Name: Gabriel Soriano	**Date Performed: August 18, 2022**
Course/Section:CPE31S23	**Date Submitted: Aug 18, 2022**
Instructor: Engr. Taylar	**Semester and SY: 1st sem/2022-2023**

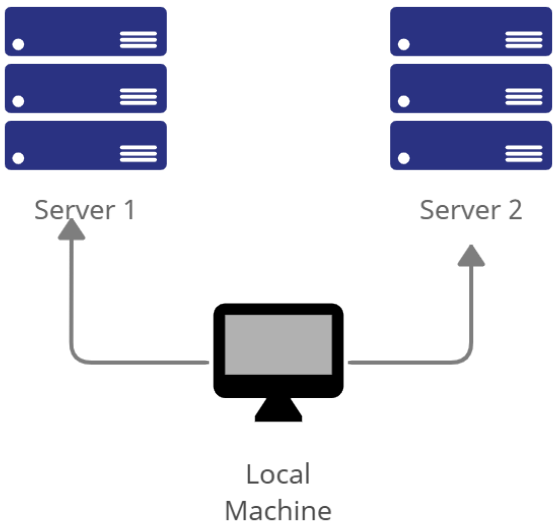
Activity 1: Configure Network using Virtual Machines

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.
2. Install the SSH server using the command *sudo apt install openssh-server*.
3. Verify if the SSH service has started by issuing the following commands:
   3.1 *sudo service ssh start*
   3.2 *sudo systemctl status ssh*
4. Configure the firewall to all port 22 by issuing the following commands:
   4.1 *sudo ufw allow ssh*
   4.2 *sudo ufw enable*
   4.3 *sudo ufw status*

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

1. Record the ip address of Server 1, Server 2, and Local Machine. Issue the command *ifconfig* and check network settings. Note that the ip addresses of all the machines are in this network 192.168.56.XX.
   1.1 Server 1 IP address: 192.168.56.104
   1.2 Server 2 IP address: 192.168.56.106
   1.3 Server 3 IP address: 192.168.56.105
2. Make sure that they can ping each other.
   2.1 Connectivity test for Local Machine 1 to Server 1: yes☐ Successful ☐ Not Successful
   2.2 Connectivity test for Local Machine 1 to Server 2: yes☐ Successful ☐ Not Successful
   2.3 Connectivity test for Server 1 to Server 2: yes☐ Successful ☐ Not Successful

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

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

1.1 ssh username@ip_address_server1 for example, *ssh jvtaylar@192.168.56.120*
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, *jvtaylar@server1*

2. Logout of Server 1 by issuing the command *control + D.*
3. Do the same for Server 2.

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

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

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

4.3 Save the file and exit.

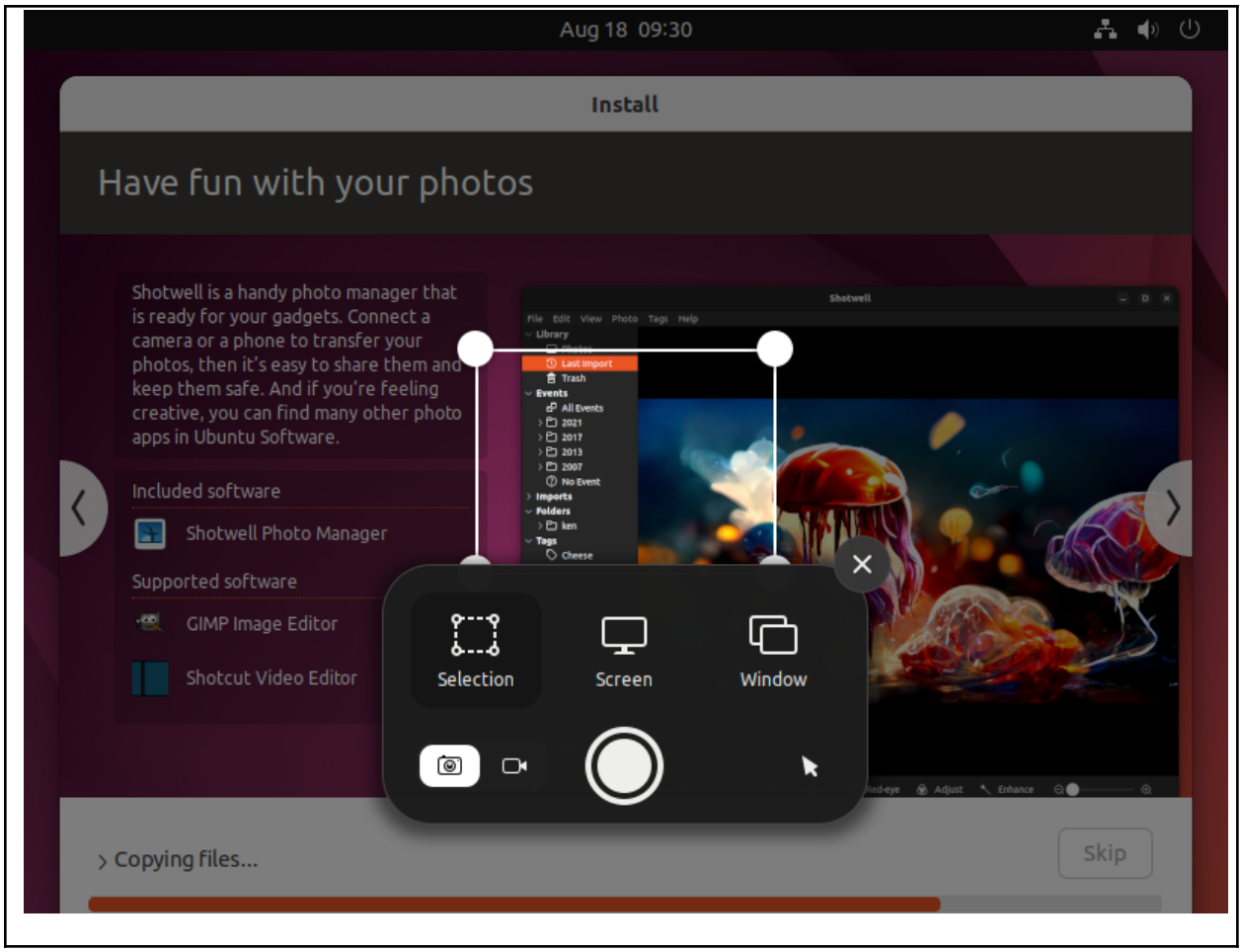
5. On the local machine, verify that you can do the SSH command but this time, use the hostname instead of typing the IP address of the servers. For example, try to do *ssh jvtaylar@server1*. Enter the password when prompted. Verify that you have entered Server 1. Do the same for Server 2.

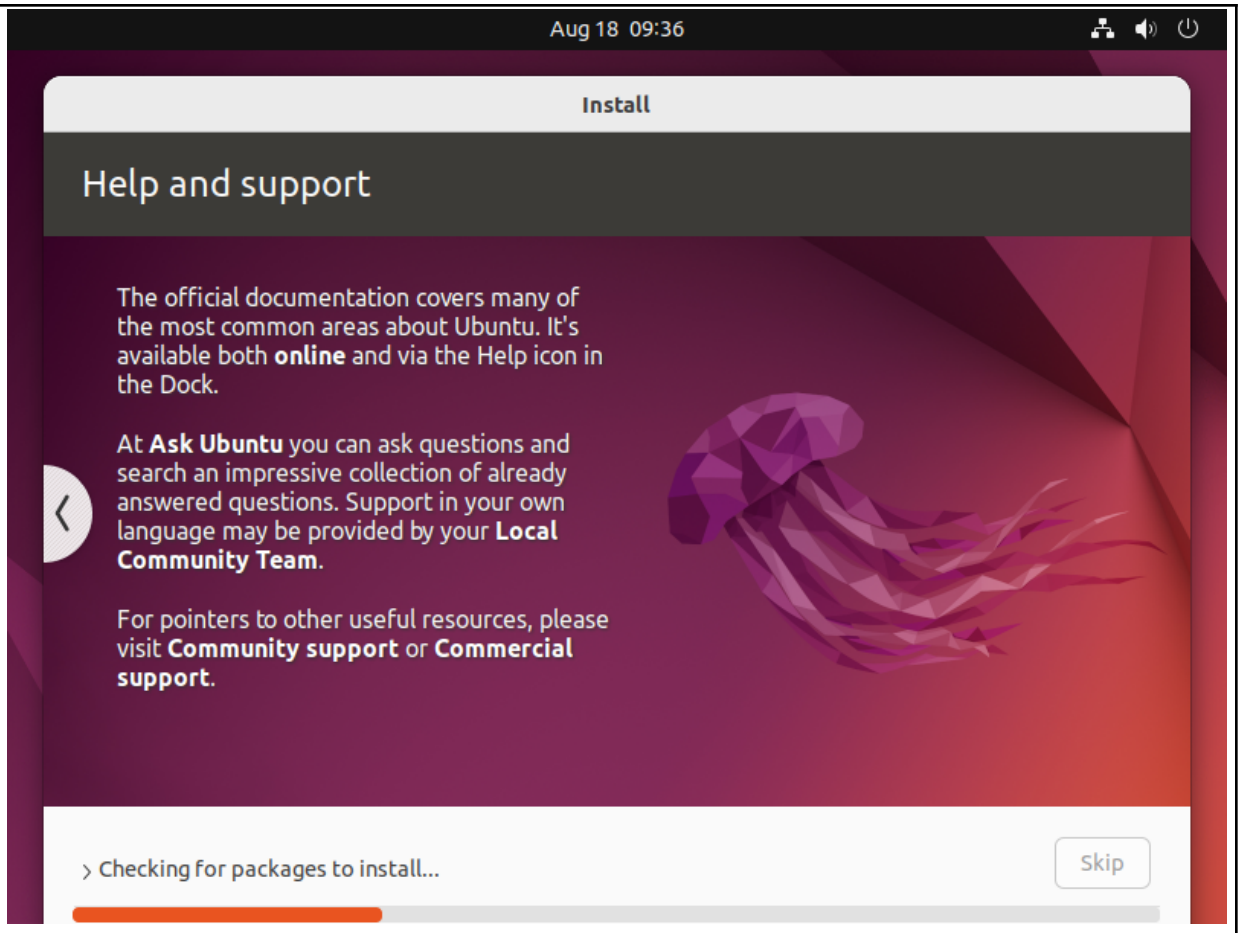
Reflections:

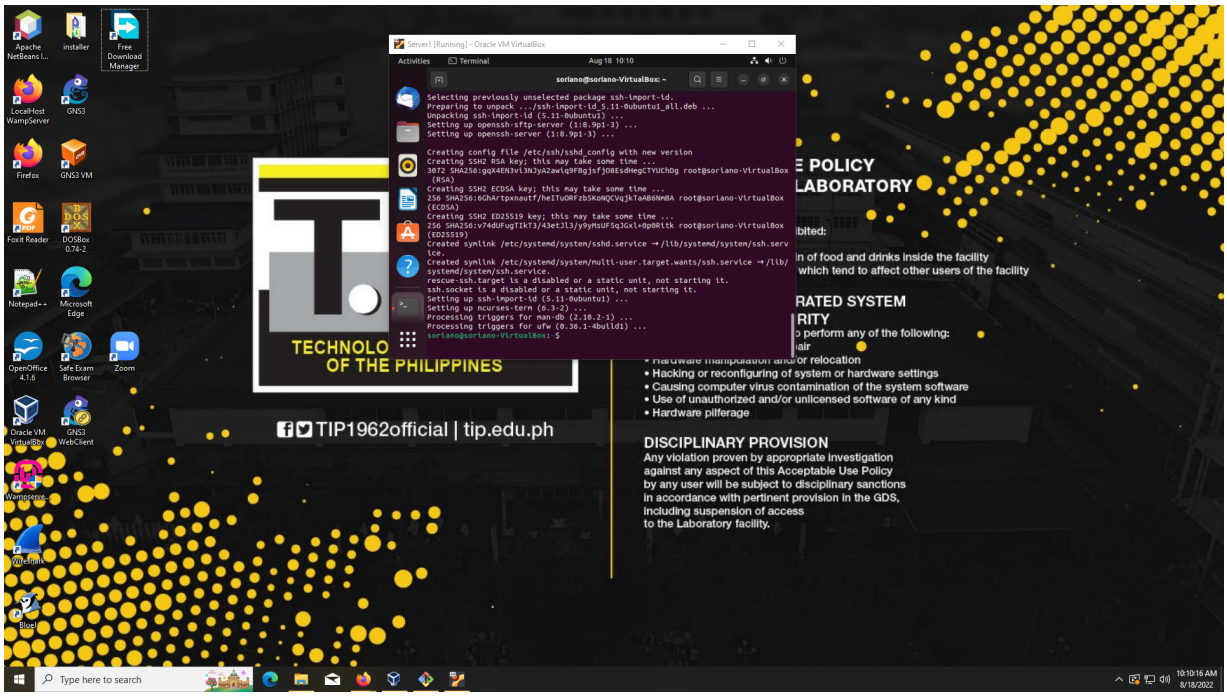
Answer the following:

1. How are we able to use the hostname instead of IP address in SSH commands?
   - It was possible because it has been verified through running some commands in the shell.
2. How secured is SSH?
   - That's why it is called "Secured Shell". It authenticates all connections and makes sure that it is encrypted.

Screenshots:


Aug 18 09:30
Install
Have fun with your photos
Shotwell is a handy photo manager that is ready for your gadgets. Connect a camera or a phone to transfer your photos, then it's easy to share them and keep them safe. And if you're feeling creative, you can find many other photo apps in Ubuntu Software.
Included software
Shotwell Photo Manager
Supported software
GIMP Image Editor
Shotcut Video Editor
Selection
Screen
Window
Copying files...
Skip


Aug 18 09:36
Install
Help and support
The official documentation covers many of the most common areas about Ubuntu. It's available both **online** and via the Help icon in the Dock.
At **Ask Ubuntu** you can ask questions and search an impressive collection of already answered questions. Support in your own language may be provided by your **Local Community Team**.
For pointers to other useful resources, please visit **Community support** or **Commercial support**.
Checking for packages to install...
Skip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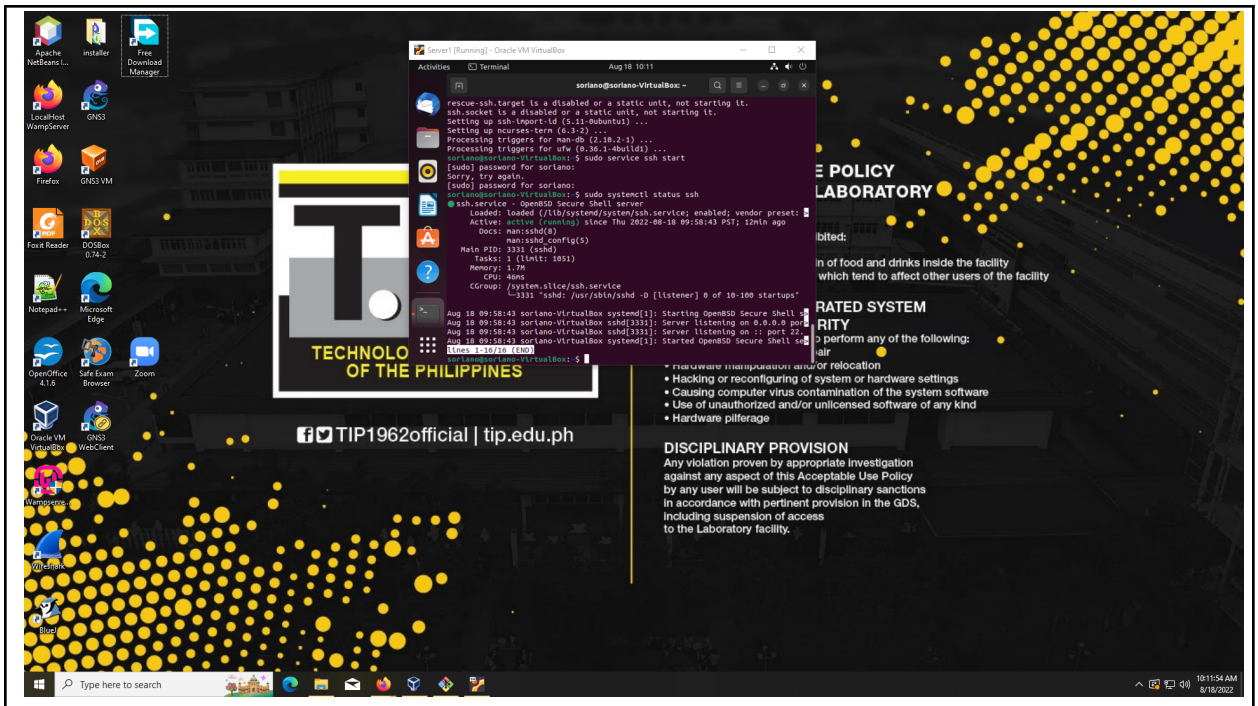
E POLICY
LABORATORY
RATED SYSTEM
RITY
• Hacking or reconfiguring of system or hardware settings
• Causing computer virus contamination of the system software
• Use of unauthorized and/or unlicensed software of any kind
• Hardware pilferage
DISCIPLINARY PROVISION
Any violation proven by appropriate investigation against any aspect of this Acceptable Use Policy by any user will be subject to disciplinary sanctions in accordance with pertinent provision in the GDS, including suspension of access to the Laboratory facility.


Server1 [Running] - Oracle VM VirtualBox
Activities
Terminal
Aug 18 10:11
soriano@soriano-VirtualBox: ~
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 (6.3-2) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for ufw (0.36.1-4build1) ...
soriano@soriano-VirtualBox:~$ sudo service ssh start
[sudo] password for soriano:
Sorry, try again.
[sudo] password for soriano:
soriano@soriano-VirtualBox:~$ sudo systemctl status ssh
ssh.service - OpenBSD Secure Shell server
Loaded: loaded (/lib/systemd/system/ssh.service; enabled; vendor preset:
Active: active (running) since Thu 2022-08-18 09:58:43 PST; 12min ago
Docs: man:sshd(8)
man:sshd_config(5)
Main PID: 3331 (sshd)
Tasks: 1 (limit: 1051)
Memory: 1.7M
CPU: 46ms
CGroup: /system.slice/ssh.service
└─3331 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"
Aug 18 09:58:43 soriano-VirtualBox systemd[1]: Starting OpenBSD Secure Shell s
Aug 18 09:58:43 soriano-VirtualBox sshd[3331]: Server listening on 0.0.0.0 por
Aug 18 09:58:43 soriano-VirtualBox sshd[3331]: Server listening on :: port 22.
Aug 18 09:58:43 soriano-VirtualBox systemd[1]: Started OpenBSD Secure Shell se
lines 1-16/16 (END)
soriano@soriano-VirtualBox:~$
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ibited:
in of food and drinks inside the facility
which tend to affect other users of the facility
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RITY
o perform any of the following:
air
or relocation
• Hacking or reconfiguring of system or hardware settings
• Causing computer virus contamination of the system software
• Use of unauthorized and/or unlicensed software of any kind
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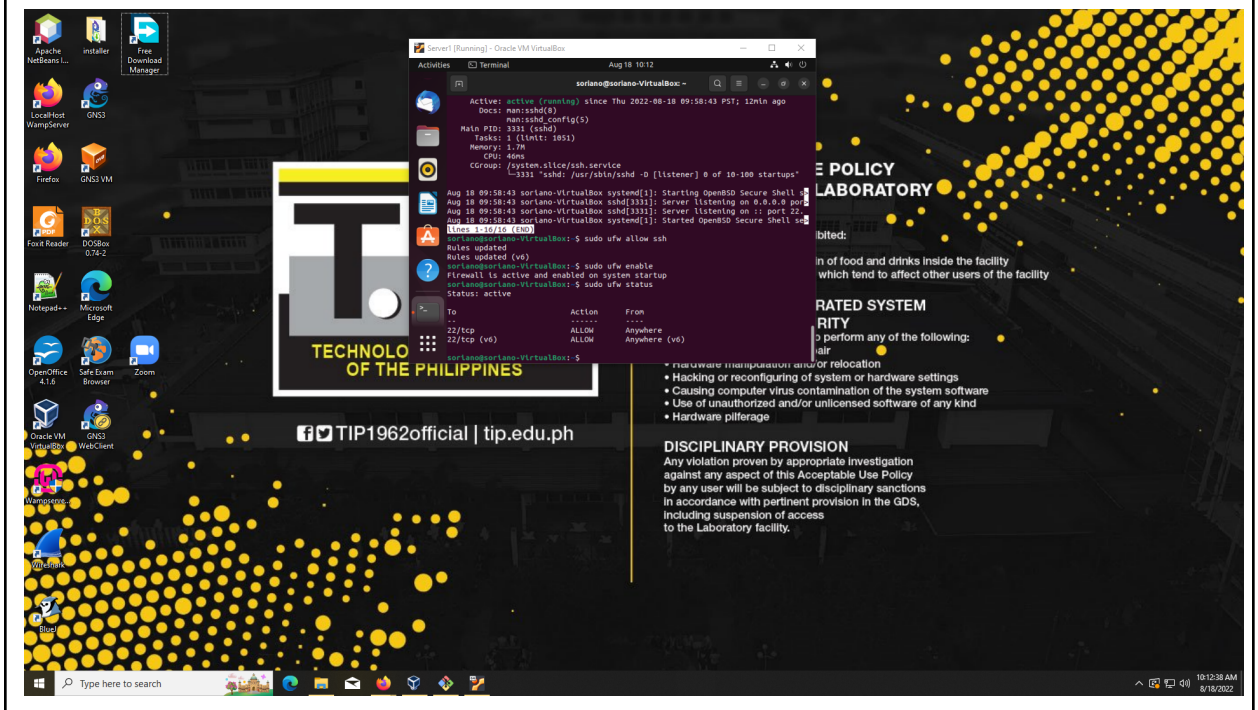
to the Laboratory facility.
Type here to search
10:11:54 AM
8/18/2022


Server1 [Running] - Oracle VM VirtualBox
Activities
Terminal
Aug 18 10:12
soriano@soriano-VirtualBox: ~
Active: active (running) since Thu 2022-08-18 09:58:43 PST; 12min ago
Docs: man:sshd(8)
man:sshd_config(5)
Main PID: 3331 (sshd)
Tasks: 1 (limit: 1051)
Memory: 1.7M
CPU: 46ms
CGroup: /system.slice/ssh.service
└─3331 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"
Aug 18 09:58:43 soriano-VirtualBox systemd[1]: Starting OpenBSD Secure Shell s
Aug 18 09:58:43 soriano-VirtualBox sshd[3331]: Server listening on 0.0.0.0 por
Aug 18 09:58:43 soriano-VirtualBox sshd[3331]: Server listening on :: port 22.
Aug 18 09:58:43 soriano-VirtualBox systemd[1]: Started OpenBSD Secure Shell se
lines 1-16/16 (END)
soriano@soriano-VirtualBox:~$ sudo ufw allow ssh
Rules updated
Rules updated (v6)
soriano@soriano-VirtualBox:~$ sudo ufw enable
Firewall is active and enabled on system startup
soriano@soriano-VirtualBox:~$ sudo ufw status
Status: active
To Action From
-- ------ ----
22/tcp ALLOW Anywhere
22/tcp (v6) ALLOW Anywhere (v6)
soriano@soriano-VirtualBox:~$
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which tend to affect other users of the facility
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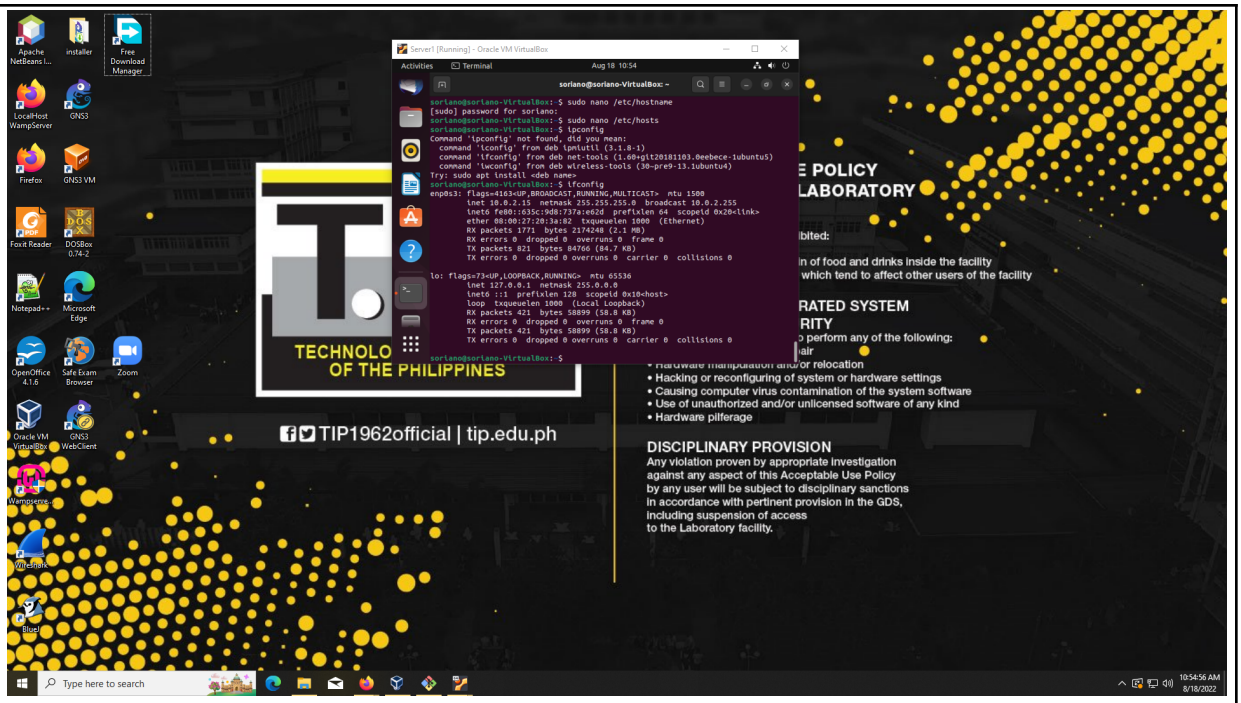
Type here to search
10:12:38 AM
8/18/2022


Server1 [Running] - Oracle VM VirtualBox
Activities
Terminal
Aug 18 10:54
soriano@soriano-VirtualBox: ~
soriano@soriano-VirtualBox: ~ $ sudo nano /etc/hostname
[sudo] password for soriano:
soriano@soriano-VirtualBox: ~ $ sudo nano /etc/hosts
soriano@soriano-VirtualBox: ~ $ ipconfig
Command 'ipconfig' not found, did you mean:
command 'iconfig' from deb lpntutil (3.1.0-1)
command 'ifconfig' from deb net-tools (1.60+git20181103.0eebece-1ubuntu5)
command 'twconfig' from deb wireless-tools (30~pre9-13.1ubuntu4)
Try: sudo apt install <deb name>
soriano@soriano-VirtualBox: ~ $ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
inet6 fe80::635c:9d8:737a:e62d prefixlen 64 scopeid 0x20<link>
ether 08:00:27:20:3a:82 txqueuelen 1000 (Ethernet)
RX packets 1771 bytes 2174248 (2.1 MB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 821 bytes 84766 (84.7 KB)
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
inet6 ::1 prefixlen 128 scopeid 0x10<host>
loop txqueuelen 1000 (Local Loopback)
RX packets 421 bytes 38899 (38.8 KB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 421 bytes 38899 (38.8 KB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
soriano@soriano-VirtualBox: ~ $
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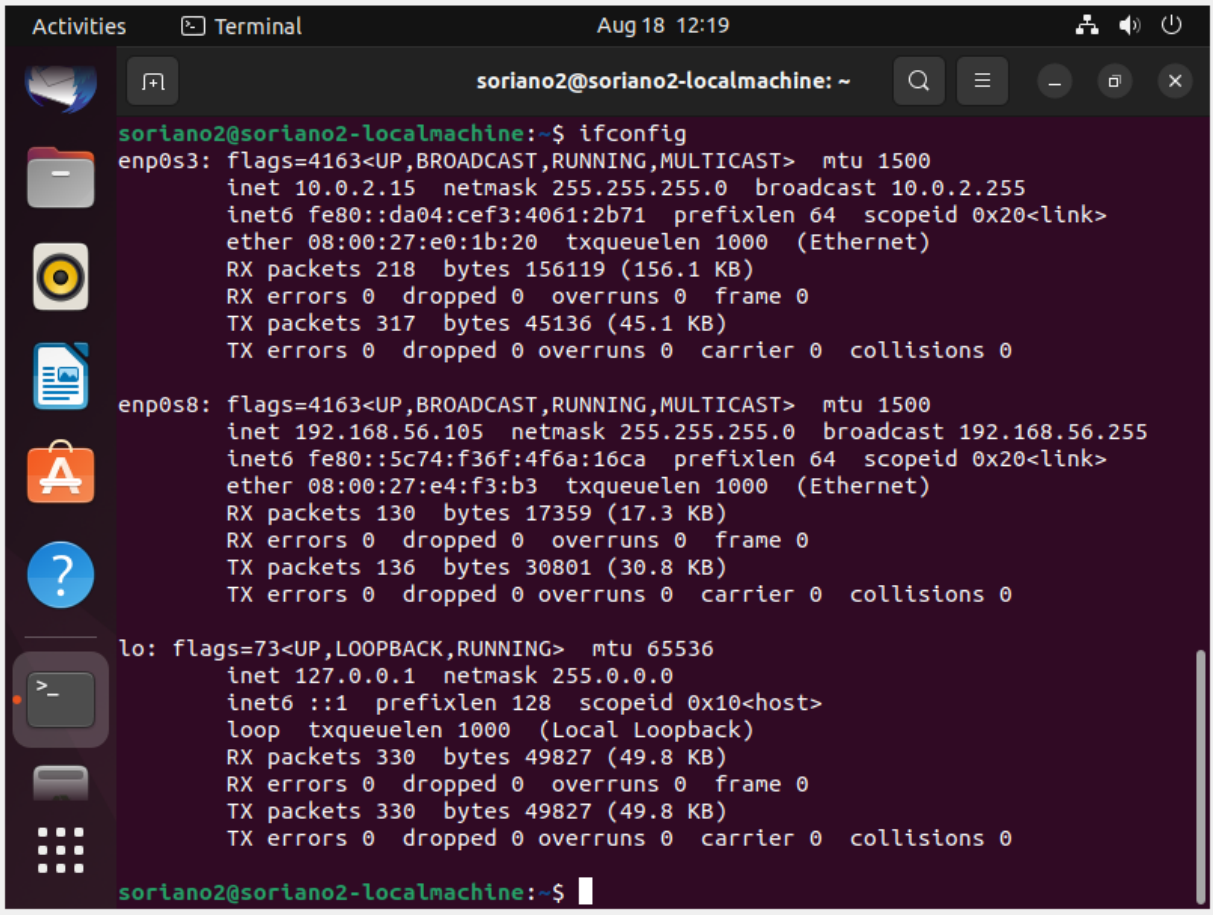
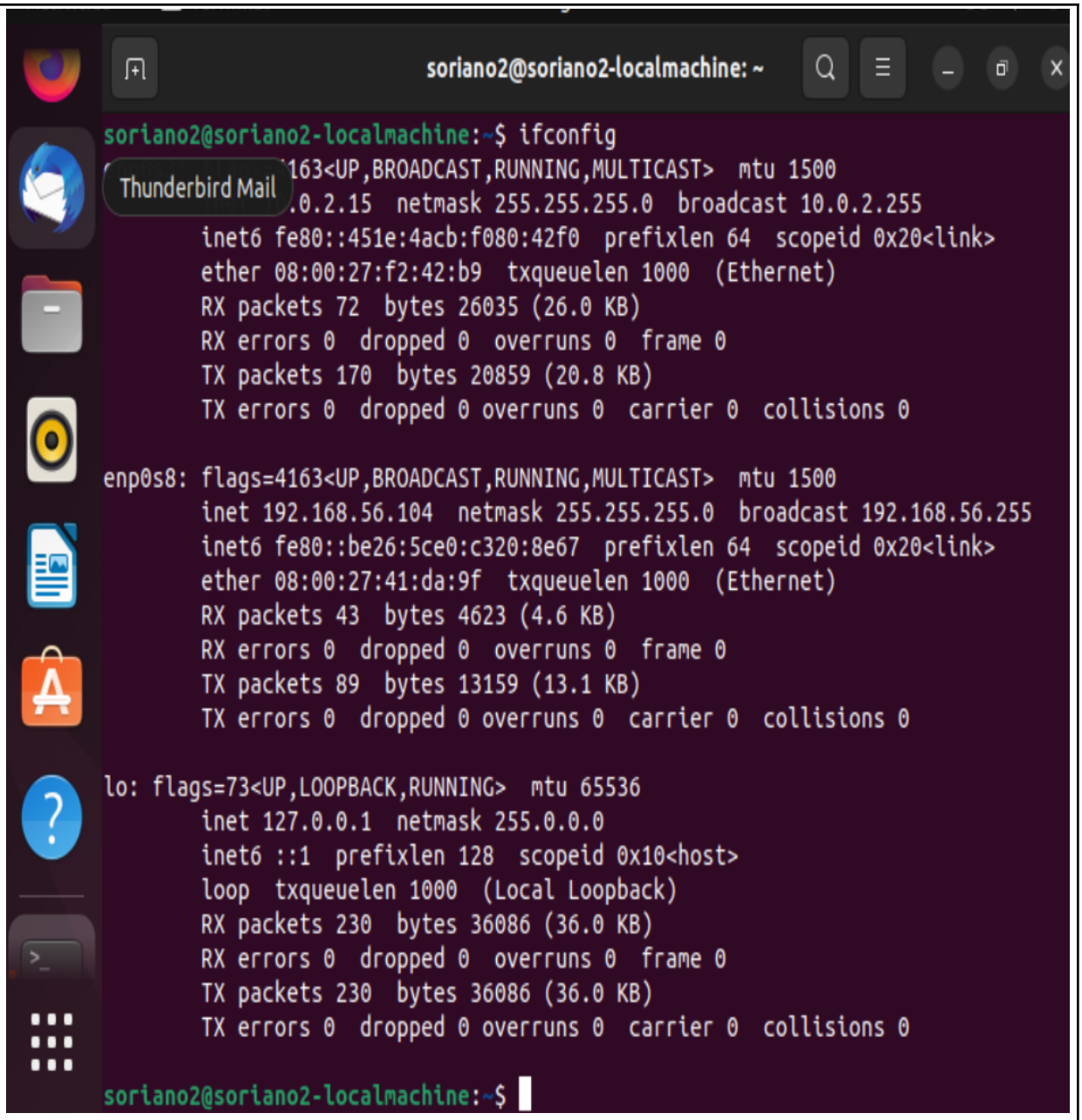
Type here to search
10:54:56 AM
8/18/2022

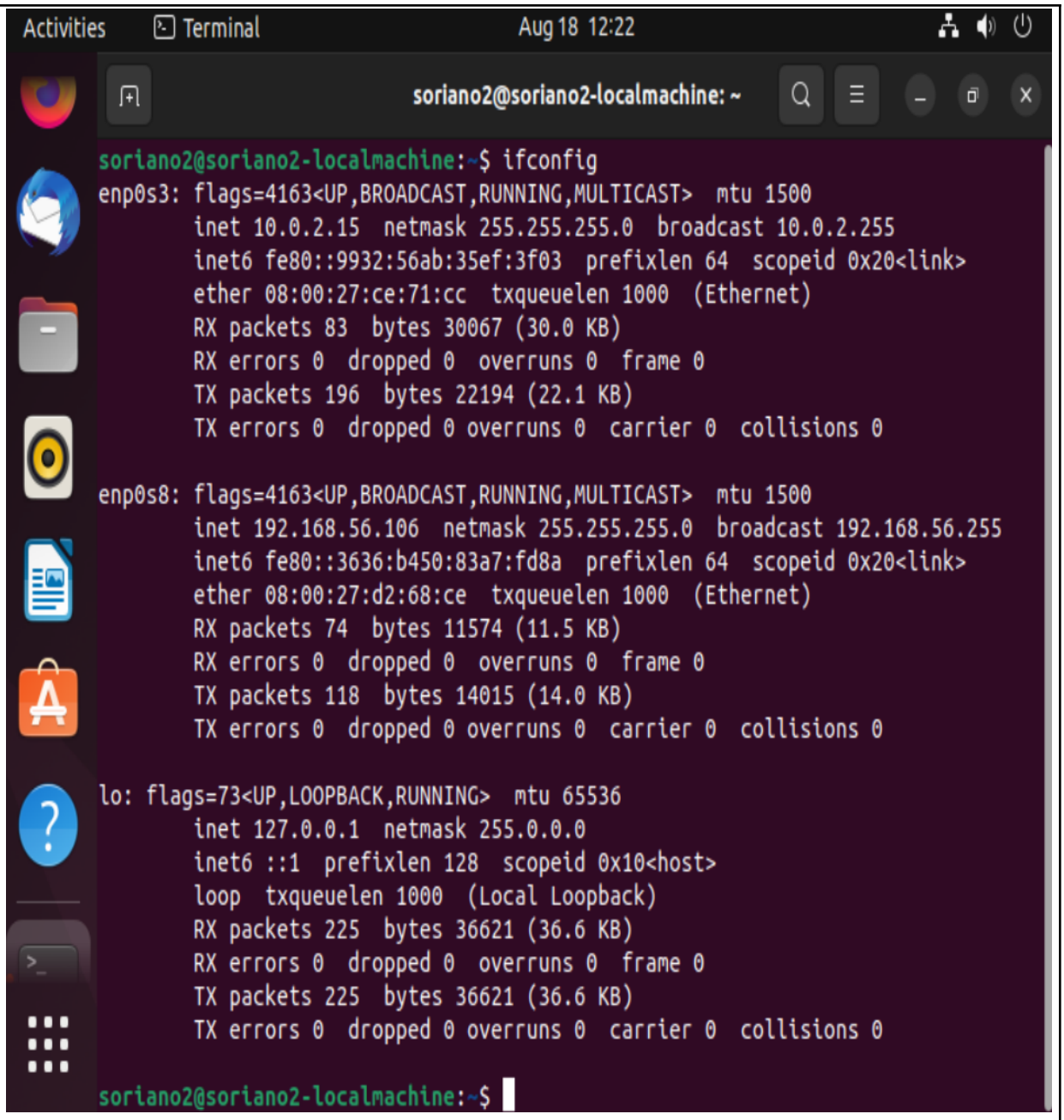
server 1



Local machine


soriano2@soriano2-localmachine: ~
Thunderbird Mail
soriano2@soriano2-localmachine:~$ ifconfig
163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
inet6 fe80::451e:4acb:f080:42f0 prefixlen 64 scopeid 0x20<link>
ether 08:00:27:f2:42:b9 txqueuelen 1000 (Ethernet)
RX packets 72 bytes 26035 (26.0 KB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 170 bytes 20859 (20.8 KB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
enp0s8: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
inet 192.168.56.104 netmask 255.255.255.0 broadcast 192.168.56.255
inet6 fe80::be26:5ce0:c320:8e67 prefixlen 64 scopeid 0x20<link>
ether 08:00:27:41:da:9f txqueuelen 1000 (Ethernet)
RX packets 43 bytes 4623 (4.6 KB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 89 bytes 13159 (13.1 KB)
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
inet6 ::1 prefixlen 128 scopeid 0x10<host>
loop txqueuelen 1000 (Local Loopback)
RX packets 230 bytes 36086 (36.0 KB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 230 bytes 36086 (36.0 KB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
soriano2@soriano2-localmachine:~$

server2

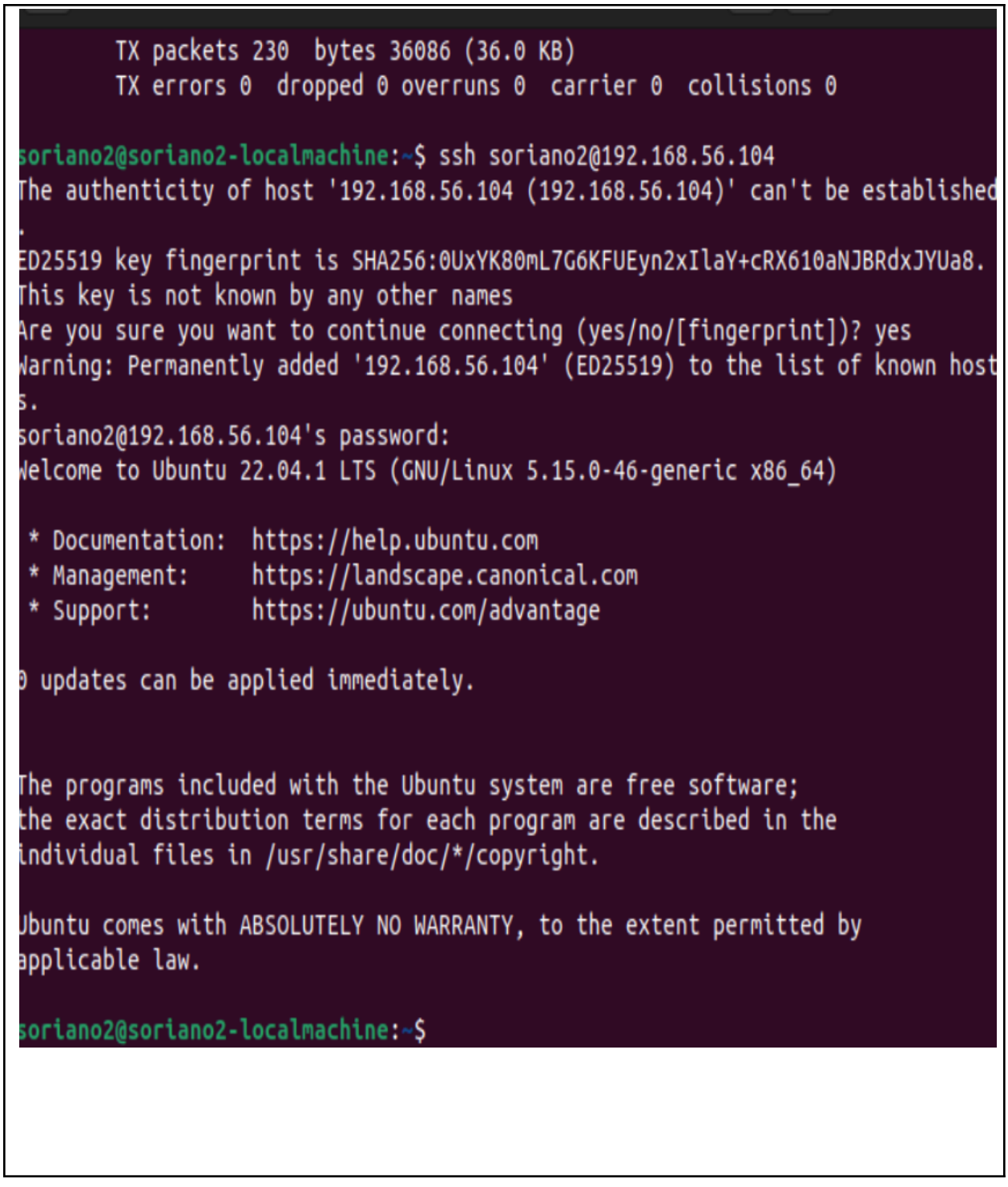


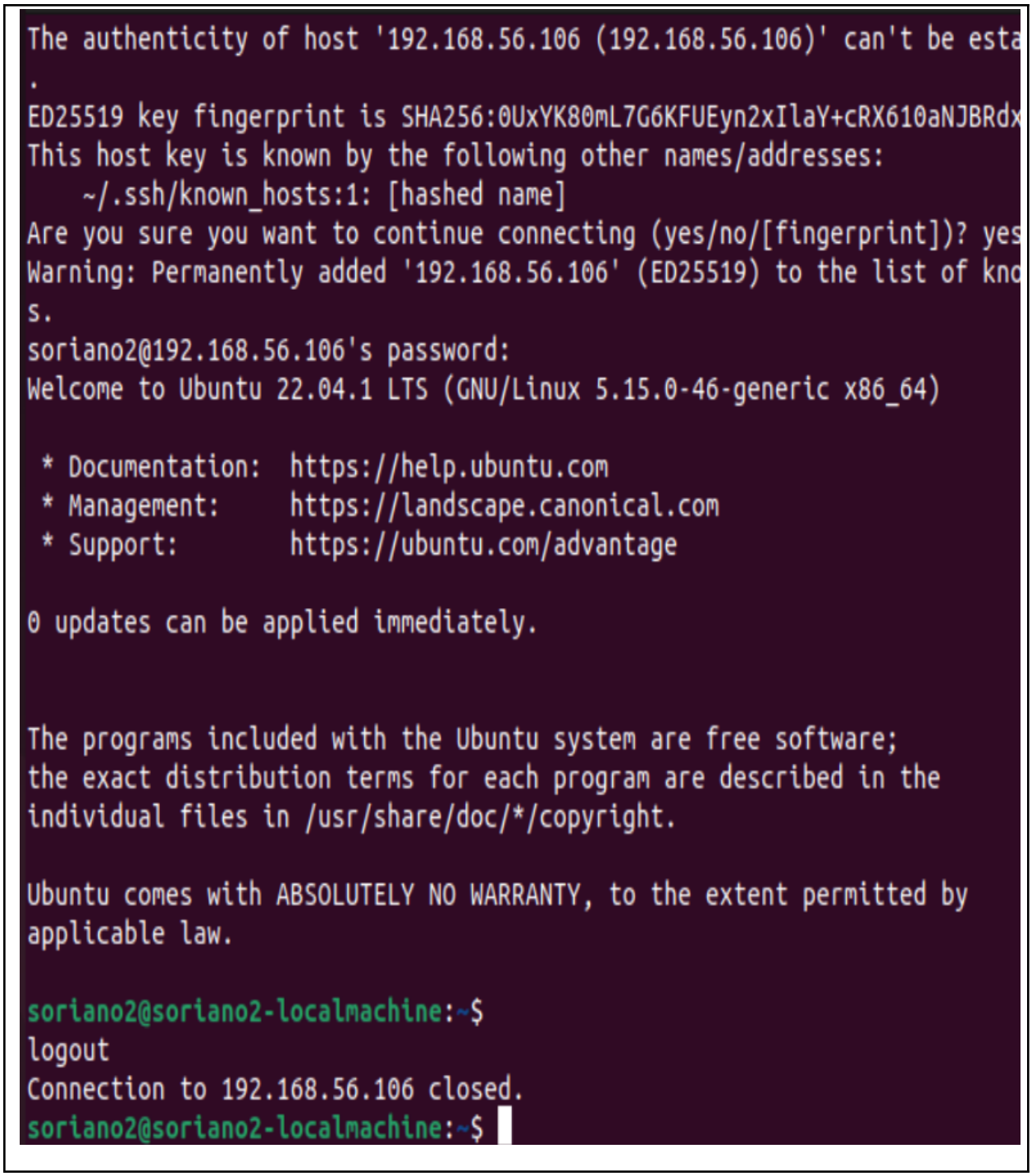
ping commands

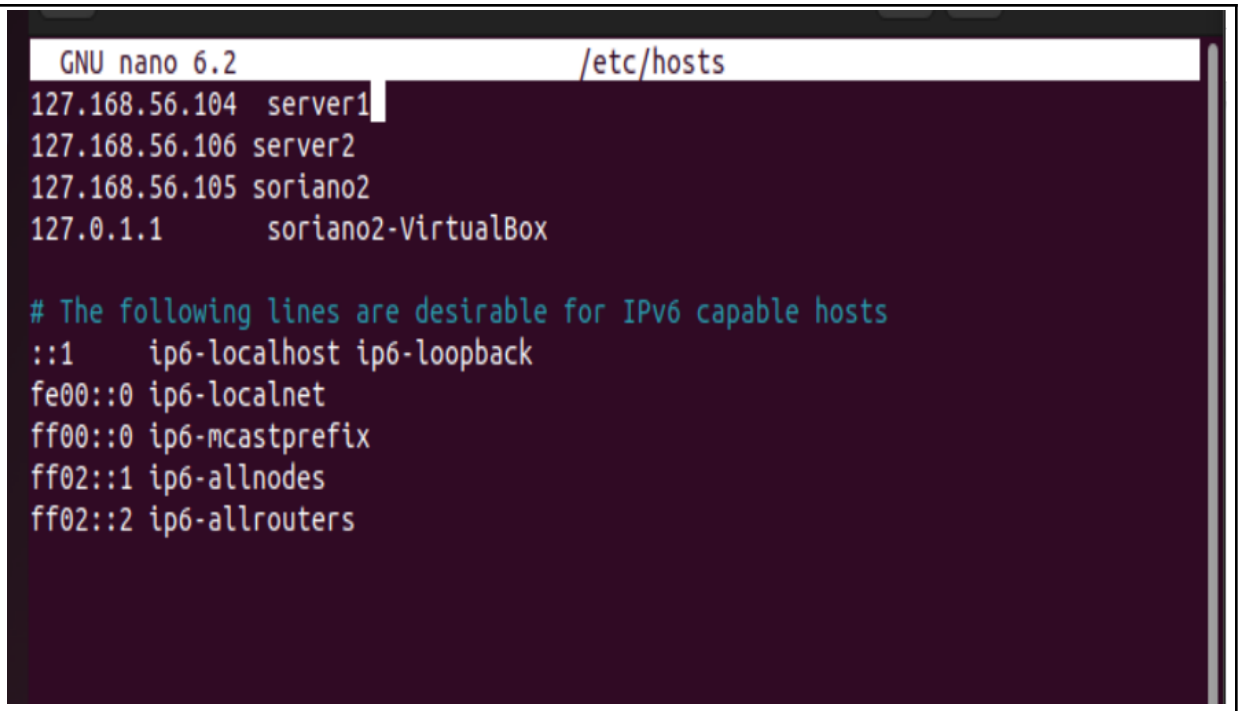
```
TIPQC@Q5202-30 MINGW64 ~/soriano/welcome-to-git (master)
$ ping 192.168.56.104

Pinging 192.168.56.104 with 32 bytes of data:
Reply from 192.168.56.104: bytes=32 time<1ms TTL=64
Reply from 192.168.56.104: bytes=32 time<1ms TTL=64
Reply from 192.168.56.104: bytes=32 time<1ms TTL=64
Reply from 192.168.56.104: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.56.104:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

TIPQC@Q5202-30 MINGW64 ~/soriano/welcome-to-git (master)
$ ping 192.168.56.104

Pinging 192.168.56.104 with 32 bytes of data:
Reply from 192.168.56.104: bytes=32 time<1ms TTL=64
Reply from 192.168.56.104: bytes=32 time<1ms TTL=64
Reply from 192.168.56.104: bytes=32 time<1ms TTL=64
Reply from 192.168.56.104: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.56.104:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

TIPQC@Q5202-30 MINGW64 ~/soriano/welcome-to-git (master)
$ ping 192.168.56.106

Pinging 192.168.56.106 with 32 bytes of data:
Reply from 192.168.56.106: bytes=32 time<1ms TTL=64
Reply from 192.168.56.106: bytes=32 time<1ms TTL=64
Reply from 192.168.56.106: bytes=32 time<1ms TTL=64
Reply from 192.168.56.106: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.56.106:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

TIPQC@Q5202-30 MINGW64 ~/soriano/welcome-to-git (master)
$ ping 192.168.56.105

Pinging 192.168.56.105 with 32 bytes of data:
Reply from 192.168.56.105: bytes=32 time<1ms TTL=64
Reply from 192.168.56.105: bytes=32 time<1ms TTL=64
Reply from 192.168.56.105: bytes=32 time<1ms TTL=64
Reply from 192.168.56.105: bytes=32 time=1ms TTL=64

Ping statistics for 192.168.56.105:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

TIPQC@Q5202-30 MINGW64 ~/soriano/welcome-to-git (master)
$
```

```
soriano2@soriano2-localmachine:~$ ping 192.168.56.106
PING 192.168.56.106 (192.168.56.106) 56(84) bytes of data.
64 bytes from 192.168.56.106: icmp_seq=1 ttl=64 time=0.661 ms
64 bytes from 192.168.56.106: icmp_seq=2 ttl=64 time=1.18 ms
64 bytes from 192.168.56.106: icmp_seq=3 ttl=64 time=0.963 ms
64 bytes from 192.168.56.106: icmp_seq=4 ttl=64 time=0.349 ms
64 bytes from 192.168.56.106: icmp_seq=5 ttl=64 time=0.531 ms
64 bytes from 192.168.56.106: icmp_seq=6 ttl=64 time=0.256 ms
64 bytes from 192.168.56.106: icmp_seq=7 ttl=64 time=0.386 ms
64 bytes from 192.168.56.106: icmp_seq=8 ttl=64 time=0.978 ms
64 bytes from 192.168.56.106: icmp_seq=9 ttl=64 time=0.729 ms
64 bytes from 192.168.56.106: icmp_seq=10 ttl=64 time=0.826 ms
64 bytes from 192.168.56.106: icmp_seq=11 ttl=64 time=1.03 ms
64 bytes from 192.168.56.106: icmp_seq=12 ttl=64 time=0.959 ms
64 bytes from 192.168.56.106: icmp_seq=13 ttl=64 time=0.969 ms
64 bytes from 192.168.56.106: icmp_seq=14 ttl=64 time=0.531 ms
64 bytes from 192.168.56.106: icmp_seq=15 ttl=64 time=0.926 ms
64 bytes from 192.168.56.106: icmp_seq=16 ttl=64 time=0.938 ms
64 bytes from 192.168.56.106: icmp_seq=17 ttl=64 time=0.862 ms
64 bytes from 192.168.56.106: icmp_seq=18 ttl=64 time=0.943 ms
64 bytes from 192.168.56.106: icmp_seq=19 ttl=64 time=0.675 ms
```

task 4


TX packets 230 bytes 36086 (36.0 KB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
soriano2@soriano2-localmachine:~$ ssh soriano2@192.168.56.104
The authenticity of host '192.168.56.104 (192.168.56.104)' can't be established
.
ED25519 key fingerprint is SHA256:0UxYK80mL7G6KFUEyn2xIlaY+cRX610aNJBRdxJYUa8.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.56.104' (ED25519) to the list of known host
s.
soriano2@192.168.56.104's password:
Welcome to Ubuntu 22.04.1 LTS (GNU/Linux 5.15.0-46-generic x86_64)
* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/advantage
0 updates can be applied immediately.
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.
soriano2@soriano2-localmachine:~$


The authenticity of host '192.168.56.106 (192.168.56.106)' can't be esta
.
ED25519 key fingerprint is SHA256:0UxYK80mL7G6KFUEyn2xIlaY+cRX610aNJBRdx
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 '192.168.56.106' (ED25519) to the list of kno
s.
soriano2@192.168.56.106's password:
Welcome to Ubuntu 22.04.1 LTS (GNU/Linux 5.15.0-46-generic x86_64)
* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/advantage
0 updates can be applied immediately.
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.
soriano2@soriano2-localmachine:~$
logout
Connection to 192.168.56.106 closed.
soriano2@soriano2-localmachine:~$


GNU nano 6.2 /etc/hosts
127.168.56.104 server1
127.168.56.106 server2
127.168.56.105 soriano2
127.0.1.1 soriano2-VirtualBox
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