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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1

About the Help

Topics:

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 *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 describes GUI pages nested under the SDS Menu options. These GUI Menu options allow you to manage configurations as well as Audit, Query and Destination Routing Entities NAI Hosts maintenance. The SDS section of the documentation explains how to perform configuration and maintenance tasks using these GUI pages.

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

Chapter

2

My Oracle Support (MOS)

Topics:

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 Technology Network 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 *http://www.adobe.com*.

1. Access the Oracle Technology Network site at *http://docs.oracle.com*.
2. Click `Industries`.
3. Under the Oracle Communications subheading, click the `Oracle Communications documentation` link.
   The Oracle Communications Documentation page appears with Tekelec shown near the top.
4. Click the `Oracle Communications Documentation for Tekelec Products` link.
5. Navigate to your Product and then the Release Number, and click the `View` link (the Download link will retrieve the entire documentation set).
   A list of the entire documentation set for the selected product and release appears.

6. To download a file to your location, right-click the **PDF** link, select **Save target as**, and save to a local folder.

Chapter

3

About SDS

Topics:

This section of documentation describe 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 24 Signaling Site servers with redundant DP SOAM servers and up to 10 DP blades. Each Provisioning Site has an active/standby pair of servers in a high availability (HA) configuration and a third server configured as a Query Server.

The SDS/DP system is built upon the AppWorks 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. This functionality is provided by AppWorks. Every server sends its traps directly to the customer's SNMP Manager. Every server 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

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 format 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 24 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 24 sites, each capable of supporting up to 512 remote signaling points.

This figure provides an overview of the SDS architecture.
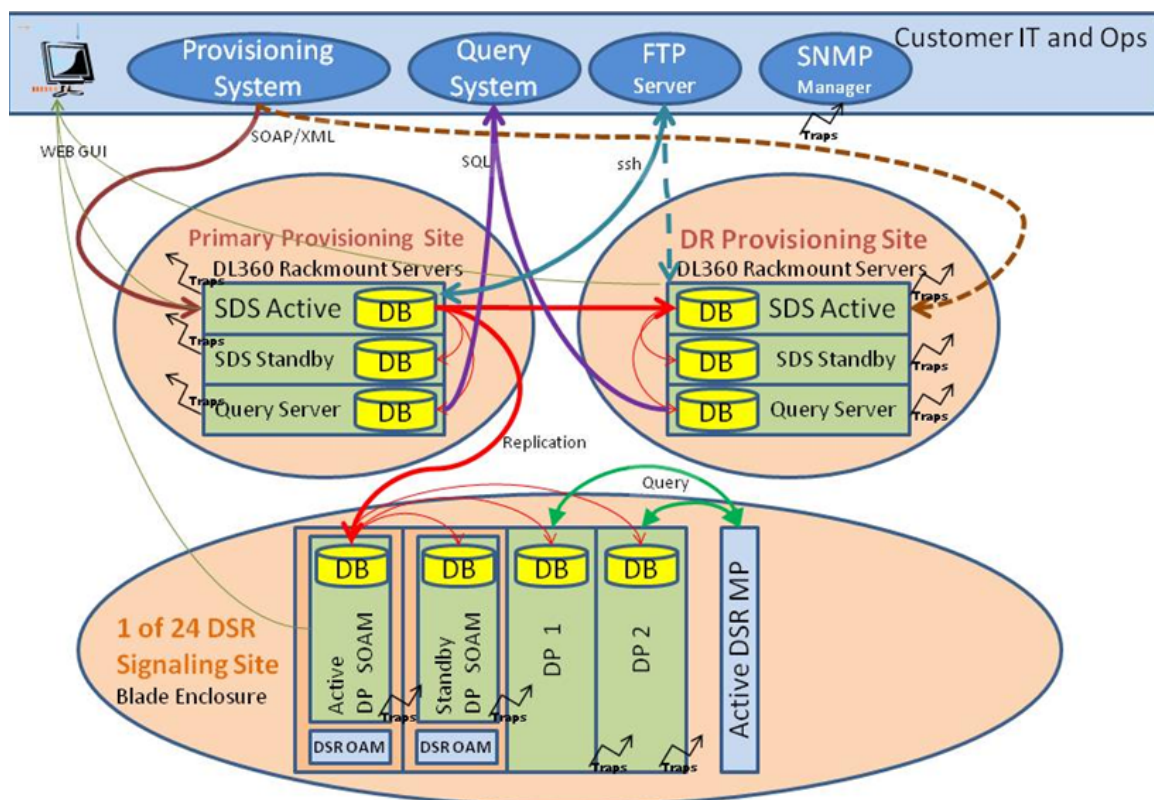
Figure 1: SDS System Diagram

SDS Components

SDS

The SDS is one active and one standby HP RMS 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 SDSes. It also provides a GUI which is used for configuration, user administration, and the viewing of 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 Network Elements are less than the database levels of the SDS and DR SDS, the active provisioning site SDS provisions the DR SDS prior to updating the Network Elements.

DR SDS

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

The DR SDS's databases are kept up to date through real-time replication of subscriber and application data from the Active 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 SDS and in turn replicates it to all underlying DPs located in the same physical frame. DP SOAM also provides a GUI used for local DP configuration and viewing alarms and measurements details specific to components located within the frame (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 SDS and stores it in a customer accessible MySQL database. A Query Server is located in the same physical frame as each SDS component (SDS / DR SDS).

Network Element

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

- 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 Network Elements and up to 24 DP SOAM Network Elements.

DPs

The Data Processors (DP) are HP C-Class blades 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 DP are servers 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 in a single frame in order to scale query capacity (by increments of 50,000 QPS per DP). Each Signaling Site can support up to 10 DPs; however, only 2 DPs are supported in the initial release.

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.

The DP server runs on a HP C-Class blade. The DP is deployed at each site on Data Processor (DP) blades with n+m redundancy. Initially n=1 and m=1.

Distributed configuration

The SDS supports centralized configurations:

- Centralized configuration:
    - All subscriber data configuration and maintenance occurs at the SDS level
    - 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 SDS.
- SDS tasks related to the subscriber database are only available when logged into an active SDS, with the exception of querying the database.
- All Alarms, KPIs, Measurements, and Events are accessible from the SDS.

Centralized configuration

Subscriber provisioning data is provisioned at the active server of the Primary SDS cluster and replicated to all servers on the network. 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 Destinations 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: • Users • Groups • Sessions • Single Sign-On • Authorized IPs • Options • SNMP • ISO • Upgrade • Software Versions • Export Server
Configuration	All options available: • Network Elements • Services • Resource Domains • Servers • Server Groups • Network
Alarms & Events	All options available: • View Active • View History • View Trap Log
Security Log	All options available: • View History
Status & Manage	All options available: • Network Elements • Server • HA • Database • KPIs • Processes • Tasks • Files
Measurements	All options available: • Report

Menu Item	Function
Communication Agent	All options available: • Configuration • Maintenance
SDS	Configuration: • Options • Connections • NAI Hosts • Destinations • Destination Map • Routing Entities • Subscribers • Blacklist Maintenance: • Connections • Command Log • Relay Exception Log • Import Status • Routing Entities • Export • Remote Audit • Query • NPA Splits

Chapter

4

User Interface Introduction

Topics:

This section describes the organization and usage of the application user interface. In it you can find information about how the interface options are organized, how to use widgets and buttons, and how filtering and other page display options work.

User interface organization

The user interface is the central point of user interaction with the application. It is a Web-based graphical user interface (GUI) that enables remote user access over the network to the application and its functions.

User Interface Elements

Table 3: User interface elements describes elements of the user interface.

Table 3: User interface elements

Element	Location	Function
Identification Banner	Top bar across the web page	Displays the company name, product name and version, and the alarm panel.
Session Banner	Next bar across the top of the web page	The left side of the banner just above the Main Menu provides the following session information: • The name of the machine to which the user is connected, and whether the user is connected via the VIP or directly to the machine. • The HA state of the machine to which the user is connected. • The role of the machine to which the user is connected. The right side of the banner: • Shows the user name of the currently logged-in user. • Provides a link to log out of the GUI.
Main Menu	Left side of screen, under banners	A tree-structured menu of all operations that can be performed through the user interface. The plus character (+) indicates that a menu item contains subfolders. • To display submenu items, click the plus character, the folder, or anywhere on the same line. • To select a menu item that does not have submenu items, click on the menu item text or its associated symbol.
Work Area	Right side of panel under status	Consists of three sections: Page Title Area, Page Control Area (optional), and Page Area. • **Page Title Area**: Occupies the top of the work area. It displays the title of the current page being

Element	Location	Function
		displayed, the date and time, and includes a link to context-sensitive help. • **Page Control Area**: Is located below the Page Title Area, and is used to show controls for the Page Area (this area is optional). When available for an option, filter controls display in this area. The Page Control Area contains the optional layout element toolbar, which displays different elements depending on which GUI page is selected. For more information, see *Optional Layout Element Toolbar*. • **Page Area**: Occupies the bottom of the work area. This area is used for all types of operations. It displays all options, status, data, file, and query screens. Information or error messages are displayed in a message box at the top of this section. A horizontal and/or vertical scroll bar is provided when the displayed information exceeds the page area of the screen. When a user first logs in, this area displays the application user interface page. The page displays a user-defined welcome message. To customize the message, see *Customizing the Splash Page Welcome Message*.

Main menu options

The menu options that appear on the screen differ according to whether you are logged into an SDS or DP SOAM. This table describes all main menu user interface options.For a list of SDS menu options please see *Centralized configuration*.

Note: The menu options can differ according to the permissions assigned to a user's log-in account. For example, the Administration menu options would not appear on the screen of a user who does not have administrative privileges.

Menu Item	Function
Administration	The Administration menu allows you to: • Set up and manage user accounts • Configure group permissions • View session information • Authorize IP addresses to access the user interface • Configure options including, but not limited to, password history and expiration, login message, welcome message, and the number of failed login attempts before an account is disabled • Configure SNMP services

Menu Item	Function
	• Validate and transfer ISO files • Prepare, initiate, monitor, and complete upgrades • View the software versions report
Configuration	Provides access to configuring network elements, servers, server groups, and systems.
Alarms & Events	Lists active alarms and alarm history.
Security Log	Allows you to view and export security log data.
Status & Manage	Allows you to monitor the statuses of server processes, both collectively and individually, as well as perform actions required for server maintenance. Also allows you to view the status of file management systems, and to manage data files on servers throughout the system.
Measurements	Allows you to view, modify, import, and export measurement data.
Communication Agent	Provides infrastructure features and services for enabling inter-server communication.
SDS	Provides maintenance and configuration options related to SDS.
Help	Launches the online help system for the user interface.
Logout	Allows you to log out of the user interface.

Common Graphical User Interface Widgets

Common controls allow you to easily navigate through the system. The location of the controls remains static for all pages that use the controls. For example, after you become familiar with the location of the display filter, you no longer need to search for the control on subsequent pages because the location is static.

System Login Page

Access to the user interface begins at the System Login page. The System Login page allows users to log in with a username and password and provides the option of changing a password upon login. The System Login page also features a current date and time stamp and a customizable login message.

The user interface is accessed via HTTPS, a secure form of the HTTP protocol. When accessing a server for the first time, HTTPS examines a web certificate to verify the identity of the server. The configuration of the user interface uses a self-signed web certificate to verify the identity of the server. When the server is first accessed, the supported browser warns the user that the server is using a self-signed

certificate. The browser requests confirmation that the server can be trusted. The user is required to confirm the browser request.

Customizing the Login Message

Before logging in, the **System Login** page appears. You can create a login message that appears just below the **Log In** button on the **System Login** page.

Figure 2: Oracle System Login

1. From the **Main Menu**, select **Administration > General Options**.

   The **General Options Administration** page appears.

2. Locate **LoginMessage** in the **Variable** column.
3. Enter the login message text in the **Value** column.
4. Click **OK** or **Apply** to submit the information.

   A status message appears at the top of the Configuration Administration page to inform you if the operation was successful.

The next time you log in to the user interface, the login message text is displayed.

Supported Browsers

This application supports the use of Microsoft® Internet Explorer 8.0, 9.0, or 10.0.

Main Menu Icons

This table describes the icons used in the **Main Menu**.

Table 4: Main Menu icons

Icon	Name	Description
	Folder	Contains a group of operations. If the folder is expanded by clicking the plus (+) sign, all available operations and sub-folders are displayed. Clicking the minus (-) will collapse the folder.
	Config File	Contains operations in an Options page.
	File with Magnifying Glass	Contains operations in a Status View page.
	File	Contains operations in a Data View page.
	Multiple Files	Contains operations in a File View page.
	File with Question Mark	Contains operations in a Query page.
	User	Contains operations related to users.
	Group	Contains operations related to groups.
	Help	Launches the Online Help.
	Logout	Logs the user out of the user interface.

Work Area Displays

In the user interface, you will see a variety of page formats. Tables, forms, tabbed pages, and reports are the most common formats in the user interface.

Note: Screenshots are provided for reference only and may not exactly match a specific application's GUI.

Tables

Paginated tables describe the total number of records being displayed at the beginning and end of the table. They provide optional pagination with **First | Prev | Next | Last** links at both the beginning and end of this table type. Paginated tables also contain action links on the beginning and end of each row. For more information on action links and other page controls, see *Page Controls*.

Figure 3: Paginated table

Scrollable tables display all of the records on a single page. The scroll bar, located on the right side of the table, allows you to view all records in the table. Scrollable tables also provide action buttons that operate on selected rows. For more information on buttons and other page controls, see *Page Controls*.

Figure 4: Scrollable table

Note: Multiple rows can be selected in a scrollable table. Add rows one at a time using CTRL-click. Add a span of rows using SHIFT-click.

Forms

Forms are pages on which data can be entered. Forms are typically used for configuration. Forms contain fields and may also contain a combination of pulldown lists, buttons, and links.

Figure 5: Form page

Tabbed pages

Tabbed pages provide collections of data in selectable tabs. Click on a tab to see the relevant data on that tab. Tabbed pages also group Retrieve, Add, Update, and Delete options on one page. Click on the relevant tab for the task you want to perform and the appropriate fields will populate on the page. Retrieve is always the default for tabbed pages.

Figure 6: Tabbed pages

```
Retrieve    Add    Update    Delete

Fields marked with a red asterisk (*) require a value.

    Field              Value                    Description
Network Entity  [                ]  *  Numeric identifier for the Network Entity
                                        1-15 DIGITS

    Retrieve
```

Figure 7: Tabbed pages

Reports

Reports provide a formatted display of information. Reports are generated from data tables by clicking the **Report** button. Reports can be viewed directly on the user interface, or they can be printed. Reports can also be saved to a text file.

```
================================================================================

User Account Usage Report

================================================================================

Report Generated: Fri Jun 19 19:30:55 2009 UTC
From: Unknown Network OAM&P on host teks5001701
Report Version: 1.0
User: guiadmin


--------------------------------------------------------------------------------

Username        Date of Last Login    Days Since Last Login   Account Status
---------------  --------------------  ---------------------  ---------------
guiadmin         2009-06-19 19:00:17   0                      enabled


--------------------------------------------------------------------------------

End of User Account Usage Report

================================================================================
```

Figure 8: Report output

Customizing the Splash Page Welcome Message

When you first log in to the user interface, the **User Interface** splash page appears. You can display a customized welcome message on the **User Interface** splash page. Use this procedure to customize the message.

1. From the **Main Menu**, select **Administration > General Options**.

   The **General Options Administration** page appears.

2. Locate **WelcomeMessage** in the **Variable** column.

3. Enter the welcome message text in the **Value** column.

4. Click **Update OK** or **Apply** to submit the information.

   A status message appears at the top of the Configuration Administration page to inform you if the operation was successful.

The next time you log in to the user interface, the welcome message text is displayed.

Column headers (sorting)

Some column headers are links that, when clicked, sort the table by that column. Sorting does not affect filtering. Column headers that are black and group column headers are not sortable.

Figure 9: Sortable and Non-sortable Column Headers

Page Controls

User interface pages contain controls, such as buttons and links, that perform specified functions. The functions are described by the text of the links and buttons.

Note: Disabled buttons are grayed out. Buttons that are irrelevant to the selection or current system state, or which represent unauthorized actions as defined in **Group Administration**, are disabled. For example, **Delete** is disabled for users without Global Data Delete permission. Buttons are also disabled if, for example, multiple servers are selected for an action that can only be performed on a single server at a time.

Table 5: Example Action buttons contains examples of Action buttons.

Table 5: Example Action buttons

Action button	Function
Insert	Insert data into a table
Edit	Edit data within a table
Delete	Delete data from table
Change	Change the status of a managed object

Some Action buttons take you to another page.

Submit buttons, described in *Table 6: Submit buttons*, are used to submit information to the server. The buttons are located in the page area and accompanied by a table in which you can enter information.

The submit buttons, except for **Cancel**, are disabled until you enter some data or select a value for all mandatory fields.

Table 6: Submit buttons

Submit button	Function
OK	Submits the information to the server, and if successful, returns to the View page for that table.
Apply	Submits the information to the server, and if successful, remains on the current page so that you can enter additional data.
Cancel	Returns to the View page for the table without submitting any information to the server.

Optional Layout Element Toolbar

The optional layout element toolbar appears in the Page Control Area of the GUI.
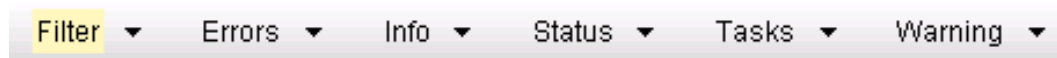
Figure 10: Optional Layout Element Toolbar

The toolbar displays different elements depending on which GUI page is selected. The elements of the toolbar that can appear include:

• Filter - Allows you to filter data in a table.
• Errors - Displays errors associated with the work area.
• Info - Displays information messages associated with the work area.
• Status - Displays short status updates associated with the main work area.
• Warning - Displays warnings associated with the work area.

Notifications

Some messages require immediate attention, such as errors and status items. When new errors occur, the Errors element opens automatically with information about the error. Similarly, when new status items are added, the Status element opens. If you close an automatically opened element, the element stays closed until a new, unacknowledged item is added.

Figure 11: Automatic Error Notification

Note: Viewing and closing an error does not clear the Errors element. If you reopen the Errors element, previously viewed errors are still in the list.

When new messages are added to Warning or Info, the styling of the element changes to indicate new messages are available. The styling of the Task element changes when a task changes state (such as, a task begins or ends).

Opening an Element in the Toolbar
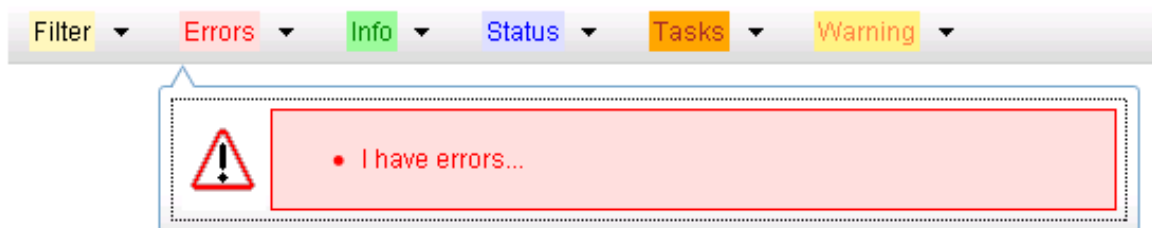
Use this procedure to open an element in the optional layout element toolbar.

1. Click the text of the element or the triangle icon to open an element.
   The selected element opens and overlays the work area.
2. Click **X** to close the element display.

Filters

Filters are part of the optional layout element toolbar and appear throughout the GUI in the Page Control Area. For more information about optional layout element toolbar functionality, see *Optional Layout Element Toolbar*.

Filters allow you to limit the data presented in a table and can specify multiple filter criteria. By default, table rows appear unfiltered. Three types of filters are supported, however, not all filtering options are available on every page. The types of filters supported include:

• Network Element - When enabled, the Network Element filter limits the data viewed to a single Network Element.

   Note: Once enabled, the Network Element filter will affect all pages that list or display data relating to the Network Element.

• Collection Interval - When enabled, the collection interval filter limits the data to entries collected in a specified time range.
• Display Filter - The display filter limits the data viewed to data matching the specified criteria.

Once a field is selected, it cannot be selected again. All specified criteria must be met in order for a row to be displayed.

The style or format of filters may vary depending on which GUI pages the filters are displayed. Regardless of appearance, filters of the same type function the same.

Figure 12: Examples of Filter Styles

Filter Control Elements

This table describes filter control elements of the user interface.

Table 7: Filter control elements

Operator	Description
=	Displays an exact match.
!=	Displays all records that do not match the specified filter parameter value.
>	Displays all records with a parameter value that is greater than the specified value.
>=	Displays all records with a parameter value that is greater than or equal to the specified value.
<	Displays all records with a parameter value that is less than the specified value.
<=	Displays all records with a parameter value that is less than or equal to the specified value.
Like	Enables you to use an asterisk (*) as a wildcard as part of the filter parameter value.
Is Null	Displays all records that have a value of **Is Null** in the specified field.

Note: Not all filterable fields support all operators. Only the supported operators will be available for you to select.

Filtering on the Network Element

The global Network Element filter is a special filter that is enabled on a per-user basis. The global Network Element filter allows a user to limit the data viewed to a single Network Element. Once enabled, the global Network Element filter affects all sub-screens that display data related to Network Elements. This filtering option may not be available on all pages.

1. Click **Filter** in the optional layout element toolbar.
   The filter tool appears.
2. Select a Network Element from the **Network Element** pulldown menu.
3. Click **Go** to filter on the selection, or click **Reset** to clear the selection.

Records are displayed according to the specified criteria.

Filtering on Collection Interval

The Collection Interval filter allows a user to limit the data viewed to a specified time interval. This filtering option may not be available on all pages.

1. Click **Filter** in the optional layout element toolbar.
   The filter tool appears.
2. Enter a duration for the **Collection Interval** filter.
   The duration must be a numeric value.
3. Select a unit of time from the pulldown menu.

The unit of time can be seconds, minutes, hours, or days.

4. Select **Beginning** or **Ending** from the pulldown menu.

5. Click **Go** to filter on the selection, or click **Reset** to clear the selection.

Records are displayed according to the specified criteria.

Filtering using the Display Filter

Use this procedure to perform a filtering operation. This procedure assumes that you have a data table displayed on your screen. This process is the same for all data tables. However, all filtering operations are not available for all tables.

1. Click **Filter** in the optional layout element toolbar.

    The filter tool appears.

2. Select a field name from the **Display Filter** pulldown menu.

    This selection specifies the field in the table that you want to filter on. The default is **None**, which indicates that you want all available data displayed.

    The selected field name displays in the **Display Filter** field.

3. Select an operator from the operation selector pulldown menu.

    The selected operator appears in the field.

4. Enter a value in the value field.

    This value specifies the data that you want to filter on. For example, if you specify Filter=Severity with the equals (=) operator and a value of MINOR, the table would show only records where Severity=MINOR.

5. For data tables that support compound filtering, click the **Add** button to add another filter condition. Then repeat steps 2 through 4.

    Multiple filter conditions are joined by an AND operator.

6. Click **Go** to filter on the selection, or click **Reset** to clear the selection.

Records are displayed according to the specified criteria.

Auto refresh controls

Auto refresh controls are widgets that control the rate at which the Page Area refreshes on some pages. They are located in the Page Control Area on the right side. Auto refresh can be set to **15** seconds or **30** seconds, and it can be turned off. The changes take effect immediately.

Click one of the Auto Refresh options to set the auto refresh rate. Click the **Off** option to terminate automatic refreshing of the page.

Auto Refresh : 15 | 30 | Off

Pause Updates

Some pages refresh automatically. Updates to these pages can be paused by selecting the **Pause updates** checkbox. Uncheck the **Pause updates** checkbox to resume automatic updates. The **Pause updates** checkbox is available only on some pages.

Max Records Per Page Controls

Max Records Per Page is used to control the maximum number of records displayed in the page area. If a page uses pagination, the value of Max Records Per Page is used. Use this procedure to change the Max Records Per Page.

1. From the **Main Menu**, select **Administration > General Options**.

    The **General Options Administration** page appears.

2. Change the value of the **MaxRecordsPerPage** variable.

    Note: MaxRecordsPerPage has a range of values from 10 to 100 records. The default value is 20.

3. Click **OK** or **Apply**.

   OK saves the change and returns to the previous page.

    Apply saves the change and remains on the same page.

The maximum number of records displayed is changed.

Message display

A message appears at the top of the Work Area on a page when a process needs to communicate errors or information. When an event is in progress, a refresh link may be provided here so that you can refresh without having to use the browser's refresh function

These are examples of some of the messages that can appear in a Work Area:

Glossary
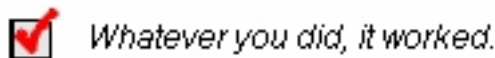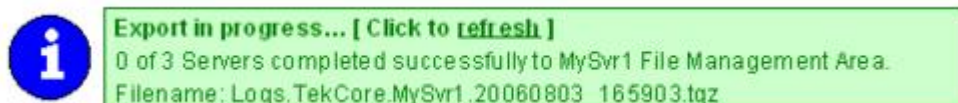
A

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 provide the user 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

Nature of Address Indicator

Standard method of identifying users who request access to a network.

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.

Network Entity

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

The application that operates the Maintenance and Administration Subsystem that controls the operation of many products.

R

RMS

RAM Management Services
Rack Mount Server

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.

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.

S

SOAM

System Operations, Administration, and Maintenance

Site Operations, Administration, and Maintenance

SQL

Structured Query Language

A special programming language for querying and managing databases.

T

TCP

Transfer-Cluster-Prohibited

Transfer Control Protocol

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.