# Michael Opoku-Arthur

**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.

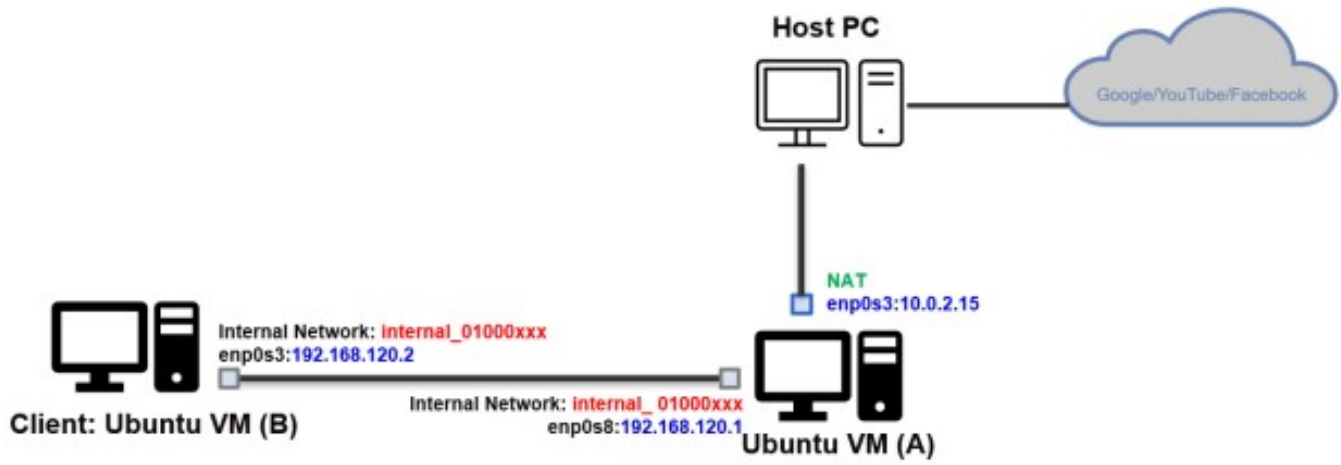



Figure 1 Desired Network Topology

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

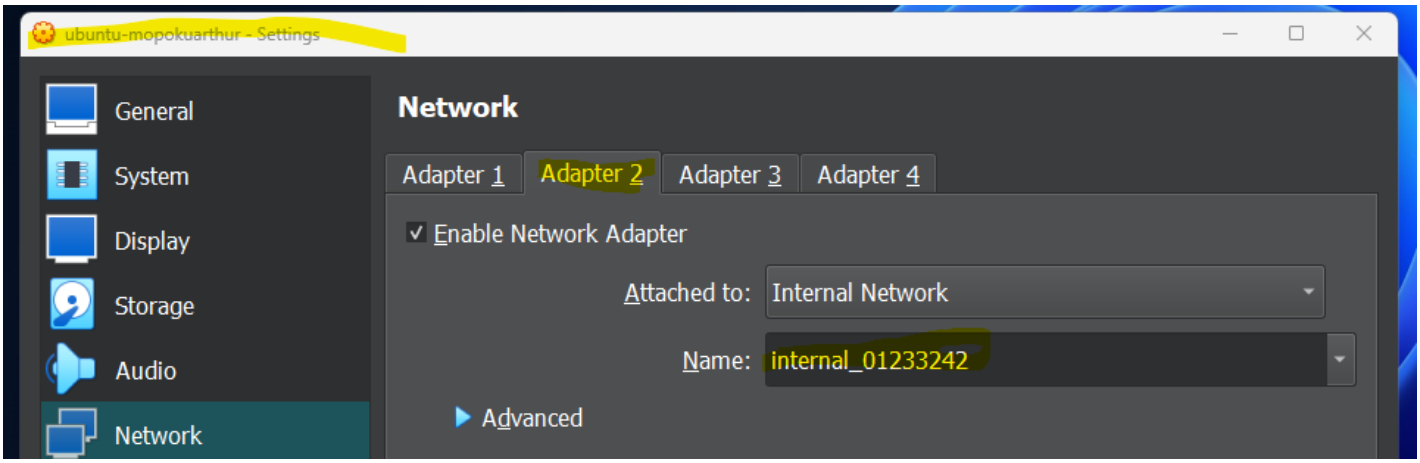
Please configure the network with the following requirement: (You need to clone the existing VM)

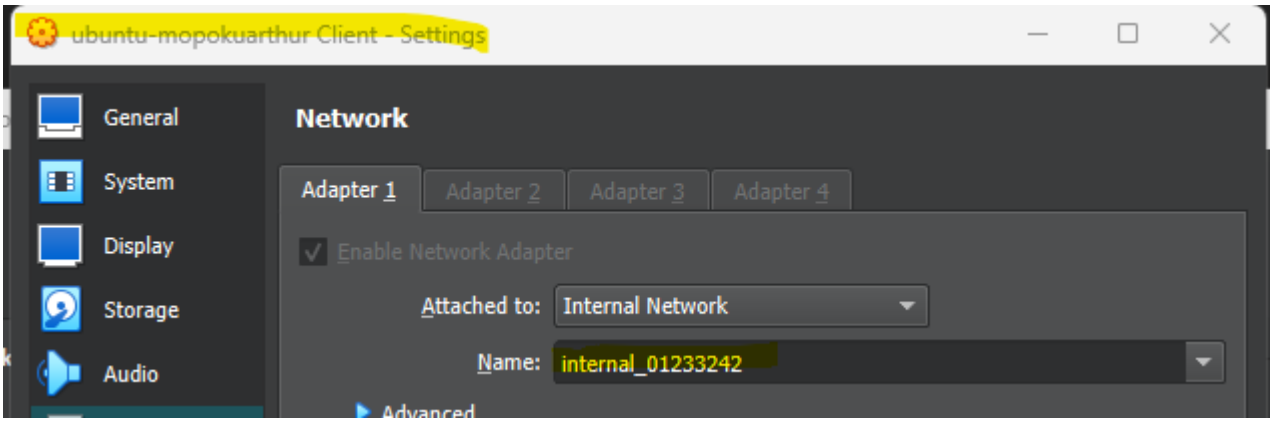
**Task A** –Network Configuration (**60 points**)

Please submit the screenshot for all the steps.

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

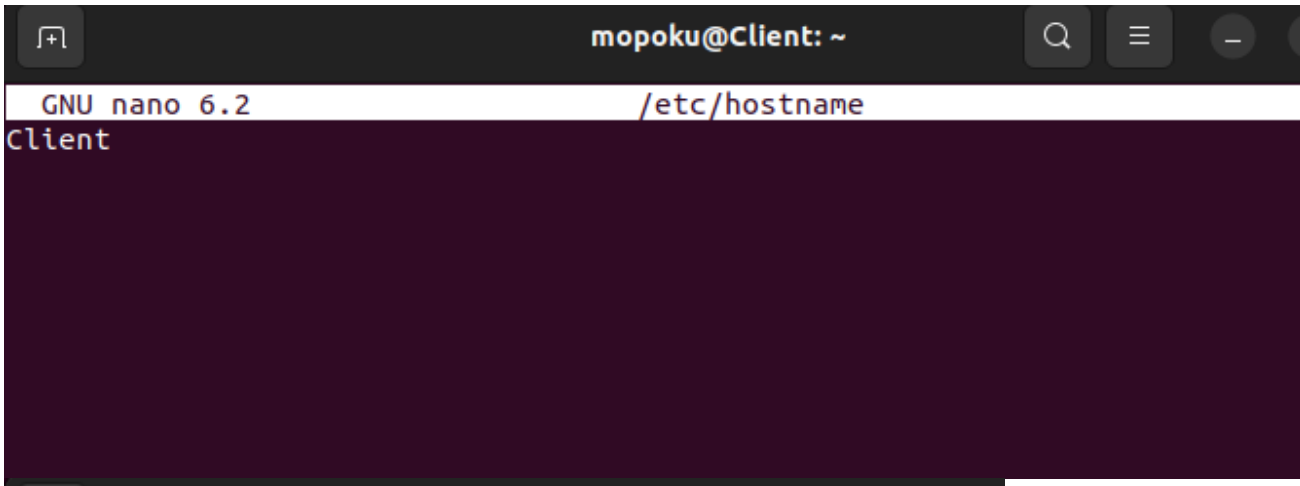
**Replace {UIN} with your real UIN.**



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.**

a

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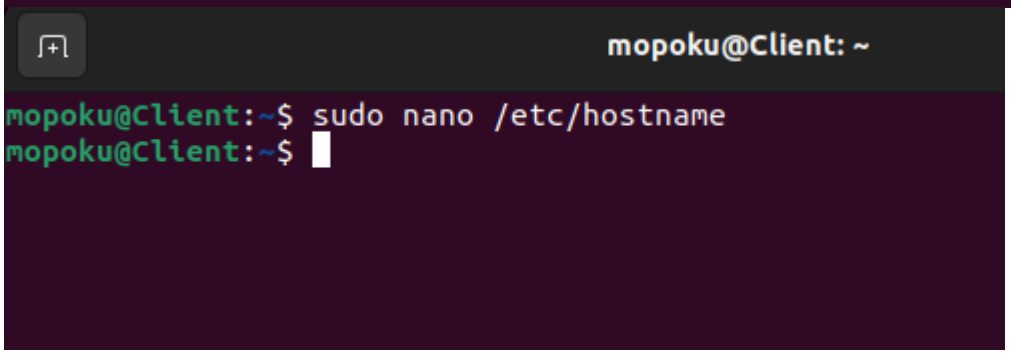
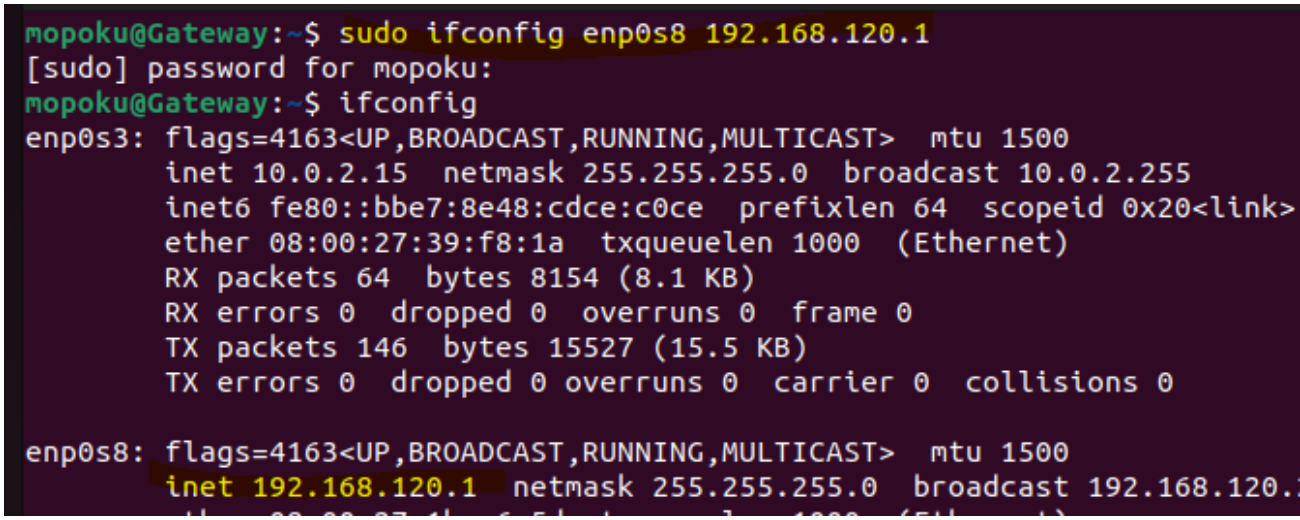



3. Configure the temporary IP address on the Gateway Ubuntu, as shown in Figure 1.

a

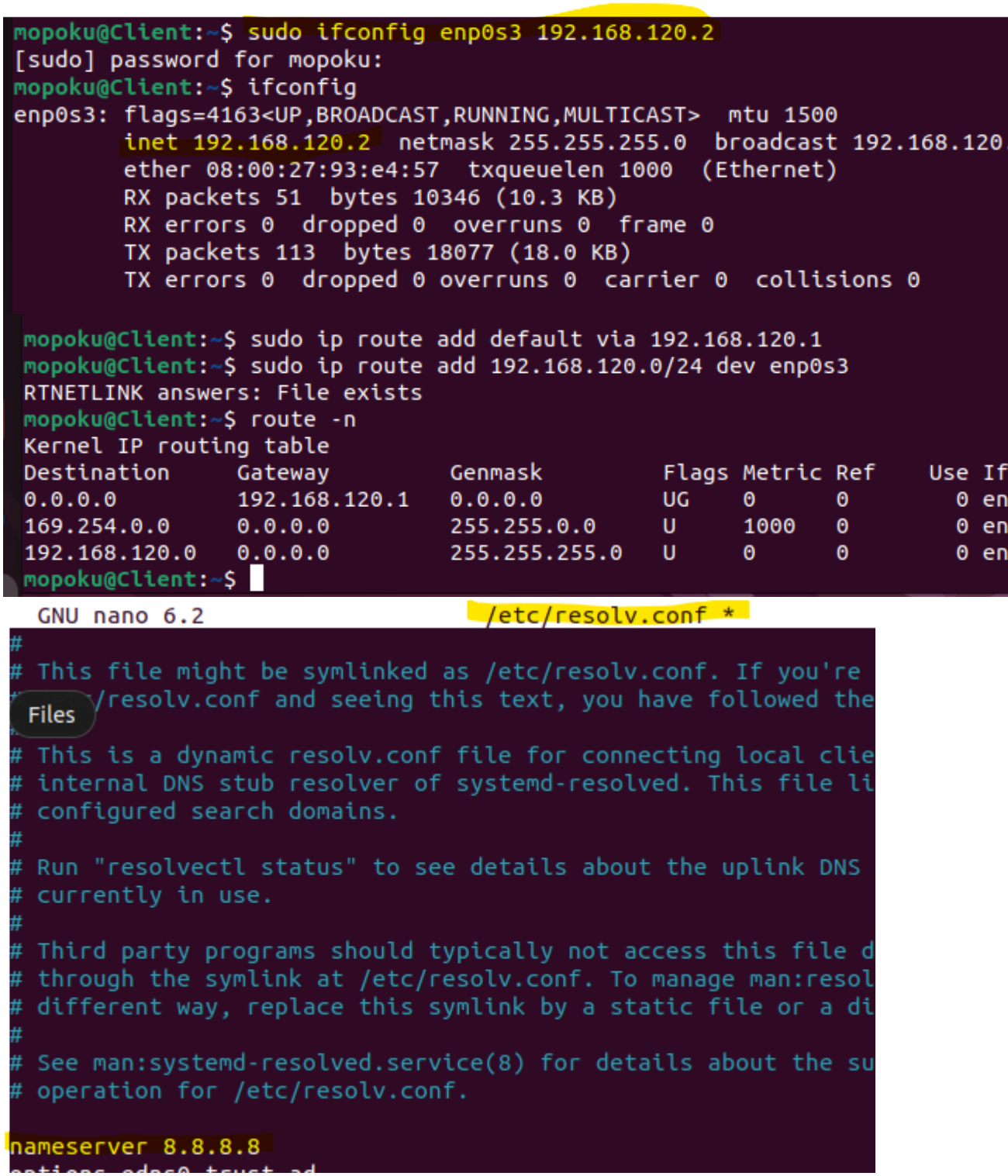


4. Configure the temporary IP address, routing table, and DNS server on Client VM as shown in Figure 1.

a

b

c



d

```
mopoku@Client:~$ sudo nano /etc/resolv.conf
mopoku@Client:~$
```

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

a

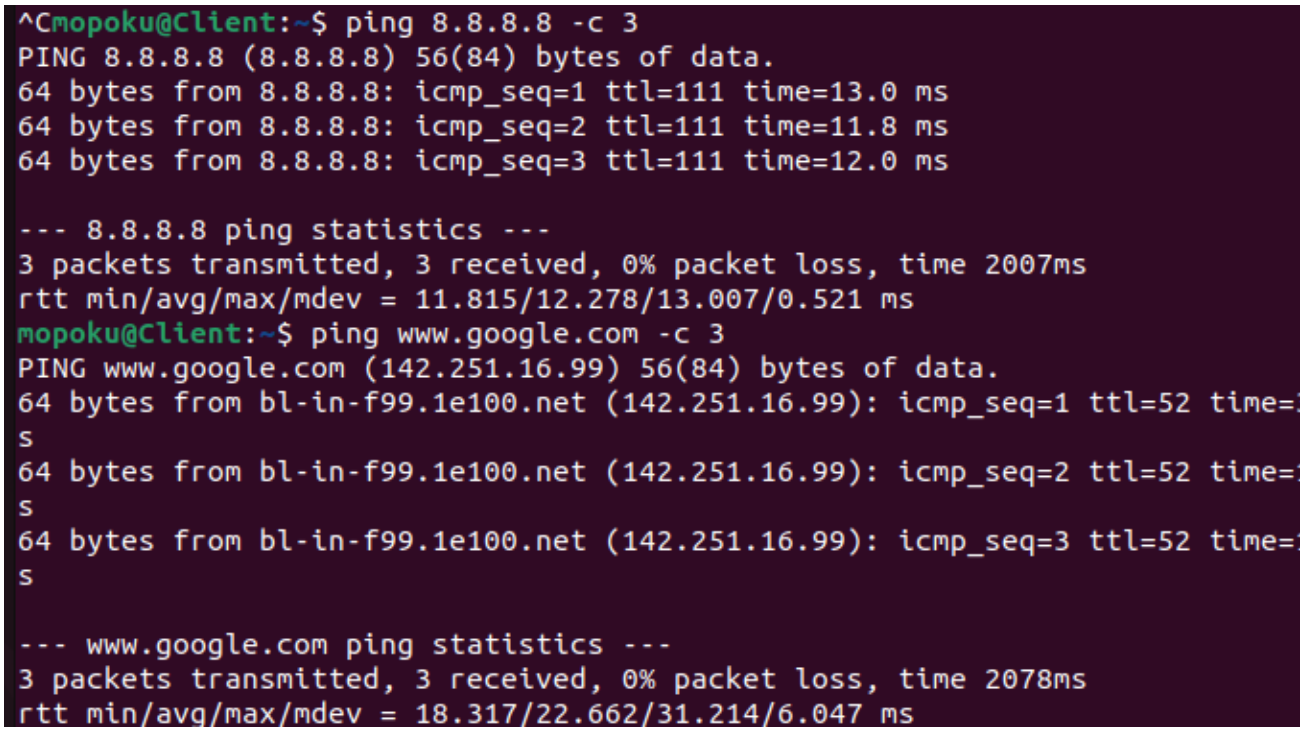
```
mopoku@Gateway:~$ sudo iptables -A FORWARD -i enp0s3 -o enp0s8 -m state --
RELATED,ESTABLISHED -j ACCEPT
iptables v1.8.7 (nf_tables): unknown option "--stateRELATED,ESTABLISHED"
Try `iptables -h' or 'iptables --help' for more information.
mopoku@Gateway:~$ sudo iptables -A FORWARD -i enp0s3 -o enp0s8 -m state --
 RELATED,ESTABLISHED -j ACCEPT
mopoku@Gateway:~$ sudo iptables -A FORWARD -i enp0s8 -o enp0s3 -j ACCEPT
mopoku@Gateway:~$ iptables -L
iptables v1.8.7 (nf_tables): Could not fetch rule set generation id: Permi
 denied (you must be root)

mopoku@Gateway:~$ sudo iptables -L
Chain INPUT (policy ACCEPT)
target     prot opt source               destination

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination
ACCEPT     all  --  anywhere             anywhere             state RELATE
ABLISHED
ACCEPT     all  --  anywhere             anywhere

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
mopoku@Gateway:~$
```

b

```
mopoku@Gateway:~$ su root
Password:
root@Gateway:/home/mopoku# echo > 1 /proc/sys/net/ipv4/ip_forward
root@Gateway:/home/mopoku# cat /proc/sys/net/ipv4/ip_forward
0
root@Gateway:/home/mopoku# cat /proc/sys/net/ipv4/ip_forward
0
root@Gateway:/home/mopoku# echo 1 > proc/sys/net/ipv4/ip_forward
bash: proc/sys/net/ipv4/ip_forward: No such file or directory
root@Gateway:/home/mopoku# echo 1 > proc/sys/net/ipv4/ip_forward
bash: proc/sys/net/ipv4/ip_forward: No such file or directory
root@Gateway:/home/mopoku# cat /proc/sys/net/ipv4/ip_forward
0
root@Gateway:/home/mopoku# echo 1 > /proc/sys/net/ipv4/ip_forward
root@Gateway:/home/mopoku# cat /proc/sys/net/ipv4/ip_forward
1
```

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

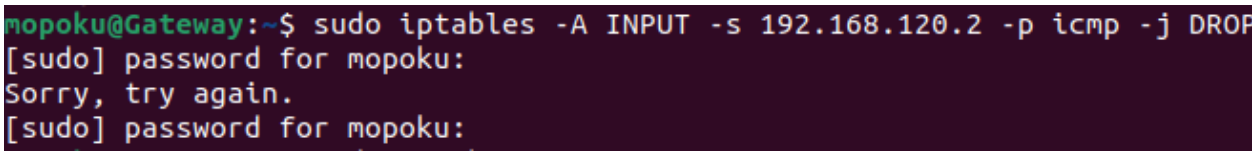
a




**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.

a



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

a

```
mopoku@Gateway:~$ sudo iptables -A OUTPUT -s 192.168.120.1 -p icmp -j
mopoku@Gateway:~$ sudo iptables -L
Chain INPUT (policy ACCEPT)
target     prot opt source               destination
DROP       icmp --  192.168.120.2        anywhere

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination
ACCEPT     all  --  anywhere             anywhere             state RELA
BLISHED
ACCEPT     all  --  anywhere             anywhere

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
DROP       icmp --  Gateway              anywhere
```

b

```
mopoku@Gateway:~$ ping 192.168.120.2
PING 192.168.120.2 (192.168.120.2) 56(84) bytes of data.
^C
--- 192.168.120.2 ping statistics ---
10 packets transmitted, 0 received, 100% packet loss, time 9257ms
```

c

```
mopoku@Client:~$ ping 192.168.120.1
PING 192.168.120.1 (192.168.120.1) 56(84) bytes of data.
^C
--- 192.168.120.1 ping statistics ---
5 packets transmitted, 0 received, 100% packet loss, time 4251ms
```

d