Recheck Yourself Before You Wreck Yourself: How Elasticsearch Helps OpenStack QA

Elizabeth K. Joseph, OpenStack Infrastructure Team, HP
@pleia2
OpenStack Infrastructure Team

- Manages the continuous integration system
- Provides technical enforcement of project-wide policies
- Hosts miscellaneous services for developers
The OpenStack Gate

All changes submitted to OpenStack must pass a series of automated unit and integration tests.
Developer workflow

**Upstream Code**
- `nova/master`
  - `Zuul / Jenkins (automated testing)`
    - `gate queue`
  - `Gerrit (Review System)`
    - Review Requirements:
      - Core Reviews: 2 +2, 0 -2
      - Jenkins: +1
  - `Zuul / Jenkins (automated testing)`
    - `check queue`

**Your Local Environment**
- `nova/master`
  - `git clone`
  - `git branch fix_bug.foo`
  - `git commit--amend`
    - `Fix changes Run unit tests git commit`
  - `git review`
  - `nova/fix_bug.foo`
Our goal

A certain level of code quality through coding standards (pep8 standards, pyflakes).

Known working code when anyone pulls from the development branch of OpenStack.
Our fleet

We have over 800 VMs running thousands of tests per day.
Gate failures

- Upstream service outage
- Infrastructure problems or bugs
- OpenStack project bugs
- Test bugs
- Dependency problems
elastic-recheck

Collects, organizes and detects failures to make it easier for developers to discover and fix them.
Lots of logs

1.1 terabytes of compressed logs per month

So we now send a subset to our ELK stack for analysis
Let's walk through how this works for a failure that's new to us
1. There is a failure in the gate, but there shouldn't be, the code being tested is fine.

<table>
<thead>
<tr>
<th>Jenkins</th>
<th>Patch Set 8: Verified-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Build failed (check pipeline).</td>
<td>For information on how to proceed, see</td>
</tr>
<tr>
<td></td>
<td><a href="http://docs.openstack.org/infra/manual/developers.html#automated-testing">http://docs.openstack.org/infra/manual/developers.html#automated-testing</a></td>
</tr>
<tr>
<td>gate-nova-pep8</td>
<td>SUCCESS in 7m 49s</td>
</tr>
<tr>
<td>gate-nova-docs</td>
<td>SUCCESS in 7m 37s</td>
</tr>
<tr>
<td>gate-nova-python27</td>
<td>SUCCESS in 11m 38s</td>
</tr>
<tr>
<td>check-tempest-dsvm-full</td>
<td>SUCCESS in 45m 05s</td>
</tr>
<tr>
<td>check-tempest-dsvm-postgres-full</td>
<td>SUCCESS in 48m 56s</td>
</tr>
<tr>
<td>check-tempest-dsvm-neutron-full</td>
<td>SUCCESS in 1h 12m 44s</td>
</tr>
<tr>
<td>check-grenade-dsvm</td>
<td>FAILURE in 6m 45s</td>
</tr>
<tr>
<td>gate-tempest-dsvm-large-ops</td>
<td>SUCCESS in 30m 00s</td>
</tr>
<tr>
<td>gate-tempest-dsvm-neutron-large-ops</td>
<td>SUCCESS in 24m 41s</td>
</tr>
<tr>
<td>check-devstack-dsvm-cells</td>
<td>SUCCESS in 31m 16s</td>
</tr>
<tr>
<td>gate-nova-tox-functional</td>
<td>SUCCESS in 12m 26s</td>
</tr>
<tr>
<td>check-grenade-dsvm-partial-ncpu</td>
<td>SUCCESS in 39m 25s</td>
</tr>
<tr>
<td>check-tempest-dsvm-ironic-pxe_ssh</td>
<td>SUCCESS in 40m 24s</td>
</tr>
<tr>
<td>check-tempest-dsvm-nova-v21-full</td>
<td>SUCCESS in 43m 40s</td>
</tr>
<tr>
<td>check-tempest-dsvm-cells</td>
<td>FAILURE in 34m 43s (non-voting)</td>
</tr>
<tr>
<td>check-tempest-dsvm-full-ceph</td>
<td>SUCCESS in 42m 13s (non-voting)</td>
</tr>
</tbody>
</table>
2. elastic-recheck notices and adds this to the Unclassified failed jobs page.

http://status.openstack.org/elastic-recheck/data/uncategorized.html
Unclassified failed jobs

Overall Categorization Rate: 66.9%
Total: 272 - Found: 182 = Unclassified: 90

Generated at: 2015-03-03T23:50 (View: 24 hours, 2 days, 7 days, 10 days)

uncategorized: 16 Uncategorized Fails. 70.9% Classification Rate (55 Total Fails)

- gate-tempest-dsvm-neutron-full: 16
- gate-cinder-python27: 8
- gate-grenade-dsvm: 5
- gate-tempest-dsvm-neutron-srsrcollector: 5
- gate-tempest-dsvm-full: 4
- gate-nova-tox-functional: 3
- gate-trove-functional-dsvm-mysql: 3
- gate-tempest-dsvm-postgres-full: 3
- gate-neutron-lbaas-python27: 3
- gate-horizon-python27-django14: 2
- gate-training-guides-tox-slides: 2
- gate-python-ironicclient-python34: 2
- gate-tempest-dsvm-neutron-large-ops: 2
- gate-nova-neutron-functional: 2
- gate-tempest-dsvm-nova-v21-full: 2
- gate-nova-python27: 2
- gate-tempest-dsvm-neutron-src-django_openstack_auth: 1
- gate-oslo.util-python34: 1
- gate-tempest-dsvm-ironic-pxe_ssh: 1
- gate-python-manilaclient-python26: 1
- gate-grenade-dsvm-partial-ncpu: 1
- gate-openstack-manuals-tox-doc-publish-checkbuild: 1
3. The QA team and developers review these unclassified failures by scouring log files to identify a pattern.
4. A bug report is created describing the problem and identifying the pattern found.
5. A Lucene query (fingerprint) is written to match this failure as closely as possible

query: >
  message:"Timeout reached while waiting for callback for node" AND tags:"screen-ir-cond.txt"
6. A patch is submitted against the elastic-recheck repository.

This gets reviewed and merged.

https://git.openstack.org/cgit/openstack-infra/elastic-recheck/tree/queries
7. elastic-recheck monitors logs and notifies patch submitters and QA when their patch has hit a known bug
Developers are notified in their review

Elastic Recheck
Patch Set 8:
I noticed jenkins failed, I think you hit bug(s):

- check-grenade-dsvm: https://bugs.launchpad.net/bugs/1365046

If you believe we’ve correctly identified the failure, feel free to leave a 'recheck' comment to run the tests again. For more details on this and other bugs, please see http://status.openstack.org/elastic-recheck/
QA team is notified on IRC

<openstackrecheck> openstack/nova change: https://review.openstack.org/156957 failed because of: gate-grenade-dsvm-ironic-sideways: https://bugs.launchpad.net/bugs/1425258
How it works

1. Gerrit
2. er data scripts
3. Logs.openstack.org
4. irc.freenode.net

Test Completes → All artifacts

Results

Report < 15 minutes after fail

Known Patterns

status.openstack.org/elastic-recheck

Every 30 mins

Select LOGs at INFO+

Diagram credit: Sean Dague
Developers rejoice

They can re-run tests, confident that their change did not cause the failure.
QA rejoices

They can now identify bug trends!

- when it started
- is the bug fixed
- is it getting worse
- ...
Systems administrators rejoice

Slow cloud provider?

Dependency issue crop up with a package update?

Now we know!
Drawbacks

- There's an art to finding the error in the logs that we want to write a query for.
- Diligence from the team is required in staying on top of bugs, new ones always crop up.
- Can still sometimes make overly broad queries that make reports less useful.
- Not all bugs are logged.
Get the code

Source
https://git.openstack.org/cgit/openstack-infra/elastic-recheck/tree/

Documentation
http://docs.openstack.org/infra/elastic-recheck/readme.html