PortaSwitch

External System Interfaces Guide

Copyright notice & disclaimers

Copyright © 2000–2021 PortaOne, Inc. All rights reserved

PortaSwitch® External System Interfaces, September 2021
Maintenance Release 95
V1.95.01

Please address your comments and suggestions to: Sales Department, PortaOne, Inc. A113 – 2099 Lougheed Hwy, Port Coquitlam, BC V3B 1A8 Canada.

Changes may be made periodically to the information in this publication. The changes will be incorporated in new editions of the guide. The software described in this document is furnished under a license agreement, and may be used or copied only in accordance with the terms thereof. It is against the law to copy the software on any other medium, except as specifically provided in the license agreement. The licensee may make one copy of the software for backup purposes. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopied, recorded or otherwise, without the prior written permission of PortaOne Inc.

The software license and limited warranty for the accompanying products are set forth in the information packet supplied with the product, and are incorporated herein by this reference. If you cannot locate the software license, contact your PortaOne representative for a copy.

All product names mentioned in this manual are for identification purposes only, and are either trademarks or registered trademarks of their respective owners.

Table of Contents

Preface

This document provides information for developers who want to interface their applications, platforms or systems with PortaSwitch®. The XML/JSON API interfaces are described in the **PortaBilling XML/JSON API Reference** and **PortaSIP XML/JSON API Reference**.

Where to get the latest version of this guide

The hard copy of this guide is updated upon major releases only, and does not always contain the latest material on enhancements that occur in-between minor releases. The online copy of this guide is always up to date, and integrates the latest changes to the product. You can access the latest copy of this guide at: **www.portaone.com/support/documentation/**.

Conventions

This publication uses the following conventions:
- Commands and keywords are given in **boldface**.
- Terminal sessions, console screens, or system file names are displayed in `fixed width font`.

Exclamation mark draws your attention to important actions that must be taken for proper configuration.

NOTE: Notes contain additional information to supplement or accentuate important points in the text.

Timesaver means that you can save time by taking the action described here.

Tips provide information that might help you solve a problem.

Gear points out that this feature must be enabled on the Configuration server.

Trademarks and copyrights

PortaBilling®, PortaSIP® and PortaSwitch® are registered trademarks of PortaOne, Inc.

What is new in Maintenance Release 95?

Updated:

- The **Provisioning via event handlers** section.
- The **Provisioning via webhooks** section.

1. PortaBilling RADIUS interface

RADIUS protocol

PortaBilling® uses the RADIUS protocol as per **Remote Authentication Dial-In User Service (RADIUS), RFC 2865** and **RADIUS Accounting, RFC 2866**. By default, the PortaBilling® RADIUS server listens on port 1812 (UDP) for authentication requests and on port 1813 (UDP) for accounting requests.

RADIUS attributes

PortaBilling® uses a set of Cisco RADIUS VSAs (Vendor-Specific Attributes). For more information, please refer to the RADIUS Vendor-Specific Attributes Voice Implementation Guide at **Cisco website (http://www.cisco.com)**.

NOTE: The time on the network access server (NAS) must be synchronized with the PortaBilling® server (the Event-Timestamp attribute sent in accounting and authentication RADIUS requests must correspond to the actual time on the NAS).

RADIUS attributes

To ensure compatibility with future releases of PortaBilling®, it is highly recommended that you follow the Cisco guidelines regarding which attributes must be contained in each authentication or accounting request. For more information, please refer to the RADIUS Vendor-Specific Attributes Voice Implementation Guide at **Cisco website (http://www.cisco.com)**.

Authentication/Authorization requests

Currently, the following attributes are required for correct processing of authentication/authorization requests:

Attribute	Description
NAS-IP-Address (required)	Specifies the IP address of the network access server that is requesting authentication
NAS-Identifier	Specifies the name (e.g., the hostname) of the network access server that is requesting authentication. Either NAS-IP-Address or NAS-Identifier attributes must be present in the authentication request
User-Name (required)	Indicates the name of the user being authenticated by the RADIUS server
Password	Indicates the user's password
Called-Station-Id	The telephone number the user called. **Only for authorization requests**

Message-Authenticator	Used to authenticate and protect the integrity of Access-Requests in order to prevent spoofing
h323-conf-id	The unique call identifier generated by the gateway. Used to identify the separate billable events (calls) within a single calling session
h323-incoming-conf-id	The unique number for identifying a parent session on a gateway, where a session is closed when the calling party hangs up. It is used to: • Match the outbound and inbound call legs for a session on a particular gateway; • Collect and match all records for multiple calls placed (within the bounds of a session) on the gateway. The value used for legs 1 and 2 on the originating gateway can differ from that for legs 3 and 4 on a terminating gateway. The h323-incoming-conf-id is different from h323-conf-id.
h323-ivr-out	User-definable attribute-value pairs sent from the NAS to the RADIUS server
PortaOne-*	PortaOne specific attributes sent from the NAS to the RADIUS server. The list of attributes is described in the PortaBilling® custom attributes section

Authentication/Authorization responses

Currently, the following standard attributes are used (A1 = authentication, A2 = authorization):

Attribute	A1	A2	Description
h323-billing-model	Y		Type of billing service for a specific session (0 Credit, 1 Debit)
h323-return-code	Y	Y	Return codes are the server's instructions to the network access server. The list of possible values are described in the *RADIUS Return Codes* section
h323-currency	Y	Y	Currency used with h323-credit-amount (in ISO_4217 format, for example USD, EUR)
h323-preferred-lang	Y	Y	Language to use for the audio prompt (in ISO 639-1 format, for example en, es, de)

h323-credit-amount	Y		Amount of credit (in currency) in the account
h323-redirect-number	Y		Optional Phone number to which the call is redirected
h323-ivr-in	Y	Y	User-definable attribute-value pairs sent from the RADIUS server back to the NAS
Message-Authenticator	Y	Y	Used to authenticate and protect the integrity of Access-Requests in order to prevent spoofing.
Reply-Message	Y	Y	The description of the accept or reject message
PortaOne-*	Y	Y	PortaOne specific attributes sent from the RADIUS server to the NAS. The list of attributes is described in the PortaBilling® custom attributes section

Accounting requests

Currently, the following attributes are required for correct processing of accounting requests:

Attribute	Description
NAS-IP-Address	Specifies the IP address of the network access server that is sending accounting requests
NAS-Identifier	Specifies the name (e.g., the hostname) of the network access server that is requesting authentication. Either NAS-IP-Address or NAS-Identifier attributes must be present in the request
NAS-Port-Name	Indicates the name of the physical NAS port that is authenticating the user
User-Name	Indicates the name of the user for the accounting request
Calling-Station-Id	The telephone number the call or message came from
Called-Station-Id	The telephone number the user called/sent a message
Acct-Session-Time	Indicates how long (in seconds) the user has received service
Acct-Status-Type	Indicates the stage of the session, whether this Accounting-Request marks the beginning of the user service (Start), interim update (Alive) or the end (Stop)

h323-remote-address	IP address of the remote voice equipment. PortaBilling® uses it to disambiguate different IP route paths on a NAS
h323-setup-time	Indicates the setup time in Network Time Protocol (NTP) format: hour, minutes, seconds, microseconds, time_zone, day, month, day_of_month, year
h323-connect-time	Indicates the connect time in Network Time Protocol (NTP) format: hour, minutes, seconds, microseconds, time_zone, day, month, day_of_month, and year
h323-disconnect-time	Indicates the disconnect time in Network Time Protocol (NTP) format: hour, minutes, seconds, microseconds, time_zone, day, month, day_of_month, year
h323-conf-id	The unique call identifier generated by the gateway. Used to identify the separate billable events (calls) within a single session. When this attribute is not present, PortaBilling calculates the equivalent ID from other attributes, for example Acct-Session-Id
h323-incoming-conf-id	The unique number for identifying a calling session on a NAS, where a session is closed when the calling party hangs up. The h323-incoming-conf-id number is used to: • Match the outbound and inbound call legs for a session on a particular NAS • Collect and match all records for multiple calls placed (within the bounds of a session) on the gateway
h323-disconnect-cause	Specifies the reason a call was disconnected (e.g., 0x10 - normal ending, 0x3 no route, 0x11 user busy, 0x1F normal unspecified)
h323-call-origin	The NAS'es behavior in relation to the connection that is active for this leg. Possible values: answer, originate. For example, answer on leg 1; originate on leg 2
h323-call-type	Protocol type or family used on this leg of the call. Possible values: VoIP, Telephony
h323-ivr-out	User-definable attribute-value (AV) pairs sent from the NAS to the RADIUS server

RADIUS attributes for Internet billing

An Internet session consists of the following RADIUS requests:

- Authorize::NETACCESS
- Accounting::NETACCESS::Start
- Accounting::NETACCESS::Alive
- Accounting::NETACCESS::Stop

Authentication/Authorization requests

Currently, the following attributes are required for the correct processing of authentication/authorization requests:

Attribute	Description
User-Name (required)	This is the name of the user being authenticated by the RADIUS server.
Password	Encrypted password with PAP or CHAP authentication. Present only in an authentication request.
NAS-IP-Address (required)	Specifies the IP address of the network access server that is requesting authentication.
NAS-Port-Type	Indicates the type of the port on the network access server that is requesting authentication.
NAS-Port	Indicates the port on the network access server that is requesting authentication.
Service-Type	The type of service the user is requesting.
Framed-IP-Address	The IP address to assign to a user. It can be defined for a user under an account configuration or allocated by NAS from a pool of IP addresses. PortaBilling® can modify the Framed-IP-Address value depending on which NAS sends the request. PortaBilling® extracts the NAS IP address from the NAS-IP-Address attribute and checks for the IP mapping rule defined for the NAS on the Configuration server. The mapping rule defines the IP pool allocated to this NAS. If there is no mapping rule, PortaBilling® returns the static IP address assigned to the user in the Framed-IP-Address. Otherwise, it assigns the IP address to the user from the IP pool allocated to the NAS. To configure IP pool mapping, enter the `ippoolmapper=Porta::Extra::IPPoolMapper` string for the **LoadModules** option on the Configuration server. Then define the mapping

	rules for every NAS you use in your network in the **IniOptions** option.

Authentication/Authorization responses

The billing server can generate one of three responses to NAS:

- **Access Reject** – the user is unconditionally denied access to all requested network resources. Reasons may include failure to provide proof of identification or unknown or inactive user account.
- **Access Challenge** – additional information such as a secondary password, PIN, etc. is requested from the user. Access Challenge is also used in complex authentication dialogues.
- **Access Accept** – the user is granted access. Once the user is authenticated, the billing server will check that the user is authorized to use the network service requested.

Accounting requests

The focus of accounting is to track both network resources usage and traffic characteristics.

The following attributes are used for the correct processing of accounting requests:

Attribute	Description
Acct-Status-Type	The type of accounting message: Start, Alive, Stop.
Calling-Station-Id	The user's telephone number for a Dialup session, MAC address for a PPPoE session and the IP address for a PPP session.
Called-Station-Id	The telephone number the user calls for a Dialup session, MAC address for a PPPoE session and the user IP address for a PPP session.
Acct-Session-Time	Defines how long the user is connected (for Alive requests) or was connected (for Stop requests).
Acct-Session-Id	A unique identifier for the session.
Acct-Input-Octets	The user's outgoing traffic (in bytes).
Acct-Output-Octets	The user's incoming traffic (in bytes).
Acct-Input-Packets	Indicates the number of received packets.
Acct-Output-Packets	Indicates the number of sent packets.
User-Name	Indicates the name of the user for the accounting request.

NAS-IP-Address	Specifies the IP address of the network access server that is sending accounting requests

PortaBilling® custom attributes

All custom attributes conform to the VSA syntax. Attributes received by PortaBilling® from the NAS are entered into the `h323-ivr-out` attribute (VSA No. 1), encoded as `name:value` pairs. Attributes sent by PortaBilling® to the NAS are entered into the `h323-ivr-in` attribute (VSA No. 1), encoded as `name:value` pairs. The second form e.g., h323-ivr-out = PortaBilling_Session:value is used to simplify integration with historical third party equipment already supporting Cisco VSA dictionaries.

Unless otherwise specified, any custom attribute may only be included once for each request.

Attributes sent by a RADIUS client to the PortaBilling® server (h323-ivr-out)

PortaBilling_AuthMethod

This is the internal attribute used to describe the method of authentication or authorization requested by NAS application from the billing server. Normally the method is determined from service type and context automatically, but advanced applications (e.g., IVR) may override it. The value is used in billing logs to differentiate among request types.

Format:
```
PortaBilling_AuthMethod:<string>
```

Possible values:
INVITE, REFER, REGISTER for various SIP voice call authorizations

Example:
```
h323-ivr-out = 'PortaBilling_AuthMethod:INVITE'
```

PortaBilling_Authorize

This attribute is used by NAS to request a quota during authorization or reauthorization from the billing server. It is then returned to the NAS in the authorization response from the billing server with provided properties of a granted quota.

Format:
```
PortaBilling_AuthMethod:base=<rating_base>;<option1>=<value1>;<
option2>=<value2>;...
```

Possible values for the authorization request:

Option	Description
base	The rating base which the application can support for maintaining usage counters, for example session-time. In general, the application can support multiple base counters, so that the attribute can be presented multiple times
min	The minimum amount of units (>0) for this rating base till the next authorization. This value also informs the billing engine that the NAS is capable of sending re-authorization requests
max	The maximum amount of units (>0) for this rating base which the application is requesting. This represents the resource limit for authorizing this session
max_funds	The maximum amount of funds to be allocated for the session. This is optional, as fund limits are usually either set on the PortaBilling side, or computed dynamically based on the price and value provided in *max* option
expires	UNIX timestamp which defines the moment when the transaction is expected to start (for example, covering the delay before a call is established). Optional; defaults to authorization request time
max_expires	An estimate of when the maximum amount of units could be spent, in order to properly estimate the time for fund lock expiry. This helps to compute the speed (in seconds) at which the units are spent. It is only needed if the base units are not in seconds. For session-time, the billing engine can compute this as expires + max, with the spending speed as 1 unit per second. In general, the spending speed can be computed as max/(max_expires – expires)

Example:
```
h323-ivr-out = 'PortaBilling_Authorize:base=session-
time;max=10;min=5'
```

Possible values for the authorization response:

Option	Description
base	The rating base which the NAS should use to limit the resources
avail	The maximum amount of resource units available for the session. This can be omitted if there is another standard

	attribute for maximum session units provided (like h323-ivr-out=DURATION:); otherwise the default for this value is -1. If the value is negative, it means "infinite", and the session resources are not limited
expires	UNIX timestamp informing NAS of the moment when the relevant deposit lock will expire
retained	When the resource limit has been used, this number shows how many units were retained (not provided for this session) due to the limit

Example:
```
h323-ivr-in = 'PortaBilling_Authorize:base=session-
time;avail=10;retained=490;expires=1515660408'
```

PortaBilling_AccessCode

An access code for selecting a specific rate plan within a product. Although originally used to pass the "IVR access number" to billing, it may contain any string (e.g., "FIRSTCALL"). For Quintum compatibility, this attribute also has the synonym ACCESSCODE.

Format:
```
PortaBilling_AccessCode:<string>
```

Possible values:
Any string. The value passed will be compared to the values entered in the product's accessibility (case-sensitively).
1.   **Exact match** – any ASCII characters string without '|' and '.' equal to the PortaBilling access code to be matched (case-sensitively).
2.   **Dot separated match pattern** – the string which consists of the "domain" like string separated by dots (e.g., 'ivr.branding.4565'). It is split on dots and matched by the longest split, e.g., to match 'ivr.branding.4565' pattern against 'ivr.branding.4565', 'ivr.branding' and 'ivr'.
3.   **The '|' separated list of patterns** – the dot separated patterns are tried from the left and the first matching one will win. E.g., 'top.321|ivr.branding' matches in the order: 'top.321', 'top', 'ivr.branding', 'ivr'.

Example:
```
h323-ivr-out     = 'PortaBilling_AccessCode:18001234567'
```

PortaBilling_CallbackHistory

This provides information about the other (second) call leg of a call in th callback scenario, so that the first call leg can be billed properly (e.g., "do not bill the first leg if the second leg was not connected").
This attribute may be present multiple times in a request. Only the last occurrence is actually used, while the others are ignored.

Format:
```
PortaBilling_CallbackHistory:<string>
```

Possible values:

Value	Description
START	The first call leg was started
ATTEMPT	The callback engine attempted to establish an outgoing call for the second leg
OK	The second call leg was successfully connected

If there is no OK entry, the call leg will be billed using a special rate plan associated in the product configuration with the "CALLBACK_FAIL" access code.

Example:
```
h323-ivr-out       = 'PortaBilling_CallbackHistory:START'
h323-ivr-out       = 'PortaBilling_CallbackHistory:ATTEMPT'
h323-ivr-out       = 'PortaBilling_CallbackHistory:OK'
```

PortaBilling_Ignore_Password

This allows to bypass the password check during authentication or authorization.

Format:
```
PortaBilling_Ignore_Password:<YES|NO>
```

Possible values:
YES or NO.

Example:
```
h323-ivr-out       = PortaBilling_Ignore_Password:YES'
```

PortaBilling_Original_DNIS

This replaces the value of the Called-Station-Id attribute (i.e. the destination phone number used for call rating) to workaround specific call scenario when it cannot be set directly (e.g., when Cisco TCL scripts are used).

Format:
```
PortaBilling_Original_DNIS:<value>
```
where the value is a semicolon-separated list of `name:value` pairs.

Possible values:
E.164 phone number (a sequence of digits, * and/or # signs).

Example:
```
h323-ivr-out       = 'PortaBilling_Original_DNIS:19001234567'
```

PortaBilling_RestoreCacheLevel

This controls how the billing engine uses the account information retrieved during the authorization process for a request, in order to facilitate the processing of other requests. Its most common application is to disable this information for re-use, if for some reason information from the current request should not be applied to other call legs (e.g., in callback scripts).

Format:
```
PortaBilling_RestoreCacheLevel:<integer>
```

Possible values:

Value	Description
-1	Disable caching and reuse of account information.
0	Trust the account identified on the request, but not the billing access context
1	Trust both - the account and the billing access context associated with the request

Example:
```
h323-ivr-out      = ' PortaBilling_RestoreCacheLevel:-1'
```

PortaBilling_SelectCode

This contains a selection code dialed by a user to route a call via a particular routing plan. PortaBilling® matches the tariff within the product based on the routing plan selection.

Format:
```
PortaBilling_SelectCode:<value>
```

Possible values:
An integer identifying a routing plan select code (prefix).

Example:
```
h323-ivr-out = 'PortaBilling_SelectCode:11564'
```

PortaBilling_Session

This allows you to control an account's login session (sessions are used to prevent simultaneous logins by debit accounts). This attribute may be used in the accounting record for a specific call leg in order to force the session to be unlocked. (For instance, to force a session unlock on the answer/VoIP call leg, instead of the customary answer/Telephony call leg). An optional `expires` and `max-expires` parameters may control how long the session lock state is supposed to be held on the billing engine

(for example, to preserve the funds deposited for the session until the next radius message.)

Format:
```
PortaBilling_Session:<string>
PortaBilling_Session:<lockaction>[;open=stageid][;expires=<seco
nds>][;max_expires=<seconds>]
```

Possible lock values:

Value	Description
lock	Lock the account for the current session and unlock any other existing session for this account
nolock	Do not lock the account after the current request
unlock	Do not lock the account for the current session and unlock any other existing session for this account
ignore	Do not set or remove any locks, and skip any lock checks

Example:
```
h323-ivr-out       = 'PortaBilling_Session:nolock'
```

PortaBilling_SessionEnv

This allows specifying the value of i_env for request from internal NAS node. For normal nodes with already defined i_env value, this attribute will be ignored.

Format:
```
PortaBilling_SessionEnv:<int>
```

Example:
```
h323-ivr-out = 'PortaBilling_SessionEnv:3'
```

PortaOne-Access-Info

Provides the information about the access points in the authorization request from NAS. An access point identifies the way in which a user accesses services and how are they going to be charged. Multiple services can be allowed for a user in a product (e.g., ANI authentication, wholesale or callback); however, they must be clearly separated from each other to ensure correct billing. This is done by defining a rating entry for every service allowed in a product. PortaBilling uses this attribute to match the rating entry in the product configuration when authorizing a session.

Format:
```
PortaOne-Access-Info:<propertyname1=value1>;…
```

Example:
```
PortaOne-Access-Info = 'delegate=1;nas-ip-
address=10.10.10.10;user-name=14567238;access-code=OUTGOING'
```

PortaOne-Service-Type (formerly Service-Identifier)

This contains the identifier for a service in PortaBilling®.

Format:
```
PortaOne-Service-Type=<value>
```

Possible values:
A non-empty string identifying a service in PortaBilling®:
- Session – generic time-based service type; it can be used to apply charges for any service use based on the length of time the service was accessed.
- Voice – rating telephony calls (incoming or outgoing) made via PortaSIP®, VoIP gateways or other equipment.
- Data – data transfers rated using the amount transferred as the billing parameter.
- Netaccess – internet access sessions (DSL, PPPoE, etc.), rated based on session duration or the amount of transferred data.
- Quantity – generic quantity-based service type; can be used to apply charges for any service use expressible in numerical form (e.g., the number of pizzas ordered).
- Wifi – wireless Internet access sessions, rated based on session duration.
- Dialup – dialup Internet access sessions, rated based on session duration.
- Msg – rating messages (text, SMS, MMS, other) based on the number of messages sent.
- Conference – rating conference calls via PortaSIP® Media Server (or some conferencing server).
- Did – can be used to apply charges to customers for usage of DID numbers.

Example:
```
PortaOne-Service-Type=Conference
```

PortaOne-Called-Party

This provides information about the called party.

Format:
```
PortaOne-called-Party:<propertyname1=value1>;…
```

Properties:

Property	Description
id	This contains the caller ID information for the call. It is taken from the *P-Asserted-Identity* and *RPID* headers
display-id	This indicates the "Caller number" value

	that is taken from the From: header and typically displayed on the called party's phone display
privacy	This indicates that the calling party requests its identification to be kept private (hidden from the final call recipient.) Possible values: 1/0, default 0
name	This is a caller name. It is taken from the CLN field
site	The unique ID of the local cloud PBX site which the party belongs to
x-id	The caller's extension number configured on the PBX of a calling party / within the cloud PBX
x	The unique ID of the local cloud PBX (customer/head office) which the party belongs to
ctx-id	The unique identifier for the calling party's PBX
x-grp	Optional. The group setting for the call group pickup. The huntgroup extension, on behalf of which the call happened
media-time	The time the respective party spent connected to media on the call
bill-to	The account ID representing the entity in system. If not present, it means the party is from the outside network. The value can be used in User-Name if the respective party performs some action (e.g., becomes transferor).
net	The identifier of the network: • 0 for directly owned accounts. • >0 is an id of reseller.
e212	Code in MCC-MNC format (E.212) - mobile operator + network codes
roam-e212	The roaming identification of a caller in the MCC-MNC format (E.212)

Example:
```
h323-ivr-out    = 'PortaOne-Called-Party = 'ctx-
id=52333;name=EASYCALL;id=17289277770;display-
id=17289277770;net=0'
```

PortaOne-Calling-Party

This provides information about the calling party.

Format:
```
PortaOne-Calling-Party = <propertyname1=value1>;…
```

Properties:

Property	Description
id	This contains the caller ID information for the call. It is taken from the *P-Asserted-Identity* and *RPID* headers
display-id	This indicates the "Caller number" value that is taken from the From: header and typically

	displayed on the called party's phone display
privacy	This is a privacy flag which indicates that the calling party requests its identification to be kept private (hidden from the final call recipient.) Possible values: 1/0, default 0
name	This is a caller name. It is taken from the CLN field
site	The unique ID of the local cloud PBX site which the party belongs to
x-id	The caller's extension number configured on the PBX of a calling party
x-grp	The huntgroup extension, on behalf of which the call has happened
x	The unique identifier for the calling party PBX
media-time	The time the respective party spent connected to media on the call
bill-to	The account ID representing the entity in system. If not present, it means the party is from the outside network. The value can be used in User-Name if the respective party performs some action (e.g., becomes transferor).
net	The identifier of the network: • 0 for directly owned accounts. • >0 is an id of reseller.
ctx-id	The unique identifier for the calling party's PBX
e212	Code in MCC-MNC format (E.212) - mobile operator + network codes
roam-e212	The roaming identification of a caller in the MCC-MNC format (E.212)

Example:
```
h323-ivr-out    = 'PortaOne-Calling-Party =
'x=52333;name=EASYCALL;id=17289277770;display-id=17289277770''
```

PortaOne-Charge

This informs that the imported xDR must be charged.

Format:
```
PortaOne-Charge:<propertyname1=value1>;…
```

Properties:

Property	Description
apply	The request flag which defines when the charge is applicable for a certain entity-type. Possible values: • always - apply the charge regardless of context;

	• connection - the charge is applicable when a connection is matched; • never - the charge is not applied
commit	The request flag which defines the condition on which the sharges are to be committed to the database. Possible values: • always (default) - commit all created charges; • complete - the charges are only stored/committed if all charges relevant for the event are applied; • never - the charges are not stored at all. We recommend using it only for testing the "dry run" charging
report	The request flag to return charge resuts in the response
type	The type of charging. Possible values: • charge – to add additional charge amount • prerated – to additionally store it into Aux record (used only for requests)
entity-type	The type of the charged entity. Possible values: account/reseller/reseller[level]/vendor
storage-type	The type of the backend storage where this xDR record is added: Account/AccountFail, Customer/CustomerFail, Vendor/VendorFail, OnNet
charged-amount	The value of *xdr .charged_amount*
charged-quantity	The value of *xdr.charged_quantity* (in units/rating base according to the service)
i_account/i_customer/i_vendor	Identifier of the entity being charged
flag.*	The indicators associated with the charge. For example, flag.block=<threshold> informs that usage already passed into the discount stage, where the service is blocked and that it happened on a threshold with the given value

Example:

```
PortaOne-Charge = 'entity-type=account;apply=always'
PortaOne-Charge = 'type=charge;entity-type=account;charged-
amount=3.2;currency=USD;history=prerated'
```

PortaOne-Redirecting-Party

This provides information about the redirecting party in case the call is forwarded or transferred.

Format:
```
PortaOne-Redirecting-Party:<propertyname1=value1>;…
```

The properties and values are the same as for the *PortaOne-Calling-Party* attribute described above.

PortaOne-Media-Info

This provides information about the consumed bandwidth according to the formula reflecting the connectivity and media.

Format:
```
PortaOne-Media-Info:<propertyname1=value1>;…
```

Properties:

Property	Description
direction	Direction of the RTP stream on the leg relative to proxy
type	The mime type style description of the codec
ptime	The packetization time in milliseconds, which determines the amount of audio data included in a single packet
bitrate	The selected bitrate in bits per second
proxy	Indication of whether the RTP proxy was used. 0 - default

Example:
```
PortaOne-Media-Info =
'bitrate=64000;direction=in;type=audio/PCMU;proxy=1;ptime=20'
```

PortaOne-Geo-Location

This provides information about a user's geographical location when they use a service. The type of identification or it's precision may vary based on the service scenario

Format:
```
PortaOne-Geo-Location:<the geo location specifier in dot notation
starting with iso country code>
```

Example:
```
PortaOne-Geo-Location:fr.Paris
```

PortaOne-Service-Features

This attribute is used by NAS to request the service features (capabilities) which are supported for the service from the billing engine. The billing engine returns the indications of service features to be provided in the response.

Format:
`PortaOne-Service-Feature:<propertyname1=value1>;…`

The list of service features which can be requested/declared:

Name	Description
incoming-charge	The option to authorize incoming call to destination party as a separate event (this is the default capability of PortaSIP)
x-nas-ip-address	Reference to the cloud PBX (on-net managing) node to determine the context for cloud PBX features in case another node is requesting the features
x-nas-identifier	Reference to the cloud PBX (on-net managing) node to determine the context for cloud PBX features in case another node is requesting the features
aaa	The currently applied authentication, authorization and accounting mode, which defining what requests/events are sent to the billing engine
app-type	The type of the application (IVR) which requests the service features
routing	The indication to request routing and provide the routing results
sip	The indication to provide routes via the SIP transport protocol (NAS is capable of SIP routing)
h323	The indication to provide routes via the H323 transport protocol (NAS is capable of H323 routing)
direct-only	Indicates to bypass any routes which require a protocol conversion to be performed via converting node
proclaim-duration	NAS is capable of informing about available call duration separately from actual call duration limit (so tricky rating may be used)
bill-to	NAS is capable of replacing User-Name/billed entity on further authorization
translate-cld	NAS is capable of replacing CLD during authorization

pattern	NAS is capable of obtaining and delivering the rate pattern
max-depth	Defines the maximum number of hops allowed for the call to be redirected before reaching the destination
force-cleanup	Forces to immediately cleanup/charge on accounting request receipt. This is the indication that there is no point to cache and wait for other call info
local-lookup	Instructs the billing engine to search for the destination among local accounts
e212	Indicates that the destination is in the e212 format and that NAS is capable of/to process e212 destination in rating/routing
e164	Indicates that the destination is in the e164 format and that NAS is capable of/to process e164 destination in rating/routing
negotiable-mask	The mask of media and other supported features available for connecting
criteria	Indicates the capability of the NAS to process routing with the consideration of adaptive routing criteria
utilization	Indicates the capability of the NAS to rearrange routes in a list to according to the connection utilization parameter
points-required	Requires a routing response to include valid routes, otherwise the call should be rejected
charge-report	Requests accounting response with charge report filled in
commit-charge	Commit the charge to the database (default). It can be set to 0 to bypass commit to perform charging in a test mode

Example:
```
PortaOne-Service-Features = 'routing=1;'
```

PortaOne-Service-Action

This allows NAS to perform special actions when BE responds with the authorization.

Format:
```
PortaOne-Service-Action:action=<action type>;param1=<param1
value>;…
```

Example:
```
PortaOne-Service-Action = 'action=call-pickup;id=call-pickup;'
```

PortaOne-Transport-Protocol

This shows the transport protocol. Type can be one of the following:
- SIP
- H323
- SMS
- SMPP

Format:
```
PortaOne-Transport-Protocol = <type>
```

Example:
```
h323-ivr-out    ='PortaOne-Transport-Protocol = 'SIP''
```

PortaOne-Leg-Type

This shows whether the request is originate or answer. Type can be one of the following:
- 1 – answer request
- 2 – originate request

Format:
```
PortaOne-Leg-Type:<type>
```

Example:
```
h323-ivr-out    = PortaOne-Leg-Type = '1''
```

PortaOne-Leg-Origin

This shows the leg origin.

Format:
```
PortaOne-Leg-Origin:<type>
```

Example:
```
h323-ivr-out    = PortaOne-Leg-Origin = '0''
```

PortaOne-Used-Resource

This specifies the amount of used service units measured from the point when the service session identified in the h323_conf_id attribute becomes active.

Format:
```
PortaOne-Used-Resource:base=<base>;amount=<value>
```

Possible values:
<base> – one of: quantity, session-time
<value> – integer number specifying amount of measurement units.

Example:
```
PortaOne-Used-Resource = base=quantity;value=2
PortaOne-Used-Resource = base=session-time;value=70
```

Attributes sent by the PortaBilling® server to a RADIUS client (h323-ivr-in)

Attribute	A1	A2	Description
DURATION		Y	The maximum allowed call duration (in seconds)
Tariff	Y	Y	The name of the rate plan applied to the account within this session
available-funds	Y		For debit accounts, this is equal to the h323-credit-amount. For credit accounts, this returns the actual amount of available funds (the difference between the credit limit and the current balance with respect to the credit limits for the individual account and customer)
ErrorExplanation		Y	A rejection explanation string code, which can be used to identify a corresponding prompt or a message to play to an end user.
h323-preferred-lang	Y	Y	Language preference for the audio prompt
h323-credit-amount	Y		Amount of credit (in currency) in the account
h323-credit-time		Y	Amount of seconds for which the call is authorized
PortaBilling_UserName	Y	Y	The account ID to be used for billing this call
PortaBilling_RatePattern		Y	The rate pattern is a string used by PortaBilling® to match the corresponding rate code/destination during authorization of an account, instead of the Called-Station-Id

PortaBilling_AccessCode	Y	Y	Access code to be used for matching rating entry and tariff
PortaBilling_AccountBalance	Y		The current amount of the account's balance in PortaBilling®
PortaBilling_CustomerBalance	Y		The current amount of the customer's balance in PortaBilling®
PortaBilling_CustomerCreditLimit	Y		The customer's current credit limit in PortaBilling®
PortaBilling_CustomerCreditLimit Threshold	Y		The customer's current balance warning in PortaBilling®
PortaBilling_NodeId	Y		Provides the node identifier to the NAS
BalanceThreshold	Y		Indicates that a customer's balance warning threshold has been reached
PortaBilling_ProductBreakage	Y		The breakage amount of the account's product in PortaBilling®
PortaBilling_No_Disconnect_War ning		Y	Indicates that NAS won't play a "time left" warning (the remaining time announcement in seconds or a "beeping" sound) when a specified number of seconds is left before the call is disconnected (calls will be terminated silently)
Product		Y	Returns the name of the product associated with the user account

DURATION

This specifies the real allowed maximum call duration (in seconds), which may differ from the announced credit time if billing tricks are applied.

Format:
```
DURATION:<integer>
```

Possible values:
An unsigned integer (number of seconds).

Example:
```
h323-ivr-in      = 'DURATION:320'
```

Tariff

The name of the rate plan applied to the account within this session.

Format:
```
Tariff:<string>
```

Possible values:
Positive integer (number of seconds).

Example:
```
h323-ivr-in      = 'Tariff:ABC prepaid'
```

available-funds

This attribute returns the amount of account's available funds without considering any locked funds. For debit accounts, this is equal to the h323-credit-amount. For credit accounts, this returns the actual amount of available funds (the difference between the credit limit and the current balance with respect to the credit limits for the individual account and customer).

Format:
```
available-funds:<decimal>
```

Possible values:
Any positive number formatted with five decimal places; a dot (.) is used as the decimal separator.

Example:
```
h323-ivr-in      = ' available-funds:124.78000'
```

ErrorExplanation

This attribute returns a rejection explanation string code, which can be used to identify a corresponding prompt or a message to play to an end user. It is sent in the authentication response within the h323-ivr-in attribute.

Format:
```
ErrorExplanation:<string>
```

Possible values:
An explanation code string according to **RADIUS return codes**.

Example:

```
h323-ivr-in = "ErrorExplanation:invalid_account"
```

PortaBilling_UserName

The account ID to be used for billing this call. The RADIUS client **must** supply this value as the `User-Name` (or, alternatively, in `h323-ivr-out=PortaBilling_UserName`) attribute value in the accounting records for all call legs (incoming and outgoing).

Format:
```
PortaBilling_UserName:<value>
```

Possible values:
A non-empty string identifying an account in PortaBilling®.

Example:
```
h323-ivr-in     = 'PortaBilling_UserName:16051233355'
```

PortaBilling_RatePattern

The rate pattern is a string used by PortaBilling® to match the corresponding rate code/destination during authorization of an account, instead of the Called-Station-Id (e.g., when a customer is to be billed according to a special rate such as VOICEONNET, rather than according to the actual number dialed). The RADIUS client **must** supply this value as the `h323-ivr-out=PortaBilling_RatePattern` attribute value in the accounting records for all outgoing legs of this call.

Format:
```
PortaBilling_RatePattern :<value>
```

Possible values:
A non-empty string, usually a destination number in e.164 format.

Example:
```
h323-ivr-in     = 'PortaBilling_RatePattern:
18001234567|VOICE\ONNET\RX
```

PortaBilling_AccessCode

The string actually used by PortaBilling® to select a specific rate plan within a product. Although originally used to pass the "IVR access number" to billing, it may contain any string (e.g., "FIRSTCALL") or it can compose advanced pattern to best match against the access code configured in the product. NAS should copy this value into all future call accounting requests as h323-ivr-out=PortaBilling_AccessCode, in order to apply the same properties during billing.

Format:
```
PortaBilling_AccessCode:<value>
```

Possible values:

Any string. The value passed will be compared to the values entered in the product's accessibility (case-sensitively).

1. **Exact match** – any ASCII characters string without '|' and '.' equal to the PortaBilling access code to be matched (case-sensitively).
2. **Dot separated match pattern** – the string which consists of the "domain" like string separated by dots (e.g., 'ivr.branding.4565'). It is split on dots and matched by the longest split, e.g., to match 'ivr.branding.4565' pattern against 'ivr.branding.4565', 'ivr.branding' and 'ivr'.
3. **The '|' separated list of patterns** – the dot separated patterns are tried from the left and the first matching one will win. E.g., 'top.321|ivr.branding' matches in the order: 'top.321', 'top', 'ivr.branding', 'ivr'.

Example:
```
h323-ivr-in     =
'PortaBilling_AccessCode:18001234567|prepaid.tollfree'
```

PortaBilling_AccountBalance

The current amount of the account's balance in PortaBilling®.

Format:
```
PortaBilling_AccountBalance:<value>
```

Possible values:
A number with a precision of five decimal places.

Example:
```
h323-ivr-in     = 'PortaBilling_AccountBalance:13.20000'
```

PortaBilling_CustomerBalance

The current amount of the customer's balance in PortaBilling®.

Format:
```
PortaBilling_CustomerBalance:<value>
```

Possible values:
A number with a precision of five decimal places.

Example:
```
h323-ivr-in     = 'PortaBilling_CurstomerBalance:13.20000'
```

PortaBilling_CustomerCreditLimit

The current amount of the customer's credit limit in PortaBilling®.

Format:
```
PortaBilling_CustomerCreditLimit:<value>
```

Possible values:
A number with a precision of five decimal places.

Example:
```
h323-ivr-in     = 'PortaBilling_CustomerCreditLimit:13.00000'
```

PortaBilling_CustomerCreditLimitThreshold

The current amount of the customer's credit limit threshold in PortaBilling®. Note that the relative threshold limit is converted into an actual currency amount.

Format:
```
PortaBilling_CustomerCreditLimitThreshold:<value>
```

Possible values:
A number with a precision of five decimal places.

Example:
```
h323-ivr-in      =
'PortaBilling_CustomerCreditLimitThreshold:12.00000'
```

PortaBilling_Mod_<modulename>

This is a special form to exchange paramters of a specific module with PortaBilling®. The exact set of parameters depends on the module.

Format:
```
PortaBilling_Mod_<modulename>:[param1=value1;]...
```

Possible values:
Module specific

Example:
```
h323-ivr-out =
"PortaBilling_Mod_callback:username=cb44012235210;access-
code=1200123;cld=+44012235210;in-progress=45;pattern=
44012235210"
```

PortaBilling_NodeId

Provides the name of the NAS node (e.g., the hostname) used to identify it back to NAS. If no name is defined for NAS, it identifies itself with IP address.

Format:
```
PortaBilling_NodeId:<nodeid>
```

Possible values:
Any valid string

Example:
```
h323-ivr-out = 'PortaBilling_NodeId:nashost.domain.foo'
```

BalanceThreshold

Indicates that the customer's balance warning threshold has been reached.

Format:
```
BalanceThreshold:<value>
```

Possible values:
```
    YES
```

Example:
```
h323-ivr-in      = 'BalanceThreshold:YES'
```

PortaBilling_ProductBreakage

The breakage amount of the account's product in PortaBilling®.

Format:
```
PortaBilling_ProductBreakage:<value>
```

Possible values:
A number with a precision of five decimal places.

Example:
```
h323-ivr-in      = 'PortaBilling_ProductBreakage:0.02000'
```

PortaBilling_No_Disconnect_Warning

Indicates that NAS should cancel IVR/beep warnings before call session timeouts (calls will be terminated silently).

Format:
```
PortaBilling_No_Disconnect_Warning:<value>
```

Possible values:
```
    YES
```

Example:
```
h323-ivr-in      = 'PortaBilling_No_Disconnect_Warning:YES'
```

Product

This returns the name of the main product associated with the user's account in PortaBilling.

Format:
```
Product:<value>
```

Example:
```
h323-ivr-in = 'Product:Smartcard'
```

Customize RADIUS response attributes using templates

If you need to customize the default RADIUS response (e.g., because your NAS requires it or because the vendor anticipates additional attributes on their side), use templates. A template is a list of attribute-value definition strings in the form of

```
<attribute name> <operation> <value template>
```

These attribute operations are supported:
- **=** – this adds the attribute value, unless it is already present in the default response.
- **:=** – this overrides the attribute value in the default response.
- **+=** – this permits the addition of more than one attribute value to the default response.

The value template can be enclosed in single quote marks to permit whitespaces and may contain placeholders in the form of

```
${<name>[:[<modifier>]<default>]}
```

where:
- **name** is a variable available in the context of expanding the template. The default context contains the so-called "control" properties available during processing. For example:
  - **netaccess.speed_limit.name** – is the property `speed_limit.name` assigned in the context of a "netaccess" service type module and contains the name of the access policy applicable for the session
  - **netaccess.speed_limit.type** – is the access policy phase type
- **modifier** is one of the following:
  - **-** – a default one. It permits the substitution of the actual value if defined, otherwise, the substitution of a default value.
  - **=** – this permits the substitution of an empty string, but the assignment of the default value goes back to the variable in the previously specified context to be used later on.

- o **+** – this permits the substitution of a default value when the variable value IS defined. Otherwise, an empty string is substituted.
- o **?** – this permits the substitution of a default value when the variable value IS NOT defined. Otherwise, an empty string is substituted.
- **default** – the actual default value to be used can be expressed as $variable_name, in which case it expands to the value of the named variable.

RADIUS return codes

Return codes can be defined by the user through the implementation of the IVR script and RADIUS server agreement. The following table lists the return codes that are predefined and anticipated by existing Cisco IVR scripts.

Explanation code	h323-return-code	Description
success	0	Success, proceed
invalid_account	1	Failed - Invalid Account number
invalid_password	2	Failed - Invalid Password
account_in_use	3	Failed - Account in use
bandwidth_limit_exceeded	3	Failed - Bandwidth limit exceeded
call_limit_exceeded	3	Failed - Call limit exceeded
zero_balance	4	Failed - Zero balance
card_expired	5	Failed - Card expired
credit_limit	6	Failed - Credit limit
user_denied	7	Failed - User denied
user_suspended	7	Failed - User suspended
not_available	8	Failed - Service not available
cld_blocked	9	Failed - Called number blocked
cld_barred	9	Failed - CLD is barred
retries_exceeded	10	Failed - Number of retries exceeded
invalid_argument	11	Failed - Invalid argument
insufficient_balance	12	Failed - Insufficient balance
toll_free_allowed	13	Toll-free calls allowed
invalid_account	14	Failed - Invalid card number
pickup_invalid_cld	15	Failed - CLD is not allowed for pick up

hairpin_to_pstn	50	Call will be hairpinned back to the Public Switched Telephone Network (PSTN)
redirect	51	Redirect to called party (use redirect number)
redirect_to_cs	52	Redirect to customer Service (use redirect number)
redirect	53	Connect IP leg to redirect IP address (108)
cld_tmp_unavail	109	CLD is a local account which can't receive the call
cld_unassigned	110	CLD is unassigned in local DID inventory
cld_dial_error	111	CLD is not a valid dialed number
preselect_not_set	112	CLD doesn't define any selection code while no default is set
funds_locked	114	Failed - Funds are locked
reject_authorization	115	Reject authorization of already terminated session
spend_limit_exceeded	116	Failed - Account over its current spending budget
funds_locked	117	Failed - Insufficient funds allocated

2. PortaBilling Diameter interface

Diameter protocol

PortaBilling® uses the Diameter protocol as defined by RFC 6733 Diameter Base Protocol and RFC 4006 Diameter Credit-Control Application with additional AVPs defined in **3GPP TS 32.299** (version 12.0.0 Release 12) for real-time authentication, authorization and user accounting in IMS networks. By default, the billing server listens on port TCP 3868 to serve Diameter requests.

Interfaces

PortaBilling® supports the following Diameter interfaces:

- **Diameter Gy** interface for real-time content-based data service charging. It is based on the 3GPP standards and relies on quota allocation. Both time- and volume-based charging models are supported.
- **Diameter Ro** interface for real-time voice and SMS traffic charging. It supports two credit authorization modes:
    - direct debiting, wherein user funds are immediately deducted in one single operation (e.g., to charge for an SMS) and
    - unit reservation. In this case the exact amount of service units (e.g., seconds) required to provide the service is not known, thus, a segment of units is reserved and periodically updated for these types of sessions.

Diameter messages

Diameter is a message-based protocol, where information is exchanged on the basis of Request and Answer messages.

Diameter messages fall into two types, basic messages and application messages. PortaBilling® exchanges the following basic messages with the Diameter node according to RFC 6733:

- CER (Capabilities-Exchange-Request) and CEA (Capabilities-Exchange-Answer) to establish connection and exchange capabilities (protocol version, supported applications, supported security mechanism, etc.);
- DWR (Device-Watchdog-Request) and DWA (Device-Watchdog-Answer) to verify connection status if no messages have been exchanged for some time.

The following credit control application messages are sent to PortaBilling® for Gy and Ro interfaces:

Diameter message	Interface		Description
	Gy	Ro	
CCR (Credit-Control-Request)	Y	Y	This message is sent to request credit authorization for a given service. A single CCR request is sent for event-based charging (e.g., for SMS), when it is sure that the requested service event will be successful. In the case of session-based charging, multiple CCR messages are sent within the session. Thus, CCR messages can be of these types: • The initiation request (CCR-I) is sent when a subscriber logs in and AAA is requested to activate the subscriber's session. • The update request (CCR-U) is sent when a usage threshold is reached. The CCR-U reports the actual usage for all statistics. • The termination request (CCR-T) is sent to terminate a credit-control session and contains credit-control information relevant to the existing session. • The event request is sent in the case of a one-time scenario with direct debiting. It contains all the information relevant to the service.
CCA (Credit-Control-Answer)	Y	Y	This is the message to acknowledge the credit control request. Accordingly, CCA messages fall into: • CCA-I – indicates the success or failure to activate a subscriber's

			session depending on whether they have sufficient credit for the requested service. • CCA-U – is the response to the CCR-U message, wherein new quotas of credit resources (e.g., validity time or usage quotas) are returned. • CCA-T acknowledges the termination of the user session. • CCA message with the Event request type is the response to the request and contains the estimated total cost for the requested service.
RAR (Re-Auth-Request)	Y		This message is sent to initiate the credit re-authorization for a whole (sub-)session, a single credit pool, a single service, or a single rating-group. The Auth-Application-Id in the RAR message is set to 4 to indicate Diameter Credit Control, and the Re-Auth-Request-Type is set to AUTHORIZE_ONLY.
RAA (Re-Auth-Answer)	Y		This message is sent to acknowledge the RAR message and is followed by a Credit-Control-Request message with the CC-Request-Type AVP set to the value UPDATE_REQUEST. The Result-Code 2002 (DIAMETER_LIMITED_SUCCESS) SHOULD be used in the RAA message to indicate that an additional message (i.e., CCR message with an UPDATE_REQUEST value) is required to complete the procedure.

Attribute-Value Pairs

Diameter messages transport a collection of Attribute-Value Pairs (AVPs). An AVP is a container of data.

The table below lists mandatory AVPs for CCR and CCA messages.

AVP name	Message		Description
	CCR	**CCA**	
Session-Id	Y	Y	This identifies the operation session.
Origin-Host	Y	Y	This identifies the endpoint that originated the Diameter message.
Origin-Realm	Y	Y	This contains the Realm of the originator of any Diameter message and must be present in all messages.
Destination-Realm	Y		This contains the realm of the host that the message is to be routed to. The realm is addressed with the domain address of the corresponding public URI.
Result-Code		Y	This indicates whether a particular request is successfully completed or whether an error occurred. The Result-Code data field contains an IANA-managed 32-bit address space that represents errors.
Auth-Application-Id	Y	Y	This corresponds to the application ID of the Diameter Credit Control Application and is defined with the value 4.
Service-Context-Id	Y		This AVP contains a unique identifier for the Diameter Credit Control service specific document that applies to the request. This identifier is allocated by the service provider, by the service element manufacturer or by a standardization body. The format for the Service-Context-Id is: `service-context @ domain`, where:

			• "service-context" is an arbitrary string of characters and digits. • "domain" represents the entity that allocates the Service-Context-Id (e.g., ietf.org, 3gpp.org, etc.).
CC-Request-Type	Y	Y	This contains the reason for sending the credit-control request message. Possible values: • INITIAL_REQUEST • UPDATE_REQUEST • TERMINATION_REQUEST • EVENT_REQUEST
CC-Request-Number	Y	Y	This AVP contains the sequence number of the messages sent.
Currency-Code		Y	This specifies in which currency (ISO 4217) the values for AVPs containing monetary units are given.
Proxy-Host	Y	Y	This field contains the identity of the host that added the Proxy-Info field.
Proxy-State	Y	Y	This field contains state local information.
Subscription-Id-Data	Y		This field contains user data content, e.g., the MSISDN.
Subscription-Id-Type	Y		This field determines the identifier type, e.g., 0 is used for the international E.164 format according to the ITU-T E.164 numbering plan.

Diameter messages may also embed grouped AVPs (e.g., Multiple-Services-Credit-Control AVP). Grouped AVP have the same format as single AVPs except that the data field of grouped AVPs contains one or more AVPs rather than raw data.

For user authorization and charging, PortaBilling® maps Diameter message AVPs with PortaBilling® attributes as follows:

| Purpose	PortaBilling® attribute	DCCA AVPs
Determination of base units used for resource allocations	`h323-ivr-out=PortaBilling_Authorize:base`	`CC-Time, CC-Input-Octets, CC-Output-Octets, CC-Total-Octets, CC-Service-Specific-Units`
Reporting of units used (incremental charging)	`h323-ivr-out=PortaBilling_Authorize:delta-used`	`Used-Service-Unit`
Requesting the next units to be granted	`h323-ivr-out=PortaBilling_Authorize:max, h323-ivr-out=PortaBilling_Authorize:min`	`Requested-Service-Unit`
Limiting the time for session granted resources	`h323-ivr-in=PortaBilling_Authorize:expires`	`Validity-Timeout`
Responding with available (granted) units	`h323-ivr-in=PortaBilling_Authorize:avail`	`Granted-Service-Unit`
Charging context	`h323-ivr-out=PortaBilling_AccessCode, h323-ivr-out=PortaBilling_RatePattern, h323-ivr-in=PortaBilling_AccessCode, h323-ivr-in=PortaBilling_RatePattern`	`Rating-Group, Service-Identifier, Service-Context-ID`

3. External system provisioning framework

Overview

PortaBilling® is a real-time converged B/OSS and OCS system and the range of services you can provide and bill for extends the world of VoIP. For example, you can integrate PortaBilling® with an IPTV platform to provide IPTV services or with a mobile carrier's HSS and PCRF servers to operate as an MVNO and provide LTE services for your users. No matter which external system PortaBilling® integrates with, you must provision data (e.g., SIM card details for HSS) to it and keep all the data synchronized.

This is the job that the External System Provisioning Framework (ESPF) does. Changes in customers' billing or service configuration that occur in PortaBilling® are recorded as provisioning events. These events are queued in the system. The ESPF captures an event and sends it to the external system to update the data there (e.g., to update the channel package for the subscriber in the IPTV platform if the customer has purchased it via an add-on product in PortaBilling®).

The ESPF simplifies the integration with the external systems that you deploy in your network infrastructure. PortaBilling® provides a single location for data provisioning management.
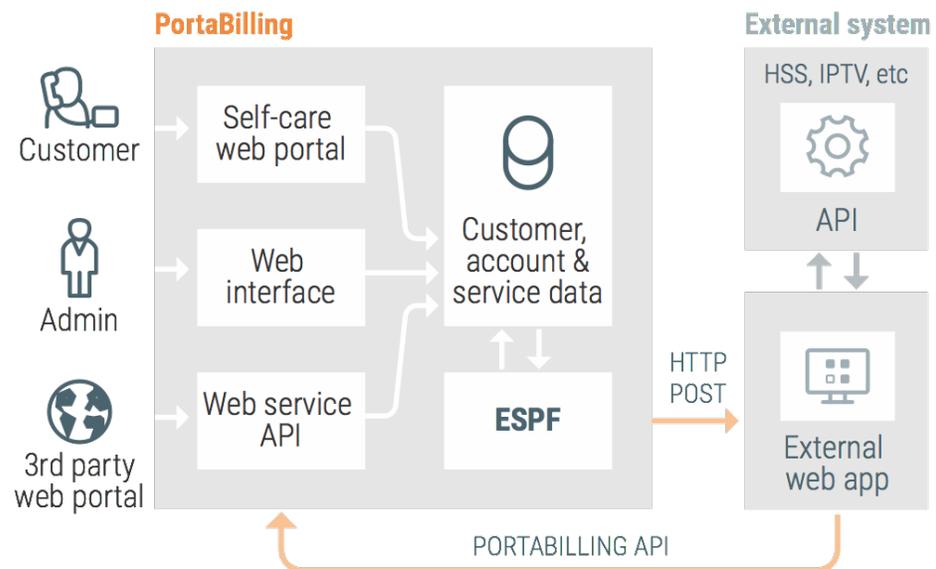
You can provision data to external systems using:

- dedicated event handlers. An event handler is a special Perl module in PortaBilling® that provisions a particular external system using this system's API. There is a separate handler for each external system that PortaBilling® is integrated with. If you need to integrate a new external system and provision data to it,

you can either create your own event handler or request development from PortaOne.

- webhooks. A webhook is an automated notification of an external application about provisioning events that happen in PortaBilling®. You develop an external application that communicates both with PortaBilling® and the external system. When an event occurs (e.g., an account is assigned a SIM card), the ESPF sends the HTTP POST request to the application's URL. The application reads it, retrieves the required information about the entity from PortaBilling® via the API and provisions the data to the external system.

Provisioning via event handlers

Every event handler provisions a particular external system. You subscribe it to provisioning events that the system requires and the event handler monitors the event queue for these events. When an event occurs, the event handler triggers the API call in the external system to perform the action there (e.g., activate the SIM card).
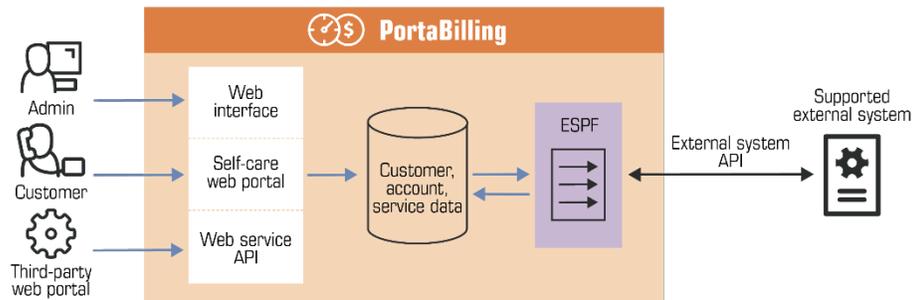
This is how it works in detail:

1. A database trigger is created for a particular table.
2. The database automatically executes the trigger in response to the defined event and the trigger inserts an event record into the Event_Queue table. The trigger also inserts a record to the Event_Notifications table, which stores the event status and the retry counter. This enables you to subscribe several event handlers to provision the same event.
3. The event record contains references to other tables with certain fields that can be provisioned to the external system (e.g., i_env, ID and balance of an account).
4. A handler subscribed for this event reads the record from the Event_Queue table and processes it by retrieving the required account or customer information from PortaBilling® via the API. This information differs for each external system (e.g., an HSS requires SIM card details while an IPTV platform requires a channel package name).

5. The handler provisions both the event and its data to the external system and receives a return code (whether the event was processed successfully or not) from it.
6. If the return code is successful, then ESPF changes the event status to "finished" for this handler in the Event_Notifications table. Otherwise, the handler tries to provision the event again until it is either provisioned or the amount of retries reaches its limit.
7. When all handlers provision this event, the ESPF cleans up the Event_Notifications table and removes the processed event from the Event_Queue table.

If an issue occurs during event provisioning, the corresponding error is written to the `provisioning.log` file. In addition, administrators can receive email notifications about provisioning event failures. On the Configuration server, they must specify an email address for the **Provisioning.AlertRecipient** option.

Also, the administrator can see the provisioning status of events (e.g., all, failed, queued, successful) and check event logs directly on the PortaBilling® web interface. If the provisioning to an external application fails, an administrator can re-start the provisioning in one click.

Configuration

To provision specific events to an external system, follow these steps:
1. Enable and configure the ESPF on the Configuration server web interface.
2. Check what handler supports the required events in **Appendix E. Events that ESPF handlers support**.
3. Add and configure the required event handler on the PortaBilling web interface.

4. Subscribe an event handler to specific events. By default, each event handler is subscribed to all supported events. You can disable specific events and re-enable them if needed.
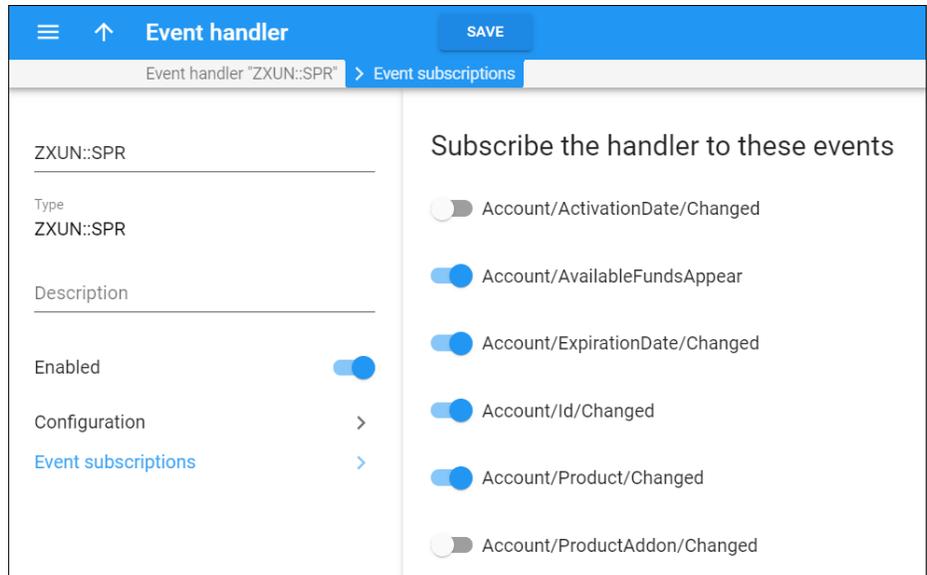
The administrator can check event subscriptions supported by added handlers on the **Event subscriptions** panel.

Provisioning via webhooks

This is an alternative approach to data provisioning. Webhooks allow your external application to receive notifications about provisioning events happening in PortaBilling®.
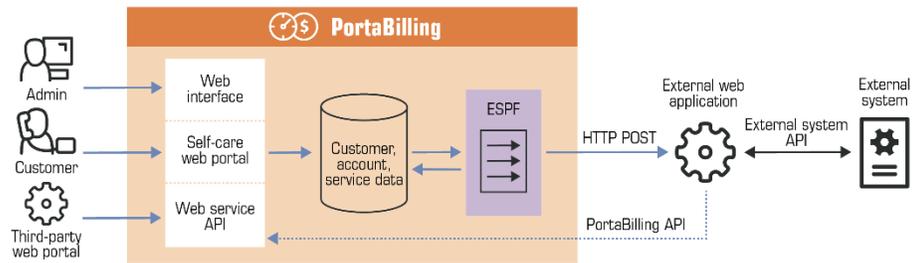
For simplicity, provisioning events are grouped into four category types:

- **Customer** – the event types of this group notify that a customer record has been created, updated or deleted in PortaBilling®.
- **Subscriber** – the event types of this group notify that an account record has been created, updated or deleted in PortaBilling®.
- **DID** – the event types of this group notify that a DID number has been added, updated (assigned to/unassigned from a customer or account) or deleted in PortaBilling®.
- **Invoice** – the event types of this group notify that an invoice has been created or updated (paid fully or partially, or refunded) in PortaBilling®.

An external application subscribes to receive these event types. Once an event occurs, the ESPF maps it to the corresponding event type and sends the HTTP POST request to the application's URL. The request body contains the event type and the ID of the provisioned entity in JSON format.

For example, when a new SIM card is assigned to a subscriber in PortaBilling®, the ESPF sends an HTTP POST request as follows:

```
http://127.X.X.X:5000:
{
    "event_type": "Subscriber/Updated",
    "variables": {
        "i_event": "5"
        "i_account": "1000889"
    }
}
```

Your application receives the request, queries the information related to this event type (SIM card details such as IMSI, MSISDN) from PortaBilling® via the API and triggers the API call in the HSS to activate the SIM card.

The `i_event` variable in the request enables the application to determine whether it is a new request or a retry. The application must be able to store requests, identify them by the `i_event` variable and check for retries.

In the case of a retry, the application verifies the request's status. If the request was already processed, the application responds with 200OK. Otherwise, the application treats it as a new request and processes it accordingly.

To illustrate the flow in detail, consider the following example:

An administrator creates a new account record in PortaBilling®. The ESPF sends the HTTP POST request with the **Subscriber/Created** event type and `i_event:5` to the external application. The application retrieves the account service configuration from PortaBilling® and provisions the external system. If the ESPF receives no response from the application during the timeout (e.g., 30 seconds), it resends the request.

The application determines that it is the same request (`i_event:5`) and searches its own event queue. If provisioning is successful but takes longer, the application does not attempt to provision that subscriber again. Otherwise, it re-provisions the external system.

When the ESPF sends several events that relate to the same entity (e.g., have the same `i_account` value), the application uses the `i_event` values to sort them in correct order.

Note that using the ESPF API, you can add events to the queue and schedule the time when they must be processed. Refer to the **Provisioning Application Reference guide** to see the configuration details and the example of the usage scenario.

Components

Your external application operates as the middleware between PortaBilling® and the external system it provisions. You can develop it in any programming language (e.g., Java, Python, etc.) and host it on a remote web server or in a cloud.

To provide an additional layer of security to communications between your external system and PortaBilling®, you can use a cryptographic signature for HTTP requests.

The ESPF sends HTTP POST requests using the EventSender handler. It supports all provisioning events and operates in asynchronous mode by default. To prevent system overload in case of large numbers of events, the EventSender controls the number of parallel requests. And, if necessary, you can always change the handler to operate in synchronous mode.

The ESPF can send HTTP POST requests to more than one external application. This enables you to provision data to several external systems at the same time.

For example, you integrate PortaBilling® with the HSS and the IPTV platform to provide both mobile and IPTV services. When you register a new account in PortaBilling®, the ESPF sends a provisioning request to both the HSS and the IPTV platforms.

If a user's service configuration includes only one service (e.g., IPTV), this request is useless for the HSS. Therefore, if a service is not used by a subscriber, make sure that the application to provision the HSS ignores it.

You can configure the ESPF to differentiate among provisioning data and send specific event types to each system. To make this happen, please contact PortaOne support. This configuration requires deep knowledge of ESPF architecture.

Provisioning event version

The EventSender handler supports both simplified and standard provisioning events. We recommend that you develop the external application to operate with the simplified events. If the simplified events do not meet the system's requirements for provisioning, you develop a web application to process the standard provisioning events.

Depending on an application's logic, you can now configure the ESPF to send a desired version of the provisioning events on the PortaBilling web interface. Specify the value for the **EventSender.APIVersion** option on the **EventSender > Configuration** panel:

- 1 stands for standard provisioning events, and
- 2 – for simplified provisioning events.
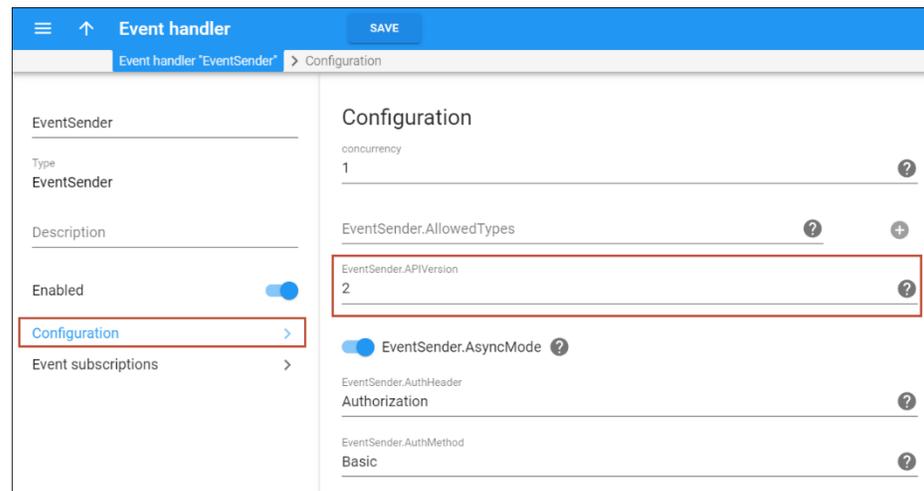
The external systems you provision may require different event versions. For example, the HSS requires standard events while the CRM system you integrate with PortaBilling® can be provisioned using the simplified events. In this case, fine-tune the ESPF to send the correct version to either application:

1. Configure the default event version for the ESPF as described above. All applications operate with it when you add more external systems to your infrastructure.
2. Define the event version for a particular web application. Enter the following string in the **ESPF.CustomIniOptions** option on the Configuration server:

```
[EventSender]APIVersionForReceivers=https://mycompany.com=version,
```

where:

- `https://mycompany.com` is the URL of the web application, and
- `version` is the provisioning event version value.

Configuration

Please refer to the **Provisioning Application Reference Guide** for guidelines on how to develop an external application to provision data from PortaSwitch®.

Supported event handlers

Built-in integrations

PortaBilling® is supplied with these handlers to provision data to external systems:

- **AricentHSS** – this handler provisions subscriber information such as the user's phone number and SIM card details to the Aricent HSS and Adax HSS. It also provisions subscriber's service configuration (static IP address, quality of service information).
- **AudioCodes** – this handler provisions subscriber information such as the user's phone number, SIM card details, status, registration (SIP parameters), mobile device (IMEI, language, etc.) and custom configurations to the AudioCodes CMMS (Clients' Management Server).
- **Bridgewater** – this handler provisions subscriber information such as company/user name, phone number and service configuration (e.g., customer class, product) to Bridgewater, the service controller for WiMAX networks.
- **Calix** – this handler provisions ONT device information such as FSAN serial number plus account and service configuration data (e.g., account status, bandwidth profile ID within the Internet

service policy) to the Calix Management System, the platform that controls Internet service availability for subscribers in fiber-optic networks such as GPON/Active Ethernet.

- **CLDB** – this handler provisions subscriber information (account ID, MAC address), billing status and service configuration data (e.g., product, speed limit changes) to the external database CLDB.
- **ECConnect** – this handler provisions subscriber information such as service configuration (allowed services), billing status and SIM card details (MSISDN, ICCID) to the ECConnect Access Portal (EAP) platform. EAP acts as the middleware between PortaBilling® and the Optus mobile core to activate mobile services for subscribers.
- **EventSender** – this is a universal handler to provision any external system. Since it sends HTTP POST requests with provisioning events to an external application, it's the middleware between PortaSwitch® and an external system. The application can be written in any programming language. It must be able to process provisioning events and communicate with PortaSwitch® and the external system via their API.
- **Huawei::HSS** – this handler provisions subscriber information such as the user's phone number and SIM card details to the Huawei HSS.
- **Huawei::PCRF** – this handler provisions the subscriber's service configuration (service and policy name, QoS parameters) to Huawei PCRF.
- **IPTV** – this handler provisions available channel information to one of the PortaSwitch® supported IPTV platforms (i.e., MatrixStream, Minerva, Telebreeze IPTV) when either new or existing customers sign up for the IPTV service.
- **Jasper** – this handler provisions subscriber and SIM card information to the Cisco Jasper connectivity management platform.
- **Kleos::HSS** – this handler provisions subscriber information such as the user's phone number, their SIM card details and account's status to Greenisis HSS.
- **Kleos::PCRF** – this handler provisions the subscriber's service configuration (service and policy name) to Greenisis PCRF.
- **LIMADispatcher** – this handler provisions subscriber information such as company/user name, phone number, follow-me number changes to the Lima Platform.
- **NBBS** – this handler provisions user device information to the Motorola NBBS Device Management Platform when a new CPE is added to the CPE inventory in PortaBilling® and also when a device is assigned to or removed from an account.

- **NetNumber** – this handler provisions ported-in numbers to the NetNumber SMS/MMS database.
- **Protei::HLR** – this handler provisions subscriber information such as the user's phone number, SIM card details and their account's status to Protei HSS (for centralized user authentication across the network).
- **Protei::PCRF** – this handler provisions the subscriber's service configuration to PCRF (to allocate the correct policy/QoS parameters to the customer).
- **ReadyWireless** – this handler provisions the subscriber's phone number and device (IMEI) to ReadyWireless MVNE to trigger device activation/deactivation.
- **Sandvine** – this handler provisions subscriber details such as username, static IP address/netmask, service provider identifier and Internet access policy details to Sandvine SPB (Subscriber Policy Broker). Sandvine SPB is a component of the Sandvine DPI (Deep Packet Inspection) solution. It enables you to shape network traffic and introduce policy enforcement on a per-subscriber basis.
- **Titan::HSS** – this handler provisions subscriber information such as the user's phone number and SIM card details to NetNumber Titan HSS. It also provisions subscriber's service configuration – Regular upload/download limits for Internet access, APN (Access Point Name) ID, Roaming profile ID.
- **YateHSS** – this handler provisions subscriber information such as the user's phone number, their SIM card details and user's status to Yate HSS/HLR.
- **ZXUN::HSS** – this handler provisions subscriber information such as the user's phone number, SIM card details and their account status to the ZTE HSS.
- **ZXUN::SPR** – this handler provisions the subscriber's service configuration, user's phone number and SIM card details to the ZTE SPR.

Internal handlers

Changes in customer, product and service configuration influence the configuration of accounts in PortaBilling®. For example, when a customer reaches their credit limit, services are no longer available to their credit accounts until the customer's balance is refilled.

To reduce the load on the system in such cases, ESPF is supplied with handlers that process product, customer and service configuration events, and then create events for accounts and place them in the event queue:

- **CustomerToAccountsDispatcher** – this handler processes customer status changes and provisions them to all customer accounts.

- **ProductToAccountsDispatcher** – this handler processes all changes at the product level and provisions them to an account that has this product assigned to it.
- **ServiceAttributeDispatcher** – this handler provisions changes in service configuration to both customers and accounts. You can specify filters for this event handler so you reduce the number of queries to the database. See the **Filters** section for details.

This handler processes events within PortaBilling®:

- **SIPForwarder** – this handler is used when an account is moved from one system to another. It provisions information about an account and/or the DID number location to the dispatching SBC in the Dual Version PortaSwitch® deployment.

These handlers can be used as templates for developing custom handlers:

- **DemoHandler** – this handler is an example of the event handler. Use it to create a custom handler.
- **Sokoban::Log** – this handler writes the data into the log file (testing, debugging, etc.).

Supported event types

The ESPF is supplied with the following set of provisioning event types:

Name	Description	Variables	Inherited from Customer
AccessPolicy/Changed	An Internet access policy was updated	i_env, i_access_policy	
AccessPolicy/Phase/New	A new Internet access policy phase was added	i_env, i_access_policy	
AccessPolicy/Phase/Changed	An Internet access policy phase was updated	i_env, i_access_policy	
AccessPolicy/Phase/Changed	An Internet access policy phase was deleted	i_env, i_access_policy	
Accessibility/Deleted	The usage charges record has been removed from the account's product.	i_env, i_product, i_accessibility	
Accessibility/Inserted	A usage charges record has been added to the accounts product.	i_env, i_product, i_accessibility	
Account/ActivationDate/Changed	The activation date has been changed for an account. (Accounts.activation_date has been changed)	i_env, i_account, prev_activation_date, curr_activation_date	
Account/AccessPolicy/Changed	The Internet access policy was updated for the account	i_env, i_account, i_access_policy	
Account/Alias/Delete	An alias has been removed from an account.	i_env, i_master_account, id	

Account/AvailableFundsAppear	An account's available funds are restored when a debit account tops up the balance or when a postpaid customer pays their invoice. (Accounts.balance has been topped up from credit_limit.) I_account.	i_env, i_account	Y
Account/BalanceChanged	The balance of a debit or individual credit account has changed (e.g., a call has been charged, a refill has been received). A customer's balance has changed for postpaid customers.	i_env, i_account, prev_balance, curr_balance	Y
Account/Blocked	An account has been blocked. (Accounts.blocked set to 'Y.')	i_env, i_account	
Account/CustomField/Changed	Custom information (e.g., ID card) has been added or changed for an account. (The Custom_Field_Values table has been updated for the account.)	i_env, i_account, field_name, prev_value, curr_value	
Account/Discount/Changed	An account's discount plan has changed.	i_env, i_account, prev_i_vd_plan, curr_i_vd_plan	
Account/ExpirationDate/ Changed	An account's expiration date has changed. (Accounts.expiration_date has been changed.)	i_env, i_account, prev_expiration_date, curr_expiration_date	
Account/FollowMe/Changed	An account's follow-me setting has changed (the Follow_Me table has been updated).	i_env, i_account	

Account/FollowMeNumber/ Inserted	A new follow-me number has been added to an account.	i_env, i_account, i_follow_me, i_follow_me_number, curr_redirect_number
Account/FollowMeNumber/ Changed	An account's follow-me number has changed.	i_env, i_account, i_follow_me, i_follow_me_number, curr_redirect_number, prev_redirect_number
Account/FollowMeNumber/ Deleted	An account's follow-me number has been removed.	i_env, i_account, i_follow_me, i_follow_me_number, prev_redirect_number
Account/ID/Changed	An account's ID has changed. (Account.id has been updated.)	i_env, i_account, prev_id, curr_id
Account/IPDeviceAssignment	An IP device has been assigned to an account (the UA_Links table has been updated).	i_env, i_account, prev_ua, prev_port, prev_config, i_ua, port, config
Account/New	A new account has been created.	i_env, i_account
Account/Password/Changed	An account's password for the self-care interface has changed. (Accounts.password has been changed.)	i_env, i_account, prev_password, curr_password

Account/Product/Changed	Another product was assigned to the account. An account's product has changed. (Account.i_product has been updated.)	i_env, i_account, prev_product, curr_product	
Account/ProductAddon/Changed	An account's add-on product has been changed.	i_env, i_account, i_addon_product	
Account/ProductAddon/Deleted	An add-on product has been removed from an account.	i_env, i_account, prev_i_addon_product	
Account/ProductAddon/Inserted	A new add-on product has been added for an account.	i_env, i_account, curr_i_addon_product	
Account/Service/QuotaAvailable	The account's service usage quota has been restored (quota counter has been reset or user topped up their service wallet).	i_env, i_account, i_service, i_vd_dg	
Account/Service/QuotaExceeded	An account has exceeded its service usage quota.	i_env, i_account, i_service, i_vd_dg	
Account/Service/Msg/QuotaExceeded	An account's service usage quota for messaging service type has expired	i_env, i_account, i_service	
Account/Service/Netaccess/QuotaExceeded	An account's Internet access quota has expired	i_env, i_account, i_service	
Account/ServiceAttribute/Changed	A service feature has been enabled/disabled for an account (the Service_Attribute_Values table has been updated).	i_env, i_account, feature_name, attribute_name, old_value	Y
Account/ServiceFlags/Changed	An account's service features have changed. (Accounts.service_flags has been updated.)	i_env, i_account, account_prev_service_flags	Y

Account/ServicePassword/ Changed	An account's service password has been changed.(Accounts.h323_password has been changed.)	i_env, i_account, prev_h323_pwd, curr_h323_pwd	
Account/SIMCardAssignment	A SIM card has been assigned to, removed from or changed for an account.	i_env, i_account, prev_i_sim, i_sim	
Account/Status/Changed	An account's billing status has been changed or affected by the customer's billing status. A customer's status has changed. (Customers.bill_status has changed.)	i_env, i_account, prev_status, new_status	Y
Account/Status/Closed	The status of the account has changed to Closed. The account has been removed from the web interface. (Accounts.bill_status set to 'C.') This event type appears when a customer is terminated.	i_env, i_account	Y
Account/Status/Exported	An account has been exported by Porter in Dual Version PortaSwitch®. (Customers.bill_status set to E.)	i_env, i_account	Y
Account/Status/Imported	An account has been imported by Porter in Dual Version PortaSwitch®.	i_env, i_account	Y

Account/Status/Suspend	An account's status has changed to suspended because of a customer's suspension. Caused by: Customer has unpaid invoice. (Customers.bill_status set to 'S.')	i_env, i_account	Y
Account/Status/Unsuspend	An account has been unsuspended; due to removing of the customer's suspension. A customer's account has been reinstated. (Customers.bill_status set to 'O' from 'S.')	i_env, i_account	Y
Account/Unblocked	An account has been unblocked. (Accounts.blocked set to 'N.')	i_env, i_account	
Account/ZeroAvailableFunds	An account's available funds have been depleted. (Accounts.balance has reached credit_limit [for credit accounts] or 0 [for debit accounts.])	i_env, i_account	Y
Connection/Changed	The connection information has been updated.	i_env, i_vendor, i_connection, prev_remote_ip	
Connection/Deleted	The connection has been removed from the vendor.	i_env, i_vendor, i_connection, i_connection_type, prev_remote_ip	
Connection/New	A new connection has been created for the vendor.	i_env, i_vendor, i_connection,	

Custom/Jasper/CapReached	External event received from Jasper Platform.	i_env, i_account	
Customer/AvailableFundsAppear	A customer has topped up his balance	i_env, i_customer	
Customer/BalanceChanged	A customer's balance has changed (e.g., a subscription charge has been applied or a refund has been issued)	i_env, i_customer, prev_balance, curr_balance	
Customer/CustomField/ Changed	The data in a customer's custom field has changed (the Custom_Field_Values table has been updated for the customer).	i_env, i_customer, field_name, prev_value, curr_value	
Customer/Deleted	The customer's record has been removed from the customer list.	i_env, i_customer, i_customer_class, name	
Customer/Name/Changed	The customer's name has changed.	i_env, i_customer, prev_name, curr_name	
Customer/New	A new customer has been created.	i_env, i_customer	
Customer/ServiceAttribute/ Changed	A customer's service setting has changed (the Service_Attribute_Values table has been updated).	i_env, i_customer, feature_name, attribute_name, old_value	
Customer/ServiceFlags/ Changed	A customer's service features have changed. (Customers.service_flags has been updated.)	i_env, i_customer, prev_service_flags	
Customer/Status/Activated	A customer's record has been activated. (Customers.bill_status set to 'O' from 'D.')	i_env, i_customer	
Customer/Status/Changed	A customer's status has changed. (Customers.bill_status has been updated.)	i_env, i_customer, prev_status, new_status	

Customer/Status/Closed	A customer has been terminated and their status changed to closed. (Customers.bill_status set to 'C.')	i_env, i_customer	
Customer/Status/Deactivated	A customer's record has been deactivated. (Customers.bill_status set to 'D' from 'O.')	i_env, i_customer	
Customer/Status/Exported	A customer's record status has changed. (Customers.bill_status set to E.)	i_env, i_customer, prev_status	
Customer/Status/Imported	A customer's record status has changed. (Customers.bill_status set to O.)	i_env, i_customer, new_status	
Customer/Status/Suspend	A customer's account has been suspended. (Customers.bill_status has been updated.)	i_env, i_customer	
Customer/Status/Unsuspend	A customer's account has been reinstated. (Customers.bill_status set to 'O' from 'S.')	i_env, i_customer	
Customer/Unblocked	A customer's account has been unblocked. (Customers.blocked set to 'N.')	i_env, i_customer	
Customer/ZeroAvailableFunds	A customer's available funds have been depleted. (Customers.balance has reached credit_limit.)	i_env, i_customer	
CustomField/Changed	A customer's custom data has changed (the Custom_Field_Values table has been updated).	i_account, i_env, curr_value, prev_value, field_name	

CustomerSite/ServiceAttribute/ Changed	A service configuration has changed for a customer class (the Service_Attribute_Values table has been updated).	i_env, i_customer_site, feature_name, attribute_name, old_value
DID/New	A new DID number has been added to the DID inventory.	i_env, number
DID/Status/Assigned	A DID number has been assigned to a customer.	i_env, number, prev_customer
DID/Status/Unassigned	A DID number has been removed from a customer.	i_env, number, prev_customer
DID/Status/Activated	A DID number has been assigned to a customer's account ID.	i_env, number
DID/Status/Canceled	A DID number has been unassigned from a customer's account ID.	i_env, number
DID/Status/Moved	A DID number has been moved to another installation as a result of provisioning.	i_env, number
DID/Deleted	A DID number has been removed from the DID inventory.	i_env, number
Invoice/Adjustment/ Changed	An invoice has been adjusted (refunded) by an administrator.	i_env, i_customer, invoice_number, amount_net, i_invoice_type, i_invoice_status, adjustments, prev_adjustments

Invoice/AmountPaid/Changed	This is the amount a customer has paid. Use this event to track and provision: - manual payment information; - partially paid invoice changes.	i_env, i_customer, invoice_number, amount_net, i_invoice_type, i_invoice_status, amount_paid, prev_amount_paid	
Invoice/New	A new invoice has been generated.	i_env, i_customer, invoice_number, amount_net, i_invoice_type, i_invoice_status	

| Invoice/Status/Changed | An invoice has changed its status (e.g., from unpaid to paid, from unpaid to overdue).

Use this event to track and provision information:
• about the payment statuses of generated invoices:
   - unpaid;
   - overdue;
   - paid;
   - partially paid;
   - do not pay;
   - no payment required;
   - previous balance remaining;
• about the statuses of invoices that require administrator's approval:
   - under review;
   - approved;
   - rejected.

Refer to the *Invoice parameters* and *Invoices review* chapters in the **PortaBilling Administrator Guide** for the description of these statuses.

Note that if a customer pays their invoice in installments, the Invoice/Status/Changed event occurs twice for this invoice: | i_env, i_customer, invoice_number, amount_net, i_invoice_type, prev_i_invoice_status, i_invoice_status | |

	- first event – changes from unpaid to partially paid; - second – changes from partially paid to paid in full. For example, a customer pays their $110 invoice in installments (e.g., $25+$20+$35+$30). Events occur when: - the first $25 payment is made: the invoice status changes from unpaid to partially paid; - the last $30 payment is made: the invoice status changes from partially paid to paid.		
IPDeviceProfile/New	A CPE profile has been created.	i_env, i_ua_profile	
PaymentTransaction/New	A customer has made a credit card payment.	i_env, i_payment_transaction, test_mode, status, amount, iso_4217	
PaymentTransaction/ ResultCode/Changed	A transaction has either started or finished.	i_env, i_payment_transaction, test_mode, status, amount, iso_4217, result_code, prev_result_code	

PaymentTransaction/Status/ Changed	A transaction has changed its status.	i_env, i_payment_transaction, test_mode, prev_status, status, amount, iso_4217
Product/AccessPolicy/Changed	The Internet access policy has been updated for a product	i_env, i_product, i_access_policy
Product/Discount/ Changed	A discount plan has been changed for a product or an add-on product.	i_env, i_product, prev_i_vd_plan, curr_i_vd_plan, addon_priority
Product/ServiceAttribute/ Changed	A service feature has been enabled/disabled for a product or an add-on product.	i_env, i_product, feature_name, attribute_name, old_value
ServiceAttribute/Changed	A service feature has been enabled/disabled for either a product, add-on product, customer or account.	i_savalue, i_foreign, i_attribute, old_value
Subscriber/Address/Changed	The address of a user registered as an account has changed.	i_env, i_subscriber, prev_baddr1... prev_baddr5, curr_baddr1 ... curr_baddr5, prev_state, curr_state, prev_zip, curr_zip, prev_city, curr_city, prev_country, curr_country

Subscriber/ContactInfo/Changed	The account's contact information has been changed.	i_env, i_subscriber, prev_phone1, curr_phone1, prev_phone2, curr_phone2, prev_cont1, curr_cont1, prev_cont2, curr_cont2, prev_faxnum, curr_faxnum, prev_email, curr_email, prev_bcc, curr_bcc	
Subscriber/Name/Changed	The user's name registered as an account has been changed.	i_env, i_subscriber, prev_companyname, curr_companyname, prev_salutation, curr_salutation, prev_firstname, curr_firstname, prev_midinit, curr_midinit, prev_lastname, curr_lastname	

Filters

The ServiceAttributeDispatcher event handler generates provisioning events with each change in service configuration. For some services (e.g., LTE), it must only provision changes related to that service. Thus, if an account uses Internet access and an LTE service, provisioning events must be triggered only when the LTE service configuration changes.

The flexible filtering mechanism does just that. When enabled for the ServiceAttributeDispatcher event handler, it only tracks the changes of particular service attributes and triggers provisioning events. This reduces the number of queries to the database and speeds up provisioning.

Supported filters:

lte

This filter is applicable to LTE-related handlers: AricentHSS, Kleos::HSS, Kleos::PCRF, Huawei::HSS, Huawei::PCRF, Titan::HSS, ZXUN::HSS, ZXUN::SPR, YateHSS, Protei::PCRF.

When enabled, it tracks only the changes in the Internet access Policy and their respective attributes: Internet Access Policy name, PDP/PDN Context ID. It also tracks changes of the Static IP service feature. Changes within all other service features and attributes are ignored.

Enable this filter only if you do not need to provision other service attribute changes (e.g., for IPTV services, etc.) and have not enabled other handlers that subscribe to them.

To enable a filter, execute the following command:
```
/home/provisioning-framework/utils/evctl.pl handler filter
ServiceAttributeDispatcher lte
```

To disable a filter, execute the following command:
```
/home/provisioning-framework/utils/evctl.pl handler filter
ServiceAttributeDispatcher none
```

As a result, the filter name is displayed right after the handler name:
```
/home/provisioning-framework/utils/evctl.pl handler list
enabled
```

ID	Handler	Enabled	Description
3	ServiceAttributeDispatcher|lte	Yes	Dispatch events to Accounts/Customers
122	Huawei::HSS	Yes	Huawei HSS LTE provisioning

123	Huawei::PCRF	Yes	Huawei PCRF LTE provisioning

Provisioning asynchronous systems

When you integrate PortaBilling® with complex external systems, this may imply the provisioning of several of their subsystems (e.g., to provision the mobile core, you must provision data to the HSS and the PCRF). This can take time, as such systems have to wait for responses from their subsystems. Therefore, they provision the data asynchronously: a system accepts the request and sends notifications with the provisioning status (e.g., an hour later).

With the ESPF API interface you can process these notifications and store the provisioning status for an account in PortaBilling®. Consequently, you can verify your customer's service activation and it also simplifies the provisioning of asynchronous systems.

You build the external application to provision subscriber data from PortaBilling® and process notifications from your external system. Thus, the application must:
1. Receive provisioning events from the ESPF;
2. Query the obligatory subscriber data via the PortaBilling® API;
3. Send the subscriber data to the external system using that system's API;
4. Receive and process notifications from the external system;
5. Update the provisioning status for the account via the ESPF API.
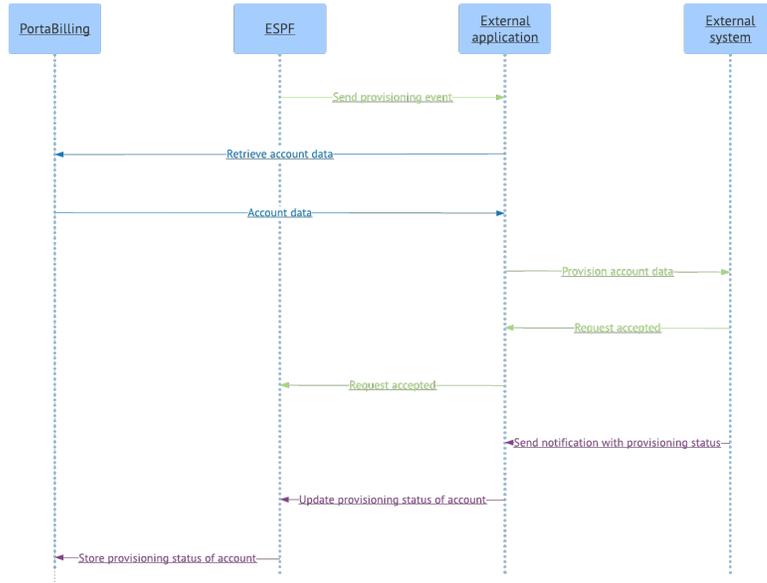
The ESPF API is available under this URL:

```
https://<portabilling-
web.yourdomain.com>/espf/v1/account/i/<i_account>/status
```
where:

- `portabilling-web.yourdomain.com` is the hostname of your PortaBilling® web server;
- `v1` is the provisioning event version;
- `i_account` is the unique ID of the PortaBilling® account; and
- `status` is the account's provisioning status.

You can also update the account's provisioning status by using the account ID. Then the URL to send requests to changes to:

```
https://<portabilling-web.yourdomain.com>/espf/v1/account/
<account_ID>/status
```

The authorization is done using the PortaBilling® administrative user's API credentials.

The API request must include these parameters in JSON format:

Parameter	Description
status	The account's provisioning status. Possible values: • OK – the provisioning is successful; • IN_PROGRESS – the provisioning is in progress;

	• RETRY – a retry is initiated after the initial failure; • FAILED – the provisioning failed.
group	A group organizes the provisioning requests per the external system (e.g., the IPTV group is used to identify provisioning requests to an IPTV platform). When the external system sends notifications, a group servers to distinguish them and store the account's provisioning status. You can use any group name to store the account's provisioning status. First, register this group in PortaSwitch® and then pass its name to the ESPF in the API request. These groups are already registered in PortaSwitch®: • VoIP; • HSS; • PCRF; • IPTV; • WiMAX; • Netaccess; • NumberPortability; and • LawfulInterception.

This example illustrates how it works:
Let's say you integrate PortaBilling® with the Order Management System (OMS) to provision the mobile core. The OMS is asynchronous and sends notifications about the provisioning status.

A new account with `i_account=189` is created in PortaBilling® and the ESPF sends the Account/New event to the external application.

The external application queries the SIM card details from PortaBilling® via the API and provisions this data to the OMS. The OMS accepts the event and replies with 200OK to the external application. In 10 minutes, the OMS platform processes the event and sends the HTTP notification with the provisioning status to the external application. The external application sends the API request to the ESPF to update the account provisioning status:

```
POST
Request URL: https://mybilling.com/espf/v1/account/i/189/status
HTTP/1.1
Host: https://mybilling.com
Content-Length: 19
```

```
Content-Type: application/x-www-form-urlencoded

{
 "status": "OK ",
 "group" : "HSS"
}
```

Configuration particularities

Consider the following points when configuring the ESPF:

- Enabling triggers on events causes additional load to the database;
- Each triggered event can be processed by more than one event handler. In this case, the event will be removed from the Event_Queue table only after the last handler processes it.
- To subscribe an event handler to all events that it supports execute the following command:
  ```
  /home/provisioning-framework/utils/evctl.pl handler
  sub <event_handler_name>
  ```
- To see the ESPF help, execute the following command:
  ```
  /home/provisioning-framework/utils/evctl.pl --help
  ```
- To ensure that your custom modifications remain on your servers during a software upgrade, list them in the Deposits page on the Configuration server web interface.

An example of a request processing script

Below is a 7-line script that was created using Flask (a python microframework). Execute the following command in Linux to install Flask using **pip** (a package management system used to install and manage software packages written in Python):

```
sudo pip install flask
```

The script receives requests with data from a handler and writes the data into the log file:

```python
from flask import Flask, request
app = Flask(__name__)
@app.route('/test', methods=['POST', 'GET'])
def test():
    print(request.get_data())
    return "<h1>OK</h1>"
app.run(debug=True, port=3000, host="0.0.0.0")
```

76

4. Appendices

Appendix A. Examples of RADIUS communication

Failed login (Authentication failure)

Authentication request

```
NAS-IP-Address = '193.38.81.226'
User-Name  = '11380441234567'
Calling-Station-Id = '11380441234567'
Service-Type = '15'
h323-conf-id = 'BEEF0960 159C48A3 5CA4966B 7536B52C'
call-id = '94fef899-3f606c5c@192.168.192.59'
Digest-Username = '11380441234567'
Digest-Realm = '193.38.81.226'
Digest-Nonce = '1373028145:4ed5168d6120ae148bc32520fdf6bba2'
Digest-URI = 'sip:193.38.81.226'
Digest-Method = 'REGISTER'
Digest-Algorithm = 'MD5'
Digest-Response = '1984af4a0e13ceb54ae86e015e934bc5'
h323-remote-address = '192.168.192.59'
NAS-Port = '5060'
```

Authentication reject response

```
Reply-Message = Failed - Invalid Account number
h323-return-code = 1
h323-ivr-in = ErrorExplanation:invalid_account
```

Failed outgoing call (Authorization failure)

Authorization request

```
NAS-IP-Address = '193.38.81.226'
User-Name = '380441234567'
Called-Station-Id = '91245684289'
Calling-Station-Id = '380441234567'
h323-conf-id = 'BC0050CE E4B011E2 B062000C 29E9476D'
call-id  = 'f7442be6-3c18ddd@192.168.192.59'
Digest-Username = '380441234567'
Digest-Realm = '193.38.81.226'
Digest-Nonce = '51bec9bb7e2276edaf48b8572a3f72300ec0'
Digest-URI = 'sip:91245684289@193.38.81.226'
Digest-Method = 'INVITE'
Digest-Algorithm = 'MD5'
Digest-Response = '35139c9d1c67dd3192a02158d93eea50'
h323-remote-address = '192.168.192.59'
h323-session-protocol = 'sipv2'
h323-ivr-out = 'PortaBilling_AuthMethod:INVITE'
PortaOne-Service-Features = 'routing=1;version=25.0'
h323-ivr-out = 'PortaBilling_Seed:2912511541'
PortaOne-Calling-Party = 'name=380441234567'
h323-ivr-out =
'PortaSIP_Aux_Info:auth_life=134455/1/0;auth_cnt=1;CC_now=13445
5/1;pid=17785;request_type=routing'
NAS-Port  = '5060'
```

Authorization reject response

```
Reply-Message = Failed - Called number blocked
h323-return-code = 9
h323-ivr-in = ErrorExplanation:cld_blocked
h323-ivr-in = Product:EasyCall Residential
h323-ivr-in = Tariff:EasyCall Residential
h323-ivr-in = PortaBilling_NodeId:193.38.81.226
h323-ivr-in = PortaBilling_AccessCode:OUTGOING
h323-ivr-in = PortaBilling_Seed:1599467173
h323-billing-model = 0
h323-currency = USD
h323-preferred-lang = en
```

Successful prepaid card IVR session

Authentication request

```
NAS-IP-Address      = '164.9.9.100'
NAS-Port-Type       = 'Async'
User-Name           = '10086610975'
Calling-Station-Id  = '6045550193'
Service-Type        = 'Login-User'
h323-conf-id        = '39AE126B CD4D11DB 958E0014 1C3F6886'
Password            = ''
h323-ivr-out        = 'PortaBilling_AccessCode:6045551600'
h323-ivr-out        = 'transactionID:526267'
NAS-Port            = '0'
NAS-Port-Id         = 'ISDN 3/0:D:13'
```

Authentication response

```
h323-credit-amount  = 10.00
h323-billing-model  = 1
h323-ivr-in         = Tariff:PrepaidCard
h323-ivr-in         = PortaBilling_AccountBalance:10.00000
h323-ivr-in         = PortaBilling_ProductBreakage:0.00000
h323-ivr-in         = available-funds:10.00
h323-return-code    = 0
h323-currency       = CAD
h323-preferred-lang = en
```

Authorization request

```
NAS-IP-Address      = '164.9.9.100'
User-Name           = '10086610975'
Called-Station-Id   = '01182623634515'
Calling-Station-Id  = '6045550193'
Service-Type        = 'Login-User'
h323-conf-id        = '39AE126B CD4D11DB 958E0014 1C3F6886'
Password            = ''
h323-ivr-out        = 'PortaBilling_Seed:18879071672'
h323-ivr-out        = 'PortaBilling_Original_CLD:6045551600'
h323-ivr-out        = 'transactionID:526273'
```

Authorization response

```
h323-billing-model  = 1
h323-ivr-in         = Tariff:PrepaidCard
h323-ivr-in         = PortaBilling_CompleteNumber:82623634515
h323-ivr-in         = PortaBilling_Auth_CLD:82623634515
h323-ivr-in         = PortaBilling_Auth_Reseller_CLD:82623634515
h323-ivr-in         = DURATION:30000
```

```
h323-return-code      = 0
h323-currency         = CAD
h323-credit-time      = 30000
h323-preferred-lang   = en
```

Accounting request (outgoing call leg)

```
NAS-IP-Address        = '164.9.9.100'
User-Name             = '10086610975'
Called-Station-Id     = '82623634515'
Calling-Station-Id    = '6045550193'
Acct-Status-Type      = 'Stop'
Service-Type          = 'Login-User'
h323-call-origin      = 'originate'
h323-call-type        = 'VoIP'
h323-setup-time       = '00:16:18.192 PST Fri Mar 9 2007'
h323-connect-time     = '00:16:21.164 PST Fri Mar 9 2007'
h323-disconnect-time  = '00:17:31.893 PST Fri Mar 9 2007'
h323-disconnect-cause = '10'
h323-conf-id          = '39AE126B CD4D11DB 958E0014 1C3F6886'
call-id               = '4A65E46C-CD4D11DB-886EDEBF-
7AF0CBAB@164.9.9.100'
h323-incoming-conf-id = '39AE126B CD4D11DB 958E0014 1C3F6886'
h323-ivr-out          = 'PortaBilling_Original_CLD:6045551600'
h323-ivr-out          = 'PortaBilling_Seed:18879071672'
h323-remote-address   = '164.9.9.101'
remote-media-address  = '164.9.9.101'
```

Accounting request (incoming call leg)

```
NAS-IP-Address        = '164.9.9.100'
NAS-Port-Type         = 'Async'
User-Name             = '10086610975'
Called-Station-Id     = '6045551600'
Calling-Station-Id    = '6045550193'
Acct-Status-Type      = 'Stop'
Service-Type          = 'Login-User'
h323-call-origin      = 'answer'
h323-call-type        = 'Telephony'
h323-setup-time       = '00:15:50.148 PST Fri Mar 9 2007'
h323-connect-time     = '00:15:50.156 PST Fri Mar 9 2007'
h323-disconnect-time  = '00:17:31.889 PST Fri Mar 9 2007'
h323-disconnect-cause = '10'
h323-conf-id          = '39AE126B CD4D11DB 958E0014 1C3F6886'
h323-incoming-conf-id = '39AE126B CD4D11DB 958E0014 1C3F6886'
h323-ivr-out          = 'PortaBilling_Session:unlock'
h323-ivr-out          = 'Tariff:Unknown'
NAS-Port              = '0'
NAS-Port-Id           = 'ISDN 3/0:D:13'
```

SIP routing request

Authorization request

```
NAS-IP-Address = '193.28.87.217'
User-Name = '193.38.81.226'
Called-Station-Id = '12125468754'
Calling-Station-Id = '380441234567'
h323-conf-id = 'FD0158BA E2F911E2 B062000C 29E9476D'
call-id = '482bb2cb-aa0eada5@192.168.192.59~1o'
Password = 'cisco'
h323-remote-address = '193.38.81.226'
h323-session-protocol = 'sipv2'
h323-ivr-out = 'PortaBilling_AuthMethod:INVITE'
```

```
PortaOne-Service-Features = 'routing=1;version=25.0'
h323-ivr-out = 'PortaBilling_Seed:2567011031'
PortaOne-Calling-Party = 'id=380441234567;name=11380441234567'
h323-ivr-out = 'PortaBilling_Ignore_Password:YES'
h323-ivr-out =
'PortaSIP_Aux_Info:auth_life=164498/1/0;auth_cnt=1;CC_now=16449
8/1;pid=19218;request_type=routing'
NAS-Port = '5060'
```

Authorization response

```
h323-return-code = 13
h323-ivr-in = PortaBilling_CompleteNumber:12125468754
h323-ivr-in = Product:PortaOne Internal
h323-ivr-in = Tariff:Internal
h323-ivr-in = PortaBilling_NodeId:193.38.81.217
h323-ivr-in = PortaBilling_AccessCode:OUTGOING
h323-ivr-in = PortaBilling_Seed:2567011031
h323-ivr-in = PortaBilling_RatePattern:12125468754
h323-ivr-in = PortaBilling_Authorize:base=session-time;avail=-
1;expires=1373028131
h323-billing-model = 0
PortaOne-Service-Features = moh=1;rec=2;rtpp-level=3
PortaOne-Calling-Party =
name=11380441234567;id=380441234567;display-id=380441234567
h323-currency = USD
h323-preferred-lang = en
Framed-Route = r=;g-hunt=seq
Framed-Route = P_=;g-hunt=skip;expires=300;patience=20
Framed-Route =
p__=65.174.119.133;auth=AA14CF3595B86BF7B1C7B0458626C288DD5B419
1C0B759A3
Framed-Route = p__=69.25.184.13;rtpp-level=3
```

Callback session

First call leg authorization

```
NAS-IP-Address       = "142.179.71.220"
User-Name            = "00099900113"
Called-Station-Id    = "00099900113"
Calling-Station-Id   = "00099900113"
h323-conf-id         = "2F01F3F6 B89192B8 711B0000 1C7A0F2A "
Password             = "secret"
h323-remote-address  = "193.28.87.193"
h323-ivr-out         = "PortaBilling_OriginalCLD:555333"
h323-ivr-out         = "PortaBilling_AuthMethod:INVITE"
h323-ivr-out         = "PortaBilling_Seed:4094388346"
Message-Authenticator = '84C47B0BDC12887A60D2C5167C740A'
```

Second call leg authorization

```
NAS-IP-Address       = "142.179.71.220"
User-Name            = "00099900113"
Called-Station-Id    = "00099900111"
Calling-Station-Id   = "00099900222"
h323-conf-id         = "2F01F3F6 B89192B8 711B0000 1C7A0F2A"
Password             = "secret"
h323-ivr-out         = "PortaBilling_OriginalCLD:OUT"
h323-ivr-out         = "PortaBilling_AuthMethod:INVITE"
```

```
h323-ivr-out               =
PortaBilling_Notify:another_cld=00099900113;another_orig_cld=55
5333;in_progess=13"
h323-ivr-out               = "PortaBilling_Seed:4094388346"
Message-Authenticator = '12C47B0B16412247A60D2C5167C718C'
```

Second call leg 1, accounting for failed call attempt

```
NAS-IP-Address          = 142.179.71.220
h323-call-origin        = "originate"
h323-call-type          = "VoIP"
h323-setup-time         = "11:34:20.677 GMT Fri Feb 23 2007"
User-Name               = "00099900113"
Calling-Station-Id      = "00099900113"
Called-Station-Id       = "000999002222"
h323-incoming-conf-id   = "2F01F3F6 B89192B8 711B0000 1C7A0F2A"
h323-conf-id            = "11111111 B89192B8 711B0000 1C7A0F2A"
Acct-Session-Id         = "B89192B8-66BC43D89"
h323-disconnect-time    = "11:34:30.677 GMT Fri Feb 23 2007"
h323-connect-time       = "11:34:30.677 GMT Fri Feb 23 2007"
h323-ivr-out            = "PortaBilling_Seed:4094388346"
h323-remote-address     = "10.28.87.193"
h323-ivr-out            = "PortaBilling_OriginalCLD:OUT"
Acct-Session-Time       = 0
h323-disconnect-cause   = "1C"
Acct-Status-Type        = Stop
```

Second call leg, accounting for connected call

```
NAS-IP-Address          = 142.179.71.220
h323-call-origin        = "originate"
h323-call-type          = "VoIP"
h323-setup-time         = "11:34:35.677 GMT Fri Feb 23 2007"
User-Name               = "00099900113"
Calling-Station-Id      = "00099900113"
Called-Station-Id       = "00099900222"
h323-incoming-conf-id   = "2F01F3F6 B89192B8 711B0000 1C7A0F2A"
h323-conf-id            = "11111111 B89192B8 711B0000 1C7A0F2A"
Acct-Session-Id         = "B89192B8-66BC43D89"
h323-disconnect-time    = "11:34:30.677 GMT Fri Feb 23 2007"
h323-connect-time       = "11:36:32.677 GMT Fri Feb 23 2007"
h323-ivr-out            = "PortaBilling_Seed:4094388346"
h323-remote-address     = "10.28.87.200"
h323-ivr-out            = "PortaBilling_OriginalCLD:OUT"
Acct-Session-Time       = 122
h323-disconnect-cause   = "0"
Acct-Status-Type        = Stop
```

First call leg accounting

```
NAS-IP-Address          = 142.179.71.220
h323-call-origin        = "originate"
h323-call-type          = "VoIP"
h323-setup-time         = "11:33:38.677 GMT Fri Feb 23 2007"
User-Name               = "00099900113"
Calling-Station-Id      = "00099900113"
Called-Station-Id       = "00099900113"
h323-ivr-out            = PortaBilling_CallbackHistory:START
h323-ivr-out            = PortaBilling_CallbackHistory:ATTEMPT
h323-ivr-out            = PortaBilling_CallbackHistory:ATTEMPT
h323-ivr-out            = PortaBilling_CallbackHistory:OK
h323-conf-id            = "2F01F3F6 B89192B8 711B0000 1C7A0F2A"
Acct-Session-Id         = "B89192B8-66BC43D89"
h323-disconnect-time    = "11:34:18.677 GMT Fri Feb 23 2007"
h323-connect-time       = "11:35:18.677 GMT Fri Feb 23 2007"
h323-ivr-out            = "PortaBilling_Seed:4094388346"
h323-remote-address     = "10.28.87.200"
```

```
h323-ivr-out          = "PortaBilling_OriginalCLD:555333"
Acct-Session-Time     = 60
h323-disconnect-cause = "0"
Acct-Status-Type      = Stop
Acct-Delay-Time       = 0
```

Voucher recharge session

Voucher recharge request

```
NAS-IP-Address        = '127.0.0.102'
User-Name             = '02001'
Calling-Station-Id    = '02001'
h323-conf-id          = '01010101 00000000 00000000 00000012'
h323-conf-id = 'PortaBilling_Session:ignore'
h323-ivr-out =
'PortaBilling_Mod_ivrutil:action=rechargeVoucher;id=111222336'
h323-ivr-out          = 'PortaBilling_Original_CLD:01inbound'
h323-ivr-out = 'PortaBilling_Ignore_Password:YES'
```

Voucher recharge response

```
h323-ivr-in           = PortaBilling_AccessCode:01inbound
h323-ivr-in =
'PortaBilling_Mod_ivrutil:action=rechargeVoucher;amount=50.00000'
h323-ivr-in           = PortaBilling_RechargedAmount:50.00000
h323-ivr-in           = Tariff:T_SubService_1
h323-ivr-in           = available-funds:60.00
h323-return-code      = 0
h323-credit-amount    = 60.00
h323-currency         = USD
h323-preferred-lang   = en
```

Music download service requests

Authorization request

```
NAS-IP-Address        = '192.168.100.50'
User-Name             = '0101'
Password              = 'secret'
Called-Station-Id     = 'JAZZ'
h323-conf-id          = 'A5D3B74C D26411DC 98D5001D 090C82FA'
PortaOne-Service-Type = Quantity
```

Authorization response (for credit account without credit limit)

```
h323-billing-model = 0
h323-ivr-in        = Tariff:Music Account
h323-ivr-in        = PortaBilling_CompleteNumber:JAZZ
h323-ivr-in        = PortaBilling_Auth_CLD:JAZZ
h323-return-code   = 13
h323-currency      = USD
h323-preferred-lang = en
Message-Authenticator = '1D86D5B0BDC33987A60D5C6167B13D91'
```

Authorization response (for debit account)

```
h323-billing-model = 1
h323-ivr-in        = Tariff:Music Account
h323-ivr-in        = DURATION:10
h323-ivr-in        = PortaBilling_CompleteNumber:JAZZ
```

```
h323-ivr-in         = PortaBilling_Auth_CLD:JAZZ
h323-return-code    = 0
h323-currency       = USD
h323-credit-time    = 10
h323-preferred-lang = en
```

Accounting request

```
NAS-IP-Address        = '192.168.100.50'
User-Name             = '0101'
Called-Station-Id     = 'JAZZ'
Acct-Status-Type      = 'Stop'
h323-call-origin      = 'originate'
h323-call-type        = 'Telephony'
h323-setup-time       = '07:18:35.965 GMT Mon Feb 6 2008'
h323-connect-time     = '07:18:43.965 GMT Mon Feb 6 2008'
h323-disconnect-time  = '08:11:38.965 GMT Mon Feb 6 2008'
h323-disconnect-cause = '0'
h323-conf-id          = 'A5D3B74C D26411DC 98D5001D 090C82FA'
Acct-Session-Id       = 'da6b76'
Acct-Session-Time     = '3175'
PortaOne-Service-Type = Quantity
h323-ivr-out          = 'Used-Service-Unit:1'
```

Internet session

Authorization request

```
NAS-IP-Address              = '41.213.1.32'
NAS-Port-Type               = 'Ethernet'
User-Name                   = 'GP4899@ibhighspeed.co.za'
Called-Station-Id           = 'pppoe-service1'
Calling-Station-Id          = 'E4:8D:8C:EE:1A:26'
Service-Type                = 'Framed-User'
Mikrotik-Realm              = 'ibhighspeed.co.za'
Unknown-Attribute           = 'unknown vendor: attr
{311, 10, 0, 17, "ibhighspeed.co.za"}'
Framed-Protocol             = 'PPP'
Event-Timestamp             = '1514299872'
NAS-Identifier              = 'WDSL_PPPoE2_MDC'
Password                    = 'password1'
NAS-Port                    = '15760440'
NAS-Port-Id                 = 'vlan140'
```

Authorization response

```
Service-Type                = 'Framed-User'
Session-Timeout             = '0'
Ascend-Data-Rate            = '20000000'
Idle-Timeout                = '86400'
Framed-IP-Address           = '41.213.82.27'
Ascend-Xmit-Rate            = '20000000'
Framed-IP-Netmask           = '255.255.255.255'
Framed-MTU                  = '1500'
```

Start Accounting request

```
NAS-IP-Address              = '41.213.1.32'
NAS-Port-Type               = 'Ethernet'
User-Name                   = 'GP4899@ibhighspeed.co.za'
```

```
Called-Station-Id                   = 'pppoe-service1'
Calling-Station-Id                  = 'E4:8D:8C:EE:1A:26'
Acct-Status-Type                    = 'Start'
Service-Type                        = 'Framed-User'
Acct-Session-Id                     = '81707b87'
Acct-Delay-Time                     = '0'
Mikrotik-Realm                      = 'ibhighspeed.co.za'
Unknown-Attribute                   = 'unknown vendor: attr
{311, 10, 0, 17, "ibhighspeed.co.za"}'
Acct-Authentic                      = 'RADIUS'
NAS-Port-Id                         = 'vlan140'
Framed-Protocol                     = 'PPP'
NAS-Identifier                      = 'WDSL_PPPoE2_MDC'
Event-Timestamp                     = '1514299872'
Framed-IP-Address                   = '41.213.82.27'
NAS-Port                            = '15760440'
```

Keep-Alive Accounting request

```
NAS-IP-Address                      = '41.213.1.32'
NAS-Port-Type                       = 'Ethernet'
User-Name                           = 'GP4899@ibhighspeed.co.za'
Called-Station-Id                   = 'pppoe-service1'
Calling-Station-Id                  = 'E4:8D:8C:EE:1A:26'
Acct-Status-Type                    = 'Alive'
Service-Type                        = 'Framed-User'
Acct-Session-Id                     = '81707b87'
Acct-Input-Octets                   = '1013118'
Acct-Output-Octets                  = '599107'
Acct-Input-Packets                  = '3494'
Acct-Output-Packets                 = '3082'
Acct-Session-Time                   = '1800'
Acct-Delay-Time                     = '0'
Mikrotik-Realm                      = 'ibhighspeed.co.za'
Unknown-Attribute                   = 'unknown vendor: attr
{311, 10, 0, 17, "ibhighspeed.co.za"}'
Idle-Timeout                        = '86400'
NAS-Identifier                      = 'WDSL_PPPoE2_MDC'
Framed-IP-Address                   = '41.213.82.27'
Session-Timeout                     = '0'
Unknown-Attribute                   = 'unknown code: attr {0,
197, 0, 4, "\0011-\000"}'
Acct-Output-Gigawords               = '0'
Acct-Authentic                      = 'RADIUS'
NAS-Port-Id                         = 'vlan140'
Framed-Protocol                     = 'PPP'
Event-Timestamp                     = '1514301672'
Acct-Input-Gigawords                = '0'
Ascend-Xmit-Rate                    = '20000000'
NAS-Port                            = '15760440'
```

Stop Accounting request

```
NAS-IP-Address                      = '41.213.1.32'
NAS-Port-Type                       = 'Ethernet'
User-Name                           = 'GP4899@ibhighspeed.co.za'
Called-Station-Id                   = 'pppoe-service1'
Calling-Station-Id                  = 'E4:8D:8C:EE:1A:26'
Acct-Status-Type                    = 'Stop'
Service-Type                        = 'Framed-User'
Acct-Session-Id                     = '81707b87'
```

```
Acct-Input-Octets                = '2668094'
Acct-Output-Octets               = '65615636'
Acct-Input-Packets               = '20697'
Acct-Output-Packets              = '52139'
Acct-Session-Time                = '3725'
Acct-Delay-Time                  = '0'
Mikrotik-Realm                   = 'ibhighspeed.co.za'
Unknown-Attribute                = 'unknown vendor: attr
{311, 10, 0, 17, "ibhighspeed.co.za"}'
Idle-Timeout                     = '86400'
Acct-Terminate-Cause             = 'Lost-Carrier'
NAS-Identifier                   = 'WDSL_PPPoE2_MDC'
Framed-IP-Address                = '41.213.82.27'
Session-Timeout                  = '0'
Unknown-Attribute                = 'unknown code: attr {0,
197, 0, 4, "\0011-\000"}'
Acct-Output-Gigawords            = '0'
Acct-Authentic                   = 'RADIUS'
NAS-Port-Id                      = 'vlan140'
Framed-Protocol                  = 'PPP'
Event-Timestamp                  = '1514303597'
Acct-Input-Gigawords             = '0'
Ascend-Xmit-Rate                 = '20000000'
NAS-Port                         = '15760440'
```

xDR import post-processing

Accounting request, originate leg

```
NAS-IP-Address = 127.0.0.101
NAS-Port-Id = IMPORT 01
User-Name = 01004
Called-Station-Id = 01020
Calling-Station-Id = 01004
Acct-Status-Type = Stop
PortaOne-Service-Type = Voice
h323-call-origin = originate
h323-call-type = Telephony
PortaOne-Service-Features = charge-report=1
h323-setup-time = 10:44:24.000 CEST Mon Mar 30 2009
h323-connect-time = 10:44:34.000 CEST Mon Mar 30 2009
h323-disconnect-time = 10:48:24.000 CEST Mon Mar 30 2009
h323-conf-id = 01010101 00000000 00000000 16000023
Acct-Session-Time = 230
Acct-Delay-Time = 86400
h323-ivr-out = PortaBilling_RatePattern:01020
h323-ivr-out = PortaBilling_Session:unlock
```

Accounting request, charge report:

```
h323-ivr-in = PortaBilling_Session:id=01010101 00000000
00000000 16000023;i_service_type=3;i_env=3;valid=1
PortaOne-Charge = type=account;storage-type=Account;charged-
amount=0.00005;charged-quantity=10;i_account=500055
PortaOne-Charge = type=reseller;storage-type=Customer;charged-
amount=0.00010;charged-quantity=10;i_customer=20
PortaOne-Charge = type=vendor;storage-type=Vendor;charged-
amount=0.00005;charged-quantity=11;i_vendor=57
```

Appendix B. Examples of Diameter communication

Diameter Gy

Credit control request for session initiation (CCR-I)Session initiation (CCR-I)

```
Session-Id = 'ee136d75e131a122f558'
Origin-Host = 'bec-pgw.portaone.com'
Origin-Realm = 'portaone.com'
Destination-Host = 'ocs.portaone.com'
Destination-Realm = 'portaone.com'
Auth-Application-Id = '4'
Service-Context-Id = '32251@3gpp.org'
CC-Request-Type = 'INITIAL_REQUEST'
CC-Request-Number = '0'
Origin-State-Id = '0'
Subscription-Id = 'BEGIN-GROUP'
Subscription-Id-Data = '380630000001'
Subscription-Id-Type = 'END_USER_E164'
Subscription-Id = 'END-GROUP'
Multiple-Services-Indicator = 'SUPPORTED'
Multiple-Services-Credit-Control = 'BEGIN-GROUP'
Requested-Service-Unit = 'BEGIN-GROUP'
Requested-Service-Unit = 'END-GROUP'
Rating-Group = '100'
Multiple-Services-Credit-Control = 'END-GROUP'
Event-Timestamp = '1551426764'
```

Session initiation acknowledgement and resource allocation (CCA-I)

```
Multiple-Services-Credit-Control = 'BEGIN-GROUP'
Granted-Service-Unit = 'BEGIN-GROUP'
CC-Total-Octets = '1073741824'
Granted-Service-Unit = 'END-GROUP'
Rating-Group = '100'
Result-Code = '2001'
Validity-Time = '7189'
Multiple-Services-Credit-Control = 'END-GROUP'
Origin-Realm = 'portaone.com'
CC-Request-Number = '1'
Session-Id = 'ee136d75e131a122f558'
CC-Request-Type = 'UPDATE_REQUEST'
Auth-Application-Id = '4'
Origin-Host = 'ocs.portaone.com'
Result-Code = '2001'
```

Credit control request for session update (CCR-U)

```
Session-Id = 'ee136d75e131a122f558'
Origin-Host = 'bec-pgw.portaone.com'
Origin-Realm = 'portaone.com'
Destination-Host = 'ocs.portaone.com'
Destination-Realm = 'portaone.com'
```

```
Auth-Application-Id = '4'
Service-Context-Id = '32251@3gpp.org'
CC-Request-Type = 'UPDATE_REQUEST'
CC-Request-Number = '3'
Origin-State-Id = '0'
Subscription-Id = 'BEGIN-GROUP'
Subscription-Id-Data = '380630000001'
Subscription-Id-Type = 'END_USER_E164'
Subscription-Id = 'END-GROUP'
Multiple-Services-Indicator = 'SUPPORTED'
Multiple-Services-Credit-Control = 'BEGIN-GROUP'
Requested-Service-Unit = 'BEGIN-GROUP'
Requested-Service-Unit = 'END-GROUP'
Used-Service-Unit = 'BEGIN-GROUP'
CC-Input-Octets = '524288'
CC-Total-Octets = '1048576'
CC-Output-Octets = '524288'
Used-Service-Unit = 'END-GROUP'
Rating-Group = '100'
Multiple-Services-Credit-Control = 'END-GROUP'
Event-Timestamp = '1551426785'
```

Session update response with new resource allocation (CCA-U)

```
Multiple-Services-Credit-Control = 'BEGIN-GROUP'
Granted-Service-Unit = 'BEGIN-GROUP'
CC-Total-Octets = '1073741824'
Granted-Service-Unit = 'END-GROUP'
Rating-Group = '100'
Result-Code = '2001'
Validity-Time = '7185'
Multiple-Services-Credit-Control = 'END-GROUP'
Origin-Realm = 'portaone.com'
CC-Request-Number = '3'
Session-Id = 'ee136d75e131a122f558'
CC-Request-Type = 'UPDATE_REQUEST'
Auth-Application-Id = '4'
Origin-Host = 'ocs.portaone.com'
Result-Code = '2001'
```

Credit control request for session termination (CCR-T)

```
Session-Id = 'ee136d75e131a122f558'
Origin-Host = 'bec-pgw.portaone.com'
Origin-Realm = 'portaone.com'
Destination-Host = 'ocs.portaone.com'
Destination-Realm = 'portaone.com'
Auth-Application-Id = '4'
Service-Context-Id = '32251@3gpp.org'
CC-Request-Type = 'TERMINATION_REQUEST'
CC-Request-Number = '5'
Origin-State-Id = '0'
Subscription-Id = 'BEGIN-GROUP'
Subscription-Id-Data = '380630000001'
Subscription-Id-Type = 'END_USER_E164'
Subscription-Id = 'END-GROUP'
Multiple-Services-Indicator = 'SUPPORTED'
Multiple-Services-Credit-Control = 'BEGIN-GROUP'
Used-Service-Unit = 'BEGIN-GROUP'
CC-Input-Octets = '524288'
```

```
CC-Total-Octets = '1048576'
CC-Output-Octets = '524288'
Used-Service-Unit = 'END-GROUP'
Rating-Group = '100'
Multiple-Services-Credit-Control = 'END-GROUP'
Event-Timestamp = '1551426810'
```

Session termination acknowledgment (CCA-T)

```
Origin-Realm = 'portaone.com'
CC-Request-Number = '5'
Session-Id = 'ee136d75e131a122f558'
CC-Request-Type = 'TERMINATION_REQUEST'
Auth-Application-Id = '4'
Origin-Host = 'ocs.portaone.com'
Result-Code = '2001'
```

Failed authorization

Account blocked

```
Origin-Realm = 'portaone.com'
CC-Request-Number = '0'
Session-Id = '72d0cce239ede1779394'
CC-Request-Type = 'INITIAL_REQUEST'
Auth-Application-Id = '4'
Final-Unit-Indication = 'BEGIN-GROUP'
Final-Unit-Action = 'TERMINATE'
Final-Unit-Indication = 'END-GROUP'
Origin-Host = 'ocs.portaone.com'
Result-Code = '4010'
```

Unknown account

```
Origin-Realm = 'portaone.com'
CC-Request-Number = '0'
Session-Id = 'd538ebc0dedcb587cf88'
CC-Request-Type = 'INITIAL_REQUEST'
Auth-Application-Id = '4'
Origin-Host = 'ocs.portaone.com'
Result-Code = '5030'
```

No available funds or credit resources

```
Multiple-Services-Credit-Control = 'BEGIN-GROUP'
Final-Unit-Indication = 'BEGIN-GROUP'
Final-Unit-Action = 'TERMINATE'
Final-Unit-Indication = 'END-GROUP'
Rating-Group = '100'
Result-Code = '4012'
Validity-Time = '7200'
Multiple-Services-Credit-Control = 'END-GROUP'
Origin-Realm = 'portaone.com'
CC-Request-Number = '0'
Session-Id = '454e357dcfc1fbaa154e'
CC-Request-Type = 'INITIAL_REQUEST'
Auth-Application-Id = '4'
Origin-Host = 'ocs.portaone.com'
Result-Code = '2001'
```

Diameter Ro

Voice calls service

Credit control request for session initiation (CCR-I for an outgoing call)

```
Session-Id = '4cd227264ec1b227f786'
Origin-Host = 'bec-pgw.portaone.com'
Origin-Realm = 'portaone.com'
Destination-Host = 'ocs.portaone.com'
Destination-Realm = 'portaone.com'
Auth-Application-ID = '4'
Service-Context-Id = '32251@3gpp.org'
CC-Request-Type = 'INITIAL_REQUEST'
CC-Request-Number = '0'
Origin-State-Id = '0'
Subscription-Id = 'BEGIN-GROUP'
Subscription-Id-Data = '380630000001'
Subscription-Id-Type = 'END_USER_E164'
Subscription-Id = 'END-GROUP'
Multiple-Services-Indicator = 'SUPPORTED'
Multiple-Services-Credit-Control = 'BEGIN-GROUP'
Service-Identifier = '35'
Requested-Service-Unit = 'BEGIN-GROUP'
CC-Time = '30'
Requested-Service-Unit = 'END-GROUP'
Multiple-Services-Credit-Control = 'END-GROUP'
Service-Information = 'BEGIN-GROUP'
IMS-Information = 'BEGIN-GROUP'
Node-Functionality = 'S-CSCF'
Calling-Party-Address = '380630000001'
Called-Party-Address = '380938508705'
Event-Type = 'BEGIN-GROUP'
Event = 'MO'
Event-Type = 'END-GROUP'
IMS-Information = 'END-GROUP'
Service-Information = 'END-GROUP'
Event-Timestamp = '1552310317'
```

Session acknowledgement and resource allocation (CCA-I for an outgoing call)

```
Multiple-Services-Credit-Control = 'BEGIN-GROUP'
Granted-Service-Unit = 'BEGIN-GROUP'
CC-Time = '30'
Granted-Service-Unit = 'END-GROUP'
Result-Code = '2001'
Service-Identifier = '35'
Validity-Time = '10800'
Multiple-Services-Credit-Control = 'END-GROUP'
Origin-Realm = 'portaone.com'
CC-Request-Number = '0'
Session-Id = '4cd227264ec1b227f786'
CC-Request-Type = 'INITIAL_REQUEST'
Auth-Application-Id = '4'
Origin-Host = 'ocs.portaone.com'
Result-Code = '2001'
```

Credit control request for session update (CCR-U)

```
Session-Id = '4cd227264ec1b227f786'
Origin-Host = 'bec-pgw.portaone.com'
Origin-Realm = 'portaone.com'
Destination-Host = 'ocs.portaone.com'
Destination-Realm = 'portaone.com'
Auth-Application-Id = '4'
Service-Context-Id = '32251@3gpp.org'
CC-Request-Type = 'UPDATE_REQUEST'
CC-Request-Number = '1'
Origin-State-Id = '0'
Subscription-Id = 'BEGIN-GROUP'
Subscription-Id-Data = '380630000001'
Subscription-Id-Type = 'END_USER_E164'
Subscription-Id = 'END-GROUP'
Multiple-Services-Indicator = 'SUPPORTED'
Multiple-Services-Credit-Control = 'BEGIN-GROUP'
Service-Identifier = '35'
Requested-Service-Unit = 'BEGIN-GROUP'
CC-Time = '30'
Requested-Service-Unit = 'END-GROUP'
Used-Service-Unit = 'BEGIN-GROUP'
CC-Time = '30'
Used-Service-Unit = 'END-GROUP'
Multiple-Services-Credit-Control = 'END-GROUP'
Service-Information = 'BEGIN-GROUP'
IMS-Information = 'BEGIN-GROUP'
Node-Functionality = 'S-CSCF'
Calling-Party-Address = '380630000001'
Called-Party-Address = '380938508705'
Event-Type = 'BEGIN-GROUP'
Event = 'MO'
Event-Type = 'END-GROUP'
IMS-Information = 'END-GROUP'
Service-Information = 'END-GROUP'
Event-Timestamp = '1552310318'
```

Session update with new resource allocation (CCA-U)

```
Multiple-Services-Credit-Control = 'BEGIN-GROUP'
Granted-Service-Unit = 'BEGIN-GROUP'
CC-Time = '30'
Granted-Service-Unit = 'END-GROUP'
Result-Code = '2001'
Service-Identifier = '35'
Validity-Time = '10800'
Multiple-Services-Credit-Control = 'END-GROUP'
Origin-Realm = 'portaone.com'
CC-Request-Number = '1'
Session-Id = '4cd227264ec1b227f7861'
CC-Request-Type = 'UPDATE_REQUEST'
Auth-Application-Id = '4'
Origin-Host = 'ocs.portaone.com'
Result-Code = '2001'
```

Credit control request for session termination (CCR-T)

```
Session-Id = '4cd227264ec1b227f786'
Origin-Host = 'bec-pgw.portaone.com'
Origin-Realm = 'portaone.com'
```

```
Destination-Host = 'ocs.portaone.com'
Destination-Realm = 'portaone.com'
Auth-Application-Id = '4'
Service-Context-Id = '32251@3gpp.org'
CC-Request-Type = 'TERMINATION_REQUEST'
CC-Request-Number = '3'
Origin-State-Id = '0'
Subscription-Id = 'BEGIN-GROUP'
Subscription-Id-Data = '380630000001'
Subscription-Id-Type = 'END_USER_E164'
Subscription-Id = 'END-GROUP'
Multiple-Services-Indicator = 'SUPPORTED'
Multiple-Services-Credit-Control = 'BEGIN-GROUP'
Service-Identifier = '35'
Requested-Service-Unit = 'BEGIN-GROUP'
CC-Time = '0'
Requested-Service-Unit = 'END-GROUP'
Used-Service-Unit = 'BEGIN-GROUP'
CC-Time = '30'
Used-Service-Unit = 'END-GROUP'
Multiple-Services-Credit-Control = 'END-GROUP'
Service-Information = 'BEGIN-GROUP'
IMS-Information = 'BEGIN-GROUP'
Node-Functionality = 'S-CSCF'
Calling-Party-Address = '380630000001'
Called-Party-Address = '380938508705'
Event-Type = 'BEGIN-GROUP'
Event = 'MO'
Event-Type = 'END-GROUP'
IMS-Information = 'END-GROUP'
Service-Information = 'END-GROUP'
Event-Timestamp = '1552310318'
```

Session termination acknowledgement (CCA-T)

```
Origin-Realm = 'portaone.com'
CC-Request-Number = '3'
Session-Id = '4cd227264ec1b227f786'
CC-Request-Type = 'TERMINATION_REQUEST'
Auth-Application-Id = '4'
Origin-Host = 'ocs.portaone.com'
Result-Code = '2001'
```

Failed authorization

Account blocked

```
Origin-Realm = 'portaone.com'
CC-Request-Number = '0'
Session-Id = 'fc2eba82f6e34253251a'
CC-Request-Type = 'INITIAL_REQUEST'
Auth-Application-Id = '4'
Origin-Host = 'ocs.portaone.com'
Result-Code = '4010'
```

Unknown account

```
Origin-Realm = 'portaone.com'
CC-Request-Number = '0'
Session-Id = 'b24e93c9c6e1c54819b8'
CC-Request-Type = 'INITIAL_REQUEST'
```

```
Auth-Application-Id = '4'
Origin-Host = 'ocs.portaone.com'
Result-Code = '5030'
```

No available funds

```
Multiple-Services-Credit-Control = 'BEGIN-GROUP'
Final-Unit-Indication = 'BEGIN-GROUP'
Final-Unit-Action = 'TERMINATE'
Final-Unit-Indication = 'END-GROUP'
Result-Code = '4012'
Service-Identifier = '35'
Validity-Time = '10800'
Multiple-Services-Credit-Control = 'END-GROUP'
Origin-Realm = 'portaone.com'
CC-Request-Number = '0'
Session-Id = '60b2d94b127899c80b96'
CC-Request-Type = 'INITIAL_REQUEST'
Auth-Application-Id = '4'
Origin-Host = 'ocs.portaone.com'
Result-Code = '2001'
```

SMS service (credit control with unit reservation)

Credit control request for session initiation

```
Session-Id = 'e547923f71a129d71027'
Origin-Host = 'bec-pgw.portaone.com'
Origin-Realm = 'portaone.com'
Destination-Host = 'ocs.portaone.com'
Destination-Realm = 'portaone.com'
Auth-Application-Id = '4'
Service-Context-Id = '32251@3gpp.org'
CC-Request-Type = 'INITIAL_REQUEST'
CC-Request-Number = '0'
Origin-State-Id = '0'
Subscription-Id = 'BEGIN-GROUP'
Subscription-Id-Data = '380630000001'
Subscription-Id-Type = 'END_USER_E164'
Subscription-Id = 'END-GROUP'
Multiple-Services-Indicator = 'SUPPORTED'
Multiple-Services-Credit-Control = 'BEGIN-GROUP'
Service-Identifier = '30'
Requested-Service-Unit = 'BEGIN-GROUP'
CC-Service-Specific-Units = '1'
Requested-Service-Unit = 'END-GROUP'
Multiple-Services-Credit-Control = 'END-GROUP'
Service-Information = 'BEGIN-GROUP'
SMS-Information = 'BEGIN-GROUP'
Recipient-Info = 'BEGIN-GROUP'
Recipient-Address = 'BEGIN-GROUP'
Address-Type = 'MSISDN'
Address-Data = '380938508705'
Recipient-Address = 'END-GROUP'
Recipient-Info = 'END-GROUP'
SMS-Node = 'SMS-SC'
Originator-Received-Address = 'BEGIN-GROUP'
Address-Type = 'MSISDN'
Address-Data = '380630000001'
```

```
Originator-Received-Address = 'END-GROUP'
SMS-Information = 'END-GROUP'
Service-Information = 'END-GROUP'
Event-Timestamp = '1552310313'
```

Session acknowledgement

```
Multiple-Services-Credit-Control = 'BEGIN-GROUP'
Granted-Service-Unit = 'BEGIN-GROUP'
CC-Service-Specific-Units = '1'
Granted-Service-Unit = 'END-GROUP'
Result-Code = '2001'
Service-Identifier = '30'
Validity-Time = '259200'
Multiple-Services-Credit-Control = 'END-GROUP'
Origin-Realm = 'portaone.com'
CC-Request-Number = '0'
Session-Id = 'e547923f71a129d71027'
CC-Request-Type = 'INITIAL_REQUEST'
Auth-Application-Id = '4'
Origin-Host = 'ocs.portaone.com'
Result-Code = '2001'
```

Credit control request with the resource usage reporting

```
Session-Id = 'e547923f71a129d71027'
Origin-Host = 'bec-pgw.portaone.com'
Origin-Realm = 'portaone.com'
Destination-Host = 'ocs.portaone.com'
Destination-Realm = 'portaone.com'
Auth-Application-Id = '4'
Service-Context-Id = '32251@3gpp.org'
CC-Request-Type = 'TERMINATION_REQUEST'
CC-Request-Number = '1'
Origin-State-Id = '0'
Subscription-Id = 'BEGIN-GROUP'
Subscription-Id-Data = '380630000001'
Subscription-Id-Type = 'END_USER_E164'
Subscription-Id = 'END-GROUP'
Multiple-Services-Indicator = 'SUPPORTED'
Multiple-Services-Credit-Control = 'BEGIN-GROUP'
Service-Identifier = '30'
Requested-Service-Unit = 'BEGIN-GROUP'
CC-Service-Specific-Units = '0'
Requested-Service-Unit = 'END-GROUP'
Used-Service-Unit = 'BEGIN-GROUP'
CC-Service-Specific-Units = '1'
Used-Service-Unit = 'END-GROUP'
Multiple-Services-Credit-Control = 'END-GROUP'
Service-Information = 'BEGIN-GROUP'
SMS-Information = 'BEGIN-GROUP'
Recipient-Info = 'BEGIN-GROUP'
Recipient-Address = 'BEGIN-GROUP'
Address-Type = 'MSISDN'
Address-Data = '380938508705'
Recipient-Address = 'END-GROUP'
Recipient-Info = 'END-GROUP'
SMS-Node = 'SMS-SC'
Originator-Received-Address = 'BEGIN-GROUP'
Address-Type = 'MSISDN'
Address-Data = '380630000001'
```

```
Originator-Received-Address = 'END-GROUP'
SMS-Information = 'END-GROUP'
Service-Information = 'END-GROUP'
Event-Timestamp = '1552310316'
```

Credit control answer

```
Origin-Realm = 'portaone.com'
CC-Request-Number = '1'
Session-Id = 'e547923f71a129d71027'
CC-Request-Type = 'TERMINATION_REQUEST'
Auth-Application-Id = '4'
Origin-Host = 'ocs.portaone.com'
Result-Code = '2001'
```

Failed authorization

The authorization responses are same as those for voice calls service.

SMS service (credit control with direct debiting)

Event based credit control request

```
Session-ID = '88d257fa04e1e90e07b3'
Origin-Host = 'bec-pgw.portaone.com'
Origin-Realm = 'portaone.com'
Destination-Host = 'ocs.portaone.com'
Destination-Realm = 'portaone.com'
Auth-Application-Id = '4'
Service-Context-Id = '32274@3gpp.org'
CC-Request-Type = 'EVENT_REQUEST'
CC-Request-Number = '0'
Requested-Action = 'DIRECT_DEBITING'
Subscription-Id = 'BEGIN-GROUP'
Subscription-Id-Data = '380630000001'
Subscription-Id-Type = 'END_USER_E164'
Subscription-Id = 'END-GROUP'
Multiple-Services-Indicator = 'NOT_SUPPORTED'
Service-Information = 'BEGIN-GROUP'
SMS-Information = 'BEGIN-GROUP'
Originator-SCCP-Address = 'tel:380630000001'
Destination-Interface = 'BEGIN-GROUP'
Interface-Type = 'MOBILE_TERMINATING'
Destination-Interface = 'END-GROUP'
Originator-Interface = 'BEGIN-GROUP'
Interface-Type = 'MOBILE_ORIGINATING'
Originator-Interface = 'END-GROUP'
SMS-Node = 'SMS_ROUTER'
SMSC-Address = 'afn:13360:333830393338353038373035'
SM-Message-Type = 'SUBMISSION'
Recipient-Info = 'BEGIN-GROUP'
Recipient-Received-Address = 'BEGIN-GROUP'
Address-Type = 'MSISDN'
Address-Data = '380938508705'
Recipient-Received-Address = 'END-GROUP'
Recipient-Address = 'BEGIN-GROUP'
Address-Type = 'MSISDN'
```

```
Address-Data = '380938508705'
Recipient-Address = 'END-GROUP'
Recipient-Info = 'END-GROUP'
SMS-Information = 'END-GROUP'
Service-Information = 'END-GROUP'
Event-Timestamp = '1552310322'
```

Event-based credit control answer

```
Origin-Realm = 'portaone.com'
CC-Request-Number = '0'
Session-Id = '88d257fa04e1e90e07b3'
CC-Request-Type = 'EVENT_REQUEST'
Granted-Service-Unit = 'BEGIN-GROUP'
CC-Service-Specific-Units = '1'
Granted-Service-Unit = 'END-GROUP'
Auth-Application-Id = '4'
Validity-Time = '259200'
Origin-Host = 'ocs.portaone.com'
Result-Code = '2001'
```

Failed authorization

Account blocked

```
Origin-Realm = 'portaone.com'
CC-Request-Number = '0'
Session-Id = '77aca35cbb83fa5341f6'
CC-Request-Type = 'EVENT_REQUEST'
Auth-Application-Id = '4'
Origin-Host = 'ocs.portaone.com'
Result-Code = '4010'
```

Unknown account

```
Origin-Realm = 'portaone.com'
CC-Request-Number = '0'
Session-Id = '1e11f4bc69098133f1a0@136.49.189.126'
CC-Request-Type = 'EVENT_REQUEST'
Auth-Application-Id = '4'
Origin-Host = 'ocs.portaone.com'
Result-Code = '5030'
```

No available funds

```
Origin-Realm = 'portaone.com'
CC-Request-Number = '0'
Session-Id = 'e33cba12a2c4174ba19b'
CC-Request-Type = 'EVENT_REQUEST'
Validity-Time = '259200'
Auth-Application-Id = '4'
Final-Unit-Indication = 'BEGIN-GROUP'
Final-Unit-Action = 'TERMINATE'
Final-Unit-Indication = 'END-GROUP'
Origin-Host = 'ocs.portaone.com'
Result-Code = '4012'
```

96

Appendix C. Examples of SIP communication

Messaging via SIP SIMPLE

In this example a message is sent between accounts of the same PBX environment using classic (non cluster) PortaSwitch® configuration.

Part 1. Sending message
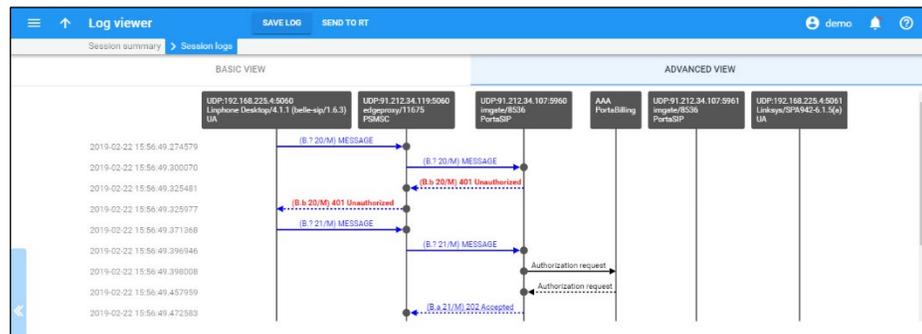
A sender's user agent sends a message to the PortaSIP® dispatching node

```
2019-02-22 15:56:49.274579 SIMPLE edgeproxy[11675]|mcRd0jnWqR|IS|544|
RECEIVED message from UDP:192.168.225.4:5060 at UDP:91.212.34.119:5060
 MESSAGE sip:12065550019@91.212.34.119 SIP/2.0
Via: SIP/2.0/UDP
192.168.246.34:5060;branch=z9hG4bK.QRd5mQCVS;rport=5060;received=192.16
8.225.4
Max-Forwards: 70
To: sip:12065550019@91.212.34.119
From: <sip:12065550021@91.212.34.119>;tag=A7inU09LN
Call-ID: mcRd0jnWqR
CSeq: 20 MESSAGE
Content-Type: text/plain
Date: Fri, 22 Feb 2019 15:56:52 GMT
Supported: replaces, outbound
User-Agent: Linphone Desktop/4.1.1 (belle-sip/1.6.3)
Content-Length: 11

hello world!
```

The PortaSIP® dispatching node transfers the message to the IMGate

```
2019-02-22 15:56:49.275586 EXTENDED
    edgeproxy[11675]|mcRd0jnWqR|IS|752|
SENDING message to UDP:91.212.34.107:5960 from UDP:91.212.34.119:5060
 MESSAGE sip:12065550019@91.212.34.107:5960 SIP/2.0
Via: SIP/2.0/UDP 91.212.34.119:5060;branch=z9hG4bK-524287-1---
53e16c3c89d156fa64a66128b905647b;rport
Via: SIP/2.0/UDP
192.168.246.34:5060;branch=z9hG4bK.QRd5mQCVS;rport=5060;received=192.16
8.225.4
Max-Forwards: 69
To: sip:12065550019@91.212.34.119
```

```
From: <sip:12065550021@91.212.34.119>;tag=A7inU09LN
Call-ID: mcRd0jnWqR
CSeq: 20 MESSAGE
Content-Type: text/plain
Date: Fri, 22 Feb 2019 15:56:52 GMT
Supported: replaces, outbound
User-Agent: Linphone Desktop/4.1.1 (belle-sip/1.6.3)
PortaOne-Requested-URI: sip:12065550019@91.212.34.119
PortaSIP-Notify: NAT=192.168.225.4;NAT-type=4
Content-Length: 11

hello world!
```

IMGate requests digest authentication from the sender's user agent providing a nonce

```
2019-02-22 15:56:49.325481 SIMPLE  edgeproxy[11675]|mcRd0jnWqR|IS|593|
RECEIVED message from UDP:91.212.34.107:5960 at UDP:91.212.34.119:5060
 SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP 91.212.34.119:5060;branch=z9hG4bK-524287-1---
53e16c3c89d156fa64a66128b905647b;rport=5060
Via: SIP/2.0/UDP
192.168.246.34:5060;branch=z9hG4bK.QRd5mQCVS;rport=5060;received=192.16
8.225.4
To: <sip:12065550019@91.212.34.119>;tag=ab4cc26b
From: <sip:12065550021@91.212.34.119>;tag=A7inU09LN
Call-ID: mcRd0jnWqR
CSeq: 20 MESSAGE
WWW-Authenticate: Digest
nonce="1550851009:827a445afee5c7abe5b503bf355489a06ebf8653",algorithm=M
D5,realm="sip-18.Omega_MR75"
Content-Length: 0
```

The PortaSIP® dispatching node sends authentication request to the sender's UA

```
2019-02-22 15:56:49.325977 SIMPLE  edgeproxy[11675]|mcRd0jnWqR|IS|485|
SENDING message to UDP:192.168.225.4:5060 from UDP:91.212.34.119:5060
 SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP
192.168.246.34:5060;branch=z9hG4bK.QRd5mQCVS;rport=5060;received=192.16
8.225.4
To: <sip:12065550019@91.212.34.119>;tag=ab4cc26b
From: <sip:12065550021@91.212.34.119>;tag=A7inU09LN
Call-ID: mcRd0jnWqR
CSeq: 20 MESSAGE
WWW-Authenticate: Digest
nonce="1550851009:827a445afee5c7abe5b503bf355489a06ebf8653",algorithm=M
D5,realm="sip-18.Omega_MR75"
Content-Length: 0
```

The sender's UA sends authorization information to the PortaSIP® dispatching node

```
2019-02-22 15:56:49.371368 SIMPLE  edgeproxy[11675]|mcRd0jnWqR|IS|776|
RECEIVED message from UDP:192.168.225.4:5060 at UDP:91.212.34.119:5060
 MESSAGE sip:12065550019@91.212.34.119 SIP/2.0
Via: SIP/2.0/UDP
192.168.246.34:5060;branch=z9hG4bK.Zbp~oz2QT;rport=5060;received=192.16
8.225.4
Max-Forwards: 70
To: sip:12065550019@91.212.34.119
From: <sip:12065550021@91.212.34.119>;tag=A7inU09LN
Call-ID: mcRd0jnWqR
CSeq: 21 MESSAGE
Content-Type: text/plain
Date: Fri, 22 Feb 2019 15:56:52 GMT
```

```
Supported: replaces, outbound
User-Agent: Linphone Desktop/4.1.1 (belle-sip/1.6.3)
Authorization: Digest realm="sip-18.Omega_MR75",
nonce="1550851009:827a445afee5c7abe5b503bf355489a06ebf8653",
algorithm=MD5, username="12065550021",
uri="sip:12065550019@91.212.34.119",
response="4e41e820ae3c5a1743d87ee4d146bb77"
Content-Length: 11

hello world!
```

The PortaSIP® dispatching node transfers the authorization information message to IMGate

```
2019-02-22 15:56:49.396946 SIMPLE  imgate[8536]|mcRd0jnWqR|IS|990|
RECEIVED message from UDP:91.212.34.119:5060 at UDP:91.212.34.107:5960
 MESSAGE sip:12065550019@91.212.34.107:5960 SIP/2.0
Via: SIP/2.0/UDP 91.212.34.119:5060;branch=z9hG4bK-524287-1---
276aec77714342c248faacceffc72349;rport=5060
Via: SIP/2.0/UDP
192.168.246.34:5060;branch=z9hG4bK.Zbp~oz2QT;rport=5060;received=192.16
8.225.4
Max-Forwards: 69
To: sip:12065550019@91.212.34.119
From: <sip:12065550021@91.212.34.119>;tag=A7inU09LN
Call-ID: mcRd0jnWqR
CSeq: 21 MESSAGE
Content-Type: text/plain
Date: Fri, 22 Feb 2019 15:56:52 GMT
Supported: replaces, outbound
User-Agent: Linphone Desktop/4.1.1 (belle-sip/1.6.3)
Authorization: Digest realm="sip-18.Omega_MR75",
nonce="1550851009:827a445afee5c7abe5b503bf355489a06ebf8653",
algorithm=MD5, username="12065550021",
uri="sip:12065550019@91.212.34.119",
response="4e41e820ae3c5a1743d87ee4d146bb77"
PortaOne-Requested-URI: sip:12065550019@91.212.34.119
PortaSIP-Notify: NAT=192.168.225.4;NAT-type=4
Content-Length: 11

hello world!
```

IMGate sends the authorization request to the PortaBilling® and if the PortaBilling® authorizes the sender, informs the PortaSIP® dispatching node about this and that and the message is accepted

```
2019-02-22 15:56:49.472583 SIMPLE  edgeproxy[11675]|mcRd0jnWqR|IS|463|
RECEIVED message from UDP:91.212.34.107:5960 at UDP:91.212.34.119:5060
 SIP/2.0 202 Accepted
Via: SIP/2.0/UDP 91.212.34.119:5060;branch=z9hG4bK-524287-1---
276aec77714342c248faacceffc72349;rport=5060
Via: SIP/2.0/UDP
192.168.246.34:5060;branch=z9hG4bK.Zbp~oz2QT;rport=5060;received=192.16
8.225.4
To: <sip:12065550019@91.212.34.119>;tag=6a810d72
From: <sip:12065550021@91.212.34.119>;tag=A7inU09LN
Call-ID: mcRd0jnWqR
CSeq: 21 MESSAGE
Content-Length: 0
```

The PortaSIP® dispatching node informs the sender's UA that that the authorization is successful the message is accepted

```
2019-02-22 15:56:49.472951 SIMPLE  edgeproxy[11675]|mcRd0jnWqR|IS|355|
SENDING message to UDP:192.168.225.4:5060 from UDP:91.212.34.119:5060
```

```
 SIP/2.0 202 Accepted
Via: SIP/2.0/UDP
192.168.246.34:5060;branch=z9hG4bK.Zbp~oz2QT;rport=5060;received=192.16
8.225.4
To: <sip:12065550019@91.212.34.119>;tag=6a810d72
From: <sip:12065550021@91.212.34.119>;tag=A7inU09LN
Call-ID: mcRd0jnWqR
CSeq: 21 MESSAGE
Content-Length: 0
```

Part 2. Delivering message
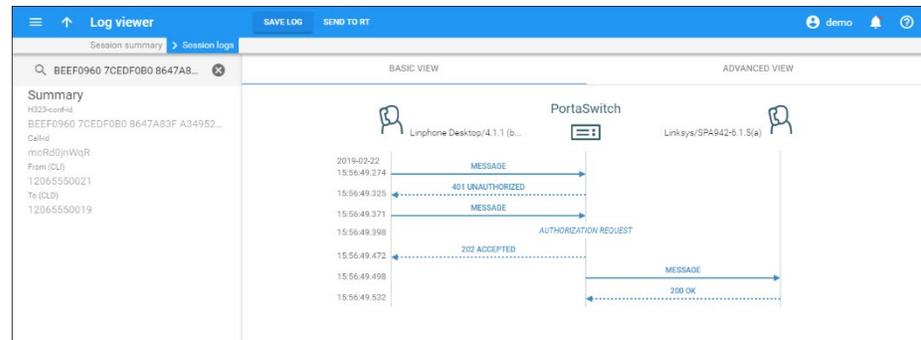
IMGate transfers the message to a recipient's SIP server

```
2019-02-22 15:56:49.497956 SIMPLE
    edgeproxy[11675]|mcRd0jnWqR~1o|IS|551|
RECEIVED message from UDP:91.212.34.107:5961 at UDP:91.212.34.119:5060
 MESSAGE sip:12065550019@192.168.246.191:5061 SIP/2.0
Via: SIP/2.0/UDP 91.212.34.107:5961;branch=z9hG4bK-524287-1---
947f67019b8c815d;rport=5961
Max-Forwards: 70
Route: <sip:91.212.34.119:5060;lr;pinhole=UDP:192.168.225.4:5061;ep>
To: <sip:12065550019@91.212.34.119:5060;transport=UDP;lr>
From: <sip:12065550021@91.212.34.119>;tag=46698f1f
Call-ID: mcRd0jnWqR~1o
CSeq: 2 MESSAGE
Allow: OPTIONS, MESSAGE, NOTIFY
Content-Type: text/plain
Content-Length: 11

hello world!
```

The recipient's SIP server transfers the message to the recipient's UA

```
2019-02-22 15:56:49.498386 SIMPLE
    edgeproxy[11675]|mcRd0jnWqR~1o|IS|582|
SENDING message to UDP:192.168.225.4:5061 from UDP:91.212.34.119:5060
 MESSAGE sip:12065550019@192.168.246.191:5061 SIP/2.0
Via: SIP/2.0/UDP 91.212.34.119:5060;branch=z9hG4bK-524287-1---
7e7c30948c5dbec8556de029eeef3b30;rport
Via: SIP/2.0/UDP 91.212.34.107:5961;branch=z9hG4bK-524287-1---
947f67019b8c815d;rport=5961
Max-Forwards: 69
To: <sip:12065550019@91.212.34.119:5060;transport=UDP;lr>
From: <sip:12065550021@91.212.34.119>;tag=46698f1f
Call-ID: mcRd0jnWqR~1o
CSeq: 2 MESSAGE
Allow: OPTIONS, MESSAGE, NOTIFY
Content-Type: text/plain
Content-Length: 11
```

```
hello world!
```

The recipient's UA responds to the recipient's SIP server that the message is accepted

```
2019-02-22 15:56:49.532172 SIMPLE
    edgeproxy[11675]|mcRd0jnWqR~1o|IS|489|
RECEIVED message from UDP:192.168.225.4:5061 at UDP:91.212.34.119:5060
 SIP/2.0 200 OK
Via: SIP/2.0/UDP 91.212.34.119:5060;branch=z9hG4bK-524287-1---
7e7c30948c5dbec8556de029eeef3b30
Via: SIP/2.0/UDP 91.212.34.107:5961;branch=z9hG4bK-524287-1---
947f67019b8c815d;rport=5961
To: <sip:12065550019@91.212.34.119:5060>;tag=7e6fc0ff69c4d29di1
From: <sip:12065550021@91.212.34.119>;tag=46698f1f
Call-ID: mcRd0jnWqR~1o
CSeq: 2 MESSAGE
Server: Linksys/SPA942-6.1.5(a)
Content-Length: 0
```

The recipient's SIP server informs IMGate that the mesage is accepted

```
2019-02-22 15:56:49.557624 SIMPLE  imgate[8536]|mcRd0jnWqR~1o|IS|393|
RECEIVED message from UDP:91.212.34.119:5060 at UDP:91.212.34.107:5961
 SIP/2.0 200 OK
Via: SIP/2.0/UDP 91.212.34.107:5961;branch=z9hG4bK-524287-1---
947f67019b8c815d;rport=5961
To: <sip:12065550019@91.212.34.119:5060>;tag=7e6fc0ff69c4d29di1
From: <sip:12065550021@91.212.34.119>;tag=46698f1f
Call-ID: mcRd0jnWqR~1o
CSeq: 2 MESSAGE
Server: Linksys/SPA942-6.1.5(a)
Content-Length: 0
```

Appendix D. Description of xDR record fields

Field	Type	Description
id	int	The unique ID of the xDR
i_env	int	The unique ID of the virtual billing environment
h323_conf_id (session_id)	string	The unique session ID
call_id (service_session_id)	string	The session ID specific for the xDR's service type
CLI (cli)	string	The caller number (also called CLI or ANI)
CLD (cld)	string	The destination number (also called CLD, Called-Station-Id or DNIS)

setup_time	int	Also known as **PDD**. The time (in ms) between the moment the first INVITE is sent in the originate leg and the moment a provisional response/final response comes from the SIP device. It is calculated by the Billing Engine as the time difference between *h323-setup-time* and *alert-timepoint* (h323-connect-time is used instead of alert-timepoint, if the latter is not present in the accounting request)
connect_time	dateTime	The time when the session started (e.g., the call got connected)
disconnect_time	dateTime	The time when the session was disconnected or was last updated (for incremental xDR charge)
bill_time	dateTime	Call bill time
disconnect_cause	int	Specifies the reason the call was disconnected. This is a hexadecimal code
voice_quality	int	Shows call quality provided during the session as/if reported by NAS (provided for voice calls by Cisco equipment)
used_quantity	int	The quantity that was charged in original measurement units (e.g., duration of the voice call in seconds)
account_id	string	ID of the account being charged
i_account	int	The unique ID of the account's record in the database
i_dest	int	The unique ID of the destination record
i_dest_group	int	The unique ID of the destination group
i_tariff	int	The unique ID of the tariff record
i_rate	int	The unique ID of the rate record
charged_quantity	int	The number of charged units (the service is measured based on *used_quantity* after applying rounding intervals)
charged_amount	float	The amount charged in the respective currency

history	string	The formula that shows charge application steps or a textual description of the charge applied
peak_level	int	The ID of the peak level: 0 (peak period), 1 (off-peak period), 2 (2nd off-peak period)
i_vendor	int	Applicable for vendor xDRs. The unique ID of the Vendor record who was billed
i_service	int	The unique ID of the service record
i_accessibility	int	The unique ID of the rating entry record in the database
i_customer	int	The unique ID of the customer or the reseller (where applicable) associated with the call. This ID should be equal to the corresponding account's owner in CDR_Accounts, to the xDR owner in CDR_Customers and to the direct customer in CDR_Vendors
h323_incoming_conf_id (parent_session_id)	string	The unique ID of the incoming session (if exists) used for interrelating xDRs, when the charged session is established as a result of a previous session (possibly having its own xDR)
rating_pattern	string	The rate pattern that was used to match a destination in the tariff rates
subscriber_ip	string	The internet address of the end-user (if applicable) which was assigned to him in the moment of charge application
split_order	int	The xDR order number in case it is a part of the group of xDRs created for the same session
billing_model	int	Specifies the account type; one of the following: -1 – debit account 1 – credit account
i_invoice	int	The unique ID of the invoice record. Designates the invoice where the xDR was settled
revenue	float	Applicable for vendor xDRs. Shows total revenue collected for the related session

Appendix E. Events that ESPF handlers support

AricentHSS handler events

Name	Description	Inherited from Customer
Account/Blocked	An account has been blocked. (Accounts.blocked set to 'Y.')	
Account/ID/Changed	An account's ID has changed. (Account.id has been updated.)	
Account/Product/Changed	Another product was assigned to the account. An account's product has changed. (Account.i_product has been updated.)	
Account/ProductAddon/ Changed	An account's add-on product has been changed.	
Account/ProductAddon/ Deleted	An add-on product has been removed from an account.	
Account/ProductAddon/ Inserted	A new add-on product has been added for an account.	
Account/ServiceAttribute/ Changed	A service feature has been enabled/disabled for an account (the Service_Attribute_Values table has been updated).	Y
Account/SIMCardAssignment	A SIM card has been assigned to, removed from or changed for an account.	

Account/Status/Suspend	An account's status has changed to suspended because of a customer's suspension. Caused by: Customer has unpaid invoice. (Customers.bill_status set to 'S.')	Y
Account/Status/Unsuspend	An account has been unsuspended; due to removing of the customer's suspension. A customer's account has been reinstated. (Customers.bill_status set to 'O' from 'S.')	Y
Account/Unblocked	An account has been unblocked. (Accounts.blocked set to 'N.')	

AudioCodes handler events

Name	Description	Inherited from Customer
Account/Blocked	An account has been blocked. (Accounts.blocked set to 'Y.')	
Account/CustomField/Changed	Custom information (e.g., ID card) has been added or changed for an account. (The Custom_Field_Values table has been updated for the account.)	
Account/Discount/Changed	An account's discount plan has changed.	
Account/ID/Changed	An account's ID has changed. (Account.id has been updated.)	

Account/New	A new account has been created.
Account/Password/Changed	An account's password for the self-care interface has changed. (Accounts.password has been changed.)
Account/Product/Changed	Another product was assigned to the account. An account's product has changed. (Account.i_product has been updated.)
Account/ProductAddon/ Inserted	A new add-on product has been added for an account.
Account/ProductAddon/ Deleted	An add-on product has been removed from an account.
Account/Service/ QuotaExceeded	An account has exceeded its service usage quota.
Account/Service/Msg/QuotaExceeded	An account's service usage quota for messaging service type has expired
Account/Service/Netaccess/QuotaExceeded	An account's Internet access quota has expired
Account/Service/ QuotaAvailable	The account's service usage quota has been restored (quota counter has been reset or user topped up their service wallet).
Account/ServicePassword/ Changed	An account's service password has been changed.(Accounts.h323_password has been changed.)
Account/SIMCardAssignment	A SIM card has been assigned to, removed from or changed for an account.

106

Account/Status/Closed	The status of the account has changed to Closed. The account has been removed from the web interface. (Accounts.bill_status set to 'C.') This event type appears when a customer is terminated.	Y
Account/Unblocked	An account has been unblocked. (Accounts.blocked set to 'N.')	
Customer/CustomField/ Changed	The data in a customer's custom field has changed (the Custom_Field_Values table has been updated for the customer).	
Product/Discount/ Changed	A discount plan has been changed for a product or an add-on product.	

Bridgewater handler events

Name	Description	Inherited from Customer
Account/AvailableFundsAppear	An account's available funds are restored when a debit account tops up the balance or when a postpaid customer pays their invoice. (Accounts.balance has been topped up from credit_limit.) I_account.	Y
Account/Blocked	An account has been blocked. (Accounts.blocked set to 'Y.')	

Account/CustomField/Changed	Custom information (e.g., ID card) has been added or changed for an account. (The Custom_Field_Values table has been updated for the account.)	
Account/IPDeviceAssignment	An IP device has been assigned to an account (the UA_Links table has been updated).	
Account/Product/Changed	Another product was assigned to the account. An account's product has changed. (Account.i_product has been updated.)	
Account/Status/Closed	The status of the account has changed to Closed. The account has been removed from the web interface. (Accounts.bill_status set to 'C.') This event type appears when a customer is terminated.	Y
Account/Status/Suspend	An account's status has changed to suspended because of a customer's suspension. Caused by: Customer has unpaid invoice. (Customers.bill_status set to 'S.')	Y

Account/Status/Unsuspend	An account has been unsuspended; due to removing of the customer's suspension. A customer's account has been reinstated. (Customers.bill_status set to 'O' from 'S.')	Y
Account/Unblocked	An account has been unblocked. (Accounts.blocked set to 'N.')	
Account/ZeroAvailableFunds	An account's available funds have been depleted. (Accounts.balance has reached credit_limit [for credit accounts] or 0 [for debit accounts.])	Y
Customer/AvailableFunds Appear	A customer payment has been received (a customer topped up their balance or paid their invoice).	
Customer/Blocked	A customer's account has been blocked. (Customers.blocked set to 'Y.')	
Customer/Status/Closed	A customer has been terminated and their status changed to closed. (Customers.bill_status set to 'C.')	
Customer/Status/Suspend	A customer's account has been suspended. (Customers.bill_status has been updated.)	
Customer/Status/Unsuspend	A customer's account has been reinstated. (Customers.bill_status set to 'O' from 'S.')	
Customer/Unblocked	A customer's account has been unblocked. (Customers.blocked set to 'N.')	

Customer/ZeroAvailableFunds	A customer's available funds have been depleted. (Customers.balance has reached credit_limit.)	
CustomField/Changed	A customer's custom data has changed (the Custom_Field_Values table has been updated).	

Calix handler events

Name	Description	Inherited from Customer
Account/AvailableFundsAppear	An account's available funds are restored when a debit account tops up the balance or when a postpaid customer pays their invoice. (Accounts.balance has been topped up from credit_limit.) I_account.	Y
Account/Blocked	An account has been blocked. (Accounts.blocked set to 'Y.')	
Account/IPDeviceAssignment	An IP device has been assigned to an account (the UA_Links table has been updated).	
Account/Product/Changed	Another product was assigned to the account. An account's product has changed. (Account.i_product has been updated.)	
Account/Status/Suspend	An account's status has changed to suspended because of a customer's suspension. Caused by: Customer has unpaid invoice. (Customers.bill_status set to 'S.')	Y

Account/Status/Unsuspend	An account has been unsuspended; due to removing of the customer's suspension. A customer's account has been reinstated. (Customers.bill_status set to 'O' from 'S.')	Y
Account/Unblocked	An account has been unblocked. (Accounts.blocked set to 'N.')	
Account/ZeroAvailableFunds	An account's available funds have been depleted. (Accounts.balance has reached credit_limit [for credit accounts] or 0 [for debit accounts.])	Y

CustomerToAccountsDispatcher handler events

Name	Description	Inherited from Customer
Customer/AvailableFunds Appear	A customer payment has been received (a customer topped up their balance or paid their invoice).	
Customer/Blocked	A customer's account has been blocked. (Customers.blocked set to 'Y.')	
Customer/CustomField/ Changed	The data in a customer's custom field has changed (the Custom_Field_Values table has been updated for the customer).	

Customer/ServiceAttribute/ Changed	A customer's service setting has changed (the Service_Attribute_Values table has been updated).	
Customer/ServiceFlags/ Changed	A customer's service features have changed. (Customers.service_flags has been updated.)	
Customer/Status/Changed	A customer's status has changed. (Customers.bill_status has been updated.)	
Customer/Status/Closed	A customer has been terminated and their status changed to closed. (Customers.bill_status set to 'C.')	
Customer/Status/Exported	A customer's record status has changed. (Customers.bill_status set to E.)	
Customer/Status/Imported	A customer's record status has changed. (Customers.bill_status set to O.)	
Customer/Status/Suspend	A customer's account has been suspended. (Customers.bill_status has been updated.)	
Customer/Status/Unsuspend	A customer's account has been reinstated. (Customers.bill_status set to 'O' from 'S.')	
Customer/Unblocked	A customer's account has been unblocked. (Customers.blocked set to 'N.')	
Customer/ZeroAvailableFunds	A customer's available funds have been depleted. (Customers.balance has reached credit_limit.)	

DemoHandler handler events

Name	Description	Inherited from Customer
ServiceAttribute/Changed	A service feature has been enabled/disabled for either a product, add-on product, customer or account.	
Accessibility/Inserted	A usage charges record has been added to the accounts product.	
Accessibility/Deleted	The usage charges record has been removed from the account's product.	
Account/ActivationDate/ Changed	The activation date has been changed for an account. (Accounts.activation_date has been changed)	
Account/AvailableFundsAppear	An account's available funds are restored when a debit account tops up the balance or when a postpaid customer pays their invoice. (Accounts.balance has been topped up from credit_limit.) I_account.	Y
Account/BalanceChanged	The balance of a debit or individual credit account has changed (e.g., a call has been charged, a refill has been received). A customer's balance has changed for postpaid customers.	Y
Account/Blocked	An account has been blocked. (Accounts.blocked set to 'Y.')	

Account/CustomField/Changed	Custom information (e.g., ID card) has been added or changed for an account. (The Custom_Field_Values table has been updated for the account.)
Account/Discount/Changed	An account's discount plan has changed.
Account/ExpirationDate/ Changed	An account's expiration date has changed. (Accounts.expiration_date has been changed.)
Account/FollowMe/Changed	An account's follow-me setting has changed (the Follow_Me table has been updated).
Account/FollowMeNumber/ Inserted	A new follow-me number has been added to an account.
Account/FollowMeNumber/ Changed	An account's follow-me number has changed.
Account/FollowMeNumber/ Deleted	An account's follow-me number has been removed.
Account/ID/Changed	An account's ID has changed. (Account.id has been updated.)
Account/IPDeviceAssignment	An IP device has been assigned to an account (the UA_Links table has been updated).
Account/New	A new account has been created.
Account/Password/Changed	An account's password for the self-care interface has changed. (Accounts.password has been changed.)
Account/Product/Changed	Another product was assigned to the account.

An account's product has changed. (Account.i_product has been updated.) |
| Account/ProductAddon/ Changed | An account's add-on product has been changed. |

Account/ProductAddon/ Deleted	An add-on product has been removed from an account.	
Account/ProductAddon/ Inserted	A new add-on product has been added for an account.	
Account/ServiceAttribute/ Changed	A service feature has been enabled/disabled for an account (the Service_Attribute_Values table has been updated).	Y
Account/ServiceFlags/Changed	An account's service features have changed. (Accounts.service_flags has been updated.)	Y
Account/ServicePassword/ Changed	An account's service password has been changed.(Accounts.h323_password has been changed.)	
Account/SIMCardAssignment	A SIM card has been assigned to, removed from or changed for an account.	
Account/Status/Changed	An account's billing status has been changed or affected by the customer's billing status. A customer's status has changed. (Customers.bill_status has changed.)	Y
Account/Status/Closed	The status of the account has changed to Closed. The account has been removed from the web interface. (Accounts.bill_status set to 'C.') This event type appears when a customer is terminated.	Y

Account/Status/Suspend	An account's status has changed to suspended because of a customer's suspension. Caused by: Customer has unpaid invoice. (Customers.bill_status set to 'S.')	Y
Account/Status/Unsuspend	An account has been unsuspended; due to removing of the customer's suspension. A customer's account has been reinstated. (Customers.bill_status set to 'O' from 'S.')	Y
Account/Unblocked	An account has been unblocked. (Accounts.blocked set to 'N.')	
Account/ZeroAvailableFunds	An account's available funds have been depleted. (Accounts.balance has reached credit_limit [for credit accounts] or 0 [for debit accounts.])	Y
Customer/AvailableFunds Appear	A customer payment has been received (a customer topped up their balance or paid their invoice).	
Customer/BalanceChanged	A customer's balance has been replenished (contains previous and current balance amount).	
Customer/Blocked	A customer's account has been blocked. (Customers.blocked set to 'Y.')	
Customer/CustomField/ Changed	The data in a customer's custom field has changed (the Custom_Field_Values table has been updated for the customer).	

Customer/Name/Changed	The customer's name has changed.
Customer/New	A new customer has been created.
Customer/ServiceAttribute/ Changed	A customer's service setting has changed (the Service_Attribute_Values table has been updated).
Customer/ServiceFlags/ Changed	A customer's service features have changed. (Customers.service_flags has been updated.)
Customer/Status/Activated	A customer's record has been activated. (Customers.bill_status set to 'O' from 'D.')
Customer/Status/Changed	A customer's status has changed. (Customers.bill_status has been updated.)
Customer/Status/Closed	A customer has been terminated and their status changed to closed. (Customers.bill_status set to 'C.')
Customer/Status/Deactivated	A customer's record has been deactivated. (Customers.bill_status set to 'D' from 'O.')
Customer/Status/Suspend	A customer's account has been suspended. (Customers.bill_status has been updated.)
Customer/Status/Unsuspend	A customer's account has been reinstated. (Customers.bill_status set to 'O' from 'S.')
Customer/Unblocked	A customer's account has been unblocked. (Customers.blocked set to 'N.')
Customer/ZeroAvailableFunds	A customer's available funds have been depleted. (Customers.balance has reached credit_limit.)

CustomField/Changed	A customer's custom data has changed (the Custom_Field_Values table has been updated).	
IPDeviceProfile/New	A CPE profile has been created.	
Product/Discount/ Changed	A discount plan has been changed for a product or an add-on product.	
Product/ServiceAttribute/ Changed	A service feature has been enabled/disabled for a product or an add-on product.	
ServiceAttribute/Changed	A service feature has been enabled/disabled for a customer. (The Service_Attribute_Values table has been updated.)	
Subscriber/Address/Changed	The address of a user registered as an account has changed.	
Subscriber/Name/Changed	The account's user name has changed.	

ECConnect handler events

Name	Description	Inherited from Customer
Account/AvailableFundsAppear	An account's available funds are restored when a debit account tops up the balance or when a postpaid customer pays their invoice. (Accounts.balance has been topped up from credit_limit.) I_account.	Y
Account/Blocked	An account has been blocked. (Accounts.blocked set to 'Y.')	

Account/CustomField/Changed	Custom information (e.g., ID card) has been added or changed for an account. (The Custom_Field_Values table has been updated for the account.)	
Account/ID/Changed	An account's ID has changed. (Account.id has been updated.)	
Account/Product/Changed	Another product was assigned to the account. An account's product has changed. (Account.i_product has been updated.)	
Account/ProductAddon/ Deleted	An add-on product has been removed from an account.	
Account/ProductAddon/ Inserted	A new add-on product has been added for an account.	
Account/ProductAddon/ Changed	An account's add-on product has been changed.	
Account/SIMCardAssignment	A SIM card has been assigned to, removed from or changed for an account.	
Account/Status/Suspend	An account's status has changed to suspended because of a customer's suspension. Caused by: Customer has unpaid invoice. (Customers.bill_status set to 'S.')	Y

Account/Status/Unsuspend	An account has been unsuspended due to the removal of the customer's suspension. A customer's account has been reinstated. (Customers.bill_status set to 'O' from 'S.')	Y
Account/Status/Closed	The status of the account has changed to Closed. The account has been removed from the web interface. (Accounts.bill_status set to 'C.') This event type appears when a customer is terminated.	Y
Account/Unblocked	An account has been unblocked. (Accounts.blocked set to 'N.')	
Account/ZeroAvailableFunds	An account's available funds have been depleted. (Accounts.balance has reached its credit_limit [for credit accounts] or 0 [for debit accounts.])	Y

EventSender handler events

Name	Description	Inherited from Customer
Accessibility/Inserted	A usage charges record has been added to the accounts product.	

Accessibility/Deleted	The usage charges record has been removed from the account's product.	
Account/ActivationDate/ Changed	The activation date has been changed for an account. (Accounts.activation_date has been changed)	
Account/Alias/Delete	An alias has been removed from an account.	
Account/AvailableFundsAppear	An account's available funds are restored when a debit account tops up the balance or when a postpaid customer pays their invoice. (Accounts.balance has been topped up from credit_limit.) I_account.	Y
Account/BalanceChanged	The balance of a debit or individual credit account has changed (e.g., a call has been charged, a refill has been received). A customer's balance has changed for postpaid customers.	Y
Account/Blocked	An account has been blocked. (Accounts.blocked set to 'Y.')	
Account/CustomField/Changed	Custom information (e.g., ID card) has been added or changed for an account. (The Custom_Field_Values table has been updated for the account.)	
Account/Discount/Changed	An account's discount plan has changed.	
Account/ExpirationDate/ Changed	An account's expiration date has changed. (Accounts.expiration_date has been changed.)	
Account/FollowMe/Changed	An account's follow-me setting has changed (the Follow_Me table has been updated).	

Account/FollowMeNumber/ Inserted	A new follow-me number has been added to an account.	
Account/FollowMeNumber/ Changed	An account's follow-me number has changed.	
Account/FollowMeNumber/ Deleted	An account's follow-me number has been removed.	
Account/ID/Changed	An account's ID has changed. (Account.id has been updated.)	
Account/IPDeviceAssignment	An IP device has been assigned to an account (the UA_Links table has been updated).	
Account/New	A new account has been created.	
Account/Password/Changed	An account's password for the self-care interface has changed. (Accounts.password has been changed.)	
Account/Product/Changed	Another product was assigned to the account. An account's product has changed. (Account.i_product has been updated.)	
Account/ProductAddon/ Changed	An account's add-on product has been changed.	
Account/ProductAddon/ Deleted	An add-on product has been removed from an account.	
Account/ProductAddon/ Inserted	A new add-on product has been added for an account.	
Account/Service/ QuotaAvailable	The account's service usage quota has been restored (quota counter has been reset or user topped up their service wallet).	
Account/Service/ QuotaExceeded	An account has exceeded its service usage quota.	
Account/Service/Msg/QuotaExceeded	An account's service usage quota for messaging service type has expired	
Account/Service/Netaccess/QuotaExceeded	An account's Internet access quota has expired	

Account/ServiceAttribute/Changed	A service feature has been enabled/disabled for an account (the Service_Attribute_Values table has been updated).	Y
Account/ServiceFlags/Changed	An account's service features have changed. (Accounts.service_flags has been updated.)	Y
Account/ServicePassword/Changed	An account's service password has been changed.(Accounts.h323_password has been changed.)	
Account/SIMCardAssignment	A SIM card has been assigned to, removed from or changed for an account.	
Account/Status/Changed	An account's billing status has been changed or affected by the customer's billing status. A customer's status has changed. (Customers.bill_status has changed.)	Y
Account/Status/Closed	The status of the account has changed to Closed. The account has been removed from the web interface. (Accounts.bill_status set to 'C.') This event type appears when a customer is terminated.	Y
Account/Status/Exported	An account has been exported by Porter in Dual Version PortaSwitch®. (Customers.bill_status set to E.)	Y
Account/Status/Imported	An account has been imported by Porter in Dual Version PortaSwitch®.	Y

Account/Status/Suspend	An account's status has changed to suspended because of a customer's suspension. Caused by: Customer has unpaid invoice. (Customers.bill_status set to 'S.')	Y
Account/Status/Unsuspend	An account has been unsuspended; due to removing of the customer's suspension. A customer's account has been reinstated. (Customers.bill_status set to 'O' from 'S.')	Y
Account/Unblocked	An account has been unblocked. (Accounts.blocked set to 'N.')	
Account/ZeroAvailableFunds	An account's available funds have been depleted. (Accounts.balance has reached credit_limit [for credit accounts] or 0 [for debit accounts.])	Y
Custom/Jasper/CapReached	External event received from Jasper Platform.	
Customer/AvailableFunds Appear	A customer payment has been received (a customer topped up their balance or paid their invoice).	
Customer/BalanceChanged	A customer's balance has been replenished (contains previous and current balance amount).	
Customer/Blocked	A customer's account has been blocked. (Customers.blocked set to 'Y.')	

124

Customer/CustomField/ Changed	The data in a customer's custom field has changed (the Custom_Field_Values table has been updated for the customer).
Customer/Name/Changed	The customer's name has changed.
Customer/New	A new customer has been created.
Customer/ServiceAttribute/ Changed	A customer's service setting has changed (the Service_Attribute_Values table has been updated).
Customer/ServiceFlags/ Changed	A customer's service features have changed. (Customers.service_flags has been updated.)
Customer/Status/Activated	A customer's record has been activated. (Customers.bill_status set to 'O' from 'D.')
Customer/Status/Changed	A customer's status has changed. (Customers.bill_status has been updated.)
Customer/Status/Closed	A customer has been terminated and their status changed to closed. (Customers.bill_status set to 'C.')
Customer/Status/Deactivated	A customer's record has been deactivated. (Customers.bill_status set to 'D' from 'O.')
Customer/Status/Exported	A customer's record status has changed. (Customers.bill_status set to E.)
Customer/Status/Imported	A customer's record status has changed. (Customers.bill_status set to O.)

Customer/Status/Suspend	A customer's account has been suspended. (Customers.bill_status has been updated.)
Customer/Status/Unsuspend	A customer's account has been reinstated. (Customers.bill_status set to 'O' from 'S.')
Customer/Unblocked	A customer's account has been unblocked. (Customers.blocked set to 'N.')
Customer/ZeroAvailableFunds	A customer's available funds have been depleted. (Customers.balance has reached credit_limit.)
CustomField/Changed	A customer's custom data has changed (the Custom_Field_Values table has been updated).
DID/Deleted	A DID number has been removed from the DID inventory.
DID/New	A new DID number has been added to the DID inventory.
DID/Status/Activated	A DID number has been assigned to a customer's account ID.
DID/Status/Assigned	A DID number has been assigned to a customer.
DID/Status/Canceled	A DID number has been unassigned from a customer's account ID.
DID/Status/Moved	A DID number has been moved to another installation as a result of provisioning.
DID/Status/Unassigned	A DID number has been removed from a customer.

Invoice/AmountPaid/ Changed	This is the amount a customer has paid. Use this event to track and provision: - manual payment information; - partially paid invoice changes.	
Invoice/New	A new invoice has been generated.	
Invoice/Status/Changed	An invoice has changed its status (e.g., from unpaid to paid, from unpaid to overdue). Use this event to track and provision information: • about the payment statuses of generated invoices: - unpaid; - overdue; - paid; - partially paid; - do not pay; - no payment required; - previous balance remaining; • about the statuses of invoices that require administrator's approval: - under review; - approved; - rejected.	

	Refer to the *Invoice parameters* and *Invoices review* chapters in the **PortaBilling Administrator Guide** for the description of these statuses.
	
	Note that if a customer pays their invoice in installments, the Invoice/Status/Changed event occurs twice for this invoice:
	   - first event – changes from unpaid to partially paid;
	   - second – changes from partially paid to paid in full.
	
	For example, a customer pays their $110 invoice in installments (e.g., $25+$20+$35+$30). Events occur when:
	   - the first $25 payment is made: the invoice status changes from unpaid to partially paid;
	   - the last $30 payment is made: the invoice status changes from partially paid to paid.	

IPDeviceProfile/New	A CPE profile has been created.	
PaymentTransaction/ ResultCode/Changed	A transaction has either started or finished.	
PaymentTransaction/New	A customer has made a credit card payment.	
PaymentTransaction/Status/ Changed	A transaction has changed its status.	
Product/Discount/ Changed	A discount plan has been changed for a product or an add-on product.	

Product/ServiceAttribute/ Changed	A service feature has been enabled/disabled for a product or an add-on product.	
ServiceAttribute/Changed	A service feature has been enabled/disabled for a customer. (The Service_Attribute_Values table has been updated.)	
ServiceAttribute/Changed	A service feature has been enabled/disabled for either a product, add-on product, customer or account.	
Subscriber/Address/Changed	The address of a user registered as an account has changed.	
Subscriber/ContactInfo/ Changed	The account's contact information has been changed.	
Subscriber/Name/Changed	The account's user name has changed.	

Huawei::HSS handler events

Name	Description	Inherited from Customer
Account/Id/Changed	An account's ID has changed. (Account.id has been updated.)	
Account/Product/Changed	Another product was assigned to the account.

An account's product has changed. (Account.i_product has been updated.) | |
| Account/ProductAddon/ Deleted | An add-on product has been removed from an account. | |
| Account/ProductAddon/ Inserted | A new add-on product has been added for an account. | |

Account/ServiceAttribute/ Changed	A service feature has been enabled/disabled for an account (the Service_Attribute_Values table has been updated).	Y
Account/SIMCardAssignment	A SIM card has been assigned to, removed from or changed for an account.	

Huawei::PCRF handler events

Name	Description	Inherited from Customer
Account/Id/Changed	An account's ID has changed. (Account.id has been updated.)	
Account/Product/Changed	Another product was assigned to the account. An account's product has changed. (Account.i_product has been updated.)	
Account/ProductAddon/ Deleted	An add-on product has been removed from an account.	
Account/ProductAddon/ Inserted	A new add-on product has been added for an account.	
Account/ServiceAttribute/ Changed	A service feature has been enabled / disabled for an account (the Service_Attribute_Values table has been updated).	Y
Account/SIMCardAssignment	A SIM card has been assigned to, removed from or changed for an account.	

IPTV handler events

Name	Description	Inherited from Customer
Account/ActivationDate/ Changed	The activation date has been changed for an account. (Accounts.activation_date has been changed)	
Account/AvailableFundsAppear	An account's available funds are restored when a debit account tops up the balance or when a postpaid customer pays their invoice. (Accounts.balance has been topped up from credit_limit.) I_account.	Y
Account/Blocked	An account has been blocked. (Accounts.blocked set to 'Y.')	
Account/ExpirationDate/ Changed	An account's expiration date has changed. (Accounts.expiration_date has been changed.)	
Account/ID/Changed	An account's ID has changed. (Account.id has been updated.)	
Account/New	A new account has been created.	
Account/Password/Changed	An account's password for the self-care interface has changed. (Accounts.password has been changed.)	
Account/Product/Changed	Another product was assigned to the account. An account's product has changed. (Account.i_product has been updated.)	
Account/ProductAddon/ Deleted	An add-on product has been removed from an account.	

Account/ProductAddon/ Inserted	A new add-on product has been added for an account.	
Account/ProductAddon/ Changed	An account's add-on product has been changed.	
Account/ServiceAttribute/ Changed	A service feature has been enabled/disabled for an account (the Service_Attribute_Values table has been updated).	Y
Account/ServiceFlags/Changed	An account's service features have changed. (Accounts.service_flags has been updated.)	Y
Account/Status/Closed	The status of the account has changed to Closed. The account has been removed from the web interface. (Accounts.bill_status set to 'C.') This event type appears when a customer is terminated.	Y
Account/Status/Suspend	An account's status has changed to suspended because of a customer's suspension. Caused by: Customer has unpaid invoice. (Customers.bill_status set to 'S.')	Y
Account/Status/Unsuspend	An account has been unsuspended; due to removing of the customer's suspension. A customer's account has been reinstated. (Customers.bill_status set to 'O' from 'S.')	Y

132

Account/Unblocked	An account has been unblocked. (Accounts.blocked set to 'N.')	
Account/ZeroAvailableFunds	An account's available funds have been depleted. (Accounts.balance has reached credit_limit [for credit accounts] or 0 [for debit accounts.])	Y
CustomField/Changed	A customer's custom data has changed (the Custom_Field_Values table has been updated).	
Subscriber/Address/Changed	The address of a user registered as an account has changed.	
Subscriber/ContactInfo/Changed	The account's contact information has been changed.	
Subscriber/Name/Changed	The account's user name has changed.	

Jasper handler events

Name	Description	Inherited from Customer
Account/Blocked	An account has been blocked. (Accounts.blocked set to 'Y.')	
Account/Product/Changed	Another product was assigned to the account. An account's product has changed. (Account.i_product has been updated.)	
Account/SIMCardAssignment	A SIM card has been assigned to, removed from or changed for an account.	

Account/Status/Suspend	An account's status has changed to suspended because of a customer's suspension. Caused by: Customer has unpaid invoice. (Customers.bill_status set to 'S.')	Y
Account/Status/Unsuspend	An account has been unsuspended; due to removing of the customer's suspension. A customer's account has been reinstated. (Customers.bill_status set to 'O' from 'S.')	Y
Account/Unblocked	An account has been unblocked. (Accounts.blocked set to 'N.')	
Custom/Jasper/CapReached	External event received from Jasper Platform.	

Kleos::HSS handler events

Name	Description	Inherited from Customer
Account/ID/Changed	An account's ID has changed. (Account.id has been updated.)	
Account/Product/Changed	Another product was assigned to the account. An account's product has changed. (Account.i_product has been updated.)	
Account/ProductAddon/ Deleted	An add-on product has been removed from an account.	
Account/ProductAddon/ Inserted	A new add-on product has been added for an account.	

Account/ProductAddon/ Changed	An account's add-on product has been changed.	
Account/SIMCardAssignment	A SIM card has been assigned to, removed from or changed for an account.	
Account/Status/Closed	The status of the account has changed to Closed.

The account has been removed from the web interface. (Accounts.bill_status set to 'C.')

This event type appears when a customer is terminated. | Y |

Kleos::PCRF handler events

Name	Description	Inherited from Customer
Account/ID/Changed	An account's ID has changed. (Account.id has been updated.)	
Account/Product/Changed	Another product was assigned to the account.

An account's product has changed. (Account.i_product has been updated.) | |
Account/ProductAddon/ Deleted	An add-on product has been removed from an account.	
Account/ProductAddon/ Inserted	A new add-on product has been added for an account.	
Account/ProductAddon/ Changed	An account's add-on product has been changed.	

Account/ServiceAttribute/ Changed	A service feature has been enabled/disabled for an account (the Service_Attribute_Values table has been updated).	Y
Account/SIMCardAssignment	A SIM card has been assigned to, removed from or changed for an account.	
Account/Status/Closed	The status of the account has changed to Closed. The account has been removed from the web interface. (Accounts.bill_status set to 'C.') This event type appears when a customer is terminated.	Y

LIMADispatcher handler events

Name	Description	Inherited from Customer
Account/FollowMeNumber/ Changed	An account's follow-me number has changed.	
Account/FollowMeNumber/ Deleted	An account's follow-me number has been removed.	
Account/FollowMeNumber/ Inserted	A new follow-me number has been added to an account.	
Account/Id/Changed	An account's ID has changed. (Account.id has been updated.)	
Customer/Name/Changed	The customer's name has changed.	

NBBS handler events

Name	Description	Inherited from Customer
Account/AvailableFundsAppear	An account's available funds are restored when a debit account tops up the balance or when a postpaid customer pays their invoice. (Accounts.balance has been topped up from credit_limit.) I_account.	Y
Account/CustomField/Changed	Custom information (e.g., ID card) has been added or changed for an account. (The Custom_Field_Values table has been updated for the account.)	
Account/IPDeviceAssignment	An IP device has been assigned to an account (the UA_Links table has been updated).	
Account/Status/Closed	The status of the account has changed to Closed. The account has been removed from the web interface. (Accounts.bill_status set to 'C.') This event type appears when a customer is terminated.	
Account/ZeroAvailableFunds	An account's available funds have been depleted. (Accounts.balance has reached credit_limit [for credit accounts] or 0 [for debit accounts.])	Y

CustomField/Changed	A customer's custom data has changed (the Custom_Field_Values table has been updated).	
IPDeviceProfile/New	A CPE profile has been created.	

NetNumber handler events

Name	Description	Inherited from Customer
Account/Id/Changed	An account's ID has changed. (Account.id has been updated.)	
Account/New	A new account has been created.	
Account/Status/Closed	The status of the account has changed to Closed. The account has been removed from the web interface. (Accounts.bill_status set to 'C.') This event type appears when a customer is terminated.	

ProductToAccountsDispatcher handler events

Name	Description	Inherited from Customer
Accessibility/Deleted	The usage charges record has been removed from the account's product.	

| Accessibility/Inserted | A usage charges record has been added to the accounts product. | |
| Product/ServiceAttribute/ Changed | A service feature has been enabled/disabled for a product or an add-on product. | |

Protei::HLR handler events

Name	Description	Inherited from Customer
Account/AvailableFundsAppear	An account's available funds are restored when a debit account tops up the balance or when a postpaid customer pays their invoice. (Accounts.balance has been topped up from credit_limit.) I_account.	Y
Account/Blocked	An account has been blocked. (Accounts.blocked set to 'Y.')	
Account/Id/Changed	An account's ID has changed. (Account.id has been updated.)	
Account/SIMCardAssignment	A SIM card has been assigned to, removed from or changed for an account.	
Account/Status/Closed	The status of the account has changed to Closed. The account has been removed from the web interface. (Accounts.bill_status set to 'C.') This event type appears when a customer is terminated.	

Account/Status/Suspend	An account's status has changed to suspended because of a customer's suspension. Caused by: Customer has unpaid invoice. (Customers.bill_status set to 'S.')	Y
Account/Status/Unsuspend	An account has been unsuspended; due to removing of the customer's suspension. A customer's account has been reinstated. (Customers.bill_status set to 'O' from 'S.')	Y
Account/Unblocked	An account has been unblocked. (Accounts.blocked set to 'N.')	
Account/ZeroAvailableFunds	An account's available funds have been depleted. (Accounts.balance has reached credit_limit [for credit accounts] or 0 [for debit accounts.])	Y

Protei::PCRF handler events

Name	Description	Inherited from Customer
Account/AvailableFundsAppear	An account's available funds are restored when a debit account tops up the balance or when a postpaid customer pays their invoice. (Accounts.balance has been topped up from credit_limit.) I_account.	Y

Account/Blocked	An account has been blocked. (Accounts.blocked set to 'Y.')	
Account/ExpirationDate/ Changed	An account's expiration date has changed. (Accounts.expiration_date has been changed.)	
Account/Id/Changed	An account's ID has changed. (Account.id has been updated.)	
Account/New	A new account has been created.	
Account/Product/Changed	Another product was assigned to the account. An account's product has changed. (Account.i_product has been updated.)	
Account/ProductAddon/ Deleted	An add-on product has been removed from an account.	
Account/ProductAddon/ Inserted	A new add-on product has been added for an account.	
Account/ServiceAttribute/ Changed	A service feature has been enabled/disabled for an account (the Service_Attribute_Values table has been updated).	Y
Account/SIMCardAssignment	A SIM card has been assigned to, removed from or changed for an account.	
Account/Status/Closed	The status of the account has changed to Closed. The account has been removed from the web interface. (Accounts.bill_status set to 'C.') This event type appears when a customer is terminated.	

Account/Status/Suspend	An account's status has changed to suspended because of a customer's suspension. Caused by: Customer has unpaid invoice. (Customers.bill_status set to 'S.')	Y
Account/Status/Unsuspend	An account has been unsuspended; due to removing of the customer's suspension. A customer's account has been reinstated. (Customers.bill_status set to 'O' from 'S.')	Y
Account/Unblocked	An account has been unblocked. (Accounts.blocked set to 'N.')	
Account/ZeroAvailableFunds	An account's available funds have been depleted. (Accounts.balance has reached credit_limit [for credit accounts] or 0 [for debit accounts.])	Y

ReadyWireless handler events

Name	Description	Inherited from Customer
Account/Alias/Delete	An alias has been removed from an account.	
Account/Service/ QuotaAvailable	The account's service usage quota has been restored (quota counter has been reset or user topped up their service wallet).	
Account/Service/ QuotaExceeded	An account has exceeded its service usage quota.	

Account/Service/Netaccess/QuotaExceeded	An account's Internet access quota has expired	
Account/Service/Msg/QuotaExceeded	An account's service usage quota for messaging service type has expired	
Customer/Status/Suspend	A customer's account has been suspended. (Customers.bill_status has been updated.)	
Customer/Status/Unsuspend	A customer's account has been reinstated. (Customers.bill_status set to 'O' from 'S.')	

Sandvine handler events

Name	Description	Inherited from Customer
Account/AvailableFundsAppear	An account's available funds are restored when a debit account tops up the balance or when a postpaid customer pays their invoice. (Accounts.balance has been topped up from credit_limit.) I_account.	Y
Account/Blocked	An account has been blocked. (Accounts.blocked set to 'Y.')	
Account/ID/Changed	An account's ID has changed. (Account.id has been updated.)	
Account/New	A new account has been created.	
Account/Product/Changed	Another product was assigned to the account. An account's product has changed. (Account.i_product has been updated.)	
Account/ProductAddon/Changed	An account's add-on product has been changed.	

Account/ProductAddon/ Deleted	An add-on product has been removed from an account.	
Account/ProductAddon/ Inserted	A new add-on product has been added for an account.	
Account/ServiceAttribute/ Changed	A service feature has been enabled/disabled for an account (the Service_Attribute_Values table has been updated).	Y
Account/SIMCardAssignment	A SIM card has been assigned to, removed from or changed for an account.	
Account/Status/Closed	The status of the account has changed to Closed. The account has been removed from the web interface. (Accounts.bill_status set to 'C.') This event type appears when a customer is terminated.	
Account/Status/Suspend	An account's status has changed to suspended. Caused by: Customer has unpaid invoice. (Customers.bill_status set to 'S.')	Y
Account/Unblocked	An account has been unblocked. (Accounts.blocked set to 'N.')	
Account/Status/Unsuspend	An account has been unsuspended. A customer's account has been reinstated. (Customers.bill_status set to 'O' from 'S.')	Y

Account/ZeroAvailableFunds	An account's available funds have been depleted. (Accounts.balance has reached credit_limit [for credit accounts] or 0 [for debit accounts].)	Y

ServiceAttributeDispatcher handler events

Name	Description	Inherited from Customer
CustomField/Changed	A customer's custom data has changed (the Custom_Field_Values table has been updated).	
ServiceAttribute/Changed	A service feature has been enabled/disabled for a customer. (The Service_Attribute_Values table has been updated.)	

SIPForwarder handler events

Name	Description	Inherited from Customer
Account/Alias/Delete	An alias has been removed from an account.	
Account/Id/Changed	An account's ID has changed. (Account.id has been updated.)	
Account/New	A new account has been created.	
Account/Status/Exported	An account has been exported by Porter in Dual Version PortaSwitch®. (Customers.bill_status set to E.)	Y

Account/Status/Imported	An account has been imported by Porter in Dual Version PortaSwitch®.	Y
Connection/Changed	The connection information has been updated.	
Connection/Deleted	The connection has been removed from the vendor.	
Connection/New	A new connection has been created for the vendor.	
DID/Deleted	A DID number has been removed from the DID inventory.	
DID/New	A new DID number has been added to the DID inventory.	
DID/Status/Activated	A DID number has been assigned to a customer's account ID.	
DID/Status/Assigned	A DID number has been assigned to a customer.	
DID/Status/Canceled	A DID number has been unassigned from a customer's account ID.	
DID/Status/Moved	A DID number has been moved to another installation as a result of provisioning.	
DID/Status/Unassigned	A DID number has been removed from a customer.	

Sokoban::Log handler events

Name	Description	Inherited from Customer
Accessibility/Deleted	The usage charges record has been removed from the account's product.	
Accessibility/Inserted	A usage charges record has been added to the accounts product.	

Account/ActivationDate/ Changed	The activation date has been changed for an account. (Accounts.activation_date has been changed)	
Account/Alias/Delete	An alias has been removed from an account.	
Account/AvailableFundsAppear	An account's available funds are restored when a debit account tops up the balance or when a postpaid customer pays their invoice. (Accounts.balance has been topped up from credit_limit.) I_account.	Y
Account/BalanceChanged	The balance of a debit or individual credit account has changed (e.g., a call has been charged, a refill has been received). A customer's balance has changed for postpaid customers.	Y
Account/Blocked	An account has been blocked. (Accounts.blocked set to 'Y.')	
Account/CustomField/Changed	Custom information (e.g., ID card) has been added or changed for an account. (The Custom_Field_Values table has been updated for the account.)	
Account/Discount/Changed	An account's discount plan has changed.	
Account/ExpirationDate/ Changed	An account's expiration date has changed. (Accounts.expiration_date has been changed.)	
Account/FollowMe/Changed	An account's follow-me setting has changed (the Follow_Me table has been updated).	
Account/FollowMeNumber/ Inserted	A new follow-me number has been added to an account.	

Account/FollowMeNumber/ Changed	An account's follow-me number has changed.	
Account/FollowMeNumber/ Deleted	An account's follow-me number has been removed.	
Account/ID/Changed	An account's ID has changed. (Account.id has been updated.)	
Account/IPDeviceAssignment	An IP device has been assigned to an account (the UA_Links table has been updated).	
Account/New	A new account has been created.	
Account/Password/Changed	An account's password for the self-care interface has changed. (Accounts.password has been changed.)	
Account/Product/Changed	Another product was assigned to the account. An account's product has changed. (Account.i_product has been updated.)	
Account/ProductAddon/ Changed	An account's add-on product has been changed.	
Account/ProductAddon/ Deleted	An add-on product has been removed from an account.	
Account/ProductAddon/ Inserted	A new add-on product has been added for an account.	
Account/Service/ QuotaAvailable	The account's service usage quota has been restored (quota counter has been reset or user topped up their service wallet).	
Account/Service/ QuotaExceeded	An account has exceeded its service usage quota.	
Account/ServiceAttribute/ Changed	A service feature has been enabled/disabled for an account (the Service_Attribute_Values table has been updated).	Y

Account/ServiceFlags/Changed	An account's service features have changed. (Accounts.service_flags has been updated.)	Y
Account/ServicePassword/Changed	An account's service password has been changed.(Accounts.h323_password has been changed.)	
Account/SIMCardAssignment	A SIM card has been assigned to, removed from or changed for an account.	
Account/Status/Changed	An account's billing status has been changed or affected by the customer's billing status. A customer's status has changed. (Customers.bill_status has changed.)	Y
Account/Status/Closed	The status of the account has changed to Closed. The account has been removed from the web interface. (Accounts.bill_status set to 'C.') This event type appears when a customer is terminated.	Y
Account/Status/Exported	An account has been exported by Porter in Dual Version PortaSwitch®. (Customers.bill_status set to E.)	Y
Account/Status/Imported	An account has been imported by Porter in Dual Version PortaSwitch®.	Y

Account/Status/Suspend	An account's status has changed to suspended because of a customer's suspension. Caused by: Customer has unpaid invoice. (Customers.bill_status set to 'S.')	Y
Account/Status/Unsuspend	An account has been unsuspended; due to removing of the customer's suspension. A customer's account has been reinstated. (Customers.bill_status set to 'O' from 'S.')	Y
Account/Unblocked	An account has been unblocked. (Accounts.blocked set to 'N.')	
Account/ZeroAvailableFunds	An account's available funds have been depleted. (Accounts.balance has reached credit_limit [for credit accounts] or 0 [for debit accounts.])	Y
Customer/AvailableFunds Appear	A customer payment has been received (a customer topped up their balance or paid their invoice).	
Customer/BalanceChanged	A customer's balance has been replenished (contains previous and current balance amount).	
Customer/Blocked	A customer's account has been blocked. (Customers.blocked set to 'Y.')	
Customer/CustomField/ Changed	The data in a customer's custom field has changed (the Custom_Field_Values table has been updated for the customer).	

Subscriber/Name/Changed	The account's user name has changed.	
Customer/Name/Changed	The customer's name has changed.	
Customer/New	A new customer has been created.	
Customer/ServiceAttribute/Changed	A customer's service setting has changed (the Service_Attribute_Values table has been updated).	
Customer/ServiceFlags/Changed	A customer's service features have changed. (Customers.service_flags has been updated.)	
Customer/Status/Activated	A customer's record has been activated. (Customers.bill_status set to 'O' from 'D.')	
Customer/Status/Changed	A customer's status has changed. (Customers.bill_status has been updated.)	
Customer/Status/Closed	A customer has been terminated and their status changed to closed. (Customers.bill_status set to 'C.')	
Customer/Status/Deactivated	A customer's record has been deactivated. (Customers.bill_status set to 'D' from 'O.')	
Customer/Status/Exported	A customer's record status has changed. (Customers.bill_status set to E.)	
Customer/Status/Imported	A customer's record status has changed. (Customers.bill_status set to O.)	
Customer/Status/Suspend	A customer's account has been suspended. (Customers.bill_status has been updated.)	

Customer/Status/Unsuspend	A customer's account has been reinstated. (Customers.bill_status set to 'O' from 'S.')
Customer/Unblocked	A customer's account has been unblocked. (Customers.blocked set to 'N.')
Customer/ZeroAvailableFunds	A customer's available funds have been depleted. (Customers.balance has reached credit_limit.)
ServiceAttribute/Changed	A service feature has been enabled/disabled for a customer. (The Service_Attribute_Values table has been updated.)
CustomField/Changed	A customer's custom data has changed (the Custom_Field_Values table has been updated).
DID/New	A new DID number has been added to the DID inventory.
DID/Status/Assigned	A DID number has been assigned to a customer.
DID/Status/Unassigned	A DID number has been removed from a customer.
DID/Status/Activated	A DID number has been assigned to a customer's account ID.
DID/Status/Canceled	A DID number has been unassigned from a customer's account ID.
DID/Status/Moved	A DID number has been moved to another installation as a result of provisioning.
DID/Deleted	A DID number has been removed from the DID inventory.
Invoice/Adjustment/ Changed	An invoice has been adjusted (refunded) by an administrator.

Invoice/AmountPaid/Changed	This is the amount a customer has paid. Use this event to track and provision: - manual payment information; - partially paid invoice changes.	
Invoice/New	A new invoice has been generated.	
Invoice/Status/Changed	An invoice has changed its status (e.g., from unpaid to paid, from unpaid to overdue). Use this event to track and provision information: • about the payment statuses of generated invoices: - unpaid; - overdue; - paid; - partially paid; - do not pay; - no payment required; - previous balance remaining; • about the statuses of invoices that require administrator's approval: - under review; - approved; - rejected. Refer to the Invoice parameters and Invoices review chapters in the PortaBilling Administrator Guide for the description of these statuses.	

	Note that if a customer pays their invoice in installments, the Invoice/Status/Changed event occurs twice for this invoice: - first event – changes from unpaid to partially paid; - second – changes from partially paid to paid in full. For example, a customer pays their $110 invoice in installments (e.g., $25+$20+$35+$30). Events occur when: - the first $25 payment is made: the invoice status changes from unpaid to partially paid; the last $30 payment is made: the invoice status changes from partially paid to paid.
IPDeviceProfile/New	A CPE profile has been created.
PaymentTransaction/New	A customer has made a credit card payment.
PaymentTransaction/ResultCode/Changed	A transaction has either started or finished.
PaymentTransaction/Status/Changed	A transaction has changed its status.
Product/Discount/Changed	A discount plan has been changed for a product or an add-on product.
Product/ServiceAttribute/Changed	A service feature has been enabled/disabled for a product or an add-on product.
ServiceAttribute/Changed	A service feature has been enabled/disabled for either a product, add-on product, customer or account.

Subscriber/Address/Changed	The address of a user registered as an account has changed.	
Subscriber/ContactInfo/ Changed	The account's contact information has been changed.	
Subscriber/Name/Changed	The user's name registered as an account has been changed.	

Titan::HSS handler events

Name	Description	Inherited from Customer
Account/AvailableFundsAppear	An account's available funds are restored when a debit account tops up the balance or when a postpaid customer pays their invoice. (Accounts.balance has been topped up from credit_limit.) I_account.	Y
Account/Blocked	An account has been blocked. (Accounts.blocked set to 'Y.')	
Account/ID/Changed	An account's ID has changed. (Account.id has been updated.)	
Account/Product/Changed	Another product was assigned to the account. An account's product has changed. (Account.i_product has been updated.)	
Account/ProductAddon/ Deleted	An add-on product has been removed from an account.	
Account/ProductAddon/ Inserted	A new add-on product has been added for an account.	
Account/ProductAddon/ Changed	An account's add-on product has been changed.	

Account/ServiceAttribute/ Changed	A service feature has been enabled/disabled for an account (the Service_Attribute_Values table has been updated).	Y
Account/SIMCardAssignment	A SIM card has been assigned to, removed from or changed for an account.	
Account/Status/Closed	The status of the account has changed to Closed. The account has been removed from the web interface. (Accounts.bill_status set to 'C.') This event type appears when a customer is terminated.	Y
Account/Status/Suspend	An account's status has changed to suspended because of a customer's suspension. Caused by: Customer has unpaid invoice. (Customers.bill_status set to 'S.')	Y
Account/Status/Unsuspend	An account has been unsuspended; due to removing of the customer's suspension. A customer's account has been reinstated. (Customers.bill_status set to 'O' from 'S.')	Y
Account/Unblocked	An account has been unblocked. (Accounts.blocked set to 'N.')	

Account/ZeroAvailableFunds	An account's available funds have been depleted. (Accounts.balance has reached credit_limit [for credit accounts] or 0 [for debit accounts.])	Y

YateHSS handler events

Name	Description	Inherited from Customer
Account/AvailableFundsAppear	An account's available funds are restored when a debit account tops up the balance or when a postpaid customer pays their invoice. (Accounts.balance has been topped up from credit_limit.) I_account.	Y
Account/Blocked	An account has been blocked. (Accounts.blocked set to 'Y.')	
Account/Product/Changed	Another product was assigned to the account. An account's product has changed. (Account.i_product has been updated.)	
Account/ProductAddon/ Changed	An account's add-on product has been changed.	
Account/ProductAddon/ Deleted	An add-on product has been removed from an account.	
Account/ProductAddon/ Inserted	A new add-on product has been added for an account.	
Account/SIMCardAssignment	A SIM card has been assigned to, removed from or changed for an account.	

    157

Account/Status/Closed	The status of the account has changed to Closed. The account has been removed from the web interface. (Accounts.bill_status set to 'C.') This event type appears when a customer is terminated.	
Account/Status/Suspend	An account's status has changed to suspended because of a customer's suspension. Caused by: Customer has unpaid invoice. (Customers.bill_status set to 'S.')	Y
Account/Status/Unsuspend	An account has been unsuspended; due to removing of the customer's suspension. A customer's account has been reinstated. (Customers.bill_status set to 'O' from 'S.')	Y
Account/Unblocked	An account has been unblocked. (Accounts.blocked set to 'N.')	
Account/ZeroAvailableFunds	An account's available funds have been depleted. (Accounts.balance has reached credit_limit [for credit accounts] or 0 [for debit accounts.])	Y

ZXUN::HSS handler events

Name	Description	Inherited from Customer
Account/Blocked	An account has been blocked. (Accounts.blocked set to 'Y.')	
Account/Id/Changed	An account's ID has changed. (Account.id has been updated.)	
Account/Product/Changed	Another product was assigned to the account. An account's product has changed. (Account.i_product has been updated.)	
Account/SIMCardAssignment	A SIM card has been assigned to, removed from or changed for an account.	
Account/Status/Closed	The status of the account has changed to Closed. The account has been removed from the web interface. (Accounts.bill_status set to 'C.') This event type appears when a customer is terminated.	
Account/Unblocked	An account has been unblocked. (Accounts.blocked set to 'N.')	

ZXUN::SPR handler events

Name	Description	Inherited from Customer
Account/ActivationDate/ Changed	The activation date has been changed for an account. (Accounts.activation_date has been changed)	
Account/AvailableFundsAppear	An account's available funds are restored when a debit account tops up the balance or when a postpaid customer pays their invoice. (Accounts.balance has been topped up from credit_limit.) I_account.	Y
Account/ExpirationDate/ Changed	An account's expiration date has changed. (Accounts.expiration_date has been changed.)	
Account/Id/Changed	An account's ID has changed. (Account.id has been updated.)	
Account/Product/Changed	Another product was assigned to the account. An account's product has changed. (Account.i_product has been updated.)	
Account/ProductAddon/ Deleted	An add-on product has been removed from an account.	
Account/ProductAddon/ Inserted	A new add-on product has been added for an account.	
Account/ServiceAttribute/ Changed	A service feature has been enabled/disabled for an account (the Service_Attribute_Values table has been updated).	Y
Account/SIMCardAssignment	A SIM card has been assigned to, removed from or changed for an account.	

Account/Status/Closed	The status of the account has changed to Closed. The account has been removed from the web interface. (Accounts.bill_status set to 'C.') This event type appears when a customer is terminated.	
Account/Status/Suspend	An account's status has changed to suspended because of a customer's suspension. Caused by: Customer has unpaid invoice. (Customers.bill_status set to 'S.')	Y
Account/Status/Unsuspend	An account has been unsuspended; due to removing of the customer's suspension. A customer's account has been reinstated. (Customers.bill_status set to 'O' from 'S.')	Y
Account/ZeroAvailableFunds	An account's available funds have been depleted. (Accounts.balance has reached credit_limit [for credit accounts] or 0 [for debit accounts.])	Y