|  |  |
| --- | --- |
| IST198  OpenStack  Administration | Version 1: 2017-08-17 |
| These exercises will guide the student through the concepts and topics learned in chapter 8, launch a CentOS 7 instance with a customization script and verify the web server function from a Linux VM | Launch a CentOS 7 Instance with a customization script and verify the web server function |

**Attributions:**

This material is based upon work supported by the National Science Foundation under Grant No. (NSF 1601166).

C:\Users\ronaldsharman\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\OpenStack_Logo_Horizontal.eps Portions of this document, in whole or part, were sourced from the OpenStack website at https://www.openstack.org

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**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.

**Module Objectives**

**Learner will be able to:**

* Launch a CentOS 7 Instance with a customization script from the OpenStack Dashboard and verify the httpd service using a web browser and the Linux command line.

**Labs 20-21**

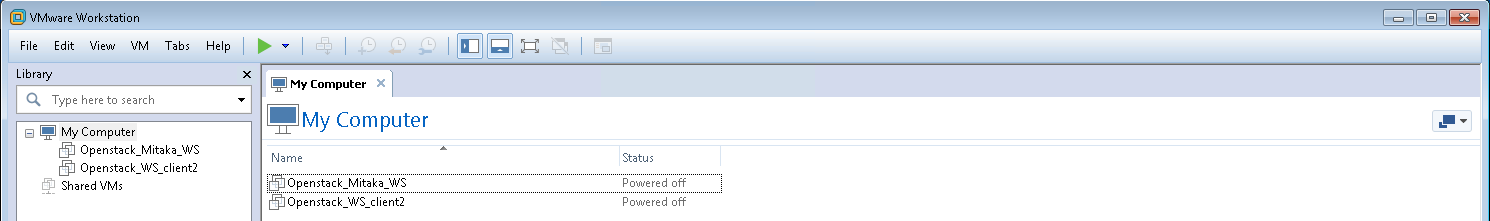
These labs will guide the student through launching a CentOS 7 Instance with a customization script and verify that the service is running with a web browser and the Linux command line.

**(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).**

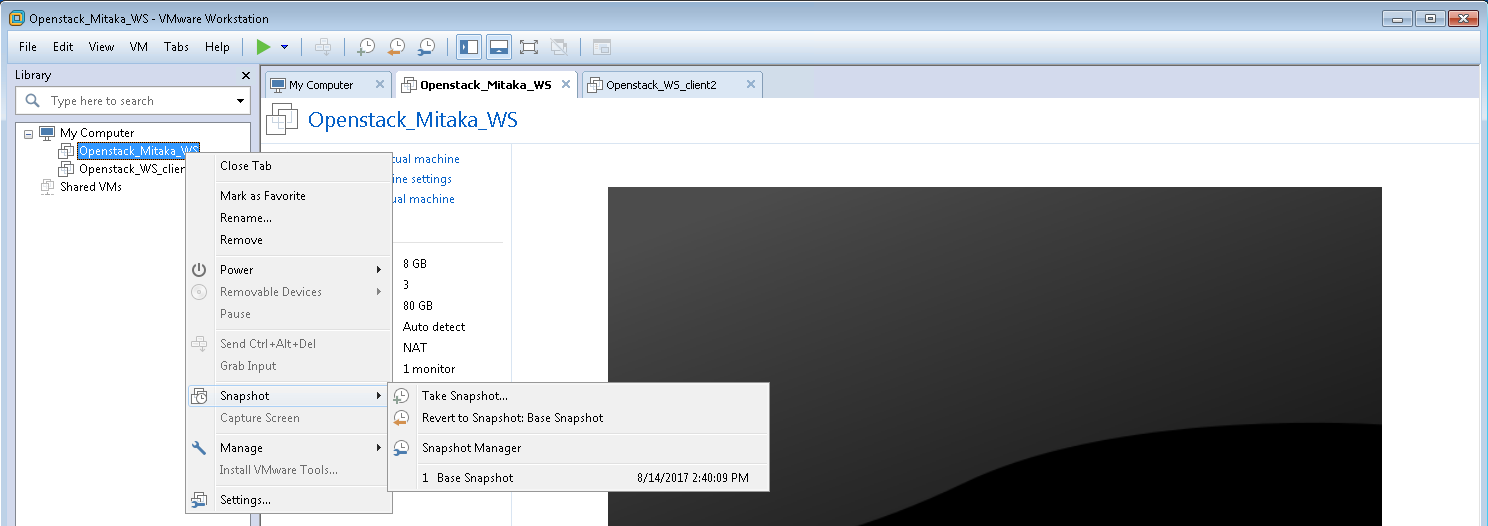
**Prepare the OpenStack Virtual Machines**



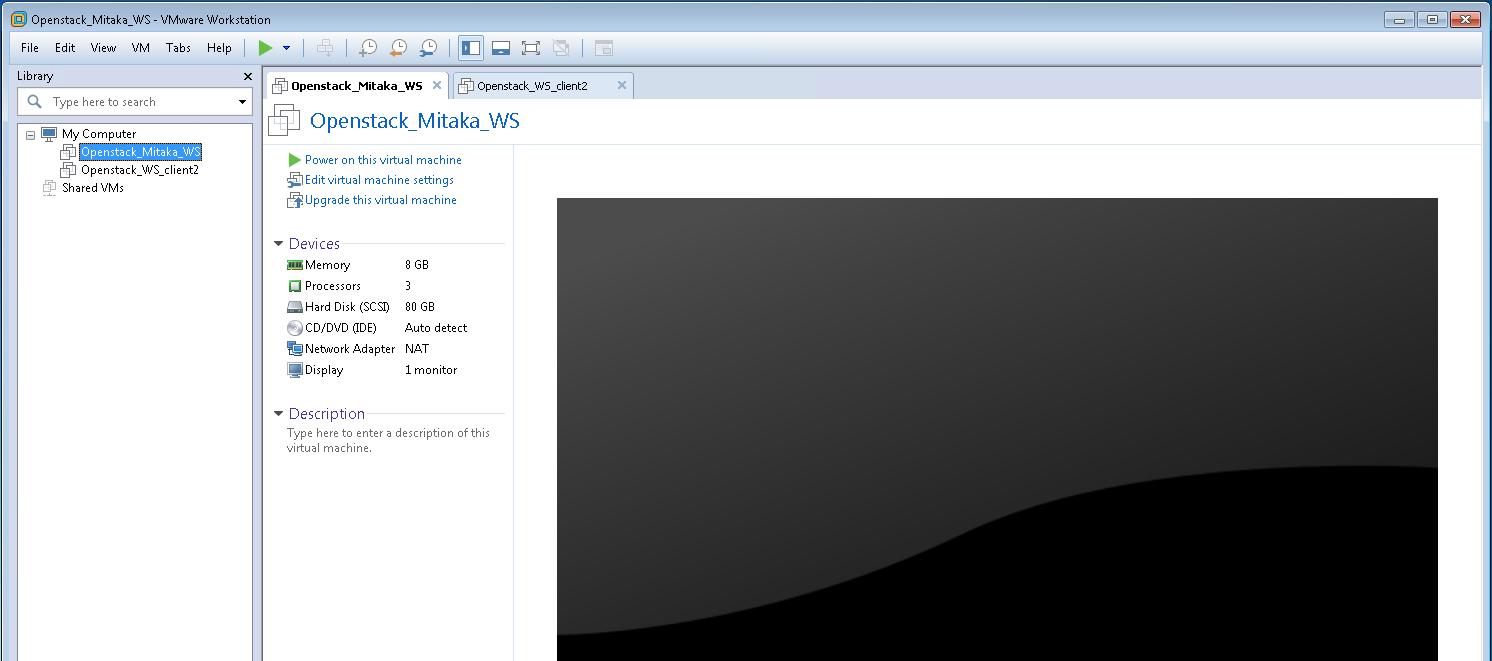
1. **Launch** the **VMware Workstation Pro application**



1. Workstation should have two virtual machines (VM) installed; Openstack\_Mitaka\_v2 and Openstack\_Mitaka\_client2.

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1. 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.

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1. **Power on** both VMs by selecting one of the two VMs and **clicking** on **Power on this virtual**

**Lab Scenario**

As part of CLOUDTech’s customer support team, this is your second field visit to XYZ Company. During this visit, you will assist the customer in creating a CentOS 7 instance, and connect to it using Remote Desktop from a Windows and CentOS 7 VM.

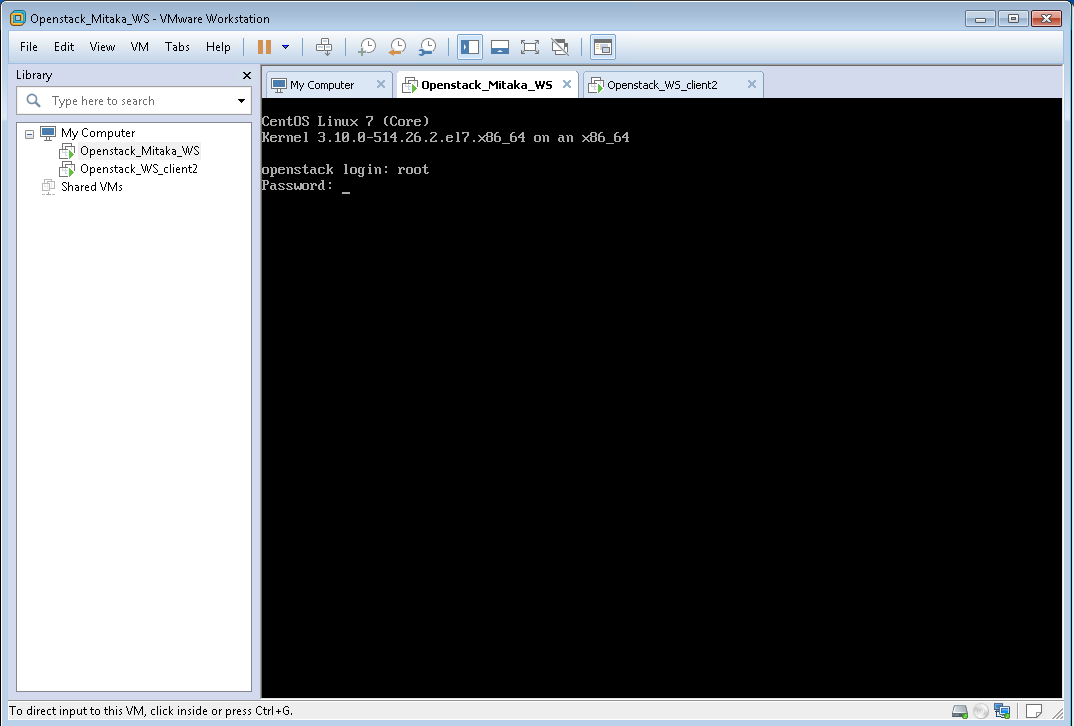
**Lab Settings**

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 |

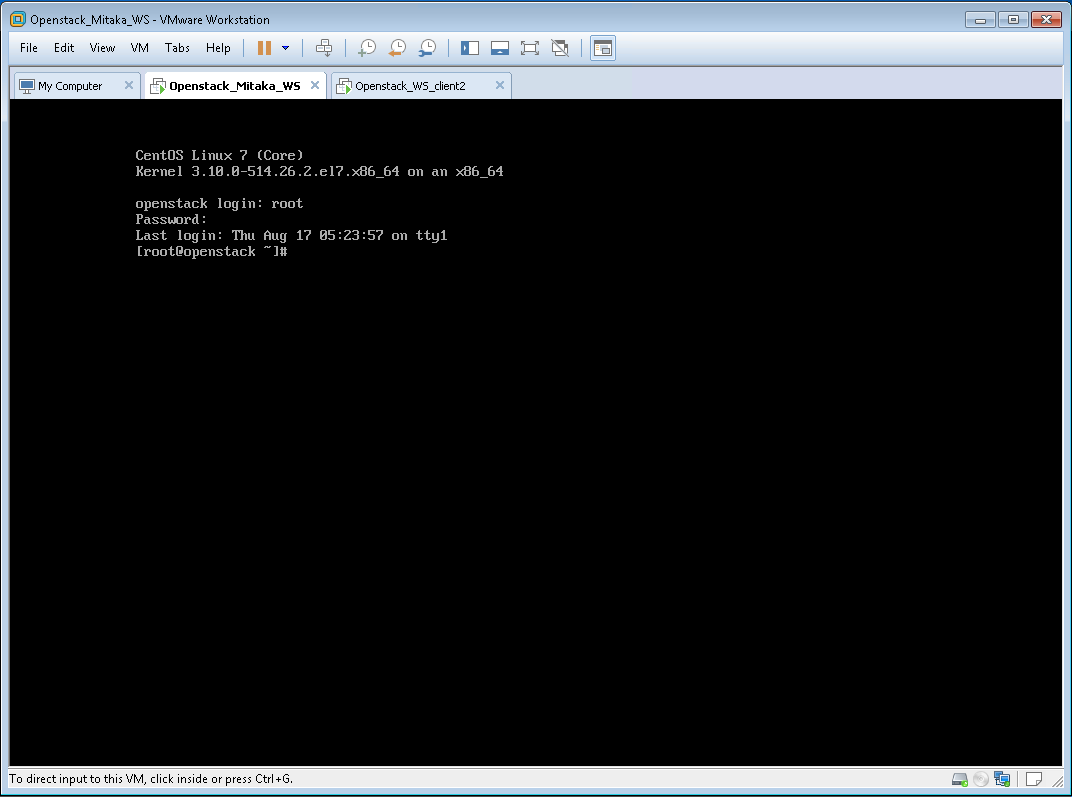
Note: The OpenStack PODs are Normal PODs, in NDG terminology, which means they revert to a snapshot after you are finished with the Lab(s), e.g. click I’M DONE on the Lab Topology. This means that you can explore or experiment without fear of damaging the POD. If you make a mistake that you can’t recover from, then end the reservation and make a new POD reservation and everything will be back to a known starting point.

**Run the lab setup script**

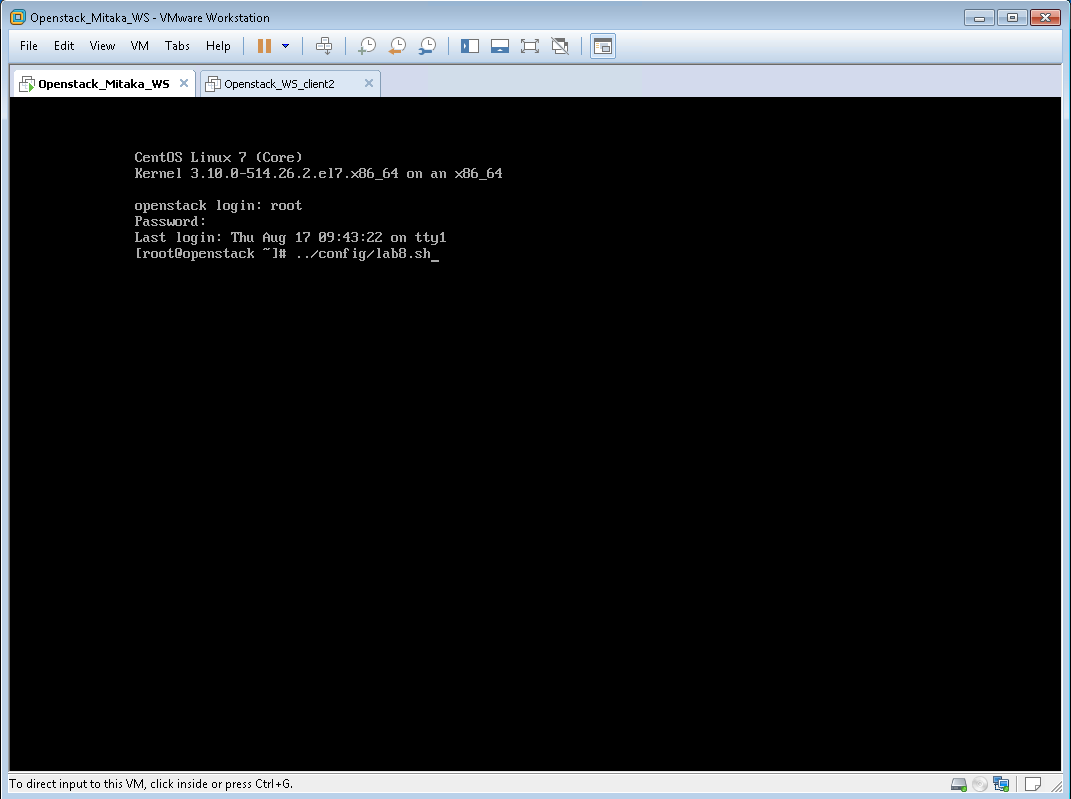
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1. Log in as **root** with the Password: **P@ssword**

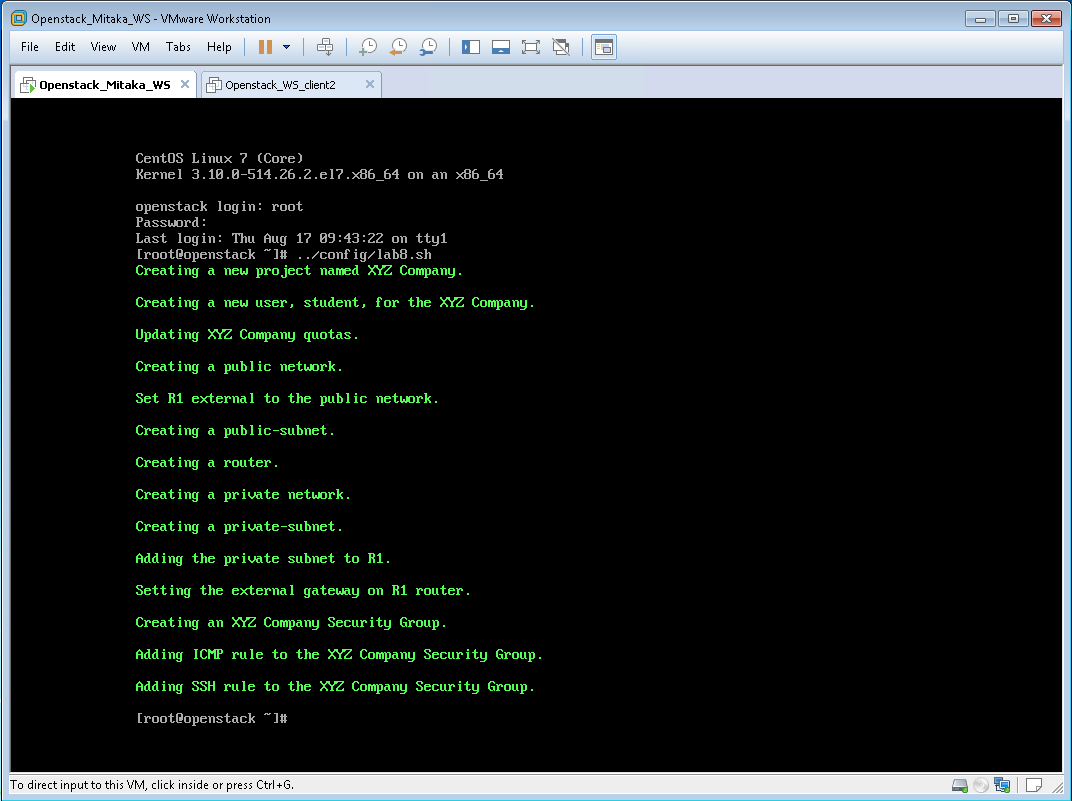
Note: The password is NOT visible as you type it

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1. After successfully logging in as root, you should see this screen. Continue to the next page

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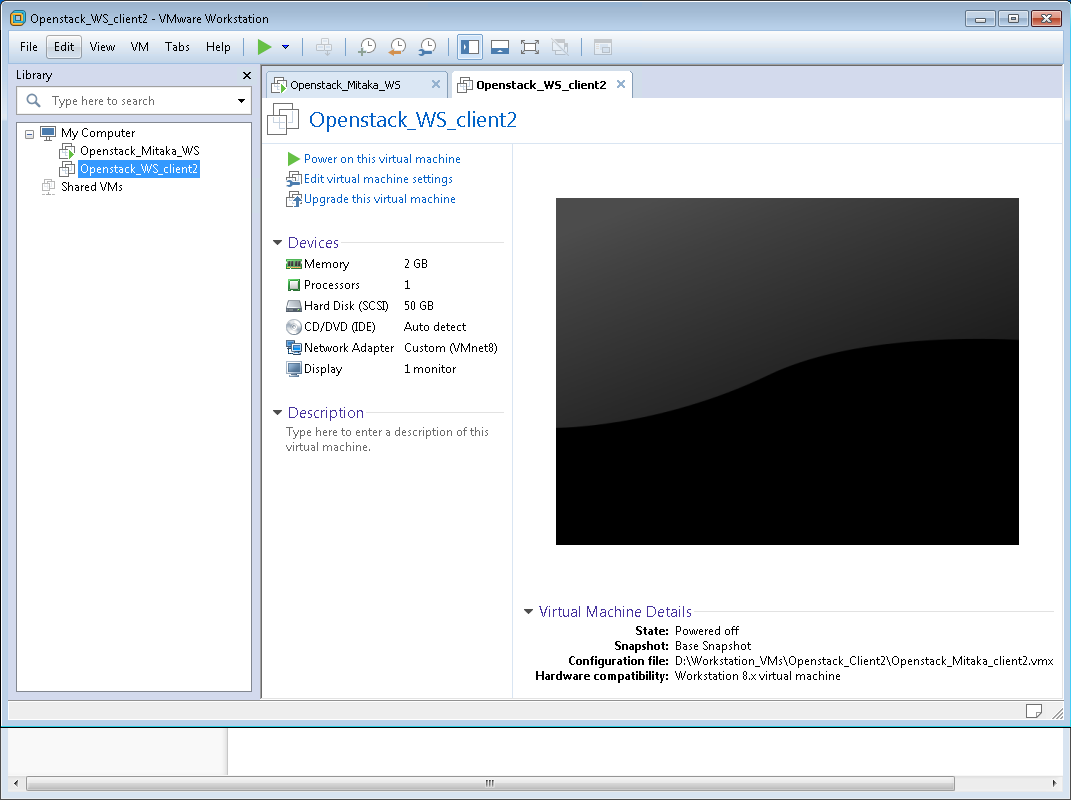
1. Type the command; **../config/lab8.sh** and **press Enter** as shown in the screen capture above to run the Module 8 setup script



1. After the setup command completes, you can **minimize VMware Workstation.**

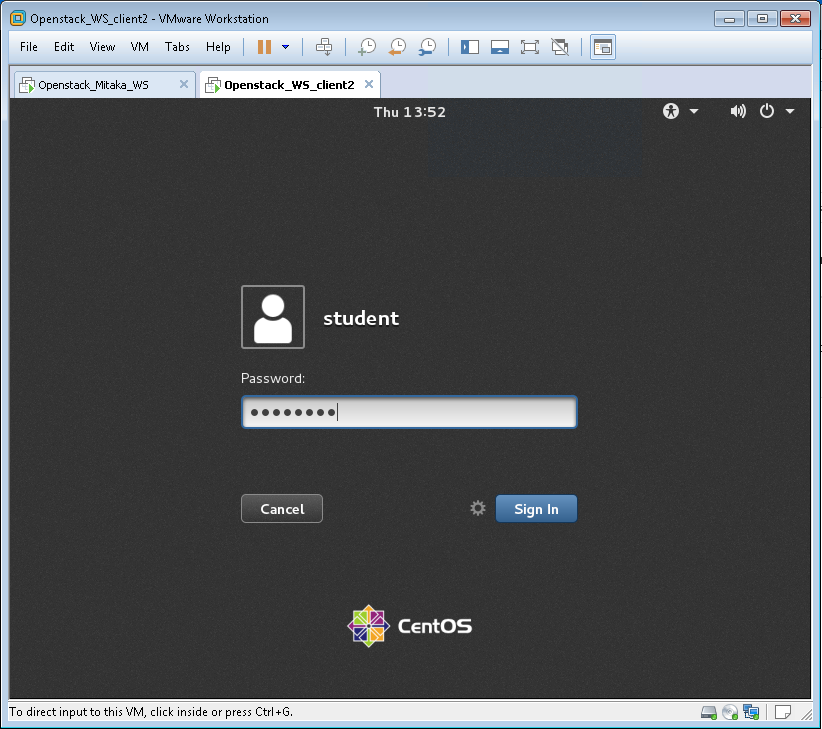
Note: The script is complete when the **[root@openstack ~]#** prompt returns

**Access the OpenStack Dashboard**



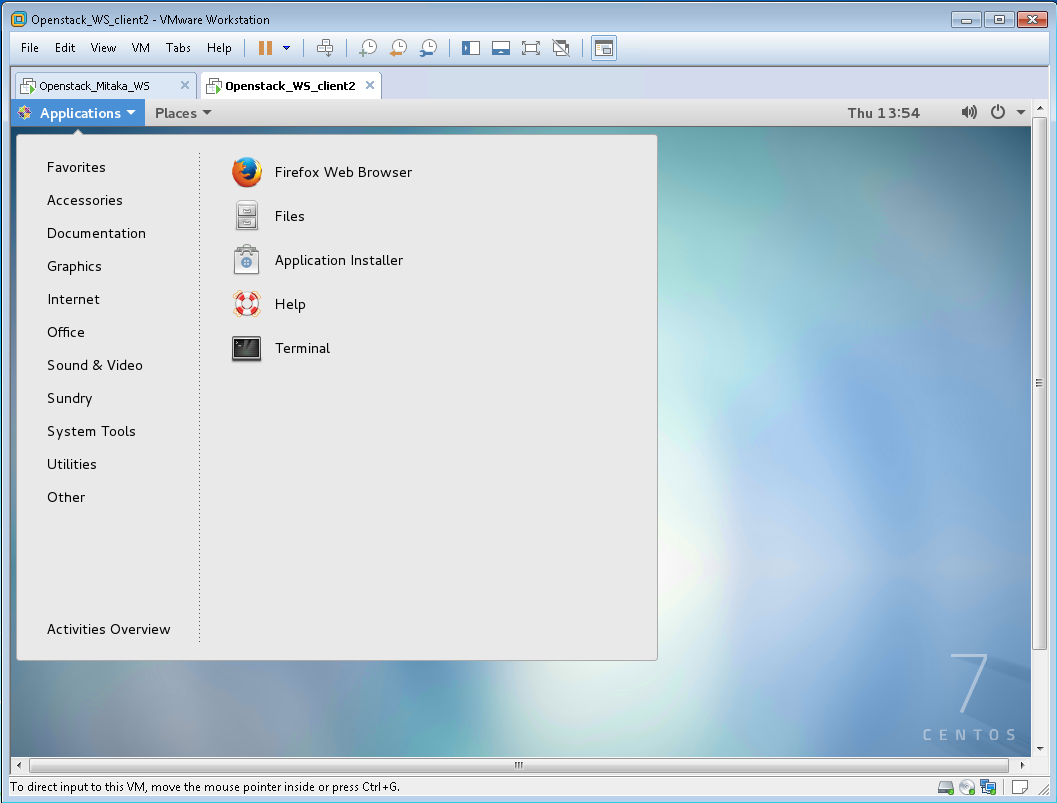
1. **Power on** the **Openstack\_WS\_client2 VM** in Workstation.

Note: Do not use the Windows host for this lab.

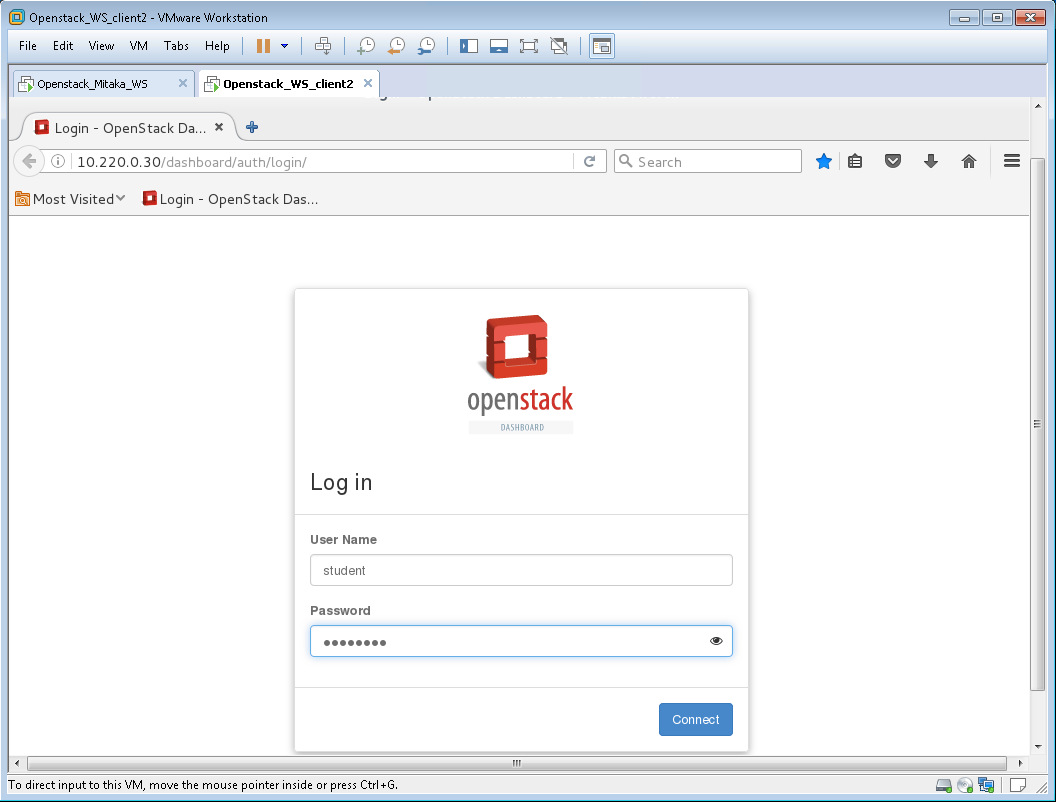
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1. **Enter** the passwordof **P@ssword** to access the CentOS 7 Client virtual machine.

Note: If the screen is black, tap the spacebar to wake up the VM.

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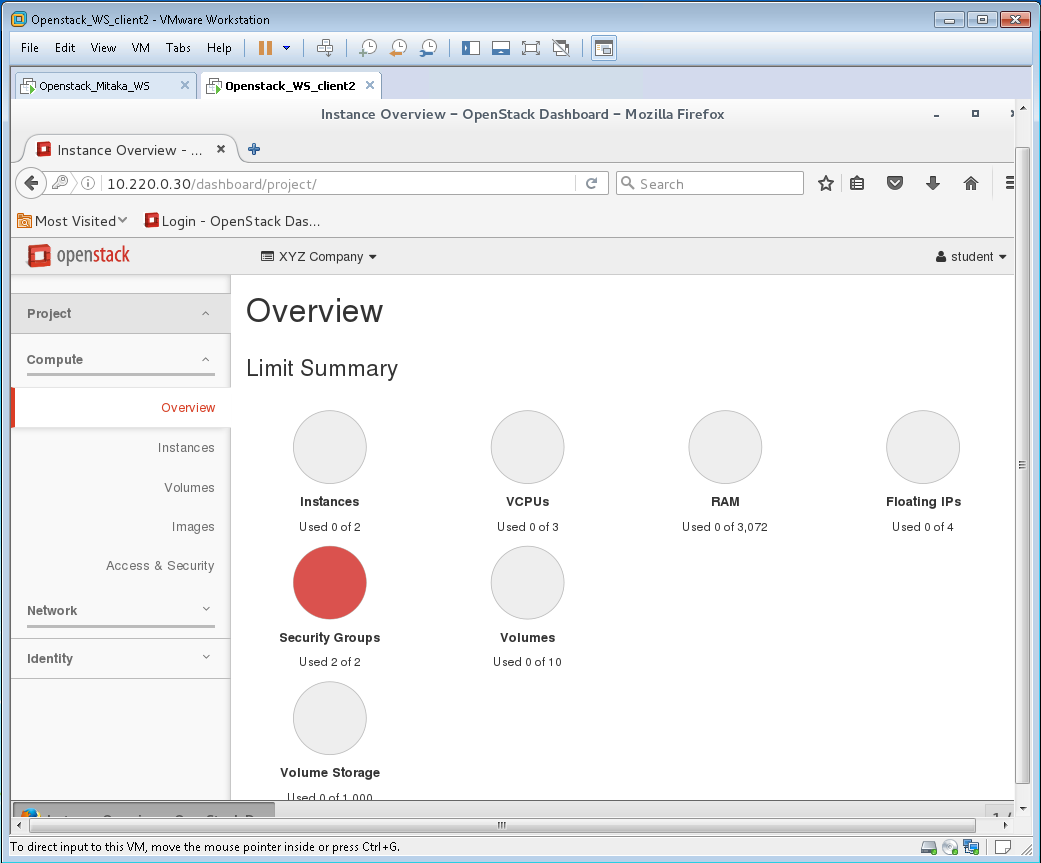
1. **Open** Firefox Web Browser from **Applications>Firefox Web Browser** to access the **OpenStack Dashboard** log in page.

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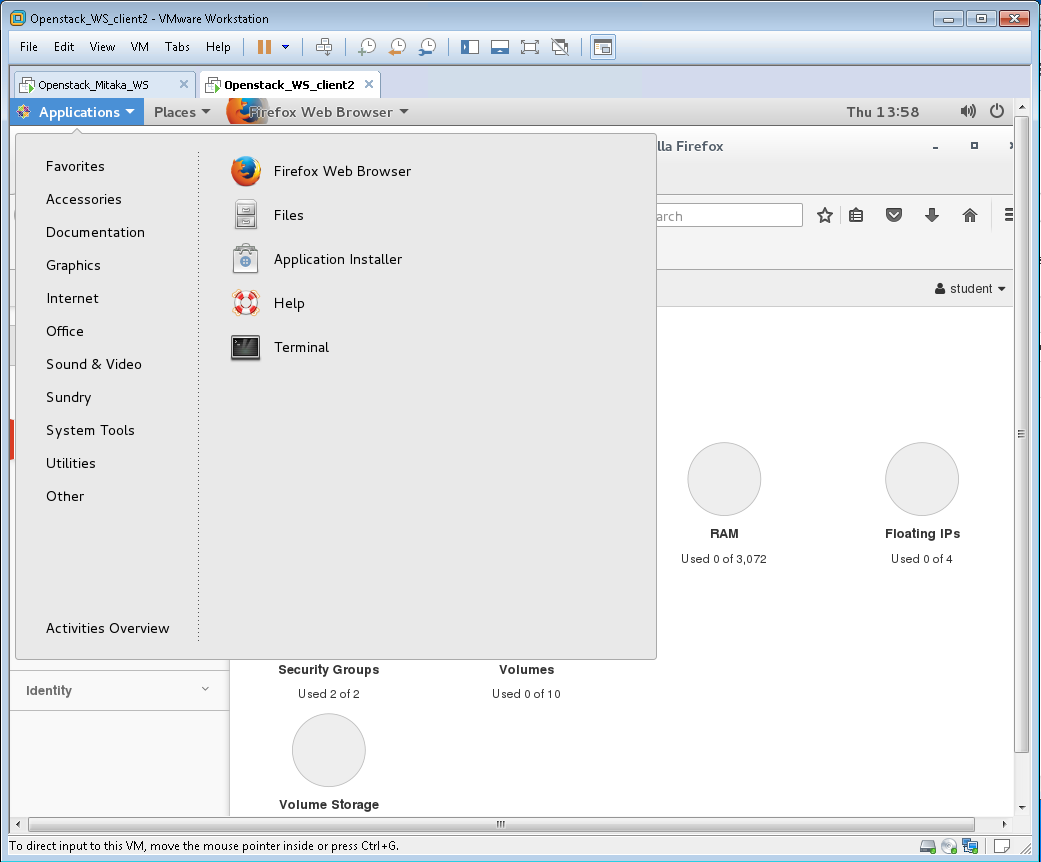
1. **Login** to the OpenStack Dashboard with the username **Student** and **P@ssword** and press **enter** or **click Connect**.

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

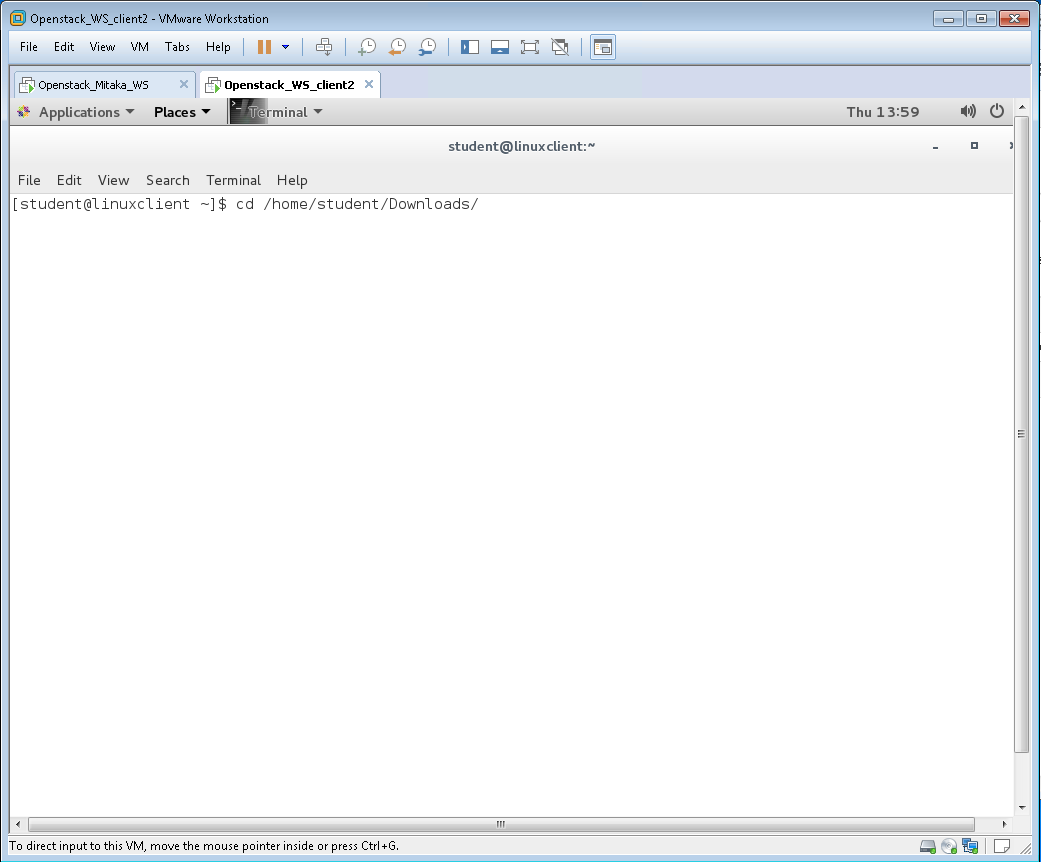
Note: In the CentOS 7 Client2 VM, the Firefox web browser home page is set to open the OpenStack Dashboard Login page.

**Lab 20: Launch a CentOS 7 instance with a customization script**

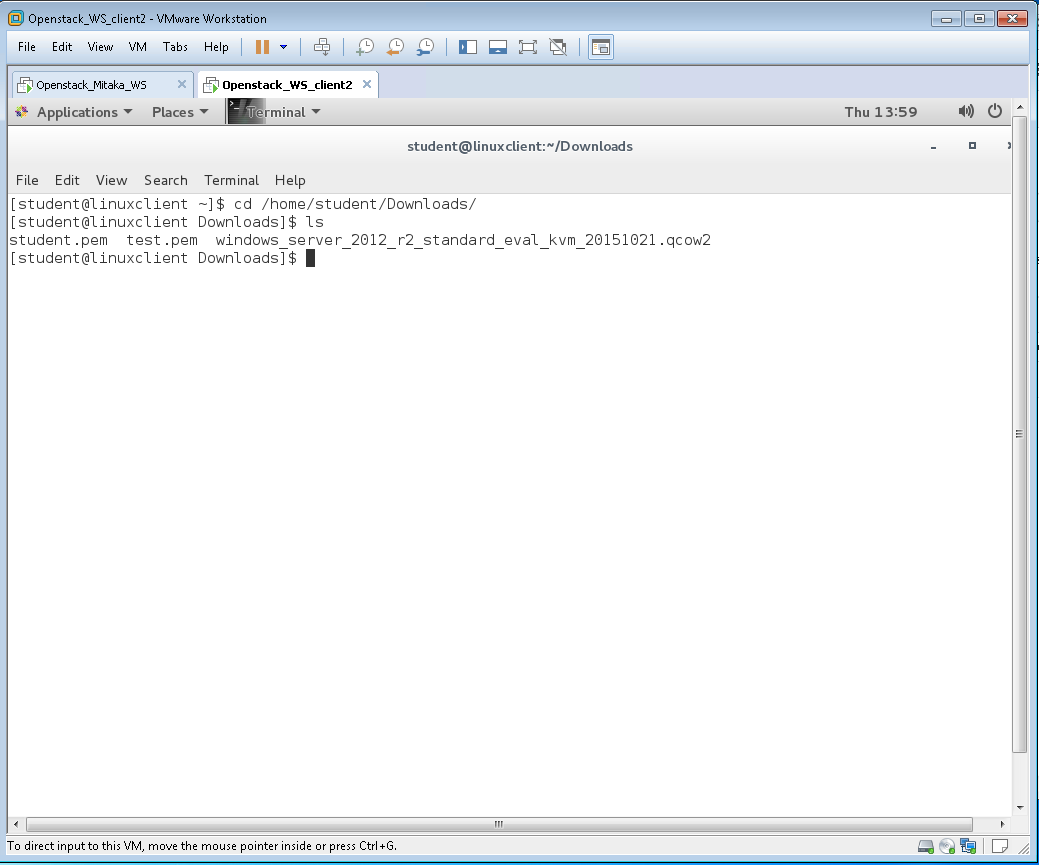
1. Using the command line, extract the public key from the private key file. Continue to the next page.



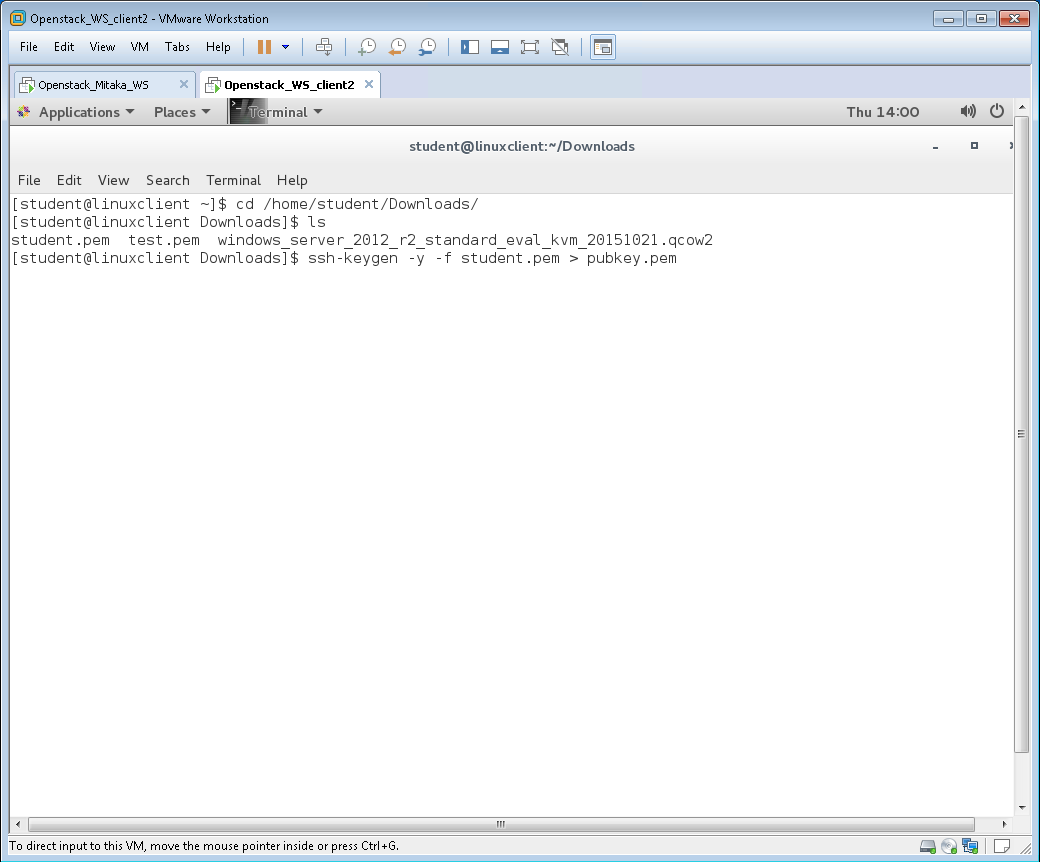
1. **Open** a **terminal window** using **Applications>terminal**.



1. Change to the student’s Downloads using the **#cd /home/student/Downloads/** command.



1. List the contents of the Downloads directory using the **# ls** command. You should the student.pem file, which was prepositioned in the Downloads directory for you. This is the private key pair file that you will extract the public key from.



1. Extract the public key from the private key using the **# ssh-keygen –y –f student.pem > pubkey.pem** command.

Note: The command elements are as follows;

**ssh-keygen** is an OpenSSH command

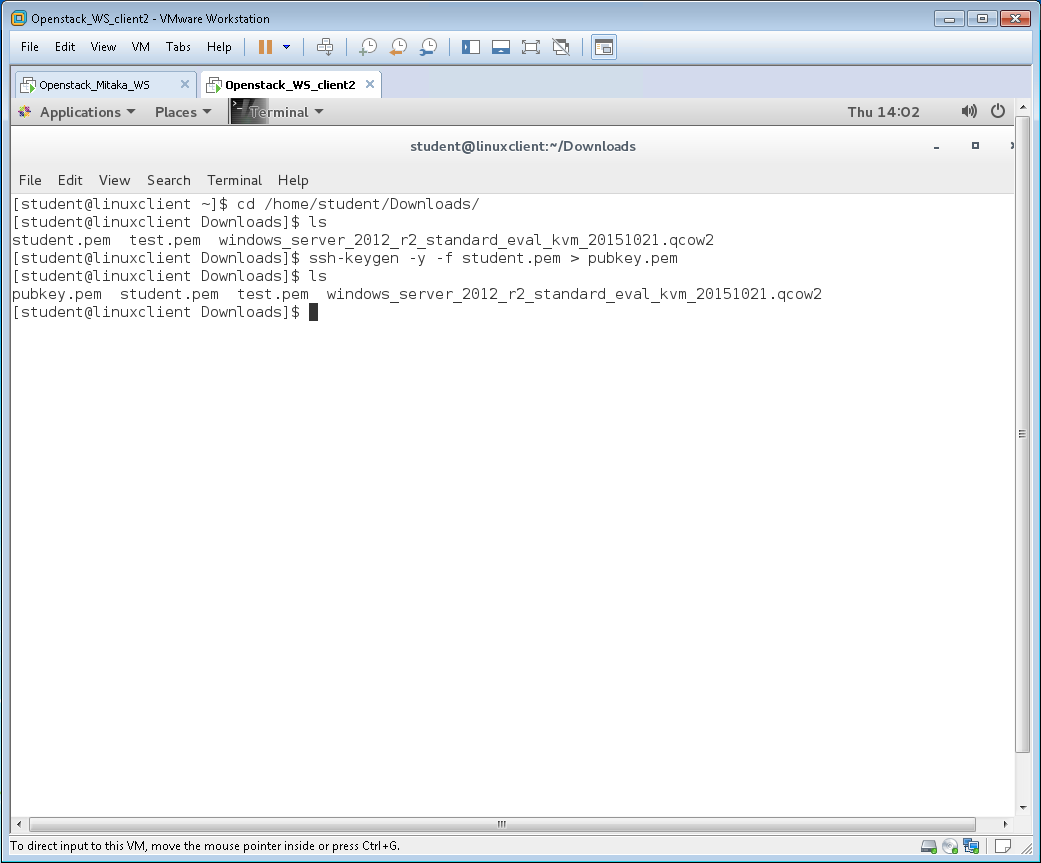
**-y** option Reads a private OpenSSH format file and prints the OpenSSH public key to stdout

**-f** option Specifies the filename of the key file

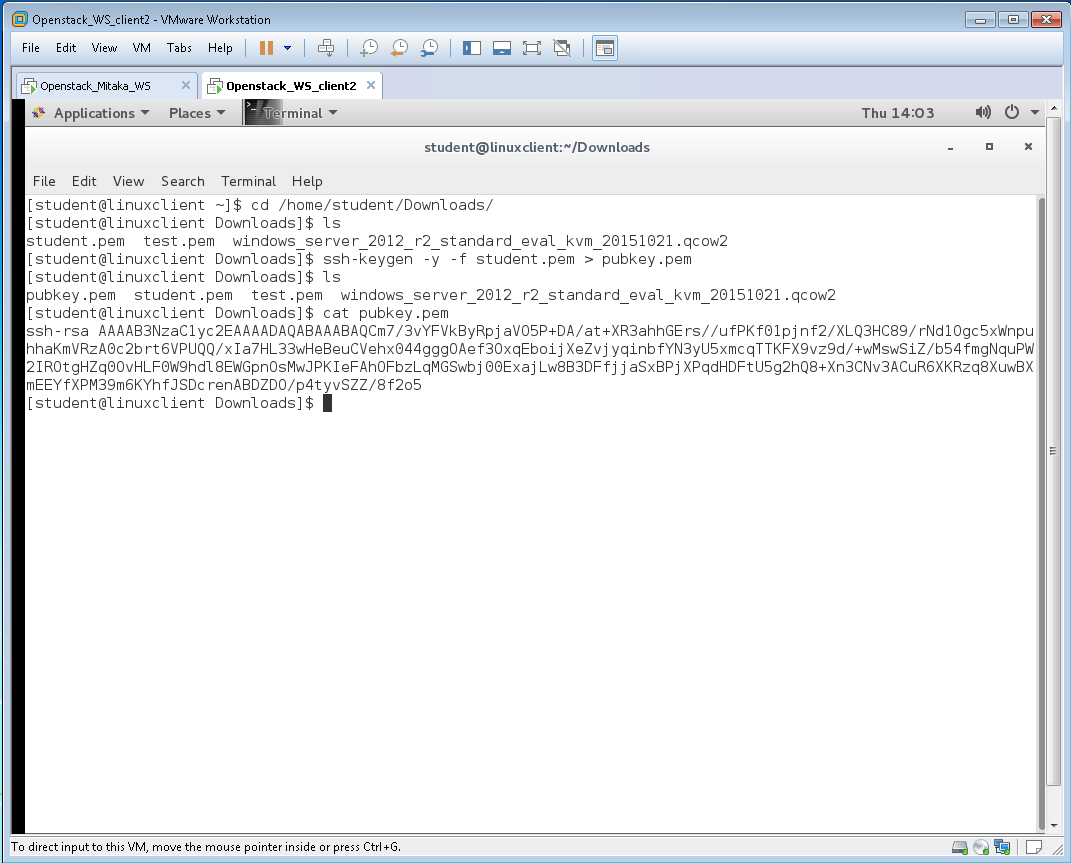
**>** option Redirects the output (standard output or stdout) generated by the command: ssh-keygen –y –f student.pem to a new file named pubkey.pem

**student.pem** Existing private key file

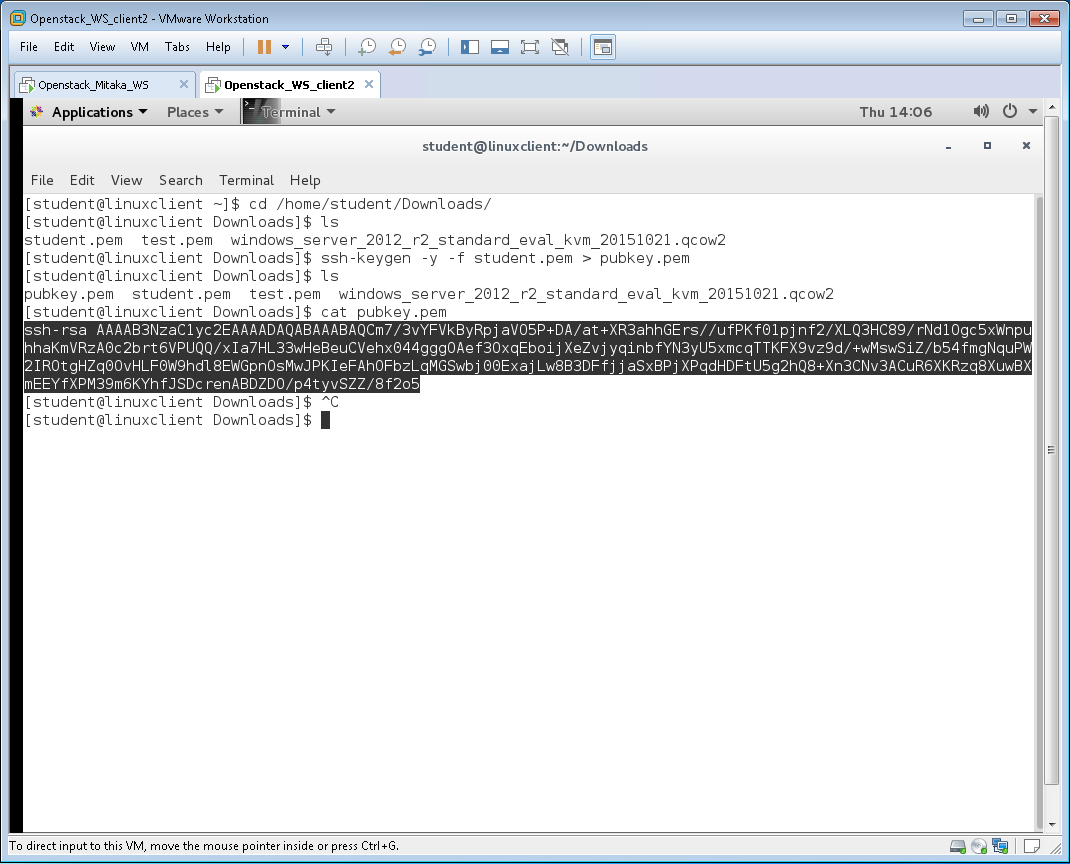
**pubkey.pem** File to export the public key to



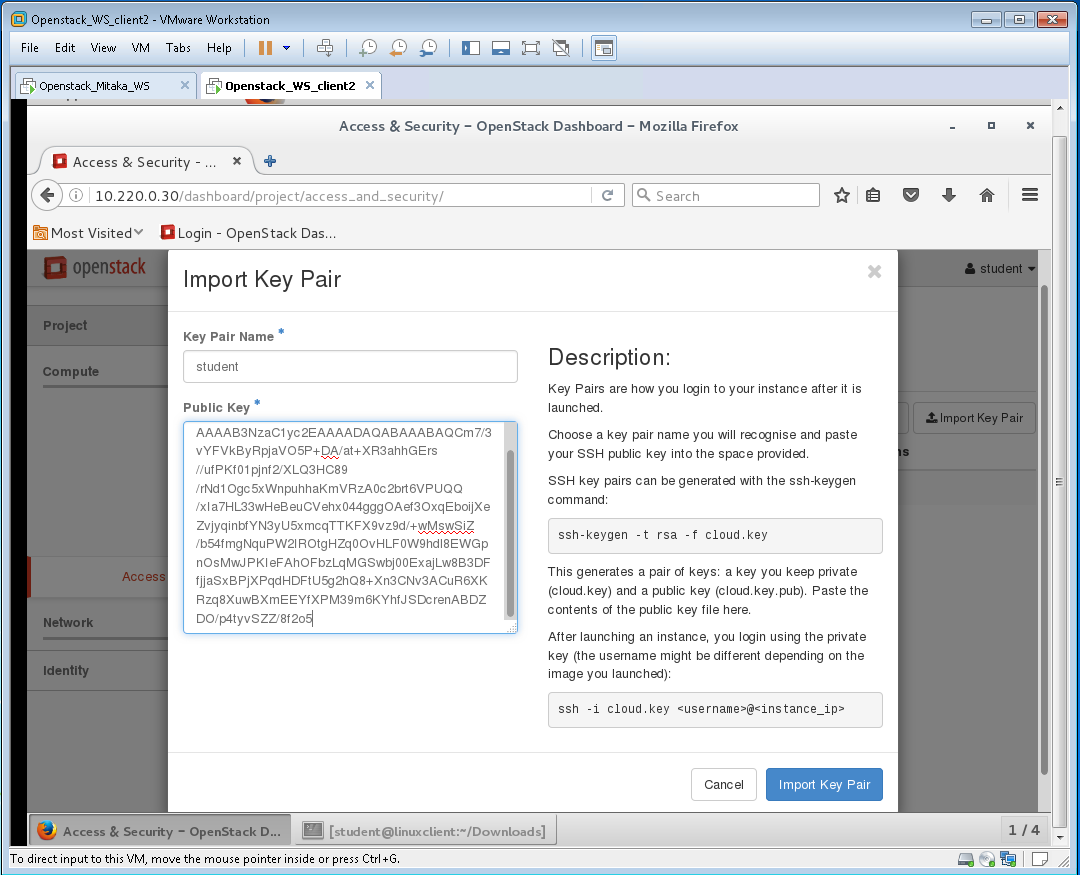
1. **Run** the **# ls** command again, and you should see the new **pubkey.pem** file.



1. Run the **#cat pubkey.pem** command to print the public key.

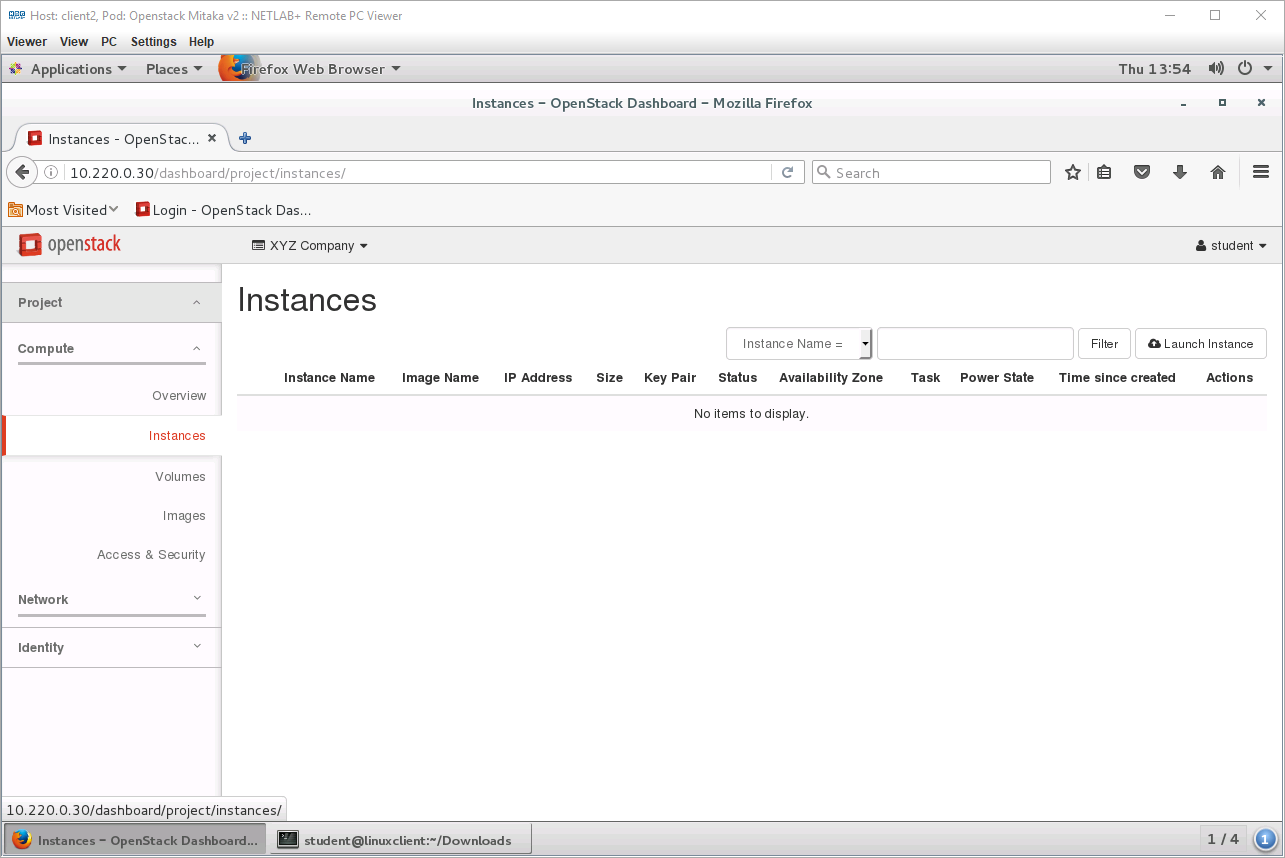
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1. Using your mouse, **copy** the entire public key starting with **ssh-rsa…**and ending with **…8f2o5**.



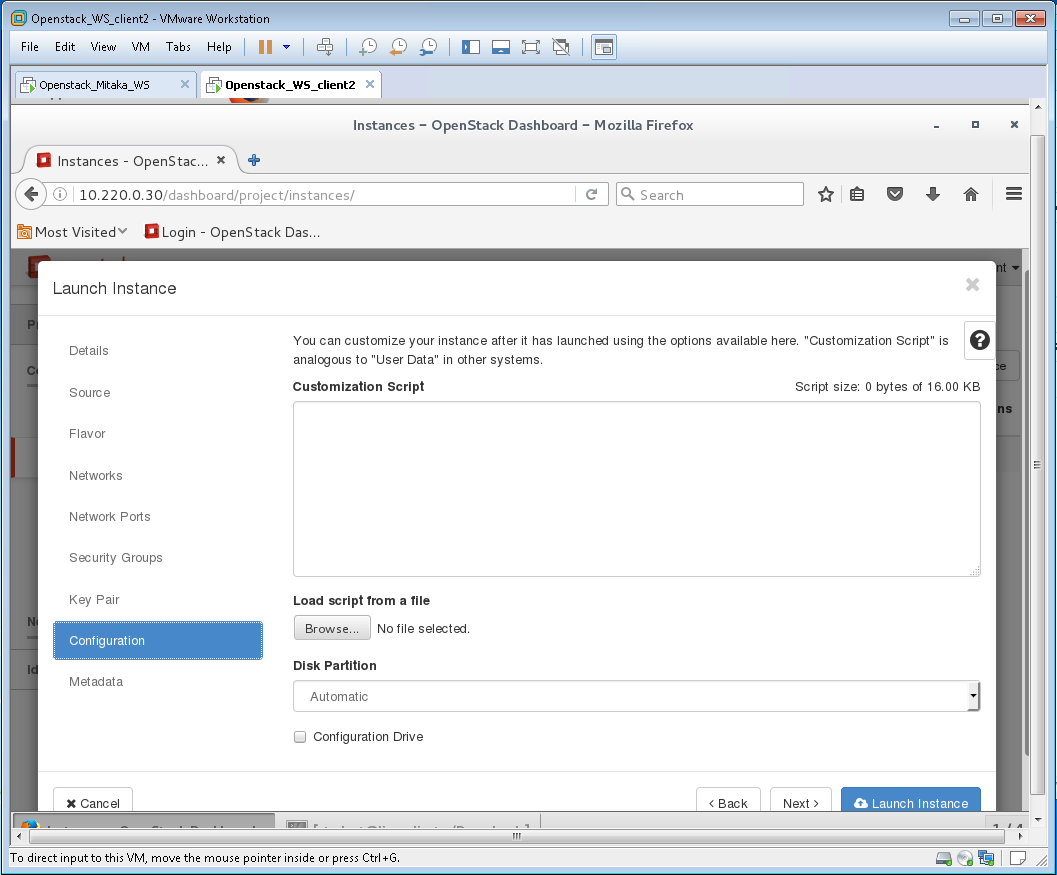
1. **Return** to the **Openstack Dashboard** and **open Access & Security>Import Key Pair**.  **Enter** **student** as the **Key Pair Name** and using your mouse, **paste** the **public key** that was copied from the bash terminal. **Click Import Key Pair**. Ensure that the key begins with ssh-rsa…and ends with …8f2o5.

Note: This technique produces the same result that using PuTTYgen on the Windows VM did in the previous lab.



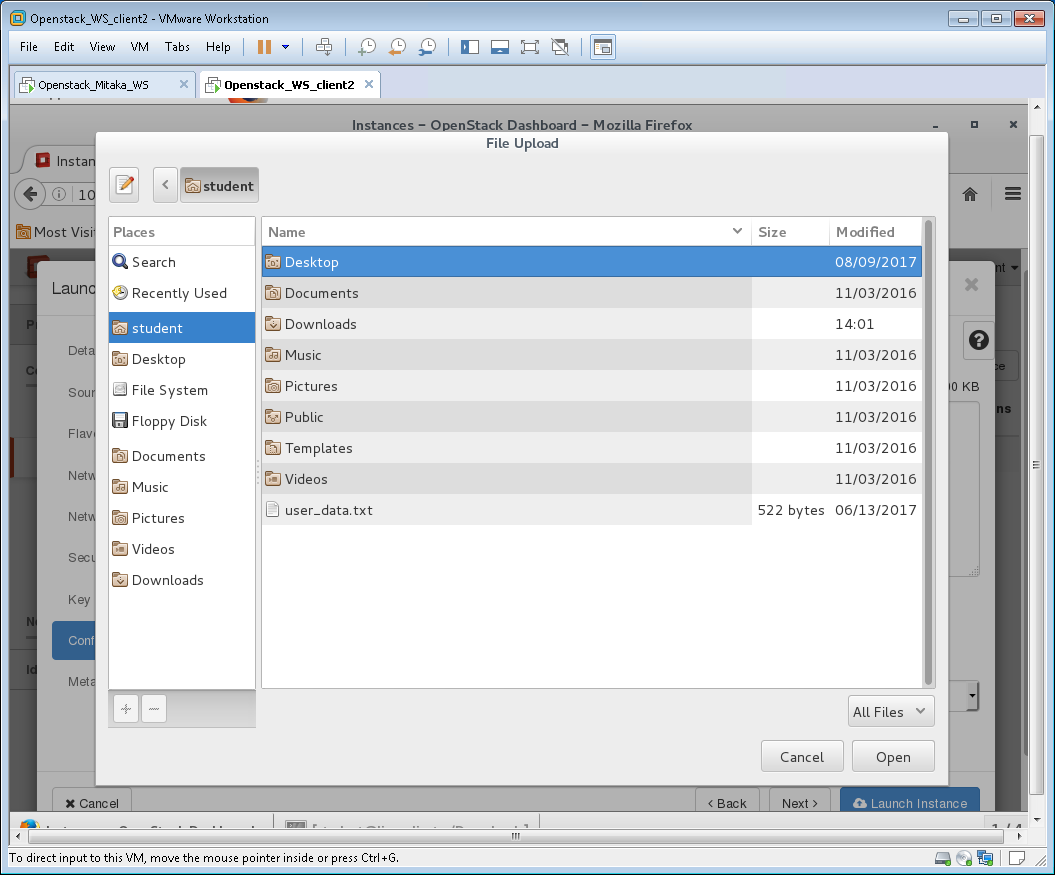
1. Using the techniques learned in previous labs, prepare to **launch** an **instance** using the information in the table below. DO NOT launch the instance yet!

|  |  |
| --- | --- |
| Instance Name | CentOS 7 |
| Source | CentOS |
| Flavor | m1.small |
| Network | private |
| Security Group | XYZ Company |
| Key Pair | student |
| Configuration | Customization script |
| Floating IP Address | 10.220.0.12 |

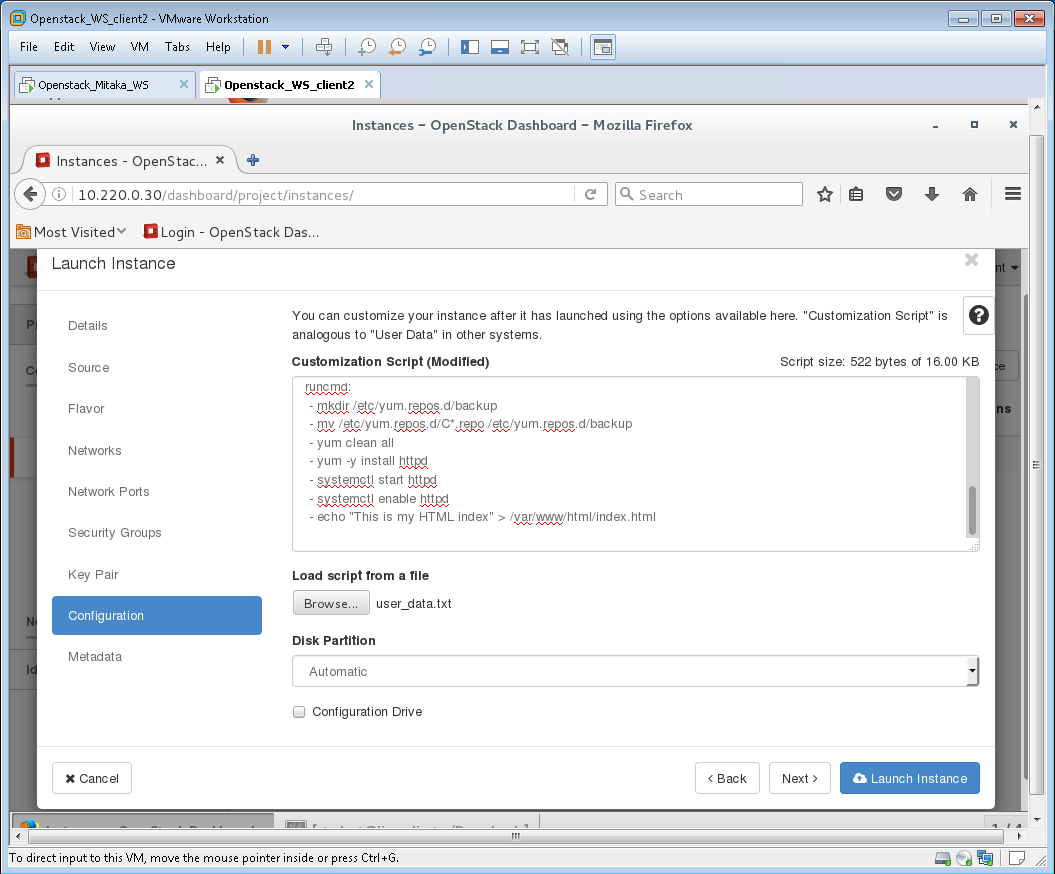


1. After entering the information into the Details through Key Pair tabs, continue to the Configuration tab where you will add the user\_data.txt customization script. **Click** on the **Browser** button. Shown on the next page.

Note: This “Customization Script” will perform the following tasks during the creation of the instance; configure the instance to use an http repository which was created on the client2 VM, install, and start and enable the httpd service, and create an html index file.



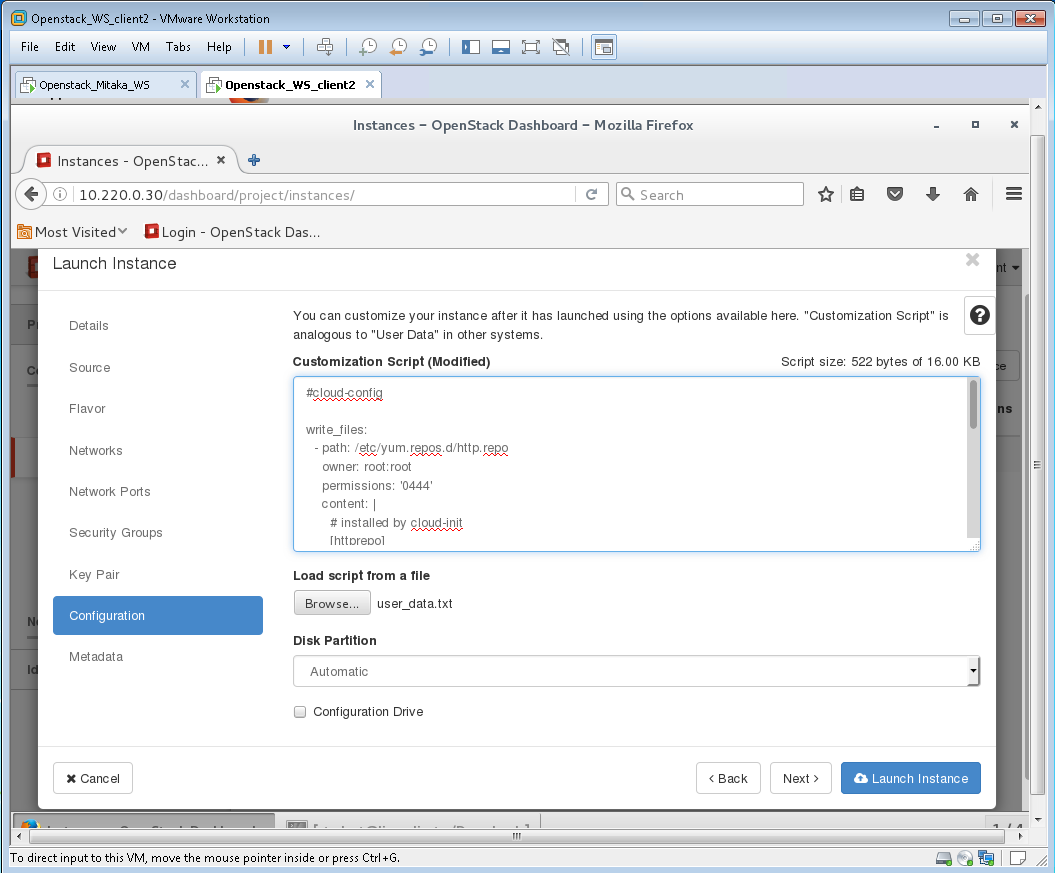
1. **Click** on the **user\_data.txt** file and the **Open** button. Shown on the next page.



1. The user\_data.txt file will populate the Customization Script with the required commands. Continue to the next page.

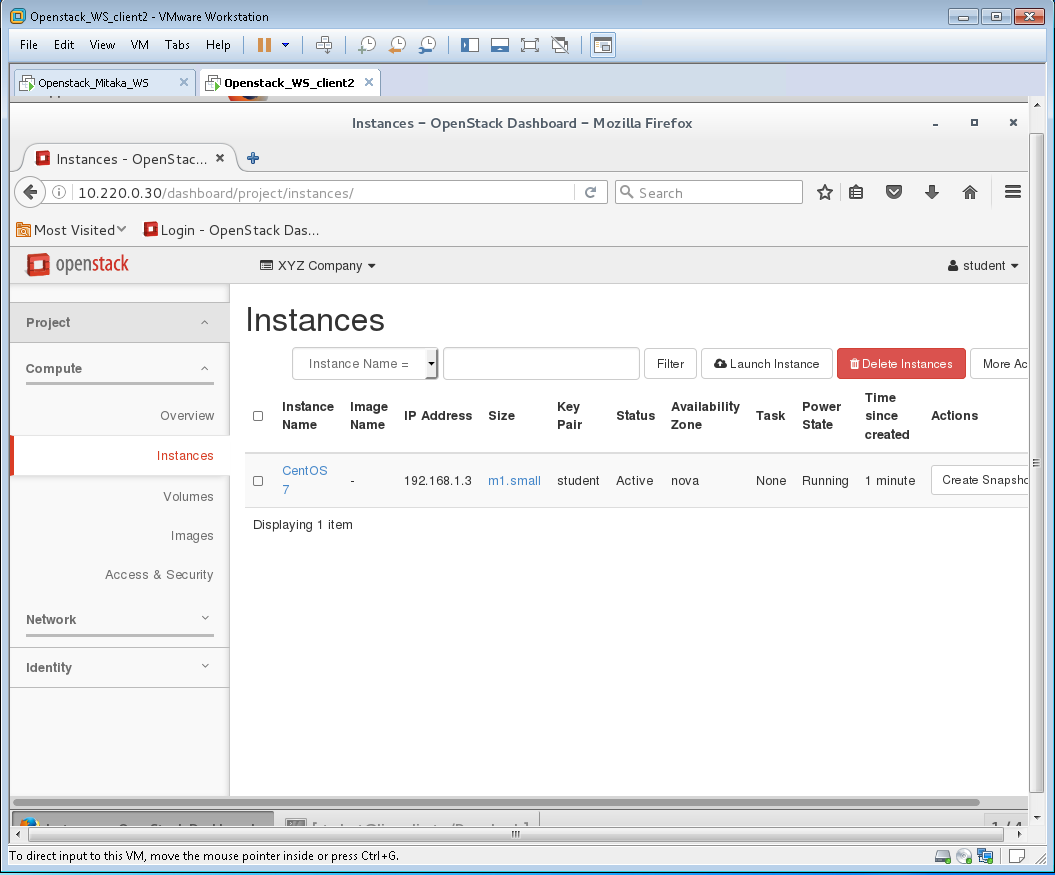
Note: You can scroll up and down to view the customization commands, but be careful not to alter the text. The user\_data.txt is written in YAML syntax, so something as simple as a stray space (aka white space) will render the script useless.

Note: You can also view the script by opening the **#cloud-config.odt** file on the desktop of the client2 VM, or by using the cat command in the Linux terminal window; **# cat user\_data.txt**

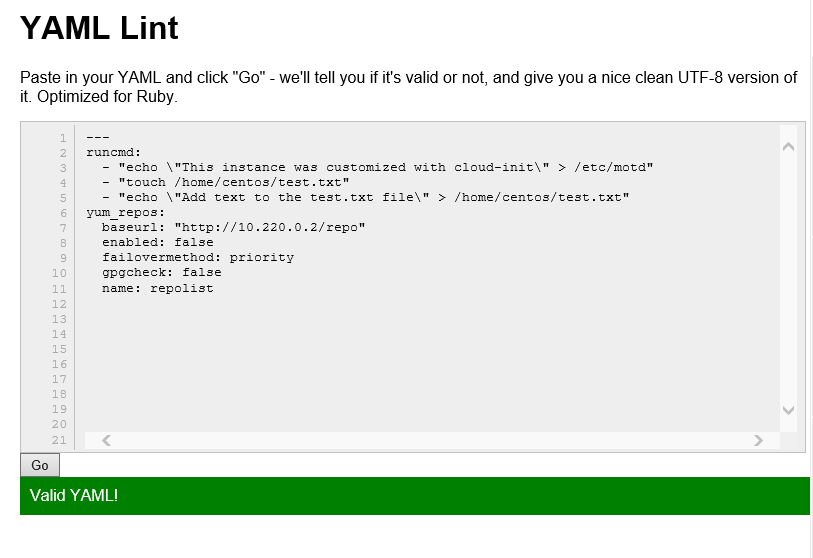


1. **Click** on **Launch Instance**.

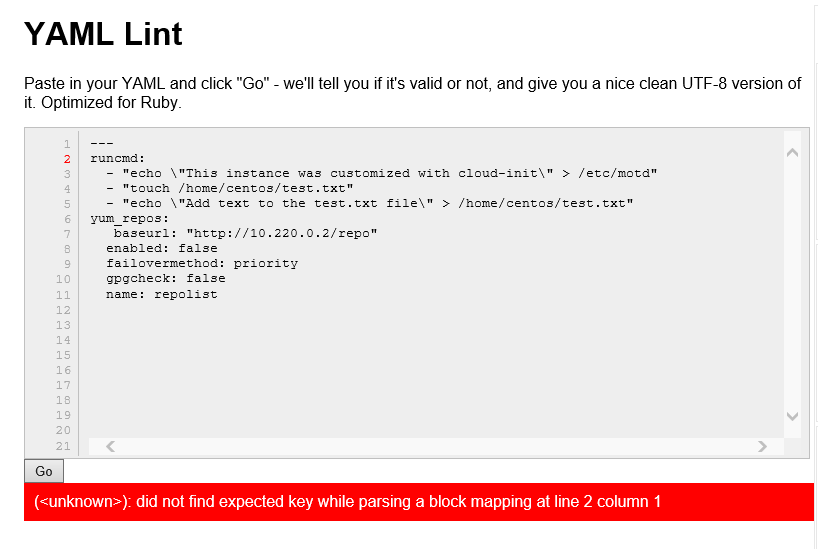
Note: I scrolled to the top of the Customization Script in this screen capture.



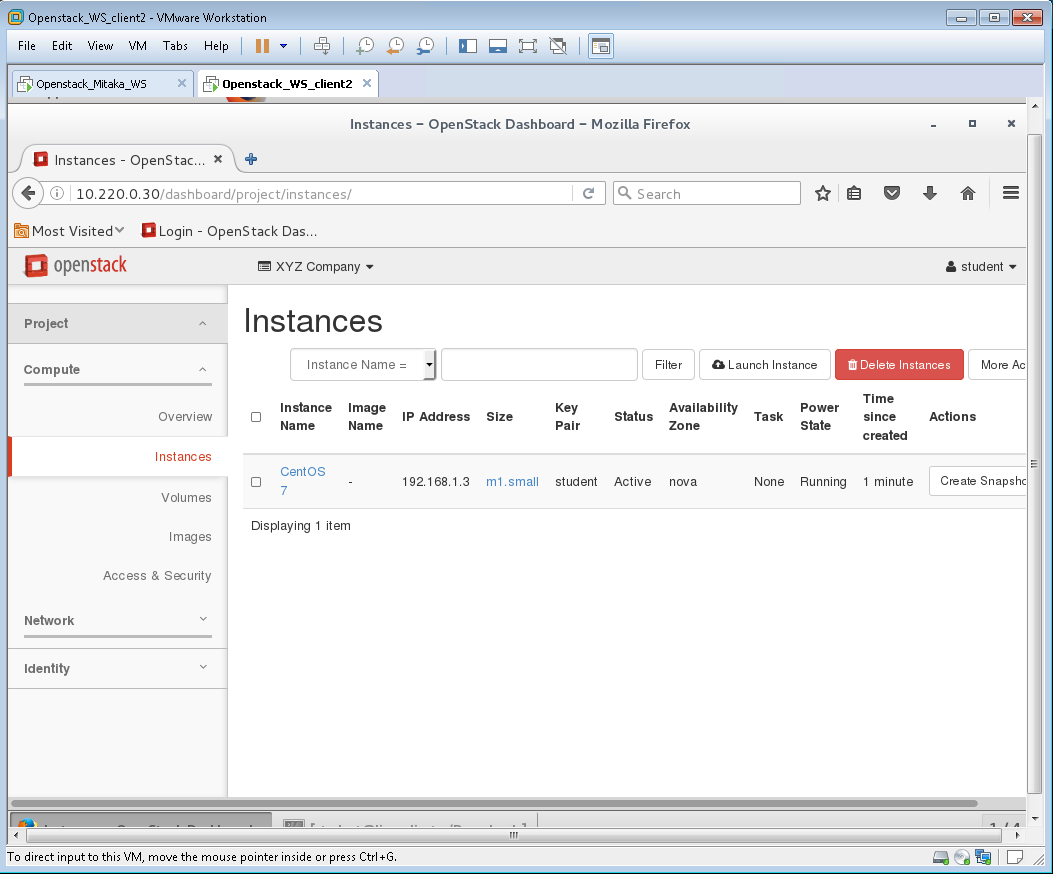
1. The CentOS 7 instance should be active shortly.



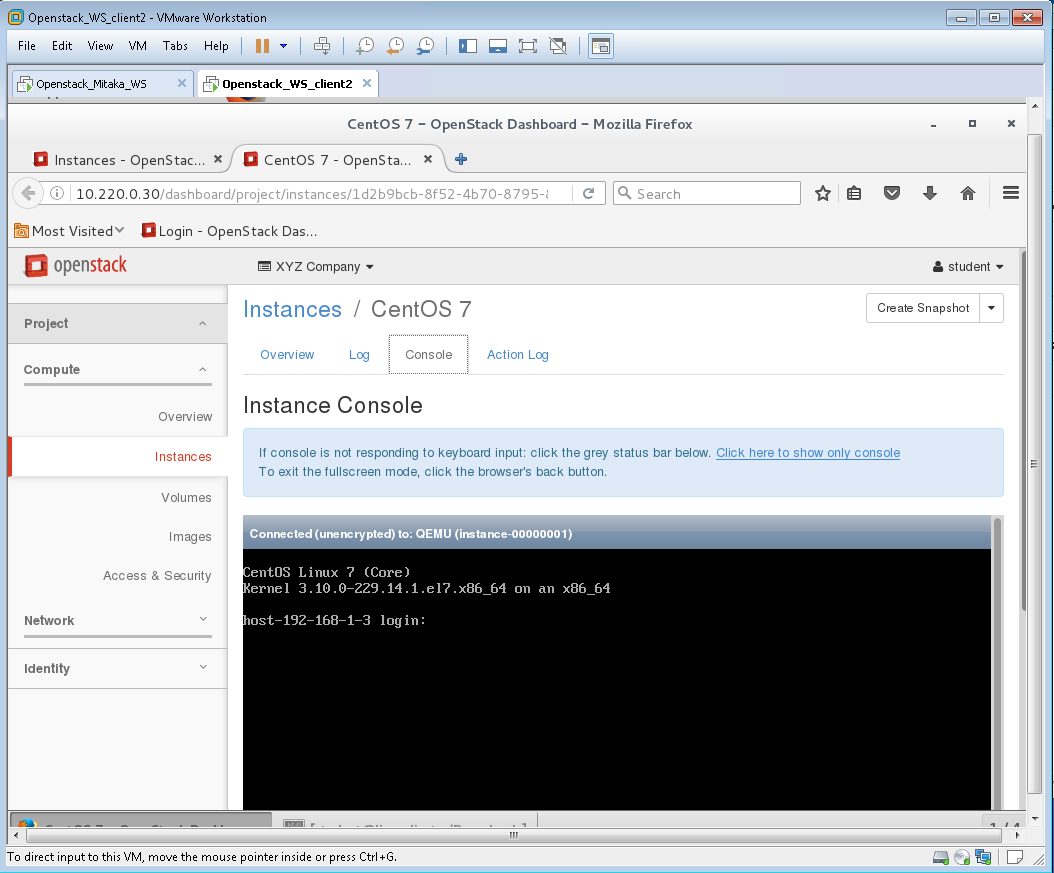
1. While the CentOS 7 instance is spawning, this screen capture is from the <http://yamllint.com> website. This is a great tool to verify that your script is correctly formatted. I pasted a customization script into the window and clicked on go. As you can see in the screen capture, this script was a valid YAML.



1. In this screen capture, I pasted the same script with an intentional error; extra white space at the beginning of the **baseurl: “http//10.220.0.2/repo”** entry. As you can see, the bottom band has turned red and provided some information to locate the error.

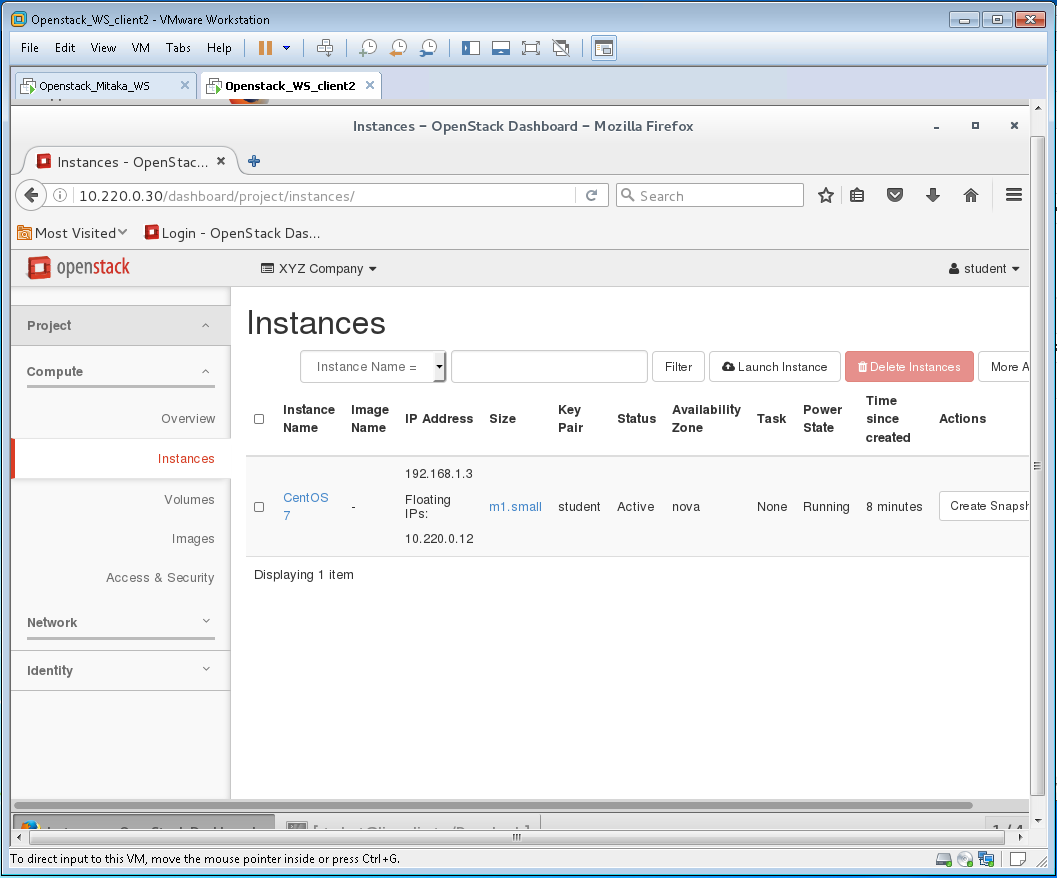


1. Back to our CentOS 7 instance. Wait until the Power State indicates the VM is running. Before allocating and assigning a Floating IP address, make sure that the OS is completely finished installing. Do this by **right clicking** on the Instance Name, **CentOS 7**, and click on **open in a new tab** (shown on next page).



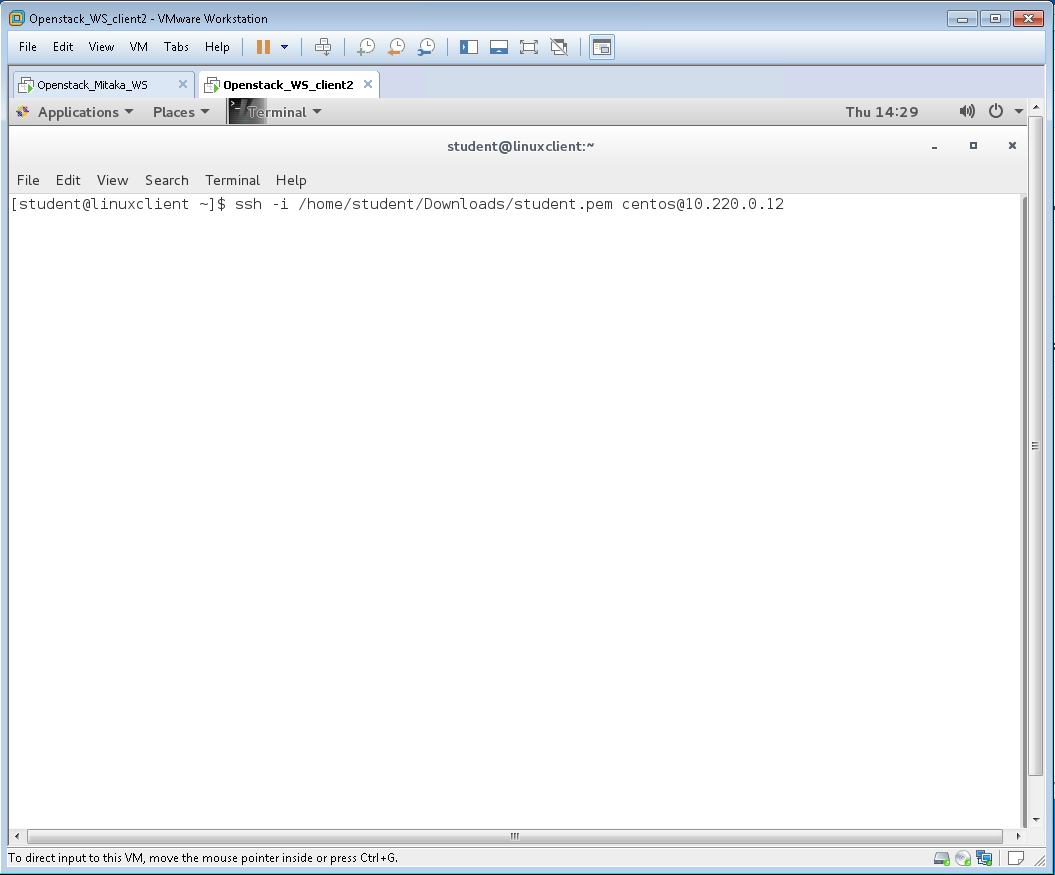
1. In the new tab, **click** on **Console**. You should see the **login prompt** before assigning a Floating IP address. Close the new tab.

Note: Remember that instances that include a key pair will not allow you to login from this screen!

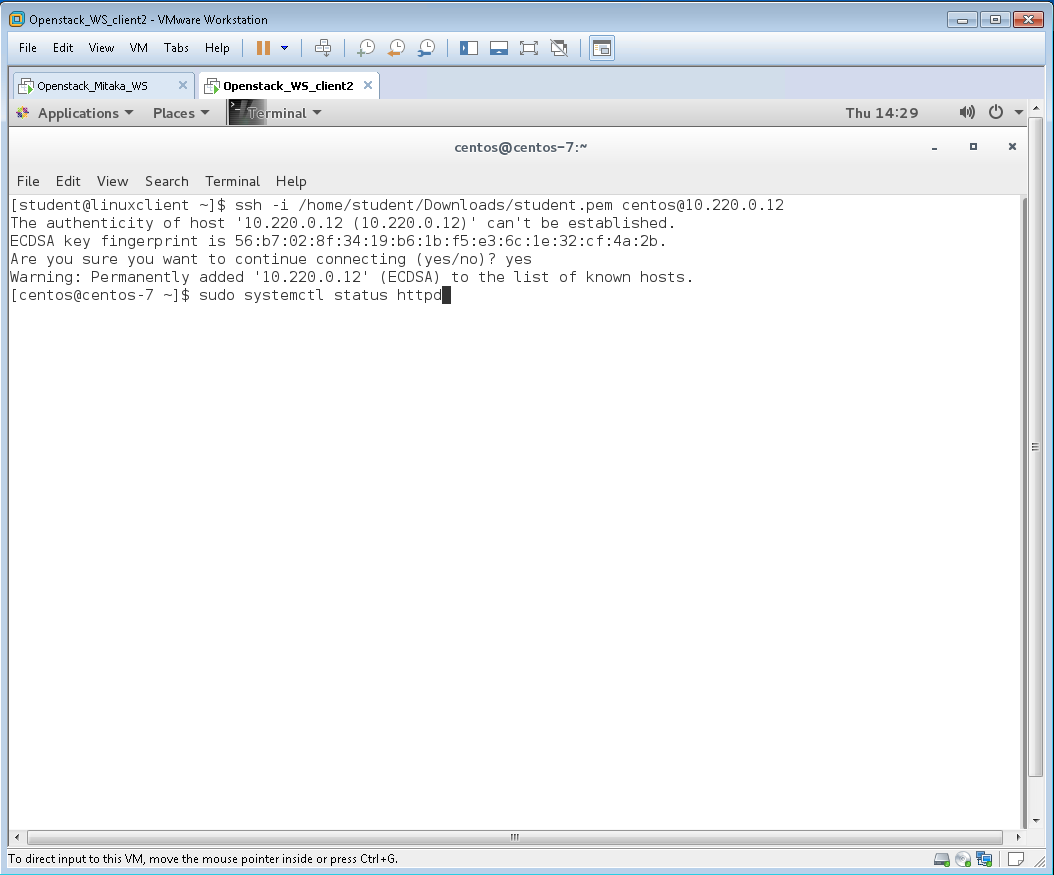


1. Using techniques learned in the course, **allocate and assign** a **Floating IP address** to the **CentOS 7 instance**.

**Lab 21: Verify web server installation on the CentOS 7 instance**

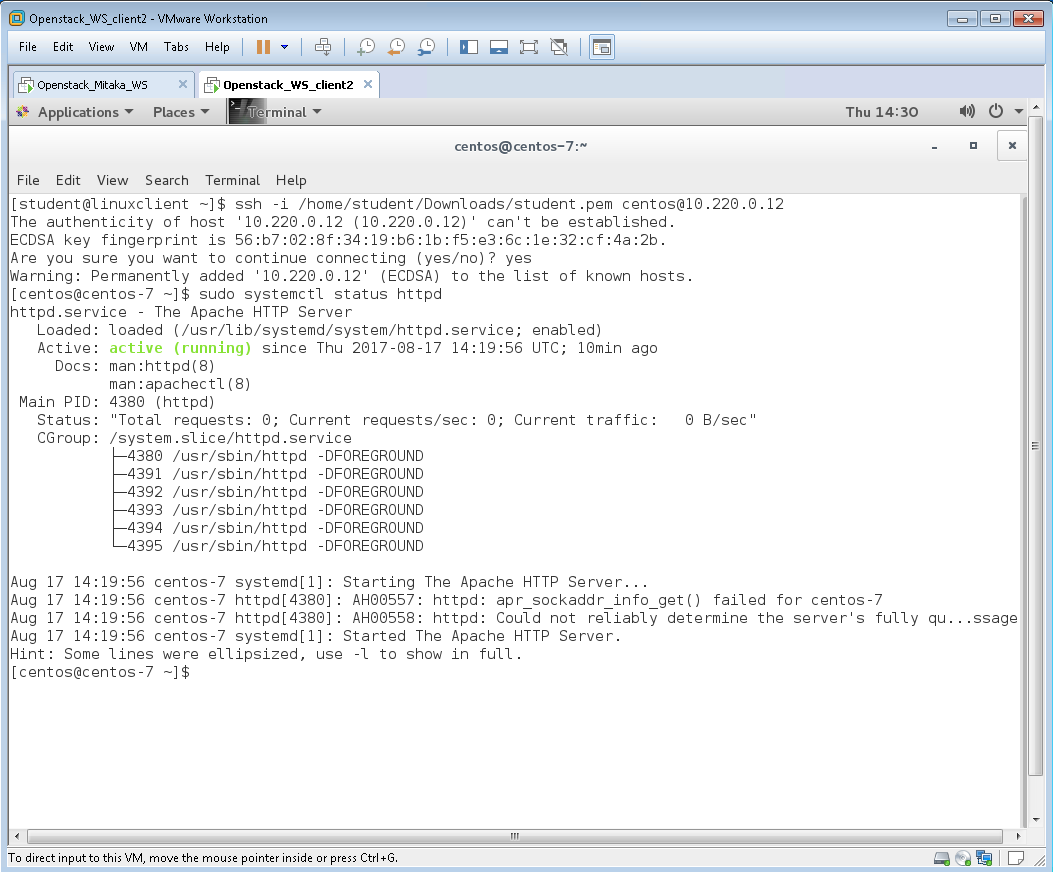


1. Open a bash terminal and SSH to the CentOS 7 instance using the student.pem key pair and the username centos. **$ ssh –i /home/student/Downloads/student.pem centos@10.220.0.12**

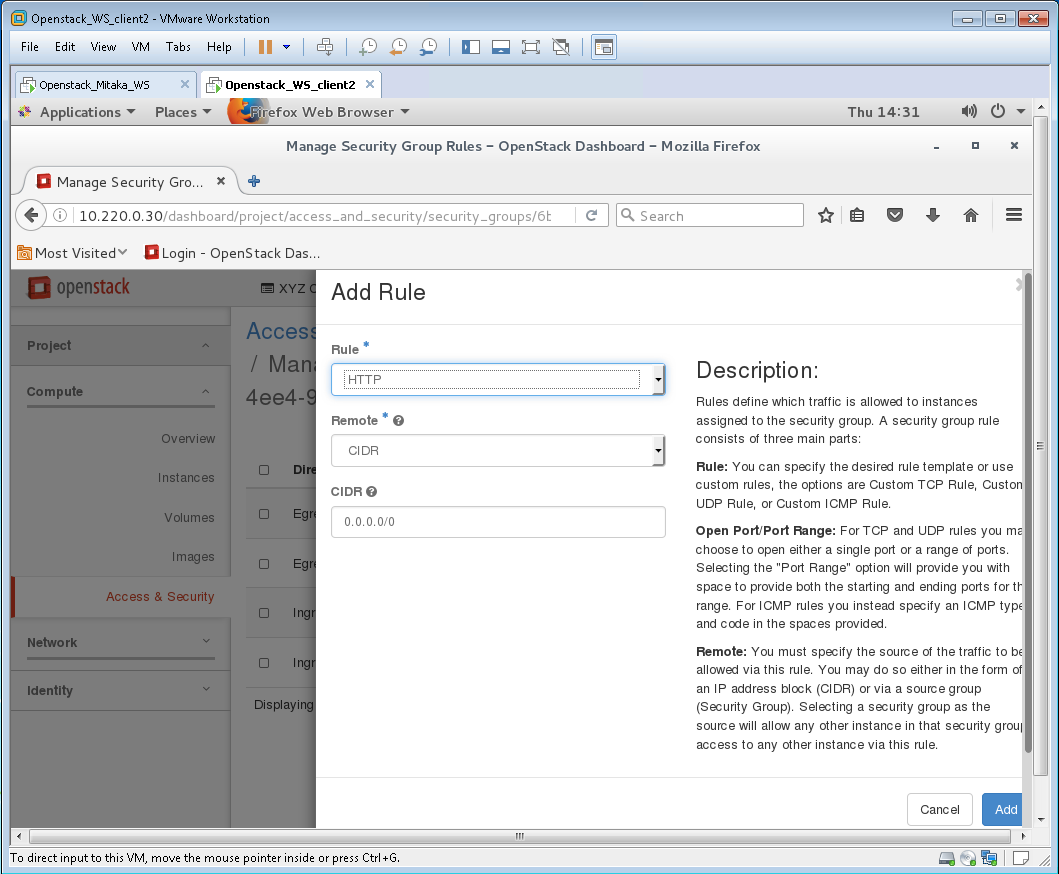


1. After successfully SSH’ing into the CentOS 7 instance, **verify** that the **httpd.service** is installed and active on the instance using the following command; **$ sudo systemctl status httpd**.

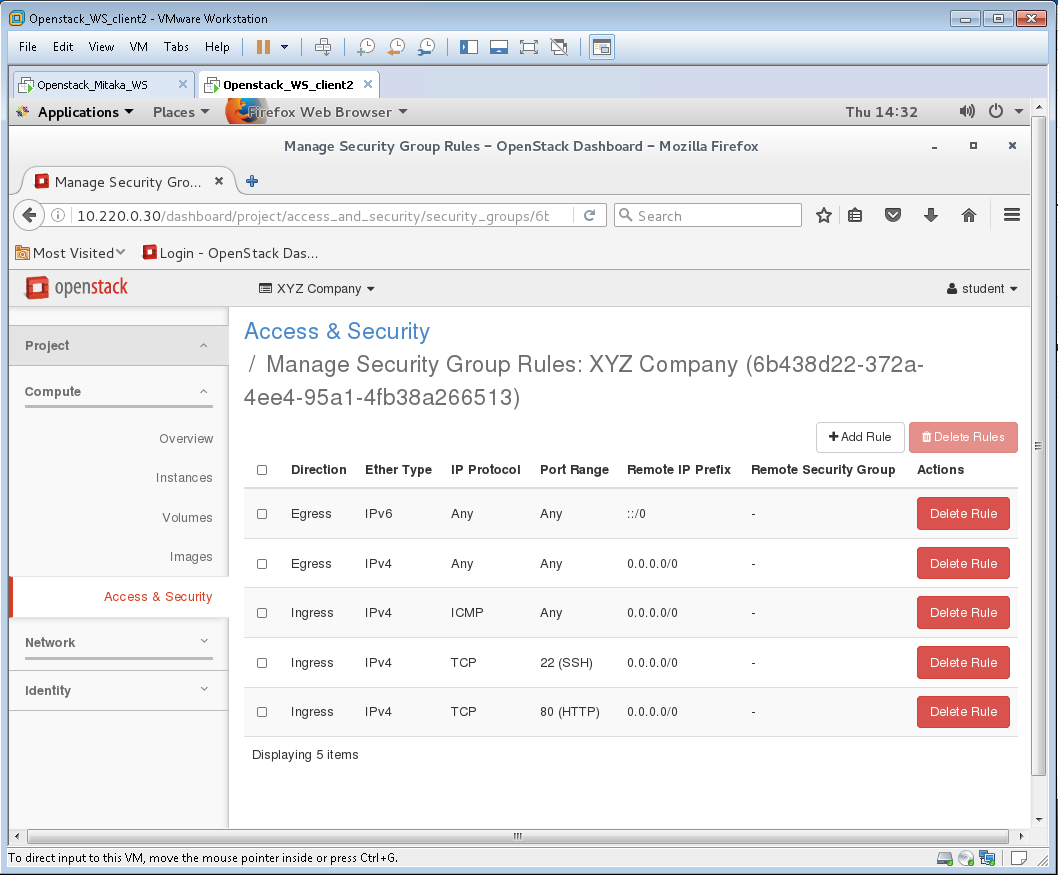
Note: Remember that for most Linux instances, you will need to use the sudo command to run commands with the security privileges of another user. Root access is disabled by default.



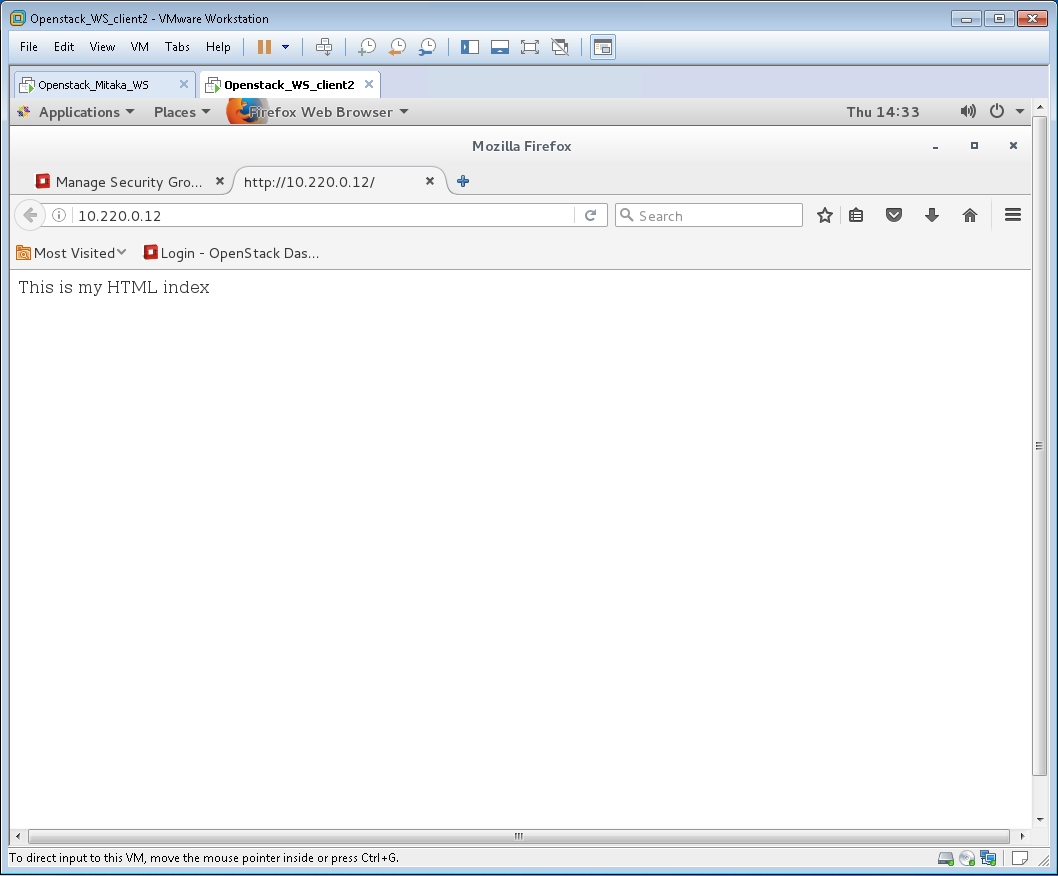
1. You should see that the httpd.service is loaded and active (running).



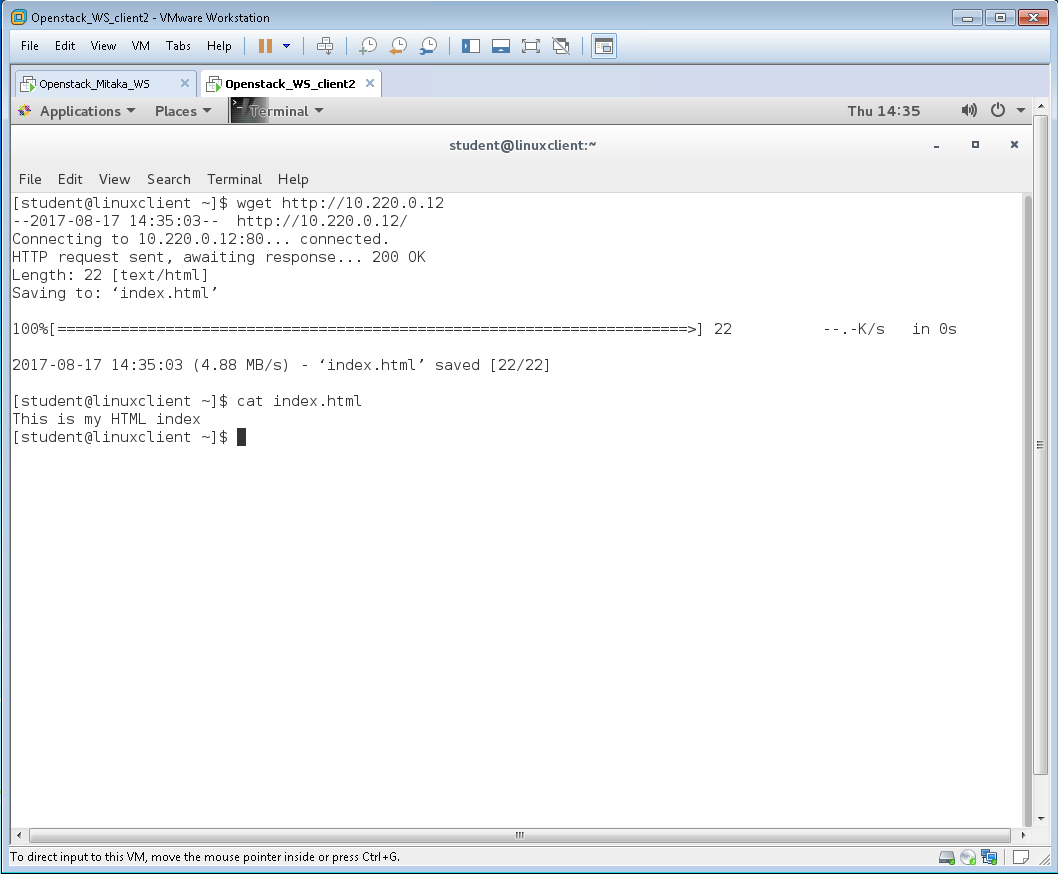
1. Return to the **Access & Security** tab andadd a ruleto **allow http** from any network to the **XYZ Company security group**.

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1. After adding the HTTP Rule, **open** a **new tab** in the web browser.



1. **Browse** to the **Public IP address, 10.220.0.12**, of the **CentOS 7 instance**. You should see the web page index statement that was created by the user\_data.txt customization script.

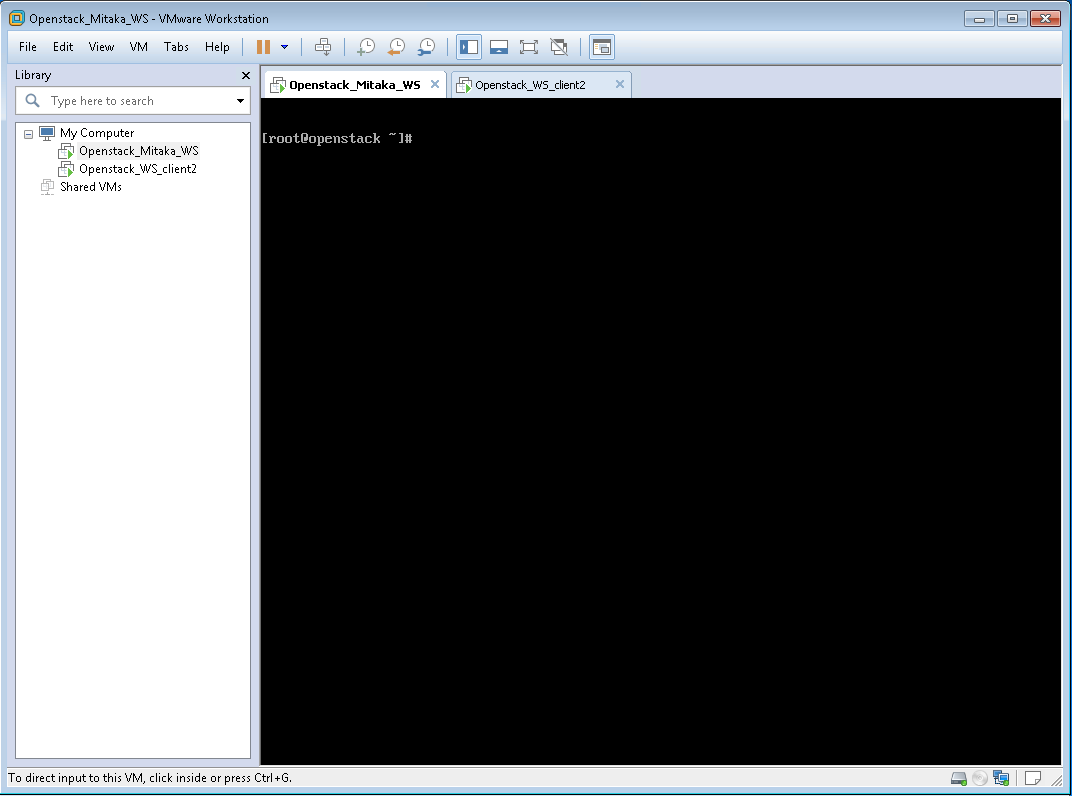
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1. Alternatively, you can use the **$ wget http://10.220.0.12** and **cat index.html** commands to verify that the CentOS 7 customization script installed the httpd.service and created an index page.

Note: The wget command was run from the Openstack\_WS\_client2 VM, not the CentOS 7 instance.

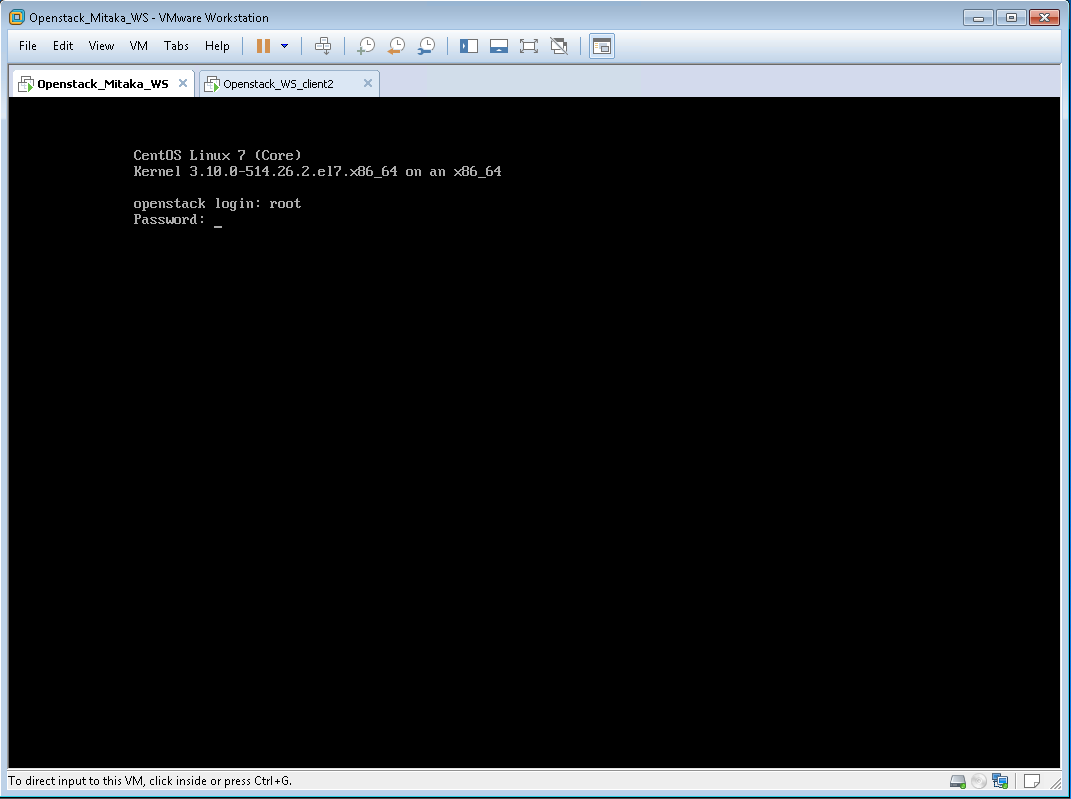
Continue to the grade script.

**Run the grade script**



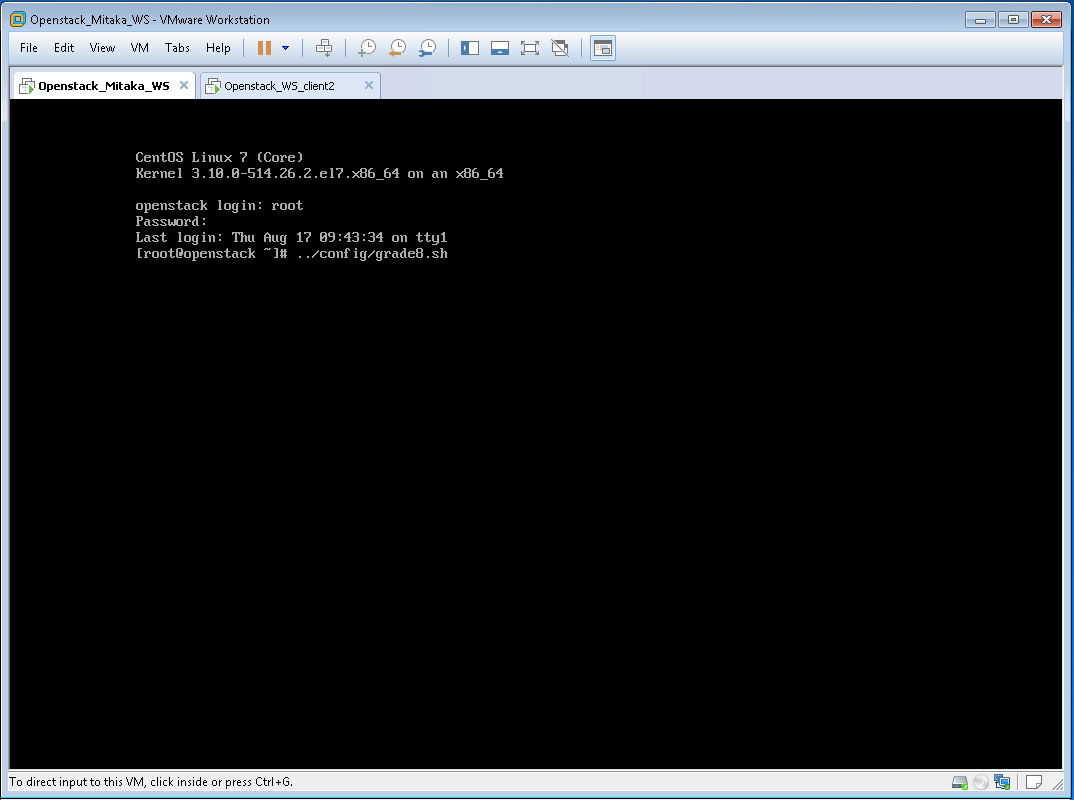
1. Return to Workstation and **Click** on **OpenStack\_WS VM**

Note: The OpenStack\_WS console may still be open on your desktop from when you ran the setup script

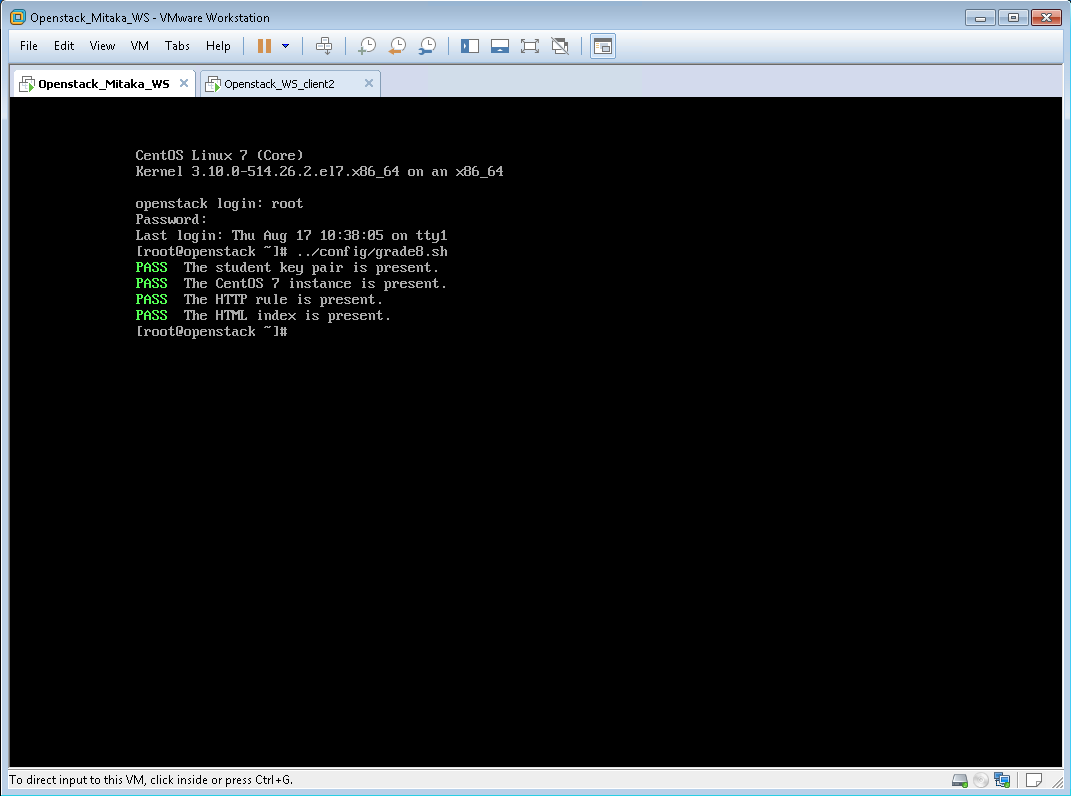


1. **Log in** as **root** with the Password: **P@ssword**

Note: The password is NOT visible as you type it



1. Enter the command; **../config/grade8.sh** and **press Enter**

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1. 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 8, continue to conclusion

**Conclusion:**

You have successfully assisted the customer in creating a CentOS instance with a customization script to enable the apache web service and demonstrated how to verify that the service is active. Your next field visit to XYZ Company will be to show the user how to create, attach, and detach a volume on several CentOS 7 instances.