

Testing at Scale

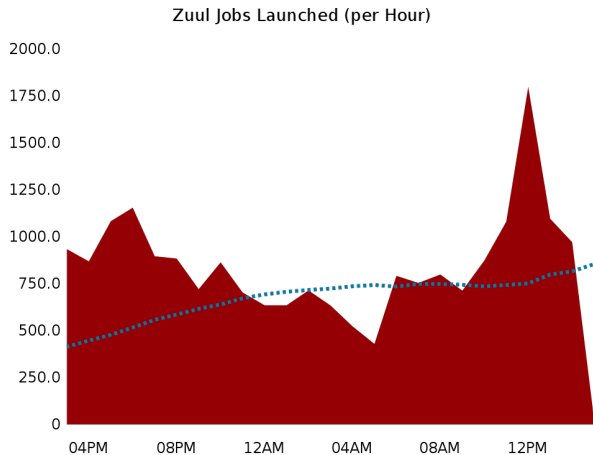
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https://github.com/andreafrittoli/testing_at_scale

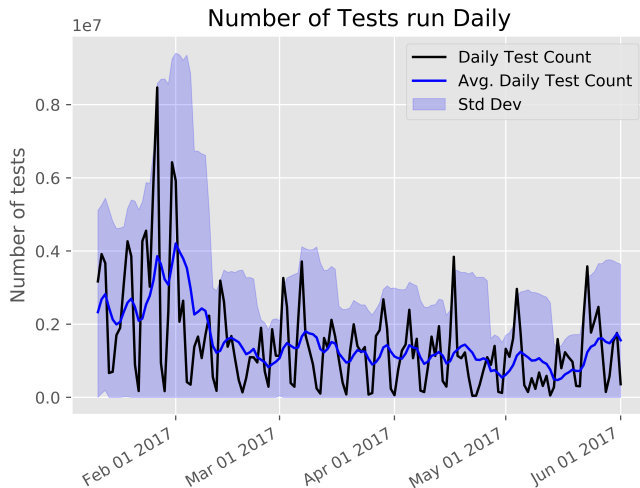
OpenStack CI in Numbers

- ▶ ~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

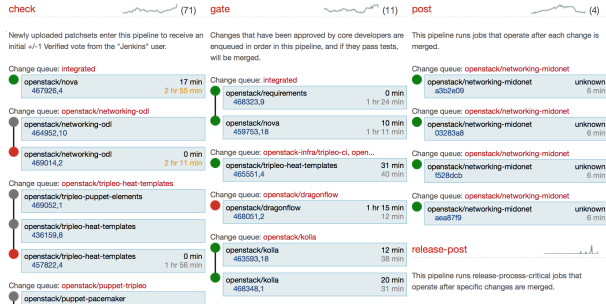


Status **Zuul** Rechecks Reviews Bugday OpenStack-Health

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: ☐



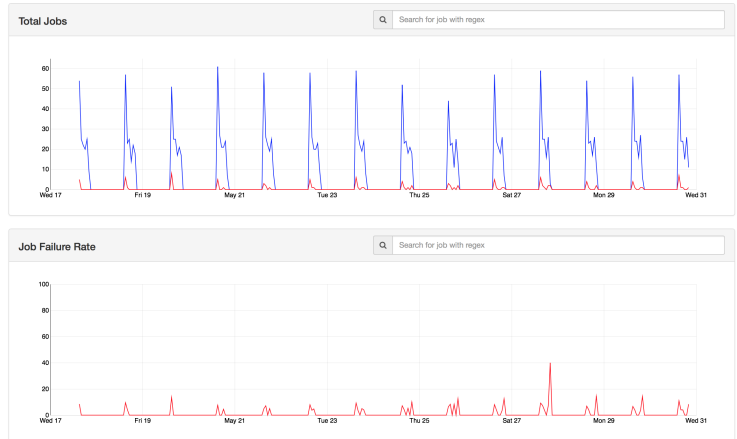
- One commit at the time
- Release ready master
- Check & Gate Pipelines
- Ephemeral test system

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

Beyond the gate

- Periodic tests
- Release jobs

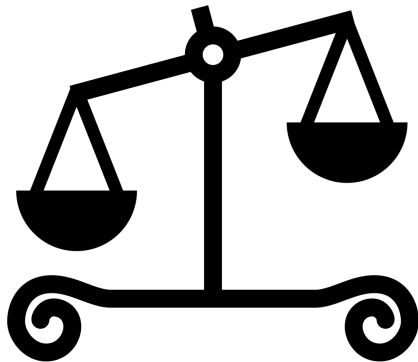
periodic jobs



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

The unbalanced scale

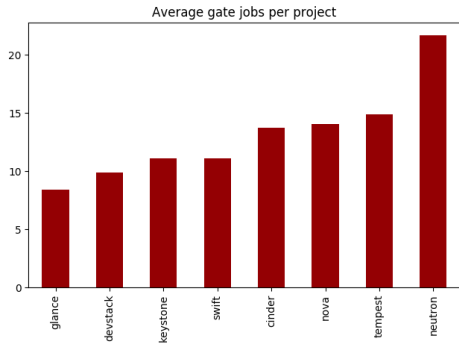
- ▶ Core reviewers
- ▶ Horizontal teams
- ▶ Running CI



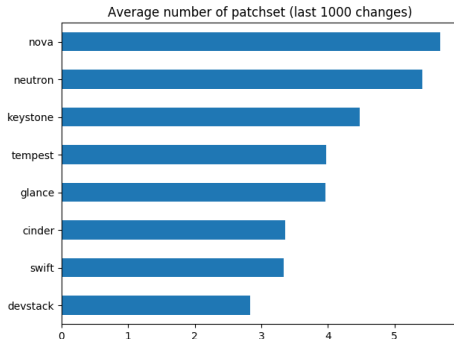
- ▶ Commits
- ▶ # of Tests
- ▶ # of Configurations

Not the scale I meant...

Life as a contributor



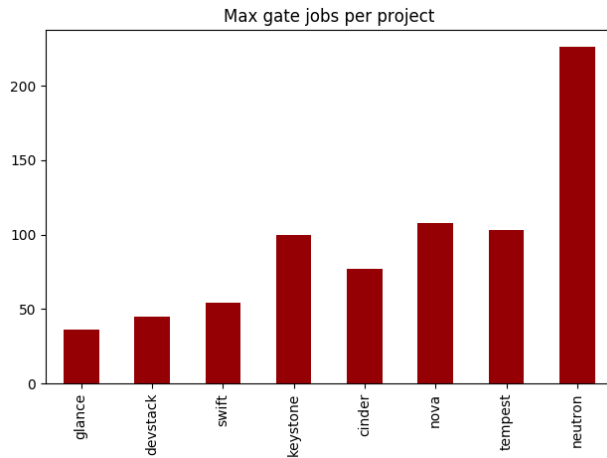
Source: subunit2sql DB



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:

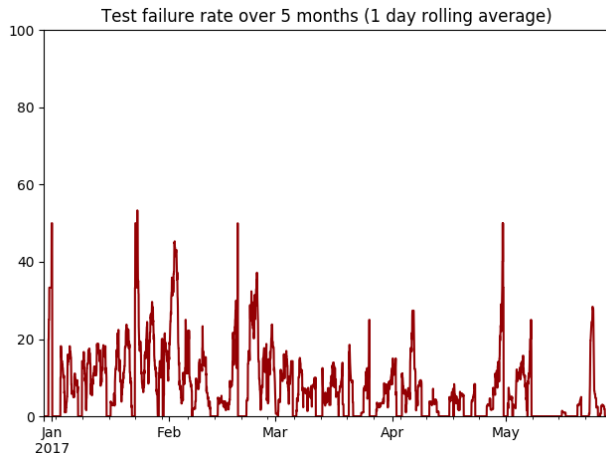
```
536      +      if [ -z "$VRIT_DRIVER" ]; then
537      +          # If there is not virt driver defined we assume nova is not installed
538      +          iniset $STEMPEST_CONFIG service_available nova "False"
539      +      fi
540      +
```

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

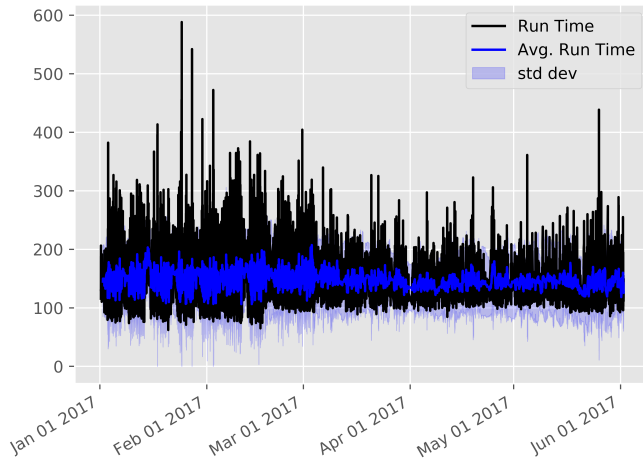
Single run view

- ▶ 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
- ▶ Elastic Recheck: <http://status.openstack.org/elastic-recheck/>
- ▶ E-R Queries: 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/
- ▶ 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/
- ▶ IRC: #openstack-qa
- ▶ email: openstack-dev@lists.openstack.org, tag [QA]

Thank you!
Questions?