# IST198 OpenStack Administration

Version 1: 2017-08-18

These exercises will guide the student through the concepts and topics learned in chapter 9, launch a CentOS 7 instance with a customization script and manage attached volumes

## Launch a CentOS 7 Instance with a customization script and manage volumes

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

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

# Module Objectives

## Learner will be able to:

- Launch a CentOS 7 Instance with a customization script from the OpenStack Dashboard and manage volumes.

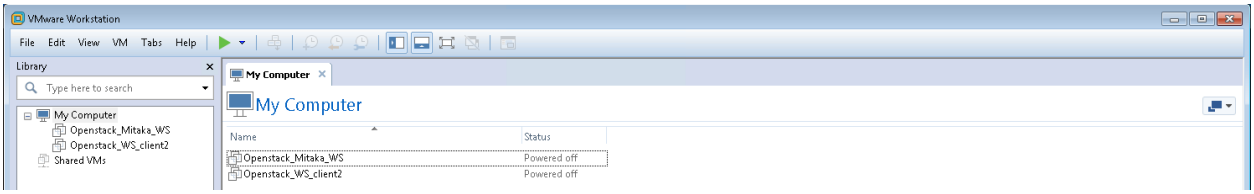
## Labs 22-24

These labs will guide the student through launching a CentOS 7 Instance with a customization script, creating a volume, attaching the volume, creating data on the volume, and moving the volume, with its data, to a new CentOS 7 instance.

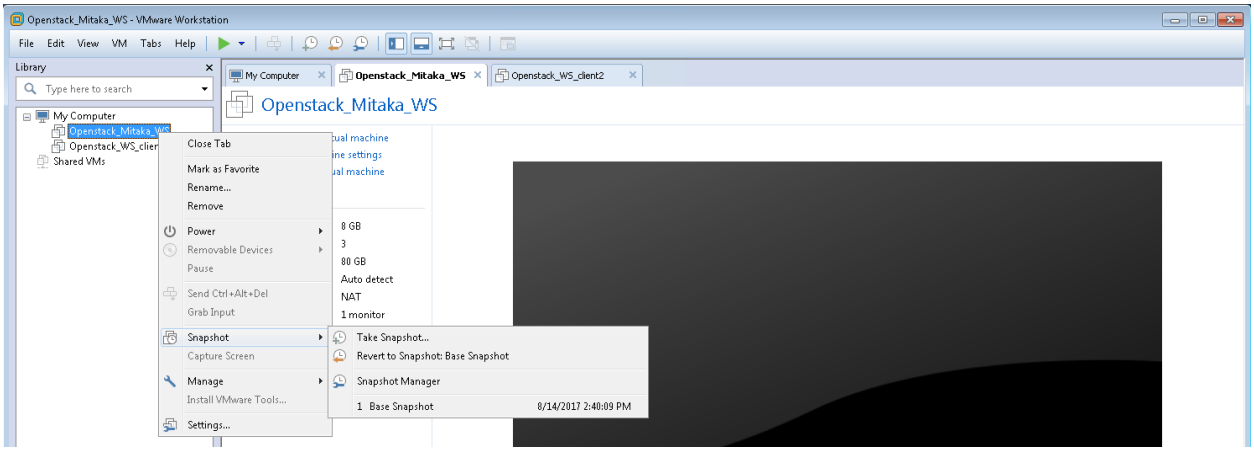
**(Note: This lab is designed to be completed on an NDG NETLAB System with the IST198_OpenStack_HXXX POD installed. The labs can also be completed on a physical machine with the appropriate software packages installed, or a PC that has VMware Workstation installed with the appropriate virtual machines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

# Prepare the OpenStack Virtual Machines

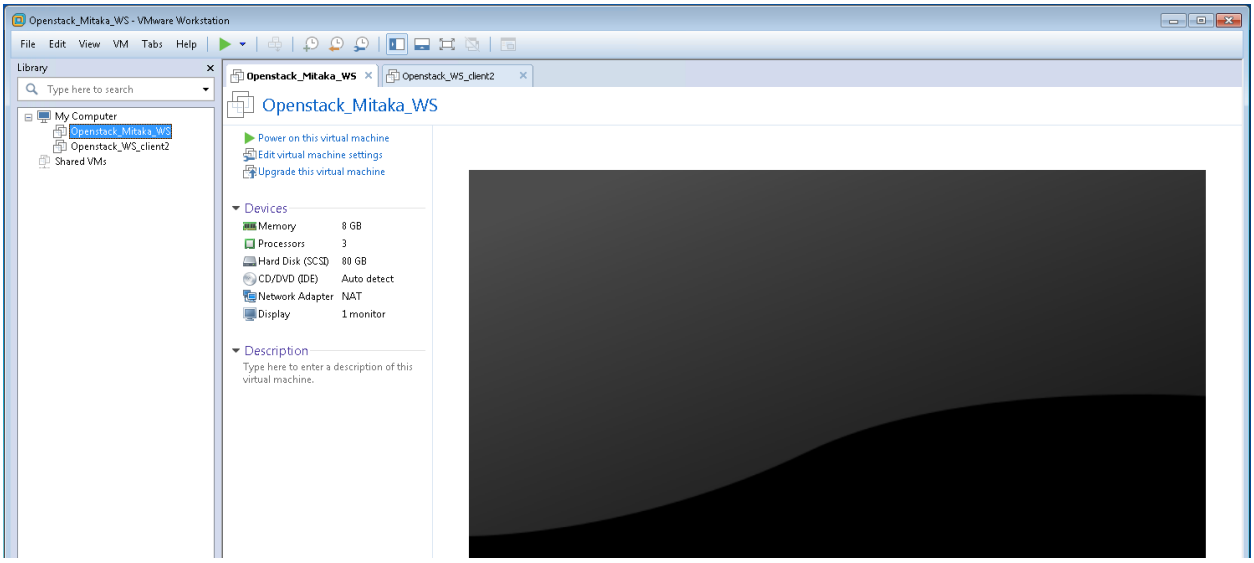

1. **Launch** the **VMware Workstation Pro application**




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.




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 the final field visit to XYZ Company. During this visit, you will assist the customer in creating a CentOS 7 and CentOS7#2 instance, creating a volume with data, and attach that volume to the instances.

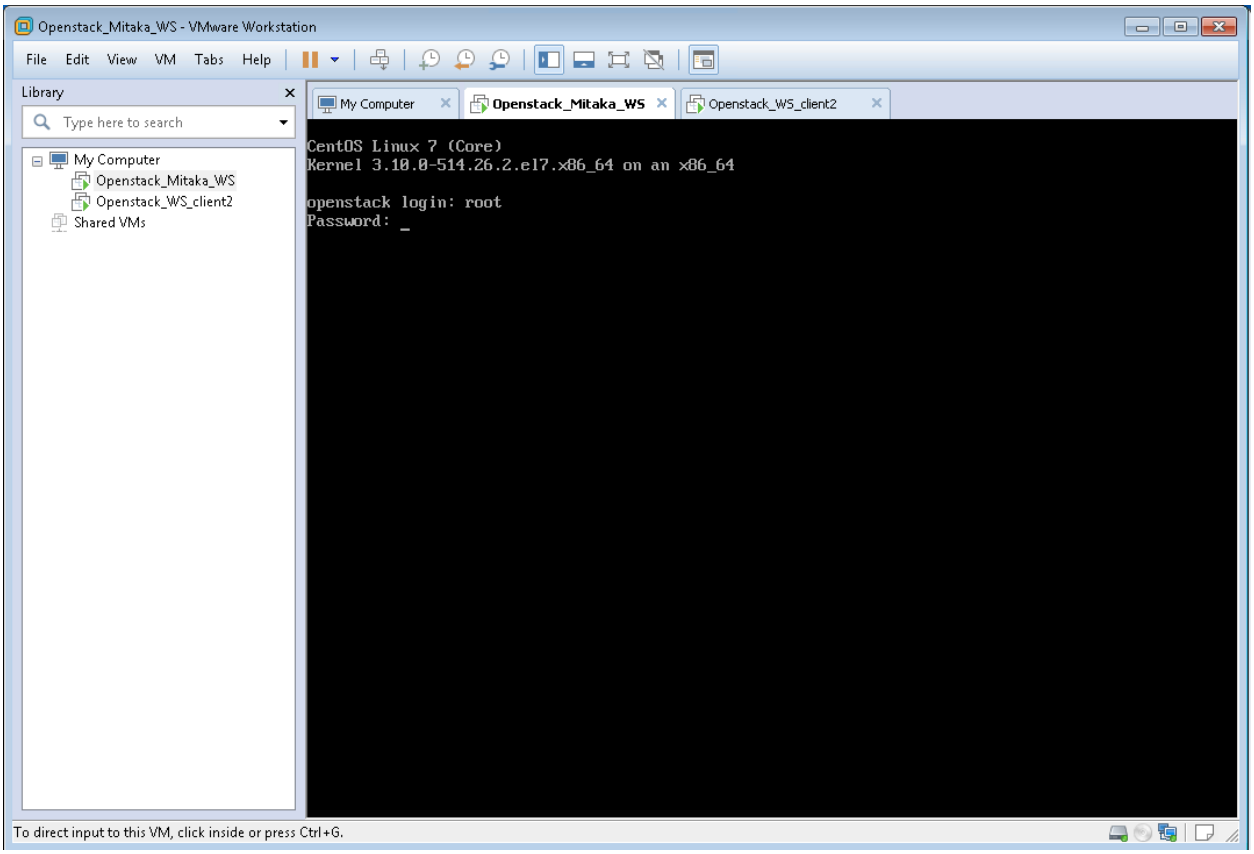
## Lab Settings

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 |

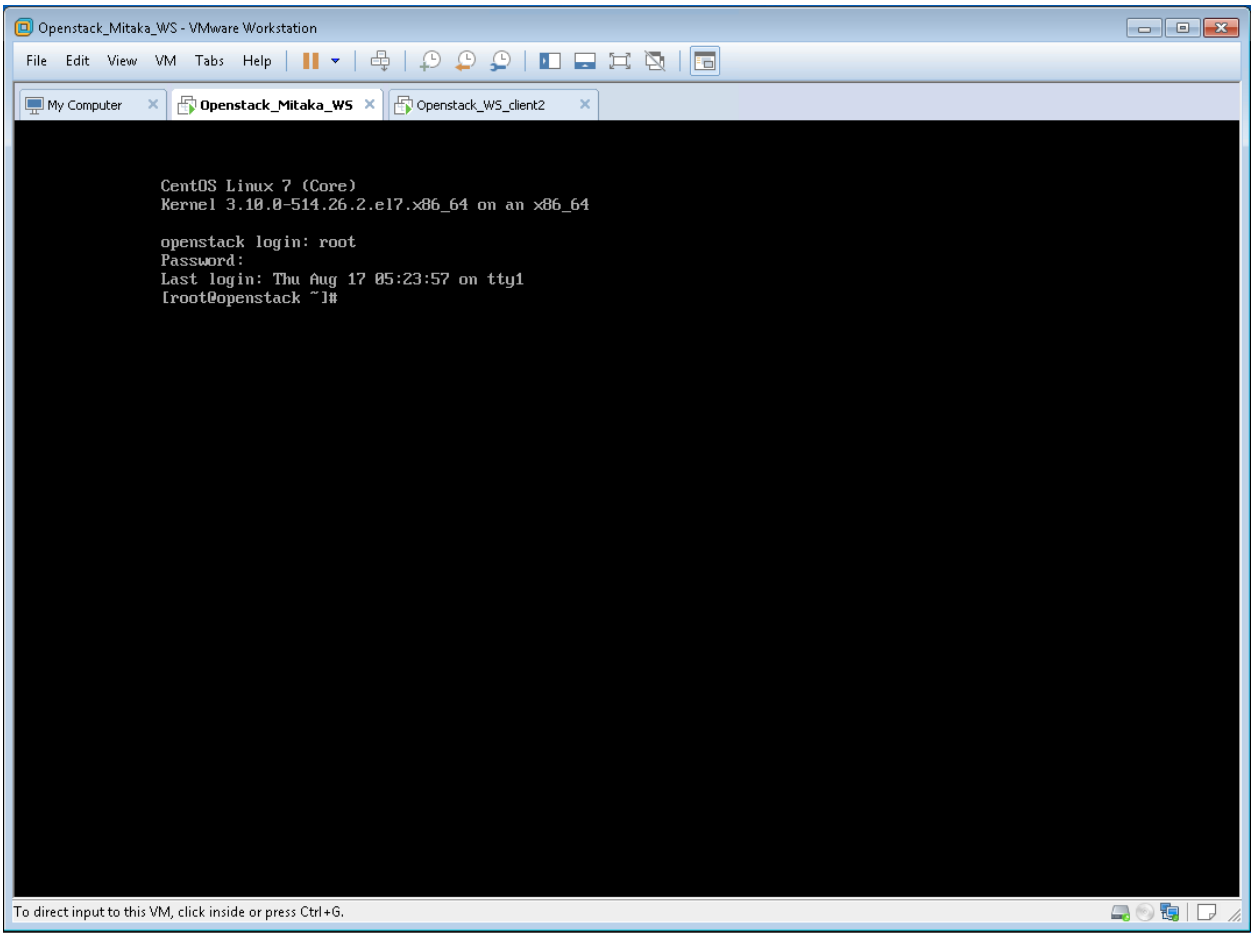
Note: The OpenStack PODs are Normal PODs, in NDG terminology, which means they revert to a snapshot after you are finished with the Lab(s), e.g. click I'M DONE on the Lab Topology. This means that you can explore or experiment without fear of damaging the POD. If you make a mistake that you can't recover 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

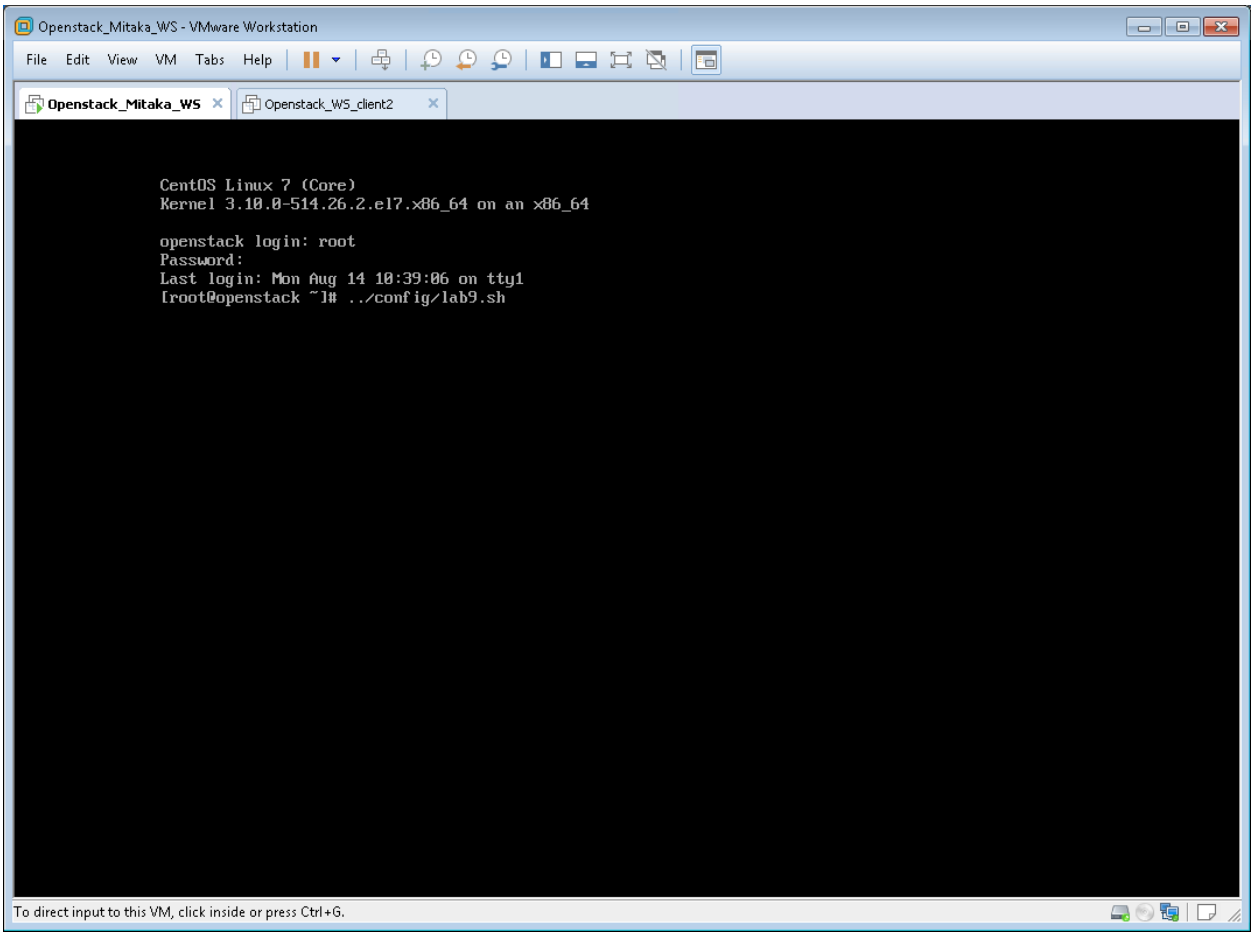



1. Log in as **root** with the Password: **P@ssword**

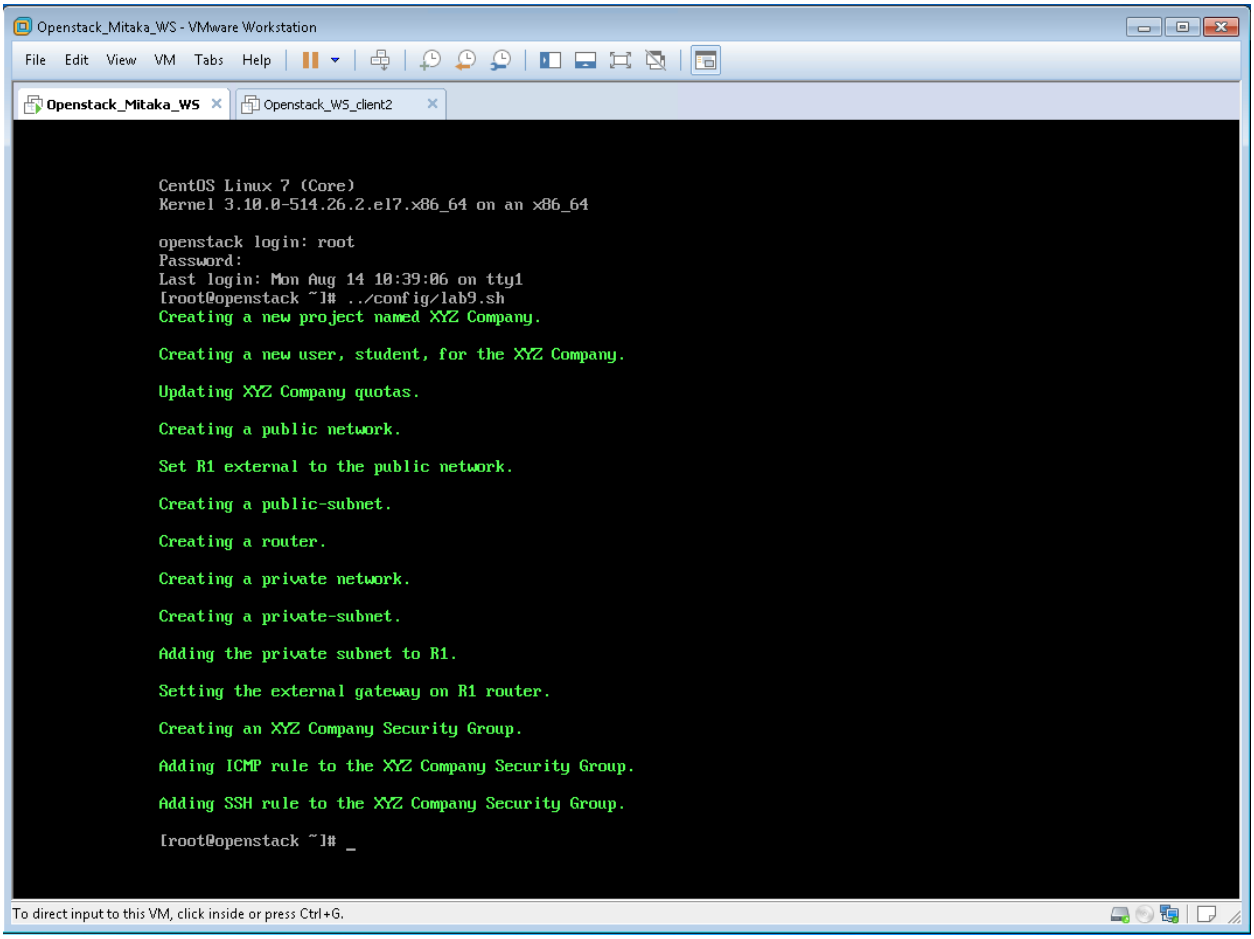
   Note: The password is NOT visible as you type it




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



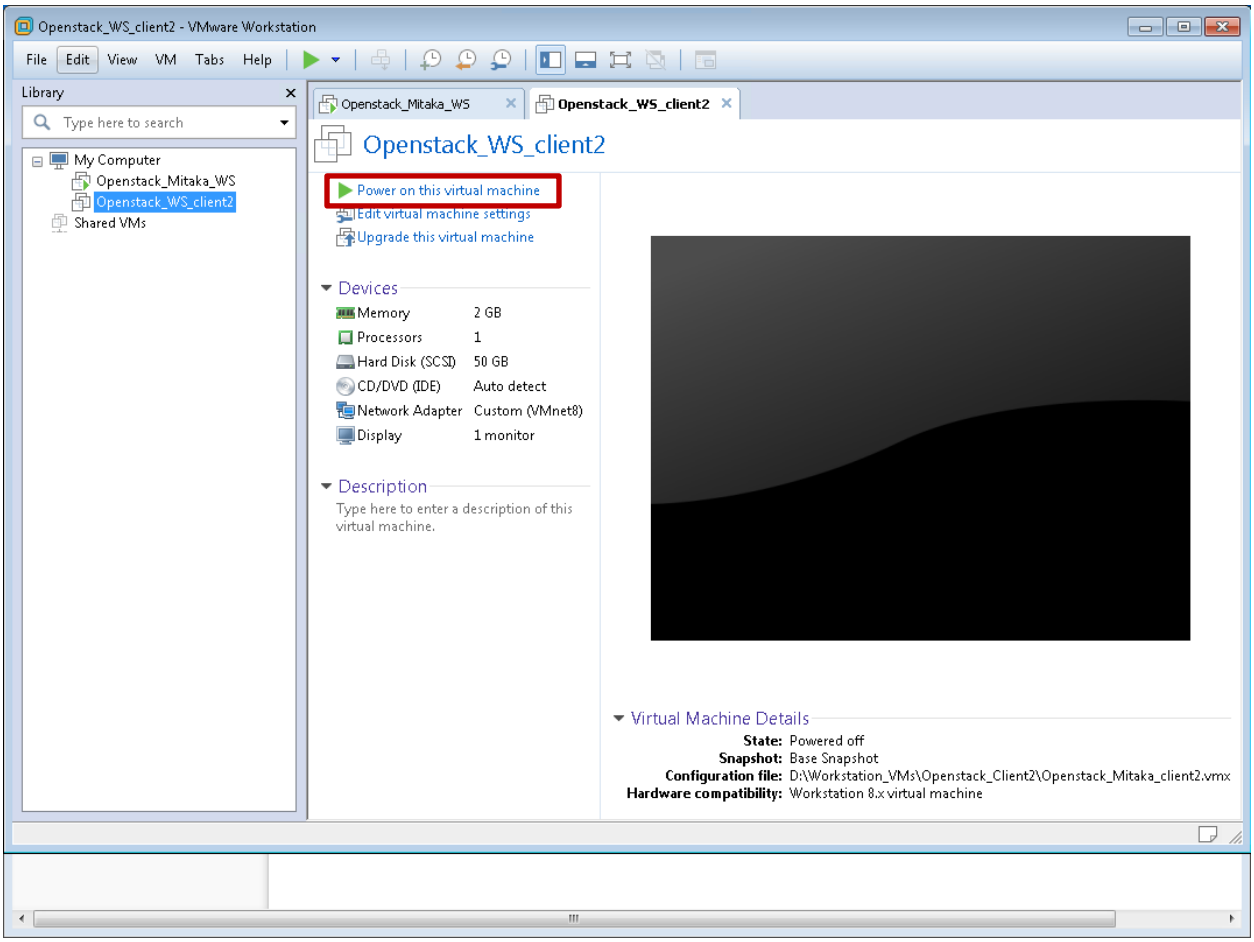

3. Type the command; **../config/lab9.sh** and **press Enter** as shown in the screen capture above to run the Module 9 setup script




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

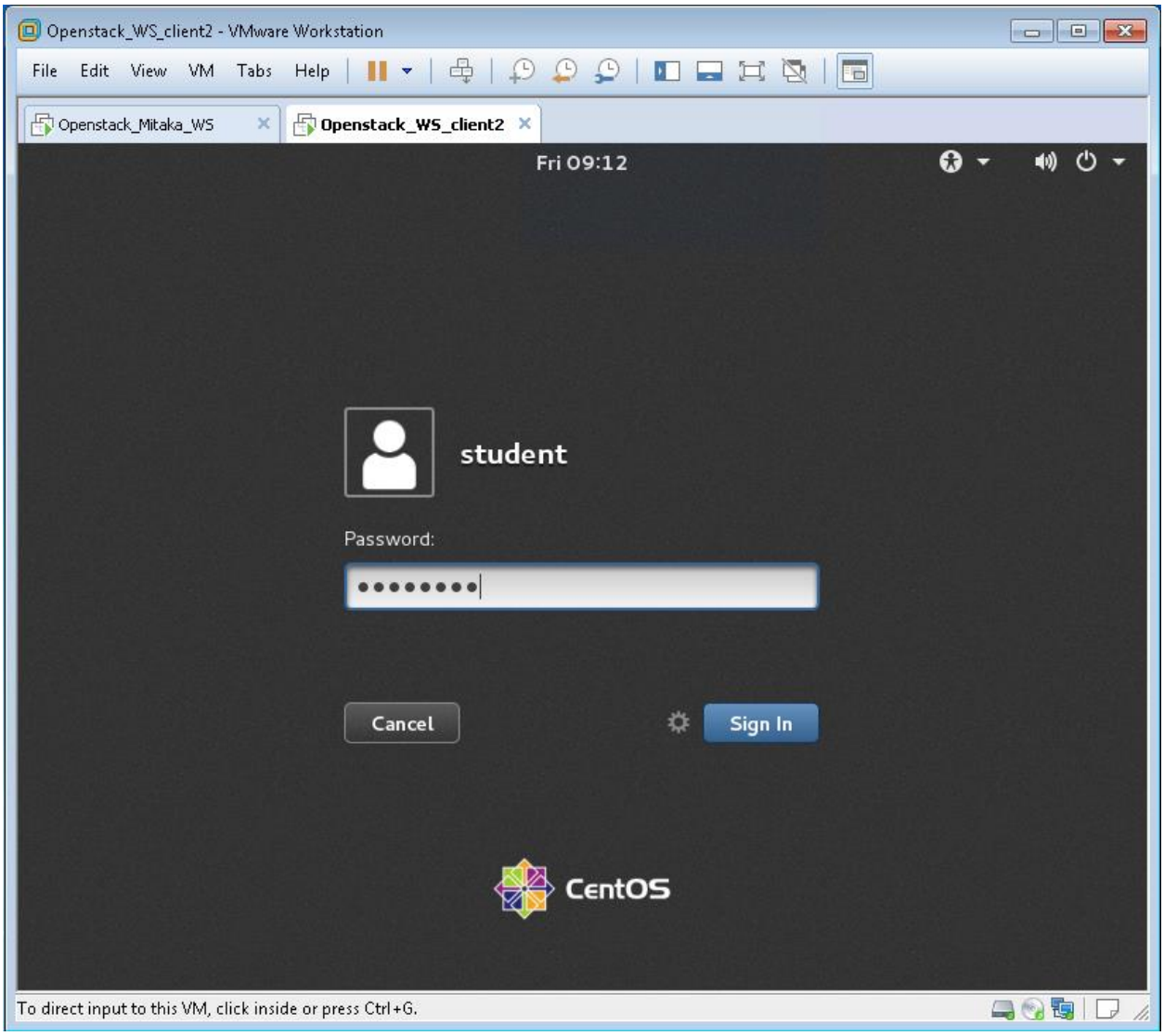
Note: The script is complete when the **[root@openstack ~]#** prompt returns

# Access the OpenStack Dashboard



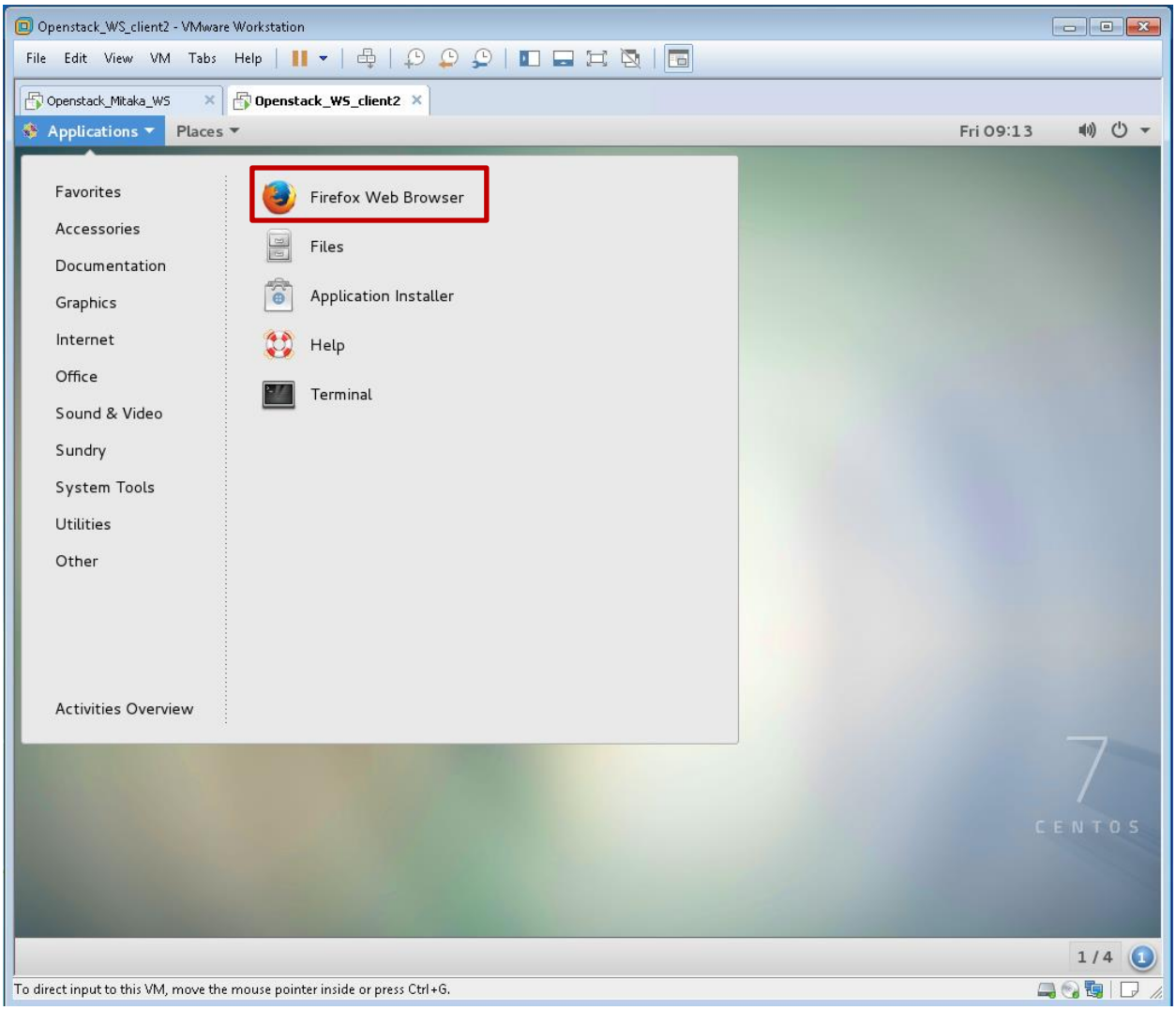

1. **Power on** the **Openstack_WS_client2 VM** in Workstation.

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

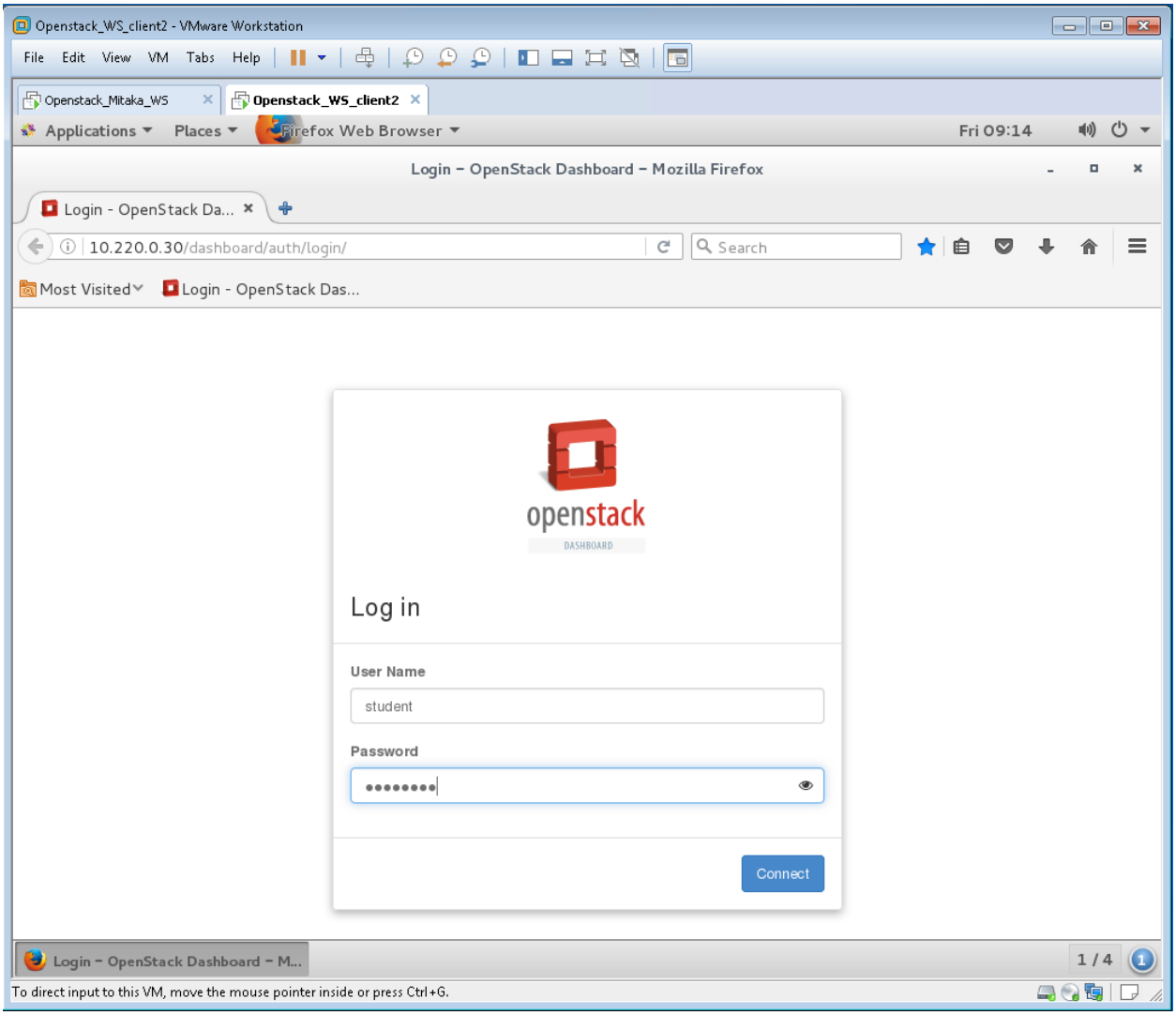



2. **Enter** the password of **P@ssword** to access the CentOS 7 Client virtual machine.

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




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

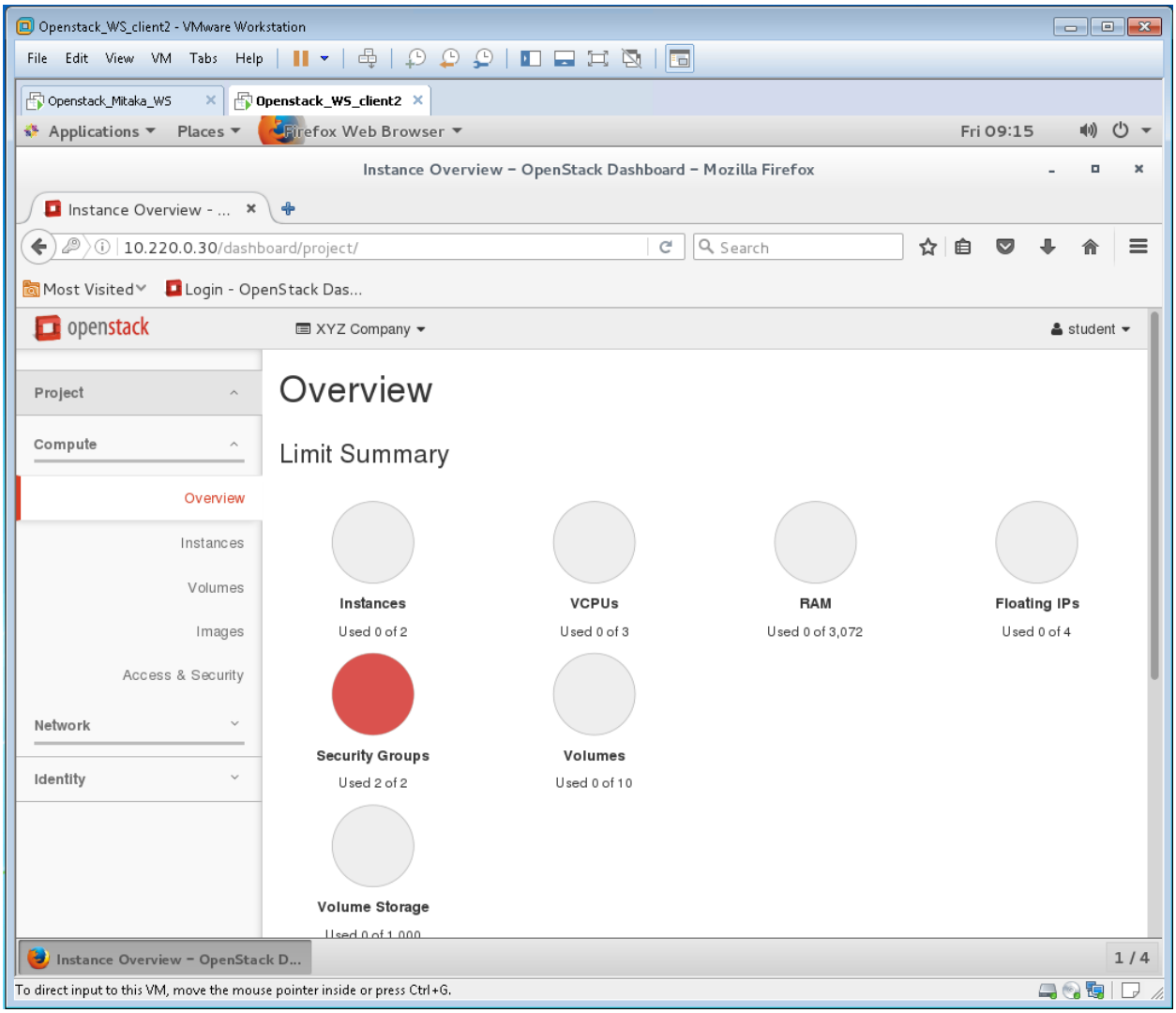



4. **Login** to the OpenStack Dashboard with the username **Student** and **P@ssword** and press **enter** or **click Connect**.

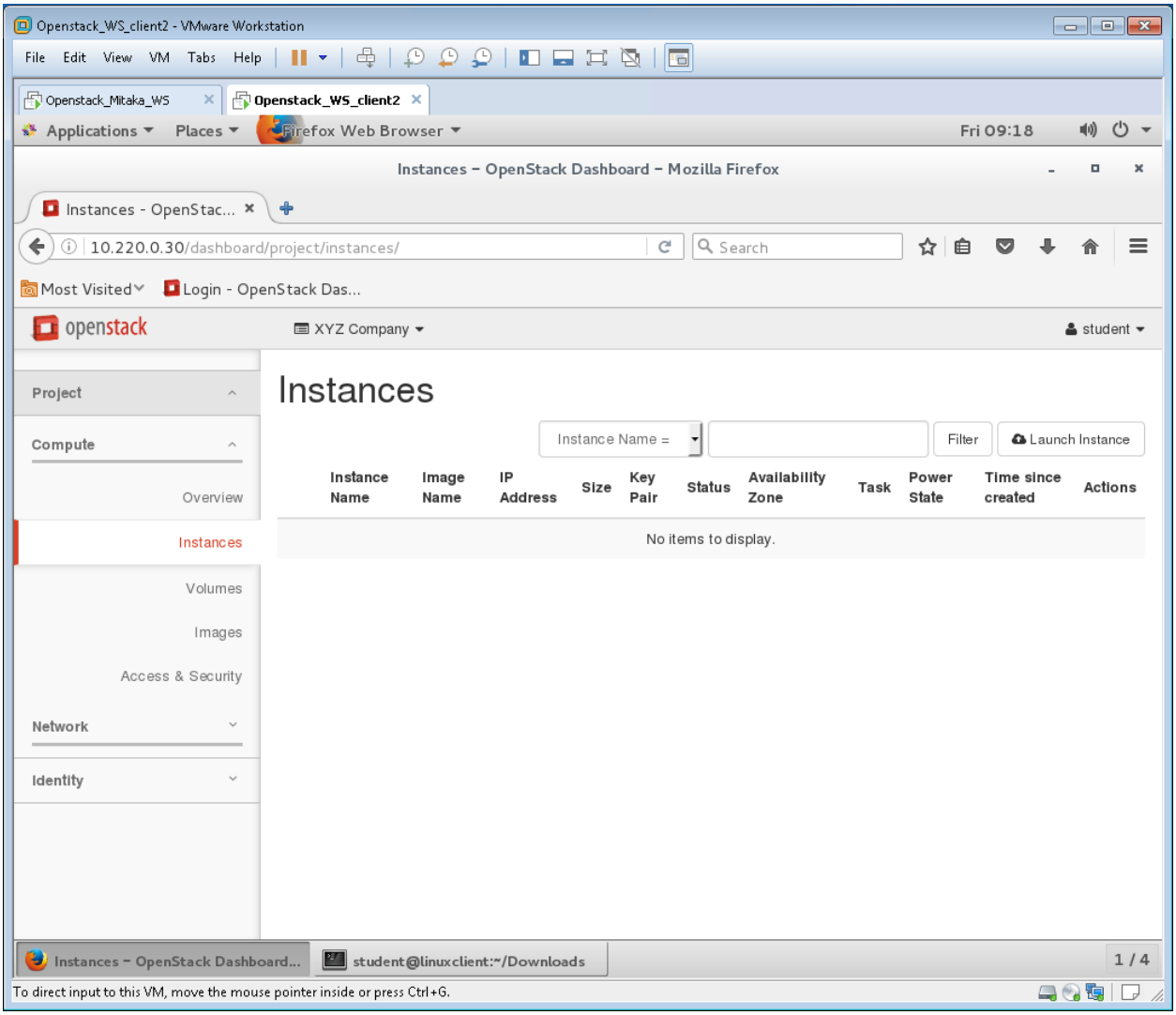
   Note: User Name entries are not case sensitive, passwords are.

   Note: In the Openstack_WS_client2 VMs the Firefox home page is set to open the OpenStack Dashboard Login page.

# Lab 22: Launch a CentOS 7 instance with a customization script

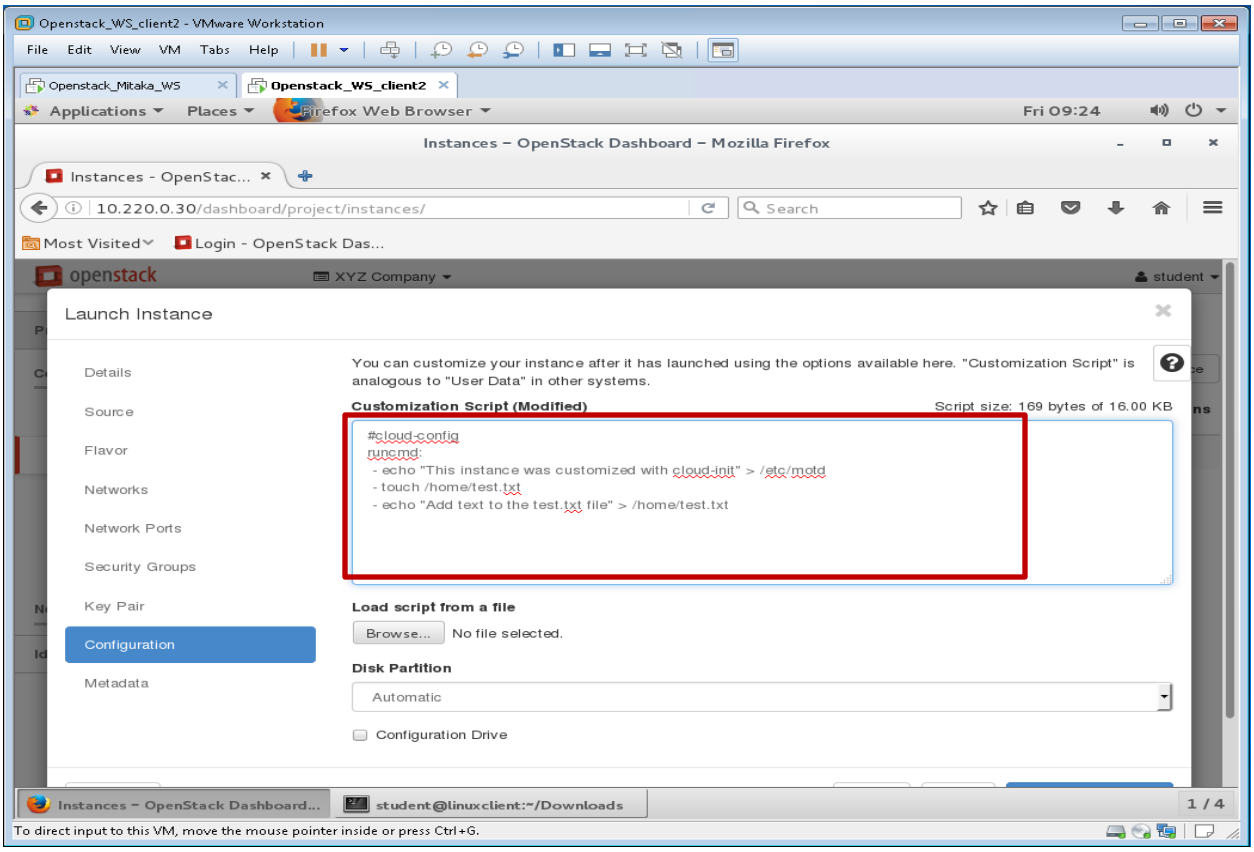



1. Using the command line, extract the public key from the private key file, using the techniques learned in the previous lab.




2. 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!

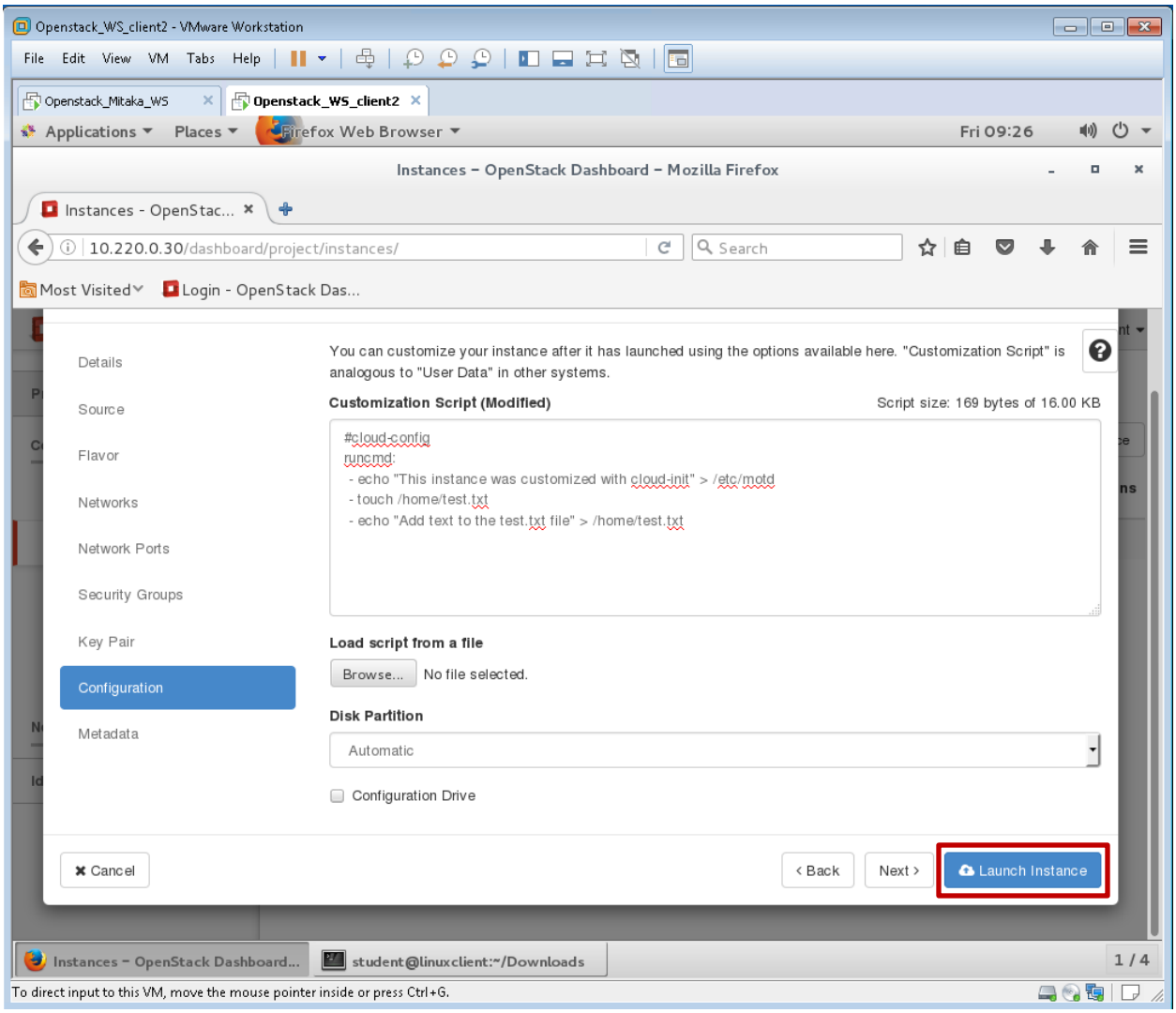
| | |
|---|---|
| Instance Name | CentOS 7 |
| Source | CentOS (see next page for more information) |
| Flavor | m1.small |
| Network | Private |
| Security Group | XYZ Company |
| Key Pair | Student |
| Configuration | Customization script |
| Floating IP Address | 10.220.0.12 |



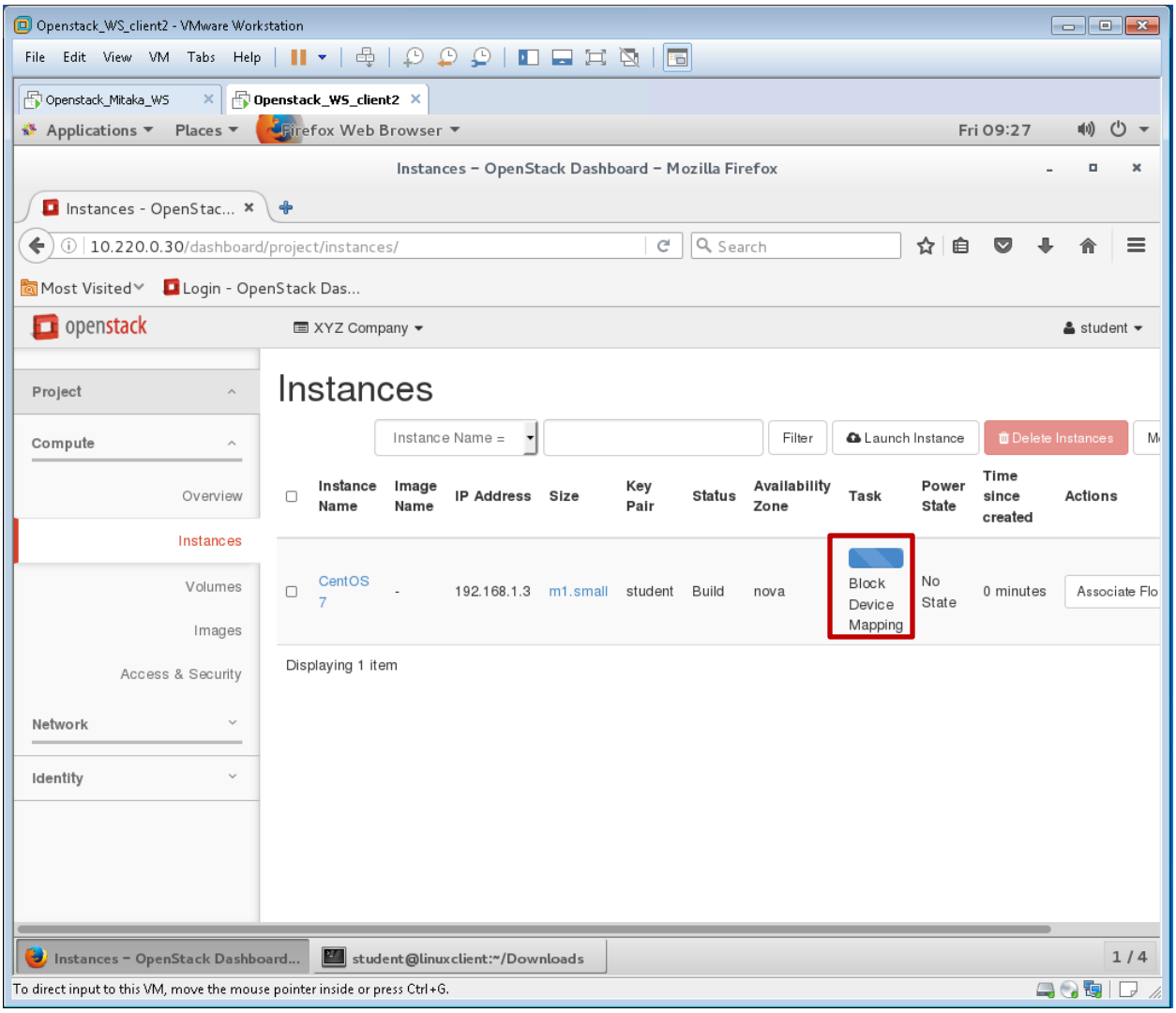

3. **Configuration:** After entering the information into the Details through Key Pair tabs, continue to the Configuration tab where you will enter the commands listed below needed to customize this instance. This is similar to the user_data.txt file that was used in the previous lab.

```
#cloud-config
runcmd:
 - echo “This instance was customized with cloud-init” > /etc/motd
 - touch /home/test.txt
 - echo “Add text to the test.txt file” > /home/test.txt
```

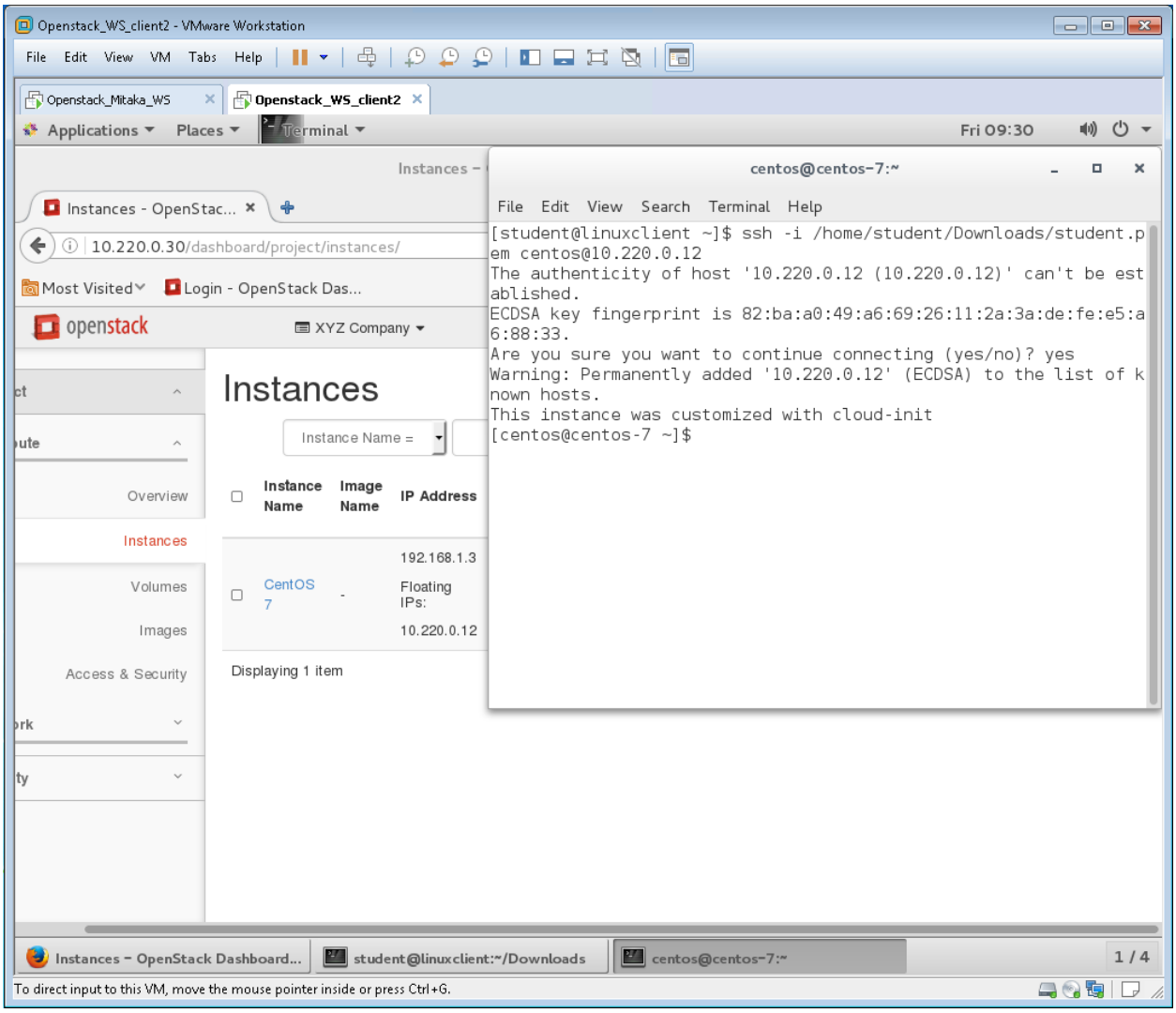
Note: The Customization Script commands are written in YAML syntax, which means that white space is critical and any stray white space will render the customization script useless. The first two commands, (**#cloud-config and runcmd:**), are aligned left and the remaining commands **contain a space before and after the hyphen**. If this is not clear, you can use the http://yamllint.com website on your internet connected host machine to verify the syntax before launching the instance.




4. **Click** on **Launch Instance**.

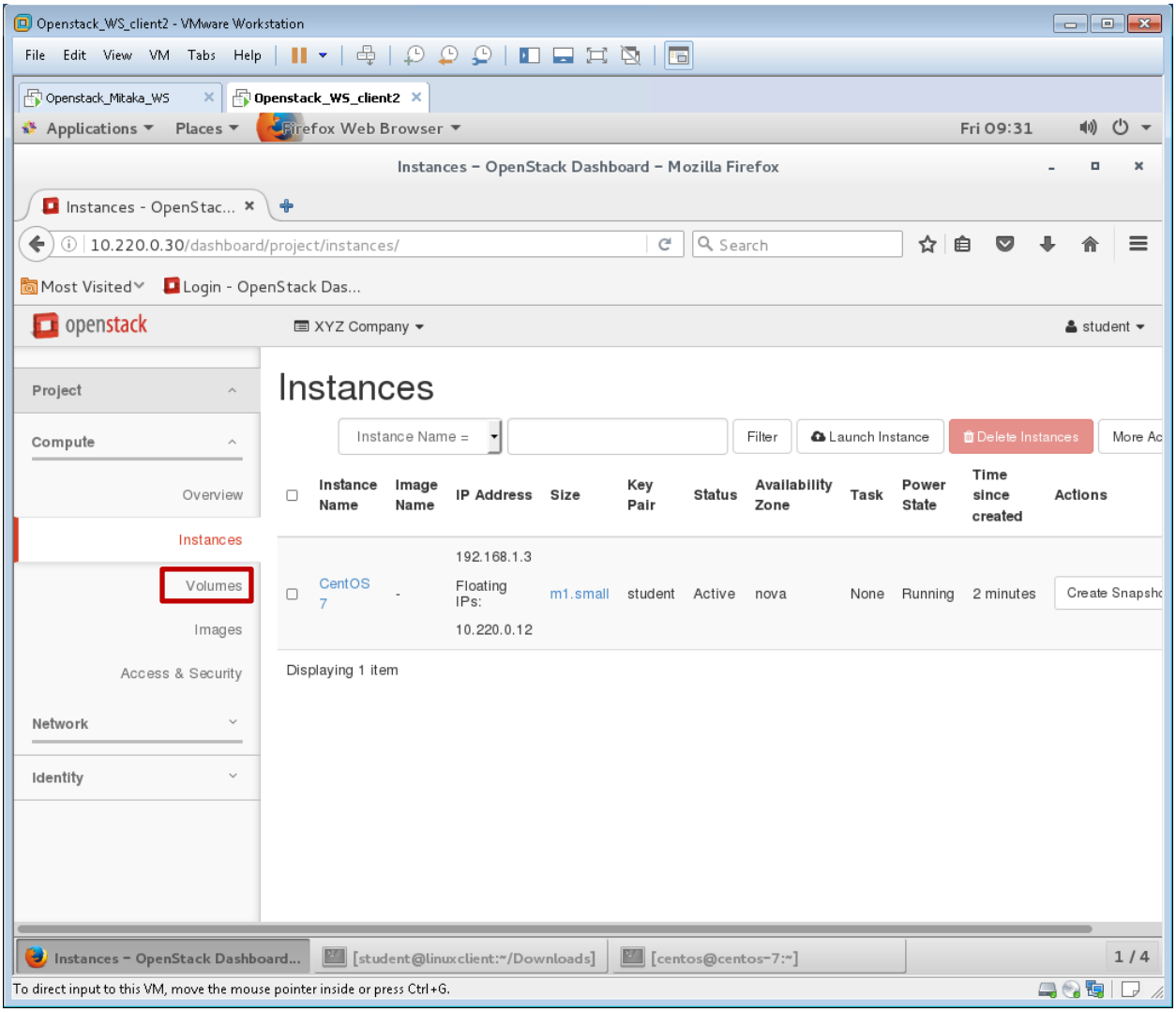



5. The CentOS 7 instance should begin spawning. Associate a Floating IP address to the instance after verifying that the installation has completed.

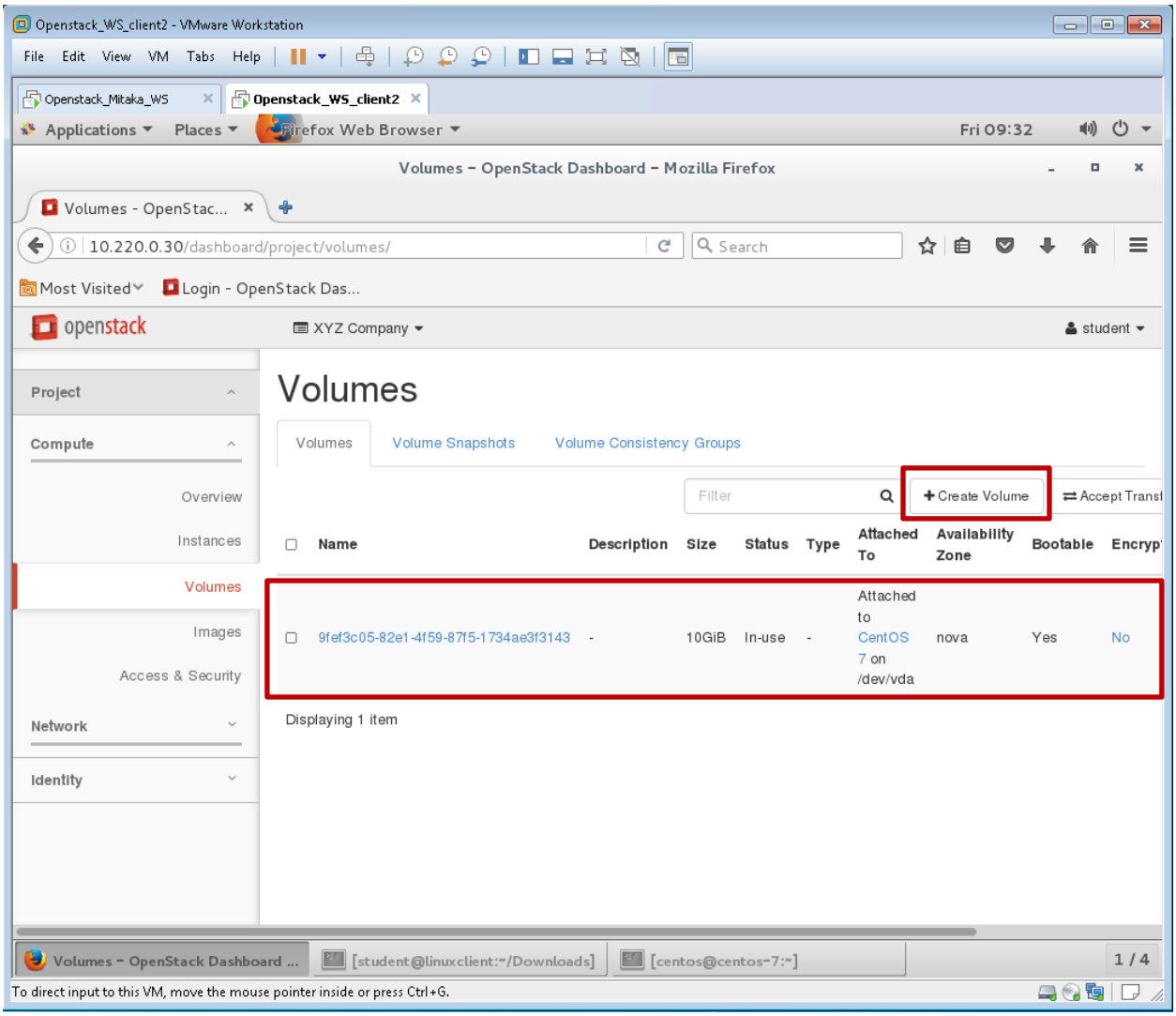



6. SSH into the CentOS 7 instance and you should see the “This instance was customized with cloud-init” MOTD, the test.txt file in the /home directory and the text string that was added to the test.txt file. If you do not see any of the information mentioned, then the most likely cause is a stray white space or two was present when typed the commands into the configuration page, delete the instance and try again. Continue to Lab 23.

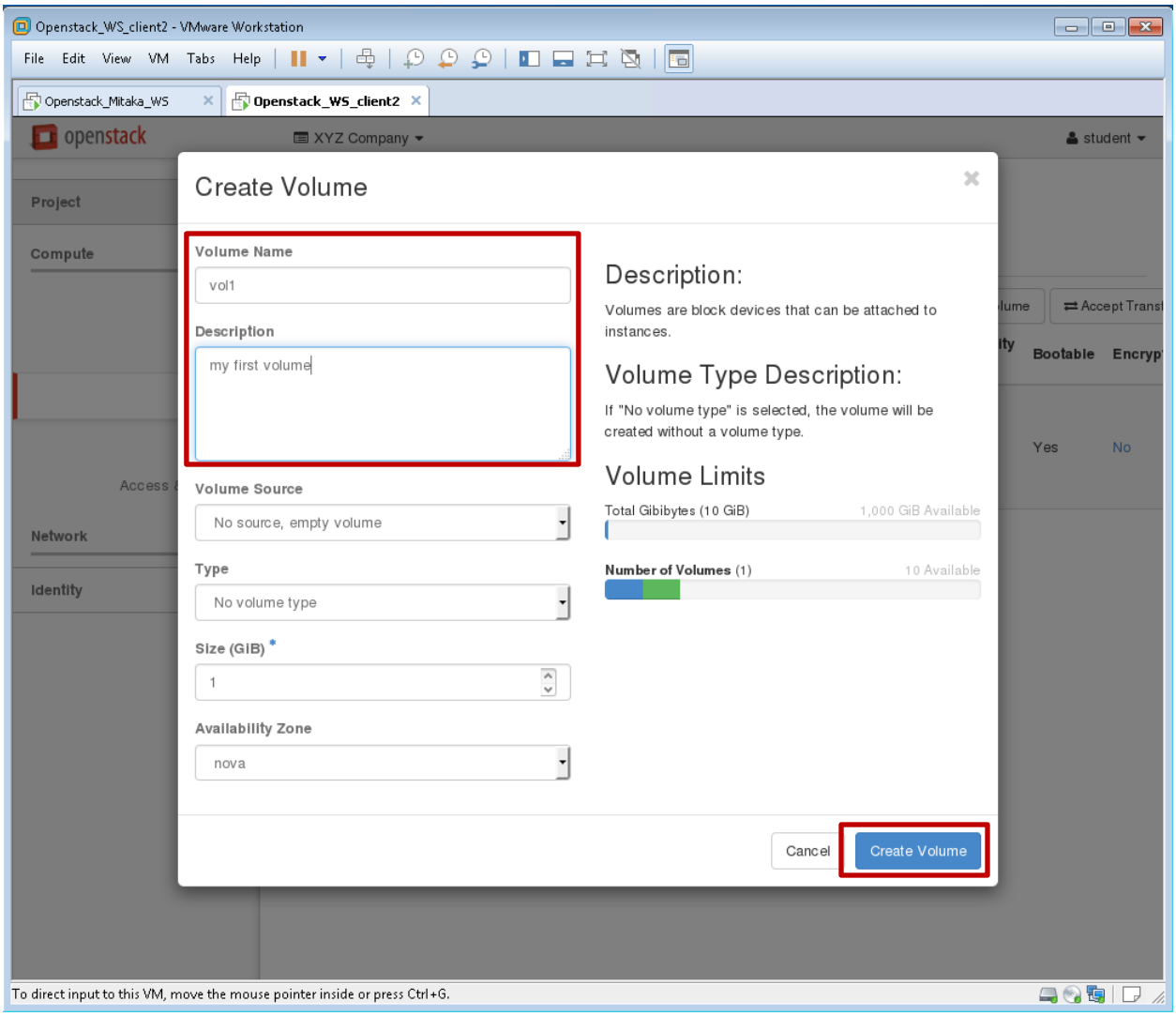
# Lab 23: Create a volume, attach it to the CentOS 7 instance, mount the volume and create some data on the volume



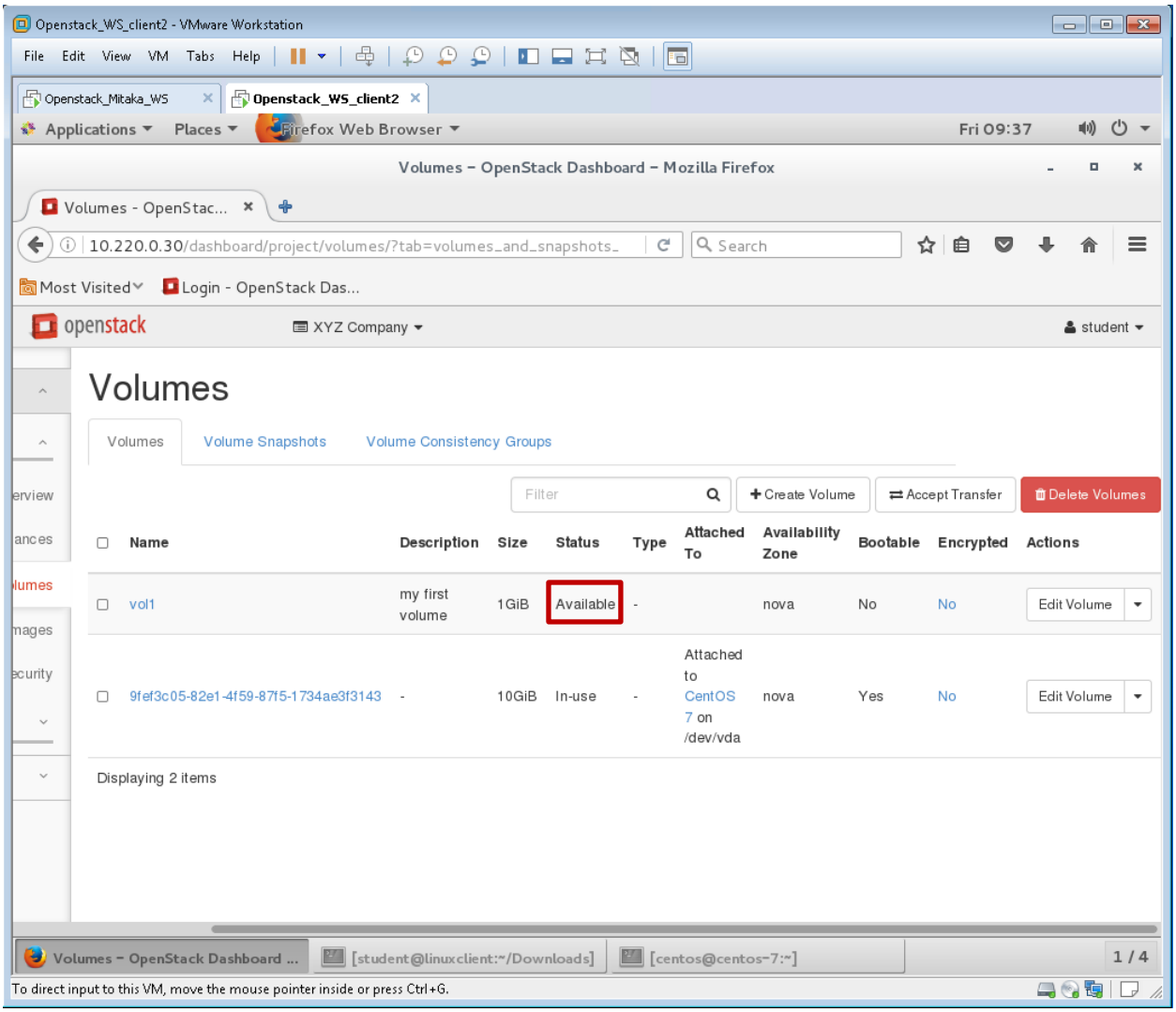

1. Return to the Openstack Dashboard on the client2 VM. **Click** on the **Volumes tab**.



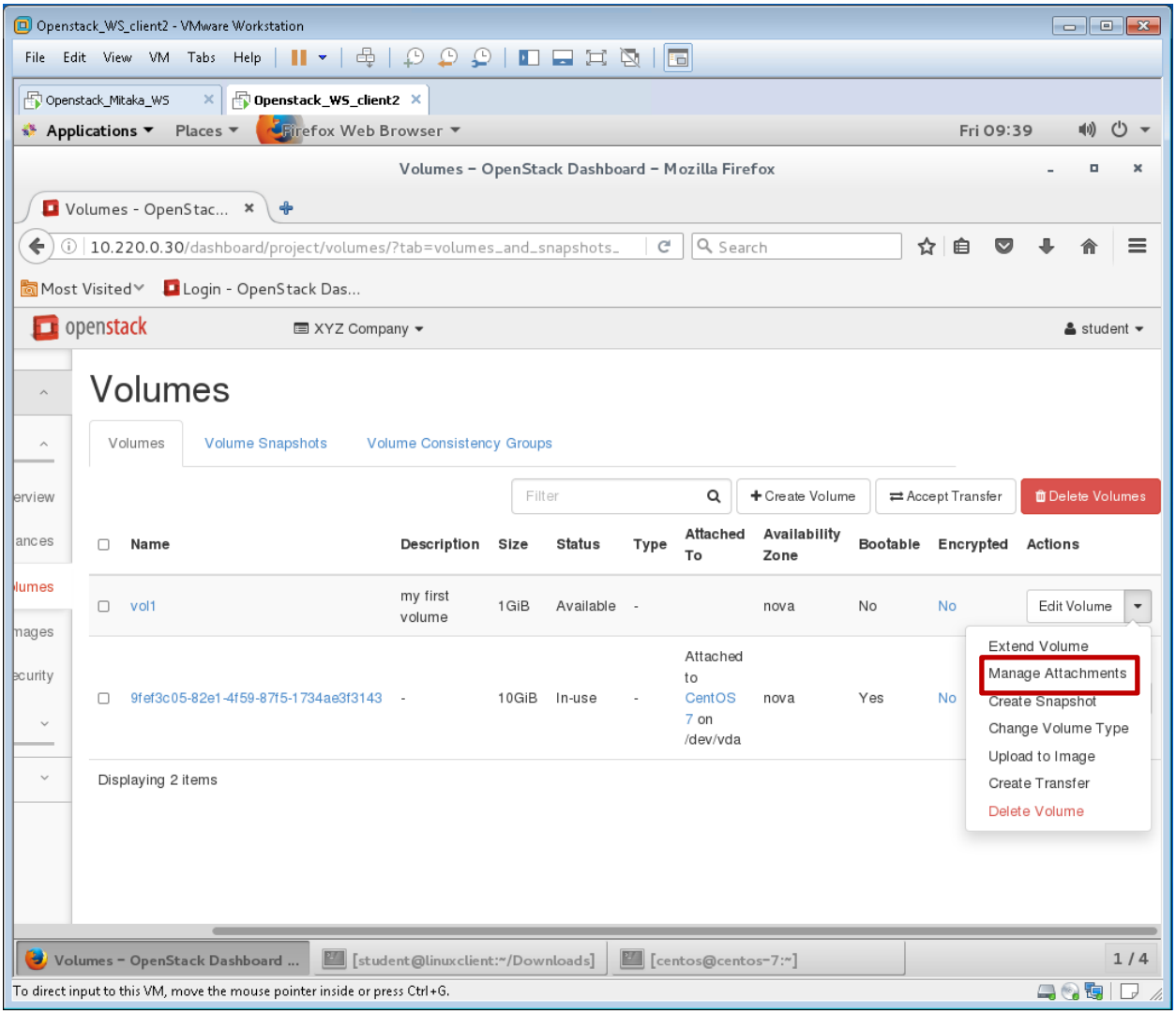

2. You should see the 10GB volume that was created for the CentOS 7 instance. **Click** on **Create Volume**.



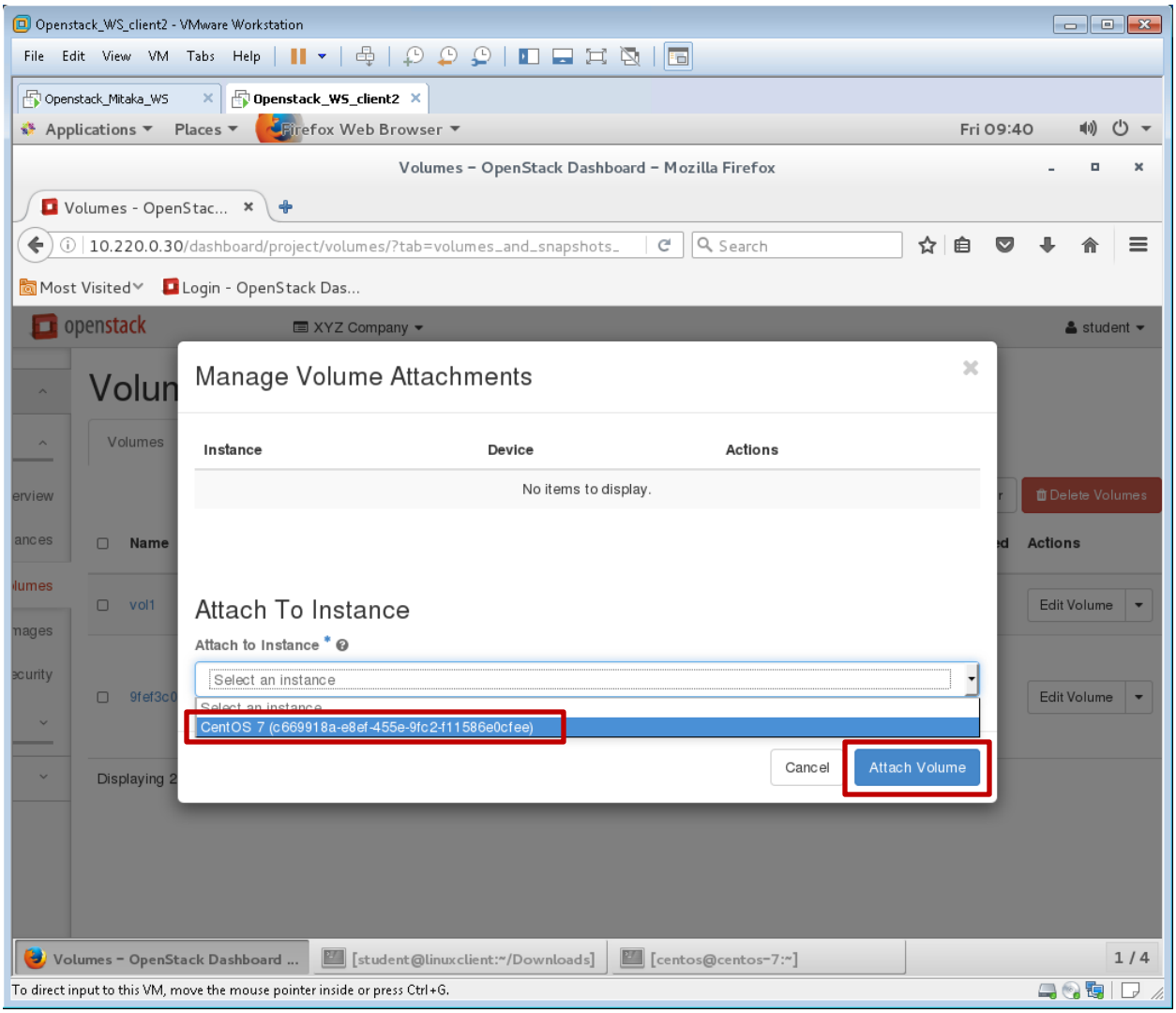

3. **Enter vol1** as the **Volume Name** and **add something to the Description block**, and leave the remaining blocks at their default settings. **Click Create Volume**.



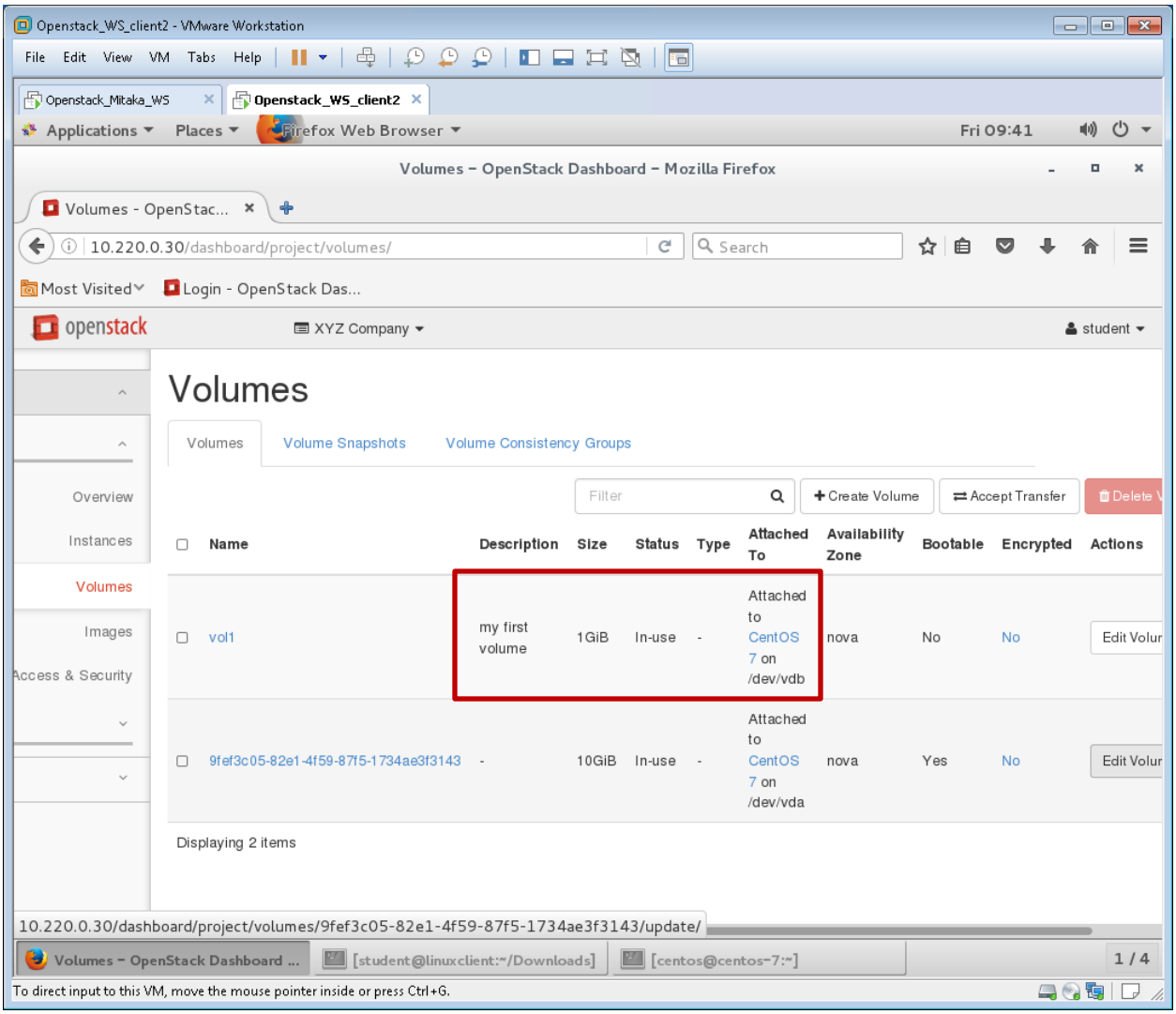

4. The **vol1** volume should appear and be marked as **Available** in the **Status column**. Select the dropdown menu on the vol1 row.




5. **Select Manage Attachments** from the Edit Volume dropdown menu.

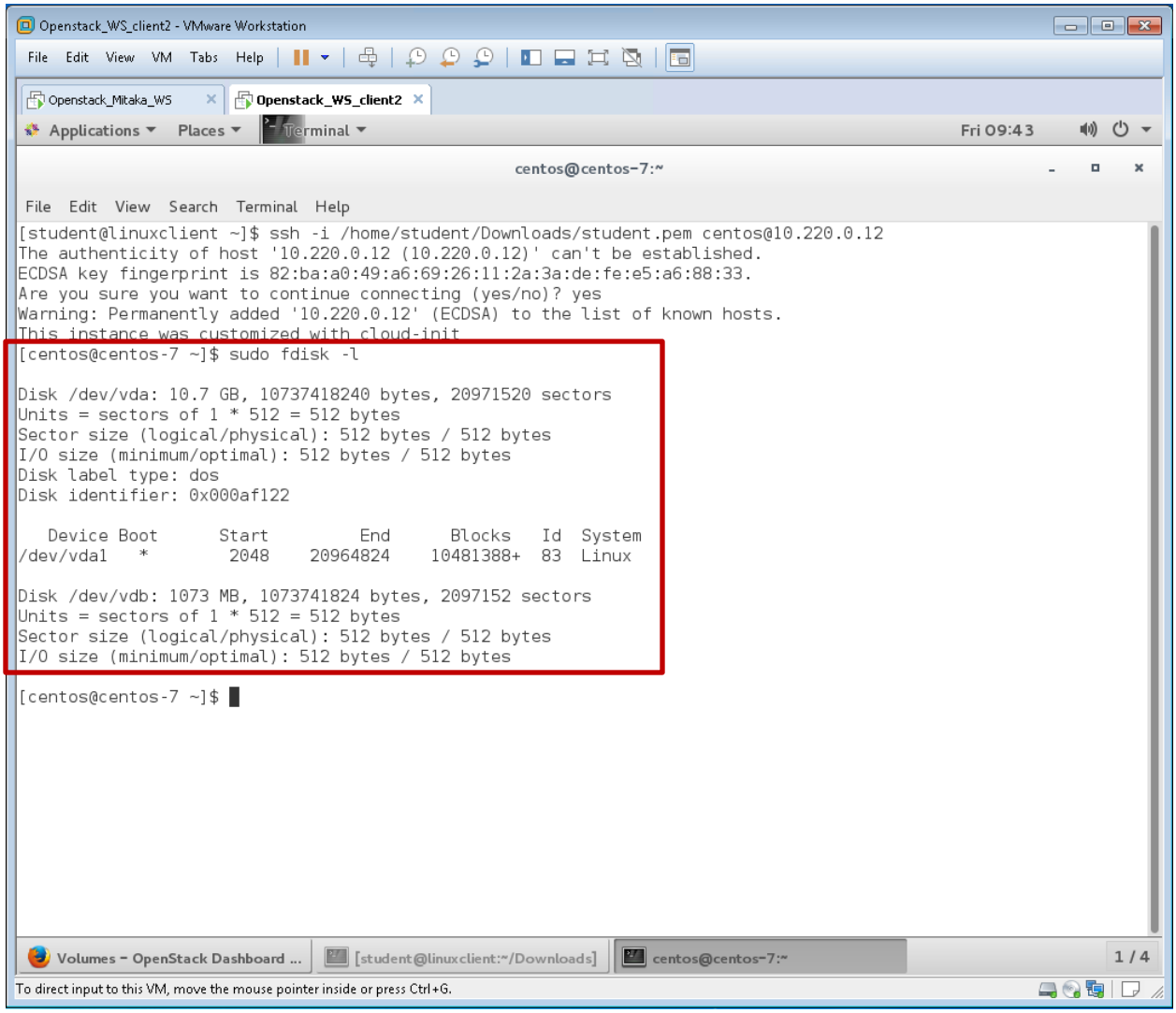



6. **Select** the **CentOS 7 instance** from the Attach to Instance dropdown menu. **Click** on **Attach Volume.**



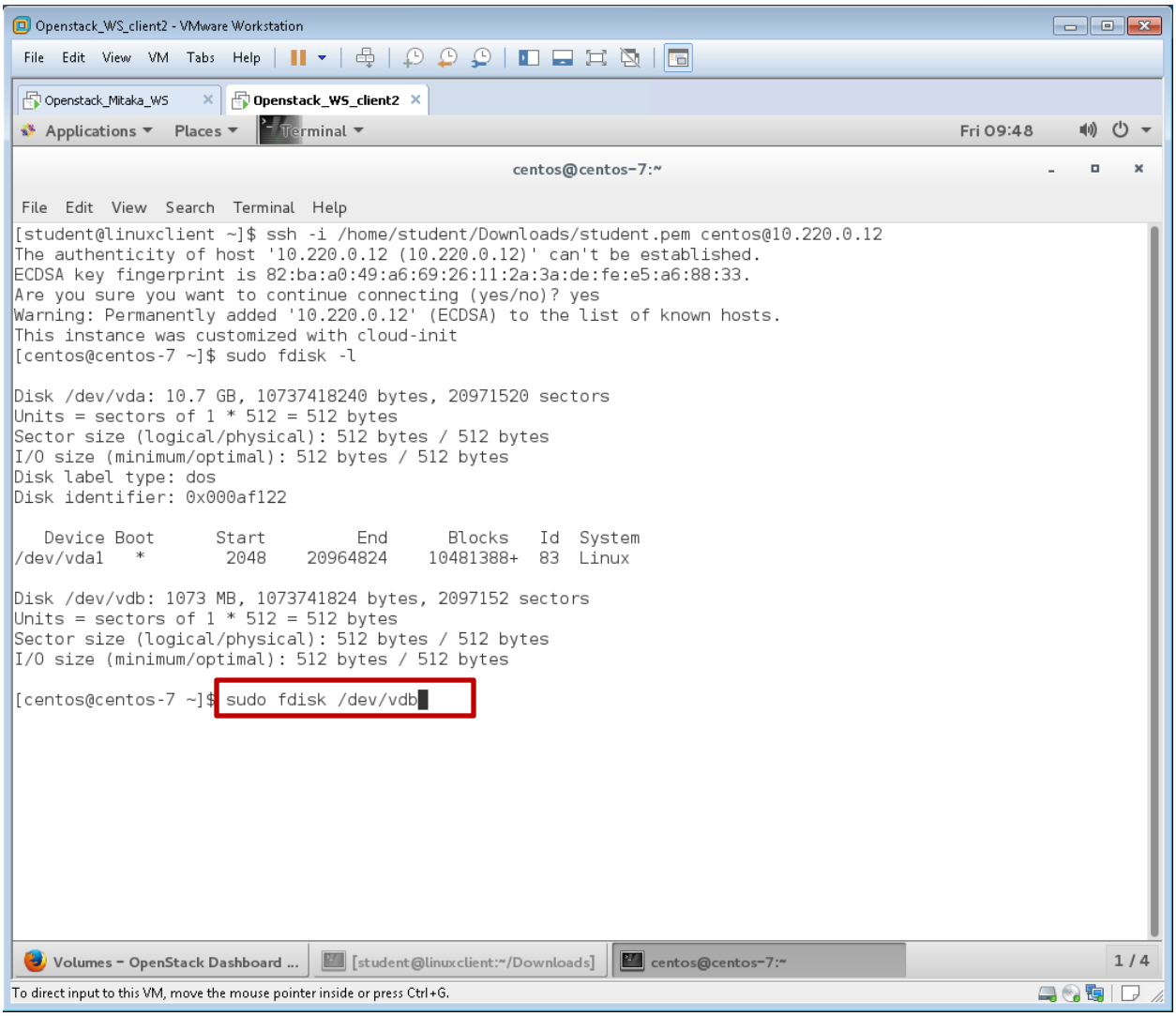

7. The **vol1 volume** should show that it is **Attached to CentOS 7 on /dev/vdb** on the Attached to column.

   Note: Make a note of **/dev/vdb**, you will need that information to mount the volume on the CentOS 7 instance.

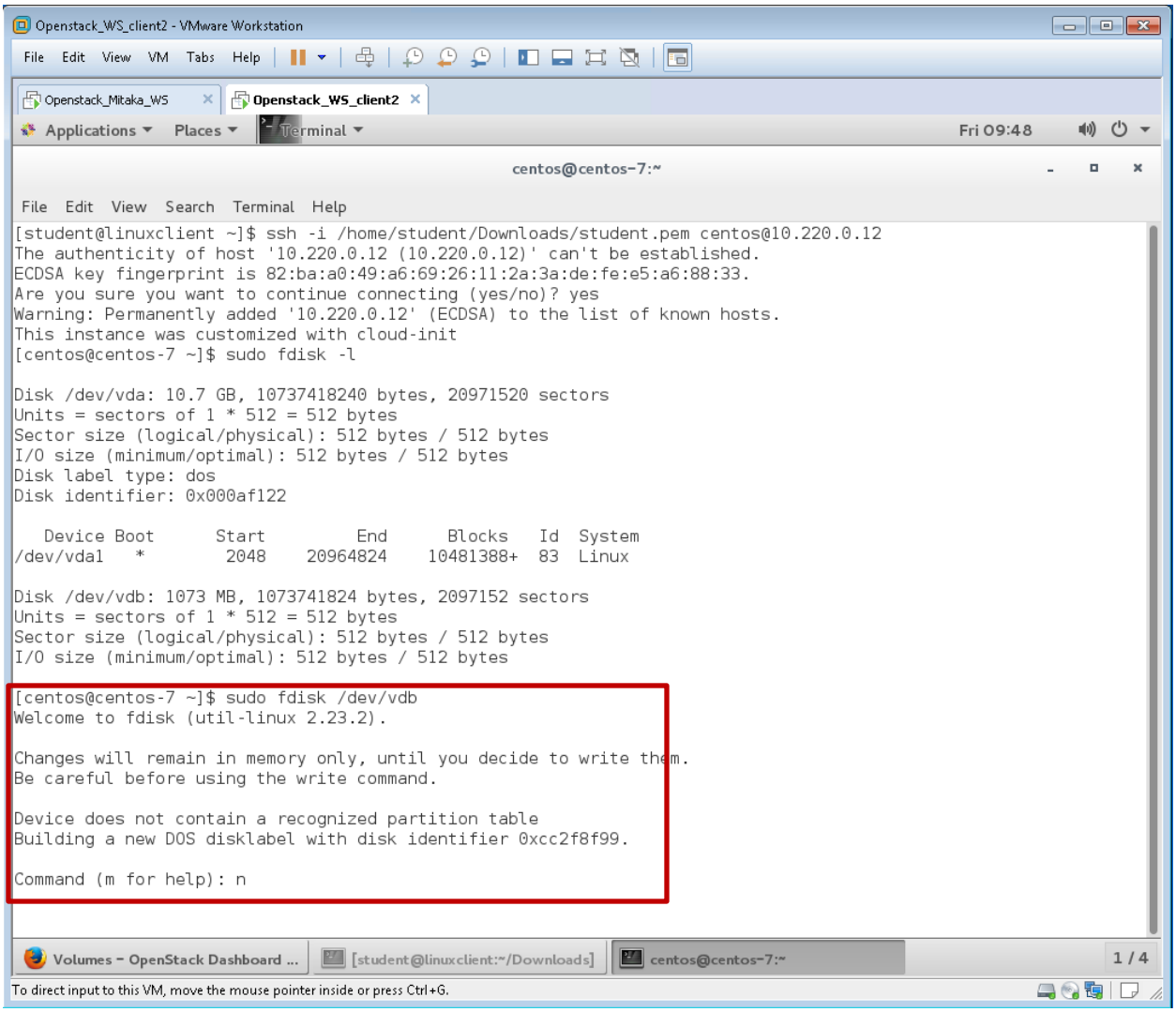



8. Return to the SSH session for the CentOS 7 instance and run the command **#sudo fdisk -l** the command should list the two disks **/dev/vda** and **/dev/vdb** that are present on the CentOS 7 instance. The /dev/vda is the disk that the CentOS 7 is installed on and the **/dev/vdb** is the **volume** (disk) that you just created and attached. Although the disk is present, it's not useable yet.

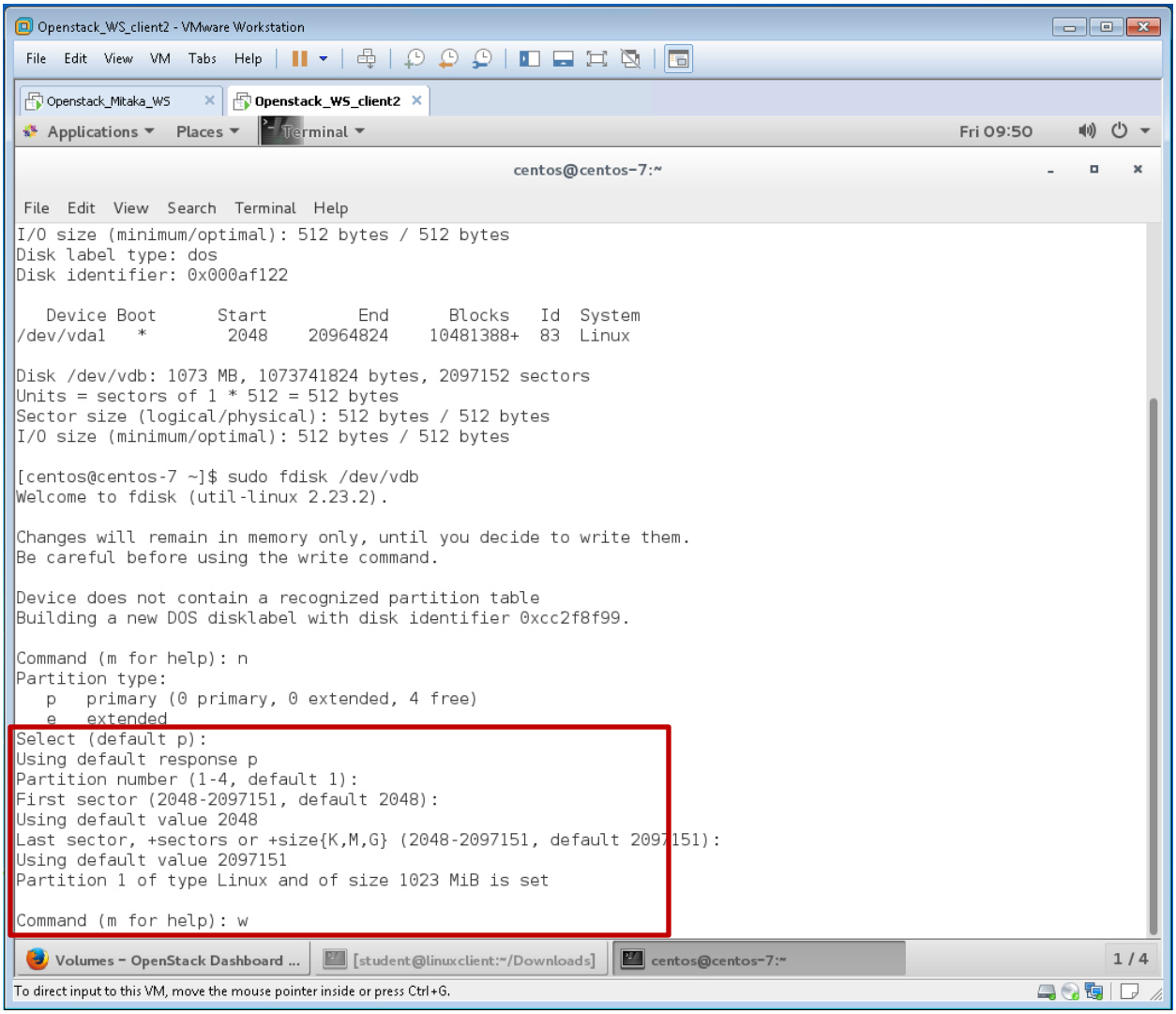
   Note: Reminder, you must use **sudo** for any commands that you are running in a Linux instance, because the root user is disabled by default.



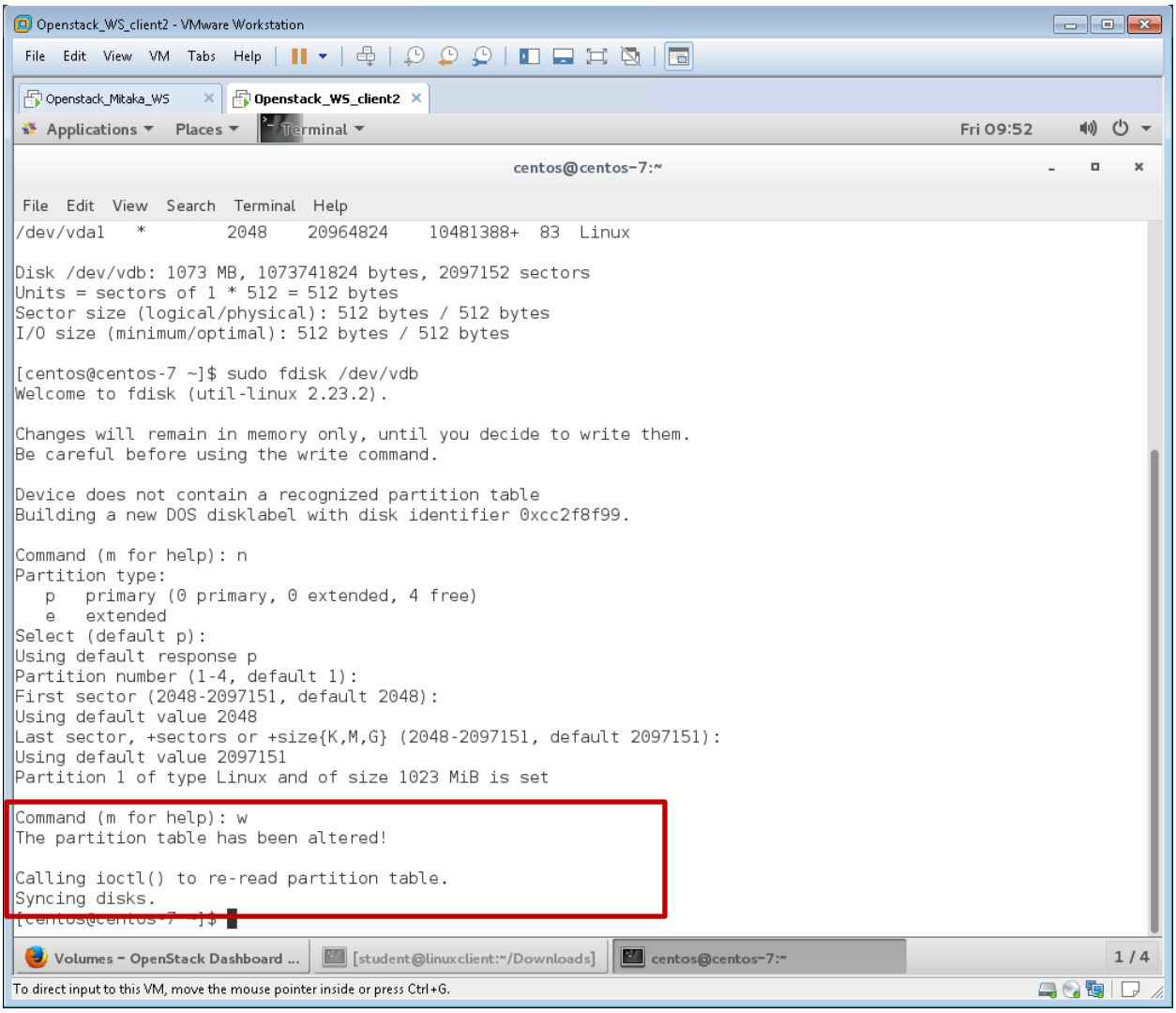

9. Run the **# sudo fdisk /dev/vdb** command to create space on the /dev/vdb disk for the new drive.



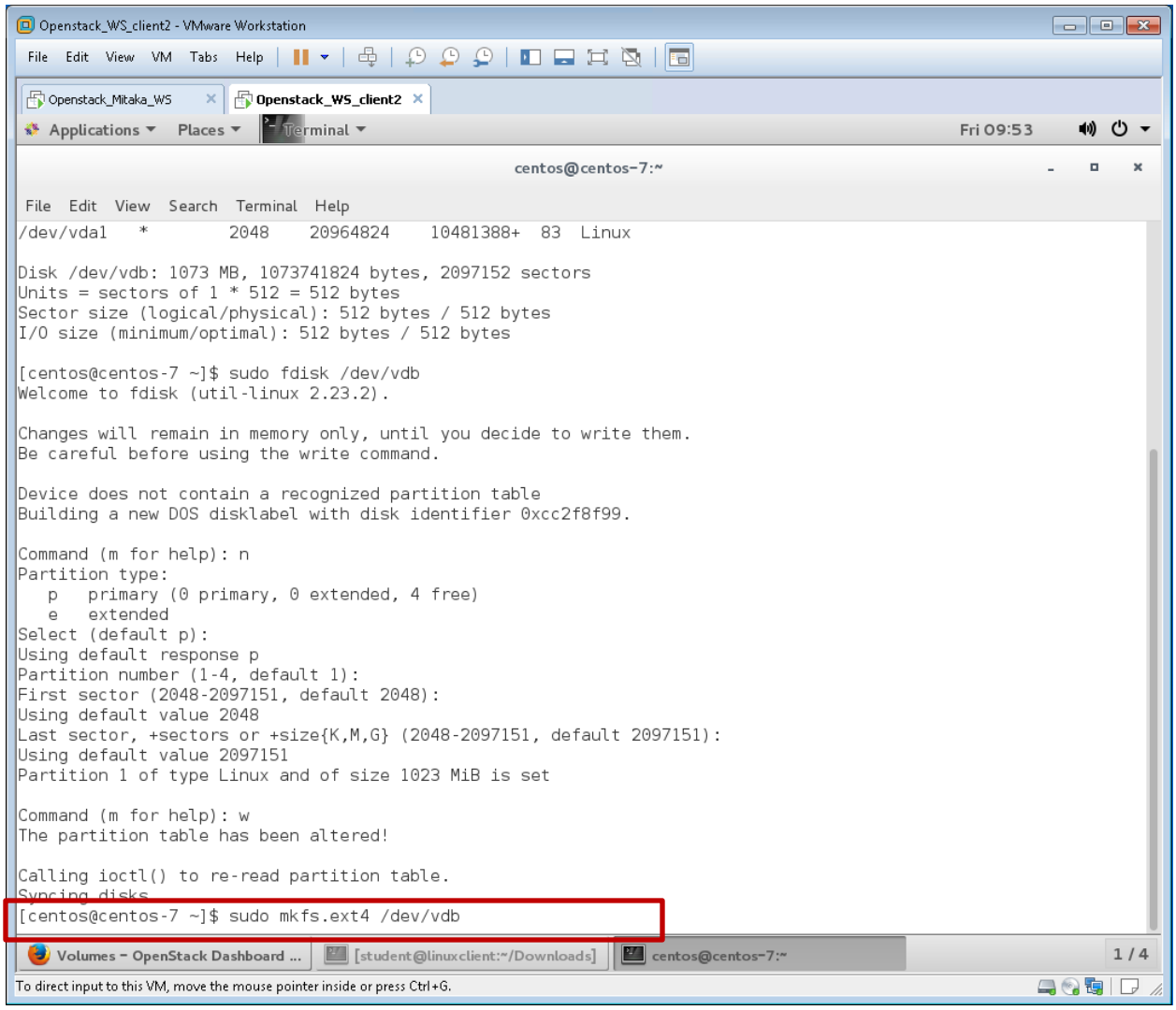

10. At the first prompt **enter n** for a new partition: Command (m for help): **n**



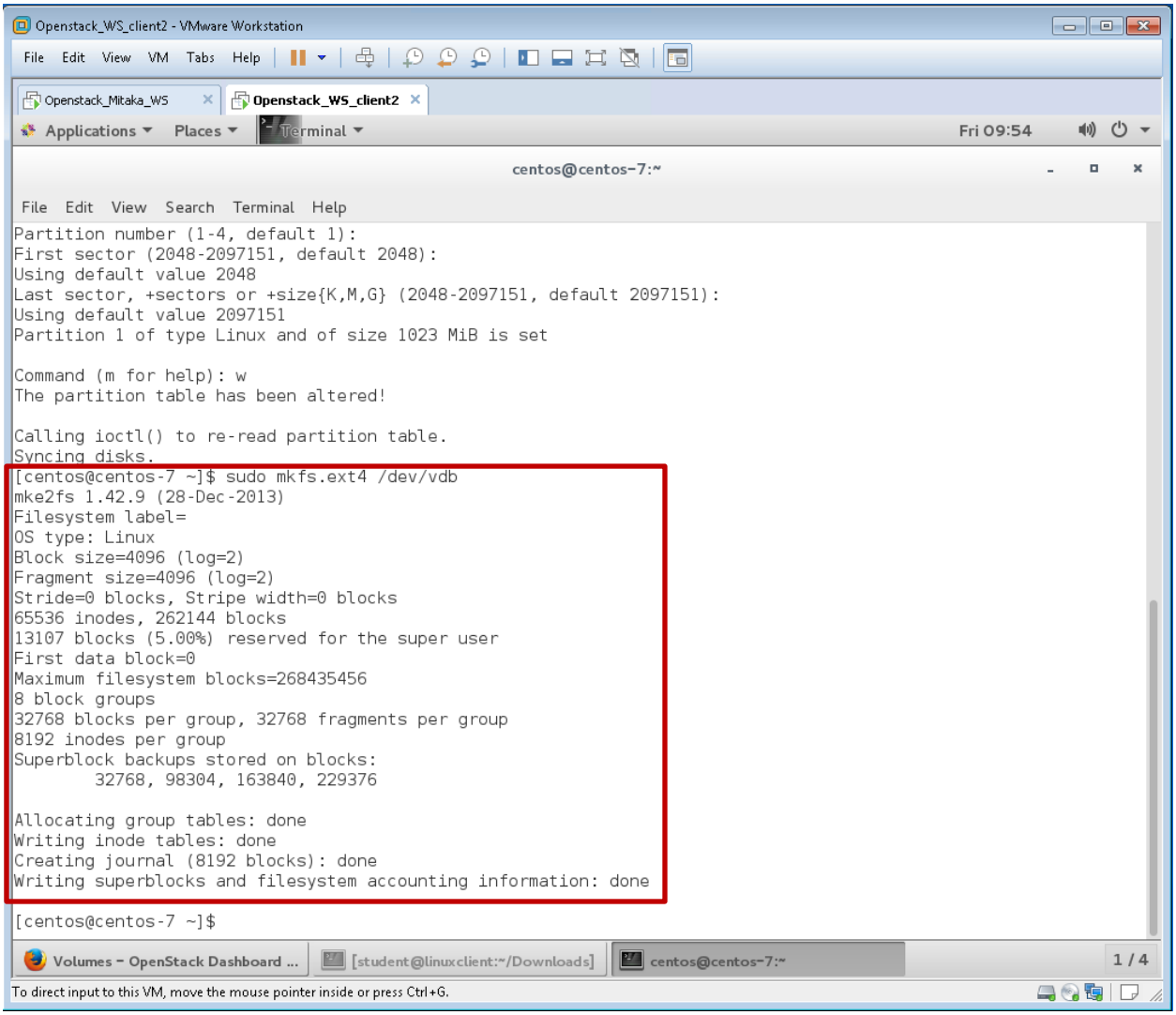

11. Use the **defaults for the Partition type p, Partition number 1, First sector, and Last sector** and **enter w** to write the new partition to the /dev/vdb disk.



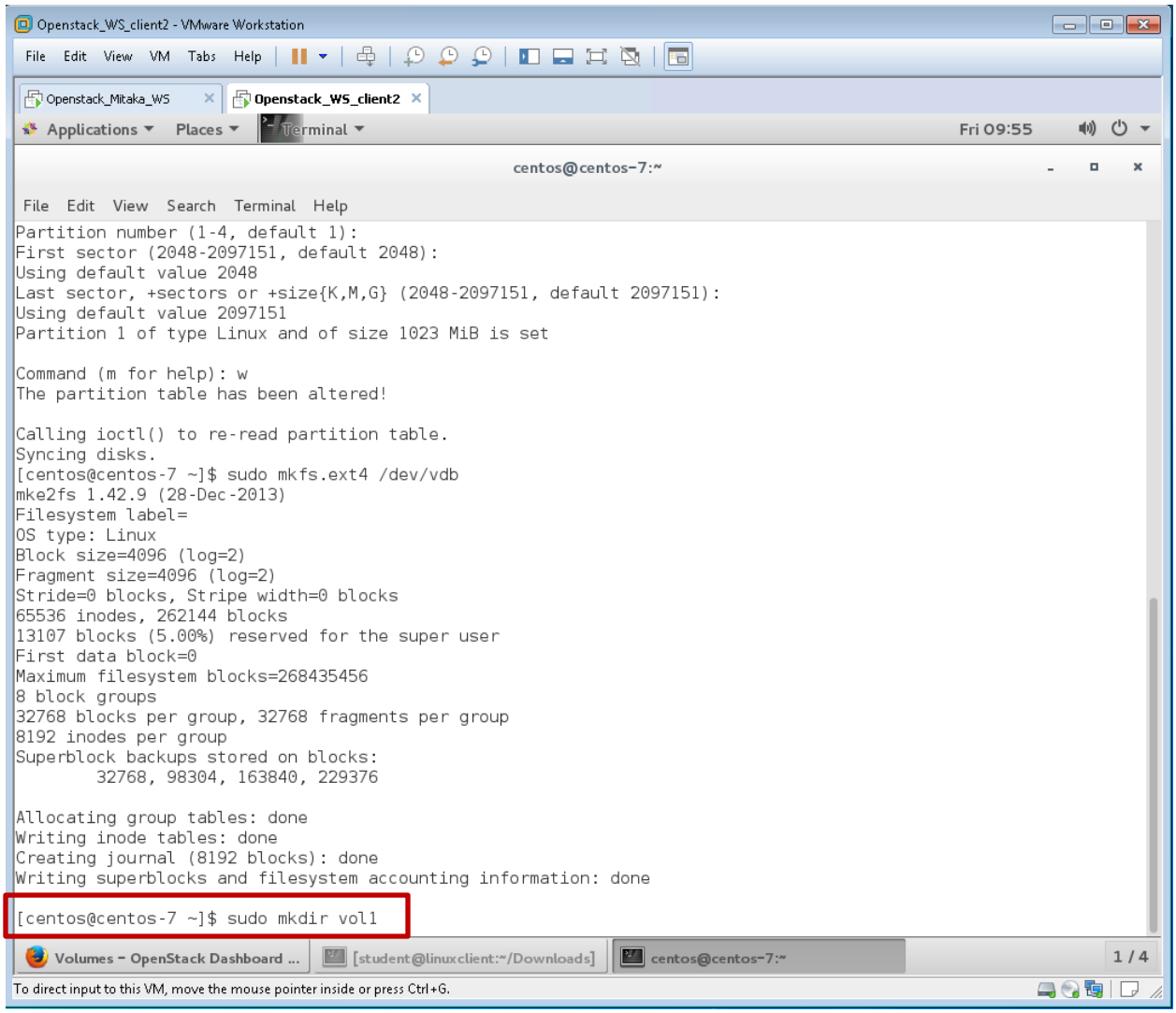

12. After entering w and pressing enter, you should see the “The Partition table……..syncing disks.” output, as shown in the screen capture. Next you will create a file system on the new partition.




13. Create a file system on the new volume (disk) /dev/vdb. Enter **# sudo mkfs.ext4 /dev/vdb**

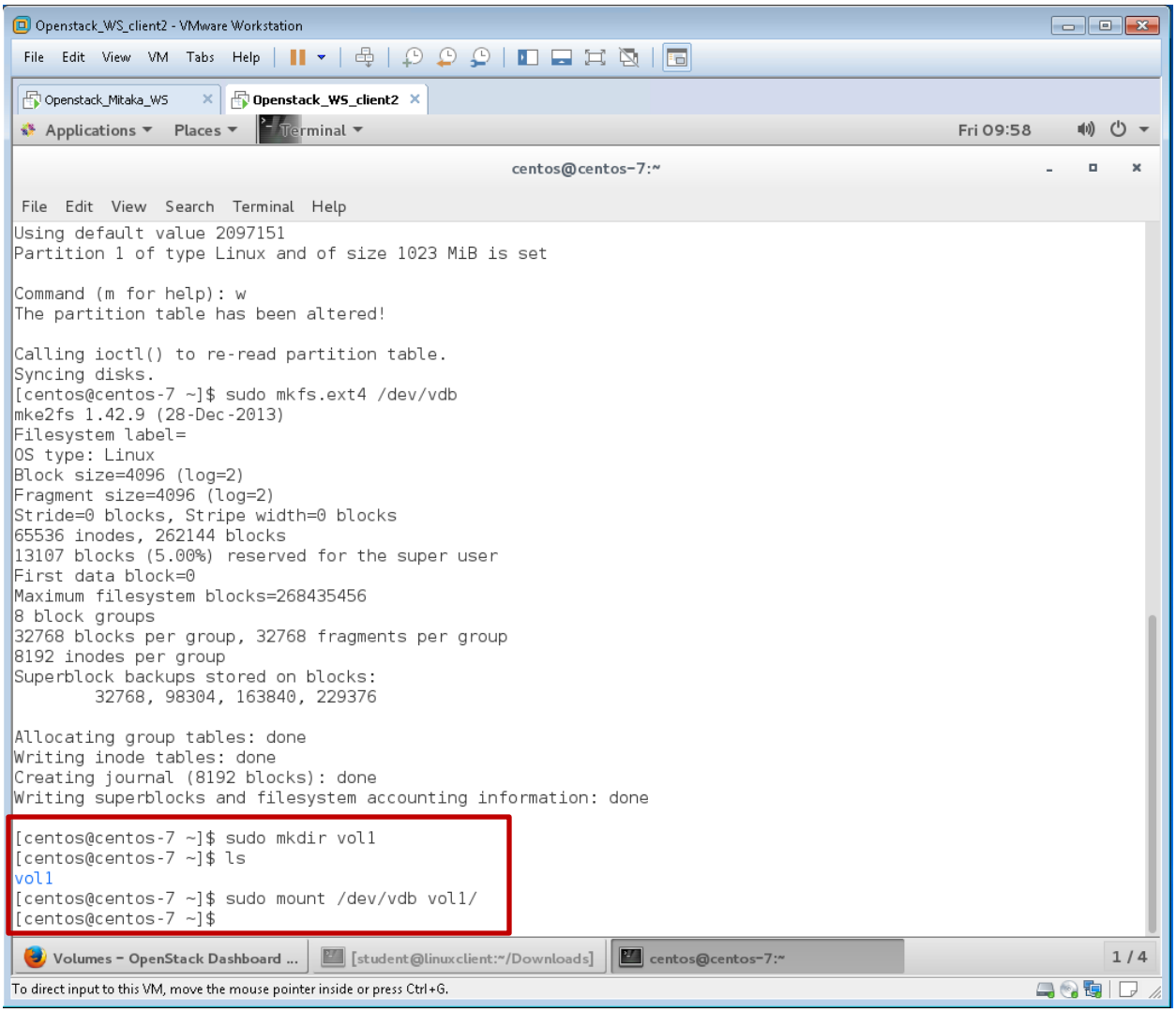



14. You should see similar output, as shown in the screen capture above, as the OS writes the ext4 file system to the /dev/vdb disk.



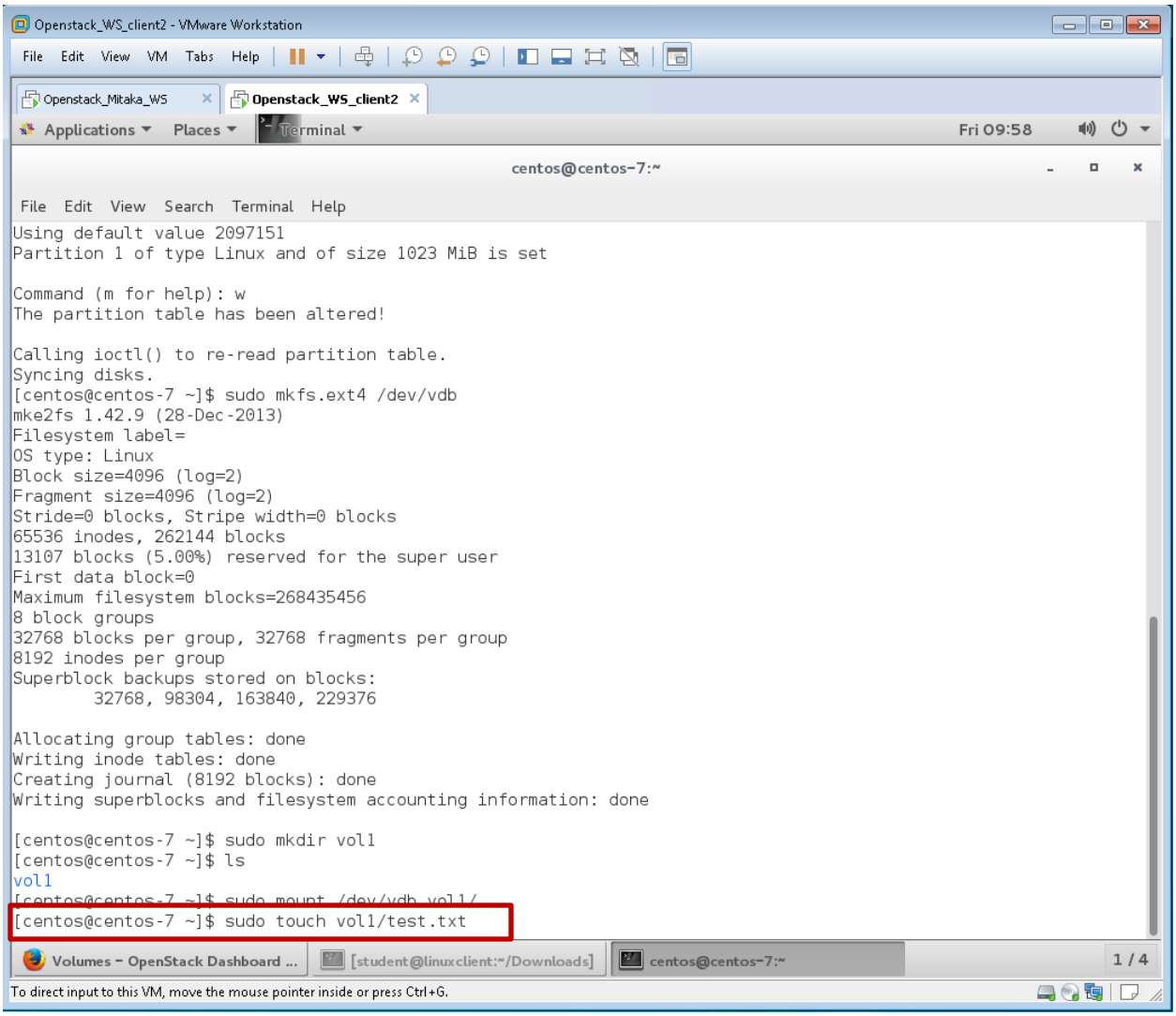

15. Create a new directory to mount the new volume. **Enter # sudo mkdir vol1**

    Note: The system doesn't produce any output after making the new directory, so you can run the ls command to verify that the new vol1 directory is present.

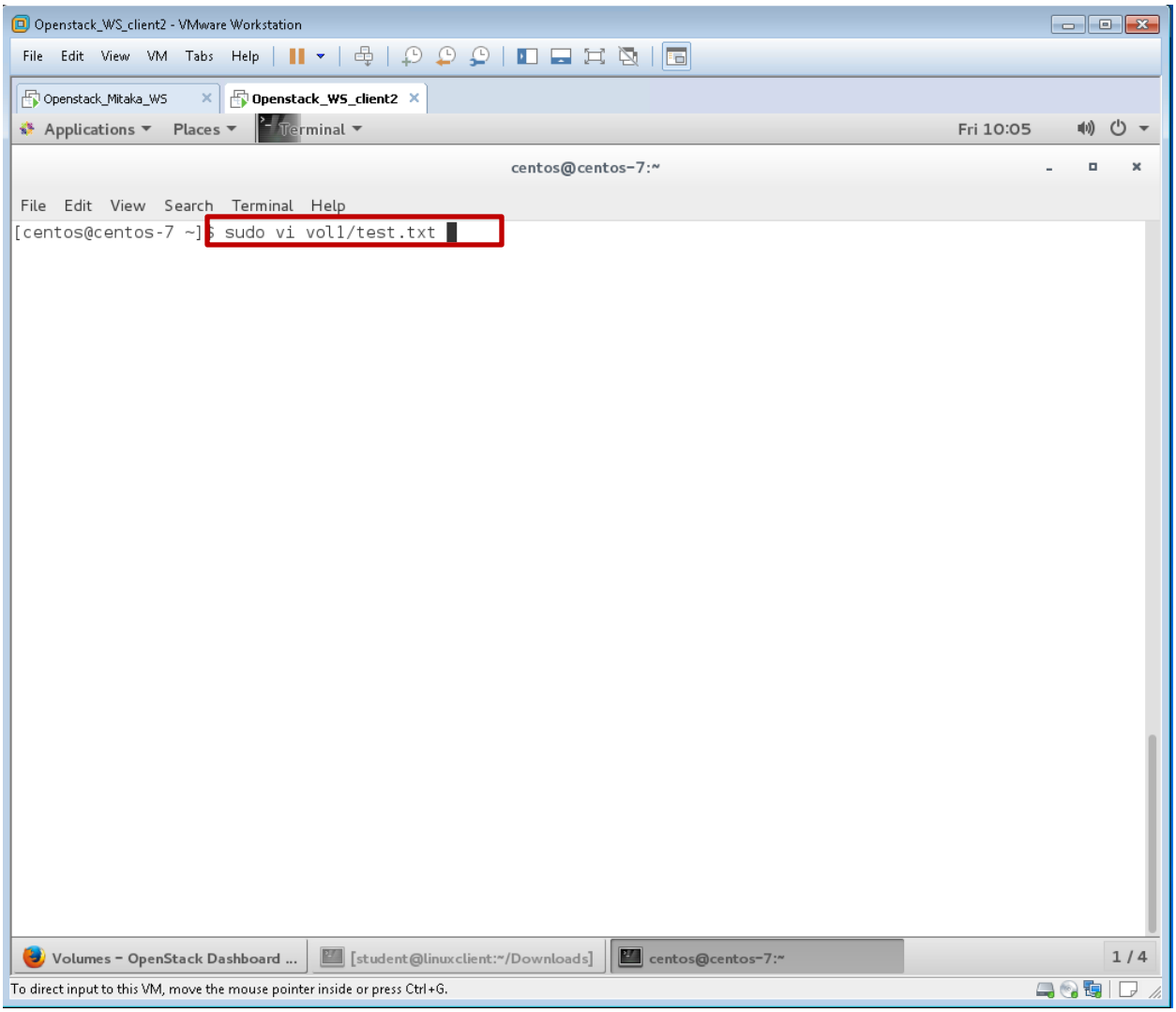



16. Mount the /dev/vdb volume (disk) to the new vol1 directory. **Enter # sudo mount /dev/vdb vol1/**

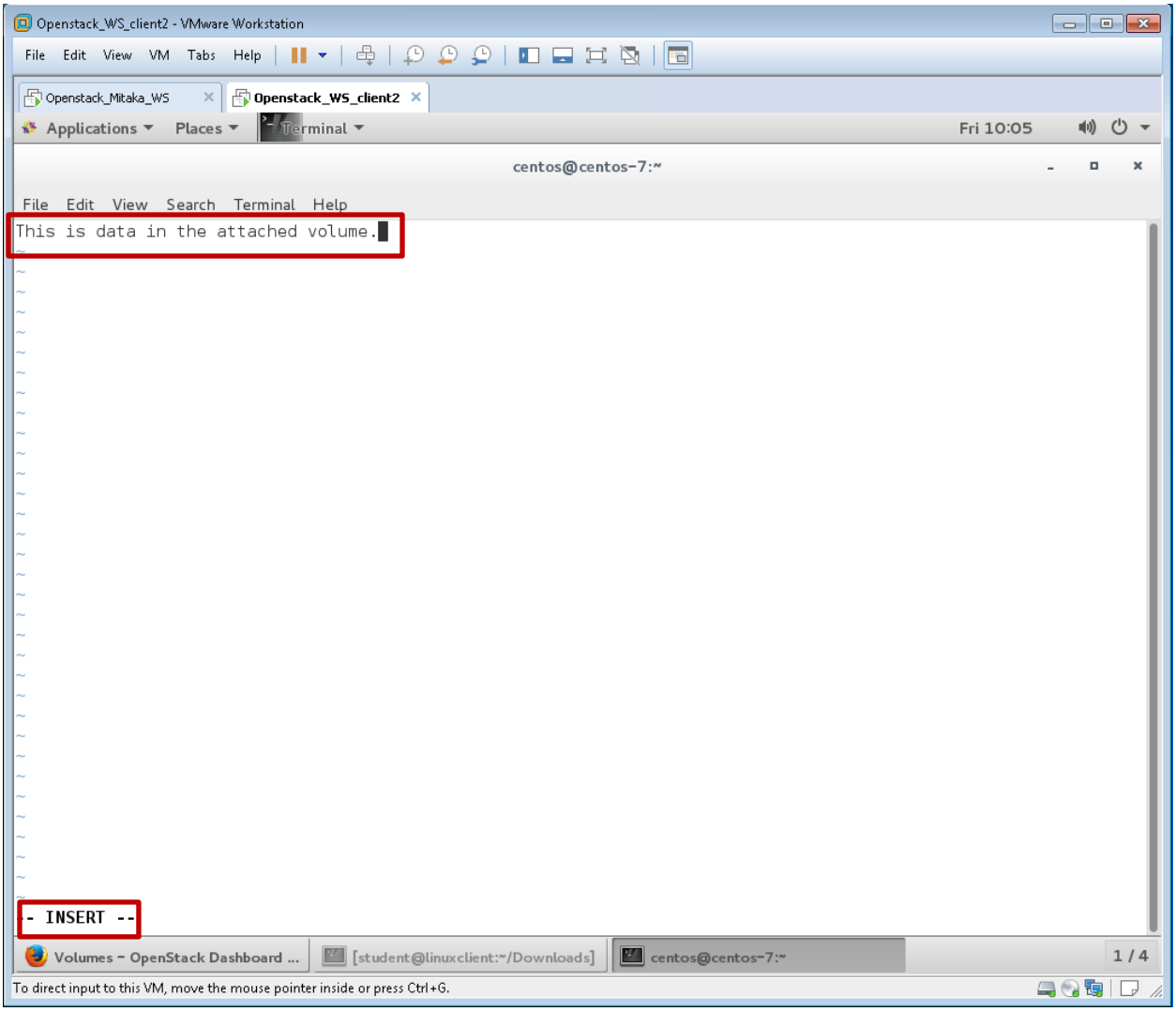
    Note: The system doesn't produce any output confirming that the volume was successfully mounted, only errors will produce an output.



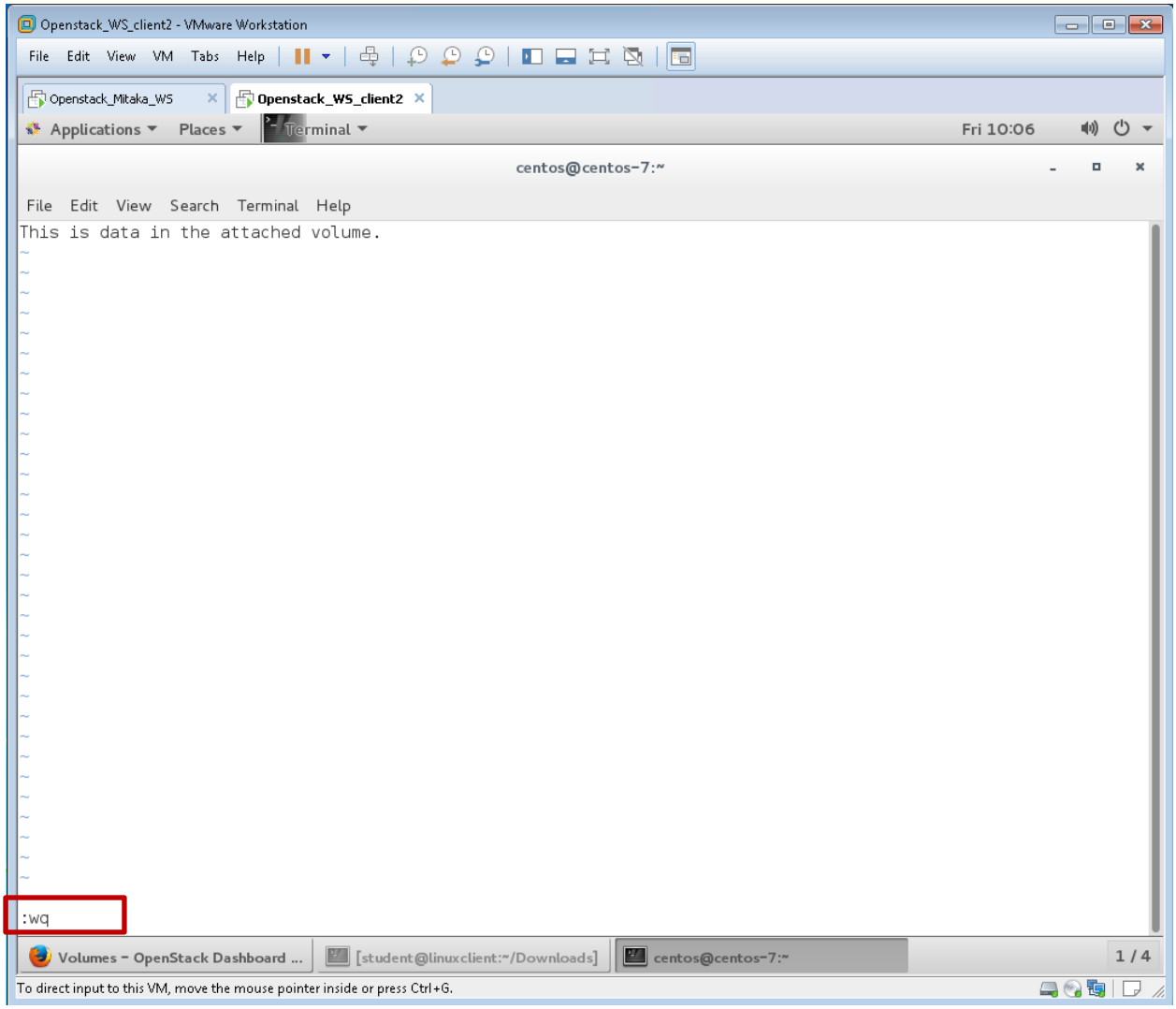

17. Create a file in the new directory. **Enter # sudo touch vol1/test.txt**



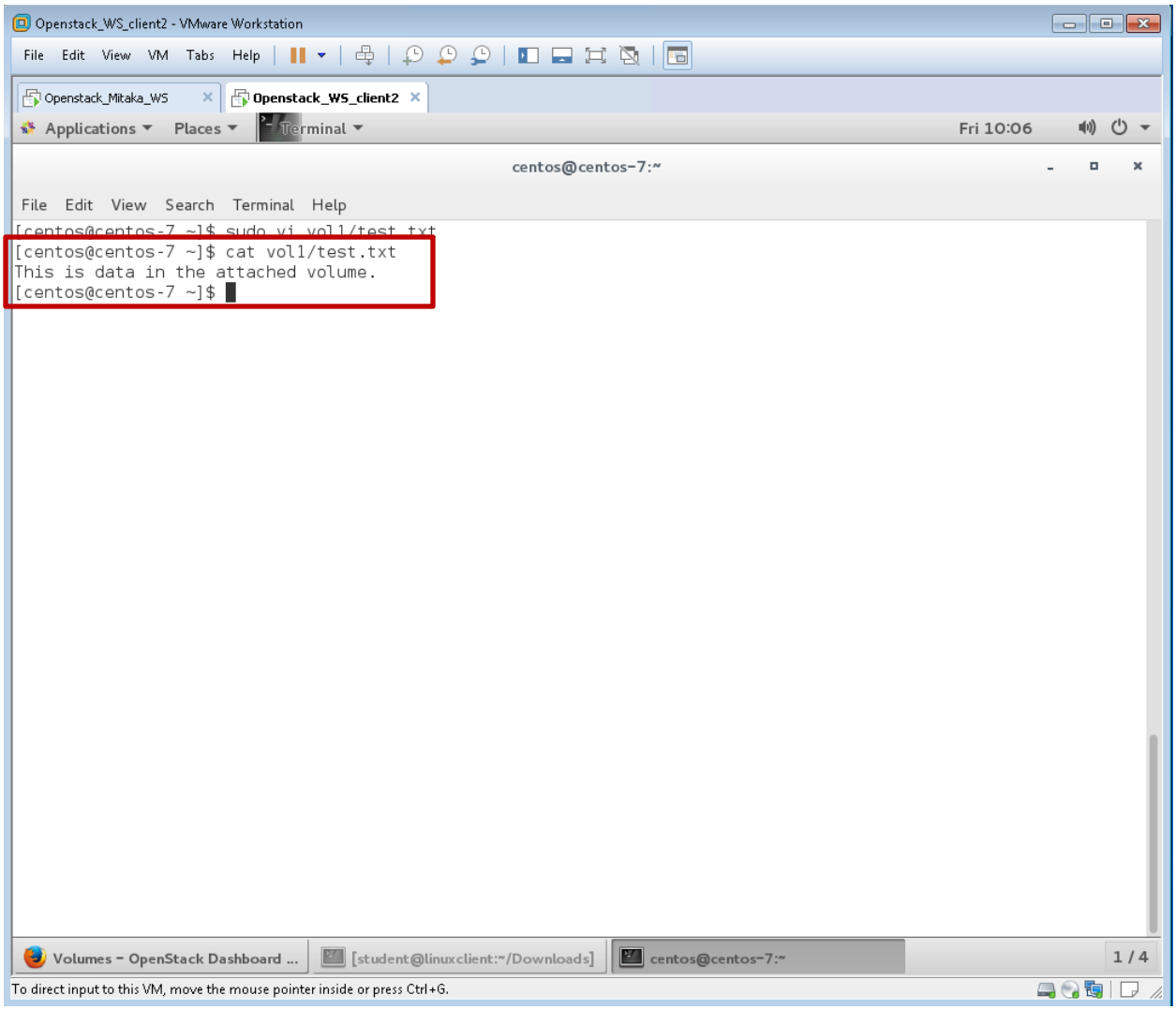

18. Create some data on the new vol1 volume. **Enter # sudo vi vol1/test.txt**



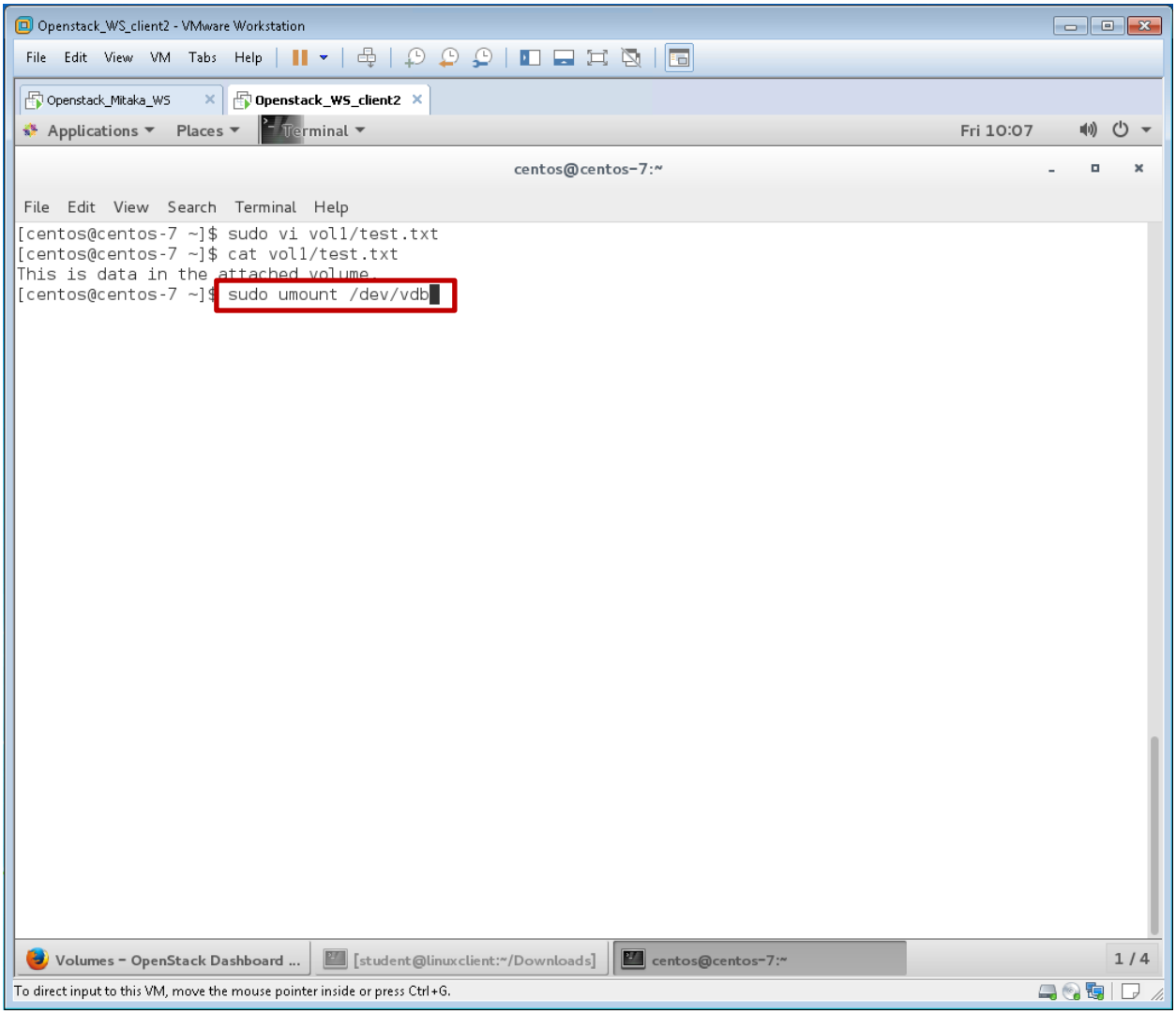

19. Press the **insert** button on your keyboard and add some text to the file. For example; "This is data in the attached volume."




20. Press the **Esc key** on your keyboard, followed by **:wq** to write and quit the text.txt file.



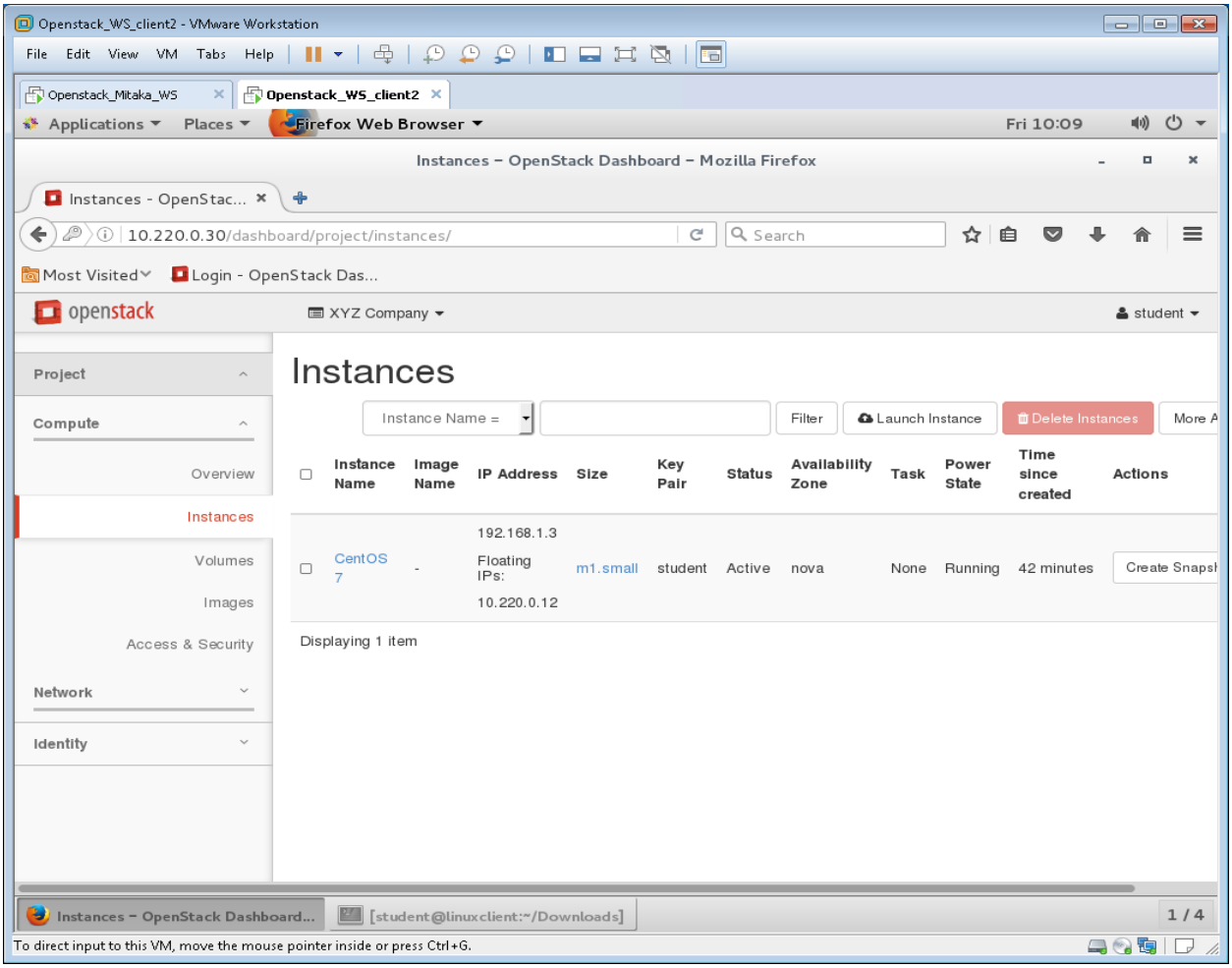

21. Verify that the data is present with the **cat vol1/test.txt** command.




22. Detach the volume from the CentOS 7 instance using the **# sudo umount /dev/vdb** vol1/ command. Close the terminal window and return to the Openstack Dashboard.

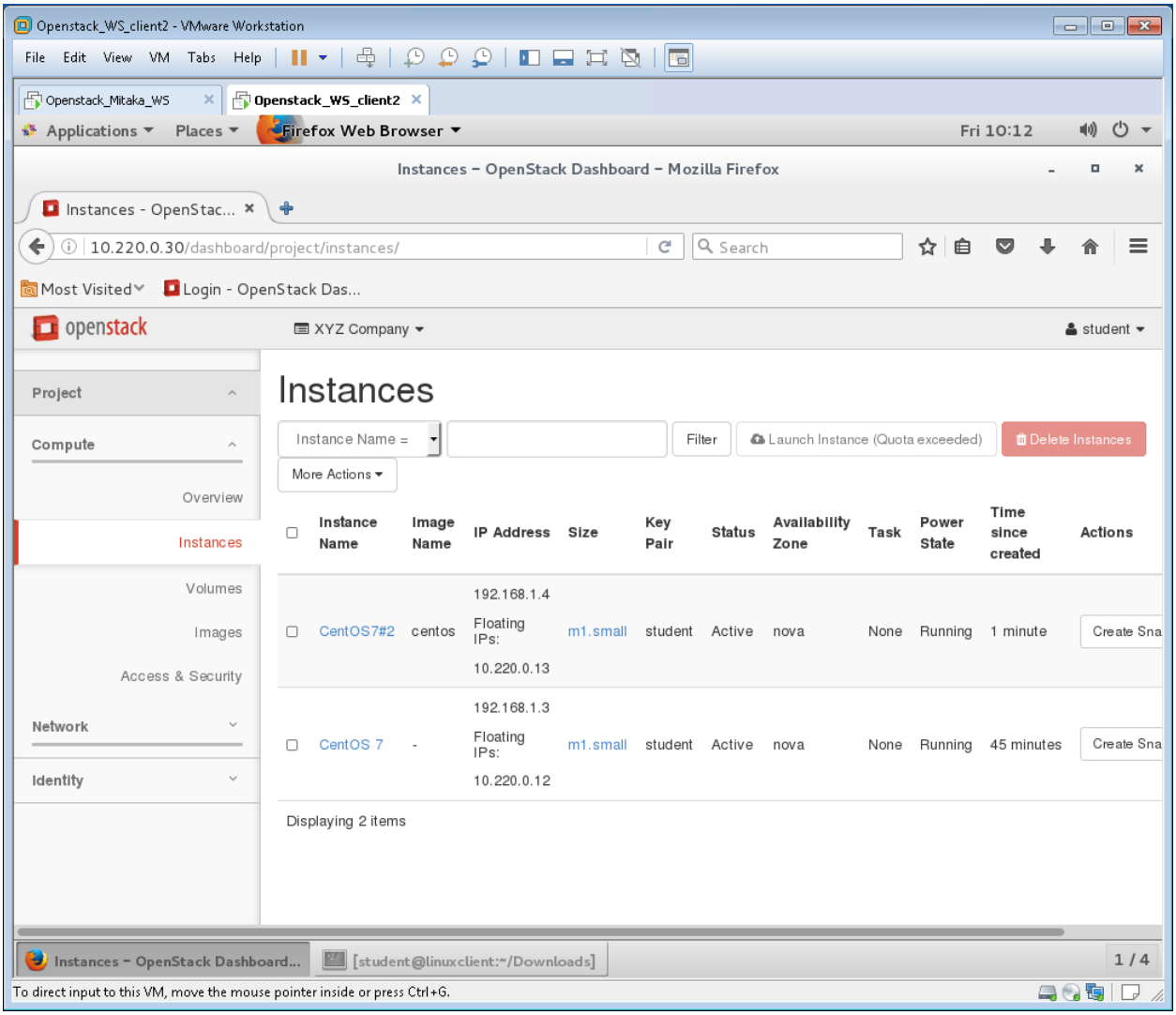
Continue to Lab 24

# Lab 24: Launch a CentOS7#2 instance and attach the volume with data from CentOS 7 to the CentOS7#2 instance.

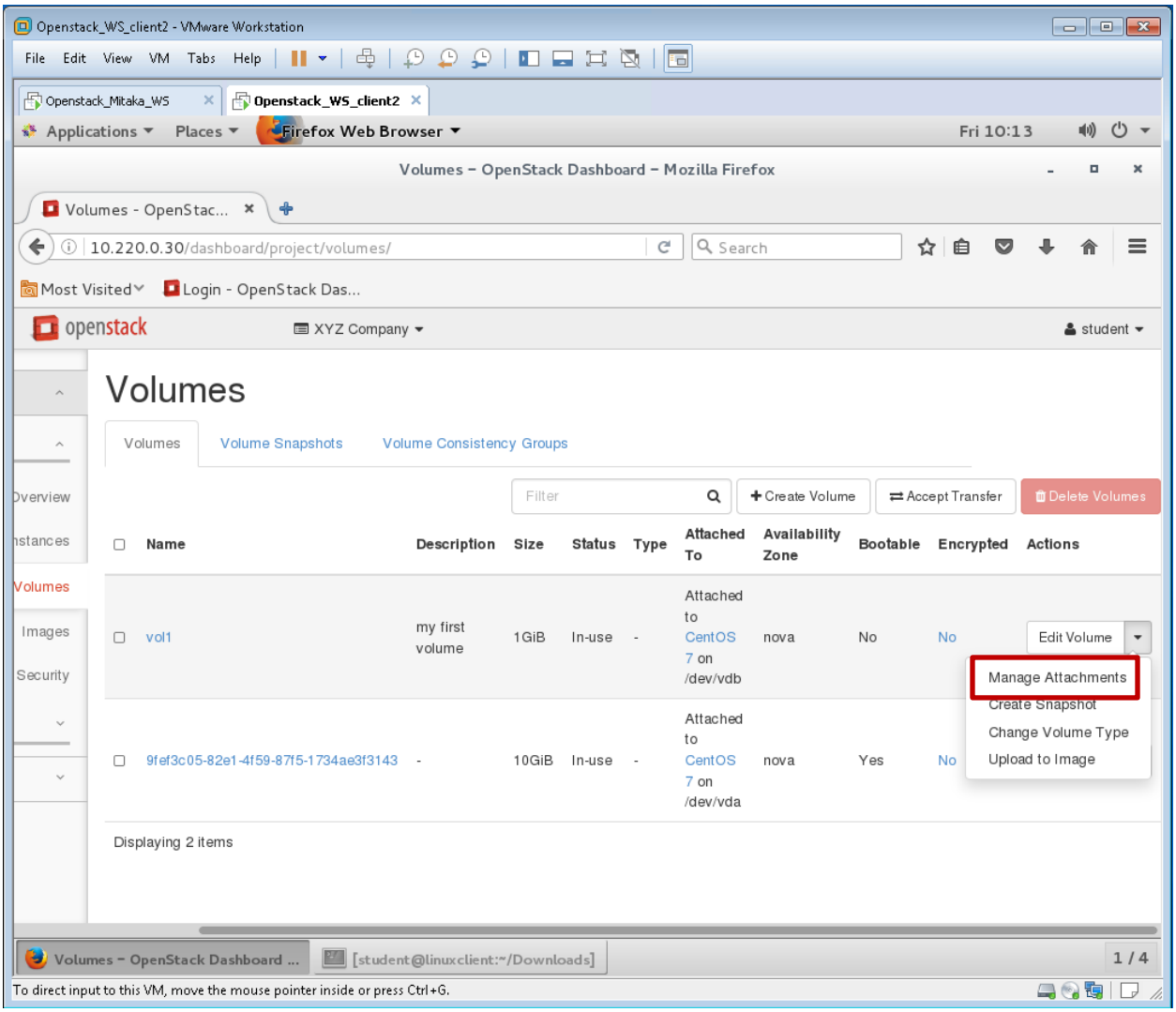



1. Create a new CentOS instance using the same techniques as the first CentOS 7 instance with the exception of the customization step. **DO NOT** use the Create New Volume feature for this instance.

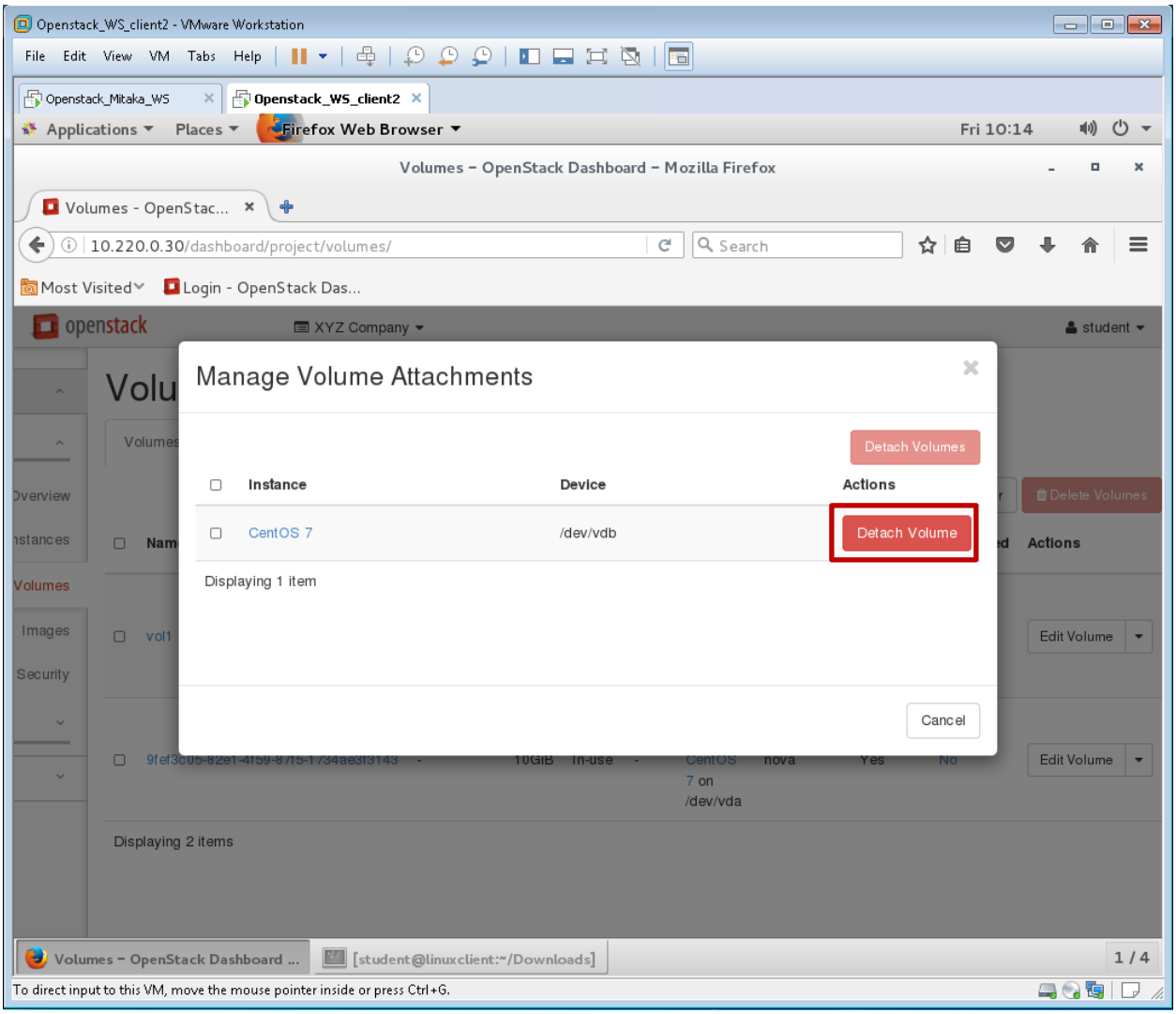
| | |
|---|---|
| Instance Name | CentOS7#2 |
| Source | CentOS |
| Flavor | m1.small |
| Network | Private |
| Security Group | XYZ Company |
| Key Pair | Student |
| Floating IP Address | 10.220.0.13 |



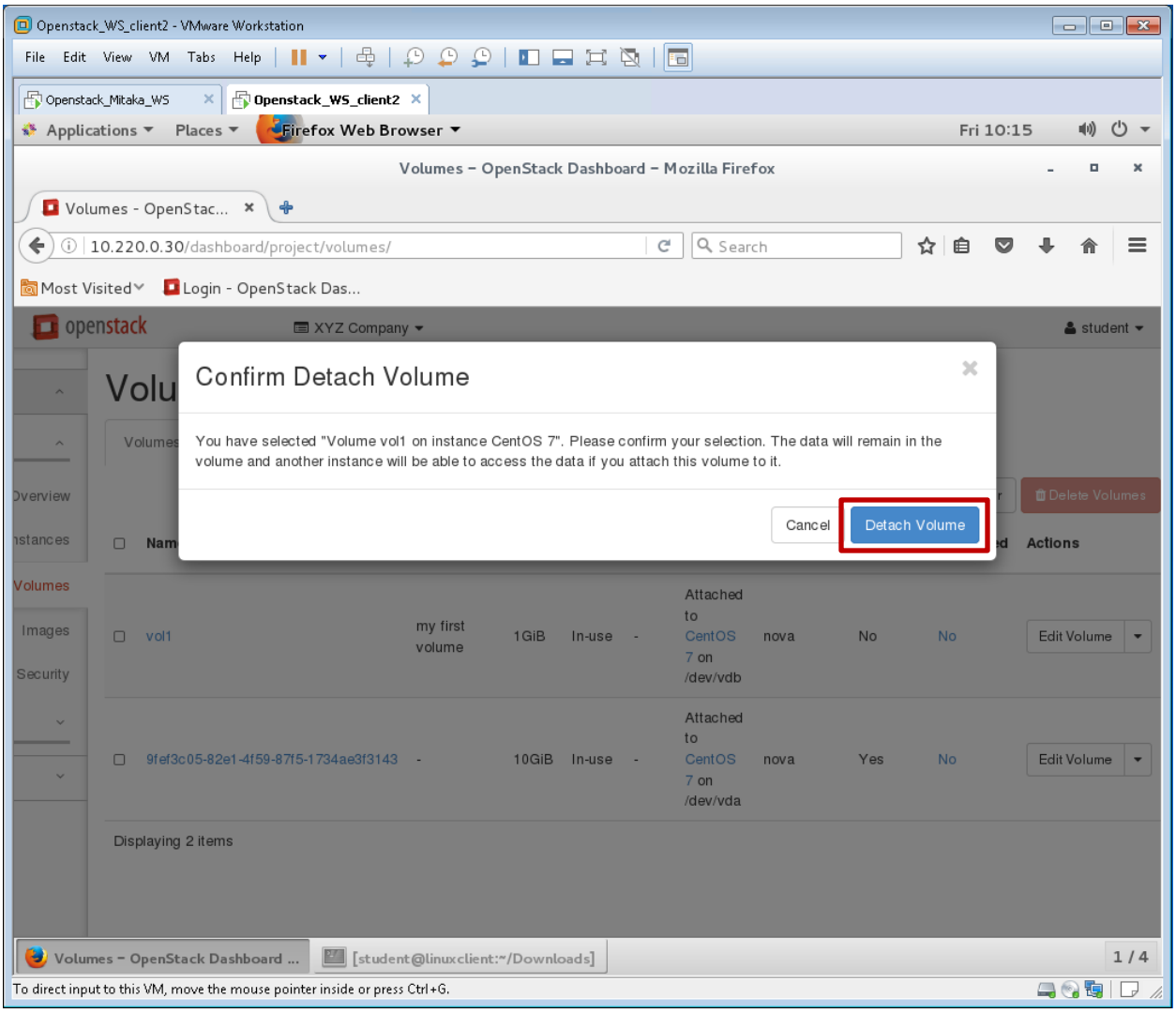

2. Your instances page should match the screen capture shown. **Switch to the Volumes tab**.



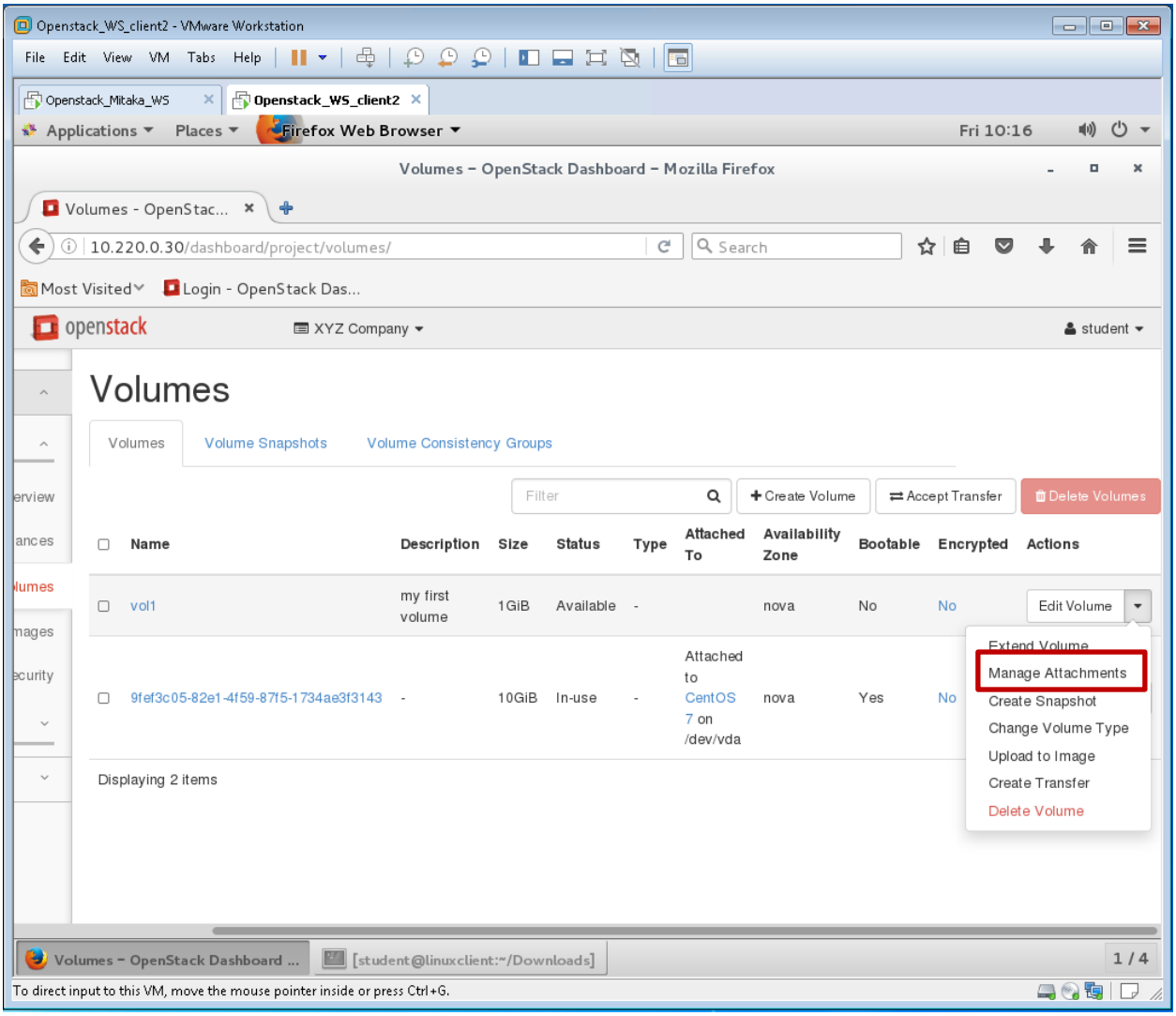

3. **Select Manage Attachments** on the same row as the vol1 volume.



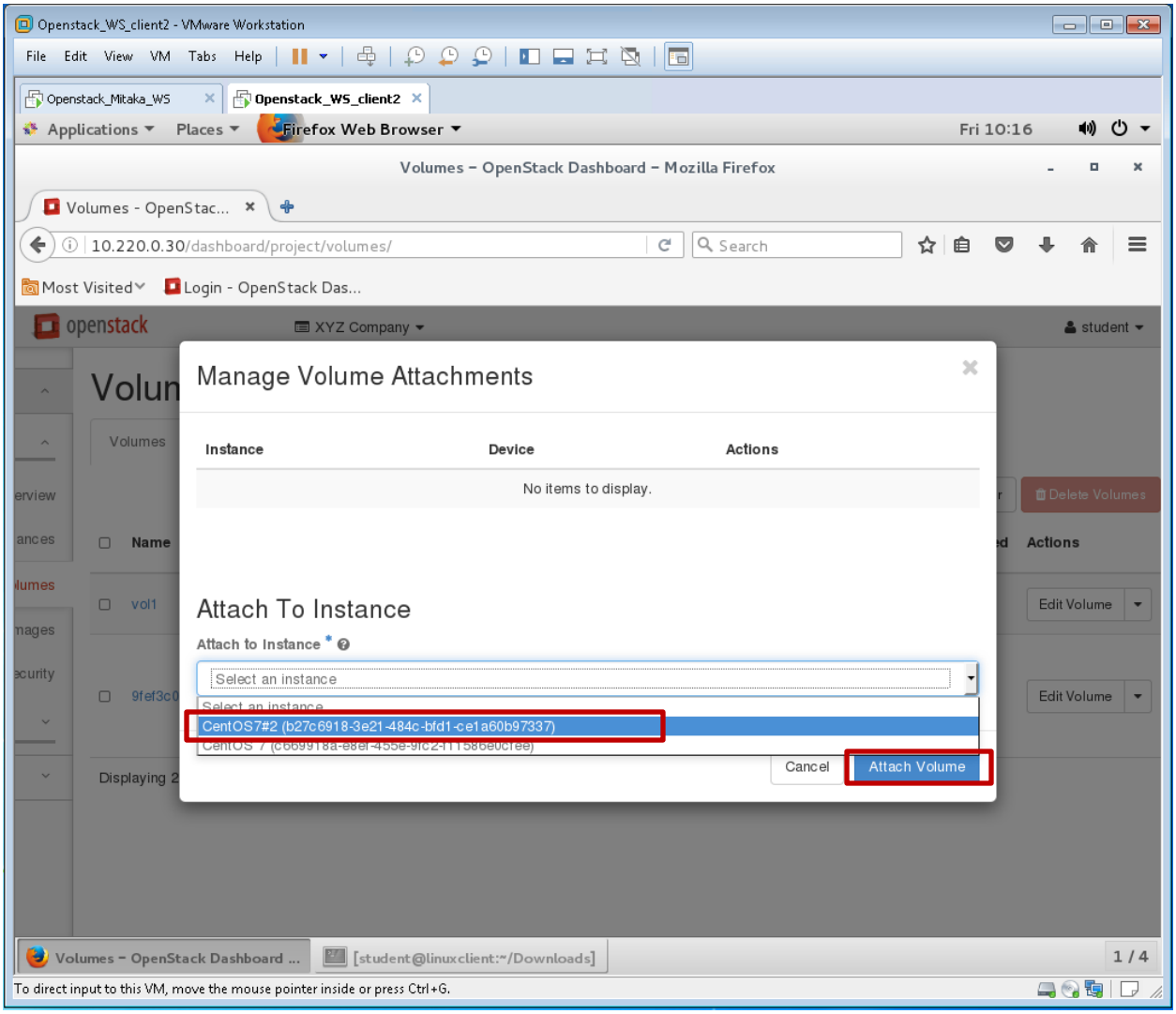

4. **Select** the **Detach Volume** button to remove the /dev/vdb from the CentOS 7 instance.



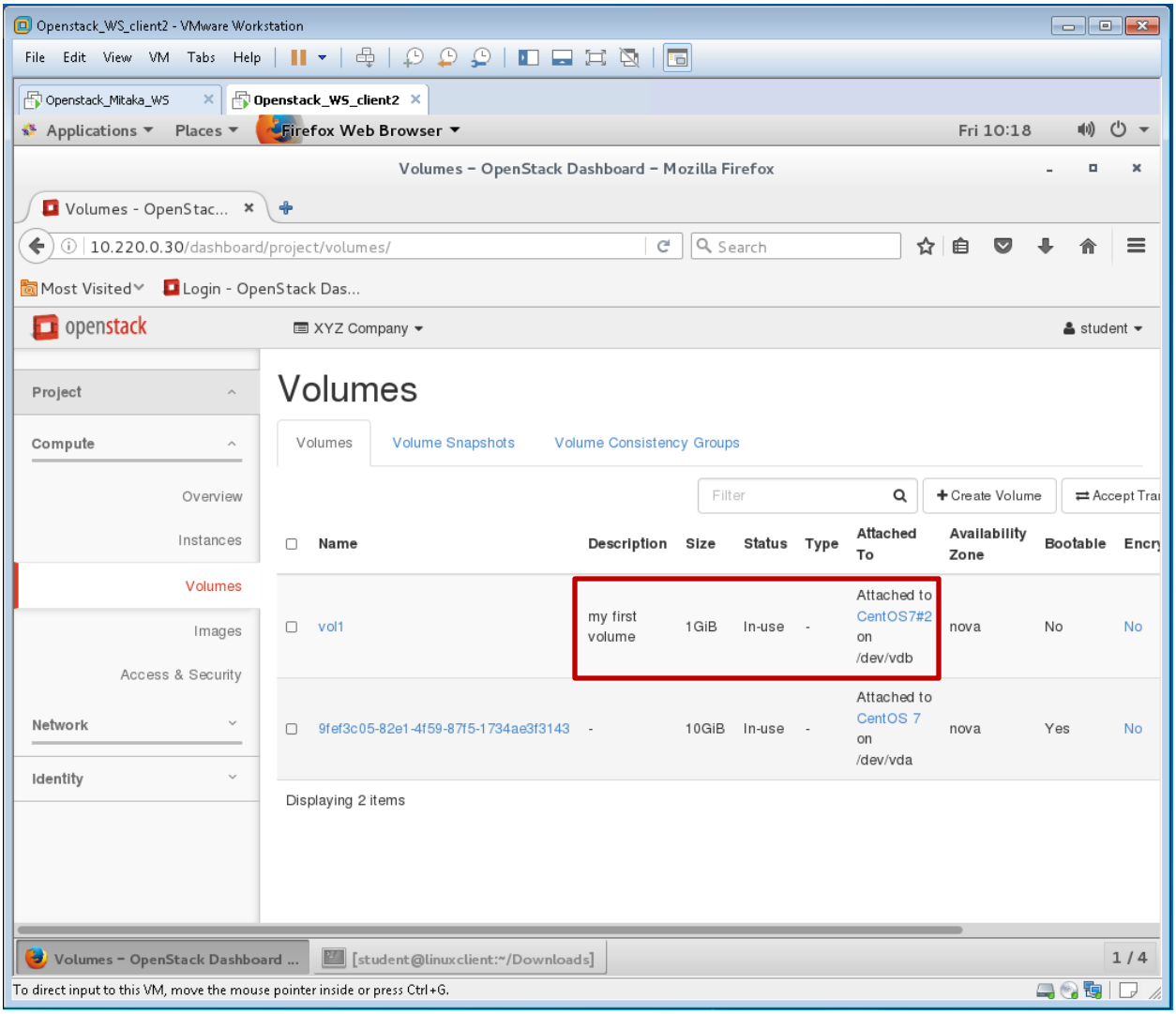

5. **Confirm Detach Volume**.



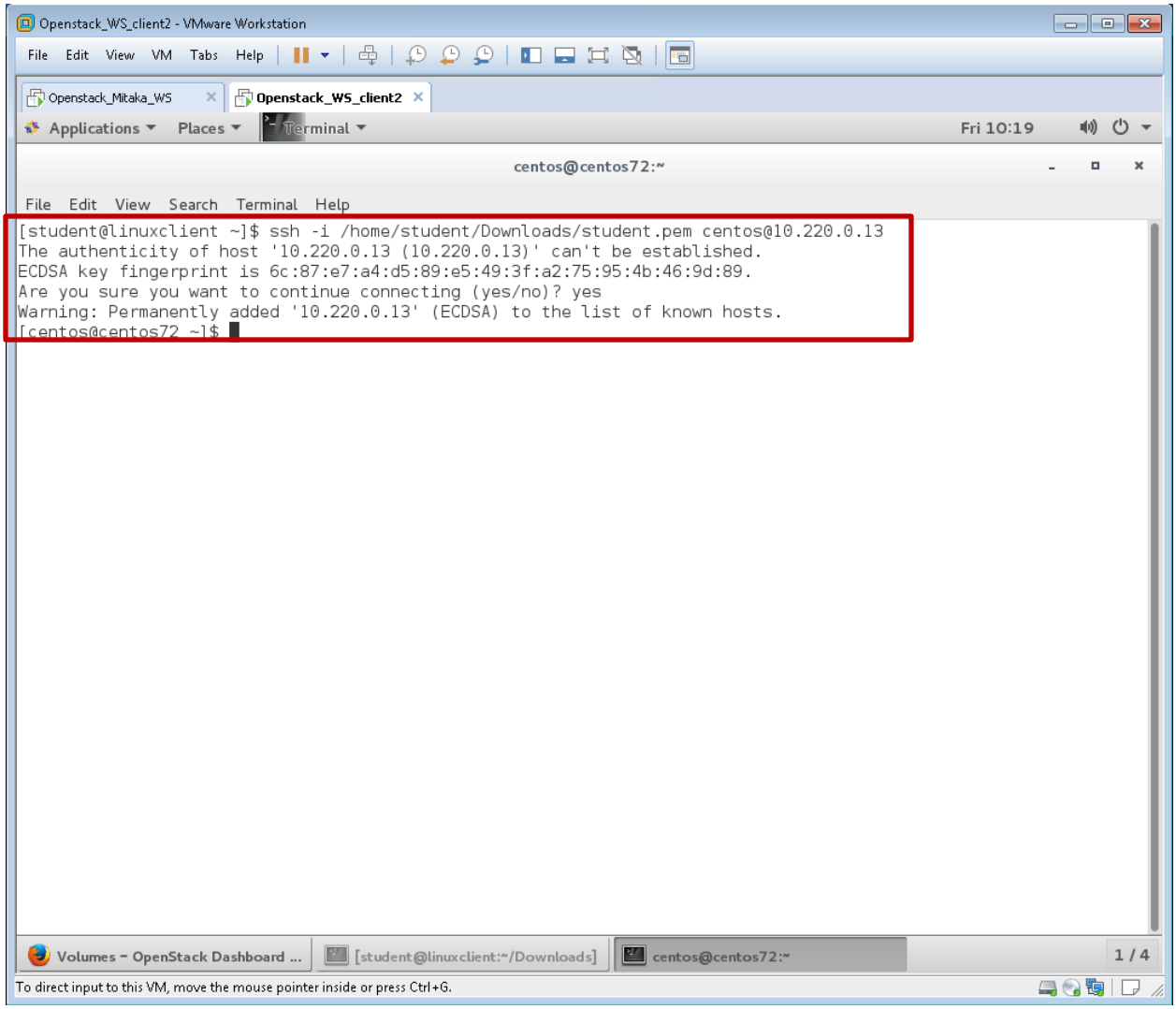

6. **Confirm** that the **vol1** is A**vailable** in the Status column. **Click on Manage Attachments**.



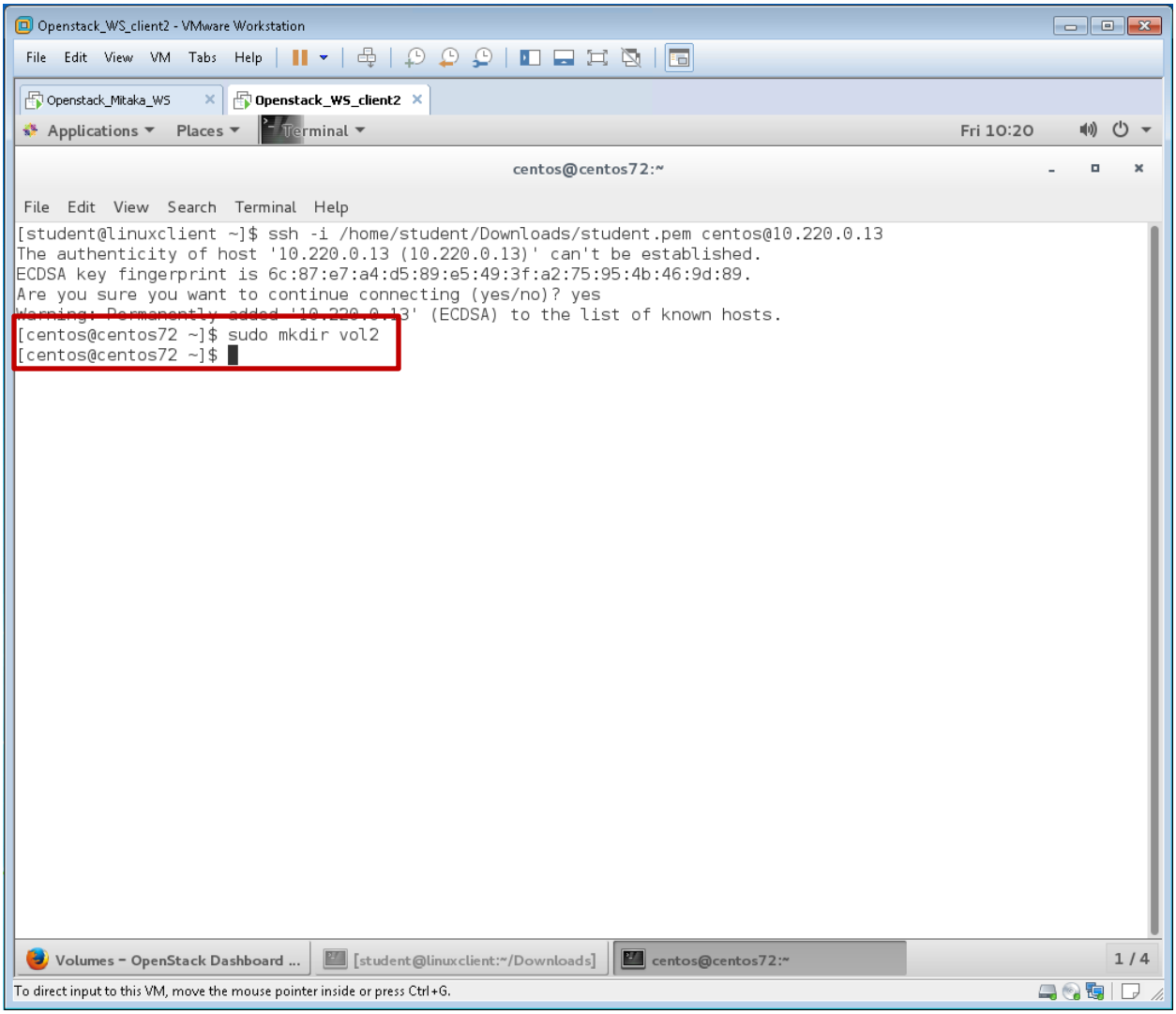

7. **Select** the **CentOS7#2 instance** and **click** on **Attach Volume**.



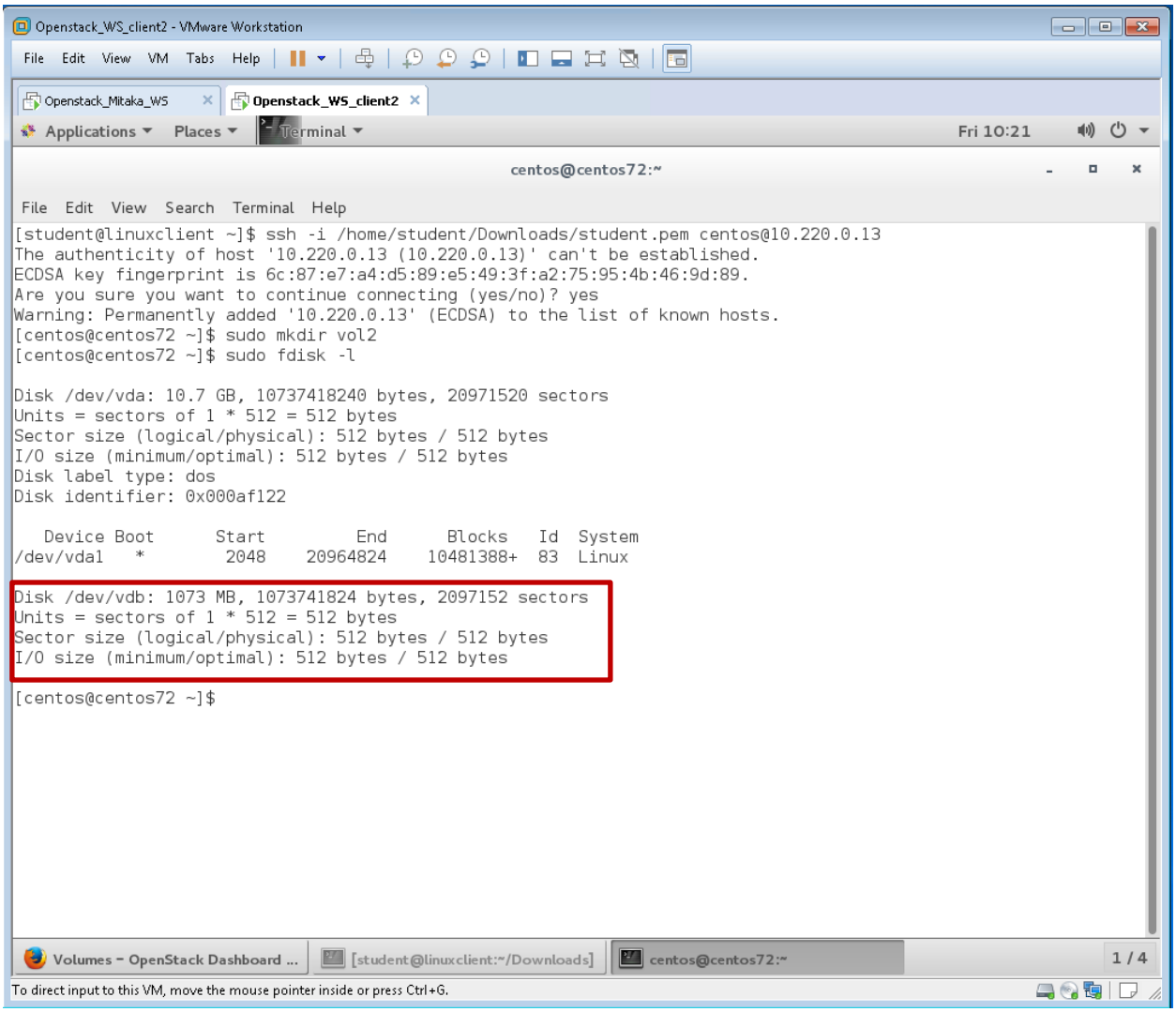

8. **Verify** that **vol1** is **Attached to CentOS7#2 on /dev/vdb**



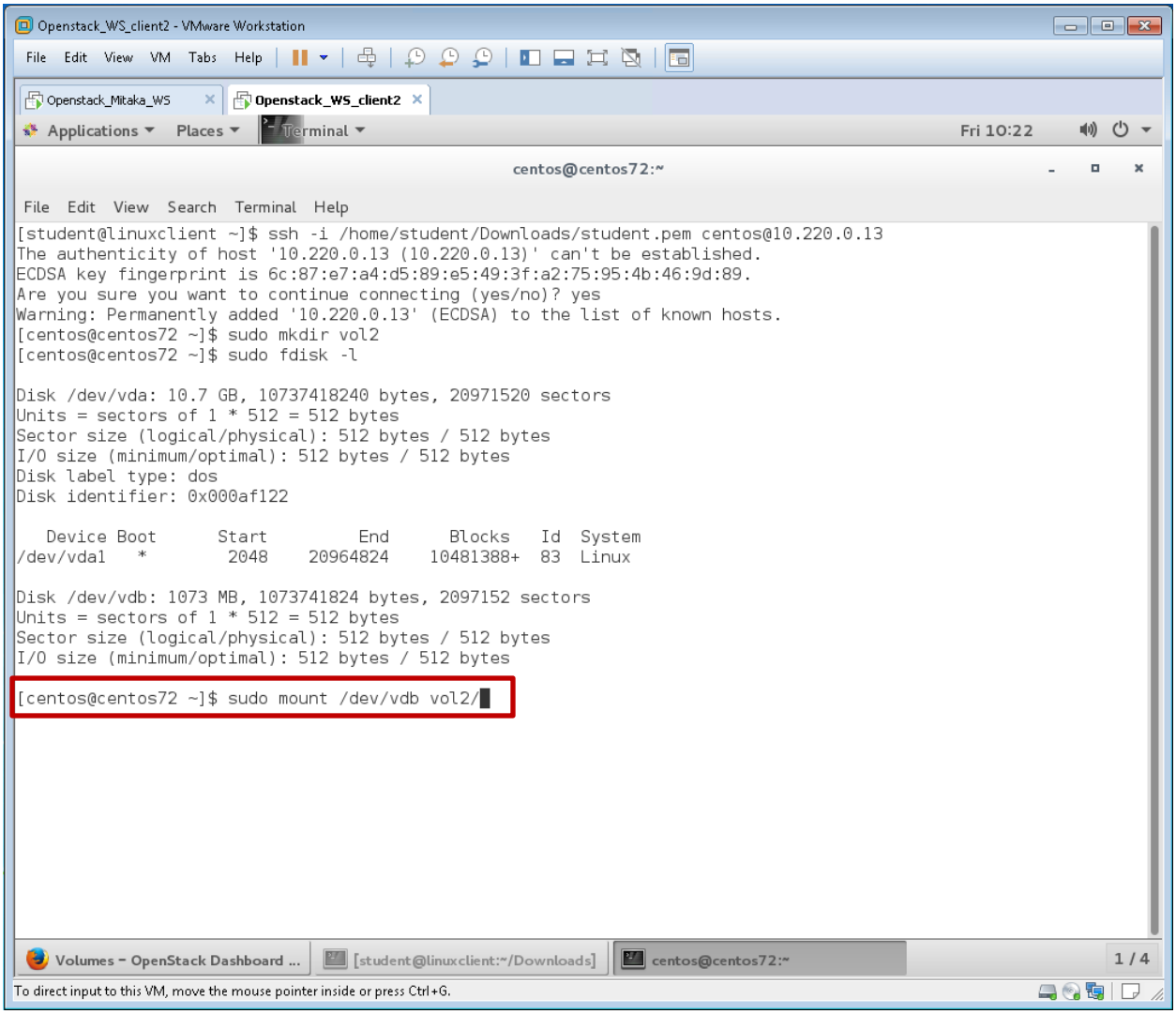

9. **SSH** into the **CentOS7#2 instance**.



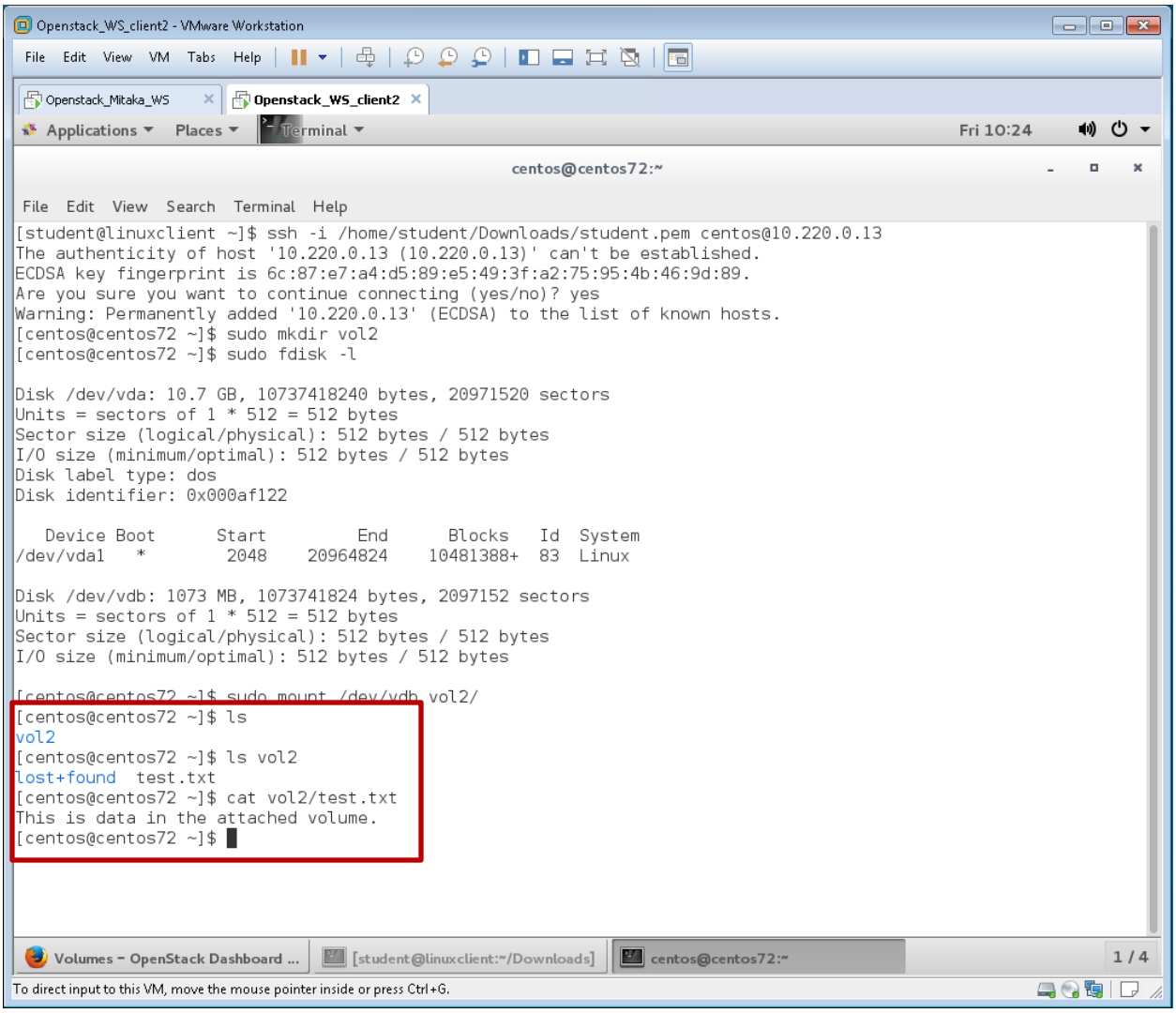

10. Create a new directory vol2 to mount the volume (disk) to using the # **sudo mkdir vol2** command.




11. Using the # **sudo fdisk -l** command, **verify** that **/dev/vdb is present**.



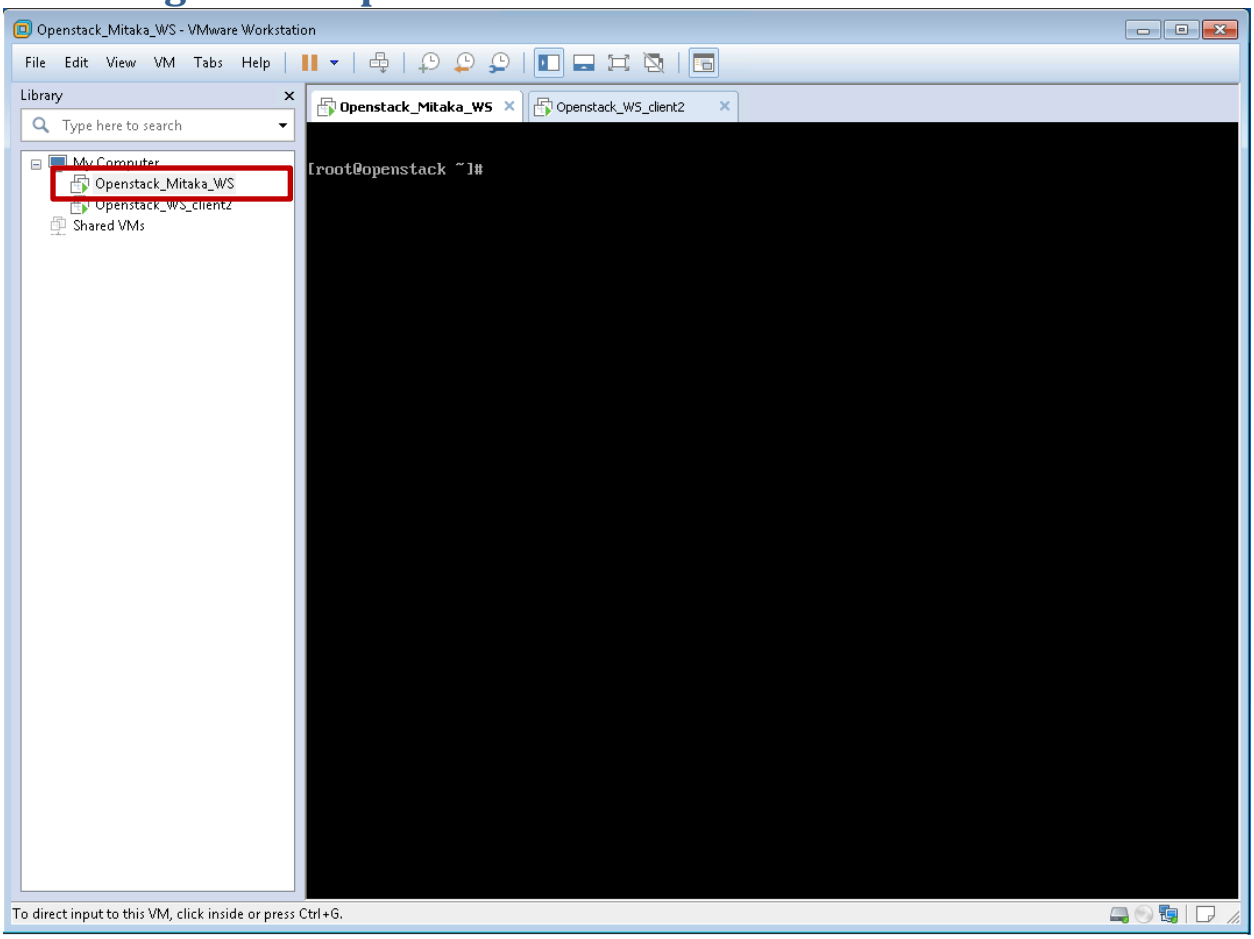

12. Mount /dev/vdb to the vol2 directory using the **# sudo mount /dev/vdb vol2/** command.




13. Using the ls and cat commands, verify that the data that was created on vol1, while attached to the CentOS 7 instance, is still present. The file system was retained and the only steps required where to create a directory and mount the /dev/vdb volume to that directory. Do not detach or umount the volume, the grade script will look for the attached volume. This completes the Module 9 labs.

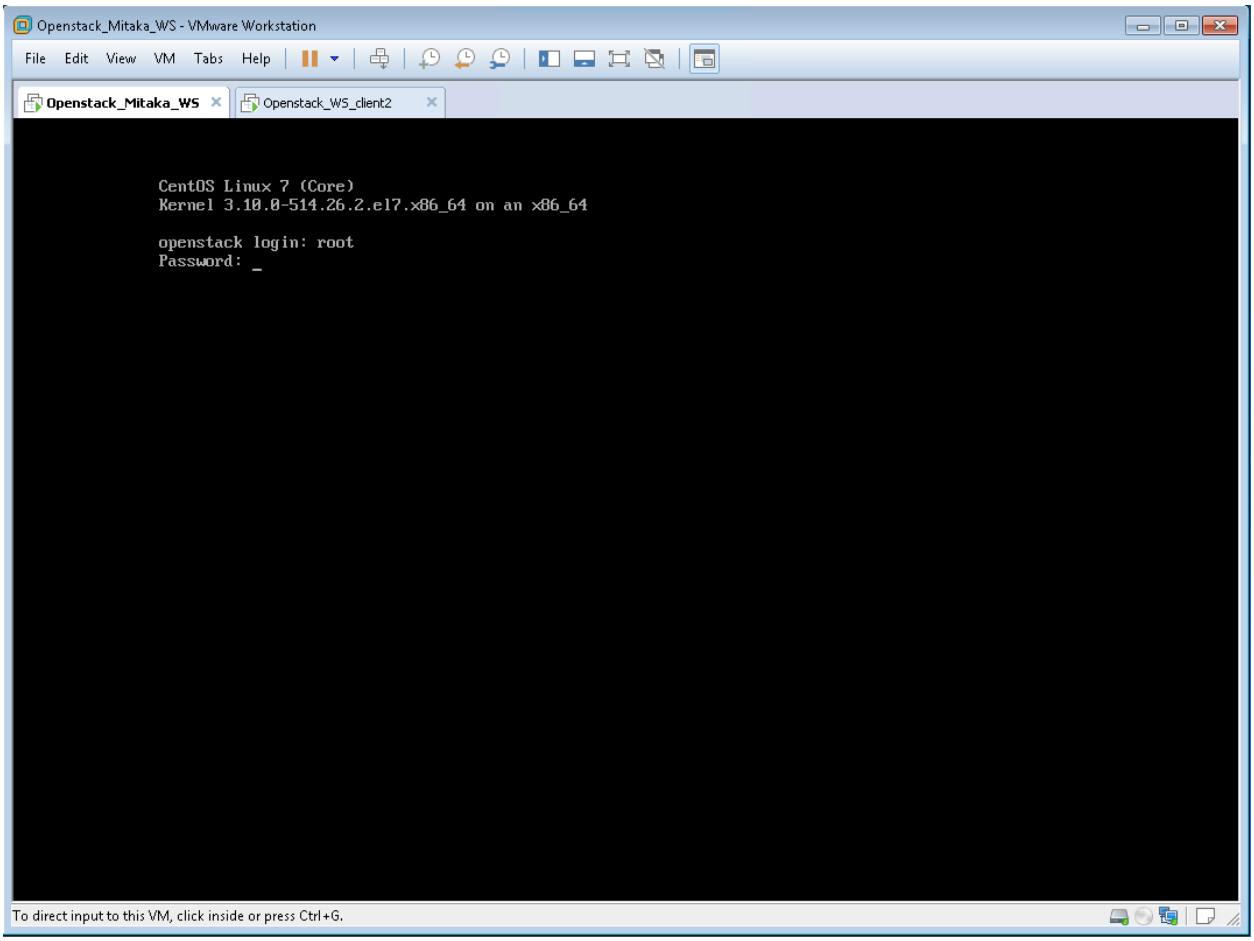
    Continue to the grade script.

# Run the grade script



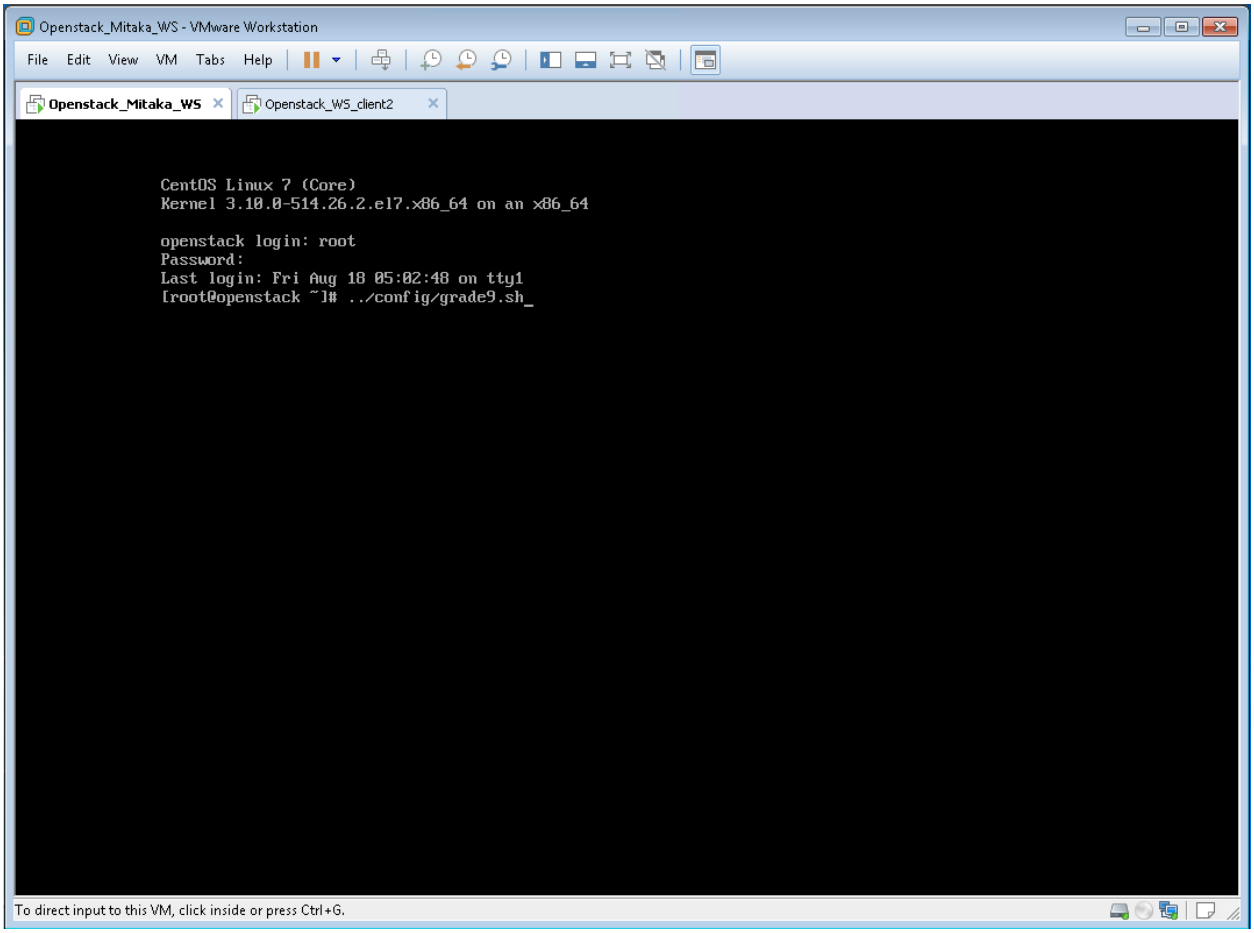

1. Return to Workstation and **Click** on **OpenStack_WS VM**

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

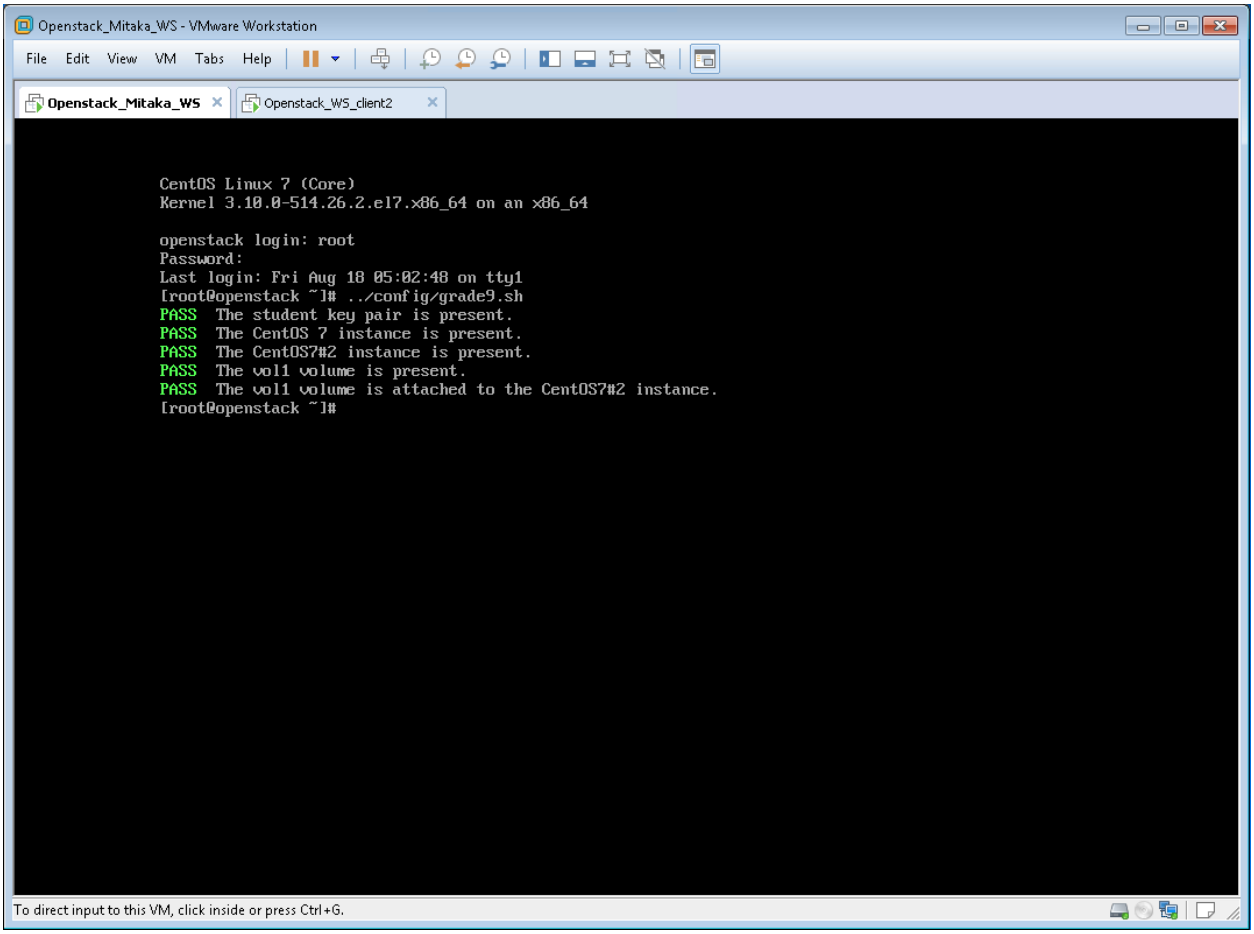



2. **Log in** as **root** with the Password: **P@ssword**

   Note: The password is NOT visible as you type it




3. Enter the command; **../config/grade9.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 9, 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.