

Name:	Date Performed:
Course/Section:	Date Submitted:
Instructor:	Semester and SY:

Activity 1: Configure Network using Virtual Machines

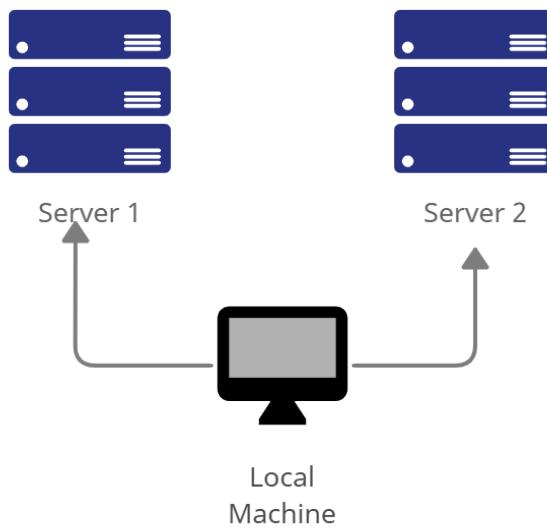
1. Objectives:

- 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:

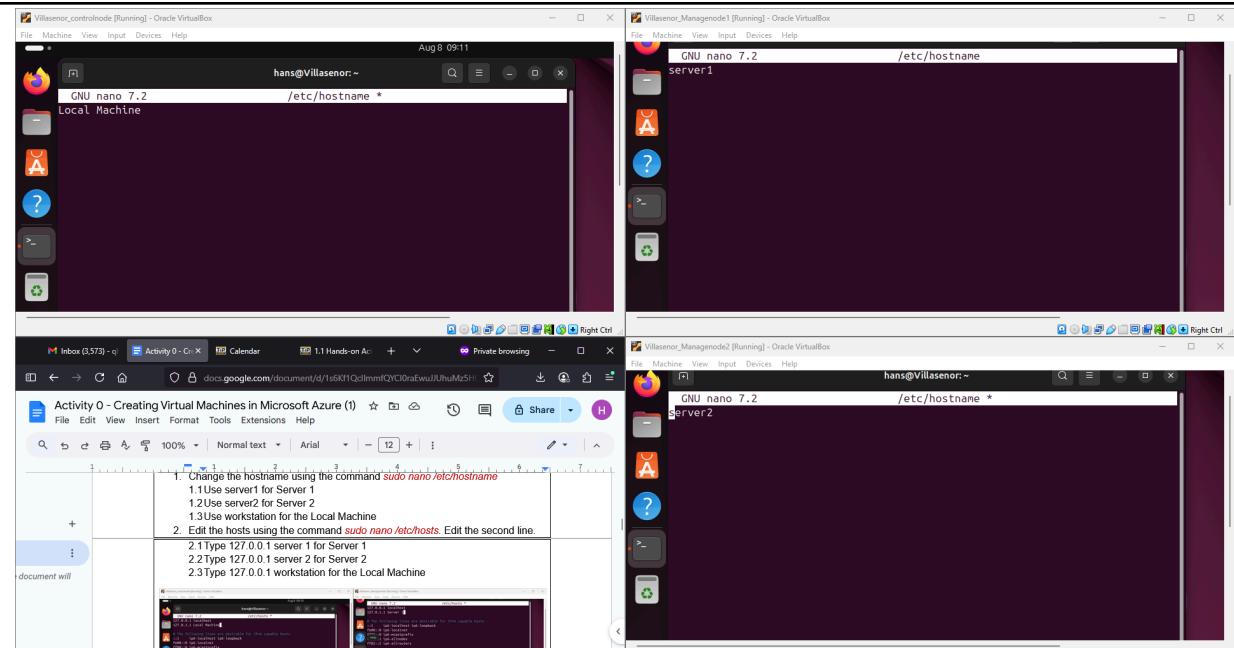
Network Topology:

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*).



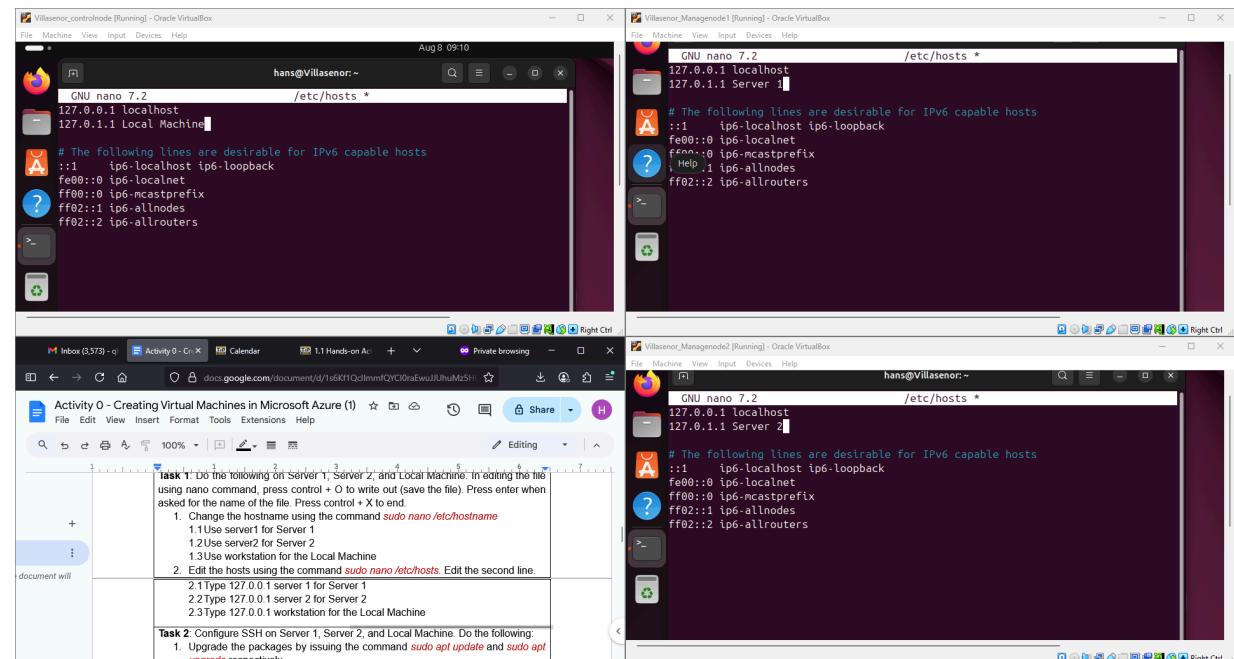
Task 1: Do the following on Server 1, Server 2, and Local Machine. In editing the file using nano command, press control + O to write out (save the file). Press enter when asked for the name of the file. Press control + X to end.

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



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



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.

Sudo apt upgrade

```
hans@Villasenor:~$ sudo nano /etc/hostname
[sudo] password for hans:
hans@Villasenor:~$ sudo nano /etc/hosts
hans@Villasenor:~$ sudo nano /etc/hostname
hans@Villasenor:~$ sudo apt update
Hit:1 http://ph.archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://ph.archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:3 http://ph.archive.ubuntu.com/ubuntu noble-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu noble-security InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
168 packages can be upgraded. Run 'apt list --upgradable' to see them.
hans@Villasenor:~$ 
```

```
hans@Villasenor:~$ rm /etc/server1
rm: remove write-protected regular file '/etc/server1'?
hans@Villasenor:~$ cd
hans@Villasenor:~$ sudo nano /etc/server1
hans@Villasenor:~$ sudo nano /etc/hostname
hans@Villasenor:~$ sudo nano /etc/hosts
hans@Villasenor:~$ sudo apt update
Htt:1 http://ph.archive.ubuntu.com/ubuntu noble InRelease
Htt:2 http://ph.archive.ubuntu.com/ubuntu noble-updates InRelease
Htt:3 http://ph.archive.ubuntu.com/ubuntu noble-backports InRelease
Htt:4 http://security.ubuntu.com/ubuntu noble-security InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
168 packages can be upgraded. Run 'apt list --upgradable' to see them.
hans@Villasenor:~$ 
```

```
hans@Villasenor:~$ sudo nano /etc/serve2
[sudo] password for hans:
hans@Villasenor:~$ sudo nano /etc/serve2
hans@Villasenor:~$ sudo rm /etc/serve2
hans@Villasenor:~$ sudo nano /etc/hostname
hans@Villasenor:~$ sudo nano /etc/hosts
hans@Villasenor:~$ sudo apt update
Htt:1 http://ph.archive.ubuntu.com/ubuntu noble InRelease
Htt:2 http://ph.archive.ubuntu.com/ubuntu noble-updates InRelease
Htt:3 http://ph.archive.ubuntu.com/ubuntu noble-backports InRelease
Htt:4 http://security.ubuntu.com/ubuntu noble-security InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
168 packages can be upgraded. Run 'apt list --upgradable' to see them.
hans@Villasenor:~$ 
```

Activity 0 - Creating Virtual Machines in Microsoft Azure (1)

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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`

Sudo apt upgrade

```
Get:70 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 libpipewire-0.3-0ubuntu3.1 [252 kB]
Get:71 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 libspa-0.2-bluetooth amd64 1.0.5-ubuntu3.1 [338 kB]
Get:72 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 libspa-0.2-modules amd64 1.0.5-ubuntu3.1 [626 kB]
Get:73 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 pipewire amd64 1.0.5-ubuntu3.1 [98.1 kB]
Get:74 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 libpipewire-0.3-modules amd64 1.0.5-ubuntu3.1 [814 kB]
Get:75 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 libbluetooth3 amd64 5.72-0ubuntu5.3 [85.2 kB]
Get:76 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 gnome-control-center-data all 1:46.7-0ubuntu0.24.04.2 [164 kB]
Get:77 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 gnome-control-center amd64 1:46.7-0ubuntu0.24.04.2 [5,012 kB]
34% [77 gnome-control-center 2,045 B/5,012 kB 0%] 708 kB/s 2min 13s
```

```
Get:112 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 pycabel amd64 24.004.60-1ubuntu7.1 [9,368 B]
Get:120 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 plymouth 24.004.60-1ubuntu7.1 [134 kB]
Get:121 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 alsnd all 1.2.10-1ubuntu5.7 [66.4 kB]
Get:122 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 blueman 5.72-0ubuntu5.3 [29.3 kB]
Get:123 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 blueman64 5.72-0ubuntu5.3 [233 kB]
Get:124 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 dnsd 202407180100.24.04.1 [5,918 B]
Get:125 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 dnsd amd64 2.90-2ubuntu0.2 [376 kB]
Get:126 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 fdi 2.39.3-Subuntu6.3 [122 kB]
Get:127 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 font-color-emoji all 2.047-0ubuntu0.24.04.1 [9,764 kB]
54% [127 fonts-noto-color-emoji 3,728 kB/9,764 kB 38%] 879 kB/s 1
```

```
Get:71 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 libbluez amd64 5.72-0ubuntu3.1 [330 kB]
Get:72 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 libbluetooth3 amd64 1.0.5-ubuntu3.1 [626 kB]
Get:73 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 pipe64 1.0.5-ubuntu3.1 [90.1 kB]
Get:74 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 libp0.3-modules amd64 1.0.5-ubuntu3.1 [814 kB]
Get:75 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 libp3.0-0ubuntu5.3 [85.2 kB]
Get:76 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 gnomel-control-data all 1:46.7-0ubuntu0.24.04.2 [164 kB]
Get:77 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 gnomel-control amd64 1:46.7-0ubuntu0.24.04.2 [5,012 kB]
Get:78 http://ph.archive.ubuntu.com/ubuntu noble-updates/main amd64 gnomamd64 46.0-0ubuntu6-24.04.9 [955 kB]
37% [78 gnome-shell 561 B/955 kB 0%] 849 kB/s 1
```

Activity 0 - Creating Virtual Machines in Microsoft Azure (1)

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Sudo apt upgrade

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`

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

```

hans@LocalMachine: $ sudo apt install openssh-server
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libgl1-amber-dri libglapi-mesa
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  ncurses-term openssh-sftp-server ssh-import-id
Suggested packages:
  molly-guard monkeysphere ssh-askpass
The following NEW packages will be installed:
  ncurses-term openssh-server openssh-sftp-server ssh-import-id
0 upgraded, 4 newly installed, 0 to remove and 1 not upgraded.
Need to get 832 kB of archives.
After this operation, 6,743 kB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://ch.archive.ubuntu.com/ubuntu/pool/main/a/amd64.openssh_sft

```

```

[sudo] password for hans:
[sudo] password for hans:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
openssh-server is already the newest version (1:9.6p1-3ubuntu13.13).
The following packages were automatically installed and are no longer required:
  libgl1-amber-dri libglapi-mesa
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 1 not upgraded.
hans@Villasenor: $ sudo apt install openssh-server
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
openssh-server is already the newest version (1:9.6p1-3ubuntu13.13).
The following packages were automatically installed and are no longer required:
  libgl1-amber-dri libglapi-mesa
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 1 not upgraded.
hans@Villasenor: $ 

```

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

3.1 *sudo service ssh start*

```

hans@LocalMachine: $ sudo service ssh start
ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/usr/lib/systemd/system/ssh.service; disabled; preset: enabled)
   Active: active (running) since Fri 2025-08-08 09:27:13 UTC; 2min 43s ago
     TriggeredBy: ● ssh.socket
      Docs: man:sshd(8)
             man:sshd_config(5)
    Process: 3424 ExecStartPre=/usr/sbin/sshd -t (code=exited, status=0/SUCCESS)
   Main PID: 3426 (sshd)
      Tasks: 1 (limit: 11839)
     Memory: 1.2M (peak: 1.7M)
        CPU: 17ms
       CGroup: /system.slice/ssh.service
               └─3426 "sshd: /usr/sbin/sshd -D [listener]" 0 of 10-100 startups

Aug 08 09:27:13 LocalMachine systemd[1]: Starting ssh.service - OpenBSD Secure Shell server
Aug 08 09:27:13 LocalMachine sshd[3426]: Server listening on 0.0.0.0 port 22.


```

```

hans@Villasenor: $ sudo service ssh start
ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/usr/lib/systemd/system/ssh.service; disabled; preset: enabled)
   Active: active (running) since Fri 2025-08-08 09:27:28 UTC; 2min 43s ago
     TriggeredBy: ● ssh.socket
      Docs: man:sshd(8)
             man:sshd_config(5)
    Process: 21986 ExecStartPre=/usr/sbin/sshd -t (code=exited, status=0/SUCCESS)
   Main PID: 21987 (sshd)
      Tasks: 1 (limit: 11839)
     Memory: 1.2M (peak: 1.7M)
        CPU: 18ms
       CGroup: /system.slice/ssh.service
               └─21987 "sshd: /usr/sbin/sshd -D [listener]" 0 of 10-100 startups

Aug 08 09:27:28 Villasenor systemd[1]: Starting ssh.service - OpenBSD Secure Shell server
Aug 08 09:27:28 Villasenor sshd[21987]: Server listening on 0.0.0.0
Aug 08 09:27:28 Villasenor sshd[21987]: Server listening on :: port 22
Aug 08 09:27:28 Villasenor systemd[1]: Started ssh.service - OpenBSD Secure Shell server.

```

```

hans@LocalMachine: $ sudo service ssh start
ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/usr/lib/systemd/system/ssh.service; disabled; preset: enabled)
   Active: active (running) since Fri 2025-08-08 09:27:13 UTC; 2min 43s ago
     TriggeredBy: ● ssh.socket
      Docs: man:sshd(8)
             man:sshd_config(5)
    Process: 3424 ExecStartPre=/usr/sbin/sshd -t (code=exited, status=0/SUCCESS)
   Main PID: 3426 (sshd)
      Tasks: 1 (limit: 11839)
     Memory: 1.2M (peak: 1.7M)
        CPU: 17ms
       CGroup: /system.slice/ssh.service
               └─3426 "sshd: /usr/sbin/sshd -D [listener]" 0 of 10-100 startups

Aug 08 09:27:13 LocalMachine systemd[1]: Starting ssh.service - OpenBSD Secure Shell server
Aug 08 09:27:13 LocalMachine sshd[3426]: Server listening on 0.0.0.0 port 22.


```

```

hans@Villasenor: $ sudo service ssh start
ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/usr/lib/systemd/system/ssh.service; disabled; preset: enabled)
   Active: active (running) since Fri 2025-08-08 09:27:28 UTC; 2min 43s ago
     TriggeredBy: ● ssh.socket
      Docs: man:sshd(8)
             man:sshd_config(5)
    Process: 21986 ExecStartPre=/usr/sbin/sshd -t (code=exited, status=0/SUCCESS)
   Main PID: 21987 (sshd)
      Tasks: 1 (limit: 11839)
     Memory: 1.2M (peak: 1.7M)
        CPU: 18ms
       CGroup: /system.slice/ssh.service
               └─21987 "sshd: /usr/sbin/sshd -D [listener]" 0 of 10-100 startups

Aug 08 09:27:28 Villasenor systemd[1]: Starting ssh.service - OpenBSD Secure Shell server
Aug 08 09:27:28 Villasenor sshd[21987]: Server listening on 0.0.0.0
Aug 08 09:27:28 Villasenor sshd[21987]: Server listening on :: port 22
Aug 08 09:27:28 Villasenor systemd[1]: Started ssh.service - OpenBSD Secure Shell server.

```

3.2 *sudo systemctl status ssh*

Villasenor_controlnode [Running] - Oracle VirtualBox

```
hans@LocalMachine: ~$ sudo systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/usr/lib/systemd/system/ssh.service; disabled; preset: enabled)
   Active: active (running) since Fri 2025-08-08 09:27:13 UTC; 2min 43s ago
     TriggeredBy: ● ssh.socket
       Docs: man:sshd(8)
             man:sshd_config(5)
   Process: 3424 ExecStartPre=/usr/sbin/sshd -t (code=exited, status=0/SUCCESS)
   Main PID: 3426 (sshd)
      Tasks: 1 (limit: 1839)
     Memory: 1.2M (peak: 1.7M)
        CPU: 17ms
       CGroup: /system.slice/ssh.service
               └─3426 "sshd: /usr/sbin/sshd -D [listener]" 0 of 10-100 startups

Aug 08 09:27:13 LocalMachine systemd[1]: Starting ssh.service - OpenBSD Secure Shell...
Aug 08 09:27:13 LocalMachine sshd[3426]: Server listening on 0.0.0.0 port 22.
```

Villasenor_Managernode1 [Running] - Oracle VirtualBox

```
? 
TriggeredBy: ● ssh.socket
  Docs: man:sshd(8)
        man:sshd_config(5)
  Process: 21906 ExecStartPre=/usr/sbin/sshd -t (code=exited, status=0/SUCCESS)
  Main PID: 21907 (sshd)
    Tasks: 1 (limit: 11839)
   Memory: 1.2M (peak: 1.7M)
      CPU: 18ms
     CGroup: /system.slice/ssh.service
             └─21907 "sshd: /usr/sbin/sshd -D [listener]" 0 of 10-100 startups

Aug 08 09:27:28 Villasenor systemd[1]: Starting ssh.service - OpenBSD Secure Shell...
Aug 08 09:27:28 Villasenor sshd[21907]: Server listening on 0.0.0.0
Aug 08 09:27:28 Villasenor sshd[21907]: Server listening on :: port 22
Aug 08 09:27:28 Villasenor systemd[1]: Started ssh.service - OpenBSD Secure Shell...
```

Villasenor_Managernode2 [Running] - Oracle VirtualBox

```
hans@Villasenor: ~$ sudo systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/usr/lib/systemd/system/ssh.service; disabled; preset: enabled)
   Active: active (running) since Fri 2025-08-08 09:28:04 UTC; 9s ago
     TriggeredBy: ● ssh.socket
       Docs: man:sshd(8)
             man:sshd_config(5)
   Process: 21959 ExecStartPre=/usr/sbin/sshd -t (code=exited, status=0/SUCCESS)
   Main PID: 21961 (sshd)
      Tasks: 1 (limit: 11839)
     Memory: 1.2M (peak: 1.7M)
        CPU: 20ms
       CGroup: /system.slice/ssh.service
               └─21961 "sshd: /usr/sbin/sshd -D [listener]" 0 of 10-100 startups
```

Technological In: Activity 0 - Cri X Calendar 1.1 Hands-on A+ Private browsing

Activity 0 - Creating Virtual Machines in Microsoft Azure (1)

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:

- 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.
- Server 1 IP address: 192.168.56.1
- Server 2 IP address: 192.168.56.2

4. Configure the firewall to all port 22 by issuing the following commands:

4.1 `sudo ufw allow ssh`

Villasenor_controlnode [Running] - Oracle VirtualBox

```
[1], Stopped Sudo systemctl status ssh
hans@LocalMachine: ~$ sudo ufw allow ssh
sudo: ufw: command not found
hans@LocalMachine: ~$ sudo ufw allow ssh
Rules updated
Rules updated (v6)
hans@LocalMachine: ~$
```

Villasenor_Managernode1 [Running] - Oracle VirtualBox

```
Process: 21986 ExecStartPre=/usr/sbin/sshd -t (code=exited, status=0/SUCCESS)
Main PID: 21987 (sshd)
Tasks: 1 (limit: 11839)
Memory: 1.2M (peak: 1.7M)
CPU: 18ms
CGroup: /system.slice/ssh.service
         └─21987 "sshd: /usr/sbin/sshd -D [listener]" 0 of 10-100 startups

Aug 08 09:27:28 Villasenor systemd[1]: Starting ssh.service - OpenBSD Secure Shell...
Aug 08 09:27:28 Villasenor sshd[21987]: Server listening on 0.0.0.0 port 22.
Aug 08 09:27:28 Villasenor sshd[21987]: Server listening on :: port 22
Aug 08 09:27:28 Villasenor systemd[1]: Started ssh.service - OpenBSD Secure Shell...
```

Villasenor_Managernode2 [Running] - Oracle VirtualBox

```
hans@Villasenor: ~$ sudo ufw allow ssh
Rules updated
Rules updated (v6)
hans@Villasenor: ~$
```

Activity 0 - Creating Virtual Machines in Microsoft Azure (1)

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:

- 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 Server 1 IP address: 192.168.56.1
- 2 Server 2 IP address: 192.168.56.2

4.2 `sudo ufw enable`

```

Villasenor_ControleNode [Running] - Oracle VirtualBox
File Machine View Input Devices Help
[1]+ Stopped sudo systemctl status ssh
hans@LocalMachine:~$ sudo ufw allow ssh
sudo: ufw: command not found
hans@LocalMachine:~$ sudo ufw allow ssh
Rules updated
Rules updated (v6)
hans@LocalMachine:~$ sudo ufw enable
Firewall is active and enabled on system startup
hans@LocalMachine:~$ 

Villasenor_Managenode1 [Running] - Oracle VirtualBox
File Machine View Input Devices Help
Tasks: 1 (limit: 11839)
Memory: 1.2M (peak: 1.7M)
CPU: 10ms
CGroup: /system.slice/sshd.service
└─21907 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

Aug 08 09:27:28 Villasenor systemd[1]: Starting ssh.service - OpenBSD Secure Shell...
Aug 08 09:27:28 Villasenor sshd[21907]: Server listening on 0.0.0.0 port 22.
Aug 08 09:27:28 Villasenor sshd[21907]: Server listening on :: port 22.
Aug 08 09:27:28 Villasenor systemd[1]: Started ssh.service - OpenBSD Secure Shell...

hans@Villasenor:~$ sudo ufw allow ssh
Rules updated
Rules updated (v6)
hans@Villasenor:~$ sudo ufw enable
Firewall is active and enabled on system startup
hans@Villasenor:~$ 

Villasenor_Managenode2 [Running] - Oracle VirtualBox
File Machine View Input Devices Help
CGroup: /system.slice/sshd.service
└─21961 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

Aug 08 09:28:04 Villasenor systemd[1]: Starting ssh.service - OpenBSD Secure Shell...
Aug 08 09:28:04 Villasenor sshd[21961]: Server listening on 0.0.0.0 port 22.
Aug 08 09:28:04 Villasenor systemd[1]: Started ssh.service - OpenBSD Secure Shell...
Aug 08 09:28:04 Villasenor sshd[21961]: Server listening on :: port 22.

hans@Villasenor:~$ sudo ufw allow ssh
Rules updated
Rules updated (v6)
hans@Villasenor:~$ sudo ufw enable
Firewall is active and enabled on system startup
hans@Villasenor:~$ 

```

4.3 sudo ufw status

```

Villasenor_ControleNode [Running] - Oracle VirtualBox
File Machine View Input Devices Help
[1]+ Stopped sudo systemctl status ssh
hans@LocalMachine:~$ sudo ufw allow ssh
sudo: ufw: command not found
hans@LocalMachine:~$ sudo ufw allow ssh
Rules updated
Rules updated (v6)
hans@LocalMachine:~$ sudo ufw enable
Firewall is active and enabled on system startup
hans@LocalMachine:~$ sudo ufw status
Status: active
To Action From
-- ....
22/tcp ALLOW Anywhere
22/tcp (v6) ALLOW Anywhere (v6)

hans@LocalMachine:~$ 

Villasenor_Managenode1 [Running] - Oracle VirtualBox
File Machine View Input Devices Help
Aug 08 09:27:28 Villasenor sshd[21907]: Server listening on 0.0.0.0 port 22.
Aug 08 09:27:28 Villasenor sshd[21907]: Server listening on :: port 22.
Aug 08 09:27:28 Villasenor systemd[1]: Started ssh.service - OpenBSD Secure Shell...
hans@Villasenor:~$ sudo ufw allow ssh
Rules updated
Rules updated (v6)
hans@Villasenor:~$ sudo ufw enable
Firewall is active and enabled on system startup
hans@Villasenor:~$ sudo ufw status
Status: active
To Action From
-- ....
22/tcp ALLOW Anywhere
22/tcp (v6) ALLOW Anywhere (v6)

hans@Villasenor:~$ 

Villasenor_Managenode2 [Running] - Oracle VirtualBox
File Machine View Input Devices Help
hans@Villasenor:~$ sudo ufw allow ssh
Rules updated
Rules updated (v6)
hans@Villasenor:~$ sudo ufw enable
Firewall is active and enabled on system startup
hans@Villasenor:~$ sudo ufw status
Status: active
To Action From
-- ....
22/tcp ALLOW Anywhere
22/tcp (v6) ALLOW Anywhere (v6)

hans@Villasenor:~$ 

```

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: 192.168.56.108

1.2 Server 2 IP address: 192.168.56.109

1.3 Server 3 IP address: 192.168.56.107

2. Make sure that they can ping each other.

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

```
^C
--- 192.168.56.108 ping statistics ---
206 packets transmitted, 206 received, 0% packet loss, time 209669ms
rtt min/avg/max/mdev = 0.255/0.617/7.547/0.541 ms
hans@LocalMachine:~$
```

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

```
hans@LocalMachine:~$ ping 192.168.56.109
PING 192.168.56.109 (192.168.56.109) 56(84) bytes of data.
64 bytes from 192.168.56.109: icmp_seq=1 ttl=64 time=1.54 ms
64 bytes from 192.168.56.109: icmp_seq=2 ttl=64 time=0.599 ms
64 bytes from 192.168.56.109: icmp_seq=3 ttl=64 time=0.435 ms
64 bytes from 192.168.56.109: icmp_seq=4 ttl=64 time=0.680 ms
^C
--- 192.168.56.109 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3074ms
rtt min/avg/max/mdev = 0.435/0.813/1.541/0.429 ms
hans@LocalMachine:~$
```

2.3 Connectivity test for Server 1 to Server 2: Successful Not Successful

```
hans@server1:~$ ping 192.168.56.109
PING 192.168.56.109 (192.168.56.109) 56(84) bytes of data.
64 bytes from 192.168.56.109: icmp_seq=1 ttl=64 time=1.08 ms
64 bytes from 192.168.56.109: icmp_seq=2 ttl=64 time=0.540 ms
64 bytes from 192.168.56.109: icmp_seq=3 ttl=64 time=0.449 ms
64 bytes from 192.168.56.109: icmp_seq=4 ttl=64 time=0.385 ms
^C
--- 192.168.56.109 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3489ms
rtt min/avg/max/mdev = 0.385/0.613/1.080/0.274 ms
hans@server1:~$
```

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

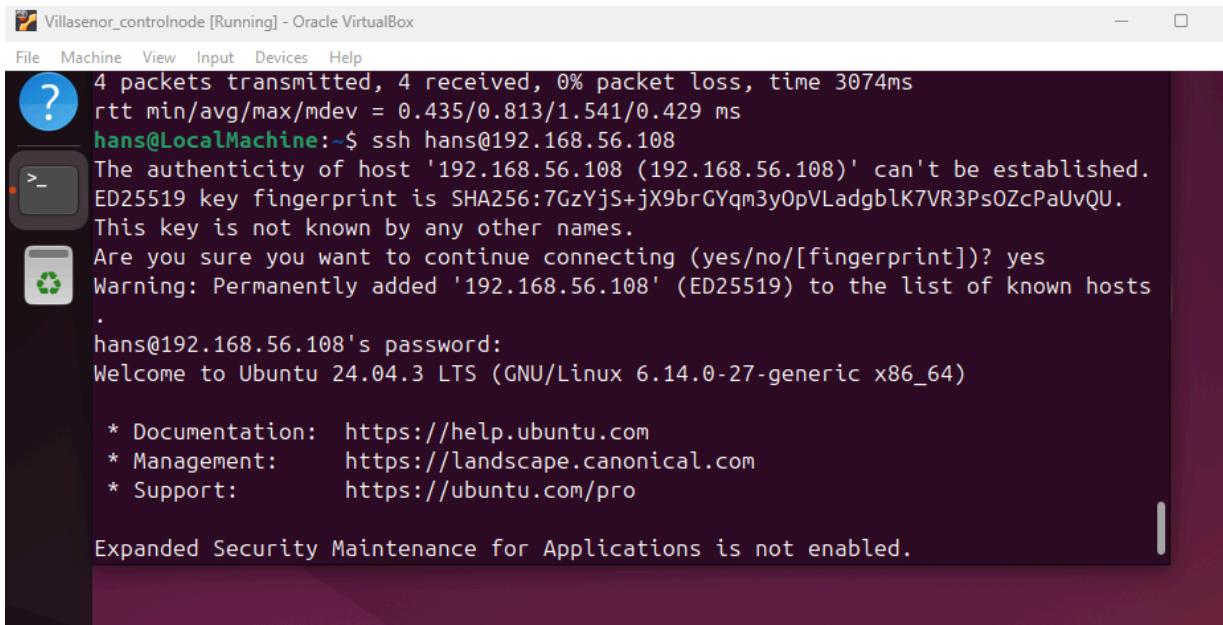
1. On the Local Machine, issue the following commands:

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

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

For example, **jvtaylor@server1**



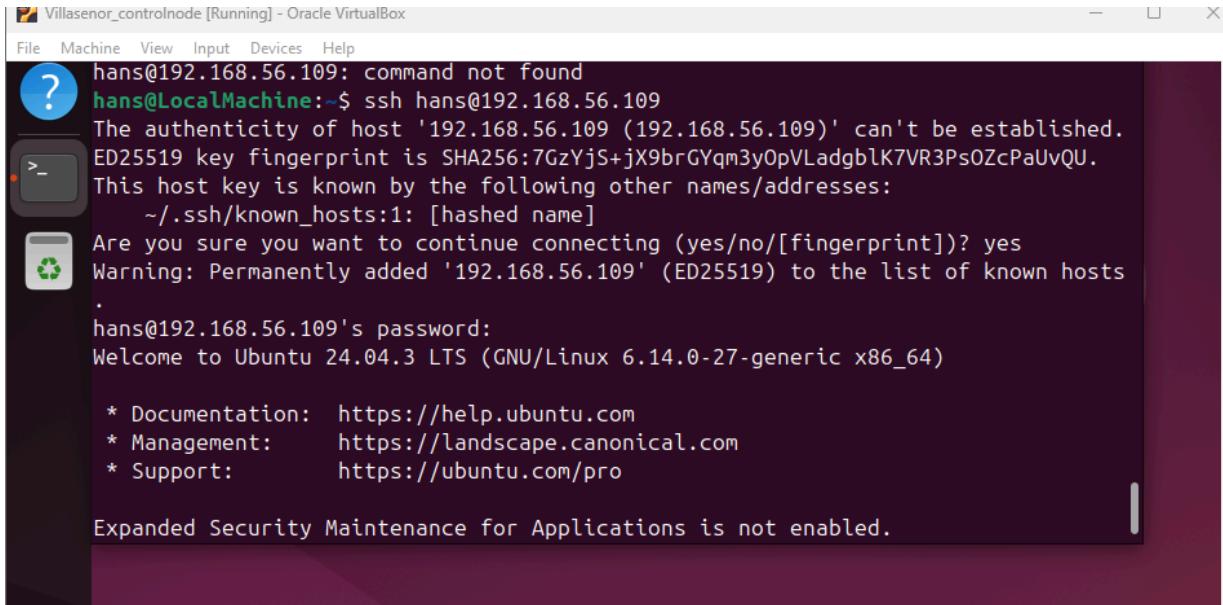
```
Villasenor_controlnode [Running] - Oracle VirtualBox
File Machine View Input Devices Help
?
>-
File Machine View Input Devices Help
4 packets transmitted, 4 received, 0% packet loss, time 3074ms
rtt min/avg/max/mdev = 0.435/0.813/1.541/0.429 ms
hans@LocalMachine:~$ ssh hans@192.168.56.108
The authenticity of host '192.168.56.108 (192.168.56.108)' can't be established.
ED25519 key fingerprint is SHA256:7GzYjs+jX9brGYqm3yOpVLadgbLK7VR3PsOZcPaUvQU.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.56.108' (ED25519) to the list of known hosts
.
hans@192.168.56.108's password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.14.0-27-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.
```

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

3. Do the same for Server 2.



```
Villasenor_controlnode [Running] - Oracle VirtualBox
File Machine View Input Devices Help
?
>-
File Machine View Input Devices Help
hans@192.168.56.109: command not found
hans@LocalMachine:~$ ssh hans@192.168.56.109
The authenticity of host '192.168.56.109 (192.168.56.109)' can't be established.
ED25519 key fingerprint is SHA256:7GzYjs+jX9brGYqm3yOpVLadgbLK7VR3PsOZcPaUvQU.
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 '192.168.56.109' (ED25519) to the list of known hosts
.
hans@192.168.56.109's password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.14.0-27-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.
```

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

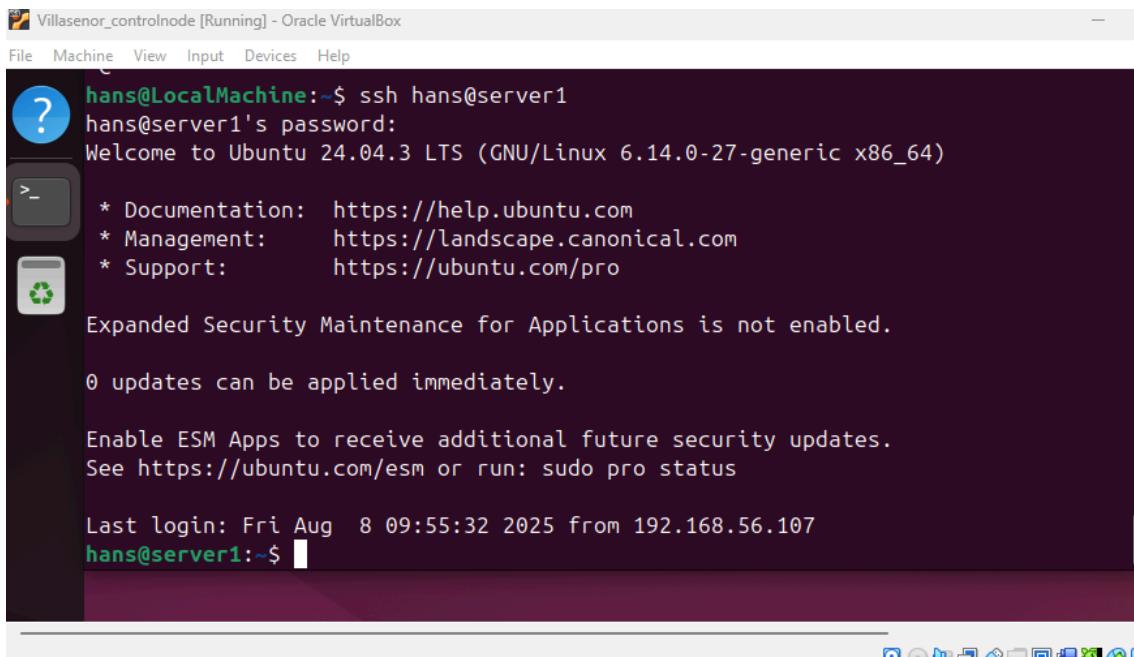
4.1 **IP_address server 1** (provide the ip address of server 1 followed by the hostname)

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

LocalMachine ssh server1



```
Villasenor_controlnode [Running] - Oracle VirtualBox
File Machine View Input Devices Help
hans@LocalMachine:~$ ssh hans@server1
hans@server1's password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.14.0-27-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

Last login: Fri Aug  8 09:55:32 2025 from 192.168.56.107
hans@server1:~$
```

LocalMachine ssh server2

The screenshot shows a terminal window titled "Villasenor_controlnode [Running] - Oracle VirtualBox". The window title bar includes "File Machine View Input Devices Help" and the date "Aug 8 10:02". The terminal itself has a dark background with light-colored text. It displays the following command-line session:

```
logout
Connection to server1 closed.
hans@LocalMachine:~$ ssh hans@server2
The authenticity of host 'server2 (192.168.56.109)' can't be established.
ED25519 key fingerprint is SHA256:7GzYjS+jX9brGYqm3y0pVLadgblk7VR3Ps0ZcPaUvQU.
This host key is known by the following other names/addresses:
  ~/.ssh/known_hosts:1: [hashed name]
  ~/.ssh/known_hosts:4: [hashed name]
  ~/.ssh/known_hosts:5: [hashed name]
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'server2' (ED25519) to the list of known hosts.
hans@server2's password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.14.0-27-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

Last login: Fri Aug  8 09:56:50 2025 from 192.168.56.107
hans@server2:~$
```

Reflections:

Answer the following:

1. How are we able to use the hostname instead of IP address in SSH commands?
Because i add the ip address in the /etc/hosts command thats why when i ssh each servers there no need to put the ip address of the servers
2. How secured is SSH?
It encrypts all data transmitted between the client and server, including usernames, passwords, commands, and file transfers.