

**Oracle® Communications Session Delivery
Manager**
Security Guide
Release 7.5

August 2016

Notices

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About This Guide

This document and other product-related documents are described in the Related Documentation table.

Related Documentation

Table 1: Oracle Communications Session Delivery Manager Documentation Library

Document Name	Document Description
Release Notes	Contains information about the administration and software configuration of the Oracle Communications Session Delivery Manager feature support new to this release.
Installation Guide	The Installation guide describes the process to install the Session Delivery Manager including both the typical installation process as well as the custom installation options.
Administration Guide	Contains information about security administration, which lets you create new users and new user groups, and set group-based authorization.
Security Guide	Provides the following security guidelines and topics: <ul style="list-style-type: none">• Guidelines for performing a secure installation of Oracle Communications Session Delivery Manager on your server, which includes methods for securing the server, firewall settings, system support for encryption and random number generators (RNG), using HTTPS, and password guidelines.• An overview of the Security Manager features that are used to configure groups, users, operations, privileges, and manage access to the system.• Security maintenance, which includes a checklist to securely deploy Oracle Communications Session Delivery Manager on your network, maintaining security updates, and security considerations for developers.

Table 2: Oracle Communications Session Element Manager Documentation Library

Document Name	Document Description
User Guide	Contains detailed information pertaining to the Session Element Manager application and describes the dashboard summary view, audit log, fault, and performance views.
Web Services SOAP XML Provisioning API Guide	Contains a full description of the individual interface definitions that make up the Application Programming Interface (API).

About This Guide

Table 3: Oracle Communications Report Manager Documentation Library

Document Name	Description
User Guide	Contains information about configuring Report Manager to interoperate with Oracle BI Publisher as well as creating reports on network devices.
Installation Guide	Contains instructions for installing Oracle Communications Report Manager as an Add-on to the Session Delivery Manager including the database and BI Publisher components.

Table 4: Oracle Communications Session Route Manager Documentation Library

Document Name	Description
User Guide	Contains documentation and about using the Session Route Manager with Oracle Communications Session Delivery Products.

Revision History

Date	Description
August 2015	<ul style="list-style-type: none">Initial release
April 2016	The following information was added to the Web Server Security section: <ul style="list-style-type: none">Maximum upload file size limitationsHTTP certificate supportHTTPS installation changes when installing your Web server.

About Session Delivery Manager

Oracle Communications Session Delivery Manager is a family of the following products, which are accessed through its GUI:

- The **Oracle Communication Session Element Manager** product is used to manage and optimize network infrastructure elements and their functions with comprehensive tools and applications used to provision fault, configuration, accounting, performance, and security (FCAPS) support for managed devices through the following sliders:
 - **Dashboard Manager**—Provides a dashboard summary view with at-a-glance device status and key performance indicators for your managed devices.
 - **Device Manager**—Applies basic administration of individual session delivery infrastructure devices or device groups to simplify the management of small to very large networks of session delivery infrastructure product devices.
 - **Configuration Manager**—Customizes your configuration of top-level elements by selecting from the following distinct configuration view styles that display a hierarchical view of session delivery infrastructure elements and their physical and logical components (physical interface, virtual interface, realm, signaling service, session agents, and so on).
 - **Fault Manager**—View events, alarms, and trap summary data.
 - **Performance Manger**—View SNMP, IP, environmental and other performance statistics collected from Oracle Communications Session Delivery products.
- The **Security Manager** (slider), which is allows a user with administrator privileges to do the following:
 - Create and manage users.
 - Create and manage groups.
 - Configure security authorization levels, policies and privileges for user groups.
 - Provide specific access controls for individual user groups, views, and operations.
 - Limit access to specific features and functionality for specific users.
 - Configure audit log parameters.
- The **Report Manager** product (slider) allows you to schedule and run dynamic reports on Oracle Communications Network Session Delivery and Control devices in your network.
- The **Route Manager** product (slider) allows you to update local route table (LRT) data on a single device or on multiple devices. You can also provision large LRTs across multiple SBCs and Session Routers for numeric-based routing.
- The Oracle Communications **Application Orchestrator** product (slider) provides a core management platform for communications service providers (CSPs). This platform supports a composite network function (CNF) that can be any combination of a virtualized network function (VNF) and physical network function (PNF) that runs as part of a network to provide one or more public, private, or hybrid cloud computing solutions.

Secure Installation Guidelines

This chapter outlines installation options for Oracle Communications Session Delivery Manager, and provides guidelines to install Oracle Communications Session Delivery Manager securely on your server. See your product installation guide for more information.

Secure the Server

You must secure the server before you install Oracle Communications Session Delivery Manager .

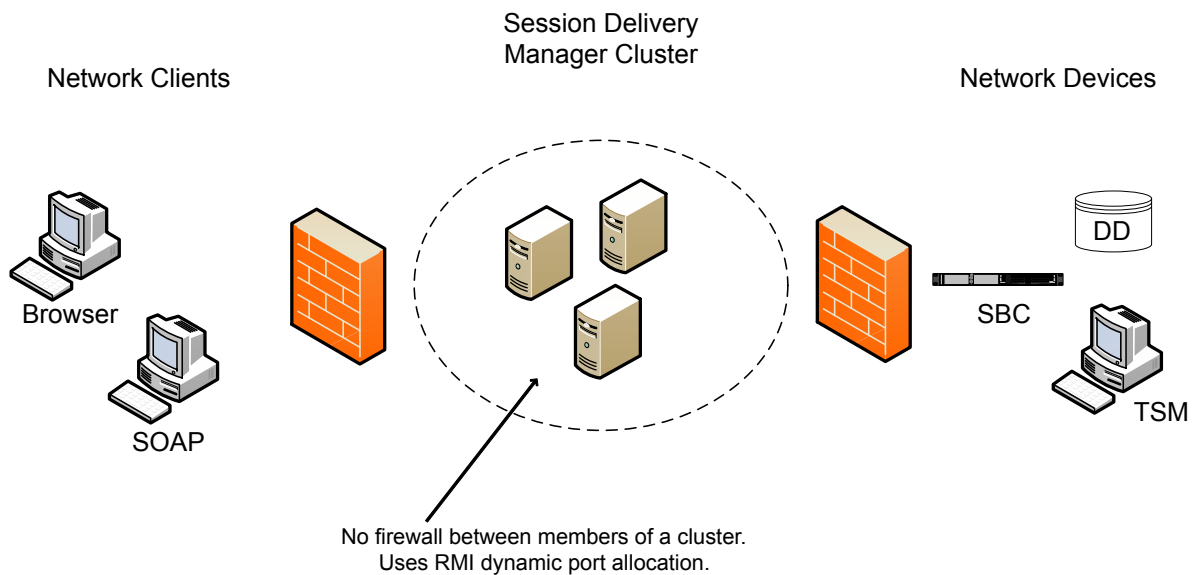
Use the following documents to help secure the server on which Oracle Communications Session Delivery Manager is installed:

- [Guide to the Secure Configuration of Red Hat Enterprise Linux 6](#)
- [Hardening Tips for the Red Hat Enterprise Linux 6](#)
- [Oracle Linux Security Guide for Release 6](#)
- [Tips for Hardening an Oracle Linux Server](#)
- [CentOS Wiki: OS Protection](#)

Check Firewall Settings

When setting up Oracle Communications Session Delivery Manager in your network, you may have a firewall between the clients (browsers, SOAP, etc.) and the Oracle Communications Session Delivery Manager cluster, and a firewall between the Oracle Communications Session Delivery Manager cluster and other devices (SBCs, Data Domain (DD), Terminal Server Manager (TSM)).

Secure Installation Guidelines



Note: You cannot have firewalls between the servers in a cluster.

If firewalls exist on either side of the Oracle Communications Session Delivery Manager cluster, ensure the ports listed in the following table are open. If your operating system comes with a firewall, you need to apply the same criteria. You must switch off the firewall in your operating system or ensure these ports are available.

Port Number	Protocol	Service	Configurable	Affects Firewall?	Purpose
Between Oracle Communications Session Delivery Manager Cluster and Network Clients					
8443	TCP	HTTPS	N	Y	Apache port. HTTPS port for client/server communication.
8080	HTTP	HTTP	N	Y	HTTP port for client/server communication.
Between Oracle Communications Session Delivery Manager Cluster and Network Devices					
161	UDP	SNMP	N	Y	SNMP traffic between the SDM server and the SBC.
162	UDP	SNMP	N	Y	SNMP trap reporting from the SBC to the Oracle Communications Session Delivery Manager server.
22/21	SFTP/FTP				Used for file transfer (such as Route Manager and LRT updates).
8080	HTTP	AMI	N	Y	Used by Oracle Communications Session Delivery Manager to communicate with 9200 devices via AMI.
5060	TCP		N	Y	Used for Oracle Communications Session Delivery Manager Trunk Manager (SIPTX) to communicate with SP-SBC.
3001/ 3000		ACP/ACLI			Used by Oracle Communications Session Delivery Manager to communicate with all

Port Number	Protocol	Service	Configurable	Affects Firewall?	Purpose
					versions of the SBC except for the Acme Packet 9200.
Between Oracle Communications Session Delivery Manager Servers in the Cluster					
1098	TCP	RMI	N	Y	RMI Communication between host members in a cluster.
1099	TCP	RMI Lookup	N	Y	RMI registry port. Used for the RMI communication between host members in a cluster.
5701	TCP	Hazelcast	N		Used by Hazelcast communication for distributed data structures, peer-to-peer collective data distribution.
5000/ 5801	TCP	Hazelcast	N	Y	Used by the Hazelcast management console port for the Oracle Communications Session Delivery Manager distributed scheduler service.
54327	UDP	Hazelcast	N	Y	Used by Hazelcast for cluster member discovery.
8005	TCP	HTTP	N	Y	Tomcat shutdown port used by the shutdown script. Can be blocked on a firewall because it is local to the Oracle Communications Session Delivery Manager server.
8009	TCP	Apache	N	Y	Tomcat port.
9000	TCP	Berkeley	N	Y	Berkeley database.
61616	TCP	Apache	N	Y	Message broker.
22	SFTP	ActiveMQ	N	Y	Used to transfer files between Oracle Communications Session Delivery Manager servers.

Either port 8080 (HTTP) or port 8443 (HTTPS) must be open on the firewall, depending on which port you choose between the network client and Oracle Communications Session Delivery Manager server. If installing on a Linux system, the Linux firewall must also have either 8080 (HTTP) or port 8443 (HTTPS) open.



Note: Ports are assigned dynamically via Remote Method Invocation (RMI) dynamic port allocation. If you are enabling and configuring iptables/ipf, all traffic must be allowed between servers in the cluster. Communication between clustered Oracle Communications Session Delivery Manager servers must not be restricted.

System Support for Encryption and Random Number Generators

The following table describes HTTPS web encryption, password encryption, and safe file transfer system support.

Secure Installation Guidelines

Algorithm(s)	Type	Bit Length	Description
MD5 and SHA-1	Asymmetric	128	Provides the following HTTPS encryption support: <ul style="list-style-type: none">• Weak cipher secure socket layer (SSL) Version 2.0• Strong cipher SSL 3.0• Strong Transport Layer Security (TLS) 1.0
OpenBSD-style Blowfish password hashing, described in "A Future-Adaptable Password Scheme" by Niels Provos and David Mazieres.	Symmetric	64	Encrypts stored passwords.
3des-cbc, aes128-cbc, aes192-cbc, aes256-cbc, aes128-ctr, aes192-ctr, aes256-ctr, 3des-ctr, arcfour, arcfour128, arcfour256	Asymmetric	128	Provides secure shell version 2 (SSH2) and secure file transfer protocol (SFTP) communications support for file transfer between servers, and between servers to devices.

Web Server Security

During the installation, when you are in the Typical Installation mode, HTTPS is selected for you (by default) as the running mode of your system. We recommend that you maintain the default (HTTPS) to create secure connections over the network. If you have a specific reason for not using the default, you can alternately select HTTP (unsecured). See the *Configure Web Server Security* section of your Oracle Communications Session Delivery Manager Installation Guide for more information.

HTTPS Certificate Support

Oracle Communications Session Delivery Manager fully supports X.509 certificates and the following certificate extensions are supported through HTTPS:

- .csr—Certificate signing request certificate used in public key infrastructure (PKI) systems.
- .cer—Internet security certificate (CER) in sockets layer (SSL) format that is used by web servers to help verify the identity and security of a site in question. SSL certificates are provided by a third-party security certificate authority such as VeriSign, GlobalSign or Thawte.
- .crt—Certificate is used with a web browser to verify the authenticity of a secure website, and is distributed by certificate authority (CA) companies such as GlobalSign, VeriSign and Thawte. CRT files allow a web browser to connect securely using SSL, and can be viewed by clicking the lock icon within your web browser.
- .der—Distinguished encoding rules certificate provides a method for encoding a data object, such as an X.509 certificate, to be digitally signed or to have its signature verified.


Set the Maximum Upload File Size Limit

You can optionally configure the upload file-size limit, from 2 to 100 gigabytes (GB), for certificate files being uploaded to the web server for its secure operation. See the *Configure Web Server Security* section of your Oracle Communications Session Delivery Manager Installation Guide for more information.

Southbound Interface Transport Layer Security

The southbound interface (SBI) transport layer security (TLS) feature is provided for session delivery network functions (NFs) like multiservice security gateway (MSG) and Enterprise Session Border Controllers that support Acme Control Protocol (ACP) over TLS. The SBI is the lower-level interface layer of a component that is directly

connected to the northbound interface (NBI) of this lower layer. Oracle Communications Session Delivery Manager primarily communicates with NFs over the communications link using ACP to add an additional layer of security.

 **Note:** Refer to the NF specifications to determine if it supports the SBI TLS feature.


- See the *Oracle Communications Session Delivery Manager Installation Guide* for more information about configuring the SBI TLS feature.
- See the *Certificate Authentication* chapter in the *Oracle Communications Session Delivery Manager* product documentation for more information about uploading a valid trusted certificate authority (CA) certificate to Oracle Communications Session Delivery Manager for NF authentication and establishing a TLS community.

Secure System Password Guidelines

No default passwords are used in the system, and the system ensures that permissions for generated files (such as temp files, configuration files, and log files) are as restrictive as possible so that they cannot be read or edited. During the system run time, all the passwords obtained, generated, stored, or transmitted are encrypted using password-based encryption (PBE).

Use the following guidelines to create user accounts during the Oracle Communications Session Delivery Manager installation:

1. Use default database accounts that are restricted for access to the local (Oracle) server only. This includes creating an **nncentral** group and **nncentral** user account to set permissions and lock file systems.
2. Create a sudo user account with limited privileges for running the SNMP Trap Relay port (162) for Fault Manager.

 **Note:** The main Oracle Communications Session Delivery Manager process has to run as a sudo user to access port 162.

3. Configure passwords for the **admin** and **Lladmin** user groups before starting Oracle Communications Session Delivery Manager.

Resiliency and High Availability

Oracle Communications Session Delivery Manager offers high availability and resiliency through clustering to create a secure deployment. When the product is deployed in a cluster, it protects the service of multiple individual members if one or more members fail. See your product installation guide for more information.

Security Manager Feature Overview

You can use the Oracle Communications Session Delivery Manager Security Manager slider to manage user accounts and maintain the authentication and authorization policies for each user.

This chapter provides an overview of the Security Manager features. See the *Oracle® Communications Session Delivery Manager Administration Guide* Security Manager chapter for more information about these features and how they are configured.

Security Manager

The Security Manager product allows a user with administrator privileges to do the following:

- Create and manage users.
- Create and manage groups.
- Configure security authorization levels, policies and privileges for user groups.
- Provide specific access controls for individual user groups, views, and operations.
- Limit access to specific features and functionality for specific users.
- Configure audit log parameters.

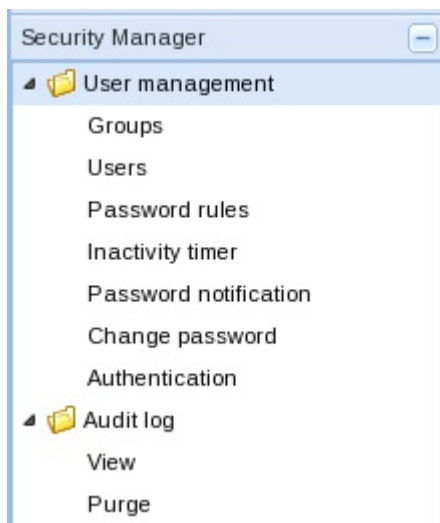


Figure 1: Security Manager Slider Parameters

User Groups

A user group is a logical collection of users grouped together to access common information or perform similar tasks. You assign specific permissions to a group and then assign users to it. Those users in turn, inherit the group-based permissions.

The following groups are created by default during the installation:

- **None**—Manually configure permissions for this user group.
- **administrators**—This super user group is privileged to perform all operations.
- **LIAdministrators**—This user group is privileged to perform most operations including Lawful Intercept (LI) configuration changes. These privileges do not include changing the default administrator user credentials. For example, users assigned to the default LI administration group cannot enable or disable accounts, change passwords, or expiration dates for other users in the default LI administration and administration groups.
- **provisioners**—This group is privileged to configure Oracle Communications Session Delivery Manager and save and apply the configuration with the exception of a LI configuration.
- **monitors**—This group is privileged to view configuration data and other types of data only. This group cannot configure Oracle Communications Session Delivery Manager, and has the fewest privileges.

Users

A user is a person who logs into the system to perform application-related operations. Before this user can access any operations, they must be added to a user group. Each user group has a defined set of privileges. The operations that a user can do depends on the privileges of the user group to which the user belongs.

Operations Tree Structure

The operations tree structure contains all the security configuration and administrative tasks you can perform in Oracle Communications Session Delivery Manager. It is logically arranged with parent and child operations that can be accessed once user group and user accounts are created. Individual access to a specific operation within the tree structure can be provided or denied by assigning a privilege to it. Although Oracle Communications Session Delivery Manager displays all the operations it supports, some apply only to users who are licensed for a specific application operation.

The top of the operations tree is the root. There can be one or more operation categories below the root that serve as parents for individual operations (children). The child privilege type of higher-level (or parent) operation is equal or less than the privilege type of its parent. When you change the privilege type of a parent, the child privilege type can change based on this rule. However, if the parent privilege type is returned to its previous privilege type, the child remains at the privilege type to which it was bumped and needs to be promoted manually.

Change Privileges for User Groups

By default, privileges are assigned to each category of a user group that allow or deny all users within this user group the ability to perform certain operations. You have the option to change the default privilege type for items in each category item of a pre-existing user group or a user group that you create allow or deny all users within this group the ability to perform certain operations. This includes items intended for use with separate application products that you are licensed to use.


Set the User Inactivity Timer to Prevent Unauthorized Access

We recommend configuring the inactivity timer to prevent unauthorized access to the system.

The inactivity timer logs off the user from the Oracle Communications Session Delivery Manager session when its value is exceeded. The user must re-enter their password to continue. You can set different values for a user with administrative permissions and users who do not have administrative permissions.

Audit Logs

You can use the audit log (containing audit trails) generated by Oracle Communications Session Delivery Manager to view performed operations information, which includes the time these operations were performed, whether they were successful, and who performed them when they were logged into the system.

 **Note:** Audit logs contain different information depending on its implementation.

Audit trails include the following information:


- The user who performed the operation.
- What operation was performed by the user.
- When the operation was performed by the user.
- Whether the operation performed by the user was successful or failed.

Configure External User Authentication

Users belonging to the external domain user group are authenticated outside of Oracle Communications Session Delivery Manager by an external domain server. You can select either a RADIUS domain server or Active Directory (AD) domain controller:

- A RADIUS server provides centralized Authentication, Authorization, and Auditing/Accounting (AAA) security protocol management for users who connect and use a network service.
- An AD domain controller provides a directory service in a Windows domain type network using Lightweight Directory Access Protocol (LDAP) versions 2 and 3, Microsoft's version of Kerberos, and DNS.

An external domain user group must be mapped to an internal (local) user group in Oracle Communications Session Delivery Manager so that this external domain user group and its users inherit the authorization privileges that are specific to the local user group. See the *Add and Map a Local User Group to an External Domain User Group* section of this chapter for more information.

 **Note:** Internal and external users are both supported simultaneously. However, external users do not have corresponding stored user records or username and password information.

Security Maintenance

Use the security maintenance practices in this chapter to keep Oracle Communications Session Delivery Manager secure.

Security Checklist

Use the following checklist to secure Oracle Communications Session Delivery Manager before, during and after its installation.

1. Do **NOT** connect your system to any untrusted networks, especially the Internet, until all protections have been configured. Customers have reported systems under configuration compromised within minutes due to incomplete configurations.
2. If you use identity management or single sign-on (SS) technologies, ensure that they are supported by security assertion markup language (SAML).
3. Harden the management environment.
 - a) Make sure all equipment is in locked cabinets or at least in a secure room.
 - b) Set strong passwords for all accounts and system users (nncentral user and nncentral group, sudo user, e-mail user, the admin user, Lladmin user etc.) during the installation.
 - c) During the system installation, use **HTTPS** (default) as the system running mode.
 - d) Use secure protocols, such as SFTP, HTTPS, LDAP and SSH, to communicate with Oracle Communications Session Delivery Manager.
4. Once Oracle Communications Session Delivery Manager is started, use the Security Manager to limit user privileges:
 - a) Carefully consider who has access to the **administrators** password.
 - b) Authenticate local groups and users that access the system. The system comes with the following default user groups: **monitor**, **provisioner**, **administrators**, and **Lladministrators**. Administrators have a complete set of permissions only, and the system provides role-based security policies for access control with dedicated user accounts that have pre-assigned privilege levels.
 - c) Authenticate and authorize external users through an existing RADIUS server or Active Directory (AD) server.
5. Configure the inactivity timer in Security Manager to stop the abuse of system services.
6. Use HP Fortify, HP WebInspect, and Tenable Nessus scans to perform static and dynamic security testing on Oracle Communications Session Delivery Manager periodically, or after each release.
7. Continue to monitor system activity to determine if someone is attempting to abuse system services and to detect if there is performance or availability problems. Useful monitoring information can be acquired through audit logs, system logs and SNMP.

Maintain Security Updates

You must install all security patch releases for Oracle Communications Session Delivery Manager software when they appear or as soon as possible to keep your system secure.

Oracle constantly reviews the latest security vulnerabilities, applies any required critical security patch (including any third-party components) to the Oracle Communications Session Delivery Manager software, and issues a security patch release with release notes that describe these updates. See the [Critical Patch Updates and Security Alerts](#) web page for these updates and other current security information. You can also use the instructions on this web page to receive email notifications for the following announcements:

- Critical Patch Updates
- Security Alerts
- Third Party Bulletins
- Fixed Public Vulnerabilities
- Policies
- Security Vulnerability Reports

Security Considerations for Developers

We highly recommend that application developers fully secure the link between the Web services application (Web service client) and follow secured coding standards.

Oracle Communications Session Delivery Manager offers a Web Service that is a SOAP/XML Provisioning Application Programming Interface (API), which allows users to write applications that automate the provisioning of network elements. Oracle Communications Session Delivery Manager Web Service consists of operations that can be performed against network elements managed by an Oracle Communications Session Delivery Manager server, and data structures used as input and output parameters for those operations. These operations are invoked by a client application to provision network elements.

See the *Oracle® Communications Session Element Manager Web Services SOAP/XML Provisioning API Guide, Release 7.5* for more information. This document also provides a full description of the individual interface definitions that make up the API.

Database Redundancy

Use backup and restore scripts to implement the database geographic (GEO) redundancy. See the *Oracle® Communications Session Delivery Manager Installation Guide, Release 7.5* Migrating Data chapter for more information.