Open Source tools for distributed systems administration

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Elizabeth K. Joseph

- OpenStack Infrastructure Team systems administrator, paid by Hewlett Packard Enterprise
- Long time contributor to various open source projects
- Co-author of The Official Ubuntu Book, 8th ed
1. Our team
2. The OpenStack CI system
3. Code Review
4. Automated testing
5. Other collaboration tools
6. Communication
How most open source projects do infrastructure

- Team (or company) manages it ...or they just use code hosting
- Requests are submitted via mailing list, bug report or ticketing system
- Request priority is determined by the core team

This may be similar to your organization.

Is there a better way?
OpenStack Infrastructure Team

- Our job is to make sure the OpenStack developers can do their job
- All of our system configurations are open source and tracked in git: https://git.openstack.org/cgit/openstack-infra
- Anyone in the world can propose patches for direct inclusion in our infrastructure, instructions at: http://docs.openstack.org/infra/manual/developers.html
- We all work remotely. Worldwide: US, Russia, Australia, Spain.
What we run

- Askbot
- Continuous Integration systems
- Cacti
- Elasticsearch, Logstash and Kibana
- IRC Bots
- Etherpad
- Git
- Paste
- Planet
- Puppetboard
- Mailing Lists
- Translations platform
- Various web services
- Wiki
OpenStack Continuous Integration (CI) System

- Lots of individual projects (800+)
- All projects must work together
- Changes can't break master branch
- Code should be syntactically clean
- Testing must be completed automated
Tools we're using for CI

- Launchpad (someday: openstackid)
- Git
- Gerrit
- Zuul*
- Gearman
- Jenkins (with jenkins-job-builder*, devstack-gate*)
- Nodepool*

* Started by the OpenStack Infrastructure team

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Why do I care?

The Infrastructure team uses it too!
Automated tests for infrastructure

- flake8 (pep 8 and pyflakes)
- puppet parser validate
- puppet lint
- Puppet application tests
- XML checkers
- Alphabetized files
- IRC channel permissions
Peer review means...

- Multiple eyes on changes prior to merging
- Good infrastructure for developing new solutions
- No special process to go through for commit access
- Trains us to be collaborative by default
- Since anyone can contribute, anyone can devote resources to it
Gerrit in-line comments
Automated deployment

• Change gets approved, tested and merged
• ...Either puppet master gets updated and applies change
• ...Or vcsrepo module in puppet pulls in latest version of project
Can you really manage an infrastructure via git commits?

Cacti (http://cacti.openstack.org/) to keep an eye on server usage
Cacti

Graph Template: uct/net - CPU Usage (Complete)

static.openstack.org - CPU Usage

Graph Template: uct/net - Device IO - Operations

static.openstack.org - IO Operations - dm-0

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Can you really manage an infrastructure via git commits? (2/3)

PuppetBoard (http://puppetboard.openstack.org/) so you can watch your changes get applied, or not
### PuppetBoard

<table>
<thead>
<tr>
<th>NODES</th>
<th>FACTS</th>
<th>REPORTS</th>
<th>METRICS</th>
<th>QUERY</th>
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</table>

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Live from PuppetDB.

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Can you really manage an infrastructure via git commits? (3/3)

Thorough, specific documentation at http://docs.openstack.org/infra/system-config
Well, not everything

- Automation is not perfect, sometimes you just need to log into a server
- Complicated migrations and upgrades need manual components (but we automate more every time!)
- Initial persistent server deployment still has manual components
- Passwords need to be privately managed (but we use git!)
Maintenance collaboration on Etherpad

1. Prepare a change to the project-config repo to update things like projects.yml/ACLs, jenkins-job-builder and gerritbot for the new name. Also add changes to update projects.txt in all branches of the requirements repo and devstack-vm-gate-wrap.sh in the devstack-gate repo if necessary.

2. Stop puppet runs on the puppetmaster to prevent early application of configuration changes: [fungi] DONE
   
   ```
   sudo crontab -u root -e
   ```
   
   Comment out the crontab entries. Use `ps` to make sure that a run is not currently in progress. When it finishes, make sure the entry has not been added back to the crontab.

   
   ```
   python /opt/zuul/tools/zuul.changes.py http://zuul.openstack.org gate >gate.sh
   python /opt/zuul/tools/zuul.changes.py http://zuul.openstack.org check >check.sh
   sudo invoke-rc.d zuul stop
   sudo rm -f /var/run/zuul/zuul.pid /var/run/zuul/zuul.lock
   ```

4. Stop Gerrit on review.openstack.org: [nibalizer] DONE
   
   ```
   sudo invoke-rc.d gerrit stop
   ```

5. Update the database on review.openstack.org: [nibalizer] DONE
Human collaboration

- Main IRC channel (#openstack-infra)
- Incident IRC channel (#openstack-infra-incident)
- Sprint IRC channel (#openstack-sprint)
- Weekly IRC-based meetings (#openstack-meeting)
- Channel/Meeting logs on [http://eavesdrop.openstack.org/](http://eavesdrop.openstack.org/)
- In person collaboration at the OpenStack Design Summit every 6 months

No voice or video calls.
And then there are time zones :(

- Increased coverage is great, but...
  - The first core/root member in a particular region struggles to feel cohesion with the team
  - Increased reluctance to land changes into production
  - Makes for slower on-boarding for key tasks

- Only solved by increasing coverage in that time zone so they're not alone
But mostly it's pretty great!

(and our team always needs help)
Questions

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Freenode: pleia2

OpenStack CI Resources: http://docs.openstack.org/infra/system-config/