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Turma: COMP 22

Lab 3 CSC05 - Microstack

Parte 1

1) A VM Ubuntu foi criada a partir do Vagrantfile conforme foi aprendido no Lab 1, e sua virtualização foi checada pelo acesso ssh:

```
PS C:\Users\rodri\Desktop\COMP_2SEM\CSC05\ubuntu18> vagrant ssh
Welcome to Ubuntu 18.04.5 LTS (GNU/Linux 4.15.0-117-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

  System information as of Thu Oct  8 04:10:31 UTC 2020

  System load:  0.19              Processes:             100
  Usage of /:   2.1% of 48.41GB   Users logged in:       0
  Memory usage: 1%                IP address for enp0s3: 10.0.2.15
  Swap usage:   0%                IP address for enp0s8: 172.16.2.25


0 packages can be updated.
0 updates are security updates.

New release '20.04.1 LTS' available.
Run 'do-release-upgrade' to upgrade to it.


vagrant@controller: $ lscpu
Architecture:        x86_64
CPU op-mode(s):      32-bit, 64-bit
Byte Order:          Little Endian
CPU(s):              2
On-line CPU(s) list: 0,1
Thread(s) per core:  1
Core(s) per socket:  2
Socket(s):           1
NUMA node(s):        1
Vendor ID:           GenuineIntel
CPU family:          6
Model:               142
Model name:          Intel(R) Core(TM) i7-8550U CPU @ 1.80GHz
Stepping:            10
CPU MHz:             1992.001
BogoMIPS:            3984.00
Virtualization:      VT-x
```

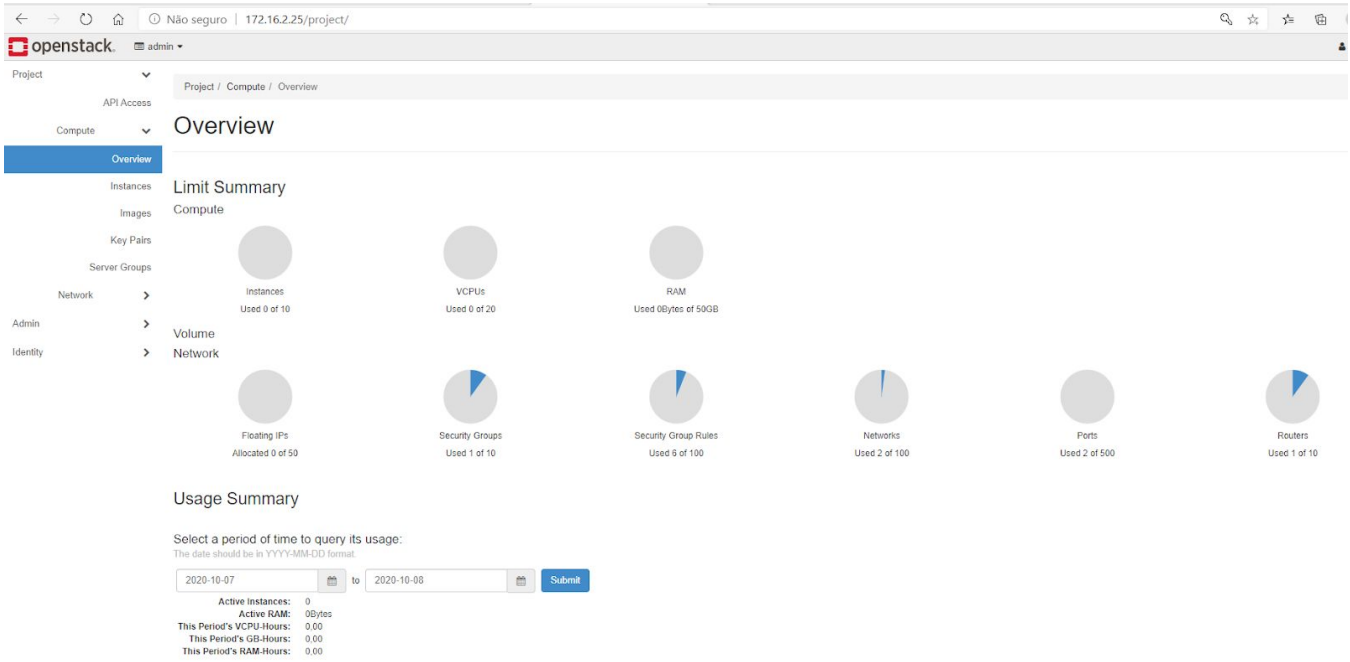
2) Instalação do snapd e microstack:

```
vagrant@controller:~$ sudo apt install snapd
Reading package lists... Done
Building dependency tree
Reading state information... Done
Suggested packages:
  zenity | kdialog
The following packages will be upgraded:
  snapd
1 upgraded, 0 newly installed, 0 to remove and 13 not upgraded.
Need to get 20.1 MB of archives.
After this operation, 1593 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 snapd amd64 2.46.1+18.04 [20.1 MB]
Fetched 20.1 MB in 1min 10s (286 kB/s)
(Reading database ... 59812 files and directories currently installed.)
Preparing to unpack .../snapd_2.46.1+18.04_amd64.deb ...
Unpacking snapd (2.46.1+18.04) over (2.45.1+18.04.2) ...
Setting up snapd (2.46.1+18.04) ...
Installing new version of config file /etc/apparmor.d/usr.lib.snapd.snap-confine.real ...
Installing new version of config file /etc/profile.d/apps-bin-path.sh ...
snapd.failure.service is a disabled or a static unit, not starting it.
snapd.snap-repair.service is a disabled or a static unit, not starting it.
Processing triggers for dbus (1.12.2-1ubuntu1.2) ...
Processing triggers for mime-support (3.60ubuntu1) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
vagrant@controller:~$ sudo snap install microstack --beta --classic
2020-10-08T04:21:42Z INFO Waiting for automatic snapd restart...
microstack (beta) stein from Canonical installed
vagrant@controller:~$
```

3) Iniciar configuração do microstack:

```
vagrant@controller: $ sudo microstack.init
Do you want to setup clustering? (yes/no) [default=no] >
2020-10-08 04:58:22,827 - microstack_init - INFO - Configuring networking ...
2020-10-08 04:58:24,646 - microstack_init - INFO - Setting up ipv4 forwarding...
2020-10-08 04:58:26,979 - microstack_init - INFO - Opening horizon dashboard up to *
2020-10-08 04:58:28,600 - microstack_init - INFO - Waiting for RabbitMQ to start ...
Waiting for 10.20.20.1:5672
2020-10-08 04:58:30,610 - microstack_init - INFO - RabbitMQ started!
2020-10-08 04:58:30,610 - microstack_init - INFO - Configuring RabbitMQ ...
2020-10-08 04:58:35,566 - microstack_init - INFO - RabbitMQ Configured!
2020-10-08 04:58:35,604 - microstack_init - INFO - Waiting for MySQL server to start ...
Waiting for 10.20.20.1:3306
2020-10-08 04:58:35,722 - microstack_init - INFO - Mysql server started! Creating databases ...
/snap/microstack/196/lib/python3.6/site-packages/pymysql/cursors.py:170: Warning: (1007, "Can't create database 'neutron'; database exists")
  result = self._query(query)
/snap/microstack/196/lib/python3.6/site-packages/pymysql/cursors.py:170: Warning: (1287, "Using GRANT statement to modify existing user's proper
l be removed in future release. Use ALTER USER statement for this operation.")
  result = self._query(query)
/snap/microstack/196/lib/python3.6/site-packages/pymysql/cursors.py:170: Warning: (1007, "Can't create database 'nova'; database exists")
  result = self._query(query)
/snap/microstack/196/lib/python3.6/site-packages/pymysql/cursors.py:170: Warning: (1007, "Can't create database 'nova_api'; database exists")
  result = self._query(query)
/snap/microstack/196/lib/python3.6/site-packages/pymysql/cursors.py:170: Warning: (1007, "Can't create database 'nova_cell0'; database exists")
  result = self._query(query)
/snap/microstack/196/lib/python3.6/site-packages/pymysql/cursors.py:170: Warning: (1007, "Can't create database 'cinder'; database exists")
  result = self._query(query)
/snap/microstack/196/lib/python3.6/site-packages/pymysql/cursors.py:170: Warning: (1007, "Can't create database 'glance'; database exists")
  result = self._query(query)
/snap/microstack/196/lib/python3.6/site-packages/pymysql/cursors.py:170: Warning: (1007, "Can't create database 'keystone'; database exists")
  result = self._query(query)
2020-10-08 04:58:36,507 - microstack_init - INFO - Configuring Keystone Fernet Keys ...
2020-10-08 04:58:55,398 - microstack_init - INFO - Bootstrapping Keystone ...
2020-10-08 04:59:03,285 - microstack_init - INFO - Creating service project ...
2020-10-08 04:59:09,432 - microstack_init - INFO - Keystone configured!
2020-10-08 04:59:09,451 - microstack_init - INFO - Configuring nova compute hypervisor ...
2020-10-08 04:59:14,382 - microstack_init - INFO - Configuring nova control plane services ...
Waiting for 10.20.20.1:8774
2020-10-08 05:00:17,756 - microstack_init - INFO - Creating default flavors...
2020-10-08 05:00:37,361 - microstack_init - INFO - Configuring Neutron
Waiting for 10.20.20.1:9696
2020-10-08 05:01:31,847 - microstack_init - INFO - Configuring Glance ...
Waiting for 10.20.20.1:9292
2020-10-08 05:01:55,244 - microstack_init - INFO - Creating security group rules ...
2020-10-08 05:02:01,432 - microstack_init - INFO - restarting libvirt and virtlogd ...
2020-10-08 05:02:01,605 - microstack_init - INFO - Complete. Marked microstack as initialized!
```

4) Acessando o microstack pelo browser:



5) Checando os dados relativos ao hypervisor:

Hypervisor | Compute Host

Displaying 1 item

Hostname	Type	VCPUs (used)	VCPUs (total)	RAM (used)	RAM (total)	Local Storage (used)	Local Storage (total)	Instances
controller	QEMU	0	2	512MB	4,8GB	0Bytes	48GB	0

6) Checando a imagem ‘cirros’ disponível para o admin:

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

7) Configurações de rede:

Name	Subnets Associated	Shared	External	Status	Admin State	Availability Zones	Actions
external	external-subnet 10.20.20.0/24	Não	Sim	Active	UP	nova	Edit Network
test	test-subnet 192.168.222.0/24	Não	Não	Active	UP	nova	Edit Network

8) Configurações do roteador:

Name	Status	External Network	Admin State	Availability Zones	Actions
test-router	Active	external	UP	nova	Clear Gateway

test-router

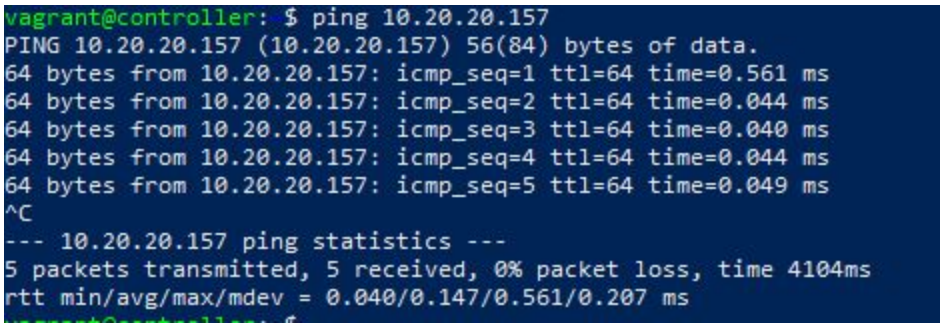
Overview | Interfaces | Static Routes

Name	test-router
ID	3c979573-f7b4-41df-ba9f-3bedbf572eae
Description	
Project ID	e326937710004b51ac0b40c6edaeed0f
Status	Active
Admin State	UP
Availability Zones	• nova

External Gateway

Network Name	external
Network ID	a20ffc96-626f-40fd-9ee7-37b3912c9b5e
External Fixed IPs	• **Subnet ID** 982ff3d0-aab3-46c5-b838-63aa4262294f • **IP Address** 10.20.20.157
SNAT	Enabled

9) Testando conexão com roteador:



Parte 2

1) Obtendo informações por linha de comando:

```
vagrant@controller: $ microstack.openstack image list
+--------------------------------------+--------+--------+
| ID                                   | Name   | Status |
+--------------------------------------+--------+--------+
| 07f86509-a04b-4aac-9540-c0f1bf60bf0a | cirros | active |
+--------------------------------------+--------+--------+
vagrant@controller: $ microstack.openstack network list
+--------------------------------------+----------+--------------------------------------+
| ID                                   | Name     | Subnets                              |
+--------------------------------------+----------+--------------------------------------+
| a20ffc96-626f-40fd-9ee7-37b3912c9b5e | external | 982ff3d0-aab3-46c5-b838-63aa4262294f |
| c4a006d2-6bec-4c93-8445-5aa47094422d | test     | 51bc8877-bdc5-483f-88da-bcb272010114 |
+--------------------------------------+----------+--------------------------------------+
vagrant@controller: $ microstack.openstack flavor list
+----+-----------+-------+------+-----------+-------+-----------+
| ID | Name      |   RAM | Disk | Ephemeral | VCPUs | Is Public |
+----+-----------+-------+------+-----------+-------+-----------+
| 1  | m1.tiny   |   512 |    1 |         0 |     1 | True      |
| 2  | m1.small  |  2048 |   20 |         0 |     1 | True      |
| 3  | m1.medium |  4096 |   20 |         0 |     2 | True      |
| 4  | m1.large  |  8192 |   20 |         0 |     4 | True      |
| 5  | m1.xlarge | 16384 |   20 |         0 |     8 | True      |
+----+-----------+-------+------+-----------+-------+-----------+
```

2) Criando máquina virtual:

```
vagrant@controller: $ microstack.openstack server create --flavor m1.tiny --nic net-id=test --image cirros meu-servidor
+-------------------------------------+----------------------------------------------+
| Field                               | Value                                        |
+-------------------------------------+----------------------------------------------+
| OS-DCF:diskConfig                   | MANUAL                                       |
| OS-EXT-AZ:availability_zone         |                                              |
| OS-EXT-SRV-ATTR:host                | None                                         |
| OS-EXT-SRV-ATTR:hypervisor_hostname | None                                         |
| OS-EXT-SRV-ATTR:instance_name       |                                              |
| OS-EXT-STS:power_state              | NOSTATE                                      |
| OS-EXT-STS:task_state               | scheduling                                   |
| OS-EXT-STS:vm_state                 | building                                     |
| OS-SRV-USG:launched_at              | None                                         |
| OS-SRV-USG:terminated_at            | None                                         |
| accessIPv4                          |                                              |
| accessIPv6                          |                                              |
| addresses                           |                                              |
| adminPass                           | 7YCA8Y8UJbeS                                 |
| config_drive                        |                                              |
| created                             | 2020-10-08T18:16:02Z                         |
| flavor                              | m1.tiny (1)                                  |
| hostId                              |                                              |
| id                                  | 7f498432-dded-4c86-8bd8-10a621e1a4c0         |
| image                               | cirros (07f86509-a04b-4aac-9540-c0f1bf60bf0a) |
| key_name                            | None                                         |
| name                                | meu-servidor                                 |
| progress                            | 0                                            |
| project_id                          | e326937710004b51ac0b40c6edaeed0f             |
| properties                          |                                              |
| security_groups                     | name='default'                               |
| status                              | BUILD                                        |
| updated                             | 2020-10-08T18:16:02Z                         |
| user_id                             | d3b48c603f5040878ca117eeb3b3b095             |
| volumes_attached                    |                                              |
+-------------------------------------+----------------------------------------------+
```

3) Adicionando endereço de IP externo ao meu-servidor:

```
vagrant@controller: $ microstack.openstack floating ip create -f value -c floating_ip_address external
10.20.20.55
vagrant@controller: $ microstack.openstack server add floating ip meu-servidor 10.20.20.55
vagrant@controller: $ microstack.openstack server list
+--------------------------------------+-------------+--------+---------------------------------+--------+---------+
| ID                                   | Name        | Status | Networks                        | Image  | Flavor  |
+--------------------------------------+-------------+--------+---------------------------------+--------+---------+
| 7f498432-dded-4c86-8bd8-10a621e1a4c0 | meu-servidor | ACTIVE | test=192.168.222.65, 10.20.20.55 | cirros | m1.tiny |
+--------------------------------------+-------------+--------+---------------------------------+--------+---------+
vagrant@controller: $
```

4) Fazendo acesso via ssh ao meu-servidor:

```
vagrant@controller: $ ssh cirros@10.20.20.55
The authenticity of host '10.20.20.55 (10.20.20.55)' can't be established.
ECDSA key fingerprint is SHA256:O0YhhwNpJe3UjJQ2ZHOEYxb0DRcfqHdkqimsm21xv/M.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '10.20.20.55' (ECDSA) to the list of known hosts.
cirros@10.20.20.55's password:
$
```

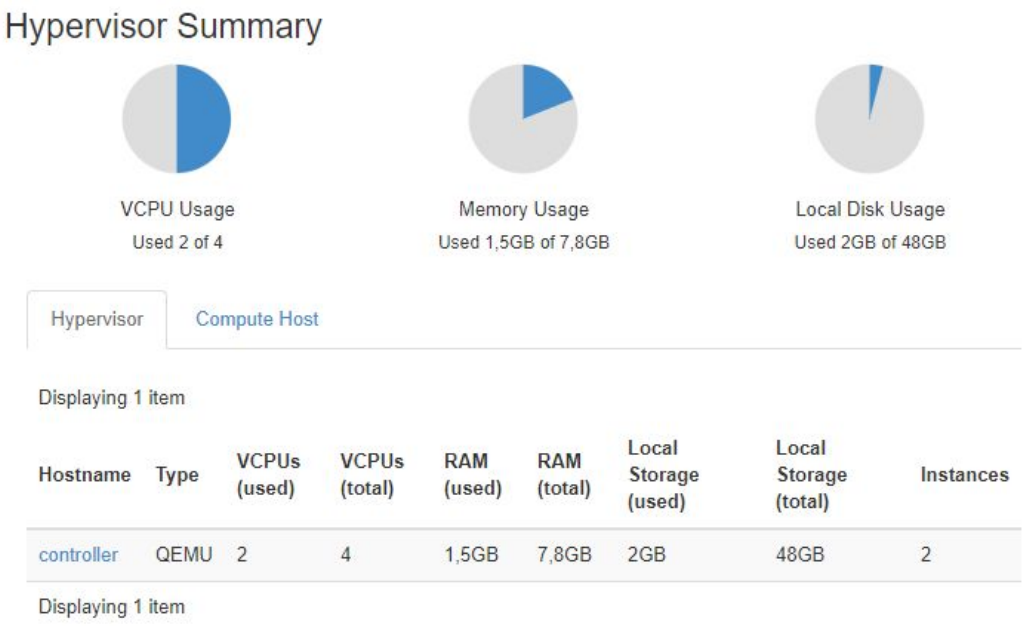
5) Verificando rede interna e conexão com internet:

```
$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue qlen 1
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1450 qdisc pfifo_fast qlen 1000
    link/ether fa:16:3e:2a:40:81 brd ff:ff:ff:ff:ff:ff
    inet 192.168.222.65/24 brd 192.168.222.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::f816:3eff:fe2a:4081/64 scope link
       valid_lft forever preferred_lft forever
$ ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8): 56 data bytes
64 bytes from 8.8.8.8: seq=0 ttl=114 time=386.463 ms
64 bytes from 8.8.8.8: seq=1 ttl=114 time=6.953 ms
^C
--- 8.8.8.8 ping statistics ---
2 packets transmitted, 2 packets received, 0% packet loss
round-trip min/avg/max = 6.953/196.708/386.463 ms
$
```

6) Criamos um novo VM:

```
vagrant@controller: $ microstack.openstack server create --flavor m1.tiny --nic net-id=test --image cirros meu-servidor2
+-------------------------------------+------------------------------------------------+
| Field                               | Value                                          |
+-------------------------------------+------------------------------------------------+
| OS-DCF:diskConfig                   | MANUAL                                         |
| OS-EXT-AZ:availability_zone         |                                                |
| OS-EXT-SRV-ATTR:host                | None                                           |
| OS-EXT-SRV-ATTR:hypervisor_hostname | None                                           |
| OS-EXT-SRV-ATTR:instance_name       |                                                |
| OS-EXT-STS:power_state              | NOSTATE                                        |
| OS-EXT-STS:task_state               | scheduling                                     |
| OS-EXT-STS:vm_state                 | building                                       |
| OS-SRV-USG:launched_at              | None                                           |
| OS-SRV-USG:terminated_at            | None                                           |
| accessIPv4                          |                                                |
| accessIPv6                          |                                                |
| addresses                           |                                                |
| adminPass                           | K6nqY8Myxt2k                                   |
| config_drive                        |                                                |
| created                             | 2020-10-22T03:58:19Z                           |
| flavor                              | m1.tiny (1)                                    |
| hostId                              |                                                |
| id                                  | 87375fed-e811-40d3-a21b-91633b0d6a5b           |
| image                               | cirros (3c31cf56-1d00-49f5-bfa0-c96ce653845a)  |
| key_name                            | None                                           |
| name                                | meu-servidor2                                  |
| progress                            | 0                                              |
| project_id                          | b441c795a04648d492778e1b6d6eeaa0               |
| properties                          |                                                |
| security_groups                     | name='default'                                 |
| status                              | BUILD                                          |
| updated                             | 2020-10-22T03:58:18Z                           |
| user_id                             | b157a01b44a84c2580a05e0d372e7e78               |
| volumes_attached                    |                                                |
+-------------------------------------+------------------------------------------------+
vagrant@controller: $
vagrant@controller: $ microstack.openstack server list
+--------------------------------------+--------------+--------+-----------------------------------+--------+---------+
| ID                                   | Name         | Status | Networks                          | Image  | Flavor  |
+--------------------------------------+--------------+--------+-----------------------------------+--------+---------+
| 87375fed-e811-40d3-a21b-91633b0d6a5b | meu-servidor2 | ACTIVE | test=192.168.222.3                | cirros | m1.tiny |
| beda9f9c-b71b-4420-a580-cb609cfdbc38 | meu-servidor  | ACTIVE | test=192.168.222.22, 10.20.20.17  | cirros | m1.tiny |
+--------------------------------------+--------------+--------+-----------------------------------+--------+---------+
```

☐	Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Time since created	Actions
☐	meu-servidor2	cirros	192.168.222.3	m1.tiny	-	Active	nova	None	Running	6 minutos	Create Snapshot
☐	meu-servidor	cirros	192.168.222.22 Floating IPs: 10.20.20.17	m1.tiny	-	Active	nova	None	Running	13 minutos	Create Snapshot



7) Através da máquina meu-servidor, é possível acessar a meu-servidor2 por conexão ssh

```
vagrant@controller: $ microstack.openstack server list
+--------------------------------------+--------------+--------+----------------------------------+--------+--------
| ID                                   | Name         | Status | Networks                         | Image  | Flavor
+--------------------------------------+--------------+--------+----------------------------------+--------+--------
| 87375fed-e811-40d3-a21b-91633b0d6a5b | meu-servidor2 | ACTIVE | test=192.168.222.3               | cirros | m1.tiny
| beda9f9c-b71b-4420-a580-cb609cfdbc38 | meu-servidor  | ACTIVE | test=192.168.222.22, 10.20.20.17 | cirros | m1.tiny
+--------------------------------------+--------------+--------+----------------------------------+--------+--------
vagrant@controller: $ ssh cirros@10.20.20.17
cirros@10.20.20.17's password:
$ ping 192.168.222.3
PING 192.168.222.3 (192.168.222.3): 56 data bytes
64 bytes from 192.168.222.3: seq=0 ttl=64 time=0.597 ms
64 bytes from 192.168.222.3: seq=1 ttl=64 time=0.412 ms
^C
--- 192.168.222.3 ping statistics ---
2 packets transmitted, 2 packets received, 0% packet loss
round-trip min/avg/max = 0.412/0.504/0.597 ms
$ ssh cirros@192.168.222.3

Host '192.168.222.3' is not in the trusted hosts file.
(ecdsa-sha2-nistp521 fingerprint md5 4f:95:8e:69:a3:fb:bb:67:0a:be:c4:5e:74:8d:71:7f)
Do you want to continue connecting? (y/n) y
cirros@192.168.222.3's password:
$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue qlen 1
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1450 qdisc pfifo_fast qlen 1000
    link/ether fa:16:3e:81:ad:3c brd ff:ff:ff:ff:ff:ff
    inet 192.168.222.3/24 brd 192.168.222.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::f816:3eff:fe81:ad3c/64 scope link
       valid_lft forever preferred_lft forever
$
```

8) Fazendo download da imagem ubuntu-18.04:

```
vagrant@controller: $ wget https://cloud-images.ubuntu.com/minimal/releases/bionic/release-20180705/ubuntu-18.04-minimal
-cloudimg-amd64.img
--2020-10-22 04:34:41--  https://cloud-images.ubuntu.com/minimal/releases/bionic/release-20180705/ubuntu-18.04-minimal-c
loudimg-amd64.img
Resolving cloud-images.ubuntu.com (cloud-images.ubuntu.com)... 91.189.88.89, 2001:67c:1560:8001::8001
Connecting to cloud-images.ubuntu.com (cloud-images.ubuntu.com)|91.189.88.89|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 165019648 (157M)
Saving to: ‘ubuntu-18.04-minimal-cloudimg-amd64.img’

ubuntu-18.04-minimal-cloudimg 100%[=============================================>] 157.38M  9.90MB/s    in 19s

2020-10-22 04:35:02 (8.08 MB/s) - ‘ubuntu-18.04-minimal-cloudimg-amd64.img’ saved [165019648/165019648]

vagrant@controller: $ ls
snap  ubuntu-18.04-minimal-cloudimg-amd64.img
vagrant@controller: $ microstack.openstack image create --public --disk-format qcow2 --container-format bare --file ubun
tu-18.04-minimal-cloudimg-amd64.img ubuntu-18.04
+------------------+------------------------------------------------------------------------------------------------------
------------------------------------------------------------------------------+
| Field            | Value
                                                                                |
+------------------+------------------------------------------------------------------------------------------------------
------------------------------------------------------------------------------+
| checksum         | 98ed437cfbf2c938588ab9e2d4067820
                                                                                |
| container_format | bare
                                                                                |
| created_at       | 2020-10-22T04:38:37Z
                                                                                |
| disk_format      | qcow2
                                                                                |
| file             | /v2/images/229faa8d-0658-4f96-af26-c4a640f1e556/file
                                                                                |
| id               | 229faa8d-0658-4f96-af26-c4a640f1e556
                                                                                |
| min_disk         | 0
                                                                                |
| min_ram          | 0
                                                                                |
| name             | ubuntu-18.04
                                                                                |
| owner            | b441c795a04648d492778e1b6d6eeaa0
                                                                                |
| properties       | os_hash_algo='sha512', os_hash_value='07408b808808316560aa5a4e87d3c10ace1bccb5d3e12e91a0b87dcc3e8e3
8bbf59c32875dfcddac6faf56bf0a219ce6099986d2a8e08ef4e38557954b21d92d', os_hidden='False' |
| protected        | False
                                                                                |
| schema           | /v2/schemas/image
                                                                                |
| size             | 165019648
                                                                                |
| status           | active
                                                                                |
| tags             |
                                                                                |
| updated_at       | 2020-10-22T04:38:38Z
                                                                                |
| virtual_size     | None
                                                                                |
| visibility       | public
                                                                                |
+------------------+------------------------------------------------------------------------------------------------------
------------------------------------------------------------------------------+
```

Displaying 2 items

		Owner	Name ▲	Type	Status	Visibility	Protected	
☐	›	admin	cirros	Image	Active	Public	No	Launch ▾
☐	›	admin	ubuntu-18.04	Image	Active	Public	No	Launch ▾

9) Iniciando instancia ubuntu e adicionando FloatingIP:

Instances

Instance ID = | Filter | Launch Instance | Delete Instances | More Actions

Displaying 3 items

Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Time since created	Actions
meu-servidor 3	ubuntu-18.04	192.168.222.19	m1.small	teste	Active	nova	None	Running	0 minuto	Create Snapshot

Floating IPs

Floating IP Address = | Filter | Allocate IP To Project | Release Floating IPs

Displaying 2 items

IP Address	Description	Mapped Fixed IP Address	Pool	Status	Actions
10.20.20.17		meu-servidor 192.168.222.22	external	Active	Disassociate
10.20.20.2	segundo ip	meu-servidor3 192.168.222.19	external	Active	Disassociate

10) Por fim, conecta-se na instância do ubuntu: