

**Oracle® Communications
Diameter Signaling Router**

Subscriber Database Server Getting Started

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Oracle Communications Diameter Signaling Router Subscriber Database Server Getting Started

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Table of Contents

Chapter 1: About the Help	6
The SDS Help System.....	7
Help organization.....	7
Documentation Admonishments.....	8
Chapter 2: My Oracle Support (MOS)	10
Emergency Response.....	11
Related Publications.....	11
Locate Product Documentation on the Oracle Help Center Site.....	11
Chapter 3: About SDS	13
Introduction to SDS.....	14
SDS functionality.....	14
System Architecture.....	15
SDS Components.....	16
Distributed configuration.....	17
Centralized configuration.....	17
Glossary	21

List of Figures

Figure 1: SDS System Diagram.....	15
-----------------------------------	----

List of Tables

Table 1: Admonishments.....	8
Table 2: SDS Main Menu Options.....	18

Chapter 1

About the Help

Topics:

- [The SDS Help System.....7](#)
- [Help organization.....7](#)
- [Documentation Admonishments.....8](#)

This online help describes the Subscriber Database Server (SDS) application and is updated with each major release of the software.

The SDS Help System

Subscriber Database Server (SDS) provides the central provisioning of the Full-Address Based Resolution (FABR) data. The SDS, which is deployed geo-redundantly at a Primary and Disaster recovery site, connects with the Query server and the Data Processor Site Operation Administration and Maintenance (DP SOAM) servers at each diameter routing site or a standalone DP site to replicate and recover provisioned data to the associated components.

The Getting Started section of the Help provides an overview of the SDS and a description of how to use the Help. In this section you can find information about SDS including a product overview, the system architecture, and functions. Additionally, the Getting Started section familiarizes you with common GUI features including user interface elements, main menu options, supported browsers, and common user interface widgets.

Help organization

There are five items on the main menu. For a more detailed explanation of each GUI Menu option, see [Table 2: SDS Main Menu Options](#).

The following sections are components of the help system:

Getting Started

The Getting Started section of the documentation provides an overview of the SDS application and documentation. In this section you can find information about the SDS including a product overview, the system architecture, and functionality. Additionally, this section familiarizes you with common SDS GUI features including user interface elements, main menu options, supported browsers, and common user interface widgets.

Communication Agent

The Communication Agent section of the documentation describes the plug-in included with SDS that includes infrastructure features and services for enabling inter-server communication. This includes:

- Overview
- Configuration
- Maintenance

The Communication Agent GUI menu also lets you monitor the operational status of High-Availability (HA) Services Sub-Resources.

SDS Online Help

The SDS section of the documentation explains how to perform and manage configurations and maintain tasks using the SDS Menu options. These options include explanations for:

- Subscribers
- Blacklists
- Logs

- Imports and Exports
- Audits
- Queries
- Destinations
- Routing Entities
- NAI Hosts

SDS Alarms, KPIs, and Measurements (AKMs)

The SDS AKM section provides information relevant to understanding alarms and events that may occur in the SDS application; recovery procedures for addressing alarms and events, as necessary; tasks for viewing alarms and events, generating alarms reports, and viewing and exporting alarms and events history; and information, including any relevant customer actions for addressing unusual measurement values.

OAM

The Operations, Administration, and Maintenance (OAM) section of the documentation describes:

- Administration
- Configuration
- Alarms and Events
- Security Log
- Status and Manage
- Measurements

The OAM section of the documentation explains how to use these GUI pages to view and manage the basic operation, administration, and maintenance for the SDS.

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> .)

Icon	Description
 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>)

My Oracle Support (MOS)

Topics:

- [Emergency Response.....11](#)
- [Related Publications.....11](#)
- [Locate Product Documentation on the Oracle Help Center Site.....11](#)

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 Publications

For information about additional publications that are related to this document, refer to the *Related Publications* document. The *Related Publications* document is published as a part of the *Release Documentation* and is also published as a separate document on the Oracle Customer Support Site.

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 3

About SDS

Topics:

- [Introduction to SDS.....14](#)
- [System Architecture.....15](#)
- [Distributed configuration.....17](#)

This section of documentation describes the SDS application, its GUI, the system architecture, and centralized configuration.

Subscriber Database Server (SDS) provides the central provisioning of the Full-Address Based Resolution (FABR) data. The SDS, which is deployed geo-redundantly at a Primary and Disaster Recovery site, connects with the Query server and the Data Processor Site Operation Administration and Maintenance (DP SOAM) servers at each diameter routing site or a standalone DP site to replicate and recover provisioned data to the associated components.

Introduction to SDS

The SDS/DP system consists of a Primary Provisioning Site, a Disaster Recovery (DR) Provisioning Site, and up to 32 Signaling Site servers with redundant DP SOAM servers and up to 10 DP servers in each site. Each Provisioning Site has an active/standby pair of servers in a high availability (HA) configuration and an optional third server configured as a Query server.

The SDS/DP system is built upon the EAGLE XG Platform. This platform provides a variety of services such as site-based GUI, HA capabilities (active/standby switchover and DR switchover), and database functionality (replication, backup, restore).

Every server within the SDS/DP system collects measurements, alarms, and events data. Every server has the ability to send traps directly to the customer's SNMP Manager and can collect measurement data. This measurement data is merged up in reverse direction of replication. The DP measurements are sent to the Active DP SOAM server, which sends the measurements from all DP servers and itself to the Primary Provisioning Site's Active SDS.

This introduction will familiarize you with the basic operation, features, and components of SDS.

SDS functionality

Subscriber Database Server (SDS) provides the central provisioning of the Full-Address Based Resolution (FABR) data. The SDS, which is deployed geo-redundantly at a Primary and Disaster recovery site, connects with the Query Server and the Data Processor Site Operation Administration and Maintenance (DP SOAM) servers at each Diameter Signaling Router (DSR) site or a standalone DP site to replicate and recover provisioned data to the associated components.

SDS provides the following functionality:

- SDS Database – Stores subscriber data needed by the FABR application
- GUI-based provisioning
- Support SOAP over HTTP and XML over TCP as provisioning interfaces
- SQL Interface – At query server for query only
- CSV and/or XML-formatted export and import of database contents
- Real Time replication to:
 - Local standby server at Primary site
 - Local query server at Primary site
 - Each server at Disaster Recovery site
 - Each DP SOAM and DP at up to 32 sites
- DP - DB Processor – A server that has a replica of the SDS database and is available for query by FABR applications
- Automatic scheduled NPA Split processing
- Provisioning Measurements and KPIs
- Alarms, Events and Logs for all interfaces
- DB Audit - Replication audit within replicas and Active SDS, and remote audit between SDS and HLR Router
- Query server
- Backup and Restore of SDS database components

- Disaster Recovery SDS – Geo-diverse site
- Automated Performance Data Export (APDE)
- Manage and associate routing destinations for routing entities that represent Subscriber identities
- Monitor exceptions
- Subscriber identity grouping
- Blacklist support
- Address resolution – Full address, as well as prefix address support

System Architecture

SDS consists of an active/standby pair of SDS servers in an HA configuration, a third SDS server configured as a Query server, an optional DR SDS, redundant DP SOAM servers, and up to 10 DPs (Database Processor) servers. An SDS can have up to 32 sites, each capable of supporting up to 512 remote signaling points.

This figure provides an overview of the SDS architecture.

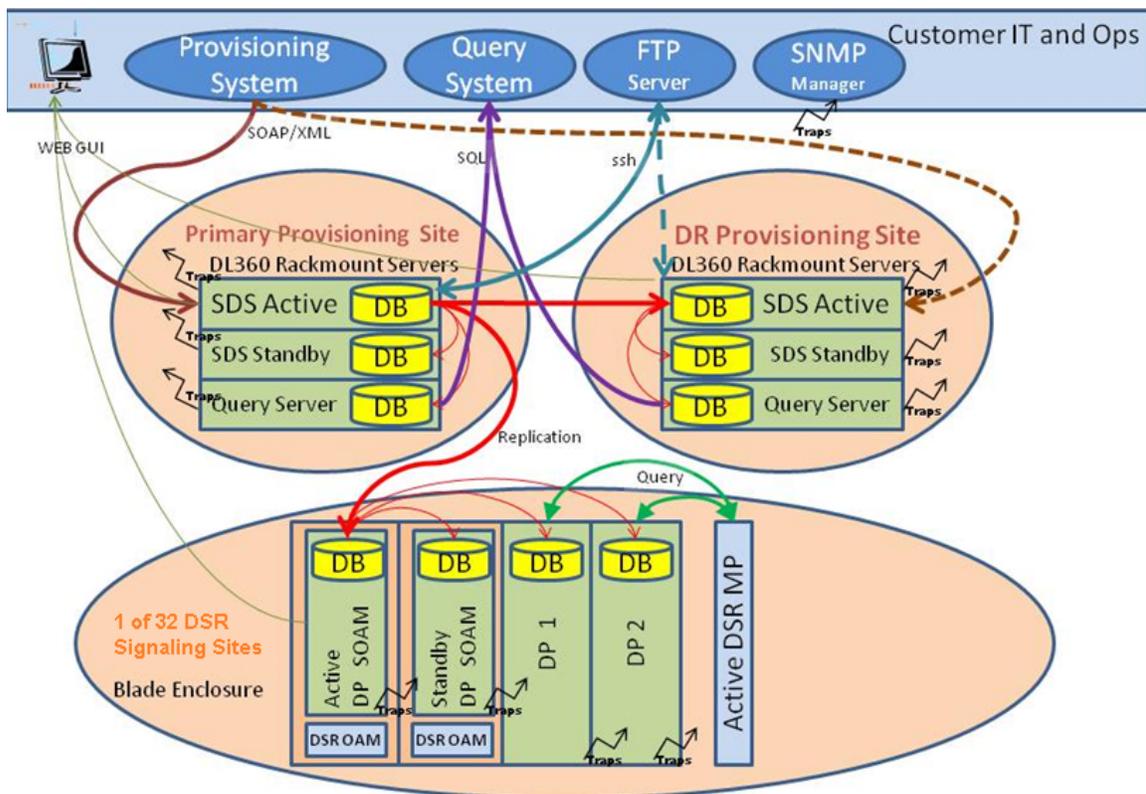


Figure 1: SDS System Diagram

SDS Components

SDS

The SDS has one active and one standby server running the SDS application and operating in a high availability configuration. It accepts subscriber data provisioned by the customer over SOAP or XML and replicates it to the DR SDS, the Query server, and all underlying servers. It also provides a GUI, which is used for configuration, user administration, and viewing alarms and measurements.

SDS distributes all successful incoming subscriber provisioning data, independent of source, to all downstream Network Elements (NEs) and to the DR SDS at a rate of up to 200 provisioning database updates per second. To ensure the database levels of the NEs are less than the database levels of the SDS and DR SDS, the active provisioning site SDS provisions the DR SDS before updating the NEs.

DR SDS

The DR SDS is a geographically independent SDS component. The DR SDS has the same hardware configuration and network accessibility as the primary SDS.

The DR SDS's databases are kept updated through real-time replication of subscriber and application data from the active primary SDS. Under normal operating conditions, the DR SDS does not provision any downstream systems, but if made active, it will take over all the functions of the active SDS including the provisioning and database replication to underlying DP SOAMs.

DP SOAM

The DP SOAM is the combination of an active and a standby application server running the DP SOAM application and operating in a high availability configuration. It accepts subscriber data replicated from the active primary SDS and in turn replicates it to all underlying DPs located in the same physical site. DP SOAM also provides a GUI used for viewing alarms and measurements details specific to components located within the site (DP SOAM, DP).

The DP SOAM supports up to 10 DPs.

Query Server

The Query server is an independent application server containing a replicated version of the provisioning database. It accepts replicated subscriber data from the active primary SDS and stores it in a customer accessible SQL interface. A Query server is located in the same physical site as each SDS component (SDS/DR SDS).

Network Element

NEs are containers that group and create relationships between servers in the network. There are two types of NEs:

- SDS: such as the SDS and the DR SDS
- DP SOAM: contains a pair of DP SOAM servers and one or more DP servers

The system can support two SDS NEs and up to 32 DP SOAM NEs.

DPs

The Data Processors (DPs) are servers with the SDS application installed that are configured for DP functionality. They accept replicated subscriber data from the local DP SOAM and store it in a subscriber database.

The DPs are used for processing queries from the Message Processor (MP) for destination address resolution. DP receives database queries that include user identities such as MSISDN, IMSI, or URI and destination types and return the resolved destination's address FQDN and/or realm values.

Each Signaling Site can support multiple DP servers deployed at a single site to scale query capacity (by increments of 140,000 QPS per DP). Each Signaling Site can support up to 10 DPs.

The DP servers all contain a copy of the same SDS data. They are configured in an active/active mode. The MP is responsible for load-balancing requests across DP servers.

Distributed configuration

The SDS supports centralized configurations where:

- All subscriber data configuration and maintenance occurs at the SDS level, and
- Application management, such as configuring servers, occurs at the SDS level.

Due to distributed configuration:

- All OAM Administration, Configuration, and Status & Manage tasks can only be performed when you are logged into an active primary SDS.
- SDS tasks related to the subscriber database are only available when logged into an active primary SDS, with the exception of querying the database.
- All Alarms, KPIs, Measurements, and Events are accessible from the SDS.

Centralized configuration

System configuration and subscriber data is provisioned at the active server of the Primary SDS cluster, replicated to all other SDS, and then replicated to the active DP SOAM of each Network Element.

SOAP/XML

The main method of subscriber data provisioning is SOAP or XML Interfaces. They allow one or several independent information systems supplied and maintained by the network operator to be used for provisioning databases and for configuring systems. Through the SOAP/XML interfaces, independent information systems may add, delete, change or retrieve information about any Routing Entities.

GUI Provisioning

Local provisioning can be done using the SDS GUI. The GUI can be used to manage Provisioning setup, to make direct changes to the subscriber database entries, and to perform application operations, management, and provisioning.

This table shows the GUI options available when logged into an SDS.

Table 2: SDS Main Menu Options

Menu Item	Function
Administration	All options available: <ul style="list-style-type: none"> • General Options • Access Control <ul style="list-style-type: none"> • Users • Groups • Sessions • Certificate Management • Authorized IPs • SFTP Users • Software Management <ul style="list-style-type: none"> • Versions • Upgrade • Remote Servers <ul style="list-style-type: none"> • LDAP Authentication • SNMP Trapping • Data Export • DNS Configuration
Configuration	All options available: <ul style="list-style-type: none"> • Network Elements • Network <ul style="list-style-type: none"> • Devices • Routes • Services • Servers • Server Groups • Resource Domains • Places • Place Associations • DSCP <ul style="list-style-type: none"> • Interface DSCP • Port DSCP
Alarms & Events	All options available: <ul style="list-style-type: none"> • View Active • View History • View Trap Log

Menu Item	Function
Security Log	All options available: <ul style="list-style-type: none"> • View History
Status & Manage	All options available: <ul style="list-style-type: none"> • Network Elements • Server • HA • Database • KPIs • Processes • Tasks <ul style="list-style-type: none"> • Active Tasks • Scheduled Tasks • Files
Measurements	All options available: <ul style="list-style-type: none"> • Report
Communication Agent	All options available: <ul style="list-style-type: none"> • Configuration <ul style="list-style-type: none"> • Remote Servers • Connection Groups • Routed Services • Maintenance <ul style="list-style-type: none"> • Connection Status • Routed Services Status • HA Services Status
SDS	All options available: <ul style="list-style-type: none"> • Configuration <ul style="list-style-type: none"> • Options • Connections • NAI Hosts • Destinations • Destination Map • Routing Entities • Subscribers • Blacklist • Maintenance <ul style="list-style-type: none"> • Connections

Menu Item	Function
	<ul style="list-style-type: none">• Command Log• Relay Exception Log• Import Status• Export Schedule• Export Status• Remote Audit• Query• NPA Splits

A

APDE Automated Performance Data Export

D

DP Data Processor
The repository of subscriber data on the individual node elements. The DP hosts the full address resolution database.

DP SOAM Data Processor System Operations, Administration, and Maintenance

DR Disaster Recovery

F

FABR Full Address Based Resolution
Provides an enhanced DSR routing capability to enable network operators to resolve the designated Diameter server addresses based on individual user identity addresses in the incoming Diameter request messages.

G

GUI Graphical User Interface
The term given to that set of items and facilities which provides you with a graphic means for manipulating screen data rather than being limited to character based commands.

H

HA High Availability
High Availability refers to a system or component that operates on a continuous basis by utilizing redundant connectivity, thereby circumventing unplanned outages.

HTTP Hypertext Transfer Protocol

N

NAI Network Access Identifier
The user identity submitted by the client during network authentication.

NE Network Element
An independent and identifiable piece of equipment closely associated with at least one processor, and within a single location.
In a 2-Tiered DSR OAM system, this includes the NOAM and all MPs underneath it. In a 3-Tiered DSR OAM system, this includes the NOAM, the SOAM, and all MPs associated with the SOAM.
The devices, servers, or functions within a wireless network with which Policy Management systems interact.

NPA Number Plan Area
The North American "Area Codes." (3 digits: 2- to-9, 0 or 1, 0-to-9. Middle digit to expand soon).

O

O

OAM

Operations, Administration, and Maintenance. These functions are generally managed by individual applications and not managed by a platform management application, such as PM&C.

Operations – Monitoring the environment, detecting and determining faults, and alerting administrators.

Administration – Typically involves collecting performance statistics, accounting data for the purpose of billing, capacity planning, using usage data, and maintaining system reliability.

Maintenance – Provides such functions as upgrades, fixes, new feature enablement, backup and restore tasks, and monitoring media health (for example, diagnostics).

S

SDS

Subscriber Database Server

Subscriber Database Server (SDS) provides the central provisioning of the Full-Address Based Resolution (FABR) data. The SDS, which is deployed geo-redundantly at a Primary and Disaster recovery site, connects with the Query Server and the Data Processor System Operations, Administration, and Maintenance (DP SOAM) servers at each Diameter Signaling Router (DSR) site or a standalone DP site to replicate and recover provisioned data to the associated components.

SNMP

Simple Network Management Protocol.

S

An industry-wide standard protocol used for network management. The SNMP agent maintains data variables that represent aspects of the network. These variables are called managed objects and are stored in a management information base (MIB). The SNMP protocol arranges managed objects into groups.

SOAM

System Operations,
Administration, and Maintenance

SQL

Structured Query Language

A special programming language for querying and managing databases.

T

TCP

Transmission Control Protocol

A connection-oriented protocol used by applications on networked hosts to connect to one another and to exchange streams of data in a reliable and in-order manner.

X

XML

eXtensible Markup Language

A version of the Standard Generalized Markup Language (SGML) that allows Web developers to create customized tags for additional functionality.