Oracle® Communications

Provisioning

User Data Repository REST Provisioning Interface Specification

Release 10.2

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Oracle Communications UDR REST Provisioning Interface Specification, Release 10.2

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1 INTRODUCTION

1.1 Purpose and Scope

This document presents the REST Provisioning interface to be used by local and remote provisioning client applications to administer the Provisioning Database of the Oracle Communications User Data Repository (UDR) system. Through REST interfaces, an external provisioning system supplied and maintained by the network operator can add, change, or delete subscriber/pool information in the UDR 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 REST interface.

1.2 External 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

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
IMSI	International Mobile Subscriber Identity, or IMSI [im-zee]
IP	Internet Protocol
KPI	Key Performance Indicator
MEAL	Measurements, Events, Alarms, and Logs

Acronym/Term	Definition
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 OAMProvisioning
PCRF	Policy Charging and Rules Function
PS	Provisioning System
REST	Representational State Transfer
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
UTC	Coordinated Universal Time
VIP	Virtual IP
XML	Extensible Markup Language

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, or 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/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 know to perform the service. User identities (MSISDN, IMSI, 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 with future upgradability to support additional types of 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 below illustrates a high level the Oracle Communications User Data Repository Architecture.

Figure 1 shows that 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. This release focuses on the development of the Sh messaging interface for use with the UDR application.

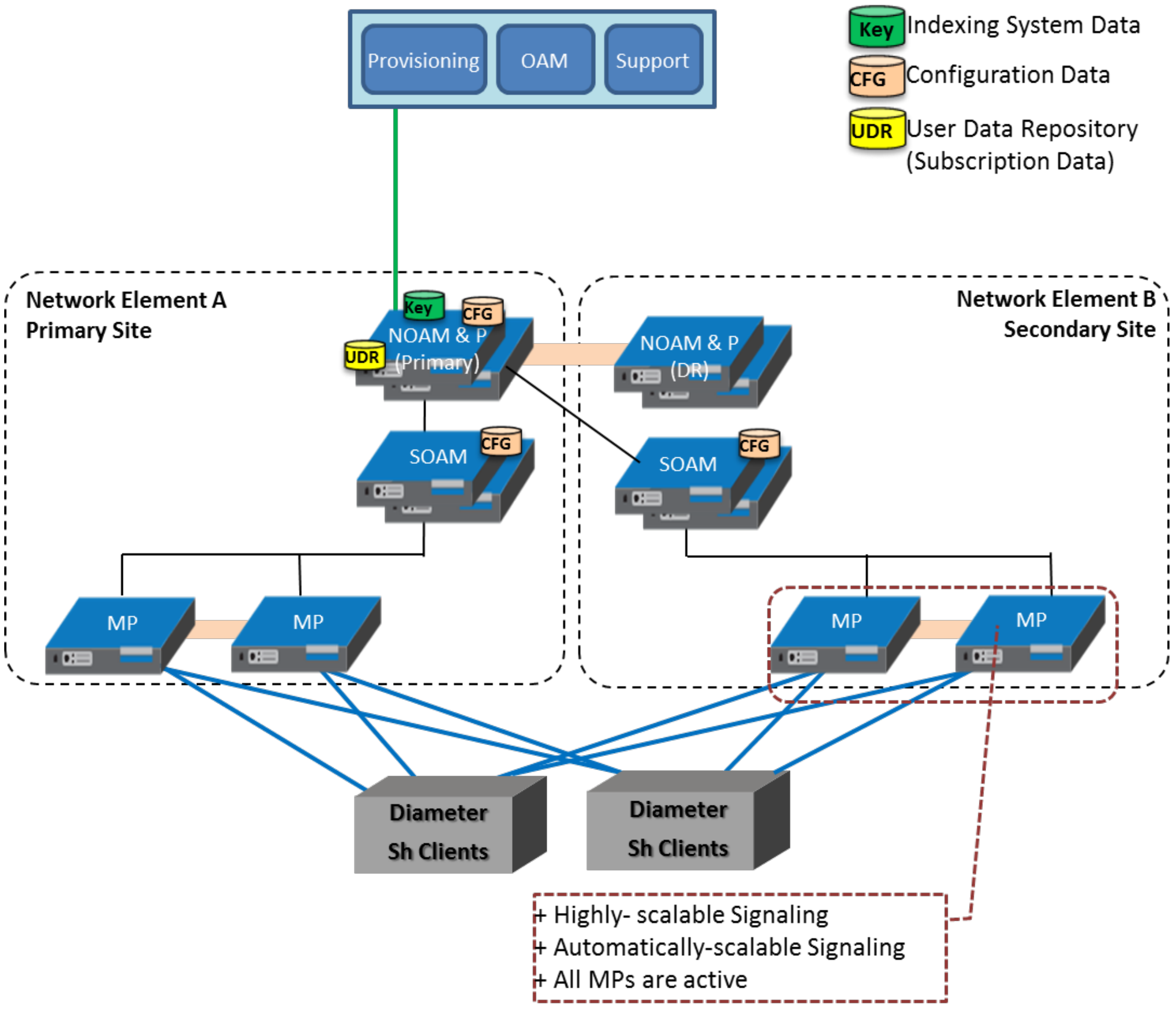
As the product evolves forward, the subscriber profiles in UDR can be expanded to support data associated with additional applications. Along with that, the MPs can be expanded to support additional Diameter interfaces associated with these applications. The IPFE can be integrated with the product to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

The Network level OAMP server (NOAMP) 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


Provisioning
OAM
Support
Key Indexing System Data
CFG Configuration Data
UDR User Data Repository (Subscription Data)
Network Element A Primary Site
Network Element B Secondary Site
NOAM & P (Primary)
NOAM & P (DR)
SOAM
MP
Diameter Sh Clients
+ Highly- scalable Signaling
+ Automatically-scalable Signaling
+ All MPs are active

2.2 Provisioning Interface

The REST provisioning interface provides following data manipulation commands:

Subscriber:

- Subscriber Profile create/retrieve/modify/delete
- Subscriber Profile field add/retrieve/modify/delete
- Subscriber opaque data create/retrieve/modify/delete
- Quota, State, and Dynamic Quota
- Reset of Subscriber Quota opaque data

Pool:

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

- Pool Quota, Pool State and Pool Dynamic Quota
- Pool subscriber membership operations
- Add/remove from pool
- Get pool subscriber membership
- Get pool for subscriber

2.3 REST Application Server (RAS)

The application within the provisioning process interfacing to REST provisioning clients runs on every active NOAMP server. The RAS is responsible for:

- Accepting and authorizing REST provisioning client connections
- Processing and responding to REST requests received from provisioning clients
- Performing provisioning requests directly on the database
- Updating the provisioning command log with requests received and responses sent

2.4 Provisioning Clients

The RAS provides connections to the Customer Provisioning Systems (CPS). These are independent information systems supplied and maintained by the network operator to be used for provisioning the UDR system. Through the RAS, the CPS may add, delete, change or retrieve information about any subscriber or pool.

CPSs use REST to send requests to manipulate and query data in the Provisioning Database. Provisioning Clients establish TCP/IP connections to the RAS running on the active NOAMP using the VIP of the Primary NOAMP.

Provisioning clients must re-establish connections with the RAS using the VIP of the Primary UDR after the switchover from the active Primary to the standby UDR server. Provisioning clients must redirect connections to the VIP of the Secondary after switchover from the Primary UDR site to the Disaster Recover UDR site.

Provisioning clients must run a timeout for the response to a request, if a response is not sent. If a response is not received, a client should drop the connection and re-establish a connection before trying again.

Provisioning clients are expected to re-send requests that resulted in a temporary error, or for which no response was received.

2.5 Security

The following forms of security are provided for securing connections between the REST interface and provisioning clients in an unsecure/untrusted network:

- Client server IP Address white list
- Secure Connections using TLS

2.5.1 Client Server IP Address White List

For securing connections between the REST interface and provisioning clients in an unsecure/untrusted network, a list of authorized IP addresses is provided.

The system configuration process maintains a white list of server IP addresses and/or IP address ranges from which clients are authorized to establish a TCP/IP connection from.

The RAS verifies provisioning connections by utilizing the authorized IP address list. Any connect request coming from an IP address that is not on the list is denied (connection is immediately closed). All active connections established from an IP address which is removed from the Authorized IP list are immediately closed.

2.5.2 Secure Connection using TLS

The RAS supports secure (encrypted) connections between provisioning clients and the RAS using Transport Layer Security version 1.0 (TLSv1.0) protocol implemented using OpenSSL based on SSLeay library developed by Eric A. Young and Tim J. Hudson.

TLS is an industry standard protocol for clients needing to establish secure (TCP-based) TLS-enabled network connections. TLS provides data confidentiality, data integrity, and server and client authentication based on digital certificates that comply with X.509v3 standard and public/private key pairs. These services are used to stop a wide variety of network attacks including: Snooping, Tampering, Spoofing, Hijacking, and Capture-replay.

The following capabilities of TLS address several fundamental concerns about communication over TCP/IP networks:

- TLS server authentication allows a client application to confirm the identity of the server application. The client application through TLS uses standard public-key cryptography to verify that certificate and public key for the server are valid and has been signed by a trusted certificate authority (CA) that is known to the client application.
- TLS client authentication allows a server application to confirm the identity of the client application. The server application through TLS uses standard public-key cryptography to verify that the certificate and public key for the client are valid and has been signed by a trusted certificate authority (CA) that is known to the server application.
- An encrypted TLS connection requires all information being sent between the client and server application to be encrypted. The sending application is responsible for encrypting the data and the receiving application is responsible for decrypting the data. In addition to encrypting the data, TLS provides message integrity. Message integrity provides a means to determine if the data has been tampered with since it was sent by the partner application.

Depending on the operating RAS mode configured (secure or unsecure), provisioning clients can connect using either unsecure or secure connections to the well-known TCP/TLS listening port for the RAS (configured using the `REST Secure Mode` configuration variable using the UDR GUI).

A TLS-enabled connection is slower than an unsecure TCP/IP connection. This is a direct result of providing adequate security. On a TLS-enabled connection, more data is transferred than normal. Data is transmitted in packets, which contain information required by the TLS protocol as well as any padding required by the cipher that is in use. There is also the overhead of encryption and decryption for each read and write performed on the connection.

2.5.2.1 TLS Certificates and Public/Private Key Pairs

TLS-enabled connections require TLS certificates. Certificates rely on asymmetric encryption (or public-key encryption) algorithms that have two encryption keys (a public key and a private key). A certificate owner can show the certificate to another party as proof of identity. A certificate contains the public key for the owner. Any data encrypted with this public key can be decrypted only using the corresponding, matching private key, which is held by the owner of the certificate.

Oracle/Tekelec issues Privacy Enhanced Mail (PEM)-encoded TLS X.509v3 certificates and encryption keys to the REST server and provisioning clients needing to establish a TLS-enabled connection with the REST server. These files can be found on the UDR server under `/usr/TKLC/udr/ssl`. These files are copied to the server running the provisioning client.

Table 2: TLS X.509 Certificate and Key PEM-encoded Files

Certificate and Key PEM-encoded Files	Description
tklcCaCert.pem	Oracle self-signed un-trusted root Certification Authority (CA) X.509v3 certificate.
serverCert.pem	The X.509v3 certificate and 2,048-bit RSA public key for the RAS digitally signed by Oracle Certification Authority (CA) using SHA-1 message digest algorithm.
serverKey.nopass.pem	The corresponding 2,048-bit RSA private key without passphrase for the RAS digitally signed by Oracle Certification Authority (CA) using SHA-1 message digest algorithm.
clientCert.pem	The X.509v3 certificate and 2,048-bit RSA public key for the provisioning client digitally signed by Oracle Certification Authority (CA) using SHA-1 message digest algorithm.
clientKey.nopass.pem	The corresponding 2,048-bit RSA private key without passphrase for the provisioning client digitally signed by Oracle Certification Authority (CA) using SHA-1 message digest algorithm.

Provisioning clients are required to send a TLS authenticating X.509v3 certificate when requested by the RAS during the secure connection handshake protocol for mutual (two-way) authentication. If the provisioning client does not submit a certificate that is issued/signed by Oracle Certification Authority (CA), it cannot establish a secure connection with the RAS.

2.5.2.2 Supported TLS Cipher Suites

A cipher suite is a set/combination of lower-level algorithms that a TLS-enabled connection uses to do authentication, key exchange, and stream encryption. The following table lists the set of TLS cipher suites from the relevant specification and their OpenSSL equivalents that are supported by the RAS to secure a TLS-enabled connection with provisioning clients. The cipher suites are listed and selected for use in the order of key strength, from highest to lowest. This ensures that during the handshake protocol of a TLS-enabled connection, cipher suite negotiation selects the most secure suite possible from the list of cipher suites the client wishes to support, and if necessary, back off to the next most secure, and so on down the list.

NOTE: Cipher suites containing anonymous DH ciphers, low bit-size ciphers (those using 64 or 56 bit encryption algorithms but excluding export cipher suites), export-crippled ciphers (including 40 and 56 bits algorithms), or the MD5 hash algorithm are not supported due to their algorithms having known security vulnerabilities.

Table 3: TLS Supported Cipher Suites

Cipher Suite (RFC)	OpenSSL Equivalent	Key Exchange	Signing/ Authentication	Encryption (Bits)	MAC (Hash) Algorithms
TLS_RSA_WITH_AES_256_CBC_SHA	AES256-SHA	RSA	RSA	AES (256)	SHA-1
TLS_RSA_WITH_3DES_EDE_CBC_SHA	DES-CBC3-SHA	RSA	RSA	3DES(168)	SHA-1
TLS_RSA_WITH_AES_128_CBC_SHA	AES128-SHA	RSA	RSA	AES(128)	SHA-1

Cipher Suite (RFC)	OpenSSL Equivalent	Key Exchange	Signing/ Authentication	Encryption (Bits)	MAC (Hash) Algorithms
TLS_KRB5_WITH_RC4_128_SHA	KRB5-RC4-SHA	KRB5	KRB5	RC4(128)	SHA-1
TLS_RSA_WITH_RC4_128_SHA	RC4-SHA	RSA	RSA	RC4(128)	SHA-1
TLS_KRB5_WITH_3DES_EDE_CBC_SHA	KRB5-DES-CBC3-SHA	KRB5	KRB5	3DES(168)	SHA-1

2.6 Multiple Connections

The RAS supports multiple connections and each connection is considered persistent unless declared otherwise. The HTTP persistent connections do not use separate keep-alive messages, they just allow multiple requests to use a same TCP/IP connection. However, connections are closed after being idle for a time limit configured in idle timeout (See section 2.9.3).

If the client does not want to maintain a connection for more than that request, it should send a Connection header including the connection-token close. If either the client or the server sends the close token in the Connection header, that request becomes the last one for the connection.

The provisioning client establishes a TCP/IP connection to RAS before sending the first REST command. After the execution of the request, the RAS sends a response message back and keeps the connection alive as long as a request comes before idle timeout.

In order to achieve the maximum provisioning TPS rate that the UDR REST interface is certified for, multiple simultaneous provisioning connections are required.

- For example, if the certified maximum provisioning TPS rate is 200 TPS, and the Maximum REST Connections (see 6.6.4Appendix A) is set to 100, then up to 100 connections may be required in order to achieve 200 TPS. It is not possible to achieve the maximum provisioning TPS rate on a single connection.

2.7 Request Queue Management

If multiple clients simultaneously issues requests, each request is queued and processed in the order in which it was received on a per connection basis. The client must wait for a response from one request before issuing another.

Incoming requests, whether multiple requests from a single client or requests from multiple clients, are not prioritized. Multiple requests from a single client are handled on a first-in, first-out basis. Requests are processed in the order in which they are received.

All requests from a client sent on a single connection are processed by UDR serially. Multiple requests can be sent without receiving a response, but each request is queued and not processed until the previous request has completed. A client can send multiple requests across multiple connections, and these can run in parallel (but requests on each connection are still processed serially).

2.8 Database Transactions

Each create, update, or delete request coming from REST interface triggers a unique database transaction, such as a database transaction started by a request is committed before sending a response.

2.8.1 ACID-Compliance

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

2.8.1.1 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 within that transaction which 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.

2.8.1.2 Consistency

Data across all requests performed inside a transaction is consistent.

2.8.1.3 Isolation

All database changes made within 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 within a transaction cannot be seen by operations outside of the transaction.

2.8.1.4 Durability

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

The system recovers committed transaction updates in spite of system software or hardware failures. If a failure (such as a 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)

2.9 Connection Management

It is possible to enable/disable/limit the REST provisioning interface in a number of different ways.

2.9.1 Connections Allowed

The configuration variable `Allow REST Provisioning Connections` (see 6.6.4Appendix A) controls whether REST interface connections are allowed to the configured port. If this variable is set to `NOT_ALLOWED`, then all existing connections are immediately dropped. Alarm 13000) is raised. Any attempts to connect are rejected.

When `Allow REST Provisioning Connections` is set back to `ALLOWED`, the alarm is cleared, and connections are accepted again.

2.9.2 Disable Provisioning

When the Oracle Communications User Data Repository GUI option to disable provisioning is selected, existing connections remain up, and new connections are allowed. But, any provisioning request is rejected with a SERVICE_UNAVAILABLE error indicating the service is unavailable.

For an example of a provisioning request/response when provisioning is disabled, see the last example in section 5.1.1.

2.9.3 Idle Timeout

HTTP connection between Provisioning client and RAS is handled persistent fashion. The configuration variable `REST Interface Idle Timeout` (see Appendix A) indicates the time to wait before closing the connection due to inactivity (such as no requests received).

2.9.4 Maximum Simultaneous Connections

The configuration variable `Maximum REST Connections` (see Appendix A) defines the maximum number of simultaneous REST interface client connections.

2.9.5 TCP Port Number

The configuration variable `REST Interface Port` (see Appendix A) defines the REST interface TCP listening port.

2.10 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 MSR4068. Before this happens, memory threshold alarms are raised indicating the impending behavior if the critical level is reached.

The HTTP Status Code returned by the REST interface when the critical level has been reached is 507.

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4068">errorText</error>
```

2.11 Congestion Control

If UDR starts to encounter congestion (based on high CPU usage), then based on the congestion level, UDR rejects some requests (based on the HTTP method, see section 3.1.1).

If the minor CPU usage threshold is crossed (CL1), then UDR rejects GET requests

If the major CPU usage threshold is crossed (CL2), then UDR rejects GET and PUT requests

If the critical CPU usage threshold is crossed (CL3), then UDR rejects all requests

The HTTP Status Code returned by the REST interface when a request is rejected due to congestion is 503.

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4097">errorText</error>
```

REST Interface Description

Oracle Communications User Data Repository provides an Application Programming Interface (API) for programmatic management of subscriber data. This interface supports querying, creation, modification, and deletion of subscriber and pool data.

The API is an XML over HTTP/HTTPS interface that is based on RESTful concepts. This section defines the operations that can be performed using the REST interface.

2.12 Rest Conventions

The REST interface uses the following RESTful concepts:

- HTTP(S) headers
- HTTP(S) status codes
- Error message representation in the response content for all 4xx and 5xx codes.

2.12.1 HTTP(S) Request Headers

The following HTTP(S) requirements must be followed.

2.12.1.1 HTTP version

For non-secure HTTP requests, the client must set the header *Request Version* property to:

```
Request Version : HTTP/1.1
```

For secure HTTPS requests, the client must set the header *Request Version* property to:

```
Request Version : HTTPS TLS v1
```

2.12.1.2 Accept Header

Set the *Accept* header property to the correct MIME version using the following format:

```
Accept: application/camiant-msr-v1+xml      <- version number is 1 or 2.0
```

or

```
Accept: application/camiant-msr-v2.0+xml
```

or

```
Accept :*/*
```

or

```
Accept :application/*
```

The *Accept* header must match the version supported by the client. This is true even for requests that do not expect entity response data so that any error content is accepted.

Operations in Oracle Communications User Data Repository support both versions 1 and 2.0.

The Oracle Communications User Data Repository response to an incorrect MIME version is a Bad Request, for example, with error code *Invalid Accept: application/camiant-msr-v1+xml*.

The `Accept` header is optional, and if omitted the value is treated as if the value "*/*" was supplied.

2.12.1.3 Transfer-Encoding Header

If a client wishes to use chunked transfer encoding, then the *Transfer-Encoding* header must be set to:

```
Transfer-Encoding: chunked
```

2.12.1.4 Requests with body content

Requests, which contain body contents, must set the *Content-Type* header property to:

```
Content-Type: application/camiant-msr-v2.0+xml
```

An XML blob for an entity supplied in body contents must begin with an XML version and encoding element as below:

```
<?xml version="1.0" encoding="UTF-8"?>
```

2.12.2 HTTP(S) Status Codes and Error Messages

The REST interface uses standard HTTP(S) status codes in the response messages. Any operation in the REST interface that results in an HTTP error response in the 4xx or 5xx range has response content that includes an error message entity.

Table 4 provides a list of most common Status Codes that an operation may return under normal operating conditions. A more detailed description of the response status codes are provided in each of the provisioning command descriptions.

Table 4: HTTP(S) Status Codes

Status Code	Description
200—OK	Indicates the successful completion of request processing.
201—Created	Used for new entities.
204—No Content	The request completed successfully and no response content body is sent back to the client.
400—Bad Request	This indicates that there is a problem with how the request is formatted or that the data in the request caused a validation error.
404—Not Found	Indicates that the client tried to operate on a resource that did not exist.
409—Conflict	Indicated that the client tried to operate on a resource where the operation was not appropriate for that resource.
4xx—Other	Status codes in the 4xx range that are also client request issues. For example, the client may be calling an operation that is not implemented/available or that is asking for a mime type that is not supported.
500—Internal Server Error	This error and other errors in the 5xx range indicate server problems.
503—Service Unavailable	Indicates that the client tried to send a provisioning request when provisioning was disabled.
507—Insufficient Storage	Indicates that free system memory is low, and the database cannot store any new data.

Besides the HTTP status codes, following additional error codes are provided for the 4xx and 5xx range of Status Codes. Note that the “Description” column is for reference only, it is not included in the HTTP response. Additional text may be included in the HTTP response in some cases, for some responses.

Table 5: Error Codes

Error Code	Description
MSR4000	Invalid content request data supplied

Error Code	Description
MSR4001	Subscriber/pool not found
MSR4002	Subscriber/pool/data field is not defined
MSR4003	A key is detected to be already in the system for another subscriber/pool
MSR4004	Unique key not found for subscriber/pool
MSR4005	Field does not support multiple values and value for field exists
MSR4049	Data type is not defined
MSR4050	Unknown key, the key provided in the request is invalid
MSR4051	The value provided for the field is invalid
MSR4053	Subscriber/pool exist, but the field value is incorrect
MSR4055	Subscriber is a member of a pool
MSR4056	Field is not updatable
MSR4057	Request only contains one field to update
MSR4058	Data type not found
MSR4059	Data row does not exist
MSR4060	Number of pool members exceeded
MSR4061	Specified pool does not exist
MSR4062	Subscriber is not a member of the pool
MSR4063	Entity cannot be reset
MSR4064	Occurrence constraint violation
MSR4065	Field is not set
MSR4066	Field value exists
MSR4067	Multiple matching rows found
MSR4068	Free system memory is low
MSR4069	At least one key is required
MSR4097	Request rejected due to system congestion
MSR4098	Provisioning is disabled

Error Code	Description
MSR4099	Unexpected server error has occurred
MSR4103	A key is detected to be already in the system for an AE subscriber

This example defines both an error code and additional error text to explain the error.

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4051">Field value not valid: Field: 'nextResetTime' Value:
'100'[MSISDN:9971701913]</error>
```

In the examples, the error text associated with the MSRxxxx is not included beacause the information varies depending on the entity, key, or field values used.

3 REST INTERFACE MESSAGE DEFINITIONS

This section describes the syntax and parameters of XML requests and responses.

3.1 Message Conventions

3.1.1 HTTP Method

The POST, PUT, GET, and DELETE HTTP methods are used on the REST interface.

3.1.2 Base URI

The base URI ({baseURI}) that is the prefix for the documented URIs uses the following syntax:

```
http{s}://{DNS Name or IP address}:<IP Port>/rs
```

The curly brackets denote replacement variables and are not part of the actual operation syntax. Any replacement variable data that contains any special characters must be encoded. The value in the curly brackets can be determined by how Oracle Communications User Data Repository is installed in the network.

For example, if UDR is installed with the DNS name *udr.oracle.com* on a system with IP address *1.2.3.4*, with a port number of *8787*, the base URI could be either:

```
http://udr.oracle.com:8787/rs
```

Or

```
https://1.2.3.4:8787/rs
```

3.1.3 REST URL

The REST interface uses the following XML conventions in the REST command URL.

3.1.3.1 Subscriber or Pool in URL

Keyword *sub* indicates subscriber operations and *pool* indicates pool operations

For example, for a subscriber:

```
DELETE {baseURI}/msr/sub/IMSI/302370123456789/field/inputVolume
```

And for a pool:

```
DELETE {baseURI}/msr/pool/100000/field/Custom12
```

3.1.3.2 Opaque Data Operations in URL

For opaque data operations the keyword *data* is used. The data type indicated in the URL can be any valid opaque or transparent data type.

Opaque data operations can be performed on entities defined as opaque or transparent. An opaque data operation works on the XML blob creating, getting, or deleting it the blob.

For example when deleting the Quota data for a subscriber:

```
DELETE {baseURI}/msr/sub/IMSI/302370123456789/data/quota
```

3.1.3.3 Field in URL

For field operations on the subscriber profile, the keyword *field* is used. A Field in the URL can be any field, including key fields.

For example, to delete the outputVolume field for a subscriber:

```
DELETE {baseURI}/msr/sub/IMSI/302370123456789/field/outputVolume
```

3.1.3.4 Transparent Data Row Operations in URL

For transparent data row based operations the keyword *data* is also used. The data type indicated in the URL can be any valid transparent data type which is row based. The data row name is also supplied.

For example when deleting a row in Quota data for a subscriber:

```
DELETE {baseURI}/msr/sub/IMSI/302370123456789/data/quota/10GBMonth
```

3.1.3.5 Transparent Data Row Field Operations in URL

For transparent data row field based operations the keyword *data* is also used. The data type indicated in the URL can be any valid transparent data type which is row based. The data row name and field name are also supplied.

For example when deleting a row field in Quota data for a subscriber:

```
DELETE {baseURI}/msr/sub/IMSI/302370123456789/data/quota/10GBMonth/totalVolume
```

3.1.4 URL Character Encoding

It is allowed to encode restricted characters in the URL using the % (percent) character, such as %3B for a ; (semicolon), but it is not permitted to use double encoding such as %253B in order to first quote the % (percent) character.

3.2 Case Sensitivity

The URL constructs that REST requests are made up of (such as, `msr`, `sub`, `pool`, `field`, `data`, or `multipleFields`) 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:

```
POST {baseURI}/msr/sub/MSISDN/33123654862/field/Entitlement/DayPass
```

But the following is not:

```
POST {baseURI}/msr/Sub/MSISDN/33123654862/field/Entitlement/DayPass
```

Key names, and entity field names are not case-sensitive, for example *keyName*, *fieldName* and *setFieldName*.

Entity field values, key values, and row identifiers are case-sensitive, for example *fieldValue*, *setFieldValue*, *keyValue*, and *rowIdValue*.

Entity names as specified in an *opaqueDataName* or *transparentDataType* are not case sensitive.

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 field is returned in a response, it is returned as defined in the SEC. For example, if the above field is created using the name “INPUTVOLUME”, then it is returned in a response as “inputVolume”

- When a *fieldValue* is used to find a field (such as when using the “Delete Field Value” command), the field value is case-sensitive. If a multi-value field contained the values “DayPass,Weekend,Evening” and the Delete Field Value command was used to delete the value “WEEKEND”, then this would fail
- When an attribute in the XML blob contains the row identifier name—aka *rowIdName* (for example for Quota, the element <quota name="AggregateLimit"> contains the attribute called “name”) the row identifier name is not case-sensitive
- When a rowIdValue is used to find a row (such as when using the `Get Row` command), the row identifier value is case-sensitive. If an entity contained a row called DayPass, and the `Get Row` command is used to get the row DAYPASS, the command fails
- When a keyValue is specified in the URL (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

3.3 XML Comments in a Request

A REST request may not contain XML comments within the request or the content body, such as:

```
<!—-comment-->
```

If a request contains a comment, the request is rejected with the following error:

HTTP Status Code

400

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4000">errorText</error>
```

3.4 List of Messages

The following table provides a list of operations/messages for subscriber data. Each row of the table represents a command. Parameters required for each command are in the colored column. Any blank/uncolored column represents unused parameter for corresponding command.

Table 6: Summary of Subscriber Commands

Operation Data	Command (Method)	URL	Main Object	Key Name	Key Value	subObject Type	subObject Name	subObject Value	Field Name	Field Value	Additional Input
Subscriber Profile	Create Profile (POST)	{Base URL}/msr	sub								Request Content
	Get Profile (GET)			{keyName} MSISDN, NAI, IMSI, AccountId	{keyValue}						
	Update Profile (PUT)										Request Content
	Delete Profile (DELETE)										
Subscriber Field	Add Field Value (POST)					field/ multipleFields			{fieldName}	{fieldValue}	
	Get Field (GET)										
	Get Field Value (GET)									{fieldValue}	
	Update Field (PUT)										
	Delete Field (DELETE)										
	Delete Field Value (DELETE)									{fieldValue}	
Subscriber Opaque Data	Set Opaque Data (PUT)					data	{opaqueDataType}				**Request Content**
	Get Opaque Data (GET)										
	Delete Opaque Data (DELETE)										
Subscriber Data Row	Set Row (PUT)							{rowIdValue}			**Request Content**
	Get Row (GET)										

Operation Data	Command (Method)	URL	Main Object	Key Name	Key Value	subObject Type	subObject Name	subObject Value	Field Name	Field Value	Additional Input
	Delete Row (DELETE)										
	Reset Quota (POST)										
Subscriber Data Row Field	Get Row Field (GET)								{fieldName}	{FieldValue}	
	Get Row Field Value (GET)										
	Update Row Field (PUT)										
	Delete Row Field (DELETE)										
	Delete Row Field Value(DELETE)										

The following table provides a list of operations/messages for pool data. Similar to the previous table, each row of the table represents a command. Parameters required for each command are in the colored column. Any blank (uncolored) column represents unused parameter for corresponding command.

Table 7: Summary of Pool Commands

Operation Data	Command (Method)	URL	Main Object	Key Name	Key Value	subObject Type	subObject Name	subObject Value	Field Name	Field Value	Additional Input
Pool Profile	Create Pool (POST)	{Base URL} /msr	pool	PoolID							**Request Content**
	Get Pool (GET)				{key Value}						
	Update Pool (PUT)										**Request Content**
	Delete Pool (DELETE)										
Pool Profile Field	Add Field Value(POST)					field/multipleFields			{fieldName}	{field Value}	
	Get Field (GET)										

Operation Data	Command (Method)	URL	Main Object	Key Name	Key Value	subObject Type	subObject Name	subObject Value	Field Name	Field Value	Additional Input
	Get Field Value (GET)									{field Value}	
	Update Field (PUT)										
	Delete Field (DELETE)										
	Delete Field Value (DELETE)									{field Value}	
Pool Opaque Data	Set Opaque Data (PUT)					data	{opaque DataType}				**Request Content**
	Get Opaque Data (GET)										
	Delete Opaque Data (DELETE)										
Pool Data Row	Set Row (PUT)							{rowId Value}			**Request Content**
	Get Row (GET)										
	Delete Row (DELETE)										
Pool Data Row Field	Get Row Field (GET)								{field Name}	{Field Value}	
	Get Row Field Value (GET)										
	Update Row Field (PUT)										
	Delete Row Field (DELETE)										
	Delete Row Field Value(DELETE)										

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 (via a provisioning interface) by the OSS system and referenced (via the Sh interface) by the PCRF.

- Quota

  Information that represents the use of managed resources (quota, pass, top-up, and roll-over) by the subscriber. Although the UDR provisioning interfaces allow quota data to be manipulated, this data is typically 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, roll-over). 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, although the intention is to extend this to multiple pools in the future.

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, 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 managed resources used by the pool (quota, pass, top-up, and roll-over)

- Pool State

  Pool-specific properties

- Pool Dynamic Quota

  Dynamically configured information related to managed resources (pass, top-up, and roll-over)

- 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 information on the following:

- 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, 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, NAI or AccountId. The pool SDO can be accessed via PoolID.

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

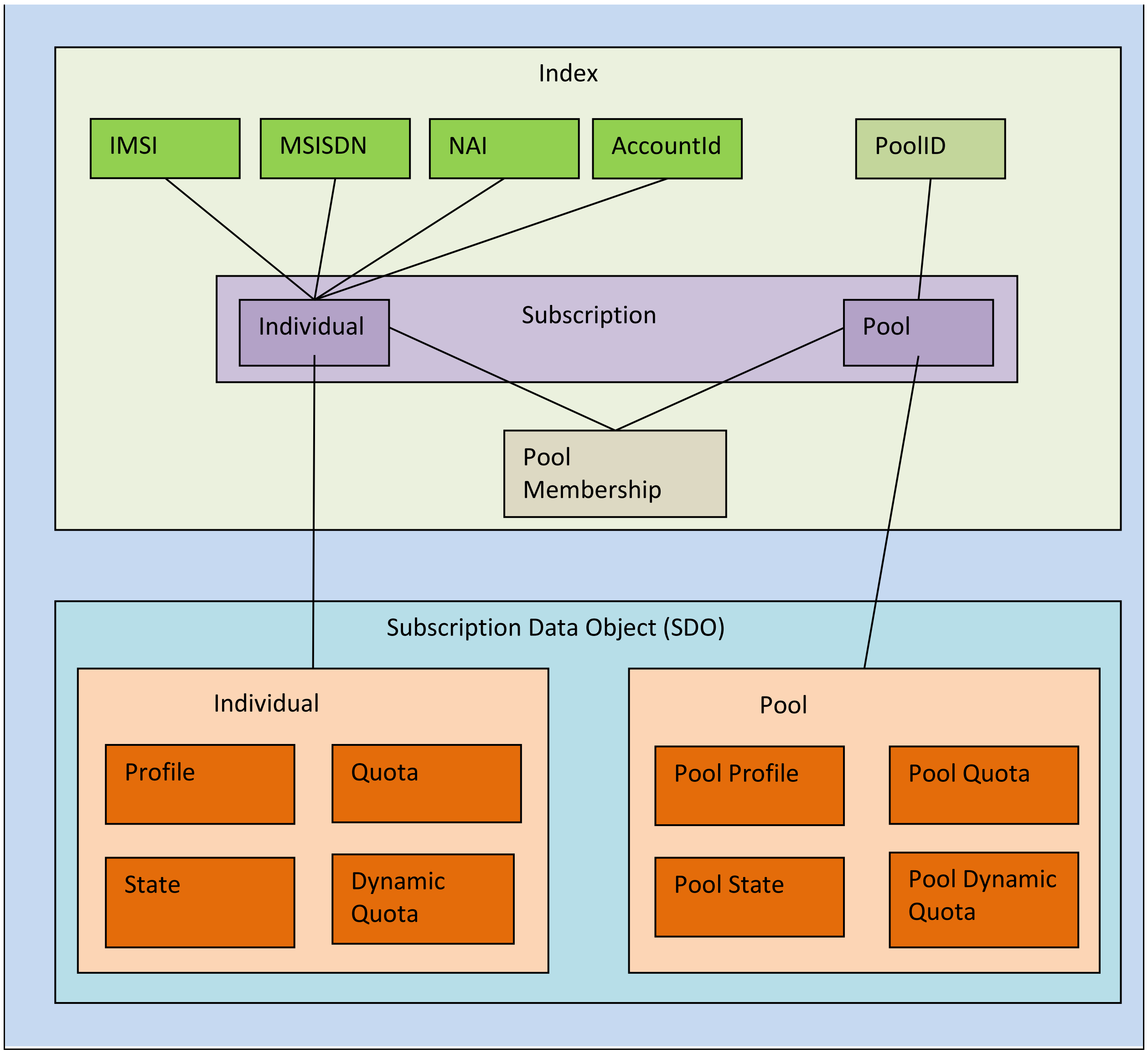
A field within an entity can have a default value. If an entity is created, and the field is not specified, it is created with the default value.

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

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

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 2: 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, NAI, and 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.

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

Table 8: Subscriber Profile Entity Definition

Name (XML tag)	Type	Description
subscriber	—	Sequence (multiplicity = 1)
MSISDN	String	List of MSISDNs (8 to 15 numeric digits). A separate entry is included for each MSISDN associated with the profile for the subscriber.
IMSI	String	List of IMSIs (10 to 15 numeric digits). A separate entry is included for each IMSI associated with the profile for the subscriber.
NAI	String	List of NAIs (in format “user@domain”). A separate entry is included for each NAI associated with the profile for the subscriber.
AccountId	String	Any string that can be used to identify the account for the subscriber (1 to 255 characters).
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 profile for the subscriber.
Tier	String	Tier for the subscriber.
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.

Name (XML tag)	Type	Description
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.

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 no value is supplied for the field. In this case, the field is created with the value indicated
- When a Quota instance is reset using the “Reset Quota” 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 gets created with the value indicated

Table 9: Quota Entity Definition

Name (XML tag)	Type	Default Value	Description	Quota Versions
usage	—	—	Sequence (multiplicity = 1)	1/2/3
version	String	—	Version of the schema.	1/2/3
quota	—	—	Sequence (multiplicity = N)	1/2/3
name	String	---	Quota name (identifier).	1/2/3
cid	String	---	Internal identifier used to identity a quota within a subscriber profile.	1/2/3
time	String	Empty string “”	This element tracks the time-based resource consumption for a Quota.	1/2/3

Name (XML tag)	Type	Default Value	Description	Quota Versions
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 policy for the subscriber. 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 State entity supports the following sequence of attributes:

Table 10: State Entity Definition

Name (XML tag)	Type	Description
state	—	Sequence (multiplicity is 1)

Name (XML tag)	Type	Description
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 associated with passes, top-ups, and roll-overs. 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 DynamicQuota entity supports the following sequence of attributes:

Table 11: 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 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.

Name (XML tag)	Type	Description
		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 should revalidate 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 12: 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 of 1).
BillingDay	Uint8	The day of the month (1 to 31) when the associated quota pool is reset. 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 profile for the pool.
Tier	String	Tier for the pool.
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.

4.2.2 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 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 policy for the pool. 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 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 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:

1. `CCYY-MM-DDThh:mm:ss`	(local time)
2. `CCYY-MM-DDThh:mm:ssZ`	(UTC time)
3. `CCYY-MM-DDThh:mm:ss+`*hh:mm*	(positive offset from UTC)
4. `CCYY-MM-DDThh:mm:ss-`*hh:mm*	(negative offset from UTC)

Where:

- CC = century
- YY = year
- MM = month
- DD = day
- T = Date/Time separator
- hh = hour
- mm = minutes
- ss = seconds
- Z = UTC (Coordinated Universal Time)
- +|- = 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)

5 SUBSCRIBER PROVISIONING

5.1 Subscriber Profile Commands

Table 13: Summary of Subscriber Profile Commands

Command	Description	Keys	Command Syntax
Create Profile	Create a subscriber or subscriber profile	MSISDN, NAI, IMSI, AccountId	`POST {baseURI}/msr/sub`
Get Profile	Get subscriber profile data		`GET {baseURI}/msr/sub/`*`keyName`*`/`*`keyValue`*
Update Profile	Replace an existing subscriber profile		`PUT {baseURI}/msr/sub/`*`keyName`*`/`*`keyValue`*
Delete Profile	Delete all subscriber profile data and all opaque data associated with the subscriber		`DELETE {baseURI}/msr/sub/`*`keyName`*`/`*`keyValue`*

5.1.1 Create Subscriber

Description

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

Unlike other subscriber commands, *keyName* and *keyValue* are not specified in the URL. Request content includes at least one key value (and up to 4 different key types), and field-value pairs, all as specified in the Subscriber Entity Configuration.

Multi-value fields can be specified by a single *fieldNameX* value with a delimited list of values, or multiple *fieldNameX* fields each containing a single value.

Prerequisites

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

Request URL

```
POST {baseURI}/msr/sub
```

Request Content

A `<subscriber>` element that contains a `<field>` element for every field-value pair defined for the new subscriber.

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <field name="keyName1">keyValue1</field>
[
  <field name="keyName2">keyValue2</field>
  :
  <field name="keyNameN">keyValueN</field>
]
[
  <field name="fieldName1">fieldValue1</field>
  <field name="fieldName2">fieldValue2</field>
  :
  <field name="fieldNameN">fieldValueN</field>
]
```

```
</subscriber>
```

- keyNameX: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId
- keyValueX: Corresponding key field value assigned to keyNameX
- fieldNameX: A user defined field within the Subscriber Profile
- fieldValueX: Corresponding field value assigned to fieldNameX

One key is mandatory. Any combination of key types are allowed. More than one occurrence of each key type (such as, IMSI MSISDN NAI or AccountId) is supported, up to an engineering configured limit

Key/field order in the request is not important

Response Content

None.

Table 14: Create Subscriber Response Status/Error Codes

HTTP Status Code	Error Code	Description
201	—	Successfully created
400	MSR4000	Invalid content request data supplied
400	MSR4003	A key is detected to be already in the system for another subscriber
400	MSR4004	The field list does not contain at least one unique key
400	MSR4051	Invalid value for a field
400	MSR4064	Occurrence constraint violation
400	MSR4103	A key is detected to be already in the system for an AE subscriber
404	MSR4002	Subscriber field is not defined

Examples

Request 1

A subscriber is created, with *AccountId*, *MSISDN* and *IMSI* keys. The *BillingDay*, *Tier*, *Entitlement*, and *Custom15* fields are set.

Request URL

```
POST {baseURI}/msr/sub
```

Request Content

```
<?xml version="1.0" encoding="UTF-8"?>
<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,DayPassPlus</field>
  <field name="Custom15">allocate</field>
</subscriber>
```

Response 1

The request is successful, and the subscriber was created.

HTTP Status Code

201

Response Content

None.

Request 2

A subscriber is created, with MSISDN and IMSI keys. The *BillingDay* and *Location* fields are set. *Location* is not a valid field name for a subscriber.

Request URL

```
POST {baseURI}/msr/sub
```

Request Content

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <field name="MSISDN">5141234567</field>
  <field name="IMSI">184126781623863</field>
  <field name="BillingDay">2</field>
  <field name="Location">Montreal</field>
</subscriber>
```

Response 2

The request fails. The error code indicates the field name is not valid.

HTTP Status Code

404

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4002">errorText</error>
```

Request 3

A subscriber is created, with *MSISDN* and *IMSI* keys. The *BillingDay* and *Entitlement* fields are set. A subscriber exists with the given IMSI.

Request URL

```
POST {baseURI}/msr/sub
```

Request Content

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <field name="MSISDN">5141112223334</field>
  <field name="IMSI">184126781612121</field>
  <field name="BillingDay">2</field>
  <field name="Entitlement">DayPass</field>
  <field name="Entitlement">DayPassPlus</field>
</subscriber>
```

Response 3

The request fails. The error code indicates the key exists.

HTTP Status Code

400

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4003">errorText</error>
```

Request 4

A subscriber is created. The *BillingDay* and *Entitlement* fields are set. No key values are supplied.

Request URL

```
POST {baseURI}/msr/sub
```

Request Content

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <field name="BillingDay">2</field>
  <field name="Entitlement">DayPass</field>
</subscriber>
```

Response 4

The request fails because no key values were supplied.

HTTP Status Code

400

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4004">errorText</error>
```

Request 5

A subscriber is created, with *MSISDN* and *IMSI* keys. The *BillingDay* and *Custom15* fields are set.

NOTE: Provisioning has been disabled.

Request URL

```
POST {baseURI}/msr/sub
```

Request Content

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <field name="MSISDN">33123654862</field>
  <field name="IMSI">184569547984229</field>
  <field name="BillingDay">1</field>
  <field name="Custom15">allocate</field>
</subscriber>
```

Response 5

The request fails, because provisioning has been disabled.

HTTP Status Code

```
503
```

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4098">errorText</error>
```

Request 6

A subscriber is created, with *MSISDN* and *IMSI* keys. The *BillingDay* and *Entitlement* fields are set. An AE subscriber exists with the given IMSI and “enableAEKeyAlreadyExistsErrCode” option is set to TRUE.

Request URL

```
POST {baseURI}/msr/sub
```

Request Content

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <field name="MSISDN">5141112223334</field>
  <field name="IMSI">184126781612121</field>
  <field name="BillingDay">2</field>
  <field name="Entitlement">DayPass</field>
  <field name="Entitlement">DayPassPlus</field>
</subscriber>
```

Response 6

The request fails. The error code indicates the key exists for an AE subscriber.

HTTP Status Code

400

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4103">errorText</error>
```

Request 7

A subscriber is created, with *MSISDN* and *IMSI* keys. The *BillingDay* and *Entitlement* fields are set. An AE subscriber exists with the given IMSI and “enableAEKeyAlreadyExistsErrCode” option is set to FALSE.

Request URL

```
POST {baseURI}/msr/sub
```

Request Content

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <field name="MSISDN">5141112223334</field>
  <field name="IMSI">184126781612121</field>
  <field name="BillingDay">2</field>
  <field name="Entitlement">DayPass</field>
  <field name="Entitlement">DayPassPlus</field>
</subscriber>
```

Response 7

The request fails. The error code indicates the key exists.

HTTP Status Code

400

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4003">errorText</error>
```

5.1.2 Get Profile

Description

This operation retrieves all field-value pairs created for a subscriber that is identified by the *keyName* and *keyValue*.

A *keyName* and *keyValue* are required in the request in order to identify the subscriber. The response content includes only valid field-value pairs which have been previously provisioned or created by default.

Prerequisites

A subscriber with a key of the *keyName*/*keyValue* supplied must exist.

Request URL

```
GET {baseURI}/msr/sub/keyName/keyValue
```

- keyName: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId
- keyValue: Corresponding key field value assigned to keyName

Request Content

None.

Response Content

A `<subscriber>` element that contains a `<field>` element for every field-value pair defined for the subscriber.

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <field name="keyName1">keyValue1</field>
[
  <field name="keyName2">keyValue2</field>
  :
  <field name="keyNameN">keyValueN</field>
]
[
  <field name="fieldName1">fieldValue1</field>
  <field name="fieldName2">fieldValue2</field>
  :
  <field name="fieldNameN">fieldValueN</field>
]
</subscriber>
```

- keyNameX: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId

- keyValueX: Corresponding key field value assigned to keyNameX
- fieldNameX: A user defined field within the Subscriber Profile
- fieldValueX: Corresponding field value assigned to fieldNameX

Key/field order in the response is not important

Table 15: Get Profile Response Status/Error Codes

HTTP Status Code	Error Code	Description
200	—	Successfully located the subscriber
400	MSR4051	Invalid value for a field
404	MSR4001	Could not find the subscriber by key

Examples

Request 1

The subscriber with the given AccountId is retrieved. The subscriber exists.

Request URL

```
GET {baseURI}/msr/sub/AccountId/10404723525
```

Request Content

None

Response 1

The request is successful, and the subscriber was retrieved.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<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>
</subscriber>
```

Request 2

The subscriber with the given IMSI is retrieved. The subscriber does notexist.

Request URL

```
GET {baseURI}/msr/sub/IMSI/184126781623863
```

Request Content

None

Response 2

The request fails. The error code indicates the subscriber does not exist.

HTTP Status Code

404

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4001">errorText</error>
```

5.1.3 Update Profile

Description

This operation replaces an existing subscriber profile, for the subscriber identified by *keyName* and *keyValue*.

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

The key value specified by *keyName* and *keyValue* must be present in the request content.

Multi-value fields can be specified by a single *fieldNameX* value with a delimited list of values, or multiple *fieldNameX* fields each containing a single value.

Prerequisites

A subscriber with a key of the *keyName*/*keyValue* supplied must exist.

Request URL

```
PUT {baseURI}/msr/sub/keyName/keyValue
```

- keyName: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId
- keyValue: Corresponding key field value assigned to keyName

Request Content

A `<subscriber>` element that contains a `<field>` element for every field-value pair defined for the existing subscriber.

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <field name="keyName1">keyValue1</field>
[
  <field name="keyName2">keyValue2</field>
  :
  <field name="keyNameN">keyValueN</field>
]
[
  <field name="fieldName1">fieldValue1</field>
  <field name="fieldName2">fieldValue2</field>
  :
  <field name="fieldNameN">fieldValueN</field>
]
</subscriber>
```

- keyNameX: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId
- keyValueX: Corresponding key field value assigned to keyNameX
- fieldNameX: A user defined field within the Subscriber Profile
- fieldValueX: Corresponding field value assigned to fieldNameX

One key is mandatory. Any combination of key types are allowed. More than one occurrence of each key type (such as IMSI MSISDN NAI or AccountId) is supported, up to an engineering configured limit

Key/field order in the request is not important

Response Content

None.

Table 16: Update Profile Response Status/Error Codes

HTTP Status Code	Error Code	Description
204	—	The subscriber data was replaced successfully
400	MSR4000	Invalid content request data supplied
400	MSR4003	A key is detected to be already in the system for another subscriber
400	MSR4004	The field list does not contain at least one unique key
400	MSR4051	Invalid value for a field
400	MSR4064	Occurrence constraint violation
404	MSR4001	Could not find the subscriber by key
404	MSR4002	Subscriber field is not defined

Examples

Request 1

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

Request URL

```
PUT {baseURI}/msr/sub/MSISDN/33123654862
```

Request Content

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <field name="AccountId">10404723525</field>
  <field name="IMSI">184569547984229</field>
  <field name="MSISDN">33123654862</field>
  <field name="BillingDay">12</field>
  <field name="Tier"></field>
  <field name="Entitlement">DayPass,DayPassPlus</field>
```

```
</subscriber>
```

Response 1

The request is successful, and the subscriber was updated.

HTTP Status Code

204

Response Content

None.

5.1.4 Delete Profile

Description

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

Prerequisites

A subscriber with a key of the *keyName*/*keyValue* supplied must exist.

The subscriber must not be a member of a pool, or the request fails.

Request URL

`DELETE {baseURI}/msr/sub/`*`keyName`*`/`*`keyValue`*

- keyName: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId
- keyValue: Corresponding key field value assigned to keyName

Request Content

None.

Response Content

None.

Table 17: Delete Profile Response Status/Error Codes

HTTP Status Code	Error Code	Description
204	—	The subscriber was successfully deleted
404	MSR4001	Could not find the subscriber by key
409	MSR4055	Cannot delete, subscriber belongs to a pool

Examples

Request 1

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

Request URL

```
DELETE {baseURI}/msr/sub/MSISDN/33123654862
```

Request Content

None

Response 1

The request is successful.

HTTP Status Code

204

Response Content

None.

Request 2

The subscriber with the given NAI is deleted. The subscriber exists. The subscriber is a member of a pool.

Request URL

```
DELETE {baseURI}/msr/sub/NAI/mum@foo.com
```

Request Content

None

Response 2

The request fails, because the subscriber is a member of a pool.

HTTP Status Code

409

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4055">errorText</error>
```

5.2 Subscriber Profile Field Commands

Table 18: Summary of Subscriber Profile Field Commands

Command	Description	Keys	Command Syntax
Add Field Value	Adds a value to the specified field. This operation does not affect any pre-existing values for the field	MSISDN, IMSI, NAI or AccountId	`POST {baseURI}/msr/sub/keyName/keyValue/field/fieldName/fieldValue`
Get Field	Retrieve the values for the specified field		`GET {baseURI}/msr/sub/keyName/keyValue/field/fieldname`
Get Field Value	Retrieve the single value for the specified field (if set as specified)		`GET {baseURI}/msr/sub/keyName/keyValue/field/fieldName/fieldValue`
Update Field Value	Updates field to the specified value		`PUT {baseURI}/msr/sub/keyName/keyValue/field/fieldName/fieldValue`

Command	Description	Keys	Command Syntax
Update Multiple Fields	Update multiple fields to the specified values		`PUT {baseURI}/msr/sub/keyName/keyValue/multipleFields/fieldName1/fieldValue1/fieldName2/fieldValue2/…`
Delete Field	Delete all the values for the specified field		`DELETE {baseURI}/msr/sub/keyName/keyValue/field/fieldname`
Delete Field Value	Delete a value for the specified field		`DELETE {baseURI}/msr/sub/keyName/keyValue/field/fieldName/fieldValue`

5.2.1 Add Field Value

Description

This operation adds one or more values to the specified multi-value field for the subscriber identified by the *keyName* and *keyValue*.

This operation can only be performed for the fields defined as multi-value field in the Subscriber Entity Configuration. Any pre-existing values for the field are not affected.

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 would have the value “a;b;c;d”.

If a value being added exists, the request fails.

If the value is being added to a filed that does not exist, it is created.

The *fieldValue* is case-sensitive. An attempt to add the value “a” to current field value of “a;b;c” would fail, but an attempt to add the value “A” would be successful and result in the field value being “a;b;c;A”

Prerequisites

A subscriber with the key of the *keyName*/*keyValue* supplied must exist.

The field *fieldName* must be a valid field in the Subscriber Profile, and must be a multi-value field.

The value *fieldValue* being added must notalready be present in the field.

Request URL

```
POST {baseURI}/msr/sub/keyName/keyValue/field/fieldName/fieldValue
```

- keyName: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId
- keyValue: Corresponding key field value assigned to keyName
- fieldName: A user defined field within the Subscriber Profile
- fieldValue: Corresponding field value assigned to fieldName

  NOTE: For multi-value fields, the value contains a semicolon separated list of values on a single line. For example, “a;b;c”

  NOTE: The semicolon between the field values may need to be encoded as %3B for certain clients

Request Content

None.

Response Content

None.

Table 19: Add Field Value Response Status/Error Codes

HTTP Status Code	Error Code	Description
200	—	Successfully added field values
400	MSR4005	Field does not support multiple values
400	MSR4051	Invalid value for a field
400	MSR4056	Field is not updatable
400	MSR4064	Occurrence constraint violation
400	MSR4066	Field value exists
404	MSR4001	Subscriber is not found
404	MSR4002	Subscriber field is not defined

Examples

Request 1

A request is made to add the value *DayPass* to the *Entitlement* field. The *Entitlement* field is a valid multi-value field. The *DayPass* value is not already present in the *Entitlement* field.

Request URL

```
POST {baseURI}/msr/sub/MSISDN/33123654862/field/Entitlement/DayPass
```

Request Content

None

Response 1

The request is successful, and the value was added to the *Entitlement* field.

HTTP Status Code

200

Response Content

None.

Request 2

A request is made to add the values *DayPass* and *HighSpeedData* to the *Entitlement* field. The *Entitlement* field is a valid multi-value field. The *DayPass* and *HighSpeedData* values are not already present in the *Entitlement* field.

Request URL

```
POST {baseURI}/msr/sub/NAI/dad@op.com/field/Entitlement/DayPass;HighSpeedData
```

Request Content

None

Response 2

The request is successful, and the values were added to the *Entitlement* field.

HTTP Status Code

200

Response Content

None.

Request 3

A request is made to add the value *Gold* to the *Tier* field. The *Tier* field is not a valid multi-value field.

Request URL

```
POST {baseURI}/msr/sub/NAI/dad@op.com/field/Tier/Gold
```

Request Content

None

Response 3

The request fails because the *Tier* field is not a multi-value field.

HTTP Status Code

400

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4005">errorText</error>
```

Request 4

A request is made to update to add two additional *MSISDN* values. Currently, the subscriber only has the MSISDN 15141234567.

Request URL

```
POST {baseURI}/msr/sub/MSISDN/5141234567/field/MSISDN/
 14161112222; 14505556666
```

Request Content

None

Response 4

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

HTTP Status Code

200

Response Content

None.

5.2.2 Get Field

Description

This operation retrieves the values for the specified fields for the subscriber identified by the specified *keyName* and *keyValue*.

Prerequisites

A subscriber with the key of the *keyName*/*keyValue* supplied must exist.

The requested field *fieldName* must be a valid field in the Subscriber Profile.

Request URL

```
GET {baseURI}/msr/sub/keyName/keyValue/field/fieldName
```

- keyName: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId
- keyValue: Corresponding key field value assigned to keyName
- fieldName: A user defined field within the Subscriber Profile

Request Content

None.

Response Content

A `<subscriber>` element that contains a `<field>` element for every field-value pair for the requested field defined for the subscriber.

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <field name="fieldName">fieldValue1</field>
[
  <field name="fieldName">fieldValue2</field>
  :
  <field name="fieldName">fieldValueN</field>
]
</subscriber>
```

- fieldName: The requested user defined field within the Subscriber Profile
- fieldValueX: Corresponding field value assigned to fieldName

For multi-value fields, more than one `<field>` element may be returned. One element per value.

Table 20: Get Field Response Status/Error Codes

HTTP Status Code	Error Code	Description
200	—	Requested field exists for subscriber
404	MSR4001	Subscriber is not found
404	MSR4002	Subscriber field is not defined
404	MSR4065	Field is not set

Examples

Request 1

A request is made to get the *AccountId* field for a subscriber.

Request URL

```
GET {baseURI}/msr/sub/MSISDN/33123654862/field/AccountId
```

Request Content

None

Response 1

The request is successful, and the requested value is returned.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <field name="AccountId">10404723525</field>
</subscriber>
```

Request 2

A request is made to get the *Entitlement* field for a subscriber. The *Entitlement* field is a multi-value field.

Request URL

```
GET {baseURI}/msr/sub/MSISDN/33123654862/field/Entitlement
```

Request Content

None

Response 2

The request is successful, and the requested value is returned. Two values are set for the multi-value field.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <field name="Entitlement">DayPass</field>
  <field name="Entitlement">HighSpeedData</field>
</subscriber>
```

Request 3

A request is made to get the *Custom11* field for a subscriber. The field is valid, but is not set for the subscriber.

Request URL

```
GET {baseURI}/msr/sub/MSISDN/33123654862/field/Custom11
```

Request Content

None

Response 3

The request is successful, and an empty value is returned.

HTTP Status Code

404

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4065">errorText</error>
```

5.2.3 Get Field Value

Description

This operation retrieves the values for the specified field for the subscriber identified by the *keyName* and *keyValue* in the request.

For a request where the presence of multiple values for a multi-value field is requested, a match is only considered to have been made if the requested values form a subset of the values stored in the profile. That is, if all of the values requested exist in the profile, return success, regardless of how many other values may exist in the profile. If any or all of the values are not present as part of the profile, an error is returned.

Depending on the field entered, there may be multiple field-value pairs returned by this operation

The *fieldValue* is case-sensitive. An attempt to get the value “a” from a current field value of “a;b;c” would be successful, but an attempt to get the value “A” would fail

Prerequisites

A subscriber with the key of the *keyName*/*keyValue* supplied must exist.

The requested field *fieldName* must be a valid field in the Subscriber Profile.

The requested field must contain the values supplied in the *fieldValue*.

Request URL

```
GET {baseURI}/msr/sub/keyName/keyValue/field/fieldName/fieldValue
```

- keyName: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId
- keyValue: Corresponding key field value assigned to keyName
- fieldName: A user defined field within the Subscriber Profile
- fieldValue: Corresponding field value assigned to fieldName

  NOTE: For multi-value fields, the value contains a semicolon separated list of values on a single line. For example, “a;b;c”

  NOTE: The semicolon between the field values may need to be encoded as %3B for certain clients

Request Content

None.

Response Content

A `<subscriber>` element that contains a `<field>` element for every field-value pair requested that matches the value supplied for the existing subscriber.

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <field name="fieldName1">fieldValue1</field>
[
  <field name="fieldName2">fieldValue2</field>
  :
  <field name="fieldNameN">fieldValueN</field>
]
</subscriber>
```

- fieldNameX: The requested user defined field within the Subscriber Profile
- fieldValueX: Corresponding field value assigned to fieldNameX

For multi-value fields, more than one `<field>` element may be returned. One element per value.

Table 21: Get Field Value Response Status/Error Codes

HTTP Status Code	Error Code	Description
200	-	Requested field exists for subscriber with given value
400	MSR4053	Subscriber and field exist, but values do not match
404	MSR4001	Subscriber does not exist
404	MSR4002	Subscriber field is not defined

Examples

Request 1

A request is made to get the *AccountId* field with the value 10404723525. The field exists and has the specified value.

Request URL

```
GET {baseURI}/msr/sub/MSISDN/33123654862/field/AccountId/10404723525
```

Request Content

None

Response 1

The request is successful, and the requested value is returned.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <field name="AccountId">10404723525</field>
</subscriber>
```

Request 2

A request is made to get the *Entitlement* field with the values *DayPass* and *HighSpeedData*. The *Entitlement* field is a multi-value field. The field exists and has the specified values.

Request URL

```
GET {baseURI}/msr/sub/MSISDN/33123654862/field/Entitlement/DayPass;HighSpeedData
```

Request Content

None

Response 2

The request is successful, and the requested values are returned. Two values are set for the multi-value field.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <field name="Entitlement">DayPass</field>
  <field name="Entitlement">HighSpeedData</field>
</subscriber>
```

5.2.4 Update Field

Description

This operation updates a field to the specified value for the subscriber identified by the specified *keyName* and *keyValue*.

This operation replaces the values of the field, which means that any existing values for the field are deleted first. For multi-value fields, all previous values are erased and the new set of values is inserted. Adding values to a current set is accomplished using Add Field Value.

Prerequisites

A subscriber with the key of the *keyName*/*keyValue* supplied must exist.

The field *fieldName* must all be a valid field in the Subscriber Profile.

Request URL

```
PUT {baseURI}/msr/sub/keyName/keyValue/field/fieldName/fieldValue
```

- keyName: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId

- keyValue: Corresponding key field value assigned to keyName
- fieldName: A user defined field within the Subscriber Profile

  NOTE: A field name cannot be for a key value—such as IMSI, MSISDN, NAI, or AccountId

- fieldValue: Corresponding field value assigned to fieldName

  NOTE: For multi-value fields, the value contains a semicolon separated list of values on a single line. For example, “a;b;c”

NOTE: The semicolon between the field values may need to be encoded as %3B for certain clients

Request Content

None.

Response Content

None.

Table 22: Update Field Response Status/Error Codes

HTTP Status Code	Error Code	Description
201	—	Fields were successfully updated
400	MSR4051	The value provided for the field is invalid
400	MSR4056	Field is not updatable
404	MSR4001	Subscriber does not exist
404	MSR4002	Subscriber field is not defined

Examples

Request 1

A request is made to update the value of the *Tier* field to *Silver*.

Request URL

```
PUT {baseURI}/msr/sub/MSISDN/33123654862/field/Tier/Silver
```

Request Content

None

Response 1

The request is successful, and the *Tier* field was updated.

HTTP Status Code

201

Response Content

None.

Request 2

A request is made to update the *Entitlement* field with the values *DayPass* and *HighSpeedData*. The *Entitlement* field is a multi-value field.

Request URL

```
PUT {baseURI}/msr/sub/MSISDN/33123654862/field/Entitlement/DayPass;HighSpeedData
```

Request Content

None

Response 2

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

HTTP Status Code

201

Response Content

None.

Request 3

A request is made to update the value of the subscribers *MSISDN* to *15145551234*.

Request URL

```
PUT {baseURI}/msr/sub/MSISDN/33123654862/field/MSISDN/15145551234
```

Request Content

None

Response 3

The request is successful, and the *MSISDN* field was updated.

HTTP Status Code

201

Response Content

None.

Request 4

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

Request URL

```
PUT {baseURI}/msr/sub/IMSI/302370123456789/field/IMSI/302370111111111
```

Request Content

None

Response 4

The request is successful, and the *IMSI* field was updated. The subscriber has a single IMSI of *302370111111111*.

HTTP Status Code

201

Response Content

None.

Request 5

A request is made to update the value of the subscribers *NAI* to two values of *mum@foo.com* and *cust514@op.com* .

Request URL

```
PUT {baseURI}/msr/sub/MSISDN/15141234567/field/NAI/mum@foo.com;cust514@op.com
```

Request Content

None

Response 5

The request is successful, and the *NAI* field was updated. The subscriber has two NAIs.

HTTP Status Code

201

Response Content

None.

5.2.5 Update Multiple Fields

Description

This operation updates 2 or 3 fields to the specified values for the subscriber identified by the specified *keyName* and *keyValue*.

This operation replaces ("sets") the value of the field, which means that any existing values for the field are deleted first. For multi-value fields, all previous values are erased and the new set of values is inserted. Adding values to a current set is accomplished using Add Field Value.

This command allows the update of multiple fields in a single command for subscriber data.

ALL fields that can be modified in the "single field" request can also be modified in the "multiple fields" request. Two or three fields can be updated at once. Updating only a single field results in an error.

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

Prerequisites

A subscriber with the key of the *keyName*/*keyValue* supplied must exist.

The fields *fieldNameX* must all be valid fields in the Subscriber Profile.

Request URL

```
PUT {baseURI}/msr/sub/keyName/keyValue/multipleFields/fieldName1/fieldValue1/
fieldName2/fieldValue2/[fieldName3/fieldValue3]
```

- keyName: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId

- keyValue: Corresponding key field value assigned to keyName
- fieldNameX: A user defined field within the Subscriber Profile

  NOTE: A field name cannot be for a key value—such as IMSI, MSISDN, NAI, or AccountId

- fieldValueX: Corresponding field value assigned to fieldNameX

  NOTE: For multi-value fields, the value contains a semicolon separated list of values on a single line. For example, “a;b;c”

NOTE: The semicolon between the field values may need to be encoded as %3B for certain clients

Request Content

None.

Response Content

None.

Table 23: Update Multiple Fields Response Status/Error Codes

HTTP Status Code	Error Code	Description
201	—	Fields were successfully updated
400	MSR4051	The value provided for the field is invalid
400	MSR4056	Field is not updatable
400	MSR4057	Request only contains one field to update
404	MSR4001	Subscriber does not exist
404	MSR4002	Subscriber field is not defined

Examples

Request 1

A request is made to update the *Entitlement* field to *YearPass*, the *Tier* field to *Silver*, and the *BillingDay* field to *11*.

Request URL

```
PUT {baseURI}/msr/sub/MSISDN/33123654862/multipleFields/Entitlement/YearPass/Tier/Silver/
BillingDay/11
```

Request Content

None

Response 1

The request is successful, and the *Entitlement*, *Tier*, and *BillingDay* fields were all updated.

HTTP Status Code

201

Response Content

None.

Request 2

A request is made to update the *MSISDN* field to *15145551234*, the *Tier* field to *Silver*, and the *NAI* field to *mum@foo.com*.

Request URL

```
PUT {baseURI}/msr/sub/MSISDN/33123654862/multipleFields/MSISDN/15145551234/Tier/Silver/
NAI/mum@foo.com
```

Request Content

None

Response 2

The request is successful, and the *MSISDN*, *Tier*, and *NAI* fields were all updated.

HTTP Status Code

201

Response Content

None.

5.2.6 Delete Field

Description

This operation deletes the specified field for the subscriber identified by *keyName* and *keyValue* in the request.

If the field is a multi-value field then all values are deleted. Deletion of a field results in the removal of the field from the subscriber profile. The field is not present, not just the value is empty.

The field being deleted does notneed to have a current value. It can be empty (deleted), and the request succeeds.

If the field being deleted is mandatory, and is defined as having a default value, then the field is not removed, but has the default value assigned.

If a key (such as IMSI, MSISDN, NAI, or AccountId) field is deleted for a subscriber, then afterwards, the subscriber must still have at least one key type/value remaining or the request fails.

Prerequisites

A subscriber with the key of the *keyName*/*keyValue* supplied must exist.

The requested field *fieldName* must be a valid field in the Subscriber Profile.

Request URL

```
DELETE {baseURI}/msr/sub/keyName/keyValue/field/fieldName
```

- keyName: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId
- keyValue: Corresponding key field value assigned to keyName
- fieldName: A user defined field within the Subscriber Profile

Request Content

None.

Response Content

None.

Table 24: Delete Field Response Status/Error Codes

HTTP Status Code	Error Code	Description
204	—	Field was successfully deleted
400	MSR4056	Field is not updatable
400	MSR4064	Occurrence constraint violation
400	MSR4069	At least one key is required
404	MSR4001	Subscriber does not exist
404	MSR4002	Subscriber field is not defined

Examples

Request 1

A request is made to delete the *Tier* field. The field is a valid Subscriber Profile field.

Request URL

```
DELETE {baseURI}/msr/sub/MSISDN/33123654862/field/Tier
```

Request Content

None

Response 1

The request is successful, and the field was deleted.

HTTP Status Code

204

Response Content

None.

Request 2

A request is made to delete the *IMSI* key field. The subscriber has MSISDN and IMSI key fields.

Request URL

```
DELETE {baseURI}/msr/sub/MSISDN/15141234567/field/IMSI
```

Request Content

None

Response 2

The request is successful, and the *IMSI* key field was deleted.

HTTP Status Code

204

Response Content

None.

Request 3

A request is made to delete the *MSISDN* key field. The subscriber only has a single MSISDN key field.

Request URL

```
DELETE {baseURI}/msr/sub/MSISDN/15145551234/field/MSISDN
```

Request Content

None

Response 3

The request fails, because the single *MSISDN* key field is the only existing key.

HTTP Status Code

400

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4069">errorText</error>
```

Request 4

A request is made to delete the *MSISDN* field. The subscriber has 2 MSISDN values, 15141234567 and 15145556666. The subscriber also has an IMSI value.

Request URL

```
DELETE {baseURI}/msr/sub/MSISDN/15141234567/field/MSISDN
```

Request Content

None

Response 4

The request is successful, and the *MSISDN* field is deleted. The subscriber does not have any MSISDN values, and just has an IMSI

HTTP Status Code

204

Response Content

None.

5.2.7 Delete Field Value

Description

This operation deletes one or more values from the specified field for the subscriber identified by the *keyName* and *keyValue* in the request.

This operation can only be perforemd for the fields defined as multi-value field in the Subscriber Entity Configuration.

Each individual value is removed from the Subscriber Profile. If a supplied value does not exist, then it is ignored. For example, if a profile contains values "a;b;c" and a request to delete "a;b" is made, this succeeds and the profile is left with "c" as the value. If the profile contains "a;b;c" and a request is made to delete "c;d" the request succeeds and the profile is left with "a;b" as the value.

If all values are removed, the field is removed from the subscriber profile (there is no XML element present).

The *fieldValue* is case-sensitive. An attempt to remove the value "a" from a current field value of "a;b;c" would be successful, but an attempt to remove the value "A" would fail

Prerequisites

A subscriber with the key of the *keyName*/*keyValue* supplied must exist.

The field *fieldName* must be a valid field in the Subscriber Profile, and set to the value supplied to be removed successfully.

Request URL

```
DELETE {baseURI}/msr/sub/keyName/keyValue/field/fieldName/fieldValue
```

- keyName: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId

- keyValue: Corresponding key field value assigned to keyName
- fieldName: A user defined field within the Subscriber Profile

  NOTE: A field name cannot be for a key value—such as IMSI, MSISDN, NAI, or AccountId

- fieldValue: Corresponding field value assigned to fieldName

  NOTE: For multi-value fields, the value contains a semicolon separated list of values on a single line. For example, "a;b;c"

  NOTE: The semicolon between the field values may need to be encoded as %3B for certain clients

Request Content

None.

Response Content

None.

Table 25: Delete Field Value Response Status/Error Codes

HTTP Status Code	Error Code	Description
204	—	Requested fields were successfully deleted
400	MSR4005	Field does not support multiple values
400	MSR4056	Field is not updatable
400	MSR4069	At least one key is required
404	MSR4001	Subscriber does not exist
404	MSR4002	Subscriber field is not defined

Examples

Request 1

A request is made to delete the values *DayPass* and *HighSpeedData* from the *Entitlement* field. The *Entitlement* field is a multi-value field. The field exists and contains the specified values.

Request URL

```
DELETE {baseURI}/msr/sub/MSISDN/33123654862/field/Entitlement/DayPass;HighSpeedData
```

Request Content

None

Response 1

The request is successful, and the values were deleted from the field.

HTTP Status Code

204

Response Content

None.

Request 2

A request is made to delete the *Tier* field which has the value *Gold*. The *Tier* field is not a multi-value field.

Request URL

```
DELETE {baseURI}/msr/sub/MSISDN/33123654862/field/Tier/Gold
```

Request Content

None

Response 2

The request fails, because the *Tier* field is not a multi-value field.

HTTP Status Code

400

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4005">errorText</error>
```

Request 3

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

Request URL

```
DELETE {baseURI}/msr/sub/MSISDN/15141234567/field/MSISDN/14161112222;15141234567
```

Request Content

None

Response 3

The request is successful, and the *MSISDN* values *14161112222* and *15141234567* are deleted. The subscriber has a single MSISDN of 15145556666.

HTTP Status Code

204

Response Content

None.

5.3 Subscriber Opaque Data Commands

The following commands perform opaque data *operations*. They can be used on entities defined as either opaque or transparent. The opaque data *operation* operates on the entity at the XML blob level. The contents of the entity is set, returned, or deleted.

Table 26: Summary of Subscriber Opaque Data Commands

Command	Description	Keys	Command Syntax
Set Opaque Data	Create/update opaque data of the specified type	MSISDN, IMSI, NAI or AccountId	`PUT {baseURI}/msr/sub/`*`keyName`*`/`*`keyValue`*`/ data/`*`opaqueDataType`*
Get Opaque Data	Retrieve opaque data of the specified type		`GET {baseURI}/msr/sub/`*`keyName`*`/`*`keyValue`*`/ data/`*`opaqueDataType`*
Delete Opaque Data	Delete opaque data of the specified type		`DELETE {baseURI}/msr/sub/`*`keyName`*`/`*`keyValue`*`/ data/`*`opaqueDataType`*

5.3.1 Set Opaque Data

Description

This operation updates (or creates if it not exists) the opaque data of the specified type for the subscriber identified by the *keyName* and *keyValue* in the request.

The opaque data is provided in the request content.

The opaque data provided in an XML blob 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 with the key of the *keyName*/*keyValue* supplied must exist.

The *opaqueDataType* must reference a valid Entity in the Interface Entity Map table in the SEC.

Request URL

```
PUT {baseURI}/msr/sub/keyName/keyValue/data/opaqueDataType
```

- keyName: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId

- keyValue: Corresponding key field value assigned to keyName

- opaqueDataType: A user defined type/name for the opaque data

  Value is either quota, state, or dynamicquota

Request Content

A `<subscriber>` element that contains a `<data>` element, which contains the specified opaque data for the identified subscriber.

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <data name="opaqueDataType">
<![CDATA[
cdataFieldValue
]]>
  </data>
</subscriber>
```

- opaqueDataType: A user defined type/name for the opaque data

  Value is either quota, state, or dynamicquota

- cdataFieldValue: Contents of the XML data "blob"

The *opaqueDataType* in the request content is ignored, and is not validated. The *opaqueDataType* in the URL is solely used to identify the opaque data type.

Response Content

None.

Table 27: Set Opaque Data Response Status/Error Codes

HTTP Status Code	Error Code	Description
201	—	Data was successfully created/updated
400	MSR4000	Request content is not valid
400	MSR4051	Invalid value for a field
400	MSR4064	Occurrence constraint violation
404	MSR4002	Field is not defined for this data type
404	MSR4001	Subscriber is not found
404	MSR4049	Data type is not defined

Examples

Request 1

A request is made to create the *quota* opaque data. The subscriber does not have an existing Quota entity.

Request URL

```
PUT {baseURI}/msr/sub/MSISDN/33123654862/data/quota
```

Request Content

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <data name="quota">
<![CDATA[
<?xml version="1.0" encoding="UTF-8"?>
<usage>
  <version>3</version>
  <quota name="AggregateLimit">
    <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>
  </quota>
</usage>
]]>
  </data>
</subscriber>
```

Response 1

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

HTTP Status Code

201

Response Content

None.

Request 2

A request is made to update the *state* opaque data. The subscriber already has an existing State entity.

Request URL

```
PUT {baseURI}/msr/sub/MSISDN/33123654862/data/state
```

Request Content

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <data name="state">
<![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>
  ]]>
    </data>
  </subscriber>
```

Response 2

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

HTTP Status Code

201

Response Content

None.

5.3.2 Get Opaque Data

Description

This operation retrieves the opaque data of the specified *opaqueDataType* for the subscriber identified by the *keyName* and *keyValue* in the request.

The response contains the XML blob for the requested opaque data.

Prerequisites

A subscriber with the key of the *keyName*/*keyValue* supplied must exist.

The *opaqueDataType* must reference a valid Entity in the Interface Entity Map table in the SEC.

The opaque data of the *opaqueDataType* must exist for the subscriber.

Request URL

```
GET {baseURI}/msr/sub/keyName/keyValue/data/opaqueDataType
```

- keyName: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId

- keyValue: Corresponding key field value assigned to keyName
- opaqueDataType: A user defined type/name for the opaque data

  Value is either quota, state, or dynamicquota

Request Content

None.

Response Content

A `<subscriber>` element that contains a `<data>` element, which contains the requested opaque data for the identified subscriber.

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <data name="opaqueDataType">
<![CDATA[
cdataFieldValue
]]>
  </data>
</subscriber>
```

- opaqueDataType: A user defined type/name for the opaque data

  Value is either quota, state, or dynamicquota
- cdataFieldValue: Contents of the XML data “blob”

Table 28: Get Opaque Data Response Status/Error Codes

HTTP Status Code	Error Code	Description
200	—	Requested data exists for subscriber
404	MSR4001	Subscriber is not found
404	MSR4049	Data type is not defined
404	MSR4053	Data type is not set for this subscriber

Examples

Request 1

A request is made to get the *quota* opaque data for a subscriber.

Request URL

```
GET {baseURI}/msr/sub/MSISDN/33123654862/data/quota
```

Request Content

None

Response 1

The request is successful, and the Quota opaque data is returned.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <data name="quota">
<![CDATA[
<?xml version="1.0" encoding="UTF-8"?>
<usage>
  <version>3</version>
  <quota name="AggregateLimit">
    <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>
    </quota>
  </usage>
  ]]>
    </data>
  </subscriber>
```

Request 2

A request is made to get the *state* opaque data for a subscriber.

Request URL

```
GET {baseURI}/msr/sub/MSISDN/33123654862/data/state
```

Request Content

None

Response 2

The request is successful, and the State opaque data is returned.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <data name="state">
<![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>
]]>
  </data>
</subscriber>
```

5.3.3 Delete Opaque Data

Description

This operation deletes the opaque data of the specified *opaqueDataType* for the subscriber identified by the *keyName* and *keyValue* in the request.

Only one opaque data type can be deleted per request.

If the opaque data of the *opaqueDataType* does not exist for the subscriber, this is not considered an error and a successful result is returned.

Prerequisites

A subscriber with the key of the *keyName*/*keyValue* supplied must exist.

The *opaqueDataType* must reference a valid Entity in the Interface Entity Map table in the SEC.

Request URL

```
DELETE {baseURI}/msr/sub/keyName/keyValue/data/opaqueDataType
```

- keyName: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId

- keyValue: Corresponding key field value assigned to keyName
- opaqueDataType: A user defined type/name for the opaque data

  Value is either quota, state, or dynamicquota

Request Content

None.

Response Content

None.

Table 29: Delete Opaque Data Response Status/Error Codes

HTTP Status Code	Error Code	Description
204	—	Data was successfully deleted
404	MSR4001	Subscriber is not found
404	MSR4049	Data type is not defined

Examples

Request 1

A request is made to delete the *quota* opaque data.

Request URL

```
DELETE {baseURI}/msr/sub/MSISDN/33123654862/data/quota
```

Request Content

None

Response 1

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

HTTP Status Code

204

Response Content

None.

Request 2

A request is made to delete the *state* opaque data.

Request URL

```
DELETE {baseURI}/msr/sub/MSISDN/33123654862/data/state
```

Request Content

None

Response 2

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

HTTP Status Code

204

Response Content

None.

Request 3

A request is made to delete the *state* opaque data. The subscriber does not have any State opaque data.

Request URL

```
DELETE {baseURI}/msr/sub/MSISDN/33123654862/data/state
```

Request Content

None

Response 3

The request is successful, although no State opaque data was deleted.

HTTP Status Code

204

Response Content

None.

5.4 Subscriber Data Row Commands

A transparent data entity may contain data that is organized in “rows”. An example of a row is a specific quota within the Quota entity.

The row commands allow operations (create/retrieve/update/delete) at the row level. The required row is identified in the request by the *RowIdValue*.

Subscriber data row commands may only be performed on entities defined as transparent in the SEC. Attempting to perform a command on an entity defined as opaque results in an HTTP Status Code `400`, with an `MSR4099` error being returned.

Table 30: Summary of Subscriber Data Row Commands

Command	Description	Keys	Command Syntax
Set Row	Create/update data row in data of the specified type.	(MSISDN, IMSI, NAI or AccountId) and Row Identifier	`PUT {baseURI}/msr/sub/keyName/keyValue/ data/transparentDataType/rowIdValue`
Get Row	Retrieve data row from data of the specified type.		`GET {baseURI}/msr/sub/keyName/keyValue/ data/transparentDataType/rowIdValue`
Delete Row	Delete data row within data of the specified type		`DELETE {baseURI}/msr/sub/keyName/keyValue/ data/transparentDataType/rowIdValue`

5.4.1 Set Row

Description

This operation creates or updates an existing data row for the subscriber identified by the *keyName* and *keyValue*.

The data row identifier field value is specified in *rowIdValue*. All fieldNameX *fields* specified are set within the row.

If more than one existing row matches the requested *rowIdValue*, then the update request fails.

If the specified row does not exist, it is created. If the row does exist, it is updated/replaced.

The *rowIdValue* is case-sensitive. If a row already existed called “DayPass”, then an attempt to update an existing row called “DAYPASS” would be successful, and two rows called “DayPass” and “DAYPASS” would be present

If the transparent entity specified in *entityName* does not exist for the subscriber, it is created.

Prerequisites

A subscriber with the key of the *keyName*/*keyValue* supplied must exist.

The *transparentDataType* must reference a valid transparent Entity in the Interface Entity Map table in the SEC.

Request URL

```
PUT {baseURI}/msr/sub/keyName/keyValue/data/transparentDataType/rowIdValue
```

- keyName: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId

- keyValue: Corresponding key field value assigned to keyName
- transparentDataType: A user defined type/name for the transparent data

  Value is quota for the Quota transparent data

- rowIdValue: The row name value that identifies the row within the data blob

Request Content

```
<?xml version="1.0" encoding="UTF-8"?>
rowValue
```

- rowValue: Contents of the XML data “blob”, with the row data

  NOTE: the rowValue is in the same format as the Quota entity, just containing a single row, the row being added

The data contained within the *rowValue* contains the same *rowIdValue* as specified in the URL. The *rowIdValue* in the URL is ignored, and is not validated. The *rowIdValue* in the request content is solely used to identify the row.

Response Content

None.

Table 31: Set Row Response Status/Error Codes

HTTP Status Code	Error Code	Description
201	—	Data row was successfully created/updated
400	MSR4000	Request content is not valid
400	MSR4051	Invalid value for a field
400	MSR4056	Field is not updatable
400	MSR4064	Occurrence constraint violation
400	MSR4067	Multiple matching rows found
404	MSR4001	Subscriber is not found
404	MSR4002	Field is not defined for this data type
404	MSR4049	Data type is not defined

Examples

Request 1

A request is made to create a data row in the *quota* transparent data for a subscriber. The data row identifier field value is *AggregateLimit*. The subscriber does not have an existing Quota row called *AggregateLimit*.

Request URL

```
PUT {baseURI}/msr/sub/MSISDN/33123654862/data/quota/AggregateLimit
```

Request Content

```
<?xml version="1.0" encoding="UTF-8"?>
<usage>
  <version>3</version>
  <quota name="AggregateLimit">
    <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>
  </quota>
</usage>
```

Response 1

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

HTTP Status Code

201

Response Content

None.

Request 2

A request is made to update a data row in the *quota* transparent data for a subscriber. The data row identifier field Value is q*1*. The subscriber has an existing Quota row called *Q1*.

Request URL

```
PUT {baseURI}/msr/sub/MSISDN/33123654862/data/quota/Q1
```

Request Content

```
<?xml 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>
  </quota>
</usage>
```

Response 2

The request is successful, and the data row *Q1* was updated.

HTTP Status Code

201

Response Content

None.

Request 3

A request is made to update a data row in the *quota* transparent data for a subscriber. The data row identifier field value is *Weekday*. Two instances of the *Weekday* data row exist.

Request URL

Request URL

```
PUT {baseURI}/msr/sub/MSISDN/33123654862/data/quota/Weekday
```

Request Content

```
<?xml version="1.0" encoding="UTF-8"?>
<usage>
```

```
  <version>3</version>
  <quota name="Weekday">
    <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>
  </quota>
</usage>
```

Response 3

The request fails, as more than one row called *Weekday* exists.

HTTP Status Code

400

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4067">errorText</error>
```

Request 4

A request is made to update a data row in the *quota* transparent data for a subscriber. The data row identifier field value is *Weekday*. The subscriber does not have Quota transparent data.

Request URL

Request URL

```
PUT {baseURI}/msr/sub/MSISDN/33123654862/data/quota/Weekday
```

Request Content

```
<?xml version="1.0" encoding="UTF-8"?>
<usage>
  <version>3</version>
  <quota name="Weekday">
    <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>
  </quota>
</usage>
```

Response 4

The request is successful, and the data row as well as the Quota entity is created.

HTTP Status Code

201

Response Content

None.

5.4.2 Get Row

Description

This operation retrieves a transparent data row for the subscriber identified by the *keyName* and *keyValue*. The data row identifier is specified in *rowIdValue*.

All data rows that match the requested *rowIdValue* are returned.

The transparent data row identifier field value is specified in *rowIdValue*.

The *rowIdValue* is case-sensitive. If a row existed called “DayPass”, then an attempt to get a row called “DayPass” would be successful, but an attempt to get a row called “DAYPASS” would fail

Prerequisites

A subscriber with the key of the *keyName*/*keyValue* supplied must exist.

The *transparentDataType* must reference a valid Entity in the Interface Entity Map table in the SEC.

A data row with the given identifier within the transparent data should exist for the subscriber.

Request URL

GET {baseURI}/msr/sub/*keyName*/*keyValue*/data/*transparentDataType*/*rowIdValue*

- keyName: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId
- keyValue: Corresponding key field value assigned to keyName
- transparentDataType: A user defined type/name for the transparent data

  Value is quota for the Quota transparent data
- rowIdValue: The row name value that identifies the row within the transparent data blob

Request Content

None.

Response Content

A `<subscriber>` element that contains a `<data>` element, which contains the specified transparent data row (if it exists) for the identified subscriber.

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <data name="transparentDataType">
<![CDATA[
cdataRowValue
]]>
  </data>
</subscriber>
```

- transparentDataType: A user defined type/name for the transparent data

  Value is quota for the Quota transparent data
- cdataRowValue: Contents of the XML data “blob”, with the row data

Table 32: Get Row Response Status/Error Codes

HTTP Status Code	Error Code	Description
200	-	Requested data row exists for subscriber
404	MSR4001	Subscriber is not found
404	MSR4049	Data type is not defined
404	MSR4058	Data type not found
404	MSR4059	Data row does not exist

Examples

Request 1

A request is made to get the *Q1* data row from the *quota* transparent data for a subscriber. The subscriber has the Quota entity, and the *Q1* data row exists.

Request URL

```
GET {baseURI}/msr/sub/MSISDN/33123654862/data/quota/Q1
```

Request Content

None

Response 1

The request is successful, and the Quota transparent data row requested is returned.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <data name="quota">
<![CDATA[
<?xml version="1.0" encoding="UTF-8"?>
<usage>
  <version>3</version>
  <quota name="Q1">
    <cid>9223372036854775807</cid>
    <time>1</time>
    <totalVolume>0</totalVolume>
    <inputVolume>0</inputVolume>
    <outputVolume>0</outputVolume>
    <serviceSpecific>12</serviceSpecific>
    <nextResetTime>2010-05-12T16:00:00-05:00</nextResetTime>
  </quota>
</usage>
]]>
  </data>
</subscriber>
```

Request 2

A request is made to get the *Weekend* data row from the *quota* transparent data for a subscriber. The subscriber has the Quota entity, but and the *Weekend* data row does notexist.

Request URL

```
GET {baseURI}/msr/sub/MSISDN/33123654862/data/quota/Weekend
```

Request Content

None

Response 2

The request fails, as the data row does not exist.

HTTP Status Code

404

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4059">errorText</error>
```

Request 3

A request is made to get the *Weekday* data row from the *quota* transparent data for a subscriber. The subscriber has the Quota entity. Two instances of the *Weekday* data row exist.

Request URL

```
GET {baseURI}/msr/sub/MSISDN/33123654862/data/quota/Weekday
```

Request Content

None

Response 3

The request is successful, and the Quota transparent data rows requested are returned.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <data name="quota">
<![CDATA[
<?xml version="1.0" encoding="UTF-8"?>
<usage>
  <version>3</version>
  <quota name="Weekend">
    <cid>9223372036854775807</cid>
    <time>1</time>
    <totalVolume>0</totalVolume>
    <inputVolume>0</inputVolume>
    <outputVolume>0</outputVolume>
    <serviceSpecific>12</serviceSpecific>
    <nextResetTime>2010-05-12T16:00:00-05:00</nextResetTime>
  </quota>
  <quota name="Weekend">
    <cid>7682364872564782343</cid>
    <time>32</time>
    <totalVolume>250</totalVolume>
    <inputVolume>4570</inputVolume>
    <outputVolume>11230</outputVolume>
    <serviceSpecific>29</serviceSpecific>
    <nextResetTime>2010-06-01T16:00:00-05:00</nextResetTime>
  </quota>
</usage>
]]>
  </data>
</subscriber>
```

5.4.3 Delete Row

Description

This operation deletes a transparent data row for the subscriber identified by the *keyName* and *keyValue*.

The transparent data row identifier field value is specified in *rowIdValue*.

If more than one row matches the requested *rowIdValue*, then all matching rows are deleted.

The *rowIdValue* is case-sensitive. If a row existed called “DayPass”, then an attempt to delete a row called “DayPass” would be successful, but an attempt to delete a row called “DAYPASS” would fail

The deletion of a non-existent data row is not considered an error.

Prerequisites

A subscriber with the key of the *keyName*/*keyValue* supplied must exist.

The *transparentDataType* must reference a valid Entity in the Interface Entity Map table in the SEC.

Request URL

`DELETE {baseURI}/msr/sub/`*`keyName`*`/`*`keyValue`*`/data/`*`transparentDataType`*`/`*`rowIdValue`*

- keyName: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId

- keyValue: Corresponding key field value assigned to keyName
- transparentDataType: A user defined type/name for the transparent data

  Value is quota for the Quota transparent data

- rowIdValue: The row name value that identifies the row within the transparent data blob

Request Content

None.

Response Content

None.

Table 33: Delete Row Response Status/Error Codes

HTTP Status Code	Error Code	Description
204	—	Data row was successfully deleted
400	MSR4064	Occurrence constraint violation
404	MSR4001	Subscriber is not found
404	MSR4049	Data type is not defined
404	MSR4058	Data type not found

Examples

Request 1

A request is made to delete the *Q1* data row in the *quota* transparent data. The *Q1* data row exists in the Quota data.

Request URL

```
DELETE {baseURI}/msr/sub/MSISDN/33123654862/data/quota/Q1
```

Request Content

None

Response 1

The request is successful, and the data row in the Quota transparent data was deleted.

HTTP Status Code

204

Response Content

None.

Request 2

A request is made to delete the *Weekend* data row in the *quota* transparent data. The *Weekend* data row does notexist in the Quota transparent data.

Request URL

```
DELETE {baseURI}/msr/sub/MSISDN/33123654862/data/quota/Weekend
```

Request Content

None

Response 2

The request is successful, even though the *Weekend* Quota row does not exist.

HTTP Status Code

204

Response Content

None.

Request 3

A request is made to delete the *Bonus* data row in the *quota* transparent data The Quota opaque data is a valid entity, but the requested subscriber does not contain any Quota opaque data.

Request URL

```
DELETE {baseURI}/msr/sub/MSISDN/33123654862/data/quota/Bonus
```

Request Content

None

Response 3

The request fails, because the specified subscriber does not contain Quota data.

HTTP Status Code

404

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4058">errorText</error>
```

5.5 Subscriber Data Row Field Commands

A transparent data entity may contain data that is organized in "rows". An example of a row is a specific quota within the Quota entity.

The row/field commands allow operations (retrieve/update/delete) at the row/field level. The required row is identified in the request by the *rowIdValue*, and the field is identified by the *fieldName*.

Subscriber data row field commands may only be performed on entities defined as transparent in the SEC. Attempting to perform a command on an entity defined as opaque results in an HTTP Status Code `400`, with an `MSR4099` error being returned.

Table 34: Summary of Subscriber Data Row Field Commands

Command	Description	Keys	Command Syntax
Get Row Field	Retrieve values for the specified field	(MSISDN, IMSI, NAI or AccountId) and Row Identifier and Field name	`GET {baseURI}/msr/sub/keyName/keyValue/data/transparentDataType/rowIdValue/fieldName`
Get Row Field Value	Retrieve a single value for the specified field		`GET {baseURI}/msr/sub/keyName/keyValue/data/transparentDataType/rowIdValue/fieldName/fieldValue`
Update Field	Update field to the specified value		`PUT {baseURI}/msr/sub/keyName/keyValue/data/transparentDataType/rowIdValue/fieldName/fieldValue`
Delete Field	Delete all values for the specified field		`DELETE {baseURI}/msr/sub/keyName/keyValue/data/transparentDataType/rowIdValue/fieldName`

5.5.1 Get Row Field

Description

This operation retrieves a field within a transparent data row for the subscriber identified by the *keyName* and *keyValue*.

All data rows that match the requested *rowIdValue* are returned.

If more than one row matches the requested *rowIdValue*, then all matching rows are returned.

The transparent data row identifier field value is specified in *rowIdValue*. The field name is specified in *fieldName*.

The *rowIdValue* is case-sensitive. If a row existed called “DayPass”, then an attempt to get a field in a row called “DayPass” would be successful, but an attempt to get a field in a row called “DAYPASS” would fail

Prerequisites

A subscriber with the key of the *keyName*/*keyValue* supplied must exist.

The *transparentDataType* must reference a valid Entity in the Interface Entity Map table in the SEC.

A data row with the given identifier within the transparent data should exist for the subscriber.

The field name specified must be a valid field for the Entity as defined in the SEC.

Request URL

```
GET {baseURI}/msr/sub/keyName/keyValue/data/transparentDataType/
rowIdValue/fieldName
```

- keyName: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId
- keyValue: Corresponding key field value assigned to keyName
- transparentDataType: A user defined type/name for the transparent data

  Value is quota for the Quota transparent data
- rowIdValue: The row name value that identifies the row within the transparent data blob
- fieldName: A user defined field within the transparent data row

Request Content

None.

Response Content

A `<subscriber>` element that contains a `<data>` element, which contains the specified transparent data row field (if it exists) for the identified subscriber.

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <data name="transparentDataType">
<![CDATA[
cdataRowFieldValue
]]>
  </data>
</subscriber>
```

- transparentDataType: A user defined type/name for the transparent data

Value is quota for the Quota transparent data

- cdataRowFieldValue: Contents of the XML data “blob”, with the field from the row data

Table 35: Get Row Field Response Status/Error Codes

HTTP Status Code	Error Code	Description
200	—	Requested data row field exists for subscriber
404	MSR4001	Subscriber is not found
404	MSR4002	Field is not defined for this data type
404	MSR4049	Data type is not defined
404	MSR4058	Data type not found
404	MSR4059	Data row does not exist
404	MSR4065	Field is not set

Examples

Request 1

A request is made to get the *inputVolume* field in the *Q1* data row of the *quota* transparent data for a subscriber.

Request URL

```
GET {BaseURI}/msr/sub/MSISDN/33123654862/data/quota/Q1/inputVolume
```

Request Content

None

Response 1

The request is successful, and the requested field value is returned

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
<data name="quota">
<![CDATA[<?xml version="1.0" encoding="UTF-8"?>
<usage>
  <version>3</version>
  <quota name="Q1">
    <inputVolume>980</inputVolume>
  </quota>
</usage>
]]>
</data>
```

```
</subscriber>
```

Request 2

A request is made to get the *outputVolume* field in the *Weekday* data row of the *quota* transparent data for a subscriber. Two instances of the *Weekday* data row exist.

Request URL

```
GET {BaseURI}/msr/sub/MSISDN/33123654862/data/quota/Weekday/outputVolume
```

Request Content

None

Response 2

The request is successful, and the field from two matching *Weekday* rows are returned.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
<data name="quota">
<![CDATA[<?xml version="1.0" encoding="UTF-8"?>
<usage>
  <version>3</version>
  <quota name="Weekday">
    <inputVolume>980</outputVolume>
  </quota>
  <quota name="Weekday">
    <inputVolume>2140</outputVolume>
  </quota>
</usage>
]]>
</data>
</subscriber>
```

5.5.2 Get Row Field Value

Description

This operation retrieves a field with a given value, within a transparent data row for the subscriber identified by the *keyName* and *keyValue*.

If more than one row matches the requested *rowIdValue*, then all matching rows are returned.

The transparent data row identifier field value is specified in *rowIdValue*. The field name is specified in *fieldName*. The field value is specified in *fieldValue*.

The *rowIdValue* is case-sensitive. If a row existed called “DayPass”, then an attempt to get a field value in a row called “DayPass” would be successful, but an attempt to get a field value in a row called “DAYPASS” would fail

The *fieldValue* is case-sensitive. An attempt to get the value “Data” from a current field value of “Data” would be successful, but an attempt to get the value “DATA” would fail

Prerequisites

A subscriber with the key of the *keyName*/*keyValue* supplied must exist.

The *transparentDataType* must reference a valid Entity in the Interface Entity Map table in the SEC.

A data row with the given identifier within the transparent data should exist for the subscriber.

The field name specified must be a valid field for the Entity as defined in the SEC.

The field value in *fieldValue* must match the specified value in the request.

Request URL

```
GET {baseURI}/msr/sub/keyName/keyValue/data/transparentDataType/rowIdValue/
fieldName/fieldValue
```

- keyName: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId
- keyValue: Corresponding key field value assigned to keyName
- transparentDataType: A user defined type/name for the transparent data

  Value is quota for the Quota transparent data
- rowIdValue: The row name value that identifies the row within the transparent data blob
- fieldName: A user defined field within the transparent data row
- fieldValue: Corresponding field value assigned to fieldName

Request Content

None.

Response Content

A `<subscriber>` element that contains a `<data>` element, which contains the specified transparent data row field (if it exists) for the identified subscriber.

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <data name="transparentDataType">
<![CDATA[
cdataRowFieldValue
]]>
  </data>
</subscriber>
```

- transparentDataType: A user defined type/name for the transparent data

  Value is quota for the Quota transparent data
- cdataRowFieldValue: Contents of the XML data "blob", with the field from the row data

The response content is only present if the requested field is present in the transparent data row, and the field is set to the supplied value.

Table 36: Get Row Field Value Response Status/Error Codes

HTTP Status Code	Error Code	Description
200	—	Requested data row field/value exists for subscriber

HTTP Status Code	Error Code	Description
400	MSR4053	Data row field value does not match
404	MSR4001	Subscriber is not found
404	MSR4002	Field is not defined for this data type
404	MSR4049	Data type is not defined
404	MSR4058	Data type not found
404	MSR4059	Data row does not exist

Examples

Request 1

A request is made to get the *inputVolume* field with the value of *980* in the *Q1* data row of the *quota* transparent data for a subscriber. The *inputVolume* field exists, and is set to the value *980*.

Request URL

```
GET {BaseURI}/msr/sub/MSISDN/33123654862/data/quota/Q1/inputVolume/980
```

Request Content

None

Response 1

The request is successful, and the requested field with the specified value is returned

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
<data name="quota">
<![CDATA[<?xml version="1.0" encoding="UTF-8"?>
<usage>
  <version>3</version>
  <quota name="Q1">
    <inputVolume>980</inputVolume>
  </quota>
</usage>
]]>
</data>
</subscriber>
```

Request 2

A request is made to get the *outputVolume* field with the value of *2000* in the *Q4* data row of the *quota* transparent data for a subscriber. The *outputVolume* field exists, but is set to the value 1500.

Request URL

```
GET {BaseURI}/msr/sub/MSISDN/33123654862/data/quota/Q1/outputVolume/2000
```

Request Content

None

Response 2

The request fails, because the requested field does not have the supplied value.

HTTP Status Code

400

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4053">errorText</error>
```

Request 3

A request is made to get the *inputVolume* field with the value of *2330* in the *Weekday* data row of the *quota* transparent data for a subscriber. Two instances of the *Weekday* data row exist. The *inputVolume* field exists in both rows, and is set to the value 3220 in both rows.

Request URL

```
GET {BaseURI}/msr/sub/MSISDN/33123654862/data/quota/Weekday/inputVolume/3220
```

Request Content

None

Response 3

The request is successful, and the field from two matching *Weekday* rows are returned.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
<data name="quota">
<![CDATA[<?xml version="1.0" encoding="UTF-8"?>
<usage>
  <version>3</version>
  <quota name="Weekday">
    <inputVolume>3220</inputVolume>
  </quota>
  <quota name="Weekday">
    <inputVolume>3220</inputVolume>
  </quota>
</usage>
]]>
</data>
</subscriber>
```

Request 4

A request is made to get the *inputVolume* field with the value of *980* in the *Weekday* data row of the *quota* transparent data for a subscriber. Two instances of the *Weekday* data row exist. The *inputVolume* field exists in both rows, and in one row is set to the value 980, and in the other row it is set to the value 3220.

Request URL

```
GET {BaseURI}/msr/sub/MSISDN/33123654862/data/quota/Weekday/inputVolume/980
```

Request Content

None

Response 4

The request is successful, and the field from the single matching Weekday row is returned.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
<data name="quota">
<![CDATA[<?xml version="1.0" encoding="UTF-8"?>
<usage>
  <version>3</version>
  <quota name="Weekday">
    <inputVolume>980</inputVolume>
  </quota>
</usage>
]]>
</data>
</subscriber>
```

5.5.3 Update Row Field

Description

This operation updates a fields within a transparent data row for the subscriber identified by the *keyName* and *keyValue*.

The transparent data row identifier field is value is specified in *rowIdValue*. The field name is specified in *fieldName*.

If the specified field is valid, but does not exist, it is created.

If more than one existing row matches the requested *rowIdValue*, then the update request fails.

The *rowIdValue* is case-sensitive. If a row already existed called “DayPass”, then an attempt to update a field in a row called “DayPass” would be successful, but an attempt to update a field in a row called “DAYPASS” would fail

Prerequisites

A subscriber with the key of the *keyName*/*keyValue* supplied must exist.

The *transparentDataType* must reference a valid Entity in the Interface Entity Map table in the SEC.

A data row with the given identifier within the transparent data should exist for the subscriber.

The field name specified must be a valid field for the Entity as defined in the SEC. The field must be updatable.

Request URL

```
PUT
{baseURI}/msr/sub/keyName/keyValue/data/transparentDataType/rowIdValue/fieldName/fieldVal
ue
```

- keyName: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId
- keyValue: Corresponding key field value assigned to keyName
- transparentDataType: A user defined type/name for the transparent data

  Value is quota for the Quota transparent data
- rowIdValue: The row name value that identifies the row within the transparent data blob
- fieldName: A user defined field within the transparent data row
- fieldValue: Corresponding field value assigned to fieldName

Request Content

None.

Response Content

None.

Table 37: Update Row Field Response Status/Error Codes

HTTP Status Code	Error Code	Description
201	—	Requested transparent data row field was successfully created
400	MSR4051	Invalid value for a field
400	MSR4056	Field is not updatable
400	MSR4067	Multiple matching rows found
404	MSR4001	Subscriber is not found
404	MSR4002	Field is not defined for this data type
404	MSR4049	Data type is not defined
404	MSR4058	Data type not found
404	MSR4059	Data row does not exist

Examples

Request 1

A request is made to update the *inputVolume* field in the *Q1* data row of the *quota* transparent data for a subscriber.

Request URL

```
PUT {BaseURI}/msr/sub/MSISDN/33123654862/data/quota/Q1/inputVolume/0
```

Request Content

None

Response 1

The request is successful, and the field in the data row in the Quota transparent data was updated.

HTTP Status Code

201

Response Content

None.

Request 2

A request is made to update the *cid* field in the *Q1* data row in the *quota* transparent data. The *cid* field is not allowed to be updated.

Request URL

```
PUT {BaseURI}/msr/sub/MSISDN/33123654862/data/quota/Q1/cid/45678
```

Request Content

None

Response 2

The request fails, because the cid field cannot be updated.

HTTP Status Code

400

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4056">errorText</error>
```

Request 3

A request is made to update the *inputVolume* field in the *Weekday* data row of the *quota* transparent data for a subscriber. Two instances of the *Weekday* data row exist.

Request URL

```
PUT {BaseURI}/msr/sub/MSISDN/33123654862/data/quota/Weekday/inputVolume/0
```

Request Content

None

Response 3

The request fails, as more than one row called *Weekday* exists.

HTTP Status Code

400

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4067">errorText</error>
```

5.5.4 Delete Row Field

Description

This operation deletes a field within a transparent data row for the subscriber identified by the *keyName* and *keyValue*.

The transparent data row identifier field value is specified in *rowIdValue*. The field name is specified in *fieldName*.

If more than one row matches the requested *rowIdValue*, then the delete request fails.

If the field with opaque data of the *opaqueDataType* does not exist, this is not considered an error and a successful result is returned.

If the field being deleted is mandatory, and is defined as having a default value, then the field is not removed, but has the default value assigned.

The *rowIdValue* is case-sensitive. If a row existed called “DayPass”, then an attempt to delete a field in a row called “DayPass” would be successful, but an attempt to delete a field in a row called “DAYPASS” would fail

Prerequisites

A subscriber with the key of the *keyName*/*keyValue* supplied must exist.

The *transparentDataType* must reference a valid Entity in the Interface Entity Map table in the SEC.

A data row with the given identifier within the transparent data should exist for the subscriber.

The field name specified must be a valid field for the Entity as defined in the SEC. The field must be updatable.

Request URL

```
DELETE {baseURI}/msr/sub/keyName/keyValue/data/transparentDataType/rowIdValue/fieldName
```

- keyName: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId
- keyValue: Corresponding key field value assigned to keyName
- transparentDataType: A user defined type/name for the transparent data

  Value is quota for the Quota transparent data
- rowIdValue: The row name value that identifies the row within the transparent data blob
- fieldName: A user defined field within the transparent data row

Request Content

None.

Response Content

None.

Table 38: Delete Row Field Response Status/Error Codes

HTTP Status Code	Error Code	Description
204	—	Requested transparent data row field was successfully deleted
400	MSR4056	Field is not updatable
400	MSR4067	Multiple matching rows found
400	MSR4064	Occurrence constraint violation
404	MSR4001	Subscriber is not found
404	MSR4002	Field is not defined for this data type
404	MSR4049	Data type is not defined
404	MSR4058	Data type not found
404	MSR4059	Data row does not exist

Examples

Request 1

A request is made to delete the *inputVolume* field in the *Q1* data row of the *quota* transparent data for a subscriber.

Request URL

```
DELETE  {BaseURI}/msr/sub/MSISDN/33123654862/data/quota/Q1/inputVolume
```

Request Content

None

Response 1

The request is successful, and the field in the data row in the Quota transparent data was deleted.

HTTP Status Code

204

Response Content

None.

Request 2

A request is made to delete the *inputVolume* field in the *Weekday* data row of the *quota* transparent data for a subscriber. Two instances of the *Weekday* data row exist.

Request URL

```
DELETE  {BaseURI}/msr/sub/MSISDN/33123654862/data/quota/Weekday/inputVolume
```

Request Content

None

Response 2

The request fails, as more than one row called *Weekday* exists.

HTTP Status Code

400

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4067">errorText</error>
```

5.6 Subscriber Special Operation Commands

A transparent data entity may contain data that is organized in "rows". An example of a row is a specific quota within the Quota entity.

The required row is identified in the request by the *rowIdValue*.

A specific instance of a quota (specified row) within the Quota transparent data entity can have its fields reset to pre-defined values using a provisioning command.

Table 39: Summary of Subscriber Special Operation Commands

Command	Description	Keys	Command Syntax
Reset Quota	Reset the fields within the specified Quota	(MSISDN, IMSI, NAI or AccountId) and Row Identifier	`POST {BaseURI}/msr/sub/keyName/KeyValue/ data/transparentDataType/rowIdValue`

5.6.1 Reset Quota

Description

This operation resets a particular quota row within the Quota transparent data associated with a subscriber.

If more than one row matches the requested *rowIdValue*, then the reset request fails.

If the subscriber has Quota transparent data, then the configured values within the specified quota row are reset to the configured reset values.

The *rowIdValue* is case-sensitive. If a row existed called "DayPass", then an attempt to reset a quota row called "DayPass" would be successful, but an attempt to reset a quota row called "DAYPASS" would fail.

When a Quota instance is reset using the "Reset Quota" 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.

Prerequisites

A subscriber with the key of the *keyName*/*keyValue* supplied must exist.

The Quota transparent data must exist for the subscriber.

The specified Quota row must exist in the Quota transparent data.

Request URL

```
POST {BaseURI}/msr/sub/keyName/KeyValue/data/transparentDataType/rowIdValue
```

- keyName: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId
- keyValue: Corresponding key field value assigned to keyName
- transparentDataType: A user defined type/name for the transparent data

  Value is quota for the Quota transparent data
- rowIdValue: The row name value that identifies the row within the transparent data blob

Request Content

None.

Response Content

None.

Table 40: Reset Quota Response Status/Error Codes

HTTP Status Code	Error Code	Description
204	—	Requested transparent data row was successfully reset
400	MSR4067	Multiple matching rows found
404	MSR4001	Subscriber is not found
404	MSR4049	Data type is not defined
404	MSR4058	Data type not found
404	MSR4059	Data row does not exist
409	MSR4063	Entity cannot be reset

Examples

Request 1

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

Request URL

```
POST {baseURI}/msr/sub/MSISDN/33123654862/data/quota/Q1
```

Request Content

None

Response 1

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

HTTP Status Code

204

Response Content

None.

Request 2

A request is made to reset the *Q1* Quota row for a subscriber. The subscriber does not have Quota transparent data.

Request URL

```
POST {baseURI}/msr/sub/MSISDN/33123654862/data/quota/Q1
```

Request Content

None

Response 2

The request fails because the subscriber does not have Quota transparent data.

HTTP Status Code

404

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4049">errorText</error>
```

Request 3

A request is made to reset the *Q6* Quota row for a subscriber. The subscriber has Quota transparent data, but the Quota transparent data does notcontain a Quota row called *Q6*.

Request URL

```
POST {baseURI}/msr/sub/MSISDN/33123654862/data/quota/Q6
```

Request Content

None

Response 3

The request fails, because the *Q6* row does not exist.

HTTP Status Code

404

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4059">errorText</error>
```

Request 4

A request is made to reset the *Weekday* Quota row for a subscriber. The subscriber has Quota transparent data, and the Quota transparent data contains two instances of the *Weekday* data row exist.

Request URL

```
POST {baseURI}/msr/sub/MSISDN/33123654862/data/quota/Weekday
```

Request Content

None

Response 4

The request fails, as more than one row called *Weekday* exists.

HTTP Status Code

400

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4067">errorText</error>
```

6 POOL PROVISIONING

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

Provisioning clients can create, retrieve, modify, and delete pool data. Pool data is accessed via the PoolID value associated with the pool.

Table 41: Summary of Pool Profile Commands

Command	Description	Keys	Command Syntax
Create Pool	Create a pool profile	—	`POST {baseURI}/msr/pool`
Get Pool	Get pool profile data	PoolID	`GET {baseURI}/msr/pool/poolId`
Update Pool	Replace an existing pool profile		`PUT {baseURI}/msr/pool/poolId`
Delete Pool	Delete all pool profile data and all opaque data associated with the pool		`DELETE {baseURI}/msr/pool/poolId`

6.1.1 Create Pool

Description

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

Unlike other pool commands, the key value (PoolID) is not specified in the URL. Request content includes *poolId*, and field-value pairs, all as specified in the Subscriber Entity Configuration.

Multi-value fields can be specified by a single *fieldNameX* value with a delimited list of values, or multiple *fieldNameX* fields each containing a single value.

Prerequisites

A pool with the supplied PoolID must not exist.

Request URL

```
POST {baseURI}/msr/pool
```

Request Content

A `<pool>` element that contains a `<field>` element for every field-value pair defined for the new pool.

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <field name="PoolID">poolId</field>
[
  <field name="fieldName1">fieldValue1</field>
  <field name="fieldName2">fieldValue2</field>
  :
  <field name="fieldNameN">fieldValueN</field>
]
</pool>
```

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

  Values: 1 to 9999999999999999999999

- fieldNameX: A user defined field within the Pool Profile
- fieldValueX: Corresponding field value assigned to fieldNameX

PoolID/field order in the request is not important

Response Content

None.

Table 42: Create Pool Response Status/Error Codes

HTTP Status Code	Error Code	Description
201	—	Successfully created
400	MSR4000	The field list does not contain at least one unique key
400	MSR4003	A key is detected to be already in the system for another pool
400	MSR4004	The field list does not contain at least one unique key
400	MSR4051	Invalid value for a field
400	MSR4064	Occurrence constraint violation
404	MSR4002	Pool field is not defined

Examples

Request 1

A pool is created, with a PoolID key. The *BillingDay*, *Tier*, *Entitlement*, and *Custom15* fields are set.

Request URL

```
POST {baseURI}/msr/pool
```

Request Content

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <field name="PoolID">100000</field>
  <field name="BillingDay">5</field>
  <field name="Tier">12</field>
  <field name="Entitlement">Weekpass</field>
  <field name="Entitlement">Daypass</field>
  <field name="Custom15">allocate</field>
</pool>
```

Response 1

The request is successful, and the pool was created.

HTTP Status Code

201

Response Content

None.

Request 2

A pool is created, with a *PoolID* key. The *BillingDay* and *Entitlement* fields are set. A pool exists with the given PoolID.

Request URL

```
POST {baseURI}/msr/pool
```

Request Content

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <field name="PoolID">100001</field>
  <field name="BillingDay">5</field>
  <field name="Entitlement">Weekpass,Daypass</field>
</pool>
```

Response 2

The request fails. The error code indicates the PoolID exists.

HTTP Status Code

400

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4004">errorText</error>
```

6.1.2 Get Pool

Description

This operation retrieves all field-value pairs created for a pool that is identified by the *poolId*.

The response content includes only valid field-value pairs which have been previously provisioned or created by default.

Prerequisites

A pool with a key of the *poolId* supplied must exist.

Request URL

```
GET {baseURI}/msr/pool/poolId
```

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

  Values: 1 to 9999999999999999999999

Request Content

None.

Response Content

A `<pool>` element that contains a `<field>` element for every field-value pair defined for the pool.

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <field name="PoolID">poolId</field>
[
  <field name="fieldName1">fieldValue1</field>
  <field name="fieldName2">fieldValue2</field>
  :
  <field name="fieldNameN">fieldValueN</field>
]
</pool>
```

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

  Values: 1 to 9999999999999999999999

- fieldNameX: A user defined field within the Pool Profile
- fieldValueX: Corresponding field value assigned to fieldNameX

PoolID/field order in the request is not important

Table 43: Get Pool Response Status/Error Codes

HTTP Status Code	Error Code	Description
200	—	Successfully located the pool
404	MSR4001	Could not find the pool by PoolID

Examples

Request 1

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

Request URL

```
GET {baseURI}/msr/pool/100000
```

Request Content

None

Response 1

The request is successful, and the pool was retrieved.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <field name="PoolID">100000</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>
```

Request 2

The pool with the given PoolID is retrieved. The pool does notexist.

Request URL

```
GET {baseURI}/msr/pool/222200
```

Request Content

None

Response 2

The request fails, as the pool does not exist.

HTTP Status Code

404

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4001">errorText</error>
```

6.1.3 Update Pool

Description

This operation replaces an existing subscriber profile, for the pool identified by *poolId*.

With the exception of the PoolID, all existing data for the pool is completely removed and replaced by the request content. Therefore, it is not necessary to include the PoolID from the URI in the request content (although it is not an error if it is included).

If the PoolID is included in the content, and it is different from the value specified in the URL, the request fails.

Prerequisites

A pool with a key of the *poolId* supplied must exist.

Request URL

```
PUT {baseURI}/msr/pool/poolId
```

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

  Values: 1 to 9999999999999999999999

Request Content

A `<pool>` element that contains a `<field>` element for every field-value pair defined for the pool.

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
[
  <field name="PoolID">poolId</field>
  <field name="fieldName1">fieldValue1</field>
  <field name="fieldName2">fieldValue2</field>
  :
  <field name="fieldNameN">fieldValueN</field>
]
</pool>
```

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

  Values: 1 to 9999999999999999999999
- fieldNameX: A user defined field within the Pool Profile

- fieldValueX: Corresponding field value assigned to fieldNameX

PoolID/field order in the request is not important

Response Content

None.

Table 44: Update Pool Response Status/Error Codes

HTTP Status Code	Error Code	Description
204	—	The pool data was replaced successfully
400	MSR4000	Invalid content/payload
400	MSR4000	The PoolID supplied in URL and request content do not match
400	MSR4051	Invalid value for a field
400	MSR4064	Occurrence constraint violation
404	MSR4001	Could not find the pool by PoolID
404	MSR4002	Pool field is not defined

Examples

Request 1

A pool is updated. The *BillingDay*, *Tier*, *Entitlement*, and *Custom15* fields are set. The pool exists.

Request URL

```
PUT {BaseURI}/msr/pool/100000
```

Request Content

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <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>
```

Response 1

The request is successful, and the pool was updated.

HTTP Status Code

204

Response Content

None.

6.1.4 Delete Pool

Description

This operation deletes all pool profile data and opaque data for the pool that is identified by *poolId*.

Prerequisites

A pool with a key of the *poolId* supplied must exist.

The pool must not have any member subscribers, or the request fails.

Request URL

```
DELETE {baseURI}/msr/pool/poolId
```

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

  Values: 1 to 9999999999999999999999

Request Content

None.

Response Content

None.

Table 45: Delete Pool Response Status/Error Codes

HTTP Status Code	Error Code	Description
204	—	The pool was successfully deleted
404	MSR4001	Could not find the pool by PoolID
409	MSR4055	The pool could not be deleted as it has member subscribers

Examples

Request 1

The pool with the given PoolID is deleted. The pool exists, and has no member subscribers.

Request URL

```
DELETE {baseURI}/msr/pool/100000
```

Request Content

None

Response 1

The request is successful.

HTTP Status Code

204

Response Content

None.

Request 2

The pool with the given PoolID is deleted. The pool exists, but has member subscribers.

Request URL

```
DELETE {baseURI}/msr/pool/200000
```

Request Content

None

Response 2

The request fails, because the pool has member subscribers.

HTTP Status Code

409

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4055">errorText</error>
```

6.2 Pool Profile Field Commands

Table 46: Summary of Pool Profile Field Commands

Command	Description	Keys	Command Syntax
Add Field Value	Adds a value to the specified field. This operation does not affect any pre-existing values for the field	PoolID	`POST {baseURI}/msr/pool/poolId/field/fieldName/fieldValue`
Get Field	Retrieve values for the specified field		`GET {baseURI}/msr/pool/poolId/field/fieldName`
Get Field Value	Retrieve the single value for the specified field (if set as specified)		`GET {baseURI}/msr/pool/poolId/field/fieldName/fieldValue`
Update Field Value	Update field to the specified value		`PUT {baseURI}/msr/pool/poolId/field/fieldName/fieldValue`
Update Multiple Fields	Update multiple fields to the specified values		`PUT {baseURI}/msr/pool/poolId/multipleFields/fieldName1/fieldValue1/fieldName2/fieldValue2/…`
Delete Field	Delete all values for the specified field		`DELETE {baseURI}/msr/pool/poolId/field/fieldName`
Delete Field Value	Delete a value for the specified field		`DELETE {baseURI}/msr/pool/poolId/field/fieldName/fieldValue`

6.2.1 Add Field Value

Description

This operation adds a value to the specified multi-value field for the pool identified by *poolId*.

This operation can only be perforemed for the fields defined as multi-value field in the Subscriber Entity Configuration. Any pre-existing values for the field are not affected.

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 would have the value “a;b;c;d”.

If a value being added exists, the request fails.

If the field to which the value is being added does not exist, it is created.

The *fieldValue* is case-sensitive. An attempt to add the value “a” to current field value of “a;b;c” would fail, but an attempt to add the value “A” would be successful and result in the field value being “a;b;c;A”

Prerequisites

A pool with the PoolID of the *poolId* supplied must exist.

The field *fieldName* must be a valid field in the Pool Profile, and must be a multi-value field.

The value *fieldValue* being added must notalready be present in the field.

Request URL

```
POST {baseURI}/msr/pool/poolId/field/fieldName/fieldValue
```

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

  Values: 1 to 9999999999999999999999
- fieldName: A user defined field within the Pool Profile
- fieldValue: Corresponding field value assigned to fieldName

  NOTE: For multi-value fields, the value contains a semicolon separated list of values on a single line. For example, “a;b;c”

  NOTE: The semicolon between the field values may need to be encoded as %3B for certain clients

Request Content

None.

Response Content

None.

Table 47: Add Field Value Response Status/Error Codes

HTTP Status Code	Error Code	Description
200	—	Successfully added field values
400	MSR4005	Field does not support multiple values
400	MSR4051	Invalid value for a field

HTTP Status Code	Error Code	Description
400	MSR4056	Field is not updatable
400	MSR4066	Field value exists
404	MSR4001	Pool is not found
404	MSR4002	Pool field is not defined

Examples

Request 1

A request is made to add the value *DayPass* to the *Entitlement* field. The *Entitlement* field is a valid multi-value field. The *DayPass* value is not already present in the *Entitlement* field.

Request URL

```
POST {baseURI}/msr/pool/100000/field/Entitlement/DayPass
```

Request Content

None

Response 1

The request is successful, and the value was added to the *Entitlement* field.

HTTP Status Code

200

Response Content

None.

Request 2

A request is made to add the values *DayPass* and *HighSpeedData* to the *Entitlement* field. The *Entitlement* field is a valid multi-value field. The *DayPass* and *HighSpeedData* values are not already present in the *Entitlement* field.

Request URL

```
POST {baseURI}/msr/pool/200000/field/Entitlement/DayPass;HighSpeedData
```

Request Content

None

Response 2

The request is successful, and the values were added to the *Entitlement* field.

HTTP Status Code

200

Response Content

None.

6.2.2 Get Field

Description

This operation retrieves the values for the specified field for the pool identified by the *poolId*.

Depending on the field entered, there may be multiple field-value pairs returned by this operation.

Prerequisites

A pool with the PoolID of the *poolId* supplied must exist.

The requested field *fieldName* must be a valid field in the Pool Profile.

Request URL

```
GET {baseURI}/msr/pool/poolId/field/fieldName
```

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

  Values: 1 to 9999999999999999999999

- fieldName: A user defined field within the Pool Profile

Request Content

None.

Response Content

A `<pool>` element that contains a `<field>` element for every value defined for the specified field within the pool.

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <field name="fieldName">fieldValue1</field>
[
  <field name="fieldName">fieldValue2</field>
  :
  <field name="fieldName">fieldValueN</field>
]
</pool>
```

- fieldName: A user defined field within the Pool Profile
- fieldValueX: Corresponding field value assigned to fieldName

Table 48: Get Field Response Status/Error Codes

HTTP Status Code	Error Code	Description
200	—	Requested field exists for pool
404	MSR4001	Pool is not found
404	MSR4002	Pool field is not defined
404	MSR4065	Field is not set

Examples

Request 1

A request is made to get the *Entitlement* field for a pool.

Request URL

```
GET {BaseURI}/msr/pool/100000/field/Entitlement
```

Request Content

None

Response 1

The request is successful, and the requested value is returned.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <field name="Entitlement">Weekpass</field>
  <field name="Entitlement">Daypass</field>
</pool>
```

6.2.3 Get Field Value

Description

This operation retrieves the values for the specified field for the pool identified by the *poolId* in the request.

For a request where the presence of multiple values for a multi-value field is requested, a match is only considered to have been made if the requested values form a subset of the values stored in the pool profile. That is, if all of the values requested exist in the pool profile, return success, regardless of how many other values may exist in the pool profile. If any or all of the values are not present as part of the pool profile, an error is returned.

Depending on the field, there may be multiple field-value pairs returned by this operation.

The *fieldValue* is case-sensitive. An attempt to get the value "a" from a current field value of "a;b;c" would be successful, but an attempt to get the value "A" would fail

Prerequisites

A pool with the PoolID of the *poolId* supplied must exist.

The requested field *fieldName* must be a valid field in the Pool Profile.

The field value in *fieldValue* must match the specified value in the request.

Request URL

```
GET {baseURI}/msr/pool/poolId/field/fieldName/fieldValue
```

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

  Values: 1 to 9999999999999999999999
- fieldName: A user defined field within the Pool Profile

- fieldValue: Corresponding field value assigned to fieldName

  NOTE: For multi-value fields, the value contains a semicolon separated list of values on a single line. For example, “a;b;c”

  NOTE: The semicolon between the field values may need to be encoded as %3B for certain clients

Request Content

None.

Response Content

A `<pool>` element that contains a `<field>` element for every field-value pair requested that matches the value supplied for the pool.

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <field name="fieldName">fieldValue1</field>
[
  <field name="fieldName">fieldValue2</field>
  :
  <field name="fieldName">fieldValueN</field>
]
</pool>
```

- fieldName: A user defined field within the Pool Profile
- fieldValueX: Corresponding field value assigned to fieldName

Table 49: Get Field Value Response Status/Error Codes

HTTP Status Code	Error Code	Description
200	—	Requested field exists for pool
400	MSR4053	Pool and field exist, but values do not match
404	MSR4001	Pool is not found
404	MSR4002	Pool field is not defined

Examples

Request 1

A request is made to get the *Tier* field with the value *Gold*. The field exists and has the specified value.

Request URL

```
GET {BaseURI}/msr/pool/200000/field/Tier/Gold
```

Request Content

None

Response 1

The request is successful, and the requested value is returned.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <field name="Tier">Gold</field>
</pool>
```

Request 2

A request is made to get the *Entitlement* field with the values DayPass and *HighSpeedData*. The *Entitlement* field is a multi-value field. The field exists and has the specified values.

Request URL

```
GET {baseURI}/msr/pool/300000/field/Entitlement/DayPass;HighSpeedData
```

Request Content

None

Response 2

The request is successful, and the requested values are returned. Two values are set for the multi-value field.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <field name="Entitlement">DayPass</field>
  <field name="Entitlement">HighSpeedData</field>
</pool>
```

6.2.4 Update Field

Description

This operation updates a field to the specified value for the pool identified by the specified *poolId*.

This operation replaces a set of values for a field, which means that any existing values for the field are deleted first. For multi-value fields, all previous values are erased and the new set of values is inserted. Adding values to a current set is accomplished using Add Field Value.

This command cannot be used to update the PoolID.

Prerequisites

A pool with the key of the *poolId* supplied must exist.

The field *fieldName* must all be a valid field in the Pool Profile.

Request URL

```
PUT {baseURI}/msr/pool/poolId/field/fieldName/fieldValue
```

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

Values: 1 to 9999999999999999999999

- fieldName: A user defined field within the Pool Profile
- fieldValue: Corresponding field value assigned to fieldName

  NOTE: For multi-value fields, the value contains a semicolon separated list of values on a single line. For example, "a;b;c"

  NOTE: The semicolon between the field values may need to be encoded as %3B for certain clients

Request Content

None.

Response Content

None.

Table 50: Update Field Response Status/Error Codes

HTTP Status Code	Error Code	Description
201	—	Field was successfully updated
400	MSR4051	The value provided for the field is invalid
400	MSR4056	Field is not updatable
404	MSR4001	Pool does not exist
404	MSR4002	Pool field is not defined

Examples

Request 1

A request is made to update the *Entitlement* field with the values *DayPass* and *HighSpeedData*. The *Entitlement* field is a multi-value field.

Request URL

```
PUT {baseURI}/msr/pool/100000/field/Entitlement/DayPass;HighSpeedData
```

Request Content

None

Response 1

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

HTTP Status Code

201

Response Content

None.

6.2.5 Update Multiple Fields

Description

This operation updates fields to the specified values for the pool identified by the specified *poolId*.

This operation replaces the value set of the field, which means that any existing values for the field are deleted first. For multi-value fields, all previous values are erased and the new set of values is inserted. Adding values to a current set is accomplished using Add Field Value.

This command updates multiple fields in a single command for pool data. ALL fields that can be modified in the "single field" request can also be modified in the "multiple fields" request. Two or three fields can be updated at once. Updating only a single field results in an error.

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

This command cannot be used to update the PoolID.

Prerequisites

A pool with the key of the *poolId* supplied must exist.

The fields *fieldNameX* must all be valid fields in the Pool Profile.

Request URL

```
PUT
{baseURI}/msr/pool/poolId/multipleFields/fieldName1/fieldValue1/fieldName2/fieldValue2/
[fieldName3/fieldValue3]
```

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

  Values: 1 to 9999999999999999999999

- fieldNameX: A user defined field within the Pool Profile
- fieldValueX: Corresponding field value assigned to fieldNameX

  NOTE: For multi-value fields, the value contains a semicolon separated list of values on a single line. For example, “a;b;c”

  NOTE: The semicolon between the field values may need to be encoded as %3B for certain clients

Request Content

None.

Response Content

None.

Table 51: Update Multiple Fields Response Status/Error Codes

HTTP Status Code	Error Code	Description
201	—	Field was successfully updated
400	MSR4051	The value provided for the field is invalid
400	MSR4056	Field is not updatable

HTTP Status Code	Error Code	Description
400	MSR4057	Request only contains one field to update
404	MSR4001	Pool does not exist
404	MSR4002	Pool field is not defined

Examples

Request 1

A request is made to update the *Entitlement* field to *Weekend* and *YearPass*, the *Tier* field to *Silver*, and the *BillingDay* field to *11*.

Request URL

```
PUT {baseURI}/msr/pool/300001/multipleFields/Entitlement/
Weekend;YearPass/Tier/Silver/BillingDay/11
```

Request Content

None.

Response 1

The request is successful, and the *Entitlement*, *Tier*, and *BillingDay* fields were all updated.

HTTP Status Code

201

Response Content

None.

6.2.6 Delete Field

Description

This operation deletes the specified field for the pool identified by *poolId* in the request.

If the field is multi-value field then all values are deleted. Deletion of a field results removal of the field from the pool profile. The field is not present, not just the value is empty.

The field being deleted does not need to have a current value. It can be empty (deleted) already, and the request succeeds.

This command cannot be used to delete the PoolID.

If the field being deleted is mandatory, and is defined as having a default value, then the field is not removed, but has the default value assigned.

Prerequisites

A pool with the key of the *poolId* supplied must exist.

The requested field *fieldName* must be a valid field in the Pool Profile.

Request URL

```
DELETE {baseURI}/msr/pool/poolId/field/fieldName
```

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

  Values: 1 to 9999999999999999999999
- fieldName: A user defined field within the Subscriber Profile

Request Content

None.

Response Content

None.

Table 52: Delete Field Response Status/Error Codes

HTTP Status Code	Error Code	Description
204	—	Field was successfully deleted
400	MSR4056	Field is not updatable
400	MSR4064	Occurrence constraint violation
404	MSR4001	Pool does not exist
404	MSR4002	Pool field is not defined

Examples

Request 1

A request is made to delete the *Entitlement* field. The field is a valid Pool Profile field.

Request URL

```
DELETE {BaseURI}/msr/pool/100000/field/Entitlement
```

Request Content

None

Response 1

The request is successful, and the field was deleted.

HTTP Status Code

204

Response Content

None.

6.2.7 Delete Field Value

Description

This operation deletes a single value from the specified field for the pool profile identified by the *poolId* in the request.

This operation can only be perforemd for the fields defined as multi-value field in the Subscriber Entity Configuration.

Each individual value is removed from the Pool Profile. If a supplied value does not exist, then it is ignored. For example, if a profile contains values "a;b;c" and a request to delete "a;b" is made, this succeeds and the profile is left with "c" as the value. If the profile contains "a;b;c" and a request is made to delete "c;d" the request succeeds and the profile is left with "a;b" as the value.

If all values are removed, the field is removed from the Pool Profile (there is no XML element present).

The *fieldValue* is case-sensitive. An attempt to remove the value “a” from a current field value of “a;b;c” would be successful, but an attempt to remove the value “A” would fail

Prerequisites

A pool with the key of the *poolId* supplied must exist.

The field *fieldName* must be a valid field in the Pool Profile, and set to the value supplied to be removed successfully.

Request URL

```
DELETE {baseURI}/msr/pool/poolId/field/fieldName/fieldValue
```

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

  Values: 1 to 9999999999999999999999
- fieldName: A user defined field within the Pool Profile
- fieldValue: Corresponding field value assigned to fieldName

  NOTE: For multi-value fields, the value contains a semicolon separated list of values on a single line. For example, “a;b;c”

  NOTE: The semicolon between the field values may need to be encoded as %3B for certain clients

Request Content

None.

Response Content

None.

Table 53: Delete Field Value Response Status/Error Codes

HTTP Status Code	Error Code	Description
204	—	Requested fields were successfully deleted
400	MSR4005	Field does not support multiple values
400	MSR4056	Field is not updatable

HTTP Status Code	Error Code	Description
404	MSR4001	Pool does not exist
404	MSR4002	Pool field is not defined

Examples

Request 1

A request is made to delete the values *DayPass* and *WeekendPass* from the *Entitlement* field. The *Entitlement* field is a multi-value field. The *Entitlement* field exists, but only contains the *DayPass* value, and not the *WeekendPass* value.

Request URL

```
DELETE {baseURI}/msr/pool/200003/field/Entitlement/DayPass;WeekendPass
```

Request Content

None

Response 1

The request is successful, because the *Entitlement* field does not contain the *WeekendPass* value.

HTTP Status Code

204

Request Content

None

Request 2

A request is made to delete the values *DayPass* and *HighSpeedData* from the *Entitlement* field. The *Entitlement* field is a multi-value field. The field exists and contains the specified values.

Request URL

```
DELETE {baseURI}/msr/pool/300003/field/Entitlement/DayPass;HighSpeedData
```

Request Content

None

Response 2

The request is successful, and the values were deleted from the field.

HTTP Status Code

204

Response Content

None.

6.3 Pool Opaque Data Commands

Table 54: Summary of Pool Opaque Data Commands

Command	Description	Keys	Command Syntax
Set Opaque Data	Create/update opaque data of the specified type	PoolID	`PUT {baseURI}/msr/pool/poolId/data/opaqueDataType`
Get Opaque Data	Retrieve opaque data of the specified type		`GET {baseURI}/msr/pool/poolId/data/opaqueDataType`
Delete Opaque Data	Delete opaque data of the specified type		`DELETE {baseURI}/msr/pool/poolId/data/opaqueDataType`

6.3.1 Set Opaque Data

Description

This operation updates (or creates if it not exists) the opaque data of the specified type for the pool identified by the *poolId* in the request.

The opaque data is provided in the request content.

The opaque data provided in an XML blob 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 pool with the key of the *poolId* supplied must exist.

The *opaqueDataType* must reference a valid pooled Entity in the Interface Entity Map table in the SEC.

Request URL

`PUT {baseURI}/msr/pool/`*`poolId`*`/data/`*`opaqueDataType`*

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

  Values: 1 to 9999999999999999999999

- opaqueDataType: A user defined type/name for the opaque data

  Value is either poolquota, poolstate, or pooldynamicquota

Request Content

A `<pool>` element that contains a `<data>` element, which contains the specified opaque data for the identified pool.

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <data name="opaqueDataType">
<![CDATA[
cdataFieldValue
]]>
  </data>
</pool>
```

- opaqueDataType: A user defined type/name for the opaque data

  Value is either poolquota, poolstate, or pooldynamicquota
- cdataFieldValue: Contents of the XML data “blob”

The *opaqueDataType* in the request content is ignored, and is not validated. The *opaqueDataType* in the URL is solely used to identify the opaque data type.

Response Content

None.

Table 55: Set Opaque Data Response Status/Error Codes

HTTP Status Code	Error Code	Description
201	—	Data was successfully created/updated
400	MSR4000	Request content is not valid
400	MSR4051	Invalid value for a field
400	MSR4064	Occurrence constraint violation
404	MSR4002	Field is not defined for this data type
404	MSR4001	Pool is not found
404	MSR4049	Data type is not defined

Example

Request 1

A request is made to create the *poolquota* opaque data. The pool does not have an existing PoolQuota entity.

Request URL

```
PUT {baseURI}/msr/pool/100000/data/poolquota
```

Request Content

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <data name="poolquota">
<![CDATA[
<?xml version="1.0" encoding="UTF-8"?>
<usage>
  <version>3</version>
  <quota name="AggregateLimit">
    <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>
  </quota>
</usage>
]]>
  </data>
</pool>
```

Response 1

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

HTTP Status Code

201

Response Content

None.

Request 2

A request is made to update the *poolstate* opaque data. The pool already has an existing PoolState entity.

Request URL

```
PUT {baseURI}/msr/pool/100002/data/poolstate
```

Request Content

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <data name="poolstate">
<![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>
]]>
  </data>
</pool>
```

Response 2

The request is successful, and the PoolState opaque data was updated.

HTTP Status Code

201

Response Content

None.

6.3.2 Get Opaque Data

Description

This operation retrieves the opaque data of the specified *opaqueDataType* for the pool identified by the *poolId* in the request.

The response contains the XML blob for the requested opaque data.

Prerequisites

A pool with the key of the *poolId* supplied must exist.

The *opaqueDataType* must reference a valid pooled Entity in the Interface Entity Map table in the SEC.

The opaque data of the *opaqueDataType* must exist for the pool.

Request URL

```
GET {baseURI}/msr/pool/poolId/data/opaqueDataType
```

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

  Values: 1 to 9999999999999999999999

- opaqueDataType: A user defined type/name for the opaque data

  Value is either poolquota, poolstate, or pooldynamicquota

Request Content

None.

Response Content

A `<pool>` element that contains a `<data>` element, which contains the requested opaque data for the identified pool.

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <data name="opaqueDataType">
<![CDATA[
cdataFieldValue
]]>
  </data>
</pool>
```

- opaqueDataType: A user defined type/name for the opaque data

  Value is either poolquota, poolstate, or pooldynamicquota

- cdataFieldValue: Contents of the XML data "blob"

Table 56: Get Opaque Data Response Status/Error Codes

HTTP Status Code	Error Code	Description
200	—	Requested opaque data exists for pool

HTTP Status Code	Error Code	Description
404	MSR4001	Pool is not found
404	MSR4049	Data type is not defined
404	MSR4053	Data type is not set for this pool

Example

Request 1

A request is made to get the *poolquota* opaque data for a pool.

Request URL

```
GET {baseURI}/msr/pool/100001/data/poolquota
```

Request Content

None

Response 1

The request is successful, and the PoolQuota opaque data is returned.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <data name="poolquota">
<![CDATA[
<?xml version="1.0" encoding="UTF-8"?>
<usage>
  <version>3</version>
  <quota name="AggregateLimit">
    <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>
  </quota>
</usage>
]]>
  </data>
</pool>
```

Request 2

A request is made to get the *poolstate* opaque data for a pool.

Request URL

```
GET {baseURI}/msr/pool/100004/data/poolstate
```

Request Content

None

Response 2

The request is successful, and the PoolState opaque data is returned.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <data name="poolstate">
<![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>
]]>
  </data>
</pool>
```

6.3.3 Delete Opaque Data

Description

This operation deletes the opaque data of the specified *opaqueDataType* for the pool identified by the *poolId* in the request.

Only one opaque data type can be deleted per request.

If the opaque data of the *opaqueDataType* does not exist for the pool, this is not considered an error and a successful result is returned.

Prerequisites

A pool with the key of the *poolId* supplied must exist.

The *opaqueDataType* must reference a valid Entity in the Interface Entity Map table in the SEC.

Request URL

```
DELETE {baseURI}/msr/pool/poolId/data/opaqueDataType
```

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

  Values: 1 to 9999999999999999999999
- opaqueDataType: A user defined type/name for the opaque data

  Value is either poolquota, poolstate, or pooldynamicquota

Request Content

None.

Response Content

None.

Table 57: Delete Opaque Data Response Status/Error Codes

HTTP Status Code	Error Code	Description
204	—	Opaque data was successfully deleted
404	MSR4001	Pool is not found
404	MSR4049	Data type is not defined

Example

Request 1

A request is made to delete the *pooldynamicquota* opaque data.

Request URL

```
DELETE {baseURI}/msr/pool/500005/data/pooldynamicquota
```

Request Content

None

Response 1

The request is successful, and the PoolDynamicQuota opaque data was deleted.

HTTP Status Code

204

Response Content

None.

Request 2

A request is made to delete the *poolstate* opaque data. The PoolState opaque data is a valid entity, but the requested pool does not contain any PoolState opaque data.

Request URL

```
DELETE {baseURI}/msr/pool/600006/data/poolstate
```

Request Content

None

Response 2

The request is successful, although no PoolState opaque data was deleted.

HTTP Status Code

204

Response Content

None.

6.4 Pool Data Row Commands

A transparent data entity may contain data that is organized in "rows". An example of a row is a specific quota within the PoolQuota entity.

The row commands allow operations (create/retrieve/update/delete) at the row level. The required row is identified in the request by the *RowIdValue*.

Pool data row commands may only be performed on entities defined as transparent in the SEC. Attempting to perform a command on an entity defined as opaque results in an HTTP Status Code `400`, with an `MSR4099` error being returned.

Table 58: Summary of Pool Data Row Commands

Command	Description	Keys	Command Syntax
Set Row	Create/update data row in data of the specified type.	PoolID and Row Identifier	`PUT {baseURI}/msr/pool/poolId/data/transparentDataType/rowIdValue`
Get Row	Retrieve data row from data of the specified type.		`GET {baseURI}/msr/pool/poolId/data/transparentDataType/rowIdValue`
Delete Row	Delete data row within data of the specified type		`DELETE {baseURI}/msr/pool/poolId/data/transparentDataType/rowIdValue`

6.4.1 Set Row

Description

This operation creates or updates an existing data row for the pool identified by the *poolId*.

The data row identifier field value is specified in *rowIdValue*. All fieldNameX *fields* specified are set within the row.

If more than one existing row matches the requested *rowIdValue*, then the update request fails.

If the specified row does not exist, it is created. If the row does exist, it is updated/replaced.

The *rowIdValue* is case-sensitive. If a row already existed called "DayPass", then an attempt to update an existing row called "DAYPASS" would be successful, and two rows called "DayPass" and "DAYPASS" would be present

If the transparent entity specified in *entityName* does not exist for the pool, it is created

Prerequisites

A pool with the key of the *poolId* supplied must exist.

The *transparentDataType* must reference a valid pooled transparent Entity in the Interface Entity Map table in the SEC.

Request URL

```
PUT {baseURI}/msr/pool/poolId/data/transparentDataType/rowIdValue
```

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

  Values: 1 to 9999999999999999999999

- transparentDataType: A user defined type/name for the transparent data

  Value is poolquota for the PoolQuota transparent data

- rowIdValue: The row name value that identifies the row within the data blob

Request Content

```
<?xml version="1.0" encoding="UTF-8"?>
rowValue
```

- rowValue: Contents of the XML data "blob", with the row data

  NOTE: The rowValue is of the same format as a PoolQuota entity, just containing a single row, the row being added

The data contained within the *rowValue* contains the same *rowIdValue* as specified in the URL. The *rowIdValue* in the URL is ignored, and is not validated. The *rowIdValue* in the request content is solely used to identify the row.

Response Content

None.

Table 59: Set Row Response Status/Error Codes

HTTP Status Code	Error Code	Description
201	—	Data row was successfully created/updated
400	MSR4000	Request content is not valid
400	MSR4051	Invalid value for a field
400	MSR4056	Field is not updatable
400	MSR4064	Occurrence constraint violation
400	MSR4067	Multiple matching rows found
404	MSR4001	Pool is not found
404	MSR4002	Field is not defined for this data type
404	MSR4049	Data type is not defined

Examples

Request 1

A request is made to create a data row in the *poolquota* transparent data for a pool. The data row identifier field value is *AggregateLimit*. The pool does not have an existing PoolQuota row called *AggregateLimit*.

Request URL

```
PUT {baseURI}/msr/pool/100000/data/poolquota/AggregateLimit
```

Request Content

```
<?xml version="1.0" encoding="UTF-8"?>
<usage>
  <version>3</version>
  <quota name="AggregateLimit">
    <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>
  </quota>
</usage>
```

Response 1

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

HTTP Status Code

201

Response Content

None.

Request 2

A request is made to update a data row in the *poolquota* transparent data for a pool. The data row identifier field Value is p*Q1*. The pool has an existing PoolQuota row called *PQ1*.

Request URL

```
PUT {baseURI}/msr/pool/100000/data/poolquota/PQ1
```

Request Content

```
<?xml version="1.0" encoding="UTF-8"?>
<usage>
  <version>3</version>
  <quota name="PQ1">
    <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>
  </quota>
```

```
</usage>
```

Response 2

The request is successful, and the data row *PQ1* was updated.

HTTP Status Code

201

Response Content

None.

6.4.2 Get Row

Description

This operation retrieves a transparent data row for the pool identified by the *poolId*. The data row identifier is specified in *rowIdValue*.

All data rows that match the requested *rowIdValue* are returned.

The transparent data row identifier field value is specified in *rowIdValue*.

The *rowIdValue* is case-sensitive. If a row existed called "DayPass", then an attempt to get a row called "DayPass" would be successful, but an attempt to get a row called "DAYPASS" would fail

Prerequisites

A pool with the key of the *poolId* supplied must exist.

The *transparentDataType* must reference a valid pooled transparent Entity in the Interface Entity Map table in the SEC.

A data row with the given identifier within the transparent data should exist for the pool.

Request URL

GET {baseURI}/msr/pool/*poolId*/data/*transparentDataType*/*rowIdValue*

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

  Values: 1 to 9999999999999999999999

- transparentDataType: A user defined type/name for the transparent data

  Value is poolquota for the PoolQuota transparent data

- rowIdValue: The row name value that identifies the row within the transparent data blob

Request Content

None.

Response Content

A `<pool>` element that contains a `<data>` element, which contains the specified transparent data row (if it exists) for the identifiedpool.

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <data name="transparentDataType">
<![CDATA[
cdataRowValue
]]>
  </data>
</pool>
```

- transparentDataType: A user defined type/name for the transparent data

  Value is poolquota for the PoolQuota transparent data
- cdataRowValue: Contents of the XML data “blob”, with the row data

Table 60: Get Row Response Status/Error Codes

HTTP Status Code	Error Code	Description
200	—	Requested data row exists for pool
404	MSR4001	Pool is not found
404	MSR4049	Data type is not defined
404	MSR4058	Data type not found
404	MSR4059	Data row does not exist

Examples

Request 1

A request is made to get the *PQ1* data row from the *poolquota* transparent data for a pool. The pool has the PoolQuota entity, and the *PQ1* data row exists.

Request URL

```
GET {baseURI}/msr/pool/100000/data/poolquota/PQ1
```

Request Content

None

Response 1

The request is successful, and the PoolQuota transparent data row requested is returned.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <data name="poolquota">
<![CDATA[
<?xml version="1.0" encoding="UTF-8"?>
<usage>
  <version>3</version>
  <quota name="PQ1">
    <cid>9223372036854775807</cid>
    <time>1</time>
    <totalVolume>0</totalVolume>
```

```
      <inputVolume>0</inputVolume>
      <outputVolume>0</outputVolume>
      <serviceSpecific>12</serviceSpecific>
      <nextResetTime>2010-05-12T16:00:00-05:00</nextResetTime>
    </quota>
  </usage>
  ]]>
    </data>
  </pool>
```

Request 2

A request is made to get the *Weekend* data row from the *poolquota* transparent data for a pool. The pool has the PoolQuota entity, but and the *Weekend* data row does notexist.

Request URL

```
GET {baseURI}/msr/pool/100000/data/poolquota/Weekend
```

Request Content

None

Response 2

The request fails, as the data row does not exist.

HTTP Status Code

404

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4059">errorText</error>
```

Request 3

A request is made to get the *Weekday* data row from the *poolquota* transparent data for a pool. The pool has the PoolQuota entity. Two instances of the *Weekday* data row exist.

Request URL

```
GET {baseURI}/msr/pool/100000/data/poolquota/Weekday
```

Request Content

None

Response 3

The request is successful, and the PoolQuota transparent data rows requested are returned.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <data name="poolquota">
<![CDATA[
<?xml version="1.0" encoding="UTF-8"?>
<usage>
```

```
      <version>3</version>
      <quota name="Weekend">
        <cid>9223372036854775807</cid>
        <time>1</time>
        <totalVolume>0</totalVolume>
        <inputVolume>0</inputVolume>
        <outputVolume>0</outputVolume>
        <serviceSpecific>12</serviceSpecific>
        <nextResetTime>2010-05-12T16:00:00-05:00</nextResetTime>
      </quota>
      <quota name="Weekend">
        <cid>7682364872564782343</cid>
        <time>32</time>
        <totalVolume>250</totalVolume>
        <inputVolume>4570</inputVolume>
        <outputVolume>11230</outputVolume>
        <serviceSpecific>29</serviceSpecific>
        <nextResetTime>2010-06-01T16:00:00-05:00</nextResetTime>
      </quota>
    </usage>
    ]]>
      </data>
    </pool>
```

6.4.3 Delete Row

Description

This operation deletes a transparent data row for the pool identified by the *poolId*.

The transparent data row identifier field value is specified in *rowIdValue*.

If more than one row matches the requested *rowIdValue*, then all matching rows are deleted.

The *rowIdValue* is case-sensitive. If a row existed called “DayPass”, then an attempt to delete a row called “DayPass” would be successful, but an attempt to delete a row called “DAYPASS” would fail

The deletion of a non-existent data row is not considered an error.

Prerequisites

A pool with the key of the *poolId* supplied must exist.

The *transparentDataType* must reference a valid pooled transparent Entity in the Interface Entity Map table in the SEC.

Request URL

```
DELETE {baseURI}/msr/pool/poolId/data/transparentDataType/rowIdValue
```

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

  Values: 1 to 9999999999999999999999
- transparentDataType: A user defined type/name for the transparent data

  Value is poolquota for the PoolQuota transparent data
- rowIdValue: The row name value that identifies the row within the transparent data blob

Request Content

None.

Response Content

None.

Table 61: Delete Row Response Status/Error Codes

HTTP Status Code	Error Code	Description
204	—	Data row was successfully deleted
400	MSR4064	Occurrence constraint violation
404	MSR4001	Pool is not found
404	MSR4049	Data type is not defined
404	MSR4058	Data type not found

Examples

Request 1

A request is made to delete the *PQ1* data row in the *poolquota* transparent data. The *PQ1* data row exists in the PoolQuota data.

Request URL

```
DELETE {baseURI}/msr/pool/100000/data/poolquota/PQ1
```

Request Content

None

Response 1

The request is successful, and the data row in the PoolQuota transparent data was deleted.

HTTP Status Code

204

Response Content

None.

Request 2

A request is made to delete the *Weekend* data row in the *poolquota* transparent data. The *Weekend* data row does notexist in the PoolQuota transparent data.

Request URL

```
DELETE {baseURI}/msr/pool/100000/data/poolquota/Weekend
```

Request Content

None

Response 2

The request is successful, even though the *Weekend* PoolQuota row does not exist.

HTTP Status Code

204

Response Content

None.

6.5 Pool Data Row Field Commands

A transparent data entity may contain data that is organized in "rows". An example of a row is a specific quota within the PoolQuota entity.

The row/field commands allow operations (retrieve/update/delete) at the row/field level. The required row is identified in the request by the *rowIdValue*, and the field is identified by the *fieldName*.

Pool data row field commands may only be performed on entities defined as transparent in the SEC. Attempting to perform a command on an entity defined as opaque results in an HTTP Status Code `400`, with an `MSR4099` error being returned.

Table 62: Summary of Pool Data Row Field Commands

Command	Description	Keys	Command Syntax
Get Row Field	Retrieve values for the specified field	PoolID and Row Identifier and Field name	`GET {baseURI}/msr/pool/poolId/data/ transparentDataType/rowIdValue/fieldName`
Get Row Field Value	Retrieve a single value for the specified field		`GET {baseURI}/msr/pool/poolId/data/ transparentDataType/rowIdValue/ fieldName/fieldValue`
Update Field	Update field to the specified value		`PUT {baseURI}/msr/pool/poolId/data/ transparentDataType/rowIdValue/ fieldName/fieldValue`
Delete Field	Delete all values for the specified field		`DELETE {baseURI}/msr/pool/poolId/data/ transparentDataType/rowIdValue/fieldName`

6.5.1 Get Row Field

Description

This operation retrieves a field within a transparent data row for the pool identified by the *poolId*.

All data rows that match the requested *rowIdValue* are returned.

If more than one row matches the requested *rowIdValue*, then all matching rows are returned.

The transparent data row identifier field value is specified in *rowIdValue*. The field name is specified in *fieldName*.

The *rowIdValue* is case-sensitive. If a row existed called "DayPass", then an attempt to get a field in a row called "DayPass" would be successful, but an attempt to get a field in a row called "DAYPASS" would fail

Prerequisites

A pool with the key of the *poolId* supplied must exist.

The *transparentDataType* must reference a valid pooled transparent Entity in the Interface Entity Map table in the SEC.

A data row with the given identifier within the transparent data should exist for the pool.

The field name specified must be a valid field for the Entity as defined in the SEC.

Request URL

```
GET {baseURI}/msr/pool/poolId/data/transparentDataType/rowIdValue/fieldName
```

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

  Values: 1 to 9999999999999999999999
- transparentDataType: A user defined type/name for the transparent data

  Value is poolquota for the PoolQuota transparent data
- rowIdValue: The row name value that identifies the row within the transparent data blob
- fieldName: A user defined field within the transparent data row

Request Content

None.

Response Content

A `<pool>` element that contains a `<data>` element, which contains the specified transparent data row field (if it exists) for the identified pool.

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <data name="transparentDataType">
<![CDATA[
cdataRowFieldValue
]]>
  </data>
</pool>
```

- transparentDataType: A user defined type/name for the transparent data

  Value is poolquota for the PoolQuota transparent data
- cdataRowFieldValue: Contents of the XML data “blob”, with the field from the row data

Table 63: Request URL Response Status/Error Codes

HTTP Status Code	Error Code	Description
200	—	Requested data row field exists for pool
404	MSR4001	Pool is not found
404	MSR4002	Field is not defined for this data type
404	MSR4049	Data type is not defined
404	MSR4058	Data type not found
404	MSR4059	Data row does not exist
404	MSR4065	Field is not set

Examples

Request 1

A request is made to get the *inputVolume* field in the *PQ1* data row of the *pooluota* transparent data for a pool.

Request URL

```
GET {BaseURI}/msr/pool/100000/data/poolquota/PQ1/inputVolume
```

Request Content

None

Response 1

The request is successful, and the requested field value is returned

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
<data name="poolquota">
<![CDATA[<?xml version="1.0" encoding="UTF-8"?>
<usage>
  <version>3</version>
  <quota name="PQ1">
    <inputVolume>980</inputVolume>
  </quota>
</usage>
]]>
</data>
</pool>
```

Request 2

A request is made to get the *outputVolume* field in the *Weekday* data row of the *poolquota* transparent data for a pool. Two instances of the *Weekday* data row exist.

Request URL

```
GET {BaseURI}/msr/pool/100000/data/poolquota/Weekday/outputVolume
```

Request Content

None

Response 2

The request is successful, and the field from two matching *Weekday* rows are returned.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
```

```
<data name="poolquota">
<![CDATA[<?xml version="1.0" encoding="UTF-8"?>
<usage>
  <version>3</version>
  <quota name="Weekday">
    <inputVolume>980</outputVolume>
  </quota>
  <quota name="Weekday">
    <inputVolume>2140</outputVolume>
  </quota>
</usage>
]]>
</data>
</pool>
```

6.5.2 Get Row Field Value

Description

This operation retrieves a field with a given value, within a transparent data row for the pool identified by the *poolId*.

If more than one row matches the requested *rowIdValue*, then all matching rows are returned.

The transparent data row identifier field value is specified in *rowIdValue*. The field name is specified in *fieldName*. The field value is specified in *fieldValue*.

The *rowIdValue* is case-sensitive. If a row existed called “DayPass”, then an attempt to get a field value in a row called “DayPass” would be successful, but an attempt to get a field value in a row called “DAYPASS” would fail

The *fieldValue* is case-sensitive. An attempt to get the value “Data” from a current field value of “Data” would be successful, but an attempt to get the value “DATA” would fail

Prerequisites

A pool with the key of the *poolId* supplied must exist.

The *transparentDataType* must reference a valid pooled transparent Entity in the Interface Entity Map table in the SEC.

A data row with the given identifier within the transparent data should exist for the pool.

The field name specified must be a valid field for the Entity as defined in the SEC.

The field value in *fieldValue* must match the specified value in the request.

Request URL

```
GET {baseURI}/msr/pool/poolId/data/transparentDataType/rowIdValue/fieldName/fieldValue
```

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

  Values: 1 to 9999999999999999999999

- transparentDataType: A user defined type/name for the transparent data

  Value is poolquota for the PoolQuota transparent data

- rowIdValue: The row name value that identifies the row within the transparent data blob
- fieldName: A user defined field within the transparent data row
- fieldValue: Corresponding field value assigned to fieldName

Request Content

None.

Response Content

A `<pool>` element that contains a `<data>` element, which contains the specified transparent data row field (if it exists) for the identified pool.

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <data name="transparentDataType">
<![CDATA[
cdataRowFieldValue
]]>
  </data>
</pool>
```

- transparentDataType: A user defined type/name for the transparent data

  Value is poolquota for the PoolQuota transparent data
- cdataRowFieldValue: Contents of the XML data “blob”, with the field from the row data

The response content is only present if the requested field is present in the transparent data row, and the field is set to the supplied value.

Table 64: Get Row Field Value Response Status/Error Codes

HTTP Status Code	Error Code	Description
200	—	Requested data row field/value exists for pool
400	MSR4053	Data row field value does not match
404	MSR4001	Pool is not found
404	MSR4002	Field is not defined for this data type
404	MSR4049	Data type is not defined
404	MSR4058	Data type not found
404	MSR4059	Data row does not exist

Examples

Request 1

A request is made to get the *inputVolume* field with the value of *980* in the *PQ1* data row of the *poolquota* transparent data for a pool. The *inputVolume* field exists, and is set to the value *980*.

Request URL

```
GET {BaseURI}/msr/pool/100000/data/poolquota/PQ1/inputVolume/980
```

Request Content

None

Response 1

The request is successful, and the requested field with the specified value is returned

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
<data name="poolquota">
<![CDATA[<?xml version="1.0" encoding="UTF-8"?>
<usage>
  <version>3</version>
  <quota name="PQ1">
    <inputVolume>980</inputVolume>
  </quota>
</usage>
]]>
</data>
</pool>
```

Request 2

A request is made to get the *outputVolume* field with the value of *2000* in the *PQ4* data row of the *poolquota* transparent data for a pool. The *outputVolume* field exists, but is set to the value 1500.

Request URL

```
GET {BaseURI}/msr/pool/100000/data/poolquota/PQ1/outputVolume/2000
```

Request Content

None

Response 2

The request fails because the requested field does not have the supplied value.

HTTP Status Code

400

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4053">errorText</error>
```

Request 3

A request is made to get the *inputVolume* field with the value of *2330* in the *Weekday* data row of the *poolquota* transparent data for a pool. Two instances of the *Weekday* data row exist. The *inputVolume* field exists in both rows, and is set to the value 3220 in both rows.

Request URL

```
GET {BaseURI}/msr/pool/100000/data/poolquota/Weekday/inputVolume/3220
```

Request Content

None

Response 3

The request is successful, and the field from two matching *Weekday* rows are returned.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
<data name="poolquota">
<![CDATA[<?xml version="1.0" encoding="UTF-8"?>
<usage>
  <version>3</version>
  <quota name="Weekday">
    <inputVolume>3220</inputVolume>
  </quota>
  <quota name="Weekday">
    <inputVolume>3220</inputVolume>
  </quota>
</usage>
]]>
</data>
</pool>
```

6.5.3 Update Row Field

Description

This operation updates a fields within a transparent data row for the pool identified by the *poolId*.

The transparent data row identifier field is value is specified in *rowIdValue*. The field name is specified in *fieldName*.

If the specified field is valid, but does not exist, it is created.

If more than one existing row matches the requested *rowIdValue*, then the update request fails.

The *rowIdValue* is case-sensitive. If a row already existed called “DayPass”, then an attempt to update a field in a row called “DayPass” would be successful, but an attempt to update a field in a row called “DAYPASS” would fail

Prerequisites

A pool with the key of the *poolId* supplied must exist.

The *transparentDataType* must reference a valid pooled transparent Entity in the Interface Entity Map table in the SEC.

A data row with the given identifier within the transparent data should exist for the pool.

The field name specified must be a valid field for the Entity as defined in the SEC. The field must be updatable.

Request URL

PUT {baseURI}/msr/pool/*poolId*/data/*transparentDataType*/*rowIdValue*/*fieldName*/*fieldValue*

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

  Values: 1 to 9999999999999999999999

- transparentDataType: A user defined type/name for the transparent data

Value is poolquota for the PoolQuota transparent data

- rowIdValue: The row name value that identifies the row within the transparent data blob
- fieldName: A user defined field within the transparent data row
- fieldValue: Corresponding field value assigned to fieldName

Request Content

None.

Response Content

None.

Table 65: Update Row Field Response Status/Error Codes

HTTP Status Code	Error Code	Description
201	—	Requested transparent data row field was successfully created
400	MSR4051	Invalid value for a field
400	MSR4056	Field is not updatable
400	MSR4067	Multiple matching rows found
404	MSR4001	Pool is not found
404	MSR4002	Field is not defined for this data type
404	MSR4049	Data type is not defined
404	MSR4058	Data type not found
404	MSR4059	Data row does not exist

Examples

Request 1

A request is made to update the *inputVolume* field in the *PQ1* data row of the *poolquota* transparent data for a pool.

Request URL

```
PUT {BaseURI}/msr/pool/100000/data/poolquota/PQ1/inputVolume/0
```

Request Content

None

Response 1

The request is successful, and the field in the data row in the PoolQuota transparent data was updated.

HTTP Status Code

201

Response Content

None.

Request 2

A request is made to update the *cid* field in the *PQ1* data row in the *poolquota* transparent data. The *cid* field is not allowed to be updated.

Request URL

```
PUT {BaseURI}/msr/pool/100000/data/poolquota/PQ1/cid/45678
```

Request Content

None

Response 2

The request fails, because the cid field cannot be updated.

HTTP Status Code

400

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4056">errorText</error>
```

Request 3

A request is made to update the *inputVolume* field in the *Weekday* data row of the *quota* transparent data for a pool. Two instances of the *Weekday* data row exist.

Request URL

```
PUT {BaseURI}/msr/pool/100000/data/poolquota/Weekday/inputVolume/0
```

Request Content

None

6.5.4 Delete Row Field

Description

This operation deletes a field within a transparent data row for the pool identified by the *poolId*.

The transparent data row identifier field value is specified in *rowIdValue*. The field name is specified in *fieldName*.

If more than one row matches the requested *rowIdValue*, then the delete request fails.

If the field with opaque data of the *opaqueDataType* does not exist, this is not considered an error and a successful result is returned.

If the field being deleted is mandatory, and is defined as having a default value, then the field is not removed, but has the default value assigned.

The *rowIdValue* is case-sensitive. If a row existed called “DayPass”, then an attempt to delete a field in a row called “DayPass” would be successful, but an attempt to delete a field in a row called “DAYPASS” would fail

Prerequisites

A pool with the key of the *poolId* supplied must exist.

The *transparentDataType* must reference a valid pooled transparent Entity in the Interface Entity Map table in the SEC.

A data row with the given identifier within the transparent data should exist for the pool.

The field name specified must be a valid field for the Entity as defined in the SEC. The field must be updatable.

Request URL

```
DELETE {baseURI}/msr/pool/poolId/data/transparentDataType/rowIdValue/fieldName
```

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

  Values: 1 to 9999999999999999999999
- transparentDataType: A user defined type/name for the transparent data

  Value is poolquota for the PoolQuota transparent data
- rowIdValue: The row name value that identifies the row within the transparent data blob
- fieldName: A user defined field within the transparent data row

Request Content

None.

Response Content

None.

Table 66: Delete Row Field Response Status/Error Codes

HTTP Status Code	Error Code	Description
204	—	Requested transparent data row field was successfully deleted
400	MSR4056	Field is not updatable
400	MSR4067	Multiple matching rows found
400	MSR4064	Occurrence constraint violation
404	MSR4001	Pool is not found
404	MSR4002	Field is not defined for this data type
404	MSR4049	Data type is not defined
404	MSR4058	Data type not found
404	MSR4059	Data row does not exist

Examples

Request 1

A request is made to delete the *inputVolume* field in the *PQ1* data row of the *poolquota* transparent data for a pool.

Request URL

```
DELETE {BaseURI}/msr/pool/100000/data/poolquota/PQ1/inputVolume
```

Request Content

None

Response 1

The request is successful, and the field in the data row in the PoolQuota transparent data was deleted.

HTTP Status Code

204

Response Content

None.

Request 2

A request is made to delete the *inputVolume* field in the *Weekday* data row of the *poolquota* transparent data for a pool. Two instances of the *Weekday* data row exist.

Request URL

```
DELETE {BaseURI}/msr/pool/100000/data/poolquota/Weekday/inputVolume
```

Request Content

None

Response 2

The request fails, as more than one row called *Weekday* exists.

HTTP Status Code

400

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4067">errorText</error>
```

6.6 Additional Pool Commands

Table 67: 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)	`POST {BaseURI}/msr/pool/poolId/member/subKeyName/subKeyValue`
Remove Member from Pool	Remove subscriber from a Pool		`DELETE {BaseURI}/msr/pool/poolId/member/subKeyName/subKeyValue`

Command	Description	Keys	Command Syntax
Get Pool Members	Retrieve pool member subscribers by PoolID	PoolID	`GET {BaseURI}/msr/pool/poolId/member`
Get PoolID	Retrieve PoolID for specified member subscriber	(MSISDN, IMSI, NAI or AccountId	`GET {BaseURI}/msr/sub/subKeyName/ subKeyValue/pool`

6.6.1 Add Member to Pool

Description

This operation adds a Subscriber to a Pool.

Prerequisites

A pool with the key of the *poolId* supplied must exist.

A subscriber with the key of the *keyName*/*keyValue* supplied must exist.

The subscriber must not already be a member of a pool.

The pool must have less than the maximum number of member subscribers allowed.

Request URL

```
POST {BaseURI}/msr/pool/poolId/member/subKeyName/subKeyValue
```

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

  Values: 1 to 9999999999999999999999
- subKeyName: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId
- subKeyValue: Corresponding key field value assigned to keyName

Request Content

None.

Response Content

None.

Table 68: Add Member to Pool Table 69 Response Status/Error Codes

HTTP Status Code	Error Code	Description
204	—	Subscriber successfully added to pool
400	MSR4060	Number of pool members exceeded
404	MSR4001	Subscriber is not found
404	MSR4061	Specified pool does not exist
409	MSR4055	Subscriber is already a member of a pool

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 already a member of a pool.

Request URL

```
POST {BaseURI}/msr/pool/100000/member/MSISDN/380561234567
```

Request Content

None

Response 1

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

HTTP Status Code

204

Response Content

None.

Request 2

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

Request URL

```
POST {BaseURI}/msr/pool/100009/member/IMSI/184569547984229
```

Request Content

None

Response 2

The request fails because the pool does not exist.

HTTP Status Code

404

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4061">errorText</error>
```

Request 3

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

Request URL

```
POST {BaseURI}/msr/pool/900000/member/NAI/mum@foo.com
```

Request Content

None

Response 3

The request fails because the subscriber does not exist.

HTTP Status Code

404

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4001">errorText</error>
```

Request 4

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

Request URL

```
POST {BaseURI}/msr/pool/100000/member/AccountId/10404723525
```

Request Content

None

Response 4

The request fails because the subscriber is already a member of a pool.

HTTP Status Code

409

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4055">errorText</error>
```

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 pool already has the maximum number of members allowed.

Request URL

```
POST {BaseURI}/msr/pool/100000/member/MSISDN/15141234567
```

Request Content

None

Response 5

The request fails because the pool has the maximum number of members allowed.

HTTP Status Code

400

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4060">errorText</error>
```

6.6.2 Remove Member from Pool

Description

This operation removes a Subscriber from a Pool.

Prerequisites

A pool with the key of the *poolId* supplied must exist.

A subscriber with the key of the *keyName*/*keyValue* supplied must exist.

The subscriber must be a member of the specified pool.

Request URL

```
DELETE {BaseURI}/msr/pool/poolId/member/subKeyName/subKeyValue
```

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

  Values: 1 to 9999999999999999999999
- subKeyName: A key field within the Subscriber Profile

  Value is either IMSI, MSISDN, NAI, or AccountId
- subKeyValue: Corresponding key field value assigned to keyName

Request Content

None.

Response Content

None.

Table 70: Remove Member from Pool Response Status/Error Codes

HTTP Status Code	Error Code	Description
204	—	Subscriber successfully removed from pool
404	MSR4001	Subscriber is not found
404	MSR4061	Specified pool does not exist
404	MSR4062	Subscriber is not a member of the given pool

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.

Request URL

```
DELETE {BaseURI}/msr/pool/100000/member/MSISDN/380561234567
```

Request Content

None

Response 1

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

HTTP Status Code

204

Response Content

None.

Request 2

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

Request URL

```
DELETE {BaseURI}/msr/pool/100000/member/MSISDN/380561234567
```

Request Content

None

Response 2

The request fails because the subscriber is not a member of the pool.

HTTP Status Code

404

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4062">errorText</error>
```

6.6.3 Get Pool Members

Description

This operation gets the list of Subscriber members of a Pool by *poolId*.

Prerequisites

A pool with the key of the *poolId* supplied must exist.

Request URL

```
GET {BaseURI}/msr/pool/poolId/member
```

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

  Values: 1 to 9999999999999999999999

Request Content

None.

Response Content

A `<members>` element that contains a `<member>` element for every subscriber that is a member of the pool. The `<member>` element is optional. There can be zero, one or many `<member>` elements. It is only present if the pool has member subscribers. One instance is present for every subscriber that is a member of the pool. A `<member>` element contains details about a single subscriber, containing all known user identities for that subscriber, one user identity per `<id>` element. There can be one or many `<id>` elements per `<member>` element.

```
<members>
[
  <member>
    <id><name>keyName1</name><value>keyValue1</value></id>
[
    <id><name>keyName2</name><value>keyValue2</value></id>
    :
    <id><name>keyNameN</name><value>keyValueN</value></id>
]
  </member>
]
[
  <member>
    <id><name>keyName1</name><value>keyValue1</value></id>
[
    <id><name>keyName2</name><value>keyValue2</value></id>
    :
    <id><name>keyNameN</name><value>keyValueN</value></id>
]
  </member>
  :
  <member>
    <id><name>keyName1</name><value>keyValue1</value></id>
[
    <id><name>keyName2</name><value>keyValue2</value></id>
              :
    <id><name>keyNameN</name><value>keyValueN</value></id>
]
  </member>
]
</members>
```

- keyNameX: A key field for the member subscriber

  Value is either IMSI, MSISDN, NAI, or AccountId
- keyValueX: Corresponding key field value assigned to keyNameX

Table 71: Get Pool Members Response Status/Error Codes

HTTP Status Code	Error Code	Description
200	—	Pool exists, and membership returned OK
404	MSR4061	Specified pool does not exist

Examples

Request 1

A request is made to get the list of subscribers for a pool.

Request URL

```
GET {BaseURI}/msr/pool/100000/member
```

Request Content

None

Response 1

The request is successful, and the 3 member subscribers are returned.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<members>
  <member>
    <id><name>IMSI</name><value>311480100000001</value></id>
    <id><name>IMSI</name><value>311480100532432</value></id>
    <id><name>NAI</name><value>dad@operator.com</value></id>
  </member>
  <member>
    <id><name>MSISDN</name><value>380561234777</value></id>
    <id><name>IMSI</name><value>311480100000999</value></id>
  </member>
  <member>
    <id><name>NAI</name><value>joe@wireless.com</value></id>
    <id><name>NAI</name><value>p12321@mynet.com</value></id>
  </member>
</members>
```

Request 2

A request is made to get the list of subscribers for a pool. The pool exists, but has no member subscribers.

Request URL

```
GET {BaseURI}/msr/pool/200000/member
```

Request Content

None

Response 2

The request is successful, and no member subscribers are returned.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<members>
```

```
</members>
```

Request 3

A request is made to get the list of subscribers for a pool. The pool does not exist.

Request URL

```
GET {BaseURI}/msr/pool/300000/member
```

Request Content

None

Response 3

The request fails, because the pool was not found.

HTTP Status Code

404

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4061">errorText</error>
```

6.6.4 Get PoolID

Description

This operation gets the PoolID related to a subscriber, based on the given user identity of the subscriber.

Prerequisites

A subscriber with the key of the *keyName*/*keyValue* supplied must exist.

The subscriber must be a member of a pool.

Request URL

```
GET {BaseURI}/msr/sub/keyName/keyValue/pool
```

- keyName: A key field for the member subscriber

  Value is either IMSI, MSISDN, NAI, or AccountId
- keyValue: Corresponding key field value assigned to keyName

Request Content

None.

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <field name="PoolID">poolId</field>
</pool>
```

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

  Values: 1 to 9999999999999999999999

Table 72: Get PoolID Response Status/Error Codes

HTTP Status Code	Error Code	Description
200	—	Subscriber pool membership successfully returned
404	MSR4001	Subscriber is not found
404	MSR4062	Subscriber is not a member of a pool

Examples

Request 1

A request is made to get the PoolID for a subscriber. The subscriber is a member of a pool.

Request URL

```
GET {BaseURI}/msr/sub/MSISDN/380561234567/pool
```

Request Content

None

Response 1

The request is successful, and the PoolID value was returned.

HTTP Status Code

200

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<pool>
  <field name="PoolID">100000</field>
</pool>
```

Request 2

A request is made to get the PoolID for a subscriber. The subscriber is nota member of a pool.

Request URL

```
GET {BaseURI}/msr/sub/NAI/joe@foo.com/pool
```

Request Content

None

Response 2

The request fails, because the subscriber is not a member of a pool.

HTTP Status Code

404

Response Content

```
<?xml version="1.0" encoding="UTF-8"?>
<error code="MSR4062">errorText</error>
```

APPENDIX A REST INTERFACE SYSTEM VARIABLES

The REST interface has a set of system variables that affect its operation as it runs. REST interface variables (Table 73) can be set using the UDR GUI and can be changed at runtime to effect dynamic server reconfiguration.

Table 73: Bulk Import/Export variables

Parameter	Description
REST Interface Port	REST Interface TCP Listening Port. **NOTE:** Changes to the TCP listening port do not take effect until the udrprov process is restarted. Also, you must specify a different port than the SOAP interface. Default is 8787; Range is 0 to 65535
REST Interface Idle Timeout	The maximum time (in seconds) that an open REST connection remains active without a request being sent, before the connection is dropped. Default is 1200; Range is 1 to 86400
Maximum REST Connections	Maximum number of simultaneous REST Interface client connections. Default is 100; Range is 1 to 100
Allow REST Connections	Whether or not to allow incoming provisioning connections on the REST Interface. Default is checked
REST Secure Mode	Whether the REST Interface operates in secure mode (using TLS), or unsecure mode (plain text). **NOTE:** Changes to the Secure Mode do not take effect until the udrprov process is restarted. Default is Unsecure
Transaction Durability Timeout*	The amount of time (in seconds) allowed between a transaction being committed and it becoming durable. If Transaction Durability Timeout lapse, DURABILITY_TIMEOUT response is sent to the originating client. The associated request is resent to ensure that the request was committed. Default is 5; Range is 2 is 3600
Compatibility Mode*	Indicates whether backwards compatibility is enabled. **NOTE:** Change to Compatibility Mode may cause the existing provisioning connections to be dropped. Default is R10+

APPENDIX B LEGACY SPR COMPATIBILITY MODE

UDR can be configured to run in a compatibility mode with the legacy SPR.

When the `Compatibility Mode` system option (see Appendix A), which is configurable by the UDR GUI is set to "R10+" then UDR functions as described in the main body of this document. When `Compatibility Mode` is set to "R9.x", then the differences contained in this appendix apply.

Enabling this configuration option results in the format of some request/responses being different to the default UDR behavior. This appendix lists the different request/responses that enabling the option applies to.

B.1 Get Row Response Format

UDR returns a data row in the format it is defined/stored (either "Field Based" or "Element Based"). The legacy SPR returns a (Quota) data row in "Element Based" format, even though the Quota entity is "Element Based".

When configured in legacy SPR mode, UDR returns the (Quota) data row in "Field Based" format, within the CDATA. For example:

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <data name="quota">
<![CDATA[
<?xml version="1.0" encoding="UTF-8"?>
<usage>
  <version>3</version>
  <field name="cid"/>
  <field name="time"/>
  <field name="totalVolume">0</field>
  <field name="inputVolume">0</field>
  <field name="outputVolume">0</field>
  <field name="serviceSpecific"/>
  <field name="nextResetTime"/>
  <field name="Type">quota</field>
  <field name="grantedTotalVolume">0</field>
  <field name="grantedInputVolume">0</field>
  <field name="grantedOutputVolume">0</field>
  <field name="grantedTime"/>
  <field name="grantedServiceSpecific"/>
  <field name="QuotaState">Valid/Inactive</field>
  <field name="RefInstanceId"/>
  <field name="name">test</field>
</usage>
]]>
  </data>
</subscriber>
```

If more than one matching row is found, then multiple <quota> rows are returned.

For example:

```
<?xml version="1.0" encoding="UTF-8"?>
<subscriber>
  <data name="quota">
<![CDATA[
<?xml version="1.0" encoding="UTF-8"?>
<usage>
```

```
  <version>3</version>
  :
</usage>
]]>
  </data>
</subscriber>

<subscriber>
  <data name="quota">
<![CDATA[
<?xml version="1.0" encoding="UTF-8"?>
<usage>
  <version>3</version>
  :
</usage>
]]>
  </data>
</subscriber>
```

APPENDIX C 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 the 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 **2** for Non-technical issue

You are connected to a live agent who can assist you with My Oracle Support registration and provide Support Identifiers. Mention you are a Tekelec Customer new to My Oracle Support.

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APPENDIX E LOCATE PRODUCT DOCUMENTATION ON THE ORACLE TECHNOLOGY NETWORK SITE

Oracle 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 www.adobe.com.

1. Go to the Oracle Help Center site at http://docs.oracle.com.
2. Click **Applications**.
3. Select **Apps A-Z**.
4. Click **Communications**.
5. In the Network Session Delivery and Control Infrastructure section, click User Data Repository.
6. Click release number.
7. To download a file to your location, click the download icon.