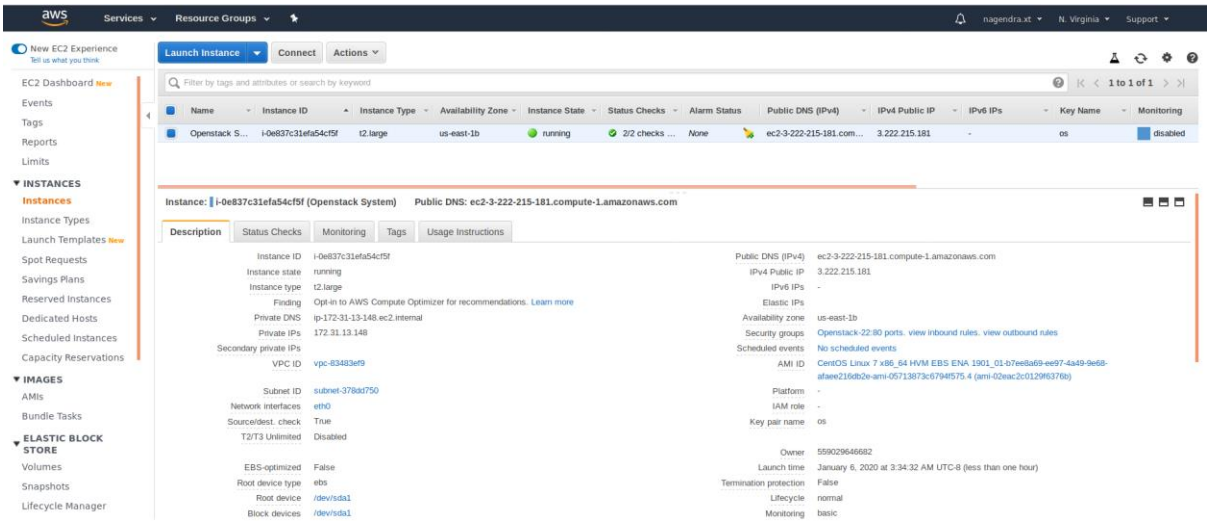
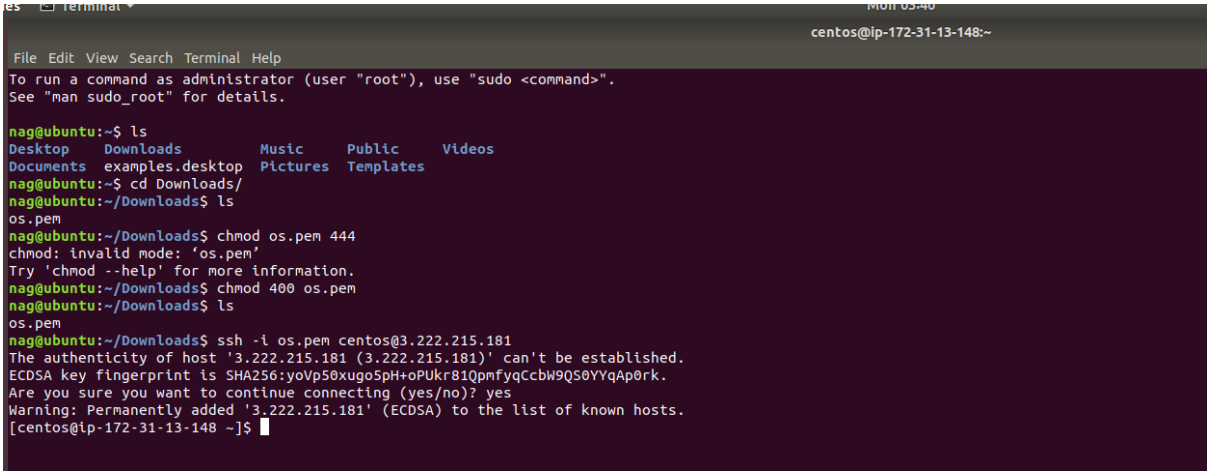
Creating an Open Stack Single Node Private Cloud Deployment on EC2 on AWS

1. Create EC2 instance t2.large with Centos 7



2. SSH to EC2 instance



3. Phase-1 Commands

```
nag@ubuntu:~/Downloads$ ssh -i os.pem centos@3.222.215.181
The authenticity of host '3.222.215.181 (3.222.215.181)' can't be established.
ECDSA key fingerprint is SHA256:yoVp50xugo5pH+oPUkr81QpmfyqCcbW9QS0YYqAp0rk.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '3.222.215.181' (ECDSA) to the list of known hosts.
[centos@ip-172-31-13-148 ~]$ sudo yum update -y
Loaded plugins: fastestmirror
Determining fastest mirrors
 * base: mirrors.advancedhosters.com
 * extras: mirrors.advancedhosters.com
 * updates: mirrors.advancedhosters.com

Complete!
[centos@ip-172-31-13-148 ~]$ sudo yum install -y centos-release-openstack-queens
Loaded plugins: fastestmirror
Loading mirror speeds from cached hostfile
 * base: mirrors.advancedhosters.com
 * extras: mirrors.advancedhosters.com
 * updates: mirrors.advancedhosters.com
Resolving Dependencies
--> Running transaction check
---> Package centos-release-openstack-queens.noarch 0:1-2.el7.centos will be installed
--> Processing Dependency: centos-release-qemu-ev for package: centos-release-openstack-queens-1-2.el7.centos.noarch

Installed:
  centos-release-openstack-queens.noarch 0:1-2.el7.centos

Dependency Installed:
  centos-release-ceph-luminous.noarch 0:1.1-2.el7.centos              centos-release-qemu-ev.noarch 0:1.0-4.el7.centos
  centos-release-virt-common.noarch 0:1-1.el7.centos

Complete!
[centos@ip-172-31-13-148 ~]$
[centos@ip-172-31-13-148 ~]$
[centos@ip-172-31-13-148 ~]$ sudo yum-config-manager --enable openstack-queens
Loaded plugins: fastestmirror
```

Restart the EC2 instance

4. Phase-2 commands

```
[centos@ip-172-31-13-148 ~]$ sudo yum update -y
Loaded plugins: fastestmirror
Loading mirror speeds from cached hostfile
 * base: mirrors.advancedhosters.com
 * centos-qemu-ev: mirrors.advancedhosters.com
 * extras: mirrors.advancedhosters.com
 * updates: mirrors.advancedhosters.com
No packages marked for update
[centos@ip-172-31-13-148 ~]$
```

```
[centos@ip-172-31-13-148 ~]$ sudo yum install -y openstack-packstack
Loaded plugins: fastestmirror
Loading mirror speeds from cached hostfile
 * base: mirrors.advancedhosters.com
 * centos-qemu-ev: mirrors.advancedhosters.com
 * extras: mirrors.advancedhosters.com
 * updates: mirrors.advancedhosters.com
Resolving Dependencies
--> Running transaction check
---> Package openstack-packstack.noarch 1:12.0.1-1.el7 will be installed
```

5. Phase 3 Commands

```
Complete!
[centos@ip-172-31-13-148 ~]$
[centos@ip-172-31-13-148 ~]$ sudo yum install nano
Loaded plugins: fastestmirror
Loading mirror speeds from cached hostfile
 * base: mirrors.advancedhosters.com
 * centos-qemu-ev: mirrors.advancedhosters.com
 * extras: mirrors.advancedhosters.com
 * updates: mirrors.advancedhosters.com
Resolving Dependencies
--> Running transaction check
---> Package nano.x86_64 0:2.3.1-10.el7 will be installed
--> Finished Dependency Resolution

Dependencies Resolved
```

```
  GNU nano 2.3.1                                          File: /etc/enviror

LANG=en_US.utf-8
LC_ALL=en_US.utf-8
```

6. Phase 4 Commands

```
                                                          centos@ip-172-31-13-148:~
File  Edit  View  Search  Terminal  Help
[centos@ip-172-31-13-148 ~]$ sudo packstack --allinone
Welcome to the Packstack setup utility

The installation log file is available at: /var/tmp/packstack/20200106-125900-qFhLMG/openstack-setup.log
Packstack changed given value  to required value /root/.ssh/id_rsa.pub

Installing:
Clean Up                                             [ DONE ]
Discovering ip protocol version                      [ DONE ]
```

7. Backend Execution

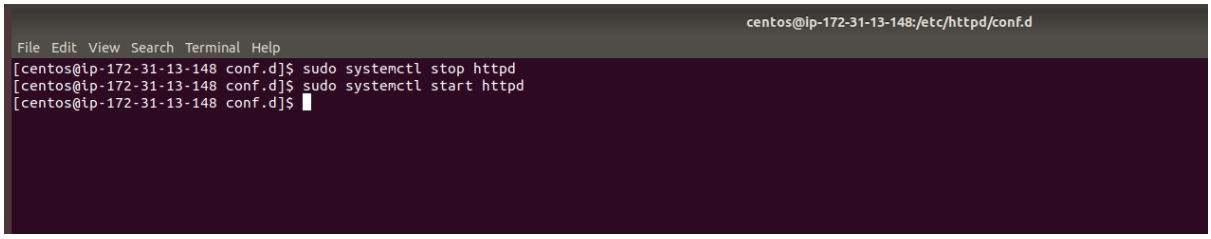
```
centos@ip-172-31-13-148:~
File  Edit  View  Search  Terminal  Help
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

nag@ubuntu:~/Downloads$ ssh -i os.pem centos@3.222.215.181
Last login: Mon Jan  6 12:39:43 2020 from 122.171.166.166
[centos@ip-172-31-13-148 ~]$ sudo tail -f /var/log/messages
```

```
centos@ip-172-31-13-148:~
File  Edit  View  Search  Terminal  Help
Checking if the Cinder server has a cinder-volumes vg[ DONE ]
Preparing Cinder entries                             [ DONE ]
Preparing Nova API entries                           [ DONE ]
Creating ssh keys for Nova migration                 [ DONE ]
Gathering ssh host keys for Nova migration           [ DONE ]
Preparing Nova Compute entries                       [ DONE ]
Preparing Nova Scheduler entries                     [ DONE ]
Preparing Nova VNC Proxy entries                     [ DONE ]
Preparing OpenStack Network-related Nova entries     [ DONE ]
Preparing Nova Common entries                        [ DONE ]
Preparing Neutron LBaaS Agent entries                [ DONE ]
Preparing Neutron API entries                        [ DONE ]
Preparing Neutron L3 entries                         [ DONE ]
Preparing Neutron L2 Agent entries                   [ DONE ]
Preparing Neutron DHCP Agent entries                 [ DONE ]
Preparing Neutron Metering Agent entries             [ DONE ]
Checking if NetworkManager is enabled and running    [ DONE ]
Preparing OpenStack Client entries                   [ DONE ]
Preparing Horizon entries                            [ DONE ]
Preparing Swift builder entries                      [ DONE ]
Preparing Swift proxy entries                        [ DONE ]
Preparing Swift storage entries                      [ DONE ]
Preparing Gnocchi entries                            [ DONE ]
Preparing Redis entries                              [ DONE ]
Preparing Ceilometer entries                         [ DONE ]
Preparing Aodh entries                               [ DONE ]
Preparing Puppet manifests                           [ DONE ]
Copying Puppet modules and manifests                 [ DONE ]
Applying 172.31.13.148_controller.pp
172.31.13.148_controller.pp:                         [ DONE ]
Applying 172.31.13.148_network.pp
172.31.13.148_network.pp:                            [ DONE ]
Applying 172.31.13.148_compute.pp
172.31.13.148_compute.pp:                            [ DONE ]
Applying Puppet manifests                            [ DONE ]
Finalizing                                           [ DONE ]

 **** Installation completed successfully ******

Additional information:
 * A new answerfile was created in: /root/packstack-answers-20200106-125900.txt
 * Time synchronization installation was skipped. Please note that unsynchronized time on server instances might be problem for some OpenStack components.
 * File /root/keystonerc_admin has been created on OpenStack client host 172.31.13.148. To use the command line tools you need to source the file.
 * To access the OpenStack Dashboard browse to http://172.31.13.148/dashboard .
Please, find your login credentials stored in the keystonerc_admin in your home directory.
 * The installation log file is available at: /var/tmp/packstack/20200106-125900-qFhLMG/openstack-setup.log
 * The generated manifests are available at: /var/tmp/packstack/20200106-125900-qFhLMG/manifests
[centos@ip-172-31-13-148 ~]$
```

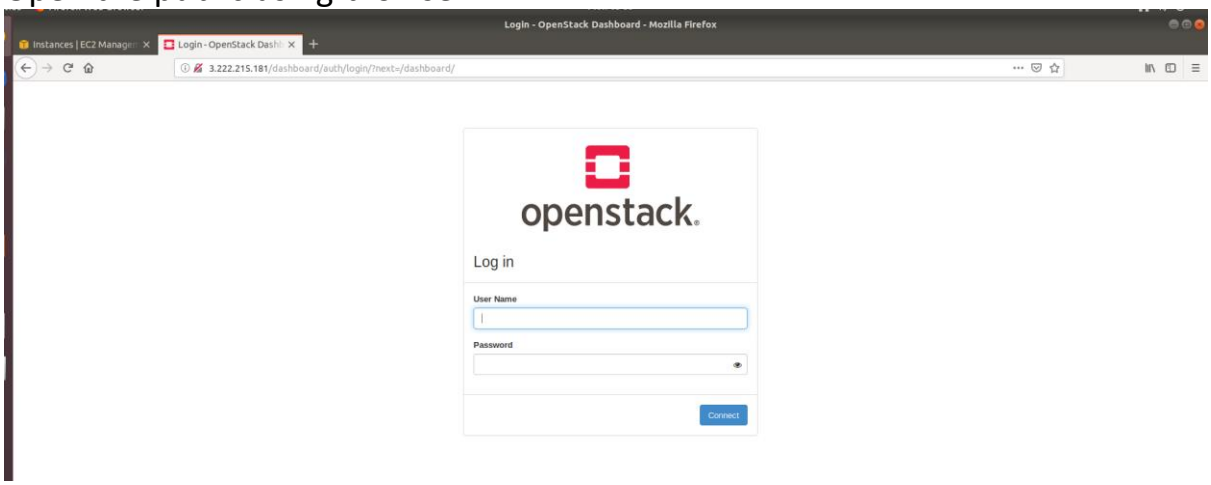
8. Phase 5 commands

```
Please, find your login credentials stored in the keystonerc_admin in your home directory.
 * The installation log file is available at: /var/tmp/packstack/20200106-125900-qFhLMG/openstack-setup.log
 * The generated manifests are available at: /var/tmp/packstack/20200106-125900-qFhLMG/manifests
[centos@ip-172-31-13-148 ~]$ cd /etc/httpd/conf.d
[centos@ip-172-31-13-148 conf.d]$ sudo nano 15-horizon_vhost.conf and replace the IP address
[centos@ip-172-31-13-148 conf.d]$ ^C
[centos@ip-172-31-13-148 conf.d]$ ^C
[centos@ip-172-31-13-148 conf.d]$ ^C
[centos@ip-172-31-13-148 conf.d]$ ^C
[centos@ip-172-31-13-148 conf.d]$ ^C
[centos@ip-172-31-13-148 conf.d]$ ^C
[centos@ip-172-31-13-148 conf.d]$ sudo nano 15-horizon_vhost.conf
```

```
centos@ip-172-31-13-148:/etc/httpd/conf.d
File  Edit  View  Search  Terminal  Help
  GNU nano 2.3.1                                File: 15-horizon_vhost.conf

# ************************************
# Vhost template in module puppetlabs-apache
# Managed by Puppet
# ************************************

<VirtualHost *:80>
  ServerName ip-172-31-13-148.ec2.internal

  ## Vhost docroot
  DocumentRoot "/var/www/"
  ## Alias declarations for resources outside the DocumentRoot
  Alias /dashboard/static "/usr/share/openstack-dashboard/static"

  ## Directories, there should at least be a declaration for /var/www/

  <Directory "/var/www/">
    Options Indexes FollowSymLinks MultiViews
    AllowOverride None
    Require all granted
  </Directory>

  ## Logging
  ErrorLog "/var/log/httpd/horizon_error.log"
  ServerSignature Off
  CustomLog "/var/log/httpd/horizon_access.log" combined

  ## RedirectMatch rules
  RedirectMatch permanent  ^/$ /dashboard

  ## Server aliases
  ServerAlias 3.222.215.181
  ServerAlias ip-172-31-13-148.ec2.internal
  ServerAlias localhost
  WSGIApplicationGroup %{GLOBAL}
  WSGIDaemonProcess apache display-name=horizon group=apache processes=3 threads=10 user=apache
  WSGIProcessGroup apache
  WSGIScriptAlias /dashboard "/usr/share/openstack-dashboard/openstack_dashboard/wsgi/django.wsgi"
</VirtualHost>
```

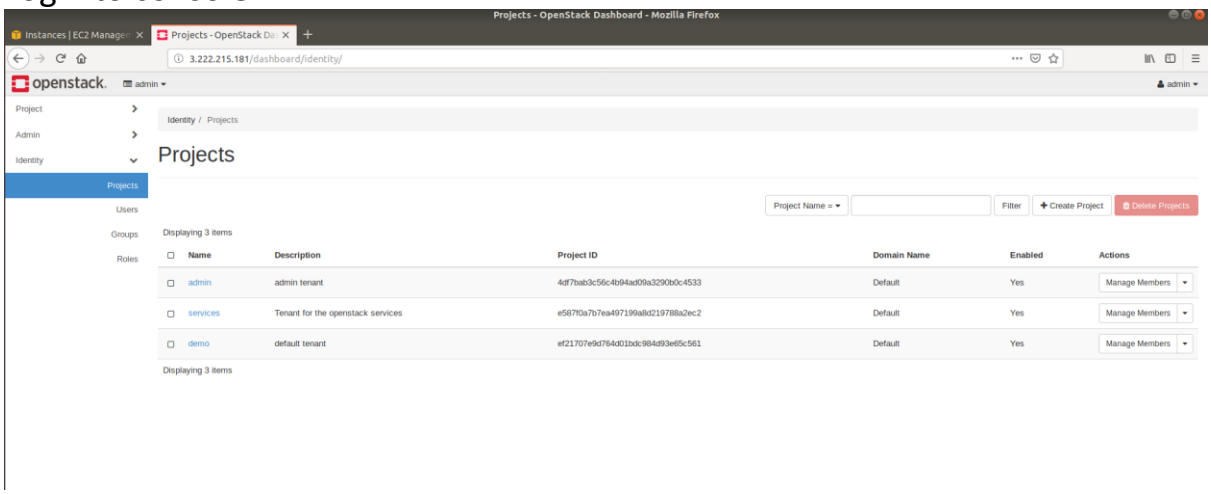


Open the public using browser



9. Phase 6

Login to console

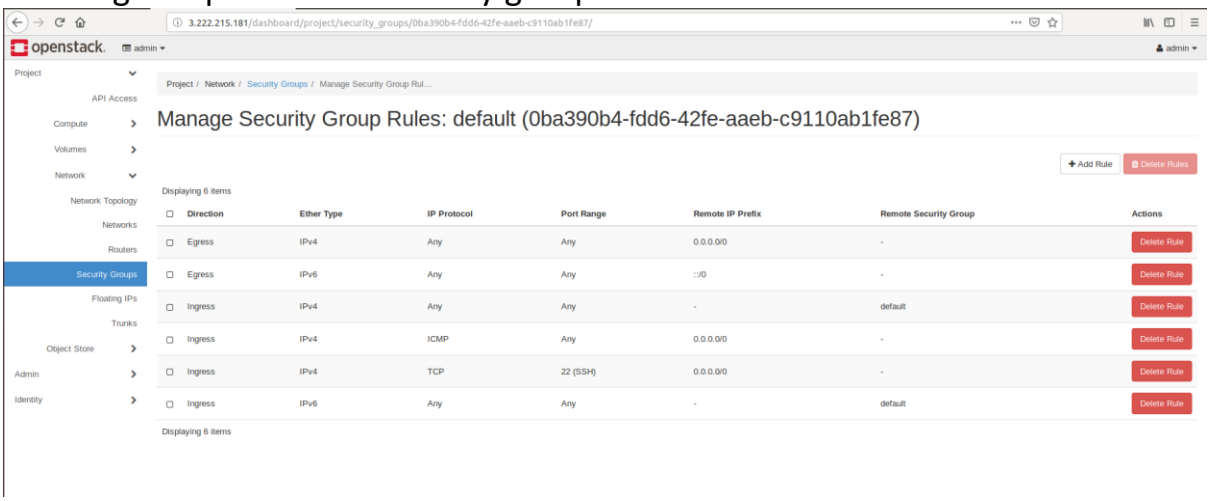


10. Observations

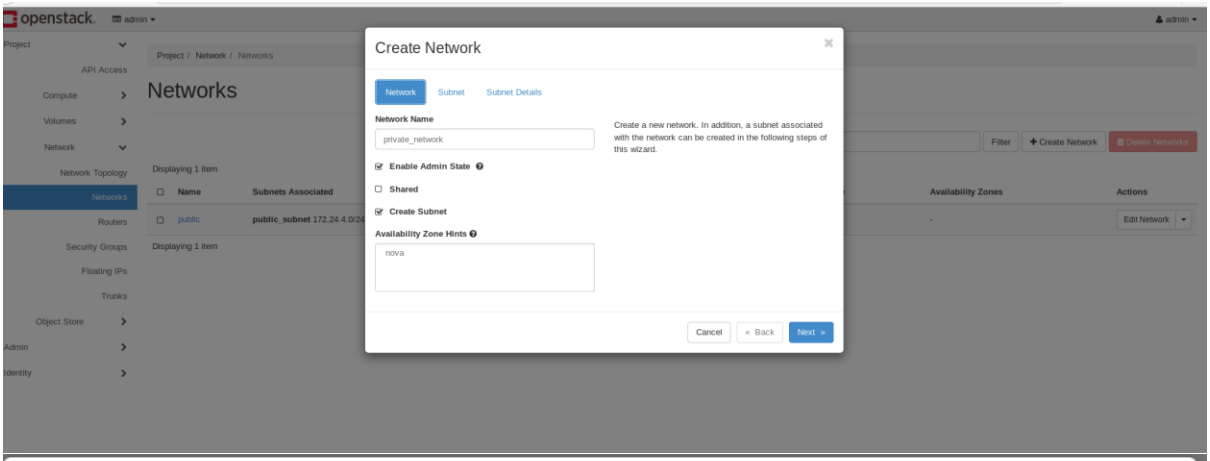
- OpenStack certainly lacks some of the pre-installed AWS applications and setups such as the excellent security module.
- Besides AWS services available globally which attracts start-ups
- Both the platforms offer similar services and it boils down to the usability and integration factor of the application with your organizational needs. OpenStack, on one hand, offers better resiliency and increased corporate profitability with its open frame network; AWS appeal to start-ups and small IT firms due to its many offerings and flexible customer support.

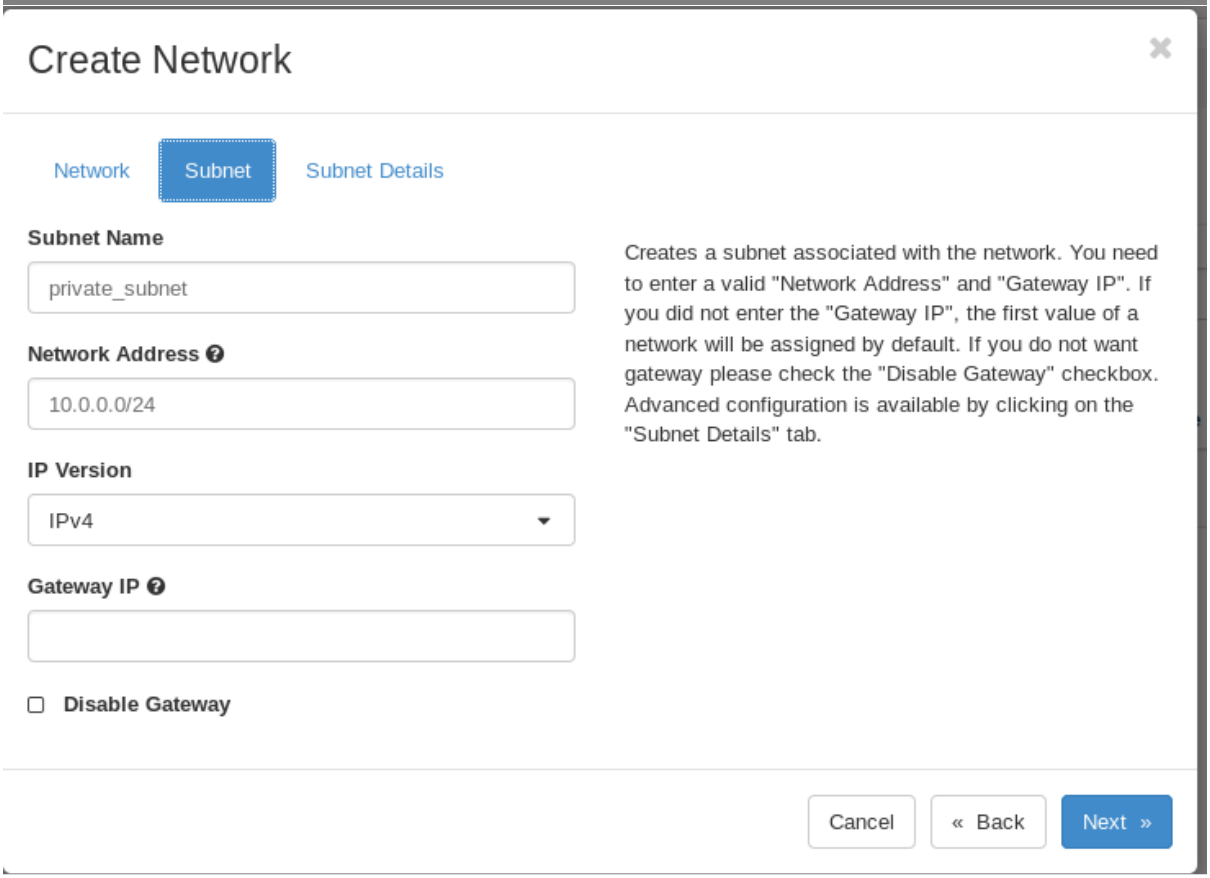
11. Creating cirros instance

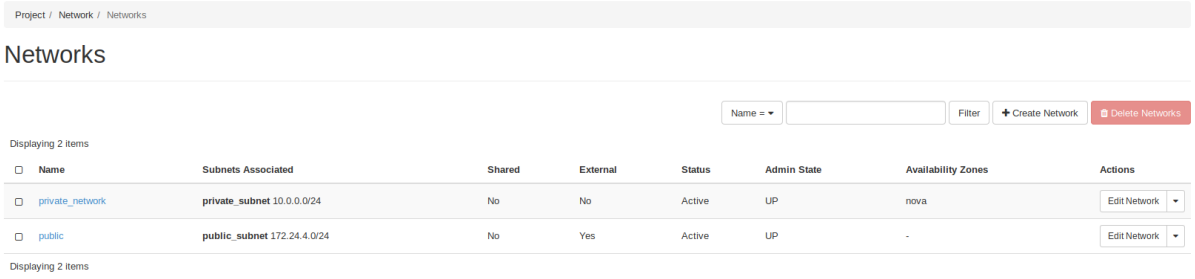
Creating SSH port under security group



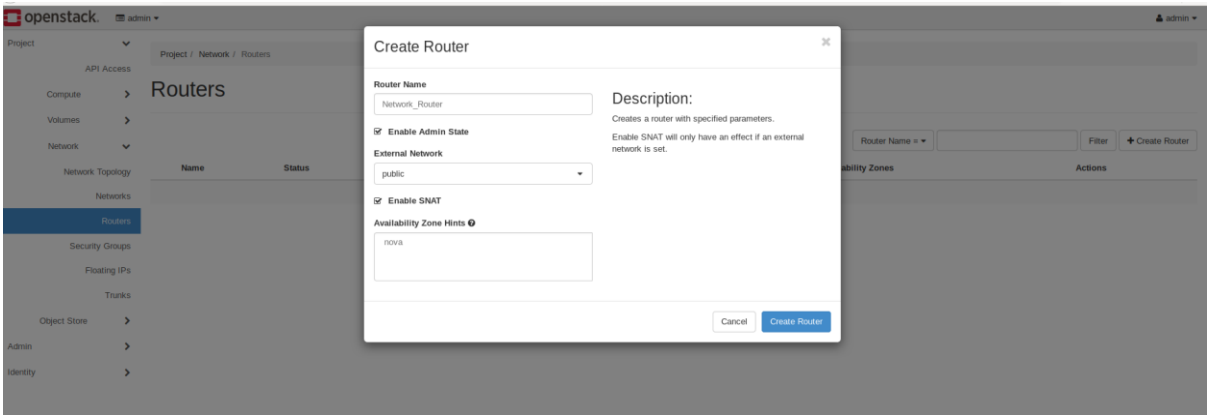
Creating Network


openstack.
admin
Project
API Access
Compute
Volumes
Network
Network Topology
Networks
Routers
Security Groups
Floating IPs
Trunks
Object Store
Admin
Identity
Project / Network / Networks
Networks
Displaying 1 item
Name
Subnets Associated
public
public_subnet 172.24.4.0/24
Availability Zones
Actions
Edit Network
Filter
Create Network
Delete Networks
Create Network
Network
Subnet
Subnet Details
Network Name
private_network
Enable Admin State
Shared
Create Subnet
Availability Zone Hints
nova
Create a new network. In addition, a subnet associated with the network can be created in the following steps of this wizard.
Cancel
« Back
Next »


Create Network
Network
Subnet
Subnet Details
Subnet Name
private_subnet
Network Address
10.0.0.0/24
IP Version
IPv4
Gateway IP
Disable Gateway
Creates a subnet associated with the network. You need to enter a valid "Network Address" and "Gateway IP". If you did not enter the "Gateway IP", the first value of a network will be assigned by default. If you do not want gateway please check the "Disable Gateway" checkbox. Advanced configuration is available by clicking on the "Subnet Details" tab.
Cancel
« Back
Next »

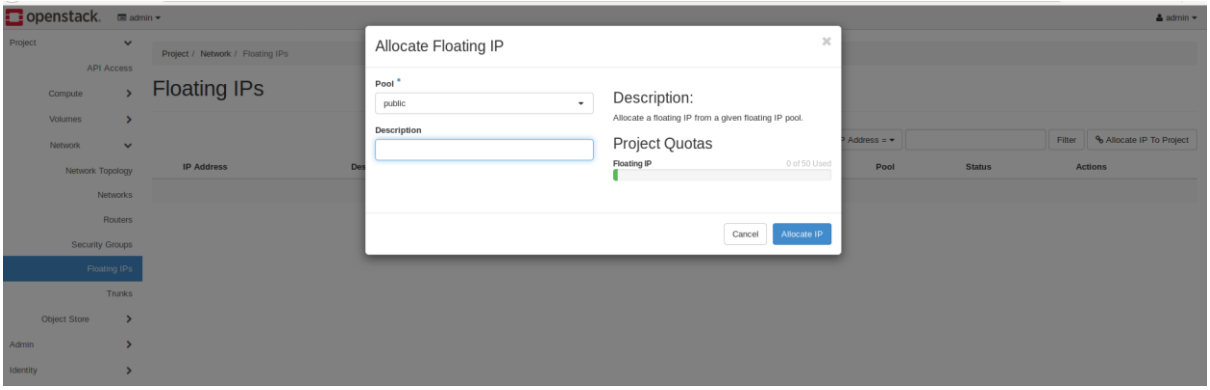

Project / Network / Networks
Networks
Name =
Filter
Create Network
Delete Networks
Displaying 2 items
Name
Subnets Associated
Shared
External
Status
Admin State
Availability Zones
Actions
private_network
private_subnet 10.0.0.0/24
No
No
Active
UP
nova
Edit Network
public
public_subnet 172.24.4.0/24
No
Yes
Active
UP
-
Edit Network
Displaying 2 items

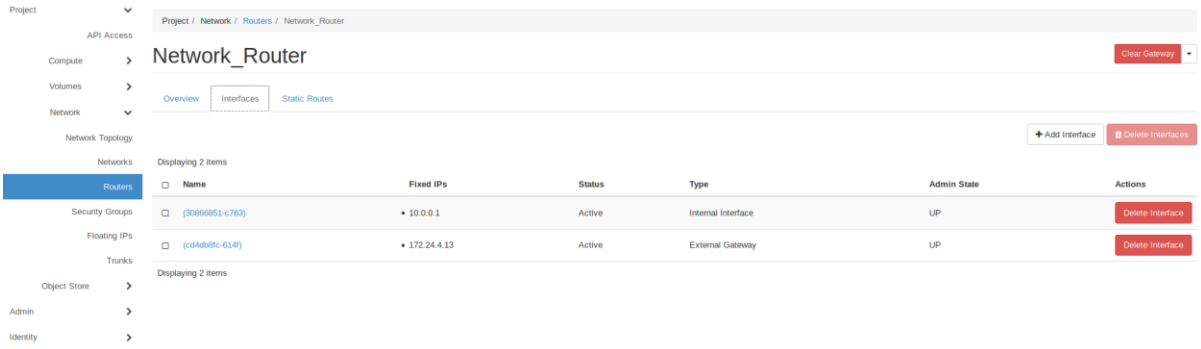
Creating Router



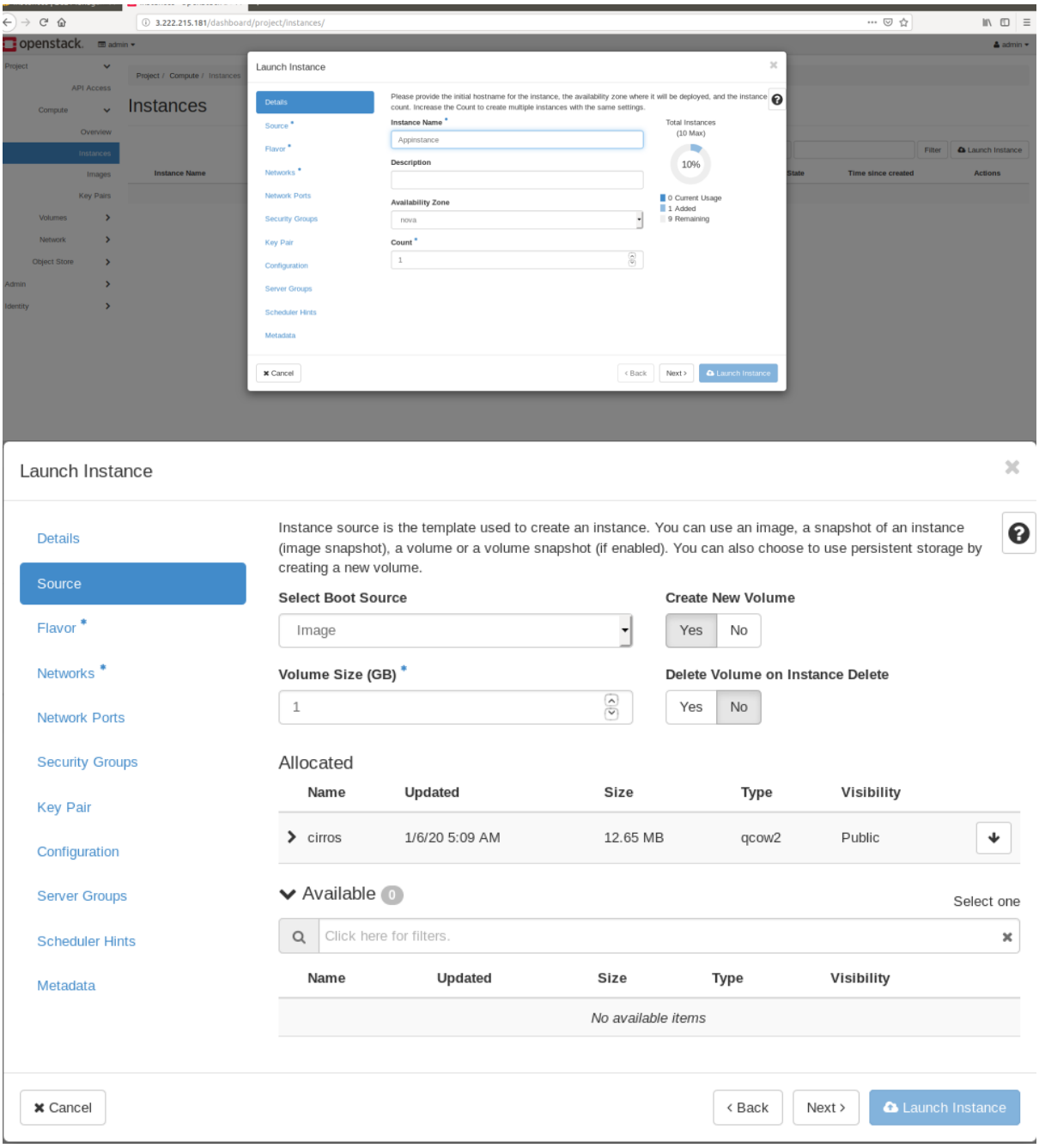
Add interface

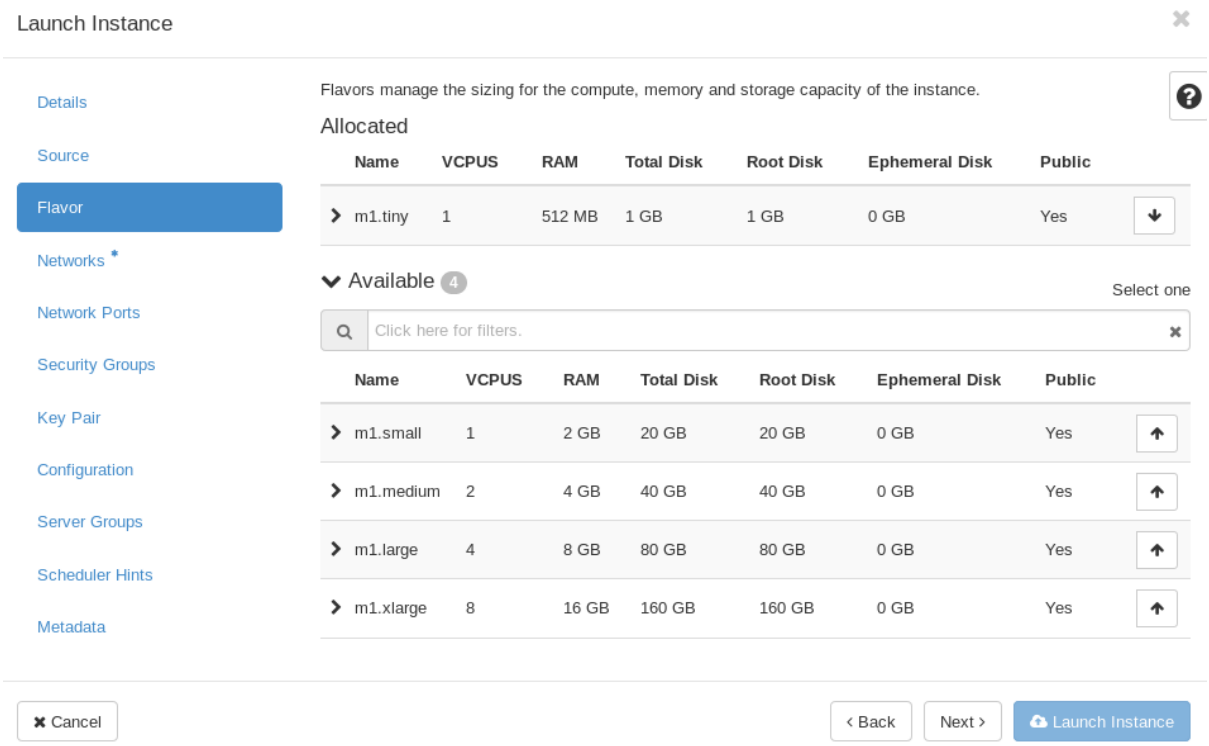
Creating Floating IP

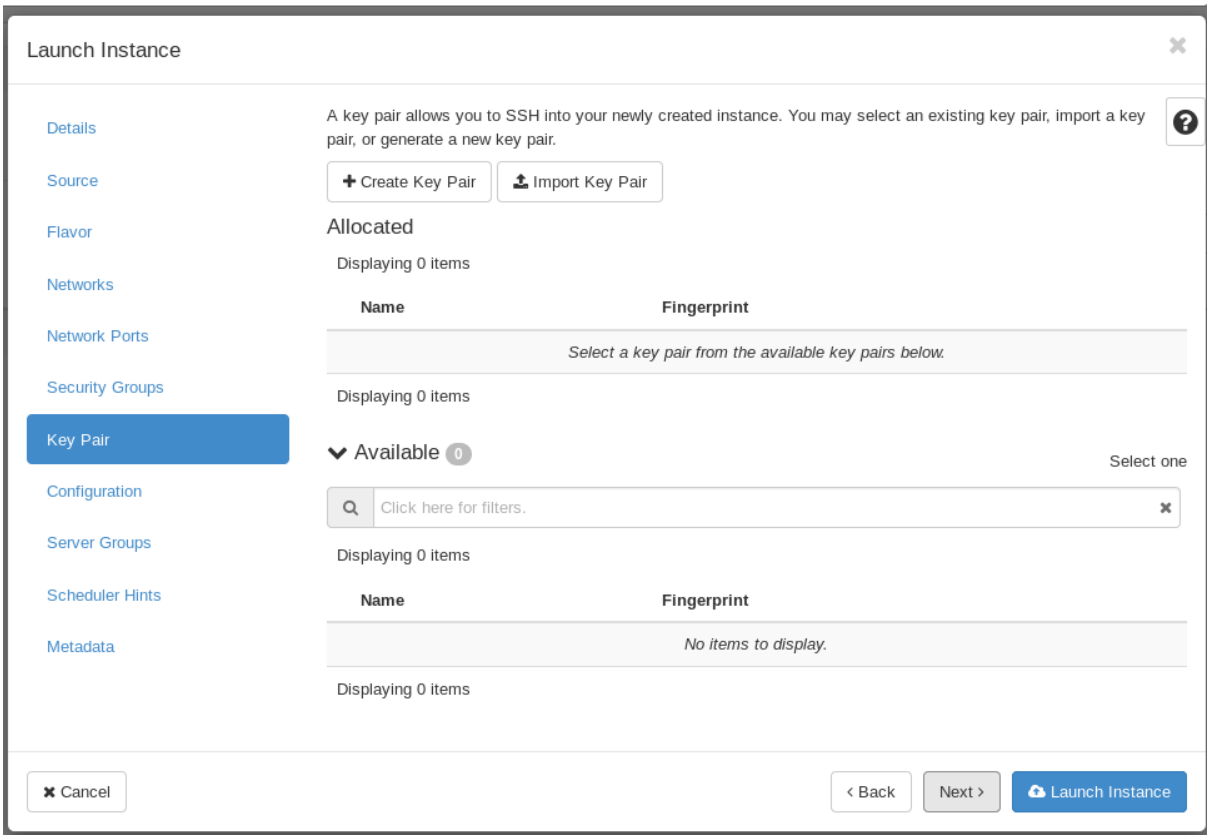


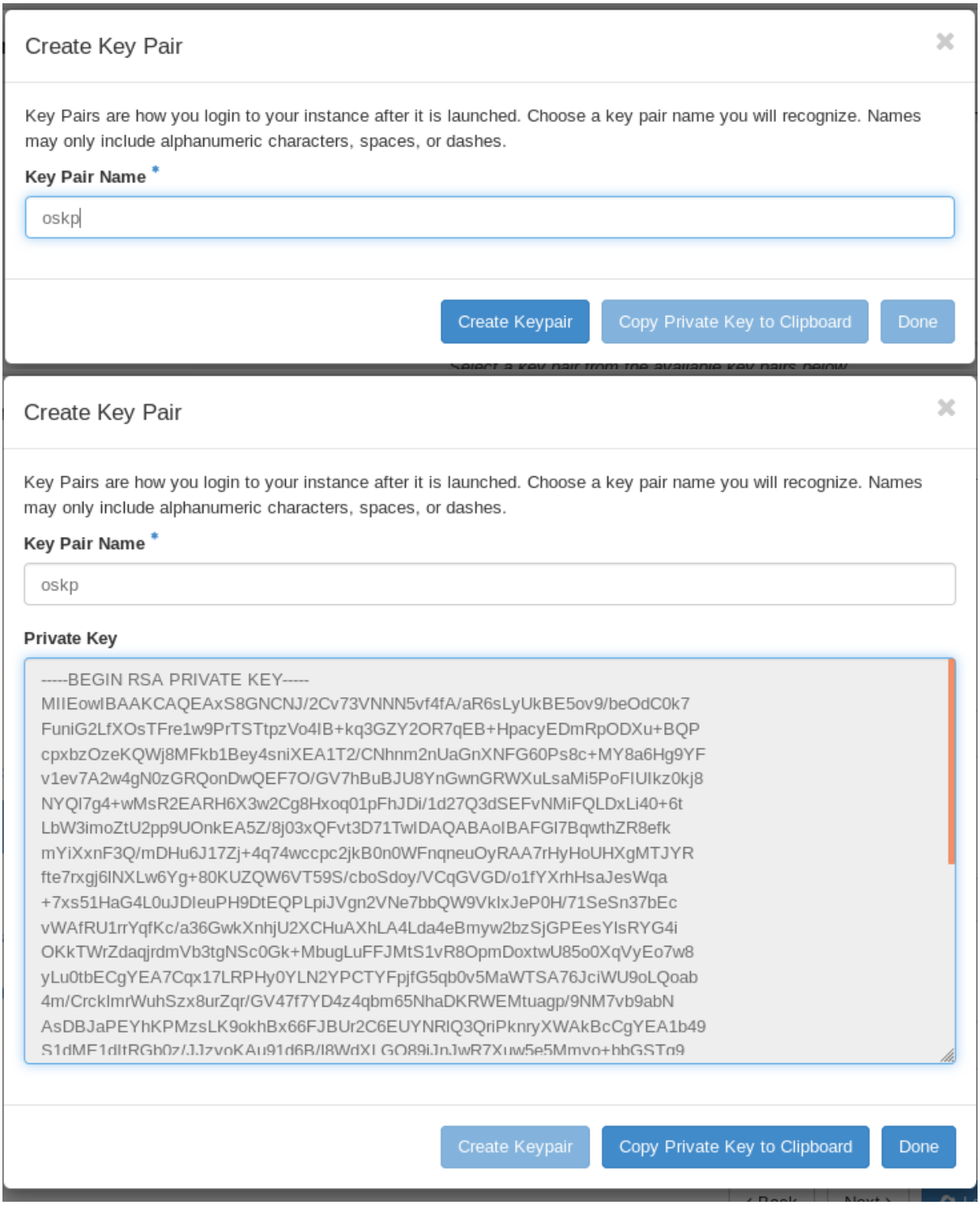


Create an Instance with below options

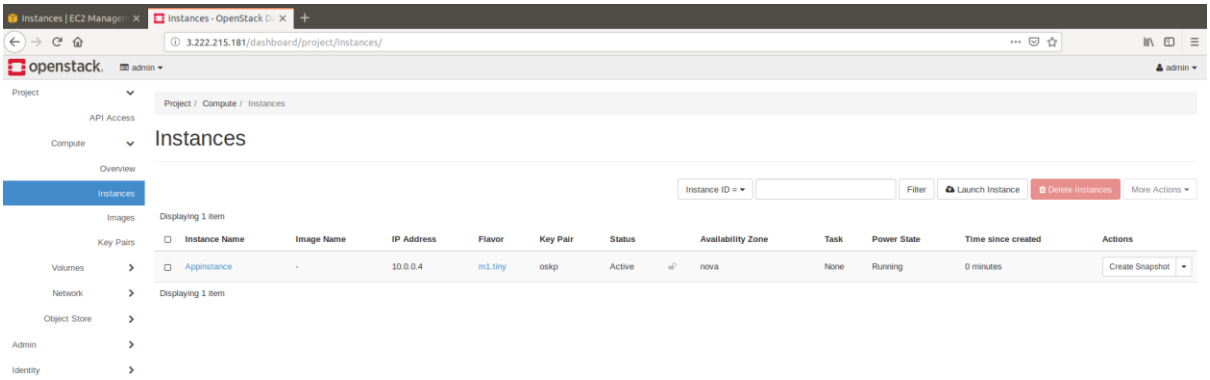



Launch Instance
Details
Source
Flavor
Networks *
Network Ports
Security Groups
Key Pair
Configuration
Server Groups
Scheduler Hints
Metadata
Flavors manage the sizing for the compute, memory and storage capacity of the instance.
Allocated
Name VCPUS RAM Total Disk Root Disk Ephemeral Disk Public
m1.tiny 1 512 MB 1 GB 1 GB 0 GB Yes
Available 4
Select one
Click here for filters.
Name VCPUS RAM Total Disk Root Disk Ephemeral Disk Public
m1.small 1 2 GB 20 GB 20 GB 0 GB Yes
m1.medium 2 4 GB 40 GB 40 GB 0 GB Yes
m1.large 4 8 GB 80 GB 80 GB 0 GB Yes
m1.xlarge 8 16 GB 160 GB 160 GB 0 GB Yes
Cancel
Back
Next
Launch Instance

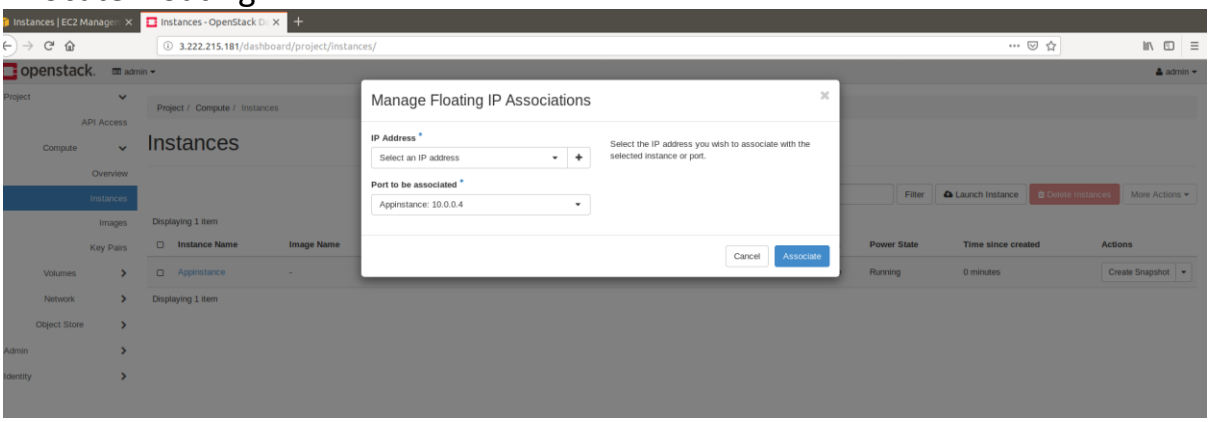

Launch Instance
Details
Source
Flavor
Networks
Network Ports
Security Groups
Key Pair
Configuration
Server Groups
Scheduler Hints
Metadata
A key pair allows you to SSH into your newly created instance. You may select an existing key pair, import a key pair, or generate a new key pair.
Create Key Pair
Import Key Pair
Allocated
Displaying 0 items
Name Fingerprint
Select a key pair from the available key pairs below.
Displaying 0 items
Available 0
Select one
Click here for filters.
Displaying 0 items
Name Fingerprint
No items to display.
Displaying 0 items
Cancel
Back
Next
Launch Instance

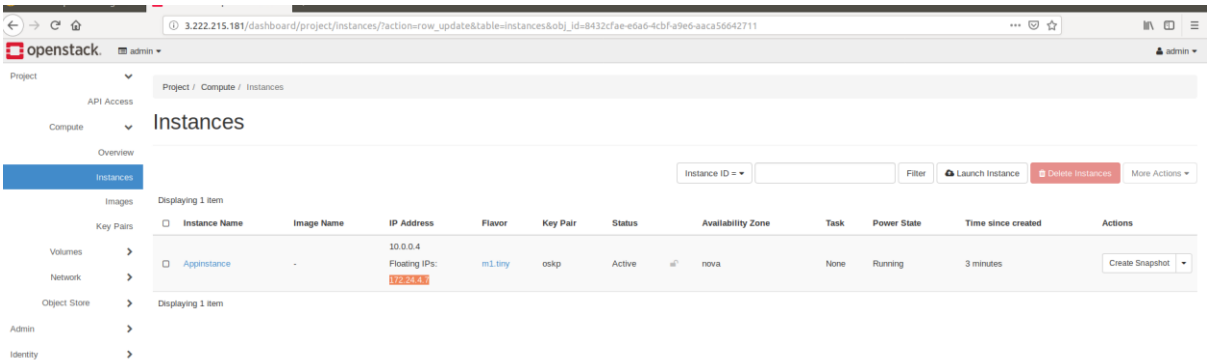

Create Key Pair
Key Pairs are how you login to your instance after it is launched. Choose a key pair name you will recognize. Names may only include alphanumeric characters, spaces, or dashes.
Key Pair Name *
oskp
Create Keypair
Copy Private Key to Clipboard
Done
Create Key Pair
Key Pairs are how you login to your instance after it is launched. Choose a key pair name you will recognize. Names may only include alphanumeric characters, spaces, or dashes.
Key Pair Name *
oskp
Private Key
-----BEGIN RSA PRIVATE KEY-----
MIIEowIBAAKCAQEAxS8GNCNJ/2Cv73VNNN5vf4fA/aR6sLyUkBE5ov9/beOdC0k7
FuniG2LfXOsTFre1w9PrTSTtpzVo4IB+kq3GZY2OR7qEB+HpacyEDmRpODXu+BQP
cpxbzOzeKQWj8MFkb1Bey4sniXEA1T2/CNhnm2nUaGnXNFG60Ps8c+MY8a6Hg9YF
v1ev7A2w4gN0zGRQonDwQEF7O/GV7hBuBJU8YnGwnGRWXuLsaMi5PoFIUIkz0kj8
NYQl7g4+wMsR2EARH6X3w2Cg8Hxoq01pFhJDi/1d27Q3dSEFvNMiFQLDxLi40+6t
LbW3imoZtU2pp9UOnkEA5Z/8j03xQFvt3D71TwIDAQABAoIBAFGl7BqwthZR8efk
mYiXxnF3Q/mDHu6J17Zj+4q74wccpc2jkB0n0WFnqneuOyRAA7rHyHoUHXgMTJYR
fte7rxgj6lNXLw6Yg+80KUZQW6VT59S/cboSdoy/VCqGVGD/o1fYXrhHsaJesWqa
+7xs51HaG4L0uJDIeuPH9DtEQPLpiJVgn2VNe7bbQW9VklxJeP0H/71SeSn37bEc
vWAfRU1rrYqfKc/a36GwkXnhjU2XCHuAXhLA4Lda4eBmyw2bzSjGPEesYlsRYG4i
OKkTWrZdaqjrdmVb3tgNSc0Gk+MbugLuFFJMtS1vR8OpmDoxtwU85o0XqVyEo7w8
yLu0tbECgYEA7Cqx17LRPHy0YLN2YPCTYFpjfG5qb0v5MaWTSA76JciWU9oLQoab
4m/CrcklmrWuhSzx8urZqr/GV47f7YD4z4qbm65NhaDKRWEMtuagp/9NM7vb9abN
AsDBJaPEYhKPMzsLK9okhBx66FJBUr2C6EUYNRlQ3QriPknryXWAkBcCgYEA1b49
S1dMF1dItRGb0z/JJzvoKAu91d6B/I8WdXLGO89iJnJwR7Xuw5e5Mmvo+bbGSTq9
Create Keypair
Copy Private Key to Clipboard
Done

Instance Launched

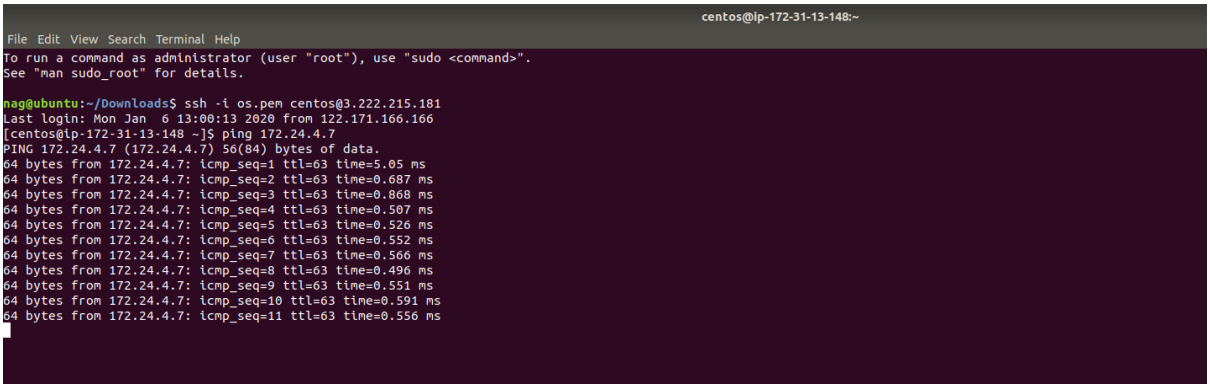


Allocate Floating IP

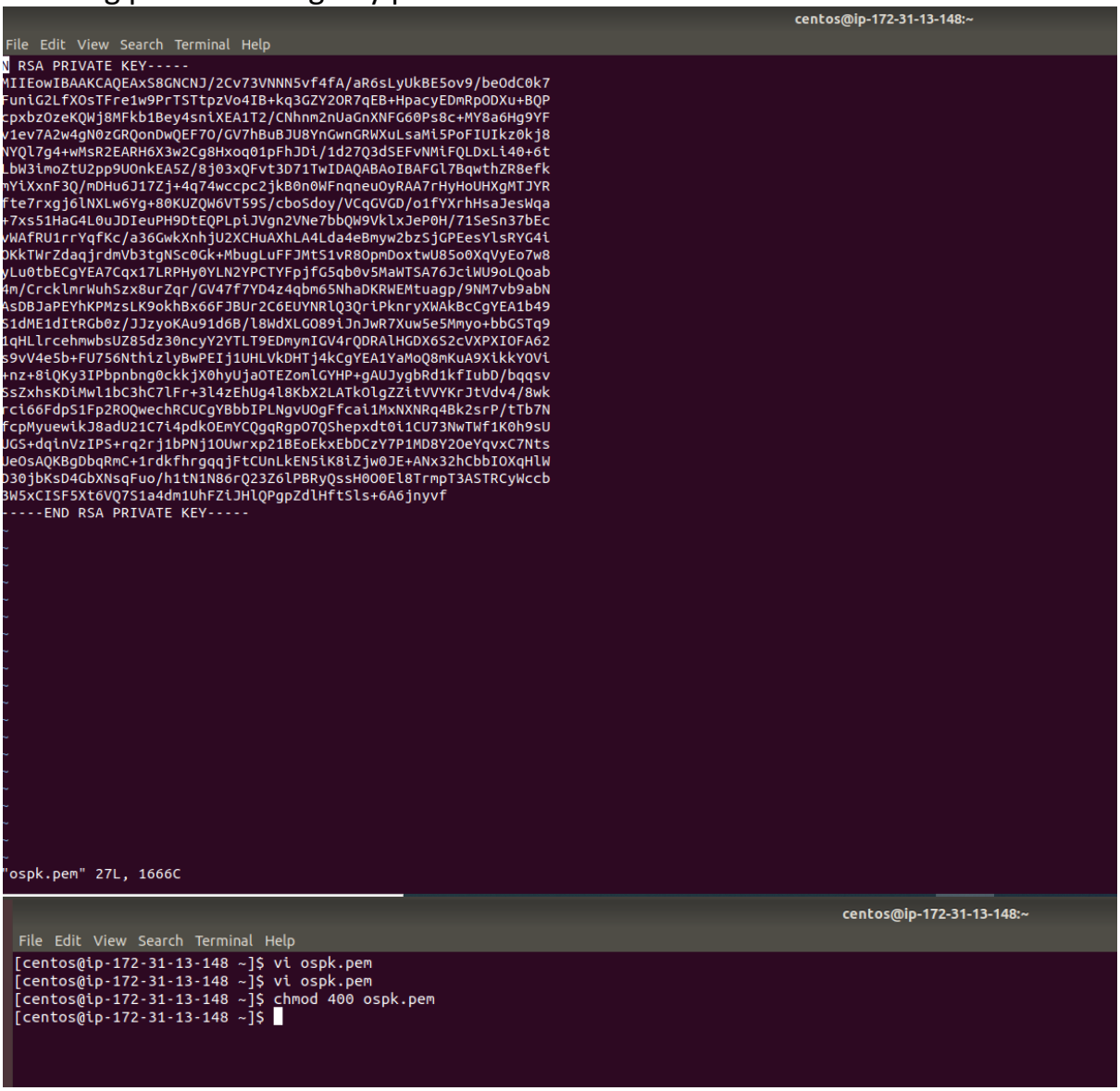




Ping the Floating IP from EC2 instance



Creating pem file using Key pair downloaded



SSH to the Cirros instance