OpenStack Labs

Lab 12: Deploying an FTP Server

Contents

Introduction

In this lab, you will practice and demonstrate the knowledge and skills you acquired throughout the course by deploying an FTP server through OpenStack.

Objectives

- Launch an instance in your OpenStack environment and customize the instance to run an FTP server.
- Access the FTP server from the workstation to confirm the configuration.

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: 192.168.1.23 ens4: 172.25.250.23	ubuntu	ubuntu
devstack	ens3: 192.168.1.22 ens4: 172.25.250.22	ubuntu	ubuntu

1 Launch an FTP Server Instance

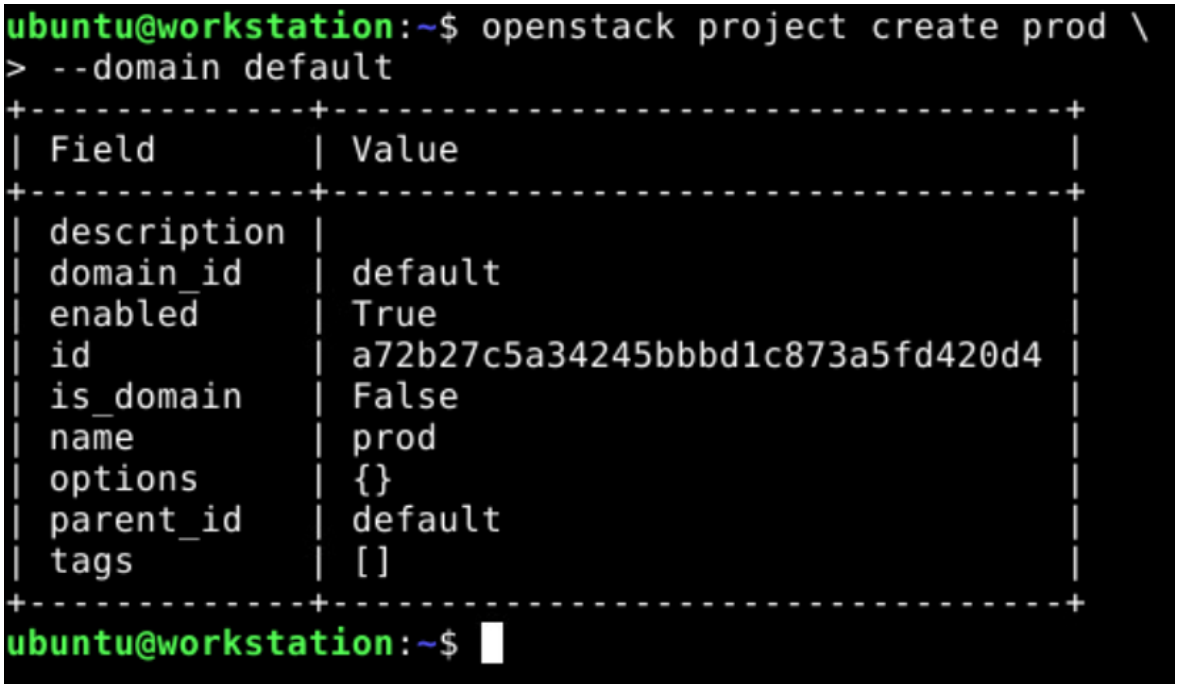
In this task, you will deploy an FTP server in your environment. The architecture will be comprised of an external network and an internal network, a new privileged user and a non-privileged user, and a set of new security rules to allow FTP access to the instance. A floating IP will be associated with the instance to permit external connectivity.

1. Log into the **workstation** machine as **ubuntu** with the password **ubuntu**.
2. Open a terminal window and source the ~/**keystonerc-admin** keystone credentials file.

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

3. Create the **prod** project.

```
ubuntu@workstation:~$ openstack project create prod \
> --domain default
```



Tip

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

4. Create a user named **superuser** with the password **secret** to the **prod** project.

```
ubuntu@workstation:~$ openstack user create \
> --project prod \
> --password secret \
> --email ubuntu@workstation.lab.example.com \
> superuser
```

```
ubuntu@workstation:~$ openstack user create \
> --project prod \
> --password secret \
> --email ubuntu@workstation.lab.example.com \
> superuser
+---------------------+----------------------------------+
| Field               | Value                            |
+---------------------+----------------------------------+
| default_project_id  | a72b27c5a34245bbbd1c873a5fd420d4 |
| domain_id           | default                          |
| email               | ubuntu@workstation.lab.example.com |
| enabled             | True                             |
| id                  | 18548b0493494ebeba479a1de1b3e264 |
| name                | superuser                        |
| options             | {}                               |
| password_expires_at | None                             |
+---------------------+----------------------------------+
ubuntu@workstation:~$
```

5. Assign the **admin** role to the user **superuser**.

```
ubuntu@workstation:~$ openstack role add \
> --project prod \
> --user superuser \
> admin
```

```
ubuntu@workstation:~$ openstack role add \
> --project prod \
> --user superuser \
> admin
ubuntu@workstation:~$
```

6. Copy the keystone credentials file **~/keystonerc-admin** to **~/keystonerc-superuser**.

```
ubuntu@workstation~$ cp ~/keystonerc-admin ~/keystonerc-superuser
```

```
ubuntu@workstation:~$ cp ~/keystonerc-admin ~/keystonerc-superuser
ubuntu@workstation:~$
```

7. Use `nano` to edit the **~/keystonerc-superuser** file. Change the `OS_USERNAME` to **superuser**, and change the `OS_TENANT_NAME` to **prod**. The file should match the the contents shown below. Press **CTRL+X** to exit the file, then press **Y** and then **ENTER** to save the changes to the file.

```
ubuntu@workstation:~$ nano ~/keystonerc-superuser
```

```
 GNU nano 2.9.3          /home/ubuntu/keystonerc-superuser          Modified

unset OS_SERVICE_TOKEN
unset OS_TENANT_ID
unset OS_TENANT_NAME
export OS_USERNAME=superuser
export OS_PASSWORD=secret
export OS_AUTH_URL=http://192.168.1.22/identity
export OS_REGION_NAME=RegionOne
export OS_PROJECT_NAME=prod
export OS_INTERFACE=public
export OS_IDENTITY_API_VERSION=3
```

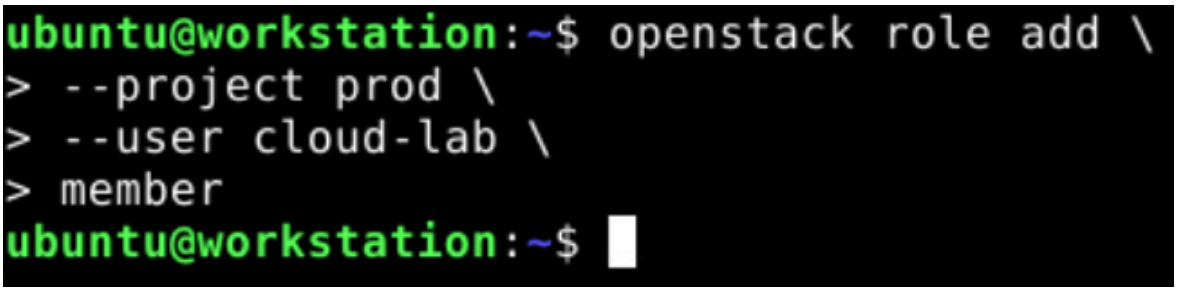
8. Now, create a non-privileged user called **cloud-lab** with the password **secret**.

```
ubuntu@workstation:~$ openstack user create \
> --project prod \
> --password secret
> --email ubuntu@workstation.lab.example.com \
> cloud-lab
```

```
ubuntu@workstation:~$ openstack user create \
> --project prod \
> --password secret \
> --email ubuntu@workstation.lab.example.com \
> cloud-lab
+---------------------+----------------------------------+
| Field               | Value                            |
+---------------------+----------------------------------+
| default_project_id  | a72b27c5a34245bbbd1c873a5fd420d4 |
| domain_id           | default                          |
| email               | ubuntu@workstation.lab.example.com |
| enabled             | True                             |
| id                  | 8588c114770741b6ae3cb0d3f6e85c00 |
| name                | cloud-lab                        |
| options             | {}                               |
| password_expires_at | None                             |
+---------------------+----------------------------------+
ubuntu@workstation:~$
```

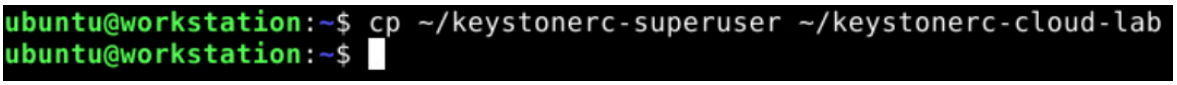
9. Assign **cloud-lab** the **member** role in the **prod** project so that it can perform actions in that project.

```
ubuntu@workstation:~$ openstack role add \
> --project prod \
> --user cloud-lab \
> member
```



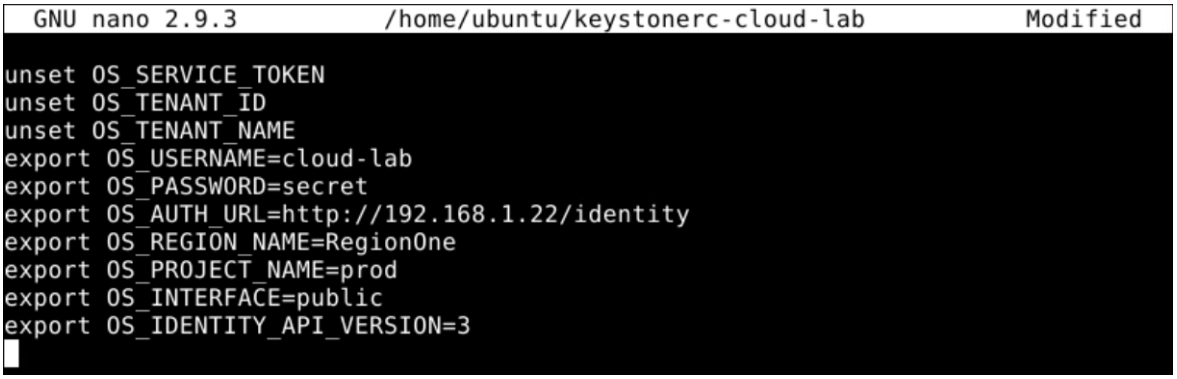
10. Copy the keystone credentials file ~/**keystonerc-superuser** to ~/**keystonerc-cloud-lab**.

```
ubuntu@workstation:~$ cp ~/keystonerc-superuser ~/keystonerc-cloud-lab
```



11. Use `nano` to edit the ~/**keystonerc-cloud-lab** file. Change the `OS_USERNAME` to **cloud-lab**. The file should match the contents shown below. Press **CTRL+X** to exit the file, then press **Y** and then **ENTER** to save the changes to the file.

```
ubuntu@workstation:~$ nano ~/keystonerc-cloud-lab
```



12. Now, source the **keystonerc-superuser** keystone file to begin working with admin privileges in the **prod** project.

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

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

13. Before making an external network for the project, the existing one must be deleted. Before the existing external network can be deleted, the router needs to be deleted, which requires first deleting its interfaces. First, show the details of the router **router1** to find the interfaces to delete.

```
ubuntu@workstation:~$ openstack router show router1
```

14. Next, delete the two interfaces on the router using the `port_id` values from the output of the previous step.

```
ubuntu@workstation:~$ openstack router remove port \
> router1 \
> 5290b8a9-4f26-415f-b134-459cb139a906
ubuntu@workstation:~$ openstack router remove port \
> router1 \
> 5c97ebfb-d998-413e-998b-f375171b363f
```

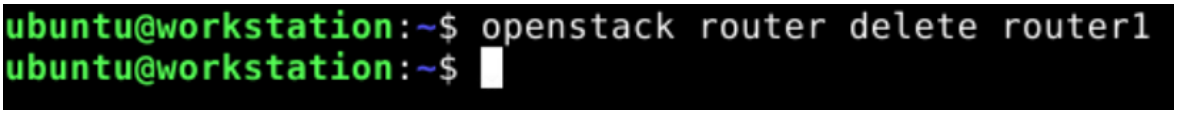
```
ubuntu@workstation:~$ openstack router remove port \
> router1 \
> 5290b8a9-4f26-415f-b134-459cb139a906
ubuntu@workstation:~$ openstack router remove port \
> router1 \
> 5c97ebfb-d998-413e-998b-f375171b363f
ubuntu@workstation:~$
```

Note

The actual IDs may differ from this example.

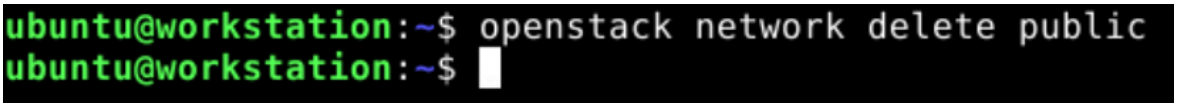
15. Now, **router1** can be deleted.

```
ubuntu@workstation:~$ openstack router delete router1
```



16. Finally, delete the existing external network named **public**.

```
ubuntu@workstation:~$ openstack network delete public
```



17. Create an external, shared network called **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                | 2024-01-04T20:13:06Z                 |
| description               |                                      |
| dns_domain                | None                                 |
| id                        | 9d09170a-73c8-419c-b8b4-db0bcf418ac8 |
| 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                | c50851c6559442df92e0e0799376a84f     |
| 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                | 2024-01-04T20:13:06Z                 |
+---------------------------+--------------------------------------+
ubuntu@workstation:~$
```

18. Create the **external_subnet** subnet in the **172.25.250.0/24** range. Make the floating IP allocation pool range from **172.25.250.25** to **172.250.250.30**, and allow DHCP. Set both the gateway and DNS nameserver addresses to **172.25.250.254**.

```
ubuntu@workstation:~$ openstack subnet create \
> --subnet-range 172.25.250.0/24 \
> --allocation-pool start=172.25.250.25,end=172.25.250.30 \
> --dhcp --network external \
> --gateway 172.25.250.254 \
> --dns-nameserver 172.25.250.254 external_subnet
```

```
ubuntu@workstation:~$ openstack subnet create \
> --subnet-range 172.25.250.0/24 \
> --allocation-pool start=172.25.250.25,end=172.25.250.30 \
> --dhcp --network external \
> --gateway 172.25.250.254 \
> --dns-nameserver 172.25.250.254 external_subnet
+-------------------+--------------------------------------+
| Field             | Value                                |
+-------------------+--------------------------------------+
| allocation_pools  | 172.25.250.25-172.25.250.30          |
| cidr              | 172.25.250.0/24                      |
| created_at        | 2024-01-04T20:18:22Z                 |
| description       |                                      |
| dns_nameservers   | 172.25.250.254                       |
| enable_dhcp       | True                                 |
| gateway_ip        | 172.25.250.254                       |
| host_routes       |                                      |
| id                | a7caff1b-19a8-4eb1-bc81-35c878fa43f5 |
| ip_version        | 4                                    |
| ipv6_address_mode | None                                 |
| ipv6_ra_mode      | None                                 |
| name              | external_subnet                      |
| network_id        | 9d09170a-73c8-419c-b8b4-db0bcf418ac8 |
| project_id        | a72b27c5a34245bbbd1c873a5fd420d4     |
| revision_number   | 0                                    |
| segment_id        | None                                 |
| service_types     |                                      |
| subnetpool_id     | None                                 |
| tags              |                                      |
| updated_at        | 2024-01-04T20:18:22Z                 |
+-------------------+--------------------------------------+
ubuntu@workstation:~$
```

19. Source the **/keystonerc-cloud-lab** keystone credentials file.

```
ubuntu@workstation:~$ source ~/keystonerc-cloud-lab
```

```
ubuntu@workstation:~$ source ~/keystonerc-cloud-lab
ubuntu@workstation:~$
```

20. Create an internal network called **net1**.

```
ubuntu@workstation:~$ openstack network create net1
```

```
ubuntu@workstation:~$ openstack network create net1
+---------------------------+--------------------------------------+
| Field                     | Value                                |
+---------------------------+--------------------------------------+
| admin_state_up            | UP                                   |
| availability_zone_hints   |                                      |
| availability_zones        |                                      |
| created_at                | 2024-01-04T20:20:38Z                 |
| description               |                                      |
| dns_domain                | None                                 |
| id                        | 050946d2-1cc0-4403-9f26-8e8513dfd41d |
| ipv4_address_scope        | None                                 |
| ipv6_address_scope        | None                                 |
| is_default                | False                                |
| is_vlan_transparent       | None                                 |
| mtu                       | 1442                                 |
| name                      | net1                                 |
| port_security_enabled     | True                                 |
| project_id                | a72b27c5a34245bbbd1c873a5fd420d4     |
| provider:network_type     | geneve                               |
| provider:physical_network | None                                 |
| provider:segmentation_id  | 38038                                |
| qos_policy_id             | None                                 |
| revision_number           | 1                                    |
| router:external           | Internal                             |
| segments                  | None                                 |
| shared                    | False                                |
| status                    | ACTIVE                               |
| subnets                   |                                      |
| tags                      |                                      |
| updated_at                | 2024-01-04T20:20:39Z                 |
+---------------------------+--------------------------------------+
ubuntu@workstation:~$
```

21. Create a subnet for **net1** called **subnet1** in the **192.168.0.0/24** range. Allow DHCP on the subnet.

```
ubuntu@workstation:~$ openstack subnet create \
> --subnet-range 192.168.0.0/24 \
> --network net1 subnet1
```

```
ubuntu@workstation:~$ openstack subnet create \
> --subnet-range 192.168.0.0/24 \
> --network net1 subnet1
+-------------------+--------------------------------------+
| Field             | Value                                |
+-------------------+--------------------------------------+
| allocation_pools  | 192.168.0.2-192.168.0.254            |
| cidr              | 192.168.0.0/24                       |
| created_at        | 2024-01-04T20:21:21Z                 |
| description       |                                      |
| dns_nameservers   |                                      |
| enable_dhcp       | True                                 |
| gateway_ip        | 192.168.0.1                          |
| host_routes       |                                      |
| id                | 6b44acd8-1ef7-4db6-9c3d-4bdc21179612 |
| ip_version        | 4                                    |
| ipv6_address_mode | None                                 |
| ipv6_ra_mode      | None                                 |
| name              | subnet1                              |
| network_id        | 050946d2-1cc0-4403-9f26-8e8513dfd41d |
| project_id        | a72b27c5a34245bbbd1c873a5fd420d4     |
| revision_number   | 0                                    |
| segment_id        | None                                 |
| service_types     |                                      |
| subnetpool_id     | None                                 |
| tags              |                                      |
| updated_at        | 2024-01-04T20:21:21Z                 |
+-------------------+--------------------------------------+
ubuntu@workstation:~$
```

22. Create a router named **router1** so that the internal and external networks can be connected.

```
ubuntu@workstation:~$ openstack router create router1
```

```
ubuntu@workstation:~$ openstack router create router1
+-------------------------+--------------------------------------+
| Field                   | Value                                |
+-------------------------+--------------------------------------+
| admin_state_up          | UP                                   |
| availability_zone_hints |                                      |
| availability_zones      |                                      |
| created_at              | 2024-01-04T20:21:53Z                 |
| description             |                                      |
| distributed             | False                                |
| external_gateway_info   | None                                 |
| flavor_id               | None                                 |
| ha                      | False                                |
| id                      | e6109151-8725-431f-90e5-a8a947679489 |
| name                    | router1                              |
| project_id              | a72b27c5a34245bbbd1c873a5fd420d4     |
| revision_number         | 1                                    |
| routes                  |                                      |
| status                  | ACTIVE                               |
| tags                    |                                      |
| updated_at              | 2024-01-04T20:21:53Z                 |
+-------------------------+--------------------------------------+
ubuntu@workstation:~$
```

23. Add a port to the router for the internal network.

```
ubuntu@workstation:~$ openstack router add subnet router1 subnet1
```

```
ubuntu@workstation:~$ openstack router add subnet router1 subnet1
ubuntu@workstation:~$
```

24. Set the external network as the gateway for the router.

```
ubuntu@workstation:~$ openstack router set \
> --external-gateway external \
> router1
```

```
ubuntu@workstation:~$ openstack router set \
> --external-gateway external \
> router1
ubuntu@workstation:~$
```

25. Allocate a floating IP address from the **external** network for hte **prod** project.

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

```
ubuntu@workstation:~$ openstack floating ip create external
+---------------------+--------------------------------------+
| Field               | Value                                |
+---------------------+--------------------------------------+
| created_at          | 2024-01-04T20:48:35Z                 |
| description         |                                      |
| fixed_ip_address    | None                                 |
| floating_ip_address | 172.25.250.30                        |
| floating_network_id | 9d09170a-73c8-419c-b8b4-db0bcf418ac8 |
| id                  | f60c1e3a-cb0e-45ed-9e3f-8c64508594fd |
| name                | 172.25.250.30                        |
| port_id             | None                                 |
| project_id          | a72b27c5a34245bbbd1c873a5fd420d4     |
| qos_policy_id       | None                                 |
| revision_number     | 0                                    |
| router_id           | None                                 |
| status              | DOWN                                 |
| subnet_id           | None                                 |
| updated_at          | 2024-01-04T20:48:35Z                 |
+---------------------+--------------------------------------+
ubuntu@workstation:~$
```

26. Generate a key pair for the **cloud-lab** user named **key1**.

```
ubuntu@workstation:~$ openstack keypair create \
> key1 > ~/Downloads/key1.pem
```

```
ubuntu@workstation:~$ openstack keypair create \
> key1 > ~/Downloads/key1.pem
ubuntu@workstation:~$
```

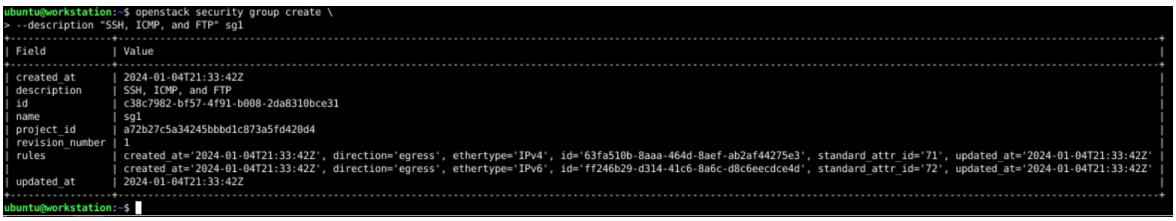
27. Change the permissions of the key pair file so that only the **ubuntu** user has read and write permissions.

```
ubuntu@workstation:~$ chmod 600 ~/Downloads/key1.pem
```

```
ubuntu@workstation:~$ chmod 600 ~/Downloads/key1.pem
ubuntu@workstation:~$
```

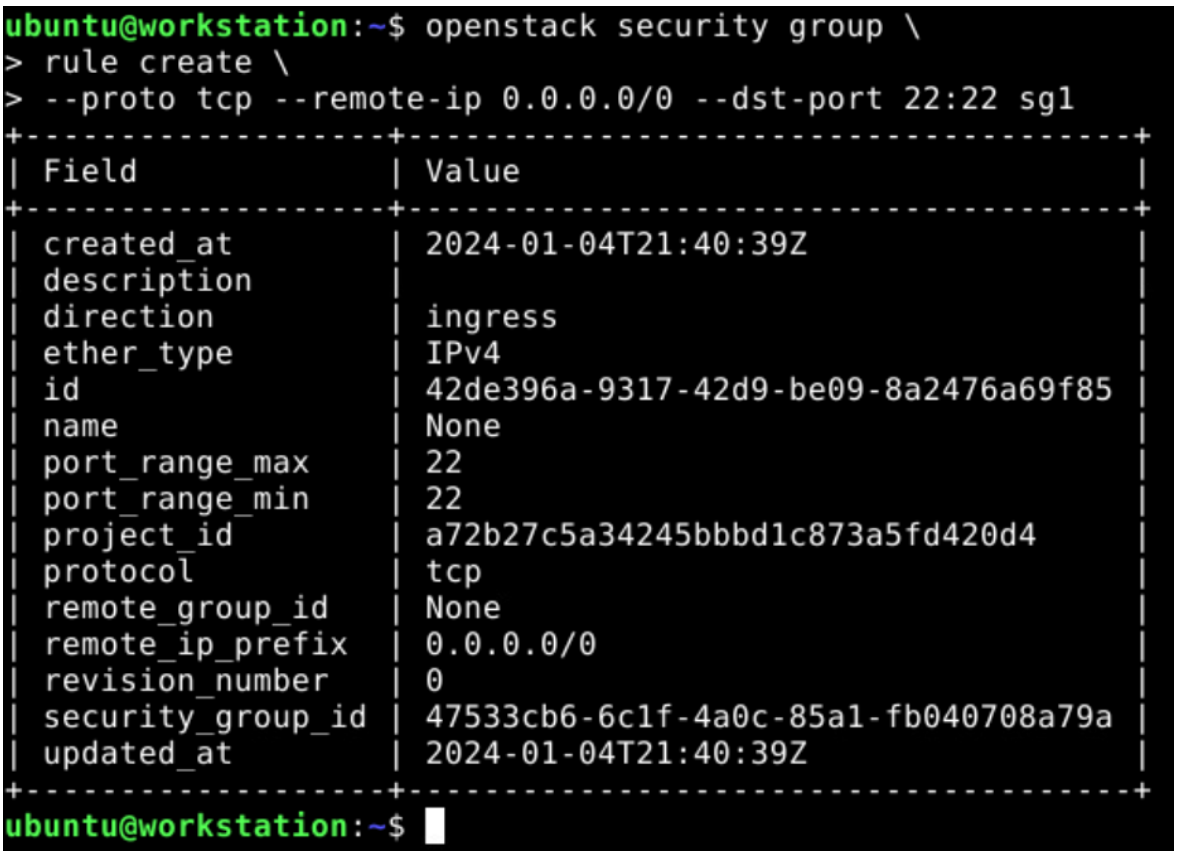
28. Create a security group named **sg1** for the **prod** project.

```
ubuntu@workstation:~$ openstack security group create \
> --description "SSH, ICMP, and FTP" sg1
```



29. Create a security group rule to allow **SSH** traffic from any IP address. SSH uses the TCP protocol on port 22 by default.

```
ubuntu@workstation:~$ openstack security group \
> rule create \
> --proto tcp --remote-ip 0.0.0.0/0 --dst-port 22:22 sg1
```



30. Create a security group rule to allow **ICMP** traffic from any IP address.

```
ubuntu@workstation:~$ openstack security group \
> rule create \
> --proto icmp --remote-ip 0.0.0.0/0 sg1
```

```
ubuntu@workstation:~$ openstack security group \
> rule create \
> --proto icmp --remote-ip 0.0.0.0/0 sg1
+-------------------+--------------------------------------+
| Field             | Value                                |
+-------------------+--------------------------------------+
| created_at        | 2024-01-04T21:50:30Z                 |
| description       |                                      |
| direction         | ingress                              |
| ether_type        | IPv4                                 |
| id                | 7508f181-399d-4ccc-aa4f-27ad4ffcd203 |
| name              | None                                 |
| port_range_max    | None                                 |
| port_range_min    | None                                 |
| project_id        | a72b27c5a34245bbbd1c873a5fd420d4     |
| protocol          | icmp                                 |
| remote_group_id   | None                                 |
| remote_ip_prefix  | 0.0.0.0/0                            |
| revision_number   | 0                                    |
| security_group_id | 47533cb6-6c1f-4a0c-85a1-fb040708a79a |
| updated_at        | 2024-01-04T21:50:30Z                 |
+-------------------+--------------------------------------+
ubuntu@workstation:~$
```

31. Create a security group rule to allow **FTP** traffic from any IP address. FTP uses the TCP protocol on port 20 (data channel) and port 21 (control channel).

```
ubuntu@workstation:~$ openstack security group \
> rule create \
> --proto tcp --remote-ip 0.0.0.0/0 --dst-port 20:21 sg1
```

```
ubuntu@workstation:~$ openstack security group \
> rule create \
> --proto tcp --remote-ip 0.0.0.0/0 --dst-port 20:21 sg1
+-------------------+--------------------------------------+
| Field             | Value                                |
+-------------------+--------------------------------------+
| created_at        | 2024-01-04T21:52:04Z                 |
| description       |                                      |
| direction         | ingress                              |
| ether_type        | IPv4                                 |
| id                | b4125b68-e5a9-4778-bc4d-6dea1e3b3bd6 |
| name              | None                                 |
| port_range_max    | 21                                   |
| port_range_min    | 20                                   |
| project_id        | a72b27c5a34245bbbd1c873a5fd420d4     |
| protocol          | tcp                                  |
| remote_group_id   | None                                 |
| remote_ip_prefix  | 0.0.0.0/0                            |
| revision_number   | 0                                    |
| security_group_id | 47533cb6-6c1f-4a0c-85a1-fb040708a79a |
| updated_at        | 2024-01-04T21:52:04Z                 |
+-------------------+--------------------------------------+
ubuntu@workstation:~$
```

32. The FTP server instance is almost ready to be launched. First, use `nano` to create a file named `script` in the home directory. Be sure it has the correct indentation and matches the contents shown below. Press **CTRL+X** to exit the file, then press **Y** and then **ENTER** to save the changes to the file.

```
ubuntu@workstation:~$ nano ~/script
```

Note

This `cloud-init` script writes to the "message of the day" file, and its contents will be displayed upon a successful login.

33. Create an instance named **ftp_server** using **net1** for the internal network, **m1.small** as the flavor, and **ubuntu** as the image.

```
ubuntu@workstation:~$ openstack server create \
> --image ubuntu \
> --flavor m1.small \
> --security-group sg1 \
> --user-data script \
> --key-name key1 \
> --nic net-id=net1 \
> --wait ftp_server
```

```
ubuntu@workstation:~$ openstack server create \
> --image ubuntu \
> --flavor m1.small \
> --security-group sg1 \
> --user-data script \
> --key-name key1 \
> --nic net-id=net1 \
> --wait ftp_server

+-----------------------------+-------------------------------------------------------------+
| Field                       | Value                                                       |
+-----------------------------+-------------------------------------------------------------+
| OS-DCF:diskConfig           | MANUAL                                                      |
| OS-EXT-AZ:availability_zone | nova                                                        |
| OS-EXT-STS:power_state      | Running                                                     |
| OS-EXT-STS:task_state       | None                                                        |
| OS-EXT-STS:vm_state         | active                                                      |
| OS-SRV-USG:launched_at      | 2024-01-04T22:13:34.000000                                  |
| OS-SRV-USG:terminated_at    | None                                                        |
| accessIPv4                  |                                                             |
| accessIPv6                  |                                                             |
| addresses                   | net1=192.168.0.167                                          |
| adminPass                   | WkwTRL595gZh                                                |
| config_drive                |                                                             |
| created                     | 2024-01-04T22:13:30Z                                        |
| flavor                      | m1.small (2)                                                |
| hostId                      | db26c44769e798a3b00d88da852fc5895221d8f8f0fcec687eccf35a    |
| id                          | 8652f17e-dc34-4672-bd79-5b8ca98764f1                        |
| image                       | ubuntu (b6e959dd-7ad1-409f-966c-9c34eee29b36)               |
| key_name                    | key1                                                        |
| name                        | ftp_server                                                  |
| progress                    | 0                                                           |
| project_id                  | a72b27c5a34245bbbd1c873a5fd420d4                            |
| properties                  |                                                             |
| security_groups             | name='sg1'                                                  |
| status                      | ACTIVE                                                      |
| updated                     | 2024-01-04T22:13:34Z                                        |
| user_id                     | 8588c114770741b6ae3cb0d3f6e85c00                            |
| volumes_attached            |                                                             |
+-----------------------------+-------------------------------------------------------------+
ubuntu@workstation:~$
```

34. Ensure that the instance state is **ACTIVE**.

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

```
ubuntu@workstation:~$ openstack server list
+--------------------------------------+------------+--------+--------------------+--------+----------+
| ID                                   | Name       | Status | Networks           | Image  | Flavor   |
+--------------------------------------+------------+--------+--------------------+--------+----------+
| 8652f17e-dc34-4672-bd79-5b8ca98764f1 | ftp_server | ACTIVE | net1=192.168.0.167 | ubuntu | m1.small |
+--------------------------------------+------------+--------+--------------------+--------+----------+
ubuntu@workstation:~$
```

35. When the instance state is **ACTIVE**, list the floating IP addresses available.

```
ubuntu@workstation:~$ openstack floating ip list
```

```
ubuntu@workstation:~$ openstack floating ip list
+--------------------------------------+---------------------+------------------+------+--------------------------------------+----------------------------------+
| ID                                   | Floating IP Address | Fixed IP Address | Port | Floating Network                     | Project                          |
+--------------------------------------+---------------------+------------------+------+--------------------------------------+----------------------------------+
| f60c1e3a-cb0e-45ed-9e3f-8c64508594fd | 172.25.250.30       | None             | None | 9d09170a-73c8-419c-b8b4-db0bcf418ac8 | a72b27c5a34245bbbd1c873a5fd420d4 |
+--------------------------------------+---------------------+------------------+------+--------------------------------------+----------------------------------+
ubuntu@workstation:~$
```

36. Associate an open floating IP address to the instance.

```
ubuntu@workstation:~$ openstack server add \
> floating ip ftp_server 172.25.250.30
```

Note

When associating the floating IP, make sure to use the IP address that appears for you in the previous step as it may differ from this example.

37. SSH into the **ftp_server** instance.

```
ubuntu@workstation:~$ ssh -i ~/Downloads/key1.pem root@172.25.250.30
```

Note

The IP address may differ slightly from this example. Make sure to use the floating IP address that you created.

38. Verify that the `vsftpd` package is installed.

```
root@ftp-server:~# apt show vsftpd
```

39. Use `nano` to edit the **vsftpd** configuration file and uncomment the vairable `anon_upload_enable` and the variable `anon_mkdir_write`, then append the variable `allow_writeable_chroot`.

```
root@ftp-server:~# nano /etc/vsftpd/vsftpd.conf
```

40. Change the ownership of the **/var/ftp/pub/** directory.

```
root@ftp-server:~# sudo chown -R ftp. /var/ftp/pub/
```

41. Exit from the **ftp_server** instance.

```
root@ftp-server:~# exit
```

42. From **workstation**, create a text file named **test_file.txt** containing the string "This is my file."

```
ubuntu@workstation:~$ echo "This is my file" > test_file.txt
```

43. Open an FTP session to the FTP server and upload the **test_file.txt** file. Log out when done. Use **anonymous** as the user and when prompted for the password, press the **Enter** key for no password input. Follow the instructions from the example and summary below.

```
ubuntu@workstation:~$ ftp 172.25.250.30
ftp> passive
ftp> dir
ftp> cd pub
ftp> put test_file.txt test_file.txt
ftp> exit
```

> **Note**
>
> The IP address may differ slightly from this example. Make sure to use the floating IP address that you created.

44. SSH into the **ftp_server** instance.

```
ubuntu@workstation:~$ ssh -i ~/Downloads/key1.pem cloud-user@172.25.250.30
```

45. Verify the file uploaded successfully.

```
ubuntu@workstation:~$ sudo ls /var/ftp/pub
```

46. Exit from the **ftp_server** instance.

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

47. The lab is now complete.