

**Oracle® Communications
LSMS Query Server**

Security Guide

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Oracle® Communications Security Guide, Release 13.0

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Chapter 1

Introduction

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

Overview

This manual describes how to ensure a secure installation of Oracle Communications LSMS (LSMS) Query Server, and explains LSMS Query Server security features.





Scope and Audience

This manual is intended for system administrators that are installing and configuring an LSMS Query Server.

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: Admonishments

Icon	Description
 DANGER	Danger: (This icon and text indicate the possibility of <i>personal injury</i> .)
 WARNING	Warning: (This icon and text indicate the possibility of <i>equipment damage</i> .)
 CAUTION	Caution: (This icon and text indicate the possibility of <i>service interruption</i> .)
 TOPPLE	Topple: (This icon and text indicate the possibility of <i>personal injury and equipment damage</i> .)

Manual Organization

This manual contains the following chapters:

- [Introduction](#) contains general information such as an overview of the manual, how to get technical assistance, and where to find more information.
- [LSMS Query Server Security Overview](#) describes basic security considerations and provides an overview of LSMS Query Server security.
- [Performing a Secure LSMS Query Server Installation](#) describes the process to ensure a secure installation of LSMS Query Server.
- [Implementing LSMS Query Server Security](#) explains LSMS Query Server security features.

Customer Care Center

Oracle's Tekelec Customer Care Center is your initial point of contact for all product support needs. A representative takes your call or email, creates a Customer Service Request (CSR) and directs your requests to the Technical Assistance Center (TAC). Each CSR includes an individual tracking number. Together with TAC Engineers, the representative will help you resolve your request.

The Customer Care Center is available 24 hours a day, 7 days a week, 365 days a year, and is linked to TAC Engineers around the globe.

TAC Engineers are available to provide solutions to your technical questions and issues 7 days a week, 24 hours a day. After a CSR is issued, the TAC Engineer determines the classification of the trouble. If a critical problem exists, emergency procedures are initiated. If the problem is not critical, normal support procedures apply. A primary Technical Engineer is assigned to work on the CSR and provide a solution to the problem. The CSR is closed when the problem is resolved.

Technical Assistance Centers are located around the globe in the following locations:

Related - Global

Email (All Regions): support@tekelec.com

- **USA and Canada**

Phone:

1-888-367-8552 (toll-free, within continental USA and Canada)

1-919-460-2150 (outside continental USA and Canada)

TAC Regional Support Office Hours:

8:00 a.m. through 5:00 p.m. (GMT minus 5 hours), Monday through Friday, excluding holidays

- **Caribbean and Latin America (CALA)**

Phone:

+1-919-460-2150

TAC Regional Support Office Hours (except Brazil):

10:00 a.m. through 7:00 p.m. (GMT minus 6 hours), Monday through Friday, excluding holidays

- **Argentina**

Phone:

0-800-555-5246 (toll-free)

- **Brazil**
Phone:
0-800-891-4341 (toll-free)
TAC Regional Support Office Hours:
8:00 a.m. through 5:48 p.m. (GMT minus 3 hours), Monday through Friday, excluding holidays
- **Chile**
Phone:
1230-020-555-5468
- **Colombia**
Phone:
01-800-912-0537
- **Dominican Republic**
Phone:
1-888-367-8552
- **Mexico**
Phone:
001-888-367-8552
- **Peru**
Phone:
0800-53-087
- **Puerto Rico**
Phone:
1-888-367-8552
- **Venezuela**
Phone:
0800-176-6497
- **Europe, Middle East, and Africa**
Regional Office Hours:
8:30 a.m. through 5:00 p.m. (GMT), Monday through Friday, excluding holidays
- **Signaling**
Phone:
+44 1784 467 804 (within UK)
- **Software Solutions**

Phone:

+33 3 89 33 54 00

- **Asia**

- **India**

Phone:

+91-124-465-5098 or +1-919-460-2150

TAC Regional Support Office Hours:

10:00 a.m. through 7:00 p.m. (GMT plus 5 1/2 hours), Monday through Saturday, excluding holidays

- **Singapore**

Phone:

+65 6796 2288

TAC Regional Support Office Hours:

9:00 a.m. through 6:00 p.m. (GMT plus 8 hours), Monday through Friday, excluding holidays

Emergency Response

In the event of a critical service situation, emergency response is offered by Oracle's Tekelec Customer Care Center 24 hours a day, 7 days a week. The emergency response provides immediate coverage, automatic escalation, and other features to ensure that the critical situation is resolved as rapidly as possible.

A critical situation is defined as a problem with the installed equipment that severely affects service, traffic, or maintenance capabilities, and requires immediate corrective action. Critical situations affect service and/or system operation resulting in one or several of these situations:

- A total system failure that results in loss of all transaction processing capability
- Significant reduction in system capacity or traffic handling capability
- Loss of the system's ability to perform automatic system reconfiguration
- Inability to restart a processor or the system
- Corruption of system databases that requires service affecting corrective actions
- Loss of access for maintenance or recovery operations
- Loss of the system ability to provide any required critical or major trouble notification

Any other problem severely affecting service, capacity/traffic, billing, and maintenance capabilities may be defined as critical by prior discussion and agreement with Oracle's Tekelec Customer Care Center.

Related Publications

The LSMS Query Server *Installation and Upgrade Guide* provides step-by-step instructions to install or upgrade the LSMS Query Server on an Oracle Solaris 10 system running on an Oracle SPARC server.

The LSMS documentation set includes the following publications:

- The *Configuration Guide* contains information about configuring the LSMS, integrating it into your network, configuring and starting connections with NPACs and network elements, and configuring optional features such as the LSMS Query Server.
- The *Alarms and Maintenance Guide* describes the LSMS design for high availability, the LSMS software, and procedures for routine and preventive maintenance including Query Server maintenance procedures. The manual also contains a reference of alarms and recovery procedures, LSMS commands, and notifications.
- The *Security Guide* provides an overview of security for LSMS, and describes how to perform a secure LSMS installation and implement LSMS security.
- The *Database Administrator's Guide* provides information about using the LSMS local and web-based graphical user interface (GUI), using the command-line interface, managing NPAC relations, managing locally provisioned data, report generation, logs and measurements, and local time calculation and world time zone data.
- The *LNP Database Synchronization User's Guide* describes how to keep the Local Number Portability (LNP) databases at the LSMS and at the Oracle Communications EAGLE (EAGLE) network element synchronized through the use of re-synchronization, audits and reconciles, and bulk loads. This manual is contained in both the EAGLE documentation set and in the LSMS documentation set.
- The LSMS Release Documentation consists of the *Feature Notice* and the *Release Notice*.
 - The *Feature Notice* describes the features for a specified release. It also includes the following information:
 - Feature overview
 - Compatibility of the features of the current release of LSMS with the releases of interfacing systems
 - LSMS supported hardware configurations
 - How to locate documentation on the Customer Support Site
 - How to access customer training information
 - Customer Care Center and support information
 - List of acronyms used in the *Feature Notice*
 - The *Release Notice* lists the PRs that have been resolved in this release, and the PRs that are known to exist in this release.
- The following related publications are also included with the LSMS documentation set:
 - The *Hardware and Installation Guide* for the Oracle Communications EAGLE Application B Card (E5-APP-B) provides specifications and a description of the E5-APP-B card, as well as procedures for installation. Refer to this manual to obtain a basic understanding of the card, its hardware, and installation requirements.
 - The *Commands Error Recovery* manual for EAGLE contains the procedures to resolve error message conditions generated by the commands in the *Commands* manual. These error messages are presented in numerical order.

- The *Administration and LNP Feature Activation Guide* for Oracle Communications EAGLE LNP Application Processor (ELAP) describes ELAP and the LNP feature.
- The *Maintenance* manual for EAGLE contains procedural information required for maintaining the EAGLE system. This manual provides preventive maintenance procedures used in maintaining the different systems, including card removal and replacement procedures.

Oracle Security Documentation

As part of its security, LSMS Query Server uses Oracle Solaris 10. Solaris 10 documentation can be found on the Oracle Technology Network (<http://docs.oracle.com>) under *Systems Software*.

Locate Product Documentation on the Customer Support Site

Oracle customer documentation is available on the web at the Oracle Technology Network (OTN) 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 www.adobe.com.

1. Log into the Oracle Customer Support site at <http://docs.oracle.com>.
2. Under **Applications**, click the link for **Communications**.
The **Oracle Communications Documentation** window opens with Tekelec shown near the top.
3. Click **Oracle Communications Documentation for Tekelec Products**.
4. Navigate to your Product and then the Release Number, and click the **View** link (the **Download** link will retrieve the entire documentation set).
5. To download a file to your location, right-click the PDF link and select **Save Target As**.

Chapter 2

LSMS Query Server Security Overview

Topics:

- *Basic Security Considerations.....13*
- *Understanding the LSMS Query Server Environment.....13*
- *Overview of LSMS Query Server Security.....14*

This chapter describes basic security considerations and provides an overview of LSMS Query Server security.

Basic Security Considerations

The following principles are fundamental to using any application securely:

- **Keep software up to date.** This includes the latest product release and any patches that apply to it.
- **Limit privileges as much as possible.** Users should be given only the access necessary to perform their work. User privileges should be reviewed periodically to determine relevance to current work requirements.
- **Monitor system activity.** Establish who should access which system components, and how often, and monitor those components.
- **Install software securely.** For example, use firewalls, secure protocols using TLS (SSL), and secure passwords. See [Performing a Secure LSMS Query Server Installation](#) for more information.
- **Learn about and use the LSMS Query Server security features.** See [Implementing LSMS Query Server Security](#) for more information.
- **Use secure development practices.** For example, take advantage of existing database security functionality instead of creating your own application security. See [Security Considerations for Developers](#) for more information.
- **Keep up to date on security information.** Oracle regularly issues security-related patch updates and security alerts. You must install all security patches as soon as possible. See the "Critical Patch Updates and Security Alerts" Web site:
<http://www.oracle.com/technetwork/topics/security/alerts-086861.html>

Understanding the LSMS Query Server Environment

When planning your LSMS Query Server implementation, consider the following questions:

- Which resources need to be protected?
 - You need to protect customer data, such as telephone number (TN) information and associated data.
 - You need to protect internal data, such as proprietary source code.
 - You need to protect system components from being disabled by external attacks or intentional system overloads.

- Who are you protecting data from?

For example, you need to protect your subscribers' data from other subscribers, but someone in your organization might need to access that data to manage it. You can analyze your work flows to determine who needs access to the data; for example, it is possible that a system administrator can manage your system components without needing to access the system data.

- What happens if protections on strategic resources fail?

In some cases, a fault in your security scheme is nothing more than an inconvenience. In other cases, a fault might cause great damage to you or your customers. Understanding the security ramifications of each resource will help you protect it properly.

Overview of LSMS Query Server Security

The optional LSMS Query Server enables automatic access to real time Local Number Portability (LNP) data through a standard API. Customers can perform customized, high volume, automated data queries for use by internal office and support systems such as service assurance, testing, service fulfillment, and customer care.

Operating System Security

An LSMS Query Server is hosted by a dedicated Oracle SPARC server running the Oracle Solaris 10 operating system. Solaris 10 handles all operating system security for the LSMS Query Server, and the LSMS Query Server *Installation and Upgrade Guide* assumes that servers already have SPARC Solaris 10 installed. Make sure you always have the latest SPARC Solaris 10 software/patches installed on your machines.

Database Security

The following security considerations apply to the MySQL database:

- Secure Database Access Credentials

Only authorized personnel are allowed to access the database and a user ID and password are required.

Provide minimum privileges to the user so that unauthorized modifications can be avoided.

For more information, see [Managing User Accounts](#).

- Use IPSEC Connections for Data Downloads

Configure an IPSEC connection to download data to customer servers or devices.

IP Security (IPSEC) secures Internet Protocol (IP) communications by encrypting and/or authenticating all IP packets. IPSEC provides security at the network layer for connections configured for specified addresses.

- Use SSH/SSL Connections

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 strongly recommended for any remote connection to an LSMS Query Server. For more information about using keys, refer to the *Configuration Guide*.

Chapter 3

Performing a Secure LSMS Query Server Installation

Topics:

- *Pre-Installation Configuration.....16*
- *Installing LSMS Query Server Securely.....16*
- *Post-Installation Configuration.....16*

This chapter describes the process to ensure a secure installation of LSMS Query Server.

For step-by-step instructions to install an LSMS Query Server, refer to the LSMS Query Server *Installation and Upgrade Guide*.

Pre-Installation Configuration

All pre-installation configuration is set by Solaris 10. No additional user configuration regarding security is required.

Installing LSMS Query Server Securely

The Oracle Solaris 10 operating system running on an Oracle SPARC server ensures a secure installation of the LSMS Query Server application. For step-by-step instructions to install the LSMS Query Server, refer to the LSMS Query Server *Installation and Upgrade Guide*. The installation procedure assumes that servers already have SPARC Solaris 10 installed. Make sure you always have the latest SPARC Solaris 10 software/patches installed on your machines.

Post-Installation Configuration

There are no required post-installation configuration changes pertaining to Security.

For general information about configuring the Query Server, refer to the *Configuration Guide*.

Chapter 4

Implementing LSMS Query Server Security

Topics:

- *Managing User Accounts.....18*
- *Configurable MySQL Port.....18*

This chapter explains the LSMS Query Server security features.

Managing User Accounts

The system administrator assigns user names and passwords.

Other than the platform-installed users, the only application and therefore the only users for the LSMS Query Server are MySQL users.

The MySQL admin user should limit additional users to only those privileges required. Refer to the Oracle *MySQL Reference Manual* for further details.

Configurable MySQL Port

The master port configuration on the LSMS Query Server must match the port configured in the LSMS GUI for the corresponding, mated LSMS pair. For information about setting the master port on the Query Server, refer to the LSMS Query Server *Installation and Upgrade Guide*.

The optional Configurable MySQL Port feature enhances the security of LSMS Query Server databases by enabling the system administrator to change the MySQL port. The port can be changed in the `my.cnf` file and the same port should be set for the corresponding Query Server IP address through the LSMS GUI. The MySQL port can be configured to ports 1024-65535.

Chapter 5

Security Considerations for Developers

This chapter provides information for developers about how to create secure applications for LSMS Query Server, and how to extend LSMS Query Server without compromising security.

Consider the following guidelines:

- Use encrypted (hashed) passwords for user-accessible files.
- Delete or disable unused user accounts.
- Remove redundant code.

E

ELAP	<p>EAGLE Local Number Portability Application Processor</p> <p>The EAGLE LNP Application Processor (ELAP) platform provides capacity and performance required to support the ported number database.</p>
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G

GUI	<p>Graphical User Interface</p> <p>The term given to that set of items and facilities which provide the user with a graphic means for manipulating screen data rather than being limited to character based commands.</p>
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L

LNP	<p>Local Number Portability</p> <p>The ability of subscribers to switch local or wireless carriers and still retain the same phone number.</p>
LSMS	<p>Local Service Management System</p> <p>An interface between the Number Portability Administration Center (NPAC) and the LNP service databases. The LSMS receives LNP data from the NPAC and downloads that data to the service databases. LNP data can be entered into the LSMS database. The data can then be downloaded to the LNP service databases and to the NPAC.</p>

N

N**NPAC**

Number Portability Administration Center

This center administers the Service Management System (SMS) regional database, managed by an independent third party, to store all Local Number Portability data, including the status of a ported telephone number, the current service provider and the owner of the telephone number.