# Testing at Scale
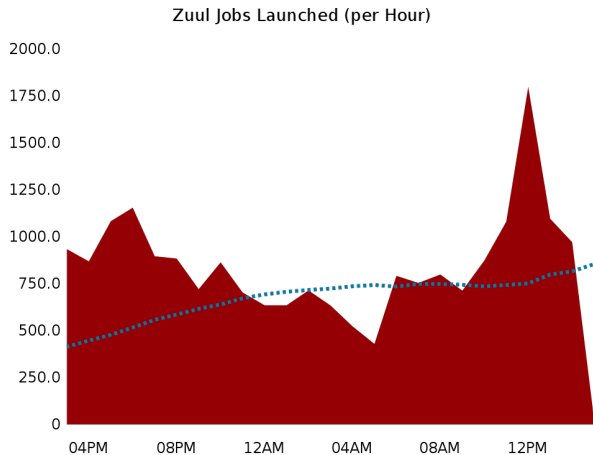
Andrea Frittoli
andrea.frittoli@gmail.com
andreaf on Freenode
@blackchip76 on Twitter

Jun 2, 2017

https://github.com/andreafrittoli/testing_at_scale
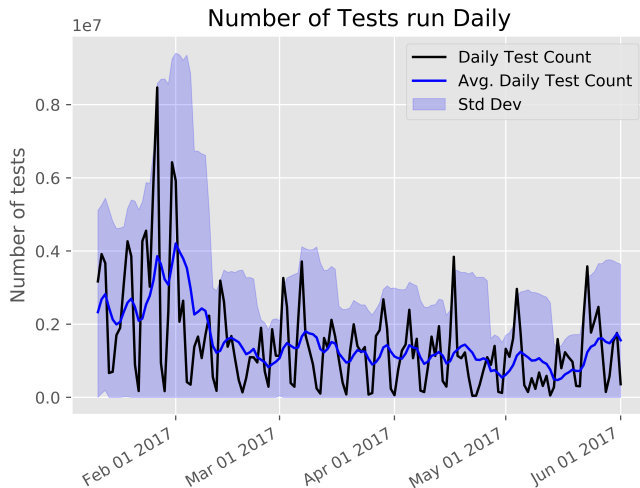
# OpenStack CI in Numbers

- ∼1500 contributors to Pike
- 6 Clouds + 2 run by OpenStack Infra
- 1600+ repos in openstack(|-dev|-infra)
- 20k lines Zuul configuration



Zuul Jobs Launched (per Hour)

Source: Zuul, Graphite

# OpenStack CI in Numbers



Number of Tests run Daily
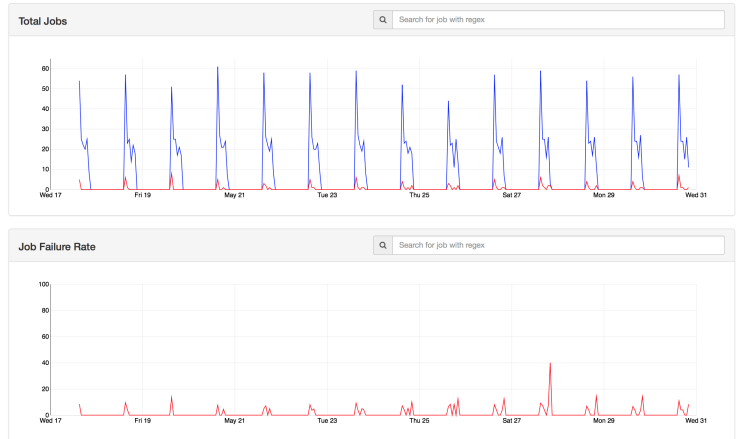
# Testing OpenStack



Source: http://status.openstack.org/zuul
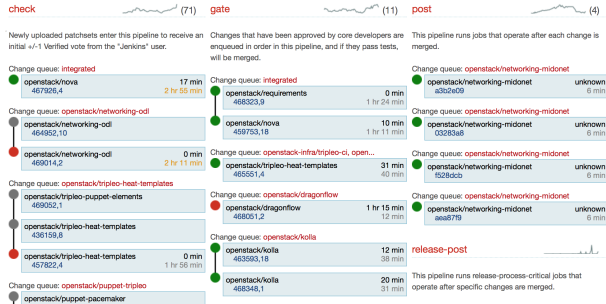
- ▶ Release ready master
- ▶ Check & Gate Pipelines
- ▶ Ephemeral test system

# Beyond the gate

- Periodic tests
- Release jobs



Reference: status.openstack.org/openstack-health/

# The unbalanced scale

- Core reviewers
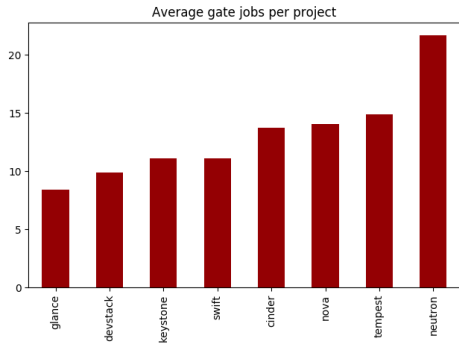- Horizontal teams
- Running CI



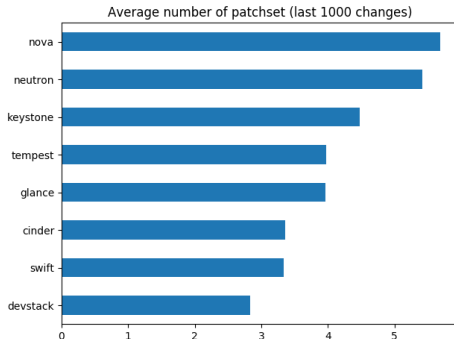Not the scale I meant...

- Commits
- # of Tests
- # of Configurations

# Life as a contributor



Source: subunit2sql DB



Source: Gerrit API

# My day in reviews

- Change in devstack:

```
536    +      if [ -z "$VRIT_DRIVER" ]; then
537    +          # If there is not virt driver defined we assume nova is not installed
538    +          iniset $TEMPEST_CONFIG service_available nova "False"
539    +      fi
540    +
```

Source: https://review.openstack.org/468060

- CI reports all green
- Can you see the error?

# Keep the gate flowing

- Number of services
- Service memory footprint
- Test load
- Libvirt instability under load
- Tempest bug in ssh test code
- Vanilla database configuration



Test failure rate over 5 months (1 day rolling average)
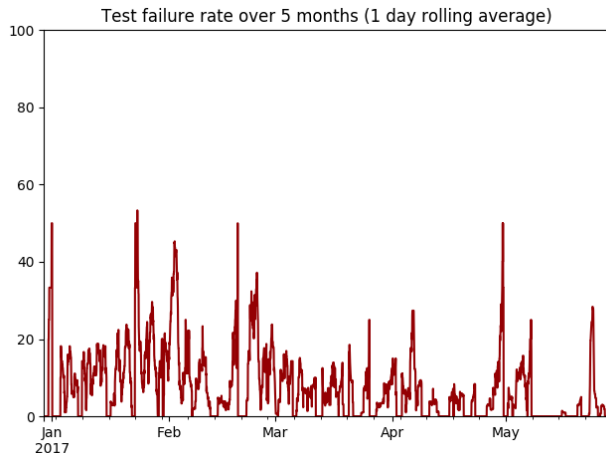
Source: Zuul, Graphite

# Data!

- 50MB compressed logs for integration test run
  - node setup
  - system, service and test log files
  - system, service and test configuration
  - system metrics (dstat data)
  - libvirt logs
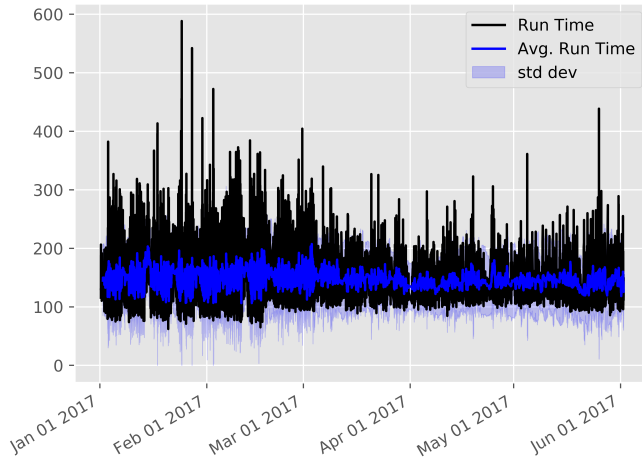- Test result data (Zuul & subunit)
- Gerrit event streams

# Single run view



- ▶ Deeplink into logs
- ▶ HTML view of tests
- ▶ Stackviz
- ▶ Ansible Run Analysis

Reference: Stackviz

# Runtime variance

# Deeper into data

- ELK, Elastic Recheck [DEMO: http://status.openstack.org/elastic-recheck/]
- Subunit2sql, OpenStack Health [DEMO: http://status.openstack.org/openstack-health/]

# Other Data Sources

- Graphite: http://graphite.openstack.org
- Grafana: http://grafana.openstack.org
- Firehose: https://docs.openstack.org/infra/system-config/firehose.html

# What's next?

- Metrics over time from OS, MySQL, RabbitMQ, etc
- CRM114
- Artificial intelligence

# Playing with Machine Learning

- Long Short Term Memory network, RNN
- Trained with nova logs from periodic test runs

- DEMO

# AI to the rescue

- Make anomalous log lines emerge

- Help identitify new elastick recheck signatures
- Catch changes in behaviour that we do not test for
- Help review process

# References

- http://status.openstack.org
- http://review.openstack.org
- https://docs.openstack.org/developer/subunit2sql/graph.html
- https://github.com/sherjilozair/char-rnn-tensorflow
- https://en.wikipedia.org/wiki/CRM114_(program)
- https://github.com/andreafrittoli/testing_at_scale/

- IRC: #openstack-qa
- email: openstack-dev@lists.openstack.org, tag [QA]

# Thank you!
# Questions?