OpenStack Additional Setup - 2

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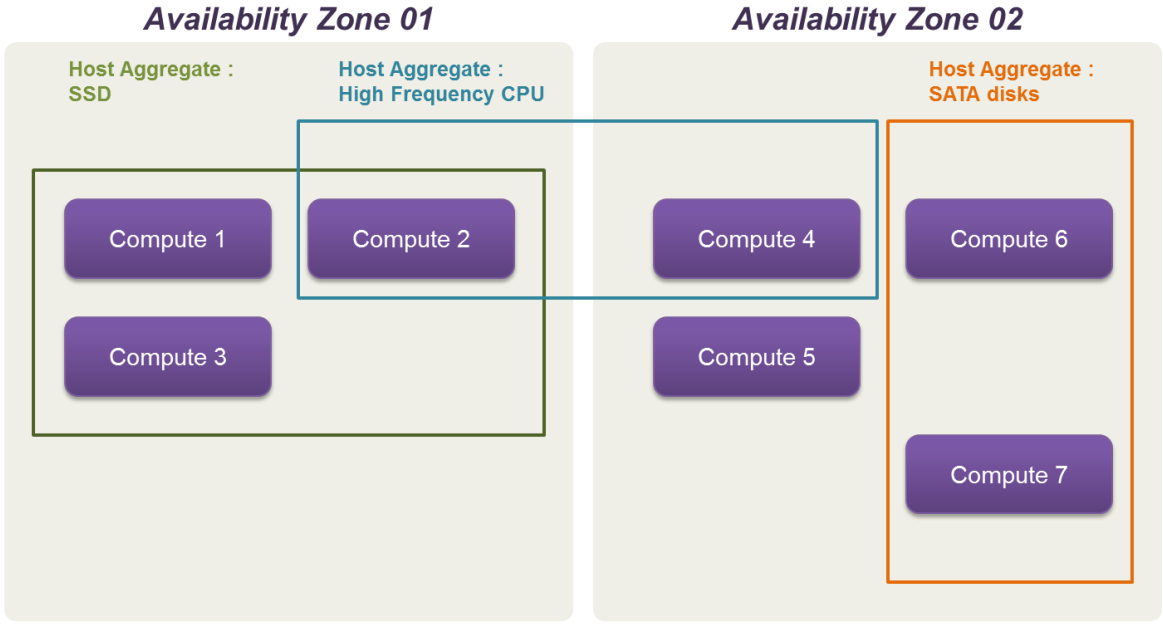
OpenStack Additional Setup

❖ Availability Zone & Host Aggregates

- Q: Is it possible to designate a compute node that has more resources and better performance when we launch a VM instance?
- A: Possible. OpenStack can make a cluster with serveral compute nodes that have common characteristics such as physical location and computing resources. It is provided by OpenStack Availity Zone and Host Aggregate concept



*Host aggregates can span across availability zones.

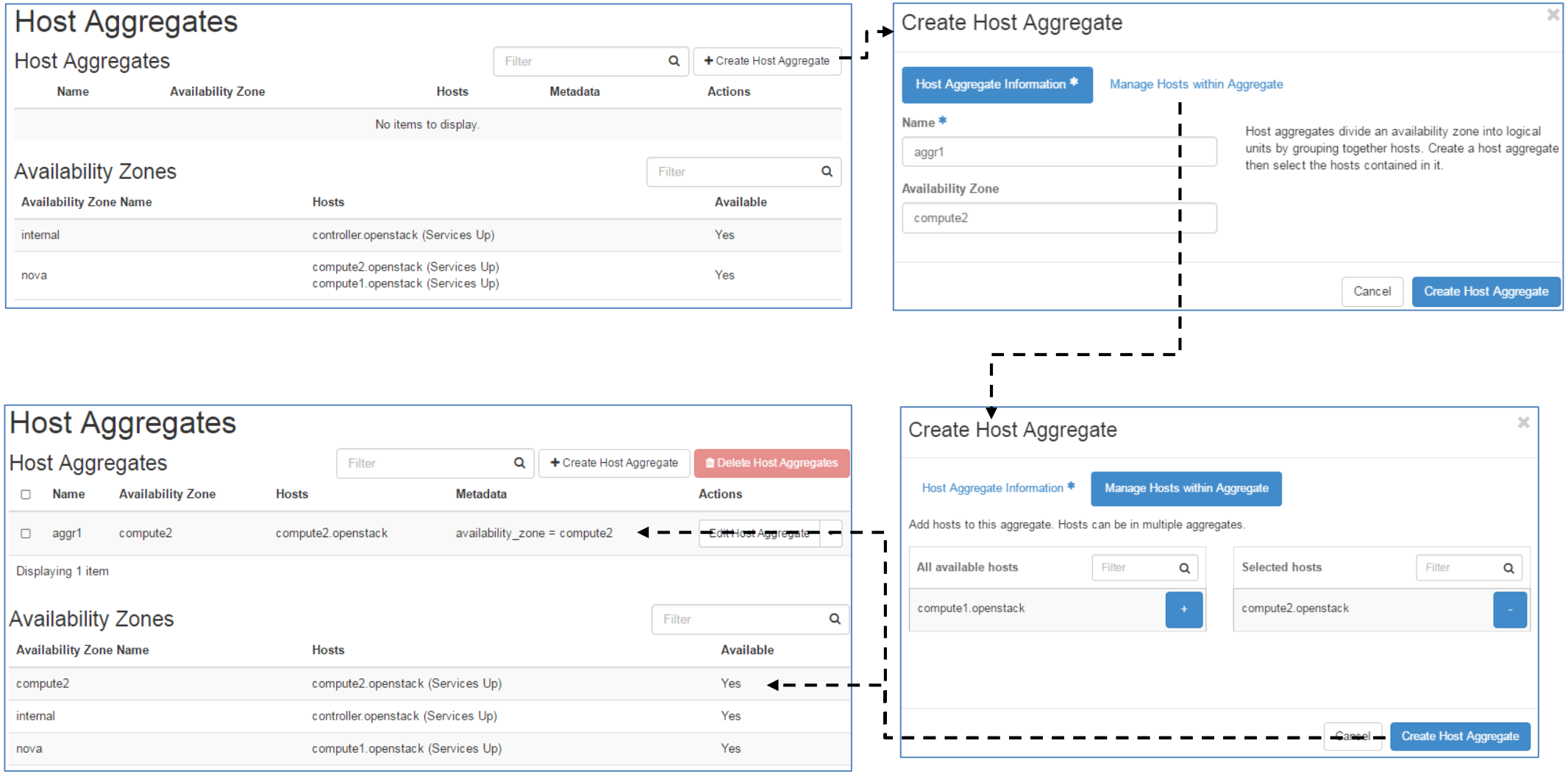
OpenStack Additional Setup

❖ Host Aggregate (admin)

- By default, all the compute nodes belong to “nova” Availability Zone (AZ)
- When we launch a new VM instance with the default AZ,
  - Nova-scheduler chooses a compute node to deploy the VM from candidate nodes in the AZ
  - If we wish to launch the VM on a certain compute node, we have to make a new AZ for the compute node
- Host Aggregate provides this function to admins
  - System → Host Aggregates → Create Host Aggregate
  - Manage Hosts with Aggregate: select the newly hosted “compute2.openstack”

OpenStack Additional Setup

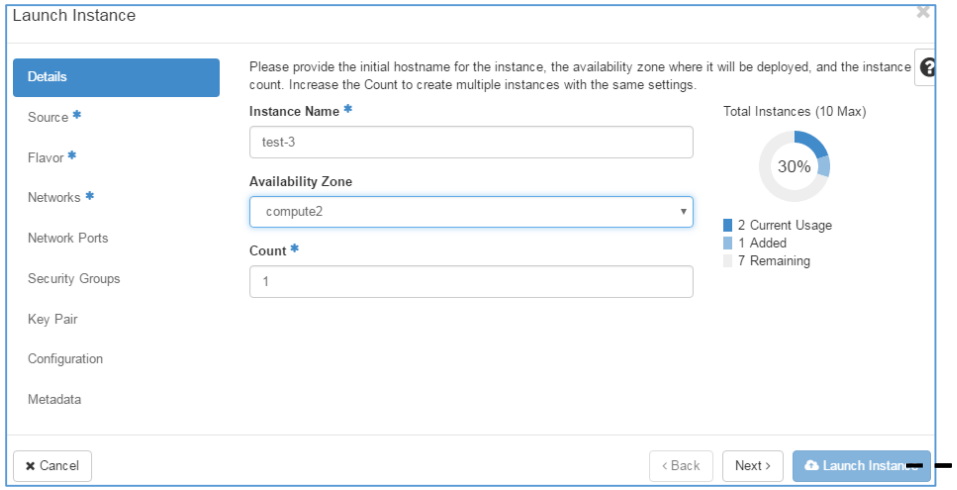
❖ Host Aggregate (admin)

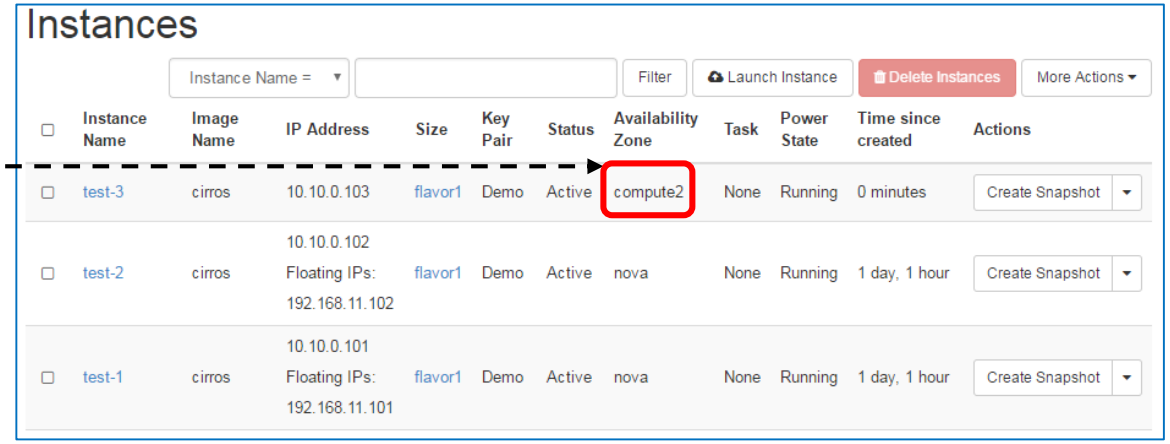


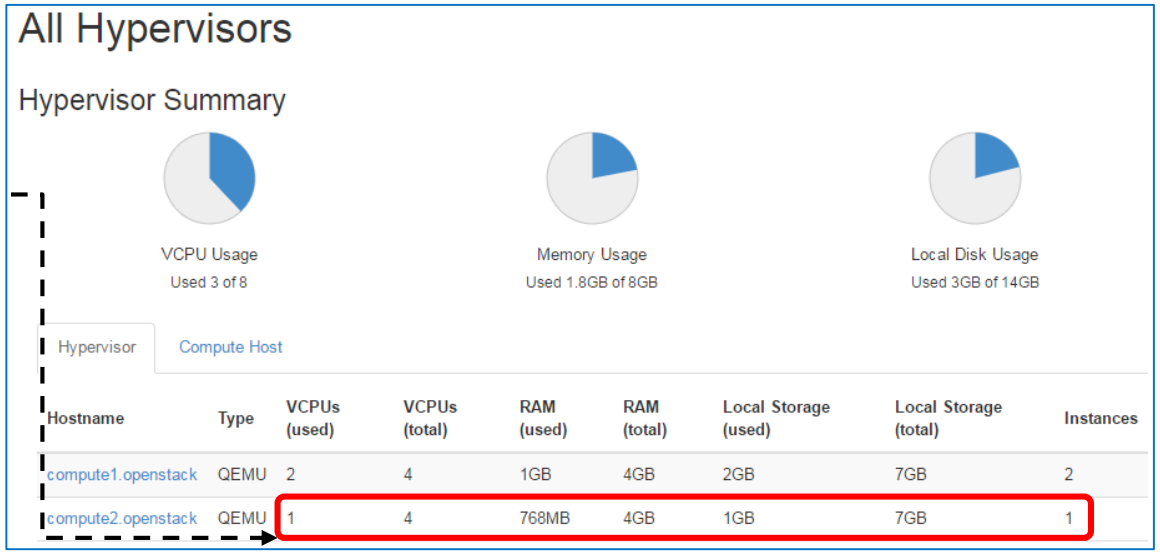
OpenStack Additional Setup

❖ Lanch a VM Instance on a Certain Availablity Zone (Demo)

- Availability Zone → “compute2”







OpenStack Additional Setup

❖ VM Live Migration

- System maintenance
  - When a compute node needs to be upgraded or shutdown, it is possible to maintain the operation of VMs on the node by migrating them to another compute node
- Resource reallocation
  - When a compute node cannot ensure the performance to VMs due to lack of resources, it is possible to migrate them to another compute node without explicit changes
- VM live migration types in OpenStack
  - Shared storage-based live migration
    - A storage (NFS, DFS) is needed to be shared among migration source and destination
    - Copy only the target VM's memory
    - Fast migration speed but loss of I/O speed on the VMs due to the use of shared storage
  - Block live migration
    - Copy the target VM's memory and disk
    - Slow migration speed but no need for additional shared storage

OpenStack Additional Setup

VM Live Migration

- Use OpenStack CLI using the same “admin” authority
- Prerequiste on each node
  - (1) Set SELinux to permissive mode
  - (2) Set hostname to IP address bindings for the other nodes
  - (3) Ping them with the corresponding hostnames

```
## controller node

root@controller:~$ setenforce 0
root@controller:~$ vim /etc/hosts
...
192.168.11.21   compute1.openstack
192.168.11.22   compute2.openstack

root@controller:~$ ping compute1.openstack
...

root@controller:~$ ping compute2.openstack
...
```

```
## compute 1 node

root@compute1:~$ setenforce 0
root@compute1:~$ vim /etc/hosts
...
192.168.11.11   controller.openstack
192.168.11.22   compute2.openstack

root@compute1:~$ ping controller.openstack
...

root@compute1:~$ ping compute2.openstack
...
```

```
## compute 2 node

root@compute2:~$ setenforce 0
root@compute2:~$ vim /etc/hosts
...
192.168.11.11   controller.openstack
192.168.11.21   compute1.openstack

root@compute2:~$ ping controller.openstack
...

root@compute2:~$ ping compute1.openstack
...
```

OpenStack Additional Setup

VM Live Migration

- Prerequiste on each node
  - 4) Modify nova-compute component and restart it

```
## each compute node

root@compute1:~$ vim /etc/nova/nova.conf
...
block_migration_flag= \
      VIR_MIGRATE_UNDEFINE_SOURCE, \
      VIR_MIGRATE_PEER2PEER, \
      VIR_MIGRATE_NON_SHARED_INC, \
      VIR_MIGRATE_LIVE

root@compute1:~$ service openstack-nova-compute restart
root@compute1:~$ service openstack-nova-compute status
● openstack-nova-compute.service - OpenStack Nova Compute Server
  Loaded: loaded (/usr/lib/systemd/system/openstack-nova-compute.service; enabled; vendor preset: disabled)
  Active: active (running) since Mon 2017-04-10 20:30:48 KST; 8s ago
Main PID: 9795 (nova-compute)
  CGroup: /system.slice/openstack-nova-compute.service
          └─9795 /usr/bin/python2 /usr/bin/nova-compute
 ...
```

OpenStack Additional Setup

❖ VM Live Migration

- OpenStack CLI
  - Source the “keystonerc_admin” file automatically created in the same directory of the Packstack answerfile
  - Block live migration from <instance> to <dest host>

```
## controller node

root@controller:~$ source keystonerc_admin
root@controller:~(keystone_admin)$ nova live-migration --block-migrate <instance id> <dest host name>
```

```
## controller node

 ~(keystone_admin)$ nova list --all-tenants 1 --fields name
+--------------------------------------+--------+
| ID                                   | Name   |
+--------------------------------------+--------+
| 7dcd5dc8-4487-4c5d-b383-420fae96ec65 | test-1 |
| 0fca45f1-7763-4baa-aa59-d9f69b8cba3c | test-2 |
| 25823025-1426-4c39-9e1e-6a5e99a3fcf5 | test-3 |
+--------------------------------------+--------+
```

```
## controller node

 ~(keystone_admin)$ nova host-list
+-----------------------+-------------+----------+
| host_name             | service     | zone     |
+-----------------------+-------------+----------+
| controller.openstack  | cert        | internal |
| controller.openstack  | consoleauth | internal |
| controller.openstack  | scheduler   | internal |
| controller.openstack  | conductor   | internal |
| compute1.openstack    | compute     | nova     |
| compute2.openstack    | compute     | compute2 |
+-----------------------+-------------+----------+
```

OpenStack Additional Setup

❖ VM Live Migration

- Migrate “test-2” VM (192.168.11.102) in “compute1” to “compute2” node
- Test ping latency to the target VM (Floating IP of test-2) during the migration

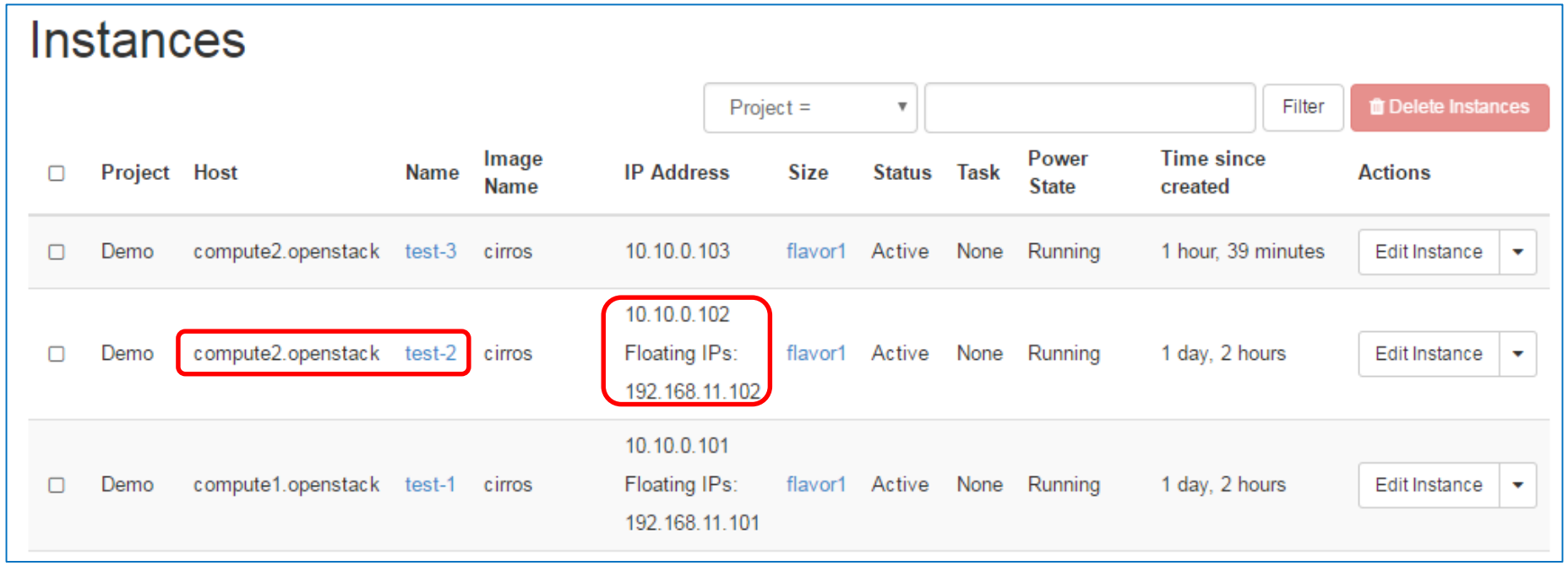
```
## controller node

root@controller:~(keystone_admin)$ nova live-migration --block-migrate \
0fca45f1-7763-4baa-aa59-d9f69b8cba3c compute2.openstack
```

```
[root@controller ~(keystone_admin)]# ping 192.168.11.102
PING 192.168.11.102 (192.168.11.102) 56(84) bytes of data.
64 bytes from 192.168.11.102: icmp_seq=1 ttl=63 time=4.27 ms
64 bytes from 192.168.11.102: icmp_seq=2 ttl=63 time=1.59 ms
64 bytes from 192.168.11.102: icmp_seq=3 ttl=63 time=1.81 ms
64 bytes from 192.168.11.102: icmp_seq=4 ttl=63 time=1.84 ms
64 bytes from 192.168.11.102: icmp_seq=5 ttl=63 time=1.92 ms
64 bytes from 192.168.11.102: icmp_seq=6 ttl=63 time=1.86 ms
64 bytes from 192.168.11.102: icmp_seq=7 ttl=63 time=2.27 ms
64 bytes from 192.168.11.102: icmp_seq=8 ttl=63 time=1.90 ms
64 bytes from 192.168.11.102: icmp_seq=9 ttl=63 time=1.92 ms
64 bytes from 192.168.11.102: icmp_seq=10 ttl=63 time=2.30 ms
64 bytes from 192.168.11.102: icmp_seq=11 ttl=63 time=1.60 ms
64 bytes from 192.168.11.102: icmp_seq=12 ttl=63 time=1.80 ms
64 bytes from 192.168.11.102: icmp_seq=13 ttl=63 time=1.98 ms
64 bytes from 192.168.11.102: icmp_seq=14 ttl=63 time=1.51 ms
64 bytes from 192.168.11.102: icmp_seq=15 ttl=63 time=1.64 ms
64 bytes from 192.168.11.102: icmp_seq=16 ttl=63 time=4.02 ms
64 bytes from 192.168.11.102: icmp_seq=17 ttl=63 time=1.37 ms
64 bytes from 192.168.11.102: icmp_seq=18 ttl=63 time=1.48 ms
64 bytes from 192.168.11.102: icmp_seq=19 ttl=63 time=1.46 ms
64 bytes from 192.168.11.102: icmp_seq=22 ttl=63 time=8.61 ms
64 bytes from 192.168.11.102: icmp_seq=23 ttl=63 time=1.52 ms
64 bytes from 192.168.11.102: icmp_seq=24 ttl=63 time=1.60 ms
```

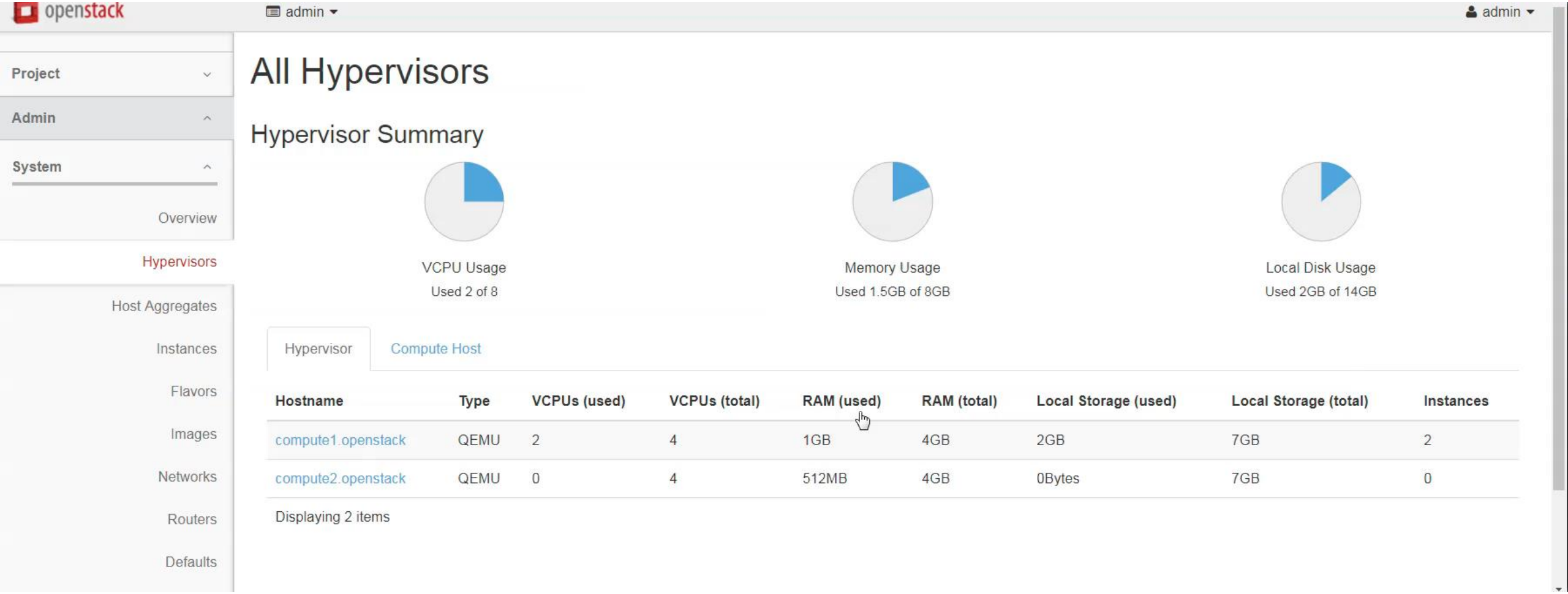
Temporal latency increase due to the migration

OpenStack Additional Setup

❖ After VM Live Migration



Demo


openstack
admin
admin
Project
Admin
System
Overview
Hypervisors
Host Aggregates
Instances
Flavors
Images
Networks
Routers
Defaults
All Hypervisors
Hypervisor Summary
VCPU Usage
Used 2 of 8
Memory Usage
Used 1.5GB of 8GB
Local Disk Usage
Used 2GB of 14GB
Hypervisor
Compute Host
Hostname
Type
VCPUs (used)
VCPUs (total)
RAM (used)
RAM (total)
Local Storage (used)
Local Storage (total)
Instances
compute1.openstack
QEMU
2
4
1GB
4GB
2GB
7GB
2
compute2.openstack
QEMU
0
4
512MB
4GB
0Bytes
7GB
0
Displaying 2 items

Demo

```
[root@controller ~]# ls
anaconda-ks.cfg  epel-release-7-1.noarch.rpm  keystonerc_admin  packstack-adding-compute.txt  packstack-sample-answer.txt
[root@controller ~]#
[root@controller ~]#
[root@controller ~]#
[root@controller ~]# source keystonerc_admin
[root@controller ~(keystone_admin)]#
[root@controller ~(keystone_admin)]#
[root@controller ~(keystone_admin)]#
[root@controller ~(keystone_admin)]#
[root@controller ~(keystone_admin)]#
[root@controller ~(keystone_admin)]#
[root@controller ~(keystone_admin)]#
[root@controller ~(keystone_admin)]#
[root@controller ~(keystone_admin)]#
[root@controller ~(keystone_admin)]# setenforce 0
[root@controller ~(keystone_admin)]# vim /etc/hosts
[root@controller ~(keystone_admin)]#
[root@controller ~(keystone_admin)]#
[root@controller ~(keystone_admin)]#
[root@controller ~(keystone_admin)]#
[root@controller ~(keystone_admin)]#
[root@controller ~(keystone_admin)]#
[root@controller ~(keystone_admin)]#
[root@controller ~(keystone_admin)]#
[root@controller ~(keystone_admin)]#
[root@controller ~(keystone_admin)]#
[root@controller ~(keystone_admin)]#
[root@controller ~(keystone_admin)]# nova live-migration --block-migrate 139ce829-c955-402b-aded-29aca3a6ac55 compute2.openstack
```