IST198 OpenStack Administration

Version 5: 2017-08-15

These exercises will guide the student through the concepts and topics learned in chapter 3, configure the Networks and Routers on OpenStack Mitaka installed on CentOS 7.

Configure OpenStack Networks and Routers.

Attributions:

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Portions of this document, in whole or part, were sourced from the OpenStack website at https://OpenStack.org

Contents

Introduction

You have been hired as an intern with CLOUDTech Inc. CLOUDTech is a Cloud Computing consulting firm and Cloud Provider supporting thousands of clients in the region. The company provides a wide range of services to support migrating client Information Technology infrastructure to a Private, Hybrid or Public Cloud environment. You learned that the company has multiple departments and you will start your internship working with the Cloud hosting department customer support team.

The Cloud hosting department provides multiple platform and vendor Cloud hosting services for Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS) and many other as a service offerings. The support team is responsible for helping customers with any issues related to their Cloud infrastructure hosted at and provided by CLOUDTech.

You will perform hands-on exercises to learn about the OpenStack Cloud implementation CLOUDTech uses to host customer Cloud environments.

Lab Objectives

Learner will be able to:

- Configure OpenStack Networks and Routers

Lab 6-8

These labs will guide the student through configuring OpenStack Networks and Routers for use by the customer's cloud instances.

(Note: This lab is designed to be completed on an NDG NETLAB System with the IST198_OpenStack_HXXX POD installed. The labs can also be completed on a physical machine with the appropriate software packages installed, or a PC that has VMware Workstation installed with the appropriate virtual machines configured).

Prepare the OpenStack Virtual Machines

1. **Launch** the **VMware Workstation Pro application**
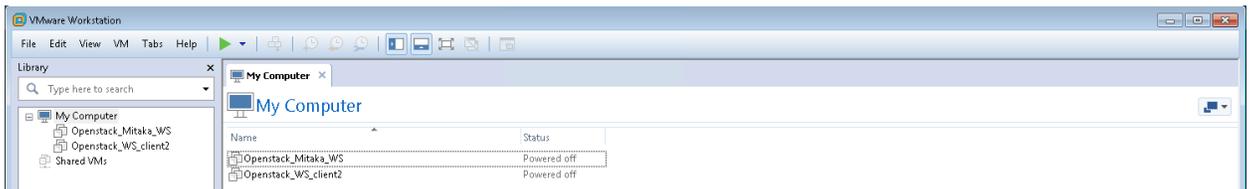
2. Workstation should have two virtual machines (VM) installed; Openstack_Mitaka_WS and Openstack_WS_client2.
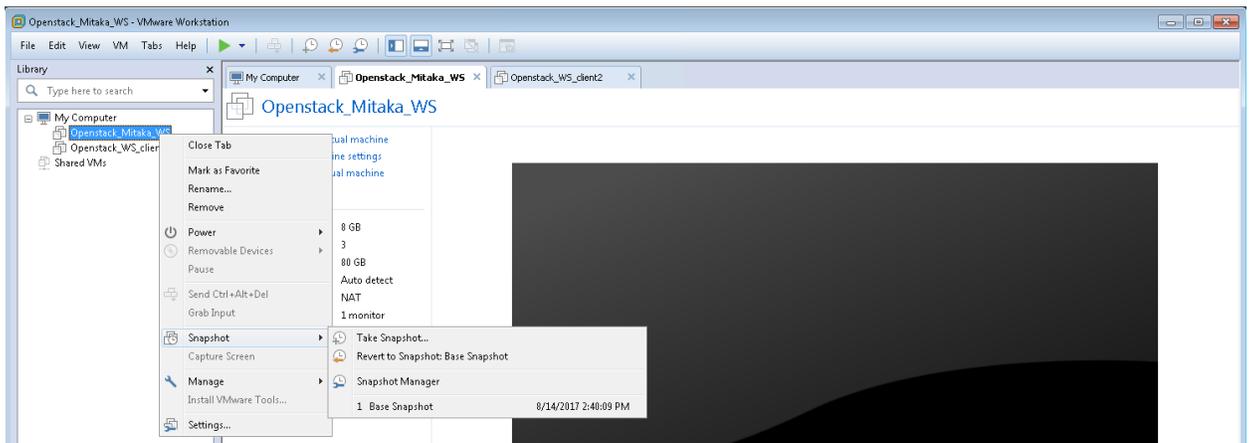
3. Ensure that the Openstack_Mitaka_WS is at the correct starting point by reverting to the base snapshot. Right Click on Openstack_Mitaka_WS then Snapshot>Base Snapshot. Repeat for the Openstack_WS_client2 VM.
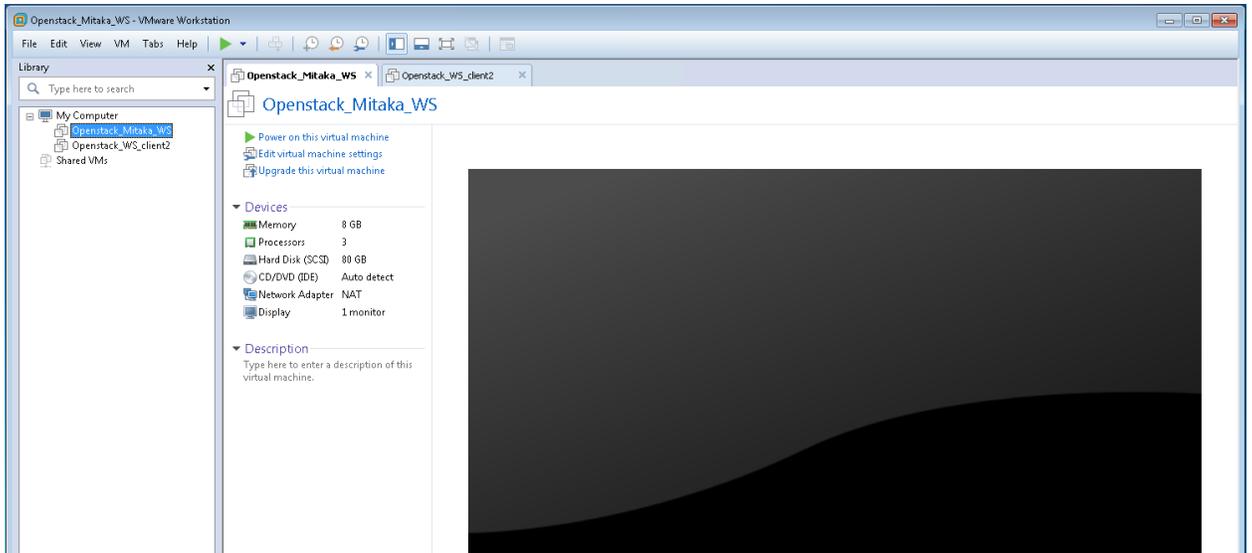
4. **Power on** both VMs by selecting one of the two VMs and **clicking** on **Power on this virtual machine**. Repeat for the other VM.

Lab Scenario

As part of CLOUDTech's customer support team, this is your first field visit to XYZ Company. During this visit, you will assist the customer in configuring their Private Network and Router.

Lab Settings

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

Virtual Machine (VM)	IP ADDRESS	Account	Password	VM Type
Client2	10.220.0.2	Student	P@ssword	CentOS 7 Client
Server1	10.220.0.30	root	P@ssword	OpenStack Mitaka
OpenStack Dashboard	10.220.0.30	Student	P@ssword	Web Page Login credentials

Note: In this OpenStack VMware Workstation environment, the two VMs can be reverted back to their base snapshot at any time. This means that you can explore or experiment without fear of permanently damaging the OpenStack environment. If you make a mistake that you can't recover from, then stop and revert the appropriate VM to the base snapshot and everything will be back to a known good starting point.

Run the lab setup script
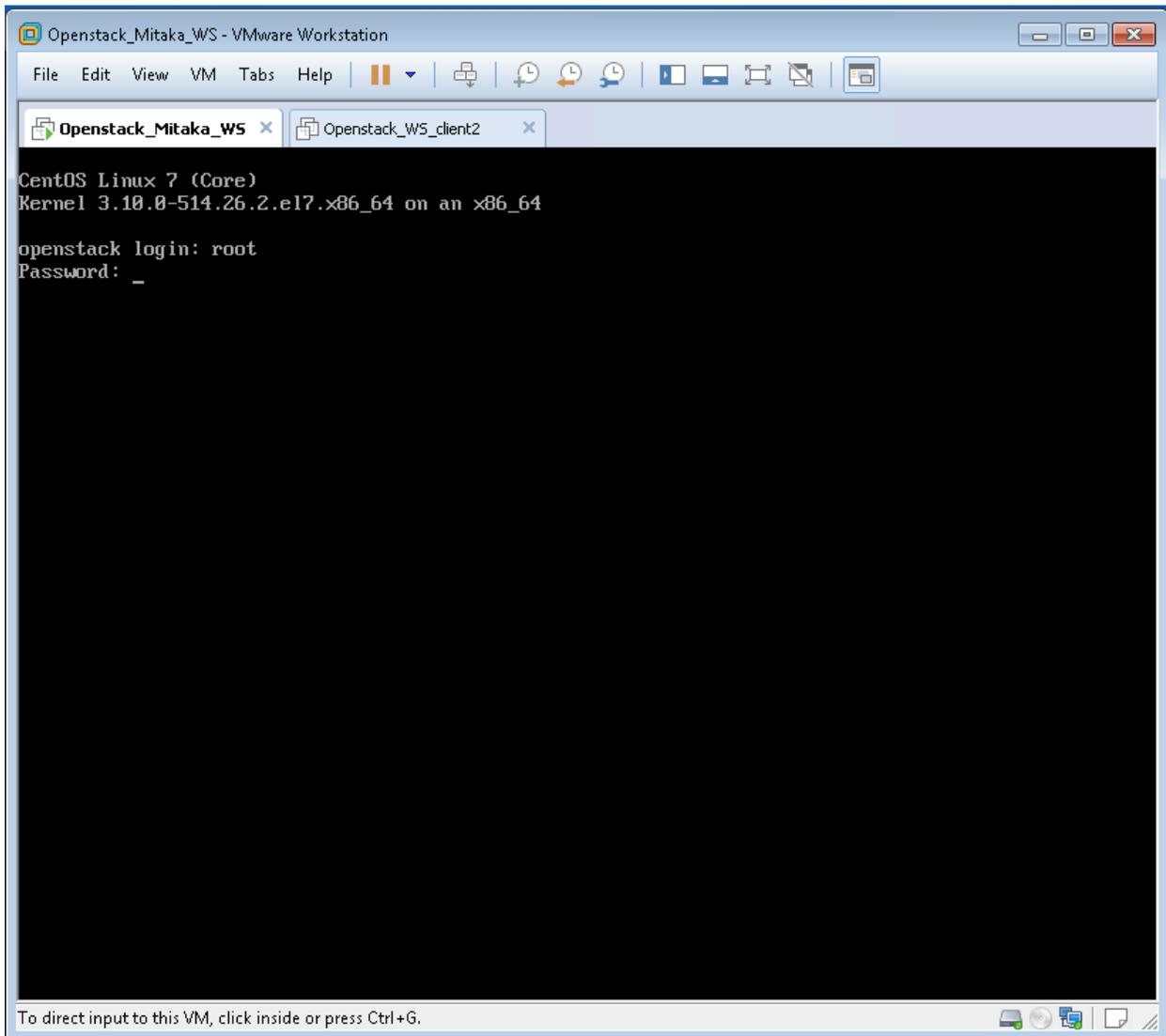
1. Log in as **root** with the Password: **P@ssword**

   Note: The password is NOT visible as you type it
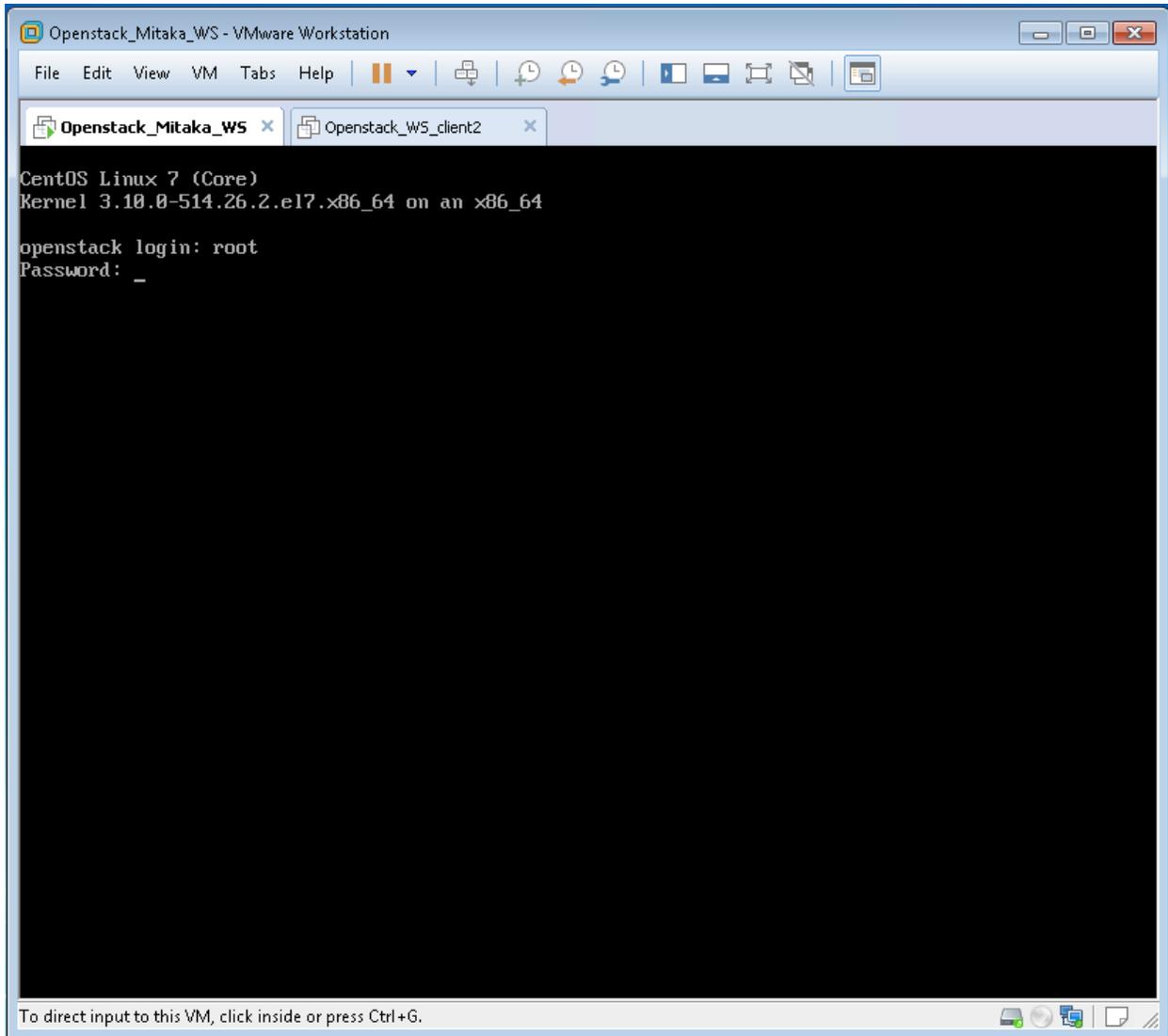
2. After successfully logging in as root, you should see this screen. Continue to the next page
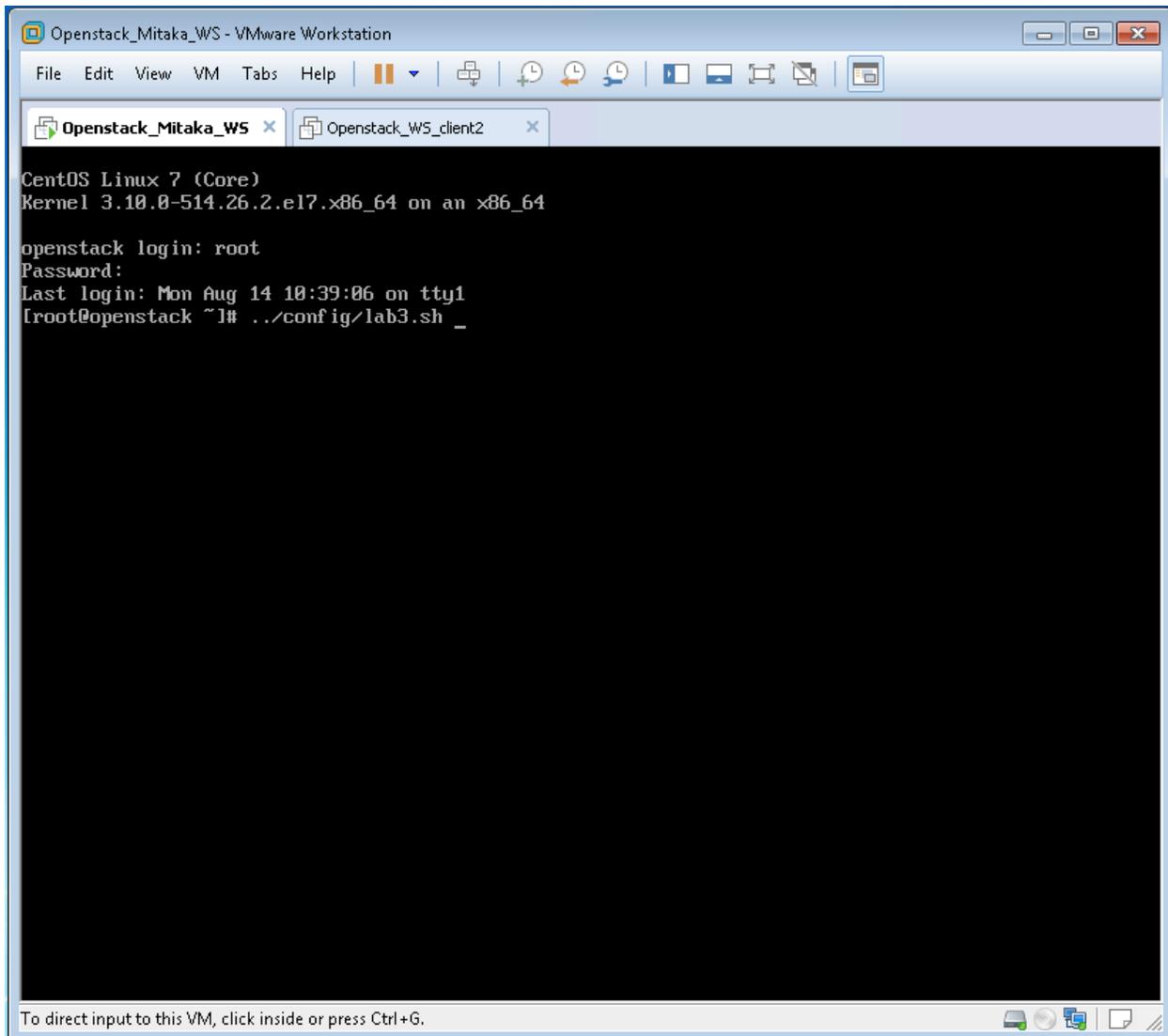
3. Type the command; **../config/lab3.sh** and **press Enter** as shown in the screen capture above to run the Module 3 setup script
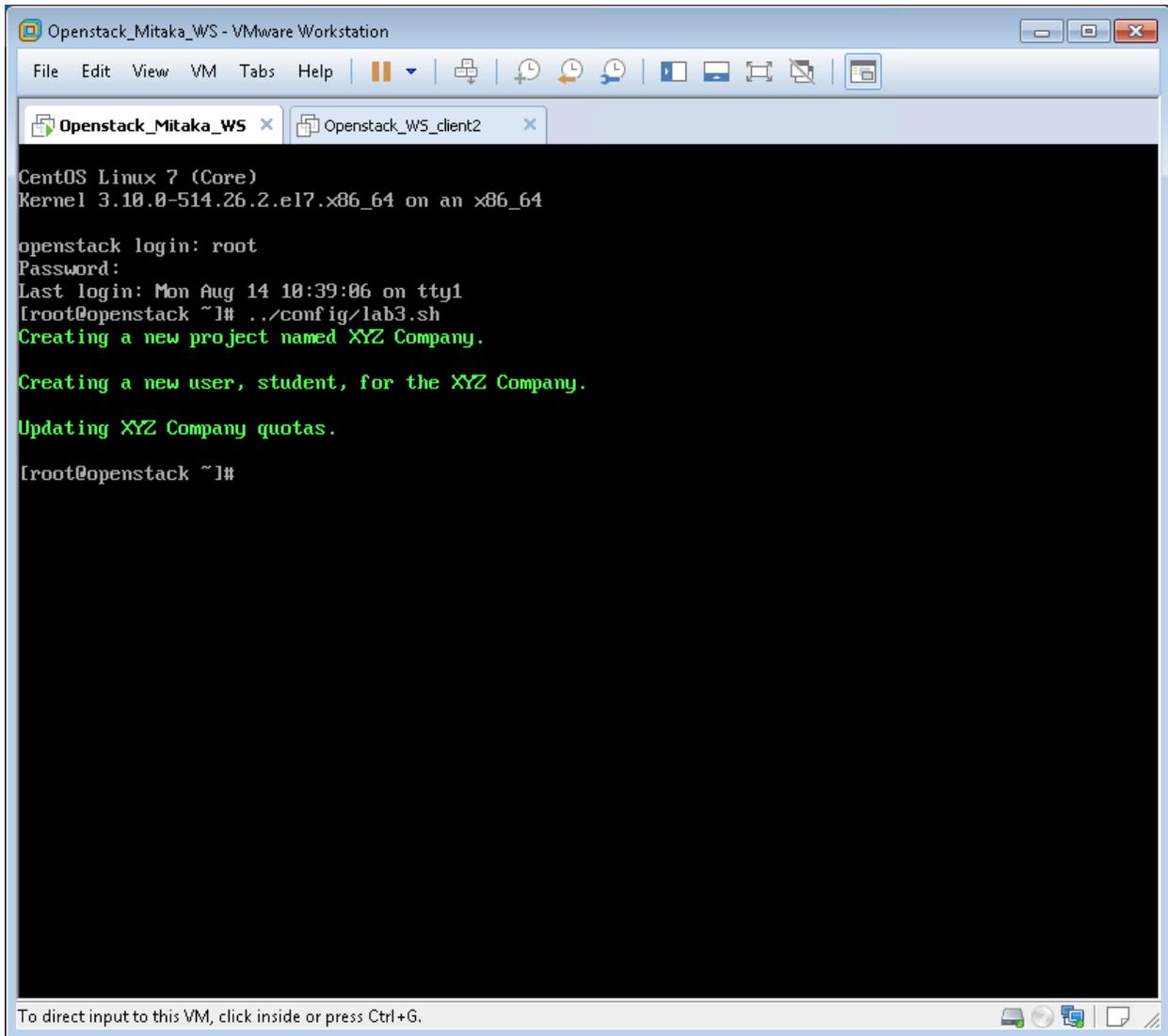
4. After the setup command completes, you can **minimize VMware Workstation.**

Note: The script is complete when the **[root@openstack ~]#** prompt returns

Access the OpenStack Dashboard
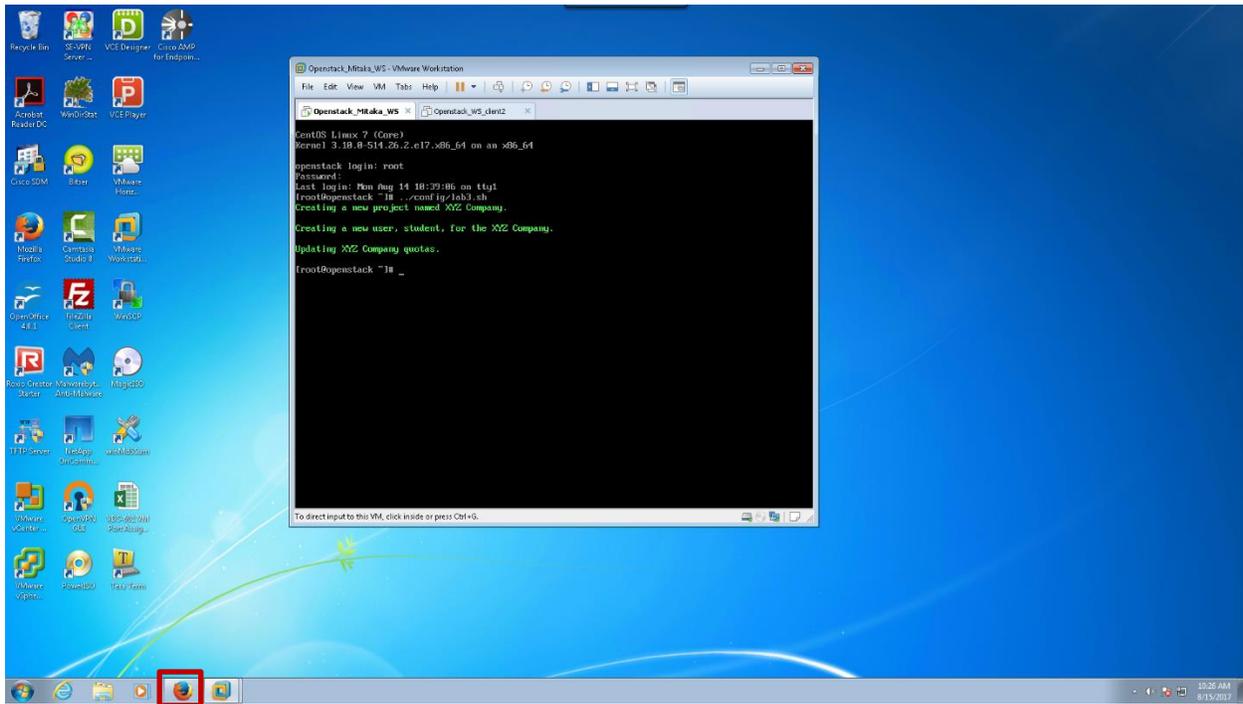
1. On your Windows host PC, open an internet browser

   Note: Openstack_WS_client2 is a CentOS 7 desktop VM that you can use as an alternate to the host to accomplish all of the labs, unless specifically noted in the instructions.
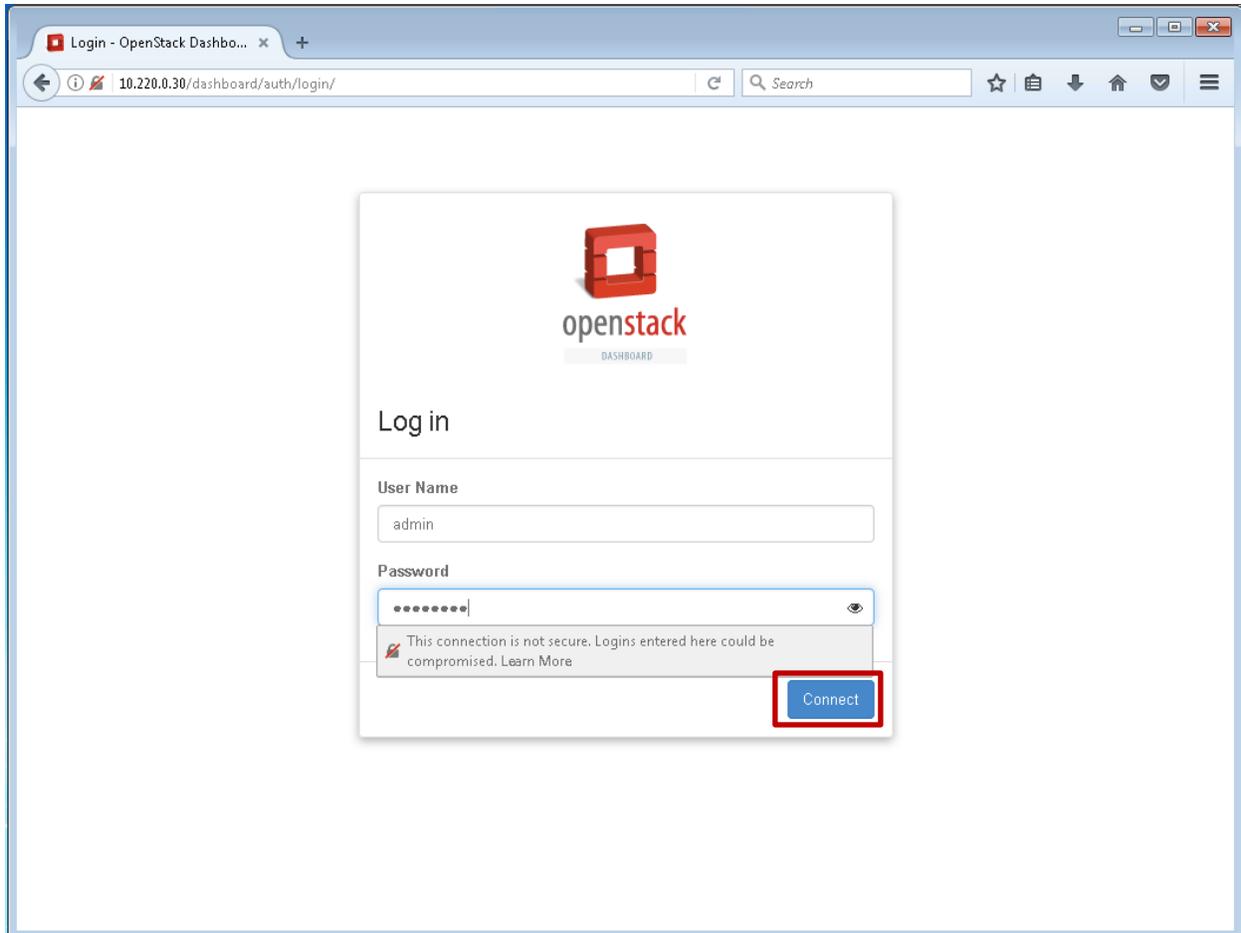
2. **Navigate** to **http://10.220.0.30/dashboard. Login** to the OpenStack Dashboard with the username **admin** and **P@ssword** and press **enter** or **click Connect**

    Note: User Name entries are not case sensitive, passwords are.

Lab 6: Add and configure a Public Network
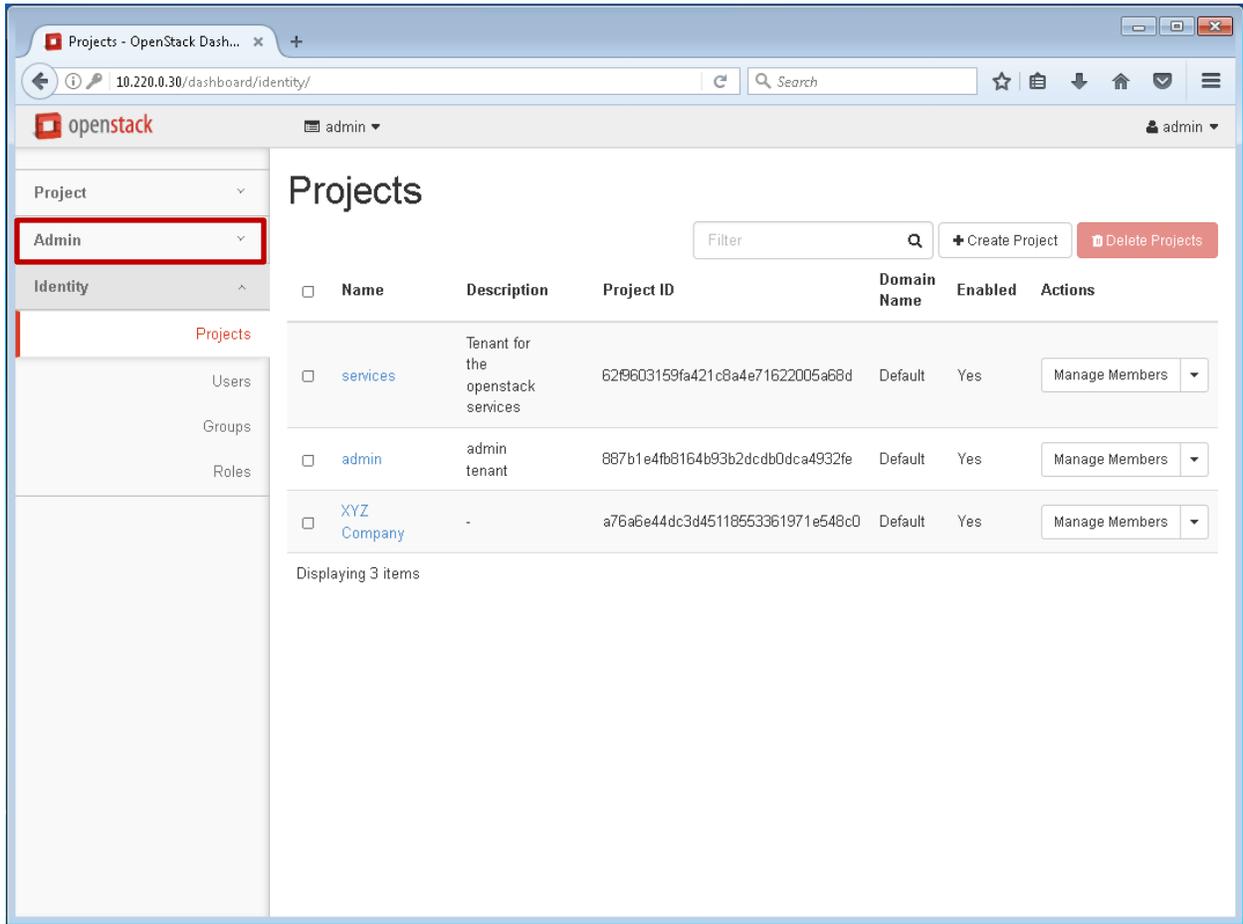
1. **Select** the **Admin tab** in the left pane.

2. **Select Networks**

Networks

When an instance is created in OpenStack, it is automatically assigned a fixed IP address in the network to which the instance is assigned. This IP address is permanently associated with the instance until the instance is terminated.

However, in addition to the fixed IP address, a floating IP address can also be attached to an instance. Unlike fixed IP addresses, floating IP addresses can have their associations modified at any time, regardless of the state of the instances involved.

Private IP addresses (fixed IP addresses) are used for communication between instances, and public addresses (floating IP addresses) are used for communication with networks outside the cloud, including the Internet.
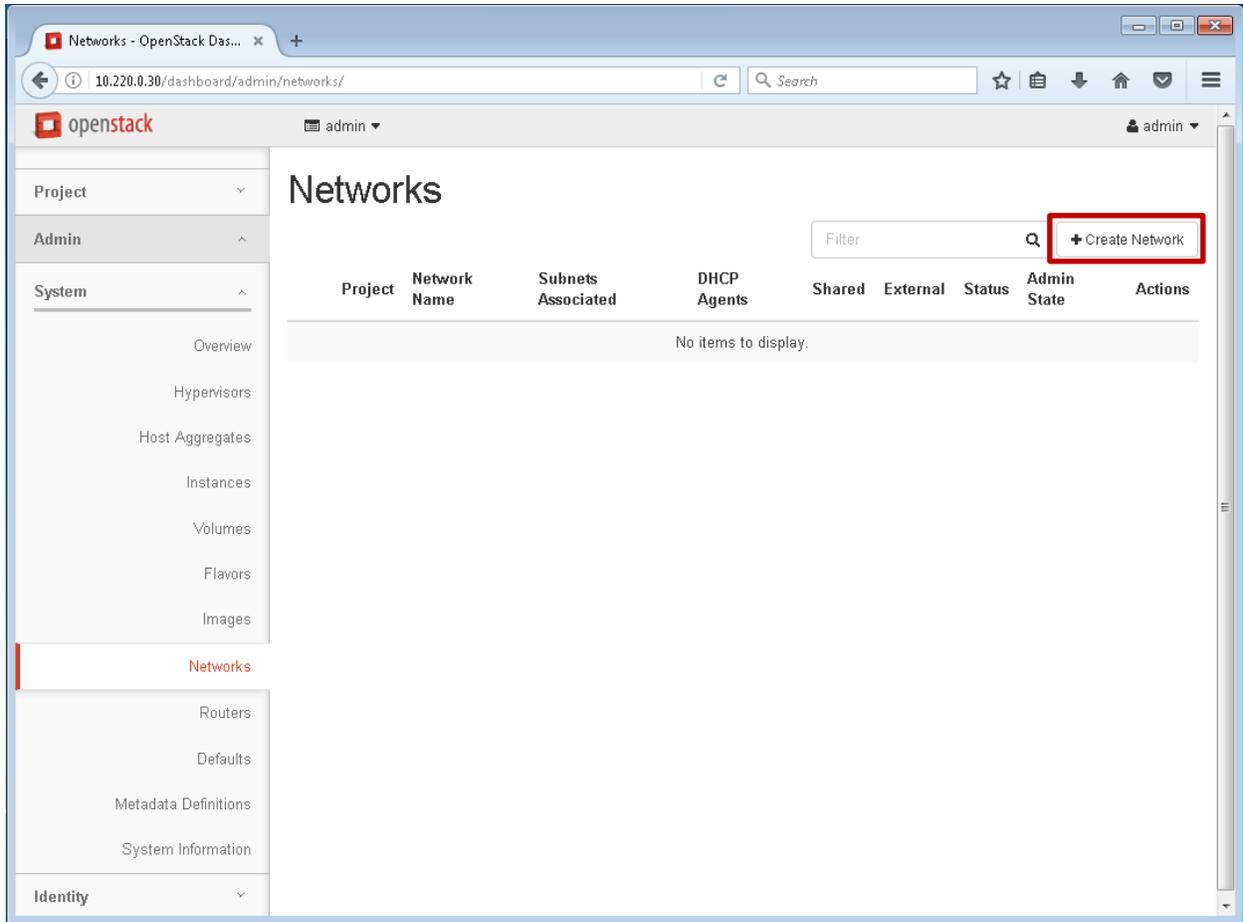
3. **Select Create Network**
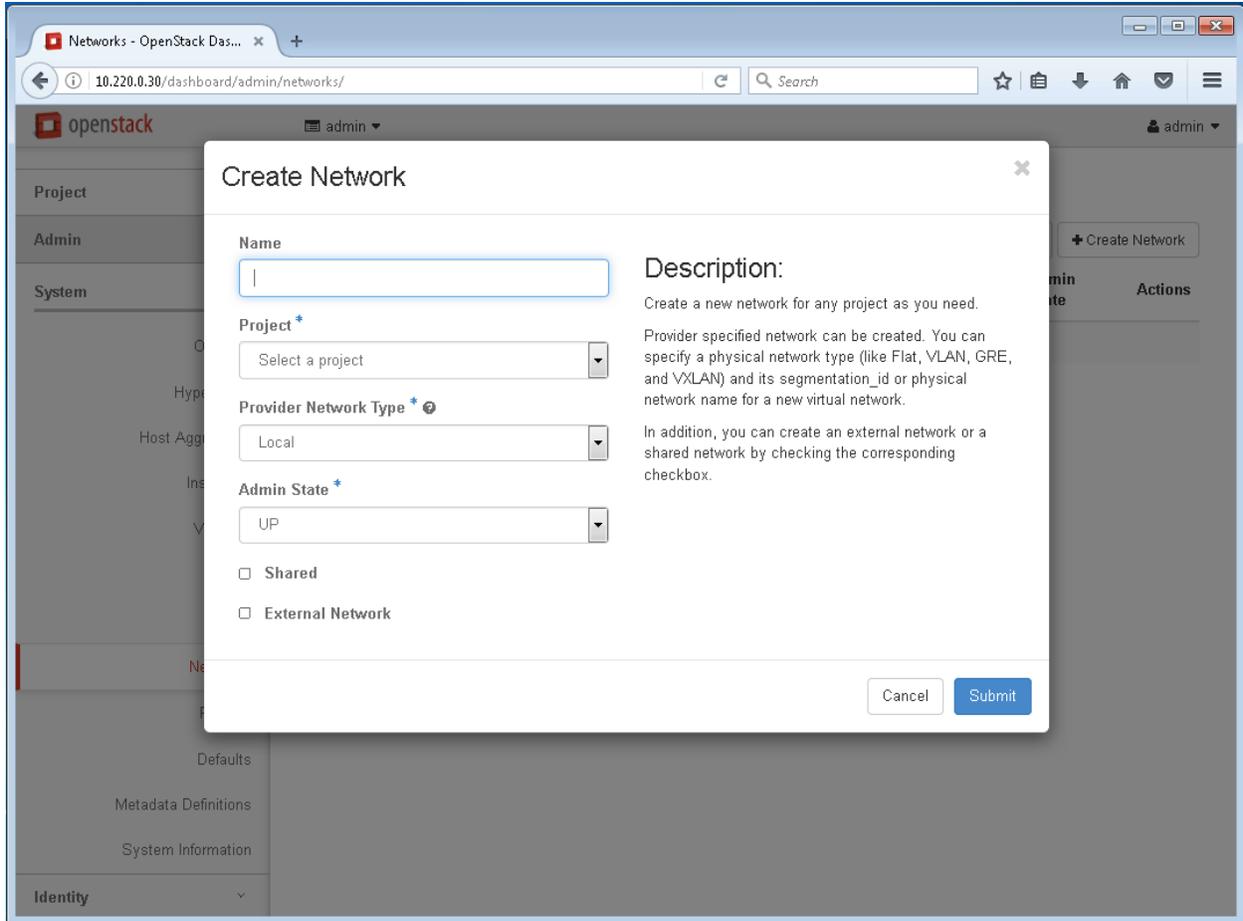
4. The Create Network wizard should open.
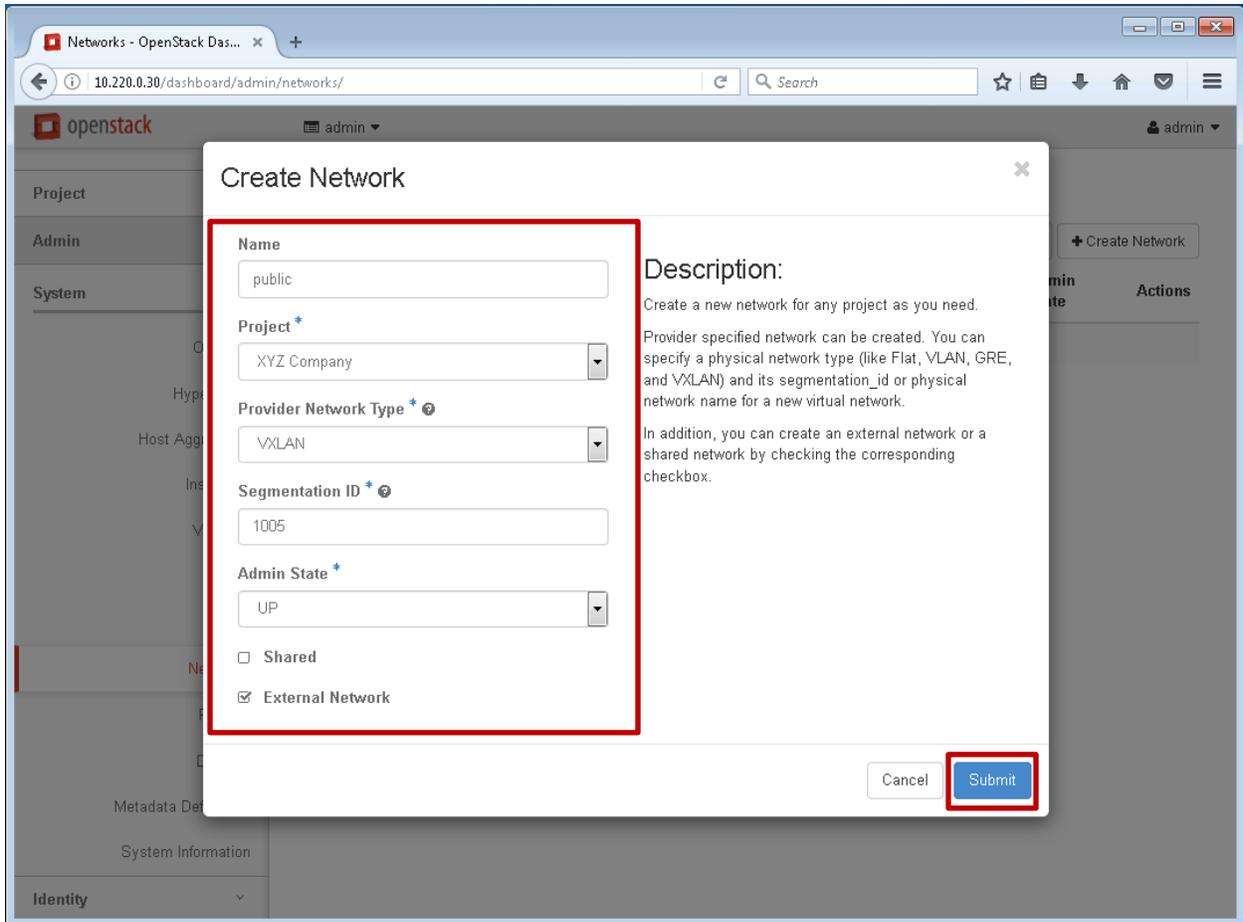
5. **Enter** the Network Name of **public**, and using the dropdown menu for Project, Provider Network Type and Segmentation ID enter the information as shown in the screen capture and the table below. **Select External Network** and **Click Submit**

Name	public
Project	XYZ Company
Provider Network Type	VXLAN
Segmentation ID	1005
External Network	checked
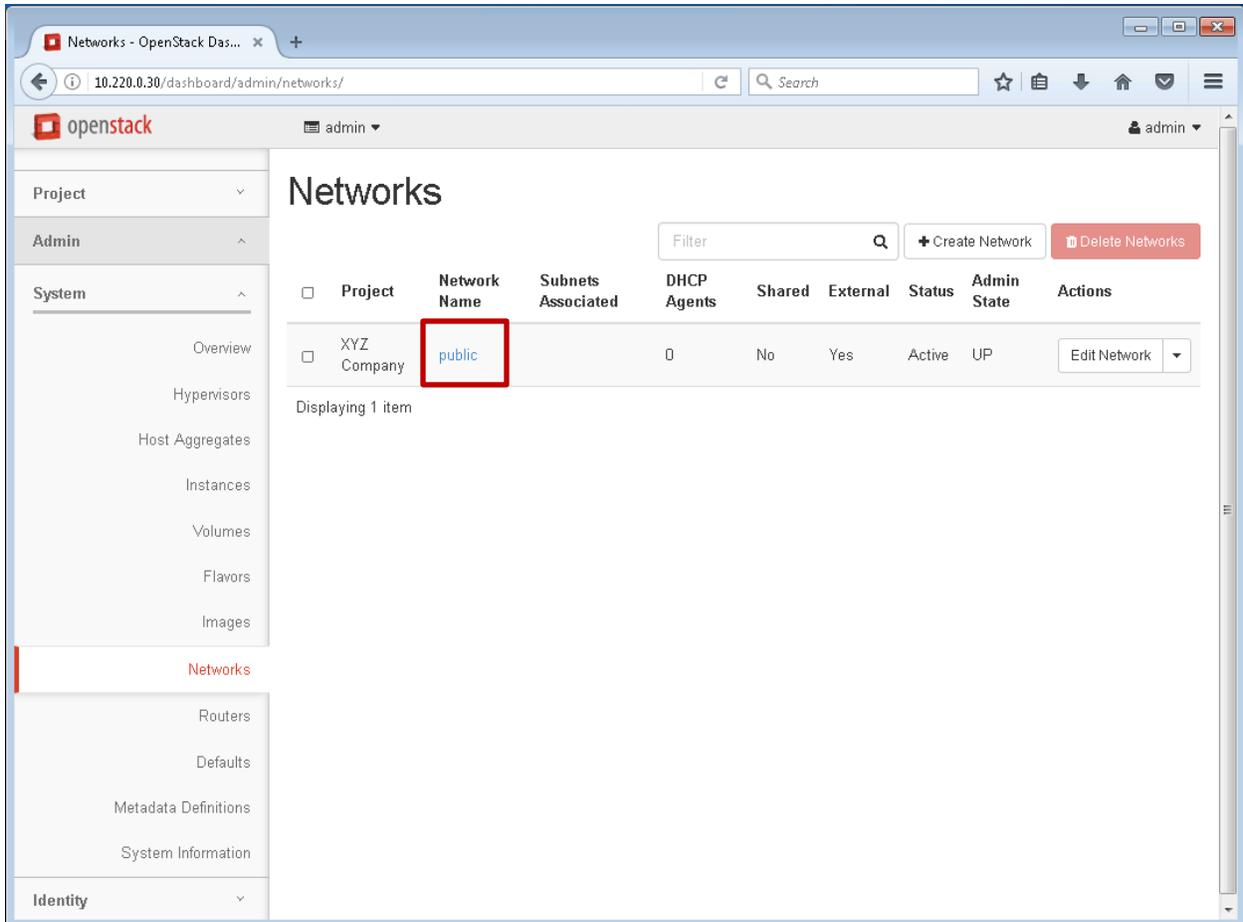
6. The network name **public** and external status of **Yes** should be present on the same line as XYZ Company. To add the required subnet information, **Click** on the **public** network name hyperlink

Public Network

The Network Controller provides virtual networks to enable compute servers to interact with each other and with the public network. All machines must have a public and private network interface

7. **Click** on **Create Subnet**

8. The Create Subnet wizard should open

Subnet

Logical subdivision of an IP network.
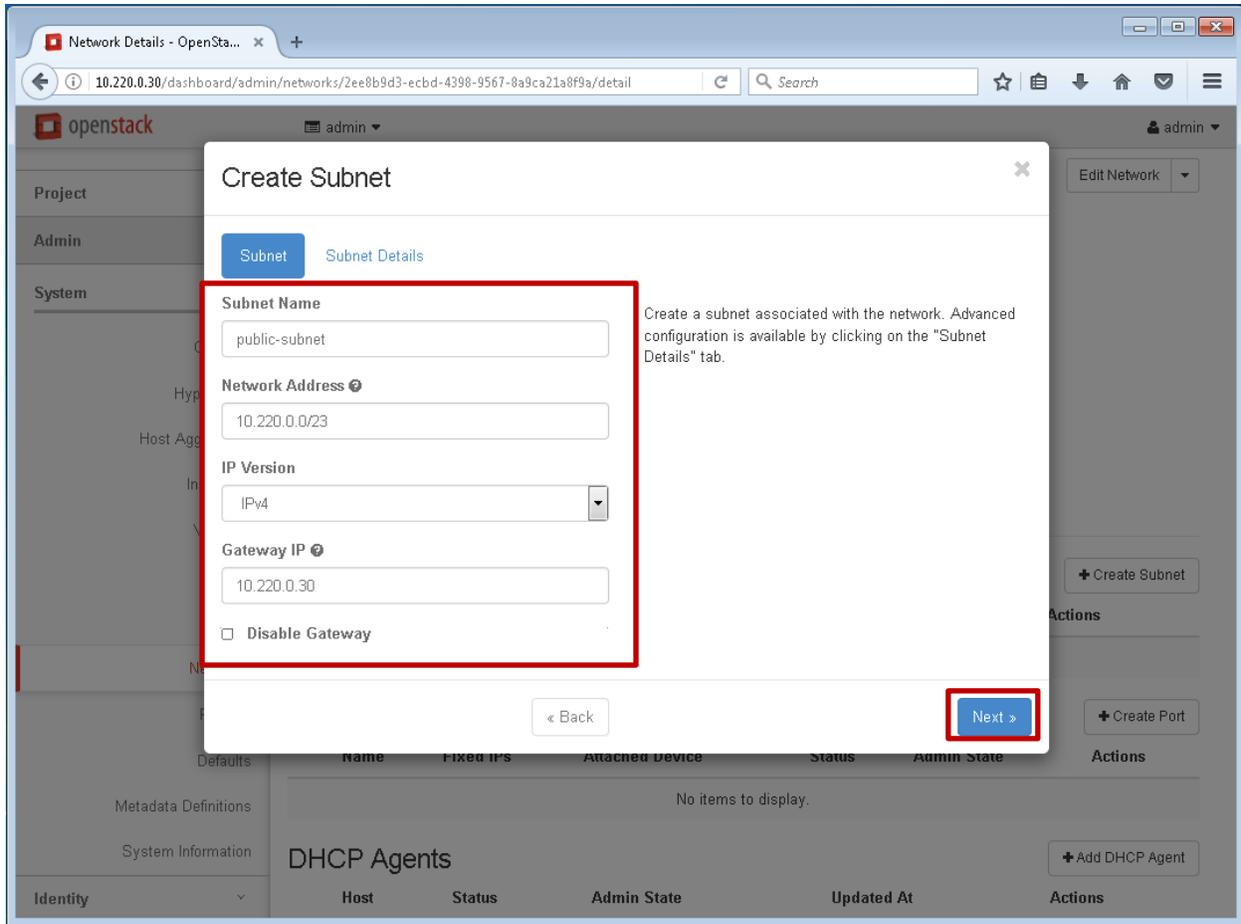
9. **Enter** the Subnet Name of **public-subnet** and enter the information as shown in the screen capture and the table below. **Click Next**

Subnet Name	public-subnet
Network Address	10.220.0.0/23
IP Version	IPv4 (default setting)
Gateway IP	10.220.0.30

Note: The Gateway IP address is the IP address of the OpenStack server, this is was required to simplify the VMware Workstation networking environment, so you would not normally see this IP addressing scheme in a production environment
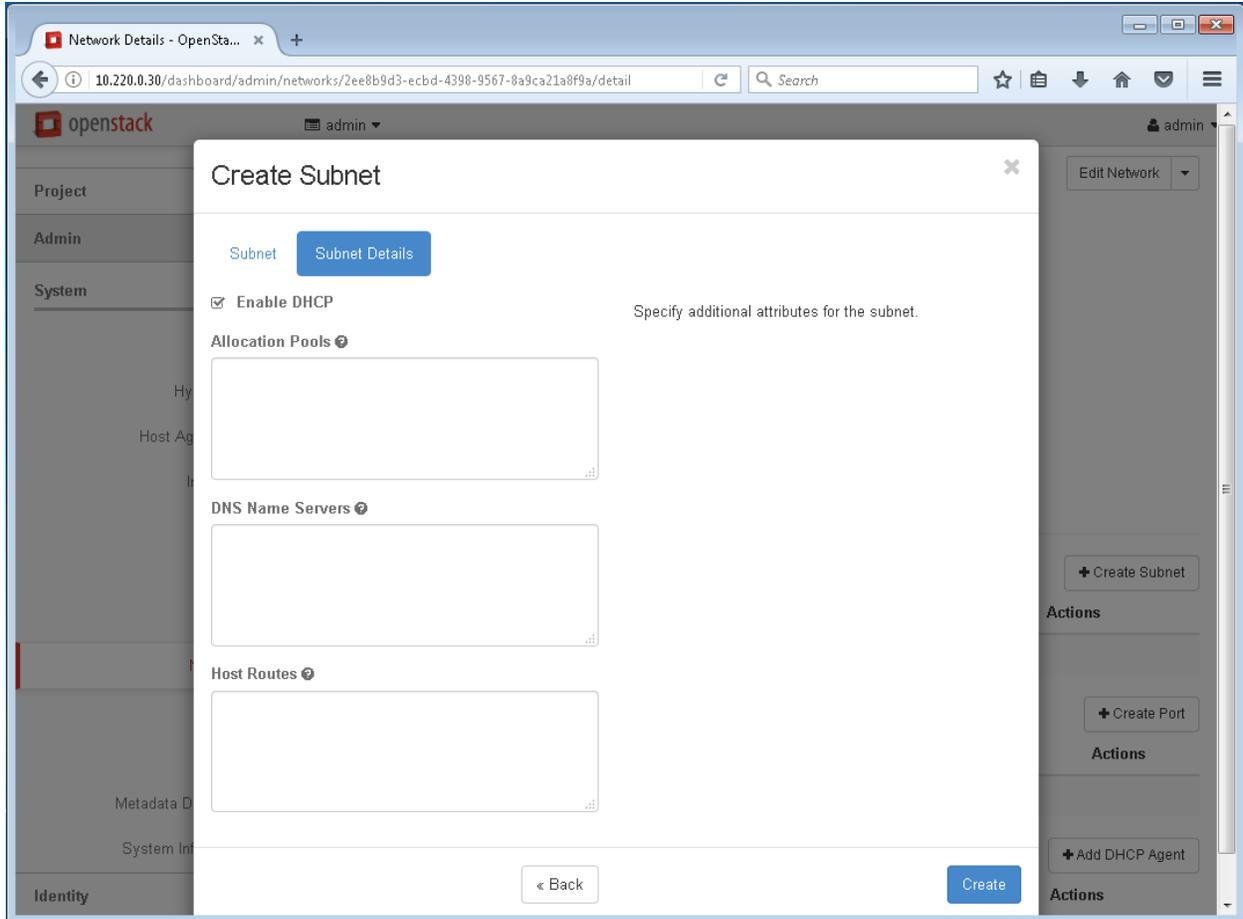
10. The Edit Subnet wizard should open

Dynamic Host Configuration Protocol (DHCP)

A network protocol that configures devices that are connected to a network so that they can communicate on that network by using the Internet Protocol (IP). The protocol is implemented in a client-server model where DHCP clients request configuration data, such as an IP address, a default route, and one or more DNS server addresses from a DHCP server. A method to automatically configure networking for a host at boot time. Provided by both Networking and Compute.
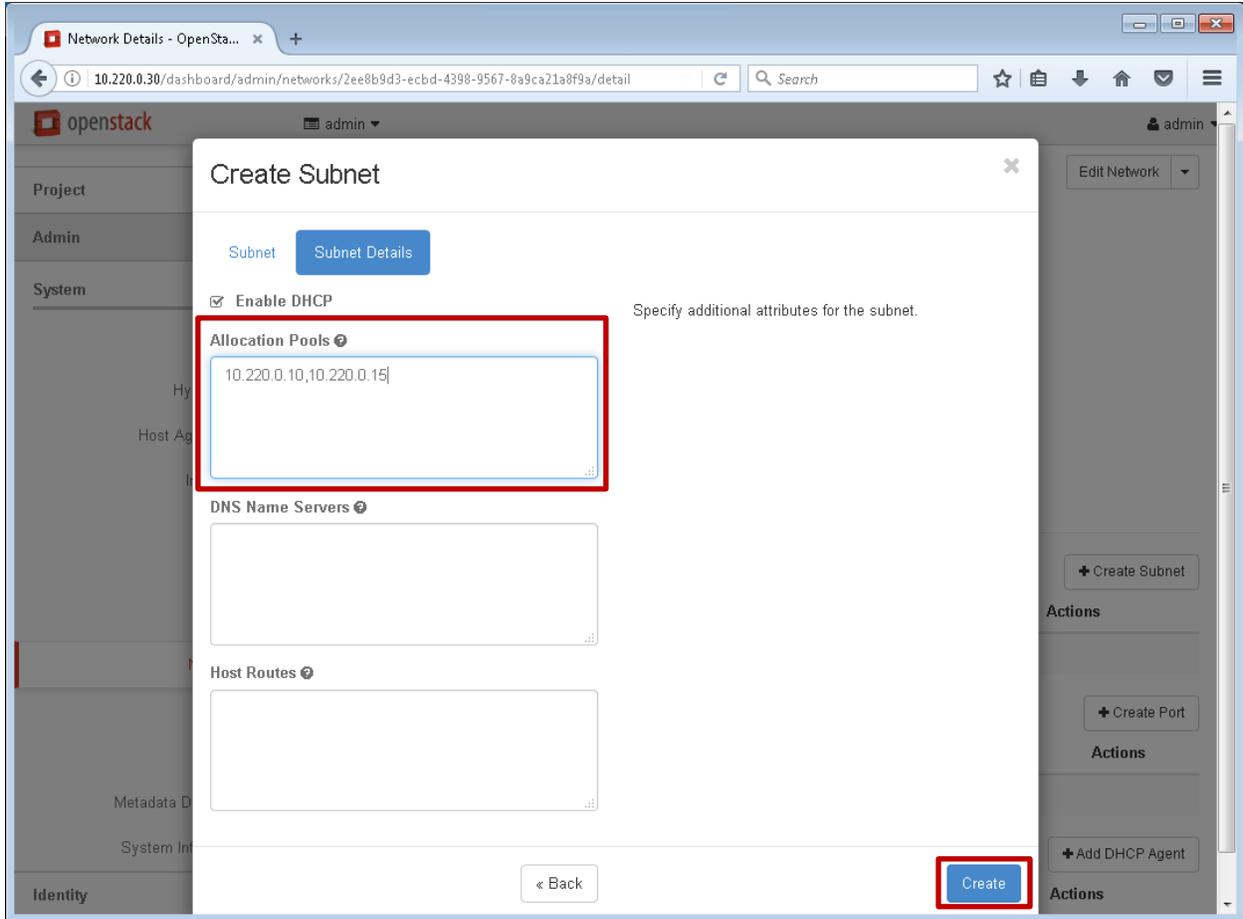
11. **Leave** the **Enable DHCP** checked, this is the default setting. **Enter** the IP Addresses, separated by a comma, as shown in the screen capture and the table below. **Click Create**

Allocation Pools	10.220.0.10,10.220.0.15

Note: The Enable DHCP option allows the OpenStack server to allocate IP addresses, in a typical production environment there would be a server or router dedicated to allocate IP addresses. If the network environment has a dedicated DHCP server or router, the Enable DHCP option would be deselected

12. Verify that the public-subnet was created with the desired CIDR, IP Version and Gateway IP. **Click Networks** in the left pane to return to the Networks overview pane

The public network and public-subnet are ready for use by the XYZ Company.

Continue to lab 7.

Lab 7: Add and configure a Private Network
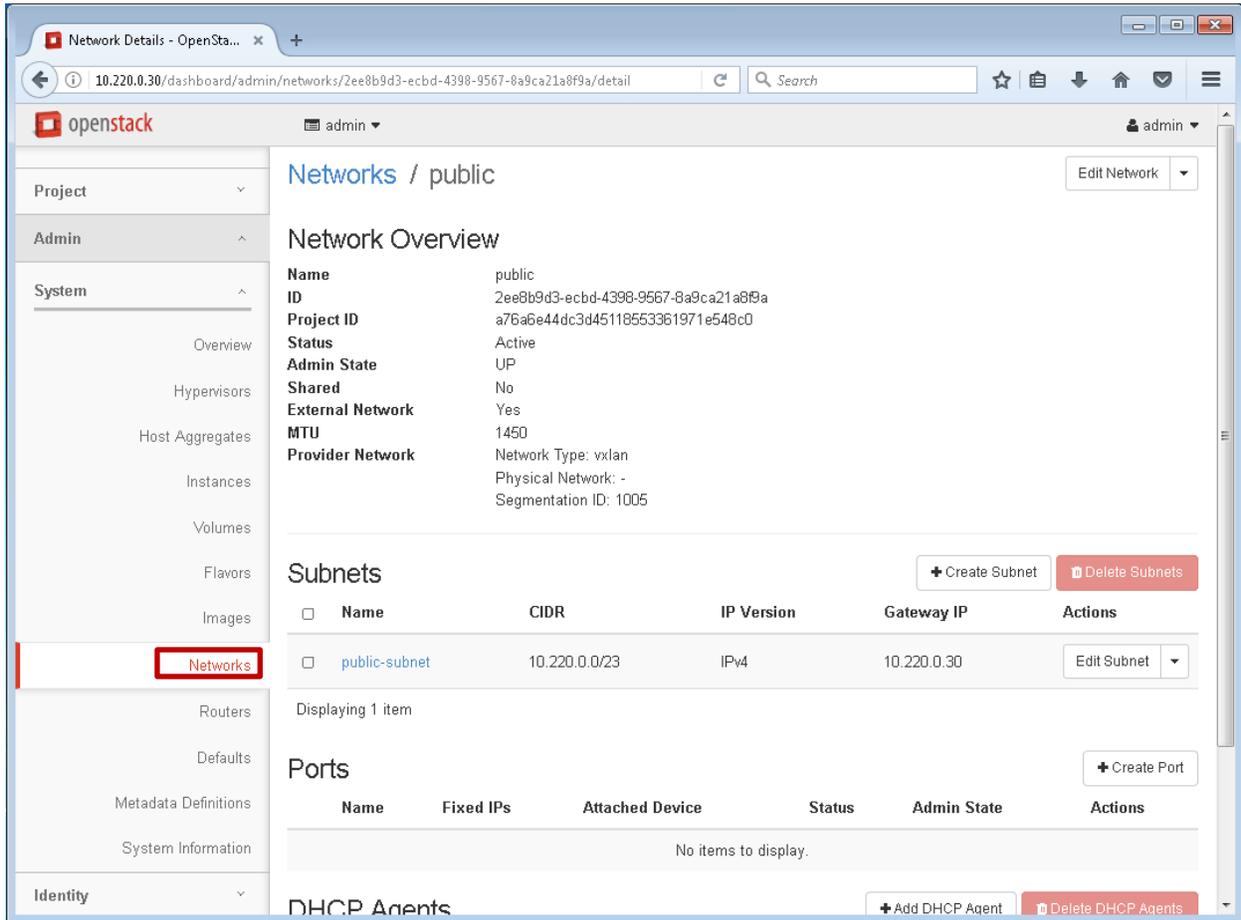
1. **Click** on **Networks**

Private Networks

Private Networks, also known as Self-service and internal networks primarily enable general (non-privileged) projects to manage networks without involving administrators. These networks are entirely virtual and require virtual routers to interact with provider and external networks such as the Internet. Self-service networks also usually provide DHCP and metadata services to instances.
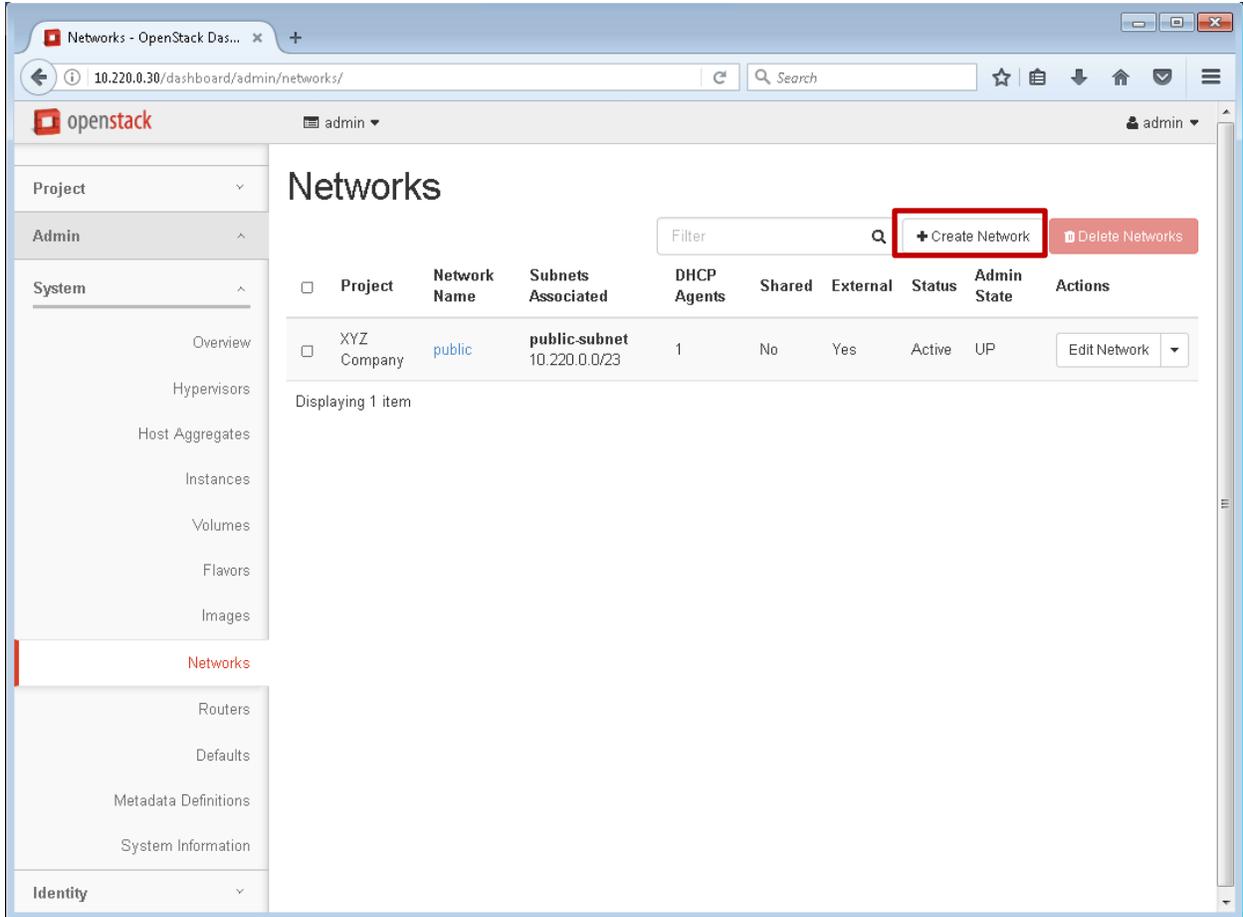
2. **Click** on **Create Network**

Networks

OpenStack networking service, project name Neutron, allows users to create and attach virtual interfaces and/or devices that perform the same functions that their physical counterparts do. Typically, the OpenStack environment will include one or more internal networks (private) and an external network (public).
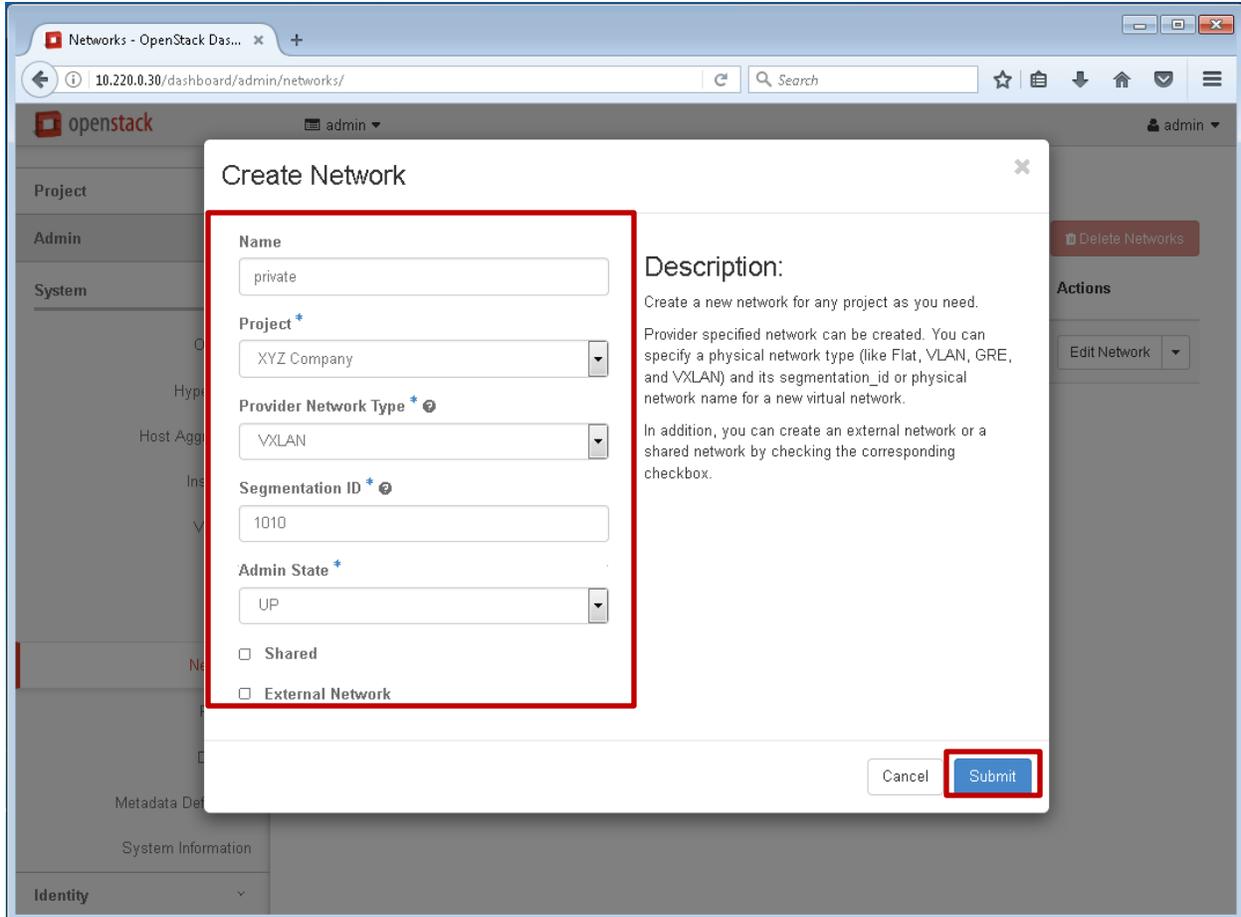
3. **Enter** the Network Name of **private**, and using the dropdown menu for Project, Provider Network Type and Segmentation ID enter the information as shown in the screen capture and the table below. **Click Submit**

Name	private
Project	XYZ Company
Provider Network Type	VXLAN
Segmentation ID	1010

External Network

The public network allows instances to communicate with networks that are outside of the cloud, for example: The Internet.

4. **Click** on **private**

5. **Click Create Subnet**

Internal Network

These private networks connect directly to instances and can only be accessed by other instances that are in the same subnet, or are connected by a router, if in a different private subnet.
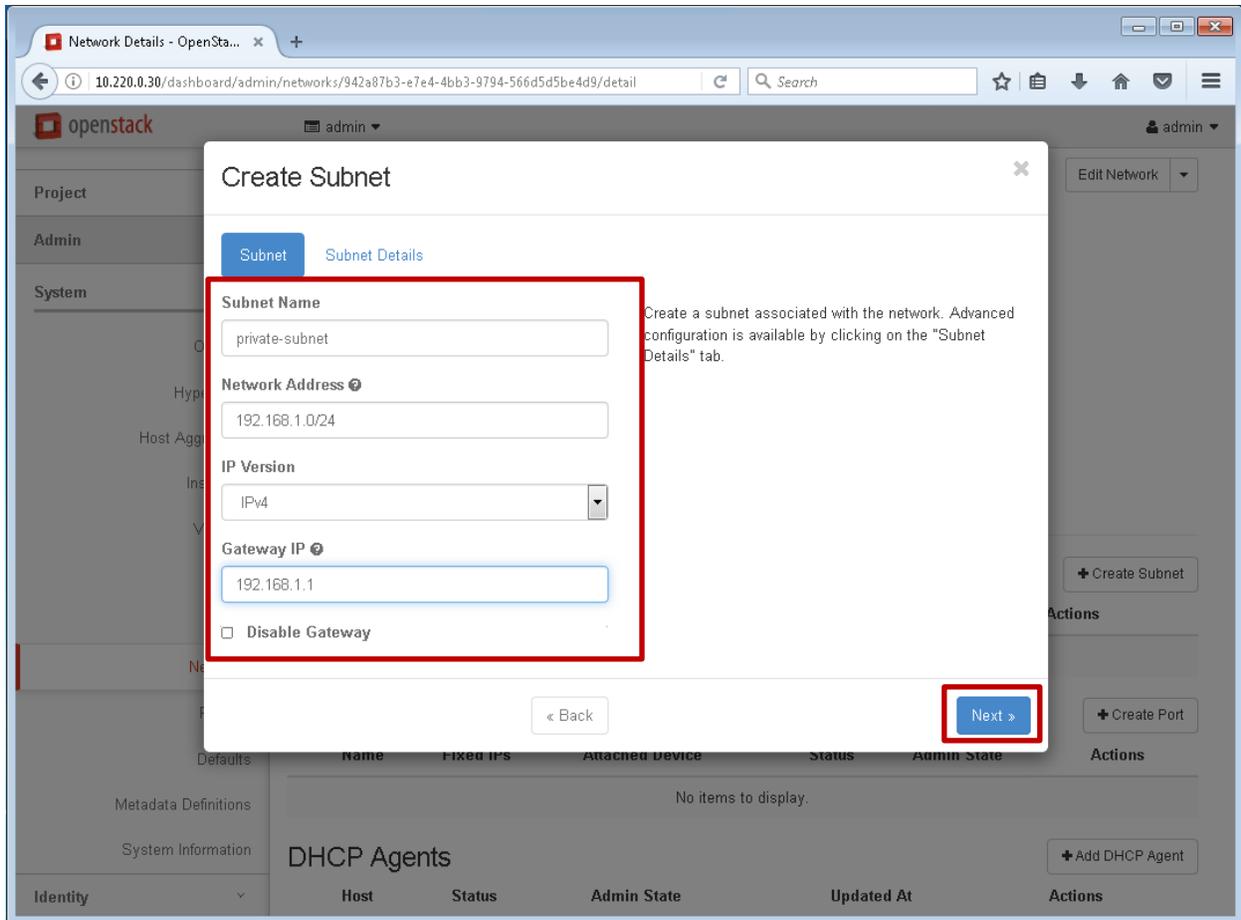
6. **Enter** the information as shown in the screen capture and the table below. **Click Next**

Subnet Name	private-subnet
Network Address	192.168.1.0/24
IP Version	IPv4
Gateway IP	192.168.1.1

Note: The best practice is to use the first available IP address from the network, in this case 192.168.1.1, as the gateway address. If you leave this entry blank, OpenStack will automatically assign the 192.168.1.1 address, or the first available address from the network you have chosen.
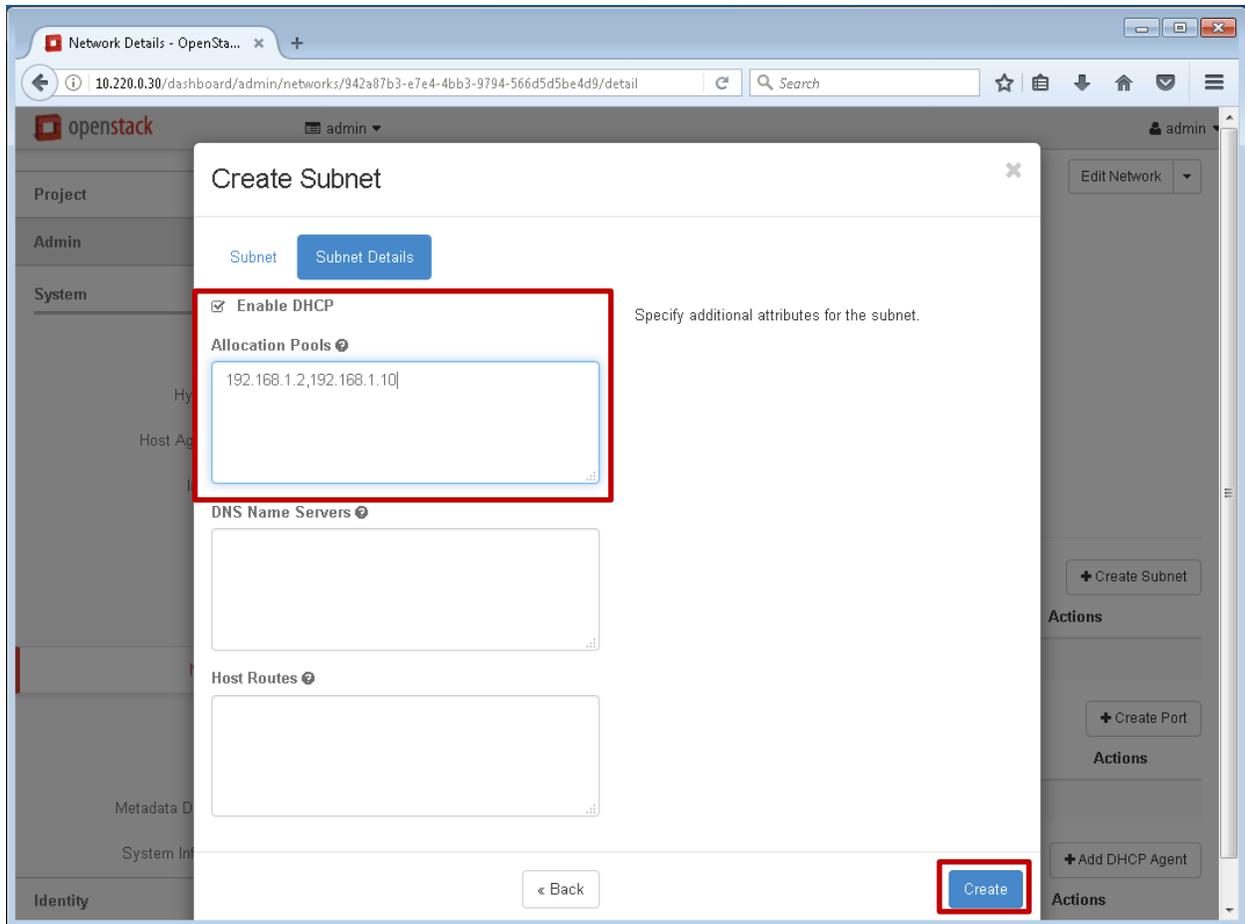
7. **Leave** the **Enable DHCP** checked, this is the default setting. **Enter** the IP Addresses, separated by a comma, as shown in the screen capture and the table below. **Click Create**

Allocation Pools	192.168.1.2,192.168.1.10

Note: The allocation pool starts at the second available IP address from the private-subnet network address range. This is because the first IP address, 192.168.1.1, was used as the gateway IP address on the previous create network page.

Note: The DNS Name Servers block is not used in this lab environment. If this were an actual deployment, then you would enter your network's DNS Name Server IP address, even if it's not in the same subnet as the private network. For example, you could enter Google's DNS server IP Address 8.8.8.8

Note: Host Routes is for any additional network route information specific to your setup, which is not used in this lab environment

8. The **private** network and its **private-subnet** should appear in the Networks pane. You are now ready to add a Router to connect the private and public networks.

Continue to Lab 8.

Lab 8: Add and Configure a Network Router
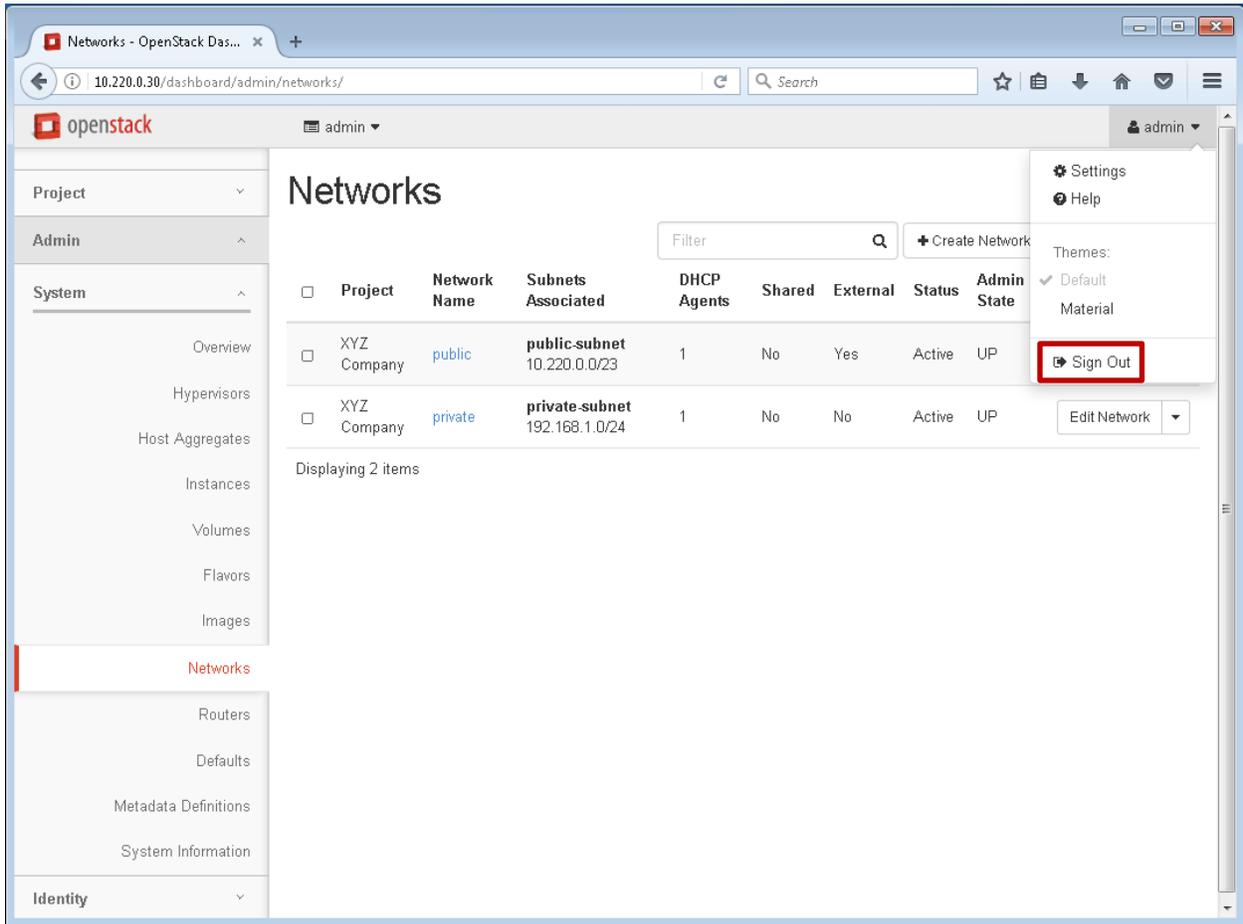
1. **Sign out** from the admin user account.
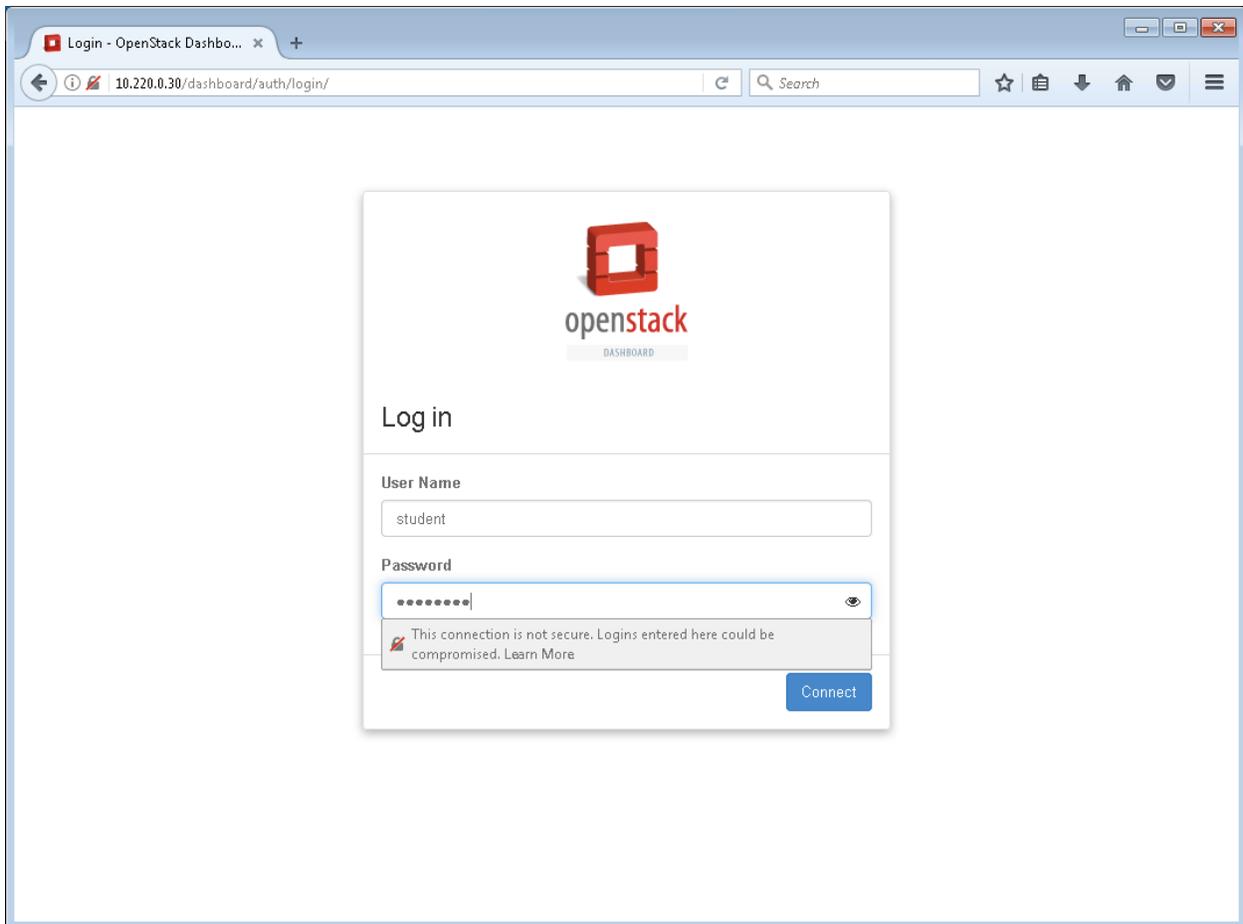
2. **Log in** as student
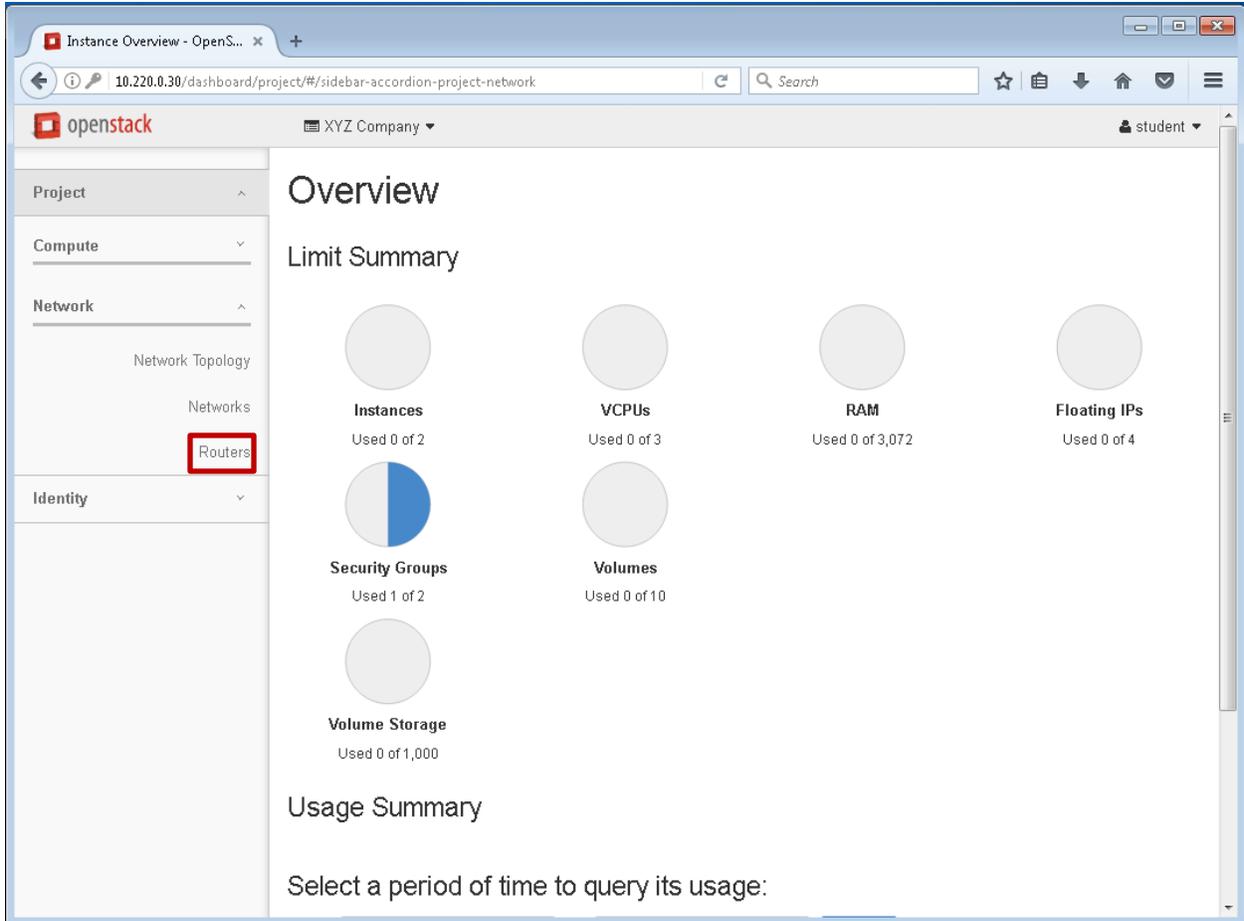
3. **Click** on **Routers** tab in the left pane

Routers

A physical or virtual network device that passes network traffic between different networks. In the OpenStack environment, a router is a virtual device that is required to allow network traffic between the private IP address (fixed IP address) and the public IP address (floating IP address), or between private IP addresses that are in different subnets.
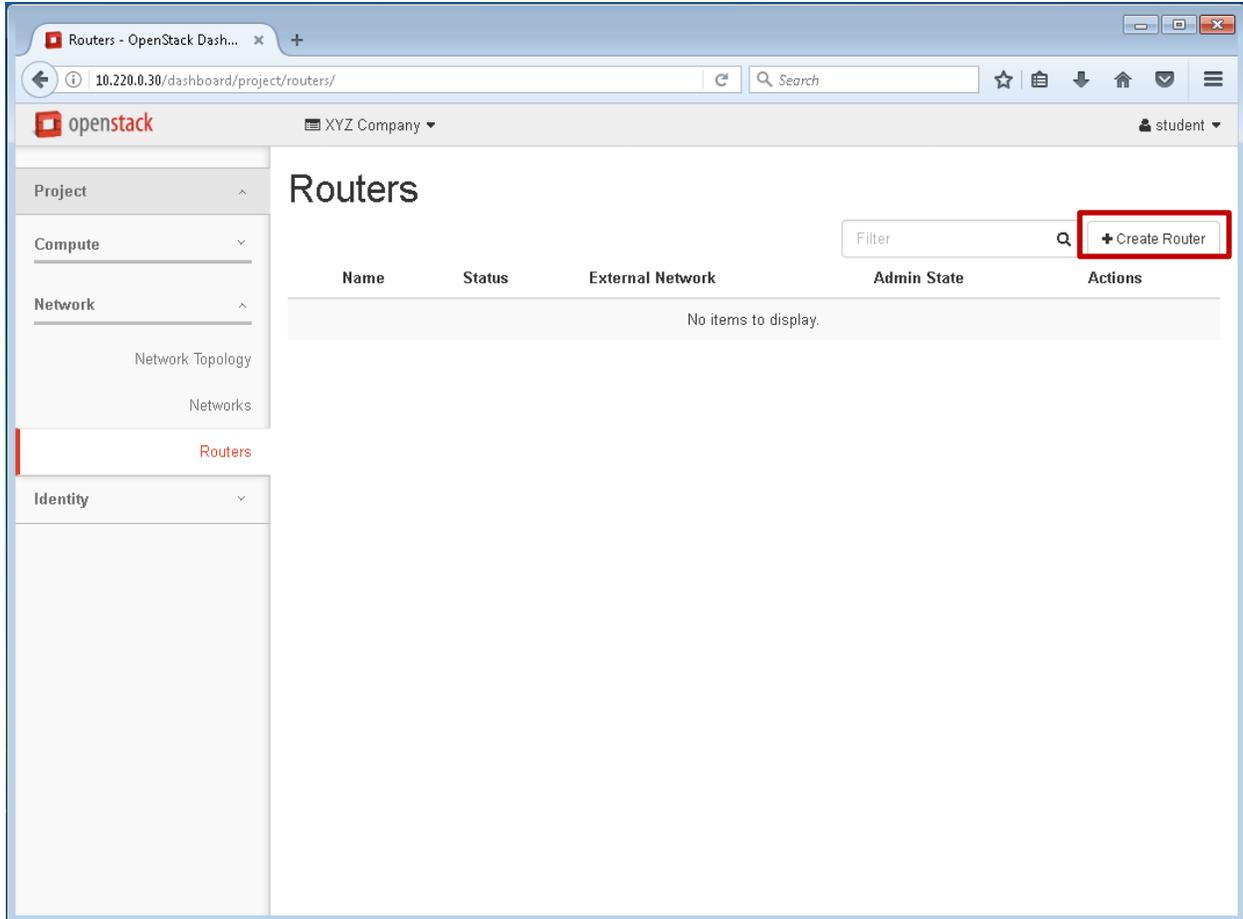
4. **Click** on the **Create Router**
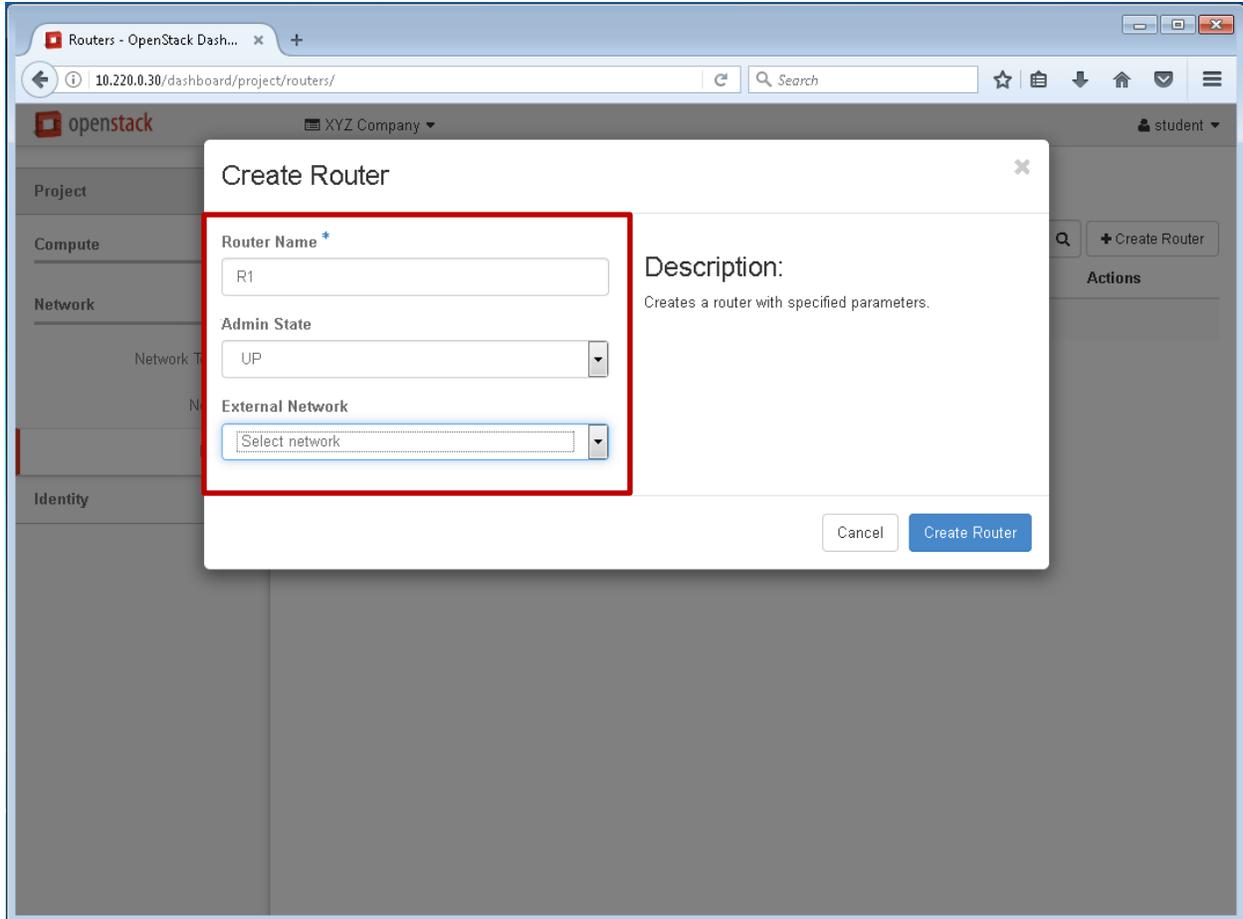
5. The **Create Router** wizard should open**. Enter R1** in the Router Name block. **Select** the **drop down menu** to see the available external networks, shown on next page
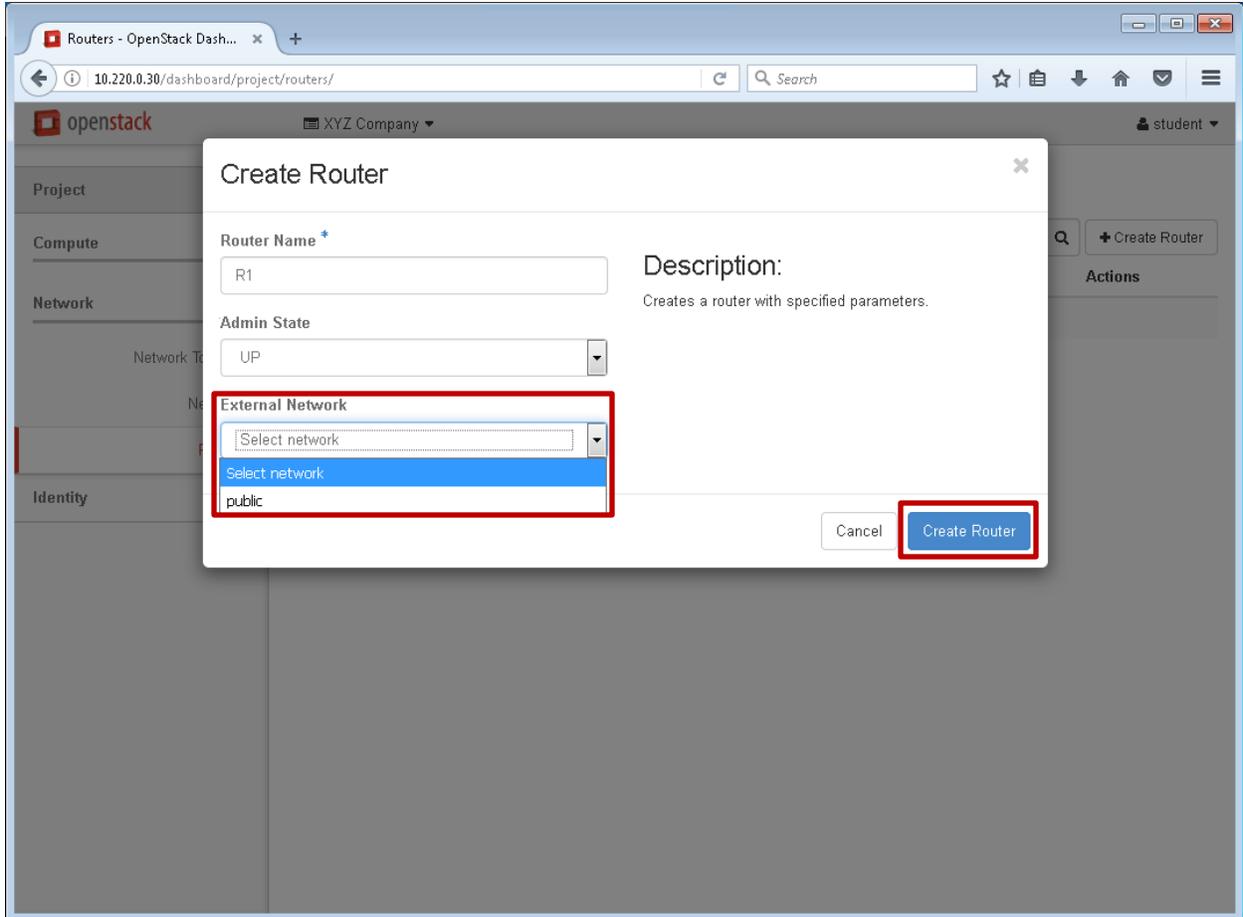
6. **Select** the **public** network, then **Click** on **Create Router**

Router Name	R1
External Network	public

7. Your new **R1** router should appear and the **Status** should be **Active** and Admin State should be **UP**. **Click** on **R1**
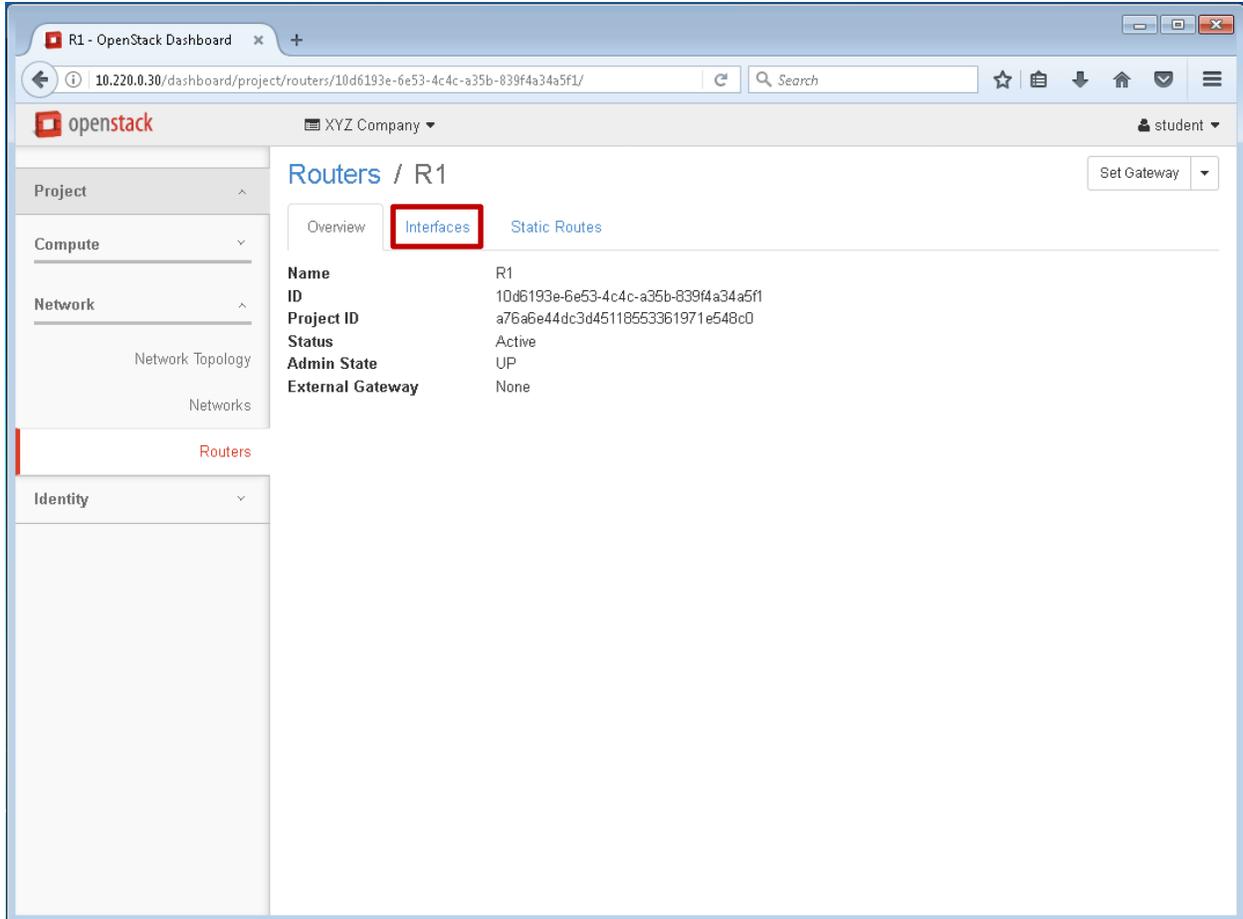
8. The **Routers** pane should appear. There are three additional tabs in the center pane; **Overview**, **Interfaces**, and **Static Routes**. The **Overview** pane, pictured, provides additional information about the Router. The **public network** was added to **Router R1** when it was created with the Create Router wizard. We will add the private network next. **Click** on the **Interfaces** tab

Interfaces

A physical or virtual device that provides connectivity to another device. In this case, you are adding a private interface to the router.
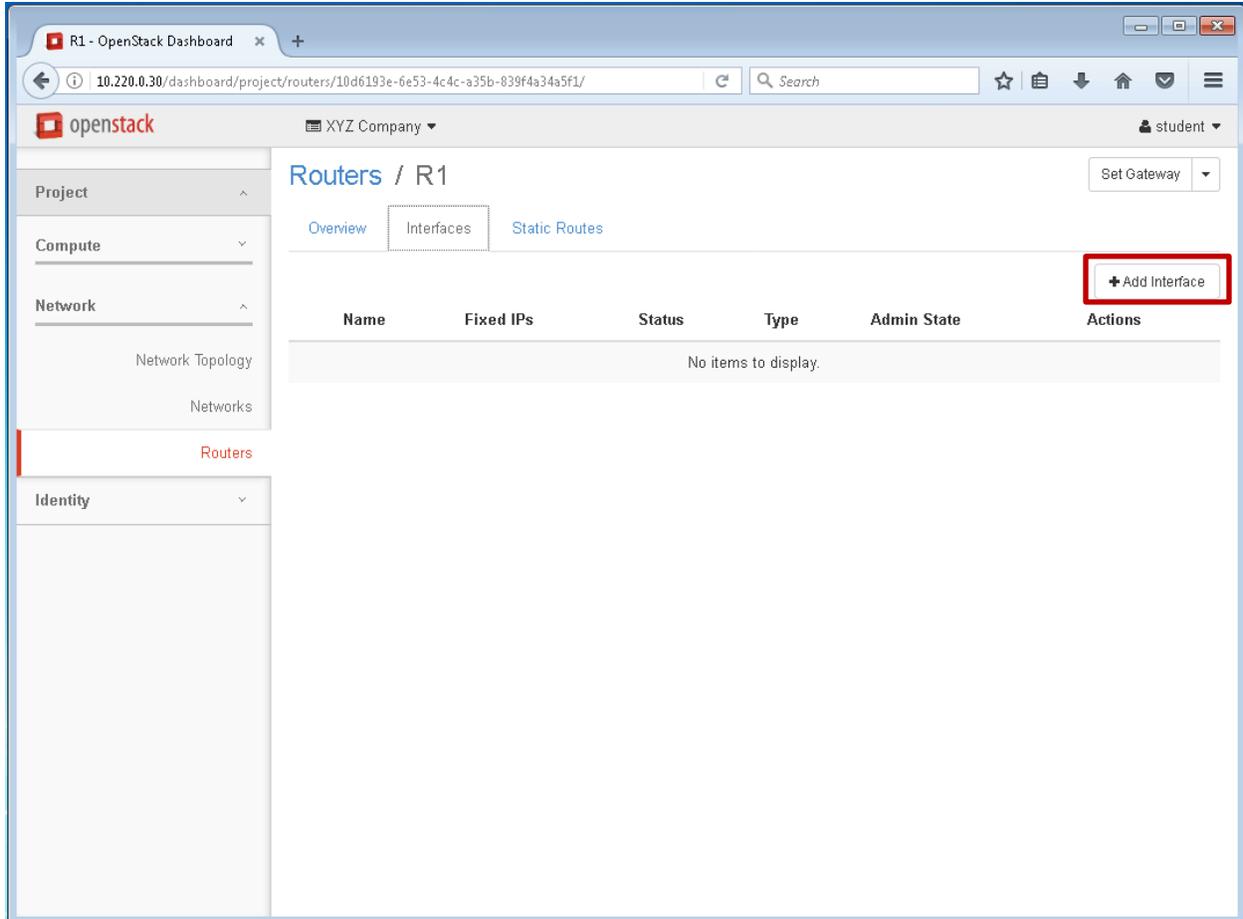
9. **Click** on **Add interface**
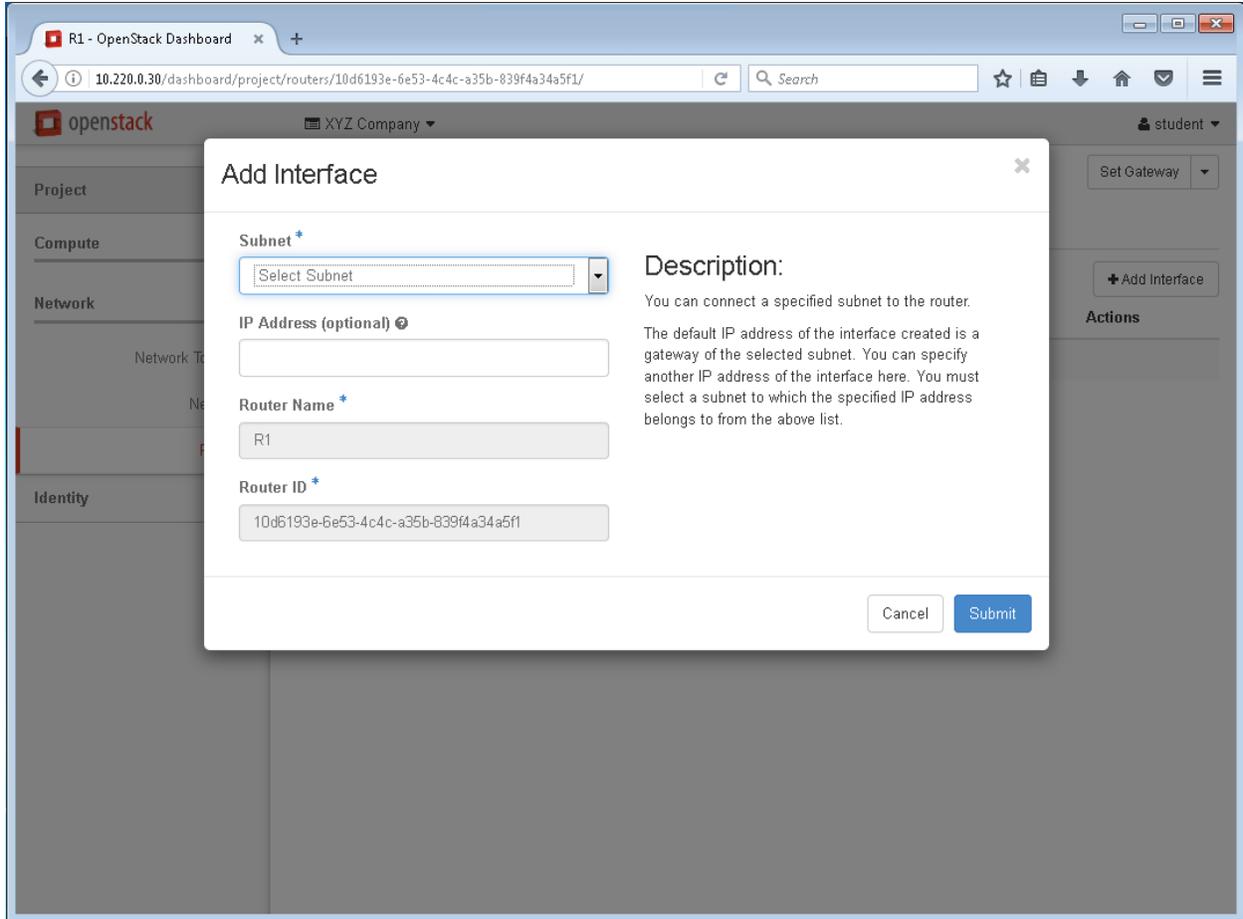
10. The **Add Interface** wizard should appear
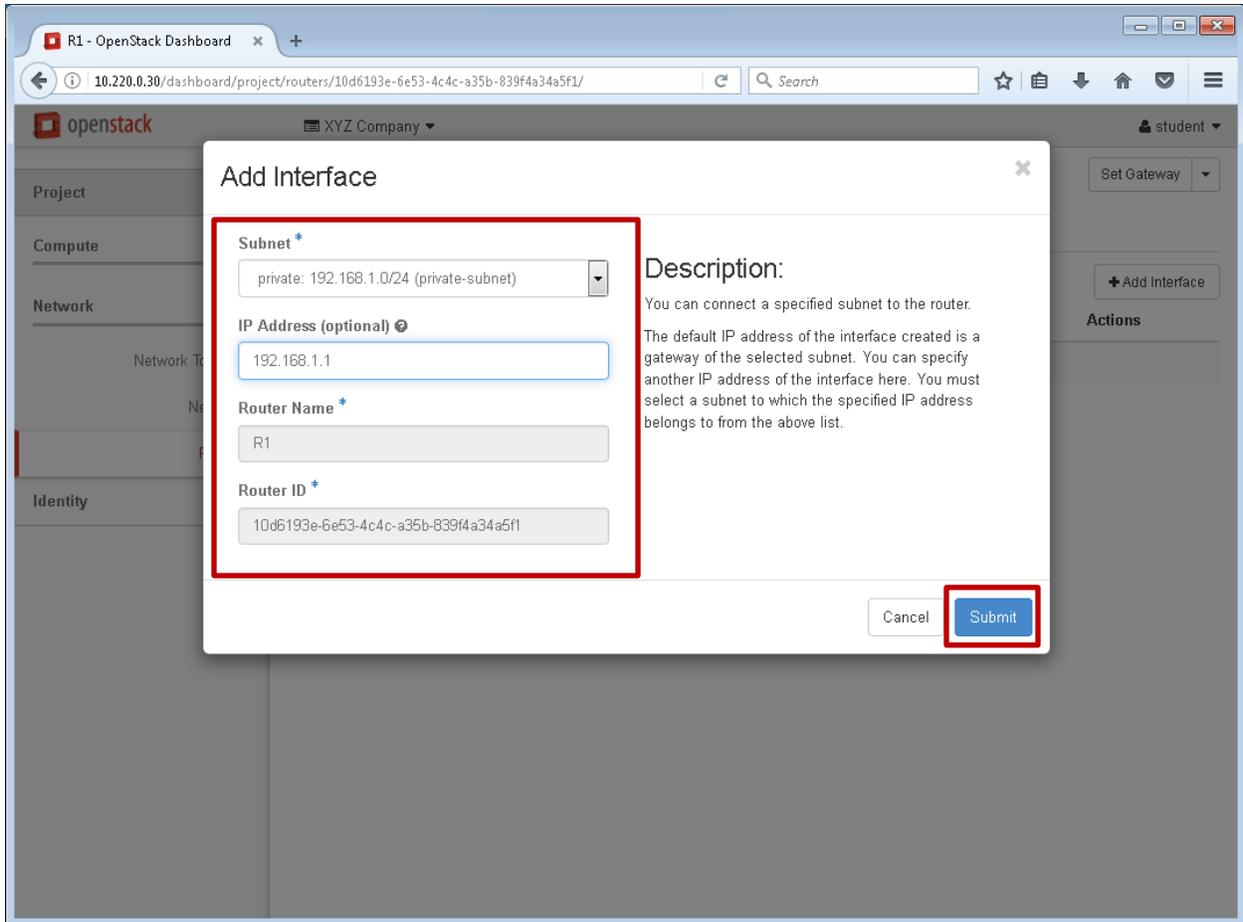
11. **Select** the **Subnet drop down menu** and **Click** on the **private: 192.168.1.0/24 (private-subnet)** network. **Enter** the **IP address 192.168.1.1**. **Click Submit**

Subnet	Private: 192.168.1.0/24 (private-subnet)
IP address	192.168.1.1
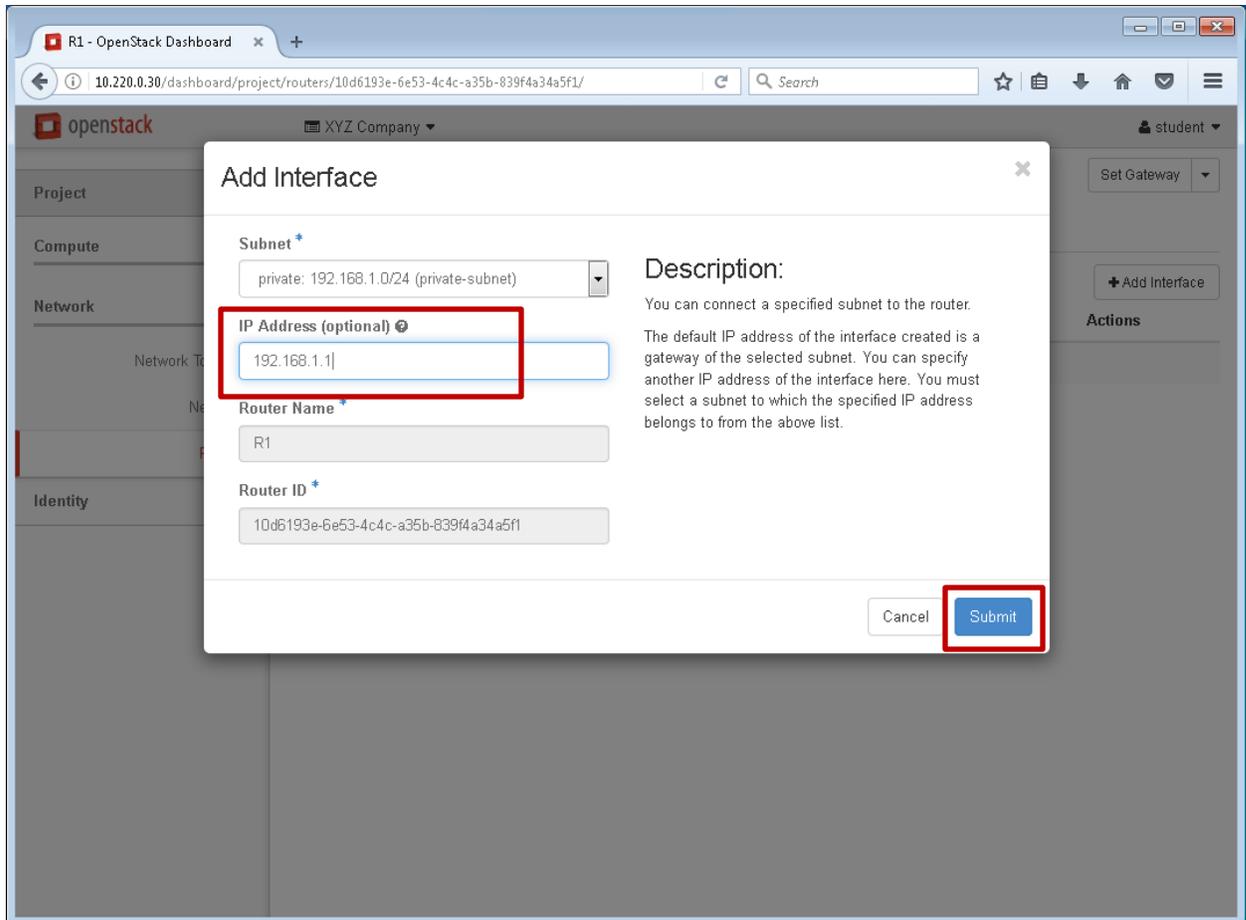
12. **Enter** the **192.168.1.1** network address in the **IP Address (optional)** block. **Click** on **Submit**.

    Note: The IP address above is the first available IP address in the private subnet and is the same IP address that you assigned as the gateway IP address in lab 7.
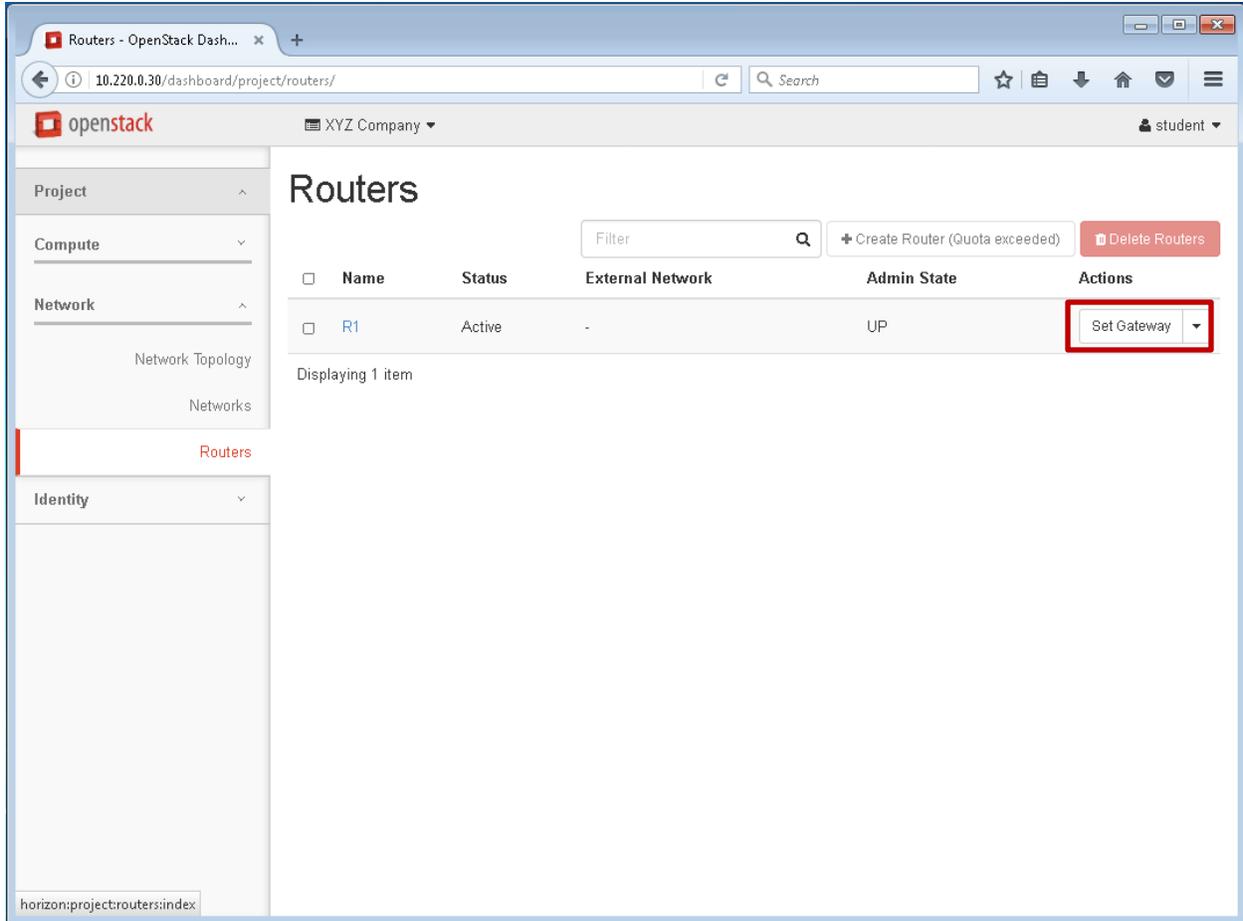
13. **Return** the **Router tab** and **Click Set Gateway**.
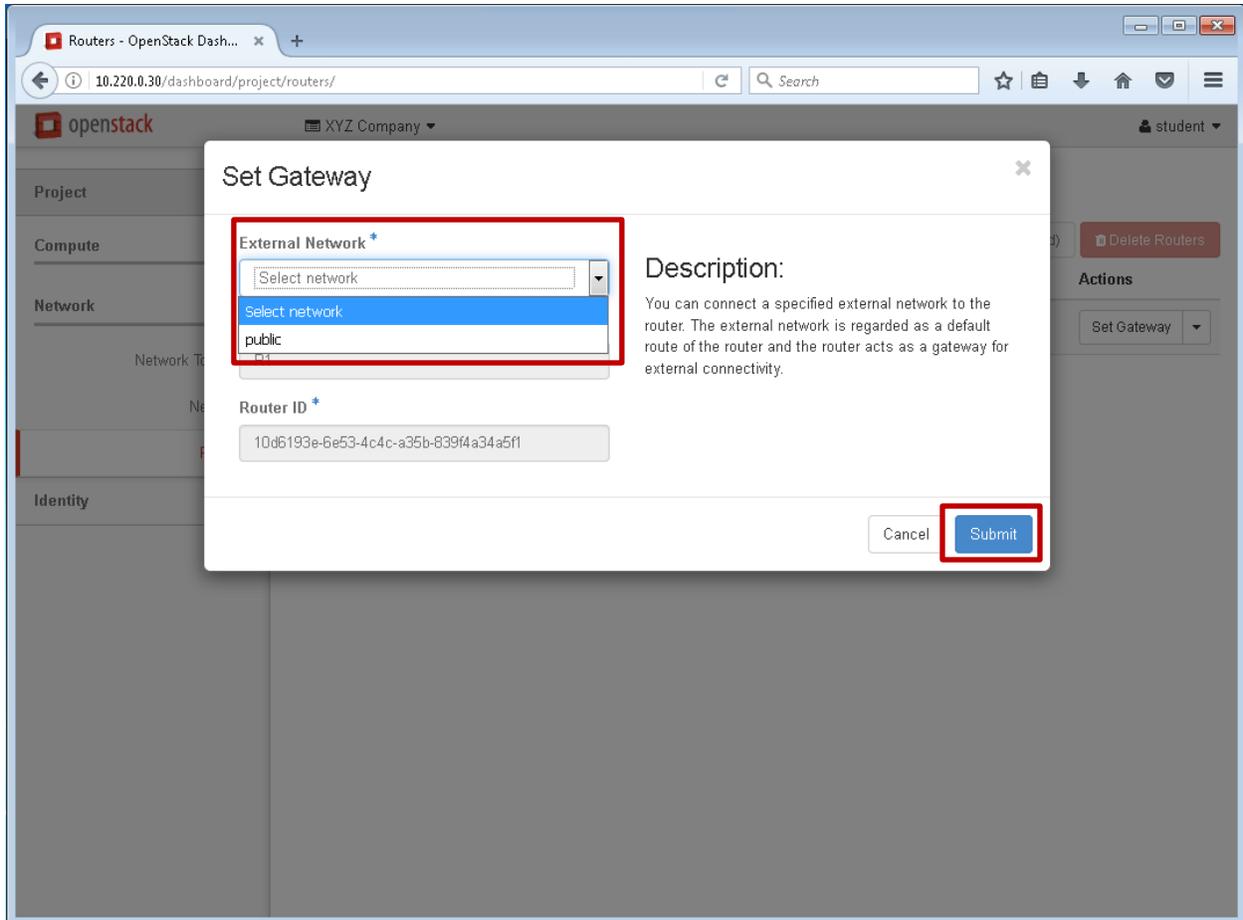
14. From the dropdown menu, **select** the **public network**. **Click Submit.**

15. Both interfaces should be listed in the center pane. **Click** on the **Network Topology** tab in the left pane
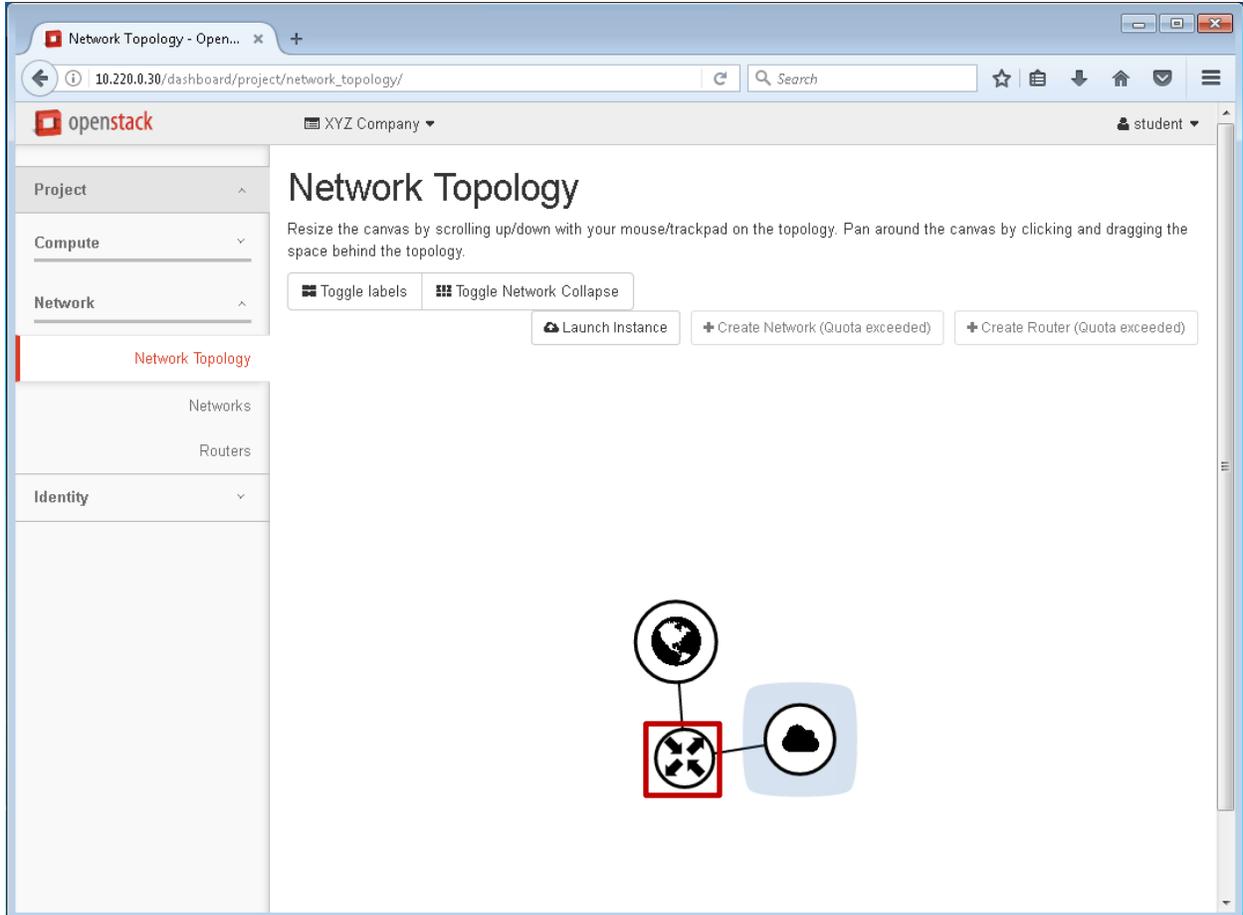
16. The **Network Topology** pane has a graphic representation of your network. **Click** on the **center icon** with the four arrows.

Note: The ICON with globe is the WAN (public network) and the ICON with the Cloud is the LAN (private network) if you click on either one, you will see the same type of popup with additional information as you do with the Router ICON.
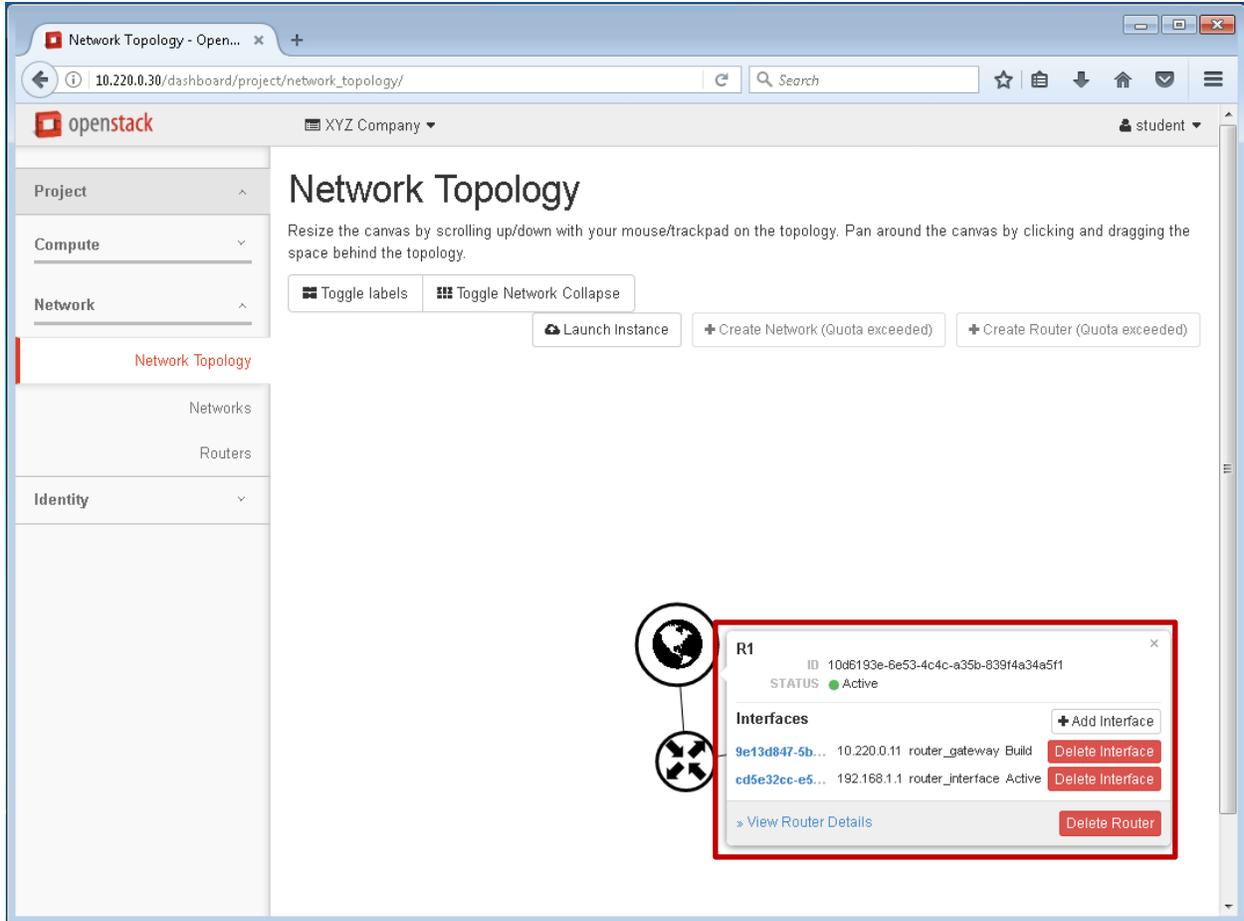
17. You should see a popup with more information about your router along with options to **Add Interface**, **Delete Interface**, **Delete Router**. Additionally, a link to **View Router details**, which takes you back to the **Routers** tab.

This completes Lab 8, continue to grading script

Run the grade script
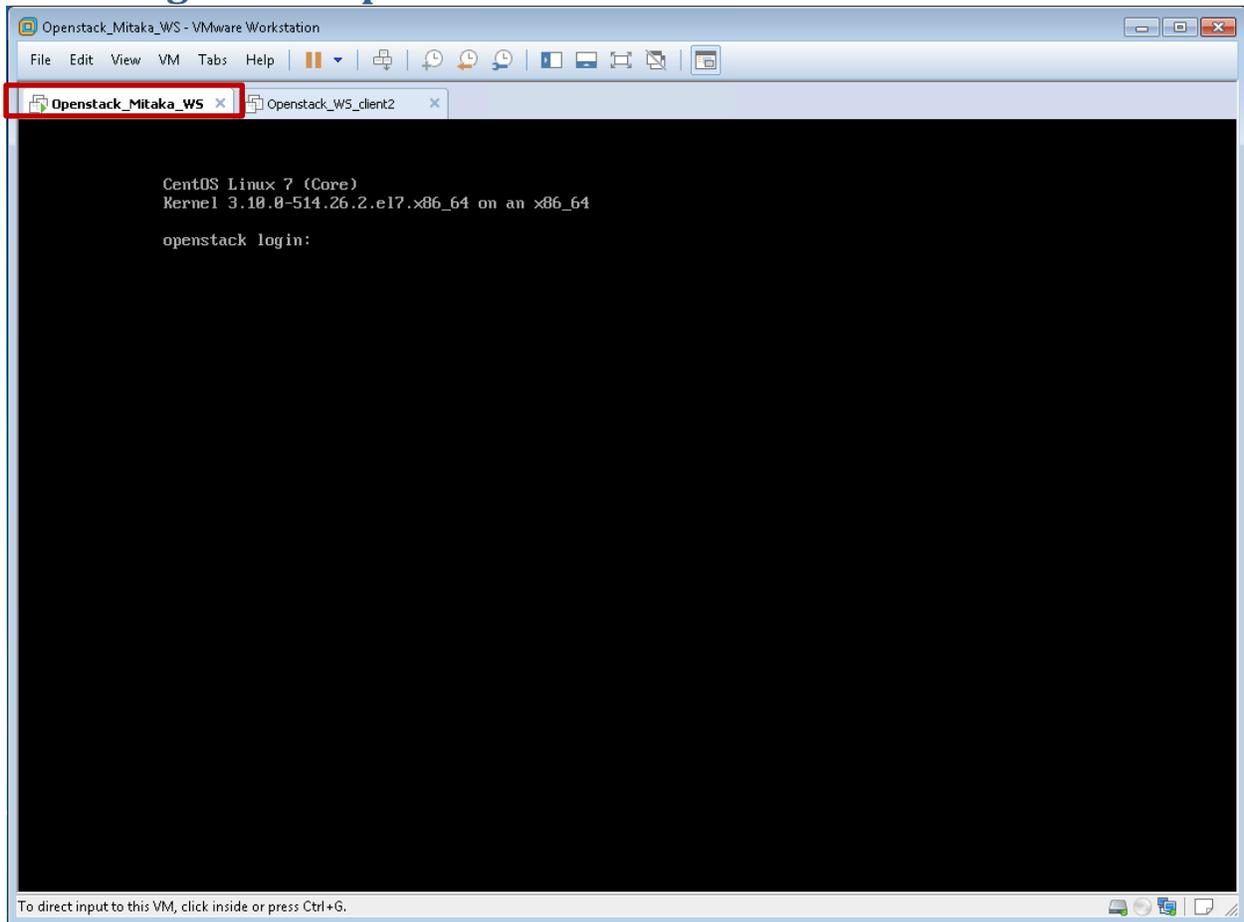
1. Return to Workstation and **Click** on **OpenStack_Mitaka_WS VM**

    Note: The OpenStack_Mitaka_WS console may still be open on your desktop from when you ran the setup script
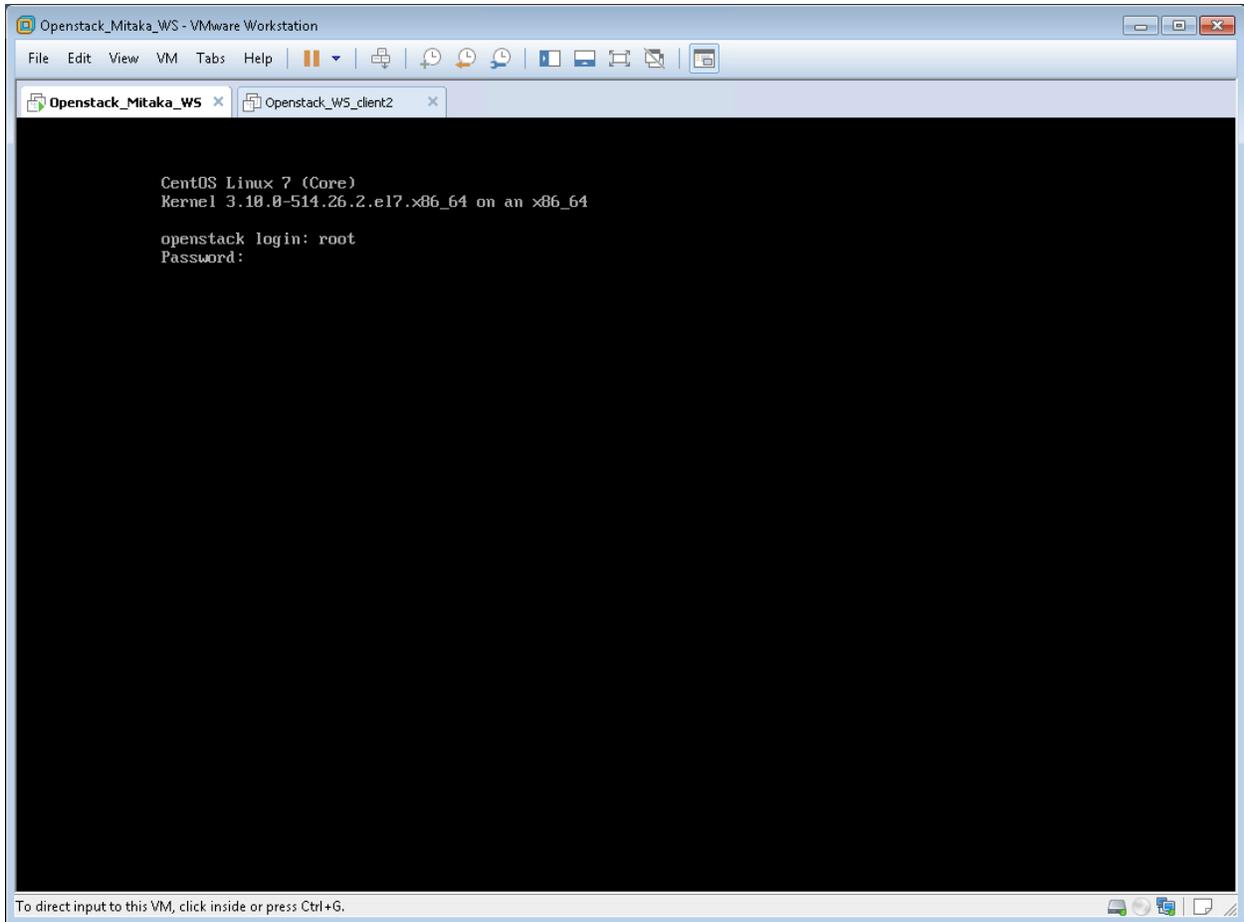
2. Log in as root with the Password: P@ssword

    Note: The password is NOT visible as you type it
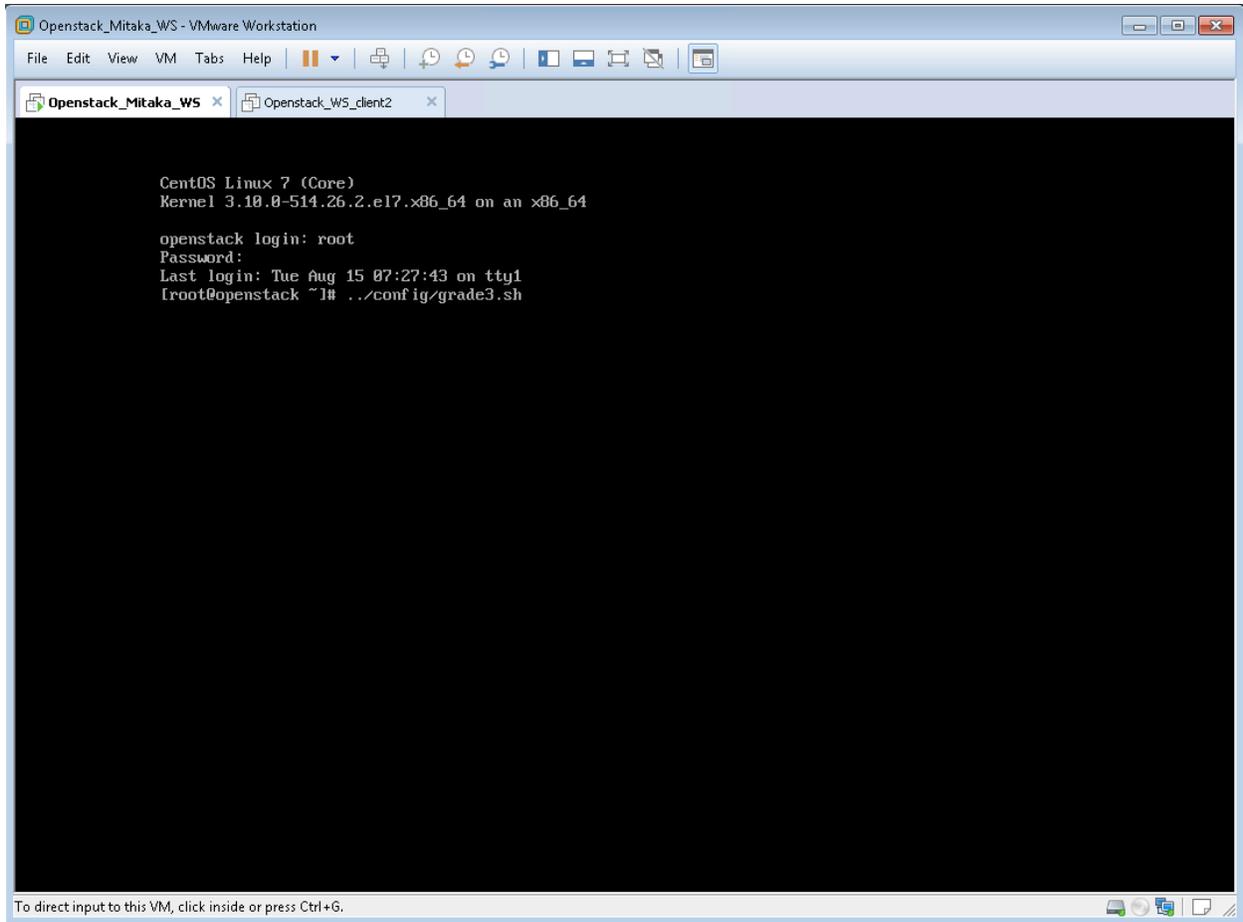
3.   Enter the command; **../config/grade3.sh** and **press Enter**

4. The grading script will produce an output with **PASS** or **FAIL** for each of the categories, similar to the screen capture above. If you receive a **FAIL** on one or more of the categories, you can go back and fix the issue and run the grading script again, or you can revert the OpenStack_Mitaka_WS VM to the base snapshot and start over again.

This completes Module 3, continue to conclusion

Conclusion:

The customer now has the minimum network requirements needed configured to successfully launch an instance. After an instance has been launched, additional configuration will be required, to the network management rules, to allow a connection to the server from the public network. Your next field visit to XYZ Company will be to launch a Linux server cloud instance.