

# Status of VoIP in FreeBSD

KyivBSD 2010  
Kyiv, Ukraine

***Do Your VoIP with FreeBSD!***



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# Open Source Media Servers

- Asterisk
- CallWeaver
- FreeSWITCH
- Yate
- sipX / sipXecs

# Asterisk Media Server



- An Open Source Modular Multiprotocol PBX
- Hybrid PBX, softswitch, IVR
- Voicemail
- PSTN gateway
- Conference
- Announcement services
- multiple protocols: IAX2, SIP, h323, Skinny, zap, jingle
- multiple codecs: gsm, g711, g729, ilbc, ...
- transcoding
- protocol translation
- back-to-back user agent

# What is DAHDI?

- Digium Asterisk Hardware Device Interface
- **It is...**
  - A high density kernel telephony interface for PSTN hardware
  - Abstracts the hardware interface
  - A collection of kernel modules to implement this interfaces.
- **It was...**
  - Formerly known as Zaptel.

# DAHDI/FreeBSD Project

- ✓ Provide FreeBSD with up-to-date DAHDI module & drivers
- ✓ Supports E1/T1, FXO/FXS analog, ISDN and TDMoE
- ✓ Sponsored by FreeBSD Foundation
- ✓ Almost complete, got first success stories



- ✓ Developed by: Max Khon <[fjoe@samodelkin.net](mailto:fjoe@samodelkin.net)>
- ✓ <http://svnview.digium.com/svn/dahdi/freebsd/>

# DAHDI / FreeBSD Project

## Цифровые карты

### \* wct4ххр:

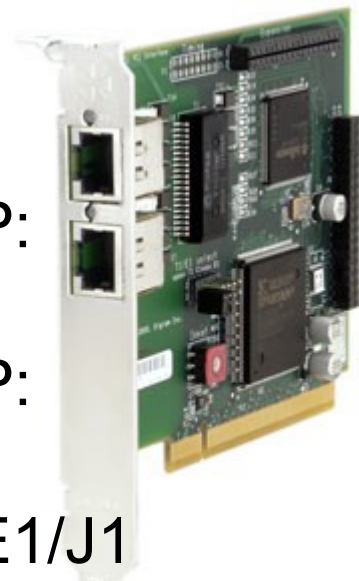
- o Digium TE205P/TE207P/TE210P/TE212P:  
PCI 2 порта T1/E1/J1
- o Digium TE405P/TE407P/TE410P/TE412P:  
PCI 4 порта T1/E1/J1
- o Digium TE220: PCI-Express 2 порта T1/E1/J1
- o Digium TE420: PCI-Express 4 порта T1/E1/J1

### \* wcte12хр:

- o Digium TE120P: PCI один порт T1/E1/J1
- o Digium TE121: PCI-Express один порт T1/E1/J1
- o Digium TE122: PCI один порт T1/E1/J1

### \* wcte11хр:

- o Digium TE110P: PCI один порт T1/E1/J1



# DAHDI / FreeBSD Project

## Аналоговые карты

### \* wctdm24хр:

- o Digium TDM2400P/AEX2400: до 24 аналоговых портов
- o Digium TDM800P/AEX800: до 8 аналоговых портов
- o Digium TDM410P/AEX410: до 4 аналоговых портов

### \* wctdm:

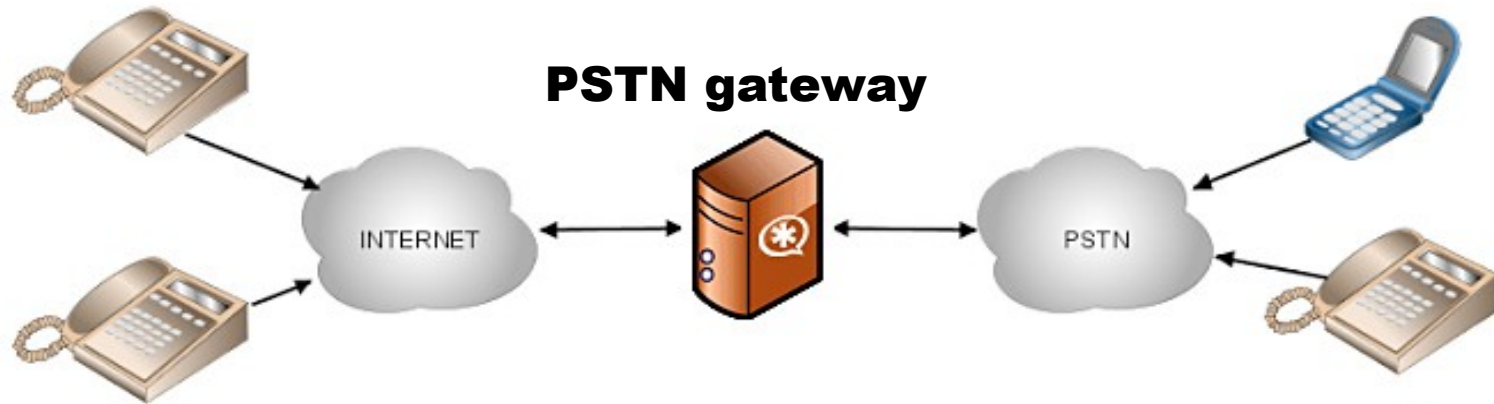
- o Digium TDM400P: до 4 аналоговых портов

### \* wcfxo:

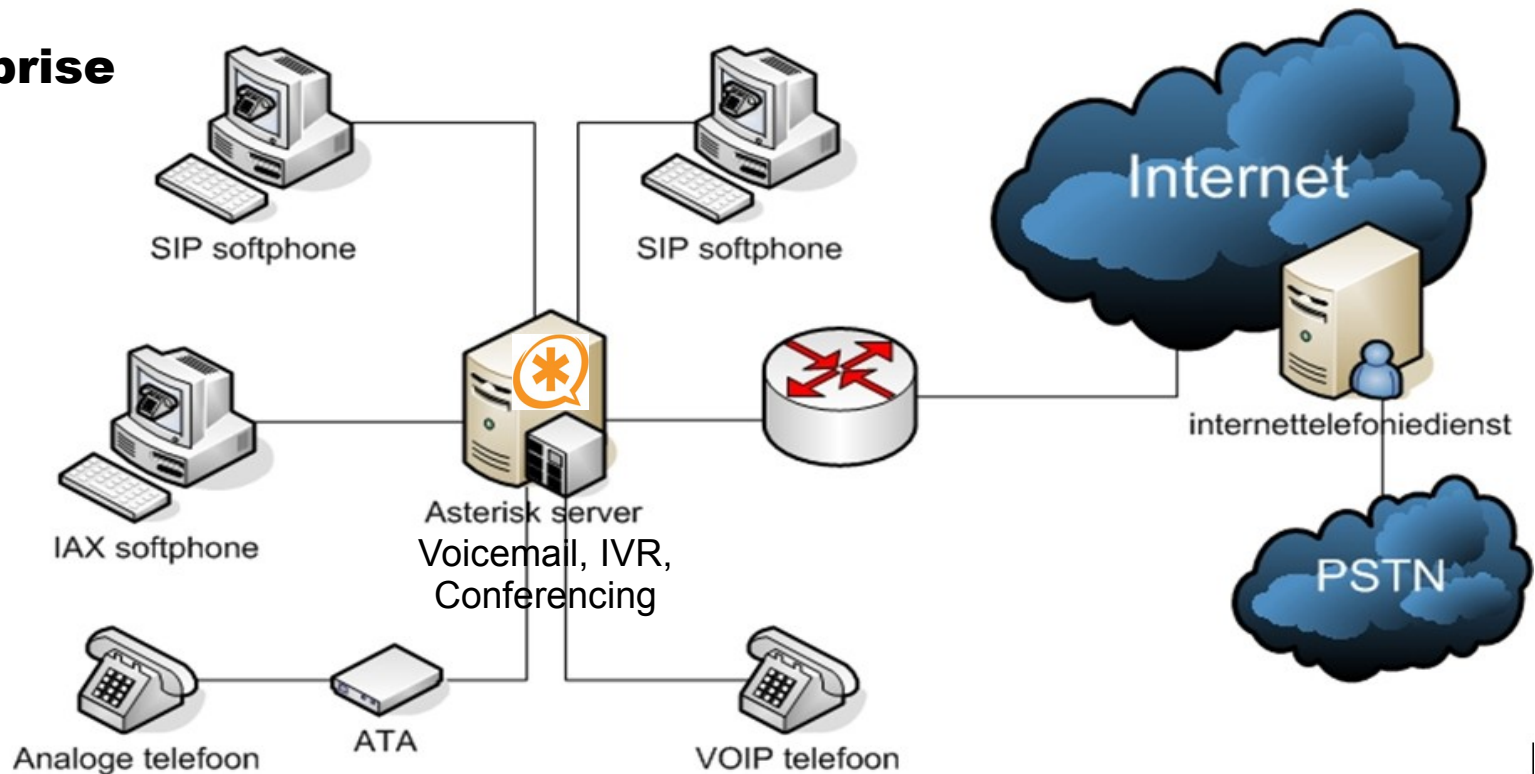
- o X100P, оригинал и его клоны. Простая однопортовая FXO карта.



# Asterisk usage scenarios



## Enterprise PBX





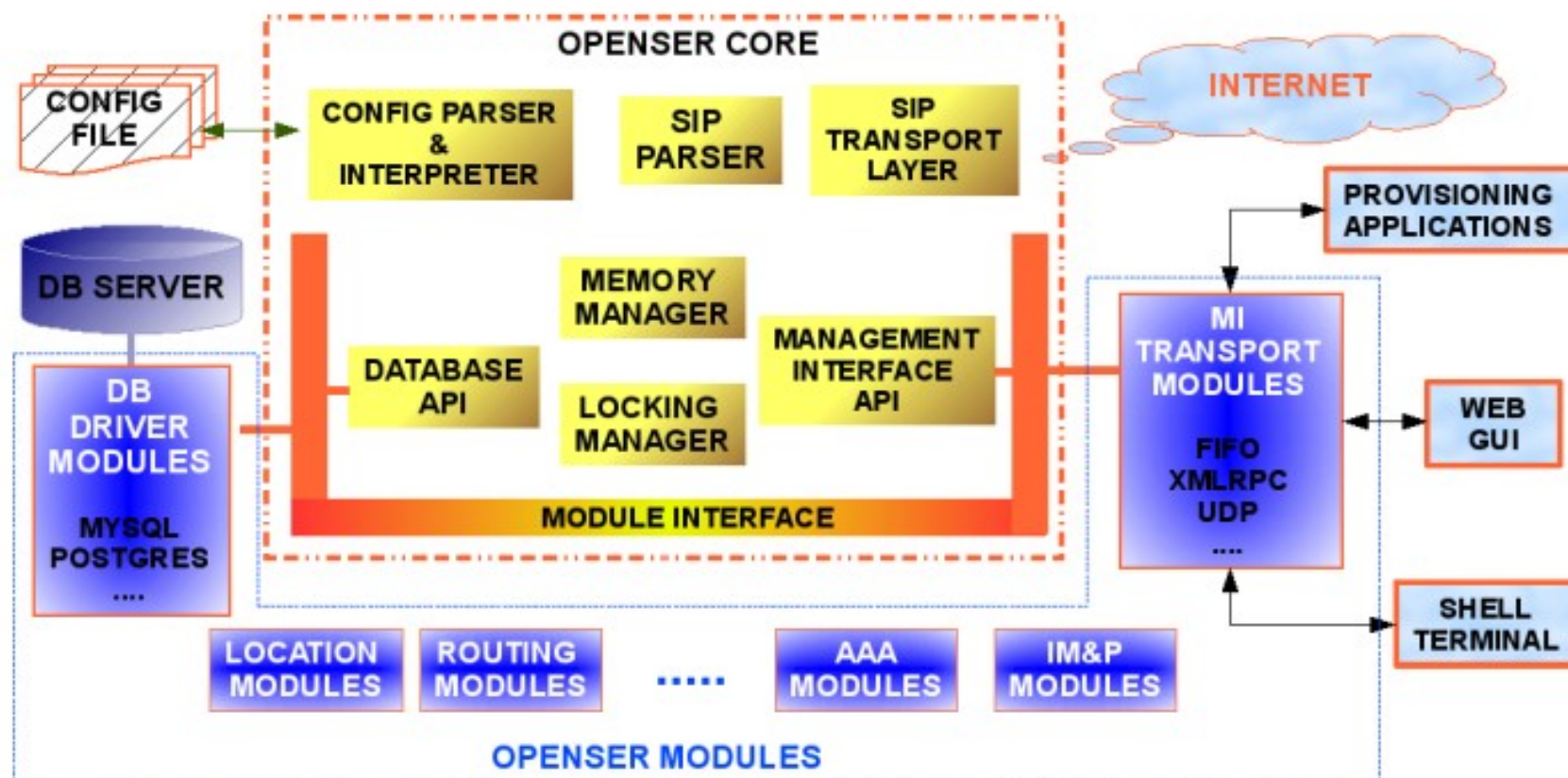
# Asterisk issues

- Asterisk was not created with performance in mind
  - Behind some SIP-only solutions (SER, OpenSER)
- Asterisk inability to handle SIP spirals
  - still cannot return a call to same Asterisk?
- limited registrar functionality
  - asterisk doesn't work with multiple registrations
- missing “domain” concept in Asterisk
- missing “user alias” concept

# What is OpenSER?

- **IT IS A SIP SERVER:**
  - It contains sip proxy, registrar and location server
  - It does not care about **CALLS!!!**
  - It can make **SIP sessions** happen
  - It works with **SIP messages**
  - It deals with **SIP transactions**
- **IT IS NOT:**
  - a SIP phone
  - a SIP media server
  - a SIP back-to-back user agent
- **IT HANDLES ONLY SIGNALING!**

# OpenSER architecture



# About OpenSER

- Developed in C
- Runs on Linux/Unix-based environments
- Modular architecture:
  - Core part for common API
  - Modules for features
- Distributed development environment
  - Source tree and trackers hosted by SF
  - Servers hosted by different companies

# How OpenSER can help YOU?

## Traffic handling

- thousands of cps
- quick delivery
- low resources usage

## Load balancing

- dispatcher module
- routing algorithms:  
hashing, round robin, random
- destination failover

## Carrier routing

- large amount of routing rules
- combining: routing,  
balancing and blacklisting
- dialplan transformations

## Dynamic routing

- scripting language
- RADIUS and DB AAA
- multiple DB backends
- Multi-Domain support

## Security

- Access control lists
- IP auth
- IP blacklisting
- destination filtering
- TLS

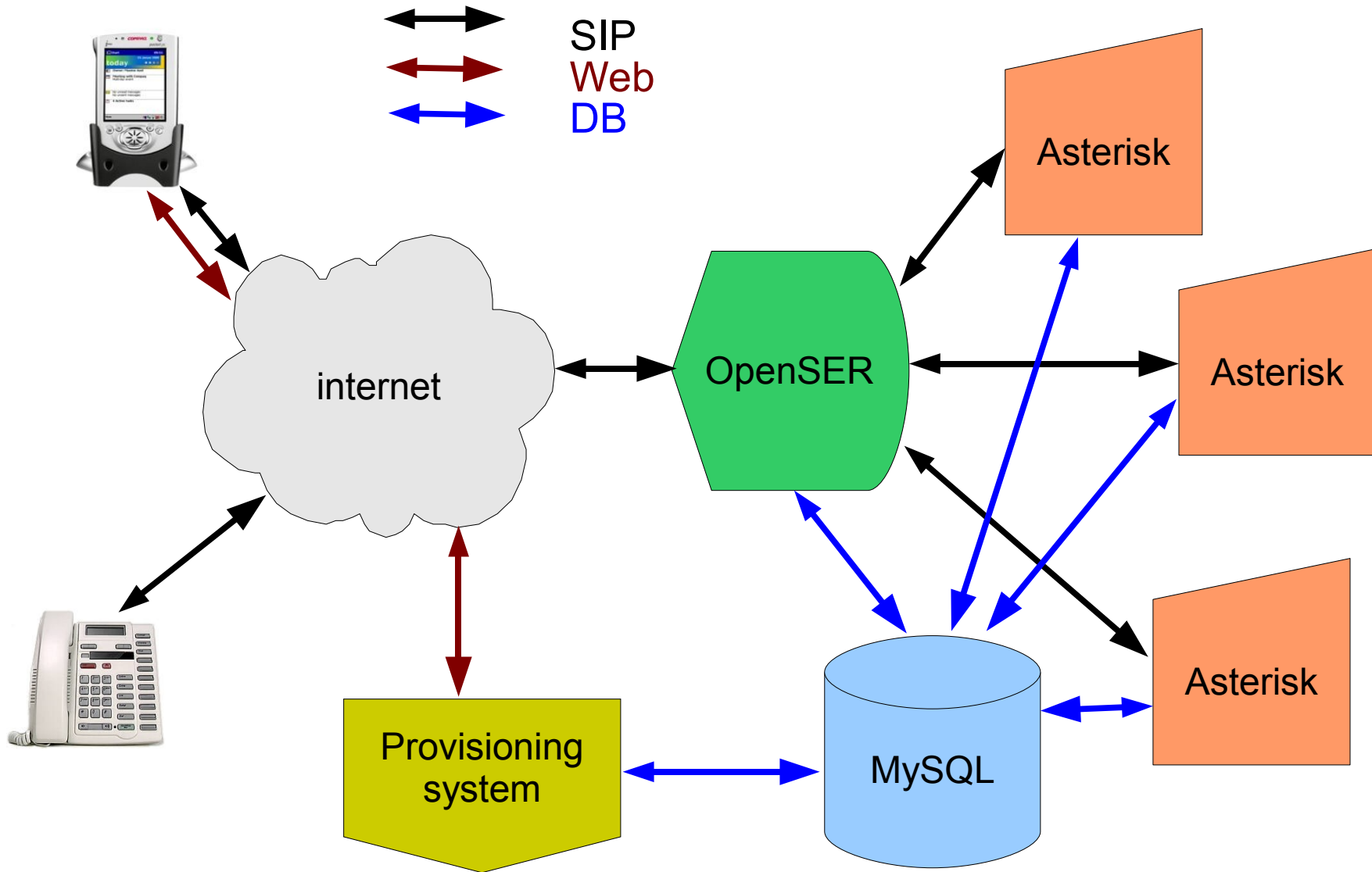
## Presence server

- XCAP (privacy rules)
- Instant Messaging
- Presence and BLF  
aggregation
- Resource List Server (RLS)

## Misc

- user location  
replication
- dns failover
- easy to scale

# OpenSER & Asterisk integration

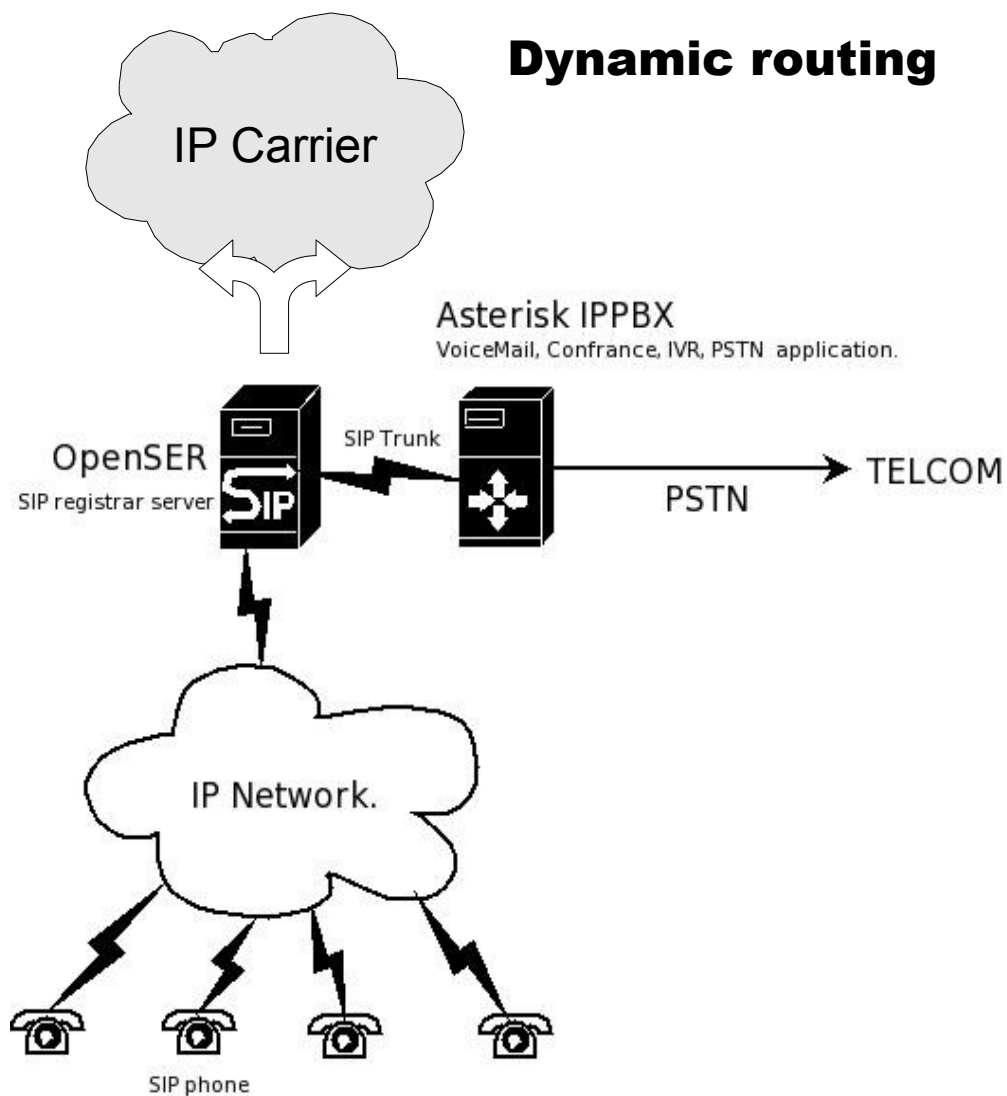


# OpenSER & Asterisk integration

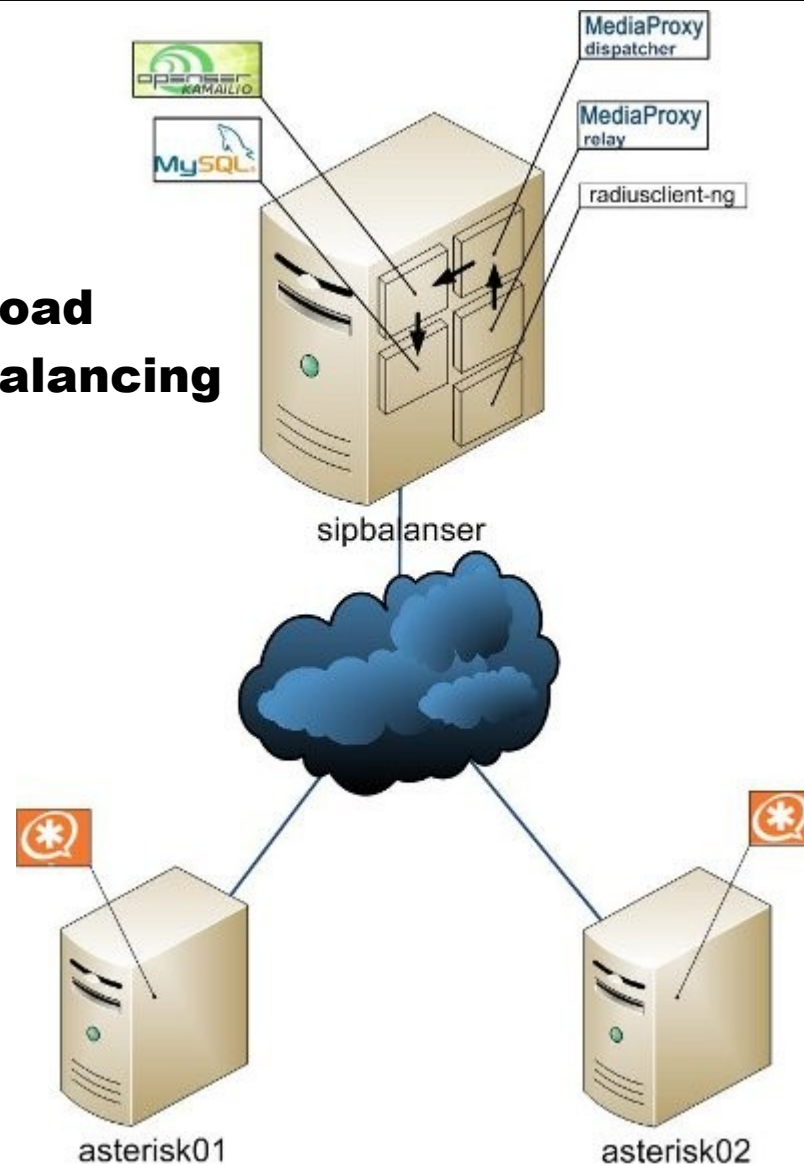
- usage of database to share user accounts:
  - makes billing and user management lot easier
- usage of database to store resources (voicemail messages, audio conferences)
- software:
  - freebsd
  - openser
  - asterisk
  - dahdi
  - unixodbc
  - mysql

# Typical OpenSER usage scenarios

## Dynamic routing

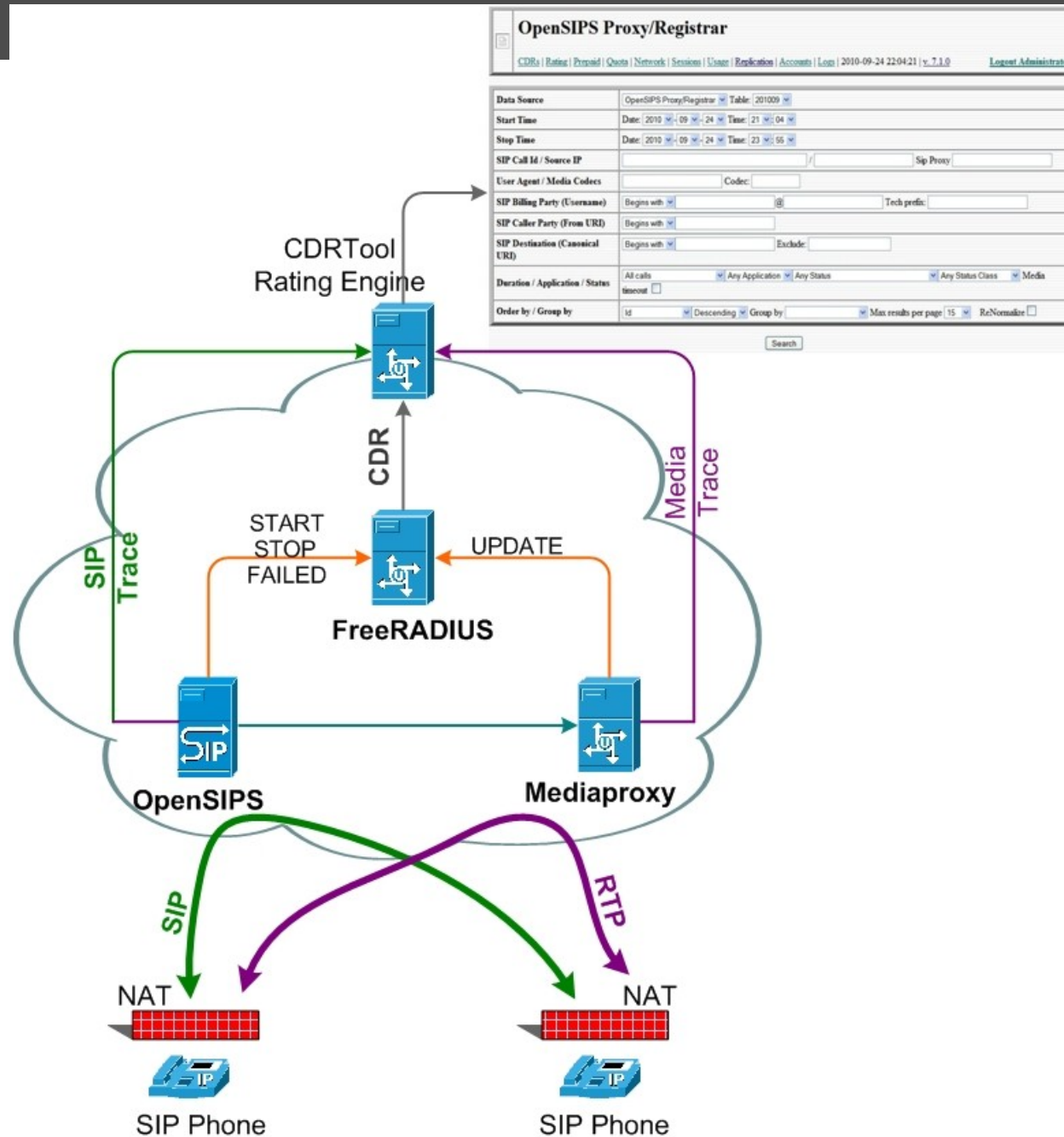


## Load balancing

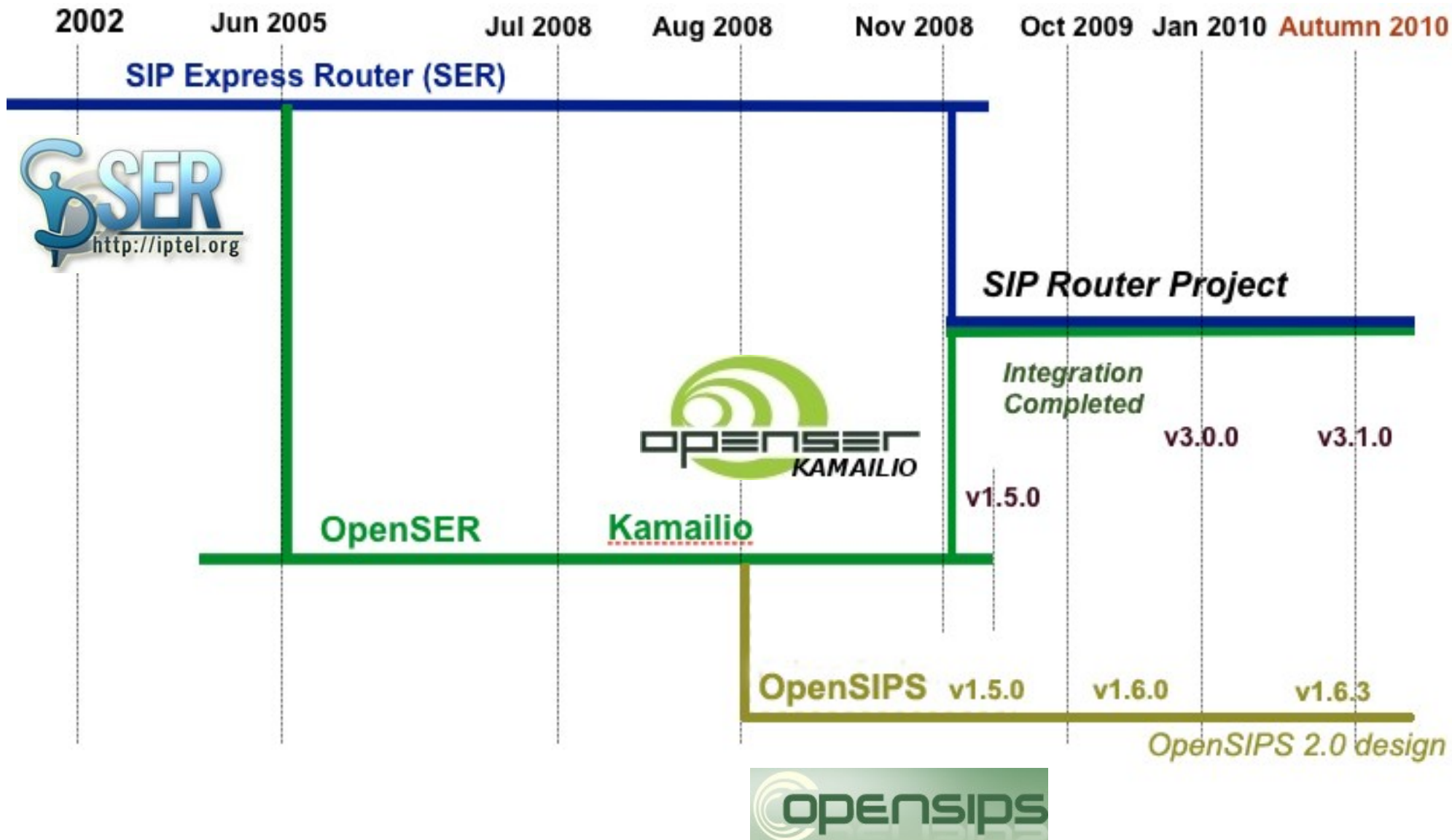




# Accounting and CDR Normalization



# 10 Years of SER Evolution



# Kamailio project



## New features of Kamailio 3.0 and 3.1

Memcached daemon support

Asynchronous processing

Kernel-based RTP proxy (for Linux ;( only)

Config language extended

Lua and Python scripting

Interactive config debugger

GeoIP API

# OpenSIPS project



## Modules

auth	dispatcher
avpops	lcr
groups	drouting
alias_db	dialplan
permissions	enum
dialog	snmpstats
nathelper	
aaa_radius	

**...101 modules in total!**

# OpenSIPS project



OpenSIPS is a OSS project based on collective effort

- 80% of the project is sustained by Voice System
- large number of developers :
- 3 core developers
- 22 main developers
- ~30 developers
- ~150 contributors

# Ecosystem

- Administration Interface
  - opensips-cp - <http://opensips-cp.sourceforge.net/>
- Command line tools
  - opensipsctl, osipsconsole
- Interfacing
  - Xmlrpc, Binrpc, Http, Raw protocol: UDP, FIFO
- Interoperability
  - Asterisk, Sems, FreeSwitch; XMPP
- SVN Repository
  - <http://sourceforge.net/projects/opensips/>

# Links



<http://www.asterisk.org>



<http://opensips.org>



<http://www.kamailio.org>  
<http://sip-router.org>

## Related software:

OpenSIPS Control Panel	<a href="http://opensips-cp.sourceforge.net/">http://opensips-cp.sourceforge.net/</a>
Siremis	<a href="http://siremis.asipto.com">http://siremis.asipto.com</a>
RTPproxy	<a href="http://rtpproxy.org/">http://rtpproxy.org/</a>
MediaProxy	<a href="http://mediaproxy.ag-projects.com/">http://mediaproxy.ag-projects.com/</a>
CDRTool	<a href="http://cdrtool.ag-projects.com/">http://cdrtool.ag-projects.com/</a>
OpenXCAP	<a href="http://openxcap.org/">http://openxcap.org/</a>

# Thank you!

## Questions?

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