



Asynchronous SIP Routing

SIP Express Router (SER) and Kamailio (OpenSER)

SIP-Router.org

Daniel-Constantin Mierla

Co-Founder Kamailio

asipto.com



Welcome to Kamailio (OpenSER) – 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), SIMPLE instant messaging and presence, ENUM, least cost routing, load balancing, routing fail-over, accounting, authentication and authorization against MySQL, Postgres, Oracle, Radius, LDAP, 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 SIP Router at Google Summer of Code 2010](#)
- [SIP Router Devel Meeting, Berlin, June 8, 2010](#)
- [Listen VoIP User Conference – The SIP Router Project](#)
- [Remarks About v3.0.x Strong Stability](#)
- [January 11, 2010 – Kamailio \(OpenSER\) – New Major Version v3.0.0 Released](#)
- [September 01, 2009 – Kamailio awarded Best Open Source Networking Software 2009](#)



Recent News

- [2010-06-03: Kamailio Booth at LinuxTag 2010](#)
- [2010-06-02: Kamailio Presentation at LinuxTag 2010](#)
- [2010-06-01: VoIPToday Kamailio Interview](#)
- [2010-05-29: Kamailio and Freeswitch Integration, Jun 2, 2010](#)
- [2010-05-28: Kamailio at Amoocon 2010](#)

[- Download Latest Stable v3.0.2 -](#)

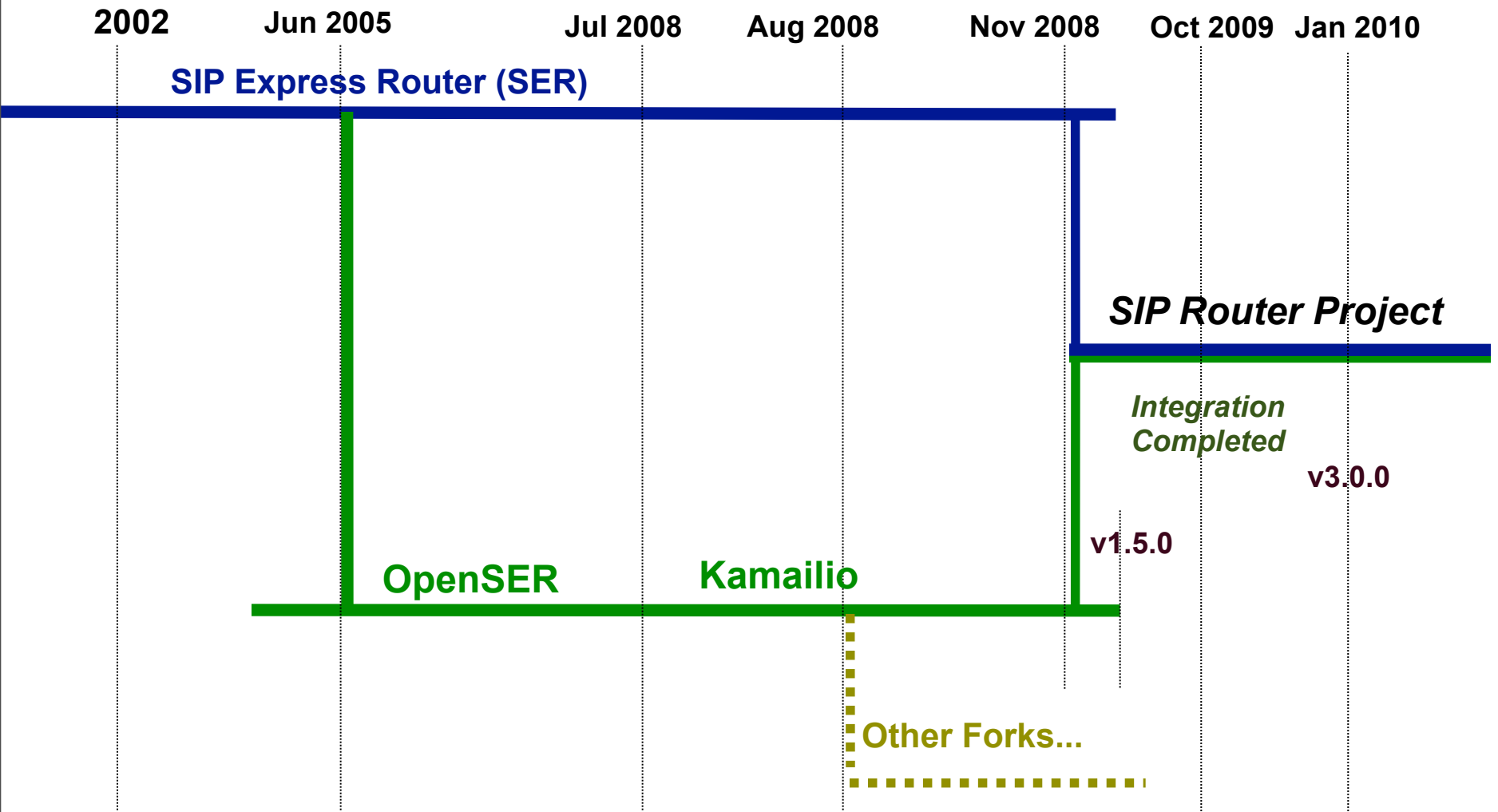
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Documentation

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[Modules](#)
[SIP Router Wiki](#)
[Devel Guide](#)
[Doxygen](#)

History



Development Portals

- ❑ Open source, GPL SIP server – IETF RFC3261
 - Web: <http://www.kamailio.org>
 - SourceForge Project: <http://sourceforge.net/projects/openser/>
 - SIP Router Project: <http://sip-router.org>

SIP-ROUTER.ORG

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Recent news:

- Jan 18, 2010: [Siremis 1.0.0 Released](#)
- Jan 11, 2010: [Kamailio \(OpenSER\) 3.0](#)
- Dec 02, 2009: [Daily tarballs for 3.0 br](#)

sourceforge

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Kamailio (OpenSER) SIP server

by [anomarme](#), [henningw](#), [juhe](#), [klaus_darillon](#), [miconda](#)

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KAMAILIO (OpenSER) - robust, secure and scalable Open Source (GPL) SIP (RFC3261) server implementation with large features set (over 90 extension modules). As of May 2009, source code is hosted by GIT repository at <http://sip-router.org>

Download Now!

kamailio-1.5.2-tls_src.ta... (3.6 MB)



OR

[View all files](#)



Best of Open Source Software

Awarded

**Best Open Source
Networking Software
2009**

By InfoWorld

- Some of biggest VoIP deployments world wide

- 1&1 (members of the management board)

- Over 3 millions subscribers
 - Over 1.5 billion minutes per month



- Sipgate



- Freenet

- 0.8 million subscribers
 - Hundreds of millions of minutes per month



<http://www.kamailio.org/w/references/>



Features

**Plug in module
interface
Perl programming
interface**

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

**Customizable routing
policy
User location service
IPv4-IPv6
UDP/TCP/TLS/SCTP
SIP translator**

**Multi-domain support
LDAP/H.350 support**

**Instant Messaging
Offline message
service
Presence server**

**ENUM lookup support
Advanced routing
(dispatching and LCR)
Dialing support
aliases and speedial**



Features

**OSP support for peering
Java SIP Servlet
programming interface**

**Link any application to Kamailio using
FIFO/UNIXSOCK/DATAGRAM/XMLRPC interfaces**

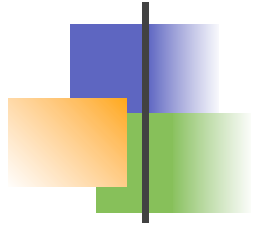
Database API
MySQL
PostgreSQL
UNIXODBC
BERKELEYDB
ORACLE
Text files
RADIUS

Gateway

SMS
XMPP

**Accounting through log file,
database or Radius/DIAMETER
servers**

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

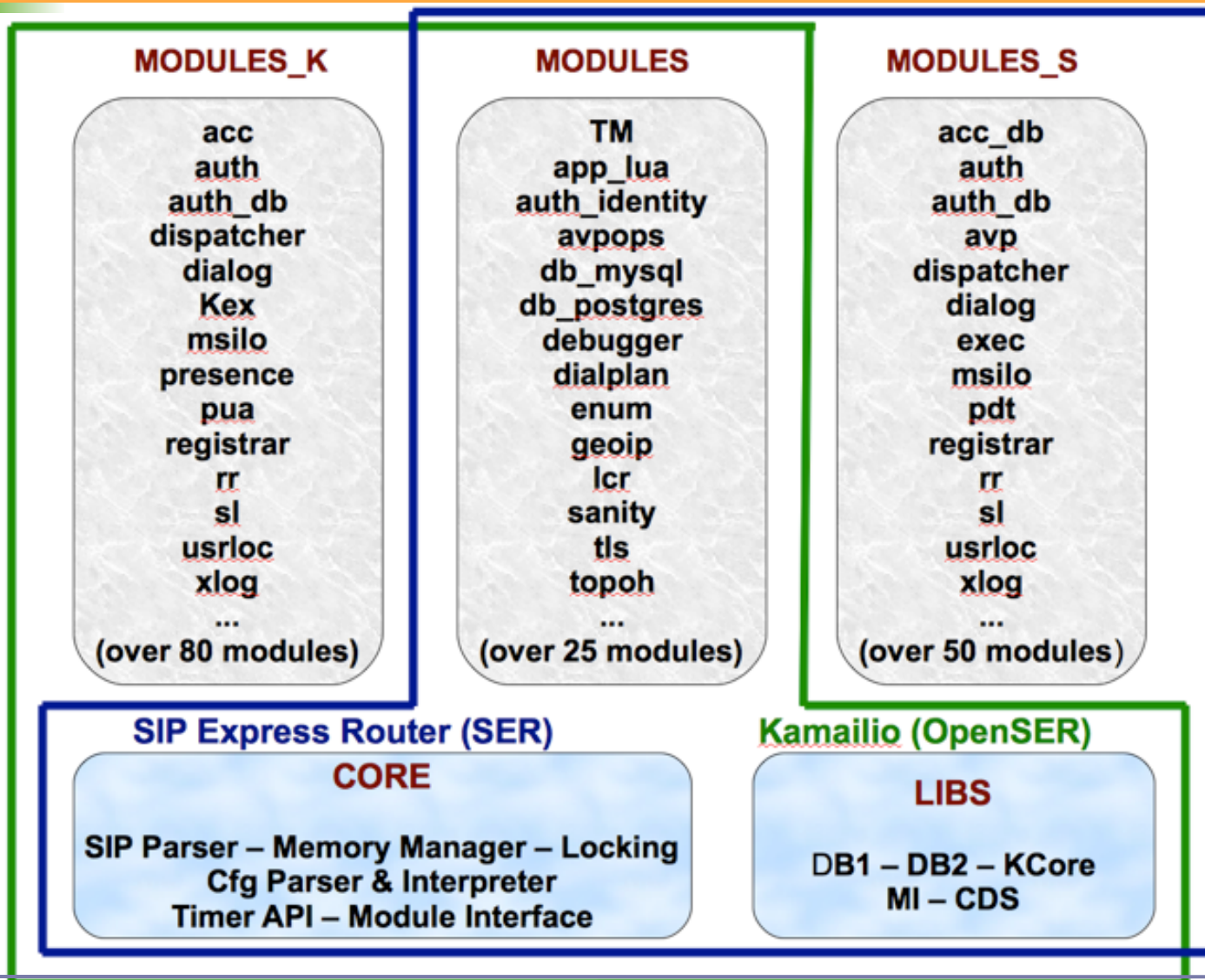


New in 3.0.0

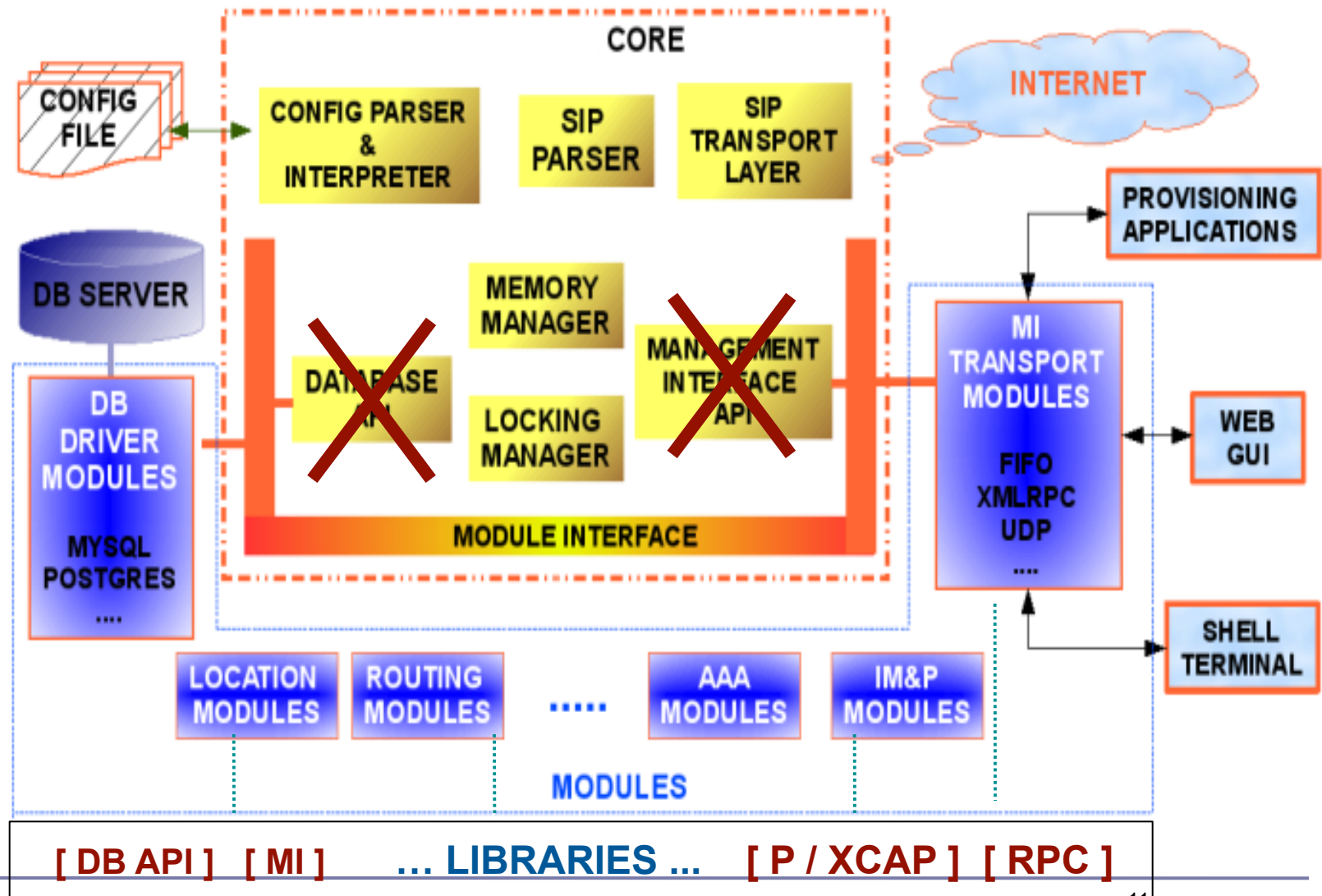
Released January 11, 2010



3.0 Releases



Improving architecture



Asynchronous TCP

several ten thousands
of TCP connections

Number Portability

customizable policies
caching system

SCTP

multi-homing
multi-streaming
statistics

Topology hiding

fast and secure
no session dependency

Web & CLI Tools

SIREMIS
SERCMD



New in 3.0.0

DNS Caching System

fast failover
blacklisting
avoid blocking

CFG Reload Framework

update global parameters
at runtime

XMLRPC

scalable control
interface
secure

Memcached connector

data distribution across
many instances

CFG Optimizations

operations - operators
switch - break - while

CFG Directives

include
define

Transport layer

UDP MTU fallback
scalable TLS

Auth Identity

RFC4474

New routing blocks

onsend route
event route

Async SIP Message Processing

suspend - process - resume

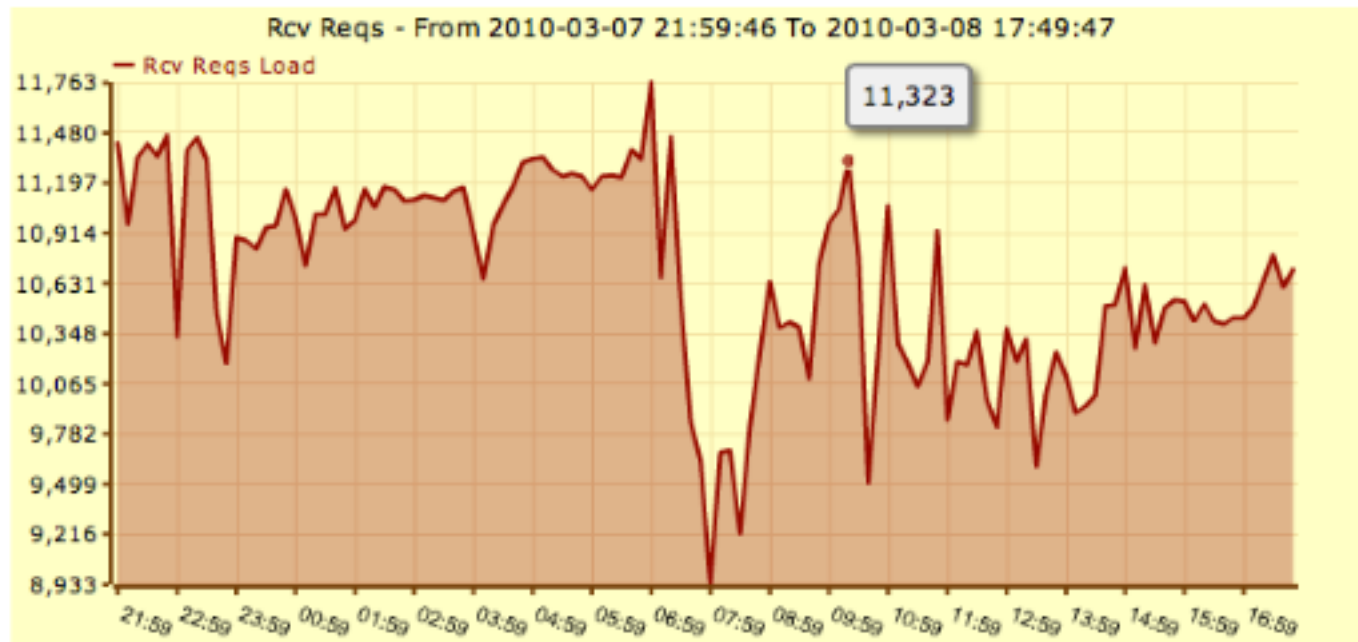
Accounting Table

Time	SIP Method	Src Username	Src Domain	Dst Username	Dst Domain	SIP Call-ID	SIP Reply Code
2009-01-21 14:47:36	INVITE	bob	asipto.com	alice	192.168.1.23	684598749@192.168.1.5	200
2009-01-21 14:55:41	INVITE	alice	asipto.com	bob	192.168.1.5	1142159929@192.168.1.23	200
2009-01-21 14:47:56	BYE	alice	asipto.com	bob	192.168.1.5	684598749@192.168.1.5	200
2009-01-21 14:55:41	ACK	alice	asipto.com	bob	192.168.1.5	1142159929@192.168.1.23	200
2009-01-21 14:56:03	BYE	alice	asipto.com	bob	192.168.1.5	1142159929@192.168.1.23	200
2009-01-21 15:29:38	INVITE	alice	asipto.com	bob	192.168.1.5	1553149770@192.168.1.23	200
2009-01-21 15:29:38	ACK	alice	asipto.com	bob	192.168.1.5	1553149770@192.168.1.23	200
2009-01-21 15:31:40	BYE	bob	asipto.com	alice	192.168.1.23	1553149770@192.168.1.23	200

CDRS

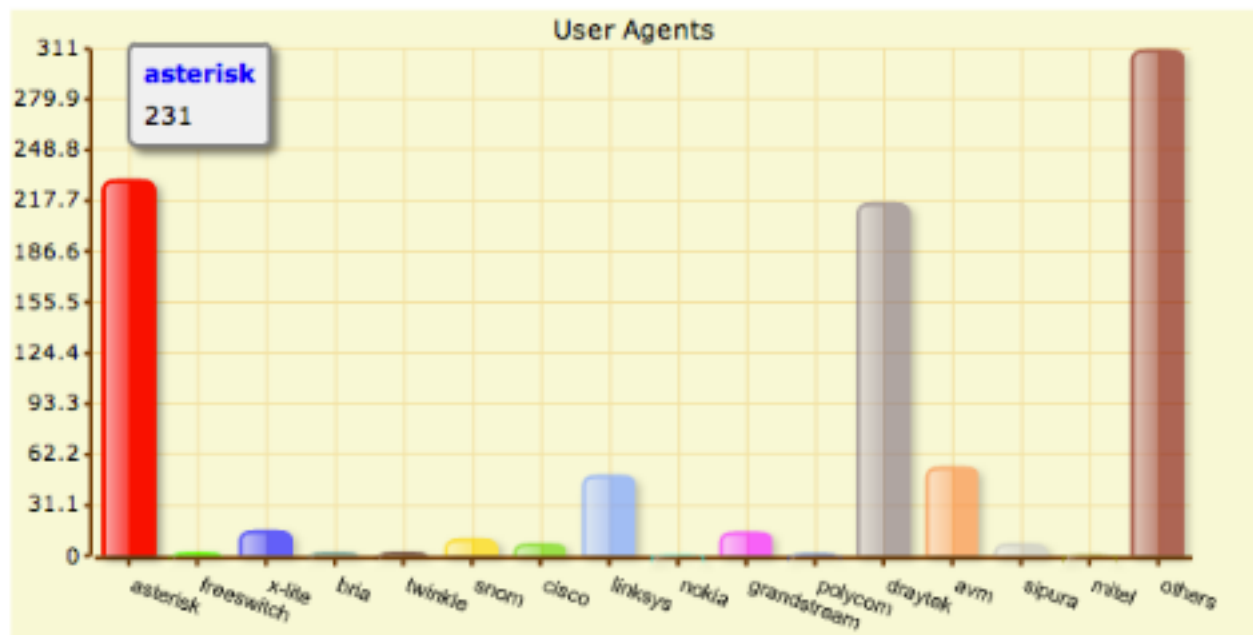
Id	Src Username	Src Domain	Dst Username	Dst Domain	Call Start Time	Duration
2	alice	asipto.com	bob	192.168.1.5	2009-01-21 14:55:41	22

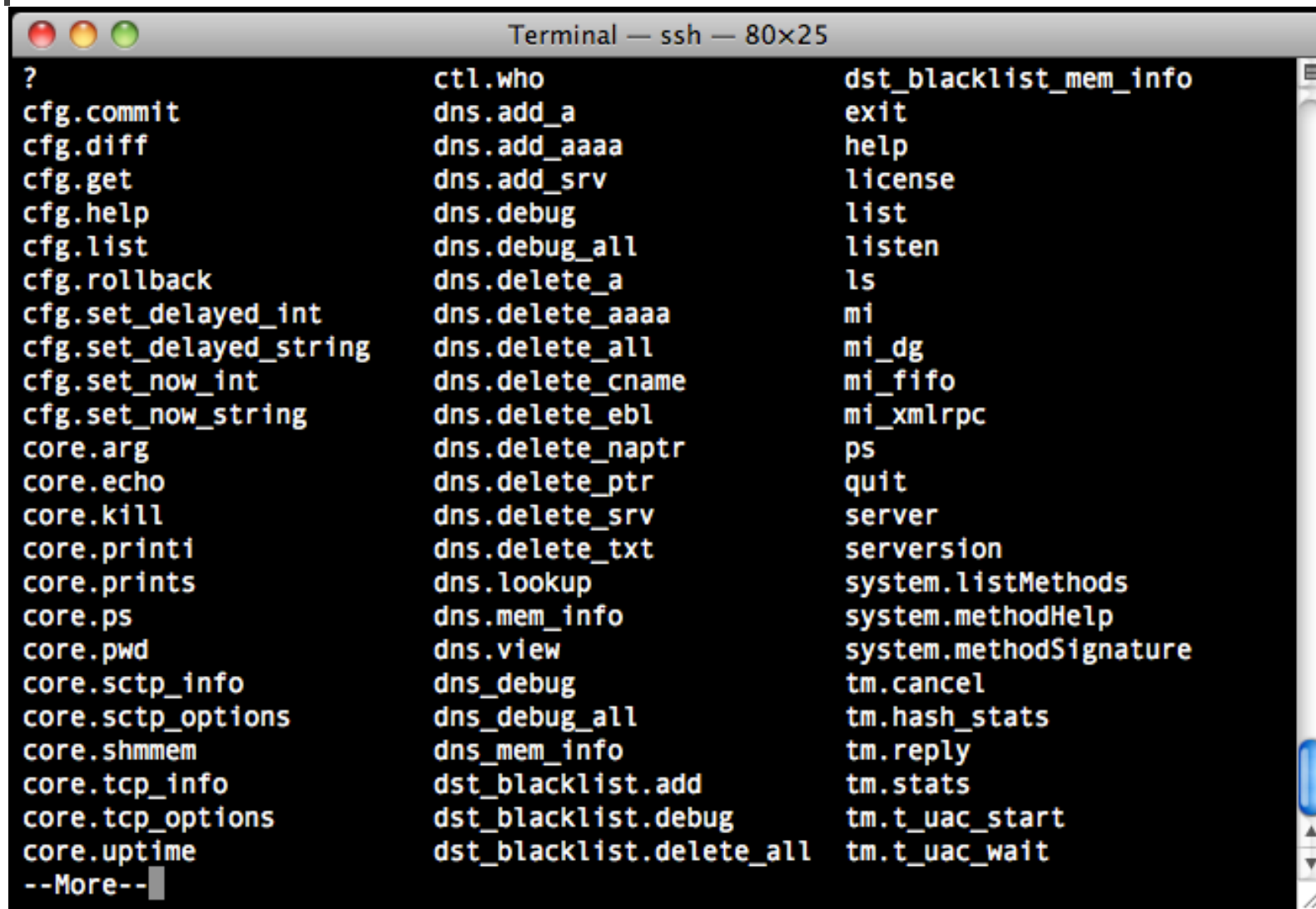
rts TM Charts **Load Charts** UL Stats



TM Charts Load Charts **UL Stats**

Processed 935 records.

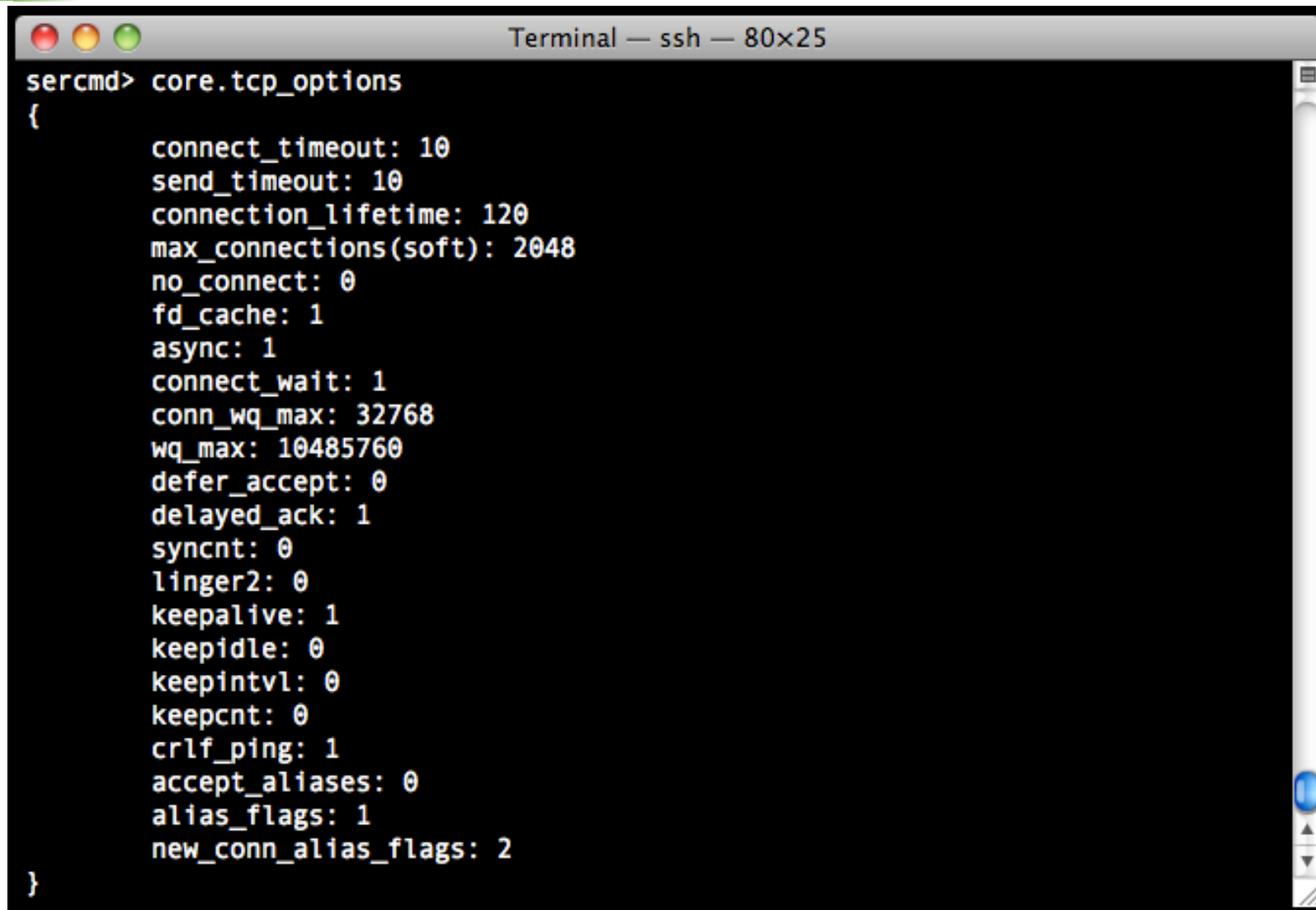




A terminal window titled "Terminal — ssh — 80x25" displays a list of commands for the SERCMD utility. The commands are organized into three columns. The first column lists configuration and core management commands. The second column lists DNS-related commands. The third column lists system and management commands. The list ends with "--More--" and a cursor.

```

?          ctl.who          dst_blacklist_mem_info
cfg.commit dns.add_a         exit
cfg.diff  dns.add_aaaa        help
cfg.get   dns.add_srv       license
cfg.help  dns.debug        list
cfg.list  dns.debug_all    listen
cfg.rollback dns.delete_a   ls
cfg.set_delayed_int dns.delete_aaaa mi
cfg.set_delayed_string dns.delete_all mi_dg
cfg.set_now_int dns.delete_cname mi_fifo
cfg.set_now_string dns.delete_ebl  mi_xmllrpc
core.arg    dns.delete_naptr ps
core.echo  dns.delete_ptr  quit
core.kill  dns.delete_srv  server
core.printi dns.delete_txt  serverversion
core.prints dns.lookup      system.listMethods
core.ps     dns.mem_info  system.methodHelp
core.pwd    dns.view      system.methodSignature
core.sctp_info dns_debug    tm.cancel
core.sctp_options dns_debug_all tm.hash_stats
core.shmmem  dns_mem_info tm.reply
core.tcp_info dst_blacklist.add  tm.stats
core.tcp_options dst_blacklist.debug tm.t_uac_start
core.uptime  dst_blacklist.delete_all tm.t_uac_wait
--More--
  
```



```
sercmd> core.tcp_options
{
    connect_timeout: 10
    send_timeout: 10
    connection_lifetime: 120
    max_connections(soft): 2048
    no_connect: 0
    fd_cache: 1
    async: 1
    connect_wait: 1
    conn_wq_max: 32768
    wq_max: 10485760
    defer_accept: 0
    delayed_ack: 1
    syncnt: 0
    linger2: 0
    keepalive: 1
    keepidle: 0
    keepintvl: 0
    keepcnt: 0
    crlf_ping: 1
    accept_aliases: 0
    alias_flags: 1
    new_conn_alias_flags: 2
}
```

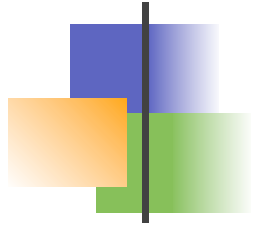


New in 3.0.0

<http://www.kamailio.org/dokuwiki/doku.php/features:new-in-3.0.x>

<http://www.kamailio.org/w/kamailio-openser-v3.0.0-release-notes/>

<http://by-miconda.blogspot.com/2010/01/best-of-new-in-kamailio-300-toc.html>

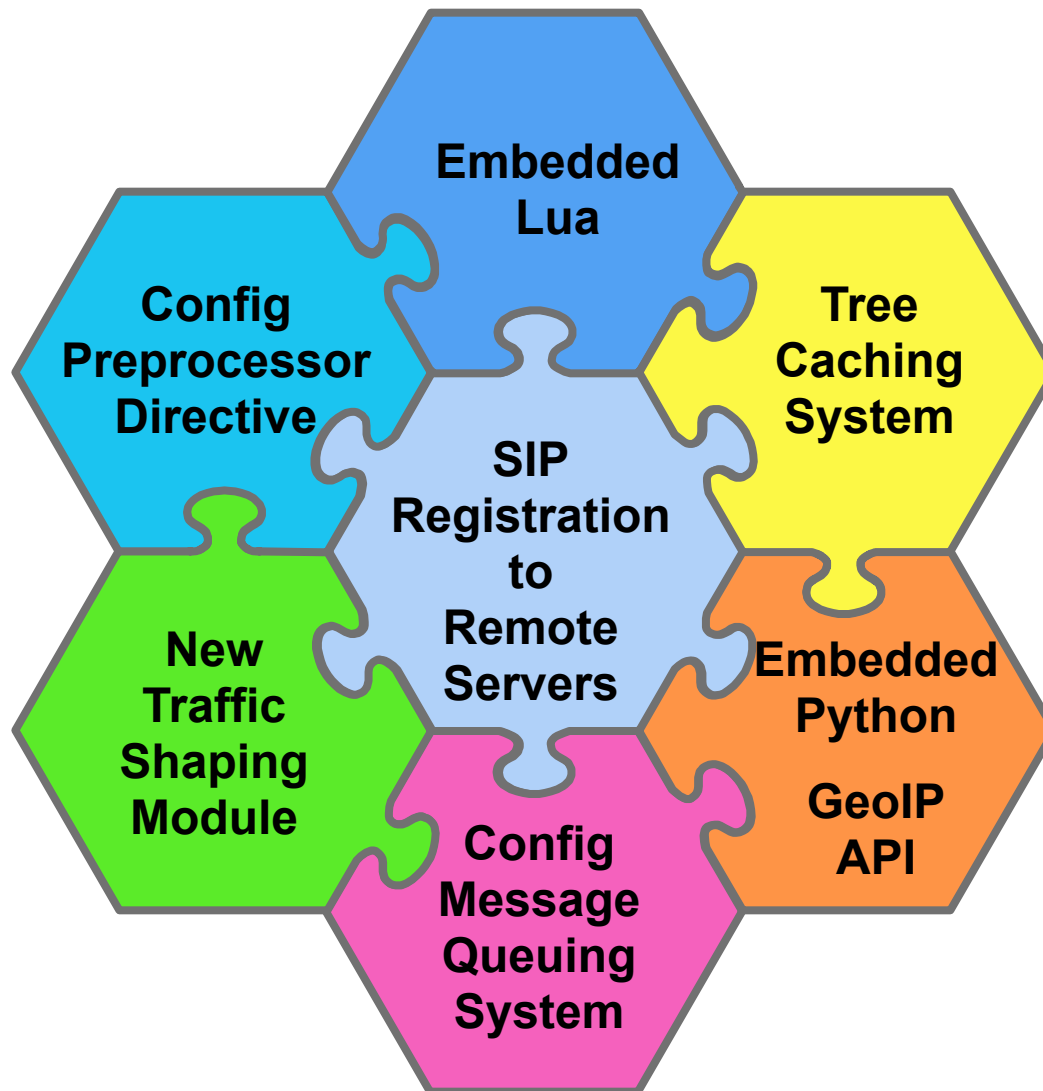


New in Development
3.1.0

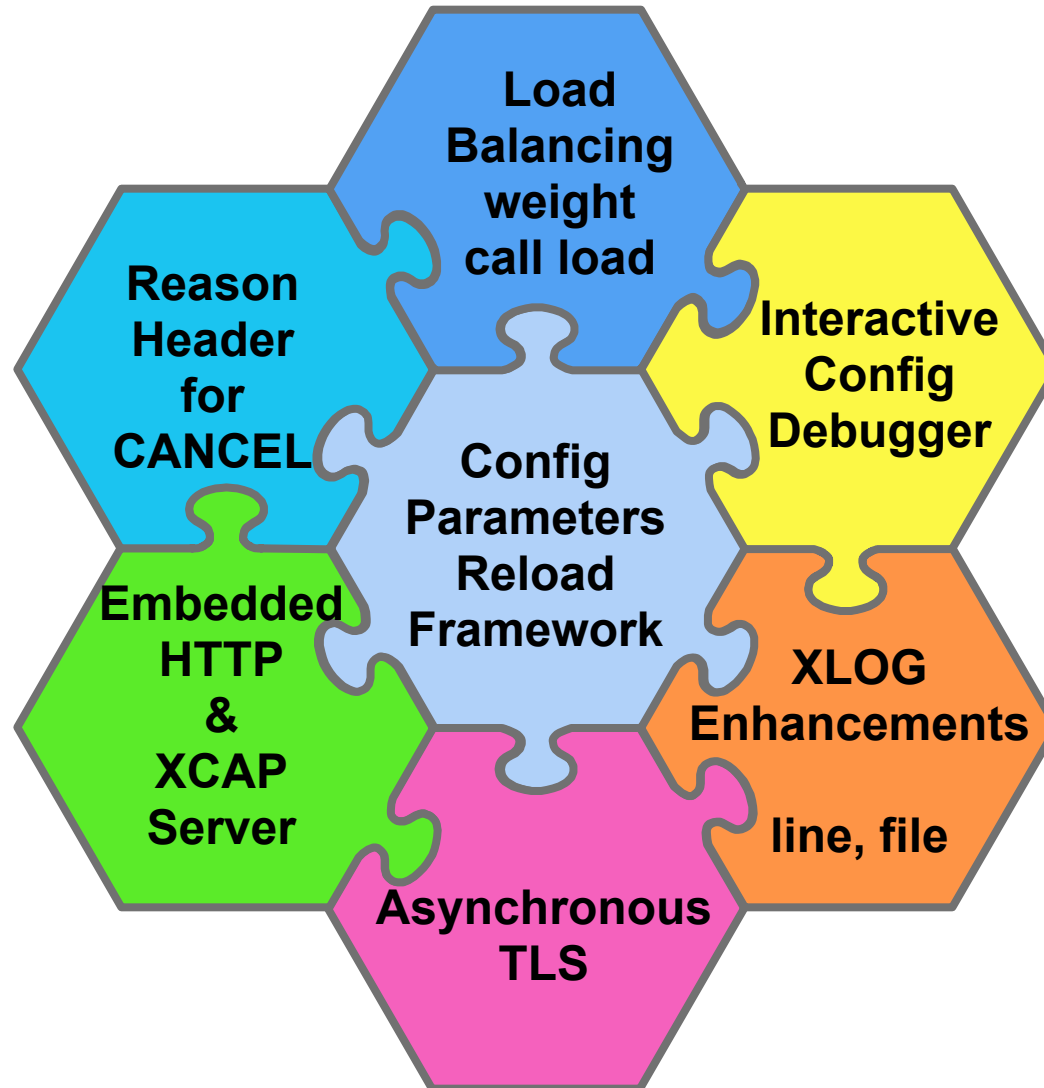
Autumn 2010



New in devel (upcoming 3.1.0)



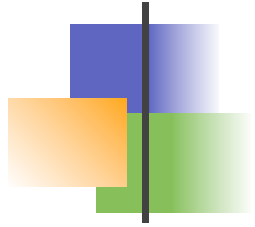
New in devel (upcoming 3.1.0)





New in devel (upcoming 3.1.0)

<http://sip-router.org/wiki/features/new-in-devel>



Asynchronous SIP Routing



- ❑ present in 3.0.x (latest stable)
 - Issues solved
 - ❑ blocking the SIP worker process
 - ❑ opening a connection
 - ❑ sending data
 - Configuration as easy as:
 - ❑ `tcp_async = yes`
 - Benefits
 - ❑ increased processing capacity over TCP
 - ❑ better handling of traffic for IM and Presence
 - ❑ transparent for modules and config file functions
 - ❑ integrated with DNS blacklisting

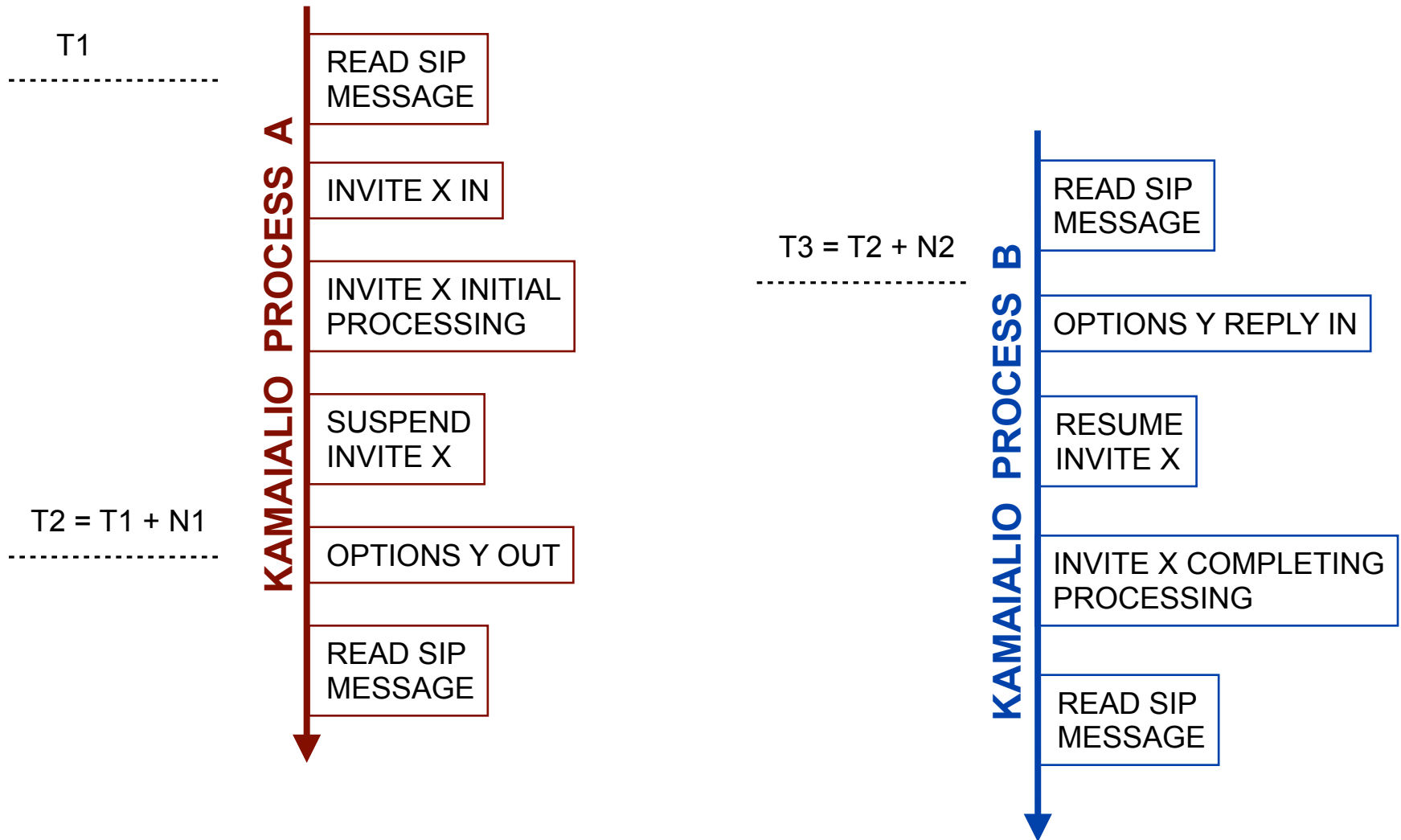
- ❑ Asynchronous TCP and TLS for SIP Routing
 - **worldwide - you can get them only with Kamailio and SER**
- ❑ in code tree GIT repository (ready for upcoming 3.1.0)
 - Same benefits as for asynchronous TCP
 - ❑ asynchronous TCP implies asynchronous TLS
 - ❑ same config parameter: tcp_async=yes
 - Extra
 - ❑ **increased capacity of handling secure communication**



Asynchronous SIP Message Processing

- present in 3.0.x (latest stable)
 - default message processing
 - receive - process - forward/reply
 - new possibility of message processing
 - receive - process - suspend - do something else - resume - forward/reply
 - requirements
 - transaction management module (tm)
 - example
 - call comes in, authenticate user, then send a request to billing engine to authorize the call
 - suspend handling the invite (park it), process other SIP requests
 - when billing engine replies, resume INVITE processing and allow or deny the call

Asynchronous SIP Message Processing





Config Message Queuing System

- ❑ in code tree GIT repository (ready for upcoming 3.1.0)
 - New module: mqueue
 - ❑ multiple message queues
 - ❑ message: (key, body)
 - Features
 - ❑ inter-process communication
 - ❑ SIP worker process can send commands to timer worker
 - Examples
 - ❑ **SIPWEET**
 - ❑ send notifications to Twitter (see my other talk @18:00)
 - ❑ email on various events



Questions?

Contact:

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<http://www.asipto.com>

<http://www.kamailio.org>

<http://sip-router.org>