

**Oracle® Communications
EAGLE Element Management System**

Security Guide

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Chapter 1

Introduction

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

Overview

This guide describes how to ensure a secure installation of Oracle Communications EAGLE Element Management System (OCEEMS), and explains OCEEMS security features.

Scope and Audience

This guide is intended for administrators that are responsible for product and network security.

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.
- [OCEEMS Security Overview](#) describes basic security considerations and provides an overview of OCEEMS security.
- [Performing a Secure OCEEMS Installation](#) describes the process to ensure a secure installation of OCEEMS.
- [Implementing OCEEMS Security](#) explains OCEEMS security features.

My Oracle Support (MOS)

MOS (<https://support.oracle.com>) is your initial point of contact for all product support and training needs. A representative at Customer Access Support (CAS) can assist you with MOS registration.

Call the CAS main number at 1-800-223-1711 (toll-free in the US), or call the Oracle Support hotline for your local country from the list at <http://www.oracle.com/us/support/contact/index.html>. When calling, make the selections in the sequence shown below on the Support telephone menu:

1. Select **2** for New Service Request
2. Select **3** for Hardware, Networking and Solaris Operating System Support
3. Select one of the following options:
 - For Technical issues such as creating a new Service Request (SR), Select **1**
 - For Non-technical issues such as registration or assistance with MOS, Select **2**

You will be connected to a live agent who can assist you with MOS registration and opening a support ticket.

MOS is available 24 hours a day, 7 days a week, 365 days a year.

Emergency Response

In the event of a critical service situation, emergency response is offered by the Customer Access Support (CAS) main number at 1-800-223-1711 (toll-free in the US), or by calling the Oracle Support hotline for your local country from the list at <http://www.oracle.com/us/support/contact/index.html>. 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.

Related Specifications

For information about additional publications that are 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.

Customer Training

Oracle University offers training for service providers and enterprises. Visit our web site to view, and register for, Oracle Communications training:

<http://education.oracle.com/communication>

To obtain contact phone numbers for countries or regions, visit the Oracle University Education web site:

www.oracle.com/education/contacts

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.

Chapter 2

OCEEMS Security Overview

Topics:

- *Basic Security Considerations.....10*
- *Overview of OCEEMS Security.....10*

This chapter describes basic security considerations and provides an overview of OCEEMS security.

Basic Security Considerations

The following principles are fundamental to using any application securely:

- **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 then monitor the user activity logs.
- **Install software securely.** For example, use firewalls, secure protocols using TLS (SSL), and strong passwords. See [Performing a Secure OCEEMS Installation](#) for more information.
- **Learn about and use the OCEEMS security features.** See [Implementing OCEEMS Security](#) 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>

Overview of OCEEMS Security

The OCEEMS is a secure and reliable Element Management System (EMS) that enables administration of EAGLE fault, admin, and measurement data in a central place. The OCEEMS also enables fault management for Oracle Communications EAGLE Application Processor (EPAP) and Oracle Communications LSMS.

Operating System Security

The OCEEMS requires a CentOS 64-bit operating system, such as Oracle Enterprise Linux 7. OCEEMS was tested on Oracle Enterprise Linux 7.

Note: FTP and Telnet are disabled in the default Oracle Linux installation, so connections from OCEEMS to other systems in non-secure mode or to the OCEEMS Northbound Interface (NBI) application are not possible (NBI connection is via Secure FTP only). If the OCEEMS must support and manage systems that do not conform to the recommended secure installation, then FTP and Telnet must also be installed or another operating system that includes these packages should be used.

Ports Usage and Firewall Configuration

The ports used by OCEEMS need to be open in firewall configurations. For a complete list of OCEEMS ports, see the "OCEEMS Ports Usage and Firewall Configuration" section in *Interface User's Guide*.

MySQL Database Security

The following OCEEMS security considerations apply to the MySQL database:

- Secure Database Access Credentials

No *direct* database access is provided for in the OCEEMS; all access is programmed.

The internal OCEEMS database is pre-configured with a password that you need to change to prevent unauthorized access to the database from the command line. For information about changing the MySQL root user's password, see *OCEEMS Database Password Change* in *Interface User's Guide*.

- 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 required for the connection between the OCEEMS and the EAGLE, EPAP, and LSMS systems.

Chapter 3

Performing a Secure OCEEMS Installation

Topics:

- [Pre-Installation Configuration.....13](#)
- [Installing OCEEMS Securely.....13](#)
- [Post-Installation Configuration.....13](#)

This chapter presents planning information to ensure a secure installation of OCEEMS.

For information about installing OCEEMS, see *Upgrade/Install Guide*.

Pre-Installation Configuration

All pre-installation configuration is set by the default Oracle Linux installation. No additional user configuration regarding security is required.

For information about installing Oracle Linux, see *Oracle Linux 7 Installation Guide*.

Installing OCEEMS Securely

All non-essential and non-secure services are removed or excluded from the default installation.

Oracle recommends using the default installation, unless there are specific customer needs for additional services.

Post-Installation Configuration

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

Establishing various network connections between the OCEEMS and other systems is performed by using the EAGLE Discovery, EPAP Discovery, and LSMS Discovery applications as documented in *Interface User's Guide*.

Implementing OCEEMS Security

Topics:

- *Managing Database Password Security.....15*
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- *Managing Usergroups and Users.....15*
- *SNMP Configuration.....15*
- *Remove the need of root privileges to run/maintain/operate EEMS.....16*
- *Create an OCEEMS SSL Certificate.....16*

This chapter explains the OCEEMS security features.

Managing Database Password Security

The internal OCEEMS database is pre-configured with a password that you need to change to prevent unauthorized access to the database from the command line. For information, see *OCEEMS Database Password Change* in *Interface User's Guide*.

Managing User Password Security

The OCEEMS provides default security settings and the System Administrator can change various rules and constraints. For example, by default, the OCEEMS does not provide any user password expiration limit, which can be set by the administrator after installation by using the OCEEMS GUI. Other examples of configurable settings include rules for password composition (minimum length and number of alphabetic/numeric/special characters) and login restrictions such as the maximum permissible number of incorrect login attempts. For more information, see *Password Management* and *Login Restrictions Management* in *Interface User's Guide*.

Managing Usergroups and Users

The OCEEMS provides a Security Administration interface to manage usergroups and users. Usergroups are created and OCEEMS operations (such as Security Administration and EAGLE Discovery) are assigned to the group. The operations assigned to a group indicate the operations to which users in the group are permitted access. A user can perform only the operations associated with the usergroup to which they belong.

The OCEEMS also offers usergroup management to limit and separate users' access authority to both commands and the managed equipment (for example, which EAGLE systems) they can access.

For more information, see *Management of Usergroups and Users* in *Interface User's Guide*.

SNMP Configuration

The OCEEMS can use the industry-standard Simple Network Management Protocol (SNMP) interface to send alarms as trap messages to an OCEEMS. Release 46.2 introduces a feature that provides SNMP v3 supports for OCEEMS North Bound Interfaces (NBIs). With this feature, the OCEEMS supports both SNMP v2c and SNMP v3 northbound.

Note: SNMP v3 is recommended and enabled by default.

In order to continue trap forwarding to the existing NMS(s) after the upgrade, it is recommended to update the NMS(s) to support SNMP v3 and then update the SNMP mode from v2c to v3 through the NMS configuration screen.

The three supported SNMP modes on the northbound interface include:

1. SNMP v2c Only Mode - the OCEEMS only supports SNMP v2c on the northbound interface.
2. SNMP v3 Only Mode - the OCEEMS only supports SNMP v3 on the northbound interface.
3. Both SNMP v2c and v3 Mode - the OCEEMS supports both SNMP v2c and SNMP v3 on the northbound interface.

For more information about SNMP Configuration, see *Interface User's Guide*.

Remove the need of root privileges to run/maintain/operate EEMS

Release 46.3 removes the need of super user 'root' for running the core OCEEMS application and the Reporting Studio. This feature allows non-root users on both the OCEEMS and Reporting Studio to perform start/stop/restart server operations, as well as update configuration files.

With this feature, the use of 'root' user is limited to OCEEMS installation/upgrade/uninstallation procedures only.

Once the OCEEMS or Reporting Studio installation/upgrade is completed and a non-root user for OCEEMS operations has been created using the `updatePrivilegesForUser.sh` script, the installer is required to logout of the root user session. Now only the configured non-root user is used for further initial configuration for OCEEMS (creation of the SSL certificate, installation of schema, running other required scripts, etc.) and for OCEEMS and Reporting Studio operations.

See *Interface User's Guide* for more information.

Create an OCEEMS SSL Certificate

To create an SSL certificate needed for HTTPS-based access for OCEEMS, the user must execute the `E5MSCertificateCreationScript.sh` script present in the `/Tekelec/WebNMS/bin` directory. During execution of the script, the user will be prompted for various inputs. The user must provide appropriate inputs (fitting the constraints) as highlighted in the following sample script execution:

```
[root@e5ms8 bin]# cd /Tekelec/WebNMS/bin
[root@e5ms8 bin]# sh E5MSCertificateCreationScript.sh
Welcome to OCEEMS SSL Certificate creation wizard!!!

Please provide OCEEMS home path (Absolute path till 'WebNMS' directory e.g.
/Tekelec/WebNMS): /Tekelec/WebNMS

Please provide the country name (e.g. US)-
(Must not be empty, permitted characters - alphabets and space): US

Please provide the state name (e.g. North Carolina)-
(Must not be empty, permitted characters - alphabets and space): North Carolina

Please provide the organization name (e.g. Oracle)-
(Must not be empty, permitted characters - alphanumeric, underscore, dot and
space): Oracle
```

```
Please provide the organization unit name (e.g. E5MS)-  
(Must not be empty, permitted characters - alphanumeric, underscore, dot and  
space): OCEEMS
```

```
Please provide the keystore password -  
(Must not be empty, length at least six, space not allowed, permitted characters-  
alphanumeric, !, @ and #):<provide a password fitting the constraints>
```

```
Please provide E5MS root user's password (used for E5MS client login):<>
```

```
Trying to generate encrypted password for keystore and trust store...
```

```
Creating certificates for BE in localhost server.  
Certificate stored in file </Tekelec/WebNMS/Certs/server.cer>  
Certificate was added to keystore  
The Certificates and key files were created in /Tekelec/WebNMS/Certs and copied  
into the respective conf directories  
Done.
```

```
Updating keystore and trust store password in transportProvider.conf file...
```

```
Passwords successfully updated.
```

E

EMS	<p>Element Management System</p> <p>The EMS feature consolidates real-time element management at a single point in the signaling network to reduce ongoing operational expenses and network downtime and provide a higher quality of customer service.</p>
EPAP	<p>EAGLE Application Processor</p>

L

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>
------	--

O

OCEEMS	<p>Oracle Communications EAGLE Element Management System</p> <p>An optional product in the Oracle Communications EAGLE product family that consolidates real-time element management functions at a centralized point within the signaling network.</p>
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S

S

SSL

Secure Socket Layer (SSL) is an industry standard protocol for clients needing to establish secure (TCP-based) SSL-enabled network connections

T

TLS

Transport Layer Security

A cryptographic protocol that provides security for communications over networks such as the Internet. TLS encrypts the segments of network connections at the transport layer end-to-end. TLS is an IETF standards track protocol.