Oracle® Communications

User Data Repository

Bulk Import/Export File Specification

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Chapter 1. Introduction

1.1 Purpose and Scope

This document presents the bulk import/export file interface to be used by provisioning client applications to administer the Provisioning Database of the Oracle Communications User Data Repository (UDR) system. Through bulk import/export files, an external provisioning system supplied and maintained by the network operator may add, change, or delete subscriber/pool information in the Oracle Communications User Data Repository database.

The primary audience for this document includes customers, Oracle customer service, software development, and product verification organizations, and any other Oracle personnel who have a need to use the bulk import/export file interface.

1.2 References

The following external document references capture the source material used to create this document.

[1] *IMS Sh interface; Signalling flows and message contents*, 3GPP TS 29.328, Release 11
[2] *Sh interface based on the Diameter protocol; Protocol details*, 3GPP TS 29.329, Release 11
[3] *User Data Convergence (UDC); Technical realization and information flows; Stage 2*, 3GPP TS 23.335, Release 11
[4] *SDM v9.3 Subscriber Provisioning Reference Manual,* 910-6870-001, Revision A, January 2014

1.3 Glossary

This section lists terms and acronyms specific to this document.

Table 1: Glossary

Acronym/Term	Definition
ACID	Atomic, Consistent, Isolatable, Durable
BLOB	Binary Large Object
CFG	Configuration Data—data for components and system identification and configuration
CPS	Customer Provisioning System
DP	Database Processor
FRS	Feature Requirements Specification
FTP	File Transfer Protocol
GUI	Graphical User Interface
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity, or IMSI [im-zee]
IP	Internet Protocol
KPI	Key Performance Indicator

Acronym/Term	Definition
MEAL	Measurements, Events, Alarms, and Logs
MP	Message Processor
MSISDN	Mobile Subscriber ISDN Number
NA	Not Applicable
NE	Network Element
NPA	Numbering Plan Area (Area Code)
OAMP	Operations, Administration, Maintenance, and Provisioning
NOAMP	Network OAM and Provisioning
PCRF	Policy Charging and Rules Function
NPHO	Non Pool Host UDR
PS	Provisioning System
PSO	Pool Spanning UDRs
SDO	Subscriber Data Object
SEC	Subscriber Entity Configuration
SNMP	Simple Network Management Protocol
SOAM	System Operation, Administration, and Maintenance
SPR	Subscriber Profile Repository
TCP	Transmission Control Protocol
UDR	User Data Repository
UTC	Coordinated Universal Time
VIP	Virtual IP
XML	Extensible Markup Language

Chapter 2. System Architecture

2.1 Overview

Oracle Communications User Data Repository (UDR) performs the function of an SPR, which is a database system that acts as a single logical repository that stores subscriber data. The subscriber data that traditionally has been stored into the HSS, HLR, AuC, and Application Servers, is stored in UDR as specified in 3GPP UDC information model [3]. UDR facilitates the share and the provisioning of user related data throughout services of 3GPP system. Several Applications Front Ends, such as: one or more PCRF, HSS, HLR, or AuCFEs can be served by UDR.

The data stored in UDR can be permanent and temporary data. Permanent data is subscription data and relates to the required information the system needs to perform the service. User identities (MSISDN, IMSI IMEI, NAI and AccountId), service data (service profile) and authentication data are examples of the subscription data. This kind of user data has a lifetime as long as the user is permitted to use the service and may be modified by administration means. Temporary subscriber data is dynamic data which may be changed as a result of normal operation of the system or traffic conditions (transparent data stored by Application Servers for service execution, user status, usage, and so on).

Oracle Communications User Data Repository is a database system providing the storage and management of subscriber policy control data for PCRF nodes. Subscriber/Pool data is created/retrieved/modified or deleted through the provisioning or by the Sh interface peers (PCRF). The following subscriber/pool data is stored in Oracle Communications User Data Repository:

- Subscriber
    - Profile
    - Quota
    - State
    - Dynamic Quota
- Pool
    - Pool Profile
    - Pool Quota
    - Pool State
    - Pool Dynamic Quota

Figure 1 illustrates a high level the Oracle Communications User Data Repository Architecture.

Oracle Communications User Data Repository consists of several functional blocks. The Message Processors (MP) provide support for a variety of protocols that entail the front-end signaling to peer network nodes. The back-end UDR database resides on the N-OAMP servers.

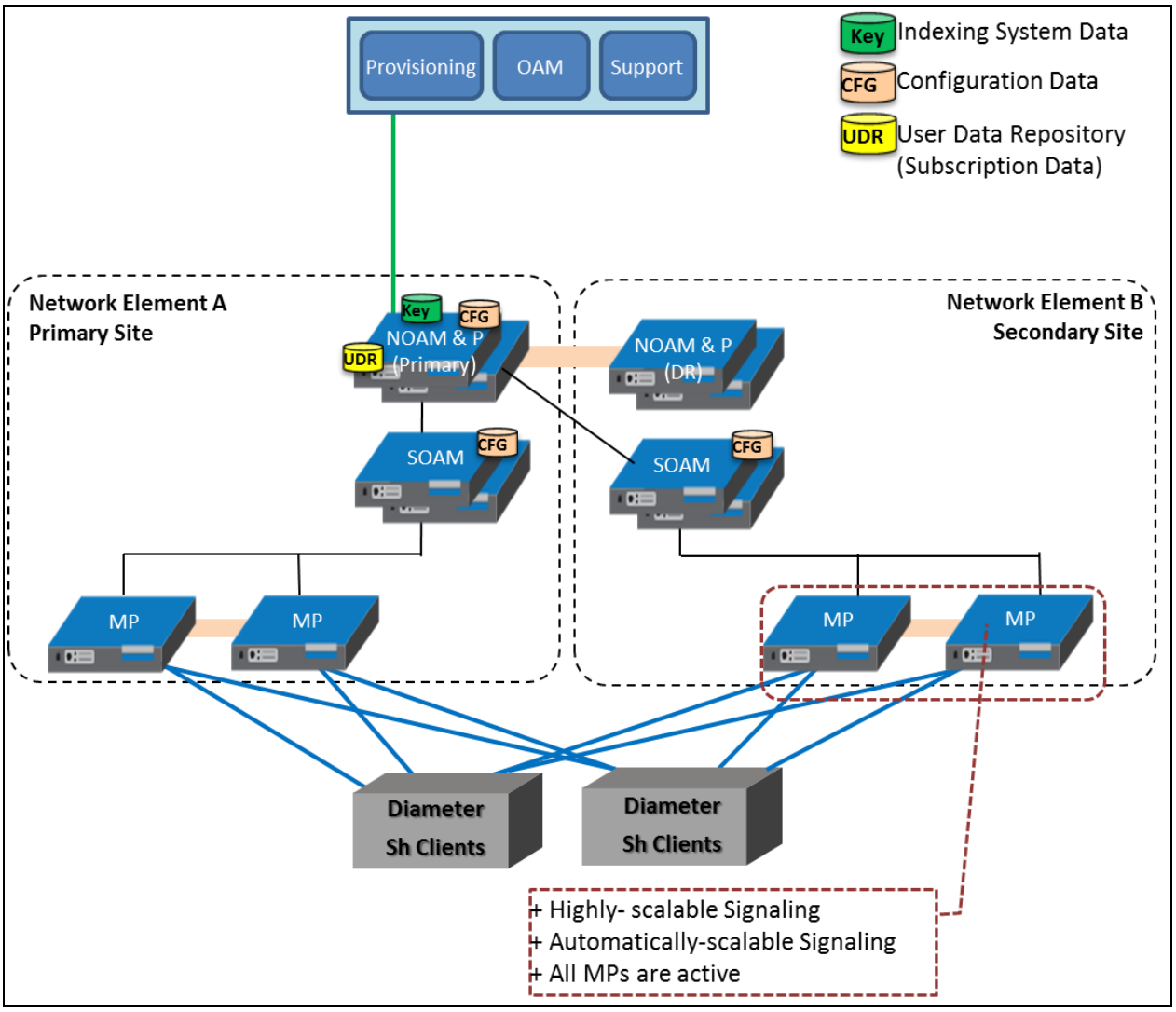
As the product evolves forward, the subscriber profiles in UDR can be expanded to support data associated with additional applications. Along with that, the MPs can be expanded to support additional Diameter interfaces associated with these applications. The IPFE can be integrated with the product to facilitate signaling distribution across multiple MP nodes.

The Network level OAMP server (NOAMP) shown in the architecture provides the provisioning, configuration and maintenance functions for all the network elements under it.

System level OAM server (SOAM) is a required functional block for each network element which gets data replicated from NOAMP and in turn replicates the data to the message processors.

MP functions as the client-side of the network application, provides the network connectivity and hosts network stack such as Diameter, SOAP, LDAP, SIP and SS7.

Figure 1: User Data Repository High Level Architecture



The bulk import provisioning interface provides data manipulation commands for subscribers and pools.

2.2 Subscriber Manipulation Commands

- Subscriber Profile create/modify/delete
- Subscriber Profile field create/modify/delete
- Subscriber opaque data create/modify/delete

  Quota, State and Dynamic Quota
- Subscriber data row and/or field create/modify/delete

  Quota, State and Dynamic Quota
- Reset of Subscriber data row data

  Quota
- Restore of complete Subscriber data

2.3 Pool Manipulation Commands

- Pool Profile create/delete
- Pool Profile field create/modify/delete
- Pool opaque data create/modify/delete

  Pool Quota, Pool State and Pool Dynamic Quota
- Pool data row and/or field create/modify/delete

  Pool Quota, Pool State and Pool Dynamic Quota
- Reset of Pool data row data

  Pool Quota
- Pool subscriber membership operations

  Add/remove from pool
- Restore of complete Pool and member Subscriber data

2.4 Bulk Export Information

The bulk export interface exports the following information:

- Subscriber:
  - Subscriber Profile
  - Subscriber opaque data (if present)

    Quota, State and Dynamic Quota
  - If a subscriber is a member of a pool:

    Subscriber pool membership (PoolID)
- Pool:
  - Pool Profile
  - Pool opaque data (if present)

    Pool Quota, Pool State and Pool Dynamic Quota

2.5 Database Transactions

Each create/update/delete request coming from the bulk import interface triggers a unique database transaction, a database transaction started by a request is committed before sending a response.

2.5.1 Block Transaction Mode

The block database transaction mode requires explicit `<transaction>` XML tags around all of the requests in a transaction. In a `<transaction>` request, all requests must be contained on a single line in the import file.

The block transaction is sent as one XML request, and all requests contained in the block are run in the sequence supplied in a database transaction. If any request fails the entire transaction is automatically rolled back. If all requests are successful then the transaction is automatically committed.

If a block transaction fails, the error code for the request in the block that encountered an error is returned.

All block transactions must also satisfy limits indicated by the Maximum Provisioning Backend Response Timeout and Transaction Durability Timeout system variables, which are defined in 9.1.2Appendix A. If any of those limits are exceeded, the transaction is aborted and automatically rolled back.

NOTES

- The relevant transaction related measurements are incremented once per <transaction> request (by +1), ProvTxnCommitted, TxProvTxnFailed or TxProvTxnAborted.
- The <restoreSubscriber> and <restorePool> requests cannot be used in a <transaction>.

Request Format

```
<transaction>
  <txRequest id="id1">
    request1
  </txRequest>
[
  <txRequest id="id2">
    request2
  </txRequest>
    :
  <txRequest id="idN">
    requestN
  </txRequest>
]
</transaction>
```

- *idX*: Identifier for the request in the transaction

  Values: 0 to 4294967295

- *requestX*: Bulk import request contained in the transaction
  - The maximum number of requests that can be included in a <transaction> transaction is 50
  - The maximum number of <addPoolMember> requests that can be included in a <transaction> is 12, if each <addPoolMember> request adds 25 members.
  - On a Low Capacity Server Configuration, the maximum number of <addPoolMember> requests that can be included in a <transaction> is 3, if each <addPoolMember> request adds 25 members.
  - On a Low Capacity Server Configuration, the maximum number of <deletePoolMember> requests that can be included in a <transaction> is 3, if each <deletePoolMember> request deletes 25 members.
  - The maximum number of <addPoolMember> requests that can be included in a <transaction> is 50, if each <addPoolMember> request adds 1 member.
  - The Database used by UDR allows only 1000 operations to be performed in a single transaction.

Examples

Request

This request creates 2 subscribers, and updates another subscriber.

```
<transaction>
  <txRequest id="1">
    <createSubscriber>
      <key>
        <MSISDN>15141234567</MSISDN>
        <IMSI>302370123456789</IMSI>
      </key>
      <entity>
        <data>
          <name>Subscriber</name>
          <interface>XMLIMPORT</interface>
        </data>
        <content>
```

```
<![CDATA[
<subscriber>
  <field name="MSISDN">15141234567</field>
  <field name="IMSI">302370123456789</field>
  <field name="BillingDay">5</field>
  <field name="Tier">Gold</field>
  <field name="Entitlement">DayPass</field>
</subscriber>
]]>
        </content>
      </entity>
    </createSubscriber>
  </txRequest>
  <txRequest id="2">
    <createSubscriber>
      <key>
        <MSISDN>14505551234</MSISDN>
        <IMSI>302370999999999</IMSI>
      </key>
      <entity>
        <data>
          <name>Subscriber</name>
          <interface>XMLIMPORT</interface>
        </data>
        <content>
<![CDATA[
<subscriber>
  <field name="MSISDN">14505551234</field>
  <field name="IMSI">302370999999999</field>
  <field name="BillingDay">1</field>
  <field name="Tier">Silver</field>
  <field name="Entitlement">DayPass</field>
</subscriber>
]]>
        </content>
      </entity>
    </createSubscriber>
  </txRequest>
  <txRequest id="3">
    <updateField clearAll="true">
      <key>
        <MSISDN>14165555555</MSISDN>
      </key>
      <entity>
        <data>
          <name>Subscriber</name>
          <interface>XMLIMPORT</interface>
          <xpath>/subscriber</xpath>
        </data>
        <fields>
          <field name="BillingDay">23</field>
          <field name="Tier">Gold</field>
        </fields>
      </entity>
    </updateField>
  </txRequest>
</transaction>
```

Import File Processing Sequencing

In order to improve the performance of bulk import operations, requests read from an import file are not guaranteed to be processed in the order they are specified in the import file.

- If multiple requests for a subscriber or pool must be performed in order, it is necessary to use a block transaction (see section 2.5.1), and sequence the requests in the transaction in the order in which they must be performed
- In a transaction, the request processing is guaranteed to be the order in which the requests are specified
- For example:
    - If the import file contained requests to do the following:

i. Create subscriber #1
ii. Update subscriber #1
iii. Update subscriber #1

- Then the first command run was (3) to update the subscriber, which fails because the subscriber did not exist. Then (2) cannot occur next, and the update fails because the subscriber did not exist, and then finally (1) creates the subscriber, but at the end of the import operation the subscriber data does not contain the updates made in (2) and (3).
- By creating a transaction such as:

```
<transaction>
    Create Subscriber #1
    Update Subscriber #1
    Update Subscriber #1
</transaction>
```

- Then the request works as expected

2.5.2 ACID-Compliance

The bulk import interface supports Atomicity, Consistency, Isolation and Durability (ACID)-compliant database transactions which guarantee transactions are processed reliably.

Atomicity

Database manipulation requests are atomic. If one database manipulation request in a transaction fails, all of the pending changes can be rolled back by the client, leaving the database as it was before the transaction was initiated. However, the client also has the option to close the transaction, committing only the changes in the transaction that were performed successfully. If any database errors are encountered while committing the transaction, all updates are rolled back and the database is restored to its previous state.

Consistency

Data across all requests performed inside a transaction is consistent.

Isolation

All database changes made in a transaction by one client are not viewable by any other clients until the changes are committed by closing the transaction. In other words, all database changes made in a transaction cannot be seen by operations outside of the transaction.

Durability

After a transaction is committed and becomes durable, it persists and is not be undone. Durability is achieved by completing the transaction with the persistent database system before acknowledging commitment. SOAP and REST Provisioning clients only receive SUCCESS responses for transactions that have been successfully committed and have become durable.

NOTE: For bulk import, requests are considered if the database transaction is committed successfully. The bulk import tool does not wait until the transaction has become durable before moving onto the next request. But, requests become durable a short time after.

The system recovers committed transaction updates in spite of system software or hardware failures. If a failure (loss of power) occurs in the middle of a transaction, the database returns to a consistent state when it is restarted.

Data durability signifies the replication of the provisioned data to different parts of the system before a response is provided for a provisioning transaction. The following additive configurable levels of durability are supported:

- Durability to the disk on the active provisioning server (just 1)
- Durability to the local standby server memory (1 + 2)
- Durability to the active server memory at the Disaster Recovery site (1 + 2 + 3)

2.6 Behavior during Low Free System Memory

If the amount of free system memory available to the database falls below a critical limit, then requests that create or update data may fail with the error `MemThresholdReached`. Before this happens, memory threshold alarms are raised indicating the impending behavior if the critical level is reached.

The error returned by the bulk import interface when the critical level has been reached is:

`[error 61 errorText : line lineNumber]`

2.7 Multiple Subscriber Key Processing

UDR allows multiple key values for a subscriber to be supplied in some requests in the `<key>` element.

When multiple keys are supplied in a request (such as an IMSI and an MSISDN or IMEI), UDR looks up all supplied keys, and only consider the subscriber record found if all supplied keys correspond to the same subscriber.

If any key value does not exist, then `KeyNotFound` is returned. If multiple keys are provided, and all keys exist, but do not correspond to the same subscriber, then the error `MultipleKeysNotMatch` is returned.

Example request:

```
<deleteField>
  <key>
    <MSISDN>15141234567</MSISDN>
    <IMSI>302370123456789</IMSI>
    <AccountId>10404723525</AccountId>
  </key>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
      <xpath>/subscriber</xpath>
    </data>
    <fields>
      <field name="Tier"/>
      <field name="Custom1"/>
    </fields>
  </entity>
</deleteField>
```

Multiple values for the same key type are also allowed, such as if a subscriber has two provisioned IMSIs, the following is allowed.

```
<deleteField>
  <key>
    <IMSI>302370123456789</IMSI>
    <IMSI>184569547984229</IMSI>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
  :
```

UDR supports as many keys that are allowed for a subscriber in the request.

NOTE: For pool based requests, only a single PoolID is allowed. It is not allowed to mix PoolID and subscriber key values in the same request, and doing so results in an `InvalidInputXML` error response. For example, the following is not allowed:

```
<deleteField>
  <key>
    <IMSI>302370123456789</IMSI>
    <PoolID>100000</PoolID>
  </key>
  <entity>
  :
```

2.8 PNR Generation with Import

UDR has a PNR Generation with Import configuration option (refer to 9.1.2Appendix A for Provisioning Options) that, when enabled, results in Sh PNR messages being generated for subscribers that have active subscriptions (an SNR for the subscriber has been received) if import requests:

- Update, create, or delete data associated with that subscriber
- Update, create, or delete data associated with the pool that the subscriber is a member of
- Add the subscriber, or remove the subscriber from a pool

2.9 Pools Spanning UDRs

Pools spanning UDRs allow subscribers to be a member of a pool that resides on a different UDR instance. A pool network is defined containing the list of UDR instances across which pools may span. These UDR instances are interconnected and networking/provisioning traffic is passed between them.

A Pool Host UDR maintains pool data which may have pool members on other UDR instances. A Non Pool Host UDR hosts pool members for which pool data resides on a Pool Host UDR.

Pools Spanning UDR feature is only supported in combination with Oracle Communications Policy Management 9.7.4 or higher. This feature cannot be deployed unless the UDR is interworking with policy release 9.7.4 or higher.

2.10 Enterprise Pools

Enterprise Pools have the capability to support more than 25 members in a pool. Basic Pools maintain a threshold of 25 members as the maximum number of subscribers that are allowed. Enterprise Pools are pools containing more than 25 members and there is not a maximum number of pool members enforced.

A field in the pool profile called Type is used to distinguish between a basic pool and an enterprise pool. If the Type field is not present, then this implies that the pool is a basic pool. A basic pool can be converted to an enterprise pool by updating the profile to set the Type field to have a value of enterprise. An enterprise pool can be converted to a basic pool by removing the Type field, as long as the number of members in the pool does not exceed the maximum allowed for a basic pool.

Pools spanning UDRs support the Enterprise Pool feature. With this feature, a pool profile on a Pool Host UDR can be provisioned as an enterprise pool (the type field set to enterprise in the pool profile). A PSO that is provisioned as an Enterprise pool on the Pool Host UDR is considered as an Enterprise pool on a Non Pool Host UDR. The Type field in the pool profile on the Non Pool Host UDR is not required to be explicitly provisioned. Provisioning a pool profile with Type field on the NPHO is rejected with error `Operation Not Allowed`.

Chapter 3. Bulk Operations

3.1 Message Conventions

XML message specification syntax follows several conventions to convey what parameters are required or optional and how they and their values must be specified.

Table 2: Message Conventions

Symbol	Description
italics	Parameter values that are replaced by an actual parameter name or numeric value.
spaces	Spaces (zero or more space characters, " ") may be inserted anywhere except in a single name or number. At least one space is required to separate adjacent names or numbers.
…	Variable number of repeated entries. For example: dn *DN1*, dn *DN2, …,*dn *DN7,* dn *DN8*
< >	Angle brackets are used to enclose parameter values that are choices or names. For example, in `parameter1` *<1|2|3>*, the numbers represent specific value choices. In `parameter2` *<ServerName>*, the *ServerName* represents the actual value. In `parameter3` *<0…3600>*, the numbers represent a choice in the range from 0 to 3600.
[ ]	Square brackets are used to enclose an optional parameter and its value, such as `[,` `parameter1` *<1|2|3>*`]`. A parameter and its value that are not enclosed in square brackets are mandatory.
|	When the pipe symbol is used in a parameter value list, such as `Parameter1` *<1|2|3>*, it indicates a choice between available values.
,	A literal comma is used in the message to separate each parameter that is specified.

3.2 Import

UDR supports mechanisms to support file-based bulk loading of subscriber data. Subscriber data records can be entered by reading files which contain the set of transactions to be processed. The import process is non-blocking, it runs together with Provisioning updates as well as network (Sh) updates.

3.2.1 Configuring Import Options

You can configure import options by using the Main Menu of the UDR GUI and selecting **UDR → Configuration → Provisioning Options** screen. Refer to 9.1.2Appendix A for Provisioning Options.

3.2.2 Import Files

Files from a remote directory can be imported and the values in the files are used to populate the database. The import file is an ASCII text file that contains a series of database manipulation requests. Each request must be formatted on a single line. Import files are placed in the `Remote Import Directory` on the remote server specified in `Remote Host IP Address` field on the Provisioning Options (see 9.1.2Appendix A). They are detected in five minutes and automatically resynched over SSH File Transfer Protocol (SFTP) to the file

management storage area on the active server. This local directory is `/var/TKLC/db/filemgmt/provimport` and is displayed in Provisioning Options (see 9.1.2Appendix A). For a file to be imported it must:

- Be properly named

  XML import files must have *.ixml file extensions.

- Have been placed in the remote directory after the time when the import last ran
- Must not have been previously imported
  - A file that has been imported into the local directory is not imported again, even if its status is failed.
  - To import a previously failed file, correct the file as necessary, rename the file, and then place the renamed file in the remote directory.

    NOTE: The renamed file must have a file update timestamp later than the last imported file, or UDR does not process it

After fully downloaded, each file is automatically imported into the Provisioning Database sequentially in the order in which their download completed. The order of imported files is also indicated on the Main Menu of the UDR GUI and selecting **UDR → Maintenance → Import Status** screen. The import file is validated one command at a time and the import continues if a command fails. Failed commands are listed in the import log file (see section **3.2.5**).

An Import file may contain as many requests as the storage media used to hold the import file allows.

3.2.3 Import File Format

Import files contain data in XML format. An XML import file is an ASCII text file that contains a series of database manipulation requests in native XML format as specified in section Chapter 5. The data used in the imports is defined in section Chapter 4.

Table 3 lists database manipulation requests that are supported in an XML import file.

Table 3: Import Request Operations

Operation	Description	Section
<createSubscriber>	Create a subscriber	5.1.1
<updateSubscriber>	Update a subscriber	5.1.2
<deleteSubscriber>	Delete a subscriber	5.1.3
<create>	Create a FieldSet	7.1.1
<updateField>	Update a Field	7.1.2
<updateFieldSet>	Update a FieldSet	7.1.3
<deleteField>	Delete a Field	7.1.4
<deleteFieldSet>	Delete a FieldSet	7.1.5
<createPool>	Create a Pool	6.1.1
<deletePool>	Delete a Pool	6.1.2
<addPoolMember>	Add a pool member	6.2.1

Operation	Description	Section
<deletePoolMember>	Delete a pool member	6.2.2
<reset>	Reset an Element	8.1.1
<transaction>	Transaction container	2.5.1
<restoreSubscriber>	Restore a subscriber	9.1.1
<restorePool>	Restore a pool	9.1.2

Basic Import File Request Format

The following describes the basic layout of an import file request, with all different options and parameters included. UDR requests are made up of different combinations of the parameters. All are listed for illustrative purposes. Proper examples of which parameters are relevant for each request are described in the section that follows.

```
<requestName [create="create"]
             [createEntityIfNotExist="createEntityIfNotExist"]
             [clearAll="clearAll"]
             [inTx="inTx"]>

  <key>
    <keyName>keyValue</keyName>
  </key>

  <entity>

    <data>
      <name>dataName</name>
      <interface>dataInterface</interface>
      <xpath>dataXpath</xpath>
      <version>
        <name>versionName</name>
        <value>versionValue</value>
      </version>
    </data>

    <fields>
      <field name="fieldName" [delete="deleteField"]>fieldValue</field>
    </fields>

    <content>
      entityContent
    </content>

  </entity>

  <members>
    <member>
      <keyName>keyValue</keyName>
    </member>
  </members>

</requestName>
```

NOTE: Each request is formatted on a single line only. It is expanded for readability.

The *requestName* element indicates the request type, such as `<createSubscriber>`, `<updateField>`. See Table 3 for the full list of request name values.

The `create` attribute is used to indicate that the row in an entity is created if it does not exist. Possible values of *create* are `true` or `false`. Note: this attribute is only applicable to the `<updateFieldSet>` request.

The createEntityIfNotExist attribute is used to indicate that the entity being updated is created if it does not exist before applying the update to create the entity/row. Possible values of *createEntityIfNotExist* are true or false. Note: this attribute is only applicable to the <create> and <updateFieldSet> requests.

The clearAll attribute is used to indicate that when a field is being updated, if all existing values in the field are cleared before applying the update. Possible values of *clearAll* are true or false. Note: this attribute is only applicable to the <updateField> request. Note: For fields that are not multi-value (single value), the value of *clearAll* must be set to true otherwise the request attempts to add a second instance of the field, and the request fails.

The inTx attribute is used to indicate that the request is in a transaction. Possible values of *inTx* are true or false. Note: this optional attribute is present on every operation, but has no use for requests *in import files*, and this attribute is omitted.

NOTE: Because this attribute does not affect any requests, it is not listed in the subsequent sections describing each request.

Most commands identify the subscriber for which the provisioning request is being made by specifying the subscriber addresses in the <key> element. When present, a key type/value must be provided. Depending on the command, *keyType* can be IMSI, MSISDN, IMEI, NAI, AccountId, or PoolID. The value of the key (of the indicated key type) is set in *keyValue*.

Depending on the keyType, the keyValue is validated as shown in Table 4.

Table 4 keyValue Validation

keyType	keyValue Validation
IMEI	8 to 14 numeric digits
IMSI	10 to 15 numeric digits
MSISDN	8 to 15 numeric digits. **NOTE:** A preceding + (plus) symbol is not supported, and is rejected.
NAI	Refer to Table 9 for format
AccountId	1 to 255 characters
PoolID	1 to 22 numeric digits , minimum value 1

NOTE: Multiple subscriber key values may be supplied. If UDR is configured to allow this, when attempting to find the subscriber, all key values supplied must be valid for the single subscriber in order to match the subscriber. For more details see section 2.7.

The *dataName* element identifies the provisioning entity type on which the request is being performed on. Values are either Subscriber, Quota, State, DynamicQuota, Pool, PoolQuota, PoolState, or PoolDynamicQuota depending on the request, which matches the configured Entity values in the SEC for the XML import interface.

The *dataInterface* element must be set to XMLIMPORT for bulk import requests.

When a request is performing an action on a specific field or row in an entity (such as updating a field value in a specific quota row), the XML XPath expression which references the row to be created/updated must be specified in *dataXpath*. The *dataXpath* value can indicate the base element, or row name optionally including a

particular instance (the <cid> field in a Quota row, or the <InstanceId> field in a DynamicQuota row) when the row name is the same.

The <version> element is only used when creating a entity when creating a row instance (using the <updateFieldSet> request). The <name> and <version> elements in are used to indicate (if required) which version of the transparent entity (if more than one are defined) to create the entity with by default. The *versionName* and *versionValue* values indicate entry defined in the SEC to use.

When a field value is included to be set (for example in an insert/update request), a <fields> element is present. In this, zero, one, or many <field name="*fieldName*">*fieldValue*</field> elements are present. The *fieldName* indicates the name of the field being set, and the *fieldValue* is the value to set it to. A <field> element may contain the optional deleteField attribute, that when set to true indicates that during an <updateField> request that the specific field is to be deleted not updated. It is also possible to specify a specific field value to indicate that the field is deleted if the current value matched.

NOTE: When specifying fields in a <fields> element, field order is not important. The fields defined for an entity do not have to be specified in the order they are defined in the SEC.

When a field is a list type (such as entitlement in profile), multiple instances of the field element is specified.

When *entityContent* is to be set as an XML data blob, the blob data isincluded in the constructs of an XML CDATA section. The CDATA section starts with <![CDATA[, then the *entityContent* containing the XML data blob, and the CDATA section ends with]]>.

The <members> element is used to contain the list of subscribers when adding or removing a subscriber to/from a pool using the <addPoolMember> and <deletePoolMember> requests. A single key (identified by *keyName* and *keyValue*) for each individual subscriber is contained in individual <member> elements.

Case Sensitivity

The constructs that bulk import requests are made up of (such as <updateField>, <key>, <entity>, <xpath>) are case-sensitive. Exact case must be followed for all the commands described in this document, or the request fails.

For example, the following is valid:

```
<addPoolMember>
  <key>
    <PoolID>100000</PoolID>
  </key>
  <members>
    <member>
      <MSISDN>15141234567</MSISDN>
    </member>
  </members>
</addPoolMember>
```

But the following is not:

```
<addPoolMember>
  <KEY>
    <PoolID>100000</PoolID>
  </KEY>
  <members>
    <member>
      <MSISDN>15141234567</MSISDN>
    </member>
  </members>
</addPoolMember>
```

Request names defined in *requestName* are case-sensitive, for example createSubscriber, updateField, and addPoolMember.

Entity names defined in *dataName* are not case-sensitive.

Entity field or key names/attributes in *fieldName*, *keyName* or *versionName* are not case-sensitive.

Entity field/key values are case-sensitive, for example *fieldValue*, *keyValue*, and *versionValue*.

Examples:

- When accessing a *fieldName* defined as inputVolume in the SEC, then inputvolume, INPUTVOLUME or inputVolume are valid field names. Field names do not have to be specified in a request as they are defined in the SEC
- When a *fieldValue* is used to find a field (such as when using the <deleteField> command), the field value is case-sensitive. If a multi-value field contained the values DayPass,Weekend,Evening and the <deleteField> command was used to delete the value WEEKEND, then this fails
- When an XPath value is specified in *dataXpath*, such as when accessing a row in an entity (for example in Quota), then everything contained in the *dataXpath* is case-sensitive, and must be specified as defined
    - For example, for Quota the following is valid:
      `/usage/quota[@name='Q1']`
    - But the following is not valid:
      `/usage/quota[@NAME='Q1']`
- When a *keyName* is specified in a <key> element (such as MSISDN), the name is not case-sensitive
- When a *keyValue* is specified in the <key> element (such as for an NAI), the value is case-sensitive. For example, for a subscriber with an NAI of mum@foo.com, then Mum@foo.com or MUM@FOO.COM does not find the subscriber
- When a *versionName* is specified in a <version> element (such as version), the name is not case-sensitive
- When a *versionValue* is specified in the <version> element (such as v1), the value is case-sensitive. For example, for a transparent entity with a single version defined of v1, then V1 does not match the version defined

3.2.4 Import File Comments

Import files in XML format can contain blank lines and comment lines. UDR ignores these particular lines. Comment lines in XML files have the following format:

Table 5: Import File Comment Format

```
<!--comment-->
```

If the comment is contained with the XML blob for an opaque entity, in the CDATA constraint, then the comment is stored in the XML blob.

If the comment is contained with the XML blob for a transparent entity, in the CDATA constraint, then the comment is stored in the XML blob.

3.2.5 Import Log Files

An import log file is created for each file that is imported and a copy is automatically uploaded to the same location the import file was downloaded from on the remote server. The log file has the same name as its corresponding import file with .log appended. Import log files on the local system are viewable for up to 7 days or until manually removed via either the Main Menu of the UDR GUI and selecting **Status & Manage → Files** screen, or **UDR → Maintenance → Import Status**.

The import log file contains:

- Date and time the import operation started and completed including percentage of the import file (lines) complete
- All requests that resulted in failure along with associated error code (value and string representation), and line of the import file containing the failure.
- Total number of requests successfully committed and failed.

Table 6: Import Log File Format

```
mm/dd/yy hh:mm:ss Started (0 of linesToImport) 0% complete

reqMsg
[error errorValue errorString : line lineOfFailure]  [description]
. . .
reqMsg
[error errorValue errorString : line lineOfFailure]  [description]

mm/dd/yy hh:mm:ss <Completed|Interrupted> (linesImported of linesToImport) percentCplt% complete
Successful: successfulCmds  Failures: failedCmds  Total: totalCmds
```

Table 7: Import Log File Parameters

Parameter	Description
mm/dd/yy	Date the entry was logged. Values: • mm is 01 to 12 (month) • dd is 01 to 31 (day of month) • yy is 00 to 99 (last two digits of the year)
hh:mm:ss	Time the entry was logged. Values: • hh is 00 to 23 (hours) • mm is 00 to-59 (minutes) • ss is 00 to 59 (seconds)
linesImported	Number of lines of the import file that has been processed
linesToImport	Total number of lines of the import file to be processed
percentCplt	Percentage of import file (lines) processed
reqMsg	Request Message that resulted in error
errorValue	Message Response Error Value
errorString	Message Response Error String
lineOfFailure	Line number of the failed Request Message
description	Description (if any) of Request Message failure.
successfulCmds	Total number of Request Messages successfully committed
failedCmds	Total number of Request Messages that resulted in failure

Parameter	Description
totalCmds	Total number of Request Messages that were processed

Figure 2 and Figure 3 are examples of import log files for successfully completed and interrupted import files:

Figure 2: Import Log File—Import Successfully Completed Example

```
02/06/13 13:28:01 Started (0 of 200) 0% complete

<removeSubscriber><imsi>310910421000102</imsi></removeSubscriber>
[error 6 Invalid XML: 100 Line:1, Column:19 error: no declaration found for element 'removeSu
bscriber' : line 1]

<updateSubscriber><key><MSISDN>33123654862</MSISDN></key><subscriber><AccountId>10404723525</Accoun
tId><MSISDN>33123654862</MSISDN><IMSI>184569547984229</IMSI><IMEI>44441111111111</IMEI></subscriber
><entity><data>
<name>Subscriber</name><interface>XMLIMPORT</interface></data><content><![CDATA[<subscriber><field
name="AccountId">10404723525</field><field name="MSISDN">33123654862</field><field name
="IMSI">184569547984229</field><field name="IMEI">44441111111111</field><field
name="BillingDay">1</field><field name="Tier"></field><
field name="Entitlement">DayPass</field></subscriber>]]></content></entity></updateSubscriber
>
[error 39 Key not found: [MSISDN:33123654862] : line 1]

<deleteSubscriber><key><MSISDN>33123654862</MSISDN></key></deleteSubscriber>
[error 39 Key not found: [MSISDN:33123654862] : line 1]

02/06/13 13:28:03 Completed (200 of 200) 100% complete

Successful: successfulCmds  Failures: failedCmds  Total: totalCmds
```

In the event the import operation is interrupted/terminated (abnormally terminated), the number and percentage of requests attempted is reported.

Figure 3: Import Log File—Import Interrupted Example

```
02/06/13 13:28:01 Started (0 of 200) 0% complete

02/06/13 13:28:03 Connection terminated

02/06/13 13:28:03 Interrupted (100 of 200) 50% complete

Successful: 100  Failures: 0  Total: 100
```

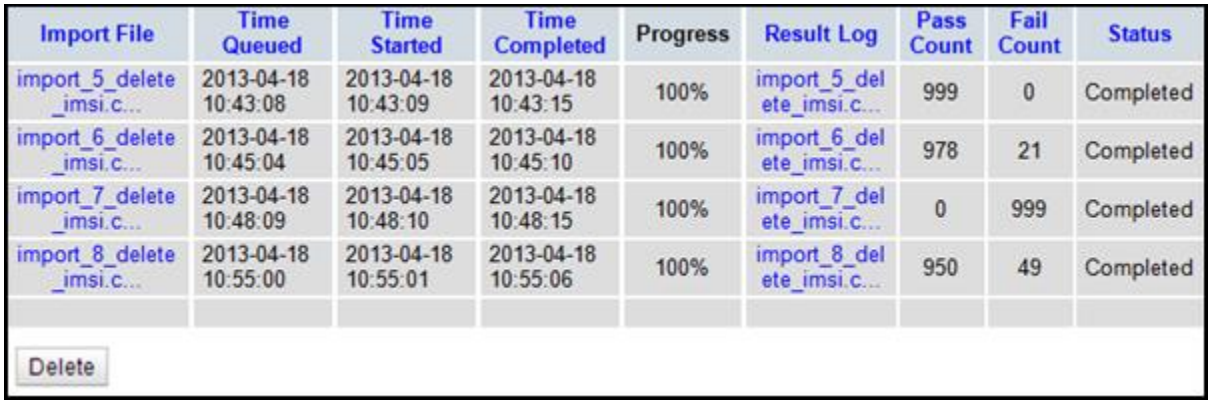
3.2.6 Import Status

The Import Status GUI is used to view and monitor the status of import operations.

You can view the status of all imported files by using the Main Menu of the UDR GUI and selcting **UDR → Maintenance → Import Status** screen. This screen displays the import file and result file names, the current progress (percentage) and status of the import, number of import commands that succeeded and failed, and time stamps for when the import was queued, started and completed. The Import Status screen also provides hyperlinks so that you can view the import and result files as text or save them locally.

Imports are not scheduled through the GUI. They are initiated by the presence of a file placed in the Remote Import Directory.

Figure 4: Import Status



Import File	Time Queued	Time Started	Time Completed	Progress	Result Log	Pass Count	Fail Count	Status
import_5_delete_imsi.c...	2013-04-18 10:43:08	2013-04-18 10:43:09	2013-04-18 10:43:15	100%	import_5_delete_imsi.c...	999	0	Completed
import_6_delete_imsi.c...	2013-04-18 10:45:04	2013-04-18 10:45:05	2013-04-18 10:45:10	100%	import_6_delete_imsi.c...	978	21	Completed
import_7_delete_imsi.c...	2013-04-18 10:48:09	2013-04-18 10:48:10	2013-04-18 10:48:15	100%	import_7_delete_imsi.c...	0	999	Completed
import_8_delete_imsi.c...	2013-04-18 10:55:00	2013-04-18 10:55:01	2013-04-18 10:55:06	100%	import_8_delete_imsi.c...	950	49	Completed

Delete

Import Status Table

Import Status table contains an entry for each XML file imported from Remote Server. The Status is changed on the basis of events occurred.

Table 8: Import Status Table

Current State	Event	Action	Next State
	XML file (*.ixml) found on Remote server	Start downloading the XML file	Transferring
		Add an entry to ProvImports table for that XML file	
Transferring	File successfully downloaded to NOAMP server	Import the file into the Provisioning Database	Transfer Completed
	File downloading failed in between (any reason)		Transfer Failed
Transfer Completed		Parse the XML file	In Progress
		Send the Internal XML Commands to UDRBE	
In Progress	Responses received from UDRBE	Update the Failed responses to a log file <XML file>.log	Completed
		Update the ProvImports Table with the status	
		Send the Result log file back to the remote server at the same location	

3.3 Export

UDR export generates XML output to align with the output produced by the Oracle Communications Subscriber Data Management v9.3. The export feature allows a text export of the database based on a range (MSISDN, IMSI, or IMEIrange). You can schedule repeat exports. Exported data may also be offloaded to a remote server. The exported text file is also available to be downloaded from the file transfer area. You may use exported records to do data manipulation of subscriber data or as an import file. The export process is non-blocking, it runs together with Provisioning updates as well as network (Sh) updates.

3.3.1 XMLExport

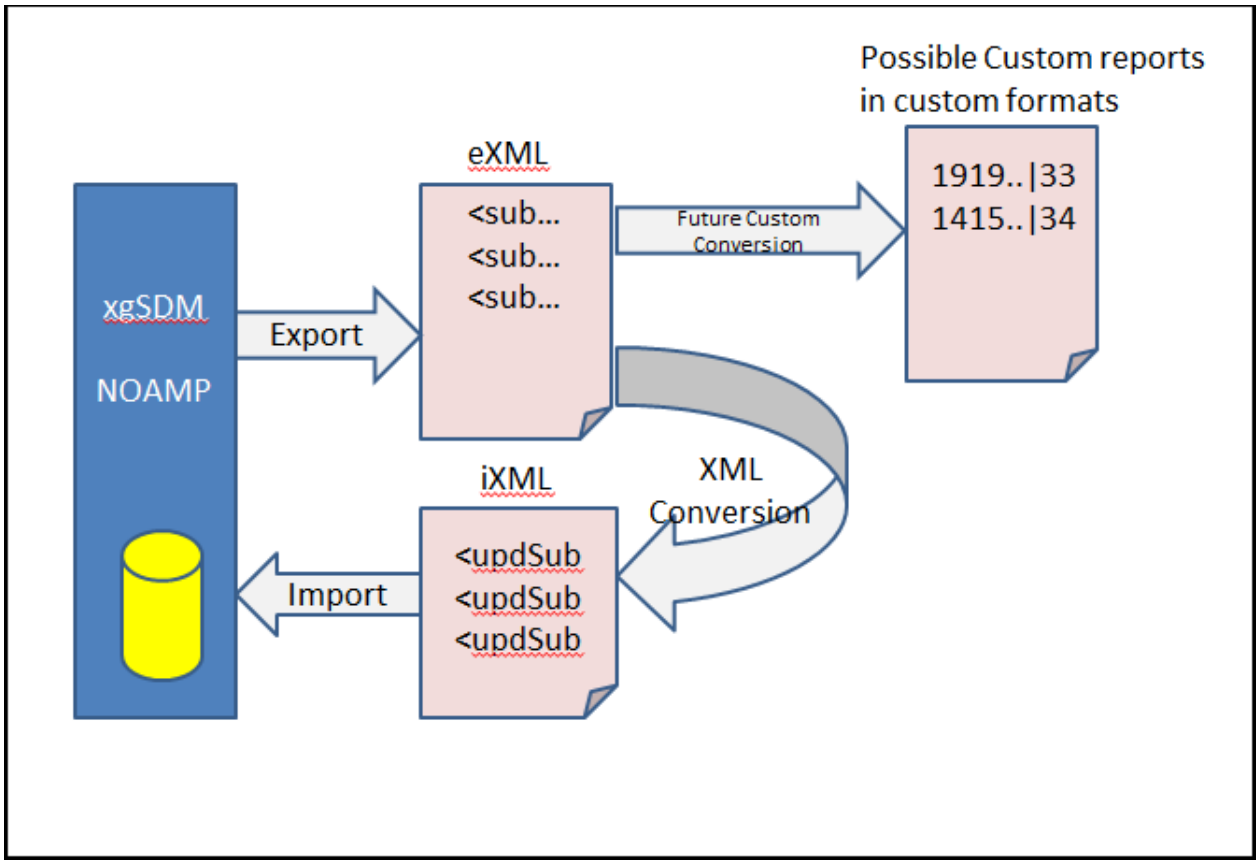
To start the process, select a range of MSISDN, IMSI or IMEI and scheduled an export via the GUI.

The XMLExport process performs the following:

- Export process creates an output file
- Export process looks up subscribers sequentially, including Auto-Enrolled subscribers, and output lines as follows:
  - Produce `<subscriberRecord>` line with all subscriber SDO entries
  - If a subscriber is part of a pool, `<subscriberRecord>` line includes `<poolId>` tag
  - If a subscriber is part of pool, `<poolRecord>` line is produced with all pool SDO entries.
  - Auto-Enrolled subscribers are exported with the `autoEnrolled="true"` attribute
- XML Declaration `<?xml version="1.0" encoding="UTF-8"?>` is stripped out of the retrieved data for each register.
- Entity/Service Indication name, Sequence Number and Last Update Time are not exported for each entity per subscriber.

A maximum of 30 million subscribers can be exported from the range specified. Figure 5 displays export in more detail.

Figure 5: Generating Output File



3.3.2 Export File and Format

Export files are created in a local directory and are transferred to a remote export host if one is configured. The local directory is `/var/TKLC/db/filemgmt/provexport` and the remote export directory can be configured in the Provisioning Options (see 9.1.2Appendix A). The export file format contains the following information:

1. The exported file contains one line per subscriber with each XML entity appended to the same line (carriage returns are removed from entity value).
2. <subscriberRecord> and <poolRecord> each take a single line.

Basic Export File Format

The following describes the basic layout of a bulk export file, with all different options and parameters included.

```
<subscriberRecord [autoEnrolled="autoEnrolled"]>

  <poolId>poolId</poolId>

  <subscriber>
    <field name="profileFieldName1">profileFieldValue1</field>
    :
    <field name="profileFieldNameN">profileFieldValueN</field>
  </subscriber>

  <entityName>
    entityData
  </entityName>

</subscriberRecord>

<poolRecord>

  <pool>
    <field name="poolProfileFieldName1">poolProfileFieldValue1</field>
    :
    <field name="poolProfileFieldNameN">poolProfileFieldValueN</field>
  </pool>

  <poolEntityName>
    poolEntityData
  </poolEntityName>

</poolRecord>
```

NOTE: Each <subscriberRecord> or <poolRecord> is formatted on a single line only. It is expanded for readability.

Subscriber Record

One <subscriberRecord> is present for every subscriber that is exported, and all data for that subscriber is contained in it.

If the subscriber was auto enrolled, then the *autoEnrolled* attribute is set to `true`. If the subscriber was not auto enrolled, then the *autoEnrolled* attribute is omitted.

If the subscriber is a member of a pool, then a <poolId> element is present, and the PoolID of the pool to which the subscriber is a member is set in *poolId*. If the subscriber is a member of a pool, then the corresponding <poolRecord> for the pool for which the subscriber is a member is also contained in the export file.

A subscriber profile is stored in the <subscriber> element. This contains all <field> elements defined in the subscriber profile XML blob. Each defined profile field is set in *profileFieldNameX*/*profileFieldValueX*.

An element exists for each entity defined for the subscriber, such as Quota, State, or DynamicQuota. All XML blob data for that entity is contained in in. For example, the element <usage> is present for the Quota entity,

the element <state> for the State entity, and <definition> for the DynamicQuota entity. The XML blob contents in the root element are in entityData.

Pool Record

One <poolRecord> is present for every pool that is exported, and all data for that pool is contained in it.

A pool profile is stored in the <pool> element. This contains all <field> elements defined in the PoolProfile XML blob for the pool. Each defined PoolProfile field is set in *poolProfileFieldNameX*/*poolProfileFieldValueX*.

An element exists for each entity defined for the pool, such as PoolQuota, PoolState, or PoolDynamicQuota. For each entity, the *entityName* contains the root element name of the XML blob. All XML blob data for that entity is contained in in. For example, the element <usage> is present for the PoolQuota entity, the element <state> for the PoolState entity, and <definition> for the PoolDynamicQuota entity. The XML blob contents in the root element are in *poolEntityData*.

If the PSO feature is enabled and the poolId falls in a range that is maintained by a different UDR instance, then any data exported for the pool only includes the pool profile as provisioned/maintained on the non pool host UDR. No other pooled entities are exported.

Examples

Sample File Formats (lines are expanded to improve readability):

Provisioned Subscriber Record

```
<subscriberRecord>
   <poolId>1000</poolId>
   <subscriber>
   :
   </subscriber>
   <usage>
   :
   </usage>
</subscriberRecord>
```

NOTE: <poolId> tag is only present if the subscriber is a pool member.

Auto-Enrolled Subscriber Record

```
<subscriberRecord autoEnrolled="true">
   <subscriber>
   :
   </subscriber>
   <usage>
   :
   </usage>
</subscriberRecord>
```

Pool Record

```
<poolRecord>
   <pool>
   :
   </pool>
   <usage>
   :
   </usage>
</poolRecord>
```

Example Export Outputs: (lines are expanded to improve readability):

Subscriber with only Profile Entity

```
<subscriberRecord>
  <subscriber>
    <field name="MSISDN">6542896514</field>
    <field name="BillingDay">1</field>
    <field name="Tier"/>
    <field name="Entitlement">DayPass</field>
  </subscriber>
</subscriberRecord>
```

Subscriber with State and Profile Entities

```
<subscriberRecord>
  <subscriber>
    <field name="MSISDN">6542896515</field>
    <field name="BillingDay">1</field>
    <field name="Tier"/>
    <field name="Entitlement">DayPass</field>
  </subscriber>
  <state>
    <version>3</version>
    <property>
      <name>mcc</name>
      <value>315</value>
    </property>
    <property>
      <name>expire</name>
      <value>2014-02-09T11:20:32</value>
    </property>
    <property>
      <name>approved</name>
      <value>yes</value>
    </property>
  </state>
</subscriberRecord>
```

Subscriber which is a member of a Pool

```
<subscriberRecord>
  <poolId>1234</poolId>
  <subscriber>
    <field name="MSISDN">6542896515</field>
    <field name="BillingDay">1</field>
    <field name="Tier"/>
    <field name="Entitlement">DayPass</field>
  </subscriber>
  <state>
    <version>3</version>
    <property>
      <name>mcc</name>
      <value>315</value>
    </property>
    <property>
      <name>expire</name>
      <value>2010-02-09T11:20:32</value>
    </property>
    <property>
      <name>approved</name>
      <value>yes</value>
    </property>
  </state>
</subscriberRecord>
```

Auto-Enrolled Subscriber

```
<subscriberRecord autoEnrolled="true">
  <subscriber>
    <field name="MSISDN">6542896515</field>
    <field name="BillingDay">1</field>
    <field name="Tier"/>
    <field name="Entitlement">DayPass</field>
```

```
  </subscriber>
  <state>
    <version>3</version>
    <property>
      <name>mcc</name>
      <value>315</value>
    </property>
    <property>
      <name>expire</name>
      <value>2010-02-09T11:20:32</value>
    </property>
    <property>
      <name>approved</name>
      <value>yes</value>
   </property>
  </state>
</subscriberRecord>
```

PoolRecord with only Pool Profile

```
<poolRecord>
  <pool>
    <field name="PoolID">206534</field>
    <field name="BillingDay">5</field>
    <field name="Tier">12</field>
    <field name="Entitlement">Weekpass</field>
    <field name="Entitlement">Daypass</field>
    <field name="Custom15">allo</field>
  </pool>
</poolRecord>
```

PoolRecord with Pool Profile and Pool Quota

```
<poolRecord>
  <pool>
    <field name="PoolID">206534</field>
    <field name="BillingDay">5</field>
    <field name="Tier">12</field>
    <field name="Entitlement">Weekpass</field>
    <field name="Entitlement">Daypass</field>
    <field name="Custom15">allo</field>
  </pool>
  <usage>
    <version>3</version>
    <quota name="DP_QUOTA_PAYG.500MB">
      <cid>5764888998014956049</cid>
      <nextResetTime>2013-04-02T00:00:00+05:00</nextResetTime>
      <totalVolume>19948458</totalVolume>
    </quota>
  </usage>
</poolRecord>
```

3.3.3 Export Conversion Tool (xmlconverter)

Xmlconverter is responsible for converting the exported .exml files to XML Import .ixml input files. This tool is invoked if you have a need to import the exported data and works as follows:

- `xmlconverter` reads the export file one line at a time and create import file to recreate all subscribers and pool relationships.
- `xmlconverter` provides a create or update option

The following is the usage for this tool.

Tool Usage

```
xmlconverter <exportFileName> <importFileName> <create|update>
```

- `exportFileName`: The file name with the absolute path which is used as input
- `importFileName`: The file name with the absolute path which is created as output.

- `Create`: The generated import file is expected to be used on an UDR system which does not contain the exported subscribers as it generates create commands.
- `Update`: The generated import file is expected to be used on an UDR system which contains the exported subscribers as it generates update commands.

For example:

```
/usr/TKLC/udr/bin/xmlconverter /var/tmp/ExportFile.exml /var/tmp/ImportFile.ixml create
```

NOTES

- For Auto-Enrolled Subscribers, internal XML commands are not generated for the profile entity. In this case, the updated internal XML commands are generated for non-profile entities only.
- For an Enterprise Pool, a single `<transaction>` are generated containing `<addPoolMember>` for each of its members. The generated file must be modifyed as described in Section 2.5.1

3.3.4 Configuring Export Options

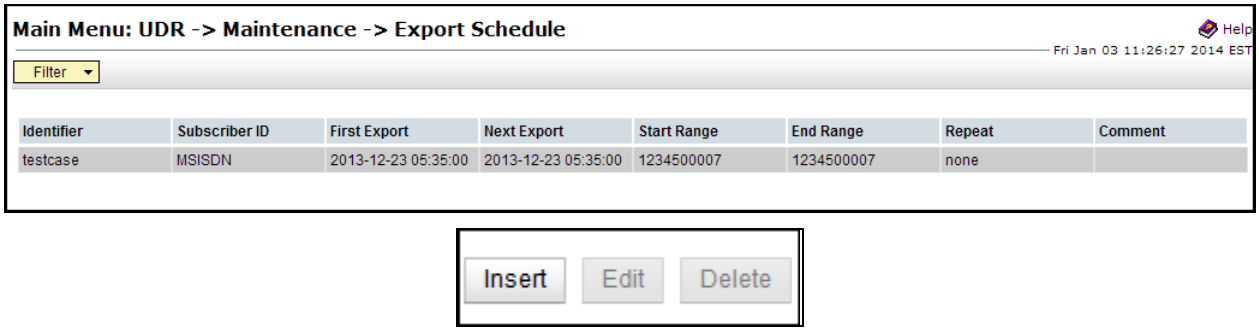
You can configure Export options by using the Main Menu for the UDR GUI and selecting **UDR → Configuration → Provisioning Options** screen. Refer to 9.1.2Appendix A for Provisioning Options.

3.3.5 Scheduling Exports

You can view the export schedule by using the Main Menu for the UDR GUI and selecting **UDR → Maintenance → Export Schedule** screen.

Display

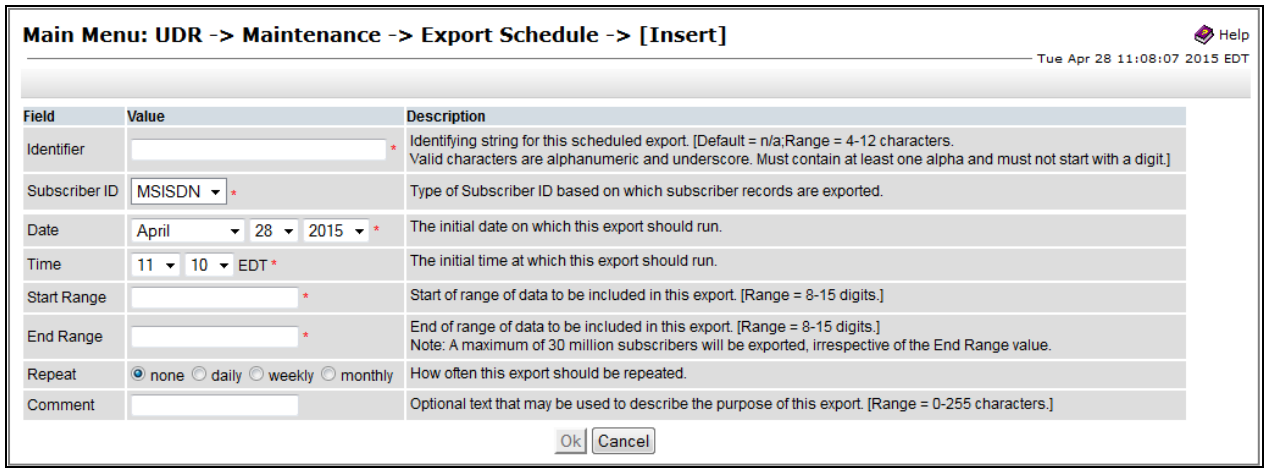
Figure 6: Export Schedule (Display)



Insert

Exports are scheduled using the **Main Menu: UDR → Maintenance → Export → Schedule → [***insert***]** GUI screen. On this screen, you can add a scheduled export. You can schedule an export from GUI by specifying a range of MSISDNs, IMSIs or IMEIs as shown in Figure 7. A maximum of 30 million subscribers are exported from the range specified. If a range larger than 30 million subscribers is specified, the export stops after it reaches 30 million subscribers. Exporting pools by specifying a range of PoolIDs is not supported.

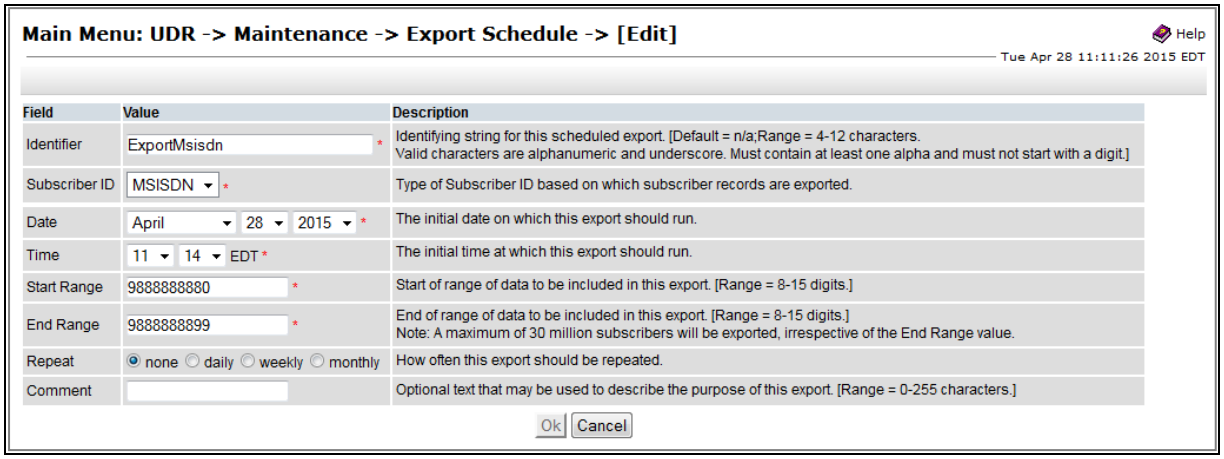
Figure 7: Export Schedule (Insert)



Edit

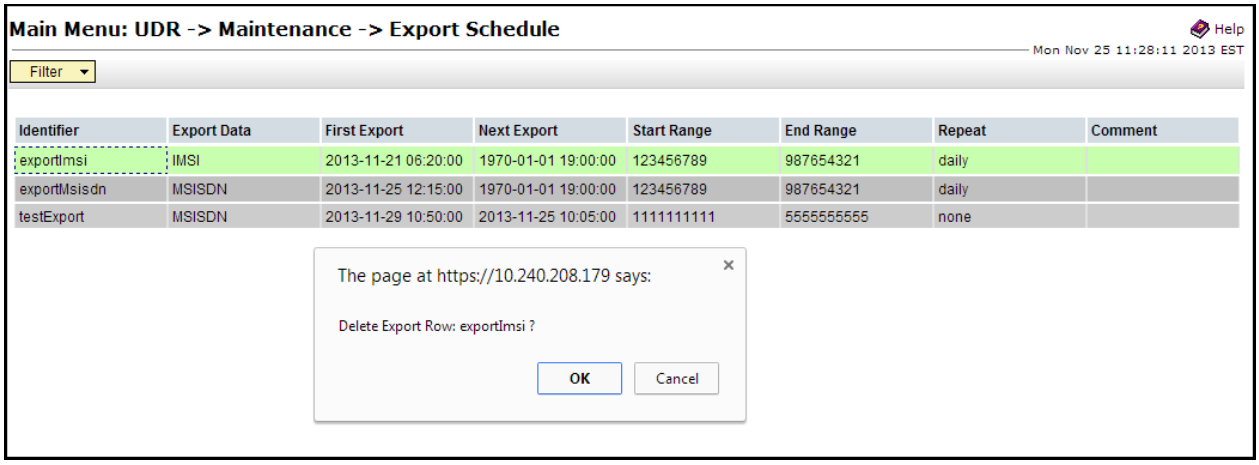
You can modify a scheduled export from GUI by specifying range of MSISDNs, IMSIs or IMEIs as shown in Figure 8. A maximum of 30 million subscribers are exported from the range specified. Exporting pools by specifying a range of PoolIDs is not supported.

Figure 8: Export Schedule (Edit)



Delete

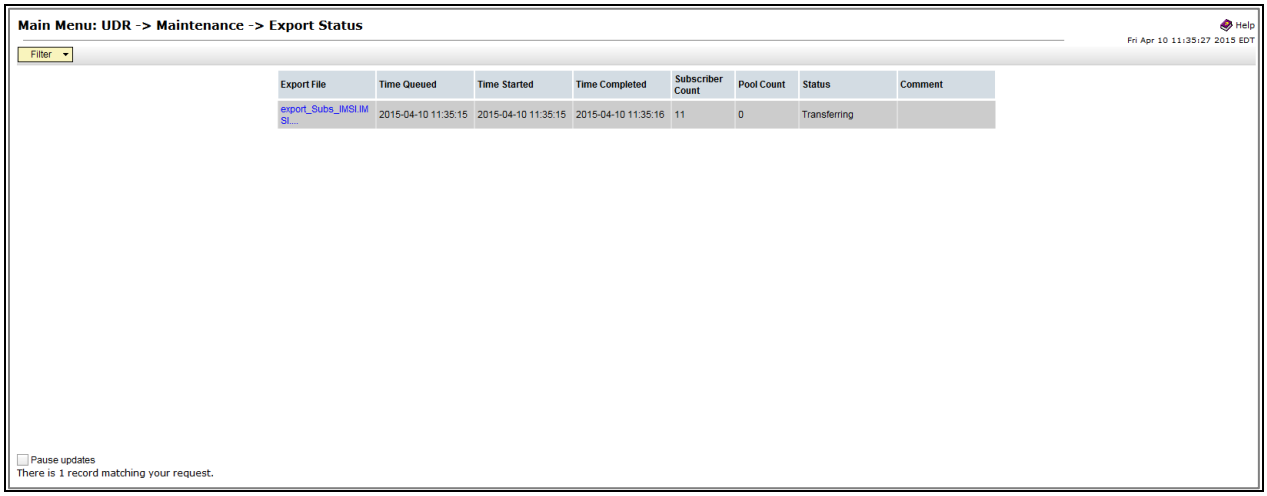
Figure 9: Export Schedule (Delete)



Export Status

You can view the status of all in progress and completed requested exports by using the Main Menu for the UDR GUI and selecting **Menu: UDR → Maintenance → Export Status** screen. This screen displays the export file name, status of the export, number of export commands that succeeded and failed, comment and time stamps for when the export was queued, started and completed. The Export Status screen also provides hyperlinks so that you can view the exported file as text or save the file locally.

Figure 10: Export Status



Chapter 4. UDR Data Model

The UDR is a system used for the storage and management of subscriber policy control data. The UDR functions as a centralized repository of subscriber data for the PCRF.

The subscriber-related data includes:

- Profile/Subscriber Data

  Pre-provisioned information that describes the capabilities of each subscriber. This data is typically written by the OSS system (via a provisioning interface) and referenced by the PCRF (via the Sh interface).

- Quota

  Information that represents the use of managed resources (quota, pass, top-up, roll-over) for theee subscriber. Although the UDR provisioning interfaces allow quota data to be manipulated, this data is written by the PCRF and only referenced using the provisioning interfaces.

- State

  Subscriber-specific properties. Like quota, this data is typically written by the PCRF, and referenced using the provisioning interfaces.

- Dynamic Quota

  Dynamically configured information related to managed resources (pass, top-up). This data may be created or updated by either the provisioning interface or the Sh interface.

- Pool Membership

  The pool to which the subscriber is associated. The current implementation allows a subscriber to be associated with a single pool.

The UDR can also be used to group subscribers using Pools. This feature allows wireless carriers to offer pooled or family plans that allow multiple subscriber devices with different subscriber account IDs, such as MSISDN, IMSI, IMEI or NAI to share one quota.

The pool-related data includes:

- Pool Profile: Pre-provisioned information that describes a pool
- Pool Quota: Information that represents the use of managed resources (quota, pass, top-up, roll-over) for the pool
- Pool State: Pool-specific properties
- Pool Dynamic Quota: Dynamically configured information related to managed resources (pass, top-up)
- Pool Membership: List of subscribers that are associated with a pool

The data architecture supports multiple Network Applications. This flexibility is achieved though implementation of a number of registers in a Subscriber Data Object (SDO) and storing the content as Binary Large Objects (BLOB). An SDO exists for each individual subscriber, and an SDO exists for each pool.

The Index contains:

- Subscription
  - A subscription exists for every individual subscriber
  - Maps a subscription to the user identities through which it can be accessed
  - Maps an individual subscription to the pool of which they are a member

- Pool Subscription
  - A pool subscription exists for every pool
  - Maps a pool subscription to the pool identity through which it can be accessed
  - Maps a pool subscription to the individual subscriptions of the subscribers that are members of the pool
- User Identities

  Use to map a specific user identity to a subscription
  - IMSI, MSISDN IMEI, NAI and AccountId map to an individual subscription
  - PoolID maps to a pool
- Pool Membership

  Maps a pool to the list of the individual subscriber members

The Subscription Data Object (SDO):

- An SDO record contains a list of registers, holding a different type of entity data in each register
- An SDO record exists for:
  - Each individual subscriber

    Defined entities stored in the registers are:
    - Profile
    - Quota
    - State
    - Dynamic Quota
  - Each pool

    Defined entities stored in the registers are:
    - Pool Profile
    - Pool Quota
    - Pool State
    - Pool Dynamic Quota

Provisioning applications can create, retrieve, modify, and delete subscriber/pool data. The indexing system allows access to the Subscriber SDO via IMSI, MSISDN, IMEI, NAI or AccountId. The pool SDO can be accessed via PoolID.

A field in an entity can be defined as mandatory, or optional. A mandatory field must exist, and cannot be deleted.

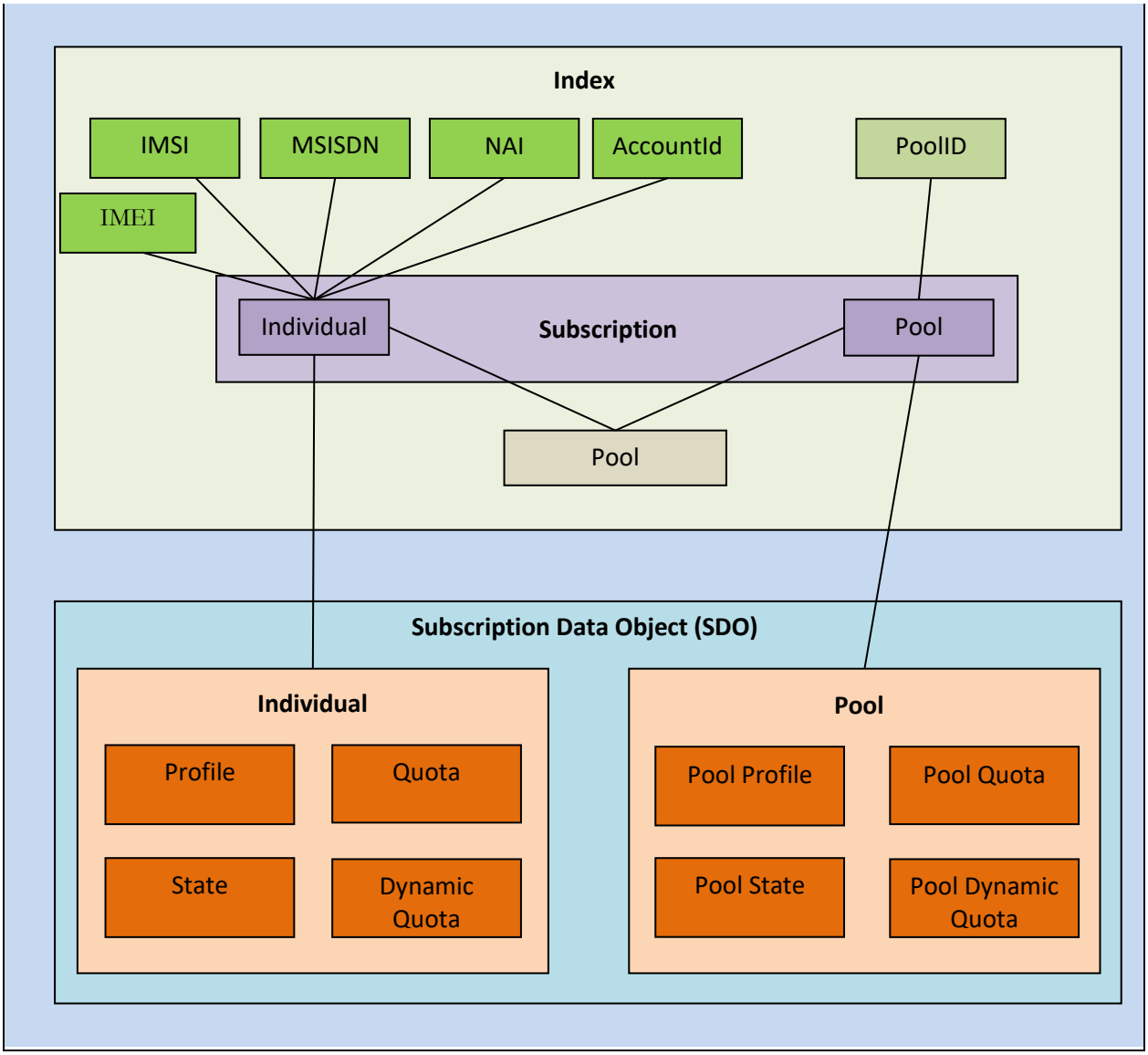
A field in an entity can have a default value. If an entity is created, and the field is not specified, it is created with the default value.

A field in an entity can be defined so that afterit is created, it cannot be modified. Any attempt to update the field after it is created fails.

A field in an entity can have a reset value. If a reset command is used on the entity, those fields with a defined reset value is set to the defined value. This is only applicable to field values in a row for the Quota and PoolQuota entities.

This section describes the default UDR data model as defined in the Subscriber Entity Configuration (SEC). The data model can be customized via the UDR GUI.

Figure 11: Data Model



4.1 Subscriber Data

4.1.1 Subscriber Profile

The Subscriber profile represents the identifying attributes associated with the user. In addition to the base fields indicated their level of service, it also includes a set of custom fields that the provisioning system can use to store information associated with the subscriber. The values in custom fields are generally set by the OSS and are read by the PCRF for use in policies.

The Subscriber profile supports the following sequence of attributes. Each record must have at least one of the following key values: MSISDN, IMSI, IMEI, NAI, AccountId.

BillingDay must be defined with a default value if another value is not specified. The remaining fields are optional, based on the description provided for each.

NOTE: UDR only supports an MSISDN with 8 to 15 numeric digits. A preceding + (plus) symbol is not supported, and is rejected.

Table 9: Subscriber Profile Entity Definition

Name (XML tag)	Type	Description
subscriber		**Sequence (multiplicity is 1)**
MSISDN	String	List of MSISDNs (8 to 15 numeric digits). A separate entry is included for each MSISDN associated with the subscriber profile.
IMEI	String	List of IMEIs (8 to 14 numeric digits). A separate entry is included for each IMEI associated with the subscriber profile.
IMSI	String	List of IMSIs (10 to 15 numeric digits). A separate entry is included for each IMSI associated with the subscriber profile.
NAI	String	User or Domain length is between 0 to 63 characters **NOTE:** The limitation for 0 to 63 characters is because NAIs beyond 63 characters may not be possible to transfer through all devices. You must ensure the combination of User and Domain does not exceed 63 characters (not including the @ character). List of NAIs (in format user@domain, user, or @domain). A separate entry is included for each NAI associated with the subscriber profile. The user or domain can be empty. Allowed characters for the user: !, %, $, A to Z, a to z, 0 to 9, ., -, _, /, *, =, ^, `, \|, #, ‘, +, ?, {, }, ~ Allowed characters for the domain: A to Z, a to z, 0 to 9, ., -, _ Example NAI Formats: bob `@privatecorp.example.net` `fred$@example.com` `eng.example.net!nancy@example.net` `eng%nancy@example.net` `bob#+ ?@example.net`
AccountId	String	Any string that can be used to identify the account for the subscriber (1 to 255 characters). Allowed values are any ASCII printable character, values x20 to x7e.
BillingDay	String	Allowed values are 0 to 31. The day of the month 1 to 31 when the associated quota for the subscriber is reset. 0 indicates that the default value configured at the PCRF level is used. This is automatically set in any record where BillingDay is not specified.
Entitlement	String	List of entitlements. A separate entry is included for each entitlement associated with the subscriber profile.
Tier	String	Subscriber tier.
Custom1	String	Fields used to store customer-specific data.
Custom2	String	Fields used to store customer-specific data.
Custom3	String	Fields used to store customer-specific data.
Custom4	String	Fields used to store customer-specific data.

Name (XML tag)	Type	Description
Custom5	String	Fields used to store customer-specific data.
Custom6	String	Fields used to store customer-specific data.
Custom7	String	Fields used to store customer-specific data.
Custom8	String	Fields used to store customer-specific data.
Custom9	String	Fields used to store customer-specific data.
Custom10	String	Fields used to store customer-specific data.
Custom11	String	Fields used to store customer-specific data.
Custom12	String	Fields used to store customer-specific data.
Custom13	String	Fields used to store customer-specific data.
Custom14	String	Fields used to store customer-specific data.
Custom15	String	Fields used to store customer-specific data.
Custom16	String	Fields used to store customer-specific data.
Custom17	String	Fields used to store customer-specific data.
Custom18	String	Fields used to store customer-specific data.
Custom19	String	Fields used to store customer-specific data.
Custom20	String	Fields used to store customer-specific data.

4.1.2 Quota

The Quota entity is used by the PCRF to record the current resource usage associated with a subscriber. A quota entity may contain multiple quota elements, each one tracking a different resource.

The Quota entity is associated with a subscriber record and supports the following sequence of attributes.

NOTES

- The Quota entity contains a version number. Different attributes maybe be present based on the version number value of the entity being accessed. In UDR, only v3 of Quota is supported.
- The default value given in the table is used either:
- When a Quota instance is created, and a value is not supplied for the field. In this case, the field is created with the value indicated
- When a Quota instance is reset using the Reset command. If a field is defined as resettable, and the field exists, then it is set to the value indicated. If the field does not exist in the Quota, it is not created.

  NOTE: If a resettable field does not exist, and the field is also defined as defaultable, then the field is get created with the value indicated.

Table 10: Quota Entity Definition

Name (XML tag)	Type	Default Value	Description	Quota Versions
usage			**Sequence (multiplicity is 1)**	1/2/3
version	String	---	Version of the schema.	1/2/3
quota			**Sequence (multiplicity is N)**	1/2/3
name	String	---	Quota name (identifier).	1/2/3
cid	String	---	Internal identifier used to identity a quota in a subscriber profile.	1/2/3
time	String	Empty string “”	This element tracks the time-based resource consumption for a Quota.	1/2/3
totalVolume	String	“0”	This element tracks the bandwidth volume-based resource consumption for a Quota.	1/2/3
inputVolume	String	“0”	This element tracks the upstream bandwidth volume-based resource consumption for a Quota.	1/2/3
outputVolume	String	“0”	This element tracks the downstream bandwidth volume-based resource consumption for a Quota.	1/2/3
serviceSpecific	String	Empty string “”	This element tracks service-specific resource consumption for a Quota.	1/2/3
nextResetTime	String	Empty string “”	When set, it indicates the time after which the usage counters need to be reset. See section 4.3 for format details.	1/2/3
Type	String	Empty string “”	Type of the resource in use.	2/3
grantedTotalVolume	String	“0”	Granted Total Volume represents the granted total volume of all the subscribers in the pool for pool quota. For individual quota, it represents the granted volume to all the PDN connections for that subscriber.	2/3
grantedInputVolume	String	“0”	Granted Input Volume.	2/3
grantedOutputVolume	String	“0”	Granted Output Volume.	2/3
grantedTime	String	Empty string “”	Granted Total Time.	2/3
grantedServiceSpecific	String	Empty string “”	Granted Service Specific Units.	2/3
QuotaState	String	Empty string “”	State of the resource in use.	3
RefInstanceId	String	Empty string “”	Instance-id of the associated provisioned pass, top-up or roll-over.	3

4.1.3 State

The State entity is written by the PCRF to store the state of various properties managed as a part of the subscriber policy. Each subscriber may have a state entity. Each state entity may contain multiple properties.

The State entity contains a version number. Different attributes maybe be present based on the version number value of the entity being accessed. In UDR, there is only one version number of 1.

The default fields configured are not:

- Resettable
- Defaultable

The State entity supports the following sequence of attributes:

Table 11: State Entity Definition

Name (XML tag)	Type	Description
state		**Sequence (multiplicity is 1)**
version	String	Version of the schema.
property		**Sequence (multiplicity is N)**
name	String	The property name.
value	String	Value associated with the given property.

4.1.4 Dynamic Quota

The DynamicQuota entity records usage is associated with passes and top-ups. The DynamicQuota entity is associated with the Subscriber profile and may be created or updated by either the PCRF or the OSS system.

The DynamicQuota entity contains a version number. Different attributes maybe be present based on the version number value of the entity being accessed. In UDR, there is only one version number of 1.

The default fields configured are not:

- Resettable
- Defaultable

The DynamicQuota entity supports the following sequence of attributes:

Table 12: Dynamic Quota Entity Definition

Name (XML tag)	Type	Description
definition		**Sequence (multiplicity is 1)**
version	String	Version of the schema.
DynamicQuota		**Sequence (multiplicity is N)**
Type	String	Identifies the dynamic quota type.
name	String	The class identifier for a pass or top-up. This name is used to match top-ups to quota definitions on the PCRF. This name is used in policy conditions and actions on the PCRF.
InstanceId	String	A unique identifier to identify this instance of a dynamic quota object.
Priority	String	An integer represented as a string. This number allows service providers to

Name (XML tag)	Type	Description
		specify when one pass or top-up is used before another pass or top-up.
InitialTime	String	An integer represented as a string. The number of seconds initially granted for the pass/top-up.
InitialTotalVolume	String	An integer represented as a string. The number of bytes of total volume initially granted for the pass/top-up.
InitialInputVolume	String	An integer represented as a string. The number of bytes of input volume initially granted for the pass/top-up.
InitialOutputVolume	String	An integer represented as a string. The number of bytes of output volume initially granted for the pass/top-up.
InitialServiceSpecific	String	An integer represented as a string. The number of service specific units initially granted for the pass/top-up.
activationdatetime	String	The date/time after which the pass or top-up may be active. See section 4.3 for format details.
expirationdatetime	String	The date/time after which the pass or top-up is considered to be exhausted See section 4.3 for format details.
purchasedatetime	String	The date/time when a pass was purchased See section 4.3 for format details.
Duration	String	The number of seconds after first use in which the pass must be used or expired. If both Duration and expirationdatetime are present, the closest expiration time is used.
InterimReportingInterval	String	The number of seconds after which the GGSN/DPI/Gateway revalidates quota grants with the PCRF.

4.2 Pool Data

4.2.1 Pool Profile

The Pool profile includes a set of custom fields that the provisioning system can use to store information associated with the pool. The values in custom fields are generally set by the OSS and are read by the PCRF for use in policies.

Each pool profile must have a unique key value called PoolID.

BillingDay must be defined with a default value if another value is not specified. The remaining fields are only included in the record if they are specified when the record is created/updated.

The Pool profile record consists of the following sequence of attributes.

Table 13: Pool Profile Entity Definition

Name (XML tag)	Type	Description
pool		**Sequence (multiplicity is 1)**
PoolID	String	Pool identifier (1 to 22 numeric digits, minimum value 1)
BillingDay	Uint8	The day of the month (1 to 31)] when the associated quota for the pool is reset.

Name (XML tag)	Type	Description
		0 indicates that the default value configured at the PCRF level is used.
BillingType	String	The billing frequency, monthly, weekly, daily
Entitlement	String	List of entitlements. A separate entry is included for each entitlement associated with the pool profile.
Tier	String	Pool tier.
Type	String	Field used to identify an Enterprise Pool. Allowed value is enterprise and is not case-sensitive
Custom1	String	Fields used to store customer-specific data.
Custom2	String	Fields used to store customer-specific data.
Custom3	String	Fields used to store customer-specific data.
Custom4	String	Fields used to store customer-specific data.
Custom5	String	Fields used to store customer-specific data.
Custom6	String	Fields used to store customer-specific data.
Custom7	String	Fields used to store customer-specific data.
Custom8	String	Fields used to store customer-specific data.
Custom9	String	Fields used to store customer-specific data.
Custom10	String	Fields used to store customer-specific data.
Custom11	String	Fields used to store customer-specific data.
Custom12	String	Fields used to store customer-specific data.
Custom13	String	Fields used to store customer-specific data.
Custom14	String	Fields used to store customer-specific data.
Custom15	String	Fields used to store customer-specific data.
Custom16	String	Fields used to store customer-specific data.
Custom17	String	Fields used to store customer-specific data.
Custom18	String	Fields used to store customer-specific data.
Custom19	String	Fields used to store customer-specific data.
Custom20	String	Fields used to store customer-specific data.

4.2.2 Pool Quota

The PoolQuota entity records usage associated with quotas, passes, top-ups, and roll-overs associated with the pool. The PoolQuota entity is associated with the pool profile and may be created or updated by either the PCRF or the OSS system.

The PoolQuota entity contains a version number. Different attributes maybe be present based on the version number value of the entity being accessed. In UDR, there is only one version number of 3.

The PoolQuota entity attributes are the same as defined for the Quota entity in section 4.1.2.

4.2.3 Pool State

The PoolState entity is written by the PCRF to store the state of various properties managed as a part of the pool's policy. Each pool profile may have a PoolState entity. Each PoolState entity may contain multiple properties.

The PoolState entity contains a version number. Different attributes maybe be present based on the version number value of the entity being accessed. In UDR, there is only one version number of 1.

The default fields configured are not:

- Resettable
- Defaultable

The PoolState entity attributes are the same as defined for the State entity in section 4.1.3.

4.2.4 Pool Dynamic Quota

The PoolDynamicQuota entity records usage associated with passes, top-ups, and roll-overs associated with the pool. The PoolDynamicQuota entity is associated with the pool profile and may be created or updated by either the PCRF or the OSS system.

The PoolDynamicQuota entity contains a version number. Different attributes maybe be present based on the version number value of the entity being accessed. In UDR, there is only one version number of 1.

The default fields configured are not:

- Resettable
- Defaultable

The PoolDynamicQuota entity attributes are the same as defined for the DynamicQuota entity in section 4.1.4.

4.3 Date/Timestamp Format

The Date/Timestamp format used by many fields is:

```
CCYY-MM-DDThh:mm:ss[<Z|<+|->hh:mm>]
```

This corresponds to either:

3. *CCYY-MM-DD*T*hh*:*mm*:*ss* (local time)
4. *CCYY-MM-DD*T*hh*:*mm*:*ss*Z (UTC time)
5. *CCYY-MM-DD*T*hh*:*mm*:*ss*+*hh*:*mm* (positive offset from UTC)
6. *CCYY-MM-DD*T*hh*:*mm*:*ss*-*hh*:*mm* (negative offset from UTC)

Where:

- CC is century
- YY is year

- MM is month
- DD is day
- T is Date/Time separator
- hh is hour
- mm is minutes
- ss is seconds
- Z is UTC (Coordinated Universal Time)
- +|- is time offset from UTC

The following are valid examples of a field in Date/Timestamp format:

- 2015-06-04T15:43:00 (local time)
- 2015-06-04T15:43:00Z (UTC time)
- 2015-06-04T15:43:00+02:00 (positive offset from UTC)
- 2015-06-04T15:43:00-05:00 (negative offset from UTC)

Chapter 5. Subscriber Provisioning

NOTE: For command responses, the error code values described are listed in section Appendix A.

5.1 Subscriber Profile Commands

Table 14: Summary of Subscriber Profile Commands

Command	Description	Keys	Command Syntax
Create Subscriber	Create a subscriber or subscriber profile	MSISDN, IMSI, IMEI, NAI and/or AccountId	<createSubscriber>
Update Subscriber	Update subscriber profile data		<updateSubscriber>
Delete Subscriber	Delete all subscriber profile data and all opaque data associated with the subscriber		<deleteSubscriber>

5.1.1 Create Subscriber

Description

This operation creates a subscriber profile using the field-value pairs that are specified in the request content.

NOTES

- All key values (IMSI/MSISDN/IMEI/NAI/AccountId) is specified identically in both the <key> section and in the profile XML blob. The values specified in the <key> section are used to create the subscriber and define what values are used in the <key> section for subsequent requests. The values in the profile XML blob are stored and returned if requested.
- The subscriber profile data provided is fully validated against the definition in the SEC. If the validation check fails, then the request is rejected.

Prerequisites

A subscriber with any of the keys supplied in the <key> section must not exist.

Request

```
<createSubscriber>

  <key>

[
    <IMSI>IMSI1</IMSI>
[   <IMSI>IMSI2</IMSI> ]
[   <IMSI>IMSI3</IMSI> ]
]

[
    <MSISDN>MSISDN1</MSISDN>
[   <MSISDN>MSISDN2</MSISDN> ]
[   <MSISDN>MSISDN3</MSISDN> ]
]

[
    <NAI>NAI1</NAI>
[   <NAI>NAI2</NAI> ]
[   <NAI>NAI3</NAI> ]
]

[   <AccountId>accountId</AccountId> ]

  </key>

  <entity>
```

```
    <data>
      <name>dataName</name>
      <interface>dataInterface</interface>
    </data>

    <content>
      <![CDATA[cdataProfile]]>
    </content>

  </entity>

</createSubscriber>
```

Where:

- *IMSIX*: IMSI values corresponding to the subscriber. There are not any values if an IMSI is not provisioned for the subscriber

  Values: A string with 10 to 15 digits (if value is set)

- *IMEIX*: IMEI values corresponding to the subscriber. There are not any values if an IMEI is not provisioned for the subscriber

  Values: A string with 8 to 14 digits (if value is set)

- *MSISDNX*: MSISDN values corresponding to the subscriber. There are not any values if an MSISDN is not provisioned for the subscriber

  Values: A string with 8 to 15 digits (if value is set)

- *NAIX*: NAI values corresponding to the subscriber. There are not any values if an NAI is not provisioned for the subscriber

  Refer to Table 9 for supported NAI formats and length

- *accountId*: AccountId corresponding to the subscriber. This value is not present if an AccountId is not provisioned for the subscriber

  Values: A string with 1 to 255 characters (if value is set)

- *dataName*: A user defined entity type/name for the subscriber profile

  Value is Subscriber

- *dataInterface*: The interface type used to identify the bulk import/export interface

  Value is XMLIMPORT

- *cdataProfile*: Contents of the XML data blob for the subscriber profile

NOTES

- In <key> at least one key type is mandatory. Any combination of key types are allowed. Up to 3 occurrences of each repeatable key type (IMSI, MSISDN, IMEI, or NAI) is supported.
- Key order in the request is not important.

Response

If the request fails, a failure response is indicated as described in section 3.2.5. The different values of *errorValue* in the failure response are indicated in the Error Codes section below.

Error Codes

Error Code	Description
ElementNotDefined	An XML Element is not defined
FieldValueNotValid	Field Value Not Valid. The value for a given field is not valid based on the definition in the SEC
InvalidInputXml	Invalid Input XML
OccurenceConstraintViolation	Occurrence Constraint Violation. There are too many instances of a given field. Likely more than one instance of a non-repeatable field
FieldDefinitionNotFound	Field Not Defined. The given field is not a valid field in the entity as defined in the SEC
KeyAlreadyExists	Key Already Exists. A subscriber exists with the given key

Examples

Request 1

A subscriber is created, with an AccountId, MSISDN and IMSI keys. The *BillingDay* , *Tier*, and *Entitlement* fields are set.

```
<createSubscriber>
  <key>
    <AccountId>10404723525</AccountId>
    <MSISDN>33123654862</MSISDN>
    <IMSI>184569547984229</IMSI>
  </key>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
    </data>
    <content>
<![CDATA[
<subscriber>
  <field name="AccountId">10404723525</field>
  <field name="MSISDN">33123654862</field>
  <field name="IMSI">184569547984229</field>
  <field name="BillingDay">1</field>
  <field name="Tier"></field>
  <field name="Entitlement">DayPass</field>
  <field name="Entitlement">DayPassPlus</field>
</subscriber>
]]>
    </content>
  </entity>
</createSubscriber>
```

Response 1

The request is successful, and the subscriber was created.

Request 2

A subscriber is created, with an AccountId, MSISDN and IMSI keys. Another subscriber exists with the given IMSI.

```
<createSubscriber>
  <key>
    <AccountId>10404723525</AccountId>
    <MSISDN>33123654862</MSISDN>
    <IMSI>184569547984229</IMSI>
  </key>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
    </data>
    <content>
<![CDATA[
<subscriber>
  <field name="AccountId">10404723525</field>
  <field name="MSISDN">33123654862</field>
  <field name="IMSI">184569547984229</field>
  <field name="BillingDay">1</field>
  <field name="Tier"></field>
  <field name="Entitlement">DayPass</field>
  <field name="Entitlement">DayPassPlus</field>
</subscriber>
]]>
    </content>
  </entity>
</createSubscriber>
```

Response 2

The request fails. The *errorValue* indicates a subscriber exists with the given IMSI.

```
[error 40 errorText : line lineNumber]
```

Request 3

A subscriber is created, with an AccountId, MSISDN and IMSI keys. The *BillingDay*, *Tier*, and *Entitlement* fields are set. Provisioning has been disabled.

```
<createSubscriber>
  <key>
    <MSISDN>33123654862</MSISDN>
    <IMSI>184569547984229</IMSI>
  </key>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
    </data>
    <content>
<![CDATA[
<subscriber>
  <field name="MSISDN">33123654862</field>
  <field name="IMSI">184569547984229</field>
  <field name="BillingDay">1</field>
  <field name="Tier"></field>
  <field name="Entitlement">DayPass</field>
</subscriber>
]]>
    </content>
  </entity>
</createSubscriber>
```

Response 3

The request is not processed.

Request 4

A subscriber is created, with one IMEI and one IMSI key. The *WL* field is set *and BL, GL, and SV* fields are zero.

This is an example for UDR for DSR based EIR solution with IMEI as key

```
<createSubscriber>
  <key>
    <IMEI>98765439876547</IMEI>
    <IMSI>987654398765470</IMSI>
  </key>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
    </data>
    <content>
<![CDATA[
<subscriber>
  <field name="IMEI">98765439876547</field>
  <field name="IMSI">987654398765470</field>
  <field name="WL">1</field>
  <field name="BL">0</field>
  <field name="GL">0</field>
  <field name="SV">00</field>
</subscriber>
]]>
   </content>
 </entity>
</createSubscriber>
```

Response 4

The request is successful, and the subscriber was created.

Request 5

A subscriber is created, with two IMEIs(IMEI range) as key. The *WL* field is set *and BL, GL* fields are zero.

This is an example for UDR for DSR based EIR solution with IMEI range as key

```
<createSubscriber>
  <key>
    <IMEI>11111111111111</IMEI>
    <IMEI>11111111112222</IMEI>
  </key>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
    </data>
    <content>
<![CDATA[
<subscriber>
  <field name="IMEI">11111111111111</field>
  <field name="IMEI">11111111112222</field>
  <field name="WL">1</field>
  <field name="BL">0</field>
  <field name="GL">0</field>
</subscriber>
]]>
   </content>
 </entity>
</createSubscriber>
```

Response 5

The request is successful, and the subscriber was created.

5.1.2 Update Subscriber

Description

This operation replaces an existing subscriber profile, for the subscriber identified by the specified keys.

All existing data for the subscriber is completely removed and replaced by the request content.

All other subscriber keys that exist for the subscriber, apart from the one specified in <key>, is replaced by those specified in <subscriber>.

NOTE: All key values (IMSI/MSISDN/IMEI/NAI/AccountId) is specified identically in both the <key> section and in the profile XML blob. The values specified in the <key> section are used to update the subscriber and define what values are used in the <key> section for subsequent requests. The values in the profile XML blob are stored and returned if requested.

Prerequisites

- A subscriber with a keys of the *keyNameX*/*keyValueX* supplied must exist.
- All supplied keys must reference the same subscriber.

Request

```
<updateSubscriber>

  <key>

    <keyName1>keyValue1</keyName1>
[
    <keyName2>keyValue2</keyName2>
    :
    <keyNameN>keyValueN</keyNameN>
]
  </key>

  <subscriber>

[
    <IMSI>IMSI1</IMSI>
[   <IMSI>IMSI2</IMSI> ]
[   <IMSI>IMSI3</IMSI> ]
]

[
    <MSISDN>MSISDN1</MSISDN>
[   <MSISDN>MSISDN2</MSISDN> ]
[   <MSISDN>MSISDN3</MSISDN> ]
]

[
    <NAI>NAI1</NAI>
[   <NAI>NAI2</NAI> ]
[   <NAI>NAI3</NAI> ]
]

[   <AccountId>accountId</AccountId> ]

  </subscriber>

  <entity>

    <data>
      <name>dataName</name>
      <interface>dataInterface</interface>
    </data>

    <content>
      <![CDATA[cdataProfile]]>
    </content>
```

```
  </entity>
</updateSubscriber>
```

Where:

- *keyNameX*: A key field in the subscriber profile

  Value is either IMSI, MSISDN, IMEI, NAI, or AccountId

- *keyValueX*: Corresponding key field value assigned to *keyName*
- *IMSIX*: IMSI values corresponding to the subscriber. There are not any values if an IMSI is not provisioned for the subscriber

  Values: A string with 10 to 15 digits (if value is set)

- *IMEIX*: IMEI values corresponding to the subscriber. There are not any values if an IMEI is not provisioned for the subscriber

  Values: A string with 8 to 14 digits (if value is set)

- *MSISDNX*: MSISDN values corresponding to the subscriber. There are not any values if an MSISDN is not provisioned for the subscriber

  Values: A string with 8 to 15 digits (if value is set)

- *NAIX*: NAI values corresponding to the subscriber. There are not any values if an NAI is not provisioned for the subscriber

  Refer to Table 9 for supported NAI formats and length

- *accountId*: AccountId corresponding to the subscriber. This value is not present if an AccountId is not provisioned for the subscriber

  Values: A string with 1 to 255 characters (if value is set)

- *dataName*: A user defined entity type/name for the subscriber profile

  Value is Subscriber

- *dataInterface*: The interface type used to identify the bulk import/export interface

  Value is XMLIMPORT

- *cdataProfile:* Contents of the XML data blob for the subscriber profile

NOTES

- In <key>, one single key value is mandatory.
- Multiple subscriber key values can be supplied. See section 2.7 for details.
- In <subscriber>, any combination of key types is allowed. Up to 3 occurrences of each repeatable key type (IMSI, MSISDN, IMEI, or NAI) is supported. Key values are checked to match those from the profile XML blob supplied.

Response

If the request fails, a failure response is indicated as described in section **3.2.5**. The different values of *errorValue* in the failure response are indicated in the Error Codes section below.

Error Codes

Error Code	Description
ElementNotDefined	An XML Element is not defined
FieldValueNotValid	Field Value Not Valid. The value for a given field is not valid based on the definition in the SEC
OccurenceConstraintViolation	Occurrence Constraint Violation. There are too many instances of a given field. Likely more than one instance of a non-repeatable field
InvalidInputXml	Invalid Input XML
FieldDefinitionNotFound	Field Not Defined. The given field is not a valid field in the entity as defined in the SEC
KeyNotFound	Key Not Found. A subscriber with the given key cannot be found
KeyAlreadyExists	Key Already Exists. A subscriber exists with the given key
MultipleKeysNotMatch	All supplied keys do not correspond to the same subscriber

Examples

Request 1

A subscriber is updated using MSISDN. The *AccountId*, *IMSI*, *BillingDay*, *Tier*, and *Entitlement* fields are set. The subscriber exists.

```
<updateSubscriber>
  <key>
    <MSISDN>33123654862</MSISDN>
  </key>
  <subscriber>
    <AccountId>10404723525</AccountId>
    <MSISDN>33123654862</MSISDN>
    <IMSI>184569547984229</IMSI>
  </subscriber>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
    </data>
    <content>
<![CDATA[
<subscriber>
  <field name="AccountId">10404723525</field>
  <field name="MSISDN">33123654862</field>
  <field name="IMSI">184569547984229</field>
  <field name="BillingDay">6</field>
  <field name="Tier">Silver</field>
  <field name="Entitlement">DayPass</field>
</subscriber>
]]>
    </content>
  </entity>
</updateSubscriber>
```

Response 1

The request is successful, and the subscriber was updated.

Request 2

A subscriber is updated using IMSI. The *AccountId*, *IMSI*, *BillingDay*, *Tier*, and *Entitlement* fields are set. The subscriber does not exist.

```
<updateSubscriber>
  <key>
    <IMSI>302370123456789</IMSI>
  </key>
  <subscriber>
    <IMSI>302370123456789</IMSI>
  </subscriber>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
    </data>
    <content>
<![CDATA[
<subscriber>
  <field name="IMSI">302370123456789</field>
  <field name="BillingDay">4</field>
  <field name="Tier">Gold</field>
  <field name="Entitlement">DayPass</field>
</subscriber>
]]>
    </content>
  </entity>
</updateSubscriber>
```

Response 2

The request fails. The *errorValue* indicates a subscriber with the given IMSI does not exist.

```
[error 39 errorText : line lineNumber]
```

Request 3

A subscriber is updated using IMEI. The *WL is set to 0 and BL* field is set to 1 are set. The subscriber exists.

This is an example for UDR for DSR based EIR solution with IMEI as key.

```
<updateSubscriber>
  <key>
    <IMEI>98765439876547</IMEI>
  </key>
  <subscriber>
    <IMEI>98765439876547</IMEI>
    <IMSI>987654398765470</IMSI>
  </subscriber>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
    </data>
    <content>
<![CDATA[
<subscriber>
  <field name="IMEI">98765439876547</field>
  <field name="IMSI">987654398765470</field>
  <field name="WL">0</field>
  <field name="BL">1</field>
  <field name="GL">0</field>
  <field name="SV">00</field>
</subscriber>
]]>
    </content>
  </entity>
</updateSubscriber>
```

Response 3

The request is successful, and the subscriber was updated.

Request 4

A subscriber is updated using IMEI range. The *WL is set to 0 and BL* field is set to 1 are set. The subscriber exists.

This is an example for UDR for DSR based EIR solution with IMEI range as key.

```
<updateSubscriber>
  <key>
    <IMEI>11111111111111</IMEI>
    <IMEI>11111111112222</IMEI>
  </key>
  <subscriber>
    <IMEI>11111111111111</IMEI>
    <IMEI>11111111112222</IMEI>
  </subscriber>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
    </data>
    <content>
<![CDATA[
<subscriber>
  <field name="IMEI">11111111111111</field>
  <field name="IMEI">11111111112222</field>
  <field name="WL">0</field>
  <field name="BL">1</field>
  <field name="GL">0</field>
</subscriber>
]]>
    </content>
  </entity>
</updateSubscriber>
```

Response 4

The request is successful, and the subscriber was updated.

5.1.3 Delete Subscriber

Description

This operation deletes all profile data (field-value pairs) and opaque data for the subscriber that is identified by the specified keys.

Prerequisites

- A subscriber with a keys of the *keyNameX*/*keyValueX* supplied must exist.
- All supplied keys must reference the same subscriber.
- The subscriber must not be a member of a pool, or the request fails.

Request

```
<deleteSubscriber>

  <key>

    <keyName1>keyValue1</keyName1>
[
    <keyName2>keyValue2</keyName2>
    :
    <keyNameN>keyValueN</keyNameN>
]
  </key>

</deleteSubscriber>
```

- *keyNameX*: A key field in the subscriber profile

  Value is either IMSI, MSISDN, IMEI, NAI, or AccountId

- *keyValueX*: Corresponding key field value assigned to *keyName*

NOTE: Multiple subscriber key values can be supplied. See section 2.7 for details.

Response

If the request fails, a failure response is indicated as described in section 3.2.5. The different values of errorValue in the failure response are indicated in the Error Codes section below.

Error Codes

Error Code	Description
KeyNotFound	Key Not Found. A subscriber with the given key cannot be found
SubscriberIsPoolMember	Subscriber is Pool Member. The subscriber is a member of a pool. A subscriber cannot be deleted if they are a pool member
MultipleKeysNotMatch	All supplied keys do not correspond to the same subscriber

Examples

Request 1

The subscriber with the given MSISDN is deleted. The subscriber exists.

```
<deleteSubscriber>
  <key>
    <MSISDN>33123654862</MSISDN>
  </key>
</deleteSubscriber>
```

Response 1

The request is successful, and the subscriber was deleted.

Request 2

The subscriber with the given MSISDN is deleted. The subscriber does not exist.

```
<deleteSubscriber>
  <key>
    <MSISDN>33123655555</MSISDN>
  </key>
</deleteSubscriber>
```

Response 2

The request fails. The errorValue indicates a subscriber with the given MSISDN does not exist.

[error 39 *errorText* : line *lineNumber*]

Request 3

The subscriber with the given IMEI is deleted. The subscriber exists.

This is an example for UDR for DSR based EIR solution with IMEI as key.

```
<deleteSubscriber>
  <key>
    <IMEI>98765439876547</IMEI>
  </key>
</deleteSubscriber>
```

Response 3

The request is successful, and the subscriber was deleted.

Request 4

The subscriber with the given IMEI is deleted. The subscriber exists.

This is an example for UDR for DSR based EIR solution with IMEI range as key.

```
<deleteSubscriber>
  <key>
    <IMEI>11111111111111</IMEI>
    <IMEI>11111111112222</IMEI>
  </key>
</deleteSubscriber>
```

Response 4

The request is successful, and the subscriber was deleted.

Chapter 6. Pool Provisioning

Pools are used to group subscribers that share common data. Subscribers in a pool share all the entities of that pool.

Via bulk import, provisioning clients can create, modify, and delete pool data. Pool data is accessed via the PoolID value associated with the pool.

NOTES

- Modifying a pool is complete by using the <updateFieldSet> command as described in section 7.1.3.
- For command responses, the error code values described are listed in Appendix A.

6.1 Pool Profile Commands

Table 15: Summary of Pool Profile Commands

Command	Description	Keys	Command Syntax
Create Pool	Creates a pool profile using the field-value pairs that are specified in the request content.	PoolID	<createPool>
Delete Pool	Delete pool profile data and all opaque data associated with the pool		<deletePool>

6.1.1 Create Pool

Description

This operation creates a pool profile using the field-value pairs that are specified in the request content.

NOTES

- The PoolID key value is specified identically in both the <key> section and in the PoolProfile XML blob. The value specified in the <key> section is used to create the pool and define what value is used in the <key> section for subsequent requests. The value in the PoolProfile XML blob is stored and returned if requested.
- The pool profile data provided is fully validated against the definition in the SEC. If the validation check fails, then the request is rejected.
- If PSO is enabled and the PoolID falls in a range that is maintained by a different UDR instance, then the pool is created as a Non Pool Host UDR pool (remote pool); otherwise the pool is created as a Pool Host UDR pool.
- If PSO is enabled, a pool profile cannot be imported with the Type field on a Non Pool Host UDR system.
- If PSO is enabled, and the pool is to be created as a Non Pool Host UDR pool, only the pool profile entity is stored. All other entity data is ignored.

Prerequisites

A pool with a key of *poolId* in the <key> section must not exist.

Request

```
<createPool>
  <key>
    <PoolID>poolId</PoolID>
  </key>
  <entity>
```

```
    <data>
      <name>dataName</name>
      <interface>dataInterface</interface>
    </data>

    <content>
      <![CDATA[cdataPoolProfile]]>
    </content>

  </entity>

</createPool>
```

Where:

- *poolId*: PoolID value of the pool. Numeric value, 1 to 22 digits in length

  Values: 1 to 999999999999999999999

- *dataName*: A user defined entity type/name for the pool profile

  Value is Pool

- *dataInterface*: The interface type used to identify the bulk import/export interface

  Value is XMLIMPORT

- *cdataPoolProfile:* Contents of the XML data blob for the pool profile

Response

If the request fails, a failure response is indicated as described in section **3.2.5**. The different values of *errorValue* in the failure response are indicated in the Error Codes section below.

Error Codes

Error Code	Description
ElementNotDefined	An XML Element is not defined
FieldValueNotValid	Field Value Not Valid. The value for a given field is not valid based on the definition in the SEC
InvalidInputXml	Invalid Input XML
OccurenceConstraintViolation	Occurrence Constraint Violation. There are too many instances of a given field. Likely more than one instance of a non-repeatable field
FieldDefinitionNotFound	Field Not Defined. The given field is not a valid field in the entity as defined in the SEC
KeyAlreadyExists	Key Already Exists. A pool exists with the given key
OperationNotAllowed	Operation Not Allowed

Examples

Request 1

A pool is created, with PoolID. The *BillingDay* and *Entitlement* fields are set.

```
<createPool>
  <key>
    <PoolID>100000</PoolID>
  </key>
  <entity>
    <data>
      <name>Pool</name>
      <interface>XMLIMPORT</interface>
    </data>
    <content>
<![CDATA[
<pool>
  <field name="PoolID">100000</field>
  <field name="BillingDay">1</field>
  <field name="Entitlement">DayPass</field>
  <field name="Entitlement">DayPassPlus</field>
</pool>
]]>
    </content>
  </entity>
</createPool>
Response 1
```

The request is successful, and the pool was created.

Request 2

A pool is created. Another pool exists with the given *PoolID*.

```
<createPool>
  <key>
    <PoolID>200000</PoolID>
  </key>
  <entity>
    <data>
      <name>Pool</name>
      <interface>XMLIMPORT</interface>
    </data>
    <content>
<![CDATA[
<pool>
  <field name="PoolID">200000</field>
  <field name="BillingDay">7</field>
  <field name="Entitlement">DayPass</field>
</pool>
]]>
    </content>
  </entity>
</createPool>
```

Response 2

The request fails. The *errorValue* indicates a pool exists with the given PoolID.

```
[error 40 errorText : line lineNumber]
```

Request 3

A pool is created with Pool Quota, Pool Dynamic Quota and Pool State entities for a PoolID that is in the remote UDR key range and the PSO feature is enabled.

```
<transaction>
  <txRequestid="1">
    <createPool>
```

```
      <key>
        <PoolID>910000001</PoolID>
      </key>
      <entity>
        <data>
          <name>Pool</name>
          <interface>XMLIMPORT</interface>
        </data>
        <content>
<![CDATA[
<pool>
  <field name="Custom10">Custom10Value</field>
  <field name="PoolId">910000001</field>
  <field name="BillingDay">15</field>
  <field name="Entitlement">DayPass</field>
  <field name="Entitlement">DayPassPlus</field>
</pool>
]]>
       </content>
     </entity>
   </createPool>
 </txRequest><txRequest id="1">
<create createEntityIfNotExist="true">
  <key>
    <PoolID>910000001</PoolID>
  </key>
  <entity>
   <data>
    <name>PoolState</name>
    <interface>XMLIMPORT</interface>
<xpath></xpath></data><content><![CDATA[<?xml version="1.0" encoding="UTF-8"?><state>
<version>1</version><property><name>mcc</name><value>315</value></property><property><name>expire</name>
<value>2010-02-09T11:20:32</value></property><property> <name>approved </name>
<value>yes</value></property></state>]]>
       </content>
     </entity>
   </create>
</txRequest><txRequest id="1"><create createEntityIfNotExist="true"><key><PoolID>910000001</PoolID>
</key><entity>
<data><name>PoolQuota</name><interface>XMLIMPORT</interface><xpath></xpath></data><content><![CDATA[<?xm
l version="1.0" encoding="UTF-8"?><usage><version>3</version><quota
name="Q1"><cid>9223372036854775807</cid><time>3422</time><totalVolume>1000</totalVolume><inputVolume>980
</inputVolume><outputVolume>20</outputVolume><serviceSpecific>12</serviceSpecific><nextResetTime>2011-
04-22T00:00:00-05:00</nextResetTime><quotaState> Expired</quotaState>
<refInstanceId>184569547984765</refInstanceId></quota></usage>]]>
</content>
</entity>
  </create>
</txRequest><txRequest id="1">
     <create createEntityIfNotExist="true">
      <key>
        <PoolID>910000001</PoolID>
      </key>
    <entity>
   <data>
    <name>PoolDynamicQuota</name>
    <interface>XMLIMPORT</interface>
<xpath></xpath></data><content><![CDATA[<?xml version="1.0" encoding="UTF-
8"?><definition><Version>1</Version><dynamicquota name="AggregateLimit"><Type>Roll-
Over</Type><InstanceId>15678</InstanceId><Priority>4</Priority><InitialTime>135</InitialTime><Initialtot
alVolume>2000</InitialtotalVolume><InitialinputVolume>1500</InitialinputVolume><InitialoutputVolume>500<
/InitialoutputVolume><InitialserviceSpecific>4</InitialserviceSpecific><ActivationDateTime>32</Activatio
nDateTime><ExpirationDateTime>28</ExpirationDateTime><InterimReportingInterval>100</InterimReportingInte
rval><Duration>10</Duration></dynamicquota></definition>]]>
     </content>
    </entity>
  </create>
</txRequest>
</transaction>
```

Response 3

The request is successful, and the pool was created as a Non Pool Host. Since the PoolID is in the remote UDR key range, only profile information is stored.

Request 4

A pool is created, with *PoolID*. PSO feature is enabled.The *PoolID* falls in a range that is maintained by a different UDR instance. The *BillingDay* , *Entitlement* and *Type* fields are set.

```
<createPool>
  <key>
    <PoolID>100000</PoolID>
  </key>
  <entity>
    <data>
      <name>Pool</name>
      <interface>XMLIMPORT</interface>
    </data>
    <content>
<![CDATA[
<pool>
  <field name="PoolID">100000</field>
  <field name="BillingDay">1</field>
  <field name="Entitlement">DayPass</field>
  <field name="Type">Enterprise</field>
</pool>
]]>
    </content>
  </entity>
</createPool>
```

Response 4

The request fails. The *errorValue* indicates this operation is not allowed on Non Pool Host UDR.

```
[error 50 errorText : line lineNumber]
```

6.1.2 Delete Pool

Description

This operation deletes all profile data (field-value pairs) and opaque data for the pool that is identified by the *poolId*.

Prerequisites

- A pool with a key of the *poolId* supplied must exist.
- The pool must not have subscriber members, or the request fails.

Request

```
<deletePool>

  <key>

    <PoolID>poolId</PoolID>

  </key>

</deletePool>
```

- *poolId*: PoolID value of the pool. Numeric value, 1 to 22 digits in length

  Values: 1 to 999999999999999999999

Response

If the request fails, a failure response is indicated as described in section **3.2.5**. The different values of *errorValue* in the failure response are indicated in the Error Codes section below.

Error Codes

Error Code	Description
KeyNotFound	Key Not Found. A subscriber with the given key cannot be found
PoolNotEmpty	Has Pool Members. A pool cannot be deleted when it has member subscribers

Examples

Request 1

The pool with the given PoolID is deleted. The pool exists.

```
<deletePool>
  <key>
    <PoolID>100000</PoolID>
  </key>
</deletePool>
```

Response 1

The request is successful, and the pool was deleted.

Request 2

The pool with the given PoolID is deleted. The pool does not exist.

```
<deletePool>
  <key>
    <PoolID>200000</PoolID>
  </key>
</deletePool>
```

Response 2

The request fails. The *errorValue* indicates a pool with the given PoolID does not exist.

```
[error 39 errorText : line lineNumber]
```

6.2 Additional Pool Commands

Table 16: Summary of Additional Pool Commands

Command	Description	Keys	Command Syntax
Add Member to Pool	Add subscriber to a Pool	PoolID and (MSISDN, IMSI, NAI or AccountId)	`<addPoolMember>`
Remove Member from Pool	Remove subscriber from a Pool		`<deletePoolMember>`

6.2.1 Add Member to Pool

Description

This operation adds one or more subscribers to a Pool.

Prerequisites

- A pool with the key of the *poolId* supplied must exist.
- Separate subscribers with the keys of the *keyNameX*/*keyValueX* supplied must exist.
- Each subscriber must not be a member of a pool.
- The pool must have less than the maximum number of member subscribers allowed.

Request

```
<addPoolMember>

  <key>

    <PoolID>poolId</PoolID>

  </key>

  <members>

    <member>
      <subKeyName1>subKeyValue1</subKeyName1>
    </member>

[
    <member>
      <subKeyName2>subKeyValue2</subKeyName2>
    </member>
    :
    <member>
      <subKeyName10>subKeyValue10</subKeyName10>
    </member>
]

  </members>

</addPoolMember>
```

- *poolId*: PoolID value of the pool. Numeric value, 1 to 22 digits in length

  Values: 1 to 999999999999999999999

- *subKeyNameX*: A key field in the subscriber profile

  Value is either IMSI, MSISDN, NAI, or AccountId

- *subKeyValueX*: Corresponding key field value assigned to *subKeyNameX*

NOTES

- Up to 25 subscribers can be added in one request.
- The number of subscribers being added must not cause the number of members in a basic pool to exceed the maximum allowed value, else the request fails.
- If any subscriber specified is a member of a pool, the request fails.

Response

If the request fails, a failure response is indicated as described in section **3.2.5**. The different values of *errorValue* in the failure response are indicated in the Error Codes section below.

Error Codes

Error Code	Description
KeyNotFound	Key Not Found. A subscriber with the given key cannot be found
MemberAlreadyExists	Already a Pool Member. The subscriber is a member of a pool

Error Code	Description
PoolNotFound	Pool does not exist. A subscriber cannot be added or removed from a pool that does not exist
MaxMembersBasicPool	Basic Pool Member List Maximum Limit Reached

Examples

Request 1

A request is made to add a subscriber to a pool. Both the pool and the subscriber exist. The subscriber is not a member of a pool.

```
<addPoolMember>
  <key>
    <PoolID>100000</PoolID>
  </key>
  <members>
    <member>
      <MSISDN>33123654862</MSISDN>
    </member>
  </members>
</addPoolMember>
```

Response 1

The request is successful, and the subscriber is added to the pool.

Request 2

A request is made to add a subscriber to a pool. The pool exists, but the subscriber does not.

```
<addPoolMember>
  <key>
    <PoolID>200002</PoolID>
  </key>
  <members>
    <member>
      <MSISDN>15141234567</MSISDN>
    </member>
  </members>
</addPoolMember>
```

Response 2

The request fails. The *errorValue* indicates that the subscriber does not exist.

```
[error 39 errorText : line lineNumber]
```

Request 3

A request is made to add a subscriber to a pool. The subscriber exists, but the pool does not.

```
<addPoolMember>
  <key>
    <PoolID>300003</PoolID>
  </key>
  <members>
    <member>
      <MSISDN>33123654862</MSISDN>
    </member>
  </members>
</addPoolMember>
```

Response 3

The request fails. The *errorValue* indicates that the pool does not exist.

```
[error 53 errorText : line lineNumber]
```

Request 4

A request is made to add a subscriber to a pool. Both the pool and the subscriber exist. The subscriber is a member of a pool.

```
<addPoolMember>
  <key>
    <PoolID>200000</PoolID>
  </key>
  <members>
    <member>
      <MSISDN>33123654862</MSISDN>
    </member>
  </members>
</addPoolMember>
```

Response 4

The request fails. The *errorValue* indicates the subscriber is a member of a pool.

```
[error 43 errorText : line lineNumber]
```

Request 5

A request is made to add a subscriber to a pool. Both the pool and the subscriber exist. The subscriber is not a member of a pool. The basic pool has the maximum number of members allowed.

```
<addPoolMember>
  <key>
    <PoolID>400000</PoolID>
  </key>
  <members>
    <member>
      <MSISDN>33123654862</MSISDN>
    </member>
  </members>
</addPoolMember>
```

Response 5

The request fails. The *errorValue* indicates the basic pool has the maximum number of members allowed.

```
[error 68 errorText : line lineNumber]
```

Request 6

A request is made to add 3 subscribers to a pool. The pool and all subscribers exist. Subscribers are not a member of a pool.

```
<addPoolMember>
  <key>
    <PoolID>800000</PoolID>
  </key>
  <members>
    <member>
      <MSISDN>15145551234</MSISDN>
    </member>
    <member>
      <IMSI>302370123456789</IMSI>
    </member>
    <member>
```

```
      <MSISDN>14162221234</MSISDN>
    </member>
  </members>
</addPoolMember>
```

Response 6

The request is successful, and the 3 subscribers are added to the pool.

6.2.2 Remove Member from Pool

Description

This operation removes one or more Subscribers from a Pool.

Prerequisites

- A pool with the key of the *poolId* supplied must exist.
- Separate subscribers with the keys of the *keyNameX*/*keyValueX* supplied must exist.
- Each subscriber must be a member of the specified pool.

Request

```
<deletePoolMember>

  <key>

    <PoolID>poolId</PoolID>

  </key>

  <members>

    <member>
      <subKeyName1>subKeyValue1</subKeyName1>
    </member>

[
    <member>
      <subKeyName2>subKeyValue2</subKeyName2>
    </member>
    :
    <member>
      <subKeyName10>subKeyValue10</subKeyName10>
    </member>
]

  </members>

</deletePoolMember>
```

- *poolId*: PoolID value of the pool. Numeric value, 1 to 22 digits in length

  Values: 1 to 999999999999999999999

- *subKeyNameX*: A key field in the subscriber profile

  Value is either IMSI, MSISDN, NAI, or AccountId

- *subKeyValueX*: Corresponding key field value assigned to *subKeyNameX*

NOTES

- Up to 25 subscribers can be removed in one request.
- If any subscriber specified is not a member of the pool, the request fails.

Response

If the request fails, a failure response is indicated as described in section **3.2.5**. The different values of *errorValue* in the failure response are indicated in the Error Codes section below.

Error Codes

Error Code	Description
KeyNotFound	Key Not Found. A subscriber with the given key cannot be found
NotAPoolMember	Not A Pool Member
PoolNotFound	Pool does not exist. A subscriber cannot be added or removed from a pool that does not exist

Examples

Request 1

A request is made to remove a subscriber from a pool. Both the pool and the subscriber exist. The subscriber is a member of the pool.

```
<deletePoolMember>
  <key>
    <PoolID>100000</PoolID>
  </key>
  <members>
    <member>
      <MSISDN>33123654862</MSISDN>
    </member>
  </members>
</deletePoolMember>
```

Response 1

The request is successful, and the subscriber is removed from the pool.

Request 2

A request is made to remove a subscriber from a pool. Both the pool and the subscriber exist. The subscriber is not a member of the pool.

```
<deletePoolMember>
  <key>
    <PoolID>200000</PoolID>
  </key>
  <members>
    <member>
      <MSISDN>33123654862</MSISDN>
    </member>
  </members>
</deletePoolMember>
```

Response 2

The request fails. The *errorValue* indicates the subscriber is not a member of the pool.

```
[error 45 errorText : line lineNumber]
```

Request 3

A request is made to remove 3 subscribers from a pool. The pool and all subscribers exist. All subscribers are a member of the pool.

```
<deletePoolMember>
  <key>
    <PoolID>800000</PoolID>
  </key>
  <members>
    <member>
      <MSISDN>15145551234</MSISDN>
    </member>
    <member>
      <IMSI>302370123456789</IMSI>
    </member>
    <member>
      <MSISDN>14162221234</MSISDN>
    </member>
  </members>
</deletePoolMember>
```

Response 3

The request is successful, and the 3 subscribers are removed from the pool.

Chapter 7. General Provisioning

NOTE: For command responses, the error code values described are listed in sectionAppendix A.

7.1 General Editing Commands

NOTE: Data row/field commands may only be performed on entities defined as transparent in the SEC. Attempting to perform a row based command on an entity defined as opaque results in a `NonEmptyXPathForOpaqueData` error being returned. Attempting to perform a field based command on an entity defined as opaque results in an `EntityDefinitionNotFounderror` being returned.

Table 17: Summary of General Editing Commands

Command	Description	Keys	Command Syntax
Create Data	Create data of the specified type	MSISDN, IMSI, NAI, AccountId, or PoolID	`<create>`
Update Field	Update fields to the specified values		`<updateField>`
Update FieldSet	Update row or entire entity		`<updateFieldSet>`
Delete Field	Delete instances of the specified fields		`<deleteField>`
Delete FieldSet	Delete row or entire entity		`<deleteFieldSet>`

7.1.1 Create Data

Description

This operation creates an entity or row for the subscriber/pool identified by the specified keys.

NOTES

- The opaque data for creating an entity/row is provided in the request in a CDATA construct.
- The opaque data provided is always checked to be valid XML. If the entity is defined as transparent in the SEC, then the XML blob is fully validated against the definition in the SEC. If either validation check fails, then the request is rejected.

Prerequisites

- A subscriber/pool with the keys of the *keyNameX*/*keyValueX* values supplied must exist.
- The supplied *dataName* must be a valid interface entity name for a subscriber/pool.
- When creating an entity, entity of the *dataName* must not exist for the subscriber/pool.
- Any supplied *dataXpath* must reference a valid field set in the entity/row for the subscriber/pool.
- For subscriber based requests, all supplied keys must reference the same subscriber.

Request

```
<create createEntityIfNotExist="createEntityIfNotExist">

  <key>

    <keyName1>keyValue1</keyName1>
[
    <keyName2>keyValue2</keyName2>
    :
    <keyNameN>keyValueN</keyNameN>
]
  </key>

  <entity>

    <data>
      <name>dataName</name>
```

```
      <interface>dataInterface</interface>
      <xpath>dataXpath</xpath>
    </data>

    <content> <![CDATA[
      entityContent
    ]]></content>

  </entity>

</create>
```

- *createEntityIfNotExist*: Indicates whether the entity is created if it does not exist before creating the entity/row (for example if a Quota row is being created, and the Quota entity does not exist for the subscriber)

  Value is either true or false

- *keyNameX*: A key field in the subscriber profile or pool profile

  Value is either IMSI, MSISDN, NAI, AccountId, or PoolID

- *keyValueX*: Corresponding key field value assigned to *keyNameX*
- *dataName*: A user defined entity type/name for the transparent entity being updated

  Value is either Subscriber, Quota, State, DynamicQuota, Pool, PoolQuota, PoolState, or PoolDynamicQuota

- *dataInterface*: The interface type used to identify the bulk import/export interface

  Value is XMLIMPORT

- *dataXpath*: XML XPath value which corresponds to the root element in the entity for which the row element is created, or empty when creating an entire entity
  - Value is "`/usage`" for a Quota or PoolQuota row
  - Value is "`/definition`" for a DynamicQuota or PoolDynamicQuota row
  - Value is "`/state`" for a State or PoolState row
- *entityContent*: Content of entity/row being created

NOTE: For subscriber based requests, multiple subscriber key values can be supplied. See section 2.7 for details.

Response

If the request fails, a failure response is indicated as described in section **3.2.5**. The different values of *errorValue* in the failure response are indicated in the Error Codes section below.

Error Codes

Error Code	Description
InterfaceEntityNameNotFound	Interface Entity Not Found
ElementNotDefined	An XML Element is not defined
FieldValueNotValid	Field Value Not Valid. The value for a given field is not valid based on the definition in the SEC
OccurenceConstraintViolation	Occurrence Constraint Violation. There are too many instances of a given field. Likely more than one instance of a non-repeatable field

Error Code	Description
InvalidInputXml	Invalid Input XML
FieldDefinitionNotFound	Field Not Defined. The given field is not a valid field in the entity as defined in the SEC
KeyNotFound	Key Not Found. A subscriber/pool with the given key cannot be found
NonEmptyXPathForOpaqueData	XPath cannot be non-empty for an Opaque-data operation
RegisterDataNotFound	Register Data Not Found
OperationNotAllowed	Operation Not Allowed
MultipleKeysNotMatch	All supplied keys do not correspond to the same subscriber

Examples

Request 1

A request is made to create the *Quota* opaque data. The Quota XML blob is supplied whole.

```
<create createEntityIfNotExist="true">
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Quota</name>
      <interface>XMLIMPORT</interface>
      <xpath/>
    </data>
    <content>
<![CDATA[
<usage>
  <version>3</version>
  <quota name="AggregateLimit">
    <cid>92233720368547758O7</cid>
    <time>3422</time>
    <totalVolume>1000</totalVolume>
    <inputVolume>980</inputVolume>
    <outputVolume>20</outputVolume>
    <serviceSpecific>12</serviceSpecific>
    <nextResetTime>2011-04-22T00:00:00-05:00</nextResetTime>
    <Type>pass</Type>
    <RefInstanceId>184569547984765</RefInstanceId>
  </quota>
</usage>
]]>
    </content>
  </entity>
</create>
```

Response 1

The request is successful, and the Quota opaque data was created.

Request 2

A request is made to create the *State* opaque data. The State XML blob is supplied whole. Two valid keys are supplied for the subscriber.

```
<create createEntityIfNotExist="true">
  <key>
    <MSISDN>15141234567</MSISDN>
    <IMSI>302370123456789</IMSI>
  </key>
  <entity>
    <data>
      <name>State</name>
      <interface>XMLIMPORT</interface>
      <xpath/>
    </data>
    <content>
<![CDATA[
<state>
  <version>1</version>
  <property>
    <name>mcc</name>
    <value>315</value>
  </property>
  <property>
    <name>expire</name>
    <value>2010-02-09T11:20:32</value>
  </property>
  <property>
    <name>approved</name>
    <value>yes</value>
  </property>
</state>
]]>
    </content>
  </entity>
</create>
```

Response 2

The request is successful, and the State opaque data was created.

Request 3

A request is made to create a row in the *Quota* opaque data. The Quota opaque data exists for the subscriber.

```
<create createEntityIfNotExist="false">
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Quota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/usage</xpath>
    </data>
  <content>
<![CDATA[
<quota name="NewQuota">
  <cid>92233720368547758O7</cid>
  <time>3422</time>
  <totalVolume>1000</totalVolume>
  <inputVolume>980</inputVolume>
  <outputVolume>20</outputVolume>
  <serviceSpecific>12</serviceSpecific>
  <nextResetTime>2011-04-22T00:00:00-05:00</nextResetTime>
  <Type>pass</Type>
  <RefInstanceId>184569547984765</RefInstanceId>
</quota>
]]>
    </content>
  </entity>
</create>
```

Response 3

The request is successful, and the Quota row data was created.

Request 4

A request is made to create a row in the *Quota* opaque data. The *Quota* opaque data does not exist for the subscriber. The request indicates that the Quota entity is not created if it does not exist.

```
<create createEntityIfNotExist="false">
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Quota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/usage</xpath>
    </data>
  <content>
<![CDATA[
<quota name="NewQuota">
  <cid>92233720368547758O7</cid>
  <time>3422</time>
  <totalVolume>1000</totalVolume>
  <inputVolume>980</inputVolume>
  <outputVolume>20</outputVolume>
  <serviceSpecific>12</serviceSpecific>
  <nextResetTime>2011-04-22T00:00:00-05:00</nextResetTime>
  <Type>pass</Type>
  <RefInstanceId>184569547984765</RefInstanceId>
</quota>
]]>
    </content>
  </entity>
</create>
```

Response 4

The request fails. The *errorValue* indicates the opaque data type does not exist.

```
[error 47 errorText : line lineNumber]
```

Request 5

A request is made to create the *Location* opaque data. The Location XML blob is supplied whole. Location is not a valid opaque data type.

```
<create createEntityIfNotExist="true">
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Location</name>
      <interface>XMLIMPORT</interface>
      <xpath/>
    </data>
    <content>
<![CDATA[
<location>
  <town>Montreal</town>
  <province>Quebec</province>
  <country>Canada</country>
</location>
]]>
    </content>
  </entity>
</create>
```

Response 5

The request fails. The *errorValue* indicates the opaque data type is invalid.

```
[error 11 errorText : line lineNumber]
```

Request 6

A request is made to create a row in the *PoolDynamicQuota* opaque data. The PoolDynamicQuota opaque data exists for the pool.

```
<create createEntityIfNotExist="false">
  <key>
    <PoolID>100000</PoolID>
  </key>
  <entity>
    <data>
      <name>PoolDynamicQuota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/definition</xpath>
    </data>
  <content>
<![CDATA[
<DynamicQuota name="NewDynamicQuota">
  <Type>Roll-over</Type>
  <InstanceId>15678</InstanceId>
  <Priority>4</Priority>
  <InitialTime>135</InitialTime>
  <InitialTotalVolume>2000</InitialTotalVolume>
  <InitialInputVolume>1500</InitialInputVolume>
  <InitialOutputVolume>500</InitialOutputVolume>
  <InitialServiceSpecific>4</InitialServiceSpecific>
  <activationdatetime>2015-03-09T11:20:32</activationdatetime>
  <expirationdatetime>2015-04-9T11:20:32</expirationdatetime>
  <InterimReportingInterval>100</InterimReportingInterval>
  <Duration>10</Duration>
</DynamicQuota>
]]>
    </content>
  </entity>
</create>
```

Response 6

The request is successful, and the PoolDynamicQuota row data was created.

7.1.2 Update Field

Description

This operation updates a fields to the specified values in an entity, or row in an entity, for the subscriber/pool identified by the specified keys, in the specified transparent entity.

For multiple value fields:

- Multiple values are specified by repeating the appropriate element, one instance per value.
- If the clearAll attribute is set to true, then all existing values are removed, and only the new values specified are inserted. For example, if the current value of a field was a,b,c, and this command was used with value d, after the update the field has the value d (it is not a,b,c,d)
- If the clearAll attribute is set to false, then all existing values are retained, and the new values specified are inserted. For example, if the current value of a field was a,b,c, and this command was used with value d, after the update the field has the value a,b,c,d)

All fields are updated at once in the DB. All fields and all values must be valid for the update to be successful. As soon as one error is detected during processing, the request is abandoned (and an error returned). For example, if the third specified field fails validation, then none of the fields are updated.

NOTES

- If the requested fields are valid, but not present, they are created.
- It is possible to also delete a fields in the update request by specifying the `delete="true"` attribute. A specific value can also be specified so that the field (or value) is only deleted if it matches the value supplied.
- If one or more key (IMSI, MSISDN, NAI, orAccountId) field (or values) are deleted for a subscriber, then afterwards, the subscriber must have at least one key type/value remaining or the request fails.

Prerequisites

- A subscriber/pool with the keys of the *keyNameX*/*keyValueX* values supplied must exist.
- Each requested field *fieldName* must be a valid field in the transparent entity being updated.
- The supplied *dataName* must be a valid interface entity name for a subscriber/pool.
- The supplied *dataXpath* must reference a valid XML XPath where the specified fields in `<fields>` exist in the transparent entity for the subscriber/pool.
- For subscriber based requests, all supplied keys must reference the same subscriber.

Request

```
<updateField clearAll="clearAll">

  <key>

    <keyName1>keyValue1</keyName1>
[
    <keyName2>keyValue2</keyName2>
    :
    <keyNameN>keyValueN</keyNameN>
]

  </key>

  <entity>

    <data>
      <name>dataName</name>
      <interface>dataInterface</interface>
      <xpath>dataXpath</xpath>
    </data>

    <fields>

      <field name="fieldName1" [delete="deleteField1"]>[fieldValue1]</field>
[
      <field name="fieldName2" [delete="deleteField2"]>[fieldValue2]</field>
      :
      <field name="fieldName250" [delete="deleteField250"]>[fieldValue250]</field>
]
    </fields>

  </entity>

</updateField>
```

- *clearAll*: Indicates whether all existing values in the fields being updated is removed before adding the specified field values

  Value is either true or false

NOTE: For fields that are not multi-value (single value), the value of *clearAll* must be set to true else the request attempts to add a second instance of the field, and the request fails

- *keyNameX*: A key field in the subscriber profile or pool profile

  Value is either IMSI, MSISDN, NAI, AccountId, or PoolID

- *keyValueX*: Corresponding key field value assigned to *keyNameX*
- *dataName*: A user defined entity type/name for the transparent entity being updated

  Value is either Subscriber, Quota, Pool, or PoolQuota

- *dataInterface*: The interface type used to identify the bulk import/export interface

  Value is XMLIMPORT

- *dataXpath*: XML XPath expression identifying the base element containing the fields to be updated
  - Value is `/usage/quota[@name='quotaName']` for a Quota or PoolQuota row without an instance specified
  - Value is `/usage/quota[@name='quotaName' and cid='quotaCid']` for a Quota or PoolQuota row with an instance specified
  - Value is `/usage/quota[@name='quotaName' and Type='quotaType']` for a Quota or PoolQuota row with a type specified
  - Value is `/definition/DynamicQuota[@name='dynamicQuotaName']` for a DynamicQuota or PoolDynamicQuota row with the name specified
  - Value is `/definition/DynamicQuota[@name='dynamicQuotaName' and InstanceId='dynamicQuotaInstanceId']` for a DynamicQuota or PoolDynamicQuota row with an instance specified
  - Value is `/definition/DynamicQuota[@name='dynamicQuotaName' and Type='dynamicQuotaType']` for a DynamicQuota or PoolDynamicQuota row with a type specified
  - Value is `/state/property[name='propertyName']` for a State or PoolState row with the property name specified

- *fieldNameX*: A user defined field in the transparent entity being updated
- *fieldValueX*: (Optional) Corresponding field value assigned to *fieldNameX*

  NOTE: This can be omitted if entire field is to be deleted, or can also be used to delete a field with the specified value

- *deleteFieldX*: (Optional) Indicates that field is deleted, not updated

  Value is either true or false. Default value is false if attribute is omitted.

- *quotaName*: (See *dataXpath*) The name that identifies the required quota row in the Quota/PoolQuota entity
- *quotaCid*: (See *dataXpath*) The cid value that identifies the specific required quota row in the Quota/PoolQuota entity
- *quotaType*: (See *dataXpath*) The type value that identifies the specific required quota row in the Quota/PoolQuota entity
- *dynamicQuotaName*: (See *dataXpath*) The name that identifies the required dynamic quota row in the DynamicQuota/PoolDynamicQuota entity
- *dynamicQuotaInstanceId*: (See *dataXpath*) The instance value that identifies the specific required dynamic quota row in the DynamicQuota/PoolDynamicQuota entity
- *dynamicQuotaType*: (See *dataXpath*) The type that identifies the required dynamic quota row in the DynamicQuota/PoolDynamicQuota entity

- *propertyName*: (See *dataXpath*) The name that identifies the required state property in the State/PoolState entity

NOTES

- A maximum of 250 fields can be updated in a single `<updateField>` request.
- For subscriber based requests, multiple subscriber key values can be supplied. See section 2.7 for details.

Response

If the request fails, a failure response is indicated as described in section **3.2.5**. The different values of *errorValue* in the failure response are indicated in the Error Codes section below.

Error Codes

Error Code	Description
InterfaceEntityNameNotFound	Interface Entity Not Found
ElementNotDefined	An XML Element is not defined
FieldValueNotValid	Field Value Not Valid. The value for a given field is not valid based on the definition in the SEC
FieldSetNotFound	Field Set Not Found
FieldAlreadyExists	Field Already Exists
FieldNotMultiValued	Field is not a multi-value field. Add and remove from list operations can only be performed on a multi-value field, and the field supplied is not multi-value
FieldSetDefinitionNotFound	Field Set Not Defined
FieldDefinitionNotFound	Field Not Defined. The given field is not a valid field in the entity as defined in the SEC
FieldNotUpdatable	Field Cannot be Updated. The field is defined in the SEC as not be updatable
MultipleRowsFound	Multiple rows match the given criteria. When updating a row, only one row can exist that match the given row criteria
KeyNotFound	Key Not Found. A subscriber/pool with the given key cannot be found
KeyAlreadyExists	Key Already Exists. A subscriber/pool exists with the given key
RegisterDataNotFound	Register Data Not Found
OperationNotAllowed	Operation Not Allowed
OneKeyRequired	A subscriber must have at least one key value
MultipleKeysNotMatch	All supplied keys do not correspond to the same subscriber

Examples

Request 1

A request is made to update a subscriber profile, and set the value of the *BillingDay* field to *23*, and the *Tier* field to *Gold*.

```
<updateField clearAll="true">
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
      <xpath>/subscriber</xpath>
    </data>
    <fields>
      <field name="BillingDay">23</field>
      <field name="Tier">Gold</field>
    </fields>
  </entity>
</updateField>
```

Response 1

The request is successful, and the *BillingDay* and *Tier* values were updated.

Request 2

A request is made to update a subscriber profile, and set the value of the *BillingDay* field to *55*.

```
<updateField clearAll="true">
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
      <xpath>/subscriber</xpath>
    </data>
    <fields>
      <field name="BillingDay">55</field>
    </fields>
  </entity>
</updateField>
```

Response 2

The request fails. The *errorValue* indicates the value of *BillingDay* was invalid.

```
[error 18 errorText : line lineNumber]
```

Request 3

A request is made to update the *inputVolume* and the *outputVolume* fields in the *Q1* Quota row in the Quota entity.

```
<updateField clearAll="true">
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Quota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/usage/quota[@name='Q1']</xpath>
```

```
    </data>
    <fields>
      <field name="inputVolume">3000</field>
      <field name="outputVolume">2500</field>
    </fields>
  </entity>
</updateField>
```

Response 3

The request is successful, and the *inputVolume* and *outputVolume* values were updated.

Request 4

A request is made to update the *inputVolume* and the *outputVolume* fields in the *Q1* Quota row in the Quota entity. Two rows called *Q1* exist, one with a *cid* of *111* and another with a *cid* of *222*. The request is to update the instance with the *cid* of *111*.

```
<updateField clearAll="true">
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Quota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/usage/quota[@name='Q1' and cid='111']</xpath>
    </data>
    <fields>
      <field name="inputVolume">3000</field>
      <field name="outputVolume">2500</field>
    </fields>
  </entity>
</updateField>
```

Response 4

The request is successful, and the *inputVolume* and *outputVolume* values were updated in the *Q1* row containing a *cid* of *111*.

Request 5

A request is made to update a subscriber profile, and add the value *EveningPass* to the multi-value field *Entitlement* retaining all existing values. The current value of the field is *DayPass,Weekend*.

```
<updateField clearAll="false">
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
      <xpath>/subscriber</xpath>
    </data>
    <fields>
      <field name="Entitlement">EveningPass</field>
    </fields>
  </entity>
</updateField>
```

Response 5

The request is successful, and the *Entitlement* field was updated. The value of the field is *DayPass,Weekend,EveningPass*.

Request 6

A request is made to update a subscriber profile, and set the multi-value field *Entitlement* to be only *Weekend*, removing all other existing values. The current value of the field is *DayPass,Weekend,EveningPass*.

```
<updateField clearAll="true">
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
      <xpath>/subscriber</xpath>
    </data>
    <fields>
      <field name="Entitlement">Weekend</field>
    </fields>
  </entity>
</updateField>
```

Response 6

The request is successful, and the Entitlement field was updated. The value of the field is *Weekend*.

Request 7

A request is made to update a subscriber profile, and add two additional MSISDN values. The subscriber only has the MSISDN *15141234567*.

```
<updateField clearAll="false">
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
      <xpath>/subscriber</xpath>
    </data>
    <fields>
      <field name="MSISDN">14161112222</field>
      <field name="MSISDN">14505556666</field>
    </fields>
  </entity>
</updateField>
```

Response 7

The request is successful, and the two additional MSISDNs were added. The subscriber has three MSISDNs, *15141234567*, *14161112222*, and 14505556666.

Request 8

A request is made to update a subscriber profile, and replace the 3 existing IMSI values 302370123456789, 302370999888777, and 302370555555555 with a single value of 302370111111111.

```
<updateField clearAll="true">
  <key>
    <IMSI>302370123456789</IMSI>
  </key>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
      <xpath>/subscriber</xpath>
    </data>
    <fields>
```

```
      <field name="IMSI">302370111111111</field>
    </fields>
  </entity>
</updateField>
```

Response 8

The request is successful, and subscriber has a single IMSI, 302370111111111.

Request 9

A request is made to update a subscriber profile. The request replaces all exist IMSI values with a single value, delete the specific MSISDN 14161112222, delete all instances of the NAI, update the *BillingDay* field, delete the *Tier* field if the existing value is set to *Gold*, and delete the *Custom5* field.

```
<updateField clearAll="false">
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
      <xpath>/subscriber</xpath>
    </data>
    <fields>
      <field name="IMSI">302370111111111</field>
      <field name="MSISDN" delete="true">14161112222</field>
      <field name="NAI" delete="true"/>
      <field name="BillingDay">11</field>
      <field name="Tier" delete="true">Gold</field>
      <field name="Custom5" delete="true"/>
    </fields>
  </entity>
</updateField>
```

Response 9

The request is successful, and subscriber has a single IMSI, 302370111111111.

Request 10

A request is made to update the *InitialInputVolume* and the *InitialOutputVolume* fields in the *DQ1* DynamicQuota row in the DynamicQuota entity. Two rows called *DQ1* exist, one with an *InstanceId* of *11111* and another with an *InstanceId* of *22222*. The request is to update the instance with the *InstanceId* of *11111*.

```
<updateField clearAll="true">
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>DynamicQuota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/definition/DynamicQuota[@name='DQ1' and InstanceId='11111']</xpath>
    </data>
    <fields>
      <field name="InitialInputVolume">3000</field>
      <field name="InitialOutputVolume">2500</field>
    </fields>
  </entity>
</updateField>
```

Response 10

The request is successful, and the *InitialInputVolume* and *InitialOutputVolume* values were updated in the *DQ1* row containing an *InstanceId* of *11111*.

Request 11

A request is made to update a property value in the PoolState entity. Two properties exist, one with a property *name* of *mcc* and another with *name* of *approved*. The request is to update the property value with the *name* of *mcc*.

```
<updateField clearAll="true">
  <key>
    <PoolID>10000</PoolID>
  </key>
  <entity>
    <data>
      <name>PoolState</name>
      <interface>XMLIMPORT</interface>
      <xpath>/state/property[name='mcc']</xpath>
    </data>
    <fields>
      <field name="value">3000</field>
    </fields>
  </entity>
</updateField>
```

Response 11

The request is successful, and the property *value* was updated in the PoolState containing a property *name* of *mcc*.

7.1.3 Update FieldSet

Description

This operation updates or creates an entity or row in an entity for the subscriber or pool identified by the specified keys, for the specified transparent entity. This operation replaces (sets) the entire content of the entity/row, which means that any existing values are deleted first.

All specified fields are updated at once in the DB. All fields and all values must be valid for the update to be successful. As soon as one error is detected during processing, the request is abandoned (and an error returned). For example, if the third specified field fails validation, then none of the fields are updated.

NOTE: When an entire entity is created during a request to update a row, if the transparent entity is versioned, then it is necessary for UDR to know which version of the transparent entity is created.

- If a <version> element is not supplied in the request, then:
  - If an entity is not versioned, then the non versioned definition is used
  - If only one version definition exists in the SEC, then that version is used
  - If multiple version definitions exists in the SEC, then the version with the alphabetically greater value is used (v3 is greater than v2, 3 is greater than 2 and so on.)
- If a <version> element is supplied in the request, then the specified version <name> and <value> are searched for. If the version is found in the SEC, then it is used. If the version is not found, then the request fails

Prerequisites

- A subscriber/pool with the keys of the *keyNameX*/*keyValueX* values supplied must exist.
- The supplied *dataName* must be a valid interface entity name for a subscriber/pool.
- Any supplied *dataXpath* must reference a valid field set in the entity/row for the subscriber/pool.
- Any supplied <version> *versionName*/*versionValue* must be a valid transparent entity version defined in the SEC for the specified entity.
- For subscriber based requests, all supplied keys must reference the same subscriber.

Request

```
<updateFieldSet [create="create"]
                [createEntityIfNotExist="createEntityIfNotExist"]>

  <key>

    <keyName1>keyValue1</keyName1>
[
    <keyName2>keyValue2</keyName2>
    :
    <keyNameN>keyValueN</keyNameN>
]

  </key>

  <entity>

    <data>
      <name>dataName</name>
      <interface>dataInterface</interface>
      <xpath>dataXpath</xpath>
[
      <version>
        <name>versionName</name>
        <value>versionValue</value>
      </version>
]
    </data>

    <content>
      entityContent
    </content>

  </entity>

</updateFieldSet>
```

- *create*: (Optional) Indicates whether the row is created if it does not exists

  Value is either true or false

  NOTE: If the entity does not exist, and the value of *createEntityIfNotExist* is set to true, the value of *create* is ignored and the row is created in the entity

- *createEntityIfNotExist*: (Optional) Indicates whether the entity is created if it does not exist before creating the entity/row (for example if a Quota row is being created, and the Quota entity does not exist for the subscriber)

  Value is either true or false

- *keyNameX*: A key field in the subscriber profile or pool profile

  Value is either IMSI, MSISDN, NAI, AccountId, or PoolID

- *keyValueX*: Corresponding key field value assigned to *keyNameX*
- *dataName*: A user defined entity type/name for the transparent entity being updated

  Value is either Subscriber, Quota, State, DynamicQuota, Pool, PoolQuota, PoolState, or PoolDynamicQuota

- *dataInterface*: The interface type used to identify the bulk import/export interface

  Value is XMLIMPORT

- *dataXpath*: XML XPath expression identifying the field set to be updated

  NOTE: To update the entire entity (a complete opaque data replacement) the *dataXpath* value is empty

  - Value is `/usage/` for a Quota or PoolQuota row
  - Value is `/definition/` for a DynamicQuota or PoolDynamicQuota row
  - Value is `/state/` for a State or PoolState property

- *versionName*: (Optional) The name of the versioning element for the entity, used to specify the default version number when creating an entity
- *versionValue*: (Optional) The version value for the entity, used to specify the default version number when creating an entity
- *entityContent*: Content of entity/row being updated

NOTE: For subscriber based requests, multiple subscriber key values can be supplied. See section 2.7 for details.

Response

If the request fails, a failure response is indicated as described in section **3.2.5**. The different values of *errorValue* in the failure response are indicated in the Error Codes section below.

Error Codes

Error Code	Description
InterfaceEntityNameNotFound	Interface Entity Not Found
ElementNotDefined	An XML Element is not defined
FieldValueNotValid	Field Value Not Valid. The value for a given field is not valid based on the definition in the SEC
OccurenceConstraintViolation	Occurrence Constraint Violation. There are too many instances of a given field. Likely more than one instance of a non-repeatable field
InvalidInputXml	Invalid Input XML
FieldDefinitionNotFound	Field Not Defined. The given field is not a valid field in the entity as defined in the SEC
MultipleRowsFound	Multiple rows match the given criteria. When updating a row, only one row can exist that match the given row criteria
KeyNotFound	Key Not Found. A subscriber/pool with the given key cannot be found
NonEmptyXPathForOpaqueData	XPath cannot be non-empty for an Opaque-data operation
RegisterDataNotFound	Register Data Not Found
OperationNotAllowed	Operation Not Allowed
MultipleKeysNotMatch	All supplied keys do not correspond to the same subscriber

Examples

Request 1

A request is made to update the entire Quota entity. The subscriber has a Quota entity.

```
<updateFieldSet createEntityIfNotExist="false" create="false">
  <key>
```

```
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Quota</name>
      <interface>XMLIMPORT</interface>
      <xpath/>
    </data>
    <content>
<![CDATA[
<usage>
  <version>3</version>
  <quota name="AggregateLimit">
    <cid>92233720368547758O7</cid>
    <time>3422</time>
    <totalVolume>1000</totalVolume>
    <inputVolume>980</inputVolume>
    <outputVolume>20</outputVolume>
    <serviceSpecific>12</serviceSpecific>
    <nextResetTime>2010-05-22T00:00:00-05:00</nextResetTime>
  </quota>
</usage>
]]>
    </content>
  </entity>
</updateFieldSet>
```

Response 1

The request is successful, and the Quota entity was updated.

Request 2

A request is made to update the entire State entity. The subscriber does not have a State entity. The request indicates that the entity is not created if it does not exist.

```
<updateFieldSet createEntityIfNotExist="false" create="false">
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>State</name>
      <interface>XMLIMPORT</interface>
      <xpath/>
    </data>
    <content>
<![CDATA[
<state>
  <version>1</version>
  <property>
    <name>mcc</name>
    <value>315</value>
  </property>
  <property>
    <name>expire</name>
    <value>2014-02-09T11:20:32</value>
  </property>
  <property>
    <name>approved</name>
    <value>no</value>
  </property>
</state>
]]>
    </content>
  </entity>
</updateFieldSet>
```

Response 2

The request fails. The *errorValue* indicates the opaque State entity does not exist.

```
[error 47 errorText : line lineNumber]
```

Request 3

A request is made to update the *Q1* row in the Quota entity. The subscriber has a Quota entity, but the *Q1* row does not exist. The request indicates that the row is not created if it does not exist.

```
<updateFieldSet createEntityIfNotExist="false" create="false">
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Quota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/usage</xpath>
    </data>
    <content>
<![CDATA[
<quota name="Q1">
  <cid>9223372036854775807</cid>
  <time>3422</time>
  <totalVolume>1000</totalVolume>
  <inputVolume>980</inputVolume>
  <outputVolume>20</outputVolume>
  <serviceSpecific>12</serviceSpecific>
  <nextResetTime>2010-05-22T00:00:00-05:00</nextResetTime>
</quota>
]]>
    </content>
  </entity>
</updateFieldSet>
```

Response 3

The request fails. The *errorValue* indicates the row does not exist.

```
[error 23 errorText : line lineNumber]
```

Request 4

A request is made to update the *Q1* row in the Quota entity. The subscriber has a Quota entity, but the Q1 row does not exist. The request indicates that the row is created if it does not exist.

```
<updateFieldSet createEntityIfNotExist="false" create="true">
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Quota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/usage</xpath>
    </data>
    <content>
<![CDATA[
<quota name="Q1">
  <cid>9223372036854775807</cid>
  <time>3422</time>
  <totalVolume>1000</totalVolume>
  <inputVolume>980</inputVolume>
  <outputVolume>20</outputVolume>
  <serviceSpecific>12</serviceSpecific>
  <nextResetTime>2010-05-22T00:00:00-05:00</nextResetTime>
</quota>
```

```
]]>
    </content>
  </entity>
</updateFieldSet>
```

Response 4

The request is successful, and the Quota row was created.

Request 5

A request is made to update the *Q1* row in the Quota entity. The subscriber does not have a Quota entity. The request indicates that the entity is created if it does not exist. A version number is not specified, so the latest version of the Quota entity is used to create Quota.

```
<updateFieldSet createEntityIfNotExist="true" create="false">
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Quota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/usage</xpath>
    </data>
    <content>
<![CDATA[
<quota name="Q1">
  <cid>9223372036854775807</cid>
  <time>3422</time>
  <totalVolume>1000</totalVolume>
  <inputVolume>980</inputVolume>
  <outputVolume>20</outputVolume>
  <serviceSpecific>12</serviceSpecific>
  <nextResetTime>2010-05-22T00:00:00-05:00</nextResetTime>
</quota>
]]>
    </content>
  </entity>
</updateFieldSet>
```

Response 5

The request is successful, and the Quota row was created.

Request 6

A request is made to update the *Q5* row in the Quota entity. The subscriber does not have a Quota entity. The request indicates that the entity is created if it does not exist. The request specifies that the *version 3* of the Quota entity is used to create Quota.

```
<updateFieldSet createEntityIfNotExist="true" create="false">
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Quota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/usage</xpath>
      <version>
        <name>version</name>
        <value>3</value>
      </version>
    </data>
   <content>
<![CDATA[
<quota name="Q5">
```

```
  <cid>9223372036854775807</cid>
  <time>3422</time>
  <totalVolume>1000</totalVolume>
  <inputVolume>980</inputVolume>
  <outputVolume>20</outputVolume>
  <serviceSpecific>12</serviceSpecific>
  <nextResetTime>2010-05-22T00:00:00-05:00</nextResetTime>
</quota>
]]>
    </content>
  </entity>
</updateFieldSet>
```

Response 6

The request is successful, and the Quota row was created.

Request 7

A request is made to update the *Q7* row in the Quota entity. The subscriber does not have a Quota entity. The request indicates that the entity is created if it does not exist. The request specifies that the *version 4* of the Quota entity is used to create Quota. The *version 4* of Quota does not exist.

```
<updateFieldSet createEntityIfNotExist="true" create="false">
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Quota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/usage</xpath>
      <version>
        <name>version</name>
        <value>4</value>
      </version>
    </data>
   <content>
<![CDATA[
<quota name="Q7">
  <cid>9223372036854775807</cid>
  <time>3422</time>
  <totalVolume>1000</totalVolume>
  <inputVolume>980</inputVolume>
  <outputVolume>20</outputVolume>
  <serviceSpecific>12</serviceSpecific>
  <nextResetTime>2010-05-22T00:00:00-05:00</nextResetTime>
</quota>
]]>
    </content>
  </entity>
</updateFieldSet>
```

Response 7

The request fails. The *errorValue* indicates that the *version 4* does not exist.

```
[error 22 errorText : line lineNumber]
```

Request 8

A request is made to update the *PDQ1* row in the PoolDynamicQuota entity. The pool has a PoolDynamicQuota entity, but the PDQ1 row does not exist. The request indicates that the row is created if it does not exist.

```
<updateFieldSet createEntityIfNotExist="false" create="true">
  <key>
    <PoolID>10000</PoolID>
  </key>
  <entity>
```

```
    <data>
      <name>PoolDynamicQuota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/definition</xpath>
    </data>
    <content>
<![CDATA[
<DynamicQuota name="PDQ1">
  <Type>Roll-over</Type>
  <InstanceId>15678</InstanceId>
  <Priority>4</Priority>
  <InitialTime>135</InitialTime>
  <InitialTotalVolume>2000</InitialTotalVolume>
  <InitialInputVolume>1500</InitialInputVolume>
  <InitialOutputVolume>500</InitialOutputVolume>
  <InitialServiceSpecific>4</InitialServiceSpecific>
  <activationdatetime>2015-03-09T11:20:32</activationdatetime>
  <expirationdatetime>2015-04-9T11:20:32</expirationdatetime>
  <InterimReportingInterval>100</InterimReportingInterval>
  <Duration>10</Duration>
</DynamicQuota>
]]>
    </content>
  </entity>
</updateFieldSet>
```

Response 8

The request is successful, and the PoolDynamicQuota row was created.
Request 9

A request is made to update the *mcc* property in the State entity. The subscriber has a State entity with the mcc property. The request indicates that the row is updated if it exists.

```
<updateFieldSet createEntityIfNotExist="false" create="true">
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>State</name>
      <interface>XMLIMPORT</interface>
      <xpath>/state</xpath>
    </data>
    <content>
<![CDATA[
<property>
  <name>mcc</name>
  <value>315</value>
</property>
]]>
    </content>
  </entity>
</updateFieldSet>
```

Response 9

The request is successful, and the State property mcc was updated.

7.1.4 Delete Field

Description

This operation deletes the specified fields for the subscriber/pool identified by the specified keys in the request, in the specified transparent entity.

A field with a specific value can be deleted the value matches what is supplied in *fieldValueX*.

If the field is multi-value field then all values are deleted, unless specific values are supplied in *fieldValueX*, when only the matching field values are deleted.

Deletion of a complete field results removal of the entire field from the entity. The field is not present, not just the value is empty.

NOTES

- The field being deleted does not need to have a current value. It can be empty (deleted), and the request succeeds.
- If a field value is supplied for a field, and the supplied value does not match the existing value, the request succeeds.
- If a field is deleted that has a default value defined in the SEC, then the field is set to the default instead of being deleted.
- If one or more key (IMSI, MSISDN, NAI, or AccountId) field (or values) are deleted for a subscriber, then afterwards, the subscriber must have at least one key type/value remaining or the request fails.

Prerequisites

- A subscriber/pool with the keys of the *keyNameX*/*keyValueX* values supplied must exist.
- The supplied *dataName* must be a valid interface entity name for a subscriber/pool.
- The supplied *dataXpath* must reference a valid XML XPath where the specified fields in `<fields>` exist in the transparent entity for the subscriber/pool.
- Each requested field *fieldNameX* must be a valid field in the specified transparent entity.
- For subscriber based requests, all supplied keys must reference the same subscriber.

Request

```
<deleteField>

  <key>

    <keyName1>keyValue1</keyName1>
[
    <keyName2>keyValue2</keyName2>
    :
    <keyNameN>keyValueN</keyNameN>
]

  </key>

  <entity>

    <data>
      <name>dataName</name>
      <interface>dataInterface</interface>
      <xpath>dataXpath</xpath>
    </data>

    <fields>

      <field name="fieldName1">[fieldValue1]</field>
[
      <field name="fieldName2">[fieldValue2]</field>
      :
      <field name="fieldName250">[fieldValue250]</field>
]
    </fields>

  </entity>

</deleteField>
```

- *keyNameX*: A key field in the subscriber profile or pool profile

Value is either IMSI, MSISDN, NAI, AccountId, or PoolID

- *keyValueX*: Corresponding key field value assigned to *keyNameX*
- *dataName*: A user defined entity type/name for the transparent entity being updated

  Value is either Subscriber, Quota, State, DynamicQuota, Pool, PoolQuota, PoolState, or PoolDynamicQuota

- *dataInterface*: The interface type used to identify the bulk import/export interface

  Value is XMLIMPORT

- *dataXpath*: XML XPath value which corresponds to the root element, or a row element in which the fields being deleted are contained
  - Value is `/usage/quota[@name='quotaName']` for a Quota or PoolQuota row without an instance specified
  - Value is `/usage/quota[@name='quotaName' and cid='quotaCid']` for a Quota or PoolQuota row with an instance specified
  - Value is `/usage/quota[@name='quotaName' and Type='quotaType']` for a Quota or PoolQuota row with a type specified
  - Value is `/definition/DynamicQuota[@name='dynamicQuotaName']` for a DynamicQuota or PoolDynamicQuota row with the name specified
  - Value is `/definition/DynamicQuota[@name='dynamicQuotaName' and InstanceId='dynamicQuotaInstanceId']` for a DynamicQuota or PoolDynamicQuota row with an instance specified
  - Value is `/definition/DynamicQuota[@name='dynamicQuotaName' and Type='dynamicQuotaType']` for a DynamicQuota or PoolDynamicQuota row with a type specified
  - Value is `/state/property[name='propertyName']` for a State or PoolState with the name specified
- *fieldNameX*: A user defined field in the transparent entity being updated
- *fieldValueX*: (Optional) Corresponding field value assigned to *fieldNameX.* Used when deleting a field only if set to the supplied field value. If a field value is not supplied, the supplied field is deleted regardless of current value

  NOTE: for multi-value fields, individual *fieldNameX* elements must be specified for each instance/value being deleted

- *quotaName*: (See *dataXpath*) The name that identifies the required quota row in the Quota/PoolQuota entity
- *quotaCid*: (See *dataXpath*) The instance value that identifies the specific required quota row in the Quota/PoolQuota entity
- *quotaType*: (See *dataXpath*) The type value that identifies the specific required quota row in the Quota/PoolQuota entity
- *dynamicQuotaName*: (See *dataXpath*) The name that identifies the required dynamic quota row in the DynamicQuota/PoolDynamicQuota entity
- *dynamicQuotaInstanceId*: (See *dataXpath*) The instance value that identifies the specific required dynamic quota row in the DynamicQuota/PoolDynamicQuota entity
- *dynamicQuotaType*: (See *dataXpath*) The type that identifies the required dynamic quota row in the DynamicQuota/PoolDynamicQuota entity
- *propertyName*: (See *dataXpath*) The name that identifies the required state property in the State/PoolState entity

NOTES

- A maximum of 250 fields can be deleted in a single `<deleteField>` request.
- For subscriber based requests, multiple subscriber key values can be supplied. See section 2.7 for details.

Response

If the request fails, a failure response is indicated as described in section **3.2.5**. The different values of *errorValue* in the failure response are indicated in the Error Codes section below.

Error Codes

Error Code	Description
InterfaceEntityNameNotFound	Interface Entity Not Found
ElementNotDefined	An XML Element is not defined
FieldNotMultiValued	Field is not a multi-value field. Add and remove from list operations can only be performed on a multi-value field, and the field supplied is not multi-value
FieldDefinitionNotFound	Field Not Defined. The given field is not a valid field in the entity as defined in the SEC
MultipleRowsFound	Multiple rows match the given criteria. When updating a row, only one row can exist that match the given row criteria
KeyNotFound	Key Not Found. A subscriber/pool with the given key cannot be found
RegisterDataNotFound	Register Data Not Found
OperationNotAllowed	Operation Not Allowed
KeyValueInvalid	The key value supplied is invalid, due to invalid characters/format.
OneKeyRequired	A subscriber must have at least one key value
MultipleKeysNotMatch	All supplied keys do not correspond to the same subscriber
EnterpriseToBasicPoolFailed	Enterprise to Basic Pool Conversion Failed Threshold Exceeded. An enterprise pool cannot be converted to a basic pool by deleting the Type field, if the pool has greater than the allowed number of members for a basic pool.

Examples

Request 1

A request is made to delete the *Tier* and *Custom1* fields. Both fields are valid subscriber profile fields.

```
<deleteField>
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
      <xpath>/subscriber</xpath>
```

```
    </data>
    <fields>
      <field name="Tier"/>
      <field name="Custom1"/>
    </fields>
  </entity>
</deleteField>
```

Response 1

The request is successful, and the two fields were deleted.

Request 2

A request is made to delete the *message* field. The field *message* is not a valid subscriber profile field.

```
<deleteField>
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
      <xpath>/subscriber</xpath>
    </data>
    <fields>
      <field name="message"/>
    </fields>
  </entity>
</deleteField>
```

Response 2

The request fails. The *errorValue* indicates the *message* field was invalid.

```
[error 30 errorText : line lineNumber]
```

Request 3

A request is made to delete the *EveningPass* value from the multi-value field *Entitlement* retaining all other values. The current value of the field is *DayPass,Weekend,EveningPass*.

```
<deleteField>
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
      <xpath>/subscriber</xpath>
    </data>
    <fields>
      <field name="Entitlement">EveningPass</field>
    </fields>
  </entity>
</deleteField>
```

Response 3

The request is successful, and the *Entitlement* field was updated. The value of the field is *DayPass,Weekend*.

Request 4

A request is made to delete the *inputVolume* and *outputVolume* fields from the *Q1* Quota row.

```
<deleteField>
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Quota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/usage/quota[@name='Q1']</xpath>
    </data>
    <fields>
      <field name="inputVolume"/>
      <field name="outputVolume"/>
    </fields>
  </entity>
</deleteField>
```

Response 4

The request is successful, and the two fields were deleted.

Request 5

A request is made to delete the *totalVolume* field with a value of *500* from the *Q1* Quota row. The value of *outputVolume* is *500*.

```
<deleteField>
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Quota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/usage/quota[@name='Q1']</xpath>
    </data>
    <fields>
      <field name="totalVolume">500</field>
    </fields>
  </entity>
</deleteField>
```

Response 5

The request is successful, and the field is deleted.

Request 6

A request is made to delete the *totalVolume* field with a value of *500* from the *Q1* Quota row. The value of *outputVolume* is *600* (it does not match the request).

```
<deleteField>
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Quota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/usage/quota[@name='Q1']</xpath>
    </data>
    <fields>
      <field name="totalVolume">500</field>
    </fields>
  </entity>
</deleteField>
```

Response 6

The request is successful, but the field is not deleted and contains the value *600*.

Request 7

A request is made to delete the *Custom3* field. Two key values are supplied, but these keys correspond to two different subscribers.

```
<deleteField>
  <key>
    <MSISDN>15141234567</MSISDN>
    <IMSI>302370111111111</IMSI>
  </key>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
      <xpath>/subscriber</xpath>
    </data>
    <fields>
      <field name="Custom3"/>
    </fields>
  </entity>
</deleteField>
```

Response 7

The request fails. The *errorValue* indicates that the subscriber with the two supplied keys is not found.

```
[error 39 errorText : line lineNumber]
```

Request 8

A request is made to delete the *MSISDN* field with a value of *14161112222* for the subscriber. The subscriber has 3 MSISDN values, *15141234567*, *14161112222*, and *15145556666*.

```
<deleteField>
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
      <xpath>/subscriber</xpath>
    </data>
    <fields>
      <field name="MSISDN">14161112222</field>
    </fields>
  </entity>
</deleteField>
```

Response 8

The request is successful, and the MSISDN value *14161112222* is deleted. The subscriber has 2 MSISDNs, *15141234567* and *15145556666*.

Request 9

A request is made to delete the *MSISDN* field for the subscriber. The subscriber has 2 MSISDN values, *5141234567* and *15145556666*. The subscriber also has an IMSI value.

```
<deleteField>
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
```

```
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
      <xpath>/subscriber</xpath>
    </data>
    <fields>
      <field name="MSISDN"/>
    </fields>
  </entity>
</deleteField>
```

Response 9

The request is successful, and the MSISDN field is deleted. The subscriber does not have any MSISDN values.

Request 10

A request is made to delete the *MSISDN* field for the subscriber. The subscriber has only a single key, an MSISDN value *15141234567*.

```
<deleteField>
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
      <xpath>/subscriber</xpath>
    </data>
    <fields>
      <field name="MSISDN"/>
    </fields>
  </entity>
</deleteField>
```

Response 10

The request fails. The *errorValue* indicates that the subscriber must have at least one key value.

```
[error 62 errorText : line lineNumber]
```

Request 11

A request is made to delete the *Custom5* field for a subscriber. Multiple key lookup is enabled. The IMSI and MSISDN values provided both exist, but correspond to different subscribers.

```
<deleteField>
  <key>
    <IMSI>302370111111111</IMSI>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Subscriber</name>
      <interface>XMLIMPORT</interface>
      <xpath>/subscriber</xpath>
    </data>
    <fields>
      <field name="Custom5"/>
    </fields>
  </entity>
</deleteField>
```

Response 11

The request fails. The *errorValue* indicates that all supplied keys do not correspond to the same subscriber.

```
[error 63 errorText : line lineNumber]
```

Request 12

A request is made to delete the *InitialTotalVolume* field with a value of *500* from the *PDQ1* PoolDynamicQuota row. The value of *InitialTotalVolume* is *500*.

```
<deleteField>
  <key>
    <PoolID>10000</PoolID>
  </key>
  <entity>
    <data>
      <name>PoolDynamicQuota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/definition/DynamicQuota[@name='PDQ1']</xpath>
    </data>
    <fields>
      <field name="InitialTotalVolume">500</field>
    </fields>
  </entity>
</deleteField>
```

Response 12

The request is successful, and the field is deleted.

Request 13

A request is made to delete the *totalVolume* field with a value of *500* from the *Q1* Quota row having *cid* of value *45678*. The value of *totalVolume* is *500*.

```
<deleteField>
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Quota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/usage/quota[@name='Q1' and cid='45678']</xpath>
    </data>
    <fields>
      <field name="totalVolume">500</field>
    </fields>
  </entity>
</deleteField>
```

Response 13

The request is successful, and the field is deleted.

Request 14

A request is made to delete the *mcc* property with a value of *315* from the State entity. The value of *mcc* is *315*.

```
<deleteField>
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>State</name>
      <interface>XMLIMPORT</interface>
      <xpath>/state/property[name='mcc']</xpath>
    </data>
    <fields>
      <field name="value">315</field>
```

```
    </fields>
  </entity>
</deleteField>
```

Response 14

The request is successful, and the field is deleted.

7.1.5 Delete FieldSet

Description

This operation deletes an entity, or row in an entity for the subscriber/pool identified by the specified keys in the request.

NOTE: If an entity or the row in the entity is being deleted, and it does not exist, the request fails.

Prerequisites

- A subscriber/pool with the keys of the *keyNameX*/*keyValueX* values supplied must exist.
- The supplied *dataName* must be a valid interface entity name for a subscriber/pool.
- The supplied *dataXpath* must reference a valid field set in the entity for the subscriber/pool.
- For subscriber based requests, all supplied keys must reference the same subscriber.

Request

```
<deleteFieldSet>

  <key>

    <keyName1>keyValue1</keyName1>
[
    <keyName2>keyValue2</keyName2>
    :
    <keyNameN>keyValueN</keyNameN>
]

  </key>

  <entity>

    <data>
      <name>dataName</name>
      <interface>dataInterface</interface>
      <xpath>dataXpath</xpath>
    </data>

  </entity>

</deleteFieldSet>
```

- *keyNameX*: A key field in the subscriber profile or pool profile

  Value is either IMSI, MSISDN, NAI, AccountId, or PoolID

- *keyValueX*: Corresponding key field value assigned to *keyNameX*
- *dataName*: A user defined entity type/name for the transparent entity being updated

  Value is either Subscriber, Quota, State, DynamicQuota, Pool, PoolQuota, PoolState, or PoolDynamicQuota

- *dataInterface*: The interface type used to identify the bulk import/export interface

  Value is XMLIMPORT

- *dataXpath*: XML XPath value which corresponds to the root element, or row being deleted

- Value is `/usage/quota[@name='quotaName']` for a Quota or PoolQuota row without an instance specified
- Value is `/usage/quota[@name='quotaName' and cid='quotaCid']` for a Quota or PoolQuota row with an instance specified
- Value is `/usage/quota[@name='quotaName' and Type='quotaType']` for a Quota or PoolQuota row with a type specified
- Value is `/definition/DynamicQuota[@name='dynamicQuotaName']` for a DynamicQuota or PoolDynamicQuota row with the name specified
- Value is `/definition/DynamicQuota[@name='dynamicQuotaName' and InstanceId='dynamicQuotaInstanceId']` for a DynamicQuota or PoolDynamicQuota row with an instance specified
- Value is `/definition/DynamicQuota[@name='dynamicQuotaName' and Type='dynamicQuotaType']` for a DynamicQuota or PoolDynamicQuota row with a type specified
- Value is `/state/property[name='propertyName']` for a State or PoolState row with the property name specified

- *quotaName*: (See *dataXpath*) The name that identifies the required quota row in the Quota/PoolQuota entity
- *quotaCid*: (See *dataXpath*) The instance value that identifies the specific required quota row in the Quota/PoolQuota entity
- *quotaType*: (See *dataXpath*) The type value that identifies the specific required quota row in the Quota/PoolQuota entity
- *dynamicQuotaName*: (See *dataXpath*) The name that identifies the required dynamic quota row in the DynamicQuota/PoolDynamicQuota entity
- *dynamicQuotaInstanceId*: (See *dataXpath*) The instance value that identifies the specific required dynamic quota row in the DynamicQuota/PoolDynamicQuota entity
- *dynamicQuotaType*: (See *dataXpath*) The type that identifies the required dynamic quota row in the DynamicQuota/PoolDynamicQuota entity
- *propertyName*: (See *dataXpath*) The name that identifies the required state property in the State/PoolState entity

NOTE: For subscriber based requests, multiple subscriber key values can be supplied. See section 2.7 for details.

Response

If the request fails, a failure response is indicated as described in section **3.2.5**. The different values of *errorValue* in the failure response are indicated in the Error Codes section below.

Error Codes

Error Code	Description
InterfaceEntityNameNotFound	Interface Entity Not Found
OccurenceConstraintViolation	Occurrence Constraint Violation. There are too many instances of a given field. Likely more than one instance of a non-repeatable field
KeyNotFound	Key Not Found. A subscriber/pool with the given key cannot be found
NonEmptyXPathForOpaqueData	XPath cannot be non-empty for an Opaque-data operation
RegisterDataNotFound	Register Data Not Found

Error Code	Description
OperationNotAllowed	Operation Not Allowed
KeyValueInvalid	The key value supplied is invalid, due to invalid characters/format.
MultipleKeysNotMatch	All supplied keys do not correspond to the same subscriber
FieldSetNotFound	Field Set Not Found

Examples

Request 1

A request is made to delete the Quota entity for a subscriber. The subscriber has a Quota entity.

```
<deleteFieldSet>
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Quota</name>
      <interface>XMLIMPORT</interface>
      <xpath/>
    </data>
  </entity>
</deleteFieldSet>
```

Response 1

The request is successful, and the Quota entity was deleted for the subscriber.

Request 2

A request is made to delete the State entity for a subscriber. The subscriber does not have a State entity.

```
<deleteFieldSet>
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>State</name>
      <interface>XMLIMPORT</interface>
      <xpath/>
    </data>
  </entity>
</deleteFieldSet>
```

Response 2

The request is successful.

Request 3

A request is made to delete the *Q1* row in the Quota entity for a subscriber. The subscriber has a Quota entity with a row called *Q1*.

```
<deleteFieldSet>
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
```

```
      <name>Quota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/usage/quota[@name='Q1']</xpath>
    </data>
  </entity>
</deleteFieldSet>
```

Response 3

The request is successful, and the *Q1* row in the Quota entity was deleted for the subscriber.

Request 4

A request is made to delete the *Q2* row in the Quota entity for a subscriber. The subscriber has a Quota entity, but it does not contain a row called *Q2*.

```
<deleteFieldSet>
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Quota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/usage/quota[@name='Q2']</xpath>
    </data>
  </entity>
</deleteFieldSet>
```

Response 4

The request fails. The errorValue indicates the Quota row *Q2* does not exist.

```
[error 23 errorText : line lineNumber]
```

Request 5

A request is made to delete the *PDQ1* row in the PoolDynamicQuota entity for a pool. The pool has a PoolDynamicQuota entity with a row called *PDQ1*.

```
<deleteFieldSet>
  <key>
    <PoolID>10000</PoolID>
  </key>
  <entity>
    <data>
      <name>PoolDynamicQuota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/definition/DynamicQuota[@name='PDQ1']</xpath>
    </data>
  </entity>
</deleteFieldSet>
```

Response 5

The request is successful, and the *PDQ1* row in the PoolDynamicQuota entity was deleted for the pool.

Request 6

A request is made to delete the *mcc* property in the State entity for a subscriber. The subscriber has a State entity with a property called mcc.

```
<deleteFieldSet>
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
```

```
    <data>
      <name>State</name>
      <interface>XMLIMPORT</interface>
      <xpath>/state/property[name='mcc']</xpath>
    </data>
  </entity>
</deleteFieldSet>
```

Response 6

The request is successful, and the *mcc* row in the State entity was deleted for the subscriber.

Request 7

A request is made to delete the *Q1* row having *cid* with value *23456* in the Quota entity for a subscriber. The subscriber has a Quota entity with a row called *Q1* having cid *23456*.

```
<deleteFieldSet>
  <key>
    <MSISDN>15141234567</MSISDN>
  </key>
  <entity>
    <data>
      <name>Quota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/usage/quota[@name='Q1' and cid='23456']</xpath>
    </data>
  </entity>
</deleteFieldSet>
```

Response 7

The request is successful, and the *Q1* row having cid *23456* in the Quota entity was deleted for the subscriber.

Chapter 8. Special Operations

Table 18: Summary of Special Operation Commands

Command	Description	Keys	Command Syntax
Reset	Reset fields in an Entity/Row	(MSISDN, IMSI, NAI, AccountId or PoolID)	`<reset>`

8.1.1 Reset

Description

This operation resets the field values in an entity (or specified row in an entity) for a subscriber/pool. The values are reset to the values defined in the SEC.

Prerequisites

- A subscriber/pool with the keys of the *keyNameX*/*keyValueX* values supplied must exist.
- The supplied *dataName* must be a valid interface entity name for a subscriber/pool.
- The supplied *dataXpath* must reference a valid field entity/row for the subscriber/pool.
- For subscriber based requests, all supplied keys must reference the same subscriber.

NOTE: When an entity/row instance is reset using the "Reset" command, each resettable field is set to its defined reset value. If the field does not exist, it is not created. But, if a resettable field does not exist, and the field has a default value, then the field is created with the default value.

Request

```
<reset>

  <key>

    <keyName1>keyValue1</keyName1>
[
    <keyName2>keyValue2</keyName2>
    :
    <keyNameN>keyValueN</keyNameN>
]

  </key>

  <entity>

    <data>
      <name>dataName</name>
      <interface>dataInterface</interface>
      <xpath>dataXpath</xpath>
    </data>

  </entity>

</reset>
```

- *keyNameX*: A key field in the subscriber profile or pool profile

  Value is either IMSI, MSISDN, NAI, AccountId, or PoolID

- *keyValueX*: Corresponding key field value assigned to *keyNameX*
- *dataName*: A user defined entity type/name for the transparent entity being updated

  Value is either Quota or PoolQuota

- *dataInterface*: The interface type used to identify the bulk import/export interface

  Value is XMLIMPORT

- *dataXpath*: XML XPath value which corresponds to the row element for which the reset operation needs to be performed
  - Value is `/usage/quota[@name='quotaName']` for a Quota or PoolQuota row without an instance specified
  - Value is `/usage/quota[@name='quotaName' and cid='quotaCid']` for a Quota or PoolQuota row with an instance specified
- *quotaName*: (See *dataXpath*) The name that identifies the required quota row in the Quota/PoolQuota entity
- *quotaCid*: (See *dataXpath*) The instance value that identifies the specific required quota row in the Quota/PoolQuota entity

NOTE: For subscriber based requests, multiple subscriber key values can be supplied. See section 2.7 for details.

Response

If the request fails, a failure response is indicated as described in section **3.2.5**. The different values of *errorValue* in the failure response are indicated in the Error Codes section below.

Error Codes

Error Code	Description
InterfaceEntityNameNotFound	Interface Entity Not Found
FieldSetNotFound	Field Set Not Found
FieldSetDefinitionNotFound	Field Set Not Defined
EntityDefinitionNoReset	Entity Cannot be Reset. The reset command cannot be used on the requested entity
MultipleRowsFound	Multiple rows match the given criteria. When updating a row, only one row can exist that match the given row criteria
KeyNotFound	Key Not Found. A subscriber/pool with the given key cannot be found
RegisterDataNotFound	Register Data Not Found
OperationNotAllowed	Operation Not Allowed
MultipleKeysNotMatch	All supplied keys do not correspond to the same subscriber

Examples

Request 1

A request is made to reset the *Q1* Quota row for a subscriber. The subscriber has Quota data, and the Quota data contains a Quota row called *Q1*.

```
<reset>
  <key>
    <MSISDN>33123654862</MSISDN>
  </key>
  <entity>
    <data>
      <name>Quota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/usage/quota[@name='Q1']</xpath>
```

```
    </data>
  </entity>
</reset>
```

Response 1

The request is successful, and the specified Quota row was reset.

Request 2

A request is made to reset the *Q1* Quota row. The subscriber does not have Quota data. Two subscriber addresses are supplied, and multiple key lookup is enabled.

```
<reset>
  <key>
    <MSISDN>15141234567</MSISDN>
    <IMSI>302370123456789</IMSI>
  </key>
  <entity>
    <data>
      <name>Quota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/usage/quota[@name='Q1']</xpath>
    </data>
  </entity>
</reset>
```

Response 2

The request fails. The subscriber with both keys exists, but the *errorValue* indicates the subscriber does not have Quota data.

```
[error 47 errorText : line lineNumber]
```

Request 3

A request is made to reset the *Q6* Quota row. The subscriber has Quota data, but the Quota data does not contain a Quota row called *Q6*.

```
<reset>
  <key>
    <MSISDN>33123654862</MSISDN>
  </key>
  <entity>
    <data>
      <name>Quota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/usage/quota[@name='Q6']</xpath>
    </data>
  </entity>
</reset>
```

Response 3

The request fails. The errorValue indicates the *Q6* data row was not present.

```
[error 29 errorText : line lineNumber]
```

Request 4

A request is made to reset the *PQ1* PoolQuota row with a *cid* of *77* for a pool. The pool has PoolQuota data, and the PoolQuota data contains a row called *PQ1* with a cid of *77*.

```
<reset>
  <key>
    <PoolID>100000</PoolID>
  </key>
```

```
  <entity>
    <data>
      <name>PoolQuota</name>
      <interface>XMLIMPORT</interface>
      <xpath>/usage/quota[@name='PQ1' and cid='77']</xpath>
    </data>
  </entity>
</reset>
```

Response 4

The request is successful, and the specified PoolQuota row was reset.

Chapter 9. Restore Commands

The restore commands are used in the cases when it is necessary to restore an entire subscriber or pool.

NOTE: These commands are used to aid in the recovery of subscribers/pools, and are not to be used in the creation of subscribers or pools.

Table 19: Summary of Restore Commands

Command	Description	Keys	Command Syntax
Restore Subscriber	Restore a Subscriber	MSISDN, IMSI, NAI, or AccountId	`<restoreSubscriber>`
Restore Pool	Restore a Pool	PoolID	`<restorePool>`

9.1.1 Restore Subscriber

Description

This operation restores a complete subscriber, including all defined entities in a single request.

NOTES

- The request contains an `<entity>` element with a profile entity.
- The `<restoreSubscriber>` request cannot be used in a `<transaction>`.

Prerequisites

A subscriber with any of the keys supplied in the subscriber profile must not exist.

Request

```
<restoreSubscriber>

  <subscriberData>

<   <poolId>poolId</poolId> | <poolId/> >

    <ae>ae</ae>

    <subscriberLastUpdateTime>subscriberLUT</subscriberLastUpdateTime>

    <notificationSubscriptionLastUpdateTime>nsLUT</notificationSubscriptionLastUpdateTime>

    <entity>

      <name>Profile</name>
      <seqnum>entitySeqnum1</seqnum>
      <data> <![CDATA[
      entityData1
      ]]></data>

    </entity>

[
    <entity>

      <name>entityName2</name>
      <seqnum>entitySeqnum2</seqnum>
      <data> <![CDATA[
      entityData2
      ]]></data>

    </entity>
    :
    <entity>

      <name>entityNameN</name>
```

```
      <seqnum>entitySeqnumN</seqnum>
      <data> <![CDATA[
      entityDataN
      ]]></data>

    </entity>
]
[
    <notificationSubscription>

      <client>client1</client>
      <userIdentity>userIdentity1</userIdentity>
      <creationTime>creationTime1</creationTime>
      <expirationTime>expirationTime1</expirationTime>
      <notEff>notEff1</notEff>

    </notificationSubscription>
    :
    <notificationSubscription>

      <client>clientN</client>
      <userIdentity>userIdentityN</userIdentity>
      <creationTime>creationTimeN</creationTime>
      <expirationTime>expirationTimeN</expirationTime>
      <notEff>notEffN</notEff>

    </notificationSubscription>
]
  </subscriberData>

</restoreSubscriber>
```

- *poolId*: PoolID value of the pool the subscriber is a member of. Numeric value, 1 to 22 digits in length

  Values: 1 to 9999999999999999999

  NOTE: If the subscriber is not a member of a pool, then a PoolID value is not given

- *ae*: Flag indicating if the subscriber is considered as auto-enrolled or not

  Value is either true or false

- *subscriberLUT*: The date/time when the data for the subscriber was last updated. Numeric value indicating number of seconds since midnight on January 1st 1970, in UTC time

  Values: 0 to 4294967295

- *nsLUT*: The most recent date/time when a notification subscription for the subscriber was either added or removed. Numeric value indicating number of seconds since midnight on January 1st 1970, in UTC time

  Values: 0 to 4294967295

- *entityNameX*: A user defined entity type/name for the subscriber entity

  Value is either Profile, Quota, State, or DynamicQuota

- *entitySeqnumX*: The sequence number associated with the subscriber entity (as used on the Diameter Sh interface)

  Values: 0 is 65535

- *entityDataX*: Contents of the subscriber XML data blob
- *clientX*: Subscribing client name of the subscribing entity. For example, a Diameter FQDN as used on the Diameter Sh interface
- *userIdentityX*: The identity value supplied by the subscribing client to identify the subscriber (such as an IMSI, MSISDN, NAI) in network specific format

- *creationTimeX*: The date/time when the notification subscription was created. Numeric value indicating number of seconds since midnight on January 1st 1970, in UTC time

  Values: 0 is 4294967295

- *expirationTimeX*: The date/time when the notification subscription expires. Numeric value indicating number of seconds since midnight on January 1st 1970, in UTC time

  Values: 0 is 4294967295

- *notEffX*: Flag indicating if the client allows multiple entities to be included in a single notification (for example when sending a PNR request on the Diameter Sh interface)

  Value is either true or false

Response

If the request fails, a failure response is indicated as described in section **3.2.5**. The different values of *errorValue* in the failure response are indicated in the Error Codes section below.

Error Codes

Error Code	Description
InvalidXml	Invalid XML
KeyNotFound	Key Not Found. A subscriber/pool with the given key cannot be found
KeyValueInvalid	The key value supplied is invalid, due to invalid characters/format.
EntityDefinitionNotFound	Entity Definition Not Found
InvalidInputXml	Invalid Input XML
HwtRetryLimitExceeded	Data is not committed to database as the total number of retries to commit database transactions exhausted.
Inconsistent	Database is inconsistent
KeyAlreadyExists	Key Already Exists. A subscriber/pool exists with the given key

Examples

Request 1

A request is made to restore a subscriber, who has Quota data. The subscriber is in a pool which has a *poolId* of *100000*. The subscriber does not have active notification subscriptions.

```
<restoreSubscriber>
  <subscriberData>
    <poolId>100000</poolId>
    <ae>false</ae>
    <subscriberLastUpdateTime>1436798453</subscriberLastUpdateTime>
    <notificationSubscriptionLastUpdateTime>1436798453</notificationSubscriptionLastUpdateTi
me>
    <entity>
      <name>Profile</name>
      <seqnum>5</seqnum>
      <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><subscriber><field name="AccountId
">10404723525</field><field name="MSISDN">15141234567</field><field name="IMSI">3023701234567
89</field><field name="BillingDay">1</field><field name="Tier">Gold</field><field name="Entit
```

```
lement">DayPass</field><field name="Entitlement">DayPassPlus</field></subscriber>]]></data>
    </entity>
    <entity>
      <name>Quota</name>
      <seqnum>12</seqnum>
      <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><usage><version>3</version><quota
name="AggregateLimit"><cid>9223372036854775807</cid><time>3422</time><totalVolume>1000</totalVolume><inp
utVolume>980</inputVolume><outputVolume>20</outputVolume><serviceSpecific>12</serviceSpecific><nextReset
Time>2015-07-22T00:00:00-05:00</nextResetTime></quota></usage>]]></data
>
    </entity>
  </subscriberData>
</restoreSubscriber>
```

Response 1

The request is successful, and the subscriber was restored.

Request 2

A request is made to restore an auto-enrolled subscriber. The subscriber has two active notification subscriptions.

```
<restoreSubscriber>
  <subscriberData>
    <poolId/>
    <ae>true</ae>
    <subscriberLastUpdateTime>1436798453</subscriberLastUpdateTime>
    <notificationSubscriptionLastUpdateTime>1436817543</notificationSubscriptionLastUpdateTi
me>
    <entity>
      <name>Profile</name>
      <seqnum>0</seqnum>
      <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><subscriber><field name="MSISDN">
15145551234</field><field name="BillingDay">0</field></subscriber>]]></data>
    </entity>
    <notificationSubscription>
      <client>mpe6.policy.operator.com</client>
      <userIdentity>tel:15145551234</userIdentity>
      <creationTime>1436798453</creationTime>
      <expirationTime>0</expirationTime>
      <notEff>true</notEff>
    </notificationSubscription>
    <notificationSubscription>
      <client>mpe3.policy.operator.com</client>
      <userIdentity>tel:15145551234</userIdentity>
      <creationTime>1436796002</creationTime>
      <expirationTime>0</expirationTime>
      <notEff>true</notEff>
    </notificationSubscription>
  </subscriberData>
</restoreSubscriber>
```

Response 2

The request is successful, and the subscriber was restored.

9.1.2 Restore Pool

Description

This operation restores a complete pool, including all defined entities for the pool, and all subscribers in the pool, in a single request.

NOTES

- The request contains an `<entity>` element in the `<poolData>` with a PoolProfile entity.
- A pool can contain zero, one, or more subscribers in the `<subscriberData>` elements.

- The <restorePool> request cannot be used in a <transaction>.
- If PSO is enabled and the PoolID falls in a range that is maintained by a different UDR instance, then the pool is restored as a Non Pool Host UDR pool (remote pool); otherwise the pool is created as a Pool Host UDR pool.
- If PSO is enabled, a pool profile cannot be restored with the Type field on a Non Pool Host UDR system.
- If PSO is enabled, and the pool is to be created as a Non Pool Host UDR pool, only the pool profile entity is stored. All other entity data is ignored.

Prerequisites

- A pool with PoolID supplied in the pool profile must not exist.
- A subscriber with any of the keys supplied in the contained subscriber profiles must not exist.

Request

```
<restorePool [ignoreExists="ignoreExists"]>

  <poolData>

    <entity>

      <name>PoolProfile</name>
      <seqnum>entitySeqnum1</seqnum>
      <data> <![CDATA[
      poolEntityData1
      ]]></data>

    </entity>

[
    <entity>

      <name>poolEntityName2</name>
      <seqnum>poolEntitySeqnum2</seqnum>
      <data> <![CDATA[
      poolEntityData2
      ]]></data>

    </entity>
    :
    <entity>

      <name>poolEntityNameN</name>
      <seqnum>poolEntitySeqnumN</seqnum>
      <data> <![CDATA[
      poolEntityDataN
      ]]></data>

    </entity>
]

[
    <subscriberData>

<     <poolId>poolId</poolId> | <poolId/> >

      <ae>ae</ae>

      <subscriberLastUpdateTime>subscriberLUT</subscriberLastUpdateTime>

      <notificationSubscriptionLastUpdateTime>nsLUT</notificationSubscriptionLastUpdateTime>

      <entity>

        <name>Profile</name>
        <seqnum>entitySeqnum1</seqnum>
        <data> <![CDATA[
        entityData1
        ]]></data>
```

```
      </entity>

[
      <entity>

        <name>entityName2</name>
        <seqnum>entitySeqnum2</seqnum>
        <data> <![CDATA[
        entityData2
        ]]></data>

      </entity>
      :
      <entity>

        <name>entityNameN</name>
        <seqnum>entitySeqnumN</seqnum>
        <data> <![CDATA[
        entityDataN
        ]]></data>

      </entity>
]
[
      <notificationSubscription>

        <client>client1</client>
        <userIdentity>userIdentity1</userIdentity>
        <creationTime>creationTime1</creationTime>
        <expirationTime>expirationTime1</expirationTime>
        <notEff>notEff1</notEff>

      </notificationSubscription>
      :
      <notificationSubscription>

        <client>clientN</client>
        <userIdentity>userIdentityN</userIdentity>
        <creationTime>creationTimeN</creationTime>
        <expirationTime>expirationTimeN</expirationTime>
        <notEff>notEffN</notEff>

      </notificationSubscription>
]
    </subscriberData>
    :
    <subscriberData>

    // see above for repeated format of <subscriberData>

    </subscriberData>
]

  </poolData>

</restorePool>
```

- *ignoreExists:* (Optional) Indicates whether the processing of adding subscribers to the pool continues as usual rather than returning an error if a subscriber exists in the pool.

  Values:

  - o true

    The processing of adding subscribers to the pool continues as usual if the subscriber exists.

  - o False

    The processing of adding subscribers to the pool returns an error if the subscriber exists. (default value)

- *poolEntityNameX*: A user defined entity type/name for the pooled entity

  Value is either PoolProfile, PoolQuota, PoolState, or PoolDynamicQuota

- *poolEntitySeqnumX*: The sequence number associated with the pooled entity (as used on the Diameter Sh interface)

  Values: 0 to 65535

- *poolEntityDataX*: Contents of the pooled XML data blob
- *poolId*: PoolID value of the pool the subscriber is a member of. Numeric value, 1 to 22 digits in length

  Values: 1 to 999999999999999999999

  NOTE: This is always be the same as the PoolID value in the PoolProfile

- *ae*: Flag indicating if the subscriber is considered as auto-enrolled or not

  Value is either true or false

  NOTE: For pool members, the value of ae is always be false

- *subscriberLUT*: The date/time when the data for the subscriber was last updated. Numeric value indicating number of seconds since midnight on January 1st 1970, in UTC time

  Values: 0 to 4294967295

- *nsLUT*: The most recent date/time when a notification subscription for the subscriber was either added or removed. Numeric value indicating number of seconds since midnight on January 1st 1970, in UTC time

  Values: 0 to 4294967295

- *entityNameX*: A user defined entity type/name for the subscriber entity

  Value is either Profile, Quota, State, or DynamicQuota

- *entitySeqnumX*: The sequence number associated with the subscriber entity (as used on the Diameter Sh interface)

  Values: 0 to 65535

- *entityDataX*: Contents of the subscriber XML data blob
- *clientX*: Subscribing client name of the subscribing entity. For example, a Diameter FQDN as used on the Diameter Sh interface
- *userIdentityX*: The identity value supplied by the subscribing client to identify the subscriber (such as an IMSI, MSISDN, NAI) in network specific format
- *creationTimeX*: The date/time when the notification subscription was created. Numeric value indicating number of seconds since midnight on January 1st 1970, in UTC time

  Values: 0 to 4294967295

- *expirationTimeX*: The date/time when the notification subscription expires. Numeric value indicating number of seconds since midnight on January 1st 1970, in UTC time

  Values: 0 to 4294967295

- *notEffX*: Flag indicating if the client allows multiple entities to be included in a single notification (for example when sending a PNR request on the Diameter Sh interface)

  Value is either true or false

Response

If the request fails, a failure response is indicated as described in section **3.2.5**. The different values of *errorValue* in the failure response are indicated in the Error Codes section below.

Error Codes

Error Code	Description
InvalidXml	Invalid XML
KeyNotFound	Key Not Found. A subscriber/pool with the given key cannot be found
KeyValueInvalid	The key value supplied is invalid, due to invalid characters/format.
EntityDefinitionNotFound	Entity Definition Not Found
InvalidInputXml	Invalid Input XML
HwtRetryLimitExceeded	Data is not committed to database as the total number of retries to commit database transactions exhausted.
Inconsistent	Database is inconsistent
KeyAlreadyExists	Key Already Exists. A subscriber/pool exists with the given key
OperationNotAllowed	Operation Not Allowed

Examples

Request 1

A request is made to restore a pool that has PoolQuota and PoolState data. The pool does not contain any subscribers.

```
<restorePool>
  <poolData>
    <entity>
      <name>PoolProfile</name>
      <seqnum>4</seqnum>
      <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><pool><field name="PoolID">100000<
/field><field name="BillingDay">1</field><field name="Entitlement">DayPass</field><field name
="Entitlement">DayPassPlus</field></pool>]]></data>
    </entity>
    <entity>
      <name>PoolQuota</name>
      <seqnum>27</seqnum>
      <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><usage><version>3</version><quota
name="AggregateLimit"><cid>92233720368547758O7</cid><time>3422</time><totalVolume>1000</totalVolume><inp
utVolume>980</inputVolume><outputVolume>20</outputVolume><serviceSpecific>12</serviceSpecific><nextReset
Time>2015-07-22T00:00:00-05:00</nextResetTime></quota></usage>]]></data>
    </entity>
    <entity>
      <name>PoolState</name>
      <seqnum>11</seqnum>
      <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><state><version>1</version><proper
ty><name>mcc</name><value>315</value></property><property><name>expire</name><value>2015-08-0
9T11:20:32</value></property><property><name>approved</name><value>yes</value></property></state>]]></da
ta>
    </entity>
  </poolData>
</restorePool>
```

Response 1

The request is successful, and the pool was restored.

Request 2

A request is made to restore a pool that contains 2 subscribers.

```
<restorePool>
  <poolData>
    <entity>
      <name>PoolProfile</name>
      <seqnum>4</seqnum>
      <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><pool><field name="PoolID">100000<
/field><field name="BillingDay">1</field><field name="Entitlement">DayPass</field><field name
="Entitlement">DayPassPlus</field></pool>]]></data>
    </entity>
    <entity>
      <name>PoolQuota</name>
      <seqnum>27</seqnum>
      <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><usage><version>3</version><quota
name="AggregateLimit"><cid>9223372036854775807</cid><time>3422</time><totalVolume>1000</totalVolume><inp
utVolume>980</inputVolume><outputVolume>20</outputVolume><serviceSpecific>12</serviceSpecific><nextReset
Time>2015-07-22T00:00:00-05:00</nextResetTime></quota></usage>]]></data>
    </entity>
    <entity>
      <name>PoolState</name>
      <seqnum>11</seqnum>
      <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><state><version>1</version><proper
ty><name>mcc</name><value>315</value></property><property><name>expire</name><value>2015-08-0
9T11:20:32</value></property><property><name>approved</name><value>yes</value></property></state>]]></da
ta>
    </entity>
    <subscriberData>
      <poolId>100000</poolId>
      <ae>false</ae>
      <subscriberLastUpdateTime>1436798453</subscriberLastUpdateTime>
      <notificationSubscriptionLastUpdateTime>1436817543</notificationSubscriptionLastUpdateT
ime>
      <entity>
        <name>Profile</name>
        <seqnum>0</seqnum>
        <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><subscriber><field name="Account
Id">10404723525</field><field name="MSISDN">15141234567</field><field name="IMSI">30237012345
6789</field><field name="BillingDay">1</field><field name="Tier">Gold</field><field name="Ent
itlement">DayPass</field><field name="Entitlement">DayPassPlus</field></subscriber>]]></data>
      </entity>
      <entity>
        <name>Quota</name>
        <seqnum>12</seqnum>
        <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><usage><version>3</version><quot
a name="AggregateLimit"><cid>9223372036854775807</cid><time>3422</time><totalVolume>1000</tot
alVolume><inputVolume>980</inputVolume><outputVolume>20</outputVolume><serviceSpecific>12</serviceSpecif
ic><nextResetTime>2015-07-22T00:00:00-05:00</nextResetTime></quota></usage>]]></da
ta>
      </entity>
      <notificationSubscription>
        <client>mpe6.policy.operator.com</client>
        <userIdentity>tel:15141234567</userIdentity>
        <creationTime>1436798453</creationTime>
        <expirationTime>0</expirationTime>
        <notEff>true</notEff>
      </notificationSubscription>
    </subscriberData>
    <subscriberData>
      <poolId>100000</poolId>
      <ae>false</ae>
      <subscriberLastUpdateTime>1436792233</subscriberLastUpdateTime>
      <notificationSubscriptionLastUpdateTime>1436816011</notificationSubscriptionLastUpdateT
ime>
      <entity>
        <name>Profile</name>
```

```
        <seqnum>17</seqnum>
        <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><subscriber><field name="Account
Id">10404712881</field><field name="MSISDN">15145551234</field><field name="IMSI">30237055555
4444</field><field name="BillingDay">3</field><field name="Tier">Silver</field><field name="E
ntitlement">DayPass</field></subscriber>]]></data>
      </entity>
      <entity>
        <name>Quota</name>
        <seqnum>20</seqnum>
        <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><usage><version>3</version><quot
a name="AggregateLimit"><cid>9223372036858772097</cid><time>3122</time><totalVolume>2000</tot
alVolume><inputVolume>9220</inputVolume><outputVolume>30</outputVolume><serviceSpecific>222</serviceSpec
ific><nextResetTime>2015-07-22T00:00:00-05:00</nextResetTime></quota></usage>]]></
data>
      </entity>
    </subscriberData>
  </poolData>
</restorePool>
```

Response 2

The request is successful, and the pool containing two subscribers was restored.

Request 3

A request is made to restore an enterprise pool.

```
<restorePool>
  <poolData>
    <entity>
      <name>PoolProfile</name>
      <seqnum>4</seqnum>
      <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><pool><field name="PoolID">100000<
/field><field name="BillingDay">1</field><field name="Entitlement">DayPass</field><field name
="Entitlement">DayPassPlus</field>><field name="Type">Enterprise</field></pool>]]></data>
    </entity>
  </poolData>
</restorePool>
```

Response 3

The request is successful, and the pool is restored as an enterprise pool.

Request 4

A request is made to restore a pool that contains 2 subscribers. The *ignoreExists* flag is set to *true*. Subscribers are being added during the restore and one of them exists in the pool.

```
<restorePool ignoreExists="true">
  <poolData>
    <entity>
      <name>PoolProfile</name>
      <seqnum>4</seqnum>
      <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><pool><field name="PoolID">100000<
/field><field name="BillingDay">1</field><field name="Entitlement">DayPass</field><field name
="Entitlement">DayPassPlus</field></pool>]]></data>
    </entity>
    <entity>
      <name>PoolQuota</name>
      <seqnum>27</seqnum>
      <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><usage><version>3</version><quota
name="AggregateLimit"><cid>9223372036854775807</cid><time>3422</time><totalVolume>1000</totalVolume><inp
utVolume>980</inputVolume><outputVolume>20</outputVolume><serviceSpecific>12</serviceSpecific><nextReset
Time>2015-07-22T00:00:00-05:00</nextResetTime></quota></usage>]]></data>
    </entity>
    <entity>
      <name>PoolState</name>
      <seqnum>11</seqnum>
      <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><state><version>1</version><proper
ty><name>mcc</name><value>315</value></property><property><name>expire</name><value>2015-08-0
```

```
9T11:20:32</value></property><property><name>approved</name><value>yes</value></property></state>]]></da
ta>
    </entity>
    <subscriberData>
      <poolId>100000</poolId>
      <ae>false</ae>
      <subscriberLastUpdateTime>1436798453</subscriberLastUpdateTime>
      <notificationSubscriptionLastUpdateTime>1436817543</notificationSubscriptionLastUpdateT
ime>
      <entity>
        <name>Profile</name>
        <seqnum>0</seqnum>
        <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><subscriber><field name="Account
Id">10404723525</field><field name="MSISDN">15141234567</field><field name="IMSI">30237012345
6789</field><field name="BillingDay">1</field><field name="Tier">Gold</field><field name="Ent
itlement">DayPass</field><field name="Entitlement">DayPassPlus</field></subscriber>]]></data>
      </entity>
      <entity>
        <name>Quota</name>
        <seqnum>12</seqnum>
        <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><usage><version>3</version><quot
a name="AggregateLimit"><cid>9223372036854775807</cid><time>3422</time><totalVolume>1000</tot
alVolume><inputVolume>980</inputVolume><outputVolume>20</outputVolume><serviceSpecific>12</serviceSpecif
ic><nextResetTime>2015-07-22T00:00:00-05:00</nextResetTime></quota></usage>]]></da
ta>
      </entity>
      <notificationSubscription>
        <client>mpe6.policy.operator.com</client>
        <userIdentity>tel:15141234567</userIdentity>
        <creationTime>1436798453</creationTime>
        <expirationTime>0</expirationTime>
        <notEff>true</notEff>
      </notificationSubscription>
    </subscriberData>
    <subscriberData>
      <poolId>100000</poolId>
      <ae>false</ae>
      <subscriberLastUpdateTime>1436792233</subscriberLastUpdateTime>
      <notificationSubscriptionLastUpdateTime>1436816011</notificationSubscriptionLastUpdateT
ime>
      <entity>
        <name>Profile</name>
        <seqnum>17</seqnum>
        <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><subscriber><field name="Account
Id">10404712881</field><field name="MSISDN">15145551234</field><field name="IMSI">30237055555
4444</field><field name="BillingDay">3</field><field name="Tier">Silver</field><field name="E
ntitlement">DayPass</field></subscriber>]]></data>
      </entity>
      <entity>
        <name>Quota</name>
        <seqnum>20</seqnum>
        <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><usage><version>3</version><quot
a name="AggregateLimit"><cid>9223372036858772097</cid><time>3122</time><totalVolume>2000</tot
alVolume><inputVolume>9220</inputVolume><outputVolume>30</outputVolume><serviceSpecific>222</serviceSpec
ific><nextResetTime>2015-07-22T00:00:00-05:00</nextResetTime></quota></usage>]]></
data>
      </entity>
    </subscriberData>
  </poolData>
</restorePool>
```


Response 4

The request is successful, and the pool containing two subscribers was restored.

Request 5

A request is made to restore a pool that has PoolQuota and PoolState data and the PoolID is in the remote UDR key range. The PSO feature is enabled. The pool does not contain any subscribers.


```
<restorePool>
```

```
  <poolData>
    <entity>
      <name>PoolProfile</name>
      <seqnum>4</seqnum>
      <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><pool><field name="PoolID">100000<
/field><field name="BillingDay">1</field><field name="Entitlement">DayPass</field><field name
="Entitlement">DayPassPlus</field></pool>]]></data>
    </entity>
    <entity>
      <name>PoolQuota</name>
      <seqnum>27</seqnum>
      <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><usage><version>3</version><quota
name="AggregateLimit"><cid>9223372036854775807</cid><time>3422</time><totalVolume>1000</totalVolume><inp
utVolume>980</inputVolume><outputVolume>20</outputVolume><serviceSpecific>12</serviceSpecific><nextReset
Time>2015-07-22T00:00:00-05:00</nextResetTime></quota></usage>]]></data>
    </entity>
    <entity>
      <name>PoolState</name>
      <seqnum>11</seqnum>
      <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><state><version>1</version><proper
ty><name>mcc</name><value>315</value></property><property><name>expire</name><value>2015-08-0
9T11:20:32</value></property><property><name>approved</name><value>yes</value></property></state>]]></da
ta>
    </entity>
  </poolData>
</restorePool>
```

Response 5

The request is successful, and only the pool profile entity is restored. The pool is a Non Pool Host UDR pool.

Request 6

A request is made to restore an enterprise pool. PSO feature is enabled.The *PoolID* falls in a range that is maintained by a different UDR instance.

```
<restorePool>
  <poolData>
    <entity>
      <name>PoolProfile</name>
      <seqnum>4</seqnum>
      <data><![CDATA[<?xml version="1.0" encoding="UTF-8"?><pool><field name="PoolID">100000<
/field><field name="BillingDay">1</field><field name="Entitlement">DayPass</field><field name
="Entitlement">DayPassPlus</field>><field name="Type">Enterprise</field></pool>]]></data>
    </entity>
  </poolData>
</restorePool>
```

Response 6

The request fails. The *errorValue* indicates this operation is not allowed on Non Pool Host UDR.

```
[error 50 errorText : line lineNumber]
```

Error Codes

Error codes are returned in the errorValue code of the import log file response when a request fails (see section **3.2.5**). The complete set of error codes and their associated values are defined in the following table.

The Type column indicates if an error is permanent (P) or temporary (T), or indicates success (S). A request that results in a permanent error is discarded and not sent again. A request that results in a temporary can be sent again at a different time, and may be successful.

Error codes that are marked with an * (asterisk) are permanent errors that can be fixed by means of configuration, such as configuring the entities/fields in the SEC.

Table 20: Error Codes

Error Code	Value	Type	Description
Success	0	S	Success
MissingArgument	1	P	An internal error has occurred
ImportFileError	2	T	An internal error has occurred
LogFileError	3	T	An internal error has occurred
InitError	4	T	An internal error has occurred
ProvProhibited	5	T	Service is unavailable. Provisioning has been disabled
InvalidXml	6	P	Invalid XML
SessionTimeOut	7	T	No response received from UDRBE for a provisioning request
TooBigMessage	8	P*	The provisioning request size exceeded the maximum allowed size
CallbackNotRegistered	9	T	An internal error has occurred
InternalError	10	T	An internal error has occurred
InterfaceEntityNameNotFound	11	P*	Interface Entity Not Found
EntityNotFound	12	P*	Entity Not Found
EntityDefinitionNotFound	13	P*	Entity Definition Not Found
VersionBaseFieldSetNotFound	14	P	Versioned Base Field Set for the Transparent Entity Not Found
NonVersionedBaseFieldSetNotFound	15	P	Non Versioned Base Field Set for the Transparent Entity Not Found
MultipleVersionTagsFound	16	P	Multiple Version Tags Found
ElementNotDefined	17	P*	An XML Element is not defined
FieldValueNotValid	18	P*	Field Value Not Valid. The value for a given field is not valid based on the definition in the SEC
OccurenceConstraintViolation	19	P*	Occurrence Constraint Violation. There are too many instances of a given field. Likely more than one instance of a non-repeatable field
RepeatableFieldSetElementInvalid	20	P	Invalid Repeatable Element
InvalidInputXml	21	P	Invalid Input XML
BaseFieldSetNotFound	22	P*	Base Field Set for Transparent Entity Not Found
FieldSetNotFound	23	P	Field Set Not Found

Error Code	Value	Type	Description
FieldSetAlreadyExists	24	P	Field Set Already Exists
FieldNotFound	25	P	Field Not Found
FieldAlreadyExists	26	P	Field Already Exists
FieldNotMultiValued	27	P	Field is not a multi-value field. Add and remove from list operations can only be performed on a multi-value field, and the field supplied is not multi-value
PathNotFound	28	P*	Specified XPath Not Found in XML
FieldSetDefinitionNotFound	29	P	Field Set Not Defined
FieldDefinitionNotFound	30	P*	Field Not Defined. The given field is not a valid field in the entity as defined in the SEC
FieldNotUpdatable	31	P*	Field Cannot be Updated. The field is defined in the SEC as not be updatable
EntityDefinitionNoReset	32	P*	Entity Cannot be Reset. The reset command cannot be used on the requested entity
MultipleRowsFound	33	P	Multiple rows match the given criteria. When updating a row, only one row can exist that match the given row criteria
InvalidOperationType	34	P	An internal error has occurred
InvalidResponseType	35	P	An internal error has occurred
XmlBuildError	36	P	An internal error has occurred
XmlParseError	37	P	An internal error has occurred
DbError	38	P	Database Operation Failed
KeyNotFound	39	P	Key Not Found. A subscriber/pool with the given key cannot be found
KeyAlreadyExists	40	P	Key Already Exists. A subscriber/pool exists with the given key
SubscriberIsPoolMember	41	P	Subscriber is Pool Member. The subscriber is a member of a pool. A subscriber cannot be deleted if they are a pool member
PoolNotEmpty	42	P	Has Pool Members. A pool cannot be deleted when it has member subscribers
MemberAlreadyExists	43	P	Already a Pool Member. The subscriber is a member of a pool
PoolLimit	44	P	Pool Member List Max Limit Reached
NotAPoolMember	45	P	Not A Pool Member

Error Code	Value	Type	Description
NonEmptyXPathForOpaqueData	46	P	XPath cannot be non-empty for an Opaque-data operation
RegisterDataNotFound	47	P	Register Data Not Found
RegisterAlreadyExists	48	P	Register Already Exists
NoResultFound	49	T	An internal error has occurred
OperationNotAllowed	50	P	Operation Not Allowed
KeyValueInvalid	51	P	The key value supplied is invalid, due to invalid characters/format.
InterfaceNotSupported	52	P*	Requested Provisioning Interface Is Not Supported
PoolNotFound	53	P	Pool does not exist. A subscriber cannot be added or removed from a pool that does not exist
OutstandingCookieIdLimitReached	54	T	An internal error has occurred
MessageQueueFull	55	T	An internal error has occurred
RowNotFound	56	P	Data row specified is not found
DbRetryExhausted	57	T	Data is not committed to database as the total number of retries to commit database transactions exhausted. **NOTE:** The client retries the command again
DurabilityDegraded	58	T	Data is not committed as Durability is degraded. **NOTE:** The client retries the command again
DurabilityTimeout	59	T	Data is not made durable in the configured Durability Timeout. **NOTE:** The client retries the command again to get the data sent in the failed request to verify that it was stored by last request
UnattemptedRequest	60	T	Request in transaction is not attempted because a prior request failed
MemThresholdReached	61	P	Free system memory is low. Request cannot be performed
UdrbeConnectionFailure	62	T	Internal connection to the UDR provisioning back-end has failed
MultipleKeysNotMatch	63	P	All supplied keys do not correspond to the same subscriber
OneKeyRequired	64	P	A subscriber must have at least one key value
CpuCongestion	65	T	Request rejected due to system congestion

Error Code	Value	Type	Description
HwtRetryLimitExceeded:	66	T	Data is not committed to database as the total number of retries to commit database transactions exhausted. **NOTE:** The client retries the command again
Inconsistent	67	P	Database is inconsistent
MaxMembersBasicPool	68	P	Basic Pool Member List Maximum Limit Reached
EnterpriseToBasicPoolFailed	69	P	Enterprise to basic Pool Conversion Failed Threshold Exceeded

Appendix A. Bulk Import/Export Variables

The bulk import/export has a set of system variables that affect its operation as it runs. Bulk import/export variables (Table 21) can be set via the UDR GUI and can be changed at runtime to effect dynamic server reconfiguration.

Table 21: Bulk Import/Export variables

Parameter	Description
Remote Host IP Address	The IP address and username of Remote Import/Export Host.
Remote Export Transfers Enabled	Whether or not to allow export files to be copied to the Remote Export Host. Default is UNCHECKED
Local Export Directory	The local directory where export files are created. Default is `/var/TKLC/db/filemgmt/provexport`; Range is 0 to 255 characters
Remote Export Directory	The directory in the Remote Export Host to which export files are transferred if configured. Default is ; Range is 0 to 255 characters
Remote Import Enabled	Whether or not import files are imported from a Remote Host. Default is UNCHECKED
Remote Import Directory	The directory in which import files exist on the Remote Host. Default is ; Range is 0 to 255 characters
PNR Generation with Import	If checked, PNRs are generated for subscribers with an active subscription if a relevant subscriber or pool is updated or deleted. Default is UNCHECKED

Appendix B. My Oracle Support

My Oracle Support (*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 My Oracle Support 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 sequence 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 Service Request (SR), Select **1**
    - For Non-technical issues such as registration or assistance with My Oracle Support, Select **2**

You are connected to a live agent who can assist you with My Oracle Support registration and opening a support ticket.

My Oracle Support is available 24 hours a day, 7 days a week, 365 days a year.

Appendix C. Locate Product Documentation on the Oracle Technology Network Site

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

1. Access the Oracle Help Center site at *http://docs.oracle.com*
2. Click **Industries**.
3. Under the Oracle Communications subheading, click the **Oracle Communications documentation** link.

   The Communications Documentation page displays. Most products covered by these documentation sets are under the headings Network Session Delivery and Control Infrastructure or Platforms.

4. Click your Product and then the Release Number.

   A list of the entire documentation set for the selected product and release displays.

5. To download a file to your location, right-click the **PDF** link, select **Save target as** (or similar command based on your browser), and save to a local folder.