

# DEPARTMENT OF COMPUTERSCIENCE & ENGINEERING

## Experiment 2.3

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**Section/Group:**CC\_615\_B

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**Semester:** 6<sup>th</sup>

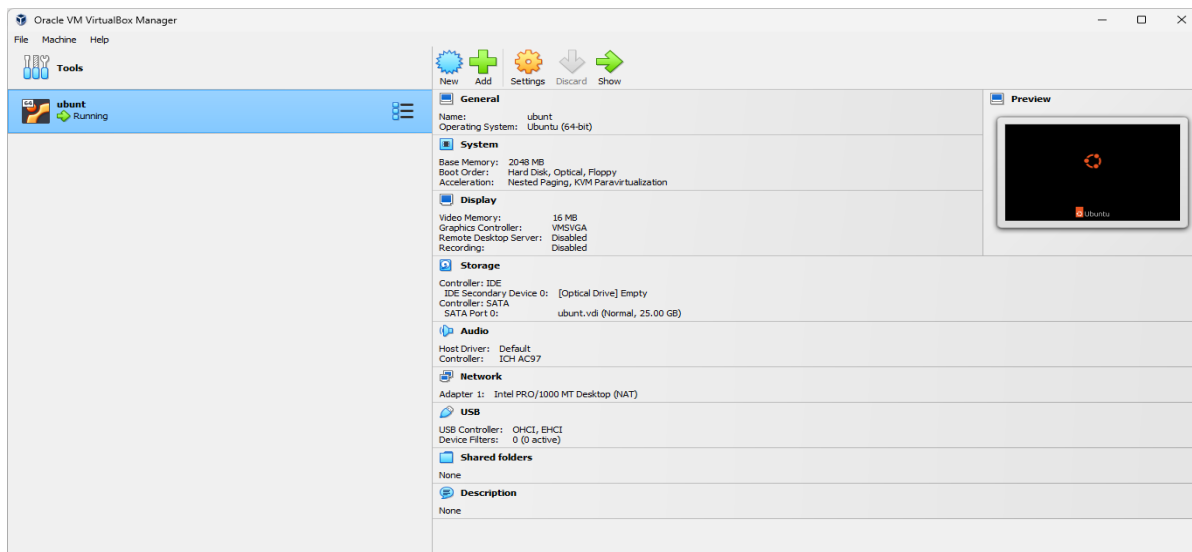
**Subject Name:** Cloud Computing & Distributed Systems Lab

**Subject Code:** 21CSP-378

- 1. Aim:** To implement IaaS by installing OpenStack.
- 2. Objective:** Develop/Implement a Infrastructure as a Service (IaaS) by deploying OpenStack, enabling scalable and flexible cloud infrastructure management for virtualized resources, including compute, storage, and networking, to meet diverse user demands efficiently..
- 3. Theory:** OpenStack is an open-source cloud computing platform that allows users to control large pools of compute, storage, and networking resources throughout a datacenter via a dashboard. It provides an Infrastructure as a Service (IaaS) solution, enabling organizations to deploy and manage virtualized resources, orchestrate instances, and automate tasks, thereby facilitating the creation and management of private and public clouds..

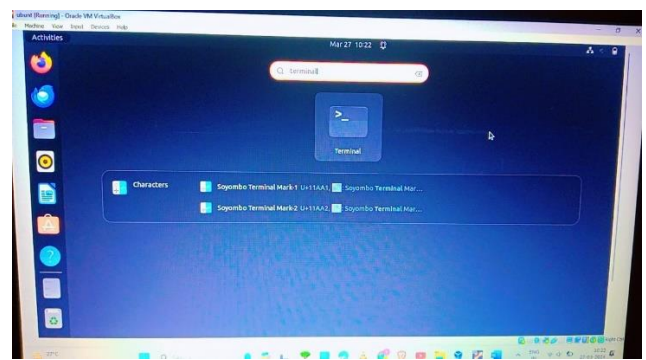
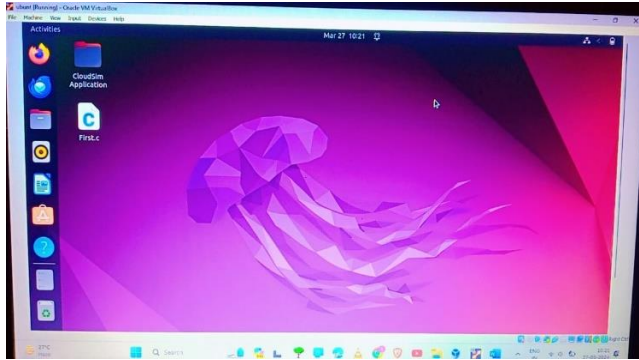
## 4. Procedure:

Step 1: Open the Virtual Box and the Virtual Machine in the Operating System.



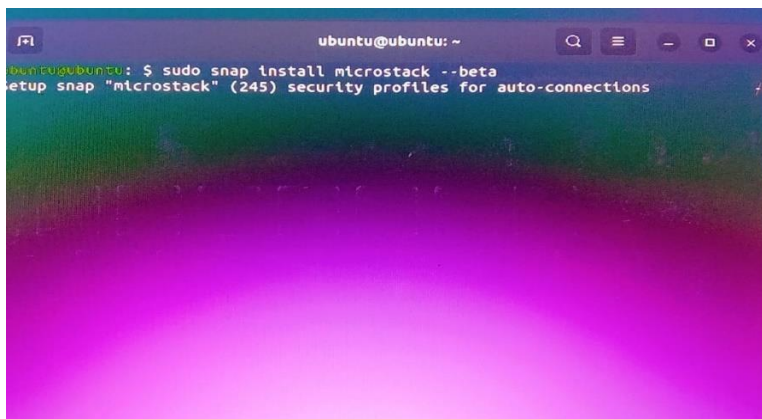
Step 2: After the open of the VM the open the terminal in the VM.

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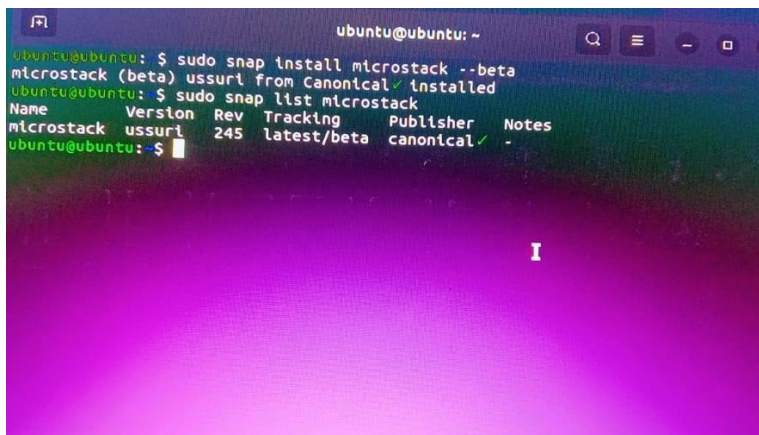


Step 3: Then in Terminal write the followings commands to build up Iaas(OpenStack).

1). Install the microstack –Beta Version write **sudo snap install microstack --beta**



2). Check installation completion with the command **sudo snap list microstack**

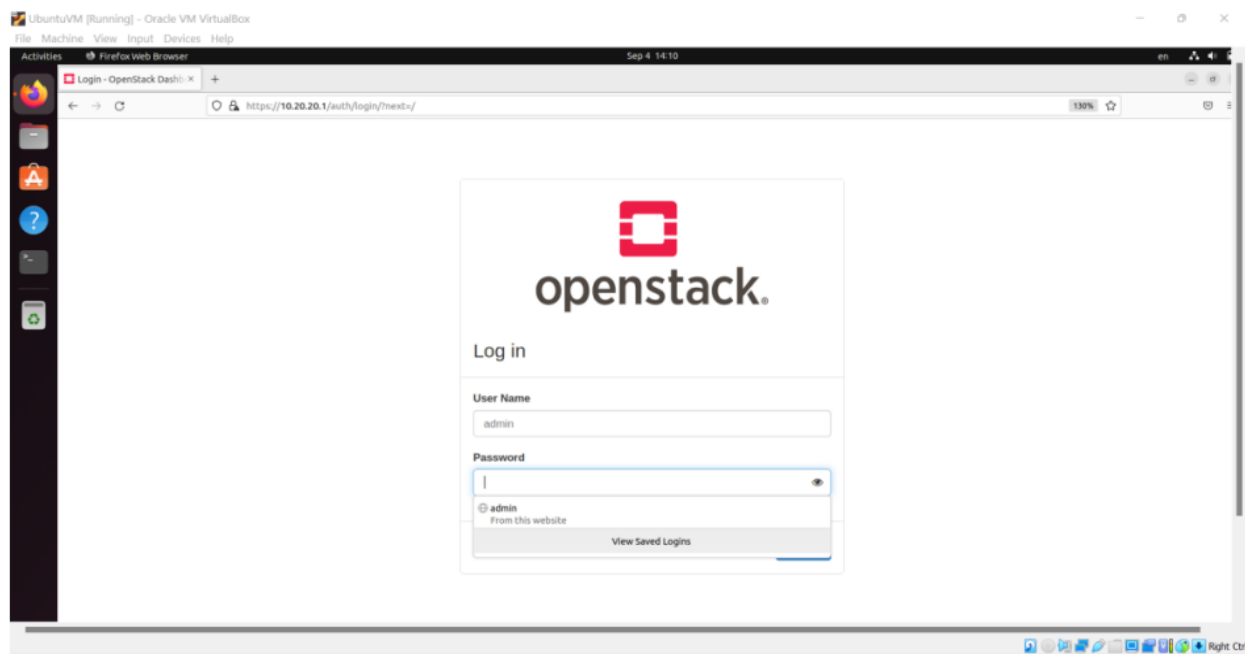


3). Initialize microstack with the command **sudo microstack init --auto --control**

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```
ubuntu@ubuntu: ~  
ubuntu@ubuntu:~$ sudo snap install microstack --beta  
microstack (beta) ussur1 from Canonical✓ installed  
ubuntu@ubuntu:~$ sudo snap list microstack  
Name            Version Rev Tracking      Publisher  Notes  
microstack       ussur1  245  latest/beta  canonical✓ -  
ubuntu@ubuntu:~$ sudo microstack init --auto --control  
2024-03-27 05:51:47,079 - microstack_init - INFO - Configuring clustering ...  
2024-03-27 05:51:47,256 - microstack_init - INFO - Setting up as a control node.  
2024-03-27 05:51:50,129 - microstack_init - INFO - Generating TLS Certificate and Key  
2024-03-27 05:51:51,464 - microstack_init - INFO - Configuring networking ...  
2024-03-27 05:51:59,372 - microstack_init - INFO - Opening horizon dashboard up to *  
2024-03-27 05:52:00,538 - microstack_init - INFO - Waiting for RabbitMQ to start ...  
Waiting for 10.0.2.15:5672  
2024-03-27 05:52:08,133 - microstack_init - INFO - RabbitMQ started!  
2024-03-27 05:52:08,134 - microstack_init - INFO - Configuring RabbitMQ ...  
2024-03-27 05:52:09,998 - microstack_init - INFO - RabbitMQ Configured!  
2024-03-27 05:52:10,122 - microstack_init - INFO - Waiting for MySQL server to start ...  
Waiting for 10.0.2.15:3306
```

**Step 4).** After initialization of OpenStack. Use browser to launch OpenStack Dashboard. Use the **IP address 10.0.2.15** to login to the dashboard.



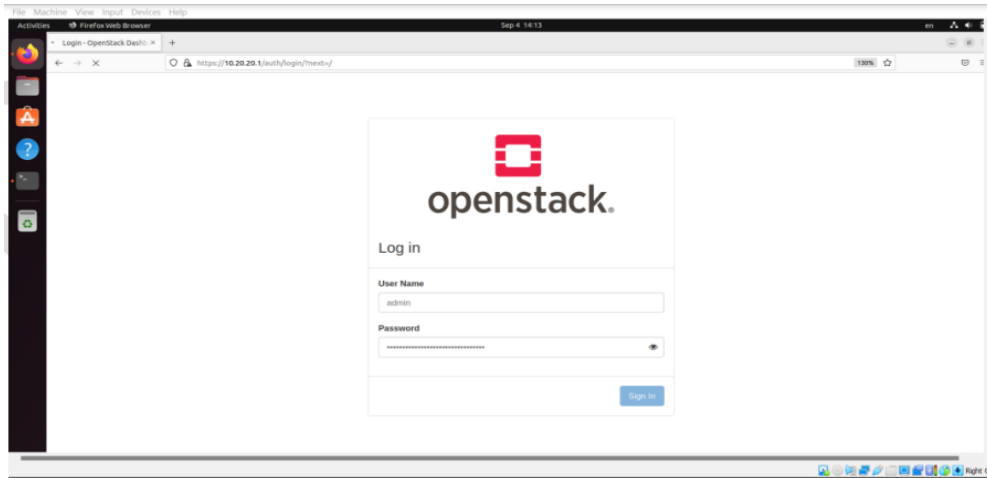
**Step 5).** Use “**admin**” as username. Get password for the login from Terminal using the command

1). For Password: **sudo snap get microstack config.credentials.keystone-password**

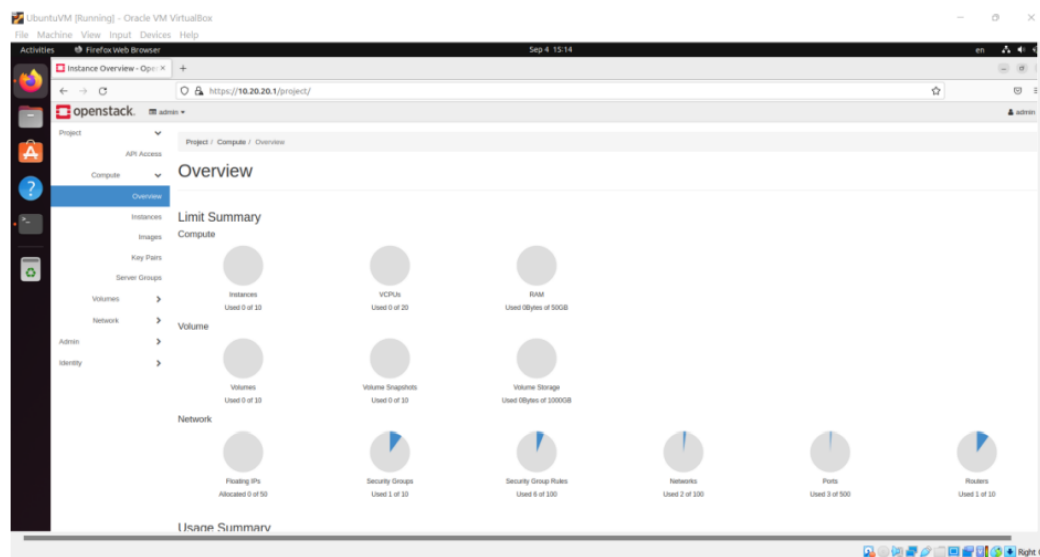
```
dns@dns-VirtualBox: ~  
dns@dns-VirtualBox:~$ sudo snap get microstack config.credentials.keystone-password  
[sudo] password for dns:  
6dWlddzyhXbKjdcBR5qMhacouMD41Jb1  
dns@dns-VirtualBox:~$
```

a). Copy the password and use it to login to the dashboard.

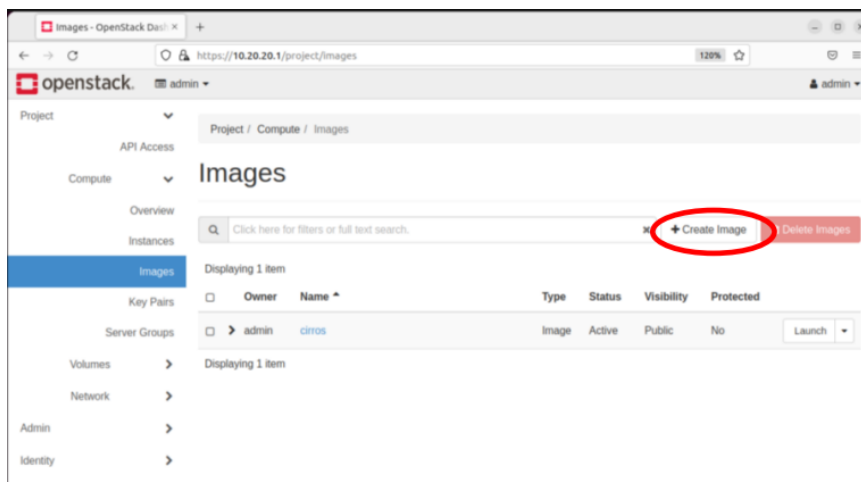
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b). Then go on the Dashboard/Overview:



c). Perform the Iaas to **Open Images Tab** and click **Create Image**



d). Provide the Image downloaded from <https://docs.openstack.org/image-guide/obtainimages.html> to create a new image.

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a). Provide Image Name:

b). Choose Image Source – Downloaded Cloud OS Image

c). Choose File Format QCOW2:

d). Choose Visibility Public and Create Image

Image are created in the OpenStack:

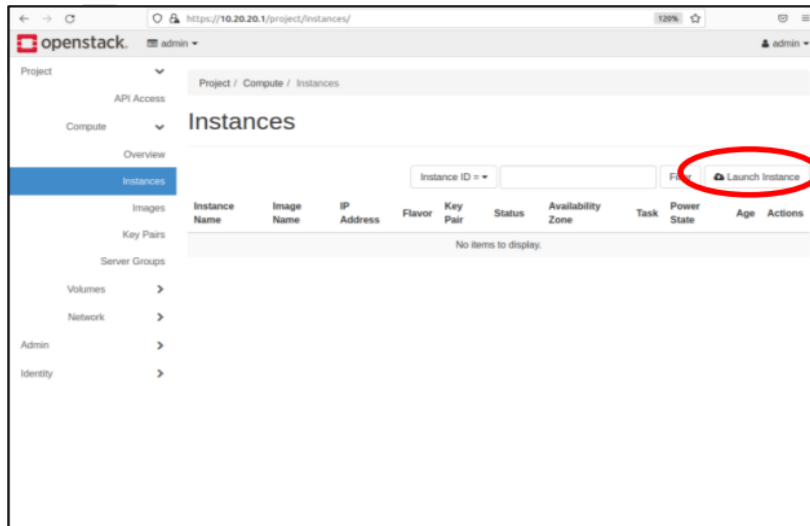
Owner	Name	Type	Status	Visibility	Protected
admin	cirros	Image	Active	Public	No
admin	NetBSD	Image	Active	Public	No

**Step 6).** Create Instance from the available Images using web interface or Terminal Interface.



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a). Open Interfaces section and select Launch Instance



b) Provide Instance Name and select Next

The screenshot shows the 'Launch Instance' dialog box, Step 1: Details. The 'Instance Name' field is set to 'MyVM1'. The 'Description' field is set to 'My Cloud Virtual Machine-1'. The 'Availability Zone' is set to 'nova'. The 'Count' is set to '1'. A progress indicator shows '10%' completion. The 'Launch Instance' button is highlighted in blue.

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

The screenshot shows the 'Launch Instance' dialog box, Step 2: Source. The 'Source' tab is selected. The 'Select Boot Source' dropdown is set to 'Image'. The 'Volume Size (GB)' is set to '1'. The 'Available' section lists 'cirros' as the selected image. The 'Launch Instance' button is highlighted in blue.

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

The screenshot shows the 'Launch Instance' dialog box, Step 3: Flavor. The 'Flavor' tab is selected. A table lists available flavors:

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

The 'm1.tiny' flavor is selected. The 'Launch Instance' button is highlighted in blue.

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

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The screenshot shows the 'Launch Instance' page with the 'Networks' tab selected. On the left sidebar, the tabs are: Details, Source, Flavor, Networks (selected), Network Ports, Security Groups, Key Pair, Configuration, Server Groups, Scheduler Hints, and Metadata. The main content area has a heading 'Networks provide the communication channels for instances in the cloud.' Below this, there are two sections: 'Allocated' and 'Available'. The 'Allocated' section shows a table with one row: #1, external, No, Up, Active. The 'Available' section has a search bar and a table with one row: test, No, Up, Active. At the bottom, there are buttons: Cancel, < Back, Next >, and Launch Instance.

Network	Shared	Admin State	Status
#1 external	No	Up	Active

Network	Shared	Admin State	Status
test	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.

The screenshot shows the 'Launch Instance' page with the 'Key Pair' tab selected. The left sidebar is the same as in the previous screenshot. The main content area has a heading 'A key pair allows you to SSH into your newly created instance. You may select an existing key pair, import a key pair, or allocate a new key pair.' Below this, there are two buttons: '+ Create Key Pair' (circled in red) and 'Import Key Pair'. The 'Allocated' section shows 'Displaying 0 items'. The 'Available' section has a search bar and shows 'No items to display.' At the bottom, there are buttons: Cancel, < Back, Next >, and Launch Instance.

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

The screenshot shows the 'Create Key Pair' dialog box. It has a title bar 'Create Key Pair'. Below the title bar, there is a text area with instructions: '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.' There are two input fields: 'Key Pair Name' with the value 'microstack' and 'Key Type' with the value 'SSH Key'. At the bottom, there are three buttons: 'Create Key Pair' (circled in red), 'Copy Private Key to Clipboard', and 'Done'. The background shows the 'Launch Instance' page with the 'Key Pair' tab selected.

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Launch Instance

Details
Source
Flavor
Networks
Network Ports
Security Groups
**Key Pair**
Configuration
Server Groups
Scheduler Hints
Metadata

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 \*

Key Type \*

SSH Key

Private Key

-----BEGIN RSA PRIVATE KEY-----  
MIIEpQIBAAKCAQEA6v9Q3BHGcCUXp4OCFU+Aepk73a1TNT4LQUJOAEHs1ed3F  
v3WUeEQ23kLY8D2anaC3RaQdRQeRtGyH8VhuRQ6+eN4UJgRcc9SNIM  
FieTzFO3SR5VE3opRQJy74NfNK2wkuu02etWOT8or973PFqMoJR5LdGR  
H3PpNZ2TERZaPwpJ+v65UH8pPT3KtAe8B0y5Yg+Q7he9ENYRP5J  
ZC87Q638Hwew9Jwa3JfpgtUwTNTwD9ZDH7A1e32ziCCE9v0n04LSMaG  
CJRSKwFw5YQcZ3BxPpGzH050+BY4d3LwDAQABu8BAQCrnkHdydR/  
wJ5KP8BYF46vOIOvwr1MMQk1epmgL8pDMMXDFuMHRXCRFV05ynV8u8YP6  
S4RnUq1ME428wR5m03swJQ1h++GzPJAsk1AFN1C44nNO0KhFg00Ehe  
cVhK8u8JISpelaV6xZL9Kdz9mclNw6ZLHO6LSQVGV3b7FLu83J3X8HLZu  
GZLj1N812EouRfH67JEJ0Z2vV5vS8HmJQ3Jv8+QWTFv8KACUKN8QhYU8  
IS7u3p8Qwv8LDT73Hw4duog8TLX0eZ28mKw8LZ5SW765++p+rm05vq  
TVQ5Q4G2AaGBAN55MP6G44LUUYHelyz+KMk3g5vPR7YvE8v7p3eakAqmT7Yq  
82h09g8Du8Kuf8QZUePUZDAu2K56v0DH82mLw+ZIC8EDZPaoG7SLCn  
8oh8qR8q8UdV8bumG8o8No8YonX7HqF8p8Q8v4Q428Y2QR8uA8GBANJb  
-----END RSA PRIVATE KEY-----

Create Key Pair Copy Private Key to Clipboard Done

Launch Instance

Details
Source
Flavor
Networks
Network Ports
Security Groups
**Key Pair**
Configuration
Server Groups
Scheduler Hints
Metadata

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.

+ Create Key Pair Import Key Pair

Allocated

Displaying 1 item

Name

microstack

Available

Select one

Click here for filters or full text search.

Server Groups

Displaying 0 items

Name

No items to display.

Displaying 0 items

Cancel Back Next 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

Filter

Custom

No available metadata

Existing Metadata

Filter

No existing metadata

Click each item to get its description here.

Cancel Back Next Launch Instance

**Implement of the Instances in the OpenStack:**

Instances - OpenStack

https://10.20.20.1/project/instances/

openstackadmin

Project

API Access

Compute

Overview

Instances

Images

Key Pairs

Server Groups

Volumes

Network

Admin

Identity

Project / Compute / Instances

Instances

Instance ID  Filter Launch Instance Delete Instances More Actions

Displaying 1 item

<input type="checkbox"/>	Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions	
<input type="checkbox"/>	MyVM1	cirros	192.168.222.163, 10.20.20.85	m1.tiny	microstack	Active	us-east-1a	nova	None	Running	8 minutes	Create Snapshot

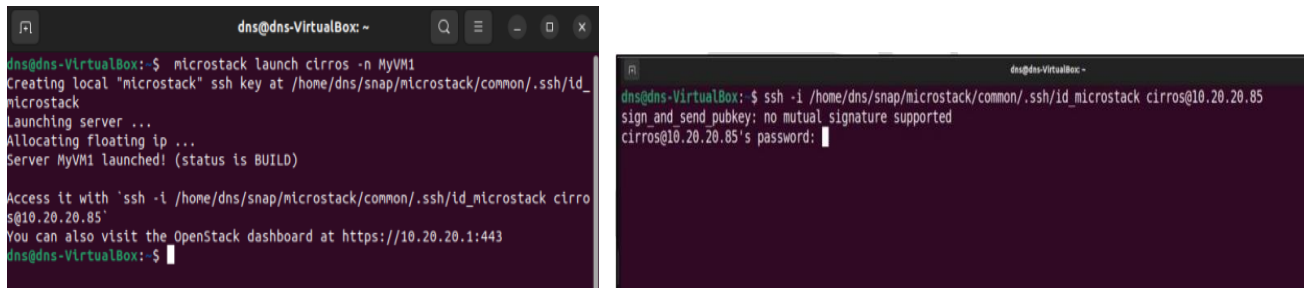
Displaying 1 item



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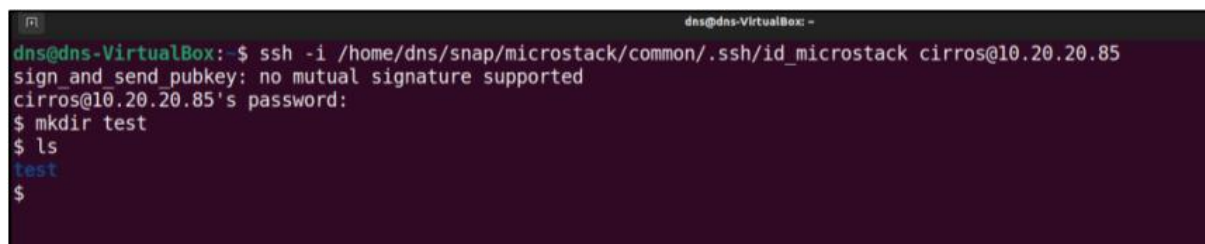
**Step 7).** Instance Creation using Terminal Interface using the given command

a). `microstack launch cirros -n MyVM1` , b). Type the “ssh” command created to login to the system



```
dns@dns-VirtualBox: ~  
dns@dns-VirtualBox:~$ microstack launch cirros -n MyVM1  
Creating local "microstack" ssh key at /home/dns/snap/microstack/common/.ssh/id_microstack  
Launching server ...  
Allocating floating ip ...  
Server MyVM1 launched! (status is BUILD)  
  
Access it with 'ssh -i /home/dns/snap/microstack/common/.ssh/id_microstack cirros@10.20.20.85'  
You can also visit the OpenStack dashboard at https://10.20.20.1:443  
dns@dns-VirtualBox:~$  
  
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: 
```

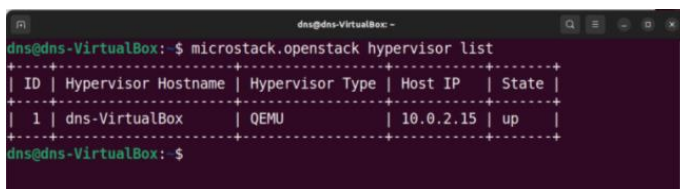
c). Enter “gocubsgo” as the password to login to the instance. Create a folder “test” and display it.



```
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  
$
```

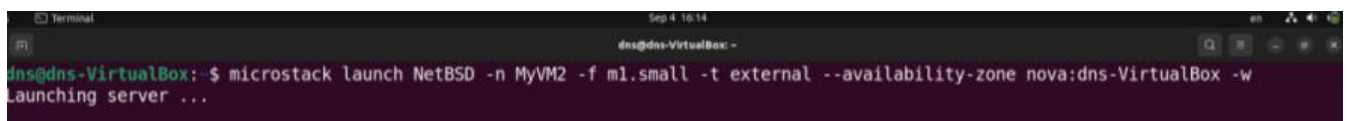
**Step 8.** Try Creating another Instance with NetBSD Image using the Command

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 ...
```

## 5). Learning Outcome:-

Installing OpenStack via terminal commands cultivates practical skills in cloud infrastructure deployment, reinforcing understanding of IaaS implementation.

- Creating images and instances through the command line enhances proficiency in resource management and provisioning, fostering adeptness in OpenStack utilization.
- Mastery of terminal-based operations facilitates efficient administration, troubleshooting, and customization, empowering users to harness OpenStack's full potential for scalable and resilient infrastructure solutions.