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About This Document

Scope
The scope of this document includes all functionality a user must know in order to effectively operate the OSA CHAM Client Interface and BE Plugins. It does not include detailed design of the service.

Audience
This guide is written primarily for OSA Client Interface and BE Plugin administrators. However, the overview sections of the document are useful to anyone requiring an introduction.

Prerequisites
Although there are no prerequisites for using this guide, familiarity with the target platform would be an advantage.

A solid understanding of UNIX and a familiarity with IN concepts are an essential prerequisite for safely using the information contained in this technical guide. Attempting to install, remove, configure or otherwise alter the described system without the appropriate background skills, could cause damage to the system; including temporary or permanent incorrect operation, loss of service, and may render your system beyond recovery.

This manual describes system tasks that should only be carried out by suitably trained operators.

Related Documents
The following documents are related to this document:

- Charging Control Services Technical Guide
- Charging Control Services User’s Guide
- Event Detail Record Reference Guide
- Service Management System Technical Guide
- Voucher and Wallet Server Technical Guide
**Document Conventions**

**Typographical Conventions**

The following terms and typographical conventions are used in the Oracle Communications Network Charging and Control (NCC) documentation.

<table>
<thead>
<tr>
<th>Formatting convention</th>
<th>Type of information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Special Bold</strong></td>
<td>Items you must select, such as names of tabs. Names of database tables and fields.</td>
</tr>
<tr>
<td><strong>Italics</strong></td>
<td>Name of a document, chapter, topic or other publication. Emphasis within text.</td>
</tr>
<tr>
<td><strong>Button</strong></td>
<td>The name of a button to click or a key to press. <strong>Example:</strong> To close the window, either click <strong>Close</strong>, or press <strong>Esc</strong>.</td>
</tr>
<tr>
<td><strong>Key+Key</strong></td>
<td>Key combinations for which the user must press and hold down one key and then press another. <strong>Example:</strong> Ctrl+P, or Alt+F4.</td>
</tr>
<tr>
<td><strong>Monospace</strong></td>
<td>Examples of code or standard output.</td>
</tr>
<tr>
<td><strong>Monospace Bold</strong></td>
<td>Text that you must enter.</td>
</tr>
<tr>
<td><strong>variable</strong></td>
<td>Used to indicate variables or text that should be replaced with an actual value.</td>
</tr>
<tr>
<td><strong>menu option &gt; menu option &gt;</strong></td>
<td>Used to indicate the cascading menu option to be selected, or the location path of a file. <strong>Example:</strong> Operator Functions &gt; Report Functions <strong>Example:</strong> /IN/html/SMS/HelpText/</td>
</tr>
<tr>
<td><strong>hypertext link</strong></td>
<td>Used to indicate a hypertext link on an HTML page.</td>
</tr>
</tbody>
</table>

Specialized terms and acronyms are defined in the glossary at the end of this guide.
Chapter 1

System Overview

Overview

Introduction

This chapter provides a high-level overview of the application. It explains the basic functionality of the system and lists the main components.

It is not intended to advise on any specific Oracle Communications Network Charging and Control (NCC) network or service implications of the product.

In this Chapter

This chapter contains the following topics.

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Introduction

Purpose

The OSA Gateway Client Interface allows proprietary ASPs to utilise the billing, account management, and functionality of the NCC Voucher and Wallet Server (VWS) using the interface defined in the 3GPP OSA/Parlay specifications.

The OSA specifications define an architecture that enables application service providers to make use of network functionality through an open, standardized interface API. The purpose of this interface is to shield the complexity of the network, its protocols, and specific implementations from the client application.

The OSA CHAM (Charging and Account Management) gateway implements a subset of the OSA APIs for the account management and charging service capability features.
System architecture

Here is an example of the system architecture of the OSA Gateway solution.

![System Architecture Diagram]

**Process**

This shows how an OSA action is processed.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The OSA Client communicates with the Service Capability Server, running the OSA CHAM Gateway. osaChamScs provides a connection point for the client.</td>
</tr>
<tr>
<td>2</td>
<td>During billing operations (reservations, debits and credits) BeClient communicates with the VWS through beServer. OSA CHAM plugins to beServer handle requests.</td>
</tr>
<tr>
<td>3</td>
<td>OSA CHAM plugins enable beVWARS to execute OSA CHAM actions.</td>
</tr>
<tr>
<td>4</td>
<td>osaChamScs generates Call Data Records which are saved to a file and moved onto the SMS, or other CDR processing platform.</td>
</tr>
</tbody>
</table>

**Components**

The OSA Gateway client interface and the billing engines:

- Must be run on separate machines
- Can be implemented on separate networks, if required
The client application can be any third-party solution that connects to the OSA Gateway client interface.

**osaChamScs**

The OSA CHAM SCS client interface receives requests from the OSA client application and converts these to billing engine (BE) client messages. Communication between the VWS and the client interface is done using the OSA CHAM SCS BE plugins. The client interface implements methods that are supported by the OSA Gateway. Only a subset of the complete specification is supported by the client interface.

**osaChamBe**

The OSA CHAM SCS uses the following BE plugins to communicate between the OSA CHAM SCS client interface and the VWS:

- The charging plugin for reservations and queries to the VWARS component of the VWS.
- The account management plugin for account queries based on MSISDN, wallet type name, balance type name, and balance type cascade.
- The notification plugin for notification events to be set on subscriber accounts for charging, recharging, or low balance notifications. The subscriber will receive a notification whenever one of the events is triggered.

For more information about the BE plugins used by the OSA CHAM SCS client interface, see *Charging Control Services Technical Guide*.

**osaChamSms**

The OSA CHAM SMS package adds entries to the SMF database in the SMS replication table ‘REP_CNFS’ on the SMS node. This action will cause the required tables to be replicated from the SMS to the target platform where the OSA Gateway resides. If the OSA Gateway is not being used in conjunction with CCS, or the customer has not purchased CCS, then this optional package need not be installed.

The following tables also need to be replicated to each of the billing engines:

1. OSA_NOTIFICATION
2. OSA_TAGGED_BALANCE

**Relationship diagram**

This diagram shows the relationships between the OSA CHAM Gateway on the SCS and the SMS, SLC, and VWS nodes and applications.
ACS and CCS provide call and data services.

VWS executes tariffing and business rule requests.

SMS provides platform support systems.

OSA CHAM SCS on the SCS provides the gateway to the client application.

OSA Account Management

Introduction

OSA account management consists of communication between the client account manager and the gateway account manager. In most cases, the message flows originate with the client.

OSA CHAM supports the following account management actions:

- Query an account
- Account transaction history
- Notifications
Message flow diagram

Here is an example message flow for Account Management.

1. The setCallback method must be the first in the sequence of method calls.
2. This is followed by an Account management method call (for example: queryBalanceReq).

Querying an account

The Query Balance Request finds:
- The value of a specific wallet balance and additional wallet information.
- The value of a specific wallet balance cascade and additional wallet information.

Account transaction history

You can obtain the transaction history for a single wallet and balance type over a given time period.

Notification triggers

You can create, change, and disable cause notification triggers on accounts and wallets on the billing engine. The client receives report notifications when a charging event fires the trigger.

OSA Charging Management

Introduction

OSA charging management consists of communication between the client charging manager and the gateway charging manager. In most cases, the message flows originate with the client.

OSA charging management supports the following charging actions:
- Amount-based reservations, debits, and credits
- Amount-based direct debits and credits
- Unit-based reservations, debits, and credits (unit seconds and unit named events)
- Unit-based direct debits and credits (unit seconds and unit named events)
- Support operations to query outstanding reservation amounts, reservations lifetimes, and rating tariffs
Message flow diagram

Here is an example message flow for Charging Management.

1. The setCallback method must be the first in the sequence of method calls.
2. This is followed by a createChargingSession method call. This returns a new charging session to the client.

Charging sessions

Charging sessions will be closed as a result of one of the following events:

- It is released by the client application using the release method.
- A session times out on the OSA Gateway and the BE and the sessionEnded method is invoked on the client application.
- An exceptional event causes the OSA Gateway to invoke the sessionAborted method on the client application.

A charging session can consist of a sequential series of reservation sessions interspersed with direct debits and credits.

Amount and unit-based methods cannot be mixed within a single reservation.

Charging session management

OSA charging session management consists of communication between the client charging session and the gateway charging session. In most cases, the message flows originate with the client.

The createChargingSession method must have been previously called to create the current charging session.

The session ID uniquely identifies the charging session.

The request number identifies the sequence of the request within the charging session.

Amount-Based Transactions

Charging management

For amount-based charging management, you can:

- Create multiple charging sessions to allow multiple amount reservations to be opened in parallel.
- Use the reserve amount request to make an amount-based reservation on a wallet or balance type, or to increase the reserved amount on an existing reservation.
- Use the debit or credit amount request to debit, or credit against a current reservation.
• Use the reserve amount request to extend the reservation lifetime or increase the reserved amount.
• Use the debit or credit amount request to confirm debited funds and charge a wallet or balance type.
• Use the direct debit or credit amount request to make a direct, or credit charge against the wallet or balance types.
• Use the direct debit or credit amount request to change the wallet expiry date, or extend the balance expiry date.
• Use balance type cascade to ignore the balance type. If the balance type cascade is specified then the balance type will be ignored.

**Charging party fields**

Charging management uses OSA-specific functionality to perform amount-based reservations and direct debits.

Charging parameters are common for all methods, however due to differences between method types, certain parameters will only be used in some method invocations.

The lifetime field is used in the initial reservation request to set the lifetime of the reservation. In subsequent requests the lifetime value is added to the remaining lifetime of the reservation.

Wallet type and balance type can be used to specify a particular wallet or balance type to be charged. If not specified, the defaults for this account will be used.

Wallet and balance expiry dates can be changed by using balance validity and wallet validity fields in the direct debit, or credit amount requests.

It is also possible to extend the lifetime of the current reservation on the OSA Gateway and the BE, using an extend lifetime request operation.

Balance type cascade can be used to ignore the balance type. If the balance type cascade is specified then the balance type will be ignored.

**OSA discount**

OSA discount is a percentage discount that is applied to the amount before charging is applied.

Valid values are 0 – 10000 where these are in 1/100th of a percent; for example, 500 would equate to a 5% discount.

The discount will be applied to the charge using the following rules:

• An OSA discount may be applied to the charge for only amount-based charges
• The OSA discount is applied in one of the following ways, depending on the BE configuration:
  • Override - ignores OSA discount
  • Cumulative - applies OSA discount
  • Compound - applies OSA discount

**Example EDRs**

Here are some example amount-based EDRs.

• Example amount-based confirmation OSA gateway EDR:

```plaintext
21|Session=New ChargingSession|Merchant=Merchant Id/1|
Account=912233289900/Personal/General Cash|ReservedAmount=50|
ConfirmedAmount=20|Reservation=20031106133119|
Confirmed=20031106133147|RES=50;LIF=180;DEB=20|
ApplicationDescription=ReserveAmountReq:DebitAmountReq|
UnitType=amount|DiscountOverride=0|N
```
For amount-based direct charges an EDR will always be written on the SCS. No Billing Engine Rate request is required as the amount is already known. Example direct debit/credit amount-based OSA Gateway EDR:

```
23|Session=New ChargingSession|Merchant=Merchant Id/1
|Account=91223289900/Personal/General Cash|Amount=-10
|Postpaid|Time=20031106133230|ApplicationDescription=DirectDebitAmountReq
|UnitType=amount|DiscountOverride=0|N
```

Example amount-based reservation BE EDR:

```
BILLING_ENGINE_ID=1|SCP_ID=198248872|SEQUENCE_NUMBER=4494|CDR_TYPE=21|RECORD_DATE=20031119140101|ACCT_ID=2146|ACCT_REF_ID=2123|WALLET_TYPE=23|BALANCE_TYPE=49|BALANCES=9270|COSTS=10
APPLICATION_DESC=ReserveAmountReq:DebitAmountReq:ReserveAmountReq(subsequent)
```

Example amount-based direct debit/credit BE EDR:

```
BILLING_ENGINE_ID=1|SCP_ID=198248872|SEQUENCE_NUMBER=4495|CDR_TYPE=23|RECORD_DATE=20031119140145|ACCT_ID=2146|ACCT_REF_ID=2123|WALLET_TYPE=23|BALANCE_TYPE=49|BALANCES=9260|COSTS=-10
APPLICATION_DESC=DirectDebitAmountReq|OLD_BALANCE_EXPIRIES=0|NEW_BALANCE_EXPIRIES=0|BONUS_TYPE=CUSTOM|REFERENCE=OSA Bonus
```

For more information, see OSA CHAM SCS Gateway (on page 68) and Billing Engine EDRs (on page 68).

### Unit-Based Transactions

#### Charging management

For unit-based charging management, you can:

- Create multiple charging sessions to allow multiple unit reservations to be opened in parallel.
- Use the reserve unit request to make an unit-based reservation on a Wallet/ Balance Cascade or to increase the reserved unit on an existing reservation.
- Use the debit/credit unit request to debit or credit against a current reservation.
- Use the reserve unit request to extend the reservation lifetime and/ or increase the reserved unit.
- Use the debit/credit unit request to confirm debited funds and charge a Wallet/ Balance Cascade.
- Use the direct debit/credit unit request to make a direct/credit charge against the Wallet/ Balance Cascade.

#### Charging party fields

Charging management uses existing CCS functionality to perform unit-based reservations and direct debits.

The wallet type can be used to specify a particular wallet type to be charged. If not specified the default wallet type for the account is used.

All unit-based reservations use the balance cascade defined through CCS.

Wallet and balance expiry dates can be changed by the unit-based methods.

An extend lifetime request (ExtendLifeTimeReq() method) can be used to extend the lifetime of a current reservation on the OSA Gateway and the billing engine.

#### Lifetime

The lifetime field in the initial reservation request determines the lifetime of the reservation on the OSA Gateway and the Billing Engine. If not specified, the default lifetime is 30 seconds.
For unit seconds-based reservations, the lifetime also determines the number of unit seconds reserved (unless this value is scaled down to match the available Wallet Balance).

- The reservation lifetime on the OSA Gateway will be set to the number of units (seconds) which the BE returns in the acknowledgement.
- If the lifetime requested is less than the BE minimum call length, the acknowledgement will return zero. This will close the session immediately.
- In subsequent reservations, the lifetime will be extended by the lifetime value from the initial reservation.

For unit-named event based reservations, the reservation lifetime on the OSA Gateway will be set to the number of seconds the BE returns in the acknowledgement. The lifetime field in subsequent reservations is ignored, the reservation lifetime cannot be extended.

**OSA discount**

OSA discount is a percentage discount applied to the final cost before charging is applied. Valid values are 0 – 10000 where these are in 1/100th of a percent; for example, 500 would equate to a 5% discount.

The discount will be applied to the charge using the following rules:

- For unit named-events only an OSA discount may be applied to the charge.
- For unit seconds a CCS tariff discount may also be applied to the charge.
- The OSA discount is applied in one of the following ways, depending on the BE configuration:
  - Override - ignores OSA Discount
  - Cumulative - combines CCS Discount and OSA Discount
  - Compound - applies CCS Discount, then applies OSA Discount

**Example EDRs**

Here are some example unit-based BE EDRs.

- **Example unit-seconds based reservation BE EDR:**
  
  BILLING_ENGINE_ID=1|SCP_ID=198248872|SEQUENCE_NUMBER=4572|CDR_TYPE=24|RECORD_DATE=20031119155328|ACCT_ID=2146|ACCT_REF_ID=2123|CLI=01473|ACS_CUST_ID=22|BALANCE_TYPES=49|BALANCES=60|COSTS=83|ACCOUNT_TYPE=22|CASCADE_ID=21|RATES=20,20,20,20,10,10,10,10,10|LENGTHS=60,60,60,60,60,60,60,60,60,60|DISCOUNTS=250000,250000,250000,250000,250000,250000,250000,250000,250000,500000|MAX_CHARGE=-1|DURATION=360|TN=01394|TCS=2003111915523|TCE=2003111915523|CS=S|DISCOUNT_TYPE=CUMULATIVE|APPLICATION_DESC=ReserveUnit(Seconds)Req:DebitUnitReq

- **Example unit-named event based reservation BE EDR:**
  
  BILLING_ENGINE_ID=1|SCP_ID=198248872|SEQUENCE_NUMBER=4487|CDR_TYPE=25|RECORD_DATE=20031119135502|ACCT_ID=2146|ACCT_REF_ID=2123|APPLICATION_DESC=ReserveUnit(NamedEvents)Req:DebitUnitReq:CreditUnitReq|ACS_CUST_ID=22|CS=S|TCS=20031119135121|BALANCE_TYPES=49|BALANCES=8985|COSTS=700|ACCOUNT_TYPE=22|EVENT_CLASS=OSA2BE|EVENT_NAME=event1|EVENT_COST=100|EVENT_COUNT=7|DISCOUNT=0|CASCADE=21

- **Example unit-seconds based direct credit/debit BE EDR:**
BILLING_ENGINE_ID=1|SCP_ID=198248872|SEQUENCE_NUMBER=4490|CDR_TYPE=26|
RECORD_DATE=20031119135814|ACCT_ID=2146|ACCT_REF_ID=2123|CLI=01473|
ACS_CUST_ID=22|BALANCE_TYPES=49|BALANCES=8285|COSTS=15|ACCOUNT_TYPE=22|
CASCADE_ID=21|RATES=20,20,20,20,20,10,10,10,10,10|
LENGTHS=60,60,60,60,60,60,60,60,60,,1|
DISCOUNTS=250000,250000,250000,250000,250000,250000,250000,250000,500000|
MAX_CHARGE=100000|DURATION=10|TN=01394|TCS=20031119135432|TCE=20031119135442|
CS=S|DISCOUNT_TYPE=CUMULATIVE|APPLICATION_DESC=DirectCreditUnit(Seconds)|

- Example unit-named event based direct credit/debit BE EDR:

```
BILLING_ENGINE_ID=1|SCP_ID=198248872|SEQUENCE_NUMBER=4492|CDR_TYPE=27|
RECORD_DATE=20031119135935|ACCT_ID=2146|ACCT_REF_ID=2123|APPLICATION_DESC=
DirectDebitUnit(NamedEvents)Req|ACS_CUST_ID=22|CS=S|TCS=20031119135554|
BALANCE_TYPES=49|BALANCES=8270|COSTS=-1000|ACCOUNT_TYPE=22|
EVENT_CLASS=OSA2BE|EVENT_NAME=event1|EVENT_COST=100|EVENT_COUNT=10|DISCOUNT=0|
CASCADE=0
```

For more information, see *Billing Engine EDRs* (on page 68).

### Post-paid charging

For unit-second based direct charges, the MSISDN will be checked against ranges defined in the configuration file on the SCS. This configuration parameter will provide the post-paid subscriber number that will be used to determine the Rating information on the Billing Engine.

For unit Named Event-based direct charges, only the Named Event is required to determine the Rating information on the BE.

Using the Rating information from the BE the OSA Gateway will calculate the cost for the requested units and then write a CDR on the SCS.

```
23|Session=New ChargingSession|Merchant=Merchant
Id/1|Account=912233289900/Personal|Amount=-10|Postpaid|
Time=20031106133230|ApplicationDescription=DirectDebitUnitReq|
UnitType=tariff.91.44|DiscountOverride=0|N
```

### Communications Framework

#### Introduction

The client application and the OSA Gateway communicate using the Common Object Reference Broker Architecture (CORBA).

On start-up, the:

- OSA gateway writes the Interoperability Object References (IORs) to a known location which is specified by configuration parameters.
  The IORs are composed of the port number, and the IP address or hostname that should be used to communicate with the OSA gateway.
- The client application must read the OSA gateway IORs and determine the appropriate references to the account manager and charging manager. These references will be used when calling the account manager and the charging manager methods on the OSA gateway.
Sending Notification Short Messages

Introduction

Some client actions may have a flag set to send a notification SMS to the subscriber.

Diagram

OSA CHAM Gateway supports notification SMS functionality as shown in this diagram.

**Process**

Here is the notification SMS process.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The OSA client sends a request for a subscriber notification to osaChamScs on the SCS.</td>
</tr>
<tr>
<td>2</td>
<td>osaChamScs writes the required notification details to the fifo file for ccsSSMDispatcher.</td>
</tr>
<tr>
<td>3</td>
<td>ccsSSMDispatcher creates a notification request for ccsSSMMaster on the SLC.</td>
</tr>
<tr>
<td>4</td>
<td>ccsSSMMaster creates the notification SMS and forwards it to NotificationIF.</td>
</tr>
<tr>
<td>5</td>
<td>NotificationIF forwards the SMS to SMSC IF, which sends it to an SMSC for delivery to the subscriber.</td>
</tr>
</tbody>
</table>

**Post-Paid Charging**

Introduction

Post paid charging:

- Applies only to direct debit and direct credit transactions
- Processes the Call Data Records(CDRs) to calculate the user’s charges after the event
- Occurs only if the MSISDN does not exist in the CCS database; the assumption is made that this is not a pre-paid account.
This table shows how a cost for the charge is determined.

<table>
<thead>
<tr>
<th>Direct Charge Type</th>
<th>A rating request is made using...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit-seconds based</td>
<td>A configured MSISDN</td>
</tr>
<tr>
<td>Unit-named event based</td>
<td>The named event</td>
</tr>
</tbody>
</table>
Overview

Introduction

This chapter explains how to configure the Oracle Communications Network Charging and Control (NCC) application.

In this chapter

This chapter contains the following topics.

- Configuration Overview ................................................................. 13
- eserv.config Configuration ............................................................ 15
- Configuring OSA CHAM on the SLC .................................................. 15
- Configuring OSA CHAM on the VWS ............................................... 34

Configuration Overview

Introduction

This topic provides a high level overview of how the OSA CHAM client interface and BE plugins are configured.

There may be other configuration options, added to the configuration files that are not explained in this chapter. These configuration options are required by the application and should not be changed by the user.

Configuration Components

OSA CHAM is configured by the following components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Locations</th>
<th>Description</th>
<th>Further Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>eserv.config.scs</td>
<td>All SLC nodes</td>
<td>OSA CHAM client interface is configured by the osaCham section in eserv.config.scs. OSA CHAM CORBA services are configured by the CorbaServices section in the eserv.config.scs file.</td>
<td>Configuring OSA CHAM on the SLC (on page 15)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Note:</strong> If you include the CorbaServices section in eserv.config.scs, then the CorbaServices configuration overrides the default values for the OSA CHAM CORBA listen port and listen addresses.</td>
<td></td>
</tr>
<tr>
<td>eserv.config</td>
<td>All VWS nodes</td>
<td>OSA CHAM BE plugins are</td>
<td></td>
</tr>
</tbody>
</table>
### Chapter 2

<table>
<thead>
<tr>
<th>Component</th>
<th>Locations</th>
<th>Description</th>
<th>Further Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLEE.cfg</td>
<td>All SLC nodes and BEs</td>
<td>configured by the osaCham section in eserv.config.</td>
<td>CHAM on the VWS (on page 34)</td>
</tr>
</tbody>
</table>

### About the BE Plugins Configuration

The BE plugins used by OSA CHAM read configuration from the `eserv.config` configuration file on the VWS. You must ensure that the `eserv.config` file on the VWS includes the osaCham configuration section, and the following sub-sections:

- NotificationDatabase
- NotificationQueueManager
- NotificationEvents
- NotificationServerHandler

The osaCham section is parsed by the OSA BE plugins and beVWARS handlers.

You must also ensure that any configuration parameters that are specific to OSA CHAM are included in the following sections in the `eserv.config` file:

- BE
- beVWARS
- CCS

### About Configuring CORBA Connections for OSA CHAM

The CorbaServices section in the `eserv.config` configuration file on the SLC nodes defines common connection parameters for CORBA services for OSA CHAM. The CorbaServices configuration overrides the default and command-line values specified for CORBA listen ports and addresses. If you are using IP version 6 addresses, you must include the CorbaServices section in the `eserv.config` file. However, this section is optional if you are using only IP version 4 addresses.

You configure the CorbaServices section of the `eserv.config` configuration file on the SLC by using the following syntax:

```plaintext
CorbaServices = {
    AddressInIOR = "hostname"
    osaChamOrbListenPort = port
    OrbListenAddresses = [
        "ip_address1",
        "ip_address2",
        ...
    ]
}
```

Where:

- `hostname` is the hostname or IP address to place in the IOR (Interoperable Object Reference) for the CORBA service.
- `port` is the number of the port on which OSA CHAM will listen. The `osaChamOrbListenPort` parameter overrides the port number set by the `ORBIIOPort` parameter.
- `ip_address1`, `ip_address2` is a list of IP addresses on which the CORBA service will listen for incoming requests. The list of IP addresses in the `OrbListenAddresses` parameter can include both IP version 6 and IP version 4 addresses. The `OrbListenAddresses` parameter overrides the IP address set by the `ORBIIPAddr` parameter.
For more information about CORBA services configuration, see *Service Management System Technical Guide*.

**eserv.config Configuration**

**Introduction**

The `eserv.config` file is a shared configuration file, from which many Oracle Communications Network Charging and Control (NCC) applications read their configuration. Each NCC machine (SMS, SLC, and VWS) has its own version of this configuration file, containing configuration relevant to that machine. The `eserv.config` file contains different sections; each application reads the sections of the file that contains data relevant to it.

The `eserv.config` file is located in the `/IN/service_packages/` directory.

The `eserv.config` file format uses hierarchical groupings, and most applications make use of this to divide the options into logical groupings.

**eserv.config Files Delivered**

Most applications come with an example `eserv.config` configuration in a file called `eserv.config.example` in the root of the application directory, for example, `/IN/service_packages/eserv.config.example`.

**Editing the file**

Open the configuration file on your system using a standard text editor. Do not use text editors, such as Microsoft Word, that attach control characters. These can be, for example, Microsoft DOS or Windows line termination characters (for example, `^M`), which are not visible to the user, at the end of each row. This causes file errors when the application tries to read the configuration file.

Always keep a backup of your file before making any changes to it. This ensures you have a working copy to which you can return.

**Loading eserv.config changes**

If you change the configuration file, you must restart the appropriate parts of the service to enable the new options to take effect.

**Configuring OSA CHAM on the SLC**

**Introduction**

The OSA CHAM client interface is configured by the `eserv.config.scs` configuration file located in the following directory on the SLC:

```
/IN/service_packages
```

If the file cannot be found, or if read permissions are not set, then a suitable ‘CRITICAL ERROR’ is displayed to the standard output and the client interface exits.

**Example configuration file**

Here is the example `osaCham` section in the `eserv.config.scs` configuration file.

```java
osaCham = {
    AllowDirectPostPaid = false
}
```
AllowInvalidReleaseSequenceNumber = true
MaximumAmountValue = 1000
MaximumSecondsValue = 3600
MaximumEventsValue = 100
ORBDebugLevel = 0
ORBIIOPPort = 1025
ORBIIOPAddr = "xxx.xxx.xxx.xxx"
ORBIIOPSetKeepalive = true
OracleUsernamePassword = "scp/scp"
requestTimeout = 10000
CDRDirectory = "/IN/service_packages/OSA/cdr"
CDRMaxAge = 60
CDRMaxSize = 100
fifoFileName = "/tmp/ccsSSMRequest.fifo"
SMSLanguage = "unknown"
AlwaysSendNotification = false
AlwaysUseAbsoluteCostValueForNotifications = false
OverrideInitialTariffCdrType = true
OverrideInitialEventCdrType = true
ipAccountManagerIORFile = "/tmp/ipAccountManagerIOR.txt"
ipChargingManagerIORFile = "/tmp/ipChargingManagerIOR.txt"
clientName = "exampleConfigBeClient"
connectionRetryTime = 5
heartbeatPeriod = 5000000
plugins = [
    {
        config="voucherRechargeOptions",
        library="libccsClientPlugins.so",
        function="makeVoucherRechargePlugin"
    },
    {
        config="voucherTypeRechargeOptions",
        library="libccsClientPlugins.so",
        function="makeVoucherTypeRechargePlugin"
    },
    {
        config="",
        library="libclientBcast.so",
        function="makeBroadcastPlugin"
    }
]

voucherRechargeOptions = {
    voucherRechargeTriggers = ["VRW"]
}

voucherTypeRechargeOptions = {
    voucherTypeRechargeTriggers = ["VTR"]
}

beLocationPluginLib = "/IN/service_packages/CCS/lib/libGetccsBeLocation.so"

PostPaidMSISDNInvalidRange = [
    {
        rangeStart = "0"
        rangeStop = "99999999999"
        postPaidMsisdn = "441473289900"
    },
    {
        rangeStart = "100000000000"
        rangeStop = "199999999999"
        postPaidMsisdn = "4412061234567"
    }
]
Parameters of osaCham

Individual parameters used in the osaCham section of eserv.config.scs are described below.

**allowBalanceDateAfterWalletDate**

**Syntax:**

allowBalanceDateAfterWalletDate = true|false

**Description:**

Allow a balance expiry date later than the wallet expiry date when set by extension or by exact date.

**Type:**

Boolean

**Optionality:**

Optional (default used if not set)

**Allowed:**

true, false

**Default:**

false

**Notes:**

**Example:**

allowBalanceDateAfterWalletDate = false
Chapter 2

AllowDirectPostPaid

Syntax: AllowDirectPostPaid = true|false
Description: This parameter permits or refuses direct debits or direct credits on post-paid (non-existent) accounts.
Type: Boolean
Optionality: Allowed:
true  Direct debits and credits will appear to be successful on post-paid accounts, though no billing will actually happen. An EDR is written, allowing a summary bill to be sent later.
false  Direct debits and credits will not be successful on post-paid accounts.
Default:
Notes:
Example: AllowDirectPostPaid = true

AllowInvalidReleaseSequenceNumber

Syntax: AllowInvalidReleasedSequenceNumber = true|false
Description: This parameter can permit an invalid sequence number in a release request. The parameter allows crashed clients to dispose of previous sessions easily.
Type: Boolean
Optionality: Allowed:
true  A release request may contain an invalid sequence number.
false  A release request may not contain an invalid sequence number.
Default:
Notes:
Example: AllowInvalidReleasedSequenceNumber = true

allowNonCashBalanceForAmountMethods

Syntax: allowNonCashBalanceForAmountMethods = true|false
Description: Allow non-cash balance types for amount methods.
Type: Boolean
Optionality: Optional (default used if not set).
Allowed: true, false
Default: false
Notes: This is an extension and is not part of the OSA standard.
Example: allowNonCashBalanceForAmountMethods = false
Chapter 2

AlwaysSendNotification
Syntax: AlwaysSendNotification = true|false
Description: Whether to always send a Notification, regardless of what is specified in the method parameter.
If the configuration parameter is:
  - 'true' then a short message request will be sent.
  - 'false' then the request type method parameter will be used to determine whether or not to send the short message request.
Type: Boolean
Optionality: Optional
Allowed: true, false
Default: false
Notes:
Example: AlwaysSendNotification = true

AlwaysUseAbsoluteCostValueForNotifications
Syntax: AlwaysUseAbsoluteCostValueForNotifications = true|false
Description: Whether or not to always use the absolute value for the recharge cost in the notification.
Type: Boolean
Optionality: Optional (default used if not set).
Allowed: true, false
Default: false
Notes:
Example: AlwaysUseAbsoluteCostValueForNotifications = false

beLocationPluginLib
Syntax: beLocationPluginLib = "PathAndName"
Description: The path and name of the BE location library plug-in.
Type: String
Optionality:
Allowed:
Default:
Notes: You can use the beLocationPluginLib as an alternative to the billingEngines parameter array. See billingEngines. If a billingEngines parameter array is defined in the configuration file, the beLocationPluginLib parameter is ignored.
Example: beLocationPluginLib = "/IN/service_packages/CCS/lib/libGetccsBeLocation.so"

CDRDirectory
Syntax: CDRDirectory = "directory"
Description: The directory into which EDR files are written.
Type: String
Optionality:
Allowed:
Chapter 2

Default:
"/IN/service_packages/OSA/cdr"

Notes:

Example:
CDRDirectory = "/IN/service_packages/OSA/cdr"

CDRMaxAge

Syntax:
CDRMaxAge = seconds

Description:
The maximum age of EDRs, in seconds, before they are written to disk.

Type:
Integer

Optionality:

Allowed:

Default:

Notes:

Example:
CDRMaxAge = 60

CDRMaxSize

Syntax:
CDRMaxSize = int

Description:
The maximum number of EDRs that can accumulate before they are written to disk.

Type:
Integer

Optionality:

Allowed:

Default:

Notes:

Example:
CDRMaxSize = 100

clientName

Syntax:
clientName = "name"

Description:
Identifies this instance of the OSA gateway to the beServer process on the BE.

Type:
String

Optionality:

Allowed:

Default:

Notes:

Example:
clientName = "exampleConfigBeClient"

connectionRetryTime

Syntax:
connectionRetryTime = seconds

Description:
The interval, in seconds, separating attempts by BeClient to fix a failed connection to a billing engine.

Type:
Integer

Optionality:

Allowed:

Default:

Notes:

Example:
connectionRetryTime = 5
fifoFileName
Syntax: \texttt{fifoFileName = "PathAndFileName"}
Description: The path to, and name of, the short message requests file.
Type: String
Optionality: Allowed
Default: 
Notes: The file name must be the same as that of the ccsSSMMaster.
Example: \texttt{fifoFileName = "/tmp/ccsSSMRequest.fifo"}

heartbeatPeriod
Syntax: \texttt{heartbeatPeriod = microseconds}
Description: The interval, in microseconds, separating attempts by BDClient to detect a heartbeat on all open billing engine connections.
Type: Integer
Optionality: Allowed
Default: 
Notes: 
Example: \texttt{heartbeatPeriod = 500000}

localTZ
Syntax: \texttt{localTZ = "time_zone"}
Description: Local time zone of the client.
Type: String
Optionality: Optional (default used if not set).
Allowed: The format is as recognised by the unix system. See \textit{ACS Technical Guide} for a list of time zones.
Default: \texttt{"GMT"}
Notes: 
Example: \texttt{localTZ = "GMT"}

ipAccountManagerIORFile
Syntax: \texttt{ipAccountManagerIORFile = "PathAndFileName"}
Description: The path and name of the file to which the ipAccountManager IOR is written.
Type: String
Optionality: Optional.
Allowed: 
Default: 	exttt{"/processesCurrentWorkingDirectory/ipAccountManagerIOR.txt"}
Notes: If this parameter is omitted, the default path and name are used.
Example: \texttt{ipAccountManagerIORFile = "/tmp/ipAccountManagerIOR.txt"}
ipChargingManagerIORFile
Syntax: ipChargingManagerIORFile = "<PathAndFileName>"
Description: The path and name of the file to which the IpChargingManager IOR is written.
Type: String
Optionality: The ipChargingManagerIORFile parameter is optional.
Allowed:
Default: "+/<processCurrentWorkingDirectory>/
ipChargingManagerIOR.txt"
Notes: If this parameter is omitted, the default path and name are used.
Example: ipChargingManagerIORFile = "/tmp/ipChargingManagerIOR.txt"

MaximumAmountValue
Syntax: MaximumAmountValue = int
Description: The maximum amount allowed in directDebitAmountReq() and
directCreditAmountReq() operations.
Type: Integer
Optionality: Optional
Allowed:
Default:
Notes: • An amount exceeding the specified value causes a request failure.
• The value of MaximumAmountValue may not be exceeded when
confirming an amount on the billing engine. For this reason, the
debitAmountReq() and creditAmountReq() operations are affected by the
MaximumAmountValue parameter.
Example: MaximumAmountValue = 1000

MaximumEventsValue
Syntax: MaximumEventsValue = int
Description: The number of events allowed in directDebitUnitReq() and directCreditUnitReq() operations.
Type: Integer
Optionality: Optional
Allowed:
Default:
Notes: • If int is exceeded, a request failure is issued.
• int may not be exceeded when confirming events on the billing engine.
For this reason, the debitUnitReq() and creditUnitReq() operations are
affected by the MaximumEventsValue parameter.
Example:

MaximumSecondsValue
Syntax: MaximumSecondsValue = int
Description: The maximum duration, in seconds, allowed in directDebitUnitReq() and
directCreditUnitReq() operations.
Type: Integer
Optionality: Optional.
Allowed:
Default:
Notes:
  - A duration exceeding the value of MaximumSeconsValue will cause a request failure.
  - MaximumSeconsValue may not be exceeded when confirming time on the billing engine. For this reason, the debitUnitReq() and creditUnitReq() operations are affected by the MaximumSecondsValue parameter.
Example: MaximumSecondsValue = 3600

NotificationDatabase
Syntax: NotificationDatabase = {
  ArraySize = <as>
  ExpiryDays = <ed>
  IntermediateCommit = <tf>
}
Description: NotificationDatabase is a parameter group.
Type: Parameter group.
Optionality: 
Allowed:
Default:
Notes:
Example:

ArraySize
Syntax: ArraySize = int
Description: The maximum number of records that can be created or accessed in an OCI call to the OSA_TAGGED_BALANCE table.
Type: Integer
Optionality: 
Allowed:
Default:
Notes: This parameter is part of the NotificationDatabase parameter group.
Example: ArraySize = 10

ExpiryDays
Syntax: ExpiryDays = days
Description: The time, in days, during which a notification remains valid.
Type: Integer
Optionality: 
Allowed:
Default:
Notes: This parameter is part of the NotificationDatabase parameter group.
Example: ExpiryDays = 5
IntermediateCommit

Syntax: IntermediateCommit = true|false

Description: This parameter may permit a change to be committed to the OSA_TAGGEBALANCE table between each creation or deletion.

Type: Boolean

Optionality: Allowed:

true  The change is committed to the OSA_TAGGEBALANCE table between each creation or deletion.

false  The change is not committed.

Default: 

Notes: This parameter is part of the NotificationDatabase parameter group.

Example: IntermediateCommit = true

notificationPollInterval

Syntax: notificationPollInterval = seconds

Description: The interval, in seconds, separating polls of the BE.

Type: Integer

Optionality: Allowed:

Default: 10

Notes: 

Example: notificationPollInterval = 10

notificationRequestsEnabled

Syntax: notificationRequestsEnabled = true|false

Description: Whether or not to enable OSA notifications.

Type: Boolean

Optionality: Allowed:

true, false

Default: false

Notes: If 'false' this will prevent the unnecessary UBE requests: NOTR_Req and NOTC_Req

- NOTR_Req requests are sent at the configured 'notificationPollInterval' interval.
- NOTC_Req requests are sent to clear the currently configured OSA notifications on the UBE.

Example: notificationRequestsEnabled = false

OracleUsernamePassword

Syntax: OracleUsernamePassword = "name/password"

Description: The Oracle username and password for the SCF.

Type: String

Optionality: Allowed:

Default: "scp/scp"
Notes:
Example: OracleUsernamePassword = "scp/scp"

ORBDebugLevel
Syntax: ORBDebugLevel = level
Description: Sets the level of debugging information provided.
Type: Integer
Optionality: Allowed: \( 0 \leq \text{level} \leq 6 \).
Default:
Notes: For production systems, set to 0.
Example: ORBDebugLevel = 0

ORBIIOPIAddr
Syntax: ORBIIOPIAddr = "IP_address"
Description: The IP address on which the OSA gateway listens for incoming requests.
Type: String
Optionality: Optional
Allowed: IP version 4 address
Default: The IP address of the host machine
Notes: If you include the CorbaServices configuration section, then the IP addresses specified in the OrbListenAddresses parameter will be used instead. For more information, see About Configuring CORBA Connections for OSA CHAM (on page 14).
Example: ORBIIOPIAddr = "192.1.2.174"

ORBIIOPPort
Syntax: ORBIIOPPort = int
Description: The port on which the OSA gateway listens for incoming requests.
Type: Integer
Optionality: Optional
Allowed: \( \text{int} \geq 1024 \)
Default:
Notes: If you include the CorbaServices configuration section, then this value will be overridden by the value specified for the osaChamOrbListenPort parameter. For more information, see About Configuring CORBA Connections for OSA CHAM (on page 14).
Example: ORBIIOPPort = 1025

ORBIIOPSetKeepalive
Syntax: ORBIIOPSetKeepalive = true|false
Description: Set the keepalive flag on new orb connections.
Type: Boolean
overrideDiscountType
Syntax: overrideDiscountType = "str"
Description: Factors OSA discounts into the BE discounts from the tariff.
Type: String
Optionality: Optional
Allowed: Override, Compound, Cumulative
Default: Override
Notes: The OSA discount is ignored and the final rate = the initial rate \times BE discount.
        The discounts are multiplied together and the final rate = initial rate \times BE discount \times OSA discount.
        The discounts are added together and the final rate = initial rate \times (BE discount + OSA discount).
Example: overrideDiscountType = "Compound"

OverrideInitialEventCdrType
Syntax: OverrideInitialEventCdrType = true|false
Description: Whether or not to override the CDR type for the reserveUnitReq (events).
Type: Boolean
Optionality: Optional (default used if not set)
Allowed: true, false
Default: true
Notes: Example: OverrideInitialEventCdrType = true

OverrideInitialTariffCdrType
Syntax: OverrideInitialTariffCdrType = true|false
Description: Whether or not to override the CDR type for the reserveUnitReq (seconds).
Type: Boolean
Optionality: Optional (default used if not set)
Allowed: true, false
Default: true
Notes: Example: OverrideInitialTariffCdrType = true
Chapter 2

plugins

Syntax: plugins = [
    {
        config="<tag>,",
        library="<lib>",
        function="<function>"
    },
    {
        <VRT config>
    },
    {
        <Broadcast plugin config>
    }
]

Description: The plugins configuration items are compulsory in the configuration file to enable the voucher and voucher type recharges.

Type: Parameter array.

Optionality: Allowed:

- The Voucher Recharge (VRW)
- Voucher Type Recharge (VTR)
- Broadcast plugin for VRW and VTR

Default:

Notes:

Example:

plugins = [
    {
        config="voucherRechargeOptions",
        library="libccsClientPlugins.so",
        function="makeVoucherRechargePlugin"
    },
    {
        config="voucherTypeRechargeOptions",
        library="libccsClientPlugins.so",
        function="makeVoucherTypeRechargePlugin"
    },
    {
        config="",
        library="libclientBcast.so",
        function="makeBroadcastPlugin"
    }
]

config

Syntax: config = "str"

Description: The configuration tag of the plugin.

Type: String

Optionality: Mandatory

Allowed: 

Default:

Notes: This parameter is part of the plugins parameter array.

Example: config = "voucherRechargeOptions"
function
Syntax: function = "cFunction"
Description: The name of the external C programming language function within the library.
Type: String
Optionality: Mandatory
Allowed:
Default:
Notes: This parameter is part of the plugins parameter array.
Example: function = "makeVoucherRechargePlugin"

library
Syntax: library = "fileName"
Description: Names the library that contains the plugin.
Type: String
Optionality: Mandatory
Allowed:
Default:
Notes: This parameter is part of the plugins parameter array.
Example: library = "libccsClientPlugins.so"

PostPaidMSISDNInvalidRange
Syntax: PostPaidMSISDNInvalidRange = [
  {
    rangeStart = "<1stRangeStart>"
    rangeStop = "<1stRangeStop>"
    postPaidMsisdn = "<1stppm>"
  },
  ...
  ...
  {
    <nth Range>
  }
]
Description: The PostPaidMSISDNInvalidRange parameter array maps a range of mobile station ISDN (MSISDN) numbers to a valid MSISDN. The valid MSISDN is substituted for the charging party in the rate request that follows.
Type: Parameter array.
Optionality: Allowed:
Default:
Notes: Use this parameter array if cold billing is required for direct delta requests.
Example:

```python
postPaidMSISDNInvalidRange = [
    {
        rangeStart = "0"
        rangeStop = "99999999999"
        postPaidMsisdn = "441473289900"
    },
    {
        rangeStart = "100000000000"
        rangeStop = "199999999999"
        postPaidMsisdn = "4412061234567"
    },
    {
        rangeStart = "200000000000"
        rangeStop = "299999999999"
        postPaidMsisdn = "481263833252"
    }
]
```

**postPaidMsisdn**

**Syntax:**

```
postPaidMsisdn = "nthppm"
```

**Description:** The mobile station ISDN number to which the nth number range is mapped.

**Type:** String

**Optionality:** Required

**Allowed:** PostPaidMSISDNInvalidRange parameter array

**Default:** None

**Notes:** This parameter is part of the PostPaidMSISDNInvalidRange parameter array.

**Example:**

```
postPaidMsisdn = "441473289900"
```

**rangeStart**

**Syntax:**

```
rangeStart = "nthRangeStart"
```

**Description:** The start number of the nth MSISDN billing range.

**Type:** String

**Optionality:** Required

**Allowed:** PostPaidMSISDNInvalidRange parameter array

**Default:** None

**Notes:** This parameter is part of the PostPaidMSISDNInvalidRange parameter array.

**Example:**

```
rangeStart = "0"
```

**rangeStop**

**Syntax:**

```
rangeStop = "nthRangeStop"
```

**Description:** The end number of the nth MSISDN billing range.

**Type:** String

**Optionality:** Required

**Allowed:** PostPaidMSISDNInvalidRange parameter array

**Default:** None

**Notes:** This parameter is part of the PostPaidMSISDNInvalidRange parameter array.

**Example:**

```
rangeStop = "99999999999"
```
remoteSMF1Name
Syntax: \texttt{remoteSMF1Name = \"name\"}
Description: The entry in the Oracle tnsnames.ora file for the remote database link to the SMS.
Type: String
Optionality: Optional, but see notes for consequence of not being set.
Allowed: 
Default: No default
Notes: This is used to attempt reconnection if the database link fails. If this is not set, automatic reconnection will not be attempted and an error will be returned to the client.
Example: \texttt{remoteSMF1Name = \"usms1_SMF\"}

requestTimeout
Syntax: \texttt{requestTimeout = milliseconds}
Description: The maximum time, in milliseconds, that the gateway will wait for a response from the BE. After that time the gateway will abandon the request.
Type: Integer
Optionality: Allowed:
Default: 
Notes: 
Example: \texttt{requestTimeout = 10000}

SMSLanguage
Syntax: \texttt{SMSLanguage = \"str\"}
Description: Defines the language used for short message requests, if the subscriber's language cannot be determined from the profile.
Type: String
Optionality: Allowed:
Default: unknown
Notes: 
Example: \texttt{SMSLanguage = \"unknown\"}

throttleRate
Syntax: \texttt{throttleRate = rate}
Description: The number of connections allowed per second.
Type: Integer
Optionality: Allowed:
Default: 
Notes: If 0, throttling is disabled.
Example: \texttt{throttleRate = 10}
**TimeUnitExponent**

**Syntax:** `TimeUnitExponent = int`

**Description:** The time unit exponent to use to translate the BE internal time balance units into seconds.

**Type:** Integer

**Optionality:** Optional (default used if not set)

**Allowed:** 0, 1, 2, 3, and 4

**Default:** 2

**Notes:** Currently the BE internal time balance units is 100th's second.

**Example:** `TimeUnitExponent = 2`

---

**voucherRechargeOptions**

**Syntax:**

```
voucherRechargeOptions = {
    voucherRechargeTriggers = [triggers]
}
```

**Description:** The voucher recharge plugin options.

**Type:**

**Optionality:** Mandatory

**Allowed:**

**Default:**

**Notes:**

See `plugins` (on page 27).

**Example:**

```
voucherRechargeOptions = {
    voucherRechargeTriggers = ["VRW "]
}
```

---

**voucherRechargeTriggers**

**Syntax:** `voucherRechargeTriggers = ["trig1, trign"]`

**Description:** The voucher recharge triggers.

**Type:** String array

**Optionality:** Mandatory

**Allowed:**

**Default:**

**Notes:**

**Example:**

```
voucherRechargeTriggers = ["VRW "]
```

---

**voucherTypeRechargeOptions**

**Syntax:**

```
voucherTypeRechargeOptions = {
    voucherTypeRechargeTriggers = [triggers]
}
```

**Description:** The voucher type recharge plugin options.

**Type:**

**Optionality:** Mandatory

**Allowed:**

**Default:**

**Notes:**

See `plugins` (on page 27).
Example:  

```
voucherTypeRechargeOptions = {
    voucherTypeRechargeTriggers = ["VTR "]
}
```

**voucherTypeRechargeTriggers**

**Syntax:**

```
voucherTypeRechargeTriggers = ["trig1 ,trign "]
```

**Description:** The voucher type recharge triggers.

**Type:** String array

**Optionality:** Mandatory

**Allowed:**

Default: 

Notes:

**Example:**  

```
voucherTypeRechargeTriggers = ["VTR "]
```

**WalletNameTranslations**

**Syntax:**

```
WalletNameTranslations = {
    Personal = "<new name>"
    Business = "<new name>"
}
```

**Description:** Used when translating between the old and new wallet type names used in Prepaid Charging.

**Type:** Parameter group.

**Optionality:** Optional. No wallet type name translation occurs if both 'Personal' and 'Business' are not present.

**Allowed:**

Default: 

Notes:

**Example:**  

```
WalletNameTranslations = {
    Personal = "Primary"
    Business = "Secondary"
}
```

**Business**

**Syntax:**

```
Business = "newname"
```

**Description:** Translates between the old and new wallet type name used in Prepaid Charging.

**Type:** String

**Optionality:** Optional

**Allowed:**

Default: 

Notes:

**Example:**  

```
Business = "Secondary"
```

**Personal**

**Syntax:**

```
Personal = "newname"
```

**Description:** Translates between the old and new wallet type name used in Prepaid Charging.

**Type:** String

**Optionality:** Optional

Allowed:
Default:

Notes:

Example: \[\text{Personal} = "\text{Primary}"\]

### CCS parameters

The following sections must be included in the CCS section of the osaChamScs. Here is an example of the CCS section of the configuration file.

```json
CCS = {
  ccsSSMMaster = {
    filename = "/tmp/ccsSSMRequest.fifo"
    hostname = "ct1bscp"
    port = 1495
    dispatcherOracleUsername = "scp"
    dispatcherOraclePassword = "scp"
  }
}
```

#### ccsSSMMaster

The parameters available to configure the ccsSSMDispatcher binary are described below. The binary is required for sending SMSs to the CCS SSM master on the voice SLC.

**dispatcherOraclePassword**

*Syntax:* `dispatcherOraclePassword = "str"`

*Description:* Oracle password for ccsSSMDispatcher database connection.

*Type:* String

*Optionality:* Mandatory

**dispatcherOracleUsername**

*Syntax:* `dispatcherOracleUsername = "name"`

*Description:* Oracle username for ccsSSMDispatcher database connection.

*Type:* String

*Optionality:* Mandatory

**filename**

*Syntax:* `filename = "fname"`

*Description:* File name to use for short message requests.

*Type:* String

*Optionality:* Mandatory
Chapter 2

Allowed:
Default:
Notes:
Example: filename = "/tmp/ccsSSMRequest.fifo"

hostname
Syntax: hostname = "hname"
Description: Host name for the machine the ccsSSMMaster is running on.
Type: String
Optionality: Mandatory
Allowed:
Default:
Notes:
Example: hostname = "ctlbscp"

port
Syntax: port = int
Description: Port to connect to on the machine the ccsSSMMaster is running on.
Type: 
Optionality: Optional
Allowed:
Default:
Notes:
Example: port = 1495

Configuring Balance Type Currencies
To ensure that balance type currencies work correctly each CCS balance type must have at least one currency setup in CCS.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>From the SMS Services menu select Prepaid Charging, and then select Wallet Management.</td>
</tr>
<tr>
<td>2</td>
<td>Select the service provider from the Service Provider list.</td>
</tr>
<tr>
<td>3</td>
<td>Edit each balance type in the table on the Balance Types tab to check that a currency record has been created for it. You configure balance type currencies on the Balance Type Announcements tab in the New or Edit Balance Type Screen window. For information about configuring balance type currencies, see the discussion on Wallet Management in Charging Control Services User's Guide.</td>
</tr>
</tbody>
</table>

Configuring OSA CHAM on the VWS

About the BE Plugins Configuration
The BE plugins used by OSA CHAM read configuration from the eserv.config configuration file on the VWS. You must ensure that the eserv.config file on the VWS includes the osaCham configuration section, and the following sub-sections:
• NotificationDatabase
• NotificationQueueManager
• NotificationEvents
• NotificationServerHandler

The osaCham section is parsed by the OSA BE plugins and beVWARS handlers.

You must also ensure that any configuration parameters that are specific to OSA CHAM are included in the following sections in the eserv.config file:

• BE
• beVWARS
• CCS

**osaCham parameters**

The parameters available to configure osaCham are described below.

**queryWalletTolerance**

Time (in milli-seconds) plugins should request the VWARS locks an account for following a query wallet request.

- Default: 3000
- Allowed:
- Note: The default used if no value specified.

**NotificationDatabase**

Use these parameters to configure the NotificationDatabase section.

**ArraySize**

Maximum number of records that can be created or accessed per OCI call in the OSA_TAGGED_BALANCE table.

- Default: 100
- Allowed:

**ExpiryDays**

Time (in days) that the notification is valid for.

- Default: 1
- Allowed:

**IntermediateCommit**

If set to true, commits will happen between each record creation or deletion in the OSA_TAGGED_BALANCE table.

- Default: true
- Allowed: true, false

**NotificationQueueManager**

Use these parameters to configure the NotificationQueueManager.
QueueSize
The maximum number of reports that may be queued.
Default: 20
Allowed: 
Note: Required.

QueueTimeout
Time (in seconds) before an unclaimed notification report in the queue will be discarded.
Default: 60
Allowed: 
Note: 

NumberOfSegments
How many segments of shared memory should be created.
Default: 2
Allowed: 
Note: Values must be 2 or higher.

SegmentSize
How big (in MB) each segment should be.
Default: 1
Allowed: integer

ShmKeyFile
File name used to create the shared memory key.
Default: "/IN/service_packages/OSA/semKeyFile"
Allowed: 

NotificationEvents
Use these parameters to configure the NotificationEvents.

SemaphoreKey
File name used to create the semaphores key.
Default: "/IN/service_packages/OSA/semKeyFile"
Allowed: 

BalanceThreshold
Minimum balance amount for which notifications will be created.
Default: 10
Allowed: 

NotificationServerHandler
Use these parameters to configure the NotificationServerHandler.
SemaphoreKey
File name used to create the semaphores key.
Default: "/IN/service_packages/OSA/semKeyFile"
Allowed:

TimeoutCheckPeriod
Frequency (in seconds) for checking for timeouts.
Default: 10
Allowed:

MaxReports
How many reports can be served per request from the OSA Gateway.
Default: 20
Allowed:

MessageTimeout
Time-to-live (in milliseconds) of the response message sent back to the OSA Gateway.
Default: 10,000,000
Allowed:

NumberOfSemaphores
How many semaphores to create.
Default: 1

**BE parameters**

The following entries need to be carefully merged. The sections will already exist in the eserv.config, so you must not just copy and paste them from the example file.

**OSA Service Handlers library**

You must add the entry for the OSA Service Handlers library to BE.beServerhandlers, as shown in the example.

**Example BE section**

Here is an example BE configuration section in the eserv.config file.

```bash
BE = {
    beServer = {
        handlers = {
            "osaServerNotificationHandlers.so"
        }
    }
}
```

**beVWARS parameters**

The following entries must be added to the beVWARS section of the eserv.config file.
plugins
You must add the OSA Cham entries for the libraries in the plugins sub-section, as shown in the example.

Example beVWARS section
Here is an example beVWARS configuration section in the eserv.config file.

```json
beVWARS = {
    plugins = {
        "osaVWARSNotificationPlugins.so"          # OSA Cham entry
    },
    handlers = {
        "osaVWARSQueryHandlers.so"                # OSA Cham entry
    }
}
```

CCS parameters
To integrate OSA with CCS, the ccsVWARSActivation sub-section must be included in the CCS section of the eserv.config file, specifying details for all customers who may have an account activated due to OSA requests.

Values marked ?? depend on your CCS configuration. For more information, see the CCS Technical Guide.

balanceTypes
Lists the balance types for the accounts that can be activated through the OSA Gateway. For each balance type you must specify the:
- ACS customer ID,
- the free SMS type and
- the expiry types.
See the example below.

Example CCS section
Here is an example CCS configuration section in the eserv.config file.

```json
CCS = {
    ccsVWARSActivation = {
        balanceTypes = [
            { acsCustomerId = ??,
              freeSmsType = ??
              setExpiryTypes = [ ??, ??, ... ]
            }
        ]
    }
}
```

Example osaCham configuration on the VWS
The following configuration shows an example osaCham configuration section in the eserv.config configuration file on the VWS.

```json
osaCham = {
    queryWalletTolerance = 5000
    NotificationDatabase = {
        ArraySize = 1000
        ExpiryDays = 20
    }
}
```
IntermediateCommit = true

NotificationQueueManager = {
  QueueSize = 20
  QueueTimeout = 60
  NumberOfSegments = 2
  SegmentSize = 1
  ShmKeyFile = "/tmp/shm"
}

NotificationEvents = {
  SemaphoreKey = "/tmp/sem"
  BalanceThreshold = 3000
}

NotificationServerHandler = {
  SemaphoreKey = "/tmp/sem"
  TimeoutCheckPeriod = 20
  MaxReports = 10
  MessageTimeout = 5000
  NumberOfSemaphores = 1
}

BE = {
  beServer = {
    handlers = {
      "osaServerNotificationHandlers.so"
    }
  }
}

beVWARS = {
  plugins = {
    "osaVWARSNotificationPlugins.so"  # OSA Cham entry
  }
  handlers = {
    "osaVWARSQueryHandlers.so"        # OSA Cham entry
  }
}

CCS = {
  ccsVWARSActivation = {
    balanceTypes = {
      { acsCustomerId = ??, freeSmsType = ??, setExpiryTypes = [ ??, ??, ... ] }
    }
  }
}
Overview

Introduction

This chapter explains the alarms which may be generated by the application, probable causes and recommended responses.

In this chapter

This chapter contains the following topics.

Alarm Topic Description ................................................................. 41
OSA Client Interface Alarms ............................................................... 43

Alarm Topic Description

Introduction

The following table lists the alarms that will be generated by the client interface during execution. These messages are logged using the system syslog functionality.

The exact action taken for each logged message is dependent on the hosts systems configuration, generally set in the /etc/syslog.conf configuration file.

Severity levels

This table describes the alarms severity levels.

<table>
<thead>
<tr>
<th>Level</th>
<th>Abbr</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical</td>
<td>C</td>
<td>These alarms are raised when the application has encountered an error which indicates that the system is unable to function.</td>
</tr>
<tr>
<td>Error</td>
<td>E</td>
<td>These alarms indicate the application has encountered a serious problem completing a necessary task and could not complete the task.</td>
</tr>
<tr>
<td>Warning</td>
<td>W</td>
<td>Warnings are raised to indicate the application encountered a problem completing a non-mission critical task.</td>
</tr>
<tr>
<td>Notice</td>
<td>N</td>
<td>Notices are raised to indicate that the application has completed a task successfully.</td>
</tr>
</tbody>
</table>

Alarm text and variables

The %d and %s symbols represent variables within the alarm text. These values are generated by the subsystem and added to the message when the alarm is raised.
Usually the %d is a number and the %s is text in the context of the message to complete the alarm message. Occasionally other % symbols are also used (for example, %u) for different variables.

**Further information**

For more information about system alarms, see the following Solaris manual pages:

- `openlog` `syslog (3c)` - control system log
- `syslog` `syslog (3c)` - control system log
- `syslog.conf` `syslog.conf (4)` - configuration file for syslogd system log daemon
## OSA Client Interface Alarms

### Critical errors

This table defines the Critical error messages for the OSA Client Interface.

<table>
<thead>
<tr>
<th>Number</th>
<th>Alarm Text</th>
<th>Reason</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1004</td>
<td>CDR logger ended while charging sessions still active!</td>
<td>This is an internal error. The CDR logger has been ended while OSA charging sessions were still active. The OSA Gateway should have aborted all active sessions before ending the CDR logger.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1005</td>
<td>Asked to release unknown session ...!</td>
<td>This is an internal error. The CDR logger has been informed that a session has been released. However, it didn’t know that the session had been created in the first place.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1006</td>
<td>Asked to expire unknown session ...!</td>
<td>This is an internal error. The CDR logger has been informed that a session has expired. However, it didn’t know that the session had been created in the first place.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1007</td>
<td>Asked to abort unknown session ...!</td>
<td>This is an internal error. The CDR logger has been informed that a session has been aborted. However, it didn’t know that the session had been created in the first place.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1008</td>
<td>Session ... is not in the list of active sessions!</td>
<td>This is an internal error. An active session has been deleted that was not in the list of active sessions.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1009</td>
<td>Asked to send subsequent reservation without initial reservation!</td>
<td>This is an internal error. The OSA Gateway was about to send a SubsequentAmountReservationRequest to the BE without having sent a InitialAmountReservationRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1011</td>
<td>Received unknown error code from InitialAmountReservationNAck!</td>
<td>This is an internal error. The OSA Gateway received an error code as part of a InitialAmountReservationNAck message that it doesn’t recognise.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1014</td>
<td>Received response to unknown request ...!</td>
<td>This is an internal error. The OSA Gateway has received a response from the BE to a request that it thinks it has never sent.</td>
<td>Contact support</td>
</tr>
<tr>
<td>Number</td>
<td>Alarm Text</td>
<td>Reason</td>
<td>Remedy</td>
</tr>
<tr>
<td>--------</td>
<td>------------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>1015</td>
<td>Received InitialAmountReservationAck in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a InitialAmountReservationAck from the Billing Engine but the original request was not a InitialAmountReservationRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1016</td>
<td>Received InitialAmountReservationNAck in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a InitialAmountReservationNAck from the Billing Engine but the original request was not a InitialAmountReservationRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1017</td>
<td>Received SubsequentAmountReservationAck in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a SubsequentAmountReservationAck from the Billing Engine but the original request was not a SubsequentAmountReservationRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1018</td>
<td>Received SubsequentAmountReservationNAck in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a SubsequentAmountReservationNAck from the Billing Engine but the original request was not a SubsequentAmountReservationRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1019</td>
<td>Received ReservationConfirmationAck in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a ReservationConfirmationAck from the Billing Engine but the original request was not a ReservationConfirmationRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1020</td>
<td>Received ReservationConfirmationNAck in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a ReservationConfirmationNAck from the Billing Engine but the original request was not a ReservationConfirmationRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1021</td>
<td>Received ReservationCancellationAck in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a ReservationCancellationAck from the Billing Engine but the original request was not a ReservationCancellationRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1022</td>
<td>Received ReservationCancellationNAck in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a ReservationCancellationNAck from the Billing Engine but the original request was not a ReservationCancellationRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>Number</td>
<td>Alarm Text</td>
<td>Reason</td>
<td>Remedy</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>1023</td>
<td>Received PerformDirectDeltaAck in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a PerformDirectDeltaAck from the Billing Engine but the original request was not a PerformDirectDeltaRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1024</td>
<td>Received PerformDirectDeltaNAck in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a PerformDirectDeltaNAck from the Billing Engine but the original request was not a PerformDirectDeltaRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1025</td>
<td>Received unknown message from BE!</td>
<td>This is an internal error. The OSA Gateway received a message from the BE that it does not recognise.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1026</td>
<td>Session timeout expired but session never expires!</td>
<td>This is an internal error. The session timeout has expired while the charging session should never expire since to reservation had been made against it.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1027</td>
<td>Session timeout expired before actual expiry time!</td>
<td>This is an internal error. The session timeout has expired before the charging session has actually due to expire.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1028</td>
<td>Could not initialise ORBit: ...</td>
<td>The OSA Gateway was unable to initialise ORBit (the ORB it is using internally).</td>
<td>Contact support</td>
</tr>
<tr>
<td>1029</td>
<td>No ORBit connection associated with file descriptor!</td>
<td>This is an internal error. The OSA Gateway thought that ORBit was using a particular file descriptor while ORBit claims that it has no connection associated with that file descriptor.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1030</td>
<td>Inconsistent file descriptor!</td>
<td>This is an internal error. ORBit thinks that a particular connection is associated with a file descriptor that is different from the one that we originally read the GIOP request from.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1032</td>
<td>Received response to unknown request ...!</td>
<td>This is an internal error. The OSA Gateway has received a response from the BE to a request that it thinks it has never sent.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1033</td>
<td>Received unexpected message from BE!</td>
<td>This is an internal error. The OSA Gateway received a message from the BE that it didn’t expect because it was not QueryAccountAck nor a QueryAccountNAck.</td>
<td>Contact support</td>
</tr>
<tr>
<td>Number</td>
<td>Alarm Text</td>
<td>Reason</td>
<td>Remedy</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>1034</td>
<td>Unknown request type '...'!</td>
<td>This is an internal error. The OSA Gateway has sent a request to the BE that it does not even recognise itself.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1038</td>
<td>Received unknown error code from PerformDirectDeltaNAck!</td>
<td>This is an internal error. The OSA Gateway received an error code as part of a PerformDirectDeltaNAck message that it doesn't recognise.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1039</td>
<td>Asked to send deferred DII requests with empty queue!</td>
<td>This is an internal error. The OSA Gateway thinks there are deferred DII requests to send to the IpAppChargingSession but its internal queue is empty.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1043</td>
<td>Received unknown error code from SubsequentAmountReservationNAck!</td>
<td>This is an internal error. The OSA Gateway received an error code as part of a SubsequentAmountReservationNAck message that it doesn't recognise.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1045</td>
<td>Unable to create IOR file!</td>
<td>The OSA Gateway was unable to generate the IOR file for either the IpAccountManager or the IpChargingManager.</td>
<td>Please check the configuration file.</td>
</tr>
<tr>
<td>1047</td>
<td>Attempted to create existing charging session ...</td>
<td>This is an internal error. The OSA Gateway tried to create a new charging session with the same ID as an existing charging session.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1048</td>
<td>Asked to send a ReservationConfirmationRequest without initial reservation!</td>
<td>This is an internal error. The OSA Gateway tried to confirm a reservation that has never been made.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1050</td>
<td>Amount confirmed is invalid!</td>
<td>The BE confirmed a reservation with an amount different from the amount it was given by the OSA Gateway.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1052</td>
<td>Inconsistent reserved amount from BE!</td>
<td>In a SubsequentAmountReservationAck, the Billing Engine reported an inconsistent reserved amount.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1068</td>
<td>Received unknown error code from IR_NAck(InitialUnitSecondsReservationNAck)!</td>
<td>This is an internal error. The OSA Gateway received an error code as part of a IR_Ack message that it doesn't recognise.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1069</td>
<td>Received IR_Ack(InitialUnitSecondsReservationAck) in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a IR_Ack from the Billing Engine but the original request was not an InitialUnitSecondsReservationRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>Number</td>
<td>Alarm Text</td>
<td>Reason</td>
<td>Remedy</td>
</tr>
<tr>
<td>--------</td>
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</tr>
<tr>
<td>1070</td>
<td>Received IR_Nack(InitialUnitSecondsReservationNAck) in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a IR_NAck from the Billing Engine but the original request was not a InitialUnitSecondsReservationRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1071</td>
<td>Received unknown error code from INER_NAck(Initial UnitNamedEventsReservationNAck)</td>
<td>This is an internal error. The OSA Gateway received an error code as part of a INER_Ack message that it doesn’t recognise.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1072</td>
<td>Received INER_Ack(InitialUnitNamedEventsReservationAck) in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a INER_Ack from the Billing Engine but the original request was not an InitialUnitNamedEventsReservationRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1073</td>
<td>Received INER_Nack(InitialUnitNamedEventsReservationNAck) in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a INER_NAck from the Billing Engine but the original request was not a InitialUnitNamedEventsReservationRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1074</td>
<td>Received unknown error code from SR_Nack(SubsequentUnitSecondsReservationNAck)</td>
<td>This is an internal error. The OSA Gateway received an error code as part of a SR_Nack message that it doesn’t recognise.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1075</td>
<td>Received SR_Ack(SubsequentUnitSecondsReservationAck) in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a SR_Ack from the Billing Engine but the original request was not a SubsequentUnitSecondsReservationRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1076</td>
<td>Received SR_Nack(SubsequentUnitSecondsReservationNAck) in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a SR_NAck from the Billing Engine but the original request was not a SubsequentUnitSecondsReservationRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1078</td>
<td>Received unknown error code from SNER_Nack(SubsequentUnitNamedEventsReservationNAck)</td>
<td>This is an internal error. The OSA Gateway received an error code as part of a SNER_NAck message that it doesn’t recognise.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1079</td>
<td>Received SNER_Ack(SubsequentUnitNamedEventsReservationAck) in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a SNER_Ack from the Billing Engine but the original request was not a SubsequentUnitNamedEventsReservationRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>Number</td>
<td>Alarm Text</td>
<td>Reason</td>
<td>Remedy</td>
</tr>
<tr>
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</tr>
<tr>
<td>1080</td>
<td>Received SNER_Nack(SubsequentUnitNamedEventsReservationNAck) in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a SNER_NAck from the Billing Engine but the original request was not a SubsequentUnitNamedEventsReservationRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1082</td>
<td>Received CR_Ack(UnitSecondsReservationConfirmationAck) in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a CR_Ack from the Billing Engine but the original request was not a UnitSecondsReservationConfirmationRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1083</td>
<td>Received CNER_Ack(UnitNamedEventsReservationConfirmationAck) in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a CNER_Ack from the Billing Engine but the original request was not a UnitNamedEventsReservationConfirmationRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1084</td>
<td>Received unknown error code from ATC_Nack(DirectDeltaUnitSecondsNAck)!</td>
<td>This is an internal error. The OSA Gateway received an error code as part of a ATC_NAck message that it doesn’t recognise.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1085</td>
<td>Received ATC_Ack(DirectDeltaUnitSecondsAck) in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a ATC_Ack from the Billing Engine but the original request was not a DirectDeltaUnitSecondsRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1086</td>
<td>Received ATC_NAck(DirectDeltaUnitSecondsNAck) in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a ATC_NAck from the Billing Engine but the original request was not a DirectDeltaUnitSecondsRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1088</td>
<td>Received unknown error code from NE_Nack(DirectDeltaUnitNamedEventsNAck)!</td>
<td>This is an internal error. The OSA Gateway received an error code as part of a NE_NAck message that it doesn’t recognise.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1089</td>
<td>Received NE_Ack(DirectDeltaUnitNamedEventsAck) in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a NE_Ack from the Billing Engine but the original request was not a DirectDeltaUnitNamedEventsRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1090</td>
<td>Received NE_Nack(DirectDeltaUnitNamedEventsNAck) in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a NE_NAck from the Billing Engine but the original request was not a DirectDeltaUnitNamedEventsRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>Number</td>
<td>Alarm Text</td>
<td>Reason</td>
<td>Remedy</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>1092</td>
<td>Asked to send a UnitSecondsReservationConfirmationRequest without initial reservation!</td>
<td>This is an internal error. The OSA Gateway tried to confirm a reservation that has never been made.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1093</td>
<td>Asked to send a UnitNamedEventsReservationConfirmationRequest without initial reservation!</td>
<td>This is an internal error. The OSA Gateway tried to confirm a reservation that has never been made.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1094</td>
<td>Received unknown error code from RateUnitSecondsNAck!</td>
<td>This is an internal error. The OSA Gateway received an error code as part of a RateUnitSecondsNAck message that it doesn’t recognise.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1095</td>
<td>Received RateUnitSecondsNAck in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a RateUnitSecondsNAck from the Billing Engine but the original request was not a RateUnitSecondsRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1096</td>
<td>Received RateUnitSecondsAck in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a RateUnitSecondsAck from the Billing Engine but the original request was not a RateUnitSecondsRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1098</td>
<td>Received unknown error code from RateUnitNamedEventsNAck!</td>
<td>This is an internal error. The OSA Gateway received an error code as part of a RateUnitNamedEventsNAck message that it doesn’t recognise.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1099</td>
<td>Received RateUnitNamedEventsNAck in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a RateUnitNamedEventsNAck from the Billing Engine but the original request was not a RateUnitNamedEventsRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1100</td>
<td>Received RateUnitNamedEventsAck in response to a ...!</td>
<td>This is an internal error. The OSA Gateway has received a RateUnitNamedEventsAck from the Billing Engine but the original request was not a RateUnitNamedEventsRequest.</td>
<td>Contact support</td>
</tr>
<tr>
<td>1111</td>
<td>Could not read configuration file</td>
<td>The OSA Gateway was unable to read its configuration file</td>
<td>Contact support</td>
</tr>
<tr>
<td>Number</td>
<td>Alarm Text</td>
<td>Reason</td>
<td>Remedy</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>1113</td>
<td>configuration file must contain beLocationPluginLib option or billingEngines list</td>
<td>The configuration file must contain either the beLocationPluginLib option (to specify the path of a BE location plugin library), or the billingEngines list (to specify a mapping between billing engines ID and billing engines location).</td>
<td>Contact support</td>
</tr>
<tr>
<td>1114</td>
<td>OSA loading database currency code to currency map check that CCS balance type currency codes are setup correctly</td>
<td>Balance Type currency was not found.</td>
<td>Check that CCS balance type currency codes are setup correctly in CCS Resources - Balance Type tab. Each cash Balance Type must have Currency One setup using the in the Balance Type screen.</td>
</tr>
<tr>
<td>1115</td>
<td>OSA loading CCS balance units found no rows - ensure &lt;string&gt; is replicated correctly - this process is now aborting to produce a core file for analysis</td>
<td>A table has not been replicated correctly. The following three tables all need to be replicated to all OSA SCP's: CCS_BALANCE_UNIT_SCP CCS_BAL_CURR_ANNUAL_SCP CCS_CURRENCY_SCP</td>
<td>Contact support</td>
</tr>
<tr>
<td>2001</td>
<td>Invalid command line option &lt;invalidOption&gt;</td>
<td>The given command line option is not understood. Check startup script invocation entry for errors.</td>
<td>Contact support</td>
</tr>
<tr>
<td>2013</td>
<td>Caught cmn::Exception: what &lt;string&gt; / reason &lt;string&gt;</td>
<td>An internal error occurred. The process will terminate with error code 2.</td>
<td>Contact support</td>
</tr>
<tr>
<td>2014</td>
<td>Caught std::exception: what &lt;string&gt;</td>
<td>An internal error occurred. The process will terminate with error code 3.</td>
<td>Contact support</td>
</tr>
<tr>
<td>2015</td>
<td>Caught something</td>
<td>An internal error occurred. The process will terminate with error code 4.</td>
<td>Contact support</td>
</tr>
</tbody>
</table>

**Errors**

This table defines the Error messages for the OSA Client Interface.

<table>
<thead>
<tr>
<th>Number</th>
<th>Alarm Text</th>
<th>Reason</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>stat(...) failed with ... (...), will use ... instead</td>
<td>The CDR logger could not find the directory specified in the CDRDirectory entry of the configuration file.</td>
<td>It will use a default directory instead.</td>
</tr>
</tbody>
</table>

NCC OSA CHAM Technical Guide
<table>
<thead>
<tr>
<th>Number</th>
<th>Alarm Text</th>
<th>Reason</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1001</td>
<td>... is not a directory, will use ... instead</td>
<td>The path specified in the CDRDirectory entry of the configuration file is actually a file.</td>
<td>The CDR logger will use a default directory instead.</td>
</tr>
<tr>
<td>1002</td>
<td>Could not create CDR directory</td>
<td>The CDR logger could not create the directory specified in the CDRDirectory entry of the configuration file.</td>
<td>It will use a default directory instead.</td>
</tr>
<tr>
<td>1003</td>
<td>Could not create CDR file!</td>
<td>The CDR logger was unable to create a CDR file.</td>
<td>CDRs will be kept in memory until a file can be created.</td>
</tr>
<tr>
<td>1010</td>
<td>Could not invoke reserveAmountRes() on the IpAppChargingSession: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppChargingSession, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1012</td>
<td>Could not invoke ...Err() on the IpAppChargingSession: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppChargingSession, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1013</td>
<td>Received ChamComsException on session ...: ...</td>
<td>The OSA Gateway received a &quot;communication failure&quot; exception from the BE client interface, meaning that it has lost connection with the Billing Engine.</td>
<td>This may be a temporary error.</td>
</tr>
<tr>
<td>1031</td>
<td>Received ChamComsException on assignment ID ...: ...!</td>
<td>The OSA Gateway received a &quot;communication failure&quot; exception from the BE client interface, meaning that it has lost connection with the Billing Engine.</td>
<td>This may be a temporary error.</td>
</tr>
<tr>
<td>1035</td>
<td>Could not invoke extendLifeTimeRes() on the IpAppChargingSession: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppChargingSession, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1036</td>
<td>Could not invoke directCreditAmountRes() on the IpAppChargingSession: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppChargingSession, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>Number</td>
<td>Alarm Text</td>
<td>Reason</td>
<td>Remedy</td>
</tr>
<tr>
<td>-------</td>
<td>----------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>1037</td>
<td>Could not invoke directDebitAmountRes() on the IpAppChargingSession: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppChargingSession, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1040</td>
<td>Could not invoke queryBalanceRes() on the IpAppAccountManager: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppAccountManager, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1041</td>
<td>Could not invoke queryBalanceErr() on the IpAppAccountManager: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppAccountManager, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1044</td>
<td>Received `no context data' error code from SubsequentAmountReservationNack!</td>
<td>The E2BE could not locate the context data for the reservation.</td>
<td>This is a temporary error.</td>
</tr>
<tr>
<td>1046</td>
<td>Could not invoke sessionEnded() on the IpAppChargingSession: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppChargingSession, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1049</td>
<td>Invoked ...Err() with invalid OSA error code ...!</td>
<td>The OSA Gateway invoked a ...Err() method on the IpAppChargingSession with an invalid OSA error code.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1051</td>
<td>Could not invoke sessionAborted() on the IpAppChargingManager: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppChargingManager, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1053</td>
<td>Could not invoke retrieveTransactionHistoryRes() on the IpAppAccountManager: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppAccountManager, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>Number</td>
<td>Alarm Text</td>
<td>Reason</td>
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<tr>
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</tr>
<tr>
<td>1054</td>
<td>Could not invoke retrieveTransaction HistoryErr() on the IpAppAccountManager: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppAccountManager, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1055</td>
<td>Could not invoke creditUnitRes() on the IpAppAccountManager: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppChargingSession, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1056</td>
<td>Could not invoke creditUnitErr() on the IpAppChargingSession: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppChargingSession, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1057</td>
<td>Could not invoke debitUnitRes() on the IpAppChargingSession: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppChargingSession, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1058</td>
<td>Could not invoke debitUnitErr() on the IpAppChargingSession: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppChargingSession, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1059</td>
<td>Could not invoke directCreditUnitRes() on the IpAppChargingSession: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppChargingSession, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1060</td>
<td>Could not invoke directCreditUnitErr() on the IpAppChargingSession: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppChargingSession, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>Number</td>
<td>Alarm Text</td>
<td>Reason</td>
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</tr>
<tr>
<td>1061</td>
<td>Could not invoke directDebitUnitRes( ) on the IpAppChargingSession: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppChargingSession, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1062</td>
<td>Could not invoke directDebitUnitErr( ) on the IpAppChargingSession: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppChargingSession, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1063</td>
<td>Could not invoke rateRes() on the IpAppChargingSession: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppChargingSession, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1064</td>
<td>Could not invoke rateErr() on the IpAppChargingSession: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppChargingSession, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1065</td>
<td>Could not invoke reserveUnitRes() on the IpAppChargingSession: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppChargingSession, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1066</td>
<td>Could not invoke reserveUnitErr() on the IpAppChargingSession: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppChargingSession, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1067</td>
<td>Could not invoke reportNotification( ) on the IpAppAccountManager: failed with CORBA system exception: ...</td>
<td>The OSA Gateway could not send a CORBA request to the IpAppAccountManager, probably because of a communication failure.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1077</td>
<td>Received ’no context data’ error code from SR_Nack(SubsequentUnitSecondsReservationNAck)!</td>
<td>The E2BE could not locate the context data for the reservation.</td>
<td>This is a temporary error.</td>
</tr>
<tr>
<td>Number</td>
<td>Alarm Text</td>
<td>Reason</td>
<td>Remedy</td>
</tr>
<tr>
<td>--------</td>
<td>------------</td>
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<td>--------</td>
</tr>
<tr>
<td>1081</td>
<td>Received 'no context data' error code from SNER_Nack(SubsequentUnitNamedEventsReservationNAck)!</td>
<td>The E2BE could not locate the context data for the reservation.</td>
<td>This is a temporary error.</td>
</tr>
<tr>
<td>1087</td>
<td>Received 'no context data' error code from ATC_NAck!</td>
<td>The E2BE could not locate the context data for the reservation.</td>
<td>This is a temporary error.</td>
</tr>
<tr>
<td>1091</td>
<td>Received 'no context data' error code from NE_NAck!</td>
<td>The E2BE could not locate the context data for the reservation.</td>
<td>This is a temporary error.</td>
</tr>
<tr>
<td>1097</td>
<td>Received 'no context data' error code from RateUnitSecondsNAck!</td>
<td>The E2BE could not locate the context data for the reservation.</td>
<td>This is a temporary error.</td>
</tr>
<tr>
<td>1101</td>
<td>Received 'no context data' error code from RateUnitNamedEventsNAck!</td>
<td>The E2BE could not locate the context data for the reservation.</td>
<td>This is a temporary error.</td>
</tr>
<tr>
<td>1102</td>
<td>Received osa::RetrieveNotificationNAck from BE!</td>
<td>A request for triggered notifications resulted in a NAck.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1103</td>
<td>Timeout waiting for osa::RetrieveNotificationAck</td>
<td>A request for triggered notifications was sent, but no reply was received.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1104</td>
<td>Invalid eventName X received in reportNotification. Can not send this notification.</td>
<td>A notification was received from the billing engine but the event type was not valid.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1105</td>
<td>Can’t open ccsSSMDispatcher file for write. Aborting SMS send.</td>
<td>Attempting to open the fifo for writing the SMS data has failed. The permissions for this file may be wrong or the file may not exist. The SMS will not be sent.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1106</td>
<td>The length of the MSISDN exceeds the defined maximum. Aborting SMS send.</td>
<td>Invalid MSISDN length has been determined. The SMS will not be sent.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1107</td>
<td>The length of the language for the SMS exceeds the defined maximum. Aborting SMS send.</td>
<td>Invalid language length has been determined. The SMS will not be sent.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>Number</td>
<td>Alarm Text</td>
<td>Reason</td>
<td>Remedy</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>1108</td>
<td>The length of the amount field for the SMS exceeds the defined maximum.</td>
<td>Invalid amount length has been determined. The SMS will not be sent.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1109</td>
<td>Can’t write to the ccsSSMDispatcher. Aborting SMS send.</td>
<td>Attempting to write to the fifo used for sending the SMS data has failed.</td>
<td>The permissions for this file may be wrong or the file may not exist. The SMS will not be sent.</td>
</tr>
<tr>
<td>1110</td>
<td>Could not increase statistic for &lt;name&gt;.</td>
<td>The statistic for &lt;name&gt; could not be increased.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>1115</td>
<td>OSA balance Type To Currency Map adding CODE %s, found Duplicate (balance type id %d, acsCustID %d).</td>
<td>When adding entries to the balance type map a duplicate entry has been found.</td>
<td>Contact Oracle support to resolve the Error.</td>
</tr>
<tr>
<td>1300</td>
<td>Could not create remote database link.</td>
<td>The OSA gateway was unable to create a remote link to the SMF database.</td>
<td>Make sure the correct hostname and Oracle SID is specified in the remoteDbLinkData section of the configuration file.</td>
</tr>
<tr>
<td>2002</td>
<td>Select failed with &lt;errorCode&gt; ( &lt;errorCodeDescription&gt; )</td>
<td>The c-library function select(), used to poll open file descriptors for activity failed, with the given error.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2004</td>
<td>Caught cmn::Exception: what &lt;errorComponent&gt; / reason &lt;errorDescription&gt;</td>
<td>The given component gave the given error whilst the new configuration was being applied.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2005</td>
<td>Due to errors updating configuration, current state indecisive</td>
<td>The process was unable to roll back to previous configuration following error.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2006</td>
<td>Caught cmn::Exception: what &lt;string&gt; / reason &lt;string&gt;</td>
<td>The given component gave the given error whilst the updated configuration was being parsed. Internal configuration remains unchanged.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2007</td>
<td>Due to errors during parsing, configuration has not been updated</td>
<td>Informational output indicating that the configuration file could not be parsed, and internal configuration remains unchanged.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>Number</td>
<td>Alarm Text</td>
<td>Reason</td>
<td>Remedy</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>2050</td>
<td>Failed to send InitialAmountReservationRequest due to invalid ChargingParty &lt;string&gt;</td>
<td>An invalid charging party was detected when attempting to send the given request to the billing engine.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2051</td>
<td>Failed to send InitialAmountReservationRequest due to problems with BeClientIF</td>
<td>It was not possible to deliver the given request to either billing engine pair. This indicates an internal logic problem.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2052</td>
<td>Attempt to send SubsequentAmountReservationRequest on non-existent session with id &lt;value&gt;</td>
<td>Program attempted to send billing engine requests &quot;out of order&quot;. This indicates an internal logic problem.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2053</td>
<td>Failed to send SubsequentAmountReservationRequest due to problems with BeClientIF</td>
<td>It was not possible to deliver the given request to either billing engine pair.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2054</td>
<td>Attempt to send AmountReservationConfirmationRequest on non-existent session with id &lt;value&gt;</td>
<td>Program attempted to send billing engine requests &quot;out of order&quot;. This indicates an internal logic problem.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2055</td>
<td>Failed to send AmountReservationConfirmationRequest due to problems with BeClientIF</td>
<td>It was not possible to deliver the given request to either billing engine pair.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2056</td>
<td>Attempt to send ReservationCancellationRequest on non-existent session with id &lt;value&gt;</td>
<td>Program attempted to send billing engine requests &quot;out of order&quot;. This indicates an internal logic problem.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2057</td>
<td>Failed to send ReservationCancellationRequest due to problems with BeClientIF</td>
<td>It was not possible to deliver the given request to either billing engine pair.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2058</td>
<td>Failed to send PerformDirectDeltaRequest due to invalid ChargingParty &lt;string&gt;</td>
<td>An invalid charging party was detected when attempting to send the given request to the billing engine.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>Number</td>
<td>Alarm Text</td>
<td>Reason</td>
<td>Remedy</td>
</tr>
<tr>
<td>--------</td>
<td>------------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>2059</td>
<td>Failed to send PerformDirectDeltaRequest due to problems with BeClientIF</td>
<td>It was not possible to deliver the given request to either billing engine pair.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2060</td>
<td>Failed to send QueryAccountRequest due to invalid ChargingParty &lt;string&gt;</td>
<td>An invalid charging party was detected when attempting to send the given request to the billing engine.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2061</td>
<td>Failed to send QueryAccountRequest due to problems with BeClientIF</td>
<td>It was not possible to deliver the given request to either billing engine pair.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2062</td>
<td>Attempt to abort non-existant session with id of &lt;value&gt;</td>
<td>This indicates an internal logic problem.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2063</td>
<td>Received response message for non-existant session with id of &lt;value&gt;</td>
<td>Unexpected message received from the billing engine, message not related to any current operations.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2064</td>
<td>Received unexpected response message for session with id &lt;value&gt; whilst idle</td>
<td>Billing engine sent unknown response message in reply to request.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2065</td>
<td>Received unknown Ack message for session with id &lt;value&gt;: action &lt;string&gt;, type &lt;string&gt;</td>
<td>Billing engine replied with unknown response message.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2066</td>
<td>Received unknown N Ack message for session with id &lt;value&gt;: action &lt;string&gt;, type &lt;string&gt;</td>
<td>Billing engine replied with unknown response message.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2067</td>
<td>Received unknown response message for session with id &lt;value&gt;: action &lt;string&gt;, type &lt;string&gt;</td>
<td>Billing engine replied with unknown response message.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2068</td>
<td>Failed to send queued request due to problems with BeClientIF</td>
<td>Process was unable to send next queued request, following receipt of a billing engine response.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2069</td>
<td>Received com error exception for non-existant session with id of &lt;value&gt;: &lt;string&gt;</td>
<td>Given communication error occurred whilst waiting for response message.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>Number</td>
<td>Alarm Text</td>
<td>Reason</td>
<td>Remedy</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>2070</td>
<td>Received com error exception for session with id &lt;value&gt; whilst idle</td>
<td>Received given communication error, not related to any outstanding request.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2071</td>
<td>Failed to send InitialUnitSecondsReservationRequest due to invalid ChargingParty &lt;string&gt;</td>
<td>An invalid charging party was detected when attempting to send the given request to the billing engine.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2072</td>
<td>Failed to send InitialUnitSecondsReservationRequest due to problems with BeClientIF</td>
<td>It was not possible to deliver the given request to either billing engine pair.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2073</td>
<td>Failed to send InitialUnitNamedEventsReservationRequest due to invalid ChargingParty &lt;string&gt;</td>
<td>An invalid charging party was detected when attempting to send the given request to the billing engine.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2074</td>
<td>Failed to send InitialUnitNamedEventsReservationRequest due to invalid NamedEvent &lt;string&gt;</td>
<td>An invalid named event was detected when attempting to send the given request to the billing engine.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2075</td>
<td>Failed to send InitialUnitNamedEventsReservationRequest due to problems with BeClientIF</td>
<td>It was not possible to deliver the given request to either billing engine pair.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2076</td>
<td>Failed to send SubsequentUnitSecondsReservationRequest due to invalid ChargingParty &lt;string&gt;</td>
<td>An invalid charging party was detected when attempting to send the given request to the billing engine.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2077</td>
<td>Failed to send SubsequentUnitSecondsReservationRequest due to problems with BeClientIF</td>
<td>It was not possible to deliver the given request to either billing engine pair.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2078</td>
<td>Failed to send SubsequentUnitNamedEventsReservationRequest due to invalid ChargingParty &lt;string&gt;</td>
<td>An invalid charging party was detected when attempting to send the given request to the billing engine.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>Number</td>
<td>Alarm Text</td>
<td>Reason</td>
<td>Remedy</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------</td>
</tr>
<tr>
<td>2079</td>
<td>Failed to send SubsequentNamedEventsReservationRequest due to problems with BeClientIF</td>
<td>It was not possible to deliver the given request to either billing engine pair.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2080</td>
<td>Attempt to send UnitSecondsReservationConfirmationRequest on non-existant session with id &lt;value&gt;</td>
<td>Program attempted to send billing engine requests &quot;out of order&quot;. This indicates an internal logic problem.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2081</td>
<td>Failed to send UnitSecondsReservationConfirmationRequest due to invalid confirmedAmount &lt;value&gt;</td>
<td>It was not possible to deliver the given request to either billing engine pair.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2082</td>
<td>Failed to send UnitSecondsReservationConfirmationRequest due to problems with BeClientIF</td>
<td>It was not possible to deliver the given request to either billing engine pair.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2083</td>
<td>Attempt to send UnitNamedEventsReservationConfirmation Request on non-existant session with id &lt;value&gt;</td>
<td>Program attempted to send billing engine requests &quot;out of order&quot;. This indicates an internal logic problem.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2084</td>
<td>Failed to send UnitNamedEventsReservationConfirmationRequest due to invalid confirmedAmount &lt;value&gt;</td>
<td>It was not possible to deliver the given request to either billing engine pair.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2085</td>
<td>Failed to send UnitNamedEventsReservationConfirmationRequest due to problems with BeClientIF</td>
<td>It was not possible to deliver the given request to either billing engine pair.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2086</td>
<td>Failed to send DirectDeltaUnitSecondsReservationRequest due to invalid ChargingParty &lt;string&gt;</td>
<td>An invalid charging party was detected when attempting to send the given request to the billing engine.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2087</td>
<td>Failed to send DirectDeltaUnitSecondsReservationRequest due to problems with BeClientIF</td>
<td>It was not possible to deliver the given request to either billing engine pair.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>Number</td>
<td>Alarm Text</td>
<td>Reason</td>
<td>Remedy</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>2088</td>
<td>Failed to send DirectDeltaUnitName dEventsReservationRequest due to invalid ChargingParty &lt;string&gt;</td>
<td>An invalid charging party was detected when attempting to send the given request to the billing engine.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2089</td>
<td>Failed to send DirectDeltaUnitName dEventsReservationRequest due to invalid NamedEvent &lt;string&gt;</td>
<td>An invalid named event was detected when attempting to send the given request to the billing engine.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2090</td>
<td>Failed to send DirectDeltaUnitName dEventsReservationRequest due to problems with BeClientIF</td>
<td>It was not possible to deliver the given request to either billing engine pair.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2091</td>
<td>Failed to send UnitSecondsRateRequest due to invalid ChargingParty &lt;string&gt;</td>
<td>An invalid charging party was detected when attempting to send the given request to the billing engine.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2092</td>
<td>Failed to send UnitSecondsRateRequest due to problems with BeClientIF</td>
<td>It was not possible to deliver the given request to either billing engine pair.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2093</td>
<td>Failed to send UnitNamedEventsRateRequest due to invalid ChargingParty &lt;string&gt;</td>
<td>An invalid charging party was detected when attempting to send the given request to the billing engine.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2094</td>
<td>Failed to send UnitNamedEventsRateRequest due to invalid NamedEvent &lt;string&gt;</td>
<td>An invalid named event was detected when attempting to send the given request to the billing engine.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2095</td>
<td>Failed to send UnitNamedEventsRateRequest due to problems with BeClientIF</td>
<td>It was not possible to deliver the given request to either billing engine pair.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2102</td>
<td>Asked to decode charging party of unknown type &lt;value&gt;</td>
<td>Client has sent invalid charging party.</td>
<td>Check parameters.</td>
</tr>
<tr>
<td>2103</td>
<td>Charging party &lt;string&gt; doesn't consist of 3 elements</td>
<td>Client has sent invalid charging party.</td>
<td>Check parameters.</td>
</tr>
<tr>
<td>Number</td>
<td>Alarm Text</td>
<td>Reason</td>
<td>Remedy</td>
</tr>
<tr>
<td>--------</td>
<td>------------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>2104</td>
<td>Failed to establish connection to Oracle using login/password of &lt;login&gt;&lt;password&gt;</td>
<td>Failed to connect to Oracle.</td>
<td>Contact Oracle Support</td>
</tr>
<tr>
<td>2150</td>
<td>Attempt to add overlapping range (&lt;value&gt;, &lt;value&gt;) conflicted with existing (&lt;value&gt;, &lt;value&gt;)</td>
<td>Configuration file error. The defined MSISDN ranges contain an overlapping region.</td>
<td>Check configuration file and restart.</td>
</tr>
<tr>
<td>3000</td>
<td>Cannot recreate db link: Not defined in remoteSMF1Name configuration</td>
<td>Runtime, the db link has failed and the remoteSMF1Name configuration item is not set.</td>
<td>Check configuration file and restart</td>
</tr>
</tbody>
</table>
| 3001   | Cannot recreate link to <configured remoteSMF1Name>: Unknown name given in remoteSMF1Name configuration | Runtime, if the db link has failed and the remoteSMF1Name configuration item does not match an entry in tnsnames.ora.  
  - <configured remoteSMF1Name> is replaced by the configuration entry. | Check configuration file and restart |
| 3002   | Cannot recreate db link to <configured remoteSMF1Name>: <error code>: <error text> | Runtime, the db link has failed and an SQL error occurs.  
  - <configured remoteSMF1Name> is replaced by the configuration entry.  
  - <error code> is replaced by the oracle error code.  
  - <error text> is replaced by the oracle error text. | Contact Oracle Support |
| 3003   | DB link to SMF failed | Runtime, the db link has failed and could not be re-established even though the configuration remoteSMF1Name is correct | Contact Oracle Support |
## Warnings

This table defines the Warning messages for the OSA Client Interface.

<table>
<thead>
<tr>
<th>Number</th>
<th>Alarm Text</th>
<th>Reason</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1112</td>
<td>beLocationPluginLib option in configuration file will be ignored</td>
<td>This is because the configuration file also contains a <code>billingEngines</code> list, which will take precedence.</td>
<td>no action required</td>
</tr>
</tbody>
</table>

## Notices

This table defines the Notice messages for the OSA Client Interface.

<table>
<thead>
<tr>
<th>Number</th>
<th>Alarm Text</th>
<th>Reason</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1042</td>
<td>Can write CDR files again</td>
<td>The OSA Gateway is able to create CDR files again.</td>
<td>No action required</td>
</tr>
<tr>
<td>1116</td>
<td>remoteSMF1Name not set in configuration. Recovery from dropped DB link will not be possible</td>
<td>On startup, the remoteSMF1Name configuration item is not set.</td>
<td>No action required</td>
</tr>
<tr>
<td>2000</td>
<td>Exiting with status <code>&lt;exitCode&gt;</code></td>
<td>The osaChamScs process is about to exit, returning the given status code <code>&lt;value&gt;</code>.</td>
<td>No action required</td>
</tr>
<tr>
<td>2003</td>
<td>Rereading config, due to receipt of SIGHUP</td>
<td>Informational output indicating the configuration file will be reread.</td>
<td>No action required</td>
</tr>
<tr>
<td>2008</td>
<td>Turning debug on, due to receipt of SIGUSR1</td>
<td>Informational output indicating debugging information has been turned on.</td>
<td>No action required</td>
</tr>
<tr>
<td>2009</td>
<td>Send SIGUSR2 to turn debug off</td>
<td>Informational output describing how to turn debugging information off.</td>
<td>No action required</td>
</tr>
<tr>
<td>2010</td>
<td>Turning debug off, due to receipt of SIGUSR2</td>
<td>Informational output indicating debugging information has been turned off.</td>
<td>No action required</td>
</tr>
<tr>
<td>2011</td>
<td>Shutting down when idle, due to receipt of SIGUSR2</td>
<td>Informational output indicating process will now refuse new connections, and will shutdown when existing operations have finished.</td>
<td>No action required</td>
</tr>
<tr>
<td>2012</td>
<td>Process is not idle, about to exit</td>
<td>Informational output indicating all existing operations have finished, and process is shutting down.</td>
<td>No action required</td>
</tr>
</tbody>
</table>
Chapter 4

Background Processes

Overview

Introduction

This chapter explains the background processes.

In this chapter

This chapter contains the following topics.

- osaServerNotificationHandlers .......................................................... 65
- osaVWARSQueryHandlers ................................................................. 66
- osaVWARSNotificationPlugins .......................................................... 66
- libnotificationQM .............................................................................. 66
- osaChamScs ......................................................................................... 67
- runOsaChamScs ................................................................................... 67
- ccsSSMDispatcher ................................................................................. 67
- signalOsaChamScs ............................................................................... 67
- OSA CHAM SCS Gateway ................................................................. 68
- Billing Engine EDRs ............................................................................. 68
- Statistics ............................................................................................. 70
- Alarms ................................................................................................. 73

osaServerNotificationHandlers

Purpose

The osaServerNotificationHandlers library provides the OSA gateway specific notification functionality on the VWS. The OSA notifications are specific to the OSA gateway and are not related to CCS real-time or short message notifications.

Location

This binary is located on VWS nodes.

Configuration

This binary has no specific configuration.
osaVWARSQueryHandlers

Purpose
The osaVWARSQueryHandlers library provides the OSA gateway query functionality on the VWS, returning one of an individual specified balance type, all the balance types in a specified balance type cascade, or all the balance types in the subscriber's wallet; for any balance type returned the sum of all buckets and the earliest expiring bucket will be returned.

Location
This binary is located on VWS nodes.

Configuration
This binary has no specific configuration.

osaVWARSNotificationPlugins

Purpose
The osaVWARSNotificationPlugins library provides the OSA gateway specific notification functionality on the VWS. The OSA notifications are specific to the OSA gateway and are not related to CCS real-time or short message notifications.

Location
This binary is located on VWS nodes.

Configuration
This binary has no specific configuration.

libnotificationQM

Purpose
The libnotificationQM library provides the OSA gateway specific notification functionality on the VWS. The OSA notifications are specific to the OSA gateway and are not related to CCS real-time or short message notifications.

Location
This binary is located on VWS nodes.

Configuration
This binary has no specific configuration.
osaChamScs

Purpose
The osaChamScs binary provides the OSA gateway functionality on the SCS.

Location
This binary is located on the SCS.

runOsaChamScs

Purpose
The runOsaChamScs shell script is used to execute the gateway. See Execution (on page 216).

Location
This binary is located on the SCS.

ccsSSMDispatcher

Purpose
The ccsSSMDispatcher shell script executes ccsSSMDispatcher binary on the machine. See CCS Technical Guide for details of this binary.

Location
This binary is located on the SCS.

signalOsaChamScs

Purpose
The signalOsaChamScs shell script provides the following:

```bash
usage() { 
  echo "usage: `basename $0` ( int | term | usrl | usr2 | hup | kill | abrt)"
  echo "  hup - reread config"
  echo "  usrl - turn debug on"
  echo "  usr2 - turn debug off"
  echo "  int - shutdown cleanly"
  echo "  term - shutdown cleanly"
  echo "  kill - end process immediately (cannot be trapped)"
  echo "  abrt - abort and produce core"
}
```
Chapter 4

OSA CHAM SCS Gateway

Events

OSA CHAM Gateway EDRs are generated on the SCS for any of the following events:

- Charging session is created. (Type 20)
- Reservation is confirmed. (Type 21)
- Reservation is canceled. (Type 22)
- Direct debit/credit is invoked. (Type 23)

For a description of OSA CHAM SCS Gateway EDRs, see Event Detail Record Reference Guide.

Example EDRs

Here are some example OSA EDRs.

- Example amount-based confirmation OSA gateway EDR:
  21|Session=New ChargingSession|Merchant=Merchant Id/1|Account=912233289900/Personal/General Cash|ReservedAmount=50|ConfirmedAmount=20|Reservation=20031106133119|Confirmed=20031106133147|RES=50;LIF=180;DEB=20|ApplicationDescription=ReserveAmountReq:DebitAmountReq|UnitType=amount|DiscountOverride=0|N

- For amount-based direct charges an EDR will always be written on the SCS. No Billing Engine Rate request is required as the amount is already known. Example direct debit/credit amount-based OSA Gateway EDR:
  23|Session=New ChargingSession|Merchant=Merchant Id/1|Account=912233289900/Personal/General Cash|Amount=-10|Postpaid|Time=20031106133230|ApplicationDescription=DirectDebitAmountReq|UnitType=amount|DiscountOverride=0|N

- Example direct debit/credit unit seconds-based OSA gateway EDR:
  23|Session=New ChargingSession|Merchant=Merchant Id/1|Account=912233289900/Personal|Amount=-10|Postpaid|Time=20031106133230|ApplicationDescription=DirectDebitUnitReq|UnitType=tariff.91.44|DiscountOverride=0|N

Billing Engine EDRs

Creation

Billing engine EDRs are written whenever an amount or an expiry date changes on a user’s Account (for a specific wallet and balance type).

For a description of billing engine EDRs, see Event Detail Record Reference Guide.

Events

Billing engine EDRs are generated for any of the following events:

- An amount-based reservation is confirmed. (Type 21)
- An amount-based direct debit/credit is made. As this is the means through which wallet type and balance type expiry dates are also changed, a billing engine EDR will also be created for this transaction. (Type 23)
- A unit seconds-based reservation is confirmed. (Type 24)
- A unit named event-based reservation is confirmed. (Type 25)
- A unit seconds-based direct debit/credit is made. (Type 26)
- A unit named event-based direct debit/credit is made. (Type 27)

**Example EDRs**

Here are some example BE EDRs.

- **Example amount-based reservation BE EDR:**
  
  BILLING_ENGINE_ID=1|SCP_ID=198248872|SEQUENCE_NUMBER=4494|CDR_TYPE=21
  
  RECORD_DATE=20031119140101|ACCT_ID=2146|ACCT_REF_ID=2123|WALLET_TYPE=23
  
  BALANCE_TYPE=49|BALANCES=9270|COSTS=10
  
  APPLICATION_DESC=ReserveAmountReq

- **Example amount-based direct debit/credit BE EDR:**
  
  BILLING_ENGINE_ID=1|SCP_ID=198248872|SEQUENCE_NUMBER=4495|CDR_TYPE=23
  
  RECORD_DATE=20031119140145|ACCT_ID=2146|ACCT_REF_ID=2123|WALLET_TYPE=23
  
  BALANCE_TYPE=49|BALANCES=9260|COSTS=-10
  
  APPLICATION_DESC=DirectDebitAmountReq

- **Example unit-seCONDS based reservation BE EDR:**
  
  BILLING_ENGINE_ID=1|SCP_ID=198248872|SEQUENCE_NUMBER=4572|CDR_TYPE=24
  
  RECORD_DATE=20031119155328|ACCT_ID=2146|ACCT_REF_ID=2123|CLI=01473
  
  ACS_CUST_ID=22|CS=S
  
  ACCOUNT_TYPE=22
  
  RATES=20,20,20,20,20,10,10,10,10,10,10
  
  LENGTHS=60,60,60,60,60,60,60,60,60,60,60,60
  
  COSTS=83
  
  BALANCES=60
  
  ACCOUNT_TYPE=22
  
  EVENT_CLASS=OSA2BE
  
  EVENT_NAME=event1
  
  EVENT_COST=100
  
  EVENT_COUNT=7
  
  DISCOUNT=0
  
  CASCADE=21

- **Example unit-seCONDS based direct credit/debit BE EDR:**
  
  BILLING_ENGINE_ID=1|SCP_ID=198248872|SEQUENCE_NUMBER=4490|CDR_TYPE=26
  
  RECORD_DATE=20031119135814|ACCT_ID=2146|ACCT_REF_ID=2123|CLI=01473
  
  ACS_CUST_ID=22|BALANCE_TYPES=49|BALANCES=8285|COSTS=15
  
  ACCOUNT_TYPE=22
  
  CASCADE_ID=21
  
  RATES=20,20,20,20,20,10,10,10,10,10
  
  LENGTHS=60,60,60,60,60,60,60,60,60,60,60,60
  
  COSTS=10
  
  BALANCES=60
  
  ACCOUNT_TYPE=22
  
  EVENT_CLASS=OSA2BE
  
  EVENT_NAME=event1
  
  EVENT_COST=100
  
  EVENT_COUNT=7
  
  DISCOUNT=0
  
  CASCADE=21
Chapter 4

Statistics

Introduction

The OSA gateway generates statistics for every defined and supported CORBA method.

The statistics are a simple count of each method, named the same as the method they are monitoring.

The OSA gateway uses the standard NCC statistics functions provided by the smsStatsDaemon. For more information about smsStatsDaemon, see Service Management System Technical Guide.

The statistics can be replicated to the SMS at a configurable rate.
Chapter 4

Diagram

Here is the Statistics process.

List of statistics

Here is a list of the statistics produced by OSA CHAM processes.

- `setCallback` (Account Manager)
- `createNotification`
- `destroyNotification`
- `queryBalanceReq`
- `changeNotification`
- `getNotification`
- `retrieveTransactionHistoryReq`
- `createChargingSession`
- `creditAmountReq`
- `creditUnitReq`
- `debitAmountReq`
- `debitUnitReq`
- `directCreditAmountReq`
- `directCreditUnitReq`
- `directDebitAmountReq`
- `directDebitUnitReq`
- `extendLifeTimeReq`
- `getAmountLeft`
- `getLifeTimeLeft`
- `getUnitLeft`
- `rateReq`
- `release`
- `reserveAmountReq`
- `reserveUnitReq`
- `reportNotification`
- `queryBalanceRes`
- `queryBalanceErr`
- `retrieveTransactionHistoryRes`
- `retrieveTransactionHistoryErr`
- `sessionAborted`
- `creditAmountErr`
- `creditAmountRes`
- `creditUnitErr`
- `creditUnitRes`
- `debitAmountErr`
- `debitAmountRes`
- `debitUnitErr`
- `debitUnitRes`
- `directCreditAmountErr`
- `directCreditAmountRes`
- `directCreditUnitErr`
- `directCreditUnitRes`
- `directDebitAmountErr`
- `directDebitAmountRes`
- `directDebitUnitErr`
- `directdebitUnitRes`
- `extendLifeTimeErr`
- `extendLifeTimeRes`
- `rateErr`
- `rateRes`
- `reserveAmountErr`
- `reserveAmountRes`
- `reserveUnitErr`
- `reserveUnitRes`
- `sessionEnded`
Alarms

Introduction
The OSA gateway generates alarms. The OSA gateway writes them to the system log on the target platform:
/var/adm/messages

Target location
The OSA gateway alarms are logged to a configurable location on the target platform such as the following:
/IN/service_packages/OSA/tmp/runOsaChamScs.log

Functionality
The OSA gateway uses the standard NCC alarm functionality provided by the smsAlarmDaemon, a process that parses the syslog in /var/adm/messages and replicates these alarms to the smsMaster on the SMS. The alarms can be replicated to the SMS at a configurable rate.

For more information about the smsAlarmDaemon, see Service Management System Technical Guide.
Diagram

Here is a diagram of the Alarms process.
Overview

Introduction
This chapter explains the tools used in OSA Gateway.

In this chapter

This chapter contains the following topics.

Running the OSA Gateway ................................................. 75
signalOsaChamScs.sh ......................................................... 75

Running the OSA Gateway

Starting up a gateway instance

Follow these steps to start up a gateway instance.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>As osa_oper on the SCS type: /IN/service_packages/OSA/bin/runOsaChamScsStartup.sh</td>
</tr>
<tr>
<td>2</td>
<td>Check the /IN/service_packages/OSA/tmp/runOsaChamScs.log on the SCS, to ensure no errors are reported and that the OSA gateway is accepting connections.</td>
</tr>
<tr>
<td>3</td>
<td>The OSA gateway will generate CORBA IOR location files during startup. These must be copied onto the client machine to allow the two CORBA objects (Client and Gateway) to communicate.</td>
</tr>
</tbody>
</table>

Stopping a gateway instance

Follow these steps to terminate all instances of the OSA gateway currently running,

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>As osa_oper on the SCS type: /IN/service_packages/OSA/bin/signalOsaChamScs.sh INT</td>
</tr>
</tbody>
</table>

signalOsaChamScs.sh

Purpose

signalOsaChamScs.sh enables you to send instructions to all the osaChamScs processes on a host.
**Configuration**

`signalOsaChamScs.sh` supports the following command line parameters:

```
signalOsaChamScs.sh <int | term | usr1 | usr2 | hup | kill | abrt>
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>int</td>
<td>Shutdown cleanly</td>
</tr>
<tr>
<td>term</td>
<td>Shutdown cleanly</td>
</tr>
<tr>
<td>usr1</td>
<td>Turn debug on</td>
</tr>
<tr>
<td>usr2</td>
<td>Turn debug off</td>
</tr>
<tr>
<td>hup</td>
<td>Reread config</td>
</tr>
<tr>
<td>kill</td>
<td>End process immediately (cannot be trapped).</td>
</tr>
<tr>
<td>abrt</td>
<td>Abort and produce core file.</td>
</tr>
</tbody>
</table>
Overview

Introduction

This section is intended to give examples of the OSA CHAM SCS gateway and third-party client application usage through providing example message flows for a small selection of possible transactions.

In this chapter

This chapter contains the following topics.

- Balance/Account Info Queries .............................................................. 77
- Creation of Charging Session ................................................................. 78
- Transaction History .............................................................................. 78
- Notifications ......................................................................................... 79
- Amount Based Reservations ................................................................. 80
- Unit Based Reservations (Named Events) .............................................. 85

Balance/Account Info Queries

Success

**Message Details**

<table>
<thead>
<tr>
<th>Step</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The IpAppAccountManager invokes a <code>queryBalanceReq()</code> on the IpAccountManager containing 1 or more user account details.</td>
</tr>
<tr>
<td>2</td>
<td>After a successful query on the billing engine the <code>queryBalanceRes()</code> method is invoked on the IpAppAccountManager containing result details.</td>
</tr>
</tbody>
</table>
### Failure

<table>
<thead>
<tr>
<th>Step</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The IpAppAccountManager invokes a queryBalanceReq() on the IpAccountManager containing 1 or more user account details.</td>
</tr>
<tr>
<td>2</td>
<td>After an unsuccessful query on the billing engine the queryBalanceRes() method is invoked on the IpAppAccountManager containing details of the specific error which occurred.</td>
</tr>
</tbody>
</table>

### Creation of Charging Session

**Message Flow**

<table>
<thead>
<tr>
<th>Step</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The IpAppChargingManager invokes a createChargingSession() on the IpChargingManager. The IpChargingManager creates an instance of the IpChargingSession object and returns an object reference for the new object.</td>
</tr>
</tbody>
</table>
Chapter 6

Message Details

<table>
<thead>
<tr>
<th>Step</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The IpAppAccountManager invokes a retrieveTransactionHistoryReq() on the IpAccountManager containing 1 or more user account details.</td>
</tr>
<tr>
<td>2</td>
<td>After a successful query on the SMS the retrieveTransactionHistoryRes() method is invoked on the IpAppAccountManager containing result details.</td>
</tr>
</tbody>
</table>

Notifications

Message Flow

![Diagram showing message flow between IpAppAccountManager and IpAccountManager]

Message Details

<table>
<thead>
<tr>
<th>Step</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The IpAppAccountManager invokes a createNotification() message on the IpAccountManager for an account, asking for notification of a low credit.</td>
</tr>
<tr>
<td>2</td>
<td>The charging event criteria is met and the IpAppAccountManager is informed.</td>
</tr>
<tr>
<td>3</td>
<td>The IpAppAccountManager retrieves information on current event criteria set.</td>
</tr>
<tr>
<td>4</td>
<td>The IpAppAccountManager changes the event criteria for the account (for example: asking for zero credit).</td>
</tr>
<tr>
<td>5</td>
<td>The charging event criteria is met and the IpAppAccountManager is informed.</td>
</tr>
<tr>
<td>6</td>
<td>The IpAppAccountManager is no longer interested in this account and removes its event criteria.</td>
</tr>
</tbody>
</table>
Amount Based Reservations

Single Reservations with Confirmation

<table>
<thead>
<tr>
<th>Step</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>At the beginning of this scenario the subscriber has a balance of 100 billing engine monetary units. The IpAppChargingSession invokes a reserveAmountReq() on the IpChargingSession containing details of the account to reserve from, the wallet/balance type, the amount to reserve (20 BE units), any discount to be applied, and the lifetime of the reservation. The subscriber's account balance will remain at 100 billing engine monetary units, however there will only be 80 billing engine monetary units available for alternative reservations.</td>
</tr>
<tr>
<td>2</td>
<td>The IpAppChargingSession object will query the billing engine and in this instance successfully reserves the requested amount. It informs the IpAppChargingSession object by calling the reserveAmountRes() method.</td>
</tr>
<tr>
<td>3</td>
<td>The application wants to debit and confirm the use of 10 of the reserved BE units against the subscriber's account. It uses the debitAmountReq() method (with the closeReservation flag set to 'true'). The current reservation is now closed and the subscriber's account would be reduced by the effective cost of 10 BE units. The 10 unconfirmed BE units, those which were initially reserved but not confirmed, would be available for other transactions. The subscriber's balance will now be equivalent to the cost of 90 billing engine monetary units.</td>
</tr>
<tr>
<td>4</td>
<td>The request is successful and the application is informed with the debitAmountRes() method.</td>
</tr>
</tbody>
</table>
Multiple Reservations With Confirmation

Messages

<table>
<thead>
<tr>
<th>Step</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>At the beginning of this scenario the subscriber has a balance of 100 billing engine monetary units. The IpAppChargingSession invokes a reserveAmountReq() on the IpChargingSession containing details of the account to reserve from, the wallet/balance type, the amount to reserve (20 BE units), any discount to be applied, and the lifetime of the reservation. The subscriber’s account balance will remain at 100 billing engine monetary units, however there will only be 80 billing engine monetary units available for alternative reservations.</td>
</tr>
<tr>
<td>2</td>
<td>The IpAppChargingSession object will query the billing engine and in this instance successfully reserves the requested amount. It informs the IpAppChargingSession object by calling the reserveAmountRes() method.</td>
</tr>
<tr>
<td>3</td>
<td>The application wants to debit the use of 10 of the reserved BE units against the reserved BE units on the OSA CHAM SCS gateway. It uses the debitAmountReq() method (with the closeReservation flag set to ‘false’). The subscriber’s account balance of 100 billing engine monetary units. The current reservation on the OSA CHAM SCS gateway now has 10 reserved BE units, and 10 BE units waiting to be confirmed through the subscriber sending a release() method (or using the closeReservation flag of a subsequent debit(credit)UnitReq() method).</td>
</tr>
<tr>
<td>4</td>
<td>The reservation alteration is successful – the debitAmountRes() method is used to inform the application.</td>
</tr>
</tbody>
</table>
Step 5  The application needs a subsequent reservation and uses the `reserveAmountReq()` method to request 10 more BE units. The subscriber’s account balance of 100 billing engine monetary units, however, there will only be the equivalent cost of 70 BE units available for alternative transactions once this transaction has completed. These unreserved units in the user’s account are available for alternative reservations from this or other third-party client applications. The current reservation on the OSA CHAM SCS gateway will now have 20 reserved BE units, and 10 BE units waiting to be confirmed through the subscriber sending a `release()` method (or using the closeReservation flag of a subsequent `debit(credit)AmountReq()` method).

Step 6  The `IpAppChargingSession` object will query the billing engine and in this instance successfully reserves the requested amount. It informs the `IpAppChargingSession` object by calling the `reserveAmountRes()` method.

Step 7  The application wants to credit some from the debited amount back to the reservation held on the OSA CHAM SCS gateway. It invokes the `creditAmountReq()` method for 5 BE units. The subscriber’s account balance of 100 billing engine monetary units. The current reservation on the OSA CHAM SCS gateway now has 25 reserved BE units, and 5 BE units waiting to be confirmed through the subscriber sending a `release()` method (or using the closeReservation flag of a subsequent `debit(credit)AmountReq()` method)

If no more messages were received before the session times out, the subscriber’s balance on the billing engine would not be changed.

Step 8  The reservation alteration is successful – the `creditUnitRes()` method is used to inform the application.

Step 9  The application uses the `debitAmountReq()` method to debit and confirm an additional 2 BE units against the reservation and have these units confirmed on the billing engine. The `debitAmountReq()` method is invoked with the closeReservation flag to ‘true’. The reservation is confirmed (7 BE units) through the `IpChargingSession` informing the billing engine. The current reservation is now closed, and the subscriber’s account would be reduced by 7 billing engine monetary units. The 23 unconfirmed BE units, those that were initially reserved but not confirmed, would be available for other reservations. The subscriber will now have a balance of 93 billing engine monetary units.

Step 10  The request is successful and the application is informed with the `debitUnitRes()` method.

Note: This charging session may now be used for subsequent reservations.

**Reservation Released**

![Diagram](image)
Messages

<table>
<thead>
<tr>
<th>Step</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>At the beginning of this scenario the subscriber has a balance of 100 billing engine monetary units. The IpAppChargingSession invokes a reserveAmountReq() on the IpChargingSession containing details of the account to reserve from, the wallet/balance type, the amount to reserve (10 BE units), any discount to be applied, and the lifetime of the reservation.</td>
</tr>
<tr>
<td>2</td>
<td>The IpAppChargingSession object will query the billing engine and in this instance successfully reserves the requested amount. It informs the IpAppChargingSession object by calling the reserveAmountRes() method.</td>
</tr>
<tr>
<td>3</td>
<td>The application cancels the reservation using the release() method. The IpAppChargingSession does not wait for a confirmation. The charging session is now closed and cannot be used for any other transactions.</td>
</tr>
</tbody>
</table>

Direct Debit

1. IpAppChargingSession
2. IpChargingSession

1: directDebitAmountReq() 
2: directDebitAmountRes() 
3: directDebitAmountReq() 
4: directDebitAmountErr()

Messages

<table>
<thead>
<tr>
<th>Step</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>At the beginning of this scenario the subscriber has a balance of 100 billing engine monetary units. The IpAppChargingSession invokes a directDebitAmountReq() on the IpChargingSession containing details of the account to reserve from, the wallet/balance type, the amount to reserve (10 BE units), any discount to be applied. The IpChargingSession object will attempt to debit the account on the billing engine and in this instance it is successful.</td>
</tr>
<tr>
<td>2</td>
<td>The IpAppChargingSession object will query the billing engine and in this instance successfully debits the requested amount. It informs the IpAppChargingSession object by calling the directDebitAmountRes() method. The subscriber will now have a balance of 90 billing engine monetary units.</td>
</tr>
<tr>
<td>3</td>
<td>At the beginning of this scenario the subscriber has a balance of 100 billing engine monetary units. The IpAppChargingSession invokes a directDebitAmountReq() on the IpChargingSession containing details of the account to reserve from, the wallet/balance type, the amount to reserve (10 BE units), any discount to be applied, and the lifetime of the reservation. The IpChargingSession object will attempt to debit the account on the billing engine and in this instance it is unsuccessful.</td>
</tr>
<tr>
<td>4</td>
<td>The IpAppChargingSession object will query the billing engine and in this instance fails to debit the requested amount. It informs the IpAppChargingSession object by calling the directDebitAmountErr() method with the appropriate error cause. The subscriber will still have a balance of 100 billing engine monetary units.</td>
</tr>
</tbody>
</table>
Chapter 6

Note: This transaction did not invoke a reservation on this charging session.

Direct Credit

Messages

<table>
<thead>
<tr>
<th>Step</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>At the beginning of this scenario the subscriber has a balance of 100 billing engine monetary units. The IpAppChargingSession invokes a directCreditAmountReq() on the IpChargingSession containing details of the account to reserve from, the wallet/balance type, the amount to reserve (10 BE units), any discount to be applied. The IpChargingSession object will attempt to credit the account on the billing engine and in this instance it is successful.</td>
</tr>
<tr>
<td>2</td>
<td>The IpAppChargingSession object will query the billing engine and in this instance successfully credits the requested amount. It informs the IpAppChargingSession object by calling the directCreditAmountRes() method. The subscriber will now have a balance of 110 billing engine monetary units.</td>
</tr>
<tr>
<td>3</td>
<td>At the beginning of this scenario the subscriber has a balance of 100 billing engine monetary units. The IpAppChargingSession invokes a directCreditAmountReq() on the IpChargingSession containing details of the account to reserve from, the wallet/balance type, the amount to reserve (10 BE units), any discount to be applied, and the lifetime of the reservation. The IpChargingSession object will attempt to credit the account on the billing engine and in this instance it is unsuccessful.</td>
</tr>
<tr>
<td>4</td>
<td>The IpAppChargingSession object will query the billing engine and in this instance fails to debit the requested amount. It informs the IpAppChargingSession object by calling the directCreditAmountErr() method with the appropriate error cause. The subscriber will still have a balance of 100 billing engine monetary units.</td>
</tr>
</tbody>
</table>

Note: This transaction did not invoke a reservation on this charging session.
Unit Based Reservations (Named Events)

Single Reservation with Confirmation

<table>
<thead>
<tr>
<th>Step</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>At the beginning of this scenario the subscriber has a balance equivalent to the cost of 100 named events. The IpAppChargingSession invokes a reserveUnitReq() on the IpChargingSession containing details of the account to reserve from, the wallet/balance type, the amount to reserve (20 named events), any discount to be applied, the event class and event name to be used, and the lifetime of the reservation. The subscriber’s account balance will remain equivalent to the cost of 100 named events, however there will only be the equivalent cost of 80 named events available for alternative reservations.</td>
</tr>
<tr>
<td>2</td>
<td>The IpAppChargingSession object will query the billing engine and in this instance successfully reserves the requested number of named events. It informs the IpAppChargingSession object by calling the reserveUnitRes() method.</td>
</tr>
<tr>
<td>3</td>
<td>The application wants to debit and confirm the use of 10 of the reserved named events against the subscriber’s account. It uses the debitUnitReq() method (with the closeReservation flag set to ‘true’). The current reservation is now closed and the subscriber’s account would be reduced by the effective cost of 10 named events. The 10 unconfirmed named events, those that were initially reserved but not confirmed, would be available for other transactions. The subscriber’s balance will now be equivalent to the cost of 90 named events.</td>
</tr>
<tr>
<td>4</td>
<td>The request is successful and the application is informed with the debitUnitRes() method.</td>
</tr>
</tbody>
</table>
Multiple Reservations With Confirmation

1. At the beginning of this scenario the subscriber has a balance equivalent to the cost of 100 named events. The IpAppChargingSession invokes a reserveUnitReq() on the IpChargingSession containing details of the account to reserve from, the wallet/balance type, the amount to reserve (20 named events), any discount to be applied, the event class and event name to be used, and the lifetime of the reservation. The subscriber's account balance will remain equivalent to the cost of 100 named events, however there will only be the equivalent cost of 80 named events available for alternative reservations.

2. The IpAppChargingSession object will query the billing engine and in this instance successfully reserves the requested number of named events. It informs the IpAppChargingSession object by calling the reserveUnitRes() method.

3. The application wants to debit the use of 10 of the reserved named events against the reserved named events. It uses the debitUnitReq() method (with the closeReservation flag set to 'false'). The subscriber's account balance will remain equivalent to the cost of 100 named events. The current reservation on the OSA CHAM SCS gateway now has 10 reserved named events, and 10 named events waiting to be confirmed through the subscriber sending a release() method (or using the closeReservation flag of a subsequent debit(credit)UnitReq() method).

4. The reservation alteration is successful – the debitUnitRes() method is used to inform the application.
### Step Details

5. The application needs a subsequent reservation and uses the `reserveUnitReq()` method to request 10 more named events. The subscriber’s account balance will remain equivalent to the cost of 100 named events, however, there will only be the equivalent cost of 70 named events available for alternative transactions once this transaction has completed. These unreserved units in the user’s account are available for alternative reservations from this or other third-party client applications. The current reservation on the OSA CHAM SCS gateway will now have 20 reserved named events, and 10 named events waiting to be confirmed through the subscriber sending a `release()` method (or using the closeReservation flag of a subsequent `debit(credit)UnitReq()` method).

6. The `IpAppChargingSession` object will query the billing engine and in this instance successfully reserves the requested amount. It informs the `IpAppChargingSession` object by calling the `reserveUnitRes()` method.

7. The application wants to credit some from the debited amount back to the reservation held on the OSA CHAM SCS gateway. It invokes the `creditUnitReq()` method for 5 named events. The subscriber’s account balance will remain equivalent to the cost of 100 named events. The current reservation on the OSA CHAM SCS gateway now has 25 reserved named events, and 5 named events waiting to be confirmed through the subscriber sending a `release()` method (or using the closeReservation flag of a subsequent `debit(credit)UnitReq()` method)

If no more messages were received before the session times out, the subscriber’s balance on the billing engine would not be changed.

8. The reservation alteration is successful – the `creditUnitRes()` method is used to inform the application.

9. The application uses the `debitUnitReq()` method to debit and confirm an additional 2 named events against the reservation and have these named events confirmed on the billing engine. The `debitUnitReq()` method is invoked with the closeReservation flag to ‘true’. The reservation is confirmed (7 named events) through the `IpChargingSession` informing the billing engine. The current reservation is now closed and the subscriber’s account would be reduced by the effective cost of 7 named events. The 23 unconfirmed named events, those that were initially reserved but not confirmed, would be available for other reservations. The subscriber will now have a balance equivalent to 93 named events.

10. The request is successful and the application is informed with the `debitUnitRes()` method.

**Note:** This charging session may now be used for subsequent reservations.

### Reservation Released

```mermaid
flowchart LR
    IpAppChargingSession[ ] --> IpChargingSession[ ]
    1: reserveUnitReq()
    2: reserveUnitRes()
    3: release()
```

---

Chapter 6, Message Flows  87
Chapter 6

Messages

<table>
<thead>
<tr>
<th>Step</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>At the beginning of this scenario the subscriber has a balance equivalent to the cost of 100 named events. The IpAppChargingSession invokes a reserveUnitReq() on the IpChargingSession containing details of the account to reserve from, the wallet/balance type, the amount to reserve (10 named events), any discount to be applied, the event class and event name to be used, and the lifetime of the reservation.</td>
</tr>
<tr>
<td>2</td>
<td>The IpAppChargingSession object will query the billing engine and in this instance successfully reserves the requested number of named events. It informs the IpAppChargingSession object by calling the reserveUnitRes() method.</td>
</tr>
<tr>
<td>3</td>
<td>The application cancels the reservation using the release() method. The IpAppChargingSession does not wait for a confirmation. The charging session is now closed and cannot be used for any other transactions.</td>
</tr>
</tbody>
</table>

Direct Debit (Named Events)

```
IpAppChargingSession
  \___________IpChargingSession
    |            |
    1: directDebitUnitReq()  \\
    |                |            |
    2: directDebitUnitResp()  \\
    |                |            |
    3: directDebitUnitResp()  \\
    |                |            |
    4: directDebitUnitErr()  \\
```

Messages

<table>
<thead>
<tr>
<th>Step</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>At the beginning of this scenario the subscriber has a balance equivalent to the cost of 100 named events. The IpAppChargingSession invokes a directDebitUnitReq() on the IpChargingSession containing details of the account to debit, the wallet/balance type, the amount to debit (10 named events), the event class and event name to be used, and any discount to be applied. The IpChargingSession object will attempt to debit the account on the billing engine and in this instance it is successful.</td>
</tr>
<tr>
<td>2</td>
<td>The IpAppChargingSession object will query the billing engine and in this instance successfully debits the account by the equivalent cost of the requested named events. It informs the IpAppChargingSession object by calling the directDebitAmountRes() method. The subscriber will now have a balance equivalent to the cost of 90 named events.</td>
</tr>
<tr>
<td>3</td>
<td>At the beginning of this scenario the subscriber has a balance equivalent to the cost of 100 named events. The IpAppChargingSession invokes a directDebitUnitReq() on the IpChargingSession containing details of the account to debit, the wallet/balance type, the amount to debit (10 named events), the event class and event name to be used, and any discount to be applied. The IpChargingSession object will attempt to debit the account on the billing engine.</td>
</tr>
</tbody>
</table>
Chapter 6

Step | Details
--- | ---
4 | The IpChargingSession object will query the billing engine and in this instance fails to debit the account by the equivalent cost of the requested named events. It informs the IpAppChargingSession object by calling the directDebitAmountErr() method with the appropriate error cause. The subscriber will still have a balance equivalent to the cost of 100 named events.

Direct Credit

```
<table>
<thead>
<tr>
<th>Step</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>At the beginning of this scenario the subscriber has a balance equivalent to the cost of 100 named events. The IpAppChargingSession invokes a directCreditUnitReq() on the IpChargingSession containing details of the account to credit, the wallet/balance type, the amount to credit (10 named events), the event class and event name to be used, and any discount to be applied. The IpChargingSession object will attempt to credit the account on the billing engine and in this instance it is successful.</td>
</tr>
<tr>
<td>2</td>
<td>The IpAppChargingSession object will query the billing engine and in this instance successfully credits the account by the equivalent cost of the requested named events. It informs the IpAppChargingSession object by calling the directDebitAmountRes() method. The subscriber will now have a balance equivalent to the cost of 110 named events.</td>
</tr>
<tr>
<td>3</td>
<td>At the beginning of this scenario the subscriber has a balance equivalent to the cost of 100 named events. The IpAppChargingSession invokes a directCreditUnitReq() on the IpChargingSession containing details of the account to credit, the wallet/balance type, the amount to credit (10 named events), the event class and event name to be used, and any discount to be applied. The IpChargingSession object will attempt to credit the account on the billing engine and in this instance it is unsuccessful.</td>
</tr>
<tr>
<td>4</td>
<td>The IpChargingSession object will query the billing engine and in this instance fails to credit the account by the equivalent cost of the requested named events. It informs the IpAppChargingSession object by calling the directDebitAmountErr() method with the appropriate error cause. The subscriber will still have a balance equivalent to the cost of 100 named events.</td>
</tr>
</tbody>
</table>
```

Messages

```
<table>
<thead>
<tr>
<th>Step</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>At the beginning of this scenario the subscriber has a balance equivalent to the cost of 100 named events. The IpAppChargingSession invokes a directCreditUnitReq() on the IpChargingSession containing details of the account to credit, the wallet/balance type, the amount to credit (10 named events), the event class and event name to be used, and any discount to be applied. The IpChargingSession object will attempt to credit the account on the billing engine and in this instance it is successful.</td>
</tr>
<tr>
<td>2</td>
<td>The IpAppChargingSession object will query the billing engine and in this instance successfully credits the account by the equivalent cost of the requested named events. It informs the IpAppChargingSession object by calling the directDebitAmountRes() method. The subscriber will now have a balance equivalent to the cost of 110 named events.</td>
</tr>
<tr>
<td>3</td>
<td>At the beginning of this scenario the subscriber has a balance equivalent to the cost of 100 named events. The IpAppChargingSession invokes a directCreditUnitReq() on the IpChargingSession containing details of the account to credit, the wallet/balance type, the amount to credit (10 named events), the event class and event name to be used, and any discount to be applied. The IpChargingSession object will attempt to credit the account on the billing engine and in this instance it is unsuccessful.</td>
</tr>
<tr>
<td>4</td>
<td>The IpChargingSession object will query the billing engine and in this instance fails to credit the account by the equivalent cost of the requested named events. It informs the IpAppChargingSession object by calling the directDebitAmountErr() method with the appropriate error cause. The subscriber will still have a balance equivalent to the cost of 100 named events.</td>
</tr>
</tbody>
</table>
```
Multiple Reservations with Confirmation - OSA Plus

Message Details

<table>
<thead>
<tr>
<th>Step</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>At the beginning of this scenario the subscriber has a balance of 100 billing engine monetary units. The IpAppChargingSession of Fusion Works instance A invokes a reserveAmountWithApplicationReferenceReq( ) on the IpChargingSession containing details of the account to reserve from, the wallet/balance type, the amount to reserve (20 BE units), any discount to be applied, and the lifetime of the reservation. The subscriber’s account balance will remain at 100 billing engine monetary units, however there will only be 80 billing engine monetary units available for alternative reservations.</td>
</tr>
<tr>
<td>2</td>
<td>The IpAppChargingSession object will query the billing engine and in this instance successfully reserves the requested amount. It informs the IpAppChargingSession of Fusion Works instance A object by calling the reserveAmountRes( ) method.</td>
</tr>
<tr>
<td>Step</td>
<td>Details</td>
</tr>
<tr>
<td>------</td>
<td>---------</td>
</tr>
</tbody>
</table>
| 3    | The application wants to debit 10 of the reserved BE units against the reservation held on the OSA CHAM SCS gateway. It uses the debitAmountWithApplicationReferenceReq() method (with the closeReservation flag set to 'false'). The current reservation on the OSA CHAM SCS gateway now has 10 reserved BE units and 90 BE units that can still be used through sending a subsequent debitUnitReq(). The debit(credit)UnitReq() message only modifies the reserved funds on the OSA CHAM SCS gateway, it does not does not send a request to the BE. If the subscriber wants to confirm the funds debited or credited from the reservation held on the OSA CHAM SCS gateway then either a release() message can be used or alternatively the 'closeReservation' flag for a subsequent debit(credit)UnitReq() message can be used. The funds confirmed will be those that have been debited from the reservation on the OSA CHAM SCS gateway. For example:  
- reserveAmountReq for 100 BE units  
- debitAmountReq for 10 BE units (closeReservation = 'false')  
- debitAmountReq for 10 BE units (closeReservation = 'true')  
This will reserve 20 BE units on the subscriber's account and close the reservation on both the OSA CHAM SCS gateway and the BE. |
| 4    | The reservation alteration is successful – the debitAmountRes( ) method is used to inform the application. |
| 5    | The application needs a subsequent reservation and uses the reserveAmountWithApplicationReferenceReq() method to request 10 more BE units. The FsionWorksinstance to be used in the call back is modified. The subscriber’s account balance of 100 billing engine monetary units however, there will only be the equivalent cost of 70 BE units available for alternative transactions once this transaction has completed. These unreserved units in the user’s account are available for alternative reservations from this or other third-party client applications. The current reservation on the OSA CHAM SCS gateway will now have 20 reserved BE units, and 10 BE units waiting to be confirmed through the subscriber sending a release( ) method (or using the closeReservation flag of a subsequent debit(credit)AmountWithApplicationReferenceReq( ) method).  
The IpAppChargingSession object will query the billing engine and in this instance successfully reserves the requested amount. It informs the IpAppChargingSession object of Fusion Works instance B by calling the reserveAmountRes( ) method. |
| 6    | The IpAppChargingSession object will query the billing engine and in this instance successfully reserves the requested amount. It informs the IpAppChargingSession object of Fusion Works instance B by calling the reserveAmountRes( ) method. |
| 7    | The application wants to credit some from the debited amount back to the reservation held on the OSA CHAM SCS gateway. It invokes the creditAmountWithApplicationReferenceReq( ) method for 5 Be units. This registers Fusion Works instance A to receive the call-backs from the CHAM. The subscriber’s account balance of 100 billing engine monetary units. The current reservation on the OSA CHAM SCS gateway now has 25 reserved BE units, and 5 BE units waiting to be confirmed through the subscriber sending a release( ) method (or using the closeReservation flag of a subsequent debit(credit)AmountWithApplicationReferenceReq( ) method)  
If no more messages were received before the session times out, the subscriber’s balance on the billing engine would not be changed. |
| 8    | The reservation alteration is successful – the creditUnitRes( ) method is used to inform the application of Fusion Works instance A. |
The application uses the `debitAmountWithApplicationReferenceReq` method to debit and confirm an additional 2 BE units against the reservation and have these units confirmed on the billing engine. The `debitAmountWithApplicationReferenceReq` method is invoked with the `closeReservation` flag to 'true'. This registers Fusion Works instance A to receive the call-backs from the CHAM. The reservation is confirmed (7 BE units) through the `IpChargingSession` informing the billing engine. The current reservation is now closed and the subscriber's account would be reduced by 7 billing engine monetary units. The 23 unconfirmed BE units, those that were initially reserved but not confirmed, would be available for other reservations. The subscriber will now have a balance of 93 billing engine monetary units.

The request is successful and the application is informed with the `debitUnitRes` method of Fusion Works instance B.

**Note:** This charging session may now be used for subsequent reservations.
Overview

Introduction

This chapter explains the methods that are available using the IpAccountManager. The IpAccountManager object resides on the OSA CHAM SCS gateway and provides the following methods that can be invoked by the third-party client application.

In this chapter

This chapter contains the following topics.

SetCallBack () .................................................................................................................. 93
QueryBalanceReq() ........................................................................................................... 93
RetrieveTransactionHistoryReq() .................................................................................. 95
CreateNotification() ........................................................................................................ 96
ChangeNotification() ....................................................................................................... 97
GetNotification() ............................................................................................................. 98
DestroyNotification() ..................................................................................................... 99
Account Manager Parameters .......................................................................................... 99

SetCallBack ()

Description

This method may be invoked on the IpAccountManager to pass the reference to the IpAppAccountManager object to be used by the SCF for call-backs.

Parameters

Here is the parameter for this method.

•  appInterface (on page 99)

Returns

Nothing.

QueryBalanceReq()

Description

This method may be invoked on the IpAccountManager and cause a billing engine query for each account in the TpAddressSet and the call-back of either the queryBalanceRes() or queryBalanceErr() method on the IpAppAccountManager.
Parameters

Here is the parameter for this method.

- users (on page 100)

TpAddress structure

The treatment and expected type of each element within each TpAddress structure is:-

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Type</th>
<th>Usage Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan</td>
<td>TpAddressPlan</td>
<td>Ignored</td>
</tr>
<tr>
<td>AddrString</td>
<td>TpString</td>
<td>Defines the Account Reference CLI (e.g.: MSISDN) in the format stored in CCS/BE database tables.</td>
</tr>
<tr>
<td>Name</td>
<td>TpString</td>
<td>Ignored</td>
</tr>
<tr>
<td>Presentation</td>
<td>TpAddressPresentation</td>
<td>Ignored</td>
</tr>
<tr>
<td>Screening</td>
<td>TpAddressScreening</td>
<td>Ignored</td>
</tr>
<tr>
<td>SubAddressString</td>
<td>TpString</td>
<td>This parameter is used to define the following parameters:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- wallet type name</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- balance type name</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- balance type cascade name</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- additional subscriber parameters that will be listed separately below.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The wallet type name, balance type name and balance type cascade name and additional subscriber parameters should be separated by a ‘;’. If no wallet type name or balance type name is given then the default wallet type/balance type for this account will be used. If the balance type cascade name is provided then the balance type name will be ignored.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>When a balance type name is specified then only the details for this balance type will be returned.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If the balance type name ‘ALL’ is specified then the system value of all buckets in the balance type and the earliest expiring bucket for each balance type will be returned.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Where a balance type cascade name is specified then the resulting Balance Info Set will contain an entry for each balance type unit within the balance type cascade.</td>
</tr>
<tr>
<td>Element Name</td>
<td>Type</td>
<td>Usage Notes</td>
</tr>
<tr>
<td>--------------</td>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The list of additional subscriber parameters that may be queried are as follows (the specific syntax for each parameter will be matched in the OSA gateway so the OSA client must adhere to this syntax):</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- IA -&gt; Initial Activation Date</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- LRA -&gt; Last Recharge Amount</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- LBRR -&gt; Last Balance Before Recharge</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- AC -&gt; Account Creation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- FDS -&gt; FFFD Status</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- FFN -&gt; FF Numbers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- FDN -&gt; FD Number</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- LR -&gt; Last Recharge Date</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- PBE -&gt; Previous Balance Expiry Date</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- PWE -&gt; Previous Wallet Expiry Date</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- LEA -&gt; Least Expired Amount</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- TEA -&gt; Total Expired Amount</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- IBA -&gt; Initial Balance Amount</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The additional subscriber parameters should be '</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;Personal;General Cash;;FFN&quot;</td>
</tr>
</tbody>
</table>

**Returns**

TpAssignmentID: a unique id (unsigned integer) within the instance of IpAccountManager for the period of transaction.

**RetrieveTransactionHistoryReq()**

**Description**

This method may be invoked on the IpAccountManager to request transaction details for the specified account for the provided time interval. Implementation of this method will involve a query to the SMS to retrieve CDR details and therefore relies on this information remaining available, as per standard NCC architecture.

**Parameters**

Here is the parameter for this method.

- `user` (on page 100)
- `transactionInterval` (on page 99)
TpAddress structure

The treatment and expected type of each element within each TpAddress structure is:

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Type</th>
<th>Usage Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan</td>
<td>TpAddressPlan</td>
<td>Ignored</td>
</tr>
<tr>
<td>AddrString</td>
<td>TpString</td>
<td>Defines the Account Reference CLI (for example: MSISDN) in the format stored in CCS/BE database tables.</td>
</tr>
<tr>
<td>Name</td>
<td>TpString</td>
<td>Ignored</td>
</tr>
<tr>
<td>Presentation</td>
<td>TpAddressPresentation</td>
<td>Ignored</td>
</tr>
<tr>
<td>Screening</td>
<td>TpAddressScreening</td>
<td>Ignored</td>
</tr>
<tr>
<td>SubAddressString</td>
<td>TpString</td>
<td>This parameter is used to define the following parameters:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- wallet type name</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- balance type name</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The wallet type name and balance type name should be separated by a ‘;’. If no wallet type name or balance type name is given then the default wallet type/balance type for this account will be used.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>When a balance type name is specified then only the details for this balance type will be returned.</td>
</tr>
</tbody>
</table>

Returns

TpAssignment ID – a unique id (unsigned integer) within the instance of IpAccountManager for the period of transaction

CreateNotification()

Description

This method may be invoked on the IpAccountManager and cause triggers to be set in the billing engine for each account specified. This enables notification of events for the account specified to be sent back to the third-party client application. As a reference to the IpAppAccountManager object is passed to the IpAccountManager, this method is unique because an alternative IpAppAccountManager object can be used by the SCF for call-backs.

Note: A specified event criterion applies to all users specified in the request. As there is no way to specify a unique user in the reportNotification() method, it is recommended that only a single user is specified in the createNotification() request.

Parameters

Here are the parameters for this method.

- AppAccountManager (on page 99)
- ChargingEventCriteria (on page 99)
TpAddress structure

The treatment and expected type of each element within each TpAddress structure is:-

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Type</th>
<th>Usage Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan</td>
<td>TpAddressPlan</td>
<td>Ignored</td>
</tr>
<tr>
<td>AddrString</td>
<td>TpString</td>
<td>Defines the Account Reference CLI (e.g.: MSISDN) in the format stored in CCS/BE database tables.</td>
</tr>
<tr>
<td>Name</td>
<td>TpString</td>
<td>Ignored</td>
</tr>
<tr>
<td>Presentation</td>
<td>TpAddressPresentation</td>
<td>Ignored</td>
</tr>
<tr>
<td>Screening</td>
<td>TpAddressScreening</td>
<td>Ignored</td>
</tr>
<tr>
<td>SubAddressString</td>
<td>TpString</td>
<td>This parameter is used to define the following parameters:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• wallet type name</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• balance type name</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The wallet type name and balance type name should be separated by a &quot;;&quot;. If no wallet type name or balance type name is given then the default wallet type/balance type for this account will be used. When a balance type name is specified then only the details for this balance type will be returned.</td>
</tr>
</tbody>
</table>

Returns

TpAssignment ID – a unique id (unsigned integer) within the instance of IpAccountManager for the period of transaction.

ChangeNotification()

Description

This method is invoked on the IpAccountManager and cause triggers to be updated in the billing engine for each account specified. This enables notification of events for the account specified to be sent back to the third-party client application. This method will overwrite any notifications of events (for the id supplied here) that were set using the createNotification() method.

**Note:** A specified event criterion applies to all users specified in the request. As there is no way to specify a unique user in the reportNotification() method, it is recommended that only a single user is specified in the createNotification() request.

Parameters

Here is a list of the parameters for this method.

- assignmentID (on page 99)
- ChargingEventCriteria (on page 99)
TpAddress structure

The treatment and expected type of each element within each TpAddress structure is:

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Type</th>
<th>Usage Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan</td>
<td>TpAddressPlan</td>
<td>Ignored</td>
</tr>
<tr>
<td>AddrString</td>
<td>TpString</td>
<td>Defines the Account Reference CLI (e.g.: MSISDN) in the format stored in CCS/BE database tables.</td>
</tr>
<tr>
<td>Name</td>
<td>TpString</td>
<td>Ignored</td>
</tr>
<tr>
<td>Presentation</td>
<td>TpAddressPresentation</td>
<td>Ignored</td>
</tr>
<tr>
<td>Screening</td>
<td>TpAddressScreening</td>
<td>Ignored</td>
</tr>
<tr>
<td>SubAddressString</td>
<td>TpString</td>
<td>This parameter is used to define the following parameters:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- wallet type name</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- balance type name</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The wallet type name and balance type name should be separated by a <code>;</code>. If no wallet type name or balance type name is given then the default wallet type/balance type for this account will be used. When a balance type name is specified then only the details for this balance type will be returned.</td>
</tr>
</tbody>
</table>

Returns

Nothing.

GetNotification()

Description

This method may be invoked on the IpAccountManager to query current charging event criteria that was introduced by the third-party client application using the createNotification() method or modified using the changeNotification() method.

Note: This method may return a large amount of data.

Parameters

None.

Returns

TpChargingEventCriteriaResultSet – this is a set containing details of every open notification for this session. The set contains a numbered set of TpChargingEventName values and the associated TpAssignmentID value that was returned to the third-party client application when the notification trigger was invoked using the createNotification() method. (See standard [4] for TpChargingEventName encoding)
DestroyNotification()

Description
This method may be invoked on the IpAccountManager to disable all current notifications associated with the id supplied. The id was returned to the third-party client application when the createNotification() method was invoked. This will affect all notifications that were later modified using the changeNotification() method.

Parameter
Here is the parameter used for this method.

- assignmentID (on page 99)

Returns
Nothing.

Account Manager Parameters

Introduction
Here are the parameters used for this functionality.

AppAccountManager
Description: Reference to an IpAppAccountManager object. (This may be different to the current IpAppAccountManager object making the request)

appInterface
Description: Reference to an IpAppAccountManager object.

assignmentID
Description: The TpAssignmentID returned by the IpAccountManager when the createNotification() method was invoked. This unique id identifies the set of triggers that the IpAccountManager has already set using the createNotification() method.

ChargingEventCriteria
Description: A TpChargingEventCriteria, which contains a set of each of TpAddress structures and TpChargingEventName values. (See standard [4] for TpChargingEventName encoding.)

transactionInterval
Description: A TpTimeInterval structure which specifies the time interval (start and stop time) for which the third-party client application is to be retrieved. Each time interval is expressed as a TpDateAndTime structure. (See standard [2] for TpDateAndTime encoding)
user
Description: A TpAddress containing only a single TpAddress structure for the specified user.

users
Description: A TpAddressSet containing a numbered set of TpAddress structures.
Chapter 8

Application Account Manager Functionality

Overview

Introduction

This chapter explains the methods available using the IpAppAccountManager. The IpAppAccountManager object resides on the third-party client application and provides the following methods that can be invoked by the OSA CHAM SCS gateway.

In this chapter

This chapter contains the following topics.

QueryBalanceRes() .................................................................................................................. 101
QueryBalanceErr() ...................................................................................................................... 107
RetrieveTransactionHistoryRes() ............................................................................................. 107
RetrieveTransactionHistoryErr() .............................................................................................. 108
ReportNotification() .................................................................................................................. 108
Application Account Manager Parameters ................................................................................. 110

QueryBalanceRes()

Description

This method will be invoked on the IpAppAccountManager as a result of a successful queryBalanceReq(). The information returned will be a summary of the subscriber’s wallet details for a single wallet type and balance type, a sum of all the available, i.e. non-expired balances, for each balance type unit within the entered balance type cascade or all the balance types (balance type name == ‘ALL’) and the expiry date of the earliest expiring bucket in the balance type for all the available, i.e. non-expired balances in the subscriber’s wallet. If the wallet type name, balance type name or balance type cascade name were not specified in the initial request, then the account query will continue using the user’s default wallet type and balance type. The response data will include a set of account balances, the account type, the wallet state, and a list of available dates (if they exist) that may include the following: the account expiry, the earliest wallet expiry, the date of the last use of the account, and the date when the last reference to the account was made. Additional subscriber details may be returned if any of the additional subscriber parameters listed below are added to the SubAddressString field in the queryBalanceReq(). The following list is all the additional subscriber details that can be returned in the queryBalanceRes():

- InitialActivationDate
- LastRechargeAmount
- LastBalanceBeforeRecharge
- AccountCreationDate
- FFFDStatus
- FFNumbers
- FDNumber
- LastRechargeDate
- PreviousBalanceExpiryDate
- PreviousWalletExpiryDate
- LastExpiredAmount
- ServiceProviderName
- TotalExpiredAmount
- InitialBalanceAmount

**Note:** The balance amount will be returned as major currency (i.e. exponent of 2) if a real currency is specified and with exponent of 0 if the currency is specified as 'XXX'

**Parameters**

Here is a list of the parameters for this method.

- `queryId` (on page 111)
- `balances` (on page 110)

**TpAddress structure**

The treatment and expected type of each element within each TpAddress structure is:-

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Type</th>
<th>Usage Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan</td>
<td>TpAddressPlan</td>
<td>Ignored (field will contain the default P_ADDR_PLAN_UNDEFINED string)</td>
</tr>
<tr>
<td>AddrString</td>
<td>TpString</td>
<td>Defines the Account Reference CLI (e.g.: MSISDN) in the format stored in CCS/BE database tables.</td>
</tr>
<tr>
<td>Name</td>
<td>TpString</td>
<td>Ignored (Empty)</td>
</tr>
<tr>
<td>Presentation</td>
<td>TpAddressPresentation</td>
<td>Ignored (field will contain the default P_ADDRESS_PRESENTATION_UNDEFINED string)</td>
</tr>
<tr>
<td>Screening</td>
<td>TpAddressScreening</td>
<td>Ignored (field will contain the default P_ADDRESS_SCREENING_UNDEFINED string)</td>
</tr>
<tr>
<td>SubAddressString</td>
<td>TpString</td>
<td>This parameter is used to define the following parameters:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- wallet type name</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- balance type name</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- balance type cascade name</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- additional subscriber parameters that will be listed separately below.</td>
</tr>
</tbody>
</table>

The wallet type name, balance type name and balance cascade name and additional subscriber parameters should be separated by a ‘;’. If no wallet type name or balance type name is given then the default wallet type/balance type for this account will be used. If the balance type cascade name is provided then the balance type name will be ignored.
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Type</th>
<th>Usage Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>When a balance type name is specified then only the details for this balance type will be returned.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If the balance type name 'ALL' is specified then the system value of all buckets in the balance type and the earliest expiring bucket for each balance type will be returned.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Where a balance type cascade name is specified then the resulting Balance Info Set will contain an entry for each balance type unit within the balance type cascade.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The list of additional subscriber parameters that may be queried are as follows (the specific syntax for each parameter will be matched in the OSA gateway so the OSA client must adhere to this syntax):</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- IA -&gt; Initial Activation Date</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- LRA -&gt; Last Recharge Amount</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- LBBR -&gt; Last Balance Before Recharge</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- AC -&gt; Account Balance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- FDS -&gt; FFFD Status</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- FFN -&gt; FF Numbers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- FDN -&gt; FD Number</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- LR -&gt; Last Recharge Date</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- PBE -&gt; Previous Balance Expiry Date</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- PWE -&gt; Previous Wallet Expiry Date</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- LEA -&gt; Least Expired Amount</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- TEA -&gt; Total Expired Amount</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- IBA -&gt; Initial Balance Amount</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The additional subscriber parameters should be '</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For example, specifying a wallet type name, balance type name and friends &amp; family numbers would have the following syntax:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;Personal;General Cash;;FFN&quot;</td>
</tr>
</tbody>
</table>

**TpBalanceSet Additional Information**

The AdditionalInfo field in the TpBalanceInfo structure contains the following information encoded as follows:

```
S=wallet state;L=last wallet use;M=last reference use;B=balance expiry date;C=wallet expiry date;P=service provider;T=account type;A=subscribers preferred language;N=balance type name;U=account creation date;AC=account creation date;IBA=initial balance amount;IA=initial activation date;LRA=last recharge amount;LRD=last recharge date;LBBR=last balance before recharge;PBE=previous balance expiry date;PWE=previous wallet expiry date;LEA=last expired amount;TEA=total expired amount;FFS=one of "Not Active", "FF Active", or "FD Active";FFN=list of "", separated F&F numbers;FDN=FD number
```
Where:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wallet State</td>
<td>The ‘wallet state’ of the TpBalanceInfo AdditionalInfo string is encoded as a single character as follows.</td>
</tr>
<tr>
<td>Character</td>
<td>State</td>
</tr>
<tr>
<td>A</td>
<td>Active</td>
</tr>
<tr>
<td>D</td>
<td>Dormant</td>
</tr>
<tr>
<td>F</td>
<td>Frozen</td>
</tr>
<tr>
<td>T</td>
<td>Terminated</td>
</tr>
<tr>
<td>P</td>
<td>Pre-Use</td>
</tr>
<tr>
<td>X</td>
<td>Unsupported</td>
</tr>
<tr>
<td>Last Wallet Use</td>
<td>The ‘last use date’ of the TpBalanceInfo Additional Info string is encoded as a date format providing the last use of the wallet as taken from the OSA VWS QueryAccountAck message. If this parameter cannot be determined, or is not yet provided then the parameter will remain empty.</td>
</tr>
<tr>
<td>Last Reference Use</td>
<td>The ‘last reference use’ of the TpBalanceInfo Additional Info string is encoded as a date format providing the last use of the account reference as taken from the CCS_ACCT_REFERENCE table using the last_accessed column. The account reference is a user of an account, i.e. home phone CLI, MSISDN, or calling card. If this parameter cannot be determined, or is not yet provided then the parameter will remain empty.</td>
</tr>
<tr>
<td>Balance Expiry Date</td>
<td>The ‘balance expiry date’ of the TpBalanceInfo Additional Info string is encoded as a date format providing the date at which the earliest bucket in the current balance expires wallet as taken from the OSA VWS QueryAccountAck message. If this parameter cannot be determined, is not yet provided, or the balance does not expire then the parameter will remain empty.</td>
</tr>
<tr>
<td>Wallet Expiry Date</td>
<td>The ‘wallet expiry date’ of the TpBalanceInfo Additional Info string is encoded as a date format providing the date at which the current wallet expires wallet as taken from the OSA VWS QueryAccountAck message. If this parameter cannot be determined, is not yet provided, or the account does not expire then the parameter will remain empty.</td>
</tr>
<tr>
<td>Service Provider</td>
<td>The ‘service provider’ of the TpBalanceInfo Additional Info string is encoded as a string corresponding to the name of the subscriber’s service provider for the current wallet as taken from the ACS_CUSTOMER table using the name column. If this parameter cannot be determined, or is not yet provided then the parameter will remain empty.</td>
</tr>
<tr>
<td>Account Type</td>
<td>The ‘account type’ of the TpBalanceInfo Additional Info string is encoded as a string corresponding to the name of the subscriber’s account type for the current wallet as taken from the CCS_ACCT_TYPE table using the name column. This parameter is used to identify the service configuration for this call where the name of the account type will be agreed between CCS and the billing system. If this parameter cannot be determined, or is not yet provided then the parameter will remain empty.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Subscriber’s Preferred Language</td>
<td>The ‘subscribers preferred language’ of the TpBalanceInfo Additional Info string is encoded as a string corresponding to the name of the subscriber's preferred language for the current account as taken from the ACS_LANGUAGE table using the name column. The numeric value for the preferred language is agreed between CCS and the billing system. If this parameter cannot be determined, or is not yet provided then the parameter will remain empty.</td>
</tr>
<tr>
<td>Balance Type Name</td>
<td>The ‘balance type name’ of the TpBalanceInfo Additional Info string is encoded as a string corresponding to the name of the balance type as taken from the CCS_BALANCE_UNIT table using the name column. This parameter will only be present if the balance type name = ‘ALL’ is specified in the incoming request.</td>
</tr>
<tr>
<td>Balance Unit Type Name</td>
<td>The ‘balance unit type name’ of the TpBalanceInfo Additional Info string is encoded as a string corresponding to the name of the balance type unit for this balance type as taken from the CCS_BALANCE_UNIT table using the name column. If this parameter cannot be determined, or is not yet provided then the parameter will remain empty.</td>
</tr>
<tr>
<td>Account Creation Date</td>
<td>The ‘account creation date’ of the TpBalanceInfo Additional Info string is encoded as a date format providing the creation date of the wallet as taken from the CCS_ACCT_HIST_INFO using the creation_date column accessed through a remote database link to the SMS. If this parameter cannot be determined, or is not yet provided, then the parameter will remain empty.</td>
</tr>
<tr>
<td>Initial Balance Amount</td>
<td>The ‘initial balance amount’ of the TpBalanceInfo Additional Info string is encoded as an integer providing the initial balance of the wallet in VWS small currency as taken from the CCS_ACCT_REFERENCE table using the initial_balance_amount column. If this parameter cannot be determined, or is not yet provided then the parameter will remain empty.</td>
</tr>
<tr>
<td>Initial Activation Date</td>
<td>The ‘initial activation date’ of the TpBalanceInfo Additional Info string is encoded as a date format providing the initial activation date of the wallet as taken from the CCS_ACCT_HIST_INFO using the initial_activation_date column accessed through a remote database link to the SMS. If this parameter cannot be determined, is not yet provided, or the wallet has not yet been activated, then the parameter will remain empty.</td>
</tr>
<tr>
<td>Last Recharge Amount</td>
<td>The 'last recharge amount' of the TpBalanceInfo Additional Info string is encoded as an integer providing the last recharge amount of the wallet in VWS small currency as taken from the CCS_ACCT_HIST_INFO using the last_recharge_amount column accessed through a remote database link to the SMS. If this parameter cannot be determined, is not yet provided, or the wallet has not yet been recharged, then the parameter will remain empty.</td>
</tr>
<tr>
<td>Last Recharge Date</td>
<td>The 'last recharge date' of the TpBalanceInfo Additional Info string is encoded as a date format providing the last recharge date of the wallet as taken from the CCS_ACCT_HIST_INFO using the last_recharge_date column accessed through a remote database link to the SMS. If this parameter cannot be determined, is not yet provided, or the wallet has not yet been recharged, then the parameter will remain empty.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Last Balance Before Recharge</td>
<td>The 'last balance before recharge' of the TpBalancelnfo Additional Info string is encoded as an integer providing the last balance before recharge amount of the wallet. The amount will be in VWS small currency as taken from the CCS_ACCT_HIST_INFO using the last_balance_before_recharge column accessed through a remote database link to the SMS. If this parameter cannot be determined, is not yet provided, or the wallet has not yet been recharged, then the parameter will remain empty.</td>
</tr>
<tr>
<td>Previous Balance Expiry Date</td>
<td>The 'previous balance expiry date' of the TpBalancelnfo Additional Info string is encoded as a date format providing the date when a balance previously expired in the wallet as taken from the CCS_ACCT_HIST_INFO using the last_balance_expiry_period column accessed through a remote database link to the SMS. If this parameter cannot be determined, or is not yet provided then the parameter will remain empty.</td>
</tr>
<tr>
<td>Previous Wallet Expiry Date</td>
<td>The 'previous wallet expiry date' of the TpBalancelnfo Additional Info string is encoded as a date format providing the date when the wallet previously expired as taken from the CCS_ACCT_HIST_INFO using the last_wallet_expiry_period column accessed through a remote database link to the SMS. If this parameter cannot be determined, or is not yet provided then the parameter will remain empty.</td>
</tr>
<tr>
<td>Last Expired Amount</td>
<td>The 'last expired amount' of the TpBalancelnfo Additional Info string is encoded as an integer providing the amount of the last expired balance (for 'Cash' balances only) in the wallet. The amount is in VWS small currency as taken from the CCS_ACCT_HIST_INFO using the last_expired_amount column accessed through a remote database link to the SMS. If this parameter cannot be determined, or is not yet provided then the parameter will remain empty.</td>
</tr>
<tr>
<td>Total Expired Amount</td>
<td>The 'total expired amount' of the TpBalancelnfo Additional Info string is encoded as an integer providing the sum of all expired balances (for 'Cash' balances only) in the wallet. The amount will be in VWS small currency as taken from the CCS_ACCT_HIST_INFO using the total_expired_amount column accessed through a remote database link to the SMS. If this parameter cannot be determined, or is not yet provided then the parameter will remain empty.</td>
</tr>
</tbody>
</table>
| Friends & Family, Friends & Destination Status | The 'friends & family, friends and destination status' of the TpBalancelnfo Additional Info string is encoded as a string providing the current F&F / F&D status as taken from the CCS_ACCT_REFERENCE table using the PT_FF_FD_SERVICE_ACTIVE profile tag in the profile column. The string returned will be one of:  
  - "Not Active" (not subscribed),  
  - "FF Active" (subscribed to the friends & family service), or  
  - "FD Active" (subscribed to the friends & destination service). |
<p>| Friends &amp; Family Numbers  | The 'friends &amp; family numbers' of the TpBalancelnfo Additional Info string is encoded as a ',' separated string providing the current F&amp;F numbers as taken from the CCS_ACCT_REFERENCE table using the PT_FF_NUMBERS profile tag in the profile column. The string returned is a list of the currently defined friends &amp; family numbers. If this parameter cannot be determined, or is not yet provided then the parameter will remain empty. |</p>
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friends &amp; Destination Number</td>
<td>The ‘friends &amp; destination number’ of the TpBalanceInfo Additional Info string is encoded as a string providing the current F&amp;D number as taken from the CCS_ACCT_REFERENCE table using the PT_FD_NUMBERS profile tag in the profile column. The string returned is the currently defined friends &amp; destination number. If this parameter cannot be determined, or is not yet provided then the parameter will remain empty.</td>
</tr>
</tbody>
</table>

Notes:

- Dates are encoded as YYYYMMDDHHMMSS. for example, 20020215201500
- All balance types consist of 0 or more buckets. An individual bucket may or may not have an individual expiry date. The expiry date of an individual balance type is the earliest expiry date for an individual bucket within the respective balance type. If none of the buckets expire, then the balance type will not expire. The total for a balance type is a sum of all the balances for the individual buckets.

QueryBalanceErr()

Description

This method is invoked on the IpAppAccountManager as a result of an unsuccessful queryBalanceReq().

Parameters

Here is a list of the parameters for this method.

- queryld (on page 111)
- cause (on page 110)

RetrieveTransactionHistoryRes()

Description

This method is invoked on the IpAppAccountManager as a result of a successful retrieveTransactionHistoryReq(). The information returned is a summary of the user’s account transaction details for a single wallet and balance type over a given interval. If the wallet and balance type were not specified in the initial request, then the account transaction history query will continue using the user’s default wallet and balance type.

Parameters

Here the parameters for this method.

- retrievalld (on page 111)
- transactionHistory (on page 111)
Additional information

The AdditionalInfo field in the TpTransactionHistory structure contains the string returned from querying the 'EXTRA_INFORMATION' field of the CCS_BE_CDR table for a particular MSISDN. This string is returned unchanged to the third-party client application. The following is a sample of this CDR field:

CLI=48495100100|ACS_CUST_ID=1|BALANCE_TYPES=1|BALANCES=1991000|COSTS=1000|ACCOUNT_TYPE=1|CASCADE_ID=1|RATES=1000|LENGTHS=-1|DISCOUNTS=0|MAX_CHARGE=5000|DURATION=60|TN=48495100100|TCS=20030528144351|TCE=20030528144451|CS=S|DISCOUNT_TYPE=BASIC|WALLET_TYPE=1|SMSMO_MSG_ID=1

RetrieveTransactionHistoryErr()

Description
This method is invoked on the IpAppAccountManager as a result of an unsuccessful retrieveTransactionHistoryReq().

Parameters
Here is a list of the parameters for this method.

- queryId (on page 111)
- transactionHistoryError (on page 111)

Note: The error return codes are an explicit encoding predefined by the standard in [4], therefore the error returned to the OSA CHAM SCS gateway may not have a suitable mapped error definition. When this occurs P_AM_TRANSACTION_ERROR_UNSPECIFIED will be returned to the third-party client application.

ReportNotification()

Description
This method is invoked on the IpAppAccountManager as a result of a successful createNotification(). This method will notify the third-party client application of any charging event criteria that have been triggered on any of the user’s accounts established by the createNotification() method. If multiple user accounts were specified in the initial request then any of the individual account triggers will cause this method to be invoked.

Parameters
Here is a list of the parameters for this method.

- queryId (on page 111)
- chargingEventInfo (on page 110)

Note: The balance amount will be returned as major currency (i.e. exponent of 2) if a real currency is specified and with exponent of 0 if the currency is specified as 'XXX'.

Additional information
The AdditionalInfo field in the TpBalanceInfo structure will contain the following information encoded as follows:
$S = \text{wallet state}; \text{L} = \text{last wallet use}; \text{M} = \text{last reference use}; \text{B} = \text{balance expiry date}; \text{C} = \text{wallet expiry date}; \text{T} = \text{account type}; \text{A} = \text{subscribers preferred language}; \text{MSISDN} = \text{MSISDN}$

Where:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wallet State</strong></td>
<td>The ‘wallet state’ of the TpBalanceInfo AdditionalInfo string is encoded as a single character as follows.</td>
</tr>
<tr>
<td>Character</td>
<td>State</td>
</tr>
<tr>
<td>A</td>
<td>Active</td>
</tr>
<tr>
<td>D</td>
<td>Dormant</td>
</tr>
<tr>
<td>F</td>
<td>Frozen</td>
</tr>
<tr>
<td>T</td>
<td>Terminated</td>
</tr>
<tr>
<td>P</td>
<td>Pre-Use</td>
</tr>
<tr>
<td>X</td>
<td>Unsupported</td>
</tr>
<tr>
<td><strong>Last Wallet Use</strong></td>
<td>The ‘last use date’ of the TpBalanceInfo AdditionalInfo string is encoded as a date format providing the last use of the account. If this parameter cannot be determined or is not yet provided then the parameter will remain empty.</td>
</tr>
<tr>
<td><strong>Last Reference Use</strong></td>
<td>The ‘last reference use’ of the TpBalanceInfo AdditionalInfo string is encoded as a date format providing the last use of the account reference. The account reference is a user of an account ie home phone CLI, MSISDN, or calling card. If this parameter cannot be determined or is not yet provided then the parameter will remain empty.</td>
</tr>
<tr>
<td><strong>Balance Expiry Date</strong></td>
<td>The ‘balance expiry date’ of the TpBalanceInfo AdditionalInfo string is encoded as a date format providing the date at which the earliest bucket in the current balance expires. If this parameter cannot be determined, is not yet provided, or the balance does not expire then the parameter will remain empty.</td>
</tr>
<tr>
<td><strong>Account Expiry Date</strong></td>
<td>The ‘account expiry date’ of the TpBalanceInfo AdditionalInfo string is encoded as a date format providing the date at which the current account expires. If this parameter cannot be determined, is not yet provided, or the account does not expire then the parameter will remain empty.</td>
</tr>
<tr>
<td><strong>Account Type</strong></td>
<td>The ‘account type’ of the TpBalanceInfo AdditionalInfo string is encoded as a string corresponding to the name of the subscriber’s account type for the current account. This parameter is used to identify the service configuration for this call where the name of the account type is agreed between CCS and the billing system. If this parameter cannot be determined or is not yet provided then the parameter will remain empty.</td>
</tr>
<tr>
<td><strong>Subscribers Preferred Language</strong></td>
<td>The ‘subscribers preferred language’ of the TpBalanceInfo AdditionalInfo string is encoded as a string corresponding to the name of the subscriber’s preferred language for the current account. The numeric value for the preferred language is agreed between CCS and the billing system. If this parameter cannot be determined or is not yet provided then the parameter will remain empty.</td>
</tr>
</tbody>
</table>
Chapter 8

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSISDN</td>
<td>The ‘MSISDN’ of the TpBalanceInfo AdditionalInfo string is encoded as a string corresponding to the MSISDN for the current account. This parameter is added to identify the account for which the charging event criteria have been triggered which has resulted in this report notification being generated on the third-party client application.</td>
</tr>
</tbody>
</table>

Notes:
- Dates are encoded as YYYYMMDDHHMMSS. e.g. 20020215201500
- All balance types consist of 0 or more buckets. An individual bucket may or may not have an individual expiry date. The expiry date of an individual balance type is the earliest expiry date for an individual bucket within the respective balance type. If none of the buckets expire, then the balance type will not expire. The total for a balance type is a sum of all the balances for the individual buckets.

Application Account Manager Parameters

Introduction

Here are the parameters used for this functionality.

balances

Description: A TpBalanceSet which is a set of numbered elements containing a:
- tpAddress structure,
- TpBalanceQueryError value (should be P_BALANCE_QUERY_OK), and
- TpBalanceInfo structure.

(See standard [4] for alternative TpBalanceQueryError and for TpBalanceInfo encodings)

cause

Description: A TpBalanceQueryError value which is either a mapping of the error returned from the billing engine or the error resolved at the OSA CHAM SCS gateway for the invoked request. (See standard [4] for the TpBalanceQueryError encoding.)

Note: The error return codes are an explicit encoding predefined by the standard in [4], therefore the error returned to the OSA CHAM SCS gateway may not have a suitable mapped error definition. When this occurs P_BALANCE_QUERY_ERROR_UNDEFINED is returned to the third-party client application.

chargingEventInfo


Note: The balance amount is returned as major currency (i.e. exponent of 2) if a real currency is specified and with exponent of 0 if the currency is specified as ‘XXX’
queryId
Description: The TpAssignmentID returned by the IpAccountManager when the matching method, i.e.:
- createNotification()
- queryBalanceReq()
- retrieveTransactionHistoryReq() was invoked.

retrievalId
Description: The TpAssignmentID returned by the IpAccountManager when the retrieveTransactionHistoryReq() method was invoked.

transactionHistory
Description: A TpTransactionHistorySet which is a set of numbered elements containing a TpAssignmentID (a local transactionID on the OSA CHAM SCS gateway – may or may not be the same as the retrievalID), a TpDateAndTime structure, and an AdditionalInfo string. (See standard [2] for TpDateAndTime encoding.)

transactionHistoryError
Description: A TpTransactionHistoryStatus value which is either a mapping of the error returned from the query or the error resolved at the OSA CHAM SCS gateway for the invoked request. (See standard [4] for the TpTransactionHistoryStatus encoding.)

Note: The error return codes are an explicit encoding predefined by the standard in [4], therefore the error returned to the OSA CHAM SCS gateway may not have a suitable mapped error definition. When this occurs P_AM_TRANSACTION_ERROR_UNSPECIFIED is returned to the third-party client application.
Chapter 9

Charging Manager Functionality

Overview

Introduction

This chapter explains the methods that are available using the IpChargingManager. The IpChargingManager object resides on the OSA CHAM SCS gateway and provides the following methods that can be invoked by the third-party client application.

In this chapter

This chapter contains the following topics.

- SetCallBack() .............................................................. 113
- CreateChargingSession() ...................................................... 114
- CreateChargingSessionWithSessionID() ..................................... 114
- getChargingSession() .......................................................... 115
- Charging Manager Parameters ................................................. 116

SetCallBack()

Description

This method is invoked on the IpChargingManager to pass the reference to the IpAppChargingManager object to be used by the SCF for call-backs.

Parameters

Here is the parameter for this method.

- appInterface (on page 116)

Returns

Nothing.
CreateChargingSession()

Description

This method is invoked on the IpChargingManager creating a new charging session. This involves the OSA CHAM SCS gateway allocating a unique session ID that is stored in an internal table of active sessions. The third-party client application passes a reference to the IpAppChargingSession object to be used by the IpChargingSession charging methods when making call-backs. An explanation for all the charging methods will follow in subsequent sections of this document. Although there may be many simultaneous active sessions, there may be only a single IpAppChargingSession object and a single IpChargingSession object created on the third-party client application and the OSA CHAM SCS gateway respectively.

Parameters

Here is a list of the parameters for this method.

- appChargingSession (on page 116)
- sessionDescription (on page 117)
- merchantAccount (on page 116)
- user (on page 117)
- correlationID (on page 116)

Returns

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TpChargingSessionID</td>
<td>a TpChargingSessionID structure.</td>
</tr>
</tbody>
</table>

The treatment and expected type of each element within each TpChargingSessionID structure is:-

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Type</th>
<th>Usage Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>ChargingSessionReference</td>
<td>IpChargingSessionRef</td>
<td>This element specifies a reference to the IpChargingSession object. (used by all the IpAppChargingSession charging methods)</td>
</tr>
<tr>
<td>ChargingSessionID</td>
<td>TpSessionID</td>
<td>This element specifies the unique session ID for the charging session. (used by all the IpAppChargingSession charging methods)</td>
</tr>
<tr>
<td>RequestNumberFirstRequest</td>
<td>TpInt32</td>
<td>This element specifies the request number to use for the next request. (used by all the IpAppChargingSession charging methods)</td>
</tr>
</tbody>
</table>

CreateChargingSessionWithSessionID( )

Description

This method will be invoked on the IpChargingManager creating a new charging session. This will involve the OSA CHAM SCS gateway allocating a unique session ID that is stored in an internal table of active sessions. The third-party client application will pass a reference to the IpAppChargingSession object to be used by the IpChargingSession charging methods when making call-backs and in addition a session ID which may be used to reference this charging session.
Parameters

Here is a list of the parameters for this method.

- `appChargingSession` (on page 116)
- `sessionDescription` (on page 117)
- `merchantAccount` (on page 116)
- `user` (on page 117)
- `correlationID` (on page 116)
- `sessionId` (on page 117)

Returns

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TpChargingSessionID</td>
<td>a TpChargingSessionID structure.</td>
</tr>
</tbody>
</table>

The treatment and expected type of each element within each TpChargingSessionID structure is:-

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Type</th>
<th>Usage Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>ChargingSessionReference</td>
<td>IpChargingSessionReference</td>
<td>This element specifies a reference to the IpChargingSession object.  (used by all the IpAppChargingSession charging methods)</td>
</tr>
<tr>
<td>ChargingSessionID</td>
<td>TpSessionID</td>
<td>This element specifies the unique session ID for the charging session. (used by all the IpAppChargingSession charging methods)</td>
</tr>
<tr>
<td>RequestNumberFirstRequest</td>
<td>TpInt32</td>
<td>This element specifies the request number to use for the next request. (used by all the IpAppChargingSession charging methods)</td>
</tr>
</tbody>
</table>

Note: The session ID is still returned by this message to ensure maximum possible OSA compatibility.

getChargingSession() 

Description

This method is invoked on the IpChargingManager and returns the details of a reference to a previously created charging session from the free shared pool (no outstanding reservations and no outstanding UBE responses). The details returned the client will be a TpChargingSessionID structure containing the IpChargingSessionReference, ChargingSessionID and RequestNumberFirstRequest (to be used in any subsequent requests for the charging session). When invoked, the third-party client application will pass a reference to the IpAppChargingSession object to be used by the IpChargingSession charging methods when making call-backs.

If there are no:

- free IpChargingSession objects, the definition of a free IpChargingSession object is one with no outstanding reservations and no outstanding UBE responses, then the IpChargingSession reference of an IpChargingSession object with an outstanding reservation will be returned but with a -1 value for both the ChargingSessionID and RequestNumberFirstRequest fields.
- free IpChargingSession objects, and all the IpChargingSession objects have outstanding UBE responses then a PRESOURCE_UNAVAILABLE exception will be returned to the client.
- previously created charging session objects then a PRESOURCE_UNAVAILABLE exception will be returned to the client.
Parameters
Here is the parameter for this method.

- `appChargingSession` (on page 116)

Returns

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TpChargingSessionID</td>
<td>a TpChargingSessionID structure.</td>
</tr>
</tbody>
</table>

The treatment and expected type of each element within each TpChargingSessionID structure is:

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Type</th>
<th>Usage Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>ChargingSessionReference</td>
<td>IpChargingSessionRef</td>
<td>This element specifies a reference to the IpChargingSession object. (used by all the IpAppChargingSession charging methods)</td>
</tr>
<tr>
<td>ChargingSessionID</td>
<td>TpSessionID</td>
<td>This element specifies the unique session ID for the charging session. (used by all the IpAppChargingSession charging methods)</td>
</tr>
<tr>
<td>RequestNumberFirstRequest</td>
<td>TpInt32</td>
<td>This element specifies the request number to use for the next request. (used by all the IpAppChargingSession charging methods)</td>
</tr>
</tbody>
</table>

Note: The session ID is still returned by this message to ensure maximum possible OSA compatibility.

Charging Manager Parameters

Introduction
Here are the parameters used for this functionality.

`appChargingSession`
Description: The reference to an IpAppChargingSession object.

`appInterface`
Description: The reference to an IpAppChargingManager object.

`correlationID`
Description: A TpCorrelationID value used to correlate the charging to network activity such as voice calls, data sessions, or multi-media sessions. This is included in the CDR (Type 20) that is generated by the OSA CHAM SCS gateway. Otherwise the parameter is ignored by this method. (See standard [5] for TpCorrelationID encoding.)

`merchantAccount`
Description: A TpMerchantAccountID structure composed of the merchant ID (string) and account ID (integer) to be included in all CDRS (Types 20 – 23) that is generated by the OSA CHAM SCS gateway. Otherwise the parameter is ignored by this method.
sessionDescription
Description: A string to be included in the CDR (Type 20) that is generated by the OSA CHAM SCS gateway. Otherwise the parameter is ignored by this method.

sessionID
Description: The ID of the charging session to be created by the OSA CHAM SCS.

user
Description: A TpAddress structure that is ignored by this method.
Overview

Introduction

This chapter explains the methods that are available using the IpAppChargingManager. The IpAppChargingManager object resides on the third-party client application and provides the following methods that can be invoked by the OSA CHAM SCS gateway.

In this chapter

This chapter contains the following topics.

SessionAborted() ................................................................. 119
Application Charging Manager Parameters ................................................. 119

SessionAborted()

Description

This method is invoked on the IpAppChargingManager to indicate an abnormal termination of a charging session. Charging methods can no longer be called using this charging session. The OSA CHAM SCS gateway will have removed this session from the internal table of active charging sessions. This method can only be invoked by OSA CHAM SCS gateway if the setCallback() method for the IpAccountManager has been previously invoked by the third-party client application.

Parameters

Here is the parameter for this method.

- sessionID (on page 119)

Application Charging Manager Parameters

Introduction

Here are the parameters used for this functionality.

sessionID

Description: The ID of the charging session that has been aborted by the OSA CHAM SCS gateway.
Overview

Introduction

This chapter explains the methods available using the IpChargingSession. The IpChargingSession object resides on the OSA CHAM SCS gateway and provides the following methods that can be invoked by the third-party client application.

In this chapter

This chapter contains the following topics.

CreditAmountReq() .......................................................... 121
CreditUnitReq() .............................................................. 122
DebitAmountReq() ............................................................ 122
DebitUnitReq() ................................................................. 123
DirectCreditAmountReq() .................................................. 123
DirectCreditUnitReq() ......................................................... 123
DirectDebitAmountReq() ...................................................... 132
DirectDebitUnitReq() .......................................................... 137
ExtendLifeTimeReq() ......................................................... 141
GetAmountLeft() ............................................................... 147
GetLifeTimeLeft() .............................................................. 148
GetUnitLeft() ................................................................. 148
RateReq() .................................................................. 149
Release() .................................................................. 151
ReserveAmountReq() .......................................................... 151
ReserveUnitReq() .............................................................. 154
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CreditAmountReq()

Description

This method is invoked on the IpChargingSession to perform one of the following:

- This method is invoked on the IpAccountManager to credit monies towards an existing reservation already made on the OSA CHAM SCS gateway. The incoming request will specify the number of UBE small currency monies to be credited.
- This method is invoked on the IpAccountManager to credit time towards an existing reservation already made on the OSA CHAM SCS gateway. The incoming request will specify the number of seconds to be credited, the internal UBE time balance units is 100ths seconds so a conversion will be required.
- This method is invoked on the IpAccountManager to credit non cash or time towards an existing reservation already made on the OSA CHAM SCS gateway. The incoming request will specify the amount to be credited; the internal UBE units are mapped directly to the specified amount.
• If a reservation does not exist for this user, or the reservation has expired then this request will fail. It is not possible to credit an amount towards a reservation unless debits greater to or equal to the credited amount have already been debited – it is not possible to credit a subscriber’s wallet through the reservation-confirmation process.

Parameters

Here is a list of the parameters for this method.

• sessionID (on page 161)
• applicationDescription (on page 160)
• amount (on page 160)
• closeReservation (on page 161)
• requestNumber (on page 161)

Returns

Nothing.

CreditUnitReq()

Description

This method is invoked on the IpAccountManager to credit units towards an existing reservation already made on the OSA CHAM SCS gateway. If a reservation does not exist for this user, or the reservation has expired, then this request will fail. It is not possible to credit units towards a reservation unless debits greater to or equal to the credited units have already been debited – it is not possible to credit a user’s account through the reservation-confirmation process.

Parameters

Here is a list of the parameters for this method.

• sessionID (on page 161)
• applicationDescription (on page 160)
• volumes (on page 162)
• closeReservation (on page 161)
• requestNumber (on page 161)

Returns

Nothing.

DebitAmountReq()

Description

This method will be invoked on the IpChargingSession to perform one of the following:

• This method will be invoked on the IpAccountManager to debit monies towards an existing reservation already made on the OSA CHAM SCS gateway. The incoming request will specify the number of UBE small currency monies to be debited.
• This method will be invoked on the IpAccountManager to debit time towards an existing reservation already made on the OSA CHAM SCS gateway. The incoming request will specify the number of seconds to be debited, the internal UBE time balance units is 100ths seconds so a conversion will be required.

• This method will be invoked on the IpAccountManager to debit non cash or time towards an existing reservation already made on the OSA CHAM SCS gateway. The incoming request will specify the amount to be debited; the internal UBE units are mapped directly to the specified amount.

• If a reservation does not exist for this user, or the reservation has expired then this request will fail.

Parameters
Here is a list of the parameters for this method.

• sessionID (on page 161)
• applicationDescription (on page 160)
• amount (on page 160)
• closeReservation (on page 161)
• requestNumber (on page 161)

Returns
Nothing.

DebitUnitReq()

Description
This method will be invoked on the IpAccountManager to debit units from an existing reservation already made on the OSA CHAM SCS gateway. If a reservation does not exist for this user, or the reservation has expired then this request will fail.

Parameters
Here is a list of the parameters for this method.

• sessionID (on page 161)
• applicationDescription (on page 160)
• volumes (on page 162)
• closeReservation (on page 161)
• requestNumber (on page 161)

Returns
Nothing.

DirectCreditAmountReq()

Description
This method is invoked on the IpChargingSession to perform one of the following:
This method is invoked on the IpChargingSession to credit monies towards a subscriber's wallet using cash balance types only. The specified (or default) balance type or the specified balance type cascade (the UBE will credit the first balance type in the balance type cascade) is used. The UBE will create the specified balance type or first balance type in the balance type cascade if the balance type does not already exist in the subscriber's wallet. If the balance type cascade name is specified then the balance type name is ignored. The incoming request will specify the number of UBE small currency monies to be credited. Typically this method is used for balance types where the unit type of the balance type is 'Cash'; if the balance type cascade name is specified in the incoming request then only balance types where the unit type of the balance type is 'Cash' is available in the balance type cascade.

This method is invoked on the IpChargingSession to credit time towards a subscriber's wallet using time balance types. The incoming request will specify the number of seconds to be credited, the internal UBE time balance units is 100ths seconds so a conversion is required. The balance type name must be specified in the incoming request where the unit type of the balance type is 'Time' and the allowNonCashBalanceForAmountMethods (on page 18) configuration parameter must be 'true' for time-based reservations to be supported. If the balance type cascade name is specified in the incoming request then the amount specified is assumed to be monies and only balance types where the unit type of the balance type is 'Cash' is available in the balance type cascade.

This method is invoked on the IpChargingSession to credit an amount towards a subscriber's wallet using non-cash or time balance types. The incoming request will specify the amount to be credited; the internal UBE units are mapped directly to the specified amount. The balance type name must be specified in the incoming request where the unit type of the balance type is non 'Cash' or 'Time' and the allowNonCashBalanceForAmountMethods configuration parameter must be 'true' for non cash or time-based reservations to be supported. If the balance type cascade name is specified in the incoming request then the amount specified is assumed to be monies and only balance types where the unit type of the balance type is 'Cash' is available in the balance type cascade.

Extend the expiry date of the specified (or default) balance type by a specified number of days based on the rules detailed in Extending balance and wallet expiry dates (on page 125). The number of days is taken from the incoming P_CHS_BALANCE_VALIDITY_MODIFICATION parameter or if not specified and the PI_XDATE_EXTENSION table is installed then determine the appropriate balance extension from this table. If the number of days is not specified in the incoming P_CHS_BALANCE_VALIDITY_MODIFICATION parameter and the PI_XDATE_EXTENSION table is not installed then no default value is used. Specifying the balance type cascade is not supported in conjunction with specifying the balance expiry extension parameter. A configuration item (defaulting to 'false') will cause the request to fail if the balance extension parameter exceeds the wallet extension parameter or if the result of extending the balance expiry date exceeds the current or extended wallet expiry date; this expiry indicator is passed through to the UBE. The P_CHS_OVERRIDE_BALANCE_VALUE is not supported when the balance type cascade name is specified.

Extend the expiry date of the specified (or default) wallet type by a specified number of days based on the rules detailed in Extending balance and wallet expiry dates. The number of days is taken from the incoming P_CHS_WALLET_VALIDITY_MODIFICATION parameter or if not specified and the PI_YDATE_EXTENSION table is installed then determine the appropriate wallet extension from this table. If the number of days is not specified in the incoming P_CHS_WALLET_VALIDITY_MODIFICATION parameter and the PI_YDATE_EXTENSION table is not installed then no default value is used. A configuration item (defaulting to 'false') will cause the request to fail if the wallet extension parameter is less than the balance extension parameter or if the result of extending the wallet expiry date is less than the extended balance expiry date; this expiry indicator is passed through to the UBE. If the balance expiry date is not being extended then this check cannot be performed.

Set the value of the specified (or default) balance type to a specific value where the UBE will create the specified balance type if the balance type does not already exist in the subscriber's wallet. The incoming P_CHS_OVERRIDE_BALANCE_VALUE will indicate the value supplied is an override and not to be used to credit an existing balance type; this override indicator is passed through to the UBE. The P_CHS_OVERRIDE_BALANCE_VALUE is not supported when the balance type cascade name is specified.
- Set the expiry date of the specified (or default) balance type to a specific date (value taken from the incoming P_CHS_BALANCE_VALIDITY_DATE parameter). A configuration item (defaulting to 'false') will cause the request to fail if the balance specific date parameter exceeds the wallet specific date parameter; this expiry indicator is passed through to the UBE.

- Set the expiry date of the specified (or default) wallet type to a specific date (value taken from the incoming P_CHS_WALLET_VALIDITY_DATE parameter). A configuration item (defaulting to 'false') will cause the request to fail if the wallet specific date parameter is less than the balance specific date parameter; this expiry indicator is passed through to the UBE.

- Recharge a wallet using a voucher (voucher number and voucher pin taken from the incoming P_CHS_VOUCHER parameter). If the EDR details contain both the BONUS_TYPE and REFERENCE tags then an applicable bonus value may be incorporated into the amount credited to subscriber's wallet subject to the rules detailed in Applying bonuses (on page 127).

- Recharge a wallet using a voucher type (voucher type name taken from the incoming P_CHS_VOUCHER_TYPE_NAME parameter). If the EDR details contain both the BONUS_TYPE and REFERENCE tags then an applicable bonus value may be incorporated into the amount credited to subscriber's wallet subject to the rules detailed in Applying bonuses.

- Bonuses may be applied to the value specified in the request; these will be calculated on the UBE using the P_CHS_BONUS_TYPE and P_CHS_REFERENCE parameters when crediting a subscriber's wallet using a specified value, recharging a subscriber using a voucher or recharging a subscriber using a voucher type. The bonus type and reference parameters will be passed through to the UBE.

If the specified balance type, or default balance type if none is specified, does not exist, then the balance type will be created; the expiry date for the existing or new balance type and for the wallet will be set based on the rules detailed in Extending balance and wallet expiry dates (on page 125) or Specifying balance and wallet expiry dates (on page 126) depending on which scenario applies.

If the balance type cascade is specified, then the first balance type in the cascade will be credited and if this balance type does not exist then the balance type will be created; the expiry date for the existing or new balance type and the wallet will be set based on the rules detailed in Extending balance and wallet expiry dates; specifying a specific balance date is not supported in conjunction with specifying a balance type cascade.

If the 'override balance wallet value' flag is specified and the balance type:

- already exists, then the specified balance type will have a single bucket value updated to this value (the bucket with the latest expiry date) and all remaining buckets in the balance type will be deleted; the expiry date for the balance type and wallet will be set based on the rules detailed in Extending balance and wallet expiry dates or Specifying balance and wallet expiry dates depending on which scenario applies. Specifying the balance type cascade is not supported in conjunction with specifying the 'override balance wallet value' flag. A configuration item (defaulting to 'false') will cause the request to fail if the specific balance date parameter exceeds the specific wallet date parameter; this expiry indicator will be passed through to the UBE.

- does not exist then the balance type will be created; the expiry date for the balance type and wallet will be set based on the rules detailed in Extending balance and wallet expiry dates or Specifying balance and wallet expiry dates depending on which scenario applies.

If the EDR details contain both the BONUS_TYPE and REFERENCE tags, then an applicable bonus value may be incorporated into the amount credited to subscriber's wallet subject to the rules detailed in Applying bonuses (on page 127).

The current reservation, if one exists, will not be affected through invoking this request.

### Extending balance and wallet expiry dates

#### Updating existing balances

If the balance extensions parameter is specified and the 'override balance wallet value' flag is:
• not specified, then all the buckets in the balance type will have the expiry date extended by this number of days from today only if extending the expiry date results in extending the existing expiry date. If the result of extending the balance expiry date exceeds the result of extending the wallet expiry date then the balance expiry date will not be extended unless the 'allow wallet balance extension' flag is present in the incoming message.

• specified and the balance extensions parameter is specified then the bucket with the latest expiry date will have the expiry date extended by this number of days from today only if extending the expiry date results in extending the existing expiry date. If the result of extending the balance expiry date exceeds the result of extending the wallet expiry date then the balance expiry date will not be extended unless the 'allow wallet balance extension' flag is present in the incoming message.

Irrespective of whether the 'override balance wallet value' flag is specified, if the:

• bucket expiry date to be extended is set to NEVER_EXPIRES then the bucket expiry date will remain unchanged.

• wallet extensions parameter is specified then the wallet will have the expiry date extended by this number of days from today if the result of extending the current wallet expiry date results in extending the existing wallet expiry date. If the result of extending the wallet expiry date is less than the result of setting the balance expiry date then the wallet expiry date will not be extended unless the 'allow wallet balance extension' flag is present in the incoming message.

Creating new balances

If the balance extensions parameter is specified and the 'override balance wallet value' flag is:

• not specified, then the new balance type will have the expiry date set to this number of days from today irrespective of the wallet expiry date.

• is specified, then the new balance type will have the expiry date set to this number of days from today irrespective of the wallet expiry date.

Irrespective of whether the 'override balance wallet value' flag is specified:

• if the the balance extensions parameter is not specified then the new balance type will have the balance expiry date set to the number of days from today using the existing BE.beVWARS.createBucketExpiryDays configuration parameter (defaulting to 30 days); this is irrespective of the wallet expiry date.

• if the wallet extensions parameter is specified then the wallet will have the expiry date extended by this number of days from today if the result of extending the current wallet expiry date results in extending the existing wallet expiry date. If the result of extending the wallet expiry date is less than the result of setting the balance expiry date then the wallet expiry date will not be extended unless the 'allow wallet balance extension' flag is present in the incoming message.

Specifying balance and wallet expiry dates

Updating existing balances

If the 'override balance wallet value' flag is:

• not specified and the specific balance date parameter or specific wallet date parameter is specified, then this will return an error; specifying the specific balance date parameter or specific wallet date parameter is not supported without specifying the 'override balance wallet value'.

• is specified and the specific balance date parameter is specified, then the bucket with the latest expiry date will have the expiry date set to the specific balance date parameter irrespective of whether the new bucket expiry date is shortened or lengthened. If the result of setting the balance expiry date exceeds the result of setting the wallet expiry date then the balance expiry date will remain unchanged unless the 'allow wallet balance extension' flag is present in the incoming message.

If the 'override balance wallet value' flag is specified and:
• if the bucket expiry date to be set is currently set to NEVER_EXPIRES, then the bucket expiry date will be set to the specific balance date parameter.

• the specific balance date is set to NEVER_EXPIRES (i.e. '0'), then the bucket expiry date will be set to NEVER_EXPIRES.

• the specific wallet date parameter is specified, then the wallet will have the expiry date set to the specific wallet date parameter irrespective of whether the new wallet expiry date is shortened or lengthened. If the result of setting the wallet expiry date is less than the result of setting the balance expiry date then the wallet expiry date will remain unchanged unless the ‘allow wallet balance extension’ flag is present in the incoming message.

• and if the wallet expiry date to be set is currently set to NEVER_EXPIRES, then the wallet expiry date will be set to the specific wallet date parameter.

• the specific wallet date is set to NEVER_EXPIRES (i.e. '0'), then the wallet expiry date will be set to NEVER_EXPIRES.

Creating new balances
If the 'override balance wallet value' flag is not specified and the specific balance date parameter:

• or specific wallet date parameter is specified, then this will return an error; specifying the specific balance date parameter or specific wallet date parameter is not supported without specifying the ‘override balance wallet value’.

• is specified, then the new balance type will have the expiry date set to the specific balance date parameter irrespective of the wallet expiry date.

If the 'override balance wallet value' flag is specified and the specific balance date:

• is set to NEVER_EXPIRES (i.e. '0'), then the new balance type will have the expiry date set to NEVER_EXPIRES.

• parameter is not specified, then the new balance type will have the balance expiry date set to the number of days from today using the existing BE.beVWARS.createBucketExpiryDays configuration parameter (defaulting to 30 days); this is irrespective of the wallet expiry date.

If the 'override balance wallet value' flag is specified and the specific wallet:

• date parameter is specified, then the wallet will have the expiry date set to the specific wallet date parameter irrespective of whether the new wallet expiry date is shortened or lengthened. If the result of setting the wallet expiry date is less than the result of setting the balance expiry date then the wallet expiry date will remain unchanged unless the 'allow wallet balance extension' flag is present in the incoming message.

• expiry date to be set is currently set to NEVER_EXPIRES, then the wallet expiry date will be set to the specific wallet date parameter.

• date is set to NEVER_EXPIRES (i.e. '0'), then the wallet expiry date will be set to NEVER_EXPIRES.

Applying bonuses
If the EDR details contain both the BONUS_TYPE and REFERENCE tags, then an attempt to match the BONUS_TYPE, REFERENCE, service provider, triggering balance type and applicable bonus range to the incoming EDR tags, recharge value and subscriber details will be made.

The triggering balance type will always have at least the recharge value credited to the balance type however as explained below if a matching bonus configuration is found then an applicable bonus will also be applied. If the triggering balance type is:

• found in the subscriber's wallet and if the promotional balance type also exists in the subscriber's wallet then the promotional balance type will be credited by the percentage of the recharge value as defined for the matching bonus definition.
- found in the subscriber’s wallet, but the promotional balance type does not exist in the subscriber’s wallet then the triggering balance type will be credited by the percentage of the recharge value as defined for the matching bonus definition.
- not found in the subscriber’s wallet then there will be no bonus applied.

Notes:
- The BONUS_TYPE value must be in upper case. For example CUSTOM.
- It is not possible to combine balance and wallet extensions with balance and wallet specific dates in the incoming request; combining these charging parameters will cause the request to fail.
- The subscriber’s wallet may not be available on the local SCS database if the user is not a prepaid subscriber. For post-paid subscribers the user can be 'cold-billed' using the information extracted from the OSA CDR. If the MSISDN is not found when the chargedParty is decoded and the ‘AllowPostPaid’ flag is set to true, then the request will return success. Otherwise, if the chargedParty fails to decode successfully and the ‘AllowPostPaid’ flag is set to false, then the request will return failure.

Parameters
Here is a list of the parameters for this method.
- sessionID (on page 161)
- applicationDescription (on page 160)
- chargingParameters (on page 160)
- amount (on page 160)
- requestNumber (on page 161)

TpChargingParameter structure
The treatment and expected type of each element within each TpChargingParameter structure is:-

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ChargedParty</td>
<td>TpString</td>
<td>Name: P_CHS_CHARGE_PARTY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mandatory.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ChargedType 1: The TpString will correspond to</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the MSISDN to charge.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ChargedType 3: The TpString will correspond to</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the wallet ID and billing engine ID to charge.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The wallet ID and billing engine ID are separated by ‘/’.</td>
</tr>
<tr>
<td>ChargedType</td>
<td>TpInt32</td>
<td>Name: P_CHS_CHARGE_TYPE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mandatory. Value showing type of ChargedParty.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1 - MSISDN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2 - reserved</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3 - Wallet ID</td>
</tr>
<tr>
<td>Element Name</td>
<td>Element Type</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------</td>
<td>--------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Discount Override</td>
<td>TpInt32</td>
<td>Name: P_CHS_DISCOUNT_OVERRIDE Percentage discount to apply to final cost. Valid values are 0 – 10000 where these are in 1/100th of a percent. Therefore, 500 would equate to a 5% discount. The discount applied to the final cost will depend solely on the OSA discount entered here.</td>
</tr>
<tr>
<td>Wallet Type Name</td>
<td>TpString</td>
<td>Name: P_CHS_WALLET_TYPE Optional. The wallet type to use for Charge Type 1. If not specified, the default wallet type for this account is used.</td>
</tr>
<tr>
<td>Balance Type Name</td>
<td>TpString</td>
<td>Name: P_CHS_BALANCE_TYPE Optional. The balance type to use for Charge Type 1. If not specified, the default balance type for this account is used.</td>
</tr>
</tbody>
</table>
| Balance Type Cascade Name    | TpString     | Name: P_CHS_BALANCE_TYPE_CASCADE Optional. The balance type cascade name to use for Charge Type 1. If:  
|                              |              | • specified then the balance type name will be ignored.  
<p>|                              |              | • not specified, the default balance type for this account will be used. |
| Voucher Number and Voucher PIN | TpString   | Name: P_CHS_VOUCHER Optional. The voucher number and voucher pin used when doing a voucher recharge.                                           |
| Voucher Type Name            | TpString     | Name: P_CHS_VOUCHER_TYPE_NAME Optional. The voucher type name used when doing a voucher type recharge.                                      |
| Bonus Type Name              | TpString     | Name: P_CHS_BONUS_TYPE Optional. The bonus type used in conjunction with the bonus reference to determine the applicable bonus to be applied to the value when crediting the subscriber’s wallet A match will be done against the configured bonus in the database using the CCS_BONUS_TYPE.type column. Valid value is ‘C(U)STOM’ where ‘U’ will be stored in the database. Bonuses will be applied subject to the rules detailed in Applying bonuses (on page 127). |</p>
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| Reference                    | TpString     | **Name:** P_CHS_REFERENCE  
Optional. The bonus reference used in conjunction with the bonus type to determine the applicable bonus to be applied to the value when crediting the subscriber's wallet. A match will be done against the configured bonus in the database using the CCS_BONUS_TYPE.component column.  
This is a freeform text string; maximum of 20 characters.  
Bonuses will be applied subject to the rules detailed in *Applying bonuses* (on page 127). |
| Override Balance Value and Dates Flag | TpBoolean    | **Name:** P_CHS_OVERRIDE_BALANCE_VALUE  
Optional. This can be set to 'TRUE' to override the value in the specified or default balance type with this amount; it cannot be used in conjunction with a balance type cascade name.  
This can be used in conjunction with the balance and wallet validity date parameters to specify specific expiry dates and must be present to use either of the balance or wallet validity date parameters.  
Defaults to 'FALSE'. |
| Balance Validity Modification | TpInt32      | **Name:** P_CHS_BALANCE_VALIDITY_MODIFICATION  
Optional. The amount of days when extending the balance expiry date. The new balance balance expiry date will be set to the current date and time plus the number of days entered here.  
Only those expiry dates within the determined balance type (entered balance type or default balance type if none entered), which would be increased by this modification, will be affected.  
Any expiry date within the determined balance type that is set to 'never expire' will not be affected by this request.  
The new balance expiry date will be set to this value irrespective of the current balance expiry date subject to the rules detailed in *Extending balance and wallet expiry dates* (on page 125). |
## Chapter 11
### Charging Session Functionality

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wallet Validity Modification</td>
<td>TpInt32</td>
<td>Optional. The amount of days when extending the wallet expiry date. The new wallet expiry date will be set to the current date and time plus the number of days entered here. The wallet expiry cannot be decreased by this modification. If the expiry date within the determined wallet type is set to 'never expire' it will not be affected by this request. The new wallet expiry date will be set to this value irrespective of the current balance expiry date subject to the rules detailed in <em>Extending balance and wallet expiry dates</em> (on page 125).</td>
</tr>
<tr>
<td>Balance Validity Date</td>
<td>TpDate</td>
<td>Optional. The specific date when setting the balance expiry date. The new balance expiry date will be set to this value irrespective of the current balance expiry date subject to the rules detailed in <em>Specifying balance and wallet expiry dates</em> (on page 126). The override balance wallet value parameter must be present for this parameter to be taken into account.</td>
</tr>
<tr>
<td>Wallet Validity Date</td>
<td>TpDate</td>
<td>Optional. The specific date when setting the wallet expiry date. The new wallet expiry date will be set to this value irrespective of the current wallet expiry date subject to the rules detailed in <em>Specifying balance and wallet expiry dates</em> (on page 126). The override balance wallet value parameter must be present for this parameter to be taken into account.</td>
</tr>
<tr>
<td>Send SMS Flag</td>
<td>TpBoolean</td>
<td>Optional. This can be set to 'TRUE' to ensure an SMS is sent when this reservation is confirmed on the billing engine (SMS only invoked if the ChargedType equals '1', otherwise this parameter is ignored). Defaults to 'FALSE'.</td>
</tr>
</tbody>
</table>

### Returns

Nothing.
DirectCreditUnitReq()

Description

This method is invoked on the IpChargingSession to perform one of the following:

- Credit units towards a subscriber's wallet using the specified balance type or the specified balance
type cascade (the UBE will credit the first balance type in the balance type cascade) where the UBE
will create the specified balance type or first balance type in the balance type cascade if the balance
type does not already exist in the subscriber's wallet. If the balance type cascade name is specified,
then the balance type name will be ignored. If neither is specified then the default balance type
cascade already defined for either the rating definition or the billable-event definition will be used.
Each unit has an associated cost on the billing engine and therefore a specified number of units
translate into a fixed amount of monies to be credited towards the subscriber's wallet. The only
supported unit-based reservations are seconds and billable events.

- Extend the expiry date of the specified balance type by a specified number of days based on the
rules detailed in Extending balance and wallet expiry dates (on page 125), albeit the 'override
balance wallet value' flag is not supported for this request. The number of days will be taken from
the incoming P_CHS_BALANCE_VALIDITY_MODIFICATION parameter. Specifying the balance
type cascade is not supported in conjunction with specifying the balance expiry extension
parameter. A configuration item (defaulting to 'false') will cause the request to fail if the balance
extension parameter exceeds the wallet extension parameter, or if the result of extending the
balance expiry date exceeds the current or extended wallet expiry date; this expiry indicator will be
passed through to the UBE.

- Extend the expiry date of the specified (or default) wallet type by a specified number of days based
on the rules detailed in Extending balance and wallet expiry dates, albeit the 'override balance wallet
value' flag is not supported for this request. The number of days will be taken from the incoming
P_CHS_WALLET_VALIDITY_MODIFICATION parameter. A configuration item (defaulting to
'false') will cause the request to fail if the wallet extension parameter is less than the balance
extension parameter; this expiry indicator will be passed through to the UBE.

If the specified balance type does not exist then the balance type will be created; the expiry date for the
existing or new balance type and for the wallet will be set based on the rules detailed in Extending
balance and wallet expiry dates, albeit the 'override balance wallet value' flag is not supported for this
request.

If the balance type cascade is specified then the first balance type in the cascade will be credited and if
this balance type does not exist then the balance type will be created; the expiry date for the existing or
new balance type and the wallet will be set based on the rules detailed in Extending balance and wallet
expiry dates, albeit the 'override balance wallet value' flag is not supported for this request; specifying a
specific balance date is not supported in conjunction with specifying a balance type cascade.

The current reservation, if one exists, will not be affected through invoking this request.

Note: The subscriber's wallet may not be available on the local SCS database if the user is not a prepaid
subscriber. For post-paid subscribers the user can be 'cold-billed' using the information extracted from
the OSA CDR. If the MSISDN is not found when the chargeParty is decoded and the 'AllowPostPaid'
flag is set to true and the rating tariff for this subscriber can be determined then the request will return
success. Otherwise, if the chargeParty fails to decode successfully and the 'AllowPostPaid' flag is set to
false and/or the rating tariff for this subscriber cannot be determined, then the request will return failure.

Parameters

Here is a list of the parameters for this method.

- sessionID (on page 161)
- applicationDescription (on page 160)
- chargingParameters (on page 160)
Chapter 11

- **volumes** (on page 162)
- **requestNumber** (on page 161)

**Unit-Seconds based credit request**

The treatment and expected type of each element within each TpChargingParameter structure for a unit-seconds based direct delta is:

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| ChargedParty         | TpString     | Name: P_CHS_CHARGE_PARTY  
Mandatory.  
ChargedType 1: The TpString will correspond to the MSISDN to charge.  
ChargedType 3: The TpString will correspond to the wallet ID and billing engine ID to charge. The wallet ID and billing engine ID is separated by '/'. |
| ChargedType          | TpInt32      | Name: P_CHS_CHARGE_TYPE  
Mandatory.  Value showing type of ChargedParty.  
- 1 - MSISDN  
- 2 - reserved  
- 3 - Wallet ID |
| Calling Number       | TpString     | Name: P_CHS_CALLING_NUMBER  
Mandatory.  Network Calling Number to be used for rating-tariff calculations. |
| Called Number        | TpString     | Name: P_CHS_CALLED_NUMBER  
Mandatory.  Network Called Number to be used for rating-tariff calculations. |
| Discount Override    | TpInt32      | Name: P_CHS_DISCOUNT_OVERRIDE  
Percentage discount to apply to final cost. Valid values are 0 – 10000 where these are in 1/100th of a percent. Therefore, 500 would equate to a 5% discount. The discount applied to the final cost will depend on the 'discountRuleType' parameter set in the CCS.ReservationHandler section of eserv.config file on the UBE. The following are valid values where the resulting discounted cost will be applied: |
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| discountRuleType = 'ServiceOverride' |  | (use only OSA discount)  
  \[
  \text{finalCost} = \text{initialCost} \times (\text{OSA discount})
  \]  
| discountRuleType = 'S*R+W' |  |\[
  \text{finalCost} = \text{initialCost} \times (\text{OSA discount} \times \text{CCS rating discount} \times \text{CCS wallet discount})
  \]  
| discountRuleType = 'S+R+W' |  |\[
  \text{finalCost} = \text{initialCost} \times (\text{OSA discount} + \text{CCS rating discount} + \text{CCS wallet discount})
  \]  
| discountRuleType = 'S+R*W' |  |\[
  \text{finalCost} = \text{initialCost} \times (\text{OSA discount} + \text{CCS rating discount} \times \text{CCS wallet discount})
  \]  
| discountRuleType = 'S*R+W' |  |\[
  \text{finalCost} = \text{initialCost} \times (\text{OSA discount} \times \text{CCS rating discount} + \text{CCS wallet discount})
  \]  
| discountRuleType = 'S+W*R' |  |\[
  \text{finalCost} = \text{initialCost} \times (\text{OSA discount} + \text{CCS wallet discount} \times \text{CCS rating discount})
  \]  
| discountRuleType = 'S*W+R' |  |\[
  \text{finalCost} = \text{initialCost} \times (\text{OSA discount} \times \text{CCS wallet discount} + \text{CCS rating discount})
  \]  
| discountRuleType = 'R+W*S' |  |\[
  \text{finalCost} = \text{initialCost} \times (\text{CCS rating discount} \times \text{CCS wallet discount} + \text{OSA discount})
  \]  
| discountRuleType = 'R*W+S' |  |\[
  \text{finalCost} = \text{initialCost} \times (\text{CCS rating discount} \times \text{OSA discount} + \text{CCS wallet discount})
  \]  

**Wallet Type Name**  
**TpString**  
**Name:** P_CHS_WALLET_TYPE  
Optional. The wallet type name to use for Charge Type 1. If not specified, the default wallet type for this account is used.
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| Balance Type Name            | TpString     | Name: P_CHS_BALANCE_TYPE  
Optional. The balance type name to use for Charge Type 1. If:  
- not specified, there will be no default balance type for this operation.  
- specified then a balance type cascade containing only this balance type will override the balance type cascade already defined for the rating definition. |
| Balance Type Cascade Name    | TpString     | Name: P_CHS_BALANCE_TYPE_CASCADE  
Optional. The balance type cascade name to use for Charge Type 1. If specified, this balance type cascade will override the balance type cascade already defined for the rating definition. |
| Balance Validity Modification| TpInt32      | Name: P_CHS_BALANCE_VALIDITY_MODIFICATION  
Optional. The number of days when extending the balance expiry date. The new balance expiry date will be set to the current date and time plus the number of days entered here. Only those expiry dates within the determined balance type (entered balance type), which would be increased by this modification, will be affected. Any expiry date within the determined balance type that is set to ‘never expire’ will not be affected by this request.  
The balance type parameter must be present for this parameter to be taken into account. |
| Wallet Validity Modification | TpInt32      | Name: P_CHS_WALLET_VALIDITY_MODIFICATION  
Optional. The number of days when extending the wallet expiry date. The new wallet expiry date will be set to the current date and time plus the number of days entered here. The wallet expiry cannot be decreased by this modification. If the expiry date within the determined wallet type is set to ‘never expire’, it will not be affected by this request.  
The balance type parameter must be present for this parameter to be taken into account. |
| Send SMS Flag                | TpBoolean    | Name: P_CHS_SEND_SMS_FLAG  
Optional. This can be set to ‘TRUE’ to ensure an SMS is sent when this reservation is confirmed on the billing engine (SMS only invoked if the ChargedType equals ‘1’, otherwise this parameter is ignored). Defaults to ‘FALSE’. |
**Unit-Billable event based credit request**

The treatment and expected type of each element within each TpChargingParameter structure for a unit-seconds based direct delta is:

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| ChargedParty       | TpString     | Name: P_CHS_CHARGE_PARTY  
Mandatory.  
ChargedType 1: The TpString will correspond to the MSISDN to charge.  
ChargedType 3: The TpString will correspond to the wallet ID and billing engine ID to charge. The wallet ID and billing engine ID is separated by '/'. |
| ChargedType        | TpInt32      | Name: P_CHS_CHARGE_TYPE  
Mandatory.  Value showing type of ChargedParty.  
- 1 - MSISDN  
- 2 - reserved  
- 3 - Wallet ID |
| Discount Override  | TpInt32      | Name: P_CHS_DISCOUNT_OVERRIDE  
Percentage discount to apply to final cost. Valid values are 0 – 10000 where these are in 1/100th of a percent.  
Therefore, 500 would equate to a 5% discount.  
The discount applied to the final cost will depend on the OSA discount entered here.  
**Note:** CCS discounts do not apply to billable events. |
| Event Name         | TpString     | Name: P_CHS_EVENT_NAME  
Mandatory.  Event Class and Name for rating tariff calculation.  
The TpString will correspond to the event class and event name to charge. The event class and event name are separated by '/'. |
| Wallet Type Name   | TpString     | Name: P_CHS_WALLET_TYPE  
Optional.  The wallet type name to use for Charge Type 1. If not specified, the default wallet type for this account is used. |
| Balance Type Name  | TpString     | Name: P_CHS_BALANCE_TYPE  
Optional.  The balance type name to use for Charge Type 1. If:  
- not specified, there will be no default balance type for this operation.  
- specified then a balance type cascade containing only this balance type will override the balance type cascade already defined for the rating definition. |
### Element Name

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance Type Cascade Name</td>
<td>TpString</td>
<td>Name: P_CHS_BALANCE_TYPECASCADE Optional. The balance type cascade name to use for Charge Type 1. If specified, then this balance type cascade will override the balance type cascade already defined for the billable-event definition.</td>
</tr>
<tr>
<td>Balance Validity Modification</td>
<td>TpInt32</td>
<td>Name: P_CHS_BALANCE_VALIDITY_MODIFICATION Optional. The number of days when extending the balance expiry date. The new balance expiry date will be set to the current date and time plus the number of days entered here. Only those expiry dates within the determined balance type (entered balance type), which would be increased by this modification, will be affected. Any expiry date within the determined balance type that is set to 'never expire' will not be affected by this request. The balance type parameter must be present for this parameter to be taken into account.</td>
</tr>
<tr>
<td>Wallet Validity Modification</td>
<td>TpInt32</td>
<td>Name: P_CHS_WALLET_VALIDITY_MODIFICATION Optional. The number of days when extending the wallet expiry date. The new wallet expiry date will be set to the current date and time plus the number of days entered here. The wallet expiry cannot be decreased by this modification. If the expiry date within the determined wallet type is set to 'never expire', it will not be affected by this request. The balance type parameter must be present for this parameter to be taken into account.</td>
</tr>
<tr>
<td>Send SMS Flag</td>
<td>TpBoolean</td>
<td>Name: P_CHS_SEND_SMS_FLAG Optional. This can be set to ‘TRUE’ to ensure an SMS is sent when this reservation is confirmed on the billing engine (SMS only invoked if the ChargedType equals ‘1’, otherwise this parameter is ignored). Defaults to ‘FALSE’.</td>
</tr>
</tbody>
</table>

**Returns**

Nothing.

**DirectDebitAmountReq()**

**Description**

This method is invoked on the IpChargingSession to perform one of the following:
This method is invoked on the IpChargingSession to debit monies from a subscriber's wallet using cash balance types only. The specified (or default) balance type or the specified balance type cascade is used. If the balance type cascade name is specified, then the balance type name will be ignored. If there are insufficient funds in the specified balance type or across all balance types in the balance type cascade, then based on a parameter in the incoming request, the balance type, or in the case of the balance type cascade, then the final balance type in the balance type cascade will be allowed to be taken negative; this 'allow negative balance' indicator will be passed through to the UBE. The incoming request specifies the number of UBE small currency monies to be credited. Typically this method is used for balance types where the unit type of the balance type is 'Cash'; if the balance type cascade name is specified in the incoming request, then only balances where the unit type of the balance type is 'Cash' will be available in the balance type cascade.

This method is invoked on the IpChargingSession to debit time towards a subscriber's wallet using time balance types. The incoming request specifies the number of seconds to be debited, the internal UBE time balance units is 100ths seconds so a conversion will be required. The balance type name must be specified in the incoming request where the unit type of the balance type is 'Time' and the allowNonCashBalanceForAmountMethods (on page 18) configuration parameter must be 'true' for time-based reservations to be supported. If the balance type cascade name is specified in the incoming request then the amount specified will be assumed to be monies and only balance types where the unit type of the balance type is 'Cash' will be available in the balance type cascade.

This method is invoked on the IpChargingSession to debit an amount towards a subscriber's wallet using non-cash or time balance types. The incoming request specifies the amount to be debited; the internal UBE units are mapped directly to the specified amount. The balance type name must be specified in the incoming request where the unit type of the balance type is non 'Cash' or 'Time' and the allowNonCashBalanceForAmountMethods configuration parameter must be 'true' for non cash or time-based reservations to be supported. If the balance type cascade name is specified in the incoming request then the amount specified will be assumed to be monies and only balance types where the unit type of the balance type is 'Cash' will be available in the balance type cascade.

Extend the expiry date of the specified (or default) balance type by a specified number of days based on the rules detailed in Extending balance and wallet expiry dates, albeit the 'override balance wallet value' flag is not supported for this request. The number of days are taken from the incoming P_CHS_BALANCE_VALIDITY_MODIFICATION parameter. Specifying the balance type cascade is not supported in conjunction with specifying the balance expiry extension parameter. A configuration item (defaulting to 'false') will cause the request to fail if the balance extension parameter exceeds the wallet extension parameter or if the result of extending the balance expiry date exceeds the current or extended wallet expiry date; this expiry indicator will be passed through to the UBE. If the balance expiry date is not being extended, then this check cannot be performed.

Extend the expiry date of the specified (or default) wallet type by a specified number of days based on the rules detailed in Extending balance and wallet expiry dates, albeit the 'override balance wallet value' flag is not supported for this request. The number of days are taken from the incoming P_CHS_WALLET_VALIDITY_MODIFICATION parameter. A configuration item (defaulting to 'false') will cause the request to fail if the wallet extension parameter is less than the balance extension parameter or if the result of extending the wallet expiry date is less than the extended balance expiry date; this expiry indicator will be passed through to the UBE. If the balance expiry date is not being extended, then this check cannot be performed.

The specified balance type, or default balance type, if none is specified, will be debited and the expiry date for the balance type and for the wallet will be set based on the rules detailed in Extending balance and wallet expiry dates, albeit the 'override balance wallet value' flag is not supported for this request. If the balance type cascade is specified, then the balances will be debited in order of the cascade; specifying a balance expiry extension is not supported in conjunction with specifying a balance type cascade.

The current reservation, if one exists, will not be affected through invoking this request.
Note: The subscriber's wallet may not be available on the local SCS database if the user is not a prepaid subscriber. For post-paid subscribers the user can be 'cold-billed' using the information extracted from the OSA CDR. If the MSISDN is not found when the chargedParty is decoded and the 'AllowDirectPostPaid' flag is set to 'true' then the request will return success. Otherwise, if the chargedParty fails to decode successfully and the 'AllowDirectPostPaid' flag is set to 'false', then the request will return failure.

Parameters

Here is a list of the parameters for this method.

- `sessionId` (on page 161)
- `applicationDescription` (on page 160)
- `chargingParameters` (on page 160)
- `amount` (on page 160)
- `requestNumber` (on page 161)

TpChargingParameter structure

The treatment and expected type of each element within each TpChargingParameter structure is:

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| ChargedParty          | TpString     | Name: P_CHS_CHARGE_PARTY
|                       |              | Mandatory. |
|                       |              | ChargedType 1: The TpString will correspond to the MSISDN to charge. |
|                       |              | ChargedType 3: The TpString will correspond to the wallet ID and billing engine ID to charge. The wallet ID and billing engine ID are separated by '/'. |
| ChargedType           | TpInt32      | Name: P_CHS_CHARGE_TYPE
|                       |              | Mandatory. Value showing type of ChargedParty. |
|                       |              | - 1 - MSISDN |
|                       |              | - 2 - reserved |
|                       |              | - 3 - Wallet ID |
| Discount Override     | TpInt32      | Name: P_CHS_DISCOUNT_OVERRIDE
|                       |              | Percentage discount to apply to final cost. Valid values are 0 – 10000 where these are in 1/100th of a percent. |
|                       |              | Therefore, 500 would equate to a 5% discount. The discount applied to the final cost will depend solely on the OSA discount entered here. |
| Wallet Type Name      | TpString     | Name: P_CHS_WALLET_TYPE
<p>|                       |              | Optional. The wallet type name to use for Charge Type 1. If not specified, the default wallet type for this account is used. |</p>
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| Balance Type Name                  | TpString     | Name: P_CHS_BALANCE_TYPE  
Optional. The balance type name or balance type cascade name to use for Charge Type 1. If not specified, the default balance type for this account will be used. To specify a balance cascade, a ";" is used to identify the parameter as a cascade. e.g. ";promo_cascade".  
When a balance type cascade name is specified only balances containing 'Cash' Balance Units will be included in the result.  
The additional ";" is maintained when specifying the balance type cascade name for backwards compatibility only, if the balance type cascade parameter is specified separately then this parameter will take priority. |
| Balance Type Cascade Name          | TpString     | Name: P_CHS_BALANCE_TYPE_CASCADE  
Optional. The balance type cascade name to use for Charge Type 1. If:  
• specified then the balance type name will be ignored.  
• not specified, the default balance type for this account will be used. |
| Balance Validity Modification      | TpInt32      | Name: P_CHS_BALANCE_VALIDITY_MODIFICATION  
Optional. The number of days when extending the balance expiry date. The new balance balance expiry date will be set to the current date and time plus the number of days entered here. Only those expiry dates within the determined balance type (entered balance type or default balance type if none entered), which would be increased by this modification, will be affected. Any expiry date within the determined balance type that is set to 'never expire' will not be affected by this request. |
| Wallet Validity Modification       | TpInt32      | Name: P_CHS_WALLET_VALIDITY_MODIFICATION  
Optional. The number of days when extending the wallet expiry date. The new wallet expiry date will be set to the current date and time plus the number of days entered here. The wallet expiry cannot be decreased by this modification. If the expiry date within the determined wallet type is set to 'never expire', it will not be affected by this request. |
### Chapter 11

#### Charging Session Functionality

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| Send SMS Flag                | TpBoolean      | Name: P_CHS_SEND_SMS_FLAG  
Optional. This can be set to ‘TRUE’ to ensure an SMS is sent when this reservation is confirmed on the billing engine (SMS only invoked if the ChargedType equals ‘1’, otherwise this parameter is ignored).  
Defaults to ‘FALSE’. |
| Allow Negative Balance Flag  | TpBoolean      | Name: P_CHS_ALLOW_NEGATIVE_BALANCE  
Optional. This can be set to ‘TRUE’ to set the ‘IgnoreWalletBalance’ flag in the UBE request message. Defaults to ‘FALSE’. |

**Returns**

Nothing.

**DirectDebitUnitReq()**

**Description**

This method is invoked on the IpChargingSession to perform one of the following:

- **Debit units from a subscriber’s wallet using the specified balance type or the specified balance type cascade.** If the balance type cascade name is specified, then the balance type name will be ignored. If there are insufficient funds in the specified balance type or across all balance types in the balance type cascade, then based on a parameter in the incoming request, the balance type, or in the case of the balance type cascade, then the final balance type in the balance type cascade will be allowed to be taken negative; this ‘allow negative balance’ indicator will be passed through to the UBE. If the ‘allow negative balance’ indicator is not set, for a seconds based charge if there is insufficient funds then the maximum number of seconds will be returned. Each unit has an associated cost on the billing engine and therefore a specified number of units translates into a fixed amount of monies to be debited from the subscriber’s wallet. The only supported unit-based reservations are seconds and billable events.

- **Extend the expiry date of the specified balance type by a specified number of days based on the rules detailed in Extending balance and wallet expiry dates (on page 125), albeit the ‘override balance wallet value’ flag is not supported for this request.** The number of days will be taken from the incoming P_CHS_BALANCE_VALIDITY_MODIFICATION parameter. Specifying the balance type cascade is not supported in conjunction with specifying the balance expiry extension parameter. A configuration item (defaulting to ‘false’) will cause the request to fail if the balance extension parameter exceeds the wallet extension parameter, or if the result of extending the balance expiry date exceeds the current or extended wallet expiry date; this expiry indicator will be passed through to the UBE.

- **Extend the expiry date of the specified (or default) wallet type by a specified number of days based on the rules detailed in Extending balance and wallet expiry dates, albeit the ‘override balance wallet value’ flag is not supported for this request.** The number of days will be taken from the incoming P_CHS_WALLET_VALIDITY_MODIFICATION parameter. A configuration item (defaulting to ‘false’) will cause the request to fail if the wallet extension parameter is less than the balance extension parameter or if the result of extending the wallet expiry date is less than the extended balance expiry date; this expiry indicator will be passed through to the UBE. If the balance expiry date is not being extended, then this check cannot be performed.
The specified balance type will be debited and the expiry date for the balance type and for the wallet will be set based on the rules detailed in *Extending balance and wallet expiry dates*, albeit the ‘override balance wallet value’ flag is not supported for this request.

If the balance type cascade is specified, then the balances will be debited in order of the cascade; specifying a balance expiry extension is not supported in conjunction with specifying a balance type cascade.

The current reservation, if one exists, will not be affected through invoking this request.

**Note:** The subscriber’s wallet may not be available on the local SCS database if the user is not a prepaid subscriber. For post-paid subscribers the user can be ‘cold-billed’ using the information extracted from the OSA EDR. If the MSISDN is not found when the chargeParty is decoded and the ‘AllowPostPaid’ flag is set to true and the rating tariff for this subscriber can be determined, then the request will return success. Otherwise, if the chargeParty fails to decode successfully and the ‘AllowPostPaid’ flag is set to false and/or the rating tariff for this subscriber can not be determined, then the request will return failure.

**Parameters**

Here is a list of the parameters for this method.

- `sessionId` (on page 161)
- `applicationDescription` (on page 160)
- `chargingParameters` (on page 160)
- `volumes` (on page 162)
- `requestNumber` (on page 161)

**Unit-Seconds based debit request**

The treatment and expected type of each element within each TpChargingParameter structure for a unit-seconds based direct delta is:-

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| ChargedParty       | TpString     | Name: P_CHS_CHARGE_PARTY  
ChargedType 1: The TpString will correspond to the MSISDN to charge.  
ChargedType 3: The TpString will correspond to the wallet ID and billing engine ID to charge. The wallet ID and billing engine ID is separated by '/'. |
| ChargedType        | TpInt32      | Name: P_CHS_CHARGE_TYPE  
Mandatory. Value showing type of ChargedParty.  
- 1 - MSISDN  
- 2 - reserved  
- 3 - Wallet ID |
| Calling Number     | TpString     | Name: P_CHS_CALLING_NUMBER  
Mandatory. Network Calling Number to be used for rating-tariff calculations. |
| Called Number      | TpString     | Name: P_CHS_CALLED_NUMBER  
Mandatory. Network Called Number to be used for rating-tariff calculations. |
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| Discount Override    | TplInt32     | Name: P_CHS_DISCOUNT_OVERRIDE  
Percentage discount to apply to final cost. Valid values are 0 – 10000 where these are in 1/100th of a percent. Therefore, 500 would equate to a 5% discount.                                                                                      |
|                      |              | The discount applied to the final cost will depend on the 'discountRuleType' parameter set in the CCS.ReservationHandler section of eserv.config file on the UBE. The following are valid values where the resulting discounted cost will be applied: |
|                      |              | - `discountRuleType = 'ServiceOverride' (use only OSA discount)`  
`finalCost = initialCost * (OSA discount)` |
|                      |              | - `discountRuleType = 'S*R*W'`  
`finalCost = initialCost * [OSA discount * CCS rating discount * CCS wallet discount]` |
|                      |              | - `discountRuleType = 'S+R+W'`  
`finalCost = initialCost * [OSA discount + CCS rating discount + CCS wallet discount]` |
|                      |              | - `discountRuleType = 'S+R*W'`  
`finalCost = initialCost * [OSA discount + CCS rating discount * CCS wallet discount]` |
|                      |              | - `discountRuleType = 'S*R+W'`  
`finalCost = initialCost * [OSA discount * CCS rating discount + CCS wallet discount]` |
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
|                              |              | • discountRuleType = ‘S+W*R’  
|                              |              | finalCost = initialCost * [OSA discount +  
|                              |              | CCS wallet discount * CCS rating  
|                              |              | discount]                                                                                                                                                                                                                                                                       |
|                              |              | • discountRuleType = ‘S+W+R’  
|                              |              | finalCost = initialCost * [OSA discount *  
|                              |              | CCS wallet discount + CCS rating  
|                              |              | discount]                                                                                                                                                                                                                                                                       |
|                              |              | • discountRuleType = ‘R+W*S’  
|                              |              | finalCost = initialCost * [CCS rating  
|                              |              | discount + CCS wallet discount * OSA  
|                              |              | discount]                                                                                                                                                                                                                                                                       |
|                              |              | • discountRuleType = ‘R+W+S’  
|                              |              | finalCost = initialCost * [CCS rating  
|                              |              | discount * CCS wallet discount + OSA  
|                              |              | discount]                                                                                                                                                                                                                                                                       |
| Wallet Type Name             | TpString     | Name: P_CHS_WALLET_TYPE  
|                              |              | Optional. The wallet type name to use for Charge Type 1. If not specified, the default wallet type for this account is used.                                                                                                                                                           |
| Balance Type Name            | TpString     | Name: P_CHS_BALANCE_TYPE  
|                              |              | Optional. The balance type name to use for Charge Type 1. If:  
|                              |              | • not specified, there will be no default balance type for this operation.  
|                              |              | • specified then a balance type cascade containing only this balance type will override the balance type cascade already defined for the rating definition.                                                                                                         |
| Balance Type Cascade Name    | TpString     | Name: P_CHS_BALANCE_TYPE_CASCADE  
|                              |              | Optional. The balance type cascade name to use for Charge Type 1. If specified, this balance type cascade will override the balance type cascade already defined for the rating definition.                                                                                           |
| Balance Validity Modification| TpInt32      | Name: P_CHS_BALANCE_VALIDITY_MODIFICATION  
|                              |              | Optional. The number of days when extending the balance expiry date. The new balance expiry date will be set to the current date and time plus the number of days entered here. Only those expiry dates within the determined balance type (entered balance type), which would be increased by this modification, will be affected. Any expiry date within the determined balance type that is set to 'never expire' will not be affected by this request.  
<p>|                              |              | The balance type parameter must be present for this parameter to be taken into account.                                                                                                                                                                                                                                               |</p>
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| Wallet Validity Modification      | TpInt32      | Name: P_CHS_WALLET_VALIDITY_MODIFICATION  
Optional. The number of days when extending the wallet expiry date. The new wallet expiry date will be set to the current date and time plus the number of days entered here. The wallet expiry cannot be decreased by this modification. If the expiry date within the determined wallet type is set to 'never expire', it will not be affected by this request. The balance type parameter must be present for this parameter to be taken into account. |
| Send SMS Flag                     | TpBoolean    | Name: P_CHS_SEND_SMS_FLAG  
Optional. This can be set to 'TRUE' to ensure an SMS is sent when this reservation is confirmed on the billing engine (SMS only invoked if the ChargedType equals '1', otherwise this parameter is ignored). Defaults to 'FALSE'. |
| Allow Negative Balance Flag       | TpBoolean    | Name: P_CHS_ALLOW_NEGATIVE_BALANCE  
Optional. This can be set to 'TRUE' to set the 'IgnoreWalletBalance' flag in the UBE request message. Defaults to 'FALSE'. |

**Unit-Billable event based debit request**

The treatment and expected type of each element within each TpChargingParameter structure for a unit-billable based direct delta is:-

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| ChargedParty     | TpString     | Name: P_CHS_CHARGE_PARTY  
Mandatory.  
ChargedType 1: The TpString will correspond to the MSISDN to charge.  
ChargedType 3: The TpString will correspond to the wallet ID and billing engine ID to charge. The wallet ID and billing engine ID is separated by '/'. |
| ChargedType      | TpInt32      | Name: P_CHS_CHARGE_TYPE  
Mandatory. Value showing type of ChargedParty.  
- 1 - MSISDN  
- 2 - reserved  
- 3 - Wallet ID |
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| Discount Override    | TpInt32      | **Name:** P_CHS_DISCOUNT_OVERRIDE  
Percentage discount to apply to final cost. Valid values are 0 – 10000 where these are in 1/100th of a percent. Therefore, 500 would equate to a 5% discount. The discount applied to the final cost will depend on the OSA discount entered here.  
**Note:** CCS discounts do not apply to billable events.                                                                                                                                         |
| Event Name           | TpString     | **Name:** P_CHS_EVENT_NAME  
Mandatory. Event Class and Name for rating tariff calculation. The TpString will correspond to the event class and event name to charge. The event class and event name are separated by '/'.                                                                                                                                                                                                                          |
| Wallet Type Name     | TpString     | **Name:** P_CHS_WALLET_TYPE  
Optional. The wallet type name to use for Charge Type 1. If not specified, the default wallet type for this account is used.                                                                                                                                                                                                                                                                                                                                 |
| Balance Type Name    | TpString     | **Name:** P_CHS_BALANCE_TYPE  
Optional. The balance type name to use for Charge Type 1. If:  
- not specified, there will be no default balance type for this operation.  
- specified then a balance type cascade containing only this balance type will override the balance type cascade already defined for the rating definition.                                                                                                                                                     |
| Balance Type Cascade | TpString     | **Name:** P_CHS_BALANCE_TYPE_CASCADE  
Optional. The balance type cascade name to use for Charge Type 1. If specified, then this balance type cascade will override the balance type cascade already defined for the billable-event definition.                                                                                                                                                                                                                       |
| Balance Validity     | TpInt32      | **Name:** P_CHS_BALANCE_VALIDITY_MODIFICATION  
Optional. The number of days when extending the balance expiry date. The new balance expiry date will be set to the current date and time plus the number of days entered here. Only those expiry dates within the determined balance type (entered balance type), which would be increased by this modification, will be affected. Any expiry date within the determined balance type that is set to 'never expire' will not be affected by this request. The balance type parameter must be present for this parameter to be taken into account. |
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| Wallet Validity Modification | TpInt32      | Name: P_CHS_WALLET_VALIDITY_MODIFICATION  
Optional. The number of days when extending the wallet expiry date. The new wallet expiry date will be set to the current date and time plus the number of days entered here. The wallet expiry cannot be decreased by this modification. If the expiry date within the determined wallet type is set to 'never expire', it will not be affected by this request. The balance type parameter must be present for this parameter to be taken into account. |
| Send SMS Flag                | TpBoolean    | Name: P_CHS_SEND_SMS_FLAG  
Optional. This can be set to 'TRUE' to ensure an SMS is sent when this reservation is confirmed on the billing engine (SMS only invoked if the ChargedType equals ‘1’, otherwise this parameter is ignored). Defaults to ‘FALSE’. |
| Allow Negative Balance Flag  | TpBoolean    | Name: P_CHS_ALLOW_NEGATIVE_BALANCE  
Optional. This can be set to 'TRUE' to set the 'IgnoreWalletBalance' flag in the UBE request message. Defaults to ‘FALSE’. |

**Returns**

Nothing.

**ExtendLifeTimeReq()**

**Description**

This method is invoked on the IpAccountManager to extend the lifetime of the reservation on both the OSA CHAM SCS gateway and on the billing engine for amount-based reservations only. The reservation will be extended by the value currently stored on the OSA CHAM SCS gateway entered as the 'ReservationLifeTimeHint' parameter of the TpChargingParameter structure for this reservation.

**Parameters**

Here is the parameter for this method.

- sessionID (on page 161)

**Returns**

Nothing.
GetAmountLeft()

Description
This method is invoked on the IpAccountManager to retrieve the amount stored in the internal table on the OSA CHAM SCS gateway remaining for this reservation. This method can only be invoked for amount-based reservations.

Parameters
Here is the parameter for this method.
• sessionID (on page 161)

Returns

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TpChargingPrice</td>
<td>This is a structure containing the currency and a TpAmount structure. The currency is returned by the OSA CHAM SCS gateway as an empty string. (See standard [5] for TpAmount encoding. The ‘Exponent’ of the TpAmount structure will always be set to ‘0’ and the ‘Number’ of the TpAmount structure will always be the number of small units of currency where the billing engine system currency is used).</td>
</tr>
</tbody>
</table>

GetLifeTimeLeft()

Description
This method is invoked on the IpAccountManager to retrieve the lifetime remaining on the OSA CHAM SCS gateway for this reservation. This method can be invoked for both amount-based and unit-based reservations.

Parameters
Here is the parameter for this method.
• sessionID (on page 161)

Returns

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TpInt32</td>
<td>An unsigned integer corresponding to the number of seconds that this reservation will remain active.</td>
</tr>
</tbody>
</table>

GetUnitLeft()

Description
This method is invoked on the IpAccountManager to retrieve the units stored in the internal table on the OSA CHAM SCS gateway remaining for this reservation. This method can only be invoked for unit-based reservations.
Parameters

Here is the parameter for this method.

- `sessionID` (on page 161)

Returns

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TpVolumeSet</td>
<td>A TpVolumeSet structure containing a single TpVolume which is composed of a TpUnitID value and a TpAmount structure. The TpUnitID value must be either P_CHS_UNIT_NUMBER (named events), or P_CHS_UNIT_SECONDS (time-based in seconds). (See standard [5] for TpAmount encoding. The ‘Exponent’ of the TpAmount structure will always be set to ‘0’ and the ‘Number’ of the TpAmount structure will always be the number of units (named events or seconds) ).</td>
</tr>
</tbody>
</table>

RateReq()

Description

This method is invoked on the IpChargingManager to determine the individual rates that are associated with this user’s account. The rates have the associated discount applied prior to returning them to the third-party client application. This method can only be invoked for unit-based reservations.

Parameters

Here is a list of the parameters for this method.

- `sessionID` (on page 161)
- `chargingParameters` (on page 160)

TpChargingParameter structure

The treatment and expected type of each element within each TpChargingParameter structure for rate request is:-

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ChargedParty</td>
<td>TpString</td>
<td>Name: P_CHS_CHARGE_PARTY Mandatory. ChargedType 1: The TpString will correspond to the MSISDN to charge. ChargedType 3: The TpString will correspond to the wallet ID and billing engine ID to charge. The wallet ID and billing engine ID is separated by ‘/’.</td>
</tr>
<tr>
<td>ChargedType</td>
<td>TpInt32</td>
<td>Name: P_CHS_CHARGE_TYPE Mandatory. Value showing type of ChargedParty. 1 - MSISDN 2 - reserved 3 - Wallet ID</td>
</tr>
<tr>
<td>Element Name</td>
<td>Element Type</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Calling Number       | TpString     | **Name:** P_CHS_CALLING_NUMBER  
Optional. Network Calling Number to be used for rating-tariff calculations |
| Called Number        | TpString     | **Name:** P_CHS_CALLED_NUMBER  
Optional. Network Called Number to be used for rating-tariff calculations. |
| Discount Override    | TpInt32      | **Name:** P_CHS_DISCOUNT_OVERRIDE  
Percentage discount to apply to final cost. Valid values are 0 – 10000 where these are in 1/100th of a percent. Therefore, 500 would equate to a 5% discount. The discount applied to the final cost will depend on the ‘overrideDiscountType’ parameter set in the CCS.ReservationHandler section of eserv.config file found on the BE. The following are valid values where the resulting discounted cost will be applied:  
- overrideDiscountType = ‘Override’ (ignore OSA discount)  
  finalCost = initialCost * (CCS discount for seconds only)  
- overrideDiscountType = ‘Compound’  
  finalCost = initialCost * [CCS discount for seconds only * OSA discount]  
- overrideDiscountType = ‘Cumulative’  
  finalCost = initialCost * [CCS discount for seconds only + OSA discount] |
| Event Name           | TpString     | **Name:** P_CHS_EVENT_NAME  
Optional. Event Class and Name for rating tariff calculation. The TpString will correspond to the event class and event name to charge. The event class and event name will be separated by '/'. |
| Wallet Type Name     | TpString     | **Name:** P_CHS_WALLET_TYPE  
Optional. The wallet type to use for Charge Type 1. If not specified, the default wallet type for this account is used. |

**Returns**

Nothing.
Release()

Description

This method will be invoked on the IpAccountManager to release the specified charging session. This will result in the following events on the OSA CHAM SCS gateway:

1. Any amounts (monies or units) that have been debited from the current reservation will be confirmed on the billing engine.
2. Any amount remaining in the current reservation will be returned to the user’s account and be available for alternative reservations from the third-party client application.
3. If any funds are confirmed on the billing engine during this transaction then an OSA CDR (Type 21) will be created and if the current reservation is unit-seconds based then a CCS CDR (Type 24) will be created, otherwise, if the current reservation is unit-named event based, then a CCS CDR (Type 25) will be created.
4. If no funds are confirmed on the billing engine during this transaction then an OSA CDR (Type 22) will be created and there will be no corresponding CCS CDRs created.
5. If any funds are confirmed on the billing engine during this transaction, then a SMS may be sent to the user with the confirmation details of this transaction.
6. The charging session on the OSA CHAM SCS gateway will be removed the internal table of active sessions. This charging session will no longer be valid for any requests from the third-party client application.

Parameters

Here is a list of the parameters for this method.

- sessionID (on page 161)
- requestNumber (on page 161)

Returns

Nothing.

ReserveAmountReq()

Description

This method is invoked on the IpChargingSession to perform one of the following:

- This method is invoked on the IpChargingSession to make an initial monies-based reservation.
  A monies-based reservation will reserve monies from the subscriber’s wallet using cash balance types only and store this amount in an internal table on the OSA CHAM SCS gateway to be debited and/or credited using the credit(debit)AmountReq() methods. The incoming request will specify the number of UBE small currency monies to be reserved. Typically this method is used for balance types where the unit type of the balance type is 'Cash'; if the balance type cascade name is specified in the incoming request then only balance types where the unit type of the balance type is 'Cash' will be available in the balance type cascade.
- This method is invoked on the IpChargingSession to make an initial time-based reservation.
A time-based reservation will reserve time from the subscriber's wallet using time balance types only and store this amount in an internal table on the OSA CHAM SCS gateway to be debited and/or credited using the credit(debit)AmountReq() methods. The incoming request will specify the number of seconds to be reserved. The internal UBE time balance units is 100ths seconds so a conversion will be required. The balance type name must be specified in the incoming request where the unit type of the balance type is 'Time' and the allowNonCashBalanceForAmountMethods (on page 18) configuration parameter must be 'true' for time-based reservations to be supported. If the balance type cascade name is specified in the incoming request then the amount specified will be assumed to be monies and only balance types where the unit type of the balance type is 'Cash' will be available in the balance type cascade.

- This method is invoked on the IpChargingSession to make an initial non-cash or time-based reservation.

A non-cash or time-based reservation will reserve time from the subscriber's wallet using non cash or time balance types only and store this amount in an internal table on the OSA CHAM SCS gateway to be debited and/or credited using the credit(debit)AmountReq() methods. The incoming request will specify the amount to be reserved; the internal UBE units are mapped directly to the specified amount. The balance type name must be specified in the incoming request where the unit type of the balance type is none 'Cash' or 'Time' and the allowNonCashBalanceForAmountMethods configuration parameter must be 'true' for non-cash or time-based reservations to be supported. If the balance type cascade name is specified in the incoming request then the amount specified will be assumed to be monies and only balance types where the unit type of the balance type is 'Cash' will be available in the balance type cascade.

- Prior to making a confirmation against the reserved amount it is necessary to have debited an amount from the reservation. It is not possible to credit an amount towards a reservation unless prior debits greater to or equal to the credited amount have already been made - it is not possible to credit a subscriber's wallet through the reservation-confirmation process. If a reservation already exists for this user on the OSA CHAM SCS gateway, then invoking this method will result in a subsequent reservation of the specified amount for this user on the billing engine and incrementing the amount stored in this reservation on the OSA CHAM SCS gateway. If an existing unit-based reservation already exists for this user on the OSA CHAM SCS gateway then this request will fail, i.e. reservation types cannot be mixed within an active reservation. If the amount-based reservation is first closed, then a unit-based reservation can be created within the same charging session. When a reservation is attempted by a subscriber on the OSA_CHAM_SCS this reservation may fail if the maximum concurrent access to the subscriber's wallet would be exceeded through successfully creating this reservation. This maximum concurrent access parameter is a current property of the subscriber's wallet and is used by reservation attempts of all types on the subscriber's wallet, i.e. voice calls, other amount-based or unit-based reservations through the OSA_CHAM SCS or billable event reservations using other applications. The amount of the reservation returned to the client will not be affected by the maximum concurrent access parameter i.e the OSA CHAM SCS will not divide the amount returned to the client by the maximum concurrent access parameter.

Parameters

Here is a list of the parameters for this method.

- **sessionID** (on page 161)
- **applicationDescription** (on page 160)
- **chargingParameters** (on page 160)
- **preferredAmount** (on page 161)
- **minimumAmount** (on page 161)
- **requestNumber** (on page 161)
## TpChargingParameter structure

The treatment and expected type of each element within each TpChargingParameter structure is:

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| ChargedParty          | TpString     | **Name:** P_CHS_CHARGE_PARTY
Mandatory.
ChargedType 1: The TpString will correspond to the MSISDN to charge.
ChargedType 3: The TpString will correspond to the wallet ID and billing engine ID to charge. The wallet ID and billing engine ID are separated by '/'. |
| ChargedType           | TpInt32      | **Name:** P_CHS_CHARGE_TYPE
Mandatory. Value showing type of ChargedParty.
- 1 - MSISDN
- 2 - reserved
- 3 - Wallet ID |
| Discount Override     | TpInt32      | **Name:** P_CHS_DISCOUNT_OVERRIDE
Percentage discount to apply to final cost. Valid values are 0 – 10000 where these are in 1/100th of a percent.
Therefore, 500 would equate to a 5% discount.
The discount applied to the final cost will depend solely on the OSA discount entered here. |
| ReservationLifeTimeHint | TpInt32   | **Name:** P_CHS_RESERVATION_LIFETIME_HINT
Optional. The lifetime of the reservation in seconds - set on both the OSA CHAM SCS gateway and the billing engine server. If the reservation times out on both the SCS and the BE, outstanding debits are not confirmed on the billing engine. The value entered must be greater than '0'. If not specified, then the default lifetime for the reservation will be '30' seconds.
An external client should not set this value to more than 24 hours to ensure that a series of outstanding concurrent reservations would not accumulate after a period of network instability. The client should set this value to the period normally associated with use period of the charge. For example charging for a bus ticket maybe instant, but a movie download may take a period of hours.
For a subsequent reservation request, if the reservation lifetime is set to '0', then the reservation will be extended by the 'ReservationLifeTimeHint' currently stored on the OSA CHAM SCS gateway from the initial reservation request. |
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| Wallet Type Name          | TpString     | Name: P_CHS_WALLET_TYPE  
Optional. The wallet type to use for Charge Type 1. If not specified, the default wallet type for this account is used. |
| Balance Type Name         | TpString     | Name: P_CHS_BALANCE_TYPE  
Optional. The balance type to use for Charge Type 1. If not specified, the default balance type for this account is used. |
| Balance Type Cascade Name | TpString     | Name: P_CHS_BALANCE_TYPE_CASCADE  
Optional. The balance type cascade name to use for Charge Type 1. If:  
- specified then the balance type name will be ignored.  
- not specified, the default balance type for this account will be used. |
| Send SMS Flag             | TpBoolean    | Name: P_CHS_SEND_SMS_FLAG  
Optional. This can be set to 'TRUE' to ensure an SMS is sent when this reservation is confirmed on the billing engine (SMS only invoked if the ChargedType equals '1', otherwise this parameter is ignored).  
Defaults to 'FALSE'. |

**Returns**

Nothing.

**ReserveUnitReq()**

**Description**

This method is invoked on the IpChargingSession to make an initial unit-based reservation. Each unit has an associated cost on the billing engine and therefore a specified number of units translate into a fixed amount of monies against which the reservation can be made on the subscriber's wallet. The only supported unit-based reservations are seconds and named events, where unit type cannot be changed during the lifetime of a reservation.

For unit-based reservation the OSA CHAM SCS gateway has no knowledge of monies and deals solely with the unit of the reservation. The number of units reserved is stored in an internal table on the OSA CHAM SCS gateway to be debited and/or credited using the credit(debit)UnitReq() methods. Prior to making a confirmation against the reserved units it is necessary to have debited units from the reservation. It is not possible to credit units towards a reservation unless prior debits greater to or equal to the credited units have already been made - it is not possible to credit a subscriber's wallet through the reservation-confirmation process.

If a reservation already exists for this user on the OSA CHAM SCS gateway, then invoking this method will result in a subsequent reservation of units for this user on the billing engine and incrementing the number of units stored in this reservation on the OSA CHAM SCS gateway. If an existing amount-based reservation already exists for this user on the OSA CHAM SCS gateway then this request will fail i.e. reservation types cannot be mixed within an active reservation. If the unit-based reservation is first closed, then an amount-based reservation can be created within the same charging session.
When a reservation is attempted by a subscriber on the OSA_CHAM_SCS this reservation may fail if the maximum concurrent access to the subscriber's wallet would be exceeded through successfully creating this reservation. This maximum concurrent access parameter is a current property of the subscriber's wallet and is used by reservation attempts of all types on the subscriber's wallet, i.e. voice calls, other amount-based or unit-based reservations through the OSA_CHAM SCS or billable-event reservations using other applications. The amount of the reservation returned to the client may be affected by the maximum concurrent access parameter in the same manner as currently seen for voice calls or billable-event reservations as follows: the amount returned for voice calls or reserve-unit requests for seconds-based reservations will be affected by the values configured on the UBE for the 'CCS.reservationHandler.maxReservationLength' and 'CCS.reservationHandler.greedyReservationLengthLimit' where the reservation length returned will be recalculated as the lesser of the maxReservationLength or the amount that the subscriber can afford if the greedyReservationLengthLimit is not initially satisfied.

Parameters

Here is a list of the parameters for this method.

- **sessionId** (on page 161)
- **applicationDescription** (on page 160)
- **chargingParameters** (on page 160)
- **volumes** - see Parameters (on page 155) and Parameters (on page 158).
- **requestNumber** (on page 161)

### Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>volumes</td>
<td>a TpVolumeSet structure containing a single TpVolume which is composed of a TpUnitID value and a TpAmount structure. The TpUnitID value is P_CHS_UNIT_SECONDS. (See standard [5] for TpAmount encoding. The ‘Exponent’ of the TpAmount structure will always be set to ‘0’ and the ‘Number’ of the TpAmount structure will always be ignored by this reservation). The ‘Number’ field of the TpAmount structure must be greater than zero.</td>
</tr>
</tbody>
</table>

The treatment and expected type of each element within each TpChargingParameter structure for a unit-seconds based reservation is:-

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| ChargedParty   | TpString     | Name: P_CHS_CHARGE_PARTY  
Mandatory.  
ChargedType 1: The TpString will correspond to the MSISDN to charge.  
ChargedType 3: The TpString will correspond to the wallet ID and billing engine ID to charge. The wallet ID and billing engine ID is separated by ‘/’. |
| ChargedType    | TpInt32      | Name: P_CHS_CHARGE_TYPE  
Mandatory. Value showing type of ChargedParty.  
- 1 - MSISDN  
- 2 - reserved  
- 3 - Wallet ID |
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| Calling Number       | TpString     | **Name:** P\_CHS\_CALLING\_NUMBER  
Mandatory. Network Calling Number to be used for rating-tariff calculations. |
| Called Number        | TpString     | **Name:** P\_CHS\_CALLED\_NUMBER  
Mandatory. Network Called Number to be used for rating-tariff calculations. |
| Discount Override    | TpInt32      | **Name:** P\_CHS\_DISCOUNT\_OVERRIDE  
Percentage discount to apply to final cost. Valid values are 0 – 10000 where these are in 1/100th of a percent.  
Therefore, 500 would equate to a 5% discount.  
The discount applied to the final cost will depend on the 'discountRuleType' parameter set in the CCS.ReservationHandler section of eserv.config file on the UBE. The following are valid values where the resulting discounted cost will be applied:  
   - discountRuleType = 'ServiceOverride'  
      (use only OSA discount)  
      \[ \text{finalCost} = \text{initialCost} \times \text{OSA discount} \]  
   - discountRuleType = 'S*R*W'  
      \[ \text{finalCost} = \text{initialCost} \times [\text{OSA discount} \times \text{CCS rating discount} \times \text{CCS wallet discount}] \]  
   - discountRuleType = 'S+R+W'  
      \[ \text{finalCost} = \text{initialCost} \times [\text{OSA discount} + \text{CCS rating discount} + \text{CCS wallet discount}] \]  
   - discountRuleType = 'S+R*W'  
      \[ \text{finalCost} = \text{initialCost} \times [\text{OSA discount} + \text{CCS rating discount} \times \text{CCS wallet discount}] \] |
### Chapter 11, Charging Session Functionality

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| discountRuleType = 'S*R+W'  
finalCost = initialCost * [OSA discount * CCS rating discount + CCS wallet discount]  |
| discountRuleType = 'S+W*R'  
finalCost = initialCost * [OSA discount + CCS wallet discount * CCS rating discount]  |
| discountRuleType = 'S+W+R'  
finalCost = initialCost * [OSA discount * CCS wallet discount + CCS rating discount]  |
| discountRuleType = 'R+W*S'  
finalCost = initialCost * [CCS rating discount + CCS wallet discount * OSA discount]  |
| discountRuleType = 'R+W+S'  
finalCost = initialCost * [CCS rating discount * CCS wallet discount + OSA discount]  |

| ReservationLifeTimeHint | TpInt32 | Name: P_CHS_RESERVATION_LIFETIME_HINT  
Optional. The lifetime of the reservation in seconds - set on both the OSA CHAM SCS gateway and the billing engine server. A hint is specified as the billing server may choose to ignore this lifetime. If the reservation times out on both the SCS and the BE, outstanding debits are not confirmed on the billing engine. If not specified, then the default lifetime passed to the billing engine for the reservation is '30' seconds.  
For an initial reservation, the reservation lifetime is set to the number of units (seconds) that the billing engine returns in the acknowledgement (this will not be the number of units specified in the volumes parameter of the original request as this value is ignored). If the lifetime requested is less than the billing engine minimum call length then the acknowledgement will return a reservation of zero. This will close the session immediately.  
For a subsequent reservation request, this parameter is ignored and the reservation lifetime is extended by the number of units (seconds) that the billing engine returns in the acknowledgement for the (this will not be the number of units specified in the volumes parameter of the original request as this value is ignored). |
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| Wallet Type Name     | TpString      | Name: P_CHS_WALLET_TYPE  
Optional. The wallet type name to use for Charge Type 1. If not specified, the default wallet type for this account is used. |
| Send SMS Flag        | TpBoolean     | Name: P_CHS_SEND_SMS_FLAG  
Optional. This can be set to 'TRUE' to ensure an SMS is sent when this reservation is confirmed on the billing engine (SMS only invoked if the ChargedType equals ‘1’, otherwise this parameter is ignored). Defaults to ‘FALSE’. |

**Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>volumes</td>
<td>A TpVolumeSet structure containing a single TpVolume which is composed of a TpUnitID value and a TpAmount structure. The TpUnitID value must be P_CHS_UNIT_NUMBER. (See standard [5] for TpAmount encoding. The ‘Exponent’ of the TpAmount structure will always be set to ‘0’ and the ‘Number’ of the TpAmount structure will always be the number of named events to be used for this reservation). The ‘Number’ field of the TpAmount structure must be greater than zero.</td>
</tr>
</tbody>
</table>

The treatment and expected type of each element within each TpChargingParameter structure for a unit-named event based reservation is:-

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| ChargedParty         | TpString      | Name: P_CHS_CHARGE_PARTY  
Mandatory.  
ChargedType 1: The TpString will correspond to the MSISDN to charge.  
ChargedType 3: The TpString will correspond to the wallet ID and billing engine ID to charge. The wallet ID and billing engine ID is separated by ‘/’. |
| ChargedType          | TpInt32       | Name: P_CHS_CHARGE_TYPE  
Mandatory. Value showing type of ChargedParty.  
- 1 - MSISDN  
- 2 - reserved  
- 3 - Wallet ID |
| Discount Override    | TpInt32       | Name: P_CHS_DISCOUNT.Override  
Percentage discount to apply to final cost. Valid values are 0 – 10000 where these are in 1/100th of a percent. Therefore, 500 would equate to a 5% discount. The discount applied to the final cost will depend solely on the OSA discount entered here.  
Note: CCS discounts do not apply to billable events. |
### Element Name | Element Type | Description
--- | --- | ---
Event Name | TpString | Name: P_CHS_EVENT_NAME  
Mandatory. Event Class and Name for rating tariff calculation.  
The TpString will correspond to the event class and event name to charge. The event class and event name are separated by '/'.

ReservationLifeTimeHint | TpInt32 | Name: P_CHS_RESERVATION_LIFETIME_HINT  
Optional. The lifetime of the reservation in seconds - set on both the OSA CHAM SCS gateway and the billing engine server. A hint is specified as the billing server may choose to ignore this lifetime. If the reservation times out on both the SCS and the BE, outstanding debits are not confirmed on the billing engine. If not specified, then the default lifetime passed to the billing engine for the reservation is '30' seconds.  
For an initial reservation, if the value entered is less than '0', then the default lifetime requested from the billing engine for the initial reservation will be '30' seconds.  
For a subsequent reservation request, this parameter is ignored and the reservation lifetime cannot be extended.

Wallet Type | TpString | Name: P_CHS_WALLET_TYPE  
Optional. The wallet type to use for Charge Type 1. If not specified, the default wallet type for this account is used.

Send SMS Flag | TpBoolean | Name: P_CHS_SEND_SMS_FLAG  
Optional. This can be set to 'TRUE' to ensure an SMS is sent when this reservation is confirmed on the billing engine (SMS only invoked if the ChargedType equals '1', otherwise this parameter is ignored). Defaults to 'FALSE'.

### Returns
Nothing.

### Charging Session Parameters

**Introduction**
Here are the parameters used for this functionality.
amount
Description: A TpChargingPrice structure containing the currency and a TpAmount structure. The currency will be ignored by the OSA CHAM SCS gateway. (See standard [5] for TpAmount encoding. The ‘Exponent’ of the TpAmount structure will always be set to ‘0’ and the ‘Number’ of the TpAmount structure will always be one of: UBE small currency monies; time in seconds; or an amount for a non cash or time balance type. For a:

- CreditAmountReq, or DebitAmountReq, the ‘Number’ field of the TpAmount structure must be greater than zero and less than or equal to the amount:
  - already debited against this reservation (credit), or
  - stored in this reservation (debit).
- DirectCreditAmountReq, or DirectDebitAmountReq, the ‘Number’ field of the TpAmount structure must be greater than or equal to zero and less than the maximum cost value defined for a single amount-based request. If the amount is set to zero then the wallet and balance dates can be changed without affecting the account balance.

Note: To summarise, the amount is one of: UBE small currency monies; time in seconds; or an amount for a non cash or time balance type that the third-party client application wishes to credit/debit:

- against the reservation on the OSA CHAM SCS gateway (CreditAmountReq, or DebitAmountReq), or
- towards the subscriber’s wallet on the billing engine (DirectCreditAmountReq, or DirectDebitAmountReq)

applicationDescription
Description: A TpApplicationDescription structure. This consists of:

- TpDateAndTime structure (See standard [2] for TpDateAndTime encoding)
- descriptive text string.

The text string is included in the CDRs (Type 21 or 22) that is generated by the OSA CHAM SCS gateway. Otherwise the parameter is ignored by this method.

appChargingSession
Description: The reference to an IpAppChargingSession object.

ChargingEventCriteria
Description: A TpChargingEventCriteria, which contains a set of each of TpAddress structures and TpChargingEventName values. (See standard [4] for TpChargingEventName encoding.)

chargingParameters
Description: A TpChargingParameterSet containing a single TpChargingParameter structure.
Chapter 11

**closeReservation**

**Description:** A boolean indicating whether the reservation should be closed after this request has completed. Closing the reservation may result in debiting the user’s account on the billing engine: all monies debited against the current OSA CHAM SCS reservation is confirmed; and all monies, which are still available in this reservation on the OSA CHAM SCS gateway, will now become available for alternative reservations. The current reservation on the OSA CHAM SCS gateway will then become invalid for all subsequent requests from the third-party client application. The current charging session will remain active and the third-party client application may choose to make additional reservations from this account on the billing engine. Failing to close this reservation will keep the reservation active for subsequent credit or debit amount requests.

**minimumAmount**

**Description:** A TpChargingPrice structure containing the currency and a TpAmount structure. The currency is ignored by the OSA CHAM SCS gateway. (See standard [5] for TpAmount encoding. The ‘Exponent’ of the TpAmount structure will always be set to ‘0’ and the ‘Number’ of the TpAmount structure will always be the number of small units of currency where the billing engine system currency is used). The ‘Number’ field of the TpAmount structure must be greater than zero.

**Note:** To summarise, the minimum amount is the minimum number in small units of currency that the third-party client application wishes to reserve on the billing engine.

**preferredAmount**

**Description:** A TpChargingPrice structure containing the currency and a TpAmount structure. The currency is ignored by the OSA CHAM SCS gateway. (See standard [5] for TpAmount encoding. The ‘Exponent’ of the TpAmount structure will always be set to ‘0’ and the ‘Number’ of the TpAmount structure will always be the number of small units of currency where the billing engine system currency is used). The ‘Number’ field of the TpAmount structure must be greater than the minimum amount and less than the maximum cost value defined for a single amount-based reservation.

**Note:** To summarise, the preferred amount is the preferred number in small units of currency that the third-party client application wishes to reserve on the billing engine.

**requestNumber**

**Description:** The request number (unsigned integer) of the individual request within this charging session.

**sessionID**

**Description:** The session ID (unsigned integer) of this charging session.
volumes

Description:

A TpVolumeSet structure containing a single TpVolume which is composed of a TpUnitID value and a TpAmount structure.

The TpUnitID value must be either:

- P_CHS_UNIT_NUMBER (named events) or
- P_CHS_UNIT_SECONDS (time-based in seconds).

(See standard [5] for TpAmount encoding. The ‘Exponent’ of the TpAmount structure will always be set to ‘0’ and the ‘Number’ of the TpAmount structure will always be the number of units (named events or seconds) to be used for this reservation).

The ‘Number’ field of the TpAmount structure must be greater than zero.
Overview

Introduction

The set of methods provided by the Charging Session object is extended to allow a group of applications to use the same charging session, for example when a stateless middleware client is used between the network element and the Charging Gateway.

To provide this functionality the standard set of OSA methods are extended to allow a call-back reference to be specified with each request, to be used for response from this charging session until such time it is modified (for example by another request message providing new call-back information).

Please note that single shot messages are included in this section to allow a single charging session from the pool to be reused by many applications. Without these methods the response to the single shot message will be returned to the application reference given when creating the charging session.

The IpChargingSession object resides on the OSA CHAM SCS gateway and provides the following methods that can be invoked by the third-party client application.

In this chapter

This chapter contains the following topics.

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DebitAmountWithAppChargingSessionReq() ............................................................... 165
DebitUnitWithAppChargingSessionReq() ................................................................. 166
DirectCreditAmountWithAppChargingSessionReq() .................................................. 166
DirectCreditUnitWithAppChargingSessionReq() ...................................................... 172
DirectDebitAmountWithAppChargingSessionReq() ................................................... 177
DirectDebitUnitWithAppChargingSessionReq() ....................................................... 181
ExtendLifeTimeWithAppChargingSessionReq() ......................................................... 187
GetAmountLeftWithAppChargingSession() ............................................................... 188
GetLifeTimeLeftWithAppChargingSession() ............................................................. 188
GetUnitLeftWithAppChargingSession() ................................................................. 189
RateWithAppChargingSessionReq() ...................................................................... 189
ReserveAmountWithAppChargingSessionReq() ......................................................... 191
ReserveUnitWithAppChargingSessionReq() ............................................................. 195

CreditAmountWithAppChargingSessionReq()

Description

This method is invoked on the IpChargingSession to perform one of the following:
- This method is invoked on the IpAccountManager to credit monies towards an existing reservation already made on the OSA CHAM SCS gateway. The incoming request will specify the number of UBE small currency monies to be credited.
- This method is invoked on the IpAccountManager to credit time towards an existing reservation already made on the OSA CHAM SCS gateway. The incoming request will specify the number of seconds to be credited, the internal UBE time balance units is 100ths seconds so a conversion will be required.
- This method is invoked on the IpAccountManager to credit non-cash or time towards an existing reservation already made on the OSA CHAM SCS gateway. The incoming request will specify the amount to be credited; the internal UBE units are mapped directly to the specified amount.
- If a reservation does not exist for this user, or the reservation has expired then this request will fail. It is not possible to credit an amount towards a reservation unless debits greater to or equal to the credited amount have already been debited – it is not possible to credit a subscriber’s wallet through the reservation-confirmation process.

This method also set the Application Charging Session reference - all call-backs from the specified session will be sent to the new reference.

**Parameters**

Here is a list of the parameters for this method.

- `sessionID` (on page 161)
- `appChargingSession` (on page 160)
- `applicationDescription` (on page 160)
- `amount` (on page 160)
- `closeReservation` (on page 161)
- `requestNumber` (on page 161)

*Note:* The `requestNumber` parameter may be given the value of zero (0) and then the CHAM will use the currently stored value for the request number.

**Returns**

Nothing.

**CreditUnitWithAppChargingSessionReq()**

**Description**

This method is invoked on the IpChargingSession to credit units towards an existing reservation already made on the OSA CHAM SCS gateway. If a reservation does not exist for this user, or the reservation has expired, then this request will fail. It is not possible to credit units towards a reservation unless debits greater to or equal to the credited units have already been debited – it is not possible to credit a subscriber’s wallet through the reservation-confirmation process.

This method will also set the Application Charging Session reference – all call-backs from the specified session will be sent to the new reference.

**Parameters**

Here is a list of the parameters for this method.

- `sessionID` (on page 161)
- `appChargingSession` (on page 160)
- `applicationDescription` (on page 160)
volumes (on page 162)
closeReservation (on page 161)
requestNumber (on page 161)

Note: The requestNumber parameter may be given the value of zero (0) and then the CHAM will use the currently stored value for the request number.

Returns
Nothing.

DebitAmountWithAppChargingSessionReq()

Description
This method will be invoked on the IpChargingSession to perform one of the following:

- This method will be invoked on the IpAccountManager to debit monies towards an existing reservation already made on the OSA CHAM SCS gateway. The incoming request will specify the number of UBE small currency monies to be debited.
- This method will be invoked on the IpAccountManager to debit time towards an existing reservation already made on the OSA CHAM SCS gateway. The incoming request will specify the number of seconds to be debited, the internal UBE time balance units is 100ths seconds so a conversion will be required.
- This method will be invoked on the IpAccountManager to debit non cash or time towards an existing reservation already made on the OSA CHAM SCS gateway. The incoming request will specify the amount to be debited; the internal UBE units are mapped directly to the specified amount.
- If a reservation does not exist for this user, or the reservation has expired then this request will fail.

This method also sets the Application Charging Session reference – all call-backs from the specified session will be sent to the new reference.

Parameters
Here is a list of the parameters for this method.

- sessionID (on page 161)
- appChargingSession (on page 160)
- applicationDescription (on page 160)
- amount (on page 160)
- closeReservation (on page 161)
- requestNumber (on page 161)

Note: The requestNumber parameter may be given the value of zero (0) and then the CHAM will use the currently stored value for the request number.

Returns
Nothing.
DebitUnitWithAppChargingSessionReq()

Description

This method will be invoked on the IpChargingSession to debit units from an existing reservation already made on the OSA CHAM SCS gateway. If a reservation does not exist for this user, or the reservation has expired then this request will fail.

This method also sets the Application Charging Session reference - all call-backs from the specified session will be sent to the new reference.

Parameters

Here is a list of the parameters for this method.

- sessionID (on page 161)
- appChargingSession (on page 160)
- applicationDescription (on page 160)
- volumes (on page 162)
- closeReservation (on page 161)
- requestNumber (on page 161)

Note: The requestNumber parameter may be given the value of zero (0) and then the CHAM will use the currently stored value for the request number.

Returns

Nothing.

DirectCreditAmountWithAppChargingSessionReq()

Description

This method is invoked on the IpChargingSession to perform one of the following:

- This method is invoked on the IpChargingSession to credit monies towards a subscriber's wallet using cash balance types only. The specified (or default) balance type or the specified balance type cascade (the UBE will credit the first balance type in the balance type cascade) is used. The UBE will create the specified balance type or first balance type in the balance type cascade if the balance type does not already exist in the subscriber's wallet. If the balance type cascade name is specified then the balance type name is ignored. The incoming request will specify the number of UBE small currency monies to be credited. Typically this method is used for balance types where the unit type of the balance type is 'Cash'; if the balance type cascade name is specified in the incoming request then only balance types where the unit type of the balance type is 'Cash' is available in the balance type cascade.
- This method is invoked on the IpChargingSession to credit time towards a subscriber's wallet using time balance types. The incoming request will specify the number of seconds to be credited, the internal UBE time balance units is 100ths seconds so a conversion is required. The balance type name must be specified in the incoming request where the unit type of the balance type is 'Time' and the allowNonCashBalanceForAmountMethods (on page 18) configuration parameter must be 'true' for time-based reservations to be supported. If the balance type cascade name is specified in the incoming request then the amount specified is assumed to be monies and only balance types where the unit type of the balance type is 'Cash' is available in the balance type cascade.
- This method is invoked on the IpChargingSession to credit an amount towards a subscriber's wallet using non-cash or time balance types. The incoming request will specify the amount to be credited;
the internal UBE units are mapped directly to the specified amount. The balance type name must be specified in the incoming request where the unit type of the balance type is non 'Cash' or 'Time' and the allowNonCashBalanceForAmountMethods configuration parameter must be 'true' for non cash or time-based reservations to be supported. If the balance type cascade name is specified in the incoming request then the amount specified is assumed to be monies and only balance types where the unit type of the balance type is 'Cash' is available in the balance type cascade.

- Extend the expiry date of the specified (or default) balance type by a specified number of days based on the rules detailed in Extending balance and wallet expiry dates (on page 125). The number of days is taken from the incoming P_CHS_BALANCE_VALIDITY_MODIFICATION parameter or if not specified and the PI_XDATE_EXTENSION table is installed then determine the appropriate balance extension from this table. If the number of days is not specified in the incoming P_CHS_BALANCE_VALIDITY_MODIFICATION parameter and the PI_XDATE_EXTENSION table is not installed then no default value is used. Specifying the balance type cascade is not supported in conjunction with specifying the balance expiry parameter. A configuration item (defaulting to 'false') will cause the request to fail if the balance extension parameter exceeds the wallet extension parameter or if the result of extending the balance expiry date exceeds the current or extended wallet expiry date; this expiry indicator is passed through to the UBE.

- Extend the expiry date of the specified (or default) wallet type by a specified number of days based on the rules detailed in Extending balance and wallet expiry dates. The number of days is taken from the incoming P_CHS_WALLET_VALIDITY_MODIFICATION parameter or if not specified and the PI_YDATE_EXTENSION table is installed then determine the appropriate wallet extension from this table. If the number of days is not specified in the incoming P_CHS_WALLET_VALIDITY_MODIFICATION parameter and the PI_YDATE_EXTENSION table is not installed then no default value is used. A configuration item (defaulting to 'false') will cause the request to fail if the wallet extension parameter is less than the balance extension parameter or if the result of extending the wallet expiry date is less than the extended balance expiry date; this expiry indicator is passed through to the UBE. If the balance expiry date is not being extended then this check cannot be performed.

- Set the value of the specified (or default) balance type to a specific value where the UBE will create the specified balance type if the balance type does not already exist in the subscriber's wallet. The incoming P_CHS_OVERRIDE_BALANCE_VALUE parameter will indicate the value supplied is an override and not to be used to credit an existing balance type; this override indicator is passed through to the UBE.

- Set the expiry date of the specified (or default) balance type to a specific date (value taken from the incoming P_CHS_BALANCE_VALIDITY_DATE parameter). A configuration item (defaulting to 'false') will cause the request to fail if the balance specific date parameter exceeds the wallet specific date parameter; this expiry indicator is passed through to the UBE.

- Set the expiry date of the specified (or default) wallet type to a specific date (value taken from the incoming P_CHS_WALLET_VALIDITY_DATE parameter). A configuration item (defaulting to 'false') will cause the request to fail if the wallet specific date parameter is less than the balance specific date parameter; this expiry indicator is passed through to the UBE. If the balance expiry date is not specified then this check cannot be performed.

- Recharge a wallet using a voucher (voucher number and voucher pin taken from the incoming P_CHS_VOUCHER parameter). If the EDR details contain both the BONUS_TYPE and REFERENCE tags then an applicable bonus value may be incorporated into the amount credited to subscriber's wallet subject to the rules detailed in Applying bonuses (on page 127).

- Recharge a wallet using a voucher type (voucher type name taken from the incoming P_CHS_VOUCHER_TYPE_NAME parameter). If the EDR details contain both the BONUS_TYPE and REFERENCE tags then an applicable bonus value may be incorporated into the amount credited to subscriber's wallet subject to the rules detailed in Applying bonuses.

- Bonuses may be applied to the value specified in the request; these will be calculated on the UBE using the P_CHS_BONUS_TYPE and P_CHS_REFERENCE parameters when crediting a subscriber's wallet using a specified value, recharging a subscriber using a voucher or recharging a
subscriber using a voucher type. The bonus type and reference parameters will be passed through to the UBE.

If the specified balance type, or default balance type if none is specified, does not exist, then the balance type will be created; the expiry date for the existing or new balance type and for the wallet will be set based on the rules detailed in *Extending balance and wallet expiry dates* (on page 125) or *Specifying balance and wallet expiry dates* (on page 126) depending on which scenario applies.

If the balance type cascade is specified, then the first balance type in the cascade will be credited and if this balance type does not exist then the balance type will be created; the expiry date for the existing or new balance type and the wallet will be set based on the rules detailed in *Extending balance and wallet expiry dates*; specifying a specific balance date is not supported in conjunction with specifying a balance type cascade.

If the 'override balance wallet value' flag is specified and the balance type:

- already exists, then the specified balance type will have a single bucket value updated to this value (the bucket with the latest expiry date) and all remaining buckets in the balance type will be deleted; the expiry date for the balance type and wallet will be set based on the rules detailed in *Extending balance and wallet expiry dates* or *Specifying balance and wallet expiry dates* depending on which scenario applies. Specifying the balance type cascade is not supported in conjunction with specifying the 'override balance wallet value' flag. A configuration item (defaulting to 'false') will cause the request to fail if the specific balance date parameter exceeds the specific wallet date parameter; this expiry indicator will be passed through to the UBE.

- does not exist then the balance type will be created; the expiry date for the balance type and wallet will be set based on the rules detailed in *Extending balance and wallet expiry dates* or *Specifying balance and wallet expiry dates* depending on which scenario applies.

If the EDR details contain both the BONUS_TYPE and REFERENCE tags, then an applicable bonus value may be incorporated into the amount credited to subscriber's wallet subject to the rules detailed in *Applying bonuses* (on page 127).

The current reservation, if one exists, will not be affected through invoking this request.

This method also sets the Application Charging Session reference - all call-backs from the specified session will be sent to the new reference.

**Notes:**

- It is not possible to combine balance and wallet extensions with balance and wallet specific dates in the incoming request; combining these charging parameters will cause the request to fail.

- The subscriber's wallet may not be available on the local SCS database if the user is not a prepaid subscriber. For post-paid subscribers the user can be 'cold-billed' using the information extracted from the OSA CDR. If the MSISDN is not found when the chargedParty is decoded and the 'AllowPostPaid' flag is set to true then the request will return success. Otherwise, if the chargedParty fails to decode successfully and the 'AllowPostPaid' flag is set to false, then the request will return failure.

**Parameters**

Here is a list of the parameters for this method.

- sessionID (on page 161)
- appChargingSession (on page 160)
- applicationDescription (on page 160)
- chargingParameters (on page 160)
- amount (on page 160)
- requestNumber (on page 161)

**Note:** The requestNumber parameter may be given the value of zero (0) and then the CHAM will use the currently stored value for the request number.
## TpChargingParameter structure

The treatment and expected type of each element within each TpChargingParameter structure is:

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| ChargedParty               | TpString     | Name: P_CHS_CHARGE_PARTY  
Mandatory.  
ChargedType 1: The TpString will correspond to the MSISDN to charge.  
ChargedType 3: The TpString will correspond to the wallet ID and billing engine ID to charge. The wallet ID and billing engine ID are separated by '/'. |
| ChargedType                | TpInt32      | Name: P_CHS_CHARGE_TYPE  
Mandatory. Value showing type of ChargedParty.  
- 1 - MSISDN  
- 2 - reserved  
- 3 - Wallet ID |
| Discount Override          | TpInt32      | Name: P_CHS_DISCOUNT_OVERRIDE  
Percentage discount to apply to final cost. Valid values are 0 – 10000 where these are in 1/100th of a percent. Therefore, 500 would equate to a 5% discount. The discount applied to the final cost will depend solely on the OSA discount entered here. |
| Wallet Type Name           | TpString     | Name: P_CHS_WALLET_TYPE  
Optional. The wallet type to use for Charge Type 1. If not specified, the default wallet type for this account is used. |
| Balance Type Name          | TpString     | Name: P_CHS_BALANCE_TYPE  
Optional. The balance type to use for Charge Type 1. If not specified, the default balance type for this account is used. |
| Balance Type Cascade Name  | TpString     | Name: P_CHS_BALANCE_TYPE_CASCADE  
Optional. The balance type cascade name to use for Charge Type 1. If:  
- specified then the balance type name will be ignored.  
- not specified, the default balance type for this account will be used. |
| Voucher Number and Voucher PIN | TpString  | Name: P_CHS_VOUCHER  
Optional. The voucher number and voucher pin used when doing a voucher recharge. |
| Voucher Type Name          | TpString     | Name: P_CHS_VOUCHER_TYPE_NAME  
Optional. The voucher type name used when doing a voucher type recharge. |
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| Bonus Type Name                  | TpString     | Name: P_CHS_BONUS_TYPE  
Optional. The bonus type used in conjunction with the bonus reference to determine the applicable bonus to be applied to the value when crediting the subscriber’s wallet A match will be done against the configured bonus in the database using the CCS_BONUS_TYPE.type column.  
Valid value is 'C(U)STOM' where 'U' will be stored in the database.  
Bonuses will be applied subject to the rules detailed in Applying bonuses (on page 127). |
| Reference                        | TpString     | Name: P_CHS_REFERENCE  
Optional. The bonus reference used in conjunction with the bonus type to determine the applicable bonus to be applied to the value when crediting the subscriber's wallet. A match will be done against the configured bonus in the database using the CCS_BONUS_TYPE.component column.  
This is a freeform text string; maximum of 20 characters.  
Bonuses will be applied subject to the rules detailed in Applying bonuses (on page 127). |
| Override Balance Wallet Value and Dates Flag | TpBoolean | Name: P_CHS_OVERRIDE_BALANCE_VALUE  
Optional. This can be set to 'TRUE' to override the value in the specified or default balance type with this amount; it cannot be used in conjunction with a balance type cascade name.  
This can be used in conjunction with the balance and wallet validity date parameters to specify specific expiry dates and must be present to use either of the balance or wallet validity date parameters.  
Defaults to 'FALSE'. |
| Balance Validity Modification    | TpInt32      | Name: P_CHS_BALANCE_VALIDITY_MODIFICATION  
Optional. The amount of days when extending the balance expiry date. The new balance balance expiry date will be set to the current date and time plus the number of days entered here. Only those expiry dates within the determined balance type (entered balance type or default balance type if none entered), which would be increased by this modification, will be affected. Any expiry date within the determined balance type that is set to 'never expire' will not be affected by this request.  
The new balance expiry date will be set to this value irrespective of the current balance expiry date subject to the rules detailed in Extending balance and wallet expiry dates (on page 125). |
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| Wallet Validity Modification | TpInt32      | **Name:** P_CHS_WALLET_VALIDITY_MODIFICATION  
Optional. The amount of days when extending the wallet expiry date. The new wallet expiry date will be set to the current date and time plus the number of days entered here. The wallet expiry cannot be decreased by this modification. If the expiry date within the determined wallet type is set to ‘never expire’ it will not be affected by this request.  
The new wallet expiry date will be set to this value irrespective of the current balance expiry date subject to the rules detailed in *Extending balance and wallet expiry dates* (on page 125). |
| Balance Validity Date        | TpDate       | **Name:** P_CHS_BALANCE_VALIDITY_DATE  
Optional. The specific date when setting the balance expiry date. The new balance expiry date will be set to this value irrespective of the current balance expiry date subject to the rules detailed in *Specifying balance and wallet expiry dates* (on page 126).  
The override balance wallet value parameter must be present for this parameter to be taken into account. |
| Wallet Validity Date         | TpDate       | **Name:** P_CHS_WALLET_VALIDITY_DATE  
Optional. The specific date when setting the wallet expiry date. The new wallet expiry date will be set to this value irrespective of the current wallet expiry date subject to the rules detailed in *Specifying balance and wallet expiry dates* (on page 126).  
The override balance wallet value parameter must be present for this parameter to be taken into account. |
| Send SMS Flag                | TpBoolean    | **Name:** P_CHS_SEND_SMS_FLAG  
Optional. This can be set to ‘TRUE’ to ensure an SMS is sent when this reservation is confirmed on the billing engine (SMS only invoked if the ChargedType equals ‘1’, otherwise this parameter is ignored).  
Defaults to ‘FALSE’. |

**Returns**

Nothing.
DirectCreditUnitWithAppChargingSessionReq()

Description

This method is invoked on the IpChargingSession to perform one of the following:

- Credit units towards a subscriber's wallet using the specified balance type or the specified balance type cascade (the UBE will credit the first balance type in the balance type cascade) where the UBE will create the specified balance type or first balance type in the balance type cascade if the balance type does not already exist in the subscriber's wallet. If the balance type cascade name is specified, then the balance type name will be ignored. If neither is specified then the default balance type cascade already defined for either the rating definition or the billable-event definition will be used. Each unit has an associated cost on the billing engine and therefore a specified number of units translate into a fixed amount of monies to be credited towards the subscriber's wallet. The only supported unit-based reservations are seconds and billable events.

- Extend the expiry date of the specified balance type by a specified number of days based on the rules detailed in Extending balance and wallet expiry dates (on page 125), albeit the 'override balance wallet value' flag is not supported for this request. The number of days will be taken from the incoming P_CHS_BALANCE_VALIDITY_MODIFICATION parameter. Specifying the balance type cascade is not supported in conjunction with specifying the balance expiry extension parameter. A configuration item (defaulting to 'false') will cause the request to fail if the balance extension parameter exceeds the wallet extension parameter, or if the result of extending the balance expiry date exceeds the current or extended wallet expiry date; this expiry indicator will be passed through to the UBE.

- Extend the expiry date of the specified (or default) wallet type by a specified number of days based on the rules detailed in Extending balance and wallet expiry dates, albeit the 'override balance wallet value' flag is not supported for this request. The number of days will be taken from the incoming P_CHS_WALLET_VALIDITY_MODIFICATION parameter. A configuration item (defaulting to 'false') will cause the request to fail if the wallet extension parameter is less than the balance extension parameter; this expiry indicator will be passed through to the UBE.

If the specified balance type does not exist then the balance type will be created; the expiry date for the existing or new balance type and for the wallet will be set based on the rules detailed in Extending balance and wallet expiry dates, albeit the 'override balance wallet value' flag is not supported for this request.

If the balance type cascade is specified then the first balance type in the cascade will be credited and if this balance type does not exist then the balance type will be created; the expiry date for the existing or new balance type and the wallet will be set based on the rules detailed in Extending balance and wallet expiry dates, albeit the 'override balance wallet value' flag is not supported for this request; specifying a specific balance date is not supported in conjunction with specifying a balance type cascade.

The current reservation, if one exists, will not be affected through invoking this request.

Note: The subscriber's wallet may not be available on the local SCS database if the user is not a prepaid subscriber. For post-paid subscribers the user can be 'cold-billed' using the information extracted from the OSA CDR. If the MSISDN is not found when the chargeParty is decoded and the 'AllowPostPaid' flag is set to true and the rating tariff for this subscriber can be determined then the request will return success. Otherwise, if the chargeParty fails to decode successfully and the 'AllowPostPaid' flag is set to false and/or the rating tariff for this subscriber can not be determined, then the request will return failure.

This method will also set the Application Charging Session reference - all call-backs from the specified session will be sent to the new reference.

Parameters

Here is a list of the parameters for this method.

- sessionID (on page 161)
- `appChargingSession` (on page 160)
- `applicationDescription` (on page 160)
- `chargingParameters` (on page 160)
- `volumes` (on page 162)
- `requestNumber` (on page 161)

**Note:** The `requestNumber` parameter may be given the value of zero (0) and then the CHAM will use the currently stored value for the request number.

### Unit-Seconds based credit request

The treatment and expected type of each element within each TpChargingParameter structure for a unit-seCONDS based direct delta is:

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| ChargedParty     | TpString     | Name: P_CHS_CHARGE_PARTY  
Mandatory.  
ChargedType 1: The TpString will correspond to the MSISDN to charge.  
ChargedType 3: The TpString will correspond to the wallet ID and billing engine ID to charge. The wallet ID and billing engine ID is separated by '/'. |
| ChargedType      | TpInt32      | Name: P_CHS_CHARGE_TYPE  
Mandatory. Value showing type of ChargedParty.  
- 1 - MSISDN  
- 2 - reserved  
- 3 - Wallet ID |
| Calling Number   | TpString     | Name: P_CHS_CALLING_NUMBER  
Mandatory. Network Calling Number to be used for rating-tariff calculations. |
| Called Number    | TpString     | Name: P_CHS_CALLED_NUMBER  
Mandatory. Network Called Number to be used for rating-tariff calculations. |
| Discount Override| TpInt32      | Name: P_CHS_DISCOUNT_OVERRIDE  
Percentage discount to apply to final cost. Valid values are 0 – 10000 where these are in 1/100th of a percent. Therefore, 500 would equate to a 5% discount. The discount applied to the final cost will depend on the 'discountRuleType' parameter set in the CCS.ReservationHandler section of eserv.config file on the UBE. The following are valid values where the resulting discounted cost will be applied: |
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| discountRuleType = ‘ServiceOverride’ | | (use only OSA discount)  
  \[ \text{finalCost} = \text{initialCost} \times (\text{OSA discount}) \] |
| discountRuleType = ‘S*R*W’ | | \[ \text{finalCost} = \text{initialCost} \times [\text{OSA discount} \times \text{CCS rating discount} \times \text{CCS wallet discount}] \] |
| discountRuleType = ‘S+R+W’ | | \[ \text{finalCost} = \text{initialCost} \times [\text{OSA discount} + \text{CCS rating discount} + \text{CCS wallet discount}] \] |
| discountRuleType = ‘S+R*W’ | | \[ \text{finalCost} = \text{initialCost} \times [\text{OSA discount} + \text{CCS rating discount} \times \text{CCS wallet discount}] \] |
| discountRuleType = ‘R+W*S’ | | \[ \text{finalCost} = \text{initialCost} \times [\text{CCS rating discount} + \text{CCS wallet discount} \times \text{OSA discount}] \] |
| discountRuleType = ‘R*W+S’ | | \[ \text{finalCost} = \text{initialCost} \times [\text{CCS rating discount} \times \text{CCS wallet discount} + \text{OSA discount}] \] |

| Wallet Type Name | TpString | Name:  P_CHS_WALLET_TYPE  
  Optional. The wallet type name to use for Charge Type 1. If not specified, the default wallet type for this account is used. |
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| Balance Type Name               | TpString     | Name: P_CHS_BALANCE_TYPE  
Optional. The balance type name to use for Charge Type 1. If:  
- not specified, there will be no default balance type for this operation.  
- specified then a balance type cascade containing only this balance type will override the balance type cascade already defined for the rating definition. |
| Balance Type Cascade Name       | TpString     | Name: P_CHS_BALANCE_TYPE_CASCADE  
Optional. The balance type cascade name to use for Charge Type 1. If specified, this balance type cascade will override the balance type cascade already defined for the rating definition. |
| Balance Validity Modification   | TpInt32      | Name: P_CHS_BALANCE_VALIDITY_MODIFICATION  
Optional. The number of days when extending the balance expiry date. The new balance expiry date will be set to the current date and time plus the number of days entered here. Only those expiry dates within the determined balance type (entered balance type), which would be increased by this modification, will be affected. Any expiry date within the determined balance type that is set to 'never expire' will not be affected by this request. The balance type parameter must be present for this parameter to be taken into account. |
| Wallet Validity Modification    | TpInt32      | Name: P_CHS_WALLET_VALIDITY_MODIFICATION  
Optional. The number of days when extending the wallet expiry date. The new wallet expiry date will be set to the current date and time plus the number of days entered here. The wallet expiry cannot be decreased by this modification. If the expiry date within the determined wallet type is set to 'never expire', it will not be affected by this request. The balance type parameter must be present for this parameter to be taken into account. |
| Send SMS Flag                   | TpBoolean    | Name: P_CHS_SEND_SMS_FLAG  
Optional. This can be set to ‘TRUE’ to ensure an SMS is sent when this reservation is confirmed on the billing engine (SMS only invoked if the ChargedType equals ‘1’, otherwise this parameter is ignored). Defaults to ‘FALSE’. |
## Unit-Billable event based credit request

The treatment and expected type of each element within each TpChargingParameter structure for a unit-seconds based direct delta is:-

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| ChargedParty          | TpString     | Name: P_CHS_CHARGE_PARTY  
Mandatory.  
ChargedType 1: The TpString will correspond to the MSISDN to charge.  
ChargedType 3: The TpString will correspond to the wallet ID and billing engine ID to charge. The wallet ID and billing engine ID is separated by ‘/’. |
| ChargedType           | TpInt32      | Name: P_CHS_CHARGE_TYPE  
Mandatory. Value showing type of ChargedParty.  
• 1 - MSISDN  
• 2 - reserved  
• 3 - Wallet ID |
| Discount Override     | TpInt32      | Name: P_CHS_DISCOUNT_OVERRIDE  
Percentage discount to apply to final cost. Valid values are 0 – 10000 where these are in 1/100th of a percent.  
Therefore, 500 would equate to a 5% discount.  
The discount applied to the final cost will depend on the OSA discount entered here.  
**Note:** CCS discounts do not apply to billable events. |
| Event Name            | TpString     | Name: P_CHS_EVENT_NAME  
Mandatory. Event Class and Name for rating tariff calculation.  
The TpString will correspond to the event class and event name to charge. The event class and event name are separated by ‘/’. |
| Wallet Type Name      | TpString     | Name: P_CHS_WALLET_TYPE  
Optional. The wallet type name to use for Charge Type 1. If not specified, the default wallet type for this account is used. |
| Balance Type Name     | TpString     | Name: P_CHS_BALANCE_TYPE  
Optional. The balance type name to use for Charge Type 1. If:  
• not specified, there will be no default balance type for this operation.  
• specified then a balance type cascade containing only this balance type will override the balance type cascade already defined for the rating definition. |
## Chapter 12

### Charging Session OSA Plus Functionality

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| Balance Type Cascade Name             | TpString     | Name: P_CHS_BALANCE_TYPE_CASCADE  
Optional. The balance type cascade name to use for Charge Type 1. If specified, then this balance type cascade will override the balance type cascade already defined for the billable-event definition. |
| Balance Validity Modification         | TpInt32      | Name: P_CHS_BALANCE_VALIDITY_MODIFICATION  
Optional. The number of days when extending the balance expiry date. The new balance expiry date will be set to the current date and time plus the number of days entered here. Only those expiry dates within the determined balance type (entered balance type), which would be increased by this modification, will be affected. Any expiry date within the determined balance type that is set to 'never expire' will not be affected by this request.  
The balance type parameter must be present for this parameter to be taken into account. |
| Wallet Validity Modification          | TpInt32      | Name: P_CHS_WALLET_VALIDITY_MODIFICATION  
Optional. The number of days when extending the wallet expiry date. The new wallet expiry date will be set to the current date and time plus the number of days entered here. The wallet expiry cannot be decreased by this modification. If the expiry date within the determined wallet type is set to 'never expire', it will not be affected by this request.  
The balance type parameter must be present for this parameter to be taken into account. |
| Send SMS Flag                         | TpBoolean    | Name: P_CHS_SEND_SMS_FLAG  
Optional. This can be set to 'TRUE' to ensure an SMS is sent when this reservation is confirmed on the billing engine (SMS only invoked if the ChargedType equals '1', otherwise this parameter is ignored). Defaults to 'FALSE'. |

### Returns

Nothing.

### DirectDebitAmountWithAppChargingSessionReq()

#### Description

This method is invoked on the IpChargingSession to perform one of the following:
This method is invoked on the IpChargingSession to debit monies from a subscriber's wallet using cash balance types only. The specified (or default) balance type or the specified balance type cascade is used. If the balance type cascade name is specified, then the balance type name will be ignored. If there are insufficient funds in the specified balance type or across all balance types in the balance type cascade, then based on a parameter in the incoming request, the balance type, or in the case of the balance type cascade, then the final balance type in the balance type cascade will be allowed to be taken negative; this 'allow negative balance' indicator will be passed through to the UBE. The incoming request specifies the number of UBE small currency monies to be credited. Typically this method is used for balance types where the unit type of the balance type is 'Cash'; if the balance type cascade name is specified in the incoming request, then only balance types where the unit type of the balance type is 'Cash' will be available in the balance type cascade.

This method is invoked on the IpChargingSession to debit time towards a subscriber's wallet using time balance types. The incoming request specifies the number of seconds to be debited, the internal UBE time balance units is 100ths seconds so a conversion will be required. The balance type name must be specified in the incoming request where the unit type of the balance type is 'Time' and the allowNonCashBalanceForAmountMethods (on page 18) configuration parameter must be 'true' for time-based reservations to be supported. If the balance type cascade name is specified in the incoming request then the amount specified will be assumed to be monies and only balance types where the unit type of the balance type is 'Cash' will be available in the balance type cascade.

This method is invoked on the IpChargingSession to debit an amount towards a subscriber's wallet using non-cash or time balance types. The incoming request specifies the amount to be debited; the internal UBE units are mapped directly to the specified amount. The balance type name must be specified in the incoming request where the unit type of the balance type is non 'Cash' or 'Time' and the allowNonCashBalanceForAmountMethods configuration parameter must be 'true' for non cash or time-based reservations to be supported. If the balance type cascade name is specified in the incoming request then the amount specified will be assumed to be monies and only balance types where the unit type of the balance type is 'Cash' will be available in the balance type cascade.

Extend the expiry date of the specified (or default) balance type by a specified number of days based on the rules detailed in Extending balance and wallet expiry dates (on page 125), albeit the 'override balance wallet value' flag is not supported for this request. The number of days are taken from the incoming P_CHS_BALANCE_VALIDITY_MODIFICATION parameter. Specifying the balance type cascade is not supported in conjunction with specifying the balance expiry extension parameter. A configuration item (defaulting to 'false') will cause the request to fail if the balance extension parameter exceeds the wallet extension parameter or if the result of extending the balance expiry date exceeds the current or extended wallet expiry date; this expiry indicator will be passed through to the UBE. If the balance expiry date is not being extended, then this check cannot be performed.

Extend the expiry date of the specified (or default) wallet type by a specified number of days based on the rules detailed in Extending balance and wallet expiry dates, albeit the 'override balance wallet value' flag is not supported for this request. The number of days are taken from the incoming P_CHS_WALLET_VALIDITY_MODIFICATION parameter. A configuration item (defaulting to 'false') will cause the request to fail if the wallet extension parameter is less than the balance extension parameter or if the result of extending the wallet expiry date is less than the extended balance expiry date; this expiry indicator will be passed through to the UBE. If the balance expiry date is not being extended, then this check cannot be performed.

The specified balance type, or default balance type, if none is specified, will be debited and the expiry date for the balance type and for the wallet will be set based on the rules detailed in Extending balance and wallet expiry dates, albeit the 'override balance wallet value' flag is not supported for this request. If the balance type cascade is specified, then the balances will be debited in order of the cascade; specifying a balance expiry extension is not supported in conjunction with specifying a balance type cascade.

The current reservation, if one exists, will not be affected through invoking this request.
Note: The subscriber's wallet may not be available on the local SCS database if the user is not a prepaid subscriber. For post-paid subscribers the user can be 'cold-billed' using the information extracted from the OSA CDR. If the MSISDN is not found when the chargedParty is decoded and the 'AllowDirectPostPaid' flag is set to 'true' then the request will return success. Otherwise, if the chargedParty fails to decode successfully and the 'AllowDirectPostPaid' flag is set to 'false', then the request will return failure.

This method also sets the Application Charging Session reference - all call-backs from the specified session will be sent to the new reference.

Parameters

Here is a list of the parameters for this method.

- `sessionID` (on page 161)
- `appChargingSession` (on page 160)
- `applicationDescription` (on page 160)
- `chargingParameters` (on page 160)
- `amount` (on page 160)
- `requestNumber` (on page 160)

Note: The `requestNumber` parameter may be given the value of zero (0) and then the CHAM will use the currently stored value for the request number.

TpChargingParameter structure

The treatment and expected type of each element within each TpChargingParameter structure is:

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| ChargedParty       | TpString     | Name: P_CHS_CHARGE_PARTY  
Mandatory.  
ChargedType 1: The TpString will correspond to the MSISDN to charge.  
ChargedType 3: The TpString will correspond to the wallet ID and billing engine ID to charge. The wallet ID and billing engine ID are separated by '/' |
| ChargedType        | TpInt32      | Name: P_CHS_CHARGE_TYPE  
Mandatory. Value showing type of ChargedParty.  
- 1 - MSISDN  
- 2 - reserved  
- 3 - Wallet ID |
| Discount Override  | TpInt32      | Name: P_CHS_DISCOUNT_OVERRIDE  
Percentage discount to apply to final cost. Valid values are 0 – 10000 where these are in 1/100th of a percent. Therefore, 500 would equate to a 5% discount. The discount applied to the final cost will depend solely on the OSA discount entered here. |
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| Wallet Type Name             | TpString     | Name: P_CHS_WALLET_TYPE  
Optional. The wallet type name to use for Charge Type 1. If not specified, the default wallet type for this account is used.                                                                 |
| Balance Type Name            | TpString     | Name: P_CHS_BALANCE_TYPE  
Optional. The balance type name or balance type cascade name to use for Charge Type 1. If not specified, the default balance type for this account will be used.  
To specify a balance cascade, a ";" is used to identify the parameter as a cascade. e.g. ";:promo_cascade".  
When a balance type cascade name is specified only balances containing 'Cash' Balance Units will be included in the result.  
The additional ";" is maintained when specifying the balance type cascade name for backwards compatibility only, if the balance type cascade parameter is specified separately then this parameter will take priority. |
| Balance Type Cascade Name    | TpString     | Name: P_CHS_BALANCE_TYPE_CASCADE  
Optional. The balance type cascade name to use for Charge Type 1. If:  
- specified then the balance type name will be ignored.  
- not specified, the default balance type for this account will be used. |
| Balance Validity Modification| TpInt32      | Name: P_CHS_BALANCE_VALIDITY_MODIFICATION  
Optional. The number of days when extending the balance expiry date. The new balance balance expiry date will be set to the current date and time plus the number of days entered here.  
Only those expiry dates within the determined balance type (entered balance type or default balance type if none entered), which would be increased by this modification, will be affected.  
Any expiry date within the determined balance type that is set to 'never expire' will not be affected by this request. |
| Wallet Validity Modification | TpInt32      | Name: P_CHS_WALLET_VALIDITY_MODIFICATION  
Optional. The number of days when extending the wallet expiry date. The new wallet expiry date will be set to the current date and time plus the number of days entered here.  
The wallet expiry cannot be decreased by this modification.  
If the expiry date within the determined wallet type is set to 'never expire', it will not be affected by this request. |
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Send SMS Flag</td>
<td>TpBoolean</td>
<td>Name: P_CHS_SEND_SMS_FLAG</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Optional. This can be set to ‘TRUE’ to ensure an SMS is sent when this</td>
</tr>
<tr>
<td></td>
<td></td>
<td>reservation is confirmed on the billing engine (SMS only invoked if the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ChargedType equals ‘1’, otherwise this parameter is ignored).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Defaults to ‘FALSE’.</td>
</tr>
<tr>
<td>Allow Negative Balance</td>
<td>TpBoolean</td>
<td>Name: P_CHS_ALLOW_NEGATIVE_BALANCE</td>
</tr>
<tr>
<td>Flag</td>
<td></td>
<td>Optional. This can be set to ‘TRUE’ to set the ‘IgnoreWalletBalance’ flag</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in the UBE request message. Defaults to ‘FALSE’.</td>
</tr>
</tbody>
</table>

**Returns**

Nothing.

**DirectDebitUnitWithAppChargingSessionReq()**

**Description**

This method is invoked on the IpChargingSession to perform one of the following:

- Debit units from a subscriber's wallet using the specified balance type or the specified balance type cascade. If the balance type cascade name is specified, then the balance type name will be ignored. If there are insufficient funds in the specified balance type or across all balance types in the balance type cascade, then based on a parameter in the incoming request, the balance type, or in the case of the balance type cascade, then the final balance type in the balance type cascade will be allowed to be taken negative; this 'allow negative balance' indicator will be passed through to the UBE. If the 'allow negative balance' indicator is not set, for a seconds based charge if there is insufficient funds then the maximum number of seconds will be returned. Each unit has an associated cost on the billing engine and therefore a specified number of units translate into a fixed amount of monies to be debited from the subscriber's wallet. The only supported unit-based reservations are seconds and billable events.

- Extend the expiry date of the specified balance type by a specified number of days based on the rules detailed in *Extending balance and wallet expiry dates* (on page 125), albeit the 'override balance wallet value' flag is not supported for this request. The number of days will be taken from the incoming P_CHS_BALANCE_VALIDITY_MODIFICATION parameter. Specifying the balance type cascade is not supported in conjunction with specifying the balance expiry extension parameter. A configuration item (defaulting to ‘false’) will cause the request to fail if the balance extension parameter exceeds the wallet extension parameter, or if the result of extending the balance expiry date exceeds the current or extended wallet expiry date; this expiry indicator will be passed through to the UBE.

- Extend the expiry date of the specified (or default) wallet type by a specified number of days based on the rules detailed in *Extending balance and wallet expiry dates*, albeit the 'override balance wallet value' flag is not supported for this request. The number of days will be taken from the incoming P_CHS_WALLET_VALIDITY_MODIFICATION parameter. A configuration item (defaulting to ‘false’) will cause the request to fail if the wallet extension parameter is less than the balance extension parameter or if the result of extending the wallet expiry date is less than the extended balance expiry date; this expiry indicator will be passed through to the UBE. If the balance expiry date is not being extended, then this check cannot be performed.
The specified balance type will be debited and the expiry date for the balance type and for the wallet will be set based on the rules detailed in *Extending balance and wallet expiry dates*, albeit the ‘override balance wallet value’ flag is not supported for this request.

If the balance type cascade is specified, then the balances will be debited in order of the cascade; specifying a balance expiry extension is not supported in conjunction with specifying a balance type cascade.

The current reservation, if one exists, will not be affected through invoking this request.

**Note:** The subscriber's wallet may not be available on the local SCS database if the user is not a prepaid subscriber. For post-paid subscribers the user can be 'cold-billed' using the information extracted from the OSA EDR. If the MSISDN is not found when the chargeParty is decoded and the 'AllowPostPaid' flag is set to true and the rating tariff for this subscriber can be determined, then the request will return success. Otherwise, if the chargeParty fails to decode successfully and the 'AllowPostPaid' flag is set to false and/or the rating tariff for this subscriber can not be determined, then the request will return failure.

This method also sets the Application Charging Session reference - all call-backs from the specified session will be sent to the new reference.

**Parameters**

Here is a list of the parameters for this method.

- `sessionID` (on page 161)
- `appChargingSession` (on page 160)
- `applicationDescription` (on page 160)
- `chargingParameters` (on page 160)
- `volumes` (on page 162)
- `requestNumber` (on page 161)

**Note:** The `requestNumber` parameter may be given the value of zero (0) and then the CHAM will use the currently stored value for the request number.

**Unit-Seconds based debit request**

The treatment and expected type of each element within each TpChargingParameter structure for a unit-seconds based direct delta is:

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| ChargedParty     | TpString     | Name: P_CHS_CHARGE_PARTY
Mandatory.
ChargedType 1: The TpString will correspond to the MSISDN to charge.
ChargedType 3: The TpString will correspond to the wallet ID and billing engine ID to charge. The wallet ID and billing engine ID is separated by '/'. |
| ChargedType      | TpInt32      | Name: P_CHS_CHARGE_TYPE
Mandatory. Value showing type of ChargedParty.
- 1 - MSISDN
- 2 - reserved
- 3 - Wallet ID |
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| Calling Number    | TpString     | Name: P_CHS_CALLING_NUMBER  
Mandatory. Network Calling Number to be used for rating-tariff calculations. |
| Called Number     | TpString     | Name: P_CHS_CALLED_NUMBER  
Mandatory. Network Called Number to be used for rating-tariff calculations. |
| Discount Override | TpInt32      | Name: P_CHS_DISCOUNT_OVERRIDE  
Percentage discount to apply to final cost. Valid values are 0 – 10000 where these are in 1/100th of a percent. Therefore, 500 would equate to a 5% discount. |

The discount applied to the final cost will depend on the 'discountRuleType' parameter set in the CCS.ReservationHandler section of eserv.config file on the UBE. The following are valid values where the resulting discounted cost will be applied:

- **discountRuleType = 'ServiceOverride'**  
  (use only OSA discount)  
  \[ finalCost = initialCost \times (OSA\ discount) \]

- **discountRuleType = 'S*R*W'**  
  \[ finalCost = initialCost \times [OSA\ discount \times CCS\ rating\ discount \times CCS\ wallet\ discount] \]

- **discountRuleType = 'S+R+W'**  
  \[ finalCost = initialCost \times [OSA\ discount + CCS\ rating\ discount + CCS\ wallet\ discount] \]

- **discountRuleType = 'S+R+W'**  
  \[ finalCost = initialCost \times [OSA\ discount + CCS\ rating\ discount + CCS\ wallet\ discount] \]

- **discountRuleType = 'S*R+W'**  
  \[ finalCost = initialCost \times [OSA\ discount \times CCS\ rating\ discount + CCS\ wallet\ discount] \]
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>discountRuleType <code>S+W*R</code></td>
<td></td>
<td><code>finalCost = initialCost * [OSA discount + CCS wallet discount * CCS rating discount]</code></td>
</tr>
<tr>
<td>discountRuleType <code>S+W*R</code></td>
<td></td>
<td><code>finalCost = initialCost * [OSA discount * CCS wallet discount + CCS rating discount]</code></td>
</tr>
<tr>
<td>discountRuleType <code>R+W*S</code></td>
<td></td>
<td><code>finalCost = initialCost * [CCS rating discount + CCS wallet discount * OSA discount]</code></td>
</tr>
<tr>
<td>discountRuleType <code>R+W*S</code></td>
<td></td>
<td><code>finalCost = initialCost * [CCS rating discount * CCS wallet discount + OSA discount]</code></td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>
| Wallet Type Name            | TpString     | Name: `{CHS_WALLET_TYPE}
Optional. The wallet type name to use for Charge Type 1. If not specified, the default wallet type for this account is used.  |
| Balance Type Name           | TpString     | Name: `{CHS_BALANCE_TYPE}
Optional. The balance type name to use for Charge Type 1. If:
- not specified, there will be no default balance type for this operation.
- specified then a balance type cascade containing only this balance type will override the balance type cascade already defined for the rating definition.  |
| Balance Type Cascade Name   | TpString     | Name: `{CHS_BALANCE_TYPE_CASCADE}
Optional. The balance type cascade name to use for Charge Type 1. If specified, this balance type cascade will override the balance type cascade already defined for the rating definition.  |
| Balance Validity Modification | TpInt32     | Name: `{CHS_BALANCE_VALIDITY_MODIFICATION}
Optional. The number of days when extending the balance expiry date. The new balance expiry date will be set to the current date and time plus the number of days entered here. Only those expiry dates within the determined balance type (entered balance type), which would be increased by this modification, will be affected. Any expiry date within the determined balance type that is set to 'never expire' will not be affected by this request.
The balance type parameter must be present for this parameter to be taken into account.  |
### Element Name | Element Type | Description
--- | --- | ---
Wallet Validity Modification | TpInt32 | Name: P_CHS_WALLET_VALIDITY_MODIFICATION
Optional. The number of days when extending the wallet expiry date. The new wallet expiry date will be set to the current date and time plus the number of days entered here. The wallet expiry cannot be decreased by this modification. If the expiry date within the determined wallet type is set to 'never expire', it will not be affected by this request.
The balance type parameter must be present for this parameter to be taken into account.

Send SMS Flag | TpBoolean | Name: P_CHS_SEND_SMS_FLAG
Optional. This can be set to 'TRUE' to ensure an SMS is sent when this reservation is confirmed on the billing engine (SMS only invoked if the ChargedType equals '1', otherwise this parameter is ignored). Defaults to 'FALSE'.

Allow Negative Balance Flag | TpBoolean | Name: P_CHS_ALLOW_NEGATIVE_BALANCE
Optional. This can be set to 'TRUE' to set the 'IgnoreWalletBalance' flag in the UBE request message. Defaults to 'FALSE'.

### Unit-Billable event based debit request

The treatment and expected type of each element within each TpChargingParameter structure for a unit-billable based direct delta is:

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| ChargedParty | TpString | Name: P_CHS_CHARGE_PARTY
Mandatory.
ChargedType 1: The TpString will correspond to the MSISDN to charge.
ChargedType 3: The TpString will correspond to the wallet ID and billing engine ID to charge. The wallet ID and billing engine ID is separated by '/'.

| ChargedType | TpInt32 | Name: P_CHS_CHARGE_TYPE
Mandatory. Value showing type of ChargedParty.
- 1 - MSISDN
- 2 - reserved
- 3 - Wallet ID
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| Discount Override        | TpInt32      | Name: P_CHS_DISCOUNT_OVERRIDE  
Percentage discount to apply to final cost. Valid values are 0 – 10000 where these are in 1/100th of a percent. Therefore, 500 would equate to a 5% discount. The discount applied to the final cost will depend on the OSA discount entered here.  
*Note*: CCS discounts do not apply to billable events. |
| Event Name               | TpString     | Name: P_CHS_EVENT_NAME  
Mandatory. Event Class and Name for rating tariff calculation. The TpString will correspond to the event class and event name to charge. The event class and event name are separated by "/". |
| Wallet Type Name         | TpString     | Name: P_CHS_WALLET_TYPE  
Optional. The wallet type name to use for Charge Type 1. If not specified, the default wallet type for this account is used. |
| Balance Type Name        | TpString     | Name: P_CHS_BALANCE_TYPE  
Optional. The balance type name to use for Charge Type 1. If:  
- not specified, there will be no default balance type for this operation.  
- specified then a balance type cascade containing only this balance type will override the balance type cascade already defined for the rating definition. |
| Balance Type Cascade Name| TpString     | Name: P_CHS_BALANCE_TYPE_CASCADE  
Optional. The balance type cascade name to use for Charge Type 1. If specified, then this balance type cascade will override the balance type cascade already defined for the billable-event definition. |
| Balance Validity         | TpInt32      | Name: P_CHS_BALANCE_VALIDITY_MODIFICATION  
Optional. The number of days when extending the balance expiry date. The new balance expiry date will be set to the current date and time plus the number of days entered here. Only those expiry dates within the determined balance type (entered balance type), which would be increased by this modification, will be affected. Any expiry date within the determined balance type that is set to 'never expire' will not be affected by this request. The balance type parameter must be present for this parameter to be taken into account. |
### Wallet Validity Modification

**Element Name:** Wallet Validity Modification  
**Element Type:**TpInt32  
**Description:**  
Name: P_CHS_WALLET_VALIDITY_MODIFICATION  
Optional. The number of days when extending the wallet expiry date. The new wallet expiry date will be set to the current date and time plus the number of days entered here. The wallet expiry cannot be decreased by this modification. If the expiry date within the determined wallet type is set to 'never expire', it will no t be affected by this request. The balance type parameter must be present for this parameter to be taken into account.

### Send SMS Flag

**Element Name:** Send SMS Flag  
**Element Type:**TpBoolean  
**Description:**  
Name: P_CHS_SEND_SMS_FLAG  
Optional. This can be set to 'TRUE' to ensure an SMS is sent when this reservation is confirmed on the billing engine (SMS only invoked if the ChargedType equals '1', otherwise this parameter is ignored). Defaults to 'FALSE'.

### Allow Negative Balance Flag

**Element Name:** Allow Negative Balance Flag  
**Element Type:**TpBoolean  
**Description:**  
Name: P_CHS_ALLOW_NEGATIVE_BALANCE  
Optional. This can be set to 'TRUE' to set the 'IgnoreWalletBalance' flag in the UBE request message. Defaults to 'FALSE'.

### Returns

Nothing.

### ExtendLifeTimeWithAppChargingSessionReq()

**Description**

This method is invoked on the IpChargingSession to extend the lifetime of the reservation on both the OSA CHAM SCS gateway and on the billing engine for amount-based reservations only. The reservation is extended by the value currently stored on the OSA CHAM SCS gateway entered as the 'ReservationLifeTimeHint' parameter of the TpChargingParameter structure for this reservation. It is not possible to extend the lifetime for a unit-based reservation using the extendLifeTimeReq() method.

**Note:** extendLifetimeReq is only used with amount based reservations. It is not possible to use extendLifetimeReq with unit based reservations.

This method also sets the Application Charging Session reference - all call-backs from the specified session will be sent to the new reference.

### Parameters

Here is a list of the parameters for this method.

- `sessionID` (on page 161)
- `appChargingSession` (on page 160)
Returns
Nothing.

GetAmountLeftWithAppChargingSession()

Description
This method is invoked on the IpAccountManager to retrieve the amount stored in the internal table on the OSA CHAM SCS gateway remaining for this reservation. This method can only be invoked for amount-based reservations.

This method also sets that Application Charging Session reference - all call-backs from the specified session will be sent to the new reference.

Parameters
Here is a list of the parameters for this method.

- sessionID (on page 161)
- appChargingSession (on page 160)

Returns

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TpChargingPrice</td>
<td>this is a structure containing the currency and a TpAmount structure. The currency is returned by the OSA CHAM SCS gateway as an empty string. (See standard [5] for TpAmount encoding. The ‘Exponent’ of the TpAmount structure will always be set to ‘0’ and the ‘Number’ of the TpAmount structure will always be the number of small units of currency where the billing engine system currency is used).</td>
</tr>
</tbody>
</table>

GetLifeTimeLeftWithAppChargingSession()

Description
This method is invoked on the IpAccountManager to retrieve the lifetime remaining on the OSA CHAM SCS gateway for this reservation. This method can be invoked for both amount-based and unit-based reservations.

This method also sets the Application Charging Session reference - all call-backs from the specified session will be sent to the new reference.

Parameters
Here is a list of the parameters for this method.

- sessionID (on page 161)
- appChargingSession (on page 160)
Returns

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TpInt32</td>
<td>an unsigned integer corresponding to the number of seconds that this reservation will remain active.</td>
</tr>
</tbody>
</table>

GetUnitLeftWithAppChargingSession()

Description

This method will be invoked on the IpChargingSession to retrieve the units stored in the internal table on the OSA CHAM SCS gateway remaining for this reservation. This method can only be invoked for unit-based reservations.

This method also sets the Application Charging Session reference - all call-backs from the specified session will be sent to the new reference.

Parameters

Here is a list of the parameters for this method.

- *sessionID* (on page 161)
- *appChargingSession* (on page 160)

Returns

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TpVolumeSet</td>
<td>A TpVolumeSet structure containing a single TpVolume which is composed of a TpUnitID value and a TpAmount structure. The TpUnitID value must be either P_CHS_UNIT_NUMBER (named events) or P_CHS_UNIT_SECONDS (time-based in seconds). (See standard [5] for TpAmount encoding. The 'Exponent' of the TpAmount structure will always be set to '0' and the 'Number' of the TpAmount structure will always be the number of units (named events or seconds) ).</td>
</tr>
</tbody>
</table>

RateWithAppChargingSessionReq()

Description

This method will be invoked on the IpChargingSession to determine the individual rates that are associated with this user’s account. The rates will have the associated discount applied prior to returning them to the third-party client application. This method can only be invoked for unit-based reservations.

This method also sets the Application Charging Session reference - all call-backs from the specified session will be sent to the new reference.

Parameters

Here is a list of the parameters for this method.

- *sessionID* (on page 161)
- *appChargingSession* (on page 160)
### TpChargingParameter structure

The treatment and expected type of each element within each TpChargingParameter structure for rate request is:

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| ChargedParty     | TpString     | Name: P_CHS_CHARGE_PARTY  
Mandatory. 
ChargedType 1: The TpString will correspond to the MSISDN to charge. 
ChargedType 3: The TpString will correspond to the wallet ID and billing engine ID to charge. The wallet ID and billing engine ID is separated by '/'.

| ChargedType      | TpInt32      | Name: P_CHS_CHARGE_TYPE  
Mandatory. Value showing type of ChargedParty. 
- 1 - MSISDN  
- 2 - reserved  
- 3 - Wallet ID

| Calling Number   | TpString     | Name: P_CHS_CALLING_NUMBER  
Optional. Network Calling Number to be used for rating-tariff calculations

| Called Number    | TpString     | Name: P_CHS_CALLED_NUMBER  
Optional. Network Called Number to be used for rating-tariff calculations.

| Discount Override| TpInt32      | Name: P_CHS_DISCOUNT_OVERRIDE  
Percentage discount to apply to final cost. Valid values are 0 – 10000 where these are in 1/100th of a percent. 
Therefore, 500 would equate to a 5% discount. 
The discount applied to the final cost will depend on the 'overrideDiscountType' parameter set in the CCS.ReservationHandler section of eserv.config file found on the BE. The following are valid values where the resulting discounted cost will be applied:
### Element Name, Element Type, Description

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Note:</strong> CCS discounts do not apply to named events</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <code>overrideDiscountType = 'Override'</code> (ignore OSA discount)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <code>finalCost = initialCost * (CCS discount for seconds only)</code></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <code>overrideDiscountType = 'Compound'</code></td>
</tr>
<tr>
<td></td>
<td></td>
<td><code>finalCost = initialCost * [CCS discount for seconds only * OSA discount]</code></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <code>overrideDiscountType = 'Cumulative'</code></td>
</tr>
<tr>
<td></td>
<td></td>
<td><code>finalCost = initialCost * [CCS discount for seconds only + OSA discount]</code></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Event Name</th>
<th>TpString</th>
<th>Name: P_CHS_EVENT_NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Optional. Event Class and Name for rating tariff calculation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The TpString will correspond to the event class and event name to charge. The event class and event name will be separated by ‘/’.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wallet Type Name</th>
<th>TpString</th>
<th>Name: P_CHS_WALLET_TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Optional. The wallet type to use for Charge Type 1. If not specified, the default wallet type for this account is used.</td>
</tr>
</tbody>
</table>

## Returns

Nothing.

### ReserveAmountWithAppChargingSessionReq()

**Description**

This method is invoked on the IpChargingSession to perform one of the following:

- This method is invoked on the IpChargingSession to make an initial monies-based reservation. A monies-based reservation will reserve monies from the subscriber’s wallet using cash balance types only and store this amount in an internal table on the OSA CHAM SCS gateway to be debited and/or credited using the credit(debit)AmountReq() methods. The incoming request will specify the number of UBE small currency monies to be reserved. Typically this method is used for balance types where the unit type of the balance type is ‘Cash’; if the balance type cascade name is specified in the incoming request then only balance types where the unit type of the balance type is ‘Cash’ will be available in the balance type cascade.

- This method is invoked on the IpChargingSession to make an initial time-based reservation.
A time-based reservation will reserve time from the subscriber's wallet using time balance types only and store this amount in an internal table on the OSA CHAM SCS gateway to be debited and/or credited using the credit(debit)AmountReq() methods. The incoming request will specify the number of seconds to be reserved. The internal UBE time balance units is 100ths seconds so a conversion will be required. The balance type name must be specified in the incoming request where the unit type of the balance type is 'Time' and the allowNonCashBalanceForAmountMethods configuration parameter must be 'true' for time-based reservations to be supported. If the balance type cascade name is specified in the incoming request then the amount specified will be assumed to be monies and only balance types where the unit type of the balance type is 'Cash' will be available in the balance type cascade.

- This method is invoked on the IpChargingSession to make an initial non-cash or time-based reservation.

A non-cash or time-based reservation will reserve time from the subscriber's wallet using non cash or time balance types only and store this amount in an internal table on the OSA CHAM SCS gateway to be debited and/or credited using the credit(debit)AmountReq() methods. The incoming request will specify the amount to be reserved; the internal UBE units are mapped directly to the specified amount. The balance type name must be specified in the incoming request where the unit type of the balance type is none 'Cash' or 'Time' and the allowNonCashBalanceForAmountMethods configuration parameter must be 'true' for non-cash or time-based reservations to be supported. If the balance type cascade name is specified in the incoming request then the amount specified will be assumed to be monies and only balance types where the unit type of the balance type is 'Cash' will be available in the balance type cascade.

- Prior to making a confirmation against the reserved amount it is necessary to have debited an amount from the reservation. It is not possible to credit an amount towards a reservation unless prior debits greater to or equal to the credited amount have already been made - it is not possible to credit a subscriber's wallet through the reservation-confirmation process. If a reservation already exists for this user on the OSA CHAM SCS gateway, then invoking this method will result in a subsequent reservation of the specified amount for this user on the billing engine and incrementing the amount stored in this reservation on the OSA CHAM SCS gateway. If an existing unit-based reservation already exists for this user on the OSA CHAM SCS gateway then this request will fail, i.e. reservation types cannot be mixed within an active reservation. If the amount-based reservation is first closed, then a unit-based reservation can be created within the same charging session. When a reservation is attempted by a subscriber on the OSA_CHAM_SCS this reservation may fail if the maximum concurrent access to the subscriber's wallet would be exceeded through successfully creating this reservation. This maximum concurrent access parameter is a current property of the subscriber's wallet and is used by reservation attempts of all types on the subscriber's wallet, i.e. voice calls, other amount-based or unit-based reservations through the OSA_CHAM SCS or billable event reservations using other applications. The amount of the reservation returned to the client will not be affected by the maximum concurrent access parameter i.e the OSA CHAM SCS will not divide the amount returned to the client by the maximum concurrent access parameter.

This method will also set the Application Charging Session reference - all call backs from the specified session will be sent to the new reference.

To ensure continuous performance of the UBE and UAS CHAM nodes, the collected clients should not reserve more that 10 concurrent amount or unit reservations on a single UBE wallet/subscriber.

**Parameters**

Here is a list of the parameters for this method.

- **sessionID** (on page 161)
- **appChargingSession** (on page 160)
- **applicationDescription** (on page 160)
- **chargingParameters** (on page 160)
- **preferredAmount** (on page 161)
• minimumAmount (on page 161)
• requestNumber (on page 161)

Note: The requestNumber parameter may be given the value of zero (0) and then the CHAM will use the currently stored value for the request number.

TpChargingParameter structure

The treatment and expected type of each element within each TpChargingParameter structure is:

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ChargedParty</td>
<td>TpString</td>
<td>Name: P_CHS_CHARGE_PARTY&lt;br&gt;Mandatory.&lt;br&gt;ChargedType 1: The TpString will correspond to the MSISDN to charge.&lt;br&gt;ChargedType 3: The TpString will correspond to the wallet ID and billing engine ID to charge. The wallet ID and billing engine ID are separated by '/'.</td>
</tr>
<tr>
<td>ChargedType</td>
<td>TpInt32</td>
<td>Name: P_CHS_CHARGE_TYPE&lt;br&gt;Mandatory. Value showing type of ChargedParty.&lt;br&gt;• 1 - MSISDN&lt;br&gt;• 2 - reserved&lt;br&gt;• 3 - Wallet ID</td>
</tr>
<tr>
<td>Discount Override</td>
<td>TpInt32</td>
<td>Name: P_CHS_DISCOUNT_OVERRIDE&lt;br&gt;Percentage discount to apply to final cost. Valid values are 0 – 10000 where these are in 1/100th of a percent. Therefore, 500 would equate to a 5% discount. The discount applied to the final cost will depend solely on the OSA discount entered here.</td>
</tr>
<tr>
<td>ReservationLifeTimeHint</td>
<td>TpInt32</td>
<td>Name: P_CHS RESERVATION LIFETIME_HINT&lt;br&gt;Optional. The lifetime of the reservation in seconds - set on both the OSA CHAM SCS gateway and the billing engine server. If the reservation times out on both the SCS and the BE, outstanding debits are not confirmed on the billing engine. The value entered must be greater than '0'. If not specified, then the default lifetime for the reservation will be '30' seconds.</td>
</tr>
</tbody>
</table>
| Element Name                      | Element Type | Description                                                                                                                                                                                                 
|----------------------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
| Wallet Type Name                 | TpString     | Name: P_CHS_WALLET_TYPE  
Optional. The wallet type to use for Charge Type 1. If not specified, the default wallet type for this account is used.                                                                                   |
| Balance Type Name                | TpString     | Name: P_CHS_BALANCE_TYPE  
Optional. The balance type to use for Charge Type 1. If not specified, the default balance type for this account is used.                                                                                   |
| Balance Type Cascade Name        | TpString     | Name: P_CHS_BALANCE_TYPE_CASCADE  
Optional. The balance type cascade name to use for Charge Type 1. If:  
- specified then the balance type name will be ignored.  
- not specified, the default balance type for this account will be used.                                                                                       |
| Send SMS Flag                    | TpBoolean    | Name: P_CHS_SEND_SMS_FLAG  
Optional. This can be set to ‘TRUE’ to ensure an SMS is sent when this reservation is confirmed on the billing engine (SMS only invoked if the ChargedType equals ‘1’, otherwise this parameter is ignored). Defaults to ‘FALSE’. |

**Returns**

Nothing.
ReserveUnitWithAppChargingSessionReq()

Description

This method is invoked on the IpChargingSession to make an initial unit-based reservation. Each unit has an associated cost on the billing engine and therefore a specified number of units translate into a fixed amount of monies against which the reservation can be made on the subscriber's wallet. The only supported unit-based reservations are seconds and named events, where unit type cannot be changed during the lifetime of a reservation.

For unit-based reservation the OSA CHAM SCS gateway has no knowledge of monies and deals solely with the unit of the reservation. The number of units reserved is stored in an internal table on the OSA CHAM SCS gateway to be debited and/or credited using the credit(debit)UnitReq() methods. Prior to making a confirmation against the reserved units it is necessary to have debited units from the reservation. It is not possible to credit units towards a reservation unless prior debits greater to or equal to the credited units have already been made - it is not possible to credit a subscriber's wallet through the reservation-confirmation process.

If a reservation already exists for this user on the OSA CHAM SCS gateway, then invoking this method will result in a subsequent reservation of units for this user on the billing engine and incrementing the number of units stored in this reservation on the OSA CHAM SCS gateway. If an existing amount-based reservation already exists for this user on the OSA CHAM SCS gateway then this request will fail i.e. reservation types cannot be mixed within an active reservation. If the unit-based reservation is first closed, then an amount-based reservation can be created within the same charging session.

When a reservation is attempted by a subscriber on the OSA_CHAM_SCS this reservation may fail if the maximum concurrent access to the subscriber's wallet would be exceeded through successfully creating this reservation. This maximum concurrent access parameter is a current property of the subscriber's wallet and is used by reservation attempts of all types on the subscriber's wallet, i.e. voice calls, other amount-based or unit-based reservations through the OSA_CHAM_SCS or named event reservations using other applications. The amount of the reservation returned to the client may be affected by the maximum concurrent access parameter in the same manner as currently seen for voice calls or named event reservations as follows: the amount returned for voice calls or reserve-unit requests for seconds-based reservations will be affected by the values configured on the UBE for the 'CCS.reservationHandler.maxReservationLength' and 'CCS.reservationHandler.greedyReservationLengthLimit' where the reservation length returned will be recalculated as the lesser of the maxReservationLength or the amount that the subscriber can afford if the greedyReservationLengthLimit is not initially satisfied.

This method also sets the Application Charging Session reference - all call-backs from the specified session will be sent to the new reference.

To ensure continuous performance of the UBE and OSA CHAM nodes, the collected clients should not reserve more that 10 concurrent amount or unit reservations.

Parameters

Here is a list of the parameters for this method.

- sessionID (on page 161)
- appChargingSession (on page 160)
- applicationDescription (on page 160)
- chargingParameters (on page 160)
- volumes - see Unit-Seconds Based Reservation and Unit-Named Event Based Reservation
- requestNumber (on page 161)
Note: The requestNumber parameter may be given the value of zero (0) and then the CHAM will use the currently stored value for the request number.

Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>volumes</td>
<td>a TpVolumeSet structure containing a single TpVolume which is composed of a TpUnitID value and a TpAmount structure. The TpUnitID value is P_CHS_UNIT_SECONDS. (See standard [5] for TpAmount encoding. The ‘Exponent’ of the TpAmount structure will always be set to ’0’ and the ‘Number’ of the TpAmount structure will always be ignored by this reservation). The ‘Number’ field of the TpAmount structure must be greater than zero.</td>
</tr>
</tbody>
</table>

The treatment and expected type of each element within each TpChargingParameter structure for a unit-seconds based reservation is:-

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ChargedParty</td>
<td>TpString</td>
<td>Name: P_CHS_CHARGE_PARTY Mandatory. ChargedType 1: The TpString will correspond to the MSISDN to charge. ChargedType 3: The TpString will correspond to the wallet ID and billing engine ID to charge. The wallet ID and billing engine ID is separated by '/'.</td>
</tr>
</tbody>
</table>
| ChargedType          | TpInt32      | Name: P_CHS_CHARGE_TYPE Mandatory. Value showing type of ChargedParty.  
• 1 - MSISDN  
• 2 - reserved  
• 3 - Wallet ID |
| Calling Number       | TpString     | Name: P_CHS_CALLING_NUMBER Mandatory. Network Calling Number to be used for rating-tariff calculations.                                      |
| Called Number        | TpString     | Name: P_CHS_CALLED_NUMBER Mandatory. Network Called Number to be used for rating-tariff calculations.                                            |
| Discount Override    | TpInt32      | Name: P_CHS_DISCOUNT_OVERRIDE Percentage discount to apply to final cost. Valid values are 0 – 10000 where these are in 1/100th of a percent.  
Therefore, 500 would equate to a 5% discount.  
The discount applied to the final cost will depend on the 'discountRuleType' parameter set in the CCS.ReservationHandler section of eserv.config file on the UBE. The following are valid values where the resulting discounted cost will be applied: |
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| discountRuleType = 'ServiceOverride' | | (use only OSA discount)  
                      \[ finalCost = initialCost \times (OSA\ discount) \]  
| discountRuleType = 'S*R*W' | |  
                      \[ finalCost = initialCost \times ([OSA\ discount \times CCS\ rating\ discount \times CCS\ wallet\ discount]) \]  
| discountRuleType = 'S+R+W' | |  
                      \[ finalCost = initialCost \times ([OSA\ discount + CCS\ rating\ discount + CCS\ wallet\ discount]) \]  
| discountRuleType = 'S+R*W' | |  
                      \[ finalCost = initialCost \times ([OSA\ discount + CCS\ rating\ discount \times CCS\ wallet\ discount]) \]  
| discountRuleType = 'S*R+W' | |  
                      \[ finalCost = initialCost \times ([OSA\ discount \times CCS\ rating\ discount + CCS\ wallet\ discount]) \]  
| discountRuleType = 'S+W*R' | |  
                      \[ finalCost = initialCost \times ([OSA\ discount + CCS\ wallet\ discount \times CCS\ rating\ discount]) \]  
| discountRuleType = 'S*W+R' | |  
                      \[ finalCost = initialCost \times ([OSA\ discount \times CCS\ wallet\ discount + CCS\ rating\ discount]) \]  
| discountRuleType = 'R+W*S' | |  
                      \[ finalCost = initialCost \times ([CCS\ rating\ discount + CCS\ wallet\ discount \times OSA\ discount]) \]  
| discountRuleType = 'R*W+S' | |  
                      \[ finalCost = initialCost \times ([CCS\ rating\ discount \times CCS\ wallet\ discount + OSA\ discount]) \]  

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ReservationLifeTimeHint</td>
<td>TpInt32</td>
<td>Name: P_CHS_RESERVED_LIFETIME_HINT Optional. The lifetime of the reservation in seconds - set on both the OSA CHAM SCS gateway and the billing engine server. A hint is specified as the billing server may choose to ignore this lifetime. If the reservation times out on both the SCS and the BE, outstanding debits are not confirmed on the billing engine. If not specified, then the default lifetime passed to the billing engine for the reservation is ‘30’ seconds. For an initial reservation, the reservation lifetime is set to the number of units (seconds) that the billing engine returns in the acknowledgement (this will not be the number of units specified in the volumes parameter of the original request as this value is ignored). If the lifetime requested is less than the billing engine minimum call length then the acknowledgement will return a reservation of zero. This will close the session immediately. For a subsequent reservation request, this parameter is ignored and the reservation lifetime is extended by the number of units (seconds) that the billing engine returns in the acknowledgement for the (this will not be the number of units specified in the volumes parameter of the original request as this value is ignored).</td>
</tr>
<tr>
<td>Wallet Type Name</td>
<td>TpString</td>
<td>Name: P_CHS_WALLET_TYPE Optional. The wallet type name to use for Charge Type 1. If not specified, the default wallet type for this account is used.</td>
</tr>
<tr>
<td>Send SMS Flag</td>
<td>TpBoolean</td>
<td>Name: P_CHS_SEND_SMS_FLAG Optional. This can be set to ‘TRUE’ to ensure an SMS is sent when this reservation is confirmed on the billing engine (SMS only invoked if the ChargedType equals ‘1’, otherwise this parameter is ignored). Defaults to ‘FALSE’.</td>
</tr>
</tbody>
</table>

**Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>volumes</td>
<td>A TpVolumeSet structure containing a single TpVolume which is composed of a TpUnitID value and a TpAmount structure. The TpUnitID value must be P_CHS_UNIT_NUMBER. (See standard [5] for TpAmount encoding. The ‘Exponent’ of the TpAmount structure will always be set to ‘0’ and the ‘Number’ of the TpAmount structure will always be the number of named events to be used for this reservation). The ‘Number’ field of the TpAmount structure must be greater than zero.</td>
</tr>
</tbody>
</table>
The treatment and expected type of each element within each `TpChargingParameter` structure for a unit-named event based reservation is:

<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| ChargedParty       | `TpString`   | **Name:** `P_CHS_CHARGE_PARTY`  
Mandatory.  
ChargedType 1: The `TpString` will correspond to the MSISDN to charge.  
ChargedType 3: The `TpString` will correspond to the wallet ID and billing engine ID to charge. The wallet ID and billing engine ID is separated by `'/`.

| ChargedType        | `TpInt32`    | **Name:** `P_CHS_CHARGE_TYPE`  
Mandatory. Value showing type of ChargedParty.  
- 1 - MSISDN  
- 2 - reserved  
- 3 - Wallet ID  

| Discount Override  | `TpInt32`    | **Name:** `P_CHS_DISCOUNT_OVERRIDE`  
Percentage discount to apply to final cost. Valid values are `0 – 10000` where these are in `1/100th` of a percent.  
Therefore, `500` would equate to a `5%` discount.  
The discount applied to the final cost will depend solely on the OSA discount entered here.  
**Note:** CCS discounts do not apply to billable events.

| Event Name         | `TpString`   | **Name:** `P_CHS_EVENT_NAME`  
Mandatory. Event Class and Name for rating tariff calculation.  
The `TpString` will correspond to the event class and event name to charge. The event class and event name are separated by `'/`.

| ReservationLifetimeHint | `TpInt32`   | **Name:** `P_CHS_RESERVATION_LIFETIME_HINT`  
Optional. The lifetime of the reservation in seconds - set on both the OSA CHAM SCS gateway and the billing engine server. A hint is specified as the billing server may choose to ignore this lifetime. If the reservation times out on both the SCS and the BE, outstanding debits are not confirmed on the billing engine. If not specified, then the default lifetime passed to the billing engine for the reservation is ‘30’ seconds.  
For an initial reservation, if the value entered is less than ‘0’, then the default lifetime requested from the billing engine for the initial reservation will be ‘30’ seconds.  
For a subsequent reservation request, this parameter is ignored and the reservation lifetime cannot be extended.
<table>
<thead>
<tr>
<th>Element Name</th>
<th>Element Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| Wallet Type         | TpString     | Name: P_CHS_WALLET_TYPE  
Optional. The wallet type to use for Charge Type 1. If not specified, the default wallet type for this account is used. |
| Send SMS Flag       | TpBoolean    | Name: P_CHS_SEND_SMS_FLAG  
Optional. This can be set to ‘TRUE’ to ensure an SMS is sent when this reservation is confirmed on the billing engine (SMS only invoked if the ChargedType equals ‘1’, otherwise this parameter is ignored). Defaults to ‘FALSE’. |

**Returns**

Nothing.
Chapter 13

Application Charging Session Functionality

Overview

Introduction

This chapter explains the methods that are available using the IpAppChargingSession. The IpAppChargingSession object resides on the third-party client application and provides the following methods that can be invoked by the OSA CHAM SCS gateway.

In this chapter

This chapter contains the following topics.

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CreditUnitErr () ............................................................ 202
CreditUnitRes() ............................................................. 202
DebitAmountErr () ........................................................... 203
DebitAmountRes() ........................................................... 203
DebitUnitErr () ............................................................. 203
DebitUnitRes() ............................................................. 204
DirectCreditAmountErr () .................................................... 204
DirectCreditAmountRes() .................................................... 205
DirectCreditUnitErr () ....................................................... 205
DirectCreditUnitRes() ....................................................... 205
DirectDebitAmountErr () ..................................................... 205
DirectDebitAmountRes() ..................................................... 206
DirectDebitUnitErr () ....................................................... 206
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CreditAmountErr ()

Description

This method will be invoked on the IpAppChargingmanager as a result of an unsuccessful creditAmountReq().
Parameters
Here is a list of the parameters for this method.

- `sessionId` (on page 212)
- `requestNumber` (on page 211)
- `error` (on page 211)
- `requestNumberNextRequest` (on page 211)

CreditAmountRes()

Description
This method is invoked on the IpAppChargingManager as a result of a successful `creditAmountReq()`. The information returned will be the amount of monies credited towards the reservation stored on the OSA CHAM SCS gateway and the amount of monies remaining in this reservation stored on the OSA CHAM SCS gateway after the request has been completed.

Parameters
Here is a list of the parameters for this method.

- `sessionId` (on page 212)
- `requestNumber` (on page 211)
- `creditedAmount` (on page 210)
- `reservedAmountLeft`
- `requestNumberNextRequest` (on page 211)

CreditUnitErr()

Description
This method is invoked on the IpAppChargingManager as a result of an unsuccessful `creditUnitReq()`.

Parameters
Here is a list of the parameters for this method.

- `sessionId` (on page 212)
- `requestNumber` (on page 211)
- `error` (on page 211)
- `requestNumberNextRequest` (on page 211)

CreditUnitRes()

Description
This method is invoked on the IpAppChargingManager as a result of a successful `creditUnitReq()`. The information returned will be the number of units credited towards the reservation stored on the OSA CHAM SCS gateway and the number of units remaining in this reservation stored on the OSA CHAM SCS gateway after the request has been completed.
Parameters
Here is a list of the parameters for this method.

- `sessionID` (on page 212)
- `requestNumber` (on page 211)
- `creditedVolumes` (on page 210)
- `reservedUnitsLeft` (on page 212)
- `requestNumberNextRequest` (on page 211)

DebitAmountErr ()

Description
This method is invoked on the IpAppChargingmanager as a result of an unsuccessful debitAmountReq().

Parameters
Here is a list of the parameters for this method.

- `sessionID` (on page 212)
- `requestNumber` (on page 211)
- `error` (on page 211)
- `requestNumberNextRequest` (on page 211)

DebitAmountRes()

Description
This method is invoked on the IpAppChargingmanager as a result of a successful debitAmountReq(). The information returned will be the amount of monies debited from the reservation stored on the OSA CHAM SCS gateway and the amount of monies remaining in this reservation stored on the OSA CHAM SCS gateway after the request has been completed.

Parameters
Here is a list of the parameters for this method.

- `sessionID` (on page 212)
- `requestNumber` (on page 211)
- `debitedAmount` (on page 210)
- `reservedAmountLeft`
- `requestNumberNextRequest` (on page 211)

DebitUnitErr ()

Description
This method is invoked on the IpAppChargingmanager as a result of an unsuccessful debitUnitReq().
Parameters

Here is a list of the parameters for this method.

- `sessionID` (on page 212)
- `requestNumber` (on page 211)
- `error` (on page 211)
- `requestNumberNextRequest` (on page 211)

DebitUnitRes()

Description

This method is invoked on the IpAppChargingmanager as a result of a successful debitUnitReq(). The information returned will be the number of units debited from the reservation stored on the OSA CHAM SCS gateway and the number of units remaining in this reservation stored on the OSA CHAM SCS gateway after the request has been completed.

Parameters

Here is a list of the parameters for this method.

- `sessionID` (on page 212)
- `requestNumber` (on page 211)
- `debitedVolumes` (on page 211)
- `reservedUnitsLeft` (on page 212)
- `requestNumberNextRequest` (on page 211)

DirectCreditAmountErr()

Description

This method is invoked on the IpAppChargingmanager as a result of an unsuccessful directCreditAmountReq().

Parameters

Here is a list of the parameters for this method.

- `sessionID` (on page 212)
- `requestNumber` (on page 211)
- `error` (on page 211)
- `requestNumberNextRequest` (on page 211)

DirectCreditAmountRes()

Description

This method is invoked on the IpAppChargingmanager as a result of a successful directCreditAmountReq(). The information returned will be the amount of monies credited towards the user’s account on the billing engine.
Chapter 13

Parameters
Here is a list of the parameters for this method.

- `sessionId` (on page 212)
- `requestNumber` (on page 211)
- `creditedAmount` (on page 210)
- `requestNumberNextRequest` (on page 211)

**DirectCreditUnitErr ()**

Description
This method is invoked on the IpAppChargingManager as a result of an unsuccessful `directCreditUnitReq()`.

Parameters
Here is a list of the parameters for this method.

- `sessionId` (on page 212)
- `requestNumber` (on page 211)
- `error` (on page 211)
- `requestNumberNextRequest` (on page 211)

**DirectCreditUnitRes ()**

Description
This method is invoked on the IpAppChargingManager as a result of a successful `directCreditUnitReq()`. The information returned will be the number of units that will translate into an amount of monies to credit towards the user’s account on the billing engine.

Parameters
Here is a list of the parameters for this method.

- `sessionId` (on page 212)
- `requestNumber` (on page 211)
- `creditedVolumes` (on page 210)
- `requestNumberNextRequest` (on page 211)

**DirectDebitAmountErr ()**

Description
This method is invoked on the IpAppChargingManager as a result of an unsuccessful `directDebitAmountReq()`.
Parameters
Here is a list of the parameters for this method.

- `sessionID` (on page 212)
- `requestNumber` (on page 211)
- `error` (on page 211)
- `requestNumberNextRequest` (on page 211)

**DirectDebitAmountRes()**

Description
This method is invoked on the IpAppChargingmanager as a result of a successful `directDebitAmountReq()`. The information returned will be the amount of monies debited from the user’s account on the billing engine.

Parameters
Here is a list of the parameters for this method.

- `sessionID` (on page 212)
- `requestNumber` (on page 211)
- `debitedAmount` (on page 210)
- `requestNumberNextRequest` (on page 211)

**DirectDebitUnitErr ()**

Description
This method is invoked on the IpAppChargingmanager as a result of an unsuccessful `directDebitUnitReq()`.

Parameters
Here is a list of the parameters for this method.

- `sessionID` (on page 212)
- `requestNumber` (on page 211)
- `error` (on page 211)
- `requestNumberNextRequest` (on page 211)

**DirectDebitUnitRes()**

Description
This method is invoked on the IpAppChargingmanager as a result of a successful `directDebitUnitReq()`. The information returned will be the number of units that will translate into an amount of monies to debit from the user’s account on the billing engine.
Chapter 13

Parameters

Here is a list of the parameters for this method.

- `sessionID` (on page 212)
- `requestNumber` (on page 211)
- `debitedVolumes` (on page 211)
- `requestNumberNextRequest` (on page 211)

ExtendLifeTimeErr()

Description

This method is invoked on the IpAppChargingManager as a result of an unsuccessful `extendLifeTimeReq()`.

Parameters

Here is a list of the parameters for this method.

- `sessionID` (on page 212)
- `error` (on page 211)

ExtendLifeTimeRes()

Description

This method is invoked on the IpAppChargingManager as a result of a successful `extendLifeTimeReq()`.

The information returned will be the session lifetime (in seconds) held open on both the OSA CHAM SCS gateway and the billing engine for this reservation after the request has been completed.

Parameters

Here is a list of the parameters for this method.

- `sessionID` (on page 212)
- `sessionTimeLeft` (on page 212)

RateErr()

Description

This method is invoked on the IpAppChargingManager as a result of an unsuccessful `rateReq()`.

Parameters

Here is a list of the parameters for this method.

- `sessionID` (on page 212)
- `error` (on page 211)
**RateRes()**

**Description**
This method is invoked on the IpAppChargingmanager as a result of a successful rateReq(). The information returned will depend on the unit type of the response message. If the value of the TpUnitID parameter in the TpVolume structure is:

- P_CHS_UNIT_SECONDS, then the information returned will be the individual rating tariffs (in small units of billing engine currency per minute) and the duration for each rating tariff (in seconds)
- P_CHS_UNIT_NUMBER, then the information returned will be a single rating tariff (in small units of billing engine currency per named event) and a duration for this rating tariff of '1'.

**Parameters**
Here is a list of the parameters for this method.

- sessionID (on page 212)
- requestNumber (on page 211)
- rates (on page 211)
- validityTimeLeft (on page 213)

**ReserveAmountErr()**

**Description**
This method will be invoked on the IpAppChargingmanager as a result of an unsuccessful reserveAmountReq().

**Parameters**
Here is a list of the parameters for this method.

- sessionID (on page 212)
- requestNumber (on page 211)
- error (on page 211)
- requestNumberNextRequest (on page 211)

**ReserveAmountRes()**

**Description**
This method will be invoked on the IpAppChargingmanager as a result of a successful reserveAmountReq(). The information returned will be the amount of monies reserved from the user’s account for either an initial or subsequent reservation. The session lifetime (in seconds) held open on both the OSA CHAM SCS gateway and the billing engine for this reservation will also be returned by this message.

**Parameters**
Here is a list of the parameters for this method.

- sessionID (on page 212)
- requestNumber (on page 211)
ReserveUnitErr()

Description

This method is invoked on the IpAppChargingmanager as a result of an unsuccessful reserveUnitReq().

Parameters

Here is a list of the parameters for this method.

- sessionID (on page 212)
- requestNumber (on page 211)
- error (on page 211)
- requestNumberNextRequest (on page 211)

ReserveUnitRes()

Description

This method is invoked on the IpAppChargingmanager as a result of a successful reserveUnitReq(). Each unit has an associated cost on the billing engine and therefore a specified number of units translate into a fixed amount of monies against which the reservation can be made on the user's account. The information returned will be the amount of units reserved from the user's account for either an initial or subsequent reservation. The session lifetime (in seconds) held open on both the OSA CHAM SCS gateway and the billing engine for this reservation will also be returned by this message.

Parameters

Here is a list of the parameters for this method.

- sessionID (on page 212)
- requestNumber (on page 211)
- reservedUnits (on page 212)
- sessionTimeLeft (on page 212)
- requestNumberNextRequest (on page 211)

SessionEnded()

Description

This method is invoked on the IpAppChargingmanager as a result of the charging session expiring on the OSA CHAM SCS gateway. This is typically caused when the lifetime of the reservation expires. This will result in the following events on the OSA CHAM SCS gateway:

1. Any amount remaining in the current reservation will be returned to the user's account and be available for alternative reservations from the third-party client application.
2 An OSA EDR (Type 22) will be created. If any funds halve already been confirmed on the billing engine for this reservation prior to this transaction, and if the current reservation is:
  - unit-seconds based, then a CCS EDR (Type 24) would have been created.
  - unit-named event based, then a CCS EDR (Type 25) would have been created.

3 The charging session on the OSA CHAM SCS gateway will be removed the internal table of active sessions. This charging session will no longer be valid for any requests from the third-party client application.

Parameters

Here is a list of the parameters for this method.

- `sessionID` (on page 212)
- `error` (on page 211)

Application Charging Session Parameters

Introduction

Here are the parameters used for this functionality.

**creditedAmount**

Description: A `TpChargingPrice` structure containing the currency and a `TpAmount` structure. The currency will be returned by the OSA CHAM SCS gateway as an empty string. (See standard [5] for `TpAmount` encoding. The 'Exponent' of the `TpAmount` structure will always be set to '0' and the 'Number' of the `TpAmount` structure will always be the number of small units of currency where the billing engine system currency will be used). This is the amount of monies that was credited towards the reservation.

**creditedVolumes**

Description: A `TpVolumeSet` structure containing a single `TpVolume` which is composed of a `TpUnitID` value and a `TpAmount` structure. The `TpUnitID` value must be either `P_CHS_UNIT_NUMBER` (named events) or `P_CHS_UNIT_SECONDS` (time-based in seconds). (See standard [5] for `TpAmount` encoding. The 'Exponent' of the `TpAmount` structure will always be set to '0' and the 'Number' of the `TpAmount` structure will always be the number of units (named events or seconds)). This is the number of units that was credited towards the reservation.

**debitedAmount**

Description: A `TpChargingPrice` structure containing the currency and a `TpAmount` structure. The currency will be returned by the OSA CHAM SCS gateway as an empty string. (See standard [5] for `TpAmount` encoding. The 'Exponent' of the `TpAmount` structure will always be set to '0' and the 'Number' of the `TpAmount` structure will always be the number of small units of currency where the billing engine system currency will be used). This is the amount of monies that was debited from the reservation.
debitedVolumes

Description: A TpVolumeSet structure containing a single TpVolume which is composed of a TpUnitID value and a TpAmount structure. The TpUnitID value must be either P_CHS_UNIT_NUMBER (named events) or P_CHS_UNIT_SECONDS (time-based in seconds). (See standard [5] for TpAmount encoding. The 'Exponent' of the TpAmount structure will always be set to '0' and the 'Number' of the TpAmount structure will always be the number of units (named events or seconds)). This is the number of units that was debited from the reservation.

error

Description: A TpChargingError value which is either a mapping of the error returned from the billing engine or the error resolved at the OSA CHAM SCS gateway for the invoked request. (See standard [5] for the TpChargingError encoding.)

Note: The error return codes are an explicit encoding predefined by the standard in [5], therefore the error returned to the OSA CHAM SCS gateway may not have a suitable mapped error definition. When this occurs P_CHS_ERR_UNDEFINED will be returned to the third-party client application.

rates

Description: A TpPriceVolumeSet structure which is a numbered set of elements containing a TpVolume structure and a TpChargingPrice structure.
The TpVolume structure is composed of a TpUnitID value and a TpAmount structure. The TpUnitID value must be either P_CHS_UNIT_NUMBER (named events) or P_CHS_UNIT_SECONDS (time-based in seconds). (See standard [5] for TpAmount encoding. The 'Exponent' of the TpAmount structure will always be set to '0' and the 'Number' of the TpAmount structure will be the duration (in seconds) of the corresponding rating tariff extracted in the TpChargingPrice structure if the TpUnitId value equals P_CHS_UNIT_SECONDS, or the 'Number' will always be '1' if the TpUnitID value equals P_CHS_UNIT_NUMBER).
The TpChargingPrice structure contains the currency and a TpAmount structure. The currency will be returned by the OSA CHAM SCS gateway as an empty string. (See standard [5] for TpAmount encoding. The 'Exponent' of the TpAmount structure will always be set to '0' and the 'Number' of the TpAmount structure will always be the number of small units of currency where the billing engine system currency will be used). This is the rating tariff that will be returned on a per minute basis or on a per named event basis depending on the value of the TpUnitID parameter in the TpVolume structure.

requestNumber

Description: The request number (unsigned integer) of the individual request within this charging session.

requestNumberNextRequest

Description: An unsigned integer corresponding to the request number that the third-party client application should use for the next request on this charging session.
reservedAmount

Description:  A TpChargingPrice structure containing the currency and a TpAmount structure. The currency will be returned by the OSA CHAM SCS gateway as an empty string. (See standard [5] for TpAmount encoding. The ‘Exponent’ of the TpAmount structure will always be set to ‘0’ and the ‘Number’ of the TpAmount structure will always be the number of small units of currency where the billing engine system currency will be used). If cascade has been specified, the number will be the summation of the balance types used from the cascade, in small units.

reservedAmountLeft

Description:  A TpChargingPrice structure containing the currency and a TpAmount structure. The currency will be returned by the OSA CHAM SCS gateway as an empty string. (See standard [5] for TpAmount encoding. The ‘Exponent’ of the TpAmount structure will always be set to ‘0’ and the ‘Number’ of the TpAmount structure will always be the number of small units of currency where the billing engine system currency will be used). This is the amount of monies remaining in this reservation after this request has been processed.

reservedUnits

Description:  A TpVolumeSet structure containing a single TpVolume which is composed of a TpUnitID value and a TpAmount structure. The TpUnitID value must be either P_CHS_UNIT_NUMBER (named events) or P_CHS_UNIT_SECONDS (time-based in seconds). (See standard [5] for TpAmount encoding. The ‘Exponent’ of the TpAmount structure will always be set to ‘0’ and the ‘Number’ of the TpAmount structure will always be the number of units (named events or seconds)).

Note:  For Unit Seconds requests, the reservedUnits returned will be set to the value of the sessionLifeTime left.

reservedUnitsLeft

Description:  A TpVolumeSet structure containing a single TpVolume which is composed of a TpUnitID value and a TpAmount structure. The TpUnitID value must be either P_CHS_UNIT_NUMBER (named events) or P_CHS_UNIT_SECONDS (time-based in seconds). (See standard [5] for TpAmount encoding. The ‘Exponent’ of the TpAmount structure will always be set to ‘0’ and the ‘Number’ of the TpAmount structure will always be the number of units (named events or seconds)). This is the number of units remaining in this reservation after this request has been processed.

sessionID

Description:  The session ID (unsigned integer) of this charging session.

sessionTimeLeft

Description:  An unsigned integer corresponding to the number of seconds that this reservation will remain active.
validityTimeLeft

Description: A TpDuration structure corresponding to the number of milliseconds that this reservation will remain active. This parameter will not be used and a '0' will be returned by the OSA CHAM SCS gateway. (See standard [2] for TpDuration encoding)
About Installation and Removal

Overview

Introduction

This chapter provides information about the installed components for the NCC application described in this guide, and lists the files installed by the application that you can check for, to ensure that the application installed successfully.

In this Chapter

This chapter contains the following topics.

Installation and Removal Overview ................................................................. 215
Execution - osaChamScs .................................................................................. 216
Auxilliary Scripts (SignalOsaChamScs.sh) ....................................................... 217

Installation and Removal Overview

Introduction

For information about the following requirements and tasks, see Installation Guide:

- NCC system requirements
- Pre-installation tasks
- Installing and removing NCC packages

OSA CHAM Packages

An installation of OSA CHAM includes the following packages, on the:

- SMS:
  - osaChamSms
- SLC:
  - osaChamScs
- VWS:
  - osaChamBe

Additional configuration of osaChamBe

Once the osaChamBe package has been successfully installed, the following process is required to complete the configuration of the service.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Check to see if startup scripts exist for the beVWARS and beServer in /IN/service_packages/E2BE/bin.</td>
</tr>
<tr>
<td></td>
<td>• If so, go to step 6.</td>
</tr>
</tbody>
</table>
Chapter 14

Step | Action
---|---

2 | Create the startup scripts in the `/IN/service_packages/E2BE/bin/` directory.

An example of a startup script for the beServer (called `IN/service_packages/E2BE/bin/beServerStartup.sh`) may be as follows:

```
#!/bin/sh
. /IN/service_packages/E2BE/.profile-be
exec /IN/service_packages/E2BE/bin/beServer >>
/IN/service_packages/E2BE/tmp/beServer.log 2>&1
```

**Note:** You must ensure that `.profile-be` exists. If not a warning will have been created when the osaChamBe package was installed.

3 | Modify the `SLEE.cfg`, located in `/IN/service_packages/SLEE/etc/SLEE.cfg`, to call the startup script instead of the beServer binary directly, for example; by modifying the following line as shown:

- **existing line:**
  ```
  INTERFACE=beServer beServer /IN/service_packages/E2BE/bin EVENT
  ```

- **modified line:**
  ```
  INTERFACE=beServer beServerStartup.sh
  /IN/service_packages/E2BE/bin EVENT
  ```

4 | A startup script for each instance of the beVWARS will also need to be created in a similar fashion.

5 | The lines which start each instance of the beVWARS will also need to be modified in a similar fashion.

6 | Add the following line (if not already present) before the line which calls the binary, for example:

```
exec /IN/service_packages/E2BE/bin/beServer >>
/IN/service_packages/E2BE/tmp/beServer.log 2>&1':
```

. /IN/service_packages/E2BE/.profile-be

**Note:** You must ensure that `.profile-be` exists. If not a warning will have been created when the osaChamBe package was installed.

### Execution - osaChamScs

**Execution**

The preferred method to execute the gateway is to install an inittab entry through the use of the `osaChamScs.conf.sh` script.

Alternatively, the following command may be executed as the `osa_oper` user:

```
/IN/service_packages/OSA/bin/runOsaChamScs.sh
```

To specify alternate configuration sections (in order to run multiple gateways) append the following command line arguments:

```
-s section name
```
**Auxiliary Scripts (SignalOsaChamScs.sh)**

**Introduction**

When the client interface package is installed, within the `/IN/service_packages/OSA/bin` directory, a script can be run by the user at runtime to send signals to the OSA Gateway process.

**Important:** All currently executing instances of the osaChamScs binary will be sent the same signal upon execution of this script.

**Procedure - aux scripts**

Follow these steps to use the auxiliary scripts.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Type <code>cd /IN/service_packages/OSA/bin</code></td>
</tr>
<tr>
<td>2</td>
<td>Type <code>sh ./signalOsaChamScs.sh &lt;signal&gt;</code></td>
</tr>
</tbody>
</table>

Where: `<signal>` can be one of the following:

- **SIGHUP** – reread the configuration file.
- **SIGUSR1** – switch debug output on.
- **SIGUSR2** – switch debug output off (This is the default on start-up).
- **SIGINT** – shutdown the process cleanly. The client interface will complete the following:
  - Refuse any further requests from the client application.
  - Complete all the current open transactions.
  - Notify the billing engine and close any open connections to the billing engine.
  - Close the connection to ORACLE.
- **SIGKILL** – end process immediately (cannot be trapped).
- **SIGABRT** – abort process and produce core file.

**Debugging**

Debug output is turned off by default.

All debug output will be sent to the standard output only, and not to the standard error, which is reserved for alarms.
NCC Glossary of Terms

AAA

AC
Application Context. A parameter in a TCAP message which indicates what protocol is conveyed. May indicate, for example, MAP, CAMEL, or INAP. Also usually specifies the particular version of the conveyed protocol, for example, which CAMEL Phase.

ACS
Advanced Control Services configuration platform.

ANI
Automatic Number Identification - Term used in the USA by long-distance carriers for CLI.

API
Application Programming Interface

BE
Billing Engine

CAMEL
Customized Applications for Mobile network Enhanced Logic
This is a 3GPP (Third Generation Partnership Project) initiative to extend traditional IN services found in fixed networks into mobile networks. The architecture is similar to that of traditional IN, in that the control functions and switching functions are remote. Unlike the fixed IN environment, in mobile networks the subscriber may roam into another PLMN (Public Land Mobile Network), consequently the controlling function must interact with a switching function in a foreign network. CAMEL specifies the agreed information flows that may be passed between these networks.

CC
Country Code. Prefix identifying the country for a numeric international address.

CCS
1) Charging Control Services (or Prepaid Charging) component.
2) Common Channel Signalling. A signalling system used in telephone networks that separates signalling information from user data.

CDR
Call Data Record
Note: The industry standard for CDR is EDR (Event Detail Record). Over time EDR will replace CDR in the Oracle documentation.
CLI
Calling Line Identification - the telephone number of the caller. Also referred to as ANI.

CORBA
Common Object Request Broker Architecture. It is a framework that provides interoperability between objects built in different programming languages, running on different physical machines perhaps on different networks. It specifies an Interface Definition Language, and API that allows client / server interaction with the ORB.

Diameter
A feature rich AAA protocol. Utilises SCTP and TCP transports.

DTMF
Dual Tone Multi-Frequency - system used by touch tone telephones where one high and one low frequency, or tone, is assigned to each touch tone button on the phone.

E2BE
Code used to designate some components and path locations used by the UBE.

EDR
Event Detail Record
Note: Previously CDR. The industry standard for CDR is EDR (Event Detail Record). Over time EDR will replace CDR in the NCC documentation.

GUI
Graphical User Interface

HLR
The Home Location Register is a database within the HPLMN (Home Public Land Mobile Network). It provides routing information for MT calls and SMS. It is also responsible for the maintenance of user subscription information. This is distributed to the relevant VLR, or SGSN (Serving GPRS Support Node) through the attach process and mobility management procedures such as Location Area and Routing Area updates.

HTML
HyperText Markup Language, a small application of SGML used on the World Wide Web. It defines a very simple class of report-style documents, with section headings, paragraphs, lists, tables, and illustrations, with a few informational and presentational items, and some hypertext and multimedia.

IN
Intelligent Network

INAP
Intelligent Network Application Part - a protocol offering real time communication between IN elements.
IOR

Inter-operable Object Reference. A reference that is used in the CORBA world that clients can use to send their requests to a particular process executing on a particular machine. Every CORBA based server has an IOR that uniquely identifies it within a distributed computing platform. IOR consists of information such as the IP address of the machine on which the process is executing, or the port number to which it is listening. This IOR is usually exported/sent to some form of central registry when the process is started up. Clients can then retrieve this information, that is, IORs, from the central registry if they want to send a request to a server.

IP

1) Internet Protocol

2) Intelligent Peripheral - This is a node in an Intelligent Network containing a Specialized Resource Function (SRF).

IP address

Internet Protocol Address - network address of a card on a computer

ISDN

Integrated Services Digital Network - set of protocols for connecting ISDN stations.

MAP

Mobile Application Part - a protocol which enables real time communication between nodes in a mobile cellular network. A typical usage of the protocol would be for the transfer of location information from the VLR to the HLR.

MSISDN

Mobile Station ISDN number. Uniquely defines the mobile station as an ISDN terminal. It consists of three parts; the country code (CC), the national destination code (NDC) and the subscriber number (SN).

Oracle

Oracle Corporation

ORB

Object Request Broker. Within an Object based communication system, an ORB keeps track of the actual addresses of all defined objects and thus is used to route traffic to the correct destination. The CORBA defines the ORB in a series of standards enabling different platforms to share common information.

OSA

Open Service Access provides a standard interface through which developers can design services that may interact with functions within the network.

PI

Provisioning Interface - used for bulk database updates/configuration instead of GUI based configuration.
PIN
Personal Identification Number

PLMN
Public Land Mobile Network

SCF
Service Control Function - this is the application of service logic to control functional entities in providing Intelligent Network services.

SCP
Service Control Point. Also known as SLC.

SCS
Service Capability Server (OSA)

SCTP
Stream Control Transmission Protocol. A transport-layer protocol analogous to the TCP or User Datagram Protocol (UDP). SCTP provides some similar services as TCP (reliable, in-sequence transport of messages with congestion control) but adds high availability.

Service Provider
See Telco.

Session
Diameter exchange relating to a particular user or subscriber access to a provided service (for example, a telephone call).

SGML

SLC
Service Logic Controller (formerly UAS).

SLEE
Service Logic Execution Environment

SMS
Depending on context, can be:
- Short Message Service
- Service Management System platform
- NCC Service Management System application
**SMSC**

Short Message Service Centre - stores and forwards a short message to the indicated destination subscriber number.

**SN**

Service Number

**SQL**

Structured Query Language - a database query language.

**SRF**

Specialized Resource Function - This is a node on an IN which can connect to both the SSP and the SLC and delivers additional special resources into the call, mostly related to voice data, for example play voice announcements or collect DTMF tones from the user. Can be present on an SSP or an Intelligent Peripheral (IP).

**SSP**

Service Switching Point

**TCAP**

Transaction Capabilities Application Part – layer in protocol stack, message protocol.

**TCP**

Transmission Control Protocol. This is a reliable octet streaming protocol used by the majority of applications on the Internet. It provides a connection-oriented, full-duplex, point to point service between hosts.

**Telco**

Telecommunications Provider. This is the company that provides the telephone service to customers.

**Telecommunications Provider**

See Telco.

**VLR**

Visitor Location Register - contains all subscriber data required for call handling and mobility management for mobile subscribers currently located in the area controlled by the VLR.

**VWS**

Oracle Voucher and Wallet Server (formerly UBE).
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