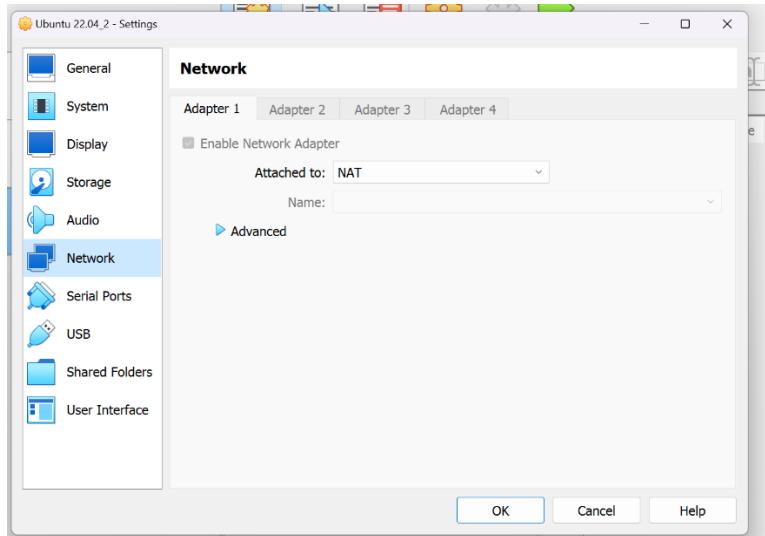


Assignment-11-Basic Network Configuration

Task A:

Connect 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.

```
shair005@shair005-VirtualBox: ~  
shair005@shair005-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::5492:960a:a3b8:a747 prefixlen 64 scopeid 0x20<link>  
    ether 08:00:27:cf:32:b7 txqueuelen 1000 (Ethernet)  
    RX packets 1130 bytes 1366110 (1.3 MB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 526 bytes 65296 (65.2 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 241 bytes 24100 (24.1 KB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 241 bytes 24100 (24.1 KB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
shair005@shair005-VirtualBox:~$
```

```
shair005@shair005-VirtualBox: ~  
shair005@shair005-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::5492:960a:a3b8:a747 prefixlen 64 scopeid 0x20<link>  
ether 08:00:27:cf:32:b7 txqueuelen 1000 (Ethernet)  
RX packets 1130 bytes 1366110 (1.3 MB)  
RX errors 0 dropped 0 overruns 0 frame 0  
TX packets 526 bytes 65296 (65.2 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 241 bytes 24100 (24.1 KB)  
RX errors 0 dropped 0 overruns 0 frame 0  
TX packets 241 bytes 24100 (24.1 KB)  
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
shair005@shair005-VirtualBox:~$
```

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

```
shair005@shair005-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
```

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

```
shair005@shair005-VirtualBox:~$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
udp        0      0 shair005-Virtual:bootpc _gateway:bootps        ESTABLISHED

Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags     Type       State         I-Node  Path
unix    3      [ ]      STREAM    CONNECTED    25305
unix    3      [ ]      STREAM    CONNECTED    29730    /run/user/1000/bus
unix    3      [ ]      STREAM    CONNECTED    24120
unix    2      [ ]      DGRAM     CONNECTED    27045
unix    3      [ ]      STREAM    CONNECTED    27029    /run/systemd/journal/stdout
unix    3      [ ]      STREAM    CONNECTED    28714
unix    3      [ ]      STREAM    CONNECTED    43354    /run/user/1000/bus
unix    3      [ ]      STREAM    CONNECTED    29852
unix    3      [ ]      STREAM    CONNECTED    17994
unix    3      [ ]      STREAM    CONNECTED    24213
unix    3      [ ]      STREAM    CONNECTED    25314    /run/systemd/journal/stdout
unix    3      [ ]      STREAM    CONNECTED    29774
unix    2      [ ]      DGRAM     CONNECTED    1831
unix    3      [ ]      STREAM    CONNECTED    1827    /run/user/1000/bus
unix    3      [ ]      STREAM    CONNECTED    18032    /run/systemd/journal/stdout
unix    3      [ ]      STREAM    CONNECTED    65160
unix    3      [ ]      STREAM    CONNECTED    28026
unix    3      [ ]      STREAM    CONNECTED    28012
unix    3      [ ]      STREAM    CONNECTED    30728
unix    3      [ ]      STREAM    CONNECTED    27043    /run/systemd/journal/stdout
unix    3      [ ]      STREAM    CONNECTED    25154    /run/dbus/system_bus_socket
unix    3      [ ]      STREAM    CONNECTED    21176
unix    3      [ ]      STREAM    CONNECTED    29831    /run/user/1000/bus
unix    3      [ ]      STREAM    CONNECTED    1855    /run/user/1000/bus
unix    3      [ ]      STREAM    CONNECTED    963
unix    3      [ ]      STREAM    CONNECTED    1945
unix    3      [ ]      STREAM    CONNECTED    26366    /run/systemd/journal/stdout
unix    3      [ ]      STREAM    CONNECTED    18906
unix    3      [ ]      STREAM    CONNECTED    36622
unix    3      [ ]      STREAM    CONNECTED    31905
unix    3      [ ]      STREAM    CONNECTED    29805
unix    3      [ ]      STREAM    CONNECTED    18293
unix    3      [ ]      STREAM    CONNECTED    23868
```

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.)

```
ping: usage error: Destination address required
shair005@shair005-VirtualBox:~$ ping -c 10 ubuntu.com
PING ubuntu.com (185.125.190.21) 56(84) bytes of data:
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_seq=1 ttl=47 time=94.3 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_seq=2 ttl=47 time=96.8 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_seq=3 ttl=47 time=96.4 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_seq=4 ttl=47 time=96.7 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_seq=5 ttl=47 time=97.4 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_seq=6 ttl=47 time=95.0 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_seq=7 ttl=47 time=94.7 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_seq=8 ttl=47 time=96.6 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_seq=9 ttl=47 time=102 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_seq=10 ttl=47 time=95.9 ms

--- ubuntu.com ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9142ms
rtt min/avg/max/mdev = 94.293/96.592/102.013/2.043 ms
```

5. Use the host command to perform a DNS query on www.odu.edu

```
shair005@shair005-VirtualBox:~$ host www.odu.edu
www.odu.edu has address 35.170.140.174
```

6. Use the cat command to display the contents of the file that contains the system's hostname.

```
shair005@shair005-VirtualBox:~$ cat /etc/hostname
shair005-VirtualBox
```

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

```
shair005@shair005-VirtualBox:~$ cat /etc/resolv.conf
# This is /run/systemd/resolve/stub-resolv.conf managed by man:systemd-resolved(8).
# Do not edit.
#
# This file might be symlinked as /etc/resolv.conf. If you're looking at
# /etc/resolv.conf and seeing this text, you have followed the symlink.
#
# This is a dynamic resolv.conf file for connecting local clients to the
# internal DNS stub resolver of systemd-resolved. This file lists all
# configured search domains.
#
# Run "resolvectl status" to see details about the uplink DNS servers
# currently in use.
#
# Third party programs should typically not access this file directly, but only
# through the symlink at /etc/resolv.conf. To manage man:resolv.conf(5) in a
# different way, replace this symlink by a static file or a different symlink.
#
# See man:systemd-resolved.service(8) for details about the supported modes of
# operation for /etc/resolv.conf.

nameserver 127.0.0.53
options edns0 trust-ad
search wlan.odu.edu
```

8. Edit the same file you display in the previous step, set the system's hostname to your MIDAS ID

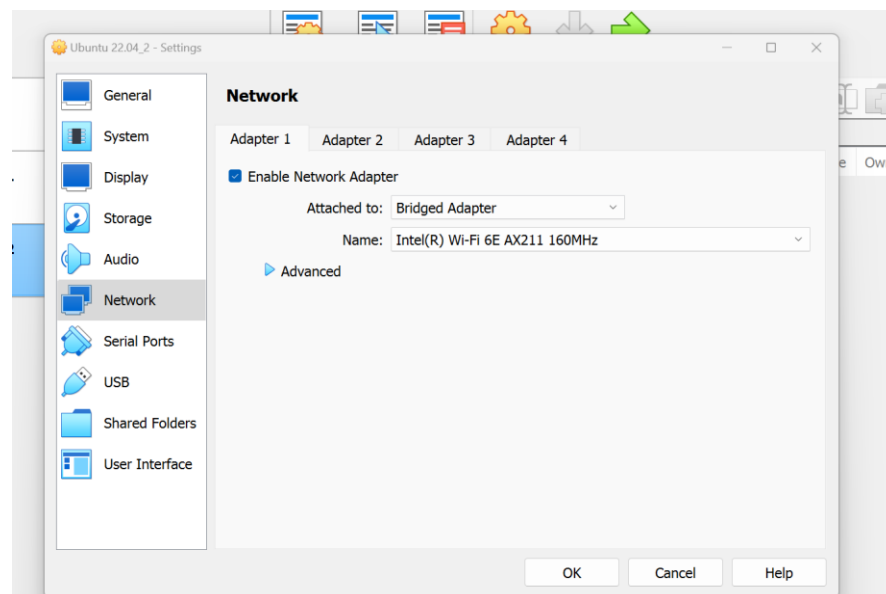
permanently. Reboot system and repeat step 6

```
shair005@shair005-VirtualBox:~$ sudo nano /etc/hostname
[sudo] password for shair005:
shair005@shair005-VirtualBox:~$
```

```
shair005@Shair005: ~
shair005@Shair005:~$ cat /etc/hostname
Shair005
shair005@Shair005:~$
```

Task B

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.

Step 1:

```
shair005@Shair005: ~  
shair005@Shair005:~$ ifconfig  
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500  
inet 10.254.174.132 netmask 255.255.0.0 broadcast 10.254.255.255  
inet6 fe80::5492:960a:a3b8:a747 prefixlen 64 scopeid 0x20<link>  
ether 08:00:27:cf:32:b7 txqueuelen 1000 (Ethernet)  
RX packets 64 bytes 11642 (11.6 KB)  
RX errors 0 dropped 0 overruns 0 frame 0  
TX packets 144 bytes 18765 (18.7 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 169 bytes 15873 (15.8 KB)  
RX errors 0 dropped 0 overruns 0 frame 0  
TX packets 169 bytes 15873 (15.8 KB)  
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
shair005@Shair005:~$
```

The netmask was slightly different and so was the broadcast number. Most of the Rx and Tx packets were also different.

Step 2:

```
shair005@Shair005:~$ 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  
shair005@Shair005:~$
```

The destination default number 10.254.0.0 changed from the first time and also the Genmask highlighted changed to 255.255.0.0 so an extra 255 was added.

Step 3:

```
shair005@Shair005:~$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
udp        0      0 Shair005:bootpc       nse.odu.edu:bootps    ESTABLISHED

Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags               Type           State         I-Node      Path
unix   3      [ ]                 STREAM        CONNECTED     41769       /run/dbus/system_bus_socket
unix   3      [ ]                 STREAM        CONNECTED     21344       /run/user/1000/at-spi/bus
unix   2      [ ]                 STREAM        CONNECTED     29016
unix   3      [ ]                 STREAM        CONNECTED     27093       /run/systemd/journal/stdout
unix   3      [ ]                 STREAM        CONNECTED     22385
unix   3      [ ]                 STREAM        CONNECTED     21018
unix   3      [ ]                 STREAM        CONNECTED     23328
unix   3      [ ]                 STREAM        CONNECTED     23067
unix   3      [ ]                 STREAM        CONNECTED     27913
unix   3      [ ]                 STREAM        CONNECTED     28804
unix   3      [ ]                 STREAM        CONNECTED     16052       /run/user/1000/gvfsd/socket-ms0r4f94
unix   3      [ ]                 STREAM        CONNECTED     15989
unix   3      [ ]                 STREAM        CONNECTED     15925
unix   2      [ ]                 DGRAM         CONNECTED     24988
unix   3      [ ]                 STREAM        CONNECTED     25360       /run/systemd/journal/stdout
unix   3      [ ]                 STREAM        CONNECTED     27937       /run/user/1000/bus
unix   3      [ ]                 STREAM        CONNECTED     28945
unix   3      [ ]                 STREAM        CONNECTED     27862       /run/user/1000/pipewire-0
unix   3      [ ]                 STREAM        CONNECTED     27276       /run/systemd/journal/stdout
unix   3      [ ]                 STREAM        CONNECTED     22447
unix   3      [ ]                 STREAM        CONNECTED     27117       /run/user/1000/bus
unix   3      [ ]                 STREAM        CONNECTED     25366
unix   3      [ ]                 STREAM        CONNECTED     29925
unix   3      [ ]                 STREAM        CONNECTED     24326       /run/user/1000/bus
unix   3      [ ]                 STREAM        CONNECTED     26525
unix   3      [ ]                 STREAM        CONNECTED     29810
unix   3      [ ]                 STREAM        CONNECTED     16055       /run/user/1000/bus
unix   3      [ ]                 STREAM        CONNECTED     21217       /run/systemd/journal/stdout
unix   3      [ ]                 STREAM        CONNECTED     28915       /run/user/1000/bus
unix   3      [ ]                 STREAM        CONNECTED     24290
unix   3      [ ]                 STREAM        CONNECTED     18363
unix   3      [ ]                 STREAM        CONNECTED     20198
unix   3      [ ]                 STREAM        CONNECTED     25552
```

The name is different at the top because it was changed, the foreign address changed all of the I-Node numbers changed and the some of the path

names changed and all of the orders of the path names changed.

Step 4:

```
shair005@Shair005:~$ ping -c 10 ubuntu.com
PING ubuntu.com (185.125.190.29) 56(84) bytes of data.
64 bytes from website-content-cache-3.ps5.canonical.com (185.125.190.29): icmp_seq=1 ttl=50 time=101 ms
64 bytes from website-content-cache-3.ps5.canonical.com (185.125.190.29): icmp_seq=2 ttl=50 time=89.7 ms
64 bytes from website-content-cache-3.ps5.canonical.com (185.125.190.29): icmp_seq=3 ttl=50 time=81.9 ms
64 bytes from website-content-cache-3.ps5.canonical.com (185.125.190.29): icmp_seq=4 ttl=50 time=82.1 ms
64 bytes from website-content-cache-3.ps5.canonical.com (185.125.190.29): icmp_seq=5 ttl=50 time=81.1 ms
64 bytes from website-content-cache-3.ps5.canonical.com (185.125.190.29): icmp_seq=6 ttl=50 time=80.6 ms
64 bytes from website-content-cache-3.ps5.canonical.com (185.125.190.29): icmp_seq=7 ttl=50 time=80.7 ms
64 bytes from website-content-cache-3.ps5.canonical.com (185.125.190.29): icmp_seq=8 ttl=50 time=81.3 ms
64 bytes from website-content-cache-3.ps5.canonical.com (185.125.190.29): icmp_seq=9 ttl=50 time=87.3 ms
64 bytes from website-content-cache-3.ps5.canonical.com (185.125.190.29): icmp_seq=10 ttl=50 time=81.3 ms
--- ubuntu.com ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9700ms
rtt min/avg/max/mdev = 80.619/84.729/101.312/6.254 ms
shair005@Shair005:~$
```

Cache was 2 instead of 3 the number 29 was 21, for ttl 50 the number was 47 and the time was different.

Step 5:

```
shair005@Shair005:~$ host www.odu.edu
www.odu.edu has address 35.170.140.174
shair005@Shair005:~$
```

The same as before no changes.

Step 6:

```
www.odu.edu has address 35.170.140.174
shair005@Shair005:~$ cat /etc/hostname
shair005
shair005@Shair005:~$
```

Same as before no changes.

Step 7:

```
nameserver 127.0.0.53  
options edns0 trust-ad  
search wlan.odu.edu
```

Same as before no changes.