OpenStack Labs

Lab 01: Launching an Instance

Contents

About This Document

- This document was developed by a team at the University of Tennessee at Chattanooga led by Dr. Mengjun Xie (**mengjun-xie@utc.edu**).
- The development of this document was supported by a National Centers of Academic Excellence in Cybersecurity Grant (#H98230-20-1-0351), housed at the National Security Agency.
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Introduction

In this lab, you will launch an instance with the *Horizon Dashboard* and the *OpenStack Unified CLI*.

Objectives

- Use the *Horizon Dashboard*.
- Launch an instance with the *Horizon Dashboard*.
- Use the *OpenStack Unified CLI*.
- Launch an instance with the *OpenStack Unified CLI*.

Lab Settings

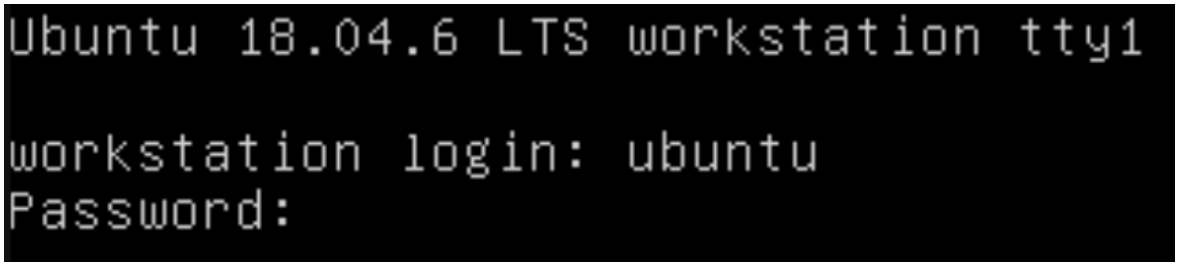
The information in the table below will be needed in order to complete the lab. The task sections below provide details on the use of this information.

Virtual Machine	IP Address	Account	Password
workstation	ens3: 192.168.1.21 ens4: 172.25.250.21	ubuntu	ubuntu
devstack	ens3: 192.168.20 ens4: 172.25.250.20	ubuntu	ubuntu

1 Launching an Instance with the Horizon Dashboard

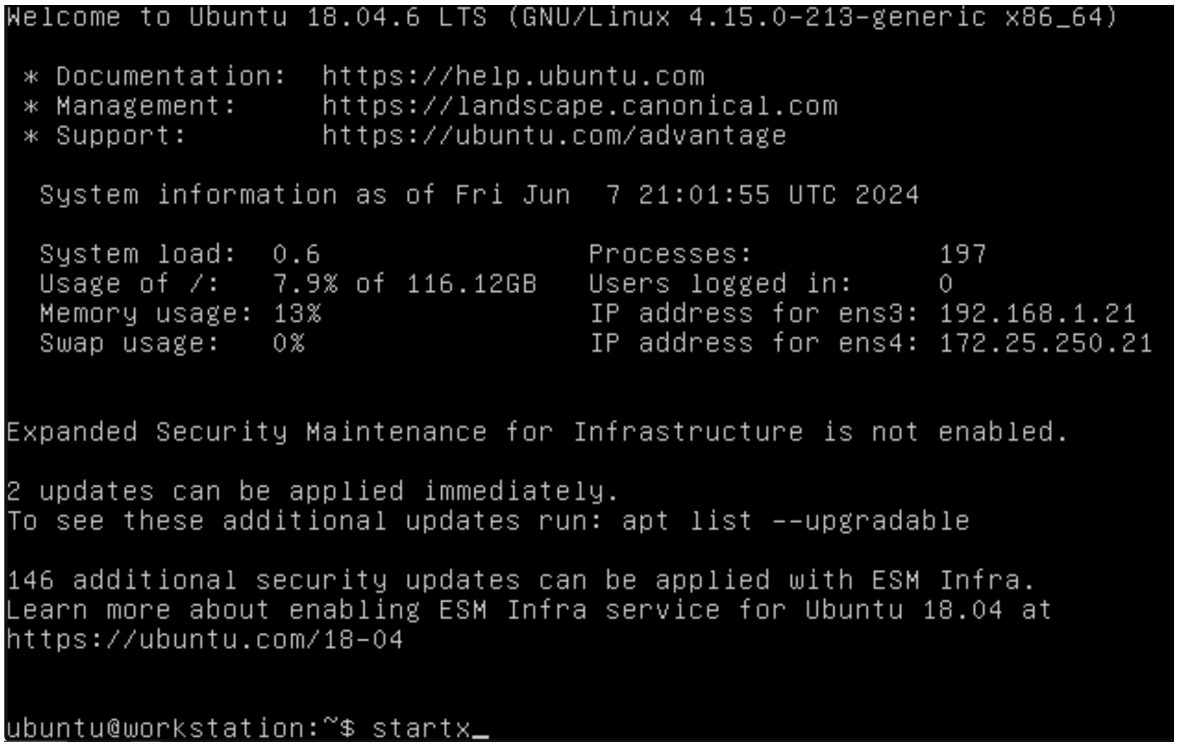
In this task, you will launch an instance with the *Horizon Dashboard*.

1.1. Log into the **workstation** machine as the **ubuntu** user with password **ubuntu**.

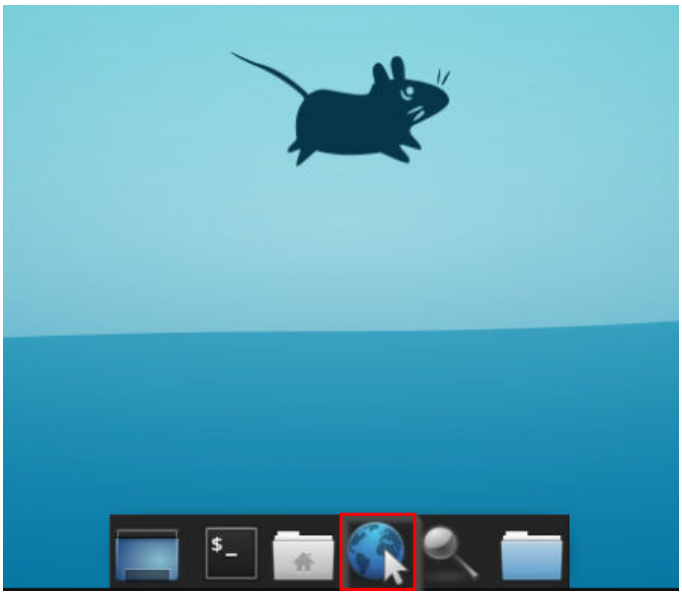


1.2. Launch the graphical user interface.

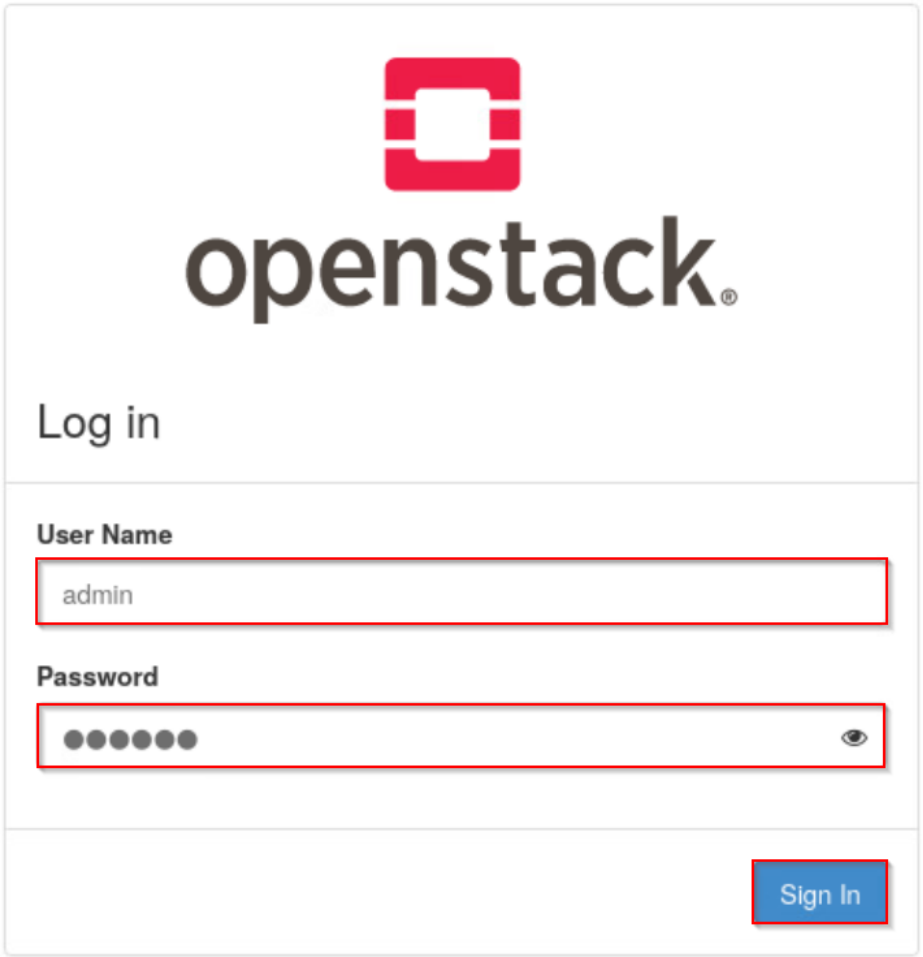
```
ubuntu@workstation:~$ startx
```



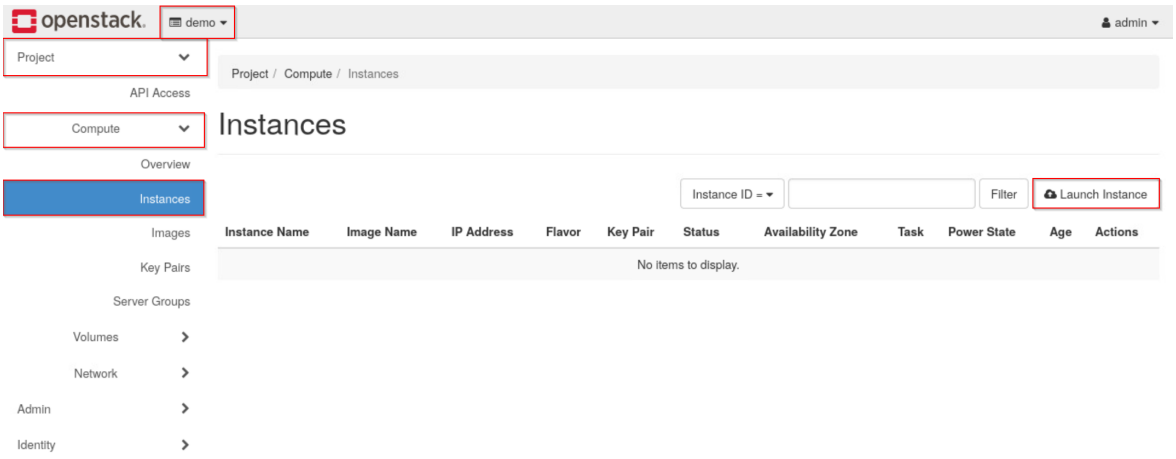
1.3. Open the web browser.



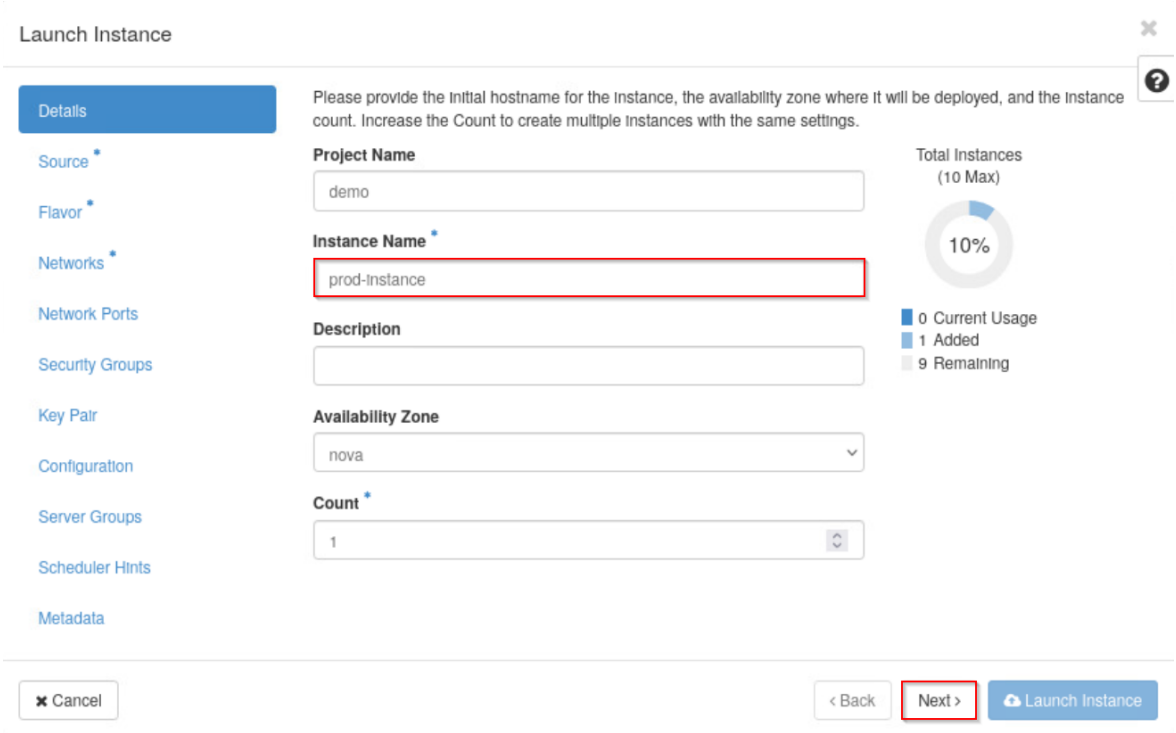
1.4. Enter the IP address of the **devstack** machine (**192.168.1.20**) into the address bar, and log into the OpenStack Horizon Dashboard with username **admin** and password **secret**.



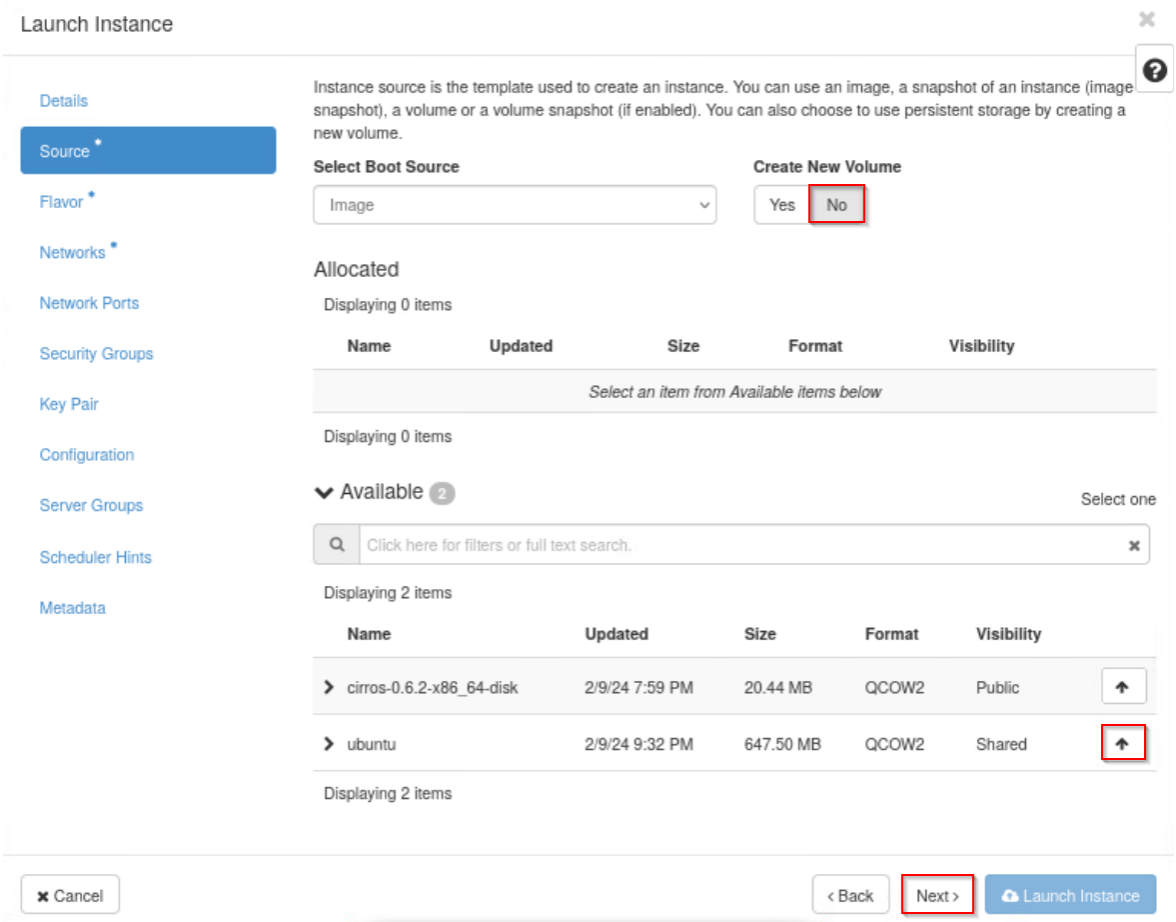
1.5. Click on the dropdown menu in the top left corner of the webpage, then select **demo** as the project. Navigate to **Project** > **Compute** > **Instances**, then click **Launch Instance** in the top right corner.



1.6. In the *Instance Name* field, type **prod-instance**, and leave the other fields with their default values. Click **Next**.



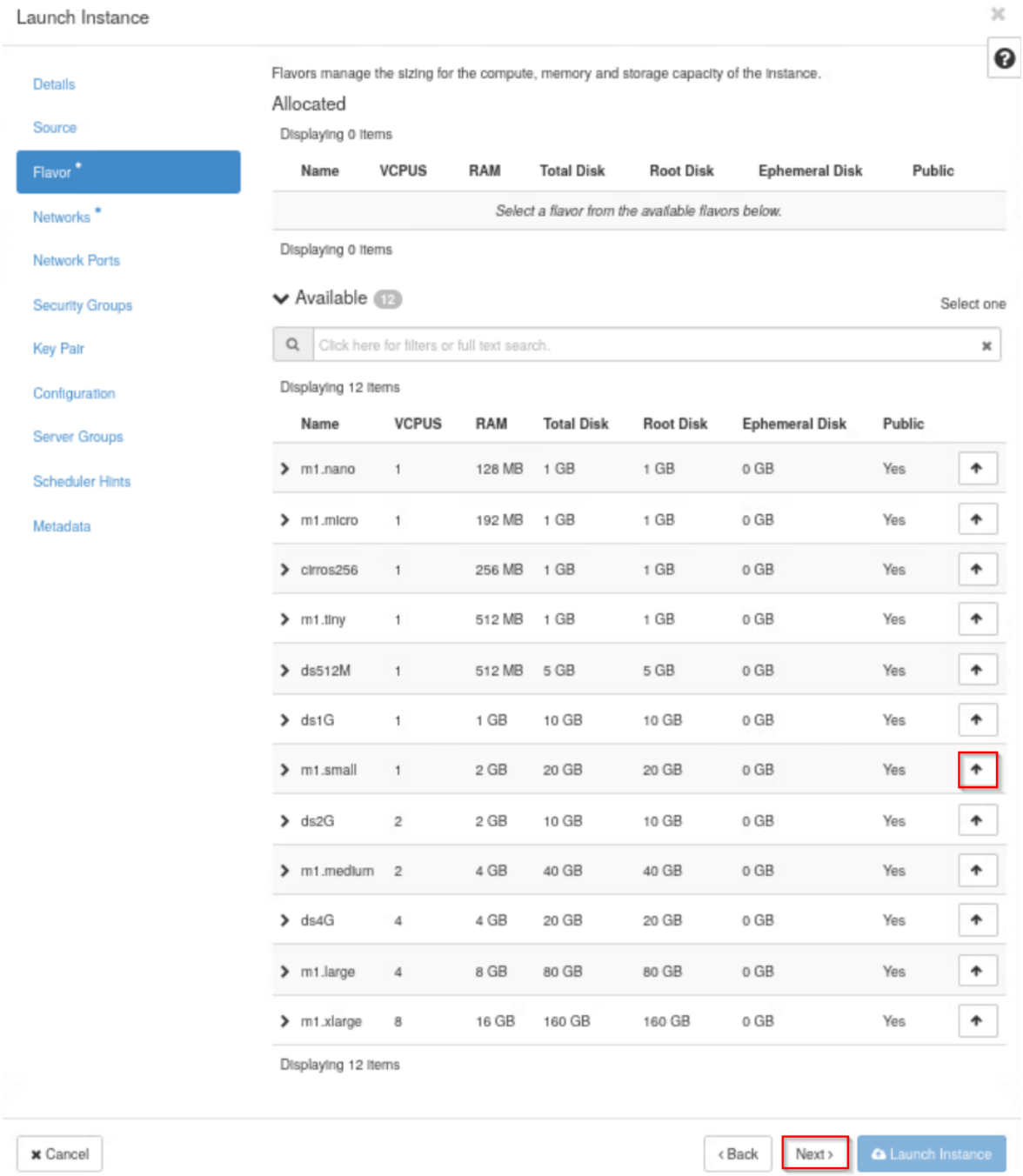
1.7. In the *Select Boot Source* dropdown, **Image** should already be selected. Set *Create New Volume* to **No**, and scroll down (if needed) to click the ↑ icon beside of **ubuntu** to use **ubuntu** as the image. Click **Next**.



Stop

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

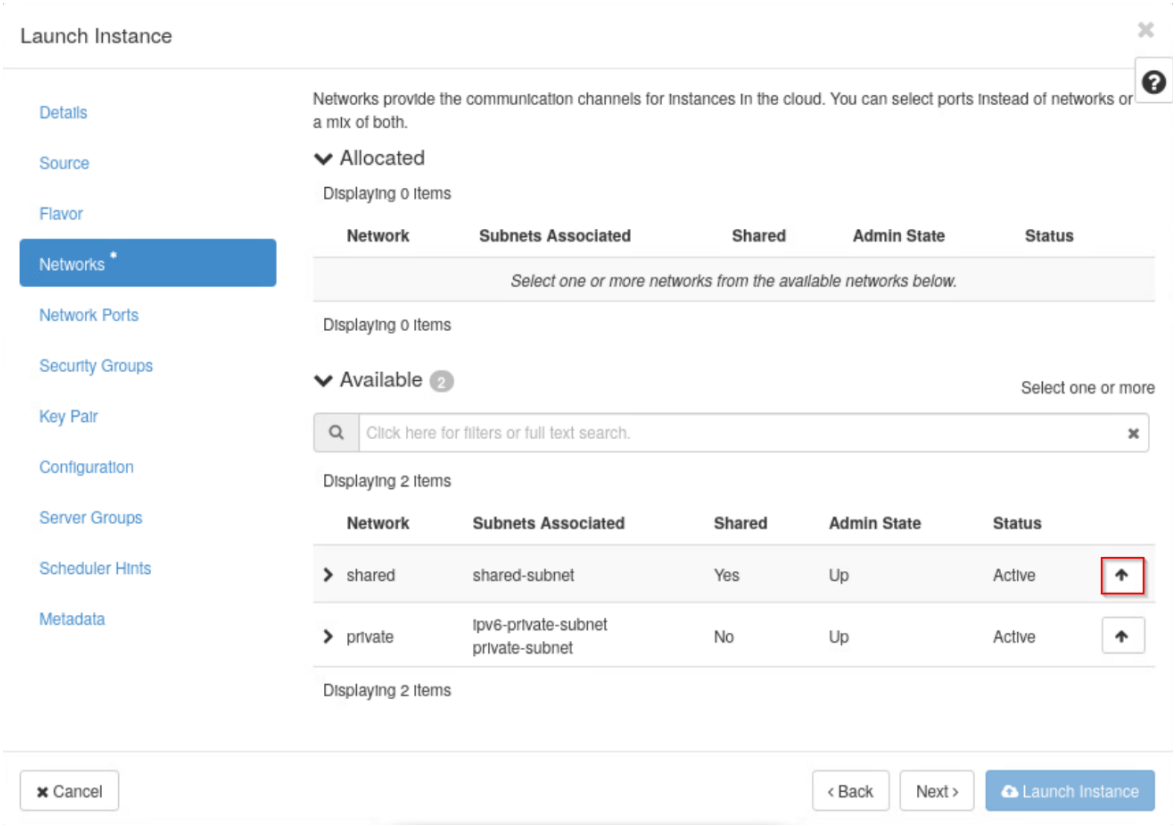
1.8. Scroll down (if needed) and click the ↑ icon beside the **m1.small** flavor. Click **Next**.



Stop

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

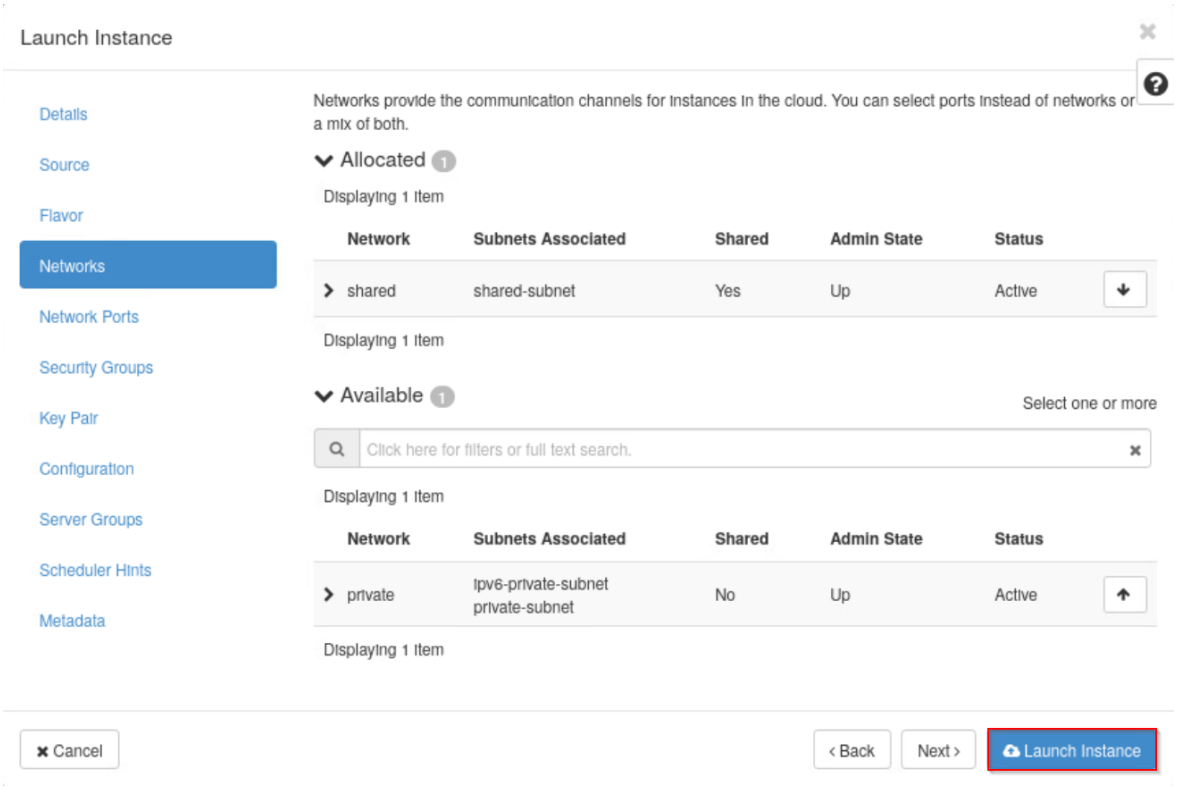
1.9. Click the ↑ icon beside the **shared** network.



Stop

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

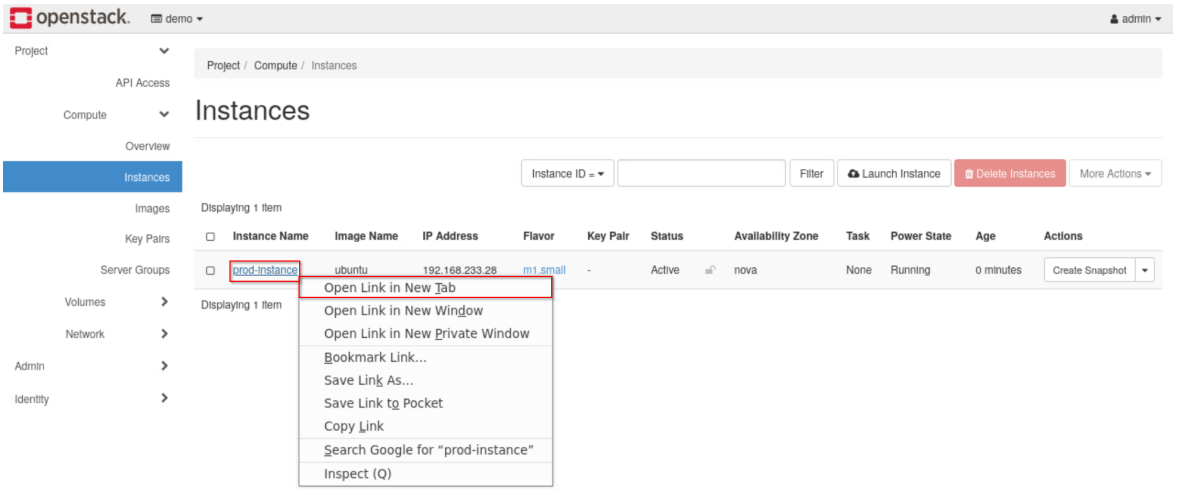
1.10. If all required fields have been set, the **Launch Instance** button in the bottom right corner should now be available. Click **Launch Instance**.



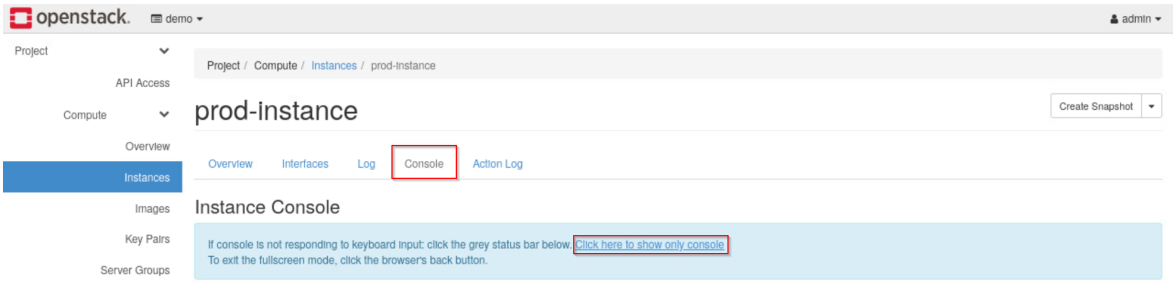
Stop

Wait for the *Power State* of **prod-instance** to display the status of *Running* before continuing to the next step.

1.11. To open the console of **prod-instance** in a new tab, right-click the name **prod-instance** and select **Open Link in New Tab**, or middle-click (press in the mouse wheel) the name **prod-instance**.



1.12. In the new tab, click the *Console* tab. Optionally, to make the console take up the whole tab, click the **Click here to show only console** link.

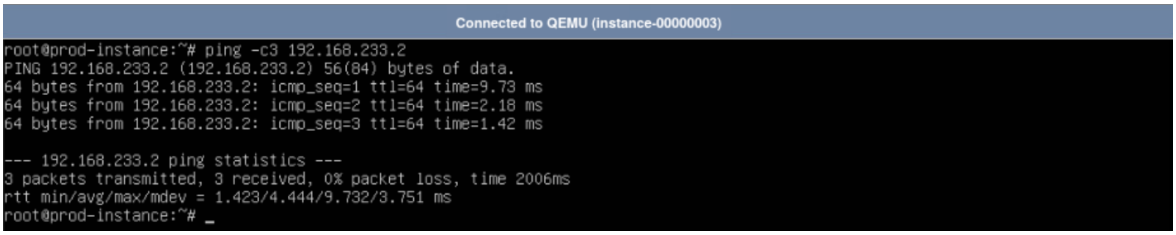


1.13. Log into the console as **root** with the password **secret**.

> **Note**
>
> It may take several minutes for the instance to fully boot up and present a login prompt.

1.14. In the console, ping **192.168.233.2** (DHCP server) to verify connectivity.

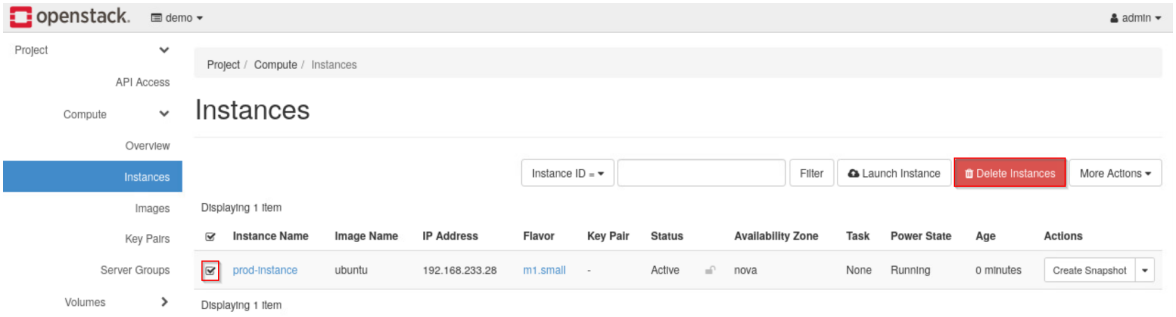
```
$ ping -c3 192.168.233.2
```



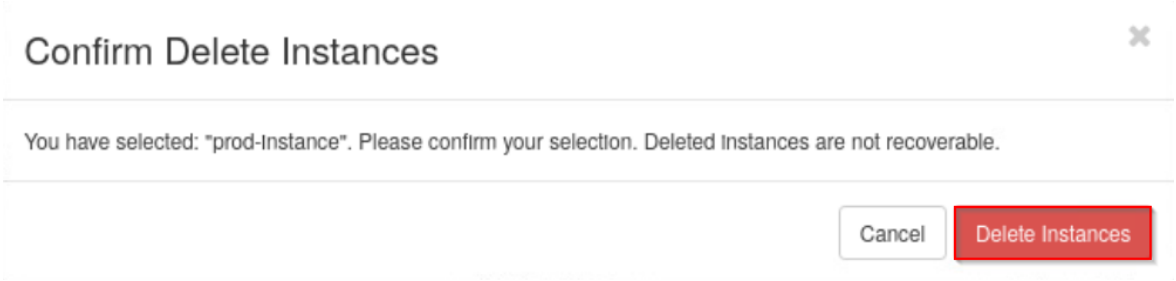
> **Note**
>
> You should receive three successful ping replies.

1.15. Close the console tab for **prod-instance**.

1.16. Focus back on the tab showing instances and delete **prod-instance**. Select the checkbox for **prod-instance** and click the **Delete Instances** button.



1.17. Confirm the deletion by clicking the **Delete Instances** button.

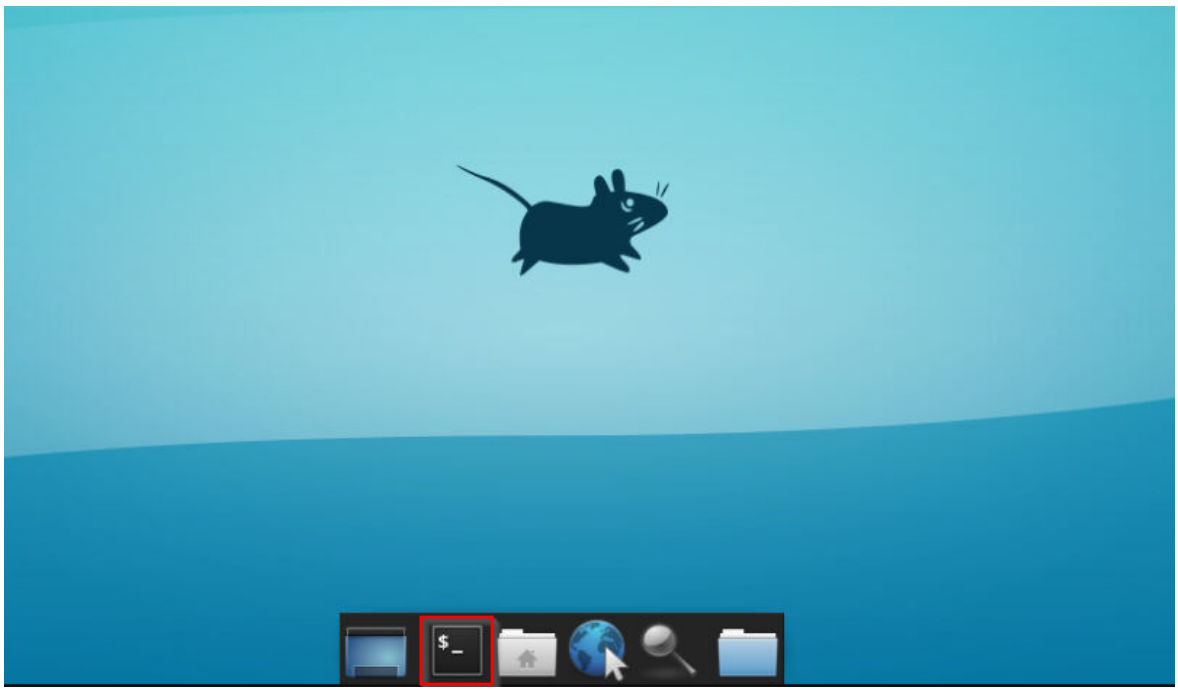


1.18. Close the web browser. Continue to the next task.

2 Running the OpenStack Unified CLI

In this task, you will launch an instance with the *OpenStack Unified command-line interface (CLI)*.

2.1. Open a terminal by clicking the terminal icon in the icon bar at the bottom of the screen. A terminal can also be opened by right-clicking the desktop and selecting **Open Terminal Here**, or by selecting **Applications** at the top left of the screen, then selecting **Terminal Emulator**.



2.2. Source the **keystonerc-admin** file. This will provide a connection with the local OpenStack service with the credentials of the **admin** user, and the command prompt will change to indicate the current OpenStack user whose credentials are keyed in.

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

```
ubuntu@workstation:~$ source ~/keystonerc-admin
[ubuntu@workstation (keystone-admin)]:~$
```

Note

keystonerc files will be discussed in more depth in a future lab.

2.3. The OpenStack CLI is now ready to use, allowing us to create an instance. Just like in the Horizon Dashboard, an image, a flavor, and a network are required. Before launching an instance, we will list the available options for these resources. First, list all available images.

```
[ubuntu@workstation (keystone-admin)]:~$ openstack image list
```

```
[ubuntu@workstation (keystone-admin)]:~$ openstack image list
+--------------------------------------+--------------------------+--------+
| ID                                   | Name                     | Status |
+--------------------------------------+--------------------------+--------+
| dfc5286d-bdb7-4338-8e4b-087422b21e68 | cirros-0.6.2-x86_64-disk | active |
| 329d361e-f6dc-4b72-b200-3de0ec230e65 | ubuntu                   | active |
+--------------------------------------+--------------------------+--------+
[ubuntu@workstation (keystone-admin)]:~$
```

2.4. List all available flavors.

```
[ubuntu@workstation (keystone-admin)]:~$ openstack flavor list
```

```
[ubuntu@workstation (keystone-admin)]:~$ 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 |   40 |         0 |     2 | True      |
| 4  | m1.large  |  8192 |   80 |         0 |     4 | True      |
| 42 | m1.nano   |   128 |    1 |         0 |     1 | True      |
| 5  | m1.xlarge | 16384 |  160 |         0 |     8 | True      |
| 84 | m1.micro  |   192 |    1 |         0 |     1 | True      |
| c1 | cirros256 |   256 |    1 |         0 |     1 | True      |
| d1 | ds512M    |   512 |    5 |         0 |     1 | True      |
| d2 | ds1G      |  1024 |   10 |         0 |     1 | True      |
| d3 | ds2G      |  2048 |   10 |         0 |     2 | True      |
| d4 | ds4G      |  4096 |   20 |         0 |     4 | True      |
+----+-----------+-------+------+-----------+-------+-----------+
[ubuntu@workstation (keystone-admin)]:~$
```

2.5. Display the details specifically for the **m1.small** flavor.

```
[ubuntu@workstation (keystone-admin)]:~$ openstack flavor show m1.small
```

```
[ubuntu@workstation (keystone-admin)]:~$ openstack flavor show m1.small
+----------------------------+-----------------------+
| Field                      | Value                 |
+----------------------------+-----------------------+
| OS-FLV-DISABLED:disabled   | False                 |
| OS-FLV-EXT-DATA:ephemeral  | 0                     |
| access_project_ids         | None                  |
| disk                       | 20                    |
| id                         | 2                     |
| name                       | m1.small              |
| os-flavor-access:is_public | True                  |
| properties                 | hw_rng:allowed='True' |
| ram                        | 2048                  |
| rxtx_factor                | 1.0                   |
| swap                       |                       |
| vcpus                      | 1                     |
+----------------------------+-----------------------+
[ubuntu@workstation (keystone-admin)]:~$
```

2.6. List all available networks.

```
[ubuntu@workstation (keystone-admin)]:~$ openstack network list
```

```
[ubuntu@workstation (keystone-admin)]:~$ openstack network list
+--------------------------------------+---------+--------------------------------------------------------------------------+
| ID                                   | Name    | Subnets                                                                  |
+--------------------------------------+---------+--------------------------------------------------------------------------+
| 32da4c25-b517-40c5-97e3-cea031467d13 | public  | 4fc6bf88-919c-49df-83c4-b09bd65776ad, c7916655-8954-4bf4-913d-416702f35d1b |
| 966ecb4f-4ff8-44ea-a476-2d2f18955085 | private | 674205b6-1357-4727-a21a-94220492a57f, fa8a2545-5a8c-44a2-bacc-1b86c253b880 |
| 9f23266f-d833-4337-9a27-4818a6d28e9e | shared  | 7e456257-76e5-4cfc-bf3f-b2a3876dba40                                     |
+--------------------------------------+---------+--------------------------------------------------------------------------+
[ubuntu@workstation (keystone-admin)]:~$
```

2.7. Create a new instance with the name **prod-instance**, using **ubuntu** as the image, **m1.small** as the flavor, and **shared** as the network.

```
[ubuntu@workstation (keystone-admin)]:~$ openstack server create \
> --image ubuntu \
> --flavor m1.small \
> --network shared \
> prod-instance
```

```
[ubuntu@workstation (keystone-admin)]:~$ openstack server create \
> --image ubuntu \
> --flavor m1.small \
> --network shared \
> --wait prod-instance

+-------------------------------------+------------------------------------------------------------+
| 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-00000002                                          |
| OS-EXT-STS:power_state              | Running                                                    |
| OS-EXT-STS:task_state               | None                                                       |
| OS-EXT-STS:vm_state                 | active                                                     |
| OS-SRV-USG:launched_at              | 2024-06-10T16:42:42.000000                                 |
| OS-SRV-USG:terminated_at            | None                                                       |
| accessIPv4                          |                                                            |
| accessIPv6                          |                                                            |
| addresses                           | shared=192.168.233.166                                     |
| adminPass                           | uPsyV9r8Rdxv                                               |
| config_drive                        |                                                            |
| created                             | 2024-06-10T16:42:39Z                                       |
| flavor                              | m1.small (2)                                               |
| hostId                              | 1b8dbd84262b5472c62a2892fd623993d3a98d2faf2f7862e90ce419   |
| id                                  | c67ff809-ff02-443f-9015-c30dbb33e45d                       |
| image                               | ubuntu (329d361e-f6dc-4b72-b200-3de0ec230e65)              |
| key_name                            | None                                                       |
| name                                | prod-instance                                              |
| progress                            | 0                                                          |
| project_id                          | 39e851b14f864573aad60582c35e40dc                           |
| properties                          |                                                            |
| security_groups                     | name='default'                                             |
| status                              | ACTIVE                                                     |
| updated                             | 2024-06-10T16:42:43Z                                       |
| user_id                             | 14f5376f00c04e90b7103dd8d4263040                           |
| volumes_attached                    |                                                            |
+-------------------------------------+------------------------------------------------------------+
[ubuntu@workstation (keystone-admin)]:~$
```

Tip

When typing the command, make sure there is a space between the last word of the line and \, and press **Enter** to get the > and continue typing the rest of the command.

2.8. Use the **openstack server list** command to list all the available instances.

```
[ubuntu@workstation (keystone-admin)]:~$ openstack server list
```

```
[ubuntu@workstation (keystone-admin)]:~$ openstack server list
+--------------------------------------+--------------+--------+-----------------------+--------+----------+
| ID                                   | Name         | Status | Networks              | Image  | Flavor   |
+--------------------------------------+--------------+--------+-----------------------+--------+----------+
| c67ff809-ff02-443f-9015-c30dbb33e45d | prod-instance | ACTIVE | shared=192.168.233.166 | ubuntu | m1.small |
+--------------------------------------+--------------+--------+-----------------------+--------+----------+
[ubuntu@workstation (keystone-admin)]:~$
```

Note

The UUID in the *ID* field and the IP address in the *Networks* field may differ from the screenshot provided.

2.9. Display more details about the instance **prod-instance**.

```
[ubuntu@workstation (keystone-admin)]:~$ openstack server show prod-instance
```

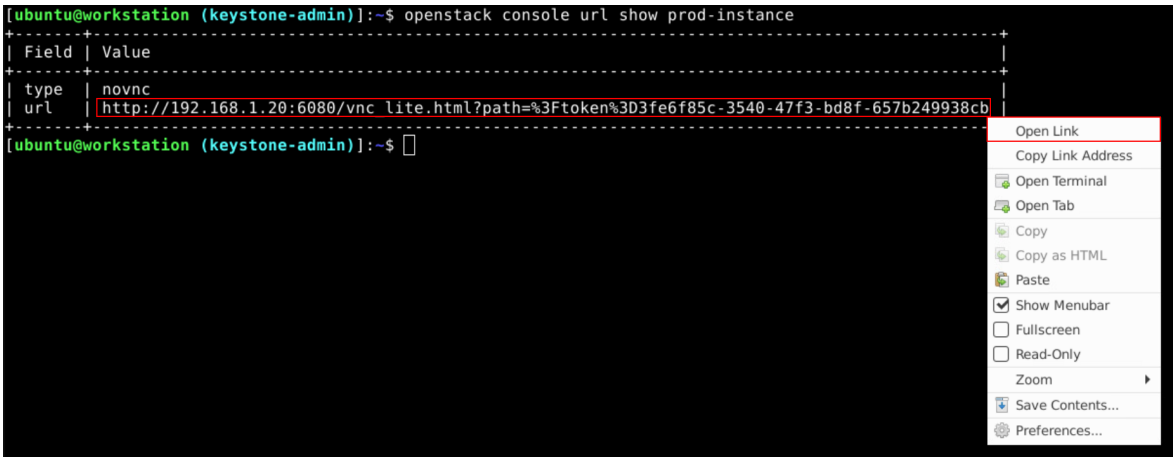
```
[ubuntu@workstation (keystone-admin)]:~$ openstack server show prod-instance
+-------------------------------------+------------------------------------------------------------+
| Field                               | Value                                                      |
+-------------------------------------+------------------------------------------------------------+
| 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-00000002                                          |
| OS-EXT-STS:power_state              | Running                                                    |
| OS-EXT-STS:task_state               | None                                                       |
| OS-EXT-STS:vm_state                 | active                                                     |
| OS-SRV-USG:launched_at              | 2024-06-10T16:42:42.000000                                 |
| OS-SRV-USG:terminated_at            | None                                                       |
| accessIPv4                          |                                                            |
| accessIPv6                          |                                                            |
| addresses                           | shared=192.168.233.166                                     |
| config_drive                        |                                                            |
| created                             | 2024-06-10T16:42:39Z                                       |
| flavor                              | m1.small (2)                                               |
| hostId                              | 1b8dbd84262b5472c62a2892fd623993d3a98d2faf2f7862e90ce419   |
| id                                  | c67ff809-ff02-443f-9015-c30dbb33e45d                       |
| image                               | ubuntu (329d361e-f6dc-4b72-b200-3de0ec230e65)              |
| key_name                            | None                                                       |
| name                                | prod-instance                                              |
| progress                            | 0                                                          |
| project_id                          | 39e851b14f864573aad60582c35e40dc                           |
| properties                          |                                                            |
| security_groups                     | name='default'                                             |
| status                              | ACTIVE                                                     |
| updated                             | 2024-06-10T16:42:43Z                                       |
| user_id                             | 14f5376f00c04e90b7103dd8d4263040                           |
| volumes_attached                    |                                                            |
+-------------------------------------+------------------------------------------------------------+
[ubuntu@workstation (keystone-admin)]:~$
```

Tip

The UUID for the instance **prod-instance** can be used in place of **prod-instance** in the above command to identify the instance.

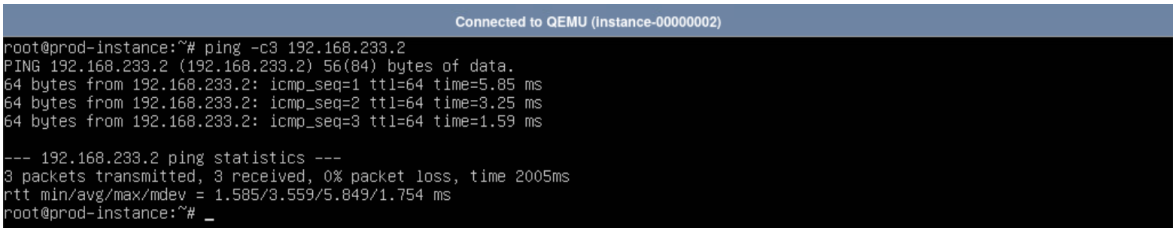
2.10. Display the instance's console URL. Then right-click on the URL and select **Open Link**.

```
[ubuntu@workstation (keystone-admin)]:~$ openstack console url show prod-instance
```



2.11. The web browser will open directly to the instance's console through noVNC. Log into **prod-instance** using **root** as the username and **secret** as the password. Then use the **ping** command to verify connectivity with the DHCP server (**192.168.233.2**).

```
$ ping -c3 192.168.233.2
```



> **Note**
>
> You should receive three successful ping replies.

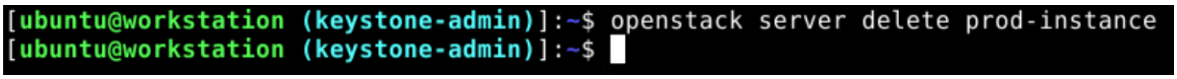
2.12. Close the web browser and change focus back to the previous terminal window.

2.13. The instance is now ready to be deleted, but first list the servers so that the effect of the next step can be observed.

```
[ubuntu@workstation (keystone-admin)]:~$ openstack server list
```

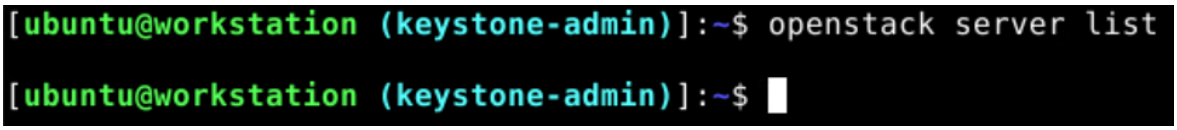
2.14. Delete the instance.

```
[ubuntu@workstation (keystone-admin)]:~$ openstack server delete prod-instance
```



2.15. Ensure that the instance was deleted by seeing that the server list is empty.

```
[ubuntu@workstation (keystone-admin)]:~$ openstack server list
```



2.16. The lab is now complete.

A OpenStack Unified CLI Help

The OpenStack Unified CLI has many commands. Thankfully, they follow a predictable form:

```
openstack [<global-options>] <object-1> <action> [<object-2>] [<command-arguments>]
```

Items in square brackets indicate that they are not present in every command. For instance,

```
openstack image list
```

contains only one object and an action. We will encounter more complex commands in the future, but it is good to keep this common structure in mind. For more information on the structure of OpenStack CLI commands, visit the **Command Structure Documentation**.

To see what actions can be performed on a given object, it is always possible to run a command structured like this:

```
openstack <object> --help
```

For instance, to see what actions you can perform on instances, you can run the command

```
openstack instance --help
```

Other objects include **image**, **flavor**, **network**, and many more that will appear throughout the labs.

Additionally, to see what parameters you can pass to an action, you can run a command structured like this:

```
openstack <object> <action> --help
```

for instance, to see what parameters you can set on an instance, you can run the command

```
openstack server set --help
```

Other object actions include **server list**, **flavor show**, **network create**, and many more that will appear throughout the labs.