

Name: Pastrana, Mark Laurenz S.	Date Performed: Aug 22, 2023
Course/Section: CPE31S5	Date Submitted: Aug 23, 2023
Instructor: Engr. Richard Roman	Semester and SY: 1st, 2023-2024

Activity 1: Configure Network using Virtual Machines

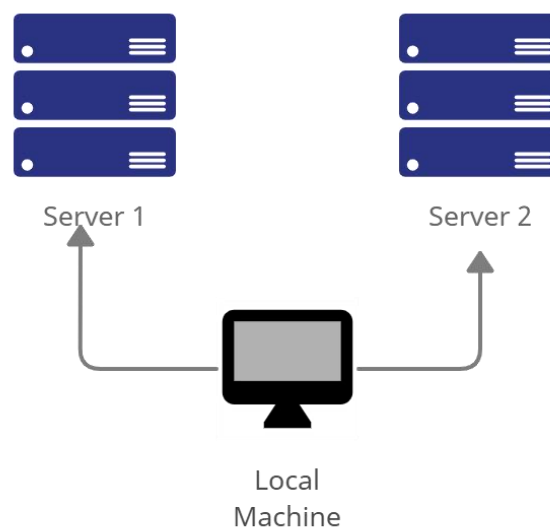
1. Objectives:

- 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, *provide screenshots for each task*. (Note: it is assumed that you have prior knowledge of cloning and creating snapshots in a virtual machine).



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*

```

pastrana@pastranamachine: ~
pastrana@pastranamachine:~$ sudo nano /etc/hostname
[sudo] password for pastrana:
pastrana@pastranamachine:~$ s
  
```

1.1 Use server1 for Server 1

```
Ubuntu_Server1_Pastrana [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
GNU nano 6.2 /etc/hostname *
server1_

lance1@server1:~$ _
```

1.2 Use server2 for Server 2

```
Ubuntu_Server2_Pastrana [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
GNU nano 6.2 /etc/hostname *
server2

lance2@server2:~$
```

1.3 Use workstation for the Local Machine

```
pastrana@localmachine: ~
pastrana@localmachine:~$
```

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

```
Ubuntu_Server1_Pastrana [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
GNU nano 6.2 /etc/hosts
127.0.0.1 localhost
127.0.0.1 pastrana1

# 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
```

2.2 Type 127.0.0.1 server 2 for Server 2

```
Ubuntu_Server2_Pastrana [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
GNU nano 6.2 /etc/hosts
127.0.0.1 localhost
127.0.0.1 pastrana2

# 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

```
pastrana@localmachine: ~  
GNU nano 6.2 /etc/hosts  
127.0.0.1 localhost  
127.0.0.1 pastranamachine.myguest.virtualbox.org pastranamachine  
  
# 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.

server1 update

```
lance@pastranaserver1:~$ sudo apt update  
[sudo] password for lance:  
Hit:1 http://archive.ubuntu.com/ubuntu bionic InRelease  
Get:2 http://archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]  
Get:3 http://security.ubuntu.com/ubuntu bionic-security InRelease [88.7 kB]  
Get:4 http://archive.ubuntu.com/ubuntu bionic-backports InRelease [83.3 kB]  
Get:5 http://archive.ubuntu.com/ubuntu bionic/multiverse Sources [181 kB]  
Get:6 http://security.ubuntu.com/ubuntu bionic-security/universe Sources [337 kB]  
Get:7 http://archive.ubuntu.com/ubuntu bionic/universe Sources [9,051 kB]  
Get:8 http://security.ubuntu.com/ubuntu bionic-security/restricted Sources [32.4 kB]  
Get:9 http://security.ubuntu.com/ubuntu bionic-security/multiverse Sources [12.2 kB]  
Get:10 http://security.ubuntu.com/ubuntu bionic-security/main Sources [301 kB]  
Get:11 http://security.ubuntu.com/ubuntu bionic-security/main Translation-en [467 kB]  
Get:12 http://security.ubuntu.com/ubuntu bionic-security/restricted amd64 Packages [1,317 kB]  
31% [7 Sources 4,771 kB/9,051 kB 53%] [12 Packages 760 kB/1,317 kB 58%]  
Fetched 34.6 MB in 31s (1,104 kB/s)  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
317 packages can be upgraded. Run 'apt list --upgradable' to see them.  
lance@pastranaserver1:~$ _
```

server2 update

```
lance2@pastranaserver2:~$ sudo apt update  
[sudo] password for lance2:  
Hit:1 http://security.ubuntu.com/ubuntu bionic-security InRelease  
Get:2 http://security.ubuntu.com/ubuntu bionic-security/main Sources [301 kB]  
Hit:3 http://archive.ubuntu.com/ubuntu bionic InRelease  
Hit:4 http://archive.ubuntu.com/ubuntu bionic-updates InRelease  
Get:5 http://archive.ubuntu.com/ubuntu bionic-backports InRelease [83.3 kB]  
Get:6 http://archive.ubuntu.com/ubuntu bionic/universe Sources [9,051 kB]  
Get:7 http://security.ubuntu.com/ubuntu bionic-security/multiverse Sources [12.2 kB]  
Get:8 http://security.ubuntu.com/ubuntu bionic-security/universe Sources [337 kB]  
Get:9 http://security.ubuntu.com/ubuntu bionic-security/restricted Sources [32.4 kB]  
Get:10 http://security.ubuntu.com/ubuntu bionic-security/main Translation-en [467 kB]  
Get:11 http://security.ubuntu.com/ubuntu bionic-security/restricted amd64 Packages [1,317 kB]  
Get:12 http://security.ubuntu.com/ubuntu bionic-security/restricted Translation-en [182 kB]  
32% [6 Sources 5,165 kB/9,051 kB 57%] [12 Translation-en 14.4 kB/182 kB 8%] 1,119 kB/s 23s  
Fetched 34.4 MB in 32s (1,077 kB/s)  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
317 packages can be upgraded. Run 'apt list --upgradable' to see them.  
lance2@pastranaserver2:~$
```

server1 upgrade

```
PASTRANA-UBUNTU-LIVESERVER [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Get:44 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 grub-pc amd64 2.02-2ubuntu8.26 [138 kB]
Get:45 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 grub2-common amd64 2.02-2ubuntu8.26 [533 kB]
Get:46 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 grub-pc-bin amd64 2.02-2ubuntu8.26 [901 kB]
Get:47 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 grub-common amd64 2.02-2ubuntu8.26 [1,773 kB]
Get:48 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 friendly-recovery all 0.2.38ubuntu1.2 [9,012 B]
Get:49 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 initramfs-tools all 0.130ubuntu3.1 [9,608 B]
Get:50 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 initramfs-tools-core all 0.130ubuntu3.13 [49.0 kB]
Get:51 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 initramfs-tools-bin amd64 0.130ubuntu3.13 [10.9 kB]
Get:52 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 busybox-initramfs amd64 1:1.27.2-2ubuntu3.4 [166 kB]
Get:53 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libklibc amd64 2.0.4-9ubuntu2.2 [41.8 kB]
Get:54 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 cpio amd64 2.12+dfsg-6ubuntu0.18.04.4 [86.4 kB]
Get:55 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libnetplan0 amd64 0.99-0ubuntu3~18.04.5 [22.6 kB]
Get:56 http://archive.ubuntu.com/ubuntu bionic/main amd64 python3-netifaces amd64 0.10.4-0.1build4 [12.8 kB]
Get:57 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libpcre3 amd64 2:8.39-9ubuntu0.1 [231 kB]
Get:58 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 zlib1g amd64 1:1.2.11.dfsg-0ubuntu2.2 [56.9 kB]
Get:59 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libglib2.0-0 amd64 2.56.4-0ubuntu0.18.04.9 [1,169 kB]
Get:60 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libdb5.3 amd64 5.3.28-13.1ubuntu1.1 [672 kB]
Get:61 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libelf1 amd64 0.170-0.4ubuntu0.1 [44.8 kB]
10% [Working] 404 kB/s 8min 28s
```

server2 upgrade

```
PASTRANA-UBUNTU-LIVESERVER2 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Get:66 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libdevmapper1.02.1 amd64 2:1.02.145-4.1ubuntu3.18.04.3 [127 kB]
Get:67 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 cron amd64 3.0p11-128.1ubuntu1.2 [59.5 kB]
Get:68 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 tar amd64 1.29b-2ubuntu0.4 [234 kB]
Get:69 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 dpkg amd64 1.19.0.5ubuntu2.4 [1,137 kB]
Get:70 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libpng16-16 amd64 1.6.34-1ubuntu0.18.04.2 [176 kB]
Get:71 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libfreetype6 amd64 2.8.1-2ubuntu2.2 [335 kB]
Get:72 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 gettext-base amd64 0.19.8.1-6ubuntu0.3 [113 kB]
Get:73 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 linux-base all 4.5ubuntu1.7 [17.9 kB]
Get:74 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 systemd-sysv amd64 237-3ubuntu10.5 [11.8 kB]
Get:75 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libgcrypt20 amd64 1.8.1-4ubuntu1.3 [418 kB]
Get:76 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libjson-c3 amd64 0.12.1-1.3ubuntu0.18.04.2 [21.7 kB]
Get:77 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libcryptsetup12 amd64 2:2.0.2-1ubuntu1.2 [134 kB]
Get:78 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 mount amd64 2.31.1-0.4ubuntu3.7 [107 kB]
Get:79 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libzstd1 amd64 1.3.3+dfsg-2ubuntu1.2 [189 kB]
Get:80 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libapt-pkg5.0 amd64 1.6.17 [812 kB]
Get:81 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libapt-inst2.0 amd64 1.6.17 [54.6 kB]
Get:82 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libksba8 amd64 1.3.5-2ubuntu0.18.04.2 [94.6 kB]
Get:83 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 gpg-wks-client amd64 2.2.4-1ubuntu1.6 [91.8 kB]
13% [Working] 481 kB/s 6min 56s
```


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

```
pastrana@localmachine: ~  
pastrana@localmachine:~$ sudo apt install openssh-server  
[sudo] password for pastrana:  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
The following package was automatically installed and is no longer required:  
  systemd-hwe-hwdb  
Use 'sudo apt autoremove' to remove it.  
The following additional packages will be installed:  
  ncurses-term openssh-client openssh-sftp-server ssh-import-id  
Suggested packages:  
  keychain libpam-ssh monkeysphere ssh-askpass molly-guard  
The following NEW packages will be installed:  
  ncurses-term openssh-server openssh-sftp-server ssh-import-id  
The following packages will be upgraded:  
  openssh-client  
1 upgraded, 4 newly installed, 0 to remove and 418 not upgraded.  
Need to get 751 kB/1,661 kB of archives.  
After this operation, 6,059 kB of additional disk space will be used.  
Do you want to continue? [Y/n] y  
Get:1 http://ph.archive.ubuntu.com/ubuntu jammy-updates/main amd64 openssh-sftp-  
server amd64 1:8.9p1-3ubuntu0.3 [38.8 kB]  
Get:2 http://ph.archive.ubuntu.com/ubuntu jammy-updates/main amd64 openssh-ser-  
v r amd64 1:8.9p1-3ubuntu0.3 [434 kB]
```

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*

```
pastrana@localmachine: ~  
sudo: services: command not found  
pastrana@localmachine:~$ sudo service ssh start  
Command 'services' not found, did you mean:  
  command 'service' from deb init-system-helpers (1.62)  
Try: apt install <deb name>  
pastrana@localmachine:~$ sudo service ssh start  
pastrana@localmachine:~$ sudo systemctl status ssh  
● ssh.service - OpenBSD Secure Shell server  
   Loaded: loaded (/lib/systemd/system/ssh.service; enabled; vendor preset: en  
   Active: active (running) since Wed 2023-08-23 23:28:44 +08; 6min ago  
     Docs: man:sshd(8)  
           man:sshd_config(5)  
   Main PID: 2390 (sshd)  
     Tasks: 1 (limit: 9424)  
    Memory: 1.7M  
       CPU: 23ms  
    CGroup: /system.slice/ssh.service  
            └─2390 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"  
  
Aug 23 23:28:44 localmachine systemd[1]: Starting OpenBSD Secure Shell server...  
Aug 23 23:28:44 localmachine sshd[2390]: Server listening on 0.0.0.0 port 22.  
Aug 23 23:28:44 localmachine sshd[2390]: Server listening on :: port 22.  
Aug 23 23:28:44 localmachine systemd[1]: Started OpenBSD Secure Shell server.  
lines 1-16/16 (END)  
  
lance1@server1:~$ sudo service ssh start  
[sudo] password for lance1:  
lance1@server1:~$ sudo systemctl status ssh  
● ssh.service - OpenBSD Secure Shell server  
   Loaded: loaded (/lib/systemd/system/ssh.service; enabled; vendor preset: enabled)  
   Active: active (running) since Wed 2023-08-23 15:45:21 UTC; 5min ago  
     Docs: man:sshd(8)  
           man:sshd_config(5)  
   Process: 691 ExecStartPre=/usr/sbin/sshd -t (code=exited, status=0/SUCCESS)  
   Main PID: 735 (sshd)  
     Tasks: 1 (limit: 4556)  
    Memory: 4.4M  
       CPU: 31ms  
    CGroup: /system.slice/ssh.service  
            └─735 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"  
  
Aug 23 15:45:21 server1 systemd[1]: Starting OpenBSD Secure Shell server...  
Aug 23 15:45:21 server1 sshd[735]: Server listening on 0.0.0.0 port 22.  
Aug 23 15:45:21 server1 sshd[735]: Server listening on :: port 22.  
Aug 23 15:45:21 server1 systemd[1]: Started OpenBSD Secure Shell server.  
lance1@server1:~$
```

```

lance2@server2:~$ sudo service ssh start
[sudo] password for lance2:
lance2@server2:~$ sudo systemctl status ssh
• ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/lib/systemd/system/ssh.service; enabled; vendor preset: enabled)
   Active: active (running) since Wed 2023-08-23 15:46:17 UTC; 1min 35s ago
     Docs: man:sshd(8)
           man:sshd_config(5)
   Process: 688 ExecStartPre=/usr/sbin/sshd -t (code=exited, status=0/SUCCESS)
   Main PID: 727 (sshd)
     Tasks: 1 (limit: 5154)
    Memory: 4.4M
       CPU: 25ms
   CGroup: /system.slice/ssh.service
           └─727 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

Aug 23 15:46:17 server2 systemd[1]: Starting OpenBSD Secure Shell server...
Aug 23 15:46:17 server2 sshd[727]: Server listening on 0.0.0.0 port 22.
Aug 23 15:46:17 server2 sshd[727]: Server listening on :: port 22.
Aug 23 15:46:17 server2 systemd[1]: Started OpenBSD Secure Shell server.
lance2@server2:~$

```

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***

```

pastrana@localmachine:~$ sudo ufw allow ssh
Rules updated
Rules updated (v6)
pastrana@localmachine:~$ sudo ufw enable
Firewall is active and enabled on system startup
pastrana@localmachine:~$ sudo ufw status
Status: active

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

pastrana@localmachine:~$

```

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 **Local Machine** IP address: 192.168.56.**103**

1.2 **Server 1** IP address: 192.168.56.**101**

1.3 **Server 2** IP address: 192.168.56.**102**

2. Make sure that they can ping each other.

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

```

pastrana@localmachine:~$ ping 192.168.56.101
PING 192.168.56.101 (192.168.56.101) 56(84) bytes of data.
64 bytes from 192.168.56.101: icmp_seq=1 ttl=64 time=0.653 ms
64 bytes from 192.168.56.101: icmp_seq=2 ttl=64 time=0.542 ms
64 bytes from 192.168.56.101: icmp_seq=3 ttl=64 time=0.569 ms
64 bytes from 192.168.56.101: icmp_seq=4 ttl=64 time=0.457 ms
64 bytes from 192.168.56.101: icmp_seq=5 ttl=64 time=0.316 ms
64 bytes from 192.168.56.101: icmp_seq=6 ttl=64 time=0.342 ms
64 bytes from 192.168.56.101: icmp_seq=7 ttl=64 time=0.391 ms
64 bytes from 192.168.56.101: icmp_seq=8 ttl=64 time=0.421 ms
64 bytes from 192.168.56.101: icmp_seq=9 ttl=64 time=0.338 ms
64 bytes from 192.168.56.101: icmp_seq=10 ttl=64 time=0.390 ms
64 bytes from 192.168.56.101: icmp_seq=11 ttl=64 time=0.416 ms

```

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

```

pastrana@localmachine:~$ ping 192.168.56.102
PING 192.168.56.102 (192.168.56.102) 56(84) bytes of data.
64 bytes from 192.168.56.102: icmp_seq=1 ttl=64 time=0.576 ms
64 bytes from 192.168.56.102: icmp_seq=2 ttl=64 time=0.436 ms
64 bytes from 192.168.56.102: icmp_seq=3 ttl=64 time=0.559 ms
64 bytes from 192.168.56.102: icmp_seq=4 ttl=64 time=0.540 ms
64 bytes from 192.168.56.102: icmp_seq=5 ttl=64 time=0.488 ms
64 bytes from 192.168.56.102: icmp_seq=6 ttl=64 time=0.538 ms
64 bytes from 192.168.56.102: icmp_seq=7 ttl=64 time=0.499 ms
64 bytes from 192.168.56.102: icmp_seq=8 ttl=64 time=0.369 ms
64 bytes from 192.168.56.102: icmp_seq=9 ttl=64 time=0.356 ms

```

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

```

lance1@server1:~$ ping 192.168.56.102
PING 192.168.56.102 (192.168.56.102) 56(84) bytes of data.
64 bytes from 192.168.56.102: icmp_seq=1 ttl=64 time=0.749 ms
64 bytes from 192.168.56.102: icmp_seq=2 ttl=64 time=0.498 ms
64 bytes from 192.168.56.102: icmp_seq=3 ttl=64 time=0.513 ms
64 bytes from 192.168.56.102: icmp_seq=4 ttl=64 time=0.435 ms
64 bytes from 192.168.56.102: icmp_seq=5 ttl=64 time=0.463 ms
64 bytes from 192.168.56.102: icmp_seq=6 ttl=64 time=0.375 ms
64 bytes from 192.168.56.102: icmp_seq=7 ttl=64 time=0.457 ms

```

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

```

pastrana@localmachine:~$ ssh lance1@192.168.56.101
lance1@192.168.56.101's password:
Welcome to Ubuntu 22.04.1 LTS (GNU/Linux 5.15.0-79-generic x86_64)

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

System information as of Wed Aug 23 04:40:42 PM UTC 2023

System load:  0.0               Processes:    131
Usage of /:   44.4% of 11.21GB  Users logged in: 1
Memory usage: 6%               IPv4 address for enp0s3: 192.168.56.101
Swap usage:  0%

```

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


```
Last login: Wed Aug 23 16:29:00 2023
lance1@server1:~$
```

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

```
Last login: Wed Aug 23 16:29:00 2023
lance1@server1:~$
logout
Connection to 192.168.56.101 closed.
pastrana@localmachine:~$
```

3. Do the same for Server 2.

```
pastrana@localmachine:~$ ssh lance2@192.168.56.102
lance2@192.168.56.102's password:
Welcome to Ubuntu 22.04.1 LTS (GNU/Linux 5.15.0-79-generic x86_64)

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

System information as of Wed Aug 23 04:43:04 PM UTC 2023

System load:  0.0029296875   Processes:            132
Usage of /:   25.9% of 11.21GB Users logged in:           1
Memory usage: 5%            IPv4 address for enp0s3: 192.168.56.102
Swap usage:  0%
```

```
Last login: Wed Aug 23 16:29:06 2023
lance2@server2:~$
```

```
Last login: Wed Aug 23 16:29:06 2023
lance2@server2:~$
logout
Connection to 192.168.56.102 closed.
pastrana@localmachine:~$
```

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.


```

pastrana@localmachine: ~
GNU nano 6.2 /etc/hosts
192.168.56.101 server1
192.168.56.102 server 2

# 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

```

- 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.

```

pastrana@localmachine: ~
pastrana@localmachine:~$ ssh lance1@server1
The authenticity of host 'server1 (192.168.56.101)' can't be established.
ED25519 key fingerprint is SHA256:3FnsVjOSQoXDAZekUMCcoAOzEV+MUNmCht9B1sd+rQ4.
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.
lance1@server1's password:
Welcome to Ubuntu 22.04.1 LTS (GNU/Linux 5.15.0-79-generic x86_64)

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

System information as of Wed Aug 23 04:47:03 PM UTC 2023

System load:  0.0          Processes:      133
Usage of /:   44.4% of 11.21GB    Users logged in: 1
Memory usage: 6%             IPv4 address for enp0s3: 192.168.56.101
Swap usage:   0%

184 updates can be applied immediately.
114 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Failed to connect to https://changelogs.ubuntu.com/meta-release-lts. Check your Internet connection or proxy settings

Last login: Wed Aug 23 16:40:42 2023 from 192.168.56.103
lance1@server1:~$
logout
Connection to server1 closed.

```

Do the same for Server 2.

```

pastrana@localmachine:~$ ssh lance2@server2
The authenticity of host 'server2 (192.168.56.102)' can't be established.
ED25519 key fingerprint is SHA256:VvDutasAhoz0x8WfWPe+5rlqYaVkpzmUbyVg8LLRZ1k.
This host key is known by the following other names/addresses:
-./ssh/known_hosts:4: [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.
lance2@server2's password:
Welcome to Ubuntu 22.04.1 LTS (GNU/Linux 5.15.0-79-generic x86_64)

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

System information as of Wed Aug 23 04:49:10 PM UTC 2023

System load:  0.0          Processes:      131
Usage of /:   25.9% of 11.21GB    Users logged in: 1
Memory usage: 4%             IPv4 address for enp0s3: 192.168.56.102
Swap usage:   0%

102 updates can be applied immediately.
14 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Last login: Wed Aug 23 16:43:04 2023 from 192.168.56.103
lance2@server2:~$
logout
Connection to server2 closed.
pastrana@localmachine:~$

```

Reflections:

Answer the following:

1. How are we able to use the hostname instead of IP address in SSH commands?
By modifying the local machine's host file via the command 'sudo nano /etc/hosts' and inputting the IP addresses of the respective servers alongside their hostnames, we achieved to utilize the server's hostname instead of the IP address in SSH commands. This adjustment allowed seamless translation between hostnames and IP addresses, giving us accessibility and streamlining SSH connections.

2. How secure is SSH?

Due to its encryption, authentication techniques such as public keys, and strong key exchange protocols, SSH is known as very secure for remote access and data transfer. Its security, however, is dependent on correct configuration, strong password restrictions, and up-to-date software. SSH, when used properly, provides a reliable and secure method of connecting to remote systems.