

CYSE 270: Linux System for Cybersecurity

Lab 12 – Advanced Network configurations

Scenario: You, as a network admin, are going to set up your Ubuntu VM as a gateway to provide Internet access to another client Ubuntu VM. The client VM needs to be in the same internal network as the gateway (as shown in Figure 1). Once the connection is ready, you need to configure the firewall to secure the network properly. The following requirements need to be satisfied to receive full credits.

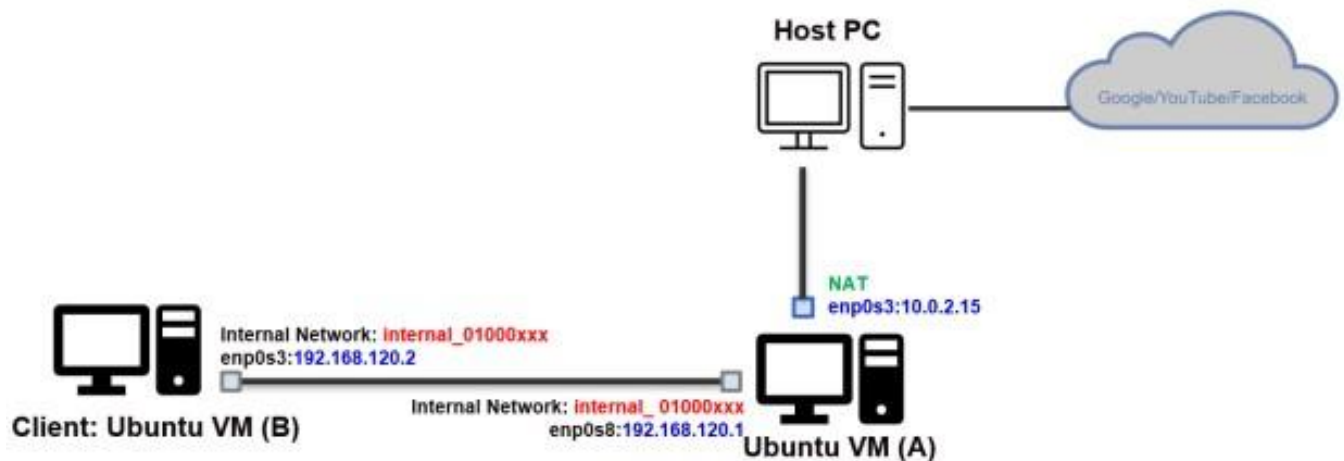


Figure 1 Desired Network Topology

Please note that you need to customize the value in the fields marked in RED above.

Please configure the network with the following requirement: (You need to clone the existing VM)

Task A –Network Configuration (60 points)

Please submit the screenshot for all the steps.

1. In the virtual box setting, connect two VMs in the same internal network, “internal_{UIN}”.

Replace {UIN} with your real UIN.

Oracle VM VirtualBox Manager

File Machine Help

Tools

New Settings Discard Show

CYSE Ubuntu (Linked Bas...) Running
CYSE Ubuntu Clone Running

General

Name: CYSE Ubuntu Clone
 Operating System: Ubuntu (64-bit)

System

Base Memory: 3000 MB
 Boot Order: Floppy, Optical, Hard Disk
 Acceleration: VT-x/AMD-V, Nested Paging, KVM Paravirtualization

Display

Video Memory: 16 MB
 Graphics Controller: VMSVGA
 Remote Desktop Server: Disabled
 Recording: Disabled

Storage

Controller: IDE
 IDE Secondary Device 0: [Optical Drive] Empty
 Controller: SATA
 SATA Port 0: CYSE Ubuntu_.vdi (Normal, 30.00 GB)
 SATA Port 1: CYSE jtayl081.vdi (Normal, 200.00 MB)

Audio

Host Driver: Windows DirectSound
 Controller: ICH AC97

Network

Adapter 2: Intel PRO/1000 MT Desktop (Internal Network, '01031996')

USB

USB Controller: OHCI, EHCI
 Device Filters: 0 (0 active)

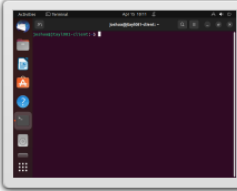
Shared folders

None

Description

None

Preview



Oracle VM VirtualBox Manager

File Machine Help

Tools

New Settings Discard Show

CYSE Ubuntu (Lin...) Running
CYSE Ubuntu Clone Running

General

Name: CYSE Ubuntu
 Operating System: Ubuntu (64-bit)

System

Base Memory: 3000 MB
 Boot Order: Floppy, Optical, Hard Disk
 Acceleration: VT-x/AMD-V, Nested Paging, KVM Paravirtualization

Display

Video Memory: 16 MB
 Graphics Controller: VMSVGA
 Remote Desktop Server: Disabled
 Recording: Disabled

Storage

Controller: IDE
 IDE Secondary Device 0: [Optical Drive] Empty
 Controller: SATA
 SATA Port 0: CYSE Ubuntu_.vdi (Normal, 30.00 GB)
 SATA Port 1: CYSE jtayl081.vdi (Normal, 200.00 MB)

Audio

Host Driver: Windows DirectSound
 Controller: ICH AC97

Network

Adapter 1: Intel PRO/1000 MT Desktop (NAT)
 Adapter 2: Intel PRO/1000 MT Desktop (Internal Network, '01031996')

USB

USB Controller: OHCI, EHCI
 Device Filters: 0 (0 active)

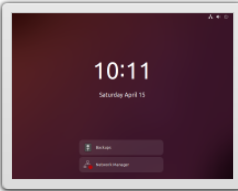
Shared folders

None

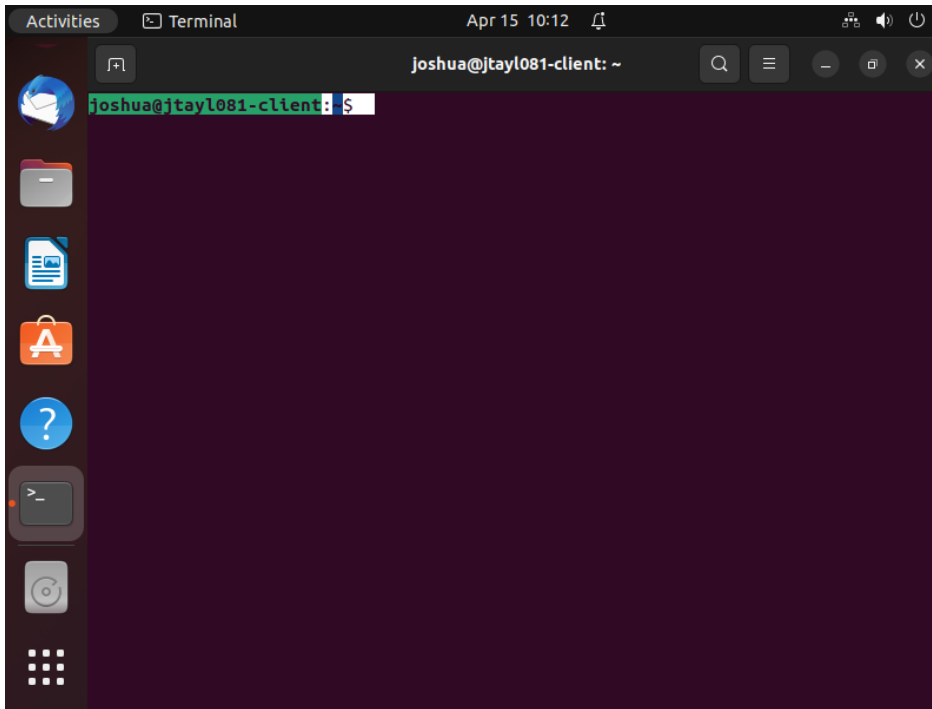
Description

None

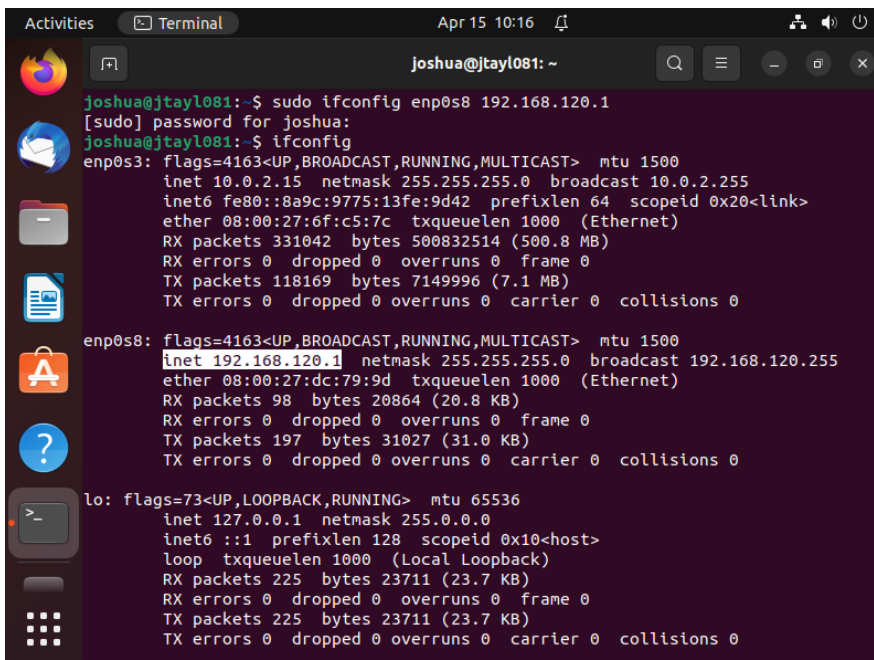
Preview



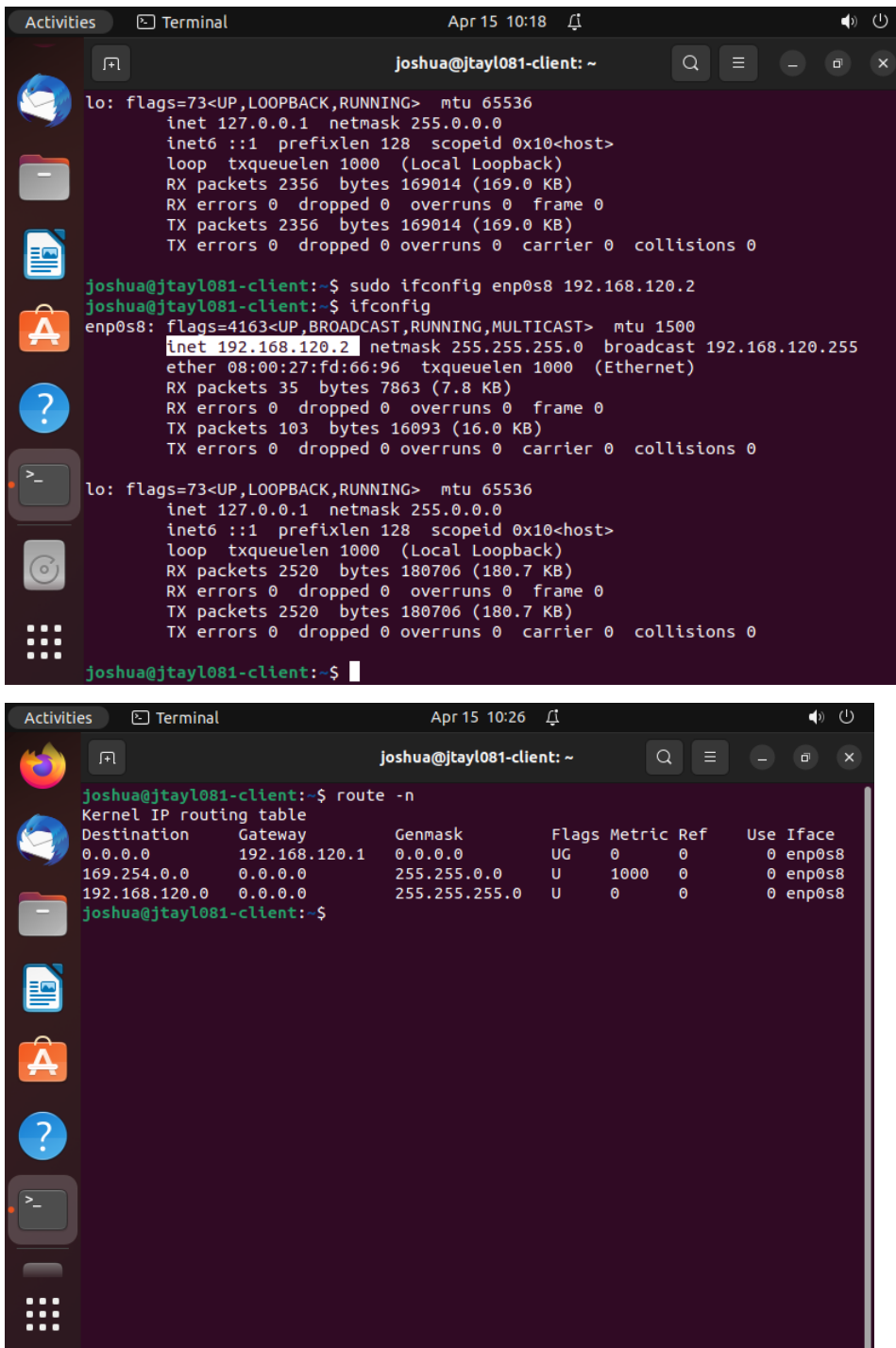
2. Change the hostname of the Client VM to "{MIDASname}-Client." **Replace {MIDAS name} with your real MIDAS name. Don't forget to reboot your client VM to reflect the change in hostname.**



3. Configure the temporary IP address on the Gateway Ubuntu, as shown in Figure 1.



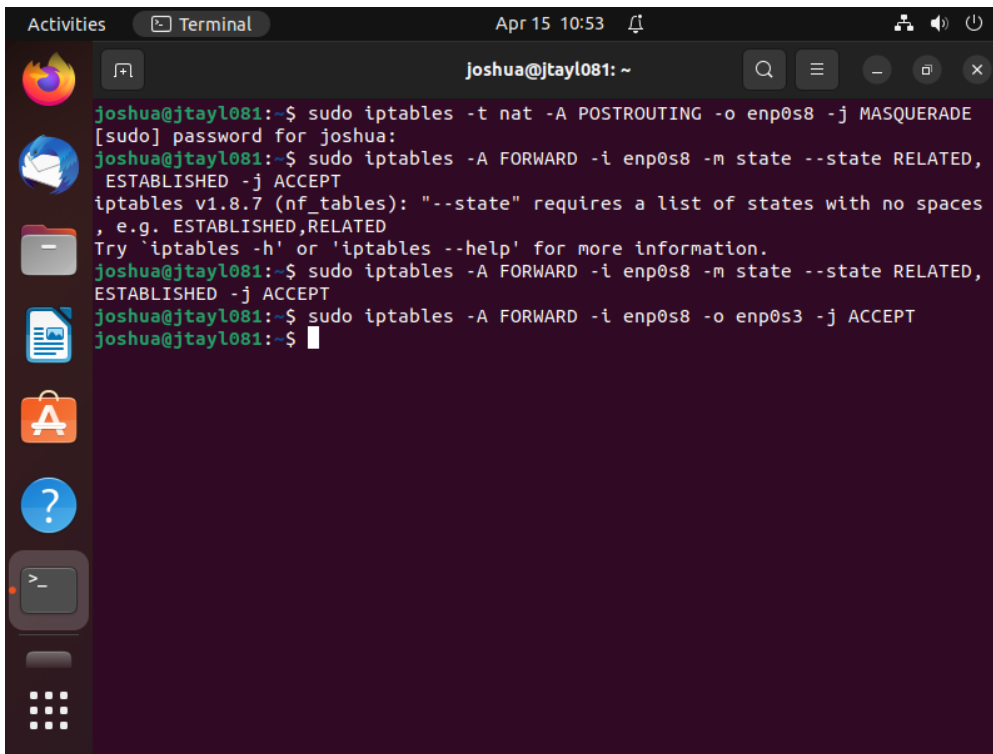
4. Configure the temporary IP address, routing table, and DNS server on Client VM as shown in Figure 1.



```
Joshua@jtayl081-client: ~  
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 2356 bytes 169014 (169.0 KB)  
RX errors 0 dropped 0 overruns 0 frame 0  
TX packets 2356 bytes 169014 (169.0 KB)  
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
joshua@jtayl081-client:~$ sudo ifconfig enp0s8 192.168.120.2  
joshua@jtayl081-client:~$ ifconfig  
enp0s8: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500  
inet 192.168.120.2 netmask 255.255.255.0 broadcast 192.168.120.255  
ether 08:00:27:fd:66:96 txqueuelen 1000 (Ethernet)  
RX packets 35 bytes 7863 (7.8 KB)  
RX errors 0 dropped 0 overruns 0 frame 0  
TX packets 103 bytes 16093 (16.0 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 2520 bytes 180706 (180.7 KB)  
RX errors 0 dropped 0 overruns 0 frame 0  
TX packets 2520 bytes 180706 (180.7 KB)  
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
joshua@jtayl081-client:~$
```

```
Joshua@jtayl081-client: ~  
joshua@jtayl081-client:~$ route -n  
Kernel IP routing table  
Destination Gateway Genmask Flags Metric Ref Use Iface  
0.0.0.0 192.168.120.1 0.0.0.0 UG 0 0 0 enp0s8  
169.254.0.0 0.0.0.0 255.255.0.0 U 1000 0 0 enp0s8  
192.168.120.0 0.0.0.0 255.255.255.0 U 0 0 0 enp0s8  
  
joshua@jtayl081-client:~$
```

5. Configure gateway Ubuntu to enable IP forwarding (to forward the traffic) (also NAT configuration)

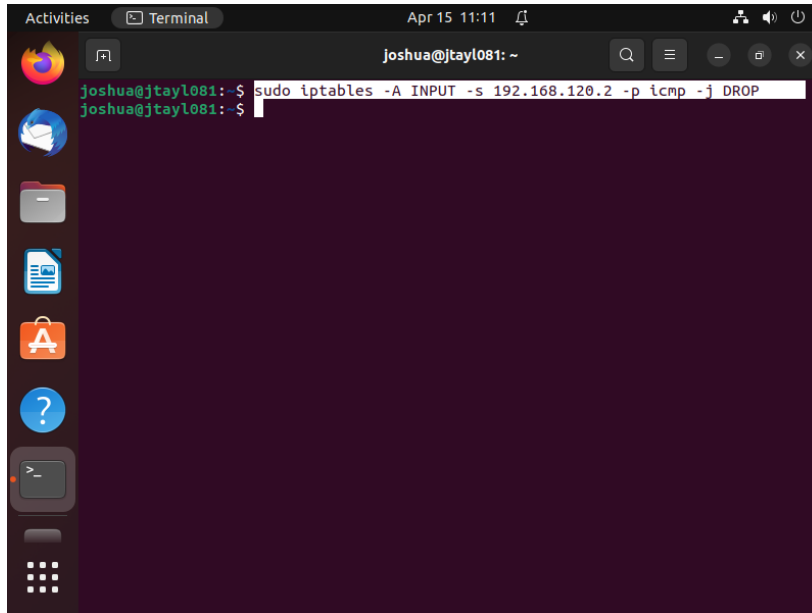


```
Activities Terminal Apr 15 10:53
joshua@jtayl081: ~
joshua@jtayl081:~$ sudo iptables -t nat -A POSTROUTING -o enp0s8 -j MASQUERADE
[sudo] password for joshua:
joshua@jtayl081:~$ sudo iptables -A FORWARD -i enp0s8 -m state --state RELATED,
ESTABLISHED -j ACCEPT
iptables v1.8.7 (nf_tables): "--state" requires a list of states with no spaces
, e.g. ESTABLISHED,RELATED
Try 'iptables -h' or 'iptables --help' for more information.
joshua@jtayl081:~$ sudo iptables -A FORWARD -i enp0s8 -m state --state RELATED,
ESTABLISHED -j ACCEPT
joshua@jtayl081:~$ sudo iptables -A FORWARD -i enp0s8 -o enp0s3 -j ACCEPT
joshua@jtayl081:~$
```

6. Test your ping connection to 8.8.8.8 and www.google.com in the client VM, respectively.

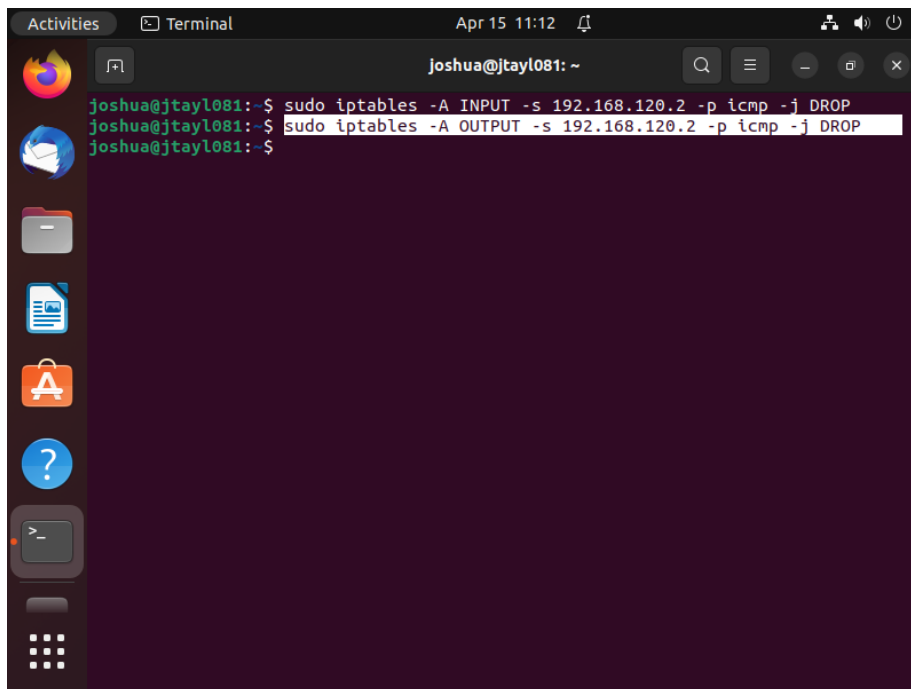
Task B –Firewall Configuration (40 points)

1. Configure the iptables on the gateway Ubuntu to block all the inbound ICMP packets from the Client VM.



```
Activities Terminal Apr 15 11:11 Joshua@jtayl081: ~
joshua@jtayl081:~$ sudo iptables -A INPUT -s 192.168.120.2 -p icmp -j DROP
joshua@jtayl081:~$
```

2. Configure the iptables on the gateway Ubuntu to block all the outbound ICMP packets that originated from the gateway Ubuntu itself.



```
Activities Terminal Apr 15 11:12 Joshua@jtayl081: ~
joshua@jtayl081:~$ sudo iptables -A INPUT -s 192.168.120.2 -p icmp -j DROP
joshua@jtayl081:~$ sudo iptables -A OUTPUT -s 192.168.120.2 -p icmp -j DROP
joshua@jtayl081:~$
```

Extra credit:

Set the permanent IP address on the Client Ubuntu based on the above network topology.