20CYS402 – Distributed Systems and Cloud Computing

Lab Exercise – 7: Setting Up OpenStack Cloud Environment

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Objective

To install and configure **OpenStack** using Microstack to create a basic cloud environment. The lab involves:

1. Installing and initializing OpenStack.
2. Creating a security group permitting **SSH** and **ICMP** traffic.
3. Launching a virtual instance and verifying accessibility via **SSH** and **ping**.

Procedure / Steps

Step 1: Install OpenStack using Microstack

```
sudo snap install microstack --beta --classic
```

Step 2: Initialize Microstack

```
sudo /snap/bin/microstack init --control --auto
```

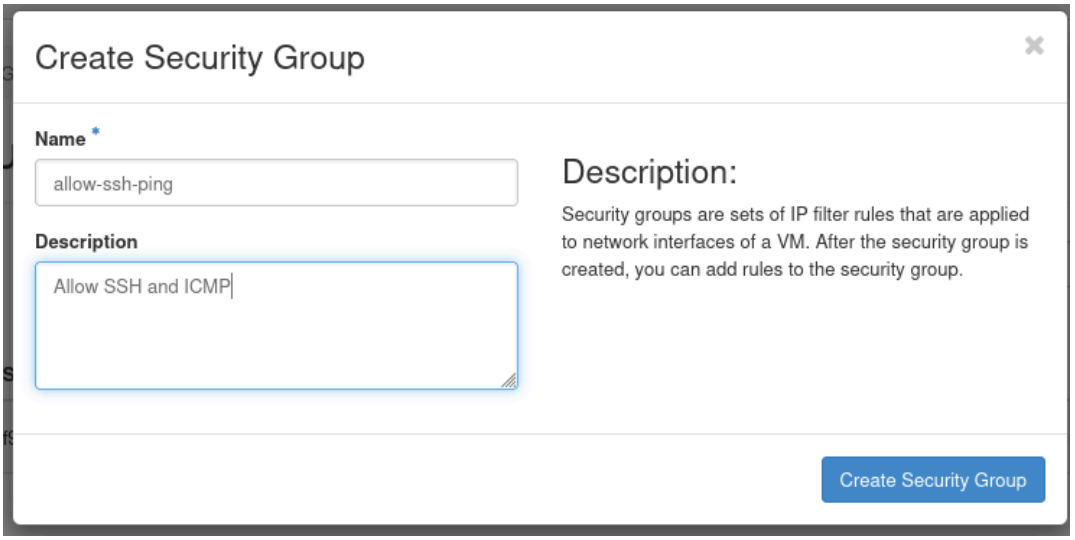
Step 3: Set Keystone Admin Password

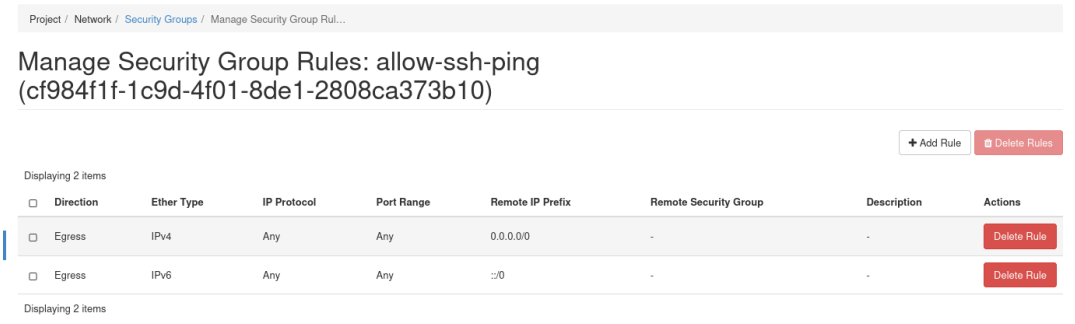
```
sudo /snap/bin/microstack.keystone-manage bootstrap \
  --bootstrap-password admin \
  --bootstrap-admin-url http://127.0.0.1:5000/v3/ \
  --bootstrap-internal-url http://127.0.0.1:5000/v3/ \
  --bootstrap-public-url http://127.0.0.1:5000/v3/ \
  --bootstrap-region-id RegionOne
```

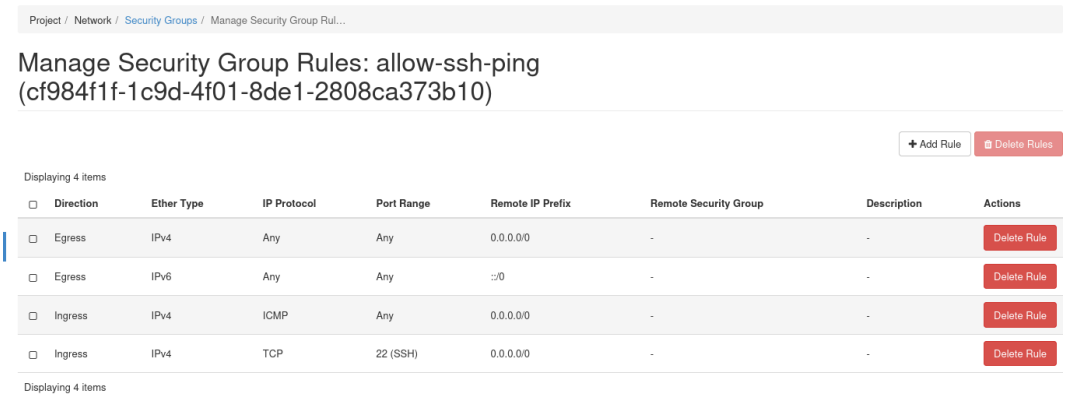
Step 4: Create Security Group

- Created a security group named **allow-ssh-icmp**.
- Added rules for **SSH** (port 22) and **ICMP** (ping) traffic.

Screenshot:



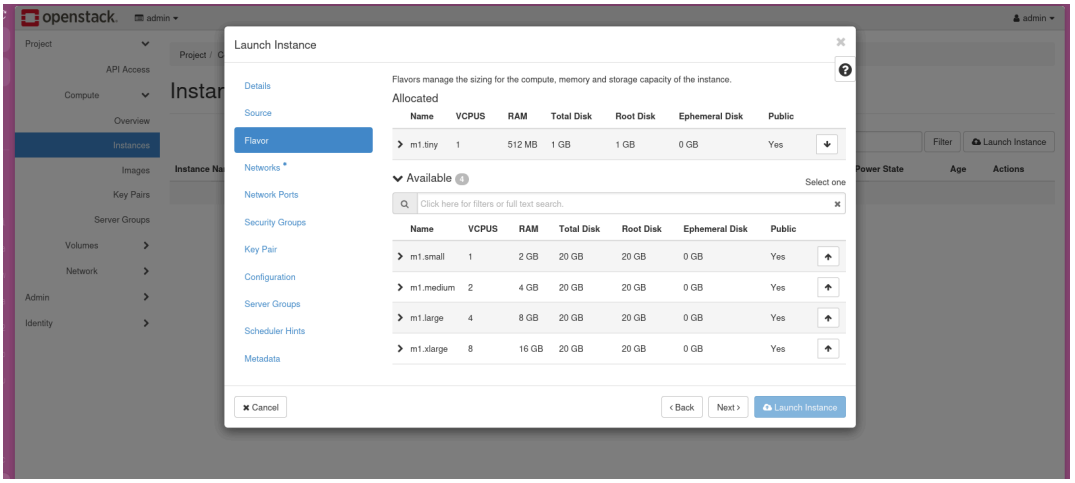


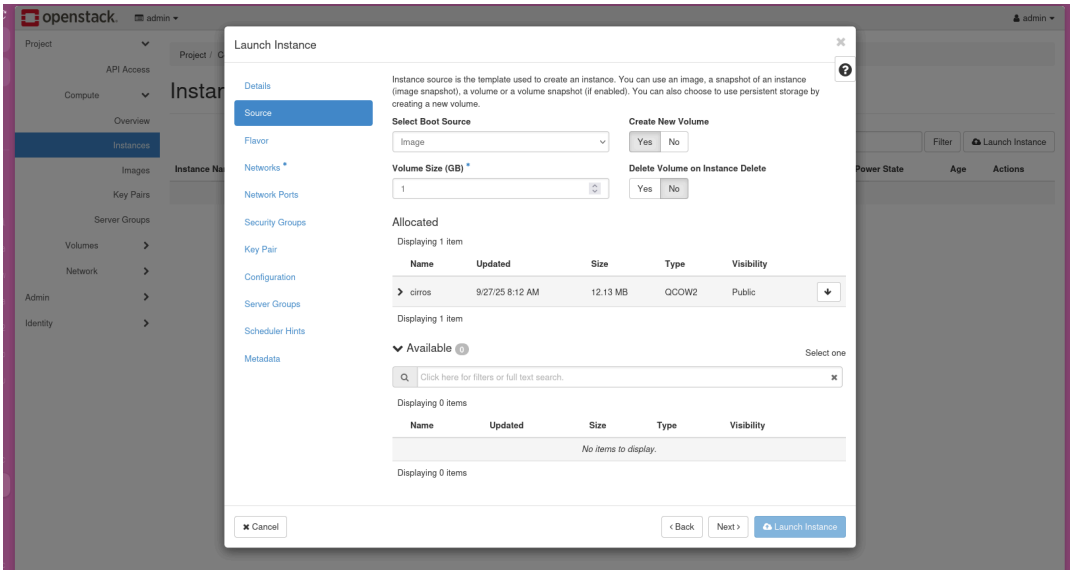


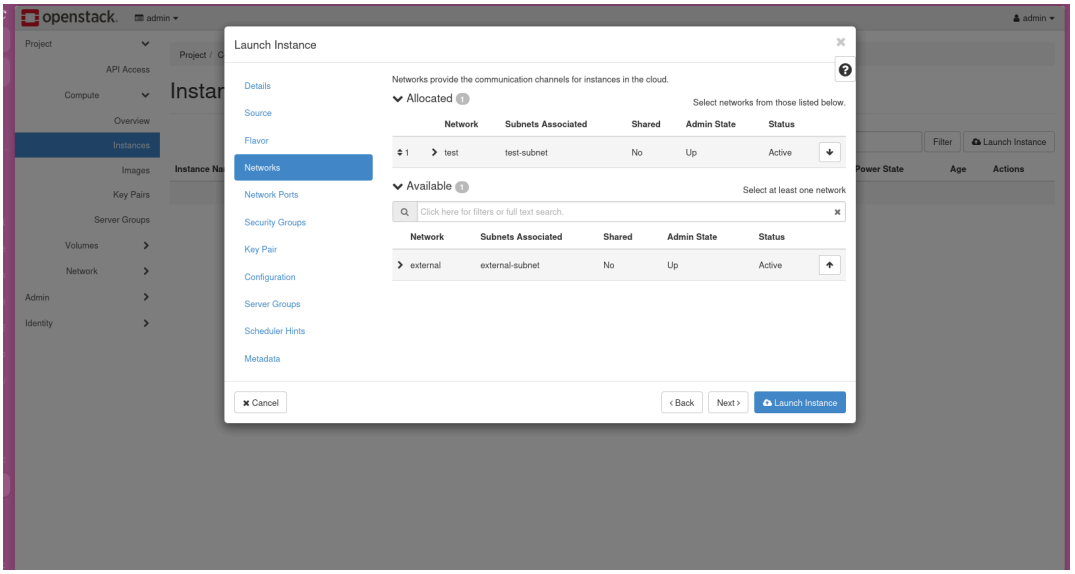
Step 5: Launch a VM Instance

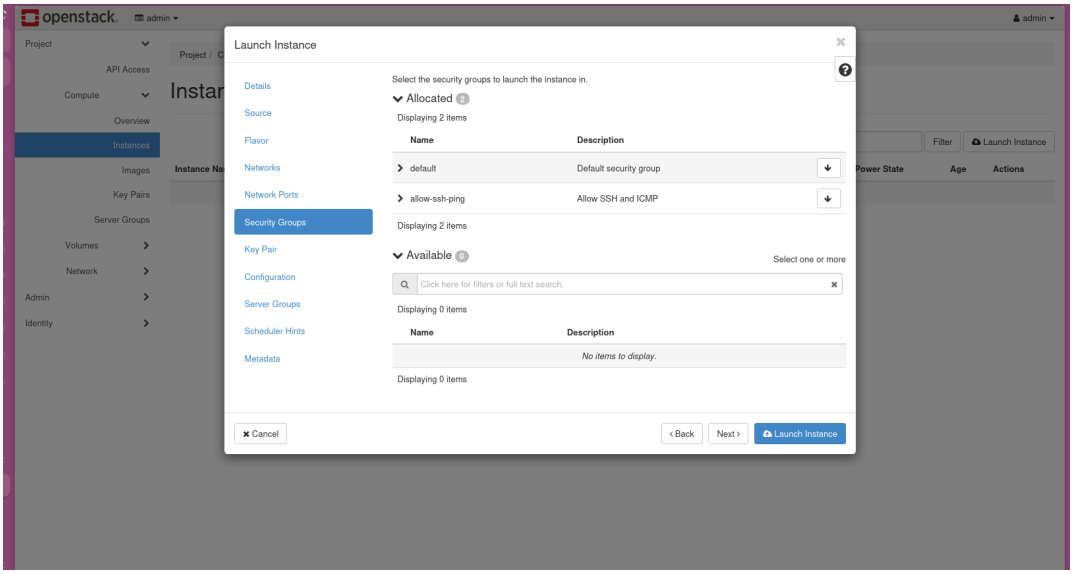
- Selected **Flavor:** `m1.tiny`
- Selected **Image:** `cirros`
- Assigned **Security Group:** `allow-ssh-icmp`
- Launched the VM instance.

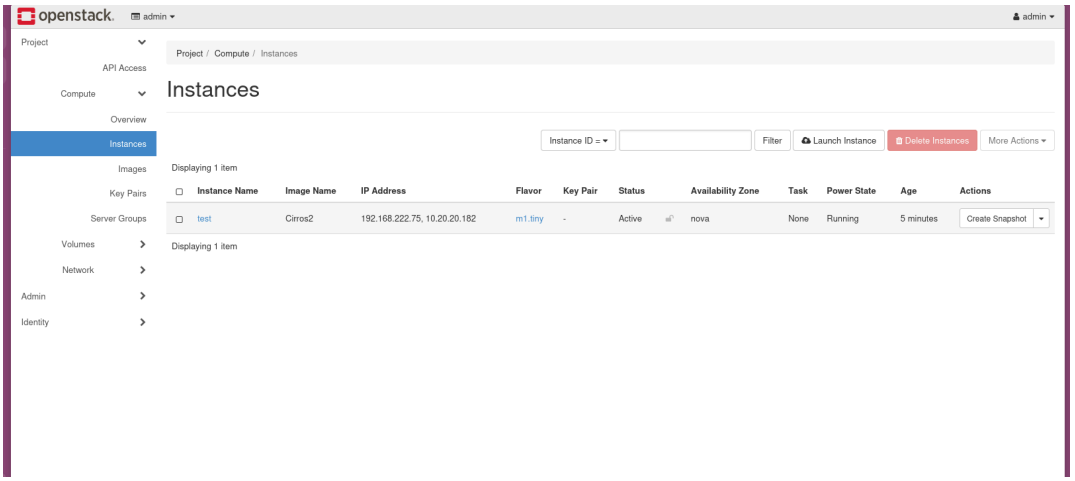
Screenshot:


openstack.
admin
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 or full text search.
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 20 GB 20 GB 0 GB Yes
m1.large 4 8 GB 20 GB 20 GB 0 GB Yes
m1.xlarge 8 16 GB 20 GB 20 GB 0 GB Yes
Cancel
Back
Next
Launch Instance


openstack.
admin
Launch Instance
Details
Source
Flavor
Networks *
Network Ports
Security Groups
Key Pair
Configuration
Server Groups
Scheduler Hints
Metadata
Instance source is the template used to create an instance. You can use an image, a snapshot of an instance (image snapshot), a volume or a volume snapshot (if enabled). You can also choose to use persistent storage by creating a new volume.
Select Boot Source
Image
Create New Volume
Yes No
Volume Size (GB) *
1
Delete Volume on Instance Delete
Yes No
Allocated
Displaying 1 item
Name Updated Size Type Visibility
cirros 9/27/25 8:12 AM 12.13 MB QCOW2 Public
Displaying 1 item
Available 0
Select one
Click here for filters or full text search.
Displaying 0 items
Name Updated Size Type Visibility
No items to display.
Displaying 0 items
Cancel
Back
Next
Launch Instance


openstack.
admin
Launch Instance
Details
Source
Flavor
Networks
Network Ports
Security Groups
Key Pair
Configuration
Server Groups
Scheduler Hints
Metadata
Networks provide the communication channels for instances in the cloud.
Allocated 1
Select networks from those listed below.
Network Subnets Associated Shared Admin State Status
1 test test-subnet No Up Active
Available 1
Select at least one network
Click here for filters or full text search.
Network Subnets Associated Shared Admin State Status
external external-subnet No Up Active
Cancel
Back
Next
Launch Instance

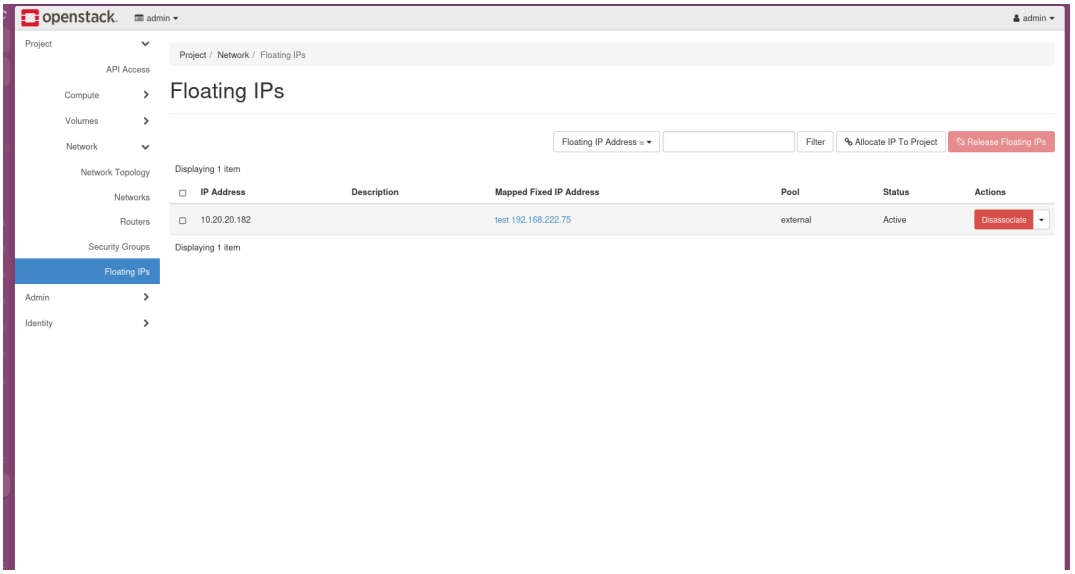




Step 6: Assign Floating IP

- Assigned a **public floating IP** to the VM to allow external access via SSH and ICMP.

Screenshot:



Step 7: Verify VM Access

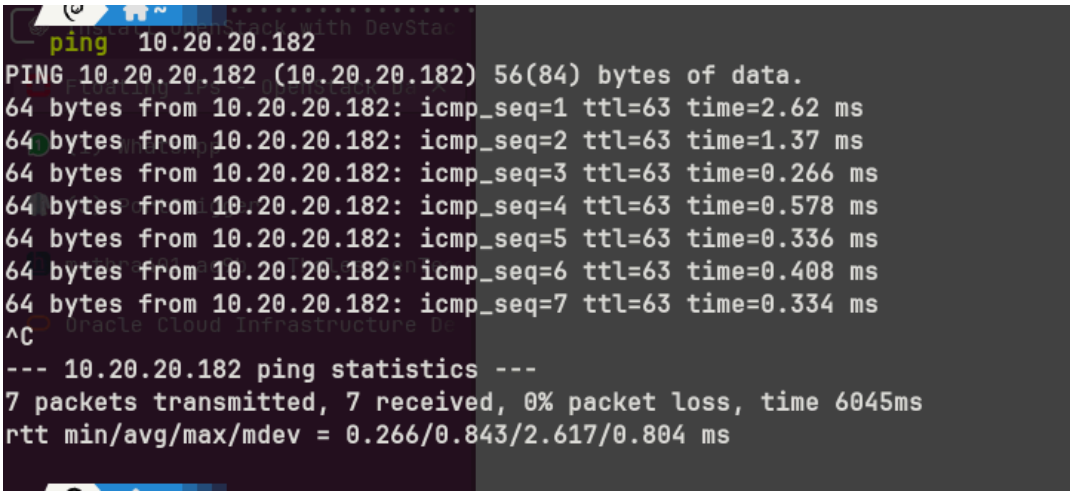
- **Ping Test:**

```
ping <floating-ip>
```

- **SSH Access:**

```
ssh cirros@<floating-ip>
```

Screenshot:



Conclusion

This lab demonstrated the setup of a **basic OpenStack cloud environment** using Microstack. Key learnings:

- Installing and initializing OpenStack services locally.
- Creating security groups for SSH and ICMP traffic.

- Launching and accessing virtual machine instances using floating IPs.
- Understanding basic cloud operations, networking, and VM management.
