LAB – OpenStack basic operations

Hands on experience with OpenStack basic operations

References:

- OpenStack documentation

Flavors

- A flavor is a configuration for a virtual machine

- It defines the set of resources that are allocated to a VM at the time of creation

- The administrator must create at least one flavor

- Admin->Flavors->Create Flavor

Create Flavor

Flavor Information *   Flavor Access

Flavors define the sizes for RAM, disk, number of cores, and other resources and can be selected when users deploy instances.

Name *

basic

ID ❓

auto

VCPUs *

1

RAM (MB) *

64

Root Disk (GB) *

1

Ephemeral Disk (GB)

0

Swap Disk (MB)

0

RX/TX Factor

1

Cancel   Create Flavor

Pre-created Flavors

☐	Flavor Name	VCPUs	RAM	Root Disk	Ephemeral Disk	Swap Disk	RX/TX factor	ID	Public	Metadata	Actions
☐	m1.large	4	8GB	20GB	0GB	0MB	1,0	4	Sì	No	Update Metadata ▼
☐	m1.medium	2	4GB	20GB	0GB	0MB	1,0	3	Sì	No	Update Metadata ▼
☐	m1.small	1	2GB	20GB	0GB	0MB	1,0	2	Sì	No	Update Metadata ▼
☐	m1.tiny	1	512MB	1GB	0GB	0MB	1,0	1	Sì	No	Update Metadata ▼
☐	m1.xlarge	8	16GB	20GB	0GB	0MB	1,0	5	Sì	No	Update Metadata ▼

Images

- VMs are created from images, template of a virtual hard drive in which the OS is preinstalled
- At least one image must be imported
- Download a template in your PC using the following link:
    - http://download.cirros-cloud.net/0.4.0/cirros-0.4.0-x86_64-disk.img
- Admin->Images->Create Image
    - Select the downloaded image

Pre-created Images

Project >

Admin ∨

Overview

Compute ∨

Hypervisors

Host Aggregates

Instances

Flavors

Images

Admin / Compute / Images

Images

| Q | Click here for filters or full text search. | ✖ | **+ Create Image** | **🗑 Delete Images** |

Displaying 1 item

		Owner	Name ▲	Type	Status	Visibility	Protected	Disk Format	Size	
☐	›	admin	cirros	Image	Active	Public	No	QCOW2	12.13 MB	Launch ▾

Instantiate the first VM

- Project->Compute->Instances->Launch Instance

Check the image running

- Admin->Compute->Instances
- The image runs on a certain host and has a certain IP in the internal network

Console

Network configuration

- By default, two networks are created, one internal and one external

Displaying 2 items

	Name	Subnets Associated	Shared	External	Status	Admin State	Availability Zones	Actions
☐	external	**external-subnet** 10.20.20.0/24	No	Sì	Active	UP	-	Edit Network ▾
☐	test	**test-subnet** 192.168.222.0/24	No	No	Active	UP	-	Edit Network ▾

Displaying 2 items

external
10.20.20.0/24

test
192.168.222.0/24
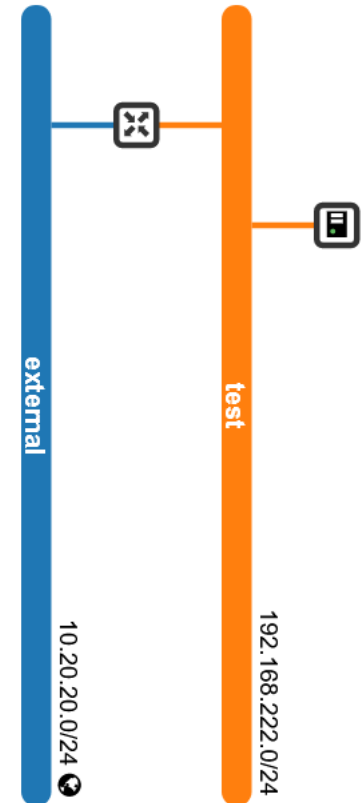
Create a network

- Admin -> Network -> Networks -> Create Network

Create Network

Name

prova

Create a new network. In addition, a subnet associated with the network can be created in the following steps of this wizard.

Project *

admin

Provider Network Type * ❓

Local

☑ Enable Admin State ❓

☐ Shared

☐ External Network

☑ Create Subnet

Availability Zone Hints ❓

Cancel | « Back | Next »

Create Network

Network | **Subnet** | Subnet Details

Subnet Name

prova

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.

Network Address ❓

192.168.1.0/24

IP Version

IPv4

Gateway IP ❓

192.168.1.1

☐ Disable Gateway

Cancel | « Back | Next »

Create Network

Network * | Subnet | **Subnet Details**

☑ Enable DHCP

Specify additional attributes for the subnet.

Allocation Pools ❓

192.168.1.2,192.168.1.20

DNS Name Servers ❓

8.8.8.8

Host Routes ❓

Cancel | « Back | Create

10

Connect the VM to the new network

- Instances->Attach Interface

Attach Interface

The way to specify an interface *

| by Network (and IP address) ▾ |

Description:

Select the network for interface attaching.

Network*

| prova (192.168.1.0/24) ▾ |

Fixed IP Address ❓

| |

Displaying 1 item

ch Interface

	Instance Name	Image Name	IP Address	Flavor	Key Pair	Status		Availability Zone	Task	Power State	Age	Actions
☐	test	cirros	prova 192.168.1.15 test 192.168.222.64	m1.tiny	-	Active	🔓	nova	None	Running	39 minuti	Create Snapshot ▾

Displaying 1 item

Floating IPs

- VMs can be assigned a public IP address to connect to the internet via Floating IP addresses

- A Floating Ip is an IP address that is assigned to a VM to access an external network

- The IP address is not actually assigned to the VM, instead, NAT is performed by the router

- To assign a floating IP address go to the menu of the instance and select 'Associate Floating IP'

Allow ingress traffic

- By default ingress traffic to VMs is disabled
- To enable some type of traffic:
  - Network->Security Groups->
    Manage Rules->Add Rule

Add Rule

Rule *

Custom TCP Rule

Description ❓

Direction

Ingress

Open Port *

Port

Port * ❓

Remote * ❓

CIDR

CIDR * ❓

0.0.0.0/0

Description:

Rules define which traffic is allowed to instances assigned to the security group. A security group rule consists of three main parts:

Rule: You can specify the desired rule template or use custom rules, the options are Custom TCP Rule, Custom UDP Rule, or Custom ICMP Rule.

Open Port/Port Range: For TCP and UDP rules you may choose to open either a single port or a range of ports. Selecting the "Port Range" option will provide you with space to provide both the starting and ending ports for the range. For ICMP rules you instead specify an ICMP type and code in the spaces provided.

Remote: You must specify the source of the traffic to be allowed via this rule. You may do so either in the form of an IP address block (CIDR) or via a source group (Security Group). Selecting a security group as the source will allow any other instance in that security group access to any other instance via this rule.
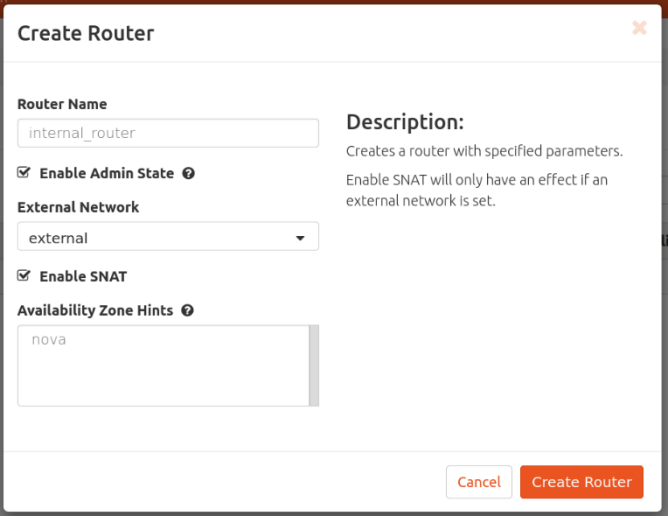
Cancel   Add

Create a virtual router for the internal net

- Create a virtual router or gateway to link the virtual network with the external one
- Project -> Network -> Routers -> Create Router

The router will have an interface on the external network

Connect router to the internal network

- The router needs to be explicitly connected to the internal network
- Enter in the router configuration, interfaces tab
- Then Add Interface:

Volumes

- A volume is a secondary hard drive that can be connected dynamically to a VM

- Volumes->Create volume

- The volume module is not installed in microstack

Create Volume

Volume Name

test

Description

Volume Source

No source, empty volume

Type

__DEFAULT__

Size (GiB) *

1

Availability Zone

No availability zones found

Group ❓

No group

Description:
Volumes are block devices that can be attached to instances.

Volume Type Description:
__DEFAULT__
Default Volume Type

Volume Limits

Total Gibibytes   0 of 1.000 GiB Used

Number of Volumes   0 of 10 Used

Cancel   Create Volume

Displaying 1 item

	Name	Description	Size	Status	Group	Type	Attached To	Availability Zone	Bootable	Encrypted	Actions
☐	test	-	1GiB	Error	-	__DEFAULT__		nova	No	No	Delete Volume ▾

Displaying 1 item

OpenStack SDK

- OpenStack provides an SDK to create applications that interact with the platform, one SDK version is available for python3

- To install it (e.g. on the controller node):

```
apt-get install python3-pip

pip3 install openstacksdk
```

- Download the authentication file and authenticate

- Upload the file on the controller and activate

```
source openstack.sh
```
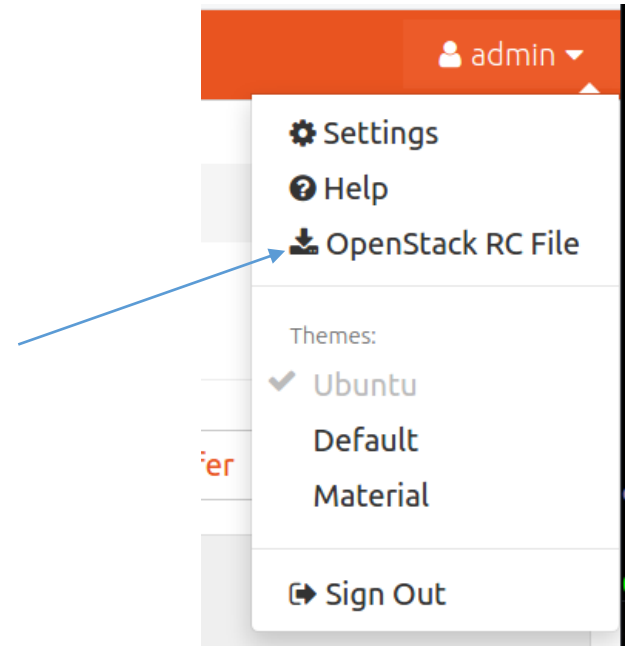
Simple Application

```
import openstack

# Connect
conn=openstack.connect()
# list images
for image in conn.compute.images():
    print(image)
# list VMs
 print("List Servers:")
for server in conn.compute.servers():
    print(server)
```

Command line

- OpenStack offers a command line interface alternative to the web one

```
snap install --classic openstackclients
```

```
wget https://cloud-
images.ubuntu.com/bionic/current/bionic-server-cloudimg-
amd64.img
```

```
source admin.sh
```

```
openstack image create --public --disk-format qcow2 --
container-format bare --file bionic-server-cloudimg-
amd64.img Ubuntu
```

Other examples

- https://github.com/openstack/openstacksdk/blob/master/examples/