

ISYS 567 INTERNSHIP

Fall 2012



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AGENDA

- ▣ Introduction to Cloud Computing
 - ▣ Public vs. Private Clouds
 - ▣ Openstack as example of open source software for private clouds
 - ▣ How-To set up and run a private cloud using Openstack
-

Introduction to Cloud Computing

▣ Cloud computing = services that are being delivered to the user by use of a network.

▣ Main cloud services



compute:

- Software as a Serv. (SaaS)
- Platform as a Serv. (PaaS)
- Desktop as a Serv. (DaaS)

storage:

- holds user's data
- centralized system

Public vs. Private Clouds

Public



Private



OpenNebula

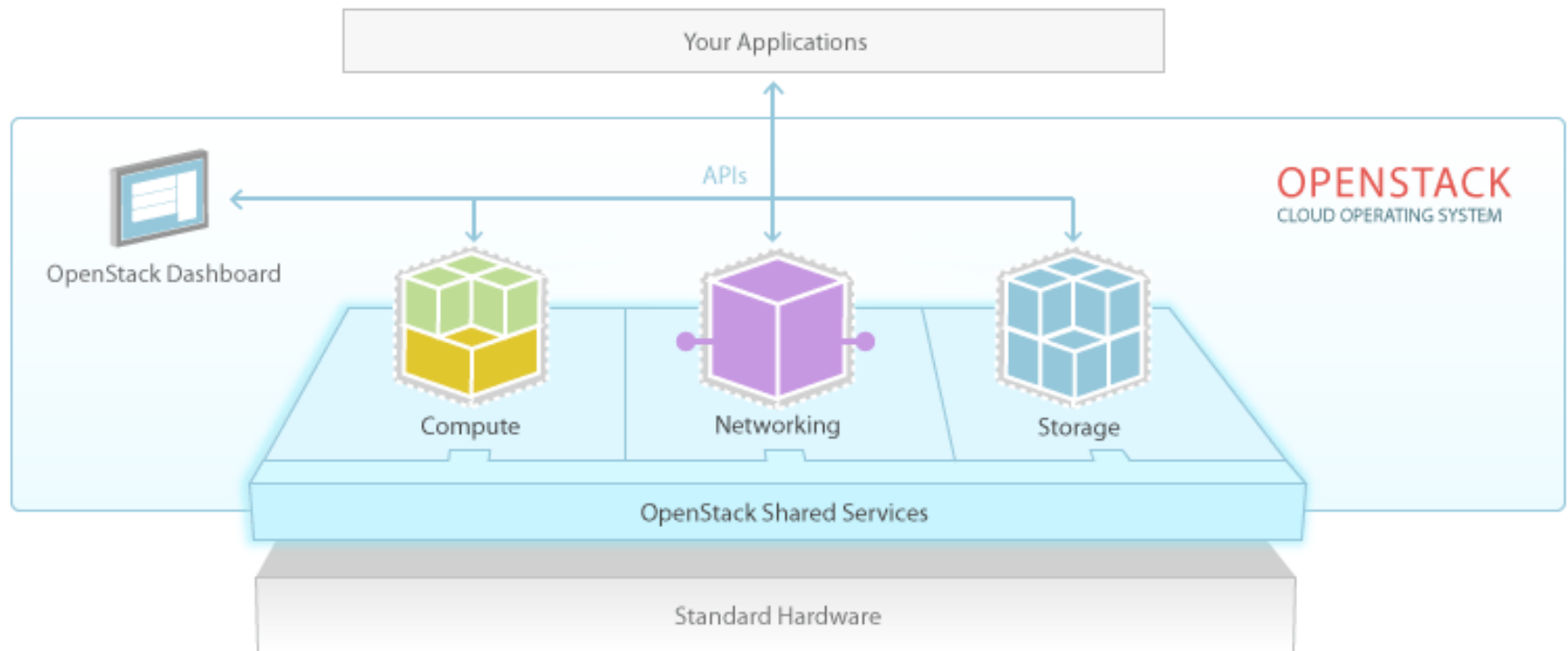
EUCALYPTUS



Logos belong to their respective owners

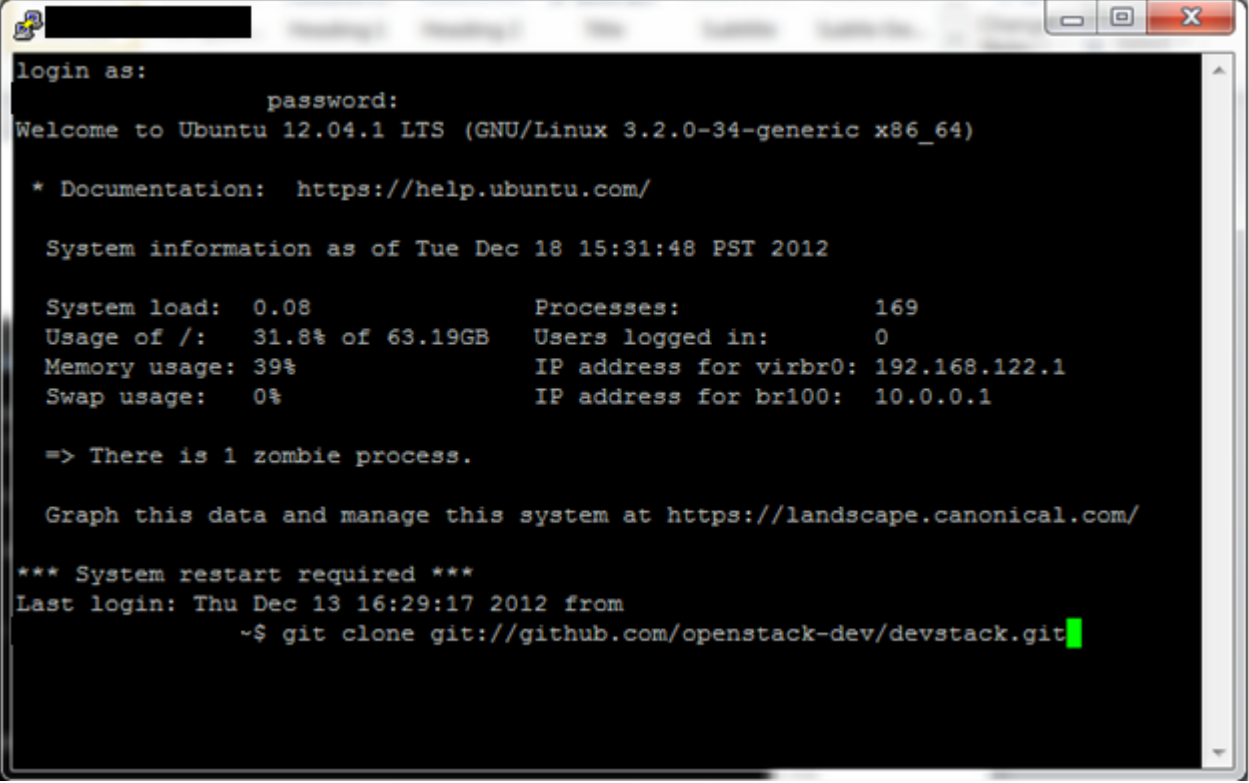
Openstack as example of open source software for private clouds

Openstack - Cloud Operating System



<http://www.openstack.org/software/>

How-To set up and run a private cloud using Openstack

A terminal window with a black background and white text. The window title bar shows standard Ubuntu window controls. The terminal output includes a login prompt, a password prompt, a welcome message for Ubuntu 12.04.1 LTS, system documentation link, system information as of Tue Dec 18 15:31:48 PST 2012, system load and usage statistics, IP addresses for network interfaces, a message about a zombie process, a link to manage the system, a system restart warning, and the last login time. The prompt is currently at the end of the command to clone the OpenStack devstack repository.

```
login as:
          password:
Welcome to Ubuntu 12.04.1 LTS (GNU/Linux 3.2.0-34-generic x86_64)

* Documentation:  https://help.ubuntu.com/

System information as of Tue Dec 18 15:31:48 PST 2012

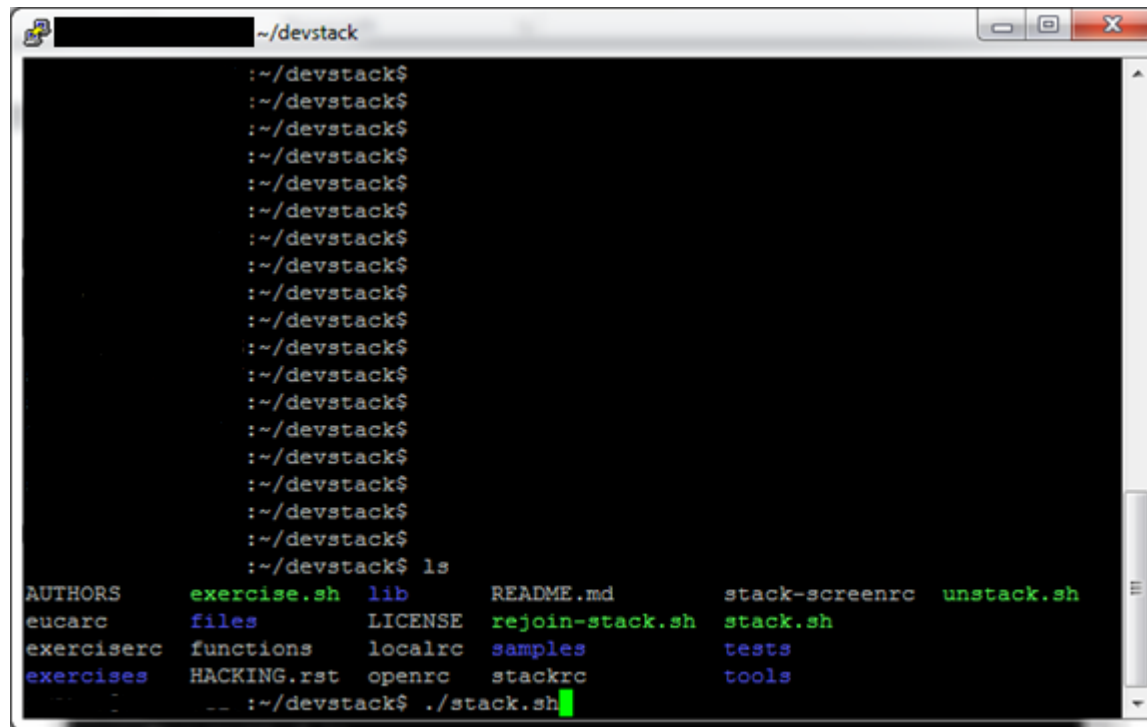
System load:  0.08               Processes:            169
Usage of /:   31.8% of 63.19GB   Users logged in:     0
Memory usage: 39%               IP address for virbr0: 192.168.122.1
Swap usage:   0%                IP address for br100:  10.0.0.1

=> There is 1 zombie process.

Graph this data and manage this system at https://landscape.canonical.com/

*** System restart required ***
Last login: Thu Dec 13 16:29:17 2012 from
~$ git clone git://github.com/openstack-dev/devstack.git
```

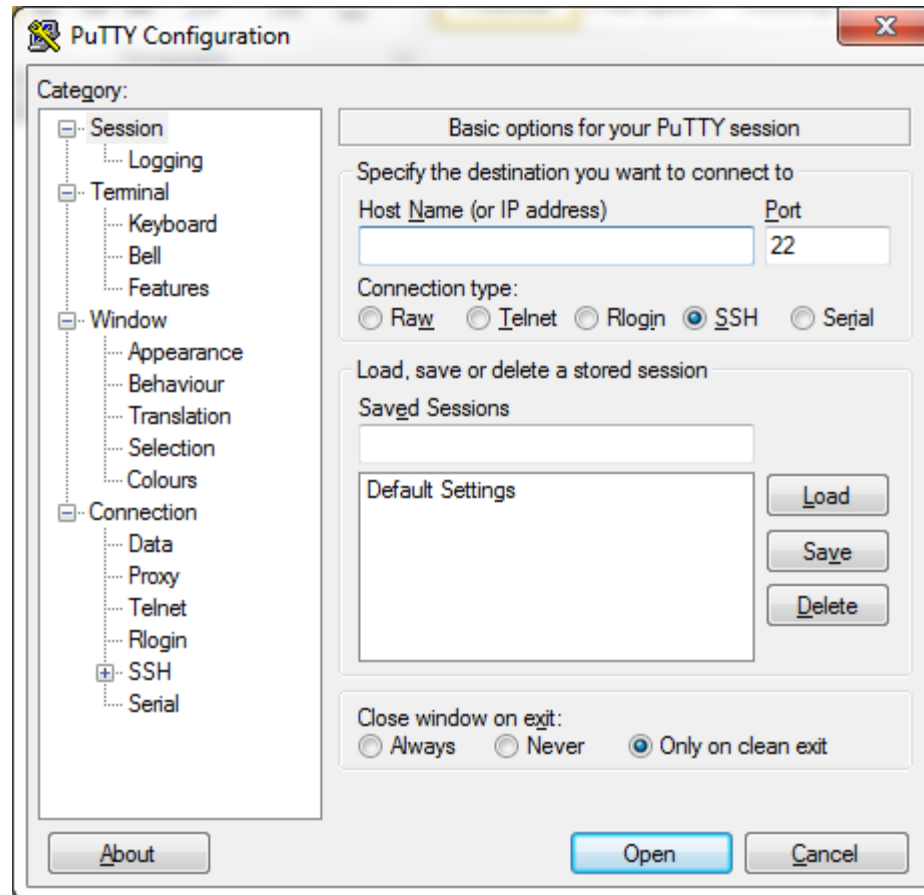
Stack.sh



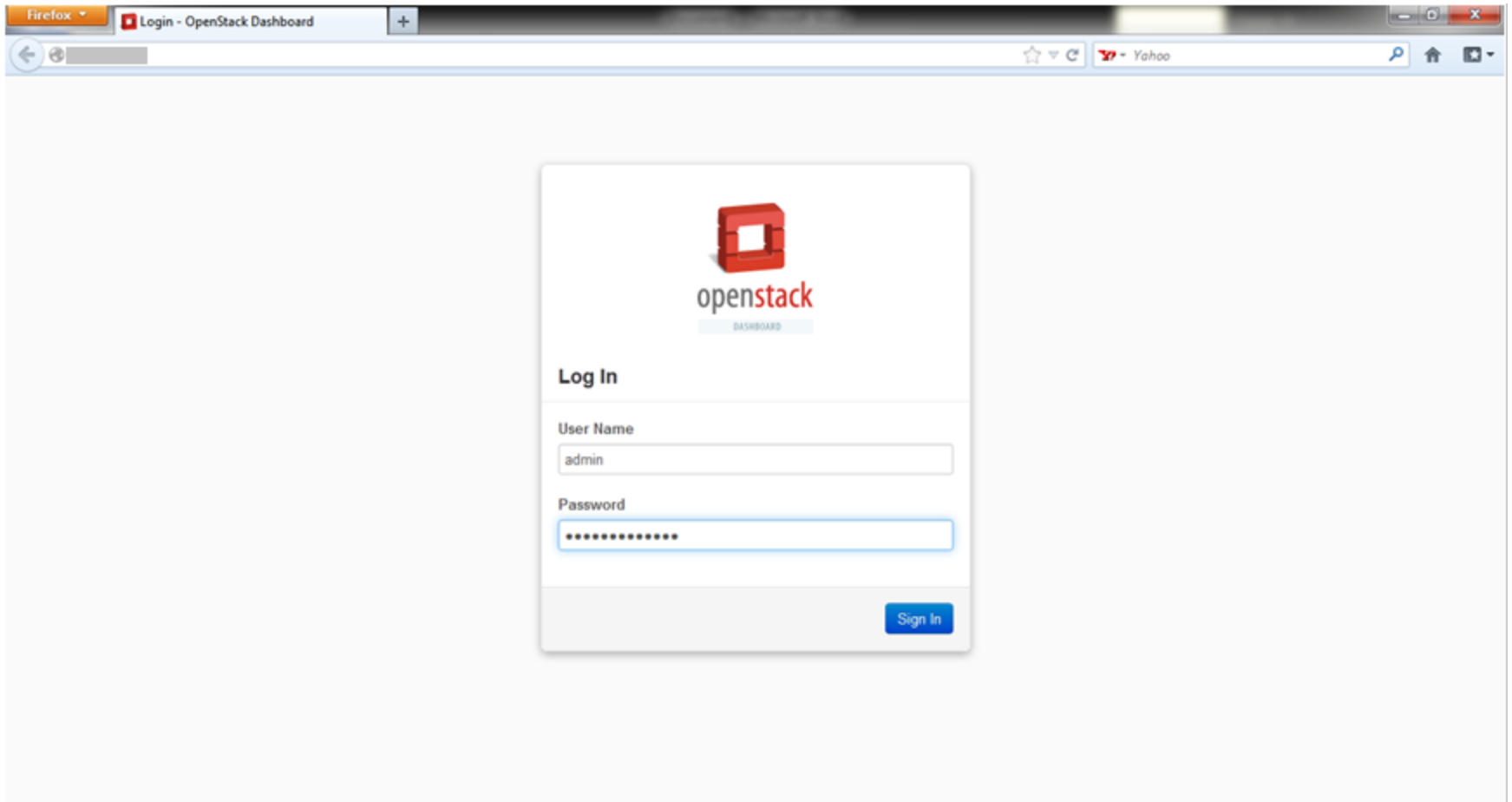
A terminal window titled `~/devstack` showing the execution of `stack.sh`. The prompt `~/devstack$` is repeated 15 times. The 16th line shows the output of `ls`, displaying a directory listing with files and directories in color. The 17th line shows the command `./stack.sh` being executed, with a green cursor at the end.

```
~/devstack$  
~/devstack$  
~/devstack$  
~/devstack$  
~/devstack$  
~/devstack$  
~/devstack$  
~/devstack$  
~/devstack$  
~/devstack$  
~/devstack$  
~/devstack$  
~/devstack$  
~/devstack$  
~/devstack$  
~/devstack$  
~/devstack$ ls  
AUTHORS  exercise.sh  lib  README.md  stack-screenrc  unstack.sh  
eucarc   files       LICENSE  rejoin-stack.sh  stack.sh  
exerciserc  functions  localrc  samples      tests  
exercises  HACKING.rst openrc   stackrc      tools  
-- :~/devstack$ ./stack.sh
```


Log In



Horizon



Overview

The screenshot shows the OpenStack Dashboard in a Firefox browser window. The page title is "Usage Overview - OpenStack Dashboard". The user is logged in as "admin". The left sidebar contains the OpenStack logo and a "System Panel" with links to Overview, Instances, Volumes, Flavors, Images, Projects, Users, and System Info. The main content area is titled "Overview" and includes a "Select a month to query its usage:" section with dropdowns for "December" and "2012", and a "Submit" button. Below this, there are placeholders for "Active Instances:", "Active RAM:", "This Month's VCPU Hours:", and "This Month's GB Hours:". The "Usage Summary" section features a table with columns: Project Name, VCPUs, Disk, RAM, VCPU Hours, and Disk GB Hours. The table is currently empty, displaying "No items to display." and "Displaying 0 items." A "Download CSV Summary" button is located to the right of the table.

Overview

Logged in as: admin [Settings](#) [Sign Out](#)

Select a month to query its usage:


December 2012

Active Instances: - Active RAM: - This Month's VCPU Hours: - This Month's GB Hours: -

Usage Summary

Project Name	VCPUs	Disk	RAM	VCPU Hours	Disk GB Hours
No items to display.					
Displaying 0 items					

Nova - Compute


openstack
DASHBOARD

ProjectAdmin

System Panel

Overview

Instances

Volumes

Flavors

Images

Projects

Users

System Info

All Instances

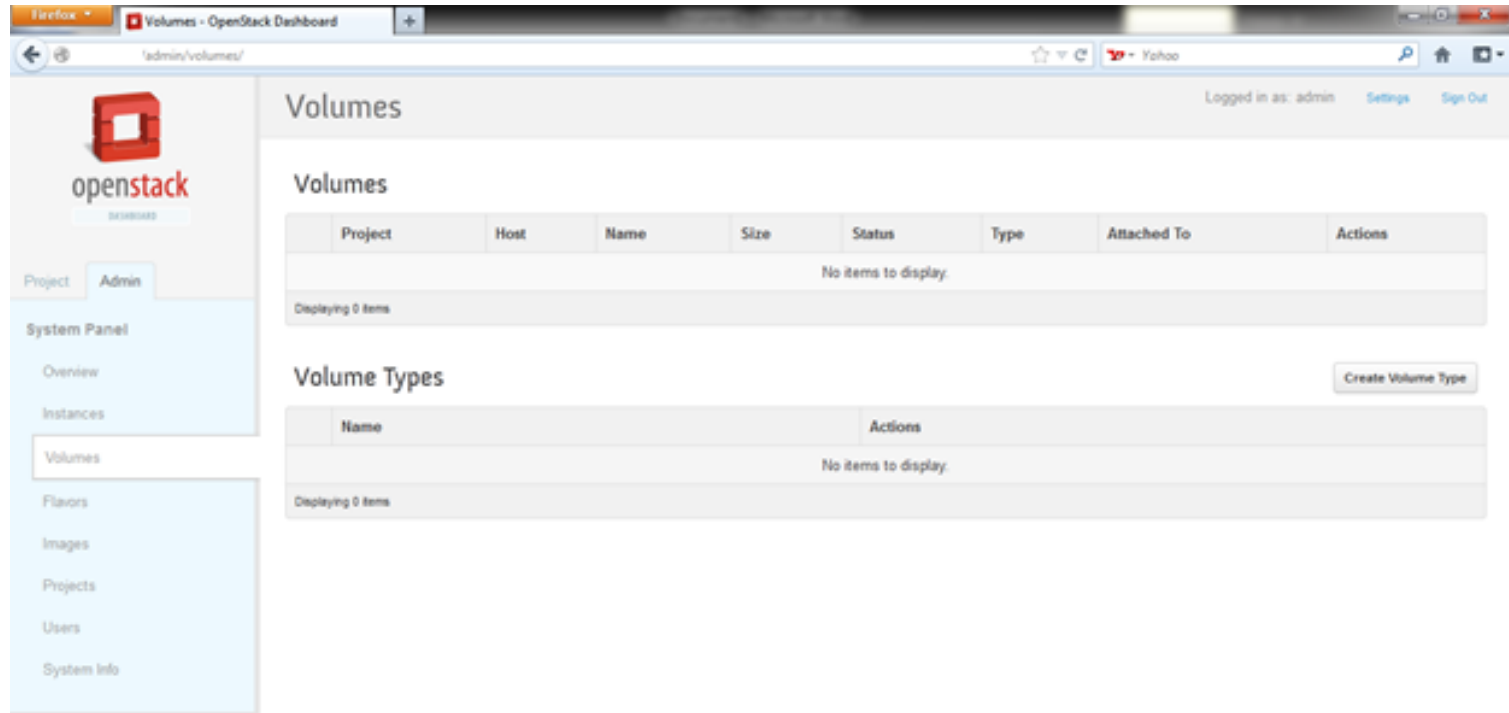
Logged in as: adminSettingsSign Out

Instances

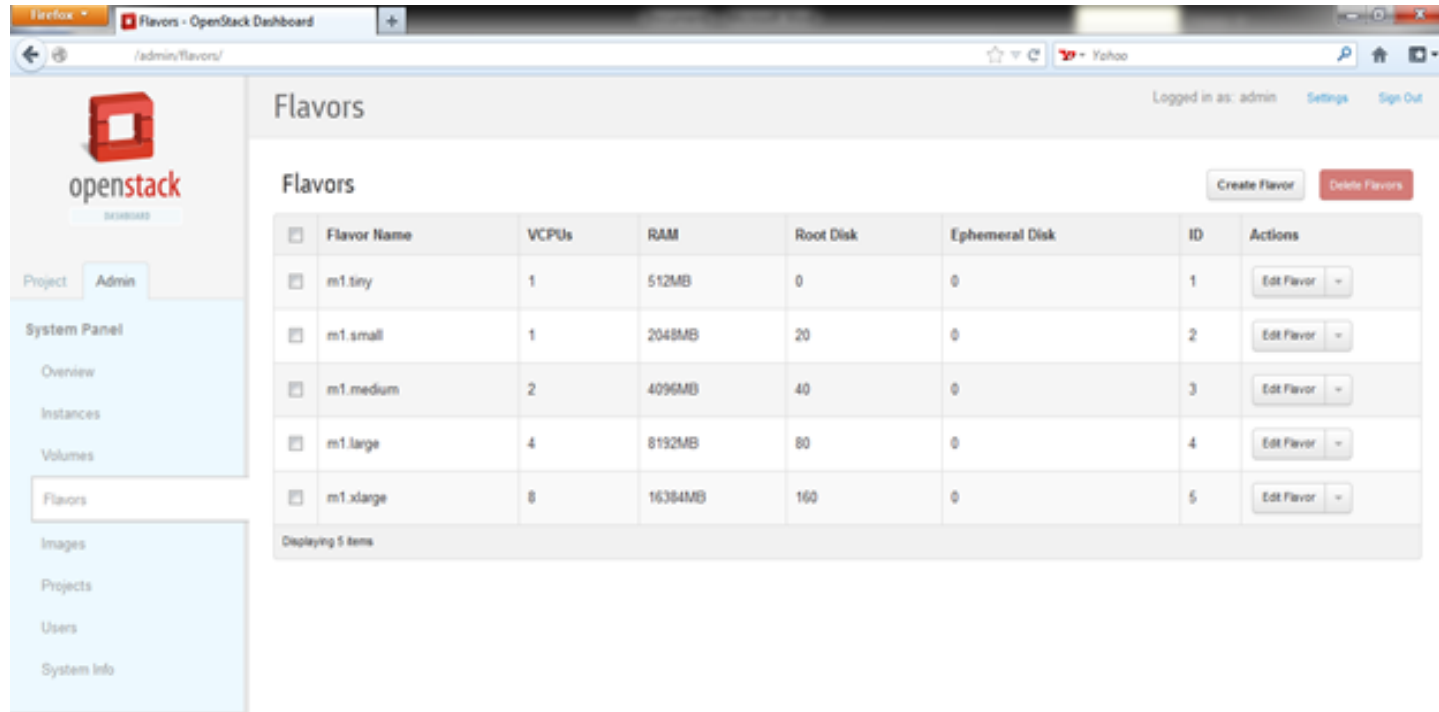
<input type="checkbox"/>	Project	Host	Name	IP Address	Size	Status	Task	Power State
<input type="checkbox"/>	demo	[REDACTED].edu	lucid	1[REDACTED]	m1.tiny 512MB RAM 1 VCPU 0 Disk	Active	None	Running

Displaying 1 item

Cinder



Flavors

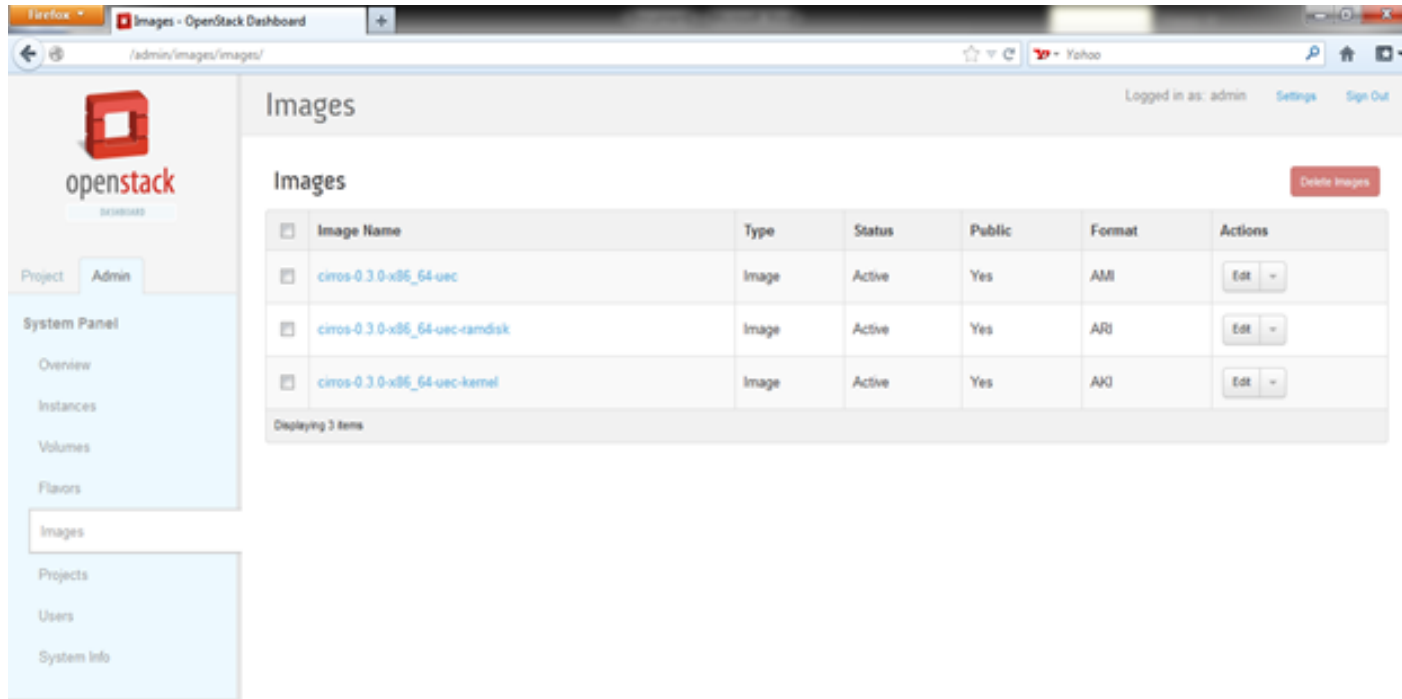


The screenshot shows the OpenStack Dashboard interface. The top navigation bar includes the OpenStack logo and the text "openstack DASHBOARD". The sidebar on the left contains a "System Panel" with links to Overview, Instances, Volumes, Flavors (selected), Images, Projects, Users, and System Info. The main content area is titled "Flavors" and displays a table of flavors. The table has columns for Flavor Name, VCPUs, RAM, Root Disk, Ephemeral Disk, ID, and Actions. The flavors listed are m1.tiny, m1.small, m1.medium, m1.large, and m1.xlarge. The "Actions" column for each flavor contains an "Edit Flavor" button. The dashboard also includes a "Create Flavor" button and a "Delete Flavors" button.

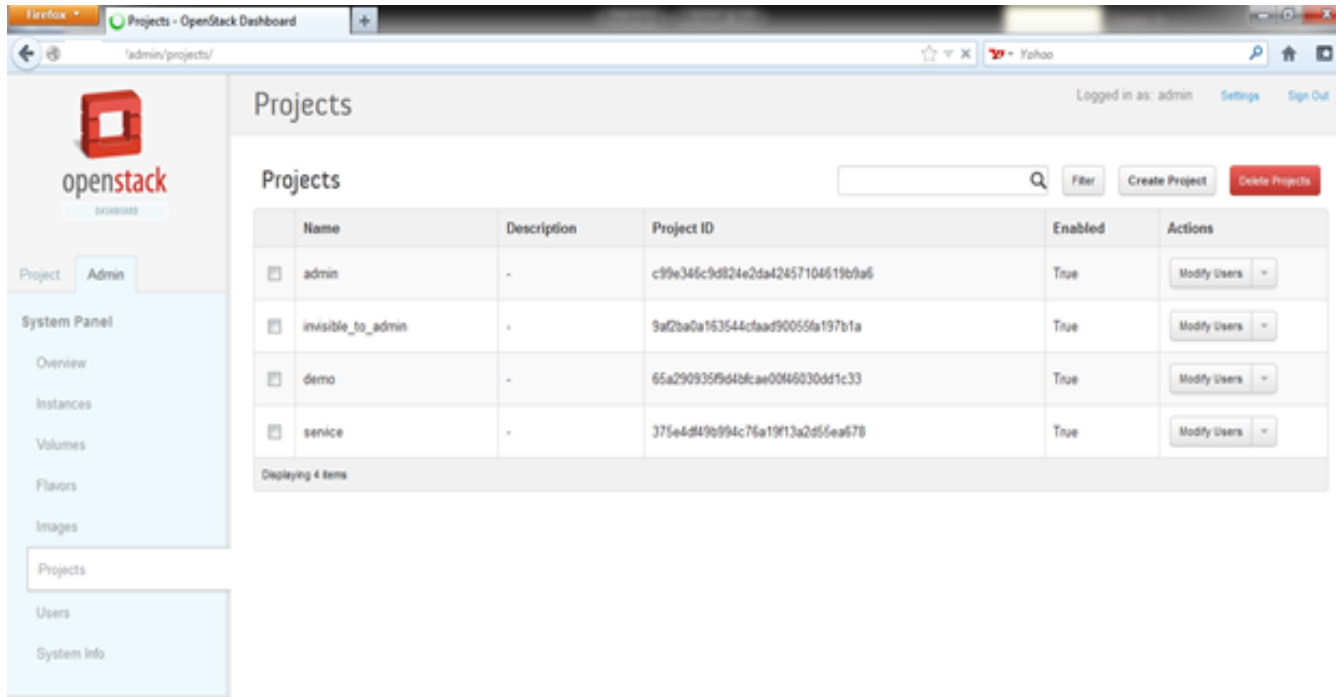
<input type="checkbox"/>	Flavor Name	VCPUs	RAM	Root Disk	Ephemeral Disk	ID	Actions
<input type="checkbox"/>	m1.tiny	1	512MB	0	0	1	Edit Flavor
<input type="checkbox"/>	m1.small	1	2048MB	20	0	2	Edit Flavor
<input type="checkbox"/>	m1.medium	2	4096MB	40	0	3	Edit Flavor
<input type="checkbox"/>	m1.large	4	8192MB	80	0	4	Edit Flavor
<input type="checkbox"/>	m1.xlarge	8	16384MB	160	0	5	Edit Flavor

Displaying 5 items

Glance



Keystone



The screenshot shows the OpenStack Dashboard interface in a Firefox browser window. The page title is "Projects" and the user is logged in as "admin". The left sidebar contains the OpenStack logo and a "System Panel" with links to Overview, Instances, Volumes, Flavors, Images, Projects (selected), Users, and System Info. The main content area displays a table of projects with columns for Name, Description, Project ID, Enabled, and Actions. There are four projects listed: "admin", "invisible_to_admin", "demo", and "service". Each project has a checkbox, a description of "-", a unique Project ID, and is set to "Enabled". The "Actions" column for each project contains a "Modify Users" button. Above the table, there is a search bar, a "Filter" button, and "Create Project" and "Delete Projects" buttons. At the bottom of the table, it says "Displaying 4 items".

	Name	Description	Project ID	Enabled	Actions
<input checked="" type="checkbox"/>	admin	-	c99e346c9d824e2da42457104619b9a6	True	Modify Users
<input checked="" type="checkbox"/>	invisible_to_admin	-	9af2ba0a163544cfaad90055a197b1a	True	Modify Users
<input checked="" type="checkbox"/>	demo	-	65a290935f964bfcac0046030dd1c33	True	Modify Users
<input checked="" type="checkbox"/>	service	-	375e4d849b994c76a19f13a2d55eae678	True	Modify Users

Displaying 4 items

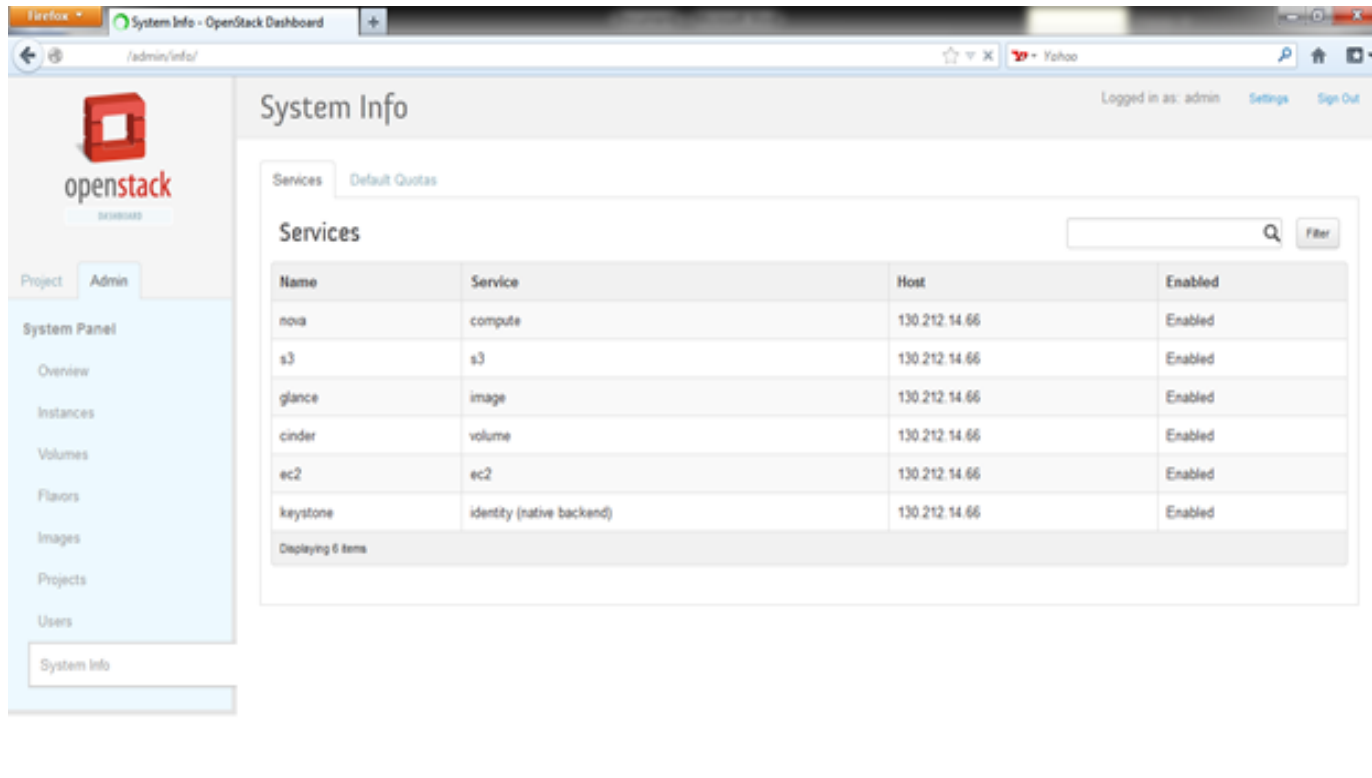
Keystone

The screenshot shows the OpenStack Users dashboard. The browser title is "Users - OpenStack Dashboard" and the address bar shows "/admin/users/". The page is logged in as "admin". The left sidebar contains the OpenStack logo and a navigation menu with "Project" and "Admin" tabs. The "Admin" tab is active, showing a "System Panel" with links to Overview, Instances, Volumes, Flavors, Images, Projects, Users, and System Info. The main content area is titled "Users" and contains a table of users. The table has columns for User Name, Email, User ID, Enabled, and Actions. There are 5 users listed: nova, cinder, demo, admin, and glance. Each user has an "Edit" button in the Actions column. A "Filter" input field and "Filter" button are above the table. "Create User" and "Delete Users" buttons are in the top right of the table area. The footer of the table says "Displaying 5 items".

<input type="checkbox"/>	User Name	Email	User ID	Enabled	Actions
<input type="checkbox"/>	nova	nova@example.com	3e2e76bbdc18460c8b53b846d2411713	True	Edit
<input type="checkbox"/>	cinder	cinder@example.com	54a9c841b1d14276bb5d5cc53edde5	True	Edit
<input type="checkbox"/>	demo	demo@example.com	c9e5df2cf104d0d9cf79bb6a02eaa1	True	Edit
<input type="checkbox"/>	admin	admin@example.com	ea09e3d495af44baa5d5c96e8b67f51	True	Edit
<input type="checkbox"/>	glance	glance@example.com	f6bc08692244c389f9ae3253bdcac9	True	Edit

Displaying 5 items

System Info

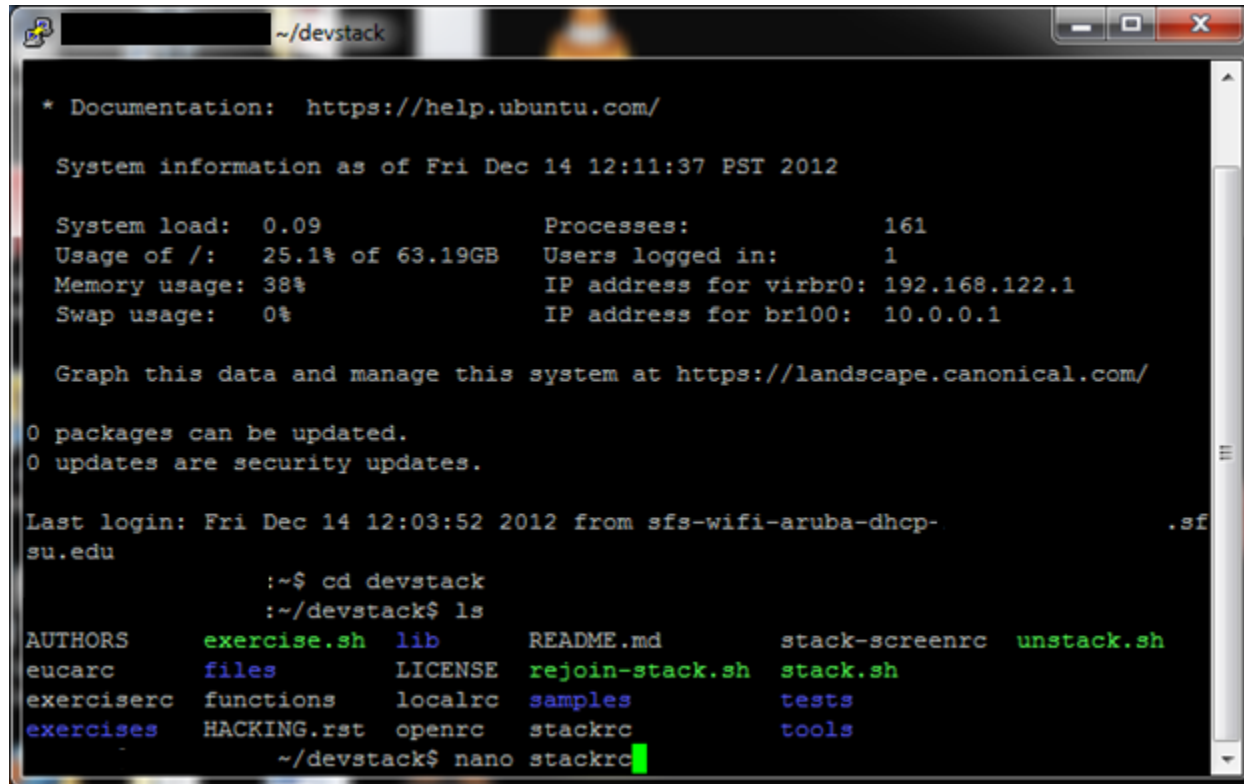


The screenshot shows the OpenStack System Info dashboard. The left sidebar contains the OpenStack logo and a navigation menu with options: Project, Admin, System Panel, Overview, Instances, Volumes, Flavors, Images, Projects, Users, and System Info. The main content area is titled 'System Info' and shows a 'Services' tab. Below the tab is a table of services.

Name	Service	Host	Enabled
nova	compute	130.212.14.66	Enabled
s3	s3	130.212.14.66	Enabled
glance	image	130.212.14.66	Enabled
cinder	volume	130.212.14.66	Enabled
ec2	ec2	130.212.14.66	Enabled
keystone	identity (native backend)	130.212.14.66	Enabled

Displaying 6 items

How to add an image



```
~/devstack

* Documentation: https://help.ubuntu.com/

System information as of Fri Dec 14 12:11:37 PST 2012

System load: 0.09          Processes:           161
Usage of /: 25.1% of 63.19GB Users logged in:      1
Memory usage: 38%         IP address for virbr0: 192.168.122.1
Swap usage: 0%            IP address for br100: 10.0.0.1

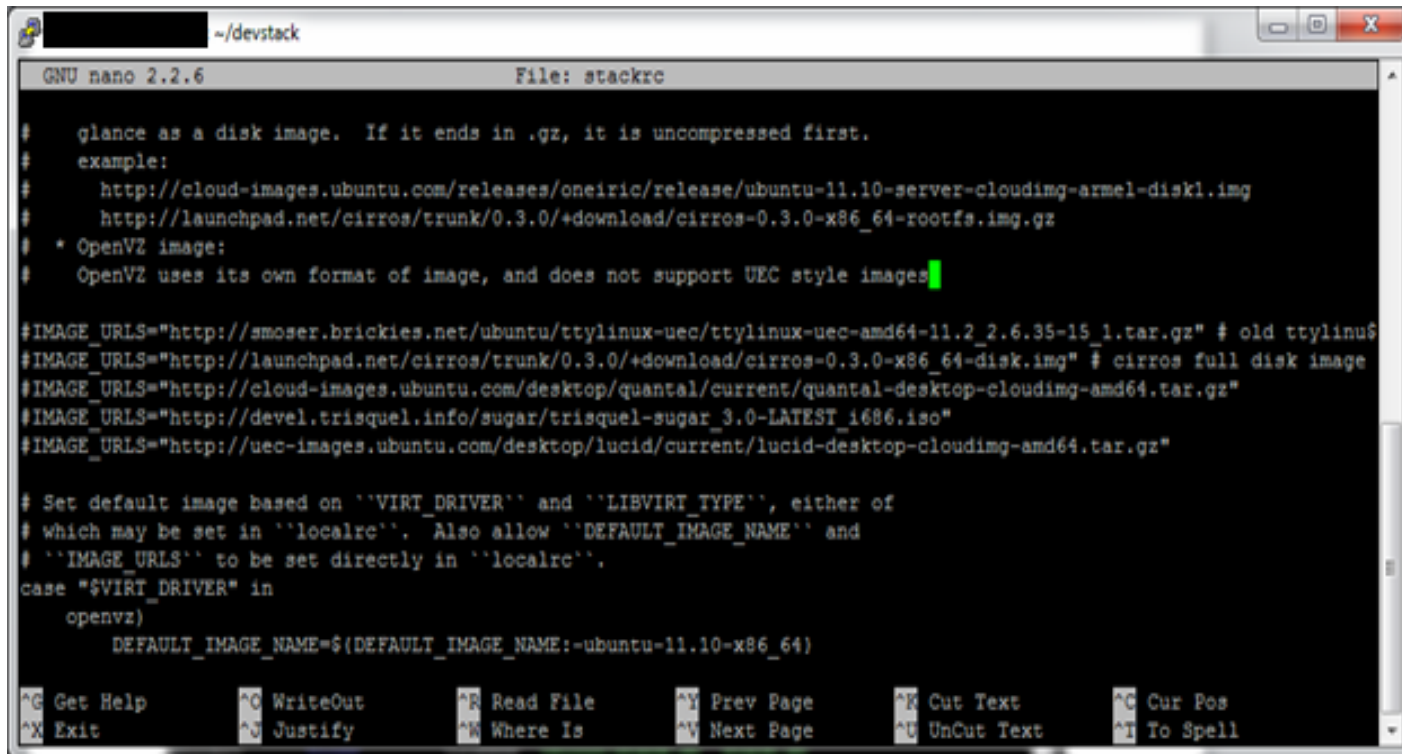
Graph this data and manage this system at https://landscape.canonical.com/

0 packages can be updated.
0 updates are security updates.

Last login: Fri Dec 14 12:03:52 2012 from sfs-wifi-aruba-dhcp-
su.edu

      ~$ cd devstack
      ~/devstack$ ls
AUTHORS  exercise.sh  lib      README.md  stack-screenrc  unstack.sh
eucarc   files        LICENSE  rejoin-stack.sh  stack.sh
exerciserc  functions  localrc  samples    tests
exercises  HACKING.rst openrc    stackrc     tools
      ~/devstack$ nano stackrc
```

Stackrc Editing



```
GNU nano 2.2.6 File: stackrc

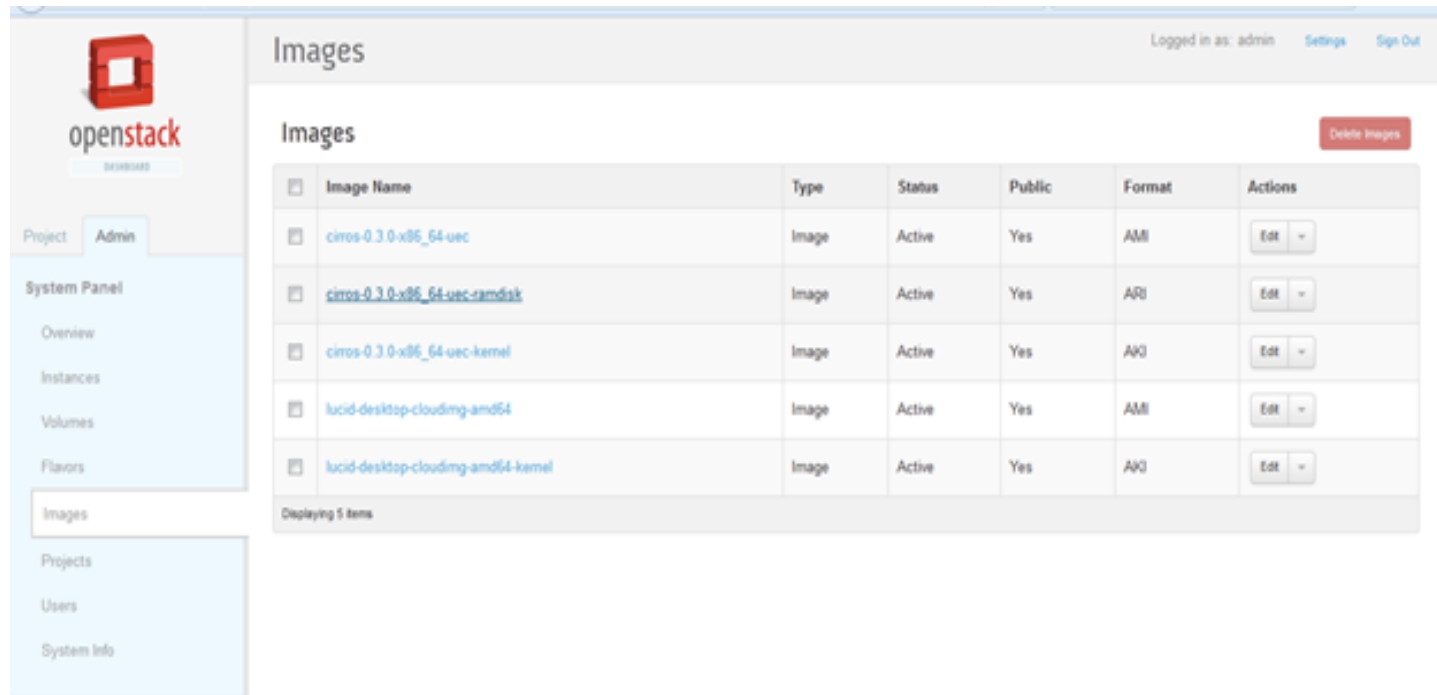
# glance as a disk image.  If it ends in .gz, it is uncompressed first.
# example:
#   http://cloud-images.ubuntu.com/releases/oneiric/release/ubuntu-11.10-server-cloudimg-armel-disk1.img
#   http://launchpad.net/cirros/trunk/0.3.0/+download/cirros-0.3.0-x86_64-rootfs.img.gz
# * OpenVZ image:
#   OpenVZ uses its own format of image, and does not support UEC style images

#IMAGE_URLS="http://smoser.brickies.net/ubuntu/ttylinux-uec/ttylinux-uec-amd64-11.2_2.6.35-15_1.tar.gz" # old ttylinux
#IMAGE_URLS="http://launchpad.net/cirros/trunk/0.3.0/+download/cirros-0.3.0-x86_64-disk.img" # cirros full disk image
#IMAGE_URLS="http://cloud-images.ubuntu.com/desktop/quantal/current/quantal-desktop-cloudimg-amd64.tar.gz"
#IMAGE_URLS="http://devel.trisquel.info/sugar/trisquel-sugar_3.0-LATEST_i686.iso"
#IMAGE_URLS="http://uec-images.ubuntu.com/desktop/lucid/current/lucid-desktop-cloudimg-amd64.tar.gz"

# Set default image based on ``VIRT_DRIVER`` and ``LIBVIRT_TYPE``, either of
# which may be set in ``localrc``.  Also allow ``DEFAULT_IMAGE_NAME`` and
# ``IMAGE_URLS`` to be set directly in ``localrc``.
case "$VIRT_DRIVER" in
  openvz)
    DEFAULT_IMAGE_NAME=${DEFAULT_IMAGE_NAME:-ubuntu-11.10-x86_64}

^G Get Help      ^O WriteOut     ^R Read File    ^Y Prev Page    ^K Cut Text     ^C Cur Pos
^X Exit          ^J Justify      ^W Where Is     ^V Next Page    ^U UnCut Text   ^H To Spell
```

Check it out



The screenshot displays the OpenStack Dashboard interface. On the left is a sidebar with the OpenStack logo and a navigation menu. The main content area is titled 'Images' and shows a table of image artifacts. The table has columns for Image Name, Type, Status, Public, Format, and Actions. Five images are listed, all with a status of 'Active' and 'Public'. Each image has an 'Edit' button in the Actions column. A 'Delete Images' button is located at the top right of the table. The sidebar menu includes 'Project', 'Admin', 'System Panel', 'Overview', 'Instances', 'Volumes', 'Flavors', 'Images' (selected), 'Projects', 'Users', and 'System Info'.

<input type="checkbox"/>	Image Name	Type	Status	Public	Format	Actions
<input type="checkbox"/>	ciros-0.3.0-x86_64-uec	Image	Active	Yes	AMI	Edit -
<input type="checkbox"/>	ciros-0.3.0-x86_64-uec-ramdisk	Image	Active	Yes	ARI	Edit -
<input type="checkbox"/>	ciros-0.3.0-x86_64-uec-kernel	Image	Active	Yes	AKI	Edit -
<input type="checkbox"/>	lucid-desktop-cloudimg-amd64	Image	Active	Yes	AMI	Edit -
<input type="checkbox"/>	lucid-desktop-cloudimg-amd64-kernel	Image	Active	Yes	AKI	Edit -

Displaying 5 items

VNC connection into Instance

The screenshot displays the OpenStack dashboard interface. On the left is a sidebar with the OpenStack logo and a 'DASHBOARD' button. Below this are tabs for 'Project' and 'Admin', and a section for 'CURRENT PROJECT demo'. Under 'Manage Compute', there are links for 'Overview', 'Instances' (which is highlighted), 'Volumes', 'Images & Snapshots', and 'Access & Security'. The main content area is titled 'Instance Detail: lucid' and shows the user is logged in as 'admin' with links for 'Settings' and 'Sign Out'. There are three tabs: 'Overview', 'Log', and 'VNC', with 'VNC' being the active tab. The 'Instance VNC Console' section contains a blue informational bar stating: 'If VNC console is not responding to keyboard input: click the grey status bar below. Click here to show only VNC'. Below this is a large VNC viewer window showing a login screen for the 'lucid' instance. The login screen has the Ubuntu logo and the text 'lucid'. It includes a username field with 'Ubuntu' entered, a password field, and 'Cancel' and 'Log In' buttons.

Conclusion

- ❑ Openstack is pretty easy to use
- ❑ Very customizable
- ❑ Does it do what we need it to?
- ❑ Try it yourself!

Questions?

