Oracle® Communications Policy Management

Message Distribution Function Reference

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Chapter 1

About This Guide

Topics:

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 a data source. The data source is either a Oracle Communications Subscriber Database Management (SDM) , a Oracle Communications User Data Repository (UDR), or a customer SPR system. The MDF helps provision subscriber data, supports management of subscriber information, and facilitates the exchange of quota information.

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 Oracle Communications Policy Management 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.
- *The Coupon Service* describes how to deploy a Coupon Service.

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: (This icon and text indicate the possibility of *personal injury*.)
	Warning: (This icon and text indicate the possibility of *equipment damage*.)
	Caution: (This icon and text indicate the possibility of *service interruption*.)
	Topple: (This icon and text indicate the possibility of *personal injury* and *equipment damage*.)

Related Publications

For information about additional publications that are related to this document, refer to the *Related Publications Reference* document, which is published as a separate document on the Oracle Technology Network (OTN) site. See *Locate Product Documentation on the Oracle Technology Network Site* for more information.

Other Publications

The following documents are useful for reference:

- Internet Engineering Task Force (IETF) Diameter-related RFCs:
  - RFC 3539: "Authentication, Authorization and Accounting (AAA) Transport Profile"
  - RFC 3588: "Diameter Base Protocol"
- 3rd Generation Partnership Project (3GPP) technical specifications:
  - 3GPP TS 23.203: "Policy and charging control architecture (Release 8)"
  - 3GPP TS 29.208: "End-to-end Quality of Service (QoS) signalling flows (Release 6)"
  - 3GPP TS 29.209: "Policy control over Gq interface (Release 6)"
  - 3GPP TS 29.211: "Rx Interface and Rx/Gx signalling flows (Release 6)"
  - 3GPP TS 29.212: "Policy and Charging Control over Gx/Sd reference point (Release 11)"
  - 3GPP TS 29.213: "Policy and Charging Control signalling flows and QoS parameter mapping (Release 11.4)"
  - 3GPP TS 29.214: "Policy and Charging Control over Rx reference point (Release 8)"

- 3GPP TS 29.219: "Policy and Charging Control: Spending limit reporting over Sy reference point (Release 11.3)"
- 3GPP TS 29.229: "Cx and Dx interfaces based on the Diameter protocol; Protocol details (Release 8)"
- 3GPP TS 32.240: "Charging architecture and principles (Release 8)"
- 3GPP TS 32.299: "Telecommunication management; Charging management; Diameter charging applications (Release 8)"

- 3rd Generation Partnership Project 2 (3GPP2) technical specifications:
  - 3GPP2 X.S0013-012-0: "Service Based Bearer Control — Stage 2"
  - 3GPP2 X.S0013-013-0: "Service Based Bearer Control — Tx Interface Stage 3"
  - 3GPP2 X.S0013-014-0: "Service Based Bearer Control — Ty Interface Stage 3"

Locate Product Documentation on the Oracle Technology Network Site

Oracle customer documentation is available on the web at the Oracle Technology Network (OTN) site, *http://docs.oracle.com*. You do not have to register to access these documents. Viewing these files requires Adobe Acrobat Reader, which can be downloaded at *http://www.adobe.com*.

1. Access the Oracle Technology Network site at *http://docs.oracle.com*.
2. Click **Industries**.
3. Under the Oracle Communications subheading, click the **Oracle Communications documentation** link.
   The Oracle Communications Documentation page appears with Tekelec shown near the top.
4. Click the **Oracle Communications Documentation for Tekelec Products** link.
5. Navigate to your Product and then the Release Number, and click the **View** link (the Download link will retrieve the entire documentation set).
   A list of the entire documentation set for the selected product and release appears.
6. To download a file to your location, right-click the **PDF** link, select **Save target as**, and save to a local folder.

Customer Training

Oracle University offers training for service providers and enterprises. Visit our web site to view, and register for, Oracle Communications training:

http://education.oracle.com/communication

To obtain contact phone numbers for countries or regions, visit the Oracle University Education web site:

www.oracle.com/education/contacts

My Oracle Support (MOS)

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

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

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

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

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

Emergency Response

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

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

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

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

Chapter 2

Introduction

Topics:

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 a data source. An SPR system can be one of the following:

- Oracle Communications Subscriber Database Management (SDM) system
- Oracle Communications User Data Repository (UDR) system
- A customer 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 Policy Management 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 Database Management (SDM) system.
- An Sh interface to support provisioning and quotas to an Oracle Communications User Data Repository (UDR) system.
- An Sh interface to provide subscriber information to an MPE system.
- A management interface to a CMP system.

The MDF will not talk to multiple data sources at same time. The SPR does not allow a pool member to be distributed across different SPR systems. If multiple data sources are configured on the MDF, it will pick the last enabled data source.

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

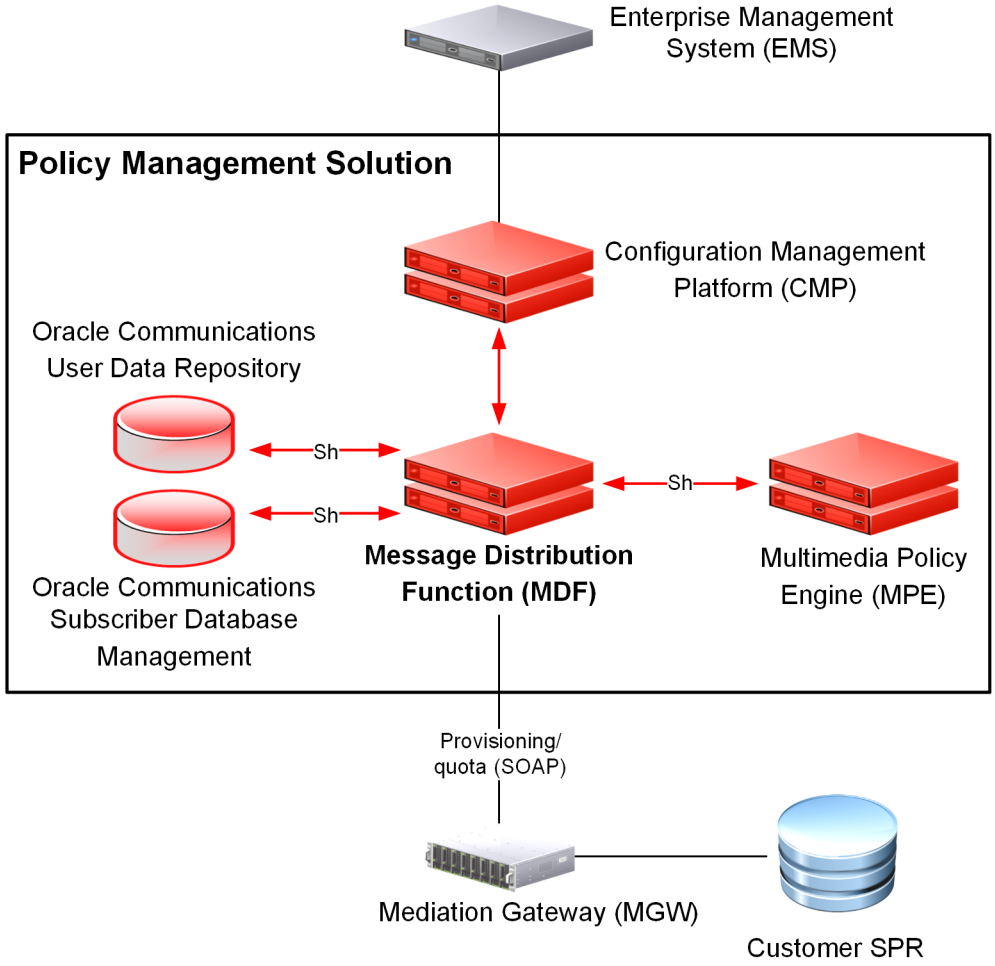

Figure 1: MDF Interfaces

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.

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 Cable 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 in 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

Topics:

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

Defining a 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**.

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 MDF Server* for information on settings.
6. When you finish, click **Save**.

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 (trash can 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. Click **Delete**.

   A confirmation message displays.
4. Click **OK**.

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 the following tables for the available options.

- *Table 2: MDF SOAP Interface Settings*
- *Table 3: MDF Diameter Settings*
- *Table 4: MDF MGW Data Source Settings*
- *Table 5: MDF Load Shedding Settings*

6. When you finish, click **Save**.

The modifications are stored in the CMP database.

Table 2: MDF SOAP Interface Settings

Attribute	Description
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 **Enable HTTP Service** or **Enable HTTPS Service** 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 **Enable HTTP Service** or **Enable HTTPS Service** must be enabled; both can be enabled.
HTTPS port	Enter the port number of the HTTPS server. The default port is 443.

Table 3: MDF Diameter Settings

Attribute	Description
Diameter Port	Enter the Diameter port number of the MDF server. The default is 3868.
Diameter Realm	The domain of responsibility (for example, **`galactel.com`**) of the MDF server.
Diameter Identity	Enter the fully qualified domain name (FQDN) of the MDF server (for example, **`mdf2.galactel.com`**).

Table 4: MDF MGW Data Source Settings

Attribute	Description
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.

Attribute	Description
MGW IP	Enter the IP address of the messaging gateway.
MGW Port	Enter the port number of the messaging gateway. The default is 80.

Table 5: MDF Load Shedding Settings

Attribute	Description
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: Do not attempt to change a service override without first consulting with My Oracle 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.
5. Click **Add**.
   The **Add Configuration Key Value** window opens.
6. Enter the following values:
   a) **Configuration Key** — The attribute to set
   b) **Value** — The attribute value
7. When you finish, click **Save**. The key is added to the table.

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

8. (Optional) Add, edit, delete, or order keys.
   - Cloning an entry in the table
     1. Select an entry in the table.

2. Click **Clone**. The **Clone** window opens with the information for the entry.
3. Make changes as required.
4. When you finish, click **Save**. The entry is added to the table

- Editing an entry in the table

  1. Select the entry in the table.
  2. Click **Edit**. The **Edit Response** window opens, displaying the information for the entry.
  3. Make changes as required.
  4. When you finish, click **Save**. The entry is updated in the table.

- Deleting a value from the table

  1. Select the entry in the table.
  2. Click **Delete**. A confirmation message displays.
  3. Click **Delete** to remove the entry. The entry is removed from the table.

- Ordering the list.

  If you define multiple entries, they are searched in the order displayed in this list. To change the order:

  1. Select an entry.
  2. Click **Up** or **Down**. The search order is changed.

9. When you finish, click **Save**.

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 (SDM or UDR) 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 SDM , UDR, 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. Click **Modify**
   The **Data Sources** page opens.
5. Add a data source to the table.
   a) Select the data source type from the **Add** pulldown list. The appropriate **Add Data Source** window opens.
   b) Configure the values.
   c) When you finish, click **Save**. 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*.
6. (Optional) Add, modify, delete, or order the data sources using the following functions:
   - Cloning an entry in the table
     1. Select an entry in the table.
     2. Click **Clone**. The **Clone** window opens with the information for the entry.
     3. Make changes as required.
     4. When you finish, click **Save**. The entry is added to the table
   - Editing a data source in the table
     1. Select the data source in the table.
     2. Click **Edit**. The **Edit Data Source** window opens, displaying the information for the data source.
     3. Make changes as required.
     4. When you finish, click **Save**. The data source is updated in the table.
   - Deleting a data source from the table
     1. Select the data source in the table.
     2. Click **Delete**. A confirmation message displays.
     3. Click **Delete** to remove the data source entry. The data source is removed from the table.
   - Ordering the list.

     If you define multiple entries, they are searched in the order displayed in this list. To change the order:
     1. Select an entry.
     2. Click **Up** or **Down**. The search order is changed.
7. Configure the **General Settings**.
   - **OCUDR Enabled Multiple Key validation**—Enables the use of the UDR multiple key validation. This option is only valid for UDR 10.2 and later.
8. When you finish, click **Save**.

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 Subscriber Database Management (SDM) or Oracle Communications User Data Repository (UDR) 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. Specify the data source version number in the form ***x.x***.
   This number identifies the data source as either SDM or UDR. A version number of 9.*x* specifies an SDM data source. A version number of 10.*x* specifies a UDR data source.
4. **Primary Servers**:
   a) **Primary Identity** — Primary server host name.
   b) **Primary Address** — IP address, in IPv4 or IPv6 format, of the primary server.
   c) **Primary Port** — Primary server port number.
      The default is 3868.
   d) **Secondary Identity** — Secondary server host name.
   e) **Secondary Address** — IP address, in IPv4 or IPv6 format, of the secondary server.
   f) **Secondary Port** — Secondary server port number.
      The default is 3868.
5. **Backup Servers**:
   a) **Primary Identity** — Primary backup server name.
   b) **Primary Address** — IP address, in IPv4 or IPv6 format, of the primary backup server.
   c) **Primary Port** — Primary backup server port number.
      The default is 3868.
   d) **Secondary Identity** — Secondary backup server name.
   e) **Secondary Address** — IP address, in IPv4 or IPv6 format, of the secondary backup server.
   f) **Secondary Port** — Secondary backup server port number.
      The default is 3868.
6. **Common**:
   a) **Realm** — Sh server realm; for example, **`galactel.com`**.
   b) **Unique Name** — The unique name assigned to the Sh server.
   c) **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.
7. When you finish, click **Save**.

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. Specify the data source version number in the form ***x.x***.
   This number identifies the data source as either SDM or UDR. A version number of 9.*x* specifies an SDM data source. A version number of 10.*x* specifies a UDR data source.
3. **Unique Name** — The unique name assigned to the SPR Provisioning Data Source.
   Identifies which SPR data source to use.
4. **Host** — The FQDN or IP address of the SPR data source. Enter the standard dot-formatted IP address string.
5. **User Name** — The user name for the SPR access account for authentication.
   The default is **`admin`**.
6. **Password** — The password for the SPR access account for authentication.
   The default is **`admin`**.
7. **Module Name** — The module name to use for authentication.
   The default is **`Mediation`**.
8. **Key Transform Pattern** — A matching expression for filtering MDF routing to the SPR system.
9. When you finish, click **Save**.

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 Subscriber Database Management (SDM) Oracle Communications User Data Repository (UDR), 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 SDM or UDR, system.
- If one data source is selected, it is configured as either an Internal-SPR (SDM or UDR system) or an External-SPR (customer SPR system). The MDF device writes data to the SDM or UDR 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** (SDM or UDR 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**, and click **Reapply Selections**.

To remove an existing rule, click the delete (trash can) icon to the right of the rule. A confirmation message displays. Click **OK** and then 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:
4. Click **Add**.
The **Add SDM Mapping** window opens.
5. Enter values for the fields **Unique Name**, **SOAP Field**, **SDM Field**, and (optionally) up to 255 characters in **Description**.
6. When you finish, click **OK**.
The mapping is added to the table.
7. (Optional) Add, delete, modify. or reorder mappings.
    - Cloning an entry in the table
        1. Select an entry in the table.

2. Click **Clone**. The **Clone** window opens with the information for the entry.
3. Make changes as required.
4. When you finish, click **Save**. The entry is added to the table

- Editing an entry in the table

  1. Select the entry in the table.
  2. Click **Edit**. The **Edit Response** window opens, displaying the information for the entry.
  3. Make changes as required.
  4. When you finish, click **Save**. The entry is updated in the table.

- Deleting a value from the table

  1. Select the entry in the table.
  2. Click **Delete**. A confirmation message displays.
  3. Click **Delete** to remove the entry. The entry is removed from the table.

- Ordering the list.

  If you define multiple entries, they are searched in the order displayed in this list. To change the order:

  1. Select an entry.
  2. Click **Up** or **Down**. The search order is changed.

8. When you finish, click **Save**.

The mappings are stored in the CMP database.

Table 6: Default Subscriber Field Mappings lists the subscriber field mappings supported by default in the MDF system.

Table 6: 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. Click **Modify**.
   The functions for mapping display.
4. Click **Add**.
   The **Add Quota Mapping** window opens.
5. 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. The options are **LIMIT**, **DATA_SVC**, **STYLE_A**, and **COUPON**.
   - **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).
   - **Priority** — Specifies a priority for the quota. Valid values are 1 – 255.

6. When you finish, click **OK**.
   The mapping is added to the table.
7. (Optional) Add, delete, modify. or reorder mappings.

   - Cloning an entry in the table

     1. Select an entry in the table.
     2. Click **Clone**. The **Clone** window opens with the information for the entry.
     3. Make changes as required.
     4. When you finish, click **Save**. The entry is added to the table

   - Editing an entry in the table

     1. Select the entry in the table.
     2. Click **Edit**. The **Edit Response** window opens, displaying the information for the entry.
     3. Make changes as required.
     4. When you finish, click **Save**. The entry is updated in the table.

   - Deleting a value from the table

     1. Select the entry in the table.
     2. Click **Delete**. A confirmation message displays.
     3. Click **Delete** to remove the entry. The entry is removed from the table.

   - Ordering the list.

     If you define multiple entries, they are searched in the order displayed in this list. To change the order:

     1. Select an entry.
     2. Click **Up** or **Down**. The search order is changed.

8. When you finish, click **Save**.

The quota mappings are stored in the CMP database.

Chapter 4

Managing Message Distribution Function Servers

Topics:

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**.

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**.

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**.

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**.

The group is renamed.

Removing an MDF Server from an MDF Group

Removing an MDFprofile 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**.
   A confirmation message displays.
4. Click **OK** to delete the group.

The MDF group is deleted.

Chapter 5

The MDF SOAP Interface

Topics:

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 Database Management (SDM) or Oracle Communications User Data Repository (UDR) 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&ONT_S:0&G4_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&ONT_T:0&G4_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).

COUPON_SVC

Specifies the quota limit for the Coupon Service in bytes. For example, **CP1:100|CP2:200|CP3:0|CP4:0|CP5:500|CP6:600|CP7:700|CP8:800|CP9:0|CP10:0**.

COUPON_SVC_SDATE

Specifies the service activation date and time for the Coupon Service. The date-time value is specified in the form *yyyymmddhhmmss*, or a value of **0**, which means not registered. For example, **CP1:20140801123416|CP2:0|CP3:0|CP4:0|CP5:0|CP6:0|CP7:0|CP8:0|CP9:0|CP10:0**.

COUPON_SVC_EDATE

Specifies the service expiration date and time for the Coupon Service. The date-time value is specified in the form *yyyymmddhhmmss*, or a value of **0**, which means not registered. For example, **CP1:20150707123416|CP2:0|CP3:0|CP4:0|CP5:0|CP6:0|CP7:0|CP8:0|CP9:0|CP10:0.**

COUPON_ACT

Specifies if the Coupon Service is active. Possible values are **0** (inactive) or **1** (active).

CP_A_SOC

Specifies if the SOC for each coupon. For example, **CP1:LTEADCG1G|CP2:LTEADCG2G**.

#COUPON_STATUS

Lists the usage for each coupon. For example, **CP1:10/100|CP2:20/100**.

Example

The following examples show an addSubscriber request and response.

- *Figure 2: addSubscriber Request Example*
- *Figure 3: addSubscriber Response Example*

```
<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: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">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="ASOC">LTEMETER3</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="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 registed 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 intial quota usage,
          2. only quota usage of registered service will be listed.
          3. if a migration user has no initial quota usage, send a 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>
```

Figure 2: addSubscriber Request Example

```
<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>
```

Figure 3: addSubscriber Response Example

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 examples show a delSubscriber request and the response.

- *Figure 4: delSubscriber Request Example*
- *Figure 5: delSubscriber Response Example*

```
<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: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>
    </pcrf:delSubscriber>
  </soapenv:Body>
</soapenv:Envelope>
```

Figure 4: delSubscriber Request Example

```
<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>
```

Figure 5: delSubscriber Response Example

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 examples show a getSubscriber request to obtain profile and quota information and the response.

- *Figure 6: getSubscriber Request Example*
- *Figure 7: getSubscriber Response Example*

```
<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>
```

Figure 6: getSubscriber Request Example

```
<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>
          <info type="profile">
            <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="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>
              <!-- Pool information-->
              <attr key="POOL_ID">45000169222778</attr>
              <attr key="POOL_MEMBERS">45000169222778|45008169222779</attr>
            </attrs>
          </info>
          <info type="quota">
            <attrs>
              <!-- 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>
            </attrs>
          </info>
        </subscriberInfo>
      </result>
```

```
    </ns1:getSubscriberResponse>
  </soap:Body>
</soap:Envelope>
```

Figure 7: getSubscriber Response Example

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 status of the SPR system. 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 7: keepAlive Response Codes lists the keepAlive response codes.

Table 7: 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 examples show a keepAlive request and the response.

- *Figure 8: keepAlive Request Example*
- *Figure 9: keepAlive Response Example*

```
<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>
```

Figure 8: keepAlive Request Example

```
<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>
```

Figure 9: keepAlive Response Example

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 examples show a notifySubscriber request and response.

- *Figure 10: notifySubscriber Request Example*
- *Figure 11: notifySubscriber Response Example*

```
<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: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>
```

Figure 10: notifySubscriber Request Example

```
<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>
```

Figure 11: notifySubscriber Response Example

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 examples show a quotaRequest request and response.

- *Figure 12: quotaRequest Request Example*
- *Figure 13: quotaRequest Response Example*

```
<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>
        <attrs>
          <!-- both SUB_IMSI and REQUEST_TYPE is optional -->
          <attr key="SUB_IMSI">450082123451011</attr>
          <attr key="REQUEST_TYPE">update</attr>
        </attrs>
```

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

Figure 12: quotaRequest Request Example

```
<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">
                  <attrs>
                     <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>
                  </attrs>
               </info>
               <info type="quota">
                  <attrs>
                     <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>
                  </attrs>
               </info>
            </subscriberInfo>
         </result>
      </ns1:quotaRequestResponse>
   </soap:Body>
</soap:Envelope>
```

Figure 13: quotaRequest Response Example

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.
- 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 examples show an updateQuota request and response.

- *Figure 14: updateQuota Request Example*
- *Figure 15: updateQuota Response Example*

```
<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: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>
```

Figure 14: updateQuota Request Example

```
<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>
```

Figure 15: updateQuota Response Example

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.

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&ONT_S:0&G4_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&ONT_T:0&G4_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 (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 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 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).

The following examples show an updateSubscriber request, updateSubscriber Request with multiple key validation, and updateSubscriber response.

- *Figure 16: updateSubscriber Request Example*

- *Figure 17: updateSubscriber Request Example with Multiple Key Validation*
- *Figure 18: updateSubscriber Response Example*

```
<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="OMPD_MAIN_IMSI">45000169222778</attr>-->
          <attr key="OPMD_SUB_IMSI">S1:0|S2:45000169222778
|S3:45008169222779</attr>

        </attrs>
      </inPara>
    </pcrf:updateSubscriber>
  </soapenv:Body>
</soapenv:Envelope>
```

Figure 16: updateSubscriber Request Example

If you are using Oracle Communications User Data Repository version 10.2 or greater, you can use Oracle Communications User Data Repository-Base multiple key validation. The following example shows a request that contains a multiple key request.

```
<req name="update" resonly="y">
            <ent name="Subscriber"/>
            <set> … </set>
            <where>
              <expr><attr name="MSISDN"/><op value="="/><value
val="01028123010"/></expr>
              <expr><attr name="IMSI"/><op value="="/><value
val="450082123451010"/></expr>
            </where>
          </req>
```

Figure 17: updateSubscriber Request Example with Multiple Key Validation

```
<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>
```

Figure 18: updateSubscriber Response Example

Chapter 6

MDF Cluster Reports

Topics:

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 (SDM and UDR 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/suspectreopened 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:

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: 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:

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>
```

```
     <!--====================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:

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 8: 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 <usus> 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: • Configuration error on the SPR system • Could not connect to the SPR system • SPR system is too busy
SYSTEM_TIMEOUT	A system timeout occurred.
UNKNOWN_ERROR(*n*)	An unknown error *n* 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.

Appendix C

The Coupon Service

Topics:

The Coupon Service describes how to deploy a coupon service using the CMP.

Overview of the Coupon Service

A Coupon Service is a free or purchasable data service. For example, a Coupon Service could be a prize to an individual subscriber, or the service could be purchased by a business unit that offers the coupon to individual subscriber. Coupons are typically valid for 1 year from the time of activation. The Coupon Service is not available to subscribers that are configured with a SOC_TYPE of METER. The coupon can be shared from the main subscriber of an Oracle SPR (SDM or UDR) to the subordinate subscriber in a Samsung SPR.

A Coupon Service must meet all the following conditions to be valid:

1. COUPON_SVC > 0
2. COUPON_SVC_SDATE > 0 , and is in the *YYYYMMDDHHMMSS* format
3. COUPON_SVC_EDATE > 0 , and is in the *YYYYMMDDHHMMSS* format
4. COUPON_SVC_SDATE < COUPON_SVC_EDATE
5. Current System Time < COUPON_SVC_EDATE

See *addSubscriber Request* for more information about the Coupon Service parameters.

Table 9: Example of Coupon Service Request Parameters shows the correct and incorrect use of the Coupon Service parameters.

Table 9: Example of Coupon Service Request Parameters

COUPON_SVC	COUPON_SVC_SDATE	COUPON_SVC_EDATE	#COUPON_STATUS	Valid
CP1:1000	CP1:20140101000000	CP1:20150101000000		Yes
CP2:1000	CP2:20140101000000	CP2:0		No (EDATE invalid) Return ILLEGAL_SOAP_REQUEST
CP3:0	CP3:20140101000000	CP3:20150101000000		No (limit invalid) Return 0, will not create dynamic quota for CP3
CP4:4000	CP4:20140101000000	CP4:20140101000000		No (SDATE should < EDATE) Return ILLEGAL_SOAP_REQUEST
CP5:5000	CP5:20140701000000	CP5:20140801000000		No (current time should < EDATE) Return 0, will not create dynamic quota for CP5
CP1:1000	CP1:20140101000000	CP1:20150101000000	CP1:500/1000	Yes
CP1:1000	CP1:20140101000000	CP1:20150101000000	CP1:500/2000	No (limit should be same in COUPON_SVC and #COUPON_STATUS) Return ILLEGAL_SOAP_REQUEST
CP1:0	CP1:0	CP1:0	CP1:500/2000	No (CP1 is invalid, the usage of CP1 in #COUPON_STATUS will be invalid)

Deploying the Coupon Service

You can deploy the coupon service using profiles that are delivered with the Policy Management system or with a quota profile you created.

To deploy the Coupon Service:

1. Add the quota profile for the coupon service using one of the following methods:
   - Import the quota profiles delivered with the Policy Management system . See the *Configuration Management Platform Wireless User's Guide* for information about importing.
   - Create the quota passes for the coupon service. See "Creating a Pass" in the *Configuration Management Platform Wireless User's Guide*.

   The following examples are sample Coupon Service quota profile configurations.

```
CID: 6773695314542936694
Name: Coupon_Pass
Priority: 0
ActiveTimePeriodName:
Use Dynamic Grants: no
Max Active Sessions: 10
QuotaConvention: none
UseDynamicQuotaGrant: no
MaxActiveSessions: 10
QuotaProfileType: SUBSCRIBER
```

Figure 19: Sample Subscriber Quota Profile for Coupon Service

```
CID: 6773695314542936707
Name: Pool_Coupon_Pass
Priority: 0
ActiveTimePeriodName:
Quota Profile Type: 1
Use Dynamic Grants: no
Max Active Sessions: 10
QuotaConvention: none
UseDynamicQuotaGrant: no
MaxActiveSessions: 10
QuotaProfileType: POOL
```

Figure 20: Sample Pool Quota Profile for Coupon Service

2. Add the quota mapping profile for the Coupon Service using one of the following methods:
   - Import the quota mapping profile delivered with the Policy Management system . See the *Configuration Management Platform Wireless User's Guide* for information about importing.
   - Create the quota mapping profile for the Coupon Service. See *Mapping Quotas*.

   The following example is a sample Coupon Service quota mapping profile configuration.

```
Name: CP1,CP10,CP2,CP3,CP4,CP5,CP6,CP7,CP8,CP9
CID: 7061925690694948399
Uid: 281474978010671 (1:1300015)
```

```
Category: COUPON
QuotaProfileName: Coupon_Pass,Pool_Coupon_Pass
QuotaType: pass
Mid-month Registration: no
OPMD Sharable: yes
MK: none
Priority: 7
Supported SOC_TYPE: none
```

Figure 21: Sample Quota Mapping Profile for Coupon Service

3. Verify that the priority values are set in the following order (from highest to lowest priority value):
   1. AL0
   2. DATA_LIM
   3. AL1 – AL10
   4. CP1 – CP10

   The following example shows a valid priority order.

Quota Mapping

Modify

Unique Name	Category	Name	Quota Profile Name	Quota Type	Mid-month Registratio	OPMD Sharable	Priority
COUPON_SVC.CPn	COUPON	CP1,CP10,CP2,CP3,	Coupon_Pass,P(	pass	false	true	3
DATA_LIM	LIMIT	DATA_LIM	DATA_Plan,Pool	quota	true	true	7
DATA_SVC.OTM	DATA_SVC	OTM	OTM_Plan	quota	false	false	0
DATA_SVC.OTN	DATA_SVC	OTN	OTN_Plan	quota	true	false	0
DAY_LIM	LIMIT	DAY_LIM	DAY_Plan	quota	false	false	0
mVOIP_LIM	LIMIT	mVOIP_LIM	mVOIP_Plan	quota	false	false	0
STYLE_A.AL0	STYLE_A	AL0	AL0_Pass,Pool_	pass	false	true	9
STYLE_A.ALn	STYLE_A	AL1,AL10,AL2,AL3,A	DATA_Plan,Pool	top-up	false	true	5

Figure 22: Valid Priority Order

4. Add the SOAP mapping for the Coupon Service using one of the following methods:

   Note: If the Coupon Service is being deployed on the SDM, it is recommended that you use Custom51–54 for the four compound fields (COUPON_SVC, COUPON_SVC_SDATE, COUPON_SVC_EDATE, CP_A_SOC) to avoid a length limitation.

   - Import the SOAP mapping profile delivered with the Policy Management system . See the *Configuration Management Platform Wireless User's Guide* for information about importing.
   - Create the SOAP mapping profile for the Coupon Service. See *Mapping Quotas*.

   The following example is a sample Coupon Service SOAP mapping profile configuration. The left is the field name in the MGW SOAP request and MDF response, the right (bold text) is the SPR storage field name.

```
MEDIATION.MDF.MAPPING.FIELDS.COUPON_ACT=Custom50
MEDIATION.MDF.MAPPING.FIELDS.COUPON_SVC=Custom51
MEDIATION.MDF.MAPPING.FIELDS.COUPON_SVC_EDATE=Custom53
MEDIATION.MDF.MAPPING.FIELDS.COUPON_SVC_SDATE=Custom52
MEDIATION.MDF.MAPPING.FIELDS.CP_A_SOC=Custom54
```

Figure 23: Sample SOAP Mapping Profile for Coupon Service

5. Configure the advance settings of the MEDIATION.MDF.MAPPING.CUSTOMFIELDS to include the five coupon related fields in MDF query result.

   Note: If the MEDIATION.MDF.MAPPING.CUSTOMFIELDS contained the XXX value, the additional five fields are appended after the XXX.

```
MEDIATION.MDF.MAPPING.CUSTOMFIELDS=XXX,Custom50,Custom51,Custom52,Custom53,Custom54
```

   Figure 24: Sample Custom Fields Advanced Configuration for Coupon Service

6. Configure the advance settings of the MEDIATION.MDF.MAPPING.TOPOOLFIELDS to include the three coupon related fields for the pool. Left is the name of the subscriber fields in SPR, and the right is the name of pool fields in SPR.

   Note: Pool has only 20 custom fields reserved, and all of them allow maximum 255 characters. Choose custom fields from pool that have not been used.

```
MEDIATION.MDF.MAPPING.TOPOOLFIELDS.Custom50=Custom10
MEDIATION.MDF.MAPPING.TOPOOLFIELDS.Custom51=Custom11
MEDIATION.MDF.MAPPING.TOPOOLFIELDS.Custom54=Custom14
```

   Figure 25: Sample Pool Fields Advanced Configuration for Coupon Service

7. Configure the advance settings of the MEDIATION.MDF.MAPPING.TOPOOL_ONCHANGED_FIELDS.

   Among all copy to fields, there are 2 categories:

   - When updating the subscriber profile, the fields should be copied to the pool if the value has been changed. The subscribers associated with the pool will then receive the PNRs. This reduces unnecessary PNRs.
   - Another category is when update subscriber profile, no matter if the field value is changed, if it's appeared in update subscriber request, it will be copied to pool.

   This advance setting lists all copy to pool fields that belong to the category. Add the COUPON_ACT (custom50) to this field list.

```
MEDIATION.MDF.MAPPING.TOPOOL_ONCHANGED_FIELDS=MSISDN,LTE,SOC,SOC_TYPE,OPMD_SUB_IMSI,Custom50
```

   Figure 26: Sample Pool On-Changed Fields Advanced Configuration for Coupon Service

8. If the datasource was switched from Oracle Communications Subscriber Database Management to UDR, make the following timeout changes:
   a) Change the timeout between the MDF and UDR to a value that is greater than 7s.
   b) Change the MGW timeout between the MGW and MDF to a value that is greater than or equal to 9s.

For information on changing advanced settings, see the *Configuration Management Platform Wireless User's Guide*.

```
MEDIATION.spr.timeout=8
```

Figure 27: Sample Timeout Configuration for Coupon Service

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

MGW

Media Gateway

Mediation Gateway. A standalone hardware system, situated between a carrier's proprietary subscriber profile repository and a Policy Management network, that converts the interfaces and data schemas embedded in the carrier's systems to the interfaces and data schemas required by Policy Management.

O

O

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

S

SDM	Subscriber Data Management
SOAP	Simple Object Access Protocol

U

UDR	User-Data-Request - A user-identity and service indication sent by a Diameter client to a Diameter server in order to request user data. User Data Repository - A logical entity containing user data

W

WSDL	Web Service Definition Language