



Kamailio SIP Server

*state of the project
and
the business environment*

www.kamailio.org

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

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); IPv4 and IPv6; SIMPLE instant messaging and presence with embedded XCAP server and MSRP relay; 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.



[click for more details](#)



Excellence in SIP since 2001

Recent News

- 2013-02-11:** Kamailio World – First set of accepted presentations
- 2013-01-25:** The heat is on – Kamailio World is the Open Source Communication conference in Europe this spring!
- 2013-01-21:** Kamailio Development Workshop, Feb 14-15, 2013, Alicante, Spain
- 2013-01-21:** Changes for version 4: Module structure and Perl support
- 2013-01-19:** Testdrive the coming 4.0 release!

[- Download Latest Stable v3.3.3 \(Dec 18, 2012\) -](#)

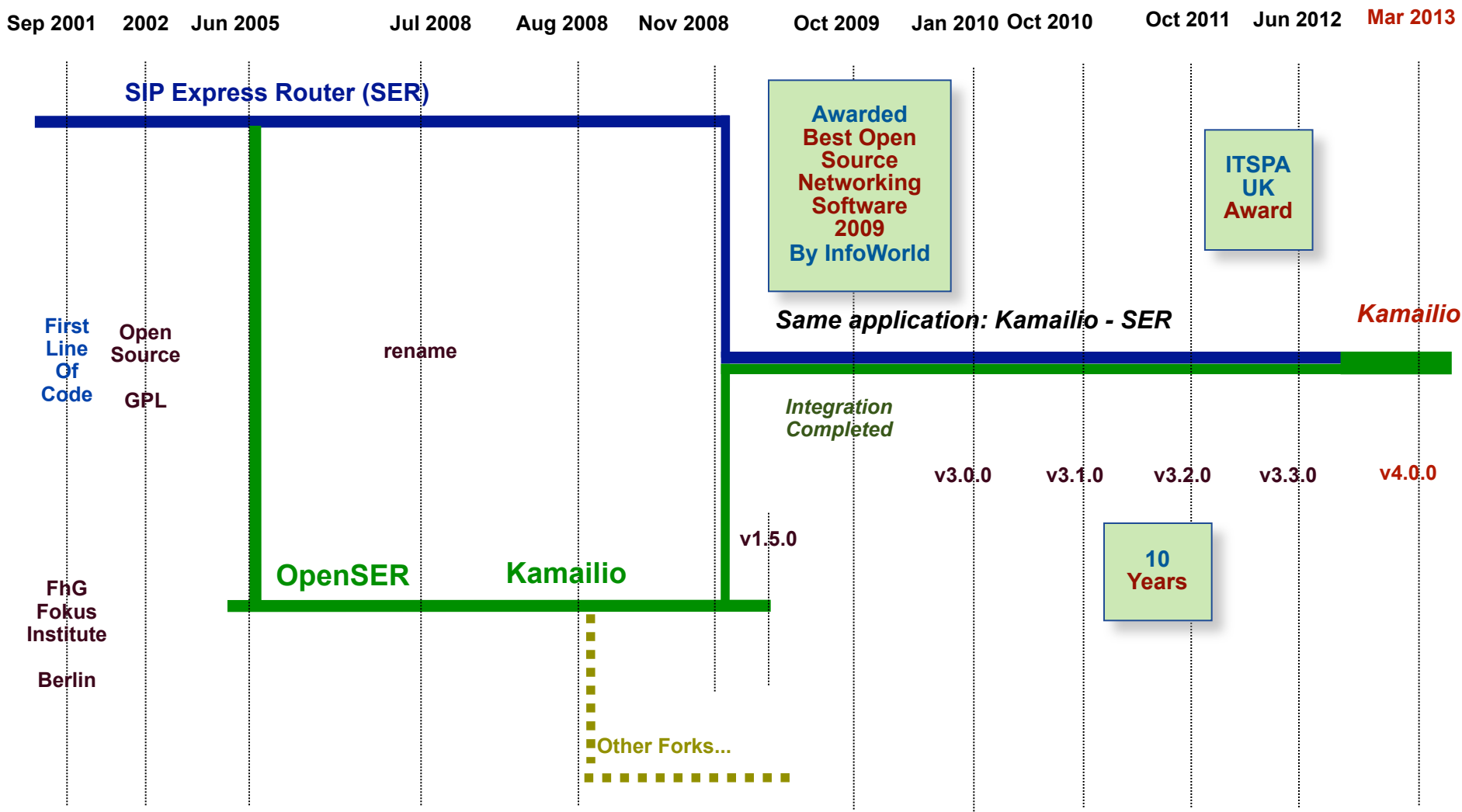
Pages

- [Home](#)
- [Features](#)
- [Download](#)

Documentation

- [Main Index](#)
- [New Wiki Site \(3.2.x+\)](#)
- [Old Wiki Site \(3.1.x-\)](#)

History





Awarded

**Best Open Source
Networking Software
2009**

By InfoWorld, USA

Awarded

**ITSPA
Members' Pick
2012**

By ITSPA, UK



Project Development Structure

Linux - Kernel Approach

Rock-solid core (fundamental components, no business):

SIP parser

Share extensions development

Memory manager

Transport layer: TCP, UDP, TLS, SCTP

SIP transaction management

Synchronization and locking system

Full flexibility and relaxed control to own modules

Write own extensions without restrictions

Developer responsibility

State of project

- Internal architecture refactored for v3.0.0

- support asynchronous processing
 - TCP and TLS
 - SIP request handling
- transaction management
- internal libraries

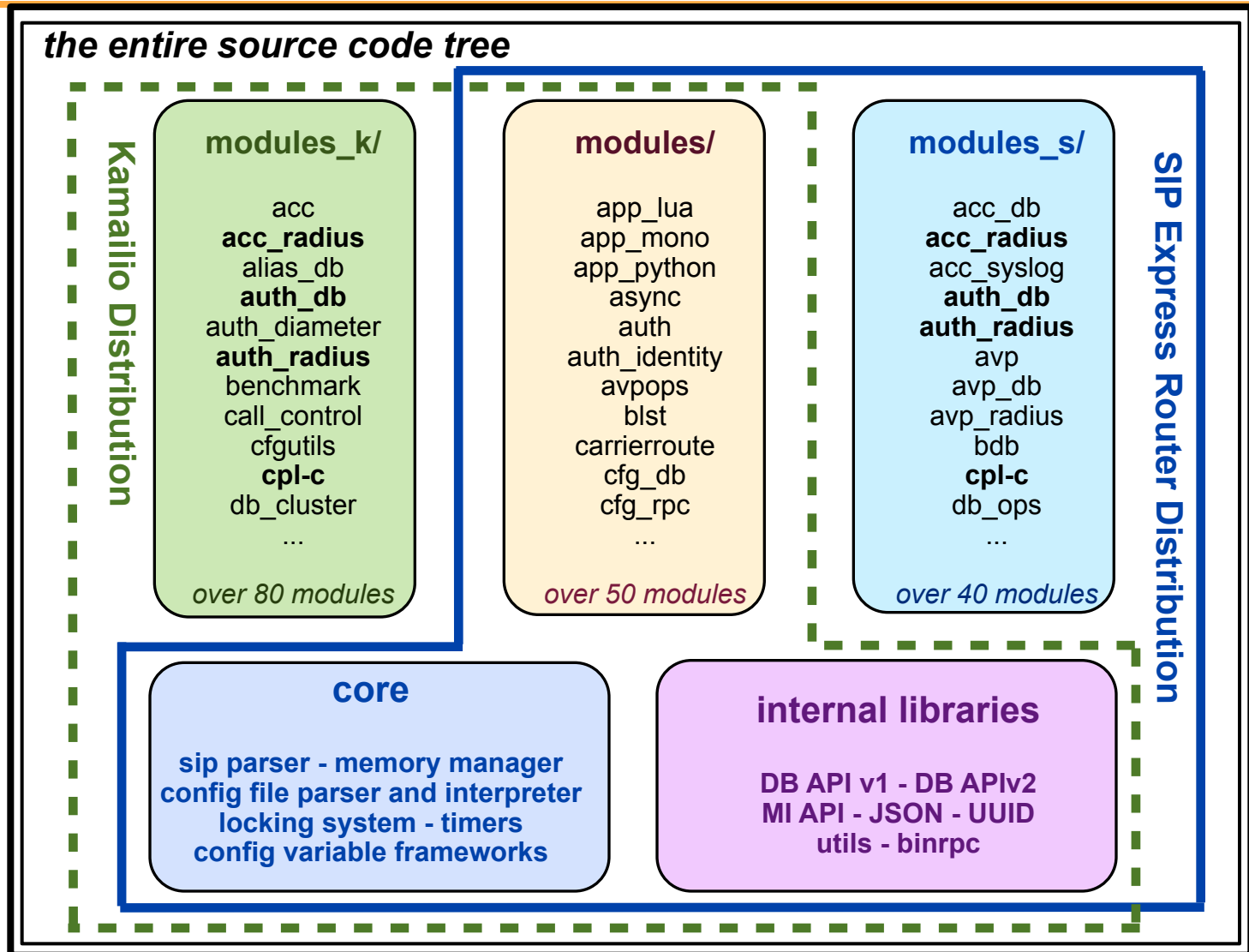
Right now

- very stable core and main components
- ➔ topped with our well known scalability and flexibility
- safe framework for future development
- ➔ your work (extensions and deployments) is safe from now on for many years - there is no need to change the architecture again
- focus is on new features
- ➔ 3.3.0 and 4.0.0 show that

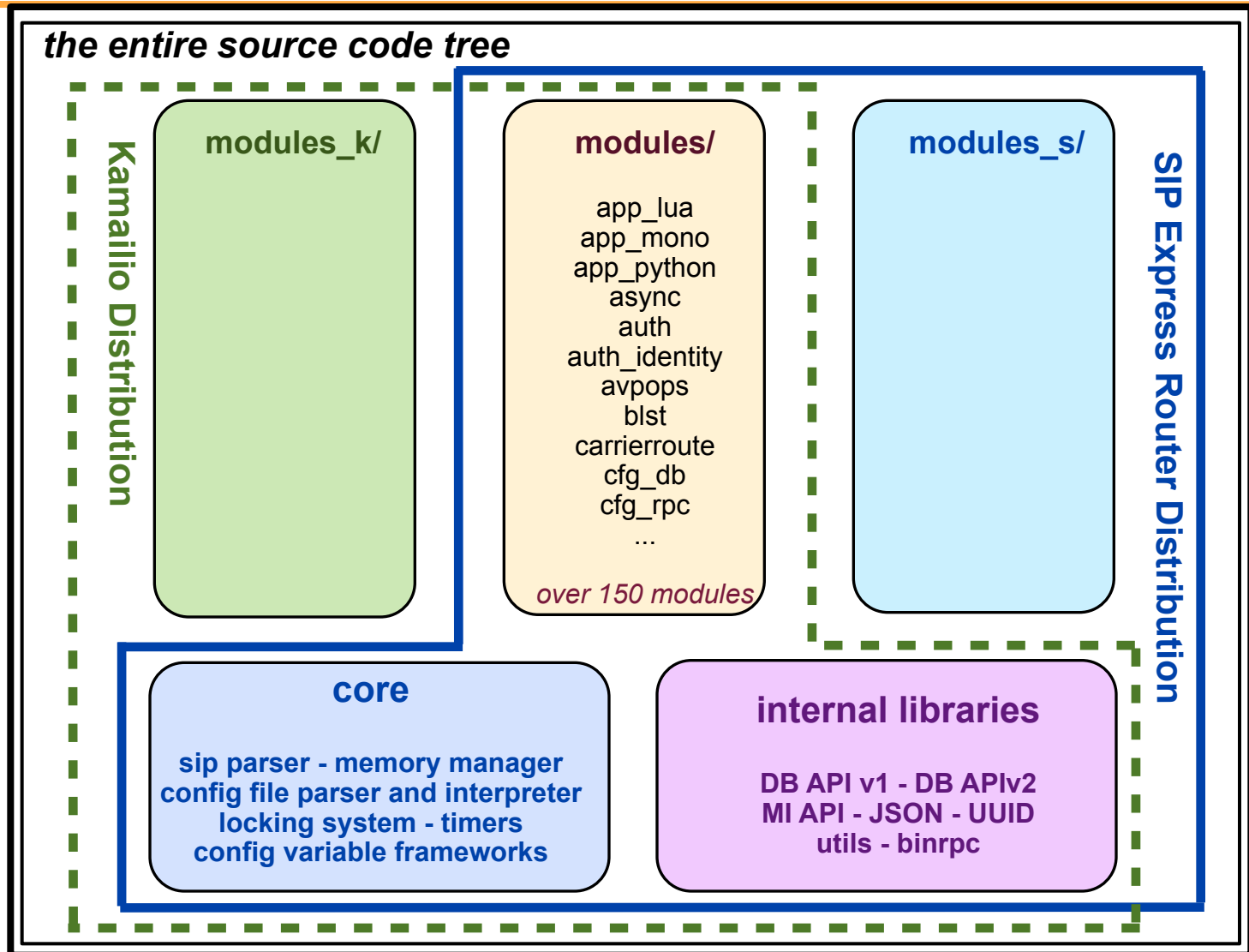
Scalability (info from public domain)

- services with millions of active subscribers
- ➔ I&I Germany (> 3M)
- services routing billions of call minutes per month
- ➔ might be the guy next to you (or pay attention tomorrow)

Source Structure - 3.x.x - Kamailio vs. SER



Source Structure - 4.x.x- Kamailio



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

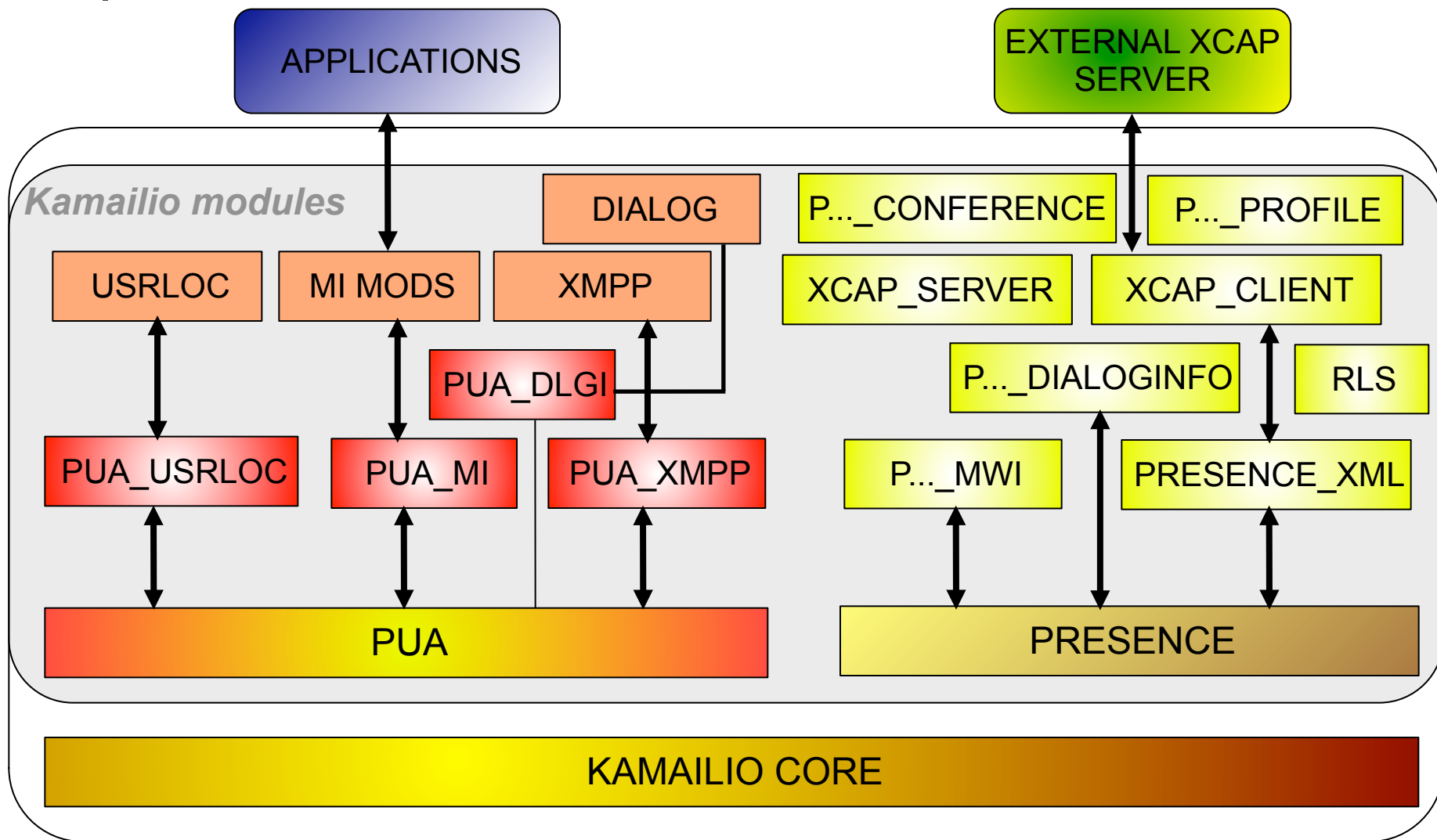
embedded mono interpreter
C#, Python, Java,

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>

SIP Beyond VoIP - Presence Services



Siremis Web Management Interface

The screenshot displays the Siremis 3.2 web management interface. The top navigation bar includes the Siremis logo, user account information (admin <admin@yourcompany.com>), and links for My Account, Help, and Logout. The breadcrumb trail shows the path: Main System > SER Menu > Chart Services > Acc Summary. The left sidebar contains the SER Admin menu with categories like Subscriber Services, Server Services, ACL Services, Routing Services, Accounting Services, Presence Services, Command Services, and Chart Services. The Chart Services category is expanded, showing options like SHM Charts, Load Charts, TM Charts, UsrLoc Charts, UsrLoc Stats, Acc Charts, and Acc Summary. The main content area shows the current date and time (December 14, 2011, 10:10 am) and the time zone (America/Los_Angeles). A table displays data for various periods and categories. A second table at the bottom shows a summary of records for different periods.

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

December 14, 2011, 10:10 am
Timezone: America/Los_Angeles

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

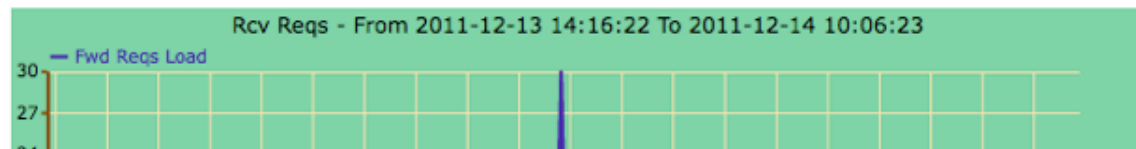
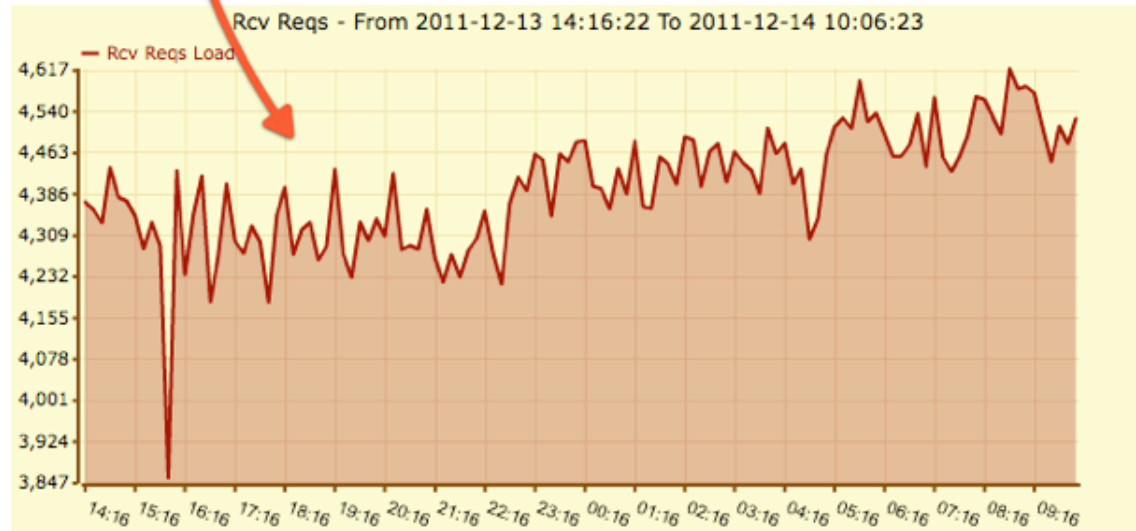
Accounting Services

Presence Services

Command Services

Chart Services

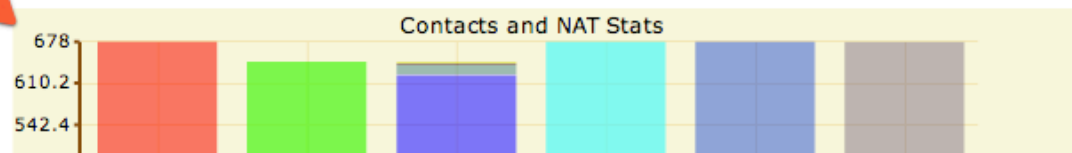
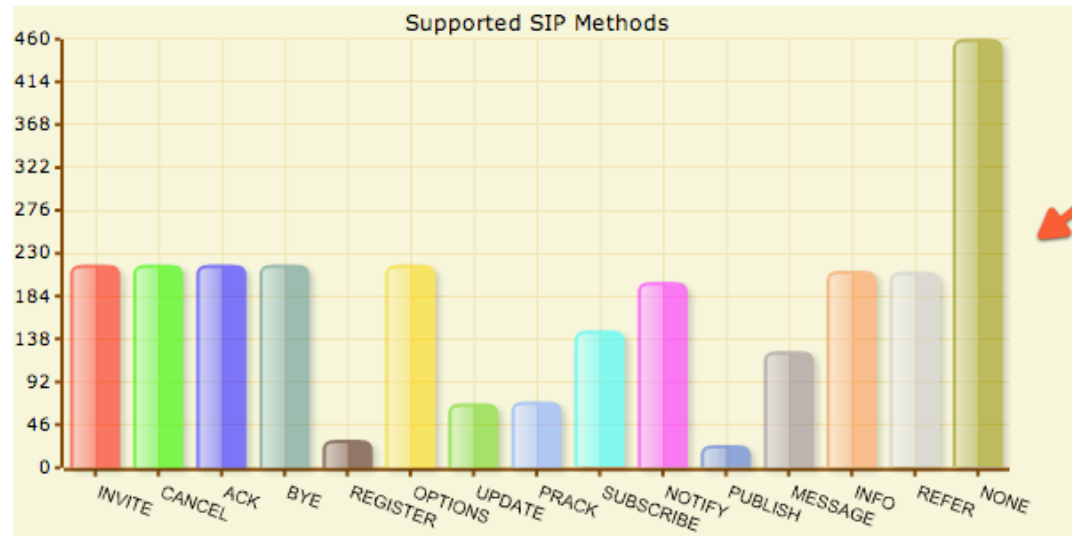
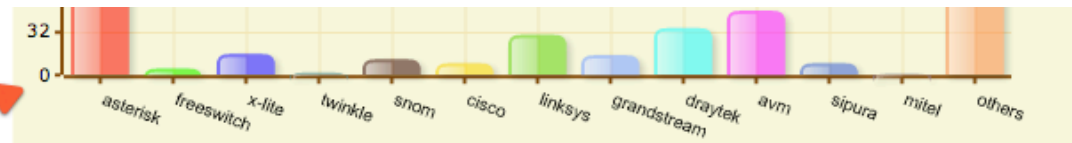
Charts Service Panel



Load Charts
TM Charts
UsrLoc Charts
UsrLoc Stats

Help Help Center

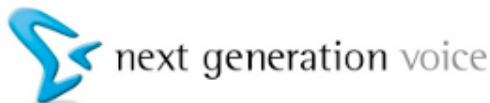
Go





KAMAILIO WORLD CONFERENCE & EXHIBITION

BERLIN - GERMANY, APRIL 16-17, 2013



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The Business Environment



solid development ecosystem



- Community oriented
 - open source project
 - over 100 registered developers over the time
 - over 30 active developers during past year
 - large community
 - popular in academic institutes
 - many companies involved
 - service providers
 - integrators
 - vendors
- Management team
 - conflict resolution
 - volunteering individuals
 - different companies and countries



Current Management Team

□ Individuals

■ 11 people as of January 25, 2010

- old members: Daniel-Constantin Mierla, Elena-Ramona Modoiu, Henning Westerholt, Juha Heinanen, Klaus Darilion
- new members: Alex Balashov, Andreas Granig, Carsten Bock, Inaki Baz Castillo, Jesus Rodriguez, Marcus Hunger

□ Companies

- Asipto, 1&1, TutPro, Enum.at, Evaristesys, Sipwise, Ngn-ims.com, Sipdoc.net, Voztelecom and Sipgate

□ Countries

- Austria, Germania, Finland, Spain, ~~Romania~~ and USA

□ Servers

- main project's web server
 - Spain
- development and backup server
 - Germany
- source code repository
 - SVN: sourceforge.net
 - GIT: sip-router.org

□ Developers

- sponsored by companies
- academic projects
- hobbyists
- over 100 registered from all over the world

Why using it?

- no vendor trap
 - no single company to control the project
 - democratic development and environment
- large development team
 - kamailio and ser back together
 - expertise since 2000 (preRFC3261)
- rather fast development cycle
 - release every 6-8 months
- big community
 - all continents
- split development effort
- easy synchronization with the main stream by contributions
 - variants to fit specific needs (e.g., lcr, prefix routing)
- performance, stability and flexibility
 - large set of options for fine tuning



Development statistics - Jan 31, 2013

Activity

30 Day Summary

Jan 1 2013 — Jan 31 2013

198 Commits

21 Contributors

including 5 new contributors

2 New Languages :

Modula-2 added Jan 16

Java added Jan 16

12 Month Summary

Jan 31 2012 — Jan 31 2013

1719 Commits

Up +538 (45%) from previous 12 months

45 Contributors

Up +7 (18%) from previous 12 months

Cocomo

Kamailio (SIP Express Router) - Project Cost

Include

Markup And Code

Avg. Salary

\$ 55000 /year

Codebase

772,927 Lines

Effort (est.)

210 Person Years

Estimated Cost

\$11,525,017

Updated Jan 31, 2013

more at [Ohloh](#)

Factoids and Stats



Kamailio (SIP Express Router)

- Mostly written in C
- Mature, well-established codebase
- Very large, active development team
- Increasing year-over-year development activity
- Well-commented source code
- 45 active contributors

Commit Activity Timeline:



Updated Jan 31, 2013

more at [Ohloh](#)

In a Nutshell, Kamailio (SIP Express Router)...

... has had 17,629 commits made by 118 contributors representing 772,927 lines of code

... is mostly written in C with a well-commented source code

... has a well established, mature codebase maintained by a very large development team with increasing year-over-year commits

... took an estimated 210 years of effort (COCOMO model) starting with its first commit in September, 2001 ending with its most recent commit 1 day ago

Development statistics - Apr 14, 2013

Activity

30 Day Summary

Mar 15 2013 — Apr 14 2013

228 Commits

22 Contributors

including 5 new contributors

12 Month Summary

Apr 14 2012 — Apr 14 2013

1874 Commits

Up +621 (49%) from previous 12 months

50 Contributors

Up +14 (38%) from previous 12 months

Factoids and Stats



Kamailio (SIP Express Router)

- [i Mostly written in C](#)
- [i Mature, well-established codebase](#)
- [i Very large, active development team](#)
- [i Increasing Y-O-Y development activity](#)
- [i Well-commented source code](#)
- [i 50 active contributors](#)

Commit Activity Timeline:



Updated Apr 14, 2013

more at [Ohloh](#)

In a Nutshell, Kamailio (SIP Express Router)...

... has had **18,017 commits** made by **124 contributors** representing **789,251 lines of code**

... is **mostly written in C** with a **well-commented source code**

... has a **well established, mature codebase** maintained by a **very large development team** with **increasing Y-O-Y commits**

... took an estimated **215 years of effort** (COCOMO model) starting with its **first commit in September, 2001** ending with its **most recent commit about 14 hours ago**

Cocomo

Kamailio (SIP Express Router) - Project Cost

Include	Avg. Salary
<input type="text" value="Markup And Code"/>	\$ 55000 /year
Codebase	Effort (est.)
789,251 Lines	214 Person Years
Estimated Cost	\$11,780,119

Updated Apr 14, 2013

more at [Ohloh](#)



The Business Environment

statistics
(rather old - 2011)



UsageStatistics

Feedback from community

- started about one month ago
 - volunteering reports
 - anonymous
- types of data
 - routed call minutes per month
 - routed calls per month
 - active subscribers
 - natted traffic
- **kind of standardized on call minutes per month**



Usage Statistics Results

Some figures

- about 35 reports
- over 4 000 000 000 call minutes per month
- over 500 000 000 calls per month (-)
- biggest reported subscriber base: 3 000 000 (already known)
- biggest call minutes per month deployment: 1 500 000 000/month
- two deployments with over 1 000 000 000 call minutes per month
- most of the deployments in range of 10 - 100 000 000 call minutes per month
- used a lot for carrier deployments: LCR, load balancing, DID routing
- one deployment with TLS only: over 15 000
- NAT is still a lot present (but IPv6 is around the corner, oh no!!!)





The Business Environment

finding a job





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

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



The Business Environment

starting a business



> START A BUSINESS



- products and solutions

- telephony operator platforms
- carrier routing systems
 - DID, prefix routing
- IM & Presence
- anti-fraud components
- least cost routing engines
- load balancing boxes
- IMS and RCS solutions
- Billing engines
- Signaling gateways (IPv4, IPv6, UDP, TCP, TLS, SCTP or WebSocket)
- WebRTC and Web2.0 Voice Services





- services

- consultancy

- design of services
- installations
- security analysis
- routing optimizations
- scalability and high availability
- redundancy

- support

- development

- writing modules in C
- writing extension in Lua, Perl, Python, Java, C#, ...

- trainings

- operate RTC services

- residential or enterprise customers
- interconnect and traffic mediation





Kamailio Business Directory

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

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

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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.

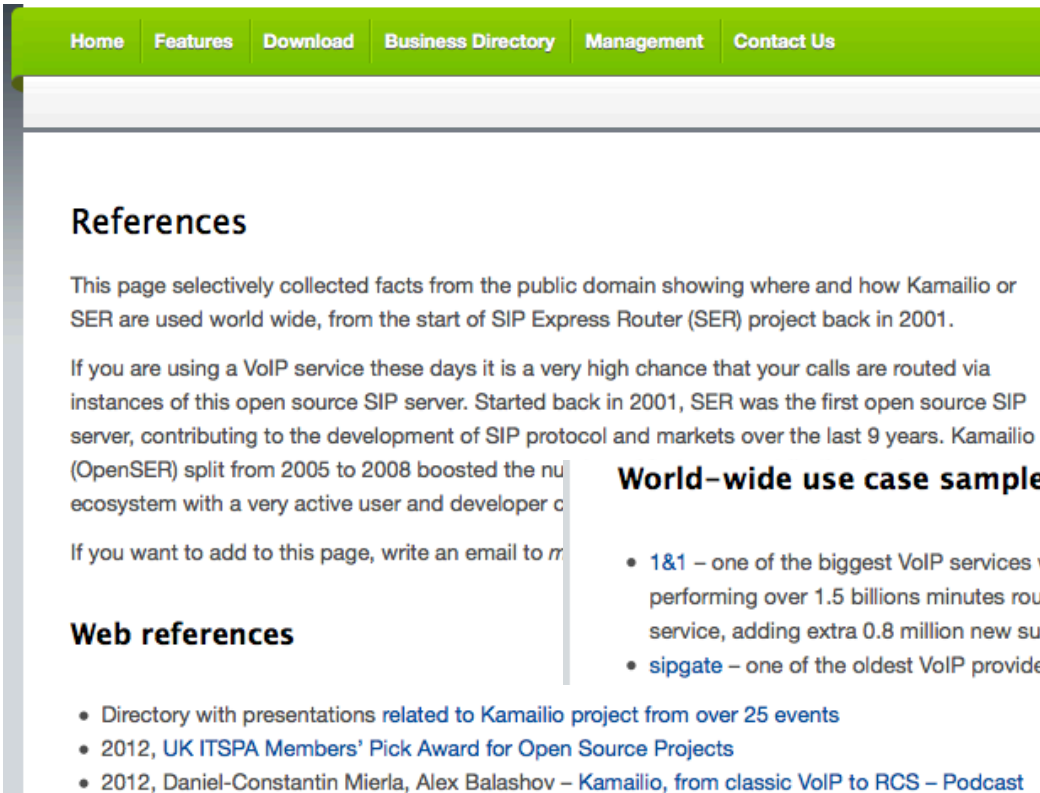
Disclaimer: whilst we do the best to select serious applications, Kamailio and SER projects, along



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 references@kamailio.org

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
- [sippgate](#) – one of the oldest VoIP providers, with hundred thousands of active subscribers,

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](#)

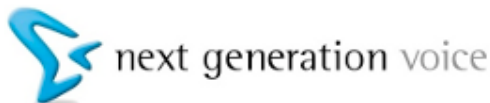


??? questions ???



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