BILLION CALLS WITH MODERN SOFTWARE STACK

SOLVING THE UNIQUE CHALLENGES OF DELIVERING
COMMUNICATIONS FROM THE CLOUD
www.flowroute.com

Contact Info
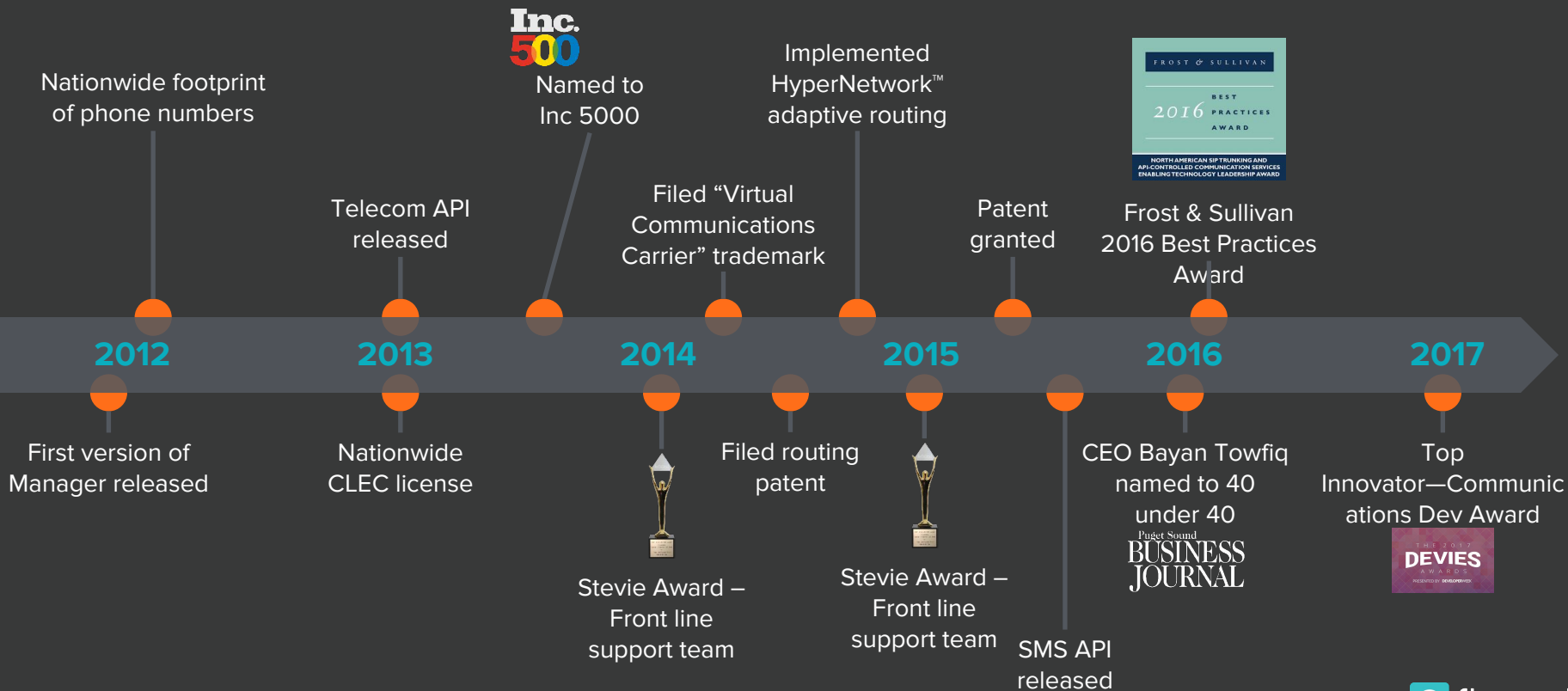
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Runway To Growth

2012
- Nationwide footprint of phone numbers
- First version of Manager released

2013
- Telecom API released
- Nationwide CLEC license

2014
- Named to Inc 5000
- Filed "Virtual Communications Carrier" trademark
- Stevie Award – Front line support team

2015
- Implemented HyperNetwork™ adaptive routing
- Filed routing patent
- Stevie Award – Front line support team
- SMS API released

2016
- Patent granted
- Frost & Sullivan 2016 Best Practices Award
- CEO Bayan Towfiq named to 40 under 40

2017
- Top Innovator—Communications Dev Award

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Delivering Communications From the Cloud

CLOUD COMMUNICATIONS GOALS

- Successful customer onboarding

- Speedy and smooth issue resolution

- Scale/automation

- Excellent customer experience

- Deliver new capabilities

Process management

Communications API

Self-service

Innovation

flowroute®
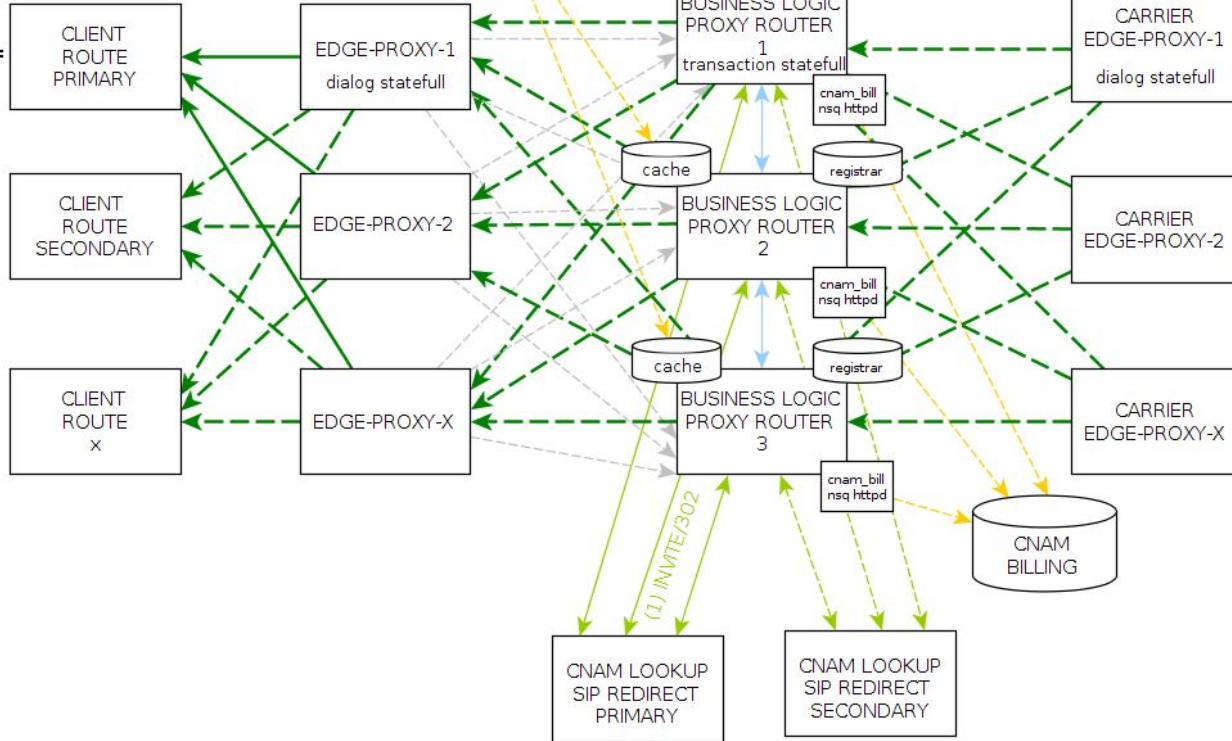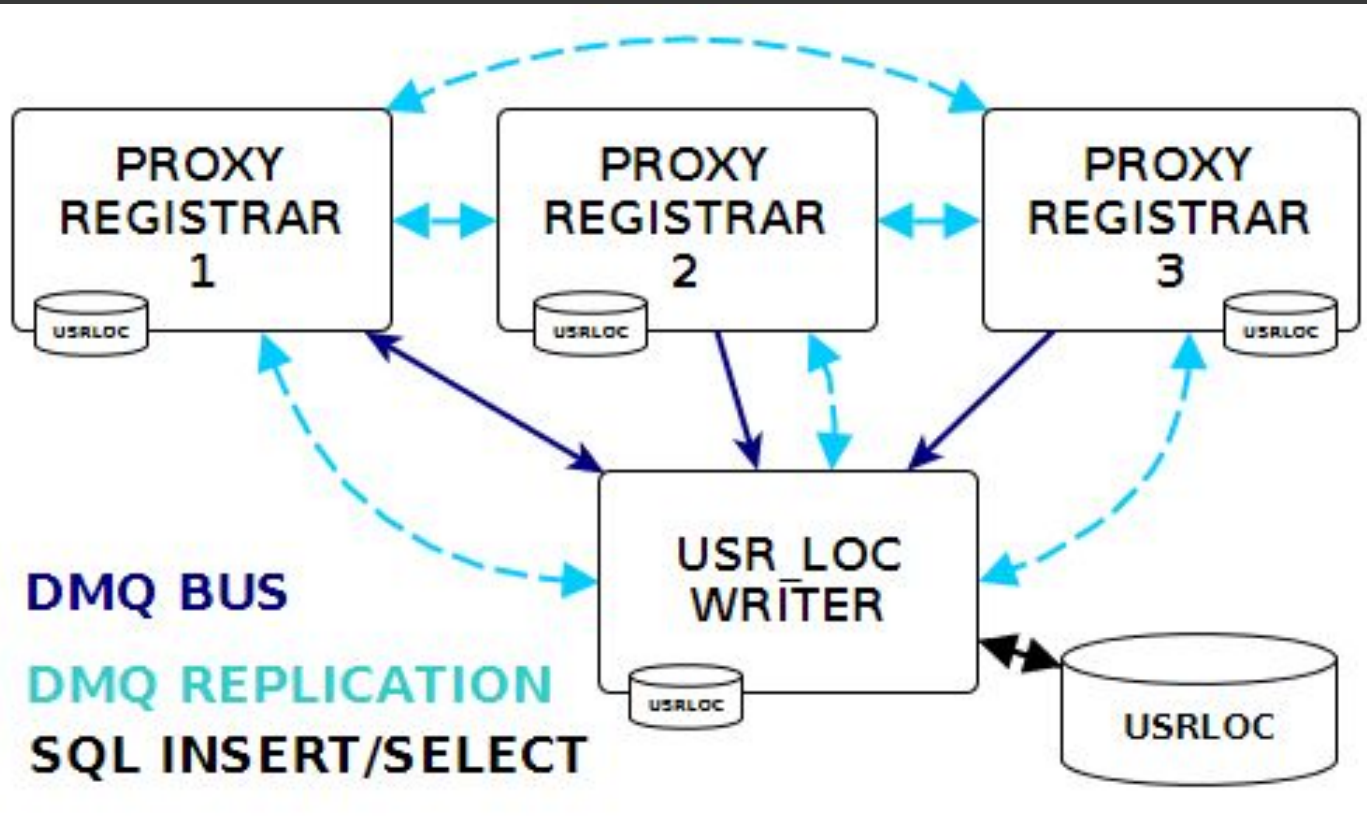
HYPERNETWORK ORIGINATING

DMQ-REPLICATED
REGISTER
INVITE

```
# _service._proto.name.  TTL class SRV priority weight port target.
_sip._tcp.client.com.    60  IN    SRV 10       60     5060 sip1.client.com.
_sip._tcp.client.com.    60  IN    SRV 10       60     5060 sip2.client.com.
_sip._tcp.client.com.    60  IN    SRV 10       30     5060 sip3.client.com.
_sip._tcp.client.com.    60  IN    SRV 20       30     5060 sip4.client.com.
```

CLIENT ROUTE

IP + PORT
DNS A RECORD
DNS SRV RECORD
PSTN #
REGISTRATION

=

CLIENT ROUTE PRIMARY

CLIENT ROUTE SECONDARY

CLIENT ROUTE x

EDGE-PROXY-1
dialog statefull

EDGE-PROXY-2

EDGE-PROXY-X

location (registrar)

real time

registrar

ratesheet
inbroundroute
phonenumber
userinfo

AWS-USRLOC WRITER

cache fill

cache

registrar

BUSINESS LOGIC PROXY ROUTER 1
transaction statefull

cnam_bill nsq httpd

cache

registrar

BUSINESS LOGIC PROXY ROUTER 2

cnam_bill nsq httpd

cache

registrar

BUSINESS LOGIC PROXY ROUTER 3

cnam_bill nsq httpd

CARRIER EDGE-PROXY-1
dialog statefull

CARRIER EDGE-PROXY-2

CARRIER EDGE-PROXY-X

CNAM BILLING

(1) INVITE/302

CNAM LOOKUP SIP REDIRECT PRIMARY

CNAM LOOKUP SIP REDIRECT SECONDARY

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Simplified Registrar Service Data Replication Paths

Container Resource Definition

When restarting a server, we observed 200K inuse_transaction --->
(transaction existing in memory at current time)

*wt_timer was set at 5000

Several GB of shared memory was required to support this huge burst.

Using multiple contacts per message greatly improved the capacity. --->
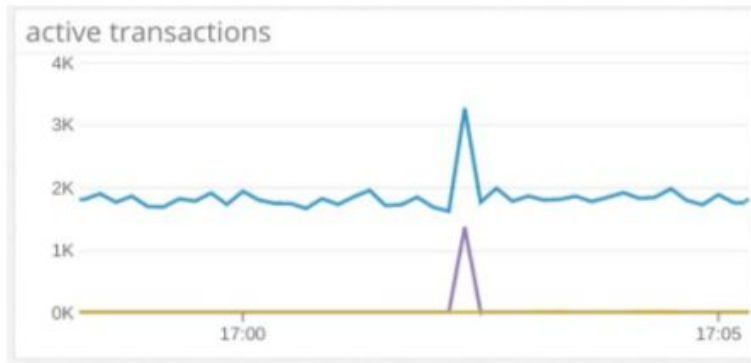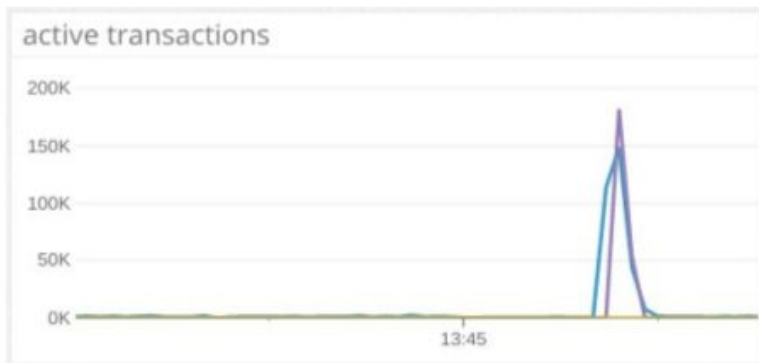
```
batch_msg_contacts: 50

# 50 contacts / message

batch_size: 10000

# 10000 contacts / batch

batch_usleep", 500000

# one batch every 500ms

syncing 20K contacts/second with 50
contacts/message
```


active transactions

active transactions

dmq_usrloc: sync with multi contacts per message   f51f4df
dmq_usrloc: param batch_max_msg_size   7cb707d

Usrloc UPSERT

usrloc: new param postgres upsert in 9.5

3.27. db_insert_update (integer)

Determine if the usrloc module should do an update when a duplicate key is found while inserting

- The SQL db insertions are the slowest operations on the cluster.

- When **usrloc** trigger an insert and fails because of a constraint violation, it will retry several time affecting server restarts.

- **usrloc** state is more accurate then the DB because after restarting the DB is out of sync with the cluster

- Using upsert introduced in PostGres 9.5 and already supported in **db_mysql** we can resolve conflict using the latest status from **usrloc**

```
"ERROR: db_postgres [km_dbase.c:582]: db_postgres_store_result(): driver error:
PGRES_FATAL_ERROR, ERROR:  duplicate key value violates unique constraint
"location_ruid_idx"#012DETAIL:  Key (ruid)=(uloc-58c8c125-ebe-4) already
exists.#012"
```
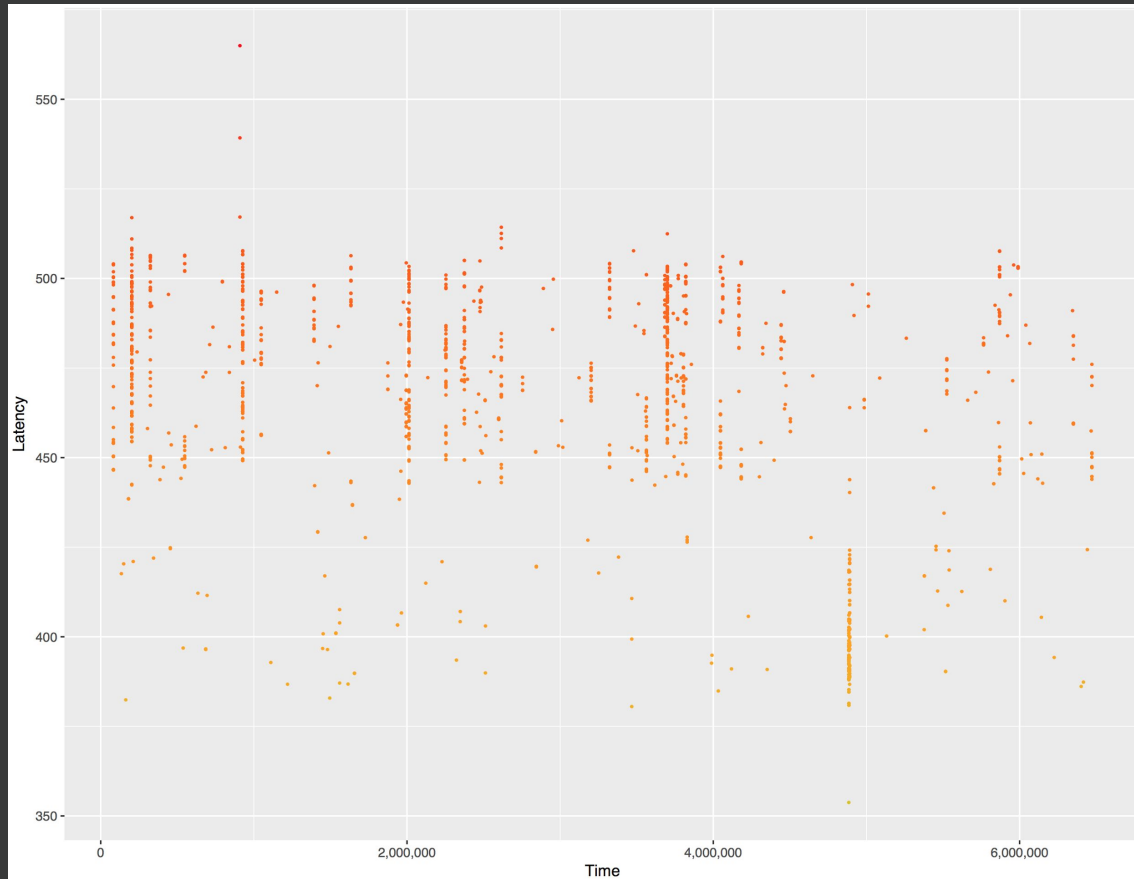
db_postgress: insert_update() with DO UPDATE 88ba02f

SIPP Latency Testing And Load Testing
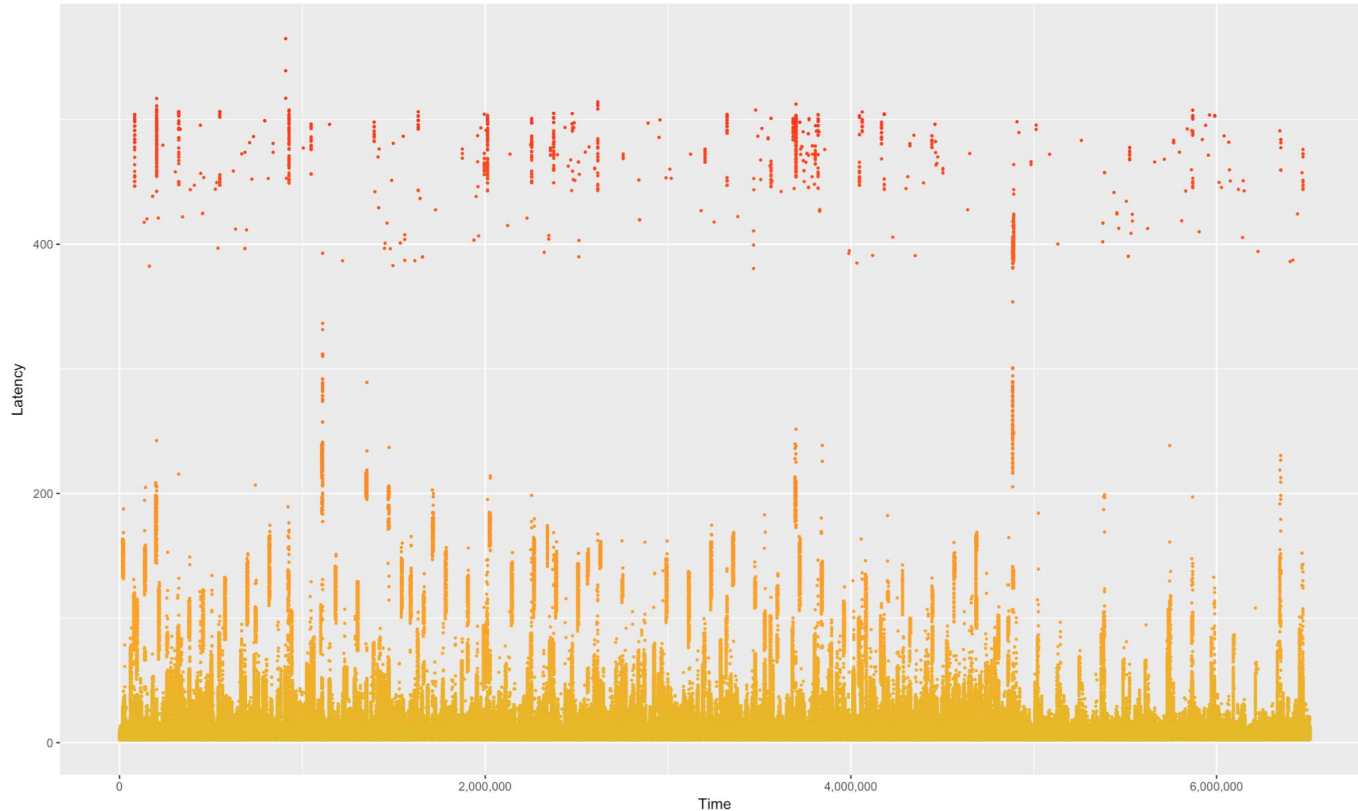
SIPP Latency Testing And Load Testing
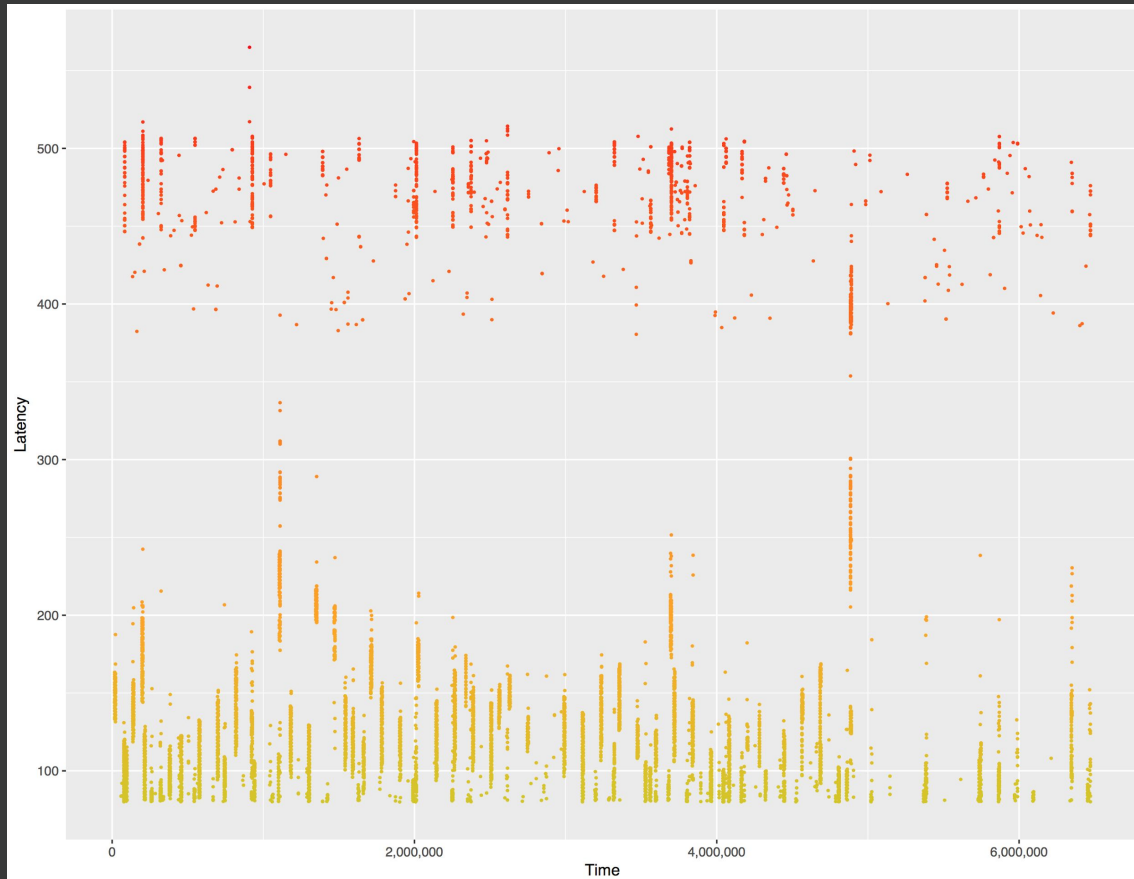
SIPP Latency Testing And Load Testing

SIPP Latency Testing And Load Testing

Dataset1

Statistic	Value
Count of all values	6467000
Count of NA	0
Min	2.17
Max	564.96
Range	562.79
Sum	32791455.61
Median	4.31
Mean	5.071
q25	3.72
q50	4.31
q75	5.06
q90	6.24
q99	17.72
q99.9	101.38
SE of the mean	0.003
Variance	77.592
Standard deviation	8.809
% values < 100	99.9
% values >= 100	0.102
% values >= 100 AND < 200	0.0728
% values >= 200 AND < 300	0.00583
% values >= 300 AND < 400	0.00196
% values >= 400 AND < 500	0.0193
% values >= 500	0.00212

Improved Reaction Time

Highly Responsive Troubleshooting

```
Core was generated by `/usr/sbin/kamailio -AREGIN -m4096 -M728 -DD -P /var/run/kamailio.pid -f /etc/ka'.
Program terminated with signal SIGSEGV, Segmentation fault.
#0  0x00007fdffc538088 in memcpy () from /lib/ld-musl-x86_64.so.1
(gdb) bt
#0  0x00007fdffc538088 in memcpy () from /lib/ld-musl-x86_64.so.1
#1  0x000055e4aa088d42 in memcpy (__n=<optimized out>, __os=0x55e4aaa35080, __od=<optimized out>) at /usr/include/fortify/string.h:51
#2  create_avp (flags=flags@entry=275, name=..., val=...) at usr_avp.c:217
#3  0x000055e4aa088dbe in add_avp_list (list=0x55e4aa51ce00 <def_list>, flags=275, name=..., val=...) at usr_avp.c:232
#4  0x000055e4aa088e5d in add_avp (flags=<optimized out>, name=..., val=...) at usr_avp.c:263
#5  0x00007fdfcb52a988 in pv_set_avp (msg=0x7fdfcf004258, param=<optimized out>, op=<optimized out>, val=0x7ffc0fcdbb90) at pv_core.c:1970
#6  0x000055e4aa0aa31a in lval_pvar_assign (lv=0x7fdfcedf2818, rv=0x7fdfcedf2ab8, msg=0x7fdfcf004258, h=0x7fdfcedf2ab0) at lvalue.c:351
#7  lval_assign (h=h@entry=0x7ffc0fcdc680, msg=msg@entry=0x7fdfcf004258, lv=0x7fdfcedf2818, rve=0x7fdfcedf2ab0) at lvalue.c:399
#8  0x000055e4aa0a78a0 in do_action (h=h@entry=0x7ffc0fcdc680, a=a@entry=0x7fdfcedf31c0, msg=msg@entry=0x7fdfcf004258) at action.c:1430
#9  0x000055e4aa09d5d6 in run_actions (h=h@entry=0x7ffc0fcdc680, a=0x7fdfcedf1bd8, msg=msg@entry=0x7fdfcf004258) at action.c:1549
#10 0x000055e4aa0a0326 in do_action (h=h@entry=0x7ffc0fcdc680, a=a@entry=0x7fdfcedd8b38, msg=msg@entry=0x7fdfcf004258) at action.c:678
#11 0x000055e4aa09d5d6 in run_actions (h=h@entry=0x7ffc0fcdc680, a=0x7fdfcedd8b38, msg=msg@entry=0x7fdfcf004258) at action.c:1549
#12 0x000055e4aa0a849a in run_actions_safe (h=0x7ffc0fcdcf30, a=<optimized out>, msg=msg@entry=0x7fdfcf004258) at action.c:1614
#13 0x000055e4aa151b5b in rval_get_int (h=0x7ffc0fcdcf30, msg=0x7fdfcf004258, i=i@entry=0x7ffc0fcdc920, rv=rv@entry=0x7fdfcedd8c70, cache=ca
#14 0x000055e4aa155d45 in rval_expr_eval_int (h=0x7ffc0fcdcf30, msg=0x7fdfcf004258, res=res@entry=0x7ffc0fcdc920, rve=0x7fdfcedd8c68) at rva
#15 0x000055e4aa155f95 in rval_expr_eval_int (h=h@entry=0x7ffc0fcdcf30, msg=msg@entry=0x7fdfcf004258, res=res@entry=0x7ffc0fcdca40, rve=rve(
#16 0x000055e4aa0a202c in do_action (h=h@entry=0x7ffc0fcdcf30, a=a@entry=0x7fdfcedd9ee8, msg=msg@entry=0x7fdfcf004258) at action.c:1030
#17 0x000055e4aa09d5d6 in run_actions (h=h@entry=0x7ffc0fcdcf30, a=a@entry=0x7fdfceda93b0, msg=msg@entry=0x7fdfcf004258) at action.c:1549
#18 0x000055e4aa0a8534 in run_top_route (a=0x7fdfceda93b0, msg=msg@entry=0x7fdfcf004258, c=c@entry=0x0) at action.c:1635
#19 0x000055e4aa09c6c6 in receive_msg (
    buf=buf@entry=0x55e4aa562a80 <buf> "INVITE sip:+14156340414@34.208.185.61 SIP/2.0\r\nMax-Forwards: 67\r\nRecord-Route: <sip:216.115.69.:
P/2.0/UDP 216"..., len=<optimized out>, rcv_info=rcv_info@entry=0x7ffc0fcdd200) at receive.c:240
#20 0x000055e4aa12fd25 in udp_rcv_loop () at udp_server.c:495
#21 0x000055e4aa0d746e in main_loop () at main.c:1614
#22 0x000055e4aa083490 in main (argc=<optimized out>, argv=<optimized out>) at main.c:2631
(gdb) fram 8
#8  0x000055e4aa0a78a0 in do_action (h=h@entry=0x7ffc0fcdc680, a=a@entry=0x7fdfcedf31c0, msg=msg@entry=0x7fdfcf004258) at action.c:1430
warning: Source file is more recent than executable.
1430                        v=lval_assign(h, msg, (struct lvalue*)a->val[0].u.data,
(gdb) p *a
$1 = {cline = 278, cfile = 0x7fdfceda1a88 "/etc/kamailio/regin.cfg", rname = 0x7fdfcedf1188 "GET_CUSTOMER_RATE", type = ASSIGN_T, count = 2
        string = 0x7fdfcedf2818 "\002", str = {s = 0x7fdfcedf2818 "\002", len = 0}, data = 0x7fdfcedf2818, attr = 0x7fdfcedf2818, select = (
        string = 0x7fdfcedf2ab0 "\001", str = {s = 0x7fdfcedf2ab0 "\001", len = 0}, data = 0x7fdfcedf2ab0, attr = 0x7fdfcedf2ab0, select = (
        data = 0x0, attr = 0x0, select = 0x0}}, {type = NOSUBTYPE, u = {number = 0, string = 0x0, str = {s = 0x0, len = 0}, data = 0x0, attr
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        s = 0x0, len = 0}, data = 0x0, attr = 0x0, select = 0x0}}, {type = NOSUBTYPE, u = {number = 0, string = 0x0, str = {s = 0x0, len =
```

AWS Marketplace SaaS Contracts Launch

AWS Marketplace SaaS Contracts Launch

THANK YOU

Julien Chavanton
Anna Sinilo
Kristin King
Chris Lacina

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COMMUNICATIONS FROM THE CLOUD
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