Oracle® Communications LSMS

Alarms and Maintenance Guide

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Introduction

This chapter contains general information, such as an overview of the manual, how the manual is organized, and how to get technical assistance.

Overview

This manual contains the information necessary for system administration of Oracle Communications LSMS. Included are an overview of the **LSMS** design, routine operation procedures, preventive maintenance techniques, corrective maintenance procedures, and appendixes that describe LSMS commands and notifications.

Scope and Audience

This manual is written for system administrators of the **LSMS**. The manual provides routine operating procedures as well as preventive and corrective procedures that aid administrators maintaining the **LSMS**.

- *Preventive maintenance* procedures are routines implemented on a scheduled basis to help prevent system faults. These tasks are industry standard recommendations and are adaptable to any company's maintenance plan.
- *Corrective maintenance* procedures are those used in response to a system alarm or output message. These procedures are **LSMS**-specific and aid in the detection, isolation, and repair of faults.

The manual assumes the system administrator is familiar with the Linux operating system.

Documentation Admonishments

Admonishments are icons and text throughout this manual that alert the reader to assure personal safety, to minimize possible service interruptions, and to warn of the potential for equipment damage.

Table 1-1 Admonishments

Icon	Description
DANGER	Danger: (This icon and text indicate the possibility of *personal injury*.)
WARNING	Warning: (This icon and text indicate the possibility of *equipment damage*.)

Table 1-1 (Cont.) Admonishments

Icon	Description
⚠ CAUTION	Caution: (This icon and text indicate the possibility of *service interruption*.)
⚠ TOPPLE	Topple: (This icon and text indicate the possibility of *personal injury* and *equipment damage*.)

Manual Organization

The manual contains the following chapters:

- Introduction contains general information about the organization of the manual, how to get technical assistance, and a description of the **LSMS** document suite.
- LSMS Overview provides a high-level overview of the **LSMS** hardware and software design for high availability and an overview of software components.
- Routine Procedures explains the routine procedures that system administrators regularly perform, such as establishing remote logins, setting the system clock, and managing user accounts.
- Preventive Maintenance explains preventive maintenance topics, such as the **LSMS** preventive maintenance schedule, backup procedures, routine cleaning, and monitoring the hardware and network.
- Restarting Software Processes explains how to verify whether software processes are running and how software processes can be automatically or manually restarted.
- Managing Server States describes how automatic switchover occurs for certain failure conditions and how to manually manage the states of the primary and secondary servers.
- Recovering from Site Failures describes and compares various backup strategies for disaster situations in which an entire **LSMS** site can no longer function. This chapter describes how to prepare for disaster recovery and, for each disaster recovery strategy, describes the recovery procedures and a list of assumptions.
- Verifying Recovery describes the processes used to verify that recovery is acceptable after recovering from site failures.
- Field Replaceable Units describes the components of an E5-APP-B card that can be replaced in the field and includes procedures for replacing each type of field replaceable unit (FRU).
- Commands describes the purpose and syntax for all **LSMS** commands and provides sample output for each.
- Automatic Monitoring of Events describes how the **LSMS** automatically monitors itself for certain events, including error conditions, and reports those events with graphical user interface (**GUI**) notifications, Surveillance notifications, and/or traps sent to a remote monitoring device. This appendix lists all events in numerical order and provides explanations and suggested recovery for each event.

- Downloading Files from an NPAC to the LSMS contains the prerequisite information and procedure needed for downloading files from Number Portability Administration Centers (NPACs). One example for using this procedure is when all the files for an entire regional database need to be downloaded as part of recovering after a site failure.
- Worksheets contains blank worksheets that you can copy and use in the procedures described in other chapters.
- Query Server Maintenance Procedures contains detailed, step-by-step procedures for maintaining the Oracle Communications LSMS Query Server (LSMS Query Server).

Related Publications

For information about additional publications related to this document, refer to the Oracle Help Center site. See Locate Product Documentation on the Oracle Help Center Site for more information on related product publications.

Locate Product Documentation on the Oracle Help Center Site

Oracle Communications customer documentation is available on the web at the Oracle Help Center (OHC) site, http://docs.oracle.com. You do not have to register to access these documents. Viewing these files requires Adobe Acrobat Reader, which can be downloaded at http://www.adobe.com.

1. Access the Oracle Help Center site at http://docs.oracle.com.
2. Click `Industries`.
3. Under the Oracle Communications subheading, click the `Oracle Communications documentation` link.

   The Communications Documentation page appears. Most products covered by these documentation sets will appear under the headings "Network Session Delivery and Control Infrastructure" or "Platforms."
4. Click on your Product and then the Release Number.

   A list of the entire documentation set for the selected product and release appears.
5. To download a file to your location, right-click the `PDF` link, select `Save target as` (or similar command based on your browser), and save to a local folder.

2
LSMS Overview

This chapter provides an overview of **LSMS** system architecture, proactive termination and re-establishment of **LSMS** connectivity, hardware and software design features that provide high availability of the **LSMS**, and third-party and Oracle software components used by the **LSMS**.

Introduction

The **LSMS** is a secure and reliable **Local Number Portability** (**LNP**) system that enables customers to administer their **LNP** data in a central place. The **LSMS** provides the following functions:

- Receives **LNP** data from Number Portability Administration Centers (**NPACs**)
- Enables customers to enter locally provisioned data such as Override **Global Title Translation** (**OGTT**) data
- Forwards all **NPAC** and locally provisioned data to up to eight **EAGLE** systems

For more information about the **LNP** functions provided by the **LSMS**, refer to *Database Administrator's Guide* and *LNP Database Synchronization User's Guide*.

This chapter provides an overview of:

- **LSMS** system architecture
- Proactive termination and re-establishment of **LSMS** connectivity
- Hardware and software design features that provide high availability of the **LSMS**
- Third-party and Oracle software components used by the **LSMS**

For additional information about the hardware, refer to *Application B Card Hardware and Installation Guide*.

LSMS Connectivity

The main function of the **LSMS** is to provision **LNP** data through the ELAP to the EAGLE. To perform this task, the **LSMS** maintains active connections with one or more **NPAC** region servers and one or more EAGLE nodes. While it is the goal of the **LSMS** to maintain active connections to each **NPAC** server and EAGLE node as nearly full-time as possible, the more important goal is to reliably forward the data from the **NPAC** to the EAGLE as quickly as possible. To that end, a number of protective problem detection and recovery mechanisms are built into the **LSMS** design. Several of these protections actually allow for the termination of application connectivity in order to gracefully restore full connectivity and guarantee total recovery of data.

The performance of the LSMS is based on network connectivity that meets a Quality of Service expectation. The expectations by Oracle for network Quality of Service are as follows:

- Network RTT latency of <= 70ms and network loss due to network error <= 0.1%

OR

- Network RTT latency of <= 120ms and network loss due to network error <= 0.01%

In the following situations, the **LSMS** proactively terminates and re-establishes application connectivity with the **NPAC** and EAGLE nodes:

- If the **LSMS** detects network level connectivity failures with either the **NPAC** or EAGLE, the respective **LSMS** processes terminate the socket level connection and then reconnect. This disconnect and reconnect occurs in a matter of seconds. Built in resynchronization mechanisms ensure data recovery. The data transmission is delayed by the time required to disconnect and reconnect, but the execution of the recovery procedures prevents data loss.
- If the **LSMS** detects critical internal errors that would cause system outages, the **LSMS** processes are designed to terminate and allow the **LSMS** `sentry` process to restart them. This is only done for significant internal errors that jeopardize internal **LSMS** communications. Once the `sentry` process restarts the **LSMS** processes, resynchronization provides full data recovery.

LSMS Hardware Overview

Table 2-1 provides an overview of **LSMS** hardware.

Table 2-1 LSMS Hardware Components

Qty	Hardware Item	For more detail, see:
2	E5-APP-B-02 cards (P/N 870-3096-02), one for each LSMS server; each card includes the following components: • Dual Core 2.66 Gigahertz (GHz) 64-bit processor • Active/Trial BIOS architecture • 1333 Megahertz (MHz) processor front side bus speed • 8 Gigabyte (GB) DDR2 DRAM • Light Emitting Diode (LED) status display • Hardware monitors that read and report: – Supply and core voltages – Fan alarm inputs – Ambient and processor temperatures • Two drive modules (Field-replaceable units (FRUs)) • Four serial interfaces • One USB port • Fan alarm • Four 1 Gigabit (Gb) Ethernet ports LSMS runs on E5-APP-B cards with Oracle Communications Tekelec Platform (TPD) 7 (64 bit).	*Application B Card Hardware and Installation Guide*
1	E5-APP-B-02 card (P/N 870-3096-02) for Oracle Communications LSMS Network Attached Storage (**NAS**) NAS runs on an E5-APP-B card with TPD 7 (64 bit).	NAS Overview

Table 2-2   LSMS Hardware Components

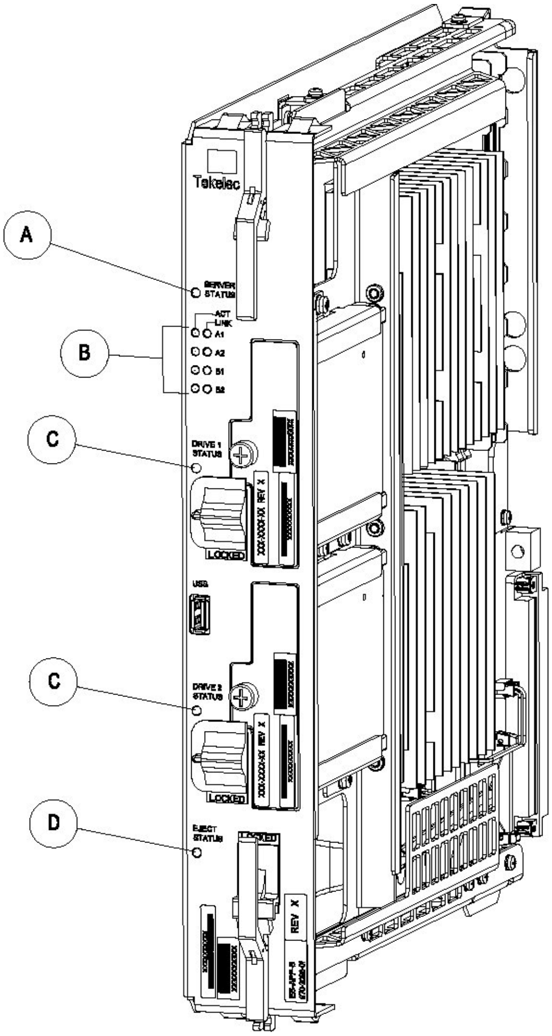
Qty	Hardware Item	For more detail, see:	To replace, see:
2	Tekelec 1100 **AS** main unit; each unit has the following cards added during manufacturing: • One quad-port gigabit Ethernet Peripheral Component Interconnect (**PCI**) cards • Two dual-port gigabit Ethernet **PCI** cards • One Out-of-Band-Management (**OOBM**) **PCI** card that contains: – One serial port – One modem interface – One Ethernet port – One interface for alarm relays Each Tekelec 1100 **AS** main unit has 8 gigabytes of Random Access Memory (**RAM**) installed and available.	*Tekelec 1100* **Application Server** *Hardware Manual*	*Tekelec 1100* **Application Server** *Hardware Manual*
1	Network Attached Storage (**NAS**) 1	#unique_33/ unique_33_Connect_42_35904	Contact the Tekelec Customer Care Center.
1	Breaker panel (for **DC** version only)		*Tekelec 1100* **Application Server** *Hardware Manual*
2	Power Distribution Units (for **AC** version only)	*Tekelec 1100* **Application Server** *Hardware Manual*	*Tekelec 1100* **Application Server** *Hardware Manual*

E5-APP-B Card LEDs

This section describes the LEDs found on the front face of the E5-APP-B card.

Figure 2-1 shows the E5-APP-B card LEDs on the front panel

Figure 2-1   E5-APP-B Card LEDs



The following light-emitting diode (**LED**) status indicators can be found on the E5-APP-B card:

- One Server Status indicator (A)
- Four E-Net link and Active LED status indicators (B)
- Two drive module status indicators (C)
- One Card Eject status indicator (D)

Table 2-3   E5-APP-B LED Table

LED Name	HW/SW Controlled	Description
Server Status	SW	Solid Red - Server is halted Flashing Red - Server is booting Solid Amber - TKLC configuration beginning Solid Green - TPD loaded/operational state Flashing Green - Server is shutting down
Drive 1 Status	SW/HW	HW: Flashing Green - Drive activity SW: Flashing Red - Impending drive removal SW: Steady red - Drive ready for removal
Drive 2 Status	SW/HW	HW: Flashing Green - Drive activity SW: Flashing Red - Impending drive removal SW: Steady red - Drive ready for removal
Eject Status	SW	Red - Card ready for extraction Flashing Red - Card preparing for extraction Off - Card is not ready for extraction
Act LED A1	HW	Flashing Green - Link Activity
Act LED A2	HW	Flashing Green - Link Activity
Act LED B1	HW	Flashing Green - Link Activity
Act LED B2	HW	Flashing Green - Link Activity
Link LED A1	HW	Green - 10/100 Link Speed Amber - 1000 Link Speed
Link LED A2	HW	Green - 10/100 Link Speed Amber - 1000 Link Speed
Link LED B1	HW	Green - 10/100 Link Speed Amber - 1000 Link Speed
Link LED B2	HW	Green - 10/100 Link Speed Amber - 1000 Link Speed

NAS Overview

LSMS uses NAS on E5-APP-B for network backup of the system logs, application logs, and databases.

- Hardware Modifications
  The E5-APP-B NAS uses a two-drive RAID configuration to save the LSMS logs and database. The E5-APP-B NAS uses the TPD 7 OS.
- Keys Exchange
  The key exchange feature provided by TPD is used to exchange keys between LSMS and NAS. This feature facilitates user access to NAS from LSMS and to LSMS from NAS without providing a user ID and password.
- Backup
  Both manual and automatic backup are supported. The LSMS interface is used to initiate the manual backup. The automatic backup is scheduled at 23:55 and cannot be rescheduled. A maximum of 4 backups are retained on NAS.
- Class Type for Storage Data

The class type of data must be known before storing the data. The class type can be defined specific to the server being backed up, or it can be files/data to be backed up on different servers based on the state of the system. For example, 'database' can be used to back up the database regardless of which server is performing the back up. The class types available are:

  - logs
  - DB
  - lsmspri
  - lsmssec
  - logs_lsmspri
  - logs_lsmssec

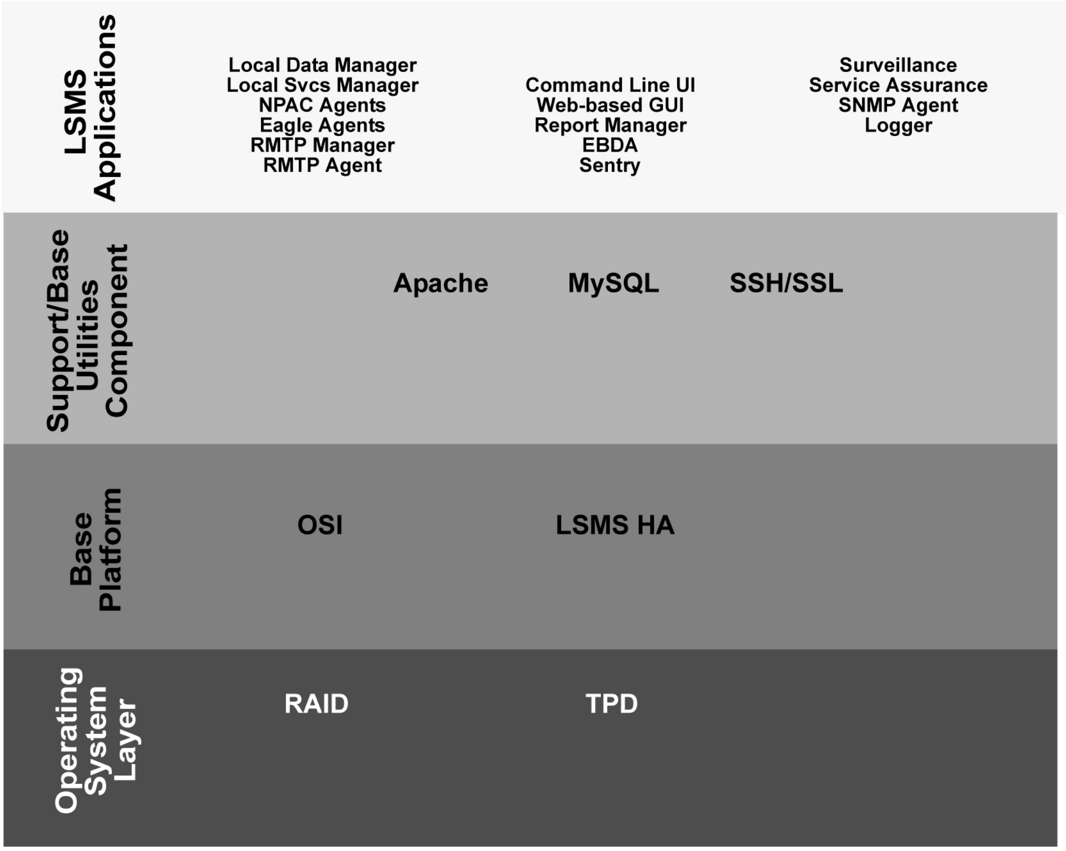
- Restore
  You have the option to restore the backups stored on NAS to LSMS. The restore operation is performed on the LSMS server.
- Alarms
  The NAS sends SNMP traps to LSMS, which in turn raises an alarm on LSMS. Multiple alarms can be raised simultaneously, which are triggered upon failure of a service. The NAS monitors two services:
  - Free space
    The free space service monitors the available space on a mounted device (/ Volumes), and sends an alert when the free space is less than 5%.
  - RAID
    The RAID service monitors RAID set degradation and rebuilds.

  An alarm is cleared when a service makes the state transition from failure to success, if a corresponding alarm was previously sent.
- Login
  After configuring NAS with LSMS, you can log into it by using the `ssh backupserver` command or the `minicom nas` command from the LSMS command line interface.

LSMS Software Overview

Figure 2-2 shows the layered organization of third party and Oracle application software used in the **LSMS** system. For more information about the **LSMS** applications, see LSMS Applications.

Figure 2-2   Software Allocation on the LSMS Platform



Following are descriptions of the various software elements by layer.

Operating System Layer

The following elements appear in the Operating System Layer.

Oracle Communications Tekelec Platform (TPD)

TPD is the operating system used for LSMS on E5-APP-B. The **TPD** software is installed on one internal disk drive and mirrored to a second internal disk for each server.

Redundant Array on Inexpensive Disks (RAID)

The **TPD** uses Linux **RAID** for monitoring disks and recovery from disk problems. **RAID** provides the following benefits:

- Redundancy
- Recoverability from hard-disk crashes

Base Platform Software

Following are the elements of the base platform software.

OSI Stack

This package implements the **OSI** protocol to allow communications between the **LSMS** and the **NPACs**.

LSMS HA

LSMS High Availability (HA) is software for a two-node cluster that provides automated switchover from an active server to a standby server when a server or monitored application experiences a failure. In the **LSMS**, the two servers are peers: either server can act as the active server (although only one server at a time can be the active server). When either automatic or manual switchover causes the standby server to become the active server, it can continue to be the active server until another switchover is needed.

> **Note:**
>
> After switchover, the state of the previously active server is **UNINITIALIZED** "**INHIBITED**". As soon as possible, you need to perform the procedure described in Starting a Server to return the state of that server to **STANDBY** so that it is available when switchover is needed again.

Support/Base Utilities Components

The following elements make up the Support/Base software utilities.

Apache

The Apache process (*httpd*) is a Web server. When the optional **IP** User Interface feature is enabled, theThe Apache process serves the **GUI** based on Java™ 1.7 technology to client browsers.

MySQL

The MySQL 5.6.31 database was selected for the **LNP** database to store all the **LNP** and service provider data. This database consists of a runtime application programming interface (**API**) and data files. The data files are organized as follows:

- One database that stores locally provisioned data
- One database for each supported **NPAC** region
- A resynchronization database that is used for automatic resynchronizations with network elements; this database can store up to one million data objects

Whenever the two **LSMS** servers are in active/standby mode, all databases are replicated between the two servers, with the active server acting as the master and the standby server acting as the slave.

SSH/SSL

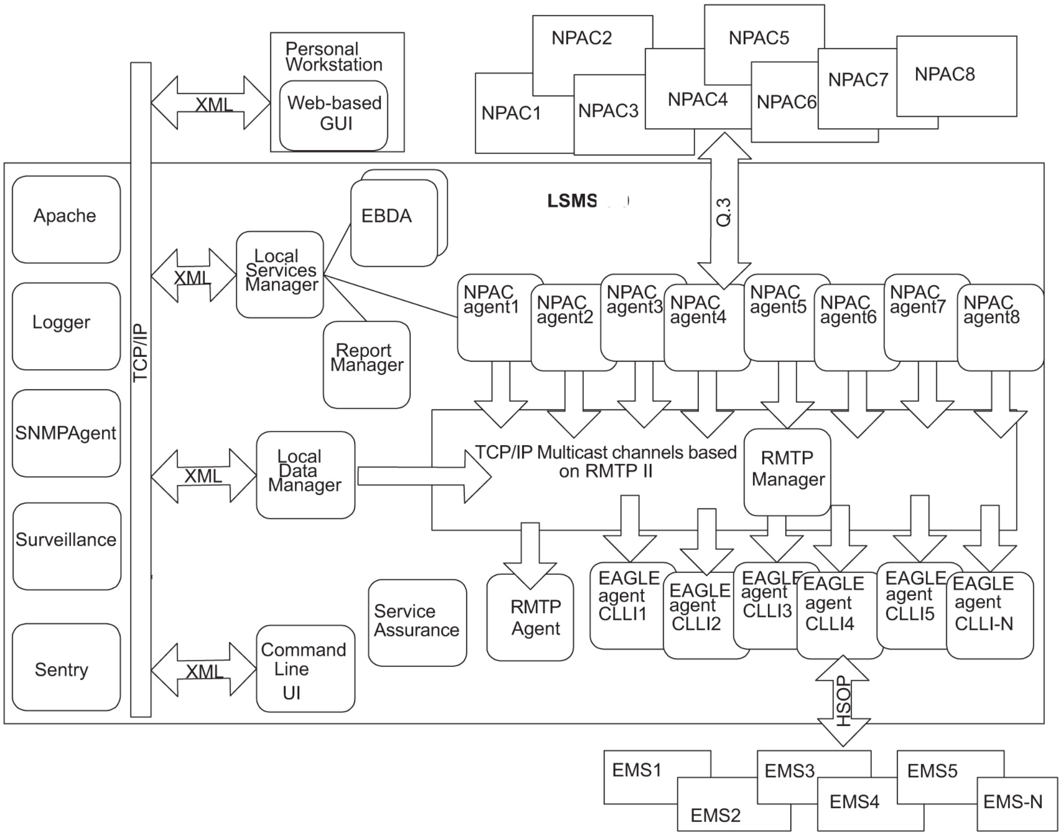
SSH/**SSL** is a robust, commercial-grade, and full-featured toolkit that implements the security and network encryption.

SSH/**SSL** provides secure data transmission through encryption keys. Encryption is required for the connection between the **NPAC** and the **LSMS**. The **LSMS** has a key for each **NPAC** that it services. For more information about keys, refer to the *Configuration Guide*.

LSMS Applications

The **LSMS** applications work together as shown below.

Figure 2-3 LSMS Applications



The **LSMS** applications provide the following functions:

Local Services Manager

The Local Services Manager (`lsman`) is responsible for providing an interface between the Local **GUI** and the web-based **GUIs** and other **LSMS** processes. It acts as a gateway to the GUIs for processes (**EBDA**, Report Manager, and **NPAC** agents) that do not have direct access to the GUI, using Extensible Markup Language (**XML**) messages to communicate.

The Local Services Manager also manages how many users can be running simultaneously. The maximum number of users allowed on the **LSMS** system is eight. A user is defined as a GUI session.

- A local **GUI**
- A web-based **GUI**

- A running *lsmsclaa* application instance. An *lsmsclaa* application instance provides a command-line interface that can be used by a script or by entering commands on a keyboard. For more information, see #unique_35/unique_35_Connect_42_34407 and Overview of LSMS Application Commands Entered at the Command-Line Prompt.

The Support for Additional Users optional feature enables you to have a maximum of 25 simultaneous users.

If you attempt to exceed the maximum allowable number of **GUI** sessions, an error message displays. For example, if you do not have the optional Support for Additional Users feature enabled and you start **LSMS GUI** sessions on eight different terminals and then attempted to start a ninth **GUI** session on another terminal, the following error message displays stating that the maximum number of users had been reached:

```
Maximum number of users reached.
```

Local Data Manager

The Local Data Manager (`supman`) is responsible for:

- Provisioning of **LSMS** configuration information and local data
- Communicating with the GUIs using **XML** messages
- Broadcasts all locally provisioned **LNP** data updates using a Reliable Multicast Transport Protocol (**RMTP** II) multicast mechanism on a single channel
- Updating the resynchronization database with locally provisioned data to facilitate automatic resynchronization with Element Management Systems (EMSs) at the supported network elements

NPAC Agents

The **NPAC** Agent application (`npacagent`) is responsible for:

- Connecting with a single **NPAC** system using the Q.3 protocol and providing all functions required by published **NPAC** standards
- Broadcasting all its updates using the **RMTP II** multicast mechanism over one broadcast channel
- Communicating with the GUIs through the Local Services Manager

One instance of the `npacagent` process exists for each enabled **NPAC** region.

EAGLE Agents

The EAGLE Agent application (`eagleagent`) is responsible for:

- Subscribing to the broadcast channels to receive all **NPAC** and local data updates
- Connecting with a single EAGLE node using the High Speed Operations Protocol (**HSOP**) and forwarding **LNP** updates to the **EAGLE**
- Filtering **LNP** data based on the provisioned filter information before forwarding it to the EAGLE (for more information, refer to the *Database Administrator's Guide*)

- Performing automatic resynchronization with an EAGLE node upon connection establishment (for more information, refer to the *LNP Database Synchronization User's Guide*)

One instance of the `eagleagent` process exists for each supported EAGLE node.

RMTPManager

The **RMTPManager** (`rmtpmgr`) is responsible for facilitating the reliable multicast mechanism that allows **LNP** data updates to reach every EAGLE agent. It acts as a top node in an **RMTP** broadcast tree. A maximum of 9 broadcast channels exists (up to 8 channels for **NPAC** agents and 1 for the Local Data Manager).

RMTPAgent

The **RMTPAgent** (`rmtpagent`) is responsible for keeping the broadcast mechanism flowing even when no EAGLE agents are running. The **RMTPAgent** subscribes to all (up to 9) broadcast channels.

Local GUI

The Local **GUI** application is responsible for providing a graphical user interface to allow operation of the **LSMS** by users who are logged into the **LSMS** administration console or a network-connected workstation through which they have made a telnet connection to the **LSMS**. Multiple instances of the Local **GUI** can exist.

Web-Based GUI

The Web-based **GUI** application runs outside of the **LSMS** system on a client platform. It provides an **IP**-based **GUI** to operate the **LSMS** and has the same appearance and functionality as the local **GUI**. Multiple instances of the Web-based **GUI** can exist.

Report Manager

The Report Manager (`reportman`) is responsible for producing reports on demand. It can produce up to 10 reports simultaneously.

EBDA

The Enhanced Bulk Download and Audit process (*ebda*) is responsible for providing the capability of performing audits, reconciles, bulk loads and user-initiated resynchronizations of an EAGLE **LNP** database. Multiple instances of the *ebda* process can exist for different EAGLE nodes.

Sentry

The Sentry process (`sentryd`) monitors other software processes and attempts to restart them automatically in certain failure conditions. For more information about the Sentry application, see “Automatically Restarting Software Processes”.

Surveillance

The **LSMS** Surveillance process (*survMon*) continually surveys the **LSMS** hardware and software and sends surveillance notifications to the server’s serial port. Users who want to display surveillance notifications on an administration console can connect Serial Port 3 to the administration console (see Configuring a Customer-Provided Administration Console).

Surveillance is also responsible for monitoring and restarting the `sentryd` and Service Assurance processes. For more information, see "Understanding the Surveillance Feature".

Service Assurance

The Service Assurance feature allows an external system to access subscription version data from the **LNP** databases in the **LSMS**. For more information, see "Understanding the Service Assurance Feature".

SNMPAgent

The **SNMPAgent** (*lsmsSNMPAgent*) is a process running on the **LSMS** platform that supports only the SNMPv1 and SNMPv3 trap operation. This process receives (through **UDP** Linux sockets) **LSMS** notification events from other **LSMS** processes and formats these events into trap requests. For more information, see "Understanding the **SNMP** Agent Process".

Logger

The Logger process (*lsmslogd*) is responsible for:

- Receiving log entries from application processes
- Storing them in appropriate log files
- Starting new log files every midnight

Overview of High Availability

To provide a high likelihood of the **LSMS** being able to function (high availability), the **LSMS** is implemented with hardware redundancies and with software that monitors hardware status and allows the **LSMS** functions to be run on either server (but not both at once).

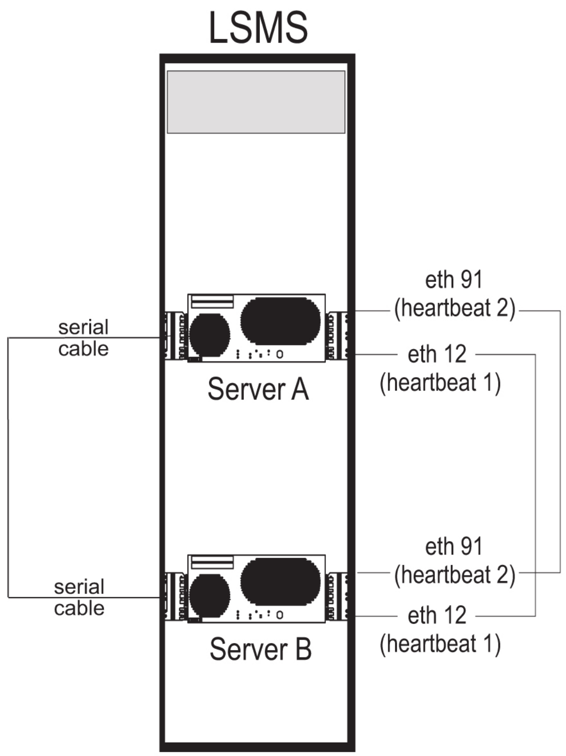
Hardware Redundancies

Each server contains two internal mirrored disks.

The **LSMS** is implemented with a pair of redundant servers and the following redundant heartbeat connections between them:

- A bonded pair of Ethernet connections for heartbeats
- A serial cable connection for heartbeats

Figure 2-4   LSMS Servers Connected with Heartbeat Links



Redundant Servers

Two servers, one active and one standby, provide redundancy in processing. If the active server fails, the **LSMS** can run on the standby server.

Changing from one server to another is called *switchover*. The server on which the **LSMS** is running at a given time is called the *active server* and the other server is called the *standby server*.

For some types of failure on the active server, the **LSMS** automatically attempts to switch over. You can also manually switch over at any time. For more information about switching over, see the following:

- “Understanding Switchover”
- “Understanding Automatic Switchover”
- Manually Switching Over from the Active Server to the Standby Server

Redundant Data

The **LSMS** is designed with the following data redundancies:

- Each server contains mirrored disks. If both sides of the mirrors fail on the active server, the **LSMS** automatically attempts to switch over to the standby server. For more information, see Automatic Switchover Due to Hardware-Related Failure.
- The database on the active server is replicated by the standby server.

Redundant Heartbeats

The servers use heartbeats to monitor each other. The servers are connected by a pair of redundant Ethernet connections and a serial connection. As long as each server is functioning, it sends its *heartbeat* to the other server over these connections. These two Ethernet connections are implemented on separate Ethernet cards, so that the failure of one Ethernet card does not prevent heartbeats from being sent.

The heartbeats are monitored by the Surveillance feature. If a heartbeat cannot be detected, one of the following notifications is posted:

```
LSMS4015|14:58 Jun 22, 2000|xxxxxxx|Notify:Sys Admin - Heartbeat 1
failure
```

```
LSMS4016|14:58 Jun 22, 2000|xxxxxxx|Notify:Sys Admin - Heartbeat 2
failure
```

Software Availability Design

The following **LSMS** software design features enhance the availability of the **LSMS**:

- The **LSMS HA** utility monitors the states of both servers, detects failure conditions, and automatically switches over for certain failures on the active server. For more information, see Managing Server States
- The Surveillance feature monitors critical processes and interfaces and posts notifications. For more information, see “Understanding the Surveillance Feature”.
- The `sentryd` feature detects certain application failures and automatically attempts to restart the failed applications. Full functionality of this feature requires that the Surveillance feature be enabled. For more information about `sentryd`, see Restarting Software Processes
- The **LSMS** provides the following automatic attempts to reassociate and resynchronize after outages between **NPACs** and the **LSMS** or between the **LSMS** and network elements (when automatic recovery is not possible, notifications are posted, and operator-initiated recovery procedures are documented as indicated):
  - Automatic reassociation with an **NPAC** after some association outages (for operator-initiated recovery procedures, refer to the *Configuration Guide*)
  - Automatic resynchronization of **NPAC** and **LSMS** data after reassociation (when automatic resynchronization is not possible, notifications are posted, and operator-initiated recovery procedures are documented in “Resynchronizing After an Outage Between an **NPAC** and the **LSMS**”)
  - Automatic resynchronization of the **LSMS** and network element data after outage (when automatic recovery is not possible, notifications are posted, and operator-initiated recovery procedures are documented in the *LNP Database Synchronization User's Guide*)

Enhancing High Availability with a Shadow LSMS

To further enhance the availability of **LSMS** functions, you can choose to implement a shadow **LSMS**, where a shadow **LSMS** is an entire **LSMS** (with its own service provider **ID**) located in a separate geographical location from the main **LSMS**. Having a shadow **LSMS** available reduces the time needed to restore service in situations of severe error or disaster, such as fire or flood. The following types of shadow strategies are available:

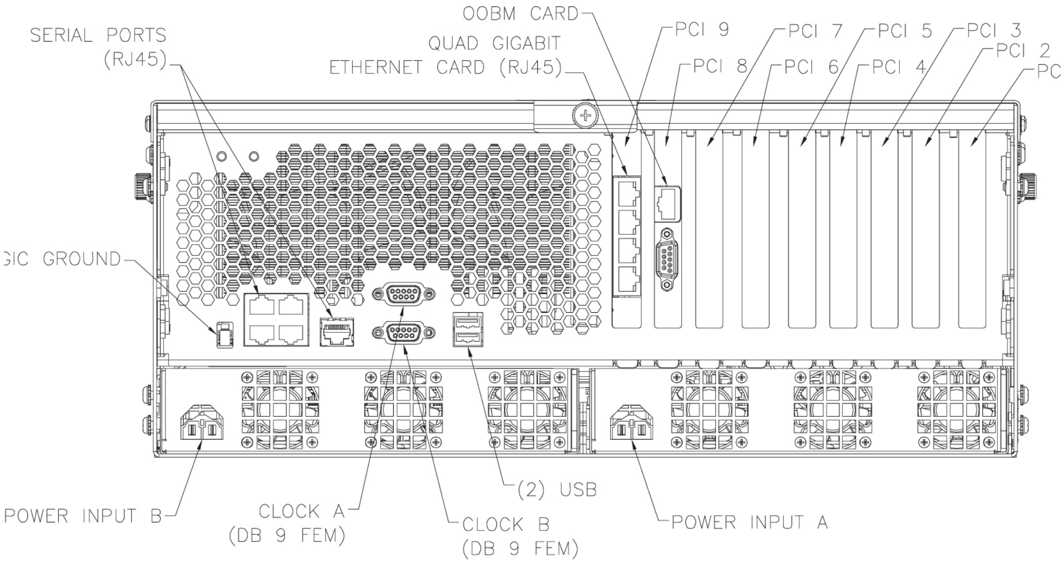
- Active shadow—a shadow **LSMS** that is connected to **NPACs**
- Inactive shadow—a shadow **LSMS** exists but is not connected to **NPACs**

For more information about a shadow **LSMS**, and recovery procedures for each strategy, see Recovering from Site Failures. This chapter also describes the procedure for restoring a main **LSMS** after a site failure when no shadow is available.

Understanding the Surveillance Feature

On each server, the **LSMS** Surveillance feature continually surveys the **LSMS** hardware and software and sends surveillance notifications to Serial Port 3 on each server. The Surveillance feature also logs all surveillance notifications in the file `survlog.log` in the`/var/TKLC/lsms/logs` directory. The Surveillance feature starts when **LSMS** starts.

Figure 2-5 T1100 - Rear View - Showing Serial Ports



The Surveillance feature also monitors network interfaces. For information about configuring the Surveillance feature for this purpose, refer to the *Configuration Guide*.

The Surveillance feature enables remote personnel to monitor the **LSMS** and detect conditions that require immediate action. Some surveillance notifications are sent only when the event occurs; other notifications are sent both when the event first occurs and also every five minutes thereafter until the condition is cleared. Every five minutes, the Surveillance feature also sends a *keep alive* notification to the Surveillance serial port and logs the *keep alive* in the file `survlog.log`.

The following topics are described in this section:

- Configuring a Customer-Provided Administration Console
- Controlling the Surveillance Feature
  - Starting the Surveillance Feature
  - Stopping the Surveillance Feature
  - Determining the Surveillance Status
- Understanding Surveillance Notifications
- Logging Surveillance Notifications

Configuring a Customer-Provided Administration Console

If customers desire a local administration console for displaying Surveillance notifications, they can attach their own administration console to Serial Port 3 on each of the **LSMS** servers. The following requirements are needed to provide and configure a customer-provided administration console:

- A workstation that can display text
- Two cables that connect to the **RJ**-45 interface used by Serial Port 3 on each **LSMS** server
- Configure the connections as:
  - 115200 baud
  - Parity 8E1
- Software running on the workstation that can determine from which cable the Surveillance notification is arriving (the Surveillance notifications do not identify which server is generating them)

Controlling the Surveillance Feature

The Surveillance feature starts on each server when the server starts. The following topics explain how to use **LSMS** commands to start, stop, and check the status of the Surveillance feature.

> **Note:**
>
> These commands affect only the server on which they are entered.

Starting the Surveillance Feature

Use the `lsmssurv start` command to start the Surveillance feature on the server that you are logged into.

1. Log in as `root` on either server.
2. Type the following command to start surveillance:

   ```
   lsmssurv start
   ```

Either of the following messages appears, depending on whether surveillance was already running:

```
LSMS Surveillance feature started
LSMS Surveillance feature is currently running
```

3. Repeat this procedure for the other server, if desired.

Stopping the Surveillance Feature

Use the `lsmssurv stop` command to stop the Surveillance feature on the server that you are logged into.

1. Log in as `root` on either server.
2. Type the following command to stop surveillance:

   ```
   lsmssurv stop
   ```

   Either of the following messages appears, depending on whether surveillance was already stopped:

   ```
   LSMS Surveillance feature stopped
   LSMS Surveillance feature is not currently running
   ```

3. Repeat this procedure for the other server, if desired.

Determining the Surveillance Status

Use the `lsmssurv status` command to check the status of the Surveillance feature. This command allows you to determine if the Surveillance feature is already running or has already been stopped.

1. Log in as `root` on either server.
2. Type the following command to get surveillance status:

   ```
   # lsmssurv status
   ```

   You will receive one of the following messages:

   ```
   LSMS Surveillance feature is currently started
   LSMS Surveillance feature is currently stopped
   ```

3. Repeat this procedure for the other server, if desired.

Returning the Surveillance Feature to Last Valid State

Use the `lsmssurv last` command to return the Surveillance feature to its last valid state. If the Surveillance Monitor should be running but it is not for any reason, then `lsmssurv last` will start it.

1. Log in as `root` on either server.

2. Type the following command:

   ```
   lsmssurv last
   ```

   The following messages appears:

   ```
   LSMS Surveillance feature started
   ```

3. Repeat this procedure for the other server, if desired.

Understanding Surveillance Notifications

Introduction provides information about the format of Surveillance notifications and how they correlate to **GUI** notifications and traps. In addition, for each Surveillance notification, ordered by its event number, the appendix provides the following information:

- It output text string
- Explanation of possible cause, beyond the text that fits into the notification text string
- Suggested recovery actions
- Source from which the notification is sent
- Frequency with which the notification appears

Logging Surveillance Notifications

In addition to displaying Surveillance notifications, the Surveillance feature logs all Surveillance notifications in the file `survlog.log` in the`/var/TKLC/lsms/logs` directory.

If the **LSMS** Surveillance feature becomes unable to properly report conditions, it logs the error information in a file, named `lsmsSurv.log`, in the `/var/TKLC/lsms/logs` directory on each server's system disk. When the size of `lsmsSurv.log` exceeds 1MB, it is copied to a backup file, named `lsmsSurv.log.bak,` in the same directory. There is only one **LSMS** Surveillance feature backup log file, which limits the amount of log disk space to approximately 2MB.

Understanding the Service Assurance Feature

The Service Assurance feature allows an external system to access subscription version data from the **LNP** databases in the **LSMS**. This information is useful in verifying correct porting of data, and helps in troubleshooting problems. There is one **LNP** database for each of the **NPACs** associated with the **LSMS**.

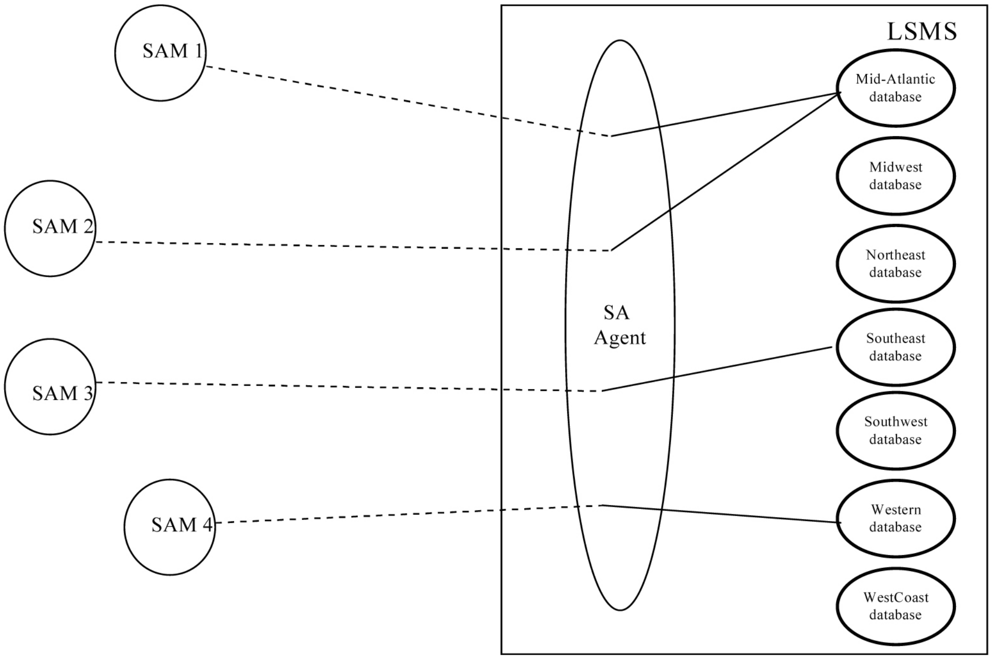
The external system uses Service Assurance Manager (**SAM**) application software to initiate service assurance data requests and associations. Single or multiple **SAMs** may exist on the external computer system. The **SAM** communicates with the **LSMS** through the Service Assurance Agent (**SAA**) application software that resides in the **LSMS**. The **SAM** application software is not Oracle software and is only resident on the external system.

The **SAA** decodes the queries from the **SAM** and then accesses the **LNP** database. The **SAA** forms the subscription version data into a message and that message is sent to the **SAM** making the query.

Service Assurance works in conjunction with the Surveillance feature. The Surveillance feature issues the command to start the Service Assurance agent (part of the Service Assurance feature that is described in this document), and it monitors the status of the Service Assurance agent.

A maximum of eight **SAM**/**SAA** sessions are allowed at one time.

Figure 2-6   Service Assurance System within a Network



The architecture used to provide the access is a Connection Oriented Manager/Agent using Common Management Information Protocol (**CMIP**). **CMIP** provides an industry standard interface between Manager and Agent applications. This allows you to use standard products and tool kits to develop applications.

Service Assurance Terminology

The following terms are used to describe Service Assurance:

- *Service Assurance Manager* (**SAM**): Initiator of service assurance associations and data requests. This is *not* part of the **LSMS** application. A **SAM** application runs on a computer but is not the computer itself. Multiple **SAMs** can run on the same computer, or each **SAM** can run on a different computer.
- *Service Assurance Agent* (**SAA**): Software residing on the **LSMS** and considered part of the **LSMS** application. This software consists of one or more Linux processes and one or more Linux scripts.
- *NPAC Database*: This refers to the database stored on the **NPAC**.
- *LNP Database*: This refers to the database that contains subscriptionVersions, Service Provider Network, Service Provider **LRN** and Service Provider **NPA**-**NXX** objects. This database resides on the **LSMS**. Each **NPAC** has one **LNP Database** on the **LSMS**.

- *Manager/Agent*: This term describes the two peer processes that work together to implement the Service Assurance feature. The Manager is the customer's application, which is used to initiate the association and send the query to the Agent process. The Agent process decodes the query message, then accesses the **LNP Database**.
  The Agent extracts the data from the database, then builds and sends the reply to the Manager. This feature allows the Manager to send a single subscription **TN** or list of subscription **TNs** to query. The Agent extracts each instance that it can find from the **LNP Database** and returns a response to the Manager.

The architecture is connection oriented to restrict access to the **LNP** databases. This system is assumed to be within the customer's private network, so no encryption security is included. The **CMIP** protocol defines the method for establishing and terminating associations. This application uses the access control and user data space in the association messages to restrict access to the system.

The **SAM** is restricted to querying subscription versions by the subscriptionTN field. Up to four **SAMs** can query the **LSMS** at the same time.

The Service Assurance feature interfaces to the **LSMS** by means of a 10 Mbps Ethernet interface. The Application **WAN** is also used as the interface for the X-terminals connected to the **LSMS**. The network connecting the Service Assurance systems to the **LSMS** is the responsibility of the customer.

Interface Implementation

The **LSMS** Service Assurance interface is implemented over a standard **CMIP**/**CMISE**-based **OSI** protocol stack (Q.3). **RFC1006** is used for the transport layer.

This interface is limited to the retrieve capabilities of the local **LSMS** database. The object to be retrieved is the subscription Version defined in *NPAC SMS Interoperable Interface Specification*, **NANC** Version 1.5, September 1997.

Allowed Functions on the Interface

The **LSMS** responds to association (bind) requests, release (unbind) requests, aborts, and subscription query (m-get) messages. No other functions are allowed over this interface and will be rejected.

Support of OSI Addresses

The **LSMS** supports four **OSI** address connections for Service Assurance interfaces, which correspond to eight domains.

Each Service Assurance system needs to establish only the associations it requires, without regard to whether the **LSMS** is operating with the primary or secondary server. Upon switchover, the association is momentarily lost. The Service Assurance system tries to reestablish the association. When the active system finishes coming up, it then responds to the Service Assurance system association requests. The Service Assurance system does not know whether the primary or secondary system is running.

Association information is specified by Oracle. This information must be present in the bind request. This data in the association information, such as the system name, is used to verify the source of a bind request. Bind requests with invalid association information are rejected.

Establishment of association between the **LSMS** and the Service Assurance system is initiated by the Service Assurance Manager. This applies to initial association as well as to reestablishing the association after outages (regardless of the cause of the loss of association). When it does not have an association, the Service Assurance system periodically tries to establish the association until a successful response is received from the **LSMS**. The minimum retry interval is one minute.

The **LSMS** provides a response to the bind request to indicate:

- Successful connection
- Access control failure (authority violation - unknown address requesting association)
- **LSMS** data access failure
- Resource failure (maximum number of associations already established)

Number of Associations Per Service Assurance System

The **LSMS** supports one association per Service Assurance system.

If a Service Assurance agent within the **LSMS** is unable to establish a connection with the **LSMS NPAC** database, the association with the Service Assurance system is aborted.

Notification Upon Loss of Association

The **LSMS** provides a notification when the association with any of the Service Assurance Manager is lost or established.

Understanding the SNMP Agent Process

The optional Remote Monitoring feature provides the capability for the **LSMS** to report certain events and alarms to a remote location, using the industry-standard **Simple Network Management Protocol** (**SNMP**). The **LSMS** implements an **SNMP** agent with the **SNMP** agent process running on the **LSMS** platform.

Customers can use this feature to cause the **LSMS** to report events and alarms to another location, which implements an **SNMP** Network Management System (**NMS**). An **NMS** is typically a standalone device, such as a workstation, which serves as an interface through which a human network manager can monitor and control the network. The **NMS** typically has a set of management applications (for example, data analysis and fault recovery applications). The SNMP feature must be enabled while configuring the NMS.

Overview of SNMP Protocols

An **SNMP** agent, such as that implemented by the **LSMS**, is responsible for **SNMP** managed objects; each managed object represents a data variable. A collection of managed objects is called a management information base (**MIB**). A copy of the **MIB** is maintained both at the **SNMP** agent and also at the **NMS**. The **MIB** can be read with a text editor.

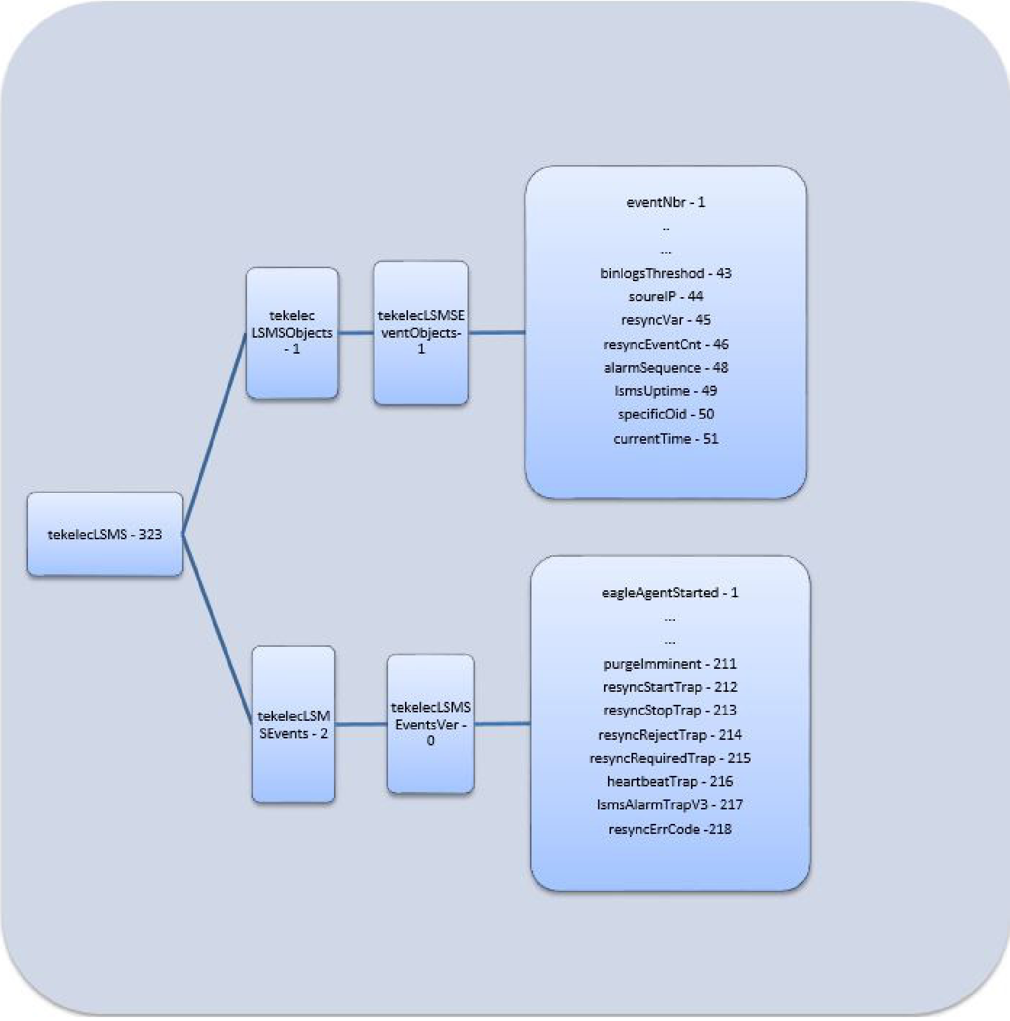
An **SNMP** agent can do the following:

- Respond to requests from the **NMS** for information and/or action. The **SNMP** architecture defines a limited set of management commands and responses. The **NMS** can issue *Get*, *GetNext*, and *Set* messages to retrieve single or multiple object variables or to modify the value of a single variable. The **SNMP** agent sends a response message to complete the *Get*, *GetNext*, or *Set*. This release of the **LSMS** does not support these functions.
- Send event notifications, called *trap* requests, to the **NMS** to identify the occurrence of conditions, such as the failure or restoration of a link interface.

The **SNMP** protocol uses the User Datagram Protocol (**UDP**) transport protocol in a **TCP/IP** network. **UDP** is a connectionless protocol and does not guarantee reliable delivery of data. Therefore, **SNMP** does not use a preestablished connection to send data and does not guarantee reliable delivery of data.

MIB Structure

Figure 2-7 MIB Structure



New Object definition:

```
sourceIP    OBJECT-TYPE
       SYNTAX      OCTET STRING
   MAX-ACCESS  read-only
   STATUS      current
   DESCRIPTION
            "Th‟ source ip of the device where event was generated."
 ″  ::= { tekelecLSMSEventObjects 44 }
```

```
resyncVar   OBJECT-TYPE
       SYNTAX  INTEGER(0..1)
   MAX-ACCESS  read-write
   STATUS  current
   DESCRIPTION "Th‟ object is available to be set by the NMS to indicate a
request for alarm resynchronization.
                 Object value=0 indicates a request to stop an ongoing
resnchronization and Object value=1 indicates a resynchronization request."
:″= { tekelecLSMSEventObjects 45 }

resyncEventCnt        OBJECT-TYPE
       SYNTAX      Unsigned32
   MAX-ACCESS  read-only
   TUS      current
   DESCRIPTION "Th‟ total number of Resync alarms to be sent."
 ″  { tekelecLSMSEventObjects 46 }


   alarmSequence    OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "Un‟que sequence number identifying an SNMP Alarm Trap instance."
 ″  ::= { tekelecLSMSEventObjects 48 }

lsmsUptime   OBJECT-TYPE
       SYNTAX      TimeTicks
   MAX-ACCESS  read-only
   STATUS      current
   DESCRIPTION
            "Ti‟e since LSMS is up."
      ::={ tekelecLSMSEventObjects 49 }

specificOid   OBJECT-TYPE
SYNTAX      OCTET STRING
MAX-ACCESS      read-only
STATUS      current
DESCRIPTION "Trap ID."
::= { tekelecLSMSEventObjects 50 }

currentTimeOBJECT-TYPE
SYNTAX      OCTET STRING
MAX-ACCESS      read-only
STATUS      current
DESCRIPTION "Date and time  string."
::= { tekelecLSMSEventObjects 51 }


         resyncErrCode   OBJECT-TYPE
    SYNTAX  OCTET STRING
    MAX-ACCESS  read-only
    STATUS  current
    DESCRIPTION
            "errorCode = 0, Resynchronization completed successfully.
```

```
             errorCode = 1, Resynchronization aborted by NMS.
             errorCode = 2, Resynchronization already in progress for
the NMS.
             errorCode = 3, Resynchronization Aborted, Database error
occurred.
             errorCode = 4, Resynchronization not in progress."
    ::= { tekelecLSMSEventsVer 218 }
```

New Trap Definition:

Existing traps defined for SNMP v1 are modified to include the following for the MIB for SNMP v3:

1. sourceIP
2. alarmSequence

New SNMPv3 MIB Traps:

```
tekelecLSMSEventsV3 OBJECT IDENTIFIER ::= { tekelecLSMSEvents 3 }

resyncStartTrap    NOTIFICATION-TYPE
    OBJECTS   { lsmsUptime, sourceIP }
    DESCRIPTION "The trap is sent by the LSMS to NMS when the LSMS is
about to start resynchronization"
    ::= {tekelecLSMSEventsV3 212 }

resyncStopTrap    NOTIFICATION-TYPE
    OBJECTS   { lsmsUptime, sourceIP, resyncEventCnt, resyncErrCode }
    DESCRIPTION "The trap is sent by the LSMS to NMS when
resynchronization is complete"
    ::= {tekelecLSMSEventsV3 213 }

resyncRejectTrap    NOTIFICATION-TYPE
    OBJECTS   { lsmsUptime, sourceIP, resyncErrCode }
    DESCRIPTION "The trap is sent by the LSMS to NMS when a
resynchronization request is rejected by LSMS "
    ::= {tekelecLSMSEventsV3 214 }

resyncRequiredTrap    NOTIFICATION-TYPE
    OBJECTS   { lsmsUptime, sourceIP }
    DESCRIPTION "The trap is sent by the LSMS to NMS when the LSMS is
rebooted or LSMS is started"
    ::= {tekelecLSMSEventsV3 215 }

heartBeatTrap    NOTIFICATION-TYPE
    OBJECTS   { lsmsUptime, sourceIP }
    DESCRIPTION "The trap is sent by the LSMS to NMS periodically to
indicate that the LSMS is up"
    ::= {tekelecLSMSEventsV3 216 }

lsmsAlarmTrapV3    NOTIFICATION-TYPE
    OBJECTS   { currentTime,specificOid ,sourceIP,
alarmSequence,specificAlarm}
    STATUS  current
    DESCRIPTION "The trap will indicate that the following information is
for a particular event"
    ::= {tekelecLSMSEventsVer 217 }
```

The MIB "choice fields" is added to accept a different number of arguments at runtime:

```
SPECIFICALARM::=
        CHOICE{
                OBJECTID-VALUE
                        TEKELECLSMSEVENTSVER
                }
```

Varbinds "sourceIP" and "alarmSequence" are added as a part of SNMPv3 and will be fixed varbinds to keep SNMPv1 backward compatible. SNMPv1 information will be passed as a part of "choice field."

A "currentTime" field conveys information about time when an alarm is triggered.

Current definition for SNMPv3 Trap:

```
LSMSALARMTRAPV3    NOTIFICATION-TYPE
    OBJECTS   { CURRENTTIME, SPECIFICOID ,SOURCEIP,
ALARMSEQUENCE,SPECIFICALARM}
    STATUS  CURRENT
    DESCRIPTION "THE TRAP WILL INDICATE THAT THE FOLLOWING INFORMATION IS
FOR A PARTICULAR EVENT"
    ::= {TEKELECLSMSEVENTSVER 217 }
```

Description of different varbinds of SNMPv3 Trap:

Table 2-4   Description of Different Varbinds of SNMPv3 Trap

MIB OBJECTS	OID	Description
currentTime	1.3.6.1.4.1.323.5.3.4.1.1.51.0	Time when alarm is generated.
specificOid	1.3.6.1.4.1.323.5.3.4.1.1.50.0	Oid which uniquely identifies a SNMPV3 alarm
sourceIP	1.3.6.1.4.1.323.5.3.4.1.1.44.0	IP address of active alarm
alarmSequence	1.3.6.1.4.1.323.5.3.4.1.1.48.0	Sequence number of triggered alarm
specifcAlarm	List of OID for different varbinds	List of oid for different varbind and values

Sample SNMPv3 trap for alarm 4021:

```
DISMAN-EVENT-MIB::SYSUPTIMEINSTANCE = TIMETICKS: (44365220) 5 DAYS,
3:14:12.20
SNMPV2-MIB::SNMPTRAPOID.0 = OID: SNMPV2-SMI::ENTERPRISES.323.5.3.4.2.0.217
SNMPV2-SMI::ENTERPRISES.323.5.3.4.1.1.51.0 = STRING: "02/01/10 20:31:31"
SNMPV2-S
MI::ENTERPRISES.323.5.3.4.1.1.50 .0= STRING: "1.3.6.1.4.1.323.5.3.4.2.0.40"
SNMPV2-SMI::ENTERPRISES.323.5.3.4.1.1.44.0 = STRING: "192.168.59.30"
SNMPV2-S
```

```
MI::ENTERPRISES.323.5.3.4.1.1.48.0 = GAUGE32: 44  SNMPV2-
SMI::ENTERPRISES.323.5.3.
4.1.1.1.0 = INTEGER: 4021       SNMPV2-
SMI::ENTERPRISES.323.5.3.4.1.1.17.0 = STR
ING: "LMGRD"
MIB FOR ALARM 4021
===============
LSMSAPPSNOTRUNNING NOTIFICATION-TYPE
    OBJECTS     { EVENTNBR, PROCESSNAME, SOURCEIP, ALARMSEQUENCE }
    STATUS      CURRENT
    DESCRIPTION
            "THIS NOTIFICATION INDICATES THAT A SPECIFIC LSMS
APPLICATION
            OR SYSTEM DAEMON IS NOT RUNNING."
    ::= {TEKELECLSMSEVENTSVER 40 }
```

Decoding SNMPv3 Trap for alarm 4021:

Table 2-5 Decode SNMPv3 Trap for Alarm 4021

OID	MIB OBJECT	Value
1.3.6.1.4.1.323. 5.3.4.2.0.217	lsmsAlarmTrapV3 (Indicating SNMPv3 Alarm)	NO value
1.3.6.1.4.1.323.5.3.4.1.1.51.0	currentTime	02/01/10 20:31:31
1.3.6.1.4.1.323.5.3.4.1.1.50.0	specificOid (unique oid of lsms alarm)	1.3.6.1.4.1.323.5.3.4.2.0.40
1.3.6.1.4.1.323.5.3.4.1.1.44.0	sourceIP	192.168.59.30
1.3.6.1.4.1.323.5.3.4.1.1.48.0	alarmSequence	44
1.3.6.1.4.1.323.5.3.4.1.1.1.0, 1.3.6.1.4.1.323. 5.3.4.1.1.17.0	eventNbr,processName(variable varbinds)	4021,lmgrd

Note:

There is no SNMPv3 trap for event numbers 8102 to 8105 and 8110 to 8118, as there is no trap definition for these events. These events will exhibit SNMPv1 behavior.

TKLC-LSMS-MIB

```
TEKELEC-LSMS-TRAP-MIB DEFINITIONS ::= BEGIN-- Copyright 2015 Oracle
Corporation IMPORTS       tekelecLSMS     FROM TEKELEC-TOPLEVEL-REG
NOTIFICATION-TYPE,            OBJECT-TYPE,     IpAddress,
TimeTicks,     Unsigned32,     CHOICE      FROM SNMPv2-SMI;-- LSMS
Object group sub-tree tekelecLSMSObjects OBJECT IDENTIFIER ::=
{ tekelecLSMS 1 }-- LSMS Product Events sub-tree tekelecLSMSEvents
OBJECT IDENTIFIER ::= { tekelecLSMS 2 }-- LSMS Events Object group sub-
tree tekelecLSMSEventObjects OBJECT IDENTIFIER ::=
{ tekelecLSMSObjects 1 }-- LSMS SNMP Events compatible for both
version1 and version3tekelecLSMSEventsVer OBJECT IDENTIFIER ::=
{ tekelecLSMSEvents 0 }specificAlarm ::=    CHOICE{        objectID-
value            tekelecLSMSEventsVer        }---- OBJECTS
```

```
DEFINITIONS--eventNbr OBJECT-TYPE    SYNTAX  INTEGER (1..2147483647)     MAX-
ACCESS  read-only    STATUS  current    DESCRIPTION        "Tekelec specific
unique identifier for the notification         error number. The value can
be any positive integer         value except 0"    ::=
{ tekelecLSMSEventObjects 1 }         -- Varying in length from 0 to 65535
for SNMPv1 OCTET STRINGnPACRegion OBJECT-TYPE    SYNTAX  OCTET STRING
MAX-ACCESS  read-only    STATUS  current    DESCRIPTION        "a string
indicating the name of the NPAC Region."    ::= { tekelecLSMSEventObjects
2 }             -- Varying in length from 0 to 65535 for SNMPv1 OCTET
STRINGneCLLI OBJECT-TYPE    SYNTAX  OCTET STRING      MAX-ACCESS  read-
only    STATUS  current    DESCRIPTION        "a string indicating the
network element CLLI."    ::= { tekelecLSMSEventObjects 3 }    npacId OBJECT-
TYPE    SYNTAX  OCTET STRING      MAX-ACCESS  read-only    STATUS
current    DESCRIPTION        "a string that identifies the specific LSMS
NPAC              association. Valid values are: primary,secondary."    ::=
{ tekelecLSMSEventObjects 4 }    npacRegionId OBJECT-TYPE    SYNTAX  OCTET
STRING      MAX-ACCESS  read-only    STATUS  current    DESCRIPTION
"A 2 character string 2 that uniquelly identifies each            NPAC
region. Valid value are:                  MW - Midwest         MA - Mid-
Atlantic         NE - Northeast         SE - Southeast             SW -
Southwest         WE - West Regional         WC - West Coast          CA -
Canada "    ::= { tekelecLSMSEventObjects 5 }                      oldNPA
OBJECT-TYPE    SYNTAX  OCTET STRING      MAX-ACCESS  read-only    STATUS
current    DESCRIPTION        "The old number planning area (area code)
value."    ::= { tekelecLSMSEventObjects 6 }            newNPA  OBJECT-
TYPE    SYNTAX  OCTET STRING      MAX-ACCESS  read-only    STATUS
current    DESCRIPTION        "The new number planning area (area code)
value."    ::= { tekelecLSMSEventObjects 7 }         nXX    OBJECT-TYPE
SYNTAX  OCTET STRING      MAX-ACCESS  read-only    STATUS  current
DESCRIPTION        "The exchange code value (NXX). "    ::=
{ tekelecLSMSEventObjects 8 } npacRecoveryRetryInterval   OBJECT-TYPE
SYNTAX  OCTET STRING    MAX-ACCESS  read-only    STATUS  current
DESCRIPTION        "Positive integer value indicating the NPAC recovery
retry interval."    ::= { tekelecLSMSEventObjects 9 } retryTimes   OBJECT-
TYPE    SYNTAX  OCTET STRING    MAX-ACCESS  read-only    STATUS  current
DESCRIPTION        "Integer values indicating the number of retries."    ::=
{ tekelecLSMSEventObjects 10 } fromPeriod   OBJECT-TYPE    SYNTAX  OCTET
STRING      MAX-ACCESS  read-only    STATUS  current    DESCRIPTION
"Beginning time specification YYYYMMDDhhmmss "    ::=
{ tekelecLSMSEventObjects 11 } toPeriod   OBJECT-TYPE    SYNTAX  OCTET
STRING      MAX-ACCESS  read-only    STATUS  current    DESCRIPTION
"Ending time specification YYYYMMDDhhmmss "    ::= { tekelecLSMSEventObjects
12 } controllerId   OBJECT-TYPE    SYNTAX  OCTET STRING      MAX-ACCESS
read-only    STATUS  current    DESCRIPTION        "The specific controller
number (either 0 or 1)."    ::= { tekelecLSMSEventObjects 13 } driveSpecId
OBJECT-TYPE    SYNTAX  OCTET STRING      MAX-ACCESS  read-only    STATUS
current    DESCRIPTION        "Disk drive specification."    ::=
{ tekelecLSMSEventObjects 14 } shareDriveId   OBJECT-TYPE    SYNTAX  OCTET
STRING      MAX-ACCESS  read-only    STATUS  current    DESCRIPTION
"Shared disk drive physical Id."    ::= { tekelecLSMSEventObjects 15 }
hotSpareDriveId   OBJECT-TYPE    SYNTAX  OCTET STRING      MAX-ACCESS  read-
only    STATUS  current    DESCRIPTION        "Hot-spare disk drive physical
id."    ::= { tekelecLSMSEventObjects 16 } processName   OBJECT-TYPE
SYNTAX  OCTET STRING      MAX-ACCESS  read-only    STATUS  current
DESCRIPTION        "Name of the process (either lsmsagent or
supagent)."    ::= { tekelecLSMSEventObjects 17 } diskVolName   OBJECT-
TYPE    SYNTAX  OCTET STRING      MAX-ACCESS  read-only    STATUS
current    DESCRIPTION        "Disk Volume name."    ::=
{ tekelecLSMSEventObjects 18 } backUpType   OBJECT-TYPE    SYNTAX
OCTET STRING      MAX-ACCESS  read-only    STATUS  current
DESCRIPTION        "DATABASE or FILESYSTEM."    ::=
{ tekelecLSMSEventObjects 19 } volumeName   OBJECT-TYPE    SYNTAX
OCTET STRING      MAX-ACCESS  read-only    STATUS  current
DESCRIPTION        "The specific problem disk volume."    ::=
{ tekelecLSMSEventObjects 20 }          fileSystem   OBJECT-TYPE
SYNTAX  OCTET STRING      MAX-ACCESS  read-only    STATUS  current
DESCRIPTION        "Specific LSMS filesystem with problem."    ::=
{ tekelecLSMSEventObjects 21 }          logFileName   OBJECT-TYPE
SYNTAX  OCTET STRING      MAX-ACCESS  read-only    STATUS  current
DESCRIPTION        "The EMS log file name."    ::=
{ tekelecLSMSEventObjects 22 }          errorCode   OBJECT-TYPE
SYNTAX  OCTET STRING      MAX-ACCESS  read-only    STATUS  current
DESCRIPTION        "errorCode = 2 , the LOG_DIR in the ShadowAudit.cfg
does not exist.          errorCode = 3, LSMS_DIR is not set in the
global.shrc file.          errorCode = 4, VERSANT_ROOT or VERSANT_REL
is not set in the global.shrc file.          errorCode = 6, the /usr/
local/etc/global.shrc file does not exist.          errorCode = 7, the
ShadowAudit.cfg file does not exist in the $LSMS_DIR/config
directory.          errorCode = 8, the lsmsmate entry in the /etc/
hosts file does not exist or is inaccessible.          errorCode = 9,
the LSMS is unable to use the SecureShell keys or the authorized_keys
file on the shadow LSMS is missing.          errorCode = 10, the
directory /var/TKLC/lsms/logs does not have at least 20 megabytes of
available disk space."    ::= { tekelecLSMSEventObjects 23 }
servAssuranceMgrName   OBJECT-TYPE    SYNTAX  OCTET STRING      MAX-
ACCESS  read-only    STATUS  current    DESCRIPTION        "Service
assurance manager name."    ::= { tekelecLSMSEventObjects
24 }          queueMgrName   OBJECT-TYPE    SYNTAX  OCTET STRING
MAX-ACCESS  read-only    STATUS  current    DESCRIPTION        "Queue
manager name."    ::= { tekelecLSMSEventObjects 25 }
operationCode   OBJECT-TYPE    SYNTAX  OCTET STRING      MAX-ACCESS
read-only    STATUS  current    DESCRIPTION        "create, delete,
modify"    ::= { tekelecLSMSEventObjects 26 }          npanxxValue
OBJECT-TYPE    SYNTAX  OCTET STRING      MAX-ACCESS  read-only
STATUS  current    DESCRIPTION        "NPA-NXX"    ::=
{ tekelecLSMSEventObjects 27 }          effectiveTimeStamp   OBJECT-
TYPE    SYNTAX  OCTET STRING      MAX-ACCESS  read-only    STATUS
current    DESCRIPTION        "YYYYMMDDhhmmss"    ::=
{ tekelecLSMSEventObjects 28 }          sPID   OBJECT-TYPE    SYNTAX
OCTET STRING      MAX-ACCESS  read-only    STATUS  current
DESCRIPTION        "4 digits alphanumeric value."    ::=
{ tekelecLSMSEventObjects 29 }          nPANXX   OBJECT-TYPE
SYNTAX  OCTET STRING      MAX-ACCESS  read-only    STATUS  current
DESCRIPTION        "npanxx value being created or deleted."    ::=
{ tekelecLSMSEventObjects 30 }          npacIP   OBJECT-TYPE
SYNTAX  OCTET STRING      MAX-ACCESS  read-only    STATUS  current
DESCRIPTION        "NPAC IP address."    ::= { tekelecLSMSEventObjects
31 }          lRN   OBJECT-TYPE    SYNTAX  OCTET STRING      MAX-
ACCESS  read-only    STATUS  current    DESCRIPTION        "Local
Routing Number (LRN) value being created, modified or deleted."    ::=
{ tekelecLSMSEventObjects 32 } id2   OBJECT-TYPE    SYNTAX  OCTET
STRING      MAX-ACCESS  read-only    STATUS  current    DESCRIPTION
"Second id."    ::= { tekelecLSMSEventObjects 33 }          hostname
OBJECT-TYPE    SYNTAX  OCTET STRING      MAX-ACCESS  read-only    STATUS
current    DESCRIPTION        "Name or IP address of host."    ::=
{ tekelecLSMSEventObjects 34 } alarmBitMask   OBJECT-TYPE    SYNTAX  OCTET
STRING      MAX-ACCESS  read-only    STATUS  current    DESCRIPTION
"Bit mask of Eagle alarm."    ::= { tekelecLSMSEventObjects 35 }
svNpbUsage   OBJECT-TYPE    SYNTAX  OCTET STRING      MAX-ACCESS  read-
only    STATUS  current    DESCRIPTION        "Usage of SV/NPB storage
database."    ::= { tekelecLSMSEventObjects 36 } dbReplErr   OBJECT-TYPE
SYNTAX  OCTET STRING      MAX-ACCESS  read-only    STATUS  current
DESCRIPTION        "Error message from database replication."    ::=
{ tekelecLSMSEventObjects 37 } dbMonErr   OBJECT-TYPE    SYNTAX  OCTET
STRING      MAX-ACCESS  read-only    STATUS  current    DESCRIPTION
"Error message from database monitor daemon."    ::=
{ tekelecLSMSEventObjects 38 } eagleAgentDataErr  OBJECT-TYPE    SYNTAX
OCTET STRING      MAX-ACCESS  read-only    STATUS  current
DESCRIPTION        "Error message preventing record from being sent to
network element."    ::= { tekelecLSMSEventObjects 39 } svNpbThreshold
OBJECT-TYPE    SYNTAX  OCTET STRING      MAX-ACCESS  read-only    STATUS
current    DESCRIPTION        "SV/NPB configurable usage threshold."    ::=
{ tekelecLSMSEventObjects 40 } oldMySQLPortNumber   OBJECT-TYPE    SYNTAX
OCTET STRING    MAX-ACCESS  read-only    STATUS  current
DESCRIPTION            "Old MySQL Port Number."    ::=
{ tekelecLSMSEventObjects 41 }newMySQLPortNumber   OBJECT-TYPE    SYNTAX
OCTET STRING    MAX-ACCESS  read-only    STATUS  current
DESCRIPTION            "New MySQL Port Number."    ::=
{ tekelecLSMSEventObjects 42 }binlogsThreshold  OBJECT-TYPE    SYNTAX  OCTET
STRING      MAX-ACCESS  read-only    STATUS  current    DESCRIPTION
"Threshold of forceful binlogs purge."    ::= { tekelecLSMSEventObjects 43 }
sourceIP    OBJECT-TYPE    SYNTAX      OCTET STRING    MAX-ACCESS      read-
only    STATUS      current    DESCRIPTION            "The source ip of the
device where event was generated."    ::= { tekelecLSMSEventObjects
44 }resyncVar   OBJECT-TYPE    SYNTAX  INTEGER(0..1)    MAX-ACCESS  read-
write    STATUS  current    DESCRIPTION "The object is available to be set
by the NMS to indicate a request for alarm
resynchronization.                 Object value=0 indicates a request to
stop an ongoing resnchronization and Object value=1 indicates a
resynchronization request."    ::= { tekelecLSMSEventObjects
45 }resyncEventCnt        OBJECT-TYPE    SYNTAX      Unsigned32    MAX-
ACCESS      read-only    STATUS      current    DESCRIPTION "The total
number of Resync alarms to be sent."    ::= { tekelecLSMSEventObjects
46 }resyncErrCode          OBJECT-TYPE    SYNTAX      INTEGER    MAX-
ACCESS      read-only    STATUS      current    DESCRIPTION "Enumerated
value that indicates the reason for the trap."    ::=
{ tekelecLSMSEventObjects 47 }alarmSequence    OBJECT-TYPE    SYNTAX
Unsigned32    MAX-ACCESS      read-only    STATUS      current
DESCRIPTION "Unique sequence number identifying an SNMP Alarm Trap
instance."    ::= { tekelecLSMSEventObjects 48 }lsmsUptime   OBJECT-TYPE
SYNTAX      TimeTicks    MAX-ACCESS      read-only    STATUS      current
DESCRIPTION "Time since LSMS is up."    ::= { tekelecLSMSEventObjects
49 }specificOid   OBJECT-TYPE    SYNTAX      OCTET STRING    MAX-ACCESS
read-only    STATUS      current    DESCRIPTION "Trap ID."    ::=
{ tekelecLSMSEventObjects 50 }currentTime    OBJECT-TYPE    SYNTAX
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OCTET STRING    MAX-ACCESS      read-only    STATUS      current
DESCRIPTION "Date and time  string."    ::= { tekelecLSMSEventObjects
51 }--        -- TRAP DEFINITIONS--                 eagleAgentStarted
NOTIFICATION-TYPE    OBJECTS     { eventNbr, neCLLI  }     STATUS
current     DESCRIPTION        "This notification indicates that the
eagleagent              process has been started. "     ::=
{tekelecLSMSEventsVer 1 }         eagleAgentStoppedbyscript
NOTIFICATION-TYPE    OBJECTS     { eventNbr, neCLLI  }     STATUS
current     DESCRIPTION        "This notification indicates that the
eagleagent              process has been stopped by the sup
script."     ::= {tekelecLSMSEventsVer 2 }
nPACagentStarted NOTIFICATION-TYPE    OBJECTS     { eventNbr,
nPACRegion  }     STATUS     current     DESCRIPTION        "This
notification indicates that the NPACagent              for the region
has been started."     ::= {tekelecLSMSEventsVer 3 }
lsmsCommandStoppedNPACagent NOTIFICATION-TYPE    OBJECTS
{ eventNbr, nPACRegion  }     STATUS      current     DESCRIPTION
"This notification indicates that the NPACagent              process
has been stopped using the lsms command."     ::=
{tekelecLSMSEventsVer 4 }         primaryEMSAssocLostSecEstablished
NOTIFICATION-TYPE    OBJECTS     { eventNbr, neCLLI  }     STATUS
current     DESCRIPTION        "This notification indicates that the
LSMS has lost              association with the primary EMS, switching
to              secondary EMS association."     ::=
{tekelecLSMSEventsVer 5 }                  npacAssocEstablished
NOTIFICATION-TYPE    OBJECTS     { eventNbr, npacRegionId, npacId  }
STATUS      current     DESCRIPTION        "This notification indicates
that the NPAC              association was successfully
established."     ::= {tekelecLSMSEventsVer 7 }
primaryEMSAssocEstablished NOTIFICATION-TYPE    OBJECTS     { eventNbr,
neCLLI  }     STATUS      current     DESCRIPTION        "This
notification indicates that the LSMS              has established the
primary association with              the EMS."     ::=
{tekelecLSMSEventsVer 8 }                  npacAbortByUser
NOTIFICATION-TYPE    OBJECTS     { eventNbr, npacRegionId, npacId  }
STATUS      current     DESCRIPTION        "This notification indicates
that the NPAC              association has been aborted by the
user."     ::= {tekelecLSMSEventsVer 9 }npaSplitActOk NOTIFICATION-
TYPE    OBJECTS     { eventNbr, oldNPA, newNPA, nXX  }     STATUS
current     DESCRIPTION        "This notification indicates that
the              activated split was successful."     ::=
{tekelecLSMSEventsVer 10 }switchOverStarted NOTIFICATION-TYPE
OBJECTS     { eventNbr  }     STATUS      current     DESCRIPTION
"This notification indicates that the active         server has
initiated an automatic switchover         to the inactive
server."     ::= {tekelecLSMSEventsVer 11 }switchOverCompleted
NOTIFICATION-TYPE    OBJECTS     { eventNbr  }     STATUS
current     DESCRIPTION        "This notification indicates that the
LSMS service Switchover process has completed."     ::=
{tekelecLSMSEventsVer 12 }switchOverFailed NOTIFICATION-TYPE
OBJECTS     { eventNbr  }     STATUS      current     DESCRIPTION
"This notification indicates that the LSMS         service Switchover
could not be switched over         to the inactive server."     ::=
{tekelecLSMSEventsVer 13 }diskContrService NOTIFICATION-TYPE
OBJECTS     { eventNbr, controllerId  }     STATUS      current
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DESCRIPTION        "This notification indicates that the disk
controller <controllerId> is out of service         and is affecting shared
storage. This notification         is only valid on E3000 systems."    ::=
{tekelecLSMSEventsVer 14 }npacInterfaceFailure NOTIFICATION-TYPE
OBJECTS     { eventNbr  }     STATUS      current    DESCRIPTION        "This
notification indicates an NPAC interface         failure. Its is generated
when the ping         utility has not receive a response from          the
interface associated with the NPAC."    ::= {tekelecLSMSEventsVer 15 }
emsInterfaceFailure NOTIFICATION-TYPE    OBJECTS     { eventNbr   }
STATUS      current    DESCRIPTION        "This notification indicates an
EMS Ethernet         interface failure. Its is generated when the
ping utility has not receive a response from         the interface
associated with the EMS."    ::= {tekelecLSMSEventsVer 16 }
appsInterfaceFailure NOTIFICATION-TYPE    OBJECTS     { eventNbr  }
STATUS      current    DESCRIPTION        "This notification indicates that
the Ethernet         interface used to connect to the APPLICATION
network has a problem."    ::= {tekelecLSMSEventsVer
17 }adminInterfaceFailure NOTIFICATION-TYPE    OBJECTS     { eventNbr  }
STATUS      current    DESCRIPTION        "This notification indicates that
the Ethernet         interface used to connect to the ADMINISTRATION network
has a problem."    ::= {tekelecLSMSEventsVer 18 }survFeatureOn NOTIFICATION-
TYPE    OBJECTS     { eventNbr  }     STATUS      current
DESCRIPTION        "This notification indicates that the Surveillance
feature is running."    ::= {tekelecLSMSEventsVer 19 }systemDiskSynch
NOTIFICATION-TYPE    OBJECTS     { eventNbr, driveSpecId  }     STATUS
current    DESCRIPTION        "This notification indicates that the system
disk has         lost synchronization, possibly due to a hardware
problem."    ::= {tekelecLSMSEventsVer 20 }dataReplError NOTIFICATION-
TYPE    OBJECTS     { eventNbr, dbReplErr  }     STATUS      current
DESCRIPTION        "This notification indicates that database replication
has failed."    ::= {tekelecLSMSEventsVer 21 }dbMonitorFail NOTIFICATION-
TYPE    OBJECTS     { eventNbr, dbMonErr  }     STATUS      current
DESCRIPTION        "This notification indicates that the DB process monitor
has failed."     ::= {tekelecLSMSEventsVer 22 }internalDiskError
NOTIFICATION-TYPE    OBJECTS     { eventNbr  }     STATUS      current
DESCRIPTION        "This notification indicates that Volume Manager does
not         recognize a shared disk that was logically replaced by
the         hot-spared disk."    ::= {tekelecLSMSEventsVer
23 }hotSparedDataResynch NOTIFICATION-TYPE    OBJECTS     { eventNbr,
shareDriveId, hotSpareDriveId  }     STATUS      current
DESCRIPTION        "This notification indicates that the hot-spare
feature         has completed automatic data resynchronization."    ::=
{tekelecLSMSEventsVer 24 }dbReplInfo NOTIFICATION-TYPE    OBJECTS
{ eventNbr, dbReplErr  }     STATUS      current    DESCRIPTION
"This notification indicates that DB replication delay threshold has
crossed."    ::= {tekelecLSMSEventsVer 25 }cpuUtilizationOver60 NOTIFICATION-
TYPE    OBJECTS     { eventNbr, processName, id2  }     STATUS      current
DESCRIPTION        "This notification indicates that the eagleagent
agent         or an NPACagent for a specific region is utilizing 79
percent or more of the LSMS's CPU resource."    ::= {tekelecLSMSEventsVer
26 }primaryServerInhibited NOTIFICATION-TYPE    OBJECTS     { eventNbr  }
STATUS      current    DESCRIPTION        "This notification indicates that
the primary servers         state is inhibited."    ::=
{tekelecLSMSEventsVer 27 }secondaryServerInhibited NOTIFICATION-TYPE
OBJECTS     { eventNbr  }     STATUS      current    DESCRIPTION        "This
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notification indicates that the secondary servers state is
inhibited."    ::= {tekelecLSMSEventsVer 28 }heartbeatLinkDown
NOTIFICATION-TYPE    OBJECTS    { eventNbr  }    STATUS
current    DESCRIPTION        "This notification indicates that a
Heartbeat link is down."    ::= {tekelecLSMSEventsVer
29 }heartbeatLinkTwoDown NOTIFICATION-TYPE    OBJECTS
{ eventNbr  }    STATUS      current    DESCRIPTION        "This
notification indicates that the Heartbeat 2 link is down."    ::=
{tekelecLSMSEventsVer 30 }lsmsNtwkConfigError NOTIFICATION-TYPE
OBJECTS    { eventNbr  }    STATUS      current    DESCRIPTION
"This notification indicates that the LSMS network configuration is
incorrect."    ::= {tekelecLSMSEventsVer 31 }networkConfigNotSupported
NOTIFICATION-TYPE    OBJECTS    { eventNbr  }    STATUS
current    DESCRIPTION        "This notification indicates that the
LSMS network configuration         is not supported or
recommended."    ::= {tekelecLSMSEventsVer
32 }emsRequiresResynchWithLSMS NOTIFICATION-TYPE    OBJECTS
{ eventNbr, neCLLI  }    STATUS      current    DESCRIPTION
"This notification indicates that an EMS (OAP) requires         a
resynchronization with the LSMS. See customer documentation
for database synchronization procedure."    ::= {tekelecLSMSEventsVer
33 }resynchLogMidFull NOTIFICATION-TYPE    OBJECTS    { eventNbr  }
STATUS      current    DESCRIPTION        "This notification indicates
that the network element         resynchronization database contains
more then 1000000         entries. Run devresync utility."    ::=
{tekelecLSMSEventsVer 34 }primaryEMSAssocLostNoSec NOTIFICATION-
TYPE    OBJECTS    { eventNbr, neCLLI  }    STATUS      current
DESCRIPTION        "This notification indicates that the LSMS has lost
association         with the primary EMS and the secondary association
is not established."    ::= {tekelecLSMSEventsVer 36 }lostNPACAssoc
NOTIFICATION-TYPE    OBJECTS    { eventNbr, npacId, npacRegionId  }
STATUS      current    DESCRIPTION        "This notification indicates
that the NPAC association was         disconnected gracefully by the
user."    ::= {tekelecLSMSEventsVer 37 }diskVolume95Usage NOTIFICATION-
TYPE    OBJECTS    { eventNbr, diskVolName  }    STATUS
current    DESCRIPTION        "This notification indicates that the
disk volume specified by         diskVolName has exceeded the 95
percent usage threshold."    ::= {tekelecLSMSEventsVer
38 }swapSpaceCritical NOTIFICATION-TYPE    OBJECTS    { eventNbr  }
STATUS      current    DESCRIPTION        "This notification indicates
that the server's system check         has raised a swap space
critical alarm."    ::= {tekelecLSMSEventsVer 39 }lsmsAppsNotRunning
NOTIFICATION-TYPE    OBJECTS    { eventNbr, processName  }
STATUS      current    DESCRIPTION        "This notification indicates
that a specific LSMS application         or system daemon is not
running."    ::= {tekelecLSMSEventsVer 40 }backupCompleted
NOTIFICATION-TYPE    OBJECTS    { eventNbr, backUpType  }
STATUS      current    DESCRIPTION        "This notification indicates
that a backup of the specified         LSMS disk (DATABASE or
FILESYSTEM) has completed successfully."    ::= {tekelecLSMSEventsVer
41 }backupFailed NOTIFICATION-TYPE    OBJECTS    { eventNbr,
backUpType  }    STATUS      current    DESCRIPTION        "This
notification indicates that a backup of the specified         LSMS
disk (DATABASE or FILESYSTEM) has failed."    ::=
{tekelecLSMSEventsVer 42 }emsPendingQueueHalfFull NOTIFICATION-TYPE
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OBJECTS    { eventNbr, neCLLI  }    STATUS      current
DESCRIPTION        "This notification indicates that the pending queue
used         to hold the transactions to send to the network element is over
half full."    ::= {tekelecLSMSEventsVer 43 }emsPendingQueueMaxReached
NOTIFICATION-TYPE    OBJECTS    { eventNbr, neCLLI  }    STATUS
current    DESCRIPTION        "This notification indicates that the pending
queue used to hold         the transactions to send to the network element
is completely full."    ::= {tekelecLSMSEventsVer 44 }failedNPACConnectivity
NOTIFICATION-TYPE    OBJECTS    { eventNbr, npacRegionId  }    STATUS
current    DESCRIPTION        "This notification indicates that the LSMS is
not able to         confirm the physical connectivity with the NPAC whose
NPAC region is npacRegionId"    ::= {tekelecLSMSEventsVer
45 }eagleAgentIgnoreRecord NOTIFICATION-TYPE    OBJECTS    { eventNbr,
neCLLI, eagleAgentDataErr  }    STATUS      current    DESCRIPTION
"This notification indicates that there was a data error in a record
preventing the eagleagent from sending it to the network element"    ::=
{tekelecLSMSEventsVer 46 }primaryServerNotOnline NOTIFICATION-TYPE
OBJECTS    { eventNbr  }    STATUS      current    DESCRIPTION        "This
notification indicates that the primary LSMS server is not online."    ::=
{tekelecLSMSEventsVer 63 }secServerNotPreparedForTakeover NOTIFICATION-
TYPE    OBJECTS    { eventNbr  }    STATUS      current
DESCRIPTION        "This notification indicates that the secondary LSMS
server         is not prepared to take over LSMS service."    ::=
{tekelecLSMSEventsVer 64 }secServerProvidingLSMSService NOTIFICATION-TYPE
OBJECTS    { eventNbr  }    STATUS      current    DESCRIPTION        "This
notification indicates that the secondary LSMS         server is currently
providing the LSMS service."    ::= {tekelecLSMSEventsVer
65 }secServerCannotDeterminePrimAvail NOTIFICATION-TYPE    OBJECTS
{ eventNbr  }    STATUS      current    DESCRIPTION        "This
notification indicates that the secondary LSMS         server cannot
determined the availability of the LSMS         service on the primary
server."    ::= {tekelecLSMSEventsVer 66 }serviceAssuranceAgentStarted
NOTIFICATION-TYPE    OBJECTS    { eventNbr  }    STATUS      current
DESCRIPTION        "This notification indicates that the Service
Assurance         agent has started successfully."    ::=
{tekelecLSMSEventsVer 67 }establishServAssuranceMgrAssoc NOTIFICATION-
TYPE    OBJECTS    { eventNbr, servAssuranceMgrName  }    STATUS
current    DESCRIPTION        "This notification indicates that the
association with         the Service Assurance manager has been established
successfully."    ::= {tekelecLSMSEventsVer 68 }servAssuranceMgrAssocBroken
NOTIFICATION-TYPE    OBJECTS    { eventNbr, servAssuranceMgrName  }
STATUS      current    DESCRIPTION        "This notification indicates that
the association with         the Service Assurance manager has been stopped
or disconnected."    ::= {tekelecLSMSEventsVer
69 }servAssuranceAgentNotRunning NOTIFICATION-TYPE    OBJECTS
{ eventNbr  }    STATUS      current    DESCRIPTION        "This
notification indicates that the Service         Assurance agent is not
currently running."    ::= {tekelecLSMSEventsVer
70 }noPhysicalConnectivityToDCM NOTIFICATION-TYPE    OBJECTS    { eventNbr,
neCLLI  }    STATUS      current    DESCRIPTION        "This notification
indicates that the LSMS is not         able to confirm physical connectivity
with the DCM."    ::= {tekelecLSMSEventsVer 73 }lsmsEagleAgentFailed
NOTIFICATION-TYPE    OBJECTS    { eventNbr, neCLLI  }    STATUS
current    DESCRIPTION        "This notification indicates that the LSMS
eagleagent         process has failed. The sentry daemon process will
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attempt to restart."    ::= {tekelecLSMSEventsVer
74 }lsmsEagleAgentRestarted NOTIFICATION-TYPE    OBJECTS
{ eventNbr, neCLLI  }    STATUS      current    DESCRIPTION
"This notification indicates that the LSMS eagleagent         process
has been successfully restarted by the sentry daemon process."    ::=
{tekelecLSMSEventsVer 75 }failureToRestartEagleAgent NOTIFICATION-
TYPE    OBJECTS    { eventNbr, neCLLI  }    STATUS      current
DESCRIPTION        "This notification indicates that the sentry
daemon         process was unable to restart the eagleAgent."    ::=
{tekelecLSMSEventsVer 76 }nPACagentForRegionFailure NOTIFICATION-
TYPE    OBJECTS    { eventNbr, nPACRegion  }    STATUS      current
DESCRIPTION        "This notification indicates that the NPACagent
process         for the region specified by nPACRegion has failed. The
sentry         daemon will attempt to restart the NPACagent
process."    ::= {tekelecLSMSEventsVer 78 }nPACagentForRegionRestarted
NOTIFICATION-TYPE    OBJECTS    { eventNbr, nPACRegion  }
STATUS      current    DESCRIPTION        "This notification indicates
that the NPACagent process         for the region specified by
nPACRegion has been successfully         restarted by the sentry
daemon."    ::= {tekelecLSMSEventsVer
79 }failureToRestartNPACagentRegion NOTIFICATION-TYPE    OBJECTS
{ eventNbr, nPACRegion  }    STATUS      current    DESCRIPTION
"This notification indicates that the sentry daemon process
was unable to restart the NPACagent process for the region specified
by nPACRegion."    ::= {tekelecLSMSEventsVer 80 }osiDeamonFailure
NOTIFICATION-TYPE    OBJECTS    { eventNbr  }    STATUS
current    DESCRIPTION        "This notification indicates that the
one of the Sunlink OSI daemons,         either osinetd or osilogd, has
failed. The lsmssentry process         will attempt to
restart."    ::= {tekelecLSMSEventsVer 88 }osiDeamonRestarted
NOTIFICATION-TYPE    OBJECTS    { eventNbr  }    STATUS
current    DESCRIPTION        "This notification indicates that the
osinetd or osilogd,         daemon has been successfully restarted by
the lsmssentry process."    ::= {tekelecLSMSEventsVer
89 }osiDeamonRestartFailure NOTIFICATION-TYPE    OBJECTS
{ eventNbr  }    STATUS      current    DESCRIPTION        "This
notification indicates that the lsmssentry process was not
able to restart the osinet or osilogd daemons."    ::=
{tekelecLSMSEventsVer 90 }lsmssentryFailure NOTIFICATION-TYPE
OBJECTS    { eventNbr  }    STATUS      current    DESCRIPTION
"This notification indicates that the Surveillance feature         has
detected that the sentry daemon process is no longer running."    ::=
{tekelecLSMSEventsVer 91 }iddAgentRestarted NOTIFICATION-TYPE
OBJECTS    { eventNbr  }    STATUS      current    DESCRIPTION
"This notification indicates that the surveillance process         has
detected that the Legacy lddAgent process has restarted and
all         functionality has resumed."    ::= {tekelecLSMSEventsVer
92 }scpmsIddAgentRestarted NOTIFICATION-TYPE    OBJECTS
{ eventNbr  }    STATUS      current    DESCRIPTION        "This
notification indicates that the surveillance process has
detected that the SCPMS lddAgent process has restarted and all
functionality has resumed."    ::= {tekelecLSMSEventsVer
93 }npacRejectedAssocAccessCtrlFail NOTIFICATION-TYPE    OBJECTS
{ eventNbr, npacId, npacRegionId  }    STATUS      current
DESCRIPTION        "This notification indicates that the NPAC aborted
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association         because it received a message from LSMS that failed
security checks."    ::= {tekelecLSMSEventsVer
95 }npacRejectedAssocInvalidData NOTIFICATION-TYPE    OBJECTS    { eventNbr,
npacId, npacRegionId  }    STATUS      current    DESCRIPTION        "This
notification indicates that the NPAC aborted         the association because
NPAC received invalid data from LSMS."    ::= {tekelecLSMSEventsVer
96 }emaAssociationAbortedQueueFull NOTIFICATION-TYPE    OBJECTS
{ eventNbr, neCLLI  }    STATUS      current    DESCRIPTION        "This
notification indicates that all associations to         the EMS are aborted,
since the pending queue used to hold         transactions to be send to the
EMS/NE is full."    ::= {tekelecLSMSEventsVer 97 }emsAssocAbortedMaxResend
NOTIFICATION-TYPE    OBJECTS    { eventNbr, neCLLI  }    STATUS
current    DESCRIPTION        "This notification indicates that all
associations to the EMS         are aborted, since the eagleagent has
already tried resending         the same message the maximum number of
times."    ::= {tekelecLSMSEventsVer 98 }assocRespNPACTimeout NOTIFICATION-
TYPE    OBJECTS    { eventNbr, npacId, npacRegionId  }    STATUS
current    DESCRIPTION        "This notification indicates that the LSMS did
not receive         an association response from the NPAC within the timeout
period.         The LSMS will attempt the association with the NPAC again
after         configurable amount of time."    ::= {tekelecLSMSEventsVer
100 }assocRejectedRetrySameHost NOTIFICATION-TYPE    OBJECTS    { eventNbr,
npacId, npacRegionId  }    STATUS      current    DESCRIPTION        "This
notification indicates that the NPAC association         was rejected by the
NPAC, and the LSMS was informed to         attempt the NPAC association
again to the same NPAC host         after configurable amount of
time."    ::= {tekelecLSMSEventsVer 101 }assocRejectedRetryOtherHost
NOTIFICATION-TYPE    OBJECTS    { eventNbr, npacId, npacRegionId  }
STATUS      current    DESCRIPTION        "This notification indicates that
the NPAC association was         rejected by the NPAC, and the LSMS was
informed to attempt         the NPAC association again to the other NPAC
host after after         configurable amount of time."    ::=
{tekelecLSMSEventsVer 102 }    nwtkProblemRetryNPACAssoc NOTIFICATION-
TYPE    OBJECTS    { eventNbr, npacId, npacRegionId  }    STATUS
current    DESCRIPTION        "This notification indicates that a problem
exists in         the network connectivity. The LSMS will attempt the
association         with the NPAC again after configurable amount of
time."    ::= {tekelecLSMSEventsVer 103 }lsmsAbortedNPACassocDowRecFail
NOTIFICATION-TYPE    OBJECTS    { eventNbr, npacId, npacRegionId  }
STATUS      current    DESCRIPTION        "This notification indicates that
the LSMS received         three consecutive responses from the NPAC with a
download         status of failure from a recovery request. The LSMS
has aborted the associations and will attempt to associate         again
after configurable amount of time. The LSMS will retry         the recovery
action after the association is reestablished."    ::= {tekelecLSMSEventsVer
104 }nwtkConnProblemNPACAssocAborted NOTIFICATION-TYPE    OBJECTS
{ eventNbr, npacId, npacRegionId  }    STATUS      current
DESCRIPTION        "This notification indicates that the NPAC association
was         aborted due to a network connectivity loss between the LSMS and
the NPAC."    ::= {tekelecLSMSEventsVer 105 }assocRejDueToAccessControl
NOTIFICATION-TYPE    OBJECTS    { eventNbr, npacId, npacRegionId  }
STATUS      current    DESCRIPTION        "This notification indicates that
the NPAC rejected         the association request because it could not
validate access control."    ::= {tekelecLSMSEventsVer
106 }npacAssocRejDuetoAccessDenied NOTIFICATION-TYPE    OBJECTS
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{ eventNbr, npacId, npacRegionId  }    STATUS      current
DESCRIPTION        "This notification indicates that the NPAC
rejected         the association with an indication of access
denied."    ::= {tekelecLSMSEventsVer 107 }npacConnFailedCMIP
NOTIFICATION-TYPE    OBJECTS    { eventNbr, npacId, npacRegionId  }
STATUS      current    DESCRIPTION        "This notification indicates
that the NPAC connection         attempt failed, because the userInfo
value in the cmipUserInfo         portion of the NPAC association
response CMIP message is invalid."    ::= {tekelecLSMSEventsVer
108 }npacAssocGracefullyTerminated NOTIFICATION-TYPE    OBJECTS
{ eventNbr, npacId, npacRegionId  }    STATUS      current
DESCRIPTION        "This notification indicates that the NPAC
association         was terminated gracefully by the NPAC."    ::=
{tekelecLSMSEventsVer 109 }lsmsDataLostBadResynch NOTIFICATION-TYPE
OBJECTS    { eventNbr, npacId, npacRegionId  }    STATUS
current    DESCRIPTION        "This notification indicates that the
LSMS was not         resynchronized properly with the NPAC. There are
multiple         steps in recovery. All steps failed."    ::=
{tekelecLSMSEventsVer 112 }badNPACresynchTime NOTIFICATION-TYPE
OBJECTS    { eventNbr, npacId, npacRegionId  }    STATUS
current    DESCRIPTION        "This notification indicates that the
LSMS was not         resynchronized properly with the NPAC. There
are         multiple steps in recovery. Some steps failed."    ::=
{tekelecLSMSEventsVer 113 }assocAbortedBadKeys NOTIFICATION-TYPE
OBJECTS    { eventNbr, npacId, npacRegionId  }    STATUS
current    DESCRIPTION        "This notification indicates that the
LSMS aborted         the NPAC association because the LSMS received a
message         from the NPAC that did not have the correct LSMS key
signature."    ::= {tekelecLSMSEventsVer 114 }scpmsMqSeriesFault
NOTIFICATION-TYPE    OBJECTS    { eventNbr  }    STATUS
current    DESCRIPTION        "This notification indicates that the
LDD SCPMS Confirmation         of Arrival message retry attempts have
been exhausted.         The MQSeries interface is not operational or
network connectivity         to the remote system is lost."    ::=
{tekelecLSMSEventsVer 116 }scpmsNotActive NOTIFICATION-TYPE
OBJECTS    { eventNbr  }    STATUS      current    DESCRIPTION
"This notification indicates that the LDD SCPMS system         has not
provided a response within the time limit specified         by the
LDD_SCP_SYSTEM_RESPONSE_TOMEOUT configuration parameter.         The
SCPMS system is not active."    ::= {tekelecLSMSEventsVer
117 }legacyMqSeriesFault NOTIFICATION-TYPE    OBJECTS
{ eventNbr  }    STATUS      current    DESCRIPTION        "This
notification indicates that the LDD Legacy Confirmation         of
Arrival message retry attempts have been exhausted.         The
MQSeries interface is not operational or network connectivity
to the remote system is lost."    ::= {tekelecLSMSEventsVer
118 }scpmsLegacyNotActive NOTIFICATION-TYPE    OBJECTS
{ eventNbr  }    STATUS      current    DESCRIPTION        "This
notification indicates that the LDD Legacy system         has not
provided a response within the time limit specified         by the
LDD_SCP_SYSTEM_RESPONSE_TOMEOUT configuration parameter.         The
SCPMS system is not active."    ::= {tekelecLSMSEventsVer
119 }mqQeriesQueueManagerNotActive NOTIFICATION-TYPE    OBJECTS
{ eventNbr, queueMgrName  }    STATUS      current
DESCRIPTION        "This notification indicates that A connection
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could not         be made to the MQSeries local queue manager. The
local         queue manager is not started or operational."    ::=
{tekelecLSMSEventsVer 120 }npacAutoAssociationRetryCanceled NOTIFICATION-
TYPE    OBJECTS    { eventNbr, npacId, npacRegionId  }    STATUS
current    DESCRIPTION        "This notification indicates that an NPAC
automatic associations         retry has been canceled."    ::=
{tekelecLSMSEventsVer 122 }npacRecoveryFailureResourceLimitation
NOTIFICATION-TYPE    OBJECTS    { eventNbr, npacId, npacRegionId,
retryTimes, npacRecoveryRetryInterval  }    STATUS      current
DESCRIPTION        "This notification indicates that the LSMS received a
response         from the NPAC with a download status of failure from a
recovery         action request. The NPAC is unable to process the recovery
action         due to a temporary resource limitation. The LSMS will retry
the         request after five minutes."    ::= {tekelecLSMSEventsVer
123 }npacAssocPeriodDowm NOTIFICATION-TYPE    OBJECTS    { eventNbr, npacId,
npacRegionId, fromPeriod, toPeriod  }    STATUS      current
DESCRIPTION        "This notification indicates that the NPAC association
will be         down for the specified period of time due to NPAC-scheduled
down time."    ::= {tekelecLSMSEventsVer
124 }npacAssocRequestSentAfterRetryTimer NOTIFICATION-TYPE    OBJECTS
{ eventNbr, npacId, npacRegionId  }    STATUS      current
DESCRIPTION        "This notification indicates that an associate request
has been         sent to the NPAC after retry timer has expired."    ::=
{tekelecLSMSEventsVer 125 }npanxxGTTValueNotFound NOTIFICATION-TYPE
OBJECTS    { eventNbr, neCLLI, operationCode  }    STATUS      current
DESCRIPTION        "This notification indicates that the EMS/NE has
rejected         the NPANXX GTT creation, deletion or modification
transaction,         and the NPANXX value in the transaction could not be
determined."    ::= {tekelecLSMSEventsVer 126 }npanxxGTTValueRejected
NOTIFICATION-TYPE    OBJECTS    { eventNbr, neCLLI, operationCode,
npanxxValue  }    STATUS      current    DESCRIPTION        "This
notification indicates that the EMS/NE has rejected         the NPANXX GTT
creation, deletion or modification transaction         for the specified
NPANXX value."    ::= {tekelecLSMSEventsVer 127 }overrideGTTValueNotFound
NOTIFICATION-TYPE    OBJECTS    { eventNbr, neCLLI, operationCode  }
STATUS      current    DESCRIPTION        "This notification indicates that
the EMS/NE has rejected         the Override GTT creation, deletion or
modification transaction,         and the LRN value in the transaction could
not be determined."    ::= {tekelecLSMSEventsVer
128 }overrideGTTValueRejected NOTIFICATION-TYPE    OBJECTS    { eventNbr,
neCLLI, operationCode, lRN  }    STATUS      current    DESCRIPTION
"This notification indicates that the EMS/NE has rejected         the
Override GTT creation, deletion or modification transaction         for the
specified LRN value."    ::= {tekelecLSMSEventsVer
129 }secondaryEMSAssocLost NOTIFICATION-TYPE    OBJECTS    { eventNbr,
neCLLI  }    STATUS      current    DESCRIPTION        "This notification
indicates that the LSMS has lost association         with the secondary EMS,
the primary association is still up."    ::= {tekelecLSMSEventsVer
130 }unableToCompleteAutoResynch NOTIFICATION-TYPE    OBJECTS    { eventNbr,
neCLLI  }    STATUS      current    DESCRIPTION        "This notification
indicates that the LSMS was not able to complete         automatic
synchronization with the EMS/NE."    ::= {tekelecLSMSEventsVer
131 }autoResynchNEStarted NOTIFICATION-TYPE    OBJECTS    { eventNbr,
neCLLI  }    STATUS      current    DESCRIPTION        "This notification
indicates that the LSMS has started its         automatic synchronization
```

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with the EMS/NE."    ::= {tekelecLSMSEventsVer 132 }dbResynchCompleted
NOTIFICATION-TYPE    OBJECTS    { eventNbr, npacId  }    STATUS
current    DESCRIPTION        "This notification indicates that the
Automatic resynchronization         of databases after an outage
between the LSMS and the NPAC has         completed
successfully."    ::= {tekelecLSMSEventsVer
133 }secondaryEMSAssocEstablished NOTIFICATION-TYPE    OBJECTS
{ eventNbr, neCLLI  }    STATUS      current    DESCRIPTION
"This notification indicates that the LSMS has established         the
second association with the EMS. This association is         only
established if a primary association already exists."    ::=
{tekelecLSMSEventsVer 134 }emsShortSynchCompleted NOTIFICATION-TYPE
OBJECTS    { eventNbr, neCLLI  }    STATUS      current
DESCRIPTION        "This notification indicates that the LSMS has
completed         Short Synchronization with the EMS."    ::=
{tekelecLSMSEventsVer 138 }transactionToSecondary NOTIFICATION-TYPE
OBJECTS    { eventNbr, neCLLI  }    STATUS      current
DESCRIPTION        "This notification indicates that the Primary EMS
association         is either down or is inhibited, such that
transaction sent to         the primary EMS will not be received by
the network element.         Transactions are being sent to the
secondary EMS instead of the primary EMS."    ::=
{tekelecLSMSEventsVer 139 }pendingQueueHalfFullClear NOTIFICATION-
TYPE    OBJECTS    { eventNbr  }    STATUS      current
DESCRIPTION        "This notification indicates that the EMS Pending
Queue is less than half full."    ::= {tekelecLSMSEventsVer
141 }pendingQueueFullClear NOTIFICATION-TYPE    OBJECTS
{ eventNbr  }    STATUS      current    DESCRIPTION        "This
notification indicates that the EMS Pending Queue is no longer
full."    ::= {tekelecLSMSEventsVer 142 }dcmConnectionRestored
NOTIFICATION-TYPE    OBJECTS    { eventNbr, neCLLI  }    STATUS
current    DESCRIPTION        "This notification indicates that
physical connection has been         restored with the DCM."    ::=
{tekelecLSMSEventsVer 143 }connToMqSeriesQueueMngrRest NOTIFICATION-
TYPE    OBJECTS    { eventNbr, queueMgrName  }    STATUS
current    DESCRIPTION        "This notification indicates that the
connection to the MQSeries         local queue manager has been
established following an outage."    ::= {tekelecLSMSEventsVer
144 }npaNxxOpenedForPortabilityAtTS NOTIFICATION-TYPE    OBJECTS
{ eventNbr, sPID, nPANXX, effectiveTimeStamp  }    STATUS
current    DESCRIPTION        "This notification indicates that the
specified NPA-NXX is opened         for portability starting at value
of the EffectiveTimeStamp field."    ::= {tekelecLSMSEventsVer
145 }npaNxxPortedAtTS NOTIFICATION-TYPE    OBJECTS    { eventNbr,
sPID, nPANXX, effectiveTimeStamp  }    STATUS      current
DESCRIPTION        "This notification indicates that the first
telephone number in         the specified NPA-NXX is ported stating at
the value of         the EffectiveTimeStamp field."    ::=
{tekelecLSMSEventsVer 146 }ebdaAuditActive NOTIFICATION-TYPE
OBJECTS    { eventNbr, neCLLI  }    STATUS      current
DESCRIPTION        "This notification indicates that an Audit is
currently running."    ::= {tekelecLSMSEventsVer 147 }ebdaAuditSuccess
NOTIFICATION-TYPE    OBJECTS    { eventNbr, neCLLI  }    STATUS
current    DESCRIPTION        "This notification indicates that an
Audit has completed successfully."    ::= {tekelecLSMSEventsVer
148 }ebdaAuditFailure NOTIFICATION-TYPE    OBJECTS    { eventNbr,
neCLLI  }    STATUS      current    DESCRIPTION        "This notification
indicates that an Audit has failed."    ::= {tekelecLSMSEventsVer
149 }ebdaAuditAbortedByUser NOTIFICATION-TYPE    OBJECTS    { eventNbr,
neCLLI  }    STATUS      current    DESCRIPTION        "This notification
indicates that an Audit has been aborted by         the user prior to
completion."    ::= {tekelecLSMSEventsVer 150 }ebdaReconcileActive
NOTIFICATION-TYPE    OBJECTS    { eventNbr, neCLLI  }    STATUS
current    DESCRIPTION        "This notification indicates that a reconcile
is currently running."    ::= {tekelecLSMSEventsVer
151 }ebdaReconcileSuccess NOTIFICATION-TYPE    OBJECTS    { eventNbr,
neCLLI  }    STATUS      current    DESCRIPTION        "This notification
indicates that a reconcile has completed successfully."    ::=
{tekelecLSMSEventsVer 152 }ebdaReconcileFailure NOTIFICATION-TYPE
OBJECTS    { eventNbr, neCLLI  }    STATUS      current
DESCRIPTION        "This notification indicates that a reconcile has
failed."    ::= {tekelecLSMSEventsVer 153 }ebdaReconcileAbortedByUser
NOTIFICATION-TYPE    OBJECTS    { eventNbr, neCLLI  }    STATUS
current    DESCRIPTION        "This notification indicates that a reconcile
has been         aborted by the user prior to completion."    ::=
{tekelecLSMSEventsVer 154 }ebdaBulkLoadActive NOTIFICATION-TYPE
OBJECTS    { eventNbr, neCLLI  }    STATUS      current
DESCRIPTION        "This notification indicates that a bulk load is
currently running."    ::= {tekelecLSMSEventsVer 159 }ebdaBulkLoadSuccess
NOTIFICATION-TYPE    OBJECTS    { eventNbr, neCLLI  }    STATUS
current    DESCRIPTION        "This notification indicates that a bulk load
has completed successfully."    ::= {tekelecLSMSEventsVer 160 }
ebdaBulkLoadFailure NOTIFICATION-TYPE    OBJECTS    { eventNbr, neCLLI  }
STATUS      current    DESCRIPTION        "This notification indicates that
a bulk load has failed."    ::= {tekelecLSMSEventsVer
161 }ebdaBulkLoadAbortedByUser NOTIFICATION-TYPE    OBJECTS    { eventNbr,
neCLLI  }    STATUS      current    DESCRIPTION        "This notification
indicates that a bulk load has been         aborted by the user prior to
completion."    ::= {tekelecLSMSEventsVer 162 }ebdaResyncActive NOTIFICATION-
TYPE    OBJECTS    { eventNbr, neCLLI  }    STATUS      current
DESCRIPTION        "This notification indicates that a re-sync is currently
running."    ::= {tekelecLSMSEventsVer 163 }ebdaResyncSuccess NOTIFICATION-
TYPE    OBJECTS    { eventNbr, neCLLI  }    STATUS      current
DESCRIPTION        "This notification indicates that a re-sync has completed
successfully."    ::= {tekelecLSMSEventsVer 164 }ebdaResyncFailure
NOTIFICATION-TYPE    OBJECTS    { eventNbr, neCLLI  }    STATUS
current    DESCRIPTION        "This notification indicates that a re-sync
has failed."    ::= {tekelecLSMSEventsVer 165 }ebdaResyncAbortedByUser
NOTIFICATION-TYPE    OBJECTS    { eventNbr, neCLLI  }    STATUS
current    DESCRIPTION        "This notification indicates that a re-sync
has been aborted         by the user prior to completion."    ::=
{tekelecLSMSEventsVer 166 }sprintIddAgentCommFailureLegSys NOTIFICATION-
TYPE    OBJECTS    { eventNbr  }    STATUS      current
DESCRIPTION        "This notification indicates that the Sprint lddAgent has
failed         to communicate with the Sprint Legacy System."    ::=
{tekelecLSMSEventsVer 167 }sprintIddAgentCommFailureScpmsSys NOTIFICATION-
TYPE    OBJECTS    { eventNbr  }    STATUS      current
DESCRIPTION        "This notification indicates that the Sprint lddAgent has
failed         to communicate with the Sprint SCPMS System."    ::=
{tekelecLSMSEventsVer 168 }lsmsMirroringInconsistance NOTIFICATION-TYPE
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OBJECTS    { eventNbr, volumeName  }    STATUS      current
DESCRIPTION        "This notification indicates an LSMS mirroring
inconsistentane."    ::= {tekelecLSMSEventsVer
169 }lsmsFilesystemNotWritable NOTIFICATION-TYPE    OBJECTS
{ eventNbr, fileSystem  }    STATUS      current    DESCRIPTION
"This notification indicates that the LSMS filesystem is not
writeable."    ::= {tekelecLSMSEventsVer
170 }automaticFileTransferFeatureFailure NOTIFICATION-TYPE
OBJECTS    { eventNbr  }    STATUS      current    DESCRIPTION
"This notification indicates that the Automatic File         Transfer
feature has a failure."    ::= {tekelecLSMSEventsVer
171 }npaSplitActFailed NOTIFICATION-TYPE    OBJECTS    { eventNbr,
oldNPA, newNPA, nXX  }    STATUS      current    DESCRIPTION
"This notification indicates the failure of an NPASplit
activation."    ::= {tekelecLSMSEventsVer
172 }activeSplitsPastEndDates NOTIFICATION-TYPE    OBJECTS
{ eventNbr  }    STATUS      current    DESCRIPTION        "This
notification indicates that some active splits are past        their
End Dates and should be deleted."    ::= {tekelecLSMSEventsVer
173 }lddScpmsAgentSwitchToBackupScpms NOTIFICATION-TYPE    OBJECTS
{ eventNbr  }    STATUS      current    DESCRIPTION        "This
notification indicates the LDD SCPMS agent is switching from
primary to backup SCPMS system."    ::= {tekelecLSMSEventsVer
174 }lddScpmsAgentSwitchFromBackupToPrim NOTIFICATION-TYPE
OBJECTS    { eventNbr  }    STATUS      current    DESCRIPTION
"This notification indicates the LDD SCPMS agent is switching
from backup to primary SCPMS system."    ::= {tekelecLSMSEventsVer
175 }lddScpmsPrimary NOTIFICATION-TYPE    OBJECTS    { eventNbr  }
STATUS      current    DESCRIPTION        "This notification indicates
the LDD SCPMS current system is primary SCPMS."    ::=
{tekelecLSMSEventsVer 176 }lddScpmsBackup NOTIFICATION-TYPE
OBJECTS    { eventNbr  }    STATUS      current    DESCRIPTION
"This notification indicates the LDD SCPMS current system is backup
SCPMS."    ::= {tekelecLSMSEventsVer
177 }emsNeRejNpaNxxSplitNotDetermined NOTIFICATION-TYPE    OBJECTS
{ eventNbr, neCLLI, operationCode  }    STATUS      current
DESCRIPTION        "This notification indicates that the EMS/NE has
rejected         the NPANXX Split creation or deletion transaction,
and         the NPANXX value in the transaction could not be
determined."    ::= {tekelecLSMSEventsVer
178 }emsNeRejectedNpaNxxSplit NOTIFICATION-TYPE    OBJECTS
{ eventNbr, neCLLI, operationCode, nPANXX  }    STATUS      current
DESCRIPTION        "This notification indicates that the EMS/NE has
rejected         the NPANXX Split creation or deletion transaction
for         the specified NPANXX value."    ::= {tekelecLSMSEventsVer
179 }physicalConnectivityWithQueryServerLost NOTIFICATION-TYPE
OBJECTS    { eventNbr, hostname  }    STATUS      current
DESCRIPTION        "This notification indicates that the LSMS is not
able to confirm        the physical connectivity with the Query Server
for the specified        hostname."    ::= {tekelecLSMSEventsVer
180 }queryServerConnectionWithLsmsLost NOTIFICATION-TYPE    OBJECTS
{ eventNbr, hostname  }    STATUS      current    DESCRIPTION
"This notification indicates that the Query Server identified
by        the hostname does not have a connection with the
LSMS."    ::= {tekelecLSMSEventsVer 181 }nPACagentStopRegDBaccessFault
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NOTIFICATION-TYPE    OBJECTS    { eventNbr, nPACRegion  }    STATUS
current    DESCRIPTION        "This notification indicates that the
NPACagent process has been        stopped due to fault in accessing the
regional database."    ::= {tekelecLSMSEventsVer 189 }swapSpaceWarning
NOTIFICATION-TYPE    OBJECTS    { eventNbr  }    STATUS      current
DESCRIPTION        "This notification indicates that the server's system
check has         raised a swap space warning alarm."    ::=
{tekelecLSMSEventsVer 190 }minorPlatAlarmMask NOTIFICATION-TYPE
OBJECTS    { eventNbr, alarmBitMask  }    STATUS      current
DESCRIPTION        "This notification indicates that minor Platform alarms
have        been raised as indicated by the alarm BitMask."    ::=
{tekelecLSMSEventsVer 191 }majorPlatAlarmMask NOTIFICATION-TYPE
OBJECTS    { eventNbr, alarmBitMask  }    STATUS      current
DESCRIPTION            "This notification indicates that major Platform
alarms have        been raised as indicated by the alarm BitMask."    ::=
{tekelecLSMSEventsVer 192 }criticalPlatAlarmMask NOTIFICATION-TYPE
OBJECTS    { eventNbr, alarmBitMask  }    STATUS      current
DESCRIPTION        "This notification indicates that critical Platform
alarms have        been raised as indicated by the alarm BitMask."    ::=
{tekelecLSMSEventsVer 193 }svNpbPercentUsage NOTIFICATION-TYPE    OBJECTS
{ eventNbr, svNpbThreshold, svNpbUsage  }    STATUS      current
DESCRIPTION        "This notification indicates that the SV/NPB storage
database        has exceeded the configured percent usage threshold."    ::=
{tekelecLSMSEventsVer 194 }dataReplClear NOTIFICATION-TYPE    OBJECTS
{ eventNbr, dbReplErr  }    STATUS      current    DESCRIPTION        "This
notification indicates that the system is ready for database
replication."    ::= {tekelecLSMSEventsVer 195 }dbMonitorClear NOTIFICATION-
TYPE    OBJECTS    { eventNbr, dbMonErr  }    STATUS      current
DESCRIPTION        "This notification indicates that the DB process monitor
has been cleared."     ::= {tekelecLSMSEventsVer 196 }
minorPlatAlarmClear NOTIFICATION-TYPE    OBJECTS    { eventNbr  }
STATUS      current    DESCRIPTION        "This notification indicates that
the server's system check process has cleared all minor platform
alarms."     ::= {tekelecLSMSEventsVer 197 }    majorPlatAlarmClear
NOTIFICATION-TYPE    OBJECTS    { eventNbr  }    STATUS      current
DESCRIPTION        "This notification indicates that the server's system
check process has cleared all major platform alarms."     ::=
{tekelecLSMSEventsVer 198 }    criticalPlatAlarmClear NOTIFICATION-TYPE
OBJECTS    { eventNbr  }    STATUS      current    DESCRIPTION        "This
notification indicates that the server's system check process has cleared
all critical platform alarms."     ::= {tekelecLSMSEventsVer
199 }dbCorruptIndex NOTIFICATION-TYPE    OBJECTS   { eventNbr,
dbMonErr  }    STATUS      current    DESCRIPTION        "This notification
indicates that the LSMS database has corruption."    ::=
{tekelecLSMSEventsVer 200 }invalidSnapshot NOTIFICATION-TYPE    OBJECTS
{ eventNbr, dbMonErr  }    STATUS      current    DESCRIPTION
"This notification indicates that the LSMS server has an Invalid
Snapshot."    ::= {tekelecLSMSEventsVer 201 }invalidSnapshotClear
NOTIFICATION-TYPE    OBJECTS   { eventNbr, dbMonErr  }    STATUS
current    DESCRIPTION            "This notification indicates that the
Invalid Snapshot has been cleared from the LSMS server."    ::=
{tekelecLSMSEventsVer 202 }fullSnapshot NOTIFICATION-TYPE    OBJECTS
{ eventNbr, dbMonErr  }    STATUS      current    DESCRIPTION
"This notification indicates that the snapshot space usage is greater than
the MAX_USAGE percent."    ::= {tekelecLSMSEventsVer 203 }fullSnapshotClear
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NOTIFICATION-TYPE    OBJECTS   { eventNbr, dbMonErr  }    STATUS
current    DESCRIPTION            "This notification indicates that
the snapshot full space usage Error is cleared."    ::=
{tekelecLSMSEventsVer 204 }mateServerDown NOTIFICATION-TYPE
OBJECTS    { eventNbr  }    STATUS      current    DESCRIPTION
"This notification indicates that mate server is Down."    ::=
{tekelecLSMSEventsVer 205 }mateServerUp NOTIFICATION-TYPE    OBJECTS
{ eventNbr  }    STATUS      current    DESCRIPTION        "This
notification indicates that mate server is Up."    ::=
{tekelecLSMSEventsVer 206 }svNpbBelowLimit NOTIFICATION-TYPE
OBJECTS    { eventNbr, svNpbThreshold, svNpbUsage  }    STATUS
current    DESCRIPTION        "This notification indicates that the
SV/NPB storage database         usage is below the configured percent
usage threshold."    ::= {tekelecLSMSEventsVer 207 }mysqlPortUpdated
NOTIFICATION-TYPE    OBJECTS   { eventNbr, oldMySQLPortNumber,
newMySQLPortNumber  }    STATUS      current    DESCRIPTION
"This notification indicates that the MySQL Port has been updated.
LSMS application restart is required."    ::= {tekelecLSMSEventsVer
208 }queryServerResetConfiguration NOTIFICATION-TYPE    OBJECTS
{ eventNbr, oldMySQLPortNumber, newMySQLPortNumber  }    STATUS
current    DESCRIPTION        "This notification indicates that the
MySQL Port has been updated. Query Server configuration needs to be
updated."    ::= {tekelecLSMSEventsVer 209 }purgeConfirmRequired
NOTIFICATION-TYPE    OBJECTS   { eventNbr  }    STATUS      current
DESCRIPTION        "This notification indicates that at least one of
the directly connected query server is out of sync and binary log
purging requires confirmation from the user."    ::=
{tekelecLSMSEventsVer 210 }purgeImminent NOTIFICATION-TYPE
OBJECTS    { eventNbr, binlogsThreshold  }    STATUS      current
DESCRIPTION            "This notification indicates that the disk
usage is reaching the threshold and forceful purge of binary logs is
imminent."    ::= {tekelecLSMSEventsVer 211 }resyncStartTrap
NOTIFICATION-TYPE    OBJECTS   { lsmsUptime, sourceIP }    STATUS
current    DESCRIPTION "The trap is sent by the LSMS to NMS when the
LSMS is about to start resynchronization"    ::= {tekelecLSMSEventsVer
212 }resyncStopTrap    NOTIFICATION-TYPE    OBJECTS    { lsmsUptime,
sourceIP, resyncEventCnt, resyncErrCode }    STATUS      current
DESCRIPTION "The trap is sent by the LSMS to NMS when
resynchronization is complete"    ::= {tekelecLSMSEventsVer
213 }resyncRejectTrap    NOTIFICATION-TYPE    OBJECTS    { lsmsUptime,
sourceIP, resyncErrCode }    STATUS      current    DESCRIPTION "The
trap is sent by the LSMS to NMS when a resynchronization request is
rejected by LSMS "    ::= {tekelecLSMSEventsVer
214 }resyncRequiredTrap    NOTIFICATION-TYPE    OBJECTS
{ lsmsUptime, sourceIP }    STATUS      current    DESCRIPTION "The
trap is sent by the LSMS to NMS when the LSMS is rebooted or LSMS is
started"    ::= {tekelecLSMSEventsVer 215 }heartBeatTrap
NOTIFICATION-TYPE    OBJECTS   { lsmsUptime, sourceIP }    STATUS
current    DESCRIPTION "The trap is sent by the LSMS to NMS
periodically to indicate that the LSMS is up"    ::=
{tekelecLSMSEventsVer 216 }lsmsAlarmTrapV3    NOTIFICATION-TYPE
OBJECTS    { currentTime,specificOid ,sourceIP,
alarmSequence,specificAlarm}    STATUS  current    DESCRIPTION "The
trap will indicate that the following information is for a perticular
event"    ::= {tekelecLSMSEventsVer 217 }resyncErrCode   OBJECT-
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TYPE    SYNTAX  OCTET STRING    MAX-ACCESS  read-only    STATUS  current
DESCRIPTION            "errorCode = 0, Resynchronization completed
successfully.            errorCode = 1, Resynchronization aborted by
NMS.             errorCode = 2, Resynchronization already in progress for
the NMS.             errorCode = 3, Resynchronization Aborted, Database
error occurred.             errorCode = 4, Resynchronization not in
progress."    ::= { tekelecLSMSEventsVer 218 }END
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LSMS-NAS-MIB

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LSMS-NAS-MIB DEFINITIONS ::= BEGIN-- Copyright 2000 Tekelec
CorporationIMPORTS    enterprises     FROM RFC1155-SMI    OBJECT-TYPE
FROM RFC-1212    TRAP-TYPE       FROM RFC-1215;tekelecCorp OBJECT
IDENTIFIER ::= { enterprises 323 }tekelecPrivate          OBJECT
IDENTIFIER ::= { tekelecCorp  1 }tekelecRegistration     OBJECT
IDENTIFIER ::= { tekelecCorp  2 }tekelecGeneric          OBJECT
IDENTIFIER ::= { tekelecCorp  3 }tekelecCapabilities     OBJECT
IDENTIFIER ::= { tekelecCorp  4 }tekelecProductGroups    OBJECT
IDENTIFIER ::= { tekelecCorp  5 }tekelecRequirements     OBJECT
IDENTIFIER ::= { tekelecCorp  6 }tekelecExperimental     OBJECT
IDENTIFIER ::= { tekelecCorp  7 }tekelecCallCenterGroup  OBJECT
IDENTIFIER ::= { tekelecProductGroups  1 }tekelecDiagnosticsGroup OBJECT
IDENTIFIER ::= { tekelecProductGroups  2 }tekelecSwitchingGroup   OBJECT
IDENTIFIER ::= { tekelecProductGroups  3 }experimental            OBJECT
IDENTIFIER ::= { tekelecSwitchingGroup  1 }generic                 OBJECT
IDENTIFIER ::= { tekelecSwitchingGroup  2 }tekelecEAGLE            OBJECT
IDENTIFIER ::= { tekelecSwitchingGroup  3 }tekelecLSMS             OBJECT
IDENTIFIER ::= { tekelecSwitchingGroup  4 }tekelecOAP              OBJECT
IDENTIFIER ::= { tekelecSwitchingGroup  5 }tekelecIP7              OBJECT
IDENTIFIER ::= { tekelecSwitchingGroup  6 }tekelecINSIGHT7         OBJECT
IDENTIFIER ::= { tekelecSwitchingGroup  7 }tekelecTALON            OBJECT
IDENTIFIER ::= { tekelecSwitchingGroup  8 }tekelecVOX              OBJECT
IDENTIFIER ::= { tekelecSwitchingGroup  9 }tekelecSCP              OBJECT
IDENTIFIER ::= { tekelecSwitchingGroup  10 }tekelecIVR              OBJECT
IDENTIFIER ::= { tekelecSwitchingGroup  11 }tekelecNetworkSwitch    OBJECT
IDENTIFIER ::= { tekelecSwitchingGroup  12 }-- LSMS Object group sub-
treetekelecLSMSObjects OBJECT IDENTIFIER ::= { tekelecLSMS 1 }-- LSMS
Product Events sub-treetekelecLSMSEvents OBJECT IDENTIFIER ::= { tekelecLSMS
2 }-- LSMS Events Object group sub-treetekelecLSMSEventObjects OBJECT
IDENTIFIER ::= { tekelecLSMSObjects 1 }-- LSMS SNMPv1
EventstekelecLSMSEventsV1 OBJECT IDENTIFIER ::= { tekelecLSMSEvents
0 }         volumeNearlyFull TRAP-TYPE        ENTERPRISE
tekelecLSMSEventsV1        DESCRIPTION                "At least one volume
is more than 95% full.                The string sent with the trap gives
the                 name of the volume or volumes which exceed
the threshold."        ::= 212        volumeRepaired  TRAP-TYPE
ENTERPRISE      tekelecLSMSEventsV1        DESCRIPTION                "All
volumes are now under 95% full."        ::= 213        diskFailed      TRAP-
TYPE        ENTERPRISE      tekelecLSMSEventsV1
DESCRIPTION                "One or more disks failed.                The
trap includes a string describing the failed disk(s)."        ::= 214
diskRepaired    TRAP-TYPE        ENTERPRISE      tekelecLSMSEventsV1
DESCRIPTION                "The failed disks have been repaired."        ::=
215END
```

The LSMS SNMP Agent Implementation

The **LSMS SNMP** agent process supports only the **SNMP** version 1 *trap* operation. The **SNMP** agent receives (through **UDP** Linux sockets) **LSMS** notification events from the following processes and formats these events into *trap* requests:

- The Surveillance process, which continually monitors the **LSMS** hardware and software.
- The **LSMS** graphical user interface (**GUI**) process.
- One or more regional agent (`npacagent`) processes, each of which receives commands from Number Portability Administration Centers (**NPACs**) and the **GUI** process, interprets those commands, and initiates appropriate **LSMS** activities to manage regional **NPAC** data. The **LSMS** can support up to eight regions; each region corresponds to an **NPAC**.
- One or more `eagleagent` processes, each of which receives commands from the **GUI** process, interprets those commands, and initiates appropriate **LSMS** activities to send data to the network elements. The **LSMS** can support up to eight pairs of network elements.
- The Local Data Manager (`supman`) process, which manages locally provisioned data that is entered through the **GUI** and sent to the network elements which the **LSMS** supports.

The **LSMS SNMP** agent formats the information received from these processes into an **SNMPv1** *trap* protocol data unit (**PDU**) and sends the *trap* request to one or more **NMSs**. Each **NMS** (provided by the customer) has a local copy of the **LSMS MIB**. When the **NMS** receives a *trap* request from the **LSMS**, it compares the information in the *trap* request to information in its own **MIB** to determine what event has occurred at the **LSMS**.

For information about the format of a *trap* and which events are reported in traps, see Automatic Monitoring of Events

Configuring the SNMP Agent

If you install the optional Remote Monitoring feature, refer to the *Configuration Guide* to configure the **IP** addresses and community names for each of the **NMSs** to which you want the **LSMS** to send *trap* requests. You can also perform this procedure if you want to add or delete **NMSs** after you have started the **LSMS**. The **LSMS** can support up to five **NMSs** simultaneously.

Controlling the SNMP Agent

If the optional Remote Monitoring feature is installed, it is managed by the sentry process (`sentryd`) and can also be controlled by the user.

After the **LSMS** boots up, the sentry process (`sentryd`) constantly monitors the **LSMS SNMP** agent process. If the **SNMP** agent process exits abnormally, the sentry process (`sentryd`) restarts it.

Any user who belongs to the `lsmsadm` permission group can use the `lsmsSNMP` command to start, stop, or display status of the **LSMS SNMP** agent.

Stopping the SNMP Agent

Perform the following procedure to stop the **SNMP** agent process:

1. Log in to the active server as a member of the `lsmsadm` permission group.
2. To stop the **SNMP** agent, enter the following command:

   ```
   $LSMS_DIR/lsmsSNMP stop
   ```

Starting the SNMP Agent

Perform the following procedure to start the **SNMP** agent process:

1. Log in to the active server as a member of the `lsmsadm` permission group.
2. To start the **SNMP** agent, enter the following command:

   ```
   $LSMS_DIR/lsmsSNMP start
   ```

Determining the Status of the SNMP Agent

Perform the following procedure to determine the status of the **SNMP** agent process:

1. Log in to the active server as a member of the `lsmsadm` permission group.
2. To retrieve the status of the **SNMP** agent, enter the following command:

   ```
   $ $LSMS_DIR/lsmsSNMP status
   ```

   Output similar to the following appears:

   ```
   Checking the status of the LSMS SNMP Agent...
   LSMS SNMP agent is running.
   LSMS SNMP AGENT PROCESS STATUS

   TOTAL SUCCESSFUL TRAP REQUEST = 2926

   TOTAL FAILED TRAP REQUEST = 0


   == IP-ADDRESS == == STATUS ==

   SNMP SESSION ESTABLISHED 10.250.54.19
   finish

   LSMS SNMP Resync is running.

   LSMS Heartbeatsender is running.
   ```

   This output provides the following information:

   - A title line to indicate that the output is **LSMSSNMP** agent process status
   - The total number of successful **SNMP** trap requests sent by the **LSMSSNMP** agent since it started

- The total number of failed **SNMP** trap requests sent by the **LSMSSNMP** agent since it started
- The status of each **UDP** socket session to an **NMS**, along with the **IP** address of the **NMS**:
  - `Failed` indicates that an SNMP session was never established
  - `SNMP Session Established` indicates that the session was successfully established

Logging SNMP Agent Actions

When the **LSMS SNMP** agent process starts, stops, or sends a *trap* request, it logs information about the action in a log file. The log file is named `lsmsSNMP.log<MMDD>`, where `<MMDD>` represents the current month and day. The log file is stored in the directory `/usr/TKLC/lsms/logs/snmp` and is automatically deleted after 7 days. If either the log file or its directory does not already exist, the agent process creates the file or the directory, or both, when one of these actions occurs.

The log file has a maximum size of 5 MB. After the log is completely filled, its contents are copied to a backup file `lsmsSNMP.log.backup` in the same directory, and actions are logged from the beginning of a fresh `lsmsSNMP.log` file.

For more information about what is logged in this file, see “Logging **SNMP** Agent Actions”.

Configuring the SNMP Agent

To configure trap forwarding, follow these general steps:

1. Set the SNMP global mode as needed.
   See SNMP Global Mode.

   If the **SNMPv1 ONLY** mode is set, skip to step 5.

   > **Note:**
   >
   > SNMPv1 provides no authentication and no privacy.

2. Configure SNMPv3 views.
   See SNMPv3 Access View Management.
3. Configure one or more SNMPv3 groups that use the SNMPv3 views.
   See SNMPv3 Group Management.
4. Configure SNMPv3 users associated with the SNMPv3 groups.
   See SNMPv3 User Management.
5. Configure the NMS on LSMS.
   See NMS Configuration.
6. Configure the NMS.
   To see what was configured in step 5, use **SNMP Configuration**, and then **NMS Configuration**, and then **Show**.

SNMP Global Mode

LSMS supports three SNMP global modes:

- **SNMPv1 ONLY**
- **SNMPv3 ONLY**
- **Both**

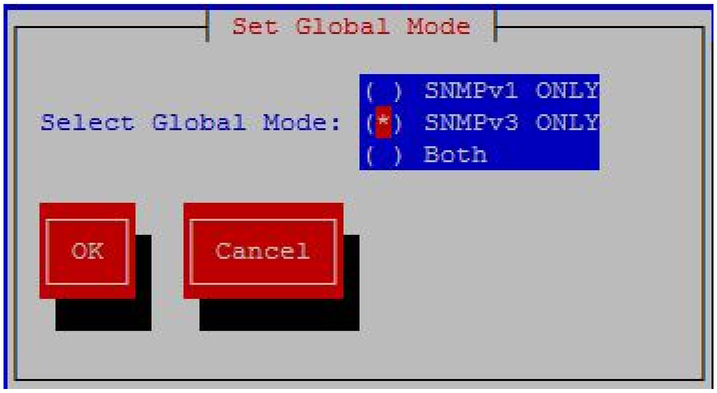
By default after a fresh installation or upgrade/re-installation, LSMS supports only the **SNMPv3 ONLY** global mode. SNMPv3 trap forwarding is recommended because of the encryption and secured authentication mechanisms provided.

For SNMPv1 trap forwarding, you can choose to change the SNMP global mode setting to **Both** or **SNMPv1 ONLY**.

> **Note:**
>
> SNMPv1 provides no authentication and no privacy.

The lsmsmgr user can change the SNMP global mode setting via menu option **SNMP Configuration**, and then **SNMP Global Mode**, and then choosing the **Edit** button. The following screen is displayed:

Figure 2-8   Set Global Mode



Select Global Mode:
( ) SNMPv1 ONLY
(*) SNMPv3 ONLY
( ) Both

Following are details on the SNMP global modes:

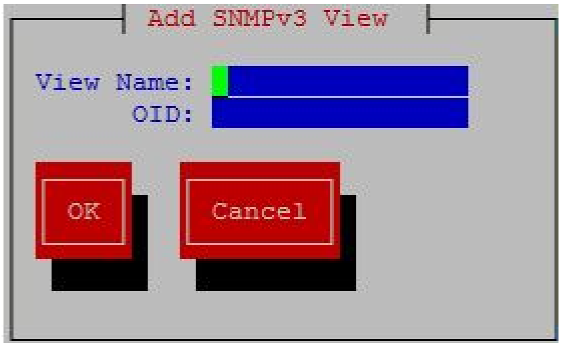
- **SNMPv1 ONLY**
  Selecting this mode results in LSMS supporting only SNMPv1 as follows:
  - LSMS will forward SNMPv1 traps to only NMS(s) configured to support SNMPv1.
  - LSMS will allow addition of any new NMS that supports SNMPv1, and will not allow modification of an existing SNMPv1-based NMS to SNMPv3.
  - Prior to changing the mode to **SNMPv3 ONLY**, any NMS(s) configured (as in NMS Configuration) to support SNMPv1 must be removed.

- **SNMPv3 ONLY (recommended mode)**
  Selecting this mode results in LSMS supporting only SNMPv3 as follows:
  - LSMS will forward SNMPv3 traps to only NMS(s) configured to support SNMPv3.
  - LSMS will allow addition of any new NMS that supports SNMPv3, and will not allow modification of an existing SNMPv3-based NMS to SNMPv1.
  - Prior to changing the mode to **SNMPv1 ONLY**, any NMS(s) configured (as in NMS Configuration) to support SNMPv3 must be removed. Changing the mode to **SNMPv1 ONLY** is not recommended.
- **Both**
  Selecting this mode results in LSMS supporting both SNMPv1 and SNMPv3 as follows:
  - LSMS will forward traps to all NMS(s) configured to support SNMPv1 or SNMPv3.
  - LSMS will allow addition of any new NMS that supports SNMPv1 or SNMPv3.
  - LSMS will allow update of any NMS that supports SNMPv1 or SNMPv3.
  - Prior to changing the mode to **SNMPv3 ONLY**, any NMS(s) configured (as in NMS Configuration) to support SNMPv1 must be removed.
  - Prior to changing the mode to **SNMPv1 ONLY**, any NMS(s) configured (as in NMS Configuration) to support SNMPv3 must be removed. Changing the mode to **SNMPv1 ONLY** is not recommended.

SNMPv3 Access View Management

To support view-based access control for SNMPv3, LSMS provides the **SNMP Configuration**, and then **SNMPv3 View Configuration**, and then **Add/Delete/Edit/Show** menu options. These menu options are accessible only when the SNMP Global Mode is set to **SNMPv3 ONLY** or **Both**. Following is an example of the **Add** menu.

Figure 2-9   Add SNMPv3 View Screen



The **SNMP Configuration**, and then **SNMPv3 View Configuration** submenus include fields for the **View Name** and the **OID** of the associated LSMS MIB object.

View names must be unique, 1 - 32 alphanumeric characters in length, and are case sensitive. The OID associated with a view is mandatory.

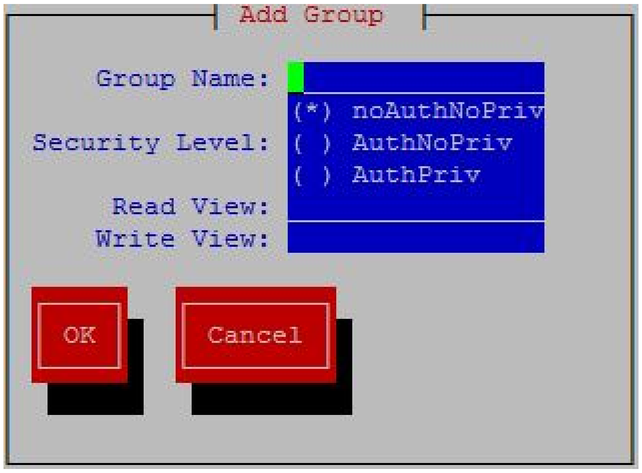
The **resyncVar** object with OID 1.3.6.1.4.1.323.5.3.4.1.1.45 is the only object available in the LSMS MIB for read/write operations by a NMS. By default, LSMS provides a view named **resyncVarView** that is sufficient for controlling read/write access to the **resyncVar** object. The **resyncVarView** cannot be modified or deleted. Use of another OID for view configuration is not restricted.

A view that is associated to any group cannot be deleted. For information about groups, see SNMPv3 Group Management.

SNMPv3 Group Management

To support user-based security for SNMPv3, LSMS provides the **SNMP Configuration**, and then **Group Configuration**, and then **Add/Delete/Edit/Show** menu options. These menu options are accessible only when the SNMP Global Mode is set to **SNMPv3 ONLY** or **Both**. Following is an example of the **Add** menu.

Figure 2-10 Add Group Screen



Group Name:
Security Level: (*) noAuthNoPriv
( ) AuthNoPriv
( ) AuthPriv
Read View:
Write View:

The **Group Name** must be unique, 1 - 32 alphanumeric characters in length, and is case sensitive.

The **Security Level** is mandatory. Valid values are **noAuthNoPriv**, **AuthNoPriv**, and **AuthPriv** as shown in Table 2-6.

Table 2-6 SNMPv3 Security Levels

Level	Authentication	Encryption	Details
noAuthNoPriv (no authentication, no privacy)	Username	No	Uses a username match for authentication
AuthNoPriv (authentication, no privacy)	Yes (SHA)	No	Provides authentication based on the algorithms available in the net-snmp API

Table 2-6 (Cont.) SNMPv3 Security Levels

Level	Authentication	Encryption	Details
AuthPriv (authentication and privacy)	Yes (SHA)	Yes (DES/AES)	Provides authentication and encryption based on the algorithms available in the net-snmp API

The **Read View** name is optional, and must be specified exactly as configured in the view. The specified view must already be configured to be added to the group. If a read view is not selected for a group, the group will not have read access to any of the LSMS MIB objects.

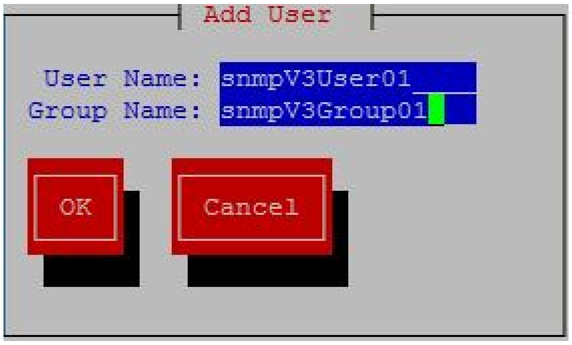
The **Write View** name is optional, and must be specified exactly as configured in the view. The specified view must already be configured to be added to the group. If a write view is not selected for a group, the group will not have write access to any of the LSMS MIB objects.

A group that is associated with any user cannot be deleted. For information about users, see SNMPv3 User Management.

SNMPv3 User Management

To support user-based security for SNMPv3, LSMS provides the **SNMP Configuration**, and then **User Configuration**, and then **Add/Delete/Edit/Show** menu options. These menu options are accessible only when the SNMP Global Mode is set to **SNMPv3 ONLY** or **Both**. Following is an example of the initial **Add** menu.

Figure 2-11 Initial Add User Screen



User Name: snmpV3User01
Group Name: snmpV3Group01

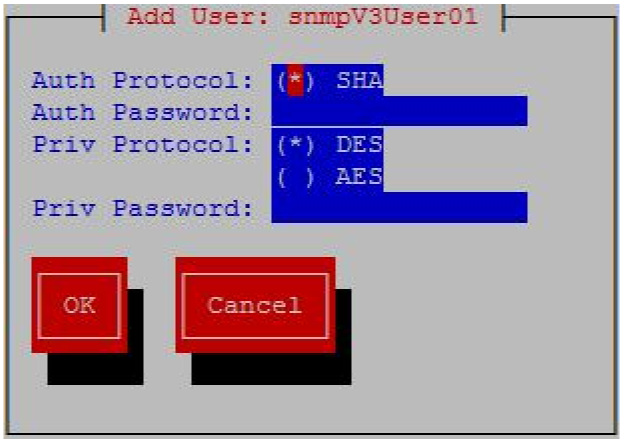
The **User Name** must be unique, 1 - 50 alphanumeric characters in length, and is case sensitive.

The **Group Name** must be already configured to be specified for a user, and must exactly match (case sensitive) a configured group name.

After specifying valid values for the **User Name** and **Group Name** and selecting **OK**, display of another screen depends on the security level configured for the specified group:

- If the security level configured for the specified group is **noAuthNoPriv**, user configuration is complete.
- If the security level configured for the specified group is **AuthNoPriv** or **AuthPriv**, a second screen is displayed containing the configured security fields for the specified group. Following is an example for a group having the AuthPriv security level:

Figure 2-12   Add User Screen for AuthPriv



```
Add User: snmpV3User01

Auth Protocol:  (*) SHA
Auth Password:
Priv Protocol:  (*) DES
                ( ) AES
Priv Password:
```

> **Note:**
>
> When the security level configured for the specified group is **AuthNoPriv**, input fields **Priv Protocol**, and **Priv Password** will not be displayed.

Select or specify the **Auth Protocol**, **Auth Password**, **Priv Protocol**, and **Priv Password** fields as needed:

- The default and only valid value for **Auth Protocol** is **SHA**.
- Valid values for **Priv Protocol** are **DES** and **AES**.
- The **Auth Password** and **Priv Password** fields must be 8 - 255 characters in length. Valid characters include alphanumeric characters and the following special characters:

  @
  #
  $
  !

  The **Auth Password** and **Priv Password** fields are encrypted in the database.

A user that is associated with any NMS cannot be deleted. For information about associating a user with an NMS, see NMS Configuration.

NMS Configuration

To configure the NMS with which LSMS will interact to send alarms, LSMS provides the **SNMP Configuration**, and then **NMS Configuration**, and then **Add/Delete/Edit/Show** menu options. The specific screen/submenu displayed depends upon the SNMP global mode set in SNMP Global Mode (the default mode is **SNMPv3 ONLY**).

The following fields are common to all modes:

Name
The **Name** is a unique logical name for the NMS server consisting of 5 - 20 alphanumeric, case-sensitive characters. The **Name** is mandatory for SNMPv3 configuration and optional for SNMPv1 configuration.

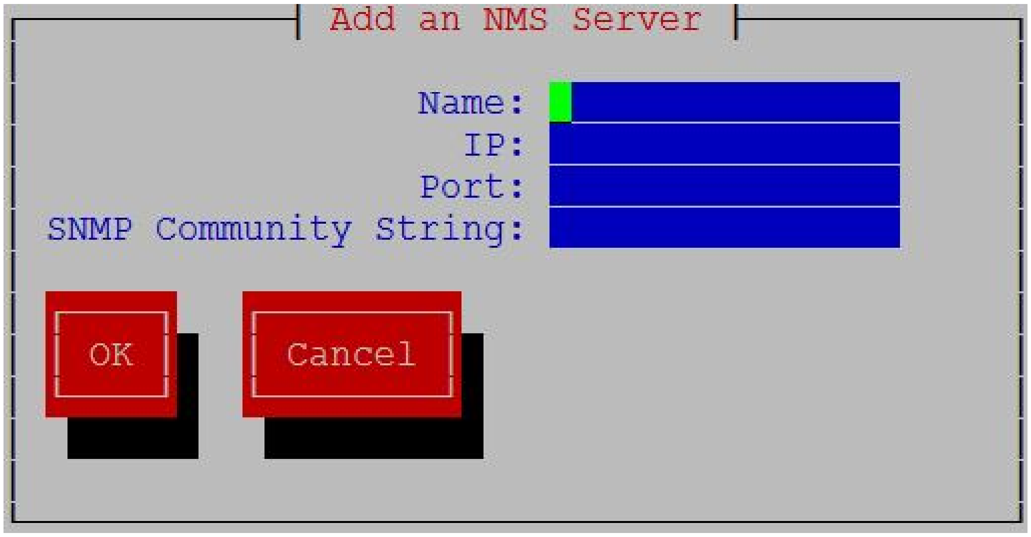
IP
The **IP** must be non-empty and unique.

Port
The **Port** must be a valid value in the range 1 - 65535, excluding the pre-defined ports.

For the **SNMPv1 ONLY** mode, in addition to the common fields, the **SNMP Community String** field is also displayed. The **SNMP Community String** is mandatory and consists of 1 - 127 alphanumeric characters or the following special characters:

@
#
$
!

Figure 2-13 Add an NMS Server Screen for SNMPv1 ONLY



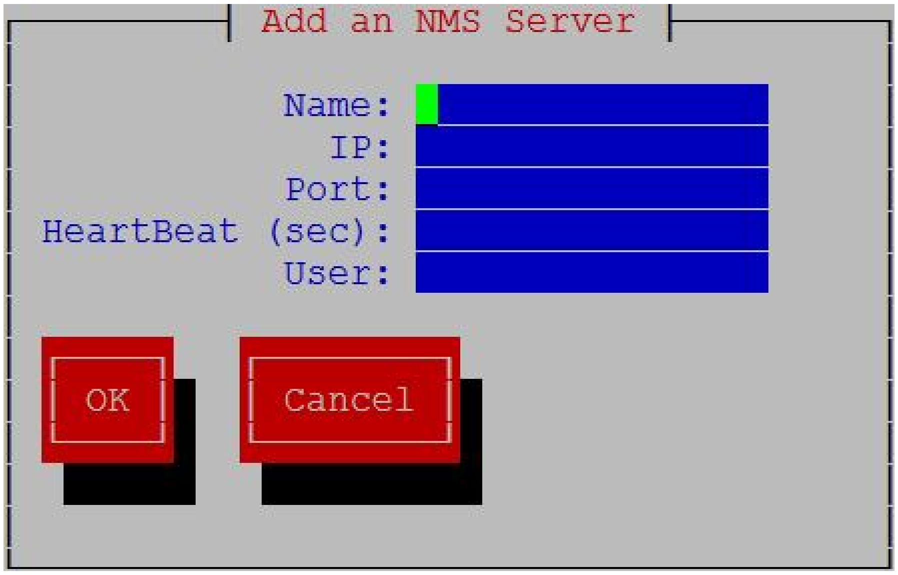
Add an NMS Server

Name:
IP:
Port:
SNMP Community String:

The community string is stored in encrypted form in the database.

For the **SNMPv3 ONLY** mode, in addition to the commone fields, the **HeartBeat (sec)** and **User** fields are also displayed.

Figure 2-14   Add an NMS Server Screen for SNMPv3 ONLY

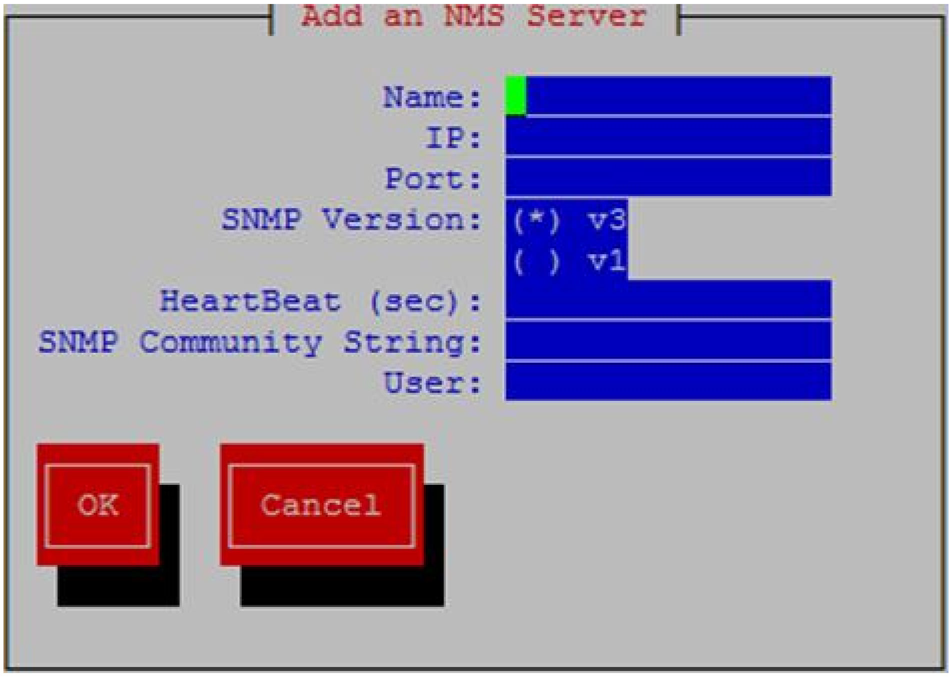


Valid values for the **HeartBeat (sec)** field are 0 or between 5 - 7200, with a default value of 60.

The **User** field is mandatory, and must be specified exactly (case sensitive) as previously configured (see SNMPv3 User Management).

If the SNMP Global Mode is **Both**, all previous fields are displayed along with the **SNMP Version** field. Either **v3** or **v1** must be selected for **SNMP Version**.

Figure 2-15   Add an NMS Server Screen for Both



SNMP Version: (*) v3
( ) v1

When the SNMP Global Mode is **Both**, the **SNMP Community String** and **User** fields are mutually exclusive. The **HeartBeat (sec)** field is applicable only for SNMPv3.

Autonomous Events Trap Forwarding

The LSMS SNMP agent forwards all autonomous events generated at the LSMS, in the form of SNMPv1 traps to an NMS configured for SNMPv1 or SNMPv3 traps to an NMS configured for SNMPv3. A circular queue is maintained to support asynchronized trap requests so that traps are not missed if an NMS is disconnected from LSMS for any reason.

Trap forwarding from LSMS to an SNMPv3-based NMS is the same as to an SNMPv1-based NMS, except for the following:

- A new varbind **currentTime** is introduced in the LSMS MIB to indicate the time when an alarm was generated.
- A new varbind **sourceIp** is introduced in the LSMS MIB to include the source IP address of the network element in traps.
- A new varbind **alarmSequence** is introduced in the LSMS MIB to maintain a sequence number with traps. The minimum sequence number value is 1 and the maximum value is 4294967295, after which the value will roll over.
- The trap PDU includes additional information related to the USM entry for the NMS.
- LSMS sends heartbeat traps to an NMS periodically to indicate that the connection is still up. The periodicity of the heartbeat trap is the **HeartBeat (sec)** value configured for the NMS.

Resynchronization

The MIB element **resyncVar** is supported and its value used to coordinate the alarm resynchronization process. The value is set to 1 to start resynchronization. Get and set operations are allowed only for resyncVar.

Connectivity between LSMS and NMS

LSMS listens at SNMP agent standard port 161 for Get/Set messages. When a Get/Set message is received, LSMS checks the Set message for validity (whether the v3 user that sent the Set request for resyncVar is valid and has permission to set the variable). If the request is valid, resyncVar is set and thereafter the alarm resynchronization mechanism (including error scenarios) between LSMS and the v3-based NMS will start.

3

Routine Procedures

This chapter explains the procedures that system administrators regularly perform. These procedures include establishing remote login procedures, starting up and shutting down the **LSMS** system, setting the system clock, and managing user accounts.

Introduction

This chapter explains the procedures that system administrators regularly perform. These procedures include establishing remote login procedures, starting up and shutting down the **LSMS** system, setting the system clock, and managing user accounts.

The procedures in this chapter assume that you are familiar with the **LSMS** hardware. For more information about the hardware, refer to *Application B Card Hardware and Installation Guide*.

Using Login Sessions

Login sessions are used for the following user functions:

- To use the command line for any of the following functions:
  - To access the `lsmsmgr` text interface, which is used for configuring and maintaining the **LSMS** system
  - To enter **LSMS** commands (generally used for managing **LSMS** applications); for more information, see Commands
- To use the graphical user interface (**GUI**), which is generally used for the following functions:
  - Configuration (for more information, refer to *Configuration Guide*)
  - **Database** administration (for more information, refer to the *Database Administrator's Guide*)
  - Synchronization of the **LSMS LNP** database with the **LNP** databases at network elements (for more information, refer to *LNP Database Synchronization User's Guide*)

Support of Multiple Users

The **LSMS** allows, as a standard feature, a maximum of eight simultaneous users. The Support for Additional Users optional feature enables you to have a maximum of 25 simultaneous users. A user is defined to be any of the following:

- `lsmsmgr` user (a user who logs in as the `lsmsmgr` user to start the `lsmsmgr` text interface)
- Web-based **GUI** user (a user who has logged into the active server **GUI** over the web; this function requires the **IP** User Interface optional feature)

- lsmsclaa user (a user who is using the optional **LSMSCommand Class** Management optional feature)

Establishing Login Sessions

From any network-connected terminal, you can establish a variety of sessions with the active server or with a specific server in one of the following ways:

- Display the lsmsmgr text interface of either the active server or of a specific server.
- Display the command line of either the active server or a specific server for entering commands; see Logging In to LSMS Server Command Line.
- Display the **GUI** remotely (if the optional **IP** User Interface feature is installed) by using a web browser; see Starting an Web-Based LSMS GUI Session.

Logging In to LSMS Server Command Line

You can log into the **LSMS** active server or into a specific server from any terminal that has a **Secure Shell** (ssh) client installed.

> **Note:**
>
> If your terminal does not already have ssh installed, PuTTY (Oracle does not make any representations or warranties about this product) is an open source ssh utility for Windows that you can download from the web.

You must have a user **ID** and password before you can log in to **LSMS**.

1. From a command-line prompt on a Windows-based or Linux-based terminal, enter one of the following commands (depending on the terminal operating system) to start a secure shell session with the **LSMS** server:

   ```
   ssh -X <username>@<server_IP_address>
   ```

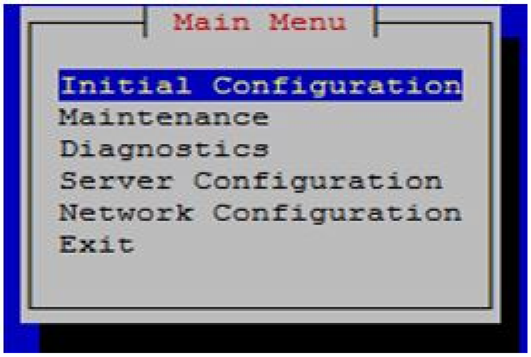
   For <username> and <server_IP_address>, specify values shown in Table 3-1 that are appropriate to the procedure you are performing:

Table 3-1 Parameters Used in Accessing Server Command Line

Parameter	Value
<username>	Use one of the following: • `lsmsmgr` to access the `lsmsmgr` text interface for configuration, diagnostics, and other maintenance functions • `syscheck` to run the `syscheck` command with no options, which returns overall health checks and then exits the login session (for more information about the `syscheck` command, see syscheck) • Other user names, as directed by a procedure
<server_IP_address>	Use one of the following: • Virtual **IP** address (**VIP**) to access the **LSMS** Web **GUI** • **IP** address of the specific server, when directed by a procedure to access a particular server

2. When prompted, enter the password associated with the user name.
3. You can now continue with any of the following functions:
   - If you entered `lsmsmgr` as the username, the `lsmsmgr` text interface displays. You can use any of the `lsmsmgr` functions.

Figure 3-1 lsmsmgr Text Interface Main Menu



Note:

Selections in the `lsmsmgr` text interface are made by either using the Up and Down Arrow keys on your keyboard or typing the first letter of any menu item to change which menu item is highlighted. When the desired menu item is highlighted, press the Enter key.
In this manual, menu selections are indicated as a series; for example, select **Maintenance**, and then **Start Node** indicates that you should highlight the Maintenance item on the main menu, press Enter, then highlight the Start Node item on the next menu, and press Enter.

- If you entered `syscheck` as the username, the command line window displays the System Health Check output. For more information about `syscheck`, see syscheck.
- If you entered any other username the command line prompt displays a prompt that shows the username and host name, similar to the following example (in this example, the user logged in as the `lsmsadm` user to the server whose host name is `lsmspri`):
  `[lsmsadm@lsmspri lsmsadm] $`

  > **Note:**
  >
  > In this manual, the prompt will be indicated simply by `$`.

  LSMS commands can be entered at this prompt. If you need to start an LSMS GUI session, see Starting an Web-Based LSMS GUI Session.

Logging in from One Server to the Mate's Command Line

Sometimes it may be necessary to have access to the command line interfaces for both servers. You can log into each server separately using `ssh`, or you can use `ssh` to go back and forth between servers.

To log in from one server's command line to the mate server's command line, use the following procedure:

1. Log in as any user except `lsmsmgr` or `syscheck`, using the procedure described in "Logging In to **LSMS** Server Command Line" to log into a server command line.
2. Enter the following command to access the command line on the mate server:

   ```
   $ ssh mate
   ```

   If you have not previously logged into the mate, the following information displays:

   ```
   The authenticity of host 'mate (192.168.1.1)' can't be established.
   RSA key fingerprint is
   1c:14:0e:ea:13:c8:68:07:3d:7c:4d:71:b1:0c:33:04.
   Are you sure you want to continue connecting (yes/no)?
   ```

   Type `yes`, and press **Enter**.
3. When prompted, enter the password for the same user name.
4. The prompt on your terminal now displays the host name of the mate server, and you can enter commands for the mate server.

   Following is an example of the sequence of commands and prompts that display during this procedure:

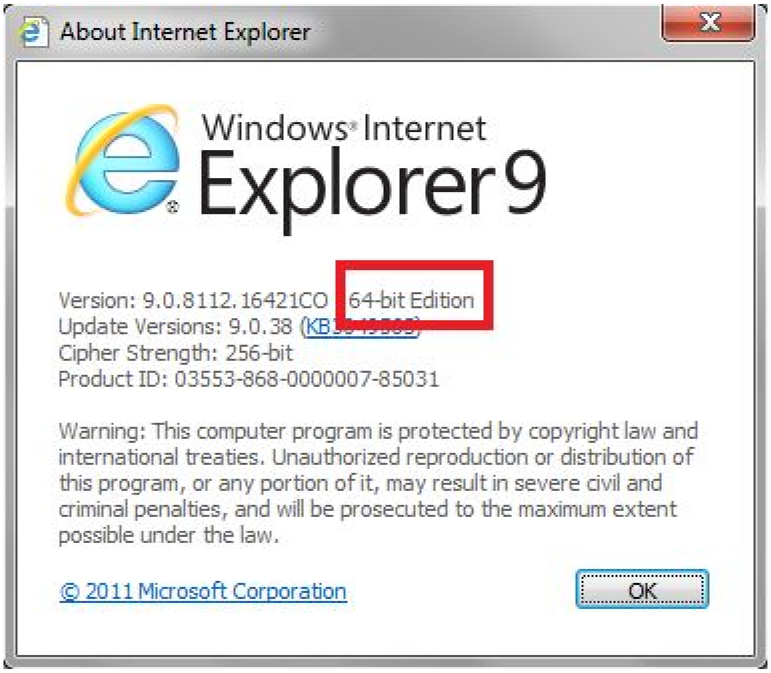
   ```
   [lsmsadm@lsmspri lsmsadm]$ ssh mate
   lsmsadm@mate's password:
   [lsmsadm@lsmssec lsmsadm]$
   ```

Starting an Web-Based LSMS GUI Session

The **LSMS** offers, as the optional **IP** User Interface feature, a web-based graphical user interface (**GUI**) intended for remote users. The web-based **GUI** can be run:

- On a **PC** with Microsoft® Windows installed, using Microsoft Internet Explorer (version 8.0, 9.0, 10.0, or 11.0)
  A 32-bit installation of Windows uses 32-bit Internet Explorer and 32-bit Java. A 64-bit installation of Windows includes both the 32-bit and 64-bit Internet Explorer. If you are using the 32-bit Internet Explorer, 32-bit Java is required, and if you are using the 64-bit Internet Explorer, 64-bit Java is required. You can check the Internet Explorer version by clicking on **Tools**, and then **About Internet Explorer**. If `64-bit Edition` is displayed as shown in the following example, you are using the 64-bit edition. If `64-bit Edition` is not displayed, you are using the 32-bit edition.

Figure 3-2 About Internet Explorer



Version: 9.0.8112.16421CO 64-bit Edition
Update Versions: 9.0.38 (KB[illegible])
Cipher Strength: 256-bit
Product ID: 03553-868-0000007-85031

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- On a Linux workstation, using Mozilla® Firefox® 3.0.0 or later

The web-based **GUI** is accessible from any machine that can access the network on which the **LSMS** resides. The functionality of the web-based **GUI** is the same as that of the server-side **GUI**.

> **Note:**
>
> When you have completed logging into thea web-based **LSMS GUI**, the session has these operating characteristics:
>
> - Pressing the Back button from the browser from which the **GUI** was launched terminates that **GUI** session. To reopen the **GUI**, you must click the Refresh button and begin the login process again.
> - Pressing the Refresh button from the browser from which the **GUI** was launched terminates that **GUI** session. To reopen the **GUI**, you must begin the login process again.
> - You cannot use a browser window that was started by selecting File > New > Window from the browser window to launch another web-based **LSMS GUI** session.
> - If the GUI is idle for an extended period, you may receive `Server not responding` or `Invalid Session ID` errors; close the existing GUI session and start a new GUI session.

The HTTPS support on LSMS feature allows you to configure the protocol(s) used for the GUI:

- Secure Hypertext Transfer Protocol (HTTPS)
- Hypertext Transfer Protocol (HTTP)
- Both HTTPS and HTTP

Both HTTPS and HTTP are enabled by default. HTTPS supports encryption of data exchanged between the web server and the browser, thus facilitating data privacy. HTTP is not encrypted/secure, allowing data to be captured by any network analyzer and viewed.

A script (`/usr/TKLC/lsms/bin/httpConfig.pl`) is provided to toggle between protocols or to check what is currently enabled. The script can be run by the lsmsadm user with one of the following parameters:

https
Results in HTTPS being enabled and HTTP being disabled.

http
Results in HTTP being enabled and HTTPS being disabled.

both
Results in both HTTPS and HTTP being enabled. This is the default.

status
Displays whether HTTPS and HTTP are enabled or disabled.

> **Note:**
>
> After changing the protocol, the GUI must be refreshed to reflect the changes. A GUI notification will be displayed.

To start the web-based **GUI**verify that the **IP** User Interface feature has been activated and, perform the following procedure:

1. Start your web browser (Mozilla® Firefox® or Internet Explorer).
2. Specify https or http followed by the **LSMS** Virtual **IP** (**VIP**) address in the Location: or Address: field, or the application VIP in a segmented network. For http, add :8200.
   - https://<VIP_address>
   - http://<VIP_address>:8200

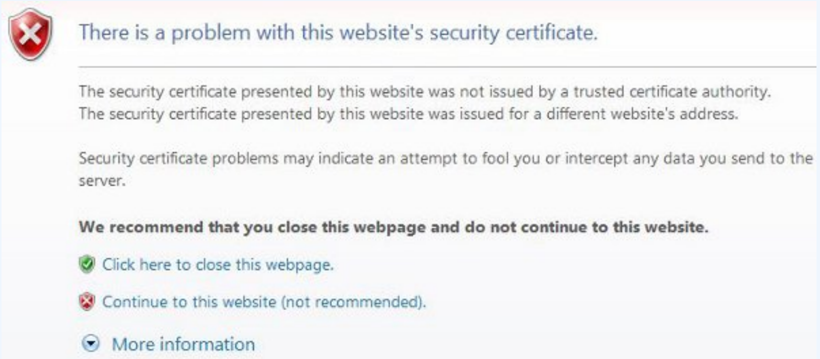
   The `<VIP_address>` is the Virtual **IP** address used by your **LSMS** system. (The **VIP** address is always associated with the active server; when switchover occurs, the **VIP** address association is switched over from previously active server to the newly active server.)
3. Press **Return** and the Oracle Communications **LSMS** start page is displayed.

Note:

If using HTTPS, you must click through some security warnings that are displayed, which differ depending on the browser in use:

- For Internet Explorer, click on `Continue to this website (not recommended)` on the following screen:

Figure 3-3 Problem with Security Certificate



There is a problem with this website's security certificate.

The security certificate presented by this website was not issued by a trusted certificate authority.
The security certificate presented by this website was issued for a different website's address.

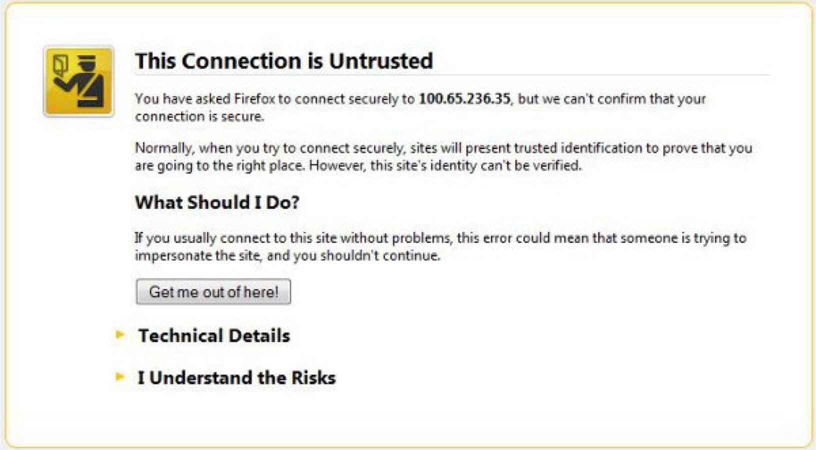
Security certificate problems may indicate an attempt to fool you or intercept any data you send to the server.

We recommend that you close this webpage and do not continue to this website.

Click here to close this webpage.
Continue to this website (not recommended).
More information

- For Mozilla Firefox, click on `I Understand the Risks` on the following screen:

Figure 3-4 Connection is Untrusted



This Connection is Untrusted

You have asked Firefox to connect securely to **100.65.236.35**, but we can't confirm that your connection is secure.

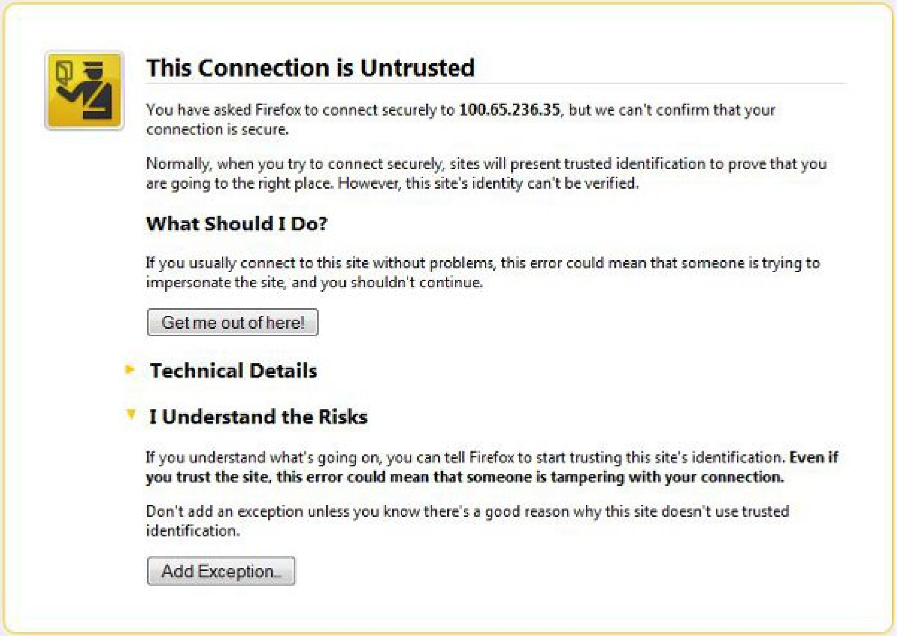
Normally, when you try to connect securely, sites will present trusted identification to prove that you are going to the right place. However, this site's identity can't be verified.

What Should I Do?

If you usually connect to this site without problems, this error could mean that someone is trying to impersonate the site, and you shouldn't continue.

Then click on `Add Exception` on the following screen:

Figure 3-5   Connection is Untrusted (continued)



This Connection is Untrusted

You have asked Firefox to connect securely to **100.65.236.35**, but we can't confirm that your connection is secure.

Normally, when you try to connect securely, sites will present trusted identification to prove that you are going to the right place. However, this site's identity can't be verified.

What Should I Do?

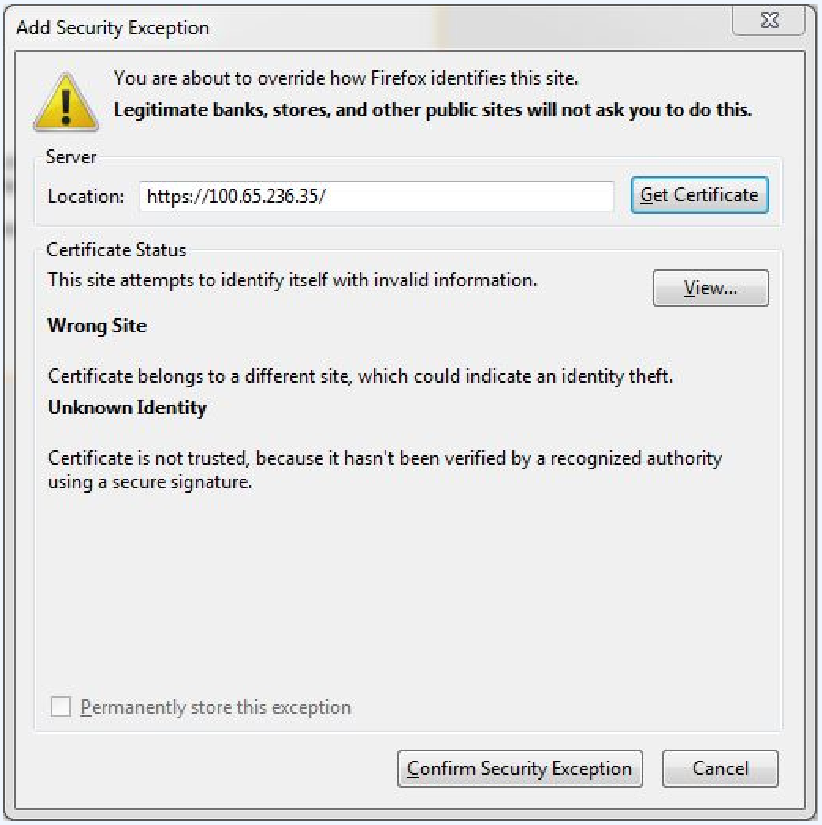
If you usually connect to this site without problems, this error could mean that someone is trying to impersonate the site, and you shouldn't continue.

If you understand what's going on, you can tell Firefox to start trusting this site's identification. **Even if you trust the site, this error could mean that someone is tampering with your connection.**

Don't add an exception unless you know there's a good reason why this site doesn't use trusted identification.

Then enter the site in the Location field and click on `Confirm Security Exception`:

Figure 3-6 Add Exception for Untrusted Connection



Add Security Exception

You are about to override how Firefox identifies this site.

Legitimate banks, stores, and other public sites will not ask you to do this.

Server

Location: https://100.65.236.35/

Certificate Status

This site attempts to identify itself with invalid information.

Wrong Site

Certificate belongs to a different site, which could indicate an identity theft.

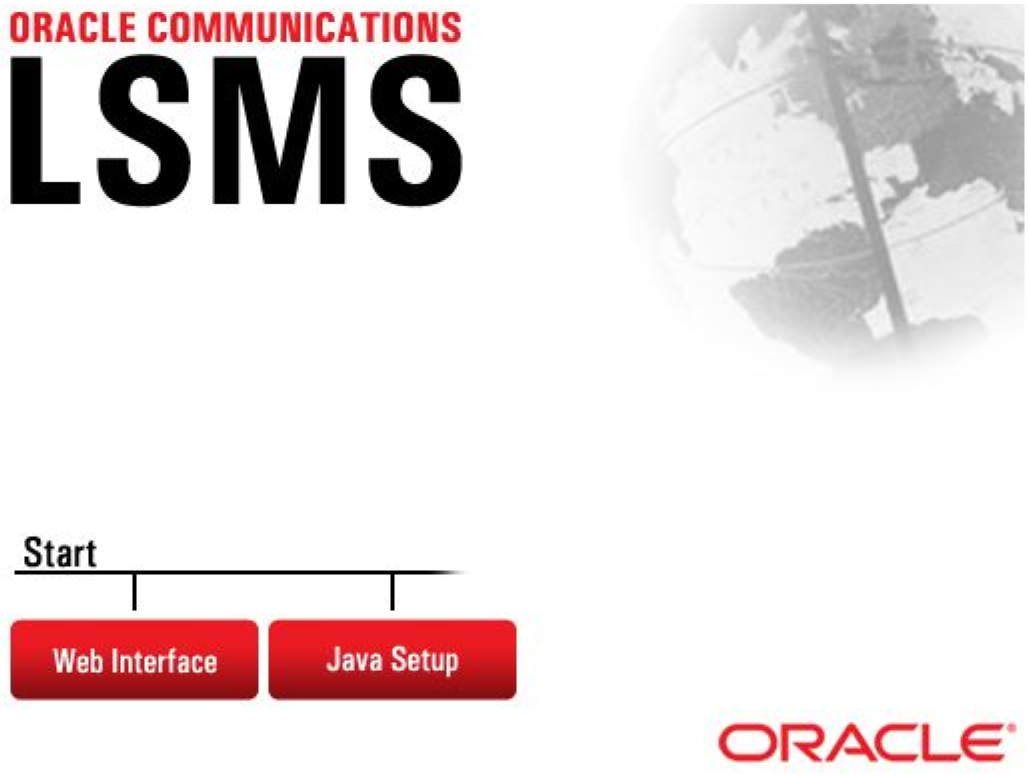
Unknown Identity

Certificate is not trusted, because it hasn't been verified by a recognized authority using a secure signature.

□ Permanently store this exception

The Oracle Communications **LSMS** start page displays:

Figure 3-7   Oracle Communications LSMS Start Page



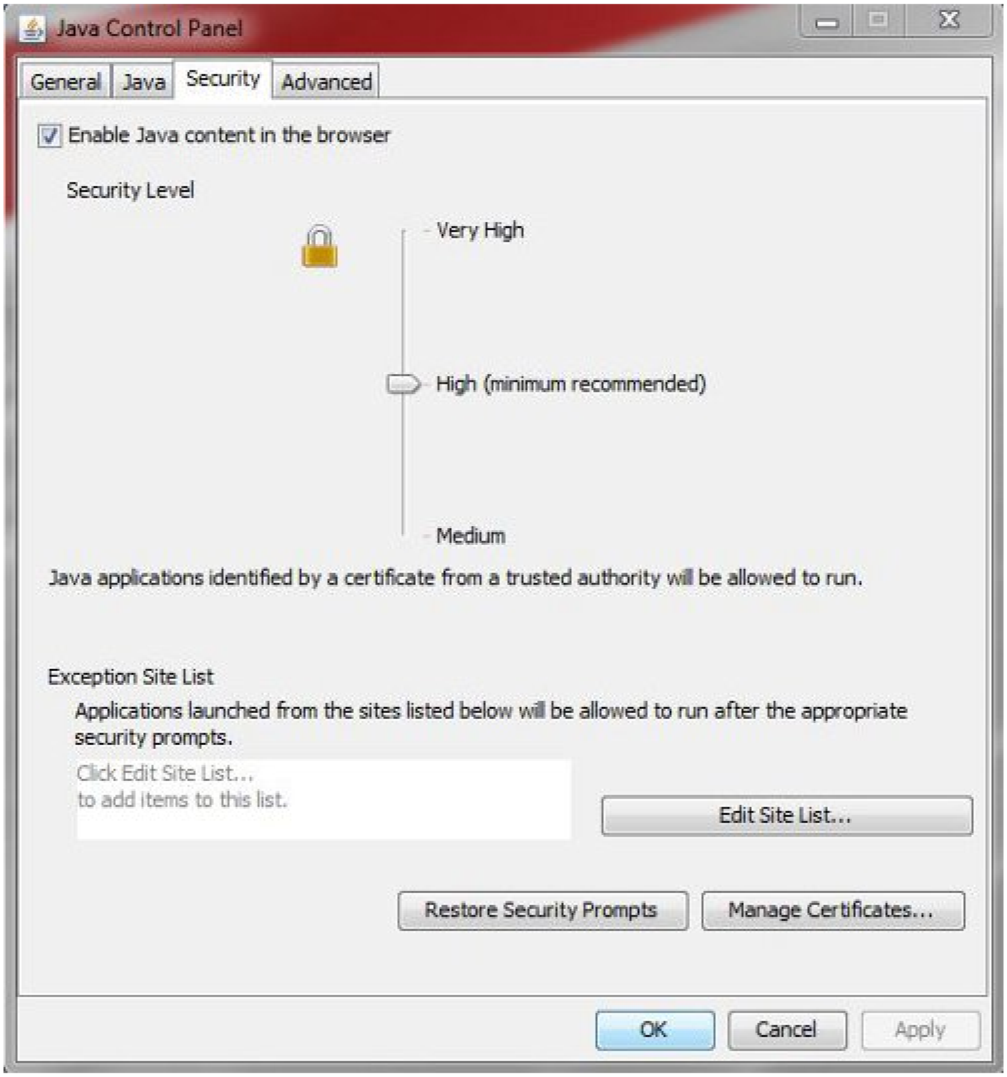
4. If you are logging in for the first time from this terminal, click the **Java Setup** button and follow the instructions on the displayed page to install a Java plug-in and set up a security policy.

   Otherwise, go to step 5.

5. Open the Java Control Panel for your terminal, go to the **Security** tab as shown in Figure 3-8, and click on **Edit Site List**.

> **Note:**
>
> - The actual screens displayed might differ from these examples depending upon the specific Java version in use.
> - If using both https and http, both must be added to the exception site list (https://<VIP_address> and http://<VIP_address>:8200).

Figure 3-8   Security Tab of Java Control Panel



☑ Enable Java content in the browser

Security Level

High (minimum recommended)

Java applications identified by a certificate from a trusted authority will be allowed to run.

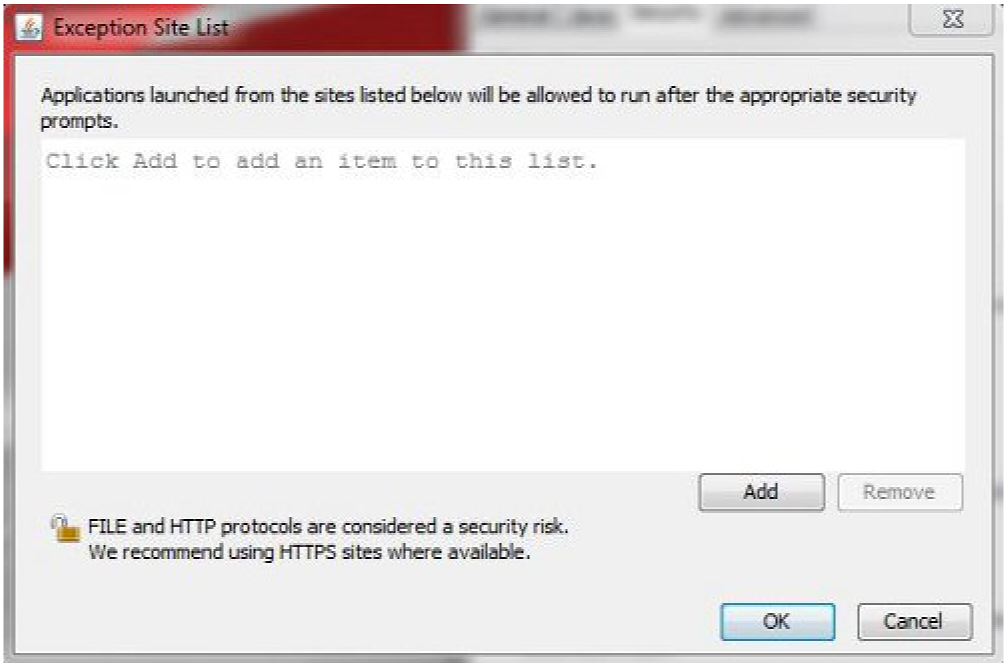
Exception Site List

Applications launched from the sites listed below will be allowed to run after the appropriate security prompts.

Click Edit Site List...
to add items to this list.

6. After clicking on **Edit Site List**, click on **Add**:

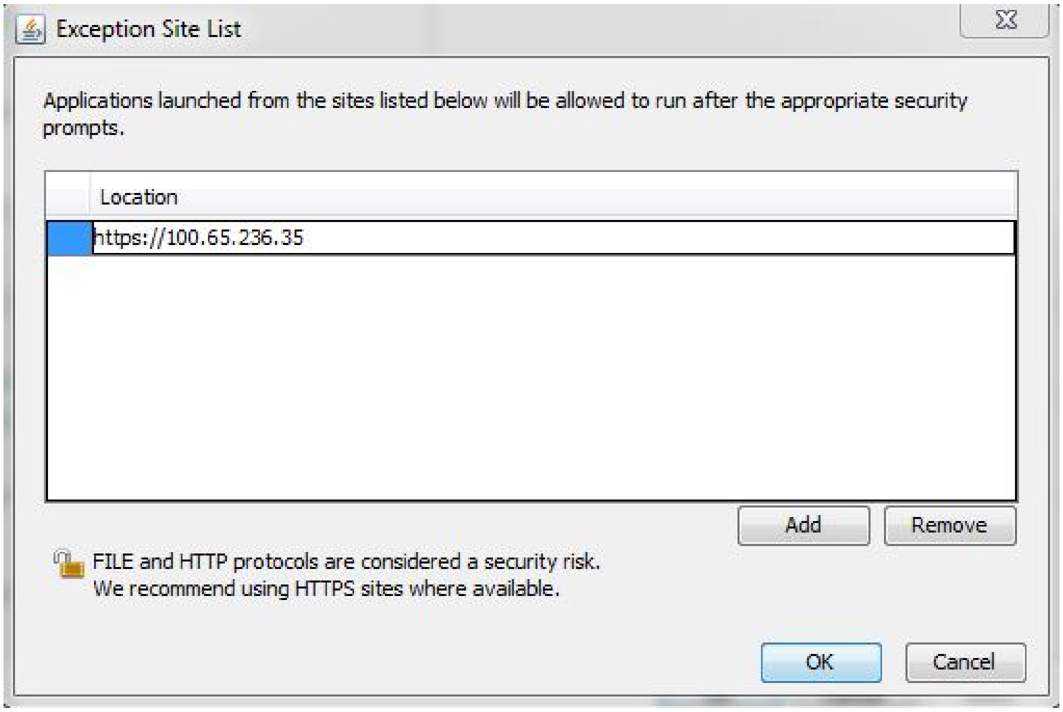
Figure 3-9 Adding to the Exception Site List



Exception Site List
Applications launched from the sites listed below will be allowed to run after the appropriate security prompts.
Click Add to add an item to this list.
Add
Remove
FILE and HTTP protocols are considered a security risk.
We recommend using HTTPS sites where available.
OK
Cancel

7. Type in the location of your LSMS server (`https://`*`IP_address`* or `http://`*`IP_address`*`:8200`):

Figure 3-10 Adding the LSMS Server to the Exception Site List



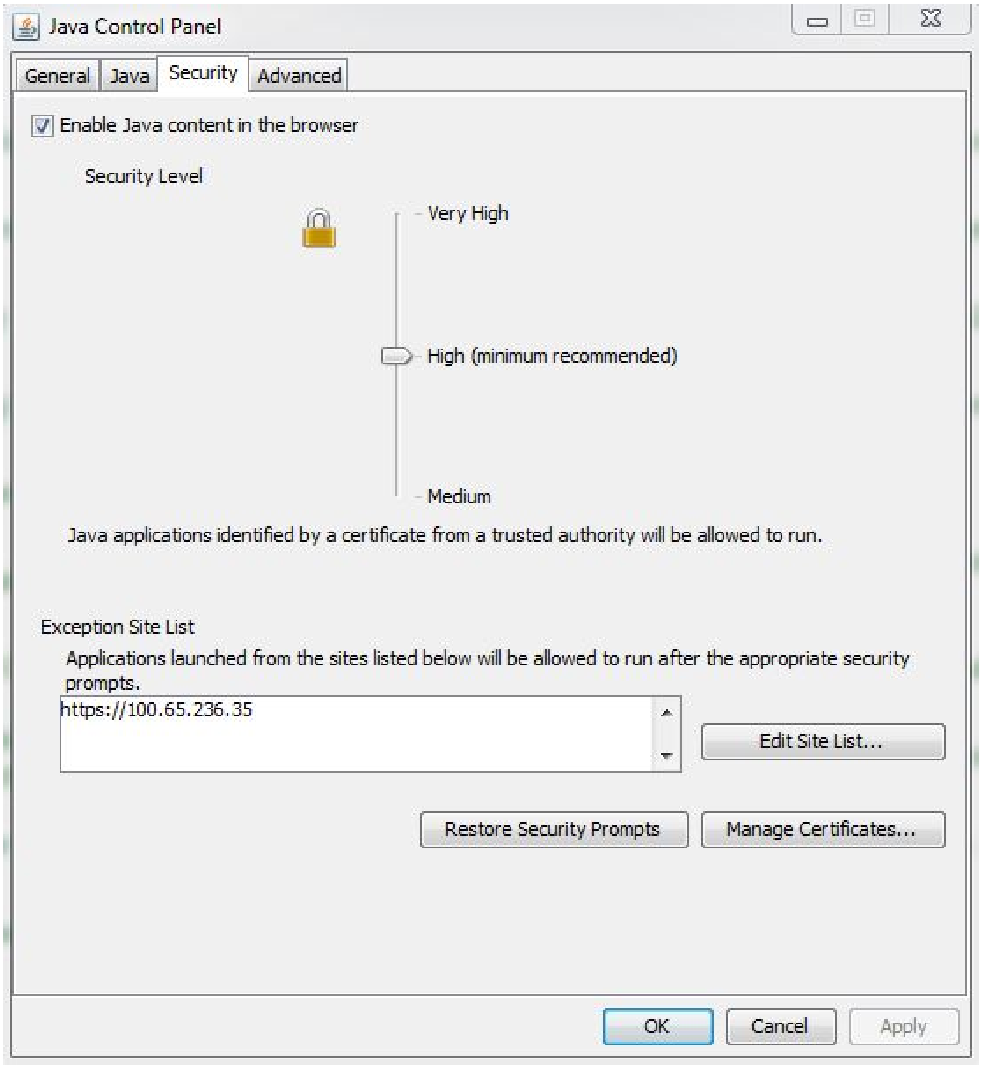
Exception Site List
Applications launched from the sites listed below will be allowed to run after the appropriate security prompts.
Location
Add
Remove
FILE and HTTP protocols are considered a security risk.
We recommend using HTTPS sites where available.
OK
Cancel

https://100.65.236.35

8. Click **OK**.

   The **Security** tab will now show the server in the Exception Site List, as shown in the following example:

Figure 3-11 Exception Site List Including the LSMS Server



☑ Enable Java content in the browser

Security Level

Java applications identified by a certificate from a trusted authority will be allowed to run.

Exception Site List

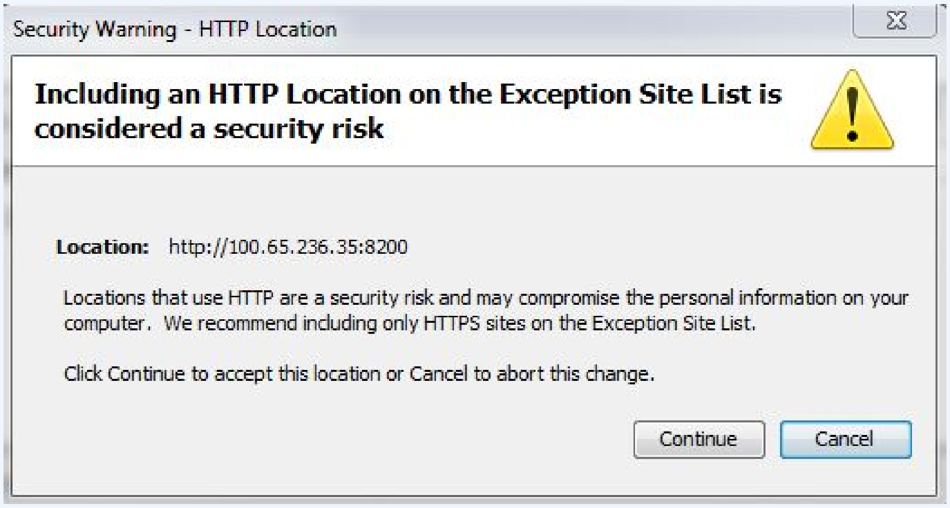
Applications launched from the sites listed below will be allowed to run after the appropriate security prompts.

https://100.65.236.35

Note:

If you are adding an http site, a warning similar to the following warning is displayed:

Figure 3-12 Security Warning for HTTP Location



Security Warning - HTTP Location

Including an HTTP Location on the Exception Site List is considered a security risk

Location: http://100.65.236.35:8200

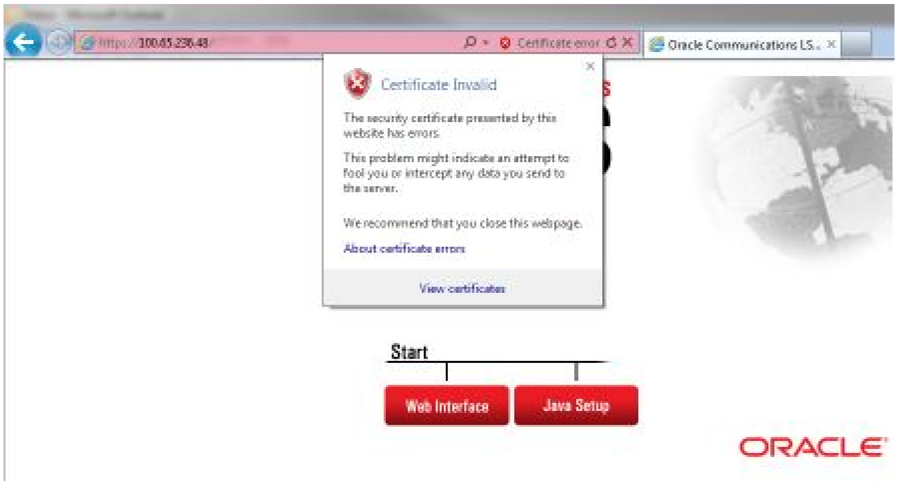
Locations that use HTTP are a security risk and may compromise the personal information on your computer. We recommend including only HTTPS sites on the Exception Site List.

Click Continue to accept this location or Cancel to abort this change.

Click **Continue** to add the server to the Exception Site List.

9. Click **OK** to exit the Java Control Panel and return to the GUI.
10. If using HTTPS and Internet Explorer, install the security certificate as follows. Otherwise, go to step 11.
    a. Back at the Oracle Communications LSMS Start Page, click on `Certificate error` at the right of the address bar, and then click on `View certificates` in the popup window titled `Certificate Invalid`.

Figure 3-13 Certificate Error



Certificate Invalid

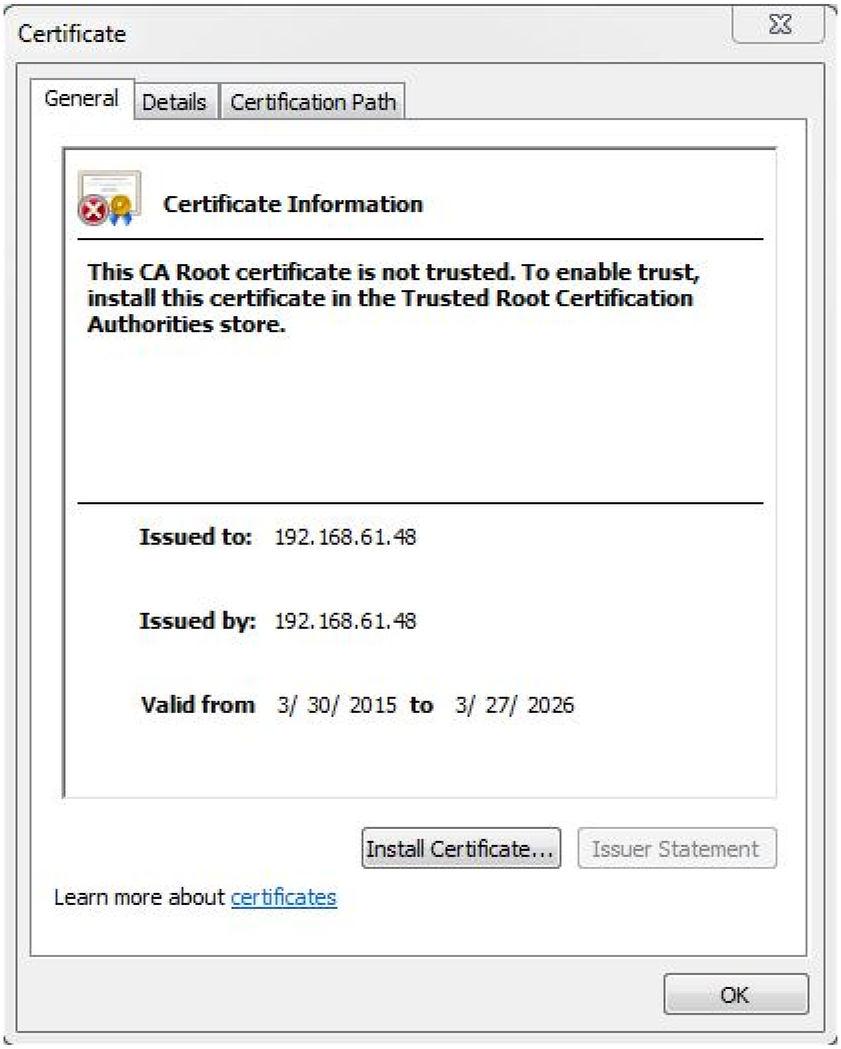
The security certificate presented by this website has errors.

This problem might indicate an attempt to fool you or intercept any data you send to the server.

We recommend that you close this webpage.

The `Certificate` screen is displayed:

Figure 3-14   Certificate Screen



Certificate Information

This CA Root certificate is not trusted. To enable trust, install this certificate in the Trusted Root Certification Authorities store.

Issued to: 192.168.61.48

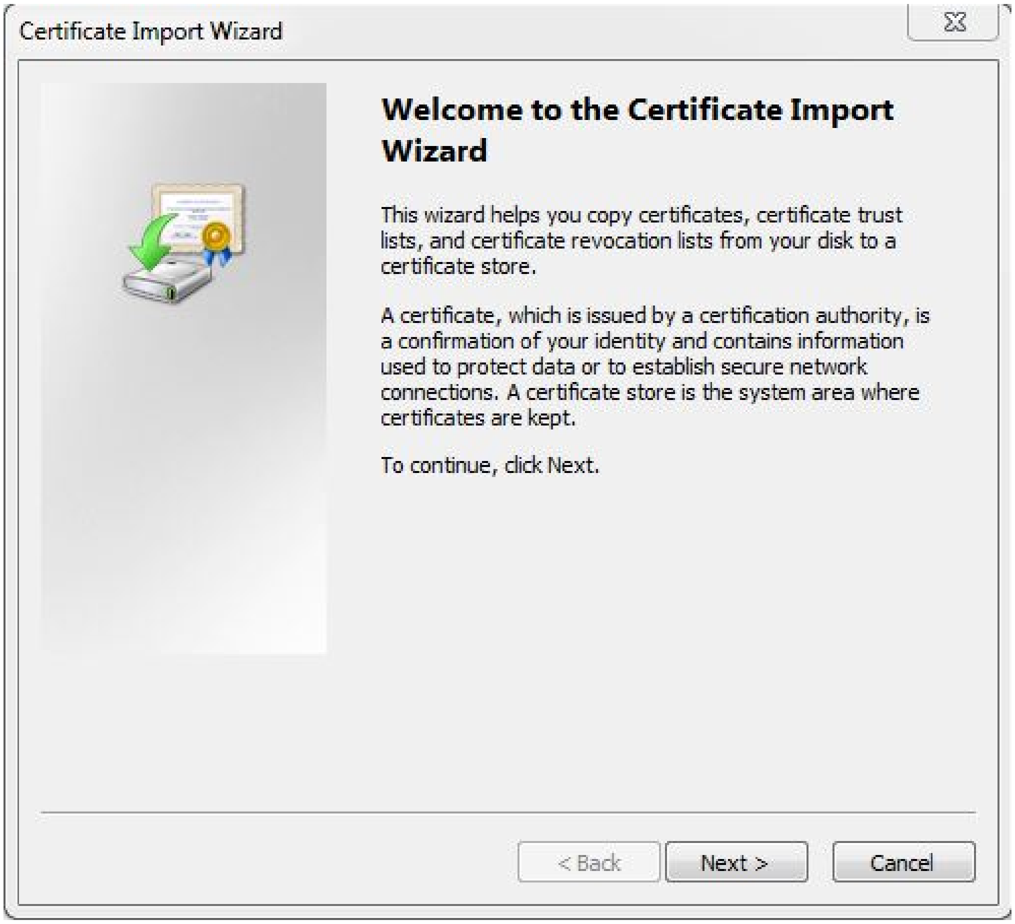
Issued by: 192.168.61.48

Valid from 3/ 30/ 2015 **to** 3/ 27/ 2026

b. Click on **Install Certificate**.

The Certificate Import Wizard opens:

Figure 3-15   Certificate Import Wizard



Certificate Import Wizard

Welcome to the Certificate Import Wizard

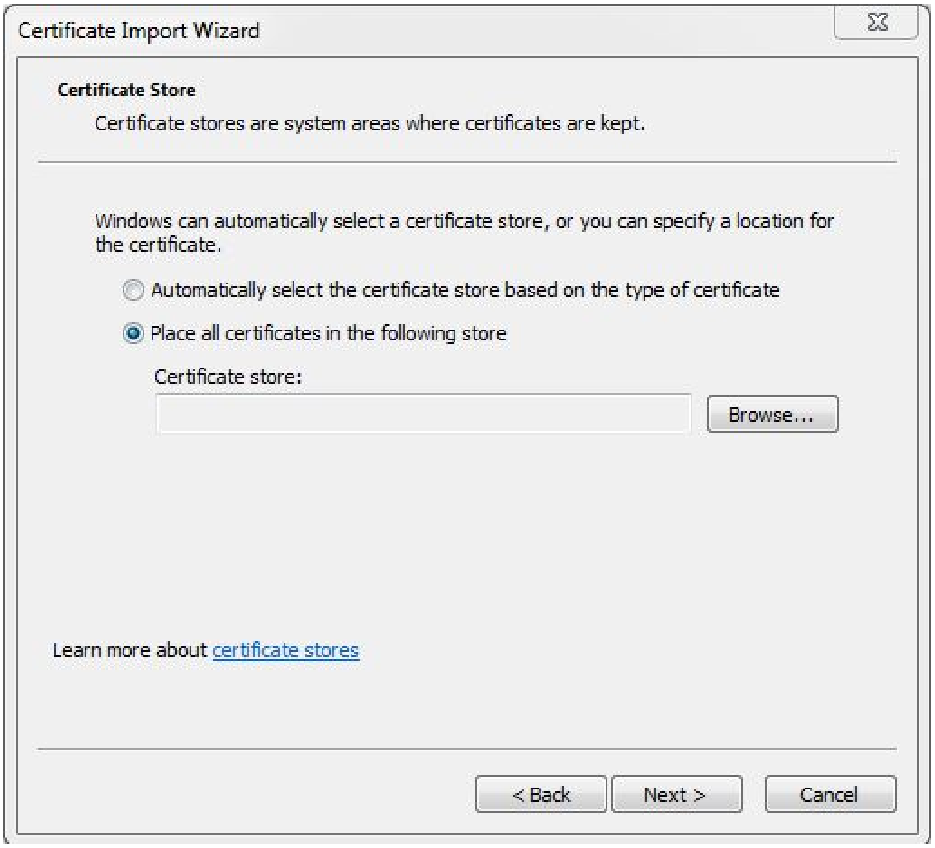
This wizard helps you copy certificates, certificate trust lists, and certificate revocation lists from your disk to a certificate store.

A certificate, which is issued by a certification authority, is a confirmation of your identity and contains information used to protect data or to establish secure network connections. A certificate store is the system area where certificates are kept.

To continue, click Next.

c. Click on **Next >**, and then select the radio button to **Place all certificates in the following store**:

Figure 3-16 Certificate Import Wizard (continued)



Certificate Import Wizard

Certificate Store

Certificate stores are system areas where certificates are kept.

Windows can automatically select a certificate store, or you can specify a location for the certificate.

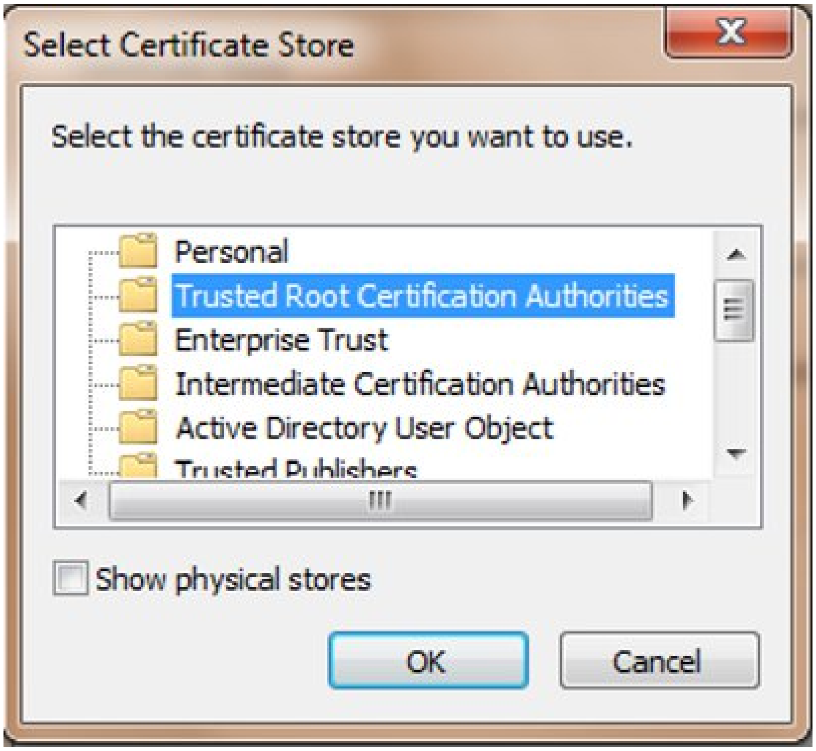
○ Automatically select the certificate store based on the type of certificate

● Place all certificates in the following store

Certificate store:

d. Click on **Browse** to go to the Select Certificate Store window, and select **Trusted Root Certification Authorities**:

Figure 3-17   Select Certificate Store



Select Certificate Store

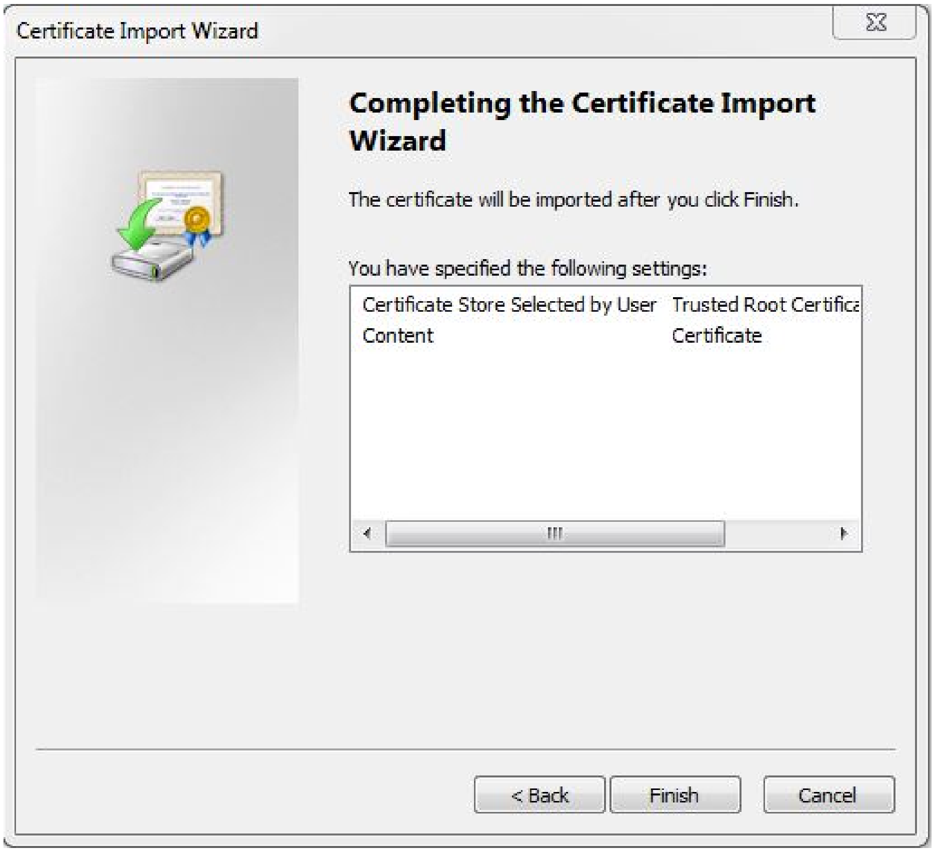
Select the certificate store you want to use.

- Personal
- Trusted Root Certification Authorities
- Enterprise Trust
- Intermediate Certification Authorities
- Active Directory User Object
- Trusted Publishers

□ Show physical stores

e. Click **OK** and **Next**, and verify the settings:

Figure 3-18   Completing the Certificate Import Wizard



Certificate Import Wizard

Completing the Certificate Import Wizard

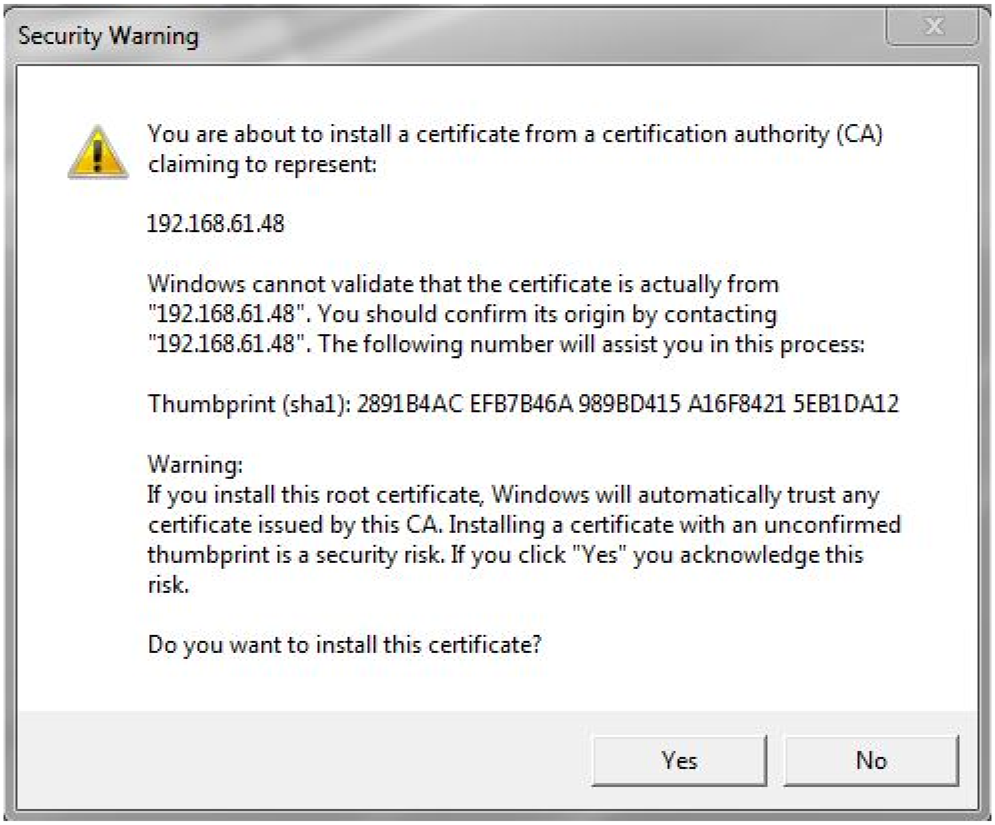
The certificate will be imported after you click Finish.

You have specified the following settings:

Certificate Store Selected by User	Trusted Root Certifica
Content	Certificate

f. Click **Finish**, and then verify that you want to install the certificate:

Figure 3-19   Certificate Installation Security Warning



Security Warning

You are about to install a certificate from a certification authority (CA) claiming to represent:

192.168.61.48

Windows cannot validate that the certificate is actually from "192.168.61.48". You should confirm its origin by contacting "192.168.61.48". The following number will assist you in this process:

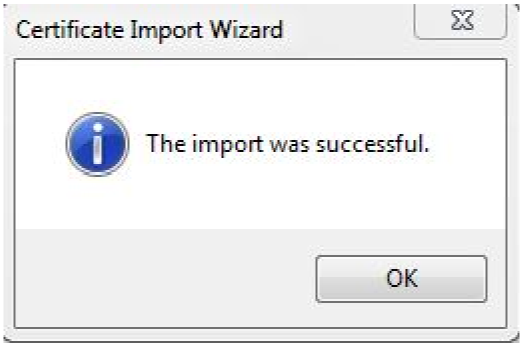
Thumbprint (sha1): 2891B4AC EFB7B46A 989BD415 A16F8421 5EB1DA12

Warning:
If you install this root certificate, Windows will automatically trust any certificate issued by this CA. Installing a certificate with an unconfirmed thumbprint is a security risk. If you click "Yes" you acknowledge this risk.

Do you want to install this certificate?

g. Click **Yes** to import the certificate:

Figure 3-20   Certificate Import Successful



Certificate Import Wizard

The import was successful.

h. Click **OK**, and then **OK** again to exit the Certificate window.

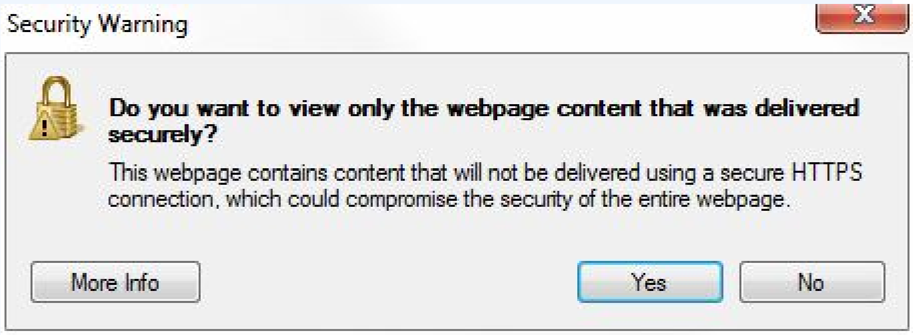
i. Restart Internet Explorer.

11. Back at the Oracle Communications LSMS Start Page, click on the **Web Interface** button.

Note:

If using HTTPS, click **Yes** and then **Continue** for the following security warnings:

Figure 3-21 Insecure Content Warning

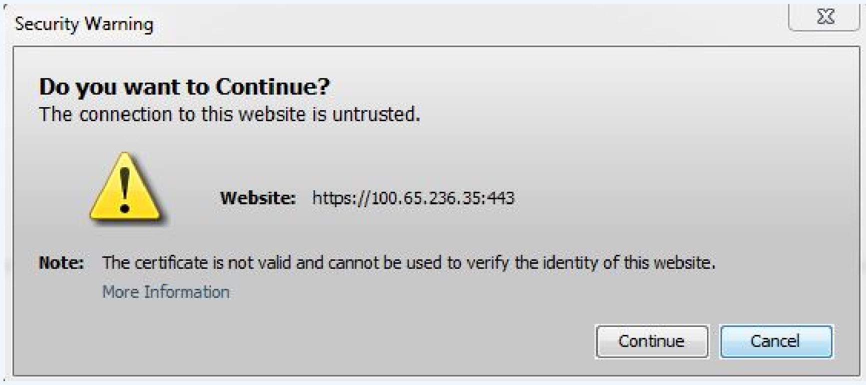


Security Warning

Do you want to view only the webpage content that was delivered securely?

This webpage contains content that will not be delivered using a secure HTTPS connection, which could compromise the security of the entire webpage.

Figure 3-22 Untrusted Website Warning



Security Warning

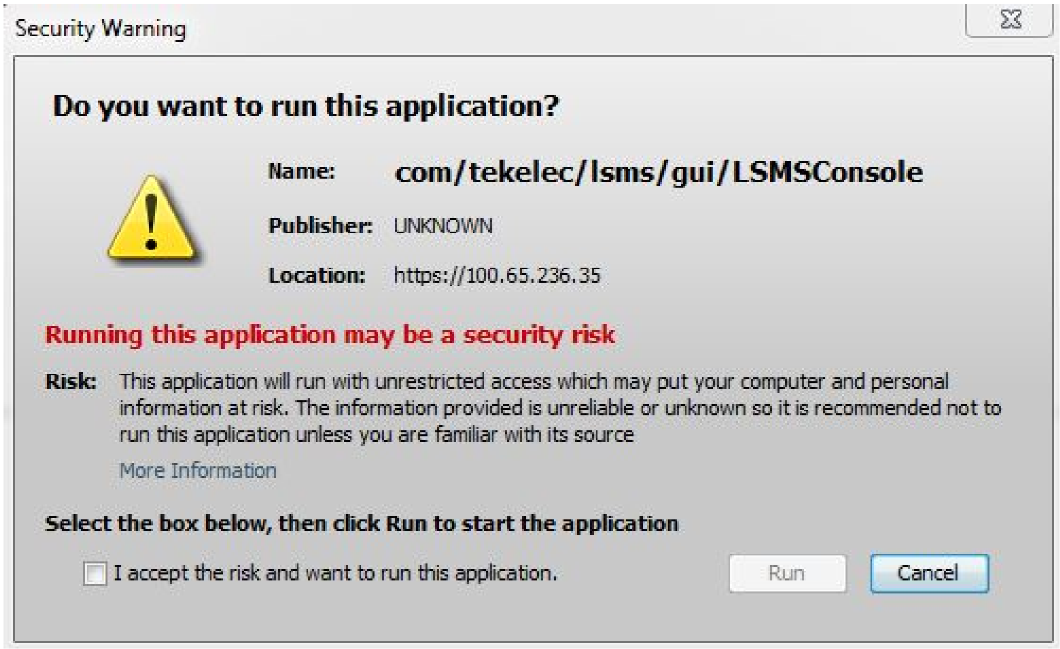
Do you want to Continue?
The connection to this website is untrusted.

Website: https://100.65.236.35:443

Note: The certificate is not valid and cannot be used to verify the identity of this website.

12. Check the box to accept the risk to run the application, and click **Run**:

Figure 3-23   Application Security Warning



Security Warning

Do you want to run this application?

Name: com/tekelec/lsms/gui/LSMSConsole

Publisher: UNKNOWN

Location: https://100.65.236.35

Running this application may be a security risk

Risk: This application will run with unrestricted access which may put your computer and personal information at risk. The information provided is unreliable or unknown so it is recommended not to run this application unless you are familiar with its source

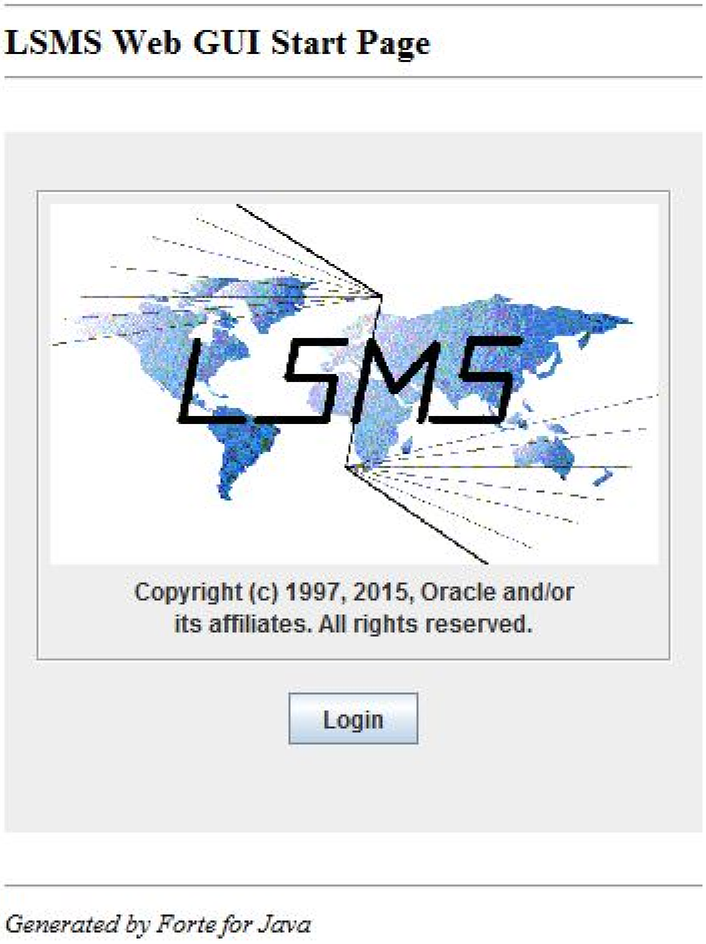
More Information

Select the box below, then click Run to start the application

☐ I accept the risk and want to run this application.

The LSMS Web GUI Start Page displays:

Figure 3-24   LSMS Web GUI Start Page with Login Button



LSMS Web GUI Start Page

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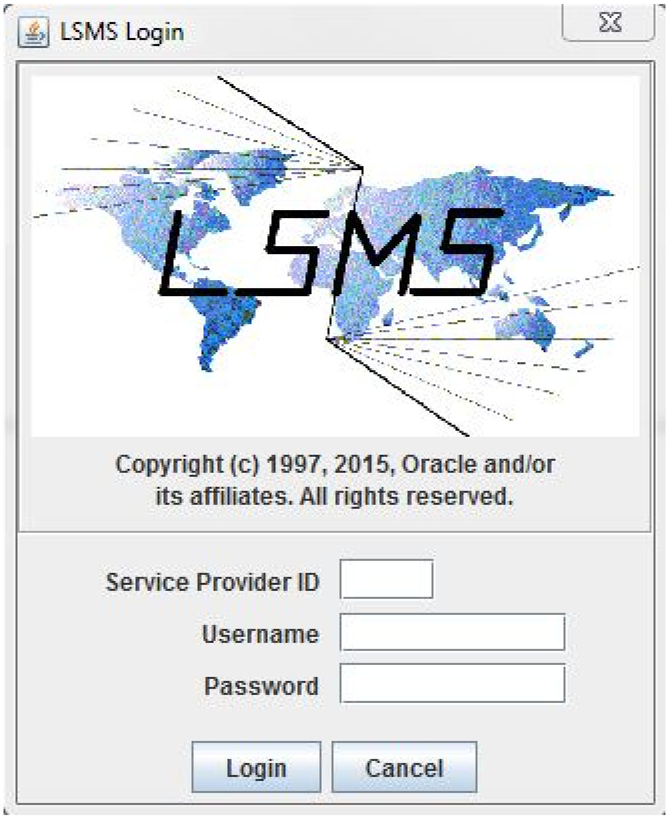
Generated by Forte for Java

13. Click the **Login** button.

    The **LSMS** Login screen appears. From this point on, the web-based **GUI** works exactly like the server-side **GUI**. Next, perform the procedure described in “Logging Into the **LSMS** Console Window”.

Figure 3-25 LSMS Welcome/Login Window



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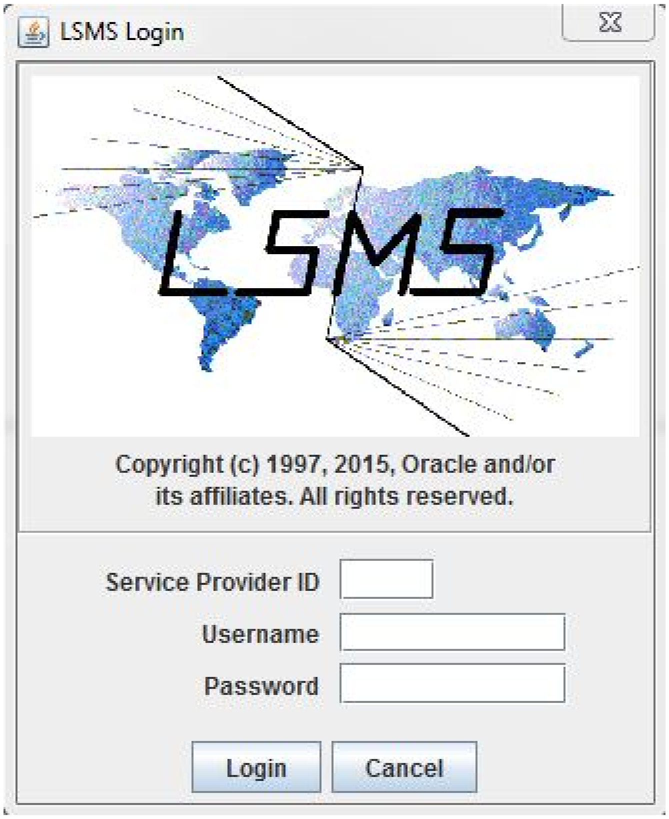
> **Note:**
>
> If you log out of this web-based **LSMS GUI** session, you must start a new browser to log back in. If you only want to change user, select User/ Session>Change User from the main **LSMS** menu.

Logging Into the LSMS Console Window

After one or more **SPIDs** have been defined, use the following procedure to log into the **LSMS** console.

1. After you have completed the procedure described in Starting an Web-Based LSMS GUI Session, the LSMS Welcome/Login Window displays.

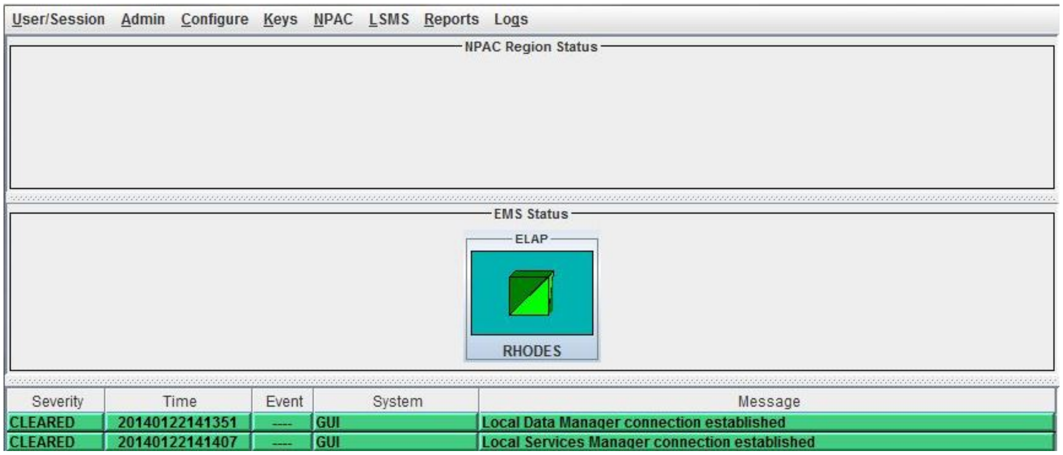
Figure 3-26 LSMS Welcome/Login Window



LSMS Login
LSMS
Copyright (c) 1997, 2015, Oracle and/or
its affiliates. All rights reserved.
Service Provider ID
Username
Password
Login
Cancel

2. Enter the Service Provider **ID** (**SPID**), username, and password, which must be as follows:
    - The username and password must have been defined as described in Managing User Accounts (the group definition determines to which **GUI** menu items the username will have access).
    - The **SPID** must be one that has been defined on this **LSMS**, as described in “Service Provider Contact Information” in *Configuration Guide*. In addition, if the **SPID** Security feature has been enabled, you must enter a username that has been authorized to access the **SPID** you enter. For information about authorizing usernames to **SPIDs**, refer to *Configuration Guide*.
3. Click **Login**.
    - If the Customizable Login Message feature is not enabled (or it is enabled, but no message text has been created), the **LSMS Console** window displays:

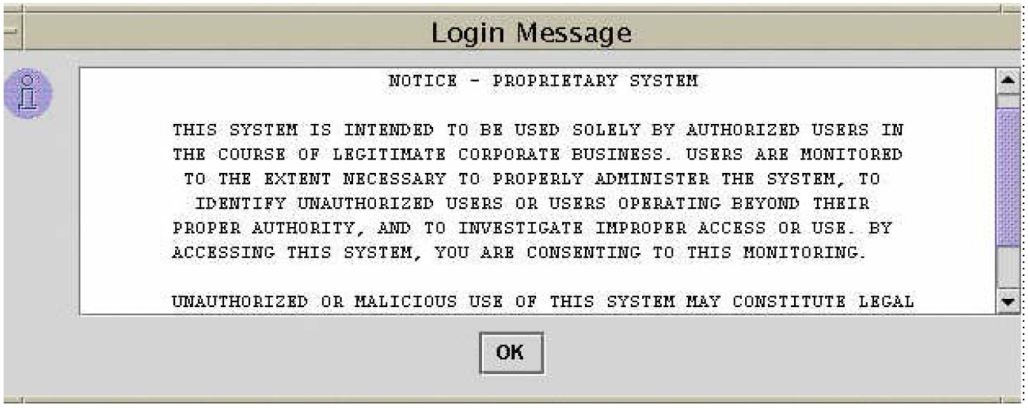
Figure 3-27 LSMS Console Window



Severity	Time	Event	System	Message
CLEARED	20140122141351	----	GUI	Local Data Manager connection established
CLEARED	20140122141407	----	GUI	Local Services Manager connection established

- If the Customizable Login Message feature is enabled and there is user-defined login message text configured, the Login Message dialog displays the message as shown in Figure 3-28 before the **LSMS Console** window is displayed. System administrators are responsible for creating the customizable login message text (for information about how to create this message text, refer to *Configuration Guide*). Oracle Customer Service is responsible for enabling the feature.

Figure 3-28 Example of Login Message Dialog



```
                 NOTICE - PROPRIETARY SYSTEM

THIS SYSTEM IS INTENDED TO BE USED SOLELY BY AUTHORIZED USERS IN
THE COURSE OF LEGITIMATE CORPORATE BUSINESS. USERS ARE MONITORED
 TO THE EXTENT NECESSARY TO PROPERLY ADMINISTER THE SYSTEM, TO
  IDENTIFY UNAUTHORIZED USERS OR USERS OPERATING BEYOND THEIR
PROPER AUTHORITY, AND TO INVESTIGATE IMPROPER ACCESS OR USE. BY
ACCESSING THIS SYSTEM, YOU ARE CONSENTING TO THIS MONITORING.

UNAUTHORIZED OR MALICIOUS USE OF THIS SYSTEM MAY CONSTITUTE LEGAL
```

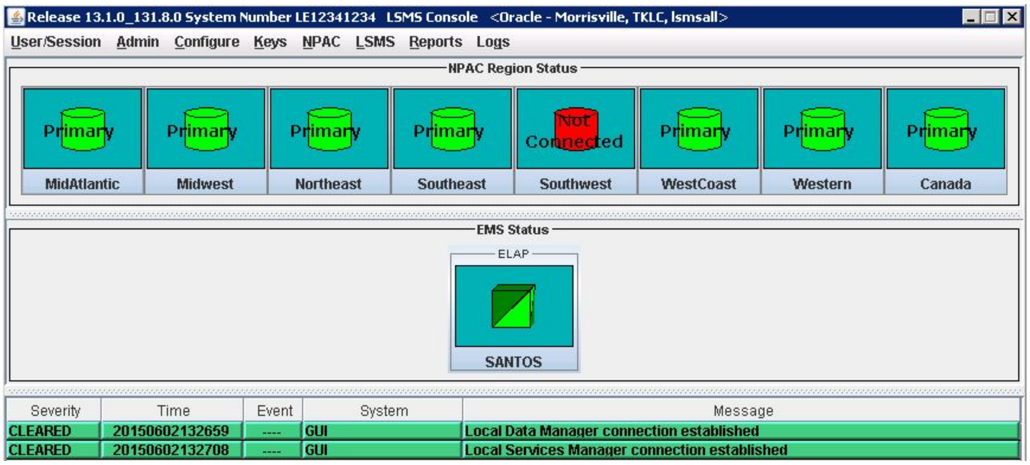
The Login Message dialog displays a 10 line by 80 character viewing area, with a scrollable text area up to a maximum of 5000 characters. Users must acknowledge this message by clicking the **OK** button.

Modifying Title Bar in LSMS Console Window

After you successfully log in to **LSMS**, the console window displays. If the `/usr/TKLC/lsms/config/LSMSname` file exists and contains a (0–30 character) unique **LSMS** name, the name (in this example, “Oracle - Morrisville”) is displayed in the title bar along with the

SPID and user name. If the file does not exist or is empty (null), no name will be displayed and the title bar will look as before—displaying only the **SPID** and user name.

Figure 3-29   LSMS Console Window with Modified Title Bar



Release 13.1.0_131.8.0 System Number LE12341234 LSMS Console <Oracle - Morrisville, TKLC, lsmsall>

Severity	Time	Event	System	Message
CLEARED	20150602132659	----	GUI	Local Data Manager connection established
CLEARED	20150602132708	----	GUI	Local Services Manager connection established

Powering On the LSMS

For information about powering on the **LSMS** servers (**LSMSPRI** and **LSMSSEC**), refer to *Application B Card Hardware and Installation Guide*.

> **Note:**
>
> Powering on the **LSMS** servers (which can be done in any order) does not start the **LSMS** application and MySQL database services. To start those functions after restoring power to the servers, perform the following steps:

1. Log in to **LSMSPRI** as `lsmsmgr`.

   (For information about logging in, see "Logging In to **LSMS** Server Command Line".)

2. Select **Maintenance**, and then **Start Node** to initiate the following activities:

   - Uninhibit **LSMSPRI**
   - Transition **LSMSPRI** to the **HAACTIVE** state

   > **Note:**
   >
   > The database on **LSMSPRI** becomes the master.

3. Log in to **LSMSSEC** as `lsmsmgr`.

   (For information about logging in, see "Logging In to **LSMS** Server Command Line".)

4. Select **Maintenance**, and then **Start Node** to initiate the following activities:
   - Copy the database on **LSMSPRI** to **LSMSSEC**
   - Begin database replication on **LSMSSEC**.

     > **Note:**
     >
     > The **LSMSSEC** database becomes a slave.

   - **HA** uninhibits **LSMSSEC**, allowing **LSMSSEC** to transition to a **HASTANDBY** state **LSMSPRI** is now active and running the **LSMS** application; **LSMSSEC** is in a standby state.

Powering Off the LSMS

Before you turn off the system power, all applications on each server must be stopped and the operating system on each server must be stopped. Use the following procedure to power off the **LSMS**; contact the #unique_86 if additional assistance is needed.

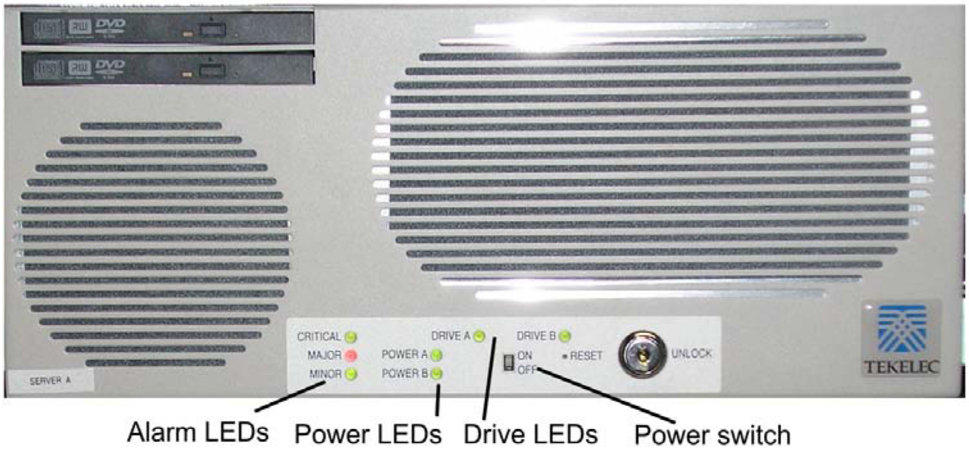
> **warning:**
>
> Do not disconnect or connect any cables to the system while the power is on. This action can damage the internal circuits.

1. On the **inactive server:**
   a. Log in to the inactive server as `root`.

      (For information about logging in, see "Logging In to **LSMS** Server Command Line".)
   b. Enter:

      ```
      # init 0
      ```
      The inactive server shuts down and powers off.
   c. Check to ensure the Power Indicator on the T1100 is off.

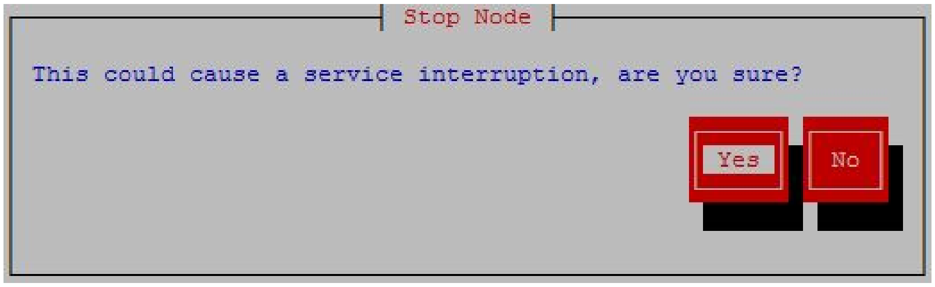
Figure 3-30 T1100 Showing Power LEDs



2. On the **active server:**
   1. Log in to the active server as `lsmsmgr`.

      (For information about logging in, see "Logging In to **LSMS** Server Command Line".)
   2. Select **Maintenance**, and then **Stop Node** (see Figure 3-31 and Figure 3-32 for example screens that display after selecting Stop Node).

Figure 3-31 Example Cautionary Message - Displayed after Selecting Stop Node

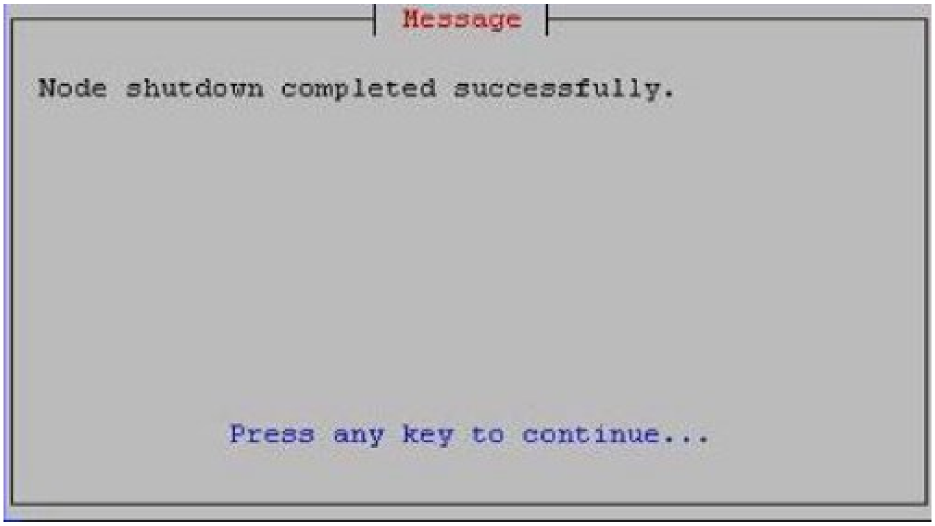


```
This could cause a service interruption, are you sure?
```

   3. Select **Yes** to continue the Stop Node process.

> **Note:**
>
> Selecting **Yes** on this screen stops the **LSMS** application and it also stops the MySQL database services from running.

Figure 3-32 Example Message - Stop Node Completed Successfully



```
Node shutdown completed successfully.

Press any key to continue...
```

   4. Press any key to continue.
   5. Exit the lsmsmgr interface by highlighting **Exit** and pressing **Enter** until you have completely exited.

f. Log in as `root` on the active server.

   (For information about logging in, see Logging In to LSMS Server Command Line.)

g. Enter:

```
# init 0
```

   The active server shuts down and powers off.

h. Check to ensure the Power **LEDs** on the T1100 are off (see Figure 3-30).

Managing the System Clock

The **NPAC** and **LSMS** system times must be within five minutes of each other, with the **NPAC** serving as the master. If the **NPAC** and **LSMS** system times are not within five minutes of each other, one of the following **GUI** notifications may be posted:

```
[Critical]:  <Timestamp> 2003: NPAC [<PRIMARY|SECONDARY>] Connection Aborted
by PEER : Access Control Failure
```

```
[Critical]:  <Timestamp> 2012: NPAC [<PRIMARY|SECONDARY>]  Connection
Attempt Failed : Access Control Failure
```

If one of these notifications appears, verify and, if necessary, reset the **LSMS** time using the methods described in either of the following sections:

- Automatically Controlling the LSMS Time Using NTP. Using the Network Time Protocol (**NTP**) requires access to accurate **NTP** servers, but results in the **LSMS** rarely, if ever, being out of synchronization with the **NPAC**. This section describes how to troubleshoot the rare problems with **NTP**.
- Manually Controlling the LSMS Time Without an External NTP Source. Using only manual methods to control the **LSMS** time can result in cases of the **LSMS** being out of synchronization with the **NPAC**.

Automatically Controlling the LSMS Time Using NTP

The **LSMS** allows you to configure the **LSMS** as an industry-standard Network Time Protocol (**NTP**) client that communicates with one or more **NTP** servers elsewhere in your network. **NTP** reads a time server's clock and transmits the reading to one or more clients with each client adjusting its clock as required.

Configuring the LSMS as an NTP Client

The **NTP** client protocol is incorporated with the operating system that is included with **LSMS**. If you choose to implement the **LSMS** as an **NTP** client, you must set up one or more **NTP** servers in your own network (or synchronize with some portion of the existing **NTP** subnet that runs on the Internet) and configure the **LSMS** to contact those **NTP** servers. For information about selecting **NTP** servers and configuring the **LSMS** as an **NTP** client and about displaying current settings for **NTP**, refer to the *Configuration Guide*.

If you prefer not to configure the **LSMS** as an **NTP** client, you can manually reset the **LSMS** time when it drifts out of synchronization with the **NPAC** time, as described in Manually Controlling the LSMS Time Without an External NTP Source.

Verifying NTP Service

Use the following procedure to verify that the time server is working.

- Log in to lsmspri as `root` and enter the following command:

  ```
  $ ntpdate -q ntpserver1
  ```

  - If the time server is working, output similar to the following displays:

    ```
    server 198.89.40.60, stratum 2, offset 106.083658, delay 0.02632
    22 May 14:23:41 ntpdate[7822]: step time server 198.89.40.60
    offset 106.083658 sec
    ```

  - If the time server is not working or is unavailable, output similar to the following displays:

    ```
    server 198.89.40.60, stratum 0, offset 0.000000, delay 0.000000
    22 May 14:33:41 ntpdate[7822]: no server suitable for
    synchronization found
    ```

Troubleshooting NTP Problems

If you configure the **LSMS** to communicate with several **NTP** servers, you should rarely encounter any problems with **NTP**. This section describes how to troubleshoot the following rare, but possible, error conditions:

- Reference Time Off By More Than Twenty Minutes
- Violation of Maximum Oscillator Frequency in Network

Reference Time Off By More Than Twenty Minutes

The **LSMS**'s **NTP** client **daemon** expects that the **LSMS** system time has been set close to the real time. If the reference time received from the **NTP** server is significantly different from the **LSMS** system time, the **daemon** waits up to twenty minutes until it sets the time. However, if the reference time is off more than about twenty minutes (which is rare), the **daemon** terminates and does not set the system time.

If you think that the **daemon** may have terminated, perform the following procedure:

1. Determine whether the `ntpd`**daemon** process is running by logging in as `root` and entering the following command:

   ```
   # ntpq -p
   ```

   If the **daemon** is not running, check the `/var/log/messages` file.

2. To set the system clock, either perform the process described in Manually Controlling the LSMS Time Without an External NTP Source or enter the following command:

   ```
   # ntpdate <IP_address_of_NTP_server>
   ```

3. Start the ntpd**daemon** by entering the following commands:

   ```
   # /etc/rc4.d/S58ntpd start
   ```

4. Verify that the ntpd**daemon** started by repeating step 1.

Violation of Maximum Oscillator Frequency in Network

The **NTP** protocol specifies that systems should have a maximum oscillator frequency tolerance of plus or minus 100 parts-per-million (ppm). This tolerance allows relatively inexpensive workstation platforms to use the **NTP** protocol. For platforms that meet this tolerance, **NTP** automatically compensates for the frequency errors of the individual oscillator, such that no additional adjustments are required to either the configuration file or to various kernel variables.

However, some platforms routinely violate this tolerance, and their violation can affect other time servers or time clients in a network. Although the **LSMS** meets the tolerance requirement, if your network contains other systems that do not meet the tolerance requirement, you may need to adjust the values of certain kernel variables.

Manually Controlling the LSMS Time Without an External NTP Source

If you choose not to configure the **LSMS** to use an **NTP** server, you can use the following procedure to resynchronize the **LSMS** system time with the **NPAC** time when one of the notifications described in Managing the System Clock is posted:

Generally, the following procedure is used only when the **LSMS** is first installed. However, if you are not able to use another method of synchronizing time with an **NPAC** (as described in Automatically Controlling the LSMS Time Using NTP), you can contact the **NPAC** administrator, inquire the time used at the **NPAC**, and use the following procedure to manually set the **LSMS** system time and date.

Internal system times are stored in **GMT**; however, the time and date are typed in the local time zone and converted automatically. If you need to check the local time zone, you can use the `env` command with the `TZ` variable.

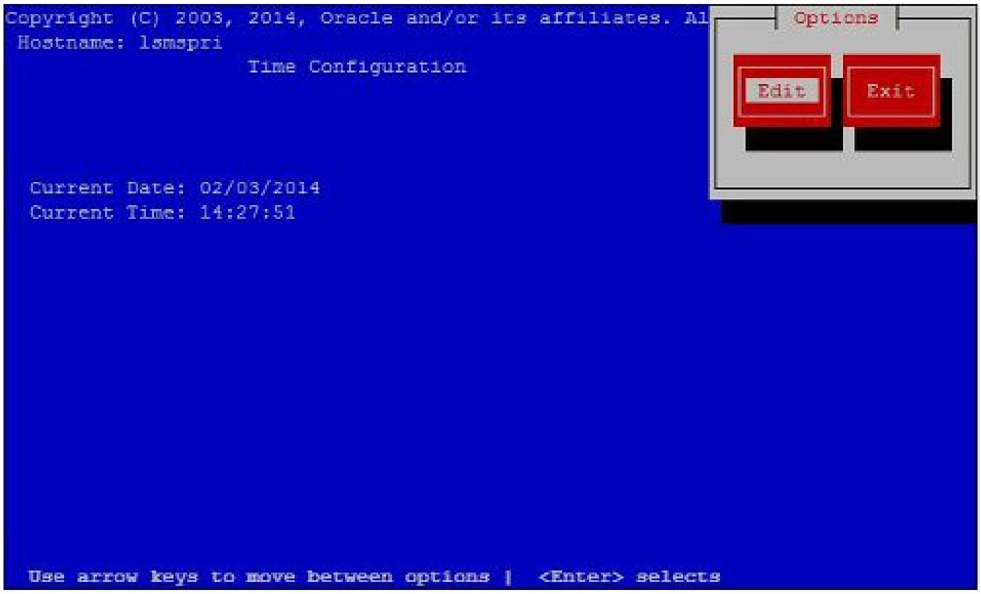
1. Log in to active server as `lsmsmgr`.

   (For information about logging in, see Logging In to LSMS Server Command Line.)

2. From the main `lsmsmgr` menu, select **Server Configuration**, and then **Set Clock**.

   A window similar to Figure 3-33 displays.

Figure 3-33 Set Clock Window



```
Copyright (C) 2003, 2014, Oracle and/or its affiliates. Al
 Hostname: lsmspri
                    Time Configuration

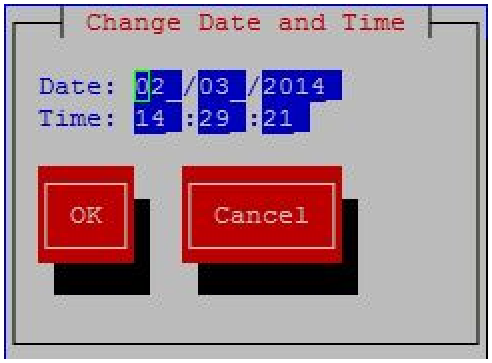
  Current Date: 02/03/2014
  Current Time: 14:27:51

  Use arrow keys to move between options | <Enter> selects
```

3. If you need to change the current date or time, press Enter while the Edit button is highlighted.

   A window similar to Figure 3-34 displays.

Figure 3-34 Change Date and Time Window



```
Change Date and Time

Date: 02 /03 /2014
Time: 14 :29 :21
```

4. Use the down and up arrow keys to move to the field that you want to change.

   Within a field, use the right and left arrow keys to move within a field, delete digits by pressing the Delete key and enter digits by typing them in. When you the values are what you want, press the down arrow key until the **OK** button is highlighted, and then press Enter. The window shown in Figure 3-11 is displayed again, and it should now display the date and time you set in this step.

5. Log in to the standby server as `lsmsmgr`, and repeat steps 1 through 4.

6. If you have changed the time by more than five minutes, it is recommended that you reboot each server.

Managing User Accounts

This section provides information about the following topics:

- Overview information about user names and passwords
- Overview information about the **SPID** Security feature
- Non-configurable permission groups
- Configurable permission groups
- Managing user accounts on the primary and secondary servers
- Managing user accounts on the administration console
- Changing account passwords using Linux commands
- Activating the **SPID** Security feature

Overview of User Names and Passwords

The system administrator assigns user names and passwords. Each user name is assigned to one of the following permission groups:

> **Note:**
>
> It is possible for an individual user name to have the same value as a group name. For example, usually a user named `lsmsadm` is assigned to the `lsmsadm` permission group. Some **LSMS** commands require the user to be logged in with the `lsmsadm` user name.

- `lsmsall`
- `lsmsadm`
- `lsmsuser`
- `lsmsuext`
- `lsmsview`

The permission groups govern which commands and which **GUI** functions the user is allowed to use.

Overview of SPID Security Feature

In addition, the **LSMS** offers the optional **SPID** Security feature that allows the **LSMS** administrator to assign only certain usernames to be allowed to log on with a specified Service Provider Identifier (**SPID**). Alternatively, the **LSMS** administrator can assign a username to be given access to all **SPIDs**; such a user is called a “golden user.”

Association of a username with a **SPID** allows the **LSMS** system administrator to restrict access to the following types of locally provisioned data (for more information about associating usernames with **SPIDs**, see Activating the SPID Security Feature):

- Default global title translation (**GTT**)
- Override **GTT**
- **GTT** Groups
- Telephone number (**TN**) filters
- Assignment of **GTT** groups and **TN** filters to an Element Management System (EMS). For more information about **GTT** groups, refer to the *Database Administrator's Guide*.

Accessibility to these types of data are protected by **SPID** security for any access method (for example, through the **GUI**, through input data by file, audit, and reconcile).

The **SPID** Security feature is especially useful for **LSMS** customers that act as service bureaus, offering **LSMS** services to other service providers. The service bureau may administer locally provisioned data for a client and may choose to allow the client to administer or view its own data without allowing that client to view or change data belonging to other clients.

> **Note:**
>
> Without this optional feature, any user can log in using any **SPID** that is defined on the **LSMS**. The user is able to view any data for any **SPID**, and depending on which user privileges were assigned to that username, may be able to change data associated with any **SPID**.

Non-Configurable Permission Groups

Table 3-2 shows a summary of privileges allowed to each user type.

Table 3-2 User Types

User type	Privileges	User secondary group name	SPID value for logging in
System Administration User	Allows the user to inherit all the privileges of all other user types	`lsmsall`	**NPAC**-assigned **SPID** (refer to the *Configuration Guide*).
System Configuration User	Allows the user to: • Create, modify and maintain the **LNP** systems, key lists, associations, and the MySQL databases • Stop automatic audits. • Inherit all the privileges of the Viewer User	`lsmsadm`	**NPAC**-assigned **SPID** (refer to the *Configuration Guide*).
Database Administration User	Allows the user to: • Modify and maintain the **NPAC** and supported service provider data • Have unlimited access to all **LNP** related-logs, data, and tables • Inherit all the privileges of the Viewer User	`lsmsuser`	Any **SPID**. If a shadow **LSMS** exists, use the same **SPID** for similar functions on main and shadow **LSMS**.

Table 3-2 (Cont.) User Types

User type	Privileges	User secondary group name	SPID value for logging in
External User	Allows the user the same access as `lsmsuser`, but the user is not permitted access to the **NPAC** menu on **LSMS GUI**	`lsmsuext`	Any **SPID**. If a shadow **LSMS** exists, use the same **SPID** for similar functions on main and shadow **LSMS**.
Viewer User	Allows the user: • Read access to the **LNP** data and tables • Limited read access to resource displays and logs • Unlimited access to viewing and acknowledging all alarms	`lsmsview`	Any **SPID**.

User Permissions for LSMS Commands

Table 3-3 shows the commands each user type has permission to execute. For more information about the commands, see Commands.

Table 3-3 Access to LSMS Commands

Command	root	lsmsadm	lsmsuser	lsmsview	lsmsall	lsmsuext
Command permissions: X = Users in this group have permission to use this command. lsmsadm = The user must be logged in with the name lsmsadm to have permission to use this command. root = The user must be logged in with the name root to have permission to use this command.						
`autoxfercfg`		X				
`chglct`		X				
`chkfilter`		X				
`eagle`		lsmsadm				
`import`		X	X	X	X	X
`keyutil`		lsmsadm				
`lsms`		lsmsadm				
`lsmsdb`	root	X	X	X	X	X
`lsmsSNMP`		X				
`lsmssurv`	root					
`massupdate`		lsmsadm				
`measdump`			X	X	X	X
`npac_db_setup`		lsmsadm				

Table 3-3 (Cont.) Access to LSMS Commands

Command	root	lsmsadm	lsmsuser	lsmsview	lsmsall	lsmsuext
`npacimport`		lsmsadm				
`report`		X	X	X	X	X
`resync_db_setup`		lsmsadm				
`SAagent`		X				
`spidsec`		lsmsadm				
`sup`		lsmsadm				
`sup_db_setup`		lsmsadm				
`survNotify`	root	X	X	X	X	X
`syscheck`	root					

User Permissions for GUI Functions

For information about the **GUI** functions each permission group can access, refer to the tables in the *Configuration Guide* (Admin **GUI** Access, Configure User Access, and Keys **GUI** Access) and the *Database Administrator's Guide* (User/Session **GUI** Access, **NPAC GUI** Access, **LSMS GUI** Access, Reports **GUI** Access, Logs **GUI** Access, and Popup Menus **GUI** Access).

Configurable Permission Groups (LSMS Command Class Mgmt)

When the optional **LSMS Command Class** Management feature is enabled, **LSMS** supports configurable **GUI** permission groups *in addition to* the five non-configurable **GUI** permission groups (`lsmsadm`, `lsmsuser`, `lsmsview`, `lsmsall`, and `lsmsuext`).

The **LSMS** supports the creation of 128 additional, configurable **GUI** permission groups that can be used to ensure a specific and secure environment. After creating the new, configurable **GUI** permission groups, the system administrator can assign users to the appropriate group.

The configurable **GUI** permission groups control access to **GUI** commands, the **CLAA** (Command Line Administration Application) equivalent, or any command-line equivalent of **GUI** functions.

A method to control access to a fixed set of commands is provided. Existing commands, executables, and scripts are classified as follows:

- Command-line equivalents of **GUI** commands (Reports and functions of **CLAA**)
  These commands are controlled by the assignment of the corresponding **GUI** function.
- Optional command-line capability for Report Generator (**LQL**)
  This command may be assigned individually, similar to **GUI** commands, to one or more permission groups.
- Root privilege-only commands
  These commands are root-only and are not assignable to any permission group.
- Other commands owned by `lsmsadm`

These commands include those used by the **LSMS** application, those used to control processes, and those for setup and configuration. Commands in this category are grouped as a single set of administration commands. Users may or may not be granted access to this command-line group, in addition to being assigned to the appropriate **GUI** group.

Some commands in this group, although owned by `lsmsadm`, are accessible to non-owners for limited operation, such as status. The incorporation of this feature will not have any impact on the current privileges of commands for non-owners.

Example:

To set up a custom environment, system administrators should define the **GUI** permission groups and populate those groups with the appropriate commands:

Table 3-4 Define GUI Permission Groups and Assign Command Privileges

GUI Permission Group	Command Privileges
Custom **GUICONFIG**	All Configuration Commands
Custom **GUIEMS**	All **EMS**-related Commands
Custom **GUISUPER**	All **GUI** Commands

Optionally, assign users (for example, Mike, Sally, and Bill) to a specific command-line permission group (in this example, `lsmsadm`) or **GUI** permission group.

Table 3-5 User Assignment Examples

User	Linux Permission Group	GUI Permission Group
Mike	`lsmsadm`	Custom **GUICONFIG**
Joe	`lsmsall`	Custom **GUIEMS**
Sally	`lsmsadm`	`lsmsadm`
Bill	`lsmsadm`	Custom **GUISUPER**

> **Note:**
>
> Secure activation is required because this is an optional feature.

After activating this feature, you can create permission groups and assign users to these new groups.

> **Note:**
>
> Changes in privileges do not automatically occur upon feature activation.

Permission Group Naming

- The **LSMS** supports the ability to uniquely name each configurable **GUI** permission group.

- A group name can consist of a minimum of one character to a maximum of 40 characters (only alphanumeric characters are permitted).

Permission Group Contents

- Each configurable **GUI** permission group supports any or all of the **LSMS GUI** commands.

> **Note:**
>
> The **GUI** command represents the function, via either the **GUI**, **CLAA**, or command-line equivalent of **GUI** commands.

- Any **GUI** command may be associated with multiple **GUI** permission groups.
- The optional **LQL** command for the Report Generator feature can be placed in **GUI** permission groups.
- The **LSMS** supports a group containing the current **LSMS** `lsmsadm` commands with the exception of Report, Audit, and **LQL**.

Permission Group Commands

The **LSMS** enables you to perform the following tasks:

- Create and modify **GUI** permission groups.
- Assign a user to a single **GUI** permission group.
- Assign a user access to the command group in addition to a **GUI** permission group.
- Retrieve the names of all permission groups, all the commands permitted within a permission group, and the names of all permission groups that contain a particular command.

Permission Group Processing

GUI Functions:

The **LSMS** allows a **GUI** user access to **GUI** commands, **CLAA** commands, or command-line equivalents of **GUI** commands only if that user is an authorized user.

Command-Line-Level:

The **LSMS** allows a user access to command-line-level scripts and executables only if that user is an authorized user.

> **Note:**
>
> For more information about command class management and configurable permission groups, refer to the *Configuration Guide*.

Managing User Accounts on the Primary and Secondary Servers

To manage user accounts, **LSMS** utilizes the `lsmsdb command`. This command allows you to add and delete user accounts, change passwords, and list users. The `lsmsdb` command makes the appropriate changes in the system `/etc/password` file.

The following topics explain how to use the `lsmsdb` command to administer **LSMS** user accounts:

- Adding a User
- Deleting a User
- Setting the System Level Password Timeout Using the Command Line
- Setting the User Level Password Timeout Using the Command Line
- Displaying All LSMS User Accounts

> **Note:**
>
> The `lsmsdb` command modifies files on the local system (the system on which lsmsdb is executed). It does not modify or update global network databases. Therefore, if you add or modify users on one server, make the same change on the other server. Sometimes, for specific administration purposes, you might add or modify users on the servers without adding or modifying them on the administration console.

The following topics explain how to use the **LSMS GUI** to administer **LSMS** user accounts:

- Setting the System Level Password Timeout Using the GUI
- Setting the User Level Password Timeout Interval Using the GUI
- Viewing the Active User List
- Terminating an Active User Session

Adding a User

Use the following procedure to add a user account:

1. Log in as `root` and type your password.

   For more information, see Logging In to LSMS Server Command Line.

2. Execute `lsmsdb` with the `adduser` command option:

   ```
   $ cd $LSMS_TOOLS_DIR
   $ lsmsdb -c adduser -u <username>
   ```

3. When the following prompt appears, enter the user password.

   ```
   Enter password:
   ```

4. When the following prompt appears, enter the user password again.

   ```
   Re-enter password:
   ```

   > **Note:**
   >
   > If you did not enter the same password in Steps 3 and 4, the following warning is displayed:

   ```
   WARNING: Passwords must match.
   #
   ```

   In this case, go back to Step 1; otherwise, proceed with Step 5.

5. When the following prompt is displayed, select the **LSMS** group name (`lsmsadm`, `lsmsuser`, `lsmsview`, `lsmsuext`, or `lsmsall`) for the user by entering the corresponding number in the `CHOICE` field, then press <return>.

   ```
   Select Secondary Permission Group From List:
   1) lsmsadm
   2) lmsuser
   3) lsmsview
   4) lsmsuext
   5) lsmsall
   CHOICE:
   ```

6. When the following prompt appears, enter **Y** or **N** in the `CHOICE` field to indicate whether you want to enter an expiration date for this login.

   ```
   Set expiration date? Y/N
   CHOICE:
   ```

   > **Note:**
   >
   > If you enter an expiration date, the user will not be allowed to login to this account after that date.

   If you enter **Y** in the `CHOICE` field, the following prompt appears:

   ```
   Enter expiration date (mm/dd/yyyy):
   ```

7. When the following prompt appears, enter **Y** or **N** in the `CHOICE` field to indicate whether you want to enter an **Inactivity Value** (in days) for this account.

   ```
   Set inactivity value? Y/N
   CHOICE:
   ```

   > **Note:**
   >
   > If you enter a value (in days), the account will be declared invalid and the user will not be allowed to use that account for the number of days specified.

   If you enter **Y** in the `CHOICE` field, the following prompt appears:

   ```
   Enter a number (of days):
   ```

8. If any other error or warning message displays, contact the #unique_86.
9. Repeat on other server, if desired.

Deleting a User

Use the following procedure to remove a user account:

1. Log in as `root` and type your password.

   For more information, see Logging In to LSMS Server Command Line.
2. Execute `lsmsdb` with the `rmuser` command option:

   ```
   $ cd $LSMS_TOOLS_DIR
   $ lsmsdb -c rmuser -u <username>
   ```

   Upon completion of the command, the prompt will be returned.
3. If an error or warning message displays, contact the #unique_86.

Changing a User Password

Use the following procedure to change a user password:

> **Note:**
>
> The `lsmsdb -c chguserpw -u <username>` command must be run on both the primary and the secondary servers to completely change the password.

1. Log in as `root`, or as the user for which the password is going to be changed, and type your password.

   For more information, see Logging In to LSMS Server Command Line.
2. Execute `lsmsdb` with the `chguserpw` command option:

```
$ cd $LSMS_TOOLS_DIR
$ lsmsdb -c chguserpw -u <username>
```

3. When the following prompt appears, enter the current user password.

   ```
   Enter current password:
   ```

4. When the following prompt appears, enter the new user password.

   ```
   Enter new password:
   ```

5. When the following prompt appears, enter the new user password again.

   ```
   Re-enter new password:
   ```

   > **Note:**
   >
   > If you did not enter the same password in Steps 3 and 4, the following warning is displayed:
   >
   > ```
   > WARNING: Passwords must match. #
   > ```

   In this case, go back to Step 1; otherwise, proceed with Step 6.

6. If any other error or warning message displays, contact the #unique_86.

Setting the System Level Password Timeout Using the Command Line

Use the following procedure to set the system level password timeout using the command line:

1. Log in as `lsmsadm` and type your password.

   For more information, see Logging In to LSMS Server Command Line.

2. Execute `lsmsdb` with the `syspwexp` command option:

   ```
   $ cd $LSMS_TOOLS_DIR
   $ lsmsdb -c syspwexp
   ```

3. When the following prompt appears, enter **Y**.

   ```
   Configured value: -1
   Set password expiration interval? Y/N
   ```

Note:

A configured value of -1 indicates the password timeout has not been configured. A configured value of 0 indicates the password timeout has been configured and the password is valid for an indefinite period of time.

4. When the following prompt appears, enter the password timeout interval.

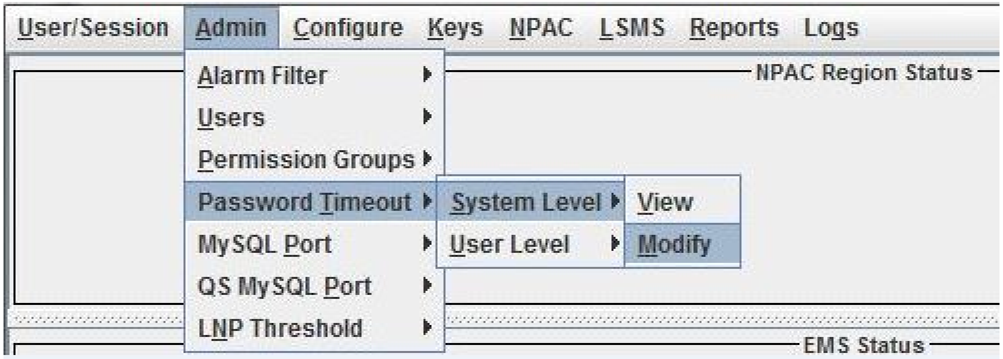
```
Set maximum number of days before password expires for users.
This will set the default password expiration interval for all users.
Valid values are 0 (never expire) or 1 to 180 days.
Enter value:
```

Setting the System Level Password Timeout Using the GUI

Use the following procedure to set the system level password timeout using the **GUI**:

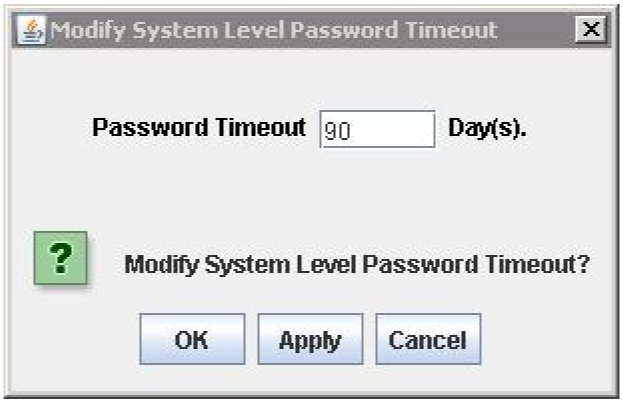
1. Log in to the **LSMS Console** as a user in the `lsmsadm` or `lsmsall` group.
2. From the main menu, select **Admin**, and then **Password Timeout**, and then **System Level**, and then **Modify**.

Figure 3-35 Modifying the System Level Password Timeout



3. Click **Modify**, and the Modify System Level Password Timeout dialog displays.

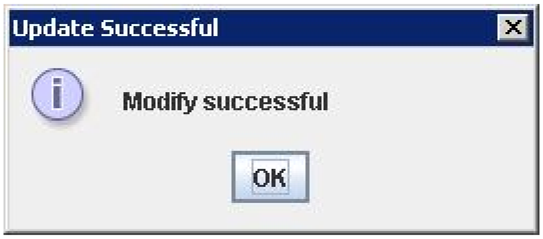
Figure 3-36 Modify System Level Password Timeout


Modify System Level Password Timeout
Password Timeout
90
Day(s).
Modify System Level Password Timeout?
OK
Apply
Cancel

4. Type in the number of days for the password timeout interval, then click **OK** .

   If you have successfully modified the password timeout, then the Update Successful dialog displays.

   Figure 3-37 Update Successful

   Update Successful

   Modify successful

5. Click **OK** .

Setting the User Level Password Timeout Using the Command Line

Use the following procedure to set the system level password timeout using the command line:

1. Log in as `lsmsadm` and type your password.

   For more information, see Logging In to LSMS Server Command Line.

2. Execute `lsmsdb` with the `usrpwexp` command option:

   ```
   $ cd $LSMS_TOOLS_DIR
   $ lsmsdb -c usrpwexp -u <username>
   ```

3. When the following prompt appears, enter **Y**.

   ```
   Configured value: -1
   Set password expiration interval? Y/N
   ```

   > **Note:**
   >
   > A configured value of -1 indicates the password timeout has not been configured. A configured value of 0 indicates the password timeout has been configured and the password is valid for an indefinite period of time.

4. When the following prompt appears, enter the password timeout interval.

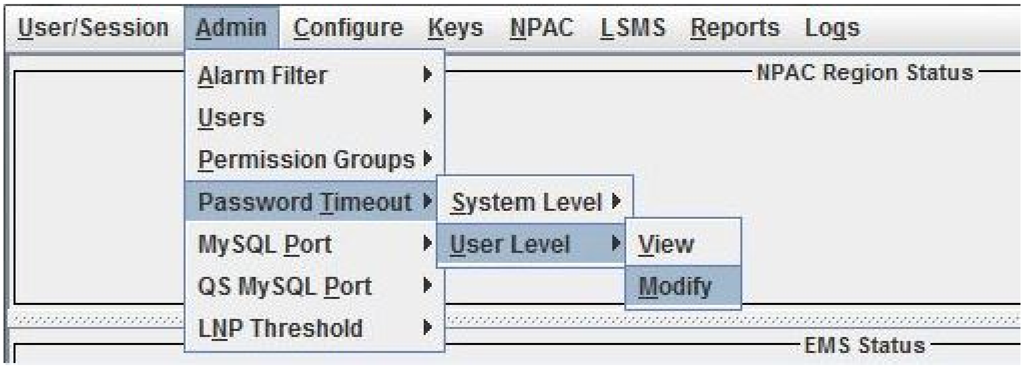
   ```
   Set maximum number of days before password expires for the user.
   Valid values are 0 (never expire) or 1 to 180 days.
   Enter value:
   ```

Setting the User Level Password Timeout Interval Using the GUI

Use the following procedure to set the system level password timeout using the **GUI**:

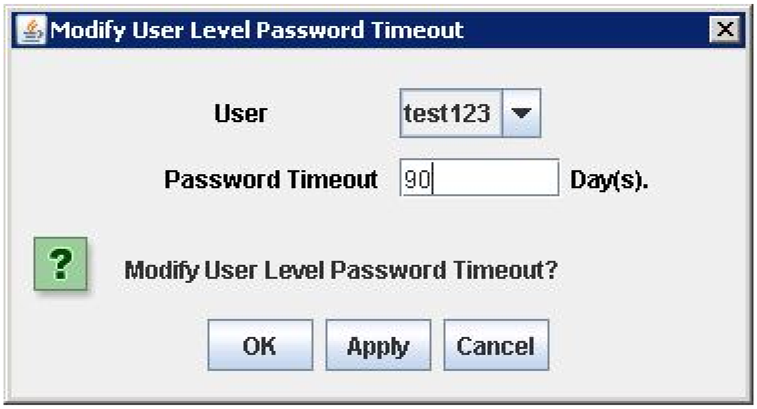
1. Log in to the **LSMS Console** as a user in the `lsmsadm` or `lsmsall` group.
2. From the main menu, select **Admin**, and then **Password Timeout**, and then **User Level**, and then **Modify**.

Figure 3-38 Modifying the User Level Password Timeout Interval



3. Click **Modify**, and the Modify User Level Password Timeout dialog displays.

Figure 3-39 Modify User Level Password Timeout



User test123

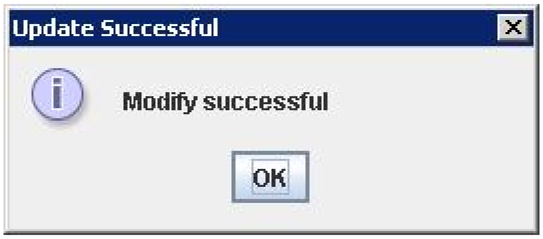
Password Timeout 90 Day(s).

Modify User Level Password Timeout?

4. Select a user whose password timeout interval you want to modify.
5. Type in the number of days for the password timeout interval, then click **OK** .

   If you have successfully modified the password timeout, then the Update Successful dialog displays.

Figure 3-40 Update Successful



Modify successful

6. Click **OK** .

Displaying All LSMS User Accounts

Use the following procedure to display a list of all **LSMS GUI** Users:

1. Log in as `root` and type your password.

   For more information, see Logging In to LSMS Server Command Line.

2. Execute `lsmsdb` with the `users` command option:

   ```
   $ cd $LSMS_TOOLS_DIR
   $ lsmsdb -c users
   ```

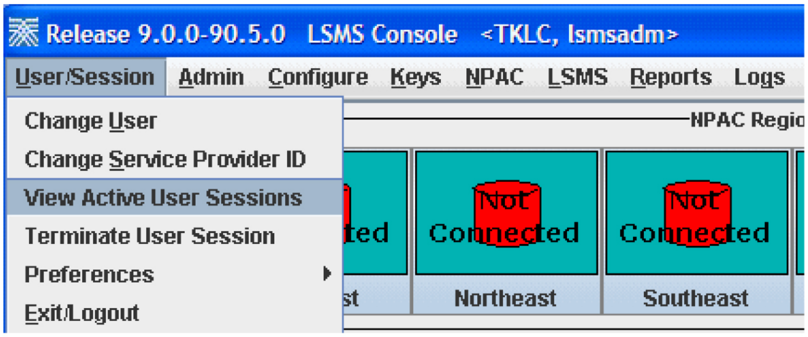
   The configured **LSMS** users will be output one user per line.

Viewing the Active User List

Use the following procedure to display a list of active **LSMS GUI** Users:

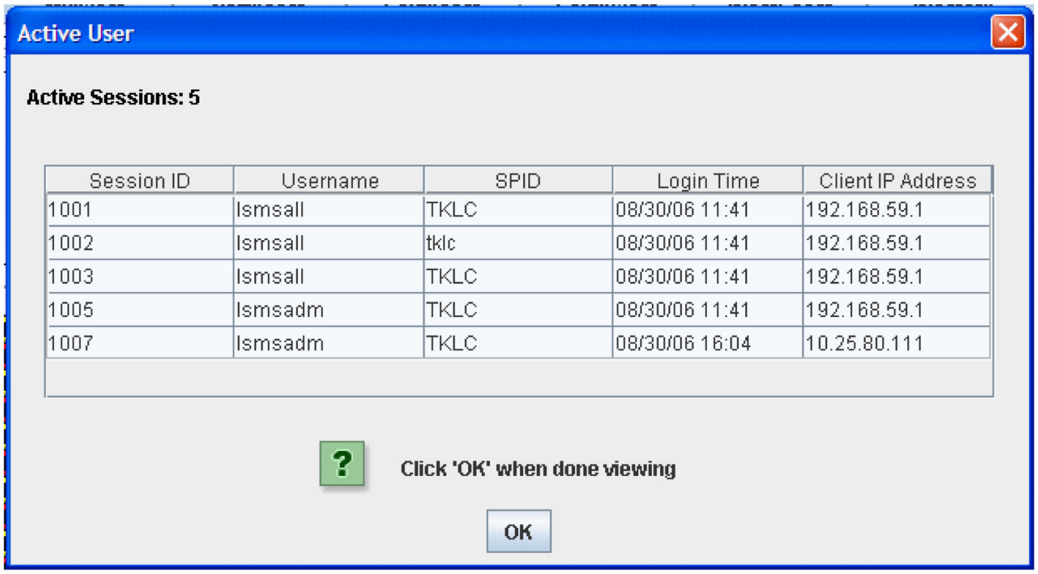
1. Log in to the **LSMS Console** as a user in the `lsmsadm` or `lsmsall` group.
2. From the main menu, select **User/Session**, and then **View Active User Sessions**.

   Figure 3-41 Select User/Session, and then View Active User Sessions

3. After clicking **View Active User Sessions**, the View Active User Sessions dialog displays.

Figure 3-42 View Active User Sessions Dialog



Active User

Active Sessions: 5

Session ID	Username	SPID	Login Time	Client IP Address
1001	lsmsall	TKLC	08/30/06 11:41	192.168.59.1
1002	lsmsall	tklc	08/30/06 11:41	192.168.59.1
1003	lsmsall	TKLC	08/30/06 11:41	192.168.59.1
1005	lsmsadm	TKLC	08/30/06 11:41	192.168.59.1
1007	lsmsadm	TKLC	08/30/06 16:04	10.25.80.111

Click 'OK' when done viewing

Note:

Timed-out sessions are included in the active sessions list.

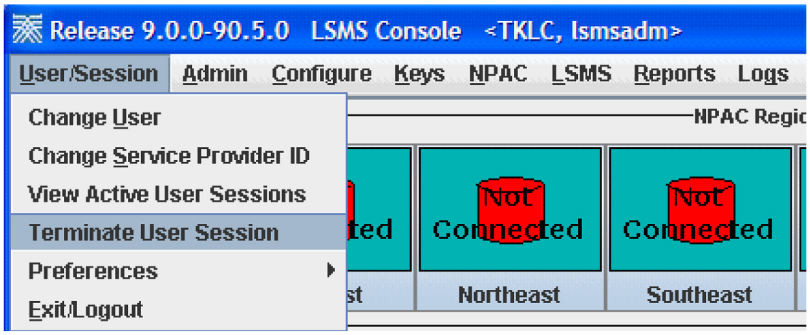
4. Click **OK** when you are done viewing the Active User list.

Terminating an Active User Session

Use the following procedure to terminate the session of an active **LSMS GUI** User:

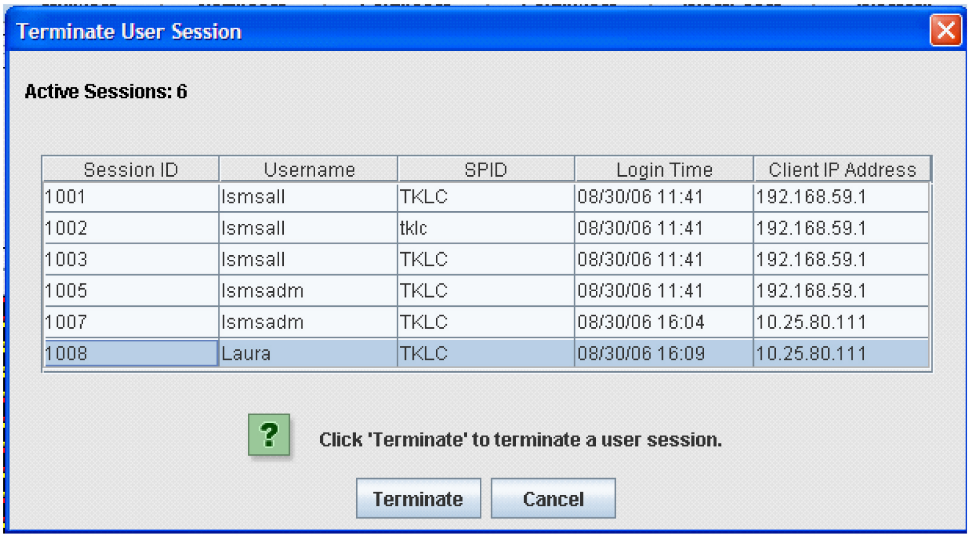
1. Log in to the **LSMS Console** as a user in the `lsmsadm` or `lsmsall` group.
2. From the main menu, select **User/Session**, and then **Terminate User Session**.

Figure 3-43 Select User/Session, and then Terminate User Session



3. After clicking **Terminate User Session**, the Terminate User Session dialog displays.

Figure 3-44 Terminate User Session Dialog



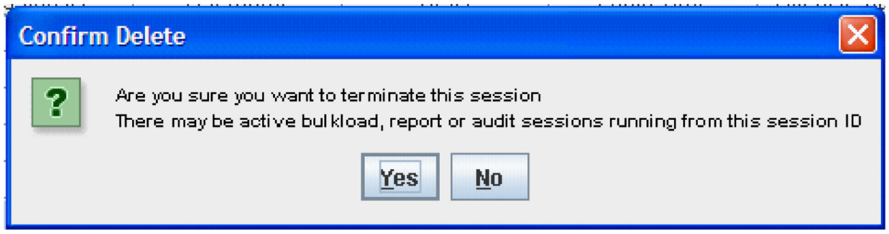
Active Sessions: 6

Session ID	Username	SPID	Login Time	Client IP Address
1001	lsmsall	TKLC	08/30/06 11:41	192.168.59.1
1002	lsmsall	tklc	08/30/06 11:41	192.168.59.1
1003	lsmsall	TKLC	08/30/06 11:41	192.168.59.1
1005	lsmsadm	TKLC	08/30/06 11:41	192.168.59.1
1007	lsmsadm	TKLC	08/30/06 16:04	10.25.80.111
1008	Laura	TKLC	08/30/06 16:09	10.25.80.111

Click 'Terminate' to terminate a user session.

4. Click on the user session you want to end and click **Terminate**.
5. If you are sure you want to terminate the session, click **Yes** in the Confirm Delete dialog, otherwise click **No**.

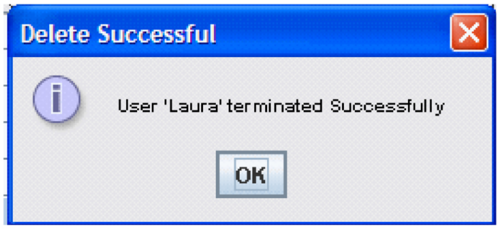
Figure 3-45 Confirm Delete Dialog



Are you sure you want to terminate this session
There may be active bulkload, report or audit sessions running from this session ID

6. After you successfully terminate a user session, click **OK** in the Delete Successful dialog.

Figure 3-46 Delete Successful Dialog



User 'Laura' terminated Successfully

Activating the SPID Security Feature

This feature is activated by Oracle customer service using secure activation procedures. Once the feature is activated, the following actual usernames (not user group names) are defined to be “golden users” having access to all **SPID** and all other usernames are defined to have no access to any **SPIDs**:

- `lsmsadm`
- `lsmsview`
- `lsmsall`
- `lsmsuser`
- `lsmsuext`

After the feature has been activated, the **LSMS** administrator (`lsmsadm`) is advised to immediately define associations between usernames and **SPIDs** as described in the following procedure:

1. Log in as `lsmsadm` on the active server.
2. If you do not wish the username `lsmsadm` to have access to all **SPIDs**, enter the following command to remove the username from golden access:

   ```
   $ spidsec -r -u lsmsadm -s golden
   ```
3. If desired, repeat step 2 for the usernames `lsmsview`, `lsmsall`, `lsmsuser`, and `lsmsuext`.
4. To display all the usernames currently defined on the **LSMS**, see Displaying All LSMS User Accounts.
5. For each displayed username, determine which **SPIDs** you wish to allow this user access to and enter the following command to authorize this username for the specified **SPID**:

   ```
   $ spidsec -a -u <username> -s {<spid>|golden}
   ```
   The following parameters and options apply to this command:

   `<username>`
   A valid **LSMS** username that has been provisioned using admintool

   `<spid>`
   A valid **SPID** defined on the **LSMS** (alternatively, you can enter `golden` to allow this username access to all **SPIDs** defined on the **LSMS**)

   To authorize this username to multiple **SPIDs**, but not for all **SPIDs**, you must enter the command once for each **SPID**.
6. Repeat step 5 for each user displayed in step 4.

4

Preventive Maintenance

This chapter describes preventive maintenance of the **LSMS**. Included are topics on backing up databases and file systems, monitoring hardware and network performance, and routine cleaning.

Introduction

This chapter describes preventive maintenance of the **LSMS**. Included are topics on backing up databases and file systems, monitoring hardware and network performance, and routine cleaning.

Use the system monitoring features regularly, especially during times of peak load, to verify that the system has adequate resources. This practice provides an insight into system resource utilization and provides early warning if the system capacity limits are being approached.

The procedures in this chapter assume that you are familiar with the **LSMS** hardware. For more information about the hardware, refer to *Application B Card Hardware and Installation Guide*.

Recommended Daily Monitoring

To properly maintain your **LSMS** system, it is recommended that you perform the activities described in this section on a daily basis.

Continuous Monitoring Activities

Perform the following activities continually:

- Always keep at least one graphical user interface (**GUI**) open. Monitor the **GUI** especially for any red or yellow conditions, either on the **NPAC** and **EMS** status icons or in the notifications display area. For more information about the display areas of the **GUI**, refer to the *Database Administrator's Guide*. For information about notifications displayed in the notifications display area, see Automatic Monitoring of Events.
- Monitor the latest Surveillance notifications in either or both of the following ways:
  - Connect a customer-provided administration console to Serial Port 3 of each server so that Surveillance notifications can be displayed there.
  - View the Surveillance log file, `/var/TKLC/lsms/logs/survlog.log`. To display the latest contents of this file, log in as any user and enter the following command:

    ```
    $ tail -f /var/TKLC/lsms/logs/survlog.log
    ```

    For more information about the Surveillance feature, see "Understanding the Surveillance Feature".

Once a Day Monitoring Activities

It is recommended that once each day you perform the following:

- Examine logs for abnormalities. For more information, see Daily Examination of Logs for Abnormalities.
- Determine the success or failure of the database and file system backups by examining the backup log (`/var/TKLC/log/backup/backup.log)` and the surveillance log (`/var/TKLC/lsms/logs/survlog.log`). For more information, see Daily Determination of Success or Failure of Backup.

> **Note:**
>
> Logs are maintained up to 20 MB for rejected logs and 500 MB for transaction logs. The old rotated logs get deleted automatically in a day and new logs start getting pegged in the newly created files.

Daily Examination of Logs for Abnormalities

Examine the following logs for any abnormalities once a day, preferably near the end of the day. In each of these logs, `<MMDD>` indicates the month and day. Each log is kept for seven days. For more information about these logs, refer to the *Database Administrator's Guide*. You can view the logs using the **GUI** or you can use any text editor.

- Examine the following exception log files:
  - Run the `chkfilter` command and then examine `/var/TKLC/lsms/logs/trace/LsmsSubNotFwd.log.<MMDD>`. This log contains subscription versions (**SVs**) or number pool blocks (**NPBs**) that have been received from an **NPAC** but could not be forwarded to a network element because the **LSMS** has no **EMS** routing defined for the **SVs** or **NPBs**.
  - `/var/`**TKLC**`/lsms/logs/<clli>/LsmsRejected.log.<MMDD>`. This log contains transactions that the **LSMS** attempted to forward to a network element, but which were rejected by the network element.
- Examine the following alarm logs to verify that you are aware of all alarms (these events will also have been reported in the **GUI** notifications display).
  - `/var/TKLC/lsms/logs/alarm/LsmsAlarm.log.<MMDD>`. This log contains events associated with the Local Data Manager, the Local Services Manager and regional **NPAC** agent processes.
- Examine the following transaction logs for any abnormalities:
  - `/var/TKLC/lsms/logs/<clli>/LsmsTrans.log.<MMDD>` for each network element identified by `<clli>`. These logs contain all transactions forwarded to **EMS** agents, including information associated with M-Create, M-Set, and M-Delete operations initiated from the **NPAC**.
- Examine the Surveillance log `/var/TKLC/lsms/logs/survlog.log` for any abnormalities. This log contains all surveillance notifications that have been posted.

Daily Determination of Success or Failure of Backup

Each day, check the backup log from the previous day on each server (as you can see from the timestamps in Figure 4-1 and Figure 4-2, backups generally begin a few minutes before midnight). Ensure that the backup logs contain text similar to that shown in the referenced figures. If you need help interpreting the logs, contact the #unique_86.

If you determine that the automatic backup(s) did not complete successfully, perform a manual backup right away.

LSMS Database Defragmentation

In releases of LSMS prior to 13.0, a database sort was sometimes required to keep the LSMS operating at maximum efficiency in terms of transactions per second (TPS). This was a manually-intensive operation that could be performed only by the Technical Assistance Center (TAC). LSMS 13.0 and later releases use the E5-APP-B platform, which has solid state drives (the old platform used disk drives) that by design do not require defragmentation. Oracle performed testing to validate that fragmentation will not be an issue on the E5-APP-B platform. However, if for some reason there is any indication of a need for database sorting, contact the #unique_86 so your system can be fully evaluated. If it is determined there is a need for database sorting, the Customer Care Center has access to MO006201 which defines this database sort procedure.

Using Backup Procedures

The most basic form of backup happens continuously and automatically, as the redundant **LSMS** servers contain duplicate hardware, and the standby server replicates the active server's database.

However, if data becomes corrupted on the active server's database, because data on the active server's database is automatically replicated to the standby server, you must also follow more conventional backup procedures so that you can recover from a corrupted database. A database saved to file on the Network Attached Storage (**NAS**) device or copied from the disk to tape on the **NAS** and then stored off-site is a precaution against database corruption.

Understanding How the LSMS Backs Up File Systems and Databases

Each night at midnight, the **LSMS** automatically backs up the following to disk:

- Platform configuration (for each server), stored as `plat.xml`
- The entire **LSMS** database, stored as `lsmsdb.xml`
- The entire **LSMS** logs filesystem, stored as `lsmslogs.xml`

When both servers are functioning, the automatic backup function backs up the database (lsmsdb.xml) and logs (lsmslogs.xml) from the standby server, and backs up only the platform configuration (plat.xml) from the active server.

If only one server is active, the automatic backup function backs up all the files shown in the bulleted list above from the active server.

In addition, you can perform the same backups manually at any time (see Backing Up the LSMS Manually).

Understanding the Backup Results

The result of each backup is posted to the log file on the server on which the backup was scheduled to take place.

1. Log into the server as `lsmsview`.
2. At the command line prompt, enter the following command to view the log:

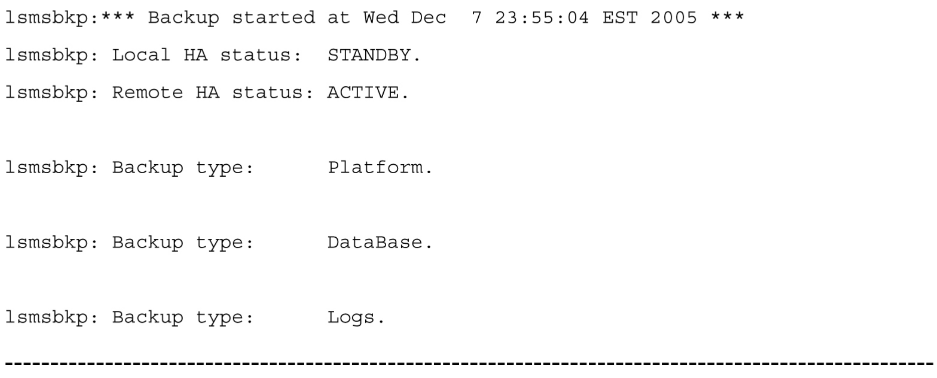
   ```
   # more /var/TKLC/log/backup/backup.log
   ```

3. Output:

   a. The example backup log for the standby server indicates that on Wednesday, December 7, an automatic backup was performed on the standby server.

      After completing the backup task for each respective backup type (platform, database, and logs), an entry was generated and stored in the backup log. If the backup was successful, output similar to the following displays:

      Figure 4-1 Example of Successful Backup Log for STANDBY Server



```
lsmsbkp:*** Backup started at Wed Dec  7 23:55:04 EST 2005 ***
lsmsbkp: Local HA status:  STANDBY.
lsmsbkp: Remote HA status: ACTIVE.

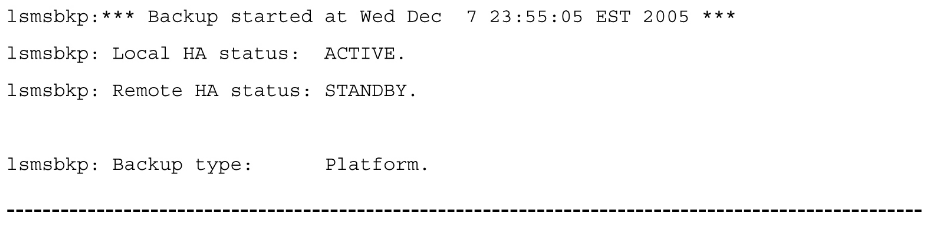
lsmsbkp: Backup type:      Platform.

lsmsbkp: Backup type:      DataBase.

lsmsbkp: Backup type:      Logs.
----------------------------------------------------------------------------------------------------
```

      The example backup log for the active server indicates that on Wednesday, December 7, an automatic backup was also performed on the active server. After completing the backup task for the platform files, an entry was generated and stored in the backup log. If the backup was successful, output similar to the following displays:

      Figure 4-2 Example of Successful Backup Log for ACTIVE Server

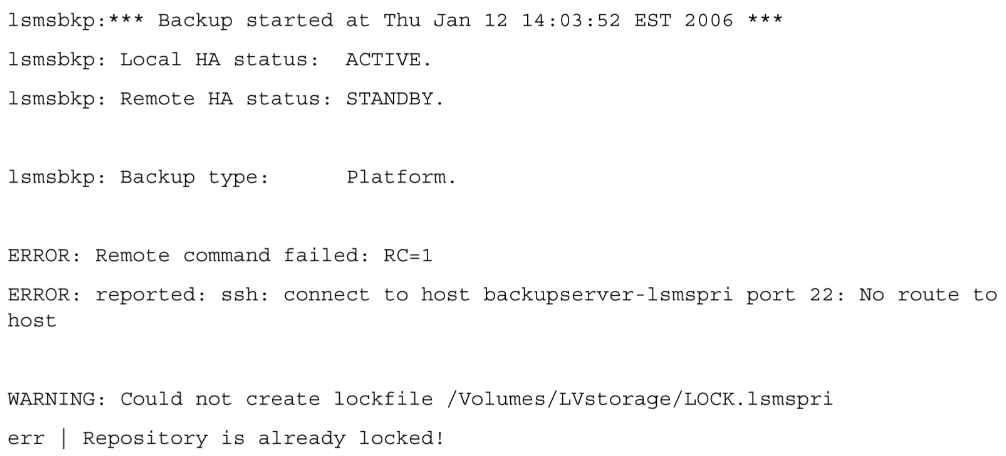


```
lsmsbkp:*** Backup started at Wed Dec  7 23:55:05 EST 2005 ***
lsmsbkp: Local HA status:  ACTIVE.
lsmsbkp: Remote HA status: STANDBY.

lsmsbkp: Backup type:      Platform.
----------------------------------------------------------------------------------------------------
```

   b. If the backup was unsuccessful, output similar to the following displays:

Figure 4-3   Example of Unsuccessful Backup Log for ACTIVE Server



```
lsmsbkp:*** Backup started at Thu Jan 12 14:03:52 EST 2006 ***
lsmsbkp: Local HA status:  ACTIVE.
lsmsbkp: Remote HA status: STANDBY.

lsmsbkp: Backup type:      Platform.

ERROR: Remote command failed: RC=1
ERROR: reported: ssh: connect to host backupserver-lsmspri port 22: No route to
host

WARNING: Could not create lockfile /Volumes/LVstorage/LOCK.lsmspri
err | Repository is already locked!
```

Backing Up the LSMS Manually

Before beginning a manual backup:

- Read Understanding How the LSMS Backs Up File Systems and Databases.
- Check the **GUI** notification information and surveillance logs for database errors before beginning the manual backup procedure to ensure that the **LSMS** is functioning correctly.
- Check whether servdi is running before starting the manual backup. If servdi is running, wait for it to complete before running the manual backup.

> **Note:**
>
> Backups can also be performed via the platcfg menu. For more information, see Using Restore Procedures.

The following procedure explains how to start a backup manually. If a backup procedure fails, contact the #unique_86.

1. Perform the procedure described in “Checking for Running Backups” to ensure that no other backup (automatic or manual) is already running.
2. Ensure that none of the following processes are running.

   All of these processes use temporary file space on the **LSMS**. If you attempt to start a backup, you may run out of file space.

   - Starting a standby node (to change its state from **UNINITIALIZED** "**INHIBITED**" to **STANDBY**)
   - An `import` command
   - An `lsmsdb quickaudit` command
   - A query server snapshot (`lsmsdb snapshot`)
3. Log into the active server as `lsmsmgr`.

   (For more information, see “Logging In to **LSMS** Server Command Line”.)

4. View the backup log and ensure that the backup completed successfully.

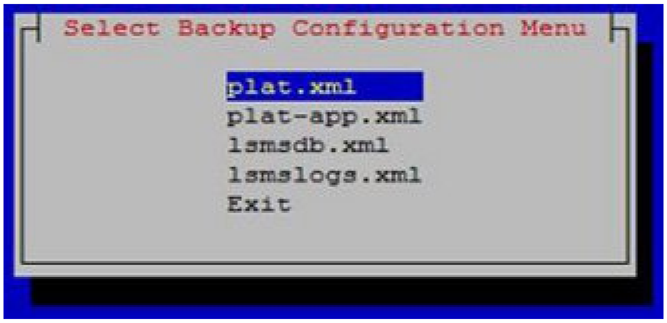
> **Note:**
>
> The backup log shows only the active server’s backup results.

   For more information, see Daily Determination of Success or Failure of Backup.

5. From the Main Menu on the active server, select **Maintenance**, and then **Backup and Restore**, and then **Network Backup**.

   The Select Backup Configuration Menu is displayed.

Figure 4-4 Select Backup Configuration Menu

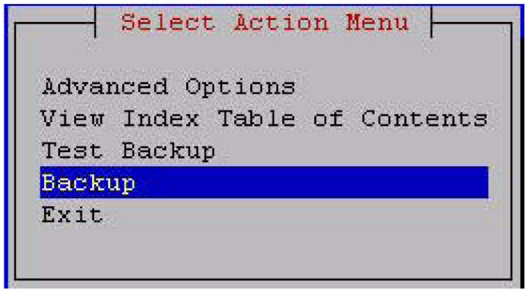


- **plat.xml** is provided by TPD and is used to back up all platform files (such as log, pkg, and rcs files) from LSMS to NAS.
- **plat-app.xml** is provided by LSMS and is used to back up all platform files (such as log, pkg, and rcs files) from LSMS to NAS.
- **lsmsdb.xml** is used to back up the LSMS database on NAS.
- **lsmslogs.xml** is used to back up the LSMS logs on NAS.
- **Exit** returns control to the Backup and Restore menu.

   Select **plat.xml** as shown.

6. Press **Enter** and the Select Action Menu is displayed.

Figure 4-5 Select Backup on Active Server



- **Advanced Options** enables specification of backup host details, the archive directory, the repository, and other options. For example:

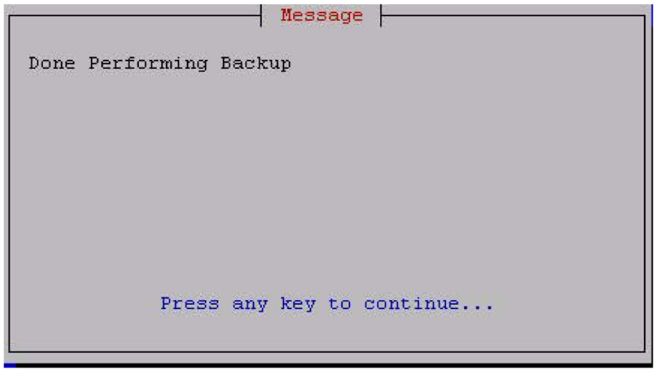
  ```
  Backup Host: backupserver
  Backup Host user: root
  Archive directory: /Volumes/LVstorage
  Repository: logs (automatically selected based on the type of backup
  selected previously)
  Depth: 5 (numerical value, use of 1-5 is suggested)
  Prune: (*)Yes or ()No
  ```

- **View Index Table of Contents** lists the data to be backed up.
- **Test Backup** performs a test backup.
- **Backup** performs backup of LSMS data on NAS.
- **Exit** returns control to the Backup and Restore menu.

Select **Backup** as shown.

7. When the backup is complete, press any key to continue.

Figure 4-6 Backup Complete on Active Server



```
Message

Done Performing Backup

Press any key to continue...
```

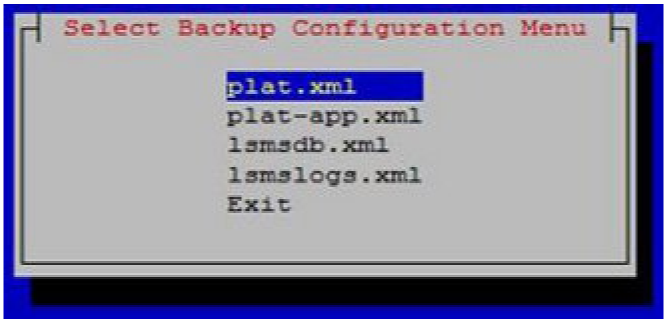
8. Log into the standby server as **lsmsmgr**.

   (For information, see “Logging in from One Server to the Mate’s Command Line”.)

> **Note:**
>
> If the standby server is not functional, perform the rest of the procedures on the active server.

9. Select **plat.xml** on the standby server, and press **Enter**.

Figure 4-7 Select plat.xml on Standby Server

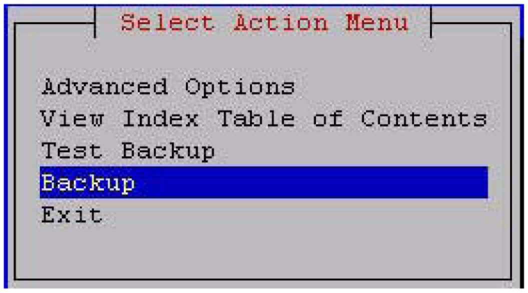


```
Select Backup Configuration Menu

plat.xml
plat-app.xml
lsmsdb.xml
lsmslogs.xml
Exit
```

10. Select **Backup**.

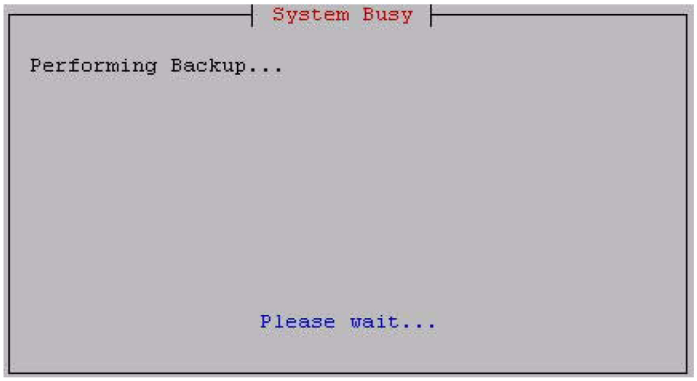
Figure 4-8 Select Backup on Standby Server



```
Select Action Menu

Advanced Options
View Index Table of Contents
Test Backup
Backup
Exit
```

Figure 4-9 Performing Backup Screen



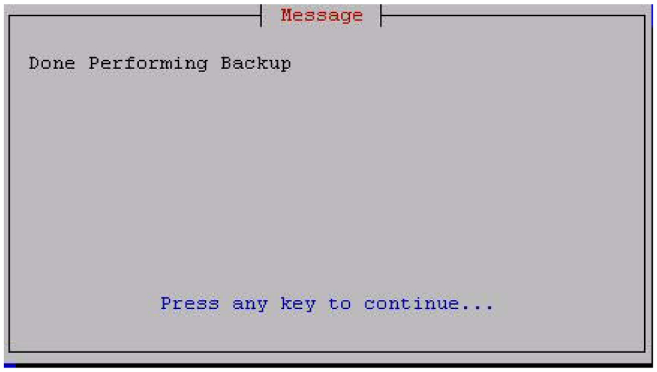
```
System Busy

Performing Backup...

Please wait...
```

11. When the backup is complete, press any key to continue.

Figure 4-10   Backup Complete on Standby Server



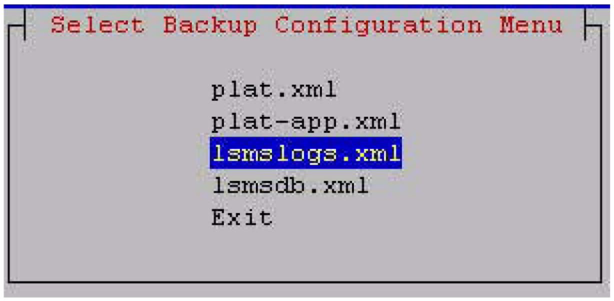
```
Message

Done Performing Backup

Press any key to continue...
```

12. Select **lsmslogs.xml** on the standby server, and press **Enter**.

Figure 4-11   Select lsmslogs.xml on Standby Server

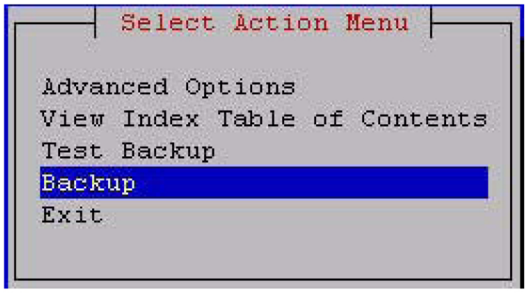


```
Select Backup Configuration Menu

plat.xml
plat-app.xml
lsmslogs.xml
lsmsdb.xml
Exit
```

13. Select **Backup**.

Figure 4-12   Select Backup on Standby Server

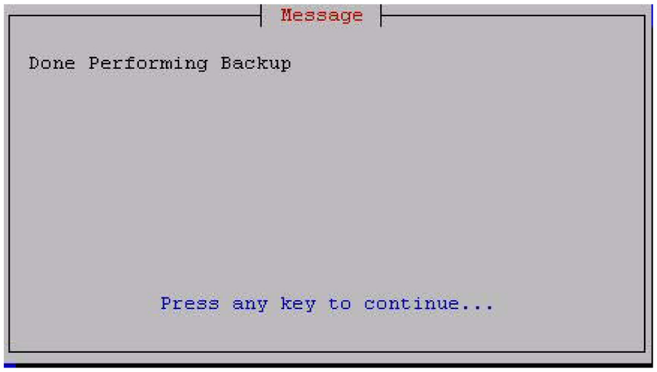


```
Select Action Menu

Advanced Options
View Index Table of Contents
Test Backup
Backup
Exit
```

14. When the backup is complete, press any key to continue.

Figure 4-13 Backup Complete on Standby Server



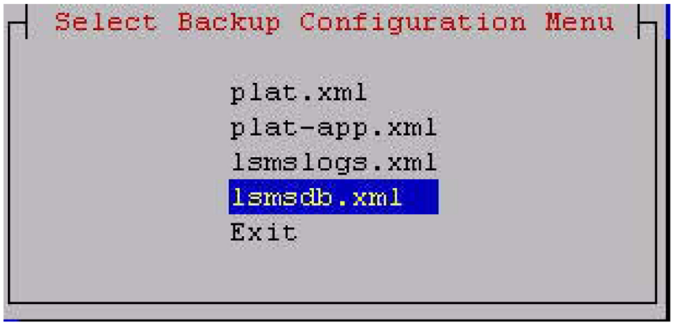
Message

Done Performing Backup

Press any key to continue...

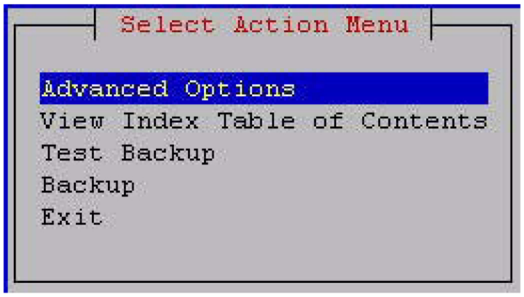
15. Select **lsmsdb.xml**, and press **Enter**.

Figure 4-14 Select lsmsdb.xml on Standby Server



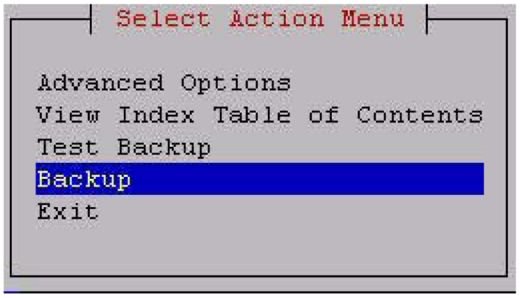
16. When the server has completed loading the **Select Action Menu** displays.

Figure 4-15 Select Action Menu



17. Select **Backup**, and press **Enter**.

Figure 4-16 Backup

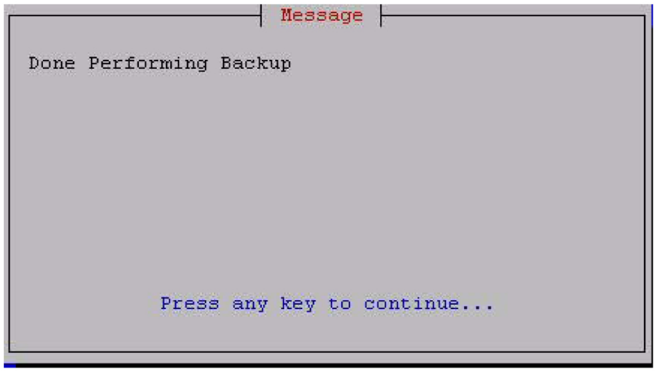


Select Action Menu

Advanced Options
View Index Table of Contents
Test Backup
Backup
Exit

18. When the backup completes, press any key to continue.

Figure 4-17 Backup Complete



Message

Done Performing Backup

Press any key to continue...

You can now exit to the Main Menu, or choose another menu item.

Stopping an Automatic or Manual Backup

Under normal conditions, backups complete relatively quickly (in less than 45 minutes). However, if no backup has been previously performed or if the previous backup was stopped before it completed, the next backup can take up to 4 hours.

It is advisable to allow a backup to complete. However, if you accidentally start a backup or need to stop the backup process, use the following procedure. You must log into both the active and standby servers to stop a backup.

Note that a backup cannot restart at the point where it was aborted because various lock files are created to prevent conflicting backups. To restart a manual backup, start the procedure from the beginning. See “Backing Up the **LSMS** Manually” if you need help.

If you need to restore data from a previously recorded backup**,** contact the #unique_86.

1. Log in as `root` on active server.
2. To find the process **ID** of the processes involved in backing up the databases, enter the following command:

   ```
   # ps -ef | egrep "rsync|netbackup|lsmsbkp" | grep -v grep
   ```

   The output from the above command includes the process **ID** (**PID**), also referred to as the job number, for each process that has the characters `rsync`, `netbackup`, or `lsmsbkp` in its name. Note the first **PID** (shown in**bold** text in the following example) displayed on the line for each process.

```
root      5673 32428  0 13:43 pts/0    00:00:00 /bin/sh
/usr/TKLC/lsms/tools/lsmsbkp
root      5759  5673  4 13:43 pts/0    00:00:00 /usr/bin/perl -T
/usr/TKLC/plat/bin/netbackup
--config=/usr/TKLC/plat/etc/BackupTK/plat.xml
root      5942  5759 25 13:43 pts/0    00:00:00 /usr/bin/rsync --
archive
--delete --delete-excluded --relative --sparse --files-from=-
--rsh=/usr/bin/ssh /
root@backupserver-lsmssec:/Volumes/LVstorage/lsmssec/00-Oct21_13:43
root      5943  5942 12 13:43 pts/0    00:00:00 /usr/bin/ssh -l
root
backupserver-lsmssec rsync --server -logDtpRS --delete-excluded .
/Volumes/LVstorage/lsmssec/00-Oct21_13:43
```

3. To stop the backup, enter the following command:

   ```
   # kill <jobnumber1> <jobnumber2> ...
   ```

   where `<jobnumber1>` is the **PID** of the first process to stop and `<jobnumber2>` is the **PID** of the second process to stop. Enter a job number for each line that displays in step 2. For the example output in step 2, enter the following command:

   ```
   kill 5673 5759 5942 5943
   ```

4. Verify that all relevant processes have been stopped by entering the following command and ensuring that no output appears:

   ```
   # ps -ef | egrep "rsync|netbackup|lsmsbkp" | grep -v grep
   ```

   If no output appears, the backup has been stopped.

5. Clean up any remaining lock files by entering the following command:

   ```
   # rm -f /TOC
   ```

6. Repeat steps 1 through 5 on the standby server to stop that server's backup.

7. To clear up any lingering lock files on the **NAS**, enter the following command on either server:

   ```
   # ssh backupserver /etc/rc3.d/S99TKLCclearlocks start
   ```

   When the **OK** in the following output displays, all lock files on the **NAS** have been cleared.

   ```
   Clearing backup locks:[  OK  ]
   ```

Checking for Running Backups

Both database backups and query server snapshots use the same file space on the **LSMS**. If a backup is in process and a query server snapshot or another backup is started, the first backup process will terminate prematurely, and the next backup will take significantly longer to complete. Therefore, it is very important that you perform the following procedure to check for a running backup before starting a manual backup or creating a query server snapshot.

In addition, the following tasks all use temporary file space on the **LSMS**. If you attempt to run these processes simultaneously, you may run out of disk space. Since backups can be run automatically, it is recommended that you perform the following procedure before attempting any of these tasks to ensure that no database backups are running:

- Starting a standby node (changing its state from **UNINITIALIZED** "**INHIBITED**" to **STANDBY**)
- Running the `import` command
- Running the `lsmsdb quickaudit` command.

1. Log in as the `lsmsadm` or `lsmsall` user to the active server (for information about logging in, see "Logging In to **LSMS** Server Command Line").
2. Enter the following command to determine whether any database backups are running:

   ```
   $ ps -ef | grep netbackup
   ```

   - If output similar to the following displays (only `grep netbackup` displays after `00:00:00`), no backup is running, and you may continue with the procedure you were performing:

     ```
     lsmsadm   6826  6312  0 16:58 pts/12   00:00:00 grep netbackup
     ```

   - If output similar to the following displays (with one or more processes after `00:00:00`), a backup is running. DO NOT proceed with the procedure that you are performing. (This output displays all on one line although it does not fit on one line in this manual.)

     ```
     lsmsadm 25742 25596  0 11:20 ?        00:00:00 /usr/bin/perl -T /usr/
     TKLC/plat/bin/netbackup --config=/usr/TKLC/plat/etc/BackupTK/
     lsmsdb.xml
     ```

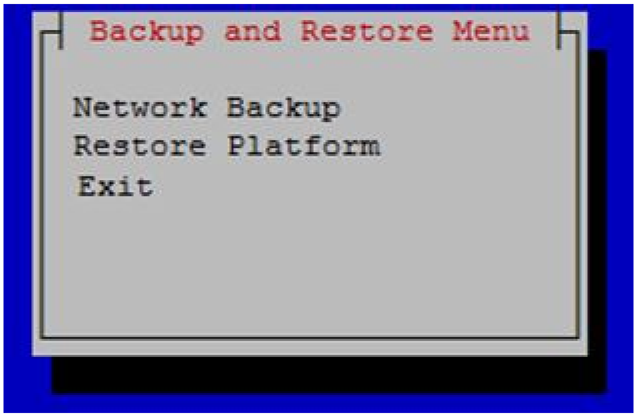
     > **Caution:**
     >
     > While a backup is in progress, do not attempt to start a standby node (change its state from **UNINITIALIZED** "**INHIBITED**" to **STANDBY**), run the `import` command, run the `lsmsdb quickaudit` command, create a query server snapshot, or start another backup. All of these tasks use temporary file space. If you attempt to start one of these processes, you may run out of disk space.

   Before restarting or attempting to proceed with the procedure you were performing, run the command in this step again.

Using Restore Procedures

The platcfg utility provides for network backup and restore operations. From the Main Menu, selecting **Backup and Restore** displays the Backup and Restore menu as shown.

Figure 4-18   Backup and Restore Menu



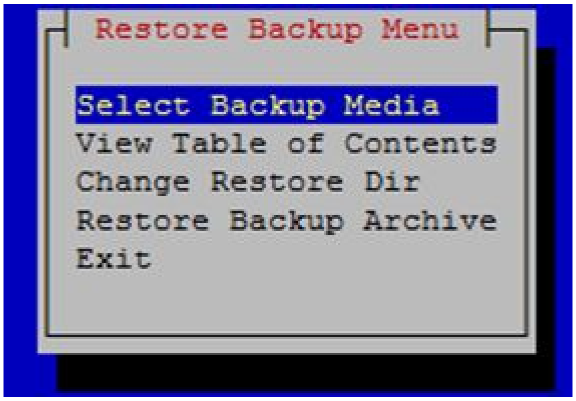
```
Backup and Restore Menu

Network Backup
Restore Platform
Exit
```

- **Network Backup** works in the same way as it does for lsmsmgr. For more information, see Backing Up the LSMS Manually.
- **Restore Platform** enables restoration of data from NAS to LSMS.

Selecting **Restore Platform** transfers control to the Restore Backup Menu as shown.

Figure 4-19   Restore Backup Menu



```
Restore Backup Menu

Select Backup Media
View Table of Contents
Change Restore Dir
Restore Backup Archive
Exit
```

- **Select Backup Media** enables selection of the backup archive to be restored from NAS to LSMS.
- **View Table of Contents** displays the contents of the selected backup archive. If no backup archive is selected, a message is displayed indicating that you must select the media first.
- **Change Restore Dir** is used to indicate the restore directory to which the archive will be restored.
- **Restore Backup Archive** restores the selected archive from NAS to LSMS. If no backup archive is selected, a message is displayed indicating that you must select the media first.

To restore the data from NAS when the servers are in active/standby state, follow these steps:

1. On the standby server, open the lsmsmgr menu using the following command:

   ```
   su - lsmsmgr
   ```

2. Select **Maintenance**, and then **Stop Node**.
3. Repeat steps 1 and 2 on the active server.
4. Start restore from NAS on the active server from the platcfg menu (**Backup and Restore**, and then **Restore Platform**).
5. After restore, issue the following command on both the A and B servers:

   ```
   rm -rf /var/TKLC/lsms/db/auto.cnf
   ```

6. On the active server, open the lsmsmgr menu using the following command:

   ```
   su - lsmsmgr
   ```

7. Select **Maintenance**, and then **Start Node**.
8. Repeat steps 6 and 7 on the standby server.

Additional Tools for Monitoring the LSMS Hardware and the Network

LSMS provides various tools that you can use to monitor the **LSMS** hardware and the network. Monitoring can help you prevent and diagnose errors.

Use the system monitoring features regularly, especially during times of peak load, to verify that the system has adequate resources. This practice provides an insight into system resource utilization and provides early warning if the system capacity limits are being approached.

Verifying Active Server Network Interfaces and NPAC Connections

Use one or more of the following methods to verify network connectivity:

- The `ifconfig` command
- The `traceroute` utility to verify network connectivity and routing between hosts
- The **LSMS** graphical user interface (**GUI**) to determine connectivity to **NPACs**

Using the `ifconfig` Command

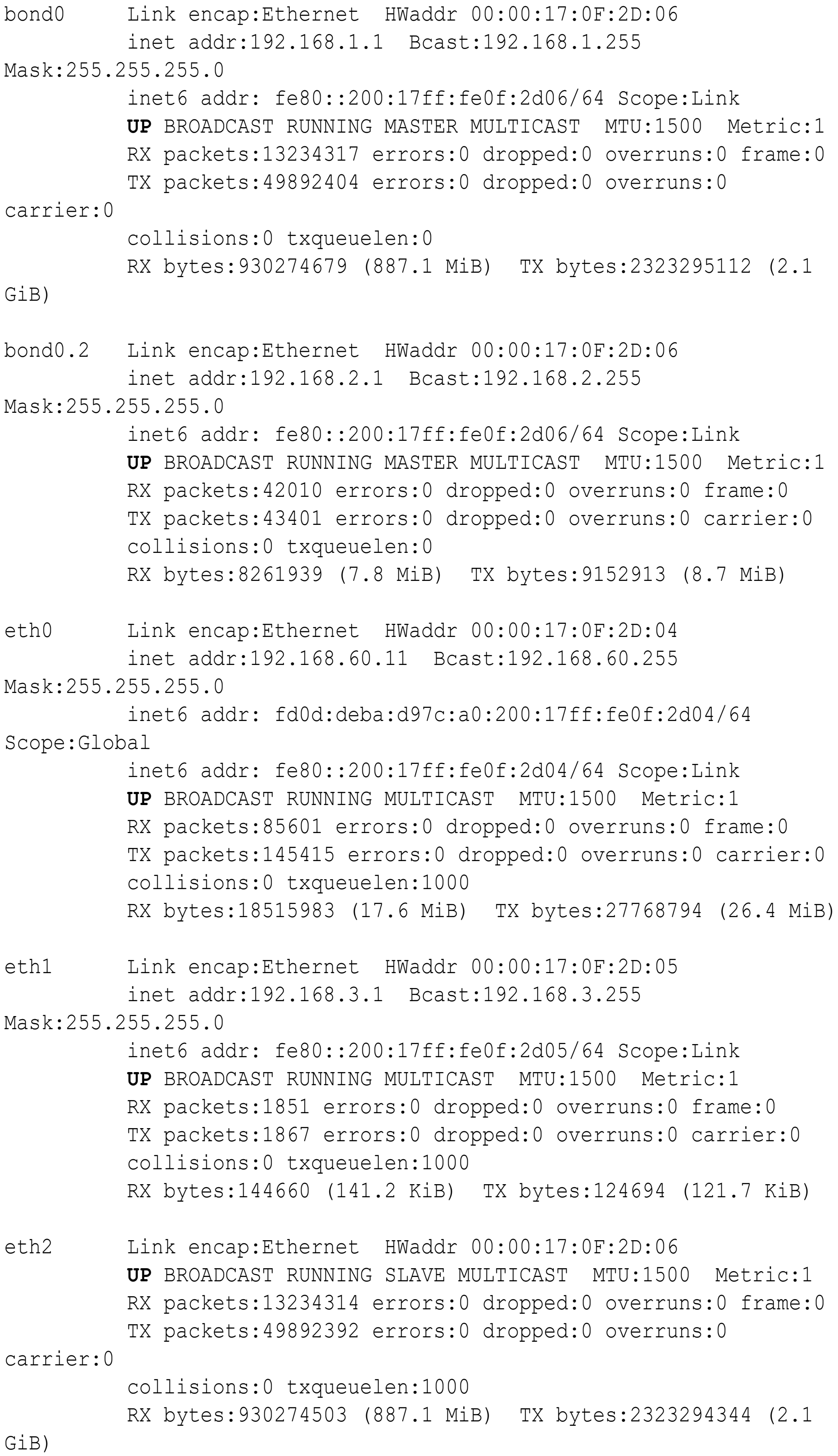
Use the `ifconfig -a` command on the target host to verify that ports are in the **UP** state.

1. Log in as `root` on the active server.
2. Enter the following command to test the interfaces:

   ```
   # ifconfig -a
   ```

   Verify the output. The successful completion is indicated by the word **UP** in the output, which is highlighted in **bold** in Figure 4-20 and Figure 4-21. A failure is indicated by the absence of the word **UP** in the output.

Figure 4-20   Single Subnet Configuration



```
bond0     Link encap:Ethernet  HWaddr 00:00:17:0F:2D:06
          inet addr:192.168.1.1  Bcast:192.168.1.255
Mask:255.255.255.0
          inet6 addr: fe80::200:17ff:fe0f:2d06/64 Scope:Link
          UP BROADCAST RUNNING MASTER MULTICAST  MTU:1500  Metric:1
          RX packets:13234317 errors:0 dropped:0 overruns:0 frame:0
          TX packets:49892404 errors:0 dropped:0 overruns:0
carrier:0
          collisions:0 txqueuelen:0
          RX bytes:930274679 (887.1 MiB)  TX bytes:2323295112 (2.1
GiB)

bond0.2   Link encap:Ethernet  HWaddr 00:00:17:0F:2D:06
          inet addr:192.168.2.1  Bcast:192.168.2.255
Mask:255.255.255.0
          inet6 addr: fe80::200:17ff:fe0f:2d06/64 Scope:Link
          UP BROADCAST RUNNING MASTER MULTICAST  MTU:1500  Metric:1
          RX packets:42010 errors:0 dropped:0 overruns:0 frame:0
          TX packets:43401 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:8261939 (7.8 MiB)  TX bytes:9152913 (8.7 MiB)

eth0      Link encap:Ethernet  HWaddr 00:00:17:0F:2D:04
          inet addr:192.168.60.11  Bcast:192.168.60.255
Mask:255.255.255.0
          inet6 addr: fd0d:deba:d97c:a0:200:17ff:fe0f:2d04/64
Scope:Global
          inet6 addr: fe80::200:17ff:fe0f:2d04/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:85601 errors:0 dropped:0 overruns:0 frame:0
          TX packets:145415 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:18515983 (17.6 MiB)  TX bytes:27768794 (26.4 MiB)

eth1      Link encap:Ethernet  HWaddr 00:00:17:0F:2D:05
          inet addr:192.168.3.1  Bcast:192.168.3.255
Mask:255.255.255.0
          inet6 addr: fe80::200:17ff:fe0f:2d05/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:1851 errors:0 dropped:0 overruns:0 frame:0
          TX packets:1867 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:144660 (141.2 KiB)  TX bytes:124694 (121.7 KiB)

eth2      Link encap:Ethernet  HWaddr 00:00:17:0F:2D:06
          UP BROADCAST RUNNING SLAVE MULTICAST  MTU:1500  Metric:1
          RX packets:13234314 errors:0 dropped:0 overruns:0 frame:0
          TX packets:49892392 errors:0 dropped:0 overruns:0
carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:930274503 (887.1 MiB)  TX bytes:2323294344 (2.1
GiB)
```

```
eth3      Link encap:Ethernet  HWaddr 00:00:17:0F:2D:06
          UP BROADCAST RUNNING SLAVE MULTICAST  MTU:1500  Metric:1
          RX packets:3 errors:0 dropped:0 overruns:0 frame:0
          TX packets:12 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:176 (176.0 b)  TX bytes:768 (768.0 b)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:1658459 errors:0 dropped:0 overruns:0 frame:0
          TX packets:1658459 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:126522800 (120.6 MiB)  TX bytes:126522800 (120.6 MiB)
```

Figure 4-21   Segmented Network Configuration

```
bond0     Link encap:Ethernet  HWaddr 00:00:17:0F:2F:12
          inet addr:192.168.1.1  Bcast:192.168.1.255  Mask:255.255.255.0
          inet6 addr: fe80::200:17ff:fe0f:2f12/64 Scope:Link
          UP BROADCAST RUNNING MASTER MULTICAST  MTU:1500  Metric:1
          RX packets:13242602 errors:0 dropped:0 overruns:0 frame:0
          TX packets:50173237 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:972152478 (927.1 MiB)  TX bytes:2368284409 (2.2 GiB)

bond0.2   Link encap:Ethernet  HWaddr 00:00:17:0F:2F:12
          inet addr:192.168.2.1  Bcast:192.168.2.255  Mask:255.255.255.0
          inet6 addr: fe80::200:17ff:fe0f:2f12/64 Scope:Link
          UP BROADCAST RUNNING MASTER MULTICAST  MTU:1500  Metric:1
          RX packets:90623 errors:0 dropped:0 overruns:0 frame:0
          TX packets:97130 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:17963083 (17.1 MiB)  TX bytes:20655848 (19.6 MiB)

bond1     Link encap:Ethernet  HWaddr 00:00:00:00:00:00
          BROADCAST MASTER MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 b)  TX bytes:0 (0.0 b)

bond2     Link encap:Ethernet  HWaddr 00:00:00:00:00:00
          BROADCAST MASTER MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 b)  TX bytes:0 (0.0 b)

bond3     Link encap:Ethernet  HWaddr 00:00:00:00:00:00
```

```
          BROADCAST MASTER MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 b)  TX bytes:0 (0.0 b)

eth0      Link encap:Ethernet  HWaddr 00:00:17:0F:2F:10
          inet addr:192.168.60.14  Bcast:192.168.60.255
Mask:255.255.255.0
          inet6 addr: fd0d:deba:d97c:a0:200:17ff:fe0f:2f10/64
Scope:Global
          inet6 addr: 2606:b400:605:b80c:200:17ff:fe0f:2f10/64
Scope:Global
          inet6 addr: fe80::200:17ff:fe0f:2f10/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:13981300 errors:0 dropped:0 overruns:0 frame:0
          TX packets:78201 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:3815515378 (3.5 GiB)  TX bytes:7623582 (7.2 MiB)

eth1      Link encap:Ethernet  HWaddr 00:00:17:0F:2F:11
          inet addr:192.168.3.1  Bcast:192.168.3.255
Mask:255.255.255.0
          inet6 addr: fe80::200:17ff:fe0f:2f11/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:559584 errors:0 dropped:0 overruns:0 frame:0
          TX packets:1805629 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:42998514 (41.0 MiB)  TX bytes:860763886 (820.8
MiB)

eth1.<vlan ID 1>  Link encap:Ethernet  HWaddr 00:00:17:0F:2F:11
          inet addr:192.168.59.18  Bcast:192.168.59.255
Mask:255.255.255.0
          inet6 addr: 2606:b400:605:b80a:200:17ff:fe0f:2f11/64
Scope:Global
          inet6 addr: fe80::200:17ff:fe0f:2f11/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:47462 errors:0 dropped:0 overruns:0 frame:0
          TX packets:3341 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:2481722 (2.3 MiB)  TX bytes:272370 (265.9 KiB)

eth1.<vlan ID 2>  Link encap:Ethernet  HWaddr 00:00:17:0F:2F:11
          inet addr:192.168.61.53  Bcast:192.168.61.255
Mask:255.255.255.0
          inet6 addr: 2606:b400:605:b80b:200:17ff:fe0f:2f11/64
Scope:Global
          inet6 addr: fe80::200:17ff:fe0f:2f11/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:502309 errors:0 dropped:0 overruns:0 frame:0
          TX packets:1328746 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:31914086 (30.4 MiB)  TX bytes:813991760 (776.2
MiB)
```

```
eth2      Link encap:Ethernet  HWaddr 00:00:17:0F:2F:12
          UP BROADCAST RUNNING SLAVE MULTICAST  MTU:1500  Metric:1
          RX packets:13242602 errors:0 dropped:0 overruns:0 frame:0
          TX packets:50173237 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:972152478 (927.1 MiB)  TX bytes:2368284409 (2.2 GiB)

eth3      Link encap:Ethernet  HWaddr 00:00:17:0F:2F:12
          UP BROADCAST RUNNING SLAVE MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 b)  TX bytes:0 (0.0 b)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:1223316 errors:0 dropped:0 overruns:0 frame:0
          TX packets:1223316 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:92431234 (88.1 MiB)  TX bytes:92431234 (88.1 MiB)

sit0      Link encap:IPv6-in-IPv4
          NOARP  MTU:1480  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 b)  TX bytes:0 (0.0 b)
```

Using the `traceroute` Utility

The `traceroute` utility determines the path between the host where the utility is run and the remote host named by the utility's input parameter. The utility also reports the latency of each hop along the route.

> **Note:**
>
> If the network between the hosts contains firewalls, this utility may fail unless the firewalls are properly set up. Setting up firewalls is the responsibility of the customer.

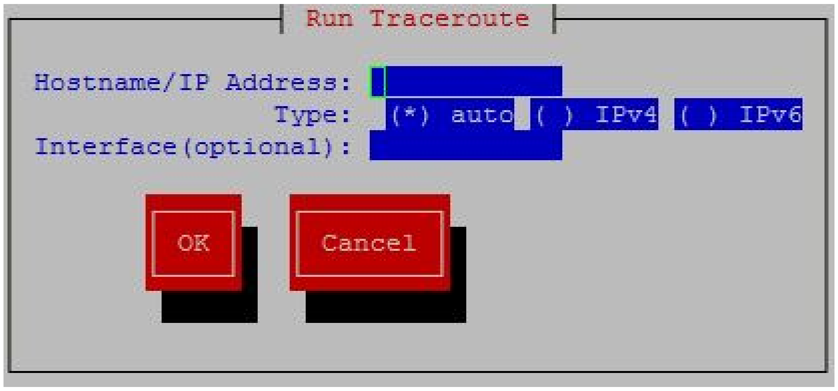
Use the following procedure to run the `traceroute` utility:

1. Log in as the `lsmsmgr` user on the server from which you want to test the route.

   (For information, see "Logging In to **LSMS** Server Command Line".)

2. From the `lsmsmgr` interface, select **Diagnostics**, and then **Network Diagnostics**, and then **Traceroute**.

Figure 4-22   TraceRoute



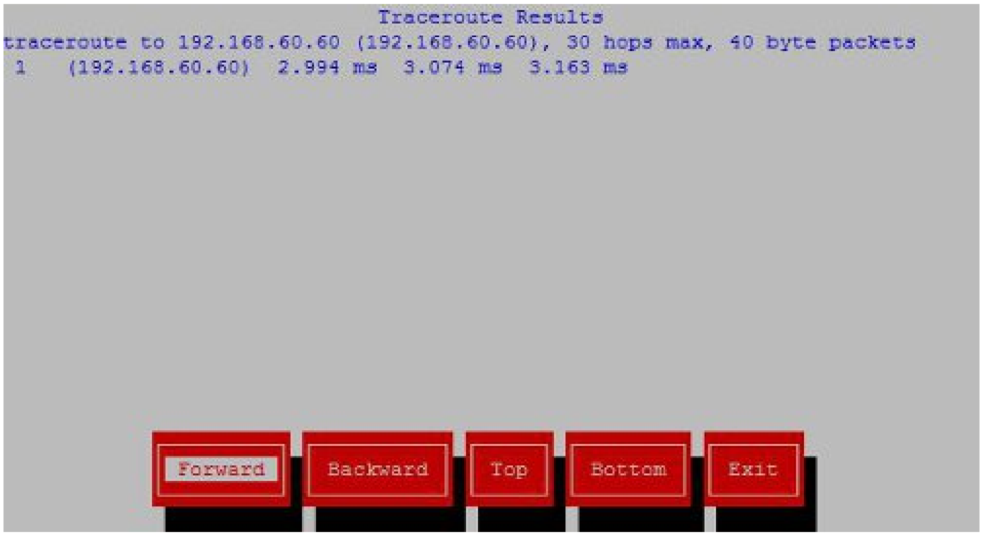
```
Run Traceroute

Hostname/IP Address:
               Type:  (*) auto ( ) IPv4 ( ) IPv6
Interface(optional):
```

3. Ensure the cursor is placed in the Hostname/**IP Address** field, and type the **IP** address of the system to which you wish to trace the route, then use the down arrow key to highlight the **OK** button, and press **Enter**.

   The results display in a window similar to the following.

Figure 4-23   TraceRoute Results



```
                    Traceroute Results
traceroute to 192.168.60.60 (192.168.60.60), 30 hops max, 40 byte packets
 1   (192.168.60.60)  2.994 ms  3.074 ms  3.163 ms
```

4. The output depends on how many hops exist between the server you logged into and the **IP** address you entered.

   To interpret output similar to the following example, see Table 4-1.

```
traceroute to 198.89.34.19 (198.89.34.19), 30 hops max, 40 byte
packets
 1  192.168.51.250 (192.168.51.250)  2 ms  2 ms  2 ms
 2  198.89.39.250 (198.89.39.250)  3 ms  4 ms  1 ms
 3  198.89.34.19 (198.89.34.19)  5 ms *  4 ms
```

Table 4-1 Interpreting traceroute Output

Line Number	Meaning
1	Indicates the **IP** address of the interface from which the `traceroute` packets left the originating host
2	Indicates the **IP** address of the router that routed the `traceroute` packets
3	Indicates the **IP** address of the remote host. The * shown in this line indicates that there was packet loss connecting to this computer.

Managing Automatic File Transfers

The **LSMS** generates many logs, measurements, and data files on a regular basis. These files are maintained on the **LSMS** for seven days. Customers can use the data in these files for traffic pattern analysis, identification of various network events, and investigation of problems.

The optional Automatic File Transfer feature enables customers to set up an automatic method of transferring selected files to specified remote sites at a specified frequency. Using this feature can reduce costs and also the chance of user error that could result in missed transfers of required data.

Whenever an error occurs during an automatic file transfer, an entry is made in the file `aft.log.<MMDD>` in the directory `/var/TKLC/lsms/logs/aft` (where `<MMDD>` is the month and day when the error occurred).

Use the `autoxfercfg` command, as described in the following subsections, to set up and manage automatic file transfers. To initially set up an automatic transfer of files, perform in the order shown below, the procedures in the following sections:

1. “Adding a New Remote Location for Automatic File Transfers”
2. “Scheduling an Automatic File Transfer”

In addition, you can use the `autoxfercfg` command to perform the following functions:

- “Displaying Remote Locations Used for Automatic File Transfers”
- “Deleting a Remote Location for Automatic File Transfers”
- “Displaying Previously Scheduled Automatic File Transfers”
- “Removing a Scheduled Automatic File Transfer”

Displaying Remote Locations Used for Automatic File Transfers

To display all remote locations that have been previously added using this feature, perform the following procedure.

1. Log in to the active server as `lsmsadm`.
2. Enter the following command (for more information about the format of this command, see “autoxfercfg”):

```
$ $LSMS_DIR/autoxfercfg
```

3. The following menu is displayed:

   ```
   Select one of the following menu options:
   1) Display valid remote locations
   2) Add new remote location
   3) Remove remote location
   4) Display all scheduled transfers
   5) Add new scheduled transfer
   6) Remove scheduled transfer
   7) Exit
   ```

4. Enter `1`.

   Output similar to the following displays:

   ```
   Valid remote machine names:
   1. lnp3
   2. ftp.lnp25
   <hit any key to continue>
   ```

5. After you have pressed any key, the output displayed in step 3 is displayed again.

   If you desire to perform other functions, enter a number and follow the procedure described in one of the other sections that describe this feature. For a list of the sections, Managing Automatic File Transfers.

6. If you do not need to perform any other function, type `7`.

Adding a New Remote Location for Automatic File Transfers

To add a new remote location for files to be automatically transferred to, perform the following procedure.

1. Log in to the active server as `lsmsadm`.

2. Enter the following command (for more information about the format of this command, see “autoxfercfg”):

   ```
   $ $LSMS_DIR/autoxfercfg
   ```

3. The following menu is displayed:

   ```
   Select one of the following menu options:
   1) Display valid remote locations
   2) Add new remote location
   3) Remove remote location
   4) Display all scheduled transfers
   5) Add new scheduled transfer
   6) Remove scheduled transfer
   7) Exit
   ```

4. Enter `2`.

Output similar to the following displays:

```
Enter remote machine name:
Enter user name:
Enter password: ...........
Verify password: ...........
```

5. Type the desired values in all four fields, and then press **Return**.

   For example, type the following values shown in **bold** and press Return. (The passwords do not display as you type them; they are shown here to demonstrate that you must enter the same value twice.)

   ```
   Enter remote machine name:  ftp.oracle.com
   Enter user name:  anonymous
   Enter password:  xy1524wp
   Verify password:  xy1524wp
   ```

   The following output displays:

   ```
   Site configured. ** Make sure the host is reachable from this system **
   <hit any key to continue>
   ```

6. After you have pressed any key, the output displayed in step 3 is displayed again.

   If you desire to perform other functions, enter a number and follow the procedure described in one of the other sections that describe this feature. For a list of the sections, Managing Automatic File Transfers.

7. If you do not need to perform any other function, type `7`.

Deleting a Remote Location for Automatic File Transfers

To delete a remote locations that has been previously added using this feature, perform the following procedure.

1. Log in to the active server as `lsmsadm`.
2. Enter the following command (for more information about the format of this command, see autoxfercfg):

   ```
   $ $LSMS_DIR/autoxfercfg
   ```

   The following menu is displayed:

   ```
   Select one of the following menu options:
   1) Display valid remote locations
   2) Add new remote location
   3) Remove remote location
   4) Display all scheduled transfers
   5) Add new scheduled transfer
   ```

```
6) Remove scheduled transfer
7) Exit
```

3. Enter `3`.

   Output similar to the following displays:

   ```
   Enter remote machine name:
   ```

4. Type the name of the location you wish to delete and press **Return**.

   For example:

   ```
   Enter remote machine name:  ftp.oracle.com
   ```

   The following output displays:

   ```
   Verify: remove ftp.oracle.com (y/n)?
   ```

5. Enter `y` to verify that the site shown is the remote site you wish to delete.

   The following output displays:

   ```
   Site removed.
   <hit any key to continue>
   ```

6. After you have pressed any key, the output displayed in step 3 is displayed again.

   If you desire to perform other functions, enter a number and follow the procedure described in one of the other sections that describe this feature. For a list of the sections, Managing Automatic File Transfers.

7. If you do not need to perform any other function, type `7`.

Displaying Previously Scheduled Automatic File Transfers

To display all automatic transfers that have been previously set up using this feature, perform the following procedure.

> **Note:**
>
> Any file transfers that have been set up to be performed one time only are not displayed.

1. Log in to the active server as `lsmsadm`.

2. Enter the following command (for more information about the format of this command, see “autoxfercfg”):

   ```
   $ $LSMS_DIR/autoxfercfg
   ```

The following menu is displayed:

```
Select one of the following menu options:
1) Display valid remote locations
2) Add new remote location
3) Remove remote location
4) Display all scheduled transfers
5) Add new scheduled transfer
6) Remove scheduled transfer
7) Exit
```

3. Enter `4`.

   Output similar to the following displays:

```
Scheduled transfers:
  # SMTWHFS HHMM Filespec                                    Remote
001  *      0200 /var/TKLC/lsms/logs/Midwest/Lsms
*        ftp.lnp25:/tmp
002 ******* 0230 /var/TKLC/lsms/logs/survlog.log             lnp3:/common/
logs
<hit any key to continue>
```

   This display shows that all files with filenames that start with `Lsms` in the directory /var/**TKLC**/lsms/logs/Midwest are transferred to `ftp.lnp25:/tmp` at 2 a.m. every Monday, and that the file `survlog.log` in the /var/**TKLC**/lsms/logs directory is transferred to `lnp3:/common/logs` every night at 2:30 a.m.

4. After you have pressed any key, the output displayed in step 3 is displayed again.

   If you desire to perform other functions, enter a number and follow the procedure described in one of the other sections that describe this feature. For a list of the sections, Managing Automatic File Transfers.

5. If you do not need to perform any other function, type `7`.

Scheduling an Automatic File Transfer

To set up files to be transferred automatically, perform the following procedure. It is recommended that you schedule transfers according to the following guidelines:

- Choose an off-peak time, such as very early in the morning.
- Avoid planning transfers that would result in the same file being transferred more than once. For example, because **LSMS** application logs are maintained on the **LSMS** for seven days, they only need to be scheduled for a weekly transfer. If you schedule a daily transfer for logs of that type, the same file will be transferred each day for seven days. For this reason the display described in "Displaying Previously Scheduled Automatic File Transfers" shows that the files with filenames that start with `Lsms` in the `/var/TKLC/lsms/logs/Midwest` directory are transferred only on Mondays.

Transferring large numbers of files does not impact the processing performance of the **LSMS**, but it can impact network performance, especially networks that use the single-subnet design. (For more information about network design, refer to the **LSMS** *Configuration*

Manual.). This feature is designed for insignificant network degradation for up to 10 configured remote locations with up to 600 transferred files.

1. Log in to the active server as `lsmsadm`.
2. Enter the following command (for more information about the format of this command, see “autoxfercfg”):

   ```
   $LSMS_DIR/autoxfercfg
   ```

   The following menu is displayed:

   ```
   Select one of the following menu options:
   1) Display valid remote locations
   2) Add new remote location
   3) Remove remote location
   4) Display all scheduled transfers
   5) Add new scheduled transfer
   6) Remove scheduled transfer
   7) Exit
   ```

3. Enter `5`.

   Output similar to the following displays:

   ```
   Enter filespec:
   Enter remote machine name:
   Enter remote directory:
   Enter FTP port [21]:
   Enter transfer time (HHMM):
   Run (O)nce, (D)aily, (W)eekly:
   Enter day of the week: (SU,MO,TU,WE,TH,FR,SA):
   ```

4. Type the desired values in all four fields, and then press Return.

   For the time, use the twenty-four hour notation, where 11 p.m is represented as `2300`. To specify multiple files, you can use a wildcard character (*) in file names. For example, to set up a weekly transfer of the file `haEvents.err` in the `/var/TKLC/lsms/logs` directory every Tuesday morning at 1:30 a.m, type the following values, as shown in **bold**, and press Return:

   ```
   Enter filespec:  /var/TKLC/lsms/logs/haEvents.err
   Enter remote machine name:  lnp3
   Enter remote directory:  /common/logs
   Enter FTP port [21]:  80
   Enter transfer time (HHMM):  0130
   Run (O)nce, (D)aily, (W)eekly:  W
   Enter day of the week: (SU,MO,TU,WE,TH,FR,SA):  TU
   ```

   Output similar to the following displays to verify your input. If the display agrees with your input, type **y**, as shown in **bold**, and press Return:

   ```
   SMTWHFS HHMM Filespec                                       Remote
   ```

```
  *     0230 /var/TKLC/lsms/logs/haEvents.err        lnp3:/common/logs
Is this correct (y/n)?  y
```

The following output displays:

```
Automatic transfer successfully scheduled.
<hit any key to continue>
```

5. After you have pressed any key, the output displayed in step 3 is displayed again.

   If you desire to perform other functions, enter a number and follow the procedure described in one of the other sections that describe this feature. For a list of the sections, Managing Automatic File Transfers.

6. If you do not need to perform any other function, type `7`.

Removing a Scheduled Automatic File Transfer

To remove an automatic transfer that has been previously set up using this feature, perform the following procedure.

> **Note:**
>
> Any file transfers that have been set up to be performed one time only cannot be removed.

1. Log in to the active server as `lsmsadm`.
2. Enter the following command (for more information about the format of this command, see “autoxfercfg”):

   ```
   $LSMS_DIR/autoxfercfg
   ```

   The following menu is displayed:

   ```
   Select one of the following menu options:
   1) Display valid remote locations
   2) Add new remote location
   3) Remove remote location
   4) Display all scheduled transfers
   5) Add new scheduled transfer
   6) Remove scheduled transfer
   7) Exit
   ```

3. Enter `6`.

   Output similar to the following displays to show all currently scheduled transfers. Enter the number of the transfer that you want to remove (in this example, the first transfer is to be removed. as shown by `1`, in **bold**), or enter `0` to quit:

   ```
   Scheduled transfers:
     # SMTWHFS HHMM Filespec                                Remote
   ```

```
001  *      0200 /var/TKLC/lsms
/
logs/Midwest/Lsms*     ftp.lnp25:/tmp
002 ******* 0230 /var/TKLC/lsms/logs/survlog.log        lnp3:/
common/logs
Remove transfer # (0-3, 0=quit):  1
```

4. The following output displays.

```
Scheduled transfer successfully removed.
<hit any key to continue>
```

5. After you have pressed any key, the output displayed in step 3 is displayed again.

   If you desire to perform other functions, enter a number and follow the procedure described in one of the other sections that describe this feature. For a list of the sections, Managing Automatic File Transfers.

6. If you do not need to perform any other function, type `7`.

5

Restarting Software Processes

This chapter describes how the **LSMS** automatically attempts to restart certain types of failures. It also describes how to manually verify and restart **LSMS** software components.

Introduction

This chapter describes how the **LSMS** automatically attempts to restart certain types of failures. It also describes how to manually verify and restart **LSMS** software components.

Automatically Restarting Software Processes

The **LSMS** Automatic Software Recovery feature, available as a standard feature for **LSMS** Release 2.0 and later, detects failures in certain **LSMS** processes and attempts to restart the processes without the need for manual intervention by the customer. This feature is implemented by the `sentryd` utility.

Detecting Failure Conditions

Table 5-1 shows which processes are checked by `sentryd` and the error conditions for which they are checked.

Table 5-1 Processes Monitored by the Automatic Software Recovery Feature

Process	Unintentional Exit	Inability to Perform Defined Tasks	Failed to Initialize During Startup	See section:
EAGLE agents	X	X	X	Automatically Monitoring and Restarting EAGLE Agent Processes
Regional **NPAC** agents	X	X	X	Automatically Monitoring and Restarting NPAC Agent Processes
OSI	X			Automatically Monitoring and Restarting OSI Process
Service Assurance	X			Automatically Monitoring and Restarting the Service Assurance Process
Local Services Manager	X	X	X	Automatically Monitoring and Restarting Other Processes

Table 5-1 (Cont.) Processes Monitored by the Automatic Software Recovery Feature

Process	Unintentional Exit	Inability to Perform Defined Tasks	Failed to Initialize During Startup	See section:
Local Data Manager	X	X	X	Automatically Monitoring and Restarting Other Processes
Logger Server	X		X	Automatically Monitoring and Restarting Other Processes
LSMS SNMP Agent	X		X	Automatically Monitoring and Restarting Other Processes
Apache web server	X		X	Automatically Monitoring and Restarting Other Processes
RMTP Manager	X		X	Automatically Monitoring and Restarting the `rmtpmgr` Process
RMTP Agent	X		X	Automatically Monitoring and Restarting the `rmtpagent` Process
Report Manager	X		X	Automatically Monitoring and Restarting Other Processes

The `sentryd` process uses either of the following methods to detect failures:

- Verifying that the process has updated its timestamp in the supplemental database periodically
- Using standard Linux commands to determine whether a process is running

For more information about specific methods used to detect failures, see the section shown in the last column of Table 5-1.

Reporting Failures Through the Surveillance Feature

If the Surveillance feature is not enabled, `sentryd` still detects failures and attempts to restart processes, but important information concerning the state of the **LSMS** is neither displayed nor logged.

To obtain the full benefit of this feature, the Surveillance feature must be enabled. The Surveillance feature displays and logs (in `/var/TKLC/lsms/logs/survlog.log`) the following notifications regarding the following conditions:

- Software failures
- Successful recovery of the software

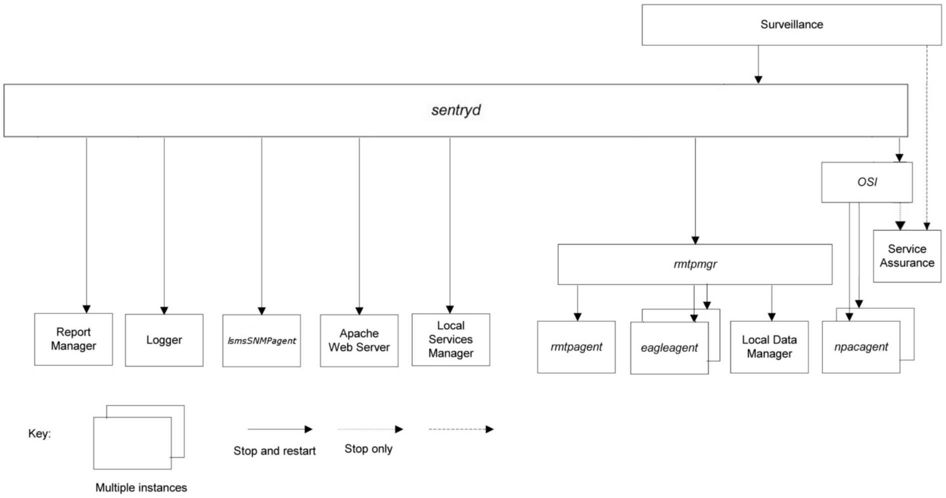
- Unsuccessful recovery of the software

Also, whether or not the Surveillance feature is enabled, surveillance agents will restart the `sentryd` process if it exits abnormally.

Automatically Restarting Processes Hierarchically

Figure 5-1 shows how `sentryd` restarts processes in a hierarchical order.

Figure 5-1 Order of Automatically Restarting Processes



This figure illustrates:

- Which processes `sentryd` monitors.
- When a failure is detected in a process, `sentryd` attempts to restart the failed process and all processes shown below it.
- The optional Service Assurance process is monitored for failure, but is not restarted by `sentryd`. Also, if `sentryd` restarts the **OSI** process, it stops the Service Assurance process. (The Surveillance feature restarts the Service Assurance process whenever it detects that the Service Assurance process has stopped.)

All recovery procedures start within 60 seconds of failure detection.

Automatically Monitoring and Restarting EAGLE Agent Processes

The following sections describe the failure conditions for which `sentryd` monitors the EAGLE agent processes (`eagleagent`) and the steps performed in attempts to restart the process after failure has been detected.

Monitoring EAGLE Agent Processes

The `sentryd` process monitors each EAGLE agent process for the following conditions:

- Failure to initialize during automatic system startup

- Failure to initialize during manual startup using the `eagle` command
- An abnormal exit during normal operation
- Inability to perform its defined tasks, for example, because it is in an infinite loop

Restarting an EAGLE Agent Process

When one of conditions described in “Monitoring Eagle Agent Processes” has been detected, `sentryd` performs the following tasks:

1. Generates the following surveillance notification, which represents the Common Language Location Identified (**CLLI**) of the **EAGLE**:

   ```
   LSMS6004|08:40 Sep 11, 1998|xxxxxxx|Notify:Sys Admin - FAILD:
   eagleagent <CLLI>
   ```

2. Attempts to stop and restart the `eagleagent`. If the `eagleagent` restarts, `sentryd` generates the following Surveillance notification:

   ```
   LSMS6005|08:40 Sep 11, 1998|xxxxxxx|Notify:Sys Admin - RECOV:
   eagleagent <CLLI>
   ```

Continuing Attempts to Restart an EAGLE Agent Process

If the attempt to restart the `eagleagent` fails, `sentryd` attempts again.

If this attempt is also unsuccessful, the `sentryd` process generates the following Surveillance notification and continues to attempt to restart the `eagleagent` process.

```
LSMS6006|08:40 Sep 11, 1998|xxxxxxx|Notify:Sys Admin - RFAILD:
eagleagent <CLLI>
```

If this notification appears several times in a row, contact the #unique_86.

Automatically Monitoring and Restarting NPAC Agent Processes

The following sections describe the failure conditions for which `sentryd` monitors the regional **NPAC** agent processes (`npacagent`s) and the steps performed in attempts to restart an `npacagent` process after failure has been detected.

Monitoring NPAC Agent Processes

For each region, `sentryd` monitors its `npacagent` process for the following conditions:

- Failure to initialize during automatic system startup
- Failure to initialize during manual startup using the `lsms` command
- An unintentional exit or crash during normal operation
- Inability to perform its defined tasks, for example, because it is in an infinite loop

Restarting NPAC Agent Processes

When one of conditions described in "Monitoring **NPAC** Agent Processes" has been detected, `sentryd` performs the following tasks:

1. Generates the following surveillance notification:

   ```
   LSMS6008|08:40 Sep 11, 1998|xxxxxxx| Notify:Sys Admin - FAILED:
   <NPAC_region> agent
   ```

   where `<NPAC_region>` indicates the name of the region whose `npacagent` process has failed.
2. Attempts to stop and restart the failed `npacagent`. If the `npacagent` restarts, `sentryd` generates the following Surveillance notification:

   ```
   LSMS6009|08:40 Sep 11, 1998|xxxxxxx| Notify:Sys Admin - RECOV:
   <NPAC_region> agent
   ```

Continuing Attempts to Restart NPAC Agent Processes

If the attempt to restart the `npacagent` fails, `sentryd` attempts again. If this attempt is also unsuccessful, the `sentryd` process generates the following Surveillance notification and continues to attempt to restart the `npacagent` process.

```
LSMS6010|08:40 Sep 11, 1998|xxxxxxx|Notify:Sys Admin - RFAILED:
<region> agent
```

If this notification appears several times in a row, contact the #unique_86.

Automatically Monitoring and Restarting OSI Process

The following sections describe the failure conditions for which `sentryd` monitors the **OSI** process and the steps performed in attempts to restart the processes after failure has been detected.

Monitoring the OSI Process

The `sentryd` process monitors the **OSI** process for the following conditions:

- An unintentional exit or crash during normal operation

Restarting the OSI Process

When one of conditions described in "Monitoring the **OSI** Process" has been detected, `sentryd` performs the following tasks:

1. Generates the following surveillance notification:

   ```
   LSMS8037|08:40 Sep 11, 1998|xxxxxxx|Notify:Sys Admin - FAILD: OSI
   ```

2. Stops all running `npacagent` processes and the Service Assurance process, if it is running.
3. Attempts to restart the **OSI** process and all `lsmsagent` processes that were previously running. If all processes restart, `sentryd` generates the following Surveillance notifications, where <**NPAC**_region> is the name of the region served by the `npacagent` process and <**CLLI**> is the name of the **EAGLE** agent:

   ```
   LSMS8038|08:40 Sep 11, 1998|xxxxxxx|Notify:Sys Admin - RECOV: OSI
   LSMS6005|08:40 Sep 11, 1998|xxxxxxx|Notify:Sys Admin - RECOV:
   eagleagent <CLLI>
   LSMS6009|08:40 Sep 11, 1998|xxxxxxx|Notify:Sys Admin - RECOV:
   <NPAC_region> agent
   ```

Continuing Attempts to Restart the OSI Process

If the attempt to restart the **OSI** process fails, `sentryd` attempts again. After two failed attempts, `sentryd` generates the following Surveillance notification.

```
LSMS8039|08:40 Sep 11, 1998|xxxxxxx|Notify:Sys Admin - RFAILD: OSI
```

If this notification appears, contact the #unique_86.

Automatically Monitoring and Restarting the Service Assurance Process

The following sections describe the failure conditions for which `sentryd` monitors the optional Service Assurance process (`sacw`) and states that the Surveillance feature restarts `sacw` when it fails.

Monitoring the Service Assurance Process

The `sentryd` process monitors the optional Service Assurance process (`sacw`) so that it can be stopped if the **OSI** process need to be restarted. It is monitored for the following conditions:

- An unintentional exit or crash during normal operation
- Inability to perform its defined tasks, for example, because it is in an infinite loop

Restarting the Service Assurance Process

The `sentryd` does not attempt to restart the Service Assurance process when it fails. The Surveillance feature performs that function. For more information about the Service Assurance process, see “Understanding the Service Assurance Feature”.

Automatically Monitoring and Restarting the rmtpmgr Process

The following sections describe the failure conditions for which sentryd monitors the **RMTP** Manager process (rmtpmgr) and the steps performed in attempts to restart rmtpmgr after failure has been detected.

Monitoring the rmtpmgr Process

The sentryd process monitors rmtpmgr for the following conditions:

- Failure to initialize during automatic system startup
- An unintentional exit or crash during normal operation
- Inability to perform its defined tasks, for example, because it is in an infinite loop

Restarting the rmtpmgr Process

When one of conditions described in “Monitoring the rmtpmgr Process” has been detected, sentryd performs the following tasks:

1. Generates the following surveillance notification:

   ```
   LSMS4021|08:40 Sep 11, 1998|xxxxxxx|Notify:Sys Admin - rmtpmgr
   failed
   ```

2. Attempts to stop and restart the process. If the process restarts, no notification is posted. After the sentryd process has restarted the rmtpmgr process, sentryd then attempts to restart the following processes that exited previously due to the rmtpmgr failure:
   - **NPAC** agents (see Restarting NPAC Agent Processes)
   - EAGLE agents (see Restarting an EAGLE Agent Process)
   - Local Data Manager (see Restarting Other Processes)

Continuing Attempts to Restart the rmtpmgr Process

If the attempt to restart the rmtpmgr process fails, sentryd attempts again. If the attempt fails again, sentryd generates the **LSMS4021** notification again. If this notification appears several times in a row, contact the #unique_86.

Automatically Monitoring and Restarting the rmtpagent Process

The following sections describe the failure conditions for which sentryd monitors the **RMTP** Agent process (rmtpagent) and the steps performed in attempts to restart rmtpagent after failure has been detected.

Monitoring the rmtpagent Process

The sentryd process monitors rmtpagent for the following conditions:

- Failure to initialize during automatic system startup
- An unintentional exit or crash during normal operation
- Inability to perform its defined tasks, for example, because it is in an infinite loop

Restarting the rmtpagent Process

When one of conditions described in Monitoring the rmtpagent Process has been detected, sentryd performs the following tasks:

1. Generates the following surveillance notification:

   ```
   LSMS4021|08:40 Sep 11, 1998|xxxxxxx|Notify:Sys Admin - rmtpagent
   failed
   ```

2. Attempts to stop and restart the process. If the process restarts, no notification is posted. After the sentryd process has restarted the rmtpagent process, sentryd then attempts to restart the following processes that exited previously due to the rmtpagent failure:
   - **NPAC** agents (see Restarting NPAC Agent Processes)
   - EAGLE agents (see Restarting an EAGLE Agent Process)
   - Local Data Manager (see Restarting Other Processes)

Continuing Attempts to Restart the rmtpagent Process

If the attempt to restart the rmtpagent process fails, sentryd attempts again. If the attempt fails again, sentryd generates the LSMS4021 notification again. If this notification appears several times in a row, contact the #unique_86.

Automatically Monitoring and Restarting Other Processes

The following sections describe the failure conditions for which sentryd monitors the following processes and the steps performed in attempts to restart a process after failure has been detected:

- Local Services Manager (lsman)
- LSMS SNMP Agent (lsmsSNMPagent)
- Local Data Manager (supman)
- Report Manager (reportman)
- Logger Server
- Apache Web Server

Monitoring Other Processes

The sentryd process monitors each process for the following conditions:

- Failure to initialize during automatic system startup
- An unintentional exit or crash during normal operation
- Inability to perform its defined tasks, for example, because it is in an infinite loop

Restarting Other Processes

When one of conditions described in Monitoring EAGLE Agent Processes has been detected, sentryd performs the following tasks:

1. Generates the following surveillance notification, where <process_name> is the name of the process:

```
LSMS4021|08:40 Sep 11, 1998|xxxxxxx|Notify:Sys Admin - <process_name>
failed
```

2. Attempts to stop and restart the process. If the process restarts, no notification is posted.

Continuing Attempts to Restart Other Processes

If the attempt to restart the process fails, sentryd attempts again. If the attempt fails again, sentryd generates the LSMS4021 notification again. If this notification appears several times in a row, contact the #unique_86.

6

Managing Server States

This chapter describes the various states that servers can have, the automatic switchover capability for certain failures, and how you can manage the states of the servers manually.

Introduction

This chapter describes the various states that servers can have, the automatic switchover capability for certain failures, and how you can manage the states of the servers manually.

Understanding Server States

The **LSMS** has two servers for high availability. Usually, the **LSMS** is in *duplex* mode, with one server the active server and the other server in a standby state. In duplex mode, the active server is the master MySQL database server, and the standby server acts as the MySQL slave. Any database changes are made on the active server and are replicated to the standby server.

If the active server is not able to run **LSMS** functions, the standby server can take over to be the active server. The servers are peers; either server can be the active server, but only one server can be active at a time.

When one server is in **ACTIVE** state and the other server is not in **STANDBY** state, the **LSMS** is in *simplex* mode. When the **LSMS** is in simplex mode, the non-**ACTIVE** server should be brought back to **STANDBY** state as soon as possible (use the procedure described in "Starting a Server").

The state of each server is monitored by the **LSMS** High Availability (**HA**) utility. Table 6-1 shows the possible states for each server (but only one server at a time can be in the **ACTIVE** state).

Table 6-1 LSMS Server States

State	Server Status
ACTIVE	Server is online, running the **LSMS** application, and acts as the MySQL master.
STANDBY	Server is online and participating in database replication. The server ready to become the active server if automatic switchover is necessary or if manual switchover is performed. The server is not currently running the **LSMS** application.
UNINITIALIZED "INHIBITED"	Server is online but it is not participating in database replication and no application is running.

Table 6-1 (Cont.) LSMS Server States

State	Server Status
	Note: Other transitional states may be displayed while a server is changing from one to another of these states.

Understanding Switchover

Changing active status from one server to another is called *switchover*. The server on which the **LSMS** is running at a given time is called the *active* server. If the other server is in **STANDBY** state, it is called the *standby* server. (If the other server is in **UNINITIALIZED** "**INHIBITED**" state, the **LSMS** is said to be running in simplex mode, which means that only one server is currently available to run the **LSMS** application, and switchover is not possible.) During switchover, the server that was in **ACTIVE** state changes to **UNINITIALIZED** "**INHIBITED**" state and the server that was in **STANDBY** state changes to **ACTIVE** state.

What Happens During Switchover?

During a switchover, the following functions occur:

1. The active server shuts down the **LSMS** application and transitions to **UNINITIALIZED** "**INHIBITED**" state.
2. The standby server stops replicating the MySQL database.
3. The standby server starts the **LSMS** application.

> **Note:**
>
> After switchover the state of the previously active server is **UNINITIALIZED** "**INHIBITED**", so this server is not ready to act as a standby server. As soon as possible, perform the procedure described in “Starting a Server” to put this server in **STANDBY** state.

The following items describe the results of a switchover:

- Any server-side **GUIs** (started using the `start_mgui` command) are terminated. This type of **GUI** must be restarted manually.
- All **NPAC** associations are terminated and then automatically restarted to connect to the newly active server (for more information, see LSMS Connectivity)
- All **EMS** associations are terminated and then automatically restarted to connect to the newly active server (for more information, see LSMS Connectivity)

- The Virtual **IP** (**VIP**) address is switched from the previously active server to the newly active server. In all types of network configuration, the **VIP** address is used for the application network, which is used by the following functions:
  - The Service Assurance feature is restarted by the Surveillance feature after the newly active server takes over.
  - After directly-connected Query Servers detect a period of inactivity, they attempt to reconnect. The reconnection is made to the newly active server.
  - Web-based **GUIs** (if this feature is enabled).

    > **Note:**
    >
    > Although it is possible to start a web-based **GUI** by specifying the server's specific **IP** address, it is recommended that web-based **GUIs** use the **VIP** address. Any web-based **GUIs** that do not use the **VIP** address will terminate during switchover.

    Switchover has the following effects on connections on the web-based **GUIs** that use the **VIP** address:

    - An alarm that switchover is being initiated is displayed
    - Any user-initiated actions, such as audits or bulk loads, are terminated
    - All web-based **GUI** sessions automatically reconnect themselves to the newly active server within the **GUI** refresh interval
    - Until the **GUI** reconnects, no new **GUI** notifications will be displayed

For some types of failure on the active server, the **LSMS** automatically attempts to switch over. If automatic switchover is not possible, or at any time you wish, you can manually switch over to the other server. For more information about switching over, see the following:

- Understanding Automatic Switchover
- Manually Switching Over from the Active Server to the Standby Server

What Needs to Happen When Switchover Completes?

When automatic or manual switchover completes, the **LSMS** is operating in simplex mode, with one server in **ACTIVE** state and the other server in **UNINITIALIZED** "**INHIBITED**" state. Only the server in **ACTIVE** state is in a condition that is available for running the **LSMS** application.

As soon as possible, manual intervention is needed to change the state of the non-active server to **STANDBY** state by performing the procedure described in Starting a Server. When this procedure is performed on a non-active server (while the other server is in **ACTIVE** state), the following functions are performed:

1. The MySQL binary logs of the active server are copied to the server being started.
2. The server being started takes the MySQL slave role and begins database replication.
3. The server changes to **STANDBY** state; it is now available if switchover is needed again.

Understanding Automatic Switchover

The **LSMS** is designed with a number of redundant systems (such as power feeds and **CPUs**) to enable a server to continue hosting the **LSMS** application even after some failures. For cases of double-faults or other failure conditions for which there is no designed redundancy, the **LSMS** is designed to automatically switch over from the active server to the standby server. These failure conditions fall into the following categories:

- Hardware-related failures, such as loss of both power feeds, loss of redundant power feeds, loss of memory controller, and so on
- **Database**-related failures, such as failed mysqld process
- Network-related failures, if the user has defined certain network interfaces to be critical

Automatic Switchover Due to Hardware-Related Failure

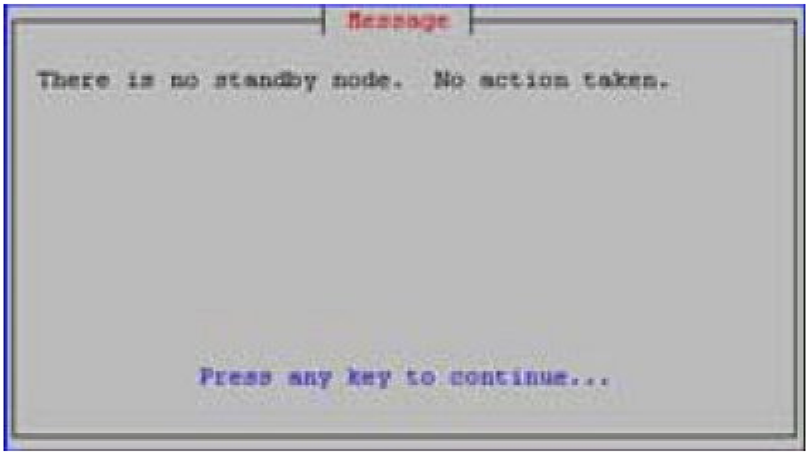
The **LSMS HA** daemons on the active and standby servers send each other heartbeats once every second. When a server detects a loss of 10 heartbeats in a row, the server concludes that the other server is no longer functional and does the following:

- If the active server detects the loss of 10 heartbeats in a row from the standby server, the active server disqualifies the standby server from either automatic or manual switchover and posts the following notification:

  ```
  LSMS4015|14:58 Oct 22, 2005|xxxxxxx|Notify:Sys Admin - Heartbeat
  failure
  ```

  Until the standby server returns to **STANDBY** state, automatic switchover is not possible, and if manual switchover is attempted, the `lsmsmgr` text interface displays a warning indicating that there is no standby mode and no action is taken.

  Figure 6-1 Unable to Switchover to Standby

  Message

  There is no standby node. No action taken.

  Press any key to continue...

- If the standby server detects the loss of 10 heartbeats in a row from the other server, the standby server transitions to **ACTIVE** state. The results are the same as those described in What Happens During Switchover?.

  ```
  LSMS4015|14:58 Oct 22, 2005|xxxxxxx|Notify:Sys Admin - Heartbeat failure
  ```

Automatic Switchover Due to Database-Related Failure

Each server monitors itself for accessibility to its database. In addition, the standby server monitors whether the replication process running and whether its replication of the active server’s database is within a configured threshhold (the default is one day).

- If a server finds an error in any of these conditions, it posts the following notification:

  ```
  LSMS4007|14:58 Oct 22, 2005|xxxxxxx|Notify:Sys Admin - DB repl error
  ```

  In addition, the server does the following:

  - If the active server detects that its database is inaccessible, the active server switches over to the standby server and posts the following notifications:

    ```
    LSMS4000|14:58 Oct 22, 2005|xxxxxxx|Notify:Sys Admin - Switchover
    initiated
    ```

    If switchover is successful, the following notification is posted:

    ```
    LSMS4001|14:58 Oct 22, 2005|xxxxxxx|Notify:Sys Admin - Switchover
    complete
    ```

    If switchover is not successful, the following notification is posted:

    ```
    LSMS4002|14:58 Oct 22, 2005|xxxxxxx|Notify:Sys Admin - Switchover
    failed
    ```

  - If the standby server detects that its replication process is not running, its database is inaccessible, or its database is lagging by more than the configured threshhold, the standby server transitions to **UNINITIALIZED** "**INHIBITED**" state, and posts one of the following notifications, depending on whether the standby server is Server A (the server with the default server name `lsmspri`) or Server B (the server with the default server name `lsmssec`):

```
LSMS4013|14:58 Oct 22, 2005|xxxxxxx|Notify:Sys Admin - Primary
inhibited
```

```
LSMS4014|14:58 Oct 22, 2005|xxxxxxx|Notify:Sys Admin - Secondary
inhibited
```

Automatic Switchover Due to Network-Related Failure

Users have the option of defining any network interfaces (**NPAC**, **EMS**, and/or Application) as critical. For each network interface that the user defines as critical, the user defines one or more **IP** addresses to be pinged by each server every minute. (For information about how to define a network interface as critical, refer to the *Configuration Guide*.)

When a network interface is defined as critical, each server pings the first configured **IP** address every minute. If the ping fails and only one **IP** address has been defined for that network interface, the interface is considered to have failed. If the interface has additional **IP** addresses defined, the interface is not considered to have failed until all **IP** addresses have been pinged with no response.

When a network interface is considered to have failed, the server posts one of the following notifications that corresponds to the failed interface:

```
LSMS2000|14:58 Oct 22, 2005|xxxxxxx|Notify:Sys Admin - NPAC interface
failure
```

```
LSMS0001|14:58 Oct 22, 2005|xxxxxxx|Notify:Sys Admin - EMS interface
failure
```

```
LSMS4004|14:58 Oct 22, 2005|xxxxxxx|Notify:Sys Admin - APP interface
failure
```

After the server posts the notification of interface failure, it does the following:

- If the active server detects that a critical network interface has failed, the active server determines whether any critical network interfaces are considered to have failed on the standby server:
  - If any critical network interfaces are considered to have failed on the standby server, the active server continues in the **ACTIVE** state; it does not switch over.

  - If all critical network interfaces are responding to pings on the standby server, the active server switches over to the standby server and posts the following notifications:

    ```
    LSMS4000|14:58 Oct 22, 2005|xxxxxxx|Notify:Sys Admin - Switchover
    initiated
    ```

    If switchover is successful, the following notification is posted:

    ```
    LSMS4001|14:58 Oct 22, 2005|xxxxxxx|Notify:Sys Admin - Switchover
    complete
    ```

    If switchover is not successful, the following notification is posted:

    ```
    LSMS4002|14:58 Oct 22, 2005|xxxxxxx|Notify:Sys Admin - Switchover
    failed
    ```

- If the standby server detects that a critical network interface has failed, it continues to operate in **STANDBY** state. Although automatic switchover is not performed in this case, it is possible to manually switch over to a standby server that has detected a critical network interface has failed.

Managing Server States Manually

The following sections describe how you can manually manage the server states:

- "Determining the Server Status"
- "Manually Switching Over from the Active Server to the Standby Server"
- "Inhibiting a Standby Server"
- "Starting a Server"

Determining the Server Status

Use either of the following to determine the server status:

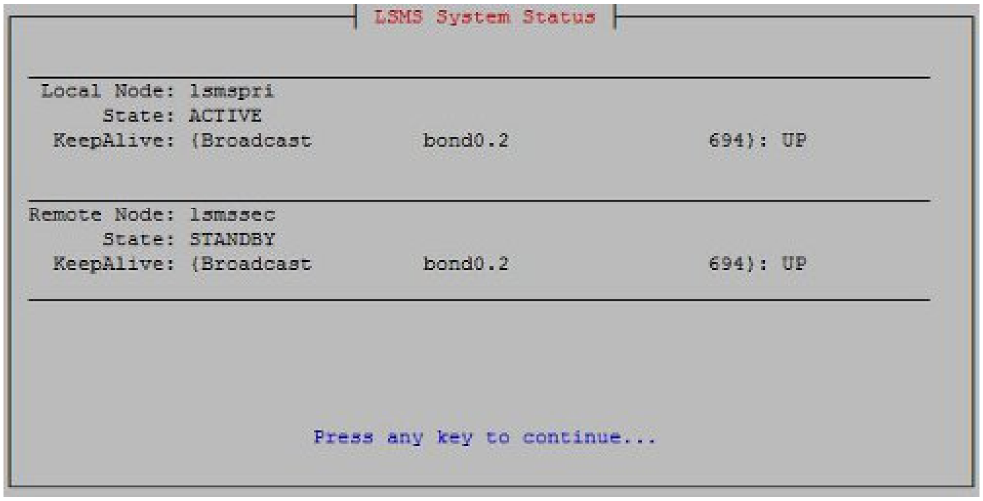
- "Using the `lsmsmgr` Interface to Determine the Server Status"
- "Using the `hastatus` Command to Determine the Server Status"

Using the `lsmsmgr` Interface to Determine the Server Status

Use the following procedure to determine the status of both servers.

1. Log into either server as the `lsmsmgr` user.
2. From the main `lsmsmgr` interface, select **Maintenance**, and then **LSMS Node Status**.

Figure 6-2 LSMS Node Status



```
                         LSMS System Status

 Local Node: lsmspri
      State: ACTIVE
  KeepAlive: (Broadcast         bond0.2                 694): UP

Remote Node: lsmssec
      State: STANDBY
  KeepAlive: (Broadcast         bond0.2                 694): UP



                     Press any key to continue...
```

In Figure 6-2, the server that was logged into is named `lsmspri` and its state is **ACTIVE**; the mate server is named `lsmssec` and its state is **STANDBY**.

3. Press any key to return to the `lsmsmgr` Maintenance menu.

Using the `hastatus` Command to Determine the Server Status

To use the command line to determine the state an individual server, perform the following procedure.

1. Log in as the `lsmsadm` or `lsmsall` user to the command line of the server whose state you want to determine.

   (For information about logging in, see "Logging In to **LSMS** Server Command Line".)

2. Enter the following command:

   ```
   $ hastatus
   ```

3. The command line interface displays the status, similar to the following example, and then returns the prompt.

   ```
   ACTIVE
   $
   ```

Manually Switching Over from the Active Server to the Standby Server

When there is a failure on the active server, or at other times for testing, you can use the `lsmsmgr` interface to manually switch over to the standby server, as described in the following procedure.

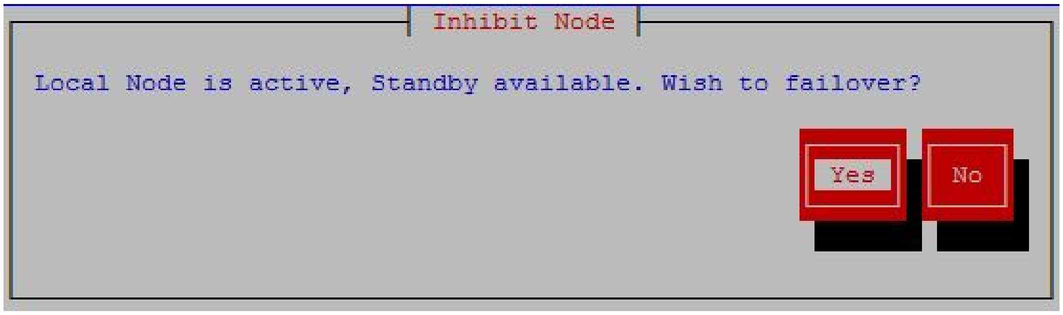
1. Log in as the `lsmsmgr` user to the active server.

   (For information about logging in as `lsmsmgr`, see "Logging In to **LSMS** Server Command Line".)

2. From the main `lsmsmgr` interface, select **Maintenance**, and then **Inhibit Node**.

If the server you logged into is the **ACTIVE** server, the `lsmsmgr` interface displays information that confirms that the local node (the server you logged into) is active and the mate server is available as a standby (which implies that its state is **STANDBY**).

Figure 6-3 Inhibit Active Node

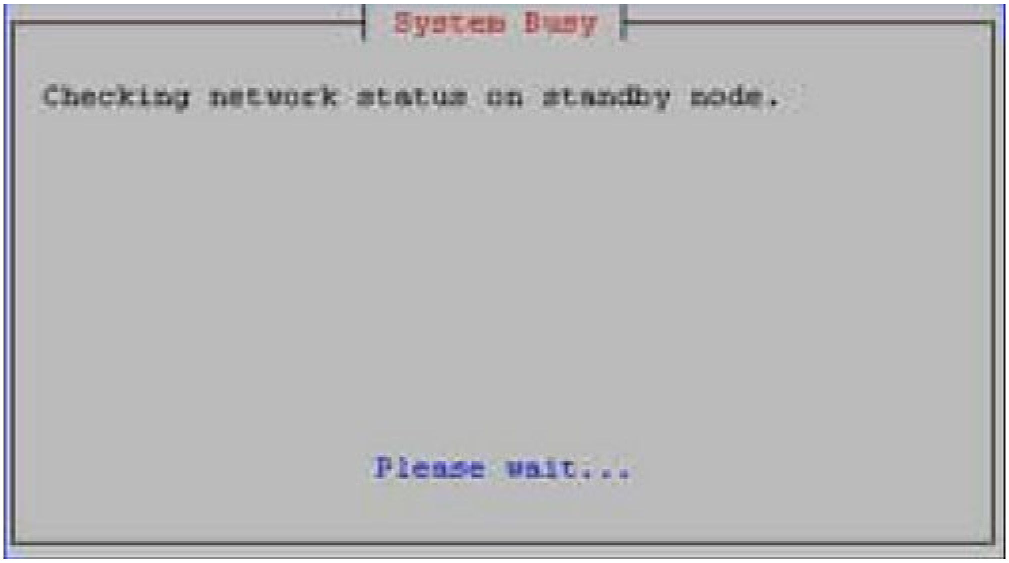


Local Node is active, Standby available. Wish to failover?

3. Ensure that the **Yes** button is highlighted and press **Enter**.

   A window, as shown in Figure 6-4, displays, but no action is needed.

Figure 6-4 Check Network Status on Standby Node

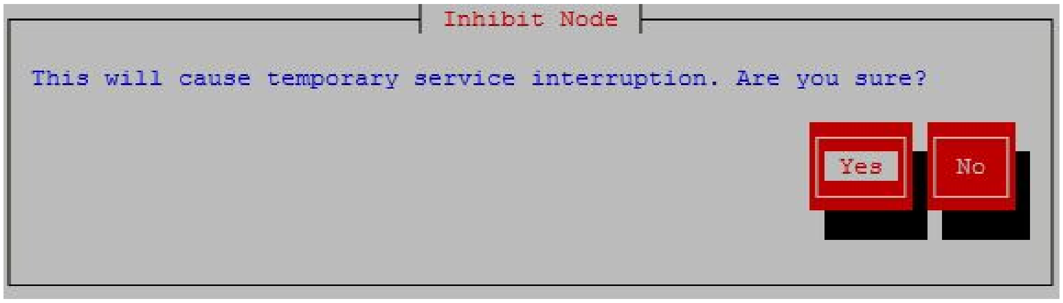


Checking network status on standby node.

Please wait...

4. After the network status on the standby node is checked, a confirmation window displays.

Figure 6-5 Confirm Switchover

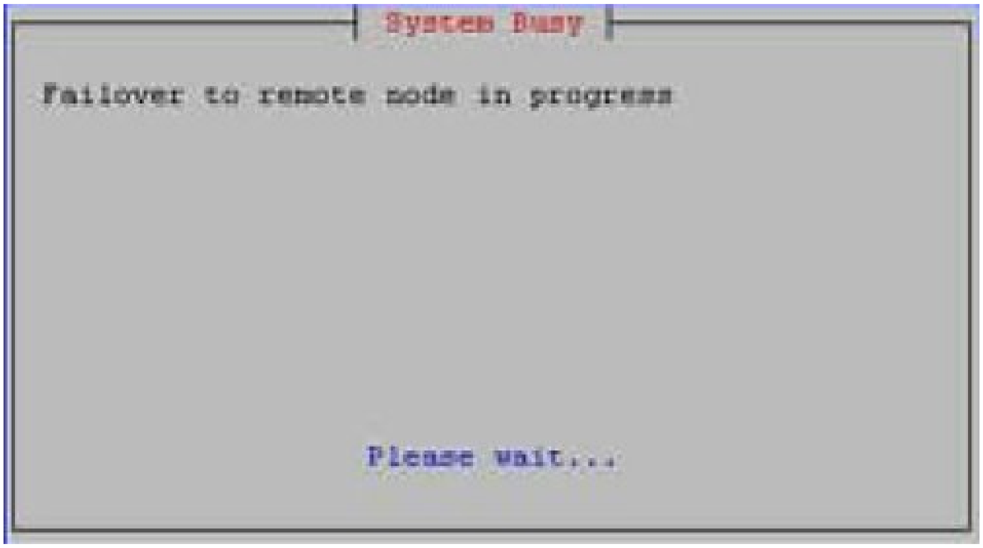


This will cause temporary service interruption. Are you sure?

5. Ensure that the **Yes** button is highlighted and press **Enter**.

   The window shown in Figure 6-7 displays.

Figure 6-6   Manual Switchover In Progress



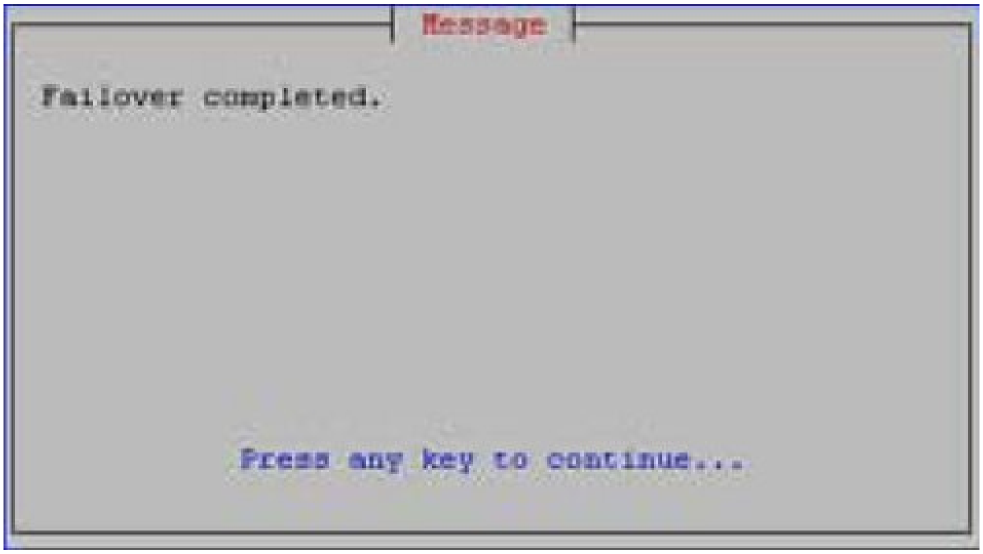
System Busy

Failover to remote node in progress

Please wait...

6. When the switchover is complete, press any key to continue.

Figure 6-7   Manual Switchover Complete



Message

Failover completed.

Press any key to continue...

The server that was previously in **STANDBY** state is now in **ACTIVE** state, and the server that was previously in **ACTIVE** state is now in **UNINITIALIZED** "**INHIBITED**" state.

> **Note:**
>
> As soon as possible, perform the procedure described in “Starting a Server” to change the state of the server that is in **UNINITIALIZED** "**INHIBITED**" state to **STANDBY** state so that it is available if automatic switchover is needed or if manual switchover is desired.

Inhibiting a Standby Server

Occasionally (for example, before powering down), it may be necessary to inhibit the standby server.

> **Note:**
>
> Inhibiting the active server results in switchover, as described in “Manually Switching Over from the Active Server to the Standby Server”.

Use the following procedure to inhibit the standby server.

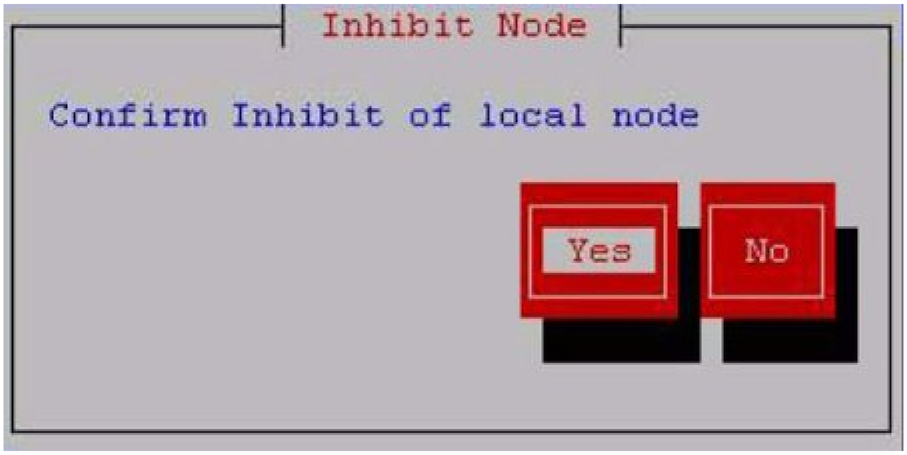
1. Log in as the `lsmsmgr` user to the standby server.

   (For information about logging in as `lsmsmgr`, see “Logging In to **LSMS** Server Command Line”.)

2. From the main `lsmsmgr` interface, select **Maintenance**, and then **Inhibit Node**.

   The `lsmsmgr` interface displays the window shown in Figure 6-8.

   Figure 6-8 Inhibit a Non-Active Server

   Confirm Inhibit of local node

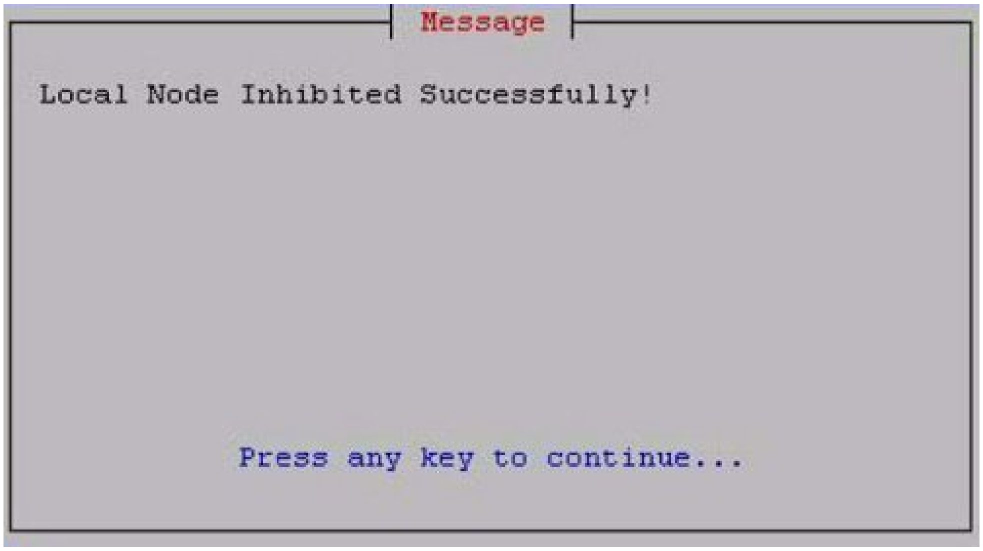
3. Ensure that the **Yes** button is highlighted and press **Enter**.

   While the server is being inhibited, the `lsmsmgr` interface disappears and the following text is displayed on the command line, where `<hostname>` is the name of the server:

```
Inhibiting node <hostname>...
```

4. When the server has been completely inhibited, the `lsmsmgr` interface appears again. Press any key to continue.

Figure 6-9 Node Successfully Inhibited



```
Message

Local Node Inhibited Successfully!

Press any key to continue...
```

The `lsmsmgr` main menu is displayed again.

> **Note:**
>
> Do not allow this server to remain in **UNINITIALIZED** "**INHIBITED**" state any longer than necessary. As soon as possible, perform the procedure described in perform the procedure described in “Starting a Server” to change the state of the server to **STANDBY** state so that it is available if automatic switchover is needed or if manual switchover is desired.

Starting a Server

A server in **UNINITIALIZED** "**INHIBITED**" state cannot run the **LSMS** application and is not available as a standby server. Use the following procedure to change the state of a server from **UNINITIALIZED** "**INHIBITED**" to a state where it is available to run the **LSMS** application.

During the starting process on a given server, the **LSMS HA** utility checks to see if the other server is in **ACTIVE** state. Therefore, the state of the server at the end of this procedure will be one of the following:

- If the other server is not in the **ACTIVE** state, this server will transition to **ACTIVE** state.
- If the other server was in the **ACTIVE** state, this server will perform the following functions:
  - Copy the MySQL binary logs from the active server

- Take a snapshot of the active server’s database
- Transition to **STANDBY** state
- Configure its MySQL to be a slave to the active server’s master
- Start performing MySQL replication

1. Log in as the `lsmsmgr` user to the appropriate server, depending on the server states, as follows (for information about logging in as `lsmsmgr`, see “Logging In to **LSMS** Server Command Line”):

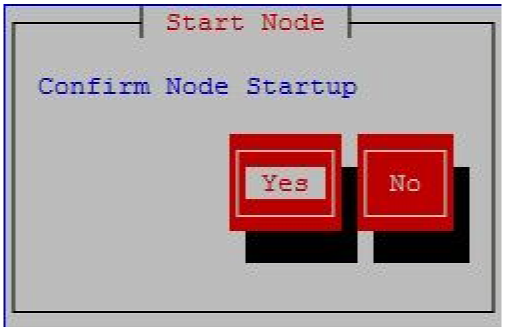
   - If both servers are in **UNINITIALIZED** "**INHIBITED**" state, log into the server that you want to make active.
     After you have finished this procedure on that server, repeat this procedure for the other server.
   - If one server is in **ACTIVE** state, log into the server that is not active.

   > **Note:**
   >
   > Do not attempt to change the state of the server while any of the following processes are running on the active server: backups (automatic or manual), running the `import` command, running the `lsmsdb quickaudit` command, or creating query server snapshots, all of which use temporary storage space. If you attempt to change the state of the server while any of these processes are running, you may not have enough disk space to complete the process. Since backups can be run automatically, perform the procedure described in “Checking for Running Backups” to ensure that no backups are running.

2. From the main `lsmsmgr` interface, select **Maintenance**, and then **Start Node**.

   The `lsmsmgr` interface displays.

   Figure 6-10   Starting a Server

   Start Node

   Confirm Node Startup

3. Ensure that the **Yes** button is highlighted and press Enter.

   While the server is being started, the `lsmsmgr` interface disappears and text similar to the following is displayed on the command line when this procedure is being performed on a server (lsmssec in this example) in **UNINITIALIZED** "**INHIBITED**" state while the other server is in **ACTIVE** state:

```
LSMS starting up on lsmssec...
```

```
Checking status from active mate...
Running status on lsmspri node
Copying DB from active mate. Local node will become standby.
  This may take a while
LSMS shutting down lsmssec...
Syncing mate:/mnt/snap/ to /var/TKLC/lsms/db/
Sync'ed
LSMS starting up on lsmssec...
Unihibiting node lsmssec...
Startup of local node successful

Press enter to continue...
```

> **Note:**
>
> The text that displays is different when this procedure is being performed when both servers were originally in **UNINITIALIZED** "**INHIBITED**" state, but the condition when both servers are in **UNINITIALIZED** "**INHIBITED**" state happens only during upgrade.

4. Press any key.

   The `lsmsmgr` main menu is displayed again.

The state of the server will be as described in the beginning of this section. To display the server state, use the procedure described in Determining the Server Status.

7 Recovering from Site Failures

This chapter describes and compares various disaster backup strategies and describes how to prepare for disaster recovery. For each disaster recovery strategy, this chapter also describes the recovery procedures and a list of assumptions.

Introduction

The **LSMS** system administrator needs to plan a recovery strategy for situations when both the **LSMS** active server and the standby server are unable to receive data from the **NPAC**. This occurs when the **LSMS** hardware is unable to operate, perhaps due to a fire or a natural disaster.

This chapter describes and compares various disaster backup strategies and describes how to prepare for disaster recovery. For each disaster recovery strategy, this chapter also describes the recovery procedures and a list of assumptions.

Choosing a Disaster Backup Strategy

Choose one of the following backup strategies, in which a shadow **LSMS** is defined to be an entire **LSMS**, with its own service provider **ID**, located in a separate geographical location from the main **LSMS**:

- Active shadow
- Inactive shadow
- No shadow

The various backup strategies provide different methods for ensuring that the shadow **LSMS** contains the same data as the main **LSMS**.

> **Note:**
>
> Whenever you must manually enter locally provisioned data at the shadow **LSMS**, be sure that you use the same service provider identifier (**SPID**) that was used to enter the same locally provisioned data at the main **LSMS**. For more information, see Synchronizing Data Between the Main LSMS and Shadow LSMS.

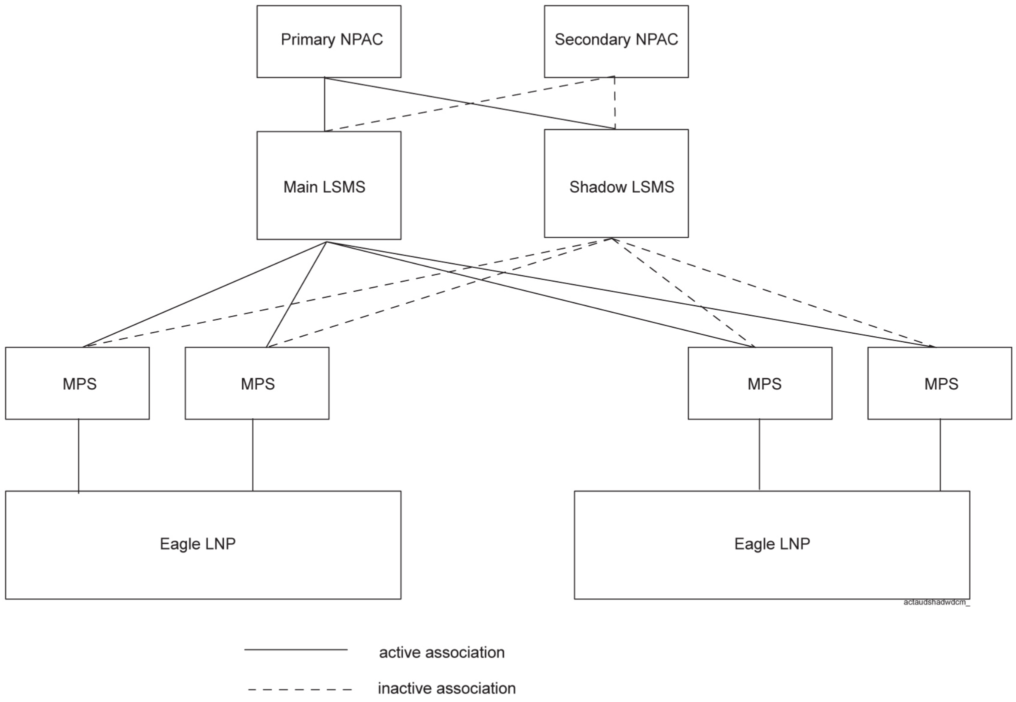
The following sections provide an overview of each strategy. Detailed descriptions or recovery procedures for each strategy are described in Performing Disaster Recovery with an Active Shadow LSMS through Returning Operation from Shadow LSMS to Main LSMS .

Using an Active Shadow

Figure 7-1 shows the configuration of a main **LSMS** that uses an active shadow as its backup.

An active shadow **LSMS** is an entire **LSMS** that is active and has active associations with each **NPAC** from which the **LSMS** needs data (only one **NPAC** is shown in Figure 7-1).

Figure 7-1   Overview of Main LSMS and Active Shadow LSMS



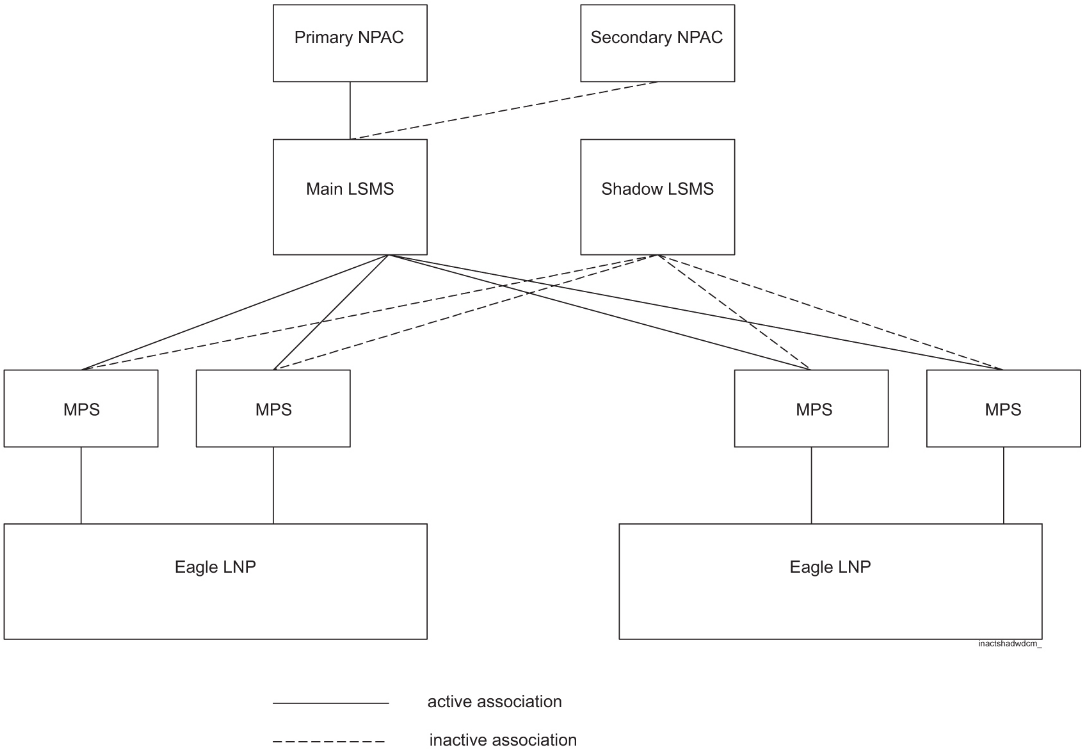
The disaster recovery backup strategy for this configuration provides the least out-of-service time for the **LSMS**. The recovery procedures for this strategy are described in Performing Disaster Recovery with an Active Shadow LSMS.

Using an Inactive Shadow

Figure 7-3 shows the configuration of a main **LSMS** that uses an inactive shadow as its backup.

The shadow **LSMS** does not maintain active connections with the **NPACs** that supply data to the main **LSMS**. However, disaster recovery is still more feasible than using no shadow, especially for disaster situations in which the physical site of the main **LSMS** is damaged (such as fire or natural disaster).

Figure 7-2   Overview of Main LSMS and Inactive Shadow LSMS

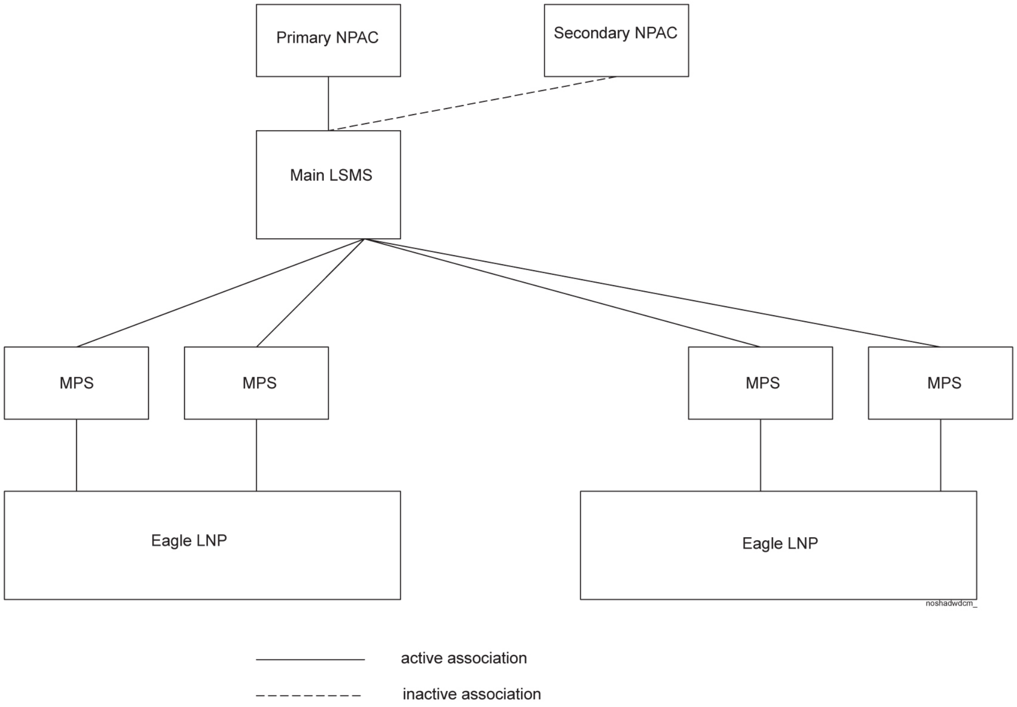


With this configuration, during disaster recovery you need to restore all databases from the NPAC. The recovery procedures are described in Performing Disaster Recovery with an Inactive Shadow LSMS.

Using No Shadow

Figure 7-3 shows the configuration of a main **LSMS** that has no shadow as its backup.

Figure 7-3 Overview of Main LSMS without a Shadow LSMS



When no shadow **LSMS** exists, disaster recovery requires immediate repair of the main **LSMS** and its physical site, and then restore all databases from the NPAC. The recovery procedures are described in Performing Disaster Recovery without a Shadow LSMS.

Synchronizing Data Between the Main LSMS and Shadow LSMS

Both **NPAC** data and locally provisioned data need to be synchronized between the main and shadow **LSMS** so that the shadow can take over when the main **LSMS** fails.

- **NPAC** data synchronization occurs in one of the following ways:
  - With an active shadow, active connections from both main and active shadow to the **NPACs** allow transmission of the same **NPAC** data to both **LSMSs**.
  - With an inactive shadow, **NPAC** data is synchronized by loading files from a backup tape and/or downloading files from the **NPAC** to the inactive shadow **LSMS**.
- Locally provisioned data must be manually entered at both the main **LSMS** and shadow **LSMS**.

> **Note:**
>
> When you log in to manually enter any locally provisioned data, always use the same service provider **ID** (**SPID**) at both the main **LSMS** and the shadow **LSMS**. Locally provisioned data is correlated with a **SPID**. In order for the data to be the same at the main **LSMS** and shadow **LSMS**, it must be entered with the same **SPID** at both **LSMSs**. The main **LSMS** and shadow **LSMS** must use different **NPAC**-assigned **SPIDs** for their association with the **NPAC**. You can create **SPIDs** used just for entering data, or you can use the main **LSMS**'s **NPAC**-assigned **SPID** for entering locally provisioned data at both the main **LSMS** and shadow **LSMS**.

For information about manually entering locally provisioned data, refer to the *Database Administrator's Guide*.

Preparing for a Disaster Situation

For all recovery strategies, prepare for disaster situations by doing the following:

- Make sure that the following conditions are true:
  - The main **LSMS**, any restored **LSMS**, and the shadow **LSMS** have the required software licenses. Use the procedure described in Verifying the Processes Running on the Active Server for each server on each **LSMS**; licenses are required for processes to run.
  - Hardware and software versions on the main and shadow **LSMS** are identical.
  - Any optional features are installed and configured on both the main and shadow **LSMS**.
- Make sure the following items are always available and easy to locate:
  - The most recent database backup tape
  - **TPD** USB media
  - **LSMS** application USB media
  - Completed Disaster Recovery sheet, as shown in Recovery Preparation Worksheet.

In addition, if you use an active shadow **LSMS**, make sure the following conditions are true:

- The shadow **LSMS** hardware has received the same required maintenance as the main **LSMS**.
- You have the ability to connect to the shadow **LSMS** using the **Secure Shell** (`ssh`).
- You have the ability to display **LSMS** applications on your workstation.
- The network connections from the network elements to the shadow **LSMS**, which are critical during a disaster, have been periodically tested. Networks are often subject to frequent changes, and these changes can affect your connection between the shadow **LSMS** and the network elements.
- Any data you have added, modified, or deleted on the main **LSMS** has also been added, modified, and deleted on the shadow **LSMS**.

At least annually, your site should prepare a drill in which the key personnel perform the disaster recovery procedure. This ensures that any potential problems or questions can be addressed in a non-emergency situation.

Determining When to Switch to Shadow LSMS

Switching to a shadow **LSMS** is the obvious solution in cases of fire or other destruction of the main **LSMS** site. In addition to these cases, some problems with the main **LSMS** may warrant switching to the shadow **LSMS**. These situations can be determined with the Surveillance feature.

If the Surveillance feature is active, it posts a notification every five minutes. If the Surveillance feature has detected an error, it posts a notification reporting the error. If no errors have been detected, the Surveillance feature posts the following “keep alive” message to indicate that the Surveillance feature is running, where `<Host Name>` indicates the host name of the server that is reporting the notification.

```
LSMS8000|14:58 Jun 22, 2000|<Host Name>|Keep alive
```

Absence of “keep alive” messages is an indication that a potential problem exists. Contact the #unique_86 for help in determining whether the problems warrants switching to the shadow **LSMS**.

For more information about the Surveillance feature, see Understanding the Surveillance Feature. For more information about Surveillance notifications, see Automatic Monitoring of Events

Disaster Recovery Procedure Overview

Table 7-1 provides an overview comparison of the procedures you should perform and the order in which to perform them, according to the disaster backup strategy you are using. Following sections describe each disaster backup strategy in more detail and list any conditions assumed.

Table 7-1 Comparison of Recovery Procedures to Perform

Recovery Procedure Note: This table is for comparison; for detailed procedures by strategy, see Table 7-2 through Table 7-4.	Active Shadow[a]	Inactive Shadow[a]	No shadow [b]	Restoring Operations to the Main LSMS After Running on Active Shadow[b]	Restoring Operations to the Main LSMS After Running on Inactive Shadow[b]
Repair or replace the LSMS			1	1	1

Table 7-1 (Cont.) Comparison of Recovery Procedures to Perform

Recovery Procedure Note: This table is for comparison; for detailed procedures by strategy, see Table 7-2 through Table 7-4.	Active Shadow[a]	Inactive Shadow[a]	No shadow [b]	Restoring Operations to the Main LSMS After Running on Active Shadow[b]	Restoring Operations to the Main LSMS After Running on Inactive Shadow[b]
Recovery acceptance test	1	1	2	2	2
Contact each **NPAC** from which the **LSMS** needs data to request download files		2	3		3
Contact each **NPAC** from which the **LSMS** needs data to provide it with the **IP** address with which to establish association to the mate **LSMS**		3		3[c]	4
FTP data from **NPAC** and import it into the **LSMS**		4	4[c]	4[c]	5[c]
Start **LSMS GUI**		5	5	5	6
Add locally provisioned data that had been entered since last backup (or not already entered on mate **LSMS**)	2	6	6	*	*
Reconnect network elements	3	7	7	6	7

Table 7-1 (Cont.) Comparison of Recovery Procedures to Perform

Recovery Procedure Note: This table is for comparison; for detailed procedures by strategy, see Table 7-2 through Table 7-4.	Active Shadow[a]	Inactive Shadow[a]	No shadow [b]	Restoring Operations to the Main LSMS After Running on Active Shadow[b]	Restoring Operations to the Main LSMS After Running on Inactive Shadow[b]
If the disaster outage has lasted 7 days or less, perform a time range audit and reconcile to network elements and a full-range audit of **DGTT**, **OGTT**, and **NPA**-Splits (otherwise perform a bulk download to network elements and then reassociate network elements)	4	8	8[c]	7[c]	8[c]
If query servers are installed, stop all directly connected query servers	5	9		8	9
If query servers are installed, configure each directly connected query server to use the **IP** address of the mate **LSMS** for its master host	6	10		9	10

Table 7-1 (Cont.) Comparison of Recovery Procedures to Perform

Recovery Procedure Note: This table is for comparison; for detailed procedures by strategy, see Table 7-2 through Table 7-4.	Active Shadow[a]	Inactive Shadow[a]	No shadow [b]	Restoring Operations to the Main LSMS After Running on Active Shadow[b]	Restoring Operations to the Main LSMS After Running on Inactive Shadow[b]
If query servers are installed, reload each directly connected query server from the mate **LSMS**	7	11	9	10	11
Run on the shadow **LSMS** until main **LSMS** is restored	8	12			
Return operations to restored main **LSMS**	9[d]	13[d]			

[a] Perform these procedures on the shadow **LSMS**.

[b] Perform these procedures on the main **LSMS**.

[c] Perform only as required.

[d] As described in Table 7-5 (and summarized in the rightmost columns of this table).

[*] Backups should always be scheduled immediately before switching from the shadow **LSMS** to the main **LSMS**; no additional data should have been locally provisioned.

Performing Disaster Recovery with an Active Shadow LSMS

In this configuration, an entire **LSMS** is active and has active associations with each **NPAC** from which the **LSMS** needs data. This disaster recovery backup strategy provides the least out-of-service time for the **LSMS**.

In addition to the assumptions listed in "Preparing for a Disaster Situation", the following conditions are assumed:

- Both the main **LSMS** and shadow **LSMS** are associated with each **NPAC** (up to eight) from which the **LSMS** needs data, and both the main **LSMS** and the shadow **LSMS** are receiving automatic updates. Each regional **NPAC** database at both **LSMS** sites is synchronized with the **NPACs**.

- A network connection from each serviced network element to the shadow **LSMS** exists, but the network element is not associated with the shadow **LSMS** at the time the main **LSMS** fails.
- Users, groups, and passwords are identically configured at the main **LSMS** and shadow **LSMS**.
- Any data locally provisioned at the main **LSMS** is also locally provisioned at the shadow **LSMS**.

Perform the procedures shown in Table 7-2 on the shadow **LSMS** when a disaster occurs on the main **LSMS**.

Table 7-2 Recovery Procedures When LSMS Shadow Is Active

Active	In the order shown, perform the following recovery procedures:
1	(Optional) Recovery acceptance test on active server of shadow **LSMS**: **1.** Verifying the State of the Servers **2.** Verifying the Processes Running on the Active Server (with primary server as active server) **3.** Verifying the GUI Operability on the Active Server (with primary server as active server) **Note:** Do not switch over to the shadow **LSMS**’s standby server until all **EMSs** have been resynchronized because all queued subscription data would be immediately flushed.
2	Add any locally provisioned data that may have been added to the main **LSMS** before it failed and has not yet been added to the active shadow.
3	Perform the procedures in “Reconnecting Network Elements” (start with 4 and use the main **LSMS** as the source and the shadow **LSMS** as the destination).
4	For each network element, perform a time-range audit (specify the start time to be one hour before the outage occurred) and a full-range audit of **DGTT**, **OGTT**, and **NPA** Splits. For information about performing audits, refer to “Audit and Optional Reconcile from the **LSMS GUI**” in the *LNP Database Synchronization User's Guide*.

Table 7-2 (Cont.) Recovery Procedures When LSMS Shadow Is Active

Active	In the order shown, perform the following recovery procedures:
5, 6, 7	If any query servers are installed: 1. Stop the directly connected query servers. 2. Configure each directly connected query server to use the shadow **LSMS** as its master host (refer to the procedure described in “MySQL Replication Configuration for Query Servers” in the *Configuration Guide*). 3. For each directly connected query server, perform the procedure in “Reload a Query Server **Database** from the **LSMS**”.
8	Run on the shadow **LSMS** until the main **LSMS** is restored.
9	Returning Operation from Shadow LSMS to Main LSMS.

Performing Disaster Recovery with an Inactive Shadow LSMS

In this disaster recovery strategy, you have a complete **LSMS** system installed at a geographically remote site, but it is not running and does not receive updates from the **NPAC** until you perform the procedures described in this section. This strategy requires a much longer recovery period than having an active shadow requires, but is still much safer than having no shadow. Having no shadow can result in a very long recovery period in serious disaster situations, such as fire or natural disaster.

In addition to the assumptions listed in “Preparing for a Disaster Situation”, the following conditions are assumed:

- At the shadow site, all hardware and software components have already been installed and passed an acceptance test.
- At the main **LSMS**, valid backups exist for all data. These backups are ready to be shipped to the shadow **LSMS**.
- A network connection exists between the shadow **LSMS** and each network element and each **NPAC**. At the time of failure, the shadow **LSMS** is not associated with any of the network elements or **NPACs**.

Perform the procedures shown in Table 7-3 on the shadow **LSMS** when a disaster occurs on the main **LSMS**.

Table 7-3 Recovery Procedures When LSMS Shadow Is Inactive

Inactive	In the order shown, perform the following recovery procedures:
1	Recovery acceptance test on inactive shadow **LSMS**: 1. Verifying the State of the Servers 2. Verifying the Processes Running on the Active Server (with primary server as active server) 3. Verifying the GUI Operability on the Active Server (with primary server as active server) 4. Manually Switching Over from the Active Server to the Standby Server 5. Verifying the Processes Running on the Active Server (with secondary server as active server) 6. Verifying the GUI Operability on the Active Server (with secondary server as active server) 7. Manually Switching Over from the Active Server to the Standby Server
2, 3	Contact each **NPAC** from which the **LSMS** needs data to: • Provide them with the **IP** address with which to establish association to the shadow **LSMS**. • Request which files will be needed to download to the shadow **LSMS**. It is recommended that the request be for all **NPAC** files dated from one hour before the time shown on the backup tape.
4	**FTP** data from the **NPAC** and import it into the **LSMS** (see Downloading Files from an NPAC to the LSMS).
5	Start the **LSMS GUI** (association with each **NPAC** is automatically attempted).
6	At the shadow, add any locally provisioned data that needs to be added. At shadow, manually enter any locally provisioned data that had been entered at the main since the last backup tape was made.
7	Perform the procedures described in "Reconnecting Network Elements".
8	If the disaster outage has lasted for 7 days or less, for each network element, perform a time-range audit (specify the start time to be one hour before the outage occurred) and a full-range audit of **DGTT**, **OGTT**, and **NPA** Splits. For information about performing audits, refer to "Audit and Optional Reconcile from the **LSMS GUI**" in the *LNP Database Synchronization User's Guide*. (If the disaster outage has lasted more than 7 days, perform a complete bulk download from the shadow **LSMS** to each network element. For information about performing bulk downloads to network elements, refer to the *LNP Database Synchronization User's Guide*.)

Table 7-3 (Cont.) Recovery Procedures When LSMS Shadow Is Inactive

Inactive	In the order shown, perform the following recovery procedures:
9, 10,11	If any query servers are installed: 1. Stop the directly connected query servers. 2. Configure each directly connected query server to use the shadow **LSMS** as its master host (refer to the procedure described in "MySQL Replication Configuration for Query Servers" in the *Configuration Guide*. 3. For each directly connected query server, perform the procedure in Reload a Query Server Database from the LSMS.
12	Run on the shadow **LSMS** until the main **LSMS** is restored.
13	After main **LSMS** has been repaired, "Returning Operation from Shadow **LSMS** to Main **LSMS**".

Performing Disaster Recovery without a Shadow LSMS

In this disaster backup strategy, you have no physical backup for the **LSMS**. In a disaster situation, you must restore the main **LSMS**. Having no shadow can result in a very long recovery period in serious disaster situations, such as fire or natural disaster.

In addition to the assumptions listed in "Preparing for a Disaster Situation", the following conditions are assumed for this procedure:

- The main **LSMS** is restored at the same physical site. If another site is used, you must perform site survey and preparation as you do for any initial **LSMS** installation. For more information about installing **LSMS**, refer to *Application B Card Hardware and Installation Guide*.
- A network connection exists between the restored main **LSMS** and each **NPAC** and network element.

Perform the procedures shown in Table 7-4 to restore the main **LSMS** when a disaster occurs.

Table 7-4 Recovery Procedures When No LSMS Shadow Exists

No shadow	In the order shown, perform the following recovery procedures:
1, 2	Contact the #unique_86 to arrange repair or replacement of the **LSMS**. Oracle will dispatch technicians who will perform repairs, return the **LSMS** to operational status, and perform recovery acceptance tests.
3	Contact each **NPAC** from which the **LSMS** needs data to request which files will be needed to download to the shadow **LSMS**. It is recommended that the request be for all **NPAC** files dated from one hour before the time shown on the backup tape.

Table 7-4 (Cont.) Recovery Procedures When No LSMS Shadow Exists

No shadow	In the order shown, perform the following recovery procedures:
4	**FTP** data from **NPAC** and import it into the **LSMS** (see Downloading Files from an NPAC to the LSMS).
5	Start the **LSMS GUI** (association with each **NPAC** is automatically attempted).
6	If any locally provisioned data needs to be added, add it.
7	Perform the procedures in "Reconnecting Network Elements".
8	If the disaster outage has lasted for 7 days or less, for each network element, perform a time-range audit (specify the start time to be one hour before the outage occurred) and a full-range audit of **DGTT**, **OGTT**, and **NPA** Splits. For information about performing audits, refer to "Audit and Optional Reconcile from the **LSMS GUI**" in the *LNP Database Synchronization User's Guide*. (If the disaster outage has lasted more than 7 days, perform a complete bulk download to each network element. For information about performing bulk downloads to network elements, refer to the *LNP Database Synchronization User's Guide*.)
9	If any query servers are installed, for each directly connected query server, perform the procedure in "Reload a Query Server **Database** from the **LSMS**".

Returning Operation from Shadow LSMS to Main LSMS

Use the procedures described in this section to return operations from the shadow **LSMS** to the main **LSMS** after the main **LSMS** has been restored. Do not take the shadow **LSMS** out of service until you have completed this procedure, including the resynchronization of **LNP** data with the **NPAC** and network elements. If any problem occurs during the restoration of operations to the main **LSMS**, you can return to using the shadow **LSMS**.

In addition to the assumptions listed in "Preparing for a Disaster Situation", the following conditions are assumed:

- The main **LSMS** is restored at the same physical site. If another site is used, you must perform site survey and preparation as you do for any initial **LSMS** installation. For more information about installing **LSMS**, refer to *Application B Card Hardware and Installation Guide*.
- A network connection exists between the restored main **LSMS** and each **NPAC** and network element.
- Encryption keys have been exchanged between the **NPAC** and the restored main **LSMS**.
- License keys are valid for the main **LSMS**.
- At the main **LSMS**, valid backups exist for all data.
- At a previously inactive shadow **LSMS**, valid backups exist for all data. A complete backup should be scheduled immediately before the scheduled return to the main

LSMS, so that no locally provisioned data is entered after the switch back to the main **LSMS**.

Perform the procedures shown in Table 7-5 to restore the main **LSMS**.

Table 7-5 Procedures to Return Operations from Shadow LSMS to Main LSMS

Restoring Operations to the Main LSMS After Running on Active Shadow Main LSMS	Restoring Operations to the Main LSMS After Running on Previously Inactive Shadow	In the order shown in the appropriate column, perform the following recovery procedures:
1	1	Contact the #unique_86 to arrange repair or replacement of the **LSMS**. Oracle will dispatch technicians who will perform repairs and return the **LSMS** to operational status.
2	2	Recovery acceptance test or manufacturing acceptance test, depending on the severity of original failure (performed by technicians).
3	3	After the #unique_86 personnel have performed an acceptance test, if desired, customers may wish to perform the following tests to verify that the restored main **LSMS** is fully functional: 1. Verifying the State of the Servers 2. Verifying the Processes Running on the Active Server (with primary server as active server) 3. Verifying the GUI Operability on the Active Server (with primary server as active server) 4. Manually Switching Over from the Active Server to the Standby Server 5. Verifying the Processes Running on the Active Server (with secondary server as active server) 6. Verifying the GUI Operability on the Active Server (with secondary server as active server) 7. Manually Switching Over from the Active Server to the Standby Server

Table 7-5 (Cont.) Procedures to Return Operations from Shadow LSMS to Main LSMS

Restoring Operations to the Main LSMS After Running on Active Shadow Main LSMS	Restoring Operations to the Main LSMS After Running on Previously Inactive Shadow	In the order shown in the appropriate column, perform the following recovery procedures:
3	4	If any **NPAC** data may be updated during the period of time between when you plan to disconnect the shadow **LSMS** and connect with the main **LSMS**, contact each **NPAC** from which the **LSMS** needs data and request download files for that time period.
	5	If returning from a shadow **LSMS** that was previously inactive, contact each **NPAC** from which the **LSMS** needs data to provide them with the **IP** address with which to establish association to the main **LSMS**.
4	6	If any download files were requested from any **NPAC** above, **FTP** the files and import them into the **LSMS** (see Downloading Files from an NPAC to the LSMS).
5	7	Start the **LSMS GUI**.
6	8	Perform the procedures in “Reconnecting Network Elements”, where the source **LSMS** is the shadow **LSMS**, and the destination **LSMS** is the main **LSMS**.
7	9	For each network element, perform a time-range audit (specify the start time to be one hour before the outage occurred) and a full-range audit of **DGTT**, **OGTT**, and **NPA** Splits. For information about performing audits, refer to “Audit and Optional Reconcile from the **LSMS GUI**” in the *LNP Database Synchronization User's Guide*.

Table 7-5 (Cont.) Procedures to Return Operations from Shadow LSMS to Main LSMS

Restoring Operations to the Main LSMS After Running on Active Shadow Main LSMS	Restoring Operations to the Main LSMS After Running on Previously Inactive Shadow	In the order shown in the appropriate column, perform the following recovery procedures:
8, 9, 10	10, 11, 12	If any query servers are installed: 1. Stop the directly connected query servers. 2. Configure each directly connected query server to use the main **LSMS** as its master host (refer to the procedure described in "MySQL Replication Configuration for Query Servers" in the *Configuration Guide*. 3. For each directly connected query server, perform the procedure in "Reload a Query Server **Database** from the **LSMS**".

Resynchronizing After an Outage Between an NPAC and the LSMS

When an outage between the **LSMS** and **NPAC** occurs, the **LSMS** attempts to resynchronize automatically as soon as the association is reestablished. The **NPAC** then resends to the **LSMS** all transactions that were missed by the **LSMS**.

Automatic Resynchronization between the NPAC and the LSMS

Whenever association is reestablished between the **NPAC** and the **LSMS**, the **NPAC** and the **LSMS** automatically resynchronize their databases. The time required for automatic resynchronization between an **NPAC** and the **LSMS** is directly proportional to the number of transactions that need to be sent. If you believe you have a lot of subscription version records, you can choose to perform a manual **NPAC**/**LSMS** recovery, as described in Downloading Files from an NPAC to the LSMS.

If the **NPAC** and the **LSMS** are unable to complete automatic recovery, one of the following notifications will display on the **LSMS** console window, where either `PRIMARY` or `SECONDARY` indicates the **NPAC** for which recovery is underway:

```
[Critical] 2018: 99-07-05 12:55:56 NPAC [<PRIMARY|SECONDARY>]  Recovery
Failed
```

or

```
[Critical] 2019: 99 -07-05 12:55:56 NPAC [<PRIMARY|SECONDARY>]
Recovery Partial Failure
```

If you receive one of these messages, perform the procedure described in Downloading Files from an NPAC to the LSMS using the example for performing a bulk download of files from the **NPAC**.

Reconnecting Network Elements

The following procedures explain how to reconnect the **LSMS** with network element software that manages database updates from the **LSMS**. Reconnecting is required in one of the following situations:

- When you switch from the main **LSMS** to the shadow **LSMS** after a disaster has occurred
- When you switch from the shadow **LSMS** back to the main **LSMS** after the main **LSMS** has been restored
- When you restore an **LSMS** that had no shadow

Perform the procedures described in the following sections. (In these procedures, the “source **LSMS**” is the **LSMS** you switch from and the “destination **LSMS**” is the **LSMS** you switch to.)

1. “Preparing to Reconnect Network Elements”
2. “Reconnecting Network Elements Procedures”

   These procedures will be followed by automatic resynchronization as described in Automatic Resyncronization after Reconnect.

Preparing to Reconnect Network Elements

1. Locate the completed Disaster Recovery Sheet, a current system backup tape, and a current database backup tape.
2. Alert the #unique_86 that you are switching to the destination **LSMS**.

   The #unique_86 will remain online to provide support during this procedure.
3. From the network element, enter the following command to verify that the destination **LSMS** is reachable, where `<LSMS_IP_Address>` is the **IP** address of the **LSMS**:

   ```
   > ping <LSMS_IP_Address>
   ```
4. From the destination **LSMS**, enter the following command to verify that the network element (**NE**) is reachable:

   ```
   # ping <ELAP_IP_Address>
   ```
5. If the destination **LSMS** is not already running, log in as a user in the `lsmsadm` group to the destination **LSMS** and start an **LSMS GUI** session.

   Verify that the destination **LSMS** is in stable condition by checking the following:

   a. Verify that there are no active alarm conditions.

Because the destination **LSMS** is not connected with the **EMS**, there are always error messages regarding the network element queue level alarms and its connection with the **LSMS**. For a destination **LSMS**, these messages are normal. If the Surveillance feature is active, these normal messages will be notifications `LSMS 0004` and `LSMS 8003` or `LSMS 8004`. (For more information, see Automatic Monitoring of Events)

b. Verify that the **NPACs** are connected to the **LSMS** by examining the **NPAC** status area on a graphical user interface; verify that the **NPAC** icon for each supported **NPAC** displays green.

c. Use following method to verify that no **LSMS** hardware failure indications are present:

If the Surveillance feature is active, verify that no hardware failure notifications (`LSMS 4003`, `LSMS 2000`, `LSMS 0001`, `LSMS 4004`, `LSMS 4005`, `LSMS 4006`, `LSMS 4007`, or `LSMS 4009`) have been posted. For more information about these notifications, see Automatic Monitoring of Events

d. Verify that the **LSMS** is not currently in recovery mode with any **NPAC** by ensuring that none of the following **GUI** notifications have been posted for any **NPAC**, where <**PRIMARY|SECONDARY**> indicates whether the **NPAC** to be connected is the primary **NPAC** or the secondary **NPAC**:

```
[Critical]: <Timestamp> 2006: NPAC <PRIMARY|SECONDARY> Bind Timed Out
- Auto retry after 2 min
[Critical]: <Timestamp> 2007: NPAC <PRIMARY|SECONDARY> Connection
Aborted by PEER - Auto retry same host
after 2 min
[Critical]: <Timestamp> 2008: NPAC <PRIMARY|SECONDARY> Connection
Aborted by PEER - Auto retry other host
after 2 min
[Critical]: <Timestamp>: 2009 NPAC <PRIMARY|SECONDARY> Connection
Aborted by Provider - Auto retry same
host after 2 min
[Critical]: <Timestamp> 2010: NPAC <PRIMARY|SECONDARY> Connection
Aborted due to recovery failure - Auto
retry after 2 min
[Critical]: <Timestamp> 2012: NPAC <PRIMARY|SECONDARY> Connection
Attempt Failed : Access Control Failure
[Critical]: <Timestamp> 2014: NPAC <PRIMARY|SECONDARY> Connection
Attempt Failed : Access Denied
[Critical]: <Timestamp> 2015: NPAC <PRIMARY|SECONDARY> Connection
disconnected by NPAC
[Critical]: <Timestamp> 2018: NPAC iiii Recovery Failed
[Critical]: <Timestamp> 2019: NPAC iiii Recovery Partial Failure
[Critical]: <Timestamp> 2020: NPAC iiii Security Violation.
Association aborted
```

Also, if the Surveillance feature is active, verify that none of the following Surveillance notifications have been posted for any **NPAC**, where `xxxxxxx` is the hostname of the server reporting the notification, <**PRIMARY|SECONDARY**> indicates the primary or secondary **NPAC**, <**NPAC**_cust_**ID**> is a numeric indicator for the **NPAC** region, and <**NPAC**_**IP**_address> is the **IP** address of the **NPAC**:

```
LSMS2000|14:58 Jul 22, 1997|xxxxxxx|Notify:Sys Admin - NPAC interface
```

```
failure
LSMS2001|14:58 Jul 22, 1997|xxxxxxx|Notify:Sys Admin - NPAC=
<PRIMARY|SECONDARY> - <NPAC_cust_ID>
LSMS2002|14:58 Jul 22, 1997|xxxxxxx|Notify:Sys Admin - NPAC=
<NPAC_IP_address>
```

If any of these notifications has been posted, verify that the following **GUI** notifications have been posted for the same **NPAC**:

```
[Cleared] 2025: <Timestamp>: NPAC <PRIMARY|SECONDARY> Connection
Successfully established
[Cleared] 8055: <Timestamp>: NPAC <PRIMARY|SECONDARY> Recovery
Complete
```

Continue with the next procedure.

Reconnecting Network Elements Procedures

Perform the following procedure:

1. At the source **LSMS**, log in as `lsmsadm` on the active server.
2. Enter the following command to display the status of all `eagleagent` processes:
   `eagle status`

   Scan the output for the names of all active EAGLE agents, similar to the values shown in **bold** in the following example:

   ```
   CLLI         Pid   State       Resync        Conn A  Conn B  DCM
   EBDA     Debug Queue
   Memory  CPU  Timestamp 1190801
        13622 A_ACTIVE    COMPLETE      ACTIVE  STANDBY NONE
   IDLE      OFF     0 %    71
   M  0.1 % 13:00:40
   ```

3. At the source **LSMS**, for each EAGLE agent process that is running, enter the following command to stop the EAGLE agent processes (`<CLLI>` is the **Common Language Location Identifier** for the **EAGLE** node):

   `$LSMS_DIR/eagle stop <CLLI>`
   For the example shown in step 2, you would enter the following commands:

   `$LSMS_DIR/eagle stop 1190801`

4. At the destination **LSMS**, for each network element serviced by the **LSMS**, do one of the following:

   - In an inactive shadow configuration, create the **EMS** for the given network element (refer to the *Configuration Guide*, “Creating an **EMS** Configuration Component”). When you finish creating the **EMS**, `sentryd` process automatically starts the Eagle agent.
   - In an active shadow configuration, modify the **EMS** for the given network element (refer to the *Configuration Guide*, “Modifying an **EMS** Configuration Component”). Next, stop and restart the Eagle agent for the given **CLLI** using

the following commands, then go to “Automatic Resyncronization after Reconnect”.

```
$LSMS_DIR/eagle stop <CLLI>
```

```
$LSMS_DIR/eagle start <CLLI>
```

Next, the **LSMS** and the network elements will automatically resynchronize as described in “Automatic Resyncronization after Reconnect”.

Automatic Resyncronization after Reconnect

When the **LSMS** and **MPS** are reconnected, the **LSMS** automatically starts an automatic resynchronization of the databases. For more information, see “Automatic Resynchronization Process” in the *LNP Database Synchronization User's Guide*. If the **LSMS** cannot complete automatic resynchronization, it posts a notification to the **LSMS GUI**. For more information, refer to “Notifications that **Database** Maintenance Is Required” in the *LNP Database Synchronization User's Guide*.

If the Surveillance feature is active, the following Surveillance notification is also posted, where `<Host Name>` is the hostname and <**CLLI**> is the 11-character **CLLI** code of the network element:

```
LSMS8001|14:58 Jul 22, 1997|<Host Name>|Notify:Sys Admin - NE CLLI=<CLLI>
```

8

Verifying Recovery

This chapter describes procedures used to verify the status of the **LSMS** after performing recovery procedures.

Introduction

This chapter describes procedures used to verify the status of the **LSMS** after performing recovery procedures.

Verifying that the LSMS Is Fully Functional

Perform the tests in the order shown in Table 8-1 to verify that the **LSMS** is fully functional following file system restoration. If any of these tests fail, contact the #unique_86.

Table 8-1 Recovery Acceptance Tests

	Condition to Verify	Test to Perform
1	One server is in **ACTIVE** state and the other server is in **STANDY** state	Verifying the State of the Servers
2	The appropriate software processes are running on the primary server	Verifying the Processes Running on the Active Server
3	The **GUI** process can be started on the primary server	Verifying the **GUI** Operability on the Active Server
4	Switchover can be performed from the active server to the standby server	Manually Switching Over from the Active Server to the Standby Server
5	The appropriate software processes can be run on the newly active server	Verifying the Processes Running on the Active Server
6	The **GUI** process can be started on the newly active server	Verifying the **GUI** Operability on the Active Server
7	Switchover can be performed from the active server to the standby server	Manually Switching Over from the Active Server to the Standby Server
8	The appropriate software processes can be run on the newly active server	Verifying the Processes Running on the Active Server
9	The **GUI** process can be started on the newly active server	Verifying the **GUI** Operability on the Active Server

Verifying the State of the Servers

Use the **TPD** High Availability (**HA**) utility to verify that one server is in **ACTIVE** state and the other server is in **STANDBY** state. See Determining the Server Status.

Verifying the Processes Running on the Active Server

1. Log in to the active server as `root`.
2. Display the status of all processes that are configured to run on the active server by entering each of the following commands and examining their outputs:

   ```
   # /usr/TKLC/plat/bin/syscheck -v proc run
   # /usr/TKLC/plat/bin/syscheck -v lsmshc proc
   ```

   The following sample output from `syscheck -v proc run` indicates which processes are configured to be running on the active server and that all expected instances of the processes are running:

   ```
   Running modules in class proc...
          run: Checking supman...
          run: Found 1 instance(s) of the supman process.
          run: Checking lsman...
          run: Found 1 instance(s) of the lsman process.
          run: Checking npacagent...
          run: Found 1 instance(s) of the npacagent process.
          run: Checking eagleagent...
          run: Found 2 instance(s) of the eagleagent process.
          run: Checking rmtpmgr...
          run: Found 1 instance(s) of the rmtpmgr process.
          run: Checking rmtpagent...
          run: Found 1 instance(s) of the rmtpagent process.
          run: Checking reportman...
          run: Found 1 instance(s) of the reportman process.
          run: Checking lsmslogd...
          run: Found 1 instance(s) of the lsmslogd process.
          run: Checking sentryd...
          run: Found 1 instance(s) of the sentryd process.
          run: Checking survMon...
          run: Found 1 instance(s) of the survMon process.
          run: Checking smartd...
          run: Found 1 instance(s) of the smartd process.
          run: Checking atd...
          run: Found 1 instance(s) of the atd process.
          run: Checking crond...
          run: Found 1 instance(s) of the crond process.
          run: Checking sshd...
          run: Found 7 instance(s) of the sshd process.
          run: Checking syscheck...
          run: Found 1 instance(s) of the syscheck process.
          run: Checking syslogd...
          run: Found 1 instance(s) of the syslogd process.
   Return string: "OK"
                                    OK
   The log is available at:
     -->/var/TKLC/log/syscheck/fail_log
   ```

If you see **FAILURE** (similar to the following example) for any process except the **GUI** process, contact the #unique_86:

```
run: Only 0 instance(s) of  lsmslogd running. 1 instance(s) required.
```

The following sample output from `syscheck -v lsmshc proc` indicates which processes are configured to be running on the active server and that all expected instances of the processes are running:

```
Running modules in class lsmshc...
      proc: Node active, checking
      proc: Checking supman...
      proc: Found 1 instance(s) of the supman process.
      proc: Checking lsman...
      proc: Found 1 instance(s) of the lsman process.
      proc: Checking npacagent...
      proc: Found 1 instance(s) of the npacagent process.
      proc: Checking eagleagent...
      proc: Found 1 instance(s) of the eagleagent process.
      proc: Checking rmtpmgr...
      proc: Found 1 instance(s) of the rmtpmgr process.
      proc: Checking rmtpagent...
      proc: Found 1 instance(s) of the rmtpagent process.
      proc: Checking reportman...
      proc: Found 1 instance(s) of the reportman process.
      proc: Checking lsmslogd...
      proc: Found 1 instance(s) of the lsmslogd process.
      proc: Checking sentryd...
      proc: Found 1 instance(s) of the sentryd process.
Return string: "OK"
                                 OK
The log is available at:
  -->/var/TKLC/log/syscheck/fail_log
```

Verifying the GUI Operability on the Active Server

Perform the following procedure to verify that the **LSMS** graphical user interface will open:

1. Perform the procedure described in "Logging In to **LSMS** Server Command Line" using the hostname of the active server.
2. Perform the procedure described in Starting an Web-Based LSMS GUI Session, using an **NPAC**-provided Service Provider **ID**.
3. Select **Exit/Logout** from the **User/Session** menu on the **LSMS** Console window.

   The console logout window displays. Click **OK** to complete the logout.

9

Field Replaceable Units

This chapter describes the components of an E5-APP-B card that can be replaced in the field and includes procedures for replacing each type of field replaceable unit (**FRU**).

Introduction

Oracle Communication EAGLE Application B Cards (E5-APP-B) are complete application server platforms and are designed for the high-availability environments required by telephony networks. They are installed in an EAGLE shelf.

Even with the advanced reliability of the E5-APP-B design, hardware failures may still occur. The E5-APP-B card is designed for easy maintenance when replacements are needed.

This chapter highlights the E5-APP-B card components that are field replaceable units (**FRU**) and provides procedures for replacing them.

This chapter explains how to remove a card from the EAGLE. The procedures include the administrative commands required to take a card out of service and place it back into service.

In the event a numbered event message is encountered, refer to the appropriate procedure in the *Unsolicited Alarm and Information Messages Reference*.

Additional information about each command can be found in the EAGLE *Commands User's Guide*.

E5-APP-B Card FRUs and Part Numbers

The following **E5-APP-B** card components can be replaced in the field:

- **E5-APP-B** cards (P/N 870-3096-01 and P/N 870-3096-02)
- Drive modules (P/N 870-3097-01 and P/N 870-3097-02)

Removing and Replacing E5-APP-B Cards

This section gives procedures on removing and replacing the E5-APP-B card and drive modules.

Removing an E5-APP-B Card

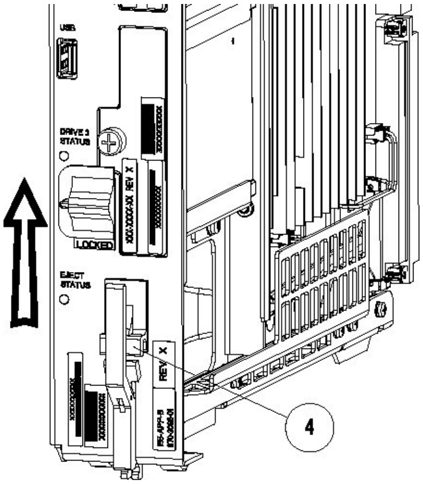
Procedure - Remove E5-APP-B card

> **Note:**
>
> The `shutdown`, `init 6` or `halt` commands will not shut down the E5-APP-B card.

1. On the E5-APP-B card, slide the Ejector switch (4) up to the UNLOCKED position (see Figure 9-1).

   > **Caution:**
   >
   > When the Ejector switch goes from locked to unlocked and the E5-APP-B card is in service, the card will halt.

   Figure 9-1 E5-APP-B Card Eject Hardware Switch, UNLOCKED

2. WAIT for the E5-APP-B Eject Status LED to go from blinking red to a steady red.

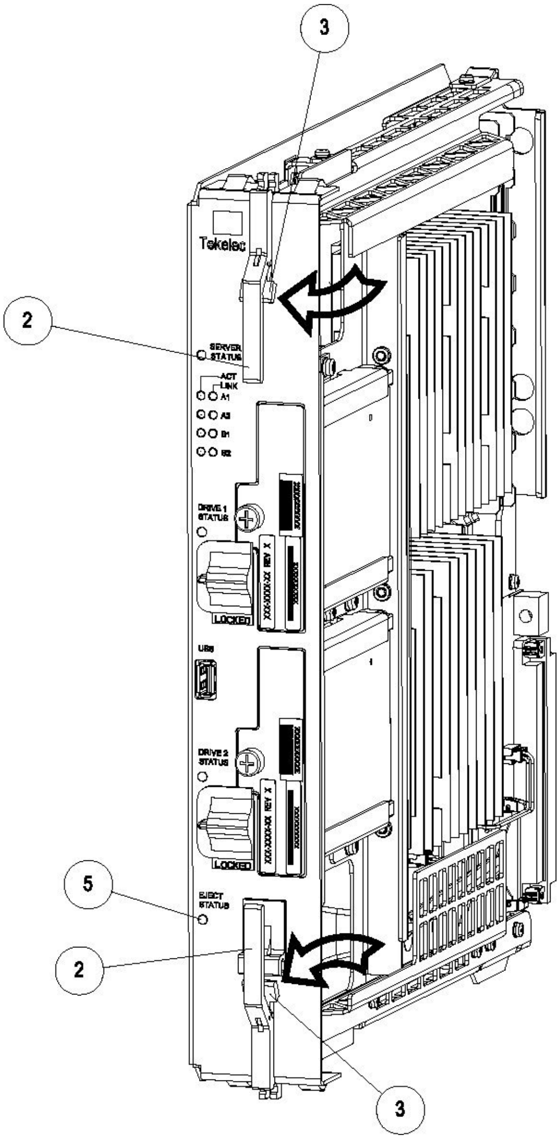
   When the Eject Status LED is steady red, the E5-APP-B card is in shutdown state.

   If the Ejector switch is put into the LOCKED position now, the E5-APP-B card will reboot.

3. Grasp the upper and lower card Inject/Eject (I/E) lever release (3) just underneath the I/E lever, and press it to meet the I/E lever. This is the mechanical interlock for the card.

   See Figure 9-2

Figure 9-2 E5-APP-B Card UNLOCKED



4. While holding the I/E interlock and lever, pull the levers (2) away from the shelf until they are parallel to the floor.
5. Remove the E5-APP-B card from the EAGLE shelf.

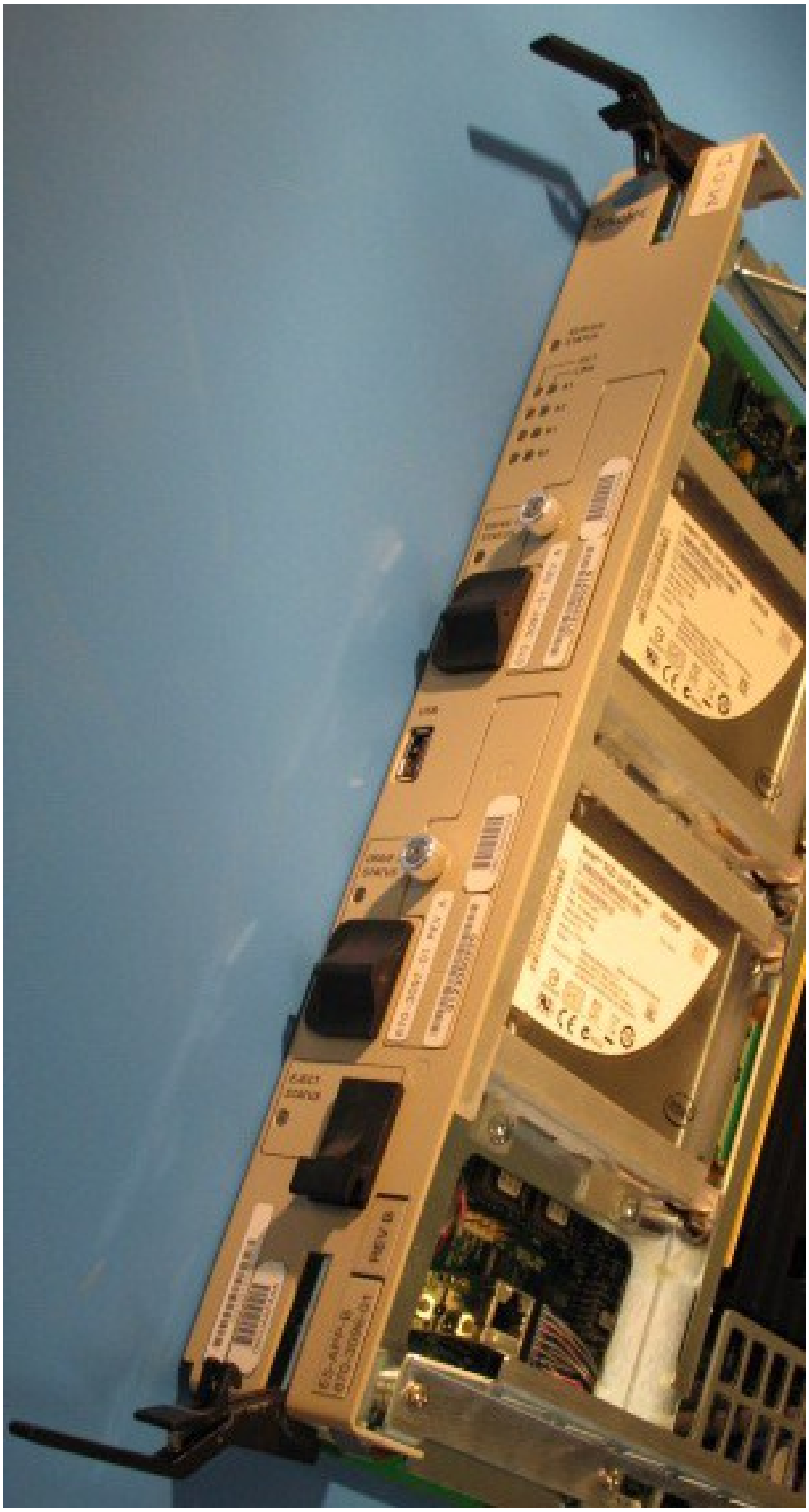
Replacing an E5-APP-B Card

Procedure - Replace E5-APP-B card

1. While holding the I/E interlock and lever, pull the levers (2) away from the card until they are parallel to the floor.

   Figure 9-3 illustrates the angle of the interlocks and levers just before inserting E5-APP-B Card into the EAGLE shelf.

Figure 9-3 E5-APP-B Card UNLOCKED

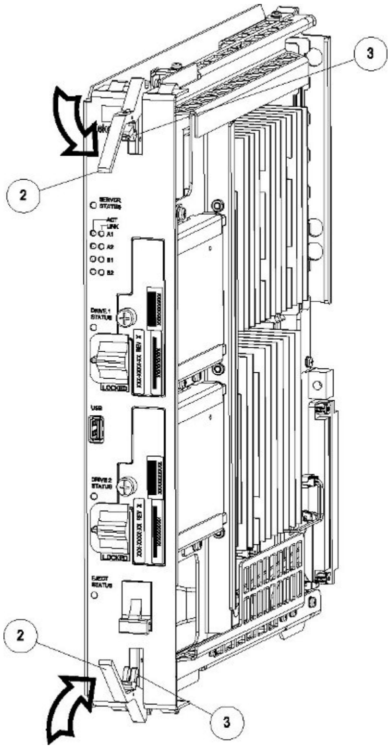


2. Insert the E5-APP-B card into the EAGLE shelf.

   Carefully align the edges of the card with the top and bottom card guides. Then, push the card along the length of the card guides until the rear connectors on the card engage the mating connectors on the target shelf backplane.

3. Push in the top and bottom inject/eject clamps (see Figure 9-4).

Figure 9-4 E5-APP-B Card Inject Levers

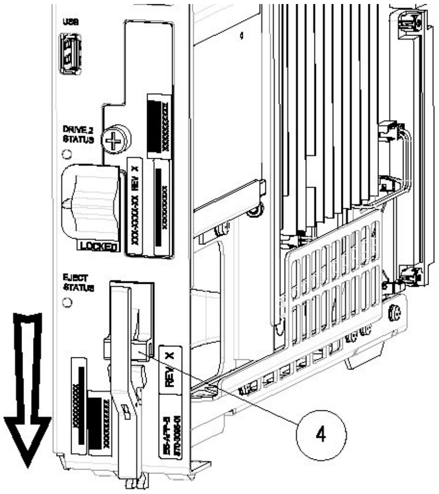


This locks the card in place and ensures a strong connection with the pins on the target shelf backplane.

4. Slide the E5-APP-B Ejector switch (4) down to the LOCKED position (see Figure 9-5).

> **Note:**
>
> When the Ejector switch goes from UNLOCKED to LOCKED, the E5-APP-B Eject Status LED blinks red as the E5-MASP card goes online.

Figure 9-5 E5-APP-B Card Inject Hardware Switch, LOCKED



5. WAIT for the E5-APP-B Eject Status LED to go from blinking red to off.

Removing and Replacing a Drive Module Assembly

E5-APP-B cards are designed for high-availability environments, but even with the advanced reliability of the E5-APP-B card, hardware failures can occur. The E5-APP-B card is designed for easy maintenance when drive module replacement is needed. Since there are two drive modules configured with RAID in an E5-APP-B card, if one becomes corrupt the other drive continues to function. No down time is required to replace a drive module as this procedure can be used on a setup that is up and running.

Procedure - Remove and Replace a Drive Module Assembly

1. Use the `smartd` command to verify the drive module names.

   ```
   # ls /var/TKLC/log/smartd
   lock log.sda log.sdb sda sdb
   ```

   In this example, the drive module names are sda and sdb.

2. Use the `mdstat` command to determine whether a drive module is corrupt:

   ```
    # cat /proc/mdstat
   ```

   - On a healthy system where both drive modules (sda and sdb) are functioning properly, the `mdstat` output will include both drive modules:

     ```
      # cat /proc/mdstat
     Personalities : [raid1]
     md1 : active raid1 sdb2[1] sda2[0]
           262080 blocks super 1.0 [2/2] [UU]

     md2 : active raid1 sda1[0] sdb1[1]
           292631552 blocks super 1.1 [2/2] [UU]
           bitmap: 2/3 pages [8KB], 65536KB chunk
     ```

```
unused devices: <none>
```

- On a system where one of the drive modules is healthy and one is corrupt, only the healthy drive module is displayed:

  ```
   # cat /proc/mdstat
  Personalities : [raid1]
  md1 : active raid1 sdb2[1]
        262080 blocks super 1.0 [2/1] [_U]

  md2 : active raid1 sdb1[1]
        292631552 blocks super 1.1 [2/1] [_U]
        bitmap: 2/3 pages [8KB], 65536KB chunk

  unused devices: <none>
  ```

  In this example, the `mdstat` output shows only sdb, which indicates that sda is corrupt.

3. Log in as root and run the `failDisk` command to mark the appropriate drive module to be replaced.

   ```
   # /usr/TKLC/plat/sbin/failDisk <disk to be removed>
   ```

   For example:

   ```
   # /usr/TKLC/plat/sbin/failDisk /dev/sda
   ```

4. After `failDisk` runs successfully, remove the drive module assembly.

   See Removing a Drive Module Assembly.

5. Insert the new drive module assembly.

   See Replacing a Drive Module Assembly.

Removing a Drive Module Assembly

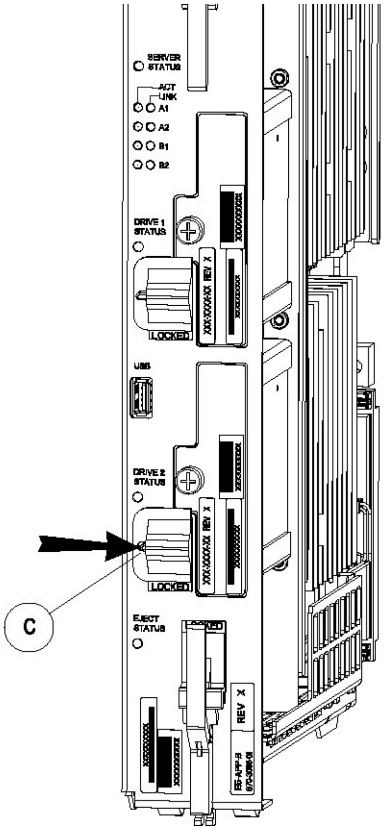
Procedure - Remove Drive Module Assembly

1. Verify that the drive module is locked in position and in use.

   The switch lock release (C) is in the LOCKED position and the Status LED on the E5-APP-B card is OFF.

   Move the switch lock release (C) to the "released" position by pressing in the direction indicated. Refer to Figure 9-6.

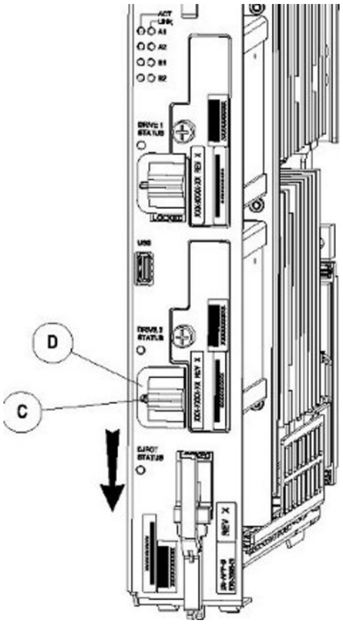
Figure 9-6   Drive Module Released



2. Move drive module locking switch (D) from the LOCKED to the unlocked position and wait for the LED (B) to indicate a steady red state. See Figure 9-7 and Figure 9-8, respectively.

   When drive module locking switch (D) is transitioned from locked to unlocked, the LED will flash red to indicate the drive is unlocked and in process of shutting down.

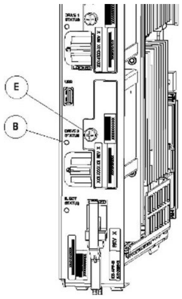
Figure 9-7   Drive Module UNLOCKED



Caution:

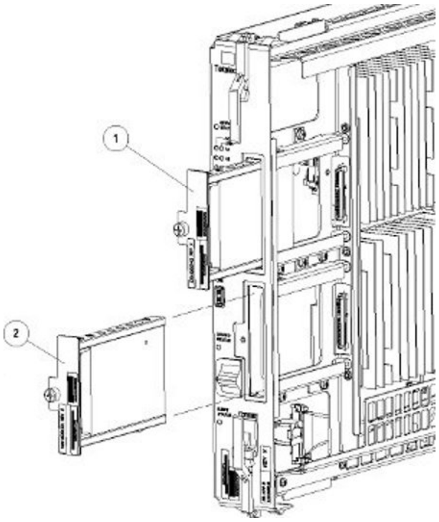
Removal of the drive prior to the LED indicating steady red could result in drive corruption.

Figure 9-8   Drive Module Status



3. When the LED indicates a steady red, the drive module can be safely removed.
4. Loosen the drive module screw (E) (see Figure 9-8).
5. Grasp the screw (E) and pull the drive out slowly until it is free from the card (see Figure 9-9).

Figure 9-9   Drive Module Removal

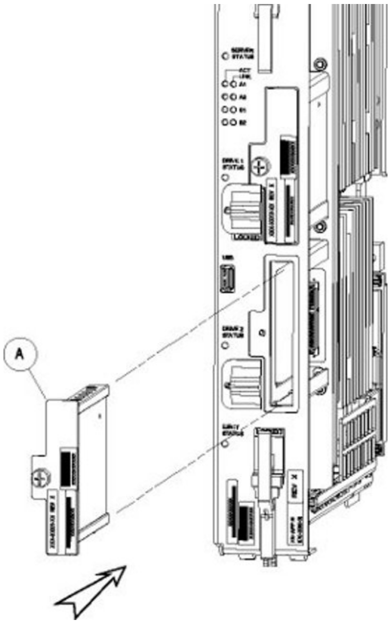


Replacing a Drive Module Assembly

Procedure - Replace Drive Module Assembly

1. Slide a new drive(s) module into the drive slot on the card (see Figure 9-10).

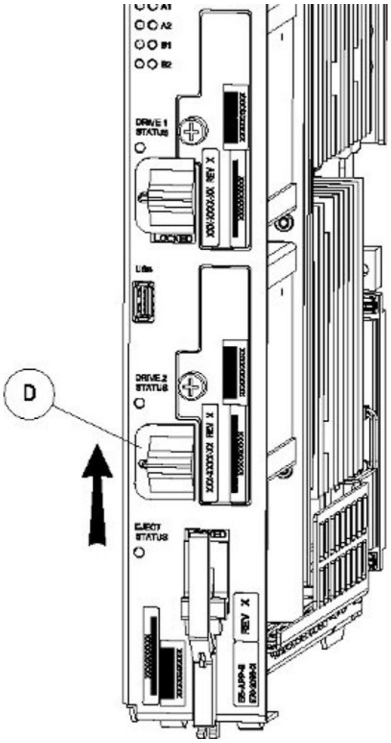
Figure 9-10   Drive Module Replacement



2. Gently push the drive (A) in slowly until it is properly seated.
3. Tighten the mounting screw until the Drive Status LED is in a steady red state ((B), from Figure 9-8).
4. Move the drive module locking switch (D) from the unlocked to the LOCKED position.

When drive module locking switch (D) is transitioned from unlocked to locked, the LED will flash red to indicate the drive is locked and in process of coming online (see Figure 9-11).

Figure 9-11   Drive Module Locked



5. When the LED turns off, log in as admusrroot and run the `cpDiskCfg` command to copy the partition table from the good drive module to the new drive module.

```
$ sudo /usr/TKLC/plat/sbin/cpDiskCfg <source disk> <destination disk>
```

```
# /usr/TKLC/plat/sbin/cpDiskCfg <source disk> <destination disk>
```

   For example:

```
$ sudo /usr/TKLC/plat/sbin/cpDiskCfg /dev/sdb /dev/sda
```

```
# /usr/TKLC/plat/sbin/cpDiskCfg /dev/sdb /dev/sda
```

6. After successfully copying the partition table, use the `mdRepair` command to replicate the data from the good drive module to the new drive module.

```
$ sudo /usr/TKLC/plat/sbin/mdRepair
```

```
# /usr/TKLC/plat/sbin/mdRepair
```

This step takes 45 to 90 minutes and runs in the background without impacting functionality.

Sample output of the command:

```
[admusr@recife-b ~]$ sudo /usr/TKLC/plat/sbin/mdRepair
SCSI device 'sdb' is not currently online
probing for 'sdb' on SCSI 1:0:0:0
giving SCSI subsystem some time to discover newly-found disks
Adding device /dev/sdb1 to md group md1...
md resync in progress, sleeping 30 seconds...
md1 is 0.0% percent done...

This script MUST be allowed to run to completion.  Do not exit.


bgRe-installing master boot loader(s)

Adding device /dev/sdb2 to md group md3...
Adding device /dev/sdb9 to md group md5...
Adding device /dev/sdb7 to md group md4...
Adding device /dev/sdb6 to md group md7...
Adding device /dev/sdb8 to md group md6...
Adding device /dev/sdb3 to md group md2...
Adding device /dev/sdb5 to md group md8...
md resync in progress, sleeping 30 seconds...
md3 is 3.6% percent done...

This script MUST be allowed to run to completion.  Do not exit.


md resync in progress, sleeping 30 seconds...
md5 is 27.8% percent done...

This script MUST be allowed to run to completion.  Do not exit.

md resync in progress, sleeping 30 seconds...
md4 is 8.9% percent done...

This script MUST be allowed to run to completion.  Do not exit.

md resync in progress, sleeping 30 seconds...
md4 is 62.5% percent done...

This script MUST be allowed to run to completion.  Do not exit.

md resync in progress, sleeping 30 seconds...
md7 is 14.7% percent done...

This script MUST be allowed to run to completion.  Do not exit.

md resync in progress, sleeping 30 seconds...
md7 is 68.3% percent done...

This script MUST be allowed to run to completion.  Do not exit.
```

```
md resync in progress, sleeping 30 seconds...
md8 is 0.3% percent done...

This script MUST be allowed to run to completion.  Do not exit.

md resync in progress, sleeping 30 seconds...
md8 is 1.1% percent done...

This script MUST be allowed to run to completion.  Do not exit.

md resync in progress, sleeping 30 seconds...
md8 is 2.0% percent done...
```

7. Use the `cat /proc/mdstat` command to confirm whether RAID repairs are successful.

   After the RAID is repaired successfully, output showing both drive modules is displayed:

```
Personalities : [raid1]
md1 : active raid1 sdb2[1] sda2[0]
      262080 blocks super 1.0 [2/2] [UU]

md2 : active raid1 sda1[0] sdb1[1]
      468447232 blocks super 1.1 [2/2] [UU]
      bitmap: 1/4 pages [4KB], 65536KB chunk

unused devices: <none>
```

```
Personalities : [raid1]
md2 : active raid1 sda2[0] sdb2[1]
      26198016 blocks super 1.1 [2/2] [UU]
      bitmap: 1/1 pages [4KB], 65536KB chunk

md1 : active raid1 sda3[0] sdb3[1]
      262080 blocks super 1.0 [2/2] [UU]

md3 : active raid1 sdb1[1] sda1[0]
      442224640 blocks super 1.1 [2/2] [UU]
      bitmap: 1/4 pages [4KB], 65536KB chunk

unused devices: <none>
```

   Output of `cat /proc/mdstat` prior to re-mirroring:

```
[admusr@recife-b ~]$ sudo cat /proc/mdstat
Personalities : [raid1]
md1 : active raid1 sda1[0]
      264960 blocks [2/1] [U_]

md3 : active raid1 sda2[0]
      2048192 blocks [2/1] [U_]

md8 : active raid1 sda5[0]
      270389888 blocks [2/1] [U_]
```

```
md7 : active raid1 sda6[0]
      4192832 blocks [2/1] [U_]

md4 : active raid1 sda7[0]
      4192832 blocks [2/1] [U_]

md6 : active raid1 sda8[0]
      1052160 blocks [2/1] [U_]

md5 : active raid1 sda9[0]
      1052160 blocks [2/1] [U_]

md2 : active raid1 sda3[0]
      1052160 blocks [2/1] [U_]

unused devices: <none>
```

Output of `cat /proc/mdstat` during re-mirroring process:

```
[admusr@recife-b ~]$ sudo cat /proc/mdstat
Personalities : [raid1]
md1 : active raid1 sdb1[1] sda1[0]
      264960 blocks [2/2] [UU]

md3 : active raid1 sdb2[1] sda2[0]
      2048192 blocks [2/2] [UU]

md8 : active raid1 sdb5[2] sda5[0]
      270389888 blocks [2/1] [U_]
      [=====>...............]  recovery = 26.9%
(72955264/270389888) finish=43.8min speed=75000K/sec

md7 : active raid1 sdb6[1] sda6[0]
      4192832 blocks [2/2] [UU]

md4 : active raid1 sdb7[1] sda7[0]
      4192832 blocks [2/2] [UU]

md6 : active raid1 sdb8[1] sda8[0]
      1052160 blocks [2/2] [UU]

md5 : active raid1 sdb9[1] sda9[0]
      1052160 blocks [2/2] [UU]

md2 : active raid1 sdb3[2] sda3[0]
      1052160 blocks [2/1] [U_]
      resync=DELAYED
```

Output of `cat /proc/mdstat` upon successful completion of re-mirror:

```
[admusr@recife-b ~]$ sudo cat /proc/mdstat
Personalities : [raid1]
```

```
md1 : active raid1 sdb1[1] sda1[0]
      264960 blocks [2/2] [UU]

md3 : active raid1 sdb2[1] sda2[0]
      2048192 blocks [2/2] [UU]

md8 : active raid1 sdb5[1] sda5[0]
      270389888 blocks [2/2] [UU]

md7 : active raid1 sdb6[1] sda6[0]
      4192832 blocks [2/2] [UU]

md4 : active raid1 sdb7[1] sda7[0]
      4192832 blocks [2/2] [UU]

md6 : active raid1 sdb8[1] sda8[0]
      1052160 blocks [2/2] [UU]

md5 : active raid1 sdb9[1] sda9[0]
      1052160 blocks [2/2] [UU]

md2 : active raid1 sdb3[1] sda3[0]
      1052160 blocks [2/2] [UU]

unused devices: <none>
```

A Commands

This appendix shows you the syntax and usage of **LSMS** commands

Introduction

You access most **LSMS** database administration and configuration functions through the **LSMS** graphical user interface (**GUI**). For more information about using the **GUI** for these functions, refer to *Database Administrator's Guide*, *LNP Database Synchronization User's Guide*, and *Configuration Guide*.

In addition, you can use commands to manage some **LSMS** functions. This appendix shows you the syntax and usage of **LSMS** and third-party application commands, entered at a command-line prompt, that control **LSMS** or third-party applications.

Overview of LSMS Application Commands Entered at the Command-Line Prompt

Table A-1 summarizes the **LSMS** application and third-party application commands that are entered at the command-line prompt. These commands are described in this appendix. For information about the notation used in the command descriptions, see Entering LSMS and Third-Party Application Commands.

Table A-1 LSMS Application Functions and Third-Party Commands Available at the command-line Prompt

Function	Command
Display, add, or delete remote locations and scheduled transfers	autoxfercfg
Select the last change time for the specified region	chglct
Verify that **EMS** Routing is set up properly	chkfilter
Control an `eagleagent` process	eagle
Import data from **NPAC** files into **LSMS** databases	import
Load, delete, or display keys for **NPAC** associations	keyutil
Control a regional `npacagent`	lsms
Obtain information about a database	lsmsdb
Start, stop, or show status of the **SNMP** Agent process	lsmsSNMP
Control the Surveillance process	lsmssurv
Perform mass update of **SPID** for **LRN**, **NPA-NXX**, and **NPA-NXX**-X	massupdate
Print measurement pegs to the display	measdump
Create or remove a regional **NPAC** database	npac_db_setup
Import specific files into a regional database	npacimport

Table A-1 (Cont.) LSMS Application Functions and Third-Party Commands Available at the command-line Prompt

Function	Command
Generate a report about one or more databases	report
Create or remove the resynchronization database	resync_db_setup
Control the Service Assurance agent	SAagent
Associate usernames with **SPIDs**	spidsec
Control the Local Services Manager and the Local Data Manager processes	sup
Create or remove the Supported database	sup_db_setup
Use to send a customer-defined notification	survNotify
Detect, diagnose, or display a summary of the overall health of the **LSMS**	syscheck

Entering LSMS and Third-Party Application Commands

This appendix describes **LSMS** and certain third-party application commands used to manage the **LSMS**. Third-party commands identify their software source. All other commands in this appendix are **LSMS** commands.

All commands in this appendix are case-sensitive and are entered at the command-line prompt. After entering a command, you must press the Enter key. When the command has executed, you can enter another command.

Notation

This appendix uses the following syntax notational conventions for commands entered at the command-line prompt:

- *Keywords* - identify the principal action to be performed by the system.
- *Permission* - identifies the group to which the user must belong to execute the command, or for certain commands, whether the user must be logged in with a particular user name. The possible groups are `lsms` as primary group, or secondary groups `lsmsadm`, `lsmsuser`, `lsmsuext`,`lsmsview`, and `lsmsall` (all users defined to be a member of one of these secondary groups should have `lsms` defined as their primary group). For more information about primary and secondary group definitions, see Managing User Accounts.
- *Restrictions* - note restrictions or limitations applying to the use of the command.
- *Syntax* - identifies the command's keywords, options (if any), parameters, and their proper order. In syntax, the following symbols are used:
  - <xxx> indicates a variable
  - [xxx] indicates a parameter or option that is optional
  - {xxx|yyy} indicates a mandatory parameter; you must specify one of the values shown (in this case xxx or yyy)
- *Options* - tell the operating system how to perform a command. Options are also known as switches.

- *Parameters* - further define the command’s operation.
- *Sample Output* - is an example of typical output produced by the command.
- *Environment* - identifies any special environment variables or condition that must exist on the system for the process to execute. All commands use only default environment variables, with the exception of `start_mgui`, which requires setting the $**DISPLAY** environment variable.
- *Response Notes* - identifies any pertinent command performance information.
- *Related Commands* - identifies other commands or programs related to this command.
- *Files* - identifies, describes, and provides the location of the configuration files required for proper execution of this command.

Command Example

The following is an example of an **LSMS** command entry:

```
$ $LSMS_DIR/resync_db_setup create
```

The environment variable is `$LSMS_DIR`, the directory containing the **LSMS** software. It is followed by the keyword `resync_db_setup` (command for creating or removing the resynchronization database). A single parameter is given for this command, `create` (indicates the resynchronization database is to be created). This command has no options.

autoxfercfg

Automatic File Transfers

Displays, adds, and deletes remote locations and scheduled transfers.

Keyword

```
autoxfercfg
```

Permission

The user must be defined as a member of the secondary group `lsmsadm`.

Syntax

```
$LSMS_DIR/autoxfercfg [-h]
```

Options

None.

Parameters

None.

Sample Output

```
Select one of the following menu options:
1) Display valid remote locations
2) Add new remote location
```

```
3) Remove remote location
4) Display all scheduled transfers
5) Add new scheduled transfer
6) Remove scheduled transfer
7) Exit
```

For more information about using this menu, see one of the following:

- “Displaying Remote Locations Used for Automatic File Transfers”
- “Adding a New Remote Location for Automatic File Transfers”
- “Deleting a Remote Location for Automatic File Transfers”
- “Displaying Previously Scheduled Automatic File Transfers”
- “Scheduling an Automatic File Transfer”
- “Removing a Scheduled Automatic File Transfer”

> **Caution:**
>
> The `.netrc` file (see “Files”) contains the `ftp` account login information and is readable by root.

Possible Errors

Table A-2 Error Messages: autoxfercfg

Exit Code	Message	Cause	Suggested Recovery
1	`Feature not enabled`	The Automatic File Transfer feature is not installed.	Contact Oracle to schedule installation and activation of the feature.
2	`Only user 'lsmsadm' can run this program`	The user that tried to run this program was not the user `lsmsadm`.	Change user to `lsmsadm`.
3	`Configuration utility already running`	The `autoxfercfg` command has already been entered, but not yet exited.	No action necessary.
4	`Unable to open <`*`home`*`>/.netrc (where <`*`home`*`> is the home directory of the user)`	The file permissions for `$HOME/.netrc` are not set correctly.	Change permissions on the `$HOME/.netrc` file.

Files

The following files associated with the `autoxfercfg` command.

Table A-3 Files: autoxfercfg

Filename	Type	Location
`.netrc`	Autologin resource file for `ftp`	`$HOME`
`crontab`	List of scheduled cron jobs	`$HOME`
`autoxfer.cfg`	Configuration file	`/usr/TKLC/lsms/config`

chglct

Change Last Change Time

Manually sets the Last Change Time (**LCT**) for the database belonging to the specified region.

In each regional database, the **LSMS** updates the **LCT** when the **LSMS** receives transactions from that **NPAC**. When the **LSMS** automatically recovers from a temporary loss of association with an **NPAC**, it uses the **LCT** to determine the time range for which to request that the **NPAC** resend transactions.

Use this command to manually set the **LCT** when performing a bulk download of files from the **NPAC** (see "**NPAC-LSMS** Download Procedure", 32

Keyword

`chglct`

Permission

The user must be logged in with the user name `lsmsadm`.

Syntax

```
$LSMS_TOOLS_DIR/chglct -h -r <region> [-d|-s <YYYYMMDDhhmmss>]
```

Options

`-h`
Displays help information

`-r` *<region>*
Display or set the **LCT** in Greenwich Mean Time (**GMT**) for the region specified by <*region*>. Possible values for <*region*> are:

```
Canada
Midwest
MidAtlantic
Southeast
Southwest
Northeast
Western
WestCoast
```

`-d`
Display the current value of the **LCT** (in **GMT**) value for the specified region. The value has 14 characters in the form **YYYYMMDDhhmmss** which has the format shown in Table A-4.

`-s <YYYYMMDDhhmmss>`
Set the value of the last change timestamp (in **GMT**) value for the specified region to the value indicated by the specified character string, which has 14 characters in the form **YYYYMMDDhhmmss**.

Table A-4 Time Value for `chglct`

Characters	Meaning	Range
YYYY	Year	Any four digits
MM	Month	01–12
DD	Day	01–31
hh	Hour	00–23
mm	Minute	00–59
ss	Second	00–59

Sample Output

```
Display the last changed timestamp for the Midwest region

$ chglct -d -r Midwest


Midwest last changed timestamp: 20011107113017
Local Time: 11/7/2001 6:30:17
GMT Time: 11/7/2001 11:30:17
```

$

Related Commands

None.

Response Notes

None.

Possible Errors

Table A-5 Error Messages: chglct

Exit Code	Error Message	Cause	Suggested Recovery
-1	`Syntax error`	User entered command with incorrect syntax.	Try the command again with correct syntax.
1	`DbError`	**Database** exception.	Contact the #unique_86.
2	`InvalidUser`	A user with a username other than `lsmsadm` attempted to run this command.	Log in as `lsmsadm` and try the command again.
3	`UnknownError`	Contact Oracle.	Contact the #unique_86.

Files

None.

chkfilter

Check EMS Routing Filters

Run this command to verify that **EMS** Routing is set up properly. This command reviews all the telephone number (**TN**) and number pool block (**NPB**) transactions that were received from **NPACs** in the past 24 hours and determines whether any of these **TNs** and **NPBs** were not forwarded to any **EAGLE** node. If any are found, a file `$LSMS_DIR/../logs/trace/LsmsSubNotFwd.log.<MMDD>` (where `<MMDD>` indicates the month and day the `chkfilter` command was run) is created and those **TNs** and **NPBs** are stored in this file.

Keyword

```
chkfilter
```

Permission

The user must be logged in with the user name `lsmsadm`.

Syntax

```
$LSMS_TOOLS_DIR/chkfilter
```

Options

None.

Sample Output

```
$ chkfilter
$
```

Related Commands

None.

Files

Table A-6 Files: chkfilter

Filename	Type	Location
`LsmsSubNotFwd.log.<MMDD>`		`$LSMS_DIR/../logs/trace/`

Response Notes

None.

Possible Errors

Table A-7 Error Messages: chkfilter

Exit Code	Error Message	Cause	Suggested Recovery
-1	`Syntax error`	User entered command with incorrect syntax.	Try the command again with correct syntax.
1	`DbError`	**Database** exception.	Contact the #unique_86.
2	`InvalidUser`	A user with a username other than `lsmsadm` attempted to run this command.	Log in as `lsmsadm` and try the command again.
3	`EnvNotSet`	The **LSMS**_DIR env variable is not set.	Verify the environment variables.
4	`FileError`	Unable to open output file, check directory and permission	Contact the #unique_86.
5	`UnknownError`	Not known.	Contact the #unique_86.

eagle

EAGLE Agent Control

Used to start, stop, or display status of an `eagleagent` process.

Keyword

`eagle`

Permission

The user must be logged in with the user name `lsmsadm`.

Syntax

```
$LSMS_DIR/eagle <Action> <CLLI>
```

Options

None.

Parameters

`Action`
The function to be performed on the `eagleagent` process. This mandatory parameter has the following values:

```
start
stop
status
```

`<CLLI>`
Common Language Location Identifier for the network element associated with this `eagleagent` process. This parameter is required when `Action` is `start` or `stop`. When `Action` is `status`, this parameter is optional; if not specified, the status for all `eagleagent` processes is displayed.

Sample Output

# Stop the EAGLE Agent for the network element whose **CLLI** is **STPM1**

```
$ $LSMS_DIR/eagle stop STPM1


eagle: Stopping...
eagle: eagleagent STPM1 stopped at Thu Mar  7 17:21:05 2002
```

# Verify that EAGLE Agent has stopped

```
$ $LSMS_DIR/eagle status STPM1


eagle: eagleagent STPM1 is not running.
```

# Restart the EAGLE Agent for the network element whose **CLLI** is **STPM1**

```
$ $LSMS_DIR/eagle start STPM1


eagle: Starting...
eagle: eagleagent STPM1 started at Thu Mar  7 17:17:36 2002
```

# Check the status of the EAGLE Agent for the network element whose **CLLI** is **STPM1**

```
$ $LSMS_DIR/eagle status STPM1


eagleagent:
                CLLI = STPM1
                 Pid = 72
               State = NONE_ACTIVE
              Resync = NO_CONNECTION
        Connection A = DOWN
        Connection B = DOWN
      DCM connection = NONE
                EBDA = IDLE
       Debug logging = OFF
       Pending queue = 0 of 2000000 bytes (0%)
 Keepalive timestamp = Thu Mar  7 17:19:02 EST 2002
      Virtual memory = 14392 K bytes
           CPU usage = 1.1 %
```

# Check the status of all EAGLE Agents

```
$ $LSMS_DIR/eagle status


CLLI        Pid   State       Resync        Conn A  Conn B  DCM
EBDA    Debug Queue  Memory  CPU  Timestamp
STPM0       ---   not running
STPM1       72    NONE_ACTIVE NO_CONNECTION DOWN    DOWN    NONE
IDLE     OFF    0 %   14 M  0.4 % 17:19:25
STPM2       449   B_ACTIVE    IN_PROGRESS   DOWN    ACTIVE  NONE
RUNNING  OFF    0 %   12 M  1.0 % 17:19:23
STPO3       20179 A_ACTIVE    COMPLETE      ACTIVE  STANDBY OK
IDLE     OFF    0 %   14 M  0.3 % 17:19:27
```

Related Commands

None.

Response Notes

None.

Files

None.

Possible Errors

Table A-8 Exit Codes: eagle

Exit Code	Cause	Suggested Recovery
1	Incorrect syntax.	Correct the syntax.
2	Invalid command for current state.	No action necessary.
3	Error in environment.	Verify the environment variables.
4	Unable to create socket.	Contact the #unique_86.
5	Unable to bind socket.	Contact the #unique_86.
6	Fatal application error.	Contact the #unique_86.
7	Operation failed.	Contact the #unique_86.
This command is usually run by scripts; scripts should search for exit codes. When the command is run from the command line, the output indicates suggested recovery.		

hastatus

Display LSMS HA Status

Allows user to display the High Availability status of the server on which the command is run.

Keyword

```
hastatus
```

Permission

The user can be logged in as any user.

Syntax

```
/usr/TKLC/plat/bin/hastatus
```

Required Flags

None.

Sample Output

```
$ hastatus


ACTIVE
```

Related Commands

None.

Response Notes

None.

Possible Errors

Table A-9 Error Messages: hastatus

Exit Code	Error Message	Cause	Suggested Recovery
0	Success	n/a	n/a
1	Failure	Varies	Contact the #unique_86
2	Query No Match	Querying the status of a component, based on a condition, did not result in a match. Following are the most common causes, which are dependent upon the particular query.	
		• If the query was returned while querying for keepalive status, keepalive may be unconfigured or misconfigured	• Customer or field engineers should: – Verify network configuration and network cabling – Verify serial configuration and cabling if serial keepalive is configured – If the problem persists, Contact the #unique_86
		• If the query was returned while querying for ping status, there may be a network problem	• Customer or field engineers should: – Verify the network configuration and connection, especially the uplink to the customer's network – Check keepalive status – If the problem persists, Contact the #unique_86

Table A-9 (Cont.) Error Messages: hastatus

Exit Code	Error Message	Cause	Suggested Recovery
		• If the query was returned while querying for node status, there may be a problem with keepalive	• Customer or field engineers should: – Check keepalive status – If the problem persists, Contact the #unique_86
		• All others	• Contact the #unique_86
6	UnknownError	Not known	Contact the #unique_86

import

Upload to MySQL Database

Imports data from **NPAC** files into **LSMS** databases. This command performs all parameter checking, and validates or creates the **NPAC** directory if required.

> **Note:**
>
> Do not run the `import` command while any of the following processes are also running: backups, starting a standby node (to change its state from **UNINITIALIZED** "**INHIBITED**" to **STANDBY**), running the `lsmsdb quickaudit` command, and creating query server snapshots, all of which use temporary storage space. If you try to run the `import` command while any of these processes are running, you may not have enough disk space to complete the process. Since backups can be run automatically, perform the procedure described in "Checking for Running Backups" to ensure that no backups are running.

Keyword

```
import
```

Permission

The user must be defined as a member of the primary group `lsms`.

Syntax

```
$LSMS_DIR/import [-c] [-o [-d <dir>]] <region> [<filename>...]
```

Provided the `import` command is prefaced by the `$LSMS_DIR` environment variable, it can be performed from any directory location.

Options

`-c`
If an error occurs, continue with the next record in the file. Errors are recorded in a file named <filename>_FAILED, where <filename> has the same value as was entered in the command.

`-o`
Generate a Response file for **SV** and **NPB** imports.

`-d <dir>`
Put the Response file(s) in the specified directory (defaults to the same directory as each **SV**/**NPB** import file).

Parameters

`<region>`
Name of the **NPAC** region: Midwest, MidAtlantic, Northeast, Southeast, Southwest, Western, WestCoast, Canada. This is a required parameter.

`<filename>`
The name of the **NPAC** downloadfile in `npacftp/<region>`. This is an optional parameter. If you do not specify a `<filename>`, a list displays that includes all the valid import files from the `npacftp/<region>` directory for the **NPAC** region specified (the region is a required parameter).

> **Note:**
>
> Filenames must adhere to the following formats:
>
> ```
> LRN.<create>.<start>.<end> NPANXX.<create>.<start>.<end>
> NPANXXX.<create>.<start>.<end>
> SPID.<create>                        <npanxx>-
> <npanxx>.<create>.<start>.<end>
> <npanxxx>-<npanxxx>.<create>.<start>.<end>
> ```
>
> Where:
> `<create>` is the file creation timestamp: `<DD-MM-YYYYhhmmss>`
>
> `<start>` is the start of the time-range: `<DD-MM-YYYYhhmmss>`
>
> `<end>` is the end of the time-range: `<DD-MM-YYYYhhmmss>`

> **Note:**
>
> For Active (not time-range) files,
>
> ```
> <start> is 00-00-0000000000 and             <end> is
> 99-99-9999999999
> ```

> **Note:**
>
> **SPID** files are always Active.

> **Note:**
>
> Active files with filenames in the old format, with only a creation timestamp, are still supported.

Example 1:

`<npanxx>-<npanxx>.<create>.<start>.<end>:`

```
303123-303125.02-11-1998133022.12-10-1998080000.13-10-1998133022
```

Example 2:

`LRN.<create>.<start>.<end> [Active (not time-range) file]:`

```
LRN.02-10-2001102201.00-00-0000000000.99-99-9999999999
```

Sample Output

```
NPAC FTP directory: /var/TKLC/lsms/free/data/npacftp/Midwest
The following NPAC download file(s) are available for import:
            LRN.11-07-2001145342            NPANXX.11-07-2001145342
        NPANXXX.11-07-2001145342              SPID.11-07-2001145342
  000000-999999.11-07-2001145342      0000000-9999999.11-07-2001145342
Import LRN.11-07-2001145342 (Yes/No/All/Quit)?all
The following NPAC download files have been chosen to be imported:
           SPID.11-07-2001145342           NPANXXX.11-07-2001145342
         NPANXX.11-07-2001145342               LRN.11-07-2001145342
  000000-999999.11-07-2001145342   0000000-9999999.11-07-2001145342
Do you want to continue (Yes/No)?yes
Beginning Delete Process for SPID.11-07-2001145342
Delete Process Completed for SPID.11-07-2001145342
Beginning Download Process for SPID.11-07-2001145342
1000 ServiceProvNetwork instance updates in MidwestDB
2000 ServiceProvNetwork instance updates in MidwestDB
2351 ServiceProvNetwork instance updates in MidwestDB
Import completed successfully.
Download Process Completed for SPID.11-07-2001145342
Beginning Delete Process for NPANXXX.11-07-2001145342
Delete Process Completed for NPANXXX.11-07-2001145342
Beginning Download Process for NPANXXX.11-07-2001145342
1000 ServiceProvNPA_NXX_X instance updates in MidwestDB
2000 ServiceProvNPA_NXX_X instance updates in MidwestDB
3000 ServiceProvNPA_NXX_X instance updates in MidwestDB
```

```
4000 ServiceProvNPA_NXX_X instance updates in MidwestDB
30000 ServiceProvNPA_NXX_X instance updates in MidwestDB
30860 ServiceProvNPA_NXX_X instance updates in MidwestDB
Import completed successfully.
Download Process Completed for NPANXXX.11-07-2001145342
Beginning Delete Process for NPANXX.11-07-2001145342
Delete Process Completed for NPANXX.11-07-2001145342
Beginning Download Process for NPANXX.11-07-2001145342
90 ServiceProvNPA_NXX instance updates in MidwestDB
1090 ServiceProvNPA_NXX instance updates in MidwestDB
Import completed successfully.
Download Process Completed for NPANXX.11-07-2001145342
Beginning Delete Process for LRN.11-07-2001145342
Delete Process Completed for LRN.11-07-2001145342
Beginning Download Process for LRN.11-07-2001145342
1000 ServiceProvLRN instance updates in MidwestDB
2000 ServiceProvLRN instance updates in MidwestDB
3000 ServiceProvLRN instance updates in MidwestDB
4000 ServiceProvLRN instance updates in MidwestDB
4700 ServiceProvLRN instance updates in MidwestDB
5700 ServiceProvLRN instance updates in MidwestDB
Import completed successfully.
Download Process Completed for LRN.11-07-2001145342
Beginning Delete Process for 000000-999999.11-07-2001145342
All Subscription Version instances deleted from Midwest
Delete Process Completed for 000000-999999.11-07-2001145342
Beginning Download Process for 000000-999999.11-07-2001145342
1000 SubscriptionVersion instance updates in MidwestDB
2000 SubscriptionVersion instance updates in MidwestDB
3000 SubscriptionVersion instance updates in MidwestDB
4000 SubscriptionVersion instance updates in MidwestDB
4500 SubscriptionVersion instance updates in MidwestDB
Import completed successfully.
Download Process Completed for 000000-999999.11-07-2001145342
Beginning Delete Process for 0000000-9999999.11-07-2001145342
All Subscription Version instances deleted from Midwest
Delete Process Completed for 0000000-9999999.11-07-2001145342
Beginning Download Process for 0000000-9999999.11-07-2001145342
1000 NumberPoolBlock instance updates in MidwestDB
2000 NumberPoolBlock instance updates in MidwestDB
Import completed successfully.
Download Process Completed for 0000000-9999999.11-07-2001145342
Script completed.
```

Files

Table A-11 shows the files for the `import` command.

Table A-10 Files: import

Filename	Type	Location
`<filename>`	Download file	`/var/TKLC/lsms/free/data/npacftp/<region>`

Table A-10 (Cont.) Files: import

Filename	Type	Location
`<filename>`_FAILED	Error file, created if errors occur during import. If the -c option was not specified, the file will contain at most one entry.	`/var/TKLC/lsms/free/data/npacftp/<region>`
`<filename>`-<*spid*>	Response file	`/var/TKLC/lsms/free/data/npacftp/<region>`

Error Messages

Table A-11 Error Messages: import

Exit Code	Message	Cause	Suggested Recovery
7	• Delete process failed for `BulkLoadFile : retCode` • Delete process failed for `BulkLoadFile : delete coredump from signal SigValue`	Delete utility failed	Contact the #unique_86.
8	• Download process failed for `BulkLoadFile : retCode` • Download process failed for `BulkLoadFile : dnld coredump from signal SigValue`	**DNLD** utility failed	Contact the #unique_86.
99	`Insufficient arguments Usage: import <region> [<filename>...] where <region> is the name of the NPAC region database: Canada, Midwest, MidAtlantic, Northeast, Southeast, Southwest, Western, WestCoast <filename> name of the NPAC download file: SPID .dd-mm-yyyyhhmmss LRN .dd-mm-yyyyhhmmss NPANXX .dd-mm-yyyyhhmmss npanxx-npanxx.dd-mm-yyyyhhmmss`	Invalid number of parameters supplied	Try the command again with correct syntax.

Table A-11 (Cont.) Error Messages: import

Exit Code	Message	Cause	Suggested Recovery
1	`Invalid NPAC Region. Usage: import <region> [<filename>...] where <region> is the name of the NPAC region: database: Canada, Midwest, MidAtlantic, Northeast, Southeast, Southwest, Western, WestCoast <filename> name of the NPAC download file: SPID.dd-mm-yyyyhhmmss LRN.dd-mm-yyyyhhmmss NPANXX.dd-mm-yyyyhhmmss npanxx-npanxx.dd-mm-yyyyhhmmss`	Invalid **NPAC** region supplied	Supply valid region name for command.
2	**LSMS**_DIR environment variable is not set/defined.	**LSMS**_DIR environment variable is not set	Verify the environment variables or contact the #unique_86.
9	`/var/TKLC/lsms/free/data/npacftp/<region>` does not contain any download files.	**NPAC** directory for `<region>` does not contain any download files	No action necessary.
3	`/var/TKLC/lsms/free/data/npacftp/<region>` **NPAC** directory does not exist.	**NPAC FTP** directory for `<region>` cannot be located	Contact the #unique_86.
5	The npacagent process is currently running for the <region> region. It must be stopped prior to importing by executing the following command: **`$LSMS_DIR/lsms stop <region>`**	The `npacagent` process is running for specified region	Stop the `npacagent` process for this region and try the command again.

keyutil

Process Keys

Allows user to view security key status, load keys, or delete keys for **NPAC** associations.

Keyword

```
keyutil
```

Permission

The user must be logged in with the user name `lsmsadm`.

Syntax

```
$LSMS_TOOLS_DIR/keyutil -r <region> -k {public|private} [-d] [-l
<filename>] [-x <listid>] [-s <listid>, <keyid>] [-y]
```

Required Flags

`-r <region>`
Perform the function specified by another option for keys for the specified region, where `<region>` has one of the following values:

```
Canada
Midwest
MidAtlantic
Southeast
Southwest
Northeast
Western
WestCoast
```

`-k {public|private}`
Perform the function specified by another option for keys of either public type or private type.

One of the following options must be specified:

`-d`
Display all keys.

`-l <filename>`
Load keys from the specified `<filename>`.

`-x <listid>`
Delete keys in the specified list.

`-s <listid>, <keyid>`
Set the active key. All private keys for the specified region that occur in the specified list before the specified key are expired; all private keys for that region that occur in the specified list after the specified key are made valid.

Optional flags:

`-y`
Make changes without prompting.

Sample Output

```
$ keyutil -r Midwest -k public -l ../../TKLC.1.public.key


Customer ID: TKLC
List ID: 1
```

```
Ok to make changes? y
$
```

Related Commands

None.

Response Notes

None.

Possible Errors

Table A-12 Error Messages: keyutil

Exit Code	Error Message	Cause	Suggested Recovery
-1	`SyntaxError`	The command was entered with incorrect syntax.	Try the command again with correct syntax.
1	`FileError`	The key file to be opened could not be found.	Verify the file path. If necessary, correct the path and try the command again. If the problem persists, contact the #unique_86.
2	`SaidNo`	User answered no when prompted for changes.	No action necessary.
3	`NoKeysFound`	User specified keys to delete, but those keys were not found.	Contact the #unique_86.
4	`DbError`	**Database** exception occurred; contact Oracle.	Contact the #unique_86.
5	`InvalidUser`	A user who is not `lsmsadm` attempted to run this command.	Contact the #unique_86.
6	`UnknownError`	Not known.	Contact the #unique_86.

lsms

NPAC Agent Control

Lets you start, stop, or display status of an instance of the **NPAC** Agent for a particular region.

Keyword

```
lsms
```

Permission

The user must be logged in with the user name `lsmsadm`.

Restrictions

Do not start an **NPAC** agent unless you have already created a regional database for it (see “npac_db_setup”).

Syntax

```
$LSMS_DIR/lsms <Action> <Region>
```

Options

None.

Parameters

`Action`
Function to perform on `npacagent` process. This is a mandatory parameter with the following values:

```
start
stop
status
```

`Region`
NPAC region associated with this `npacagent` process. This is a mandatory parameter with the following values:

```
Canada
Midwest
MidAtlantic
Southeast
Southwest
Northeast
Western
WestCoast
```

Sample Output

```
# Stop the NPAC Agent for the Canada NPAC
$ $LSMS_DIR/lsms stop Canada
Checking if npacagent is running....Yes.

Stopping npacagent....
OK.

npacagent stopped:   Wed Nov 30  16:28:26 2005

Command complete.
$
# Verify that NPAC Agent has terminated
```

```
$ $LSMS_DIR/lsms status Canada
Checking if npacagent is running. .. .No.
Command Complete.
# Restart the NPAC Agent for the Canada NPAC
>
$ $LSMS_DIR/lsms start Canada
Checking if npacagent is already running....No

Starting npacagent....

Verifying....OK.

npacagent started:   Wed Nov 30  16:29:45 2005

Command complete.
```

Possible Errors

Table A-13 Error Messages: lsms

Exit Code	Message	Cause	Suggested Recovery
1	Checking if npacagent is already running....Yes. npacagent is already running	Operator tried to startnpacagentwhen it was already running	No action necessary.
1	Checking if npacagent is running....No. npacagent is not running.	Operator tried to stopnpacagentwhen it was already stopped	No action necessary.
3	lsms: bind: *errornumber*	Attempt to bind **UDP** socket failed. *errornumber* is the error returned by bind.	Contact the #unique_86.
3	lsms: exec: *errornumber*	Attempt to exec npacagent process failed. *errornumber* is the error returned by exec.	Contact the #unique_86.
1	lsms: Failed to start npacagent	Execution of npacagent failed	Contact the #unique_86.
1	lsms: Failed to stop npacagent	Attempt to stop npacagent failed	Contact the #unique_86.
2	lsms:LSMS_DIR is not defined	**LSMS**_DIR environment variable is not set	Verify the environment variables.

Table A-13 (Cont.) Error Messages: lsms

Exit Code	Message	Cause	Suggested Recovery
3	`lsms: send:` *`errornumber`*	Attempt to send command to agent failed. *errornumber* is the error returned by send.	Contact the #unique_86.
3	`lsms: socket: errornumber`	Attempt to open **UDP** socket failed. *errornumber* is the error returned by socket.	Contact the #unique_86.
2	`npacagent: Permission denied for npacagent or executable not found.`	Operator does not have permission to execute this command or executable could not be found. The operator must be an `lsmsadm` user.	Change user to `lsmsadm` or `lsmsall` and try the command again. If the error persists, contact the #unique_86.

2	`Unknown region ==>< region name > must be one of the following:`
	`Canada`
	`MidAtlantic`
	`Midwest`
	`Northeast`
	`Southeast`
	`Southwest`
	`WestCoast`
	`Western`
		Invalid **NPAC** region specified	Try the command again with a valid region name.

2	`Usage: lsms`
	`[ start | stop ]`
	`<region>`
		Invalid action specified	Try the command again with correct syntax.

lsmsdb

Database Maintenance Utility

The **LSMS Database** Command-Line Utility (a MySQL client), `$LSMS_TOOLS_DIR/lsmsdb`, provides the capability of obtaining information and performing maintenance operations on the **LSMS** database. Additionally, the `lsmsdb` command is used to provide information and perform operations to configure query servers.

The syntax for lsmsdb as used within this document is as follows:

Keyword

```
lsmsdb
```

Permission

The user can be `root` or be defined as a member of the primary group `lsms`.

Syntax

```
$LSMS_TOOLS_DIR/lsmsdb -c <command> [-b <basedir>] [-d
<database>] [-h <hostname>] [-p <password>] [-u <username>]
```

-c <*command*> Options

`adduser`
Creates **TPD** and MySQL users, both with the same password. Must be run as root.When the `adduser` command option is specified, the `-u <username>` option is required.

`addrepluser`
Sets up a special replication user at the **LSMS** with privileges and permission that a query server can use to access the **LSMS** and perform database replication. When the `addrepluser` command option is specified, the `-h <hostname>` and `-p <password>` options are required. SECURITY NOTE: The combination of username and password is unique to replication use and only provides read access to the resynchronization binary log on the **LSMS** system. Additionally, access to this user account is restricted to the hostname specified. If the maximum number of **EAGLE** nodes supported would be exceeded, the command terminates with the following error:

```
"Failed: The maximum number of eagles supported has been reached."
```

`chguserpw`
Allows modification of the **TPD** and MySQL passwords. Can be run as root, or as the user who wants to change the password. When the `chguserpw` command option is specified, the `-u <username>` option is required.

> **Note:**
>
> The `lsmsdb - c chguserpw - u <username>` command must be run on both the primary and the secondary servers to completely change the password.

`counts`
Displays counts of records in specified database.

`dblist`
Displays list of databases (if the `-d` option is specified, it is ignored).

`features`
Displays current settings of all optional features.

`users`
Lists all defined **LSMS GUI** users.

`masterstatus`
Displays status information (log name and position) on the binary log of the master server (**LSMS**).

`ping`
Pings the `mysql`**daemon**.

`queryservers`
Displays the connection status of all query servers that are directly connected to the **LSMS**. The connection status for each query server (denoted by hostname and **IP** address) is displayed as `Connected`, `Disconnected`, `Not Reachable`, or `Hostname not associated with IP address`. For this command to show correct connection status between LSMS and a query server, a new user must be created on the query server. For information about how to create this user to check replication status from LSMS, see the *Query Server Installation and Upgrade Instructions*.

`quickaudit`
Performs a quick comparison of the number of rows in all of the database tables on both the active and standby servers. It returns "0" if the comparison on the active and standby servers results in a match; it returns various error numbers and error messages if the comparison does not produce a match or if a problem was encountered.

> **Note:**
>
> Do not specify this option when the LSMS is performing bulk download. In addition, do not specify this option when any of the following processes are running, due to the possibility of disk space shortage: backups, starting a standby node (to change its state from UNINITIALIZED "INHIBITED" to STANDBY), running the `import` command, and creating query server snapshots. Since backups can be run automatically, perform the procedure described in Checking for Running Backups to ensure that no backups are running.

This option:

- Takes about 5 seconds to run.
- Must be run from the active server.
- Checks first to see if the standby server is more than 5 seconds behind the active server; if it is, an error message is generated and quickaudit does not proceed.

`rmrepluser`
Removes a replication user at the **LSMS**. When the `rmrepluser` command option is specified, the `-h <hostname>` option is required.

`rmuser`
Deletes **TPD** and MySQL users. Must be run as root. When the `rmuser` command option is specified, the `-u <username>` option is required.

`shutdown`
Stops `mysql` (if the `-d` option is specified, it is ignored).

`snapshot`
Creates a snapshot of the **LSMSLNP** database to be used to setup query servers and/or for disaster recovery.When the `snapshot` command option is specified, the `-b <basedir>` option is optional.
During the creation of a snapshot of the **LSMS LNP** database, the following occurs:

- A read lock will be obtained
- Table information is flushed
- Binary logs (if already existing) are removed and a new one started (with log numbered 1)
- MySQL server performs a shutdown
- All **LSMS** database tables are archived as compressed files, `mysql-snapshot-supDB.tar.gz` and `mysql-snapshot-<regionDB>.tar.gz` (by default in `/var/TKLC/lsms/db`, although the `-b` option changes this base directory)
- MySQL server is restarted
- The read lock is released

`start`
Starts `mysql` (if the `-d` option is specified, it is ignored).

`syspwexp`
Modifies the system level defaul password timeout interval.

`usrpwexp`
Modifies the user level defaul password timeout interval, the `-u <username>` option is required.

Options

`-b basedir`
Base directory for storing snapshots.

`-d database`
Run the command on the database specified by this option. If the `-d` option is not specified, the command is run on all databases.

`-h hostname`
Name of the host.

`-p password`
User’s password.

`-u username`
LSMS user’s username.

> **Note:**
>
> The `-c` flag is required.

Sample Input and Output

```
$ ./lsmsdb -c features


              Y  AFT
              Y  EDR
              Y  ENHANCED_FILTERS
              Y  HTTP
              Y  HTTPS
             16  MAX_EAGLES
             32  MAX_SPIDS
              8  MAX_USERS
              Y  QUERY_SERVER
              Y  REPORT_GEN
              0  REPORT_GEN_QUERY_ACTIVE
              Y  SNMP
              Y  SPID_SECURITY
              Y  WSMSC
              N  WSMSC_TO_EAGLE

$ ./lsmsdb -c counts -d NortheastDB


1 ............. NortheastDB.NumberPoolBlock
1 ............. NortheastDB.ServiceProvLRN
0 ............. NortheastDB.ServiceProvNPA_NXX
0 ............. NortheastDB.ServiceProvNPA_NXX_X
1 ............. NortheastDB.ServiceProvNetwork
39,756 ........ NortheastDB.SubscriptionVersion

$ $LSMS_TOOLS_DIR/lsmsdb -c addrepluser -h queryserver1 -p password
$ $LSMS_TOOLS_DIR/lsmsdb -c masterstatus


Lsmspri-bin.001 73

$LSMS_TOOLS_DIR/lsmsdb -c queryservers


queryserver1 (10.25.60.28) Connected
queryserver2 (10.25.60.45) Disconnected
queryserver3 (10.25.60.31) Not Reachable
queryserver4 (Unknown) Hostname not associated with IP address

$LSMS_TOOLS_DIR/lsmsdb -c rmrepluser -h queryserver1 -p password
$LSMS_TOOLS_DIR/lsmsdb -c snapshot


WARNING: For the duration of this command, traffic being sent from the NPAC
to connected network elements and local LSMS provisioning will be
```

```
INTERRUPTED.
Do you want to continue? [Y/N] Y
```

lsmsSNMP

SNMP Agent Process Control

Lets you start, stop, or show status of the **SNMP** Agent process. For more information about the **SNMP** agent process, see "Understanding the **SNMP** Agent Process".

Keyword

`lsmsSNMP`

Permission

Any user who belongs to the lsmsadm permission group.

Restrictions

The **LSMS**_DIR environment variable must be set.

Syntax

```
$LSMS_DIR/lsmsSNMP <Action>
```

Options

None.

Parameters

`Action`
Function to perform on the **SNMP** agent. This is a mandatory parameter with the following values:

```
start
stop
status
```

Sample Output

```
 #Stop the SNMP Agent
> $LSMS_DIR/lsmsSNMP stop
LSMS SNMP Agent stopped: Fri Mar 10 09:50:47 2000 #Start the SNMP Agent
 > $LSMS_DIR/lsmsSNMP start
LSMS SNMP Agent started: Fri Mar 10 10:50:47 2000 #Determine the SNMP
Agent status
> $LSMS_DIR/lsmsSNMP status
LSMS SNMP AGENT PROCESS STATUS:
TOTAL SUCCESSFUL TRAP REQUEST= 12
TOTAL FAILED TRAP REQUEST = 2
   == IP-ADDRESS ==   == STATUS ====
   177.88.34.7         Failed
   198.77.39.2         SNMP Session Established
```

Files

Table A-15 shows the files for the `lsmsSNMP` command.

Table A-14 Files: lsmsSNMP

Filename	Type	Location
`snmp.cfg`	Configuration file	`/usr/TKLC/plat/etc/snmp`

Possible Errors

Table A-15 Exit Codes: lsmsSNMP

Exit Code	Cause	Suggested Recovery
1	Failed operation.	Contact the #unique_86.
2	Operation not required.	No action necessary.
3	Usage error.	Correct the syntax.
4	Fatal application error	Contact the #unique_86.
5	Server not active.	Execute the command on the active server.
6	**LSMS** software not running.	Start the **LSMS**.
This command is usually run by scripts; scripts should search for exit codes. When the command is run from the command line, the output indicates suggested recovery.		

lsmssurv

Surveillance Monitor Control

Starts, stops, and retrieves the status of the Surveillance Monitor.

The notification output from the Surveillance Monitor is written to Serial Port 3 on each server. The non-active server, whether its state is **STANDBY** or **UNINITIALIZED** "**INHIBITED**", sends surveillance notifications only for platform events that it detects on itself. It also forwards those notifications to the active server.

- The active server sends surveillance notifications for:
  - All platform events that the active server detects on itself
  - All platform notifications received from the non-active server (the active server inserts the hostname of the non-active server before the event text for these notifications)
  - Some applications events (not all application events generate surveillance notifications; for more information, see Automatic Monitoring of Events).

By default, all notification output that is sent to Serial Port 3 on a given server is written also to the log file on that server, `/var/TKLC/lsms/logs/survlog.log`. (See “Files”.)

Keyword

`lsmssurv`

Permission

The user must be `root` to specify the `start` or `stop` for `<Action>`.

Syntax

```
# $LSMS_DIR/lsmssurv <Action>
```

Options

None.

Parameters

`Action`
Specifies the action to be performed on the Surveillance Monitor. This is a mandatory parameter with the following values:

```
start
stop
status
last
```

Sample Output

```
# Start LSMS Surveillance Process
#
$LSMS_DIR/lsmssurv start
LSMS Surveillance feature started
# Request LSMS Surveillance Process status
#
$LSMS_DIR/lsmssurv status
LSMS Surveillance feature is currently started
# Stop LSMS Surveillance Process
#
$LSMS_DIR/lsmssurv stop
LSMS Surveillance feature stopped
# Return LSMS Surveillance Process to last valid state. The following
# output indicates that the process had been running prior to
termination
#
$LSMS_DIR/lsmssurv last
LSMS Surveillance feature started
#
```

Files

Table A-16 shows the files for the `lsmssurv` command.

Table A-16 Files: lsmssurv

Filename	Type	Location
`lsmsSurv.log`	Error/Debug log file	`/var/TKLC/lsms/logs/`

Table A-16 (Cont.) Files: lsmssurv

Filename	Type	Location
`survlog.log`	Notification log file	`/var/TKLC/lsms/logs/`

Response Notes

The designated response will not occur for five to ten seconds after execution.

Possible Errors

Table A-17 Error Messages: lsmssurv

Exit Code	Message	Cause	Suggested Recovery
1	`LSMS Surveillance feature is currently running.`	**LSMS** Surveillance feature is running	No action necessary.
1	`LSMS Surveillance feature is not currently running.`	**LSMS** Surveillance feature is not running	No action necessary.
1	`LSMS Surveillance feature did not start successfully Please review log file: /var/TKLC/lsms/logs/lsmsSurv.log for errors`	Socket communication problems, hang on opening of console/serial ports	Contact the #unique_86.
1	`Must be root to start the LSMS Surveillance feature`	User **ID** must be root to start the **LSMS** Surveillance feature	Change user to `root`.

massupdate

SPID Mass Update

The optional mass update utility provides the ability to migrate subscription version, number pool block, and network data from one Service Provider **ID** (**SPID**) to another based on an input file downloaded from the **NPAC**. The mass update utility reads **SIC-SMURF** files for **LRN**, **NPA-NXX**, and **NPA-NXX**-X, performs the required database updates and, in the case of **LRN** data, forwards an appropriate Update Override GTT message to the **EAGLE**.

Keyword

```
massupdate
```

Permission

The user must be logged in with the user name `lsmsadm`.

Syntax

```
$LSMS_DIR/massupdate [-v] [-p] [-n <npacRegion>] <filename>
```

> **Note:**
>
> Stop the `npacagent` process for the region in question when the `-n` option is used. It is not necessary to stop the `npacagent` processes for all eight regions when the `-n` option is used.

Optional flags:

`-v`
Provides verbose output.

`-p`
Perform “pre-check” but make no database updates.

`-n`
Perform the mass update only for the region named by the `<npacRegion>` parameter. Only one **NPAC** region may be entered after the `-n` option

Parameters

`<npacRegion>`
The name of the region to perform the mass update for.

`<filename>`
The name of the **SIC-SMURF** file to process.

> **Note:**
>
> The filename must be in the following format:

SIC-SMURF-[LRN|NPANXX|NPANXXX].OldSpid.NewSpid.**DD-MM-YYYYHH24MISS**

Example: `SIC-SMURF-NPANXX.0001.0002.25-12-1996081122`

Sample Output

```
$ $LSMS_DIR/massupdate SIC-SMURF-LRN.1234.9876.15-03-2002121530


One or more npacagents processes are currently running.  They must be
Stopped prior to mass spid updates by executing the following command:
/lsms stop <region>
Massupdate: exiting.
```

```
$ $LSMS_DIR/massupdate SIC-SMURF-LRN.1234.9876.15-03-2002121530


WARNING: The supman, lsman or an eagleagent process is currently running. It
is recommended that all of these processes be stopped prior to mass spid
updates to prevent modifications of GTT data during execution of this
command.
Do you wish to continue [N]?
Massupdate: exiting.


$ $LSMS_DIR/massupdate -v SIC-SMURF-LRN.1234.9876.15-03-2002121530



Using SIC-SMURF File: SIC-SMURF-LRN.1234.9876.15-03-2002121530
Performing Mass Update of SPIDs for LRN data...
Updating LRN 2223334000 from SPID 1234 to SPID 9876...
5 OverrideGtt object(s) updated in supported database
1 ServiceProvLRN object(s) updated in Southeast region
4 NumberPoolBlock object(s) updated in Southeast region
Updating LRN 2224441000 from SPID 1234 to SPID 9876...
0 OverrideGtt object(s) updated
1 ServiceProvLRN object(s) updated in Southeast region
10 NumberPoolBlock object(s) updated in Southeast region
Updating LRN 2225550000 from SPID 1234 to SPID 9876...
4 OverrideGtt object(s) updated
0 ServiceProvLRN object(s) updated in Southeast region
4 NumberPoolBlock object(s) updated in Southeast region
Updating SubscriptionVersion tables (this may take a while)...
790 SubscriptionVersion object(s) updated in Southeast region
Command stats
-------------
Lines processed: 3
Successful:      3
Failed:          0
Command complete.
$


$ $LSMS_DIR/massupdate -p SIC-SMURF-LRN.TKLC.SP05.06-30-2004101010

WARNING: The supman, lsman or an eagleagent process is currently running. It
is recommended that all of these processes be stopped prior to mass spid
updates to prevent modifications of GTT data during execution of this
command.
Do you wish to continue [N]? Y

START Mass update command: Thu Nov  8 13:41:57 EST 2007

Precheck mode: Makes NO CHANGES, but reports everything as if updating.

Executing mass update for all regions...
 {Precheck only}
Reading SIC-SMURF File: SIC-SMURF-LRN.TKLC.SP05.06-30-2004101010

Performing Mass Update of SPIDs for LRN data... {Precheck only}
```

```
Command stats {Precheck only}
-------------
Lines processed: 1
Successful:      1
Failed:          0

Mass update command complete: Thu Nov  8 13:41:57 EST 2007
```

Table A-19 identifies the database tables and fields that are updated after invoking `massupdate` for the various **SIC-SMURF** files.

For each table/field that is affected, the field that is checked for a match is listed under the appropriate **SIC-SMURF** filename. Under the Table/Field column, the database containing the object to be updated (for example, SupDB), the table to be updated (for example, OverrideGTT), and the field to be updated (for example, spid) are listed.

Under each **SIC-SMURF** file type, the field to be used for the match (for example, lrn) is listed for each Table/Field impacted by the update. For example, for **LRN SIC-SMURF** files, the SupDB OverrideGTT table's spid is updated if the lrn is matched.

Table A-18 Tables/Fields Affected By SIC-SMURF Processing

Table/Field	LRN SIC-SMURF	NPA-NXX SIC-SMURF	NPA-NXX-X SIC-SMURF
supDB.OverrideGtt.spid	lrn		
supDB.LsmsServiceProvider.spid (create if required)	spid		
supDB.GttGroupSpid.spid (create if required)	spid		
<regionDB>.ServiceProvLRN.serviceProviderId	lrn		
<regionDB>.ServiceProvNPA_NXX.serviceProvId		npanxx	
<regionDB>.ServiceProvNPA_NXX_X.serviceProvId			npanxx_x
<regionDB>.ServiceProvNetwork.serviceProvId (create if required)	spid	spid	spid
<regionDB>.SubscriptionVersion.newCurrentSp	lrn		
<regionDB>.NumberPoolBlock.newCurrentSp	lrn		

If an Override **GTT** entry is modified and there is no **LSMS** Service Provider with the NewSpid, then one is created. If that **LSMS** Service Provider **SPID** is not a member of the **GTT** group for a modified Override **GTT**, then that membership is added by creating a **GTT** Group **SPID** table entry.

If a ServiceProvLRN, ServiceProvNPA_NXX, or ServiceProvNPA_NXX_X object is modified and there is no ServiceProvNetwork object with the NewSpid, then one is created.

LsmsServiceProvider Limit

The mass update utility creates LsmsServiceProvider objects, if needed, even if creating them exceeds the maximum number of SPIDs supported (as recorded in the MAX_SPIDS field in the DbConfig entry.) However, the fact that the limit has been exceeded is recorded in the log file and the limit remains in force otherwise.

Mass Update Log File

To record information or errors during the mass update or the precheck, the mass update utility appends to a log file named `massupdate.log.MMDD`, located in the `$LSMS_DIR/../logs/massupdate` directory. The `.MMDD` suffix is the month and day the massupdate excution begins. If the massupdate runs past midnight, it will keep all output from one massupdate execution in one file, so the file will not be split across days but continue in the same file it started in. The following information is written to the log file by the mass update utility:

- The path name of the mass update input file being used
- The time and date for the start and stop of utility execution
- Identifying information for all automatically created objects, whether ServiceProvNetwork or LsmsServiceProvider, including the adding of a (possibly already existing) LsmsServiceProvider to a GttGroup and noting if a newly created LsmsServiceProvider is over the MAX_SPIDS limit
- Identifying information for any LsmsServiceProvider objects that are no longer used in any OverrideGtt as a result of the mass update and therefore could be removed
- Output from the precheck
- Any kind of processing problem or error
- A summary showing the number of lines actually processed successfully for each invocation of the utility (not needed for precheck mode)

Error Codes

Table A-19 Error Codes: massupdate

Error Code	Cause	Suggested Corrective Action
0	Success	None required.
1	Command syntax error	Rerun the command with the proper syntax.
2	Feature not enabled	Enable optional feature.
3	**SIC**-**SMURF** file not found	Verify path and filename for **SIC**-**SMURF** file.
4	Unable to open **SIC**-**SMURF** file	Verify permissions on **SIC**-**SMURF** file.
5	Incorrect file format	Supply valid **SIC**-**SMURF** file for processing.
6	massupdate already running	Do not attempt to execute more than one massupdate process at the same time.

Table A-19 (Cont.) Error Codes: massupdate

Error Code	Cause	Suggested Corrective Action
7	npacmassupdate executable not found	Define environment variable **LSMS**_DIR or contact the #unique_86.
8	**Database** error	Make sure the database server is running.
9	User chose to stop	None needed.
10	`npacagent` running	If massupdate is run for all regions, stop all `npacagent` processes. If massupdate is run for a single region, stop the `npacagent` for that region only.
11	Unable to write	Remove `<filename>_FAILED` file and verify directory permissions.
12	Invalid user	Rerun as user `lsmsadm`.

measdump

Print Measurement Information

Lets you print measurement information (contained in databases) to the display.

Keyword

```
measdump
```

Permission

The user must be logged in with the user name in the `lsmsuser`, `lsmsuext`, `lsmsview`, or `lsmsall`, group.

Syntax

```
$LSMS_TOOLS_DIR/measdump {-r <region>|-c <CLLI> [-n]
```

Required Flags

Specify one of the following flags:

`-r <region>`
NPAC region associated with this `npacagent` process. This is a mandatory parameter with the following values:

```
Canada
Midwest
MidAtlantic
Southeast
Southwest
```

```
Northeast
Western
WestCoast
```

-c <CLLI>
Common Language Location Identifier for the network element for which you wish to display measurements.

Optional Flags

Optionally specify one of the following flags:

-l
Lets you create measurement logs (a `<region>.meas.<MMDD>` file for each **NPAC** region and a `<clli>.meas.<MMDD>` file for each network elements) for compatibility with previous releases of the **LSMS**.

-n
Number of days before current day for which measurements are to be displayed, where `n` can have one of the values shown in Table A-21 (if this option is not specified, the default value is 0):

Table A-20 Measurement Pegs Date

Value	Print Measurement Pegs for the Date of:
0	Today
1	Yesterday
2	Two days before current date
3	Three days before current date
4	Four days before current date
5	Five days before current date
6	Six days before current date

Sample Output

```
$ measdump -r Midwest -2


measdump: There is no measurement data available for the requested day.

$ measdump -r Midwest


Hour      Binds      SuccessOps      FailedOps
   0          0               0              0
   1          0               0              0
   2          0               0              0
   3          0               0              0
   4          0               0              0
   5          0               0              0
   6          0               0              0
   7          0               0              0
```

```
 8         0           0          0
 9         0           0          0
10         1           0          0
11         0           0          0
12         0           0          0
13         0           0          0
14         0           0          0
15         0           0          0
16         0           0          0
17         0           0          0
18         0           0          0
19         0           0          0
20         0           0          0
21         0           0          0
22         0           0          0
23         0           0          0
```

Possible Errors

Table A-21 Error Messages: measdump

Exit Code	Error Message	Cause	Suggested Recovery
-1	`Syntax error`	User entered command with incorrect syntax.	Try the command again with the correct syntax.
1	`DbError`	**Database** exception. Contact Oracle.	Contact the #unique_86.
2	`EnvNotSet`	The **LSMS**_DIR env variable is not set.	Verify the environment variables.
3	`NoData`	No measurement data available for the specified day (the agent was never started)	No action necessary.
4	`UnknownError`	Not known.	Contact the #unique_86.

npac_db_setup

NPAC Database Maintenance

Creates or removes the regional **NPAC** database.

Keyword

`npac_db_setup`

Permission

The user must be logged in with the user name `lsmsadm`.

Restrictions

- This command must be run on each server.
- If a database is in use by a regional **LSMS** agent, it cannot be removed.
- If a regional database has already been created, it must be removed before it can be created again.

Syntax

```
$LSMS_DIR/npac_db_setup <Action> <Region>
```

This command must be run from the $**LSMS**_DIR directory and run only from the primary server.

Options

None.

Parameters

`Action`
Specifies the action to be performed on the database. This is a mandatory parameter with the following values:

```
create
remove
```

`Region`
NPAC region associated with this `npacagent`. This is a mandatory parameter with the following values:

```
Canada
Midwest
MidAtlantic
Southeast
Southwest
Northeast
Western
WestCoast
```

Sample Output

# Create **NPAC** database for Canada region for the first time

```
> $LSMS_DIR/npac_db_setup create Canada


-------------------------------------------------------------------------
Npac Region Database Setup Script
The Region Database Name is CanadaDB
Initializing regional database...CanadaDB
The regional database CanadaDB was created successfully.
>


> $LSMS_DIR/npac_db_setup remove Northeast
```

# Remove **NPAC** database for Northeast Region

```
-----------------------------------------------------------------------
--
Npac Region Database Setup Script
The Region Database Name is NortheastDB
Warning: NPAC region database CanadaDB is about to be removed.

  All data in the database will be lost.

  Do you want to continue? [Y/N]Y
Removing regional database...CanadaDB
>
```

Response Notes

This command takes approximately 35 to 40 seconds to execute.

Possible Errors

Table A-22 Error Messages: npac_db_setup

Exit Code	Cause	Suggested Recovery
1	Syntax was incorrect	Use correct syntax.
2	MySQL command failed	Contact Oracle.
7	User attempted to create a database that already exists	None needed.
9	User attempted to remove a database that is in use	Stop indicated processes before attempting to remove the database.
10	The root user cannot execute this command	Change users to `lsmsadm`.
12	User attempted to remove database for an active region	Make region inactive and retry command.

npacimport

Import Specific Files into a Regional Database

Allows user to import specific files into the regional **NPAC** database.

Keyword

`npacimport`

Permission

The user must be logged in with the user name `lsmsadm`.

Restrictions

This command must be run from the $**LSMS_**DIR directory and run only from the primary server.

Syntax

```
$LSMS_TOOLS_DIR/npacimport [-h] -r <region> -i <type> [-u] [-y] [-t
<number>] [-c <number>] <filename>
```

Required Flags

`-r <region>`
Specifies the region whose database the imported files are intended for. This is a mandatory parameter with the following values:

```
Canada
MidAtlantic
Midwest
Northeast
Southeast
Southwest
WestCoast
Western
```

`-i <type>`
Specifies the type of the file to be imported into the database. This is a mandatory parameter with the following values:

```
SubscriptionVersion
NumberPoolBlock
ServiceProvNetwork
ServiceProvLRN
ServiceProvNPA-NXX
ServiceProvNPA-NXX-X
```

Parameters

`<filename>`
Specifies the input file of pipe delimited records to be used.

Optional Flags

`-h`
Display Help text and quit.

`-u`
Time-range update: May modify or delete and does not purge object range first. Not valid for ServiceProvNetwork.

`-y`
Continue on if a record update fails.

`-t`
Specify number of threads to use (maximum number is 10).

-c
Specify number of records in each batch to a thread (default is 1000).

Exit Codes

Table A-23 lists the exit codes generated by the `npacimport` command.

Table A-23 Exit Codes: npacimport

Exit Code	Cause	Suggested Recovery
-1	Invalid syntax	Correct the syntax.
1	**Database** error	Contact the #unique_86.
2	File access error	Contact the #unique_86.
3	Invalid record in the input file	Correct the file entry or contact the #unique_86.
4	Invalid user	Change user to `lsmsadm`.
5	Unknown error	Contact the #unique_86.
This command is usually run by scripts; scripts should search for exit codes. When the command is run from the command line, the output indicates suggested recovery.		

report

Report Generation

Generates reports for regional **NPAC** databases and supplemental databases.

Keyword

`report`

Permission

The user must be defined as a member of the primary group `lsms`.

Syntax

```
$LSMS_DIR/report <OutputFile> <ReportType> [<SP>|<LRN>|<DPC>|
<Region>|<SplitStatus>] [<StartTN>] [<EndTN>] [<StartNPB>]
[<EndNPB>]
```

Options

None.

Parameters

OutputFile
The filename for the file in which to store the report. This is a mandatory parameter whose value is the filename. The filename is appended with the value specified for `<ReportType>` and the file is stored in the directory where the command is run.

ReportType
The type of report to create. This is a mandatory parameter; use one of the following values:

`SPA` - Service Provider Administrative Report

`SPN` - Service Provider Network Report

`EMR` - Element Management Report

`6DT` - Six Digit Translation Report

`10DT` - Ten Digit Translation Report

`SPL` - **NPA** Split Data by Status Report

`SBL` - Subscription Report by **LRN**

`SBS` - Subscription Report by Service Provider **ID**

`SBT` - Subscription Report by **TN**

`NBL` - Number Pool Block Report by **LRN**

`NBS` - Number Pool Block Report by Service Provider **ID**

`NBN` - Number Pool Block Report by **NPA**-**NXX**-X

`SPD` - Service Provider Data Report

SP
Four-character alphanumeric string to specify Service Provider **ID**. This is a mandatory parameter when `<ReportType>` is set to `SBS` or `NBS`; optional when `<ReportType>` is set to `6DT,10DT`, `EMR`, or `SPN`; otherwise not allowed.

LRN
Ten-digit string (values 0000000000–9999999999) to specify **Location Routing Number**. This is a mandatory parameter when `<ReportType>` is set to `SBL` or `NBL`; otherwise not allowed.

DPC
Eleven-character string of format xxx-xxx-xxx (where each xxx can have a value 000 to 256) to specify **Destination Point Code**. This is an optional parameter when `<ReportType>` is set to `6DT` or `10DT`; otherwise not allowed.

Region
NPAC region. This is an optional parameter when `<ReportType>` is set to `SPL`; otherwise not allowed. Use one of the following values:

`MidAtlantic`

`Midwest`
`Northeast`

`Southeast`

`Southwest`

`Western`

`Westcoast`

`Canada`

SplitStatus
NPA-NXX split status. This is an optional parameter when <ReportType> is set to SPL; otherwise not allowed. Use one of the following values:

```
Active
Pending
Error
```

StartTN
Starting telephone number in a range of telephone numbers. This is a mandatory parameter when <ReportType> is set to SBT. Valid values are 10 digits from 0000000000 to 9999999999.

EndTN
Ending telephone number in a range of telephone numbers. This is a mandatory parameter when <ReportType> is set to SBT. Valid values are 10 digits from 0000000000 to 9999999999.

StartNPB
Starting value in a range of number pool blocks. This is a mandatory parameter when <ReportType> is set to NBN. Valid values are 7 digits from 0000000 to 9999999.

EndNPB
Ending value in a range of number pool blocks. This is a mandatory parameter when <ReportType> is set to NBN. Valid values are 7 digits from 0000000 to 9999999.

Sample Commands

```
 # Generate SPA report for MidAtlantic NPAC
 $ $LSMS_DIR/report MidAtlanticDB supDB report.output SPA
   # Generate SBL report for MidAtlantic NPAC for LRN 9194605500
 $ $LSMS_DIR/report MidAtlanticDB supDB report.output SBL 9194605500
 # Generate SPL report
> $LSMS_DIR/report MidAtlanticDB supDB report.out SPL
# Generate SBS report for Midwest NPAC for all Subscriptions having a
service provider of TKLC and a TN in the range of 9194600000 to
9195600000
$ $LSMS_DIR/report MidwestDB supDB report.out SBS TKLC 9194600000
9195600000
# Generate SBT report for Western NPAC for all Subscriptions having a
TN in the range of 9194600000 to 9195600000
$ $LSMS_DIR/report WesternDB supDB report.out SBT 9194600000 9195600000
```

Files

Table A-25 shows the files for the report command.

Table A-24 Files: report

Filename	Type	Location
Output	Report Output File	Directory where command is run

Response Notes

The `report` command can process approximately 300-500 records per second, depending upon the type of report.

To view the report, change directory to the directory where the command was run and use any text editor to open the file named in the command. If you run the command from the `$HOME/LSMSreports` directory, you can also view the report through the graphical user interface; for information, refer to the *Database Administrator's Guide*.

Possible Errors

Table A-25 Error Messages: report

Exit Code	Message	Cause	Suggested Recovery
1	DATABASE <name> NOT FOUND	Specified database could not be found	Verify that the database exists and try the command again.
1	disk space check failed	Attempt to check available disk space failed	Remove unnecessary reports from disk.
1	End TN must be greater than Start TN value.	The start **TN** is greater than the end **TN** in the range of **TNs** to generate an **LSMS** subscription report	Try the command again using the correct syntax and supplying all required arguments.
1	Insufficient disk space available to generate report. *N* bytes of disk space required: *n* bytes of disk space available	Insufficient disk space to save report	Remove unnecessary reports from disk.
1	Invalid End TN value - <EndTN>	The last **TN** in the range of **TNs** to generate an **LSMS** subscription report is out of range. The valid range of values for a telephone number is 0000000000...9999999999.	Try the command again using the correct syntax and supplying all required arguments.
1	Invalid Report Type Specified <Report Type>	The value specified for the ReportType parameter is not valid.	Try the command again using the correct syntax and supplying all required arguments.

Table A-25 (Cont.) Error Messages: report

Exit Code	Message	Cause	Suggested Recovery
1	`Invalid Start TN value - <StartTN>`	The first **TN** in the range of **TNs** to generate an **LSMS** subscription report is out of range. The valid range of values for a telephone number is 0000000000...9999999999.	Try the command again using the correct syntax and supplying all required arguments.
1	`LRN argument is required for SBL/NBL report`	If <ReportType> parameter is specified as **SBL** or **NBL**, the <**LRN**> parameter must also be specified	Try the command again using the correct syntax and supplying all required arguments.
3	`LRN argument must be exactly 10 numeric digits`	An <**LRN**> parameter that had less than 10 digits, more than 10 digits, or non-numeric characters was specified	Try the command again using the correct syntax and supplying all required arguments.
1	`Missing mandatory arguments`	The command was specified with an insufficient number of arguments.	Try the command again using the correct syntax and supplying all required arguments.
1	`NO ACCESS RIGHTS TO DATABASE`	Requesting operator does not have access rights to the database	Change user to a username that has access rights to the database.
4	`Service Provider argument must have from 1 to 4 characters`	The <**SP**> parameter was specified with more than 4 characters	Try the command again using the correct syntax and supplying all required arguments.
1	`Service Provider argument required for SBS/NBS report`	If <ReportType> parameter is specified as **SBS** or **NBS**, the <**SP**> parameter must also be specified	Try the command again using the correct syntax and supplying all required arguments.
1	`StartNPB argument is required for NBN report`	If <ReportType> parameter is specified as **NBN**, the <StartNPB> parameter must also be specified	Try the command again using the correct syntax and supplying all required arguments.
1	`StartTN argument is required for SBT report`	If <ReportType> parameter is specified as **SBT**, the <StartTN> parameter must also be specified	Try the command again using the correct syntax and supplying all required arguments.

Table A-25 (Cont.) Error Messages: report

Exit Code	Message	Cause	Suggested Recovery
1	`Unable to determine home directory of user - report could not be generated`	Report could not be stored in home directory of user	Contact the #unique_86.
1	`Unable to open <filename> - report could not be generated`	Could not open the file in which to save the report	Contact the #unique_86.
1	`Usage: report <regional_database_name sup_database_name> output file <report_type>[LRN|SP]`	Operator did not supply the correct number of arguments	Try the command again using the correct syntax and supplying all required arguments.
1	`Wrong number of arguments for Split report`	The <ReportType> parameter was specified as **SPLA** or **SPLR**, but the wrong number of parameters was specified	Try the command again using the correct syntax and supplying all required arguments.

resync_db_setup

Resynchronization Database Maintenance

Creates or removes the resynchronization database.

Keyword

```
resync_db_setup
```

Permission

The user must be logged in with the user name `lsmsadm`.

Restrictions

- This command must be run on each server.
- If the resynchronization database has already been created, it must be removed before it can be created again.

Syntax

```
$LSMS_DIR/resync_db_setup <Action>
```

This command must be run from the $**LSMS**_DIR directory and run only from the primary server.

Options

None.

Parameters

`Action`
Specifies the action to be performed on the database. This is a mandatory parameter with the following values:

```
create
remove
```

Response Notes

This command takes approximately 35 to 40 seconds to execute.

Files

None.

Possible Errors

Table A-26 Exit Codes: resync_db_setup

Exit Code	Cause	Suggested Recovery
1	Missing arguments.	Use the correct syntax and supply all required arguments.
3	Executing command from wrong directory.	Change directory to $**LSMS**_DIR.
6	Invalid action argument.	Use the correct syntax and supply a valid action argument.
7	**Database** already exists.	No action necessary.
8	**Database** exists on another host.	No action necessary.
9	**Database** in use by process.	Stop the process that is using the database.
10	User is not authorized to use this command.	Change user to `lsmsadm`.
11	Command executed on secondary server.	Execute command on the primary server.
This command is usually run by scripts; scripts should search for exit codes. When the command is run from the command line, the output indicates suggested recovery.		

SAagent

Service Assurance Agent Control

Starts, stops, inhibits automatic restart, allows automatic restart, and retrieves the status of the Service Assurance Agent.

The **SA** Agent can be prevented from starting by inhibiting the process. This action allows you to control whether or not the Surveillance feature automatically starts the agent when it detects that it is not running.

NOTE: If the SA agent is running, the inhibit action does not take effect until the agent has stopped.

Keyword

`SAagent`

Permission

The user must be defined as a member of the secondary group `lsmsadm`.

Syntax

`$LSMS_DIR/SAagent <Action>`

Options

None.

Parameters

`Action`
Specifies the action to be performed on the Service Assurance Agent. This is a mandatory parameter with the following values:

- `start`
- `stop`
- `inhibit`
- `allow`
- `status`

Sample Output

```
#  Start the process
 $ $LSMS_DIR/SAagent start
 Checking if SA Agent is already running...No Starting SA
Agent...Started...Verifying... SAagent started:   1997 Sept 04  12:13:14
EST  # Stop the process, allow Surveillance to restart it.
 $ $LSMS_DIR/SAagent stop
 Checking if SA Agent is already running...Yes Stopping SA Agent... SAagent
stopped:   1997 Sept 04  12:13:24 EST  # Stop the process but keep
Surveillance or the user from starting it. # This case assumes it was
```

```
stopped.
 $ $LSMS_DIR/SAagent inhibit
 Saagent inhibited: 1997 Sept 04  12:13:34 EST  # Now restart the
process after it had be inhibited.
 $ $LSMS_DIR/SAagent allow
 Saagent allowed:   1997 Sept 04  12:13:44 EST $ $LSMS_DIR/SAagent
start Checking if SA Agent is already running...No Starting SA
Agent...Started...Verifying... SAagent started:   1997 Sept 04
12:13:45 EST  # Request status
 $ $LSMS_DIR/SAagent status
 Checking if SA Agent is already running...Yes
SA Agent: GPL=012-000-000  : mem= 5176 kbytes : pcpu = 0.0 % TOTAL
QUERIES=0            : TOTAL TNs=0

THERE ARE CURRENTLY NO SERVICE ASSURANCE ASSOCIATIONS
```

Files

Table A-28 shows the files for the `SAagent` command.

Table A-27 Files: SAagent

Filename	Type	Location
`sa.cfg`	Configuration file	`$LSMS_DIR/config`

Command Usage

A-29 gives several examples of typical command usage sequence.

Table A-28 SAagent Command Usage

Case	Action	Command Sequence
1	Start the process.	`$LSMS_DIR/SAagent start`
2	Stop the process, allow Surveillance to restart it.	`$LSMS_DIR/SAagent stop`

3	Stop the process but keep Surveillance or the user from starting it. This case assumes it was already started.	`$LSMS_DIR/SAagent stop`
		`$LSMS_DIR/SAagent inhibit`

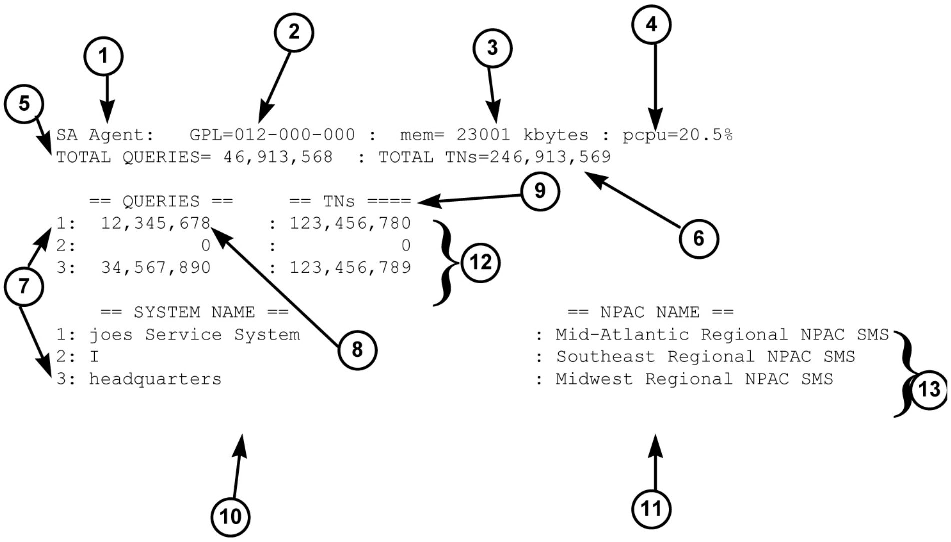
4	Start the process after it was stopped as in Case #3.	`$LSMS_DIR/SAagent allow`
		`$LSMS_DIR/SAagent start`

Understanding Status Output

The association status shows each association established for that pairing. The association is designated with a number (1..4) in the left-most column. The number is a tag to coordinate with the statistics that precede the association status.

Figure A-1 shows an example in which there are three active associations. The first is handling 10 **TNs** per query, the second is associated but no traffic has been sent across the interface, and the third is handling an average of 3.5 **TNs** per query.

Figure A-1 Example of SA Agent Status Output



```
SA Agent:   GPL=012-000-000 :  mem= 23001 kbytes : pcpu=20.5%
TOTAL QUERIES= 46,913,568  : TOTAL TNs=246,913,569

   == QUERIES ==      == TNs ====
1:  12,345,678      : 123,456,780
2:           0      :           0
3:  34,567,890      : 123,456,789

    == SYSTEM NAME ==                         == NPAC NAME ==
1: joes Service System                     : Mid-Atlantic Regional NPAC SMS
2: I                                       : Southeast Regional NPAC SMS
3: headquarters                            : Midwest Regional NPAC SMS
```

The following numbered items correspond to the numbers in Figure A-1:

1. Name of the process (**SA** Agent)
2. **GPL** number of the **SA** Agent process
3. Number of bytes used by the **SA** Agent process, in kilobytes as decimal number
4. Ratio of the **CPU** time used by the **SA** Agent to the **CPU** time available during the same time period
5. Total number of queries received by the **SA** Agent since it was last started
6. Total number of **TNs** in the queries
7. Tag that correlates the association statistics to the System Name and the **NPAC** database to which it is connected. Only the systems that are currently associated are shown
8. Total number of queries received by the **SA** Agent on that association since the association was established
9. Total number of **TNs** received by the **SA** Agent on that association since the association was established
10. SystemName of **SA** Manager
11. InpNPAC-**SMS**-Name
12. **Association** statistics block. Values of zero indicate that no queries or **TNs** have been sent across the association.
13. **Association** status

The examples below show the status as the user sees it when the **SA** Agent is in various conditions. Figure A-2 shows the **SA** Agent running without any associations.

Figure A-2   Example -- No Associations Status Output

```
Checking if SA Agent is running....Yes.

SA Agent: GPL=012-000-000    : mem= 5176 kbytes : pcpu = 0.0 %
TOTAL QUERIES=0              : TOTAL TNs=0

THERE ARE CURRENTLY NO SERVICE ASSURANCE ASSOCIATIONS
------------------------------------------------------------------------
```

Figure A-3 shows example output that indicates that the **SA** Agent was inhibited after it was started.

Figure A-3   Example -- Marked Inhibited Status Output

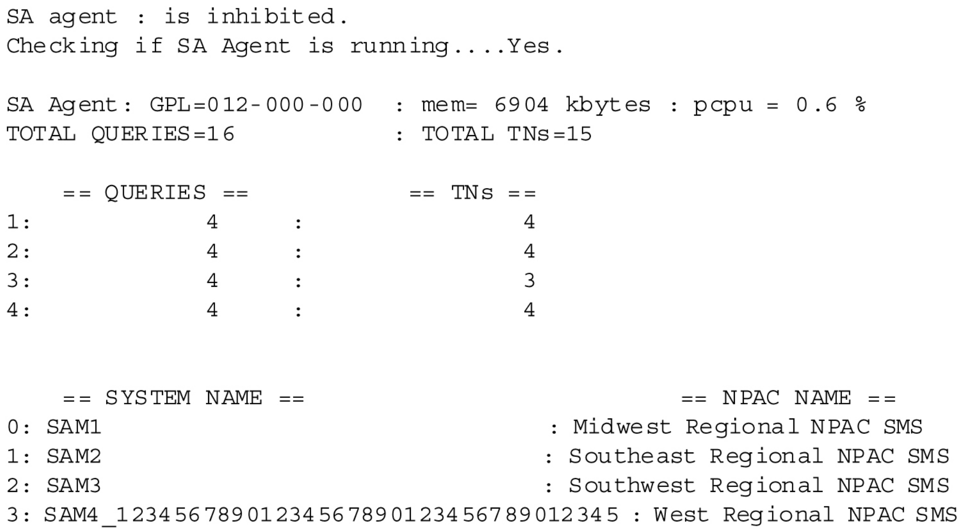
```
SA agent : is inhibited.
Checking if SA Agent is running....Yes.

SA Agent: GPL=012-000-000    : mem= 5176 kbytes : pcpu = 0.1 %
TOTAL QUERIES=0              : TOTAL TNs=0

THERE ARE CURRENTLY NO SERVICE ASSURANCE ASSOCIATIONS
------------------------------------------------------------------------
```

Figure A-4 shows example output that indicates that the **SA** Agent is inhibited and has active associations.

Figure A-4   Example -- Active Associations Status Output



```
SA agent : is inhibited.
Checking if SA Agent is running....Yes.

SA Agent: GPL=012-000-000    : mem= 6904 kbytes : pcpu = 0.6 %
TOTAL QUERIES=16             : TOTAL TNs=15

    == QUERIES ==            == TNs ==
1:             4      :              4
2:             4      :              4
3:             4      :              3
4:             4      :              4


    == SYSTEM NAME ==                            == NPAC NAME ==
0: SAM1                              : Midwest Regional NPAC SMS
1: SAM2                              : Southeast Regional NPAC SMS
2: SAM3                              : Southwest Regional NPAC SMS
3: SAM4_123456789012345678901234567890123 45 : West Regional NPAC SMS
```

Response Notes

It takes 15 seconds to start the **SA** agent. If the **SA** agent is not running, the results of a status request will not appear for at least five seconds.

Possible Errors

Table A-29 Error Messages: SAagent

Exit Code	Message	Cause	Suggested Recovery
4	`bind:` *`errormsg`*	The bind command failed. *errormsg*is the error message.	Contact the #unique_86.
3	`SA  Agent: executable missing`	**sacw** executable could not be found	Contact the #unique_86.
1	`SA Agent: Failed to start`	Start action failed	Contact the #unique_86.
1	`SA Agent: Failed to stop SA Agent`	Stop action failed	Contact the #unique_86.
2	`SA Agent: is already allowed`	Allow action failed since **SA** Agent is already in Allow state	No action necessary.
3	`SA Agent: is already inhibited`	Inhibit action failed because the **SA** Agent is already inhibited	No action necessary.
2	`SA Agent is already started`	Could not start **SA** Agent since it is already executing	No action necessary.
2	`SA Agent is not running`	Status or stop performed when **SA** Agent was not running	No action necessary.
3	**SA** Agent: log directory $logdir does not exist	Logfile directory does not exist	Contact the #unique_86.
3	`SA Agent: LSMS_DIR is not defined`	**LSMS**_DIR environment variable not set	Verify the environment variables.
3	`SA Agent: Permission Denied`	Cannot start **SA** Agent because it has been inhibited	Perform `SAagent allow` and then retry this command.
4	`socket:` *`errormsg`*	The socket command failed. *errormsg* is the error message.	Contact the #unique_86.
3	`Usage: SAagent [ status | start | stop | inhibit | allow ]`	Invalid action specified	Try the command again using the correct syntax.

savelogs

Save logs

Enables you to capture LSMS system logs for debugging purposes.

When this command is issued on the LSMS console, an alarm (event number 8110) is raised on the LSMS GUI, followed by alarm/event number 8111 after the logs are successfully captured. Savelogs files are generated in bz format in the savelogs directory, which is in the LSMS free directory.

Keyword

```
savelogs
```

Permission

The user must be root.

Syntax

```
savelogs -n days {-f} {-x [activity]:[cmip]:[ems]:[npac]}
```

Options

`-n days`
The `-n` option is required.

`-f`
`-f` stands for force and is optional.

`-x [activity]:[cmip]:[ems]:[npac]`
`-x` stands for exclude and is optional. For `-x ems` or `-x npac`, only the transaction logs are excluded; otherwise, all logs are captured.

service mysql status

Check MySQL Status

Enables you to check the status of the MySQL database.

Keyword

```
service mysql status
```

Permission

The user must be root.

Syntax

```
# service mysql status
```

Options

None.

Sample Output

```
[lsmsadm@lsmspri etc]$ su - root
Password:
[root@lsmspri ~]#
[root@lsmspri ~]#
[root@lsmspri ~]# service mysql status
MySQL running (5089) [ OK ]
[root@lsmspri ~]#
```

spidsec

Authorize Users to Access SPIDs

When the **SPID** Security feature is enabled, this command allows a user logged in as `lsmsadm` to associate specified users to access data belonging to specified Service Provider **ID** (**SPID**).

Keyword

`spidsec`

Permission

The user must be logged in with the user name `lsmsadm`.

Syntax

```
$LSMS_TOOLS_DIR/spidsec [-h] [-a -r -d] -u <user> -s{<spid>|GOLDEN}
```

Required Flags

`-u <user>`
Specify a username that has already been defined on the **LSMS** (see Managing User Accounts).

`-s {<spid>|GOLDEN}`
Specify a **SPID** that has been defined (for more information, refer to the *Configuration Guide*) or specify `GOLDEN` to apply to all defined **SPIDs**.

One of the following options must be specified:

`-a`
Authorize user for the specified **SPID**.

`-d`
Display user’s authorization information.

`-r`
Remove **SPID** authorization from given user (optionally specify a username with the `-u` flag; if no username is specified, all usernames that have been defined on the **LSMS** are displayed).

Sample Output

```
# Display the SPID security for the username lsmsadm
$ spidsec -d -u lsmsadm


lsmsadm GOLDEN


# Authorize the username thomas to access the SPID TKLC
$ spidsec -a -u thomas -s TKLC
```

No output is displayed.

```
# Display the SPID security for all usernames
$ spidsec -d


lsmsadm GOLDEN
lsmsall GOLDEN
lsmsuser GOLDEN
lsmsuext GOLDEN
lsmsview GOLDEN
```

thomas **TKLC**

Related Commands

None.

Possible Errors

Table A-30 Exit Codes: spidsec

Exit Code	Cause	Suggested Recovery
-1	Usage error.	Correct the syntax.
1	File access error.	Contact the #unique_86.
2	**Database** error.	Contact the #unique_86.
3	Invalid user.	Change user to `lsmsadm`.
4	Unknown error.	Contact the #unique_86.
This command is usually run by scripts; scripts should search for exit codes. When the command is run from the command line, the output indicates suggested recovery.		

sup

Control of Local Services Manager and Local Data Manager

Used to start, stop, or display status of the Local Services Manager (`lsman`) and Local Data Manager (`supman`).

Keyword

`sup`

Permission

The user must be logged in with the user name `lsmsadm`.

Syntax

```
$LSMS_DIR/sup <Action>
```

Options

None.

Parameters

`Action`
The function to be performed on the `lsman` and `supman` processes. This mandatory parameter has the following values:

- `start`
- `stop`
- `status`

Sample Output

```
# Stop the lsman and supman currently running

$ $LSMS_DIR/sup stop


supman stopped
lsman stopped
# Restart the lsman and supman

$ $LSMS_DIR/sup start
```

This command has no output.

```
# Check the status of the lsman and supman

$ $LSMS_DIR/sup status


0 reports in progress
0 LNP database synchronization operations in progress
6 GUIs connected
lsman: mem= 23480 kbytes : pcpu = 0.1 %
```

```
supman: mem= 41216 kbytes : pcpu = 0.2 %
reportma: mem= 14072 kbytes : pcpu = 0.1 %
```

Possible Errors

Table A-31 Exit Codes: sup

Exit Code	Cause	Suggested Recovery
1	Usage error.	Correct the syntax.

This command is usually run by scripts; scripts should search for exit codes. When the command is run from the command line, the output indicates suggested recovery.

sup_db_setup

Supplemental Database Setup

Creates or removes the supplemental database.

> **Note:**
>
> See "Special Procedure to Remove **EMSs** from Shared Memory" for information about removing **EMSs** from shared memory when removing supDB.

Keyword

```
sup_db_setup
```

Permission

The user must be logged in with the user name `lsmsadm`.

Syntax

```
$LSMS_DIR/sup_db_setup <Action>
```

This command must be executed from the $**LSMS**_DIR and must be run on the both servers. The operator must respond to a prompt to verify removal or creation of the database when a version already exists.

Options

None.

Parameters

`Action`
The function to be performed on the database. This mandatory parameter has the following values:

```
    create
```

```
   remove
```

Sample Output

To create a new Supplemental **Database**:

```
$ $LSMS_DIR/sup_db_setup create
-----------------------------------------------------------------



Supplemental Database Setup Script The Supplemental Database name is supDB
Initializing Supplemental Database...supDB
The supplemental database supDB was created successfully.
```

To remove the current Supplemental **Database**

```
$ $LSMS_DIR/sup_db_setup remove
-----------------------------------------------------------------



Supplemental Database Setup Script
WARNING: Supplemental Database supDB is about to be removed.
         All data in this database will be lost.
         Do you want to continue? [Y/N] Y
Removing Supplemental Database...supDB
$
```

Response Notes

The create action requires 20 or more seconds to create the database and respond.

Possible Errors

Table A-32 Error Messages: sup_db_setup

Exit Code	Cause	Suggested Recovery
1	Syntax was incorrect	Use correct syntax.
2	MySQL command failed	Contact Oracle.
7	User attempted to create a database that already exists	None needed.
9	User attempted to remove a database that is in use	Stop indicated processes before attempting to remove the database.
10	The root user cannot execute this command	Change users to `lsmsadm`.

Special Procedure to Remove EMSs from Shared Memory

> **Note:**
>
> Beginning with **LSMS** Release 6.0, Sentry information for **LSMS** processes is stored in shared memory, not the database. As a result, use of the sup_db_setup command to remove the supDB leaves Sentry in the state that it still monitors/restarts EagleAgents for **EMS** that were previously defined in the supDB. Therefore, Sentry will continually attempt to restart the EagleAgents for these **EMS**'s and will continue to display their status. To eliminate this problem, perform the following procedure:

Procedure:

1. Delete all **EMS** Components using the **LSMS GUI**. (For more information, refer to the *Configuration Guide*, Chapter 3, "Deleting an **EMS** Configuration Component.")
2. Deactivate all **NPAC** Regions using the **LSMS GUI**. (For more information, refer to the *Configuration Guide*, Chapter 3, "Modifying **LSMS** Configuration Components.")
3. Shutdown the **LSMS** using Sentry. Log in to the active server as `root`, and execute the `sentry shutdown` command:

   ```
   # sentry shutdown
   ```
4. Delete the supDB. Log in to the active server as `lsmsadm`, and execute the `sup_db_setup remove` command:

   ```
   $ $LSMS_DIR/sup_db_setup remove
   ```

You have now completed this procedure.

survNotify

Surveillance Notification Command

Use this command to send a customer-defined notification.

Keyword

```
survNotify
```

Permission

The user must be defined as a member of the primary group `lsms`.

Syntax

```
$LSMS_DIR/survNotify <MsgNo> SET <Text>
```

Options

None.

Parameters

MsgNo
Unique identifier for a customer-defined message. When the Action parameter has the value SET, this parameter is mandatory and must have a value in the range 9000-9999. When the Action parameter has any value other than SET, this parameter is not allowed.

SET
Send a surveillance notification which has the number specified by the MsgNo parameter and the text specified by Text parameter.

Text
The message text for a customer-defined notification. This parameter can contain up to 39 characters. If the text contains spaces, the text should begin and end with a double quote character. This parameter is optional.

Sample Output

```
 # Notify the Surveillance Monitor that a new customer-defined event has
occurred
 $ $LSMS_DIR/survNotify 9001 SET "Job completed"

 Response Notes
```

This command has no output other than the prompt.

Possible Errors

Table A-33 Exit Codes: survNotify

Exit Code	Cause	Suggested Recovery
1	Socket open error.	Contact the #unique_86.
2	Usage error.	Correct the syntax.
3	Unknown operation argument.	Supply a valid operation argument.
This command is usually run by scripts; scripts should search for exit codes. When the command is run from the command line, the output indicates suggested recovery.		

syscheck

Check System Health

Detects, diagnoses, and displays a summary of the overall health of the **LSMS**.

Keyword

```
syscheck
```

Permission

The user must be root.

Syntax

The syscheck command resides in the `/usr/TKLC/plat/bin` directory. Use only the syntax specified in procedures in this manual. For all other uses, contact the #unique_86.

Additional Information

For additional information about the syscheck command, access the man page from the **LSMS** by typing the following:

```
man syscheck
```

B

Automatic Monitoring of Events

This appendix contains overviews of monitored events, GUI and surveillance notifications, and traps.

Introduction

This appendix contains:

- “Overview of Monitored Events”, which describes how the **LSMS** monitors itself for events and alarms and how it reports them.
- “Overview of **GUI** Notifications”, which describes the display, format, and logging of notifications that appear on the graphical user interface.
- “Overview of Surveillance Notifications”, which describes the display, format, and logging of Surveillance notifications.
- “Overview of Traps”, which describes the transmission, format, and logging of **SNMP** *traps*.
- A listing of all events, in numerical order, starting on page B-18. For each event, this appendix includes:
  - Explanation of the probable cause for the event
  - Suggested recovery
  - Indication of whether the event results in a **GUI** notification, Surveillance notification, *trap*, or some combination of these.

Overview of Monitored Events

This section describes:

- Types of Events and Alarms Reported
- How Servers Report Alarms and Events

Types of Events and Alarms Reported

The **LSMS** monitors itself for the types of events and alarms shown in Table B-1 . When one of these events occurs, the **LSMS** does one or more of the following:

- Displays a notification on the graphical user interface (**GUI** notification)
- Posts a Surveillance notification at a certain frequency to the administration console by default, or to the second serial port if so configured
- Sends a *trap* to a Network Management System (**NMS**) if you have installed the optional Remote Monitoring feature

Every **GUI** notification and Surveillance notification contains its associated event number. Traps contain a trap **ID**, which is explained in Overview of Traps.

Table B-1 Notification Event Number Categories

Event Number Range	Category	Description
0000–1999	**EMS**	Events that pertain to an Element Management System (**EMS**). The **EMS** is a process that runs on the **Multi-Purpose Server** (**MPS**) at a network element.
2000–3999	**NPAC**	Events that pertain to a Number Portability Administration Center (**NPAC**)
4000–5999	Platform and switchover (some of these events do not produce **GUI** notifications)	Events that pertain to system resources, such as disks, hardware, memory, central processing unit (**CPU**) utilization and to switchover functions
6000–7999	Main **LSMS** processes	Events that pertain to one of the following main **LSMS** processes: `lsman`, `supman`, `npacagent`, or `eagleagent`
8000–8999	Applications	Events that pertain to **LSMS** applications that are feature or application dependent, such as **LNP Database** Synchronization, Service Assurance, or **NPA** Split Administration

How Servers Report Alarms and Events

The **LSMS** 9.0 servers perform the following functions to monitor and report events:

- The standby server:
  - Monitors itself only for:
    - Platform events (see Platform Alarms)
    - Switchover-readiness events, such as those that describe database replication or critical network interfaces
  - Controls the appropriate **AlarmLED** (Critical, Major, or Minor) on the front of the server by illuminating the **LED** when one or more platform alarm in that category exists and turning off the **LED** when no platform alarms in that category exist
  - Sends any notification to its Serial Port 3 and logs the notification in its Surveillance log
  - Sends the notification to the active server
- The active server performs the following functions:
  - Monitors itself for both platform events and application events

- Controls the appropriate **AlarmLED** (Critical, Major, or Minor) on the front of the server by illuminating the **LED** when one or more platform alarm in that category exists and turning off the **LED** when no platform alarms in that category exist
- Sends all platform events for itself, events reported from the standby server, and appropriate application events for itself to its Serial Port 3 and also logs the event as appropriate in its Surveillance log (some event notifications are reported repeatedly; for more information about which events are reported repeatedly, see the individual event descriptions)
  - Alarms that originate from the active server contain the alarm text with no hostname
  - Alarms that originate from the standby server contain the alarm text preceded by the standby server's hostname

  > **Note:**
  >
  > Although all events are reported through **SNMP** traps and all platform alarms are reported through Surveillance notifications, not all application alarms are reported both through the **GUI** and through Surveillance notifications; for more information about which alarms are reported in which way, see the individual event descriptions.

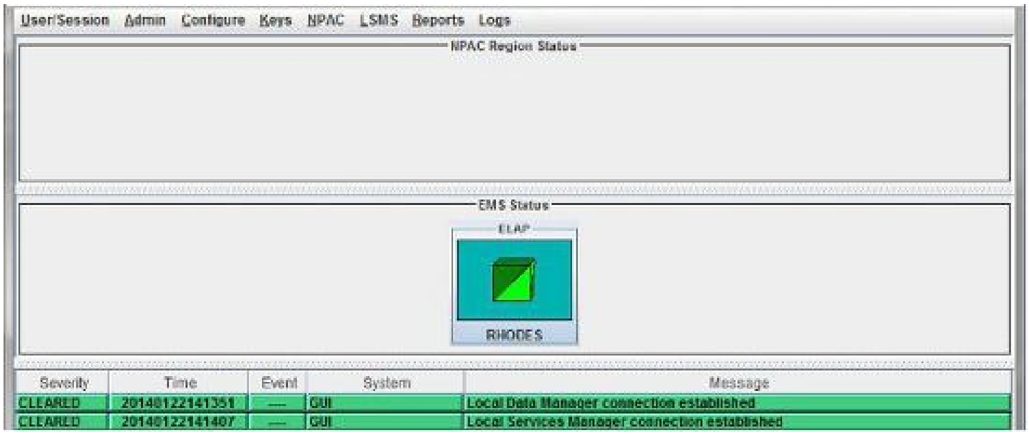
- Displays one time on the **GUI** each platform or application event for itself and each platform event received from the standby server:
  - Alarms that originate from the active server display the alarm text with no hostname
  - Alarms that originate from the standby server display the alarm text preceded by the standby server's hostname
- Sends one **Simple Network Management Protocol** (**SNMP**) trap for each platform or application event for itself and for each platform event received from the standby server. Each trap contains the **IP** address of the server from which the notification originated.

Overview of GUI Notifications

Displaying GUI Notifications

GUI notifications are displayed on the **GUI** only if the **GUI** is active when the reported event occurs, but all **GUI** notifications are logged in an appropriate log as described in Logging GUI Notifications. Figure B-1 shows an example of notifications displayed on the **GUI**.

Figure B-1   GUI Notifications



Severity	Time	Event	System	Message
CLEARED	20140122141351	—	GUI	Local Data Manager connection established
CLEARED	20140122141407	—	GUI	Local Services Manager connection established

Format of GUI Notifications

This section describes the general format used for most **GUI** notifications, as well as additional fields used for **GUI** event notifications (used to report information only) and for **EMS GUI** notifications. The formats are expressed as an ordered sequence of variables. Variables are expressed with the name of the variable enclosed by angle brackets; for example, <Severity> indicates a variable for the severity assigned to a **GUI** notification. Variables Used in GUI Notification Format Descriptionsshows the variables used in **GUI** notification formats.

General Format for GUI Notifications

The format for most **GUI** notifications is:

```
[<Severity>]:<Time Stamp> <Event Number> <Message Text String>
```

In addition, the following types of **GUI** notifications contain additional fields:

- **EMS GUI** notifications contain information about the **EMS** for which they are reporting status (see Format for EMS GUI Notifications)
- Notifications that have the severity `EVENT` can contain additional event data fields (see Format for GUI Notifications with EVENT Severity)

Format for EMS GUI Notifications

EMS GUI notifications (event numbers in the range 0000–1999) contain a `<CLLI>` value to indicate the **Common Language Location Identifier** for the network element where the **EMS** resides. The format for **EMS GUI** notifications is:

```
[<Severity>]:<Time Stamp> <Event Number> <CLLI>: <Message Text String>
```

Format for GUI Notifications with EVENT Severity

Notifications that have the severity EVENT can contain additional event data fields. The format for **GUI** notifications with severity EVENT is:

```
[EVENT]:<Time Stamp> <Event Number> <EventType>:<EventData1>,
[<EventData2>],...
```

Variables Used in GUI Notification Format Descriptions

Table B-2 shows the possible values and meanings for each of the variables shown in format definitions for **GUI** notifications.

Table B-2 Variables Used in GUI Notifications

Field	Description		
<Severity>	Indicates seriousness of event, using both text and color, as follows:		
	Text	Color	Meaning
	[Critical]	Red	Reports a serious condition that requires immediate attention
	[Major]	Yellow	Reports a moderately serious condition that should be monitored, but does not require immediate attention
	[Minor]	Turquoise	Reports a condition of minor significance that should be monitored, but which does not require immediate attention.
	[Cleared]	Green	Reports status information or the clearing of a condition that caused previous posting of a [Critical] or [Major] **GUI** notification
	[EVENT]	White	For information only
<Time Stamp>	Indicates time that the event was detected, in format: **YYYY**-**MM**-**DD** hh:mm:ss where fields are as follows:		
	Field	**Meaning**	**Possible Values**
	YYYY	Year	Any four digits
	MM	Month	01 through 12
	DD	Day	01 through 31
	hh	Hour	00 through 23

Table B-2 (Cont.) Variables Used in GUI Notifications

Field	Description		
	mm	Minute	00 through 59
	ss	Second	00 through 59
<Event Number>	Four-digit number that identifies the specific **GUI** notification (also indicates the type of **GUI** notification, as shown in Table B-1).		
<Message Text String>	Text string (which may contain one or more variables defined in Table B-3) that provides a small amount of information about the event. For more information about the event, look up the corresponding event number in this appendix; for each event number, this appendix shows the text string as it appears in a **GUI** notification, as well as a more detailed explanation and suggested recovery.		
<CLLI>	Used in all **EMS GUI** notifications to indicate the **Common Language Location Identifier** for the network element where the **EMS** resides.		
<EventType>:<EventData1>,[<EventData2>],...	Optional event data fields, as indicated by square brackets around the field, included in **GUI** notifications with severity [EVENT]. If no data is available for a given field, the field is empty. If other fields follow an empty field, the empty field is indicated by consecutive commas with no intervening data. One of the optional fields in an event notification is an effective timestamp field. This field indicates the time that the event actually occurred. When present, it uses the **ASN**.1 Generalized Time format.		

Variables Used in Message Text String of GUI Notifications

Table B-3 shows the variables that can appear in the message text of a **GUI** notification.

Table B-3 Variables Used in Message Text of GUI Notifications

Symbol	Possible Values and Meanings	Number of Characters
<PRIMARY|SECONDARY>	**PRIMARY**=Primary **NPAC** **SECONDARY**=Secondary **NPAC**	7 or 9
<retry_interval>	Time, in minutes, between retries of a request sent to an **NPAC** after it sent a failure response	1-10
<retry_number>	Number of times the **LSMS** will retry to recover from a failure response sent by **NPAC**	1-10
<YYYYMMDDhhmmss>	Year, month, day, hour, minute, second	14

Table B-3 (Cont.) Variables Used in Message Text of GUI Notifications

Symbol	Possible Values and Meanings	Number of Characters
`<NPAC_region_ID>`	**CA** = Canada **MA** = MidAtlantic **MW** = Midwest **NE** = Northeast **SE** = Southeast **SW** = Southwest **WE** = Western **WC** = WestCoast	2

Examples of GUI Notifications

Example of General Format GUI Notifications

Following is an example of a general **GUI** notification (for a description of its format, see General Format for GUI Notifications):

```
[Critical]:1998-07-05 11:49:56 2012 NPAC PRIMARY-NE Connection Attempt
Failed:
Access Control Failure
```

Example of an EMS GUI Notification

Following is an example of an **EMS GUI** notification (for a description of its format, see Format for EMS GUI Notifications). In this example, `<CLLI>` has the value `LNPBUICK`:

```
[Critical]:1998-07-05 11:49:56 0003 LNPBUICK: Primary Association Failed
```

Example of GUI Notification with EVENT Severity Level

Following is an example of a **GUI** notification with severity `[EVENT]`. For a description of its format, see Format for GUI Notifications with EVENT Severity:

```
[EVENT]: 2000-02-05 11:49:56 8069 LNPBUICK: Audit LNP DB Synchronization
Aborted
```

Logging GUI Notifications

When an event that generates a **GUI** notification occurs, that notification is logged in the file created for those events. Table B-4 shows the types of log files used for each of these file names, where `<mmdd>` indicates the month and day the event was logged.

Table B-4 Logs for GUI Notifications

Event Type	Log File
EMS Alarms, **NPAC** Alarms, and Main **LSMS** Process Alarms	`/var/TKLC/lsms/logs/alarm/LsmsAlarm.log.<mmdd>`
Non-alarm Events	`/var/TKLC/lsms/logs/<region>/LsmsEvent.log.<mmdd>`, where `<region>` indicates the region of the **NPAC** that generated the information

For information about the format of the logs and how to view the logs, refer to the *Database Administrator's Guide*.

Overview of Surveillance Notifications

Surveillance notifications are created by the Surveillance feature. These notifications can report status that is not available through the **GUI** notifications and report status that can be monitored without human intervention.

Displaying Surveillance Notifications

Surveillance notifications are sent to Serial Port 3 on each server.

Format of Surveillance Notifications

All Surveillance notifications reported on the same server where the event occurred have the following format:

```
<Event Number>|<Time Stamp>|<Message Text String>
```

Surveillance notifications that originated from the non-active server and are reported on the active server where the event occurred have an additional field that shows the hostname of the server where the event occurred, as shown in the following format:

```
<Event Number>|<Time Stamp>|<Host Name>|<Message Text String>
```

Variables Used in Surveillance Notification Format Descriptions

Table B-5 shows the possible values and meanings for each of the variables shown in format definition for Surveillance notifications.

Table B-5 Variables Used in Surveillance Notifications

Field	Description
`<Event Number>`	Four-digit number that identifies the specific Surveillance notification and also indicates the type of Surveillance notification, as shown in Table B-2 .

Table B-5 (Cont.) Variables Used in Surveillance Notifications

<table>
<tr><th>Field</th><th>Description</th></tr>
<tr><td>&lt;Time Stamp&gt;</td><td>Indicates time that the event was detected, in format:
hh:mm Mon DD, YYYY where fields are as follows:
<table>
<tr><th>Field</th><th>Meaning</th><th>Possible Values</th></tr>
<tr><td>hh</td><td>Hour</td><td>00 through 23</td></tr>
<tr><td>mm</td><td>Minute</td><td>00 through 59</td></tr>
<tr><td>Mon</td><td>Month</td><td>First three letters of month’s name</td></tr>
<tr><td>DD</td><td>Day</td><td>01 through 31</td></tr>
<tr><td>YYYY</td><td>Year</td><td>Any four digits</td></tr>
</table></td></tr>
<tr><td>&lt;Host Name&gt;</td><td>First seven letters of the name of the host (one of two redundant servers) that noted the event. (In addition, the documentation of the individual event includes information about whether the event is reported by the active server or inactive server, or both servers.)</td></tr>
<tr><td>&lt;Message Text String&gt;</td><td>Text string (which may contain one or more variables defined in Table B-6) that provides a small amount of information about the event. For more information about the event, look up the corresponding event number in this appendix; for each event number, this appendix shows the text string as it appears in a Surveillance notification, as well as a more detailed explanation and suggested recovery.</td></tr>
</table>

Variables Used in Message Text String of Surveillance Notifications

Table B-6 shows the variables that can appear in the message text of a Surveillance notification.

Table B-6 Variables Used in Message Text of Surveillance Notifications

Symbol	Possible Values and Meanings	Number of Characters
<CLLI>	**Common Language Location Identifier** for the network element	11

<PRIMARY|SECONDARY>	PRIMARY=Primary **NPAC**
	SECONDARY=Secondary **NPAC**
		7 or 9

<NPAC_cust_ID>	0000 = Midwest 0001 = MidAtlantic 0002 = Northeast 0003 = Southeast 0004 = Southwest 0005 = Western 0006 = WestCoast 0008 = Canada	4
<NPAC_IP_Address>	**IP** address of the **NPAC**	10
<process_name>	First 12 characters of process name	12

Table B-6 (Cont.) Variables Used in Message Text of Surveillance Notifications

Symbol	Possible Values and Meanings	Number of Characters
`<region>`	Midwest MidAtlantic Northeast Southeast Southwest Western WestCoast Canada	6 to 12
`<return_code>`	Return code	1 or 2
`<Service_Assurance_Manager_name>`	System name of machine that implements the Service Assurance Manager	12
`<volume_name>`	Name of disk volume, for example: `a01`	3
`<volume_name_of_disk_partition>`	Name of disk volume, for example: `a01`	3

Example of a Surveillance Notification

Following is an example of a Surveillance notification:

```
LSMS8088|14:58 Mar 10, 2000|lsmspri|Notify: sys Admin - Auto Xfer
Failure
```

Logging Surveillance Notifications

In addition to displaying Surveillance notifications, the Surveillance feature logs all Surveillance notifications in the file `survlog.log` in the`/var/`**TKLC**`/lsms/logs` directory.

If the **LSMS** Surveillance feature becomes unable to properly report conditions, it logs the error information in a file, named `lsmsSurv.log`, in the /var/**TKLC**/lsms/logs directory on each server’s system disk. When the size of `lsmsSurv.log` exceeds 1MB, it is copied to a backup file, named `lsmsSurv.log.bak`,in the same directory. There is only one **LSMS** Surveillance feature backup log file, which limits the amount of log disk space to approximately 2MB.

Overview of Traps

The optional Remote Monitoring feature provides the capability for the **LSMS** to report certain events and alarms to a remote location, using the industry-standard **Simple Network Management Protocol** (**SNMP**). The **LSMS** implements an **SNMP** agent.

Customers can use this feature to cause the **LSMS** to report events and alarms to another location, which implements an **SNMP** Network Management System (**NMS**). An **NMS** is typically a standalone device, such as a workstation, which serves as an interface through which a human network manager can monitor and control the network. The **NMS** typically has a set of management applications (for example, data analysis and fault recovery applications).

For more information about the **LSMS** implementation of an **SNMP** agent, see "Understanding the **SNMP** Agent Process".

SNMP Version 3 Trap PDU Format

An SNMPv3 trap PDU consists of the following fields:

- PDU Type
  Specifies the type of PDU (in this case, trap).
- Request ID
  Used to associate requests with responses.
- Error Status
  Specifies an error or error type in response PDUs only (else set to 0)
- Error Index
  Associates an error with a particular object instance in response PDUs only (else set to 0)
- Variable Bindings
  Each variable binding contains an object field followed by its value field. The object and value fields together specify information about the event being reported.

SNMP Version 1 Trap PDU Format

Following is an overview of the format of the **SNMP** version 1 *trap* request. For more information about **SNMP** message formats, refer to **SNMP**, **SNMPv2**, **SNMPv3**, *and* **RMON** *1 and 2*, Third Edition, William Stallings, Addison Wesley, **ISBN** 0-201-48534-6, 1999.

Each **SNMP** message consists of the following fields:

- **SNMP** authentication header, which consists of:
  - Version identifier, used to ensure that both the sender and receiver of the message are using the same version of the **SNMP** protocol. Currently, the **LSMS** supports only version 1, which has a version identifier of 0 (zero).
  - Community name, used to authenticate the **NMS**. The **SNMP** agent uses this field as a password to ensure that the sender of the message is allowed to access the **SNMP** agent's information. The **LSMS** supports only *trap* requests, which originate at the **LSMS**; therefore, this field is not significant.
- Protocol data unit (**PDU**), which for a *trap* request consists of:

An SNMPv1 trap PDU consists of the following fields:

- PDU Type field, which specifies the type of PDU (in this case, trap).
- Enterprise field, which identifies the device generating the message. For the **LSMS SNMP** agent, this field is 323.
- Agent address field, which contains the **IP** address of the host that runs **SNMP** agent. For the **LSMS SNMP** agent, this field contains the **IP** address of the **LSMS** active server.

- Generic *trap* type, which can be set to any value from 0 through 6. Currently, the **LSMS** supports only the value 6, which corresponds to the *enterpriseSpecific* type of *trap* request.
- Specific *trap* type, which can be used to identify a specific trap.
- Time stamp, which indicates how many hundredths of a second have elapsed since the last reinitialization of the host that runs the **SNMP** agent.
- One or more variables bindings, each of which contains an object field followed by a value field. The object and value fields together specify information about the event being reported.

Logging SNMP Agent Actions

When the **LSMS SNMP** agent process starts, stops, or sends a *trap* request, it logs information about the action in a log file. The log file is named `lsmsSNMP.log.<MMDD>`, where `<MMDD>` represents the current month and day. The log file is stored in the directory `/usr/TKLC/lsms/logs/snmp`.

Table B-7 shows the actions and information logged by the **LSMS SNMP** agent.

Table B-7 Information Logged by the LSMS SNMP Agent

<table>
<tr><th>Action</th><th>Information Logged</th></tr>
<tr><td>The <b>SNMP</b> agent starts</td><td>Action, followed by day, date, time, and year; for example:
<code>LSMS SNMP agent started: Thu Mar 09 09:02:53 2000</code></td></tr>
<tr><td>The <b>SNMP</b> agent stops</td><td>Action, followed by day, date, time, and year; for example:
<code>LSMS SNMP agent stopped: Thu Mar 09 15:34:50 2000</code></td></tr>
<tr><td>The <b>SNMP</b> agent sends a <i>trap</i> request</td><td>The following fields, delimited by pipe characters:<ul><li>Timestamp, recorded as <b>YYYYMMDDhhmmss</b> (year, month, date, hour, minute, second)</li><li>trap_<b>ID</b>, a unique numeric identifier that corresponds to the specific <i>trap</i> request sent.</li><li>For each <b>NMS</b> configured (up to five allowed):<ul><li>The <b>NMS</b>’s <b>IP</b> address</li><li>Status (either of the following):<ul><li><code>S</code> to indicate that the <b>LSMS SNMP</b> agent succeeded in sending the <i>trap</i> request. (Even if the <b>LSMS SNMP</b> agent successfully sends the <i>trap</i> request, there is no guarantee that the <b>NMS</b> receives it.)</li><li><code>F</code> to indicate that the <b>LSMS SNMP</b> agent failed in sending the <i>trap</i> request.</li></ul></li></ul></li></ul>Following is a sample entry logged when a <i>trap</i> is sent (in this entry, a <i>trap</i> with a trap_<b>ID</b> of 3 is sent to two <b>NMSs</b>):
<code>20000517093127|3|10.25.60.33|S|10.25.60.10|S</code></td></tr>
</table>

Event Descriptions

0001

Explanation

The **EMS** Ethernet interface has a problem. The `ping` utility did not receive a response from the interface associated with the **EMS**.

Recovery

Consult with your network administrator.

Event Details

Table B-8   Event 0001 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - EMS interface failure
Source	Both servers
Frequency	Every 2.5 minutes as long as condition exists
Trap	
Trap **ID**	16
Trap **MIB** Name	emsInterfaceFailure

0002

Explanation

The **EMS**, which is indicated in the System field on the **GUI** or whose **CLLI** has the value that replaces `<CLLI>` in the Surveillance notification text, requires a resynchronization with the **LSMS** that cannot be accomplished by automatic resynchronization between the **LSMS** and the **EMS**.

Recovery

Perform one of the synchronization procedures described in the *LNP Database Synchronization User's Guide*.

Event Details

Table B-9   Event 0002 Details

GUI Notification	
Severity	Critical
Text	**DB** Maintenance Required
Surveillance Notification	
Text	Notify:Sys Admin - NE CLLI=<CLLI>

Table B-9 (Cont.) Event 0002 Details

Source	Active server
Frequency	As soon as condition occurs, and at five-minute intervals as long as condition exists
Trap	
Trap **ID**	33
Trap **MIB** Name	emsRequiresResynchWithLSMS

0003

Explanation

The **LSMS** has lost association with the primary **EMS** of the network element, which is indicated in the System field on the **GUI** or whose **CLLI** has the value that replaces <**CLLI**> in the Surveillance notification text; the association with the secondary **EMS** is established.

Recovery

Determine why the primary association failed (connectivity problem, **EMS** software problems, **NE** software problem, etc.). Correct the problem. **Association** will be automatically retried.

Event Details

Table B-10 Event 0003 Details

GUI Notification	
Severity	Major
Text	Primary Association Failed
Surveillance Notification	
Text	Notify:Sys Admin - NE CLLI=<CLLI>
Source	Active server
Frequency	As soon as condition occurs, and at five-minute intervals as long as condition exists
Trap	
Trap **ID**	5
Trap **MIB** Name	primaryEMSAssocLostSecEstablished

0004

Explanation

The **LSMS** has lost association with the primary **EMS** of the network element, which is indicated in the System field on the **GUI** or whose **CLLI** has the value that replaces <**CLLI**> in the Surveillance notification text; the association with the secondary **EMS** is not established.

Recovery

Determine why the primary association failed (connectivity problem, **EMS** software problems, **NE** software problem, etc.). Correct the problem, and then reestablish the association with the primary **EMS**.

Event Details

Table B-11 Event 0004 Details

GUI Notification	
Severity	Critical
Text	Primary Association Failed
Surveillance Notification	
Text	Notify:Sys Admin - NE CLLI=<CLLI>
Source	Active server
Frequency	As soon as condition occurs, and at five-minute intervals as long as condition exists
Trap	
Trap **ID**	36
Trap **MIB** Name	primaryEMSAssocLostNoSec

0006

Explanation

The pending queue used to hold transactions to be sent to the **EMS**/**NE**, which is indicated in the System field on the **GUI** or whose **CLLI** has the value that replaces <**CLLI**> in the Surveillance notification text, is full. To help ensure that no updates are lost, the `eagleagent` will abort associations with both the primary **EMS** and secondary **EMS**. Updates will be queued in a resynchronization log until the **EMS** reassociates.

Recovery

Determine why the **EMS**/**NE** is not receiving **LNP** updates, and correct the problem.

Event Details

Table B-12 Event 0006 Details

GUI Notification	
Severity	Critical
Text	All Association(s) Aborted: Pending Queue Full
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	97
Trap **MIB** Name	emsAssociationAbortedQueueFull

0007

Explanation

The network element, which is indicated in the System field on the **GUI** or whose **CLLI** has the value that replaces `<CLLI>` in the Surveillance notification text, is busy and is sending ’retry later’ in response to a message sent by the `eagleagent`. The `eagleagent` has already tried resending the same message the maximum number of times. The `eagleagent` has aborted associations with both the primary **EMS** and secondary **EMS**.

Recovery

Correct the problem at the network element. When the **EMS** reconnects with the **LSMS**, the **LSMS** will automatically resynchronize the network element’s **LNP** database.

Event Details

Table B-13 Event 0007 Details

GUI Notification	
Severity	Critical
Text	All Association(s) Aborted: Retries Exhausted
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	98
Trap **MIB** Name	emsAssocAbortedMaxResend

0008

Explanation

The **LSMS** has lost association with the secondary **EMS** which is indicated in the System field on the **GUI** or whose **CLLI** has the value that replaces `<CLLI>` in the Surveillance notification text. The association with the primary **EMS** is still up.

Recovery

Determine why the secondary association failed (connectivity problem, **EMS** software problems, **NE** software problem, etc.) and then reestablish the association with the secondary **EMS**.

Event Details

Table B-14 Event 0008 Details

GUI Notification	
Severity	Major

Table B-14 (Cont.) Event 0008 Details

Text	Secondary Association Failed
Surveillance Notification	
Text	Notify:Sys Admin - NE CLLI=<CLLI>
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	130
Trap **MIB** Name	secondaryEMSAssocLost

0009

Explanation

The **LSMS** has established the first association with the network element (**NE**) which is indicated in the System field on the **GUI** or whose **CLLI** has the value that replaces <**CLLI**> in the Surveillance notification text. The first association established is called the primary association. This **EMS** is called the primary **EMS**.

Recovery

No action required; this notification is for information only.

Event Details

Table B-15 Event 0009 Details

GUI Notification	
Severity	Cleared
Text	Primary Association Established
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	8
Trap **MIB** Name	primaryEMSAssocEstablished

0010

Explanation

The **LSMS** has established the second association with the network element (**NE**) which is indicated in the System field on the **GUI** or whose **CLLI** has the value that replaces <**CLLI**> in the Surveillance notification text. The association is established only if a primary association already exists. This **EMS** is called the secondary **EMS**.

Recovery

No action required; this notification is for information only.

Event Details

Table B-16   Event 0010 Details

GUI Notification	
Severity	Cleared
Text	Secondary Association Established
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	134
Trap **MIB** Name	secondaryEMSAssocEstablished

0011

Explanation

The primary association for the **EMS**/**NE**, which is indicated in the System field on the **GUI** or whose **CLLI** has the value that replaces <**CLLI**> in the Surveillance notification text, is either down or is inhibited, such that transactions sent to the primary **EMS** will not be received by the **NE**. Transactions are being sent to the secondary **EMS** instead of the primary **EMS**.

Recovery

Determine why the primary association failed (connectivity problem, **EMS** software problem, **NE** software problem, or other problem). Correct the problem. **Association** will be automatically retried. When the association is reestablished, it will be a secondary association, and the **EMS** will be the secondary **EMS**.

Event Details

Table B-17   Event 0011 Details

GUI Notification	
Severity	Cleared
Text	Successful Switchover Occurred to Secondary EMS
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	139
Trap **MIB** Name	transactionToSecondary

2000

Explanation

The **NPAC** Ethernet interface has a problem. The `ping` utility did not receive a response from the interface associated with the **NPAC**.

Recovery

Consult with your network administrator.

Event Details

Table B-18 Event 2000 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - NPAC interface failure
Source	Both primary and secondary servers
Frequency	Every 2.5 minutes as long as condition exists
Trap	
Trap **ID**	15
Trap **MIB** Name	npacInterfaceFailure

2001

Explanation

The association with the **NPAC** identified by <**NPAC**_region_**ID**> has been disconnected by the user.

Recovery

Examine additional **GUI** notifications to determine whether the **LSMS** is retrying the association. Follow the recovery actions described for the **GUI** notification.

Event Details

Table B-19 Event 2001 Details

GUI Notification	
Severity	Critical
Text	NPAC [<PRIMARY|SECONDARY>-<NPAC_region_ID>] Connection Disconnected
Surveillance Notification	
Text	Notify:Sys Admin - NPAC=<PRIMARY|SECONDARY>-<NPAC_region_ID>
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	37

Table B-19 (Cont.) Event 2001 Details

Trap **MIB** Name	lostNPACAssoc

2002

Explanation

The **LSMS** is not able to confirm the physical connectivity with the **NPAC**, which is specified in the System field on the **GUI** or is indicated by `<NPAC_region_ID>` in the Surveillance notification.

Recovery

Check the physical connection between the **LSMS** and the **NPAC**. The problem may be in the network, a router, or both.

Event Details

Table B-20 Event 2002 Details

GUI Notification	
Severity	Critical
Text	**LSMS** Physical Disconnect with **NPAC**
Surveillance Notification	
Text	Notify:Sys Admin - **NPAC**=<**NPAC**_region_**ID**>
Source	Active server
Frequency	As soon as condition occurs, and at five-minute intervals as long as condition exists
Trap	
Trap **ID**	45
Trap **MIB** Name	failedNPACConnectivity

2003

Explanation

The **NPAC** (`PRIMARY` or `SECONDARY`, as indicated) identified by `<NPAC_region_ID>` rejected the association because it received a message from the **LSMS** that failed security checks. This can be due to one of the following:

- The **CMIP** departure time is more than five minutes out of synchronization with the **NPAC** servers.
- The security key is not valid.
- The **CMIP** sequence number is out of sequence (messages must be returned to the **NPAC** in the same order in which they were received).

Recovery

Do the following:

1. Log in as `lsmsadm` to the active server.

2. Enter the following command to determine what the **LSMS** system time is:

   ```
   $ date
   ```

3. Contact the **NPAC** administrator to determine what the **NPAC** time is. If the **NPAC** time is more than five minutes different from the **LSMS** time, reset the **LSMS** system time on both servers and on the administration console using one of the procedures described in "Managing the System Clock".

4. After you have verified that the **NPAC** and **LSMS** times are within five minutes of each other, cause a different security key to be used by stopping and restarting the regional agent. Enter the following commands, where `<region>` is the name of the region in which this notification occurred:

   ```
   $LSMS_DIR/lsms stop <region> $LSMS_DIR/lsms start <region>
   ```

5. Start the **GUI** again.

6. Attempt to reassociate with the **NPAC**. For information about associating with an **NPAC**, refer to the *Configuration Guide*.

7. If the problem persists, contact Oracle Technical Service.

Event Details

Table B-21 Event 2003 Details

	GUI Notification
Severity	Critical
Text	NPAC [<PRIMARY|SECONDARY>-<NPAC_region_ID>] Connection Aborted by PEER: Access Control Failure
	Surveillance Notification
Text	Notify:Sys Admin - NPAC=<PRIMARY|SECONDARY>-<NPAC_region_ID>
Source	Active server
Frequency	As soon as condition occurs, and at five-minute intervals as long as condition exists
	Trap
Trap **ID**	95
Trap **MIB** Name	npacRejectedAssocAccessCtrlFail

2004

Explanation

The primary or secondary **NPAC**, identified by <**NPAC**_region_**ID**>, rejected the association because it received data that was not valid.

Recovery

Contact the **NPAC** administrator.

Event Details

Table B-22 Event 2004 Details

	GUI Notification

Table B-22 (Cont.) Event 2004 Details

Severity	Critical
Text	**NPAC** [<**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>] Connection Aborted by **PEER**: Invalid Data Received
	Surveillance Notification
Text	Notify:Sys Admin - **NPAC**= <**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>
Source	Active server
Frequency	As soon as condition occurs, and at five-minute intervals as long as condition exists
	Trap
Trap **ID**	96
Trap **MIB** Name	npacRejectedAssocInvalidData

2005

Explanation

The **LSMS** has lost association with the primary or secondary **NPAC** identified by <**NPAC**_region_**ID**> because the user aborted the association.

Recovery

Reassociate with the **NPAC** when the reason for aborting the association no longer exists. For information about associating with an **NPAC**, refer to the *Configuration Guide*.

Event Details

Table B-23 Event 2005 Details

	GUI Notification
Severity	Critical
Text	**NPAC** [<**PRIMARY**|**SECONDARY**>]-<**NPAC**_region_**ID**> **Association** Aborted by User
	Surveillance Notification
Text	Notify:Sys Admin - **NPAC**= <**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>
Source	Active server
Frequency	Once, as soon as condition occurs
	Trap
Trap **ID**	9
Trap **MIB** Name	npacAbortByUser

2006

Explanation

The **LSMS** did not receive an association response from the **NPAC** within the timeout period. The **LSMS** will attempt the association with the **NPAC** again after an interval that defaults to two minutes, but can be configured to a different value by Oracle.

Recovery

Determine whether there is a network connection problem and/or contact the **NPAC** administrator to determine whether the **NPAC** is up and running.

Event Details

Table B-24 Event 2006 Details

	GUI Notification
Severity	Critical
Text	**NPAC** [<**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>] Bind Timed Out - Auto Retry After **NPAC**_RETRY_INTERVAL
	Surveillance Notification
Text	Notify:Sys Admin - **NPAC**= <**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>
Source	Active server
Frequency	As soon as condition occurs, and at two-minute intervals as long as condition exists
	Trap
Trap **ID**	100
Trap **MIB** Name	assocRespNPACTimeout

2007

Explanation

The **NPAC** association attempt was rejected by the **NPAC**, and the **LSMS** was informed to attempt the **NPAC** association again to the same **NPAC** host after an interval that defaults to two minutes, but can be configured to a different value by Oracle.

Recovery

No action required; the **LSMS** will automatically try to associate again.

Event Details

Table B-25 Event 2007 Details

	GUI Notification
Severity	Critical
Text	**NPAC** [<**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>] Connection Aborted by **PEER** - Auto Retry Same Host After **NPAC**_RETRY_INTERVAL
	Surveillance Notification
Text	Notify:Sys Admin - **NPAC**=< **PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>
Source	Active server

Table B-25 (Cont.) Event 2007 Details

Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	101
Trap **MIB** Name	assocRejectedRetrySameHost

2008

Explanation

The **NPAC** association attempt was rejected by the **NPAC**, and the **LSMS** was informed to attempt the **NPAC** association again to the other **NPAC** host after an interval that defaults to two minutes, but can be configured to a different value by Oracle.

Recovery

No action required; the **LSMS** will automatically try to associate again.

Event Details

Table B-26 Event 2008 Details

GUI Notification	
Severity	Critical
Text	**NPAC** [<**PRIMARY**|**SECONDARY**>]-<**NPAC**_region_**ID**>- Connection Aborted by **PEER** - Auto Retry Other Host After **NPAC**_RETRY_INTERVAL
Surveillance Notification	
Text	Notify:Sys Admin - **NPAC**= <**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	102
Trap **MIB** Name	assocRejectedRetryOtherHost

2009

Explanation

A problem exists in the network connectivity. The **LSMS** will attempt the association with the **NPAC** again after an interval that defaults to two minutes, but can be configured to a different value by Oracle.

Recovery

Check the network connectivity for errors. Verify the ability to `ping` the **NPAC** from the **LSMS**.

Event Details

Table B-27 Event 2009 Details

GUI Notification	
Severity	Critical
Text	**NPAC** [<**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>] Connection Aborted by **PROVIDER** - Auto Retry Same Host After **NPAC**_RETRY_INTERVAL
Surveillance Notification	
Text	Notify:Sys Admin - **NPAC**= <**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	103
Trap **MIB** Name	nwtkProblemRetryNPACAssoc

2010

Explanation

The **LSMS** received three consecutive responses from the **NPAC** with a download status of failure from a recovery action request. The **LSMS** has aborted the association and will attempt to associate again after a retry interval that defaults to five minutes, but can be configured to a different value by Oracle. The **LSMS** will retry the recovery action after the association is reestablished.

Recovery

No action required; the **LSMS** will automatically try to associate again.

Event Details

Table B-28 Event 2010 Details

GUI Notification	
Severity	Critical
Text	**NPAC** [<**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>] Connection Aborted Due to Recovery Failure - Auto Retry After **NPAC**_RETRY_INTERVAL
Surveillance Notification	
Text	Notify:Sys Admin - **NPAC**= <**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	104
Trap **MIB** Name	lsmsAbortedNPACassocDowRecFail

2011

Explanation

The **LSMS** has disconnected the association with the **NPAC** region in question due to the lack of a response to heartbeat messages from the **LSMS** to the **NPAC**.

Recovery

Contact the #unique_86.

Event Details

Table B-29 Event 2011 Details

	GUI Notification
Severity	Critical
Text	**NPAC** [<**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>] Connection Disconnected by Heartbeat
	Surveillance Notification
Text	Notify:Sys Admin - **NPAC**= <**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>
Source	Active server
Frequency	Once, as soon as condition occurs
	Trap
Trap **ID**	111
Trap **MIB** Name	lostNPACAssoc

2012

Explanation

The **NPAC** (`primary` or `secondary`, as indicated) identified by <**NPAC**_region_**ID**> rejected the association because of an access control failure. This can be due to one of the following:

- The **OSI** Presentation Address is incorrect.
- The Service Provider **ID** in the regional configuration file is incorrect.
- The **CMIP** departure time is more than five minutes out of synchronization with the **NPAC** servers.
- The security key is not valid.

Recovery

Do the following:

1. Verify that the correct **PSEL**, **SSEL**, **TSEL**, and **NSAP** values have been configured for the **OSI** Presentation Address (for more information, refer to "Viewing a Configured **NPAC** Component" in the *Configuration Guide*). If you need to change the values, use the procedure described in "Modifying an **NPAC** Component" in the *Configuration Guide*.
2. Verify that the configured Service Provider **ID** (**SPID**) is the same as the **SPID** assigned by the **NPAC**. For more information about this configuration file, refer to "Modifying **LSMS** Configuration Components" in the *Configuration Guide*.
3. Verify that the configured **NPAC_SMS**_NAME is the same as the value assigned by the **NPAC** (this field is case-sensitive). For more information about this

configuration file, refer to “Modifying an **NPAC** Component” in the *Configuration Guide*.

4. Log in as `lsmsadm` to the active server.
5. Enter the following command to determine what the **LSMS** system time is:

   ```
   $ date
   ```

6. Contact the **NPAC** administrator to determine what the **NPAC** time is. If the **NPAC** time is more than five minutes different from the **LSMS** time, reset the **LSMS** system time on both servers and on the administration console by performing one of the procedures described in “Managing the System Clock”.
7. After you have verified that the **NPAC** and **LSMS** times are within five minutes of each other, cause a different security key to be used by stopping and restarting the regional agent. Enter the following commands, where `<region>` is the name of the region in which this notification occurred:

   ```
   $ $LSMS_DIR/lsms stop <region> $ $LSMS_DIR/lsms start <region>
   ```

8. Start the **GUI** again.
9. Attempt to reassociate with the **NPAC**.
10. If the problem persists, contact Oracle Technical Service.

Event Details

Table B-30 Event 2012 Details

	GUI Notification
Severity	Critical
Text	**NPAC** [<**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>] Connection Attempt Failed: Access Control Failure
	Surveillance Notification
Text	Notify:Sys Admin - **NPAC**= <**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>
Source	Active server
Frequency	Once, as soon as condition occurs
	Trap
Trap **ID**	106
Trap **MIB** Name	assocRejDueToAccessControl

2014

Explanation

The userInfo value in the cmipUserInfo portion of the **NPAC** association response **CMIP** message is not valid.

Recovery

Contact the **NPAC** administrator to determine why the **NPAC** is sending an invalid association response.

Event Details

Table B-31   Event 2014 Details

	GUI Notification
Severity	Critical
Text	**NPAC** [<**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>] Connection Attempt Failed: Invalid Data Received
	Surveillance Notification
Text	Notify:Sys Admin - **NPAC**= <**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>
Source	Active server
Frequency	Once, as soon as condition occurs
	Trap
Trap **ID**	108
Trap **MIB** Name	npacConnFailedCMIP

2015

Explanation

The **NPAC** association was terminated gracefully by the **NPAC**.

Recovery

According to the **NANC** specifications, this should never occur; if this message is seen, contact the **NPAC** administrator for the reason for the association unbind.

Event Details

Table B-32   Event 2015 Details

	GUI Notification
Severity	Critical
Text	**NPAC** [<**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>] Connection Disconnected by **NPAC**
	Surveillance Notification
Text	Notify:Sys Admin - **NPAC**= <**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>
Source	Active server
Frequency	As soon as condition occurs, and at five-minute intervals as long as condition exists
	Trap
Trap **ID**	109
Trap **MIB** Name	npacAssocGracefullyTerminated

2018

Explanation

The **LSMS** was unable to properly resynchronize (with the **NPAC**) the data that was lost while the **LSMS** was not associated with the **NPAC**.

Recovery

Do the following:

1. Abort the **NPAC** association (refer to the *Configuration Guide*).
2. Attempt to reassociate with the **NPAC** (refer to the *Configuration Guide*).
3. If the reassociation is not successful, contact the **NPAC** and contact the #unique_86.

Event Details

Table B-33 Event 2018 Details

	GUI Notification
Severity	Critical
Text	**NPAC** [<**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>] Recovery Failed
	Surveillance Notification
Text	
Source	None
Frequency	
	Trap
Trap **ID**	112
Trap **MIB** Name	lsmsDataLostBadResynch

2019

Explanation

The **LSMS** data lost during the resynchronization time was not resynchronized properly with the **NPAC**.

Recovery

Do the following:

1. Abort the **NPAC** association (refer to the *Configuration Guide*).
2. Reestablish the **NPAC** association (refer to the *Configuration Guide*).
3. Determine whether notification `NPAC <PRIMARY|SECONDARY> Recovery Complete` is posted. If instead notification `2019` reappears, perform a resynchronization for a period of time starting one hour before the `2019` notification first appeared, using either the **GUI** (refer to “Resynchronizing for a Defined Period of Time Using the **GUI**” in the *Database Administrator's Guide*).
4. If `2019` continues to appear, contact the #unique_86.

Event Details

Table B-34 Event 2019 Details

	GUI Notification

Table B-34 (Cont.) Event 2019 Details

Severity	Critical
Text	**NPAC** [<**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>] Recovery Partial Failure
Surveillance Notification	
Text	**NPAC** [<**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>] Recovery Failure
Source	Active server
Frequency	Once , as soon as condition occurs
Trap	
Trap **ID**	113
Trap **MIB** Name	badNPACresynchTime

2020

Explanation

The **LSMS** aborted the **NPAC** association because the **LSMS** received a message from the **NPAC** that did not have the correct **LSMS** key signature.

Recovery

Verify that the correct keys are being used by both the **NPAC** and the **LSMS**.

Event Details

Table B-35 Event 2020 Details

GUI Notification	
Severity	Critical
Text	**NPAC** [<**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>] Security Violation. **Association** Aborted. Retrying
Surveillance Notification	
Text	Notify:Sys Admin - **NPAC**= <**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	114
Trap **MIB** Name	assocAbortedBadKeys

2021

Explanation

An associate retry timer was in effect. The retry attempt was canceled because a **GUI** user issued an Associate, Abort or Disconnect request. If an Associate request was issued, the association is attempted immediately.

Recovery

No action required; for information only.

Event Details

Table B-36   Event 2021 Details

	GUI Notification
Severity	Major
Text	**NPAC** [<**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>] Automatic **Association** Retry Canceled
	Surveillance Notification
Text	
Source	None
Frequency	
	Trap
Trap **ID**	122
Trap **MIB** Name	npacAutoAssociationRetryCanceled

2022

Explanation

Either the **LSMS** did not receive any response from the **NPAC** before a timeout expired or the **LSMS** received a response from the **NPAC** with a download status of failure from a recovery action request. The **NPAC** is unable to process the recovery action due to a temporary resource limitation. The **LSMS** will retry the request for the number of times indicated by `<retry_number>` with the interval between each retry indicated by `<retry_interval>` minutes. If recovery is not successful after the indicated number of retries, the **LSMS** will abort the association and post the following notification:

```
[Critical]: <Timestamp>  2010
:  NPAC [<PRIMARY|SECONDARY>-<NPAC_region_ID>] Connection Aborted Due to
Recovery Failure - Auto Retry After NPAC_RETRY_INTERVAL
```

Recovery

No action required; for information only.

Event Details

Table B-37   Event 2022 Details

	GUI Notification
Severity	Major
Text	**NPAC** [<**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>] Fail/No Response from **NPAC** Recovery - Auto Retry <retry_number> Times in <retry_interval> Minutes
	Surveillance Notification
Text	None
Source	

Table B-37 (Cont.) Event 2022 Details

Frequency	
Trap	
Trap **ID**	123
Trap **MIB** Name	npacRecoveryFailureResourceLimit

2023

Explanation

The **NPAC** association will be down for the specified period of time (from the first time field shown in the notification to the second time field shown in the notification) due to **NPAC**-scheduled down time.

Recovery

When the scheduled down time is over, manually reestablish the **NPAC** association. For information about aborting and reestablishing an association, refer to the *Configuration Guide*.

Event Details

Table B-38 Event 2023 Details

GUI Notification	
Severity	Major
Text	**NPAC** [<**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>] ScheduleDownTime from [<**YYYYMMDDhhmmss**>] to [<**YYYYMMDDhhmmss**>]
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	124
Trap **MIB** Name	npacAssocPeriodDown

2024

Explanation

An Associate request has been sent to the **NPAC** after a retry timer expired.

Recovery

No action required; for information only.

Event Details

Table B-39 Event 2024 Details

	GUI Notification
Severity	Major
Text	**NPAC** [<**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>] Timer Expired - Resending **Association** Request
	Surveillance Notification
Text	
Source	None
Frequency	
	Trap
Trap **ID**	125
Trap **MIB** Name	npacAssocRequestSentAfterRetryTimer

2025

Explanation

The **NPAC** association was successfully established.

Recovery

No action required; for information only.

Event Details

Table B-40 Event 2025 Details

	GUI Notification
Severity	Cleared
Text	**NPAC** [<**PRIMARY**|**SECONDARY**>-<**NPAC**_region_**ID**>] Connection Successfully Established
	Surveillance Notification
Text	
Source	None
Frequency	
	Trap
Trap **ID**	7
Trap **MIB** Name	npacAssocEstablished

4000

Explanation

The active server has initiated an automatic switchover to the inactive server.

Recovery

No action required; for information only.

Event Details

Table B-41 Event 4000 Details

GUI Notification	
Severity	Event
Text	Switchover Initiated
Surveillance Notification	
Text	Notify:Sys Admin - Switchover initiated
Source	Active server
Frequency	Once, soon as condition occurs.
Trap	
Trap **ID**	11
Trap **MIB** Name	switchOverStarted

4001

Explanation

LSMS service has been switched over.

Recovery

No action required; for information only.

Event Details

Table B-42 Event 4001 Details

GUI Notification	
Severity	Event
Text	Switchover complete
Surveillance Notification	
Text	Notify:Sys Admin - Switchover complete
Source	Active server
Frequency	Once, soon as condition occurs.
Trap	
Trap **ID**	12
Trap **MIB** Name	switchOverCompleted

4002

Explanation

LSMS service could not be switched over to the inactive server; the inactive server was not able to start **LSMS** service.

Recovery

Contact the #unique_86.

Event Details

Table B-43 Event 4002 Details

GUI Notification	
Severity	Event
Text	Switchover Failed
Surveillance Notification	
Text	Notify:Sys Admin - Switchover Failed
Source	Active server
Frequency	Once, as soon as condition occurs.
Trap	
Trap **ID**	13
Trap **MIB** Name	switchOverFailed

4003

Explanation

This notification indicates that the disk controller <controllerId> is out of service and is affecting shared storage. This notification is only valid on E3000 systems.

controllerId= The specific controller number (either 0 or 1).

Recovery

Contact #unique_86 for assistance.

Event Details

Table B-44 Event 4003 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - Loss of disk on < controllerId>
Source	Either server
Frequency	Every 5 minutes as long as condition exists
Trap	
Trap **ID**	14
Trap **MIB** Name	diskContrService

4004

Explanation

The Ethernet interface used to connect to the application network has a problem. This interface usually connects to network-connected workstations. The `ping` utility did not receive a response from the interface associated with the application network.

Recovery

Consult with your network administrator.

Event Details

Table B-45 Event 4004 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - **APP** interface failure
Source	Either server
Frequency	Every 2.5 minutes as long as condition exists
Trap	
Trap **ID**	17
Trap **MIB** Name	appsInterfaceFailure

4005

Explanation

This notification indicates that the Ethernet interface used to connect to the ADMINISTRATION network has a problem.

Recovery

Consult with your network administrator.

Event Details

Table B-46 Event 4005 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - ADMIN interface faire
Source	Either server
Frequency	Every 2.5 minutes as long as condition exists
Trap	
Trap **ID**	18
Trap **MIB** Name	adminInterfaceFailure

4006

Explanation

This notification indicates that the system disk has lost synchronization, possibly due to a hardware problem.

driveSpecId= disk drive specification.

Recovery

Contact #unique_86 for assistance.

Event Details

Table B-47 Event 4006 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - < driveSpecId >
Source	Either server
Frequency	Every 5 minutes as long as condition exists
Trap	
Trap **ID**	20
Trap **MIB** Name	systemDiskSynch

4007

Explanation

Database replication has failed.

Recovery

Contact the #unique_86.

Event Details

Table B-48 Event 4007 Details

GUI Notification	
Severity	Critical
Text	**DB** Repl Err - <dbReplErr>
Surveillance Notification	
Text	Notify:Sys Admin - **DB** repl error
Source	Both servers
Frequency	Every minute as long as condition exists.
Trap	
Trap **ID**	21
Trap **MIB** Name	dataReplError

4008

Explanation

The database replication process monitor has failed.

Recovery

Contact the #unique_86.

Event Details

Table B-49 Event 4008 Details

GUI Notification	
Severity	Critical
Text	**DB** Proc Mon Err - <dbMonErr>
Surveillance Notification	
Text	Notify:Sys Admin - **DB** monitor failure
Source	Active server
Frequency	Every five minutes as long as condition exists.
Trap	
Trap **ID**	22
Trap **MIB** Name	dbMonitorFail

4009

Explanation

The server has an internal disk error.

Recovery

Contact the #unique_86.

Event Details

Table B-50 Event 4009 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - Internal Disk Error
Source	Either server
Frequency	Within five minutes of the condition occurring and at five-minute intervals as long as condition exists
Trap	
Trap **ID**	23
Trap **MIB** Name	internalDiskError

4010

Explanation

This notification indicates that the hot-spare feature has completed automatic data resynchronization.

Recovery

No action required; this notification is for information only.

Event Details

Table B-51 Event 4010 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - < driveSpecId >- < driveSpecId >
Source	Either server
Frequency	Once
Trap	
Trap **ID**	24
Trap **MIB** Name	hotSparedDataResynch

4011

Explanation

This notification indicates that LSMS database replication is delayed.

Recovery

No action required.

Event Details

Table B-52 Event 4011 Details

GUI Notification	
Severity	N/A
Text	DB Repl Info
Surveillance Notification	
Text	Notify:Sys Admin - DB repl info
Source	Either server
Frequency	Within five minutes of the condition occurring and every minute thereafter as long as condition exists.
Trap	
Trap **ID**	25
Trap **MIB** Name	dataReplInfo

4012

Explanation

A process specified by `<process_name>` is utilizing 40 percent or more of the **LSMS**'s **CPU** resource and the <second_**ID**> indicates a specific instance of the process, as follows:

- When the `<process_name>` is `eagleagent`, the <second_**ID**> specifies the Common Language Location Indicator (**CLLI**) of the network element
- When the `<process_name>` is `npacagent`, the <second_**ID**> specifies the name of the region
- When the `<process_name>` is not `eagleagent` or `npacagent`, the <second_**ID**> specifies the process **ID** (**PID**) of the process.

Recovery

Because this notification is posted every five minutes as long as the condition exists, you may choose to ignore this notification the first time that it appears. However, if this notification is repeated several times in a row, do one of the following:

1. If the `<process_name>` is not `npacagent`, go to step 4. Otherwise, determine whether the `npacagent` is still using 40% or more of the **CPU** resource by entering the following command, where `<region>` can be optionally specified (it is the name of the region as displayed at the end of the notification text):

   ```
   $ ps -eo pid,pcpu,args | grep npacagent | grep <region>
   ```

2. If the `npacagent` is still using 40% or more of the **CPU** resource, enter the following commands to stop the `npacagent` and restart it, where `<region>` is the name of the **NPAC** region whose `npacagent` is using 40% or more of the **CPU** resource:

   ```
   $ cd $LSMS_DIR
   $ lsms stop <region>
   ```

   ```
   $ lsms start <region>
   ```

3. Repeat step 1. If the `npacagent` you tried to stop is still using 40% or more of the **CPU** resource, contact the #unique_86.
4. If the `<process_name>` is not `eagleagent`, go to step 7. Otherwise, determine whether the `eagleagent` is still using 40% or more of the **CPU** resource by entering the following command, where `<CLLI>` can be optionally specified (it is the name of the network element as displayed at the end of the notification text):

   ```
   $ ps -eo pid,pcpu,args | grep eagleagent | grep <CLLI>
   ```

5. If the `eagleagent` is still using 40% or more of the **CPU** resource, enter the following commands to stop the `eagleagent` and restart it, where `<CLLI>` is the Common Language Location Indicator (**CLLI**) of the network element whose `eagleagent` is using 40% or more of the **CPU** resource:

   ```
   $ cd $LSMS_DIR
   $ eagle stop <CLLI>
   ```

   ```
   $ eagle start <region>
   ```

6. Repeat step 1. If the process you tried to stop is still using 40% or more of the **CPU** resource, contact the #unique_86.

7. If the <process_name> is not eagleagent or npacagent, contact the #unique_86.

Event Details

Table B-53 Event 4012 Details

GUI Notification	
Severity	Major
Text	Process [<process_name>-<second_**ID**>] Utilizing High Percentage of **CPU**
Surveillance Notification	
Text	Notify:Sys Admin - [<process_name>-<second_**ID**>]
Source	Either server
Frequency	Every five minutes as long as condition exists
Trap	
Trap **ID**	26
Trap **MIB** Name	cpuUtilitzationOver39

4013

Explanation

The **LSMS** server with default hostname `lsmspri` has been inhibited.

Recovery

As soon as possible, start the server by performing the procedure described in “Starting a Server”.

Event Details

Table B-54 Event 4013 Details

GUI Notification	
Severity	Major
Text	Primary Server Inhibited
Surveillance Notification	
Text	Notify:Sys Admin - Primary inhibited
Source	Server with default hostname `lsmspri`
Frequency	As soon as condition occurs, and at five-minute intervals as long as condition exists
Trap	
Trap **ID**	27
Trap **MIB** Name	primaryServerInhibited

4014

Explanation

The **LSMS** server with default hostname `lsmssec` has been inhibited.

Recovery

As soon as possible, start the server by performing the procedure described in "Starting a Server".

Event Details

Table B-55 Event 4014 Details

GUI Notification	
Severity	Major
Text	`Secondary Server Inhibited`
Surveillance Notification	
Text	`Notify:Sys Admin - Secondary inhibited`
Source	Server with default hostname `lsmssec`
Frequency	As soon as condition occurs, and at five-minute intervals as long as condition exists
Trap	
Trap **ID**	28
Trap **MIB** Name	secondaryServerInhibited

4015

Explanation

A heartbeat link is down.

Recovery

Contact the #unique_86.

Event Details

Table B-56 Event 4015 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - Heartbeat failure
Source	Both servers
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	29
Trap **MIB** Name	heartbeatLinkDown

4016

Explanation

This notification indicates that the Heartbeat 2 link is down.

Recovery

Contact #unique_86 for assistance.

Event Details

Table B-57 Event 4016 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - Heartbeat 2 failure
Source	Both server
Frequency	Once
Trap	
Trap **ID**	30
Trap **MIB** Name	heartbeatLinkTwoDown

4017

Explanation

This notification indicates that the LSMS network configuration is incorrect.

Recovery

Customer or field engineers should:

- Verify network configuration and network cabling
- Verify serial configuration and cabling if serial keepalive is configured
- If the problem persists, contact #unique_86

Event Details

Table B-58 Event 4017 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - Network setup error
Source	Active server
Frequency	Every 5 minutes
Trap	
Trap **ID**	31
Trap **MIB** Name	lsmsNtwkConfigError

4018

Explanation

This notification indicates that the LSMS network configuration is not supported or recommended.

Recovery

Contact #unique_86 for assistance.

Event Details

Table B-59 Event 4018 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - Network setup unsupp
Source	Active server
Frequency	Every 5 minutes
Trap	
Trap **ID**	32
Trap **MIB** Name	lsmsNtwkConfigNotSupported

4019

Explanation

This notification indicates that the disk volume specified by diskVolName has exceeded the 95 percent usage threshold.

Recovery

Contact #unique_86 for assistance.

Event Details

Table B-60 Event 4019 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - < diskVolName >
Source	Either server
Frequency	Every 5 minutes
Trap	
Trap **ID**	38

Table B-60 (Cont.) Event 4019 Details

Trap **MIB** Name	diskVolume95Usage

4020

Explanation

The server’s swap space has exceeded the critical usage threshold (default = 95%).

Recovery

If the problem persists, contact #unique_86.

Event Details

Table B-61 Event 4020 Details

GUI Notification	
Severity	Critical
Text	Swap space exceeds Critical
Surveillance Notification	
Text	Notify:Sys Admin - Swap space Critical
Source	Either server
Frequency	Every five minutes as long as condition exists
Trap	
Trap **ID**	39
Trap **MIB** Name	swapSpaceCritical

4021

Explanation

The **LSMS** application or system **daemon** whose name has `<process_name>` as the first 12 characters is not running.

Recovery

No user action is necessary. The Surveillance process automatically restarts the Service Assurance process (`sacw`) and the `sentryd` process automatically restarts other processes.

Event Details

Table B-62 Event 4021 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - <process_name> failed
Source	Active server

Table B-62 (Cont.) Event 4021 Details

Frequency	As soon as condition occurs, and at five-minute intervals as long as condition exists
Trap	
Trap **ID**	40
Trap **MIB** Name	lsmsAppsNotRunning

4022

Explanation

The backup of the **LSMS** database has completed successfully.

Recovery

No action required; for information only.

Event Details

Table B-63 Event 4022 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	**DATABASE** backup complete
Source	Standby server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	41
Trap **MIB** Name	backupCompleted

4023

Explanation

The backup of the **LSMS** database has failed.

Recovery

Review backup output to determine why backup failed, correct the problems, and run backup script again manually.

> **Note:**
>
> Determine whether the NAS can be reached using the ping command. If the NAS cannot be reached, restart the NAS. To restart the NAS turn the power off, then turn the power on. If the NAS can be reached, contact the #unique_86 for assistance.

Event Details

Table B-64 Event 4023 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - **DATABASE** backup failed
Source	Standby server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	42
Trap **MIB** Name	backupFailed

4024

Explanation

The primary **LSMS** server (Server 1A) is not providing the **LSMS** service.

Recovery

No action required; for information only.

Event Details

Table B-65 Event 4024 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - Primary not online
Source	Both primary and secondary servers
Frequency	Every five minutes as long as condition exists
Trap	
Trap **ID**	63
Trap **MIB** Name	primaryServerNotOnline

4025

Explanation

The standby server is not prepared to take over **LSMS** service.

Recovery

Contact #unique_86.

Event Details

Table B-66 Event 4025 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - Can't switch to standby
Source	Standby server
Frequency	Every five minutes as long as condition exists
Trap	
Trap **ID**	64
Trap **MIB** Name	standbyNotReadyForSwitchover

4026

Explanation

The secondary **LSMS** server (Server 1B) is currently providing the **LSMS** service.

Recovery

No action required; for information only.

Event Details

Table B-67 Event 4026 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - Secondary online
Source	Both primary and secondary servers
Frequency	Every five minutes as long as condition exists
Trap	
Trap **ID**	65
Trap **MIB** Name	secServerProvidingLSMSService

4027

Explanation

The standby **LSMS** server cannot determine the availability of the **LSMS** service on the active server.

Recovery

Determine if the other server is working normally. Also, verify that the heartbeat connections (`eth2`, `eth3`, and the serial cable) are connected and functioning properly

Event Details

Table B-68 Event 4027 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - Primary status unknown
Source	Standby server
Frequency	Every five minutes as long as condition exists
Trap	
Trap **ID**	66
Trap **MIB** Name	secServerCannotDeterminePrimAvailability

4028

Explanation

This notification indicates an LSMS mirroring inconsistency.

Recovery

Contact #unique_86 for assistance.

Event Details

Table B-69 Event 4028 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - < volume_name >
Source	Either server
Frequency	Every 5 minutes
Trap	
Trap **ID**	169
Trap **MIB** Name	lsmsMirroringInconsistance

4029

Explanation

This notification indicates that the LSMS filesystem is not writeable.

Recovery

Contact #unique_86 for assistance.

Event Details

Table B-70 Event 4029 Details

	GUI Notification
Severity Text	None
	Surveillance Notification
Text	Notify:Sys Admin - < fileSystem >
Source	Either server
Frequency	Every 5 minutes
	Trap
Trap **ID**	170
Trap **MIB** Name	lsmsFilesystemNotWritable

4030

Explanation

The server's swap space has exceeded the major usage threshold (default = 80%).

Recovery

If the problem persists, contact #unique_86.

Event Details

Table B-71 Event 4030 Details

	GUI Notification
Severity	Major
Text	`Swap Space Warning`
	Surveillance Notification
Text	`Notify:Sys Admin - Swap space warning`
Source	Both servers
Frequency	Every five minutes as long as condition exists
	Trap
Trap **ID**	190
Trap **MIB** Name	swapSpaceWarning

4031

Explanation

A database replication error that was reported earlier by the 4007 event has now been cleared.

Recovery

No action necessary.

Event Details

Table B-72 Event 4031 Details

GUI Notification	
Severity	Cleared
Text	**Database** Replication cleared - <dbReplErr>
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	195
Trap **MIB** Name	dataReplClear

4032

Explanation

A database process monitor error that was reported earlier by the 4008 event has now been cleared.

Recovery

No action necessary.

Event Details

Table B-73 Event 4032 Details

GUI Notification	
Severity	Cleared
Text	**Database** Replication cleared - <dbMonErr>
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	196
Trap **MIB** Name	dbMonitorCLear

4033

Explanation

The LSMS database failed count operation, which suggests a corrupt MySQL index.

Recovery

Contact #unique_86.

Event Details

Table B-74 Event 4033 Details

GUI Notification	
Severity	Critical
Text	Database Corrupt Index
Surveillance Notification	
Text	None
Source	Both servers
Frequency	Every 30 minutes.
Trap	
Trap **ID**	200
Trap **MIB** Name	dbCorruptIndex

4034

Explanation

This notification indicates that the Invalid Snapshot has been detected.

Recovery

Clean Up After Failed or Interrupted Snapshot

Event Details

Table B-75 Event 4034 Details

GUI Notification	
Severity	Critical
Text	Invalid Snapshot - <snapName>
Surveillance Notification	
Text	Notify:Sys Admin - Invalid Snapshot
Source	Active server
Frequency	Every 30 minutes
Trap	
Trap **ID**	201
Trap **MIB** Name	snapInvalidErr

4035

Explanation

This notification indicates that the Invalid Snapshot error has been cleared.

Recovery

No action required; this notification is for information only.

Event Details

Table B-76 Event 4035 Details

GUI Notification	
Severity	Cleared
Text	Invalid Snapshot cleared - <snapName>
Surveillance Notification	
Text	Invalid Snapshot cleared - <snapName>
Source	Active server
Frequency	Every 30 minutes
Trap	
Trap **ID**	202
Trap **MIB** Name	snapInvalidClear

4036

Explanation

This notification indicates that the Snapshot is greater than 80% full.

Recovery

No action required; this notification is for information only.

Event Details

Table B-77 Event 4036 Details

GUI Notification	
Severity	Critical
Text	Full Snapshot - <snapName>
Surveillance Notification	
Text	Notify:Sys Admin - Full Snapshot
Source	Active server
Frequency	Every 30 minutes
Trap	
Trap **ID**	203
Trap **MIB** Name	fullSnapshot

4037

Explanation

This notification indicates that the Snapshot full error is cleared.

Recovery

No action required; this notification is for information only.

Event Details

Table B-78 Event 4037 Details

GUI Notification	
Severity	Cleared
Text	Full Snapshot cleared - <snapName>
Surveillance Notification	
Text	Full Snapshot cleared - <snapName>
Source	Active server
Frequency	Every 30 minutes
Trap	
Trap **ID**	204
Trap **MIB** Name	fullSnapshotClear

4038

Explanation

The mate server is down.

Recovery

Contact the #unique_86.

Event Details

Table B-79 Event 4038 Details

GUI Notification	
Severity	Critical
Text	Mate Server Down
Surveillance Notification	
Text	Notify:Sys Admin - Mate Server Down
Source	Both servers
Frequency	Every minute as long as condition exists
Trap	
Trap **ID**	205
Trap **MIB** Name	mateServerDown

4039

Explanation

The mate server is up.

Recovery

No action is required.

Event Details

Table B-80   Event 4039 Details

GUI Notification	
Severity	Cleared
Text	Mate Server Up
Surveillance Notification	
Text	Notify:Sys Admin - Mate Server Up
Source	Both servers
Frequency	As soon as condition clears
Trap	
Trap **ID**	206
Trap **MIB** Name	mateServerUp

4100

Explanation

One or more platform alarms in the minor category exists. To determine which minor platform alarms are being reported, see “How to Decode Platform Alarms”. When the active server reports minor platform alarms that originated on the other server, the hostname of the other server is inserted before the alarm string.

Recovery

Contact the #unique_86.

> **Note:**
>
> If you received Event 4100 in response to an snmpget error, contact the #unique_86 to have the NAS snmp daemon stopped and restarted.

Event Details

Table B-81   Event 4100 Details

GUI Notification	
Severity	Minor
Text	Minor Platform **Alarm** [hostname]: <alarm_string>
Surveillance Notification	
Text	Notify:Sys Admin - **ALM** <alarm_string>
Source	Both servers
Frequency	Every five minutes as long as condition exists
Trap	
Trap **ID**	191
Trap **MIB** Name	minorPlatAlarmMask

4101

Explanation

All platform alarms in the minor category have been cleared. When the active server reports that all minor platform alarms have cleared on the other server, the hostname of the other server is inserted before the alarm string.

Recovery

No action necessary.

Event Details

Table B-82 Event 4101 Details

GUI Notification	
Severity	Cleared
Text	Minor Platform Alarms Cleared
Surveillance Notification	
Text	Notify:Sys Admin - Minor Plat alrms clear
Source	Both servers
Frequency	Every five minutes as long as condition exists
Trap	
Trap **ID**	197
Trap **MIB** Name	minorPlatAlarmClear

4200

Explanation

One or more platform alarms in the major category exists. To determine which major platform alarms are being reported, see “How to Decode Platform Alarms”. When the active server reports major platform alarms that originated on the other server, the hostname of the other server is inserted before the alarm string.

Recovery

Contact the #unique_86.

Event Details

Table B-83 Event 4200 Details

GUI Notification	
Severity	Major
Text	Major Platform **Alarm** [hostname]: <alarm_string>
Surveillance Notification	
Text	Notify:Sys Admin - **ALM** <alarm_string>
Source	Both servers

Table B-83 (Cont.) Event 4200 Details

Frequency	Every five minutes as long as condition exists
Trap	
Trap **ID**	192
Trap **MIB** Name	majorPlatAlarmMask

4201

Explanation

All platform alarms in the major category have been cleared. When the active server reports that all major platform alarms have cleared on the other server, the hostname of the other server is inserted before the alarm string.

Recovery

No action necessary.

Event Details

Table B-84 Event 4201 Details

GUI Notification	
Severity	Cleared
Text	Major Platform Alarms Cleared
Surveillance Notification	
Text	Notify:Sys Admin - Major Plat alrms clear
Source	Both servers
Frequency	Once
Trap	
Trap **ID**	198
Trap **MIB** Name	majorPlatAlarmClear

4300

Explanation

One or more platform alarms in the critical category exists. To determine which critical platform alarms are being reported, see “How to Decode Platform Alarms”. When the active server reports critical platform alarms that originated on the other server, the hostname of the other server is inserted before the alarm string.

Recovery

Contact the #unique_86.

Event Details

Table B-85 Event 4300 Details

GUI Notification	
Severity	Critical
Text	Critical Platform **Alarm** [hostname]: <alarm_string>
Surveillance Notification	
Text	Notify:Sys Admin - **ALM** <alarm_string>
Source	Both servers
Frequency	Once
Trap	
Trap **ID**	193
Trap **MIB** Name	criticalPlatAlarmMask

4301

Explanation

All platform alarms in the major category have been cleared. When the active server reports that all major platform alarms have cleared on the other server, the hostname of the other server is inserted before the alarm string.

Recovery

No action necessary.

Event Details

Table B-86 Event 4301 Details

GUI Notification	
Severity	Cleared
Text	Critical Platform Alarms Cleared
Surveillance Notification	
Text	Notify:Sys Admin - Crit Plat alrms clear
Source	Both servers
Frequency	Once
Trap	
Trap **ID**	199
Trap **MIB** Name	criticalPlatAlarmClear

6000

Explanation

The `eagleagent` process has been started.

Recovery

No action required; for information only.

Event Details

Table B-87 Event 6000 Details

GUI Notification	
Severity	Cleared
Text	Eagleagent <**CLLI**> Has Been Started
Surveillance Notification	
Text	Notify:Sys Admin - <**CLLI**> started
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	1
Trap **MIB** Name	eagleAgentStarted

6001

Explanation

The `eagleagent` process has been stopped by the `eagle` script.

Recovery

No action required; for information only.

Event Details

Table B-88 Event 6001 Details

GUI Notification	
Severity	Critical
Text	Eagleagent <**CLLI**> Has Been Stopped by User
Surveillance Notification	
Text	Notify:Sys Admin - <**CLLI**> norm exit
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	2
Trap **MIB** Name	eagleAgentStoppedbyscript

6002

Explanation

The `npacagent` for the region indicated by <**NPAC**_region_**ID**> has been started.

Recovery

No action required; for information only.

Event Details

Table B-89 Event 6002 Details

GUI Notification	
Severity	Cleared
Text	**NPACagent** Has Been Started
Surveillance Notification	
Text	Notify:Sys Admin - <**NPAC**_region_**ID**> **NPACagent** started
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	3
Trap **MIB** Name	**NPACAgentStarted**

6003

Explanation

The `npacagent` for the region indicated by `<region>` has been stopped using the `lsms` command.

Recovery

No action required; for information only. If you desire to restart the agent, do the following:

1. Log in to the active server as `lsmsadm`.
2. Enter the following commands to start the `npacagent` where `<region>` is the name of the **NPAC** region:

```
$ cd $LSMS_DIR
$ lsms start <region>
```

Event Details

Table B-90 Event 6003 Details

GUI Notification	
Severity	Critical
Text	**NPACAgent** Has Been Stopped by User
Surveillance Notification	
Text	Notify:Sys Admin - <**NPAC**_region_**ID**> norm exit
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	4
Trap **MIB** Name	lsmsCommandStoppedNPACAgent

6004

Explanation

The eagleagent process for the network element identified by <**CLLI**> has failed. The sentryd process will attempt to restart.

Recovery

No action required; the sentryd process will attempt to restart the eagleagent process.

Event Details

Table B-91 Event 6004 Details

GUI Notification	
Severity	Critical
Text	Eagleagent [<**CLLI**>] Has Failed
Surveillance Notification	
Text	Notify:Sys Admin - **FAILD**: <**CLLI**>
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	74
Trap **MIB** Name	lsmsEagleAgentFailed

6005

Explanation

The eagleagent process for the network element identified by <**CLLI**> has been successfully restarted by the sentryd process.

Recovery

No action required.

Event Details

Table B-92 Event 6005 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - **RECOV**: <**CLLI**>
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	75

Table B-92 (Cont.) Event 6005 Details

Trap **MIB** Name	lsmsEagleAgentRestarted

6006

Explanation

The `sentryd` process was unable to restart the `eagleagent` process for the network element identified by `<CLLI>`.

Recovery

Contact the #unique_86.

Event Details

Table B-93 Event 6006 Details

GUI Notification	
Severity	Critical
Text	Failure Restarting Eagleagent [<**CLLI**>]
Surveillance Notification	
Text	Notify:Sys Admin - **RFAILD**: <**CLLI**>
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	76
Trap **MIB** Name	failureToRestartEagleAgent

6008

Explanation

The `npacagent` process for the region specified by <**NPAC**_region_**ID**> has failed. The `sentryd` process will attempt to restart.

Recovery

No action required; the `sentryd` process will attempt to restart the `npacagent` process.

Event Details

Table B-94 Event 6008 Details

GUI Notification	
Severity	Critical
Text	**NPACagent** [<**NPAC**_region_**ID**>] Failure
Surveillance Notification	

Table B-94 (Cont.) Event 6008 Details

Text	Notify:Sys Admin - **FAILD**: <**NPAC**_region_**ID**> agent
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	78
Trap **MIB** Name	**NPACagentForRegionFailure**

6009

Explanation

The `npacagent` process for the region specified by <**NPAC**_region_**ID**> has been successfully restarted by the `sentryd` process.

Recovery

No action required. Any active **LSMS GUI** processes will automatically reconnect.

Event Details

Table B-95 Event 6009 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - **RECOV**: <**NPAC**_region_**ID**> agent
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	79
Trap **MIB** Name	**NPACagentForRegionRestarted**

6010

Explanation

The `sentryd` process was unable to restart the `npacagent` process for the region specified by `<NPAC_region_ID>`.

Recovery

Contact the #unique_86.

Event Details

Table B-96 Event 6010 Details

GUI Notification	
Severity	Critical
Text	Failure Restarting **NPACagent** [<**NPAC**_region_**ID**>]
Surveillance Notification	
Text	Notify:Sys Admin - **RFAILD**: <**NPAC**_region_**ID**> agent
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	80
Trap **MIB** Name	failureToRestartNPACagentRegion

6020

Explanation

The `npacagent` process has been stopped due to a fault in accessing the regional database.

Recovery

A database error has occurred. Contact the #unique_86.

Event Details

Table B-97 Event 6020 Details

GUI Notification	
Severity	Critical
Text	**NPACagent** Has Been Shut Down - **Database** Access Error
Surveillance Notification	
Text	Notify:Sys Admin - <**NPAC**_region_**ID**> **DB** error
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	189
Trap **MIB** Name	**NPACagentStopRegDBaccessFault**

8000

Explanation

The **LSMS** Surveillance feature is in operation.

Recovery

No action required; for information only.

Event Details

Table B-98   Event 8000 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	`Keep alive`
Source	Both primary and secondary servers
Frequency	Every five minutes as long as condition exists
Trap	
Trap **ID**	19
Trap **MIB** Name	survFeatureOn

8001

Explanation

The network element resynchronization database contains more than 1 million entries.

Recovery

Each day, as part of a cron job, the **LSMS** trims the resynchronization database so that it contains 768,000 entries. The occurrence of this event means that more than 232,000 transactions have been received since the last cron job. If this event occurs early in the day, contact the #unique_86.

Event Details

Table B-99   Event 8001 Details

GUI Notification	
Severity	Major
Text	ResyncDB Contains 1 Mil Entries
Surveillance Notification	
Text	Notify:Sys Admin - ResyncDB 1 Mil
Source	Active server
Frequency	Once
Trap	
Trap **ID**	34
Trap **MIB** Name	resynchLogMidFull

8003

Explanation

The pending queue, used to hold the transactions to send to the network element (which is indicated in the System field on the **GUI** or whose **CLLI** has the value that replaces <**CLLI**> in the Surveillance notification text), is over half full.

Recovery

No recovery is required. Informational only.

Event Details

Table B-100   Event 8003 Details

GUI Notification	
Severity	Major
Text	**EMS** Pending Queue Is Half full
Surveillance Notification	
Text	Notify:Sys Admin - **CLLI**=<**CLLI**>
Source	Active server
Frequency	As soon as condition occurs, and at five-minute intervals as long as condition exists
Trap	
Trap **ID**	43
Trap **MIB** Name	ensPendingQueueHalfFull

8004

Explanation

The pending queue, used to hold the transactions to send to the network element (which is indicated in the System field on the **GUI** or whose **CLLI** has the value that replaces <**CLLI**> in the Surveillance notification text), is completely full. The association to that **EMS** will be broken.

Recovery

No manual recovery required. The **LSMS** will automatically re-establish the association to the **EMS** and synchronization will take place.

Event Details

Table B-101   Event 8004 Details

GUI Notification	
Severity	Critical
Text	**EMS** Pending Queue Is Full
Surveillance Notification	
Text	Notify:Sys Admin - **CLLI**=<**CLLI**>
Source	Active server
Frequency	As soon as condition occurs, and at five-minute intervals as long as condition exists
Trap	

Table B-101   (Cont.) Event 8004 Details

Trap **ID**	44
Trap **MIB** Name	emsPendingQueueMaxReached

8005

Explanation

There was a data error in a record that prevented the **LSMS** eagleagent from sending the record to the network element.

Recovery

Both the error and the ignored record are written to the file `/var/TKLC/lsms/logs/trace/LsmsTrace.log.<mmdd>`, where `<mmdd>` indicates the month and day the error occurred. Examine the log file for the month and day this error was reported to determine what the error was. Enter the data manually or send it again.

Event Details

Table B-102   Event 8005 Details

GUI Notification	
Severity	Minor
Text	Eagleagent <**CLLI**> Ignoring Record: <DataError>
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	46
Trap **MIB** Name	eagleAgentIgnoredRecord

8024

Explanation

The Service Assurance agent has started successfully.

Recovery

No action required; for information only.

Event Details

Table B-103   Event 8024 Details

GUI Notification	
Severity	None
Text	

Table B-103 (Cont.) Event 8024 Details

Surveillance Notification	
Text	Notify:Sys Admin
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	67
Trap **MIB** Name	serviceAssuranceAgentStarted

8025

Explanation

Association with the Service Assurance Manager, identified by `<Service_Assurance_Manager_Name>`, has been established successfully.

Recovery

No action required; for information only.

Event Details

Table B-104 Event 8025 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - <Service_Assurance_Manager_Name>
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	68
Trap **MIB** Name	establishServAssuranceMgrAssoc

8026

Explanation

Association with the Service Assurance Manager, identified by `<Service_Assurance_Manager_Name>`, has been stopped or disconnected.

Recovery

Contact the Service Assurance system administrator to determine the cause of disconnection, then have Service Assurance system administrator reassociate the Service Assurance Manager to the Service Assurance Agent.

Event Details

Table B-105   Event 8026 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - <Service_Assurance_Manager_Name>
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	69
Trap **MIB** Name	servAssuranceMgrAssocBroken

8027

Explanation

The Service Assurance agent is not currently running.

Recovery

No action required; the Service Assurance agent should be restarted automatically.

Event Details

Table B-106   Event 8027 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	70
Trap **MIB** Name	servAssuranceAgentNotRunning

8030

Explanation

This notification indicates that the LSMS is not able to confirm physical connectivity with the DCM.

Recovery

Contact #unique_86 for assistance.

Event Details

Table B-107 Event 8030 Details

GUI Notification	
Severity	Critical
Text	EBDA Physical Connection Lost
Surveillance Notification	
Text	Notify:Sys Admin - NE=< NE CLLI > EBDA conn lost
Source	Active server
Frequency	Every 5 minutes
Trap	
Trap **ID**	73
Trap **MIB** Name	noPhysicalConnectivityToDCM

8037

Explanation

The **OSI** process has failed. The `sentryd` process will attempt to restart.

Recovery

No action required; the `sentryd` process will attempt to restart the failed process.

Event Details

Table B-108 Event 8037 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - **FAILD**: **OSI**
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	88
Trap **MIB** Name	osiDaemonFailure

8038

Explanation

The **OSI** process has been successfully restarted by the `sentryd` process.

Recovery

No action required. The `sentryd` process will attempt to restart the `npacagent` processes for all active regions. Any active **LSMS GUI** processes will automatically reconnect.

Event Details

Table B-109   Event 8038 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - **RECOV**: **OSI**
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	89
Trap **MIB** Name	osiDaemonRestarted

8039

Explanation

The `sentryd` process was not able to restart the **OSI** process.

Recovery

Contact #unique_86.

Event Details

Table B-110   Event 8039 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - **RFAILD**: **OSI**
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	90
Trap **MIB** Name	osiDaemonRestartFailure

8040

Explanation

The Surveillance feature has detected that the `sentryd` process is no longer running.

Recovery

No action required; the **LSMS HA** software will attempt to restart the `sentryd` process.

Event Details

Table B-111   Event 8040 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - **FAILD**: sentryd
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	91
Trap **MIB** Name	sentrydFailure

8041

Explanation

This notification indicates that the surveillance process has detected that the Legacy IddAgent process has restarted and all functionality has resumed.

Recovery

No action required; this notification is for information only.

Event Details

Table B-112   Event 8041 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - RECOV: IddAgent legacy
Source	Both servers
Frequency	Once, as soon as the condition occurs
Trap	
Trap **ID**	92
Trap **MIB** Name	IddAgentRestarted

8042

Explanation

This notification indicates that the surveillance process has detected that the SCPMS IddAgent process has restarted and all functionality has resumed.

Recovery

No action required; this notification is for information only.

Event Details

Table B-113 Event 8042 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	Notify:Sys Admin - RECOV: lddAgent scpms
Source	Both servers
Frequency	Once, as soon as the condition occurs
Trap	
Trap **ID**	93
Trap **MIB** Name	scpmsIddAgentRestarted

8044

Explanation

This notification indicates that the LDD SCPMS Confirmation of Arrival message retry attempts have been exhausted. The MQSeries interface is not operational or network connectivity to the remote system is lost.

Recovery

Contact #unique_86 for assistance.

Event Details

Table B-114 Event 8044 Details

GUI Notification	
Severity	Critical
Text	LDD SCPMS COA Retry Attempts Exhausted
Surveillance Notification	
Text	None
Source	
Frequency	
Trap	
Trap **ID**	116
Trap **MIB** Name	scpmsMqSeriesFault

8045

Explanation

This notification indicates that the LDD SCPMS system has not provided a response within the time limit specified by the LDD_SCP_SYSTEM_RESPONSE_TIMEOUT configuration parameter. The SCPMS system is not active.

Recovery

Contact #unique_86 for assistance.

Event Details

Table B-115 Event 8045 Details

GUI Notification	
Severity	Critical
Text	LDD SCPMS Response Retry Attempts Exhausted
Surveillance Notification	
Text	None
Source	
Frequency	
Trap	
Trap **ID**	117
Trap **MIB** Name	scpmsNotActive

8046

Explanation

This notification indicates that the LDD Legacy Confirmation of Arrival message retry attempts have been exhausted.

The MQSeries interface is not operational or network connectivity to the remote system is lost.

Recovery

Contact #unique_86 for assistance.

Event Details

Table B-116 Event 8046 Details

GUI Notification	
Severity	Critical
Text	LDD SCPMS COA Retry Attempts Exhausted
Surveillance Notification	
Text	None
Source	
Frequency	
Trap	
Trap **ID**	118

Table B-116 (Cont.) Event 8046 Details

Trap **MIB** Name	legacyMqSeriesFault

8047

Explanation

This notification indicates that the LDD Legacy system has not provided a response within the time limit specified by the LDD_SCP_SYSTEM_RESPONSE_TOMEOUT configuration parameter. The SCPMS system is not active.

Recovery

Contact #unique_86 for assistance.

Event Details

Table B-117 Event 8047 Details

GUI Notification	
Severity	Critical
Text	LDD Legacy Response Retry Attempts Exhausted
Surveillance Notification	
Text	None
Source	
Frequency	
Trap	
Trap **ID**	119
Trap **MIB** Name	scpmsLegacyNotActive

8048

Explanation

This notification indicates that a connection could not be made to the MQSeries local queue manager. The local queue manager is not started or operational.

Recovery

Contact #unique_86 for assistance.

Event Details

Table B-118 Event 8048 Details

GUI Notification	
Severity	Critical
Text	Unable to Connect to Queue Manager: < queueMgrName >
Surveillance Notification	

Table B-118 (Cont.) Event 8048 Details

Text	None
Source	
Frequency	
Trap	
Trap **ID**	120
Trap **MIB** Name	mqSeriesQueueManagerNotActive

8049

Explanation

The **EMS**/**NE** has rejected the **NPANXX GTT** creation, deletion, or modification transaction, and the **NPANXX** value in the transaction could not be determined.

Recovery

Look in the transaction log file, `/var/TKLC/lsms/logs/<CLLI>/LsmsTrans.log.MMDD`, and locate the **NE**'s response to the **NPANXX GTT** command to determine why the command failed. Re-enter the **NPANXX GTT** data correctly, which will cause the **LSMS** to try to command again.

Event Details

Table B-119 Event 8049 Details

GUI Notification	
Severity	Major
Text	<**CLLI**>: **NPANXX GTT** <type_of_operation> Failed
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	126
Trap **MIB** Name	npanxxGTTValueNotFound

8050

Explanation

The **EMS**/**NE** has rejected the **NPANXX GTT** creation, deletion, or modification transaction for the specified **NPANXX** value.

Recovery

Look in the transaction log file, `/var/TKLC/lsms/logs/<CLLI>/LsmsTrans.log.MMDD`, and locate the **NE**'s response to the **NPANXX GTT** command to determine why the command failed. Re-enter the **NPANXX GTT** data correctly, which will cause the **LSMS** to try to command again.

Event Details

Table B-120 Event 8050 Details

GUI Notification	
Severity	Major
Text	<**CLLI**>: **NPANXX GTT** <type_of_operation> Failed for **NPANXX** <**NPANXX**_value>
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	127
Trap **MIB** Name	npanxxGTTValueRejected

8051

Explanation

The **EMS**/**NE** has rejected the Override **GTT** creation, deletion, or modification transaction, and the **LRN** value in the transaction could not be determined.

Recovery

Look in the transaction log file, `/var/TKLC/lsms/logs/<CLLI>/LsmsTrans.log.MMDD`, and locate the **NE**'s response to the Override **GTT** command to determine why the command failed. Re-enter the Override **GTT** data correctly, which will cause the **LSMS** to try to command again.

Event Details

Table B-121 Event 8051 Details

GUI Notification	
Severity	Major
Text	<**CLLI**>: Override **GTT** <type_of_operation> Failed
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	128
Trap **MIB** Name	overrideGTTValueNotFound

8052

Explanation

The **EMS**/**NE** has rejected the Override **GTT** creation, deletion, or modification transaction for the specified **LRN** value.

Recovery

Look in the transaction log file, `/var/TKLC/lsms/logs/<CLLI>/LsmsTrans.log.MMDD`, and locate the **NE**'s response to the Override **GTT** command to determine why the command failed. Re-enter the Override **GTT** data correctly, which will cause the **LSMS** to try to command again.

Event Details

Table B-122 Event 8052 Details

GUI Notification	
Severity	Major
Text	<**CLLI**>: Override **GTT** <type_of_operation> Failed for **LRN** <**LRN**_value>
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	129
Trap **MIB** Name	overrideGTTValueRejected

8053

Explanation

The **LSMS** was not able to complete the automatic synchronization with the **EMS**/**NE**. Possible reasons include:

- The network failed temporarily but not long enough to cause the association with the **EMS** to fail.
- The **EMS**/**NE** rejected the data because it is busy updating its databases.

Recovery

Verify the connection between the **LSMS** and the **EMS**; then reinitialize the **MPS**. If this notification appears again, perform one of the bulk download procedures in the *LNP Database Synchronization User's Guide*.

Event Details

Table B-123 Event 8053 Details

GUI Notification	
Severity	Major

Table B-123 (Cont.) Event 8053 Details

Text	Short Synchronization Failed
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	131
Trap **MIB** Name	unableToCompleteAutoResynch

8054

Explanation

The **LSMS** has started its automatic synchronization with the **EMS**/**NE**.

Recovery

No action required; for information only.

Event Details

Table B-124 Event 8054 Details

GUI Notification	
Severity	Major
Text	Short Synchronization Started
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	132
Trap **MIB** Name	autoResynchNEStarted

8055

Explanation

The automatic resynchronization of databases after an outage between the **LSMS** and the **NPAC** has completed successfully.

Recovery

No action required; for information only.

Event Details

Table B-125 Event 8055 Details

GUI Notification	
Severity	Cleared
Text	Recovery Complete
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	133
Trap **MIB** Name	dbResynchCompleted

8059

Explanation

The **LSMS** has completed its automatic synchronization with the **EMS**/**NE**.

Recovery

No action required; for information only.

Event Details

Table B-126 Event 8059 Details

GUI Notification	
Severity	Cleared
Text	Short Synchronization Complete
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	138
Trap **MIB** Name	emsShortSynchCompleted

8060

Explanation

The **EMS** pending queue used to hold the transactions to send to the **EMS**/**NE** identified by `<CLLI>` in the Survellance notification, has fallen sufficiently below the halfway full point.

Recovery

No action required; for information only.

Event Details

Table B-127 Event 8060 Details

GUI Notification	
Severity	Cleared
Text	**EMS** Pending Queue Less Than Half Full
Surveillance Notification	
Text	Notify:Sys Admin - **CLLI**=<**CLLI**>
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	141
Trap **MIB** Name	pendingQueueHalfFull

8061

Explanation

The **EMS** pending queue used to hold the transactions to send to the **EMS**/**NE** identified by <**CLLI**> in the Survellance notification, has fallen sufficiently below the full point.

Recovery

No action required; for information only.

Event Details

Table B-128 Event 8061 Details

GUI Notification	
Severity	Cleared
Text	**EMS** Pending Queue No Longer Full
Surveillance Notification	
Text	Notify:Sys Admin - **CLLI**=<**CLLI**>
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	142
Trap **MIB** Name	pendingQueueNotFull

8062

Explanation

This notification indicates that physical connection has been restored with the DCM.

Recovery

No action required; for information only.

Event Details

Table B-129   Event 8062 Details

GUI Notification	
Severity	Cleared
Text	EBDA Physical Connection Restored
Surveillance Notification	
Text	None
Source	
Frequency	
Trap	
Trap **ID**	143
Trap **MIB** Name	dcmConnectionRestored

8063

Explanation

This notification indicates that the connection to the MQSeries local queue manager has been established following an outage.

Recovery

No action required; for information only.

Event Details

Table B-130   Event 8063 Details

GUI Notification	
Severity	Cleared
Text	Connected to Queue Manager: < queueMgrName >
Surveillance Notification	
Text	None
Source	
Frequency	
Trap	
Trap **ID**	144
Trap **MIB** Name	connToMqSeriesQueueMngrRest

8064

Explanation

The specified **NPA-NXX** is opened for portability starting at the value of the `<EffectiveTimestamp>` field.

Recovery

No action required; for information only.

Event Details

Table B-131   Event 8064 Details

GUI Notification	
Severity	Event
Text	New **NPA-NXX**: **SPID** [<**SPID**>], **NPANXX** [<**NPANXX**>], TS [<EffectiveTimestamp>]
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	145
Trap **MIB** Name	npaNxxOpenedForPortabilityAtTS

8065

Explanation

The first telephone number in the specified **NPA-NXX** is ported starting at the value of the `<EffectiveTimestamp>` field.

Recovery

No action required; for information only.

Event Details

Table B-132   Event 8065 Details

GUI Notification	
Severity	Event
Text	First use of **NPA-NXX**: **SPID** [<**SPID**>], **NPANXX** [<**NPANXX**>], TS [<EffectiveTimestamp>]
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	146
Trap **MIB** Name	npaNxxPortedAtTS

8066

Explanation

An audit of the network element identified by `<CLLI>` has begun.

Recovery

No action required; for information only.

Event Details

Table B-133 Event 8066 Details

GUI Notification	
Severity	Cleared
Text	Audit **LNP DB** Synchronization Started
Surveillance Notification	
Text	**NE** <**CLLI**> Audit started
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	147
Trap **MIB** Name	ebdaAuditActive

8067

Explanation

An audit of the network element identified by `<CLLI>` has completed successfully.

Recovery

No action required; for information only.

Event Details

Table B-134 Event 8067 Details

GUI Notification	
Severity	Cleared
Text	Audit **LNP DB** Synchronization Completed
Surveillance Notification	
Text	**NE** <**CLLI**> Audit completed
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	148
Trap **MIB** Name	ebdaAuditSuccess

8068

Explanation

An audit of the network element identified by `<CLLI>` has failed.

Recovery

Inspect the log file `/var/TKLC/lsms/logs/<CLLI>/LsmsTrans.log.MMDD` for details as to the cause of the error. After clearing the cause of the error, start the audit again.

Event Details

Table B-135   Event 8068 Details

GUI Notification	
Severity	Critical
Text	Audit **LNP DB** Synchronization Failed
Surveillance Notification	
Text	**NE** <**CLLI**> Audit failed
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	149
Trap **MIB** Name	ebdaAuditFailure

8069

Explanation

The user aborted an audit of the network element identified by `<CLLI>` before it had completed.

Recovery

No action required; for information only.

Event Details

Table B-136   Event 8069 Details

GUI Notification	
Severity	Cleared
Text	Audit **LNP DB** Synchronization Aborted
Surveillance Notification	
Text	**NE** <**CLLI**> Audit aborted
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	150
Trap **MIB** Name	ebdaAuditAbortedByUser

8070

Explanation

A reconcile has started at the completion of an audit.

Recovery

No action required; for information only.

Event Details

Table B-137   Event 8070 Details

GUI Notification	
Severity	Cleared
Text	Reconcile **LNP DB** Synchronization Started
Surveillance Notification	
Text	**NE** <**CLLI**> Reconcile started
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	151
Trap **MIB** Name	ebdaReconcileActive

8071

Explanation

A reconcile, which was performed at the end of an audit, has completed.

Recovery

No action required; for information only.

Event Details

Table B-138   Event 8071 Details

GUI Notification	
Severity	Cleared
Text	Reconcile **LNP DB** Synchronization Complete
Surveillance Notification	
Text	**NE** <**CLLI**> Reconcile completed
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	152
Trap **MIB** Name	ebdaReconcileSuccess

8072

Explanation

A reconcile, which was performed at the end of an audit, has failed before it completed.

Recovery

Inspect the log file `/var/TKLC/lsms/logs/<CLLI>/LsmsAudit.log.MMDD` for details as to the cause of the error. After clearing the cause of the error, start the reconcile again.

Event Details

Table B-139   Event 8072 Details

GUI Notification	
Severity	Critical
Text	Reconcile **LNP DB** Synchronization Failed
Surveillance Notification	
Text	**NE** <**CLLI**> Reconcile failed
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	153
Trap **MIB** Name	ebdaReconcileFailure

8073

Explanation

The user has stopped a reconcile before it completed.

Recovery

No action required; for information only.

Event Details

Table B-140   Event 8073 Details

GUI Notification	
Severity	Cleared
Text	Reconcile **LNP DB** Synchronization Aborted
Surveillance Notification	
Text	**NE** <**CLLI**> Reconcile aborted
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	154
Trap **MIB** Name	ebdaReconcileAbortedByUser

8078

Explanation

A bulk download is currently running.

Recovery

No action required; for information only.

Event Details

Table B-141   Event 8078 Details

GUI Notification	
Severity	Cleared
Text	Bulk Load **LNP DB** Synchronization Started
Surveillance Notification	
Text	**NE** <**CLLI**> Bulk load started
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	159
Trap **MIB** Name	ebdaBulkLoadActive

8079

Explanation

A bulk download has completed successfully.

Recovery

No action required; for information only.

Event Details

Table B-142   Event 8079 Details

GUI Notification	
Severity	Cleared
Text	Bulk Load **LNP DB** Synchronization Complete
Surveillance Notification	
Text	**NE** <**CLLI**> Bulk load completed
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	160
Trap **MIB** Name	ebdaBulkLoadSuccess

8080

Explanation

A bulk download has failed before it completed.

Recovery

Inspect the log file `/var/TKLC/lsms/logs/<CLLI>/LsmsBulkLoad.log.MMDD` for details as to the cause of the error. After clearing the cause of the error, start the bulk download again.

Event Details

Table B-143 Event 8080 Details

GUI Notification	
Severity	Critical
Text	Bulk Load **LNP DB** Synchronization Failed
Surveillance Notification	
Text	**NE** <**CLLI**> Bulk load failed
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	161
Trap **MIB** Name	ebdaBulkLoadFailure

8081

Explanation

The user has stopped a bulk download before it completed.

Recovery

No action required; for information only.

Event Details

Table B-144 Event 8081 Details

GUI Notification	
Severity	Cleared
Text	Bulk Load **LNP DB** Synchronization Aborted
Surveillance Notification	
Text	**NE** <**CLLI**> Bulk load aborted
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	162
Trap **MIB** Name	ebdaBulkLoadAbortedByUser

8082

Explanation

A user-initiated resynchronization is currently running.

Recovery

No action required; for information only.

Event Details

Table B-145   Event 8082 Details

GUI Notification	
Severity	Cleared
Text	Re-sync **LNP DB** Synchronization Started
Surveillance Notification	
Text	**NE** <**CLLI**> Re-sync started
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	163
Trap **MIB** Name	ebdaResyncActive

8083

Explanation

A user-initiated resynchronization has completed successfully.

Recovery

No action required; for information only.

Event Details

Table B-146   Event 8083 Details

GUI Notification	
Severity	Cleared
Text	Re-sync **LNP DB** Synchronization Complete
Surveillance Notification	
Text	**NE** <**CLLI**> Re-sync completed
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	164
Trap **MIB** Name	ebdaResyncSuccess

8084

Explanation

A user-initiated resynchronization has failed before it completed.

Recovery

Inspect the contents of the file `/var/TKLC/lsms/logs/<CLLI>/LsmsResync.log.MMDD` to determine the cause of the error. After clearing the cause of the error, start the user-initiated resynchronization again.

Event Details

Table B-147 Event 8084 Details

GUI Notification	
Severity	Critical
Text	Re-sync **LNP DB** Synchronization Failed
Surveillance Notification	
Text	**NE** <**CLLI**> Re-sync failed
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	165
Trap **MIB** Name	ebdaResyncFailure

8085

Explanation

The user has stopped a user-initiated resynchronization before it completed.

Recovery

No action required; for information only.

Event Details

Table B-148 Event 8085 Details

GUI Notification	
Severity	Cleared
Text	Re-sync **LNP DB** Synchronization Aborted
Surveillance Notification	
Text	**NE** <**CLLI**> Re-sync aborted
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	166
Trap **MIB** Name	ebdaResyncAbortedByUser

8086

Explanation

This notification indicates that the Sprint IddAgent has failed to communicate with the Sprint Legacy System.

Recovery

No action required; for information only.

Event Details

Table B-149 Event 8086 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	FAILED:IddAgent legacy
Source	Both servers
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	167
Trap **MIB** Name	sprintIddAgentCommFailureLegSys

8087

Explanation

This notification indicates that the Sprint IddAgent has failed to communicate with the Sprint SCPMS System.

Recovery

Contact #unique_86 for assistance.

Event Details

Table B-150 Event 8087 Details

GUI Notification	
Severity	None
Text	
Surveillance Notification	
Text	FAILED:IddAgent scpms
Source	Both servers
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	168
Trap **MIB** Name	sprintIddAgentCommFailureScpmsSys

8088

Explanation

A scheduled file transfer has failed.

Recovery

Inspect the error log file/var/**TKLC**/lsms/logs`/aft/aft.log.MMDD` for details as to the cause of the error.

Event Details

Table B-151 Event 8088 Details

	GUI Notification
Severity	Major
Text	Automatic File Transfer Failure - See Log for Details
	Surveillance Notification
Text	Notify:Sys Admin- Auto xfer Failure
Source	Active server
Frequency	Once, as soon as condition occurs
	Trap
Trap **ID**	171
Trap **MIB** Name	automaticFileTransferFeatureFailure

8089

Explanation

An **NPA-NXX** split activation completed successfully.

Recovery

No action required; for information only.

Event Details

Table B-152 Event 8089 Details

	GUI Notification
Severity	Cleared
Text	Activate Split Successful OldNPA=<old_**NPA**> NewNPA=<new_**NPA**> **NXX**=<**NXX**>
	Surveillance Notification
Text	
Source	None
Frequency	
	Trap
Trap **ID**	10
Trap **MIB** Name	npaSplitActOk

8090

Explanation

An **NPA**-**NXX** split activation failed.

Recovery

Perform and audit and reconcile of **NPA** Split information at the network element.

Event Details

Table B-153 Event 8090 Details

GUI Notification	
Severity	Critical
Text	Activate Split Failed OldNPA=<old_**NPA**> NewNPA=<new_**NPA**> **NXX**=<**NXX**>
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	172
Trap **MIB** Name	npaSplitActFailed

8091

Explanation

At least one active **NPA**-**NXX** split is past its end date and needs to be deleted.

Recovery

Do the following:

1. View all split objects (for information, refer to the *Database Administrator's Guide*) to determine which objects have end dates that have already passed.
2. Delete the objects whose end dates have passed (for information, refer to the *Database Administrator's Guide*).

Event Details

Table B-154 Event 8091 Details

GUI Notification	
Severity	Major
Text	Active Splits Are Past Their End Dates
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	173
Trap **MIB** Name	activeSplitsPastEndDates

8092

Explanation

This notification indicates the LDD SCPMS agent is switching from primary to backup SCPMS system.

Recovery

No action required; this notification is for information only.

Event Details

Table B-155   Event 8092 Details

GUI Notification	
Severity	Critical
Text	LDD SCPMS Agent Switching from Primary to Backup SCPMS System
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	174
Trap **MIB** Name	lddScpmsAgentSwitchToBackupScpms

8093

Explanation

This notification indicates the LDD SCPMS agent is switching from backup to primary SCPMS system.

Recovery

No action required; this notification is for information only.

Event Details

Table B-156   Event 8093 Details

GUI Notification	
Severity	Critical
Text	LDD SCPMS Agent Switching from Backup to Primary SCPMS System
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	

Table B-156 (Cont.) Event 8093 Details

Trap **ID**	175
Trap **MIB** Name	lddScpmsAgentSwitchFromBackupToPrim

8094

Explanation

This notification indicates the LDD SCPMS current system is primary SCPMS.

Recovery

No action required; this notification is for information only.

Event Details

Table B-157 Event 8094 Details

GUI Notification	
Severity	Cleared
Text	LDD SCPMS Current System is Primary SCPMS
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	176
Trap **MIB** Name	lddScpmsPrimary

8095

Explanation

This notification indicates the LDD SCPMS current system is backup SCPMS.

Recovery

No action required; this notification is for information only.

Event Details

Table B-158 Event 8095 Details

GUI Notification	
Severity	Cleared
Text	LDD SCPMS Current System is Backup SCPMS
Surveillance Notification	
Text	None

Table B-158 (Cont.) Event 8095 Details

Source	
Frequency	
Trap	
Trap **ID**	177
Trap **MIB** Name	lddScpmsBackup

8096

Explanation

The **EMS**/**NE** has rejected the **NPANXX** Split operation indicated by <operation>, and the **NPANXX** value in the transaction could not be determined.

Recovery

Look in the transaction log file, `/var/TKLC/lsms/logs/<CLLI>/LsmsTrans.log.MMDD`, and locate the **NE**’s response to the **NPANXX** Split command to determine why the command failed. Delete and re-enter the **NPANXX** Split data correctly, which will cause the **LSMS** to try to command again.

Event Details

Table B-159 Event 8096 Details

GUI Notification	
Severity	Major
Text	<**CLLI**>: **NPANXX** Split <operation> Failed
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	178
Trap **MIB** Name	EmsNeRejNpaNxxSplitNotDetermined

8097

Explanation

The **EMS**/**NE** has rejected the **NPANXX** Split operation indicated by <operation> for the indicated **NPANXX** value.

Recovery

Look in the transaction log file, `/var/TKLC/lsms/logs/<CLLI>/LsmsTrans.log.MMDD`, and locate the **NE**’s response to the **NPANXX** Split command to determine why the command failed. Delete and re-enter the **NPANXX** Split data correctly, which will cause the **LSMS** to try to command again.

Event Details

Table B-160 Event 8097 Details

GUI Notification	
Severity	Major
Text	<**CLLI**>: **NPANXX** Split <operation> Failed for New **NPANXX** <**NPANXX**>
Surveillance Notification	
Text	
Source	None
Frequency	
Trap	
Trap **ID**	179
Trap **MIB** Name	EmsNeRejectedNpaNxxSplit

8098

Explanation

The **LSMS** is not able to confirm the physical connectivity with the directly connected query server identified by `<hostname>`. The problem may be one of the following:

- Physical connectivity issues between the **LSMS** and directly connected Query Server.
- The query server host name is not associated with the appropriate **Internet Protocol** (**IP**) address in `/etc/hosts` file.
- The **Internet Protocol** (**IP**) address specified for the special replication user for the for the query server is incorrect.
- The proper **TCP/IP** ports are not open in the firewall(s) between the **LSMS** and the query servers.

Recovery

- Check the physical connectivity of the **LSMS** to the query server.
- Check that the query server hosts name is associated with corresponding **Internet Protocol** (**IP**) addresses in `/etc/hosts` file.
- Verify that the **IP** address for the query server is correct. Display the **IP** address of all configured query servers by using the `$LSMS_TOOLS_DIR/lsmsdb -c queryservers` command.
- Verify that the firewall **TCP/IP** port configuration is set correctly for both the **LSMS** and query servers directly connected to the **LSMS** (refer to Appendix A, “Configuring the Query Server,” of the *Configuration Guide* for information about port configuration for firewall protocol filtering).

Event Details

Table B-161 Event 8098 Details

GUI Notification	
Severity	Major

Table B-161 (Cont.) Event 8098 Details

Text	`Query Server <hostname>`
	`Physical Connection Lost`

Surveillance Notification	

Text	`Query Server=<hostname>`
	`Physical Conn Lost`

Source	Active Server
Frequency	As soon as condition occurs, and at five-minute intervals as long as condition exists
SNMP Trap	
Trap **ID**	180
Trap **MIB** Name	physicalConnectivityWithQueryServerLost

8099

Explanation

The query server identified by `<hostname>` does not have a replication connection established with the **LSMS**. The problem may be one of the following:

- Query server cannot establish a connection with the master.
- Query server not properly configured to connect to the master.
- A query that succeeded on the master failed on the query server.
- The binary log(s) that are needed by the query server to resynchronize itself to its master no longer exist.
- Data on the query server does not agree with what is on the master when the binary log was started.
- Replication was stopped at the query server by a user.

Recovery

1. At the query server, perform the following substeps:
   a. Start the MySQL command line utility on the slave server:

      ```
      # cd /opt/mysql/mysql/bin
      # mysql -u root -p


      Enter password:


      <Query Server/s MySql root user password>
      ```

   b. Determine whether the query server is running by entering the following command and looking at the Slave_IO_Running and Slave_SQL_Running column values.

      ```
      mysql> SHOW SLAVE STATUS \G;
      ```

      - If the Slave_IO_Running and Slave_SQL_Running column values show that the slave is not running, verify the query server's `/usr/mysql1/my.cnf` option file (refer to “MySQL Replication Configuration for Query Servers,” in Appendix A, "Configuring the Query Server," of the *Configuration Guide*) and check the error log (/usr/mysql1/<hostname>.err) for messages.

- If the Slave_IO_Running and Slave_SQL_Running column values show that the slave (query server) is running, enter the following command to verify whether the slave established a connection with the master (**LSMS** or another query server acting as a master/slave).

  ```
  mysql> SHOW PROCESSLIST;
  ```

  Find the thread with the system user value in the User column and none in the Host column, and check the State column. If the State column says "connecting to master," verify that the master hostname is correct, that the **DNS** is properly set up, whether the master is actually running, and whether it is reachable from the slave (refer to Appendix A, "Configuring the Query Server," of the *Configuration Guide* for information about port configuration for firewall protocol filtering if the master and slave are connecting through a firewall).

- If the slave was running, but then stopped, enter the following command:

  ```
  mysql> SHOW SLAVE STATUS;
  ```

  Look at the output. This error can happen when some query that succeeded on the master fails on the slave, but this situation should never happen while the replication is active if you have taken a proper snapshot of the master and never modify the data on the slave outside of the slave thread.

2. However, if this is not the case, or if the failed items are not needed and there are only a few of them, try the following:

   a. First see if there is some stray record in the way on the query server. Understand how it got there, then delete it from the query server database and run start slave.

   b. If the above does not work or does not apply, try to understand if it would be safe to make the update manually (if needed) and then ignore the next query from the **LSMS**.

   c. If you have decided you can skip the next query, enter one of the following command sequences:

      - To skip a query that uses **AUTO_INCREMENT** or **LAST_INSERT_ID**(), enter:

        ```
        mysql> SET GLOBAL SQL_SLAVE_SKIP_COUNTER=2;
        mysql> start slave;
        ```

        Queries that use **AUTO_INCREMENT** or **LAST_INSERT_ID**() take two events in the binary log of the master.

      - Otherwise, enter:

        ```
        mysql> SET GLOBAL SQL_SLAVE_SKIP_COUNTER=1;
        mysql> start slave;
        ```

3. If you are sure the query server database started out perfectly in sync with the **LSMS** database, and no one has updated the tables involved outside of the slave thread, contact #unique_86 so you will not have to do the above steps again.

4. If all else fails, read the error log, /usr/mysql/<hostname>.err. If the log is big, run the following command on the slave:

```
grep -i slave /usr/mysql1/<hostname>.err
```

(There is no generic pattern to search for on the master, as the only errors it logs are general system errors. If it can, the master will send the error to the slave when things go wrong.)

- If the error log on the slave conveys that it could not find a binary log file, this indicates that the binary log files on the master have been removed (purged). Binary logs are periodically purged from the master to prevent them from growing unbounded and consuming large amounts of disk resources. However, if a query server was not replicating and one of the binary log files it wants to read is purged, it will be unable to replicate once it comes up. If this occurs, the query server is required to be reset with another snapshot of data from the master or another query server (see “Reload a Query Server **Database** from the **LSMS**” and “Reload a Query Server **Database** from Another Query Server”).
- When you have determined that there is no user error involved, and replication still either does not work at all or is unstable, please contact the #unique_86.

Event Details

Table B-162 Event 8099 Details

GUI Notification	
Severity	Major
Text	Query Server <hostname> Replication Connection Lost
Surveillance Notification	
Text	Query Server=<hostname> Replication Conn Lost
Source	Active Server
Frequency	As soon as condition occurs, and at five-minute intervals as long as condition exists
SNMP Trap	
Trap **ID**	181
Trap **MIB** Name	queryServerConnectionWithLsmsLost

8100

Explanation

The SV/NPB storage database has exceeded the configured percent usage threshhold.

Recovery

Contact the #unique_86.

Event Details

Table B-163 Event 8100 Details

GUI Notification	
Severity	Event
Text	SV/NPB Storage Exceeds <%> percent
Surveillance Notification	

Table B-163 (Cont.) Event 8100 Details

Text	Notify:Sys Admin - SV/NPB threshold %
Source	Both servers
Frequency	Every 5 minutes after condition occurs
Trap	
Trap **ID**	194
Trap **MIB** Name	svNpbPercentUsage

8101

Explanation

This event indicates that the SV/NPB storage database usage is below the configured percent usage threshold.

Recovery

No action is required

Event Details

Table B-164 Event 8101 Details

GUI Notification	
Severity	Cleared
Text	SV/NPB storage falls below <%> percent
Surveillance Notification	
Text	Notify: Sys Admin - SV/NPB cleared
Source	Both servers
Frequency	As soon as condition clears
Trap	
Trap **ID**	207
Trap **MIB** Name	svNpbBelowLimit

8102

Explanation

The event number present in the untilClear filter list is cleared. The event number is removed from the untilClear filter list.

Recovery

No action is required.

Event Details

Table B-165 Event 8102 Details

GUI Notification	

Table B-165 (Cont.) Event 8102 Details

Severity	Event
Text	<Event number> in the untilClear filter list, event clear received at <%s>
Surveillance Notification	
Text	None
Source	
Frequency	
Trap	
Trap **ID**	None
Trap **MIB** Name	

8103

Explanation

The alarm filter counter has reached its limit; the counter will start again from one.

Recovery

No action is required.

Event Details

Table B-166 Event 8103 Details

GUI Notification	
Severity	Event
Text	Counter associated with event <event number> exceeds limit <%s>. Resetting counter.
Surveillance Notification	
Text	None
Source	
Frequency	
Trap	
Trap **ID**	None
Trap **MIB** Name	

8104

Explanation

The event number present in the untilTimeout filter list is cleared. The event number is removed from the untilTimeout filter list.

Recovery

No action is required.

Event Details

Table B-167   Event 8104 Details

GUI Notification	
Severity	Event
Text	<Event number> in the untilTimeout filter list, event timeout at <%s>
Surveillance Notification	
Text	None
Source	
Frequency	
Trap	
Trap **ID**	None
Trap **MIB** Name	

8105

Explanation

The log capture started by the user has failed.

Recovery

Contact the #unique_86.

Event Details

Table B-168   Event 8105 Details

GUI Notification	
Severity	Minor
Text	Logs Capture Failed
Surveillance Notification	
Text	None
Source	
Frequency	
Trap	
Trap **ID**	None
Trap **MIB** Name	

8106

Explanation

The MySQL Port has been updated. The LSMS application must be restarted.

Recovery

The application must be restarted. Restart the LSMS application first on the active server and then on the standby server. For more information, refer to the *Configuration Guide*.

Event Details

Table B-169 Event 8106 Details

GUI Notification	
Severity	Event
Text	MySQL Port changed from <%s> to <%s>. LSMS application restart required.
Surveillance Notification	
Text	Notify: Sys Admin - LSMS restart required
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	208
Trap **MIB** Name	mysqlPortUpdated

8107

Explanation

The MySQL Port has been updated. The Query Server configuration needs to be updated with the new MySQL port.

Recovery

Configure the Query Server with the updated MySQL port. For more information, refer to the *Configuration Guide*.

Event Details

Table B-170 Event 8107 Details

GUI Notification	
Severity	Event
Text	MySQL Port changed from <%s> to <%s>. Query Server configuration updated required.
Surveillance Notification	
Text	Notify: Sys Admin - QS updated required
Source	Active server
Frequency	Once, as soon as condition occurs
Trap	
Trap **ID**	209
Trap **MIB** Name	queryServerResetConfiguration

8108

Explanation

At least one of the connected Query Servers is out of sync, and the binary logs cannot be purged without user confirmation.

Recovery

When the Query Server is out of sync, automatic purging is not possible. To delete all but the last 10 binary logs, log on to the active LSMS server as `root` and enter the following command:

```
pruneBinaryLogs -force
```

Event Details

Table B-171 Event 8108 Details

GUI Notification	
Severity	Minor
Text	Automatic purging of binary logs cannot be done. User confirmation required.
Surveillance Notification	
Text	Notify: Sys Admin - Purge need confirmation
Source	Both servers
Frequency	Every 45 minutes
Trap	
Trap **ID**	210
Trap **MIB** Name	purgeConfirmRequired

8109

Explanation

Disk usage is reaching the capacity threshold, and an automatic purge of binary logs is imminent.

Recovery

No action is required.

Event Details

Table B-172 Event 8109 Details

GUI Notification	
Severity	Minor
Text	Disk usage reaching <%> percent. Purging of binary logs is imminent.
Surveillance Notification	
Text	Notify: Sys Admin - Purging is imminent
Source	Both servers
Frequency	Every 45 minutes
Trap	
Trap **ID**	211
Trap **MIB** Name	purgeImminent

8110

Explanation

Logs capture has been started by the user.

Recovery

No action is required.

Event Details

Table B-173   Event 8110 Details

GUI Notification	
Severity	Cleared
Text	Logs Capture Started
Surveillance Notification	
Text	None
Source	
Frequency	
Trap	
Trap **ID**	None
Trap **MIB** Name	

8111

Explanation

The logs capture started by the user completed successfully.

Recovery

No action is required.

Event Details

Table B-174   Event 8111 Details

GUI Notification	
Severity	Minor
Text	Logs Captured Successfully
Surveillance Notification	
Text	None
Source	
Frequency	
Trap	
Trap **ID**	None
Trap **MIB** Name	

8112

Explanation

Syscheck was not able to restart automatically by the cron job.

Recovery

Contact the #unique_86.

Event Details

Table B-175 Event 8112 Details

GUI Notification	
Severity	Event
Text	Failed to restart syscheck services
Surveillance Notification	
Text	None
Source	
Frequency	
Trap	
Trap **ID**	None
Trap **MIB** Name	

8116

Explanation

The HTTP protocol is enabled but secure HTTP (HTTPS) is recommended.

Recovery

For information on configuring the protocols, see Starting an Web-Based LSMS GUI Session.

Event Details

Table B-176 Event 8116 Details

GUI Notification	
Severity	Event
Text	HTTP is enabled and it is recommended to use HTTPS.
Surveillance Notification	
Text	None
Source	
Frequency	
Trap	
Trap **ID**	None
Trap **MIB** Name	

8117

Explanation

HTTP is disabled and HTTPS is enabled.

Recovery

No recovery required; only HTTPS is enabled now.

Event Details

Table B-177 Event 8117 Details

GUI Notification	
Severity	Event
Text	Only HTTPS is enabled now.
Surveillance Notification	
Text	None
Source	
Frequency	
Trap	
Trap **ID**	None
Trap **MIB** Name	

8118

Explanation

Both HTTP and HTTPS are enabled, but using only HTTPS is recommended.

Recovery

For information on configuring the protocols, see Starting an Web-Based LSMS GUI Session.

Event Details

Table B-178 Event 8118 Details

GUI Notification	
Severity	Event
Text	Both HTTP and HTTPS are enabled and it is recommended to use HTTPS.
Surveillance Notification	
Text	None
Source	
Frequency	
Trap	
Trap **ID**	None
Trap **MIB** Name	

Additional Trap Information

Trap Id	Trap MIB Name	Notification Description	Trap variables def	Retry Interval	Severity	Event Num	GUI Event Text	Pair Event Num
25	dataReplInfo	This notification indicates that database replication is delayed.	**eventNbr = **Oracle specific unique identifier for event notification. This eventNbr field can be used to reference Oracle documentation. **dbReplInfo** = Info message from database replication.	Every 5 mins	event_notif_event	4011	DB Repl Info - %s	0
201	snapInvalidErr	This notification indicates that the Invalid Snapshot has been detected.	**eventNbr = **Oracle specific unique identifier for event notification. This eventNbr field can be used to reference Oracle documentation. **snapName = **Name of the invalid snapshot.	Every 30 mins	event_notif_critical	4034	Invalid Snapshot - %s	4035

Trap Id	Trap MIB Name	Notification Description	Trap variables def	Retry Interval	Severity	Event Num	GUI Event Text	Pair Event Num
203	snapFullErr	This notification indicates that the Snapshot is greater than 80% full.	**eventNbr** = Oracle specific unique identifier for event notification. This eventNbr field can be used to reference Oracle documentation. **snapName =** Name of the invalid/ hanging snapshot.	Every 30 mins	event_notif_critical	4036	Full Snapshot - %s	4037

Trap Id	Trap MIB Name	Notification Description	Frequency	Source	Clearing behavior
212	resyncStartTrap	The trap is sent by the LSMS to NMS when the LSMS is about to start resynchronization	Every time when starting a resynchronization with a NMS	/vobs/lsms/apps/snmp/lsmsSNMPResyncHandler.pl	None
213	resyncStopTrap	The trap is sent by the LSMS to NMS when resynchronization is complete	Every time when a resynchronization with a NMS is complete	/vobs/lsms/apps/snmp/lsmsSNMPResyncHandler.pl	None
214	resyncRejectTrap	The trap is sent by the LSMS to NMS when a resynchronization request is rejected by LSMS	Every time when a resynchronization request is initialized while an existing resynchronization is still being processed	/vobs/lsms/apps/snmp/lsmsSNMPResyncHandler.pl	None
215	resyncRequiredTrap	The trap is sent by the LSMS to NMS when the LSMS is rebooted or LSMS is started	Every time when LSM S is rebooted or restarted	/vobs/lsms/apps/snmp/lsmsSNMPResyncHandler.pl	None

Trap Id	Trap MIB Name	Notification Description	Frequency	Source	Clearing behavior
216	heartBeatTrap	The trap is sent by the LSMS to NMS periodically to indicate that the LSMS is up	Per the configured value in second (0, 5-7200), where 0 indicates the heartbeat trap is disabled.	/vobs/lsms/apps/snmp/lsmsSnmpHeartbeatSender.pl	None
217	lsmsAlarmTrapV3	The trap will indicate that the following information is for a particular event	Every v3 trap message sent to nms will carry this OID	/vobs/lsms/apps/snmp/lsmsSNMPResyncHandler.pl	None
218	resyncErrCode	errorCode = 0, Resynchronization completed successfully. errorCode = 1, Resynchronization aborted by NMS. errorCode = 2, Resynchronization already in progress for the NMS. errorCode = 3, Resynchronization Aborted, Database error occurred. errorCode = 4, Resynchronization not in progress.	Every time when either resyncStopTrap or resyncRejectTrap sent to NMS	/vobs/lsms/apps/snmp/lsmsSNMPResyncHandler.pl	None

Platform Alarms

This section describes the following:

- “How Platform Alarms Are Reported”
- “How to Decode Platform Alarms”
- Platform Alarms

How Platform Alarms Are Reported

Each server runs `syscheck` periodically and reports any problems found through platform alarms. The severity of platform alarms is one of the following:

- Critical, reported through event 4300
- Major, reported through event 4200
- Minor, reported through event 4100

When one or more problems in a given category has been found, the server reports one corresponding event notification to its Surveillance log and its serial port 3. If the server is not the active server, it also sends the event notification to the active server.

The active server reports its own platform events to its own Surveillance log and to its Serial Port 3, and also sends an **SNMP** trap and displays a **GUI** notification for either its own platform events or for the non-active server's platform events.

Each of the events 4100, 4200, and 4300 contain a 16-character hexadecimal bitmasked string that indicates all of the platform events in that category that currently exist. To decode which platform events exist, use the procedure described in "How to Decode Platform Alarms".

Each time the combination of platform events in a given category changes, a new event is reported. Following is an example of how platform events are reported:

1. At first, only one major platform event is reported on the standby server. A 4200 event with the alarm number of the event is reported.
2. One minute later, another platform event exists on the standby server (and the first one still exists). Another 4200 event is reported, with a bitmasked string that indicates both of the platform events that exist.
3. One minute later, another platform event exists on the standby server (and the previous ones still exist). Another 4200 event is reported, with a bitmasked string that indicates all of the platform events that exist.
4. One minute later, the first platform event is cleared. Another 4200 event is reported, with a bitmasked string that indicates the two platform events that still exist.

How to Decode Platform Alarms

Use the following procedure to determine all the platform alarms that exist in a given category:

1. Look in Platform Alarms to see if the alarm number is shown there.
   - If the alarm number matches one of the alarms shown in this table, only one alarm (the one that appears in the table) is being reported and you have completed this procedure.
   - If the alarm number does not match one of the alarms shown in this table, perform the remaining steps of this procedure.
2. Log in as any user to either server.
3. Enter the following command to decode the reported hexadecimal alarm string:

   ```
   $ /usr/TKLC/plat/bin/almdecode <alarm_number>
   ```

   The output displays the information about the alarm category and displays the text string for each of the alarms that is represented by the string. For example, if you enter:

   ```
   $ /usr/TKLC/plat/bin/almdecode 3000000000000180
   ```

   the following text displays:

   ```
   The string alarm value comes from the Major Platform alarm category.
   ```

   The following alarms are encoded within the hex string:

   ```
   Server Swap Space Shortage FailureServer Provisioning Network
   Error
   ```

Platform Alarms

Platform errors are grouped by category and severity. The categories are listed from most to least severe:

Table B-179 shows the alarm numbers and alarm text for all alarms generated by the MPS platform. The order within a category is not significant. Some of the alarms described are not available with specific configurations.

Table B-179   Platform Alarms

Alarm Codes and Error Descriptor
Major Platform Alarms
3000000000000001 – Server fan failure
3000000000000002 - Server Internal Disk Error
3000000000000008 - Server Platform Error
3000000000000010 - Server File System Error
3000000000000020 - Server Platform Process Error
3000000000000080 - Server Swap Space Shortage Failure
3000000000000100 - Server provisioning network error
3000000000001000 - Server Disk Space Shortage Error
3000000000002000 - Server Default Route Network Error
3000000000004000 - Server Temperature Error
3000000000008000 - Server Mainboard Voltage Error
3000000000010000 - Server Power Feed Error
3000000000020000 - Server Disk Health Test Error
3000000000040000 - Server Disk Unavailable Error
3000000000080000 - Device Error
3000000000100000 - Device Interface Error
3000000008000000 - Server HA Keepalive Error
3000000010000000 - DRBD block device can not be mounted
3000000020000000 - DRBD block device is not being replicated to peer
3000000040000000 - DRBD peer needs intervention
3000000400000000 - Multipath device access link problem
3000000800000000 – Switch Link Down Error
3000001000000000 - Half-open Socket Limit
3000002000000000 - Flash Program Failure
3000004000000000 - Serial Mezzanine Unseated
Minor Platform Alarms
5000000000000001 - Server Disk Space Shortage Warning
5000000000000002 - Server Application Process Error
5000000000000004 - Server Hardware Configuration Error
5000000000000008 - Server RAM Shortage Warning
5000000000000020 - Server Swap Space Shortage Warning
5000000000000040 - Server Default Router Not Defined
5000000000000080 – Server temperature warning
5000000000000100 - Server Core File Detected
5000000000000200 - Server NTP Daemon Not Synchronized

Table B-179 (Cont.) Platform Alarms

Alarm Codes and Error Descriptor
5000000000000400 - Server CMOS Battery Voltage Low
5000000000000800 - Server Disk Self Test Warning
5000000000001000 - Device Warning
5000000000002000 - Device Interface Warning
5000000000004000 - Server Reboot Watchdog Initiated
5000000000008000 - Server HA Failover Inhibited
5000000000010000 - Server HA Active To Standby Transition
5000000000020000 - Server HA Standby To Active Transition
5000000000040000 - Platform Health Check Failure
5000000000080000 - NTP Offset Check Failure
5000000000100000 - NTP Stratum Check Failure
5000000000200000 - SAS Presence Sensor Missing
5000000000400000 - SAS Drive Missing
5000000000800000 - DRBD failover busy
5000000001000000 - HP disk resync
5000000020000000 – Server Kernel Dump File Detected
5000000040000000 – TPD Upgrade Failed
5000000080000000 - Half Open Socket Warning Limit
NOTE: The order within a category is not significant.

Alarm Recovery Procedures

This section provides recovery procedures for the MPS, listed by alarm category and **Alarm** Code (alarm data string) within each category.

Major Platform Alarms

Major platform alarms involve hardware components, memory, and network connections.

3000000000000001 – Server fan failure

Alarm Type: TPD

Description: This alarm indicates that a fan in the EAGLE fan tray in the EAGLE shelf where the E5-APP-B is "jacked in" is either failing or has failed completely. In either case, there is a danger of component failure due to overheating.

Severity: Major

OID: TpdFanErrorNotify 1.3.6.1.4.1.323.5.3.18.3.1.2.1

Alarm ID: TKSPLATMA13000000000000001

Recovery

Note:

1. Run syscheck in Verbose mode to verify a fan failure using the following command:

   ```
   [root@hostname1351690497 ~]# syscheck -v hardware fan
   Running modules in class hardware...
            fan: Checking Status of Server Fans.
   *         fan: FAILURE:: MAJOR::3000000000000001 -- Server Fan
   Failure. This test uses the leaky bucket algorithm.
   *         fan: FAILURE:: Fan RPM is too low, fana: 0, CHIP: FAN
   One or more module in class "hardware" FAILED

   LOG LOCATION: /var/TKLC/log/syscheck/fail_log
   ```

2. Refer to the procedure for determining the location of the fan assembly that contains the failed fan and replacing a fan assembly in the appropriate hardware manual. After you have opened the front lid to access the fan assemblies, determine whether any objects are interfering with the fan rotation. If some object is interfering with fan rotation, remove the object.
3. Contact the #unique_86.

3000000000000002 - Server Internal Disk Error

This alarm indicates that the server is experiencing issues replicating data to one or more of its mirrored disk drives. This could indicate that one of the server disks has failed or is approaching failure.

Recovery

1. Run `syscheck` in Verbose mode.
2. Call #unique_86 and provide the system health check output.

3000000000000008 - Server Platform Error

This alarm indicates a major platform error such as a corrupt system configuration or missing files, or indicates that `syscheck` itself is corrupt.

Recovery

1. Run `syscheck` in Verbose mode.
2. Call #unique_86 and provide the system health check output.

3000000000000010 - Server File System Error

This alarm indicates that `syscheck` was unsuccessful in writing to at least one of the server file systems.

Recovery

- Call #unique_86 for assistance.

3000000000000020 - Server Platform Process Error

This alarm indicates that either the minimum number of instances for a required process are not currently running or too many instances of a required process are running.

Recovery

- Contact #unique_86 for recovery procedures.

3000000000000080 - Server Swap Space Shortage Failure

This alarm indicates that the server's swap space is in danger of being depleted. This is usually caused by a process that has allocated a very large amount of memory over time.

> **Note:**
>
> In order for this alarm to clear, the underlying failure condition must be consistently undetected for a number of polling intervals. Therefore, the alarm may continue to be reported for several minutes after corrective actions are completed.

Recovery

- Call #unique_86 for assistance.

3000000000000100 - Server provisioning network error

Alarm Type: TPD

Description: This alarm indicates that the connection between the server's eth01ethernet interface and the customer network is not functioning properly. The eth01 interface is at the upper right port on the rear of the server on the EAGLE backplane.

> **Note:**
>
> The interface identified as eth01 on the hardware is identified as eth91 by the software (in syscheck output, for example).

Severity: Major

OID: TpdProvNetworkErrorNotify 1.3.6.1.4.1.323.5.3.18.3.1.2.9

Alarm ID: TKSPLATMA93000000000000100

Recovery

1. Check the physical network connectivity between the LSMS and the NAS.
2. Contact #unique_86.

3000000000001000 - Server Disk Space Shortage Error

This alarm indicates that one of the following conditions has occurred:

- A file system has exceeded a failure threshold, which means that more than 90% of the available disk storage has been used on the file system.
- More than 90% of the total number of available files have been allocated on the file system.
- A file system has a different number of blocks than it had when installed.

Recovery

1. Run `syscheck`.
2. Examine the `syscheck` output to determine if the file system `/var/TKLC/lsms/free` is low on space. If it is, continue to the next step; otherwise go to Step 4.
3. If possible, recover space on the free partition by deleting unnecessary files:
   a. Log in to the server generating the alarm as the root user:

      Login: `root`

      Password:`<Enter root password>`
   b. Change to the /var/TKLC/lsms/free directory: `# cd /var/TKLC/lsms/free`
   c. Confirm that you are in the /var/TKLC/lsms/free directory: `# pwd /var/TKLC/lsms/free`
   d. When the `pwd` command is executed, if /var/TKLC/lsms/free is not output, go back to Sub-step b
   e. List files to be deleted and delete them using the `rm` command
   f. Re-run `syscheck`

   If the alarm is cleared, the problem is solved. If the alarm is not cleared, go to the next Step.
4. If the file system mounted on /var/TKLC/lsms/logs is the file system that `syscheck` is reporting to be low on space, execute the following steps:
   a. Log in to the server generating the alarm as the root user:

      Login: `root`

      Password:`<Enter root password>`
   b. Change to the /var/TKLC/lsms/logs directory: `# cd /var/TKLC/lsms/logs`
   c. Confirm that you are in the /var/TKLC/lsms/logs directory: `# pwd /var/TKLC/lsms/logs`
   d. When the `pwd` command is executed, if /var/TKLC/lsms/logs is not output, go back to Sub-step b
   e. Look for files with names matching: logs_(hostname)_(date/timestamp).tar, where (hostname) is replaced by the server's hostname, and (date/timestamp) is any date or timestamp. `# ls logs_'hostname'_*.tar`. Any files listed may be safely deleted, so for each file listed in the `ls` output, execute an `rm` command: `# rm <filename>` where <filename> is replaced by the name of the file to be deleted.

f. Re-run `syscheck`

   If the alarm is cleared, the problem is solved. If the alarm is not cleared, go to the next Step.

5. Core files can occupy a large amount of disk space and may the cause of this alarm. To collect and remove any core files from the server:

   a. Log in to the server generating the alarm as the root user:

      Login: `root`

      Password:`<Enter root password>`

   b. Change directory to /var/TKLC/core and list the core files. `# cd /var/TKLC/core # ls -l`

> **Note:**
>
> The `ls` command shown above will list any core files found and then compresses and renames the file, adding a ".gz" extension. If any core files are found, transfer them off the system and save them for examination by Oracle Engineering. Once a copy of a compressed file has been saved, it is safe to delete it from the server.

- Re-run `syscheck`

  If the alarm is cleared, the problem is solved. If the alarm is not cleared, go to the next Step.

6. Execute the following Sub-steps if the file system reported by `syscheck` is `/tmp`, otherwise skip to Step 7:

   a. Log in to the server generating the alarm as the root user:

      Login: `root`

      Password:`<Enter root password>`

   b. Change to the `/tmp` directory: `# cd /tmp`

   c. Confirm that you are in the `/tmp`directory: `# pwd /tmp`

   d. When the `pwd` command is executed, if `/tmp` is not output, go back to Step 5.

   e. Look for possible candidates for deletion: `# ls *.iso *.bz2 *.gz *.tar *.tgz *.zip`

   f. If any deletable files exist, the output of the `ls` will show them. For each of the files listed, execute the `rm` command to delete the file: `# rm <filename>`

   g. Run `syscheck`

      If the alarm is cleared, the problem is solved. If the alarm is not cleared, go to Step 4.

   h. Upon a reboot, the system will clean the `/tmp` directory.

      To reboot the system issue the `# shutdown -r now` command.

   i. Re-run `syscheck`

If the alarm is cleared, the problem is solved. If the alarm is not cleared, go to the next Step.

7. Execute the following steps if the file system reported by `syscheck` is `/var`, otherwise skip to Step 10:
   a. Log in to the server generating the alarm as the root user:

      Login: `root`

      Password:`<Enter root password>`
   b. Change to the `/var/tmp` directory: `# cd /var/tmp`
   c. Confirm that you are in the `/var/tmp` directory: `# pwd`, then `/var/tmp`
   d. When the `pwd` command is executed, if `/var/tmp` is not output, go back to Step 5.
   e. Since all files in this directory can be safely deleted, execute the `rm *` command to delete all files from the directory: `# rm -i *`.
   f. Re-run `syscheck`

      If the alarm is cleared, the problem is solved. If the alarm is not cleared, go to Step 10.
8. Execute the following steps if the file system reported by `syscheck` is `/var/TKLC`, otherwise skip to Step 10.
   a. Log in to the server generating the alarm as the root user:

      Login: `root`

      Password:`<Enter root password>`
   b. Change to the `/var/TKLC/upgrade` directory: `# cd /var/TKLC/upgrade`
   c. Confirm that you are in the `/var/TKLC/upgrade` directory: `# pwd`, then `/var/TKLC/upgrade`
   d. When the `pwd` command is executed, if `/var/tmp` is not output, go back to Step 5.
   e. Since all files in this directory can be safely deleted, execute the `rm *` command to delete all files from the directory: `# rm -i *`.
   f. Re-run `syscheck`

      If the alarm is cleared, the problem is solved. If the alarm is not cleared, go to Step 10.
9. For any other file system, execute the following command, where `<mountpoint>` is the file system's mount point: `# find <mountpoint> -type f -exec du -k {} \; | sort -nr > /tmp/file_sizes.txt`

   This will produce a list of files in the given file system sorted by file size in the file `/tmp/file_sizes.txt`.

Note:

The `find` command above may take a few minutes to complete if the given `mountpoint` contains many files. Do not delete any files unless care certain that they are not needed. Continue to Step 10.

10. Run `savelogs` to gather all application logs (see Saving Logs Using the LSMS **GUI** or Command Line).
11. Contact the #unique_86.

3000000000002000 - Server Default Route Network Error

This alarm indicates that the default network route of the server is experiencing a problem. Running `syscheck` in Verbose mode will provide information about which type of problem.

Caution:

When changing the network routing configuration of the server, verify that the modifications will not impact the method of connectivity for the current login session. The route information must be entered correctly and set to the correct values. Incorrectly modifying the routing configuration of the server may result in total loss of remote network access.

Recovery

1. Run `syscheck` in Verbose mode.

   The output should indicate one of the following errors:

   - `The default router at <IP_address> cannot be pinged.`

     This error indicates that the router may not be operating or is unreachable. If the `syscheck` Verbose output returns this error, go to the next Step.

   - `The default route is not on the provisioning network.`

     This error indicates that the default route has been defined in the wrong network. If the `syscheck` Verbose output returns this error, go to Step 3.

   - `An active route cannot be found for a configured default route.`

     This error indicates that a mismatch exists between the active configuration and the stored configuration. If the `syscheck` Verbose output returns this error, go to Step 4.

   Note:

   If the `syscheck` Verbose output does not indicate one of the errors above, go to step 5.

2. Perform the following substeps when `syscheck` Verbose output indicates:

```
The default router at <IP_address> cannot be pinged
```

   a. Verify that the network cables are firmly attached to the server, network switch, router, Ethernet switch or hub, and any other connection points.
   b. Verify that the configured router is functioning properly.

      Request that the network administrator verify the router is powered on and routing traffic as required.
   c. Request that the router administrator verify that the router is configured to reply to pings on that interface.
   d. Run `syscheck`.
      - If the alarm is cleared, the problem is resolved and this procedure is complete.
      - If the alarm is not cleared, go to step 5.
3. Perform Network Reconfiguration from the Command Line using `su - lsmsmgr` command. Update the default router.
4. Contact the Customer Care Center for further assistance. Provide the `syscheck` output collected in the previous steps.

3000000000004000 - Server Temperature Error

Alarm Type: TPD

Description: The internal temperature within the server is unacceptably high.

Severity: Major

OID: TpdTemperatureErrorNotify 1.3.6.1.4.1.323.5.3.18.3.1.2.15

Alarm ID: TKSPLATMA153000000000004000

Recovery

1. Ensure that nothing is blocking the fan's intake. Remove any blockage.
2. Verify that the temperature in the room is normal with the following table. If it is too hot, lower the temperature in the room to an acceptable level.

Table B-180 Server Environmental Conditions

Ambient Temperature	Operating: 5 degrees C to 40 degrees C Exceptional Operating Limit: 0 degrees C to 50 degrees C Storage: -20 degrees C to 60 degrees C
Ambient Temperature	Operating: 5° C to 35° C Storage: -20° C to 60° C
Relative Humidity	Operating: 5% to 85% non-condensing Storage: 5% to 950% non-condensing

Table B-180 (Cont.) Server Environmental Conditions

Elevation	Operating: -300m to +300m Storage: -300m to +1200m
Heating, Ventilation, and Air Conditioning	Capacity must compensate for up to 5100 BTUs/hr for each installed frame. Calculate HVAC capacity as follows: Determine the wattage of the installed equipment. Use the formula: watts x 3.143 = BTUs/hr

> **Note:**
>
> Be prepared to wait the appropriate period of time before continuing with the next step. Conditions need to be below alarm thresholds consistently for the alarm to clear. The alarm may take up to five minutes to clear after conditions improve. It may take about ten minutes after the room returns to an acceptable temperature before syscheck shows the alarm cleared.

3. Verify that the temperature in the room is normal. If it is too hot, lower the temperature in the room to an acceptable level.

> **Note:**
>
> Be prepared to wait the appropriate period of time before continuing with the next step. Conditions need to be below alarm thresholds consistently for the alarm to clear. It may take about ten minutes after the room returns to an acceptable temperature before the alarm cleared.

4. Run syscheck Check to see if the alarm has cleared
   - If the alarm has been cleared, the problem is resolved.
   - If the alarm has not been cleared, continue with the next step.
5. Run syscheck Check to see if the alarm has cleared
   - If the alarm has been cleared, the problem is resolved.
   - If the alarm has not been cleared, continue with the next step.
6. Replace the filter (refer to the appropriate hardware manual).

> **Note:**
>
> Be prepared to wait the appropriate period of time before continuing with the next step. Conditions need to be below alarm thresholds consistently for the alarm to clear. The alarm may take up to five minutes to clear after conditions improve. It may take about ten minutes after the filter is replaced before syscheck shows the alarm cleared.

7. Run syscheck.
   - If the alarm has been cleared, the problem is resolved.

- If the alarm has not been cleared, continue with the next step.

8. If the problem has not been resolved, contact #unique_86.

3000000000008000 - Server Mainboard Voltage Error

This alarm indicates that at least one monitored voltages on the server mainboard is not within the normal operating range.

Recovery

- Contact #unique_86 for assistance.

3000000000010000 - Server Power Feed Error

This alarm indicates that one of the power feeds to the server has failed.

Recovery

1. Locate the server supplied by the faulty power feed. Verify that all connections to the power supply units are connected securely. To determine where the cables connect to the servers, see the Power Connections and Cables page of the NAS on LSMS E5-APP-B Interconnect.
2. Run `syscheck`.
   a. If the alarm is cleared, the problem is resolved.
   b. If the alarm is not cleared, go to the next step.
3. Trace the power feed to its connection on the power source.

   Verify that the power source is on and that the power feed is properly secured.
4. Run `syscheck`.
   a. If the alarm is cleared, the problem is resolved.
   b. If the alarm is not cleared, go to the next step.
5. If the power source is functioning properly and all connections are secure, request that an electrician check the voltage on the power feed.
6. Run `syscheck`.
   a. If the alarm is cleared, the problem is resolved.
   b. If the alarm is not cleared, go to the next step.
7. If the problem is not resolved, call the #unique_86 for assistance.
8. Run `savelogs_plat` to gather system information for further troubleshooting, (see Saving Logs Using the LSMS **GUI** or Command Line), and contact the #unique_86.

3000000000020000 - Server Disk Health Test Error

This alarm indicates that the hard drive has failed or failure is imminent.

Recovery

- Immediately contact #unique_86 for assistance with a disk replacement.

3000000000040000 - Server Disk Unavailable Error

This alarm indicates that the smartd service is not able to read the disk status because the disk has other problems that are reported by other alarms. This alarm appears only while a server is booting.

Recovery

- Perform the recovery procedures for the other alarms that accompany this alarm.

3000000000080000 - Device Error

This alarm indicates that the offboard storage server has a problem with its disk volume filling.

Recovery

- Call #unique_86 for assistance.

3000000000100000 - Device Interface Error

This alarm indicates that the IP bond is either not configured or not functioning.

Recovery

- Call #unique_86 for assistance.

3000000400000000 - Multipath device access link problem

Alarm Type: TPD

Description: One or more "access paths" of a multipath device are failing or are not healthy, or the multipath device does not exist.

Severity: Major

OID: TpdMpathDeviceProblemNotify1.3.6.1.4.1.323.5.3.18.3.1.2.35

Alarm ID: TKSPLATMA353000000400000000

Recovery

1. #unique_86 should do the following:
    a. Check in the MSA administration console (web-application) that correct "volumes" on MSA exist, and read/write access is granted to the blade server.
    b. Check if multipath daemon/service is running on the blade server: service multipathd status. Resolution:
        i. start multipathd: service multipathd start
    c. Check output of "multipath -ll": it shows all multipath devices existing in the system and their access paths; check that particular /dev/sdX devices exist. This may be due to SCSI bus and/or FC HBAs haven't been rescanned to see if new devices exist. Resolution:
        i. run "/opt/hp/hp_fibreutils/hp_rescan -a",

        ii. "echo 1 > /sys/class/fc_host/host*/issue_lip",
        iii. "echo '- - -' > /sys/class/scsi_host/host*/scan"
    d. Check if syscheck::disk::multipath test is configured to monitor right multipath devices and its access paths: see output of "multipath -ll" and compare them to "syscheckAdm disk multipath - -get - -var=MPATH_LINKS" output.
       Resolution:
        i. configure disk::multipath check correctly.
2. Contact #unique_86.

3000000800000000 – Switch Link Down Error

This alarm indicates that the switch is reporting that the link is down. The link that is down is reported in the alarm. For example, port 1/1/2 is reported as 1102.

Recovery Procedure:

1. Verify cabling between the offending port and remote side.
2. Verify networking on the remote end.
3. If problem persists, contact #unique_86 to verify port settings on both the server and the switch.

3000001000000000 - Half-open Socket Limit

Alarm Type: TPD

Description: This alarm indicates that the number of half open TCP sockets has reached the major threshold. This problem is caused by a remote system failing to complete the TCP 3-way handshake.

Severity: Major

OID: tpdHalfOpenSocketLimit 1.3.6.1.4.1.323.5.3.18.3.1.2.37

Alarm ID: TKSPLATMA37 3000001000000000

Recovery

- Contact #unique_86.

3000002000000000 - Flash Program Failure

Alarm Type: TPD

Description: This alarm indicates there was an error while trying to update the firmware flash on the E5-APP-B cards.

Severity: Major

OID: tpdFlashProgramFailure 1.3.6.1.4.1.323.5.3.18.3.1.2.38

Alarm ID: TKSPLATMA383000002000000000

Recovery

- Contact #unique_86.

3000004000000000 - Serial Mezzanine Unseated

Alarm Type: TPD

Description: This alarm indicates the serial mezzanine board was not properly seated.

Severity: Major

OID: tpdSerialMezzUnseated 1.3.6.1.4.1.323.5.3.18.3.1.2.39

Alarm ID: TKSPLATMA393000004000000000

Recovery

- Contact #unique_86.

3000000008000000 - Server HA Keepalive Error

This alarm indicates that heartbeat process has detected that it has failed to receive a heartbeat packet within the timeout period.

Recovery

1. Determine if the mate server is currently operating. If the mate server is not operating, attempt to restore it to operation.
2. Determine if the keepalive interface is operating.
3. Determine if heartbeart is running (service TKLCha status).
4. Call #unique_86 for assistance.

3000000010000000 - DRBD block device can not be mounted

This alarm indicates that DRBD is not functioning properly on the local server. The DRBD state (disk state, node state, or connection state) indicates a problem.

Recovery

- Call #unique_86 for assistance.

3000000020000000 - DRBD block device is not being replicated to peer

This alarm indicates that DRBD is not replicating to the peer server. Usually this alarm indicates that DRBD is not connected to the peer server. A DRBD Split Brain may have occurred.

Recovery

1. Determine if the mate server is currently operating.
2. Call #unique_86 for assistance.

3000000040000000 - DRBD peer needs intervention

This alarm indicates that DRBD is not functioning properly on the peer server. DRBD is connected to the peer server, but the DRBD state on the peer server is either unknown or indicates a problem.

Recovery

- Call #unique_86 for assistance.

Minor Platform Alarms

Minor platform alarms involve disk space, application processes, **RAM**, and configuration errors.

5000000000000001 - Server Disk Space Shortage Warning

This alarm indicates that one of the following conditions has occurred:

- A file system has exceeded a warning threshold, which means that more than 80% (but less than 90%) of the available disk storage has been used on the file system.
- More than 80% (but less than 90%) of the total number of available files have been allocated on the file system.

Recovery

1. Run `syscheck`.
2. Examine the `syscheck` output to determine if the file system `/var/TKLC/lsms/free` is low on space. If it is, continue to the next step; otherwise go to Step 4.
3. If possible, recover space on the free partition by deleting unnecessary files:
   a. Log in to the server generating the alarm as the root user:

      Login: `root`

      Password:`<Enter root password>`
   b. Change to the /var/TKLC/lsms/free directory: `# cd /var/TKLC/lsms/free`
   c. Confirm that you are in the /var/TKLC/lsms/free directory: `# pwd /var/TKLC/lsms/free`
   d. When the `pwd` command is executed, if /var/TKLC/lsms/free is not output, go back to Sub-step b
   e. List files to be deleted and delete them using the `rm` command
   f. Re-run `syscheck`

   If the alarm is cleared, the problem is solved. If the alarm is not cleared, go to the next Step.
4. Run `savelogs` to gather all application logs (see Saving Logs Using the LSMS **GUI** or Command Line).
5. Contact the #unique_86.

5000000000000002 - Server Application Process Error

This alarm indicates that either the minimum number of instances for a required process are not currently running or too many instances of a required process are running.

Recovery

1. Contact the #unique_86.
2. If a 3000000000000020 - Server Platform Process Error alarm is also present, execute the recovery procedure associated with that alarm before proceeding.
3. Log in to the LSMS CLI using root password.
4. Stop the LSMS application.
5. Start the LSMS Application.
6. Capture the log files on both LSMSs (see Saving Logs Using the LSMS **GUI** or Command Lineand contact the #unique_86.

5000000000000004 - Server Hardware Configuration Error

This alarm indicates that one or more of the server’s hardware components are not in compliance with proper specifications (refer to *Application B Card Hardware and Installation Guide*.

Recovery

1. Run `syscheck` in verbose mode.
2. Call #unique_86 for assistance.

5000000000000008 - Server RAM Shortage Warning

This alarm indicates one of two conditions:

- Less memory than the expected amount is installed.
- The system is swapping pages in and out of physical memory at a fast rate, indicating a possible degradation in system performance.

This alarm may not clear immediately when conditions fall below the alarm threshold. Conditions must be below the alarm threshold consistently for the alarm to clear. The alarm may take up to five minutes to clear after conditions improve.

Recovery

- Call #unique_86 for assistance.

5000000000000020 - Server Swap Space Shortage Warning

This alarm indicates that the swap space available on the server is less than expected. This is usually caused by a process that has allocated a very large amount of memory over time.

> **Note:**
>
> In order for this alarm to clear, the underlying failure condition must be consistently undetected for a number of polling intervals. Therefore, the alarm may continue to be reported for several minutes after corrective actions are completed.

Recovery

- Call #unique_86 for assistance.

5000000000000040 - Server Default Router Not Defined

This alarm indicates that the default network route is either not configured or the current configuration contains an invalid **IP** address or hostname.

> **Caution:**
>
> When changing the server's network routing configuration it is important to verify that the modifications will not impact the method of connectivity for the current login session. It is also crucial that this information not be entered incorrectly or set to improper values. Incorrectly modifying the server's routing configuration may result in total loss of remote network access.

Recovery

- To define the default router:
  1. Obtain the proper Provisioning Network netmask and the IP address of the appropriate Default Route on the provisioning network. These are maintained by the customer network administrators.
  2. Log in to the LSMS CLI from lsmspri server with username `root` and run `su - lsmsmgr`
  3. Select **Network Configuration Menu**, from the LSMS Configuration Menu
  4. Select **Network Reconfiguration Menu** from the Network Configuration Menu. The following warning appears:

     WARNING: This action is service impacting. Are you sure?
  5. Chose yes. This displays the configuration screen. See the *Configuration Guide* for Initial Configuration information.
  6. Do the configuration.
  7. Exit from the lsmsmgr menu.
  8. Run `syscheck` again. If the alarm has not been cleared, go to Sub-step j.
  9. Run `savelogs` to gather all application logs.
  10. Contact the #unique_86.

5000000000000080 – Server temperature warning

Alarm Type: TPD

Description: This alarm indicates that the internal temperature within the server is outside of the normal operating range. A server Fan Failure may also exist along with the Server Temperature Warning.

Severity: Minor

OID: tpdTemperatureWarningNotify 1.3.6.1.4.1.323.5.3.18.3.1.3.8

Alarm ID: TKSPLATMI85000000000000080

Recovery

1. Ensure that nothing is blocking the fan's intake. Remove any blockage.
2. Verify that the temperature in the room is normal. If it is too hot, lower the temperature in the room to an acceptable level.

Table B-181 Server Environmental Conditions

Ambient Temperature	Operating: 5 degrees C to 40 degrees C Exceptional Operating Limit: 0 degrees C to 50 degrees C Storage: -20 degrees C to 60 degrees C
Relative Humidity	Operating: 5% to 85% non-condensing Storage: 5% to 950% non-condensing
Elevation	Operating: -300m to +300m Storage: -300m to +1200m
Heating, Ventilation, and Air Conditioning	Capacity must compensate for up to 5100 BTUs/hr for each installed frame. Calculate HVAC capacity as follows: Determine the wattage of the installed equipment. Use the formula: watts x 3.143 = BTUs/hr

> **Note:**
>
> Be prepared to wait the appropriate period of time before continuing with the next step. Conditions need to be below alarm thresholds consistently for the alarm to clear. The alarm may take up to five minutes to clear after conditions improve. It may take about ten minutes after the room returns to an acceptable temperature before syscheck shows the alarm cleared.

3. Verify that the temperature in the room is normal. If it is too hot, lower the temperature in the room to an acceptable level.

> **Note:**
>
> Be prepared to wait the appropriate period of time before continuing with the next step. Conditions need to be below alarm thresholds consistently for the alarm to clear. It may take about ten minutes after the room returns to an acceptable temperature before the alarm cleared.

4. Run syscheck to see if the alarm has cleared
   - If the alarm has been cleared, the problem is resolved.
   - If the alarm has not been cleared, continue with the next step.
5. Replace the filter (refer to the appropriate hardware manual).

> **Note:**
>
> Be prepared to wait the appropriate period of time before continuing with the next step. Conditions need to be below alarm thresholds consistently for the alarm to clear. It may take about ten minutes after the filter is replaced before the alarm cleared.

6. Run syscheck to see if the alarm has cleared
   - If the alarm has been cleared, the problem is resolved.
   - If the alarm has not been cleared, contact #unique_86 and provide the system health check output.

5000000000000100 - Server Core File Detected

This alarm indicates that an application process has failed and debug information is available.

Recovery

1. Run `syscheck` in verbose mode.
2. Run `savelogs` to gather system information (see Saving Logs Using the LSMS **GUI** or Command Line).
3. Contact the #unique_86.

5000000000000200 - Server NTP Daemon Not Synchronized

This alarm indicates that the **NTP daemon** (background process) has been unable to locate a server to provide an acceptable time reference for synchronization.

Severity: Minor

Alarm ID: TKSPLATMI10

Recovery

- Contact #unique_86.

5000000000000400 - Server CMOS Battery Voltage Low

The presence of this alarm indicates that the **CMOS** battery voltage has been detected to be below the expected value. This alarm is an early warning indicator of **CMOS** battery end-of-life failure which will cause problems in the event the server is powered off.

Recovery

- Contact #unique_86.

5000000000000800 - Server Disk Self Test Warning

A non-fatal disk issue (such as a sector cannot be read) exists.

Recovery

- Contact #unique_86.

5000000000001000 - Device Warning

This alarm indicates that either a `snmpget` cannot be performed on the configured SNMP OID or the returned value failed the specified comparison operation.

Recovery

1. Run `syscheck` in Verbose mode.
2. Call #unique_86 for assistance.

5000000000002000 - Device Interface Warning

This alarm can be generated by either an SNMP trap or an IP bond error. If `syscheck` is configured to receive SNMP traps, this alarm indicates that a SNMP trap was received with the *set* state. If `syscheck` is configured for IP bond monitoring, this alarm can mean that a slave device is not operating, a primary device is not active, or `syscheck` is unable to read bonding information from interface configuration files.

Recovery

1. Run `syscheck` in Verbose mode.
2. Call #unique_86 for assistance.

5000000000004000 - Server Reboot Watchdog Initiated

This alarm indicates that the server has been rebooted due to a hardware watchdog.

Recovery

- Contact #unique_86.

  This condition should never happen.

5000000000008000 - Server HA Failover Inhibited

This alarm indicates that the server has been inhibited and HA failover is prevented from occurring.

Recovery

- Call #unique_86 for assistance.

5000000000010000 - Server HA Active To Standby Transition

This alarm indicates that the server is in the process of transitioning HA state from Active to Standby.

Recovery

- Call #unique_86 for assistance.

5000000000020000 - Server HA Standby To Active Transition

This alarm indicates that the server is in the process of transitioning HA state from Standby to Active.

Recovery

- Call #unique_86 for assistance.

5000000000040000 - Platform Health Check Failure

This alarm indicates a `syscheck` configuration error.

Recovery

- Call #unique_86 for assistance.

5000000000080000 - NTP Offset Check Failure

This alarm indicates that time on the server is outside the acceptable range or offset from the NTP server. The alarm message provides the offset value of the server from the NTP server and the offset limit set for the system by the application.

Alarm Type: TPD

Severity: Minor

Alarm ID: TKSPLATMI20

Recovery

- Call #unique_86 for assistance.

5000000000100000 - NTP Stratum Check Failure

This alarm indicates that NTP is syncing to a server, but the stratum level of the NTP server is outside the acceptable limit. The alarm message provides the stratum value of the NTP server and the stratum limit set for the system by the application.

Recovery

- Call #unique_86 for assistance.

5000000020000000 – Server Kernel Dump File Detected

Alarm Type: TPD

Description: This alarm indicates that the kernel has crashed and debug information is available.

Severity: Minor

OID: 1.3.6.1.4.1.323.5.3.18.3.1.3.30

Alarm ID: TKSPLATMI305000000020000000

Recovery

- Contact #unique_86.

5000000040000000 – TPD Upgrade Failed

Alarm Type: TPD

Description: This alarm indicates that a TPD upgrade has failed.

Severity: Minor

OID: tpdServerUpgradeFailDetectedNotify 1.3.6.1.4.1.323.5.3.18.3.1.3.31

Alarm ID: TKSPLATMI315000000040000000

Recovery

1. Run the following command to clear the alarm.

   ```
   /usr/TKLC/plat/bin/alarmMgr -clear TKSPLATMI31
   ```

2. Contact #unique_86.

5000000080000000 - Half Open Socket Warning Limit

Alarm Type: TPD

This alarm indicates that the number of half open TCP sockets has reached the major threshold. This problem is caused by a remote system failing to complete the TCP 3-way handshake.

Severity: Minor

OID: tpdHalfOpenSocketWarningNotify1.3.6.1.4.1.323.5.3.18.3.1.3.32

Alarm ID: TKSPLATMI325000000080000s000

Recovery

1. Run `syscheck`.
2. Contact the Customer Care Center and provide the system health check output.

5000000000200000 - SAS Presence Sensor Missing

This alarm indicates that the server drive sensor is not working.
Recovery

- Call #unique_86 for assistance with a replacement server.

5000000000400000 - SAS Drive Missing

This alarm indicates that the number of drives configured for this server is not being detected.

Recovery

- Call #unique_86 to determine if the alarm is caused by a failed drive or failed configuration.

5000000000800000 - DRBD failover busy

This alarm indicates that a DRBD sync is in progress from the peer server to the local server. The local server is not ready to bethe primary DRBD node because its data is not current.

Recovery

1. Wait for approximately 20 minutes, then check if the DRBD sync has completed. A DRBD sync should take no more than 15 minutes to complete.
2. If the alarm persists longer than this time interval, call #unique_86 for assistance.

5000000001000000 - HP disk resync

This alarm indicates that the HP disk subsystem is currently resyncing after a failed or replaced drive, or after another change in the configuration of the HP disk subsystem. The output of the message will include the disk that is resyncing and the percentage complete. This alarm eventually clears after the resync of the disk is completed. The time to clear is dependant on the size of the disk and the amount of activity on the system..

Recovery

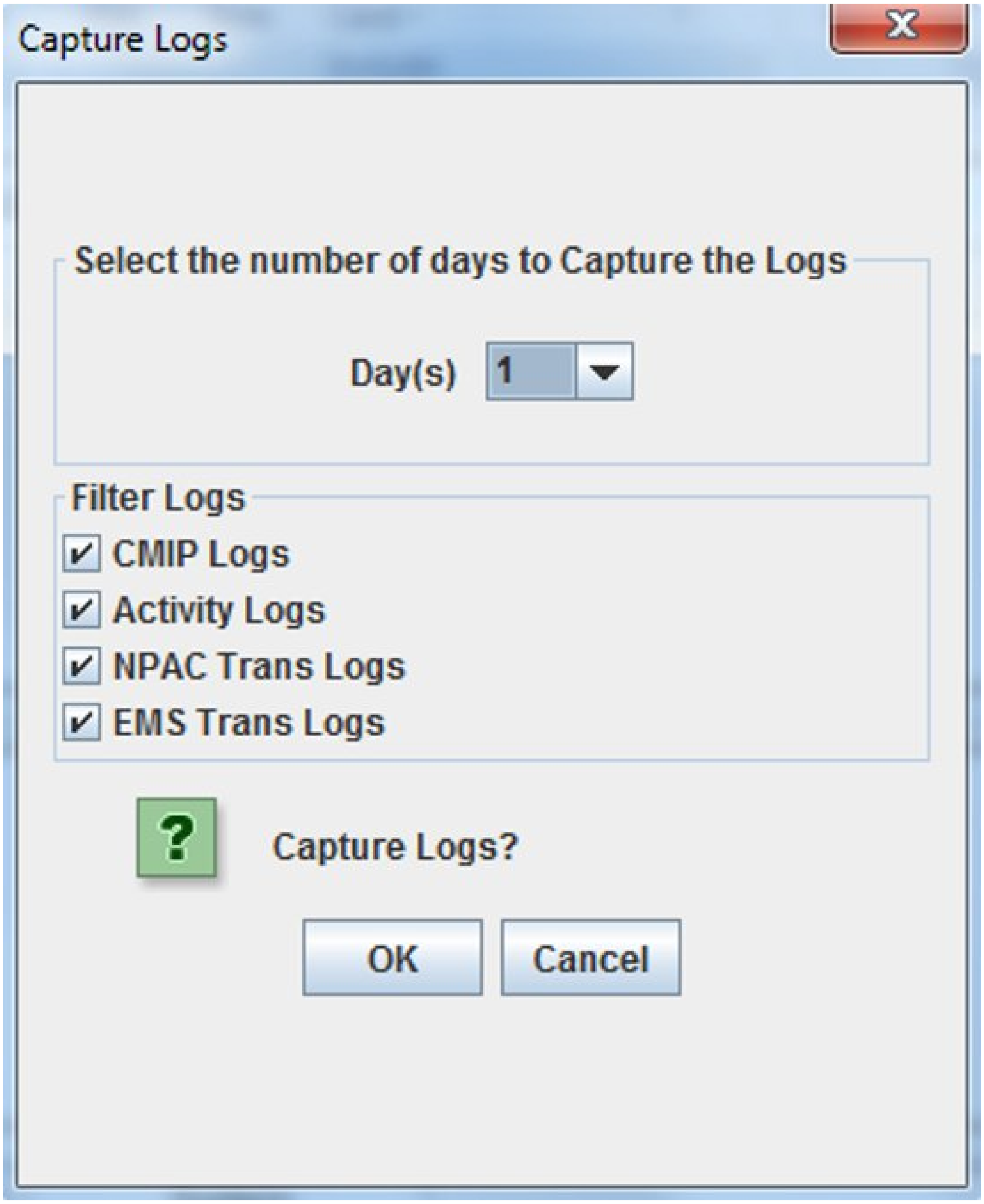
1. Run `syscheck` in Verbose mode.
2. If the percent recovering is not updating, wait at least 5 minutes between subsequent runs of `syscheck`, then call #unique_86 with the `syscheck` output.

Saving Logs Using the LSMS **GUI** or Command Line

During some corrective procedures, it may be necessary to provide Oracle Communications with information about the LSMS for help in clearing an alarm. These log files are used to aid the #unique_86 when troubleshooting the LSMS.

Use the following procedure to save logs using menu selections from the LSMS GUI.

1. Log in to the User Interface screen of the LSMS GUI (see Starting an Web-Based LSMS GUI Session).
2. From the menu, select **Logs>Capture Logs.**



Capture Logs

Select the number of days to Capture the Logs

Day(s) 1

Filter Logs

☑ CMIP Logs

☑ Activity Logs

☑ NPAC Trans Logs

☑ EMS Trans Logs

Capture Logs?

3. Select the number of days for which you want to capture the logs, as well as the specific logs, and click **OK**.

4. To capture logs from the Command Line, enter the following command: `/usr/TKLC/plat/sbin/savelogs_plat`

C
Downloading Files from an NPAC to the LSMS

This chapter describes how you can manually **FTP** bulk data download (**BDD**) files from the **NPAC** to the **LSMS** and merge those data files into an **LSMS** regional database.

Overview

This chapter describes how you can manually **FTP** bulk data download (**BDD**) files from the **NPAC** to the **LSMS** and merge those data files into an **LSMS** regional database.

Following are some examples of situations in which you would use the **BDD** procedure described in this chapter (see NPAC-LSMS Download Procedure):

- To perform a download of **NPAC** data after an **LSMS** site failure (for more information about restoring an **LSMS** site, see Recovering from Site Failures)
- To perform a download of **NPAC** data when migrating an **LSMS**
- To update **NPA** split information as part of a procedure to correct an active **NPA** Split Entry made in error (for more information about this procedure, refer to “Reversing (Correcting) an **NPA** Split Entry Made in Error” in the *Database Administrator's Guide*)

Time Range BDD and Object BDD/Object Range BDD

> **Note:**
>
> Object ranges are used so that potentially very large files can be broken down into smaller files based on **NPA-NXX** (for **SVs**) or **NPA-NXX**-X (for **NPBs**) ranges. Because of the much smaller number of **LRN**, **NPA-NXX**, **NPA-NXX**-X, or **SPID** objects, ranges are not supported for these data file types.

If you have installed the optional feature, **NANC** 3.2 Mass Update of **SPID** and **BDD** Enhancements, you can download files either for objects/object ranges or for time ranges (however, time range files are not supported for **SPIDs**).

Whenever you need to perform a download after a site failure or when migrating an **LSMS**, determine if it necessary to perform an Object **BDD**/Object Range **BDD**, or whether a Time Range **BDD** would suffice; a Time Range **BDD** can take many hours less to complete than an Object **BDD**/Object Range **BDD**.

Primarily, a Time Range **BDD** differs from an Object **BDD**/Object Range **BDD** in that:

- Each entry in the Time Range **BDD** file is processed as a create, modify, or delete in the **LSMS** databases; *no data* is deleted from the **LSMS** database prior to the import. Each entry in the Object **BDD**/Object Range **BDD** file is processed only as a create in the **LSMS** databases; *all data* in the **LSMS** database that meets the range criteria is deleted prior to the import.

- A Time Range **BDD** enables you to download a file from an **NPAC** that contains porting data for a specific period of time (you can specify begin and end timestamp values); an Object Range **BDD** does not allow you to specify begin and end timestamp values (the default values, 00-00-0000000000 and 99-99-9999999999, are assumed).

> **Note:**
>
> Time Range **SPIDBDD** files are not supported.

A Time Range **BDD** is not appropriate for correcting **NPA** Split information or **EDR** Conversion data.

NPAC-LSMS Download Procedure Summary

The following procedure is an outline of the detailed procedure shown in "**NPAC-LSMS** Download Procedure".

> **Caution:**
>
> The following procedure requires the connection between the **LSMS** and each regional **NPAC** that needs to have files downloaded be aborted (when you stop the regional agent in 27) before the **NPAC** builds the files to be sent to the **LSMS**. The connection must be aborted so that data can be properly resynchronized after the download of files completes. Therefore, the normal transmission of **NPAC** data from the **LSMS** to the connected **NEs** will temporarily be precluded during this procedure. It is recommended that you contact the #unique_86 before performing this procedure.

> **Note:**
>
> If an automatic or manual switchover occurs while files are being downloaded from the **NPAC** or between the time files are downloaded from the **NPAC** and the time they are imported into the **LSMS** database, perform the appropriate procedure described in "Copying Files to Other Server If Switchover Occurs".

> **Note:**
>
> Before you start this procedure, it is recommended that you contact the #unique_86. If you encounter any problems in the procedure, you must call the #unique_86.

1. Request the appropriate file from the **NPAC** for a given **SPID** and region.
2. Use **FTP** to download that file when the **NPAC** indicates the file is available.

3. Move to another folder all the files currently residing in the **NPAC** import folder (`/var/TKLC/lsms/free/data/npacftp/<region>`, where `<region>` is the region that you are importing).
4. Untar the **BDD** file (Object **BDD**/Object Range **BDD** file or Time Range **BDD** file) in this `<region>` folder using the following command:

   ```
   tar -zxvf filename.tar.gz
   ```

5. Run `/usr/TKLC/lsms/bin/import <region>` for the appropriate region.
6. Answer the questions presented by the import script.

Prerequisite Information

Before starting this procedure, obtain the following site-specific information. Record this information on your recovery preparation worksheet (see Recovery Preparation Worksheet).

- A login name and password for each supported **NPAC**. This login and password have been previously issued by the regional **NPAC**.
- The **FTP IP** address of each supported **NPAC**.
- The **FTP** directory names where the files are located on each supported **NPAC**.
- Data file names you need to download. To determine the naming convention for each type of **NPAC** data file, see “File Naming Conventions”.
- Contact the **NPAC** of the region for which data files are required and request that the files you need be copied into the **NPAC**’s **FTP** directory.

File Naming Conventions

All **BDD** file names include a creation timestamp, which is represented as **<create>**. Time Range **BDD** file names also contain start (**<start>**) and end (**<end>**) timestamps. All timestamps are represented as **DD-MM-YYYYhhmmss** where:

DD represents a two-digit day

MM represents a two-digit month

YYYY represents a four-digit year

hh represents a two-digit hour

mm represents a two-digit minute

ss represents a two-digit second

An example timestamp is 11-10-2006123015.

For Object Range **BDD** files, `<start>` is always 00-00-0000000000 and `<end>` is always 99-99-9999999999. These are the default values.

Table C-1 references the pages where you can find information about file naming conventions for each data type:

Table C-1 Determining Naming Conventions for NPAC Data Files

Type of Data File	See:
Subscription Version (Object Ranges and Time Ranges are supported)	Table C-2
Number Pool Block (Object Ranges and Time Ranges are supported)	Table C-3
LRN, **NPA-NXX**, and **NPA-NXXX** (Only Objects are supported)	Table C-4
SPID (Only Objects are supported)	Table C-5

> **Note:**
>
> Object ranges are used so that potentially very large files can be broken down into smaller files based on **NPA-NXX** (for **SVs**) or **NPA-NXX**-X (for **NPBs**) ranges. Because of the much smaller number of **LRN**, **NPA-NXX**, **NPA-NXX**-X, or **SPID** objects, ranges are not supported for these data file types.

Subscription Version File Naming Convention

The file name for subscription version files is represented as `<NPANXX-NPANXX>`, which indicates the range of **NPA-NXX** values contained in the download file. The file extension values depend on whether you are requesting a file for an Object Range **BDD** or for a Time Range **BDD**, as shown in Table C-2.

Table C-2 NPAC File Naming Convention for Subscription Version Data File

Range Type	Naming Convention
Object Range **BDD**	`<NPANXX-NPANXX>.<create>`[2]`.00-00-0000000000.99-99-9999999999`
Time Range[1] **BDD**	`<NPANXX-NPANXX>.<create>.<start>.<end>`[2]

[1] Time Range files are supported only if you have installed the NANC 3.2 feature

[2] For format of `<create>`, `<start>`, and `<end>`, see File Naming Conventions.

Following are examples of uses for subscription version **BDD** files:

- If you need to bulk download all subscription versions from the **NPAC**, use the following file name:

```
<000000-999999>.<create>.00-00-0000000000.99-99-9999999999
```

- If you need to bulk download all subscription versions for a time period from midnight February 12, 2006 to midnight February 13, 2006 in a file created February 14, 2006 at 9:00 a.m., use the following file name:

```
<000000-999999>.14022006090000.12022006000000.13022006000000
```

- If you need files to correct an **NPA** split, specify three Object Range files that have the same **NPANXX** values before and after the hyphen:
  - One file with the old **NPANXX** value
  - One file with the correct new **NPANXX** value
  - One file with the erroneous new **NPANXX** value

  For example, if an **NPA** split was erroneously entered from 909-860 to 123-860 instead of correctly from 909-860 to 124-860, specify the following files:
  - 909860-909860
  - 124860-124860
  - 123860-123860

  Because no file extension is specified in these files, the default values of `00-00-0000000000.99-99-9999999999` are assumed.

Number Pool Block File Naming Convention

The file name for number pool block files is represented as `<NPANXXX-NPANXXX>`, which indicates the range of **EDR NPA-NXXX** values contained in the download file. The file extension values depend on whether you are requesting a file for an Object Range **BDD** or for a Time Range **BDD**, as shown in Table C-3.

Table C-3 NPAC File Naming Convention for Number Pool Block Data File

Range Type	Naming Convention
Object Range **BDD**	`<NPANXXX-NPANXXX>.<create>`[2]`.00-00-0000000000.99-99-9999999999`
Time Range[1] **BDD**	`<NPANXXX-NPANXXX>.<create>.<start>.<end>`[2]

[1] Time Range files are supported only if you have installed the NANC 3.2 feature

[2] For format of `<create>`, `<start>`, and `<end>`, see File Naming Conventions.

These file types exist only if the **NPAC** supports Efficient Data Representation (**EDR**). Following are examples of uses for number pool block **BDD** files:

- If you need to bulk download all number pool blocks from the **NPAC**, use the following file name:

```
<0000000-9999999>.<create>.00-00-0000000000.99-99-9999999999
```

- If you need to bulk download all number pool blocks for a time period from midnight February 12, 2006 to midnight February 13, 2006 in a file created February 14, 2006 at 9:00 a.m., use the following file name:

  ```
  <0000000-9999999>.14022006090000.12022006000000.13022006000000
  ```

- If you need files to correct an **NPA** split, specify three files, each with the **NPANXX** value followed by a 0 before the hyphen and the **NPANXX** value followed by a 9 after the hyphen:
  - One file with the old **NPANXX** value
  - One file with the correct new **NPANXX** value
  - One file with the erroneous new **NPANXX** value

    For example, if an **NPA** split was erroneously entered from 909-860 to 123-860 instead of correctly from 909-860 to 124-860, specify the following files:
  - 9098600-9098609
  - 1248600-1248609
  - 1238600-1238609

Because no file extension is specified in these files, the default values of `00-00-0000000000.99-99-9999999999` are assumed.

LRN, NPA-NXX, and NPA-NXXX File Naming Convention

> **Note:**
>
> In contrast to **SVs** and **NPBs** data file types, there are a much smaller number of **LRN**, **NPA-NXX**, and **NPA-NXX**-X objects; therefore, ranges are not supported for these data file types, as shown in Table C-4.

- The file name for **LRN** files is represented as `<LRN>`, which indicates the **LRN** value contained in the download file.
- The file name for **NPA-NXX** files is represented as `<NPANXX>,`which indicates the **NPA-NXX** value contained in the download file.
- The file name for **NPA-NXXX** files is represented as `<NPANXX>,` , which indicates the **EDR NPA-NXXX** value contained in the download file. This file type exists only if the **NPAC** supports Efficient Data Representation (**EDR**).

The file extension values depend on whether you are requesting a file for an Object **BDD** or for a Time Range **BDD**, as shown in Table C-4.

Table C-4 NPAC File Naming Convention for LRN, NPA-NXX, and NPA-NXXX Network Data Files

Type	Naming Convention
Object **BDD**	`<LRN>.<create>`[2]`.00-00-0000000000.99-99-9999999999`

Table C-4 (Cont.) NPAC File Naming Convention for LRN, NPA-NXX, and NPA-NXXX Network Data Files

Type	Naming Convention
	<NPANXX>.<create>[2].00-00-0000000000.99-99-9999999999
	<NPANXX>.<create>[2].00-00-0000000000.99-99-9999999999
Time Range[1]**BDD**	<LRN>.<create>.<start>.<end>[2]
	<NPANXX>.<create>.<start>.<end>[2]
	<NPANXXX>.<create>.<start>.<end>[2]

[1] Time Range files are supported only if you have installed the NANC3.2 feature

[2] For format of <create>, <start>, and <end>, see File Naming Conventions.

SPID File Naming Convention

> **Note:**
>
> In contrast to **SVs** and **NPBs** data file types, there is a much smaller number of **SPID** objects; therefore, ranges are not supported for this data file type, as shown in Table C-5.

The **SPID** naming convention only applies to Object **BDD** files; Time Range is not supported. The file name for **SPID** files is represented as <SPID>, which indicates the **SPID** value contained in the download file..

Table C-5 NPAC File Naming Convention for SPID Network Data File

Type	Naming Convention
Object **BDD**	<SPID>.<create>[2].00-00-0000000000.99-99-9999999999

[2] For format of <create>, <start>, and <end>, see File Naming Conventions.

Only the <create> timestamp field is supported.

Because no file extension is specified in these files, the default values of 00-00-0000000000.99-99-9999999999 are assumed.

NPAC-LSMS Download Procedure

Use the following procedure to perform a download of files from an **NPAC** to the **LSMS**. The example output shown in the procedure is for Time Range **BDD** files that include Number Pooling Efficient Data Representation (**EDR**). File formats for other download types vary, as described in File Naming Conventions. For more information about **EDR**, refer to the *Database Administrator's Guide*.

> **Note:**
>
> Before you start this procedure, it is recommended that you contact the #unique_86. If you encounter any problems in the procedure, you must call the #unique_86.

> **Caution:**
>
> The following procedure requires the connection between the **LSMS** and each regional **NPAC** that needs to have files downloaded be aborted (when you stop the regional agent in step 26) before the **NPAC** builds the files to be sent to the **LSMS**. The connection must be aborted so that data can be properly resynchronized after the download of files completes. Therefore, the normal transmission of **NPAC** data from the **LSMS** to the connected **NEs** will temporarily be precluded during this procedure. It is recommended that you contact the #unique_86 before performing this procedure.

> **Note:**
>
> If an automatic or manual switchover occurs while files are being downloaded from the **NPAC** or between the time files are downloaded from the **NPAC** and the time they are imported into the **LSMS** database, perform the appropriate procedure described in "Copying Files to Other Server If Switchover Occurs".

1. Ensure that you have the necessary information, as described in "Prerequisite Information".
2. Log in to the **LSMS** active server as `lsmsadm`.
3. Change to the directory that contains the current **LSMS** version:

   ```
   $ cd /var/TKLC/lsms/free/data/npacftp/<region>
   ```

4. Verify that the correct directory was accessed by entering the following command:

   ```
   $ pwd
   ```

   The correct output is:

   ```
   /var/TKLC/lsms/free/data/npacftp/<region>
   ```

5. Determine whether any files are currently contained in this directory:

   ```
   $ ls -l
   ```

6. If the output shows any files, delete them by entering the following command:

   ```
   $ rm *
   ```

> **Note:**
>
> Though the steps in this procedure refer to the use of FTP, you may use SFTP instead.

7. Use **FTP** to connect to the **NPAC** by entering the following command, where `<NPAC_IP_address>` is the decimal version of the **NPAC**'s **IP** address, recorded on your worksheet, as described in "Prerequisite Information":

   ```
   $ ftp <NPAC_IP_address>
   ```

   An example command line follows:

   ```
   $ ftp 208.143.38.10
   ```

8. When prompted, enter your **NPAC** login name and password, recorded on your worksheet, as described in "Prerequisite Information".

9. Change to the **NPAC**'s **FTP** directory by entering the following command, where `<NPAC_FTP_directory>` is the regional directory as recorded on the your worksheet that corresponds to the region selected in 3:

   ```
   ftp> cd <NPAC_FTP_directory>
   ```

10. Display the contents of the **NPAC**'s **FTP** directory by entering the following command:

    ```
    ftp> ls
    ```

    - Output similar to the following appears.

      ```
      200 PORT command successful.
      150 Opening ASCII mode data connection for file list.
      000000-999999.07-11-2004023849.07-10-2004023849.07-11-2004023849
      0000000-9999990.07-11-2004023849.07-10-2004023849.07-11-2004023849
      LRN.07-11-2004023849.07-10-2004023849.07-11-2004023849
      NPANXX.07-11-2004023849.07-10-2004023849.07-11-2004023849
      NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849
      SPID.07-11-2000023849
      226 Transfer complete.
      70 bytes received in 0.026 seconds (2.6 Kbytes/s)
      ```

    - If you are converting a regional database to support **EDR**, output similar to the following appears:

      ```
      200 PORT command successful.
      150 Opening ASCII mode data connection for file list.
      0000000-9999990.07-11-2004023849.07-10-2004023849.07-11-2004023849
      NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849
      226 Transfer complete.
      20 bytes received in 0.026 seconds (2.6 Kbytes/s)
      ```

11. Change to noninteractive mode by entering the following command:

    ```
    ftp> prompt
    ```

Output similar to the following appears:

```
Interactive mode off
```

12. Transfer the files you need as follows:

    - If you are downloading files from the **NPAC** after a site failure, enter the following command to transfer all the files in the **NPAC**’s **FTP** directory `<NPAC_FTP_directory>` to the **LSMS**’s regional directory `/var/TKLC/lsms/free/data/npacftp/<region>`:

      ```
      ftp> mget *
      ```

    - If you are reversing an **NPA** split, enter commands similar to the following commands (these commands use the values from the example) to transfer the subscription files and **NPB** files for the old **NPANXX** and the erroneous new **NPANXX** from the **NPAC**’s **FTP** directory `<NPAC_FTP_directory>` to the **LSMS**’s regional directory `/var/TKLC/lsms/free/data/npacftp/<region>`:

      ```
      ftp> mget 909860*
      ```

      ```
      ftp> mget 123860*
      ```

      ```
      ftp> mget 124860*
      ```

    - If you are converting a regional database to support **EDR**, enter the following commands to transfer the **EDR** files from the **NPAC**’s **FTP** directory `<NPAC_FTP_directory>` to the **LSMS**’s regional directory `/var/TKLC/lsms/free/data/npacftp/<region>`:

      ```
      ftp> mget 0000000-9999999*
      ```

      ```
      ftp> mget NPANXXX*
      ```

13. Output similar to the following appears (the example shows only Time Range **BDD** files for downloading):

```
200 PORT command successful.
150 Opening BINARY mode data connection for
000000-999999.07-11-2004023849.07-10-2004023849.07-11-2004023849
(17979 bytes).
###
226 Transfer complete.
local:
000000-999999.07-11-2004023849.07-10-2004023849.07-11-2004023849
remote:
000000-999999.07-11-2004023849.07-10-2004023849.07-11-2004023849
17979 bytes received in 0.18 seconds (le+02 Kbytes/s)
200 PORT command successful.
150 Opening BINARY mode data connection for
0000000-9999999.07-11-2004023849.07-10-2004023849.07-11-2004023849
(17979 bytes).
###
226 Transfer complete.
local:
0000000-9999999.07-11-2004023849.07-10-2004023849.07-11-2004023849
remote:
0000000-9999999.07-11-2004023849.07-10-2004023849.07-11-2004023849
```

```
17979 bytes received in 0.18 seconds (le+02 Kbytes/s)
200 PORT command successful.
150 Opening BINARY mode data connection for LRN.07-10-2000023849
(17979 bytes).
###
226 Transfer complete.
local: LRN.07-11-2004023849.07-10-2004023849.07-11-2004023849
remote: LRN.07-11-2004023849.07-10-2004023849.07-11-2004023849
17979 bytes received in 0.18 seconds (le+02 Kbytes/s)
200 PORT command successful.
150 Opening BINARY mode data connection for
NPANXX.07-11-2004023849.07-10-2004023849.07-11-2004023849 (124831 bytes).
################
226 Transfer complete.
local: NPANXX.07-11-2004023849.07-10-2004023849.07-11-2004023849
remote: NPANXX.07-11-2004023849.07-10-2004023849.07-11-2004023849
124831 bytes received in 1 seconds (1.2e+02 Kbytes/s)
200 PORT command successful.
150 Opening BINARY mode data connection for
NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849 (124831 bytes).
################
226 Transfer complete.
local: NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849
remote: NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849
124831 bytes received in 1 seconds (1.2e+02 Kbytes/s)
200 PORT command successful.
150 Opening BINARY mode data connection for SPID.07-10-2004023849 (479
bytes).
#
226 Transfer complete.
local: SPID.07-10-2004023849 remote: 07-10-2004023849
479 bytes received in 0.018 seconds (27 Kbytes/s)
```

14. Exit **FTP** by entering the following command:

    ```
    ftp> quit
    ```

15. Ensure that the files just downloaded have appropriate permissions for all users by entering the following command:

    ```
    $ chmod 655 *
    ```

16. Enter the following command to verify that all the files in 12 transferred and that they now have read-write permission:

    ```
    $ ls -l
    ```

    Output similar to the following appears (the example shows only Time Range **BDD** files for downloading):

    ```
    total 3188358
    -rw-r-r-  1 lsmsadm  lsms 1608000001 Jul  11 02:38
    000000-999999.07-11-2004023849.07-10-2004023849.07-11-2004023849
    -rw-r-r-  1 lsmsadm  lsms 1608000001 Jul  11 02:38
    0000000-9999999.07-11-2004023849.07-10-2004023849.07-11-2004023849
    -rw-r-r-  1 lsmsadm  lsms 780001     Jul  11 02:38
    LRN.07-11-2004023849.07-10-2004023849.07-11-2004023849
    ```

```
-rw-r-r-  1 lsmsadm  lsms 6440001    Jul  11 02:38
NPANXX.07-11-2004023849.07-10-2004023849.07-11-2004023849
-rw-r-r-  1 lsmsadm  lsms 6440001    Jul  11 02:38
NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849
-rw-r-r-  1 lsmsadm  lsms 239990     Jul  11 02:38
SPID.07-10-2000023849
```

> **Note:**
>
> It is recommended that you create a backup of your files before proceeding to the next step. To create a backup, enter the following command:
> `$ mkdir /var/TKLC/lsms/free/data/npacftp/<region>/save`

17. If you need files from another **NPAC** region, repeat 3 through 16.
18. If switchover has occurred, perform the appropriate procedure described in "Copying Files to Other Server If Switchover Occurs".
19. Untar the **BDD** file (Object Range **BDD** file or Time Range **BDD** file) in the `<region>` folder using the following command:

    ```
    tar -zxvf filename.tar.gz
    ```

20. Enter the following command to display the number of lines in each bulk load file.

    ```
    $ wc -l *
    ```

> **Note:**
>
> Record the line count values (shown in **bold** below) for future reference.

```
    1892
000000-999999.07-11-2004023849.07-10-2004023849.07-11-2004023849
      0
000000-999999.07-11-2004023849.07-10-2004023849.07-11-2004023849
    892
0000000-9999999.07-11-2004023849.07-10-2004023849.07-11-2004023849
      0
0000000-9999999.07-11-2004023849.07-10-2004023849.07-11-2004023849
    250 LRN.07-11-2004023849.07-10-2004023849.07-11-2004023849
      0 LRN.07-10-2004023849.07-11-2004023849
     23 NPANXX.07-10-2004023849.07-11-2004023849
      0 NPANXX.07-10-2004023849.07-11-2004023849
     12 NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849
      0 NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849
      0 SPID.07-10-2004023849
```

21. **BDD** files received from the **NPAC** require conversion before they can be imported into the **LSMS** database.

The conversion must be performed by entering the following command for each file:

```
$ cat orig_file_from_NPAC | tr "\015" "\012" >
new_file_for_import
```

(The file name must be changed. Oracle recommends that you append a few characters, such as `.tr`, to the end of the file name. Maintaining most of the file name will make it easier to rename the files to the original file names, as instructed in 23) For example:

```
$ cat 000000-999999.07-10-2000023849 | tr "\015" "\012" >
000000-999999.07-11-2004023849.07-10-2004023849.07-11-2004023849.tr
$ cat 0000000-9999999.07-11-2004023849.07-10-2004023849.07-11-2004023849
| tr "\015" "\012" >
0000000-9999999.07-11-2004023849.07-10-2004023849.07-11-2004023849.tr
$ cat LRN.07-10-2000023849 | tr "\015" "\012" >
LRN.07-11-2004023849.07-10-2004023849.07-11-2004023849.tr
$ cat NPANXX.07-11-2004023849.07-10-2004023849.07-11-2004023849 | tr
"\015" "\012" >
NPANXX.07-11-2004023849.07-10-2004023849.07-11-2004023849.tr
$ cat NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849 | tr
"\015" "\012" >
NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849.tr
$ cat SPID.07-10-2004023849 | tr "\015" "\012" >
SPID.07-10-2004023849.tr
```

22. After ensuring all files have been converted, delete the original files.

    ```
    $ rm orig_file_from_NPAC
    ```

    For example:

    ```
    $ rm 000000-999999.07-11-2004023849.07-10-2004023849.07-11-2004023849
    $ rm 0000000-9999999.07-11-2004023849.07-10-2004023849.07-11-2004023849
    $ rm LRN.07-11-2004023849.07-10-2004023849.07-11-2004023849
    $ rm NPANXX.07-11-2004023849.07-10-2004023849.07-11-2004023849
    $ rm NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849
    $ rm SPID.07-10-2004023849
    ```

23. Rename each of the files that were converted in 21 back to the original **NPAC** file names by entering the following command for each file:

    ```
    $ mv new_file_for_import orig_filename_from_NPAC
    ```

    For example:

    ```
    $ mv 000000-999999.07-11-2004023849.07-10-2004023849.07-11-2004023849.tr
     000000-999999.07-11-2004023849.07-10-2004023849.07-11-2004023849
    $ mv
    0000000-9999999.07-11-2004023849.07-10-2004023849.07-11-2004023849.tr
    0000000-9999999.07-11-2004023849.07-10-2004023849.07-11-2004023849
    $ mv LRN.07-11-2004023849.07-10-2004023849.07-11-2004023849.tr
    LRN.07-11-2004023849.07-10-2004023849.07-11-2004023849
    $ mv NPANXX.07-11-2004023849.07-10-2004023849.07-11-2004023849.tr
    NPANXX.07-11-2004023849.07-10-2004023849.07-11-2004023849
    $ mv NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849.tr
    ```

```
NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849
$ mv SPID.07-10-2004023849.tr SPID.07-10-2004023849
```

24. Verify that the files were properly converted by entering the following command:

    ```
    $ file *
    ```

    Properly converted files will be appended with the following information, `: ASCII text`, as shown in the example output below.

    ```
    000000-999999.07-11-2004023849.07-10-2004023849.07-11-2004023849:
    ASCII text
    000000-999999.07-11-2004023849.07-10-2004023849.07-11-2004023849:
    ASCII text
    0000000-9999999.07-11-2004023849.07-10-2004023849.07-11-2004023849:
    ASCII text
    0000000-9999999.07-11-2004023849.07-10-2004023849.07-11-2004023849:
    ASCII text
    LRN.07-11-2004023849.07-10-2004023849.07-11-2004023849: ASCII text
    LRN.07-10-2004023849.07-11-2004023849: ASCII text
    NPANXX.07-10-2004023849.07-11-2004023849: ASCII text
    NPANXX.07-10-2004023849.07-11-2004023849: ASCII text
    NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849: ASCII
    text
    NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849: ASCII
    text
    SPID.07-10-2004023800: ASCII text
    SPID.07-10-2004023849: ASCII text
    ```

    > **Note:**
    >
    > If the files are appended with `: ASCII text, with CR line terminators`, then the conversion performed in 21 failed. Contact the #unique_86.

25. If switchover has occurred, perform the appropriate procedure described in "Copying Files to Other Server If Switchover Occurs".

26. If the **SWIM** feature has been enabled, contact the #unique_86 to turn off **SWIM**.

27. Perform the following substeps to prevent the **NPAC** database from being updated while the files are being converted and copied in subsequent steps:

    a. Halt the **LSMS** agent for the region:

       ```
       $ $LSMS_DIR/lsms stop <region>
       ```

    b. From the **LSMS GUI** menu, select **Configure>LNP System>NPAC>Modify>Primary** and click the Activate Region checkbox so that is empty.

       For more information about this **GUI** window, refer to the *Configuration Guide*. Having this checkbox empty prevents the `sentryd` utility from attempting to automatically restart the regional agent.

28. You are now ready to run the `import` command.

> **Note:**
>
> Do not run the `import` command while any of the following processes are also running: backups, starting a standby node (to change its state from **UNINITIALIZED** "**INHIBITED**" to **STANDBY**), running the `lsmsdb quickaudit` command, and creating query server snapshots, all of which use temporary storage space. If you try to run the `import` command while any of these processes are running, you may not have enough disk space to complete the process. Since backups can be run automatically, perform the procedure described in "Checking for Running Backups" to ensure that no backups are running.

- If you are performing this procedure as part of reversing an NPA split, converting a regional database to support EDR, importing an incremental download of files from NPAC after a site failure, or importing files for any reason other than a complete regional bulk download, go to 29.
- If you are performing a complete regional bulk download from the NPAC, you can save a significant amount of time (which would be required to delete all existing entries in the database) by entering the following commands, where `<region>` is the name of the NPAC region:

  > **Caution:**
  >
  > The following commands will delete all data in your regional database.

  Log into the active server and run both of the following commands:

  ```
  $ $LSMS_DIR/npac_db_setup remove <region>
  ```

  ```
  $ $LSMS_DIR/npac_db_setup create <region>
  ```

29. Import data in the downloaded files into the regional database by entering the following command:

    ```
    $ $LSMS_DIR/import [-c] <region>
    ```

    For example:

    ```
    $ $LSMS_DIR/import -c MidAtlantic
    ```

    The `-c` option allows the import to continue on to the next line of the file even if errors occur. Output similar to the following indicates the progress of the **LSMS** processing:

    > **Note:**
    >
    > In these examples, … on a line by itself indicates that output occurs, but its contents are not significant to this procedure.

Note:

If you do not specify the `-c` option and a failure, such as a syntax error, occurs during the import process, an error message is displayed and the import utility prompts the user with the following message: `Do you want to continue (Yes/No)?` If `n` is entered, the import utility operation is aborted. If `y` is entered, the import utility aborts its operation for the current download file and continues importing the remaining specified download files.
If such an error occurs, be sure to perform the substeps shown in 30.

- Output similar to the following appears as the LSMS deletes subscription versions, NPBs, LRNs, NPANXXs, and SPIDs in the regional LSMS database, reformats the NPAC data file, and places the data from the NPAC data file into the specified regional LSMS database.

```
NPAC FTP directory: /var/TKLC/lsms/free/data/npacftp/Midwest
The following NPAC download file(s) are available for import:

LRN.07-11-2004023849.07-10-2004023849.07-11-2004023849

NPANXX.07-11-2004023849.07-10-2004023849.07-11-2004023849

NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849

SPID.07-10-2004023849

000000-999999.07-11-2004023849.07-10-2004023849.07-11-2004023849

0000000-9999999.07-11-2004023849.07-10-2004023849.07-11-200402384
9
Import LRN.07-11-2004023849.07-10-2004023849.07-11-2004023849
(Yes/No/All/Quit)?all
The following NPAC download files have been chosen to be
imported:
           SPID.07-10-2004023849
NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849

NPANXX.07-11-2004023849.07-10-2004023849.07-11-2004023849

LRN.07-11-2004023849.07-10-2004023849.07-11-2004023849

000000-999999.07-11-2004023849.07-10-2004023849.07-11-2004023849

0000000-9999999.07-11-2004023849.07-10-2004023849.07-11-200402384
9
Do you want to continue (Yes/No)?yes
Beginning Delete Process for SPID.07-10-2004023849
Delete Process Completed for SPID.07-10-2004023849
Beginning Download Process for SPID.07-10-2004023849
1000 ServiceProvNetwork instances written to MidwestDB
```

```
2000 ServiceProvNetwork instances written to MidwestDB
2351 ServiceProvNetwork instances written to MidwestDB

Import completed successfully.
Download Process Completed for SPID.11-07-2001145342

Beginning Delete Process for
NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849
Delete Process Completed for
NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849

Beginning Download Process for
NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849

1000 ServiceProvNPA_NXX_X instances written to MidwestDB
2000 ServiceProvNPA_NXX_X instances written to MidwestDB
3000 ServiceProvNPA_NXX_X instances written to MidwestDB
4000 ServiceProvNPA_NXX_X instances written to MidwestDB
…
30000 ServiceProvNPA_NXX_X instances written to MidwestDB
30860 ServiceProvNPA_NXX_X instances written to MidwestDB
Import completed successfully.
Download Process Completed for
NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849

Beginning Delete Process for
NPANXX.07-11-2004023849.07-10-2004023849.07-11-2004023849

Delete Process Completed for
NPANXX.07-11-2004023849.07-10-2004023849.07-11-2004023849

Beginning Download Process for
NPANXX.07-11-2004023849.07-10-2004023849.07-11-2004023849

90 ServiceProvNPA_NXX instances written to MidwestDB
1090 ServiceProvNPA_NXX instances written to MidwestDB
Import completed successfully.
Download Process Completed for
NPANXX.07-11-2004023849.07-10-2004023849.07-11-2004023849

Beginning Delete Process for
LRN.07-11-2004023849.07-10-2004023849.07-11-2004023849

Delete Process Completed for
LRN.07-11-2004023849.07-10-2004023849.07-11-2004023849

Beginning Download Process for
LRN.07-11-2004023849.07-10-2004023849.07-11-2004023849

1000 ServiceProvLRN instances written to MidwestDB
2000 ServiceProvLRN instances written to MidwestDB
3000 ServiceProvLRN instances written to MidwestDB
4000 ServiceProvLRN instances written to MidwestDB
4700 ServiceProvLRN instances written to MidwestDB
5700 ServiceProvLRN instances written to MidwestDB
```

```
Import completed successfully.
Download Process Completed for
LRN.07-11-2004023849.07-10-2004023849.07-11-2004023849

Beginning Delete Process for
000000-999999.07-11-2004023849.07-10-2004023849.07-11-2004023849

Will drop instances of:
Drop instances of class `SubscriptionVersion'
DROPPING INSTANCES.
Delete Process Completed for
000000-999999.07-11-2004023849.07-10-2004023849.07-11-2004023849

Beginning Download Process for
000000-999999.07-11-2004023849.07-10-2004023849.07-11-2004023849

1000 SubscriptionVersion instances written to MidwestDB
2000 SubscriptionVersion instances written to MidwestDB
3000 SubscriptionVersion instances written to MidwestDB
4000 SubscriptionVersion instances written to MidwestDB
4500 SubscriptionVersion instances written to MidwestDB
Import completed successfully.
Download Process Completed for 000000-999999.11-07-2001145342

Beginning Delete Process for
0000000-9999999.07-11-2004023849.07-10-2004023849.07-11-200402384
9

Will drop instances of:
Drop instances of class `NumberPoolBlock'
DROPPING INSTANCES.
Delete Process Completed for
0000000-9999999.07-11-2004023849.07-10-2004023849.07-11-200402384
9

Beginning Download Process for
0000000-9999999.07-11-2004023849.07-10-2004023849.07-11-200402384
9

1000 NumberPoolBlock instances written to MidwestDB
2000 NumberPoolBlock instances written to MidwestDB
Import completed successfully.
Download Process Completed for
0000000-9999999.07-11-2004023849.07-10-2004023849.07-11-200402384
9
Script completed.
```

- If you are reversing an **NPA** split, in this step the **LSMS** deletes all subscription versions and **NPBs** for the old **NPA-NXX** and the erroneous new **NPA-NXX** in the regional **LSMS** database, reformats the **NPAC** data file, and places the data from the **NPAC** data file into the specified regional **LSMS** database. (Example output is not shown.)
- If you are converting a regional database to support **EDR**, in this step the **LSMS** formats the **NPAC** data file, and places the data from the **NPAC** data file into the specified regional **LSMS** database. (Example output is not shown.)

30. If you specified the `-c` option or you answered Y when prompted for any failure, such as syntax error, that occurred during the import process in 29, perform the one of the following sets of substeps:

> ⚠ **Caution:**
>
> This step requires a working knowledge of the vi editor and detailed understanding of the contents of the files downloaded from the **NPAC**. It is recommended that the #unique_86 be contacted prior to performing this step.

If you answered Y when prompted for any failure during the import process in , perform these substeps:

a. Examine and correct the files that were not successfully imported by entering the following command:

```
$ vi /var/TKLC/lsms/free/data/npacftp/<region>/<downloaded
file>
```

For example:

```
$ vi /var/TKLC/lsms/free/data/npacftp/Midwest/
SPID.07-10-2000023849
```

b. Delete the `^D` characters added at the end of the file by the vi editor by pressing the Shift and G keys at the same time to go to the end of the file, and then typing `dd` to remove the last line.

c. For each file corrected by a and b, enter the following command to import the corrected file into the regional database:

```
$ $LSMS_DIR/import <region> <bulk load file>
```

d. Go to step .

If you specified the `-c` option in , perform these substeps:

a. Examine and correct the files that were not successfully imported by entering the following command:

```
$ vi /var/TKLC/lsms/free/data/npacftp/<region>/<downloaded
file>
```

For example:

```
$ vi /var/TKLC/lsms/free/data/npacftp/Midwest/
SPID.07-10-2000023849_FAILED
```

b. Correct the file as desired, and then import the file into the database by entering the following command, where `<region>` is the name of the **NPAC** region, `<instance>` is the type of instance to be imported into the database, and `<filename>` is the name of the file to be imported:

```
$ $LSMS_TOOLS_DIR/npacimport -r <region> -i <instance> -y
<filename>
```

31. If you are reversing an **NPA** split, go to step .

Otherwise, perform the following substeps:

Table C-6   NPAC Bulk Load Files and LSMS Database Object Classes

NPAC Bulk Load File	LSMS Database Object Class
`000000-999999.07-11-2004023849.07-10-2004023849.07-11-2004023849`	SubscriptionVersion
`0000000-9999999.07-11-2004023849.07-10-2004023849.07-11-2004023849`	NumberPoolBlock
`LRN.07-11-2004023849.07-10-2004023849.07-11-2004023849`	ServiceProvLRN
`NPANXX.07-11-2004023849.07-10-2004023849.07-11-2004023849`	ServiceProvNPA_NXX
`NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849`	ServiceProvNPA_NXX_X
`SPID.07-11-2004023849`	ServiceProvNetwork

These substeps compare the number of instances of each object type (shown in **bold** in the following examples) contained in the **NPAC** files and in the **LSMS** database.

a. Enter the following command to display the number of lines in each bulk load file:

```
$ wc -l *
```

Output similar to the following appears:

- If you are downloading files from the **NPAC** after a site failure or during migration, output similar to the following appears. This output includes lines (shown in **bold**) used for Efficient Data Representation (**EDR**). If an **NPAC** does not support **EDR**, or if you do not have the **EDR** feature installed, lines similar to those shown in **bold** will not appear.

```
     1892

000000-999999.07-11-2004023849.07-10-2004023849.07-11-2004023
849
     892
0000000-9999999.07-11-2004023849.07-10-2004023849.07-11-20040
23849         250

LRN.07-11-2004023849.07-10-2004023849.07-11-2004023849
    23
  NPANXX.07-11-2004023849.07-10-2004023849.07-11-2004023849
      12
NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849
     5
  SPID.07-10-2004023849
```

- If you are converting a regional database to support **EDR**, output similar to the following output appears.

```
 892

0000000-9999999.07-11-2004023849.07-10-2004023849.07-11-2004023849
 12
  NPANXXX.07-11-2004023849.07-10-2004023849.07-11-2004023849
```

b. Enter the following command to display the total number of instances of each class in the regional database:

```
$ lsmsdb -c counts -d <dbname>
```

Output similar to the following appears:

```
$ lsmsdb -c counts -d MidwestDB 892
 ........... MidwestDB.NumberPoolBlock 250
 ........... MidwestDB.ServiceProvLRN 23
 ............ MidwestDB.ServiceProvNPA_NXX 12
 ............ MidwestDB.ServiceProvNPA_NXX_X 5
 ............. MidwestDB.ServiceProvNetwork 1,892
 ......... MidwestDB.SubscriptionVersion
#
```

c. Verify that the numbers of instances indicated in the output of b (shown in **bold** in the example) match the numbers included in the output of a (shown in **bold** in that example). If they do not match, repeat through

32. If you are converting a regional database to support **EDR**, go to .

    Otherwise, perform the following command to change the Last Change Time (**LCT**) of the regional database to match the timestamp embedded in the file name of the files obtained in .

    ```
    $ chglct -r <region> -s <YYYYMMDDhhmmss>
    ```

    Where `<region>` is the name of the **NPAC** for which you are performing the download and <YYYYMMDDhhmmss> is the timestamp embedded in the file name as shown in the files displayed in . For more information about the `chglct` command, see "chglct".

33. Once you have verified that the region has received a "Recovery Complete" message from the **NPAC**, you may remove the "import" files from the system by repeating 2 through 6 of this procedure.

34. Restart the **LSMS** agent for the region by doing the following:

    From the **LSMS GUI** menu, select **Configure**, and then **LNP System**, and then **NPAC**, and then **Modify**, and then **Primary** and click the Activate Region checkbox so that is checked. For more information about this **GUI** window, refer to the *Configuration Guide*. Having this checkbox checked enables the `sentryd` utility to automatically attempt to restart the regional agent.

35. If the **SWIM** feature was turned off in 26, contact the **NPAC** to have the **SWIM** list cleared for all imported regions, then contact the #unique_86 to reactivate **SWIM**.

36. If imports were performed for all active regions, go to Otherwise, contact the #unique_86 to determine if time range resynchronizations are needed for regions that were not imported due to **SWIM** having been turned off temporarily.

If necessary, the #unique_86 will help the customer reassociate **LSMS** with the **NPAC** and perform manual time range resynchronizations.

37. Restart the **LSMS GUI** for the region. by entering the following command:

    ```
    $ $LSMS_DIR/start_mgui
    ```
    For example:

    ```
    $ $LSMS_DIR/start_mgui
    ```

38. Repeat steps through for each **NPAC** region for which you have downloaded files.

39. For each network element supported by the **LSMS**, resynchronize the data that corresponds to the data downloaded from the **NPAC**, using one of the procedures described in *LNP Database Synchronization User's Guide*. For example:

    - If you downloaded from the **NPAC** after a site failure or during migration, perform a time range audit or a bulk download to each supported network element (refer to “Auditing and Reconciling Network Elements from the **LSMS**” or “Managing Bulk Load from the **LSMS**”).
    - If you have reversed an **NPA** split, perform an audit and reconcile procedure for subscription versions and **NPBs** in both the old **NPA-NXX** and the erroneous new **NPA-NXX** to each supported network element (refer to “Auditing and Reconciling Network Elements from the **LSMS**”).
    - If you have converted a regional database to support **EDR**, perform an audit and reconcile procedure for all **NPBs** to each supported network element (refer to “Auditing and Reconciling Network Elements from the **LSMS**”).

Copying Files to Other Server If Switchover Occurs

When switchover (whether automatically or manually initiated) occurs, the standby server, which has been replicating the database on the active server, takes over to be the newly active server. However, any files that have been downloaded from the **NPAC** exist only on the server to which they were downloaded. If switchover occurs during a **BDD** procedure, the quickest way to get the files on the newly active server is to perform one of the procedures described in this section.

The following notifications indicate that a switchover has been initiated and completed:

```
LSMS4000|14:58 Oct 22, 2005|xxxxxxx|Notify:Sys Admin - Switchover
initiated
LSMS4001|14:58 Oct 22, 2005|xxxxxxx|Notify:Sys Admin - Switchover
complete
```

Perform one of the following procedures:

- If switchover occurred after all files have been downloaded from the **NPAC**, perform the procedure described in “Copying All Downloaded Files After Switchover”
- If switchover occurred while files are being downloaded from the **NPAC**, perform the procedure described in “Copying Partially Downloaded Files After Switchover”

Copying All Downloaded Files After Switchover

If switchover is initiated and completed after all the files you need have been downloaded from the **NPAC** but before you have imported them into the **LSMS** database, perform the following procedure.

1. If switchover is initiated between the time all the files have been downloaded from the **NPAC** and the time they are to be imported into the **LSMS**, wait until the following notification has been reported:

   ```
   LSMS4001|14:58 Oct 22, 2005|xxxxxxx|Notify:Sys Admin - Switchover complete
   ```

2. Log into the non-active server as `lsmsadm`.
3. Navigate to the directory where files have been downloaded:

   ```
   $ cd /var/TKLC/lsms/free/data/npacftp/<region>
   ```

   Where `<region>` is the name of the **NPAC** region for which files are being downloaded.
4. Verify that the correct directory was accessed by entering the following command:

   ```
   $ pwd
   ```

   The correct output is:

   ```
   /var/TKLC/lsms/free/data/npacftp/<region>
   ```

5. Use the secure file transfer protocol (`sftp`) to move the files from the previously active server into the `/var/TKLC/lsms/free/data/npacftp/<region>` directory on the newly active server:

   ```
   $ sftp lsmsadm@mate
   ```

   When prompted, enter the `lsmsadm` password. Then the `sftp>` prompt will appear; enter the following commands at the prompt:

   ```
   sftp> cd /var/TKLC/lsms/free/data/npacftp/<region>
   sftp> mput *
   sftp> bye
   ```

6. Proceed with the step you were performing when you were directed to this procedure.

Copying Partially Downloaded Files After Switchover

If switchover is initiated and completed while files are being downloaded from the **NPAC**, some of the files may exist on the previously active server and some may exist on the newly active server. The safest procedure is to repeat the **BDD** procedure.

However, if you have already downloaded a number of files, you can choose to determine which files exist on which server and use the following procedure to copy the files that exist on the non-active server to the active server.

1. If switchover is initiated while files are being downloaded from the **NPAC**, wait until the following notification has been reported:

```
LSMS4001|14:58 Oct 22, 2005|xxxxxxx|Notify:Sys Admin -
Switchover complete
```

2. Log into the non-active server as `lsmsadm`.
3. Navigate to the directory where files have been downloaded:

   ```
   $ cd /var/TKLC/lsms/free/data/npacftp/<region>
   ```

   Where `<region>` is the name of the **NPAC** region for which files are being downloaded.
4. Verify that the correct directory was accessed by entering the following command:

   ```
   $ pwd
   ```

   The correct output is:

   ```
   /var/TKLC/lsms/free/data/npacftp/<region>
   ```

5. Enter the following command to list which files are stored in this directory:

   ```
   $ ls -l
   ```

6. Log into the active server as `lsmsadm`.
7. Navigate to the directory where files have been downloaded:

   ```
   $ cd /var/TKLC/lsms/free/data/npacftp/<region>
   ```

   Where `<region>` is the name of the **NPAC** region for which files are being downloaded.
8. Verify that the correct directory was accessed by entering the following command:

   ```
   $ pwd
   ```

   The correct output is:

   ```
   /var/TKLC/lsms/free/data/npacftp/<region>
   ```

9. Enter the following command to list which files are stored in this directory:

   ```
   $ ls -l
   ```

10. Compare the files listed in 5 and 9 to determine whether all the files you need have been downloaded to one server or the other.

    If any files you need are missing from both servers, perform the procedure described in “**NPAC-LSMS** Download Procedure” to obtain the missing files from the **NPAC**.
11. If you desire to copy any files from the non-active server to the active server, perform the remaining steps of this procedure.
12. At the previously active server, use the secure file transfer protocol (`sftp`) to move the files from the standby server into the/var/**TKLC**/lsms/free/data/npacftp/<region> directory on the newly active server:

    ```
    $ sftp lsmsadm@mate
    ```

    When prompted, enter the `lsmsadm` password. Then the sftp> prompt will appear; enter the following commands at the prompt:

    ```
    sftp> cd /var/TKLC/lsms/free/data/npacftp/<region>
    ```

```
sftp> mput *
```

```
sftp> bye
```

13. Proceed with the step you were performing when you were directed to this procedure.

D

Worksheets

This appendix contains worksheets that you can copy and fill out with your own information.

Introduction

This appendix contains worksheets that you can copy and fill out with your own information.

Complete the worksheet shown in Table D-1 to record information that you may need during disaster recovery procedures, as described in Recovering from Site Failures.

Recovery Preparation Worksheet

In preparation for possible error situations, including disasters, record the following information, as shown in Table D-1, and store it in a safe and accessible location, off-site from both the main and shadow **LSMS**. Rows are provided for up to eight **NPACs** and up to eight **EMSs**; your **LSMS** may serve fewer **NPACs** or **EMSs**.

Table D-1 Recovery Preparation Worksheet

Information Required	Customer Value
Obtain the following license information from the #unique_86	
OSI license key for main **LSMS** server with default server name lsmspri	
OSI license key for main **LSMS** server with default server name lsmssec	
OSI license key for shadow **LSMS** server with default server name lsmspri	
OSI license key for shadow **LSMS** server with default server name lsmssec	
Main LSMS Data	
Service Provider Identification (**SPID**)	
LSMS Version	
`root` password	
`lsmsadm` name	
`lsmsadm` password	
`lsmsuser` name	
`lsmsuser` password	
`lsmsuext` name	
`lsmsuext` password	
`lsmsview` name	
`lsmsview` password	

Table D-1 (Cont.) Recovery Preparation Worksheet

Information Required	Customer Value
`lsmsall` name	
`lsmsall` password	
Shadow LSMS Data	
Service Provider Identification (**SPID**)	
primary **IP** address (decimal)	
primary **IP** address (hexadecimal)	
secondary **IP** address (decimal)	
secondary **IP** address (hexadecimal)	
NPAC Region 1 Name and Information	
FTP IP address (decimal)	
FTP IP address (hexadecimal)	
FTP directory	
FTP file names	
NPAC user **ID**	
NPAC password	
LSMS key set	
NPAC Region 2 Name and Information	
FTP IP address (decimal)	
FTP IP address (hexadecimal)	
FTP directory	
FTP file names	
NPAC user **ID**	
NPAC password	
LSMS key set	
NPAC Region 3 Name and Information	
FTP IP address (decimal)	
FTP IP address (hexadecimal)	
FTP directory	
FTP file names	
NPAC user **ID**	
NPAC password	
LSMS key set	
NPAC Region 4 Name and Information	
FTP IP address (decimal)	
FTP IP address (hexadecimal)	
FTP directory	
FTP file names	
NPAC user **ID**	

Table D-1 (Cont.) Recovery Preparation Worksheet

Information Required	Customer Value
NPAC password	
LSMS key set	
NPAC Region 5 Name and Information	
FTP IP address (decimal)	
FTP IP address (hexadecimal)	
FTP directory	
FTP file names	
NPAC user **ID**	
NPAC password	
LSMS key set	
NPAC Region 6 Name and Information	
FTP IP address (decimal)	
FTP IP address (hexadecimal)	
FTP directory	
FTP file names	
NPAC user **ID**	
NPAC password	
LSMS key set	
NPAC Region 7 Name and Information	
FTP IP address (decimal)	
FTP IP address (hexadecimal)	
FTP directory	
FTP file names	
NPAC user **ID**	
NPAC password	
LSMS key set	
NPAC Region 8 Name and Information	
FTP IP address (decimal)	
FTP IP address (hexadecimal)	
FTP directory	
FTP file names	
NPAC user **ID**	
NPAC password	
LSMS key set	

E

Query Server Maintenance Procedures

This appendix contains detailed, step-by-step query server procedures, as well as information about the automated system check feature, the query server error log, and how to retrieve information from the **LNP** database fields.

Introduction

This appendix contains detailed, step-by-step query server procedures to enable you to do the following:

- Modify the MySQL Port for Query Servers
- Check Connection Status of Directly Connected Query Servers
- Maintain the Binary Log on Query Servers
- Check MySQL Replication Status on Query Servers
- Start MySQL Replication on Query Servers
- Stop MySQL Replication on Query Servers
- Check for Running Backups
- Reload a Query Server **Database** from the **LSMS**
- Reload a Query Server **Database** from Another Query Server
- Clean Up After Failed or Interrupted Snapshot

It also contains information about the automated system check feature, the query server error log, and how to retrieve information from the **LNP** database fields.

LSMS Maintenance Procedures

Figure E-1 illustrates a query server configuration scenario depicting how the **LSMS** might be directly connected to a query server, or indirectly connected to daisy-chained query servers. Refer to this figure when performing the maintenance procedures described in this section.

This scenario includes the following:

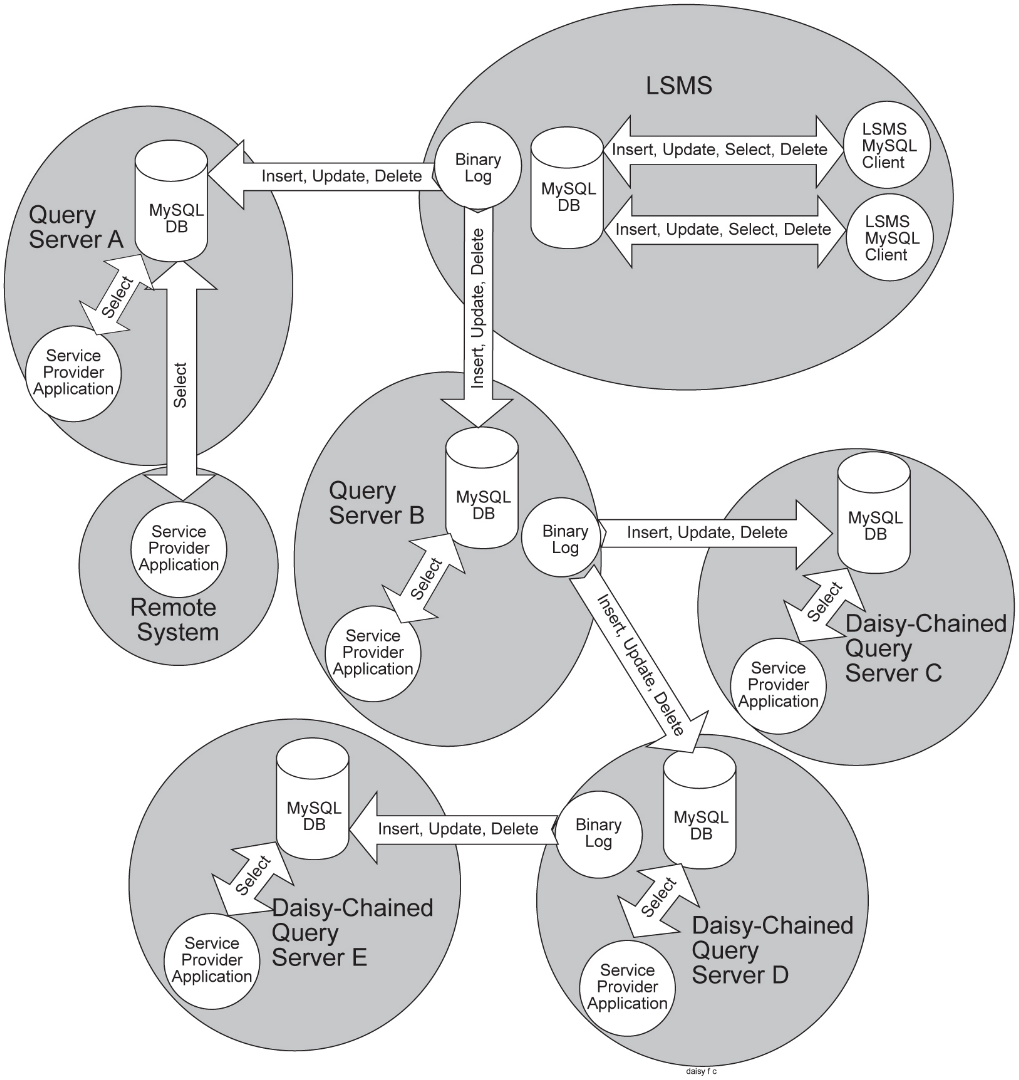
- One master (**LSMS**)
- One remote system
- Five query servers:
  - One directly connected slave (Query Server A)
  - One directly connected master/slave (Query Server B)
  - Two daisy-chained slaves (Daisy-chained Query Servers C and E)
  - One daisy-chained master/slave (Daisy-chained Query Server D)

Client applications on each query server represent a Service Provider application that queries the replicated **LSMS LNP** databases using supported MySQL database **APIs**.

Note:

Process all updates to the query server database through the master.

Figure E-1 Query Server Configuration Scenario


LSMS
Binary Log
MySQL DB
Insert, Update, Select, Delete
LSMS MySQL Client
Insert, Update, Select, Delete
LSMS MySQL Client
Insert, Update, Delete
Query Server A
MySQL DB
Select
Service Provider Application
Select
Insert, Update, Delete
Service Provider Application
Remote System
Query Server B
MySQL DB
Binary Log
Select
Service Provider Application
Insert, Update, Delete
MySQL DB
Select
Daisy-Chained Query Server C
Service Provider Application
Insert, Update, Delete
MySQL DB
Insert, Update, Delete
Binary Log
MySQL DB
Select
Daisy-Chained Query Server E
Service Provider Application
Select
Daisy-Chained Query Server D
Service Provider Application
daisy f c

Automatic Monitoring of Query Servers

The `lsmsQueryServer` script monitors the connectivity and status of each directly connected query server to ensure that it is replicating the **LSMS LNP** database. During failure and recovery of the connection with the query servers, the **LSMS** does one or more of the following:

- Displays a notification on the graphical user interface (**GUI** notification)
- Posts a Surveillance notification at five-minute intervals to Serial Port 3 used by Surveillance
- Sends a trap to a Network Management System (**NMS**) if the optional Remote Monitoring feature is installed

For information about the notifications posted, see 8098 and 8099.

> **Note:**
>
> The **LSMS** does not monitor the connectivity or status of the daisy-chained query servers.

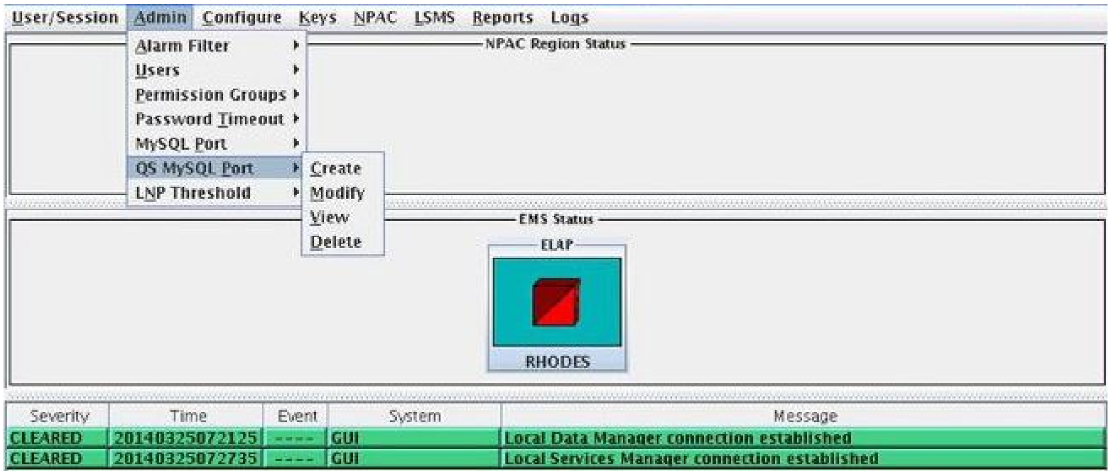
Modify the MySQL Port for Query Servers

Since the MySQL port is a well-known port, for security purposes you can use the LSMS GUI to change the configured MySQL port for a query server.

> **Note:**
>
> To avoid database replication issues, configure the same MySQL port for LSMS that you configure for the query server. For information about configuring the MySQL port for LSMS on the MySQL Port submenu, refer to the *Configuration Guide*.

For the MySQL Port for Query Servers, there are four options under **Admin**, and then **QS MySQL Port** as shown:

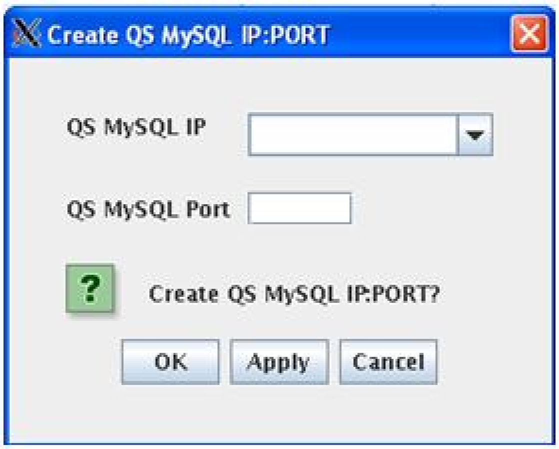
Figure E-2   Change configured QS MySQL Port



Severity	Time	Event	System	Message
CLEARED	20140325072125	----	GUI	Local Data Manager connection established
CLEARED	20140325072735	----	GUI	Local Services Manager connection established

- **Create**
  Choosing **Create** displays the Create QS MySQL IP:Port menu.

Figure E-3 Create QS MySQL IP:Port



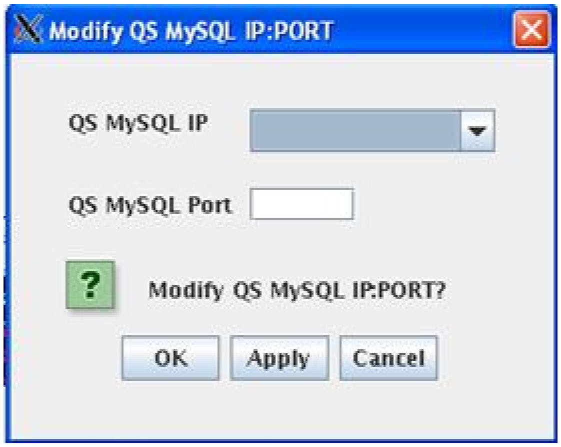
To start, all IP addresses that are configured to use default port 3306 are selectable in the **QS MySQL IP** field. Select an IP address, add the desired port in the **QS MySQL Port** field, click **OK** (or **Apply** followed by **OK**), and a `Create Successful` message is displayed.

The valid QS MySQL Port range is 1024-65535. An error message is displayed if a port outside of this range is entered.

After **Create** is used, the IP/Port combination is stored in a hidden file on LSMS, `/usr/TKLC/lsms/tools/.qs.mysql.port`. IP addresses that are assigned to particular ports are not displayed the next time **Create** is used.

- **Modify**
  Choosing **Modify** displays the Modify QS MySQL IP:Port menu.

Figure E-4 Modify QS MySQL IP:Port

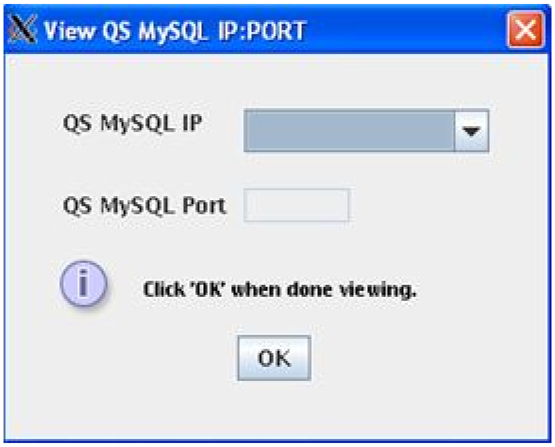


The **QS MySQL IP** field displays the IP addresses that were configured using **Create** and saved in `/usr/TKLC/lsms/tools/.qs.mysql.port`. You can modify the port associated with an IP address, click **OK** (or **Apply** followed by **OK**), and a `Modify Successful` message is displayed.

After **Modify** is used, `/usr/TKLC/lsms/tools/.qs.mysql.port` is updated with the modified IP/Port combination.

- **View**
  Choosing **View** displays the View QS MySQL IP:Port menu.

Figure E-5 View QS MySQL IP:Port



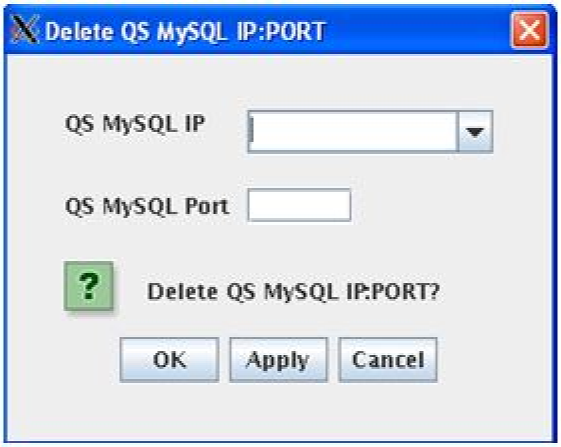
View QS MySQL IP:PORT

Click 'OK' when done viewing.

The **QS MySQL IP** field displays the IP addresses that are stored in `/usr/TKLC/lsms/tools/.qs.mysql.port`, and the **QS MySQL Port** field lists the corresponding port for each IP address.

- **Delete**
  Choosing **Delete** displays the Delete QS MySQL IP:Port menu.

Figure E-6 Delete QS MySQL IP:Port



Delete QS MySQL IP:PORT

Delete QS MySQL IP:PORT?

Use this option to delete an IP/Port combination from `/usr/TKLC/lsms/tools/.qs.mysql.port`. Deleted IP/Port entries result in that LSMS subsequently connecting using default port 3306.

Check Connection Status of Directly Connected Query Servers

You can check the connection status of query servers that are directly connected to the **LSMS**. The connection status for each query server (denoted by hostname and **IP** address) is displayed as "Connected", "Disconnected" or "Not Reachable."

To check the connection status, use the following procedure:

1. Log into the active server as the `lsmsadm` user.

   (For information about logging in, see "Logging In to **LSMS** Server Command Line".)

2. Enter the following command:

   ```
   $ lsmsdb -c queryservers
   ```
   Output similar to the following displays:

   ```
   10.25.60.32 (10.25.60.32) Disconnected
    Failed to connect to 10.25.60.12 database
   ```

   In this example, two query servers have been configured to directly connect to the **LSMS**; the first is currently disconnected and the second failed to connect.

Maintain the Binary Log on Query Servers

Use this procedure to purge the binary log of a query server platform that will have one or more daisy-chained query servers. (Perform this procedure on Query Servers B and D, as shown in Figure E-1.)

> **Note:**
>
> Monitor the binary log size and delete unnecessary binary log files on a weekly basis, following the steps listed below.

1. Use the following commands to identify what log each daisy-chained query server is replicating from and record your findings:

   ```
   # cd /opt/mysql/mysql/bin
   # mysql -u root -p
   ```

   Enter password:
   ```
   <daisy-chained Query Server’s MySql root user password
   ```

   ```
   >mysql> SHOW SLAVE STATUS \G;
   mysql> exit;
   ```

2. From Step 1, find the earliest log among all the daisy-chained query servers (if all the daisy-chained query servers are up-to-date, this is the last log on the list).

   On the query server that has query servers daisy-chained from it, list the binary log files. The target log is the one just before the earliest one in use.
   ```
   # cd /opt/mysql/mysql/bin
   ```

   ```
   # mysql -u root -p
   ```

```
Enter password:
<Query Server’s MySql root user password>
```

```
mysql> SHOWMASTERLOGS;
```

3. Use the following command to purge the master binary log files on the query server (that has one or more query servers daisy-chained from it) excluding the target log:

```
mysql> PURGE MASTER LOGS TO '<binary_log_file>';
```

Check MySQL Replication Status on Query Servers

Use the following procedure to check MySQL replication status on query servers:

1. Start the MySQL command-line utility on the slave server:

```
# cd /opt/mysql/mysql/bin
```

```
# mysql -u root -p
```

```
Enter password:
<Query Server’s MySql root user password>
```

2. Check the replication status using the `show slave status` command (the status of the slave server is conveyed by the Slave_IO_Running and Slave_SQL_Running column values):

```
mysql> SHOW SLAVE STATUS \G;
```

Start MySQL Replication on Query Servers

Use the following procedure to start MySQL replication on the query server:

1. Start the MySQL command-line utility on the query server:

```
# cd /opt/mysql/mysql/bin
```

```
# mysql -u root -p
```

```
Enter password:
<Query Server’s MySql root user password>
```

2. Start MySQL replication:

When the replication operation resumes, the slave server should connect to the master and catch up on any updates that occurred since the replication operation was terminated.

```
mysql> start slave;
```

3. Verify that MySQL replication is running using the `show slave status` command (ensure the Slave_IO_Running and Slave_SQL_Running column values are set to **Yes**, and ensure that the log file has a name).

```
mysql> SHOW SLAVE STATUS \G;
```

4. Exit the MySQL command-line utility:

```
mysql> exit;
```

Stop MySQL Replication on Query Servers

Use the following procedure to stop MySQL replication on the query server:

1. Start the MySQL command-line utility on the query server:

   ```
   # cd /opt/mysql/mysql/bin
   ```

   ```
   # mysql -u root -p
   ```

   ```
   Enter password:
   <Query Server’s MySql root user password>
   ```

2. Stop MySQL replication: (When replication is off, the slave server data is not updated and is not kept in synchronization with the master server.)

   ```
   mysql> stop slave;
   ```

3. Verify that MySQL replication is no longer running using the `show slave status` command (ensure the Slave_IO_Running and Slave_SQL_Running column values are set to **No**).

   ```
   mysql> SHOW SLAVE STATUS \G;
   ```

4. Exit the MySQL command-line utility:

   ```
   mysql> exit;
   ```

Check for Running Backups

Both database backups and query server snapshots use the same file space on the **LSMS**. Before creating a snapshot on the **LSMS**, perform the procedure described in “Checking for Running Backups” to ensure that no database backups are running.

> **Caution:**
>
> If you attempt to create a snapshot while a backup is running, the backup will be interrupted, and the next time a backup is performed, it will take much longer to complete.

The following tasks also use temporary file space (as does a snapshot), so you may run out of file space if you attempt to create a snapshot after you have started but not yet finished any of these tasks:

- Starting the standby server (changing its state from **UNINITIALIZED** "**INHIBITED**" to **STANDBY**) using the procedure described in “Starting a Server”
- Running the `import` command
- Running the `quickaudit` command

Reload a Query Server Database from the LSMS

This procedure reloads a corrupted or backlevel query server's database by copying the **LSMS LNP** database. If the **LSMS** is configured with multiple query servers, reload a query server from another query server (that is currently synchronized with the

LSMS) to prevent **NPAC**-to-network element traffic from being interrupted (see "Reload a Query Server **Database** from Another Query Server").

> **Note:**
>
> The following method of reloading a query server may briefly interrupt provisioning on the **LSMS** while a snapshot of the **LNP** database occurs. Therefore, choose this method only when other methods for synchronizing the query server are not feasible. The time required to accomplish this procedure depends on the bandwidth of the customer's network and the amount of data to be reloaded. To minimize service interruption, perform this procedure during a scheduled maintenance period.

1. Log into the active server as `root`.

   If you are already logged into the active server as a different user, enter the following command:
   ```
   $ su - root
   ```
   When prompted, enter the root password.

2. Enter both of the following commands to remove all existing snapshots as well as the snapshot information file:

   ```
   # rm /var/TKLC/lsms/free/mysql-snapshot*
   # rm /var/TKLC/lsms/free/snapinfo.sql
   ```

3. Ensure that no database backups are in progress by performing the procedure described in "Check for Running Backups".

4. Enter the following command to create a snapshot of all the **LSMS** data.

   > **Caution:**
   >
   > Do not create a snapshot while a database backup is occurring. To ensure that a database backup is not occurring, perform the procedure described in "Check for Running Backups".

   In addition, do not create a snapshot while any of the following processes are also running: backups, starting a standby node (to change its state from **UNINITIALIZED** "**INHIBITED**" to **STANDBY**), running the `import` command, or running the `lsmsdb quickaudit` command, all of which use temporary storage space. If you try to create a snapshot while any of these processes are running, you may not have enough disk space to complete the process.

   > **Note:**
   >
   > GNU tar (gtar) must be installed on the Query Server prior to any single region exceeding 60 million TNs.

   ```
   # lsmsdb -c snapshot
   ```

The following output displays:

```
WARNING: This command may cause a brief interruption in traffic
being sent from the NPAC to connected network elements and local
LSMS provisioning may be INTERRUPTED.
Do you want to continue? [Y/N] Y
```

5. Type **Y** and press Enter.

> **Note:**
>
> This input is case-sensitive. Be sure to type a capital Y.

Output similar to the following displays (the line ....: in the example output below represents many lines of information that are displayed about each of the databases that is included in the snapshot).

```
Creating snapshot of the database partition, please wait...
lvcreate -- WARNING: the snapshot will be automatically disabled
once it gets full
lvcreate -- INFO: using default snapshot chunk size of 64 KB for
"/dev/vgapp/dbbackup"
lvcreate -- doing automatic backup of "vgapp"
lvcreate -- logical volume "/dev/vgapp/dbbackup" successfully
created
The database is available to the application again.
Disk snapshot created successfully.
mount: block device /dev/vgapp/dbbackup is write-protected,
mounting read-only
Snapshot mounted successfully.
Created snapinfo.sql file successfully
............
lvremove -- doing automatic backup of volume group "vgapp"
lvremove -- logical volume "/dev/vgapp/dbbackup" successfully
removed
```

When the last two lines shown above (which start with lvremove), the snapshot is complete. However, the database is available to the application before the snapshot is complete, as indicated by the line shown in bold in the example output above. During the creation of a snapshot of the **LSMS** data, the following occurs:

- A read lock is obtained
- Table information is flushed
- A snapshot is created
- The read lock is released

> **Caution:**
>
> If the snapshot fails or is interrupted, perform the procedure described in "Clean Up After Failed or Interrupted Snapshot" to clean up the file space where snapshot information is temporarily stored. If you do not clean up this file space, future snapshots will fail.

If the compressed snapshot is successfully created, the **LSMS** data is stored in the following files in the `/var/TKLC/lsms/free` directory:

- `mysql-snapshot-supDB.tar.gz`
- `mysql-snapshot-<region>DB.tar.gz`
- `snapinfo.sql`

6. Use the file transfer protocol (**FTP**) to move the snapshot data of the master server into the`/usr/mysql1` directory on the query server:

```
# cd /var/TKLC/lsms/free
# ftp <IP address of the Query Server>
```

```
ftp> cd /usr/mysql1
```

```
ftp> bin
```

```
ftp> prompt
```

```
ftp> mput mysql-snapshot*.tar.gz snapinfo.sql
```

```
ftp> bye
```

7. Shut down the MySQL server on the query server (if it is running):

```
# cd /opt/mysql/mysql/bin
# ./mysqladmin -u root -p shutdown
```

```
Enter password:
<Query Server's MySQL user root password>
```

8. On the query server, extract the snapshot data from the archive tar files, `/usr/mysql1/mysql-snapshot-<db>.tar.gz` of the master server's data.

   Make sure that the privileges on the files and directories are correct. The user that MySQL runs as needs to be able to read and write to them, just as on the master.

```
# cd /usr/mysql1
```

```
# gunzip -c mysql-snapshot-supDB.tar.gz | tar -xvf -
```

```
# rm mysql-snapshot-supDB.tar.gz
```

   Now, extract the data for the snapshot files for each of the **LSMS** regions starting with the largest regions first. Replace <regionDB> with the regional database name (for example, CanadaDB, MidwestDB, and so forth). Be sure to remove the compressed snapshot files after each database is extracted to guarantee that sufficient disk space is available for all databases.

```
# gunzip -c mysql-snapshot-<regionDB>.tar.gz | tar -xvf -
```

```
# rm mysql-snapshot-<regionDB>.tar.gz
```

9. Start the MySQL **daemon** on the query server:

```
# cd /opt/mysql/mysql/bin
# ./mysqld_safe --skip-slave-start &
```

> **Note:**
>
> It is important to start the **daemon** with the --skip-slave-start option so that replication does not start automatically.

10. On the query server, start the MySQL command line utility:

```
# ./mysql -u root -p
```

11. On the query server, reset the configuration information:

```
mysql> reset slave;
```

```
mysql> reset master;
```

12. Configure the query server to start replication from the correct position on the master.

    This information is stored in the `snapinfo.sql` file.

```
mysql> source /usr/mysql1/snapinfo.sql
```

13. Start replication:

```
mysql> start slave;
```

    The query server should connect to the master and catch up on any updates that occurred since the snapshot was taken. When a query server has started replicating, a `master.info` file is stored in the same directory as the error log (for information about where the error log is stored, see Query Server Error Log).

> **Caution:**
>
> Do not remove or edit the `master.info` file. This file is used by the query server to keep track of how much of the master’s binary log it has processed.

Reload a Query Server Database from Another Query Server

This procedure reloads a corrupted or backlevel query server's **LNP** database by copying another query server's **LNP** database. If the **LSMS** is configured with multiple query servers and at least one is currently synchronized, it is recommended to reload a query server from another query server (instead of from the **LSMS**) to prevent **NPAC**-to-network element traffic from being interrupted.

> **Note:**
>
> Replication on the query server may be interrupted while a snapshot of the **LNP** database occurs. The time required to accomplish this procedure depends on the bandwidth of your network and the amount of data to be reloaded.

Note:

1 through 10 pertain to the query server that is directly connected to the **LSMS**. 11 through 14 pertain to the query server being reloaded.

1. Start the MySQL command-line utility on the query server that is directly connected to the **LSMS**:

   ```
   # cd /opt/mysql/mysql/bin
   # ./mysql -u root -p
   ```

   ```
   Enter password:
   ```

   ```
   <Query Server’s MySQL user root password>
   ```

2. Stop MySQL replication: (When replication is off, the query server data is not updated and is not kept in synchronization with the **LSMS**.)

   ```
   mysql> stop slave;
   ```

3. Obtain a read lock and flush table cache information:

   (The flush writes changes to tables on disk. The read lock prohibits changes to be made to tables but continues to allow other threads to read from them.)

   ```
   mysql> FLUSH TABLES WITH READ LOCK;
   ```

4. Display the file name and current position of the binary log:

   ```
   mysql> SHOW MASTER STATUS;
   ```

   Output similar to the following displays:

   ```
   +---------------+---------+-------------+-----------------+
   | File | Position | Binlog_Do_DB | Binlog_Ignore_DB |
   +---------------+---------+-------------+-----------------+
   | mysql-bin.003 | 73      | test        | manual,mysql    |
   +---------------+---------+-------------+-----------------+
   ```

5. Record the values in the `File` and `Position` columns, which display the file name and current position of the binary log, respectively.

   In the example above, the file name is `mysql-bin.003`, and the current position is `73`. These values are necessary to properly start the slave process on the query server that is being reloaded.

6. Exit the MySQL command-line utility:

   ```
   mysql> exit;
   ```

7. Shutdown the MySQL server on the query server that is directly connected to the **LSMS**:

   ```
   # ./mysqladmin -u root -p shutdown
   Enter password:
   ```

   ```
   <Query Server’s MySql root user password>
   ```

8. Remove all existing compressed snapshot files (if any):

   ```
   # rm /usr/mysql1/mysql-snapshot*
   ```

9. Create a snapshot of the query server’s copy of all the **LSMS** data.

Create a compressed snapshot file for the Supplemental database:

> **Note:**
>
> GNU tar (gtar) must be installed on the Query Server prior to any single region exceeding 60 million TNs.

```
# tar -cvf - /usr/mysql1/supDB/* | gzip > /usr/mysql1/mysql-snapshot-supDB.tar.gz
```

Create compressed snapshot files for each of the regional databases. Replace <regionDB> with the regional database name (for example, CanadaDB, MidwestDB, and so forth).

```
# tar -cvf - /usr/mysql1/<regionDB>/* | gzip > /usr/mysql1/mysql-snapshot-<regionDB>.tar.gz
```

10. At the query server that is directly connected to the **LSMS**, restart the MySQL **daemon**:

```
# cd /opt/mysql/mysql/bin
# ./mysqld_safe &
```

11. Shut down the MySQL server on the query server being reloaded:

```
# ./mysqladmin -u root -p shutdown
Enter password:

<Query Server's MySQL user root password>
```

12. From the master query server, use the file transfer protocol (**FTP**) to move the snapshot data of the master server into the `/usr/mysql1` directory on the query server being reloaded:

```
# cd /usr/mysql1
# ftp <IP address of the Query Server being reloaded>

ftp> cd /usr/mysql1

ftp> bin

ftp> prompt

ftp> mput mysql-snapshot*.tar.gz

ftp> bye
```

13. On the query server being reloaded, extract the snapshot data from the archive tar file of the directly connected query server's data.

Ensure that the privileges on the files and directories are correct. The user which MySQL runs as needs to be able to read and write to them, just as on the master. Perform the following commands:

```
# cd /usr/mysql1

# gunzip -c mysql-snapshot-supDB.tar.gz | tar -xvf -

# rm mysql-snapshot-supDB.tar.gz
```

Now, extract the data for the snapshot files for each of the **LSMS** regions starting with the largest regions first. Replace <regionDB> with the regional database name (for example, CanadaDB, MidwestDB, and so forth). Be sure to remove the compressed snapshot files after each database is extracted to guarantee that sufficient disk space is available for all databases:#

```
# gunzip -c mysql-snapshot-<regionDB>.tar.gz | tar -xvf -
```

```
# rm mysql-snapshot-<regionDB>.tar.gz
```

14. Start the MySQL **daemon** on the query server being loaded.

    ```
    # cd /opt/mysql/mysql/bin
    ```

    ```
    # ./mysqld_safe --skip-slave-start
    ```

    > **Note:**
    >
    > It is important to start the **daemon** with the --skip-slave-start option so that replication does not start automatically.

15. Start the `mysql` command-line utility on the query server that is being loaded:

    ```
    # ./mysql -u root -p
    ```

16. Set the binary log position using information that you recorded in 5.

    ```
    mysql> CHANGE MASTER TO
    MASTER_LOG_FILE='<recorded_log_file_name>',
    ```

    ```
    MASTER_LOG_POS=<recorded_log_position>;
    ```

    For `<recorded_log_file_name>`, use the value you recorded for the file name in 5, and for , use the value you recorded for the binary position in 5. For example, using the values shown in the example in 4, enter the following command to set the binary log position:

    ```
    mysql> CHANGE MASTER TO
    ```

    ```
    MASTER_LOG_FILE='mysql-bin.003',
    ```

    ```
    MASTER_LOG_POS=73;
    ```

17. Start replication on the query server that has been loaded:

    ```
    mysql> start slave;
    ```

    The query server should connect to the master server (**LSMS** or another query server) and catch up on any updates that occurred since the snapshot was taken.

Clean Up After Failed or Interrupted Snapshot

If a snapshot fails or is interrupted, the `/dev/vgapp/dbbackup` volume will remain in the file space that is temporarily used by both backups and snapshot creation. If this volume is present when another snapshot is attempted, the new snapshot will fail.

If a snapshot fails, perform the following procedure to clean up the file space that is used for temporarily storing snapshot information. If this file space is not cleaned up, any future snapshot attempts will fail.

1. If a snapshot has failed, first ensure that no backup is already running by performing the procedure described in “Check for Running Backups”.

    - If a backup is running, **DONOT** perform this procedure. Wait until the backup is complete and retry the snapshot.

   - If a backup is not running, proceed to the next step.

2. Log into the active server as `root`.

   If you are already logged into the active server as a different user, enter the following command:
   ```
   $ su - root
   ```

   When prompted, enter the root password.

3. Enter the following commands:

   ```
   # /bin/umount /mnt/backup
   # /usr/sbin/lvremove -f /dev/vgapp/dbbackup
   ```

   The following output will display:

   ```
   lvremove -- doing automatic backup of volume group "vgapp"
   lvremove -- logical volume "/dev/vgapp/dbbackup" successfully
   removed
   ```

When the last line in 3 displays, you have completed this procedure.

Automated System Check

The automated system check feature (`syscheck`) detects, diagnoses, and displays a summary of the overall health of the **LSMS** server. An **LSMS** application-specific module, `qs_app` (System Class) reports on the status of query server direct connections with the **LSMS**. The status of each connection is displayed on the screen as "**OK**", "**WARNING**", or "**FAILURE**".

Manually Checking Query Server Status

Although `syscheck` runs automatically and records output in the syscheck log, users can run the syscheck command to check query server status. To manually check query server status, perform the following procedure:

1. Log into the active server command line as `root`.

   (For information about logging in, see "Logging In to **LSMS** Server Command Line").

2. Enter the following command:

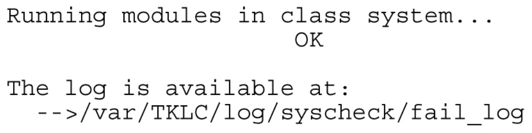
   ```
   # syscheck system qs
   ```

   The possible output examples are explained below.

Automated System Check OK Status

When `syscheck` detects no problems with query server direct connections, output similar to the following appears.

Figure E-7 Automated System Check Output Example - OK



```
Running modules in class system...
                       OK

The log is available at:
  -->/var/TKLC/log/syscheck/fail_log
```

Automated System Check FAILURE Status

When `syscheck` detects one or more of the following failures, output similar to the following appears.

- The **LSMSDB** tool, which is utilized to obtain connection status, does not exist.
- The **LSMSDB** tool fails to connect to the database server.
- The query server hostname is not associated with corresponding **Internet Protocol** (**IP**) addresses in the `/etc/hosts` file.
- The platform hosting a query server could not be pinged (Not Reachable). The hostname of the query servers that fail the `ping` check is reported.

Figure E-8 Automated System Check Output Example - FAILURE

```
Running modules in class system...
*       qs: FAILURE:: Query Server 10.26.60.136 (10.26.60.136) Not Reachable
One or more module in class "system" FAILED

Failures occured during system check. The failure log is available at:
  -->/var/TKLC/log/syscheck/fail_log
```

Automated System Check WARNING Status

When `syscheck` detects that one or more query servers are not connected and replicating the **LSMS** database, output similar to the following appears. The hostname of the query servers that fail the connections check is reported.

Figure E-9 Automated System Check Output Example - WARNING

```
Running modules in class system...
*       qs: WARNING:: Query Server 10.25.60.32 (10.25.60.32) Disconnected
                                 OK
The log is available at:
  -->/var/TKLC/log/syscheck/fail_log
```

Query Server Error Log

The query server error log (see the example shown in Figure E-10) contains the following information, if applicable:

- When `mysqld` was started and stopped
- Critical errors found when running `mysqld`
- Replication errors and warnings
- Warnings if `mysqld` detects a table that needs to be automatically checked or repaired

The query server error log is assigned a name based on the name of your host and appended with a `.err` extension (for example, `<hostname>.err`) and is located in one of the following directories:

- On the **LSMS**, in `/var/TKLC/lsms/db`
- On a query server, in `/usr/mysql1`. On a Windows machine, `mysqld` writes this log directly to `C:\mysql\data\mysql.err`.

> **Note:**
>
> Because the query server error log continuously increases in size, it is the user's responsibility to monitor it. To manually delete the log, first shut down the server. Alternatively, execute the `mysql-log-rotate`script inside your crontab.

Figure E-10   Query Server Error Log Example

```
mysqld: ready for connections

020715 14:27:38  Slave thread initialized

020715 14:28:00  Slave thread: error connecting to master: Can't connect
to MySQL server on '192.168.34.98' (183) (0), retry in 60 sec

020715 14:29:21  Slave: connected to master
'lsmsrepl@192.168.34.98:3306',  replication started in log
'192.168.34.98-bin.003' at position 1763
```

Retrieving Information from LNP Database Fields

The **LNP** database is in table format. Following are the characteristics of the table rows and columns:

- Each column contains a value for each row.
- The table does not contain gaps or short columns.
- Each row is a single entity, and the columns describe the attributes of those entities.
- Each column has a name and a type, such as a string or a number. (See Table E-1 throughTable E-3 for the **LNP** database table names and associated fields.)

  To obtain information (name, type, if field contains a Null, key fields, default value, and so forth) for each field of a table on the query server, perform the following steps:

> **Note:**
>
> Example output follows the command syntax in 2 through 5

1. Start the `mysql` command-line utility on the query server using the following command:

   ```
   # cd /opt/mysql/mysql/bin
   # mysql -u root -p
   ```

   ```
   Enter password:
   <Query Server’s MySQL user root password>
   ```

2. List the names of the databases on the query server using the following command:

   ```
   mysql> SHOWDATABASES;
   ```

   ```
   mysql> SHOW DATABASES;
   +-----------+
   | Database  |
   +-----------+
   | ResyncDB  |
   | WesternDB |
   | mysql     |
   | supDB     |
   +-----------+
   4 rows in set (0.09 sec)
   ```

3. Select the name of the database that contains tables from which you want to retrieve information using the following command:

   ```
   mysql> USE <database>;
   ```

   where <database> is one of the following: supDB, CanadaDB, MidAtlanticDB, MidwestDB, NortheastDB, SoutheastDB, SouthwestDB, WestCoastDB, WesternDB

   ```
   mysql> USE WesternDB
   Database changed
   ```

4. List the names of the tables in the selected database using the following command:

   ```
   mysql> SHOW TABLES;
   ```

   ```
   mysql> SHOW TABLES;
   +----------------------+
   | Tables_in_WesternDB  |
   +----------------------+
   | NumberPoolBlock      |
   | ServiceProvLRN       |
   | ServiceProvNPA_NXX   |
   | ServiceProvNPA_NXX_X |
   | ServiceProvNetwork   |
   | SubscriptionVersion  |
   +----------------------+
   6 rows in set (0.01 sec)
   ```

5. Retrieve column and field information of a database table using the following command:

   ```
   mysql> DESCRIBE <table>;
   ```

   where <table> is the name of the database table from the list of tables displayed in 4

   ```
   mysql> describe SubscriptionVersion;

   Field                Type                Null Key Default      Extra
   --------------------------------------------------------------------


   versionId            int(11)             NO   PRI
   ```

```
tn                   char(10)            NO   UNI
lrn                  char(10)            NO   MUL
newCurrentSp         char(4)             NO   MUL 0000
activationTimestamp  char(14)            NO
00000000000000      classDPC             char(9)             NO
classSSN             char(3)             NO
lidbDPC              char(9)             NO
lidbSSN              char(3)             NO
isvmDPC              char(9)             NO
isvmSSN              char(3)             NO
cnamDPC              char(9)             NO
cnamSSN              char(3)             NO
endUserLocationValue char(12)            NO
endUserLocationType  char(2)             NO
billingId            char(4)             NO
lnpType              tinyint(3) unsigned NO       0
downloadReason       tinyint(3) unsigned NO       0
wsmscDPC             char(9)             NO
wsmscSSN             char(3)             NO
svType               tinyint(4)          NO       -1
alternativeSPID      char(4)             NO

22 rows in set (0.00 sec)
```

LNP Database Tables and Fields

The Query Server database consists of replicated copies of the **LSMS LNP** database tables listed in Table E-1, Table E-2, and Table E-3.

> **Note:**
>
> In the table below, names of regional LNP database tables and fields may be split between lines. This does not imply a space in the name of the table or field.

Table E-1 Regional Database Tables and Fields

Regional (<Region>) DB) LNP Database Tables	Fields			
SubscriptionVersion	versionID	tn	lrn	newCurrentSp
	classDPC	classSSN	lidbDPC	lidbSSN
	isvmDPC	isvmSSN	cnamDPC	cnamSSN
	wsmscDPC	wsmscSSN	LnpType	billingId
	endUserLocationValue	endUserLocationType	activationTimestamp	downloadReason
	SVType	alternativeSPID		
NumberPoolBlock	blockId	npanxx_x	lrn	newCurrentSP
	classDPC	classSSN	lidbDPC	lidbSSN

Table E-1 (Cont.) Regional Database Tables and Fields

Regional (<Region>) DB) LNP Database Tables	Fields			
	isvmDPC	isvmSSN	cnamDPC	cnamSSN
	wsmscDPC	wsmscSSN	activationTimestamp	downloadReason
	SVType	alternativeSPID		
ServiceProvLRN	serviceProviderId	id	lrn	creationTimeStamp
	downloadReason			
ServiceProv NPA_NXX	serviceProviderId	id	npanxx	creationTimeStamp
	effectiveTimeStamp	downloadReason		
ServiceProv NPA_NXX_X	serviceProviderId	id	npanxx_x	creationTimeStamp
	effectiveTimeStamp	modifiedTime Stamp	downloadReason	
ServiceProvNetwork	serviceProvId	serviceProvName	serviceProvType	
Where <Region> is one of the following:	Canada	MidAtlantic	Midwest	Northeast
	Southeast	Southwest	WestCoast	Western

Table E-2 Supplemental Database Tables and Fields (Part 1)

Supplemental (supDB) LNP Database Tables	Fields			
DefaultGtt	groupName	npanxx	spid	
	ain_set	ain_tt	ain_dpc	ain_ssn
	ain_xlat	ain_ri	ain_ngt	ain_rgta
	in_set	in_tt	in_dpc	in_ssn
	in_xlat	in_ri	in_ngt	in_rgta
	class_set	class_tt	class_dpc	class_ssn
	class_xlat	class_ri	class_ngt	class_rgta
	lidb_set	lidb_tt	lidb_dpc	lidb_ssn
	lidb_xlat	lidb_ri	lidb_ngt	lidb_rgta
	isvm_set	isvm_tt	isvm_dpc	isvm_ssn
	isvm_xlat	isvm_ri	isvm_ngt	isvm_rgta
	cnam_set	cnam_tt	cnam_dpc	cnam_ssn
	cnam_xlat	cnam_ri	cnam_ngt	cnam_rgta
	wsmsc_set	wsmsc_tt	wsmsc_dpc	wsmsc_ssn
	wsmsc_xlat	wsmsc_ri	wsmsc_ngt	wsmsc_rgta
OverrideGtt	groupName	lrn	spid	
	class_set	class_tt	class_dpc	class_ssn

Table E-2 (Cont.) Supplemental Database Tables and Fields (Part 1)

Supplemental (supDB) LNP Database Tables	Fields			
	class_xlat	class_ri	class_ngt	class_rgta
	lidb_set	lidb_tt	lidb_dpc	lidb_ssn
	lidb_xlat	lidb_ri	lidb_ngt	lidb_rgta
	isvm_set	isvm_tt	isvm_dpc	isvm_ssn
	isvm_xlat	isvm_ri	isvm_ngt	isvm_rgta
	cnam_set	cnam_tt	cnam_dpc	cnam_ssn
	cnam_xlat	cnam_ri	cnam_ngt	cnam_rgta
	wsmsc_set	wsmsc_tt	wsmsc_dpc	wsmsc_ssn
	wsmsc_xlat	wsmsc_ri	wsmsc_ngt	wsmsc_rgta
NpaSplit	oldNpa	newNpa	nxx	startPDP
	endPDP	region	status	
LsmsServiceProvider	spid	description	contactInfo	

Table E-3 Supplemental Database Tables and Fields (Part 2)

Supplemental (supDB) LNP Database Tables	Fields			
GttGroup	name	description		
	ain_set	ain_tt	ain_dpc	ain_ssn
	ain_xlat	ain_ri	ain_ngt	ain_rgta
	in_set	in_tt	in_dpc	in_ssn
	in_xlat	in_ri	in_ngt	in_rgta
	class_set	class_tt	class_dpc	class_ssn
	class_xlat	class_ri	class_ngt	class_rgta
	lidb_set	lidb_tt	lidb_dpc	lidb_ssn
	lidb_xlat	lidb_ri	lidb_ngt	lidb_rgta
	isvm_set	isvm_tt	isvm_dpc	isvm_ssn
	isvm_xlat	isvm_ri	isvm_ngt	isvm_rgta
	cnam_set	cnam_tt	cnam_dpc	cnam_ssn
	cnam_xlat	cnam_ri	cnam_ngt	cnam_rgta
	wsmsc_set	wsmsc_tt	wsmsc_dpc	wsmsc_ssn
	wsmsc_xlat	wsmsc_ri	wsmsc_ngt	wsmsc_rgta
EmsInterface	clli	emsType	primaryAddress	secondaryAddress
	mateClii	pointCode	matePointCode	capabilityPointCode
	gttGroup	tnFilter	ownerSpid	componentInfo
	contactInfo	dcmAddress	retryinterval	retryCount
	pingMethod			
TnFilter	spid	name	description	filterType

Table E-3 (Cont.) Supplemental Database Tables and Fields (Part 2)

Supplemental (supDB) LNP Database Tables	Fields			
	regions	npanxxType	npanxxs	
NpacRegion	region	npacSmsName	lsmsPsel	lsmsSsel
	lsmsTsel	lsmsNsap	primaryNpacPsel	primaryNpacSsel
	primaryNpacTsel	primaryNpacNsap	primaryNpacFtpAddress	secondaryNpacPsel
	secondaryNpacSsel	secondaryNpacTsel	secondaryNpacNsap	secondaryNpacFtpAddress
	active	componentInfo	contactInfo	lastChangedTimestamp
	currentNpac			
<Region>NpacMeasurements	yyyydddhh	Binds	SuccessOps	FailedOps
<Clii>EagleMeasurements	yyyydddhh			
	updTnSuccess	updTnFail	DelTnSuccess	DelTnFail
	updDGttSuccess	updDGttFail	DelDGttSuccess	DelDGttFail
	updOGttSuccess	updOGttFail	DelOGttSuccess	DelOGttFail
	updSplitSuccess	updSplitFail	DelSplitSuccess	DelSplitFail
	Binds	LsmsRetries	NERetries	
<Region>PublicKey	id	listId	keyId	status
	exponent	modulus		
<Region>PrivateKey	id	listId	keyId	status
	keyval			
LsmsUser	name	golden	groupName	inactivityTimeout
LsmsUserSpid	lsmsUser	spid		
Where <Region> is one of the following:	Canada	MidAtlantic	Midwest	Northeast
	Southeast	Southwest	WestCoast	Western
Where <Clii> is the Common Language Location Indicator of the EMS/EAGLE to which that LSMS is connected.				

Note:

In Table E-3, by default, the following Supplemental (SupDB) **LNPDatabase** Tables are not replicated. To replicate these tables, refer to the Note in Step 1 of the topic, “MySQL Replication Configuration for Query Servers” in Appendix A of the *Configuration Guide*.

- <Region>PublicKey
- <Region>PrivateKey
- LsmsUser
- LsmsUserSpid

To replicate these tables, refer to the Note in Step 1 of the topic, “MySQL Replication Configuration for Query Servers” in Appendix A of the *Configuration Guide*.

Query Server Database Structure

This section contains the database structure needed to develop customer-provided applications on the query servers.

```
--

-- Create NpacRegion table

--

-- One NpacRegion defines the configuration of the primary and
secondary
NPAC.

--

CREATE TABLE  NpacRegion

(

    -- Region name

    region               VARCHAR(40)  NOT NULL,



    -- SMS Name defined by NPAC

    npacSmsName          TINYBLOB,



    -- OSI address of LSMS

    lsmsPsel              TINYBLOB,

    lsmsSsel              TINYBLOB,

    lsmsTsel              TINYBLOB,

    lsmsNsap              TINYBLOB,



    -- OSI address of primary NPAC

    primaryNpacPsel       TINYBLOB,

    primaryNpacSsel       TINYBLOB,
    primaryNpacTsel       TINYBLOB,

    primaryNpacNsap       TINYBLOB,


    primaryNpacFtpAddress TINYBLOB,


    -- OSI address of secondary NPAC

    secondaryNpacPsel     TINYBLOB,

    secondaryNpacSsel     TINYBLOB,

    secondaryNpacTsel     TINYBLOB,

    secondaryNpacNsap     TINYBLOB,


    secondaryNpacFtpAddress TINYBLOB,


    -- Region is active

    active               BOOL        NOT NULL DEFAULT 0,


    -- Component Info (stored as CSV string)

    componentInfo        BLOB        NOT NULL,

    -- Contact Info (stored as CSV string)

    contactInfo        BLOB          NOT NULL,


    -- Last changed timestamp set by npacagent

    lastChangedTimestamp CHAR(14)    NOT NULL, -- Default now


    -- Current npac in use set by npacagent

    currentNpac          ENUM("Primary", "Secondary") DEFAULT "Primary",
    -- Region name is primary key

    PRIMARY KEY (region)

)

TYPE = MyIsam;



INSERT INTO NpacRegion

    (region, npacSmsName,

     lsmsPsel, lsmsSsel, lsmsTsel, lsmsNsap,

     primaryNpacPsel, primaryNpacSsel, primaryNpacTsel,
primaryNpacNsap,
primaryNpacFtpAddress,

     secondaryNpacPsel, secondaryNpacSsel, secondaryNpacTsel,
secondaryNpacNsap, secondaryNpacFtpAddress,

     componentInfo, contactInfo, lastChangedTimestamp)

    VALUES ("Canada", "Region8 NPAC Canada",

            "cw7", "cw7", "", "rk6",

            "", "", "", "0x00000000",

            "0.0.0.0",

            "", "", "", "0x00000000",

            "0.0.0.0",

            '"NPAC","TKLC","LSMS","Tekelec, Inc.","6.0","1.0"',

            '"Lsms Admin","admin@tekelec.com","5200 Paramount
Parkway","Morrisville","NC","","USA","27560","9194605500","8005551234",
"1
234","9195551234"',

            DATE_FORMAT(NOW(), "%Y%m%d%h%i%s")),

           ("MidAtlantic", "Mid-Atlantic Regional NPAC SMS",

            "cw1", "cw1", "", "rk6",

            "", "", "", "0x00000000",

            "0.0.0.0",

            "", "", "", "0x00000000",
            "0.0.0.0",

            '"NPAC","TKLC","LSMS","Tekelec, Inc.","6.0","1.0"',

            '"Lsms Admin","admin@tekelec.com","5200 Paramount 
Parkway","Morrisville","NC","","USA","27560","9194605500","8005551234","1
234","9195551234"',

            DATE_FORMAT(NOW(), "%Y%m%d%h%i%s")),

           ("Midwest", "Midwest Regional NPAC SMS",

            "cw0", "cw0", "", "rk6",

            "", "", "", "0x00000000",

            "0.0.0.0",

            "", "", "", "0x00000000",

            "0.0.0.0",

            '"NPAC","TKLC","LSMS","Tekelec, Inc.","6.0","1.0"',

            '"Lsms Admin","admin@tekelec.com","5200 Paramount 
Parkway","Morrisville","NC","","USA","27560","9194605500","8005551234","1
234","9195551234"',

            DATE_FORMAT(NOW(), "%Y%m%d%h%i%s")),

           ("Northeast", "Northeast Regional NPAC SMS",

            "cw2", "cw2", "", "rk6",

            "", "", "", "0x00000000",

            "0.0.0.0",

            "", "", "", "0x00000000",

            "0.0.0.0",

            '"NPAC","TKLC","LSMS","Tekelec, Inc.","6.0","1.0"',

            '"Lsms Admin","admin@tekelec.com","5200 Paramount 
Parkway","Morrisville","NC","","USA","27560","9194605500","8005551234","1
234","9195551234"',

            DATE_FORMAT(NOW(), "%Y%m%d%h%i%s")),

           ("Southeast", "Southeast Regional NPAC SMS",

            "cw3", "cw3", "", "rk6",
            "", "", "", "0x00000000",

            "0.0.0.0",

            "", "", "", "0x00000000",

            "0.0.0.0",

            '"NPAC","TKLC","LSMS","Tekelec, Inc.","6.0","1.0"',

            '"Lsms Admin","admin@tekelec.com","5200 Paramount
Parkway","Morrisville","NC","","USA","27560","9194605500","8005551234",
"1
234","9195551234"',

            DATE_FORMAT(NOW(), "%Y%m%d%h%i%s")),

           ("Southwest", "Southwest Regional NPAC SMS",

            "cw4", "cw4", "", "rk6",

            "", "", "", "0x00000000",

            "0.0.0.0",

            "", "", "", "0x00000000",

            "0.0.0.0",

            '"NPAC","TKLC","LSMS","Tekelec, Inc.","6.0","1.0"',

            '"Lsms Admin","admin@tekelec.com","5200 Paramount
Parkway","Morrisville","NC","","USA","27560","9194605500","8005551234",
"1
234","9195551234"',

            DATE_FORMAT(NOW(), "%Y%m%d%h%i%s")),

           ("WestCoast", "WestCoast Regional NPAC SMS",

            "cw6", "cw6", "", "rk6",

            "", "", "", "0x00000000",

            "0.0.0.0",

            "", "", "", "0x00000000",

            "0.0.0.0",

            '"NPAC","TKLC","LSMS","Tekelec, Inc.","6.0","1.0"',

            '"Lsms Admin","admin@tekelec.com","5200 Paramount
Parkway","Morrisville","NC","","USA","27560","9194605500","8005551234",
"1
```

```
234","9195551234"',
            DATE_FORMAT(NOW(), "%Y%m%d%h%i%s")),
           ("Western", "Western Regional NPAC SMS",
            "cw5", "cw5", "", "rk6",
            "", "", "", "0x00000000",
            "0.0.0.0",
            "", "", "", "0x00000000",
            "0.0.0.0",
            '"NPAC","TKLC","LSMS","Tekelec, Inc.","6.0","1.0"',
            '"Lsms Admin","admin@tekelec.com","5200 Paramount
Parkway","Morrisville","NC","","USA","27560","9194605500","8005551234","1
234","9195551234"',
            DATE_FORMAT(NOW(), "%Y%m%d%h%i%s"));


--
-- Create  LsmsServiceProvider table
--
CREATE TABLE  LsmsServiceProvider
(
    -- The service provider id (Primary Key)
    spid        CHAR(4)   NOT NULL,

    -- Description of the service provider
    description CHAR(80)  NOT NULL,

    -- Contact Info (stored as comma separated value string)
    contactInfo BLOB NOT NULL,

    -- Primary key is the spid
    PRIMARY KEY (spid)
)
TYPE = MyIsam;


--
-- Create  LsmsUser table
--
CREATE TABLE  LsmsUser
(
    -- The user name (Primary Key)
    name    CHAR(64) NOT NULL,

    -- Description of the service provider
    golden  BOOL     NOT NULL DEFAULT 0,

    -- The Assigned permission group
    groupName    CHAR(4) NOT NULL,

    -- The assigned inactivity timeout
    inactivityTimeout    CHAR(11) NOT NULL DEFAULT '-1',

    -- Primary key is the user name
    PRIMARY KEY (name)
)
TYPE = MyIsam;
-- Create default 'golden' users
INSERT INTO LsmsUser (name, golden)
```

```
            VALUES('lsmsadm',1), ('lsmsuser',1), ('lsmsview',1),
                  ('lsmsall',1), ('lsmsuext',1);
--
-- Create  GttGroup table
--
CREATE TABLE  GttGroup
(
    -- The group name (Primary Key)
    name        CHAR(64)   NOT NULL,

    -- Description of the GttGroup
    description CHAR(80)  NOT NULL,

    -- Services in GttGroup are for storing default TT/SSN values
    -- AIN Service
    ain_set  BOOL    NOT NULL DEFAULT 0,
    ain_tt   TINYINT UNSIGNED NOT NULL,
    ain_dpc  CHAR(9) NOT NULL,
    ain_ssn  CHAR(3) NOT NULL,
    ain_xlat TINYINT UNSIGNED NOT NULL,
    ain_ri   TINYINT UNSIGNED NOT NULL,
    ain_ngt  TINYINT UNSIGNED NOT NULL,
    ain_rgta BOOL    NOT NULL,
    -- IN Service
    in_set  BOOL    NOT NULL DEFAULT 0,
    in_tt   TINYINT UNSIGNED NOT NULL,
    in_dpc  CHAR(9) NOT NULL,
    in_ssn  CHAR(3) NOT NULL,
    in_xlat TINYINT UNSIGNED NOT NULL,
    in_ri   TINYINT UNSIGNED NOT NULL,
    in_ngt  TINYINT UNSIGNED NOT NULL,
    in_rgta BOOL    NOT NULL,
    -- CLASS Service
    class_set  BOOL    NOT NULL DEFAULT 0,
    class_tt   TINYINT UNSIGNED NOT NULL,
    class_dpc  CHAR(9) NOT NULL,
    class_ssn  CHAR(3) NOT NULL,
    class_xlat TINYINT UNSIGNED NOT NULL,
    class_ri   TINYINT UNSIGNED NOT NULL,
    class_ngt  TINYINT UNSIGNED NOT NULL,
    class_rgta BOOL    NOT NULL,
    -- LIDB Service
    lidb_set  BOOL    NOT NULL DEFAULT 0,
    lidb_tt   TINYINT UNSIGNED NOT NULL,
    lidb_dpc  CHAR(9) NOT NULL,
    lidb_ssn  CHAR(3) NOT NULL,
    lidb_xlat TINYINT UNSIGNED NOT NULL,
    lidb_ri   TINYINT UNSIGNED NOT NULL,
    lidb_ngt  TINYINT UNSIGNED NOT NULL,
    lidb_rgta BOOL    NOT NULL,
    -- ISVM Service
    isvm_set  BOOL    NOT NULL DEFAULT 0,
    isvm_tt   TINYINT UNSIGNED NOT NULL,
    isvm_dpc  CHAR(9) NOT NULL,
    isvm_ssn  CHAR(3) NOT NULL,
    isvm_xlat TINYINT UNSIGNED NOT NULL,

    isvm_ri   TINYINT UNSIGNED NOT NULL,

    isvm_ngt  TINYINT UNSIGNED NOT NULL,

    isvm_rgta BOOL    NOT NULL,

    -- CNAM Service

    cnam_set  BOOL    NOT NULL DEFAULT 0,

    cnam_tt   TINYINT UNSIGNED NOT NULL,

    cnam_dpc  CHAR(9) NOT NULL,

    cnam_ssn  CHAR(3) NOT NULL,

    cnam_xlat TINYINT UNSIGNED NOT NULL,

    cnam_ri   TINYINT UNSIGNED NOT NULL,

    cnam_ngt  TINYINT UNSIGNED NOT NULL,

    cnam_rgta BOOL    NOT NULL,

     -- WSMSC Service

    wsmsc_set  BOOL    NOT NULL DEFAULT 0,

    wsmsc_tt   TINYINT UNSIGNED NOT NULL,

    wsmsc_dpc  CHAR(9) NOT NULL,

    wsmsc_ssn  CHAR(3) NOT NULL,

    wsmsc_xlat TINYINT UNSIGNED NOT NULL,

    wsmsc_ri   TINYINT UNSIGNED NOT NULL,

    wsmsc_ngt  TINYINT UNSIGNED NOT NULL,

    wsmsc_rgta BOOL    NOT NULL,


    -- Primary key is the group name

    PRIMARY KEY (name)

)

TYPE = MyIsam;
```

```
--
-- Create GttGroupSpid table
--
-- This table is used to associate a GttGroup to an authorized
-- LsmsServiceProvider. The many-many relationship between the two
-- is stored by this table a group-spid combinations.
--
CREATE TABLE  GttGroupSpid
(
    -- Group name
    gttGroup    CHAR(64) NOT NULL,

    -- Spid
    spid        char(4) NOT NULL,

    -- Force GttGroup,LsmsServiceProvider combinations to be unique
    PRIMARY KEY (gttGroup, spid),

    -- Not used by MySql but included for documentation
    FOREIGN KEY (gttGroup) REFERENCES GttGroup(groupName),
    FOREIGN KEY (spid) REFERENCES LsmsServiceProvider(spid)
)
TYPE = MyIsam;

--
-- Create LsmsUserSpid table
--
```

```
-- This table is used to associate a LsmsUser to an authorized
-- LsmsServiceProvider. The many-many relationship between the two
-- is stored by this table a group-spid combinations.
--
CREATE TABLE  LsmsUserSpid
(
    -- User name
    lsmsUser    CHAR(64) NOT NULL,

    -- Spid
    spid        CHAR(4) NOT NULL,

    -- Force LsmsUser,LsmsServiceProvider combinations to be unique
    PRIMARY KEY (lsmsUser, spid),

    -- Not used by MySql but included for documentation
    FOREIGN KEY (lsmsUser) REFERENCES LsmsUser(name),
    FOREIGN KEY (spid) REFERENCES LsmsServiceProvider(spid)
)
TYPE = MyIsam;

--
-- Create DefaultGTT Table
--
CREATE TABLE  DefaultGtt
(
    -- The group this DefaultGtt belongs to
    groupName  CHAR(64) NOT NULL, -- Foreign key
```

```
-- NPA-NXX of the DefaultGtt
npanxx     CHAR(6) NOT NULL,

-- The SPID that created the DefaultGtt
spid       CHAR(4) NOT NULL,

-- AIN Service
ain_set  BOOL    NOT NULL DEFAULT 0,
ain_tt   TINYINT UNSIGNED NOT NULL,
ain_dpc  CHAR(9) NOT NULL,
ain_ssn  CHAR(3) NOT NULL,
ain_xlat TINYINT UNSIGNED NOT NULL,
ain_ri   TINYINT UNSIGNED NOT NULL,
ain_ngt  TINYINT UNSIGNED NOT NULL,
ain_rgta BOOL    NOT NULL,
-- IN Service
in_set  BOOL    NOT NULL DEFAULT 0,
in_tt   TINYINT UNSIGNED NOT NULL,
in_dpc  CHAR(9) NOT NULL,
in_ssn  CHAR(3) NOT NULL,
in_xlat TINYINT UNSIGNED NOT NULL,
in_ri   TINYINT UNSIGNED NOT NULL,
in_ngt  TINYINT UNSIGNED NOT NULL,
in_rgta BOOL    NOT NULL,
-- CLASS Service
class_set  BOOL    NOT NULL DEFAULT 0,
class_tt   TINYINT UNSIGNED NOT NULL,
class_dpc  CHAR(9) NOT NULL,
class_ssn  CHAR(3) NOT NULL,
class_xlat TINYINT UNSIGNED NOT NULL,
class_ri   TINYINT UNSIGNED NOT NULL,
class_ngt  TINYINT UNSIGNED NOT NULL,
class_rgta BOOL    NOT NULL,
-- LIDB Service
lidb_set  BOOL    NOT NULL DEFAULT 0,
lidb_tt   TINYINT UNSIGNED NOT NULL,
lidb_dpc  CHAR(9) NOT NULL,
lidb_ssn  CHAR(3) NOT NULL,
lidb_xlat TINYINT UNSIGNED NOT NULL,
lidb_ri   TINYINT UNSIGNED NOT NULL,
lidb_ngt  TINYINT UNSIGNED NOT NULL,
lidb_rgta BOOL    NOT NULL,
-- ISVM Service
isvm_set  BOOL    NOT NULL DEFAULT 0,
isvm_tt   TINYINT UNSIGNED NOT NULL,
isvm_dpc  CHAR(9) NOT NULL,
isvm_ssn  CHAR(3) NOT NULL,
isvm_xlat TINYINT UNSIGNED NOT NULL,
isvm_ri   TINYINT UNSIGNED NOT NULL,
isvm_ngt  TINYINT UNSIGNED NOT NULL,
isvm_rgta BOOL    NOT NULL,
-- CNAM Service
cnam_set  BOOL    NOT NULL DEFAULT 0,
cnam_tt   TINYINT UNSIGNED NOT NULL,
    cnam_dpc  CHAR(9) NOT NULL,
    cnam_ssn  CHAR(3) NOT NULL,
    cnam_xlat TINYINT UNSIGNED NOT NULL,
    cnam_ri   TINYINT UNSIGNED NOT NULL,
    cnam_ngt  TINYINT UNSIGNED NOT NULL,
    cnam_rgta BOOL    NOT NULL,
     -- WSMSC Service
    wsmsc_set  BOOL    NOT NULL DEFAULT 0,
    wsmsc_tt   TINYINT UNSIGNED NOT NULL,
    wsmsc_dpc  CHAR(9) NOT NULL,
    wsmsc_ssn  CHAR(3) NOT NULL,
    wsmsc_xlat TINYINT UNSIGNED NOT NULL,
    wsmsc_ri   TINYINT UNSIGNED NOT NULL,
    wsmsc_ngt  TINYINT UNSIGNED NOT NULL,
    wsmsc_rgta BOOL    NOT NULL,

    -- DefaultGtt npanxx's are unique within each group
    PRIMARY KEY (groupName, npanxx),

    -- Not used by MySql but included for documentation
    FOREIGN KEY (groupName) REFERENCES GttGroup(name)
)
TYPE = MyIsam;

--
-- Create OverrideGtt Table
--
```

```
CREATE TABLE  OverrideGtt
(
    -- The group this OverrideGtt belongs to
    groupName  CHAR(64) NOT NULL, -- Foreign key

    -- LRN of the OverrideGtt
    lrn        CHAR(10) NOT NULL,

    -- The SPID that created the OverrideGtt
    spid       CHAR(4)  NOT NULL,

    -- CLASS Service
    class_set  BOOL    NOT NULL DEFAULT 0,
    class_tt   TINYINT UNSIGNED NOT NULL,
    class_dpc  CHAR(9) NOT NULL,
    class_ssn  CHAR(3) NOT NULL,
    class_xlat TINYINT UNSIGNED NOT NULL,
    class_ri   TINYINT UNSIGNED NOT NULL,
    class_ngt  TINYINT UNSIGNED NOT NULL,
    class_rgta BOOL    NOT NULL,
    -- LIDB Service
    lidb_set  BOOL    NOT NULL DEFAULT 0,
    lidb_tt   TINYINT UNSIGNED NOT NULL,
    lidb_dpc  CHAR(9) NOT NULL,
    lidb_ssn  CHAR(3) NOT NULL,
    lidb_xlat TINYINT UNSIGNED NOT NULL,
    lidb_ri   TINYINT UNSIGNED NOT NULL,
    lidb_ngt  TINYINT UNSIGNED NOT NULL,
    lidb_rgta BOOL    NOT NULL,
    -- ISVM Service
    isvm_set  BOOL    NOT NULL DEFAULT 0,
    isvm_tt   TINYINT UNSIGNED NOT NULL,
    isvm_dpc  CHAR(9) NOT NULL,
    isvm_ssn  CHAR(3) NOT NULL,
    isvm_xlat TINYINT UNSIGNED NOT NULL,
    isvm_ri   TINYINT UNSIGNED NOT NULL,
    isvm_ngt  TINYINT UNSIGNED NOT NULL,
    isvm_rgta BOOL    NOT NULL,
    -- CNAM Service
    cnam_set  BOOL    NOT NULL DEFAULT 0,
    cnam_tt   TINYINT UNSIGNED NOT NULL,
    cnam_dpc  CHAR(9) NOT NULL,
    cnam_ssn  CHAR(3) NOT NULL,
    cnam_xlat TINYINT UNSIGNED NOT NULL,
    cnam_ri   TINYINT UNSIGNED NOT NULL,
    cnam_ngt  TINYINT UNSIGNED NOT NULL,
    cnam_rgta BOOL    NOT NULL,
     -- WSMSC Service
    wsmsc_set  BOOL    NOT NULL DEFAULT 0,
    wsmsc_tt   TINYINT UNSIGNED NOT NULL,
    wsmsc_dpc  CHAR(9) NOT NULL,
    wsmsc_ssn  CHAR(3) NOT NULL,
    wsmsc_xlat TINYINT UNSIGNED NOT NULL,
    wsmsc_ri   TINYINT UNSIGNED NOT NULL,
    wsmsc_ngt  TINYINT UNSIGNED NOT NULL,
    wsmsc_rgta BOOL    NOT NULL,


    -- OverrideGtt lrns are unique within each group

    PRIMARY KEY (groupName, lrn),


    -- Not used by MySql but included for documentation

    FOREIGN KEY (groupName) REFERENCES GttGroup(name)

)

TYPE = MyIsam;



--

-- Create EmsInterface table. A row in the EmsInterface table can 
represent

-- either a MpsInterface or a OapInterface object

--

CREATE TABLE  EmsInterface

(

    -- The CLLI (Primary Key)

    clli                CHAR(10)   NOT NULL,


    emsType             ENUM("OAP", "MPS") NOT NULL,


    -- The IP address of the primary interface

    primaryAddress      TINYBLOB   NOT NULL,


    -- The IP address of the secondary interface

    secondaryAddress    TINYBLOB   NOT NULL,
    -- The method to use to verify the presence of the MPS
    pingMethod          ENUM("PING", "SSH", "NONE") NOT NULL,

    -- The mate CLLI
    mateClli            CHAR(10)   NOT NULL,

    -- Point code
    pointCode           CHAR(9)    NOT NULL,

    -- Point code of the mate
    matePointCode       CHAR(9)    NOT NULL,

    -- Capability point code
    capabilityPointCode CHAR(9)    NOT NULL,

    -- GttGroup assigned to the EmsInterafacе
    gttGroup            CHAR(64)   NOT NULL DEFAULT ""
        REFERENCES GttGroup(name),

    -- TnFilter assigned to the EmsInterafacе
    tnFilter            CHAR(64)   NOT NULL DEFAULT ""
        REFERENCES TnFilter, -- via FOREIGN KEY (ownerSpid, tnfilter)

    -- ServiceProvider to which this EmsInterface is assigned
    ownerSpid           CHAR(4)    NOT NULL DEFAULT ""
        REFERENCES LsmsServiceProvider(spid),

    -- Component Info (stored as CSV string)
```

```
    componentInfo        BLOB        NOT NULL,

    -- Contact Info (stored as CSV string)

    contactInfo        BLOB          NOT NULL,



    -- The last fields are only used when the row represents a

    -- OAP interface. The row is used to construct both OapInterface

    -- objects and MpsInterface objects which are subclasses of
EmsInterface



    -- OAP dcmAddress

    dcmAddress        TINYBLOB NULL DEFAULT NULL,



    -- OAP retry interval

    retryInterval     INTEGER  NULL DEFAULT NULL,



    -- OAP retry count

    retryCount        INTEGER  NULL DEFAULT NULL,



    -- Primary key is the CLLI name

    PRIMARY KEY (clli),



    -- Not used by MySql but included for documentation

    FOREIGN KEY (ownerSpid, tnFilter) REFERENCES TnFilter

)

TYPE = MyIsam;



--

-- Create TnFilter table. A row in the EmsInterface table can represent
-- either a RegionTnFilter or a NpaNxxTnFilter object
--
CREATE TABLE  TnFilter
(
    -- The LsmsServiceProvider this TnFilter belongs to
    spid           char(4)    NOT NULL,   -- Foreign key

    -- The name of the TnFilter
    name           CHAR(64)   NOT NULL,

    -- Description of the TnFilter
    description CHAR(80)  NOT NULL,

    -- The filter type (NpaNxxTnFilter or RegionalTnFilter)
    filterType     ENUM("Regional", "NpaNxx") NOT NULL,

    -- If RegionalTnFilter, the region to send
    regions        SET("Not Used", "Canada", "MidAtlantic", "Midwest", 
"Northeast",
                       "Southeast", "Southwest", "WestCoast", 
"Western")
NOT NULL,

    -- If NpaNxxTnFilter, the filter type
    npanxxType     ENUM("Include", "Exclude") NOT NULL,

    -- If NpaNxxTnFilter, the npa-nxxs to send
    npanxxs        LONGBLOB NOT NULL,
    -- TnFilter names are unique within LsmsServiceProvider
    PRIMARY KEY (spid, name),

    -- Not used by MySql but included for documentation
    FOREIGN KEY (spid) REFERENCES LsmsServiceProvider(spid)

)
TYPE = MyIsam;

--
--  Create private and public key tables
--
--  The first four fields define a base class Key in the object interface
--
--         +-- PrivateKey
--  Key <--|
--         +-- PublicKey
--
-- Each subclass and table has the key values for the key type.
--

--
-- Create "Model" PrivateKey table
--
CREATE TEMPORARY TABLE IF NOT EXISTS TempPrivateKey
(
    listId      INT UNSIGNED,
    keyId       INT UNSIGNED,
    status      ENUM("Expired", "Valid", "InUse"),
    keyval      BLOB -- Max length 1024
)
TYPE = MyIsam;

-- Create CanadaPrivateKey table
CREATE TABLE  CanadaPrivateKey
(
    id INT UNSIGNED NOT NULL AUTO_INCREMENT,
    PRIMARY KEY (id)
) SELECT * FROM TempPrivateKey;

-- Create NortheastPrivateKey table
CREATE TABLE  NortheastPrivateKey
(
    id INT UNSIGNED NOT NULL AUTO_INCREMENT,
    PRIMARY KEY (id)
) SELECT * FROM TempPrivateKey;

-- Create MidAtlanticPrivateKey table
CREATE TABLE  MidAtlanticPrivateKey
(
    id INT UNSIGNED NOT NULL AUTO_INCREMENT,
    PRIMARY KEY (id)
) SELECT * FROM TempPrivateKey;

-- Create MidwestPrivateKey table
```

```
CREATE TABLE  MidwestPrivateKey
(
    id INT UNSIGNED NOT NULL AUTO_INCREMENT,
    PRIMARY KEY (id)
) SELECT * FROM TempPrivateKey;

-- Create SoutheastPrivateKey table
CREATE TABLE  SoutheastPrivateKey
(
    id INT UNSIGNED NOT NULL AUTO_INCREMENT,
    PRIMARY KEY (id)
) SELECT * FROM TempPrivateKey;

-- Create SouthwestPrivateKey table
CREATE TABLE  SouthwestPrivateKey
(
    id INT UNSIGNED NOT NULL AUTO_INCREMENT,
    PRIMARY KEY (id)
) SELECT * FROM TempPrivateKey;

-- Create WestCoastPrivateKey table
CREATE TABLE  WestCoastPrivateKey
(
    id INT UNSIGNED NOT NULL AUTO_INCREMENT,
    PRIMARY KEY (id)
) SELECT * FROM TempPrivateKey;
```

```
-- Create WesternPrivateKey table

CREATE TABLE  WesternPrivateKey

(

    id INT UNSIGNED NOT NULL AUTO_INCREMENT,

    PRIMARY KEY (id)

) SELECT * FROM TempPrivateKey;


--

-- Create "Model" PublicKey table

--

CREATE TEMPORARY TABLE IF NOT EXISTS TempPublicKey

(

    listId      INT UNSIGNED,

    keyId       INT UNSIGNED,

    status      ENUM("Expired", "Valid", "InUse"),

    exponent    TINYBLOB, -- Max length 3

    modulus     TINYBLOB  -- Max length 256

)

TYPE = MyIsam;


-- Create CanadaPublicKey table

CREATE TABLE  CanadaPublicKey

(

    id INT UNSIGNED NOT NULL AUTO_INCREMENT,

    PRIMARY KEY (id)

) SELECT * FROM TempPublicKey;


-- Create NortheastPublicKey table
```

```
CREATE TABLE  NortheastPublicKey
(
    id INT UNSIGNED NOT NULL AUTO_INCREMENT,
    PRIMARY KEY (id)
) SELECT * FROM TempPublicKey;

-- Create MidAtlanticPublicKey table
CREATE TABLE  MidAtlanticPublicKey
(
    id INT UNSIGNED NOT NULL AUTO_INCREMENT,
    PRIMARY KEY (id)
) SELECT * FROM TempPublicKey;

-- Create MidwestPublicKey table
CREATE TABLE  MidwestPublicKey
(
    id INT UNSIGNED NOT NULL AUTO_INCREMENT,
    PRIMARY KEY (id)
) SELECT * FROM TempPublicKey;

-- Create SoutheastPublicKey table
CREATE TABLE  SoutheastPublicKey
(
    id INT UNSIGNED NOT NULL AUTO_INCREMENT,
    PRIMARY KEY (id)
) SELECT * FROM TempPublicKey;
```

```
-- Create SouthwestPublicKey table

CREATE TABLE  SouthwestPublicKey

(

    id INT UNSIGNED NOT NULL AUTO_INCREMENT,

    PRIMARY KEY (id)

) SELECT * FROM TempPublicKey;


-- Create WestCoastPublicKey table

CREATE TABLE  WestCoastPublicKey

(

    id INT UNSIGNED NOT NULL AUTO_INCREMENT,

    PRIMARY KEY (id)

) SELECT * FROM TempPublicKey;


-- Create WesternPublicKey table

CREATE TABLE  WesternPublicKey

(

    id INT UNSIGNED NOT NULL AUTO_INCREMENT,

    PRIMARY KEY (id)

) SELECT * FROM TempPublicKey;


--

-- Create one measurements table for each region

--

-- Create "Model" NpacMeasurements table

CREATE TEMPORARY TABLE IF NOT EXISTS TempNpacMeasurements

(

    yyyydddhh   INT UNSIGNED NOT NULL,
    Binds       INT UNSIGNED NOT NULL DEFAULT 0,
    SuccessOps  INT UNSIGNED NOT NULL DEFAULT 0,
    FailedOps   INT UNSIGNED NOT NULL DEFAULT 0,

    PRIMARY KEY (yyyydddhh)
)
TYPE = MyIsam;

-- Create CanadaNpacMeasurements table
CREATE TABLE  CanadaNpacMeasurements
(
    PRIMARY KEY (yyyydddhh)
) SELECT * FROM TempNpacMeasurements;

-- Create NortheastNpacMeasurements table
CREATE TABLE  NortheastNpacMeasurements
(
    PRIMARY KEY (yyyydddhh)
) SELECT * FROM TempNpacMeasurements;

-- Create MidAtlanticNpacMeasurements table
CREATE TABLE  MidAtlanticNpacMeasurements
(
    PRIMARY KEY (yyyydddhh)
) SELECT * FROM TempNpacMeasurements;

-- Create MidwestNpacMeasurements table
```

```
CREATE TABLE  MidwestNpacMeasurements

(

    PRIMARY KEY (yyyydddhh)

) SELECT * FROM TempNpacMeasurements;


-- Create SoutheastNpacMeasurements table

CREATE TABLE  SoutheastNpacMeasurements

(

    PRIMARY KEY (yyyydddhh)

) SELECT * FROM TempNpacMeasurements;


-- Create SouthwestNpacMeasurements table

CREATE TABLE  SouthwestNpacMeasurements

(

    PRIMARY KEY (yyyydddhh)

) SELECT * FROM TempNpacMeasurements;


-- Create WestCoastNpacMeasurements table

CREATE TABLE  WestCoastNpacMeasurements

(

    PRIMARY KEY (yyyydddhh)

) SELECT * FROM TempNpacMeasurements;


-- Create WesternNpacMeasurements table

CREATE TABLE  WesternNpacMeasurements

(

    PRIMARY KEY (yyyydddhh)

) SELECT * FROM TempNpacMeasurements;
```

```
--
-- Create DbConfig table
--
CREATE TABLE  DbConfig
(
    keyType     ENUM("Canada", "MidAtlantic", "Midwest", "Northeast",
                     "Southeast", "Southwest", "WestCoast", "Western",
                     "R9", "R10", "R11", "R12", "R13", "R14",
                     "R15", "R16", "R17", "R18", "R19", "R20", -- Future 
Regions
                     "Internal", "Ebda", "Lsms") NOT NULL,
    keyName     TINYBLOB NOT NULL,            -- Max length 256
    description TINYBLOB NOT NULL DEFAULT "", -- Max length 256
    value           BLOB NOT NULL DEFAULT "", -- Max length 64K

    -- keyName is unique within keyType
    PRIMARY KEY (keyType, keyName(255))
)
TYPE = MyIsam;

INSERT INTO DbConfig (keyType, keyName, description, value)
    VALUES
    ("Canada",     "REQUEST_RETRY_NUMBER",   "Retry times for NPAC 
requests",   "3"),
    ("Canada",     "REQUEST_RETRY_INTERVAL", "Retry minutes for NPAC 
requests", "2"),
    ("Canada",     "RECOV_RETRY_NUMBER",     "Retry times for NPAC 
recovery requests",   "3"),
    ("Canada",      "RECOV_RETRY_INTERVAL",   "Retry mintues for NPAC
recovery requests", "5"),

    ("MidAtlantic", "REQUEST_RETRY_NUMBER",   "Retry times for NPAC
requests",   "3"),

    ("MidAtlantic", "REQUEST_RETRY_INTERVAL", "Retry minutes for NPAC
requests", "2"),

    ("MidAtlantic", "RECOV_RETRY_NUMBER",     "Retry times for NPAC
recovery requests",   "3"),

    ("MidAtlantic", "RECOV_RETRY_INTERVAL",   "Retry mintues for NPAC
recovery requests", "5"),

    ("Midwest",     "REQUEST_RETRY_NUMBER",   "Retry times for NPAC
requests",   "3"),

    ("Midwest",     "REQUEST_RETRY_INTERVAL", "Retry minutes for NPAC
requests", "2"),

    ("Midwest",     "RECOV_RETRY_NUMBER",     "Retry times for NPAC
recovery requests",   "3"),

    ("Midwest",     "RECOV_RETRY_INTERVAL",   "Retry mintues for NPAC
recovery requests", "5"),

    ("Northeast",   "REQUEST_RETRY_NUMBER",   "Retry times for NPAC
requests",   "3"),

    ("Northeast",   "REQUEST_RETRY_INTERVAL", "Retry minutes for NPAC
requests", "2"),

    ("Northeast",   "RECOV_RETRY_NUMBER",     "Retry times for NPAC
recovery requests",   "3"),

    ("Northeast",   "RECOV_RETRY_INTERVAL",   "Retry mintues for NPAC
recovery requests", "5"),

    ("Southeast",   "REQUEST_RETRY_NUMBER",   "Retry times for NPAC
requests",   "3"),

    ("Southeast",   "REQUEST_RETRY_INTERVAL", "Retry minutes for NPAC
requests", "2"),

    ("Southeast",   "RECOV_RETRY_NUMBER",     "Retry times for NPAC
recovery requests",   "3"),

    ("Southeast",   "RECOV_RETRY_INTERVAL",   "Retry mintues for NPAC
recovery requests", "5"),

    ("Southwest",   "REQUEST_RETRY_NUMBER",   "Retry times for NPAC
requests",   "3"),

    ("Southwest",   "REQUEST_RETRY_INTERVAL", "Retry minutes for NPAC
requests", "2"),

    ("Southwest",   "RECOV_RETRY_NUMBER",     "Retry times for NPAC 
recovery requests",  "3"),

    ("Southwest",   "RECOV_RETRY_INTERVAL",   "Retry mintues for NPAC 
recovery requests", "5"),

    ("WestCoast",   "REQUEST_RETRY_NUMBER",   "Retry times for NPAC 
requests",   "3"),

    ("WestCoast",   "REQUEST_RETRY_INTERVAL", "Retry minutes for NPAC 
requests", "2"),

    ("WestCoast",   "RECOV_RETRY_NUMBER",     "Retry times for NPAC 
recovery requests",  "3"),

    ("WestCoast",   "RECOV_RETRY_INTERVAL",   "Retry mintues for NPAC 
recovery requests", "5"),

    ("Western",     "REQUEST_RETRY_NUMBER",   "Retry times for NPAC 
requests",   "3"),

    ("Western",     "REQUEST_RETRY_INTERVAL", "Retry minutes for NPAC 
requests", "2"),

    ("Western",     "RECOV_RETRY_NUMBER",     "Retry times for NPAC 
recovery requests",  "3"),

    ("Western",     "RECOV_RETRY_INTERVAL",   "Retry mintues for NPAC 
recovery requests", "5"),



    ("Internal", "MAX_SPIDS",     "Maximum Service Providers 
allowed.",
"32"),

    ("Internal", "EDR",           "Enable Efficient Data Reperesentation 
(EDR).",   "N" ),

    ("Internal", "SNMP",          "Enable SNMP 
Agent.",
"N" ),

    ("Internal", "AFT",           "Enable Automatic File 
Transfer.",
"N" ),

    ("Internal", "WSMSC",         "Enable wireless service 
feature.",
"N" ),

    ("Internal", "WSMSC_TO_EAGLE","Enable sending of WSMSA service to 
Eagle.",      "N" ),
    ("Internal", "IP_GUI",        "Enable Web based ip
gui.",                       "N" ),
    ("Internal", "SPID_SECURITY", "Enable SPID based
security.",
"N" ),

    ("Internal", "MAX_USERS",     "Maximum Number of
Users",
"8" ),

    ("Internal", "ENHANCED_FILTERS","Enable Group and Regional filter
creation.",   "N" ),

    ("Internal", "MAX_EAGLES",    "Maximum number of
eagles.",
"16"),

    ("Internal", "REPORT_GEN",    "Enable report
generator.",
"N" ),

    ("Internal", "REPORT_GEN_QUERY_ACTIVE","Report generator pid
field",
"0" ),

    ("Internal", "QUERY_SERVER",  "Enable Query Server
feature",
"N" ),

    ("Internal", "INACTIVITY_TIMEOUT", "Gui and Shell inactivity
timeout
feature",  "N" ),

    ("Internal", "SYSTEM_INACTIVITY_TIMEOUT", "System wide GUI and
Shell
inactivity timeout value", "15" ),



    ("Ebda", "CMD_ARGS", "EBDA command line arguments", ""),



    ("Lsms", "NPAC_SPID", "Spid used to connect to NPAC", ""),

    ("Lsms", "CONTACT_INFO", "Spid used to connect to NPAC", '"Lsms
Admin","admin@tekelec.com","5200 Paramount
Parkway","Morrisville","NC","","USA","27560","9194605500","8005551234",
"1
234","9195551234"'),

    ("Lsms", "COMPONENT_INFO", "Spid used to connect to NPAC",
'"LSMS","TKLC","LSMS","Tekelec, Inc.","6.0","1.0"');
```

```
--
-- Create NpaSplit table
--
CREATE TABLE  NpaSplit
(
    -- The old npa
    oldNpa         char(3)    NOT NULL,

    -- The new npa
    newNpa         CHAR(3)    NOT NULL,

    -- The nxx
    nxx            CHAR(3)    NOT NULL,

    -- The start of the permissive dialing period
    startPDP       CHAR(8)    NOT NULL,

    -- The end of the permissive dialing period
    endPDP         CHAR(8)    NOT NULL,

    -- The region the split belongs to
    region      ENUM("Canada", "MidAtlantic", "Midwest", "Northeast",
                     "Southeast", "Southwest", "WestCoast", "Western",
                     "R9", "R10", "R11", "R12", "R13", "R14",
                     "R15", "R16", "R17", "R18", "R19", "R20"), -- Future
Regions

    -- The status of the npa split
    status      ENUM("NotSet", "Pending", "Active", "Error"),


    -- Old npa, new npa and nxx form primary unique key

    PRIMARY KEY (oldnpa, newnpa, nxx)

)

TYPE = MyIsam;




--
-- Create SubscriptionVersion table
--
-- The Fields are defined in the order and format that are defined by
the
-- NPAC bulk data file. This allows the SQL LOAD DATA command to be
used
-- to load tables which is extremely fast.
--
-- Revision History
-- 15-may-07  ARICENT  Feature 110663: NANC 399
--
CREATE TABLE  SubscriptionVersion
(
    -- Required field (Primary key)
    versionId           INT             NOT NULL,

    -- Required field (10 numeric character unique key)
    tn                  CHAR(10)        NOT NULL,

    -- Optional field (10 numeric characters, Empty string means not
present)
    lrn                 CHAR(10)        NOT NULL DEFAULT "",

    -- Required field (1-4 characters)
    newCurrentSp        CHAR(4)         NOT NULL DEFAULT "0000",

    -- Required field (14 characters "YYYYMMDDHHMMSS")
    activationTimestamp  CHAR(14)       NOT NULL DEFAULT
"00000000000000",

    -- Optional field (9 characters, Empty string means not present)
    classDPC            CHAR(9)         NOT NULL DEFAULT "",

    -- Optional field (1-3 characters, Empty string means not present)
    classSSN            CHAR(3)         NOT NULL DEFAULT "",

    -- Optional field (9 characters, Empty string means not present)
    lidbDPC             CHAR(9)         NOT NULL DEFAULT "",
    -- Optional field (1-3 characters, Empty string means not present)
    lidbSSN              CHAR(3)          NOT NULL DEFAULT "",

    -- Optional field (9 characters, Empty string means not present)
    isvmDPC              CHAR(9)          NOT NULL DEFAULT "",

    -- Optional field (1-3 characters, Empty string means not present)
    isvmSSN              CHAR(3)          NOT NULL DEFAULT "",

    -- Optional field (9 characters, Empty string means not present)
    cnamDPC              CHAR(9)          NOT NULL DEFAULT "",

    -- Optional field (1-3 characters, Empty string means not present)
    cnamSSN              CHAR(3)          NOT NULL DEFAULT "",

    -- Optional field (1-12 numeric characters, Empty string means not
present)
    endUserLocationValue CHAR(12)         NOT NULL DEFAULT "",

    -- Optional field (2 numeric characters, Empty string means not present)
    endUserLocationType  CHAR(2)          NOT NULL DEFAULT "",

    -- Required field (1-4 characters, Empty string means not present)
    billingId            CHAR(4)          NOT NULL DEFAULT "",

    -- Required field (lspp(0), lisp(1), pool(2))
    lnpType              TINYINT UNSIGNED NOT NULL DEFAULT 0,

    -- Required field (new(0), delete(1), modified(2), audit-descrepancy(3)
    downloadReason       TINYINT UNSIGNED NOT NULL DEFAULT 0,

    -- Optional field (9 characters, Empty string means not present)
    wsmscDPC             CHAR(9)          NOT NULL DEFAULT "",

    -- Optional field (1-3 characters, Empty string means not present)
    wsmscSSN             CHAR(3)          NOT NULL DEFAULT "",

    -- Optional field  (wireline(0), wireless(1), voIP(2), voWiFi(3),
sv_type_4(4), sv_type_5(5), sv_type_6(6) )
    svType TINYINT NOT NULL DEFAULT -1,

    -- Optional field (1-4 CHARACTERS)
    alternativeSPIDCHAR(4)         NOT NULL DEFAULT "",

    -- Primay key is the Npac SubscriptionVersion id
    PRIMARY KEY (versionId),

    -- TN must be indexed and unique
    UNIQUE KEY tn (tn),

    -- Index lrn, for LSMS Subscription Version by LRN reports
    INDEX (lrn),

    -- Index lrn, for LSMS Subscription Version by SPID reports
    INDEX (newCurrentSp)

)
TYPE = MyIsam;

--
-- Create NumberPoolBlock table
--
-- The Fields are defined in the order and format that are defined by
the
-- NPAC bulk data file. This allows the SQL LOAD DATA command to be
used
-- to load tables which is extremely fast.
--
CREATE TABLE  NumberPoolBlock
(
    -- Required field (Primary key)
    blockId              INT              NOT NULL,

    -- Required field (7 numeric characters, Unique key)
    npanxx_x             CHAR(7)          NOT NULL,

    -- Optional field (10 numeric characters, Empty string means not
present)
    lrn                  CHAR(10)         NOT NULL DEFAULT "",

    -- Required field (1-4 characters)
    newCurrentSp         CHAR(4)          NOT NULL DEFAULT "0000",

    -- Required field (14 characters "YYYYMMDDHHMMSS")
    activationTimestamp  CHAR(14)         NOT NULL DEFAULT
"00000000000000",

    -- Optional field (9 characters, Empty string means not present)
    classDPC             CHAR(9)          NOT NULL DEFAULT "",
    -- Optional field (1-3 characters, Empty string means not present)
    classSSN             CHAR(3)          NOT NULL DEFAULT "",

    -- Optional field (9 characters, Empty string means not present)
    lidbDPC              CHAR(9)          NOT NULL DEFAULT "",
    -- Optional field (1-3 characters, Empty string means not present)
    lidbSSN              CHAR(3)          NOT NULL DEFAULT "",

    -- Optional field (9 characters, Empty string means not present)
    isvmDPC              CHAR(9)          NOT NULL DEFAULT "",
    -- Optional field (1-3 characters, Empty string means not present)
    isvmSSN              CHAR(3)          NOT NULL DEFAULT "",

    -- Optional field (9 characters, Empty string means not present)
    cnamDPC              CHAR(9)          NOT NULL DEFAULT "",
    -- Optional field (1-3 characters, Empty string means not present)
    cnamSSN              CHAR(3)          NOT NULL DEFAULT "",

    -- Optional field (9 characters, Empty string means not present)
    wsmscDPC             CHAR(9)          NOT NULL DEFAULT "",
    -- Optional field (1-3 characters, Empty string means not present)
    wsmscSSN             CHAR(3)          NOT NULL DEFAULT "",

    -- Required field (new(0), delete(1), modified(2), audit-descrepancy(3)
    -- Changed DEFAULT from "" to 0 when migrated MySQL from 4.1.11 to 5.0.37
    downloadReason       TINYINT UNSIGNED NOT NULL DEFAULT 0,

    -- Optional field  (wireline(0), wireless(1), voIP(2), voWiFi(3),
sv_type_4(4), sv_type_5(5), sv_type_6(6) )
    svType TINYINT NOT NULL DEFAULT -1,

    -- Optional field (1-4 CHARACTERS)
    alternativeSPID     CHAR(4)         NOT NULL DEFAULT "",

    -- Primay key is the Npac NumberPoolBlock id
    PRIMARY KEY (blockId),

    -- TN must be indexed and unique
    UNIQUE KEY npanxx_x (npanxx_x),

    -- Index lrn, for LSMS Number Pool Block by LRN reports
    INDEX (lrn),

    -- Index lrn, for LSMS Number Pool Block by SPID reports
    INDEX (newCurrentSp)
)
TYPE = MyIsam;

--
-- Create ServiceProvNetwork table
--
-- The Fields are defined in the order and format that are defined by the
-- NPAC bulk data file
--
CREATE TABLE ServiceProvNetwork
(
    -- Required field (Primary key)
    serviceProvId    CHAR(4)       NOT NULL,

    -- Required field (1 - 40 characters)
    serviceProvName  CHAR(40)      NOT NULL DEFAULT "",

     -- Service Provider type
    serviceProvType  ENUM("wireline", "wireless", "non_carrier",
"sp_type_3",
"sp_type_4", "sp_type_5") NULL DEFAULT NULL,

    -- Prmary key is the Service Provider ID
    PRIMARY KEY (serviceProvId)
)
TYPE = MyIsam;

--
-- Create ServiceProvLRN table
--
```

```
-- The Fields are defined in the order that are defined by the
-- NPAC bulk data file
--
CREATE TABLE ServiceProvLRN
(
    -- Foreign key -> ServiceProvNetwork
    serviceProvId     CHAR(4)   NOT NULL,

    -- Required field (Primary key within each ServiceProvNetwork)
    id                INT       NOT NULL,

    -- Required field (10 numeric characters)
    lrn               CHAR(10)  NOT NULL,

    -- Required field (14 characters "YYYYMMDDHHMMSS")
    creationTimeStamp CHAR(14)  NOT NULL DEFAULT "00000000000000",

    -- Required field (new(0), delete(1), modified(2), audit-
descrepancy(3)
    downloadReason    TINYINT   NOT NULL DEFAULT 0,

    -- Primary key is the Npac id within each ServiceProvNetwork
    PRIMARY KEY (serviceProvId, id),

    -- Lrn is unique key within each ServiceProvNetwork
    UNIQUE KEY lrn (serviceProvId, lrn),

    -- Index lrn
    INDEX (lrn),

    -- Not used by MySql but included for documentation
    FOREIGN KEY (serviceProvId) REFERENCES
ServiceProvNetwork(serviceProvId)
)
TYPE = MyIsam;

--
-- Create ServiceProvNPA_NXX table
--
-- The Fields are defined in the order defined by the NPAC bulk data
file
-- but the npac file formats the npanxx as 'npa-nxx'.
--
CREATE TABLE ServiceProvNPA_NXX
(
    -- Foreign key -> ServiceProvNetwork
    serviceProvId      CHAR(4)  NOT NULL,

    -- Required field (Primary Unique Key)
    id                 INT      NOT NULL,

    -- Required field (6 numeric characters)
    npanxx             CHAR(6)  NOT NULL,

    -- Required field (14 characters "YYYYMMDDHHMMSS")
    creationTimeStamp  CHAR(14) NOT NULL DEFAULT "00000000000000",

    -- Required field (14 characters "YYYYMMDDHHMMSS")
    effectiveTimeStamp CHAR(14) NOT NULL DEFAULT "00000000000000",

    -- Required field (new(0), delete(1), modified(2), audit-descrepancy(3)
    downloadReason     TINYINT  NOT NULL DEFAULT 0,

    -- Primary key is the Npac id within each ServiceProvNetwork
    PRIMARY KEY (serviceProvId, id),

    -- NpaNxx is unique key within each ServiceProvNetwork
    UNIQUE KEY npanxx (serviceProvId, npanxx),

    -- Index npanxx
    INDEX (npanxx),

    -- Not used by MySql but included for documentation
    FOREIGN KEY (serviceProvId) REFERENCES ServiceProvNetwork(serviceProvId)

)
TYPE = MyIsam;

--
-- Create ServiceProvNPA_NXX_X table
--
-- The Fields are defined in the order defined by the NPAC bulk data file
-- but the npac file formats the npanxx as 'npa-nxx-x'.
--
CREATE TABLE ServiceProvNPA_NXX_X
(
    -- Foreign key -> ServiceProvNetwork
    serviceProvId      CHAR(4)  NOT NULL,

    -- Required field (Primary Unique Key)
    id                 INT      NOT NULL,

    -- Required field (7 numeric characters)
    npanxx_x           CHAR(7)  NOT NULL,

    -- Required field (14 characters "YYYYMMDDHHMMSS")
    creationTimeStamp  CHAR(14) NOT NULL DEFAULT "00000000000000",

    -- Required field (14 characters "YYYYMMDDHHMMSS")
    effectiveTimeStamp CHAR(14) NOT NULL DEFAULT "00000000000000",

    -- Required field (14 characters "YYYYMMDDHHMMSS")
    modifiedTimeStamp  CHAR(14) NOT NULL DEFAULT "00000000000000",

    -- Required field (new(0), delete(1), modified(2), audit-descrepancy(3)
    downloadReason     TINYINT  NOT NULL DEFAULT 0,

    -- Primary key is the Npac id within each ServiceProvNetwork
    PRIMARY KEY (serviceProvId, id),
    -- NpaNxx is unique key within each ServiceProvNetwork
    UNIQUE KEY npanxx_x (serviceProvId, npanxx_x),

    -- Index npanxx_x
    INDEX (npanxx_x),

    -- Not used by MySql but included for documentation
    FOREIGN KEY (serviceProvId) REFERENCES
ServiceProvNetwork(serviceProvId)
)
TYPE = MyIsam;




-- Create Eagle Measurements Table

-- $S is replaced by CLLI for EMS in Table Name (ie,
STPAEagleMeasurments)

CREATE TABLE $SEagleMeasurements (

        yyyydddhh   INT UNSIGNED NOT NULL,

        UpdTnSuccess    INT UNSIGNED NOT NULL DEFAULT 0,

        UpdTnFail       INT UNSIGNED NOT NULL DEFAULT 0,

        DelTnSuccess    INT UNSIGNED NOT NULL DEFAULT 0,

        DelTnFail       INT UNSIGNED NOT NULL DEFAULT 0,


        UpdDGttSuccess  INT UNSIGNED NOT NULL DEFAULT 0,

        UpdDGttFail     INT UNSIGNED NOT NULL DEFAULT 0,

        DelDGttSuccess  INT UNSIGNED NOT NULL DEFAULT 0,

        DelDGttFail     INT UNSIGNED NOT NULL DEFAULT 0,


        UpdOGttSuccess  INT UNSIGNED NOT NULL DEFAULT 0,

        UpdOGttFail     INT UNSIGNED NOT NULL DEFAULT 0,

        DelOGttSuccess  INT UNSIGNED NOT NULL DEFAULT 0,

        DelOGttFail     INT UNSIGNED NOT NULL DEFAULT 0,
        UpdSplitSuccess INT UNSIGNED NOT NULL DEFAULT 0,
        UpdSplitFail    INT UNSIGNED NOT NULL DEFAULT 0,
        DelSplitSuccess INT UNSIGNED NOT NULL DEFAULT 0,
        DelSplitFail    INT UNSIGNED NOT NULL DEFAULT 0,
        Binds           INT UNSIGNED NOT NULL DEFAULT 0,
        LsmsRetries     INT UNSIGNED NOT NULL DEFAULT 0,
        NERetries       INT UNSIGNED NOT NULL DEFAULT 0,

        PRIMARY KEY (yyyydddhh)
)
TYPE = MyIsam;";
```

F
Resolution Of Known Customer Issues

Issue: `startNode` Command gets stuck in ACTIVE -> TO-ACTIVE state

Description: It has been observed in LSMS that during startNode on active server, sometimes even after Node is started, the server gets stuck in ACTIVE -> TO_ACTIVE state as shown below:

```
$hastatus
ACTIVE "lsmspri->TO_ACTIVE"
```

Solution:

Remove the file /usr/TKLC/plat/etc/HA/state.d/.haTransitionInProgress_lsmspri if issue is observed on primary server or /usr/TKLC/plat/etc/HA/state.d/.haTransitionInProgress_lsmssec if issue is observed on secondary server using command as mentioned below:

```
$ rm /usr/TKLC/plat/etc/HA/state.d/.haTransitionInProgress_lsmspri
```