Present and Future

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10 years SER Conference

SIP Express Router & Kamailio

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sipgate
amooma
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Next Generation Voice
asipto
FRAFOS
A bit of history – 10 years SER

First Line Of Code

Open Source

GPL

FhG Fokus Institute

Berlin

SIP Express Router (SER)

OpenSER

Kamailio

rename

Other Forks...

Integration Completed

v1.5.0

v3.0.0  v3.1.0  v3.2.0

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Awarded Best Open Source Networking Software 2009 By InfoWorld

Same application: Kamailio - SER

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Constrained mainly by database schema
• during 2005 - 2008, SER and Kamailio developed different database structure to store user profiles and routing data
• strong dependency on administration and auto-provisioning systems

Example
• subscriber: username, password, DID, ACL, a.s.o.
• Kamailio - table with many columns (one attribute in a dedicated column)
• SER: table with many rows of (attribute name, attribute value)

Many duplicated modules were merged meanwhile
New in 3.1.0

- Embedded Lua
- Embedded Python
- Extended preprocessor directive
  - #!define
  - #!subst
- New variables

- Interactive config debugger
  - step-by-step execution
  - execution trace
  - xlog enhan’s
  - print cfg line
  - k&s modules integration

- Asynchronous TLS
- UDP raw sockets
- Multi-homed improvements
- Load balancing
  - weight
  - call load
  - Traffic shaping

- GeoIP API
- Registration to remote servers
- Reason header for Cancel
- Embedded HTTP & XCAP servers
- Cfg tree cashing & message queue systems

http://www.kamailio.org/w/kamailio-openser-v3.1.0-release-notes/
State of the 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
  ➞ 3.2.0 (and the next slides) shows that

Scalability (info from public domain)
- services with millions of active subscribers
  ➞ 1&1 Germany (> 3M)
- services routing billions of call minutes per month
  ➞ might be the guy next to you (or pay attention tomorrow)
New in 3.2.0

- Many native extensions to Lua
  - cfg routing logic all in Lua

- Partitioned user location service
  - many nodes sharing location data

- Distributed Message Queue
  - Using SIP and Peer-to-Peer

- SQLite connector
  - use file based database for embedded systems

- Redis No-SQL connector from config
New in 3.2.0 – presence server

- **Reg-Info Implementation**
  - RFC3860
  - pub-sub service for location data

- **RLS**
  - OMA specs
  - split NOTIFY bodies
  - XPath support within doc

- **Embedded XCAP server**
  - OMA - specs
  - If-Match cond

- **Presence Server**
  - data distribution across many instances through database

- **Presence User Agent**
  - updates for latest RL services

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New in 3.2.0

**async module**
run asynchronously parts of config file (route blocks)

**ipops module**
a set of operations for handling IPv4/IPv6 addresses

**sdrops module**
SDP body management

**New features in old parts**

- acc - write full CDR at once
- dialog - attach extra attributes
- core - more pre-processor directives
- pv - new variables and transformations
- tmx - export of async TM functions
- sqlops - support for xavs
- uac - enhancements to remote registration
- siptrace - traffic replication enhancements

**IMS Extensions**
about 10 new modules (P-CSCF, I-CSCF, S-CSCF...)

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SIP:Provider CE

* complete VoIP servicing platform using Kamailio for SIP routing
* administration interface and user portal
* ready to roll-out open source Community Edition
* easy to install with DEB packages - images for VMWare and VirtualBox
Elsipo – this SIP browser

https://github.com/miconda/elsipo
TLS – Scalability

• a research project about Green VoIP
  • by Columbia University, NY
  • using complete config file, with user authentication and NAT traversal
  • injected traffic captured from an European ITSP

http://www.kamailio.org/w/2011/05/green-voip-energy-efficiency-and-performaces-of-v3-0/

Some interesting results:

• one instance of SIP server with 500 000 online users (mixed users – behind and not NAT routers) – consumed energy 210W
• one instance of SIP server with 1 000 000 online users (no NAT involved) – consumed energy 190W
• on a 32-bit machine with 4GB of memory and with 2.5GB reserved for SIP server, the server could support 43 000 simultaneous TLS connections – consumed energy 209W
• one SIP server instance with 80 000 permanent TCP connections, the SIP server could still handle at least 1000 requests per second and a connection arrival rate of 1000 new connections per second, done for 20 000 new connections. CPU load generated by the SIP server was from 6% to 8%.
TLS – Stress tests

- private company lab environment
  - Kamailio 3.1.x with 8 children and 2 GB memory
- traffic stress
  - 6000 SIP messages/second for 2 weeks
- socket stress
  - created over 4000 connections
  - released the connections immediately
  - at the same time created more connections

![Graph showing Total (Request+ response) rate vs CPU use](image)
BERLIN, GERMANY

SEP 2, 2011

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Thank you!
Questions?

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