OBJECT-TYPE
  SYNTAX Unsigned32
  MAX-ACCESS read-create
```

```
  STATUS current
  DESCRIPTION
    "The time in seconds the agent should perform automatic refresh for
    a data table managed by this control row.
    Any value other then zero activates the automatic refresh
    mechanism, otherwise automatic refresh is disabled (default)."
  DEFVAL {0}
  ::= { gServerControlEntry 5 }

gsCtrlRowStatus OBJECT-TYPE
  SYNTAX RowStatus
  MAX-ACCESS read-create
  STATUS current
  DESCRIPTION
    "The status of this conceptual control entry.

     The agent may change the value of this object to 'notInService' if a
     connection to a managed server has been lost or some internal error has
     occurred. The manager also sets this object to 'active' in order to
     refresh table(s).

     The following is a detailed description of the object's functions
     and data refresh mechanism:

    (a) Creating new conceptual row.

     Management station should set value ·createAndWait'
     for gsCtrlRowStatus with instance id specifying managed server and refreshed
     table. Agent MUST create a row and set gsCtrlRowStatus to ·notReady' and return
     noError. No data refresh is performed.

     Alternatively, management station may set value ·createAndGo'. In this case
     the agent MUST create a row, set gsCtrlRowStatus to ·active', returnnoError
     and immediatly start data refresh.

    (b) Refreshing data tables.

    In order to refresh the table specified by row instance id the manager should set
    value of object gsCtrlRowStatus 'active'. In response, the agent MUST set
    gsCtrlRefreshStatus to dataRefreshInProgress, start data table refresh, and
    return noError.

    Upon successful completion of data table refresh the agent MUST set
    gsCtrlRefreshStatus to dataReady.

    In some cases data retrieval may not be completed successfully. In
    such case, the agent MUST set gsCtrlRefreshStatus to a value indicating the
    reason of failure and delete all corresponding rows from the refreshed table.

    (c) Canceling data collection in progress.
```

```
    If the agent receives request to set gsCtrlRowStatus to ·notInService' when
    data collection is in progress, it MUST interrupt data collection, delete
    corresponding rows from data table and set gsCtrlRefresh to dataNotReady.

    (d) Cleaning data tables upon management station request.

    If the agent receives request to set gsCtrlRowStatus to ·destroy' it MUST
    interrupt data collection in progress (if any), delete the row from
    gServerControlTable and all corresponding rows from data table.

    (e) Automated cleaning of data tables.

    The agent MUST keep track of the times when the last SNMP request to
    gServerControlTable row or corresponding data table rows occur for each
    gServerControlTable row. If no requests occur during threshold time
    interval specified by gsCleanupTimeout object, corresponding rows MUST
    be deleted from gServerControlTable and data tables. That would save memory
    in case when management station *forgets* to clean data tables.

    (f) Data tables should always contain snapshots of corresponding information and
    the agent MUST NOT update them the way other then described above. The only
    exception is gsPollingTable that MUST be automatically updated in response to
    notifications from managed servers."

  ::= { gServerControlEntry 6 }


-- ##############################################################################################
-- Generic Server - Info Table
-- ##############################################################################################

gsInfoTable OBJECT-TYPE
  SYNTAX SEQUENCE OF GsInfoEntry
  MAX-ACCESS  not-accessible
  STATUS current
  DESCRIPTION
    " Collection of statistics about server's client. As well it contains object
      to send delete client command to a server."
  ::= { genericServer 4 }

gsInfoEntry OBJECT-TYPE
  SYNTAX      GsInfoEntry
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    " "
  INDEX { gsCtrlServerID }
  ::= { gsInfoTable 1 }

GsInfoEntry ::= SEQUENCE
{
```

```
  gsClientsExistNum       Unsigned32,
  gsClientsTotalNum       Integer32,
  gsServerConfigFile      DisplayString
}

gsClientsExistNum OBJECT-TYPE
  SYNTAX Unsigned32
  MAX-ACCESS read-only
  STATUS current
  DESCRIPTION
    "Total number of clients that can be handled by a server."
  ::= { gsInfoEntry 1 }

gsClientsTotalNum OBJECT-TYPE
  SYNTAX      Integer32
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "The total number of clients currently connected to server."
  ::= { gsInfoEntry 2 }

gsServerConfigFile OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Indicates config file name that was used to start a server, if any."
  ::= { gsInfoEntry 3 }

-- ##############################################################################################
-- Generic Server - Log Table
-- ##############################################################################################

gsLogTable OBJECT-TYPE
  SYNTAX SEQUENCE OF GsLogEntry
  MAX-ACCESS not-accessible
  STATUS current
  DESCRIPTION
    " "
  ::= { genericServer 5 }

gsLogEntry OBJECT-TYPE
  SYNTAX     GsLogEntry
  MAX-ACCESS not-accessible
  STATUS     current
  DESCRIPTION
    " "
  INDEX { gsCtrlServerID }
  ::= { gsLogTable 1 }

GsLogEntry ::= SEQUENCE
```

```
{
  logVerbose       DisplayString,
  logTrace         DisplayString,
  logStandard      DisplayString,
  logDebug         DisplayString,
  logAll           DisplayString,
  logBuffering     DisplayString,
  logSegment       DisplayString,
  logExpire        DisplayString,
  logMessageFile   DisplayString,
  logMessageFormat DisplayString,
  logTimeFormat    DisplayString,
  logTimeConvert   DisplayString
}

logVerbose OBJECT-TYPE
  SYNTAX     DisplayString (SIZE(1..10))
  MAX-ACCESS read-write
  STATUS     current
  DESCRIPTION
    "Specifies logging verbose mode. Determines the minimum level
     of log events to be generated by a server.
     Activates or deactivates server event log feature according to
     the verbose mode specified.
     Possible settings: one of the following keywords:

     none
     debug
     trace
     standard
     all

     The SET request takes effect immediately."
  ::= { gsLogEntry 1 }

logTrace OBJECT-TYPE
  SYNTAX     DisplayString
  MAX-ACCESS read-write
  STATUS     current
  DESCRIPTION
    "Specifies the log outputs that log events of the
     Trace level are to be sent to.
     Possible settings: any combination of the following key words
     separated by space:

     stdout
     stderr
     filename
     network

     The SET request takes effect immediately."
```

```
  ::= { gsLogEntry 2 }

logStandard OBJECT-TYPE
  SYNTAX     DisplayString
  MAX-ACCESS read-write
  STATUS     current
  DESCRIPTION
    "Specifies the log outputs that log events of the Standard
     level are to be sent to.
     Possible settings: any combination of the following keywords
     separated by space:

     stdout
     stderr
     filename
     network

     Note: to avoid network congestion log events of Standard level
     can be logged locally only.
     The SET request takes effect immediately."
  ::= { gsLogEntry 3 }

logDebug OBJECT-TYPE
  SYNTAX      DisplayString (SIZE (0..22))
  MAX-ACCESS  read-write
  STATUS      current
  DESCRIPTION
    "Specifies the log outputs that log events of the Debug
    level are to be sent to.
    Possible settings: any combination of the following keywords
    separated by space:

      stdout
      stderr
      filename

    Note: to avoid network congestion log events of Debug level
    can be logged locally only.
    The SET request takes effect immediately."
  ::= { gsLogEntry 4 }

logAll OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-write
  STATUS      current
  DESCRIPTION
    "Specifies the log outputs that log events of all levels are to be sent to.
     Possible settings: any combination of one or more of
     the following keywords separated by space:

     stdout
```

```
     stderr
     filename
     network

     Note: to avoid network congestion log events of Debug level
     can be logged locally only.
     The SET request takes effect immediately."
  ::= { gsLogEntry 5 }

logBuffering OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-write
  STATUS      current
  DESCRIPTION
    "Turns on/off operating system file buffering.
     To set this object use the following keywords:
       true
       false
     The SET request takes effect immediately."
  ::= { gsLogEntry 6 }

logSegment OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-write
  STATUS      current
  DESCRIPTION
    "Specifies log file segmentation mode.
    When currently opened log segment exceeds the size set by this
    option, then current segment is closed and a new empty
    log segment is created.
    Possible settings: one of the following keywords:

      false
      <number> KB
      <number> MB
      <number> hr

    Setting object to a value other than false will activate log
    segmentation feature according to the mode specified.
    The SET request takes effect immediately."
  ::= { gsLogEntry 7 }

logExpire OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-write
  STATUS      current
  DESCRIPTION
    "Specifies log file expiration mode.
    When old file is expired, new file is created while the old one is removed.
    Possible settings: one of the following keywords:
```

```
      false
      <number> file
      <number> day

    Setting object to a value other than false will activate log
    expiration feature according to the expiration method specified.
    The SET request takes effect immediately."
  ::= { gsLogEntry 8 }

logMessageFile OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-write
  STATUS      current
  DESCRIPTION
    "Specifies the file name for application-specific log events.
    Valid filename is of the following format:

      <filename>.lms

    The SET request takes effect after an application is restarted.
    NOTE: object intended for use by Genesys personnel only."
  ::= { gsLogEntry 9 }


logMessageFormat OBJECT-TYPE
  SYNTAX      DisplayString (SIZE(1..10))
  MAX-ACCESS  read-write
  STATUS      current
  DESCRIPTION
    "Specifies the format of log record headers that an
     application uses when writing logs in the log file. Using compressed
     log record headers improves application performance and reduces the
     log file size.
     Possible settings: one of the following keywords:

     full
     short

     The SET request takes effect immediately."
  ::= { gsLogEntry 10 }

logTimeFormat OBJECT-TYPE
  SYNTAX      DisplayString (SIZE(1..10))
  MAX-ACCESS  read-write
  STATUS      current
  DESCRIPTION
    "Specifies how to represent in a log file the time when
     an application generates log records.
     Possible settings: one of the following keywords:

    locale
```

```
    iso8601

    The SET request takes effect immediately."
  ::= { gsLogEntry 11 }

logTimeConvert OBJECT-TYPE
  SYNTAX      DisplayString (SIZE(1..10))
  MAX-ACCESS  read-write
  STATUS      current
  DESCRIPTION
    "Specifies in which system an application calculates the log record time
     when generating a log file. The time is converted from the time in seconds
     since the Epoch (00:00:00 UTC,January 1, 1970).
     Possible settings: one of the following keywords:

    local
    utc

    The SET request takes effect immediately."
  ::= { gsLogEntry 12 }


-- ##############################################################################################
-- Generic Server Polling Table
-- ##############################################################################################

gsPollingTable OBJECT-TYPE
  SYNTAX SEQUENCE OF GsPollingEntry
  MAX-ACCESS not-accessible
  STATUS current
  DESCRIPTION
    " A set of parameters to control the server's polling feature. As well as
      contains an object to watch the progress of the polling signals from
      a particular server."
  ::= { genericServer 6 }

gsPollingEntry OBJECT-TYPE
  SYNTAX GsPollingEntry
  MAX-ACCESS not-accessible
  STATUS current
  DESCRIPTION
    " "
  INDEX { gsCtrlServerID }
  ::= { gsPollingTable 1 }

GsPollingEntry ::= SEQUENCE
{
  gsPollingStatus      DisplayString,
  gsPollingInterval    Unsigned32,
  gsPollingID          Unsigned32,
  gsPollingLastTrap    DisplayString
```

```
}

gsPollingStatus OBJECT-TYPE
  SYNTAX      DisplayString (SIZE(1..10))
  MAX-ACCESS  read-write
  STATUS      current
  DESCRIPTION
    "Activates or deactivates server polling feature, which
     sends NMS periodical signals describing server
     operational status. Possible settings on/off."
  ::= { gsPollingEntry 1 }

gsPollingInterval OBJECT-TYPE
  SYNTAX      Unsigned32 (0..120)
  MAX-ACCESS  read-write
  STATUS      current
  DESCRIPTION
    "Specifies interval in seconds between polling signals from server."
  ::= { gsPollingEntry 2 }

gsPollingID OBJECT-TYPE
  SYNTAX      Unsigned32
  MAX-ACCESS  read-write
  STATUS      current
  DESCRIPTION
    "Event ID assigned to each polling signal, used by NMS for monitoring purposes."
  DEFVAL {1}
  ::= { gsPollingEntry 3 }

gsPollingLastTrap OBJECT-TYPE
  SYNTAX      DisplayString (SIZE(1..64))
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Last ID assigned to polling signal by the agent."
  ::= { gsPollingEntry 4 }

-- ##############################################################################################
-- Generic Server Client Table
-- ##############################################################################################

gsClientTable OBJECT-TYPE
  SYNTAX SEQUENCE OF GsClientEntry
  MAX-ACCESS not-accessible
  STATUS     current
  DESCRIPTION
    " "
  ::= { genericServer 7 }

gsClientEntry OBJECT-TYPE
  SYNTAX      GsClientEntry
```

```
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    " "
  INDEX { gsCtrlServerID, gsClientSocket }
  ::= { gsClientTable 1 }

GsClientEntry ::= SEQUENCE
{
  gsClientSocket      Unsigned32,
  gsClientAppName     DisplayString,
  gsClientAuthorized  Integer32,
  gsClientType        INTEGER,
  gsClientGotEvents   Unsigned32,
  gsClientSentReqs    Unsigned32
}

gsClientSocket OBJECT-TYPE
  SYNTAX      Unsigned32
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    "Specifies socket number through which client connected to server."
  ::= { gsClientEntry 1 }

gsClientAppName OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies client app name."
  ::= { gsClientEntry 2 }

gsClientAuthorized OBJECT-TYPE
  SYNTAX      Integer32
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies level of client authorization."
  ::= { gsClientEntry 3 }

gsClientType OBJECT-TYPE
  SYNTAX INTEGER
  {
    typeTClient(0),
    typeMClient(1),
    typeEXRClient(2),
```

```
    typeUnknown(3)
  }
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Indicates client type."
  ::= { gsClientEntry 4 }

gsClientGotEvents OBJECT-TYPE
  SYNTAX      Unsigned32
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies number of events received by clients."
  ::= { gsClientEntry 5 }

gsClientSentReqs OBJECT-TYPE
  SYNTAX      Unsigned32
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies number of requests sent by client."
  ::= { gsClientEntry 6 }


-- ##############################################################################
-- Generic server alarm objects
-- ##############################################################################

gsAlarmObjects OBJECT IDENTIFIER
  ::= { genericServer 10 }

gsServersLastAlarm OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies the last alarm message sent to NMS.
     Note: object provides for backward compatibility in Genesys v5."
  ::= { gsAlarmObjects 11 }

gsServersLastTrap OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies the last server-status (server up or down) trap sent to NMS.
     Note: object provides for backward compatibility in Genesys v5."
  ::= { gsAlarmObjects 12 }

gsAlarmId OBJECT-TYPE
```

```
  SYNTAX      Unsigned32
  MAX-ACCESS  accessible-for-notify
  STATUS      current
  DESCRIPTION
    "Uniquely identifies an alarm condition upon
    which Management Layer can react with sending of SNMP
    Trap. The alarm condition is configured in
    the Configuration Server and assigned with an unique
    configuration object ID (smlAlarmId) which is
    unique within the Genesys Configuration Database."
  ::= { gsAlarmObjects 13 }

gsAlarmLogText OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  accessible-for-notify
  STATUS      current
  DESCRIPTION
    "A textual description of an alarm event.
     For example: Connection to [server type] [servername] at host [hostname], port
   [port number] lost."
  ::= { gsAlarmObjects 14 }

gsAlarmMessagesIds OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  accessible-for-notify
  STATUS      current
  DESCRIPTION
    "Uniquely identifies log event (or a set of log events) upon which an
    active alarm condition has been created (or deleted).
    Currently, only one log event can create or destroy an Alarm condition.
    For example, 4003."
  ::= { gsAlarmObjects 15 }

gsAlarmApplicationName OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  accessible-for-notify
  STATUS      current
  DESCRIPTION
    "Application name which is the source of this alarm. For example: tserver."
  ::= { gsAlarmObjects 16 }

gsAlarmApplicationType OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  accessible-for-notify
  STATUS      current
  DESCRIPTION
    "Application type which is the source of this alarm. For example: G3tserver."
  ::= { gsAlarmObjects 17 }

gsAlarmCategory OBJECT-TYPE
  SYNTAX      DisplayString
```

```
  MAX-ACCESS  accessible-for-notify
  STATUS      current
  DESCRIPTION
    "A category assigned to this alarm. The following
     categories are defined: Critical, Major, Minor, Clearance.
     Category Clearance indicates that this notification is sent in response to an
     active alarm being canceled."
  ::= { gsAlarmObjects 18 }


gsAlarmGUID OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  accessible-for-notify
  STATUS      current
  DESCRIPTION
    " Uniquely identifies Alarm Clearance Trap with Alarm Creation Trap."
  ::= { gsAlarmObjects 19 }


gsAlarmAppHostName OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  accessible-for-notify
  STATUS      current
  DESCRIPTION
    "Host name the application that generated the alarm is running on."
  ::= { gsAlarmObjects 20 }



-- ##############################################################################################
-- TServer Info Table
-- ##############################################################################################
tsInfoTable OBJECT-TYPE
  SYNTAX SEQUENCE OF TsInfoEntry
  MAX-ACCESS not-accessible
  STATUS current
  DESCRIPTION
    "This table contains some statistical data about TServer."
  ::= { tServer 1 }

tsInfoEntry OBJECT-TYPE
  SYNTAX     TsInfoEntry
  MAX-ACCESS not-accessible
  STATUS     current
  DESCRIPTION
    " "
  INDEX { gsCtrlServerID }
  ::= { tsInfoTable 1 }

TsInfoEntry ::= SEQUENCE
{
```

```
  tsCallsExistNum          Unsigned32,
  tsCallsTotalNum          Unsigned32,
  tsLinksCommand           DisplayString,
  tsLastChangedLinkStatus  DisplayString
}

tsCallsExistNum OBJECT-TYPE
  SYNTAX     Unsigned32
  MAX-ACCESS read-only
  STATUS     current
  DESCRIPTION
    "Specifies number of calls being handled by TServer."
  ::= { tsInfoEntry 1 }

tsCallsTotalNum OBJECT-TYPE
  SYNTAX     Unsigned32
  MAX-ACCESS read-only
  STATUS     current
  DESCRIPTION
    "Specifies total number of calls handled by TServer."
  ::= { tsInfoEntry 2 }

tsLinksCommand OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-write
  STATUS      current
  DESCRIPTION
    "Specifies command which will be sent to T-Server."
  ::= { tsInfoEntry 3 }

tsLastChangedLinkStatus OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Last changed link status sent from T-Server."
  ::= { tsInfoEntry 4 }


-- ##############################################################################################
-- T-Server Calls Table
-- ##############################################################################################

tsCallTable OBJECT-TYPE
  SYNTAX SEQUENCE OF TsCallEntry
  MAX-ACCESS not-accessible
  STATUS     current
  DESCRIPTION
    " A collection of telephony calls data for one or more
      T-Server (for which an entry has been created in the
      tsControlTable). "
```

```
  ::= { tServer 2 }

tsCallEntry OBJECT-TYPE
  SYNTAX     TsCallEntry
  MAX-ACCESS not-accessible
  STATUS     current
  DESCRIPTION
    "A conceptual row in the tsCalls table.

     The gsCtrlServerID identifies a managed TServer, and along with the TableID (6),
     identifies a row in the gServerControlTable on which behalf this entry was created.

     The tsCallInstanceID is the call instance ID assigned by the management library.

     An example of the indexing of this entry is
     tsCallType.101.1508, where 101 is the server ID and 1508 is the call instance ID."

  INDEX {gsCtrlServerID, callInstanceID }
  ::= { tsCallTable 1 }

TsCallEntry ::= SEQUENCE
{
  callInstanceID            Unsigned32,
  callConnID                DisplayString,
  callState                 INTEGER,
  callCallID                Unsigned32,
  callType                  INTEGER,
  callReferenceID           Unsigned32,
  callTimeStamp             TimeTicks,
  callDNIS                  DisplayString,
  callANI                   DisplayString,
  callNumParties            Unsigned32,
  callPartiesList           DisplayString,
  callCustomerID            DisplayString,
  callFirstTransferLocation DisplayString,
  callFirstTransferDN       DisplayString,
  callLastTransferLocation  DisplayString,
  callLastTransferDN        DisplayString
}

callInstanceID OBJECT-TYPE
  SYNTAX     Unsigned32
  MAX-ACCESS not-accessible
  STATUS     current
  DESCRIPTION
    "Specifies number of instance of call."
  ::= { tsCallEntry 1 }

callConnID OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
```

```
  STATUS      current
  DESCRIPTION
     "Specifies ID assigned to call by TServer."
  ::= { tsCallEntry 2 }

callState OBJECT-TYPE
  SYNTAX INTEGER
  {
    stateOk(0),
    stateTransferred(1),
    stateConferenced(2),
    stateGeneralError(3),
    stateSystemError(4),
    stateRemoteRelease(5),
    stateBusy(6),
    stateNoAnswer(7),
    stateSitDetected(8),
    stateAnsweringMachineDetected(9),
    stateAllTrunksBusy(10),
    stateSitInvalidnum(11),
    stateSitVacant(12),
    stateSitIntercept(13),
    stateSitUnknown(14),
    stateSitNocircuit(15),
    stateSitReorder(16),
    stateFaxDetected(17),
    stateQueueFull(18),
    stateCleared(19),
    stateOverflowed(20),
    stateAbandoned(21),
    stateRedirected(22),
    stateForwarded(23),
    stateConsult(24),
    statePickedup(25),
    stateDropped(26),
    stateDroppednoanswer(27),
    stateUnknown(28)
}

  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies call state."
  ::= { tsCallEntry 3 }

callCallID OBJECT-TYPE
  SYNTAX      Unsigned32
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies ID assigned to call by switch."
```

```
  ::= { tsCallEntry 4 }

callType OBJECT-TYPE
  SYNTAX INTEGER
  {
    typeUnknown(0),
    typeInternal(1),
    typeInbound(2),
    typeOutbound(3),
    typeConsult(4)
   }
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies call type."
  ::= { tsCallEntry 5 }

callReferenceID OBJECT-TYPE
  SYNTAX      Unsigned32
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies call reference ID."
  ::= { tsCallEntry 6 }

callTimeStamp OBJECT-TYPE
  SYNTAX      TimeTicks
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies the timestamp when the call was created, in seconds starting from January
   1, 1970."
  ::= { tsCallEntry 7 }

callDNIS OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies DNIS field in call structure."
  ::= { tsCallEntry 8 }

callANI OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies ANI field in call structure."
  ::= { tsCallEntry 9 }

callNumParties OBJECT-TYPE
```

```
  SYNTAX      Unsigned32
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies number of parties currently participating in call."
  ::= { tsCallEntry 10 }

callPartiesList OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies list of parties involved in call."
  ::= { tsCallEntry 11 }

callCustomerID OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies customer id field in call structure."
  ::= { tsCallEntry 12 }

callFirstTransferLocation OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies location of T-Server which first transfer has been made from."
  ::= { tsCallEntry 13 }

callFirstTransferDN OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies DN on remote T-Server which first transfer has been made from."
  ::= { tsCallEntry 14 }

callLastTransferLocation OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies location of T-Server which last transfer has been made from."
  ::= { tsCallEntry 15 }

callLastTransferDN OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
```

```
  DESCRIPTION
    "Specifies DN on remote T-Server which last transfer has been made from."
  ::= { tsCallEntry 16 }


-- ##############################################################################
-- T-Server Dta Table
-- ##############################################################################

tsDtaTable OBJECT-TYPE
  SYNTAX SEQUENCE OF TsDtaEntry
  MAX-ACCESS not-accessible
  STATUScurrent
  DESCRIPTION
    "A collection of telephony calls data for one or more
     T-Server (for which an entry has been created in the
     tsControlTable). "
  ::= { tServer 3 }

tsDtaEntry OBJECT-TYPE
  SYNTAX     TsDtaEntry
  MAX-ACCESS not-accessible
  STATUS     current
  DESCRIPTION
    "A conceptual row in the tsDtaTable.
     The gsCtrlServerID identifies the manager on whose behalf this entry was created.
     The tsDtaInstanceID value in the index identifies the call instance
     assigned by the management library to this Dta instance.
     An example of the indexing of this entry is
     tsDtaDigits.1.134, where 1 is the index to to control table and 134 is the instance
   of dta."
  INDEX {gsCtrlServerID, tsDtaInstanceID }
  ::= { tsDtaTable 1 }

TsDtaEntry ::= SEQUENCE
{
  tsDtaInstanceID Unsigned32,
  tsDtaDigits     DisplayString,
  tsDtaMode       INTEGER,
  tsDtaState      INTEGER,
  tsDtaType       DisplayString
}

tsDtaInstanceID OBJECT-TYPE
  SYNTAX      Unsigned32
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    "Specifies instance field in dta structure."
  ::= { tsDtaEntry 1 }
```

```
tsDtaDigits OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies digits field dta structure."
  ::= { tsDtaEntry 2 }

tsDtaMode OBJECT-TYPE
  SYNTAX INTEGER
  {
    modeShared(0),
    modePrivate(1),
    modeMonitor(2),
    modeUnknown(3)
  }
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies mode field in dta structure."
  ::= { tsDtaEntry 3 }

tsDtaState OBJECT-TYPE
  SYNTAX INTEGER
  {
    stateIdle(0),
    stateNonIdle(1)
  }
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies state field in dta structure."
  ::= { tsDtaEntry 4 }

tsDtaType OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies type field in dta structure."
  ::= { tsDtaEntry 5 }


-- ##############################################
-- T-Server Link Table
-- ##############################################

tsLinkTable OBJECT-TYPE
  SYNTAX SEQUENCE OF TsLinkEntry
  MAX-ACCESS not-accessible
  STATUScurrent
```

```
  DESCRIPTION
    " A collection of CTI link data."
 ::= { tServer 4 }

tsLinkEntry OBJECT-TYPE
  SYNTAX TsLinkEntry
  MAX-ACCESS not-accessible
  STATUS    current
  DESCRIPTION
    "A conceptual row in the tsLink table.
     The gsCtrlServerID identifies the manager on whose behalf this entry was created.
     The tsLinkID value in the index identifies the call instance
     assigned by the management library.
     An example of the indexing of this entry is
     tsLinkProtocol.9.2, where 9 is the index to the control table and 2 is the link
   id."
  INDEX {gsCtrlServerID, tsLinkID}
  ::= { tsLinkTable 1 }

TsLinkEntry ::= SEQUENCE
{
  tsLinkID              Unsigned32,
  tsLinkName            DisplayString,
  tsLinkStatus          INTEGER,
  tsLinkProtocol        INTEGER,
  tsLinkSocket          Unsigned32,
  tsLinkPID             Unsigned32,
  tsLinkDelay           Unsigned32,
  tsLinkPort            Unsigned32,
  tsLinkAddress         DisplayString,
  tsLinkX25LocalAddress DisplayString,
  tsLinkMode            Unsigned32,
  tsLinkX25Device       DisplayString,
  tsLinkDTEClass        DisplayString,
  tsLinkTemplate        DisplayString
}

tsLinkID OBJECT-TYPE
  SYNTAX      Unsigned32
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    "Specifies link identificator."
  ::= { tsLinkEntry 1 }

tsLinkName OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies link name."
```

```
  ::= { tsLinkEntry 2 }

tsLinkStatus OBJECT-TYPE
  SYNTAX INTEGER
  {
    statusNone(0),
    statusIdle(1),
    statusUp(2),
    statusDown(3),
    statusUnknown(4)
  }
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies link current status."
  ::= { tsLinkEntry 3 }

tsLinkProtocol OBJECT-TYPE
  SYNTAX INTEGER
  {
    protoX25(0),
    protoTCPIP(1),
    protoX25server(2),
    protoTCPIPdebug(3),
    protoUnknown(4)
  }
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies protocol type."
  ::= { tsLinkEntry 4 }

tsLinkSocket OBJECT-TYPE
  SYNTAX      Unsigned32
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
  "Specifies socket number through which server connected to link."
  ::= { tsLinkEntry 5 }

tsLinkPID OBJECT-TYPE
  SYNTAX      Unsigned32
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies link process ID."
  ::= { tsLinkEntry 6 }

tsLinkDelay OBJECT-TYPE
  SYNTAX      Unsigned32
  MAX-ACCESS  read-only
```

```
  STATUS      current
  DESCRIPTION
    "Specifies delay."
  ::= { tsLinkEntry 7 }

tsLinkPort OBJECT-TYPE
  SYNTAX      Unsigned32
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies link physical port number."
  ::= { tsLinkEntry 8 }

tsLinkAddress OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies link address."
  ::= { tsLinkEntry 9 }

tsLinkX25LocalAddress OBJECT-TYPE
  SYNTAX     DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies local address for x25 connection."
  ::= { tsLinkEntry 10 }

tsLinkMode OBJECT-TYPE
  SYNTAX      Unsigned32
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies mode."
  ::= { tsLinkEntry 11 }

tsLinkX25Device OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies x25 device."
  ::= { tsLinkEntry 12 }

tsLinkDTEClass OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies DTE class for x25 connection."
```

```
  ::= { tsLinkEntry 13 }

tsLinkTemplate OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specifies template."
    ::= { tsLinkEntry 14 }


-- ##############################################
-- T-Server Call Filter Table
-- ##############################################

tsCallFilterTable OBJECT-TYPE
  SYNTAX SEQUENCE OF TsCallFilterEntry
  MAX-ACCESS not-accessible
  STATUS     current
  DESCRIPTION
    " A collection of CallFilter data."
 ::= { tServer 5 }

tsCallFilterEntry OBJECT-TYPE
  SYNTAX TsCallFilterEntry
  MAX-ACCESS not-accessible
  STATUS     current
  DESCRIPTION
    "A conceptual row in the tsCallFilter table.

     tsCallFilterTable and tsCallInfoTable introduced to facilitate the discovery of
   stuck calls.

     gsCtrlServerID identifies a managed TServer, and along with TableID (9),
     identifies a row in the gServerControlTable on which behalf this entry was
     created.

     An example of the indexing of this entry is
     fltCallUpdatedBefore.101, where 101 is the server ID.

     This table is used to set filtering criteria for the tsCallInfoTabe and provides
     the interface for clearing call by Connection ID."
  INDEX {gsCtrlServerID }
  ::= { tsCallFilterTable 1 }

TsCallFilterEntry ::= SEQUENCE
{
  fltCallCreatedBefore  Unsigned32,
  fltCallCreatedAfter   Unsigned32,
  fltCallUpdatedBefore  Unsigned32,
  fltCallUpdatedAfter   Unsigned32,
```

```
  fltClearCallByConnId  DisplayString
}

fltCallCreatedBefore OBJECT-TYPE
  SYNTAX      Unsigned32
  MAX-ACCESS  read-write
  STATUS      current
  DESCRIPTION
    "Filters calls reported via tsCallInfoTable to those created more than
     specified number of seconds before the request to get information.
     Zero value means filter is not used."
  ::= { tsCallFilterEntry 1 }

fltCallCreatedAfter OBJECT-TYPE
  SYNTAX      Unsigned32
  MAX-ACCESS  read-write
  STATUS      current
  DESCRIPTION
    "Filters reported calls to those created less than specified number of
     seconds before the request."
  ::= { tsCallFilterEntry 2 }

fltCallUpdatedBefore OBJECT-TYPE
  SYNTAX      Unsigned32
  MAX-ACCESS  read-write
  STATUS      current
  DESCRIPTION
    "Filters calls reported to those updated more than specified number of
     seconds before the request to get information."
  ::= { tsCallFilterEntry 3 }

fltCallUpdatedAfter OBJECT-TYPE
  SYNTAX      Unsigned32
  MAX-ACCESS  read-write
  STATUS      current
  DESCRIPTION
    "Filters calls reported to those updated less than specified number of
     seconds before the request to get information."
  ::= { tsCallFilterEntry 4 }

fltClearCallByConnId OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-write
  STATUS      current
  DESCRIPTION
    "Connection ID (converted to string by connid_to_str function) of the call
     to be cleared."
  ::= { tsCallFilterEntry 5 }

-- ##############################################
-- T-Server Call Info Table
```

```
-- ##############################################

tsCallInfoTable OBJECT-TYPE
  SYNTAX SEQUENCE OF TsCallInfoEntry
  MAX-ACCESS not-accessible
  STATUS     current
  DESCRIPTION
    " A collection of CallInfo data."
 ::= { tServer 6 }

tsCallInfoEntry OBJECT-TYPE
  SYNTAX     TsCallInfoEntry
  MAX-ACCESS not-accessible
  STATUS     current
  DESCRIPTION
    "A conceptual row in the tsCallFilter table.

     gsCtrlServerID identifies a managed TServer, and along with the TableID of this
     table (10), identifies a row in the gServerControlTable on which behalf this entry
   was
     created.

     The tsCallFilterID value in the index identifies the call instance
     assigned by the management library.

     An example of the indexing of this entry is
     callLastUpdatedTimemark.101.5510, where 101 is the server ID and 5510 is the call
   instance
     ID as assigned by the management library.

     This table stores the latest snapshot of active calls from a given T-Server.
     Contains a set of attributes that facilitates the discovery of stuck calls."
  INDEX { gsCtrlServerID, callInfoInstanceID }
  ::= { tsCallInfoTable 1 }

TsCallInfoEntry ::= SEQUENCE
{
  callInfoInstanceID            Unsigned32,
  callInfoConnID                DisplayString,
  callInfoType                  INTEGER,
  callInfoCreationTimestamp     Unsigned32,
  callInfoLastUpdatedTimestamp  Unsigned32,
  callInfoInternalParties       DisplayString
}

callInfoInstanceID OBJECT-TYPE
  SYNTAX      Unsigned32
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    "Call instance ID."
```

```
  ::= { tsCallInfoEntry 1 }

callInfoConnID OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
     "Specifies ID assigned to call by TServer."
  ::= { tsCallInfoEntry 2 }

callInfoType OBJECT-TYPE
  SYNTAX INTEGER
  {
    typeUnknown(0),
    typeInternal(1),
    typeInbound(2),
    typeOutbound(3),
    typeConsult(4)
  }
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Specified call type."
  ::= { tsCallInfoEntry 3 }

callInfoCreationTimestamp OBJECT-TYPE
  SYNTAX      Unsigned32
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Call creation timestamp - seconds since Epoch as returned by time()
     system function.
     The epoch on most UNIX and POSIX systems is 1970-01-01 00:00:00 UTC."
  ::= { tsCallInfoEntry 4 }

callInfoLastUpdatedTimestamp OBJECT-TYPE
  SYNTAX      Unsigned32
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Call info last updated timestamp - seconds since Epoch as returned by
     time() system function.
     The epoch on most UNIX and POSIX systems is 1970-01-01 00:00:00 UTC."
  ::= { tsCallInfoEntry 5 }

callInfoInternalParties OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
```

```
    "Internal DN where the call is believed to be located; in case of multiple
     internal parties, all of them are merged into one string, separated by the
     '\n' (new line) character."
  ::= { tsCallInfoEntry 6 }


-- ##############################################################################
-- Hosts
-- ##############################################################################

hostsTable OBJECT-TYPE
  SYNTAX SEQUENCE OF HostsEntry
  MAX-ACCESS not-accessible
  STATUS current
  DESCRIPTION
    " "
  ::= { hosts 1 }

hostsEntry OBJECT-TYPE
  SYNTAX      HostsEntry
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    " "
  INDEX { hostId }
  ::= { hostsTable 1 }

HostsEntry ::= SEQUENCE
{
  hostId              HostDBID,
  hostName            DisplayString,
  hostStatus          DisplayString,
  hostIPAddress       IpAddress,
  hostOSType          DisplayString,
  hostLCAPort         Unsigned32
}

hostId OBJECT-TYPE
  SYNTAX      HostDBID
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    " "
  ::= { hostsEntry 1 }

hostName OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    " "
```

```
  ::= { hostsEntry 2 }


hostStatus OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    " "
  ::= { hostsEntry 3 }

hostIPAddress OBJECT-TYPE
  SYNTAX      IpAddress
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    " "
  ::= { hostsEntry 4 }

hostOSType OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    " "
  ::= { hostsEntry 5 }

hostLCAPort OBJECT-TYPE
  SYNTAX      Unsigned32
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    " "
  ::= { hostsEntry 6 }



-- ##############################################################################
-- Solutions
-- ##############################################################################

solutionsTable OBJECT-TYPE
  SYNTAX SEQUENCE OF SolutionsEntry
  MAX-ACCESS not-accessible
  STATUS current
  DESCRIPTION
    " "
  ::= { solutions 1 }

solutionsEntry OBJECT-TYPE
  SYNTAX      SolutionsEntry
```

```
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    " "
  INDEX { solutionId }
  ::= { solutionsTable 1 }

SolutionsEntry ::= SEQUENCE
{
  solutionId              SolutionDBID,
  solutionName            DisplayString,
  solutionType            DisplayString,
  solutionStatus          DisplayString,
  solutionControlServer   DisplayString
}

solutionId OBJECT-TYPE
  SYNTAX      SolutionDBID
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    " "
  ::= { solutionsEntry 1 }

solutionName OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    " "
  ::= { solutionsEntry 2 }

solutionType OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    " "
  ::= { solutionsEntry 3 }

solutionStatus OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    " "
  ::= { solutionsEntry 4 }

solutionControlServer OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
```

```
  STATUS      current
  DESCRIPTION
    "Name of the Solution Control Server application that controls this solution."
  ::= { solutionsEntry 5 }

--
-- Solution components
--

solutionsComponentsTable OBJECT-TYPE
  SYNTAX SEQUENCE OF SolutionsComponentsEntry
  MAX-ACCESS not-accessible
  STATUS current
  DESCRIPTION
    " "
  ::= { solutions 2 }

solutionsComponentsEntry OBJECT-TYPE
  SYNTAX      SolutionsComponentsEntry
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    " "
  INDEX { solutionId, componentId }
  ::= { solutionsComponentsTable 1 }

SolutionsComponentsEntry ::= SEQUENCE
{
  componentId             ServerDBID,
  componentName           DisplayString
}

componentId OBJECT-TYPE
  SYNTAX      ServerDBID
  MAX-ACCESS  not-accessible
  STATUS      current
  DESCRIPTION
    "Uniquely identifies a server that is part of this particular Solution."
  ::= { solutionsComponentsEntry 1 }

componentName OBJECT-TYPE
  SYNTAX      DisplayString
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "Name of this components."
  ::= { solutionsComponentsEntry 2 }
```

```
--
   ##############################################################################################
   ##
-- Conformance Information
--
   ##############################################################################################
   ##

genesysmibConformance  OBJECT IDENTIFIER ::= { genesys 110 }
genesysmibGroups       OBJECT IDENTIFIER ::= { genesysmibConformance 1 }
genesysmibCompliances  OBJECT IDENTIFIER ::= { genesysmibConformance 2 }

-- Compliance Statements

genesysmibCompliance MODULE-COMPLIANCE
  STATUS current
  DESCRIPTION
    "The compliance statement for SNMPv2 entities."
  MODULE -- this module
  MANDATORY-GROUPS
  {
    gServersListGroup,
    genericServerControlGroup,
    genericServerInfoGroup,
    genericServerLogGroup,
    genericServerPollingGroup,
    genericServerClientGroup,
    tServerInfoGroup,
    tServerCallGroup,
    tServerDtaGroup,
    tServerLinkGroup,
    genericAlarmObjectGroup,
    specificAlarmObjectGroup,
    hostsGroup,
    solutionsGroup,
    solutionsComponentsGroup,
    notificationGroup,
    tServerCallFilterGroup,
    tServerCallInfoGroup
  }
  ::= { genesysmibCompliances 1 }

-- Units of Conformance

gServersListGroup OBJECT-GROUP
  OBJECTS
  {
    gServerName,
    gServerStatus,
    gServerType,
    gServerVersion,
```

```
    gServerWorkDir,
    gServerCommandLine,
    gServerPID, gServerCommand,
    gServerDeleteClient
  }
  STATUS current
  DESCRIPTION
    "A collection of objects providing information about Genesys managed servers."
  ::= { genesysmibGroups 1 }

genericServerControlGroup OBJECT-GROUP
  OBJECTS
  {
    gsCleanupTimeout,
    gsCtrlRefreshStatus,
    gsCtrlLastRefreshed,
    gsCtrlAutomaticRefresh,
    gsCtrlRowStatus
  }
  STATUS current
  DESCRIPTION
    " "
  ::= { genesysmibGroups 2 }

genericServerInfoGroup OBJECT-GROUP
  OBJECTS
  {
    gsClientsExistNum,
    gsClientsTotalNum,
    gsServerConfigFile
  }
  STATUS current
  DESCRIPTION
    " "
  ::= { genesysmibGroups 3 }

genericServerLogGroup OBJECT-GROUP
  OBJECTS
  {
    logVerbose,
    logTrace,
    logStandard,
    logDebug,
    logAll,
    logBuffering,
    logSegment,
    logExpire,
    logMessageFile,
    logMessageFormat,
    logTimeFormat,
    logTimeConvert
```

```
  }
  STATUS current
  DESCRIPTION
    " "
  ::= { genesysmibGroups 4 }


genericServerPollingGroup OBJECT-GROUP
  OBJECTS
  {
    gsPollingStatus,
    gsPollingInterval,
    gsPollingID,
    gsPollingLastTrap
  }
  STATUS current
  DESCRIPTION
    " "
  ::= { genesysmibGroups 5 }

genericServerClientGroup OBJECT-GROUP
  OBJECTS
  {
    gsClientAppName,
    gsClientAuthorized,
    gsClientType,
    gsClientGotEvents,
    gsClientSentReqs
  }
  STATUS current
  DESCRIPTION
    " "
  ::= { genesysmibGroups 6 }


tServerInfoGroup OBJECT-GROUP
  OBJECTS
  {
    tsCallsExistNum,
    tsCallsTotalNum,
    tsLinksCommand,
    tsLastChangedLinkStatus
  }
  STATUS current
  DESCRIPTION
    " "
  ::= { genesysmibGroups 7 }

tServerCallGroup OBJECT-GROUP
  OBJECTS
  {
```

```
    callConnID,
    callState,
    callCallID,
    callType,
    callReferenceID,
    callTimeStamp,
    callDNIS,
    callANI,
    callNumParties,
    callPartiesList,
    callCustomerID,
    callFirstTransferLocation,
    callFirstTransferDN,
    callLastTransferLocation,
    callLastTransferDN
  }
  STATUS current
  DESCRIPTION
    " "
  ::= { genesysmibGroups 8 }

tServerDtaGroup OBJECT-GROUP
  OBJECTS
  {
    tsDtaDigits,
    tsDtaMode,
    tsDtaState,
    tsDtaType
  }
  STATUS current
  DESCRIPTION
    " "
  ::= { genesysmibGroups 9 }

tServerLinkGroup OBJECT-GROUP
  OBJECTS
  {
    tsLinkName,
    tsLinkStatus,
    tsLinkProtocol,
    tsLinkSocket,
    tsLinkPID,
    tsLinkDelay,
    tsLinkPort,
    tsLinkAddress,
    tsLinkX25LocalAddress,
    tsLinkMode,
    tsLinkX25Device,
    tsLinkDTEClass,
    tsLinkTemplate
  }
```

```
  STATUS current
  DESCRIPTION
    " "
  ::= { genesysmibGroups 10 }


genericAlarmObjectGroup OBJECT-GROUP
  OBJECTS
  {
    gsAlarmId,
    gsAlarmLogText,
    gsAlarmMessagesIds,
    gsAlarmApplicationName,
    gsAlarmApplicationType,
    gsAlarmCategory,
    gsServersLastAlarm,
    gsServersLastTrap,
    gsAlarmAppHostName,
    gsAlarmGUID
  }
  STATUS current
  DESCRIPTION
    " "
  ::= { genesysmibGroups 11 }

specificAlarmObjectGroup OBJECT-GROUP
  OBJECTS
  {
    tsLastChangedLinkStatus
  }
  STATUS current
  DESCRIPTION
    " "
  ::= { genesysmibGroups 12 }

hostsGroup OBJECT-GROUP
  OBJECTS
  {
    hostName,
    hostStatus,
    hostIPAddress,
    hostOSType,
    hostLCAPort
  }
  STATUS current
  DESCRIPTION
    " "
  ::= { genesysmibGroups 13 }

solutionsGroup OBJECT-GROUP
  OBJECTS
```

```
  {
    solutionName,
    solutionType,
    solutionStatus,
    solutionControlServer
  }
  STATUS current
  DESCRIPTION
    " "
  ::= { genesysmibGroups 14 }

solutionsComponentsGroup OBJECT-GROUP
  OBJECTS
  {
    componentName
  }
  STATUS current
  DESCRIPTION
    " "
  ::= { genesysmibGroups 15 }

notificationGroup NOTIFICATION-GROUP
  NOTIFICATIONS
  {
    gsAlarm,
    gsMLAlarm,
    gsServerUpTrap,
    gsServerDownTrap,
    gsPollingSignal,
    tsLinkStatusTrap
  }
  STATUS current
  DESCRIPTION
    "List of notifications generated by ML SNMP agent."
  ::= { genesysmibGroups  16 }

tServerCallFilterGroup OBJECT-GROUP
  OBJECTS
  {
    fltCallCreatedBefore,
    fltCallCreatedAfter,
    fltCallUpdatedBefore,
    fltCallUpdatedAfter,
    fltClearCallByConnId
  }
  STATUS current
  DESCRIPTION
    " "
  ::= { genesysmibGroups 17 }

tServerCallInfoGroup OBJECT-GROUP
```

```
  OBJECTS
  {
    callInfoConnID,
    callInfoType,
    callInfoCreationTimestamp,
    callInfoLastUpdatedTimestamp,
    callInfoInternalParties
  }
  STATUS current
  DESCRIPTION
    " "
  ::= { genesysmibGroups 18 }

END
```

Appendix

B Changes in MIB File

This appendix lists the differences in Genesys Management Information Base (MIB) files between releases. It contains the following sections:

Changes from 7.5 to 7.6

There are no changes in the Genesys MIB file in release 7.6.

Changes from 7.1 to 7.5

There are no changes in the Genesys MIB file in release 7.5.

Changes from 7.0 to 7.1

Release 7.1 supports the new stuck calls functionality with new tables and an extended SNMP trap.

Two new MIB tables were added to manage stuck calls via SNMP: `tsCallFilterTable` and `tsCallInfoTable`.

- `tsCallFilterTable` filters calls to reduce network traffic and increase application performance when monitoring T-Servers via SNMP to identify stuck calls.

`tsCallFilterTable` also provides the interface for clearing a call by the call's Connection ID. See Chapter 7, "The tsCallFilterTable" on page 101.

- `tsCallInfoTable supports this function` with information about active calls filtered by conditions set in `tsCallFilterTable`. See Chapter 7, "The tsCallnfoTable Table" on page 102.

Note: The new filters do not apply in any way to the old `tsCallTable`.

The SNMP trap gsMLAlarm was extended.

- Starting with 7.1.0, this trap includes the host name and the Alarm GUID in the trap's variable-binding list. These are new attributes added to the set of existing attributes.
- You can use the Alarm GUID to match alarm clearance traps to alarm creation traps.

Changes from 6.5 to 7.0

In release 7.0, the Genesys MIB (Management Information Base) file was extended. This change offers you the following new functionality through the SNMP (Simple Network Management Protocol) interface:

- You can now monitor multiple servers simultaneously. The change in the MIB file also offers the possibility of configurable and selective data retrieval from multiple servers.
- You can now monitor the status of additional objects, including Solutions (a given list of Solutions) and Hosts (a list of Hosts, including the Host name, IP address, status, and operating system).
- With release 7.0.1, you can enable an automatic refresh of MIB tables.

In releases 7.0, Genesys MIB uses the SMI-v2 Row-Status mechanism and control/data tables concept to facilitate management of multiple Genesys servers simultaneously.

Changes from 5.1 to 6.5

Table 23 on page 215 describes changes made to the Genesys MIB file when SNMP Option 5.1 was replaced with built-in SNMP (Simple Network Management Protocol) support in the Management Layer 6.5 releases.

Table 23: MIB File Changes Between Release 5.1 and 6.5

Object Name	Object Group	Value Type	Access	Type of Change	Details
gpServersRefreshData	gpServers	integer	read/ write	Added[a]	
gpServerCommandLine	gpServer	string	read	Added	
gpLogCheckInterval	gpLog	integer	read/ write	Removed	
gpLogFileName	gpLog	string	read/ write	Removed	
gpLogFileSize	gpLog	integer	read/ write	Removed	
gpLogLevel	gpLog	integer	read/ write	Removed	
gpLogRemOldFiles	gpLog	string	read/ write	Removed	
gpLogStatus	gpLog	string	read/ write	Removed	
logVerbose	gpLog	string	read/ write	Added	
logTrace	gpLog	string	read/ write	Added	
logStandard	gpLog	string	read/ write	Added	
logDebug	gpLog	string	read/ write	Added	
logAll	gpLog	string	read/ write	Added	
logBuffering	gpLog	string	read/ write	Added	
logSegment	gpLog	string	read/ write	Added	
logExpire	gpLog	string	read/ write	Added	

Table 23: MIB File Changes Between Release 5.1 and 6.5 (Continued)

Object Name	Object Group	Value Type	Access	Type of Change	Details
logMessageFile	gpLog	string	read/ write	Added	
logMessageFormat	gpLog	string	read/ write	Added	
				Renamed[a]	New name: logMessageFormat Old name: logMessage_format
logTimeFormat	gpLog	string	read/ write	Added	
				Renamed[a]	New name: logTimeFormat Old name: logTime_format
logTimeConvert	gpLog	string	read/ write	Added	
				Renamed[a]	New name: logTimeConvert Old name: logTime_convert
smlAlarmID	gSmlAlarms	integer	read	Added	Was available with the earlier SNMP implementation in the Management Layer 6.x, but was not a part of SNMP Option 5.1.
smlAlarmLogText	gSmlAlarms	string	read	Added	
smlMessagesIds	gSmlAlarms	string	read	Added	
smlAlarmApplication-Name	gSmlAlarms	string	read	Added	
smlAlarmApplication-Type	gSmlAlarms	string	read	Added	
smlAlarmCategory	gSmlAlarms	string	read	Added	

a. Refer to Release Notes for Solution Control Server and/or Genesys SNMP Master Agent for the exact number of the release in which the change was made.

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