



# OpenStack Additional Setup - 2

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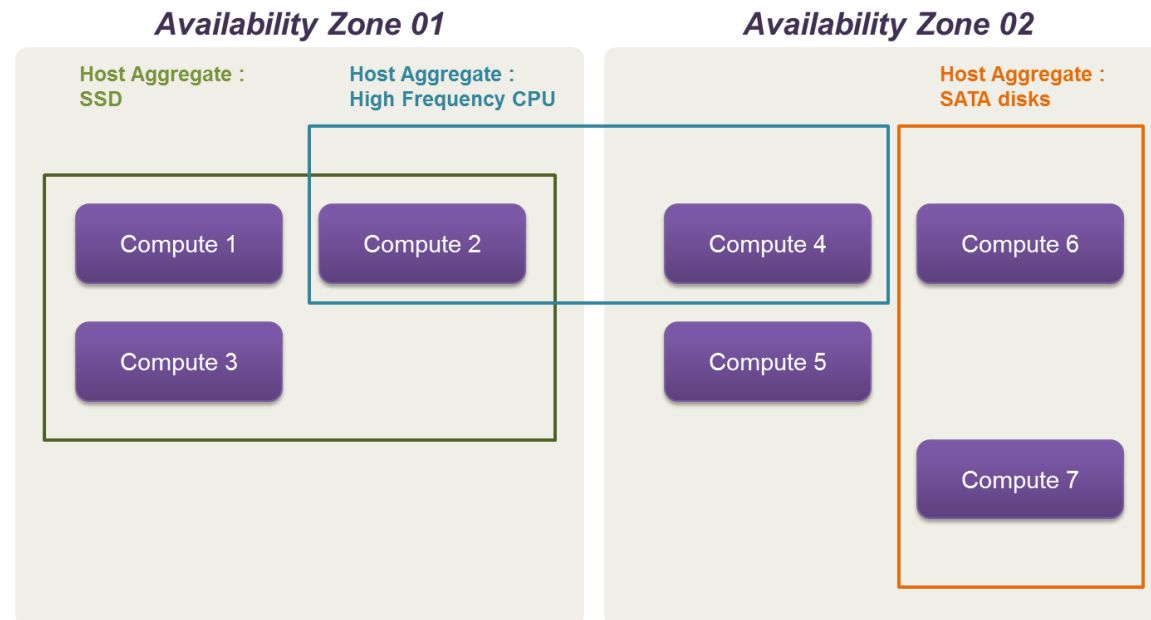
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## ❖ Availability Zone & Host Aggregates

- 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 several compute nodes that have common characteristics such as physical location and computing resources. It is provided by OpenStack Availability Zone and Host Aggregate concept



\*Host aggregates can span across availability zones.



## ❖ 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”



## ❖ Host Aggregate (admin)

### Host Aggregates

Host Aggregates

Filter

Name	Availability Zone	Hosts	Metadata	Actions
No items to display.				

### Availability Zones

Filter

Availability Zone Name	Hosts	Available
internal	controller.openstack (Services Up)	Yes
nova	compute2.openstack (Services Up) compute1.openstack (Services Up)	Yes

### Create Host Aggregate

Host Aggregate Information \*

Name \*

Availability Zone

Host aggregates divide an availability zone into logical units by grouping together hosts. Create a host aggregate then select the hosts contained in it.

### Host Aggregates

Host Aggregates

Filter

<input type="checkbox"/>	Name	Availability Zone	Hosts	Metadata	Actions
<input type="checkbox"/>	aggr1	compute2	compute2.openstack	availability_zone = compute2	<input type="button" value="Edit Host Aggregate"/>

Displaying 1 item

### Availability Zones

Filter

Availability Zone Name	Hosts	Available
compute2	compute2.openstack (Services Up)	Yes
internal	controller.openstack (Services Up)	Yes
nova	compute1.openstack (Services Up)	Yes

### Create Host Aggregate

Host Aggregate Information \*

Add hosts to this aggregate. Hosts can be in multiple aggregates.

All available hosts

Selected hosts



## ❖ Lanch a VM Instance on a Certain Availability Zone (Demo)

- Availability Zone → “compute2”

Launch Instance

Details

Please provide the initial hostname for the instance, the availability zone where it will be deployed, and the instance count. Increase the Count to create multiple instances with the same settings.

Source \*

Flavor \*

Networks \*

Network Ports

Security Groups

Key Pair

Configuration

Metadata

Instance Name \*

test-3

Total Instances (10 Max)

30%

2 Current Usage

1 Added

7 Remaining

Availability Zone

compute2

Count \*

1

✕ Cancel

< Back

Next >

Launch Instance

Instances

Instance Name =

Filter

Launch Instance

Delete Instances

More Actions

<input type="checkbox"/>	Instance Name	Image Name	IP Address	Size	Key Pair	Status	Availability Zone	Task	Power State	Time since created	Actions
<input type="checkbox"/>	test-3	cirros	10.10.0.103	flavor1	Demo	Active	compute2	None	Running	0 minutes	Create Snapshot
<input type="checkbox"/>	test-2	cirros	10.10.0.102 Floating IPs: 192.168.11.102	flavor1	Demo	Active	nova	None	Running	1 day, 1 hour	Create Snapshot
<input type="checkbox"/>	test-1	cirros	10.10.0.101 Floating IPs: 192.168.11.101	flavor1	Demo	Active	nova	None	Running	1 day, 1 hour	Create Snapshot

All Hypervisors

Hypervisor Summary

VCPU Usage

Used 3 of 8

Memory Usage

Used 1.8GB of 8GB

Local Disk Usage

Used 3GB 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	1	4	768MB	4GB	1GB	7GB	1



## ❖ 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



## ❖ VM Live Migration

- Use OpenStack CLI using the same “admin” authority
- Prerequisite 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
...
```



## ❖ VM Live Migration

- Prerequisite 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

...
```





## ❖ 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



## ❖ 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



## ❖ After VM Live Migration

Instances											
			Project =			Filter	Delete Instances				
<input type="checkbox"/>	Project	Host	Name	Image Name	IP Address	Size	Status	Task	Power State	Time since created	Actions
<input type="checkbox"/>	Demo	compute2.openstack	test-3	cirros	10.10.0.103	flavor1	Active	None	Running	1 hour, 39 minutes	Edit Instance
<input type="checkbox"/>	Demo	compute2.openstack	test-2	cirros	10.10.0.102 Floating IPs: 192.168.11.102	flavor1	Active	None	Running	1 day, 2 hours	Edit Instance
<input type="checkbox"/>	Demo	compute1.openstack	test-1	cirros	10.10.0.101 Floating IPs: 192.168.11.101	flavor1	Active	None	Running	1 day, 2 hours	Edit Instance

 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
<a href="#">compute1.openstack</a>	QEMU	2	4	1GB	4GB	2GB	7GB	2
<a href="#">compute2.openstack</a>	QEMU	0	4	512MB	4GB	0Bytes	7GB	0

Displaying 2 items

```
[root@controller ~]# ls
anaconda-ks.cfg  epel-release-7-1.noarch.rpm  keystone_admin  packstack-adding-compute.txt  packstack-sample-answer.txt
[root@controller ~]#
[root@controller ~]#
[root@controller ~]#
[root@controller ~]# source 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)]#
[root@controller ~(keystone_admin)]#
[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)]#
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[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
```