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Course/Section: CPE31S21	Date Submitted: 8/30/24
Instructor: Sir Robin Valenzuela	Semester and SY: 1st sem 24-25'

### Activity 1: Configure Network using Virtual Machines

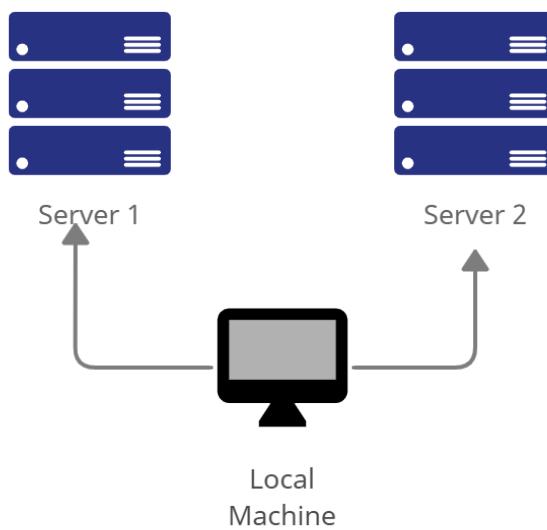
#### 1. Objectives:

- 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:

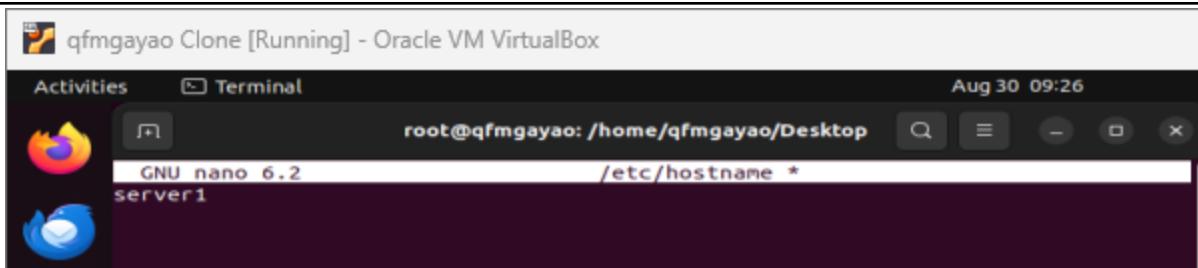
##### Network Topology:

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*).



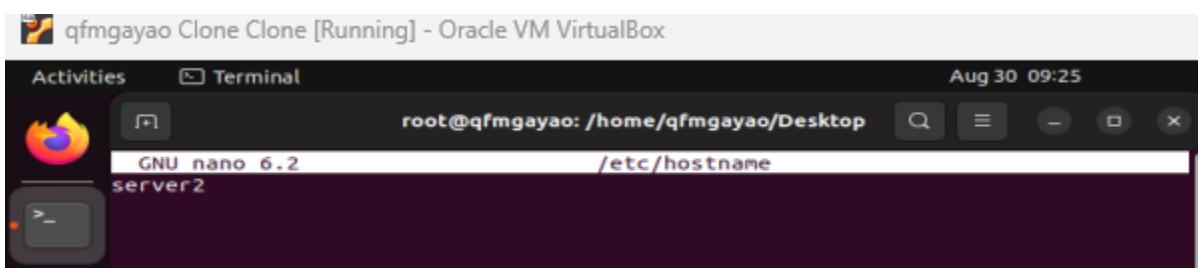
**Task 1:** Do the following on Server 1, Server 2, and Local Machine. In editing the file using nano command, press control + O to write out (save the file). Press enter when asked for the name of the file. Press control + X to end.

1. Change the hostname using the command ***sudo nano /etc/hostname***
  - 1.1 Use server1 for Server 1



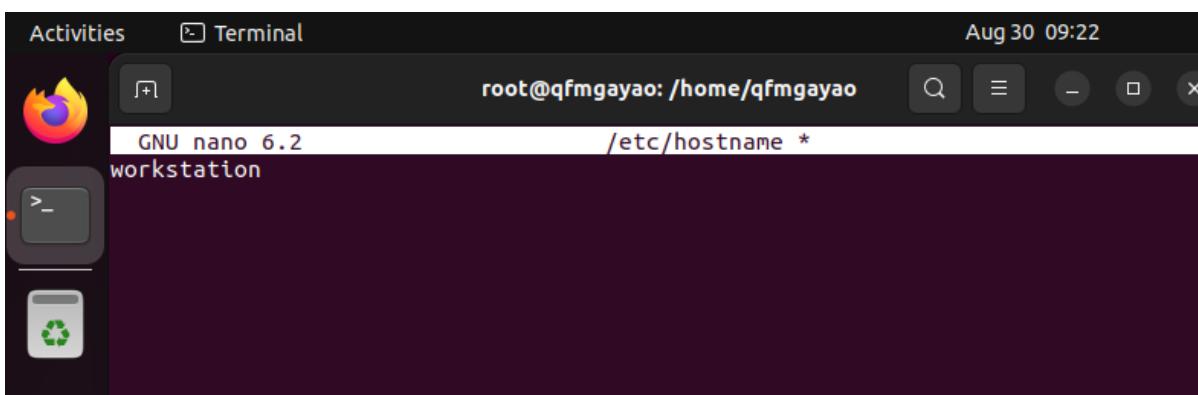
```
root@qfmgayao: /home/qfmgayao/Desktop
GNU nano 6.2
server1
/etc/hostname *
```

## 1.2 Use server2 for Server 2



```
root@qfmgayao: /home/qfmgayao/Desktop
GNU nano 6.2
server2
/etc/hostname *
```

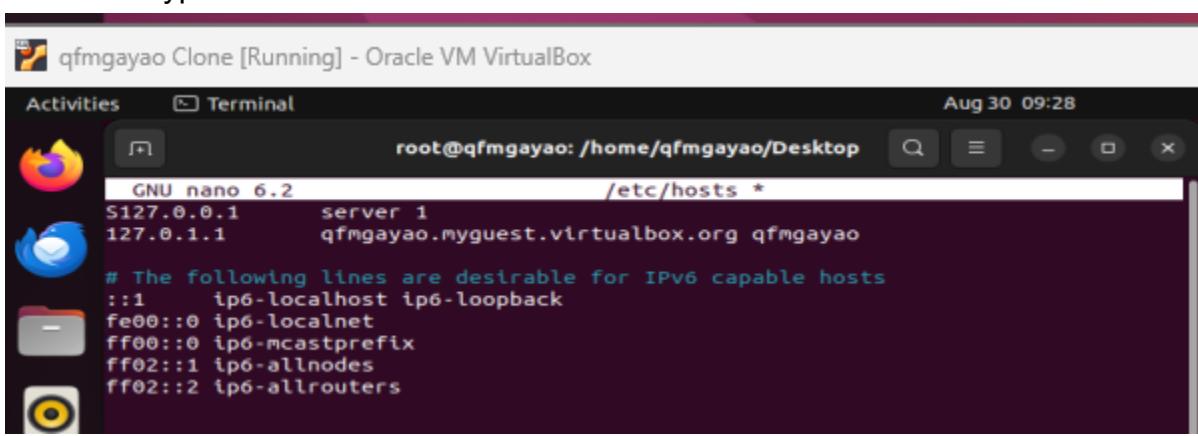
## 1.3 Use workstation for the Local Machine



```
root@qfmgayao: /home/qfmgayao/Desktop
GNU nano 6.2
workstation
/etc/hostname *
```

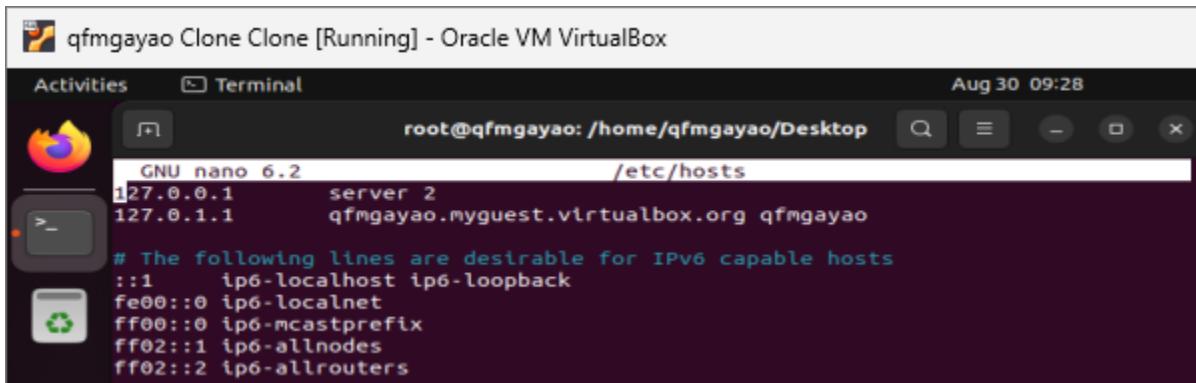
2. Edit the hosts using the command ***sudo nano /etc/hosts***. Edit the second line.

### 2.1 Type 127.0.0.1 server 1 for Server 1



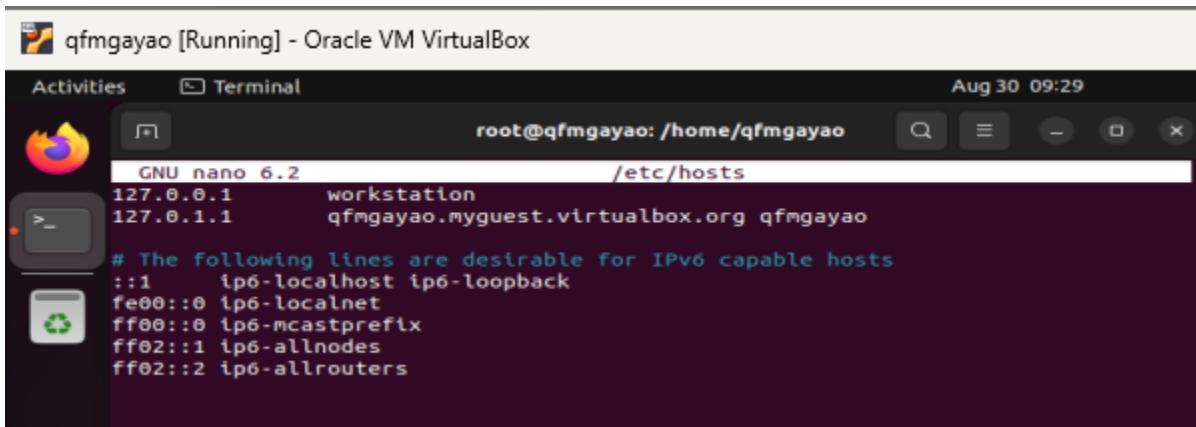
```
root@qfmgayao: /home/qfmgayao/Desktop
GNU nano 6.2
127.0.0.1      server 1
127.0.1.1      qfmgayao.myguest.virtualbox.org qfmgayao
# The following lines are desirable for IPv6 capable hosts
::1      ip6-localhost ip6-loopback
ff00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
```

## 2.2 Type 127.0.0.1 server 2 for Server 2



```
root@qfmgayao: /home/qfmgayao/Desktop
Aug 30 09:28
GNU nano 6.2
/etc/hosts
127.0.0.1      server 2
127.0.0.1      qfmgayao.myguest.virtualbox.org qfmgayao
# 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
```

## 2.3 Type 127.0.0.1 workstation for the Local Machine



```
root@qfmgayao: /home/qfmgayao
Aug 30 09:29
GNU nano 6.2
/etc/hosts
127.0.0.1      workstation
127.0.0.1      qfmgayao.myguest.virtualbox.org qfmgayao
# 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
```

**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.

```

root@qfmgayao:~# sudo apt update
Setting up lib libreoffice-impress (1:7.3.7-0ubuntu0.22.04.6) ...
Setting up lib libreoffice-base-core (1:7.3.7-0ubuntu0.22.04.6) ...
Setting up lib libreoffice-ogltrans (1:7.3.7-0ubuntu0.22.04.6) ...
Setting up lib libreoffice-calc (1:7.3.7-0ubuntu0.22.04.6) ...
Setting up lib libreoffice-writer (1:7.3.7-0ubuntu0.22.04.6) ...
Processing triggers for libcolor-icns-theme (0.17-2) ...
Processing triggers for gnome-menus (3.36.0-ubuntu3) ...
Processing triggers for libc-bin (2.35-0ubuntu3.8) ...
Processing triggers for ufw (0.36.1-4ubuntu0.1) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for dbus (1.12.20-2ubuntu4.1) ...
Processing triggers for shared-mime-info (2.1-2) ...
Processing triggers for libudev (249.11-0ubuntu1.12) ...
Processing triggers for install-info (6.8-4build1) ...
Processing triggers for mailcap (3.70+mmu1ubuntus) ...
Processing triggers for fontconfig (2.13.1-4.2ubuntu5) ...
Processing triggers for desktop-file-utils (0.26-1ubuntus) ...
Processing triggers for intramfs-tools (0.140ubuntu13.4) ...
update-intramfs: Generating /boot/initrd.img-6.8.0-40-generic
root@qfmgayao:~# 

```

```

root@qfmgayao:~# sudo apt upgrade
Setting up lib libreoffice-gnome (1:7.3.7-0ubuntu0.22.04.6) ...
Setting up lib libreoffice-impress (1:7.3.7-0ubuntu0.22.04.6) ...
Setting up lib libreoffice-base-core (1:7.3.7-0ubuntu0.22.04.6) ...
Setting up lib libreoffice-ogltrans (1:7.3.7-0ubuntu0.22.04.6) ...
Setting up lib libreoffice-calc (1:7.3.7-0ubuntu0.22.04.6) ...
Setting up lib libreoffice-writer (1:7.3.7-0ubuntu0.22.04.6) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
Processing triggers for libcolor-icns-theme (0.17-2) ...
Processing triggers for libc-bin (2.35-0ubuntu3.8) ...
Processing triggers for ufw (0.36.1-4ubuntu0.1) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for dbus (1.12.20-2ubuntu4.1) ...
Processing triggers for shared-mime-info (2.1-2) ...
Processing triggers for libudev (249.11-0ubuntu1.12) ...
Processing triggers for install-info (6.8-4build1) ...
Processing triggers for mailcap (3.70+mmu1ubuntus) ...
Processing triggers for fontconfig (2.13.1-4.2ubuntu5) ...
Processing triggers for desktop-file-utils (0.26-1ubuntus) ...
Processing triggers for intramfs-tools (0.140ubuntu13.4) ...
update-intramfs: Generating /boot/initrd.img-6.8.0-40-generic
root@qfmgayao:~# 

```

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

```

root@qfmgayao:~# sudo apt update
Setting up openssh-sftp-server (1:8.9p1-3ubuntu0.10) ...
Setting up openssh-server (1:8.9p1-3ubuntu0.10) ...

Creating config file /etc/ssh/sshd_config with new version
Creating ECDH RSA key; this may take some time ...
3072 SHA256:UqjIAI3ZIoRnkAhMsheetshukI/HPhvkSFcu0kZAl4 root@qfmgayao (RSA)
Creating SSH2 ECDSA key; this may take some time ...
256 SHA256:L3cLSS5JRoFhrlhYcjIPPPwdPmNthf9VKAfB0z4BuWQ root@qfmgayao (ECDSA)
Creating SSH2 ED25519 key; this may take some time ...
256 SHA256:BBB1JD9N97j1+fdKbseCs4d4css0H2w00IkblUNAA root@qfmgayao (ED25519)
Created symlink /etc/systemd/system/ssh.service → /lib/systemd/system/ssh.service
Created symlink /etc/systemd/system/multi-user.target.wants/ssh.service → /lib/
systemd/system/ssh.service.
rescue-ssh.target is a disabled or a static unit, not starting it.
ssh.socket is a disabled or a static unit, not starting it.
Setting up ssh-import-id (5.11-0ubuntu1) ...
Setting up ssh-import-id (5.11-0ubuntu1) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for ufw (0.36.1-4ubuntu0.1) ...
root@qfmgayao:~# 

root@qfmgayao:~# sudo apt upgrade
Setting up openssh-sftp-server (1:8.9p1-3ubuntu0.10) ...
Setting up openssh-server (1:8.9p1-3ubuntu0.10) ...

Creating config file /etc/ssh/sshd_config with new version
Creating ECDH RSA key; this may take some time ...
3072 SHA256:zpg90lzs5/56gbj71Qh9oZJL5AjeQNSUKFqInFkg root@qfmgayao (RSA)
Creating SSH2 ECDSA key; this may take some time ...
256 SHA256:FZXXFk43/HMft6yUM7nFw+Pz1lmttDkvhxvCgqY root@qfmgayao (ECDSA)
Creating SSH2 ED25519 key; this may take some time ...
256 SHA256:26Qoa+D3WVQhmyK84G5r4WrT/qE618CxmkNeir9w/0 root@qfmgayao (ED25519)
Created symlink /etc/systemd/system/ssh.service → /lib/systemd/system/ssh.service
Created symlink /etc/systemd/system/multi-user.target.wants/ssh.service → /lib/
systemd/system/ssh.service.
rescue-ssh.target is a disabled or a static unit, not starting it.
ssh.socket is a disabled or a static unit, not starting it.
Setting up ssh-import-id (5.11-0ubuntu1) ...
Setting up ncurses-term (6.3-2ubuntu0.1) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for ufw (0.36.1-4ubuntu0.1) ...
root@qfmgayao:~# 

```

```

root@qfmgayao:/home/qfmgayao/Desktop# sudo service ssh start
root@qfmgayao:/home/qfmgayao/Desktop# sudo systemctl status ssh
Unit ssh.service could not be found.

root@qfmgayao:/home/qfmgayao/Desktop# sudo systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/lib/systemd/system/ssh.service; enabled; vendor preset: active)
   Active: active (running) since Fri 2024-08-30 10:02:19 +08; 3min 57s ago
     Docs: man:sshd(8)
             man:sshd_config(5)
   Main PID: 30077 (sshd)
      Tasks: 1 (limit: 9438)
        Memory: 1.7M
         CPU: 29ms
        CGroup: /system.slice/ssh.service
                └─30077 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

Aug 30 10:02:19 qfmgayao sshd[30077]: Starting OpenBSD Secure Shell server...
Aug 30 10:02:19 qfmgayao sshd[30077]: Server listening on 0.0.0.0 port 22.
Aug 30 10:02:19 qfmgayao sshd[30077]: Server listening on :: port 22.
Aug 30 10:02:19 qfmgayao systemd[1]: Started OpenBSD Secure Shell server.

root@qfmgayao:/home/qfmgayao/Desktop# sudo systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/lib/systemd/system/ssh.service; enabled; vendor preset: active)
   Active: active (running) since Fri 2024-08-30 10:02:19 +08; 3min 57s ago
     Docs: man:sshd(8)
             man:sshd_config(5)
   Main PID: 30077 (sshd)
      Tasks: 1 (limit: 9438)
        Memory: 1.7M
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        CGroup: /system.slice/ssh.service
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Aug 30 10:02:19 qfmgayao sshd[30077]: Starting OpenBSD Secure Shell server...
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Aug 30 10:02:19 qfmgayao sshd[30077]: Server listening on :: port 22.
Aug 30 10:02:19 qfmgayao systemd[1]: Started OpenBSD Secure Shell server.

root@qfmgayao:/home/qfmgayao/Desktop# sudo service ssh start
root@qfmgayao:/home/qfmgayao/Desktop# sudo systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/lib/systemd/system/ssh.service; enabled; vendor preset: active)
   Active: active (running) since Fri 2024-08-30 10:02:19 +08; 3min 57s ago
     Docs: man:sshd(8)
             man:sshd_config(5)
   Main PID: 30077 (sshd)
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Aug 30 10:02:19 qfmgayao sshd[30077]: Starting OpenBSD Secure Shell server...
Aug 30 10:02:19 qfmgayao sshd[30077]: Server listening on 0.0.0.0 port 22.
Aug 30 10:02:19 qfmgayao sshd[30077]: Server listening on :: port 22.
Aug 30 10:02:19 qfmgayao systemd[1]: Started OpenBSD Secure Shell server.

root@qfmgayao:/home/qfmgayao/Desktop# sudo systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/lib/systemd/system/ssh.service; enabled; vendor preset: active)
   Active: active (running) since Fri 2024-08-30 10:02:19 +08; 3min 57s ago
     Docs: man:sshd(8)
             man:sshd_config(5)
   Main PID: 30077 (sshd)
      Tasks: 1 (limit: 9438)
        Memory: 1.7M
         CPU: 29ms
        CGroup: /system.slice/ssh.service
                └─30077 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

Aug 30 10:02:19 qfmgayao sshd[30077]: Starting OpenBSD Secure Shell server...
Aug 30 10:02:19 qfmgayao sshd[30077]: Server listening on 0.0.0.0 port 22.
Aug 30 10:02:19 qfmgayao sshd[30077]: Server listening on :: port 22.
Aug 30 10:02:19 qfmgayao systemd[1]: Started OpenBSD Secure Shell server.

root@qfmgayao:/home/qfmgayao/Desktop# Lines 1-16/16 (END)

```

### 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***

```

root@qfmgayao:/home/qfmgayao/Desktop# sudo service ssh start
root@qfmgayao:/home/qfmgayao/Desktop# sudo systemctl status ssh
Unit ssh.service could not be found.

root@qfmgayao:/home/qfmgayao/Desktop# sudo systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/lib/systemd/system/ssh.service; enabled; vendor preset: active)
   Active: active (running) since Fri 2024-08-30 10:02:43 +08; 3min 27s ago
     Docs: man:sshd(8)
             man:sshd_config(5)
   Main PID: 31913 (sshd)
      Tasks: 1 (limit: 9438)
        Memory: 1.7M
         CPU: 24ms
        CGroup: /system.slice/ssh.service
                └─31913 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

Aug 30 10:02:43 qfmgayao sshd[31913]: Starting OpenBSD Secure Shell server...
Aug 30 10:02:43 qfmgayao sshd[31913]: Server listening on 0.0.0.0 port 22.
Aug 30 10:02:43 qfmgayao sshd[31913]: Server listening on :: port 22.
Aug 30 10:02:43 qfmgayao systemd[1]: Started OpenBSD Secure Shell server.

root@qfmgayao:/home/qfmgayao/Desktop# sudo systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/lib/systemd/system/ssh.service; enabled; vendor preset: active)
   Active: active (running) since Fri 2024-08-30 10:02:43 +08; 3min 27s ago
     Docs: man:sshd(8)
             man:sshd_config(5)
   Main PID: 31913 (sshd)
      Tasks: 1 (limit: 9438)
        Memory: 1.7M
         CPU: 24ms
        CGroup: /system.slice/ssh.service
                └─31913 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

Aug 30 10:02:43 qfmgayao sshd[31913]: Starting OpenBSD Secure Shell server...
Aug 30 10:02:43 qfmgayao sshd[31913]: Server listening on 0.0.0.0 port 22.
Aug 30 10:02:43 qfmgayao sshd[31913]: Server listening on :: port 22.
Aug 30 10:02:43 qfmgayao systemd[1]: Started OpenBSD Secure Shell server.

root@qfmgayao:/home/qfmgayao/Desktop# sudo service ssh start
root@qfmgayao:/home/qfmgayao/Desktop# sudo systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/lib/systemd/system/ssh.service; enabled; vendor preset: active)
   Active: active (running) since Fri 2024-08-30 10:02:43 +08; 3min 27s ago
     Docs: man:sshd(8)
             man:sshd_config(5)
   Main PID: 31913 (sshd)
      Tasks: 1 (limit: 9438)
        Memory: 1.7M
         CPU: 24ms
        CGroup: /system.slice/ssh.service
                └─31913 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

Aug 30 10:02:43 qfmgayao sshd[31913]: Starting OpenBSD Secure Shell server...
Aug 30 10:02:43 qfmgayao sshd[31913]: Server listening on 0.0.0.0 port 22.
Aug 30 10:02:43 qfmgayao sshd[31913]: Server listening on :: port 22.
Aug 30 10:02:43 qfmgayao systemd[1]: Started OpenBSD Secure Shell server.

root@qfmgayao:/home/qfmgayao/Desktop# sudo systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/lib/systemd/system/ssh.service; enabled; vendor preset: active)
   Active: active (running) since Fri 2024-08-30 10:02:43 +08; 3min 27s ago
     Docs: man:sshd(8)
             man:sshd_config(5)
   Main PID: 31913 (sshd)
      Tasks: 1 (limit: 9438)
        Memory: 1.7M
         CPU: 24ms
        CGroup: /system.slice/ssh.service
                └─31913 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

Aug 30 10:02:43 qfmgayao sshd[31913]: Starting OpenBSD Secure Shell server...
Aug 30 10:02:43 qfmgayao sshd[31913]: Server listening on 0.0.0.0 port 22.
Aug 30 10:02:43 qfmgayao sshd[31913]: Server listening on :: port 22.
Aug 30 10:02:43 qfmgayao systemd[1]: Started OpenBSD Secure Shell server.

root@qfmgayao:/home/qfmgayao/Desktop# Lines 1-16/16 (END)

```

### 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

The screenshot shows a desktop environment with multiple windows open:

- A terminal window titled "qfmgayao Clone [Running] - Oracle VM VirtualBox" showing the output of the command "sudo ufw status". It lists the following rules:

To	Action	From
...	...	...
22/tcp	ALLOW	Anywhere
22/tcp (v6)	ALLOW	Anywhere (v6)

- A terminal window titled "qfmgayao [Running] - Oracle VM VirtualBox" showing the output of "ufw status". It shows the same rules as the first terminal.
- A browser window titled "Activity 0 - Creating Virtual Machines in Microsoft Azure" displaying a Google Docs page with the URL <https://docs.google.com/document/d/1YNgtPw2S4lUdSWA13Oe3AI>. A red box highlights the title "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.\_\_\_\_

1.2 Server 2 IP address: 192.168.56.\_\_\_\_

1.3 Server 3 IP address: 192.168.56.\_\_\_\_

**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.\_\_\_\_
  - 1.2 Server 2 IP address: 192.168.56.\_\_\_\_
  - 1.3 Server 3 IP address: 192.168.56.\_\_\_\_
2. Make sure that they can ping each other.

**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**

The screenshot shows two terminal windows side-by-side. Both are running on a dark-themed desktop environment.

**Top Terminal (Workstation):**

```

root@workstation:/home/qfmgayao# TX packets 3649 bytes 261684 (261.6 KB)
root@workstation:/home/qfmgayao# TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
root@workstation:/home/qfmgayao# ping 192.168.56.132
PING 192.168.56.132 (192.168.56.132) 56(84) bytes of data.
64 bytes from 192.168.56.132: icmp_seq=1 ttl=64 time=27.5 ms
64 bytes from 192.168.56.132: icmp_seq=2 ttl=64 time=0.618 ms
64 bytes from 192.168.56.132: icmp_seq=3 ttl=64 time=0.889 ms
64 bytes from 192.168.56.132: icmp_seq=4 ttl=64 time=0.690 ms
^C
--- 192.168.56.132 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 8747ms
rtt min/avg/max/mdev = 0.618/7.422/27.493/11.588 ms
root@workstation:/home/qfmgayao# ping 192.168.56.150
PING 192.168.56.150 (192.168.56.150) 56(84) bytes of data.
64 bytes from 192.168.56.150: icmp_seq=1 ttl=64 time=1.58 ms
64 bytes from 192.168.56.150: icmp_seq=2 ttl=64 time=0.723 ms
64 bytes from 192.168.56.150: icmp_seq=3 ttl=64 time=0.765 ms
64 bytes from 192.168.56.150: icmp_seq=4 ttl=64 time=1.46 ms
64 bytes from 192.168.56.150: icmp_seq=5 ttl=64 time=0.952 ms
64 bytes from 192.168.56.150: icmp_seq=6 ttl=64 time=1.59 ms
^C64 bytes from 192.168.56.150: icmp_seq=7 ttl=64 time=0.439 ms
^C
--- 192.168.56.150 ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 13348ms
rtt min/avg/max/mdev = 0.439/1.073/1.591/0.432 ms
root@workstation:/home/qfmgayao# S

```

**Bottom Terminal (Server 1):**

```

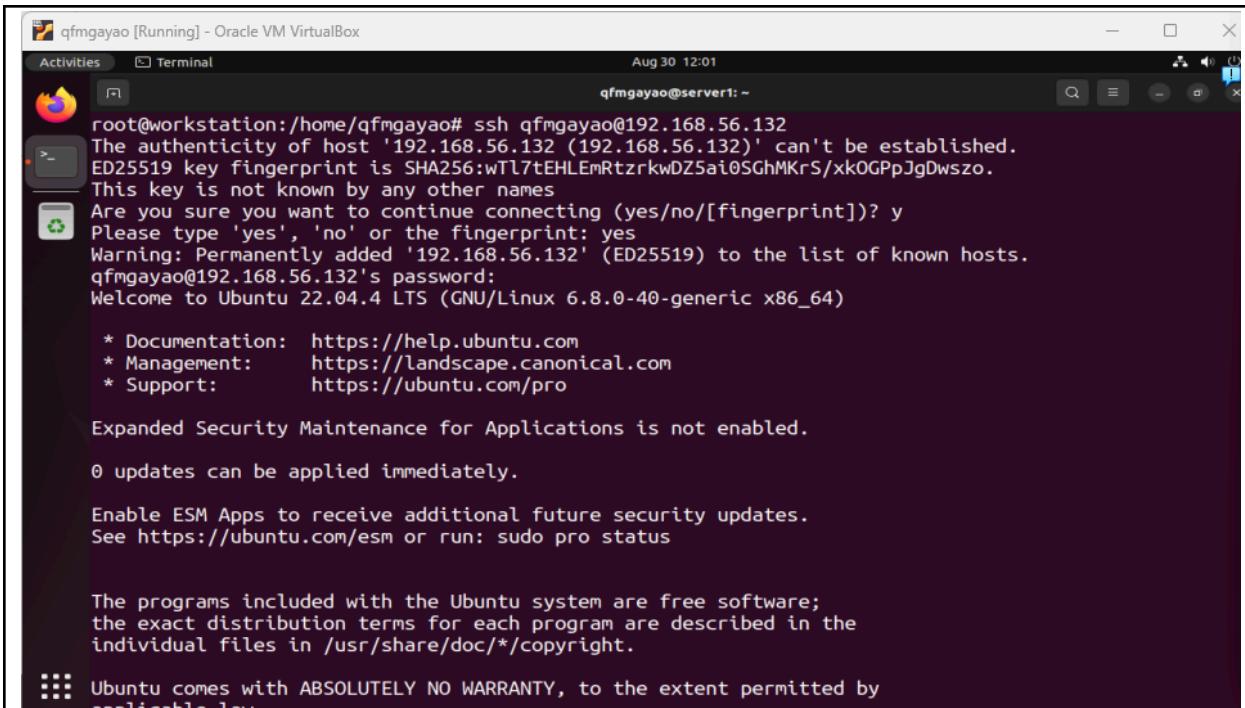
root@server1:/home/qfmgayao# TX packets 99 bytes 11933 (11.9 KB)
root@server1:/home/qfmgayao# TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inetc6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 3305 bytes 237156 (237.1 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 3305 bytes 237156 (237.1 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

root@server1:/home/qfmgayao# ping 192.168.56.150
PING 192.168.56.150 (192.168.56.150) 56(84) bytes of data.
64 bytes from 192.168.56.150: icmp_seq=1 ttl=64 time=5.24 ms
64 bytes from 192.168.56.150: icmp_seq=2 ttl=64 time=1.25 ms
64 bytes from 192.168.56.150: icmp_seq=3 ttl=64 time=0.586 ms
64 bytes from 192.168.56.150: icmp_seq=4 ttl=64 time=0.483 ms
^C
--- 192.168.56.150 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 7579ms
rtt min/avg/max/mdev = 0.483/1.890/5.242/1.957 ms
root@server1:/home/qfmgayao#

```

#### 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 jvtaylor@192.168.56.120`
- 1.2 Enter the password for server 1 when prompted



qfmgayao [Running] - Oracle VM VirtualBox

Activities Terminal Aug 30 12:01

```
root@workstation:/home/qfmgayao# ssh qfmgayao@192.168.56.132
The authenticity of host '192.168.56.132 (192.168.56.132)' can't be established.
ED25519 key fingerprint is SHA256:wTl7tEHLEMrtzrkwDZ5ai0SGhMKrS/xkOGPpJgDwszo.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? y
Please type 'yes', 'no' or the fingerprint: yes
Warning: Permanently added '192.168.56.132' (ED25519) to the list of known hosts.
qfmgayao@192.168.56.132'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.

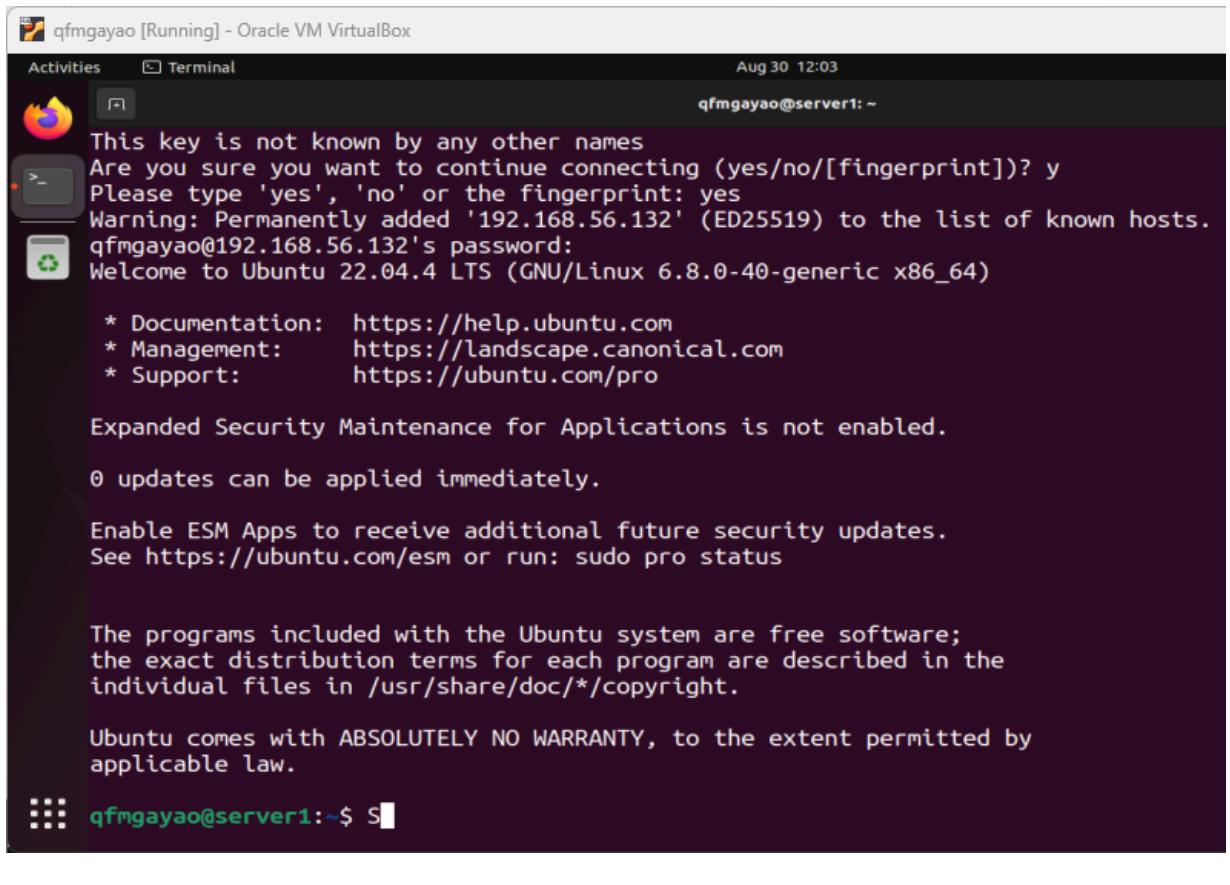
Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.
```

1.3 Verify that you are in server 1. The user should be in this format user@server1.

For example, *jvtaylor@server1*



qfmgayao [Running] - Oracle VM VirtualBox

Activities Terminal Aug 30 12:03

```
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? y
Please type 'yes', 'no' or the fingerprint: yes
Warning: Permanently added '192.168.56.132' (ED25519) to the list of known hosts.
qfmgayao@192.168.56.132'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.

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Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

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individual files in /usr/share/doc/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

qfmgayao@server1:~$ S
```

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

```
qfmgayao@server1:~$  
logout  
Connection to 192.168.56.132 closed.  
root@workstation:/home/qfmgayao#  
exit  
qfmgayao@workstation:~$  
qfmgayao@workstation:~$ su root  
Password:  
root@workstation:/home/qfmgayao# █
```

3. Do the same for Server 2.

```
root@workstation:/home/qfmgayao# ssh qfmgayao@192.168.56.150  
The authenticity of host '192.168.56.150 (192.168.56.150)' can't be established  
.ED25519 key fingerprint is SHA256:8BB1jDN9N7j1/+fdKbseC5a44css0HZW00IkkDlUNAA.  
This key is not known by any other names  
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes  
Warning: Permanently added '192.168.56.150' (ED25519) to the list of known host  
s.  
qfmgayao@192.168.56.150'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
```

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)

```
GNU nano 6.2 /etc/hosts *
127.0.0.1 workstation
127.0.1.1 qfmgayao.myguest.virtualbox.org qfmgayao
192.168.56.132 server1
192.168.56.150 server2
# 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
```

4.2 IP\_address server 2 (provide the ip address of server 2 followed by the hostname)

```
GNU nano 6.2 /etc/hosts *
127.0.0.1 workstation
127.0.1.1 qfmgayao.myguest.virtualbox.org qfmgayao
192.168.56.132 server1
192.168.56.150 server2
# 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
```

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 jvtaylor@server1**. Enter the password when prompted. Verify that you have entered Server 1. Do the same for Server 2.

```
qfmgayao@server1:~$  
logout  
Connection to server1 closed.  
root@workstation:/home/qfmgayao# ssh qfmgayao@server1  
qfmgayao@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: Fri Aug 30 12:52:42 2024 from 192.168.56.131  
qfmgayao@server1:~$
```

```
qfmgayao@server2:~$  
logout  
Connection to server2 closed.  
root@workstation:/home/qfmgayao# ssh qfmgayao@server2  
qfmgayao@server2'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: Fri Aug 30 12:54:06 2024 from 192.168.56.131  
qfmgayao@server2:~$
```

### Reflections:

Answer the following:

1. How are we able to use the hostname instead of IP address in SSH commands?
  - because we have used the su root so we can access the root file.
2. How secured is SSH?

- ssh protocol is more than enough to be secured where it encrypts each data and sending it, it also uses tunneling and port forwarding.