OpenStack tutorial

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Rackspace International

"Linux of the cloud"

"last cycle .. 517 contributors"

Source: http://lists.openstack.org/pipermail/openstack-dev/2013-April/007189.html

Figure 5 - Accumulated Community Population

CloudStack
OpenStack
OpenNebula
Eucalyptus

http://www.qyjohn.net/?p=3120
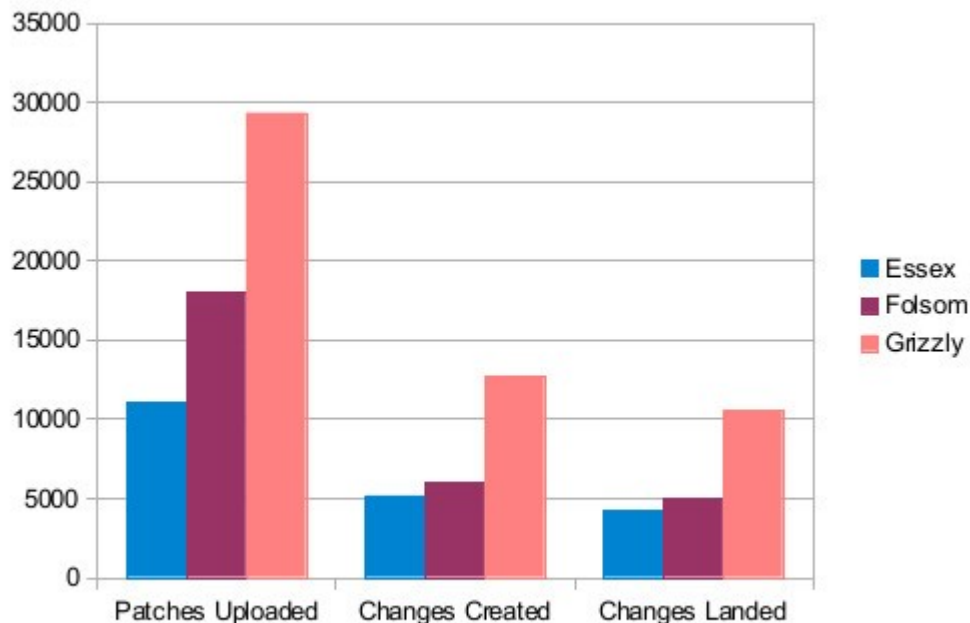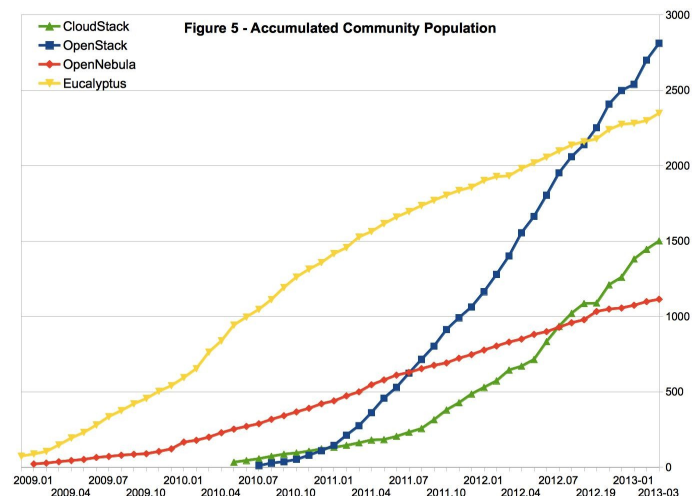
Where are these devs coming from?

Summary of activity

Commits per company (weekly)

Commits per company (aggregated)

Legend: Red Hat, Rackspace, IBM, HP, Nebula, Intel, eNovance, VMware, Canonical, Cloudscaling

http://blog.bitergia.com/2013/04/04/companies-contributing-to-openstack-grizzly-analysis/

http://www.bauder.co.uk/media-centre/hot-project
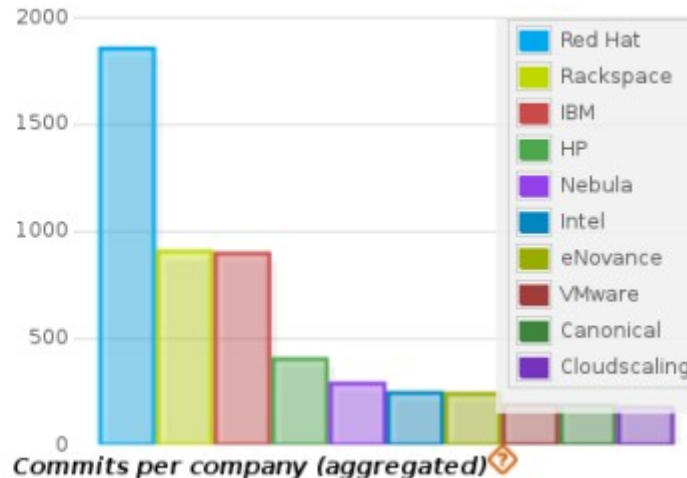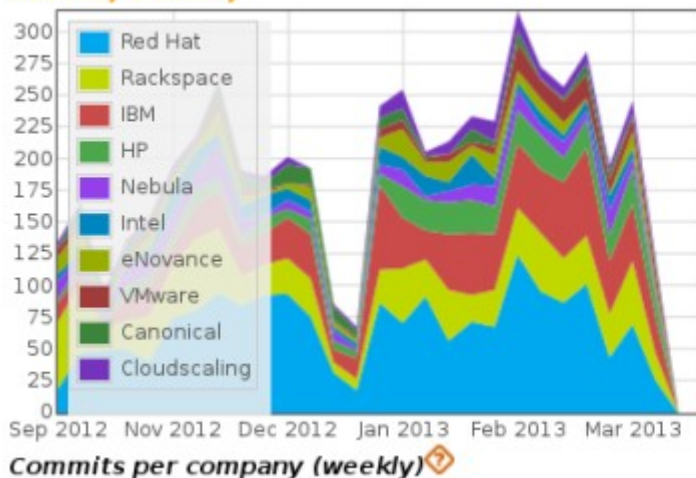
332,387 lines of python code

http://ken.pepple.info/openstack/2012/09/25/openstack-folsom-architecture/

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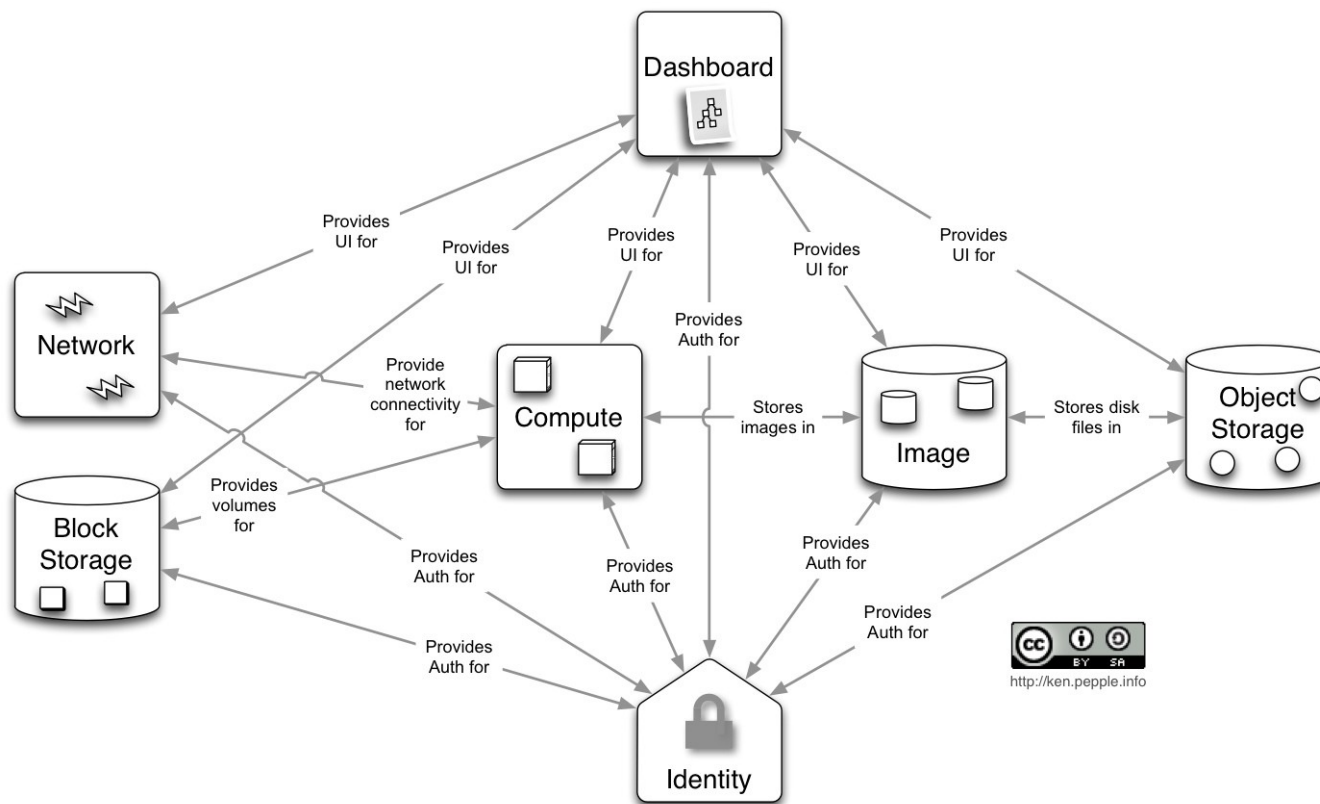
Wait! There's more

- **heat** - orchestration
- **ceilometer** - metering & monitoring
- **Marconi** - queuing as a service
- **reddwarf** - database as a service
- **moniker** - dns as a service

Open => operational choice

- Public cloud (Rackspace, HP etc.)
- Your own cloud (data centre, laptop, vm)
  - Distro
    - Rackspace private cloud
    - RDO
  - devstack

!! **experiment and play** !!

nova

http://www.williamsclass.com/EighthScienceWork/ImagesEighth/SuperNovaReminant.jpg

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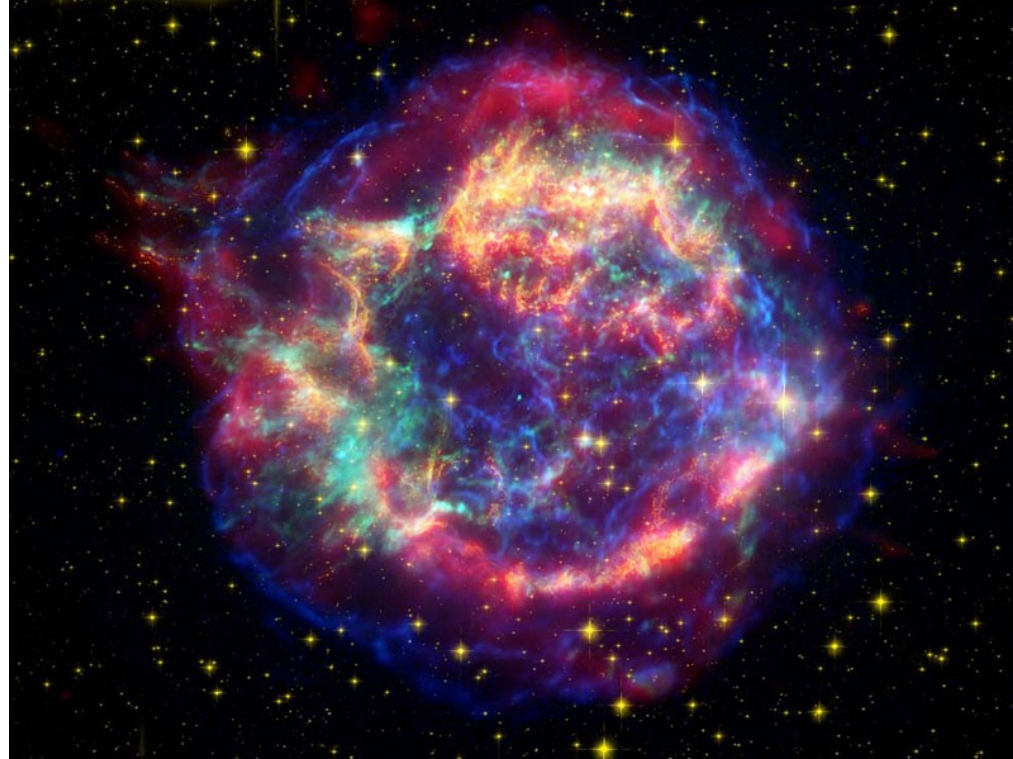
features

List images, flavors and instances

```
+-----+----------+-----------+------+-----------+------+-------+-------------+-----------+-------------+
| ID  | Name     | Memory_MB | Disk | Ephemeral | Swap | VCPUs | RXTX_Factor | Is_Public | extra_specs |
+-----+----------+-----------+------+-----------+------+-------+-------------+-----------+-------------+
| 1   | m1.tiny  | 512       | 0    | 0         |      | 1     | 1.0         | True      | {}          |
| 2   | m1.small | 2048      | 10   | 20        |      | 1     | 1.0         | True      | {}          |
| 3   | m1.medium| 4096      | 10   | 40        |      | 2     | 1.0         | True      | {}          |
| 4   | m1.large | 8192      | 10   | 80        |      | 4     | 1.0         | True      | {}          |
| 5   | m1.xlarge| 16384     | 10   | 160       |      | 8     | 1.0         | True      | {}          |
| 100 | m1.midi  | 1024      | 5    | 0         |      | 1     | 1.0         | True      | {}          |
| 101 | m1.mmax  | 1024      | 0    | 0         |      | 1     | 1.0         | True      | {}          |
+-----+----------+-----------+------+-----------+------+-------+-------------+-----------+-------------+
tete@osc:~$ nova image-list
+--------------------------------------+--------------------+--------+--------+
| ID                                   | Name               | Status | Server |
+--------------------------------------+--------------------+--------+--------+
| 2d906358-bee3-4ed7-b4b5-d9db4eb1e1e8 | ubuntu.12.04.server| ACTIVE |        |
+--------------------------------------+--------------------+--------+--------+
tete@osc:~$ nova list
+--------------------------------------+------+--------+------------------------+
| ID                                   | Name | Status | Networks               |
+--------------------------------------+------+--------+------------------------+
| 924928a8-2dff-46fa-96e7-5ae473c7e842 | ui2  | ACTIVE | novanetwork=10.1.0.2   |
+--------------------------------------+------+--------+------------------------+
tete@osc:~$ 
```

features

Launch, suspend, resume, terminate instances

```
tete@osc:~$ nova boot --flavor 1 --image ubuntu.12.04.server --key-name guest instance1
+-------------------------------------+--------------------------------------------------------+
| Property                            | Value                                                  |
+-------------------------------------+--------------------------------------------------------+
| OS-DCF:diskConfig                   | MANUAL                                                 |
| OS-EXT-STS:power_state              | 0                                                      |
| OS-EXT-STS:task_state               | scheduling                                             |
| OS-EXT-STS:vm_state                 | building                                               |
| accessIPv4                          |                                                        |
| accessIPv6                          |                                                        |
| adminPass                           | HBy3mbwKieAT                                           |
| config_drive                        |                                                        |
| created                             | 2013-05-29T16:29:29Z                                  |
| flavor                              | m1.tiny                                                |
| hostId                              | 231ad1f4c4e954fb7814dfcbfb2adc250f300f0c87bfddf445adaa43 |
| id                                  | e76a3033-cb0c-497c-9d66-db0770f31e06                  |
| image                               | ubuntu.12.04.server                                    |
| key_name                            | guest                                                  |
| metadata                            | {}                                                     |
| name                                | instance1                                              |
| progress                            | 0                                                      |
| security_groups                     | [{u'name': u'default'}]                                |
| status                              | BUILD                                                  |
| tenant_id                           | 8638d357ec6f42cdb4ab44584a2172ea                      |
| updated                             | 2013-05-29T16:29:29Z                                  |
| user_id                             | ac6cea30da394de7978fb67737d3052b                      |
+-------------------------------------+--------------------------------------------------------+
tete@osc:~$
```

features

Launch, suspend, resume, terminate instances

```
tete@osc:~$ nova suspend instance1
tete@osc:~$ nova list
+--------------------------------------+-----------+-----------+----------------------+
| ID                                   | Name      | Status    | Networks             |
+--------------------------------------+-----------+-----------+----------------------+
| d1eb5ef8-e5ff-4f65-8fef-8c69f970768c | instance1 | SUSPENDED | novanetwork=10.1.0.4 |
| 924928a8-2dff-46fa-96e7-5ae473c7e842 | ui2       | ACTIVE    | novanetwork=10.1.0.2 |
+--------------------------------------+-----------+-----------+----------------------+
tete@osc:~$ nova resume instance1
tete@osc:~$ nova list
+--------------------------------------+-----------+--------+----------------------+
| ID                                   | Name      | Status | Networks             |
+--------------------------------------+-----------+--------+----------------------+
| d1eb5ef8-e5ff-4f65-8fef-8c69f970768c | instance1 | ACTIVE | novanetwork=10.1.0.4 |
| 924928a8-2dff-46fa-96e7-5ae473c7e842 | ui2       | ACTIVE | novanetwork=10.1.0.2 |
+--------------------------------------+-----------+--------+----------------------+
tete@osc:~$ nova delete instance1
tete@osc:~$ nova list
+--------------------------------------+------+--------+----------------------+
| ID                                   | Name | Status | Networks             |
+--------------------------------------+------+--------+----------------------+
| 924928a8-2dff-46fa-96e7-5ae473c7e842 | ui2  | ACTIVE | novanetwork=10.1.0.2 |
+--------------------------------------+------+--------+----------------------+
tete@osc:~$ ■
```

rackspace®
the open cloud company

Advanced features

- Evacuate servers

- Manage bare metal nodes
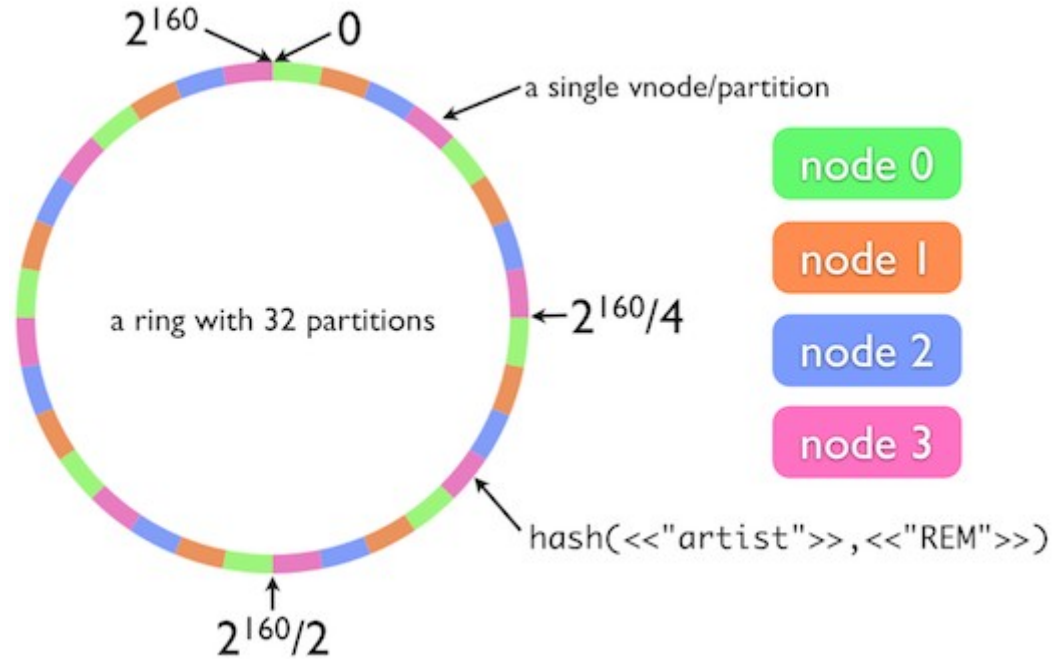
Nova demo (CloudInit)

http://2.bp.blogspot.com/-hNhZtLtNVvs/TqznOhzG-tI/AAAAAAAAAAKk/xm-bx0svRbc/s1600/funny_accident.jpg

swift

2^{160} 0

a single vnode/partition

a ring with 32 partitions

$2^{160}/4$

node 0

node 1

node 2

node 3

hash(<<"artist">>,<<"REM">>)

$2^{160}/2$

http://paperplanes-assets.s3.amazonaws.com/consistent-hashing.png

Swift facts

- highly available, distributed
- eventually consistent
- 3 replicas by default
- Supports rate limiting, container level ACLs
- client config

  stat, list, upload, post, download, delete

Swift demo

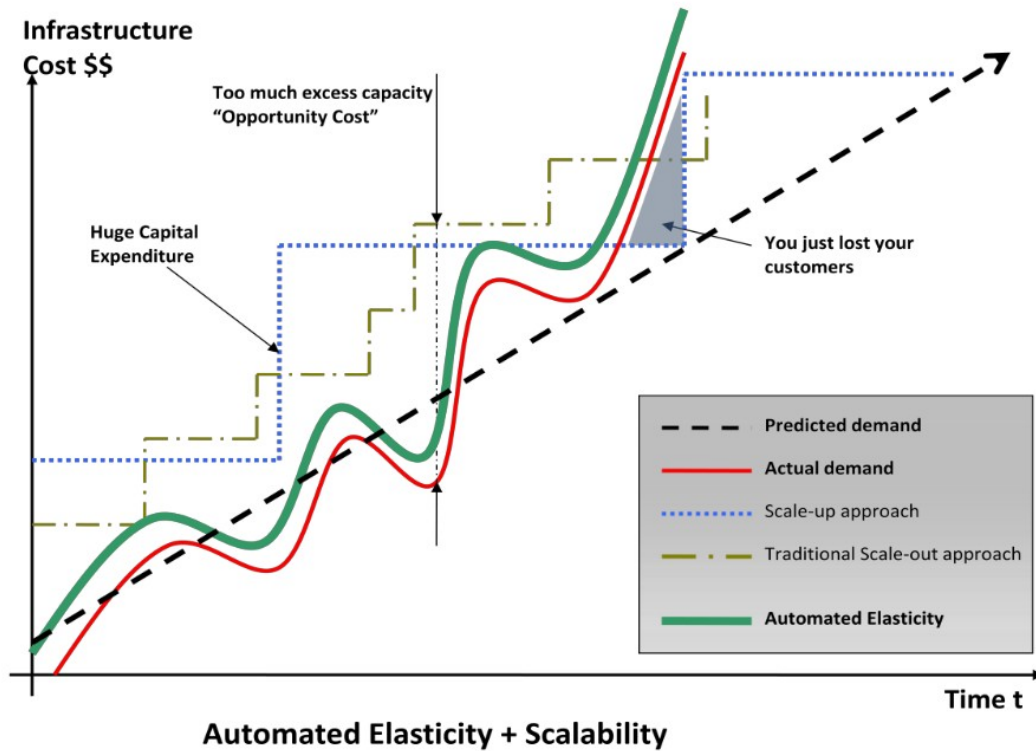http://funkydowntown.com/incredible-but-funny-accident-photos

Where's IT headed?

http://www.photosfan.com/images/view-upside-down-from-inside-an-airplane1.jpg

Perspective

Automated Elasticity + Scalability

http://media.amazonwebservices.com/AWS_Cloud_Best_Practices.pdf

Cloud drivers

- "infinite" scale

- Pay as you go (capex → opex)

- Minimal time to resource (business agility)

- Elasticity

- Automation

Data centre with an API

Why is it cool?

- Python!
- Open source
- Great community
- Distributed
- All kinds of cool technologies :-)