



PortaSwitch

Interoperability Guide

70
MAINTENANCE
RELEASE

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Preface

This document provides information about interoperability between PortaSwitch® and the third-party equipment. It aims to help PortaSwitch® owners enhance their networks and facilitate service provisioning.

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.



Archivist explains how the feature worked in previous releases.



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

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What is new in Maintenance Release 70?

Added:

- The [Acrobits Cloud Softphone](#) chapter.
- The [Integration with YateHSS/HLR and YateUCN](#) chapter.
- The [Integration with Aricent HSS](#) chapter.

Removed:

- The PortaSIP® as IMS Application Server chapter has been moved to the [PortaSIP® Administrator guide](#).

1. Internet provisioning

Integration with Alcatel-Lucent Service Router

PortaBilling® is integrated with the Alcatel-Lucent Service Router (SR), used by service providers worldwide for providing broadband Internet services.

In this configuration, the Alcatel-Lucent SR is deployed as a DSL access point within a service provider's network. It communicates with PortaBilling® via the RADIUS protocol to authorize end users when they connect to the Internet. When an Internet session is established, the Alcatel-Lucent SR periodically sends interim (also called keep-alive) accounting requests with information about the current transferred data volume. When an end user's balance is not sufficient for using the service or their Internet quota is reached, PortaBilling® sends the Alcatel-Lucent SR a CoA (change of authorization) request. The Alcatel-Lucent SR then switches the session to a hotlined state – i.e. redirects the end user to a defined website.

PortaBilling® acts as an OCS (Online Charging System). It communicates with the Alcatel-Lucent SR via the RADIUS protocol for real-time session authorization and rating. PortaBilling® also provisions Alcatel-Lucent SR information about the bandwidth speed (for example, 1 Mbps or 10 Mbps) and Internet quota allocated to a particular customer. The bandwidth options and quota amounts are defined by the product configuration in PortaBilling®.

This integration extends the variety of equipment that PortaOne's clients can use for broadband Internet service provisioning. Service providers who have already chosen the Alcatel-Lucent SR and are looking for a flexible and reliable billing system, can explore the advantages of choosing PortaBilling®.

Integration with Bridgewater Service Controller

PortaBilling® is integrated with Bridgewater, a service controller for WiMAX networks.

WiMAX services with Amdocs

PortaBilling® supports the following billing models for WiMAX via Bridgewater:

- Preset bandwidth with unlimited data transfer amount, fixed recurrent fee.

- Preset data transfer quota, fixed recurrent fee.

In both cases, the user connects to the ASN gateway, which sends requests to and receives authorization from Amdocs Service Controller. Amdocs uses account information from its DB, which in turn, is pre-populated and kept current by PortaBilling®.

Account provisioning

PortaBilling® can automatically provision WiMAX accounts into Amdocs. It means that:

- An account created in PortaBilling® will be automatically created in Amdocs with a Profile¹ assigned that corresponds to the PortaBilling® product.
- When an account is suspended due to non-payment or reaches a credit limit in PortaBilling®, the account is automatically blocked in Amdocs.
- When an account is unsuspended or balance returns below a credit limit, the account is automatically unblocked.
- When an account is terminated in PortaBilling®, it gets removed from Amdocs.

Integration with Cisco PDSN

CDMA operators can use PortaBilling® to provision, bill and monitor mobile broadband services controlled by Cisco PDSN (Packet Data Serving Node for CDMA networks). To do this, Cisco PDSN connects to PortaBilling® via RADIUS.

Integration and operation flow

The integration of PortaBilling® with Cisco PDSN is similar to its integration with NAS – the principles of integration are almost the same. Though PDSN is used only for CDMA networks, the main difference between services provided via PDSN and a “traditional” NAS is the user’s mobility. Users may not be stationary and thus switching from one base station to another while the original Internet session is connected. PortaBilling® ensures that even if there are various individual sub-sessions, a single xDR is produced at the end.

Provisioning

To set Cisco PDSN for PortaBilling® you need to carry out settings on the Configuration server and on the administrative web interface (tariffs, nodes, etc.)

¹ Profiles are to be predefined on Bridgewater side as part of the setup process.

Integration with Cisco SCE (Service Control Engine)

PortaBilling® is integrated with Cisco SCE, a network element specifically designed for carrier-grade deployments that require high-capacity stateful application and session-based classification and control of application-level IP traffic, per subscriber.

This solution facilitates content-based charging and allows the ISP to granularly track Internet usage, permitting varied pricing schemes for truly differentiated IP service offerings, while at the same time keeping costs low.

Consider a few examples of services that you could offer using this solution:

- Offer *high speed Internet* service to your business customers but disallow bandwidth-consuming peer-to-peer (P2P) applications.
- Provide residential customers with standard Internet speed, but offer enhanced latency-sensitive services such as online gaming, by assigning a high priority for identified users of this service.

PortaBilling® currently works with the Cisco SCE integrated with PDSN nodes that already allow CDMA operators to raise their mobile broadband services to new heights. In the future, this solution can be enhanced to support various equipment bundled with Cisco SCEs, thereby benefitting ISPs that provide other Internet services.

Integration with Huawei BRAS CX600 Router

PortaBilling® is now integrated with the Huawei BRAS CX600 Router used by service providers to provide broadband Internet access.

The Huawei BRAS CX600 Router is deployed at the edge of the service provider network and acts as an aggregation point through which end users connect to the broadband Internet. It communicates with PortaBilling® via the RADIUS protocol to authorize end users and manage their Internet sessions.

Once an end user starts an Internet session, the Huawei BRAS CX600 Router performs the session authorization in PortaBilling® to verify that the end user has sufficient balance and is allowed to use the service. PortaBilling® also provides information to the Huawei BRAS CX600 Router about bandwidth speed (for example, 1 Mbps or 10 Mbps) allocated to a particular end user.

When the Internet session is established, the Huawei BRAS CX600 Router periodically provides session usage information to PortaBilling®, i.e. sends interim (also called keep-alive) accounting requests with information about the current volume of transferred data. When an end user's balance is not sufficient to use the service, PortaBilling® sends the Huawei BRAS CX600 Router a POD (Packet of Disconnect) request. The Huawei BRAS CX600 Router then switches the session to a hotlined state – i.e. redirects the end user to the service provider's portal.

PortaBilling® acts as an OCS (Online Charging System) performing such functions as authentication, authorization and accounting of end users' sessions.

This integration extends the variety of equipment that service providers can use for broadband Internet service provisioning.

2. LTE services

Integration with Adax EPC

PortaBilling® is integrated with Adax EPC, which enables ISPs to provide Internet Access services to their customers within LTE networks.

In terms of integration with Adax EPC, PortaBilling® operates as the online charging system (OCS), communicating with the Packet Data Network Gateway (P-GW) using the Diameter (Gy) protocol for real-time user authorization and rating.

When a user establishes an Internet session, P-GW sends an authorization request to PortaBilling®. During the session, P-GW sends recurring interim credit control requests that report on the volume of traffic already consumed. Based on that information, PortaBilling® verifies that the user can use the service further. If the user is out of funds, they cannot access paid Internet content (e.g. YouTube.)

Adax EPC supports rating groups and AVPs such as Validity-Time and Volume-Quota-Threshold. This enables ISPs to introduce different business models and ensure correct charging for all of them.

Integration with Adax EPC increases the number of LTE solutions available for MNOs to use with PortaBilling® for providing full-scale Internet services to their mobile customers.

Integration with Aricent HSS

PortaBilling® is integrated with the Aricent HSS – LTE core network element that contains all subscriber data, such as:

- the account identification (the phone number (MSISDN) and SIM card, identified by IMSI), and
- profile information (e.g. static IP address, quality of service information).

This integration enables wireless operators to provision subscriber information defined within PortaBilling® to Aricent HSS, where a SIM card is activated by Aricent HSS and the LTE service becomes available for the subscriber.

To make this happen, an administrator enables the **Mobile Network Provisioning** service for a product and assigns it to an account with an associated SIM card. PortaBilling® then provisions the new subscriber information to Aricent HSS via the External System Provisioning Framework (ESPF). When an administrator makes changes for an account (e.g. blocking, changing a product), PortaBilling® automatically synchronizes this data with Aricent HSS.

This feature extends the list of LTE equipment that wireless operators can use for organizing their network infrastructure. For those operators that want to switch from legacy billing systems to PortaBilling®, the integration with Aricent HSS ensures the seamless migration of subscriber information.

Integration with Huawei EPC

To enable ISPs to provide Internet Access services to their users within the LTE network, PortaBilling® is integrated with Huawei EPC.

PortaBilling® provides a single place for customer information and balance and service configuration management by provisioning user data to the HSS and PCRF.

In network terms, PortaBilling® operates as the OCS that performs real-time user authorization and rating. Communication with the SAE-GW is managed via the Diameter (Gy) interface. The same interface is used to disconnect an Internet session when a user is out of funds or exceeds their credit limit or when redirecting the user to a hotlining portal.

The Huawei UGW9811 supports the following features:

- Traffic categorization into rating groups
- Credit Control for Multiple Services per session
- Hotlining
- Server-Initiated Credit Re-Authorization (RAR)
- Online Centralized Session charging with units reservation SCUR, DCCA
- Real-time billing for period-switch

This integration extends the variety of existing LTE equipment for service providers who are interested in becoming active players in the wireless telecommunications industry.

Integration with YateHSS/HLR and YateUCN

Wireless operators can use PortaBilling® to provision their subscriber information to HSS and / or bill their subscribers for the LTE service. The integration of PortaBilling® with EPC components produced by Yate, i.e. YateHSS/HLR for subscriber data provisioning and YateUCN for real-time charging, allows wireless operators to use Yate products exclusively to organize and build their network infrastructure.

Integration with YateHSS/HLR

YateHSS/HLR functions as a centralized subscriber database that stores and manages subscriber information for LTE service provisioning.

Using PortaBilling®, you can provision subscriber details such as subscriber's phone number (MSISDN), SIM card IMSI and profile details (e.g. LTE service, quality of service information) to activate SIM cards in YateHSS/HLR. This registers subscribers on the mobile network and gives them access to the LTE service.

To provision subscriber details to YateHSS/HLR, an administrator creates a product for the LTE service and enables the **Mobile Network Provisioning** service for it. When a new mobile account is created, PortaBilling® sends the subscriber information to YateHSS/HLR via the External System Provisioning Framework (ESPF).

With PortaBilling® you can also update YateHSS/HLR with any subscriber changes (e.g. account is blocked or is assigned a new product).

Integration with YateUCN EPC

The PortaBilling® integration with YateUCN – an LTE EPC component – enables you to provide LTE service and charge your mobile subscribers for it in real time.

With this integration, PortaBilling® operates as an OCS (online-charging system) and communicates with the YateUCN EPC using the Diameter (Gy) protocol for real-time user authorization and rating. It also instructs the YateUCN EPC to redirect users to a hotlining portal if and when they run out of funds / lack available quota.

YateUCN EPC supports rating groups. This enables you to introduce content-based charging. For example, you can charge users for watching YouTube videos or visiting social networks although traffic for using your self-care portal always comes free of charge.

Integration with ZTE EPC

PortaBilling® supports the provisioning of LTE / 3G services to ZTE EPC (Evolved Packet Core) and quota control for these services. You can combine PortaBilling® as the online charging system and SIM card provisioning system with ZTE equipment.

When a PortaBilling® administrator makes changes for an account (creating, blocking, changing product / Internet access policy, etc.), PortaBilling® immediately provisions updated data to the ZTE HSS

(Home Subscriber Server) or ZTE SPR (Subscription Profile Repository). HSS then provides centralized user authentication across the network and SPR manages users' service policies. This way, user data is always up-to-date in ZTE.

PortaBilling® can also independently serve as the B/OSS system for LTE services. It manages customer data (including unified balance), service configuration details, product / rate tables, etc. for LTE just as for other services. Therefore, by using PortaBilling® as a unified platform you reduce your administration costs and improve user experience.

Multiple add-on products provisioning for LTE

In LTE networks deployed with ZTE equipment, services for subscribers are activated based on the PAKID value. The PAKID value defines which Internet quota is available for a subscriber and is taken from the accounts' product configuration provisioned by PortaBilling®.

By provisioning several PAKID values via add-on products, you can allocate multiple Internet quotas within ZTE EPC for subscribers and then allow them to modify their product configuration a la carte. PortaBilling® provisions a PAKID value to ZTE SPR as soon as a subscriber assigns an add-on product and ZTE SPR allocates the corresponding quota for the subscriber. As a result, the subscriber receives the service based on the combination of the PAKID values and according to add-on precedence.

Consider the following example:

Smart Net is an LTE service provider. They offer a 1 GB Internet quota for their basic service and the following additional service packages:

- 2 GB “Turbo” quota available within 24 hours and
- 5 GB of “Regular Internet access” quota available within 30 days.

These service packages are configured as the following add-on products in PortaBilling®:

- “Turbo” add-on product with high precedence level and
- “Regular Internet access” add-on product with medium precedence level.

John Doe has basic LTE service. In a week, he uses all the allocated 1 GB Internet quota so he is then redirected to his self-care portal. There he signs up for both service packages. His product configuration now includes the “Turbo” add-on product with an expiration date of 24 hours and the “Regular Internet access” add-on product with an expiration date of 30 days. Thus, John Doe uses the “Turbo” quota first and once it expires, he uses the “Regular Internet access” quota.

To configure add-on product provisioning to ZTE EPC, include the LTE service and Internet access policy with the PAKID value defined in the product configuration.

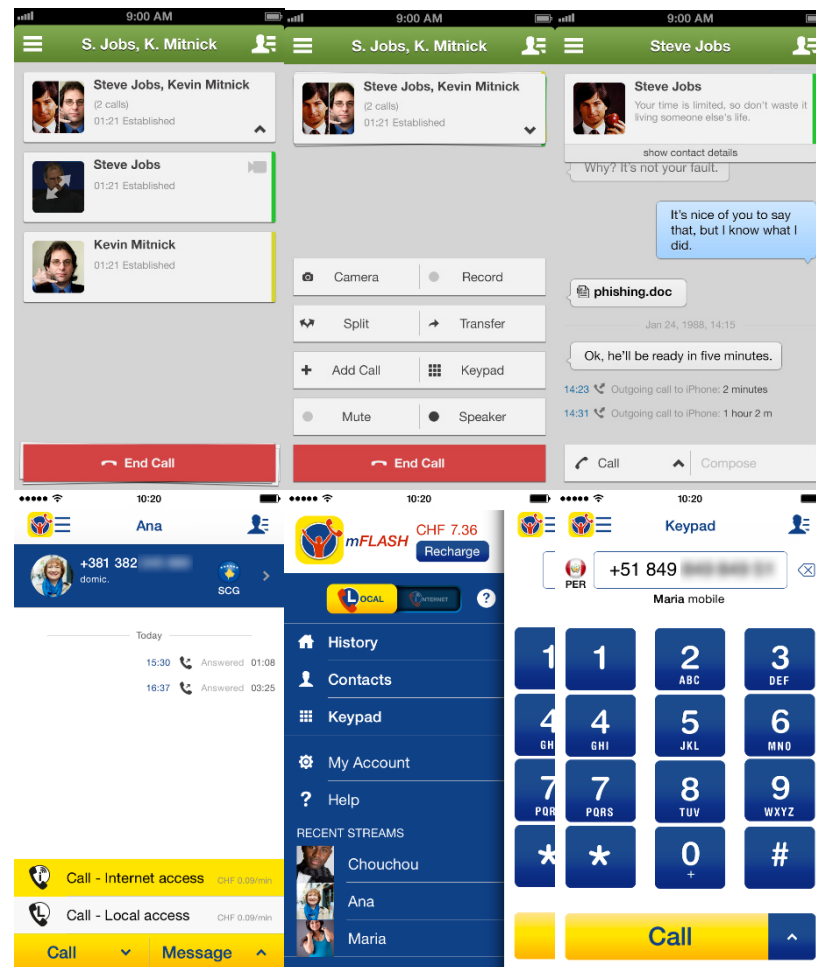
Add-on product provisioning for ZTE EPC enables ISPs to provide various service packages to their customers, making them more competitive in the market while growing their customers' loyalty.

Alternatively, for quota control organized within ZTE EPC, you can deploy PortaBilling® as the online charging system (OCS) in your LTE network. Thereby you gain advanced control over your service provisioning by receiving information about monthly quotas, service wallets, and current usage bars and rollovers in one single location.

3. MNO / MVNO solution

Acrobits Cloud Softphone

Service providers can use Acrobits Cloud Softphone to deploy a premium quality, customized mobile app for iOS and Android devices. Cloud Softphone is fully integrated with PortaSwitch® to enable seamless calling and advanced features such as on-line balance display. PortaOne and Acrobits engineering teams work in sync to provide a best-of-breed, innovative and reliable platform for mobile services. In less than one day, service providers can launch their own white-label smartphone app via the iOS App Store and Google Play, with settings and features set specifically for their service.



Acrobits Cloud Softphone is a highly configurable SIP client designed specifically for VoIP service providers. The following features are available:

- centralized configuration management
- incoming and outgoing calls
- applying and managing tariffs

- possibility to perform calls via mobile network and Wi-Fi
- option to quickly private-brand app
- push notification feature— users can receive calls even when the app is closed
- web service-based callback for maximum battery efficiency
- instant messaging
- presence feature provides option to check availability of those on your contact list to chat
- HD sound
- balance checker
- customizable ringtones
- bluetooth support

To simplify customer management, Acrobits iOS/Android softphone apps offer one-touch provisioning with QR codes generated by PortaSwitch® online signup portal.

For detailed description of how to use the service from the mobile application, please refer to the **Unified PortaSwitch® Handbook Collection**.

Integration with Acrobits Webs

PortaSwitch® is integrated with Acrobits Webs – a solution that allows end users to communicate with each other directly from their web browsers, e.g. make voice and video calls, send messages, exchange files and share screens. Acrobits Webs is available for use on mobile, tablet and desktop devices.

In its integration with PortaSwitch®, Acrobits Webs acts as a WebRTC gateway, enabling communication between WebRTC and SIP endpoints.

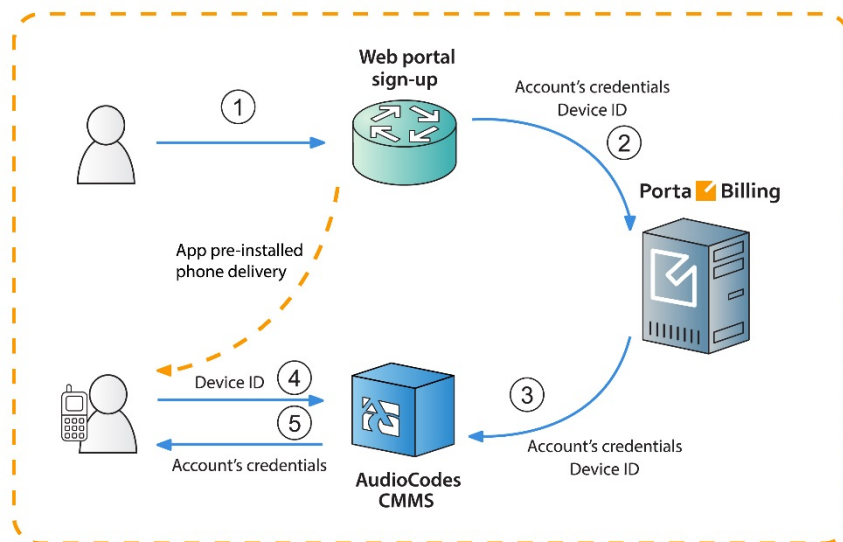
When a WebRTC endpoint initiates a call, it connects to a mediation component – a WEBIS server – that converts session control messages received from the WebRTC client into SIP messages (and vice versa). The WEBIS server then forwards these SIP messages to PortaSwitch® which is responsible for their further processing.

Note that Acrobits Webs is not provided as a part of the PortaSwitch® solution. For more details about integration with Acrobits Webs, please contact support@acrobits.cz.

Integration with AudioCodes Mobile Application

PortaBilling® can provision the AudioCodes mobile application for service providers and their resellers. Auto-provisioning makes the configuration of services quick and convenient for end users while saving time and expense for service providers.

This multi-featured AudioCodes mobile application provides a wide range of services: voice and video calls, SMS, IM and more. To provision the application, PortaBilling® is in constant interaction with the AudioCodes CMMS (Clients' Management Server) which is responsible for customized profiles, user level control, time-based licensing and other functions. CMMS, in turn, is in constant interaction with users' mobile phones and tablets, so when a user's information is changed on the PortaBilling® side (e.g. user's credentials), it is quickly updated on the user's side, too.



MVNOs

The AudioCodes mobile application registration and configuration process for the MVNO business model is detailed in the following example:

John Doe wants to subscribe to EasyCall's services. **(1)** He visits the service provider's website and makes a request for a new mobile phone and a list of services to be provided with that phone (e.g. call forwarding, voicemail, etc.). **(2)** A new account is created for John Doe in PortaBilling® that contains information such as account ID, password, IMEI (device ID), etc. **(3)** At the next stage, PortaBilling creates the account in the AudioCodes CMMS with all of the required parameters –

the account's credentials, IMEI, etc. The phone with the installed AudioCodes mobile application is then sent to the user. John Doe receives his new phone and switches on the AudioCodes application. (4) It automatically connects to the CMMS, provides the IMEI (device ID) and requests the user's credentials. (5) The AudioCodes CMMS parses this information and provides those credentials. Thus, the mobile application is configured, John Doe has avoided having to manually set it up and the requested services can be used immediately.

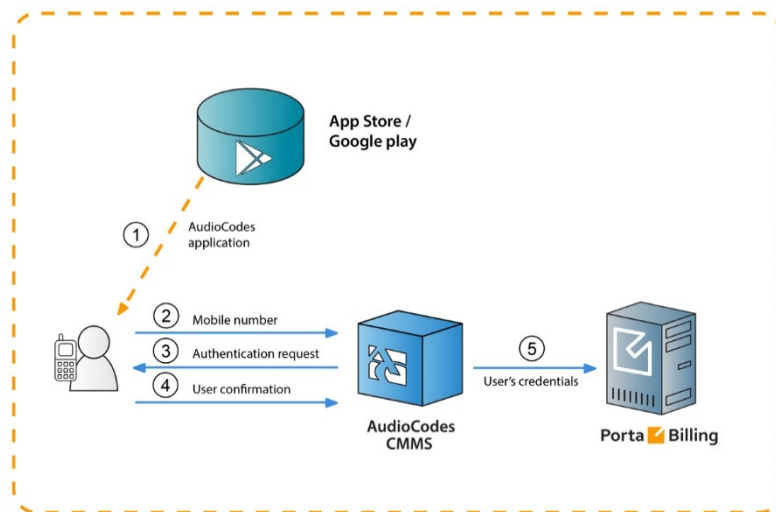
NOTE: AudioCodes CMMS is compatible with Android and iOS only.

OTT service providers

The business model for downloading the AudioCodes mobile application from the App Store or from Google play is applicable to a wide circle of service providers. For this model, creation of a new account in PortaBilling® is initiated by registration of a new user in AudioCodes mobile application. The whole process is described in this following example:

The TelePlus service provider will provide voice calls, messaging and other custom services via their own SIP mobile application. TelePlus obtains the mobile application from AudioCodes and brands it as TelePlus.

(1) John Doe downloads the TelePlus application. The first time he runs it, the application requests his mobile number. (2) He inputs his number and the application sends it to the CMMS server. (3) The server generates a special security code and texts it to John Doe via SMS to confirm that the owner of that number indeed made the request. (4) John Doe enters this security code which is then passed to CMMS. (5) The server accepts the code and sends the request to PortaBilling® with the user's credentials. Then a new account is created in PortaBilling® with John Doe's mobile number used as the account ID. Starting from this moment, PortaBilling® charges John Doe for service usage.



The account information configuration and the updates for the AudioCodes mobile application occur immediately and automatically. Auto-provisioning decreases the workload on the service provider and ensures continuous and smooth service provision, leading to user satisfaction with service quality.

Customized provisioning

Service providers can fine-tune the application's configuration for individual customers who belong to different business models and then automatically provision it to them.

AudioCodes profiles determine which services to deliver to which customers within the applications. Each profile comprises a set of services and application settings defined for a particular customer. Customers who share the same business model or have similar profiles are also identified within the AudioCodes' CMMS by either the service provider's or reseller's company domain name. These can be used for statistics purposes.

By configuring additional parameters in PortaBilling® such as domain and profile name and then passing them to the CMMS in the provisioning request, service providers gain advanced control over services available for a customer within the mobile application.

Consider the following example:

You provide services to your customers under your domain name *mycompany.com*.

John Doe is one of your residential customers whose service bundle includes domestic calls and SMSs. EasyCall Ltd. is one of your IP Centrex

customers whose service bundle includes voice and video calls and conferencing services.

You want to auto-provision the customized AudioCodes mobile application to both of them. To do this, configure two different AudioCodes profiles: “Residential” and “Business.” In PortaBilling®, assign them to John Doe and EasyCall Ltd., respectively, as custom fields. Then, after PortaBilling® provisions the CMMS, the customers’ applications are provisioned with specific settings that improve their usage experience.

To customize the AudioCodes mobile application auto-provisioning, do the following:

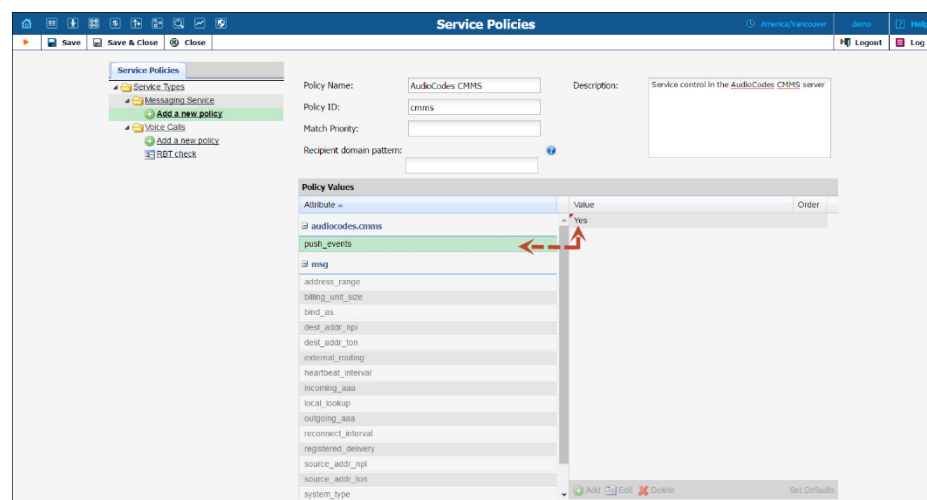
- Configure the custom fields *profileName* and *domain*
- Assign them to the requisite customer class
- Specify the custom fields’ values for a particular customer on the **Edit Customer** page.

Messaging service management in AudioCodes CMMS

With PortaBilling® API you can effectively manage messaging service availability for accounts provisioned in AudioCodes. When an account’s service wallet is empty or expires, a PortaBilling® sends a corresponding request to the AudioCodes CMMS server and the messaging service is suspended. Likewise, it is resumed upon topping up the service wallet.

To configure messaging service management within the AudioCodes CMMS server, do the following:

1. Configure a service policy for messaging services and enable the **push_events** option within.



2. Assign a service policy to the product. Note that service policies directly defined for accounts are not considered.

The screenshot displays the 'Edit Product SMS Services' web application. At the top, there are navigation buttons like 'Save', 'Save & Close', 'Close', 'Rate Lookup', and 'Clone'. The main form contains several input fields: 'Product Name' (SMS Services), 'Currency' (USD - US Dollar), 'Product Name visible to End User' (SMS Services), 'Managed By' (Administrator Only), 'Account Role' (MSISDN), and 'Product Type' (Main Product). Below these fields are tabs for 'Included Services', 'Service Configuration', 'Usage Charges', 'Volume Discount', 'Recurring Charges', 'Additional Info', and 'Notepad'. The 'Service Configuration' tab is selected, showing a 'Messaging Service' section with 'Service Policy' set to 'AudioCodes CMMS'. There are also sections for 'SMS/MMS Routing Data' and 'Update NetNumber Database'.

Of course, a user must have a service wallet for the particular messaging service assigned.

Integration with the BroadForward BFX Interface Gateway

Among the variety of wireless networks in the telecommunications market, networks such as 2.5G, 3G and CDMA are still popular. For 3G networks CAMEL is the main protocol, that enables communication for Intelligent Network (IN) architectures. For North American CDMA networks, this role is fulfilled by the WIN (Wireless Intelligent Network) protocol.

You can penetrate this segment of wireless networks or preserve service provisioning in a CDMA network by using PortaBilling®, and all the while deploying new generation network services (e.g. LTE).

The CDMA network solution includes PortaBilling® operating as an OCS (Online Charging System) for real-time call authorization and rating and the BFX Interface Gateway as the entry point to your network.

In this deployment, the BFX Interface Gateway operates as the mediation component performing the conversion of WIN messages into Diameter (Ro) messages. Thus, the BFX Interface Gateway communicates with the MSC using WIN, while it communicates with PortaBilling® using Diameter (Ro).

When a user places a call, the following occurs:

The MSC (Mobile Switching Center) performs the call authorization in PortaBilling® that verifies that the customer's balance is sufficient to call the desired destination. The MSC uses the WIN protocol, therefore its call authorization request is sent via the BFX Interface Gateway where it is converted to Diameter (Ro) and then delivered to PortaBilling®. PortaBilling® locks in the funds to cover the initial period of the call and sends a confirmation message to the MSC. This message also passes via the BFX Interface Gateway where it is converted to WIN and then delivered to the MSC.

When the user's initial call period finishes and their overdraft protection is configured in PortaBilling®, the BFX Interface Gateway sends a request to lock in the funds for subsequent periods.

Once the user hangs up or runs out of sufficient funds to continue the call, the BFX Interface Gateway sends instructions to the MSC to disconnect the call and sends a Credit Control Request – Terminate (CCR-Terminate) message to PortaBilling® to report the end of the call. PortaBilling® then produces a CDR record for this call.

Destination number translation and provisioning

In addition to basic call processing, PortaBilling® can translate service numbers dialed by end users into actual numbers and provision them to the MSC.

This is how it works:

For example, a user dials 411 for directory assistance. The BFX Interface Gateway passes this number to PortaBilling® in a Credit Control Request – Initiate (CCR-I) message. PortaBilling® translates the dialed 411 into an actual number (e.g. 12055576061) and returns this number back to the BFX Interface Gateway in a Credit Control Answer – Initiate (CCA-I) message. The BFX Interface Gateway then delivers this number to the MSC to connect the call.

For number translation and provisioning to take place, configure the dialing rules for the customer and specify the following translation rule for the Diameter node in PortaBilling®:

```
s/ro.ProvisionCld/1/;
```

The integration of PortaBilling® with the BFX Interface Gateway may be of special interest for service providers who aim to penetrate the mobile communications market as MVNOs or MVNEs, since it expands the range of equipment they can use for organizing their network infrastructure.

Integration with Cisco Jasper

PortaBilling® is integrated with Cisco Jasper, the automated connectivity management platform. This integration enables you to deliver IoT connectivity services to all of your subscribers so that they can connect any device via their SIM card.

Within your infrastructure, PortaBilling® serves as the service and revenue management system. It provisions the account and SIM card information to Cisco Jasper, manages customer balances, collects billing information and issues invoices.

Cisco Jasper handles communication with the mobile network to activate SIM cards for your subscribers.

This is how it works:

When an administrator creates a customer and assigns a SIM card to the customer's account in PortaBilling®, PortaBilling® provisions the customer data to Cisco Jasper. It instructs Cisco Jasper to activate the SIM card associated with the account and to assign the rate plan to it. When an administrator or distributor blocks / terminates the account, PortaBilling® instructs Cisco Jasper to deactivate the account's SIM card.

When the subscriber uses up all of the allocated Internet quota, PortaBilling® receives notification from Cisco Jasper and changes the account's product to block service availability. The SIM card is consequently deactivated in Cisco Jasper.

As soon as the subscriber purchases additional quota, their account is assigned a new product in PortaBilling® and their SIM card is reactivated in Cisco Jasper meaning the subscriber can once again access the Internet.

To configure provisioning to Cisco Jasper, do the following:

1. Enable the Jasper module on the Configuration server;
2. Configure the External System Provisioning Framework (ESPF), and
3. Enable the Mobile service provisioning service feature for the products you use for granting and denying service usage to subscribers. Make sure the product names match the names of the rate plans in the Jasper Call Control Center.

Cisco Jasper partners with 550+ mobile networks worldwide, enabling you to provide IoT connectivity to your subscribers across several networks. This allows you to expand your services into other markets while your business grows.

Integration with Qualution

Qualution is the OSS (Operation Support System) used by some North American MVNOs to manage service provisioning on the MVNE side (e.g. they may use it for SIM card management and the like). It operates as middleware between PortaBilling® and the mobile network.

PortaBilling® is integrated with Qualution via API and performs real-time management of users' volume discount plan usage. As soon as an MVNO subscriber exceeds their allocated quota, PortaBilling® sends a notification to Qualution via the API.

NOTE: To perform real-time management of users' volume discount plan usage, every account in PortaBilling® must have an individual volume discount plan assigned to them via product.

If several volume discount plans apply to the same service and destination group, PortaBilling® will send notification to Qualution only after the last one is used up (e.g. if a user has a quota of 100 domestic SMS and another quota for 50 domestic SMS, the notification will be sent immediately after the user sends 150 SMS).

This integration widens the pool of the potential business partners and enlarges the service provider's opportunities for how to organize their network infrastructure.

Integration with PROTEI CAMEL gateway

As an OCS (Online Charging System), PortaBilling® can be integrated with 2.5 / 3G and 4G mobile networks. In 2.5 and 3G networks, the CAMEL protocol is the de-facto standard for real-time charging.

In this case, PortaBilling® can interoperate with mobile operator networks via the PROTEI CAMEL gateway.

In this configuration, the PROTEI CAMEL gateway is deployed within a service provider's network and acts as a mediation component between PortaBilling® and a mobile operator's network, converting the CAMEL protocol to the Diameter protocol and vice versa.

This allows PortaBilling® to communicate with the MSC (Mobile Switching Center) – a switching node that routes calls and messages to and from other telecommunication networks, including PSTN, ISDN and other mobile operators' networks – for real-time calls and SMS authorization and rating.

When a customer makes a call, MSC performs the call authorization in PortaBilling® to verify that the customer has sufficient balance and is

allowed to call that destination. Since MSC uses the CAMEL protocol, its call authorization request is sent via the PROTEI CAMEL gateway, where it is converted to Diameter Ro and then delivered to PortaBilling®. PortaBilling® locks in the funds to cover the initial period of the call and sends a confirmation message to MSC. This message also passes via the PROTEI CAMEL gateway where it is converted to CAMEL and then delivered to MSC.

When the period is over, MSC sends a request to lock in the funds for the subsequent period, etc. When the call is over, MCS sends a Credit Control Request - Terminate (CCR-Terminate) message to PortaBilling® to report the end of the call. PortaBilling® produces a CDR record for this call. In the message exchange between MCS and PortaBilling® all the protocol conversion – from CAMEL to Diameter and from Diameter to CAMEL – is done using the PROTEI CAMEL gateway.

A similar procedure is followed when a customer sends an SMS.

This kind of integration allows service providers interested in entering the mobile market to integrate with mobile operator's networks that use the CAMEL (Phase 1, 2 and 3) protocol to communicate with a billing system for real-time call authorization and rating.

Integration with Protei HLR / HSS and Protei PCRF

In order to operate as full MVNOs / MVNEs on the mobile market, service providers often encounter a prerequisite (raised from the hosted MNO) to deploy such equipment as HLR / HSS and PCRF within their own networks. The joint solution developed by PortaOne, Inc. and PROTEI can easily help you meet this requirement.

PortaBilling® guarantees its integration with Protei HLR / HSS and Protei Policy Controller (PCRF) core network elements. As a provisioning system, PortaBilling® synchronizes subscriber information defined within the system with Protei HLR / HSS, and policy / service quality parameters with Protei PCRF.

To enable provisioning to Protei HLR/HSS and Protei PCRF, an administrator enables the **Mobile Network Provisioning** service for a product. For example, the administrator creates a product and configures voice calls, messaging and / or Internet access services for it. The administrator configures the corresponding service policies and enables the **Mobile Network Provisioning** service for this product. Upon assigning this product to an account with an associated SIM card, PortaBilling® provisions account and policy / service quality parameters to Protei HLR / HSS and Protei PCRF. When the administrator makes

changes for an account (creating, blocking, etc.) or product, PortaBilling® immediately provisions the updated data to Protei HLR / HSS or Protei PCRF.

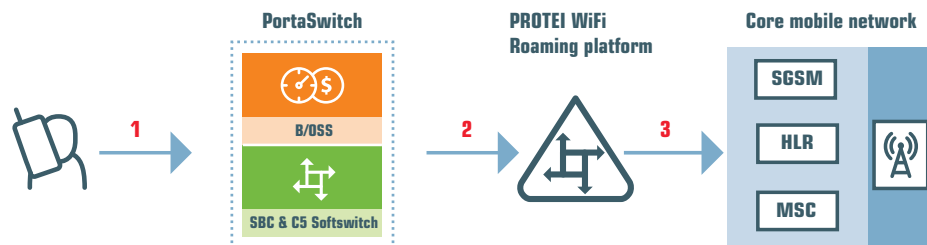
This integration helps service providers meet the MNO's requirements necessary to operate as full MVNOs / MVNEs. It also allows service providers to manage their subscribers and associated services independently, thereby achieving more autonomy from the host MNO.

Voice over WiFi solution for roaming users

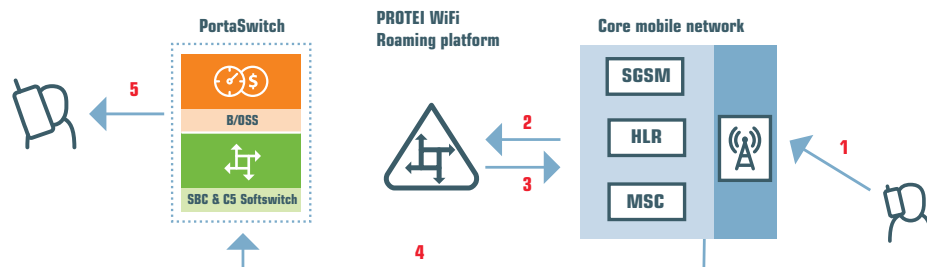
To stay competitive, wireless operators need to permit their customers to use their services even when they are traveling outside of their home networks. Introducing roaming service support, however, is costly and cumbersome, both for you and for your users. With PortaSwitch® you can deploy roaming services using WiFi and a mobile application at no cost and with no extra charges to your users.

The voice over WiFi solution, introduced with this release, includes PortaSwitch® and the PROTEI WiFi Roaming platform, which updates the users' mobile carrier about their current location. Thus, when a user is in roaming, all incoming calls to them arrive to PortaSwitch®, which then delivers them to the user's mobile application.

This is how it works in more detail:



When a user connects to WiFi and the mobile application registers with PortaSwitch® (1), PortaSwitch® forwards the user's registration to the PROTEI WiFi Roaming platform (2). The PROTEI WiFi Roaming platform passes the user's current location to the user's mobile carrier within the LU (Location Update) message (3).



When someone dials the user's phone number (1), the mobile carrier addresses the PROTEI WiFi Roaming platform with a PRN (Provide Roaming Number) message (2). The PROTEI WiFi Roaming platform responds with the user's local roaming number and prefix (3) based upon which their mobile carrier routes the call to PortaSwitch® via SIP (4). PortaSwitch® then processes the call and delivers it to the user's mobile application (5).

To instruct PortaSwitch® to forward user registrations to the PROTEI WiFi Roaming platform, define its IP address for the **third_party_registrars** option on the Configuration server web interface.

PortaSwitch® operates in the high-availability mode; therefore, it forwards user registrations in the “fire-and-forget” mode. In case of an unlikely network connectivity issue between PortaSwitch® and PROTEI WiFi Roaming platform, the registration will be updated when the application renews it in a few minutes.

With this solution, you introduce roaming service support at no cost, allow your customers to receive incoming calls free of charge and make outgoing calls at reduced rates. This increases your competitiveness in the market and improves customer experience.

4. IPTV Provisioning

Integration with Minerva IPTV platform

PortaBilling® is a converged real-time billing system, service provisioning environment and CRM used for rating and invoicing any type of service you provide to customers, including centralized funds management and consolidated bills.

For IPTV service provisioning, PortaBilling® is integrated with the Minerva IPTV platform. With this solution, service providers are able to:

- Configure channel packages and provide them to customers within a product configuration;
- Charge recurring fees to customers by using subscriptions;
- Manage customers' service packages so that while Minerva's channel packages only include sets of IPTV channels, service packages can include both channel sets and additional services such as the VOD catalogue, WHDVR or Caller ID presentation.

IPTV service activation is completed by using the External System Provisioning Framework (ESPF) in PortaBilling®. This makes it easy to provide IPTV service to your customers while eliminating additional manual work.

An IPTV service is activated for the subscriber when:

- A new account assigned to the IPTV product is created in PortaBilling®.
- An already existing account assigned to the IPTV product is unblocked in PortaBilling®.
- A product assigned to an already existing account is changed to a new product with IPTV.

The key assets of integration with Minerva that occur when an account in PortaBilling® corresponds to a customer in Minerva are:

4. When a customer is suspended in PortaBilling®, therefore the account is either blocked or switched to a product that no longer includes IPTV services. Their "subscriber" record is maintained in Minerva although it is disabled.
5. When a customer is terminated in PortaBilling®, the account is deleted in Minerva.
6. PortaBilling® adds information to the customer's bill about services provided and charges incurred.

This interoperation between PortaBilling® and the Minerva IPTV platform enables service providers to provide triple-play services to their users and therefore increase their revenue stream.

Integration with the MatrixStream IPTV platform

For today's service providers, "triple play" is not just a buzzword – rather, it is the only way to remain competitive while retaining their customer base. Combined solutions provided by PortaOne in conjunction with the MatrixStream IPTV platform can be used to add IPTV to your service portfolio and expand your business growth.

The IPTV service is activated in PortaBilling® by using the External System Provisioning Framework (ESPF), which therefore simplifies service provisioning to end users and reduces manual work for your administrators.

When a new or existing customer signs up for the IPTV service, the available channel information (based on the assigned subscription) is provisioned into the IPTV delivery platform via an extensible XML API. If a customer's product configuration changes, or a customer is blocked (e.g. due to non-payment), PortaBilling® transfers this information to the IPTV delivery platform.

An IPTV service is activated for the subscriber when:

- A new account assigned to the IPTV product is created in PortaBilling®.
- An already existing account assigned to the IPTV product is unblocked in PortaBilling®.
- A product assigned to an already existing account is changed to a new product with IPTV.

The key assets of this integration are the following:

1. An account in PortaBilling® corresponds to a subscriber in MatrixStream.
2. When a customer is suspended in PortaBilling® or the account is blocked or switched to a product that no longer includes IPTV services, his "subscriber" record continues to be maintained in MatrixStream although it is disabled.
3. When a customer is terminated in PortaBilling®, the account is deleted in MatrixStream.
4. PortaBilling® provides information to the customer's bill about services provided and charges incurred.

In this way, service providers extend their service provisioning portfolio while remaining competitive in the market.

Integration with Telebreeze IPTV platform

PortaBilling® is integrated with the Telebreeze IPTV platform (<https://telebreeze.com/>). The interoperation between PortaBilling® and Telebreeze enables you to:

- Define various channel packages in Telebreeze and bundle them into products for your customers. As soon as you create an account in PortaBilling® and assign a product that includes the IPTV service, the customer is created in Telebreeze and a corresponding channel package activated for them.
- Configure a variety of channel packages and manage customer service configurations using add-on products.
- Charge recurring fees to customers for IPTV channel packages via subscriptions.
- Manage customer information and service availability using the PortaBilling® web interface. Any changes in customer information are provisioned to Telebreeze. Customer services remain available as long as there are sufficient funds to cover them or their product configuration includes the IPTV service. If a customer is terminated in PortaBilling®, their record in Telebreeze is also deleted.

Thus, the key assets of this integration are as follows:

1. An account in PortaBilling® corresponds to a customer in Telebreeze.
2. Telebreeze channel packages are defined within PortaBilling® products.
3. Customers are charged for IPTV services via subscriptions. Video-on-demand and pay-per-view services are solely handled by Telebreeze. PortaBilling® receives balance update records and produces xDRs.
4. Customers are authenticated in Telebreeze by either device ID or Telebreeze login / password. This information is defined in a customer's custom fields.

NOTE: Do not change the account ID in PortaBilling® since the Telebreeze customer ID will not be updated and therefore further customer management will become inaccessible.

Integration with yet another IPTV platform expands your IPTV provisioning capabilities and enables you to provide full-scale triple-play services to customers.

5. Hosted IP PBX / IP Centrex solution

Integration with Mida Queue Manager

PortaSwitch® is integrated with the Mida Queue Manager. This application is used for call queuing and routing of incoming phone calls. It allows all call queues to be customized to have their own set of messages, working hours, timeouts, overflows and routing algorithms.

A call queue in the Mida Queue Manager is linked to an IP PBX phone line that receives all incoming calls. PortaSwitch® routes the calls from an IP PBX phone line to the Mida Queue Manager, where they are queued. The Mida Queue Manager distributes these calls in a predefined fashion among the dedicated phone lines on this IP PBX.

In PortaSwitch®, the Mida Queue Manager is configured as a vendor with two connections. The **Calls to vendor via SIP** connection delivers calls from the IP PBX to the Mida Queue Manager. The **Calls from vendor via SIP** connection delivers calls from the Mida Queue Manager to this IP PBX. All call queue configuration settings are defined via the Mida Queue Manager.

This integration allows service providers to offer advanced call queue features to their IP PBX customers.

6. Framework for external system operation

Unified interface for real-time data retrieval from external systems

Let's say you use PortaBilling® for customer management and a NMS (Network Management System) for monitoring network performance, circuit management and configuration, etc. When checking customer information (e.g. during troubleshooting) you must login to both PortaBilling® and to the NMS.

Instead of managing two systems separately, you can integrate the NMS with PortaBilling®. Create an integration plugin, install it in PortaBilling® and operate with the NMS from the PortaBilling® web interface.

Each time you open customer data, PortaBilling®:

- dynamically retrieves the network information related to the customer from the NMS via the API, and
- displays the consolidated data on the web interface.

The NMS data is then displayed on the custom panel.

When you modify the information (e.g. change bandwidth limits or reconfigure a router), the data is automatically sent to the NMS.

An integration plugin is a set of application files that contain the logic for a new custom panel (e.g. fields, types, default values). While installing the plugin, specify whether the panel appears in the main navigation menu or at a specific entity level (e.g. customer, reseller). Upon installing the plugin, the custom panel for system operation appears in PortaBilling®. This way, you can integrate PortaBilling® with any external system that supports the REST API.

Consider the following example:

Asgard Telecom has a contract management system (CMS) to store and manage customer contracts. They require:

- real-time interaction between the CMS and PortaBilling®, and
- the ability to manage the contracts (e.g. Contracts feature) via the PortaBilling® web interface.

Asgard Telecom implements a plugin for the Contracts feature. After the plugin installation, a new Contracts panel is available at the customer level. It permits the customer contract details to be managed. When an administrator saves a contract, the plugin pushes the data to the CMS via the API. Each time an administrator opens the Contracts panel, the data is retrieved from the CMS.

[illegible]

Customer

SAVE

CHANGE STATUS

demo

Asgard Telecom > Contracts

Asgard Telecom

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Business model
Universal

Customer class *
Default customer class

Balance control
Postpaid

Currency
USD - US Dollar

Balance, USD
\$73,520.00

Credit limit, USD
10,000.00

Services

Fraud protection

Contracts

Contracts

ADD

Name *	Group *
W Telecom	Wholesale
Escalation period, months *	Base fee *
6	3
Notify before end date, days	
7	<input checked="" type="checkbox"/> Notify about last month
Start date *	End date *
12/20/2017	12/21/2020

Escalations list

Period *

From period *

10

1

+ -

CANCEL

SAVE

Name	Group
Z Telecom	Wholesale

This solution allows you to integrate PortaBilling® with the external systems and manage all of the data from a single place. Aside from improving workflow, it gives you additional flexibility with introducing individual business solutions using PortaBilling®.

Please contact the PortaOne® support team for assistance with how to install integration plugins.