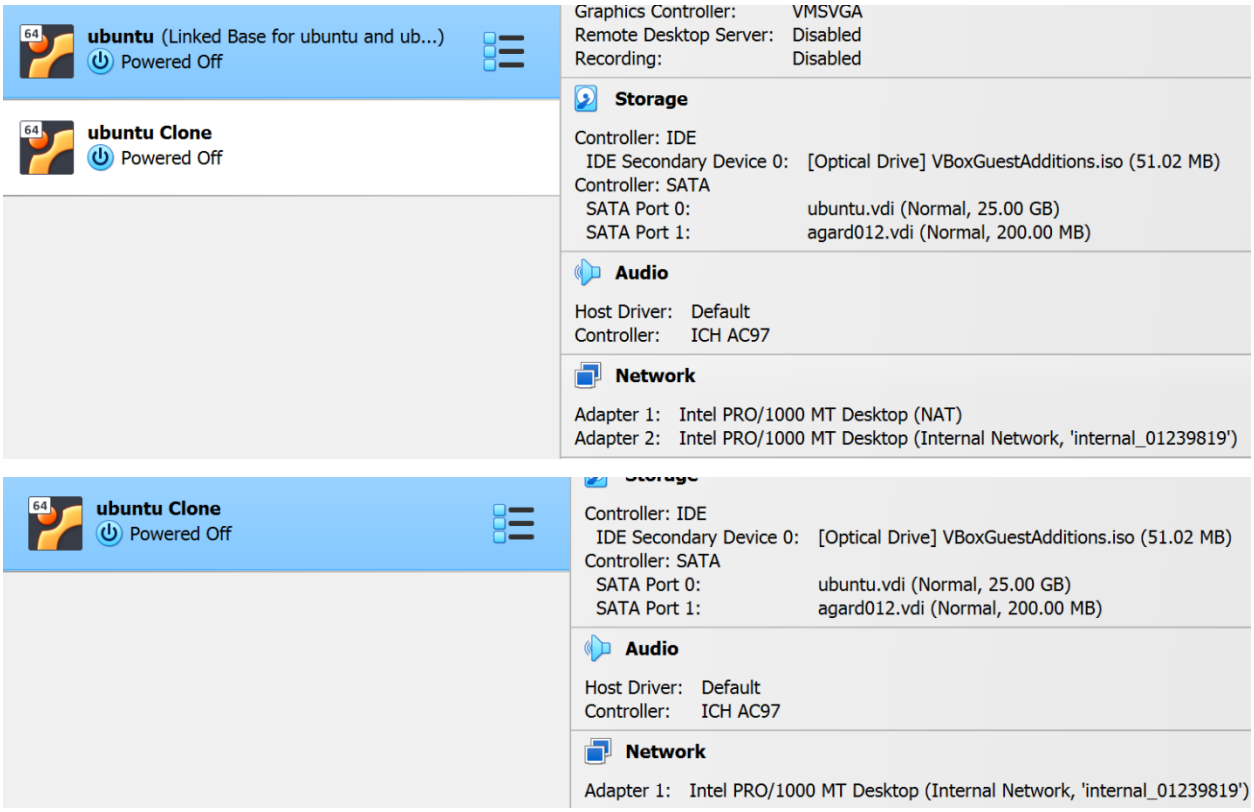
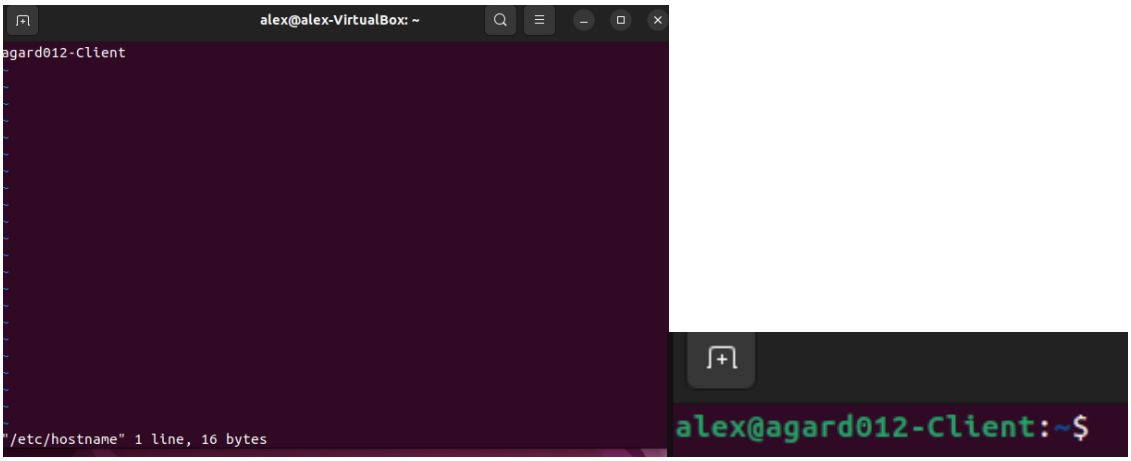
Assignment 12

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.



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

```
alex@alex-VirtualBox:~$ sudo ifconfig enp0s8 192.168.120.1
[sudo] password for alex:
alex@alex-VirtualBox:~$ sudo ifconfig enp0s3 10.0.2.15
alex@alex-VirtualBox:~$ sudo 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::9043:a683:6a7d:65c4  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:64:91:3c  txqueuelen 1000  (Ethernet)
        RX packets 51  bytes 18240 (18.2 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 112  bytes 12459 (12.4 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

enp0s8: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.120.1  netmask 255.255.255.0  broadcast 192.168.120.255
        inet6 fe80::9f79:cb3e:ca44:1ba7  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:b3:f9:f4  txqueuelen 1000  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 107  bytes 16700 (16.7 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
```

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

```
alex@agard012-Client:~$ sudo ifconfig enp0s3 192.168.120.2
[sudo] password for alex:
alex@agard012-Client:~$ sudo ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.120.2  netmask 255.255.255.0  broadcast 192.168.120.255
        inet6 fe80::4e26:8712:c901:a4e1  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:39:84:21  txqueuelen 1000  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 57  bytes 8993 (8.9 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

```
alex@agard012-Client:~$ sudo ip route add default via 192.168.120.1
alex@agard012-Client:~$ sudo ip route add 192.168.120.0/24 dev enp0s3
RTNETLINK answers: File exists
alex@agard012-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 enp0s3
169.254.0.0     0.0.0.0         255.255.0.0     U     1000   0        0 enp0s3
192.168.120.0   0.0.0.0         255.255.255.0   U     0      0        0 enp0s3
alex@agard012-Client:~$ ping 192.168.120.1
PING 192.168.120.1 (192.168.120.1) 56(84) bytes of data.
64 bytes from 192.168.120.1: icmp_seq=1 ttl=64 time=1.49 ms
64 bytes from 192.168.120.1: icmp_seq=2 ttl=64 time=0.850 ms
64 bytes from 192.168.120.1: icmp_seq=3 ttl=64 time=1.17 ms
^C
--- 192.168.120.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2009ms
rtt min/avg/max/mdev = 0.850/1.170/1.491/0.261 ms
```

```
alex@agard012-Client:~$ sudo vi /etc/resolv.conf
[sudo] password for alex:
alex@agard012-Client:~$ tail -n 2 /etc/resolv.conf
options edns0 trust-ad
search .
alex@agard012-Client:~$ tail -n 3 /etc/resolv.conf
nameserver 8.8.8.8
options edns0 trust-ad
search .
```

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

```
alex@alex-VirtualBox:~$ sudo iptables -t nat -A POSTROUTING -o enp0s3 -j MASQUERADE
alex@alex-VirtualBox:~$ sudo iptables -A FORWARD -i enp0s3 -o enp0s8 -m state --state RELATED, ESTABLISHE
D -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.
alex@alex-VirtualBox:~$ sudo iptables -A FORWARD -i enp0s3 -o enp0s8 -m state --state RELATED,ESTABLISHED
 -j ACCEPT
alex@alex-VirtualBox:~$ sudo iptables -A FORWARD -i enp0s8 -o enp0s3 -j ACCEPT
```

```
alex@alex-VirtualBox:~$ su root
Password:
su: Authentication failure
alex@alex-VirtualBox:~$ sudo passwd
New password:
Retype new password:
passwd: password updated successfully
alex@alex-VirtualBox:~$ su root
Password:
root@alex-VirtualBox:/home/alex# echo 1 > /proc/sys/net/ipv4/ip_forward
root@alex-VirtualBox:/home/alex# cat /proc/sys/net/ipv4/ip_forward
1
root@alex-VirtualBox:/home/alex#
```

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

```
alex@agard012-Client:~$ ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=112 time=37.6 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=112 time=34.1 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=112 time=34.5 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=112 time=36.2 ms
^C
--- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3014ms
rtt min/avg/max/mdev = 34.139/35.610/37.562/1.377 ms
alex@agard012-Client:~$ ping www.google.com
PING www.google.com (173.194.219.103) 56(84) bytes of data.
64 bytes from ya-in-f103.1e100.net (173.194.219.103): icmp_seq=1 ttl=53 time=41.7 ms
64 bytes from ya-in-f103.1e100.net (173.194.219.103): icmp_seq=2 ttl=53 time=36.7 ms
64 bytes from ya-in-f103.1e100.net (173.194.219.103): icmp_seq=3 ttl=53 time=34.2 ms
64 bytes from ya-in-f103.1e100.net (173.194.219.103): icmp_seq=4 ttl=53 time=36.6 ms
^C
--- www.google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3009ms
rtt min/avg/max/mdev = 34.194/37.313/41.702/2.729 ms
```

Task B

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

```
alex@alex-VirtualBox:~$ sudo iptables -A INPUT -p icmp -s 192.168.120.2 -j DROP
alex@alex-VirtualBox:~$ sudo iptables -A OUTPUT -p icmp -j DROP
```