OpenStack Labs

Lab 09: Customizing Instances

Contents

Introduction

In this lab, you will use the `cloud-init` utility to customize OpenStack instances.

Objectives

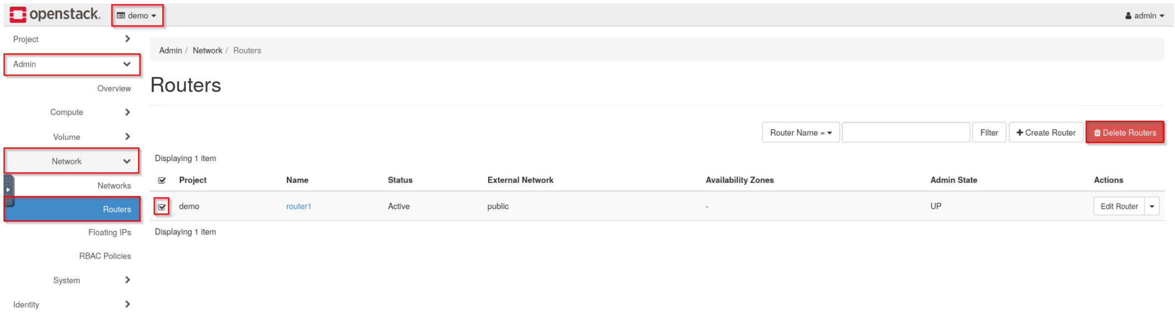
- Customize an instance with `cloud-init`.
- Verify instance customization.

1 Creating Customized Instances

In this task, you will customize two instances using `cloud-init` capabilities and features. You will log into the first instance to confirm `cloud-init` is up and running.

1. Open the web browser and navigate to **192.168.1.20**. Log into the dashboard as **admin** with the password **secret**.

2. Switch to the **demo** project. Navigate to **Admin**→**Network**→**Routers**. Check the box in the same row as **router1**, then click **Delete Routers**.



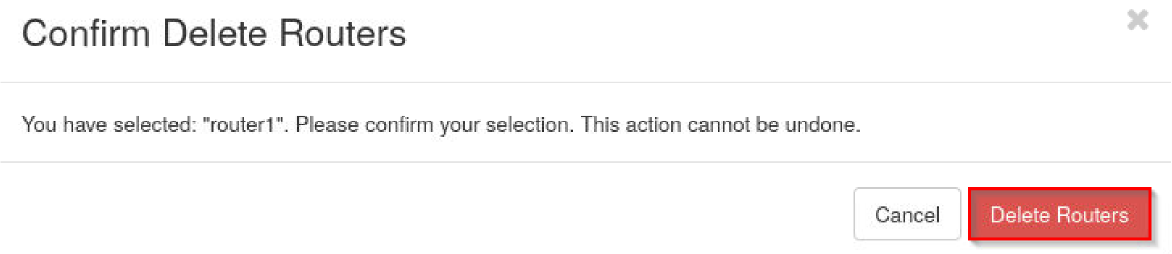
Routers

Displaying 1 item

☑	Project	Name	Status	External Network	Availability Zones	Admin State	Actions
☑	demo	router1	Active	public	-	UP	Edit Router

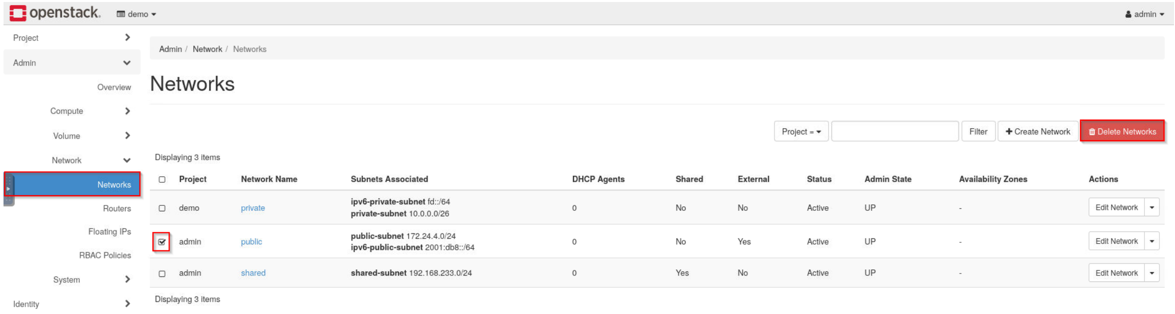
Displaying 1 item

3. In the *Confirm Delete Routers* dialog box that pops up, click **Delete Routers**.


Confirm Delete Routers

You have selected: "router1". Please confirm your selection. This action cannot be undone.

4. Now, navigate to **Networks**. Check the box in the same row as **public**, then click **Delete Networks**.



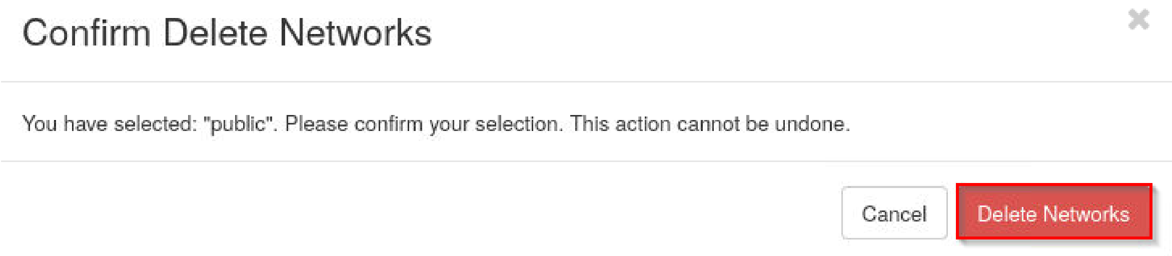
Networks

Displaying 3 items

□	Project	Network Name	Subnets Associated	DHCP Agents	Shared	External	Status	Admin State	Availability Zones	Actions
□	demo	private	**ipv6-private-subnet** fd::/64 **private-subnet** 10.0.0.0/26	0	No	No	Active	UP	-	Edit Network
☑	admin	public	**public-subnet** 172.24.4.0/24 **ipv6-public-subnet** 2001:db8::/64	0	No	Yes	Active	UP	-	Edit Network
□	admin	shared	**shared-subnet** 192.168.233.0/24	0	Yes	No	Active	UP	-	Edit Network

Displaying 3 items

5. In the *Confirm Delete Networks* dialog box that pops up, click **Delete Networks**.

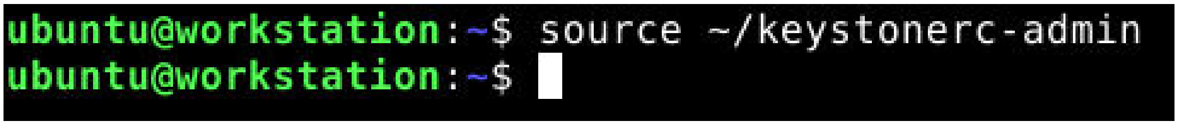


Confirm Delete Networks

You have selected: "public". Please confirm your selection. This action cannot be undone.

6. Leave the web browser open and open a terminal window. Source the keystone credentials for the **admin** user.

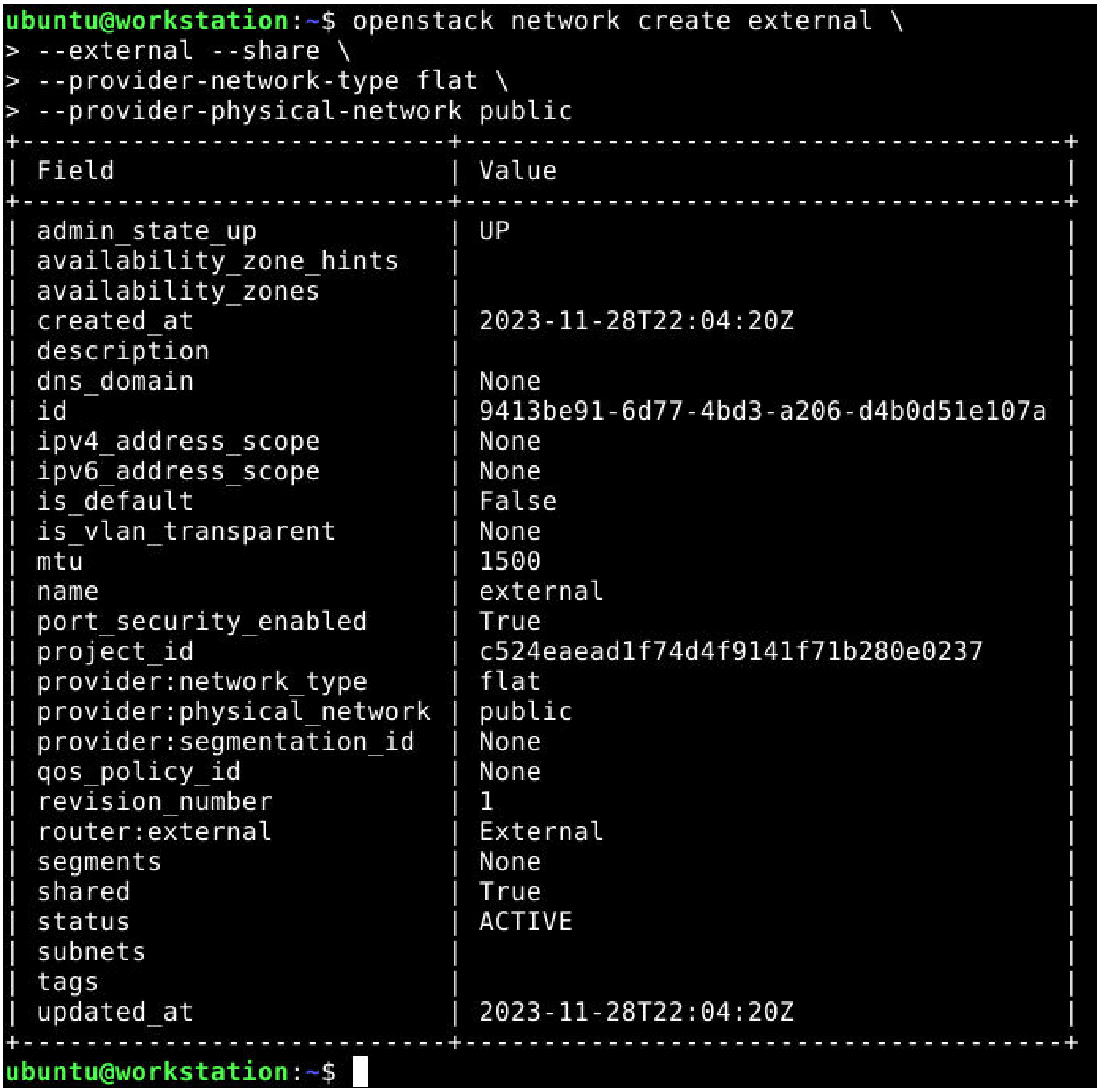
```
ubuntu@workstation:~$ source ~/keystonerc-admin
```



```
ubuntu@workstation:~$ source ~/keystonerc-admin
ubuntu@workstation:~$
```

7. A few resources need to be created to help with customizing the instances. First, create an external network named **external**. Set the network type to **flat** and the physical network to **public**. Set the network as shared and external.

```
ubuntu@workstation:~$ openstack network create external \
> --external --share \
> --provider-network-type flat \
> --provider-physical-network public
```



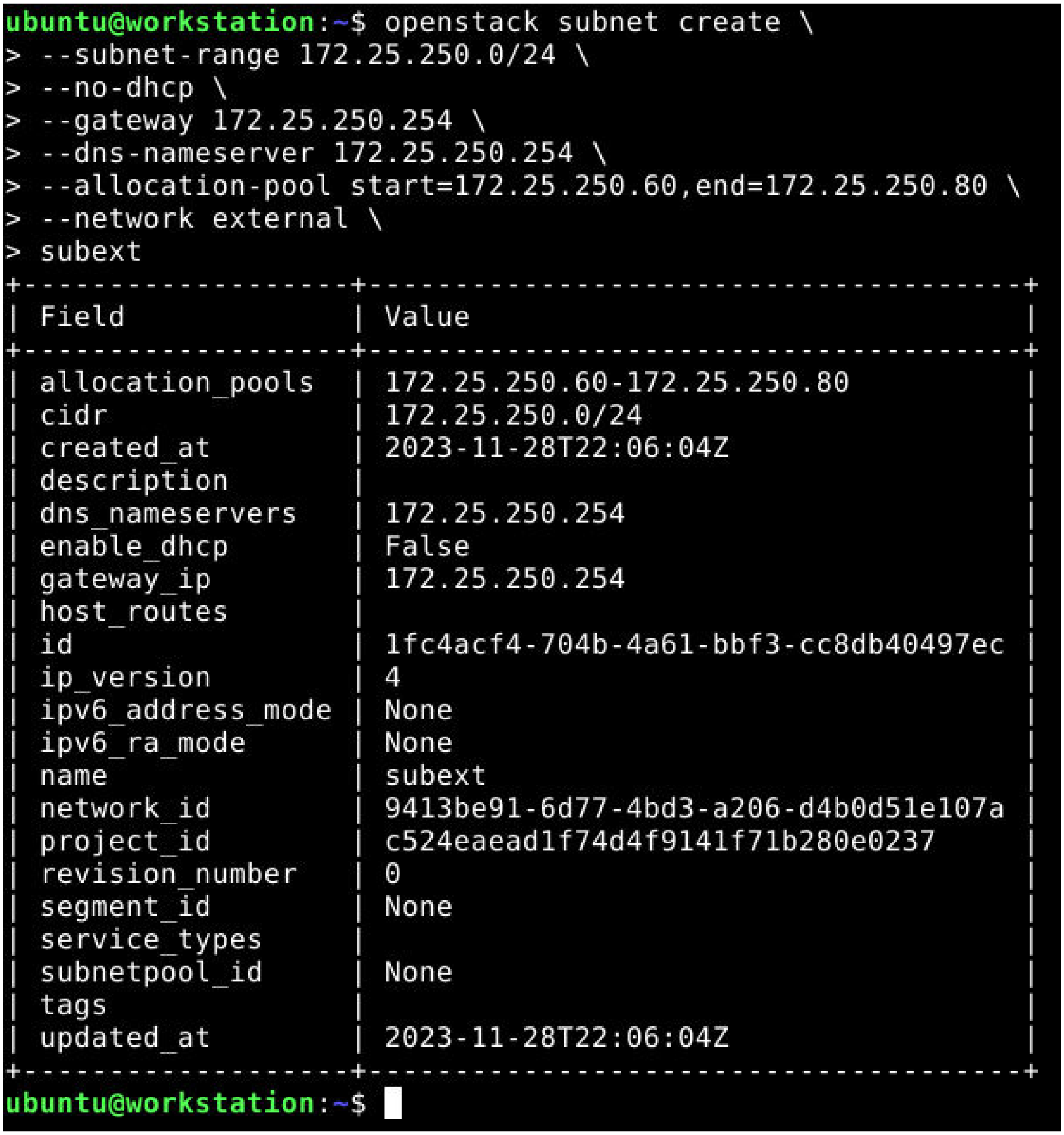
```
ubuntu@workstation:~$ openstack network create external \
> --external --share \
> --provider-network-type flat \
> --provider-physical-network public
+---------------------------+--------------------------------------+
| Field                     | Value                                |
+---------------------------+--------------------------------------+
| admin_state_up            | UP                                   |
| availability_zone_hints   |                                      |
| availability_zones        |                                      |
| created_at                | 2023-11-28T22:04:20Z                 |
| description               |                                      |
| dns_domain                | None                                 |
| id                        | 9413be91-6d77-4bd3-a206-d4b0d51e107a |
| ipv4_address_scope        | None                                 |
| ipv6_address_scope        | None                                 |
| is_default                | False                                |
| is_vlan_transparent       | None                                 |
| mtu                       | 1500                                 |
| name                      | external                             |
| port_security_enabled     | True                                 |
| project_id                | c524eaead1f74d4f9141f71b280e0237     |
| provider:network_type     | flat                                 |
| provider:physical_network | public                               |
| provider:segmentation_id  | None                                 |
| qos_policy_id             | None                                 |
| revision_number           | 1                                    |
| router:external           | External                             |
| segments                  | None                                 |
| shared                    | True                                 |
| status                    | ACTIVE                               |
| subnets                   |                                      |
| tags                      |                                      |
| updated_at                | 2023-11-28T22:04:20Z                 |
+---------------------------+--------------------------------------+
ubuntu@workstation:~$
```

Tip

WHen typing the command, make sure there is a space between `external` and the \ character, and press **Enter** to get the > and continue typing the rest of the command.

8. Create a subnet named **subext** in the **external** network. Give the subnet a range of **172.25.250.60** to **172.25.250.80**. Disable DHCP services for the subnet and use the address **172.25.250.254** as the gateway as well as the DNS name server.

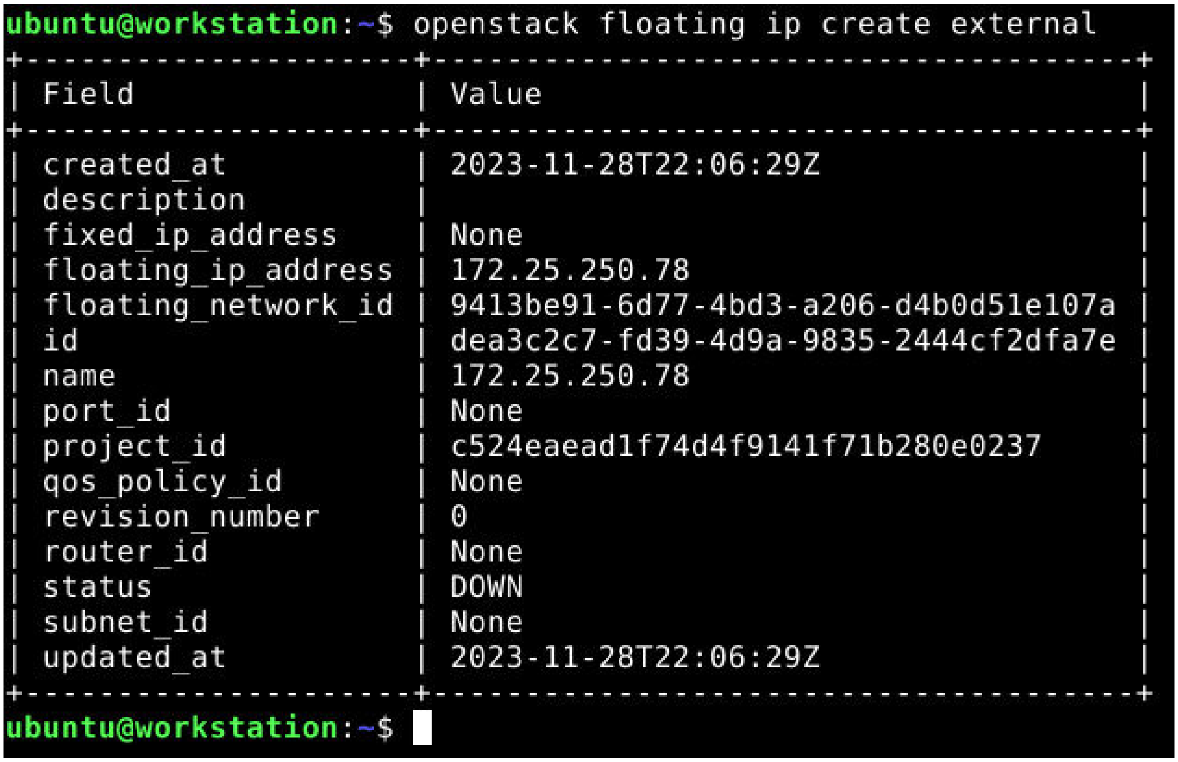
```
ubuntu@workstation:~$ openstack subnet create \
> --subnet-range 172.25.250.0/24 \
> --no-dhcp \
> --gateway 172.25.250.254 \
> --dns-nameserver 172.25.250.254 \
> --allocation-pool start=172.25.250.60,end=172.25.250.80 \
> --network external \
> subext
```



```
ubuntu@workstation:~$ openstack subnet create \
> --subnet-range 172.25.250.0/24 \
> --no-dhcp \
> --gateway 172.25.250.254 \
> --dns-nameserver 172.25.250.254 \
> --allocation-pool start=172.25.250.60,end=172.25.250.80 \
> --network external \
> subext
+-------------------+--------------------------------------+
| Field             | Value                                |
+-------------------+--------------------------------------+
| allocation_pools  | 172.25.250.60-172.25.250.80          |
| cidr              | 172.25.250.0/24                      |
| created_at        | 2023-11-28T22:06:04Z                 |
| description       |                                      |
| dns_nameservers   | 172.25.250.254                       |
| enable_dhcp       | False                                |
| gateway_ip        | 172.25.250.254                       |
| host_routes       |                                      |
| id                | 1fc4acf4-704b-4a61-bbf3-cc8db40497ec |
| ip_version        | 4                                    |
| ipv6_address_mode | None                                 |
| ipv6_ra_mode      | None                                 |
| name              | subext                               |
| network_id        | 9413be91-6d77-4bd3-a206-d4b0d51e107a |
| project_id        | c524eaead1f74d4f9141f71b280e0237     |
| revision_number   | 0                                    |
| segment_id        | None                                 |
| service_types     |                                      |
| subnetpool_id     | None                                 |
| tags              |                                      |
| updated_at        | 2023-11-28T22:06:04Z                 |
+-------------------+--------------------------------------+
ubuntu@workstation:~$
```

9. From the floating IP pool in the **external** network, create a floating IP.

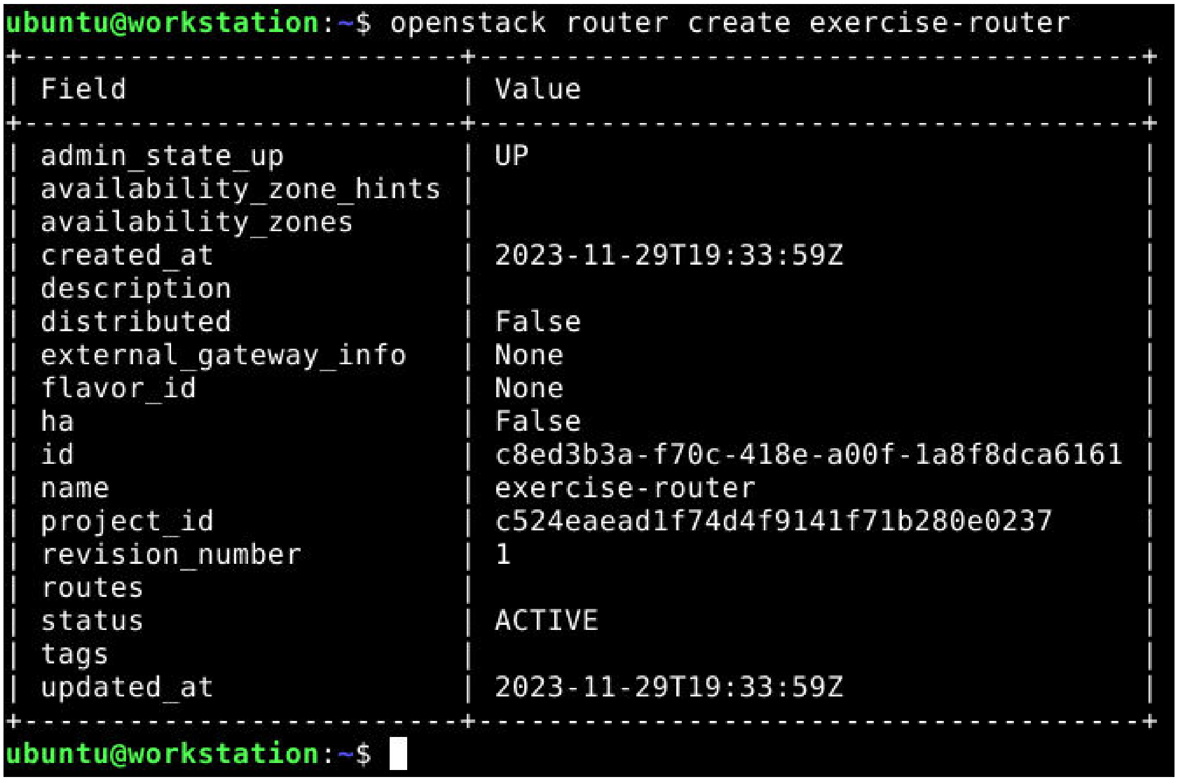
```
ubuntu@workstation:~$ openstack floating ip create external
```



```
ubuntu@workstation:~$ openstack floating ip create external
+---------------------+--------------------------------------+
| Field               | Value                                |
+---------------------+--------------------------------------+
| created_at          | 2023-11-28T22:06:29Z                 |
| description         |                                      |
| fixed_ip_address    | None                                 |
| floating_ip_address | 172.25.250.78                        |
| floating_network_id | 9413be91-6d77-4bd3-a206-d4b0d51e107a |
| id                  | dea3c2c7-fd39-4d9a-9835-2444cf2dfa7e |
| name                | 172.25.250.78                        |
| port_id             | None                                 |
| project_id          | c524eaead1f74d4f9141f71b280e0237     |
| qos_policy_id       | None                                 |
| revision_number     | 0                                    |
| router_id           | None                                 |
| status              | DOWN                                 |
| subnet_id           | None                                 |
| updated_at          | 2023-11-28T22:06:29Z                 |
+---------------------+--------------------------------------+
ubuntu@workstation:~$ 
```

10. Create a router named **exercise-router**.

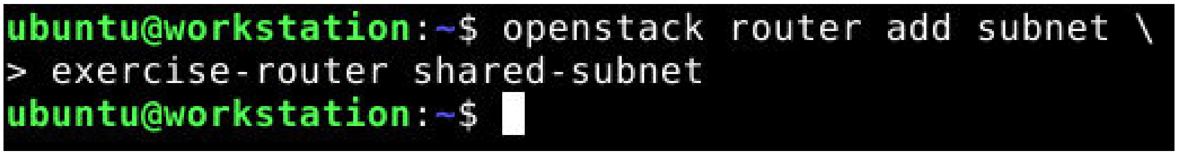
```
ubuntu@workstation:~$ openstack router create exercise-router
```



```
ubuntu@workstation:~$ openstack router create exercise-router
+-------------------------+--------------------------------------+
| Field                   | Value                                |
+-------------------------+--------------------------------------+
| admin_state_up          | UP                                   |
| availability_zone_hints |                                      |
| availability_zones      |                                      |
| created_at              | 2023-11-29T19:33:59Z                 |
| description             |                                      |
| distributed             | False                                |
| external_gateway_info   | None                                 |
| flavor_id               | None                                 |
| ha                      | False                                |
| id                      | c8ed3b3a-f70c-418e-a00f-1a8f8dca6161 |
| name                    | exercise-router                      |
| project_id              | c524eaead1f74d4f9141f71b280e0237     |
| revision_number         | 1                                    |
| routes                  |                                      |
| status                  | ACTIVE                               |
| tags                    |                                      |
| updated_at              | 2023-11-29T19:33:59Z                 |
+-------------------------+--------------------------------------+
ubuntu@workstation:~$ 
```

11. Connect the router to the **shared-subnet** subnet.

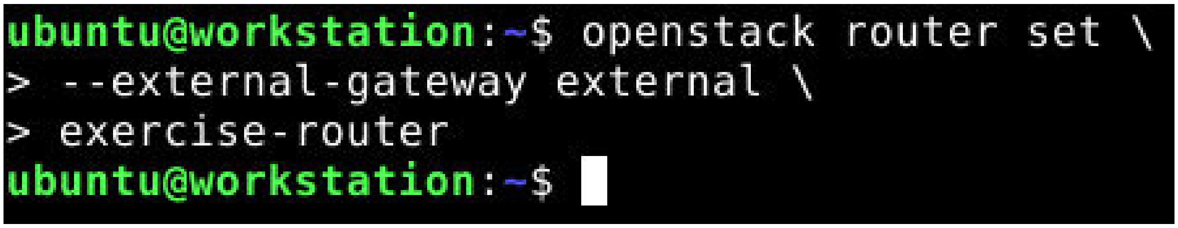
```
ubuntu@workstation:~$ openstack router add subnet \
> exercise-router shared-subnet
```



```
ubuntu@workstation:~$ openstack router add subnet \
> exercise-router shared-subnet
ubuntu@workstation:~$
```

12. Set the **external** network as the gateway for the router.

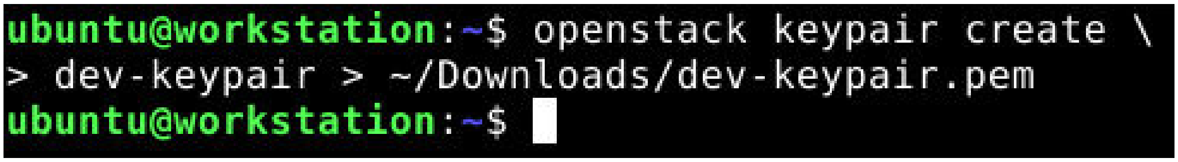
```
ubuntu@workstation:~$ openstack router set \
> --external-gateway external \
> exercise-router
```



```
ubuntu@workstation:~$ openstack router set \
> --external-gateway external \
> exercise-router
ubuntu@workstation:~$
```

13. Create the key pair **dev-keypair** and save the private key to the file **~/Downloads/dev-keypair.pem**.

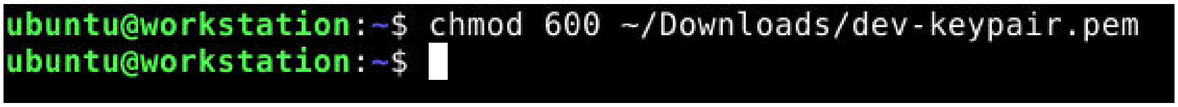
```
ubuntu@workstation:~$ openstack keypair create \
> dev-keypair > ~/Downloads/dev-keypair.pem
```



```
ubuntu@workstation:~$ openstack keypair create \
> dev-keypair > ~/Downloads/dev-keypair.pem
ubuntu@workstation:~$
```

14. the `chmod` command with a mode of **600** to make it so that the **ubuntu** user has read/write permissions on the file, and groups and other users have no permissions to the file.

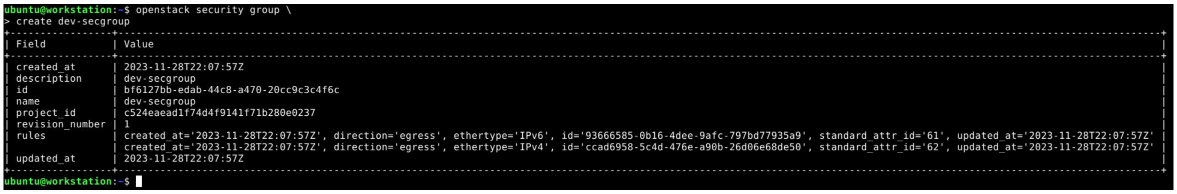
```
ubuntu@workstation:~$ chmod 600 ~/Downloads/dev-keypair.pem
```



```
ubuntu@workstation:~$ chmod 600 ~/Downloads/dev-keypair.pem
ubuntu@workstation:~$
```

15. Create the **dev-secgroup** security group.

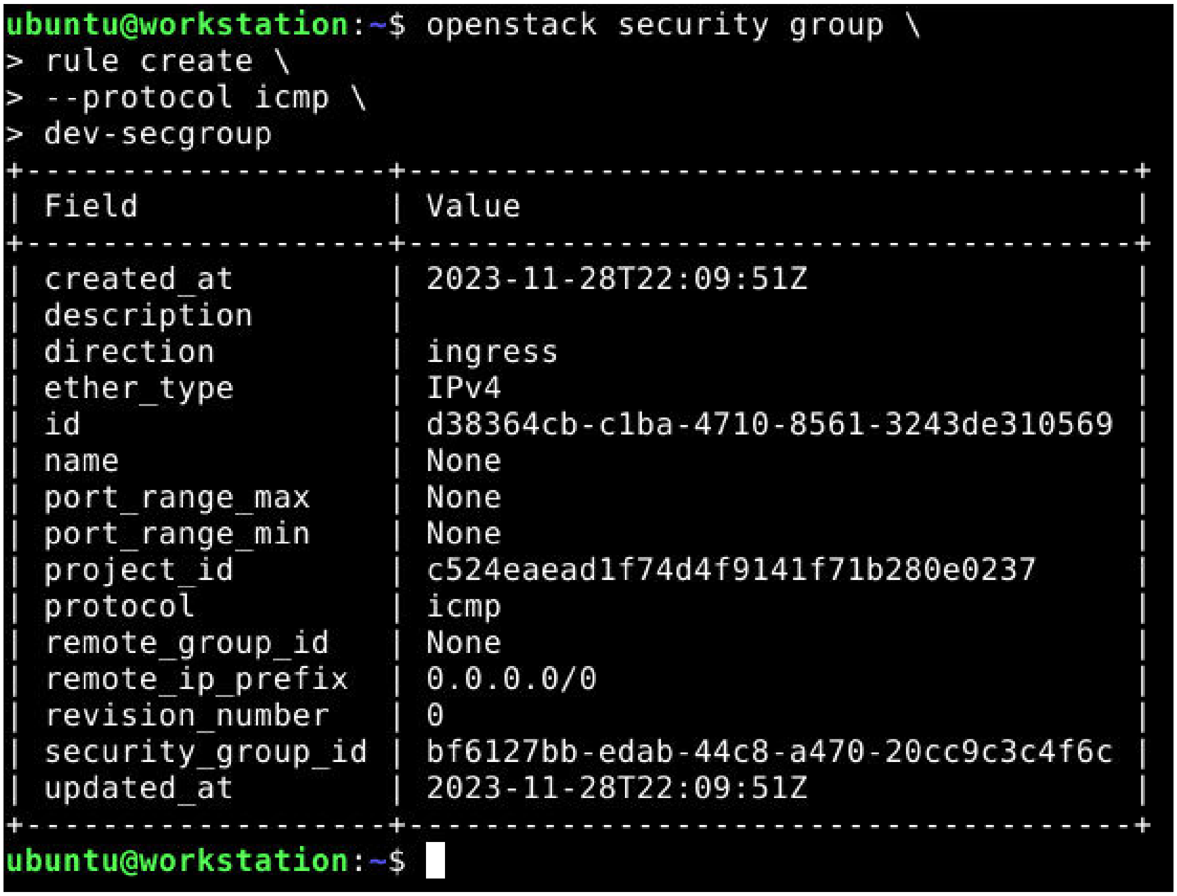
```
ubuntu@workstation:~$ openstack security group \
> create dev-secgroup
```



```
ubuntu@workstation:~$ openstack security group \
> create dev-secgroup
+-----------------+------------------------------------------------------------------------------------------------------------------------------------------------------------------------------+
| Field           | Value                                                                                                                                                                        |
+-----------------+------------------------------------------------------------------------------------------------------------------------------------------------------------------------------+
| created_at      | 2023-11-28T22:07:57Z                                                                                                                                                         |
| description     | dev-secgroup                                                                                                                                                                 |
| id              | bf6127bb-edab-44c8-a470-20cc9c3c4f6c                                                                                                                                         |
| name            | dev-secgroup                                                                                                                                                                 |
| project_id      | c524eaead1f74d4f9141f71b280e0237                                                                                                                                             |
| revision_number | 1                                                                                                                                                                            |
| rules           | created_at='2023-11-28T22:07:57Z', direction='egress', ethertype='IPv6', id='93666585-0b16-4dee-9afc-797bd77935a9', standard_attr_id='61', updated_at='2023-11-28T22:07:57Z' |
|                 | created_at='2023-11-28T22:07:57Z', direction='egress', ethertype='IPv4', id='ccad6958-5c4d-476e-a90b-26d06e68de50', standard_attr_id='62', updated_at='2023-11-28T22:07:57Z' |
| updated_at      | 2023-11-28T22:07:57Z                                                                                                                                                         |
+-----------------+------------------------------------------------------------------------------------------------------------------------------------------------------------------------------+
ubuntu@workstation:~$
```

16. Add a security rule in the **dev-secgroup** security group to allow remote ICMP traffic.

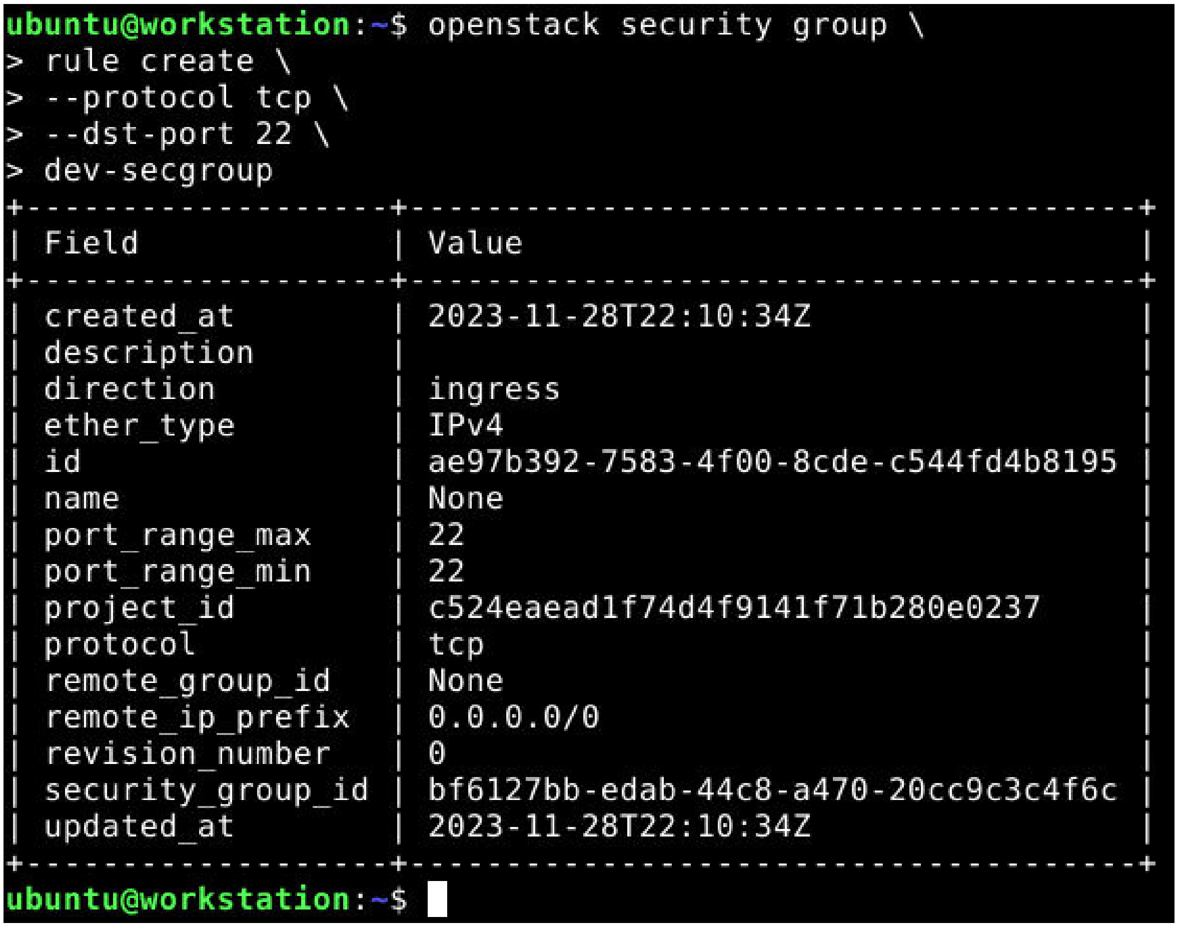
```
ubuntu@workstation: openstack security group \
> rule create \
> --protocol icmp \
> dev-secgroup
```



```
ubuntu@workstation:~$ openstack security group \
> rule create \
> --protocol icmp \
> dev-secgroup
+-------------------+--------------------------------------+
| Field             | Value                                |
+-------------------+--------------------------------------+
| created_at        | 2023-11-28T22:09:51Z                 |
| description       |                                      |
| direction         | ingress                              |
| ether_type        | IPv4                                 |
| id                | d38364cb-c1ba-4710-8561-3243de310569 |
| name              | None                                 |
| port_range_max    | None                                 |
| port_range_min    | None                                 |
| project_id        | c524eaead1f74d4f9141f71b280e0237     |
| protocol          | icmp                                 |
| remote_group_id   | None                                 |
| remote_ip_prefix  | 0.0.0.0/0                            |
| revision_number   | 0                                    |
| security_group_id | bf6127bb-edab-44c8-a470-20cc9c3c4f6c |
| updated_at        | 2023-11-28T22:09:51Z                 |
+-------------------+--------------------------------------+
ubuntu@workstation:~$
```

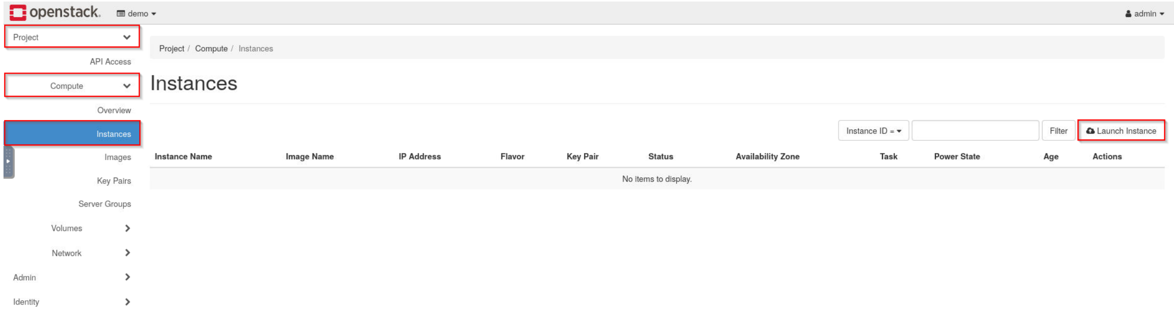
17. Add another security rule to allow remote connection using SSH on the default port 22.

```
ubuntu@workstation:~$ openstack security group \
> rule create \
> --protocol tcp \
> --dst-port 22 \
> dev-secgroup
```



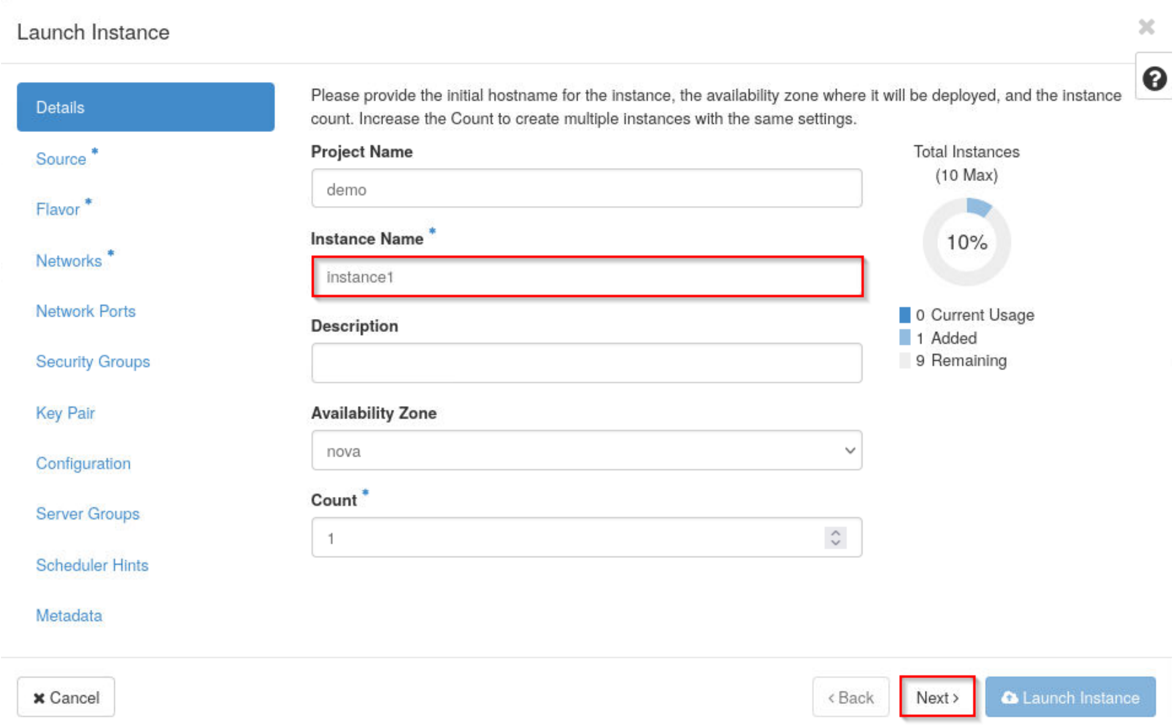
```
ubuntu@workstation:~$ openstack security group \
> rule create \
> --protocol tcp \
> --dst-port 22 \
> dev-secgroup
+-------------------+--------------------------------------+
| Field             | Value                                |
+-------------------+--------------------------------------+
| created_at        | 2023-11-28T22:10:34Z                 |
| description       |                                      |
| direction         | ingress                              |
| ether_type        | IPv4                                 |
| id                | ae97b392-7583-4f00-8cde-c544fd4b8195 |
| name              | None                                 |
| port_range_max    | 22                                   |
| port_range_min    | 22                                   |
| project_id        | c524eaead1f74d4f9141f71b280e0237     |
| protocol          | tcp                                  |
| remote_group_id   | None                                 |
| remote_ip_prefix  | 0.0.0.0/0                            |
| revision_number   | 0                                    |
| security_group_id | bf6127bb-edab-44c8-a470-20cc9c3c4f6c |
| updated_at        | 2023-11-28T22:10:34Z                 |
+-------------------+--------------------------------------+
ubuntu@workstation:~$ 
```

18. Now that the necessary resources have been created, focus back to the web browser. Navigate to **Project**→**Compute**→**Instances**, then click **Launch Instance**.



Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
No items to display.										

19. In the *Details* tab, enter **instance1** in the *Instance Name* field and click **Next**.



Please provide the initial hostname for the instance, the availability zone where it will be deployed, and the instance count. Increase the Count to create multiple instances with the same settings.

Project Name: demo

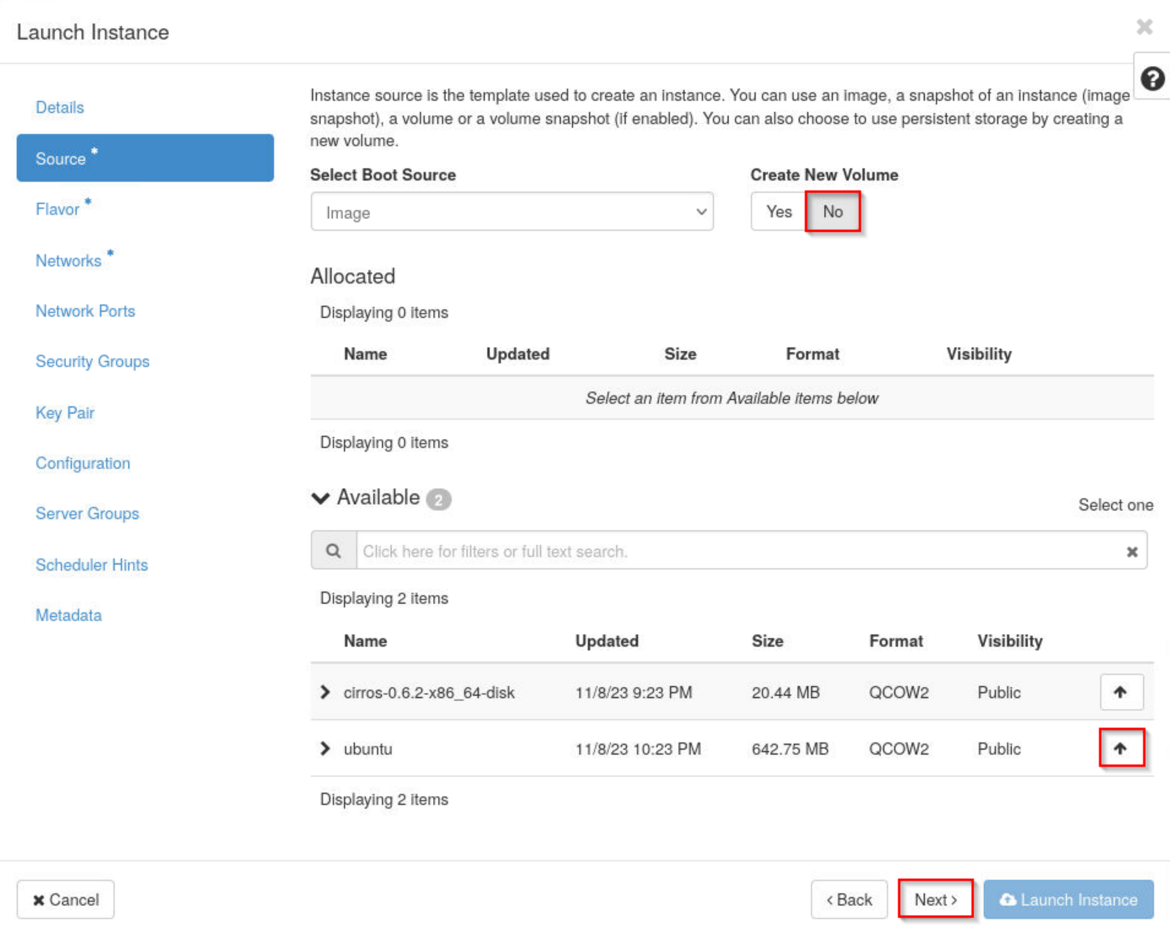
Instance Name *: instance1

Description:

Availability Zone: nova

Count *: 1

20. In the *Source* tab, make sure **Image** is selected in the *Select Boot Source* dropdown and click **No** under *Create New Volume*. Select the **ubuntu** image by clicking the ↑ symbol in the same row. Click **Next**.



Instance source is the template used to create an instance. You can use an image, a snapshot of an instance (image snapshot), a volume or a volume snapshot (if enabled). You can also choose to use persistent storage by creating a new volume.

Select Boot Source: Image

Create New Volume: Yes [✓ No]

Allocated

Displaying 0 items

Name	Updated	Size	Format	Visibility
Select an item from Available items below				

Displaying 0 items

Available 2 — Select one

Click here for filters or full text search.

Displaying 2 items

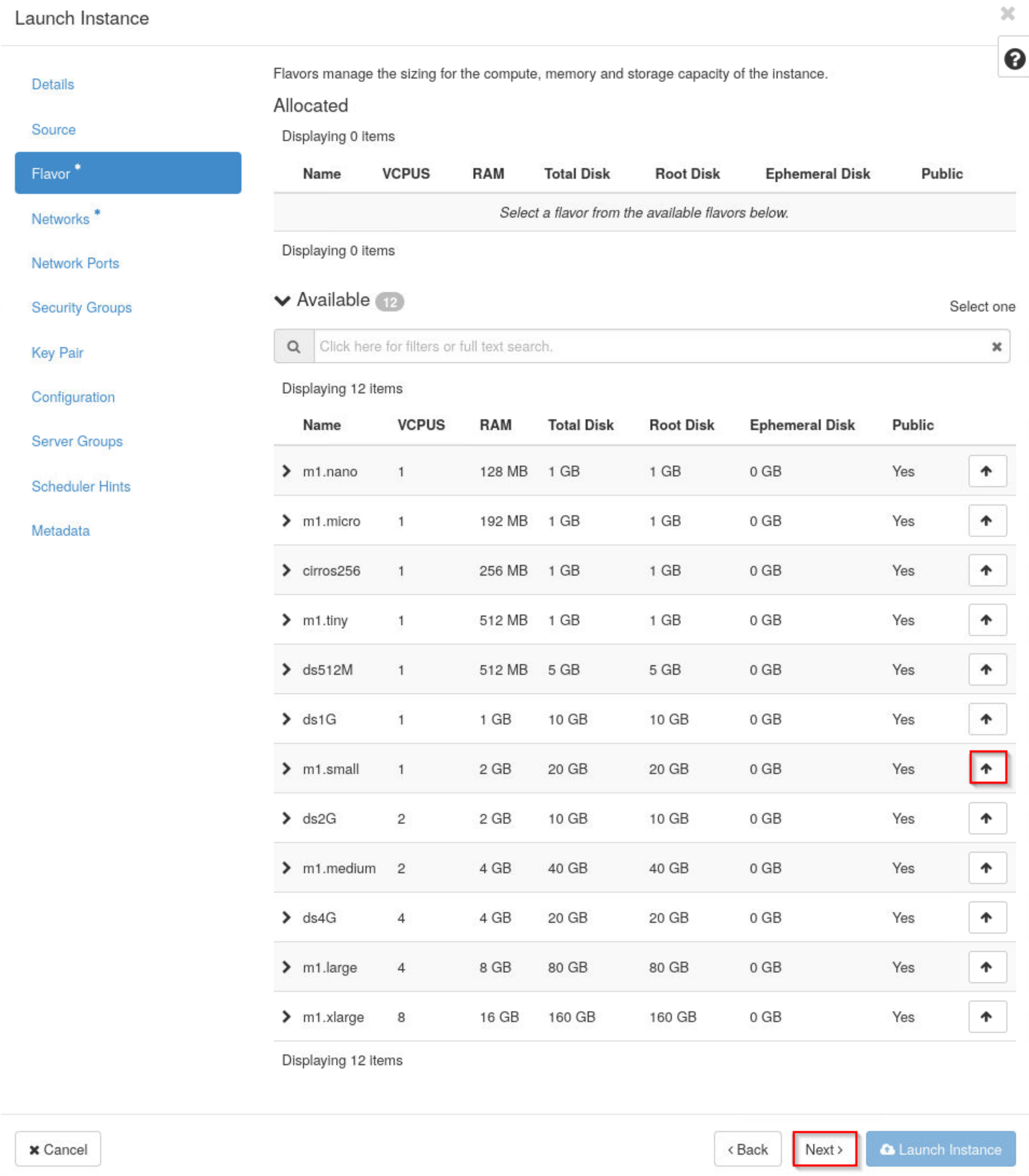
Name	Updated	Size	Format	Visibility
cirros-0.6.2-x86_64-disk	11/8/23 9:23 PM	20.44 MB	QCOW2	Public
ubuntu	11/8/23 10:23 PM	642.75 MB	QCOW2	Public

Displaying 2 items

Stop

Before proceeding to the next step, confirm that **ubuntu** appears underneath the *Allocated* section.

21. In the *Flavor* tab, click the ↑ symbol in the same row as **m1.small**. Click **Next**.



Flavors manage the sizing for the compute, memory and storage capacity of the instance.

Allocated

Displaying 0 items

Name	VCPUS	RAM	Total Disk	Root Disk	Ephemeral Disk	Public
Select a flavor from the available flavors below.						

Displaying 0 items

Available 12 — Select one

Click here for filters or full text search.

Displaying 12 items

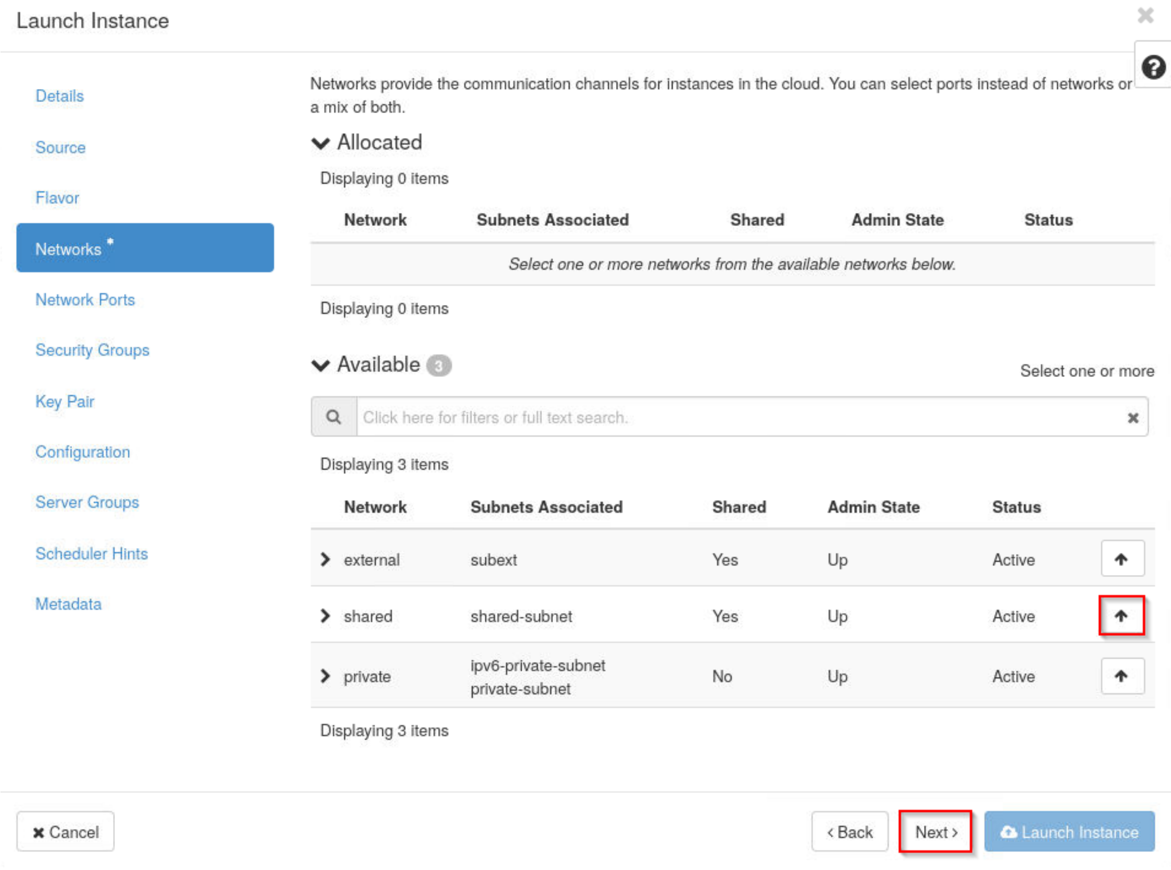
Name	VCPUS	RAM	Total Disk	Root Disk	Ephemeral Disk	Public	
m1.nano	1	128 MB	1 GB	1 GB	0 GB	Yes	↑
m1.micro	1	192 MB	1 GB	1 GB	0 GB	Yes	↑
cirros256	1	256 MB	1 GB	1 GB	0 GB	Yes	↑
m1.tiny	1	512 MB	1 GB	1 GB	0 GB	Yes	↑
ds512M	1	512 MB	5 GB	5 GB	0 GB	Yes	↑
ds1G	1	1 GB	10 GB	10 GB	0 GB	Yes	↑
m1.small	1	2 GB	20 GB	20 GB	0 GB	Yes	↑
ds2G	2	2 GB	10 GB	10 GB	0 GB	Yes	↑
m1.medium	2	4 GB	40 GB	40 GB	0 GB	Yes	↑
ds4G	4	4 GB	20 GB	20 GB	0 GB	Yes	↑
m1.large	4	8 GB	80 GB	80 GB	0 GB	Yes	↑
m1.xlarge	8	16 GB	160 GB	160 GB	0 GB	Yes	↑

Displaying 12 items

Stop

Before proceeding to the next step, confirm that **m1.small** appears underneath the *Allocated* section.

22. In the *Networks* tab, click the ↑ symbol in the same row as **shared**. Click **Next**.



Networks provide the communication channels for instances in the cloud. You can select ports instead of networks or a mix of both.

Allocated

Displaying 0 items

Network	Subnets Associated	Shared	Admin State	Status
Select one or more networks from the available networks below.				

Displaying 0 items

Available 3

Select one or more

Click here for filters or full text search.

Displaying 3 items

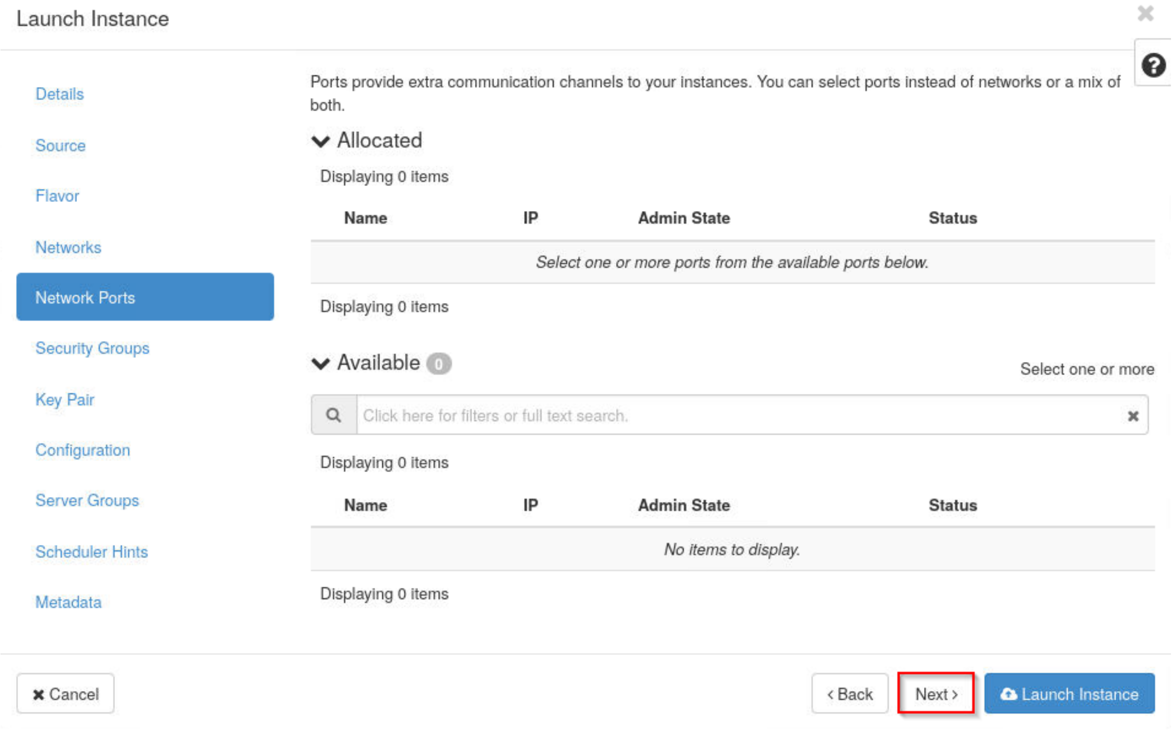
Network	Subnets Associated	Shared	Admin State	Status
external	subext	Yes	Up	Active
shared	shared-subnet	Yes	Up	Active
private	ipv6-private-subnet private-subnet	No	Up	Active

Displaying 3 items

Stop

Before proceeding to the next step, confirm that **shared** appears underneath the *Allocated* section.

23. In the *Network Ports* tab, click **Next**.


Launch Instance

Ports provide extra communication channels to your instances. You can select ports instead of networks or a mix of both.

Allocated

Displaying 0 items

Name	IP	Admin State	Status
Select one or more ports from the available ports below.			

Displaying 0 items

Available 0

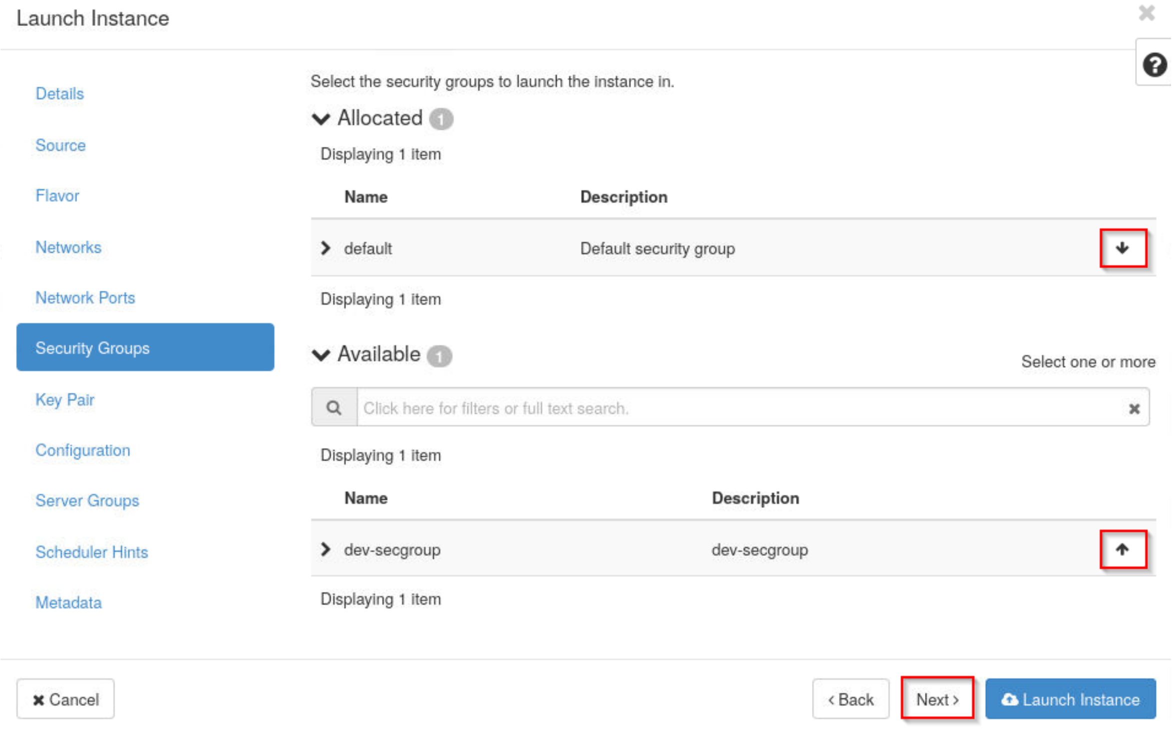
Select one or more

Displaying 0 items

Name	IP	Admin State	Status
No items to display.			

Displaying 0 items

24. In the *Security Groups* tab, click the ↓ symbol in the same row as **default**, and click the ↑ symbol in the same row as **dev-secgroup**. Click **Next**.


Launch Instance

Select the security groups to launch the instance in.

Allocated 1

Displaying 1 item

Name	Description
default	Default security group

Displaying 1 item

Available 1

Select one or more

Displaying 1 item

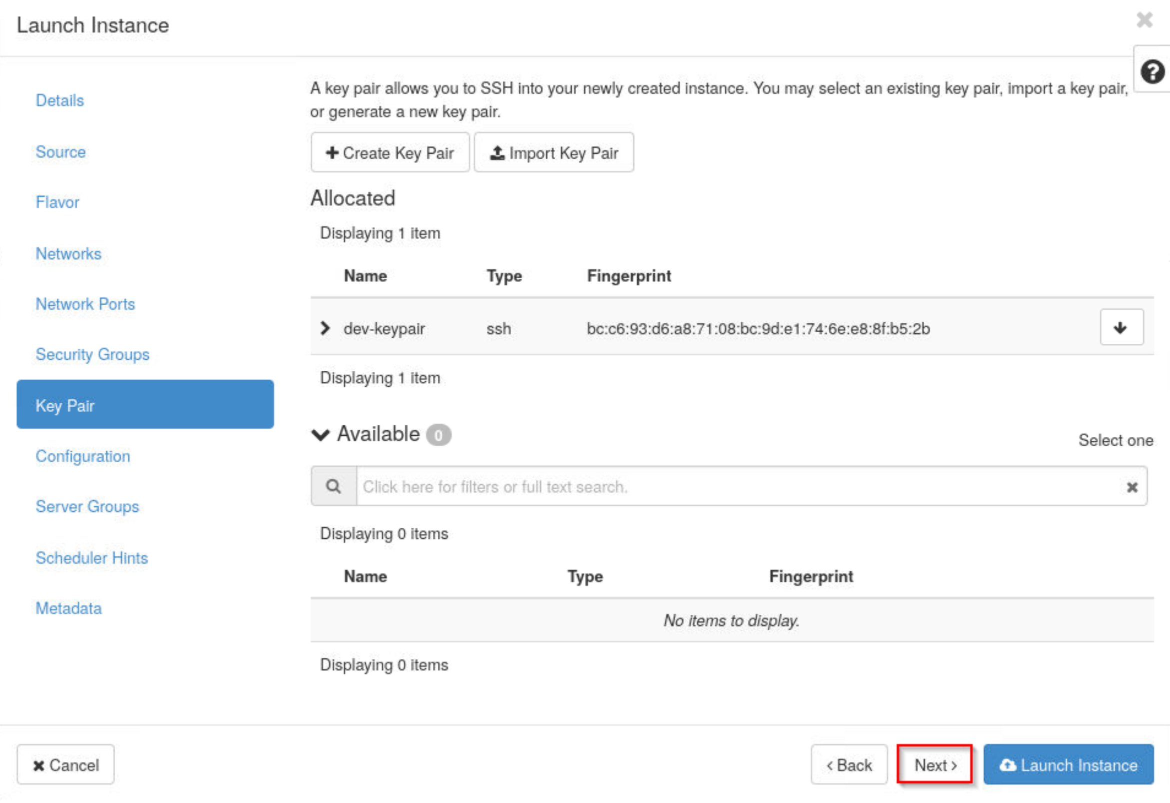
Name	Description
dev-secgroup	dev-secgroup

Displaying 1 item

Stop

Before proceeding to the next step, confirm that only **dev-secgroup** appears underneath the *Allocated* section.

25. In the *Key Pair* tab, ensure that the key pair **dev-keypair** has been selected and is underneath the *Allocated* section. Click **Next**.



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.

Allocated

Displaying 1 item

Name	Type	Fingerprint
dev-keypair	ssh	bc:c6:93:d6:a8:71:08:bc:9d:e1:74:6e:e8:8f:b5:2b

Displaying 1 item

Available 0 — Select one

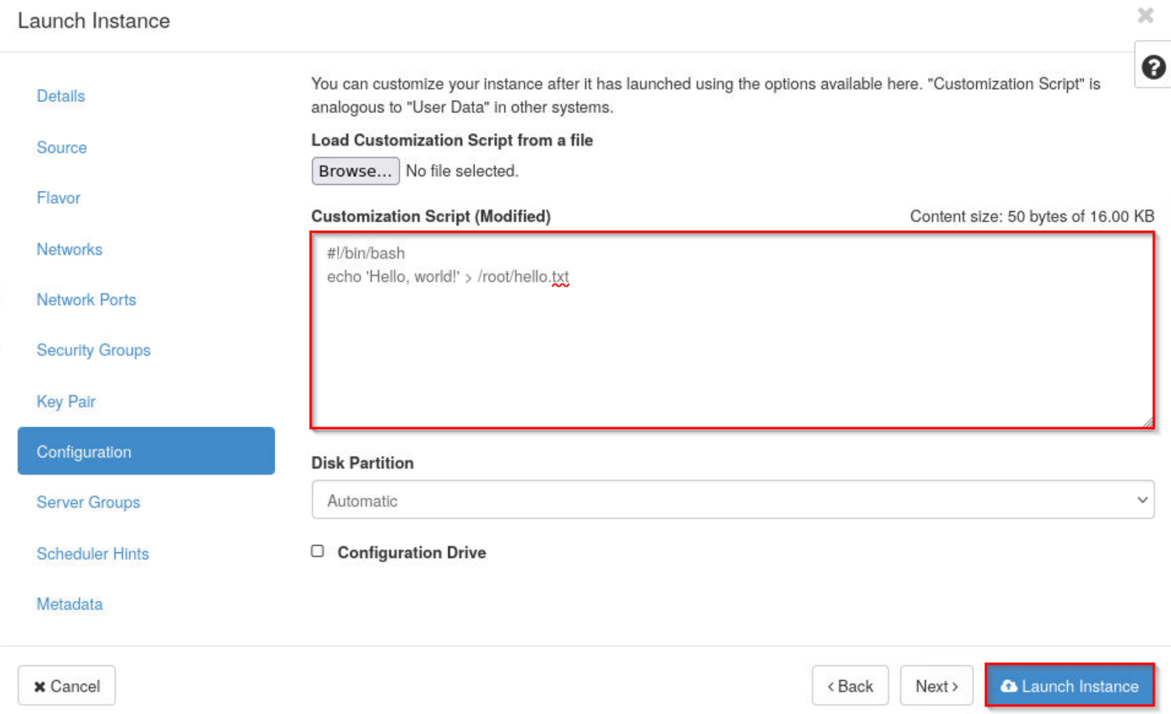
Displaying 0 items

Name	Type	Fingerprint
No items to display.		

Displaying 0 items

26. In the *Configuration* tab, populate the **Customization Script** field with the content below. Once finished, click **Launch Instance**.

```
#!/bin/bash
echo 'Hello, world!' > /root/hello.txt
```



You can customize your instance after it has launched using the options available here. "Customization Script" is analogous to "User Data" in other systems.

Load Customization Script from a file

Browse... No file selected.

Customization Script (Modified) Content size: 50 bytes of 16.00 KB

```
#!/bin/bash
echo 'Hello, world!' > /root/hello.txt
```

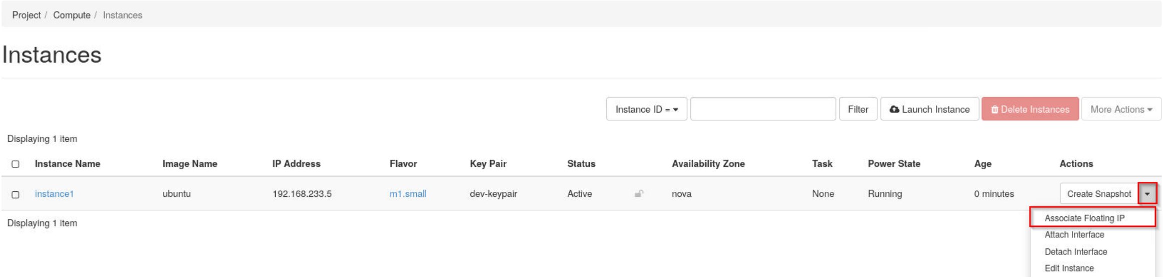
Disk Partition: Automatic

□ **Configuration Drive**

Tip

A customization script can be used to perform many commands automatically upon instance creation, such as installing packages, configuring a host name, etc. The simple script above is just an example.

27. Once the status for **instance1** is **Active**, attach a floating IP address to it. Select **Associate Floating IP** from the dropdown menu next to **Create Snapshot** in the row for the instance.

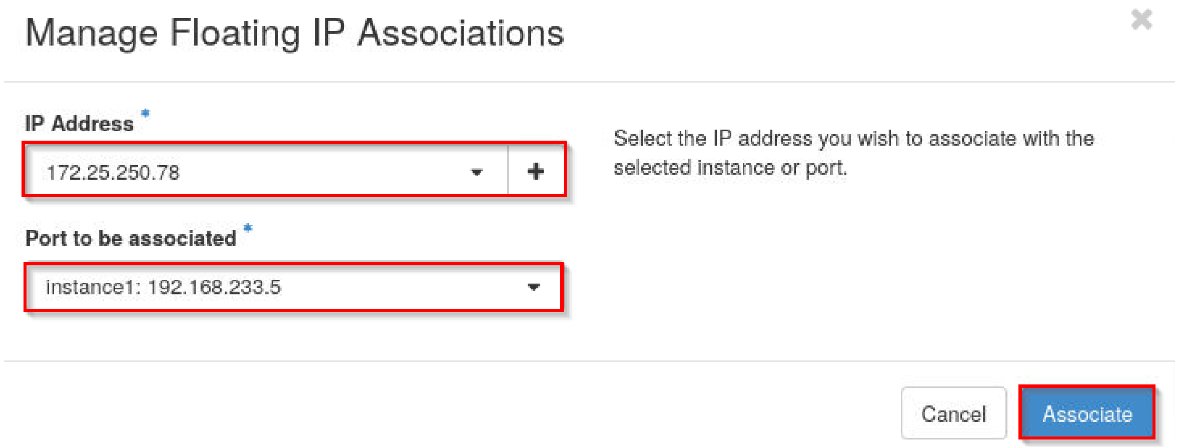


Displaying 1 item

□	Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
□	instance1	ubuntu	192.168.233.5	m1.small	dev-keypair	Active	nova	None	Running	0 minutes	Create Snapshot

Displaying 1 item

28. Select any one of the IP addresses from the *IP Address* dropdown and select **instance1: 192.168.233.XYZ** as the *Port to be associated*. Click **Associate**.



Manage Floating IP Associations

IP Address *

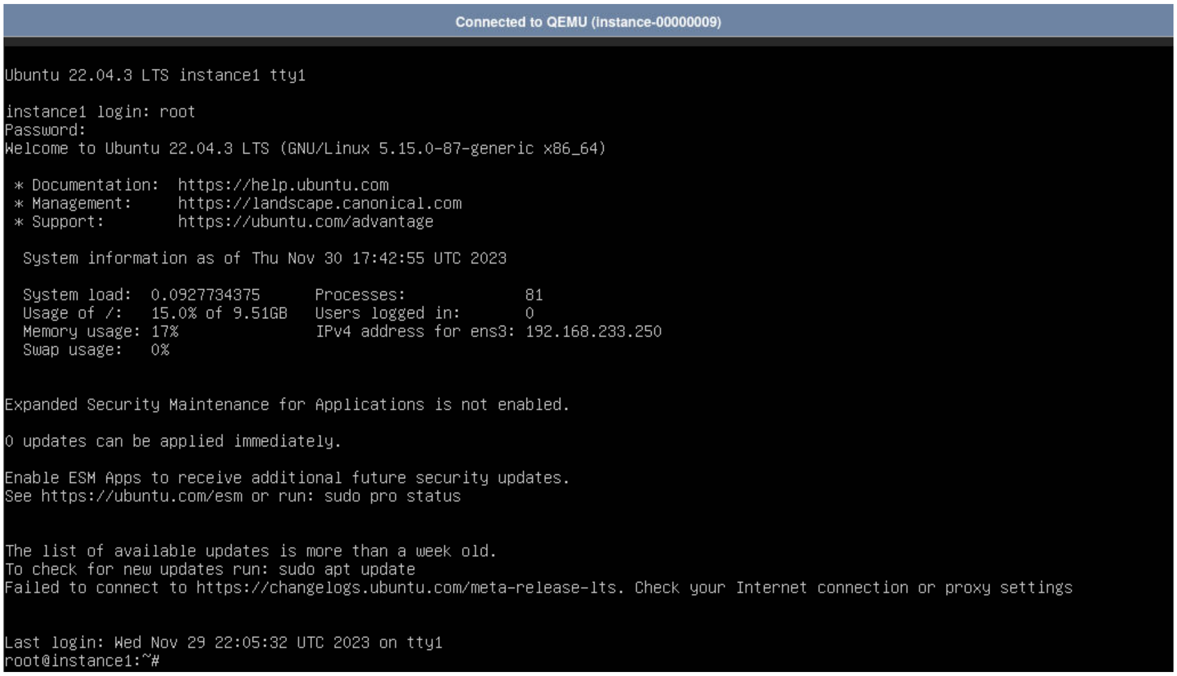
172.25.250.78

Port to be associated *

instance1: 192.168.233.5

Select the IP address you wish to associate with the selected instance or port.

29. To verify that the customization script worked, first click on **instance1** under the *Instance Name* column, then navigate to the *Console* tab if you are not directed there automatically. Log into the instance as **root** with the password **secret**.

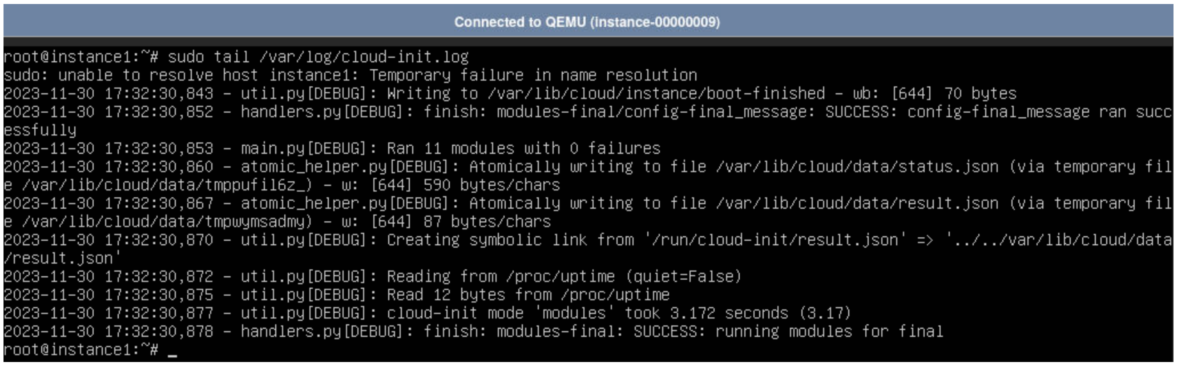


Connected to QEMU (instance-00000009)

```
Ubuntu 22.04.3 LTS instance1 tty1

instance1 login: root
Password:
Welcome to Ubuntu 22.04.3 LTS (GNU/Linux 5.15.0-87-generic x86_64)

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

  System information as of Thu Nov 30 17:42:55 UTC 2023

  System load:  0.0927734375      Processes:             81
  Usage of /:   15.0% of 9.51GB   Users logged in:       0
  Memory usage: 17%               IPv4 address for ens3: 192.168.233.250
  Swap usage:   0%


Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status


The list of available updates is more than a week old.
To check for new updates run: sudo apt update
Failed to connect to https://changelogs.ubuntu.com/meta-release-lts. Check your Internet connection or proxy settings


Last login: Wed Nov 29 22:05:32 UTC 2023 on tty1
root@instance1:~#
```

30. Check **/var/log/cloud-init.log** to confirm that **cloud-init** ran. Use the `tail` command to print the last 10 lines of the log.

```
root@instance:~# tail /var/log/cloud-init.log
```

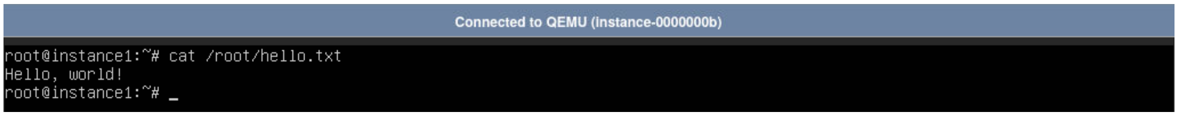


Connected to QEMU (instance-00000009)

```
root@instance1:~# sudo tail /var/log/cloud-init.log
sudo: unable to resolve host instance1: Temporary failure in name resolution
2023-11-30 17:32:30,843 - util.py[DEBUG]: Writing to /var/lib/cloud/instance/boot-finished - wb: [644] 70 bytes
2023-11-30 17:32:30,852 - handlers.py[DEBUG]: finish: modules-final/config-final_message: SUCCESS: config-final_message ran succ
essfully
2023-11-30 17:32:30,853 - main.py[DEBUG]: Ran 11 modules with 0 failures
2023-11-30 17:32:30,860 - atomic_helper.py[DEBUG]: Atomically writing to file /var/lib/cloud/data/status.json (via temporary fil
e /var/lib/cloud/data/tmppufil6z_) - w: [644] 590 bytes/chars
2023-11-30 17:32:30,867 - atomic_helper.py[DEBUG]: Atomically writing to file /var/lib/cloud/data/result.json (via temporary fil
e /var/lib/cloud/data/tmpwymsadmy) - w: [644] 87 bytes/chars
2023-11-30 17:32:30,870 - util.py[DEBUG]: Creating symbolic link from '/run/cloud-init/result.json' => '../../var/lib/cloud/data
/result.json'
2023-11-30 17:32:30,872 - util.py[DEBUG]: Reading from /proc/uptime (quiet=False)
2023-11-30 17:32:30,875 - util.py[DEBUG]: Read 12 bytes from /proc/uptime
2023-11-30 17:32:30,877 - util.py[DEBUG]: cloud-init mode 'modules' took 3.172 seconds (3.17)
2023-11-30 17:32:30,878 - handlers.py[DEBUG]: finish: modules-final: SUCCESS: running modules for final
root@instance1:~# _
```

31. Ensure that the **/root/hello.txt** file exists and has the correct content.

```
root@instance:~# cat /root/hello.txt
```



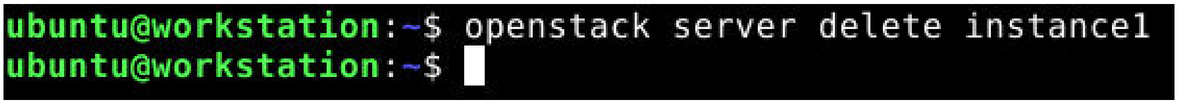
Connected to QEMU (instance-0000000b)

```
root@instance1:~# cat /root/hello.txt
Hello, world!
root@instance1:~# _
```

32. Log out of the *Horizon Dashboard* and close the web browser.

33. Focus back on the terminal and delete **instance1**.

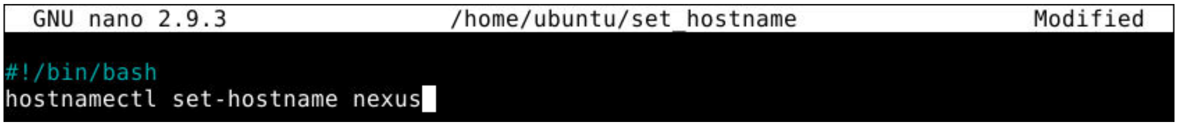
```
ubuntu@workstation:~$ openstack server delete instance1
```



```
ubuntu@workstation:~$ openstack server delete instance1
ubuntu@workstation:~$ 
```

34. Another instance will be created and customized using the *OpenStack Unified CLI*. First, create a **user-data** script that will be attached to the instance at creation. Create a script called ~/**set_hostname** that matches the content shown below. Press **CTRL+X**, then **Y** to accept the file changes. Press **Enter** to confirm and exit back to the terminal.

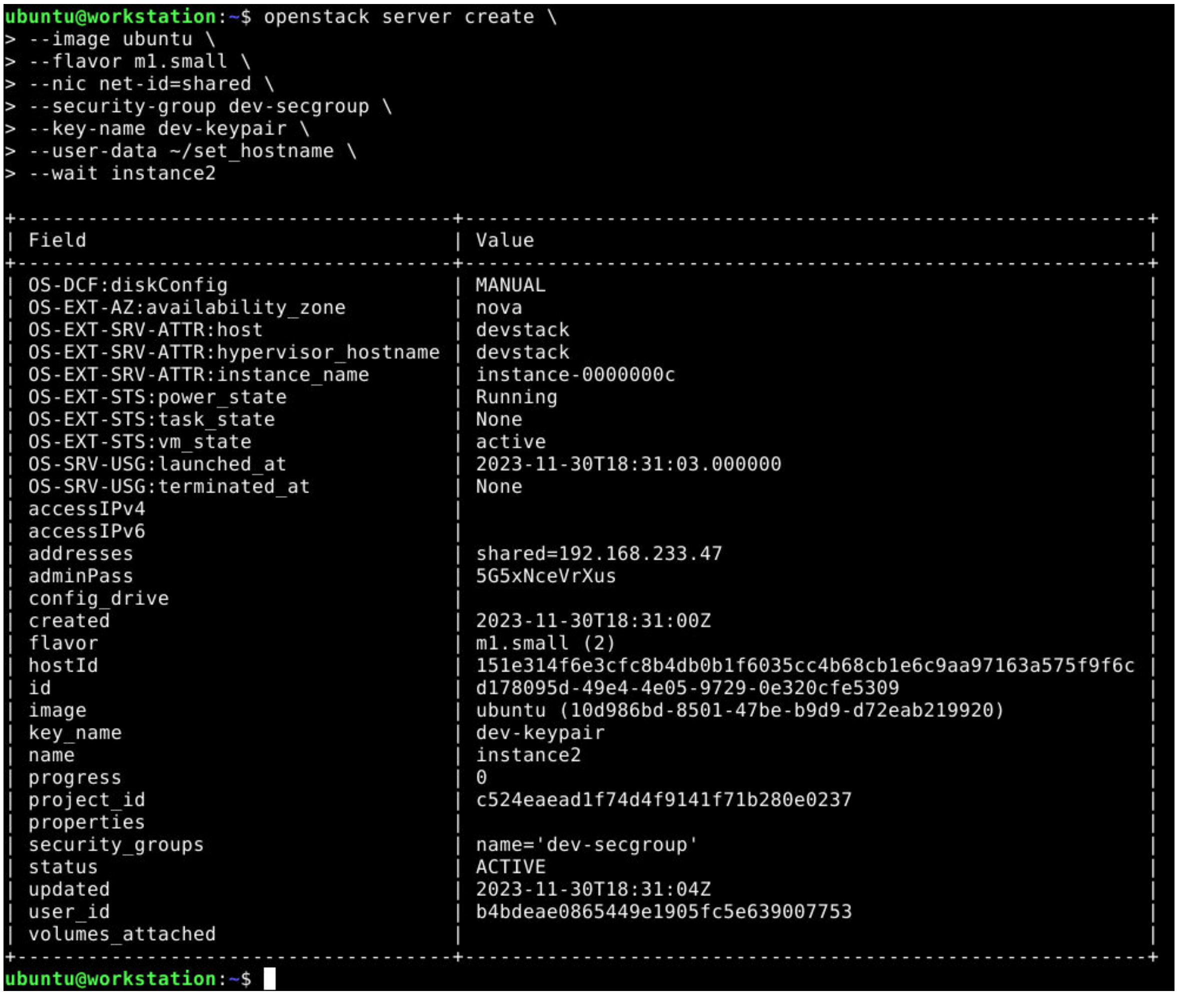
```
ubuntu@workstation: nano ~/set_hostname
```



```
  GNU nano 2.9.3                /home/ubuntu/set_hostname                 Modified

#!/bin/bash
hostnamectl set-hostname nexus
```

35. Launch an instance using the **user-data** option with the previously created script to perform the customization. Use the **ubuntu** image, the **m1.small** flavor, the **shared** network, the **dev-secgroup** security group, and the **dev-keypair** key pair.

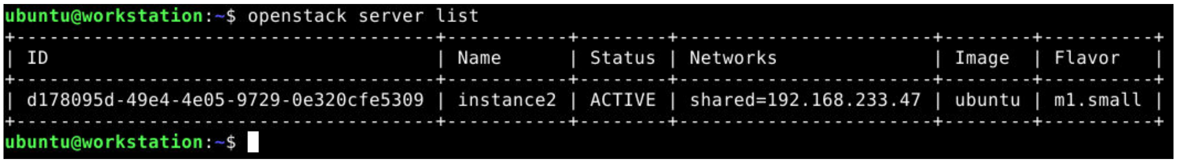
```
ubuntu@workstation: openstack server create \
> --image ubuntu \
> --flavor m1.small \
> --nic net-id=shared \
> --security-group dev-secgroup \
> --key-name dev-keypair \
> --user-data ~/set_hostname \
> --wait instance2
```



```
ubuntu@workstation:~$ openstack server create \
> --image ubuntu \
> --flavor m1.small \
> --nic net-id=shared \
> --security-group dev-secgroup \
> --key-name dev-keypair \
> --user-data ~/set_hostname \
> --wait instance2

+-------------------------------------+------------------------------------------------------------------+
| Field                               | Value                                                            |
+-------------------------------------+------------------------------------------------------------------+
| OS-DCF:diskConfig                   | MANUAL                                                           |
| OS-EXT-AZ:availability_zone         | nova                                                             |
| OS-EXT-SRV-ATTR:host                | devstack                                                         |
| OS-EXT-SRV-ATTR:hypervisor_hostname | devstack                                                         |
| OS-EXT-SRV-ATTR:instance_name       | instance-0000000c                                                |
| OS-EXT-STS:power_state              | Running                                                          |
| OS-EXT-STS:task_state               | None                                                             |
| OS-EXT-STS:vm_state                 | active                                                           |
| OS-SRV-USG:launched_at              | 2023-11-30T18:31:03.000000                                       |
| OS-SRV-USG:terminated_at            | None                                                             |
| accessIPv4                          |                                                                  |
| accessIPv6                          |                                                                  |
| addresses                           | shared=192.168.233.47                                            |
| adminPass                           | 5G5xNceVrXus                                                     |
| config_drive                        |                                                                  |
| created                             | 2023-11-30T18:31:00Z                                             |
| flavor                              | m1.small (2)                                                     |
| hostId                              | 151e314f6e3cfc8b4db0b1f6035cc4b68cb1e6c9aa97163a575f9f6c |
| id                                  | d178095d-49e4-4e05-9729-0e320cfe5309                             |
| image                               | ubuntu (10d986bd-8501-47be-b9d9-d72eab219920)                    |
| key_name                            | dev-keypair                                                      |
| name                                | instance2                                                        |
| progress                            | 0                                                                |
| project_id                          | c524eaead1f74d4f9141f71b280e0237                                 |
| properties                          |                                                                  |
| security_groups                     | name='dev-secgroup'                                              |
| status                              | ACTIVE                                                           |
| updated                             | 2023-11-30T18:31:04Z                                             |
| user_id                             | b4bdeae0865449e1905fc5e639007753                                 |
| volumes_attached                    |                                                                  |
+-------------------------------------+------------------------------------------------------------------+
ubuntu@workstation:~$
```

36. Verify that the status of the **instance2** instance is **ACTIVE**.

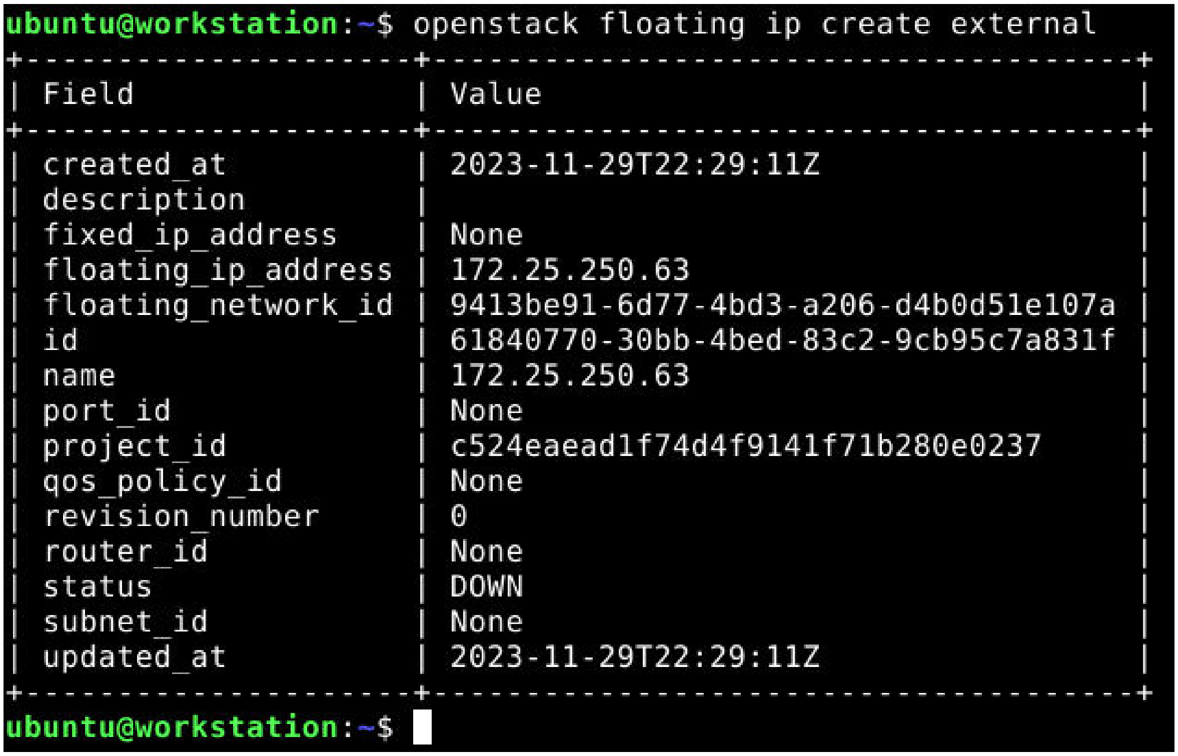
```
ubuntu@workstation: openstack server list
```



```
ubuntu@workstation:~$ openstack server list
+--------------------------------------+-----------+--------+------------------------+--------+----------+
| ID                                   | Name      | Status | Networks               | Image  | Flavor   |
+--------------------------------------+-----------+--------+------------------------+--------+----------+
| d178095d-49e4-4e05-9729-0e320cfe5309 | instance2 | ACTIVE | shared=192.168.233.47  | ubuntu | m1.small |
+--------------------------------------+-----------+--------+------------------------+--------+----------+
ubuntu@workstation:~$
```

37. Generate another floating IP address to assign to this instance. Take note of the IP address generated, which is listed in the *name* row in the output from the below command.

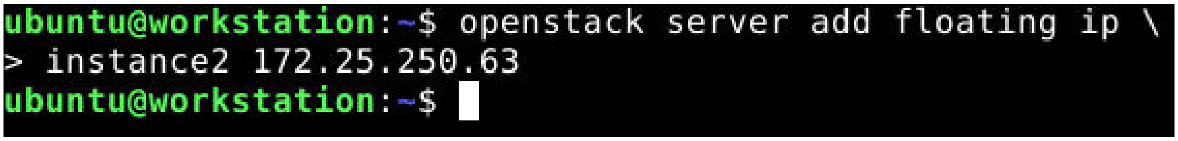
```
ubuntu@workstation:~$ openstack floating ip create external
```



```
ubuntu@workstation:~$ openstack floating ip create external
+---------------------+--------------------------------------+
| Field               | Value                                |
+---------------------+--------------------------------------+
| created_at          | 2023-11-29T22:29:11Z                 |
| description         |                                      |
| fixed_ip_address    | None                                 |
| floating_ip_address | 172.25.250.63                        |
| floating_network_id | 9413be91-6d77-4bd3-a206-d4b0d51e107a |
| id                  | 61840770-30bb-4bed-83c2-9cb95c7a831f |
| name                | 172.25.250.63                        |
| port_id             | None                                 |
| project_id          | c524eaead1f74d4f9141f71b280e0237     |
| qos_policy_id       | None                                 |
| revision_number     | 0                                    |
| router_id           | None                                 |
| status              | DOWN                                 |
| subnet_id           | None                                 |
| updated_at          | 2023-11-29T22:29:11Z                 |
+---------------------+--------------------------------------+
ubuntu@workstation:~$
```

38. Assign the floating IP generated from the last step to **instance2**.

```
ubuntu@workstation:~$ openstack server add floating ip \
instance2 172.25.250.63
```



```
ubuntu@workstation:~$ openstack server add floating ip \
> instance2 172.25.250.63
ubuntu@workstation:~$
```

Note

The actual value of your floating IP address may be different.

2 Verify Customized Instances

In this task, you will verify that `cloud-init` has correctly customized the two instances created in the previous section.

1. If a terminal window is not already open, open one and source the admin credentials from the **~/keystonerc-admin** file.

2. Determine the floating IP address associated with **instance1**. Remember that the floating IP address is in the **172.25.250.0/24** subnet.

```
ubuntu@workstation: openstack server show instance1 \
> | grep address
```

> Note
>
> The floating IP addresses in your output may differ from these examples.

3. Now, use this command again to determine the floating IP address associated with **instance2**.

```
ubuntu@workstation: openstack server show instance2 \
> | grep address
```