EAGLE® XG Diameter Signaling Router

Getting Started

910-6584-001 Revision B

December 2012

Table of Contents

List of Figures

List of Tables

Chapter 1

About the Help

Topics:

This online help describes the EAGLE XG DSR and is updated with each major release of the software. This online help system and the online help included on DVD 936-0366-501 are functionally equivalent.

For additional copies of the DVD, contact your Tekelec Sales Representative.

Purpose of this documentation

The online help system:

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

Documentation organization

The online help is organized into the following sections, each covering a different aspect of the DSR. For a more detailed explanation of each GUI Menu option, please see *Main Menu options*.

Getting Started

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

OAM

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

Communication Agent

The Communication Agent (ComAgent) section of the documentation describes GUI pages for the Communication Agent plug-in. In this section you can find information about configuring Remote Servers, Connection Groups, and Routed Servers, and information about maintaining configured connections.

IPFE

The IPFE section of the document describes GUI pages for the IP Front End application. In this section you can find information about how to configure IPFE to distribute IPv4 and IPv6 connections from multiple clients to multiple CPA nodes.

Diameter

The Diameter section of the documentation 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 local and peer nodes, connections, peer routing rules, and system, DNS, and local congestion options.

Range-Based Address Resolution

The Range-Based Address Resolution section of the documentation describes GUI pages for the Range-Based Address Resolution (RBAR) application. In this section you can find 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

The Full-Address Based Resolution section of the documentation describes GUI pages for the Full-Address Based Resolution (FABR) application. In this section you can find 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.

Charging Proxy Application

The Charging Proxy Application section of the documentation describes GUI pages for the Charging Proxy Application (CPA). In this section you can find information about setting System Options for CPA and configuring the CPA's Message Copy capability.

DSR Alarms, KPIs, and Measurements

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

DSR Administration

The Administration section explains DSR transport and routing concepts, IPsec, Diameter transport and routing configuration, the Diameter Intelligence Hub, IPv4 vs IPv6, and database backups.

Roadmap to Hardware Documentation

This section provides links as an aid to navigate the respective hardware manufacturer online documentation related to the DSR.

Release 4.0 Feature Notice

The Feature Notice describes new features in the current release, provides the hardware baseline or this release, and explains how to find customer documentation on the Customer Support Site.

Release Notice Info

This section describes the contents of a Release Notice, and how to access the Release Notice on the Customer Support Site.

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

	**DANGER**: (This icon and text indicate the possibility of *personal injury*.)
	**WARNING**: (This icon and text indicate the possibility of *equipment damage*.)
	**CAUTION**: (This icon and text indicate the possibility of *service interruption*.)

Chapter 2

Customer Support

Topics:

This section provides:

- Contact information for the Tekelec Customer Care Center
- Information about situations that warrant an emergency response
- Instructions on how to access product documentation on the Customer Support Site

Customer Care Center

The Tekelec Customer Care Center is your initial point of contact for all product support needs. A representative takes your call or email, creates a Customer Service Request (CSR) and directs your requests to the Tekelec Technical Assistance Center (TAC). Each CSR includes an individual tracking number. Together with TAC Engineers, the representative will help you resolve your request.

The Customer Care Center is available 24 hours a day, 7 days a week, 365 days a year, and is linked to TAC Engineers around the globe.

Tekelec TAC Engineers are available to provide solutions to your technical questions and issues 7 days a week, 24 hours a day. After a CSR is issued, the TAC Engineer determines the classification of the trouble. If a critical problem exists, emergency procedures are initiated. If the problem is not critical, normal support procedures apply. A primary Technical Engineer is assigned to work on the CSR and provide a solution to the problem. The CSR is closed when the problem is resolved.

Tekelec Technical Assistance Centers are located around the globe in the following locations:

Tekelec - Global

Email (All Regions): support@tekelec.com

- **USA and Canada**

  Phone:

  1-888-FOR-TKLC or 1-888-367-8552 (toll-free, within continental USA and Canada)

  1-919-460-2150 (outside continental USA and Canada)

  TAC Regional Support Office Hours:

  8:00 a.m. through 5:00 p.m. (GMT minus 5 hours), Monday through Friday, excluding holidays

- **Caribbean and Latin America (CALA)**

  Phone:

  USA access code +1-800-658-5454, then 1-888-FOR-TKLC or 1-888-367-8552 (toll-free)

  TAC Regional Support Office Hours (except Brazil):

  10:00 a.m. through 7:00 p.m. (GMT minus 6 hours), Monday through Friday, excluding holidays

  - **Argentina**

    Phone:

    0-800-555-5246 (toll-free)

  - **Brazil**

    Phone:

    0-800-891-4341 (toll-free)

    TAC Regional Support Office Hours:

    8:00 a.m. through 5:48 p.m. (GMT minus 3 hours), Monday through Friday, excluding holidays

  - **Chile**

Phone:

1230-020-555-5468

- **Colombia**

  Phone:

  01-800-912-0537

- **Dominican Republic**

  Phone:

  1-888-367-8552

- **Mexico**

  Phone:

  001-888-367-8552

- **Peru**

  Phone:

  0800-53-087

- **Puerto Rico**

  Phone:

  1-888-367-8552 (1-888-FOR-TKLC)

- **Venezuela**

  Phone:

  0800-176-6497

- **Europe, Middle East, and Africa**

  Regional Office Hours:

  8:30 a.m. through 5:00 p.m. (GMT), Monday through Friday, excluding holidays

  - **Signaling**

    Phone:

    +44 1784 467 804 (within UK)

  - **Software Solutions**

    Phone:

    +33 3 89 33 54 00

- **Asia**

  - **India**

    Phone:

    +91 124 436 8552 or +91 124 436 8553

    TAC Regional Support Office Hours:

10:00 a.m. through 7:00 p.m. (GMT plus 5 1/2 hours), Monday through Saturday, excluding holidays

- **Singapore**

  Phone:

  +65 6796 2288

  TAC Regional Support Office Hours:

  9:00 a.m. through 6:00 p.m. (GMT plus 8 hours), Monday through Friday, excluding holidays

Emergency Response

In the event of a critical service situation, emergency response is offered by the Tekelec Customer Care Center 24 hours a day, 7 days a week. 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 the Tekelec Customer Care Center.

Locate Product Documentation on the Customer Support Site

Access to Tekelec's Customer Support site is restricted to current Tekelec customers only. This section describes how to log into the Tekelec Customer Support site and locate a document. Viewing the document requires Adobe Acrobat Reader, which can be downloaded at www.adobe.com.

1. Log into the *Tekelec Customer Support* site.

   Note: If you have not registered for this new site, click the **Register Here** link. Have your customer number available. The response time for registration requests is 24 to 48 hours.

2. Click the **Product Support** tab.
3. Use the Search field to locate a document by its part number, release number, document name, or document type. The Search field accepts both full and partial entries.

4. Click a subject folder to browse through a list of related files.
5. To download a file to your location, right-click the file name and select **Save Target As**.

Chapter 3

Introduction to EAGLE XG DSR

Topics:

This section describes the purpose, functions, components, and system architecture of the EAGLE XG DSR.

Purpose of the DSR solution

EAGLE XG 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 interconnect 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.

DSR functions

The 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 balance traffic over 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**:

  Diameter can be distributed over multiple MPs; however, 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 up to 64 transport connections per Peer Node, and up to 32 Local Nodes.

    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/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 Peer Routing Rules that define where to route a Diameter message to an upstream Peer based upon Diameter message content.
- **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 alternate route if failures are encountered.
  - **Alternate Implicit Routing**: Instead of a message being routed directly to an available Peer Node, the message is routed on an "alternate implicit route" that is chosen firom a 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.

- **Capacity and Congestion Status and Control**: Performing connection capacity status and control, ingress message MPS control, and egress message throttling; providing Local Congestion and Egress Transport Congestion status.
- **Diameter Medation**: The DSR provides configuration and application of rules that modify message processing behavior when conditions are met at specified points in the message processing.
- **Message Copy**: The DSR Charging Proxy Application (CPA) supports forwarding a copy of a Diameter Request message received by or routed through the DSR to a Diameter Application Server (DAS).
- **Diameter Intelligence Hub**: The Diameter Intelligence Hub (DIH) 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.
- **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.

DSR components

A DSR is a signaling network element (NE) composed of OAM servers, message processors, and the Diameter Intelligence Hub.

The DSR solution contains multiple DSR signaling network elements, each of which contains OAM servers and message processors.

OAM servers

One pair of Operation, Administration, and Maintenance (OAM) servers make up the OAM&P component of the DSR. This pair of servers has an active/standby relationship. The active server in the pair controls the virtual IP addresses (VIP) 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&P functions (for example, user administration, provisioning and configuration data, database administration, fault management and upgrade functions) for the DSR under its control. The OAM server replicates

configuration and provisioning 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.

Message Processors

The role of the message processors (MPs) is to provide the Diameter application messaging interfaces and processing. All message processors replicate configuration and provisioning data from the OAM servers and send measurements, events, alarms, and log data to the OAM servers.

Diameter Intelligence Hub

The Diameter Intelligence Hub (DIH) component of the DSR provides troubleshooting capabilities without the need for separate probes or taps. Specifically, the DIH provides:

- Nodal tracing (DSR ingress and egress traffic) and message protocol decode
- Ladder diagrams showing the continuous flow between elements
- Alarm forwarding for signaling and system alarms
- A diagnostic utility
- Data feed that can be used to schedule automatic export of trace data to a customer server.
- Filtering on xDR content
- A web-based GUI providing security, configuration, and application access

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.

The DSR product supports:

- A 2-tiered DSR topology
- A 3-tiered DSR topology

In 2-tiered DSR topology, an independent pair of NOAM servers for each DSR interacts directly with MP servers in that DSR system.

In 3-tiered 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 a mated pair of SOAM servers. The DA-MP servers reside with a pair of SOAM servers that interact directly with the DA-MP servers on that DSR.

The same functions are provided in both topologies. The 3-tiered DSR topology does not alter existing DSR functions other than separating what can be configured or managed at what level (DSR NOAM or DSR SOAM).

The architecture includes the following characteristics:

- The DSR supports a 2-tiered or 3-tiered topology.

- Each DSR services signaling traffic to and from a collection of Diameter clients, servers, and agents.
- Each DSR supports :
  - OAM servers (OAM), operating in active/standby mode; only NOAM servers in 2-tiered DSR topology; NOAM and SOAM servers in 3-tiered DSR topology.
  - Two message processors (MPs), operating in active/standby mode, or up to 16 DA-MPs in active/active mode.
- The DA-MPs provide the Diameter message handling functions. A DA-MP communicates with all of its DSR Peers.
- DSRs are deployed in mated pairs for purposes of geo-redundancy. Each DSR operates at 40% capacity under normal conditions.
- The Diameter Intelligence Hub (DIH) provides the ability to filter, access, and troubleshoot Diameter transactions.

Figure 1: EAGLE XG DSR System Diagram with 2-tiered Topology provides an overview of the EAGLE XG DSR architecture.

2-tiered DSR Topology

In 2-tiered DSR topology, as shown in *Figure 1: EAGLE XG DSR System Diagram with 2-tiered Topology*, there are NOAM servers and MP servers. On NOAM servers, GUI screens can be used to configure and manage:

- Network topology data (such as user accounts, network elements, servers, and server groups)
- Diameter signaling data (such as Local Nodes, Peer Nodes, Connections, Route Groups, and Route Lists) and DSR Application data (RBAR, FABR, and CPA)

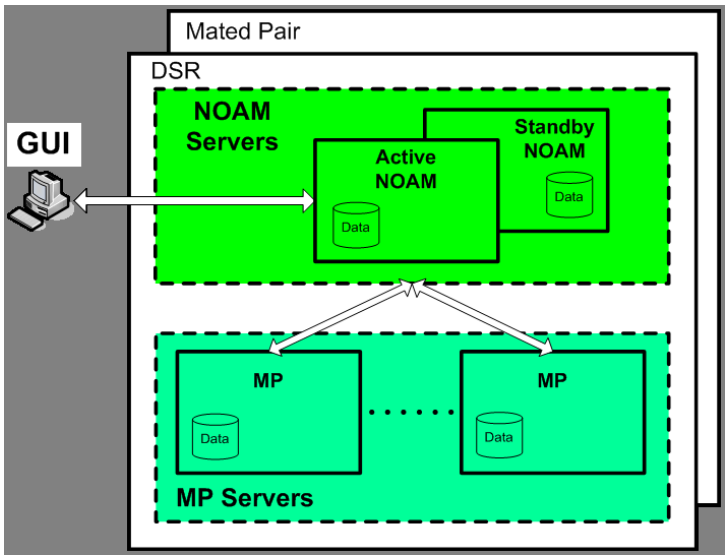


Figure 1: EAGLE XG DSR System Diagram with 2-tiered Topology

The MP servers process the database updates from NOAM servers and perform the real-time signaling functions. The MP servers also supply the Platform measurements, events, alarms, and log (MEAL) data, Diameter signaling MEAL data, and Diameter Application MEAL data to NOAM servers.

3-tiered DSR Topology

The primary change between the 2-tiered DSR topology and the 3-tiered DSR topology is the introduction of the DSR SOAM server. The role of the DSR NOAM server is changed to take on network scope instead of the Network Element scope it has with the 2-tiered DSR topology. The role of the DSR SOAM becomes similar to the role of the NOAM in the 2-tiered DSR topology in that it is managing a single DSR system (or DSR Signaling NE).

In 3-tiered DSR topology, as shown in *Figure 2: EAGLE XG DSR Diagram with 3-tiered Topology*, there are NOAM servers, SOAM servers, and MP servers.

In 3-tiered DSR topology, 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)
- On a DSR SOAM, Diameter signaling data (such as Local Nodes, Peer Nodes, Connections, Route Groups, and Route Lists) and DSR Application data (RBAR, FABR, and CPA)

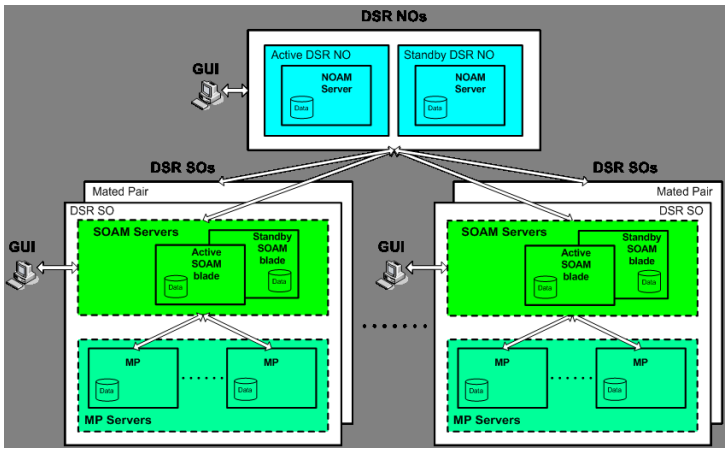


Figure 2: EAGLE XG DSR Diagram with 3-tiered Topology

The DA-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, and merge the Platform MEAL data to the NOAM servers.

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 up to 24 DSR Signaling Site servers with redundant DP SOAM servers and up to 2 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.

In 2-tiered DSR topology, the SDS has its own independent NOAM and SOAM infrastructure.

In 3-tiered DSR topology, the DSR SOAM and the SDS SOAM servers are run on the DSR OAM blade using virtualization technology. It is assumed that most deployments that support both DSR and SDS

will deploy the DSR NOAM on Rack Mount Servers, as 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 blade. This requires running three Virtual Machines (VMs) on the blade – DSR NOAM, DSR SOAM and SDS SOAM.

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.

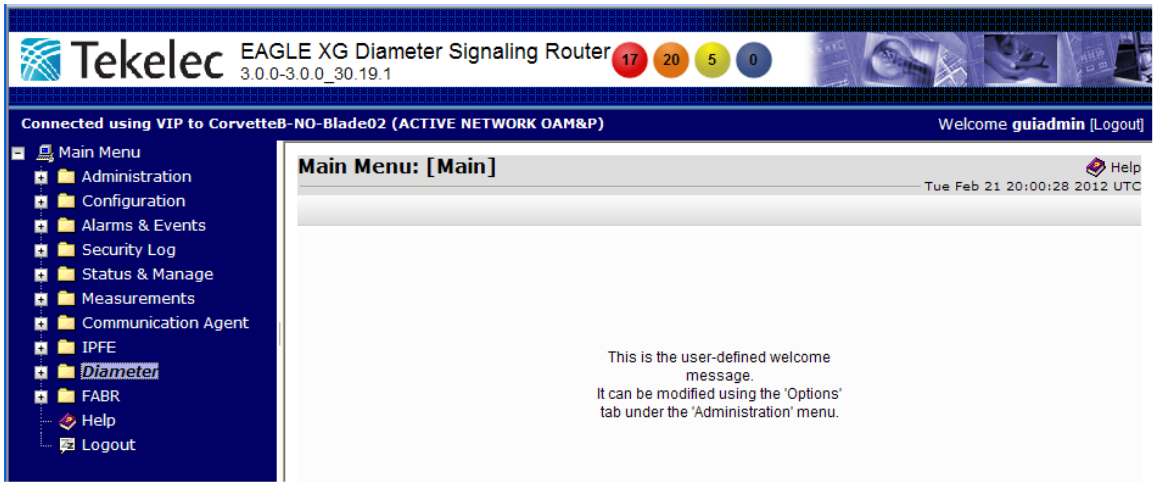


Figure 3: User Interface

2-Tier DSR GUI

In a 2-Tier DSR, all Main Menu options are accessible from the Network OAM&P server.

3-Tier DSR GUI

In a 3-Tier DSR, the following Main Menu options are accessible only from the System OAM server:

- IPFE
- Diameter
- RBAR
- FABR
- CPA

All other Main Menu options are accessible from the Network OAM&P server or the System OAM server.

User interface elements

This table describes elements of the user interface.

Table 2: 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.

Element	Location	Function
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 displayed, the date and time, and includes a link to context-sensitive help. • **Page Control Area**: Is located below the Page Title 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

Element	Location	Function
		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

Table 3: Main Menu Options describes all main menu user interface options.

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.

Note: In a 3-tier DSR configuration, some menu options are available only on the System OAM server. See *3-Tier DSR GUI*.

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

Table 3: Main Menu Options

Menu Item	Function
Administration	The Administration menu allows you to: • Set up and manage user accounts • Configure group permissions • View session information • Configure single sign-on • Authorize IP addresses to access the user interface • Configure options such as password history and expiration, login message, welcome message, and the number of failed login attempts before an account is disabled • Configure SNMP services • Validate and transfer ISO files • Prepare, initiate, monitor, and complete upgrades • View the software versions report • Configure an export server
Configuration	Allows you to configure: • Network Elements • Services • Servers • Server Groups • Network Devices and Routes
Alarms and Events	Allows you to view: • Active alarms and events

Menu Item	Function
	• Alarm and event history • Trap log
Security Log	Allows you to view, export, and generate reports from security log history.
Status & Manage	Allows you to monitor the individual and collective status of server processes and 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 and export measurement data.
Communication Agent	Allows you to configure Remote Servers, Connection Groups, and Routed Services. Also allows you to monitor the status of Connections, Routed Services, and HA Services.
IPFE (optional)	Allows you to configure IP Front End (IPFE) options and IP List TSAs. In a 3-Tier DSR configuration, accessible from the System OAM server only.
Diameter	Allows you to configure, modify, and monitor Diameter routing. In a 3-Tier DSR configuration, accessible from the System OAM server only.
Range-Based Address Resolution (optional)	Allows you to configure the following Range-Based Address Resolution (RBAR) settings: • Applications • Exceptions • Destinations • Address Tables • Addresses • Address Resolutions • System Options In a 3-Tier DSR configuration, accessible from the System OAM server only.
Full Address Based Resolution (optional)	Allows you to configure the following Full Address Based Resolution (FABR) settings: • Applications • Exceptions • Default Destinations • Address Resolutions • System Options

Menu Item	Function
	In a 3-Tier DSR configuration, accessible from the System OAM server only.
Charging Proxy Agent (optional)	Allows you to perform configuration tasks, edit system options, and view elements for: • Charging Proxy Agent (CPA) • Message Copy • Session Binding Repository In a 3-Tier DSR configuration, accessible from the System OAM server only.
Help	Launches the online help system for the user interface.
Logout	Allows you 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 will 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 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.

Supported browsers

This application requires the use of Microsoft® Internet Explorer 7.0 or 8.0.

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

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

Figure 4: Tekelec System Login

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

   The **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.

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

Accessing the 3-Tier DSR graphical user interface

In a 3-Tier DSR, some configuration is done at the NOAM server, while some is done at the SOAM server. Because of this, you will access the DSR graphical user interface (GUI) from two servers. 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, see **OAM ➤ Administration ➤ Single Sign-On administration** in the DSR online help.

After Single Sign-On has been configured, you can log into the DSR GUI on any NOAM or SOAM, and then 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: 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.

Icon	Name	Description
	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*.

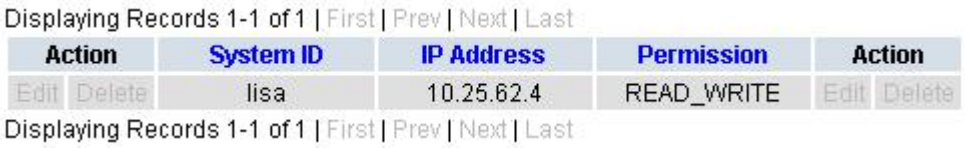
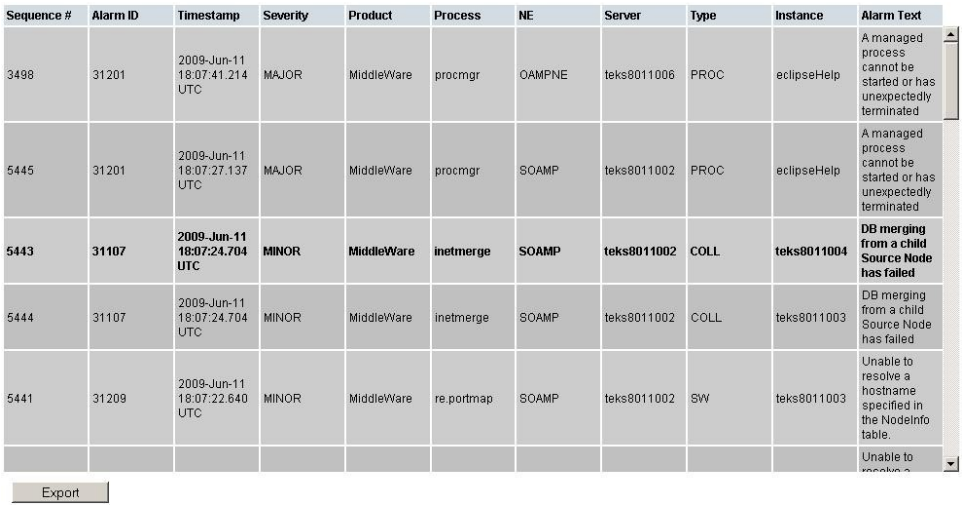


Figure 5: Paginated table

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*.



Sequence #	Alarm ID	Timestamp	Severity	Product	Process	NE	Server	Type	Instance	Alarm Text
3498	31201	2009-Jun-11 18:07:41.214 UTC	MAJOR	MiddleWare	procmgr	OAMPNE	teks8011006	PROC	eclipseHelp	A managed process cannot be started or has unexpectedly terminated
5445	31201	2009-Jun-11 18:07:27.137 UTC	MAJOR	MiddleWare	procmgr	SOAMP	teks8011002	PROC	eclipseHelp	A managed process cannot be started or has unexpectedly terminated
5443	**31107**	**2009-Jun-11 18:07:24.704 UTC**	**MINOR**	**MiddleWare**	**inetmerge**	**SOAMP**	**teks8011002**	**COLL**	**teks8011004**	**DB merging from a child Source Node has failed**
5444	31107	2009-Jun-11 18:07:24.704 UTC	MINOR	MiddleWare	inetmerge	SOAMP	teks8011002	COLL	teks8011003	DB merging from a child Source Node has failed
5441	31209	2009-Jun-11 18:07:22.640 UTC	MINOR	MiddleWare	re.portmap	SOAMP	teks8011002	SW	teks8011003	Unable to resolve a hostname specified in the NodeInfo table.
										Unable to

Export

Figure 6: 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.

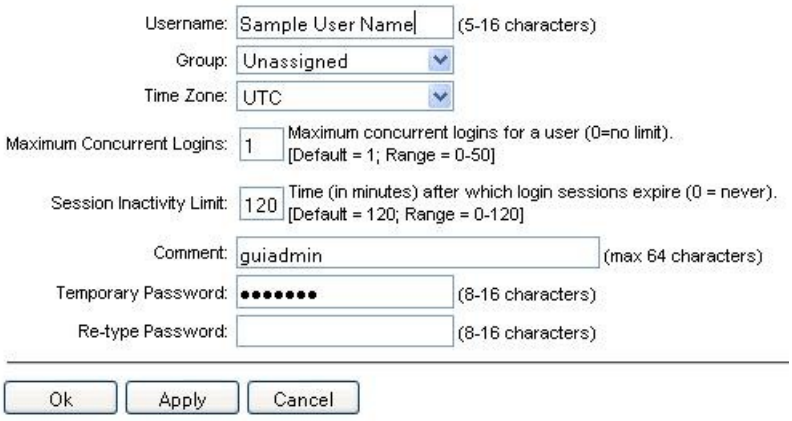
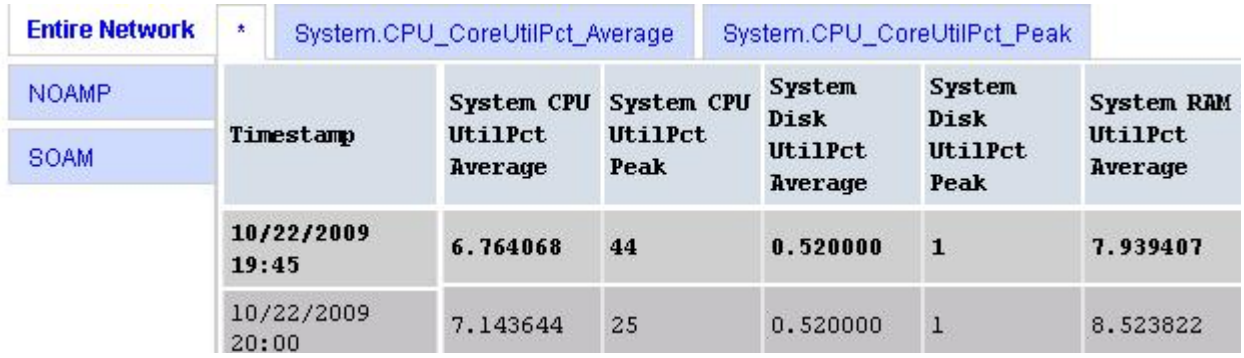


Figure 7: Form page

Tabbed pages

Tabbed pages provide collections of data in selectable tabs. Click on a tab to see the relevant data on that tab.



Timestamp	System CPU UtilPct Average	System CPU UtilPct Peak	System Disk UtilPct Average	System Disk UtilPct Peak	System RAM UtilPct Average
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 8: 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 9: 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 > Options**.

   The **Options Administration** page appears.
2. Locate **WelcomeMessage** in the **Variable** column.
3. Enter the welcome message text in the **Value** column.
4. Click **OK** or **Apply** to submit the information.

The next time you log in to the user interface, the 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 10: Sorting a Table by Column Header*. Clicking the column header again reverses the direction of the sort.

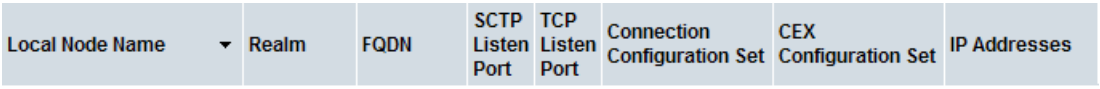


Figure 10: Sorting a Table by Column Header

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.

Submit button	Function
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 is a widget that allows you to clear the value from a pulldown list. The clear field control is available only on some pulldown fields.

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

Figure 11: Clear Field Control X

Optional layout element toolbar

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

Figure 12: 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.

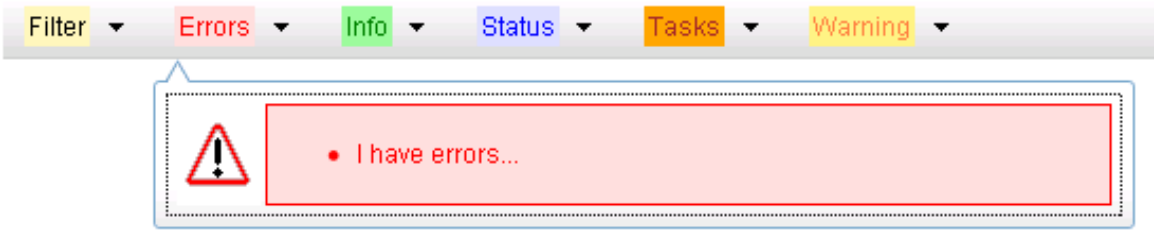


Figure 13: Automatic Error Notification

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.

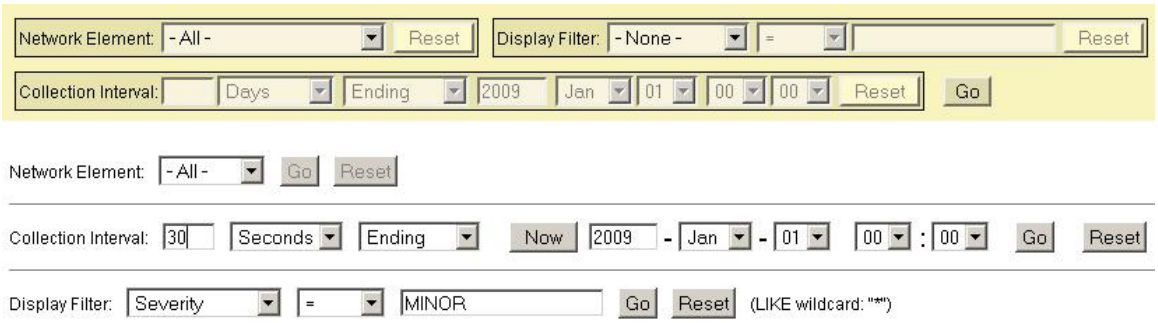


Figure 14: Examples of Filter Styles

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.

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 > Options.**
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.

Chapter 5

Copyright, notice, trademarks, and patents

Topics:

This section provides important information about copyrights, notices, trademarks, and patents associated with this product.

EAGLE XG Diameter Signaling Router (DSR) - Copyright, Notice, Trademarks, and Patents

Notice

Information in this documentation is subject to change without notice. Unauthorized use, copying, or translation of this documentation can result in civil or criminal penalties.

Any export of Tekelec products is subject to the export controls of the United States and the other countries where Tekelec has operations.

No part of this documentation may be reproduced, translated, or transmitted in any form or by any means, electronic or mechanical, including photocopying or recording, for any purpose without the express written permission of an authorized representative of Tekelec.

Other product names used herein are for identification purposes only, and may be trademarks of their respective companies.

RoHS 5/6 - As of July 1, 2006, all products that comprise new installations shipped to European Union member countries will comply with the EU Directive 2002/95/EC "RoHS" (Restriction of Hazardous Substances). The exemption for lead-based solder described in the Annex will be exercised. RoHS 5/6 compliant components will have unique part numbers as reflected in the associated hardware and installation manuals.

WEEE - All products shipped to European Union member countries comply with the EU Directive 2002/96/EC, Waste Electronic and Electrical Equipment. All components that are WEEE compliant will be appropriately marked. For more information regarding Tekelec's WEEE program, contact your sales representative.

Trademarks

TEKELEC, EAGLE, G-Flex, G-Port, and CAMIANT are registered trademarks of Tekelec. The Tekelec logo, A-Port, EAGLE 5, EAGLE 5 ISS, IP7, IP7 Secure Gateway, V-Flex, ngHLR, BLUESLICE, and Subscriber Data Server (SDS) are trademarks of Tekelec. All other trademarks are the property of their respective owners.

Patents

This product may be covered by one or more of the following U.S. and foreign patents:

U.S. Patent Numbers:

6,795,546; 6,901,262; 6,967,956; 7,043,000; 7,190,959; 7,286,516; 7,318,091; 7,383,298; 7,403,537; 7,406,159; 7,466,807; 7,633,872; 7,633,969; 7,650,367; 7,706,343; 7,743,131; 7,804,789; 7,860,799; 7,916,685; 8,179,885; 8,224,928;

Foreign Patent Numbers:

EP 1314324; EP 1568203; EP 1846832; EP 1847076; ZL 200780017383.1;

Glossary

C

ComAgent
Communication Agent

A common infrastructure component delivered as part of a common plug-in, which provides services to enable communication of message between application processes on different servers.

Communication Agent
See ComAgent.

CPA
Charging Proxy Application

A local application running on the DSR.

D

Diameter
Protocol that provides an Authentication, Authorization, and Accounting (AAA) framework for applications such as network access or IP mobility. Diameter works in both local and roaming AAA situations.

Diameter can also be used as a signaling protocol for mobility management which is typically associated with an IMS or wireless type of environment. Diameter is the successor to the RADIUS protocol. The MPE device supports a range of Diameter interfaces, including Rx, Gx, Gy, and Ty.

DIH
Diameter Intelligence Hub

A troubleshooting solution for LTE, IMS, and 3G Diameter traffic processed by the DSR. DIH does not require separate probes or taps.

D

DSR	Diameter Signaling Router A set of co-located Message Processors which share common Diameter routing tables and are supported by a pair of OAM servers. A DSR Network Element may consist of one or more Diameter nodes.
DVD	Digital Versatile Disk

E

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

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.

I

I

IMI	Internal Management Interface
IP	Internet Protocol IP specifies the format of packets, also called datagrams, and the addressing scheme. The network layer for the TCP/IP protocol suite widely used on Ethernet networks, defined in STD 5, RFC 791. IP is a connectionless, best-effort packet switching protocol. It provides packet routing, fragmentation and re-assembly through the data link layer.
IPFE	IP Front End A traffic distributor that routes TCP traffic sent to a target set address by application clients across a set of application servers. The IPFE minimizes the number of externally routable IP addresses required for application clients to contact application servers.
IPsec	Internet Protocol Security A protocol suite for securing Internet Protocol communications by authenticating and encrypting each IP packet of a data stream.
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6

K

KPI	Key Performance Indicators

M

M

MEAL	Measurements, Events, Alarms, and Logs
MP	Message Processor The role of the Message Processor is to provide the application messaging protocol interfaces and processing. However, these servers also have OAM&P components. All Message Processors replicate from their Signaling OAM's database and generate faults to a Fault Management System.

N

NMS	Network Management System An NMS is typically a standalone device, such as a workstation, that serves as an interface through which a human network manager can monitor and control the network. The NMS usually has a set of management applications (for example, data analysis and fault recovery applications).
NOAM	Network Operations, Administration, and Maintenance

O

OAM	Operations, Administration, and Maintenance The application that operates the Maintenance and Administration Subsystem which controls the operation of many Tekelec products.
OAM&P	Operations – Monitoring the environment, detecting and determining faults, and alerting administrators.

O

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

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

Provisioning – Setting up user accounts, devices, and services.

P

Peer

A Diameter node to which a given Diameter node has a direct transport connection.

R

RBAR

Range Based Address Resolution

A DSR enhanced routing application which allows the user to route Diameter end-to-end transactions based on Application ID, Command Code, "Routing Entity" Type, and Routing Entity address ranges.

S

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

T

TSA	Target Set Address An externally routable IP address that the IPFE presents to application clients. The IPFE distributes traffic sent to a target set address across a set of application servers.

V

VIP	Virtual IP Address Virtual IP is a layer-3 concept employed to provide HA at a host level. A VIP enables two or more IP hosts to operate in an active/standby HA manner. From the perspective of the IP network, these IP hosts appear as a single host.

X

XMI	External Management Interface