

## **Oracle® Communications**

Diameter Signaling Router Getting Started

Release 8.3

**E88995**

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# About the Help

The online help describes the functions of a diameter signaling router, and provides procedures and explanations of the GUI used to configure the application components. The online help is updated with each major release of the software.

## The Online Help System

The online help system:

- Provides a conceptual overview of the application, including its purpose, architecture, and functionality
- Describes the pages and fields on the GUI
- Describes tasks that can be performed using the GUI
- Provides descriptions of and recovery procedures for alarms and events
- Provides descriptions of and procedures for generating reports for measurements and KPIs
- Explains system configuration and administration

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

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**Note:** Some content may refer to future functionality; if you do not see information on your window that matches the Help contents, please contact your Oracle Sales Representative or Customer Support.

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## Help Organization

The online help is organized into the following sections, each covering a different aspect of the application. For a more detailed explanation of each GUI Menu item, see [Main Menu Options](#).

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**Note:** The items and order may vary depending on your installation's configuration.

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## **Getting Started**

The Getting Started section of the Help provides an overview of the DSR, including a product overview, the system architecture, and functions. Additionally, this section describes common GUI features, including user interface elements, main menu options, supported browsers, and common user interface widgets.

## **Diameter**

The Diameter section of the Help describes GUI pages nested under the Diameter menu. In this section you can find information about how to perform tasks that allow you to manage the configuration and maintenance of Diameter components, including Local and Peer Nodes, Connections, Peer Routing Rules, Application Routing Rules, System and DNS Options, Topology Hiding, and Troubleshooting with IDIH Traces and Options.

## **Diameter Common**

The Diameter Common section of the Help explains how to use the Diameter Common GUI pages to configure components used by more than one application, including the Dashboard (Metric Groups, Metric Threshold Configuration Sets, Dashboard network Elements, Dashboard Networks), Network Identifiers (MCC Ranges, MCCMNC, and MCCMNC Mapping) , and MPs (Profiles and Profile Assignments). The Help also describes the use of the Bulk Import and Export functions for exporting Diameter, IPFE, MAP-Diameter Interworking, and application configuration data on demand and at scheduled intervals; and for importing configuration data from exported files.

## **Communication Agent**

The Communication Agent (ComAgent) section of the Help describes GUI pages for Communication Agent configuration and maintenance. This section contains information about configuring Remote Servers, Connection Groups, and Routed Servers; and information about maintaining configured Connections.

## **IP Front End (IPFE)**

The IPFE section of the Help describes GUI pages for the IP Front End application. This section contains information about how to configure IPFE to distribute IPv4 and IPv6 connections from multiple clients to multiple Diameter Agent Message Processors (DA-MPs).

## **Diameter Mediation**

The Diameter Mediation section of the Help describes GUI pages for Diameter Mediation on how to configure and test Rule Templates, how to use the Formatting Value Wizard, and how to configure Rule Sets.

## **Policy and Charging Application (PCA)**

The Policy and Charging Application section of the Help describes the GUI pages on the NOAM and the SOAM for Policy DRA (P-DRA) functionality and Online Charging DRA (OC-DRA) functionality, as well as the Session Binding Repository. This section includes information about configuring General Options, SBR Databases, Access Point Names, SBR Database Resizing Plans, SBR Data Migration Plans, PCRFs, Binding Key Priority, PCRF Pooling and Sub-Pooling, Policy Clients, Suspect Binding Removal Rules, Site Options, Network-Wide Options, OCSs, CTFs, OCS Sessions States, Realms, Error Codes, Alarm Settings, and Congestion Options; viewing maintenance data for the Session Binding Repository (SBR), SBR Database, and SBR Database Reconfiguration; and using the Policy Database Query tool.

The Policy and Charging Application (PCA) supports both Policy DRA (P-DRA) functionality and Online Charging DRA (OC-DRA) functionality. PCA was called P-DRA before the inclusion of OC-DRA functionality

### **Range-Based Address Resolution (RBAR)**

The Range-Based Address Resolution section of the Help describes GUI pages for the Range-Based Address Resolution (RBAR) application. This section contains information about how to perform tasks that allow you to route Diameter end-to-end transactions based on Diameter Application ID, Command Code, Routing Entity Type, and Routing Entity address ranges and individual addresses.

### **Full-Address Based Resolution (FABR)**

The Full-Address Based Resolution section of the Help describes GUI pages for the Full-Address Based Resolution (FABR) application. This section contains information about how to perform tasks that allow you to resolve the designated Diameter server (IMS, HSS, LTE HSS, PCRF, OCS, OFCE, and AAA) addresses based on Diameter Application ID, Command Code, Routing Entity Type, and Routing Entity addresses.

### **Session Binding Repository (SBR)**

The Session Binding Repository Help section of the Help describes GUI pages for the Session Binding Repository (SBR) application. This section contains information about how to perform tasks that allow you to configure, edit system options, and elements for SBR-related elements. Additionally, on the NOAMP, you can to perform maintenance tasks, edit options, and view elements for SBR-related maintenance elements.

### **Integrated Diameter Intelligence Hub (IDIH)**

The IDIH section of the Help describes the configuration and use of the Integrated Diameter Intelligence Hub (IDIH). Detailed information about selected Diameter transactions can be captured and transmitted to IDIH for further analysis and to troubleshoot issues while processing traffic within the routing application.

### **DSR Administration**

The Administration section describes architecture, functions, configuration, and tools and utilities (IPsec, bulk import and export of configuration data, IDIH, and database backups); and provides references to other publications for more detailed information.

### **Alarms and KPIs**

This section provides the details for alarms, events, and KPIs and includes actions you can take to resolve an alarm or event.

### **Measurements**

This section provides the details for measurements and includes actions you can take to resolve an unusual Diameter measurement value.

### **Platform Operations, Administration, and Maintenance (OAM)**

The Platform OAM section of the Help describes the Operation, Administration, and Maintenance, and the GUI pages nested under the Administration, Configuration, Alarms & Events, Security Log, Status & Manage, and Measurements menu options. OAM Help explains how to use these GUI pages to view and manage the basic operation, administration, and maintenance for the application.

### **Machine to Machine Interface (MMI)**

Machine to Machine Interface API describes the Machine to Machine Interface (MMI) for DSR. The DSR MMI is a RESTful (Representational State Transfer) interface

providing access to a broad range of Operations, Administration, and Maintenance (OAM) services that clients use to configure and manage the DSR. Resources supported include the Administration, Topology, Monitoring, and Diameter. This document is the comprehensive API reference guide to the RESTful services the DSR makes available to clients through the DSR MMI. To access the MMI API documentation through a direct URL access, without login, go to <http://<IP address of NOAM or SOAM>/raml/mmi.html>. Or the MMI API documentation can be accessed directly from the DSR GUI by clicking on the new MMI API Guide menu item. API documentation can also be accessed by going to the latest DSR release on OHC at <https://docs.oracle.com/en/industries/communications/diameter-signaling-router/index.html>, downloading the MMI API Specification ZIP file, and accessing the [html/mmi.html](#) inside the ZIP file.

MMI allows you to access several applications including:

- Virtual Signaling Transfer Point (vSTP)
- Service Capability Exposure Function (SCEF) includes the Oracle Communications Services Gatekeeper (OCSG) sometimes referred to as API Gateway (APIGW)
- Virtual Network Functions Manager (VNFM)

### **Virtual Signaling Transfer Point (vSTP)**

This section of Help describes the Virtual Signaling Transfer Point (vSTP) application, which uses signaling experience from both the Oracle Communication EAGLE STP and the vDSR products to build a common signaling platform for unified signaling solutions.

### **Service Capability Exposure Function (SCEF)**

This section of Help describes the SCEF application, which interacts with, and implements control on, Internet of Things (IoT) devices. The SCEF is the key entity within the 3GPP architecture for service capability exposure that provides a means to securely expose the services and capabilities provided by 3GPP network interfaces.

### **Oracle Communications Services Gatekeeper (OCSG)**

This section of Help is located in the appendix of the SCEF help section. OCSG configuration for the OCSG database server, admin server, and an application server is provided in this section.





### **Virtual Network Functions Manager (VNFM)**

The VNFM automates lifecycle operations for Virtual Network Functions (VNFs) under the control of the NFV Orchestrator. Two VNFs (one for the network OAM VNF and one for the signaling VNF) are required to deploy DSR. The DSR VNFM application helps deploy virtual DSRs quickly by automating the deployment process.

## **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 1-1 Admonishments**

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



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## My Oracle Support (MOS)

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

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

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

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

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

### Emergency Response

In the event of a critical service situation, emergency response is offered by the Customer Access Support (CAS) main number at 1-800-223-1711 (toll-free in the US), or by calling the Oracle Support hotline for your local country from the list at <http://www.oracle.com/us/support/contact/index.html>. The emergency response provides immediate coverage, automatic escalation, and other features to ensure that the critical situation is resolved as rapidly as possible.

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

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

- Loss of the system ability to provide any required critical or major trouble notification

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

## 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.



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# Introduction to the Diameter Signaling Router

This section describes the purpose, functions, components, and system architecture of the Oracle Communications DSR application.

## Purpose of the Diameter Signaling Router solution

The DSR acts as a centralized core Diameter signaling layer that relieves LTE, IMS, and 3G Diameter endpoints of routing, traffic management, and load balancing tasks; and provides a single interconnection point to other networks.

This approach eliminates the Diameter/SCTP (or TCP) mesh that is created by having direct signaling connections between each network element. Having one or more hubs that centralize the connection to all end nodes simplifies interoperability between different network elements and enhances network scalability. The resulting architecture reduces the cost and complexity of the core network and enables IP networks to grow incrementally to support increasing service and traffic demands. It also facilitates network monitoring by providing a centralized vantage point in the signaling network.

## Diameter Signaling Router Functions

The Diameter Signaling Router (DSR) provides the following functions:

- **Base Diameter Relay Agent:** The DSR uses a Diameter Relay Agent to forward a message to the appropriate destination based on the information contained in the message.
- **Core Routing and Load Balancing:** The DSR creates a centralized Diameter signaling core that handles routing, traffic management, and load balancing tasks; and provides a single interconnect point to other networks.

The IP Front End (IPFE) can run in a DSR system to distribute traffic across connections.

- **DNS A and AAAA support:** The DSR supports resolving host names using DNS A and AAAA queries based on the configured Peer IP address of the connection when the peer IP address is not provisioned.
- **Diameter Transport Function:** The Diameter Transport Function is responsible for managing the transport connections only on a single MP and relies on the Diameter Routing Function to perform distributed processing.
  - **Diameter Connection management:** Reporting of Diameter Connection status changes.

The DSR supports multiple Diameter Connections to any Peer Node and multiple Peer Nodes.

- SCTP and TCP transport protocols: The DSR supports both Stream Control Transmission Protocol (SCTP uni-homing and multi-homing) and Transmission Control Protocol (TCP) based transport Connections.
- Message Processing: Processing of Diameter Peer-to-Peer messages (CER/CEA, DWR/DWA, DPR/DPA), and delivery of Diameter Request and Answer messages from and to Diameter Peers and the Diameter Routing Function.
- Diameter Routing Function:
  - Routing of Diameter Request and Answer messages to and from Diameter Peers (through the Diameter Transport Function) and DSR Applications.
    - Peer Routing Rules: The DSR provides the ability to configure up to 1000 Peer Routing Rules, in up to 100 Peer Route Tables, that define where to route a Diameter message to an upstream Peer based upon Diameter message content.
    - Application Routing Rules: The DSR provides the ability to configure Application Routing Rules, in Application Route Tables that are used by the Diameter Routing Function to determine whether a received Diameter message is routed to a specific DSR application or routed to a Diameter Peer in the network. The Application Routing Rules are rules based upon the Diameter message Application ID, Command-Code, Destination-Realm/Host, and Origin-Realm/Host.
    - Application Chaining: Application Routing Rules can be configured to allow more than one DSR Application to process the same Diameter Request message. (The same message is not usually processed more than once by the same Application.)
    - Processing of Diameter Connection status from the Diameter Transport Function and status from DSR Applications for maintaining dynamic routing configuration data.
    - Message Rerouting: A Diameter Relay Agent is responsible for making sure that Request messages are successfully delivered, and to choose an alternate route if failures are encountered.
      - Alternate Implicit Routing: Instead of a message being routed directly to an unavailable Peer Node, the message is routed on an alternate implicit route that is chosen from a Route List that has been configured for the Peer Node.
      - Reroute on Answer: The DSR supports alternate routing of a Request message when an Answer response is received with a configured error code.
  - Topology Hiding: Trusted Network Lists, Protected Networks, and Configuration Sets for specific Diameter applications or any Diameter application are used for Diameter Topology Hiding functions.
  - Shared Traffic Throttle Groups: Shows all TTGs defined as shared across the diameter routing network. TTGs can be shared between DSR Nodes in the

same network managed by a NOAM. Thus, each TTG is uniquely identified by its DSR Node.

- Diameter Message Copy: Copying of messages to a DAS can be triggered by Peer Routing Rules, Diameter Mediation, or a DSR Application. Message Copy Configuration Sets provide the data required Diameter Message Copy functions.
- Next Generation Network Priority Service (NGN-PS) that allows National Security/Emergency Preparedness (NS/EP) users to make priority calls/sessions using public networks.
- Bulk Import and Export: The DSR provides functions for exporting some or all of the Diameter, Diameter Common, IPFE, and DSR Application configuration data from an NOAM or SOAM to a CSV file, editing the file, and importing the edited file for inserting new configuration data, updating existing data, or deleting data on a local OAM, as well as PCA. Exports can be scheduled periodically for specified configuration data.
- Virtualization on Servers: Virtualization defines and executes virtual machines to allow multiple functional components of the DSR to be deployed on a single server, including TVOE, PMAC, SOAM, NOAM, DA-MP, IPFE, SDS (SOAM and NOAM), PCA (including SBR), and SS7 MP.
- Capacity and Congestion Status and Control: Functions are provided for performing Connection capacity status and control, ingress message MPS control, and egress message throttling; and message processing, Connection, DSR Application, and DA-MP congestion status.
- Diameter Mediation: The DSR provides configuration and application of rules that modify message processing behavior when conditions are met at specified trigger points in the message processing.
- Diameter Intelligence Hub: The Diameter Intelligence Hub (DIH) provides the ability to troubleshoot Diameter transactions.
- Integrated Diameter Intelligence Hub: The Integrated Diameter Intelligence Hub (IDIH) provides the ability to troubleshoot Diameter transactions.
- DSR Switchover: The DSR servers operate in redundancy mode and support automatic failover to the standby server if the active server fails. Automatic failover does not require manual intervention, but is restricted to NOAM, SOAM, active/standby DA-MPs, and SBRs.
- IPsec Support: The DSR supports transporting messages over Internet Protocol security (IPsec) secure Connections.
- IPv4 and IPv6 Support: The DSR supports IPv6 and IPv4 IP address formats.
- AVP Removal: DSR supports the ability to remove AVPs from messages upon receipt from a Peer Node and to remove AVPs from messages upon forwarding to a Peer Node via an AVP Removal List that identifies a list of AVPs that must be removed.
- Static ETR Throttling: Static ETR Throttling allows the operator to limit the rate of transactions that are forwarded to a particular Peer Node which are addressed to a particular Diameter Application ID. For each (Peer Node, Application ID)

ordered pair that you want to throttle, create a Traffic Throttle Point (TTP) attribute and assign it a Maximum ETR value.

- Peer Node reported congestion (DOIC): Supports the ability to modify the rate of transactions forwarded to a Peer Node based upon Diameter Overload Requests (OLRs) it receives in Answer responses from the Peer Node.
- Dynamic Peer Discovery: Peer Discovery (also known as Dynamic Peer Discovery [DPD]) allows the user to discover remote hosts within user-defined Realms and to configure all required elements for successful routing of diameter traffic between the signaling router and those remote hosts. This configuration is dynamic and performs the configuration at the time the routing elements are created.

## Diameter Signaling Router Components

A DSR is a group of signaling network elements (NE) composed of OAM servers and message processors. The NE can also contain database processors and the Integrated Diameter Intelligence Hub (IDIH). See [Figure 3-1](#).

### OAM Servers

One or more pairs of Operation, Administration, and Maintenance (OAM) servers make up the **OAM** component of the DSR. Each pair of servers has an Active/Standby relationship, or three servers in an Active/Standby/Spare relationship. The Active server in the pair controls the virtual IP (**VIP**) addresses that direct **XMI** and **IMI** traffic to the Active server.

The role of the OAM server is to provide a central operational interface and all OAM functions (for example, user administration, configuration data, database administration, fault management, and upgrade functions) for the DSR under its control. The OAM server replicates configuration data to and collects all measurements, events, alarms, and log data from all message processors within the DSR.

The OAM server provides an **SNMP** interface to an external **EMS/NMS**. Up to five SNMP destinations can be configured at the OAM level.

OAM architecture is described in [System Architecture](#).

### Message Processors

The role of the Message Processors (MPs) is to provide the Diameter protocol messaging interfaces and message processing support for DSR applications. NOAMs and SOAMs replicate configuration and provisioning data to the MPs, which measurements, events, alarms, and log data to the OAM servers. There are two types of message processors: Diameter Agent Message Processors (DA-MPs) and STP-MPs.

DA-MPs host the following DSR applications:

- Range Based Address Resolution (RBAR)
- Full Address Based Resolution (FABR)
- Policy and Charging Application (PCA)
- Virtual Signaling Transfer Point (vSTP)
- Service Capability Exposure Function (SCEF)

Machine to Machine Interface (MMI) is a provisioning method that uses a RESTful (Representational State Transfer) interface to access OAM services.

The RBAR and PCA applications can run on the same DA-MP and RD-IWF.

PCA and GLA can run on the same DA-MP or on separate DA-MPs.

FABR and DM-IWF must run on the same DA-MP if both process the same Diameter Request message (Application Chaining).

RBAR and DM-IWF must run on the same DA-MP if both process the same Diameter Request message (Application Chaining).

IPFE runs as separate MPs.

## Integrated Diameter Intelligence Hub (IDIH)

The IDIH:

- Allows the user to create and manage trace filters on DSR to capture messages needed for troubleshooting service issues
- Presents traces to the user via the graphical visualization capabilities provided by IDIH
- Allows the user to filter, view, and store the results with IDIH

The IDIH feature allows the user to capture detailed information about selected Diameter transactions and transmit this information to IDIH for further analysis. The integration of troubleshooting capabilities into the DSR product provides a high value proposition for customers to be able to troubleshoot issues that might be identified with the Diameter traffic transmitted to the DSR.

These troubleshooting capabilities can supplement other network monitoring functions provided by the customer's OSS and network support centers to help quickly pinpoint the root cause of signaling issues associated with connections, peer signaling nodes, or individual subscribers.

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**Note:** IDIH is not a replacement of the features in previous DIH releases.

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## Oracle Communications Services Gatekeeper (OCSG)

Oracle Communications Services Gatekeeper (OCSG) sometimes referred to as API Gateway (APIGW) allows configuration for the OCSG database server, admin server, and an application server.

## Virtual Network Functions Manager (VNFM)

The VNFM automates lifecycle operations for Virtual Network Functions (VNFs) under the control of the NFV Orchestrator. Two VNFs (one for the network OAM VNF and one for the signaling VNF) are required to deploy DSR. The DSR VNFM application helps deploy virtual DSRs quickly by automating the deployment process.

## Session Binding Repository (SBR)

SBR provides a common database framework to host database solutions for native or custom applications.

## System Architecture

The DSR can be deployed either as a core router that routes traffic between Diameter elements in the home network, or as a gateway router that routes traffic between Diameter elements in the visited network and the home network.

In DSR topology, the OAM server function is split into Network OAM (NOAM) servers and System OAM (SOAM) servers. A DSR with a pair of NOAM servers is connected to multiple DSRs with SOAM servers in the network. Each DSR with NOAM servers is connected to one or more mated pairs of SOAM servers, or a triplet if using Policy Diameter Routing Agent (Policy DRA). The DA-MP servers reside with a pair of SOAM servers that interact directly with the MP servers on that DSR.

The architecture includes the following characteristics:

- A 3-tiered topology.
- A traffic signaling service to and from a collection of Diameter clients, servers, and agents.
- Each DSR supports:
  - NOAM and SOAM servers operating in Active/Standby mode, or SOAM as triplet in Active/Standby/Spare mode
  - Two Diameter Agent Message Processors (DA-MPs) operating in Active/Standby mode
  - Additional MPs providing other functions such as IPFE, SS7, and Policy SBR databases
  - Charging Session Binding Repository (SBR) databases
- The DA-MPs provide the Diameter message handling functions. A DA-MP communicates with all of its DA-MP Peers in the same DSR.
- DSRs are deployed in mated pairs for purposes of geo-redundancy. Properly engineered systems do not exceed operating at 40% under normal conditions.
- The Integrated Diameter Intelligence Hub (IDIH) provides the ability to filter, access, and troubleshoot Diameter transactions.

[Figure 3-1](#) provides an overview of the DSR architecture.

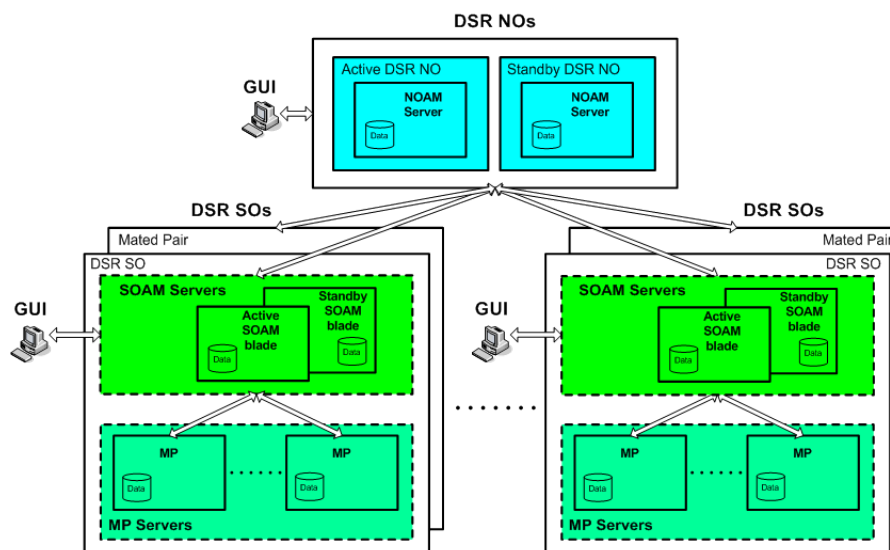
### Diameter Signaling Router Topology

The role of the DSR NOAM server is network scope. The role of the DSR SOAM is managing a DSR Signaling NE.

As shown in [Figure 3-1](#), there are NOAM servers, SOAM servers, and MP servers.

GUI screens can be used to configure and manage:

- On a DSR NOAM, network topology data (such as user accounts, network elements, servers, and server groups) and network-wide DSR Application configuration data
- On a DSR SOAM, Diameter signaling data (such as Local Nodes, Peer Nodes, Connections, Route Groups, and Route Lists) and site-specific DSR Application data.

**Figure 3-1 Diameter Signaling Router Diagram**

The MPs process the database updates from NOAM servers and SOAM servers and perform the real-time signaling. The MP servers also supply the Platform MEAL data, Diameter signaling MEAL data, and DSR Application MEAL data to SOAM servers. The SOAM servers retain the Diameter signaling MEAL data and DSR Application MEAL data if it is site specific, and merge the Platform MEAL data to the NOAM servers. Network-scoped MEAL data is forwarded to the NOAM).

### Deployment with SDS

DSR deployments that include support for the DSR Full Address Based Resolution (FABR) application must be deployed with the Subscriber Database Server (SDS). The SDS is used to provision the FABR subscriber data.

The SDS/DP system consists of a Primary Provisioning Site, a Disaster Recovery (DR) Provisioning Site, and DSR Signaling Site servers with redundant DP SOAM servers and DP servers. 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 DSR SOAM and the SDS SOAM servers are run on some DSR OAM server using virtualization technology. It is assumed that most deployments that support both DSR and SDS deploy the DSR NOAM on servers since this is how the SDS NOAM is deployed. Small deployments that minimize the amount of hardware investment require the DSR NOAM to be deployed as a virtual server on the OAM server. This requires running three virtual machines (VMs) on the server – DSR NOAM, DSR SOAM, and SDS SOAM.





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## User Interface Introduction

This section describes the organization and usage of the application's 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 within an application. It is a Web-based graphical user interface (GUI) that enables remote user access over the network to an application and its functions.

The core framework presents a common set of Main Menu options that serve various applications. The common Main Menu options are:

- Administration
- Configuration
- Alarms and Events
- Security Log
- Status and Manage
- Measurements
- Help
- Legal Notices
- Logout

Applications build upon this framework to present features and functions. Depending on your application, some or all of the following Main Menu options may appear on the Network Operation, Administration, and Maintenance (NOAM) GUI:

- Communication Agent
- Diameter Common
- Diameter
- UDR (User Data Repository)
- SBR (Session Binding Repository)
- Policy and Charging
- DCA (Diameter Custom Application) Framework

The DSR System OAM GUI may present even more Main Menu options as listed below. The end result is a flexible menu structure that changes according to the application needs and features activated.

- Transport Manager
- SS7/Sigtran
- RBAR (Range Based Address Resolution)
- FABR (Full Address Based Resolution)
- SBR
- Mediation
- Policy and Charging
- DCA Framework
- IPFE (IP Front End)

Note that the System OAM (SOAM) Main Menu options differ from the Network OAM (NOAM) options. Some Main Menu options are configurable from the NOAM server and view-only from the SOAM (SOAM) server. This remains true for other applications.

### **Machine to Machine Interface**

The Machine to Machine Interface API describes the Machine to Machine Interface (MMI) for DSR. The DSR MMI is a RESTful (Representational State Transfer) interface providing access to a broad range of Operations, Administration, and Maintenance (OAM) services that clients use to configure and manage the DSR. This document is the comprehensive API reference guide to the RESTful services the DSR makes available to clients through the DSR MMI. To access the MMI API documentation through a direct URL access, without login, go to [http://\(IP address of NOAM or SOAM\)/raml/mmi.html](http://(IP address of NOAM or SOAM)/raml/mmi.html). Or the MMI API documentation can be accessed directly from the DSR GUI by clicking on the new MMI API Guide menu item.

One of the applications you can access through the MMI is virtual Signaling Transport (vSTP) application. The vSTP application uses signaling experience from both the Oracle Communication EAGLE STP and the vDSR products to build a common signaling platform for unified signaling solutions. The application is installed on virtual machines.

Another application you can access through the MMI is the Service Capability Exposure Function (SCEF) application, which interacts with, and implements controls on, Internet of Things (IoT) devices. SCEF uses the Oracle Communications Services Gatekeeper (OCSG) for configuration and provisioning.

## **User Interface Elements**

[Table 4-1](#) describes elements of the user interface.

**Table 4-1 User Interface Elements**

Element	Location	Function
Identification Banner	Top bar across the web page	<p>The left side of the banner provides the following information:</p> <ul style="list-style-type: none"><li>• Displays the company name,</li><li>• Oracle product name and version, and</li><li>• the alarm panel.</li></ul> <p>The right side of the banner:</p> <ul style="list-style-type: none"><li>• Allows you to pause any software updates.</li><li>• Links to the online help for all software.</li><li>• Shows the user name of the currently logged-in user.</li><li>• Provides a link to log out of the GUI.</li></ul>
Main Menu	Left side of screen, under banners	<p>A tree-structured menu of all operations that can be performed through the user interface. The plus character (+) indicates a menu item contains subfolders.</p> <ul style="list-style-type: none"><li>• To display submenu items, click the plus character, the folder, or anywhere on the same line.</li><li>• To select a menu item that does not have submenu items, click on the menu item text or its associated symbol.</li></ul>

**Table 4-1 (Cont.) User Interface Elements**

Element	Location	Function
Work Area	Right side of panel under status	<p>Consists of three sections: Page Title Area, Page Control Area (optional), and Page Area.</p> <ul style="list-style-type: none"><li>• <b>Page Title Area:</b> Occupies the top of the work area. It displays the title of the current page being displayed, date and time, and includes a link to context-sensitive help.</li><li>• <b>Page Control Area:</b> Located below the Page Title Area, this area shows controls for the Page Area (this area is optional). When available as 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 <a href="#">Optional Layout Element Toolbar</a>.</li><li>• <b>Page Area:</b> 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</li></ul>

**Table 4-1 (Cont.) User Interface Elements**

Element	Location	Function
		user interface page. The page displays a user-defined welcome message. To customize the message, see <a href="#">Customizing the Login Message</a> .
Session Banner	Across the bottom of the web page	<p>The left side of the banner provides the following session information:</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• The HA state of the machine to which the user is connected.</li> <li>• The role of the machine to which the user is connected.</li> </ul> <p>The right side of the banner shows the alarm panel.</p>

## Main Menu Options

[Table 4-2](#) describes all main menu user interface options.

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

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**Note:** Some menu items are configurable only on the Network OAM and view-only on the System OAM; and some menu options are configurable only on the System OAM.

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**Note:** Some features do not appear in the main menu until the features are activated.

---

**Table 4-2 Main Menu Options**

Menu Item	Function
Administration	<p>The Administration menu allows the user to:</p> <ul style="list-style-type: none"><li>• General Options. Configure options such as password history and expiration, login message, welcome message, and the number of failed login attempts before an account is disabled</li><li>• Set up and manage user accounts</li><li>• Configure group permissions</li><li>• View session information</li><li>• Manage sign-on certificates</li><li>• Authorize IP addresses to access the user interface</li><li>• Configure SFTP user information</li><li>• View the software versions report</li><li>• Upgrade management including backup and reporting</li><li>• Authenticate LDAP servers</li><li>• Configure SNMP trapping services</li><li>• Configure an export server</li><li>• Configure DNS elements</li></ul>
Configuration	<p>On the NOAM, allows the user to configure:</p> <ul style="list-style-type: none"><li>• Network Elements</li><li>• Network Devices</li><li>• Network Routes</li><li>• Services</li><li>• Servers</li><li>• Server Groups</li><li>• Resource Domains</li><li>• Places</li><li>• Place Associations</li><li>• Interface and Port DSCP</li></ul>
Alarms and Events	<p>Allows the user to view:</p> <ul style="list-style-type: none"><li>• Active alarms and events</li><li>• Alarm and event history</li><li>• Trap log</li></ul>
Security Log	<p>Allows the user to view, export, and generate reports from security log history.</p>
Status and Manage	<p>Allows the user to monitor the individual and collective status of Network Elements, Servers, HA functions, Databases, KPIs, system Processes, and Tasks. The user can perform actions required for server maintenance, database management, data, and ISO file management.</p>
Measurements	<p>Allows the user to view and export measurement data.</p>

**Table 4-2 (Cont.) Main Menu Options**

Menu Item	Function
Transport Manager (optional)	On the SOAM, allows the user to configure adjacent nodes, configuration sets, or transports. A maintenance option allows the user to perform enable, disable, and block actions on the transport entries. This option only appears with the DSR application.
Communication Agent (optional)	Allows the user to configure Remote Servers, Connection Groups, and Routed Services. The user can perform actions to enable, disable, and block connections. Also allows the user to monitor the status of Connections, Routed Services, and HA Services.
SS7/Sigtran (optional)	On the SOAM, allows the user to configure various users, groups, remote signaling points, links, and other items associated with SS7/Sigtran; perform maintenance and troubleshooting activities; and provides a command line interface for bulk loading SS7 configuration data. This option only appears with the DSR application.
Diameter Common (optional)	<p>Allows the user to view or configure:</p> <ul style="list-style-type: none"> <li>• Dashboard, configure on the NOAM; view on both OAMs</li> <li>• Network Identifiers on the SOAM - MCC Ranges</li> <li>• Network Identifiers on the NOAM - MCCMNC and MCCMNC Mapping</li> <li>• MPs (on the SOAM) - editable Profile parameters and Profile Assignments</li> </ul> <p>The DSR Bulk Import and Export functions are available on both OAMs for the data configured on that OAM.</p>
Diameter (optional)	<p>Allows the user to configure, modify, and monitor Diameter routing:</p> <ul style="list-style-type: none"> <li>• On the NOAMP, Diameter Topology Hiding and Egress Throttle List configuration</li> <li>• On the SOAM, Diameter Configuration, Maintenance, Reports, Troubleshooting with IDIH, AVP Dictionary, and Diameter Mediation configuration</li> </ul>
UDR (User Data Repository) (optional)	Allows the user to add, edit, store, and manage subscriber, pool data, and EIR information. The user can also monitor the import, export, and subscribing client status. This option only appears with the UDR application.

**Table 4-2 (Cont.) Main Menu Options**

Menu Item	Function
RBAR (Range-Based Address Resolution) (optional)	<p>Allows the user to configure the following Range-Based Address Resolution (RBAR) settings:</p> <ul style="list-style-type: none"><li>• Applications</li><li>• Exceptions</li><li>• Destinations</li><li>• Address Tables</li><li>• Addresses</li><li>• Address Resolutions</li><li>• System Options</li></ul> <p>This is accessible from the SOAM only. This option only appears with the DSR application.</p>
FABR (Full Address Based Resolution) (optional)	<p>Allows the user to configure the following Full Address Based Resolution (FABR) settings:</p> <ul style="list-style-type: none"><li>• Applications</li><li>• Exceptions</li><li>• Default Destinations</li><li>• Address Resolutions</li><li>• System Options</li></ul> <p>This is accessible from the SOAM only. This option is only available with the DSR application.</p>
SBR (Session Binding Repository) (optional)	<p>Allows the user to perform configuration tasks, edit system options, and view elements for:</p> <ul style="list-style-type: none"><li>• SBR Databases</li><li>• SBR Database Resizing Plans</li><li>• SBR Data Migration Plans</li><li>• Database Options</li></ul> <p>Additionally, on the NOAMP, users are allowed to perform maintenance tasks, edit options, and view elements for:</p> <ul style="list-style-type: none"><li>• Maintenance<ul style="list-style-type: none"><li>– SBR Database Status</li><li>– SBR Status</li><li>– SBR Database Reconfiguration Status</li></ul></li></ul> <p>This option only appears with the DSR application.</p>
Mediation	<p>Allows the user to make routable decisions to end the reply, drop the message, or set the destination realm.</p>



**Table 4-2 (Cont.) Main Menu Options**

Menu Item	Function
Policy and Charging (optional)	<p>On the NOAMP, allows the user to perform configuration tasks, edit options, and view elements for:</p> <ul style="list-style-type: none"> <li>• General Options</li> <li>• Access Point Names</li> <li>• Policy DRA <ul style="list-style-type: none"> <li>– PCRF Pools</li> <li>– PCRF Sub-Pool Selection Rules</li> <li>– Network-Wide Options</li> </ul> </li> <li>• Online Charging DRA <ul style="list-style-type: none"> <li>– OCS Session State</li> <li>– Realms</li> <li>– Network-Wide Options</li> </ul> </li> <li>• Alarm Settings</li> <li>• Congestion Options</li> </ul> <p>Additionally on the NOAMP, users are allowed to perform maintenance tasks, edit options, and view elements for:</p> <ul style="list-style-type: none"> <li>• Maintenance <ul style="list-style-type: none"> <li>– SBR Database Status</li> <li>– SBR Status</li> <li>– SBR Database Reconfiguration Status</li> <li>– Policy Database Query</li> </ul> </li> </ul> <p>On the SOAM, allows the user to perform configuration tasks, edit options, and view elements for:</p> <ul style="list-style-type: none"> <li>• General Options</li> <li>• Access Point Names</li> <li>• Policy DRA <ul style="list-style-type: none"> <li>– PCRFs</li> <li>– Binding Key Priority</li> <li>– PCRF Pools</li> <li>– PCRF Pool to PRT Mapping</li> <li>– PCRF Sub-Pool Selection Rules</li> <li>– Policy Clients</li> <li>– Suspect Binding Removal Rules</li> <li>– Site Options</li> </ul> </li> <li>• Online Charging DRA <ul style="list-style-type: none"> <li>– OCSs</li> <li>– CTFs</li> <li>– OCS Session State</li> <li>– Realms</li> </ul> </li> <li>• Error Codes</li> <li>• Alarm Settings</li> <li>• Congestion Options</li> </ul> <p>This option only appears with the DSR application.</p>

**Table 4-2 (Cont.) Main Menu Options**

Menu Item	Function
DCA Framework (optional)	Allows the user to perform configuration tasks, edit system options, and view elements for DCA applications: <ul style="list-style-type: none"><li>• Custom MEALs (Measurements, Events, Alarms, and Logs)</li><li>• General Options</li><li>• Trial MPs assignment</li><li>• Application Control</li><li>• System Options</li></ul>
IPFE (optional)	Allows the user to configure IP Front End (IPFE) options and IP List TSAs. This is accessible from the SOAM server only. This option only appears with the DSR application.
Help	Launches the Help system for the user interface
Legal Notices	Product Disclaimers and Notices
Logout	Allows the user to log out of the user interface

## Missing Main Menu Options

Permissions determine which Main Menu options are visible to users. Permissions are defined through the Group Administration page. The default group, admin, is permitted access to all GUI options and functionality. Additionally, members of the admin group set permissions for other users.

Main Menu options vary according to the group permissions assigned to a user's account. Depending on your user permissions, some menu options may be missing from the Main Menu. For example, Administration menu options do not appear on your screen if you do not have administrative permissions. For more information about user permissions, see *Group Administration* in the OAM section of the online help, or contact your system administrator.

## Common Graphical User Interface Elements

Common controls allow you to easily navigate through the system once you become familiar with the GUI. 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.

## Supported Browsers

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

is designed to work with most modern HTML5 compliant browsers and uses both JavaScript and cookies. Please refer to the [Oracle Software Web Browser Support Policy](#) for details

## 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 the password upon login. The System Login page also features a date and time stamp reflecting the time the page was last refreshed. Additionally, a customizable login message appears just below the **Log In** button.

The user interface is accessed using 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 to gain access.

### 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 4-1 Oracle System Login**



**ORACLE®**

**Oracle System Login** Wed Jul 8 14:20:00 2015 EDT

**Log In**

Enter your username and password to log in

Username:

Password:

☐ Change password

Welcome to the Oracle System Login.

Unauthorized access is prohibited. This Oracle system requires the use of Microsoft Internet Explorer 8.0, 9.0, or 10.0 with support for JavaScript and cookies.

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1. From the **Main Menu**, click **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 displays.

### Accessing the DSR Graphical User Interface

In DSR, some configuration is done at the NOAM server, while some is done at the SOAM server. Because of this, you need to access the DSR graphical user interface (GUI) from two servers. Certificate Management (Single Sign-On) can be configured to simplify accessing the DSR GUI on the NOAM and the SOAM.

For information on configuring Single Sign-On certificates, see **OAM > Administration > Access Control > Certificate Management** in the DSR online help.

After the certificates have been configured, you can log into the DSR GUI on any NOAM or SOAM, and access the DSR GUI on other servers (NOAM or other SOAMs) without having to re-enter your login credentials.

1. In the browser URL field, enter the fully qualified hostname of the NOAM server, for example `https://dsr-no.yourcompany.com`.

When using Single Sign-On, you cannot use the IP address of the server.

2. When prompted by the browser, confirm that the server can be trusted.

The System Login page appears.

3. Enter the Username and Password for your account.

The DSR GUI for the NOAM appears.

4. To access the DSR GUI for the SOAM, open another browser window and enter the fully qualified hostname of the SOAM.


The DSR GUI for the SOAM appears

You can toggle between the DSR GUI on the NOAM and the DSR GUI on the SOAM as you perform configuration tasks.











## Main Menu Icons

This table describes the icons used in the Main Menu.

**Table 4-3 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 (-) collapses the folder.

**Table 4-3 (Cont.) Main Menu Icons**

Icon	Name	Description
	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.
	Task	Contains operations related to Tasks
	Help	Launches the Online Help.
	Logout	Logs the user out of the user interface.

## Work Area Displays

In the user interface, tables, forms, tabbed pages, and reports are the most common formats.

---

**Note:** Screen shots 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 4-2 Paginated Table**

Displaying Records 1-1 of 1 | [First](#) | [Prev](#) | [Next](#) | [Last](#)

Action		System ID	IP Address	Permission	Action	
<a href="#">Edit</a>	<a href="#">Delete</a>	lisa	10.25.62.4	READ_WRITE	<a href="#">Edit</a>	<a href="#">Delete</a>

Displaying Records 1-1 of 1 | [First](#) | [Prev](#) | [Next](#) | [Last](#)

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 4-3 Scrollable Table**

Sequence #	Alarm ID	Timestamp	Severity	Product	Process	NE	Server	Type
3498	31201	2009-Jun-11 18:07:41.214 UTC	MAJOR	MiddleWare	procmgr	OAMPNE	teks8011006	PROC
5445	31201	2009-Jun-11 18:07:27.137 UTC	MAJOR	MiddleWare	procmgr	SOAMP	teks8011002	PROC
5443	31107	2009-Jun-11 18:07:24.704 UTC	MINOR	MiddleWare	inetmerge	SOAMP	teks8011002	COLL
5444	31107	2009-Jun-11 18:07:24.704 UTC	MINOR	MiddleWare	inetmerge	SOAMP	teks8011002	COLL
5441	31209	2009-Jun-11 18:07:22.640 UTC	MINOR	MiddleWare	re.portmap	SOAMP	teks8011002	SW
<div>Export</div>								

---

**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 lists, buttons, and links.

**Figure 4-4 Form Page**

Username:  (5-16 characters)

Group:  ▼

Time Zone:  ▼

Maximum Concurrent Logins:  Maximum concurrent logins for a user (0=no limit).  
[Default = 1; Range = 0-50]

Session Inactivity Limit:  Time (in minutes) after which login sessions expire (0 = never).  
[Default = 120; Range = 0-120]

Comment:  (max 64 characters)

Temporary Password:  (8-16 characters)

Re-type Password:  (8-16 characters)

**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 populate on the page. Retrieve is always the default for tabbed pages.

**Figure 4-5 Tabbed Pages**

Entire Network	*	System.CPU_CoreUtilPct_Average		System.CPU_CoreUtilPct_Peak			
NOAMP		Timestamp	System CPU UtilPct Average	System CPU UtilPct Peak	System Disk UtilPct Average	System Disk UtilPct Peak	System RAM UtilPct Average
SOAM		10/22/2009 19:45	6.764068	44	0.520000	1	7.939407
		10/22/2009 20:00	7.143644	25	0.520000	1	8.523822

**Figure 4-6 Tabbed Pages**

**Retrieve**

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

Field	Value	Description
Network Entity	<input type="text"/>	* Numeric identifier for the Network Entity 1-15 DIGITS

**Reports**

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

**Figure 4-7 Report Output**

```

=====
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
=====

```

## Customizing the Splash Page Welcome Message

When you first log in to the user interface, the splash page appears. Located in the center of the main work area is a customizable welcome message. Use this procedure to create a message suitable for your needs.

1. From the **Main Menu**, click **Administration > General Options**.
2. Locate **Welcome Message** in the **Variable** column.
3. Enter the desired welcome message text in the **Value** column.
4. Click **OK** to save the change or **Cancel** to undo the change and return the field to the previously saved value.

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

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

## Column Headers (Sorting)

You can sort a table by a column by clicking the column header. However, sorting is not necessarily available on every column. Sorting does not affect filtering.

When you click the header of a column that the table can be sorted by, an indicator appears in the column header showing the direction of the sort. See [Figure 4-8](#). Clicking the column header again reverses the direction of the sort.

**Figure 4-8 Sorting a Table by Column Header**

Local Node Name ▼	Realm	FQDN	SCTP Listen Port	TCP Listen Port	Connection Configuration Set	CEX Configuration Set	IP Addresses
-------------------	-------	------	------------------	-----------------	------------------------------	-----------------------	--------------

## 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 4-4 contains examples of Action buttons.

**Table 4-4    Example Action Buttons**

Action Button	Function
Insert	Inserts data into a table.
Edit	Edits data within a table.
Delete	Deletes data from table.
Change	Changes the status of a managed object.

Some Action buttons take you to another page.

Submit buttons, described in Table 4-5, 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 4-5    Submit Buttons**

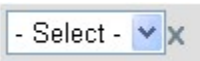
Submit Button	Function
OK	Submits the information to the server, and if successful, returns to the View page for that table.
Apply	Submits the information to the server, and if successful, remains on the current page so that you can enter additional data.
Cancel	Returns to the View page for the table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

**Clear Field Control**

The clear field control allows you to clear the value from a list. The clear field control is available only on some lists.

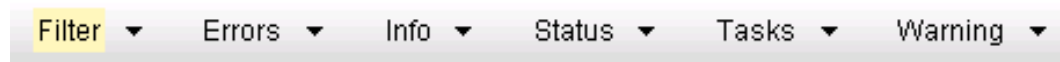
Click the X next to a list to clear the field.

**Figure 4-9    Clear Field Control X**



**Optional Layout Element Toolbar**

The optional layout element toolbar appears in the Page Control Area of the GUI.

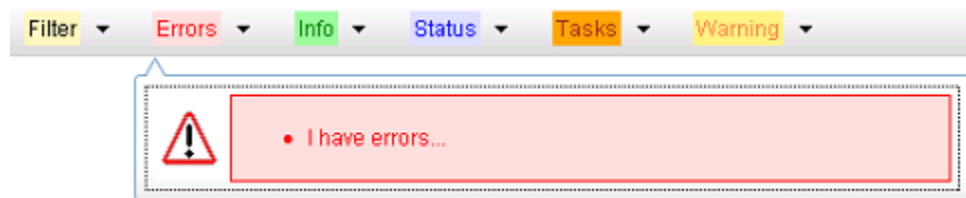
**Figure 4-10 Optional Layout Element Toolbar**

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 4-11 Automatic Error Notification**

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**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.

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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.

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

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- 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 4-12 Examples of Filter Styles**

Figure 4-12 displays three examples of filter styles in a GUI. The first example shows a 'Network Element' dropdown set to '- All -' with a 'Reset' button, and a 'Display Filter' dropdown set to '- None -' with an equals sign dropdown and a text input. The second example shows a 'Collection Interval' section with a text input '30', a 'Days' dropdown, an 'Ending' dropdown, a date '2009 Jan 01 00:00', and a 'Reset' button. The third example shows a 'Display Filter' section with a 'Severity' dropdown, an equals sign dropdown, a text input 'MINOR', 'Go' and 'Reset' buttons, and a note '(LIKE wildcard: \"\*\")'.

## Filter Control Elements

This table describes filter control elements of the user interface.

**Table 4-6 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.

**Table 4-6 (Cont.) Filter Control Elements**

Operator	Description
<	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 <b>Is Null</b> in the specified field.

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

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### 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.
2. Select a Network Element from the **Network Element** list.
3. Click **Go** to filter on the selection or click **Reset** to clear the selection.
4. For data tables that support compound filtering, click **Add** to add another filter condition and repeat steps 2 through 4.

Multiple filter conditions are joined by an AND operator.

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.
2. Enter a duration for the **Collection Interval** filter.

The duration must be a numeric value.

3. Select a unit of time from the list.

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

4. Select **Beginning** or **Ending** from the list.

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 you have a data table displayed on your screen with the Display Filter field. This process is the same for all data tables. However, all filtering operations are not available for all tables.

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**Note:** Display Filter does not support compound filtering. For example, you cannot filter on both severity and a server name. Try to filter on a single filter criteria, such as the server hostname for server-scoped metric cells; or the application name for St- and NE-scoped metric cells. You can also sort by congestion level (descending) to help improve your filter.

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1. Click **Filter** in the optional layout element toolbar.
2. Select a field name from the **Display Filter** list.

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.

3. Select an operator from the operation selector list.
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. Click **Go** to filter on the selection, or click **Reset** to clear the selection.

Records are displayed according to the specified criteria.

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**Note:** PCA was known as PDRA and may still be seen in some filtering.

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## 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**, click **Administration > General Options**.
2. Change the value of the **MaxRecordsPerPage** variable.

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**Note:** **Maximum Records Per Page** has a range of values from 10 to 100 records. The default value is 20.

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**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.