
OpenSIPS

Building multi-tenant VoIP platform

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Very beginning

- Started at 2013 with ÉTS
- Replace old Nortel VoIP PBX CS1000
- More than 1500 Avaya phones
- Requirements:
 - Open Source
 - Scalability
 - Virtualization
 - Multi-level management (admins, users)
 - Gradual migration process

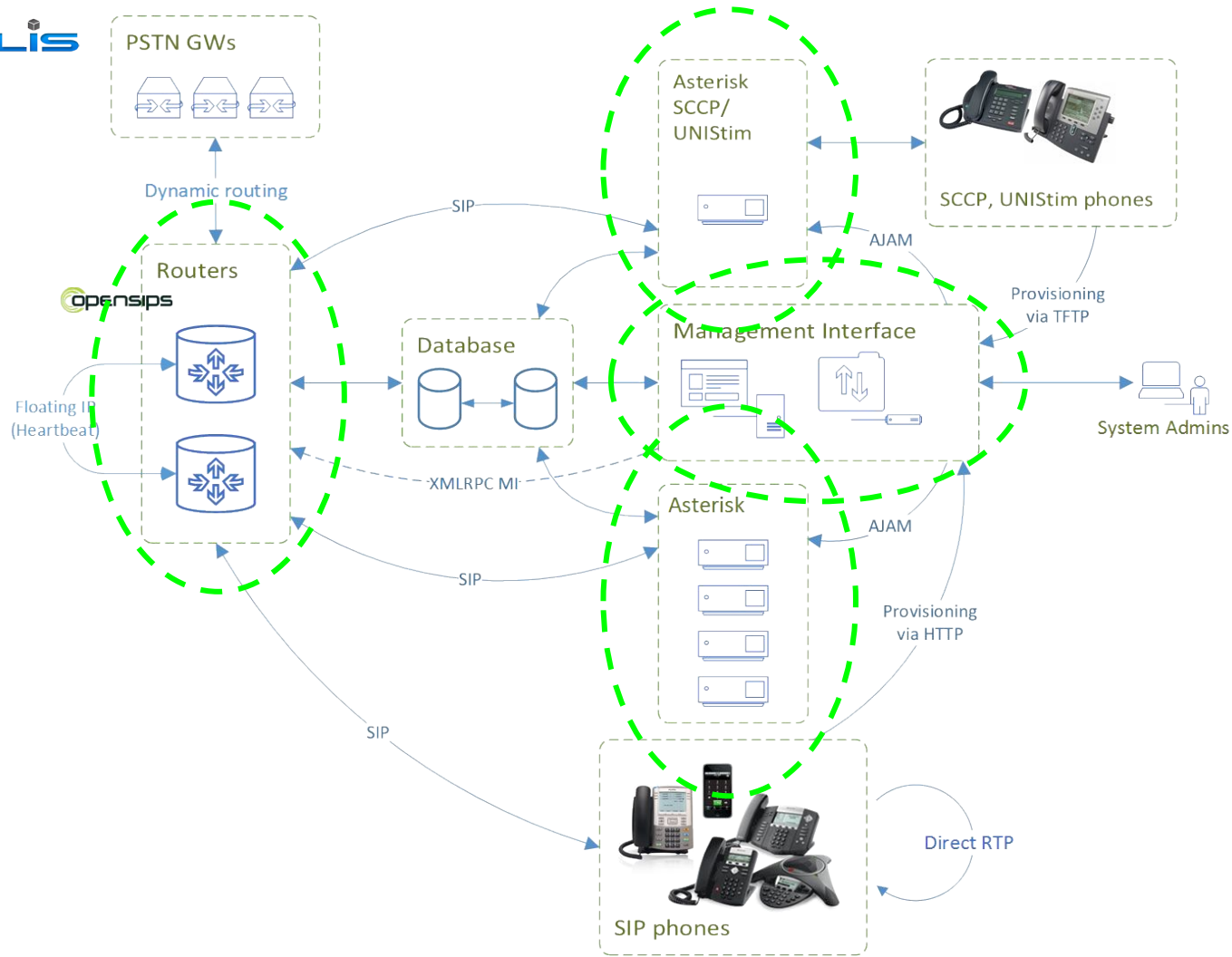


Challenges

- Three protocols: SIP, UNISim, SCCP
- Unified management
- PBX features
- No single points of failure

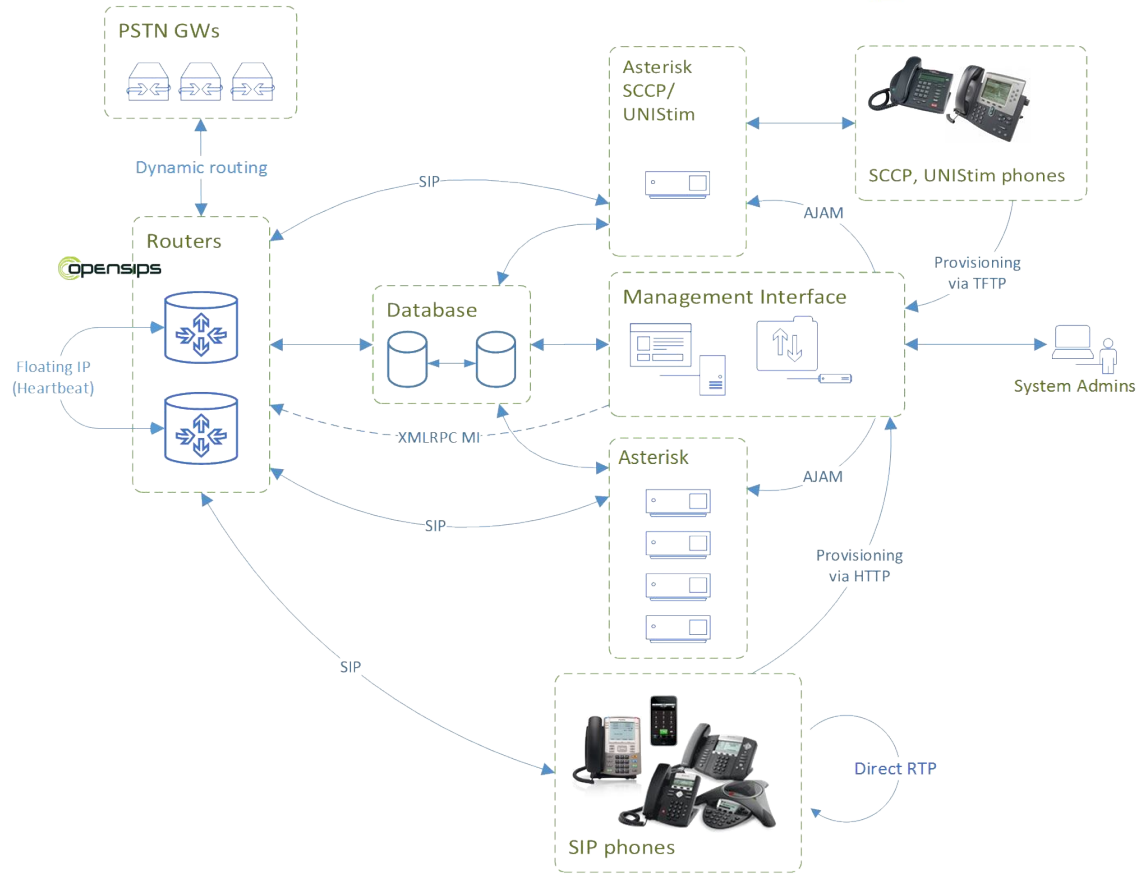
Platform design

- OpenSIPS
- Asterisk PBX features
- Asterisk SCCP/UNISTim gateway
- Admin web-interface (Rails + ExtJS)
- REST API
- Provisioning
- Monitoring and alerts (monit)



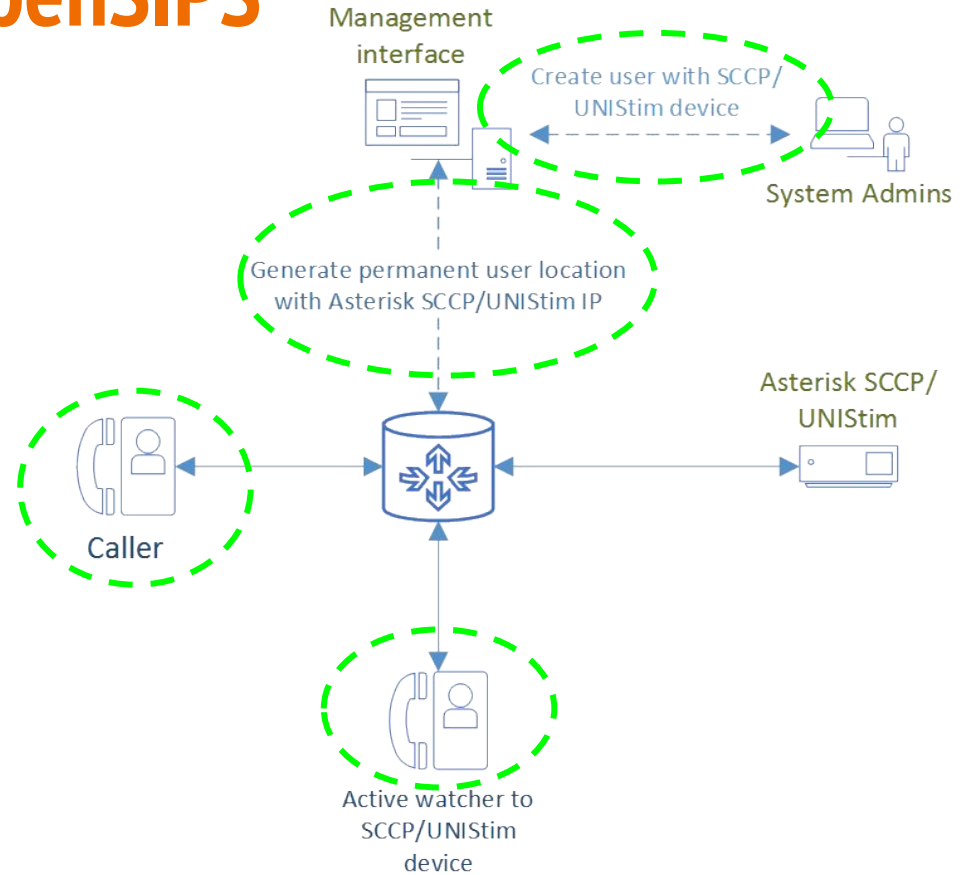
OpenSIPS roles

- Registrar
- Proxy
- Load balance
- Presence server
- PSTN SIP trunking
- Calls Profiling
- Exceptions handling
- Security



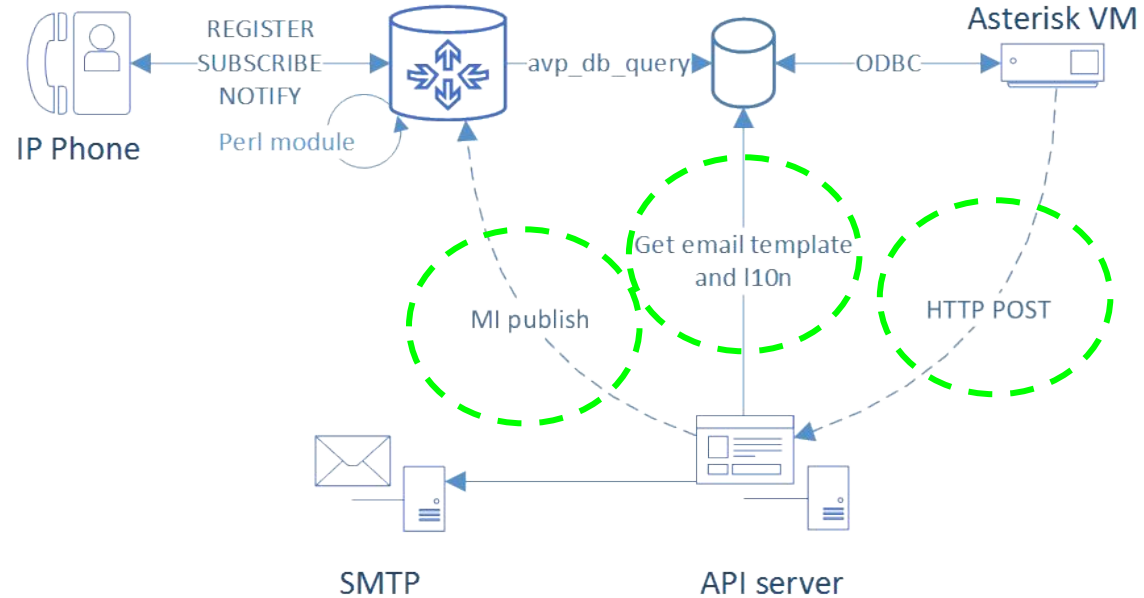
None-SIP devices via OpenSIPS

- Management
- OpenSIPS proxy
- Sharing presence state

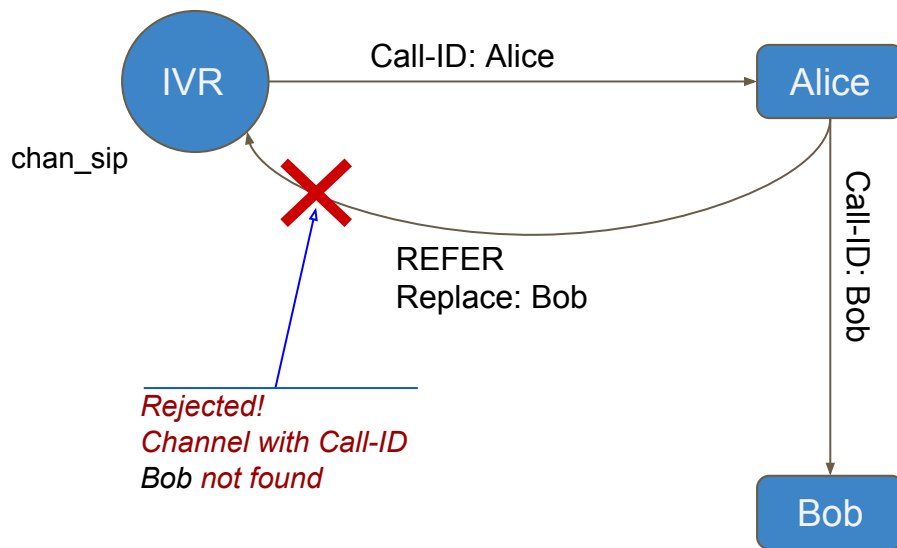


Presence

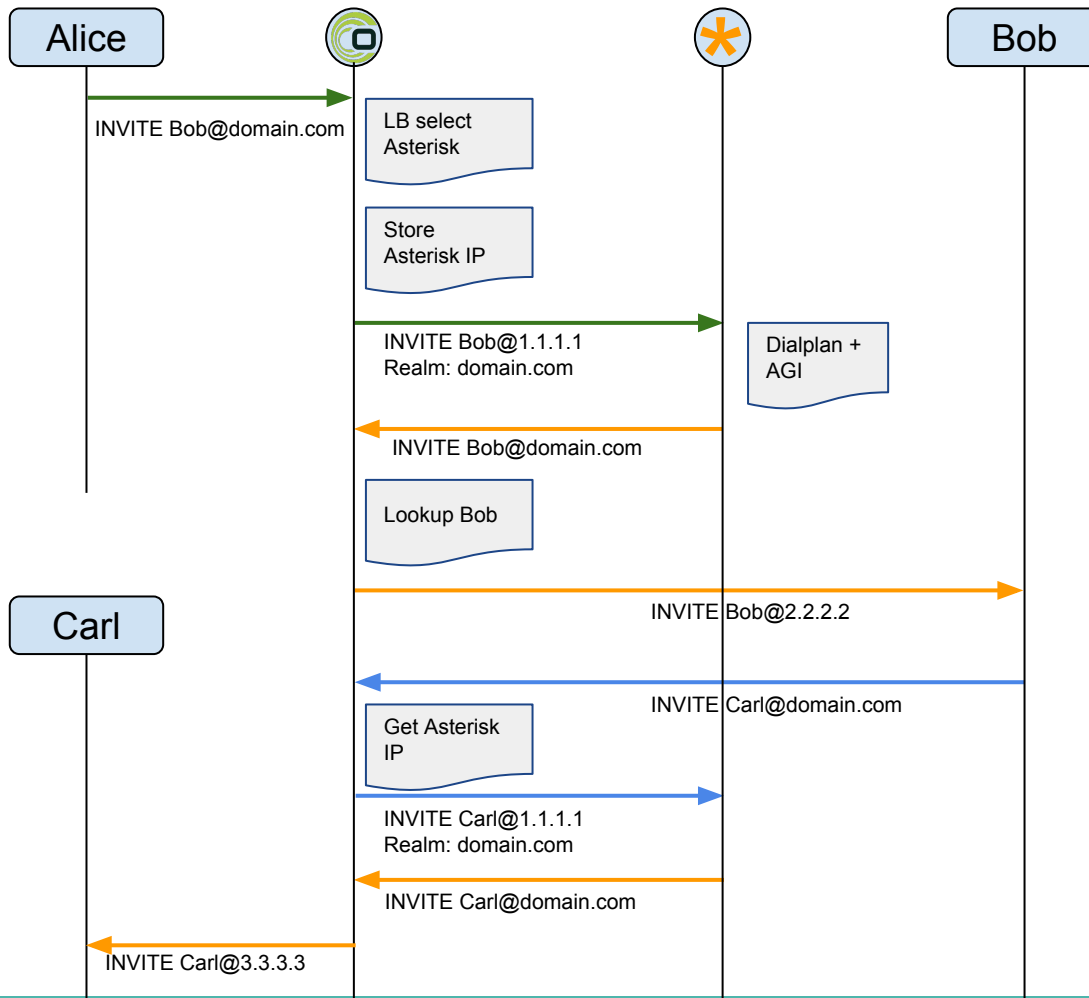
- RLS and xcap for Avaya phones
- Call pickup
- MWI (Message Waiting Indicator)



Remote attended x-fer and Asterisk challenge



Call flow



Challenge : MySQL

- MySQL cluster
- MySQL Master/Master simultaneous write.
- MySQL Master/Master active/passive

Testing with SIPP

- Call flows (register, call, presence)
- Stress tests.
- OpenSIPS benchmark

```

----- Scenario Screen ----- [1-9]: Change Screen --
Call-rate(length) Port Total-time Total-calls Remote-host
2.0(10000 ms)/1.000s 5060 572.27 s 1144 10.130.8.20:5060(UDP)

2 new calls during 1.004 s period 1 ms scheduler resolution
24 calls (limit 60) Peak was 28 calls, after 20 s
0 Running, 90 Paused, 9 Woken up
11 dead call msg (discarded) 353 out-of-call msg (discarded)
3 open sockets

Messages Retrans Timeout Unexpected-Msg
INVITE -----> 1144 0 0
100 <----- 1122 0 0
407 <----- 1142 0 0
INVITE -----> 1142 0 0
100 <----- 1164 0 0
180 <----- 924 0 0
183 <----- 0 0 0
200 <----- E-RTD1 1141 0 0
ACK -----> 1141 0
INVITE <----- 1125 0 15

200 -----> 1125 0 0
ACK <----- E-RTD1 1125 0 0

Pause [ 10.0s] 1125 0 1
BYE -----> 1104 0 0
200 <----- 1104 0 0

----- [+|-|*|/]: Adjust rate ---- [q]: Soft exit ---- [p]: Pause traffic -----

```

```

----- Scenario Screen ----- [1-9]: Change Screen --
Port Total-time Total-calls Transport
5060 608.01 s 1159 UDP

2 new calls during 1.001 s period 1 ms scheduler resolution
28 calls Peak was 34 calls, after 44 s
0 Running, 92 Paused, 7 Woken up
8 dead call msg (discarded)
4 open sockets

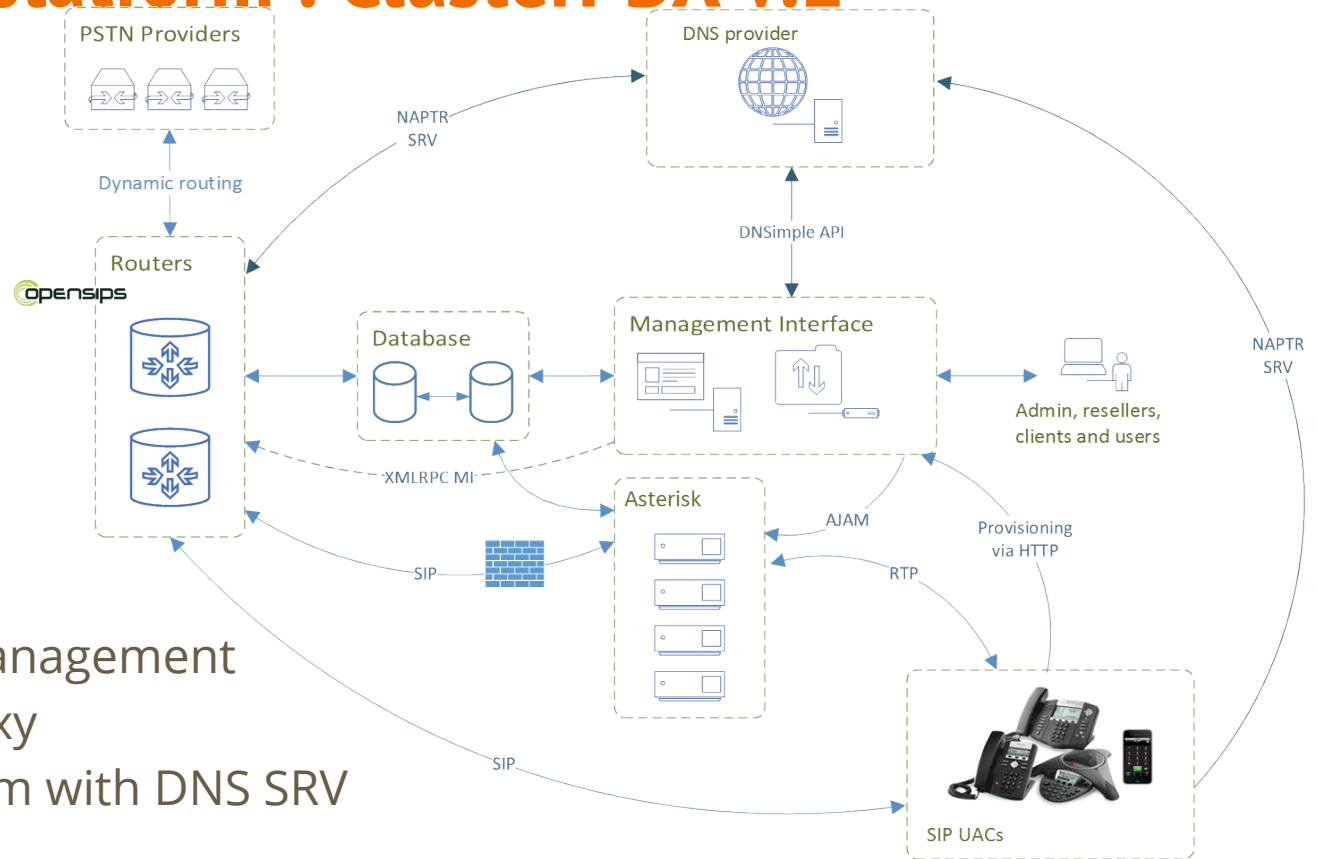
Messages Retrans Timeout Unexpected-Msg
-----> INVITE 1159 0 0
<----- 180 1159 0
<----- 200 1159 0
-----> ACK E-RTD1 1158 0 0 1
-----> INVITE 1158 0 0 0
<----- 200 1158 0 0
-----> ACK E-RTD1 1158 0 0 0
-----> INVITE 1138 0 0 0
<----- 200 1138 0 0
-----> ACK E-RTD1 1138 0 0 0
-----> BYE 1138 0 0 0
<----- 200 1138 0
[ 4000ms] Pause 1138 0

----- Sipp Server Mode -----

```

ClusterPBX v2

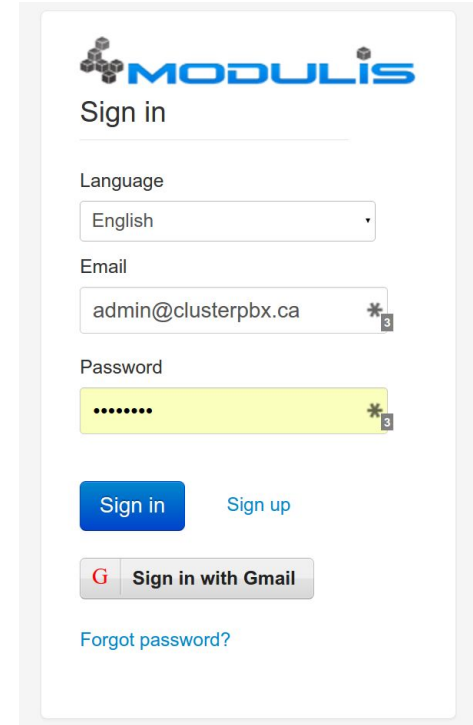
Multi-tenant platform : ClusterPBX v.2



- DNS NAPTR/SRV management
- Asterisk as RTP proxy
- Asterisk has problem with DNS SRV

Management

- Multilingual
- OpenSIPS MI and Asterisk AJAM
- Multi-tenant
- Admin -> resellers -> clients -> users
- Domains client.reseller.tld



The screenshot shows the MODULIS Sign in interface. At the top left is the MODULIS logo. Below it is the text "Sign in". There are three input fields: "Language" with a dropdown menu showing "English", "Email" with the text "admin@clusterpbx.ca", and "Password" with a masked password ".....". Each input field has a small asterisk icon and a small "3" in a square box to its right. Below the input fields are two buttons: a blue "Sign in" button and a light blue "Sign up" button. Below these is a "Sign in with Gmail" button with the Gmail logo. At the bottom is a link for "Forgot password?".

Top level : admin

- Access to any sub level
- DID management
- Provisioning templates
- SIP trunks
- Routing rules

Logged in as clusterpbx.ca (Root Modulis) Admin

Resellers page

[Add Reseller](#)
[Delete Reseller](#)
[Edit Reseller](#)
[Login as](#)

Reseller Realm	Email	Discount (%)	Balance	Language
modulis.clusterpbx.ca	voipreseller@modulis.ca	0	-\$46,131.20	English
ntek.clusterpbx.ca	js@ntek.ca	0	-\$40.00	French
avancie.clusterpbx.ca	netadmin@avancie.com	0	\$300.00	French
genilan.clusterpbx.ca	genilansreseller@genilan.net	0	\$0.00	French
csur.clusterpbx.ca	csur@modulis.ca	0	\$0.00	French
test.clusterpbx.ca	demo.reseller@modulis.ca	0	\$0.00	French
canfone.clusterpbx.ca	voip@canfone.com	0	\$0.00	English
lb3.clusterpbx.ca	voip@lb3.ca	0	\$0.00	French
nnadeau.clusterpbx.ca	nnadeauresel@ggconfiance.ca	0	\$0.00	French

Resellers level

- Sub-level management
- Profiling
- Routing
- Branding

Outgoing calls are sent over trunks, and determined by the configuration of the outbound routes on this page.

Rule / Destinations Name: International

Gateways List:

- Canada: gw05.modulis.ca (199.182.13)
- International: gw05.modulis.ca (199.182.13)
- Local Montreal - Local Montreal: gw05.modulis.ca (199.182.13)
- NewGatewayTest: gw05.modulis.ca (199.182.13)
- Toll Free: ulis.ca (199.182.13)
- UK: ulis.ca (199.182.13)
- US: ulis.ca (199.182.13)

Edit Outbound Rule

Destination: International

Available Gateways:

- gw01.modulis.ca
- gw02.modulis.ca
- gw03.modulis.ca
- gw04.modulis.ca
- zoom.us
- zoom.us2
- Trunk Jean-Sebastien NTEK
- Bell PRI
- Trunk Jean-Sebastien NTEK New

Selected Gateways:

- gw05.modulis.ca
- gw06.modulis.ca

Logged in as ntek.clusterpbx.ca (Lepage Jean-Sébastien) Admin > Reseller

NTEK

Home

Clients

Users

Call Details

Outbound Routes

DID

LNP

Provisioning Templates

Users Profiles

Billing Profiles

Active Calls

My Balance

Logo

Settings

Sign out

Notice

This page contains the list of all client accounts. You can add, edit and delete clients from here. To view a client's web

Add Client Delete Client Edit Client Connect As Client Search

Realm	Email	Number of users	Language
acloutier.nteck.clusterpbx.ca	andre.dcloutier@ntek.ca	1	French
asicc.nteck.clusterpbx.ca	asicc@ntek.ca	16	French
bd.nteck.clusterpbx.ca	bd@ntek.ca	1	French
bia.nteck.clusterpbx.ca	bia@ntek.ca	10	French
cdlegal.nteck.clusterpbx.ca	cdlegal@ntek.ca	7	French
cvro.nteck.clusterpbx.ca	cvro@ntek.ca	4	French
dbedjanic.nteck.clusterpbx.ca	dbedjanic@ntek.ca	1	English
dixmo.nteck.clusterpbx.ca	dixmo@ntek.ca	0	French
drspa.nteck.clusterpbx.ca	drspa@ntek.ca	12	French
epm.nteck.clusterpbx.ca	epm@ntek.ca	1	French
fusion.nteck.clusterpbx.ca	fusion@ntek.ca	23	French
implantech.nteck.clusterpbx.ca	implantech@ntek.ca	1	French
jph.nteck.clusterpbx.ca	jph@ntek.ca	1	French
microfix.nteck.clusterpbx.ca	microfix@ntek.ca	24	French
ntekhq.nteck.clusterpbx.ca	ntekhq@ntek.ca	5	French
orsj.nteck.clusterpbx.ca	orsj@ntek.ca	10	French
pp.nteck.clusterpbx.ca	pp@ntek.ca	2	French
print.nteck.clusterpbx.ca	print@ntek.ca	9	French
prodentia.nteck.clusterpbx.ca	prodentia@ntek.ca	2	French
quatemedia.nteck.clusterpbx.ca	quatemedia@ntek.ca	1	English

Client level

- Users management
- PBX features (conferences, ring groups, MoH etc.)
- DID assign
- Reporting
- IVRs
- Dialplan

Logged in as office.modulis.clusterpbx.ca (Office Modulis) Admin > Client

Notice

This page contains the list of all user accounts. You can add, edit and delete users from here. To view a user's web interface, select him in the list and click on 'Connect as User'.

[Add User](#)
[Delete User](#)
[Edit User](#)
[Connect as User](#)
[Export](#)
[Import](#)

Extension	Status	VM	First name	Last name	Profile	Login	Mac	Department
200		1	Conference	Board	Office Modulis Conference	conference@modulis.ca	0004f227b0a8	Ventes
201		1	Conf2	Extension	Office Modulis Conference	demo@modulisdemoextension.com	0004f2e75b93	
202		15	Adrien	Laurent	Client's employee on new gateway (no rec)	adrien@modulis.ca	0004f2e75b94	Administrati
203		1	Cuisine	Jerme	Client's employee on new gateway (no rec)	team@modulis.ca	00085d2f1d60	
204			Serena	Caplette	Client's employee on new gateway (with rec)	serena.caplette@modulis.ca	0004f2a9b1dd	Administrati
205		8	Jason	Tremblay	Client's employee on new gateway (with rec)	jason.tremblay@modulis.ca	0004f2286f28	Administrati
206			Sebastien	Patus	Client's employee on new gateway (with rec)	sebastien.patus@modulis.ca	0004f21f4742	Ventes
207			Jean-Sebastien	Lepage	Client's employee on new gateway (with rec)	jean-sebastien.lepage@modulis.ca		Ventes
208			Yannick	Morel	Sales person or Admin	morel.yannick@gmail.com		Marketing
211			Paul	Vint	Client's employee on new gateway (with rec)	paul.vint@modulis.ca	00085d26c472	Operations
212			Jocelle	Morissette	Client's employee on new gateway (with rec)	jocelle.morissette@modulis.ca	00085d2f1db3	Marketing
213		50	Judy	Liu	Client's employee on new gateway (with rec)	finance@modulis.ca	001565178d0c	
215			Lei	Fu	Client's employee on new gateway (with rec)	lei.fu@modulis.ca	0004f282bdc2	R&D
216			Kevin	Gagne	Client's employee on new gateway (with rec)	kevin.gagne@modulis.ca	0004f2a91668	
217			Mamadou	Kone	Client's employee on new gateway (with rec)	mamadou.kone@modulis.ca	00085d4a4444	Operations
218		1	Michael	Reiss	Client's employee on new gateway (no rec)	michael.reiss@modulis.ca		Marketing
219		9	Jean-Philippe	Vallee	Client's employee on new gateway (no rec)	jean-philippe.vallee@modulis.ca		
220		3	Lei	TTT	Client's employee on new gateway (no rec)	wwtfg@modulis.ca	0004f22c2ab8	R&D
221			Daniel	Delisle	Client's employee on new gateway (with rec)	daniel.delisle@modulis.ca	0004f2389c2d	Ventes

Multi-tenant : User

Logged in as Laurent Adrien #202

Admin > Client > User

Advanced Account Voicemail Box

- Home
- My Profile Picture
- Call Details
- Voicemails
- Active Calls
- My Softphone
- My Phone
- My Queues
- Directory
- SMS
- Online Conference
- Personal Conferences
- Settings
- Sign out

Configure your personal options from this page. Hover the mouse cursor above each option to see additional info.

Call settings

Feature	Value
Call Waiting	On
Do Not Disturb	Off
Follow Me	5149833991
Forward	

Follow-me setup

Follow-me to an external number

Force to press 1 to accept the call:

Follow-me delay

Delay (seconds):

Language

Name	Value
Language	French

Available destinations

See more

Destinations

None/Calling Test

411

Logged in as Laurent Adrien #202

Admin > Client > User

- Home
- My Profile Picture
- Call Details
- Voicemails
- Active Calls
- My Softphone
- My Phone
- My Queues
- Directory
- SMS
- Online Conference
- Personal Conferences
- Settings
- Sign out

My Softphone

What is a softphone?
 A softphone is a software that allows you to connect to and use a VoIP account. There are many alternatives on all platforms (Windows, Mac, Linux, Android, iOS). From this page you can connect your softphone to ClusterPBX, without a VPN. With a SIP softphone, users can communicate free.

My softphone settings

Username:

Secret:

Server:

Some links to download free softphones

[Zoiper](#) [X-Lite](#) [QuteCom](#) [Twinkle \(Linux only\)](#) [Ekiga](#)

More softphone settings

Authentication username:

Outbound proxy:

Port:

To easily set up your softphone with Zoiper

[Configuration instructions for Android and iOS](#)

Or just scan this QR code from zoiper:



Ruby gems

- opensips-mi (<https://github.com/modulis/opensips-mi>)
- asterisk-ajam (<https://github.com/modulis/asterisk-ajam>)

Plans

- Migration to OpenSIPS v2
- Locations and dialogs binary replications
- RabbitMQ multiple OpenSIPS servers
- Investigating Percona

Thank you!

Questions?

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