

Ex. No 6

OpenStack Installation IaaS Implementation

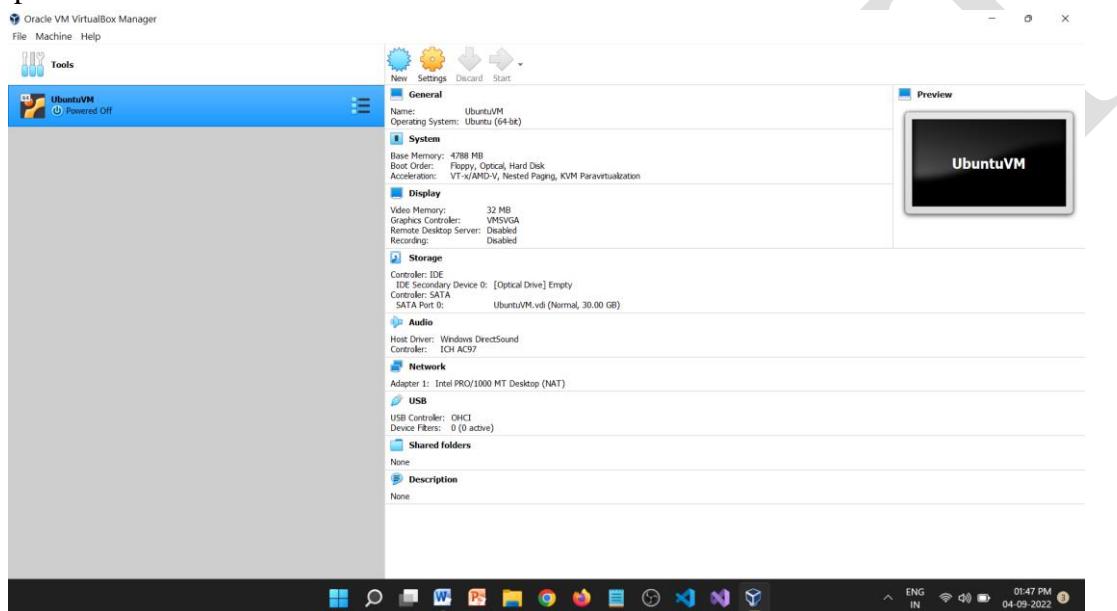
Aim: To implement IaaS by installing OpenStack.

Softwares Required

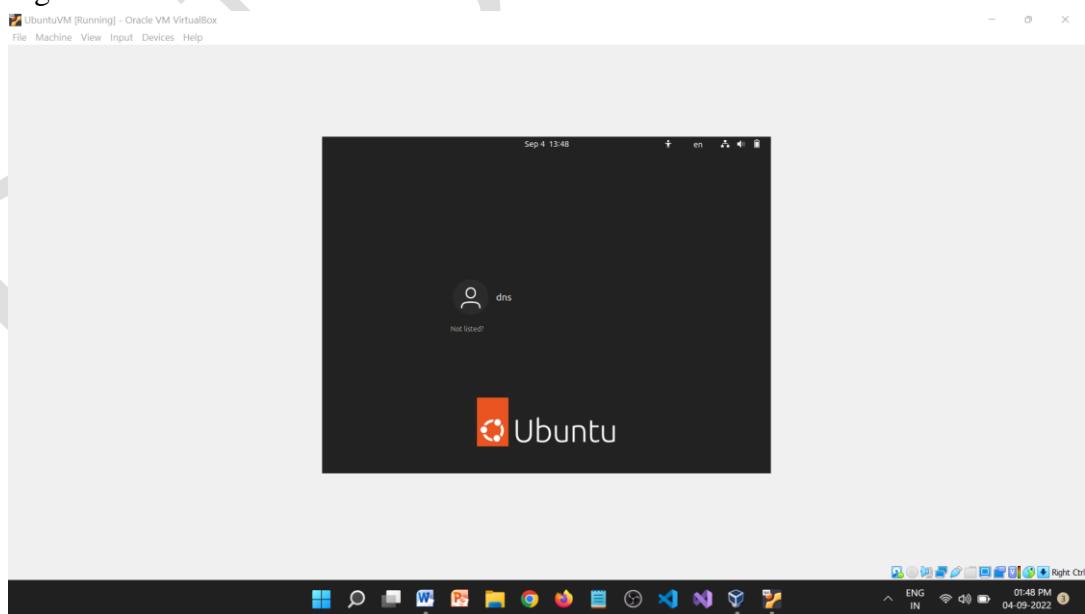
- VM VirtualBox (<https://www.virtualbox.org/wiki/Downloads>)
- Ubuntu OS (<https://ubuntu.com/download/desktop>)

Procedure:

1. Open VirtualBox with Virtual Ubuntu OS installed in it.

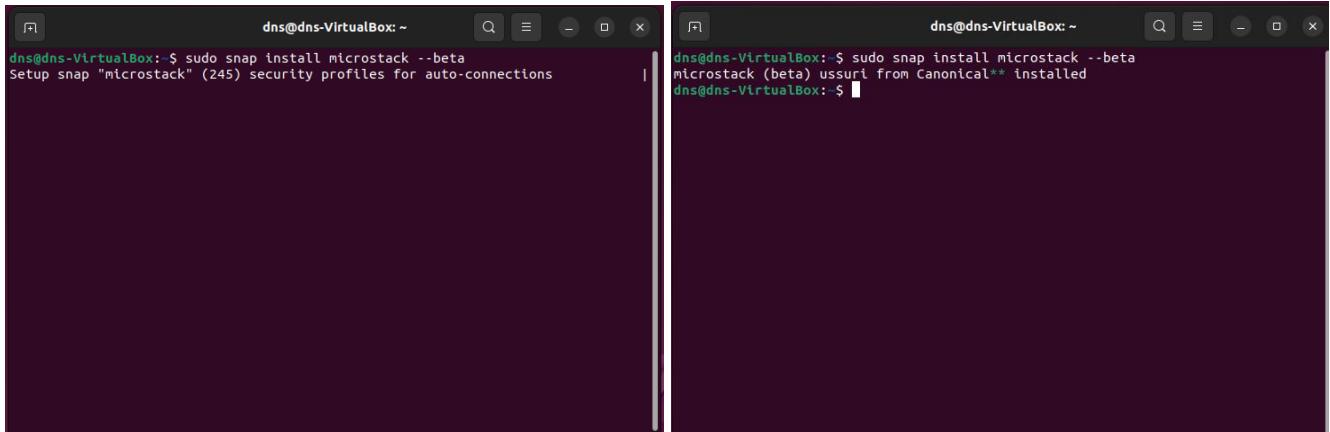


2. Login to the Ubuntu OS.



3. Open Terminal and type the command

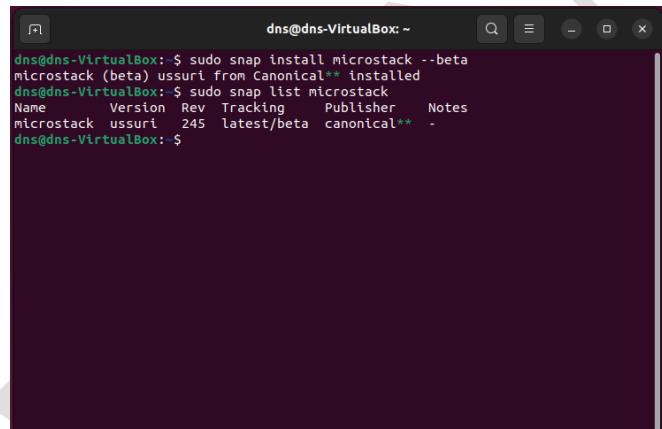
a. **sudo snap install microstack --beta**



The image shows two side-by-side terminal windows. Both windows have a dark background and white text. The left window shows the command being typed: "dns@dns-VirtualBox: ~ \$ sudo snap install microstack --beta". Below it, the terminal outputs: "Setup snap "microstack" (245) security profiles for auto-connections". The right window shows the command completed: "dns@dns-VirtualBox: ~ \$ sudo snap install microstack --beta". Below it, the terminal outputs: "microstack (beta) ussrui from Canonical** installed dns@dns-VirtualBox: ~ \$".

4. Check installation completion with the command

a. **sudo snap list microstack**



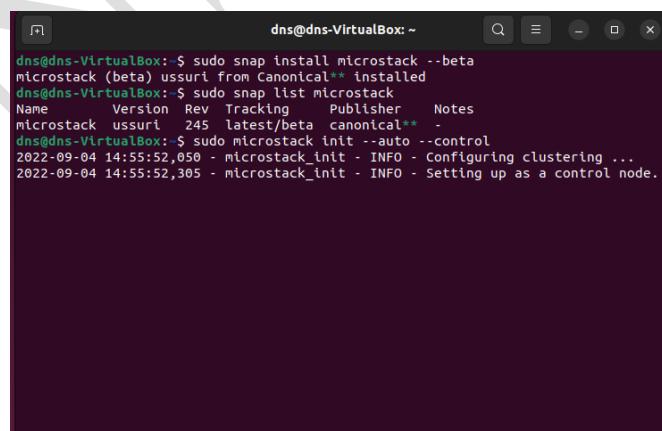
The image shows a single terminal window with a dark background and white text. It displays the command "dns@dns-VirtualBox: ~ \$ sudo snap list microstack" followed by its output: "microstack (beta) ussrui from Canonical** installed". Below this, the command "dns@dns-VirtualBox: ~ \$ sudo snap list microstack" is shown again, followed by a table of data:

Name	Version	Rev	Tracking	Publisher	Notes
microstack	ussrui	245	latest/beta	canonical**	-

The terminal prompt "dns@dns-VirtualBox: ~ \$" appears at the bottom.

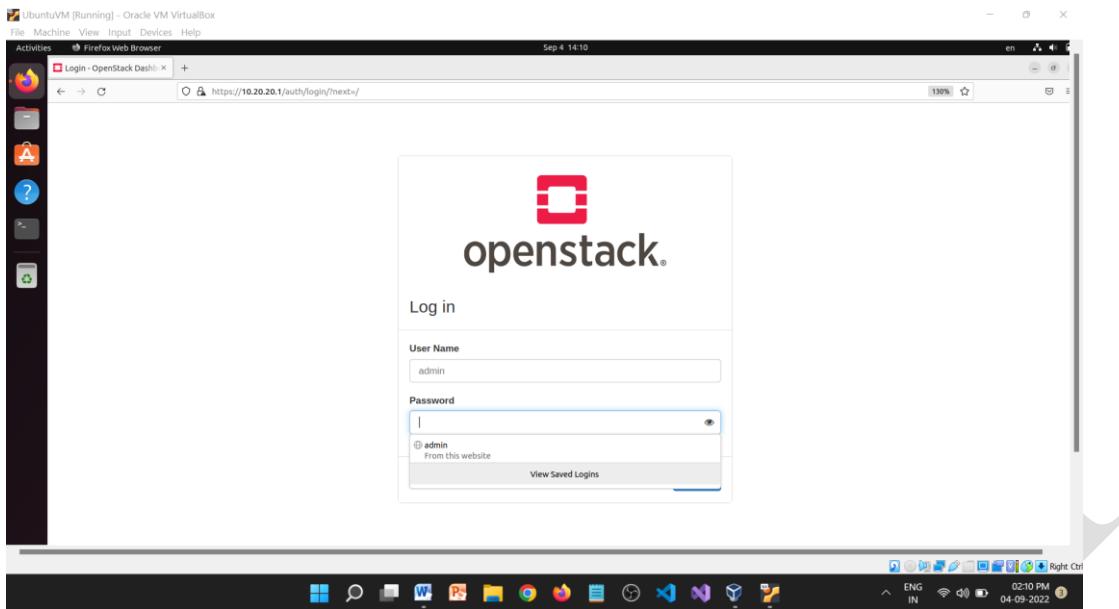
5. Initialize microstack with the command

a. **sudo microstack init --auto --control**



The image shows a single terminal window with a dark background and white text. It displays the command "dns@dns-VirtualBox: ~ \$ sudo snap install microstack --beta" followed by its output: "microstack (beta) ussrui from Canonical** installed". Below this, the command "dns@dns-VirtualBox: ~ \$ sudo snap list microstack" is shown again, followed by the same table of data as in the previous screenshot. At the bottom, the command "dns@dns-VirtualBox: ~ \$ sudo microstack init --auto --control" is shown, followed by log output: "2022-09-04 14:55:52,050 - microstack_init - INFO - Configuring clustering ... 2022-09-04 14:55:52,305 - microstack_init - INFO - Setting up as a control node.". The terminal prompt "dns@dns-VirtualBox: ~ \$" appears at the bottom.

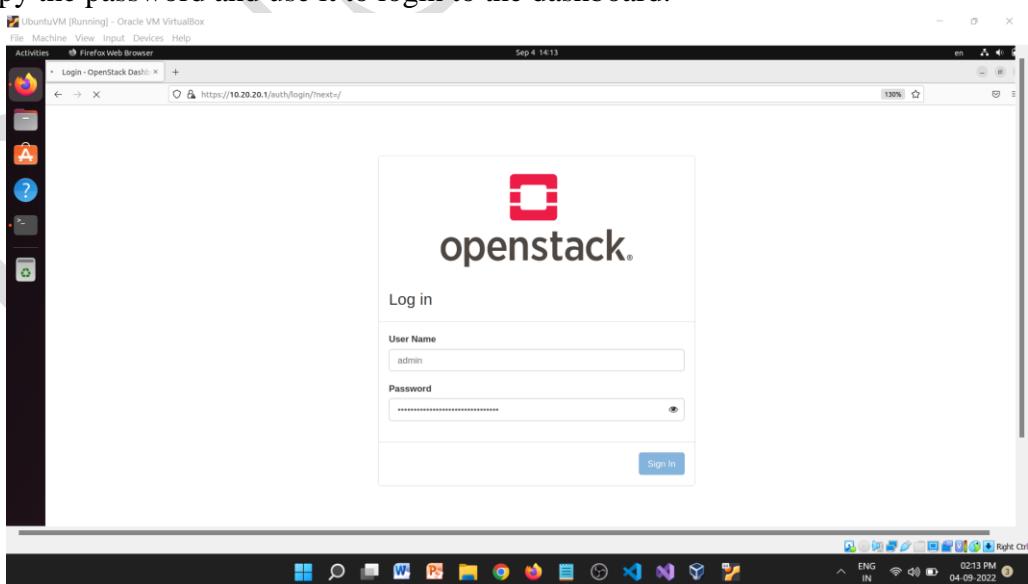
6. After initialization of OpenStack. Use browser to launch OpenStack Dashboard. Use the IP address **10.20.20.1** to login to the dashboard.

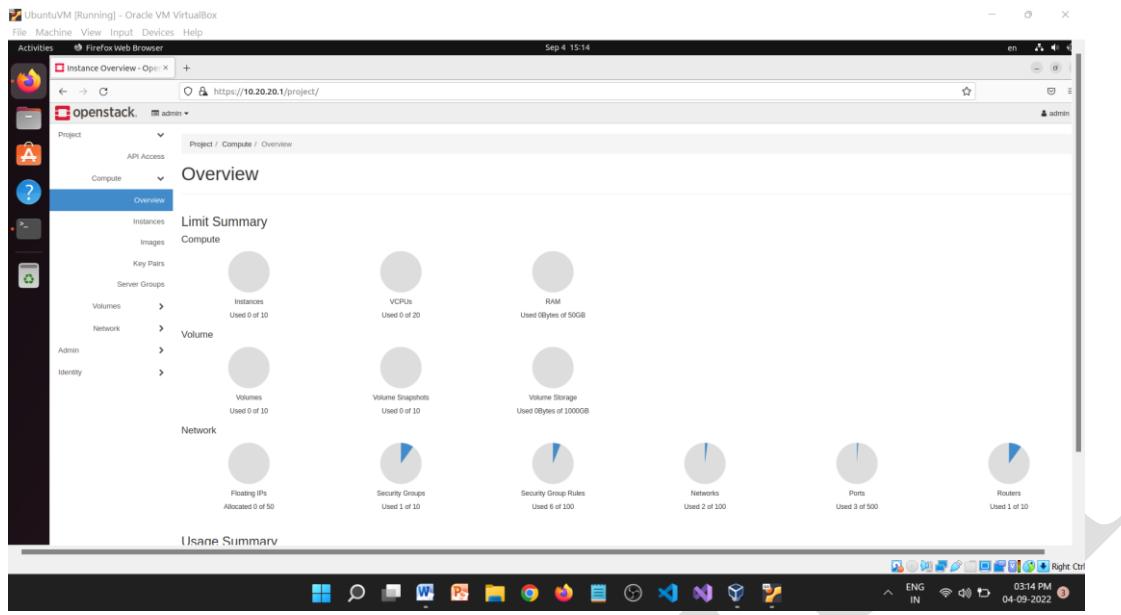


7. Use “admin” as username. Get password for the login from Terminal using the command
 - a. **sudo snap get microstack config.credentials.keystone-password**

A screenshot of a terminal window titled 'dns@dns-VirtualBox: ~'. The command entered is 'sudo snap get microstack config.credentials.keystone-password'. The terminal prompts for a password, which is then entered. The output shows the password as a long string of characters: '6dw1ddzyhxbkJdcBRSqMhacouMD41Jb1'. The terminal prompt then changes to 'dns@dns-VirtualBox: \$'.

8. Copy the password and use it to login to the dashboard.





9. Open Images Tab and click Create Image

A screenshot of the OpenStack Dashboard showing the 'Images' page. The sidebar is open with 'Compute' selected, and the 'Images' tab is highlighted. The main content area shows a table with one item: 'cirros' (Type: Image, Status: Active, Visibility: Public, Protected: No). Below the table is a note: 'Displaying 1 item'. At the top right of the page, there is a red circle around the '+ Create Image' button. A large grey arrow points from the bottom left towards the screenshot.

10. Provide the Image downloaded from <https://docs.openstack.org/image-guide/obtain-images.html> to create a new image.

- Provide Image Name

Image Details *

Metadata

Image Details
Specify an image to upload to the Image Service.

Image Name
NetBSD

Image Description
NetBSD Cloud OS

Image Source

File*
 netbsd-8.2.qcow2

Format*

Image Requirements

Kernel
Choose an image

Ramdisk
Choose an image

Architecture

Minimum Disk (GB)* 0 **Minimum RAM (MB)*** 0

Image Sharing

Visibility
Private Shared Community Public

Protected
Yes No

b. Choose Image Source – Downloaded Cloud OS Image

Image Details *

Metadata

Image Details
Specify an image to upload to the Image Service.

Image Name
NetBSD

Image Description
NetBSD Cloud OS

Image Source

File Upload

netbsd-8.2.qcow2

Downloads

dns
 Home
 Documents
 Downloads
 Music
 Pictures
 Videos

Open files read-only

Image Sharing

Visibility
Private Shared Community Public

Protected
Yes No

c. Choose File Format QCOW2

Image Details *

Metadata

Image Details
Specify an image to upload to the Image Service.

Image Name
NetBSD

Image Description
NetBSD Cloud OS

Image Source

File*
 netbsd-8.2.qcow2

Format*

ISO - Optical Disk Image
PLOOP - Virtuozzo/Parallels Loopback Disk
QCOW2 - QEMU Emulator
Raw
VDI - Virtual Disk Image
VHD - Virtual Hard Disk
VMDK - Virtual Machine Disk
AKI - Amazon Kernel Image
AMI - Amazon Machine Image
ARI - Amazon Ramdisk Image

Ramdisk
Choose an image

Minimum Disk (GB)* 0 **Minimum RAM (MB)*** 0

Protected
Yes No

Visibility
Private Shared Community Public

d. Choose Visibility **Public** and Create Image

The screenshot shows two stacked OpenStack interface windows.

Top Window: Image Details

- Image Name:** NetBSD
- Image Description:** NetBSD Cloud OS
- Image Source:** File (Browse... netbsd-8.2.qcow2)
- Format:** QCOW2 - QEMU Emulator
- Image Requirements:**
 - Kernel:** Choose an image
 - Architecture:** Choose an image
 - Minimum Disk (GB):** 0
 - Minimum RAM (MB):** 0
- Image Sharing:**
 - Visibility:** Public (selected)
 - Protected:** No
- Create Image** button (highlighted with a red circle)

Bottom Window: Images

- Shows the 'Images' section of the OpenStack dashboard.
- Table displays two items:

Owner	Name	Type	Status	Visibility	Protected	Action
admin	cirros	Image	Active	Public	No	Launch
admin	NetBSD	Image	Active	Public	No	Launch

11. Create Instance from the available Images using web interface or Terminal Interface.

12. Instance Creation Using Web Interface

a. Open Instances section and select Launch Instance

The screenshot shows the 'Instances' creation form in the OpenStack web interface.

Form Fields:

- Instance Name: (empty)
- Image Name: (empty)
- IP Address: (empty)
- Flavor: (empty)
- Key Pair: (empty)
- Status: (empty)
- Availability Zone: (empty)
- Task: (empty)
- Power State: (empty)
- Age: (empty)
- Actions: (empty)

Buttons:

- Launch Instance (highlighted with a red circle)
- Cancel

b. Provide Instance Name and select Next

Launch Instance

Details

Source

Flavor *

Networks *

Network Ports

Security Groups

Key Pair

Configuration

Server Groups

Scheduler Hints

Metadata

Instance Name * MyVM1

Description My Cloud Virtual Machine-1

Availability Zone nova

Count * 1

Total Instances (10 Max) 10%
0 Current Usage
1 Added
9 Remaining

< Back | Next > | Launch Instance

c. Select “cirros” as source form the available images

Details

Source

Flavor *

Networks *

Network Ports

Security Groups

Key Pair

Configuration

Server Groups

Scheduler Hints

Metadata

Select Boot Source Image Yes No

Volume Size (GB) * 1 Delete Volume on Instance Delete Yes No

Allocated Displaying 0 items

Name Select an item from Available items below

Available Displaying 2 items

Name

cirros

NetBSD

< Back | Next > | Launch Instance

Details

Source

Flavor *

Networks *

Network Ports

Security Groups

Key Pair

Configuration

Server Groups

Scheduler Hints

Metadata

Select Boot Source Image Yes No

Volume Size (GB) * 1 Delete Volume on Instance Delete Yes No

Allocated Displaying 1 item

Name

cirros

Available Displaying 1 item

Name

NetBSD

< Back | Next > | Launch Instance

d. Select Flavor “m1.tiny” from the available Flavors

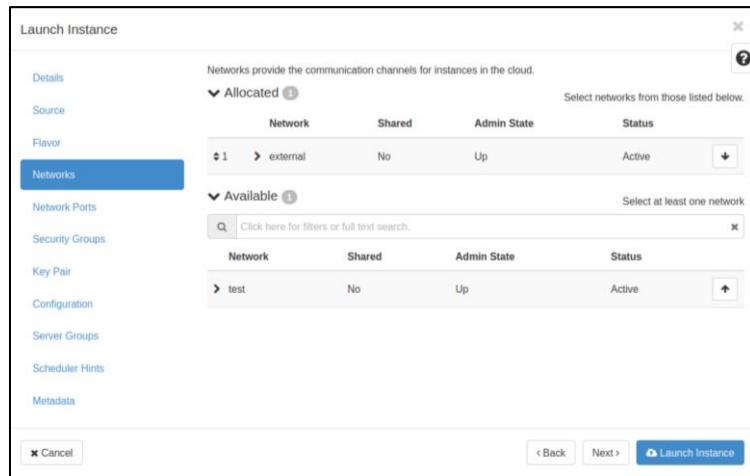
The image contains two identical screenshots of the 'Launch Instance' configuration page. The 'Flavor' section is highlighted in blue. In the 'Allocated' table, the 'm1.tiny' flavor is selected. In the 'Available' table, the 'm1.tiny' flavor is also listed.

Name	VCPUS	RAM	Total Disk	Public
m1.tiny	1	512 MB	1 GB	Yes
m1.small	1	2 GB	20 GB	Yes
m1.medium	2	4 GB	20 GB	Yes
m1.large	4	8 GB	20 GB	Yes
m1.xlarge	8	16 GB	20 GB	Yes

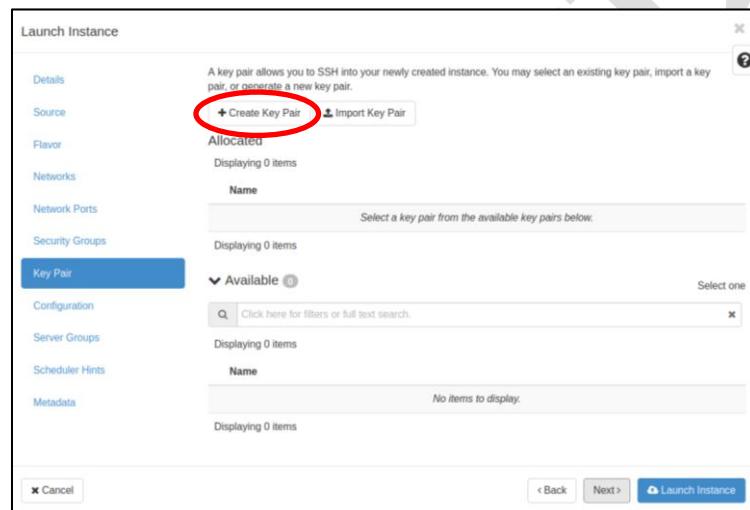
e. Select “external” network as the network for the Instance

The image shows the 'Networks' section of the 'Launch Instance' interface. The 'Available' table lists two networks: 'test' and 'external'. The 'external' network is selected.

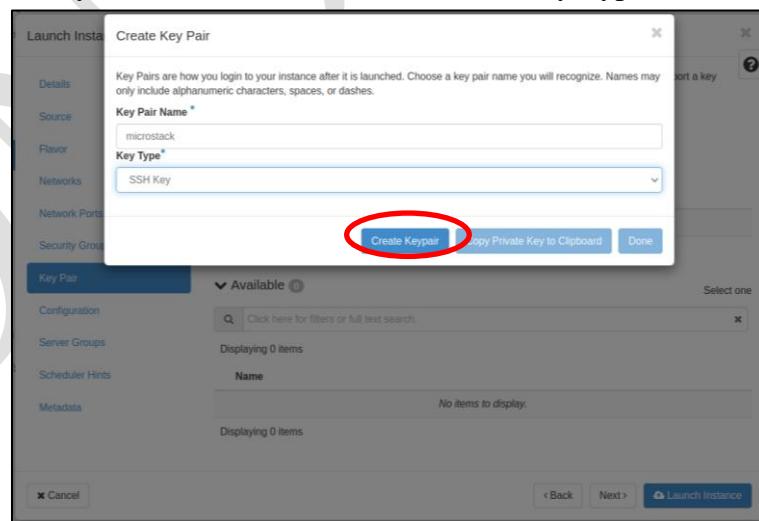
Network	Shared	Admin State	Status
test	No	Up	Active
external	No	Up	Active



- f. Network Ports and Security Group use the default Options. In Key Pair Section Create a new SSH Key Pair with name “microstack” and select it.



- g. Provide Key Name “microstack” and Choose Key Type as “SSH”.



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 *: microstack

Key Type *: SSH Key

Private Key

```
-----BEGIN RSA PRIVATE KEY-----
MIIEpgIBAAQEAts903BHGcCXUpk0CFU+Aepk73a1TlNT4LQdJ0AEHs1ec83/F
v3WLiJdFCQ23clY8t2anaC3rRaQyRiQfeflGyHfVhurQf6+eM4lgRccA9SNIM
Fre1ZfP03SR5V9opRX/y7ANFNU2ewuue2ewN0T8cf973PfMoJRS71DrGR
f13PnZNzNTER2zarpJ+e65LiH8aPTSKT4e8805YgG+JTHb0EIVYRPS
ZCB7Q51W(Hwoy)5VaxJfVigwLwATTNv19ZDlHUTA1e3Z1lGC9ENwkrlr6lS84oG
CJrSkEfVmSYC2zBxPfGzrl+o5+9Y43dLwDAQA8a0lAQCrmlk4sfydrV
wJ5KpBirF46sOIVw1MfQ11cpmgL8jpmMXFuMlHRYXCRFv5lynvubuYP6
S4RnUj1MEI42lsR5m3kuuQy1h+-0zPAb1AF1LCG-nlhOOkKFg0H0ehx
cVnk8sB1JSpewMoxZL0kd2nclNw82LH06L5jQ2jG3b7FLah03JLX8THlZu
GZ2Lg1N612etacfch00T3EJ022zWnSsSP-HmJq3dJ4v4+GWT6vokxMCUKrlQvhYuH
ISS7UgpbOQkwOLDT7phw4a9uoq8TLXvDz2NmJxwWJ2SSW755++g+urxsod5uq
TVQ504dzAoGBAn55MPGg4aU1UYHely+KMkIg5pR77yxExv7JedcAQzn7Tyg
82h0Dgs9DuIOKs6fQwzLIGEPU2DAj2KS0/DHn82mln+ZIC6ED2hPaogC75LCh
llNsHqRngehUrdvbumGloNoaQYonX/hJFxpzQqv4Q2zBY2QfRBBAoGBAn

```

Create Keypair **Copy Private Key to Clipboard** **Done**

Launch Instance

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.

Key Pair

Allocated (Displaying 1 item)

Name
> microstack

Available (Displaying 0 items)

Configuration

Server Groups

Scheduler Hints

Metadata

Launch Instance

- h. Remaining Options “Configuration”, “Server Groups”, “Scheduler Hints” and “Metadata” keep the default values. Launch the Instance.

Details

Source

Flavor

Networks

Network Ports

Security Groups

Key Pair

Configuration

Server Groups

Scheduler Hints

Metadata

You can specify resource metadata by moving items from the left column to the right column. In the left column there are metadata definitions from the Glance Metadata Catalog. Use the "Custom" option to add metadata with the key of your choice.

Available Metadata	Existing Metadata
Custom	No existing metadata

Click each item to get its description here.

Launch Instance

A screenshot of a web browser displaying the OpenStack dashboard at https://10.20.20.1/project/instances/. The dashboard has a left sidebar with categories: Project, API Access, Compute (selected), Overview, Instances (selected), Images, Key Pairs, Server Groups, Volumes, Network, Admin, and Identity. The main content area is titled 'Instances' and shows a table with one item: MyVM1. The table columns are Instance Name, Image Name, IP Address, Flavor, Key Pair, Status, Availability Zone, Task, Power State, Age, and Actions. The IP address is 192.168.222.163, flavor is m1.tiny, status is Active, availability zone is nova, power state is Running, and age is 8 minutes.

13. Instance Creation using Terminal Interface using the given command

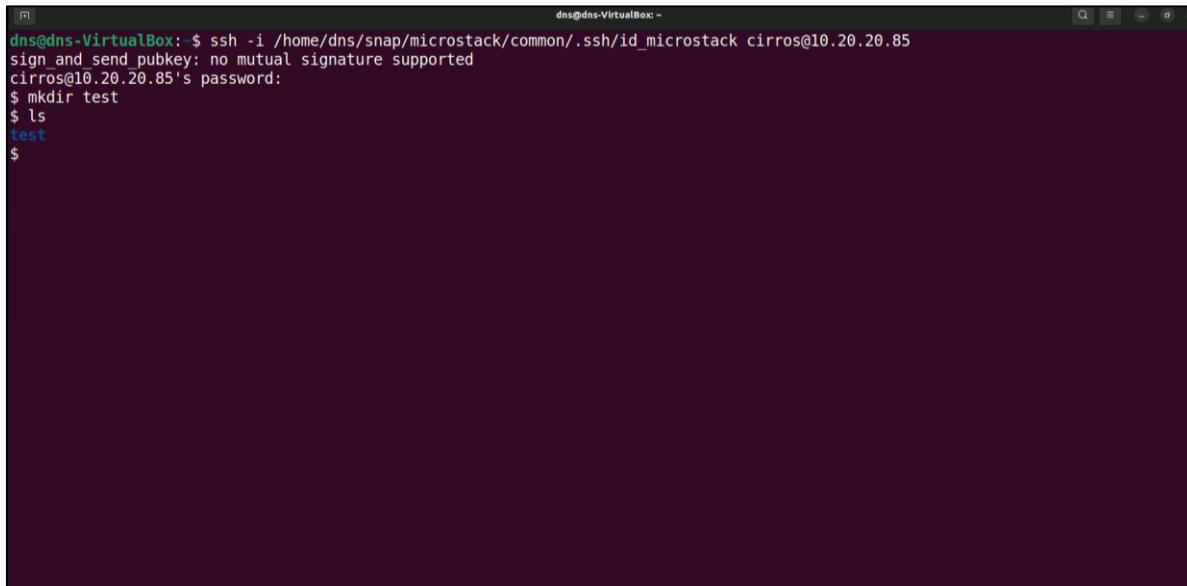
a. **microstack launch cirros -n MyVM1**

Two terminal windows side-by-side. The left terminal window shows the command 'microstack launch cirros -n MyVM1' being run, followed by a message about creating a local 'microstack' ssh key. The right terminal window shows the command being run again, followed by messages about launching the server, allocating a floating IP, and the server being launched with status BUILD. It also provides instructions to access it via SSH and mentions visiting the OpenStack dashboard.

14. Type the “ssh” command created to login to the system

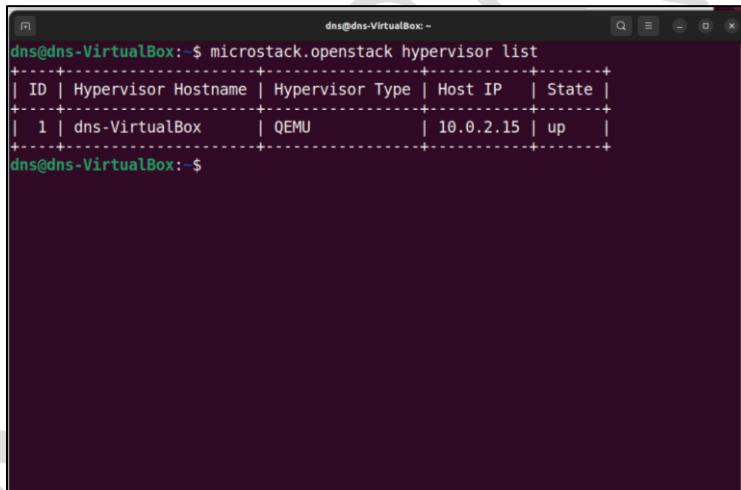
A terminal window showing the user running the command 'ssh -i /home/dns/snap/microstack/common/.ssh/id_microstack cirros@10.20.20.85'. The user is prompted for a password, which they enter. The terminal shows the password being sent and the connection attempt.

15. Enter “gocubsgo” as the password to login to the instance. Create a folder “test” and display it.



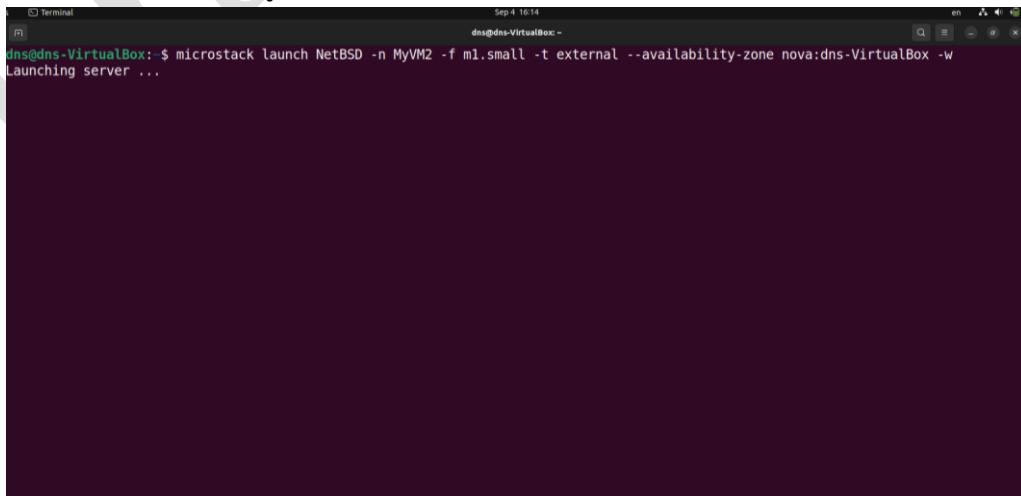
```
dns@dns-VirtualBox:~$ ssh -i /home/dns/snap/microstack/common/.ssh/id_microstack cirros@10.20.20.85
sign_and_send_pubkey: no mutual signature supported
cirros@10.20.20.85's password:
$ mkdir test
$ ls
test
$
```

16. Try Creating another Instance with NetBSD Image using the Command
a. Get the host name using **microstack.openstack hypervisor list**



```
dns@dns-VirtualBox:~$ microstack.openstack hypervisor list
+---+-----+-----+-----+
| ID | Hypervisor Hostname | Hypervisor Type | Host IP | State |
+---+-----+-----+-----+
| 1 | dns-VirtualBox | QEMU | 10.0.2.15 | up |
+---+-----+-----+-----+
dns@dns-VirtualBox:~$
```

b. Use the Terminal Command **microstack launch NetBSD -n MyVM2 -f m1.small -t external --availability-zone nova:dns-VirtualBox**



```
dns@dns-VirtualBox:~$ microstack launch NetBSD -n MyVM2 -f m1.small -t external --availability-zone nova:dns-VirtualBox -w
Launching server ...
```

DRAFT

Result:

Thus implementation of OpenStack installation to realize IaaS is completed and verified.