About Me

Open Source user for 12 years

Gnu Coreutils co-maintainer (4 of us) for 4 years

Red Hatter for 6 months

Open Stacker for 4 months

Fedora OpenStack lead for 1 month

http://www.pixelbeat.org/talks/openstack_essex/

What is OpenStack

- IaaS platform (like AWS)
- Open Source (unlike vmware or aws etc.)
- Leverages lots of existing Linux technologies
- Written mainly in 2.6 <= python < 3.0
- 2012-03-22 (yesterday) Amazon acknowledges need for private on-premise clouds
  - Partners with Eucalyptus

Who uses OpenStack?

- private clouds
  - mercado libre (ebay of south america)
  - Wikimedia
  - scientific community
    - NASA
    - HEPIX
      - CERN
    - ISI.edu
- Public clouds
  - Rackspace
  - HP

OpenStack Project Structure

- Separate projects in different groups
- community project -> incubation project -> core project
- Core (Essex)
  - nova, swift, glance + horizon & keystone
- Incubation
  - Melange
  - Quantum
- Community
  - Lots of businesses being formed around these
  - DatabaseAsAService CloudHA CloudAbstractions ...

Linux Kernel Similarities

- Open Source
- Released early
- OpenStack Foundation is being formed akin to the Linux Foundation
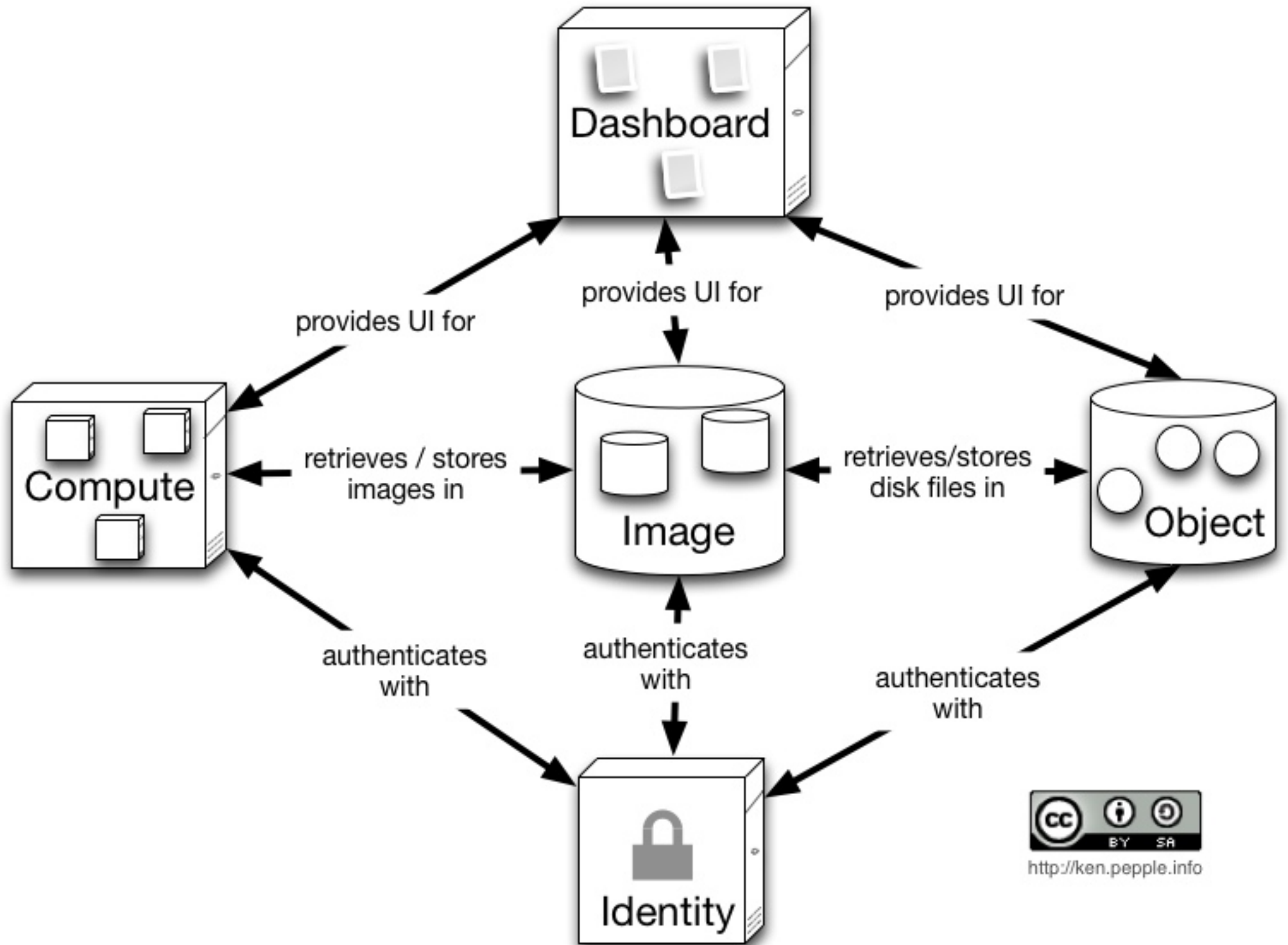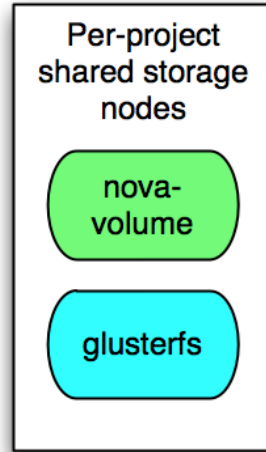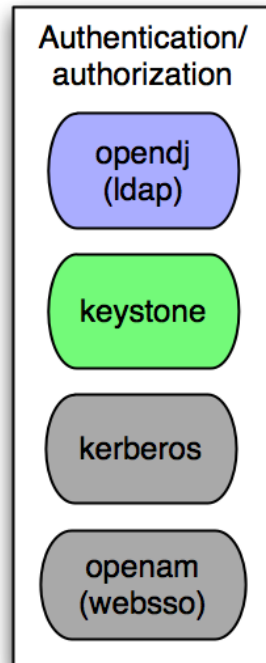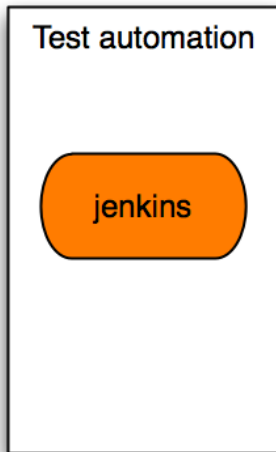- One could consider the abstractions quite similar too:

coreutils	VMs
kernel	openstack

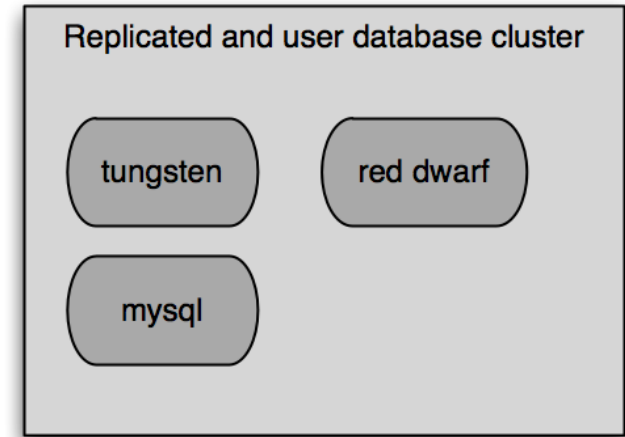| cpu	mem	dev	net	obj	blk
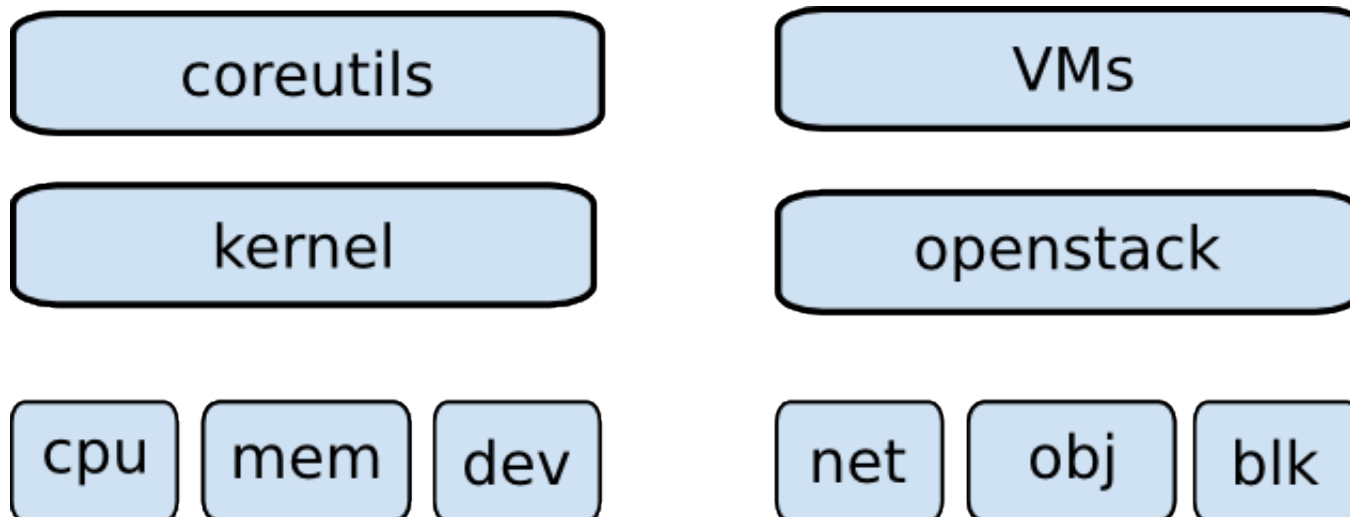
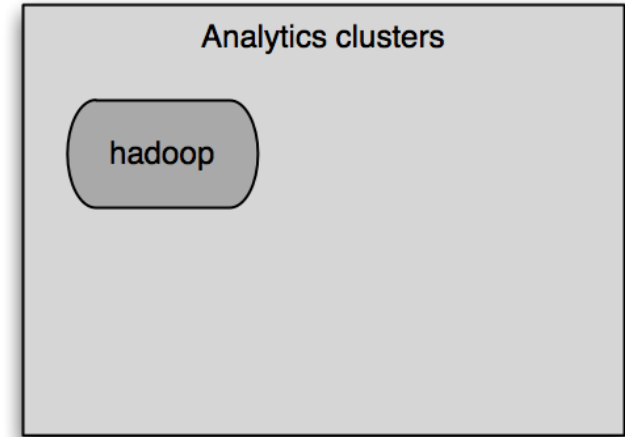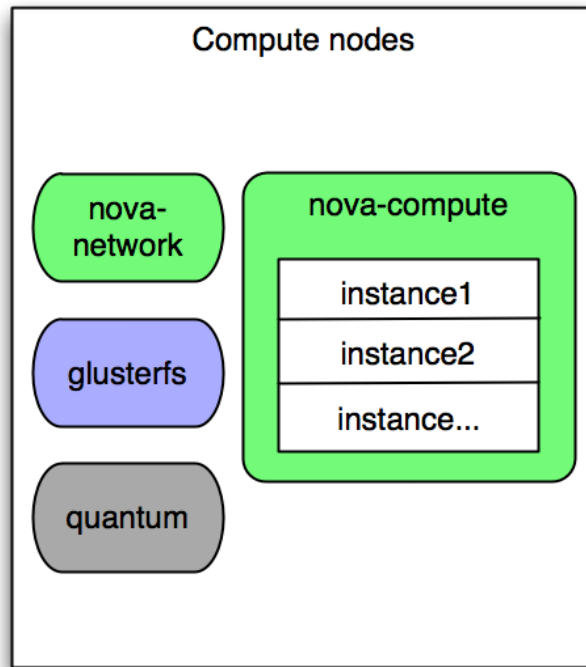# Release History

- 6 monthly (except for Bexar)
- Austin Oct 2010
  - Nova + Swift
- Cactus Apr 2011
  - Glance
- Diablo Sep 2011
  - First "production ready" release
- Essex Apr 2012
  - Horizon + Keystone
- Folsom Sep 2012
  - Quantum + Melange

Core Projects Overview

- Nova akin to EC2 – Controls VMs
- Swift akin to S3 – Object storage
- Glance – VM image, registration service
- Keystone – Identity/Auth
- Horizon – Self service and Admin UI
- Quantum – Advanced networking

Dashboard

Compute

Image

Object

Identity

provides UI for

provides UI for

provides UI for

retrieves / stores images in

retrieves/stores disk files in

authenticates with

authenticates with

authenticates with

Controller
- nova-scheduler
- mediawiki
- nova-api
- puppet
- glance
- DNS
- mysql
- rabbitmq

Compute nodes
- nova-network
- nova-compute
  - instance1
  - instance2
  - instance...
- glusterfs
- quantum

Analytics clusters
- hadoop

Test automation
- jenkins

Repositories/ code review
- gerrit

Authentication/ authorization
- opendj (ldap)
- keystone
- kerberos
- openam (websso)

Per-project shared storage nodes
- nova-volume
- glusterfs

Replicated and user database cluster
- tungsten
- red dwarf
- mysql

Wikimedia implementation

http://ryandlane.com/blog/?attachment_id=505

Nova summary

- VM control
    - Functions and supported virt platforms at:
        - http://wiki.openstack.org/HypervisorSupportMatrix
        - KVM & XenServer the 2 main ones
- Largest most active project
- New projects tend to fall out of here

Glance summary

- Lookup, caching and retrieval of VM images

- Storage in swift, S3, or file system

- REST interface

- Sort/Filter on name, status, format, size, etc.

Keystone summary

- Issue and Validate tokens
- Rewritten in the last few weeks
- Supports multi-tenant clouds
  - tenant_id = token scope
- Request Token
  - user_id, tenant_id, password -> http://0.0.0.0:5000/v2.0/tokens
- Validate Token
  - user_id, tenant_id, token_id -> http://0.0.0.0:35357/v2.0/tokens/$TOKEN

Quantum summary

- Advanced network topologies

  - Compared to Nova's FlatManager or VlanManager

- Supports plugable advanced network services

  - VPN-aaS, firewall-aaS, IDS-aaS, ...

- Other possible plugins

  - QoS, netflow, ...

- openvswitch support now in Fedora 17 (kernel)

- www.mariosandreou.com...openstack-cimi-network

Nova Compute Service

- Plugable components
  - KVM -> XenServer or LXC, ...
  - Qpid -> RabbitMQ or ØMQ
  - DB can be postgres, mysql, ...
- Components can be distributed
  - See wikimedia slide
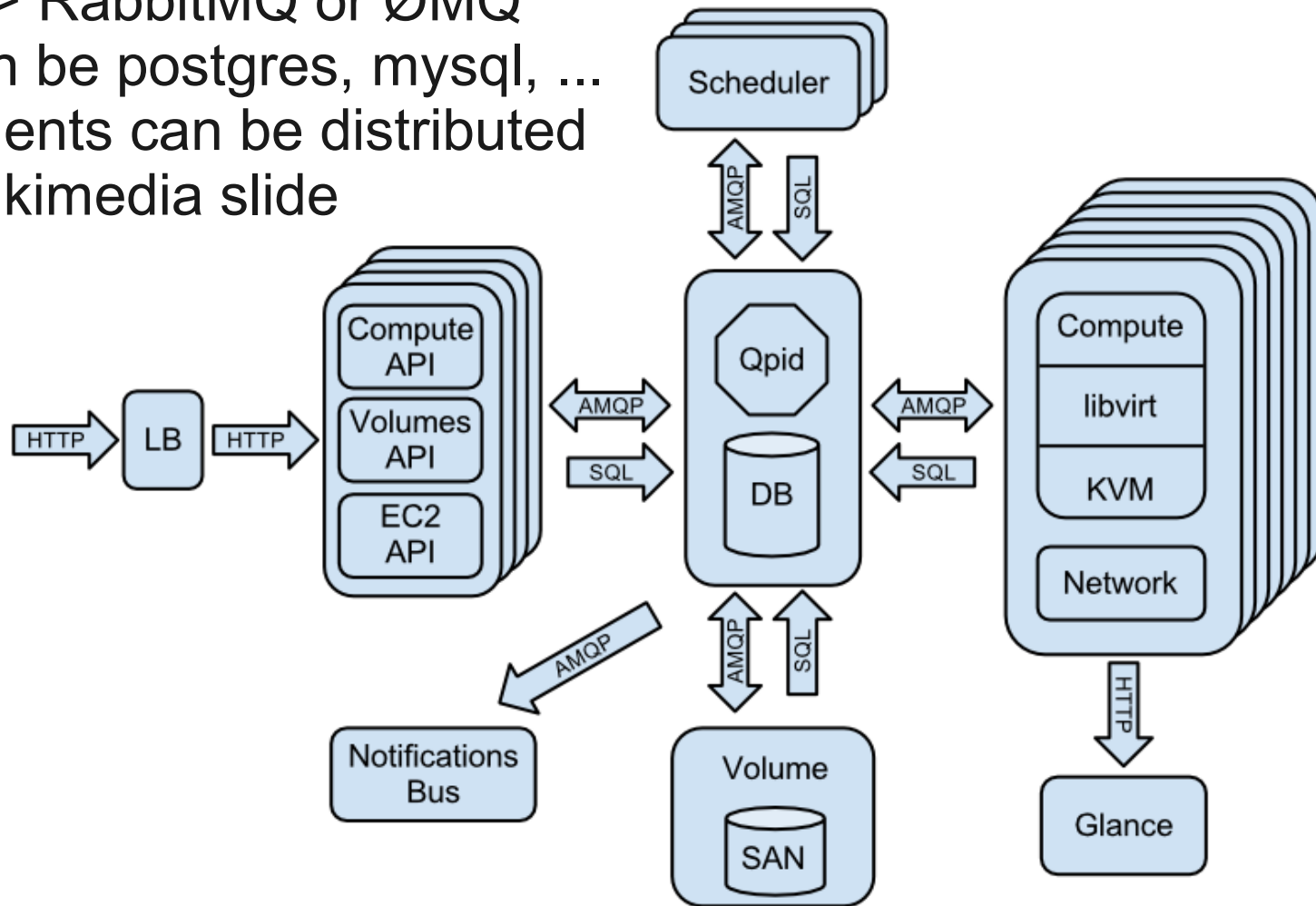
Nova request sequence
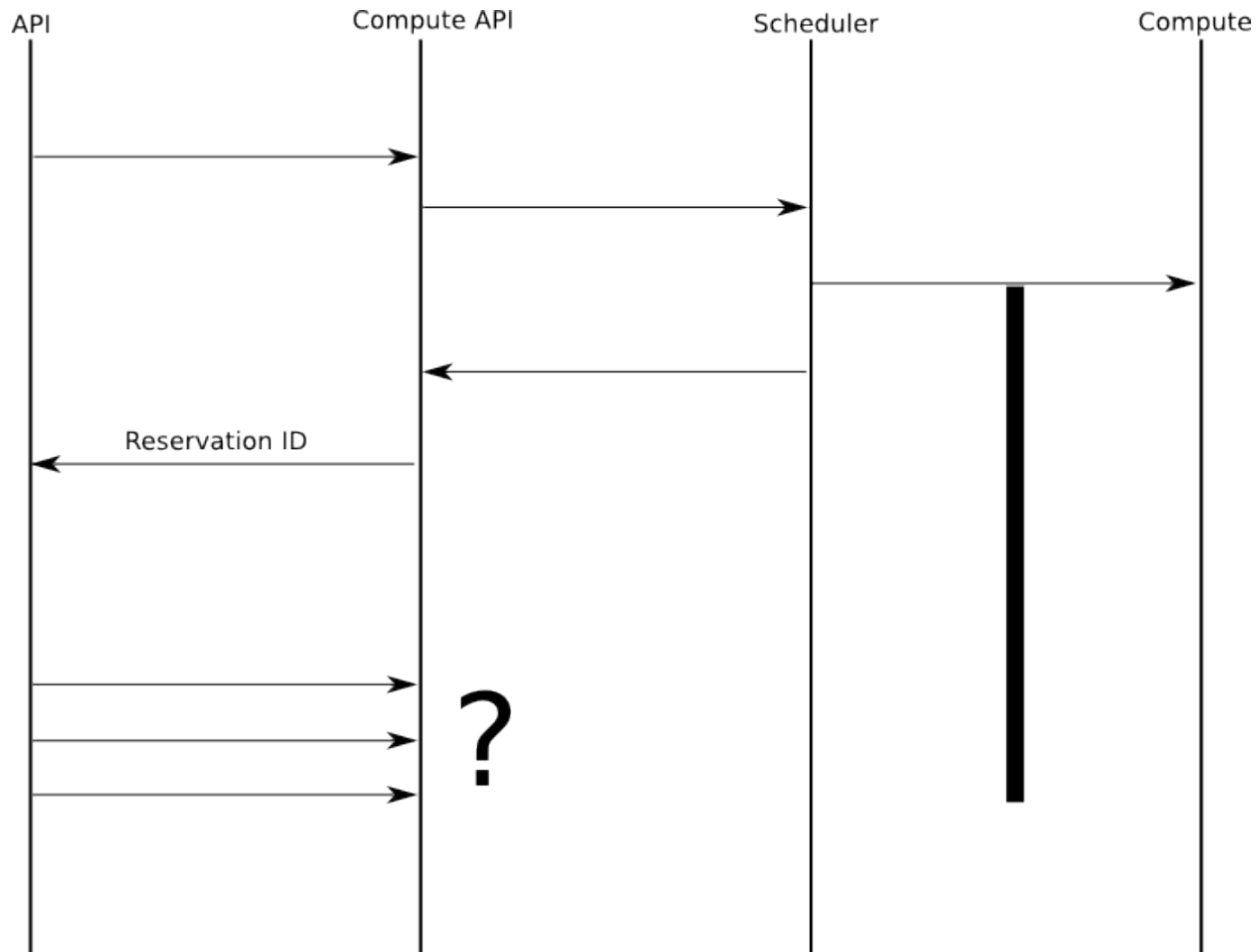
Scalability notes

- Services use eventlet and greenthread to support concurrency

  - Some explicit locking required in various places

- Can scale almost everything horizontally

- There is a single AMQP/DB though per "cell"

  - Supports 500-1000 hosts

- Several "cells" (zones) can be used for further scalability

Scalability improvements

- **Caching**
  - within nova
  - Keystone tokens
- **"Orchestration" service proposed to act as event sink**
  - Refer to previous Nova request sequence
  - This simplifies state manipulation in other services
  - More scalable as interrupt not polling
  - Simplifies % done etc. for async operations

Developers

- A rough estimate from the Nova project:

```
$ curl -s https://raw.github.com/openstack/nova/master/Authors |
  sed -n 's/.*<.*@\(.*\)>/\1/p' |
  sort | uniq -c | sort -n |
  tail -n20 | column
```

```
 2 midokura.jp          4 ubuntu.com
 2 netapp.com           5 pistoncloud.com
 2 wikimedia.org        6 isi.edu
 3 canonical.com        6 nttdata.co.jp
 3 cloudscaling.com     6 openstack.org
 3 dreamhost.com        8 hp.com
 3 eu.citrix.com        9 redhat.com
 3 mirantis.com        10 citrix.com
 3 nicira.com          22 rackspace.com
 4 lab.ntt.co.jp       31 gmail.com
```

Development

- Git

- Gerrit
  - Standalone patch review server
  - Has hooks to integrate with other services

- Jenkins
  - Continuous integration
  - Gates commits on unit tests

- Development done on trunk
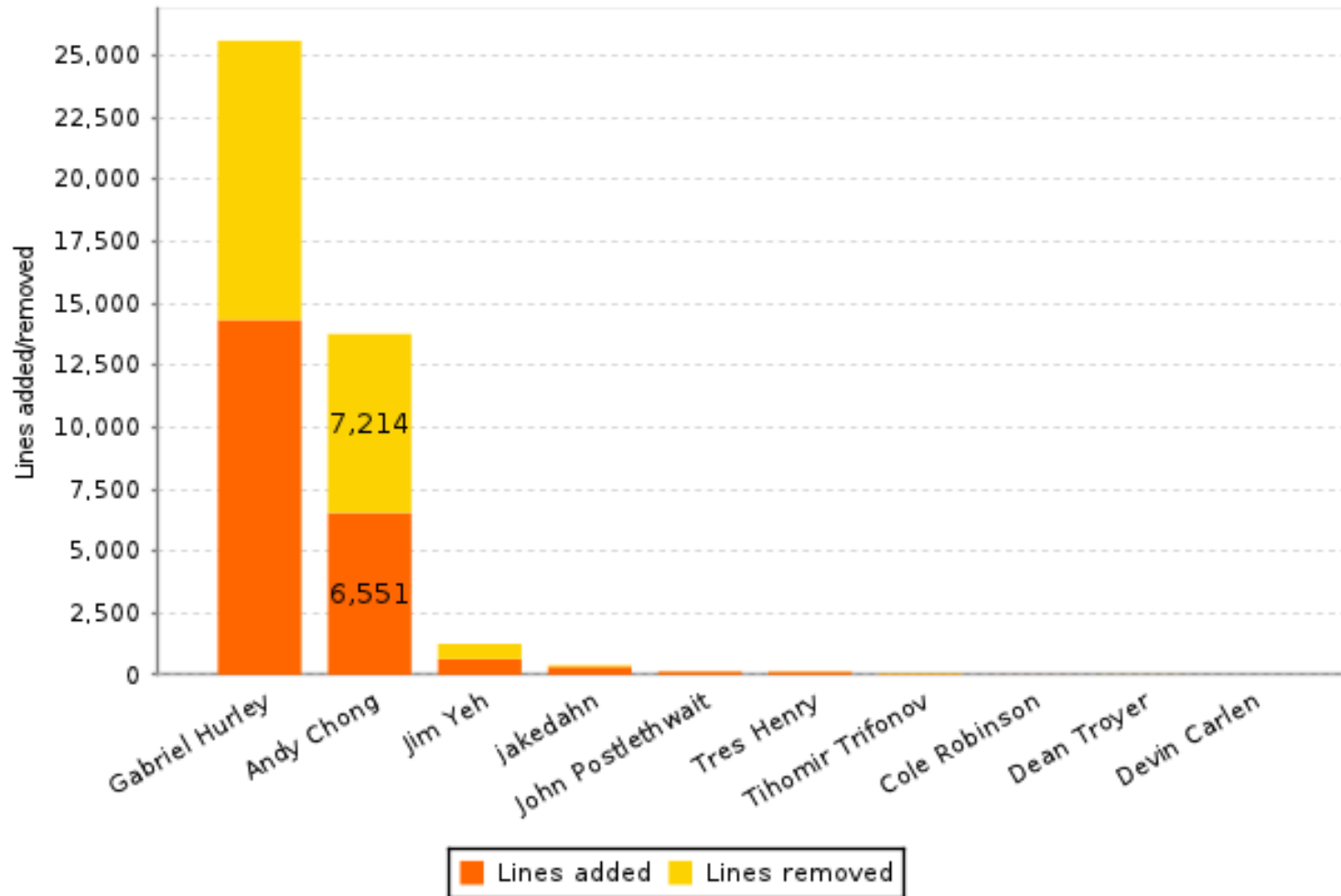
- Releases done to a stable branch

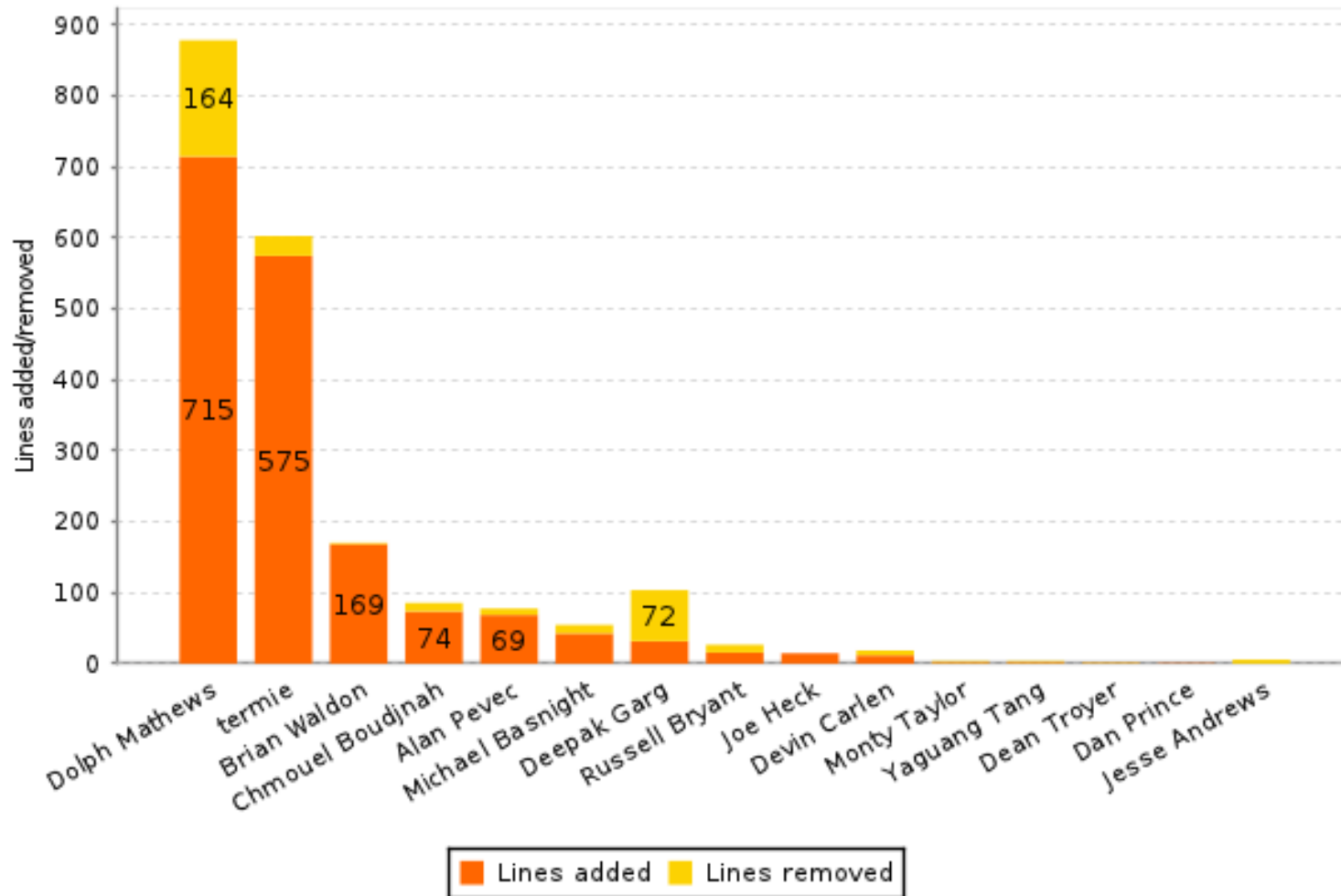# Glance activity week 10 2012

Weekly history of changes per author
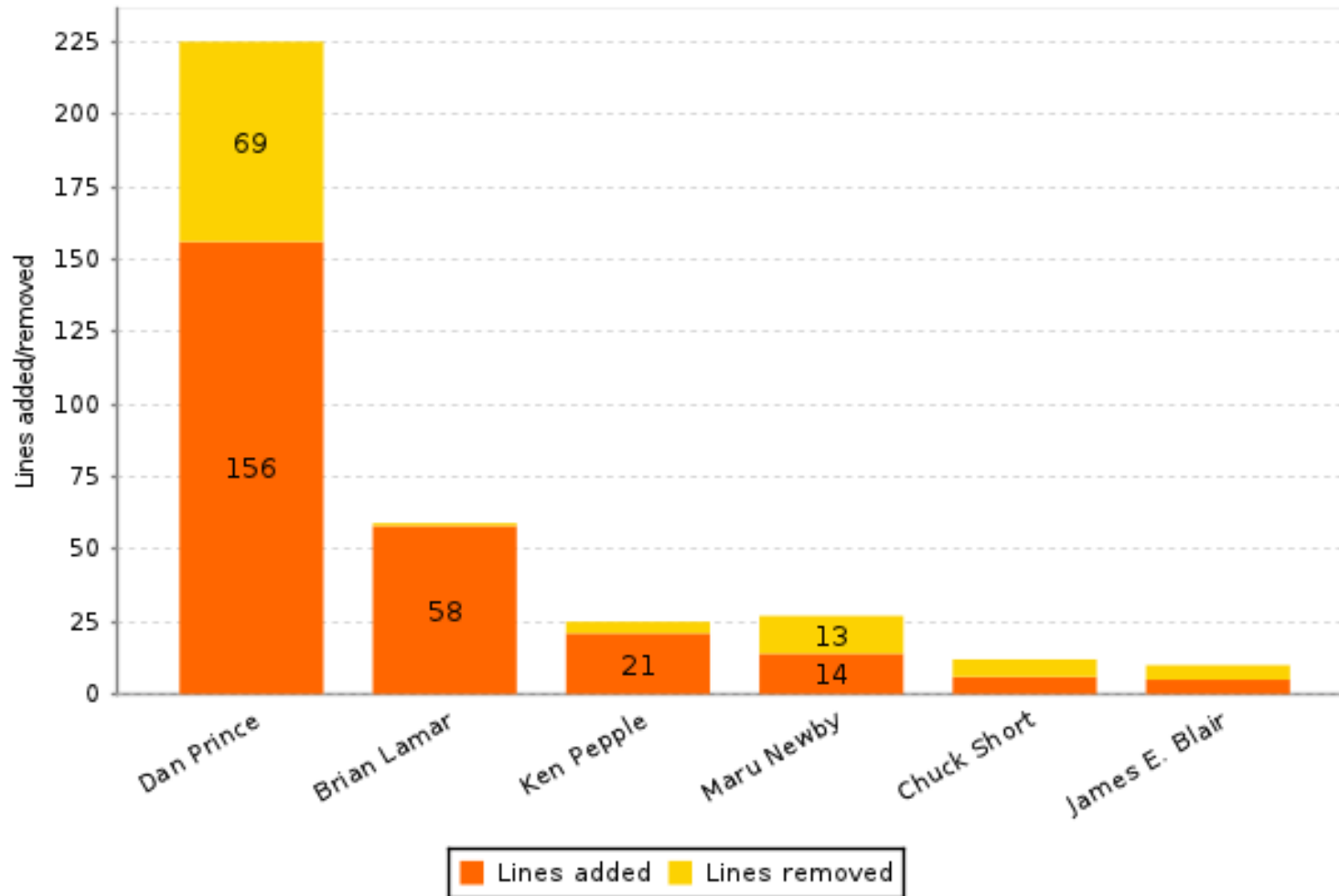
Horizon activity week 10 2012
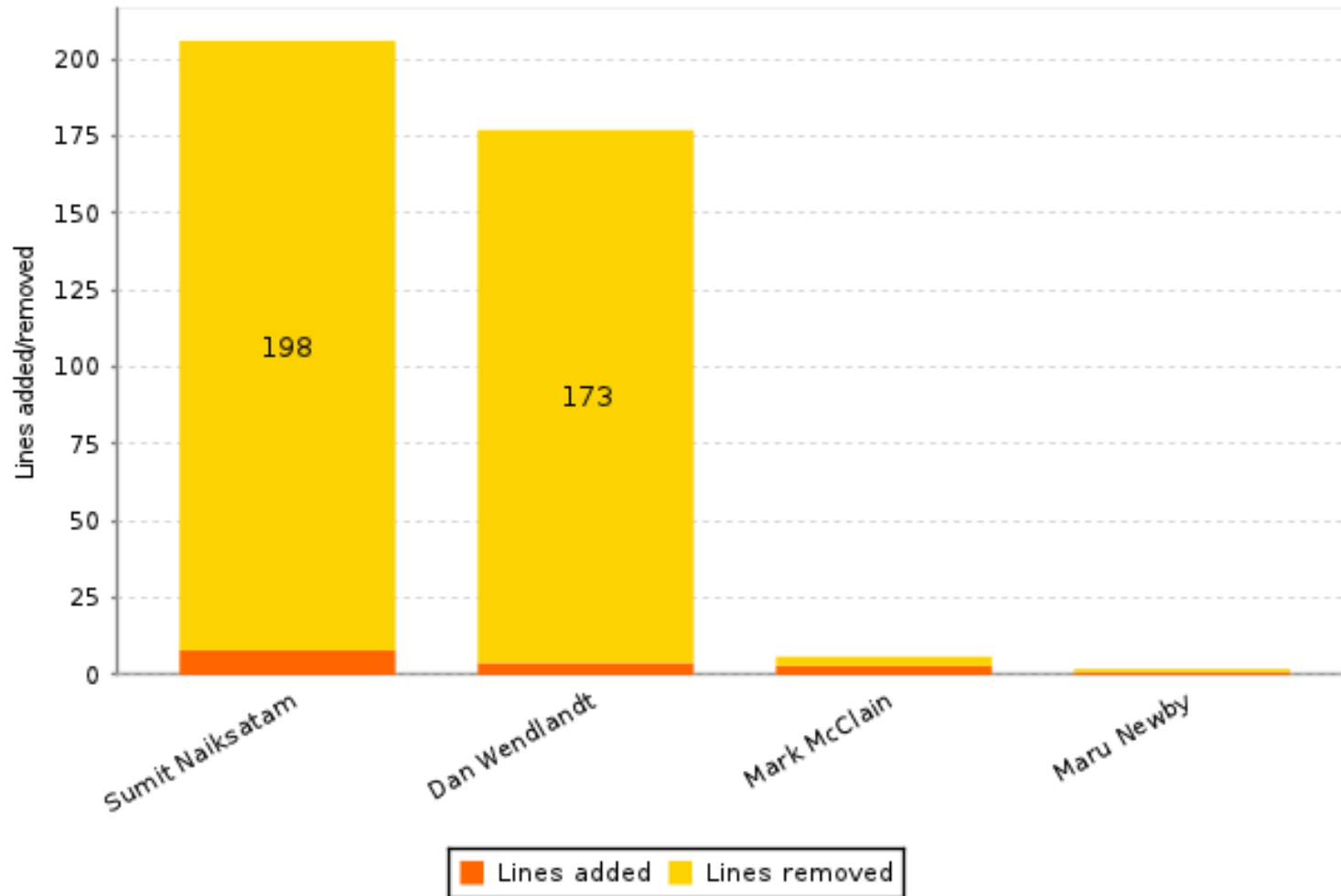

Weekly history of changes per author

Keystone activity week 10 2012

Quantum activity week 10 2012

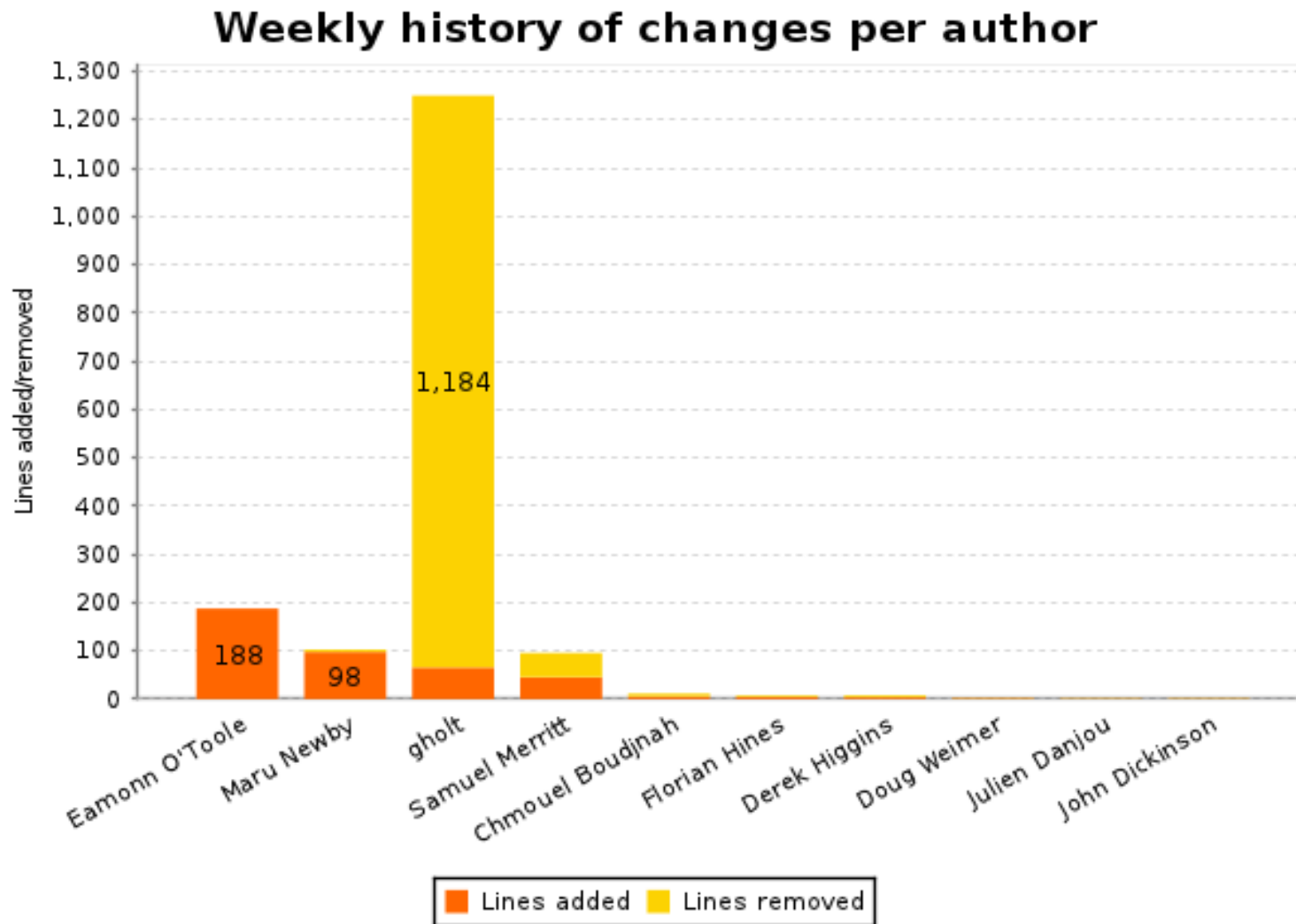Weekly history of changes per author

Swift activity week 10 2012

Weekly history of changes per author

Tempest activity week 10 2012

Manuals activity week 10 2012

Weekly history of changes per author

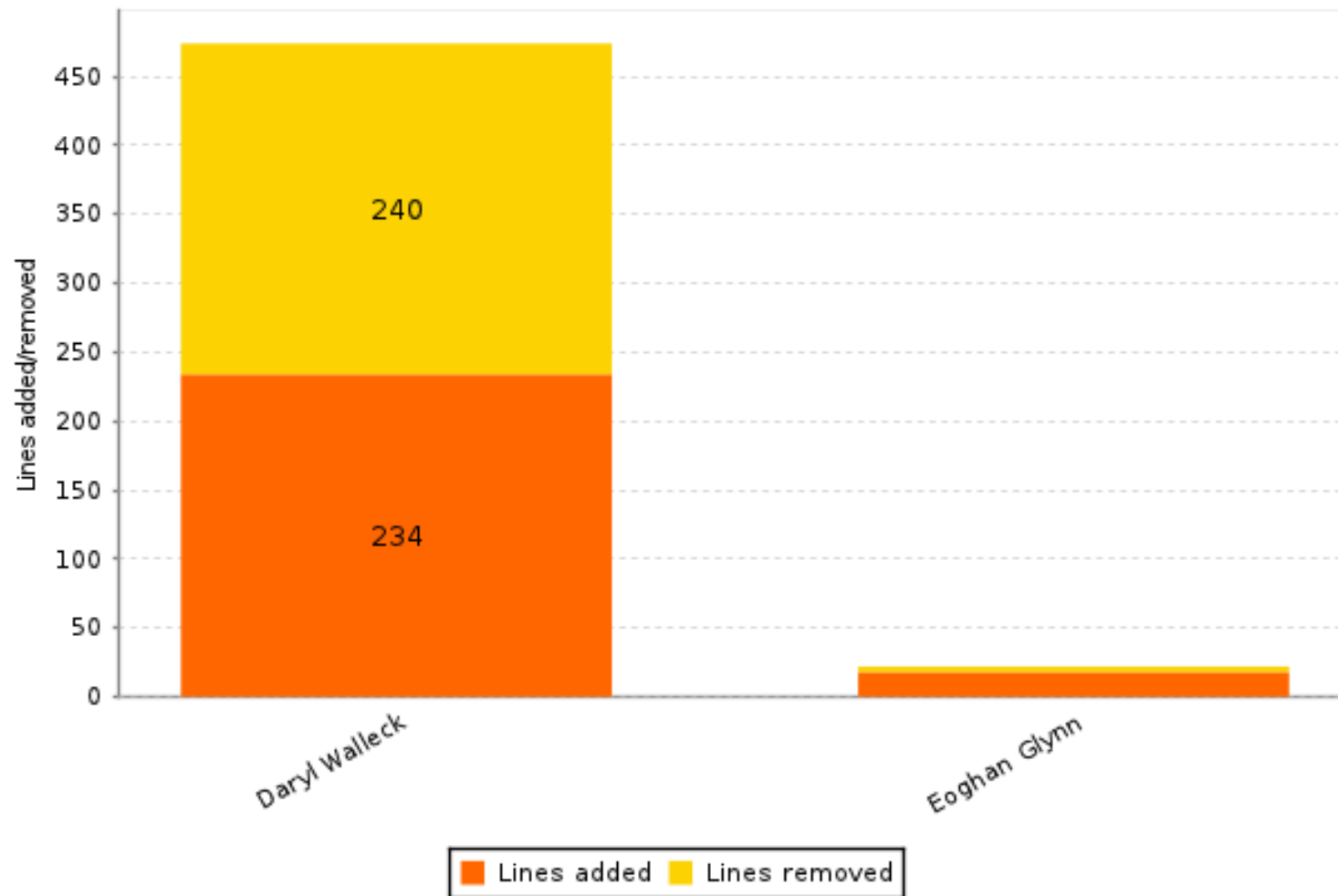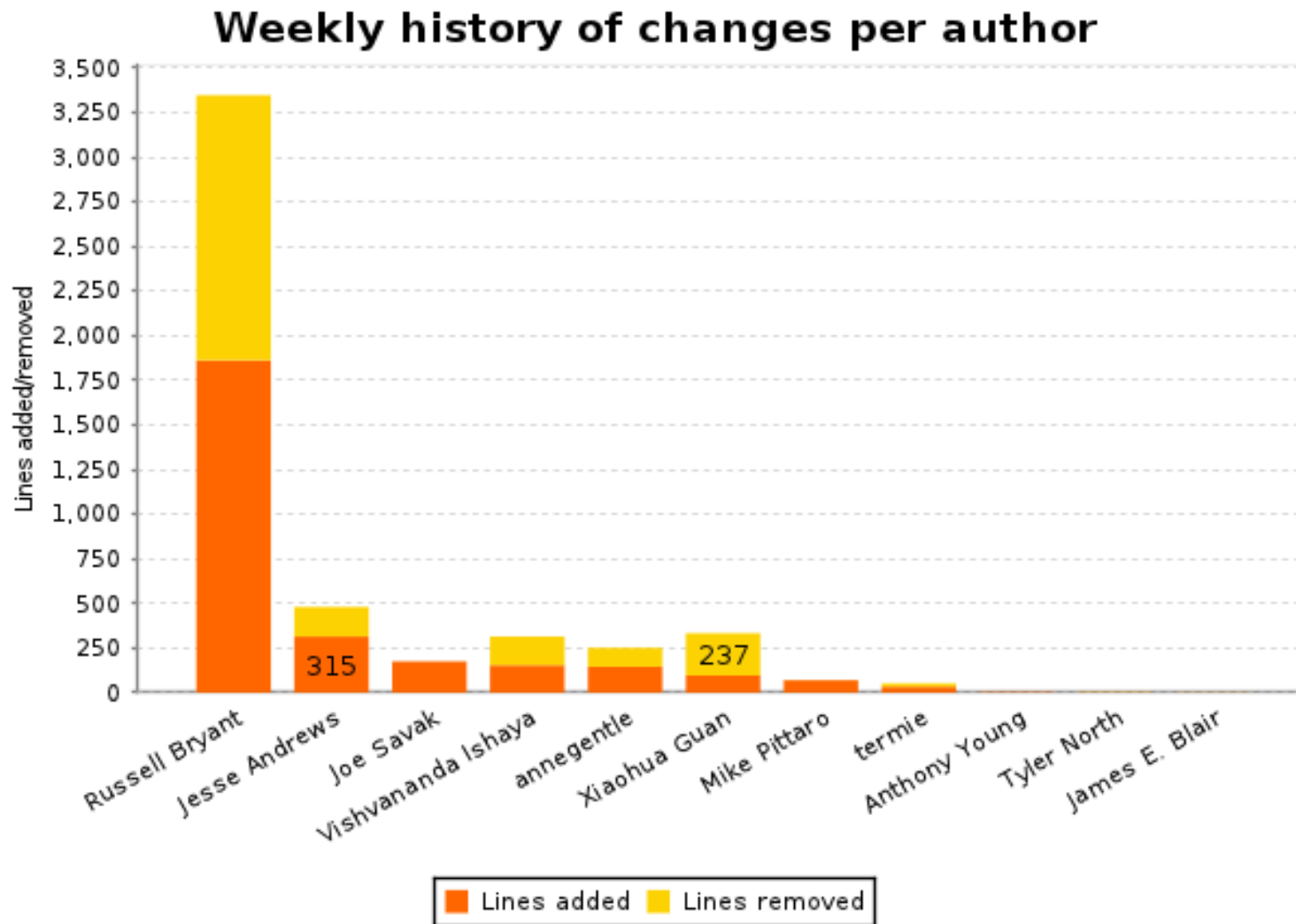# Nova activity week 10 2012

Weekly history of changes per author
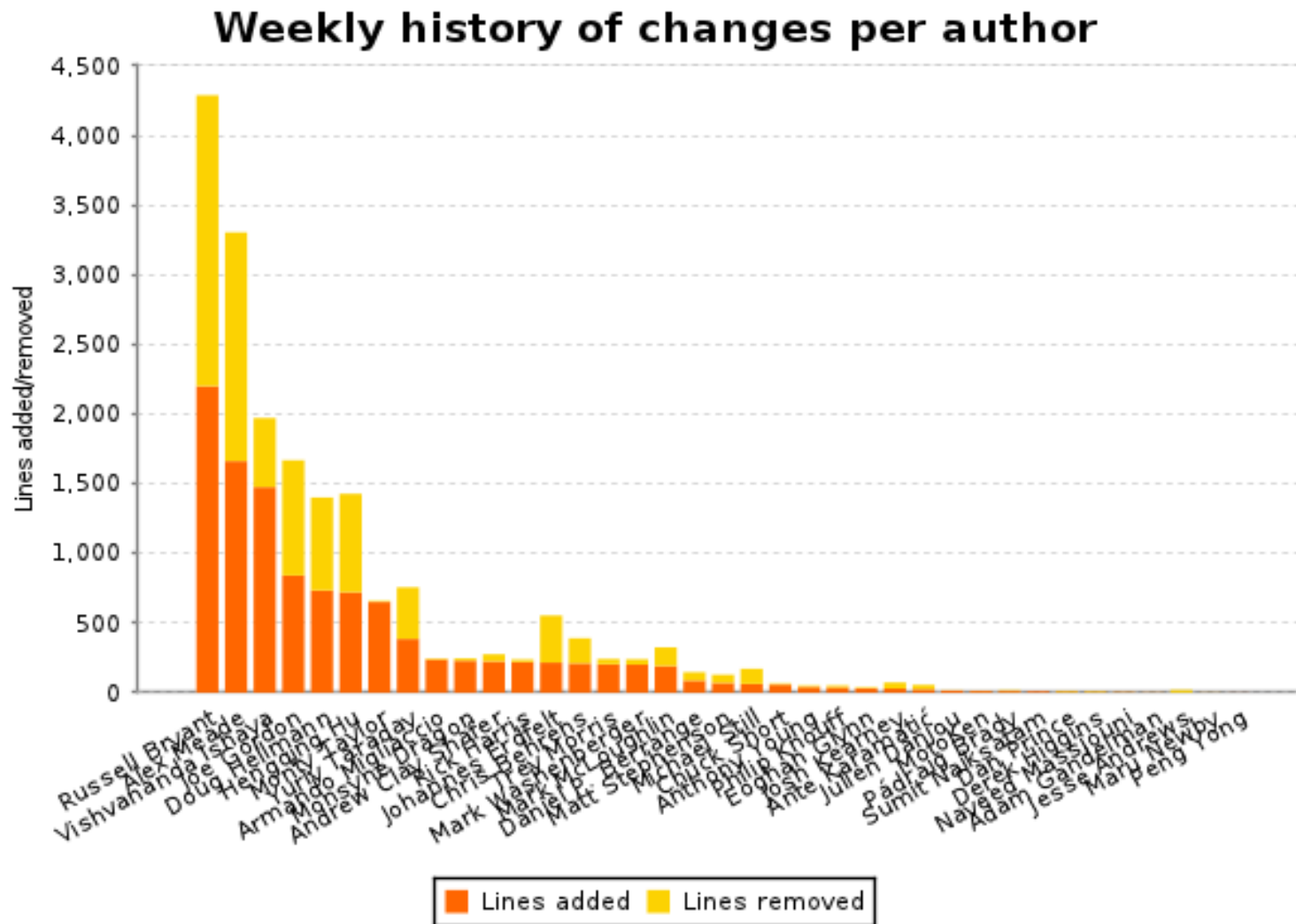
Trying it out

- http://trystack.org/
  - Register to try out a test public OpenStack cloud
- http://devstack.org/
  - Script to setup simple/developer installs
  - Currently Ubuntu centric
  - https://fedoraproject.org/wiki/OpenStack_devstack
- fedoraproject.org/wiki/Test_Day:2012-03-08
  - Basic setup instructions for machine or VM
- http://www.pixelbeat.org/docs/pacemaker-cloud/
  - More realistic example for a machine

Project Packaging

- Given the number of parts and options there is a large gain with consuming through distros

- Distro package dependencies are a good way to get overall position and leverage of a project

```
yum install rpmorphan graphviz
for pkg in nova glance dashboard keystone quantum quantum-openvswitch;
do
    rpmdep -dot $pkg.dot openstack-$pkg
    dot -Tsvg $pkg.dot -o $pkg.svg
done
```

More info

- http://docs.openstack.org/
    - The compute admin guide is a good overview
- http://summit.openstack.org/
    - Proposals for Folsom