

PortaSwitch



New Features Guide

53

Maintenance
Release



Documentation

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Table of Contents

Preface	4
xDR Mediation	5
Discounts, Quotas and Service Wallets.....	7
Presence and Busy Lamp Field (BLF) Services in PortaSIP® Cluster	12
Media Encryption in PortaSwitch®	13
Ring-back Tone Generation by PortaSwitch®	17
Early Media Relaying.....	18
Spending Plan.....	19
Extended xDRs for IP Centrex Calls	20
SIM Card Inventory	21
Wholesale Messaging Support.....	23
Advanced Invoice .pdf File Generation.....	24
Adjustments for Paid Invoices.....	25
DID Number Self Provisioning	26
Key API Methods Support for the Secondary Site in the Standalone Mode	27
Other Features and Enhancements	28
Web Interface Changes	32
Important Upgrade Notes	32

Preface

PortaSwitch® Maintenance Release 53 is the next leap-forward release, consistent with our “fast releases, precisely on time” ideology.

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 introduced between major 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 performing the action described here.



Archivist explains how the feature worked in previous releases.



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



Tips provide information that might help you solve a problem.

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xDR Mediation

The xDR Mediation utility is a powerful new tool that replaces the legacy xDR Importer and significantly expands and enhances the pre-existing functionality. Among the new features that one can benefit from are the following:

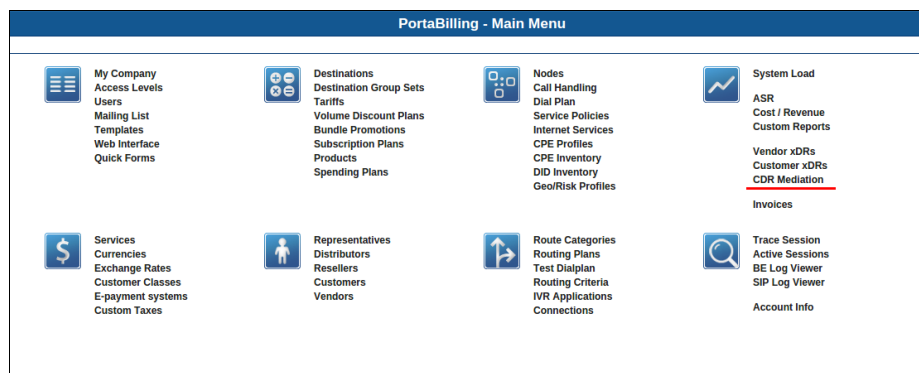
- **Extended range of supported formats** – xDRs can be imported to the PortaBilling® from the .csv, fixed-width and TAP3 files.
- **A custom data transformation module** – Add a custom module with source data manipulation rules via the configuration server web interface. This is convenient for complex transformations as it allows the use of dedicated software for coding instead of typing code directly into the configuration file. It is also easy to maintain the defined rules over the system upgrades this way.
- **Flexible import setup vs. unified rating** – Each type of source data usually requires tailored data manipulation. On the other hand, the rating process is often more or less the same. Thus, the xDR import utility is divided into two components: xDR Extraction (responsible for importing source xDRs) and xDR Rating.

Create as many xDR Extraction instances with different import rules as required. Rating options may be configured just once, though, and a node for a single xDR Rating instance is added on the web interface.

- **Re-run the rating process for rejected or failed xDRs** – Check in real time whether xDRs are imported and rated successfully. In case there are issues with some of them, adjust the extraction or rating configuration and re-run the process.
This interactive approach allows large and complex xDR batches to be dealt with quickly. (Elasticsearch must be selected as the storage type to enable this functionality.)
- **Web interface** – One of the main and greatest advantages of the new xDR Mediation utility is the visual representation of the xDR import process on the web interface.

Web Interface

A new section was added on the main menu page to grant easy access to xDR import control.



On the **CDR Mediation** page you can search for a certain data collection already imported or still in process. The search is available both by the status of the xDR import process and by the data. You can also choose to check only those data collections that have rejected xDRs within.

CDRs	CDR Collection	Status	Added	Processed	Total Records	Imported	Skipped ?	Rejected ?
	cd20151225_1303_20391814_0001	Processed	2015-12-25 15:03:18		5	5	0	0
	cd20151225_1303_20391814_0001	Processed	2015-12-25 15:06:46		5	5	0	0
	cd20151225_1306_20391331_0002	Processed	2015-12-25 15:06:54		147	67	0	80

Click the **xDRs** icon to review xDRs from the particular collection and see their real-time status. Multiple selection parameters are available. From this page you can launch the reprocessing of the rejected xDRs.

Details	BE Log	Billing ID	CLJ	CLD	Service	Connect Time	Used Service	Customer Charges	Vendor Cost	Vendor	Status
		11196700010	11196700010	00096700010	Netacore	2015-11-05 11:14:26					Account charge error
		11196700007	11196700007	00096700007	Voice	2015-11-25 14:15:00	8	2.83	0.41		
		11196700029	11196700029	00096700009	Voice	2015-11-25 14:15:00	18	1.95	0.96		
		11196700010	11196700010	00096700010	Netacore	2015-11-05 11:14:26					Account charge error
		11196700111	11196700111	00096700001	Voice	2015-11-25 14:15:00	11	6.64	0.17		
		11196700003	11196700003	00096700003	Voice	2015-11-25 14:15:00	19	7.31	0.65		
		11196700021	11196700021	00096700001	Voice	2015-11-25 14:15:00	15	10.12	0.33		
		11196700027	11196700027	00096700010	Netacore	2015-11-05 11:14:26					Account charge error
		11196700010	11196700010	00096700010	Netacore	2015-11-05 11:14:26					Account charge error
		11196700008	11196700008	00096700008	Voice	2015-11-25 14:15:00	1	6.37	0.61		
		11196700010	11196700010	00096700010	Netacore	2015-11-05 11:14:26					Account charge error
		11196700028	11196700028	00096700008	Voice	2015-11-25 14:15:00	13	5.63	0.30		
		11196700028	11196700028	00096700008	Voice	2015-11-25 14:15:00	9	10.31	0.25		
		99912356479	99912356479	00096700008	Voice	2015-11-25 14:15:00			0.15		Account charge error
		11196700010	11196700010	00096700010	Netacore	2015-11-05 11:14:26					Account charge error
		11196700010	11196700010	00096700010	Netacore	2015-11-05 11:14:26					Account charge error
		11196700113	11196700113	00096700003	Voice	2015-11-25 14:15:00	7	8.65	0.55		
		11196700026	11196700026	00096700006	Voice	2015-11-25 14:15:00	14	4.80	0.23		
		11196700022	11196700022	00096700002	Voice	2015-11-25 14:15:00	18	10.32	0.09		
		11196700024	11196700024	00096700004	Voice	2015-11-25 14:15:00	18	4.63	0.73		
		11196700002	11196700002	00096700002	Voice	2015-11-25 14:15:00	15	2.61	0.96		
		11196700024	11196700024	00096700004	Voice	2015-11-25 14:15:00	6	2.54	0.19		
		11196700010	11196700010	00096700010	Netacore	2015-11-05 11:14:26					Account charge error
		99912356474	99912356474	00096700004	Voice	2015-11-25 14:15:00			0.06		Account charge error
		11196700002	11196700002	00096700002	Voice	2015-11-25 14:15:00	13	0.94	0.22		

Finally, you can look even deeper into data and inspect an individual xDR – both how it looks in the source file and in the parsed format.

700111	11198700111	00098700001	Voice	2015-11-25 14:15:00	11	6.64	0.17
700003	11198700003	00098700003	Voice	2015-11-25 14:15:00	10	7.01	0.85
700221							0.33
700227							
700010							
700009							0.81
700010							
700228							0.30
700226							0.25
856479							0.15
700010							
700010							
700113							0.55
700226	11198700226	00098700006	Voice	2015-11-25 14:15:00	14	4.92	0.23
700222	11198700222	00098700002	Voice	2015-11-25 14:15:00	16	10.32	0.93
700224	11198700224	00098700004	Voice	2015-11-25 14:15:00	16	4.63	0.73

All these features make the xDR import more convenient to manage. The new import tool requires less technical expertise to control the process. A non-specialist web administrator can easily check whether all the data has been successfully imported and find if there are any rejected xDRs.

Discounts, Quotas and Service Wallets

With this release, improved volume discount plans offer more opportunities for managing price offers for your customers. The discount plans have been developed and structured into three discount schemes – discounts, quotas and service wallets. Use these discount schemes separately or combine them with each other to get the best solution for your business model.

- **Discounts** – Using discounts, you can adjust prices depending on the volume of service consumed by customers. This encourages them to use the service more in order to receive the discount (e.g. spend \$20 for calls to the UK and get a 30% discount for the following calls made during the rest of the month). You can also use discounts to make special offers (e.g. new customers receive 50% off for 10 GB of Internet traffic).
- **Quotas** – With quotas you are now able to allocate a defined volume of services for your customers free of charge. A quota is usually combined with a recurring fee (a subscription). For example, provide 100 minutes for calls to Canada and 3 GB of Internet traffic for a \$30 monthly fee.
- **Service Wallets** – This tool makes it possible to divide the customer's balance into virtual sub-wallets. Each sub-wallet is designated for a specific service and destination group. Therefore, money transferred to a sub-wallet can only be used for a specific

service (e.g. only for calls to the US or only for sending SMS, etc.). For example, a customer wants to have unbroken access to the Internet even if all his available funds have been consumed by making calls. So the customer tops up his Internet service sub-wallet by \$10 using a credit card. The customer receives 5 GB of Internet traffic that can be used even when his available funds reach zero. Service wallets can be topped up via the customer self-care or administrator web interface.

Discounts, quotas and service wallets can be configured based on the consumed volume of service (e.g. minutes, Mb, SMS) or on the service cost (note that this cost is calculated using a standard rate).

Discounts

There are two discount schemes available:

- Permanent discount.
- Individual discount for a recurring usage period.

Permanent discount

This discount scheme is a great tool for providing a permanent discount with no time limitation. For example, apply this discount scheme to provide a rate that is 10% cheaper for a wholesale partner.

Individual discount for a recurring usage period

Use this discount scheme to provide a discount for a defined usage period – daily, weekly, bi-weekly or monthly. When the usage period ends, the discount counters reset. For example, provide a monthly deal of the first 100 minutes for calls to the UK at a standard rate, the following 200 minutes at a 20% discount and all following calls to this destination at a 30% discount. When the next usage period begins, the customer's calls to the UK are charged the standard rate.

General Info		Discounts, Quotas and Service Wallets					
Destination Group	Service	Type	Scheme	Usage Period	Scheme details		Delete
UK	Voice Calls	Volume, minute	Discount	Repeat Monthly	N/A 0..100 - 0% 100..300 - 20% 300..0 - 30% Always		✖

General Info

Service: * Voice Calls

Destination Group: * UK

Scheme: * Discount

Type: * Volume, minute

Scheme *

☐ One time Discount

☒ Apply Discount

Monthly

Additional Info

☐ Prorate thresholds for first usage period

☐ Rollover unused minutes to the next usage period

Allow no more than: rollover

☐ Use separate Scheme for Off-peak

Discounts

[Scheme Details](#)

Quotas

Repeatable quota

This is the most common way to provide a set of services for a recurring fixed fee. To do this, create a quota for your service, then create a subscription plan and assign them both to the same product. For example, you can provide a triple-play package that includes quotas such as 1000 minutes for domestic calls, 1 GB of Internet traffic and 150 domestic SMS – for a monthly subscription fee of \$40. Once the quota is consumed, the service is unavailable until the following month.

Destination Group	Service	Type	Scheme	Usage Period	Scheme details	Delete
France	LTE	Volume, megabyte	Quota	Repeat Monthly	N/A 0.1000 - 100% Always	✗
France	Voice Calls	Volume, minute	Quota	Repeat Monthly	N/A 0.1000 - 100% Always	✗
France	Messaging Serv...	Volume, message	Quota	Repeat Monthly	N/A 0.150 - 100% Always	✗

Service Wallets

Standard service wallet

Sometimes customers want to reserve an amount of money for a specific service so they can freely use their available funds for other services. If a customer runs out of money at some point, the money in reserve remains available and the customer can still spend it only for the needed service. Within a single volume discount plan, the administrator can configure as many service wallets as needed. The volume discount plan can be assigned to a product, a customer or one of their accounts. When assigned, the standard service wallet is empty, so in order to use it, the customer or administrator needs to top it up. Alternatively, there is the option of configuring a service wallet with an initial value.

Service wallet with initial value

Use this service wallet scheme to grant a certain volume of service to your customers for one time. For example, grant your IPTV customers 10 GB of Internet traffic free of charge as a promotional offer. Once the traffic is consumed, they decide whether to subscribe to the Internet service on a regular basis or not. Note that service wallets with an initial value cannot be topped up, so use the standard service wallet to provide your customers with a top up option.

Service wallet top up

This is a fast and easy-to-use tool to reserve customers' money for a specific service. The administrator or customer can top up the wallet at any time via their web interfaces. A top up is an efficient way to increase your payment flow since you, as the service provider, can sell a larger volume of service at a lower price.

For example, you can offer 10-minute calls to Japan for \$3; 50-minute calls for \$10 and 100-minute calls for \$15. The customer selects the most suitable offer among the three options and either tops up his service wallet via the customer self-care web interface or requests this service from the administrator.

Destination Group	Service	Type	Scheme	Usage Period	Scheme details	Delete
Japan	Voice Calls	Volume, minute	Quota	One-Time Discount	N/A 0.0 - 100% 0.0 - 0% After reaching the last threshold limit Allow no more than 1 rollover(s)	X

General Info

Service: * Voice Calls

Destination Group: * Japan

Scheme: * Quota

Type: * Volume, minute

Additional Info

☐ Notify Customer/End User when 0

☐ Notify Customer/End User when Threshold reached

Scheme *

☒ Service Wallet

☐ Service Wallet with initial value

☐ Repeatable Quota

Topup your Service Wallet *

Add

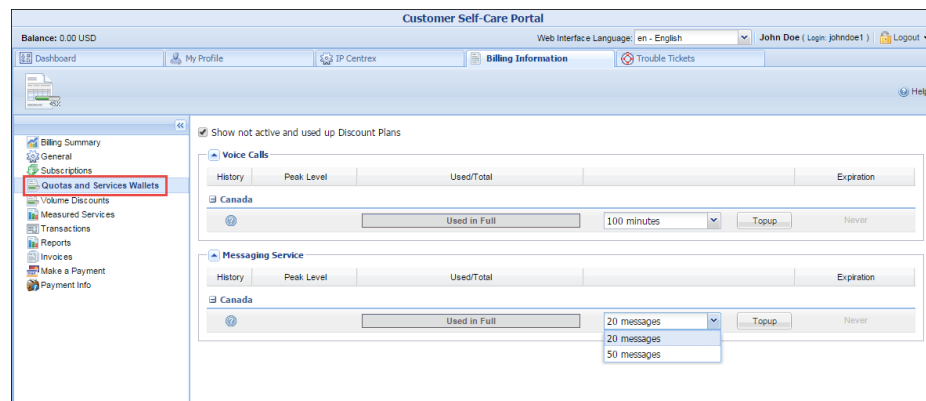
Volume, minutes	Fee, USD	
10	3	+
50	10	+
100	15	+

Consider the following example:

John Doe is a prepaid customer of EasyCall Inc. To be on the safe side, John Doe wants approximately 10 SMS and about 100 minutes for domestic calls in case he runs out of money using other services. His current available funds are \$20. He accesses the customer self-care interface and sees these available options:

- 20 SMS for \$3 and 50 SMS for \$6.
- 50 minutes for \$5, 100 minutes for \$9 and 200 minutes for \$15.

John Doe buys 20 SMS for \$3 and 100 minutes for \$9, his credit card is charged for \$12. Now he can use other available services (e.g. he surfs the Internet and makes international calls) feeling confident that this will not impact his ability to make domestic calls and send SMS messages.



NOTE: In the current release, the administrators are enabled to transfer money from a customer's balance to his service wallet. In upcoming releases, customers will be enabled to do this too via their customer self-care interfaces.

Best practices

The table below matches the most common business cases and discount schemes suitable for them. Use this table to select the proper option for your own business model.

Description	Example	Scheme
The customer receives a permanent discount	The service provider grants a wholesale customer an unlimited 10% discount for calls to the US and Canada.	One time discount
The customer has a monthly discount for a service	The service provider makes a special offer for business customers: "Spend \$100 for calls to Germany and get 50% off all following calls to this destination this month." To receive the 50% discount again for the following month, the customer must spend \$100 for calls to Germany at the standard price.	Individual discount for a recurring usage period
The customer receives a defined amount of service free of charge	The new subscribers of the "triple play" service receive 10 GB of Internet traffic for free.	Service wallet with initial value

The customer pays a monthly fee and receives a defined set of services	The customer pays \$30 monthly and receives: • free domestic calls • 30 free minutes for calls to Europe • 100 domestic SMS.	Repeatable quota (+ subscription)
The customer wants to maintain a separate balance for Internet service and for international calls	The customer's current balance is \$100. At the customer's request, the administrator transfers \$20 from the main balance to the Internet service sub-wallet and \$10 to the international calls sub-wallet. The customer receives 5 GB of Internet traffic and 50 minutes for making calls, respectively.	Service wallet

Presence and Busy Lamp Field (BLF) Services in PortaSIP® Cluster

To unify the system architecture and provide scalability and high-availability of services, both the presence and BLF functionalities have now been integrated to the PortaSIP® cluster.

Presence and BLF services are performed using a new PortaSIP® cluster component – the subscription manager. It communicates both with users' devices and with cluster components handling presence requests and then sends notifications about users' availability. The subscription manager is part of the cluster processing node, thus it inherits PortaSIP® cluster redundancy features. It is enabled by default as soon as the PortaSIP® cluster is configured.

Additionally, BLF functionality has been enhanced to flexibly monitor phone status updates for calls made to account aliases. This means that if a DID number associated with an account as an alias receives a call, the status of that account changes.

For example, Bill subscribes to his colleague John's phone number 16475556786 (provisioned as an account in PortaBilling®). John also has DID numbers 12065552154 and 44065578913 associated with his account. When someone calls either 12065552154 or 44065578913, Bill sees that John's phone is busy.

If necessary, you can further fine tune the BLF to only receive notifications about calls made to a particular DID.

For security purposes, only accounts within the same IP Centrex environment may monitor each other's statuses.

Please note that a subscription manager will notify a newly subscribed watcher to the presence of a user regarding this user's subsequent statuses. Thus, if Bill from the example above subscribes to John's presence when John is calling, Bill will not see John's current status (busy) but will be notified about John's new status (e.g. available or DND).

For geo-redundant installations new presence requests are not processed if a secondary site is operating in a stand-alone mode.

Embedding the support of presence and BLF services into the PortaSIP® cluster provides possibilities for their further development and maintenance. It also brings the following advantages to the administrators:

- A simplified network configuration – There is no need for an administrator to configure a separate instance since the subscription manager is automatically enabled during the initial setup.
- Efficient scalability – This is achieved by adding additional processing nodes to the PortaSIP® cluster. It also helps to evenly distribute the load among all subscription managers.
- High-availability of services – If any subscription manager fails, the services are handled by those that remain.

Media Encryption in PortaSwitch®

These days the telecommunications market demands that secure calls be provided. If a user connects to a public WiFi hotspot and establishes a call from his soft phone, it is possible that a third party could intercept and / or listen in on the conversation. Therefore, it is necessary to protect such calls and guarantee their security by means of media encryption.

Another situation might be that a call established from an application that strictly requires media encryption reaches a phone that does not support media encryption.

To handle such cases and enable calls among devices with different capabilities to go through, PortaSwitch® now performs intermediate media encryption. The system can be configured so that:

- PortaSwitch® encrypts the media stream during a call and proxies it to a user's device,
- PortaSwitch® decrypts the media stream received from a user's device before sending it to another party, or

- The media stream is encrypted by phones that use the Secure Real-time Transport Protocol (SRTP RFC 3711) instead of basic RTP. The encrypted media occurs directly among phones or is relayed by PortaSwitch® without decryption (the so-called fully private call).

Let us have a closer look at the possibilities in more detail.

Media Encryption by PortaSwitch®

The key distinction of calls encrypted by PortaSwitch® is that the RTP proxy always mediates the RTP media stream. This provides the RTP proxy with encryption keys, thus making it possible for a calling party's media to be encrypted and then decrypted for a called party and vice versa. More complex call scenarios where a media stream must be encrypted for both call participants and their phones use different key agreement protocols are also supported.

Consider the following example:

John Doe calls his wife Jane from a phone that works only with encrypted media and supports encryption by zRTP. Jane's phone, however, supports only SDES encryption. When the system authorizes the call, it detects that the media must be encrypted for both John and Jane and that the encryption methods differ. During the call, the media stream passes via the RTP proxy which has two sets of encryption keys. This allows PortaSwitch® to receive encrypted media from John's phone, decrypt it with the zRTP encryption keys, encrypt it using SDES encryption keys and send it to Jane's phone.

Fully private calls

During fully private calls the media stream is solely encrypted by users' phones and delivered directly between these phones. If any of the phones is on a private network and the RTP proxy is involved in the call, it relays the media stream only, without decryption.

When establishing a fully private call, one must remember that:

- Both phones must support the same key agreement protocol.
- Since data is encrypted without the participation of PortaSwitch®, account settings such as call recoding and music on hold are ignored since PortaSwitch® cannot decrypt the media stream.

Whether media encryption by PortaSwitch® is required, and for which call participant: the called party, the calling party or both, is defined by the service policy configuration. The following service policy options:

caller_stream_relay_or_decrypt and **callee_stream_security_settings**

define the security settings for both the calling and called party, respectively.

Service Policies

Policy Name: Media Security Description: Service policy for secure media streaming

Policy ID: p1

Match Priority: 0

Match Pattern: Sipura%

Policy Values

Attribute	Value	Order
out_hdr_diversion		
codec_order_list		
fake_180_ringing		
initial_negotiation_codecs		
sdp_cline_mode		
out_hdr_contact		
onjoin_renegotiation_delay		
force_sip_proxy		
remote_address_sip_field		
initial_sdp_on_transfer		
sticky_1xx_sdp		
gw_longpound_event		
oid_uri_combining_for_aor		
call_progress_notification		
call_progress_filter		
transfer_progress		
early_media_timeout		
caller_stream_relay_or_decrypt		
callee_stream_security_settings		

Security settings, however, are applied separately to the calling and called parties. Thus, media stream processing for a calling party can be configured as follows:

- **forced_relay** – PortaSwitch® relays the media stream received from the calling party and ignores the called party's settings. The media features for the account such as music on hold, music on waiting and call recording are not available if the relayed media stream is encrypted.
- **relay_or_decrypt** – This is the default setting. PortaSwitch® relays any type of media stream received from the calling party if it is allowed by the called party's settings. Otherwise, the media stream is encrypted / decrypted.
- **decrypt** – PortaSwitch® always decrypts the media stream received from the calling party.

The following are media stream processing configuration options for the called party:

- **as_caller** – This is the default setting. PortaSwitch® relays any type of stream received from the calling party. The media features for the account such as music on hold, music on waiting and call recording are not available if the relayed media stream is encrypted.
- **decrypted** – PortaSwitch® always decrypts / encrypts the media stream for the called party.

- **sdes** – PortaSwitch® always performs media stream encryption for the called party using the SDES protocol.
- **dtls** – PortaSwitch® always performs media stream encryption for the called party using the DTLS protocol.
- **zrtp** – PortaSwitch® always performs media stream encryption for the called party using the zRTP protocol.

The decision to encrypt or relay a particular call depends on the security settings for the call originator. This allows you to fine tune the system for each specific case.

The results of the security setting configuration for both calling and called parties are provided in the table below:

caller_stream_relay_or_decrypt	callee_stream_security_settings	Encryption for the caller device	Result	Media Features
forced_relay	decrypted, as_caller, sdes, dtls, zrtp	requested	Caller <-> Relayed via PortaSwitch® or sent directly <-> Callee	No
		no	Caller <-> Relayed via PortaSwitch® or sent directly <-> Callee	Yes
relay_or_decrypt	as_caller	requested	Caller <-> Relayed via PortaSwitch® or sent directly <-> Callee	No
		no	Caller <-> Relayed via PortaSwitch® or sent directly <-> Callee	Yes
relay_or_decrypt	decrypted	requested	Caller <-encrypted-> PortaSwitch® <-non-encrypted-> Callee	Yes
		no	Caller <-> Non-encrypted stream relayed via PortaSwitch® <-> Callee	Yes
relay_or_decrypt	sdes, dtls, zrtp	requested	Caller <-encrypted-> (Encrypt 1) PortaSwitch® (Encrypt 2) <-encrypted-> Callee	Yes
		no	Caller <-non-encrypted-> PortaSwitch® <-encrypted-> Callee	Yes

decrypt	as_caller, decrypted	requested	Caller <-encrypted-> PortaSwitch® <-non-encrypted-> Callee	Yes
		no	Caller <-> Non-encrypted stream relayed via PortaSwitch® <-> Callee	Yes
decrypt	sdes, dtls, zrtp	requested	Caller <-encrypted-> (Encrypt 1) PortaSwitch® (Encrypt 2) <-encrypted-> Callee	Yes
		no	Caller <-non-encrypted-> PortaSwitch® <-encrypted-> Callee	Yes

The following key agreement protocols are supported:

- SDES
- DTLS
- zRTP

Each key agreement protocol has its own distinctive features, yet the general flow is an exchange of cryptographic parameters between a device or an application and the RTP proxy. These keys are then used to encrypt / decrypt the RTP media stream that occurs between the device and PortaSwitch® during a call. The cryptographic parameters are unique for each session. This eliminates the chance for the call to be intercepted and decrypted.

At present, media stream encryption is only supported for ordinary calls. Support for “complex” calls such as those that involve call pickup, call transfer, etc. will be added in future releases.

PortaSwitch® media stream encryption increases call security and protects users from unwanted interception activities. It allows administrators to manage security settings for accounts, thus making it possible to provide secure calls among phones that have different capabilities.

With this functionality added, PortaSwitch® can be easily integrated with WebRTC applications, thereby increasing the service provider’s competitiveness in the market.

Ring-back Tone Generation by PortaSwitch®

When an end user places an outgoing call, they expect to hear a ring-back tone in return, to signify that the call is in progress. If the line is quiet, the

end user might think the call has failed and might hang up although the call is actually ringing at its destination.

Such situations have been observed when certain VoIP equipment is unable to generate a ring-back tone (for example, due to overload). To ensure that a ring-back tone is delivered to the call originator, PortaSwitch® generates a ring-back tone with this release, thus providing a solution.

To do this, an administrator configures a service policy that commands PortaSwitch® to generate a local ring-back tone if no ringing packets were detected within the ring-back tone detection timeout. This service policy is then assigned to Calls from Vendor connections or accounts.

As a result, if no ringing packets arrive within the predefined timeout, PortaSwitch® plays its own ring-back tone to the caller.

Let's see how this works in SIP. When a caller makes a call from a SIP user agent, an INVITE request is sent to the called party. When the called party's phone begins to ring, it sends back an 18x Ringing response. The 18x Ringing message may or may not include the Session Description Protocol (SDP) which is used to set up a one-way media stream for conveying RTP media packets with ring-back tone to the caller.

PortaSwitch® analyzes the 18x Ringing message received. If it doesn't contain the SDP, PortaSwitch® immediately generates its own ring-back tone and sends it to the caller. If the 18x Ringing message is received with the SDP, PortaSwitch® waits for the RTP media packets. If they are not received within a predefined timeout, PortaSwitch® generates its own ring-back tone for the caller.

This new functionality ensures that callers hear a ring-back tone each time they place a call, thus increasing the number of successfully established calls and improving the customer's overall experience.

Early Media Relaying

Early media relaying is a powerful aspect of SIP that allows two endpoints (user agents) to communicate before a call is actually established. In terms of SIP this means relaying media prior to 200 OK is sent in response to an INVITE request.

Starting with this release, PortaSwitch® supports relaying early media for transferred calls and including scenarios when a call transfer is performed by auto-attendant.

Further details on this are as follows. An administrator configures a service policy that enables early media to be relayed for transferred calls and then assigns this policy to the account that performs the transfer. As a result, early media announcements are played for the transferred party.

This helps to ensure that transferred parties are kept informed about the progress of the call, thus improving the customer's overall experience with PortaSwitch®.

Spending Plan

To help service providers minimize losses from fraudulent events, we have introduced the new spending plan functionality.

A spending plan defines the amount of money per day that a customer can spend on services. PortaBilling® tracks the customer's daily charges and once the spending limit is reached, this customer's services are suspended. However, customers whose spending limit has been reached can still make calls to emergency numbers. Regular service usage is reinstated on the following day when the spending plan is renewed.

Edit	Name*	Currency*	Spending Limit (daily)*	Warning Threshold (%)	Managed By	Delete
	300 USD per day	USD	300	90%	Administrator Only	

For each spending plan the administrator can define warning thresholds for receiving notifications when these thresholds' limits are reached. Spending plans are then assigned to customer classes or directly to the customers.

NOTE: Spending plans can only be assigned to customer classes with a defined currency.

If a customer has used up their spending plan and wants to continue using the services, an administrator can temporarily increase their spending limit. End users can obtain more information about their spending plans on the customer self-care interface.

With this spending plan functionality, service providers offer their customers extra fraud protection, which significantly reduces losses caused by fraudulent incidents.

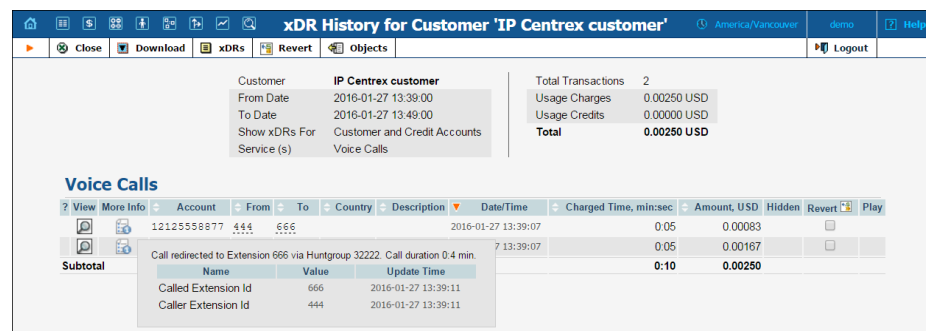
Extended xDRs for IP Centrex Calls

Owners of IP Centrex environments may wish to obtain information about the actions of particular extensions during “complex” calls, i.e. calls that consist of several call legs such as call transfer, call forwarding, etc. For example, you might want to know which extension transferred the call or for how long an operator actually spoke, so that this information can be used in statistics reports.

With this release, xDRs for complex IP Centrex calls are complemented with auxiliary call details such as:

- Which huntgroup a call came from.
- What the last extension ID was that forwarded or transferred the call.
- The actual call duration, i.e. the length of time an operator spoke in the call.
- The caller identity from where the call originated.

All of these details are available on the administrator web interface as part of the xDR history for a customer or their accounts. To browse auxiliary call details, with the mouse cursor point at the  **More Info** icon next to the required xDR.



xDR History for Customer 'IP Centrex customer'

Customer: IP Centrex customer
 From Date: 2016-01-27 13:39:00
 To Date: 2016-01-27 13:49:00
 Show xDRs For: Customer and Credit Accounts
 Service (s): Voice Calls

Total Transactions: 2
 Usage Charges: 0.00250 USD
 Usage Credits: 0.00000 USD
 Total: 0.00250 USD

Voice Calls

Account	From	To	Country	Description	Date/Time	Charged Time, min:sec	Amount, USD	Hidden	Revert	Play
12125558877	444	666			2016-01-27 13:39:07	0:05	0.00083			
				Call redirected to Extension 666 via Huntgroup 32222. Call duration 0.4 min.	7 13:39:07	0:05	0.00167			
Subtotal						0:10	0.00250			

More Info

Name	Value	Update Time
Called Extension Id	666	2016-01-27 13:39:11
Caller Extension Id	444	2016-01-27 13:39:11

The **More Info** dialog window displays:

- The extension number to which the call was redirected.
- **Via** – The extension or huntgroup number that dispatched the call.
- **Call duration** – The time during which the owner of the account being billed was occupied.
- **Caller Extension ID** – The extension number where the call originated from.
- **Called Extension ID** – The extension number that accepted the call.
- **Calling Party Identity** – The actual caller identity where the call originated from.

Auxiliary call details are created for the following IP Centrex calls:

- Calls to voicemail (direct and missed calls).
- Forwarded / follow-me calls.
- Call pick-up.
- Transferred calls (via blind and attended transfer).

This list is provided out of the box. However, it is easily scalable and in future releases will be extended to cover more call scenarios such as call queues, etc.

External Custom Reports

The auxiliary call details are defined by the following xDR fields:

- `via_hg` – Information about the huntgroup that dispatched the call.
- `via_ext` – Information about the last extension ID from where the call was forwarded or transferred.

NOTE: These flags appear when a call is processed within the IP Centrex environment.

- `media-time` – Information about the actual time the owner of the account to be billed was speaking during the call.
- `accli` – Information about the actual caller identity within the IP Centrex environment from where the call originated. This identity may differ from the one delivered by the IP PBX (e.g. the IP PBX main account or the caller's phone in case of forwarded calls) and displayed on the device of the called party.

These fields are added to the `XDR_Auxiliary_Types` table in the database while their values are stored in a separate `XDR_Accounts_Aux` table. The administrator can retrieve the information by accessing the database and can formulate a statistics report using a third-party application such as the Crystal Report tool.

With extended xDRs you receive more sophisticated statistics data which helps you improve the IP Centrex management. The data may also serve as an additional tool for accounting.

SIM Card Inventory

With this release, it becomes possible to store and manage SIM cards in the SIM card inventory. This flexible tool enables the MVNOs and LTE service providers to bulk upload SIM cards via the administrator web interface and therefore, easily manage them.

The SIM card inventory is used for adding, viewing, removing SIM cards and while assigning them to accounts. Its convenient search function makes it possible to quickly find the desired record by simply inputting a key word.

Managed By	Status	IMSI	ICCID	MSISDN	
ANY	ANY				Search

	IMSI	Managed By	Description	MSISDN	ICCID	Status	Delete
☐	262020123456782	Administrator Only	491761234565		8849176521458741201	Free	☐
☐	262020123456787	Administrator Only	495550000100	49555000100	8949176521458741203	In Use	☐
☐	262020123456788	Administrator Only	491761234507	49555000101		In Use	☐
☐	262020123456789	Administrator Only	491761234567		8949176521458741202	Free	☐

SIM cards can be added to a SIM card inventory either manually, i.e. one at a time, or can be bulk uploaded from a .csv file. Find out more about SIM card uploads and the .csv file structure in the [PortaBilling Web Reference Guide](#).

	A	B	C	D	E	F	G	H
1	Action	IMSI	ICCID	KI	OPC	AMF	Description	HLR
2	+	162020123456789	1949176521458740000	00112233445566778899AABBCCDDEEFF	01D47545168EAFE2C39C075829A7B61F	8463	12065550007	123475
3	+	163030133456780	1040176531458740000	00113333445566778800DDBBCCDEEEFF	01E47545168EAFE3C30C075830D7B61F	8363	13065550007	133675
4	+	163131133456781	1141176531458740000	001113333445566778811DDBBCCAAAF	11A47545168ADFA3C31C175831D7B61F	8263	13165551117	133775
5	+	162020123056787	1707176521058700000	00112233005566778877AABBCCDDBBFF	01D07505168BAFB2C37C075827A7B61F	8063	12065550007	123075
6	+	134040143453789	1949173541458740000	00114433445533778899EEBBCCDDEEFF	01D47545138EAFE4C39C075849E7B31F	8433	14035550007	143475
7	+	102020123450389	1949130521458340000	00112233445500338899AABBFFDDDEFF	01D43545108EAFE2F39F035829A3B01F	8403	12005550003	123435
8	+	162020123497789	1949177921498740000	00112233449977778899CCBDDDDDEEFF	01D47949178ECFE2D39D079829C7B71F	8473	12079990007	123479
9								
10								
11								
12								

Once a SIM card is added to a SIM card inventory, its status is *Free*. This means that this SIM card is not yet assigned to any account.

To provision a SIM card, go to the **Additional Info** tab of the account's page, click on the **SIM Card** link and select the desired SIM card from the inventory.

Once a SIM card is assigned, its status is *In Use*. Note that a SIM card having an *In Use* status cannot be removed from the SIM card inventory until it is first unassigned.

Account Info / Retail Customer 'LTE customers'

Account ID: 55517173301 Balance Control: Subordinate

Blocked: ☐

Life Cycle: Subscriptions: Notepad: Service Configuration

Account Info: Products: Web Self-Care: Subscriber: Aliases: Additional Info: Custom Fields

☐ CPE CPE Port: None Discount Plan: None

☒ SIM Card

SIM Card Inventory

IMSI: ICCID: Search

IMSI	Managed By	Description	ICCID	Status
102020123450389	Administrator Only	12005550003	1949130521458340000	Free
134040143453789	Administrator Only	14035550007	1949173541458740000	Free
162020123056787	Administrator Only	12065550007	1707176521058700000	Free
162020123456789	Administrator Only	12065550007	1949176521458741202	Free
162020123497789	Administrator Only	12079990007	1949177921498740000	Free
163030133456780	Administrator Only	13065550007	1040176531458740000	Free
163131133456781	Administrator Only	13165551117	1141176531458740000	Free
262020123456782	Administrator Only	491761234565	8849176521458741201	Free
262020123456789	Administrator Only	491761234567	8949176521458741202	Free

When a SIM card is assigned to an account, it acquires the MSISDN value that equals the *account ID* of the linked account. Therefore, both the account and the assigned SIM card are now connected and PortaBilling® can automatically provision the information into HSS / HLR by using a Sokoban provisioning framework.

With the increasing need to manage and maintain large numbers of SIM cards and provision them into external systems, the SIM card inventory is becoming a great tool for LTE service providers and MVNOs.

Wholesale Messaging Support

In today's world, instant messages are a powerful and popular tool for marketing and for customer support. For example, call centers that advertise goods often need to broadcast promotional information about sales or reach individual subscribers about special offers. Instant messages are an easy and convenient way to do this.

With this release, the support of wholesale messaging is introduced in PortaSwitch®.

Messages are sent via the SMPP protocol. Upon receiving a message, PortaSwitch® authorizes the customer by their IP address and checks whether the customer's product and balance allow messaging. Then the message is forwarded to a vendor. When there are several vendors configured in the system, LCR (least-cost routing) is used allowing a service provider to build an optimal pricing strategy.

Wholesale messaging is a very lucrative business at the moment. It generates higher profit margins than wholesale voice and thus allows service providers to significantly increase their revenue stream.

Advanced Invoice .pdf File Generation

With this release, it is possible to enable, postpone or skip invoice generation in .pdf files.

Pdf file generation is a resource-consuming process, therefore this functionality makes it possible to evenly distribute the load on the system and save hard disk space. This is a very useful tool for companies that order invoicing services from third parties.

There are three ways to schedule .pdf file generation. Define the most appropriate way for you at the customer or customer class level.

The screenshot shows the 'Edit Customer Class' interface for 'CC retail'. The 'Generate Invoice PDF' section is highlighted with a red box, showing three radio button options: 'At the end of billing period' (selected), 'Postponed, based on resource availability', and 'On demand'. Other settings include 'Invoice Template' set to 'Residential1 customers', 'Send invoices via email' set to 'Never', and various timing settings for notifications and account closure.

- **.pdf file generation at the end of a billing period** – This is the default option. Once a billing period ends, PortaBilling® processes the customer's xDRs, applies charges (e.g. subscriptions, fees, etc.), creates an invoice and generates a .pdf file. xDR processing for the next customer only starts once the .pdf file for the previous customer has been generated. Therefore, it takes longer to process xDRs for all customers, though the .pdf files are quickly available.
- **Postponed .pdf file generation** – This is a useful option for service providers who automatically charge customers' credit cards. PortaBilling® creates an invoice and charges a customer's

credit card immediately. The .pdf files are generated only once the calculations related to the previous billing period (e.g. xDR processing, statistics) for all customers have been completed. Postponed generation accelerates the payment procedure, evenly distributes the load on the system, allowing service providers to quickly receive revenue.

- **.pdf file generation on demand** – PortaBilling® makes all calculations for the customer, creates their invoices and saves them to a database. These invoices are then accessible via API. However, the .pdf file will not be generated unless explicitly requested.

By generating .pdf file invoices on demand you can save hard disk space and decrease the workload on the system by up to 50%, depending on the data amount. Note that at any time an administrator can initiate .pdf file invoice generation on the customer's page.

Consider the following example:

The EasyCall service provider orders invoice mailing service from their outsourcing partner Alpha. Therefore, EasyCall's administrator configures PortaBilling® to generate .pdf files on demand only. John Doe is an EasyCall subscriber. When his billing period ends on January 31st, PortaBilling® processes his xDRs and creates an internal invoice. This invoice is stored on the PortaBilling® database and sent to Alpha. Alpha then generates an invoice in its own format and mails it to John Doe.

In a month, John Doe wants to compare his expenses for calls from January and February, but he cannot find his January invoice. He contacts EasyCall, the administrator finds John Doe's account and generates the invoice. The invoice shows that \$40 is due. John Doe receives the information and can now compare those two months' expenses.

Improved .pdf file generation management enables service providers to schedule invoice generation according to their business models. This results in decreasing the workload on the system, saving hard disk space and quicker statistics calculation.

Adjustments for Paid Invoices

Once customers pay their invoices automatically by credit card, they receive their invoices with the status Paid. Sometimes, however, an administrator may need to adjust such an invoice and issue a refund to the customer.

Starting with this release, the ability to adjust paid invoices is introduced for administrators and helpdesk operators. When adjusting an invoice, they can select how to apply a refund to the customer: either adding to a customer's balance as unallocated funds or crediting it to the credit card.

The screenshot displays the 'Invoices of the Retail Customer' interface for 'Easy Call Ltd.'. It shows a table of invoices with columns for VL, No., Date, Delivered to Customer, Period, Period Total, Due date, Payments/Adjustment, Outstanding Balance, Status, Adjust, Generate PDF, and Void. An 'Invoice Adjustment' dialog box is open, allowing users to adjust a specific invoice (219). The dialog includes fields for the invoice number, period, due date, and payment method. It also features a table for adjustments, showing the current period total, payments, and the adjustment being made. The 'Action' tab provides two options for how to apply the refund: either to the current billing period or to the original payment method. The 'Adjustments' tab shows the current period total, payments, and the adjustment being made. The 'Invoice' tab shows details for the selected invoice, including the period, due date, and payment method.

A refund that is issued for a customer's current billing period appears as an unallocated payment and is included in their forthcoming invoice.

If a refund to a credit card is unsuccessful for some reason, the refund is added to the customer's unallocated payments and is used for paying their following invoice.

This capability to adjust paid invoices improves the claims settlement process, thus increasing the customer's overall experience.

DID Number Self Provisioning

Starting with this release, customers can self-provision service provider's DID numbers. For customers' convenience, DID numbers are grouped by country and country area.

Consider the following example:

The service provider has purchased a set of DID numbers and wants them to be made available among their customers, with minimal administrator assistance.

An administrator adds these DIDs to a pricing batch. This pricing batch is then assigned to the customers that the service provider wants to provision these DID numbers for.

If a customer with this assigned pricing batch needs some DID numbers for their business, they log in to the customer self-care interface and allocate DID numbers from this pricing batch. The customer is then charged the price specified for this batch.

If a customer decides that they no longer need a DID number, they simply delete it from the list of allocated DIDs. As a result, the DID number is no longer provisioned in PortaBilling®. If the DID number was assigned to an account as an alias prior to deletion, this alias is removed in PortaBilling®.

This enhancement allows customers to provision DID numbers by themselves, without the administrator's assistance, thus decreasing the administrator's workload.

Key API Methods Support for the Secondary Site in the Standalone Mode

Imagine that a prepaid calling cards provider has a PortaSwitch® deployed over several sites, and sudden power outage in the main site location makes the system switch to the secondary site and activate the standalone mode on it. Most of the service provider's customers won't notice it: they are still able to make calls, and are correctly charged for them. After the main site is up back, all the xDRs are smoothly merged into the main database.

However, when the power outage lasts for a comparably long time, customers must be able to top up their balances to continue using the service. Also, it is not only the number of satisfied customers that generates profit of the middle to big service provider. A continual flow of new customers is of the same importance.

That is why, the support of such API methods as `Account.update_accounts_batch` and `Account.topup_account` in the standalone mode has been implemented in this release, thus raising the system availability to the new level.

By executing `Account.update_accounts_batch` using different arguments, it is possible to activate and block / unblock accounts. If a batch is assigned to a distributor, the system will check the distributor's balance before activating the account. The `Account.topup_account` method enables the topping up of an account via a voucher or a prepaid calling card.

For more information about these methods and others that are supported in the standalone mode please refer to the [PortaSwitch API Guide](#).

Other Features and Enhancements

- **Reseller can create custom fields for their subtentities –**
Using custom fields, it is possible to store extra attributes to supplement the standard PortaBilling® information. For example, a reseller that operates as an ISP using independent software may also provide a wholesale VoIP service via PortaSwitch®. They want to create a reference between their Internet and wholesale customers and therefore need a special ID field in PortaBilling® for it.

With this release, resellers are given the option to define custom fields themselves. Custom fields defined on the reseller self-care interface can be used with resellers' customers, subresellers and distributors. Custom fields created on the reseller self-care interface are not visible for administrators.

Resellers can create custom fields on the **Web Interface** page. The link to the page is available from the **Management** section of the **Main Menu** page. After that, custom fields can be assigned to reseller's subtentities via a customer class (please see the description of the [Organize sets of custom fields per customer class](#) feature).



Now a reseller does not have to contact their service provider over each required change in the custom field list. This saves time and effort for both the service provider and the reseller.

- **Organize sets of custom fields per customer class –** Each customer class can now be assigned their own set of custom fields.

Object	Name	Type	Properties	Default	Mandatory
☒	Customer Customer Bonus	Text	Min. Length: 4, Max. Length: 5	None	Yes
☐	Customer Birthday Present Selected	Text	Min. Length: 1, Max. Length: 25		No
☒	Customer Preferred Support Engineer Name	Text	Min. Length: 1, Max. Length: 20		No

To configure custom fields for a customer class, do as follows:

1. On the **Main Menu** page, click **Customer Classes**.
2. On the **Customer Classes** page, go to the **Custom Fields** tab.
3. Select check boxes at the far left of the rows with required custom fields.
4. Click **Save**.

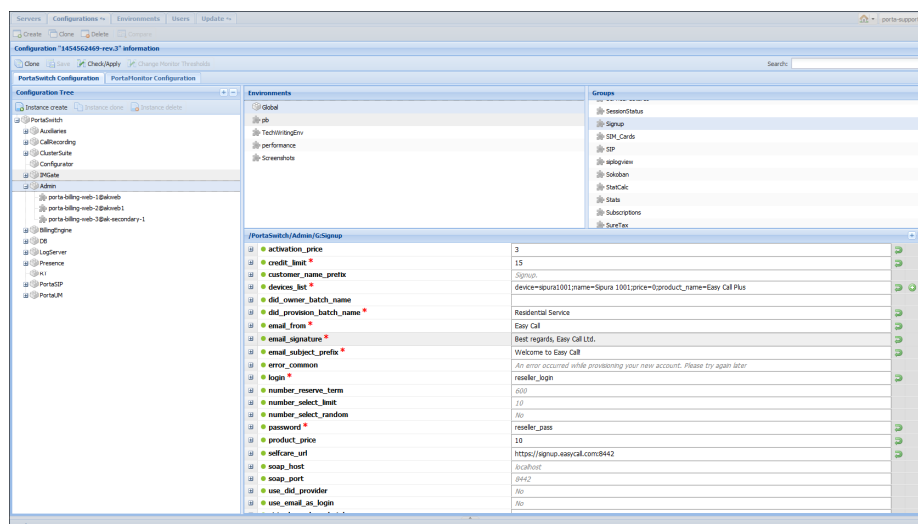
Note that an administrator can add custom fields to the customer class managed by a reseller. In this case, however, only fields created via the admin interface will appear on this tab.

The option to add custom fields per customer class ensures that only relevant information is present on customer and account pages. This appreciably facilitates customer support.

- **Online signup setup via the configuration server web interface** – When a service provider offers several products to a large target group, it is expedient to automate the account creation process and enable end users to sign up for the service online. Setting up an online signup page with PortaSwitch® is much easier with this release, since the entire configuration can now be performed via the configuration server web interface.

This enhancement affects both regular and multi-card signup. The corresponding configuration options can be found at:

- **Admin** node - > **Global** environment -> **VirtualHosts** group
- **Admin** node - > **Global** environment -> **Signup** group
- **Admin** node - > **Global** environment -> **MultiAccountSignup** group



The main advantage of these changes, besides facilitating the sign up process, is that it is much easier to keep the configured settings throughout PortaSwitch® upgrades.

NOTE: Online signup pages that were created before this release must be reconfigured via the configuration server web interface upon the system upgrade to MR53.

- Enhanced integrity checks for DID numbers with the In Use status** – With this release, it is no longer possible to remove a DID number from the DID inventory or release it to the DID pool if the DID number is used as:
 - an account ID,
 - an account alias, or
 - an access number.

Therefore, the administrator or a reseller must first delete an alias / access number or rename the account ID before deleting the DID number.

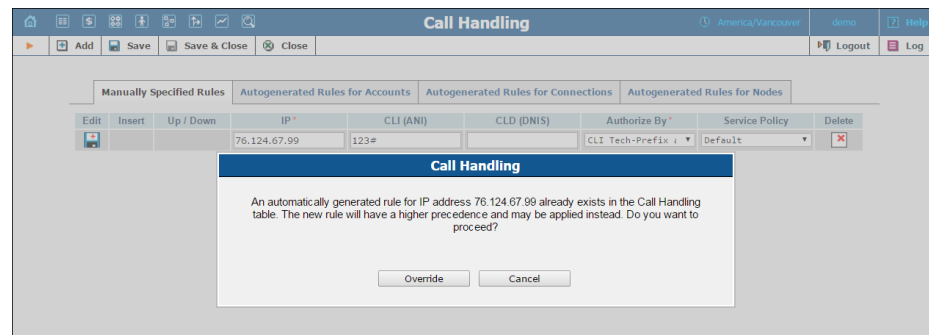
- The PortaSIP® cluster can now communicate with IMGate** – IMGate processes instant messages sent by the PortaSIP® cluster only when there are no individual PortaSIP instances in the billing environment where IMGate is configured. Otherwise, IMGate processes instant messages sent by the PortaSIP Switching server and ignores instant messages from the PortaSIP® cluster.
- Handling resale tariff change** – Now when the service provider or a reseller changes their resale tariffs (for example, from tariff A to tariff B), the entire chain of subresellers must create new resale tariffs too.

For each subreseller in the chain, a message is shown on their self-care interface notifying them that the corresponding resale tariffs are not found. Subresellers are then redirected to the **Usage Charges** tab, where they can configure the new resale tariffs.

The top screenshot shows the 'Edit Subreseller 'John Doe'' page. A modal dialog titled 'Usage Charges' is displayed with a yellow warning icon. The message reads: 'No Resale Tariff(s) found for the Wholesale Tariff(s): ABC Shuttle - outgoing calls. You can configure Resale Tariff(s) on the 'Usage Charges' tab'. An 'OK' button is at the bottom of the dialog. A red arrow points from the 'OK' button to the 'Usage Charges' tab in the bottom screenshot.

The bottom screenshot shows the 'Edit Subreseller 'John Doe'' page with the 'Usage Charges' tab selected. The page displays customer information (Customer ID: John Doe reseller, Customer Class: ABC Shuttle Inc., Balance: 0.00000 USD, Current Credit Limit: 1000.00000 USD). Below this is a table with tabs: Invoices & Taxation, Subscriptions, Notepad, Measured Services, Address Info, Balance Adjustments, Web Self-Care, Additional Info, Usage Charges, Balance & Credits, and Fraud Protection. The 'Usage Charges' tab is active, showing a table with columns: When I am charged using Wholesale Tariff, Charge Subreseller using Resale Tariff, and Description. A row is shown for 'ABC Shuttle - outgoing calls' with a dropdown menu set to 'Clone the selected Wholesale Tariff'. At the bottom of the table are 'Update' and 'Cancel' buttons. A red arrow points from the 'Update' button to the 'Usage Charges' tab in the bottom screenshot.

- **Access to the Invoices page** – In this release an administrator can still assign an invoice template for customers with disabled **Generate Statistics** and **Generate Invoices** options in their customer class. Although regular invoices will not be generated for such customers at the end of the billing period, an administrator may access the **Invoices** page and generate the out-of-term invoices at any time.
- **Extended notification during manual call handling rule creation** – When an administrator creates a manual call handling rule to override one that was autogenerated, he is provided with an extended explanation about how this rule will be applied. This helps reduce human error during the call handling setup.



- **Use prepaid calling cards to top up an account online** – Aside from calling cards, service providers usually need to distribute vouchers – special cards that can only be used for top up. However, it may be economically sound to combine both calling and top-up functionality in one card.

Now end users have the option to top up their accounts with prepaid calling card funds via their self-care interfaces. These cards must share the same product as the account being recharged.

To enable this functionality, set the **UseDebitAccountsForRecharge** option value to **Yes** on the configuration server web interface.

This feature ensures that end users can top up their accounts as needed, even if the service provider does not sell vouchers. Likewise, the service provider can reduce production and logistics costs by distributing only prepaid calling cards.

Web Interface Changes

- **Interface migration to Ext JS 5** – Starting with this release, the interface for managing destination groups and destination group sets operates on the Ext JS 5 framework, which decreases web page response waiting time.

Important Upgrade Notes

Instant messages are processed by IMGate only – Installations where the SIP proxy server is used for processing instant messages must be reconfigured to process instant messages via IMGate.