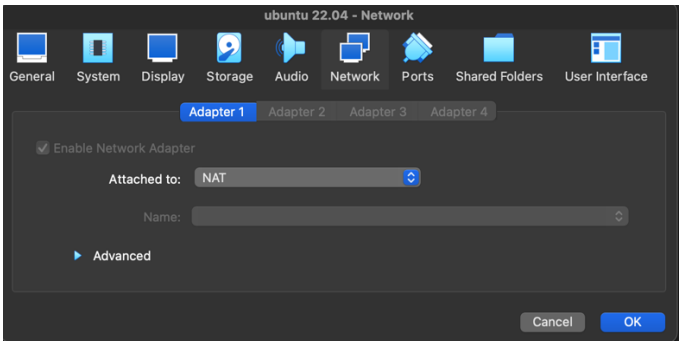
CYSE 270: Linux System for Cybersecurity

Lab 12 – Basic Network Configurations

You can use either Ubuntu VM or Kali Linux VM to complete the following tasks.

Task A – Explore Network Configurations (8 * 5 = 40 Points)

{{{{{{{{{Connect your VM in the NAT mode}}}}}}}}}



1. Use the correct **ifconfig** command to display the current network configuration. **Highlight your IP address, MAC address, and the network mask.**

```
eric@eric-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::40e1:280:14e5:1eb1  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:d8:5f:12  txqueuelen 1000  (Ethernet)
```

COMMAND: ifconfig

2. Use the correct **route** command to display the current routing table.

```
eric@eric-VirtualBox:~$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         _gateway        0.0.0.0         UG    100    0        0 enp0s3
10.0.2.0        0.0.0.0         255.255.255.0   U     100    0        0 enp0s3
link-local      0.0.0.0         255.255.0.0     U     1000   0        0 enp0s3
eric@eric-VirtualBox:~$
```

COMMAND: route

3. Use the **netstat** command to list current TCP connections.

```
eric@eric-VirtualBox:~$ netstat --tcp
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
eric@eric-VirtualBox:~$
```

COMMAND: netstat --tcp

4. Use the **ping** command to determine if the ubuntu.com system is accessible via the network.

(Use the correct option to send 10 ping requests only.)

```
eric@eric-VirtualBox:~$ ping -c 10 ubuntu.com
PING ubuntu.com (185.125.190.20) 56(84) bytes of data.
--- ubuntu.com ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9006ms
rtt min/avg/max/mdev = 89.061/96.850/137.317/13.718 ms
eric@eric-VirtualBox:~$
```

COMMAND: ping -c 10 ubuntu.com

5. And 6. Use the **host** command to perform a DNS query on www.odu.edu. Use the **cat** command to display the contents of the file that contains the system's hostname.

```
eric@eric-VirtualBox:~$ host www.odu.edu
www.odu.edu has address 35.170.140.174
eric@eric-VirtualBox:~$ cat /etc/hostname
eric-VirtualBox
eric@eric-VirtualBox:~$
```

COMMANDS: 1. host www.odu.edu 2. cat /etc/hostname

7. Use the **cat** command to display the contents of the file that contains the DNS servers for this system.

```
eric@eric-VirtualBox:~$ cat /etc/resolv.conf
# This is /run/systemd/resolve/stub-resolv.conf managed by man:systemd-resolved(
8).
```

```
nameserver 127.0.0.53
options edns0 trust-ad
search .
eric@eric-VirtualBox:~$
```

COMMAND: cat /etc/resolv.conf

8. Edit the same file you display in the previous step, set the system's hostname to your MIDAS ID permanently. Reboot system and **repeat step 6**.

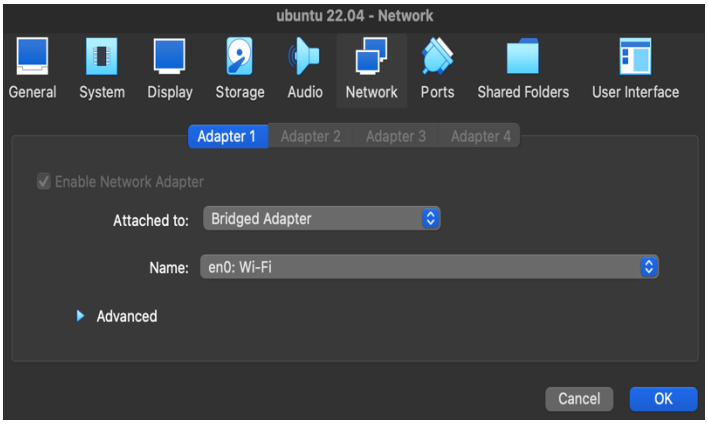
```
eric@eric-VirtualBox:~$ sudo nano /etc/hostname
[sudo] password for eric:
eric@eric-VirtualBox:~$ sudo nano /etc/hosts
eric@eric-VirtualBox:~$ sudo nano /etc/hostname
eric@eric-VirtualBox:~$ sudo reboot
```

```
eric@epres010:~$ cat /etc/hostname
epres010
eric@epres010:~$
```

COMMANDS: 1. sudo nano /etc/hostname 2. sudo nano /etc/hosts 3. sudo nano /etc/hostname 4. sudo reboot 5. cat /etc/hostname

Task B – **A Different Network Setting** (3 * 20 = 60 Points)

1. Change the VM network connection from NAT to the bridge mode (you will lose your Internet connection if you are connected to the ODU campus Wi-Fi network, but it is okay).



2. Reboot your system, then repeat Steps 1 – 7 in Task A.

```
eric@epres010:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.254.161.240  netmask 255.255.0.0  broadcast 10.254.255.255
        inet6 fe80::40e1:280:14e5:1eb1  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:d8:5f:12  txqueuelen 1000  (Ethernet)
```

```
eric@epres010:~$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         _gateway        0.0.0.0         UG    100    0        0 enp0s3
10.254.0.0      0.0.0.0         255.255.0.0     U     100    0        0 enp0s3
link-local      0.0.0.0         255.255.0.0     U     1000   0        0 enp0s3
eric@epres010:~$
```

```
eric@epres010:~$ netstat --tcp
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
eric@epres010:~$
```

```
eric@epres010:~$ ping -c 10 ubuntu.com
PING ubuntu.com (185.125.190.20) 56(84) bytes of data.
```

```
--- ubuntu.com ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9001ms
rtt min/avg/max/mdev = 82.550/87.420/95.947/3.995 ms
eric@epres010:~$
```

```
eric@epres010:~$ host www.odu.edu
www.odu.edu has address 35.170.140.174
eric@epres010:~$ cat /etc/hostname
epres010
eric@epres010:~$
```

```
eric@epres010:~$ cat /etc/resolv.conf
# This is /run/systemd/resolve/stub-resolv.conf managed by man:systemd-resolved(
8).
```

```
nameserver 127.0.0.53
options edns0 trust-ad
search wlan.odu.edu
eric@epres010:~$
```

COMMANDS: 1. ifconfig 2. route 3. netstat --tcp 4. ping -c 10 ubuntu.com 5. host www.odu.edu 6. cat /etc/hostname 7. cat /etc/resolv.conf

3. Highlight the differences at the end of each step and discuss what do you find.

TASK 1: The IP address and broadcast address have changed

TASK 2: One of the Genmask and Destination IP addresses have changed

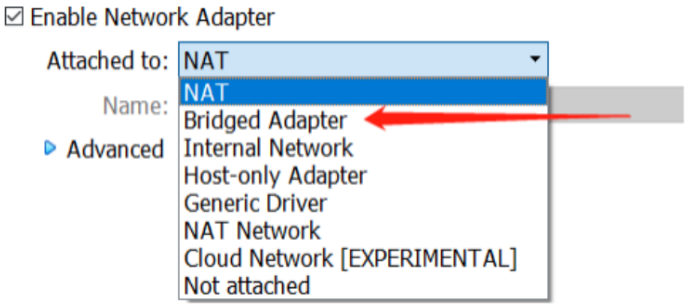
TASK 3: There was no change in the TCP connections

TASK 4: When changing the VM network connection, the 10 packets were delivered 5 ms faster

TASK 5: The IP address to www.odu.edu remained the same.

TASK 6: The changed hostname remained the same

TASK 7: The search line changed from '.' To 'wlan.odu.edu'


Enable Network Adapter
Attached to:
NAT
Name:
Advanced
NAT
Bridged Adapter
Internal Network
Host-only Adapter
Generic Driver
NAT Network
Cloud Network [EXPERIMENTAL]
Not attached