

# Testing at Scale

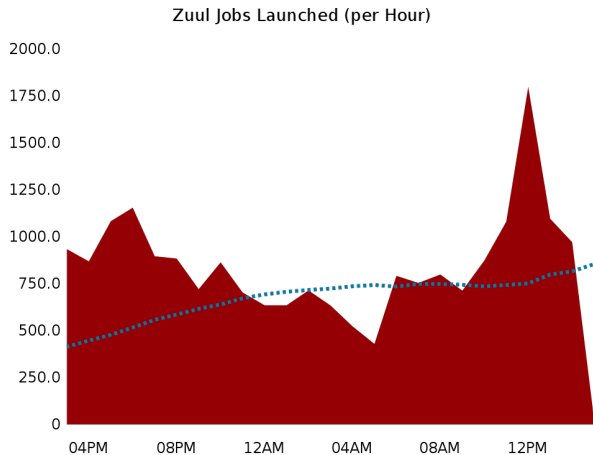
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andreaaf on Freenode  
@blackchip76 on Twitter

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[https://github.com/andreafrittoli/testing\\_at\\_scale](https://github.com/andreafrittoli/testing_at_scale)

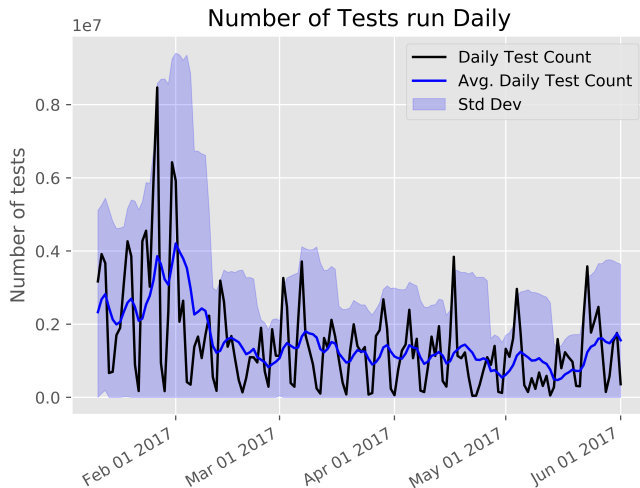
# OpenStack CI in Numbers

- ▶ ~1800 contributors to Pike
- ▶ 6 Clouds + 2 run by OpenStack Infra
- ▶ 1600+ repos in openstack(|-dev|-infra)
- ▶ 20k lines Zuul configuration



Source: Zuul, Graphite

# OpenStack CI in Numbers



Source: subunit2sql-graph dailycount

# OpenStack QA Mission Statement

*"Develop, maintain, and initiate tools and plans to ensure the upstream stability and quality of OpenStack, and its release readiness at any point during the release cycle."*

# Testing OpenStack

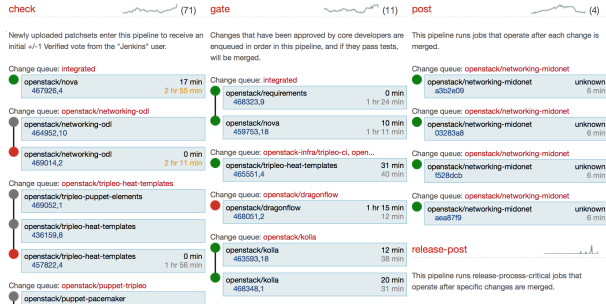


Status **Zuul** Rechecks Reviews Bugday OpenStack-Health

## Zuul Status

Zuul is a pipeline oriented project gating and automation system. Each of the sections below is a separate pipeline configured to automate some portion of the testing or operation of the OpenStack project. For more information, please see the [Zuul reference manual](#).

Queue lengths: 0 events, 0 results. Filters:  Expand by default: ☐



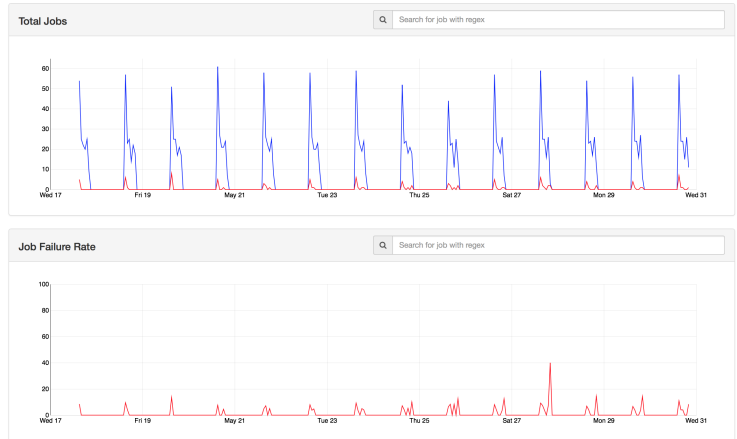
- Release ready master
- Check & Gate Pipelines
- Ephemeral test system

Source: <http://status.openstack.org/zuul>

# Beyond the gate

- Periodic tests
- Release jobs

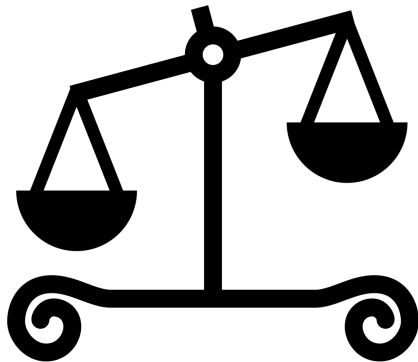
## periodic jobs



Source: [status.openstack.org/openstack-health/](https://status.openstack.org/openstack-health/)

## The unbalanced scale

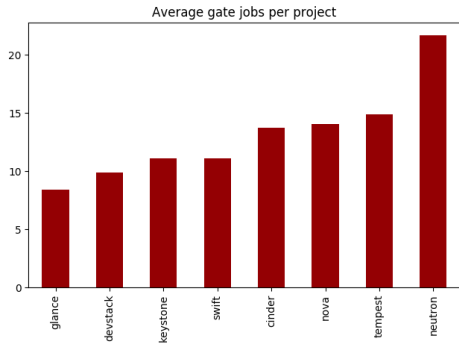
- ▶ Core reviewers
- ▶ Horizontal teams
- ▶ Running CI



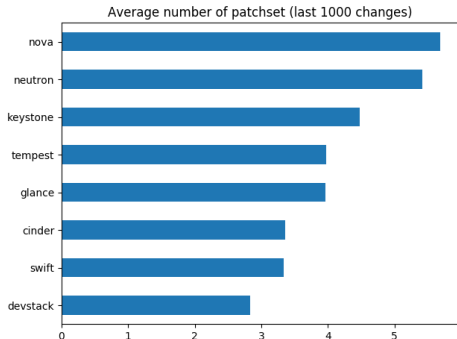
- ▶ Commits
- ▶ # of Tests
- ▶ # of Configurations

Not the scale I meant...

# Life as a contributor



Source: subunit2sql DB

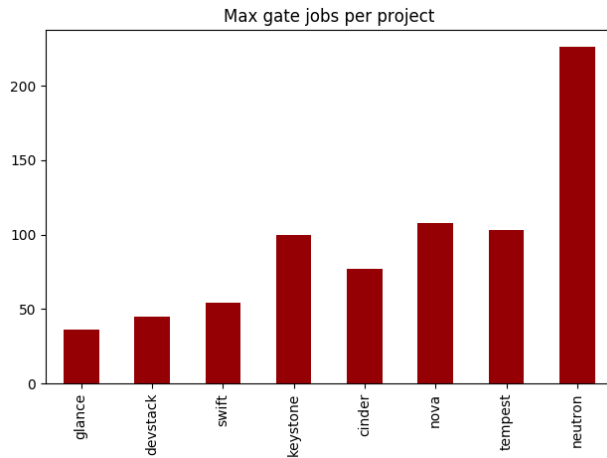


Source: Gerrit API



# Life as a contributor

- ▶ Worst case
- ▶ Recheck



Source: subunit2sql DB

# My day in reviews

Project	Unreviewed	Open
[[ QA ]]	498	501
openstack-dev/devstack	176	176
openstack-dev/grenade	7	7
openstack-dev/hacking	5	5
openstack/eslint-config-openstack	2	2
openstack/karma-subunit-reporter	1	1
openstack/os-performance-tools	1	1
openstack/os-testr	6	6
openstack/patrole	19	21
openstack/tempest	272	273
openstack/tempest-lib	9	9
[[ Test Results ]]	53	53
[[ Plugins ]]	50	50
[[ Infra ]]	192	192
[[ Specs ]]	165	165
[[ Governance & Co. ]]	23	23
[[ Oslo ]]	19	19

Source: gertty

# My day in reviews

- Change in devstack:

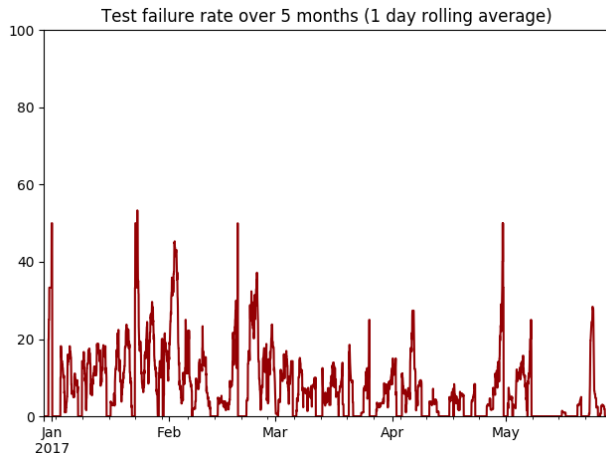
```
536      +      if [ -z "$VRIT_DRIVER" ]; then
537      +          # If there is not virt driver defined we assume nova is not installed
538      +          iniset $STEMPEST_CONFIG service_available nova "False"
539      +      fi
540      +
```

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

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

# Keep the gate flowing

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



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

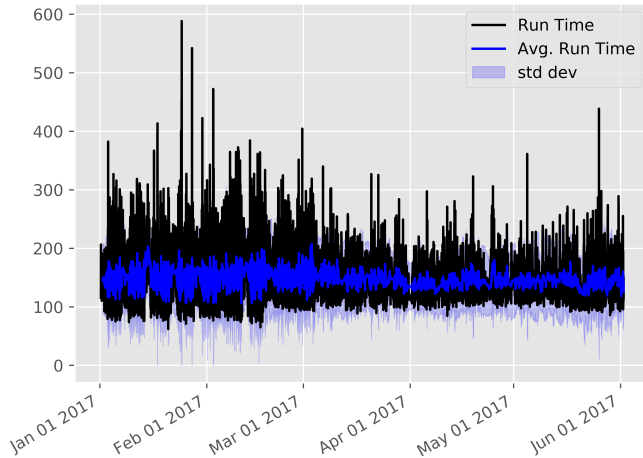
# Single run view

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



Source: [Stackviz](#)

## Runtime variance



Source: subunit2sql-graph run\_time

## Deeper into data

- ▶ Logstash: [logstash.openstack.org](http://logstash.openstack.org)
- ▶ Elastic Recheck: <http://status.openstack.org/elastic-recheck/>
- ▶ E-R Queries: [git.openstack.org/openstack-infra/elastic-recheck/queries](https://git.openstack.org/openstack-infra/elastic-recheck/queries)



## Deeper into data

- ▶ subunit2sql <mysql://logstash.openstack.org/subunit2sql>
- ▶ subunit2sql-graph
- ▶ OpenStack-Health API [health.openstack.org/](http://health.openstack.org/)
- ▶ OpenStack Health <http://status.openstack.org/openstack-health/>

## Other Data Sources and Views

- ▶ 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 identify 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://docs.openstack.org/infra/system-config/logstash.html#crm114>
- ▶ [https://github.com/andreafrittoli/testing\\_at\\_scale/](https://github.com/andreafrittoli/testing_at_scale/)
- ▶ IRC: #openstack-qa
- ▶ email: [openstack-dev@lists.openstack.org](mailto:openstack-dev@lists.openstack.org), tag [QA]

Thank you!  
Questions?