

**Oracle® Communications  
Policy Management**

Message Distribution Function Reference

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# Chapter 1

## About This Guide

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### Topics:

- *Introduction.....8*
- *How This Guide is Organized.....8*
- *Scope and Audience.....8*
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- *Customer Care Center.....9*
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- *Locate Product Documentation on the Customer Support Site.....13*

This chapter describes the organization of the document and provides other information useful to the reader.

## Introduction

This guide describes how to implement the Message Distribution Function (MDF) in a Policy Management network. The MDF is a standalone server deployed between a Mediation Gateway (MGW) and an Oracle Communications Subscriber Profile Repository (SPR) system. The MDF helps provision subscriber data, supports management of subscriber information, and facilitates the exchange of quota information.

### Conventions

The following conventions are used throughout this guide:

- **Bold text** in procedures indicates icons, buttons, links, or menu items that you click on.
- *Italic text* indicates variables.
- `Monospace text` indicates text displayed on screen.
- `Monospace bold text` indicates text that you enter exactly as shown.

## How This Guide is Organized

The information in this guide is presented in the following order:

- [About This Guide](#) contains general information about this guide, the organization of this guide, and how to get technical assistance.
- [Introduction](#) contains an overview of the MDF and its function in a Policy Management network.
- [Configuring MDF Servers](#) describes how to configure MDF servers using the Configuration Management Platform (CMP) system.
- [Managing Message Distribution Function Servers](#) describes how to manage MDF groups.
- [The MDF SOAP Interface](#) describes how to use an MDF system to provision, maintain, and exchange data with subscriber profile repositories (SPRs).
- [MDF Cluster Reports](#) describes how to view information about the MDF clusters in a Policy Management network.
- [The MDF Trace Log](#) describes the MDF trace log function.
- [MDF WSDL Definitions](#) describes the MDF web service definition language (WSDL) script files.
- [MDF Interface Error Codes](#) describes the interface error codes that can be returned by the MDF application.

## Scope and Audience

This guide is intended for the following trained and qualified service personnel who are responsible for operating Policy Management networks:

- System operators, who are responsible for provisioning SPR systems
- System administrators, who are responsible for configuring and maintaining MDF systems

## Documentation Admonishments

Admonishments are icons and text throughout this manual that alert the reader to assure personal safety, to minimize possible service interruptions, and to warn of the potential for equipment damage.

**Table 1: Admonishments**

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

## 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:

1-888-367-8552 (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:

+1-919-460-2150

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
- **Venezuela**  
Phone:  
0800-176-6497
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  - **Signalizing**  
Phone:  
+44 1784 467 804 (within UK)
  - **Software Solutions**  
Phone:  
+33 3 89 33 54 00
- **Asia**
  - **India**  
Phone:  
+91-124-465-5098 or +1-919-460-2150
  - 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.

## Related Publications

The Policy Management product set includes the following publications, which provide information for the configuration and use of Policy Management products in the following environments:

### Cable

- *Feature Notice*
- *Cable Release Notes*
- *Roadmap to Hardware Documentation*
- *CMP Cable User's Guide*
- *Troubleshooting Reference*
- *SNMP User's Guide*
- *OSSI XML Interface Definitions Reference*
- *Platform Configuration User's Guide*
- *Bandwidth on Demand Application Manager User's Guide*
- *PCMM specification PKT-SP-MM-I06* (third-party document, used as reference material for PCMM)

### Wireless

- *Feature Notice*
- *Wireless Release Notes*
- *Roadmap to Hardware Documentation*
- *CMP Wireless User's Guide*
- *Multi-Protocol Routing Agent User's Guide*
- *Troubleshooting Reference*

- *SNMP User's Guide*
- *OSSI XML Interface Definitions Reference*
- *Analytics Data Stream Reference*
- *Platform Configuration User's Guide*
- *Message Distribution Function Reference*

#### Wireline

- *Feature Notice*
- *Wireline Release Notes*
- *Roadmap to Hardware Documentation*
- *CMP Wireline User's Guide*
- *Troubleshooting Reference*
- *SNMP User's Guide*
- *OSSI XML Interface Definitions Reference*
- *Platform Configuration User's Guide*

## 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](http://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 2

## Introduction

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### Topics:

- *Message Distribution Function Overview.....15*
- *Interface Overview.....15*
- *MDF Functions on the CMP Navigation Pane.....16*

*Introduction* provides an overview of the Message Distribution Function (MDF) and its role in a Policy Management network.

## Message Distribution Function Overview

The Message Distribution Function (MDF) is a standalone server deployed between a Mediation Gateway (MGW) and an Oracle Communications Subscriber Profile Repository (SPR) system. The MDF system provides the modifications necessary to map provisioning requests from an MGW system to the data schema required for Policy Management systems and policies. This includes mapping subscriber profile data to relevant usage data that is then distributed to Policy Management subscriber profile, quota, state, and dynamic quota data objects. The MDF system provides the logic necessary to map the provisioning data associated with the one person, multiple devices (OPMD) feature to the pool profiles that are needed to manage the capability within Multimedia Policy Engine (MPE) and SPR systems.

The MDF system presents a set of Simple Object Access Protocol (SOAP) application programming interfaces (APIs) to support migration, provisioning, subscriber management, and quota management.

The MDF system provides an interface to collect alarm, event log, and performance metrics from the SPR system and distribute them to an enterprise management system (EMS) through an Oracle Communications Configuration Management Platform (CMP) system. This insulates the EMS from the SPR operations, administration, and management (OAM) interfaces.

The MDF system includes a load-shedding mechanism to reduce latency and remain stable and reliable for SOAP transactions under overload conditions. If the MDF system becomes overloaded (busy), requests to add subscribers are rejected. The configuration parameters are factory-preset and should not be changed.

The MDF system includes a throttling mechanism to gracefully reduce performance under overload conditions. The throttling mechanism is implemented using a token bucket algorithm that limits the rate of sending requests to the SPR provisioning interface. The configuration parameters are factory-preset and should not be changed.

## Interface Overview

The MDF provides the following interfaces:

- A SOAP interface to support migration, provisioning, and quotas to a Mediation Gateway (MGW) system that connects to a customer SPR system
- An Sh interface to support provisioning and quotas to an Oracle Communications Subscriber Profile Repository (SPR) system
- An Sh interface to provide subscriber information to an MPE system
- A management interface to a CMP system

*Figure 1: MDF Interfaces* shows the main system components and interfaces used to communicate between them.

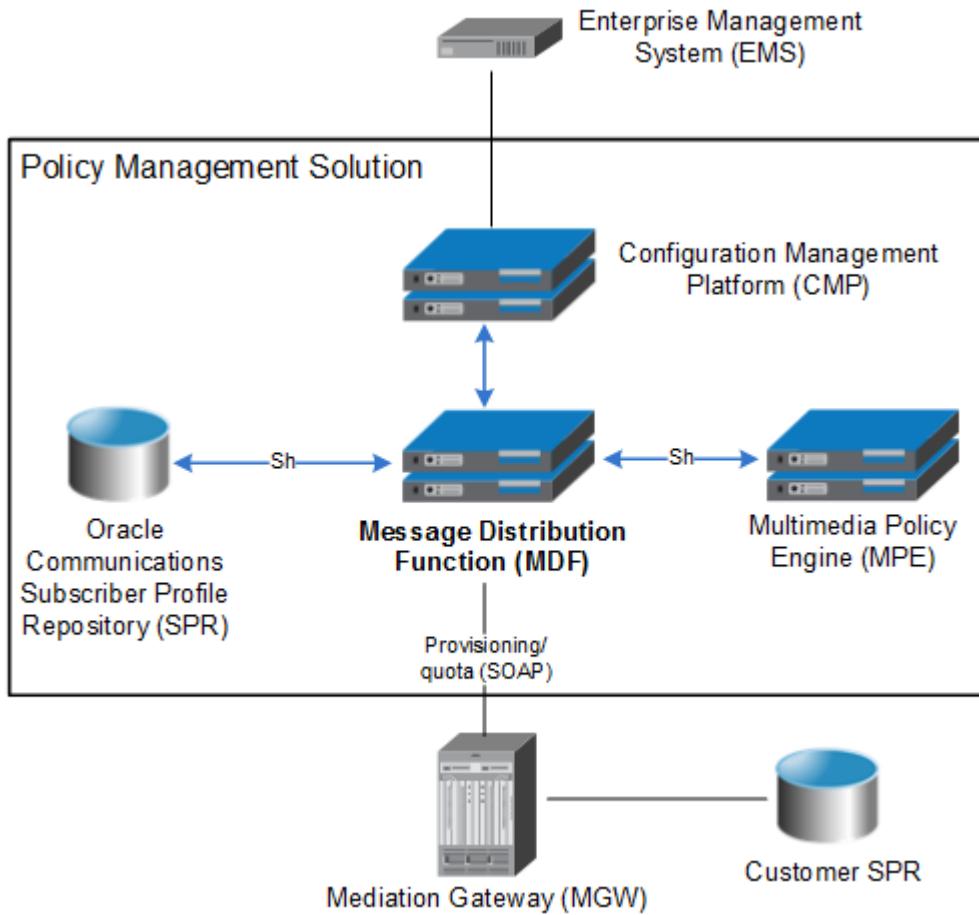
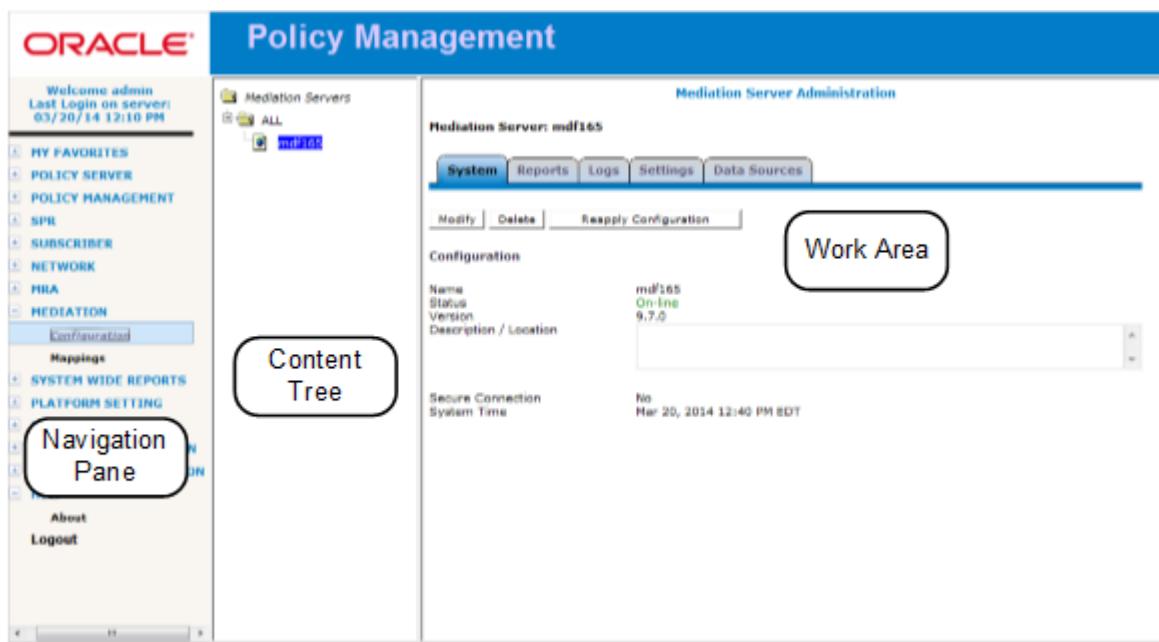


Figure 1: MDF Interfaces

## MDF Functions on the CMP Navigation Pane

MDF functions are available from the CMP system. Refer to the *Configuration Management Platform Wireless User's Guide* for a complete description of the CMP management functions.



**Figure 2: MDF Management Functions**

**Note:** The CMP supports the MDF as an optional configuration mode. This mode must be configured before your CMP system will display MDF options. Refer to the *Configuration Management Platform Wireless User's Guide* for a description of the Mode Settings page. Contact Customer Support to change an existing CMP system to support MDF functions.

You must have the correct privileges before you can view or make changes to MDF settings. These privileges are assigned using the **User Management** option from the **System Administration** section of the Navigation pane. Refer to the *Configuration Management Platform Wireless User's Guide* for information on user management.

The following options are available on the **Mediation** section of the CMP navigation pane:

- **Configuration** — Use this option to define MDF servers and server groups, modify settings for an existing MDF server, and access reports and trace logs associated with that server.
- **Mappings** — Use this option to create, view, modify, or delete mappings between SPR system fields, as well as quotas.

# Chapter 3

## Configuring MDF Servers

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### Topics:

- *Defining a New MDF Server.....19*
- *Modifying an MDF Server Profile.....19*
- *Deleting an MDF Server.....20*
- *Reapplying the Configuration to an MDF Server.....20*
- *Viewing MDF Server Settings.....21*
- *Modifying MDF Server Settings.....21*
- *Configuring MDF Advanced Settings.....23*
- *Data Source Interfaces for MDF Devices.....24*
- *Mapping Fields.....27*
- *Mapping Quotas.....28*

*Configuring MDF Servers* describes how to define and configure new Message Distribution Function (MDF) servers in a Policy Management network.

## Defining a New MDF Server

To define a new MDF server:

1. From the **Mediation** section of the navigation pane, select **Configuration**.  
The content tree displays a list of MDF groups; the initial group is **ALL**.
2. From the content tree, select **ALL**.  
The **Mediation Server Administration** page opens in the work area.
3. Click **Create Mediation Server**.  
The **New Mediation Server** page opens.
4. Enter information as appropriate for the MDF server:
  - a) **Associated Cluster** (required) — Select a MDF cluster from the pulldown list.
  - b) **Name** (required) — Enter a name for the MDF server.  
The name can be up to 32 characters long. The name can contain any alphanumeric characters except quotation marks ("") and commas (,).
  - c) **Description/Location** (optional) — Free-form text that described the cluster.  
Enter up to 250 characters.
  - d) **Secure Connection** — Select to enable a secure (HTTPS) connection instead of a normal connection (HTTP).  
The default is a non-secure (HTTP) connection.
5. When you finish, click **Save** (or **Cancel** to discard your changes).  
The MDF cluster profile is displayed in the **Mediation Server Administration** page.

The MDF server is defined.

## Modifying an MDF Server Profile

To modify an MDF server profile:

1. From the **Mediation** section of the navigation pane, select **Configuration**.  
The content tree displays a list of MDF groups; the initial group is **ALL**.
2. From the content tree, select the MDF profile.  
The **Mediation Server Administration** page opens in the work area.
3. Select the **System** tab.  
The current profile settings are displayed.
4. Click **Modify**.  
The **Modify System Settings** page opens.
5. Make changes as necessary. See [Defining a New MDF Server](#) for information on settings.
6. When you finish, click **Save** (or **Cancel** to discard your changes).  
You are prompted, “The configuration was applied successfully.”

The MDF profile is modified.

## Deleting an MDF Server

Deleting an MDF profile from the ALL group also deletes it from any associated group.

To delete an MDF profile:

1. From the **Mediation** section of the navigation pane, select **Configuration**. The content tree displays a list of MDF groups; the initial group is **ALL**.
2. From the content tree, select the **ALL** group. the **Mediation Server Administration** page opens in the work area, displaying all defined MDF profiles.
3. Use one of the following methods to select the MDF profile to delete:
  - From the work area, click the **Delete** icon located next to the MDF profile you want to delete.
  - From the MDF group tree, select the MDF profile; the **Mediation Server Administration** page opens. Click the **System** tab; the System tab opens. Click **Delete**.

You are prompted, "Are you sure you want to delete this Mediation Server?"

4. Click **OK** (or **Cancel** to abandon the request).

The MDF definition is removed from the CMP database.

## Reapplying the Configuration to an MDF Server

You can reapply the configuration to an MDF cluster. When you reapply the configuration the CMP system completely reconfigures the servers in the cluster with topology information, ensuring that the configuration matches the data in the CMP database. This action is not needed during normal operation but is useful in the following situations:

- When the servers of a cluster are replaced, the new servers come up initially with default values. Reapplying the configuration lets you redeploy the entire configuration rather than reconfiguring each server field by field. You should also apply the Rediscover Cluster operation to the CMP system to re-initialize the Cluster Information Report for the device, thereby clearing out the failed servers' status.
- After upgrading the Policy Management on a server, it is recommended that you reapply the configuration from the CMP database to ensure that the upgraded server and the CMP database are synchronized.
- The server configuration may go out of synchronization with the CMP system (for example, when a break in the network causes communication to fail between the CMP system and the server). If such a condition occurs, the CMP system displays the server status on its System tab with the notation "Config Mismatch." You can click the notice to display a report comparing the server configuration with the CMP database information. Reapplying the configuration brings the server back into synchronization with the CMP database.



**Caution:** Reapplying the configuration pushes the settings on the CMP system to the selected MDF server and overwrites the current settings stored on that server.

To reapply the configuration to an MDF server:

1. From the **Mediation** section of the navigation pane, select **Configuration**.  
The content tree displays a list of MDF groups; the initial group is **ALL**.
2. Select the MDF group from the content tree.  
The contents of the selected group are displayed.
3. Select an MDF server from the group.  
The information for the server displays in the **Mediation Server Administration** page.
4. Select the **System** tab.  
The configuration information for the server displays.
5. Click **Reapply Configuration**.  
If the application was successful, you receive the message, "The configuration was applied successfully."

The configuration is reapplied to the MDF server.

## Viewing MDF Server Settings

To view MDF server settings:

1. From the **Mediation** section of the navigation pane, select **Configuration**.  
The content tree displays a list of MDF groups; the initial group is **ALL**.
2. Select the MDF group from the content tree.  
The contents of the selected group are displayed.
3. Select an MDF server from the group.  
The information for the server displays in the **Mediation Server Administration** page.
4. Click the **Settings** tab.  
The settings for the MDF server display.

Settings for the SOAP interface, Diameter, MGW data source, and load shedding configuration are displayed.

## Modifying MDF Server Settings

To modify MDF server settings:

1. From the **Mediation** section of the navigation pane, select **Configuration**.  
The content tree displays a list of MDF groups; the initial group is **ALL**.
2. From the content tree, select the MDF server.  
The **Mediation Server Administration** page displays information for the server.
3. Select the **Settings** tab.  
The current configuration options are displayed.
4. Click **Modify**.  
The **Modify Mediation Server** page opens.
5. Make changes to the configuration as necessary.

See [Table 2: MDF Server Settings](#) for the available options.

- When you finish, click **Save** to apply the updated configuration (or **Cancel** to discard your changes). You are prompted, “The configuration was applied successfully.”

The modifications are stored in the CMP database.

**Table 2: MDF Server Settings**

Attribute	Description
<b>SOAP Interface</b>	
SOAP User Name	Enter the account user name used to authenticate SOAP requests. This field can be left blank.
SOAP Password	Enter the account password used to authenticate SOAP requests. The value is stored as an MD5 digest. This field can be left blank.
Enable HTTP Service	If enabled, the MDF system communicates using HTTP protocol. Either <b>Enable HTTP Service</b> or <b>Enable HTTPS Service</b> must be enabled; both can be enabled.
HTTP port	Enter the port number of the HTTP server. The default port is 80.
Enable HTTPS Service	If enabled, the MDF system communicates using HTTPS protocol. Either <b>Enable HTTP Service</b> or <b>Enable HTTPS Service</b> must be enabled; both can be enabled.
HTTPS port	Enter the port number of the HTTPS server. The default port is 443.
<b>Diameter</b>	
Diameter Port	Enter the Diameter port number of the MDF server. The default is 3868.
Diameter Realm	The domain of responsibility (for example, <b>galactel.com</b> ) of the MDF server.
Diameter Identity	Enter the fully qualified domain name (FQDN) of the MDF server (for example, <b>mdf2.galactel.com</b> ).
<b>MGW Data Source</b>	
MGW User Name	Enter the user name for the messaging gateway access account (if the MGW requires authentication).
MGW Password	Enter the password for the messaging gateway access account (if the MGW requires authentication).
MGW Base URI	Enter the uniform resource identifier for the messaging gateway.
MGW IP	Enter the IP address of the messaging gateway.
MGW Port	Enter the port number of the messaging gateway. The default is 80.
<b>Load Shedding Configuration</b>	
Enabled	If enabled, the MDF system performs load shedding during periods of excessive usage.

## Configuring MDF Advanced Settings

The Advanced configuration page provides access to factory-default attribute settings that are not normally changed.



### CAUTION

**Caution:** Do not attempt to change a configuration key without first consulting with Tekelec Technical Support.

To configure an advanced setting on an MDF device:

1. From the **Mediation** section of the navigation pane, select **Configuration**.  
The content tree displays a list of MDF groups; the initial group is **ALL**.
2. From the content tree, select an MDF device.  
The **Mediation Server Administration** page opens.
3. Select the **Settings** tab.  
The MDF configuration settings are displayed.
4. Click **Advanced**.

The **Other Advanced Configuration Settings** table opens.

- **To add a key to the table** — Click **Add**; the **Add Configuration Key Value** window opens. Enter the following values:
  - **Configuration Key** — The attribute to set
  - **Value** — The attribute value

When you finish, click **Save** (or **Cancel** to discard your changes). The key is added to the table.



### CAUTION

**Caution:** There is no input validation on keys or values. Also, if you overwrite a setting that is already configurable using the CMP GUI, the value adopted by the MDF device is undetermined.

- **To clone a key in the table** — Select an existing key in the table and click **Clone**; the **Clone Configuration Key Value** window opens with that key's information filled in. Make changes as required. When you finish, click **Save** (or **Cancel** to discard your changes). The key is added to the table.
- **To edit a key in the table** — Select an existing key in the table and click **Edit**; the **Edit Configuration Key Value** window opens with that key's information. Make changes as required. When you finish, click **Save** (or **Cancel** to discard your changes). The updated key is added to the table.
- **To delete a key from the table** — Select an existing key in the table and click **Delete**; you are prompted, "Are you sure you want to delete the selected Configuration Key Value(s)?" Click **Delete** to remove the key (or **Cancel** to cancel your request). The key is removed from the table.
- **To change the order of keys in the table** — Configuration keys are executed in the order listed. To change the order, select an existing key in the table and click **Up** or **Down**; the key is moved up or down in the list.

5. When finished making changes, click **Save** (or **Cancel** to discard changes).  
The settings are applied to the selected MDF device.

## Data Source Interfaces for MDF Devices

Before the MDF device can communicate with any external data sources, you must configure the interface. You can configure data source interfaces for an individual MDF device. See [Configuring Data Source Interfaces for an MDF Device](#).

From within the **Data Sources** window, you can configure Sh (Oracle Communications SPR) or provisioning (customer SPR) data sources. See the following tasks:

- [Configuring Data Source Interfaces for an MDF Device](#)
- [Configuring the Sh Data Source for an MDF Server](#)
- [Configuring the SPR Provisioning Data Source for an MDF Server](#)

Subscriber data can be mapped by IMSI prefix to an Oracle Communications SPR system or a customer SPR system. For information, see [Selecting Data Sources for MDF Devices](#).

## Configuring Data Source Interfaces for an MDF Device

To configure a data source interface for an MDF device:

1. From the **Mediation** section of the navigation pane, select **Configuration**.  
The content tree displays a list of policy server groups; the initial group is **ALL**.
2. Select the MDF server.  
The **Mediation Server Administration** page opens.
3. Select the **Data Sources** tab.  
The current data sources are displayed, listing the administrative state, name, type, primary address, and primary port.
4. To modify the list of data sources, click **Modify**.

The **Data Sources** page opens. The functions available from the embedded table are as follows:

- **To add a data source to the table** — Select the data source type from the **Add** pulldown list; the appropriate **Add Data Source** window opens. Configure values as appropriate. When you finish, click **Save** (or **Cancel** to discard your changes); the data source is added to the table. For more information, see [Configuring the SPR Provisioning Data Source for an MDF Server](#) and [Configuring the Sh Data Source for an MDF Server](#).
- **To clone a data source in the table** — Select an existing data source in the table and click **Clone**; the **Clone Data Source** window opens with the information for the data source displayed. Make changes as required. When you finish, click **Save** (or **Cancel** to discard your changes); the data source is added to the table.
- **To edit a data source in the table** — Select the data source in the table and click **Edit**; the **Edit Data Source** window opens, displaying the information for the data source. Change the configuration values as required. When you finish, click **Save** (or **Cancel** to discard your changes); the data source is updated in the table.
- **To delete a data source from the table** — Select the data source in the table and click **Delete**; you are prompted, “Are you sure you want to delete the selected data source(s)?” Click **Delete** to remove the data source entry (or **Cancel** to cancel your request); the data source is removed from the table.

- **To change the order of the list** — If you define multiple data sources, they are searched in the order displayed in this list. To change the order, select a data source and click **Up** or **Down**; the search order is changed.

5. When you finish, click **Save** (or **Cancel** to discard your changes).

The data source interface for the MDF is configured.

## Configuring the Sh Data Source for an MDF Server

See [Configuring Data Source Interfaces for an MDF Device](#) for information on the **Add Data Source** page.

An Sh data source is usually an Oracle Communications SPR device. To define an Sh data source, on the **Add Data Source** page, enter the following information:

1. **Admin State** — Enable this data source.  
Selected by default.
2. **Sh Profile** — Select **ProfileV4** (to support provisioning of pass, rollover, and top-up information).  
**Note:** **ProfileV4** is the only Sh profile available for MDF servers.
3. **Primary Servers:**
  - Primary Identity** — Primary server host name.
  - Primary Address** — IP address, in IPv4 or IPv6 format, of the primary server.
  - Primary Port** — Primary server port number.  
The default is 3868.
  - Secondary Identity** — Secondary server host name.
  - Secondary Address** — IP address, in IPv4 or IPv6 format, of the secondary server.
  - Secondary Port** — Secondary server port number.  
The default is 3868.
4. **Backup Servers:**
  - Primary Identity** — Primary backup server name.
  - Primary Address** — IP address, in IPv4 or IPv6 format, of the primary backup server.
  - Primary Port** — Primary backup server port number.  
The default is 3868.
  - Secondary Identity** — Secondary backup server name.
  - Secondary Address** — IP address, in IPv4 or IPv6 format, of the secondary backup server.
  - Secondary Port** — Secondary backup server port number.  
The default is 3868.
5. **Common:**
  - Realm** — Sh server realm; for example, **galactel.com**.
  - Unique Name** — The unique name assigned to the Sh server.
  - Connect SCTP** — Indicates whether the Sh data source can support SCTP protocol. If checked, an MDF device can communicate with the Sh data source in SCTP.
6. When you finish, click **Save** (or **Cancel** to discard your changes).

The Sh data source is configured.

## Configuring the SPR Provisioning Data Source for an MDF Server

See [Configuring Data Source Interfaces for an MDF Device](#) for information on the **Add Data Source** page.

A provisioning data source is a customer SPR system. To define a provisioning data source, on the **Add Data Source** page, enter the following information:

1. **Admin State** — Enable this data source.  
Selected by default.
2. **Unique Name** — The unique name assigned to the SPR Provisioning Data Source.  
Identifies which SPR data source to use.
3. **Host** — The FQDN or IP address of the SPR data source. Enter the standard dot-formatted IP address string.
4. **User Name** — The user name for the SPR access account for authentication.  
The default is **admin**.
5. **Password** — The password for the SPR access account for authentication.  
The default is **admin**.
6. **Module Name** — The module name to use for authentication.  
The default is **Mediation**.
7. **Key Transform Pattern** — A matching expression for filtering MDF routing to the SPR system.
8. When you finish, click **Save** (or **Cancel** to discard your changes).

The SPR Provisioning data source is configured.

## Selecting Data Sources for MDF Devices

MDF devices determine whether a subscriber record is located on an Oracle Communications SPR system or a customer SPR system using matching rules based on the IMSI value. The rules apply globally to all MDF devices.

The selection algorithm is as follows:

- If no data source is selected, the MDF device writes data to the Oracle Communications SPR system.
- If one data source is selected, it is configured as either an “Internal-SPR” (Oracle Communications SPR system) or an “External-SPR” (customer SPR system). The MDF device writes data to the Oracle Communications SPR system when the IMSI matches an Internal-SPR data source. (It will not write data to an External-SPR data source.)
- If multiple data sources are selected, the MDF device writes data to an SPR system based on the rule with the longest IMSI prefix match.

To define a data source rule for MDF devices:

1. From the **Global Configuration** section of the navigation pane, select **Data Source Selection**. The **Data Source Selection Administration** page opens.
2. Define the following fields:
  - a) **IMSI Prefix** — Enter an IMSI substring.
  - b) **Datasource Type** — Select **Internal-SPR** (Oracle Communications SPR system) or **External-SPR** (customer SPR system) from the pulldown list.
  - c) **MPE Datasource** — Select the SPR device name from the pulldown list.
  - d) **Prov Datasource** — Select the provisioning SPR device name from the pulldown list.

3. When you finish, click **Add**.  
The IMSI prefix is added to the IMSI Prefix list.
4. Repeat steps 2 and 3 as required.  
Additional rules are added to the IMSI Prefix list.
5. When you finish, click **Reapply Selections**.  
The rules are deployed to MDF and MPE devices.

To modify an existing rule, click the edit (pencil) icon to the right of the rule. The fields become editable. Make changes as necessary, click **Modify** (or **Cancel** to abandon your changes), and click **Reapply Selections**.

To remove an existing rule, click the delete (trash can) icon to the right of the rule. You are prompted, "Are you sure you want to delete this item?" Click **OK** (or **Cancel** to cancel the request), and click **Reapply Selections**.

## Mapping Fields

The attribute names of MDF SOAP requests must match field names in the SPR database. If the names differ, the request will fail. To support flexibility, the MDF system supports attribute mapping between SOAP interface attribute names and SPR database field names.

Each mapping includes the following:

- Unique name — A unique name for the mapping within the CMP database
- SOAP field — The name of the SOAP request attribute
- SDM field — The name of the SPR database field
- Description — Free-form text describing the mapping

To map fields:

1. From the **Mediation** section of the navigation pane, select **Mappings**.  
The content tree displays a list of mapping groups.
2. From the content tree, select the **SDM Mapping** group.  
The **SDM Mapping** page displays the mapping table.
3. On the **SDM Mapping** page, click **Modify**.

The functions available from the embedded table are as follows:

- **To add a mapping to the table** — Click **Add**; the **Add SDM Mapping** window opens. Enter values for the fields **Unique Name**, **SOAP Field**, **SDM Field**, and (optionally) up to 255 characters in **Description**. When you finish, click **OK** (or **Cancel** to discard your changes); the mapping is added to the table.
- **To clone a mapping in the table** — Select an existing mapping in the table and click **Clone**; the **Clone SDM Mapping** window opens with the information for the mapping displayed. Make changes to the fields as required. When you finish, click **OK** (or **Cancel** to discard your changes); the mapping is added to the table.
- **To edit a mapping in the table** — Select the mapping in the table and click **Edit**; the **Edit SDM Mapping** window opens, displaying the information for the mapping. Make changes to the fields as required. When you finish, click **OK** (or **Cancel** to discard your changes); the mapping is updated in the table.

- **To delete a mapping from the table** — Select one or more mappings in the table and click **Delete**; you are prompted, “Are you sure you want to delete the selected SDM Mapping(s)?” Click **Delete** to remove the mapping entry or entries (or **Cancel** to cancel your request); the mapping is removed from the table.
- **To change the order of the list** — If you define multiple mappings, they are applied in the order displayed in this list. To change the order, select a mapping and click **Up** or **Down**; the search order is changed.

4. When you finish, click **Save** to apply the updated configuration (or **Cancel** to discard your changes). The mappings appear in the table.

The mappings are stored in the CMP database.

*Table 3: Default Subscriber Field Mappings* lists the subscriber field mappings supported by default in the MDF system.

**Table 3: Default Subscriber Field Mappings**

SOAP Attribute Name	SPR Field Name
ASOC	ASSOC
MDN	MSISDN
PID	NAI

## Mapping Quotas

The quota provisioning request names in MDF SOAP requests must match quota profile names in the CMP database. If the names differ, the request will fail. To support flexibility, the MDF system supports quota mapping between SOAP interface quota request names and CMP quota profile names.

To map quotas:

1. From the **Mediation** section of the navigation pane, select **Mappings**.  
The content tree displays a list of mapping groups.
2. From the content tree, select the **Quota Mapping** group.  
The **Quota Mapping** page displays the mapping table.
3. On the **Quota Mapping** page, click **Modify**.

The functions available from the embedded table are as follows:

- **To add a mapping to the table** — Click **Add**; the **Add Quota Mapping** window opens. Enter values for the following fields:
  - **Unique Name** — A unique name for the quota mapping within the CMP database.
  - **Category** — Select a category from the pulldown list.
  - **Name** — Enter the quota name used in the SOAP request and click **Add**; the name is added to the list. To remove a quota name, select it from the list and click **Delete**.
  - **Quota Profile Name** — Enter the quota profile from the list and click **Add**; the name is added to the list. To remove a quota profile name, select it from the list and click **Delete**.
  - **Quota Type** — Select the quota type (**quota**, **pass**, or **top-up**) from the pulldown list.

- **Mid-month Registration** — Select if the quota supports mid-month registration.
- **OPMD Sharable** — Select if the quota is shared as part of one person, multiple devices (OPMD).

When you finish, click **OK** (or **Cancel** to discard your changes); the mapping is added to the table.

- **To clone a mapping in the table** — Select an existing mapping in the table and click **Clone**; the **Clone Quota Mapping** window opens with the information for the mapping displayed. Make changes to the fields as required. When you finish, click **OK** (or **Cancel** to discard your changes); the mapping is added to the table.
- **To edit a mapping in the table** — Select the mapping in the table and click **Edit**; the **Edit Quota Mapping** window opens, displaying the information for the mapping. Make changes to the fields as required. When you finish, click **OK** (or **Cancel** to discard your changes); the mapping is updated in the table.
- **To delete a mapping from the table** — Select one or more mappings in the table and click **Delete**; you are prompted, “Are you sure you want to delete the selected Quota Mapping(s)?” Click **Delete** to remove the mapping entry or entries (or **Cancel** to cancel your request); the mapping is removed from the table.
- **To change the order of the list** — If you define multiple mappings, they are applied in the order displayed in this list. To change the order, select a mapping and click **Up** or **Down**; the search order is changed.

4. When you finish, click **Save** to apply the updated configuration (or **Cancel** to discard your changes). The mappings appear in the table.

The quota mappings are stored in the CMP database.

# Chapter 4

## Managing Message Distribution Function Servers

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### Topics:

- *Creating an MDF Server Group.....31*
- *Adding an MDF Server to an MDF Server Group.....31*
- *Creating an MDF Server Sub-group.....31*
- *Renaming an MDF Server Group.....32*
- *Removing an MDF Server from an MDF Group.....32*
- *Deleting an MDF Server Group.....33*

*Managing Message Distribution Function Servers* describes how to define and manage Message Distribution Function (MDF) servers in the CMP system.

**Note:** For more information on using MDF servers, refer to the *Message Distribution Function Reference*.

## Creating an MDF Server Group

You can create groups for MDF servers to organize and simplify management.

To create an MDF server group:

1. From the **Mediation** section of the navigation pane, select **Configuration**.  
The content tree displays a list of MDF groups; the initial group is **ALL**.
2. From the content tree, select the **ALL** group.  
The **Mediation Server Administration** page opens in the work area.
3. Click **Create Group**.  
The **Create Group** page opens.
4. Enter the name of the new MDF group.  
The name can be up to 250 characters long and must not contain quotation marks ("") or commas (,).
5. When you finish, click **Save** (or **Cancel** to discard your changes).  
The new group appears in the content tree.

The MDF group is created.

## Adding an MDF Server to an MDF Server Group

To add an MDF server to an MDF server group:

1. From the **Mediation** section of the navigation pane, select **Configuration**.  
The content tree displays a list of MDF groups; the initial group is **ALL**.
2. From the content tree, select the MDF group.  
The **Mediation Server Administration** page opens in the work area, displaying the contents of the selected MDF group.
3. Click **Add Mediation Server**.  
The **Add Mediation Server** page opens, displaying the MDF servers not already part of the group.
4. Click on the MDF server you want to add; use Ctrl or Shift-Ctrl to select multiple MDF servers.
5. When you finish, click **Save** (or **Cancel** to cancel the request).

The MDF server is added to the selected group.

## Creating an MDF Server Sub-group

You can create sub-groups to further organize your Policy Management network. To add an MDF sub-group to an existing MDF group:

1. From the **Mediation** section of the navigation pane, select **Configuration**.  
The content tree displays a list of MDF groups; the initial group is **ALL**.
2. From the content tree, select the MDF group.

The **Mediation Server Administration** page opens in the work area, displaying the contents of the selected MDF group.

3. Click **Create Sub-Group**.

The **Create Group** page opens.

4. Enter the name of the new MDF sub-group.

The name can be up to 250 characters long and must not contain quotation marks ("") or commas (,).

5. When you finish, click **Save** (or **Cancel** to discard your changes).

The new sub-group appears in the content tree.

The MDF sub-group is created.

## Renaming an MDF Server Group

To modify the name assigned to an MDF group or sub-group:

1. From the **Mediation** section of the navigation pane, select **Configuration**.

The content tree displays a list of MDF groups; the initial group is **ALL**.

2. From the content tree, select the MDF group or sub-group.

The **Mediation Server Administration** page opens in the work area.

3. Click **Modify**.

The **Modify Group** page opens.

4. Enter the new name in the **Name** field.

The name cannot contain quotation marks ("") or commas (,).

5. When you finish, click **Save** (or **Cancel** to cancel the request).

The new group name appears in the content tree.

The group is renamed.

## Removing an MDF Server from an MDF Group

Removing an MDF profile from an MDF group or sub-group does not delete the profile. To delete an MDF profile, see [Deleting an MDF Server](#).

To remove an MDF profile from an MDF group or sub-group:

1. From the **Mediation** section of the navigation pane, select **Configuration**.

The content tree displays a list of MDF groups; the initial group is **ALL**.

2. From the content tree, select the MDF group or sub-group.

The **Mediation Server Administration** page opens in the work area, displaying the contents of the selected MDF group or sub-group.

3. Remove the MDF profile using one of the following methods:

- Click the Remove (✖) icon located next to the MDF profile you want to remove.

- From the content tree, select the MDF profile; the **Mediation Server Administration** page opens. Click the **System** tab; the **System** tab opens. Click **Remove**.

The MDF profile is removed immediately; there is no confirmation message.

The MDF profile is removed from the group or sub-group.

## Deleting an MDF Server Group

Deleting an MDF group also deletes any associated sub-groups. However, any MDF profiles associated with a deleted group or sub-group remain in the All group. You cannot delete the ALL group.

To delete an MDF group or sub-group:

1. From the **Mediation** section of the navigation pane, select **Configuration**.  
The content tree displays a list of MDF groups; the initial group is **ALL**.
2. From the content tree, select the MDF group or sub-group.  
The **Mediation Server Administration** page opens in the work area, displaying the contents of the selected MDF group or sub-group.
3. On the **Mediation Server Administration** page, click **Delete**.  
You are prompted, “Are you sure you want to delete this Group?”
4. Click **OK** to delete the group (or **Cancel** to cancel the request).

The MDF group is deleted.

# Chapter 5

## The MDF SOAP Interface

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### Topics:

- *SOAP Interface Definitions.....35*
- *addSubscriber Request.....35*
- *delSubscriber Request.....41*
- *getSubscriber Request.....42*
- *keepAlive Request.....45*
- *notifySubscriber Request.....46*
- *quotaRequest Request.....48*
- *updateQuota Request.....50*
- *updateSubscriber Request.....51*

*The MDF SOAP Interface* describes the Simple Object Access Protocol (SOAP) application programming interface (API) calls supported by the Message Distribution Function (MDF) to provision an Oracle Communications Subscriber Profile Repository (SPR) system with carrier subscriber data.

## SOAP Interface Definitions

The MDF system functions as a Simple Object Access Protocol (SOAP) server to exchange requests with the mediation gateway (MGW) system and translate SOAP requests to SPR requests. After the SPR processes the request, the MDF system translates the SPR response to a SOAP response and sends it back to the MGW system.

The following sections describe the SOAP interface supported by the MDF system for provisioning, subscriber maintenance, and quota management. Refer to [MDF WSDL Definitions](#) for a Web Services Description Language (WSDL) definition that can be used to generate client-side code to call these functions.

**Note:** The MDF system does not validate attribute values for data type or range.

## addSubscriber Request

### Description

The addSubscriber request adds a subscriber to the SPR. Quota grants are pro-rated according to the day of the month.

**Note:** The request does not check if the subscriber already exists.

### Attributes

#### password

Required password for access to the SPR.

#### username

Required user name for access to the SPR.

#### MDN

Specifies the subscriber Mobile Directory Number (MDN) if the query user ID type is MDN. An 11-digit value.

#### IMSI

Specifies the subscriber International Mobile Subscriber Identity number if the query user ID type is IMSI. A 15-digit value.

#### ESN

Specifies the electronic serial number of the user equipment. A seven-digit hexadecimal value.

#### PID

Specifies the subscriber PID (Network Address Identifier). In the form of an email address.

#### OI

Specifies the Origination Indicator. Possible values are **1** (AA, allow all) or **2** (OD, origination denied).

**TC**

Specifies the Termination Restriction Code. Possible values are **1** (AA, allow all) or **2** (TD, termination denied).

**SC**

Specifies the Subscriber Capability. Possible values are **0** through **17**.

**HA\_IP**

Specifies the home agent IP address, used with VPNs. An IPv4 address.

**SEC\_LEVEL**

Specifies the security level, used with VPNs. Possible values are **1** through **4**.

**TUNNELING**

Used with VPNs. Possible values are **0** or **1**.

**SVC**

Specifies the Supplementary Service, used with VPNs. Services can be defined as **0** (register) or **1** (deregister). Possible values are **SIP**, **MIPS**, **MIPD**, **AUTH**, **WIN**, and **VPN**. Values can be combined; for example,

**SIP:3|MIPS:1|MIPD:1|AUTH:1|WIN:1|VPN:1**.

**WIN\_SVC**

Used with PCRF and LMSC.

**SUB\_IP**

An IPv4 address.

**PWD**

Specifies the authentication password used with AAA. A string value.

**S\_KEY**

Used with AAA.

**VPN\_HA\_IP**

Specifies the VPN home agent IP address. An IPv4 address.

**VPN\_FLAG**

Used with VPN.

**VPN\_PRO**

Used with VPN.

**ALYS\_ON**

Not currently used.

**SOC**

Specifies the provisioned entitlement.

**ASOC**

Specifies the associated SOC.

**LTE**

Possible values are **0** (flags a 3G user) or **1** (flags a 4G user).

**IMS\_SVC**

Specifies the IMS service. Possible values are **VOLTE:1**, **PSVT:1**, and **RCS:1**. Values can be combined; for example, **VOLTE:1&PSVT:1&RCS:1**.

#### **SPEED\_CON**

Specifies the bandwidth control: **BASIC\_S**, **GN\_S**, **OTN\_S**, and **Q4\_S**. Possible values include 0 (no QoS control), 400 (400 kbps), 800 (800 kbps), and so forth. Values can be combined; for example, **BASIC\_S:0&GN\_S:400&OTN\_S:0&Q4\_S:0**.

#### **TIME\_CON**

Specifies the time control used in policies: **BASIC\_S**, **GN\_S**, **OTN\_S**, and **Q4\_S**. Possible values include 0 (unlimited), 1 (no busy hour control), 2 (busy hour control) and 3 (predefined time control). Values can be combined; for example, **BASIC\_T:0&GN\_T:0&OTN\_T:0&Q4\_T:0**.

#### **IMS\_FLAG**

Set to **0**; only multiple APNs used.

#### **MM**

Specifies the Message Manager service type.

#### **MC**

Specifies the Message Quoting service.

#### **MODEL**

Specifies the phone model. A 12-character string. For example, **SHV-E300K**.

#### **DSI**

Data Service Inhibited. Possible values are **0** or **1**.

#### **RDSI**

Roaming Data Service Inhibited. Possible values are **0** or **1**.

#### **MCI**

Specifies the Message Coupon Service. Used by LMSC. Possible values are **0** or **1**.

#### **FM**

Specifies Foreign Mobile. Possible values are **0** or **1**.

#### **CS**

Specifies the Cool Shot service. Possible values are **0** or **1**.

#### **CATE**

Specifies the Category. Possible values are **0** or **1**.

#### **3GNOTI**

Specifies the 3G SMS Service. Possible values are **0** or **1**.

#### **DATA\_LIM**

Specifies the monthly data limit in bytes.

#### **DAY\_LIM**

Specifies the daily data limit in bytes.

#### **mVoIP\_LIM**

Specifies the monthly mobile VOIP limit in bytes.

#### **DATA\_LIM\_A**

Specifies the data limit for ASOC.

#### STYLE\_A

Specifies the specific type of data plan. A list of 11 elements, in order, from **AL0**, **AL1**, ..., **AL10**. A value in bytes; **0** means not registered. Always combined with **STYLE\_A\_SDATE**. For example,

**AL0:0|AL1:2048|AL2:0|AL3:0|AL4:0|AL5:0|AL6:0|AL7:0|AL8:0|AL9:0|AL10:0.**

#### STYLE\_A\_SDATE

Specifies the purchase time of a data plan, effective from the purchase time to the end of the billing cycle. A list of 11 elements, in order, from **AL0**, **AL1**, ..., **AL10**. Each element includes a date-time value of the form *yyyymmddhhmmss*, or a value of **0**, which means not registered. For example,

**AL0:0|AL1:20140309102454|AL2:0|AL3:0|AL4:0|AL5:0|AL6:0|AL7:0|AL8:0|AL9:0|AL10:0.**

#### DATA\_SVC

Specifies a quota limit for LTE service. A list of elements. Possible values are **0** (deregister or not registered), **1** (register or registered), or greater than 1 (a quota limit in bytes). For example, **GN:1|OTN:3072|Q4:0.**

#### DATA\_SVC\_SDATE

Specifies the purchase time of an LTE service plan, effective from the purchase time to the end of the billing cycle. A list of elements. The purchase date-time value is of the form *yyyymmddhhmmss*, or a value of **0**, which means not registered. For example, **GN:20130812123352|OTN:20130812123352|Q4:0.**

#### QOS\_IND

Specifies whether QoS is degraded when the quota is exceeded. Possible values are **0** (QoS is not degraded) or **1** (QoS is degraded).

#### QOS\_NOTI

Specifies whether an SMS message is sent when the quota is exceeded. Possible values are **0**, **1** or **2**.

#### mVOIP\_NOTI

Specifies whether an SMS message is sent when the mobile VOIP quota is exceeded. Possible values are **0**, **1** or **2**.

#### OPMD

One Person Multiple Devices. Possible values are **0** (service deregistration), **1** (main device registration), or **2** (sub-device registration).

#### OPMD\_MAIN\_IMSI

The IMSI number of the main device in an OPMD plan. This value is not set if the current IMSI is the main device of an OPMD plan.

#### OPMD\_SUB\_IMSI

A list of sub-device IMSI numbers in an OPMD plan. This value is not set if the current IMSI is the sub-device of an OPMD plan. For example,

**S1:0|S1:45000169222778|S3:45008169222779.**

#### OLD\_IMSI

Specifies an old IMSI number before a subscriber changed it to the current IMSI number. A 15-digit value.

**MMOSF**

Specifies the Multi-Media Originating Service Flag.

**MMON**

Specifies the Multi-Media Originating Number.

**COMP**

Specifies whether the provisioning gateway uses compression. Possible values are **0** (no compression) or **1** (compression).

**SOC\_TYPE**

Possible values are **METER**, **METER\_Q4**, **STYLE**, **Q\_UNLIMIT**, or **U\_UNLIMIT**.

**SYS\_TYPE**

Possible values are **1** (KT N-STEP1), **2** (KT new N-STEP(GENESIS)), or **3** (MNVO platform).

**Example**

The following example shows an addSubscriber request and response.

**addSubscriber Request**

```

<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
  <ns1:pcrf="http://www.tekelec.com/SPRMediationServerForKT/">
    <soapenv:Header>
      <Password>admin</Password>
      <Username>admin</Username>
    </soapenv:Header>
    <soapenv:Body>
      <pcrf:addSubscriber>
        <inPara>
          <userid>
            <!-- useridtype could be: IMSI or MDN-->
            <useridtype>IMSI</useridtype>
            <useriddata>450082000001803</useriddata>
          </userid>
          <attrs>
            <attr key="IMSI">450082000001803</attr>
            <attr key="MDN">01028670541</attr>
            <attr key="PID">450082000001803@kt.com</attr>
            <attr key="ESN">FFFFFFFF</attr>
            <attr key="OI">2</attr>
            <attr key="TC">2</attr>
            <attr key="SC">9</attr>
            <attr key="HA_IP">10.42.1.31</attr>
            <attr key="SEC_LEVEL">4</attr>
            <attr key="TUNNELING">2</attr>
            <attr key="WIN_SVC">PPS</attr>
            <attr key="SUB_IP">172.21.100.139</attr>
            <attr key="PWD">NOPa$$word</attr>
            <attr key="S_KEY">keystore</attr>
            <attr key="VPN_HA_IP">10.15.2.33</attr>
            <attr key="VPN_FLAG">11</attr>
            <attr key="VPN_PRO">3</attr>
            <attr key="ALYS_ON">1</attr>
            <attr key="SOC">LTERAVUT2</attr>
            <attr key="ASOC">LTEMETER3</attr>
            <attr key="IMS_FLAG">0</attr>
            <attr key="MM">00</attr>
            <attr key="MC">0</attr>
          </attrs>
        </inPara>
      </pcrf:addSubscriber>
    </soapenv:Body>
  </ns1:pcrf>
</soapenv:Envelope>

```

```

<attr key="MODEL">SHV-E300K</attr>
<attr key="DSI">1</attr>
<attr key="RDSI">2</attr>
<attr key="MCI" />
<attr key="FM">1</attr>
<attr key="CS">0</attr>
<attr key="CATE">50</attr>
<attr key="3GNOTI">0</attr>
<attr key="QOS_IND">1</attr>
<attr key="QOS_NOTI">2</attr>
<attr key="mVOIP_NOTI">2</attr>
<attr key="OLD_IMSI">450087540081760</attr>
<attr key="MMOSF">1</attr>
<attr key="MMON">0115355006</attr>
<attr key="COMP">1</attr>
<attr key="LTE">1</attr>
<attr key="DATA_LIM_A">0</attr>
<attr key="SOC_TYPE">STYLE</attr>
<attr key="SYS_TYPE">1</attr>

<attr key="SVC">SIP:3|MIPS:1|MIPD:1|AUTH:1|WIN:1|VPN:1</attr>
<attr key="IMS_SVC">VOLTE:1|PSVT:1</attr>
<attr key="SPEED_CON">BASIC_S:0|GN_S:0|ONT_S:0|Q4_S:0</attr>
<attr key="TIME_CON">BASIC_T:0|GN_T:0|OTN_T:0|Q4_T:0</attr>

<!-- unit is bytes -->
<attr key="DATA_LIM">2147483648</attr>
<attr key="DAY_LIM">2097152</attr>
<attr key="mVOIP_LIM">524288000</attr>
<!-- always send sorted full list from AL0 to AL10 in STYLE_A and
STYLE_A_SDATE, quota will be registered only when ALx>0 and SDATE:ALx>0 -->
<!-- the priority depends on SDATE, the earlier register, the higher
priority -->
<!-- unit of STYLE_A is bytes -->
<attr key="STYLE_A">AL0:0|AL1:2048|AL2:0|AL3:0|AL4:0|AL5:0|AL6:0|AL7:0
|AL8:0|AL9:0|AL10:0</attr>
<attr key="STYLE_A_SDATE">AL0:0|AL1:20140309123416|AL2:0|AL3:0|AL4:0
|AL5:0|AL6:0|AL7:0|AL8:0|AL9:0|AL10:0</attr>

<!-- DATA_SVC is extensible, more data service need be supported -->
<!-- value in DATA_SVC: 0:unregistered or deregister, 1:registered or
register, >1:quota limit (unit is bytes) -->
<!-- always send full list -->
<attr key="DATA_SVC">GN:1|OTN:500|Q4:0</attr>
<attr
key="DATA_SVC_SDATE">GN:20130812123352|OTN:20130812123352|Q4:0</attr>

<!-- OPMD=0:unregistered or deregister, OPMD=1:main, OPMD=2:sub -->
<attr key="OPMD">1</attr>
<!-- OPMD_MAIN_IMSI shall be set if current user is the sub IMSI of an
OPMD-->
<!--attr key="OPMD_MAIN_IMSI"></attr-->
<!-- OPMD_SUB_IMSI shall be set if current user is the main IMSI of an
OPMD, but it's not ensured by N-STEP -->
<attr key="OPMD_SUB_IMSI">S1:0|S2:45000169222778|S3:45008169222779</attr>

<!-- 1. Below # attributes only for subscriber migration from S-SPR to
T-SPR or IMSI change, with initial quota usage,
2. only quota usage of registered service will be listed.
3. if a migration user has no initial quota usage, send an empty <attr
key="#STATUS"></attr>
4. if the field values of quota limit conflict with other fields,
response with error code.

```

```

5. unit of quota usage and quota limit is bytes -->
<attr key="#STATUS">DATA_LIM:5200/2147483648|DAY_LIM:0/2097152
|mVOIP_LIM:0/524288000</attr>
<attr key="#STYLE_STATUS">AL1:2048/2048</attr>
<attr key="#DATA_STATUS">OTN:500/500</attr>

<!-- will not provision these attributes
<attr key="APN"></attr>
<attr key="GBUL"></attr>
<attr key="GBDL"></attr>
<attr key="QCI"></attr>
<attr key="PLVL"></attr>
<attr key="CAPA"></attr>
<attr key="VULN"></attr>-->
</attrs>
</inPara>
</pcrf:addSubscriber>
</soapenv:Body>
</soapenv:Envelope>

```

### addSubscriber Response

```

<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Body>
    <ns1:addSubscriberResponse
      xmlns:ns1="http://www.tekelec.com/SPRMediationServerForKT/">
      <result xmlns:ns2="http://www.tekelec.com/SPRMediationServerForKT/">
        <resultCode>0</resultCode>
      </result>
    </ns1:addSubscriberResponse>
  </soap:Body>
</soap:Envelope>

```

## delSubscriber Request

### Description

The delSubscriber request removes a subscriber from the SPR. The request must contain either an IMSI or IMSI/MDN pair. If an IMSI/MDN pair is provided, it is checked against the SPR data, and the deletion is only processed if the pair is found.

Deleting an OPMD main subscriber also deletes the quota pool and pool member. Deleting an OPMD sub-subscriber also deletes its quota pool member. If the last sub-device in a quota pool is deleted, and the main pool does not exist, then the pool is deleted.

### password

Required password for access to the SPR.

### username

Required user name for access to the SPR.

### MDN

Specifies the subscriber Mobile Directory Number (MDN) if the query user ID type is MDN. An 11-digit value.

### IMSI

Specifies the subscriber International Mobile Subscriber Identity number if the query user ID type is IMSI. A 15-digit value.

### Example

The following example shows a delSubscriber request and the response.

#### delSubscriber Request

```

<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
  <ns1:Header>
    <Password>admin</Password>
    <Username>admin</Username>
  </ns1:Header>
  <soapenv:Body>
    <ns1:delSubscriber>
      <inPara>
        <!-- IMSI is mandatory -->
        <userid>
          <useridtype>IMSI</useridtype>
          <useriddata>450082000001803</useriddata>
        </userid>
        <!-- If need support IMSI/MDN pair checking, could send both IMSI/MDN -->
        <userid>
          <useridtype>MDN</useridtype>
          <useriddata>01028670541</useriddata>
        </userid>
      </inPara>
    </ns1:delSubscriber>
  </soapenv:Body>
</soapenv:Envelope>

```

#### delSubscriber Response

```

<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Body>
    <ns1:delSubscriberResponse
      xmlns:ns1="http://www.tekelec.com/SPRMediationServerForKT/">
      <result xmlns:ns2="http://www.tekelec.com/SPRMediationServerForKT/">
        <resultCode>0</resultCode>
      </result>
    </ns1:delSubscriberResponse>
  </soap:Body>
</soap:Envelope>

```

## getSubscriber Request

### Description

The getSubscriber request queries the SPR for profile information, quota information, or both.

If a main device IMSI is queried for quota information, quota usage from both the user profile and the quota pool is combined.

**Attributes****password**

Required password for access to the SPR.

**username**

Required user name for access to the SPR.

**IMSI**

Specifies the subscriber International Mobile Subscriber Identity number if the query user ID type is IMSI. A 15-digit value.

**MDN**

Specifies the subscriber Mobile Directory Number (MDN) if the query user ID type is MDN. An 11-digit value.

**type**

Specifies the query type. Possible values are **profile** (return profile information), **quota** (return quota information) or **profile,quota** (return both profile and quota information).

**Example**

The following example shows a getSubscriber request to obtain profile and quota information and the response.

**getSubscriber Request**

```

<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/" xmlns:pcrf="http://www.tekelec.com/SPRMediationServerForKT/">
  <soapenv:Header>
    <Password>admin</Password>
    <Username>admin</Username>
  </soapenv:Header>
  <soapenv:Body>
    <pcrf:getSubscriber>
      <inPara>
        <userid>
          <!-- query could be based on either IMSI or MDN -->
          <useridtype>IMSI</useridtype>
          <useriddata>450082000001803</useriddata>
        </userid>
        <type>profile,quota</type>
      </inPara>
    </pcrf:getSubscriber>
  </soapenv:Body>
</soapenv:Envelope>

```

**getSubscriber Response**

```

<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Body>
    <ns1:getSubscriberResponse
      xmlns:ns1="http://www.tekelec.com/SPRMediationServerForKT/">
      <result xmlns:ns2="http://www.tekelec.com/SPRMediationServerForKT/">
        <resultCode>0</resultCode>
        <subscriberInfo>
          <userid>
            <useridtype>IMSI</useridtype>
            <useriddata>450082000001803</useriddata>
          </userid>
        </subscriberInfo>
      </result>
    </ns1:getSubscriberResponse>
  </soap:Body>
</soap:Envelope>

```

```

<info type="profile">
  <attr>
    <attr key="IMSI">450082000001803</attr>
    <attr key="MDN">01028670541</attr>
    <attr key="PID">450082000001803@kt.com</attr>
    <attr key="ESN">FFFFFFFF</attr>
    <attr key="OI">2</attr>
    <attr key="TC">2</attr>
    <attr key="SC">9</attr>
    <attr key="HA_IP">10.42.1.31</attr>
    <attr key="SEC_LEVEL">4</attr>
    <attr key="TUNNELING">2</attr>
    <attr key="SVC">SIP:3|MIPS:1|MIPD:1|AUTH:1|WIN:1|VPN:1</attr>
    <attr key="WIN_SVC">PPS</attr>
    <attr key="SUB_IP">172.21.100.139</attr>
    <attr key="PWD">N0Pa$$word</attr>
    <attr key="S_KEY">keystore</attr>
    <attr key="VPN_HA_IP">10.15.2.33</attr>
    <attr key="VPN_FLAG">11</attr>
    <attr key="VPN_PRO">3</attr>
    <attr key="ALYS_ON">1</attr>
    <attr key="SOC">LTERAVUT2</attr>
    <attr key="ASSOC">LTEMETER3</attr>
    <attr key="IMS_SVC">VOLTE:1|PSVT:1</attr>
    <attr key="SPEED_CON">BASIC:0|GN:0|OTN:0|Q4:0</attr>
    <attr key="TIME_CON">BASIC:0|GN:0|OTN:0|Q4:0</attr>
    <attr key="IMS_FLAG">0</attr>
    <attr key="MM">00</attr>
    <attr key="MC">0</attr>
    <attr key="MODEL">SHV-E300K</attr>
    <attr key="DSI">1</attr>
    <attr key="RDSI">2</attr>
    <attr key="MCI"/>
    <attr key="FM">1</attr>
    <attr key="CS">0</attr>
    <attr key="CATE">50</attr>
    <attr key="3GNOTI">0</attr>
    <attr key="QOS_IND">1</attr>
    <attr key="QOS_NOTI">2</attr>
    <attr key="mVOIP_NOTI">2</attr>
    <attr key="OLD_IMSI">450087540081760</attr>
    <attr key="MMOSF">1</attr>
    <attr key="MMON">0115355006</attr>
    <attr key="COMP">1</attr>
    <attr key="LTE">1</attr>
    <attr key="DATA_LIM_A">0</attr>
    <attr key="SOC_TYPE">STYLE</attr>
    <attr key="SYS_TYPE">1</attr>

    <attr key="DATA_LIM">2147483648</attr>
    <attr key="DAY_LIM">2097152</attr>
    <attr key="mVOIP_LIM">524288000</attr>

    <!-- return full list
        if expires, return AL:0 SDATE AL:0 -->
    <attr
key="STYLE_A">AL0:0|AL1:2048|AL2:0|AL3:0|AL4:0|AL5:0|AL6:0|AL7:0|AL8:0
|AL9:0|AL10:0</attr>
    <attr
key="STYLE_A_SDATE">AL0:0|AL1:20130809123416|AL2:0|AL3:0|AL4:0|AL5:0
|AL6:0|AL7:0|AL8:0|AL9:0|AL10:0</attr>
        <!-- return full list -->
    <attr key="DATA_SVC">GN:100|OTN:500|Q4:0</attr>
    <attr

```

```

key="DATA_SVC_SDATE">GN:20130812123352|OTN:20130812123352|Q4:0</attr>
    <attr key="OPMD">1</attr>
    <attr
key="OPMD_SUB_IMSI">S1:0|S2:45000169222778|S3:45008169222779</attr>
    </attr>
</info>
<info type="quota">
    <attr>
        <!-- Only valid quota will be listed (not expired, not de-registered)
-->
        <attr key="STATUS">DATA_LIM:5200/10240|DAY_LIM:0/300</attr>
        <attr key="STYLE_STATUS">AL1:2048/2048|AL3:10/200</attr>
        <attr key="DATA_STATUS">OTN:500/500</attr>
    </attr>
</info>
</subscriberInfo>
</result>
</ns1:getSubscriberResponse>
</soap:Body>
</soap:Envelope>

```

## keepAlive Request

### Description

If there is no traffic between the mediation gateway (MGW) and the MDF system for a period of time, the MGW send a keepAlive message to detect the status of the MDF and SPR systems. The response includes a code that indicates the SPR's status. If there is no response, that indicates an error condition.

### password

Required password for access to the SPR.

### username

Required user name for access to the SPR.

*Table 4: keepAlive Response Codes* lists the keepAlive response codes.

**Table 4: keepAlive Response Codes**

Response Code	Value	Description
0	None	No error.
1	SPR_TCP_CONN_DOWN	The SPR provisioning interface is down.
1	SPR_SH_CONN_DOWN	The SPR Sh interface is down.
1	SPR_BOTH_CONN_DOWN	The SPR provisioning and Sh interfaces are both down.

## Example

The following example shows a keepAlive request and the response.

### keepAlive Request

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/" xmlns:pcrf="http://www.tekelec.com/SPRMediationServerForKT/">
  <soapenv:Header>
    <Password>admin</Password>
    <Username>admin</Username>
  </soapenv:Header>
  <soapenv:Body>
    <pcrf:keepAlive/>
  </soapenv:Body>
</soapenv:Envelope>
```

### keepAlive Response

```
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
<soap:Body>
<ns1:keepAliveResponse xmlns:ns1="http://www.tekelec.com/SPRMediationServerForKT/">
<result xmlns:ns2="http://www.tekelec.com/SPRMediationServerForKT/">
  <!-- keep alive result, 0: success, 1: fail -->
<resultCode>0</resultCode>
  <!-- If detect SDM connection error, the errorDesc could be:
      SPR_TCP_CONN_DOWN
      SPR_SH_CONN_DOWN
      SPR_BOTH_CONN_DOWN -->
</result>
</ns1:keepAliveResponse>
</soap:Body>
</soap:Envelope>
```

## notifySubscriber Request

### Description

The notifySubscriber request provides a mechanism to pass event notifications about OPMD sub-subscribers to the SPR.

### Attributes

#### password

Required password for access to the SPR.

#### username

Required user name for access to the SPR.

#### IMSI

Specifies the subscriber's sub-subscriber International Mobile Subscriber Identity number. A 15-digit value. The subscriber's main IMSI must be in the SPR.

#### TYPE

Specifies the notification type. Possible values are 1 (Notify Update), 2 (Notify Terminate), or 3 (Quota Reset).

**SOC\_TYPE**

Possible values are **METER**, **METER\_Q4**, **STYLE**, **Q\_UNLIMIT**, or **U\_UNLIMIT**.

**DATA\_LIM**

Specifies the monthly data limit in bytes.

**Example**

The following example shows a notifySubscriber request and response.

**notifySubscriber Request**

```

<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
  <soapenv:Header>
    <Password>admin</Password>
    <Username>admin</Username>
  </soapenv:Header>
  <soapenv:Body>
    <pcrf:notifySubscriber>
      <inPara>
        <userid>
          <!-- the sub IMSI -->
          <useridtype>IMSI</useridtype>
          <useriddata>450082000001803</useriddata>
        </userid>
        <attrs>
          <!-- value set for TYPE:
              1: Notify Update
              2: Notify Terminate
              3: Quota Reset
              TYPE code is extensible if have further business requirement
              SOC_TYPE and DATA_LIM is optional -->
          <attr key="TYPE">1</attr>
          <!-- METER, METER_Q4, STYLE -->
          <attr key="SOC_TYPE">STYLE</attr>
          <!-- usage/limit, unit is byte -->
          <attr key="DATA_LIM">0/100</attr>
        </attrs>
      </inPara>
    </pcrf:notifySubscriber>
  </soapenv:Body>
</soapenv:Envelope>

```

**notifySubscriber Response**

```

<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Body>
    <ns1:notifySubscriberResponse
      xmlns:ns1="http://www.tekelec.com/SPRMediationServerForKT/">
      <result xmlns:ns2="http://www.tekelec.com/SPRMediationServerForKT/">
        <resultCode>0</resultCode>
      </result>
    </ns1:notifySubscriberResponse>
  </soap:Body>
</soap:Envelope>

```

## quotaRequest Request

### Description

The quotaRequest request supports quota lookups and reports.

### Attributes

#### password

Required password for access to the SPR.

#### username

Required user name for access to the SPR.

#### IMSI

Specifies the subscriber International Mobile Subscriber Identity number. A 15-digit value.

#### usu

Specifies the quota usage rule and usage limit in bytes.

#### type

Specifies the query type. Possible values are **profile** (return profile information), **quota** (return quota information) or **profile,quota** (return both profile and quota information).

### Example

The following example shows a quotaRequest request and response.

#### quotaRequest Request

```

<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/" xmlns:tkl="http://www.tekelec.com/SPRMediationServerForKT/">
  <soapenv:Header>
    <Password>admin</Password>
    <Username>admin</Username>
  </soapenv:Header>
  <soapenv:Body>
    <tkl:quotaRequest>
      <inPara>
        <userid>
          <useridtype>IMSI</useridtype>
          <useriddata>450082123451010</useriddata>
        </userid>

        <usus>
          <usu>LEVEL:RULE | USAGE:1000000000 | MK:SESS</usu>
        </usus>

        <lookup>profile,quota</lookup>
        <atrrs>
          <!-- both SUB_IMSI and REQUEST_TYPE is optional -->
          <attr key="SUB_IMSI">450082123451011</attr>
          <attr key="REQUEST_TYPE">update</attr>
        </atrrs>
      </inPara>
    </tkl:quotaRequest>
  </soapenv:Body>
</soapenv:Envelope>

```

```

        </inPara>
    </tkl:quotaRequest>
</soapenv:Body>
</soapenv:Envelope>

```

### quotaRequest Response

```

<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
    <soap:Body>
        <ns1:quotaRequestResponse
            xmlns:ns1="http://www.tekelec.com/SPRMediationServerForKT/">
            <result xmlns:ns2="http://www.tekelec.com/SPRMediationServerForKT/">
                <resultCode>0</resultCode>
                <subscriberInfo>
                    <info type="profile">
                        <atrrs>
                            <attr key="DAY_LIM">2097152</attr>
                            <attr key="DATA_LIM">2000000000</attr>
                            <attr
key="STYLE_A_SDATE">AL0:20131105000000|AL1:20131105030000
|AL2:20131105030000|AL3:20131101010000|AL4:0|AL5:0|AL6:0|AL7:0|AL8:0|AL9:0|AL10:0</attr>

                            <attr key="SOC_TYPE">STYLE</attr>
                            <attr key="OPMD">1</attr>
                            <attr key="mVOIP_LIM">524288000</attr>
                            <attr key="LTE">1</attr>
                            <attr
key="STYLE_A">AL0:100|AL1:100|AL2:200|AL3:300|AL4:0|AL5:0
|AL6:0|AL7:0|AL8:0|AL9:0|AL10:0</attr>
                            <attr
key="DATA_SVC_SDATE">GN:20131112123352|OTN:20131112123352 |Q4:20131105000000</attr>

                            <attr key="DATA_SVC">GN:100|OTN:500|Q4:1</attr>
                            <attr key="SYS_TYPE">1</attr>
                        </atrrs>
                    </info>
                    <info type="quota">
                        <atrrs>
                            <attr key="DATA_STATUS">OTN:0/500</attr>
                            <attr
key="STYLE_STATUS">AL0:110/100|AL1:0/100|AL2:0/200|AL3:0/300</attr>
                            <attr
key="STATUS">DAY_LIM:0/2097152|DATA_LIM:1000000000/2000000000
|mVOIP_LIM:0/524288000</attr>
                        </atrrs>
                    </info>
                    </subscriberInfo>
                </result>
            </ns1:quotaRequestResponse>
        </soap:Body>
    </soap:Envelope>

```

## updateQuota Request

### Description

The updateQuota request resets monthly quota usage in the SPR to a specified value. It can be used to manually change a quota value (for example, to resolve a subscriber issue, or if a value must be changed administratively).

The request is processed subject to the following rules:

- Only monthly quotas (DATA\_LIM, mVOIP\_LIM, and OTN) can be reset.
- If the quota does not exist, it is created.
- If the value of nextResetTime is not in the future, it is updated.
- If the main device quota is updated to register STYLE\_A, then the dynamic quota is added to the pool dynamic quota.
- If the main device quota is updated to de-register STYLE\_A, then the dynamic quota and quota is removed from the pool.
- If the main device quota limit is updated, the subscriber level quotas DATA\_SVC, mVOIP\_LIM, and DAY\_LIM, and the pool for pool level quotas DATA\_LIM and STYLE\_A, are updated.
- For the purpose of quota usage mid-month calculations: within the current billing cycle, the total volume is set to the simulated usage plus the recovered usage, and the quota is set to the recovered usage divided by the recalculated limit; outside of the current billing cycle, the total volume is set to the recovered quota.
- If any part of the request resets quota beyond its limit, an error is returned.

### Attributes

#### password

Required password for access to the SPR.

#### username

Required user name for access to the SPR.

#### IMSI

Specifies the subscriber International Mobile Subscriber Identity number. A 15-digit value.

### Example

The following example shows an updateQuota request and response.

#### updateQuota Request

```

<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">
  <soapenv:Header>
    <Password>admin</Password>
    <Username>admin</Username>
  </soapenv:Header>
  <soapenv:Body>
    <pcrf:updateQuota>
      <inPara>
        <userid>

```

```

<useridtype>IMSI</useridtype>
<useriddata>450082000001803</useriddata>
</userid>
<attrs>
    <!-- send the usage value to set -->
    <attr key="#STATUS">DATA_LIM:50|mVOIP_LIM:20</attr>
    <attr key="#DATA_STATUS">OTN:200</attr>
</attrs>
    </inPara>
    </pcrf:updateQuota>
</soapenv:Body>
</soapenv:Envelope>

```

### updateQuota Response

```

<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
<soap:Body>
<ns1:updateQuota xmlns:ns1="http://www.tekelec.com/SPRMediationServerForKT/">
<result xmlns:ns2="http://www.tekelec.com/SPRMediationServerForKT/">
<resultCode>0</resultCode>
</result>
</ns1:updateQuota>
</soap:Body>
</soap:Envelope>

```

## updateSubscriber Request

### Description

The updateSubscriber request updates subscriber information in the SPR. The request must contain either an IMSI or IMSI/MDN pair. If an IMSI/MDN pair is provided, it is checked against the SPR data, and the update is only processed if the pair is found.

If the update request contains quota limit information, the MDF system removes the old quota information, updates quota limits, performs any mid-month quota calculations, and rebuilds any dynamic quota.

### Attributes

#### password

Required password for access to the SPR.

#### username

Required user name for access to the SPR.

#### IMSI

Specifies the subscriber International Mobile Subscriber Identity number if the query user ID type is IMSI. A 15-digit value.

#### MDN

Specifies the subscriber Mobile Directory Number (MDN) if the query user ID type is MDN. An 11-digit value.

#### ESN

	Specifies the electronic serial number of the user equipment. A seven-digit hexadecimal value.
<b>PID</b>	Specifies the subscriber PID (Network Address Identifier). In the form of an email address.
<b>OI</b>	Specifies the Origination Indicator. Possible values are <b>1</b> (AA, allow all) or <b>2</b> (OD, origination denied).
<b>TC</b>	Specifies the Termination Restriction Code. Possible values are <b>1</b> (AA, allow all) or <b>2</b> (TD, termination denied).
<b>SC</b>	Specifies the Subscriber Capability. Possible values are <b>0</b> through <b>17</b> .
<b>HA_IP</b>	Specifies the home agent IP address, used with VPNs. An IPv4 address.
<b>SEC_LEVEL</b>	Specifies the security level, used with VPNs. Possible values are <b>1</b> through <b>4</b> .
<b>TUNNELING</b>	Used with VPNs. Possible values are <b>0</b> or <b>1</b> .
<b>SVC</b>	Specifies the Supplementary Service, used with VPNs. Services can be defined as <b>0</b> (register) or <b>1</b> (deregister). Possible values are <b>SIP</b> , <b>MIPS</b> , <b>MIPD</b> , <b>AUTH</b> , <b>WIN</b> , and <b>VPN</b> . Values can be combined; for example, <b>SIP:3 MIPS:1 MIPD:1 AUTH:1 WIN:1 VPN:1</b> .
<b>WIN_SVC</b>	Used with PCRF and LMSC.
<b>SUB_IP</b>	An IPv4 address.
<b>PWD</b>	Specifies the authentication password used with AAA. A string value.
<b>S_KEY</b>	Used with AAA.
<b>VPN_HA_IP</b>	Specifies the VPN home agent IP address. An IPv4 address.
<b>VPN_FLAG</b>	Used with VPN.
<b>VPN_PRO</b>	Used with VPN.
<b>ALYS_ON</b>	Not currently used.

<b>SOC</b>	Specifies the provisioned entitlement.
<b>ASOC</b>	Specifies the associated SOC.
<b>LTE</b>	Possible values are <b>0</b> (flags a 3G user) or <b>1</b> (flags a 4G user).
<b>IMS_SVC</b>	Specifies the IMS service. Possible values are <b>VOLTE:1</b> , <b>PSVT:1</b> , and <b>RCS:1</b> . Values can be combined; for example, <b>VOLTE:1&amp;PSVT:1&amp;RCS:1</b> .
<b>SPEED_CON</b>	Specifies the bandwidth control: <b>BASIC_S</b> , <b>GN_S</b> , <b>OTN_S</b> , and <b>Q4_S</b> . Possible values include 0 (no QoS control), 400 (400 kbps), 800 (800 kbps), and so forth. Values can be combined; for example, <b>BASIC_S:0&amp;GN_S:400&amp;ONT_S:0&amp;G4_S:0</b> .
<b>TIME_CON</b>	Specifies the time control used in policies: <b>BASIC_S</b> , <b>GN_S</b> , <b>OTN_S</b> , and <b>Q4_S</b> . Possible values include 0 (unlimited), 1 (no busy hour control), 2 (busy hour control) and 3 (predefined time control). Values can be combined; for example, <b>BASIC_T:0&amp;GN_T:0&amp;ONT_T:0&amp;G4_T:0</b> .
<b>IMS_FLAG</b>	Set to <b>0</b> ; only multiple APNs used.
<b>MM</b>	Specifies the Message Manager service type.
<b>MC</b>	Specifies the Message Quoting service.
<b>MODEL</b>	Specifies the phone model. A 12-character string. For example, <b>SHV-E300K</b> .
<b>DSI</b>	Data Service Inhibited. Possible values are <b>0</b> or <b>1</b> .
<b>RDSI</b>	Roaming Data Service Inhibited. Possible values are <b>0</b> or <b>1</b> .
<b>MCI</b>	Specifies the Message Coupon Service. Used by LMSC. Possible values are <b>0</b> or <b>1</b> .
<b>FM</b>	Specifies Foreign Mobile. Possible values are <b>0</b> or <b>1</b> .
<b>CS</b>	Specifies the Cool Shot service. Possible values are <b>0</b> or <b>1</b> .
<b>CATE</b>	Specifies the Category. Possible values are <b>0</b> or <b>1</b> .
<b>3GNOTI</b>	Specifies the 3G SMS Service. Possible values are <b>0</b> or <b>1</b> .

**DATA\_LIM**

Specifies the monthly data limit in bytes.

**DAY\_LIM**

Specifies the daily data limit in bytes.

**mVoIP\_LIM**

Specifies the monthly mobile VOIP limit in bytes.

**DATA\_LIM\_A**

Specifies the data limit for ASOC.

**STYLE\_A**

Specifies the specific type of data plan. A list of 11 elements, in order, from **AL0**, **AL1**, ..., **AL10**. A value in bytes; 0 means not registered. Always combined with **STYLE\_A\_SDATE**. For example,

**AL0:0|AL1:2048|AL2:0|AL3:0|AL4:0|AL5:0|AL6:0|AL7:0|AL8:0|AL9:0|AL10:0**.

**STYLE\_A\_SDATE**

Specifies the purchase time of a data plan, effective from the purchase time to the end of the billing cycle. A list of 11 elements, in order, from **AL0**, **AL1**, ..., **AL10**. Each element includes a date-time value of the form *yyyymmddhhmmss*, or a value of 0, which means not registered. For example,

**AL0:0|AL1:20140309102454|AL2:0|AL3:0|AL4:0|AL5:0|AL6:0|AL7:0|AL8:0|AL9:0|AL10:0**.

**DATA\_SVC**

Specifies a quota limit for LTE service. A list of elements. Possible values are 0 (deregister or not registered), 1 (register or registered), or greater than 1 (register with the value as a quota limit in bytes). If the service is registered, a quota profile and quota mapping is added to the CMP database. For example, **GN:1|OTN:3072|Q4:0**.

**DATA\_SVC\_SDATE**

Specifies the purchase time of an LTE service plan, effective from the purchase time to the end of the billing cycle. A list of elements. The purchase date-time value is of the form *yyyymmddhhmmss*, or a value of 0, which means not registered. For example, **GN:20130812123352|OTN:20130812123352|Q4:0**.

**QOS\_IND**

Specifies whether QoS is degraded when the quota is exceeded. Possible values are 0 (QoS is not degraded) or 1 (QoS is degraded).

**QOS\_NOTI**

Specifies whether an SMS message is sent when the quota is exceeded. Possible values are 0, 1 or 2.

**mVOIP\_NOTI**

Specifies whether an SMS message is sent when the mobile VOIP quota is exceeded. Possible values are 0, 1 or 2.

**OPMD**

One Person Multiple Devices. Possible values are 0 (service deregistration), 1 (main device registration), or 2 (sub-device registration). The way the request is processed depends on its value and the value of this attribute in the SPR database:

- If this attribute is set to 1 and the OPMD attribute in the SPR database is set to 0 or null, the request is processed as a registration. A quota pool is created if it does not exist, a pool member is added, and any pool-level dynamic quota and quota is moved from the subscriber to the pool.
- If this attribute is set to 0 and the OPMD attribute in the SPR database is set to 1, the request is processed as a deregistration. The quota pool member is deleted, the quota pool is deleted, and any pool-level dynamic quota and quota is moved from the pool to the subscriber.
- If this attribute is set to 0 and the OPMD attribute in the SPR database is set to 2, the request is processed as a sub-device deregistration. The quota pool member is deleted; if this is the last member of the quota pool, and if the main member does not exist, then the pool is deleted.
- If this attribute is set to 2 and the OPMD attribute in the SPR database is set to 0 or null, the request is processed as a sub-device registration. A quota pool is created if it does not exist, and a quota pool is created in the Oracle Communications SPR depending on the IMSI range.

#### **OPMD\_MAIN\_IMSI**

This value is not set if the current device is the main IMSI of an OPMD plan. If this value is set and the OPMD attribute in the SPR database is set to 2, the request is processed as an update to the main IMSI of a sub-device. The member is deleted from the old quota pool. If the quota pool does not exist and the main IMSI is in the Oracle Communications SPR (according to its IMSI range), the pool is created and the member is added as a pool member.

#### **OPMD\_SUB\_IMSI**

A list of subordinate device IMSI numbers. This value is not set if the current device is the sub IMSI of an OPMD plan. For example,

**s1:0|s1:45000169222778|s3:45008169222779.**

#### **OLD\_IMSI**

Specifies an old IMSI number before a subscriber changed it to the current IMSI number. A 15-digit value.

#### **MMOSF**

Specifies the Multi-Media Originating Service Flag.

#### **MMON**

Specifies the Multi-Media Originating Number.

#### **COMP**

Specifies whether the provisioning gateway uses compression. Possible values are **0** (no compression) or **1** (compression).

#### **SOC\_TYPE**

Possible values are **METER**, **METER\_Q4**, **STYLE**, **Q\_UNLIMIT**, or **U\_UNLIMIT**.

#### **SYS\_TYPE**

Possible values are **1** (KT N-STEP1), **2** (KT new N-STEP(GENESIS)), or **3** (MNVO platform).

#### **Example**

The following example shows an updateSubscriber request and response.

**updateSubscriber Request**

```

<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:pcrf="http://www.tekelec.com/SPRMediationServerForKT/">
  <soapenv:Header>
    <Password>admin</Password>
    <Username>admin</Username>
  </soapenv:Header>
  <soapenv:Body>
    <pcrf:updateSubscriber>
      <inPara>
        <!-- IMSI is mandatory -->
        <userid>
          <useridtype>IMSI</useridtype>
          <useriddata>450082000001803</useriddata>
        </userid>
        <!-- If need support IMSI/MDN pair checking, could send both IMSI/MDN -->
        <userid>
          <useridtype>MDN</useridtype>
          <useriddata>01028670541</useriddata>
        </userid>
        <attrs>
          <!-- if want to set a value to NULL, leave the value blank -->
          <attr key="ESN"/>
          <attr key="OI">1</attr>
          <attr key="TC">0</attr>
          <attr key="SC">AR</attr>
          <attr key="SOC">LTE_mVOIP</attr>
          <attr key="DSI">0</attr>
          <attr key="CS">1</attr>

          <attr key="DATA_LIM">20480</attr>
          <!-- In updateSubscriber request, MGW will send sorted full list from
          AL0 to AL10 in STYLE_A and STYLE_A_SDATE
              while only changed service will be listed in #STYLE_A and
#STYLE_A_SDATE -->
          <attr key="STYLE_A">AL0:0|AL1:0|AL2:1024|AL3:0|AL4:0|AL5:0|AL6:0
|AL7:0|AL8:0|AL9:0|AL10:0</attr>
          <attr key="STYLE_A_SDATE">AL0:0|AL1:0|AL2:20130810103416|AL3:0
|AL4:0|AL5:0|AL6:0|AL7:0|AL8:0|AL9:0|AL10:0</attr>
          <!-- The conditions for AL0 be activated are:
              1)Q4=1 and 2)SDATE of Q4 is valid date and not start with DELAYED
          (these 2 condition could already been provisioned in previous updateSubscriber
          request)
              and 3) AL0>0 and 4) AL0 SDATE>0 -->
          <attr key="#STYLE_A">AL1:0|AL2:1024</attr>
          <attr key="#STYLE_A_SDATE">AL1:0|AL2:20130810103416</attr>

          <!-- 1. If Q4 initial delayed provision (for example in Sep. 15), the
          Q4 SDATE start with DELAYED-20130915000000 -->
          <attr key="DATA_SVC">GN:0|OTN:500|Q4:1</attr>
          <attr key="DATA_SVC_SDATE">GN:0|OTN:20130812123352
|Q4:DELAYED-20130915000000</attr>
          <attr key="#DATA_SVC">GN:0|Q4:1</attr>
          <attr key="#DATA_SVC_SDATE">GN:0|Q4:DELAYED-20130915000000</attr>
          <!-- 2. If Q4 activated (for example on first day of next month Oct.1,
          the Q4 SDATE will not start with DELAYED -->
          <attr key="#DATA_SVC_SDATE">Q4:20131001000000</attr>-->

          <!-- OPMD=0:unregistered or deregister, OPMD=1:main, OPMD=2:sub -->
          <attr key="OPMD">1</attr>
          <attr key="OPMD_MAIN_IMSI">45000169222778</attr>-->
          <attr key="OPMD_SUB_IMSI">S1:0|S2:45000169222778

```

```
|S3:45008169222779</attr>  
  
    </attrs>  
    </inPara>  
    </pcrf:updateSubscriber>  
  </soapenv:Body>  
</soapenv:Envelope>
```

### updateSubscriber Response

```
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">  
  <soap:Body>  
    <ns1:updateSubscriberResponse  
      xmlns:ns1="http://www.tekelec.com/SPRMediationServerForKT/">  
      <result xmlns:ns2="http://www.tekelec.com/SPRMediationServerForKT/">  
        <resultCode>0</resultCode>  
      </result>  
    </ns1:updateSubscriberResponse>  
  </soap:Body>  
</soap:Envelope>
```

# Chapter 6

## **MDF Cluster Reports**

---

### **Topics:**

- *Checking the Status of MDF Clusters.....59*
- *Viewing the Cluster Information Report.....59*
- *Viewing Blade Information.....60*
- *Viewing SOAP Statistics.....60*
- *Viewing Protocol Statistics.....61*

*MDF Cluster Reports* describes the **Reports** tab on the **Mediation Server Administration** page. This tab displays current information about the Message Distribution Function (MDF) cluster, each blade (server) of the cluster, and the SOAP and protocol statistics for the cluster.

## Checking the Status of MDF Clusters

The CMP system lets you view the status of MDF clusters, either collectively (all clusters within the topology) or individually.

To check the status of a cluster:

1. From the **Mediation** section of the navigation pane, select **Configuration**.  
The content tree displays a list of MDF cluster groups; the initial group is **All**.
2. From the content tree, select the **All** group.  
The **Mediation Server Administration** page opens in the work area.

The display in the work area lists the configured MDF clusters and their status:

- **On-Line** — All servers in the cluster have completed startup, and their database services are synchronized.
- **Degraded** — At least one server is not functioning properly (its database services are not synchronized or it has not completed startup) or has failed, but the cluster continues to function with the active server. This state sets the alarm ID 70005 with severity Major.

**Note:** If the cluster status is **Degraded**, but the server details do not show any failures or disconnection, then the cluster is performing a database synchronization operation. Until the synchronization process has completed, the active server cannot perform as the active server.

- **Out of Service** — Communication to the cluster has been lost.
- **No Data** — Communication to the cluster has been lost. This status value may be observed during an upgrade.

From the **Mediation Server Administration** page, you can perform one of the following tasks on MDF clusters:

- Define the configuration of a new cluster.
- Create a group folder for a set of clusters.
- View and edit details about an individual cluster.
- Remove a cluster from the Policy Management topology.

## Viewing the Cluster Information Report

The Cluster Information Report is visible on the Reports tab of the **Mediation Server Administration** page. See [Checking the Status of MDF Clusters](#) for information on locating this page.

The Cluster Information Report displays the following information:

- **Stats Reset** — Shows how statistical values are being reset: **Manual** (displaying statistics since the last time the counters were reset) or **Interval** (displaying statistics since the last collection interval). See the *Configuration Management Platform Wireless User's Guide* for information on configuring statistics collection resets and intervals.
- **Mode** — Shows whether live display of statistical data on this page is currently **Active** or **Paused**.
- **Cluster Status** — Current state of the cluster. The status values are:

- **On-Line** — The cluster is healthy and fully redundant
- **Non-Service Affecting Failure** — The cluster is fully functional, but cabling is not fully connected.
- **Failed** — The cluster is not available.
- **Degraded** — Service is currently not affected but a failure has occurred.

From the Cluster Information Report, you can do the following:

- Click **Reset Counters** to reset all of the counters to zero.
- Click **Rediscover Cluster** to refresh the page manually and obtain the latest reports from the cluster.
- Click **Pause** to stop the page from refreshing automatically.

## Viewing Blade Information

The Blades Report is visible on the **Reports** tab of the **Mediation Server Administration** page. See [Checking the Status of MDF Clusters](#) for information on locating this page.

The Blades Report lists all the servers (blades) contained within the cluster. Each blade is identified by its internal IP address and the order in which it was defined within the cluster (Server-A, Server-B).

A symbol () indicates which server currently has the external connection (that is, which server is the active server). The report also lists the following server-specific information:

- **State** — The current topology state (Active, Standby, Forced-Standby, or Spare).
- **Blade Failures** — The number of times the blade has failed.
- **Uptime** — The amount of time the blade has been active (providing active or standby service).
- **Disk Utilization** — The percentage of available disk space (of the /var/camiant filesystem) used by the blade.
- **CPU Utilization** — The average percentage of CPU capacity used by the blade in the last ten seconds.
- **Memory Utilization** — The percentage of memory used by the blade.

From the Actions section of the Blades report, you can do the following:

- Click **Restart** to restart the Policy Management software on the server.
- Click **Reboot** to restart the server itself.

## Viewing SOAP Statistics

The SOAP statistics are visible on the **Reports** tab of the **Mediation Server Administration** page. See [Checking the Status of MDF Clusters](#) for information on locating this page.

The Soap Statistics section of the report summarizes all SOAP requests sent, and all SOAP responses received, by the cluster. The summary also includes the total number of SOAP requests sent by, and SOAP responses to, clients of the cluster.

To drill down to detailed information, click **SOAP Statistics**. The **Soap Statistics** page opens. The following statistics are displayed:

- Stats start time
- Last stats reset time
- Total Request received/sent
- Total Response received/sent
- Total success Response received/sent
- Total Failure Response received/sent
- Subscriber Add request received
- Subscriber Add success response sent
- Subscriber Add failure response sent
- Subscriber Delete request received
- Subscriber Delete success response sent
- Subscriber Delete failure response sent
- Subscriber Update request received
- Subscriber Update success response sent
- Subscriber Update failure response sent
- Subscriber Get request received
- Subscriber Get success response sent
- Subscriber Get failure response sent
- Quota Request request received/sent
- Quota Request success response received/sent
- Quota Request failure response received/sent
- Quota Update request received
- Quota Update success response sent
- Quota Update failure response sent

From this page you can do the following:

- Click **Reset Counters** to reset all counters to zero. (Available if Stats Reset Configuration is set to Manual; for more information see the *Configuration Management Platform Wireless User's Guide*.)
- Click **Show Deltas** to show the change in counters between the current and previous reports. After clicking **Show Deltas**, the button changes to **Show Absolute**, which shows the total count.
- Click **Pause** to stop refreshing statistics automatically.
- Click **Cancel** to return you to the Cluster Information Report.

## Viewing Protocol Statistics

The protocol statistics are visible on the **Reports** tab of the **Mediation Server Administration** page. See [Checking the Status of MDF Clusters](#) for information on locating this page.

The Protocol Statistics section of the report lists the current number of active connections between the cluster and Sh data sources (SPR systems); the total number of Diameter Sh messages sent and received by the cluster; and the total number of Diameter Sh messages that have timed out.

To drill down to detailed information, click **Diameter Sh Statistics**. The **Diameter Sh Statistics** page opens. The following statistics are displayed:

- **Connections**

- Currently okay peers
- Currently down/suspect/reopened peers
- Total messages in/out
- UDR messages received/sent
- UDR messages timeout
- UDA success messages received/sent
- UDA failure messages received/sent
- PNR messages received/sent
- PNA success messages received/sent
- PNA failure messages received/sent
- PUR messages received/sent
- PUR messages timeout
- PUA success messages received/sent
- PUA failure messages received/sent
- SNR messages received/sent
- SNR messages timeout
- SNA success messages received/sent
- SNA failure messages received/sent
- Currently active sessions
- Max active sessions

From this page you can do the following:

- Click **Reset Counters** to reset all counters to zero. (Available if Stats Reset Configuration is set to Manual; for more information see the *Configuration Management Platform Wireless User's Guide*.)
- Click **Show Deltas** to show the change in counters between the current and previous reports. After clicking **Show Deltas**, the button changes to **Show Absolute**, which shows the total count.
- Click **Pause** to stop refreshing statistics automatically.
- Click **Cancel** to return you to the Cluster Information Report.

# Chapter 7

## The MDF Trace Log

### Topics:

- *Modifying the Trace Log Configuration.....64*
- *Viewing the Trace Log.....65*

*The MDF Trace Log* describes the trace log for a Message Distribution Function (MDF) server.

The trace log records MDF application notifications for individual servers. Trace logs are written to a trace log file. Trace logs are not replicated between servers in a cluster, but they persist after failovers. You can use the trace log to debug problems by tracing through application-level messages. You can view the trace log and configure the severity of messages that are recorded.

## Modifying the Trace Log Configuration

You can filter the messages written to the trace log by severity to control the volume of messages recorded.

To modify the MDF Trace log configuration information:

1. From the **Mediation** section of the navigation pane, select **Configuration**.  
The content tree displays a list of MDF cluster groups; the initial group is **All**.
2. From the content tree, select the desired MDF cluster.  
The **Mediation Server Administration** page opens in the work area.
3. On the **Mediation Server Administration** page, select the **Logs** tab.  
The current trace log options are displayed.
4. Click **Modify**.  
The Modify Trace Log Settings fields open in the work area.
5. Select the trace log level from the pulldown list.

This setting indicates the minimum severity of messages that are recorded in the trace log. These severity levels correspond to the syslog message severities from RFC 3164. Adjusting this setting allows new notification, at or above the configured severity level, to be recorded in the trace log. The levels are:

- **Emergency** — Designates events causing the system to be unusable. This setting provides the least amount of logging.
- **Alert** — Designates events for which action must be taken immediately to prevent the system from becoming unusable.
- **Critical** — Designates events causing service impact to operations.
- **Error** — Designates error events that may or may not be fatal to the application.
- **Warning** (the default) — Designates potentially harmful situations.
- **Notice** — Designates messages that may be of significant interest that occur during normal operation.
- **Info** — Designates informational messages highlighting overall progress of the application.
- **Debug** — Designates events of lower importance (all reportable events). This setting provides the greatest amount of logging.



**CAUTION**

**Caution:** The MDF system does not generate trace logs with the levels **Emergency**, **Alert**, or **Critical**. If you set the trace log level to these values, you will record no data in the MDF trace log. Additionally, the MDF system does not generate trace logs with the level **Debug**. Setting the trace log level to **Debug** has no effect.

**Note:** Before changing the default logging level, consider the implications. Lowering the trace log level setting from its default value (for example, from "Warning" to "Info") causes more notifications to be recorded in the trace log and therefore can adversely affect performance. On the other hand, raising the log level setting (for example, from "Warning" to "Error") causes fewer notification to be recorded in the trace log, and could cause you to miss important notifications.

6. When you finish, click **Save** (or **Cancel** to discard your changes).  
You are prompted, "The configuration was applied successfully."

The trace log configuration is changed.

## Viewing the Trace Log

To view the MDF Trace log:

1. From the **Mediation** section of the navigation pane, select **Configuration**.  
The content tree displays a list of MDF cluster groups; the initial group is **All**.
2. From the content tree, select the desired MDF cluster.  
The **Mediation Server Administration** page opens in the work area.
3. On the **Mediation Server Administration** page, select the **Logs** tab.  
The current trace log options are displayed.
4. Click **View Trace Log**.

The **Trace Log Viewer** window opens, displaying trace log recorded based on the current filter settings. While data is being retrieved, the in-progress message “Scanning Trace Logs” appears.

All events contain the following information:

- **Date/Time** — Event timestamp. This time is relative to the server time.
- **Code** — The event code. For information about event codes and messages, see the *Troubleshooting Reference*.
- **Severity** — Severity level of the event.
- **Message** — The message associated with the event. If additional information is available, the event entry shows as a link. Click on the link to see additional detail in the frame below.

5. You can filter the events displayed using the following:
  - **Trace Log Viewer for Server** — Select the individual server within the cluster.
  - **Start Date/Time** — Click the calendar icon, select the starting date and time, then click **Enter** (or close the window to abandon the request).
  - **End Date/Time** — Click the calendar icon, select the ending date and time, then click **Enter** (or close the window to abandon the request).
  - **Trace Code(s)** — Enter one or a comma-separated list of trace code IDs. Trace code IDs are integer strings up to 10 digits long.
  - **Use timezone of remote server for Start Date/Time** — Select to use the time of a remote server (if it is in a different time zone) instead of the time of the CMP server.
  - **Severity** — Filter by severity level. Events with the selected severity and higher are displayed. For example, if the severity selected is **Warning**, the trace log displays events with the severity levels Emergency, Alert, Critical, Error, and Warning.
  - **Contains** — Enter a text string to search for. For example, if you enter **connection**, all events containing the word connection appear.

**Note:** The **Start Date/Time** setting overrides the **Contains** setting. For example, if you search for events happening this month, and search for a string that appeared in events last month and this month, only results from this month appear.

After entering the filtering information, click **Search**. The selected events are displayed.

By default, the window displays 25 events per page. You can change this to 50, 75, or 100 events per page by selecting a value from the **Display results per page** pulldown list.

Events that occur after the Trace Log Viewer starts are not visible until you refresh the display. To refresh the display, click one of the following buttons:

- **Show Most Recent** — Applies filter settings and refreshes the display. This displays the most recent log entries that fit the filtering criteria.
- **Next/Prev** — Once the number of trace log entries exceeds the page limit, pagination is applied. Use the **Prev** or **Next** buttons to navigate through the trace log entries. When the **Next** button is not visible, you have reached the most recent log entries; when the **Prev** button is not visible, you have reached the oldest log entries.
- **First/Last** — Once the number of trace log entries exceeds the page limit, pagination is applied. Use the **First** and **Last** buttons to navigate to the beginning or end of the trace log. When the **Last** button is not visible, you have reached the end; when the **First** button is not visible, you have reached the beginning.

When you are finished viewing the trace log, click **Close**.

# Appendix A

## **MDF WSDL Definitions**

---

**Topics:**

- *WSDL Definitions.....68*

*MDF WSDL Definitions* lists the Message Distribution Function (MDF) web service definition language (WSDL) files.

## WSDL Definitions

### Description

The following WSDL script defines the MDF SOAP API.

```

<?xml version="1.0" encoding="UTF-8"?>
<definitions xmlns="http://schemas.xmlsoap.org/wsdl/">
  xmlns:ns1="http://www.tekelec.com/SPRMediationServerForKT/"
  xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
  xmlns:tns="http://www.tekelec.com/SPRMediationServerForKT/"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  targetNamespace="http://www.tekelec.com/SPRMediationServerForKT/">
  <types>
    <schema targetNamespace="http://www.tekelec.com/SPRMediationServerForKT/">
      xmlns="http://www.w3.org/2001/XMLSchema"
      xmlns:soap11-enc="http://schemas.xmlsoap.org/soap/encoding/"
      xmlns:tns="http://www.tekelec.com/SPRMediationServerForKT/"
      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
        <element name="Username" type="xsd:string" />
        <element name="Password" type="xsd:string" />

        <!-- ===== Attribute Value Pair ===== -->
        <complexType name="MSAVP">
          <simpleContent>
            <extension base="string">
              <attribute name="key" use="required" type="string">
                </attribute>
            </extension>
          </simpleContent>
        </complexType>

        <!-- ===== Attributes ===== -->
        <complexType name="MSAttrs">
          <sequence>
            <element name="attr" maxOccurs="unbounded" minOccurs="1" nillable="false" type="tns:MSAVP" />
          </sequence>
        </complexType>

        <!-- ===== User Identify Info ===== -->
        <complexType name="MSUserId">
          <sequence>
            <element maxOccurs="1" minOccurs="1" name="useridtype" type="xsd:string" />
            <element maxOccurs="1" minOccurs="1" name="useriddata" type="xsd:string" />
          </sequence>
        </complexType>

        <!-- ===== Subscriber Profile ===== -->
        <complexType name="MSSubscriberProfile">
          <sequence>
            <element maxOccurs="unbounded" minOccurs="1" name="userid" nillable="false" type="tns:MSUserId" />
            <element maxOccurs="1" minOccurs="1" name="attrs" nillable="false" type="tns:MSAttrs" />
          </sequence>
        </complexType>
      </schema>
    </types>
  </definitions>

```

```

<=====Subscriber Profile for delete=====-->
<complexType name="MSDelSubscriberProfile">
  <sequence>
    <element maxOccurs="unbounded" minOccurs="1" name="userid"
nillable="false" type="tns:MSUserId" />
  </sequence>
</complexType>

<=====Quota Definition in query result===== -->
<!--complexType name="MSQuota">
  <sequence>
    <element maxOccurs="1" minOccurs="1" name="name" nillable="false"
type="string" />
    <element maxOccurs="1" minOccurs="1" name="limit" nillable="false"
type="long" />
    <element maxOccurs="1" minOccurs="1" name="used" nillable="false"
type="long" />
  </sequence>
</complexType-->

<===== Subscriber Quota Information ===== -->
<complexType name="MSQuotaInfo">
  <sequence>
    <element maxOccurs="unbounded" minOccurs="1" name="userid"
nillable="false" type="tns:MSUserId" />
    <element maxOccurs="1" minOccurs="1" name="attrs" nillable="false"
type="tns:MSAttrs" />
  </sequence>
</complexType>

<===== User Identify and Quota Information ===== -->
<!--complexType name="MSUserIdQuotaInfo">
  <sequence>
    <element maxOccurs="unbounded" minOccurs="1" name="userid"
nillable="false" type="tns:MSUserId" />
    <element maxOccurs="1" minOccurs="1" name="attr" nillable="false"
type="tns:MSQuotaInfo" />
  </sequence>
</complexType-->

<=====Subscriber Overall Information=====-->
<complexType name="MSSubscriberInfo">
  <sequence>
    <element maxOccurs="unbounded" minOccurs="1" name="userid"
nillable="false" type="tns:MSUserId" />
    <element maxOccurs="unbounded" minOccurs="1" name="info"
nillable="false">
      <complexType>
        <sequence>
          <element maxOccurs="1" minOccurs="1" name="attrs" nillable="false"
type="tns:MSAttrs" />
        </sequence>
        <attribute name="type" type="string" />
      </complexType>
    </element>
  </sequence>
</complexType>

<===== Subscriber Query Parameter =====-->
<complexType name="MSSubscriberQueryParams">

```

```

<sequence>
  <element maxOccurs="1" minOccurs="1" name="userid" nillable="false" type="tns:MSUserId" />
  <element maxOccurs="1" minOccurs="1" name="type" nillable="false" type="string" />
</sequence>
</complexType>

<!-- ===== Operation Result ===== -->
<complexType name="MSResult">
  <sequence>
    <element maxOccurs="1" minOccurs="1" name="resultCode" type="int" />
    <element maxOccurs="1" minOccurs="0" name="errorDesc" type="string" />
    <element maxOccurs="1" minOccurs="0" name="subscriberInfo" nillable="false" type="tns:MSSubscriberInfo" />
  </sequence>
</complexType>

<!-- ===== User Id ===== -->
<complexType name="MSUserIdParam">
  <sequence>
    <element maxOccurs="1" minOccurs="1" name="userid" nillable="false" type="tns:MSUserId" />
  </sequence>
</complexType>

<complexType name="MSQuotaUSU">
  <sequence>
    <element maxOccurs="unbounded" minOccurs="1" name="usu" nillable="false" type="xsd:string" />
  </sequence>
</complexType>

<!-- ===== Usage Request Parameter ===== -->
<complexType name="MSQuotaRequestParams">
  <sequence>
    <element maxOccurs="1" minOccurs="1" name="userid" nillable="false" type="tns:MSUserId" />
    <element maxOccurs="1" minOccurs="0" name="usus" nillable="false" type="tns:MSQuotaUSU" />
    <element maxOccurs="1" minOccurs="0" name="lookup" type="xsd:string" />
    <element maxOccurs="1" minOccurs="1" name="attrs" type="tns:MSAttrs" />
  </sequence>
</complexType>
</schema>
</types>

<message name="MSSoapServiceEndpoint_addSubscriber">
  <part name="inPara" type="ns1:MSSubscriberProfile" />
</message>
<message name="MSSoapServiceEndpoint_addSubscriberResponse">
  <part name="result" type="ns1:MSResult" />
</message>
<message name="MSSoapServiceEndpoint_getSubscriber">
  <part name="inPara" type="ns1:MSSubscriberQueryParams" />
</message>
<message name="MSSoapServiceEndpoint_getSubscriberResponse">
  <part name="result" type="ns1:MSResult" />
</message>
<message name="MSSoapServiceEndpoint_updateQuota">

```

```

<part name="inPara" type="ns1:MSQuotaInfo" />
</message>
<message name="MSSoapServiceEndpoint_updateQuotaResponse">
    <part name="result" type="ns1:MSResult" />
</message>
<message name="MSSoapServiceEndpoint_delSubscriber">
    <part name="inPara" type="ns1:MSDelSubscriberProfile" />
</message>
<message name="MSSoapServiceEndpoint_delSubscriberResponse">
    <part name="result" type="ns1:MSResult" />
</message>
<message name="MSSoapServiceEndpoint_updateSubscriber">
    <part name="inPara" type="ns1:MSSubscriberProfile" />
</message>
<message name="MSSoapServiceEndpoint_updateSubscriberResponse">
    <part name="result" type="ns1:MSResult" />
</message>
<message name="MSSoapServiceEndpoint_keepAlive">
</message>
<message name="MSSoapServiceEndpoint_keepAliveResponse">
    <part name="result" type="ns1:MSResult" />
</message>
<message name="MSSoapServiceEndpoint_quotaRequest">
    <part name="inPara" type="ns1:MSQuotaRequestParams" />
</message>
<message name="MSSoapServiceEndpoint_getQuotaReply">
    <part name="result" type="ns1:MSResult" />
</message>
<message name="MSSoapServiceEndpoint_notifySubscriber">
    <part name="inPara" type="ns1:MSSubscriberProfile" />
</message>
<message name="MSSoapServiceEndpoint_notifySubscriberResponse">
    <part name="result" type="ns1:MSResult" />
</message>
<message name="AuthSOAPHeader">
    <part name="Username" type="xsd:string" />
    <part name="Password" type="xsd:string" />
</message>
<portType name="MSSoapServiceEndpoint">
    <operation name="addSubscriber" parameterOrder="inPara">
        <input message="tns:MSSoapServiceEndpoint_addSubscriber" />
        <output message="tns:MSSoapServiceEndpoint_addSubscriberResponse" />
    </operation>
    <operation name="getSubscriber" parameterOrder="inPara">
        <input message="tns:MSSoapServiceEndpoint_getSubscriber" />
        <output message="tns:MSSoapServiceEndpoint_getSubscriberResponse" />
    </operation>
    <operation name="updateQuota" parameterOrder="inPara">
        <input message="tns:MSSoapServiceEndpoint_updateQuota" />
        <output message="tns:MSSoapServiceEndpoint_updateQuotaResponse" />
    </operation>
    <operation name="updateSubscriber" parameterOrder="inPara">
        <input message="tns:MSSoapServiceEndpoint_updateSubscriber" />
        <output message="tns:MSSoapServiceEndpoint_updateSubscriberResponse" />
    </operation>
    <operation name="delSubscriber" parameterOrder="inPara">
        <input message="tns:MSSoapServiceEndpoint_delSubscriber" />
        <output message="tns:MSSoapServiceEndpoint_delSubscriberResponse" />
    </operation>
    <operation name="keepAlive" parameterOrder="Username">
        <input message="tns:MSSoapServiceEndpoint_keepAlive" />
        <output message="tns:MSSoapServiceEndpoint_keepAliveResponse" />
    </operation>
    <operation name="quotaRequest" parameterOrder="inPara">

```

```

<input message="tns:MSSoapServiceEndpoint_quotaRequest" />
<output message="tns:MSSoapServiceEndpoint_getQuotaReply" />
</operation>
<operation name="notifySubscriber" parameterOrder="inPara">
<input message="tns:MSSoapServiceEndpoint_notifySubscriber" />
<output message="tns:MSSoapServiceEndpoint_notifySubscriberResponse" />
</operation>
</portType>
<binding name="TKLCMSSoapServiceEndpointBinding"
type="tns:MSSoapServiceEndpoint">
<soap:binding style="rpc" transport="http://schemas.xmlsoap.org/soap/http"
/>
<operation name="addSubscriber">
<soap:operation />
<input>
<soap:body use="literal"
namespace="http://www.tekelec.com/SPRMediationServerForKT/" />
<soap:header message="tns:AuthSOAPHeader" part="Username" use="literal"
/>
<soap:header message="tns:AuthSOAPHeader" part="Password" use="literal"
/>
</input>
<output>
<soap:body use="literal"
namespace="http://www.tekelec.com/SPRMediationServerForKT/" />
</output>
</operation>
<operation name="delSubscriber">
<soap:operation />
<input>
<soap:body use="literal"
namespace="http://www.tekelec.com/SPRMediationServerForKT/" />
<soap:header message="tns:AuthSOAPHeader" part="Username" use="literal"
/>
<soap:header message="tns:AuthSOAPHeader" part="Password" use="literal"
/>
</input>
<output>
<soap:body use="literal"
namespace="http://www.tekelec.com/SPRMediationServerForKT/" />
</output>
</operation>
<operation name="getSubscriber">
<soap:operation />
<input>
<soap:body use="literal"
namespace="http://www.tekelec.com/SPRMediationServerForKT/" />
<soap:header message="tns:AuthSOAPHeader" part="Username" use="literal"
/>
<soap:header message="tns:AuthSOAPHeader" part="Password" use="literal"
/>
</input>
<output>
<soap:body use="literal"
namespace="http://www.tekelec.com/SPRMediationServerForKT/" />
</output>
</operation>
<operation name="updateQuota">
<soap:operation />
<input>
<soap:body use="literal"
namespace="http://www.tekelec.com/SPRMediationServerForKT/" />
<soap:header message="tns:AuthSOAPHeader" part="Username" use="literal"
/>

```

```

        <soap:header message="tns:AuthSOAPHeader" part="Password" use="literal"
/>
    </input>
    <output>
        <soap:body use="literal"
namespace="http://www.tekelec.com/SPRMediationServerForKT/" />
    </output>
</operation>
<operation name="updateSubscriber">
    <soap:operation />
    <input>
        <soap:body use="literal"
namespace="http://www.tekelec.com/SPRMediationServerForKT/" />
    <soap:header message="tns:AuthSOAPHeader" part="Username" use="literal"
/>
    <soap:header message="tns:AuthSOAPHeader" part="Password" use="literal"
/>
    </input>
    <output>
        <soap:body use="literal"
namespace="http://www.tekelec.com/SPRMediationServerForKT/" />
    </output>
</operation>
<operation name="keepAlive">
    <soap:operation />
    <input>
        <soap:body use="literal"
namespace="http://www.tekelec.com/SPRMediationServerForKT/" />
    <soap:header message="tns:AuthSOAPHeader" part="Username" use="literal"
/>
    <soap:header message="tns:AuthSOAPHeader" part="Password" use="literal"
/>
    </input>
    <output>
        <soap:body use="literal"
namespace="http://www.tekelec.com/SPRMediationServerForKT/" />
    </output>
</operation>
<operation name="quotaRequest">
    <soap:operation />
    <input>
        <soap:body use="literal"
namespace="http://www.tekelec.com/SPRMediationServerForKT/" />
    <soap:header message="tns:AuthSOAPHeader" part="Username" use="literal"
/>
    <soap:header message="tns:AuthSOAPHeader" part="Password" use="literal"
/>
    </input>
    <output>
        <soap:body use="literal"
namespace="http://www.tekelec.com/SPRMediationServerForKT/" />
    </output>
</operation>
<operation name="notifySubscriber">
    <soap:operation />
    <input>
        <soap:body use="literal"
namespace="http://www.tekelec.com/SPRMediationServerForKT/" />
    <soap:header message="tns:AuthSOAPHeader" part="Username" use="literal"
/>
    <soap:header message="tns:AuthSOAPHeader" part="Password" use="literal"
/>
    </input>
    <output>

```

```
    <soap:body use="literal"
namespace="http://www.tekelec.com/SPRMediationServerForKT/" />
    </output>
</operation>
</binding>
<service name="PCRFSoap">
    <port name="TKLCMediationServerKTSoapServiceEndpointPort"
binding="tns:TKLCMSSoapServiceEndpointBinding">
        <soap:address location="REPLACE_ME" />
    </port>
</service>
</definitions>
```

# Appendix B

## MDF Interface Error Codes

---

**Topics:**

- *Interface Error Codes.....76*

*MDF Interface Error Codes* lists the error codes that can be returned by a SOAP API call from a Message Distribution Function (MDF) system.

## Interface Error Codes

If an MDF SOAP API request succeeds, a result code of 0 is returned in the response. If the request fails, a result code of 1 is returned, along with a description of the error. Here are two examples of response messages to addSubscriber requests indicating failures:

```
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Body>
    <ns1:addSubscriberResponse
      xmlns:ns1="http://www.tekelec.com/SPRMediationServerForKT/">
      <result xmlns:ns2="http://www.tekelec.com/SPRMediationServerForKT/">
        <resultCode>1</resultCode>
        <errorDesc>ILLEGAL_SOAP_REQUEST</errorDesc>
      </result>
    </ns1:addSubscriberResponse>
  </soap:Body>
</soap:Envelope>
```

```
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Body>
    <ns1:addSubscriberResponse
      xmlns:ns1="http://www.tekelec.com/SPRMediationServerForKT/">
      <result xmlns:ns2="http://www.tekelec.com/SPRMediationServerForKT/">
        <resultCode>1</resultCode>
        <errorDesc>UNKNOWN_ERROR(3002)</errorDesc>
      </result>
    </ns1:addSubscriberResponse>
  </soap:Body>
</soap:Envelope>
```

The following table lists error code descriptions returned from the SOAP interface.

**Table 5: Error Descriptions**

errorDesc Value	Description
CAN'T_GET_QUOTA_PROFILE_NAME	Could not get quota profile name from quota profile mapping.
DUP_KEY	Duplicate key encountered in SPR system.
ILLEGAL_SOAP_REQUEST	The SOAP request was invalid; for example, the quota limit in STYLE_A and #STYLE_A was inconsistent.
IMSI_NOT_IN_RANGE	When adding an OPMD main subscriber, the IMSI was not in the configured range.
INTERNAL_EXCEPTION	MDF system internal exception.
KEY_NOT_FOUND	Key not found in SPR system; for an update/delete/query operation, the subscriber record does not exist.
NO_SPR_MESSAGES	Internal error: SPRMessages was empty or null.

errorDesc Value	Description
PARAMETER_ERROR	A parameter error was encountered; for example, a <usu> element contained an empty <usu> element.
QUOTA_RECOVERY_ERROR	A quotaUpdate request failed.
SPR_NOT_FOUND	The SPR system was not found using the data source key transform pattern configured in the CMP database.
SPR_TOO_BUSY	Possible causes: <ul style="list-style-type: none"> <li>• Configuration error on the SPR system</li> <li>• Could not connect to the SPR system</li> <li>• SPR system is too busy</li> </ul>
SYSTEM_TIMEOUT	A system timeout occurred.
UNKNOWN_ERROR( <i>n</i> )	An unknown error <i>n</i> was returned. See the MDF engineering log /var/camiant/log/mediation.log for more information.
UPDATE_USAGE_ERROR	A quotaRequest request failed to deduct quota.
USAGE_PARSE_ERROR	The contents of a <usu> element in a quotaRequest request could not be parsed.
USERID_INCONSISTENCY	The user IDs specified in the <userid> and <attr> arguments in the request were inconsistent.
XML_PARSE_ERROR	The SPR system responded with an XML parse error.

# **Glossary**

---

## **A**

API	Application Programming Interface An interface with commands, possibly routines and/or macros, provided by an operating system or an add-on for an operating system (that support network use, for example). Application programs can use this interface to tell the operating system to perform specific actions.
-----	---

## **E**

event	In Policy Management, an expected incident that is logged. Events can be used for debugging purposes.
-------	---

## **M**

MDF	Message Distribution Function. A standalone hardware system, situated between a Mediation Gateway and an Oracle Communications subscriber profile repository (SPR), that exchanges messages between a Mediation Gateway and SPR systems
-----	---

## **O**

OPMD	One Person Multiple Devices. A carrier plan that allows a wireless subscriber to share quota with up to nine sub-devices.
------	---

## **S**

SOAP	Simple Object Access Protocol
------	-------------------------------

## **W**

**W**

WSDL

Web Service Definition Language