

MicroStack Tutorial

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Current Topics in Distributed Systems: Internet of
Things and Cloud Computing,

What is OpenStack?



- *OpenStack software* controls large pools of compute, storage, and networking resources throughout a datacenter, managed through a [dashboard](#) or via the [OpenStack API](#).
- [OpenStack](#) is a collection of open-source projects designed to work together to form the basis of a Cloud.
- OpenStack can be used for both private and public clouds.

Why OpenStack

Why do we use OpenStack rather than setting everyone to a physical server?

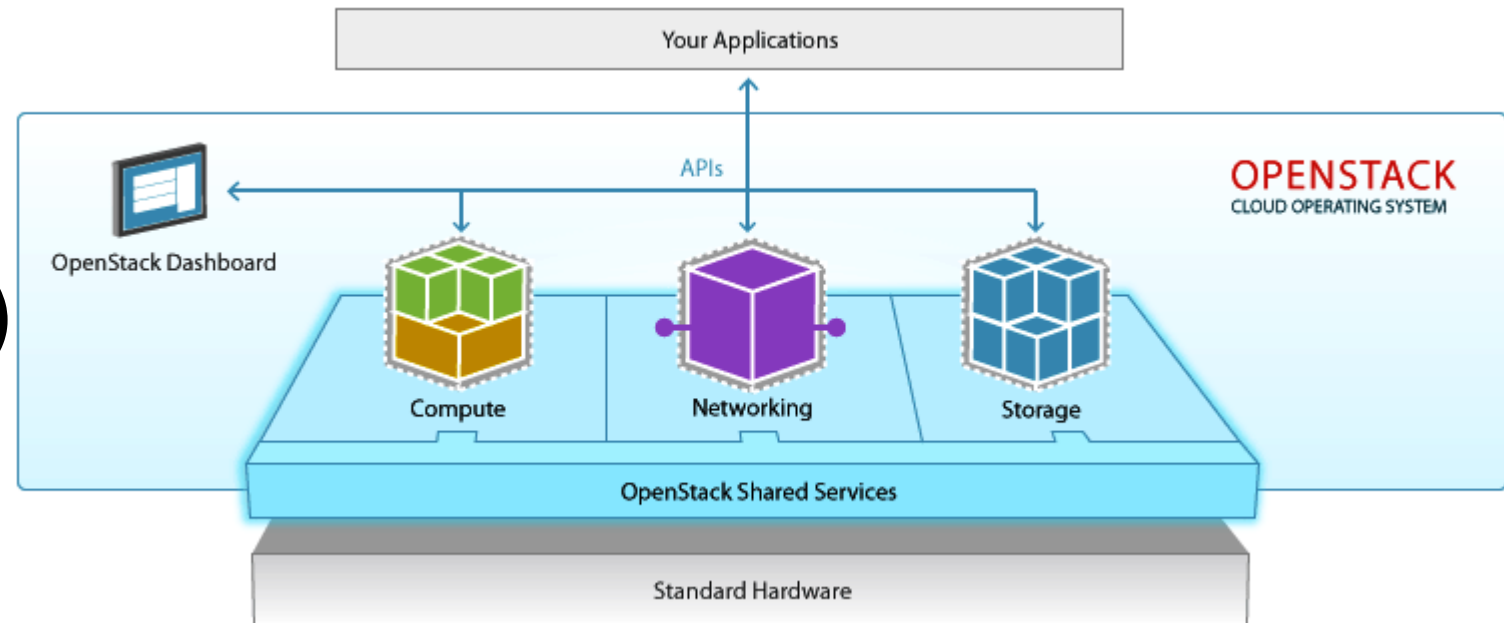
- Imagine that a few computers in the data center are available for us. We could limit them and allocate each customer, one of the computers.
- OpenStack takes advantage of this and allows us to have much more flexibility.
- It allows us to pool the physical machines and then subdivide the pool into virtual machines or instances.
- We can start more virtual machines than the number of physical machines, sharing resources like disk space, memory and processors.
- We can even allocate more processing power to a virtual machine than available,
- as they may not be fully utilized at the same time.

OpenStack is responsible for

- ✓ Booting Virtual Machines (VMs),
- ✓ assigning VMs in networks,
- ✓ storing operating system images,
- ✓ administering users,
- ✓ or any operation related to the management of a DC.

OpenStack Components

- Compute (Nova)
- Image Service (Glance)
- Object Storage (Swift)
- Dashboard (Horizon)
- Identity Service (Keystone)
- Networking (Neutron)
- Block Storage (Cinder)
- Telemetry (Ceilometer)
- Orchestration (Heat)



Source: www.openstack.org

What is MicroStack?

- [MicroStack](#) provides a single or multi-node OpenStack deployment which can run directly on your workstation.
- Although made for developers to prototype and test, it is also suitable for edge, IoT, and appliances.
- MicroStack is an OpenStack in a [snap](#) which means that all OpenStack services and supporting libraries are packaged together in a single package which can be easily installed, upgraded or removed.
 - By snap, you can package and publish your app.
 - Just you need to pick the language your app is written in.
- MicroStack includes all important OpenStack components.

What will we learn today?

- In this tutorial you will learn how to:
 - Get a single-node OpenStack cloud up and running with MicroStack
 - Interact with OpenStack via the web GUI
 - Launch your first VM on OpenStack and access it

What is the requirement?

- A machine running Linux, a multi-core processor and at least 8 GB of RAM.
- Successful run on Ubuntu:16.04 (:

Install MicroStack

- Install MicroStack from the beta channel:
 - *sudo snap install microstack --devmode --edge*
- You can run this command to see which versions are currently available:
 - *snap info microstack*
- For other Operating Systems:
 - <https://microstack.run/#get-started>

Initialize MicroStack

- MicroStack needs to be initialized, so that networks and databases get configured. To do this, run:
 - *sudo microstack.init --auto*
- To see other options:
 - *microstack.openstack --help*

Interact with OpenStack

Via web GUI

- To interact with your cloud via the web GUI visit <http://10.20.20.1/>
- Log in with the following credentials:
 - username: admin
 - For password run: `sudo snap get microstack config.credentials.keystone-password`



openstack®

Log in

User Name

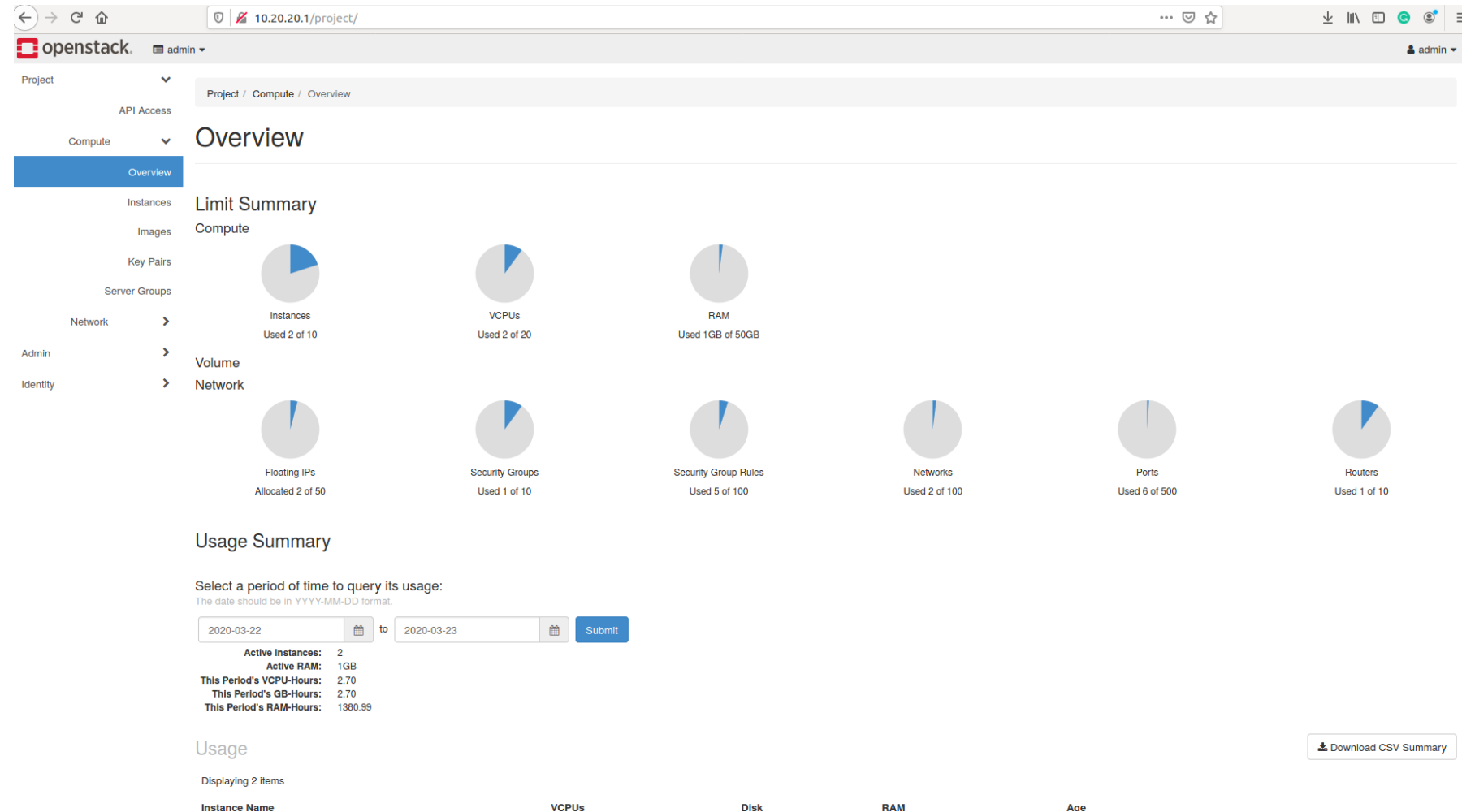
Password

Sign In

Interact with OpenStack (cont.)

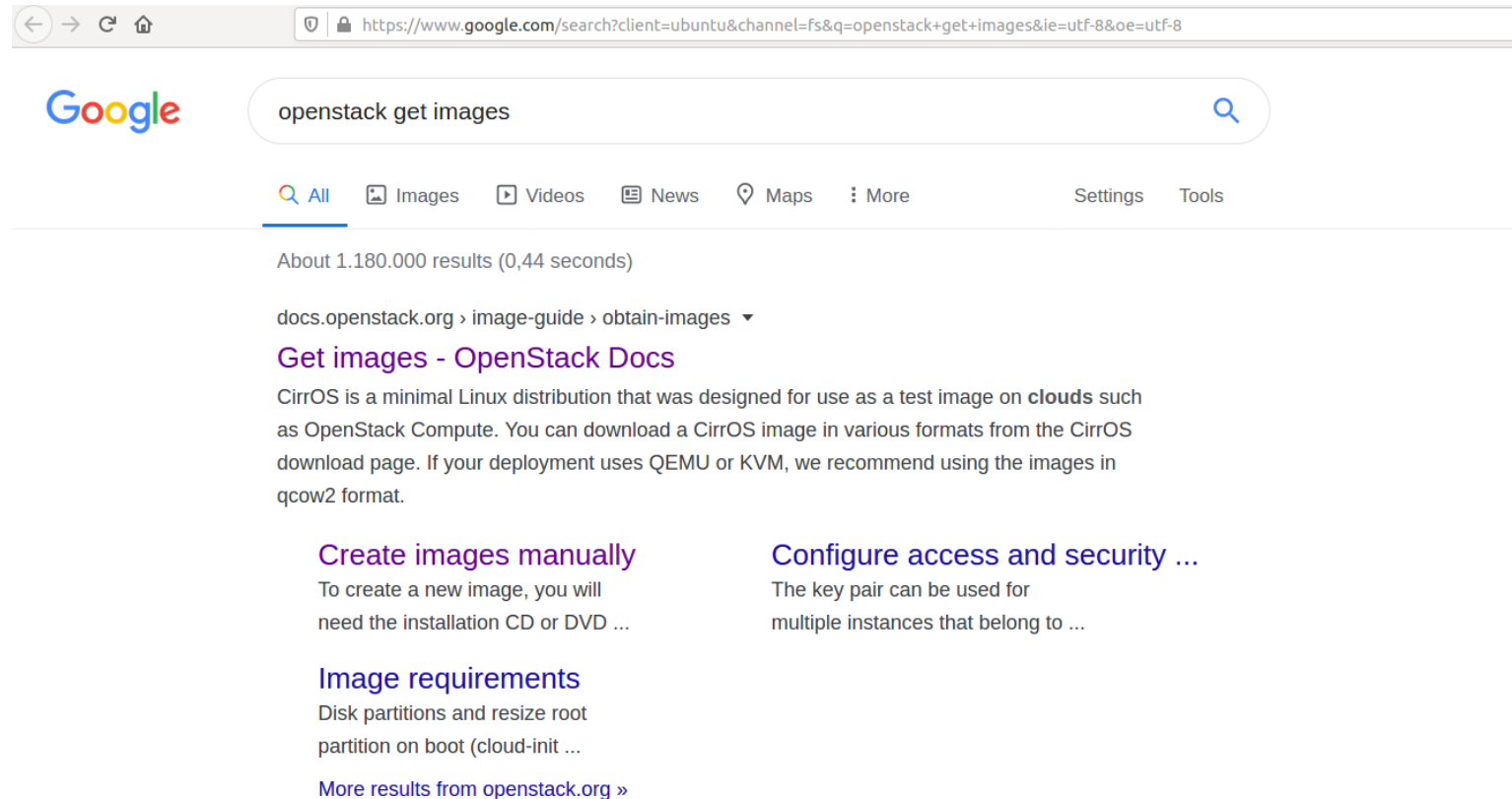
Via web GUI

- You can start your OpenStack installation (i.e. create additional users, launch instances, etc.).



Minimal image to run on OpenStack

- CirrOS is a minimal **Linux** distribution that was designed for use as a test image on clouds such as **OpenStack** Compute.



Launch and connect to your VM with a default SSH key-pair

- To launch your first OpenStack instance (VM) called “test” based on the CirrOS image, run the following:
 - *microstack.launch cirros --name test*
 - *ssh -i <KEY> cirros@<IP_ADD>*

```
narges@Narges:~$ microstack.launch cirros --name test1
Creating local "microstack" ssh key at /home/narges/snap/microstack/common/.ssh/id_microstack
Launching server ...
Allocating floating ip ...
Server test1 launched! (status is BUILD)

Access it with `ssh -i /home/narges/snap/microstack/common/.ssh/id_microstack cirros@10.20.20.33`
You can also visit the OpenStack dashboard at http://10.20.20.1:80
narges@Narges:~$ ssh -i ~/snap/microstack/common/.ssh/id_microstack cirros@10.20.20.33
The authenticity of host '10.20.20.33 (10.20.20.33)' can't be established.
ECDSA key fingerprint is SHA256:QDHVt/gAH5Dv+HMZgW62H0u2NcqEvEmYDFJlsbXKWzQ.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '10.20.20.33' (ECDSA) to the list of known hosts.
$ uptime
 20:24:27 up 1 min,  1 users,  load average: 0.04, 0.02, 0.00
$ Connection to 10.20.20.33 closed.
```

```
~/uni/distributed-systems/exercise-3$ microstack.openstack image create --name ubuntu-18.04 --file images/bionic-server-cloudimg-amd64.img --disk-format qcow2
```

```
usage: openstack image create [-h] [-f {json,shell,table,value,yaml}]
                             [-c COLUMN] [--noindent] [--prefix PREFIX]
                             [--max-width <integer>] [--fit-width]
                             [--print-empty] [--id <id>]
                             [--container-format <container-format>]
                             [--disk-format <disk-format>]
                             [--min-disk <disk-gb>] [--min-ram <ram-mb>]
                             [--file <file> | --volume <volume>] [--force]
                             [--sign-key-path <sign-key-path>]
                             [--sign-cert-id <sign-cert-id>]
                             [--protected | --unprotected]
                             [--public | --private | --community | --shared]
                             [--property <key=value>] [--tag <tag>]
                             [--project <project>]
                             [--project-domain <project-domain>]
                             <image-name>
```

```
openstack image create: error: unrecognized arguments: --file images/bionic-server-cloudimg-amd64.img --disk-format qcow2 ubuntu-18.04
```

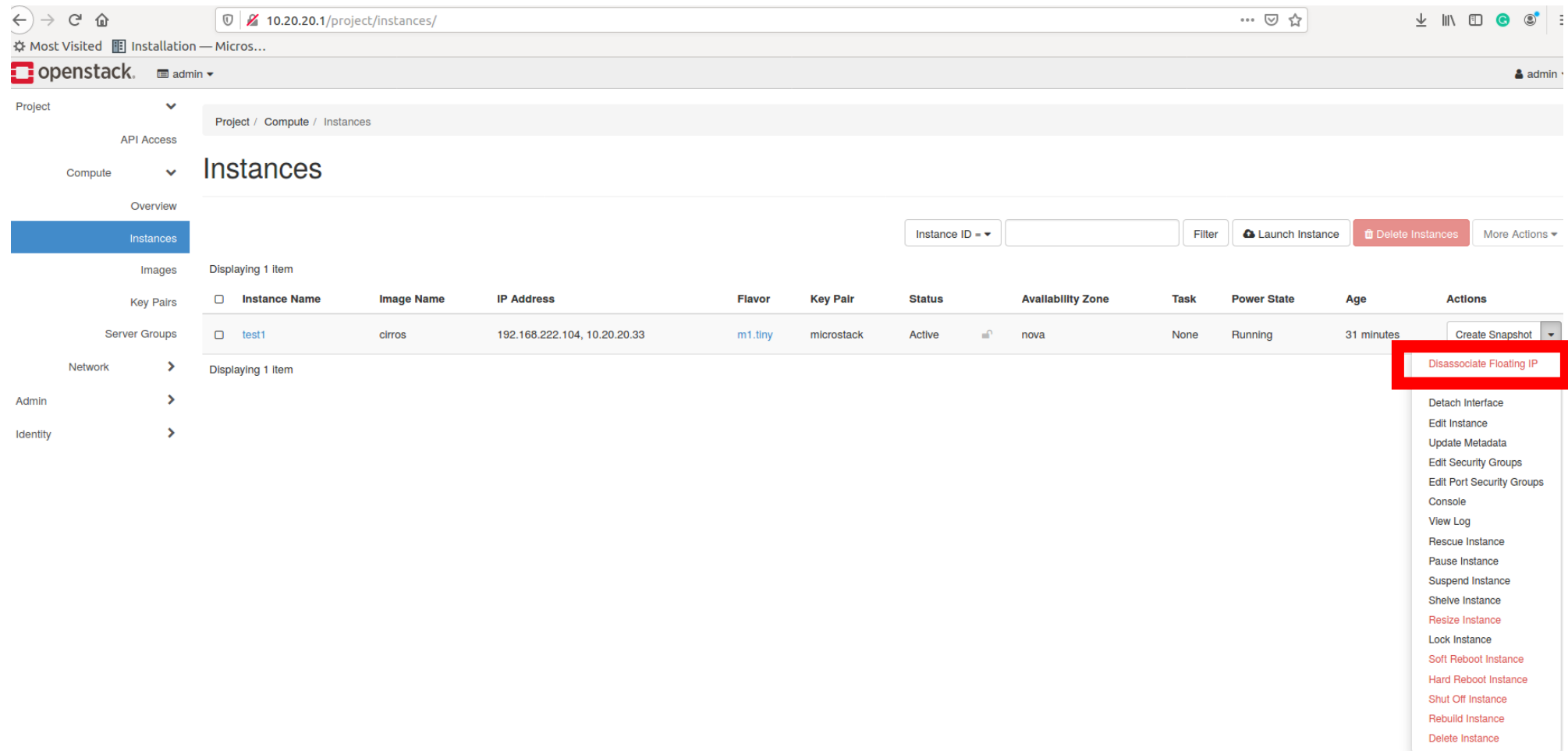
```
~/uni/distributed-systems/exercise-3$ microstack.openstack image create --file images/bionic-server-cloudimg-amd64.img --disk-format qcow2 ubuntu-18.04
```

Field	Value
checksum	26add2d1bee7f3a2ef707c00a34b9059
container_format	bare
created_at	2020-03-25T17:22:50Z
disk_format	qcow2
file	/v2/images/c5efd276-3175-4bd6-925b-d209099ae1ef/file
id	c5efd276-3175-4bd6-925b-d209099ae1ef
min_disk	0
min_ram	0
name	ubuntu-18.04
owner	94955715b6554225bc19eb5d00cf9a80
properties	os_hash_algo='sha512', os_hash_value='3a8ec316678b4e06efac986e3cb98b96fb11365c5e2794c47f9417f1a5298ee8d7e5990d55172d91b4f28f6cdd4648f33461d5f3e6102b789d3719b3790f673f', os_hidden='False'
protected	False
schema	/v2/schemas/image
size	345636864
status	active
tags	
updated_at	2020-03-25T17:22:51Z
virtual_size	None
visibility	shared

```
~/uni/distributed-systems/exercise-3$ microstack.openstack image list
```

ID	Name	Status
fe3dac42-d533-40cf-bb57-b90f27ea0fed	cirros	active
c5efd276-3175-4bd6-925b-d209099ae1ef	ubuntu-18.04	active

- As shown in this figure, the instance is allocated by a Floating IP address.
- Floating IP addresses are needed to connect to the Internet.
- If there is no Floating IP allocated, you can associate one to your instance.



The screenshot shows the OpenStack dashboard interface. The breadcrumb navigation indicates the path: Project / Compute / Instances. The main heading is 'Instances'. Below this, there is a table with one instance listed. The instance is named 'test1', uses the 'cirros' image, and has a floating IP address of '192.168.222.104, 10.20.20.33'. The instance is in an 'Active' state, running on the 'nova' availability zone. The 'Actions' column for this instance has a dropdown menu open, showing various options. The option 'Disassociate Floating IP' is highlighted with a red box.

Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
test1	cirros	192.168.222.104, 10.20.20.33	m1.tiny	microstack	Active	nova	None	Running	31 minutes	Create Snapshot Disassociate Floating IP Detach Interface Edit Instance Update Metadata Edit Security Groups Edit Port Security Groups Console View Log Rescue Instance Pause Instance Suspend Instance Shelve Instance Resize Instance Lock Instance Soft Reboot Instance Hard Reboot Instance Shut Off Instance Rebuild Instance Delete Instance

Thanks for your attention