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To KAZOO or not to KAZOO?

The question is the BILLING...

... for in that Erlang code what dreams may come ...

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A Bit of Nostalgia

- 2011 -> 201? - The golden era of Kazoo open source
- KazooUI as an example of how to build your very own UI
- waiting for a Monster or miracle is somewhere around the corner.

Those Were the Days...

Cluecon 2012





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Cruel Reality?

Open core ~~era~~ disappointment

- MonsterUI - everything you need, but rarely open-sourced
- ~~Vendor~~ OPEN CORE lock?
- Apocalypse... and OTF WAS BORN!
- Is there any other open source project to run away?



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Is there really any difference?

A feature seems vital to you might not be priorities for the community (== PR wont be accepted)

VS

Feature you need badly could be out of open core spot (== PR wont be accepted)

No difference in case you are able to code on your own a bit...

Some bonuses of open core as a plus:

- you can compete with closed features
- you can opensource your “closed feature competotor” ... and say hello to 2600hz
- Kazoo got more reasons to have stable future..
- more to be understood...



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By the way...

What is Kazoo for you?

- Just another FreePBX?
- The most powerful and open VoIP platform available? (2600hz.org)
- Mega glue for Kamailio and FreeSwitch?
- Cloud communications platform?



Why not?

KAZOO == Cloud ^{applications} ~~communications~~ platform?

- distributed
 - horizontally scalable
 - database backend
 - RESTful API
 - etc.
- I wanna sell potatoes online!
- Try KAZOO!



Did I miss something?

Selling potatoes online is a promising idea!

VoIP services is not that bad too...

... but how will I bill my customers?

They say:

- use third-party billing;
- billing is a very complex “thing”;
- understanding of billing differs from one person/company/country to another;
- better not even start thinking about billing kazoo_app.

Which means:

- use/serve additional technology stack;
- spend more money;
- have another single point of failure.



I've got the problem

I Want To Break Free

- get rid of third-party billing/rating system;
- more familiar to customers payment gateways needed;
- dirty hacks before they evolve to PRs should have a place to live somewhere too :)
- don't want to look like other tens?/hundreds? of VoIP websites;
- don't want to hire an army of admins to manage the Zoo.

A plan to escape

- dare to run your billing tasks in Kazoo;
- create your very own UI;
- use the same stack as used for Kazoo development to save time and money.



Do more with less tools

The same technology stack

Backend

- Kazoo app:
 - Erlang
 - ErlyDTL
 - Cowboy
 - Websockets

Frontend

- Erlang web framework (Zotonic for now)
 - Server side rendering
 - Erlang
 - ErlyDTL
 - Cowboy
 - WebSockets and Comet
- Kazoo app soon
 - Zotonic libs Hex packages
 - What if we omit crossbar just for fun?



A bit about OKUI

OnNet Kazoo UI

- Inspired by KazooUI, therefore:
 - a kind of frontend just to expose features provided by crossbar;
 - probably should be rewritten or at least design should be improved.
- Kazoo administration
 - accounts management
 - routing
 - notifications
- Kazoo monitoring
 - system-wide registrations
 - system-wide current calls (live)
- Customer portal
 - user portal
 - callflow builder
 - conference manager
 - etc.



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OKUI: Kazoo administration

OnNet Kazoo UI - Chromium

OnNet Kazoo UI x OnNet Kazoo UI x To Kazoo or not to x

Secure https://onnet.su/reseller_settings

ONNET KAZOO UI DASHBOARD ACCOUNTS SETTINGS OPERATIONS MONITOR SIGN OUT EN

Reseller settings Logged in as Account Admin at onnet.su

General settings restrictions

Reseller's name: OnNet communications Inc. [edit](#)

Account language: en-us [edit](#)

Account timezone: Europe/Moscow [edit](#)

Display billing widgets: ☐

Display E911 widgets: ☐

Outbound routing: ☒ General routing ☐ Account defined

Account's Users add user

Notifications send customers update send notifications

5 lines per page Filter:

Template name	Category						
New Account	account	edit	delete	copy	paste	mail	print
Transaction Problem	account	edit	delete	copy	paste	mail	print
Transaction Success	account	edit	delete	copy	paste	mail	print
Top Up	account	edit	delete	copy	paste	mail	print
New Service Addition	account	edit	delete	copy	paste	mail	print

Showing 1 to 5 of 39 entries Forward

Outbound routing add route

5 lines per page Filter:

Resource name	Weight cost			
<input checked="" type="checkbox"/> SMG2016-SPB	14	edit	delete	info
<input checked="" type="checkbox"/> SMG2016-MSK	40	edit	delete	info
<input checked="" type="checkbox"/> RS_Radius	45	edit	delete	info
<input checked="" type="checkbox"/> FS_Multifon	30	edit	delete	info

Showing 1 to 4 of 4 entries

Allocated numbers

OnBill settings

OnBill settings doc [edit](#) [add](#) [delete](#)

Service plans select create

Carrier onnet choose template to edit restore save

Carrier beeline_spb choose template to edit restore save

Carrier beeline_msk choose template to edit restore save

https://onnet.su/reseller_portal



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OKUI: monitoring

OnNet Kazoo UI - Chromium

OnNet Kazoo UI x OnNet Kazoo UI x To Kazoo or not to x

Secure https://onnet.su/reseller_system_monitor

ONNET KAZOO UI DASHBOARD ACCOUNTS SETTINGS OPERATIONS MONITOR SIGN OUT EN

Logged in as Account Admin at onnet.su

Current state

Notifications

5 lines per page Filter:

Date	To	Subject	Details
Nothing found, sorry			

Showing 0 entries

System-wide registrations:

5 lines per page Filter: refresh

User	User agent	Contact IP	Details
user_zu1ms...	Yealink SIP-T21P...	46.3...	
user_ytqwjh...	A510 IP/42.207.00.	94.1...	
user_ymrcvm...	Linksys/PAP2T-3.1.	109.12...	
user_ymhhv...	Linksys/PAP2T-5.1.	94.12...	
user_yggxr...	Linksys/SPA8000-6.	94.12...	

Showing 1 to 5 of 5 entries Forward

System-wide current calls:

refresh

	Account	Caller Number	Callee Number	Realm	Status	Hang Up
2018-05-03 12:51 MSK	Rodionov	78126433	89095862	rodionov.onnet.su	connecting	
2018-05-03 12:51 MSK		792132834	+78123850	94.1...	answered	
2018-05-03 12:51 MSK	Agronom	78123634	79616127	agronom.onnet.su	answered	
2018-05-03 12:51 MSK		78123844	+78126433	94.1...	answered	
2018-05-03 12:51 MSK	NT-SPb	78123850	7812322	ntsp.onnet.su	answered	
2018-05-03 12:50 MSK		78125750	78123634	94.1...	answered	
2018-05-03 12:50 MSK		7812244	+78122404	94.1...	answered	
2018-05-03 12:50 MSK		53638	+78122404	94.1...	answered	
2018-05-03 12:50 MSK		7812635	+78123634	94.1...	answered	
2018-05-03 12:50 MSK		79811557066	+78124906	94.1...	answered	



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OKUI: accounts management

OnNet Kazoo UI - Chromium

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Secure https://beta.onnet.su/en/reseller_portal

ONNET KAZOO UI DASHBOARD ACCOUNTS SETTINGS OPERATIONS MONITOR SIGN OUT EN

Search Center MRT - centermrt.sip.onnet.su Mask Create Delete

Account details ⓘ send message

Account name Center MRT ⓘ Europe/Moscow ⓘ

Account status Active - P 5,945.54

Account type Prepaid (billing day: 1) 1 May 2018 - 31 May 2018

Billing status Good standing

Reseller status Not provided

Numbers management Not activated

Service plans: current services add plan sync reconcile

Low balance notify level P 500.00

Details: controls

Date of creation 2014-01-23 18:05 MSK

Realm centermrt.sip.onnet.su ⓘ

Account ID 0c237d13a4a9dbe43dfac69e8e890832

Database account%2F0c%2F23%2F7d13a4a9dbe43dfac69e8e890832

Notify on de-register ⓘ

Outbound routing ☒ Global carrier ☐ Account based

Current services: Estimated total monthly cost: P 1,180.00

Fee name	Rate	Quantity	Discount	Cost
Виртуальная АТС. Абонентская плата.	P 1,180.00	1	P 0.00	P 1,180.00

Account's allocated numbers 10123456789 add number

Transactions list May 2018

Opening balance - P 4,765.54

Monthly payments add credit P 0.00

Monthly fees add debit P 1,180.00

Per minute calls P 0.00

Related documents

Current balance - P 5,945.54

Account's current registrations: 2 current calls

5 lines per page Filter:

Username	User agent	Contact IP	Details
user_39e	Linksys/SPA941-5.1.	188.93.2	ⓘ
user_2fi	Linksys/SPA3102-5.	188.93.2	ⓘ

Showing 1 to 2 of 2 entries



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OKUI: Callflow Builder

OnNet Kazoo UI - Chromium

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Secure https://onnet.su/admin_callflows

ONNET KAZOO UI DASHBOARD ACCOUNTING HOSTED PBX UNMASK -- ONNET OFFICE -- SIGN OUT EN

Callflow Builder Logged in as Account Admin at OnNet Office

Sales Reload Details Save Delete

Sales 6700 Click to add number

TIME OF DAY Europe/Moscow

OfficeHours MENU Sales

Default PLAY MEDIA Non-Working_way

Default 0 RING GROUP Whole Office RECEIVE FAX Account Admin

Actions

- Basic
 - User
 - Device
 - Play Media
 - Receive Fax
 - Ring Group
 - Menu
 - Time of Day
 - Branch recovery
 - CID Check
 - CID Match
 - CID Lookup
 - Callflow
- Advanced
 - Queues

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OKUI: account settings

OnNet Kazoo UI - Chromium

OnNet Kazoo UI x To Kazoo or not to x OnNet Kazoo UI x

Secure | https://onnet.su/admin_settings

ONNET KAZOO UI DASHBOARD ACCOUNTING HOSTED PBX UNMASK - ONNET OFFICE - SIGN OUT EN

Logged in as Account Admin at OnNet Office

Account settings

- General settings ⓘ
- Account's Devices
- Account's Users
- Groups
- Media
- Conferences
- Trunkstore

Main account number: 78124906700 ⓘ

Account language: ru ⓘ

All calls recording: ⓘ

Account timezone: Europe/Moscow ⓘ

Music on hold: Default music ⓘ

Dialplan: Saint Petersburg ⓘ

Outbound routing: ⓘ General

Account's Devices

5 lines per page Filter:

Type	Name	Owner	CID Number	
☐	Vlad S5 5533	-	5533 78123634546	✎ ✎ ⓘ
☐	Vlad-Home	-	+78124565808	✎ ✎ ⓘ
☐	AL softphone	-	5602 5602	✎ - -
☐	5600	-	5600 78123634505	✎ ✎ ⓘ
☐	5528	-	5528	✎ - -

Showing 1 to 5 of 51 entries Forward

Time of the day rules ⓘ add rule

Menus ⓘ add menu

Blacklists ⓘ add blacklist

Voice mailboxes ⓘ add vmbox

Lists ⓘ add list

Queues max connect failures: 9999 ⓘ agents status add queue

https://onnet.su/admin_settings



Results:

- Just another Kazoo UI Frontend - boring, huh?
- But big fun is around the corner ...
 - UI as kazoo_app?
 - just git clone, make and run
 - why use crossbar if we are that close to kazoo core libs (beware - dirty hack) :)
 - etc.

Dare to put all the eggs in one distributed and scalable basket?

Goals wanted!

- real time billing;
- each reseller at each level should be able to run it's billing tasks independently (currency, balances, etc.);
- additional payment gateways like Paypal, Yandex.Money, etc should be connected;
- all charges are made against Kazoo account balance, no hooks to customer's pocket;
- Braintree top-up is an exception;
- funds could be added manually in case of customers wire transfer;
- different charging schemes support: monthly recurring / daily basis fee;
- documents should be generated automatically at the end of each billing period.

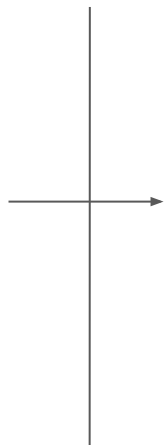


Want to get close to real time?

Just listen to your docs...

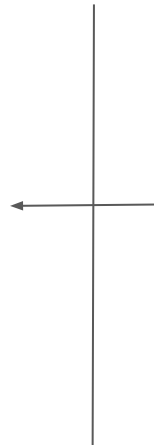
doc_created

- <<"doc_type">>
 - <<"limits">>
 - <<"user">>
 - <<"device">>
 - <<"number">>
 - <<"credit">>
 - ...



account

- services
 - reconcile/1
 - sync/1



doc_edited

- <<"doc_type">>
 - <<"limits">>
 - ...



A place where all the logic lives

Bookkeeper - the module intended to determine the logic of billing process

Wasn't that hard - just a reworked `kz_bookkeeper_braintree.erl`

- rely on our own data, not Braintree;
- keep all the transactions' information in CouchDB;
- implement Prorated/MRC functionality on your own.

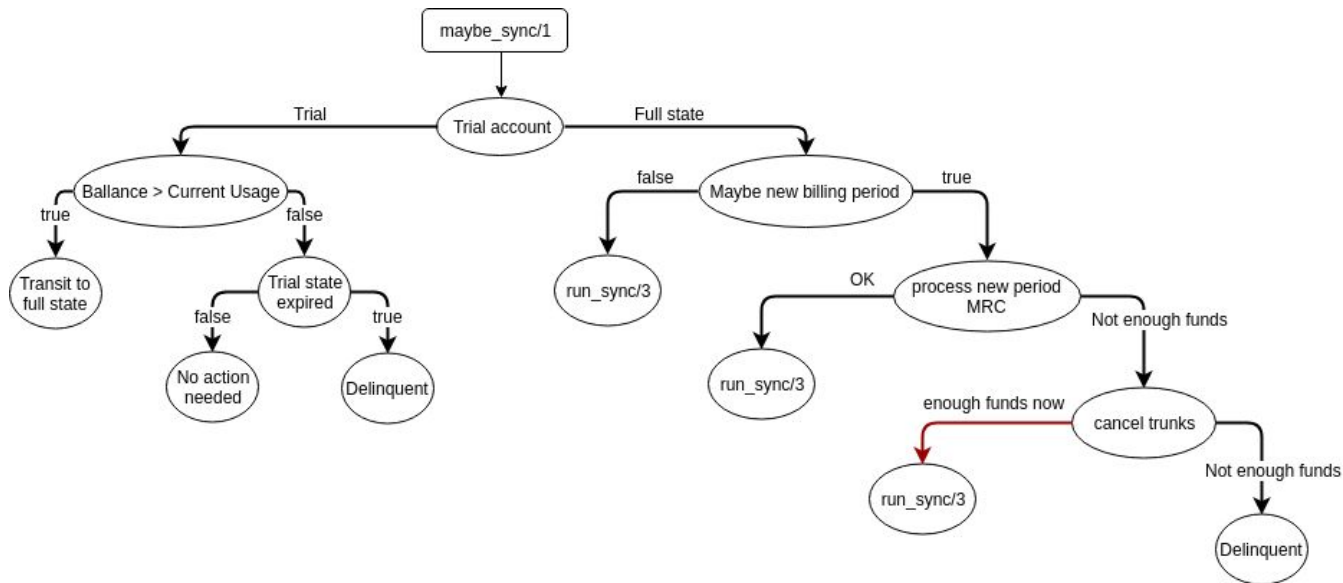
https://github.com/onnet/zzapp/blob/master/src/misc/kz_bookkeeper_onbill.erl



Bookkeeper tasks

Run checks against account:

- trial or full state
- good standing or delinquent
- whether new period starts
- if sync needed





Bookkeeper tasks

To charge or not to charge:

- newly added services;
- daily fees in case applicable.

Handle transactions

- list transactions - nothing to do it's already local
- save transactions local





How to charge?

Monthly Recurring Charge

- MRC / Prorated MRC;
- In case account lacks of funds for new billing period flat rate services could be automatically cancelled.

Daily fees

- account charged on daily basis;
- fraction of monthly fee extracted day by day
- if account goes negative it could be blocked until top-up;
- some services (flat rate trunks) could be excluded from this scheme to be charged on monthly basis.



Payment gateways

Braintree pros & cons:

- works out of the box;

but:

- not all countries supported;
- customers don't like to share its credit cards info;
- they say Braintree don't like VoIP businesses :).

Which payment gateway to choose?

- it depends:
 - country;
 - customer type.
- .. you need more than one for failover anyway.



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Payment gateways how to

Good news!

Add payment gateway as easy as create crossbar module:

1. Use inbound hook for payment approval to avoid standard auth process

(<https://{SERVER}:8443/hooks/paymentgw/5c36900d63069782e4e0b0ad2f131e45>)

2. Validate request as payment gateway recommends
3. Add transaction to an account

A couple of examples:

- Paypal - https://github.com/onnet/zzapp/blob/master/src/crossbar/cb_paypal.erl
- Yandex.Money - https://github.com/onnet/zzapp/blob/master/src/crossbar/cb_yandex_money.erl



Payment gateways

Portal - Chromium

OnNet Kazoo UI x OnNet Kazoo UI x To Kazoo or not to x

Secure https://.../finance_details

Portal Dashboard Payments Hosted PBX Unmask -- OnNet -- Sign out en

Logged in as Kirill Sysoev at 13:27

Payments

Account [refresh balance](#)

Account status **Good standing**

Current balance **\$395.68**

Wire transfer [show issued](#)

Issue pro-forma invoice

Enter desired amount \$ [proceed](#)

Online payments

PayPal - Electronic Payment System [Pay now with PayPal](#)

Braintree Sandbox (click for cards numbers) [add card](#)

Enter an amount to pay (\$10 - \$200) \$ [proceed](#)

Saved cards [add card](#)

Type	Number	Expiration	Default	Delete
	**** * 8431	12/2021	<input checked="" type="checkbox"/>	

Auto Recharge (once per day maximum) **\$10 / \$25**

Braintree transactions list [refresh list](#)

Transactions list [May 2018](#)

Opening balance **\$3,370.68**

Monthly payments **\$100.00**

Monthly fees **\$3,075.00**

5 lines per page Filter:

Date	Description	Qty	Sum
2018-05-03 13:21 MSK	Kazoo consulting May 2018.	1	\$3,000.00
2018-05-01 03:01 MSK	User. MRC.	3	\$15.00
2018-05-01 03:01 MSK	E911 Service. MRC.	2	\$4.00
2018-05-01 03:01 MSK	US DID. MRC.	9	\$18.00
2018-05-01 03:01 MSK	Hosted PBX. MRC.	1	\$10.00

Showing 1 to 5 of 6 entries [Forward](#)

Per minute calls **\$0.00**

Related documents [create reports](#)

Current balance **\$395.68**

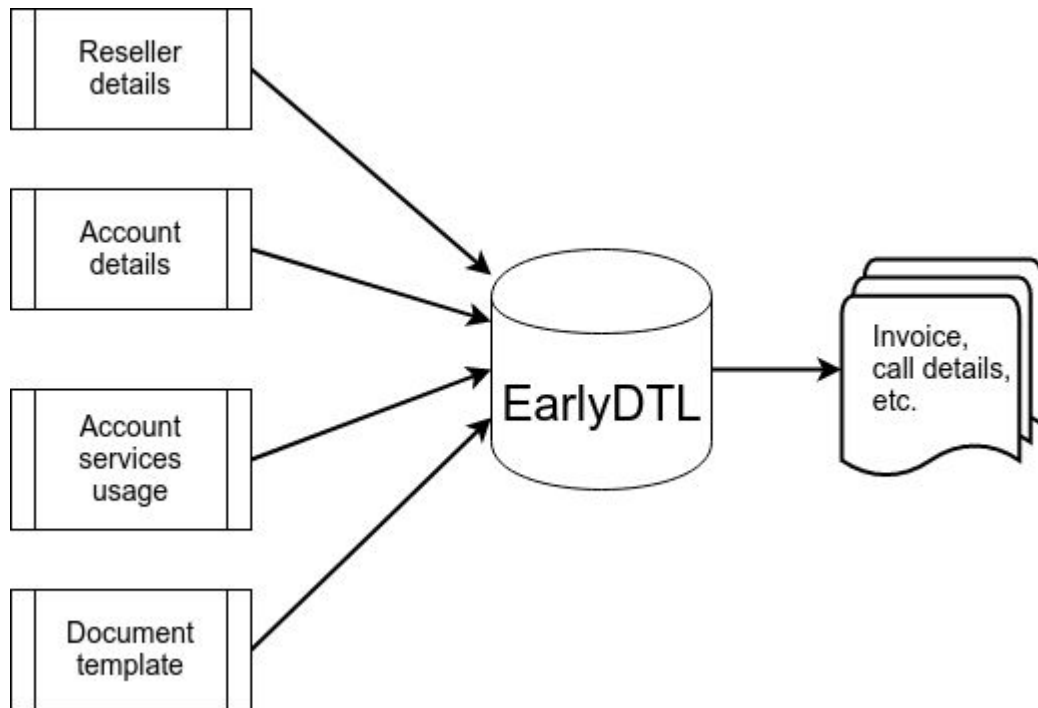


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Docs as easy as a pie

Documents generation:

- automatically;
- on demand;
- mail to account admins optionally.



Ready to sell potatoes online now? :)

Enjoy!