



# Kamailio World

*2nd edition*



**welcome**

**Daniel-Constantin Mierla - Co-Founder**  
**Elena-Ramona Modroiu - Co-Founder**

---

[www.asipto.com](http://www.asipto.com)



---



**KAMAILIO WORLD**  
CONFERENCE & EXHIBITION  
BERLIN - GERMANY, APRIL 2-4, 2014





# KAMAILIO WORLD CONFERENCE & EXHIBITION



sponsors and exhibitors



# Agenda Overview

---

- ❑ Spektrum: the conference room
- ❑ Atrium: the exhibition area (the big hall outside of Spektrum)
  
- ❑ April 3-4 - Conference
  - 09:00 - 10:30 [Spektrum] Presentations
  - 10:30 - 11:00 [Atrium] Coffee Break
  - 11:00 - 12:30 [Spektrum] Presentations
  - 12:30 - 13:30 [Atrium] Lunch
  - 13:30 - 15:30 [Spektrum] Presentations
  - 15:30 - 16:00 [Atrium] Coffee Break
  - 16:00 - 18:00 [Spektrum] Presentations
  
- ❑ April 3 - Social Event
  - 19:00 - 22:00 [Atrium]



# Interactive sessions

---

- April 3
  - 17:00 [Spektrum] VUC Pannel by Randy Resnick
    - prepare with hot topics and tough questions
  
- April 4
  - 12:00 [Spektrum] Dangerous Live Demos by James Body
    - prepare yours and enrol in a fight for world recognition and interesting prizes
  
- April 3-4
  - 09:00-18:00 [Atrium] Exhibition Spots
    - Asipto
    - Digium
    - FhG Fokus
    - IT Center
    - NG Voice
    - Obihai
    - Sipgate

- ❑ Network Name (ESSID): **FhG-Guests**
  
- ❑ Open a browser, try to access a web page:
  - ❑ username: **ForumBerlin**
  - ❑ password: **A4wzkDv6**
  
- ❑ Flyers with these details are on the back of the room
  - ❑ if needed, ask the registration desk for support

- ❑ Twitter Hashtag: #KamailioWorld
  
- ❑ Twitter
  - ❑ @kamailioworld
  - ❑ @kamailioproject
- ❑ Facebook Page - kamailio:
  - ❑ <https://www.facebook.com/Kamailio>
- ❑ Google+ Page: kamailio:
  - ❑ <https://plus.google.com/114984922071338017631>
- ❑ LinkedIn Group: kamailio:
  - ❑ <https://www.linkedin.com/groups/kamailio-145924/about>



# Kamailio SIP Server

*state of the project  
and  
the infrastructure behind it*

---

[www.kamailio.org](http://www.kamailio.org)

**Daniel-Constantin Mierla - Co-Founder**  
**Elena-Ramona Modroiu - Co-Founder**

---

[www.asipto.com](http://www.asipto.com)



Welcome to Kamailio™ – the Open Source SIP Server

Kamailio™ (former OpenSER) is an Open Source SIP Server released under GPL, able to handle thousands of call setups per second. Among features: asynchronous TCP, UDP and SCTP; secure communication via TLS for VoIP (voice, video); WebSocket support for WebRTC; IPv4 and IPv6; SIMPLE instant messaging and presence with embedded XCAP server and MSRP relay; IMS extensions; ENUM; DID and least cost routing; load balancing; routing fail-over; accounting, authentication and authorization; support for many backend systems such as MySQL, Postgres, Oracle, Radius, LDAP, Redis, Cassandra; XMLRPC control interface, SNMP monitoring. It can be used to build large VoIP servicing platforms or to scale up SIP-to-PSTN gateways, PBX systems or media servers like Asterisk™, FreeSWITCH™ or SEMS. Kamailio and the SIP Express Router (SER) teamed up for the integration of the two applications and new development.



Excellence in SIP since 2001

Recent News

- 2014-03-19: Kamailio World 2014 – two weeks to go
2014-03-14: Kamailio World 2014 – Interactive Sessions
2014-03-06: Kamailio v4.1.2 Released
2014-03-06: Kamailio v4.0.6 Released
2014-03-05: Kamailio World 2014 – Exhibitors

- Download Latest Stable v4.1.2 (Mar 06, 2014) -

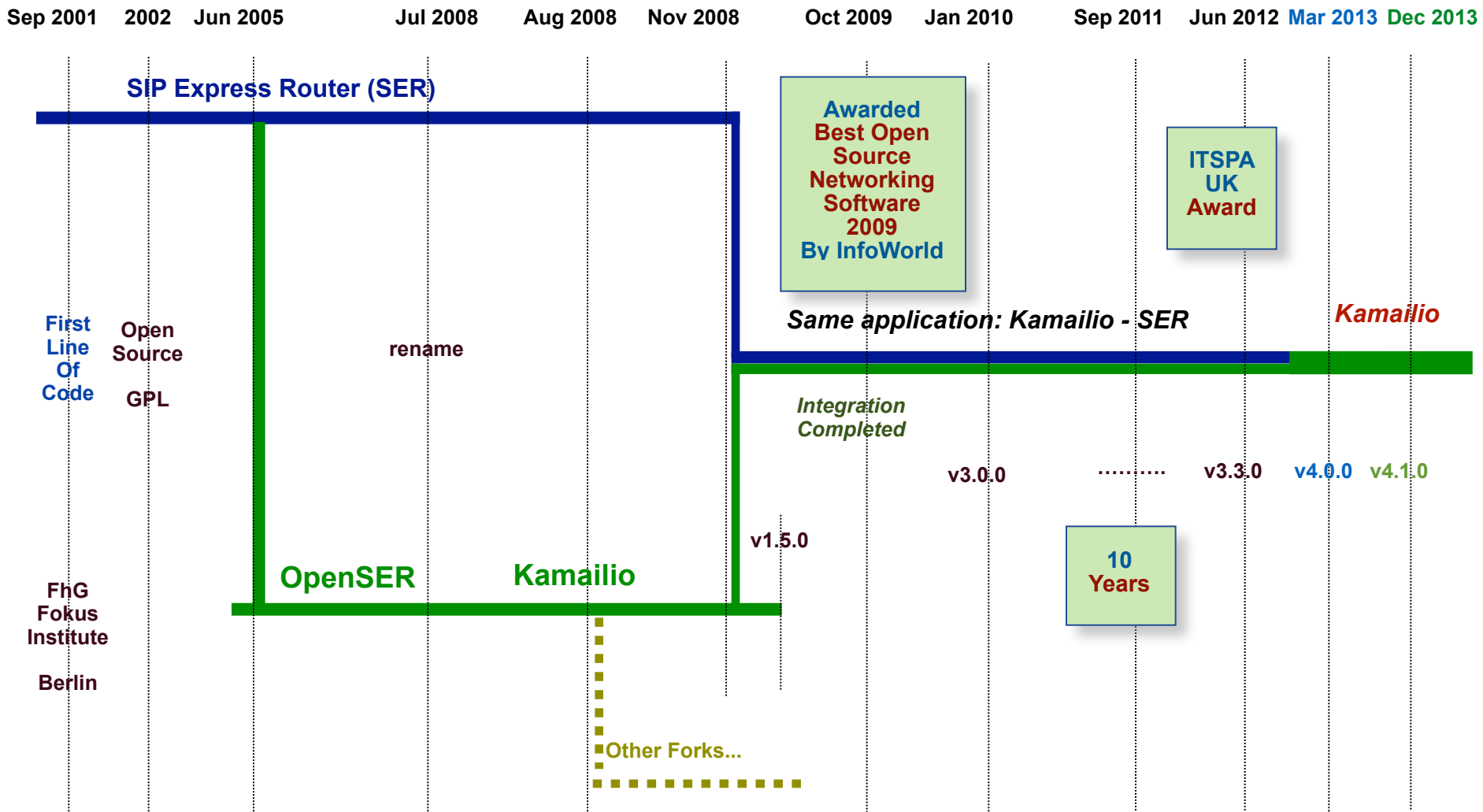
Pages

- Home
Features
Download
About
SIP Services

Documentation

- Main Index
New Wiki Site (3.2.x+)
Old Wiki Site (3.1.x-)
Modules
SIP Router Wiki

# History



# Features - Highlights

**SIP proxy, redirect  
and registrar server  
user registration  
with  
digest authorization**

**Plug-in module  
interface**

**Embedded  
interpreters for  
Lua, Perl,  
Mono (C#), Python**

**IPv4-IPv6  
UDP/TCP/TLS/SCTP  
SCTP  
multi-homing  
multi-streaming, statistics  
UDP Raw Sockets  
DNS NAPTR & SRV**

**Multi-domain support  
Customizable routing policy  
User location service**

## ***Presence Services***

**End-to-End Presence  
SIMPLE Presence Server  
Embedded XCAP Server  
Dialog Info (blinking lamps)  
Resource Lists Service (RLS)  
Profile and Conference Events  
Presence User Agents**

**Load Balancing  
Least Cost Routing  
DID - Prefix  
Routing  
Aliases  
Ring Groups  
Speed Dial  
ENUM Routing**

# Features - Highlights

Link any application to or control Kamailio using  
FIFO/UNIXSOCK/DATAGRAM/TCP/XMLRPC/HTTP interfaces

Embedded  
HTTP  
client  
server

OSP support for peering  
Connector for Java SIP Servlet  
LDAP - H350

NAT traversal  
Security  
permissions  
anti-DOS attacks  
User call  
preferences  
Call Processing  
Language

**Database  
Connectors**  
MySQL  
PostgreSQL  
SQLite  
UNIXODBC  
BERKELEYDB  
ORACLE  
Text files

**Accounting**  
log file, database,  
Radius, Diameter

Gateway

SMS  
XMPP

**Instant Messaging**  
End-to-End  
Offline Storage  
Embedded MSRP Relay  
IM Conferencing

# Features - Highlights

**Asynchronous  
TCP - TLS  
SIP Request Processing  
Cfg Route Block Execution**

**IMS  
Extensions**

**Traffic Shaping**  
limit inbound traffic rates  
track DoS - DDoS

**Active calls**  
tracking  
max duration  
counting per user  
click-to-dial

**Number Portability  
Topology Hiding  
GeoIP API  
Internal Message Queues  
Registration to Remote Servers  
Generic Database Cluster**

**Web & CLI  
Tools**  
SIREMIS  
SERCMD  
KAMCTL



# Feature - Highlights

---

## DNS Caching System

srv load balancing  
fast failover  
blacklisting  
avoid long blocking

## *Config File*

Parameter Reload Framework  
Cfg SQL Query API  
Preprocessor Directives  
(define, include)  
Interactive Debugger

## Security

encryption  
block addresses  
IP authorization  
user authentication  
certificate validation

*NoSQL*  
Memcached  
Redis  
Cassandra

time recurrence matching  
SDP operations

# 2012 - Highlights

Websockets

Over 10 IMS Extensions

IPv6  
review

presence/rls/xcap  
OMA/RCS  
enhancements

time recurrence  
matching

embedded  
MSRP Relay

GRUU  
SIP Outbound

embedded HTTP  
RPC/Provisioning  
APIs

embedded mono interpreter  
C#, Python, Java, ....

generic  
database  
clustering

cassandra connector

<http://www.kamailio.org/wiki/features/new-in-3.3.x>  
<http://www.kamailio.org/wiki/features/new-in-4.0.x>

# 2013 - Highlights

sidt

app\_java

dnssec

auth\_ephemeral  
(webrtc)

stun

cnxcc  
(prepaid)

debugger  
(per module debug)  
(log pv assignment)

sctp

ndb\_cassandra

tm  
htable  
cfgutils  
siputils

gzcompress

snmpstats - usrloc - dmq

mohqueue

<http://www.kamailio.org/wiki/features/new-in-4.1.x>  
<http://www.kamailio.org/wiki/features/new-in-devel>



# Siremis Web Management Interface

**SIREMIS 3.2** My Account Help Logout

Administration SER Menu

Main System > SER Menu > Chart Services > Acc Summary admin <admin@yourcompany.com>

December 14, 2011, 10:10 am  
Timezone: America/Los\_Angeles

**SER Admin**

- Subscriber Services
- Server Services
- ACL Services
- Routing Services
- Accounting Services
- Presence Services
- Command Services
- Chart Services**
  - SHM Charts
  - Load Charts
  - TM Charts
  - UsrLoc Charts
  - UsrLoc Stats
  - Acc Charts
  - Acc Summary**

Period	INVITE - ALL	INVITE - 200	INVITE - 404	INVITE - 487	INVITE - XYZ	BYE - ALL	ALL RECORDS
Last 72 Hours	143	143	0	0	0	162	305
Last 48 Hours	105	105	0	0	0	121	226
Last 24 Hours	68	68	0	0	0	80	148
5 To 4 Hours Ago	9	9	0	0	0	8	17
4 To 3 Hours Ago	1	1	0	0	0	2	3
3 To 2 Hours Ago	8	8	0	0	0	8	16
2 To 1 Hours Ago	4	4	0	0	0	4	8
Last Hour	0	0	0	0	0	0	0

Period	Type	#1	#2	#3	#4	#5

### SER Admin

#### Subscriber Services

- Subscriber List
- Aliases DB List
- Speed Dial List
- User Preferences
- URI DB List
- Location List
- Messages List
- User Black List
- Global Black List

#### Server Services

#### ACL Services

#### Routing Services

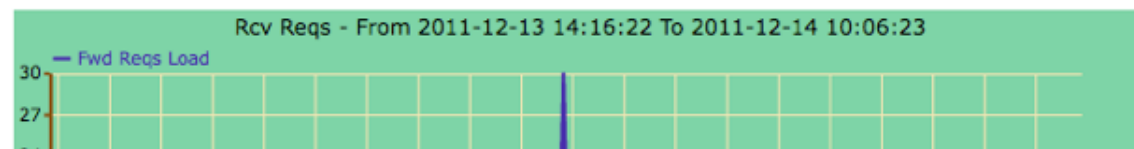
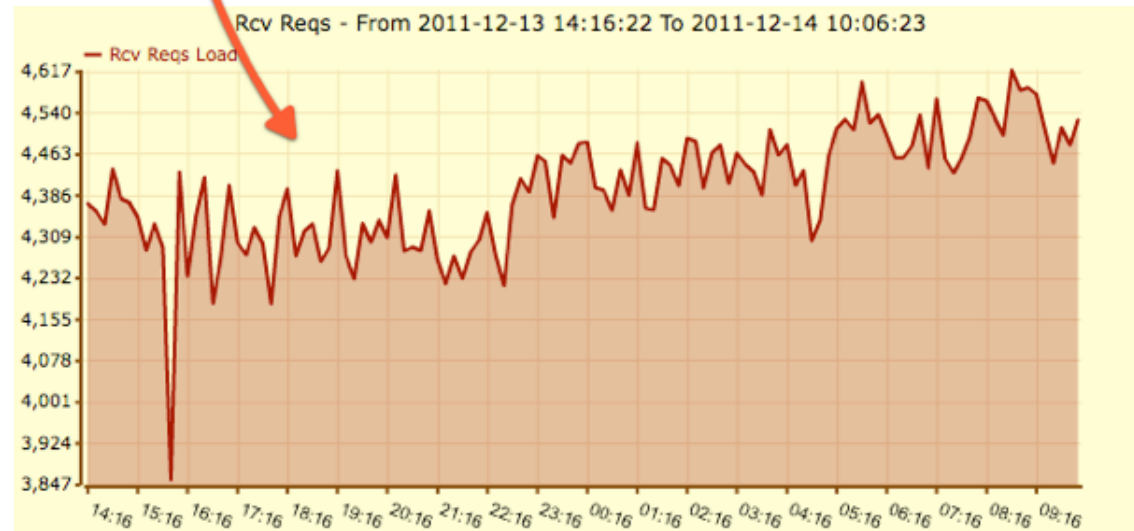
#### Accounting Services

#### Presence Services

#### Command Services

#### Chart Services

### Charts Service Panel



Load Charts

TM Charts

UsrLoc Charts

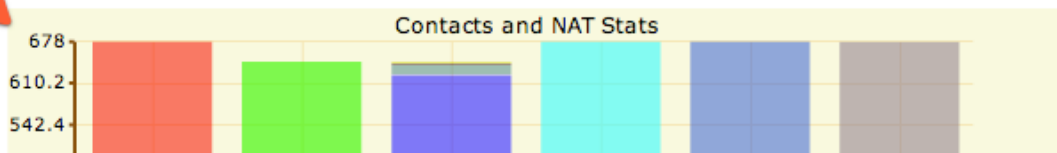
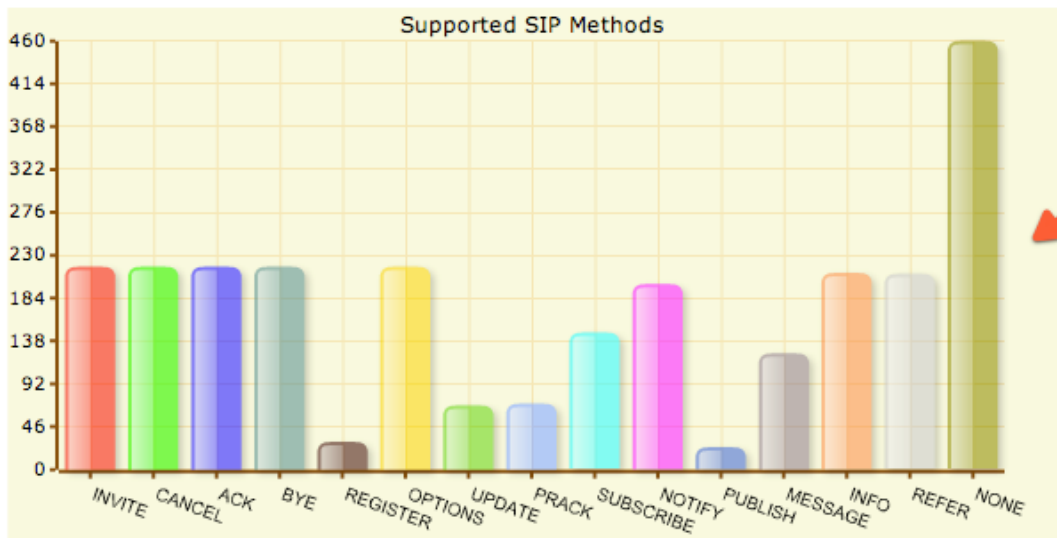
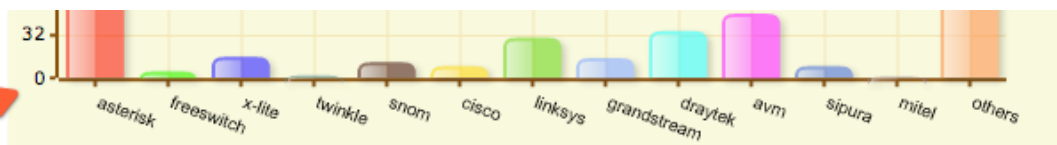
UsrLoc Stats

Help

Help Center

Q

Go





# **Project Infrastructure**

**an estimation of operational costs**



# Estimated Cost by Ohloh

## Project Cost Calculator

### Include

All Code

### Average Salary (per year)

\$ 55000 .00

### Codebase Size

843,227 lines

### Estimated Effort

230 person-years

### Estimated Cost

\$ 12,631,286 \*

\*Using the Basic COCOMO Model

## Project Cost Calculator

### Include

Logic Code Only

### Average Salary (per year)

\$ 55000 .00

### Codebase Size

654,916 lines

### Estimated Effort

181 person-years

### Estimated Cost

\$ 9,962,941 \*

\*Using the Basic COCOMO Model

## Project Cost Calculator

### Include

Markup Only

### Average Salary (per year)

\$ 55000 .00

### Codebase Size

179,857 lines

### Estimated Effort

47 person-years

### Estimated Cost

\$ 2,564,876 \*

\*Using the Basic COCOMO Model

## Project Cost Calculator

### Include

Build Scripts O...

### Average Salary (per year)

\$ 55000 .00

### Codebase Size

8,454 lines

### Estimated Effort

2 person-years

### Estimated Cost

\$ 103,468 \*

\*Using the Basic COCOMO Model

[https://www.ohloh.net/p/sip-router/estimated\\_cost](https://www.ohloh.net/p/sip-router/estimated_cost)

# Estimated Cost - West Europe

## Project Cost Calculator

### Include

All Code

### Average Salary (per year)

\$ 75000 .00

### Codebase Size

843,227 lines

### Estimated Effort

230 person-years

### Estimated Cost

\$ 17,224,481 \*

\*Using the Basic COCOMO Model

## Project Cost Calculator

### Include

Logic Code Only

### Average Salary (per year)

\$ 75000 .00

### Codebase Size

654,916 lines

### Estimated Effort

181 person-years

### Estimated Cost

\$ 13,585,829 \*

\*Using the Basic COCOMO Model

## Project Cost Calculator

### Include

Markup Only

### Average Salary (per year)

\$ 75000 .00

### Codebase Size

179,857 lines

### Estimated Effort

47 person-years

### Estimated Cost

\$ 3,497,558 \*

\*Using the Basic COCOMO Model

## Project Cost Calculator

### Include

Build Scripts O...

### Average Salary (per year)

\$ 75000 .00

### Codebase Size

8,454 lines

### Estimated Effort

2 person-years

### Estimated Cost

\$ 141,093 \*

\*Using the Basic COCOMO Model

$55000\text{Euro} \times 1.38 \Rightarrow 75\,000\text{USD}$



# Estimated Cost - Silicon Valley

---

per person/year

90 000 USD

120 000 USD

.....



# Estimated Cost - Beyond Development

---

- ❑ developers:testers ratio
  - recommended for high quality - 2:1
    - ❑ 115 person years x \$55 000 pp/y => \$6 325 000
    - ❑ 115 person years x \$75 000 pp/y => \$8 625 000
  - at least - 4:1
    - ❑ 58 person years x \$55 000 => \$3 190 000
    - ❑ 58 person years x \$75 000 => \$4 350 000
- ❑ sysadmin
  - servers maintenance, web sites, ... => 1.5 x 12 = 18
    - ❑ 18 person years x \$50 000 pp/y => \$900 000
    - ❑ 18 person years x \$70 000 pp/y => \$1 260 000
- ❑ advertising
  - travel to events and lost of word during trips
  - 5-10 events per year
  - 1-10 participants from the project team
  - estimated \$50 000 to \$100 000 per year
    - ❑ 12 x \$50 000 => \$600 000
    - ❑ 12 x \$100 000 => \$1 200 000





# Estimated Cost - Infrastructure

---

- ❑ three main servers
  - kamilio.org - Spain, voztele.com
    - ❑ 75Eur/month => \$100
    - ❑ 12 x \$1200 => \$14400
  - devel.kamilio.org - Germany, 1&1
    - ❑ 75Eur/month => \$100
    - ❑ 12 x \$1200 => \$14400
  - sip-router.org - Germany, community
    - ❑ 75Eur/month => \$100
    - ❑ 12 x \$1200 => \$14400
- ❑ mirrors
  - github - git repository: \$0
  - sourceforge - old svn repository: \$0
- ❑ additional
  - deb.kamilio.org - apt repository for Debian and Ubuntu - by sipwise.com
  - conference.kamilio.com - by asipto.com
  - USA mirror for debs and rpm - (planned) by lod.com



# Estimated Cost - Running as Company

---

- administrative team
  - one manager, one accountant, one salesman and the pizza boy
    - 48 person years x \$55 000 => \$2 640 000
    - 48 person years x \$75 000 => \$3 600 000
- office space and logistics
  - rent and additional costs - \$4000 per month
    - 12 years x \$48 000 => \$576 000
  - laptops, computers, phones - \$2000 per developer/3 years
    - $(230 / 3) * 12$  => \$153 000

estimated total cost

**- *minimum: > \$23 000 000***



# Behind volunteering roles

---

- ❑ sysadmins
  - kamilio.org
    - ❑ Daniel-Constantin Mierla, Henning Westerholt, Oriol Capsada
    - ❑ Jesus Rodrigues
  - devel.kamilio.org
    - ❑ Henning Westerholt
  - sip-router.org
    - ❑ Andrei Pelinescu-Onciul, Daniel-Constantin Mierla, Henning Westerholt
    - ❑ Jan Janak, Victor Seva
  - deb.kamilio.org
    - ❑ now: Michael Prokop, Victor Seva & Sipwise team
    - ❑ before: Jon Bonilla, Inaki Baz Castillo
  - rpm builds via opensuse build service or custom repository
    - ❑ Daniel-Constantin Mierla, Peter Dunkley
  - USA mirror
    - ❑ Fred Posner
  - mailing lists
    - ❑ Daniel-Constantin Mierla, Henning Westerholt



# Behind volunteering roles

---

- ❑ advertising
  - news via kamilio.org
    - ❑ Carsten Bock, Daniel-Constantin Mierla
    - ❑ Henning Westerholt, Olle E. Johansson
  - kamilio facebook page
    - ❑ Olle E. Johansson
  - kamilio google+ group
    - ❑ Fred Posner
  - linkedin groups - kamilio, openser
    - ❑ Daniel-Constantin Mierla
  - twitter
    - ❑ @kamailioproject: Olle E. Johansson
    - ❑ @kamailiworld: Daniel-Constantin Mierla (+@kamilio.org - reserved/inactive)



# The Business Environment

---

finding a job





write on Kamilio public forums  
- there are many more looking to hire

*It is really hard to stay jobless as an active contributor to Kamilio!*



# The Business Environment

---

running a business



> START A BUSINESS

---



# Kamailio Business Directory

---

Anyone offering services related to Kamailio can get listed there with:

- *name and contact coordinates*
- *short description*

[Home](#)

[Features](#)

[Download](#)

[Business Directory](#)

[Management](#)

[Contact Us](#)

## Business Directory

This is a list of companies and individuals offering commercial products or services based on [Kamailio](#) or [SIP Express Router \(SER\)](#). The list is managed by Kamailio project, if you want to apply to be listed check first the [Business Directory Rules](#). Also, check our [Business web page](#) for other details regarding business environment related to this project.

**Disclaimer:** whilst we do the best to select serious applications, Kamailio and SER projects, along



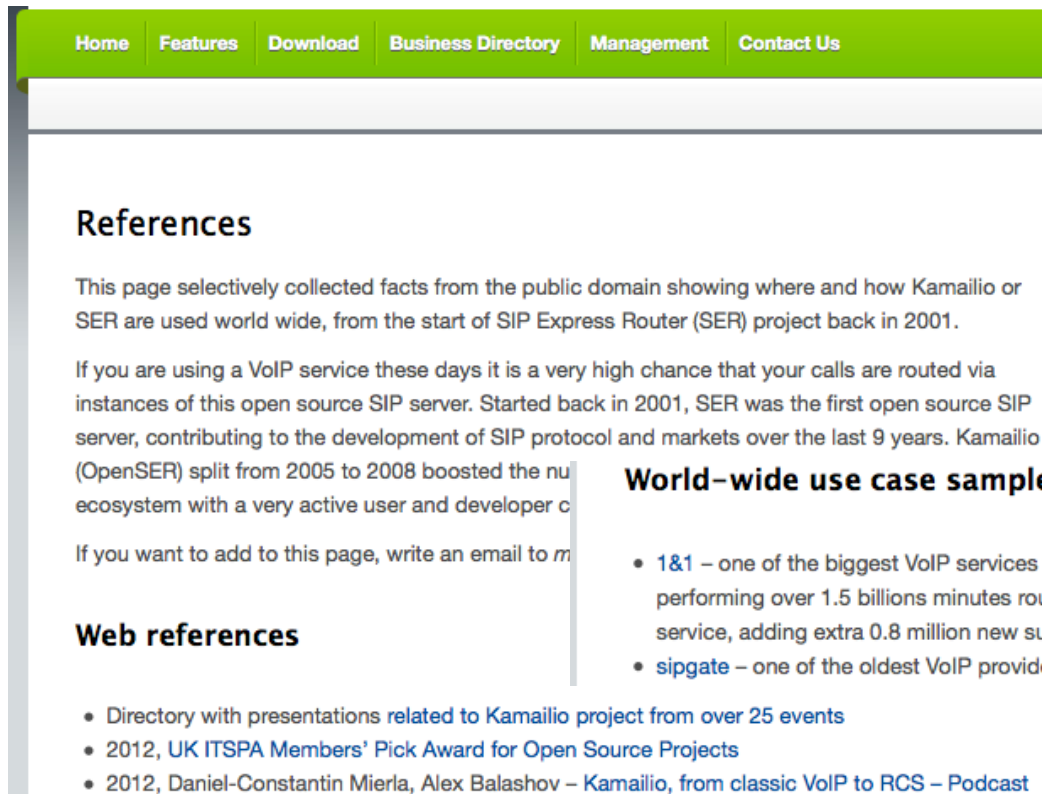


# Kamailio References Directory

---

Anyone running services relying on Kamailio can get listed there with:

- *name and contact coordinates*
- *short description*



Home Features Download Business Directory Management Contact Us

## References

This page selectively collected facts from the public domain showing where and how Kamailio or SER are used world wide, from the start of SIP Express Router (SER) project back in 2001.

If you are using a VoIP service these days it is a very high chance that your calls are routed via instances of this open source SIP server. Started back in 2001, SER was the first open source SIP server, contributing to the development of SIP protocol and markets over the last 9 years. Kamailio (OpenSER) split from 2005 to 2008 boosted the nu ecosystem with a very active user and developer c

If you want to add to this page, write an email to m

### Web references

- Directory with presentations related to Kamailio project from over 25 events
- 2012, UK ITSPA Members' Pick Award for Open Source Projects
- 2012, Daniel-Constantin Mierla, Alex Balashov – Kamailio, from classic VoIP to RCS – Podcast

### World-wide use case samples

- **1&1** – one of the biggest VoIP services world wide, hosting over 3 000 000 subscribers and performing over 1.5 billions minutes routed per month. In 2009 they merged in the Freenet service, adding extra 0.8 million new subscribers
- **sipgate** – one of the oldest VoIP providers, with hundred thousands of active subscribers,



# KAMAILIO WORLD CONFERENCE & EXHIBITION



sponsors and exhibitors



??? questions ???