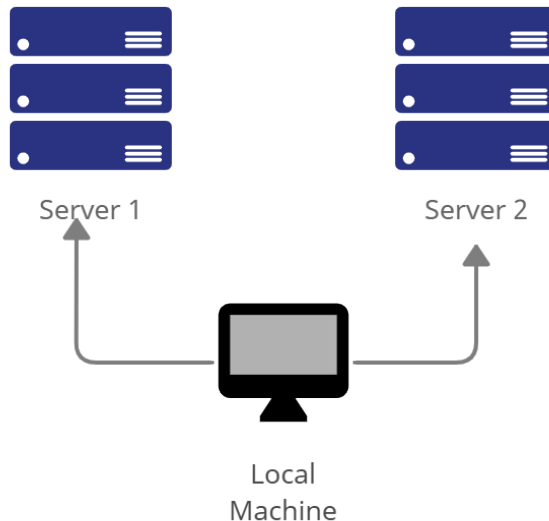
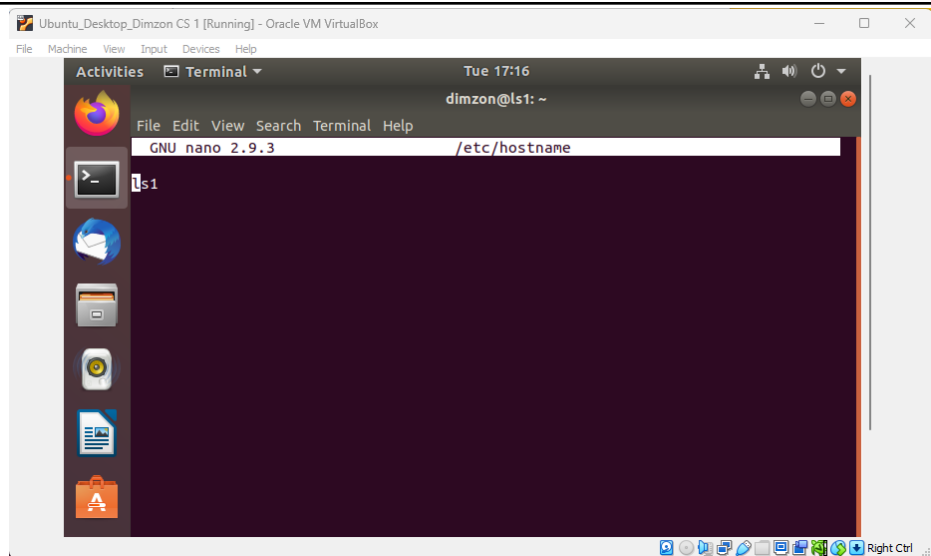
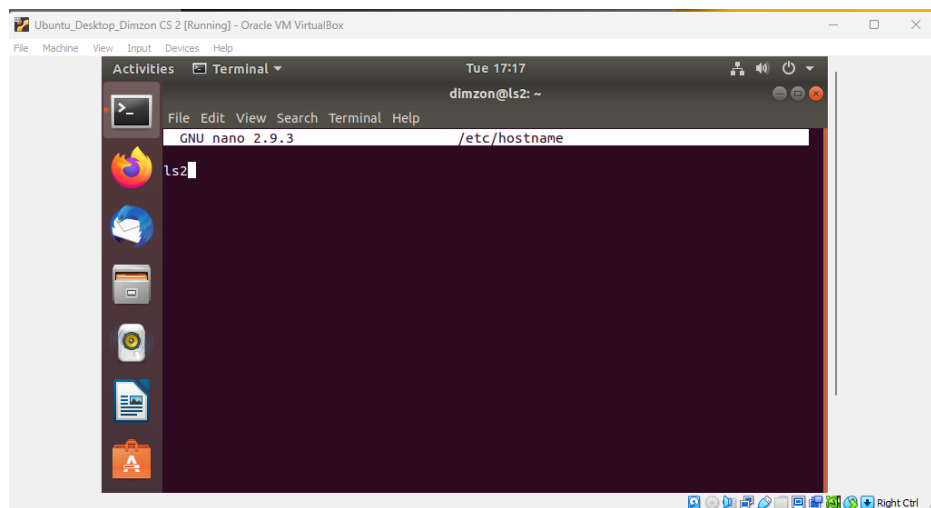


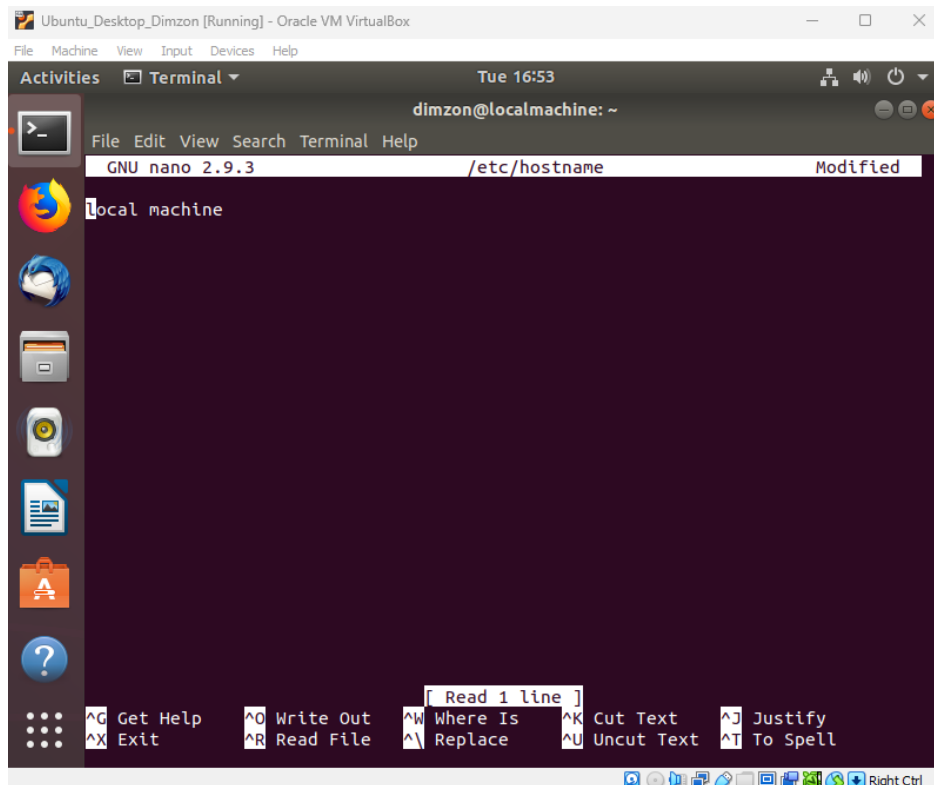
| | |
|--|---|
| Name: DIMZON ,MARK ALLEN RHOY | Date Performed:AUG 14, 2023 |
| Course/Section: CPE232 - CPE31S4 | Date Submitted: AUG 15, 2023 |
| Instructor: DR. JONATHAN V. TAYLAR | Semester and SY: 1ST SEM 2023-2024 |
| Activity 1: Configure Network using Virtual Machines | |
| 1. Objectives: 1.1. 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, <i>provide screenshots for each task</i> . (Note: <i>it is assumed that you have the prior knowledge of cloning and creating snapshots in a virtual machine</i>). | |
|  <pre> graph TD LocalMachine[Local Machine] --> Server1[Server 1] LocalMachine --> Server2[Server 2] </pre> <p>The diagram illustrates a network topology where a central 'Local Machine' (represented by a monitor icon) is connected to two separate server stacks. 'Server 1' on the left and 'Server 2' on the right each consist of three stacked server icons. Arrows point from the Local Machine to each of the two server stacks, indicating network connectivity.</p> | |
| 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. <ol style="list-style-type: none"> Change the hostname using the command <i>sudo nano /etc/hostname</i> <ol style="list-style-type: none"> Use server1 for Server 1 | |



1.2 Use server2 for Server 2

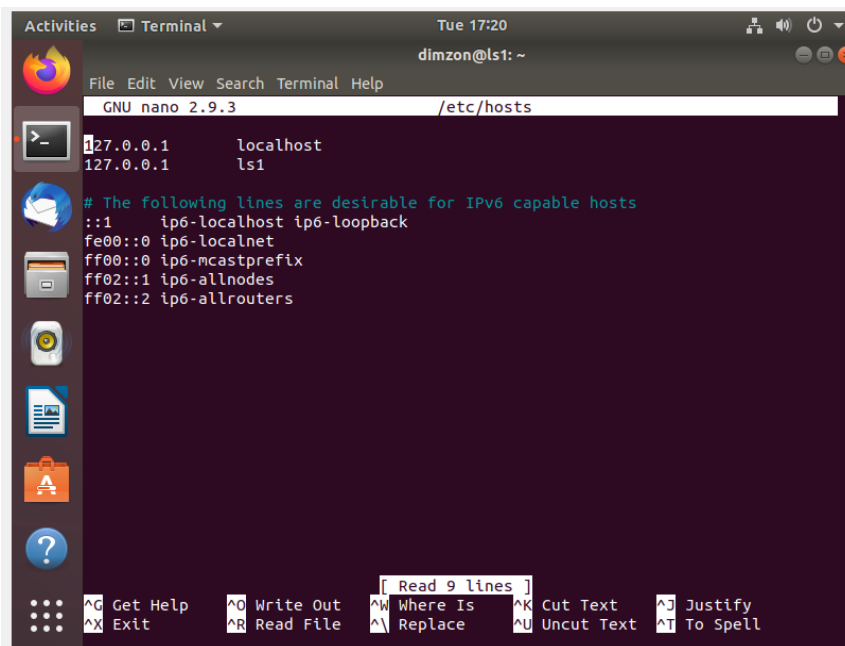


1.3 Use workstation for the Local Machine

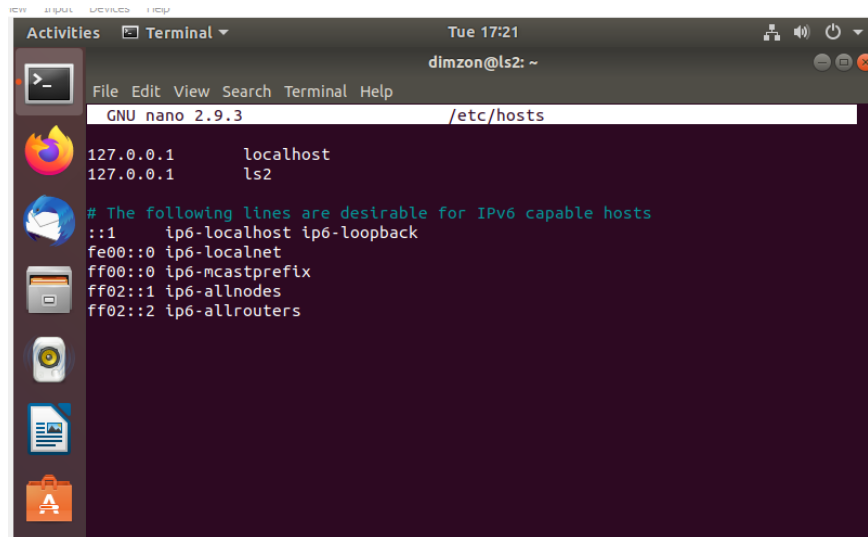


2. Edit the hosts using the command *sudo nano /etc/hosts*. Edit the second line.

2.1 Type 127.0.0.1 server 1 for Server 1



2.2 Type 127.0.0.1 server 2 for Server 2

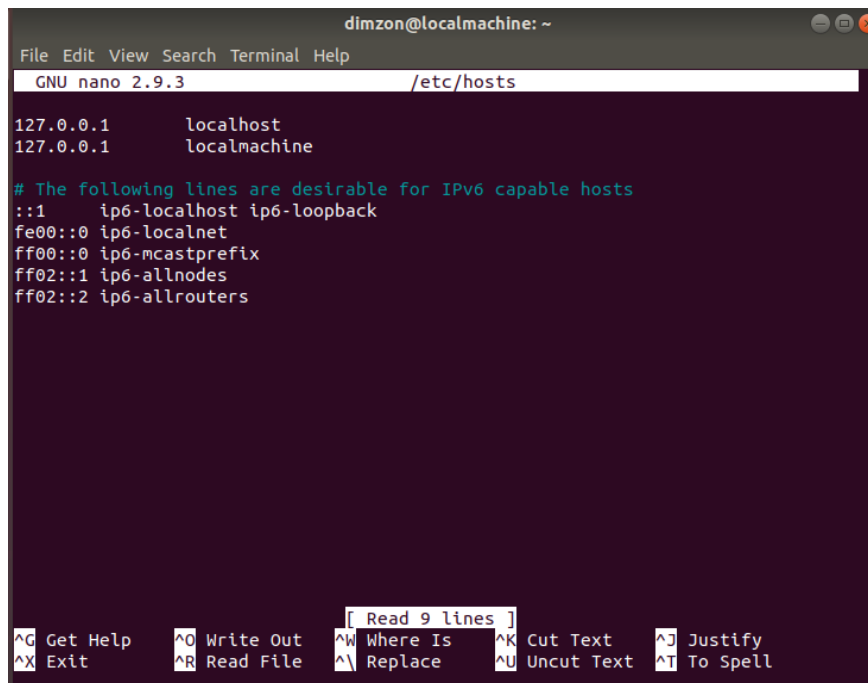


The screenshot shows a terminal window titled 'dimzon@ls2: ~' with a menu bar (File, Edit, View, Search, Terminal, Help). The nano editor is open to the file '/etc/hosts'. The content of the file is as follows:

```
127.0.0.1      localhost
127.0.0.1      ls2

# 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



The screenshot shows a terminal window titled 'dimzon@localmachine: ~' with a menu bar (File, Edit, View, Search, Terminal, Help). The nano editor is open to the file '/etc/hosts'. The content of the file is as follows:

```
127.0.0.1      localhost
127.0.0.1      localmachine

# 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
```

At the bottom of the terminal, there is a status bar showing keyboard shortcuts: ^G Get Help, ^O Write Out, ^W Where Is, ^K Cut Text, ^J Justify, ^X Exit, ^R Read File, ^_ Replace, ^U Uncut Text, ^T To Spell. A tooltip '[Read 9 lines]' is visible over the status bar.

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.

```
dimzon@localmachine:~$ sudo apt upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done

The following NEW packages will be installed:
amd64-microcode bubblewrap distro-info fwupd-signed gstreamer1.0-gtk3
intel-microcode iucode-tool libbrotlit1 libblvm10 libnetplan0
libwayland-egl1 libwoff1 libxmlb1 linux-headers-4.15.0-213
linux-headers-4.15.0-213-generic linux-image-4.15.0-213-generic
linux-modules-4.15.0-213-generic linux-modules-extra-4.15.0-213-generic
python3-click python3-colorama python3-dateutil python3-netifaces
ubuntu-advantage-desktop-daemon xdg-desktop-portal xdg-desktop-portal-gtk

The following packages will be upgraded:
accountsservice apparmor apport apport-gtk appstream apt apt-config-icons
apt-utils aptdaemon aptdaemon-data apturl apturl-common aspell
avahi-autoipd avahi-daemon avahi-utils base-files bash bind9-host binutils
binutils-common binutils-x86-64-linux-gnu bluez bluez-cups bluez-obexd bolt
brltty bsdutils busybox-initramfs busybox-static unzip ca-certificates
command-not-found command-not-found-data console-setup console-setup-linux
cpio cron cups cups-browsed cups-bsd cups-client cups-common
cups-core-drivers cups-daemon cups-filters cups-filters-core-drivers
cups-ipp-utils cups-pk-helper cups-ppdc cups-server-common dbus
dbus-user-session dbus-x11 debconf debconf-i18n deja-dup desktop-file-utils
dirmngr distro-info-data dmidecode dmsetup dnsmasq-base dnsutils dpkg
e2fsprogs evince evince-common evolution-data-server
evolution-data-server-common fdisk file file-roller findmnt
```

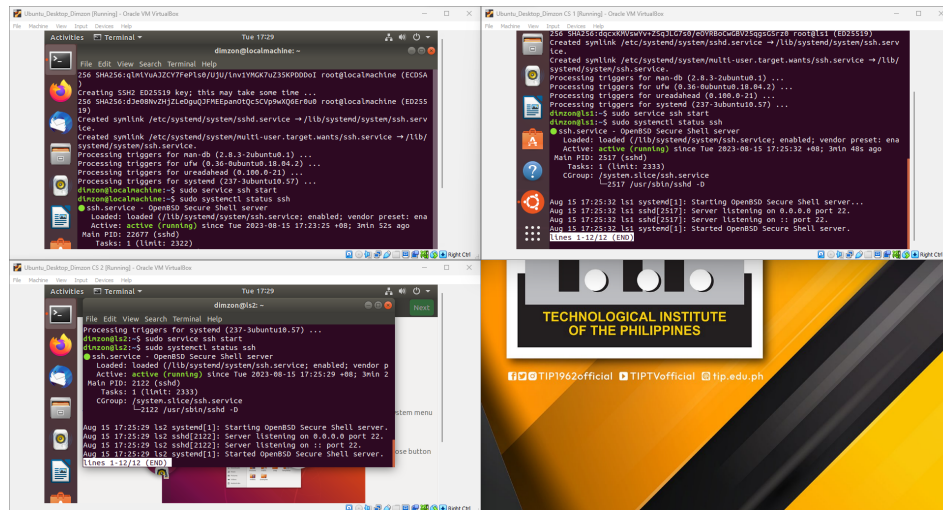
- ```
dinzon@localmachine:~$ sudo apt install openssh-server
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
 ncurses-term openssh-sftp-server ssh-import-id
Suggested packages:
 molly-guard monkeysphere rssh 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 0 not upgraded.
Need to get 637 kB of archives.
After this operation, 5,320 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://ph.archive.ubuntu.com/ubuntu bionic-updates/main amd64 ncurses-ter
m all 6.1-1ubuntu1.18.04.1 [248 kB]
Get:2 http://ph.archive.ubuntu.com/ubuntu bionic-updates/main amd64 openssh-sft
p-server amd64 1:7.6p1-4ubuntu0.7 [45.5 kB]
Get:3 http://ph.archive.ubuntu.com/ubuntu bionic-updates/main amd64 openssh-ser
ver amd64 1:7.6p1-4ubuntu0.7 [332 kB]
Get:4 http://ph.archive.ubuntu.com/ubuntu bionic-updates/main amd64 ssh-import-
id all 5.7-0ubuntu1.1 [10.9 kB]
Fetched 637 kB in 2s (278 kB/s)
```

- installed openssh server for all the machine

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*

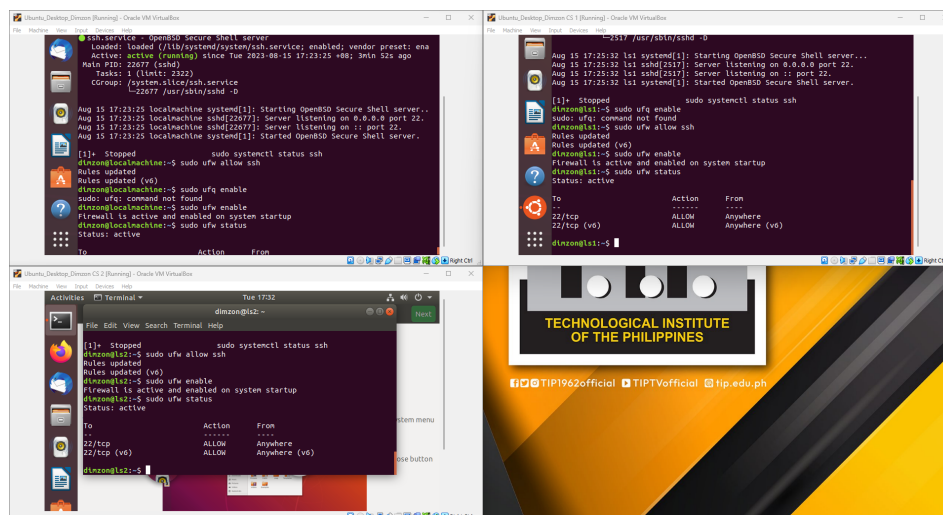


4. Configure the firewall to all port 22 by issuing the following commands:

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: 192.168.51.4

1.2 Server 2 IP address: 192.168.51.5

- 1.3 Server 3 IP address: 192.168.51.3
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 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`

```
dimzon@localmachine:~$ ssh dimzon@192.168.51.4
The authenticity of host '192.168.51.4 (192.168.51.4)' can't be established.
ECDSA key fingerprint is SHA256:KzyPTUhODh8wyIh2KjhfmNEFpb0xoywFVHm1WuHRRiM.
Are you sure you want to continue connecting (yes/no)? y
Please type 'yes' or 'no': yes
Warning: Permanently added '192.168.51.4' (ECDSA) to the list of known hosts.
dimzon@192.168.51.4's password:
Welcome to Ubuntu 18.04.6 LTS (GNU/Linux 4.15.0-213-generic x86_64)

 * Documentation: https://help.ubuntu.com
 * Management: https://landscape.canonical.com
 * Support: https://ubuntu.com/advantage

Expanded Security Maintenance for Infrastructure is not enabled.

0 updates can be applied immediately.

Enable ESM Infra 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.
```

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

```
dimzon@ls1:~$ logout
Connection to 192.168.51.4 closed.
```

3. Do the same for Server 2.

```

dimzon@ls1:~$ ssh dimzon@192.168.51.5
The authenticity of host '192.168.51.5 (192.168.51.5)' can't be established.
ECDSA key fingerprint is SHA256:TRja4vk93zgG1BZWzzb0LeJMTmgj+7kv99TlBweTbQ.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.51.5' (ECDSA) to the list of known hosts.
dimzon@192.168.51.5's password:
Welcome to Ubuntu 18.04.6 LTS (GNU/Linux 4.15.0-213-generic x86_64)

 * Documentation: https://help.ubuntu.com
 * Management: https://landscape.canonical.com
 * Support: https://ubuntu.com/advantage

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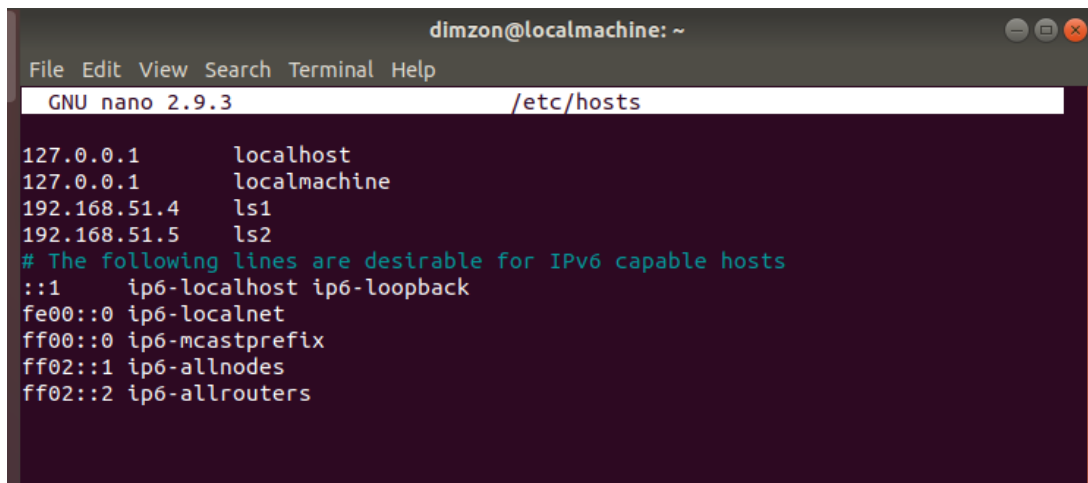
```

```

dimzon@ls2:~$ logout
Connection to 192.168.51.5 closed.

```

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)



```

dimzon@localmachine: ~
File Edit View Search Terminal Help
GNU nano 2.9.3 /etc/hosts

127.0.0.1 localhost
127.0.0.1 localmachine
192.168.51.4 ls1
192.168.51.5 ls2
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.

```
dimzon@localmachine:~$ ssh dimzon@ls1
The authenticity of host 'ls1 (192.168.51.4)' can't be established.
ECDSA key fingerprint is SHA256:KzyPTUdh8wyIh2KjhfmNEFpb0xoywFVHm1WuHRim.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'ls1' (ECDSA) to the list of known hosts.
dimzon@ls1's password:
Permission denied, please try again.
dimzon@ls1's password:
Welcome to Ubuntu 18.04.6 LTS (GNU/Linux 4.15.0-213-generic x86_64)

 * Documentation: https://help.ubuntu.com
 * Management: https://landscape.canonical.com
 * Support: https://ubuntu.com/advantage

Expanded Security Maintenance for Infrastructure is not enabled.

0 updates can be applied immediately.

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

New release '20.04.6 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Last login: Tue Aug 15 17:41:37 2023 from 192.168.51.3
dimzon@ls1:~$
```

```
dimzon@localmachine:~$ ssh dimzon@ls2
The authenticity of host 'ls2 (192.168.51.5)' can't be established.
ECDSA key fingerprint is SHA256:TRja4vk93zgGlbZWzzb0LeJMTmgj+7kv99TLBweTbQ.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'ls2,192.168.51.5' (ECDSA) to the list of known host
s.
dimzon@ls2's password:
Welcome to Ubuntu 18.04.6 LTS (GNU/Linux 4.15.0-213-generic x86_64)

 * Documentation: https://help.ubuntu.com
 * Management: https://landscape.canonical.com
 * Support: https://ubuntu.com/advantage

Expanded Security Maintenance for Infrastructure is not enabled.

0 updates can be applied immediately.

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

New release '20.04.6 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Last login: Tue Aug 15 17:42:07 2023 from 192.168.51.4
dimzon@ls2:~$
```

**Reflections:**

Answer the following:

1. How are we able to use the hostname instead of IP address in SSH commands?

using command `sudo nano /etc/hosts` where we added both servers in the hosts of the main workspace through ssh

2. How secure is SSH?

ssh is the most secured type of connection protocol because its work like an authentication that if there is a breach of username and password you are assured that the system is still protected

**Conclusion**

In this activity we are able to securely and successfully remotely control machines through one machine through ssh. With the use of ssh it made the connection secure when remotely connecting to another device. The use of remote connections increases the efficiency and productivity of not working with a lot of machines but rather being able to control many devices with one workspace.