

**OpenStack Labs**

**Lab 01: Launching an Instance**

## Contents

Introduction .....	2
Objectives .....	3
1 Launching an Instance Using the Horizon Dashboard .....	4
2 Running the OpenStack Unified CLI .....	13

## Introduction

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

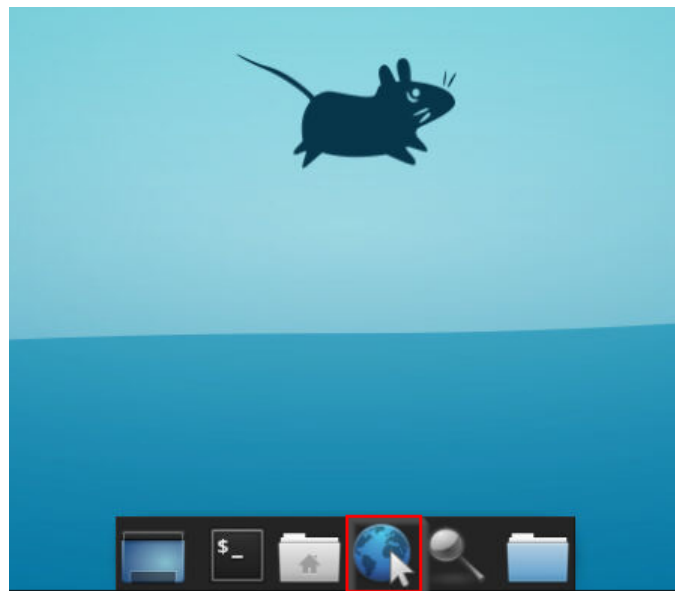
## Objectives

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

# 1 Launching an Instance Using the Horizon Dashboard

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

1. Navigate to **EZSetup**→**Workspaces**→**[Lab Name]**.
2. Log into the **workstation** machine.
  - (a) Copy the password under *Password*.
  - (b) Click **Open** under *VNC Connection*.
  - (c) Paste the password into the *Password* field.
3. A popup window will you to choose the panel setup for the first startup. Choose **Use default config**. Otherwise, there will be no taskbar or panel with convenient shortcuts for the terminal or web browser.
4. If the desktop screen is larger than the window, select the options on the left-hand side of the screen, click the gear icon to go to the settings menu, and under *Scaling Mode*, select **Remote Resizing**.
5. Open the web browser.



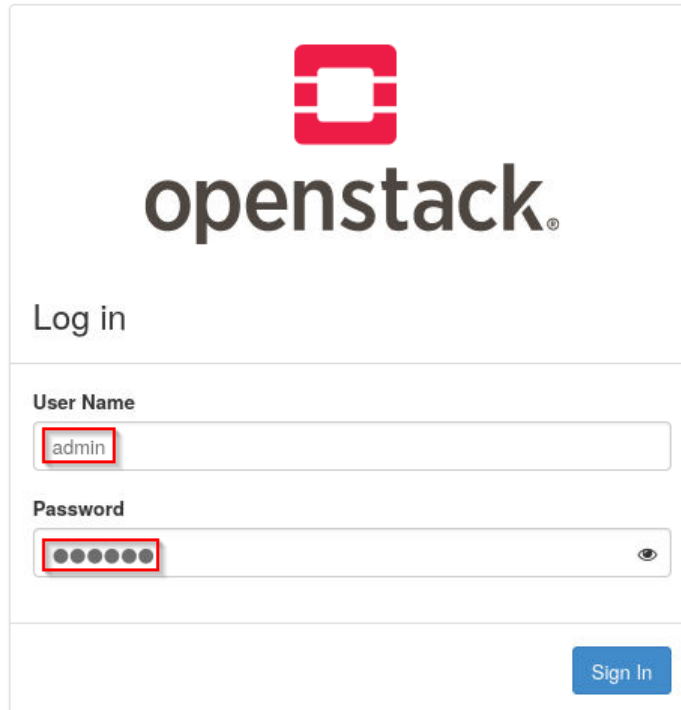
6. Enter the IP address of the **devstack** machine (**192.168.20.0**) into the address bar.



**Tip**

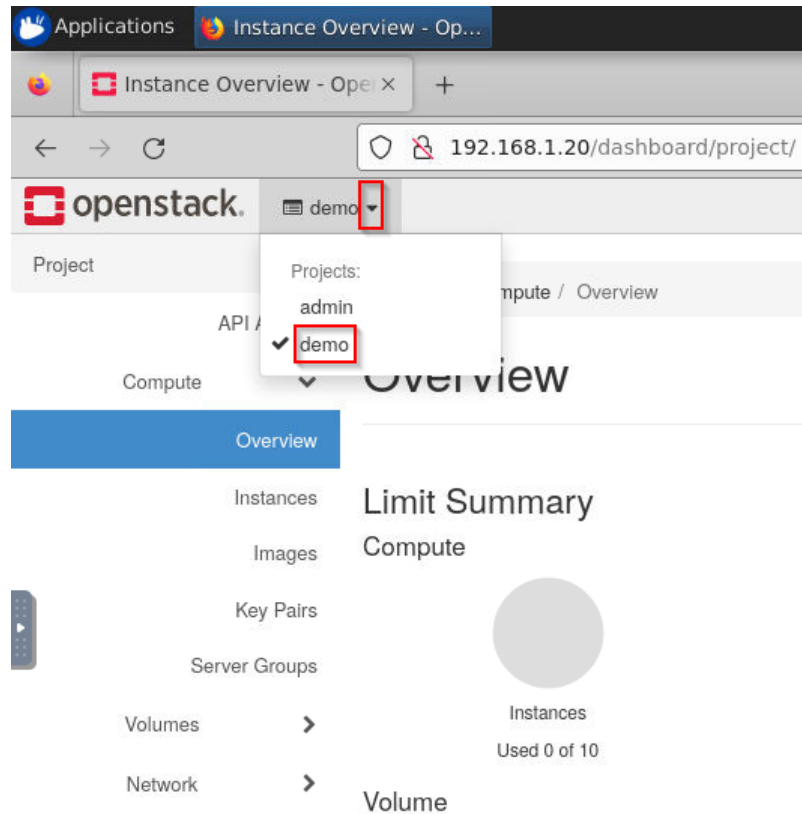
The IP address of each machine of the lab can be found by viewing the EZSetup lab page. Simply click the link between the machine and another object on the network (normally the cloud icon) to find the IP address for that interface.

7. Log into the OpenStack Horizon Dashboard. The username is **admin** and the password is **secret**.

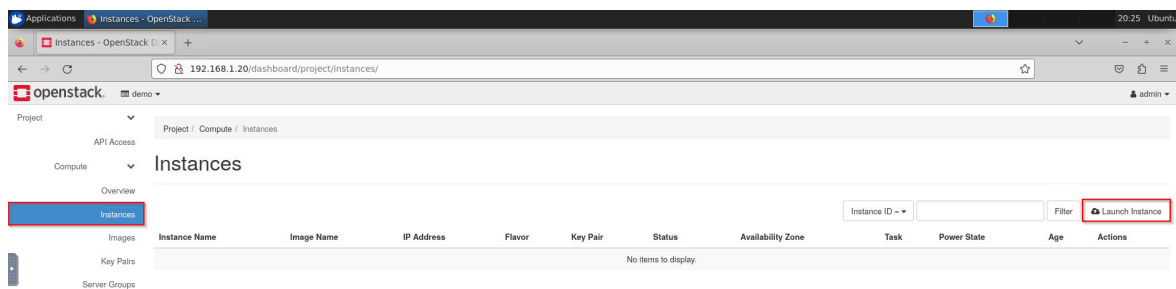


The image shows the OpenStack Horizon login page. At the top is the OpenStack logo, which consists of a red square with a white 'O' inside, followed by the text 'openstack®'. Below the logo is the text 'Log in'. There are two input fields: 'User Name' and 'Password'. The 'User Name' field contains the text 'admin'. The 'Password' field contains a series of dots, indicating a password is entered. A red box highlights the 'admin' text in the 'User Name' field and the dots in the 'Password' field. At the bottom right of the form is a blue button labeled 'Sign In'.

8. Click on the *Project* tab in the top right corner of the webpage, then select **demo** as the project.



9. Navigate to the *Instances* panel and click **Launch Instance** in the top right corner.



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

Launch Instance

Details

Source \*

Flavor \*

Networks \*

Network Ports

Security Groups

Key Pair

Configuration

Server Groups

Scheduler Hints

Metadata

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 \*

prod-instance

Description

Availability Zone

nova

Count \*

1

Total Instances (10 Max)

10%

0 Current Usage

1 Added

9 Remaining

Cancel

< Back

Next >

Launch Instance

11. In the *Select Boot Source* drop down, select **Image**, set *Create New Volume* to **No** and scroll down (if needed) to click the ↑ icon beside of **cirros-0.6.2-x86-64-disk** to use **cirros-0.6.2-x86-64-disk** as the image. Click **Next**.



Launch Instance

Details

Source \*

Flavor \*

Networks \*

Network Ports

Security Groups

Key Pair

Configuration

Server Groups

Scheduler Hints

Metadata

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 1

Select one

Q

Click here for filters or full text search.

X

Displaying 1 item

Name	Updated	Size	Format	Visibility
➤ cirros-0.6.2-x86_64-disk	10/10/23 4:19 PM	20.44 MB	QCOW2	Public

Displaying 1 item

X Cancel

< Back

Next >

Launch Instance

## Stop

Before proceeding to the next step, confirm that **cirros-0.6.2-x86-64-disk** appears underneath the *Allocated* section.

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

[Key Pair](#)
[Configuration](#)
[Server Groups](#)
[Scheduler Hints](#)
[Metadata](#)

Q

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

✕ Cancel

< Back

Next >

Launch Instance

## Stop

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

- Click the ↑ icon beside the **shared** network. If all required fields have been set, the **Launch Instance** button in the bottom right corner should now be clickable. Click **Launch Instance**.

Launch Instance ✕

[Details](#)  
[Source](#)  
[Flavor](#)  
**[Networks](#)** <sup>\*</sup>  
[Network Ports](#)  
[Security Groups](#)  
[Key Pair](#)  
[Configuration](#)  
[Server Groups](#)  
[Scheduler Hints](#)  
[Metadata](#)

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** <sup>2</sup> Select one or more

✕

Displaying 2 items

Network	Subnets Associated	Shared	Admin State	Status
> shared	shared-subnet	Yes	Up	Active <span>⬆</span>
> private	private-subnet ipv6-private-subnet	No	Up	Active <span>⬆</span>

Displaying 2 items

✕ Cancel < Back Next > Launch Instance

### Stop

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

14. To open the console of **prod-instance** in a new tab, right-click on the name **prod-instance** and select **Open Link in New Tab**, or middle-click the name **prod-instance**.

Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State
<b>prod-instance</b>	cirros-0.6.2-x86_64-disk	192.168.233.85	m1.tiny	-	Active	nova	None	Running

Displaying 1 item

- Open Link in New Tab
- Open Link in New Window
- Open Link in New Private Window
- Bookmark Link...
- Save Link As...
- Save Link to Pocket
- Copy Link
- Search Google for "prod-instance"
- Inspect (Q)

### Stop

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

15. 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.

# prod-instance

Overview

Interfaces

Log

Console

Action Log

## Instance Console

If console is not responding to keyboard input: click the grey status bar below. [Click here to show only console](#)  
To exit the fullscreen mode, click the browser's back button.

16. Log into the console as **cirros** with password **gocubsgo**.
17. In the console, ping **192.168.233.2** (DHCP server) to verify connectivity.

```
$ ping -c3 192.168.233.2
```

```

Connected to QEMU (Instance-00000002)

[ 4.018527] evm: security.capability
[ 4.018704] evm: HMAC attrs: 0x1
[ 4.022559] PM: Magic number: 11:457:650
[ 4.023014] tty ttyprintk: hash matches
[ 4.028302] RAS: Correctable Errors collector initialized.
[ 4.046974] Freeing unused decrypted memory: 2036K
[ 4.104696] Freeing unused kernel image (initmem) memory: 3244K
[ 4.105783] Write protecting the kernel read-only data: 30720k
[ 4.109422] Freeing unused kernel image (text/rodata gap) memory: 2036K
[ 4.111574] Freeing unused kernel image (rodata/data gap) memory: 1448K
[ 4.355116] x86/mm: Checked W+X mappings: passed, no W+X pages found.
[ 4.355831] x86/mm: Checking user space page tables
[ 4.581432] x86/mm: Checked W+X mappings: passed, no W+X pages found.
[ 4.582119] Run /init as init process

further output written to /dev/ttyS0
[ 5.468644] virtio_blk virtio2: lvdal 2097152 512-byte logical blocks (1.07 GB/1.00 GiB)
[ 5.490521] GPT:Primary header thinks Alt. header is not at the end of the disk.
[ 5.490891] GPT:229375 t= 2097151
[ 5.491051] GPT:Alternate GPT header not at the end of the disk.
[ 5.491287] GPT:229375 t= 2097151
[ 5.491433] GPT: Use GNU Parted to correct GPT errors.
[ 5.856364] virtio_gpu virtio0: [drm] drm_plane_enable_fb_damage_clips() not called
[ 5.924016] random: crng init done

login as 'cirros' user. default password: 'gocubsgo'. use 'sudo' for root.
prod-instance login: cirros
Password:
$ ping -c3 192.168.233.2
PING 192.168.233.2 (192.168.233.2) 56(84) bytes of data.
64 bytes from 192.168.233.2: icmp_seq=1 ttl=64 time=3.64 ms
64 bytes from 192.168.233.2: icmp_seq=2 ttl=64 time=1.97 ms
64 bytes from 192.168.233.2: icmp_seq=3 ttl=64 time=0.759 ms

--- 192.168.233.2 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2005ms
rtt min/avg/max/mdev = 0.759/2.120/3.635/1.179 ms
$

```

### Note

You should have received three successful ping replies.

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

Instances

Instance ID =

Filter

Launch Instance

Delete Instances


More Actions

Displaying 1 item

<input checked="" type="checkbox"/>	Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
<input checked="" type="checkbox"/>	prod-instance	cirros-0.6.2-x86_64-disk	192.168.233.85	m1.tiny	-	Active	nova	None	Running	0 minutes	Create Snapshot

Displaying 1 item

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

Confirm Delete Instances 

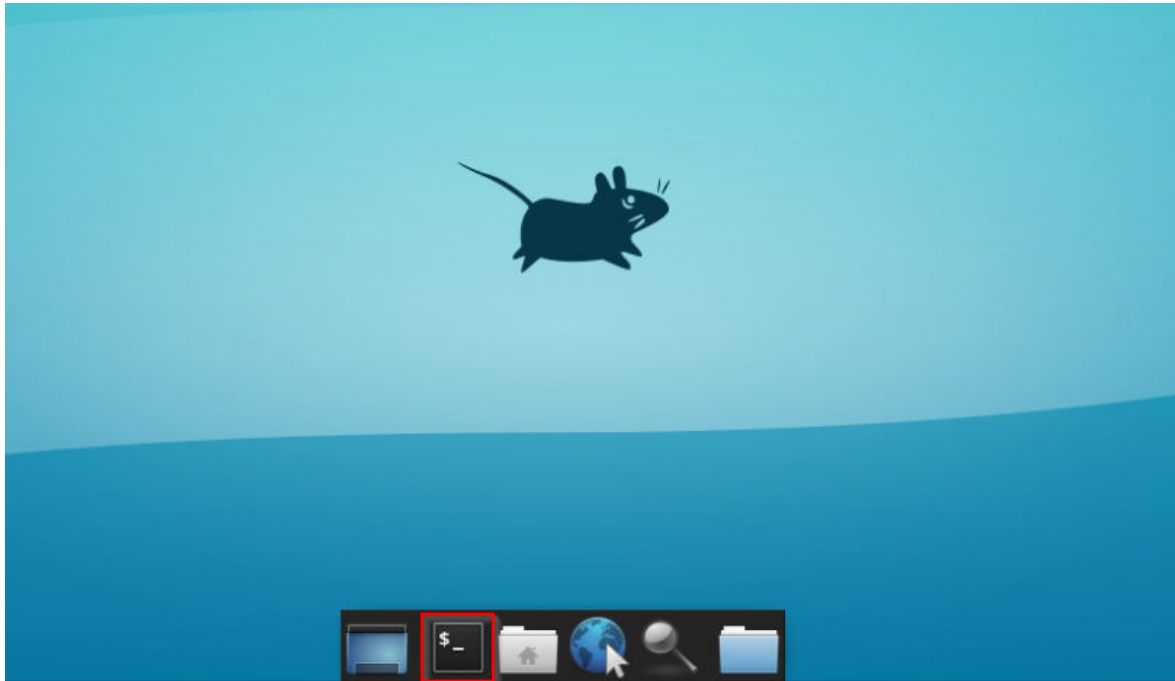
You have selected: "prod-instance". Please confirm your selection. Deleted instances are not recoverable.

21. Close the web browser.

## 2 Running the OpenStack Unified CLI

In this task, you will use the *OpenStack Unified command-line interface (CLI)* to list and check the details of existing projects, users, flavors, images, and instances, and to launch an instance.

1. Open a terminal, either by right-clicking the desktop and selecting **Open Terminal Here**, by clicking the terminal icon in the icon bar at the bottom of the screen, or by selecting **Applications** at the top left of the screen, then selecting **Terminal Emulator**.



2. Ensure you are in the home directory.

```
ubuntu@workstation:/$ cd ~
```

```
ubuntu@workstation:/$ cd ~  
ubuntu@workstation:~$
```

3. The **keystonerc-admin** file in the home directory defines several OS\_\* environment variables that allow you to use the OpenStack platform on the **devstack** server through the OpenStack Unified CLI. The username will be **admin**, the password will be **secret**, the project will be **demo**, and the IP address for OS\_AUTH\_URL is the IP address of the **devstack** server, **192.168.1.20**. You can run **cat** on the file to view its contents.

```
ubuntu@workstation:~$ cat keystonerc-admin
```

```
ubuntu@workstation:~$ cat keystone-admin
unset OS_SERVICE_TOKEN
unset OS_TENANT_ID
unset OS_TENANT_NAME
export OS_USERNAME=admin
export OS_PASSWORD=secret
export OS_AUTH_URL=http://192.168.1.20/identity
export OS_REGION_NAME=RegionOne
export OS_PROJECT_NAME=demo
export OS_INTERFACE=public
export OS_IDENTITY_API_VERSION=3
ubuntu@workstation:~$
```

4. Use the `source` command with the **keystone-admin** argument to enable all the `OS_*` environment variables included in the **keystone-admin** file.

```
ubuntu@workstation:~$ source keystone-admin
```

```
ubuntu@workstation:~$ source keystone-admin
ubuntu@workstation:~$
```

5. Verify that the `OS_*` environment variables have been exported to the shell environment.

```
ubuntu@workstation:~$ env | grep OS_
```

```
ubuntu@workstation:~$ env | grep OS_
OS_AUTH_URL=http://192.168.1.20/identity
OS_REGION_NAME=RegionOne
OS_PROJECT_NAME=demo
OS_IDENTITY_API_VERSION=3
OS_INTERFACE=public
OS_PASSWORD=secret
OS_USERNAME=admin
ubuntu@workstation:~$
```

#### Tip

Use the `openstack help project show` command to determine how to display the details of a particular project.

6. Enter the command below to gather additional information about the **admin** user's current project, **demo**.

```
ubuntu@workstation:~$ openstack project show demo
```

```
ubuntu@workstation:~$ openstack project show demo
+-----+-----+
| Field      | Value                                |
+-----+-----+
| description |                                     |
| domain_id   | default                             |
| enabled     | True                                |
| id          | ac77ab3519ac4a588dfefcb7d7c31085   |
| is_domain   | False                              |
| name        | demo                                |
| options     | {}                                  |
| parent_id   | default                             |
| tags        | []                                  |
+-----+-----+
ubuntu@workstation:~$
```

**Note**

The ID value for **demo** may differ from above since it is a unique ID.

**Tip**

Use the `openstack help user show` command to determine how to display details of a specific user account.

7. Enter the command below to check the details of **admin**.

```
ubuntu@workstation:~$ openstack user show admin
```

```
ubuntu@workstation:~$ openstack user show admin
+-----+-----+
| Field      | Value                                |
+-----+-----+
| domain_id   | default                             |
| enabled     | True                                |
| id          | d20b6b5676724f12b891563fee6b62fd   |
| name        | admin                               |
| options     | {}                                  |
| password_expires_at | None                              |
+-----+-----+
ubuntu@workstation:~$
```

**Tip**

Use the `openstack help flavor list` command to determine how to display all available flavors.

8. Enter the command below to list all available flavors.

```
ubuntu@workstation:~$ openstack flavor list
```



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

9. Enter the command below to display the details specifically for the **m1.tiny** flavor.

```
ubuntu@workstation:~$ openstack flavor show m1.tiny
```

```
ubuntu@workstation:~$ openstack flavor show m1.tiny
```

Field	Value
OS-FLV-DISABLED:disabled	False
OS-FLV-EXT-DATA:ephemeral	0
access_project_ids	None
disk	1
id	1
name	m1.tiny
os-flavor-access:is_public	True
properties	hw_rng:allowed='True'
ram	512
rxtx_factor	1.0
swap	
vcpus	1

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

#### Tip

Use the `openstack help image` command to determine how to list all images.

10. Enter the command below to list all available images.

```
ubuntu@workstation:~$ openstack image list
```

```
ubuntu@workstation:~$ openstack image list
```

ID	Name	Status
8d113bad-1e30-4e04-86a5-bbd9e7effebd	cirros-0.6.2-x86_64-disk	active

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

**Tip**

Use the `openstack help network` command to determine how to list all networks.

- Enter the command below to list all available networks.

```
ubuntu@workstation:~$ openstack network list
```

```
ubuntu@workstation:~$ openstack network list
+-----+-----+-----+
| ID | Name | Subnets |
+-----+-----+-----+
| c2b73520-f786-4891-85d7-5474ff485db6 | private | 5073e887-6c34-4018-9023-19ab46028a6c, 64e819da-079c-4cff-8f54-2bc03c26f95e |
| d787b1d5-d630-4c1d-9274-4d4fd092223b | shared | eaefc117-3488-4d12-884f-13e77b53cae3 |
| ea56d8cd-a775-40f6-8806-6a34c80488e2 | public | 041271d7-5c3b-4c84-a058-f0e8d705a5d1, eef4a8c1-8a72-45e2-8c3a-4ad48797d8c3 |
+-----+-----+-----+
```

- Enter the command below to create a new instance with the name **prod-instance**, using **cirros-0.6.2-x86\_64-disk** as the image, **m1.tiny** as the flavor, and **shared** as the network.

```
ubuntu@workstation:~$ openstack server create --image cirros-0.6.2-x86_64-disk \
> --flavor m1.tiny --network shared --wait prod-instance
```

```
ubuntu@workstation:~$ openstack server create --image cirros-0.6.2-x86_64-disk \
> --flavor m1.tiny --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-00000004 |
| OS-EXT-STS:power_state | Running |
| OS-EXT-STS:task_state | None |
| OS-EXT-STS:vm_state | active |
| OS-SRV-USG:launched_at | 2023-10-24T00:45:31.000000 |
| OS-SRV-USG:terminated_at | None |
| accessIPv4 | |
| accessIPv6 | |
| addresses | shared=192.168.233.186 |
| adminPass | GGWvjngPH732 |
| config drive | |
| created | 2023-10-24T00:45:28Z |
| flavor | m1.tiny (1) |
| hostId | 34e8127e00a53eee6e37b4721631638d2d8534e4bb471ef6ac0c5271 |
| id | 36a3afcc-76e3-4b05-a912-ce7925b1ff24 |
| image | cirros-0.6.2-x86_64-disk (8d113bad-1e30-4e04-86a5-bbd9e7effebd) |
| key_name | None |
| name | prod-instance |
| progress | 0 |
| project_id | ac77ab3519ac4a588dfefcb7d7c31085 |
| properties | |
| security_groups | name='default' |
| status | ACTIVE |
| updated | 2023-10-24T00:45:31Z |
| user_id | d20b6b5676724f12b891563fee6b62fd |
| volumes_attached | |
+-----+-----+
```

**Tip**

When typing the command, make sure there is a space between `cirros-0.6.2-x86_64-disk` and the `\`, and press **Enter** to get the `>` and continue typing the rest of the command.

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

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

```
ubuntu@workstation:~$ openstack server list
+-----+-----+-----+-----+-----+-----+
| ID | Name | Status | Networks | Image | Flavor |
+-----+-----+-----+-----+-----+-----+
| 36a3afcc-76e3-4b05-a912-ce7925b1ff24 | prod-instance | ACTIVE | shared=192.168.233.186 | cirros-0.6.2-x86_64-disk | m1.tiny |
+-----+-----+-----+-----+-----+-----+
ubuntu@workstation:~$
```

**Note**

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

14. Enter the command below to display more details about the instance **prod-instance**.

```
ubuntu@workstation:~$ openstack server show prod-instance
```

```
ubuntu@workstation:~$ 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-00000004 |
| OS-EXT-STS:power_state | Running |
| OS-EXT-STS:task_state | None |
| OS-EXT-STS:vm_state | active |
| OS-SRV-USG:launched_at | 2023-10-24T00:45:31.000000 |
| OS-SRV-USG:terminated_at | None |
| accessIPv4 | |
| accessIPv6 | |
| addresses | shared=192.168.233.186 |
| config_drive | |
| created | 2023-10-24T00:45:28Z |
| flavor | m1.tiny (1) |
| hostId | 34e8127e00a53eee6e37b4721631638d2d8534e4bb471ef6ac0c5271 |
| id | 36a3afcc-76e3-4b05-a912-ce7925b1ff24 |
| image | cirros-0.6.2-x86_64-disk (8d113bad-1e30-4e04-86a5-bbd9e7effebd) |
| key_name | None |
| name | prod-instance |
| progress | 0 |
| project_id | ac77ab3519ac4a588dfefcb7d7c31085 |
| properties | |
| security_groups | name='default' |
| status | ACTIVE |
| updated | 2023-10-24T00:45:31Z |
| user_id | d20b6b5676724f12b891563fee6b62fd |
| volumes_attached | |
+-----+-----+
ubuntu@workstation:~$
```

### Tip

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

- Enter the command below to verify the log for the instance.

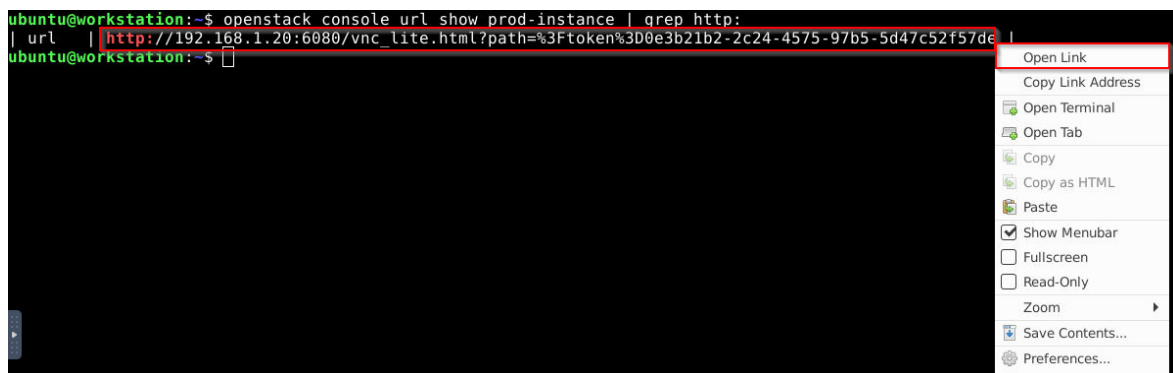
```
ubuntu@workstation:~$ openstack console log show prod-instance
```

```
ubuntu@workstation:~$ openstack console log show prod-instance
[ 0.000000] Linux version 5.15.0-71-generic (build@lcy02-amd64-044) (gcc (Ubuntu 11.3.0-1ubuntu1-22.04.1) 11.3.0, GNU ld (GNU Binutils for Ubuntu) 2.38) #78-Ubuntu SMP Tue Apr 18 09:00:29 UTC 2023 (Ubuntu 5.15.0-71-generic 5.15.92)
[ 0.000000] Command line: LABEL=cirros-rootfs ro console=ttyl console=ttyS0
[ 0.000000] KERNEL supported cpus:
[ 0.000000] Intel GenuineIntel
[ 0.000000] AMD AuthenticAMD
[ 0.000000] Hygon HygonGenuine
[ 0.000000] Centaur CentaurHauls
[ 0.000000] Zhaoxin Shanghai
[ 0.000000] x86/fpu: x87 FPU will use FXSAVE
[ 0.000000] signal: max sigframe size: 1440
[ 0.000000] BIOS-provided physical RAM map:
[ 0.000000] BIOS-e820: [mem 0x0000000000000000-0x000000000009fbfff] usable
[ 0.000000] BIOS-e820: [mem 0x000000000009fc00-0x000000000009ffff] reserved
[ 0.000000] BIOS-e820: [mem 0x00000000000f0000-0x00000000000fffff] reserved
[ 0.000000] BIOS-e820: [mem 0x0000000000100000-0x00000000001ffccfff] usable
[ 0.000000] BIOS-e820: [mem 0x00000000001ffdd000-0x00000000001fffffff] reserved
[ 0.000000] BIOS-e820: [mem 0x0000000000fffc0000-0x0000000000fffffff] reserved
[ 0.000000] NX (Execute Disable) protection: active
[ 0.000000] SMBIOS 2.8 present.
[ 0.000000] DMI: OpenStack Foundation OpenStack Nova, BIOS 1.15.0-1 04/01/2014
[ 0.000000] tsc: Fast TSC calibration using PIT
[ 0.000000] tsc: Detected 2494.158 MHz processor
[ 0.014140] last pfn = 0x1ffdd max arch pfn = 0x400000000
[ 0.015415] x86/PAT: Configuration [0-7]: WB WC UC- UC WB WP UC- WT
[ 0.036538] found SMP MP-table at [mem 0x000f5b80-0x000f5b8f]
[ 0.044705] RAMDISK: [mem 0x1f743000-0x1ffccfff]
[ 0.045260] ACPI: Early table checksum verification disabled
```

- Enter the command below to display the instance's console URL. Pipe the command to **grep** so that you will get a link in the terminal you can click on. Then right click on the URL and select **Open Link**.

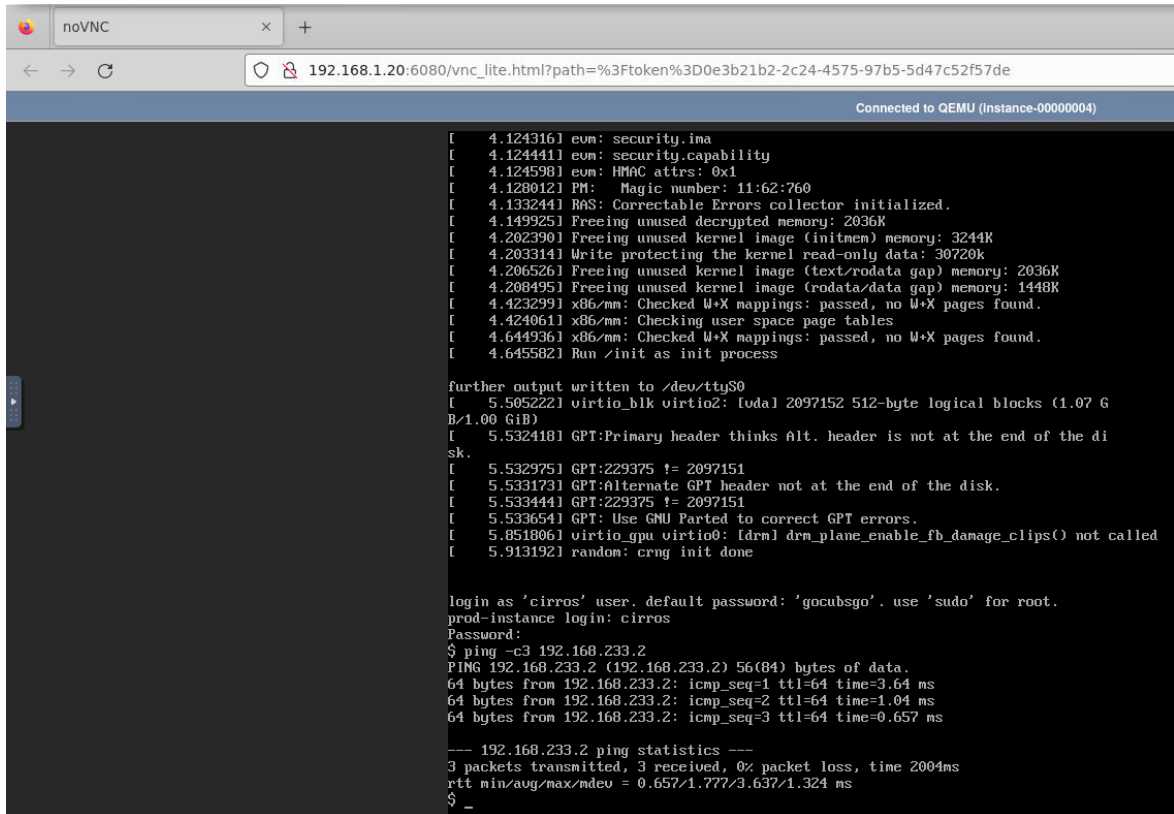
```
ubuntu@workstation:~$ openstack console url show prod-instance grep https:
```

```
ubuntu@workstation:~$ openstack console url show prod-instance | grep http:
| url | http://192.168.1.20:6080/vnc_lite.html?path=%3Ftoken%3D0e3b21b2-2c24-4575-97b5-5d47c52f57de
ubuntu@workstation:~$
```



- The web browser will open directly to the instance's console through noVNC. Log into **prod-instance** using **cirros** as the username and **gocubsgo** 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
```



```

[ 4.124316] evm: security.ima
[ 4.124441] evm: security.capability
[ 4.124598] evm: HMAC attrs: 0x1
[ 4.128012] PM: Magic number: 11:62:760
[ 4.133244] RAS: Correctable Errors collector initialized.
[ 4.149925] Freeing unused decrypted memory: 2036K
[ 4.202390] Freeing unused kernel image (initmem) memory: 3244K
[ 4.203314] Write protecting the kernel read-only data: 30720k
[ 4.206526] Freeing unused kernel image (text/rodata gap) memory: 2036K
[ 4.208495] Freeing unused kernel image (rodata/data gap) memory: 1448K
[ 4.423299] x86/mm: Checked W*X mappings: passed, no W*X pages found.
[ 4.424061] x86/mm: Checking user space page tables
[ 4.644936] x86/mm: Checked W*X mappings: passed, no W*X pages found.
[ 4.645582] Run /init as init process

further output written to /dev/ttyS0
[ 5.505222] virtio_blk virtio2: [tda] 2097152 512-byte logical blocks (1.07 G
B/1.00 GiB)
[ 5.532418] GPT:Primary header thinks Alt. header is not at the end of the di
sk.
[ 5.532975] GPT:229375 != 2097151
[ 5.533173] GPT:Alternate GPT header not at the end of the disk.
[ 5.533444] GPT:229375 != 2097151
[ 5.533654] GPT: Use GNU Parted to correct GPT errors.
[ 5.851806] virtio_gpu virtio0: [drm] drm_plane_enable_fb_damage_clips() not called
[ 5.913192] random: crng init done

login as 'cirros' user. default password: 'gocubsgo'. use 'sudo' for root.
prod-instance login: cirros
Password:
$ ping -c3 192.168.233.2
PING 192.168.233.2 (192.168.233.2) 56(84) bytes of data.
64 bytes from 192.168.233.2: icmp_seq=1 ttl=64 time=3.64 ms
64 bytes from 192.168.233.2: icmp_seq=2 ttl=64 time=1.04 ms
64 bytes from 192.168.233.2: icmp_seq=3 ttl=64 time=0.657 ms

--- 192.168.233.2 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2004ms
rtt min/avg/max/ndev = 0.657/1.777/3.637/1.324 ms
$ _

```

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

19. Enter the command below to stop the instance

```
ubuntu@workstation:~$ openstack server stop prod-instance
```

```
ubuntu@workstation:~$ openstack server stop prod-instance
ubuntu@workstation:~$
```

20. **prod-instance** should now be in the SHUTOFF state. Enter the command below to verify this.

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

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

ID	Name	Status	Networks	Image	Flavor
36a3afcc-76e3-4b05-a912-ce7925b1ff24	prod-instance	SHUTOFF	shared=192.168.233.186	cirros-0.6.2-x86_64-disk	m1.tiny

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

21. Enter the command below to delete the instance.

```
ubuntu@workstation:~$ openstack server delete prod-instance
```

```
ubuntu@workstation:~$ openstack server delete prod-instance  
ubuntu@workstation:~$
```

22. The lab is now complete.