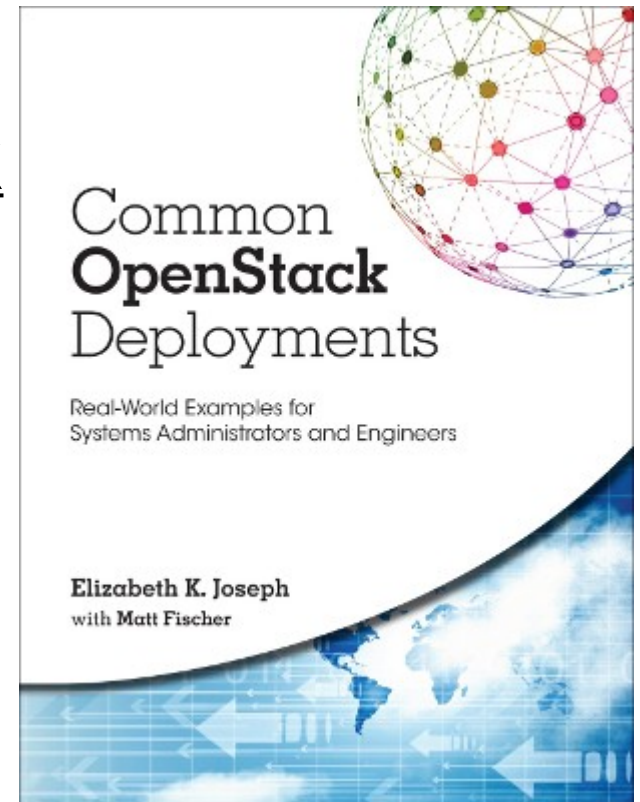


# The OpenStack Project Continuous Integration System

Elizabeth K. Joseph  
@pleia2

# Elizabeth K. Joseph

- Core/root member of the OpenStack Infrastructure Team
- Author of Common OpenStack Deployments (along with Matt Fischer)



# Projects

- Over 1500 individual git repositories
- All need capacity for CI
- Many need integration testing

# Other efforts

- Documentation
- Translations (i18n)
- Infrastructure
- Quality Assurance
- Release Management
- Oslo

# Contributors

- Unaffiliated individuals
- Commercial entities
- Non-profit organizations
- Research facilities
- National and local governments

# Specific Challenges

- Testing effect of merging change
- Using cloud builders
- Large numbers of similar projects
- Disparate hardware configurations

# Consistent Tooling

- Minimize meta-development
- Process divergence == wasted developer time
- Lowers on-boarding time
- Consolidate tool development
- Minimize project-specific weird build crud

# Developer Infrastructure

- Code review and git
- Test/build automation
- Job logs, artifacts
- Releases (PyPI, tarballs, etc)
- Collaboration and communication tools
- Feature, bug and task tracking



# Project Infrastructure in Git

- All system administration performed via code review
- Anyone on the internet can look at our changes
- Anyone can sign up for a code review account
- Anyone can write and propose changes
- <https://git.openstack.org/cgit/openstack-infra/system-config/tree/>

# Development Environment

- Python using pep8, Ubuntu, Fedora
- Tests run on all submitted changes
- Code merges are gated on tests

# Project Gating

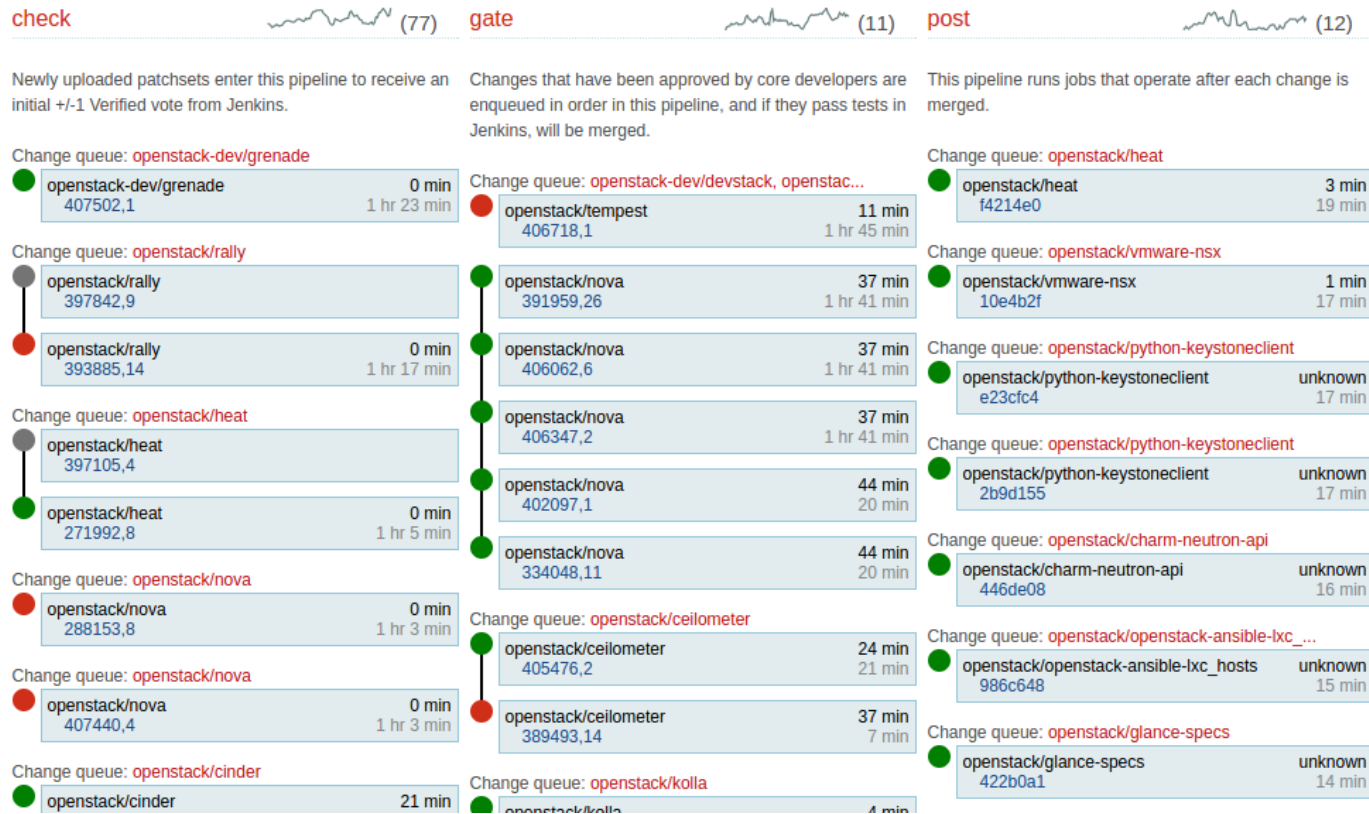
- Ensures code quality
- Protects developers from each other
- Protects tree so bad code doesn't land
- The process is the same for everyone

# Everything is automated

## 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](#).

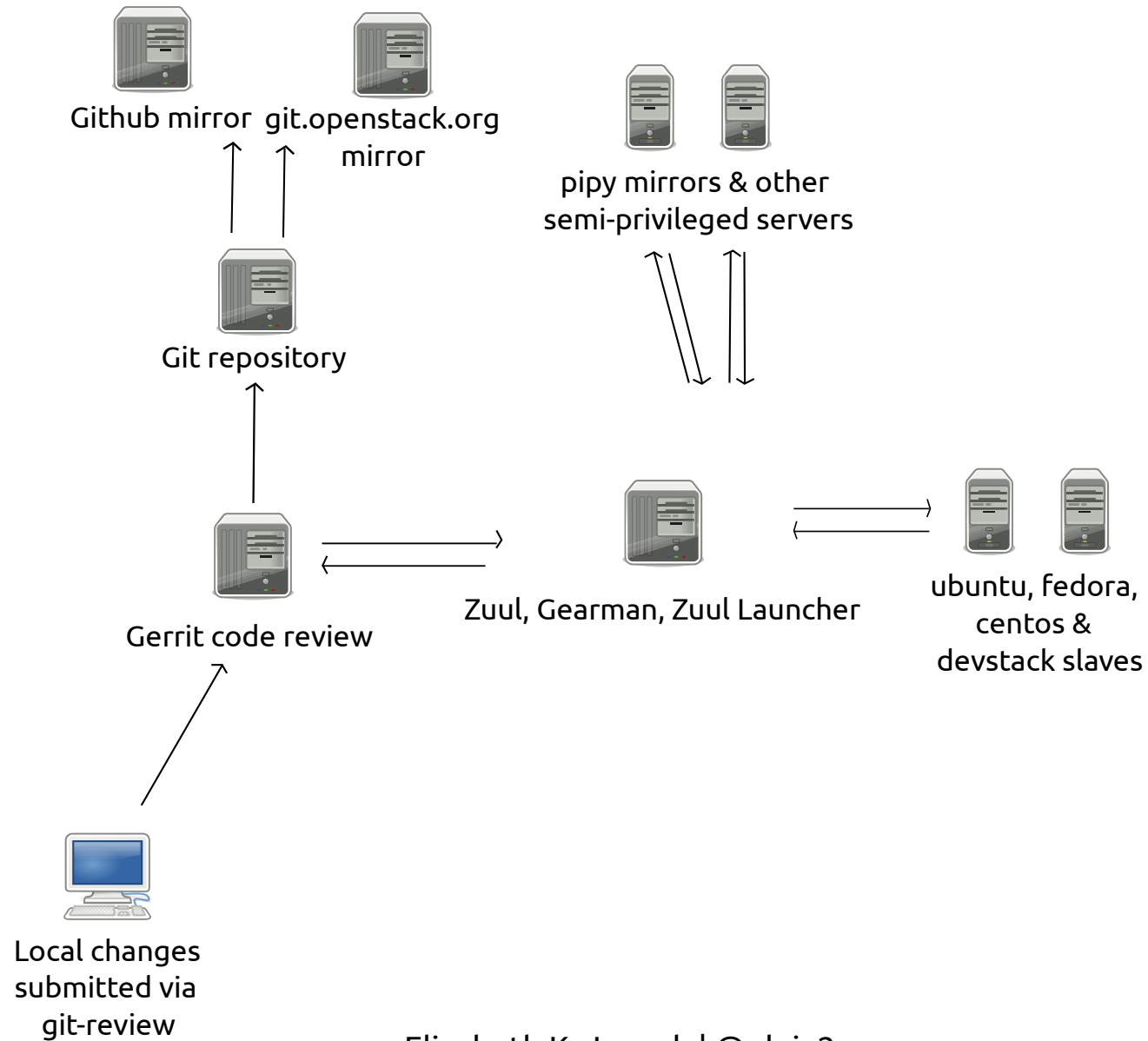
Queue lengths: 0 events, 0 results. Filters:  Expand by default:



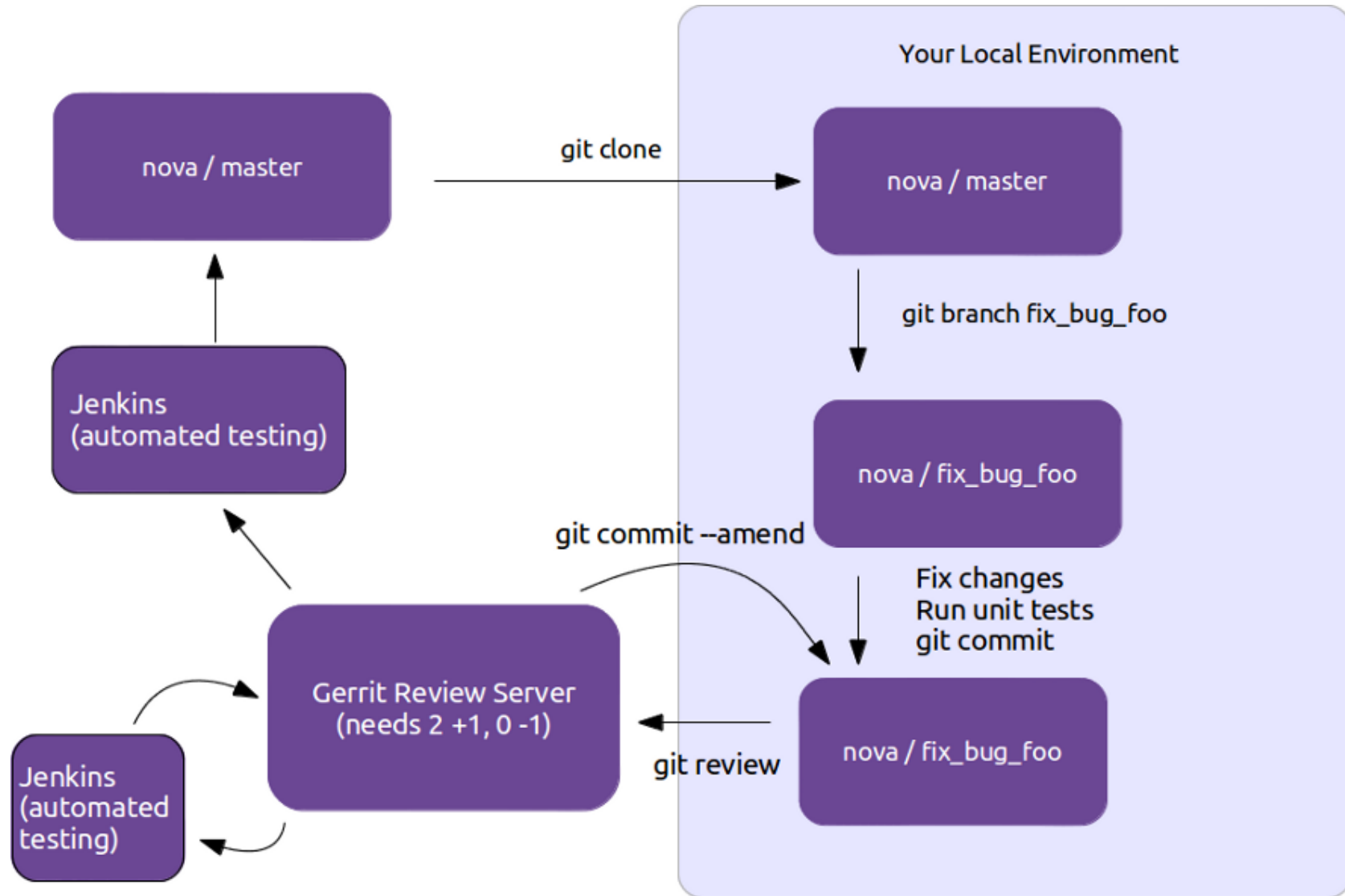
<http://status.openstack.org/zuul/>

Elizabeth K. Joseph | @pleia2

# CI Workflow




# Process Flow



# Gerrit Code Review

- Stand-alone patch review system
- Integration points: hooks, JSON queries, event-stream
- Extensible review categories, default: Verified, Code-Review
- REST API

# Gerrit

All **My** Projects People Plugins DocumentationSearch term  Search Elizabeth K. Josep

Change 308264 - Needs Workflow Reply... Patch Sets (2/2) Download

### Prevent nova-api from dying if enabled\_apis is wrong

This prevents nova-api from dying if there are values in ``enabled\_apis`` which don't actually exist. This is all the way out at the cli for nova-api which makes it really hard to test for real with anything in tree, so should be looked at carefully.

Closes - Bug: #1572495

Change-Id: Id9a6f5e38b017f4687eb245fd238104379d437d6

Author	Sean Dague <sean@dague.net>	Apr 20, 2016 3:53 AM
Committer	Sean Dague <sean@dague.net>	Apr 21, 2016 11:15 AM
Commit	f1a4474722ab84c268001dd877cc500cc5062dd	<input type="checkbox"/> (gitweb)
Parent(s)	5f996d4786c11a587364cfa9a6acf5922f5245a6	<input type="checkbox"/> (gitweb)
Change-Id	Id9a6f5e38b017f4687eb245fd238104379d437d6	<input type="checkbox"/>

Owner: Sean Dague

Reviewers: Citrix XenServer CI × XenProject CI × jichenj × Add...

DB Datasets CI × IBM PowerKVM CI × Intel NFV CI × Intel PCI CI × Jenkins × Matt Riedemann × Microsoft Hyper-V CI × Quobyte CI × Virtuozzo CI ×

Project: openstack/nova

Branch: master

Topic: 1572495

Strategy: Merge if Necessary

Updated: 9 minutes ago

Cherry Pick Rebase Abandon Follow-Up

#### Related Changes (2)

- Prevent nova-api from dying if deprecated nova-all

Code-Review +1 jichenj

Verified +1 Citrix XenServer CI XenProject CI

Workflow

Intel PCI CI check	11:32 AM
pci-test	SUCCESS
Citrix XenServer CI check	12:23 PM
check-citrix-xenserver	SUCCESS in 01 h 06 m 40 s
IBM PowerKVM CI check	12:28 PM
check-ibm-tempest-dsvm-full	SUCCESS in 1h 12m 20s (non-voting)
XenProject CI check	12:33 PM
dsvm-tempest-xen	SUCCESS in 1h 17m 33s
Microsoft Hyper-V CI check	1:02 PM
nova-dsvm-full-tempest	SUCCESS in 1h 46m 06s

Files Open All Diff against: Base Edit

File Path	Comments	Size
Commit Message		
nova/cmd/api.py	14	
	+12, -2	

History Expand All

Sean Dague	Uploaded patch set 1.	Apr 20 3:56 AM
DB Datasets CI	Patch Set 1: Verified+1 Database migration testing successful. - real-db-upgrade_nova_mysql_devstack_131007:th-mysql http://www.rcbops.com/turbo...	Apr 20 4:08 AM
Intel PCI CI	Patch Set 1: * pci-test http://52.27.155.124/pci/308264/1 : SUCCESS	Apr 20 4:13 AM
Virtuozzo CI	Patch Set 1: Build failed - check-dsvm-tempest-v27-exe-minimal http://openstack-3rd-party-virtuozzo-ci-logs.virtuozzo.com/64/308264/1/check/check-d...	Apr 20 4:34 AM
IBM PowerKVM CI	Patch Set 1: Testing completed on IBM PowerKVM platform. For rechecking only on the IBM PowerKVM CI, add a review comment with pkvm-recheck...	Apr 20 5:05 AM
Citrix XenServer CI	Patch Set 1: Verified+1 Testing completed on Citrix Xenserver. For rechecking only on the Citrix Xenserver CI,add a review comment with "xenserver. r...	Apr 20 5:05 AM
XenProject CI	Patch Set 1: Verified+1 Build succeeded. - dsvm-tempest-xen http://logs.openstack.xenproject.org/64/308264/1/check/dsvm-tempest-xen/719f971 : SU...	Apr 20 5:13 AM
Jenkins	Patch Set 1: Verified-1 Build failed (check pipeline). For information on how to proceed, see http://docs.openstack.org/infra/manual/developers.html#au...	Apr 20 5:39 AM
Microsoft Hyper-V CI	Patch Set 1: Build succeeded. - nova-dsvm-full-tempest http://64.119.130.115/nova/308264/1/ : SUCCESS in 1h 56m 27s	Apr 20 5:53 AM
Sean Dague	Patch Set 1: recheck	Apr 20 8:39 AM
IBM PowerKVM CI	Patch Set 1: Testing completed on IBM PowerKVM platform. For rechecking only on the IBM PowerKVM CI, add a review comment with pkvm-recheck..	Apr 20 10:19 AM
Microsoft Hyper-V CI	Patch Set 1: Build succeeded. - nova-dsvm-full-tempest http://64.119.130.115/nova/308264/1/ : SUCCESS in 1h 48m 37s	Apr 20 10:29 AM
Jenkins	Patch Set 1: Verified+1 Build succeeded (check pipeline). - gate-nova-docs http://docs-draft.openstack.org/64/308264/1/check/gate-nova-docs/2b93aa...	Apr 20 11:35 AM
Matt Riedemann	Patch Set 1: (2 comments) nova/cmd/api.py Line 51: This is also in nova/cmd/all.py so you'd probably want to do it there also, although I'm not sure how many people actually use that endpoint. nit: I'd say: Line 58: "The 'enabled_apis' configuration option contains bad values...."	Apr 20 1:34 PM ←



# Gerrit diff view

openstack/nova / nova/cmd/api.py

Patch Set Base 1 2 ... skipped 16 common lines ...

```
17 """Starter script for Nova API.
18
19 Starts both the EC2 and OpenStack APIs in separate greenthreads.
20
21 """
22
23 import sys
24
25 from oslo_log import log as logging
26 from oslo_reports import guru_meditation_report as gmr
27
28 import nova.conf
29 from nova import config
30
31 from nova import objects
32 from nova import service
33 from nova import utils
34 from nova import version
35
36 CONF = nova.conf.CONF
37
38 def main():
39     config.parse_args(sys.argv)
40     logging.setup(CONF, "nova")
41     utils.monkey_patch()
42     objects.register_all()
43
44     gmr.TextGuruMeditation.setup_autorun(version)
45
46     launcher = service.process_launcher()
47     for api in CONF.enabled_apis:
48         should_use_ssl = api in CONF.enabled_ssl_apis
49         server = service.WSGIService(api, use_ssl=should_use_ssl)
50         launcher.launch_service(server, workers=server.workers or 1)
51
52 launcher.wait()
```

Patch Set 1 2 ... skipped 16 common lines ...

```
17 """Starter script for Nova API.
18
19 Starts both the EC2 and OpenStack APIs in separate greenthreads.
20
21 """
22
23 import sys
24
25 from oslo_log import log as logging
26 from oslo_reports import guru_meditation_report as gmr
27 import six
28
29 import nova.conf
30 from nova import config
31 from nova import exception
32 from nova.i18n import _LW
33 from nova import objects
34 from nova import service
35 from nova import utils
36 from nova import version
37
38 CONF = nova.conf.CONF
39
40 def main():
41     config.parse_args(sys.argv)
42     logging.setup(CONF, "nova")
43     logging.setup(CONF, "nova")
44     utils.monkey_patch()
45     objects.register_all()
46     log = logging.getLogger( name )
47
48     gmr.TextGuruMeditation.setup_autorun(version)
49
50     launcher = service.process_launcher()
51     for api in CONF.enabled_apis:
52         should_use_ssl = api in CONF.enabled_ssl_apis
53         try:
54             server = service.WSGIService(api, use_ssl=should_use_ssl)
55             launcher.launch_service(server, workers=server.workers or 1)
56         except exception.PasteAppNotFound as ex:
57             log.warning(
58                 _LW("%s. ``enabled_apis`` includes bad values. "
59                    "Fix to remove this warning."), six.text_type(ex))
60
61 launcher.wait()
```

# Bug Integration - Launchpad

## Nova API fails to start if "ec2" is specified in enabled\_apis

Bug #1572495 reported by Sean Dague on 2016-04-20

This bug affects 1 person. Does this bug affect you?

6

Affects	Status	Importance	Assigned to	Milestone
OpenStack Compute (nova)	In Progress	High	Sean Dague	

Also affects project Also affects distribution/package

### Bug Description

As reported by Kevin Foxx yesterday, if "ec2" is listed in enabled\_apis in Mitaka and beyond Nova will refuse to start because we removed it.

We assumed the change in defaults was good enough for people to move forward, but didn't realize that many of the install tools (packstack for sure) hardcoded this value into the config instead of sticking with the defaults.

While we've added a new upgrade note on this, we could also actually catch the error and not crash people.

Tags: api upgrades

Sean Dague (sdague) on 2016-04-20

Changed in nova:

status:New → Confirmed

importance:Undecided → High

tags:added: api

tags:added: upgrades

Report a bug

This report contains Public information

Everyone can see this information.

Mark as duplicate

Convert to a question

Link a related branch

Link to CVE

You are not directly subscribed to this bug's notifications.

Edit bug mail

### Other bug subscribers

Subscribe someone else

Notified of all changes

Sean Dague

May be notified

Adam Johnson

Ahmed Ezzat

Aishwarya

Alex Baretto

Alex Ermolov

Alex Meade

Alex Xu

Alfred Shen

Alfredzo Nash

Ali hussnain

# Reviews at a glance

Search for status:open

ID	Subject	Owner	Project	Branch	Updated	V	R	A
☆ I7353991f	Add hypervisor information extension.	Kevin L. Mitchell	openstack/python-novaclient	master (hypervisor-info)	2:56 PM			
☆ I29b69022	Expand HACKING with commit message guidelines	Brian Waldon	openstack/nova	master (hacking-commit-messages)	2:54 PM		✓	
☆ Ie6d68026	Add multi-process support for API services	Johannes Erdfelt	openstack/nova	master (bp/multi-process-api-service)	2:53 PM	+1		
☆ I3bb1b83b	IP Address allocation	garyk	openstack/quantum	master (bug/1008029)	2:53 PM			
☆ Ied0d325a	Change cli options to use dashes	Dean Troyer	openstack/python-keystoneclient	master (bp/https)	2:49 PM	-1		
☆ Ib87c3dad	Refactoring of base test case classes	Rohit Karajgi	openstack/tempest	master (whitebox-manager)	2:49 PM			
▶ ☆ I90ce78d7	Allow specification of the libvirt guest CPU model per host	Daniel Berrange	openstack/nova	master (bug/1003373)	2:47 PM	+1	✓	
☆ I8d535cb6	Updated files from openstack-common.	andrewbogott	openstack/nova	master (newcommon)	2:45 PM	+1	-1	
☆ Ia8a80a71	Add Java Melody to Gerrit.	Clark Boylan	openstack-ci/gerrit	openstack/2.4.1 (bug/1013201)	2:45 PM		✓	✓
☆ I5b96e453	Set the default CPU mode to 'host-model' for Libvirt KVM/QEMU guests	Daniel Berrange	openstack/nova	master (bug/1003373)	2:40 PM			
☆ I121e8cc6	Webob needs body to calc Content-Length (bug 1016171)	Dolph Mathews	openstack/keystone	master (bug/1016171)	2:40 PM			
☆ I3e55ffcc	Add compatibility for CPU model config with libvirt < 0.9.10	Daniel Berrange	openstack/nova	master (bug/1003373)	2:38 PM	+1		
☆ I6e9d7bd2	Removed the min_count and max_count attributes from create server. These are a R	Diane Fleming	openstack/compute-api	master (mincount_undo)	2:33 PM			

# Git Review

- External Git subcommand
- Developers can easily incorporate code review into git workflow
- Zero-configuration
- Can be used for any project, being adopted by other projects

# Gerrit git prep, Zuul Cloner

- Test the result of the change, not the change
- `openstack-infra/project-config:jenkins/scripts/gerrit-git-prep.sh`
- Gerrit git prep:
  - grabs target branch
  - cleans tree
  - merges change to be tested
- Zuul Cloner:
  - grabs target branch (from local cache)
  - cleans tree
  - merges change to be tested
  - cross project dependencies with Depends-On header

# Interrelated Integration Testing

- devstack-gate & Nodepool
  - boot fresh servers
  - run DevStack
  - run integration tests
- OpenStack Puppet Integration
  - boot fresh servers
  - use puppet to provision OpenStack
  - deploy tempest to run integration tests
- Gate proposed change against current state of other projects

# Zuul

- A general purpose trunk gating system
- Interfaces with Gerrit and Nodepool (via Zuul Launcher)
- Flexible configuration allows for many kinds of project automation
- Allows parallel testing of serialized changes

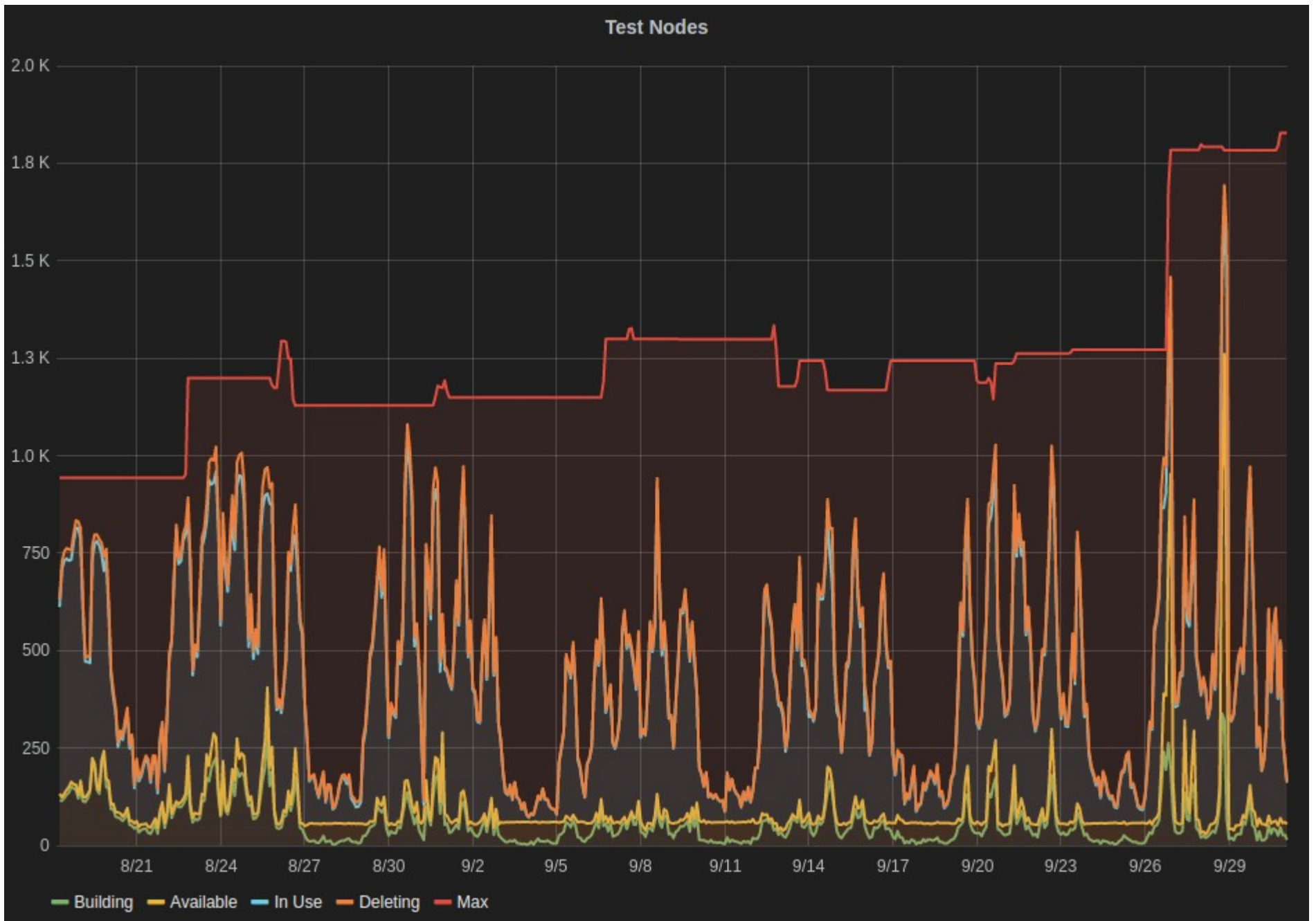
# Logs

- Massive amount of logs generated
  - Terabytes of compressed logs per development cycle
- Filtered and normalized by LogStash
- Recent logs indexed by ElasticSearch
  - Searchable through Kibana and ElasticSearch API
- Driving automatic failure classification



# Elastic test nodes with Nodepool

- Automate management (build, delete) of test nodes
- Handles multiple OpenStack clouds
- Hit 2k test nodes in the Newton cycle



Elizabeth K. Joseph | @pleia2

# Questions?

System Documentation

<http://docs.openstack.org/infra/system-config/>

Email me

[lyz@princessleia.com](mailto:lyz@princessleia.com)

Common OpenStack Deployments book, use code **OPENSOURCE35** to save 35% on checkout at [informit.com](http://informit.com)