Name: Clarence B. Chavez	**Date Performed:** August 24, 2024
Course/Section: CPE31S2	**Date Submitted:** August 24, 2024
Instructor: Engr. Robin Valenzuela	**Semester and SY:** 1st Sem (2024-2025)

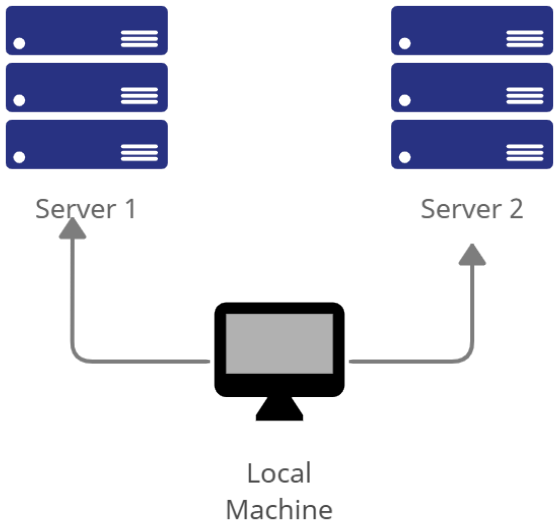
Activity 1: Configure Network using Virtual Machines

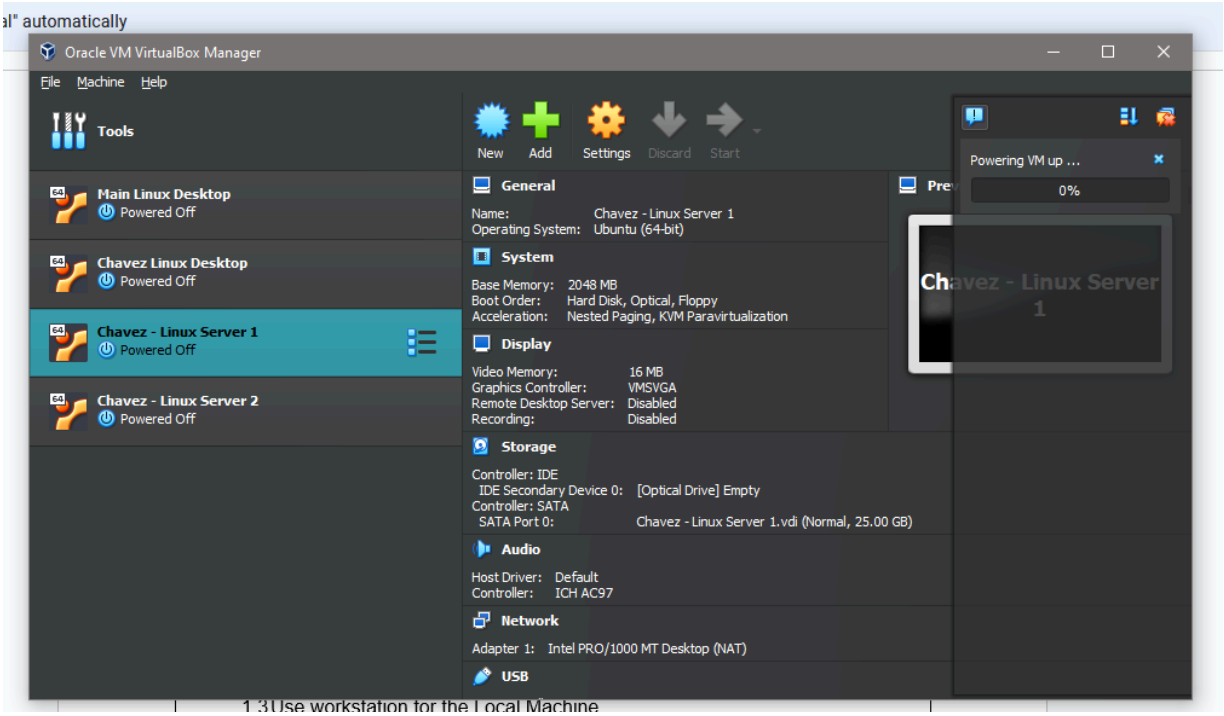
1. **Objectives:**
   1.1. Create and configure Virtual Machines in Microsoft Azure or VirtualBox
   1.2. Set-up a Virtual Network and Test Connectivity of VMs

2. **Discussion:**

Network Topology:

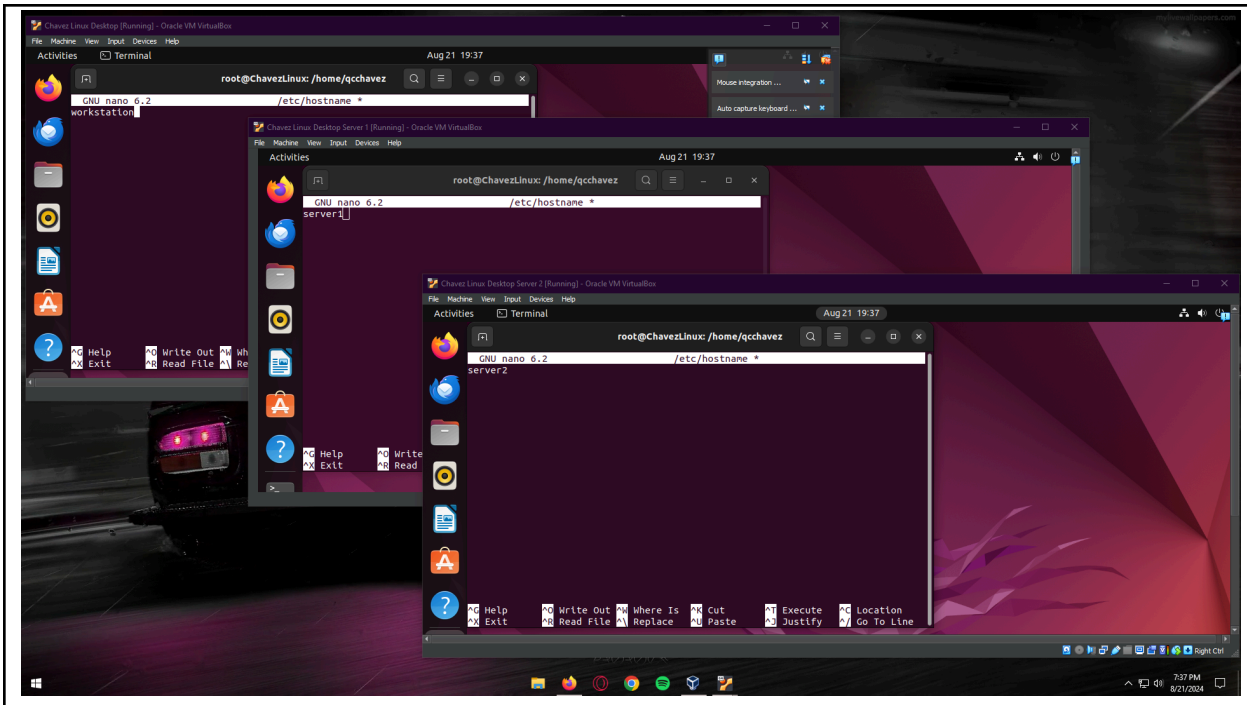
Assume that you have created the following network topology in Virtual Machines, *provide screenshots for each task*. (Note: *it is assumed that you have the prior knowledge of cloning and creating snapshots in a virtual machine*).

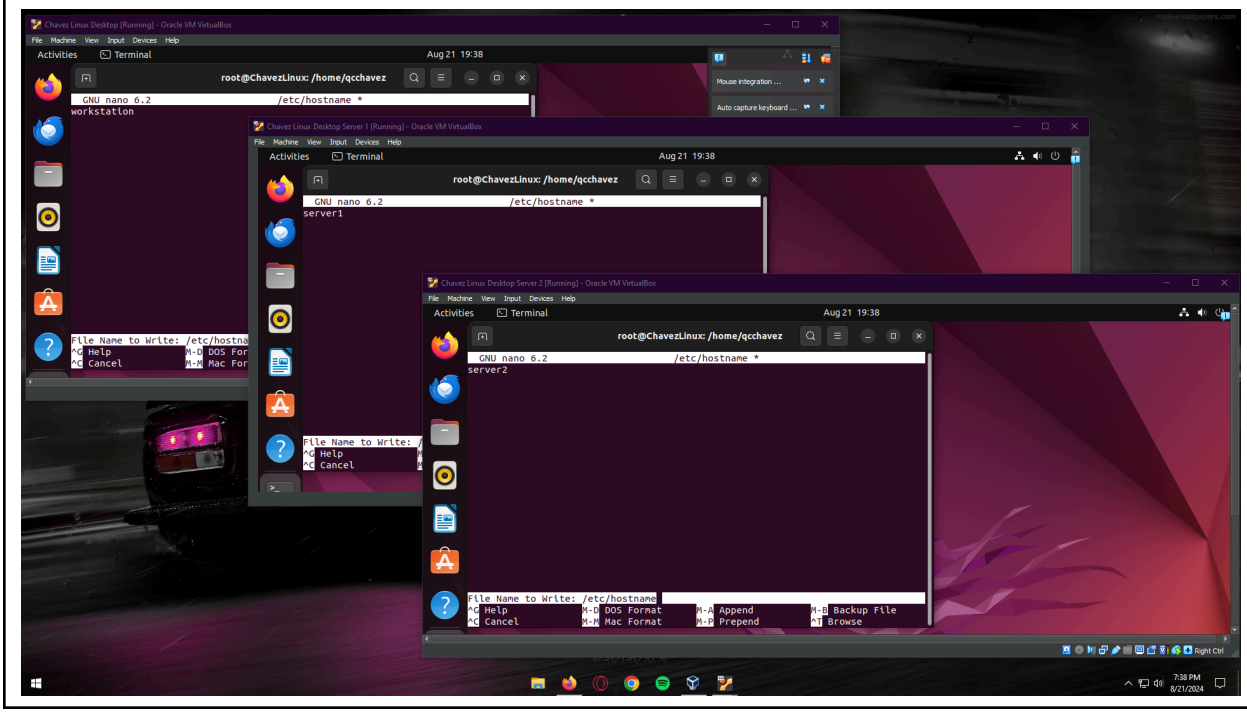


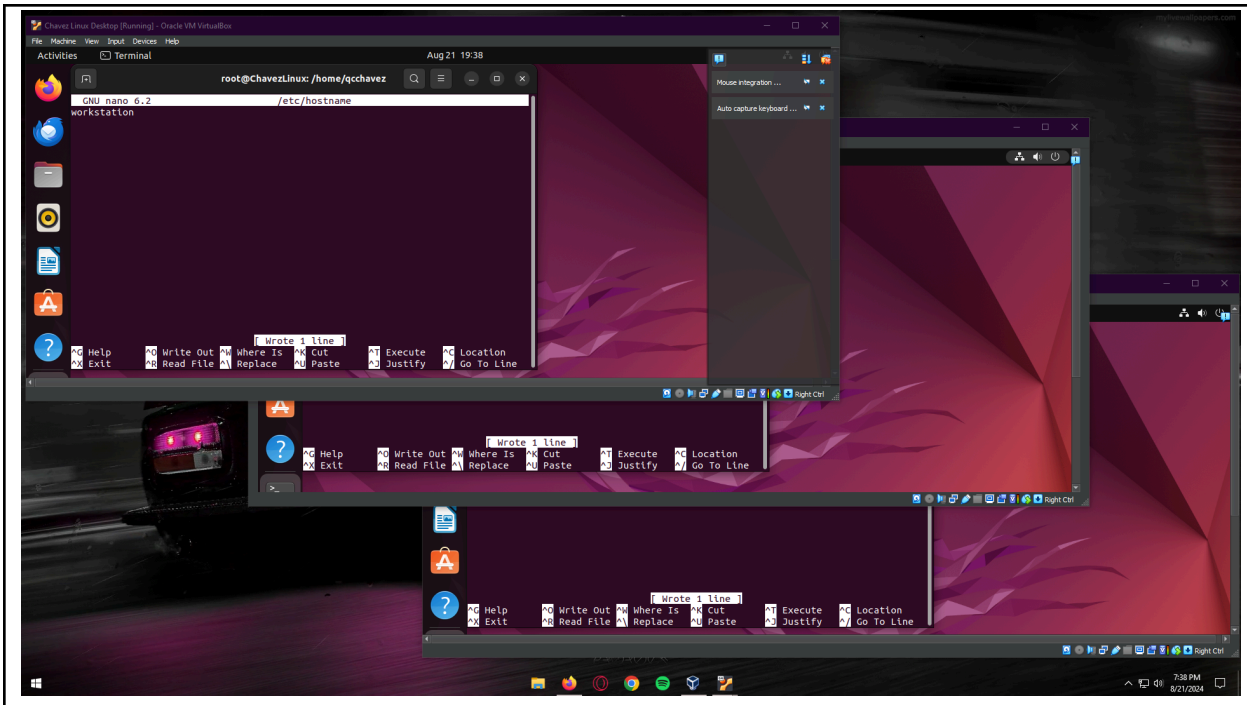


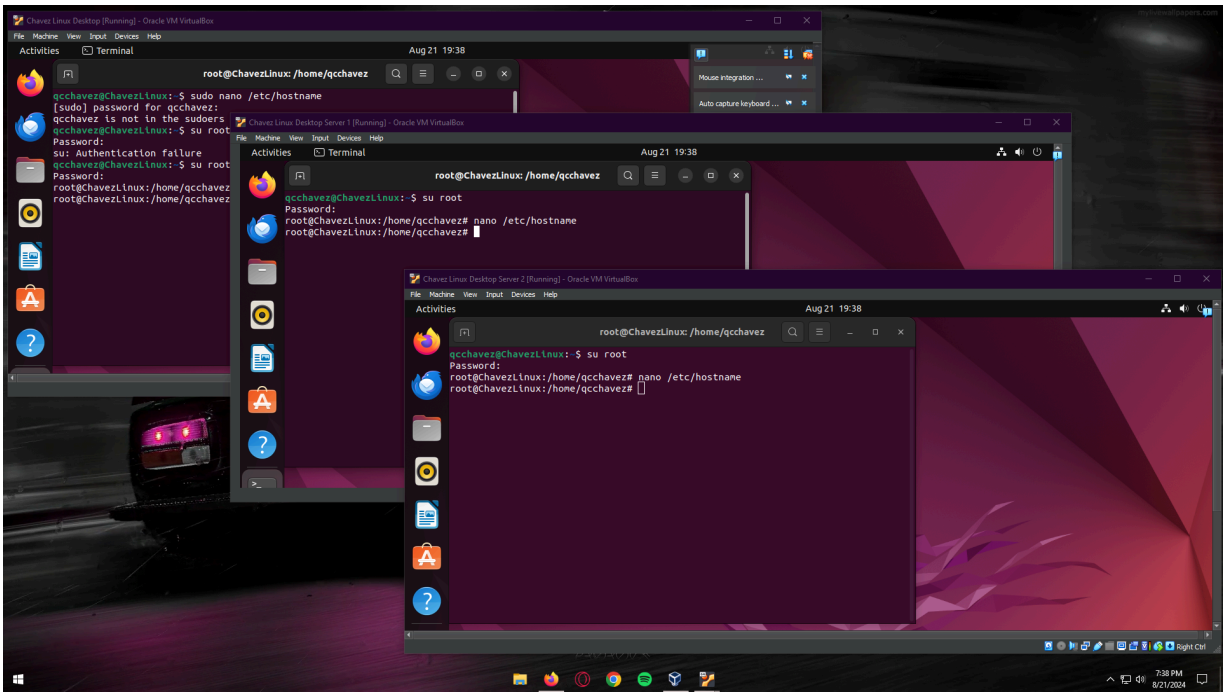
Task 1: Do the following on Server 1, Server 2, and Local Machine. In editing the file using nano command, press control + O to write out (save the file). Press enter when asked for the name of the file. Press control + X to end.

1. Change the hostname using the command *sudo nano /etc/hostname*
   1.1 Use server1 for Server 1
   1.2 Use server2 for Server 2
   1.3 Use workstation for the Local Machine

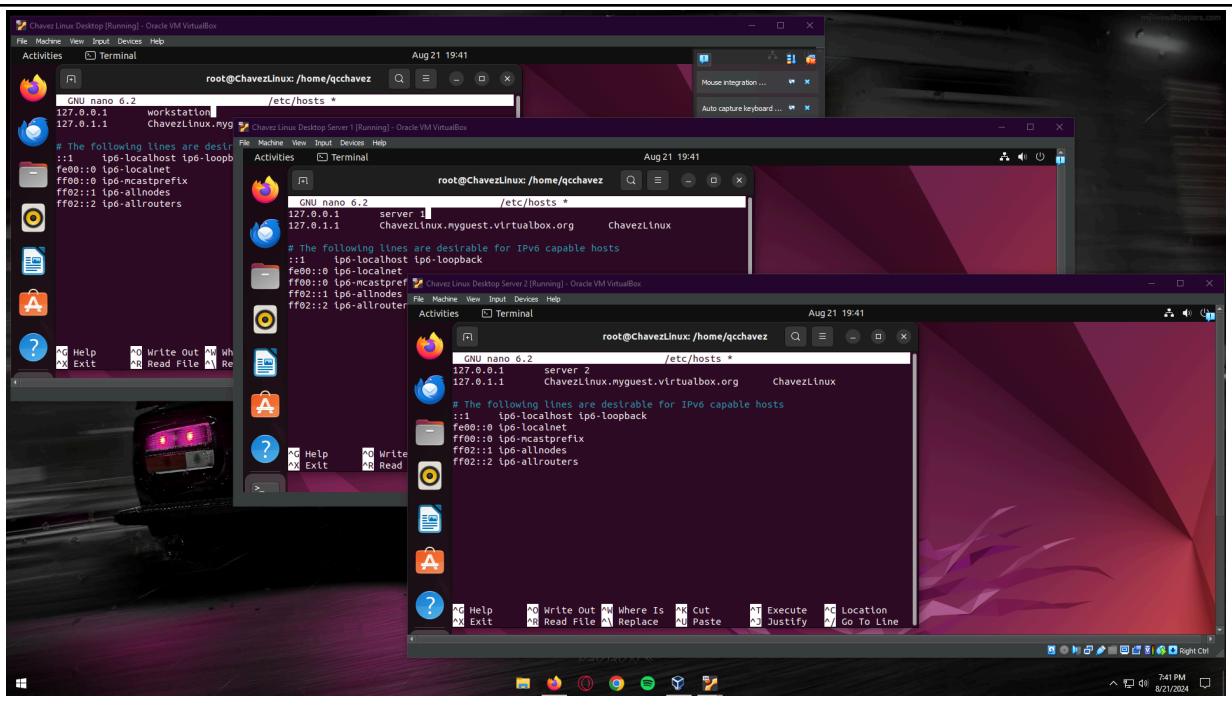

Chavez Linux Desktop [Running] - Oracle VM VirtualBox
Activities
Terminal
Aug 21 19:37
root@ChavezLinux: /home/qcchavez
GNU nano 6.2 /etc/hostname *
workstation
server1
server2
^G Help
^X Exit
^O Write Out
^R Read File
^W Where Is
^\ Replace
^K Cut
^U Paste
^T Execute
^J Justify
^C Location
M-/ Go To Line
Mouse integration ...
Auto capture keyboard ...
7:37 PM
8/21/2024

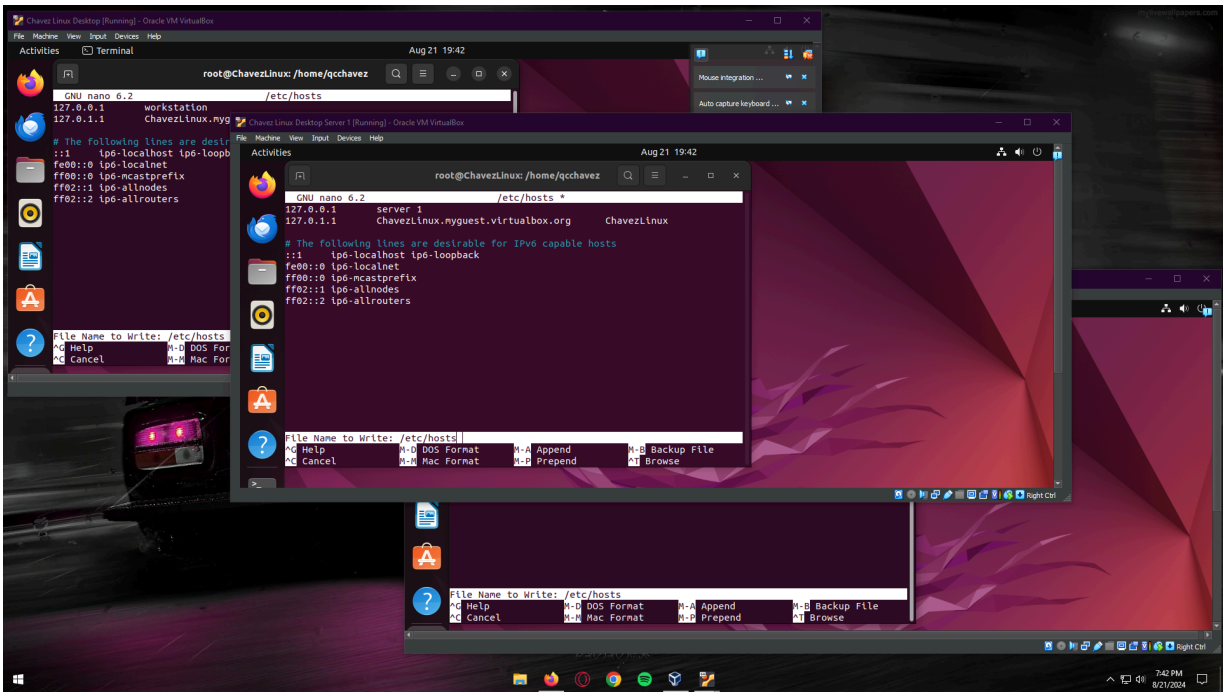

Chavez Linux Desktop [Running] - Oracle VM VirtualBox
Activities
Terminal
Aug 21 19:38
root@ChavezLinux: /home/qcchavez
GNU nano 6.2 /etc/hostname *
workstation
server1
server2
File Name to Write: /etc/hostname
^G Help
^C Cancel
M-D DOS Format
M-M Mac Format
M-A Append
M-P Prepend
M-B Backup File
^T Browse
Mouse integration ...
Auto capture keyboard ...
7:38 PM
8/21/2024

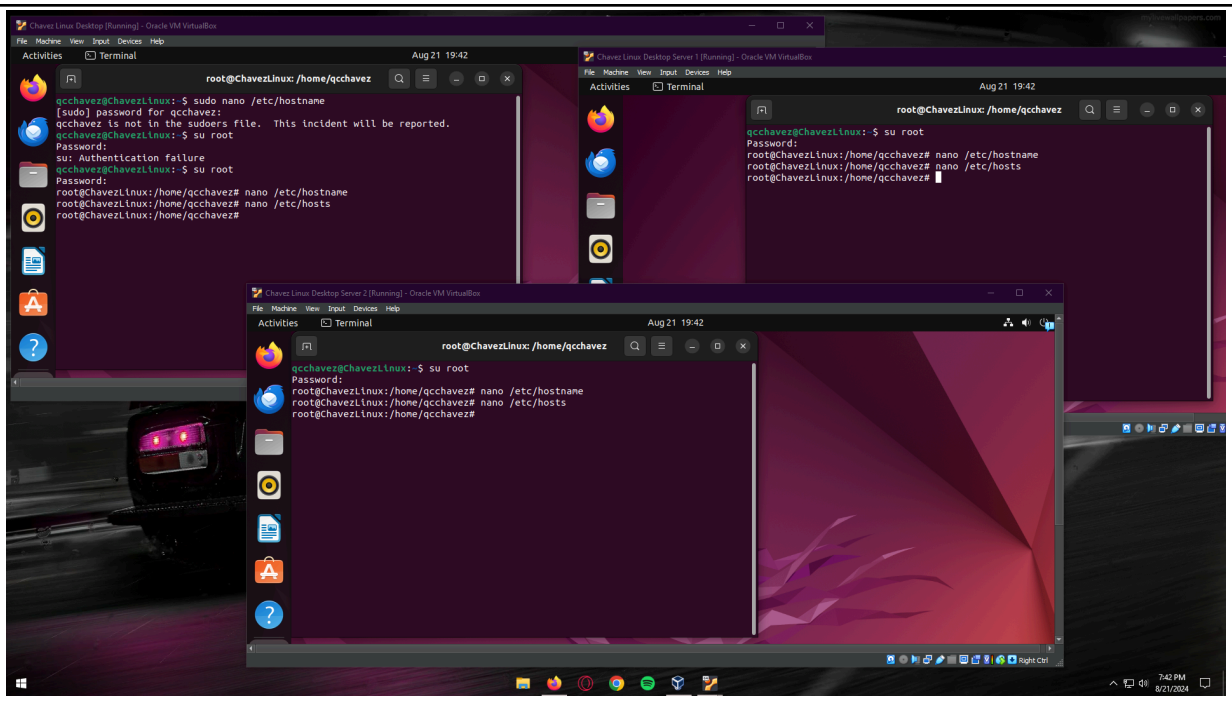

Chavez Linux Desktop [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Aug 21 19:38
root@ChavezLinux: /home/qcchavez
GNU nano 6.2 /etc/hostname
workstation
[Wrote 1 line]
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line
Mouse integration ...
Auto capture keyboard ...
Right Ctrl
7:38 PM
8/21/2024


Chavez Linux Desktop [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Aug 21 19:38
root@ChavezLinux: /home/qcchavez
qcchavez@ChavezLinux:~$ sudo nano /etc/hostname
[sudo] password for qcchavez:
qcchavez is not in the sudoers
qcchavez@ChavezLinux:~$ su root
Password:
su: Authentication failure
qcchavez@ChavezLinux:~$ su root
Password:
root@ChavezLinux:/home/qcchavez
root@ChavezLinux:/home/qcchavez
Chavez Linux Desktop Server 1 [Running] - Oracle VM VirtualBox
qcchavez@ChavezLinux:~$ su root
Password:
root@ChavezLinux:/home/qcchavez# nano /etc/hostname
root@ChavezLinux:/home/qcchavez#
Chavez Linux Desktop Server 2 [Running] - Oracle VM VirtualBox
qcchavez@ChavezLinux:~$ su root
Password:
root@ChavezLinux:/home/qcchavez# nano /etc/hostname
root@ChavezLinux:/home/qcchavez#
Right Ctrl
7:38 PM
8/21/2024

2. Edit the hosts using the command *sudo nano /etc/hosts*. Edit the second line.
   2.1 Type 127.0.0.1 server 1 for Server 1
   2.2 Type 127.0.0.1 server 2 for Server 2
   2.3 Type 127.0.0.1 workstation for the Local Machine

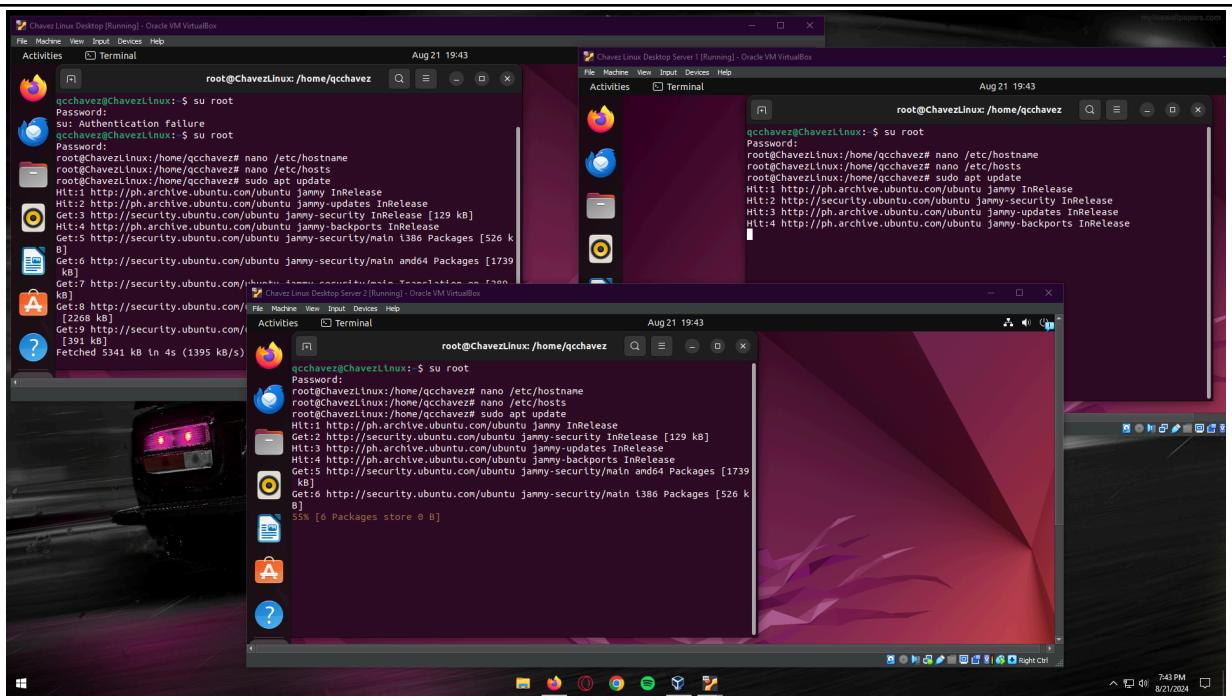

Chavez Linux Desktop [Running] - Oracle VM VirtualBox
Activities
Terminal
Aug 21 19:41
root@ChavezLinux: /home/qcchavez
GNU nano 6.2 /etc/hosts *
127.0.0.1 workstation
127.0.1.1 ChavezLinux.myg
The following lines are desir
::1 ip6-localhost ip6-loopb
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
^G Help ^O Write Out ^W Wh
^X Exit ^R Read File ^\ Re
Chavez Linux Desktop Server 1 [Running] - Oracle VM VirtualBox
Activities
Terminal
Aug 21 19:41
root@ChavezLinux: /home/qcchavez
GNU nano 6.2 /etc/hosts *
127.0.0.1 server 1
127.0.1.1 ChavezLinux.myguest.virtualbox.org ChavezLinux
The following lines are desirable for IPv6 capable hosts
::1 ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastpref
ff02::1 ip6-allnodes
ff02::2 ip6-allrouter
^G Help ^O Write
^X Exit ^R Read
Chavez Linux Desktop Server 2 [Running] - Oracle VM VirtualBox
Activities
Terminal
Aug 21 19:41
root@ChavezLinux: /home/qcchavez
GNU nano 6.2 /etc/hosts *
127.0.0.1 server 2
127.0.1.1 ChavezLinux.myguest.virtualbox.org ChavezLinux
The following lines are desirable for IPv6 capable hosts
::1 ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line
Right Ctrl
7:41 PM
8/21/2024

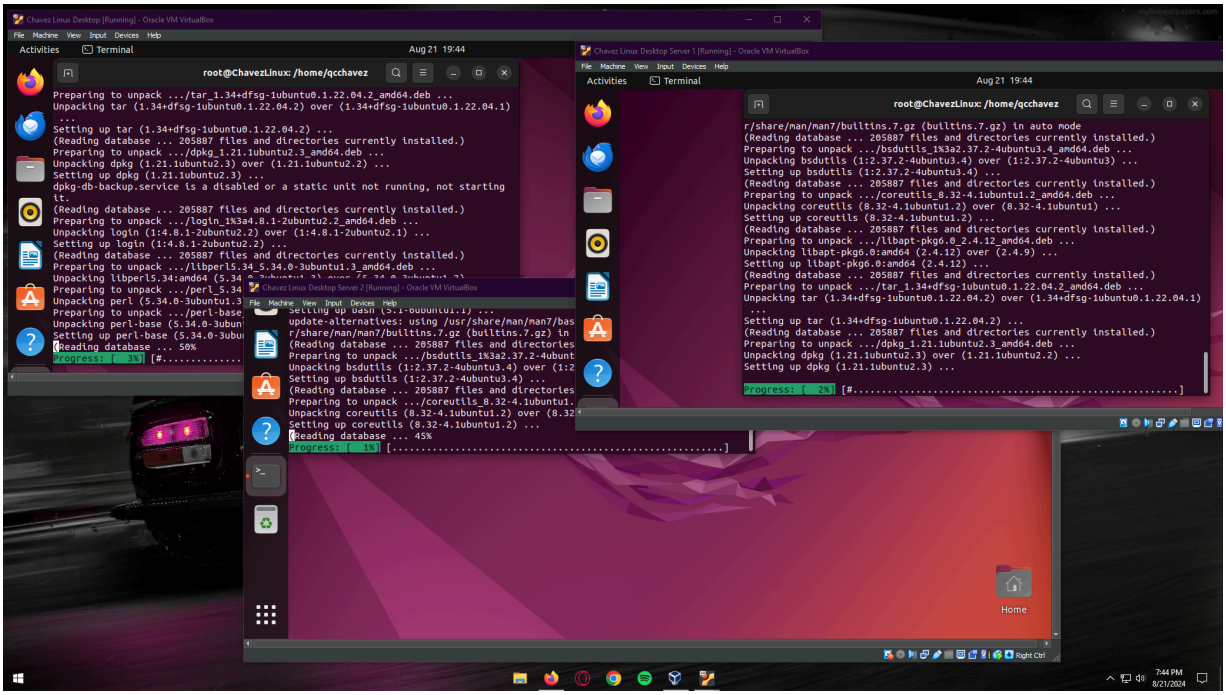

Chavez Linux Desktop [Running] - Oracle VM VirtualBox
Activities
Terminal
Aug 21 19:42
root@ChavezLinux: /home/qcchavez
GNU nano 6.2 /etc/hosts
127.0.0.1 workstation
127.0.1.1 ChavezLinux.myg
The following lines are desir
::1 ip6-localhost ip6-loopb
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
File Name to Write: /etc/hosts
^G Help M-D DOS For
^C Cancel M-M Mac For
Chavez Linux Desktop Server 1 [Running] - Oracle VM VirtualBox
Activities
Aug 21 19:42
root@ChavezLinux: /home/qcchavez
GNU nano 6.2 /etc/hosts *
127.0.0.1 server 1
127.0.1.1 ChavezLinux.myguest.virtualbox.org ChavezLinux
The following lines are desirable for IPv6 capable hosts
::1 ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
File Name to Write: /etc/hosts
^G Help M-D DOS Format M-A Append M-B Backup File
^C Cancel M-M Mac Format M-P Prepend ^T Browse
File Name to Write: /etc/hosts
^G Help M-D DOS Format M-A Append M-B Backup File
^C Cancel M-M Mac Format M-P Prepend ^T Browse
Right Ctrl
7:42 PM
8/21/2024



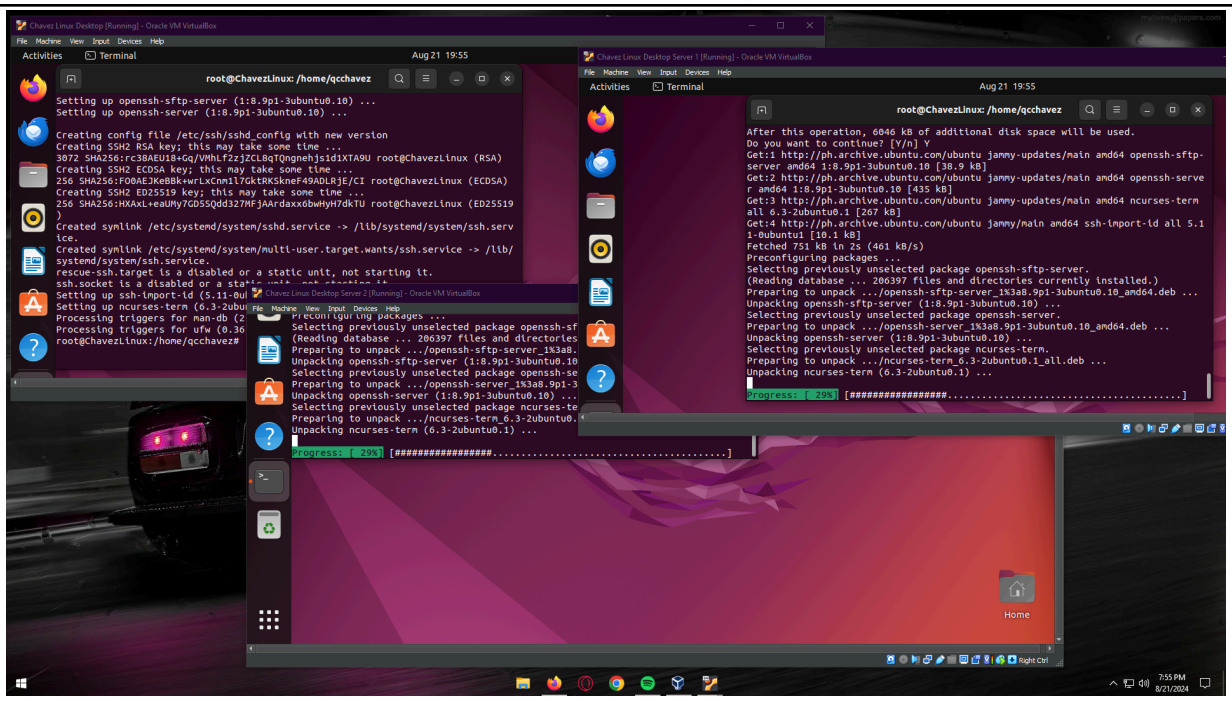
Task 2: Configure SSH on Server 1, Server 2, and Local Machine. Do the following:

1. Upgrade the packages by issuing the command *sudo apt update* and *sudo apt upgrade* respectively.



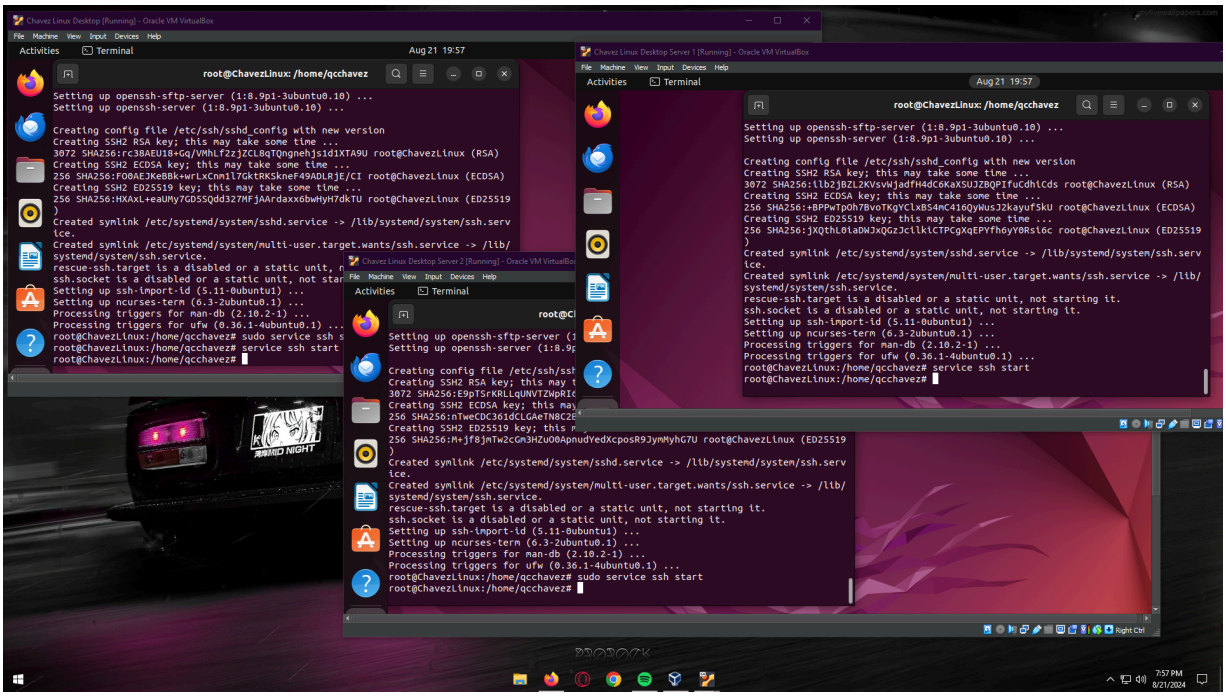


2. Install the SSH server using the command *sudo apt install openssh-server*.

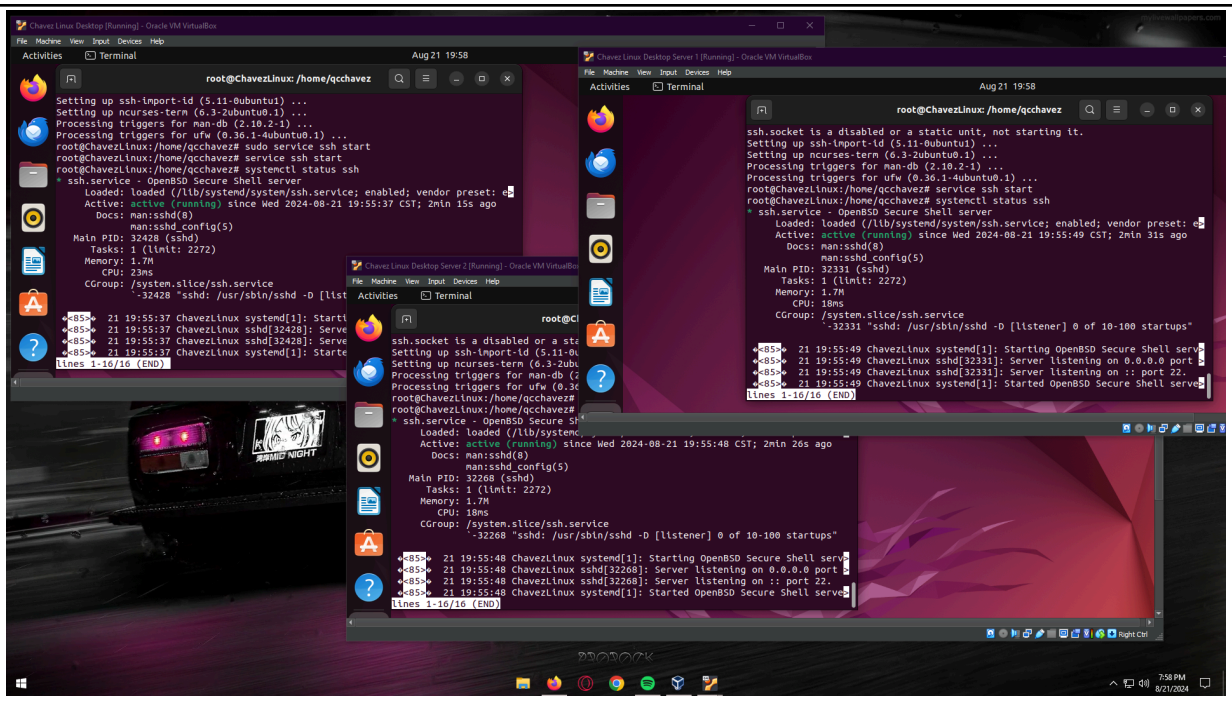


3. Verify if the SSH service has started by issuing the following commands:

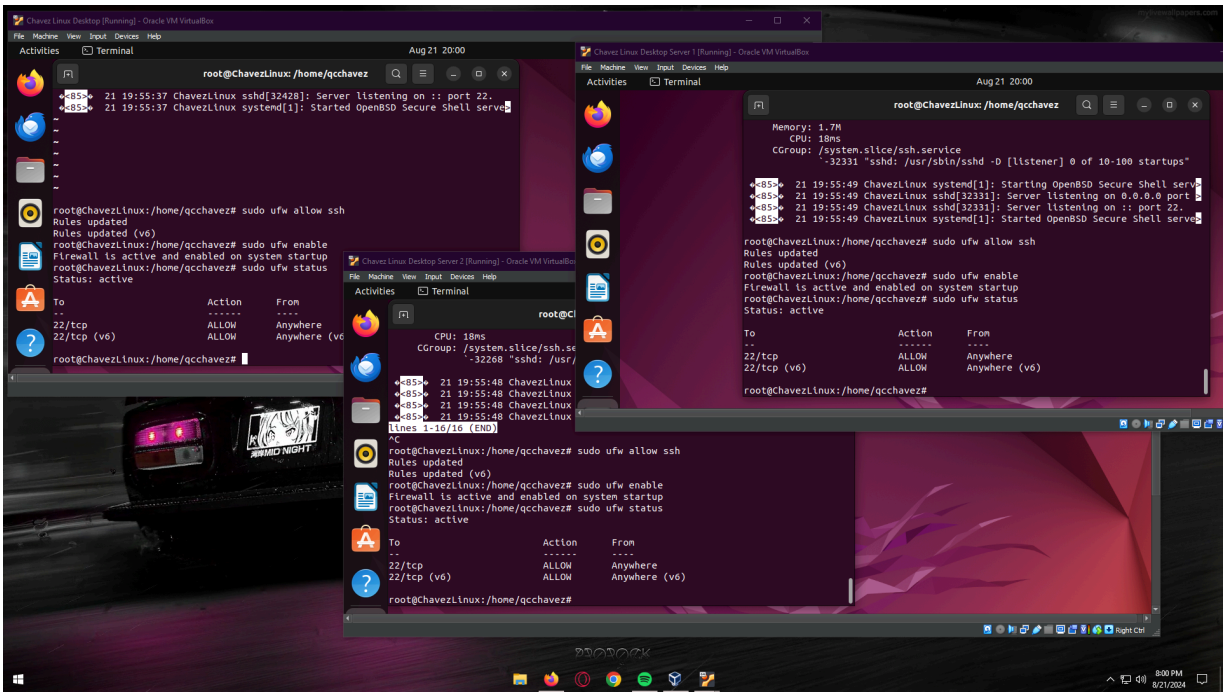
   3.1 *sudo service ssh start*



   3.2 *sudo systemctl status ssh*

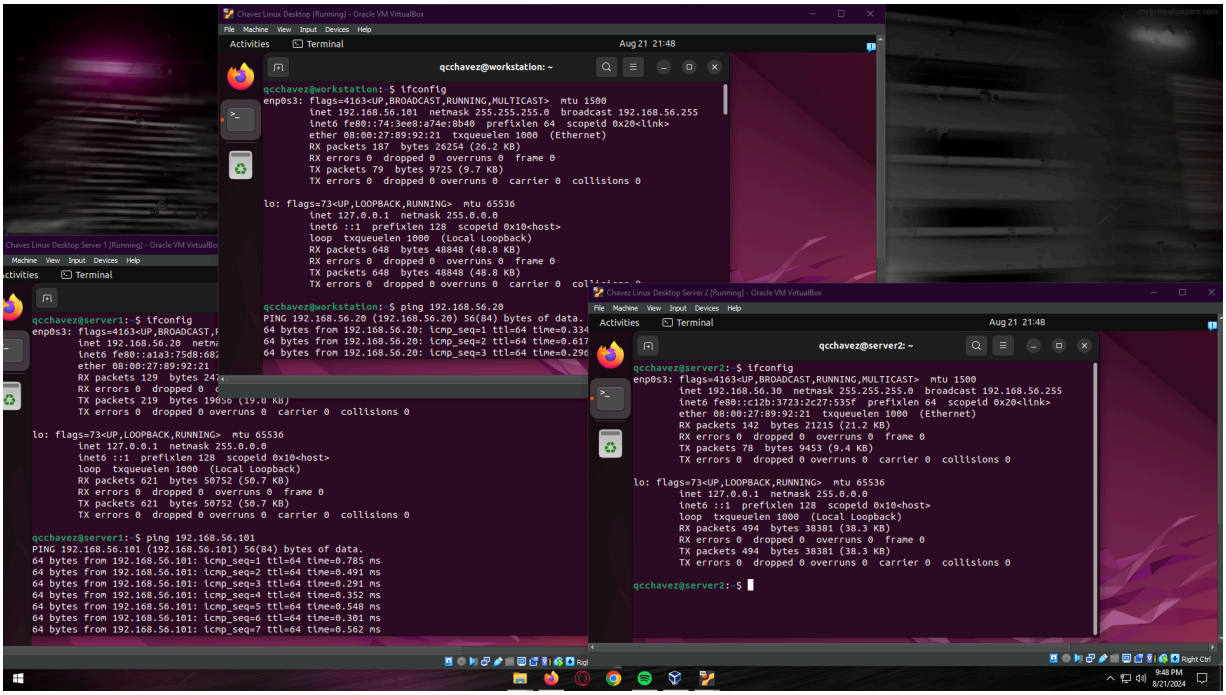


4. Configure the firewall to all port 22 by issuing the following commands:
   4.1 *sudo ufw allow ssh*
   4.2 *sudo ufw enable*
   4.3 *sudo ufw status*



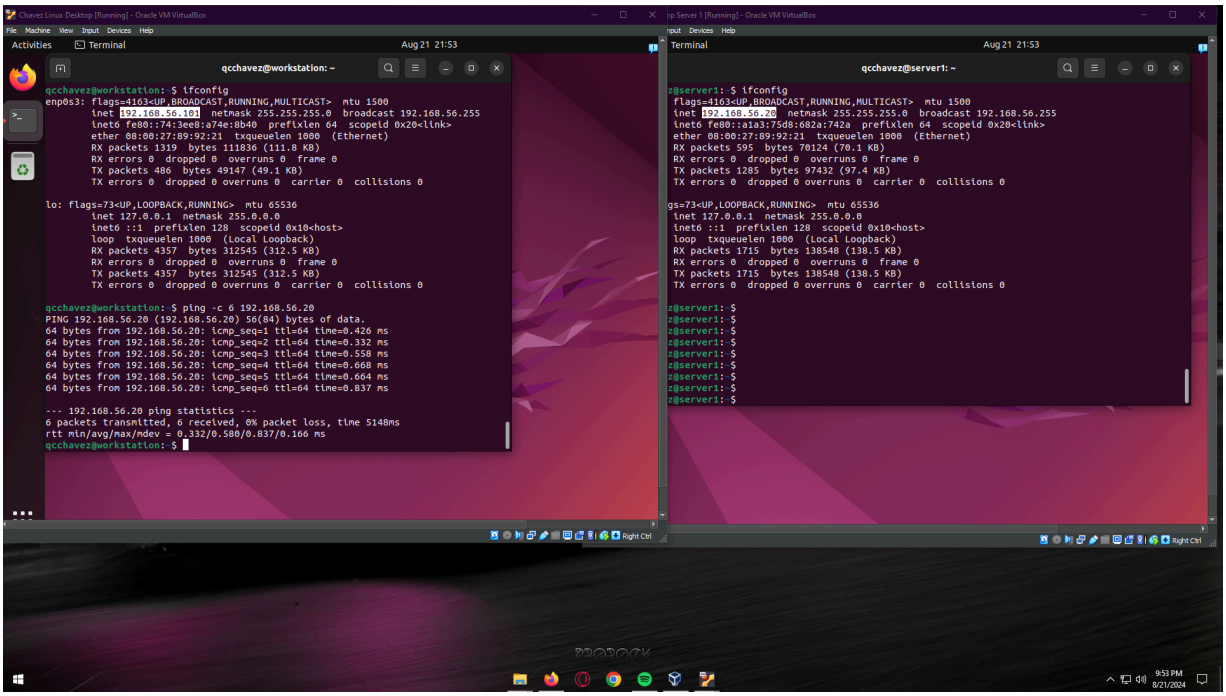
Task 3: Verify network settings on Server 1, Server 2, and Local Machine. On each device, do the following:

1. Record the ip address of Server 1, Server 2, and Local Machine. Issue the command *ifconfig* and check network settings. Note that the ip addresses of all the machines are in this network 192.168.56.XX.
   1.1 Server 1 IP address: 192.168.56.20
   1.2 Server 2 IP address: 192.168.56.30
   1.3 Local Machine IP address: 192.168.56.101

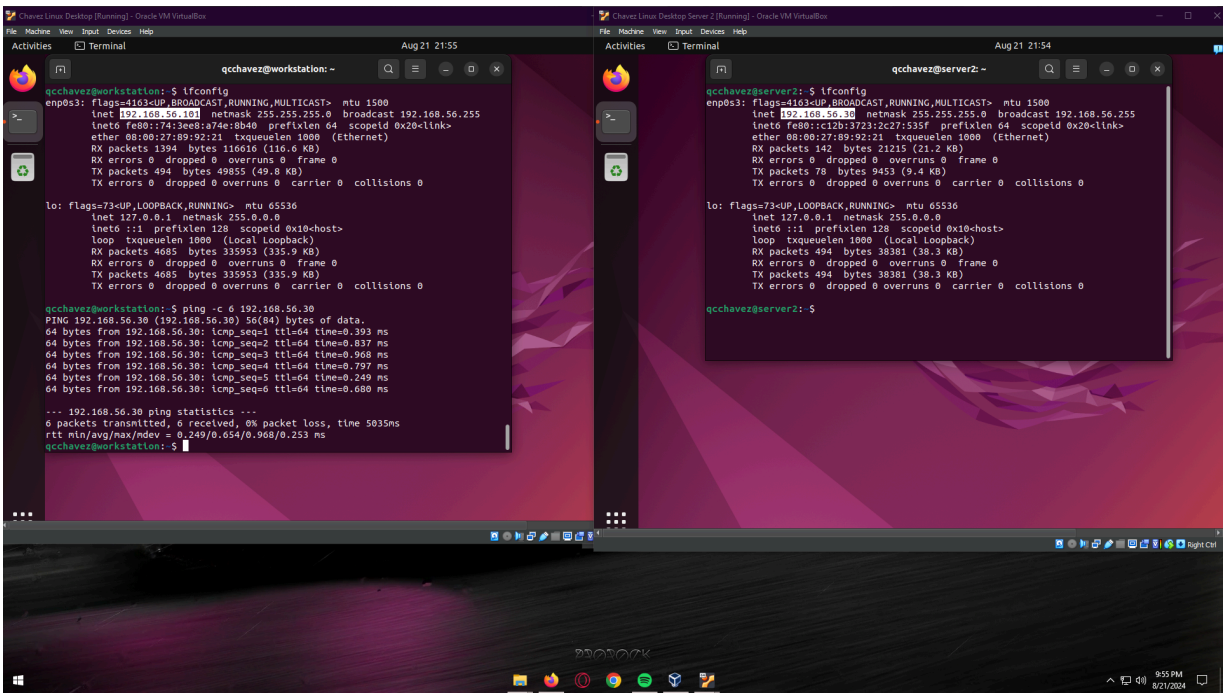


2. Make sure that they can ping each other.

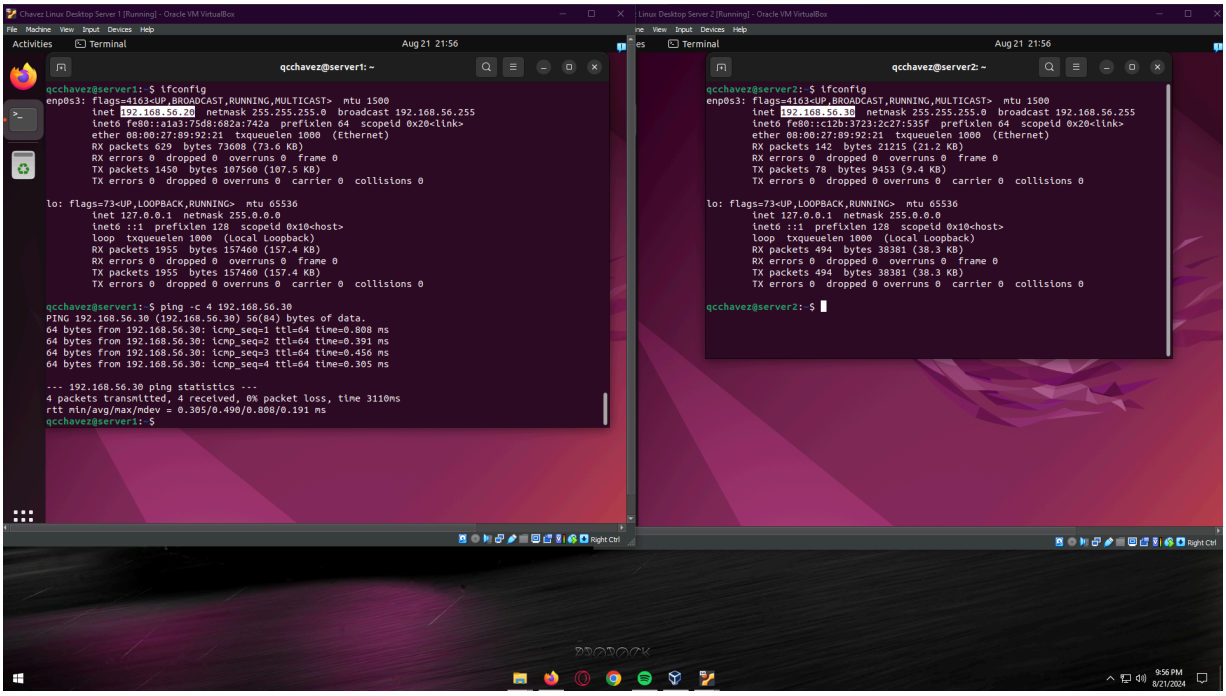
2.1 Connectivity test for Local Machine 1 to Server 1: ☑ **Successful** ☐ Not Successful



2.2 Connectivity test for Local Machine 1 to Server 2: ☑ **Successful** ☐ Not Successful



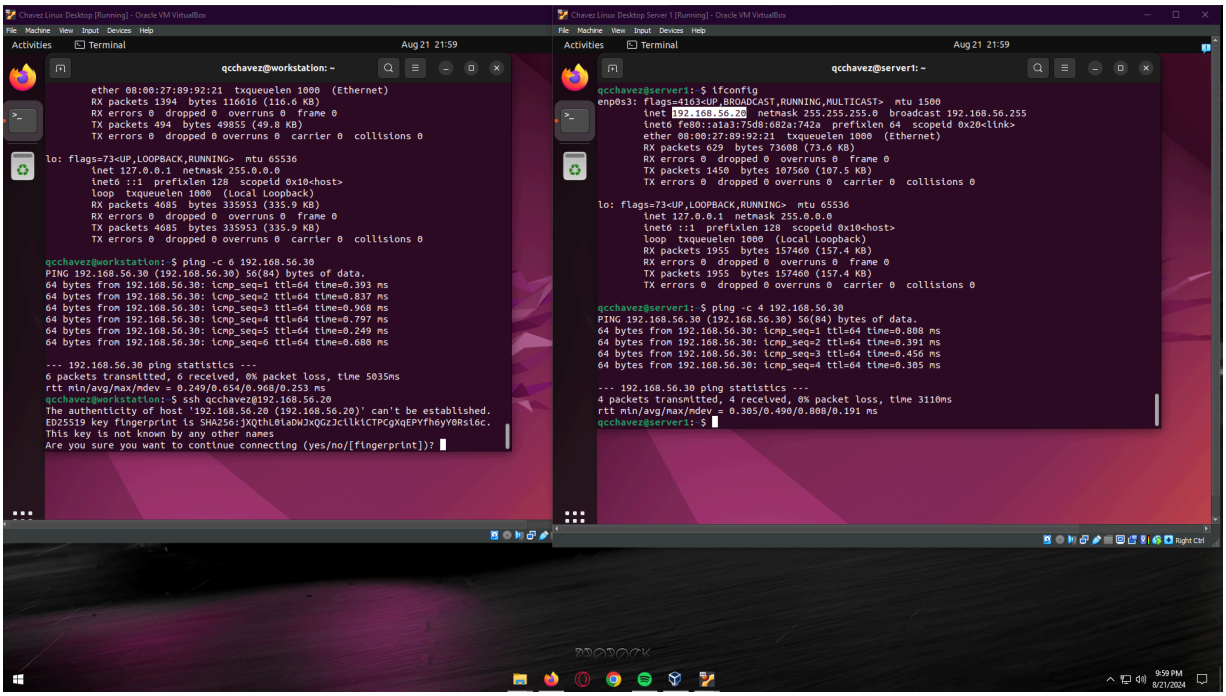
2.3 Connectivity test for Server 1 to Server 2: ☑ **Successful** ☐ Not Successful



Task 4: Verify SSH connectivity on Server 1, Server 2, and Local Machine.

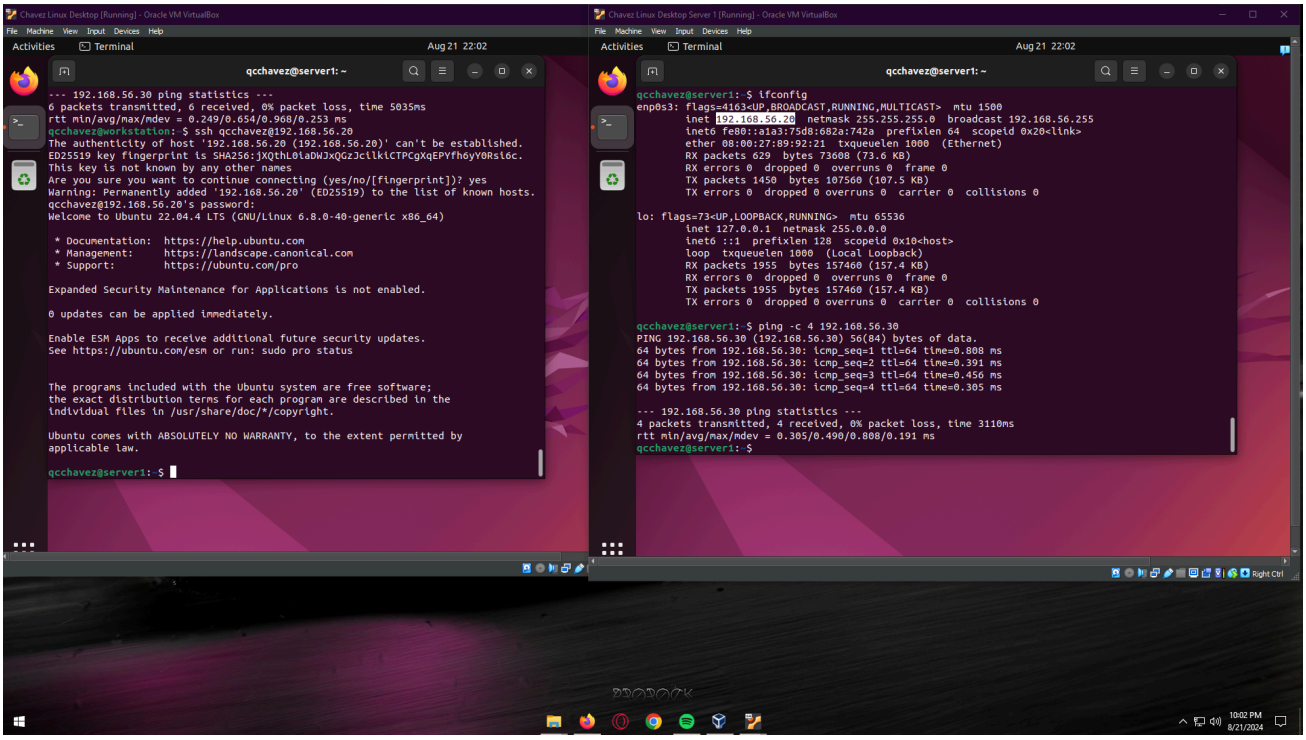
1. On the Local Machine, issue the following commands:

1.1 ssh username@ip_address_server1 for example, *ssh jvtaylar@192.168.*

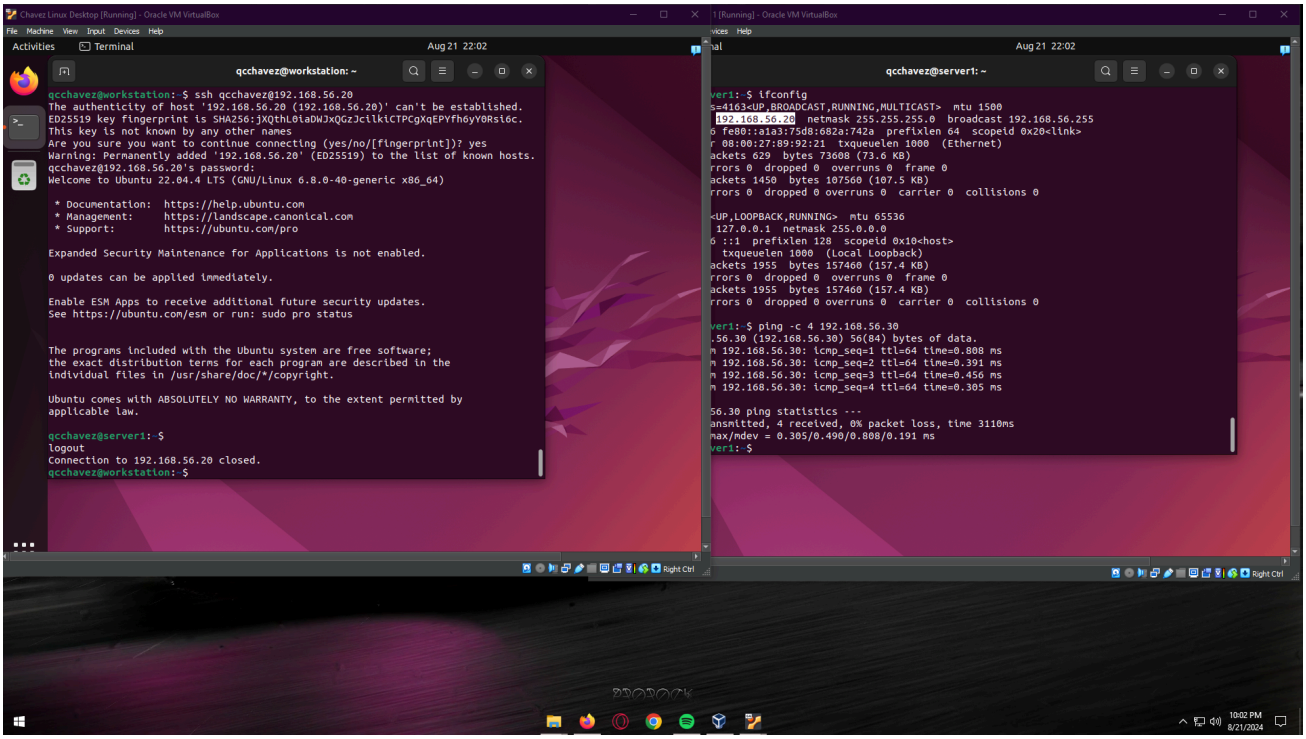


1.2 Enter the password for server 1 when prompted

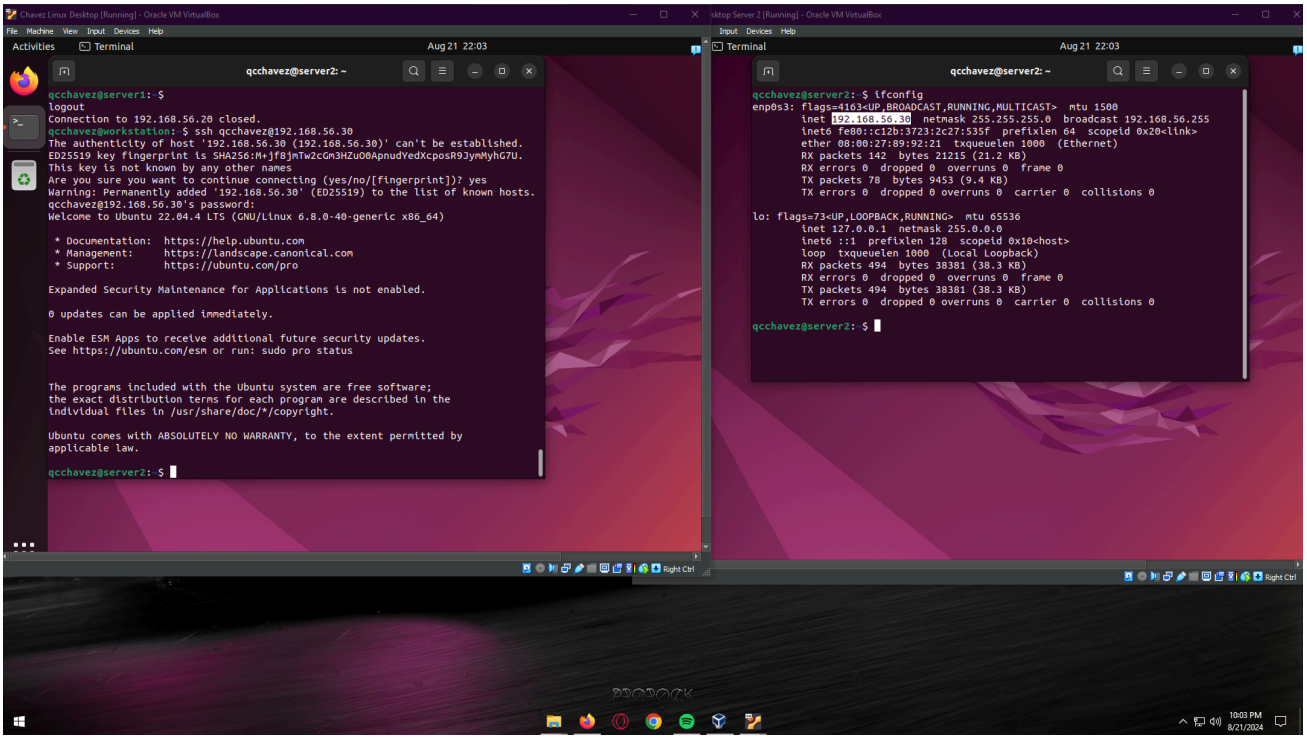
1.3 Verify that you are in server 1. The user should be in this format user@server1. For example, *jvtaylar@server1*

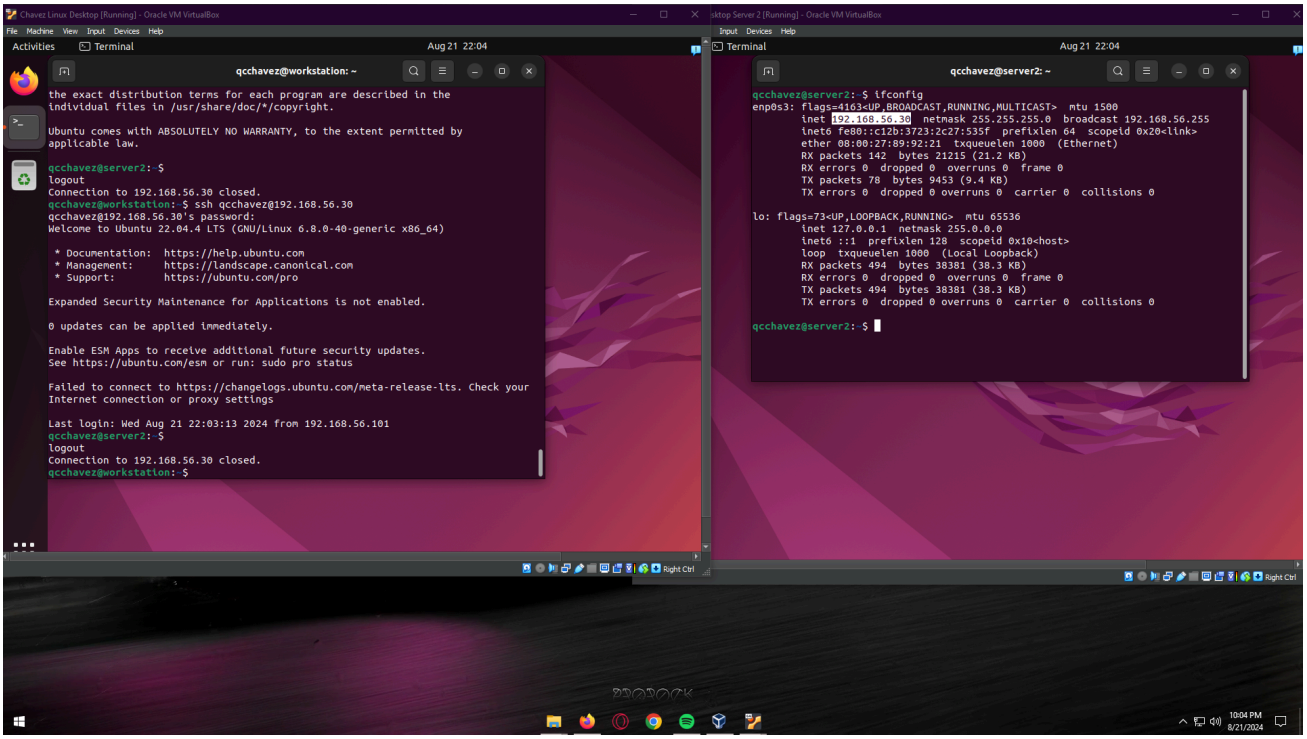


2. Logout of Server 1 by issuing the command *control + D.*



3. Do the same for Server 2.



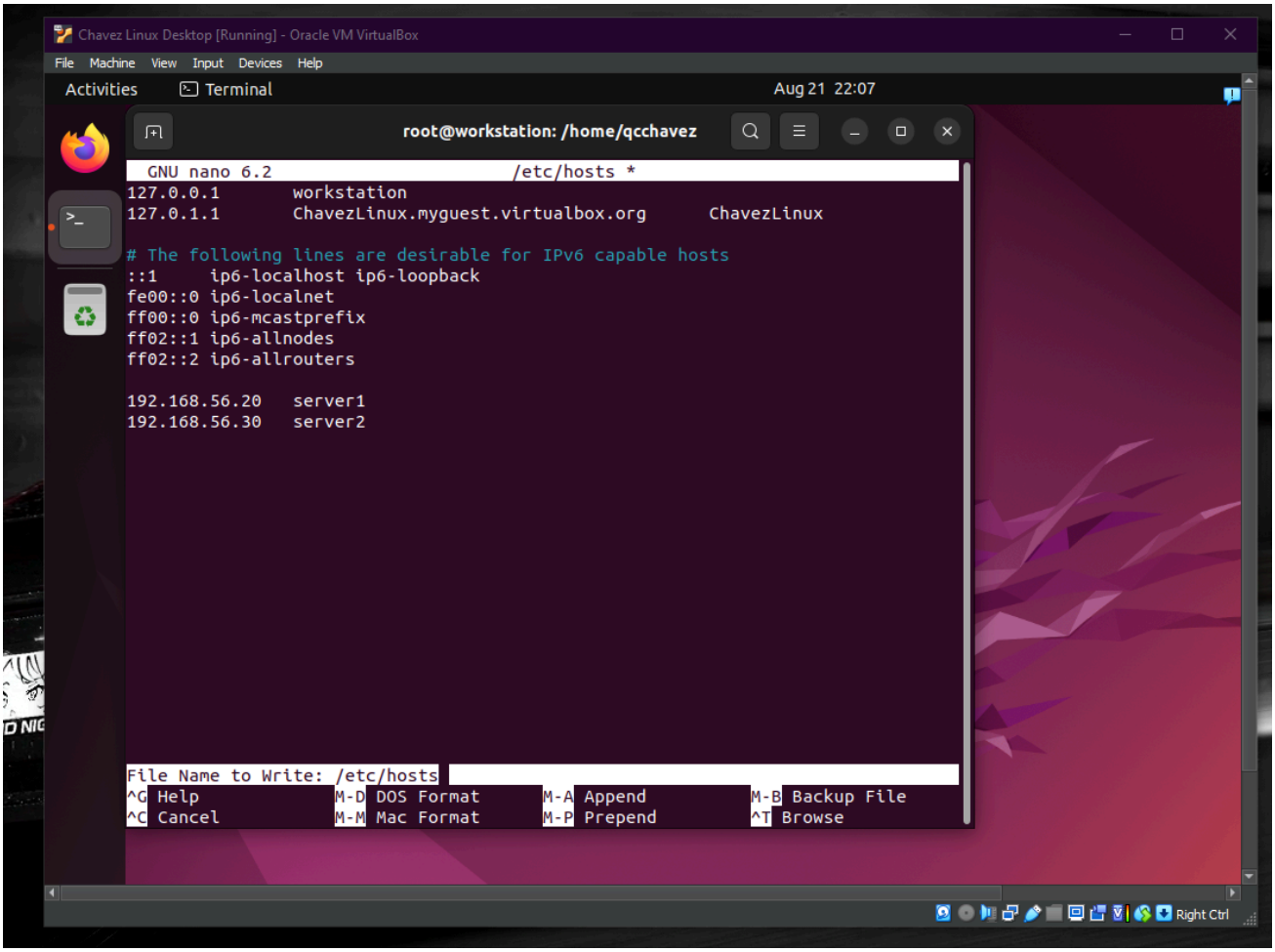


4. Edit the hosts of the Local Machine by issuing the command *sudo nano /etc/hosts.* Below all texts type the following:

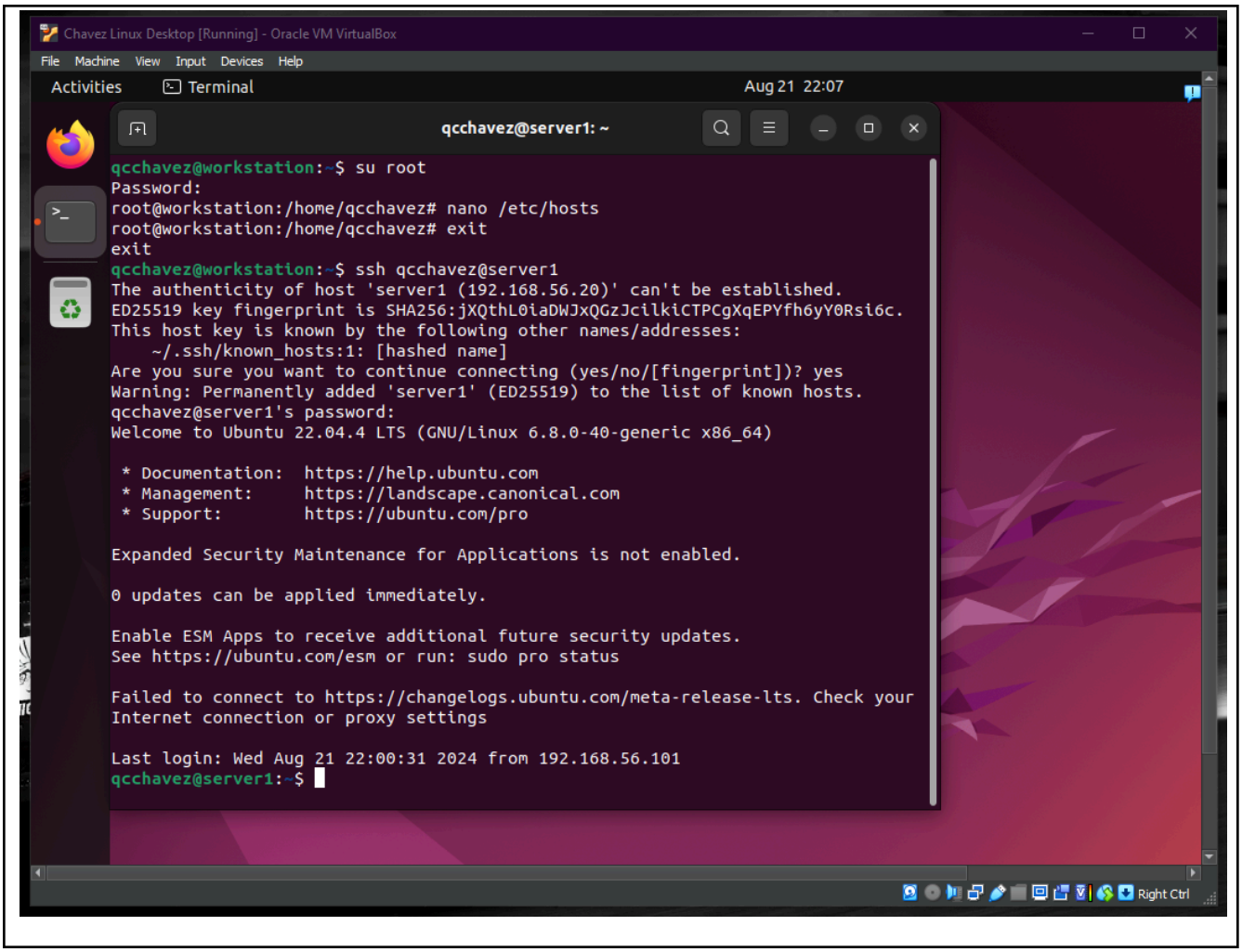
4.1 IP_address server 1 (provide the ip address of server 1 followed by the hostname)

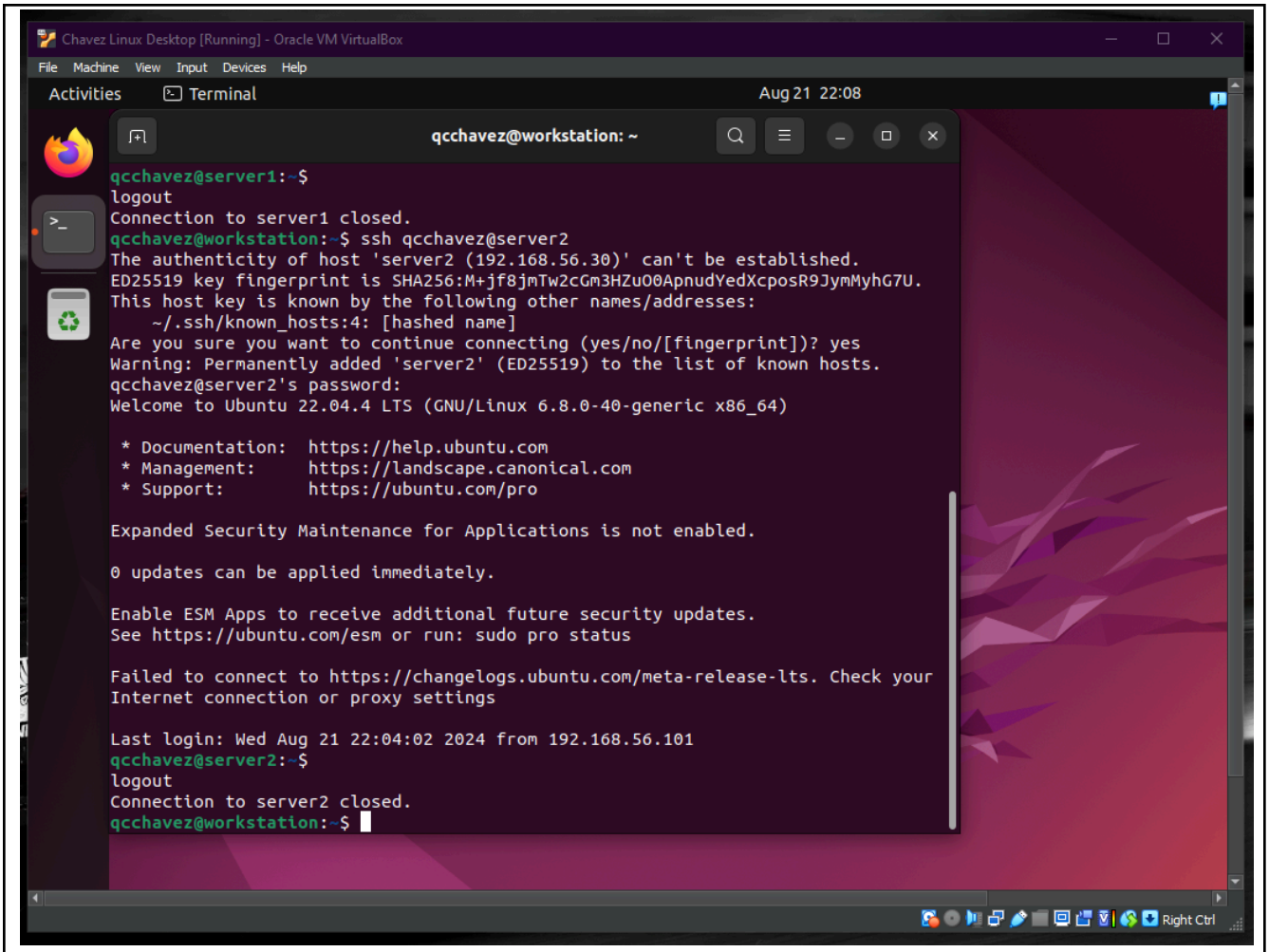
4.2 IP_address server 2 (provide the ip address of server 2 followed by the hostname)

4.3 Save the file and exit.



5. On the local machine, verify that you can do the SSH command but this time, use the hostname instead of typing the IP address of the servers. For example, try to do *ssh jvtaylar@server1*. Enter the password when prompted. Verify that you have entered Server 1. Do the same for Server 2.


Chavez Linux Desktop [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Aug 21 22:07
qcchavez@server1: ~
qcchavez@workstation:~$ su root
Password:
root@workstation:/home/qcchavez# nano /etc/hosts
root@workstation:/home/qcchavez# exit
exit
qcchavez@workstation:~$ ssh qcchavez@server1
The authenticity of host 'server1 (192.168.56.20)' can't be established.
ED25519 key fingerprint is SHA256:jXQthL0iaDWJxQGzJcilkiCTPCgXqEPYfh6yY0Rsi6c.
This host key is known by the following other names/addresses:
~/.ssh/known_hosts:1: [hashed name]
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'server1' (ED25519) to the list of known hosts.
qcchavez@server1's password:
Welcome to Ubuntu 22.04.4 LTS (GNU/Linux 6.8.0-40-generic x86_64)
* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/pro
Expanded Security Maintenance for Applications is not enabled.
0 updates can be applied immediately.
Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status
Failed to connect to https://changelogs.ubuntu.com/meta-release-lts. Check your Internet connection or proxy settings
Last login: Wed Aug 21 22:00:31 2024 from 192.168.56.101
qcchavez@server1:~$
Right Ctrl



Reflections:

Answer the following:

1. How are we able to use the hostname instead of IP address in SSH commands?
   - By importing the IP address of another Linux machine and its hostname, the IP address must be indicated first and after that, the hostname should follow.
     Example: 192.168.56.20 server1

2. How secured is SSH?
   - **SSH** is a highly secure protocol for remote administration and communication in Linux. It offers powerful authentication methods and encryptions to prevent any unauthorized access and at the same time, provides strong security.