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        net
mem        obj
dev        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
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
2 netapp.com
2 wikimedia.org
3 canonical.com
3 cloudscaling.com
3 dreamhost.com
3 eu.citrix.com
3 mirantis.com
3 nicira.com
4 lab.ntt.co.jp
4 ubuntu.com
4 pistoncloud.com
5 isi.edu
6 nttddata.co.jp
6 openstack.org
8 hp.com
9 redhat.com
10 citrix.com
22 rackspace.com
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

- Dan Prince: 156 lines added, 69 lines removed
- Brian Lamar: 58 lines added, 0 lines removed
- Ken Pepple: 21 lines added, 13 lines removed
- Maru Newby: 14 lines added, 0 lines removed
- Chuck Short: 3 lines added, 0 lines removed
- James E. Blair: 2 lines added, 0 lines removed

Legend:
- Lines added
- Lines removed
Horizon activity week 10 2012

Weekly history of changes per author

- Gabriel Hurley: 7,214 lines added, 6,551 lines removed
- Andy Chong
- Jim Yeh
- Jakedahn
- John Postlethwait
- Tres Henry
- Thomir Trifonov
- Cole Robinson
- Dean Troyer
- Devin Carlen

Legend:
- Orange: Lines added
- Yellow: Lines removed
Keystone activity week 10 2012

Weekly history of changes per author

- Dolph Mathews: 715 (Lines added), 164 (Lines removed)
- termie: 169 (Lines added), 575 (Lines removed)
- Brian Waldon: 169 (Lines added)
- Chmouel Boudjnah: 74 (Lines added), 69 (Lines removed)
- Alan Pevec: 74 (Lines added), 69 (Lines removed)
- Michael Basnight: 72 (Lines removed)
- Deepak Garg: 72 (Lines removed)
- Russell Bryant: 72 (Lines removed)
- Joe Heck: 72 (Lines removed)
- Devin Carlen: 72 (Lines removed)
- Monty Taylor: 72 (Lines removed)
- Yaguang Tang: 72 (Lines removed)
- Dean Troyer: 72 (Lines removed)
- Dan Prince: 72 (Lines removed)
- Jesse Andrews: 72 (Lines removed)

Legend: Orange = Lines added, Yellow = Lines removed
Quantum activity week 10 2012

Weekly history of changes per author

Lines added/removed

- Sumit Naiksatam: 198
- Dan Wendlandt: 173
- Mark McClain
- Maru Newby

Legend:
- Orange: Lines added
- Yellow: Lines removed
Swift activity week 10 2012

Weekly history of changes per author

- Eamonn O'Toole: 188 lines added, 98 lines removed
- Maru Newby: 98 lines added, 0 lines removed
- gholt: 1,184 lines added, 0 lines removed
- Samuel Merritt: 0 lines added, 0 lines removed
- Chmouel Boudjnah: 0 lines added, 0 lines removed
- Florian Hines: 0 lines added, 0 lines removed
- Derek Higgins: 0 lines added, 0 lines removed
- Doug Weimer: 0 lines added, 0 lines removed
- Julien Danjou: 0 lines added, 0 lines removed
- John Dickinson: 0 lines added, 0 lines removed

Legend:
- Orange: Lines added
- Yellow: Lines removed
Tempest activity week 10 2012

Weekly history of changes per author

Daryl Walleck

Lines added: 234
Lines removed: 240

Eoghan Glynn

Lines added: 40
Lines removed: 0

Legend:
- Orange: Lines added
- Yellow: Lines removed
Manuals activity week 10 2012

Weekly history of changes per author

Lines added/removed

- Russell Bryant
- Jesse Andrews
- Joe Savak
- Vishvananda Ishaya
- annegentle
- Xiaohua Guan
- Mike Pittaro
- termie
- Anthony Young
- Tyler North
- James E. Blair

- Lines added
- Lines removed

315
237
Nova activity week 10 2012

Weekly history of changes per author

Lines added/removed

- Lines added
- Lines removed
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

```bash
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/](http://docs.openstack.org/)
  - The compute admin guide is a good overview
- [http://summit.openstack.org/](http://summit.openstack.org/)
  - Proposals for Folsom