

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



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Attributions:



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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).



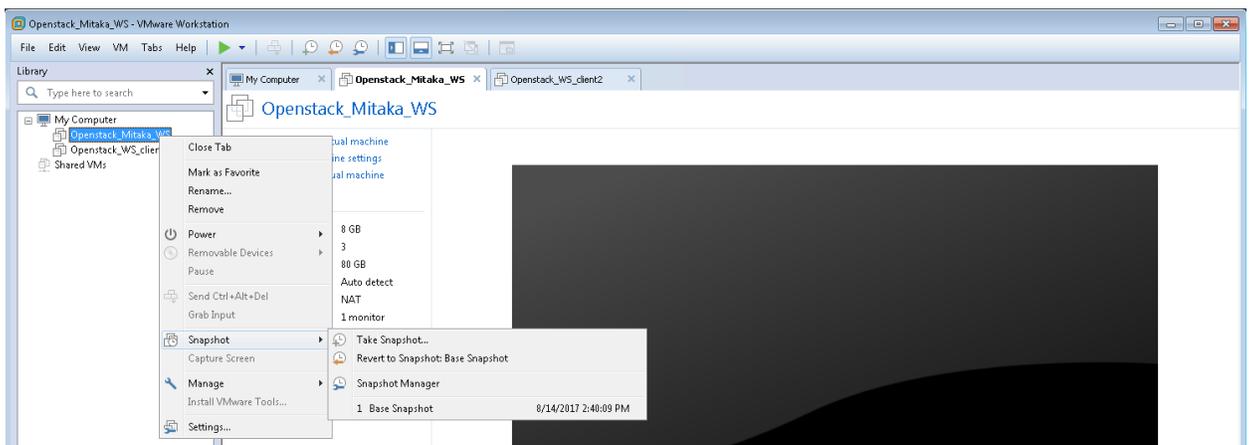
Prepare the OpenStack Virtual Machines



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



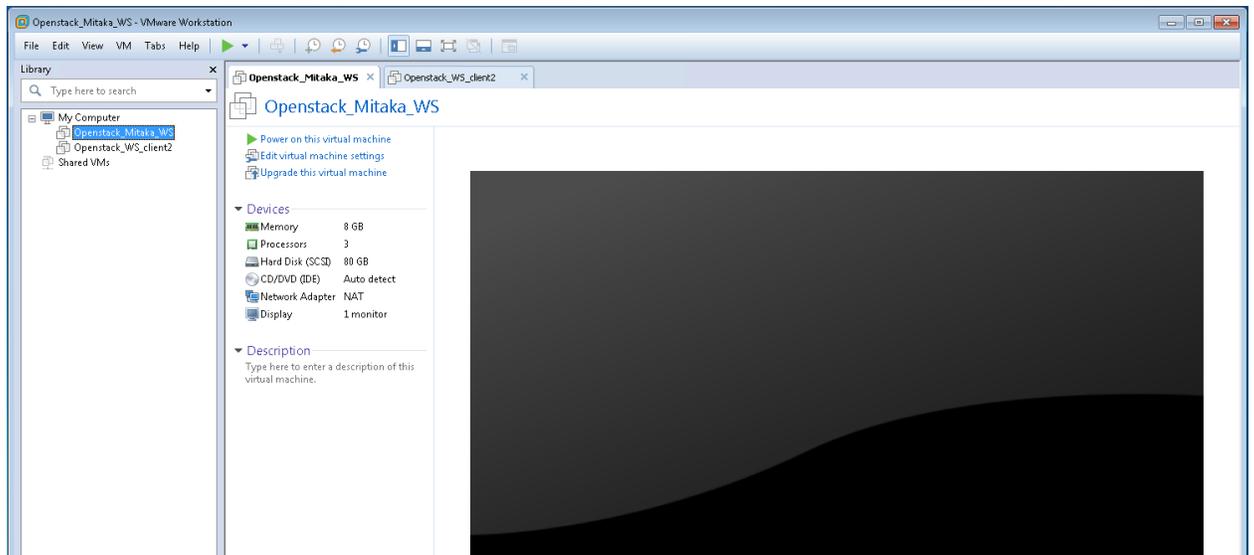
2. Workstation should have two virtual machines (VM) installed; Openstack_Mitaka_v2 and Openstack_Mitaka_client2.



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.



Module 8: Launch a CentOS 7 instance with a customization script



4. **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

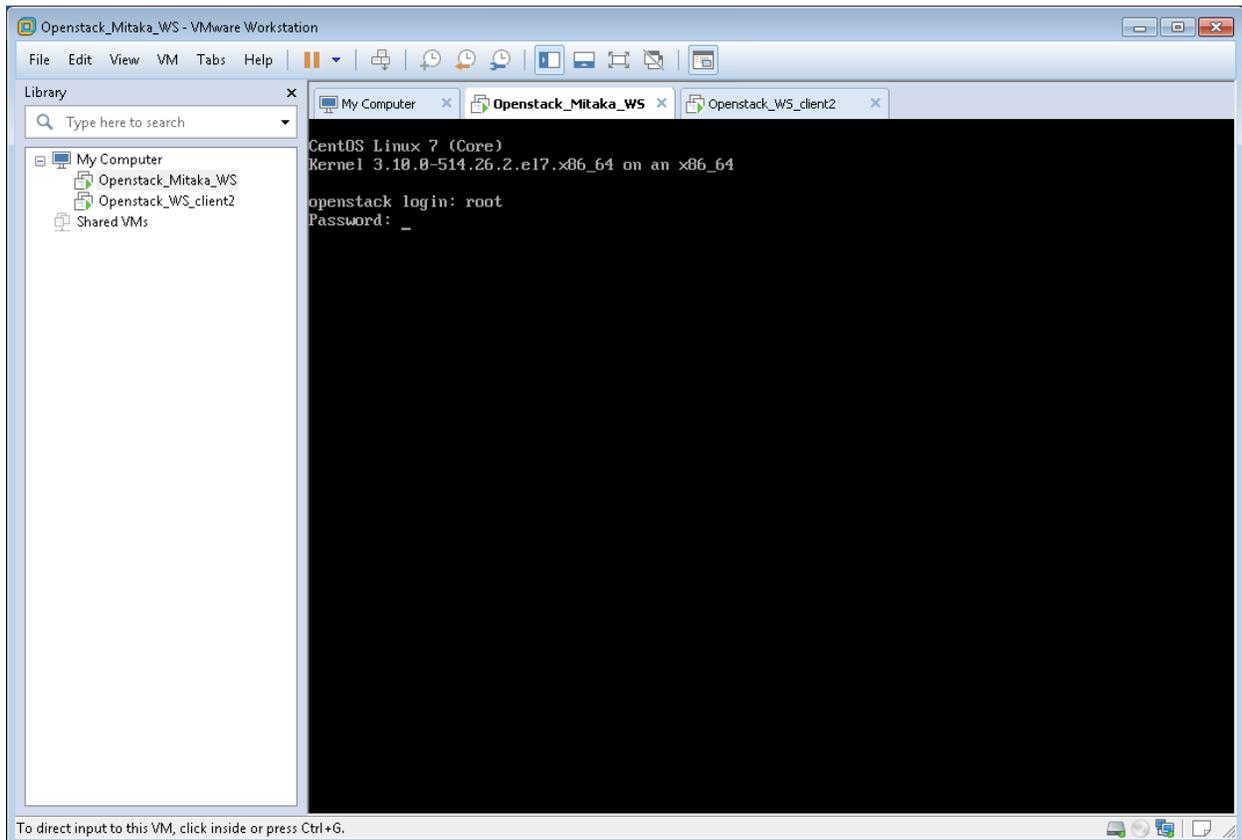
The information in the table below will be needed in order to complete the labs. The task sections that follow provide details on the use of this information

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.



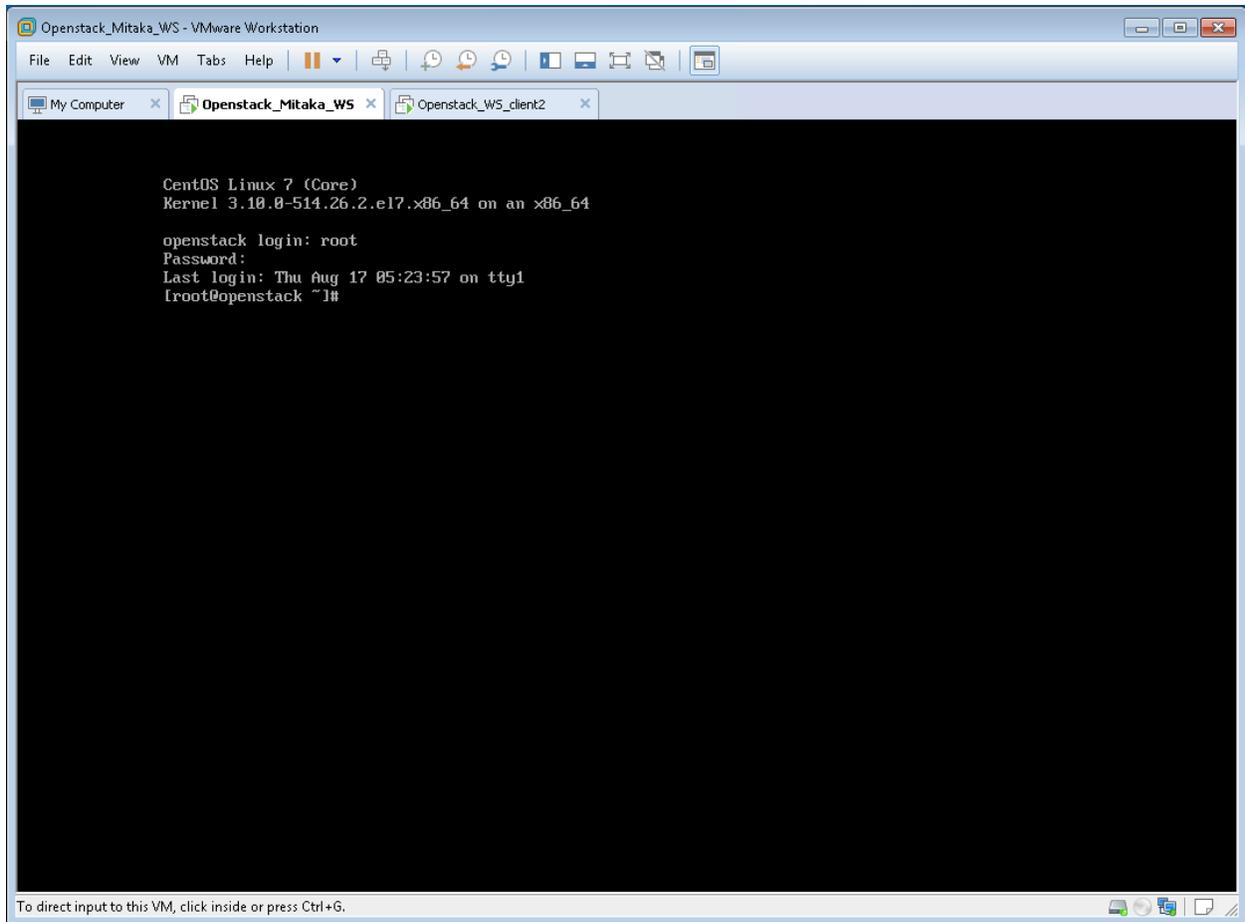
Run the lab setup script



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

Note: The password is NOT visible as you type it

Module 8: Launch a CentOS 7 instance with a customization script



The screenshot shows a VMware Workstation window titled "Openstack_Mitaka_WS - VMware Workstation". The window contains three tabs: "My Computer", "Openstack_Mitaka_WS", and "Openstack_WS_client2". The "Openstack_Mitaka_WS" tab is active, displaying a terminal window with the following text:

```
CentOS Linux 7 (Core)
Kernel 3.10.0-514.26.2.el7.x86_64 on an x86_64

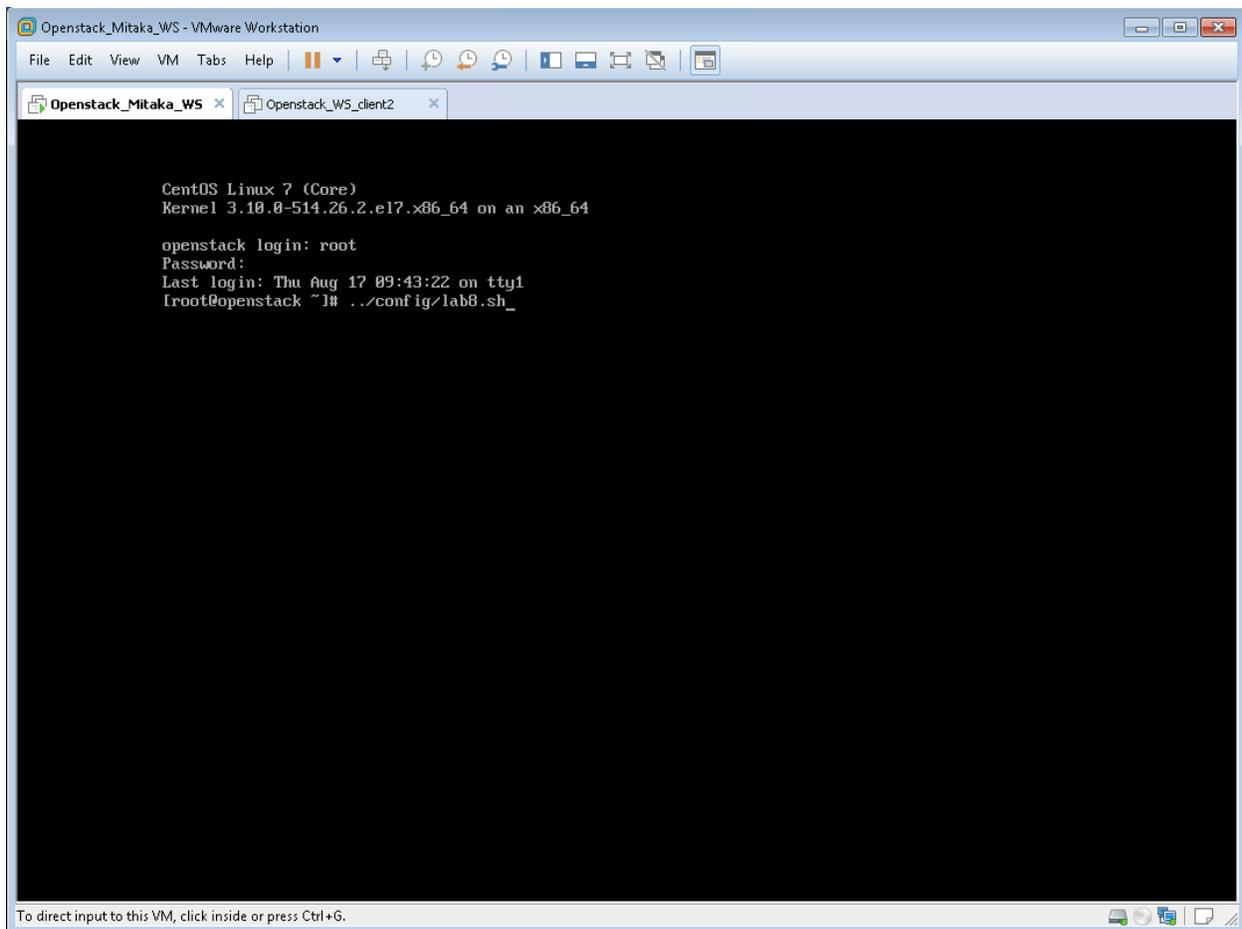
openstack login: root
Password:
Last login: Thu Aug 17 05:23:57 on tty1
[root@openstack ~]#
```

At the bottom of the terminal window, there is a status bar that reads: "To direct input to this VM, click inside or press Ctrl+G."

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



Module 8: Launch a CentOS 7 instance with a customization script



The screenshot shows a VMware Workstation window titled "Openstack_Mitaka_WS - VMware Workstation". The terminal window displays the following text:

```
CentOS Linux 7 (Core)
Kernel 3.10.0-514.26.2.el7.x86_64 on an x86_64

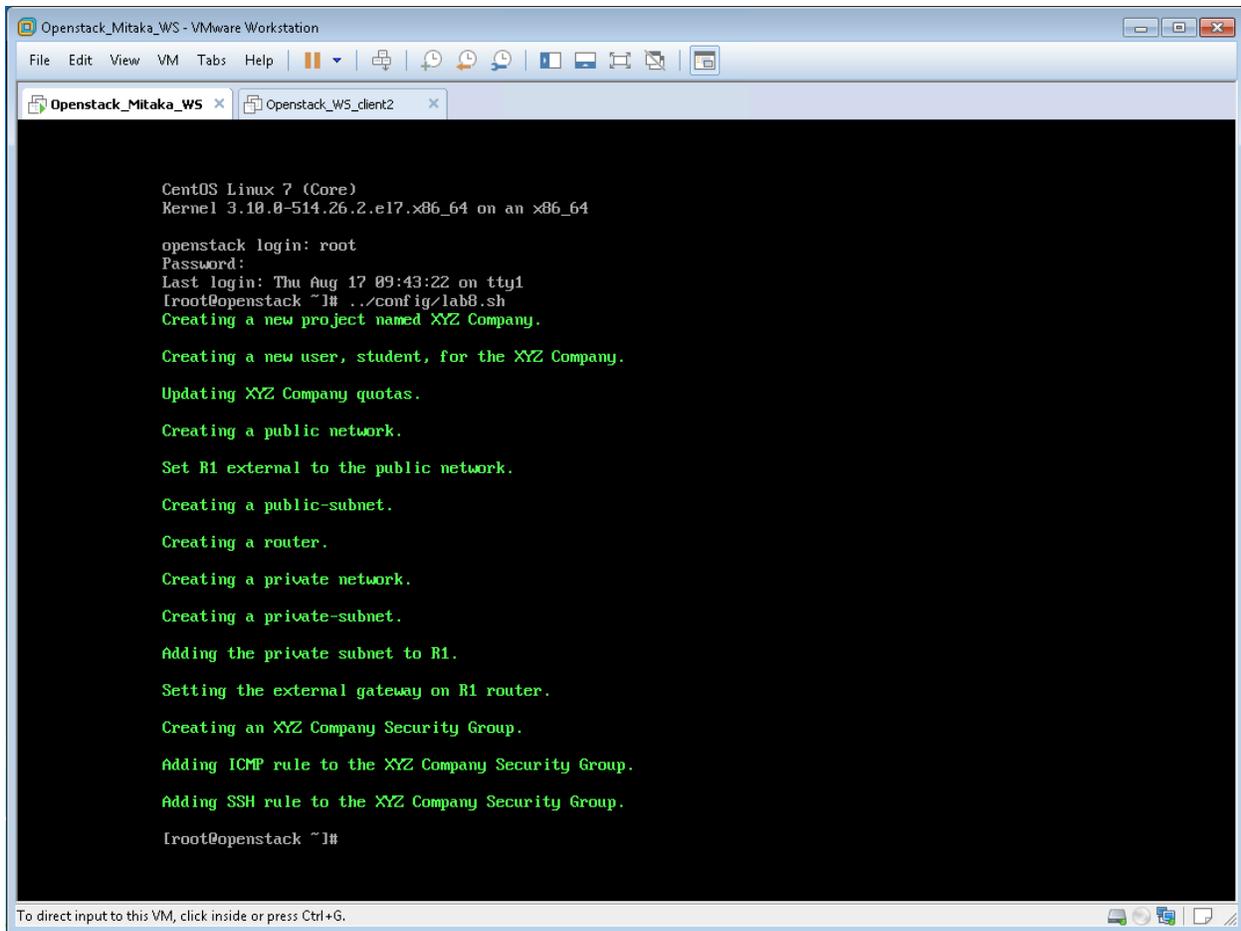
openstack login: root
Password:
Last login: Thu Aug 17 09:43:22 on tty1
[root@openstack ~]# ../config/lab8.sh_
```

At the bottom of the terminal window, there is a status bar that reads: "To direct input to this VM, click inside or press Ctrl+G."

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



Module 8: Launch a CentOS 7 instance with a customization script



```
Openstack_Mitaka_WS - VMware Workstation
File Edit View VM Tabs Help
Openstack_Mitaka_WS x Openstack_WS_client2 x

CentOS Linux 7 (Core)
Kernel 3.10.0-514.26.2.el7.x86_64 on an x86_64

openstack login: root
Password:
Last login: Thu Aug 17 09:43:22 on tty1
[root@openstack ~]# ./config/lab8.sh
Creating a new project named XYZ Company.

Creating a new user, student, for the XYZ Company.

Updating XYZ Company quotas.

Creating a public network.

Set R1 external to the public network.

Creating a public-subnet.

Creating a router.

Creating a private network.

Creating a private-subnet.

Adding the private subnet to R1.

Setting the external gateway on R1 router.

Creating an XYZ Company Security Group.

Adding ICMP rule to the XYZ Company Security Group.

Adding SSH rule to the XYZ Company Security Group.

[root@openstack ~]#
```

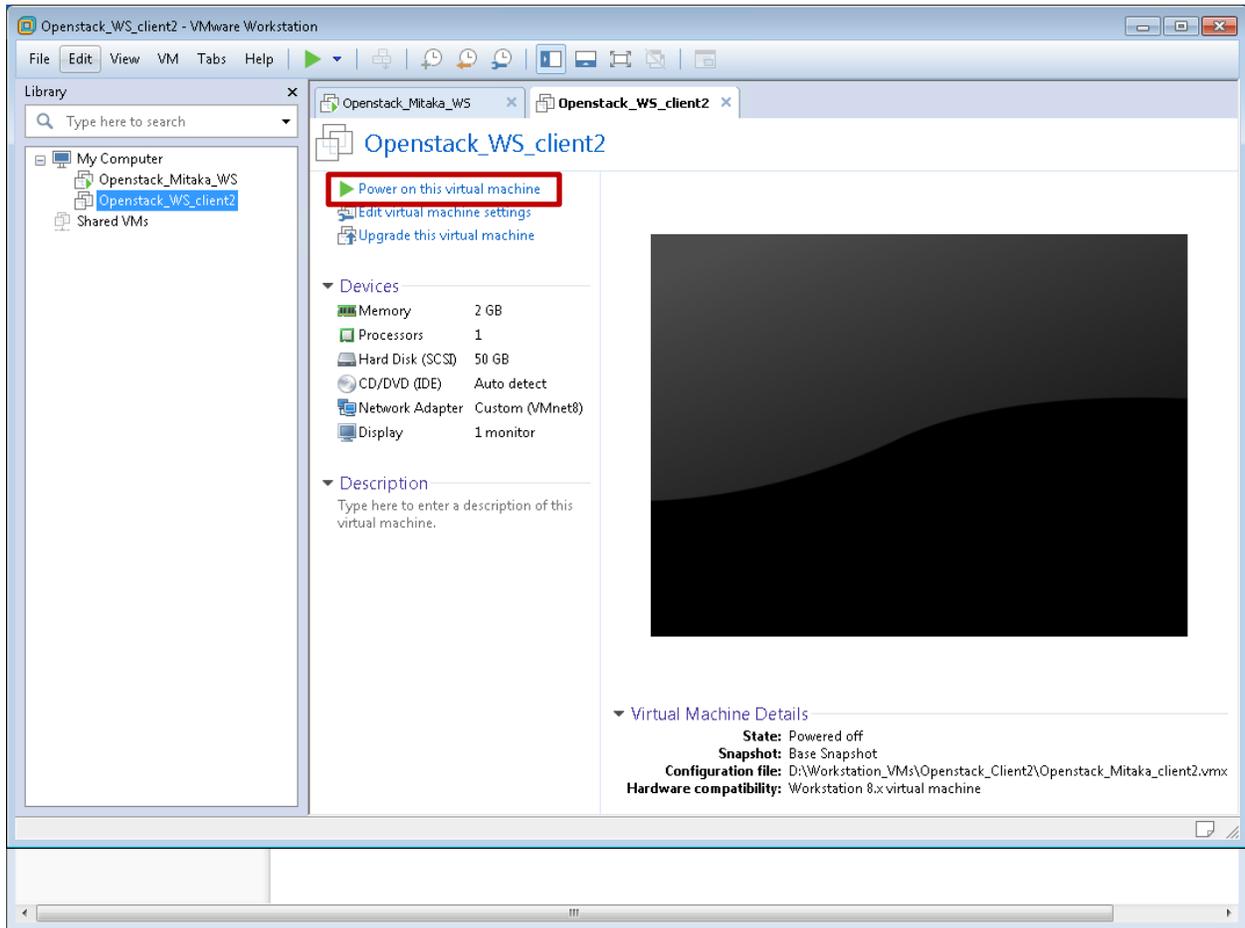
To direct input to this VM, click inside or press Ctrl+G.

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

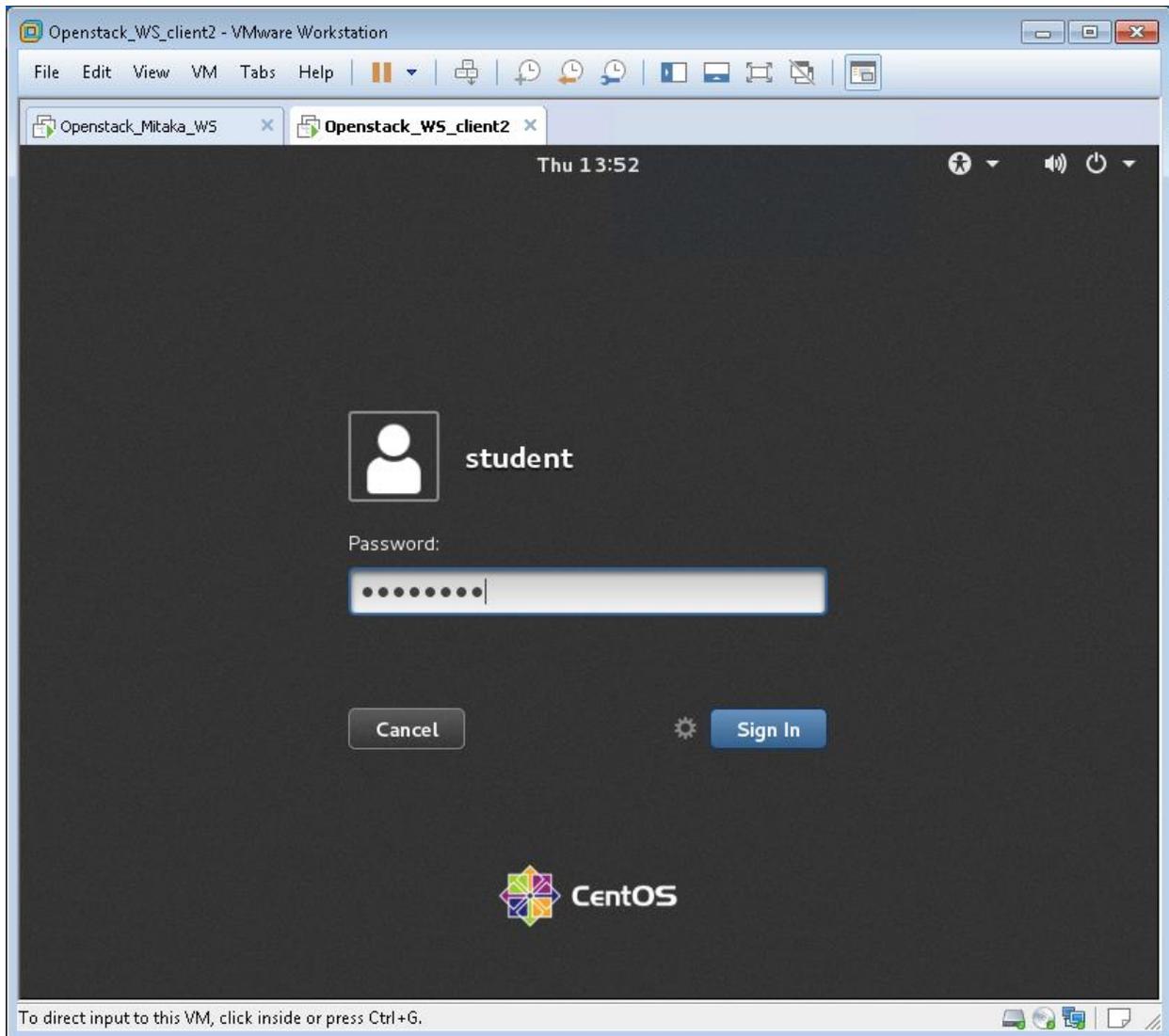


1. **Power on the Openstack_WS_client2 VM in Workstation.**

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



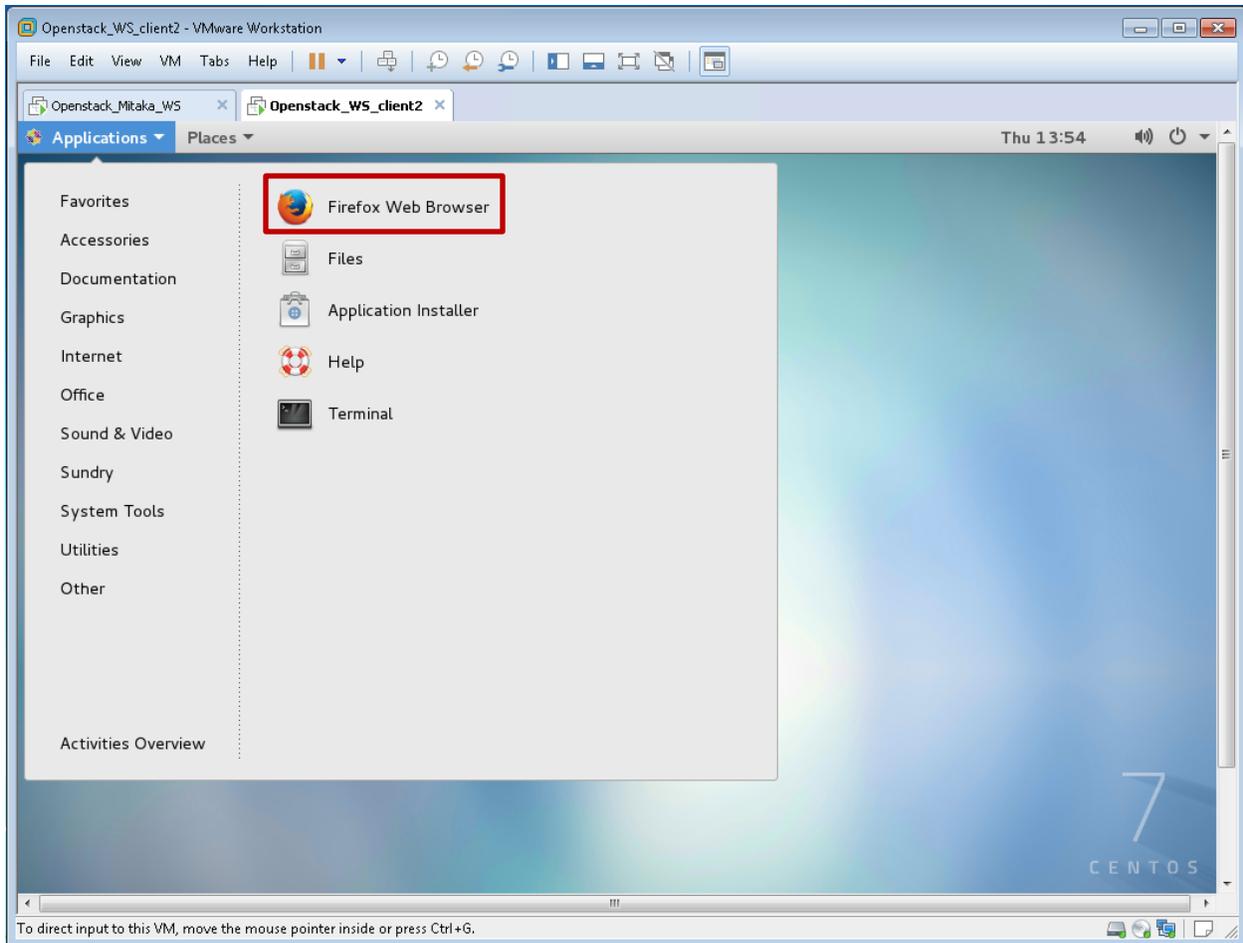
Module 8: Launch a CentOS 7 instance with a customization script



2. **Enter** the password of **P@ssword** to access the CentOS 7 Client virtual machine.

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

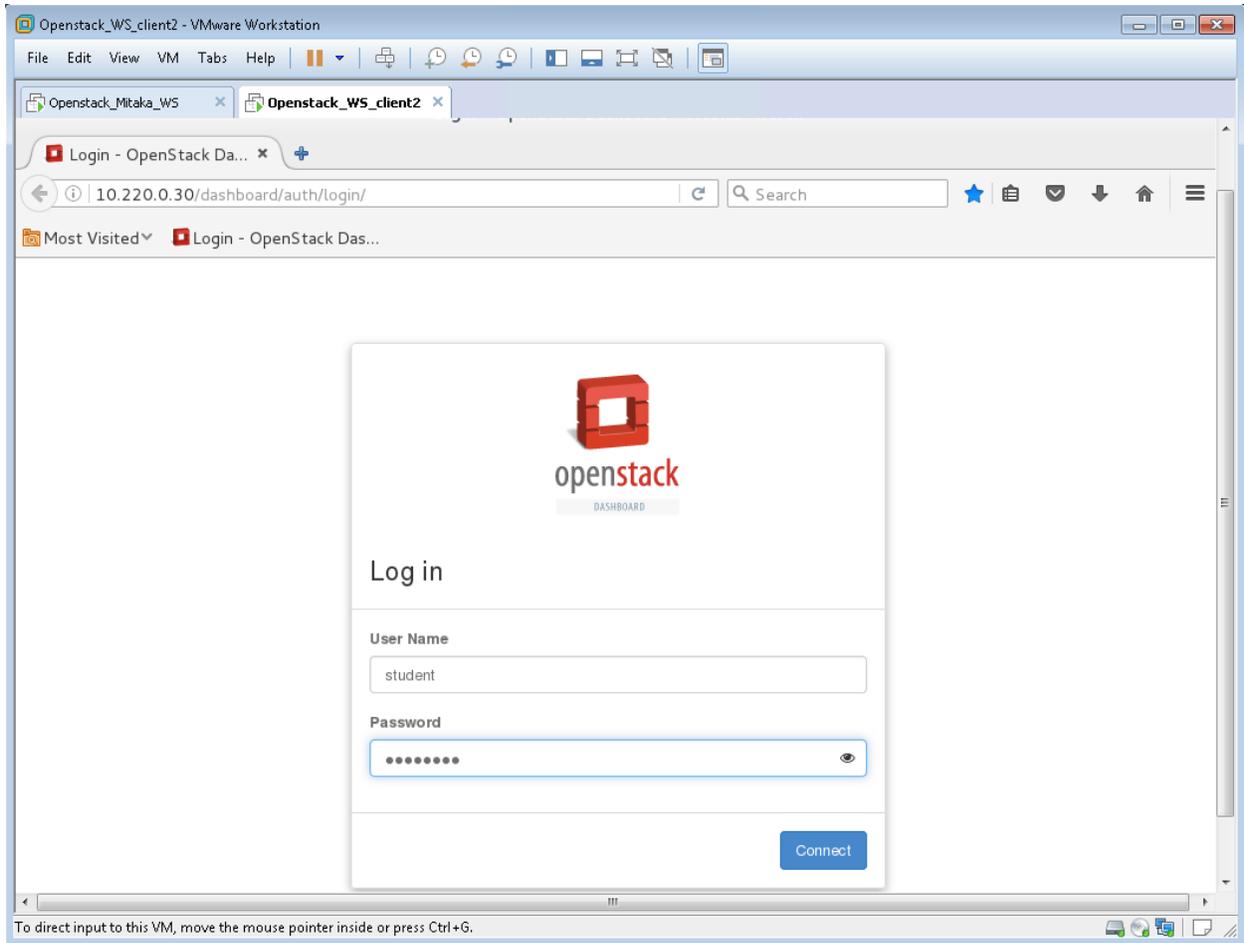
Module 8: Launch a CentOS 7 instance with a customization script



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



Module 8: Launch a CentOS 7 instance with a customization script



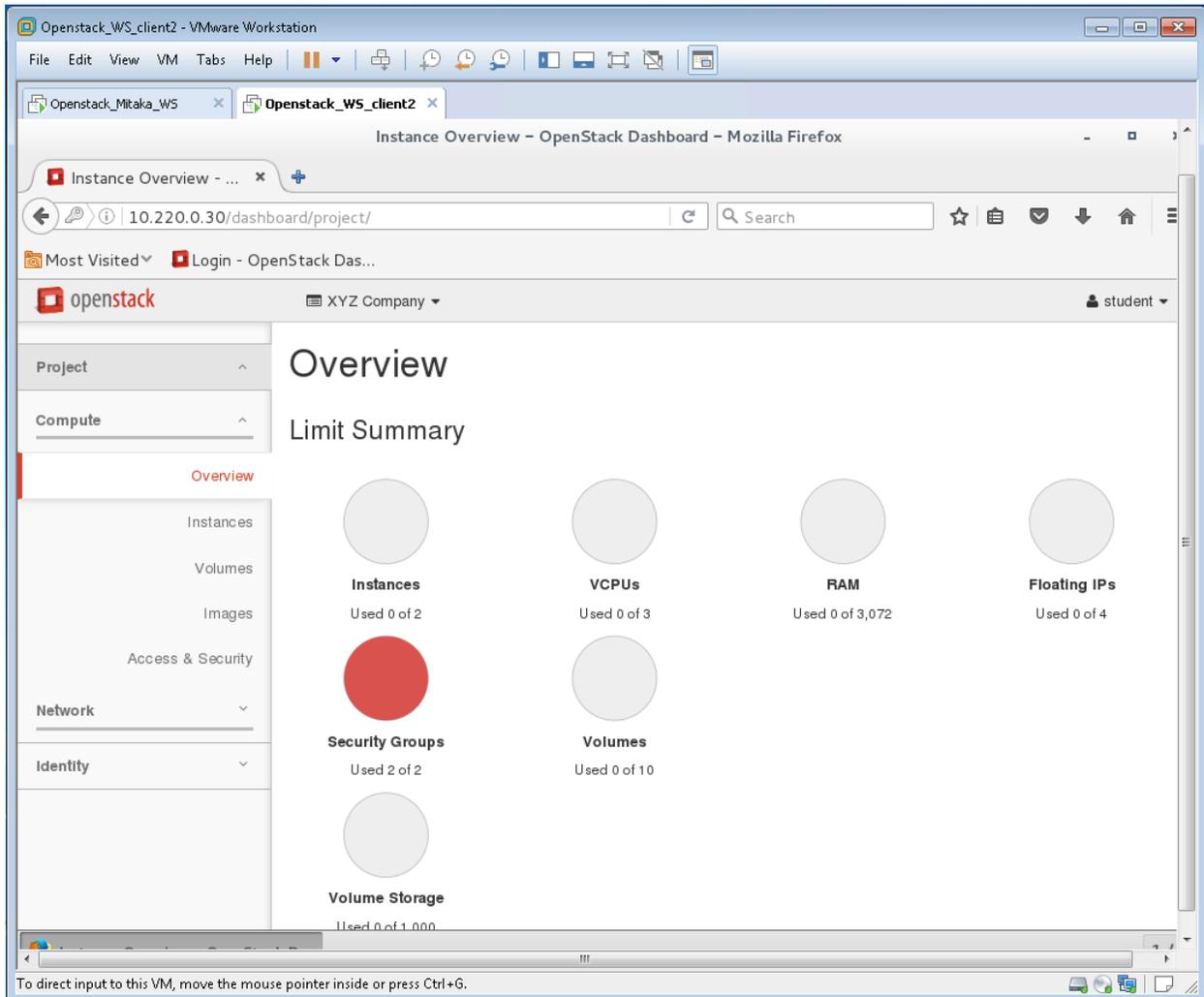
4. **Log in** to the OpenStack Dashboard with the username **Student** and **P@ssword** and press **enter** or **click Connect**.

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.



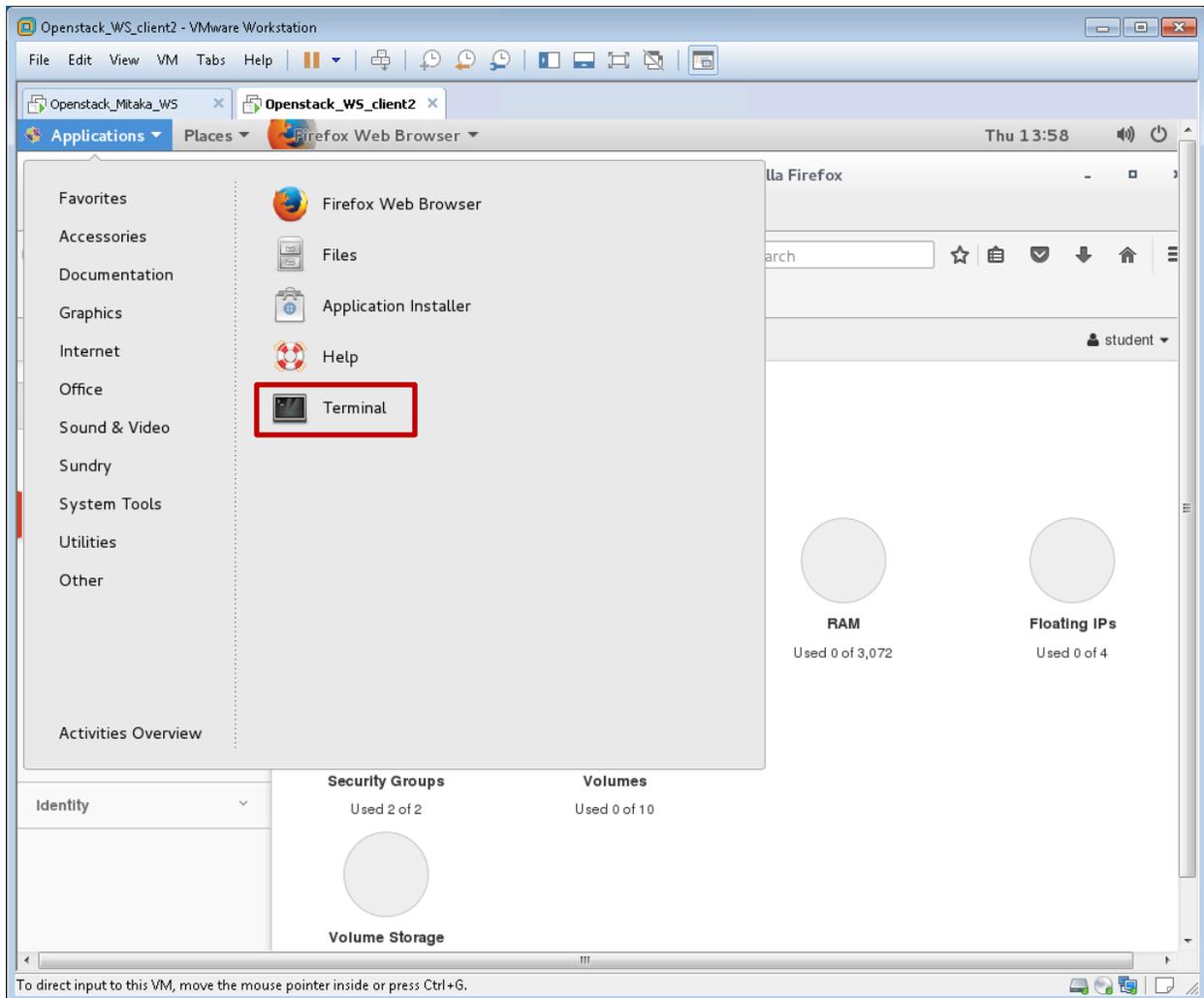
Lab 20: Launch a CentOS 7 instance with a customization script



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



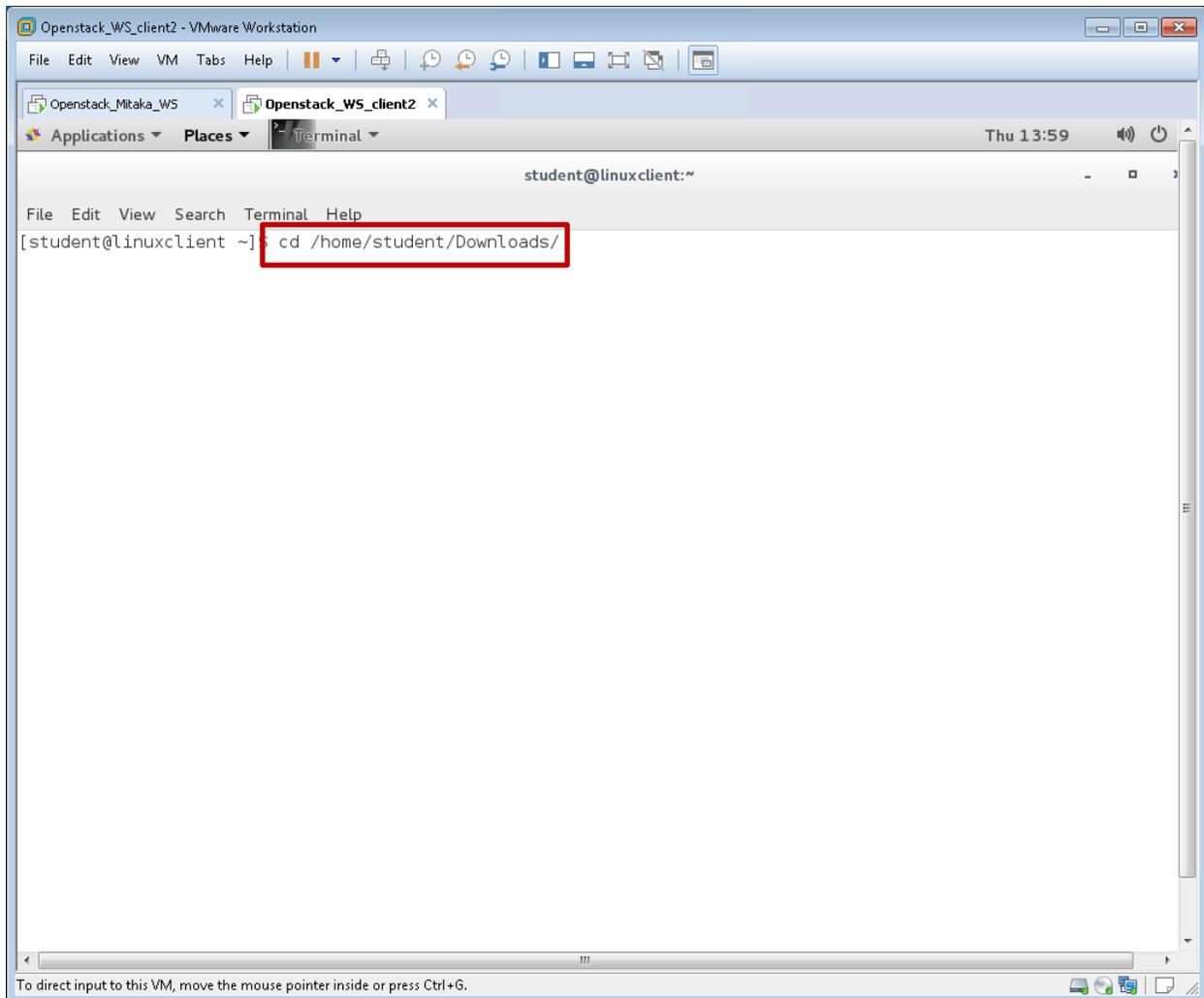
Module 8: Launch a CentOS 7 instance with a customization script



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

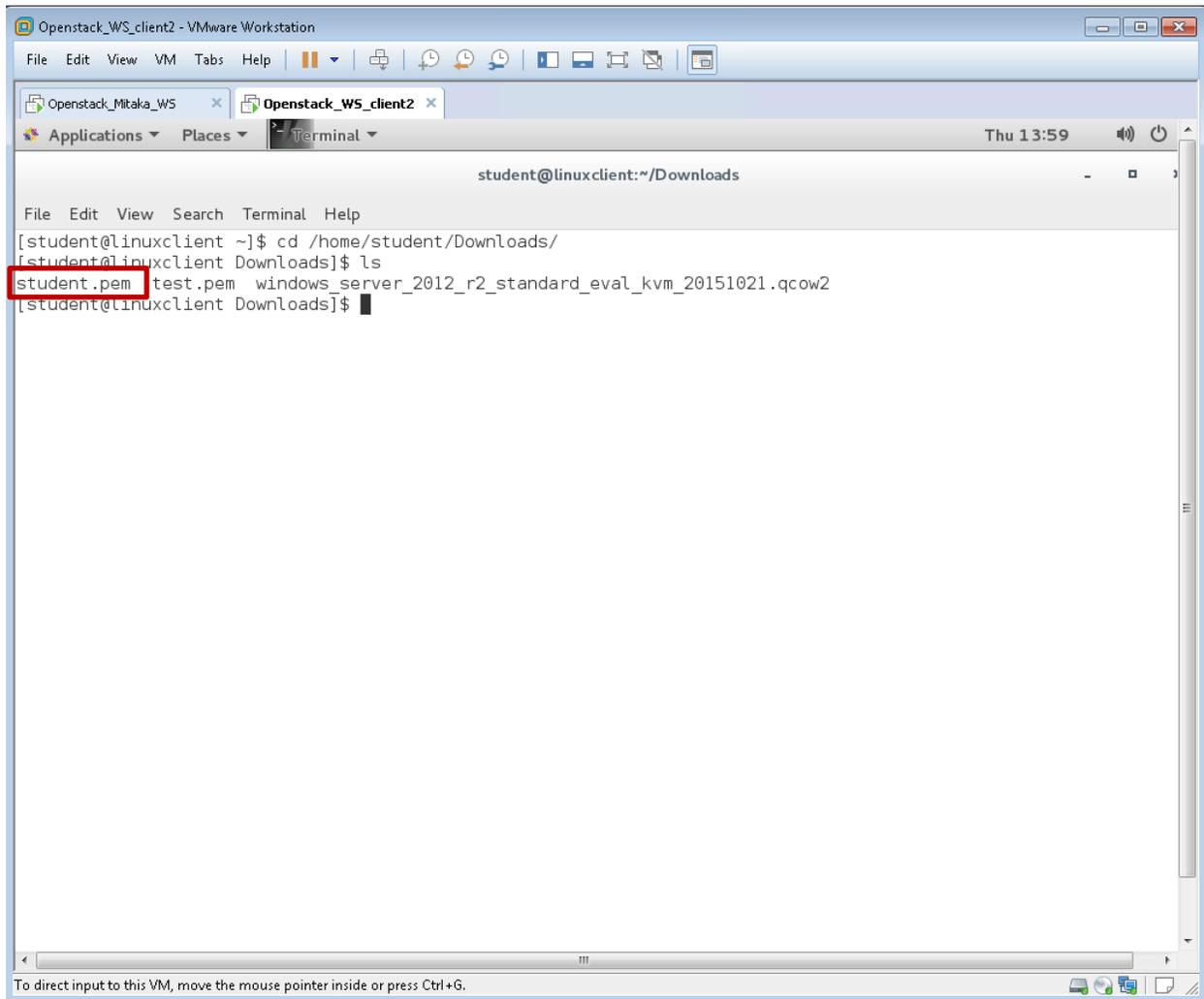


Module 8: Launch a CentOS 7 instance with a customization script



3. Change to the student's Downloads using the **#cd /home/student/Downloads/** command.

Module 8: Launch a CentOS 7 instance with a customization script



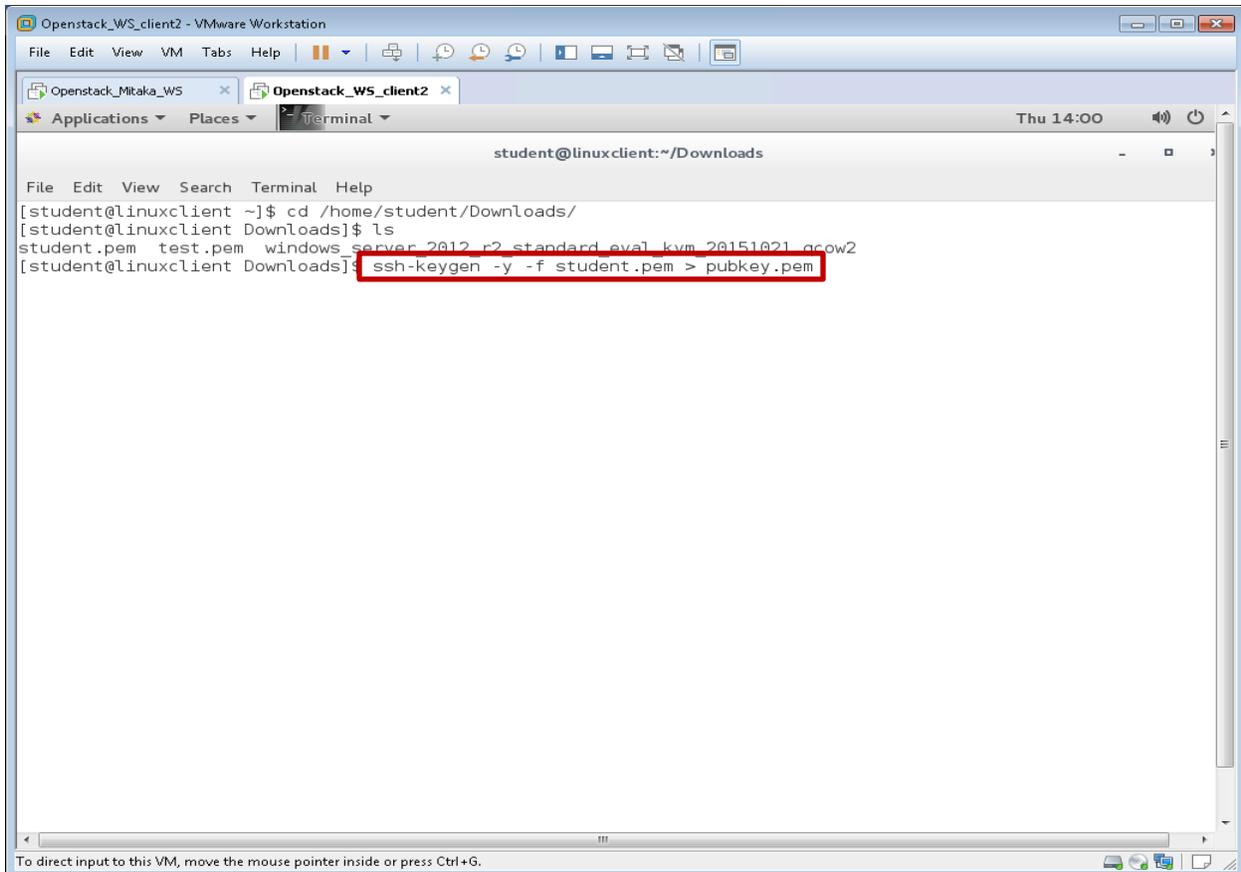
The screenshot shows a terminal window titled "Openstack_WS_client2 - VMware Workstation". The terminal prompt is "student@linuxclient:~/Downloads". The user has entered the command "ls" and the output is "student.pem test.pem windows_server_2012_r2_standard_eval_kvm_20151021.qcow2". The file "student.pem" is highlighted with a red box. The terminal window also shows a menu bar with "File", "Edit", "View", "Search", "Terminal", and "Help".

```
student@linuxclient:~/Downloads
File Edit View Search Terminal Help
[student@linuxclient ~]$ cd /home/student/Downloads/
[student@linuxclient Downloads]$ ls
student.pem test.pem windows_server_2012_r2_standard_eval_kvm_20151021.qcow2
[student@linuxclient Downloads]$
```

4. List the contents of the Downloads directory using the `# ls` command. You should see 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.



Module 8: Launch a CentOS 7 instance with a customization script



```
Openstack_WS_client2 - VMware Workstation
File Edit View VM Tabs Help
Openstack_Mitaka_WS Openstack_WS_client2
Applications Places Terminal Thu 14:00
student@linuxclient:~/Downloads
File Edit View Search Terminal Help
[student@linuxclient ~]$ cd /home/student/Downloads/
[student@linuxclient Downloads]$ ls
student.pem test.pem windows_server_2012_r2_standard_eval_kvm_20151021_grow2
[student@linuxclient Downloads]$ ssh-keygen -y -f student.pem > pubkey.pem
```

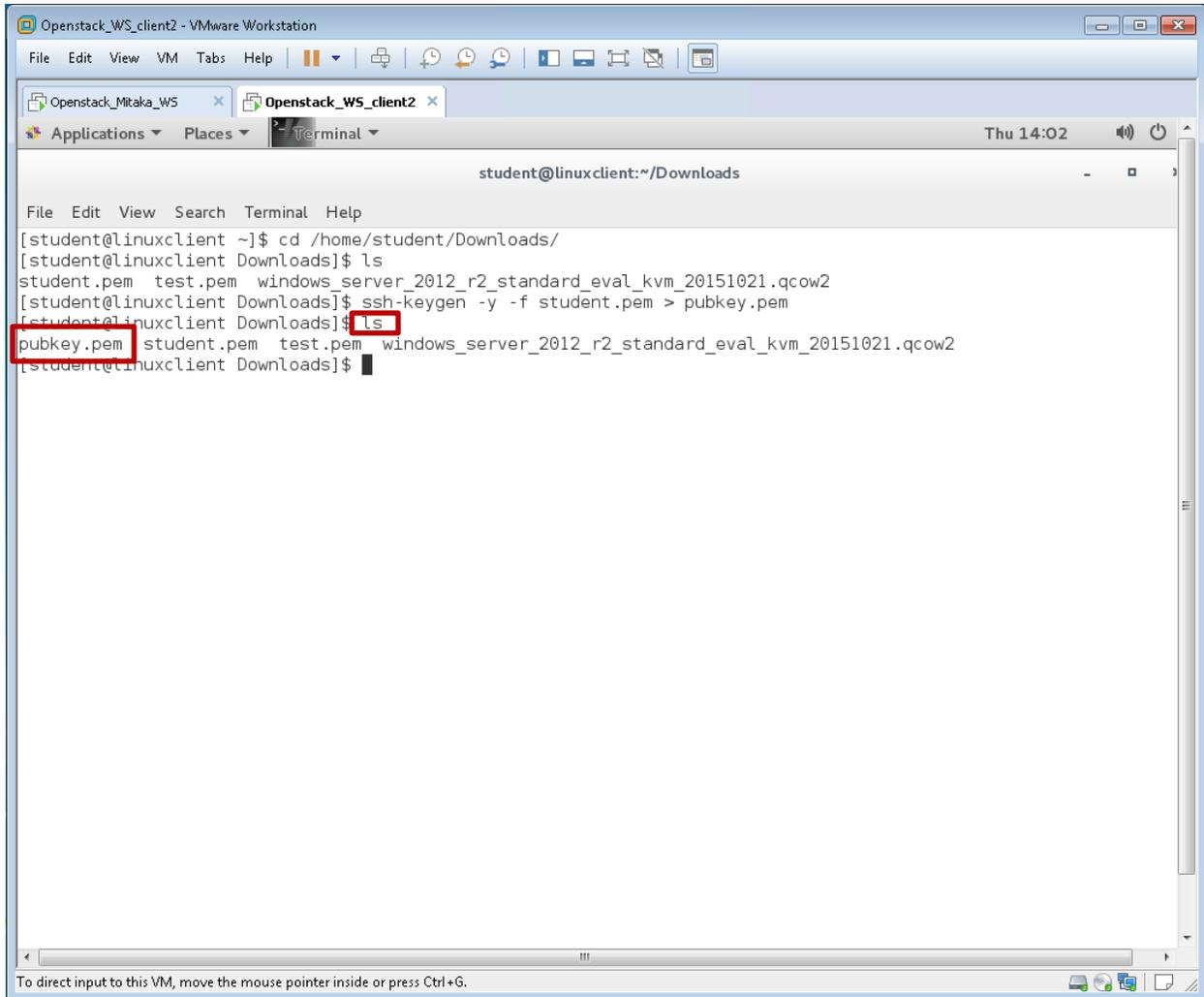
5. Extract the public key from the private key using the **# ssh-keygen -y -f student.pem > pubkey.pem** command.

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



Module 8: Launch a CentOS 7 instance with a customization script

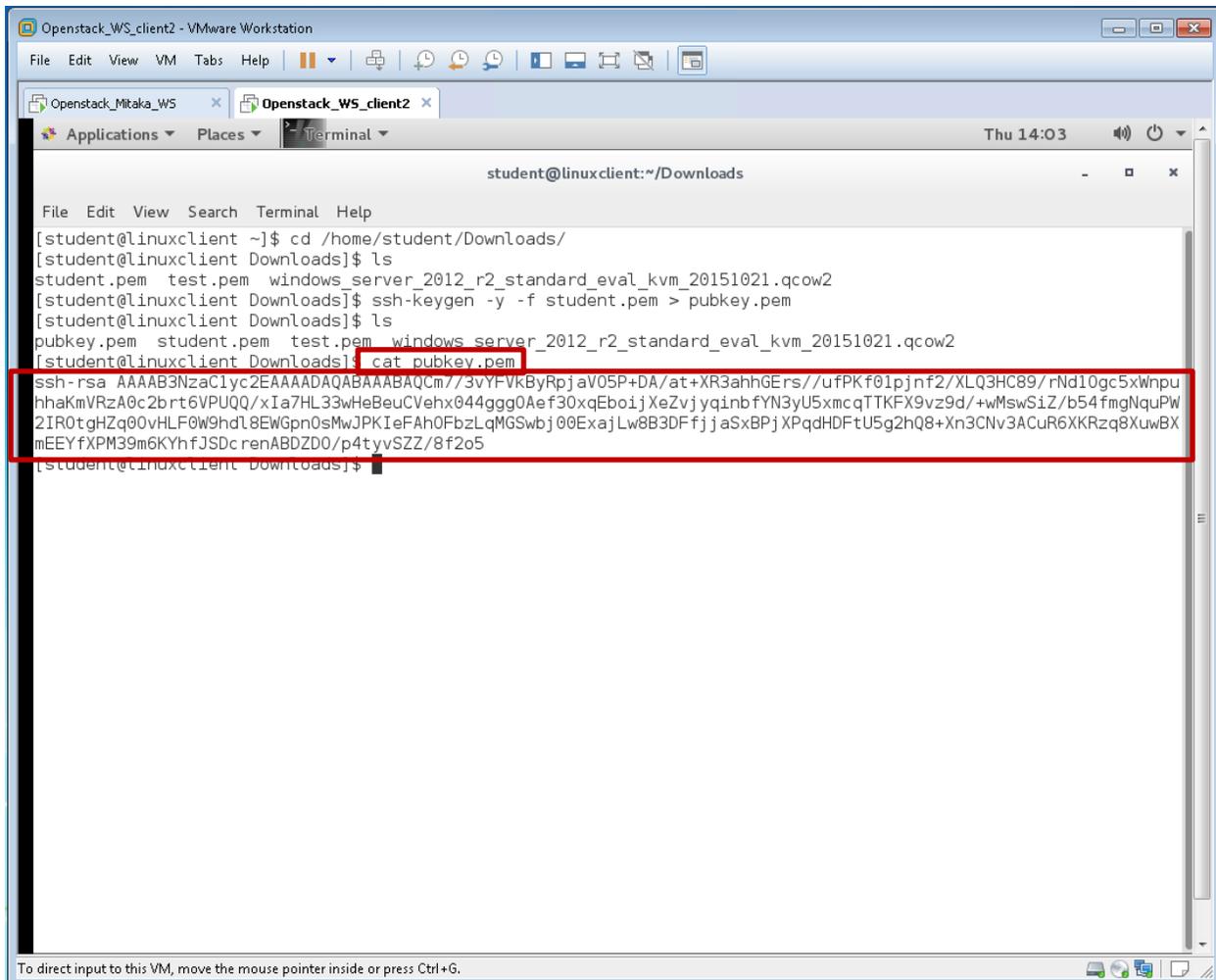


```
Openstack_WS_client2 - VMware Workstation
File Edit View VM Tabs Help
Openstack_Mitaka_WS x Openstack_WS_client2 x
Applications Places Terminal Thu 14:02
student@linuxclient:~/Downloads
File Edit View Search Terminal Help
[student@linuxclient ~]$ cd /home/student/Downloads/
[student@linuxclient Downloads]$ ls
student.pem test.pem windows_server_2012_r2_standard_eval_kvm_20151021.qcow2
[student@linuxclient Downloads]$ ssh-keygen -y -f student.pem > pubkey.pem
[student@linuxclient Downloads]$ ls
pubkey.pem student.pem test.pem windows_server_2012_r2_standard_eval_kvm_20151021.qcow2
[student@linuxclient Downloads]$
```

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



Module 8: Launch a CentOS 7 instance with a customization script



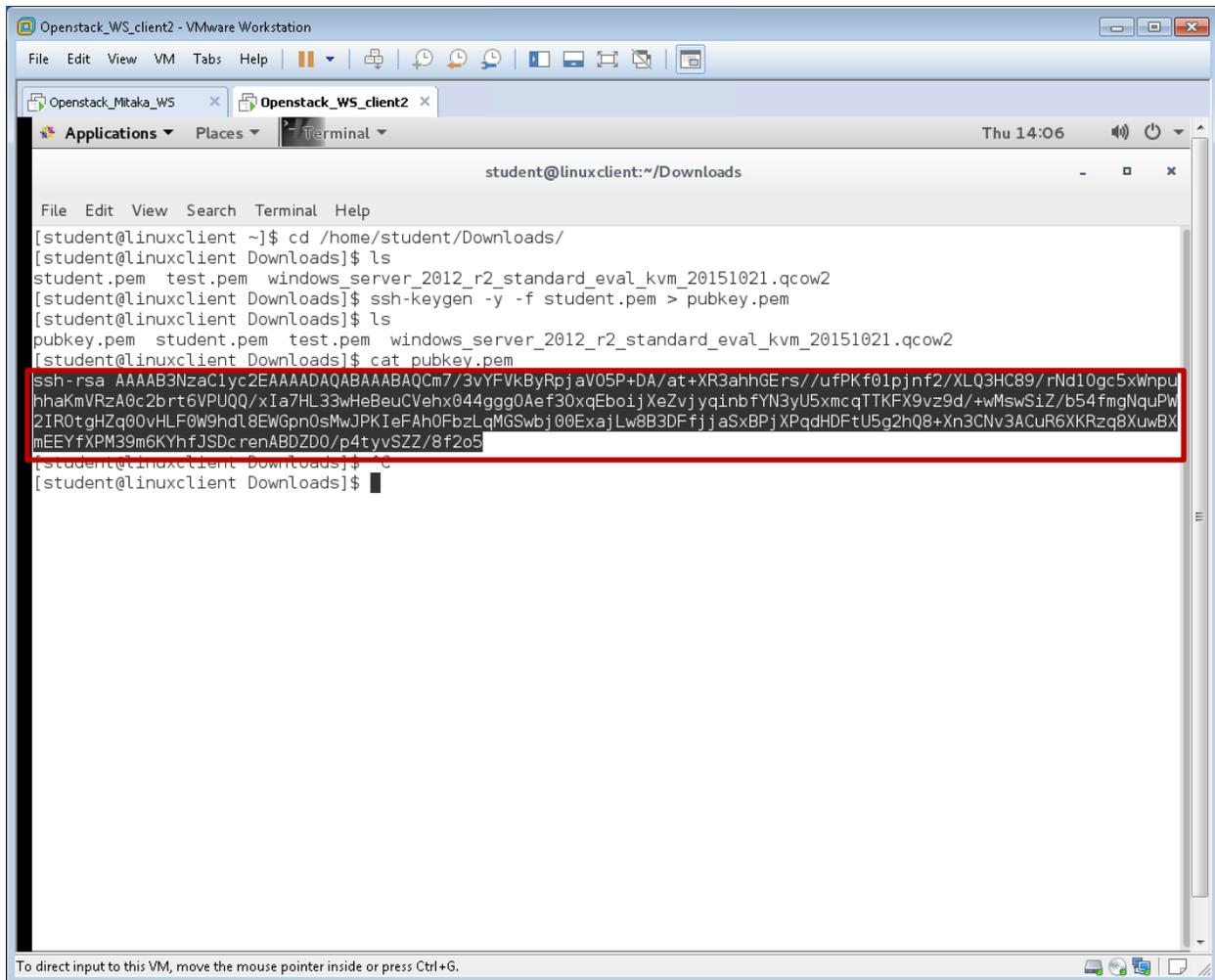
The screenshot shows a terminal window titled "student@linuxclient: ~/Downloads". The user has navigated to the Downloads directory and listed files, including "student.pem", "test.pem", and "windows_server_2012_r2_standard_eval_kvm_20151021.qcow2". They then ran "ssh-keygen -y -f student.pem > pubkey.pem" to generate a public key. Finally, they ran "cat pubkey.pem" to display the public key, which is highlighted with a red box. The public key is an OpenSSH RSA key with the following text:

```
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQCM//3vYFvkByRpjaV05P+DA/at+XR3ahhGErs//ufPKf01pjnf2/XLQ3HC89/rNd10gc5xWnpu  
hhaKmVRzA0c2brt6VPUQQ/xIa7HL33wHeBeuCVehx044ggg0Aef30xqEboijXeZvjyqinbfYN3yU5xmcqTKFX9vz9d/+wMswSiZ/b54fmgNquPW  
2IROtgHZq00vHLf0W9hdL8EWGpn0sMwJPKIeFAh0FbzLqMGSwbj00ExajLw8B3DFfjjaSxBPjXPqdHDFtU5g2hQ8+Xn3CNv3ACuR6XKRzq8XuwBX  
mEEYfXPM39m6KYhfJSDcrenABDZD0/p4tyvSZZ/8f2o5
```

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



Module 8: Launch a CentOS 7 instance with a customization script



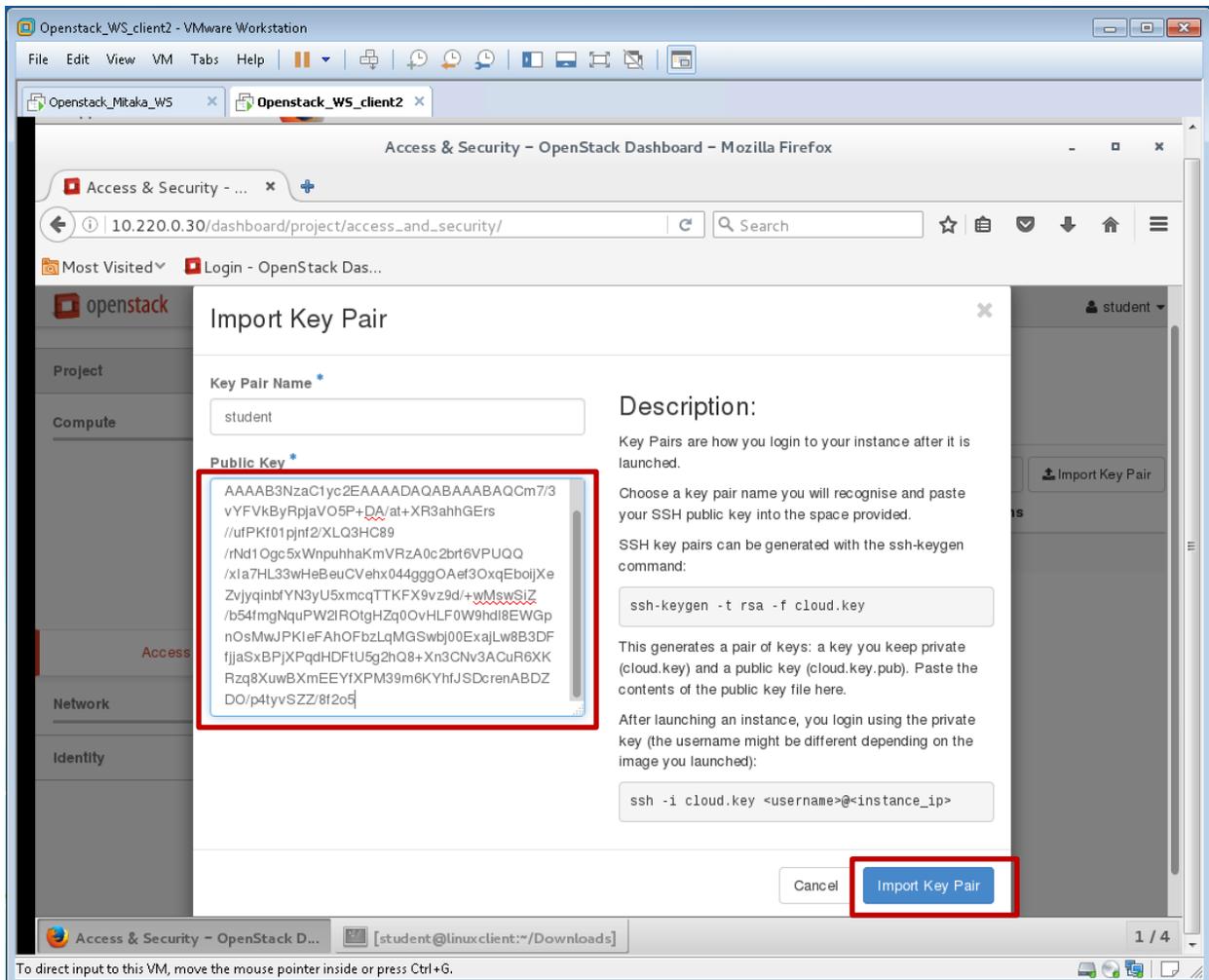
The screenshot shows a terminal window titled "student@linuxclient:~/Downloads". The user has navigated to the Downloads directory and listed files, including "student.pem", "test.pem", and "windows_server_2012_r2_standard_eval_kvm_20151021.qcow2". They then used the command "ssh-keygen -y -f student.pem > pubkey.pem" to generate a public key. Finally, they used "cat pubkey.pem" to display the public key, which is highlighted with a red box. The public key text is as follows:

```
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQCM7/3vYFVkBjRyRpaV05P+DA/at+XR3ahh6Ers//ufPKf01p1nf2/XLQ3HC89/rNd10gc5xWnpu  
hhaKmVRzA0c2brt6VPUQQ/xIa7HL33wHeBeuCVehx044ggg0Aef30xqEboijXeZvjyq1nbfYN3yU5xmcqTTKFX9vz9d/+wMswSiZ/b54fmgNquPW  
2IR0tgHZq00vHLF0W9hdL8EWGpn0sMwJPKIeFAh0FbzLqMGSwbj00ExajLw8B3DFfjj aSxBPjXPqdHDFtU5g2hQ8+Xn3CNv3ACuR6XKRzq8XuwBX  
mEEYfXPM39m6KYhfJSDcrenABDZD0/p4tyvSZZ/8f2o5
```

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



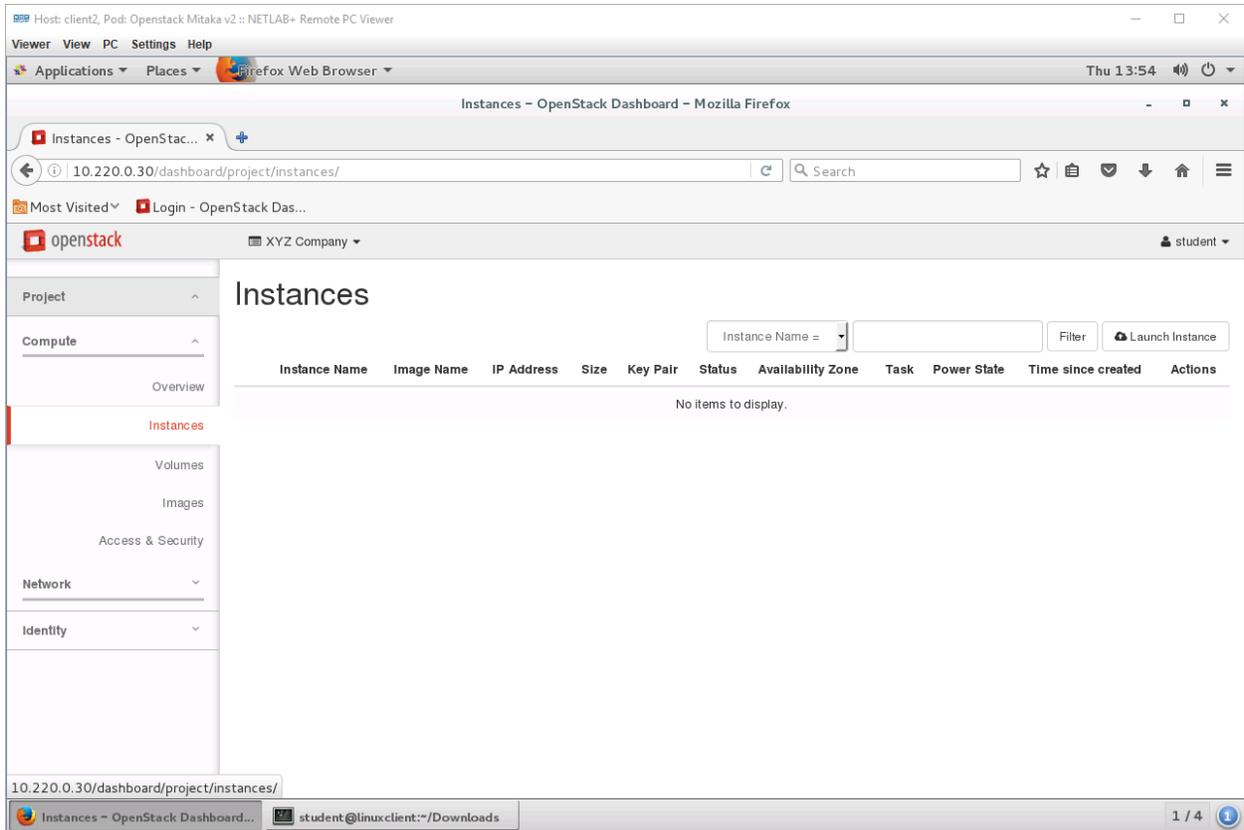
Module 8: Launch a CentOS 7 instance with a customization script



9. 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.

Module 8: Launch a CentOS 7 instance with a customization script

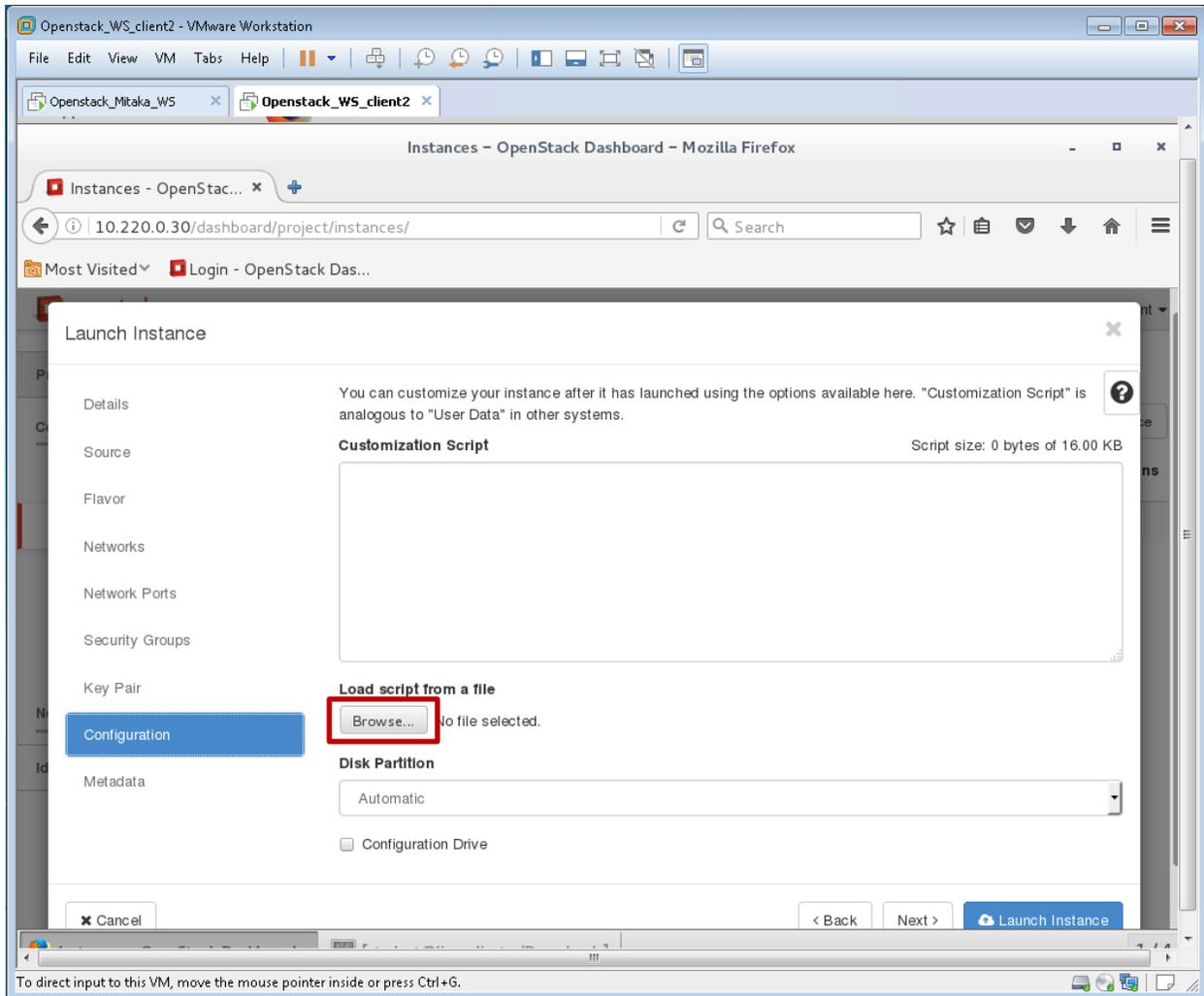


10. Using the techniques learned in previous labs, **prepare** to **launch** an **instance** using the information in the table below. **DO NOT launch the instance yet!**

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



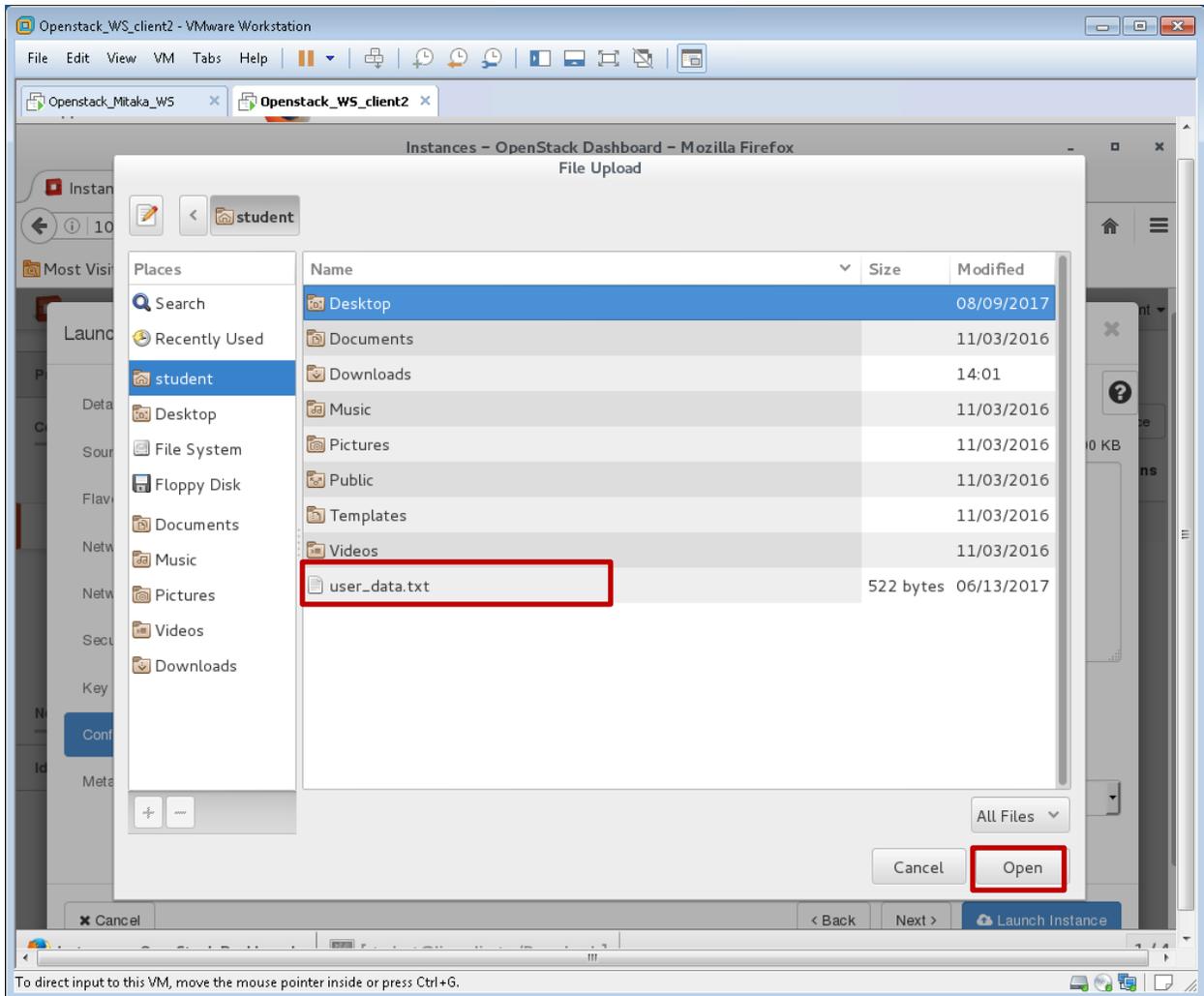
Module 8: Launch a CentOS 7 instance with a customization script



11. 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.

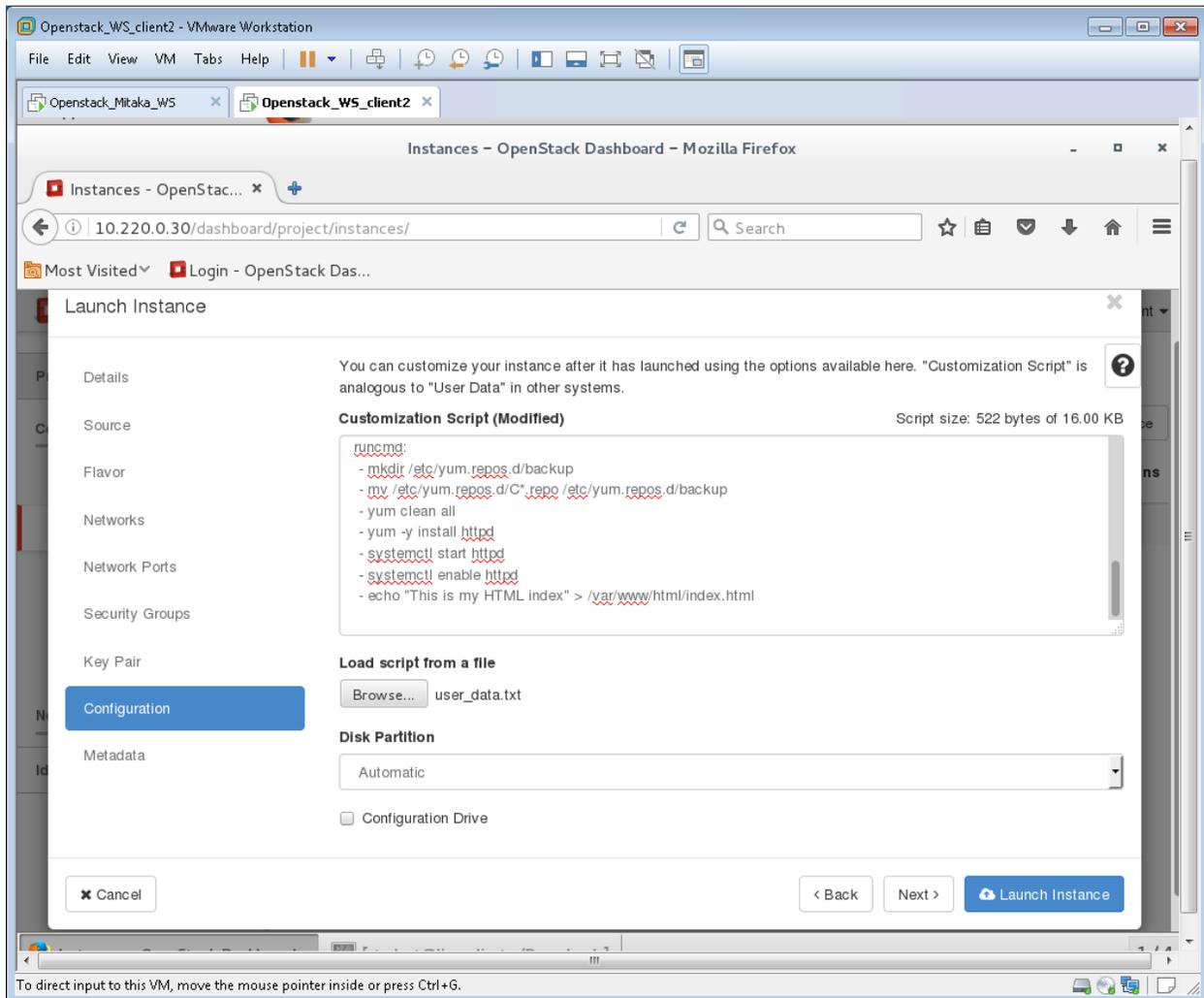
Note: This “Customization Script” will perform the following tasks during the creation of the instance; configure the instance to use an http repository which was created on the client2 VM, install, and start and enable the httpd service, and create an html index file.

Module 8: Launch a CentOS 7 instance with a customization script



12. Click on the **user_data.txt** file and the **Open** button. Shown on the next page.

Module 8: Launch a CentOS 7 instance with a customization script

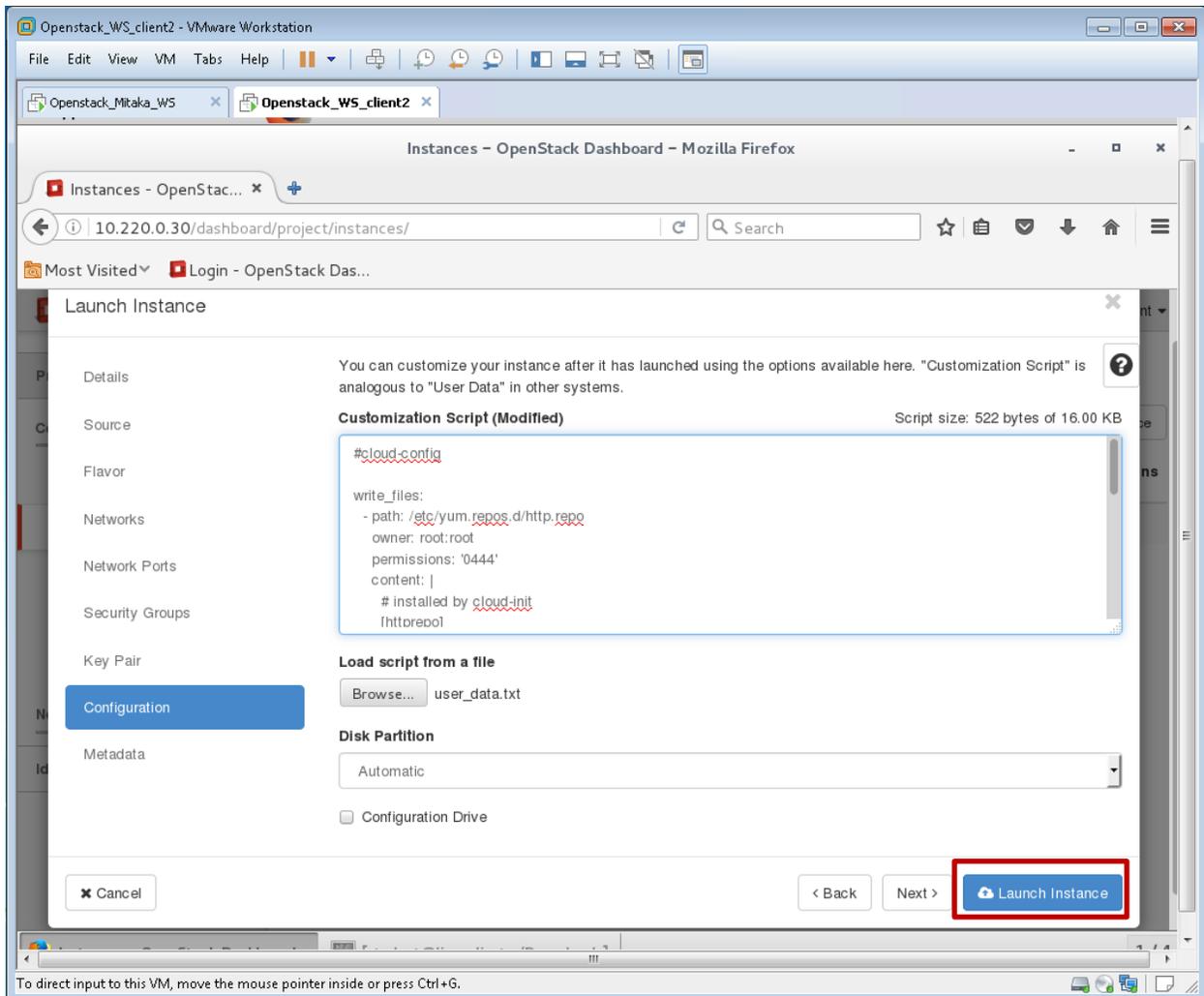


13. The `user_data.txt` file will populate the Customization Script with the required commands. Continue to the next page.

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`

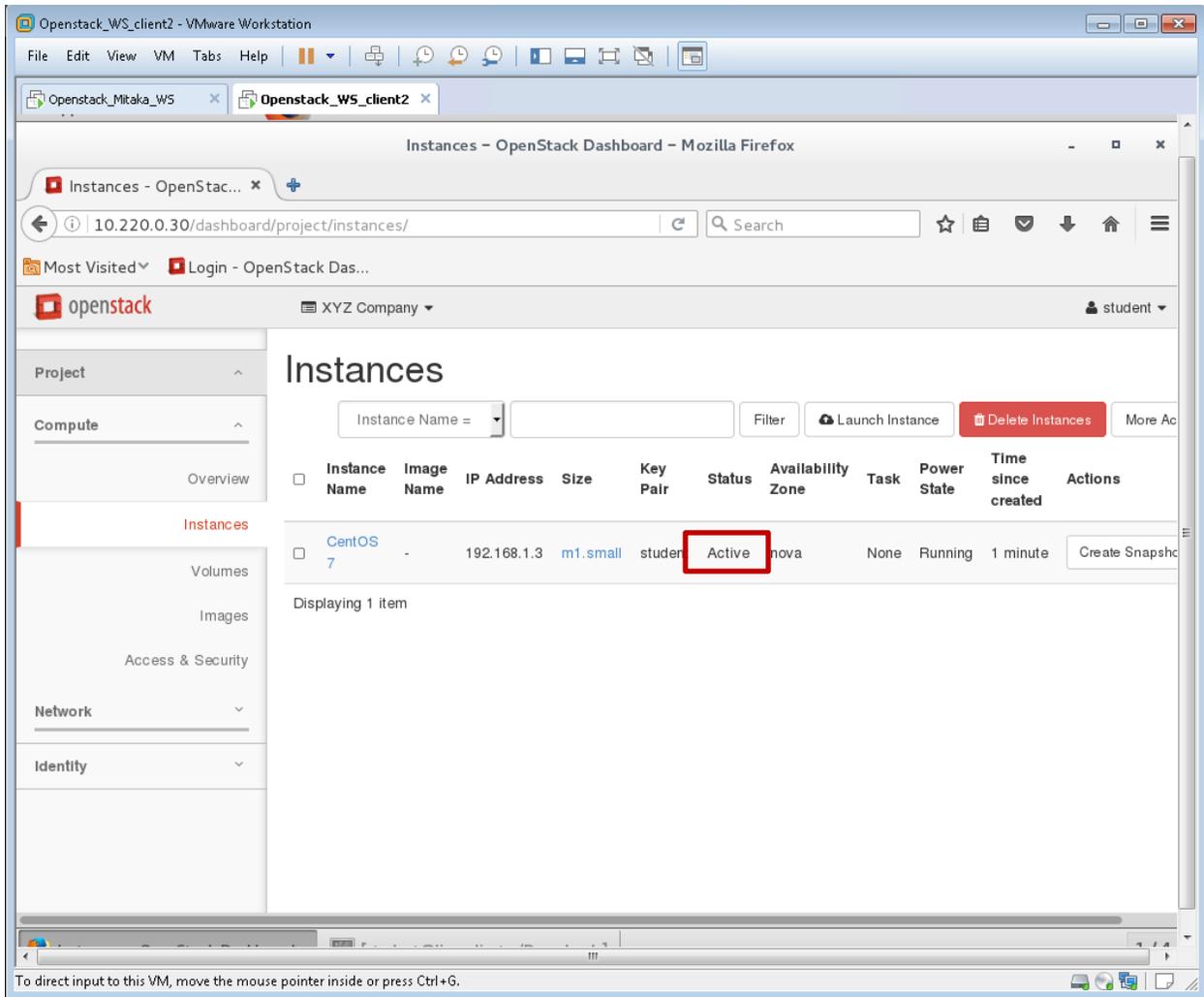
Module 8: Launch a CentOS 7 instance with a customization script



14. Click on Launch Instance.

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

Module 8: Launch a CentOS 7 instance with a customization script



15. The CentOS 7 instance should be active shortly.

YAML Lint

Paste in your YAML and click "Go" - we'll tell you if it's valid or not, and give you a nice clean UTF-8 version of it. Optimized for Ruby.

```
1 ---
2 runcmd:
3   - "echo \"This instance was customized with cloud-init\" > /etc/motd"
4   - "touch /home/centos/test.txt"
5   - "echo \"Add text to the test.txt file\" > /home/centos/test.txt"
6 yum_repos:
7   baseurl: "http://10.220.0.2/repo"
8   enabled: false
9   failovermethod: priority
10  gpgcheck: false
11  name: repolist
12
13
14
15
16
17
18
19
20
21
```

Go

Valid YAML!

16. 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.



YAML Lint

Paste in your YAML and click "Go" - we'll tell you if it's valid or not, and give you a nice clean UTF-8 version of it. Optimized for Ruby.

```
1 ---
2 runcmd:
3   - "echo \"This instance was customized with cloud-init\" > /etc/motd"
4   - "touch /home/centos/test.txt"
5   - "echo \"Add text to the test.txt file\" > /home/centos/test.txt"
6 yum_repos:
7   baseurl: "http://10.220.0.2/repo"
8   enabled: false
9   failovermethod: priority
10  gpgcheck: false
11  name: repolist
12
13
14
15
16
17
18
19
20
21
```

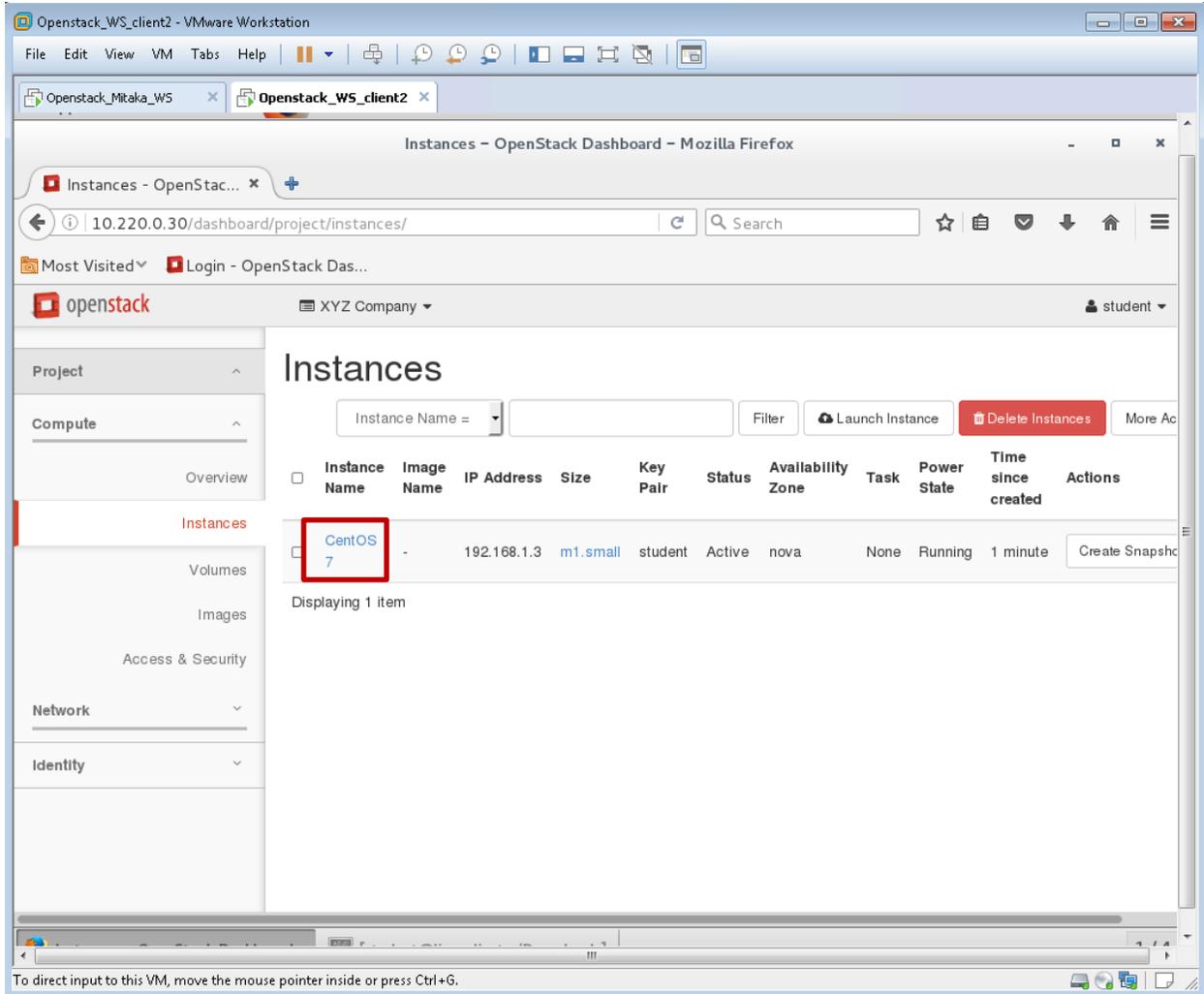
Go

(<unknown>): did not find expected key while parsing a block mapping at line 2 column 1

17. 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**". As you can see, the bottom band has turned red and provided some information to locate the error.

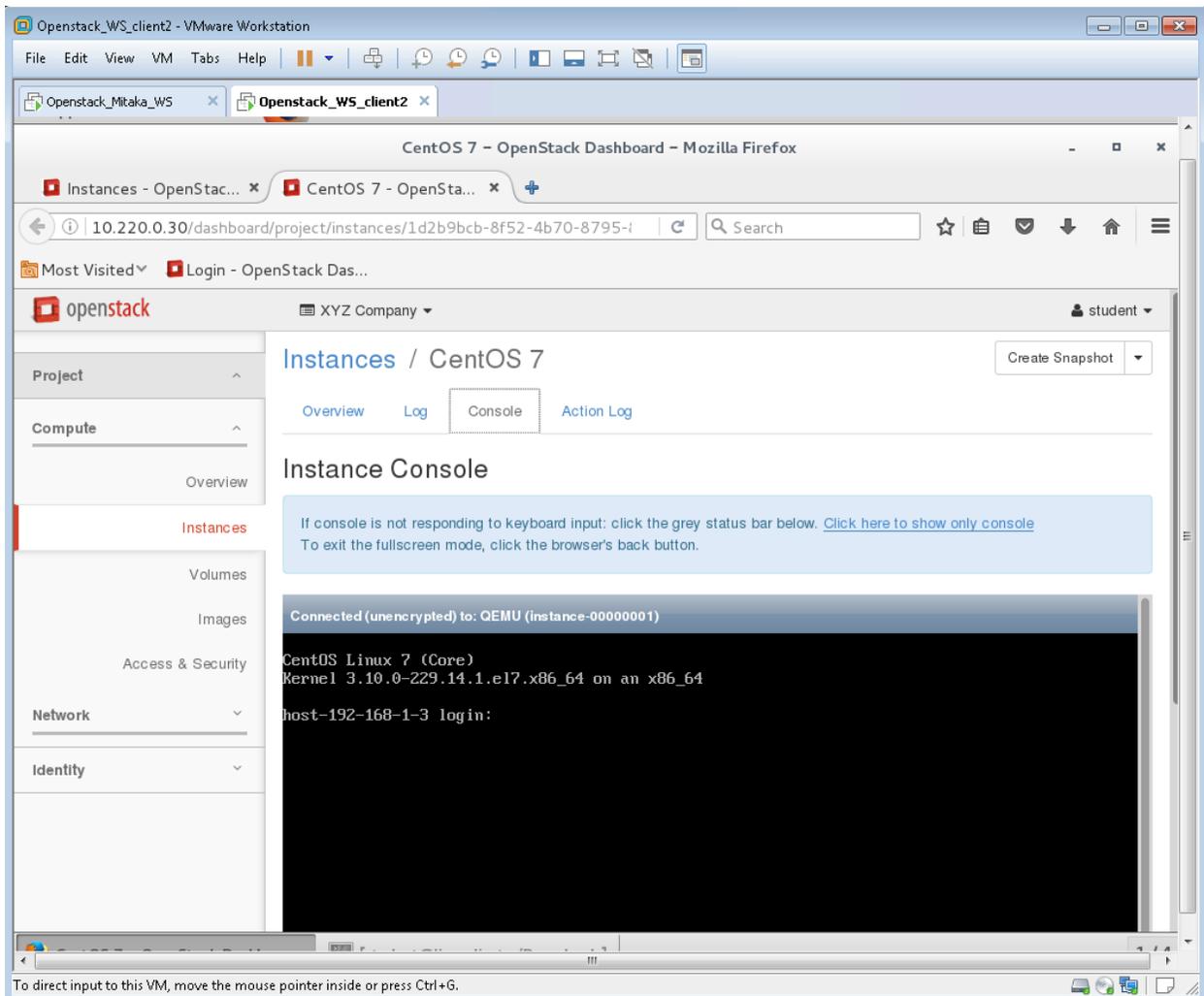


Module 8: Launch a CentOS 7 instance with a customization script



18. 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).

Module 8: Launch a CentOS 7 instance with a customization script

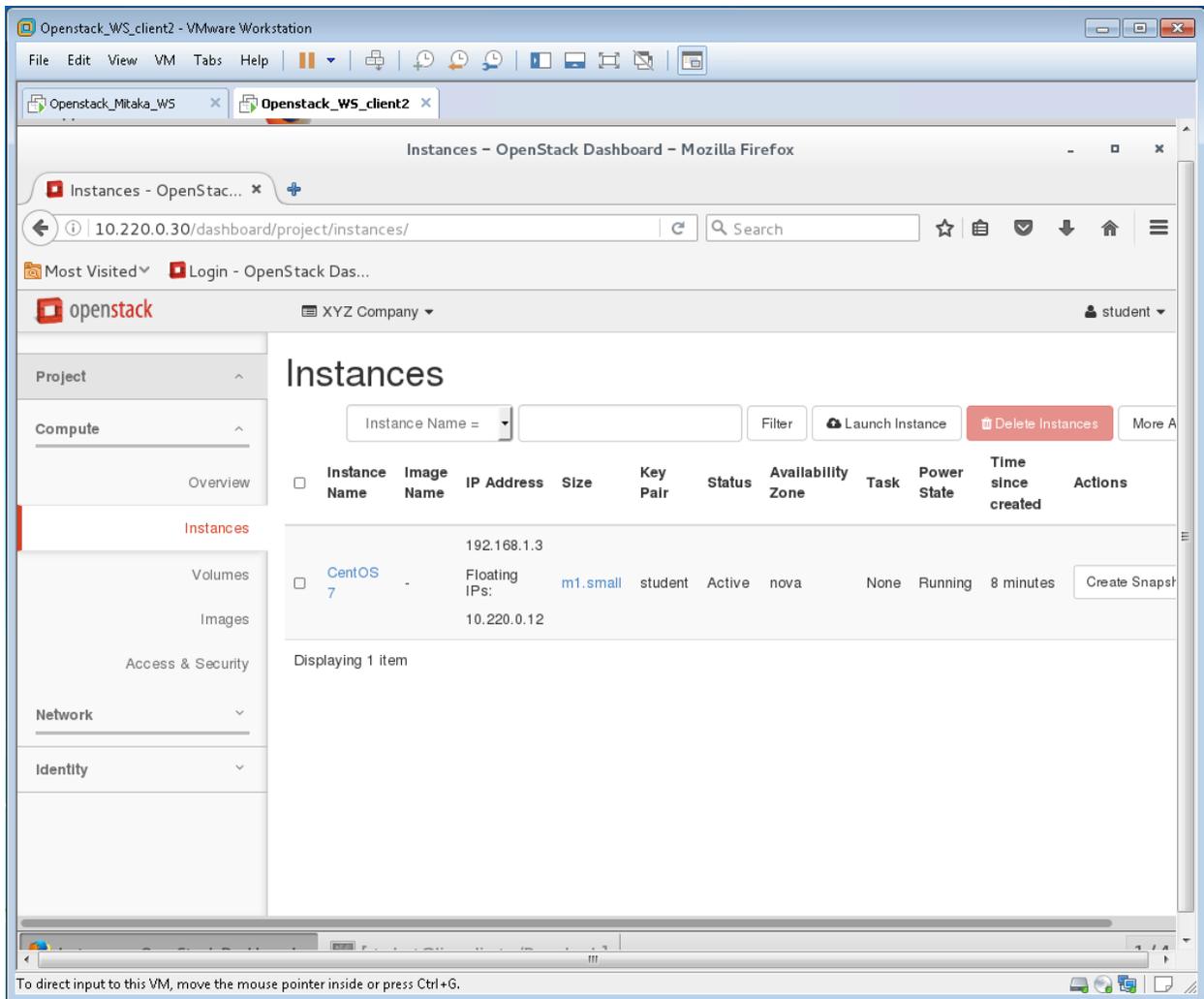


19. In the new tab, **click on Console**. You should see the **login prompt** before assigning a Floating IP address. Close the new tab.

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

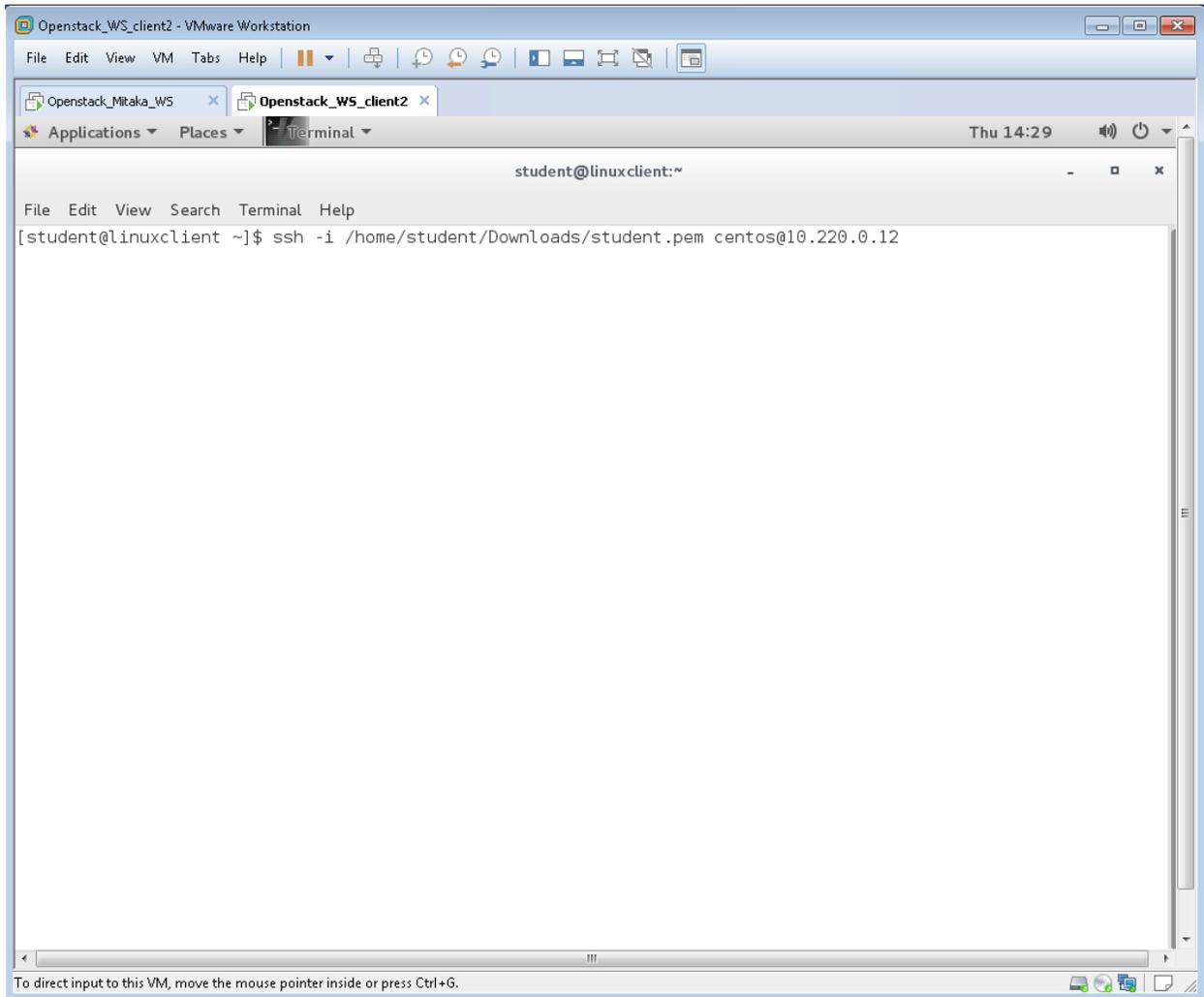


Module 8: Launch a CentOS 7 instance with a customization script



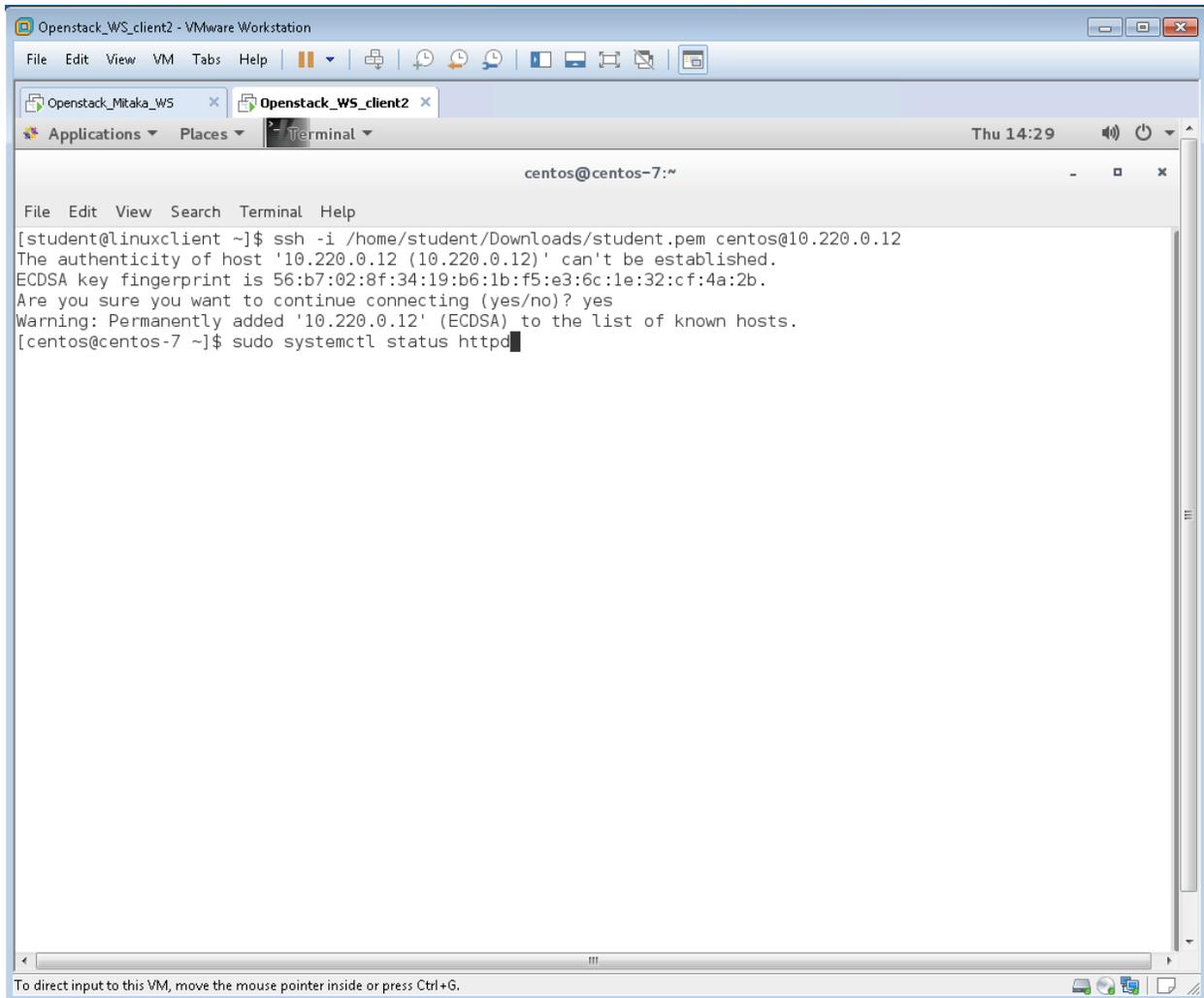
20. Using techniques learned in the course, **allocate and assign a Floating IP address** to the **CentOS 7 instance**.

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**

Module 8: Launch a CentOS 7 instance with a customization script



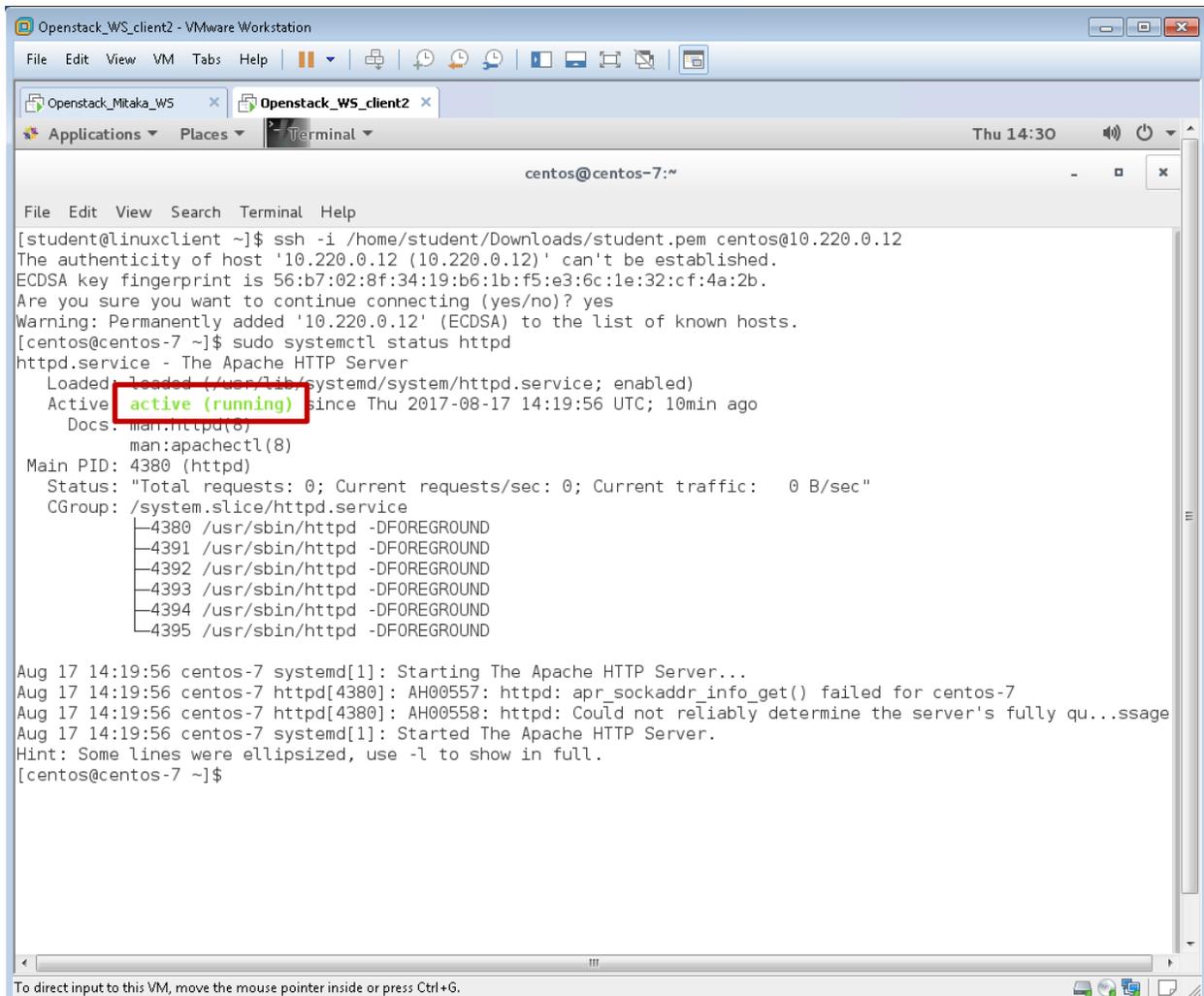
```
Openstack_WS_client2 - VMware Workstation
File Edit View VM Tabs Help
Openstack_Mitaka_WS Openstack_WS_client2
Applications Places Terminal Thu 14:29
centos@centos-7:~
File Edit View Search Terminal Help
[student@linuxclient ~]$ ssh -i /home/student/Downloads/student.pem centos@10.220.0.12
The authenticity of host '10.220.0.12 (10.220.0.12)' can't be established.
ECDSA key fingerprint is 56:b7:02:8f:34:19:b6:1b:f5:e3:6c:1e:32:cf:4a:2b.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '10.220.0.12' (ECDSA) to the list of known hosts.
[centos@centos-7 ~]$ sudo systemctl status httpd
```

2. 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.



Module 8: Launch a CentOS 7 instance with a customization script



```
Openstack_WS_client2 - VMware Workstation
File Edit View VM Tabs Help
Openstack_Mitaka_WS Openstack_WS_client2
Applications Places Terminal Thu 14:30
centos@centos-7:~

File Edit View Search Terminal Help

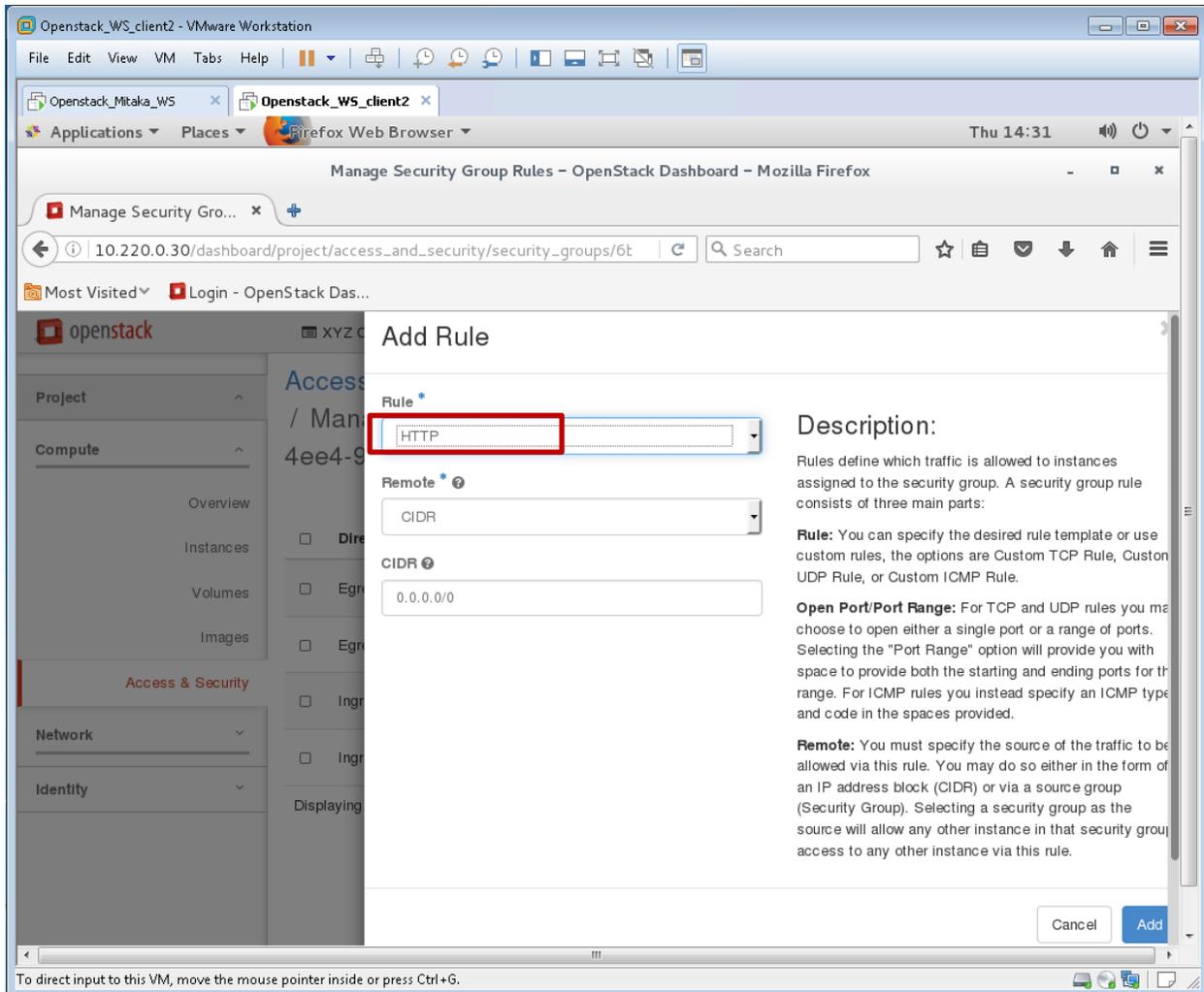
[student@linuxclient ~]$ ssh -i /home/student/Downloads/student.pem centos@10.220.0.12
The authenticity of host '10.220.0.12 (10.220.0.12)' can't be established.
ECDSA key fingerprint is 56:b7:02:8f:34:19:b6:1b:f5:e3:6c:1e:32:cf:4a:2b.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '10.220.0.12' (ECDSA) to the list of known hosts.
[centos@centos-7 ~]$ sudo systemctl status httpd
httpd.service - The Apache HTTP Server
Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled)
Active: active (running) since Thu 2017-08-17 14:19:56 UTC; 10min ago
Docs: man:httpd(8)
      man:apachectl(8)
Main PID: 4380 (httpd)
Status: "Total requests: 0; Current requests/sec: 0; Current traffic:  0 B/sec"
CGroup: /system.slice/httpd.service
├─4380 /usr/sbin/httpd -DFOREGROUND
├─4391 /usr/sbin/httpd -DFOREGROUND
├─4392 /usr/sbin/httpd -DFOREGROUND
├─4393 /usr/sbin/httpd -DFOREGROUND
├─4394 /usr/sbin/httpd -DFOREGROUND
└─4395 /usr/sbin/httpd -DFOREGROUND

Aug 17 14:19:56 centos-7 systemd[1]: Starting The Apache HTTP Server...
Aug 17 14:19:56 centos-7 httpd[4380]: AH00557: httpd: apr_sockaddr_info_get() failed for centos-7
Aug 17 14:19:56 centos-7 httpd[4380]: AH00558: httpd: Could not reliably determine the server's fully qu...ssage
Aug 17 14:19:56 centos-7 systemd[1]: Started The Apache HTTP Server.
Hint: Some lines were ellipsized, use -l to show in full.
[centos@centos-7 ~]$
```

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



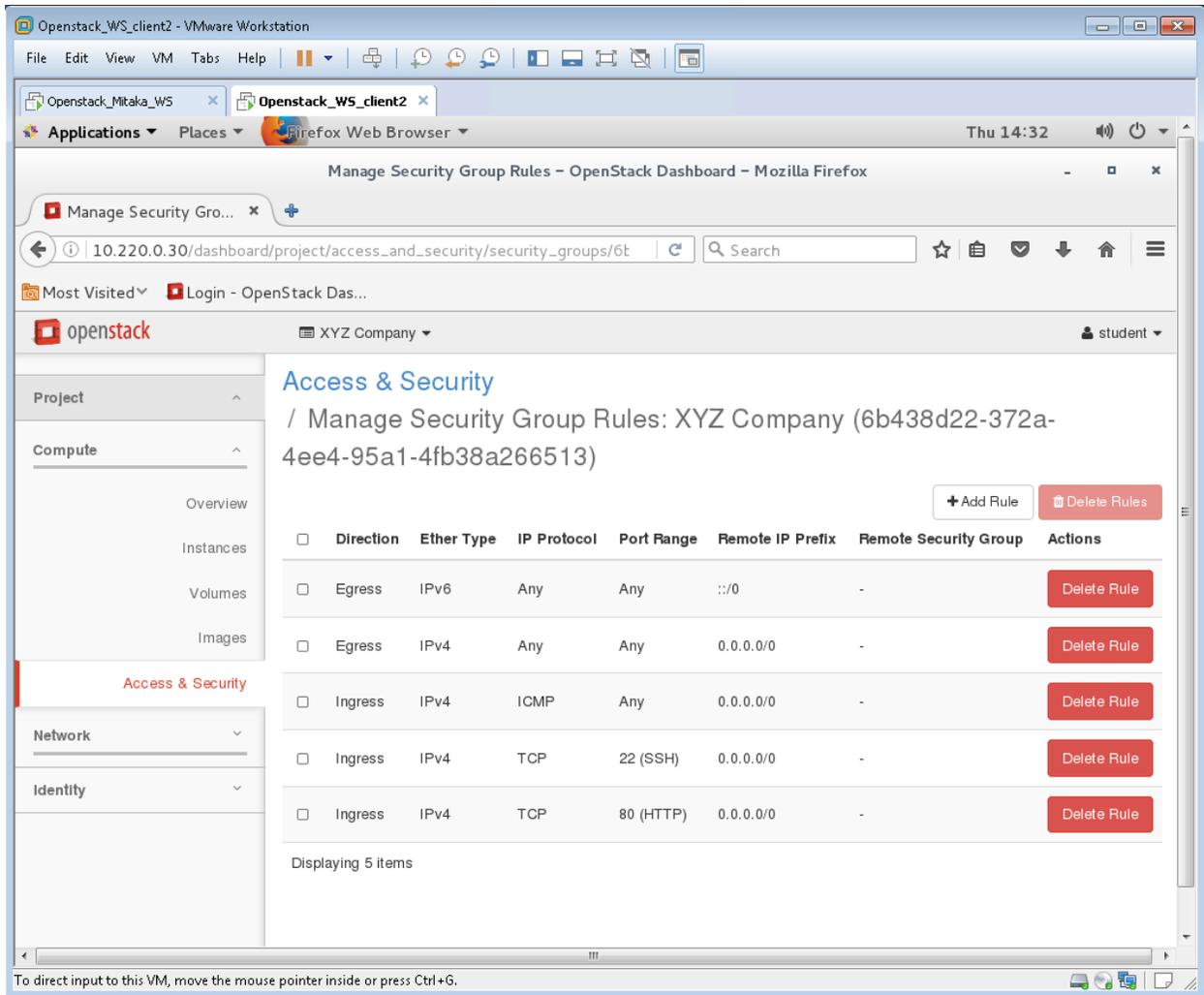
Module 8: Launch a CentOS 7 instance with a customization script



4. Return to the **Access & Security** tab and add a rule to **allow http** from any network to the **XYZ Company security group**.



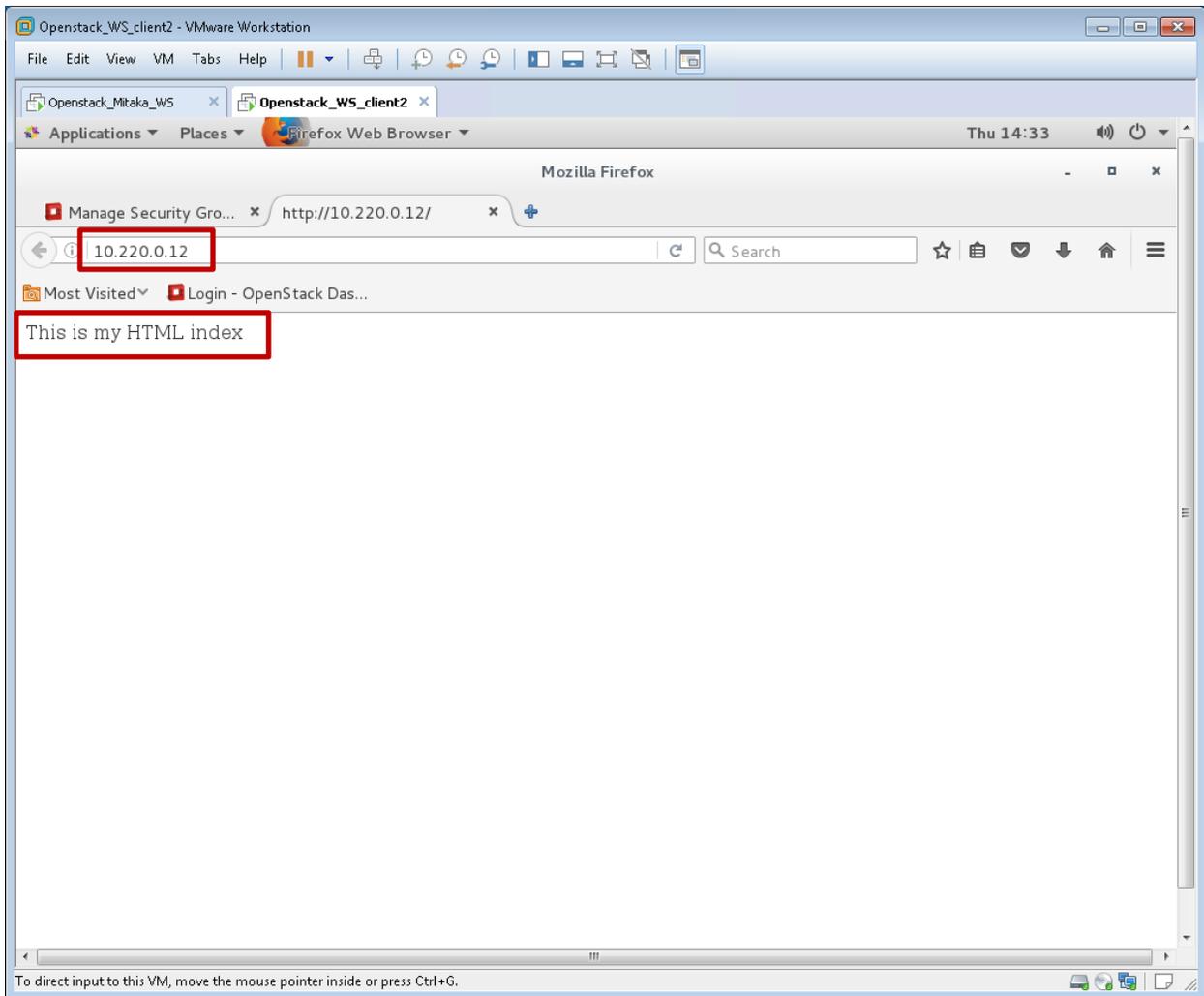
Module 8: Launch a CentOS 7 instance with a customization script



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

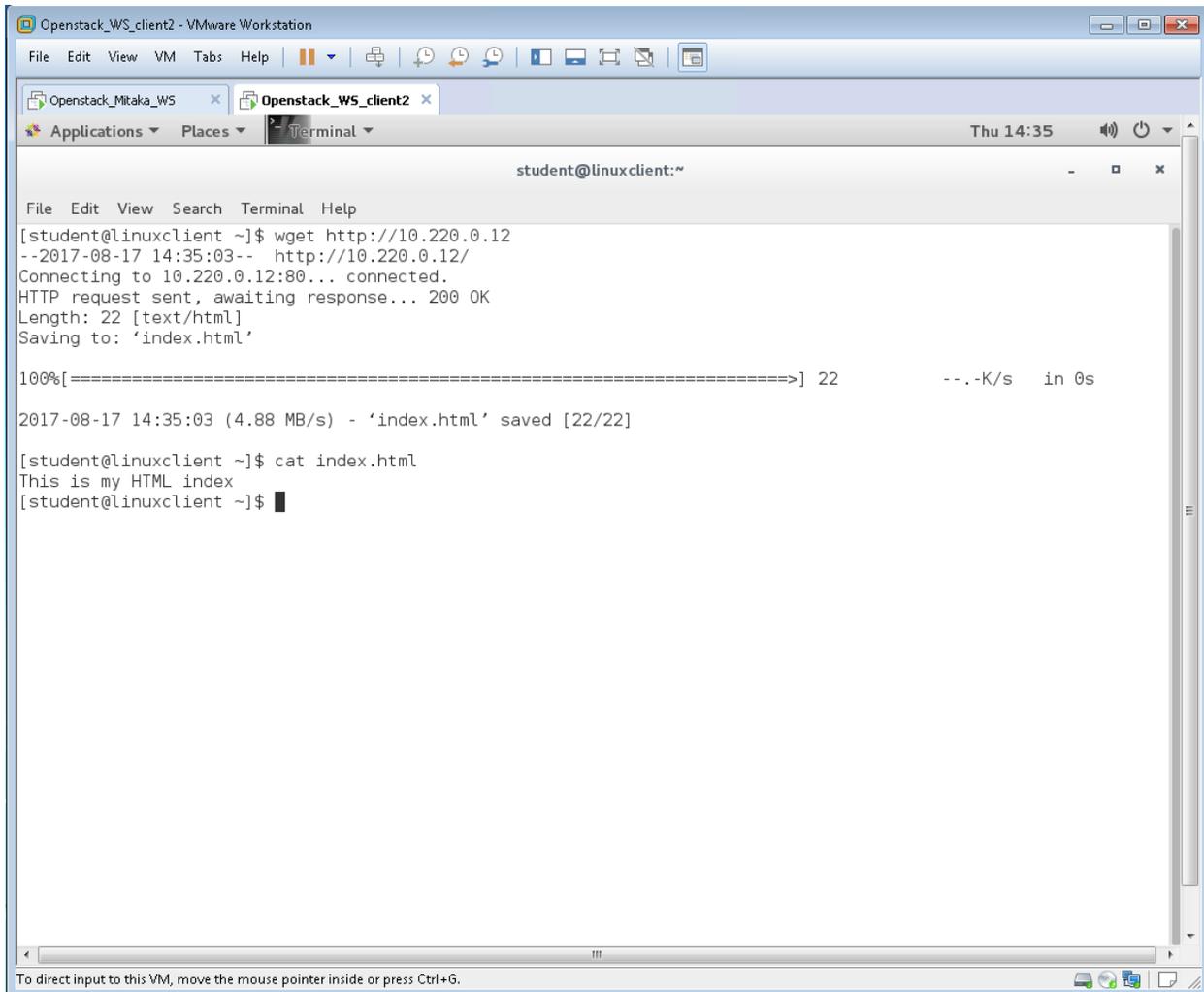


Module 8: Launch a CentOS 7 instance with a customization script



6. **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.

Module 8: Launch a CentOS 7 instance with a customization script



The screenshot shows a terminal window titled 'student@linuxclient:~' within a VMware Workstation environment. The terminal displays the following output:

```
File Edit View Search Terminal Help
[student@linuxclient ~]$ wget http://10.220.0.12
--2017-08-17 14:35:03-- http://10.220.0.12/
Connecting to 10.220.0.12:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 22 [text/html]
Saving to: 'index.html'

100%[=====] 22      ---K/s   in 0s

2017-08-17 14:35:03 (4.88 MB/s) - 'index.html' saved [22/22]

[student@linuxclient ~]$ cat index.html
This is my HTML index
[student@linuxclient ~]$
```

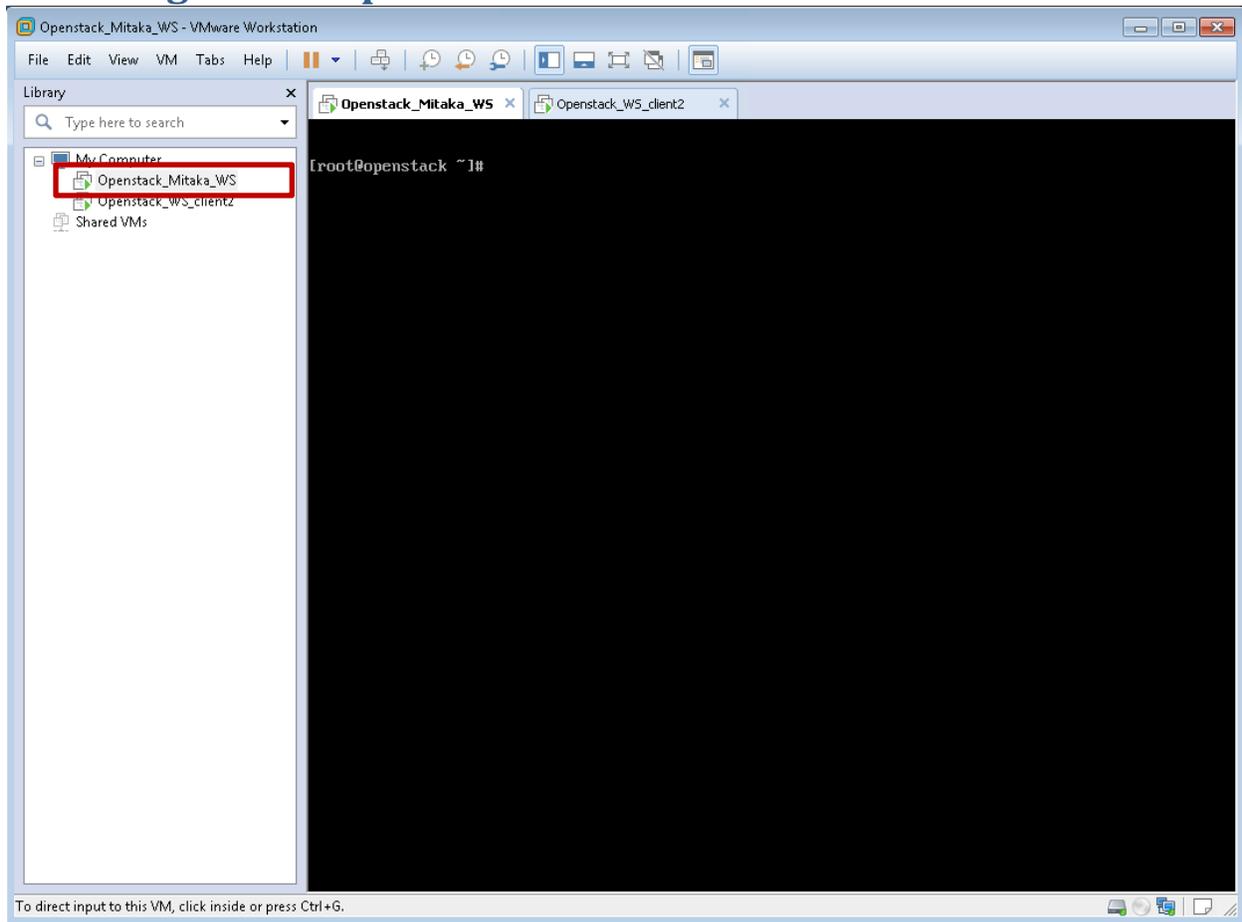
7. Alternatively, you can use the **\$ wget http://10.220.0.12** and **cat index.html** commands to verify that the CentOS 7 customization script installed the `httpd.service` and created an index page.

Note: The `wget` command was run from the `Openstack_WS_client2` VM, not the CentOS 7 instance.

Continue to the grade script.



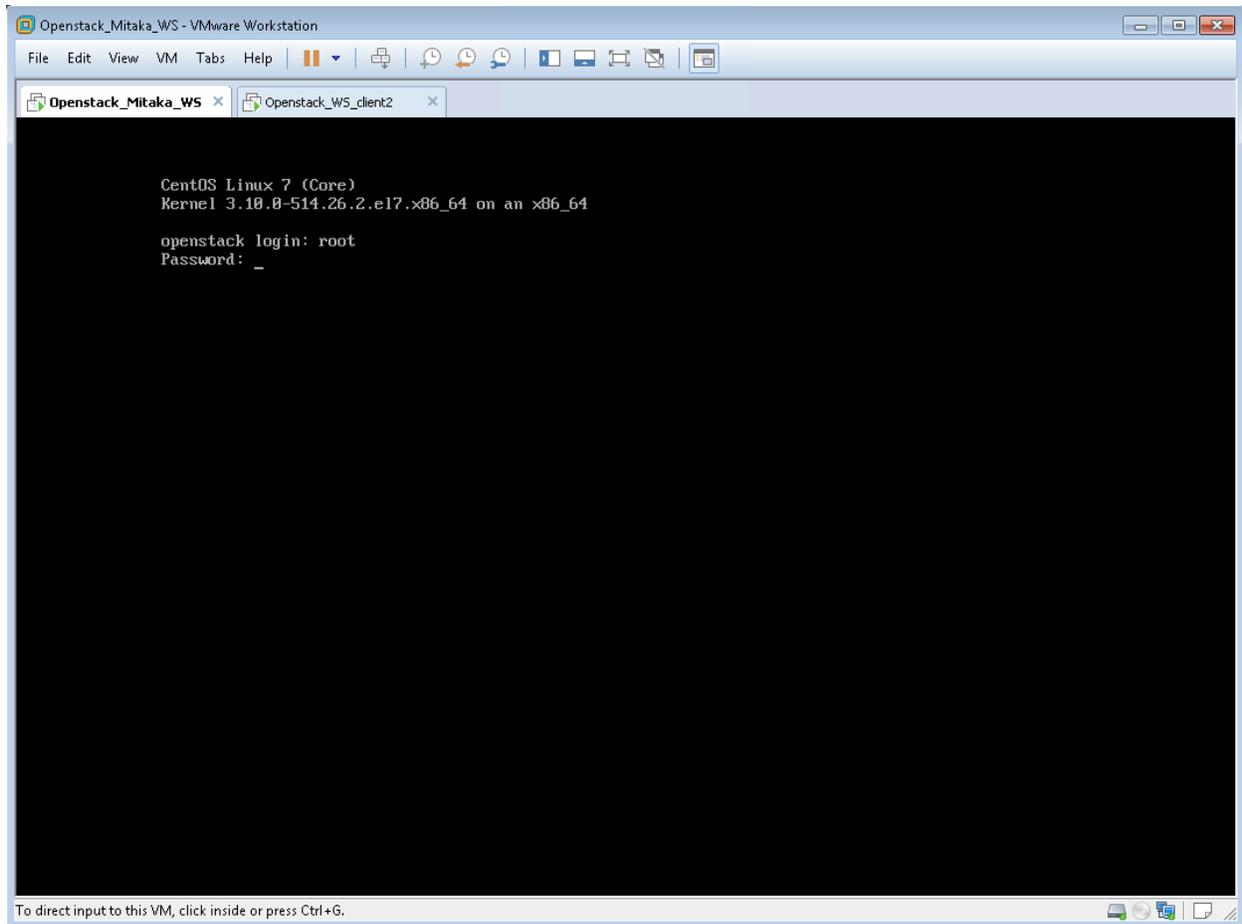
Run the grade script



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

Module 8: Launch a CentOS 7 instance with a customization script

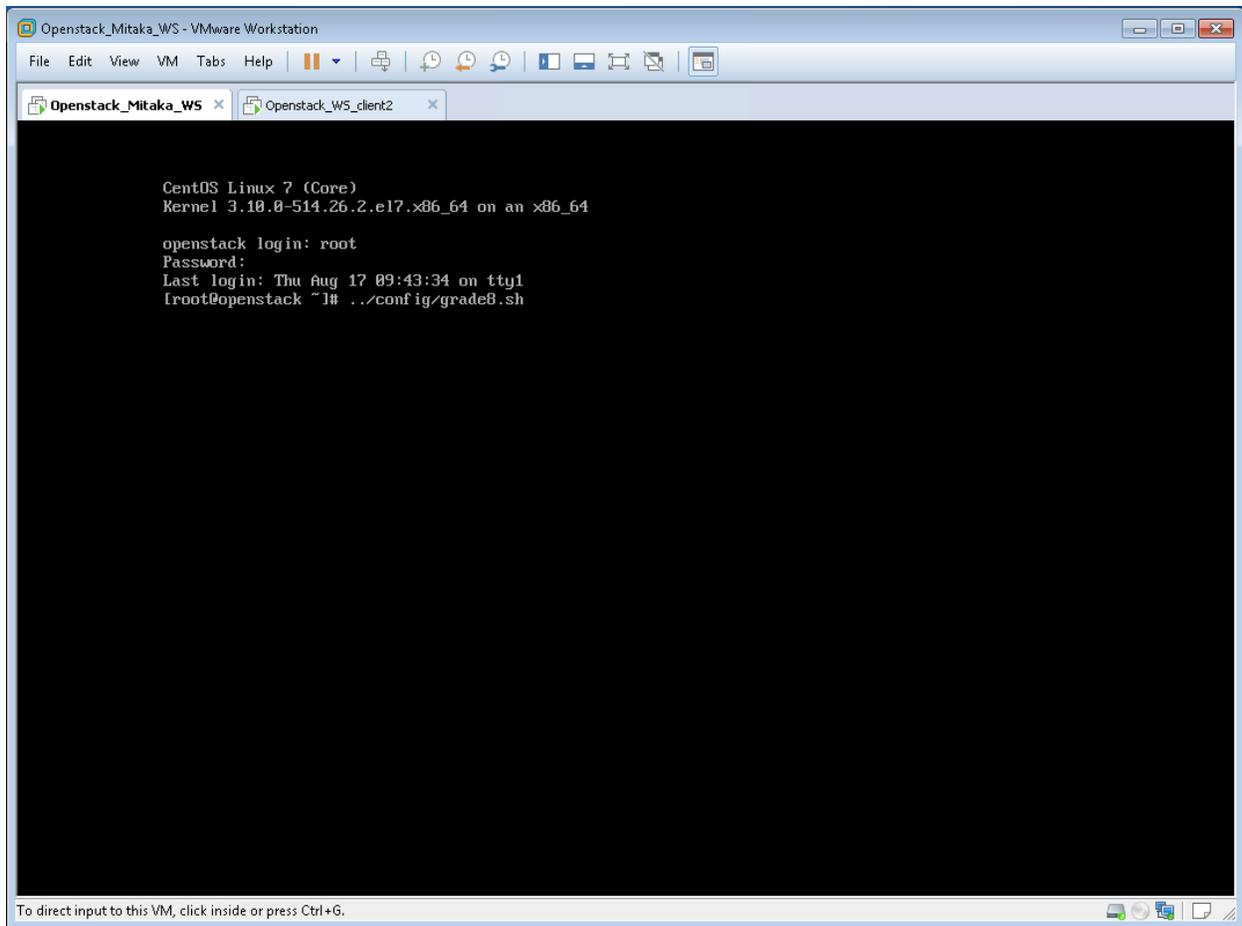


2. Log in as root with the Password: P@ssword

Note: The password is NOT visible as you type it



Module 8: Launch a CentOS 7 instance with a customization script



The screenshot shows a VMware Workstation window titled "Openstack_Mitaka_WS - VMware Workstation". The window contains two tabs: "Openstack_Mitaka_WS" and "Openstack_WS_client2". The active tab displays a terminal window with the following text:

```
CentOS Linux 7 (Core)
Kernel 3.10.0-514.26.2.el7.x86_64 on an x86_64

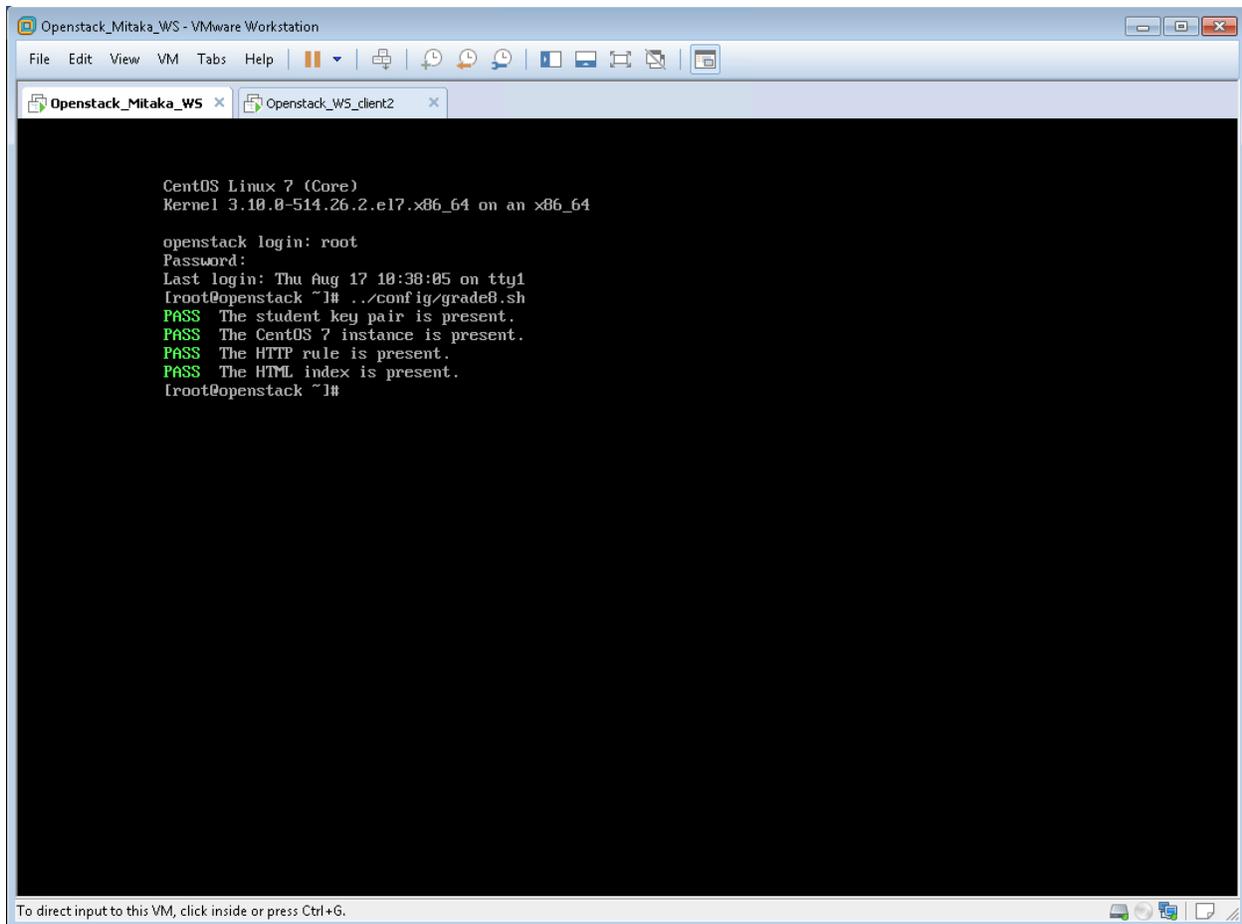
openstack login: root
Password:
Last login: Thu Aug 17 09:43:34 on tty1
[root@openstack ~]# ../config/grade8.sh
```

At the bottom of the terminal window, there is a status bar that reads: "To direct input to this VM, click inside or press Ctrl+G."

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



Module 8: Launch a CentOS 7 instance with a customization script



```
CentOS Linux 7 (Core)
Kernel 3.10.0-514.26.2.el7.x86_64 on an x86_64

openstack login: root
Password:
Last login: Thu Aug 17 10:38:05 on tty1
[root@openstack ~]# ./config/grade8.sh
PASS The student key pair is present.
PASS The CentOS 7 instance is present.
PASS The HTTP rule is present.
PASS The HTML index is present.
[root@openstack ~]#
```

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 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.

