

Tecnologías Específicas de la Ingeniería Informática - Curso 2021/2022

Ejemplos de Cloud Computing con Openstack

Grado Ingeniería Informática

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1.1 *Instalación de las herramientas de cliente de Openstack*

```
sudo apt-get install python-novaclient
```

```
sudo apt-get install python-glanceclient
```

```
sudo apt-get install python-keystoneclient
```

```
sudo apt-get install python-neutronclient
```

```
sudo apt-get install python-cinderclient
```

Establecer variables de entorno *openrc.sh*

```
export OS_TENANT_NAME=TTTT
```

```
export OS_USERNAME=XXXX
```

```
export OS_PASSWORD=YYYY
```

```
export OS_AUTH_URL=http://controller:5000/v2.0
```

```
source openrc.sh
```

Añadir la IP del controller al fichero /etc/hosts

```
WW.XX.YY.ZZ controller
```

1.2 Comandos iniciales Openstack

Ayuda

```
nova --help
```

Listar todas las VMs del sistema

```
nova list
```

```
$ nova list
+-----+-----+-----+-----+
| ID              | Name      | Status | Networks |
+-----+-----+-----+-----+
| c41f3074-c82a-4837-8673-fa7e9fea7e11 | myInstance | SHUTOFF | private=10.0.0.3 |
+-----+-----+-----+-----+
```

listar las imágenes disponibles, tamaño, formato, estado

```
nova image-list
```

```
glance image-list
```

```
$ nova image-list
+-----+-----+-----+-----+
| ID              | Name                                             | Status | Server |
+-----+-----+-----+-----+
| 657ebb01-6fae-47dc-986a-e49c4dd8c433 | cirros-0.3.2-x86_64-uec                       | ACTIVE |        |
| 72074c6d-bf52-4a56-a61c-02a17bf3819b | cirros-0.3.2-x86_64-uec-kernel                 | ACTIVE |        |
| 3c5e5f06-637b-413e-90f6-ca7ed015ec9e | cirros-0.3.2-x86_64-uec-ramdisk                 | ACTIVE |        |
| f30b204e-1ce6-40e7-b8d9-b353d4d84e7d | myInstanceSnapshot                             | ACTIVE |        |
+-----+-----+-----+-----+
```

Listar las extensiones de red disponibles

neutron ext-list

```
george@DESKTOP-PQAMA1S:~$ neutron ext-list
```

alias	name
security-group	security-group
l3_agent_scheduler	L3 Agent Scheduler
ext-gw-mode	Neutron L3 Configurable external gateway mode
binding	Port Binding
provider	Provider Network
agent	agent
quotas	Quota management support
dhcp_agent_scheduler	DHCP Agent Scheduler
l3-ha	HA Router extension
multi-provider	Multi Provider Network
external-net	Neutron external network
router	Neutron L3 Router
allowed-address-pairs	Allowed Address Pairs
extraroute	Neutron Extra Route
extra_dhcp_opt	Neutron Extra DHCP opts
dvr	Distributed Virtual Router

Pausar una instancia, *unpause*

nova pause INSTANCE_NAME

Reiniciar una instancia “suspended”

nova resume INSTANCE_NAME

Apagar y reinicia la máquina (opción --hard)

nova reboot SERVER

Eliminar la instancia

nova delete newServer

1.3 Creación de redes

Para permitir la conectividad de red a nuestra instancia, necesitamos definir:

- Crear una red interna donde se adjuntarán instancias

```
neutron net-create redprueba
```

Crear la subred

```
neutron subnet-create redprueba --name redprueba_subred --dns-nameserver 8.8.4.4 --gateway 192.168.50.1 192.168.50.0/24
```

- Crear un enrutador para conectar la red externa con la interna

```
neutron router-create redprueba_router
```

Mostrar los routers

```
neutron router-list
```

Añadir una interfaz que conecta la subred al router

```
neutron router-interface-add redprueba_router redprueba_subred
```

Añadir la red externa al router que hemos creado

```
neutron router-gateway-set redprueba_router ext-net
```

Mostrar redes

```
neutron net-list
```

Project

Compute

Network

Network Topology

Networks

Routers

Orchestration

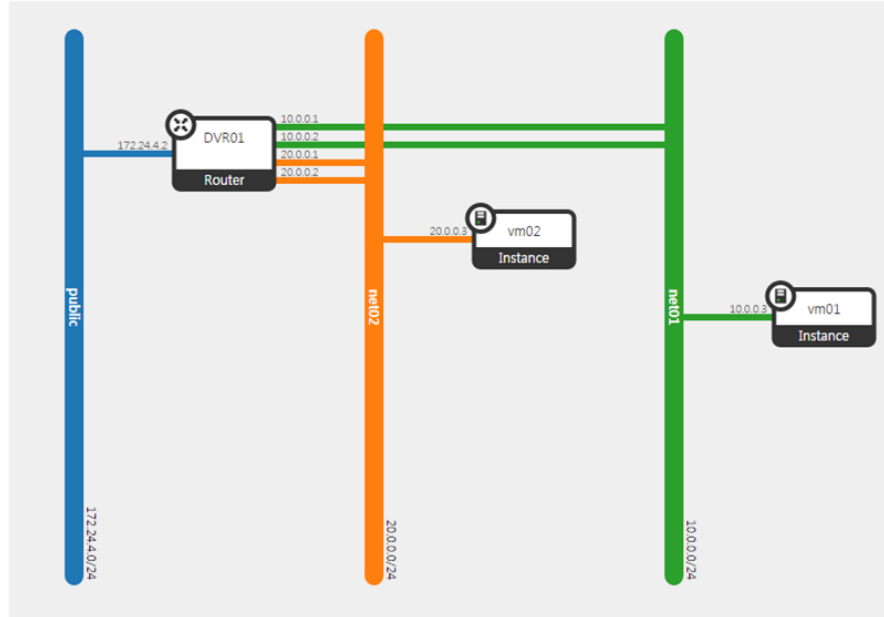
Admin

Identity

Network Topology

Small

Normal



1.4 Gestión de instancias (VMs)

```
nova flavor-list
```

```
george@DESKTOP-PQAMA1S:~$ nova flavor-list
```

ID	Name	Memory_MB	Disk	Ephemeral	Swap	VCPUs	RXTX_Factor	Is_Public
1	m1.tiny	512	1	0		1	1.0	True
2	m1.small	2048	20	0		1	1.0	True
3	m1.medium	4096	40	0		2	1.0	True
4	m1.large	8192	80	0		4	1.0	True
5	m1.xlarge	16384	160	0		8	1.0	True

Lanzar la VM

```
nova boot --flavor m1.tiny --image cirros-0.3.3-x86_64 --nic net-id=416a62fb-454a-4f6e-a469-3ff34c72c2c3 --security-group default testVM1
```

(el id de la red se toma *de \$netutron net-list*)

parar la VM

```
$ nova stop myInstance
```

Hacer un snapshot

```
$ nova image-create --poll myInstance myInstanceSnapshot
```

Descargar el snapshot como imagen (se le pasa el `imageId` que se obtiene del comando `$ nova image-list`)

```
glance image-download --file snapshot.raw f30b204e-1ce6-40e7-b8d9-b353d4d84e7d
```

Importar una imagen en glance

```
glance --os-image-api-version 1 image-create \ --container-format bare --disk-format qcow2 --copy-from IMAGE_URL
```

1.5 Conectar a la máquina virtual

1.5.1 Acceso mediante SSH

Dar permiso de acceso al Puerto 22 de SSH para poder acceder desde el exterior a la VM

```
nova secgroup-add-rule default tcp 22 22 0.0.0.0/0
```

Asociar floating Ips públicas a la red externa, que se asignarán a las VMs:

Creamos las floating ip al proyecto, tomando la floating-ip del pool de Ips *ext-net*

```
neutron floatingip-create ext-net
```

```
nova floating-ip-list
```

```
$ nova floating-ip-list
+-----+-----+-----+-----+
| Ip           | Instance Id           | Fixed Ip | Pool   |
+-----+-----+-----+-----+
| 172.24.4.225 | 4a60ff6a-7a3c-49d7-9515-86ae501044c6 | 10.0.0.2 | public |
| 172.24.4.226 | None                   | None     | public |
+-----+-----+-----+-----+
```

Asociamos a la instancia la floating IP

```
nova floating-ip-associate testVM1 xx.xx.xx.xx
```

Conectar por SSH

```
ssh cirros@xx.xx.xx.xx
```

cubswin:)

Nótese que la mayoría de las distribuciones linux no tienen por defecto en la imagen el usuario ya creado y por lo tanto se accede mediante claves RSA.

Openstack inyecta a la VM recién creada una clave publica RSA que nos debemos haber creado con *ssh-keygen*. Esa clave publica la damos de alta en openstack para que openstack la pueda inyectar en la VM

```
nova keypair-add --pub-key clave.pub mykeyname
```

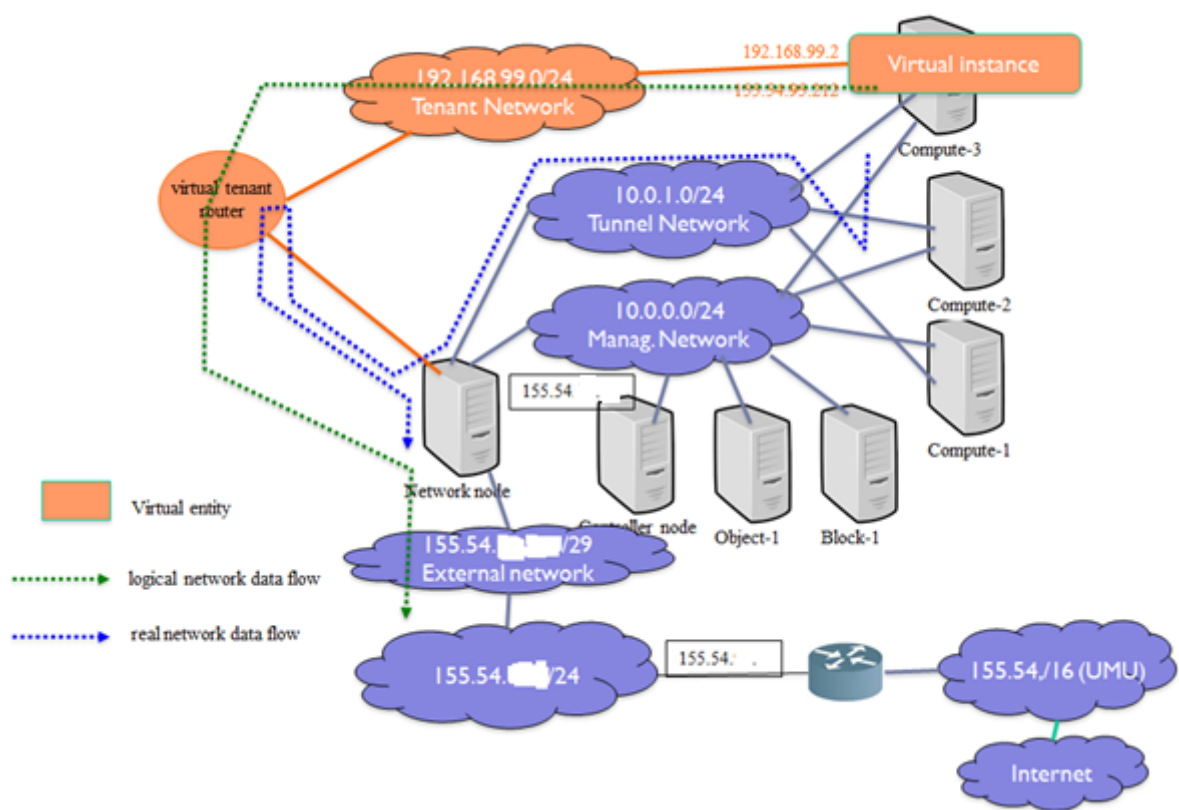
Cuando vamos a lanzar la imagen con nova-boot debemos proporcionar el nombre de la clave

```
nova-boot --key-name mykeyname
```

1.5.2 Acceso por VNC

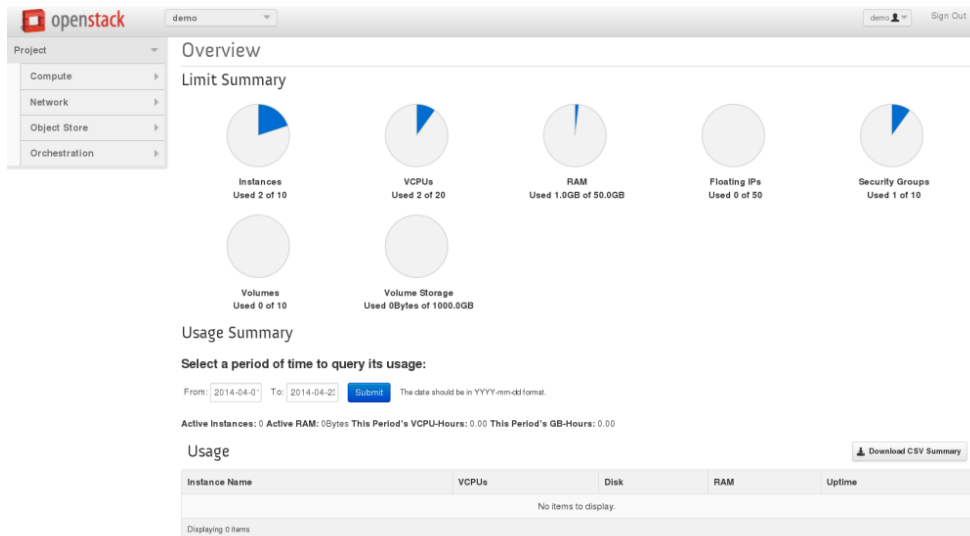
```
nova get-vnc-console demo-instance2 novnc
```

```
george@DESKTOP-PQAMA1S:~$ nova get-vnc-console demo-instance2 novnc
+-----+-----+
| Type | Url |
+-----+-----+
| novnc | http://controller:6080/vnc_auto.html?token=42edf025-a69e-4e96-9672-cc776d7b018a |
+-----+-----+
```

1.6 Horizon Dashboard

http://XX.XX.XX.XX:80/horizon



The screenshot shows the OpenStack Horizon 'Instances & Volumes' page. The top navigation bar includes the OpenStack logo, a 'demo' dropdown, and a 'Sign Out' button. The left sidebar lists navigation options: Project, Manage Compute, Overview, Instances & Volumes, Images & Snapshots, and Access & Security. The main content area is titled 'Instances & Volumes' and shows the user is logged in as 'user2'. It features two sections: 'Instances' and 'Volumes'. The 'Instances' section has a 'Launch Instance' button and a 'Terminate Instances' button. It displays a table with columns: Instance Name, IP Address, Size, Status, Task, Power State, and Actions. The table shows one instance named 'cirros-test2' with IP addresses 172.16.1.3 and 192.168.39.21, size 512MB RAM | 1 VCPU | 0 Disk, status Active, task None, and power state Shutoff. The 'Volumes' section has a 'Create Volume' button and a 'Delete Volumes' button. It displays a table with columns: Name, Description, Size, Status, Attachments, and Actions. The table shows one volume named 'nova-vol2' with description '2nd volume', size 2 GB, status In-Use, and attachment 'Instance 8fc57e90-9b2c-4c04-a2fe-c69c1e47d9d7 (vda)'. Both sections indicate 'Displaying 1 item'.

Instance Name	IP Address	Size	Status	Task	Power State	Actions
<input type="checkbox"/> cirros-test2	172.16.1.3 192.168.39.21	512MB RAM 1 VCPU 0 Disk	Active	None	Shutoff	Edit Instance

Displaying 1 item

Name	Description	Size	Status	Attachments	Actions
<input type="checkbox"/> nova-vol2	2nd volume	2 GB	In-Use	Instance 8fc57e90-9b2c-4c04-a2fe-c69c1e47d9d7 (vda)	Edit Attachments

Displaying 1 item