Making WallStreet talk with GO

Matthew Campbell

Who Am I

- New York / Bangkok
- Run GO Meetup in Bangkok
- bloomberg.com (Rails)
- gucci.com (Rails)
- Co founder ErrPlane (GO)
- Thomson Reuters Messenger (GO)

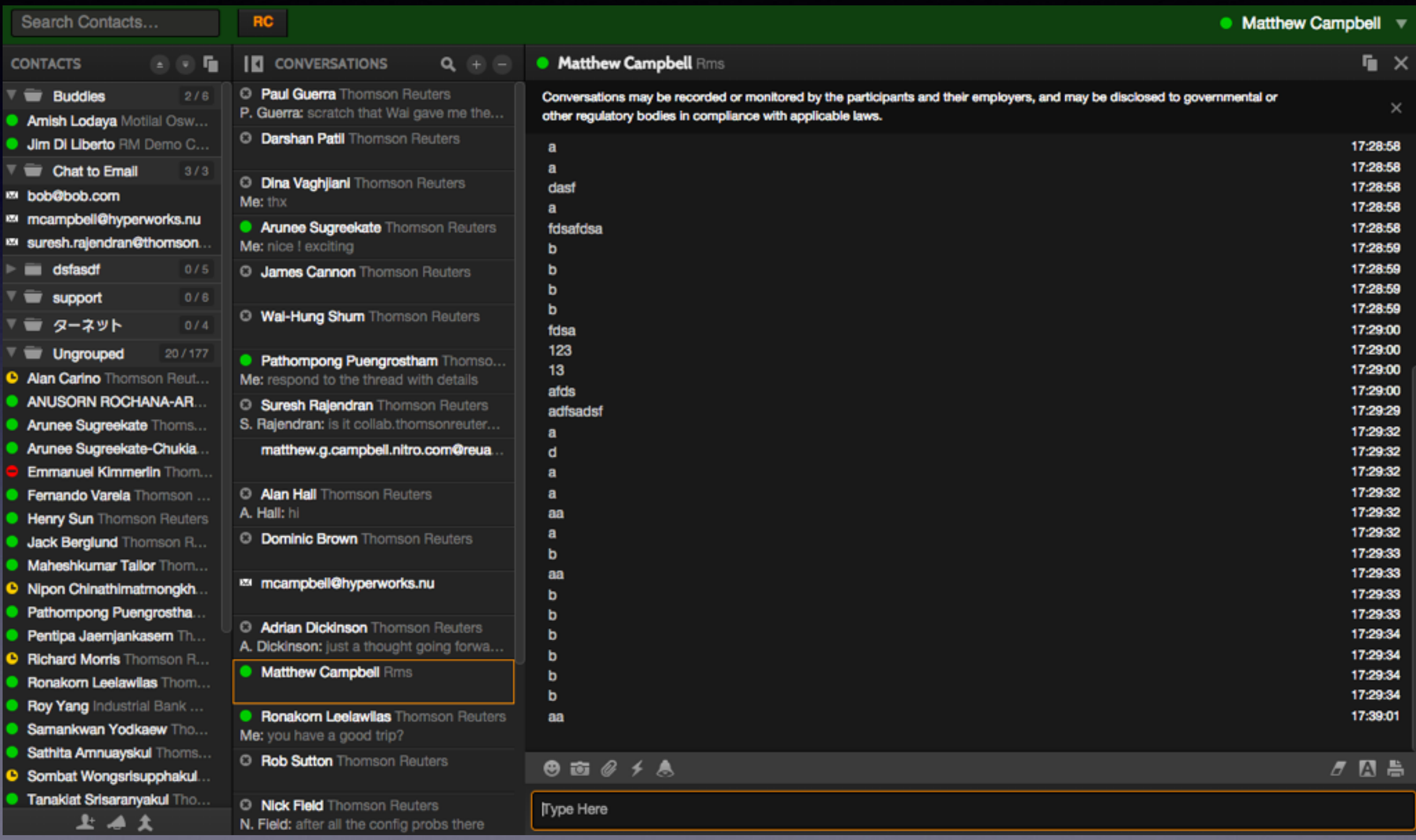
GOLANG Bangkok 2015

#langfight

What is this talk about?

- Running GO with a 300k users in production for multiple years
- Monitoring Large scale GO Servers
- Remote teams and GO

Eikon Messenger



Eikon Messenger

- 300k Traders / Fund Managers
- Federation with 20+ Bank/Financial Networks
- Strict compliance rules in 100+ countries
- Global usage, largest in SE Asia
- Downtime == Lost Trades == Upset customers

Protocols

- XMPP (Most XEPS)
- SIP (Microsoft SIP)
- BOSH (http xmpp)
- Chatrooms

Team

- 80% remote team
- Development
  New York/Canada/Portugal/Germany/Bangkok
- Ops London
- QA Bangkok

Remote Dev

- Daily Google Hangouts
- Pivotal Tracker
- Github pull request, code reviews
- Xmpp Chatroom, all day multi time zone
- Email group

Issues with GO

Missing Features

- Decent XML Dom Parser
- Regex with decent performance
- Serializing performance / allocations
- Better CGO integration

Garbage Collection

- Our single largest problem. Our app is latency sensitive.
- We have automated test suite to detect garbage collection problems
- Avoiding Heap allocations
- Managing Size of Heap

IO Latency

- Many Layers
- In process cache
- Local Redis instance on machine
- Mysql primary storage
- NSQ for delayed message queuing

Mysql (Roster Information)

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Redis Server (Routing Information)

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Roster Storage

Presence Routing

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Legacy C# Server

REDIS

REDIS

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REDIS

ETCD (Configuration)

In Memory Cache

Nitro

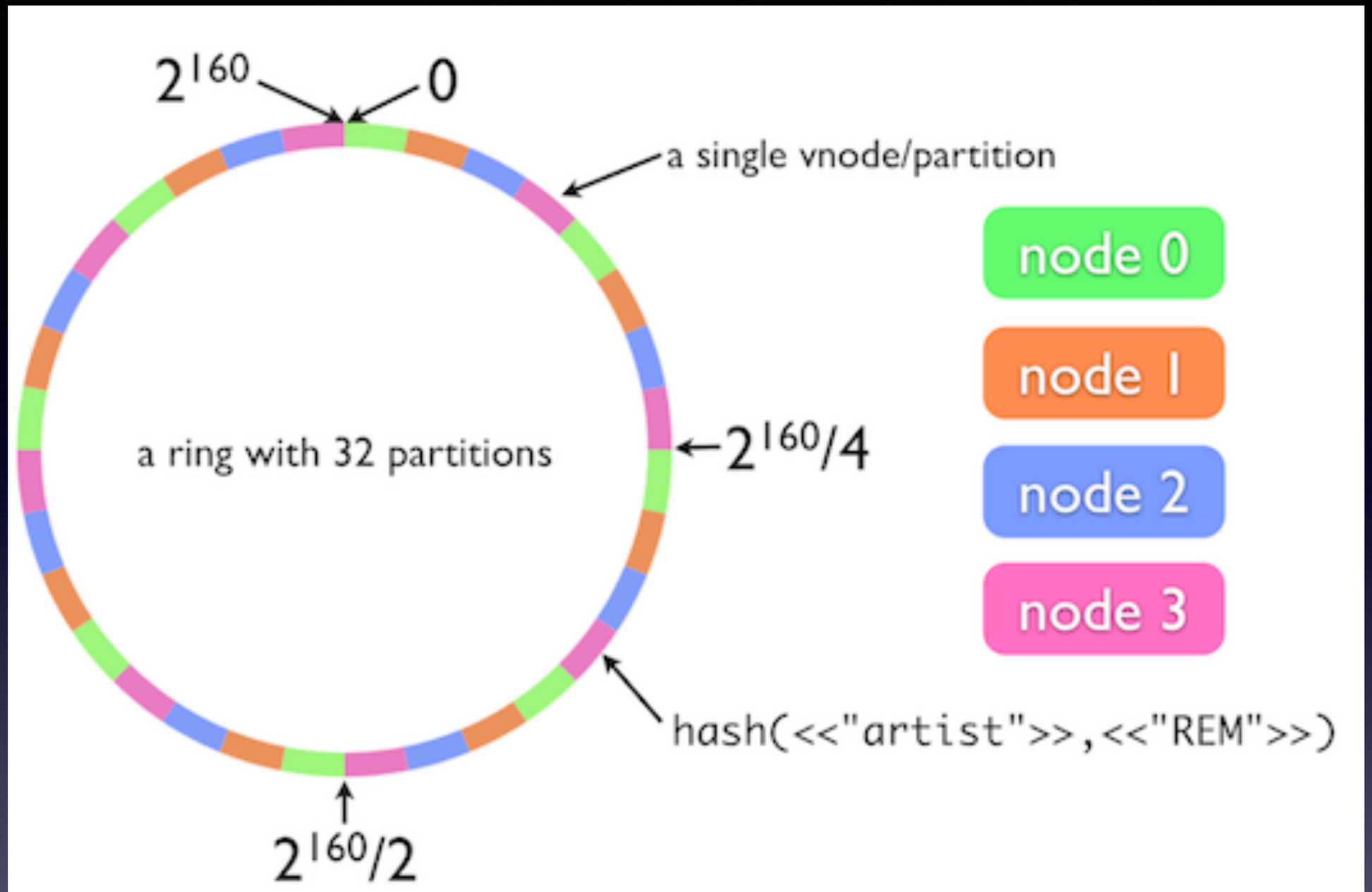
Single Physical Blade Server

NSQ

Mysql Compliance Message Storage

Compliance and Message Storage

ElasticSearch Long Term Message Storage



Clustered Redis

source: paperplanes.de

CGO Issues

- Libxml2 (Gokogiri) , PCRE (Perl Regex)
- Issues with to many Pthreads
- 1.4 broke a lot of C libraries, with stack moving
- Broke GDB for a while
- Faster sometimes, sometimes significantly slower cause of thread dispatch

Following GO Libraries

- For the first year, we tracked all GO dependencies
- We often time found bugs in upstream libraries with our automated integration suite
- Over time this got to risky, and we chose to freeze our GO Libraries

Tracking GO Lang

- PAINLESS !
- We track Go Lang official releases, within 2 weeks of each release we have gone to production using the new compiler
- We have had a few integration tests break during upgrades
- Only production code that broke, was in CGO ;(

Continuous Delivery

- Jenkins
- Integration level tests, that fire up a cluster of our servers, and validates user level interactions at protocol level. Including federating with several open source messaging servers
- Unit tests for functional areas

Plugin Architecture

- Plugins are processes
- Go doesn’t support dynamic linking
- Plugins talk to main process via TCP
- Plugins can be run in process, but still use tcp, to simulate exact same properties

Chat To Email

Yahoo

TCP

Server #1

Twitter

Nitro

TCP

Server #2

Chatrooms

Metrics

- Annotate everything
- Us GO-Metrics
- Graphite / InfluxDb

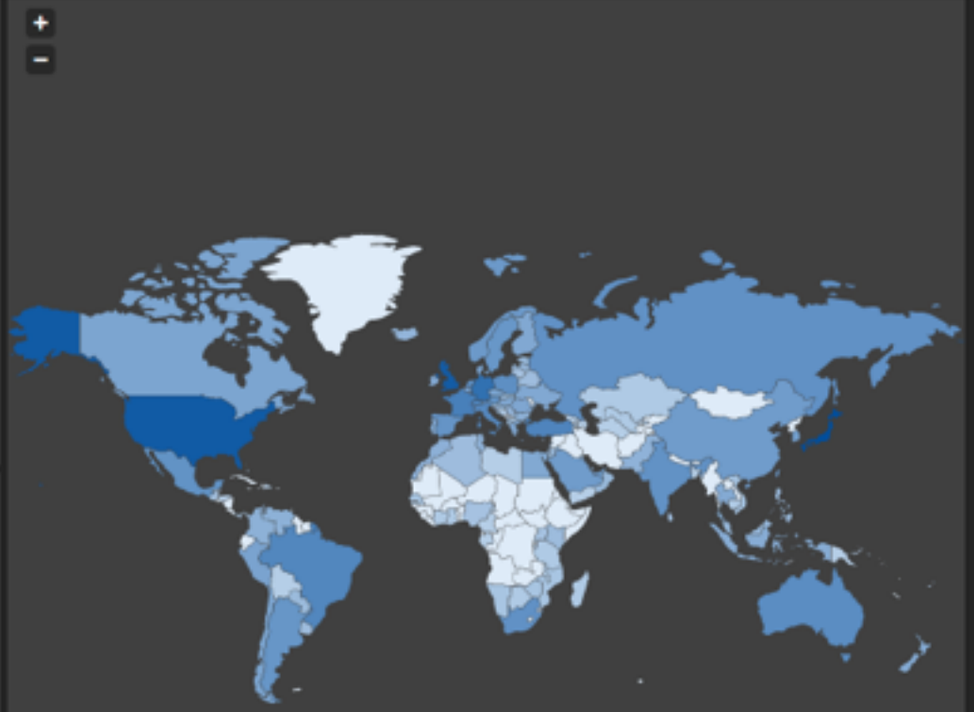
ukbp-claicpr01	ukbp-claicpr02	ukbp-claicpr03
0	0	0
ukbp-claicpr04	ukbp-claicpr05	ukbp-claicpr06
0	0	0
ukbp-claicpr07	ukbp-claicpr08	ukbp-claicpr09
0	0	0
ukbp-claicpr10	ukbp-claicpr11	ukbp-claicpr12
0	0	0

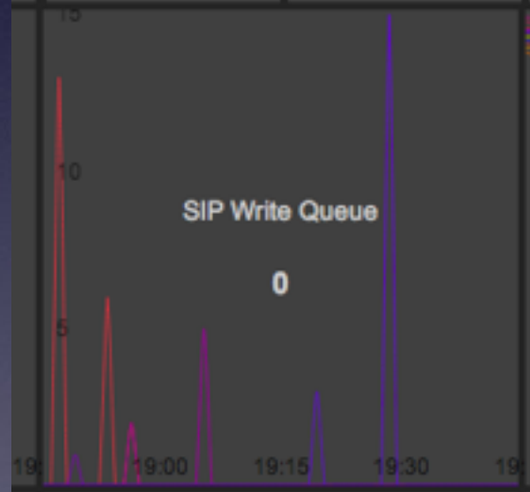
Messages in Queue (Xmpp)

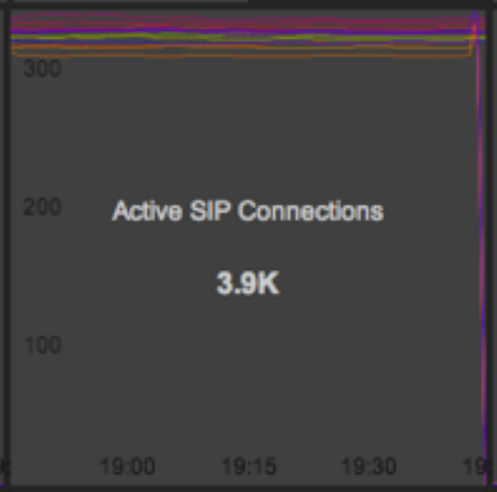
0

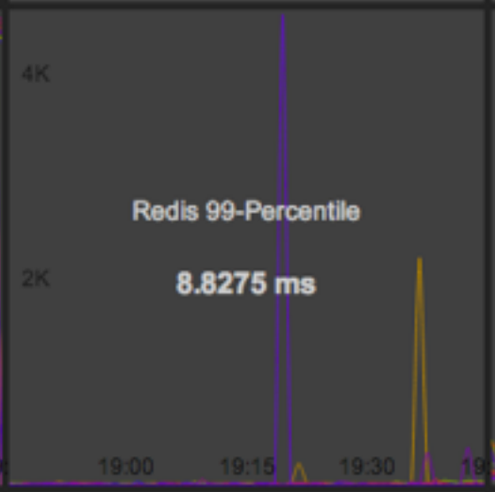
Active Xmpp(Bosh) Conn

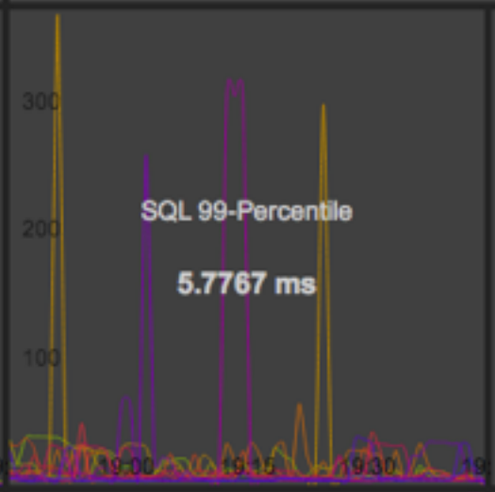
30.1K

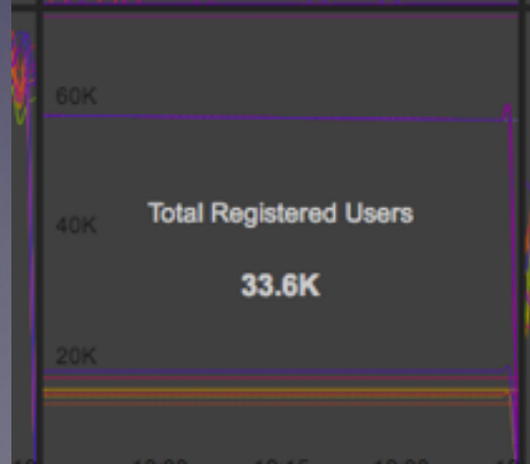


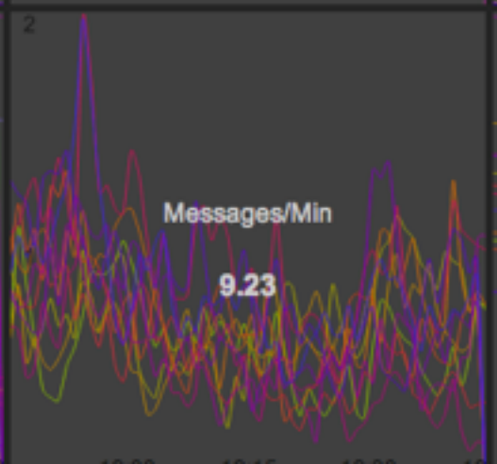


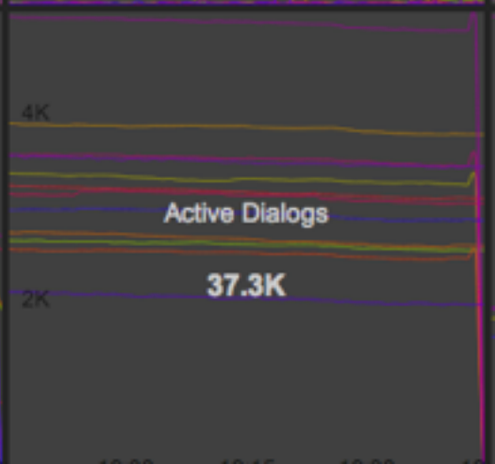


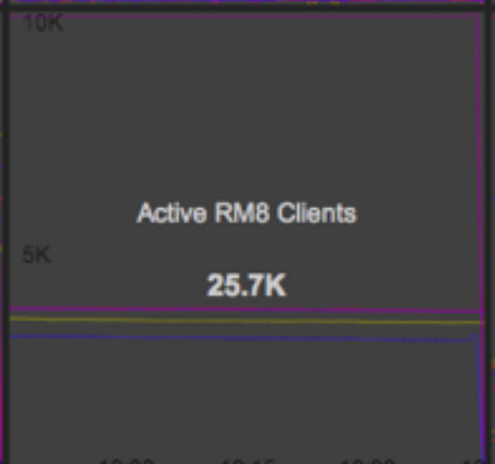


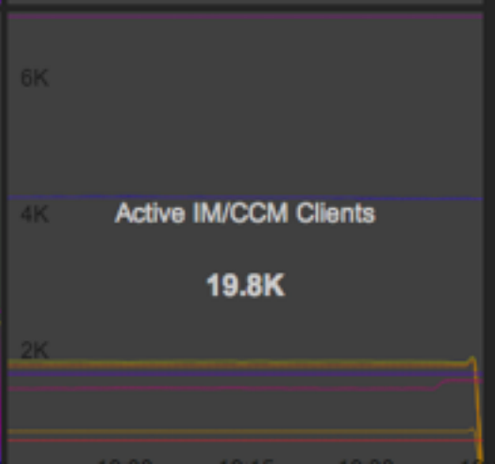












Single Points of Failure

- Mysql Multimaster
- Redis Master / Slave
- Sentinel for Mysql Failover
- Custom scripts + ETCD for Mysql Failover

Packaging

- RPMs
- FPM Ruby Gem
- Single binary + Configs

Managing Config

- ETCD vs Zookeeper
- Push
- Pull

Compliance

- NSQ
- Elastic Search
- Mysql
- C# process

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Upgrades

- In place upgrades
- Spawn a new process
- Pass file handles for TCP via a Named Pipe
- New process kills parent

What's Next

- Multiple live datacenters, currently Hot/Cold
- Removal of all CGO Code
- Using GO Generate for config classes

Q & A

Contact

- Feel Free to email me any further questions
- We’re Hiring!
- mcampbell@hyperworks.nu