

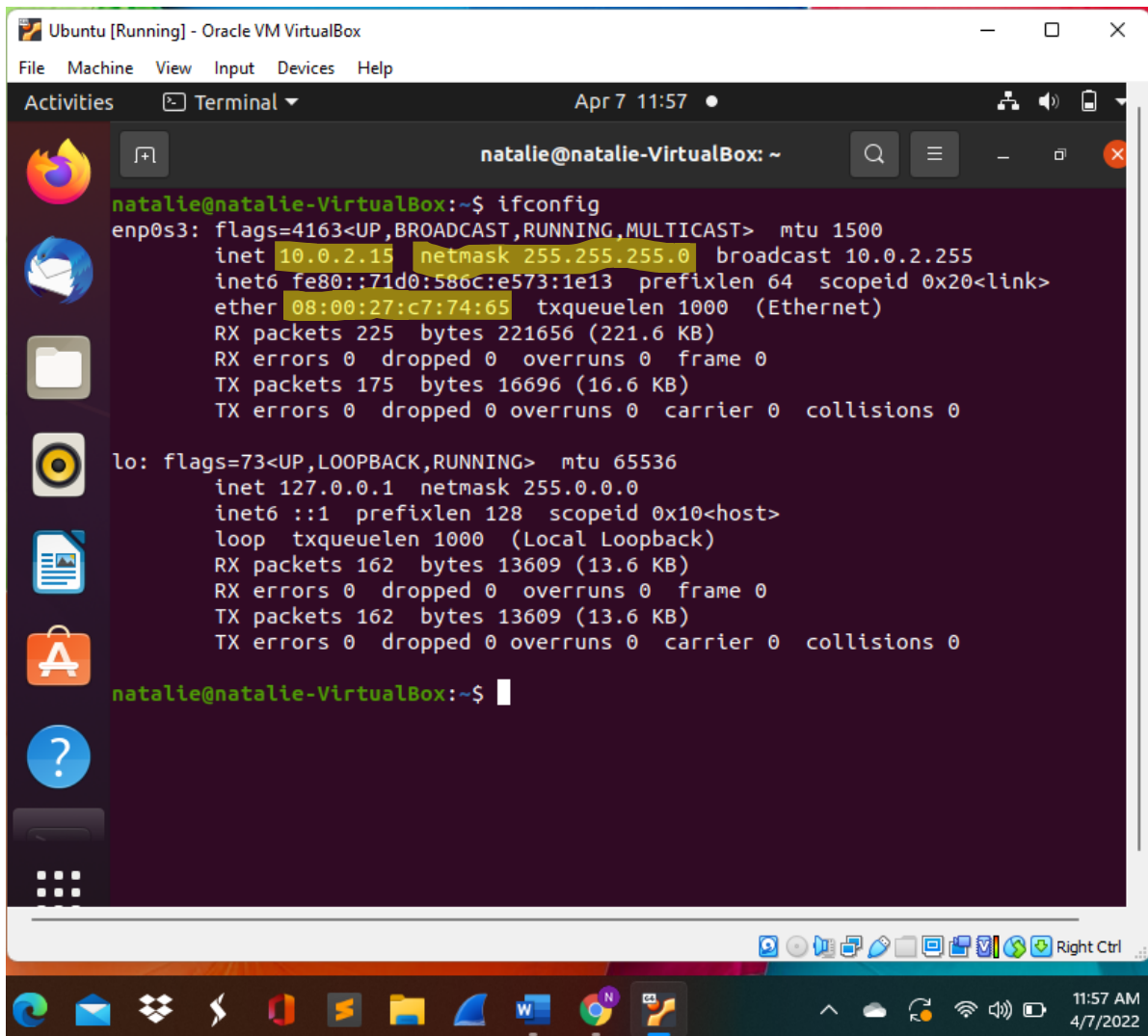
## Assignment #12 Basic Network Configurations

Natalie Hardwicke

01167235

### TASK A: EXPLORE NETWORK CONFIGURATIONS

#### Step 1



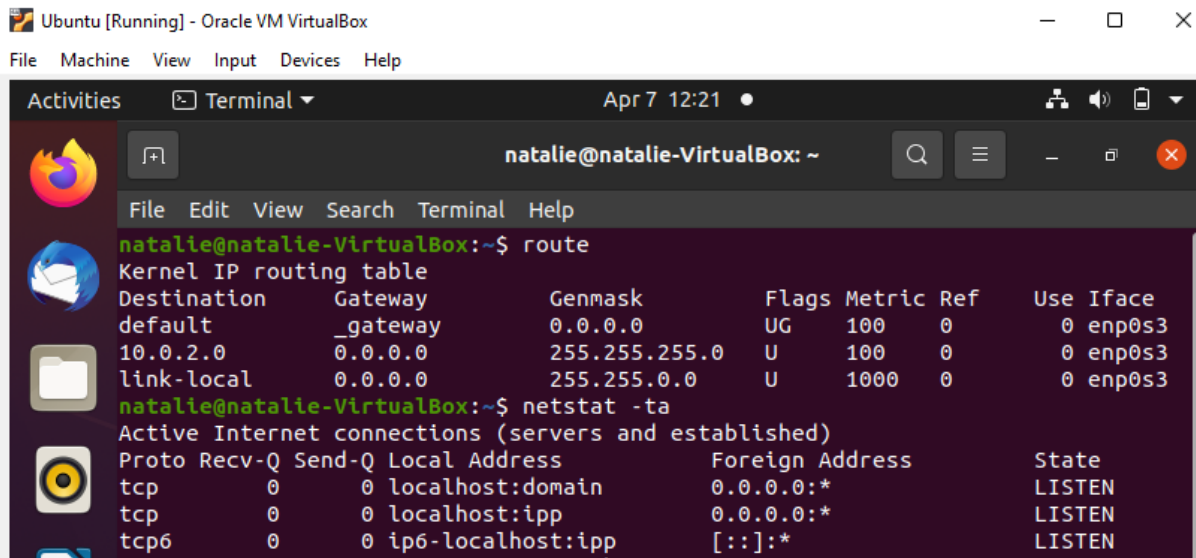
```
Ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Apr 7 11:57
natalie@natalie-VirtualBox: ~
natalie@natalie-VirtualBox:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
    inet6 fe80::71d0:586c:e573:1e13 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:c7:74:65 txqueuelen 1000 (Ethernet)
    RX packets 225 bytes 221656 (221.6 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 175 bytes 16696 (16.6 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 162 bytes 13609 (13.6 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 162 bytes 13609 (13.6 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

natalie@natalie-VirtualBox:~$
```

Used ifconfig to see network configuration. Highlighted IP address, netmask, and MAC address.

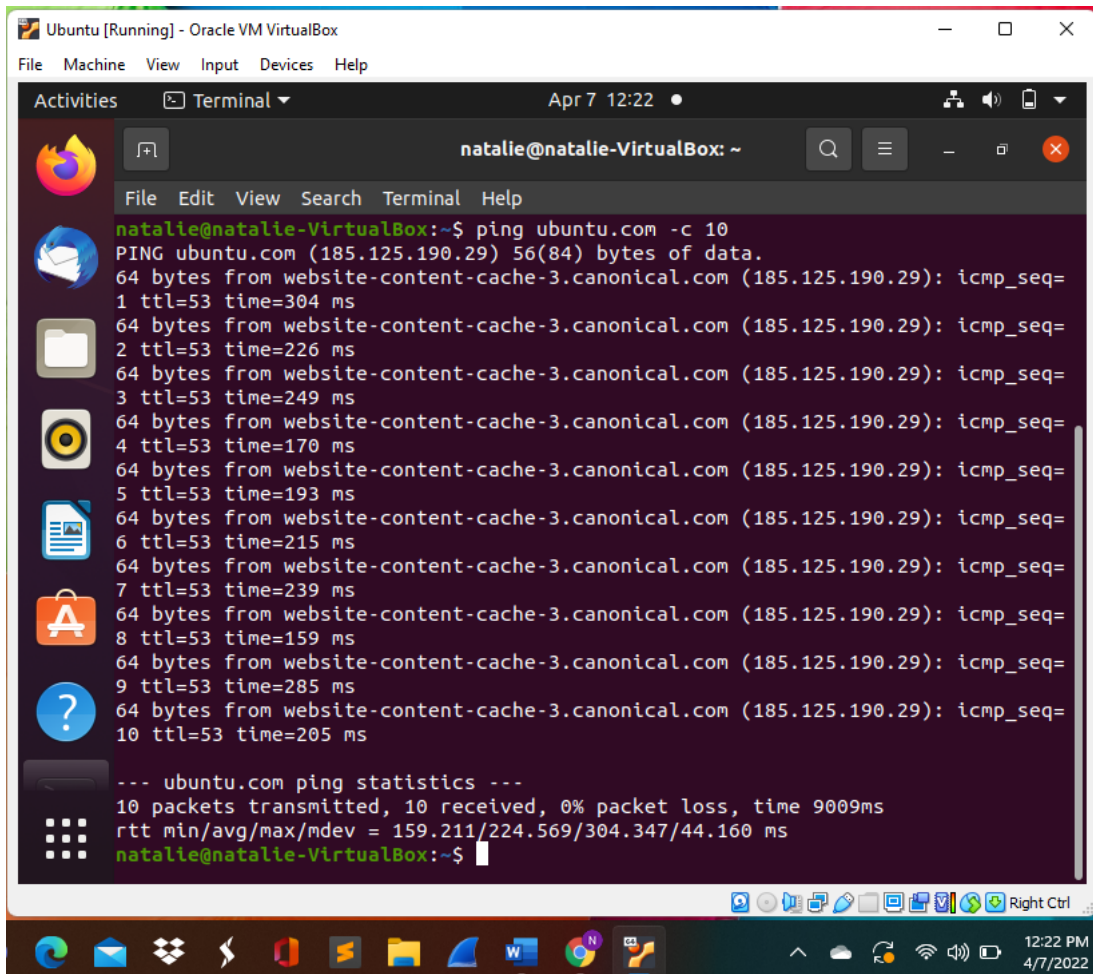
## Steps 2 & 3



```
Ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Apr 7 12:21
natalie@natalie-VirtualBox: ~
File Edit View Search Terminal Help
natalie@natalie-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
natalie@natalie-VirtualBox:~$ netstat -ta
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address Foreign Address State
tcp 0 0 localhost:domain 0.0.0.0:* LISTEN
tcp 0 0 localhost:ipp 0.0.0.0:* LISTEN
tcp6 0 0 ip6-localhost:ipp [::]:* LISTEN
```

Used the “route” command with no parameters to show current routing table. Used “netstat -ta” to show current TCP connections.

## Step 4

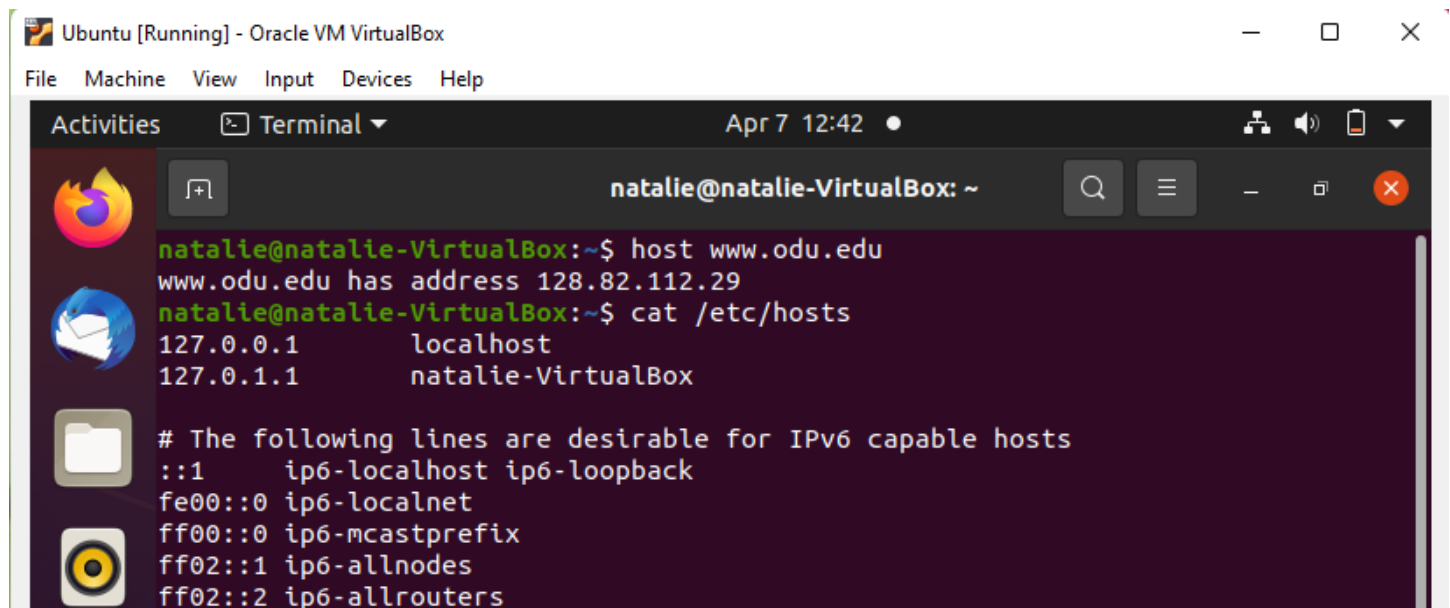


```
Ubuntu [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Apr 7 12:22
natalie@natalie-VirtualBox: ~
File Edit View Search Terminal Help
natalie@natalie-VirtualBox:~$ ping ubuntu.com -c 10
PING ubuntu.com (185.125.190.29) 56(84) bytes of data.
64 bytes from website-content-cache-3.canonical.com (185.125.190.29): icmp_seq=
1 ttl=53 time=304 ms
64 bytes from website-content-cache-3.canonical.com (185.125.190.29): icmp_seq=
2 ttl=53 time=226 ms
64 bytes from website-content-cache-3.canonical.com (185.125.190.29): icmp_seq=
3 ttl=53 time=249 ms
64 bytes from website-content-cache-3.canonical.com (185.125.190.29): icmp_seq=
4 ttl=53 time=170 ms
64 bytes from website-content-cache-3.canonical.com (185.125.190.29): icmp_seq=
5 ttl=53 time=193 ms
64 bytes from website-content-cache-3.canonical.com (185.125.190.29): icmp_seq=
6 ttl=53 time=215 ms
64 bytes from website-content-cache-3.canonical.com (185.125.190.29): icmp_seq=
7 ttl=53 time=239 ms
64 bytes from website-content-cache-3.canonical.com (185.125.190.29): icmp_seq=
8 ttl=53 time=159 ms
64 bytes from website-content-cache-3.canonical.com (185.125.190.29): icmp_seq=
9 ttl=53 time=285 ms
64 bytes from website-content-cache-3.canonical.com (185.125.190.29): icmp_seq=
10 ttl=53 time=205 ms

--- ubuntu.com ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9009ms
rtt min/avg/max/mdev = 159.211/224.569/304.347/44.160 ms
natalie@natalie-VirtualBox:~$
```

Used “ping ubuntu.com -c 10” to ping ubuntu.com and only send 10 pings.

## Steps 5 & 6



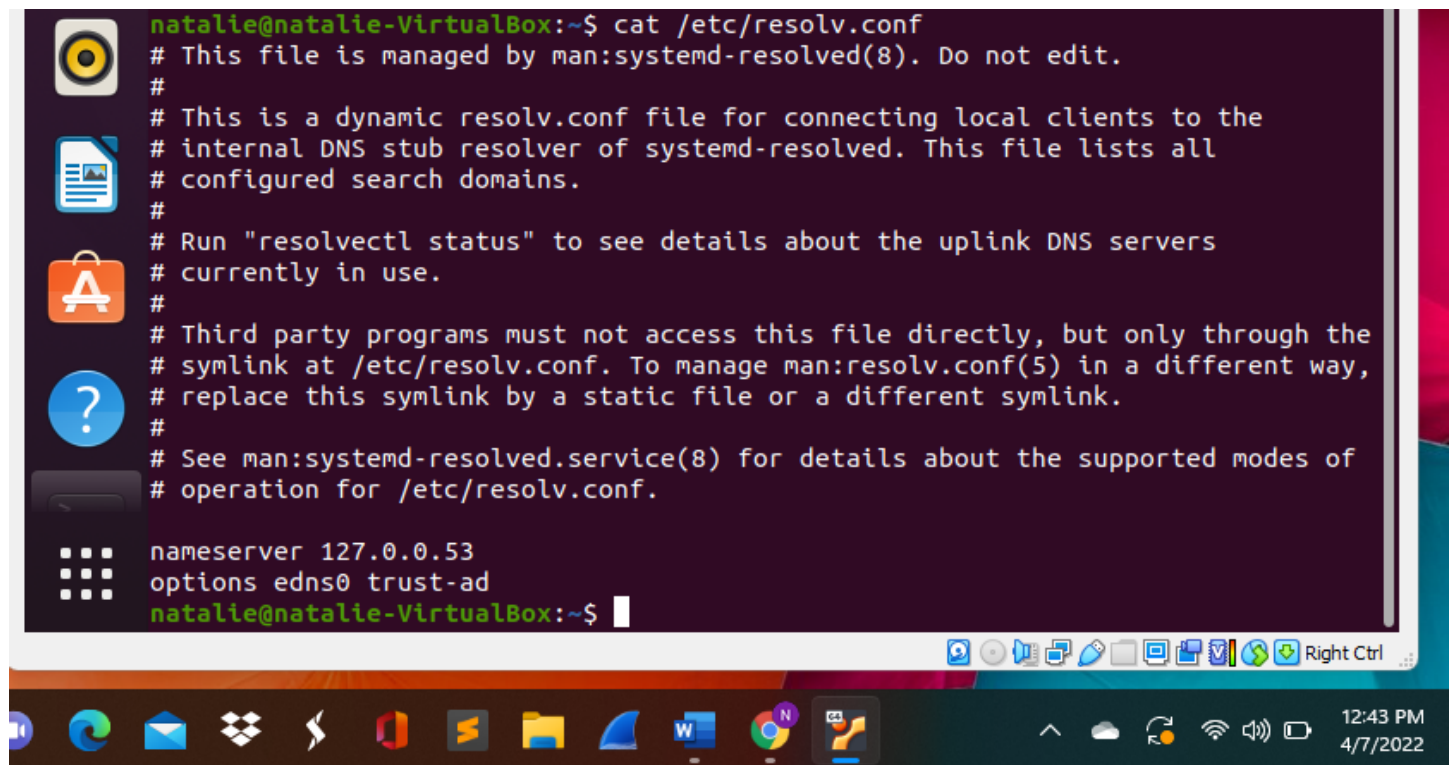
The screenshot shows a terminal window titled "Ubuntu [Running] - Oracle VM VirtualBox". The terminal prompt is "natalie@natalie-VirtualBox: ~". The user has entered the command "host www.odu.edu", which returns "www.odu.edu has address 128.82.112.29". The user then enters "cat /etc/hosts", which displays the contents of the /etc/hosts file:

```
natalie@natalie-VirtualBox:~$ host www.odu.edu
www.odu.edu has address 128.82.112.29
natalie@natalie-VirtualBox:~$ cat /etc/hosts
127.0.0.1      localhost
127.0.1.1      natalie-VirtualBox

# The following lines are desirable for IPv6 capable hosts
::1          ip6-localhost ip6-loopback
fe00::0      ip6-localnet
ff00::0      ip6-mcastprefix
ff02::1      ip6-allnodes
ff02::2      ip6-allrouters
```

Used "host" command to see www.odu.edu. Used "cat /etc/hosts" to see the host names of the systems.

## Step 7



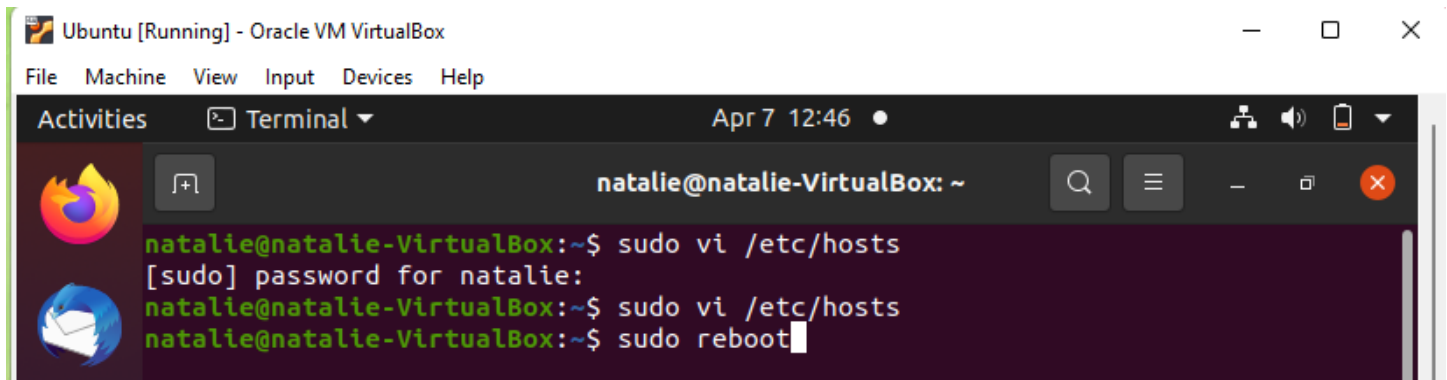
The screenshot shows a terminal window titled "Ubuntu [Running] - Oracle VM VirtualBox". The terminal prompt is "natalie@natalie-VirtualBox: ~". The user has entered the command "cat /etc/resolv.conf", which displays the contents of the /etc/resolv.conf file:

```
natalie@natalie-VirtualBox:~$ cat /etc/resolv.conf
# This file is managed by man:systemd-resolved(8). Do not edit.
#
# 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 must 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
natalie@natalie-VirtualBox:~$
```

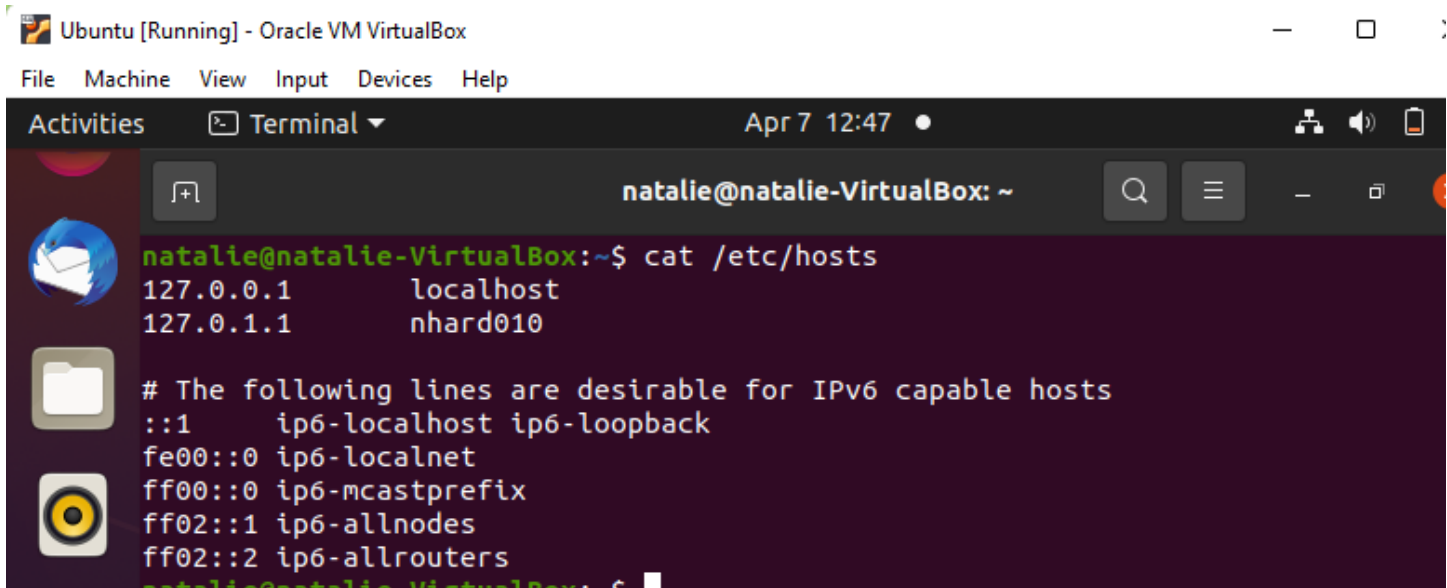
Used "cat /etc/resolv.conf" to see file containing DNS servers.

## Step 8



A terminal window titled "Ubuntu [Running] - Oracle VM VirtualBox" with a menu bar (File, Machine, View, Input, Devices, Help) and a status bar (Apr 7 12:46). The terminal shows the user "natalie@natalie-VirtualBox: ~" executing the following commands:

```
natalie@natalie-VirtualBox:~$ sudo vi /etc/hosts
[sudo] password for natalie:
natalie@natalie-VirtualBox:~$ sudo vi /etc/hosts
natalie@natalie-VirtualBox:~$ sudo reboot
```



A terminal window titled "Ubuntu [Running] - Oracle VM VirtualBox" with a menu bar (File, Machine, View, Input, Devices, Help) and a status bar (Apr 7 12:47). The terminal shows the user "natalie@natalie-VirtualBox: ~" executing the command:

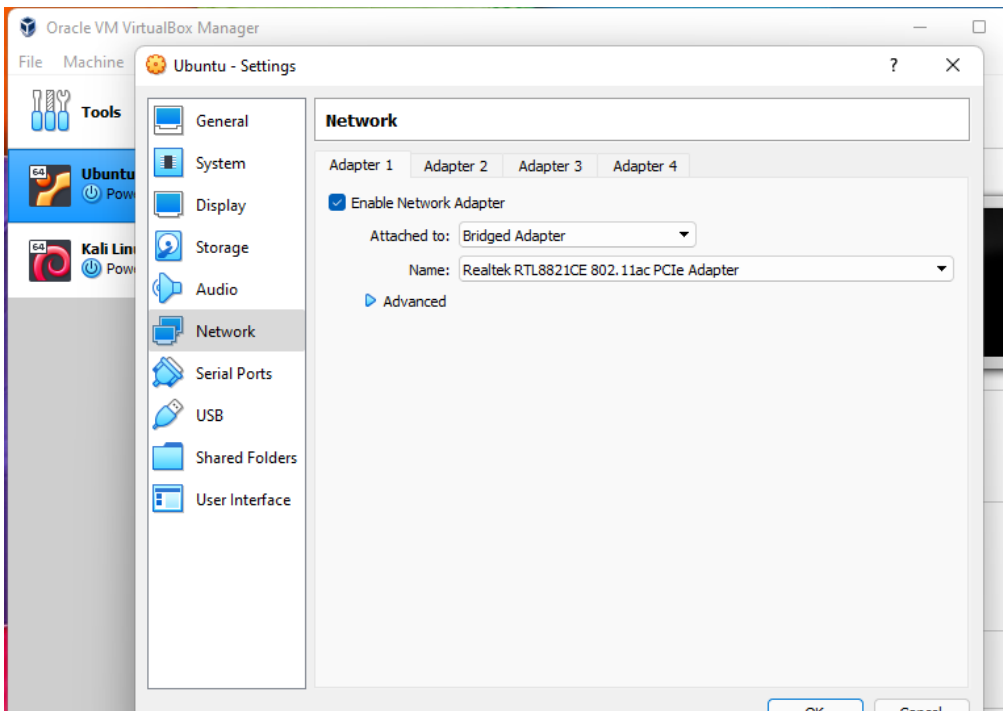
```
natalie@natalie-VirtualBox:~$ cat /etc/hosts
127.0.0.1      localhost
127.0.1.1      nhard010

# The following lines are desirable for IPv6 capable hosts
::1           ip6-localhost ip6-loopback
fe00::0       ip6-localnet
ff00::0       ip6-mcastprefix
ff02::1       ip6-allnodes
ff02::2       ip6-allrouters
```

First, went into the `/etc/hosts` file and changed the system name to my midas ID, then rebooted. After the reboot repeated step 6.

## TASK B: A Different Network Setting

### Steps 1 & 2



Changed from NAT to bridged Adapter and restart.

### Step 3

A screenshot of a terminal window titled 'Ubuntu [Running] - Oracle VM VirtualBox'. The terminal shows the output of the 'ifconfig' command. The output for 'enp0s3' is highlighted in yellow to show differences: 'inet 172.20.10.14 netmask 255.255.255.240 broadcast 172.20.10.15', 'inet6 2600:380:4042:f0be:5fbb:8235:fd8f:2ab3 prefixlen 64 scopeid 0x0', and 'ether 08:00:27:c7:74:65 txqueuelen 1000 (Ethernet)'. The output for 'lo' is also shown, with 'inet 127.0.0.1 netmask 255.0.0.0' highlighted in yellow. The terminal prompt is 'natalie@natalie-VirtualBox: ~'.

Differences highlighted. Global, different IP address, net mask, and MAC address.



```
natalie@natalie-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  
link-local       0.0.0.0         255.255.0.0      U      1000   0      0 enp0s3  
172.20.10.0      0.0.0.0         255.255.255.240  U      100    0      0 enp0s3  
$ netstat -ta  
Active Internet connections (servers and established)  
Proto Recv-Q Send-Q Local Address           Foreign Address         State  
tcp        0      0 localhost:domain        0.0.0.0:*               LISTEN  
tcp        0      0 localhost:ipp           0.0.0.0:*               LISTEN  
tcp6       0      0 ip6-localhost:ipp      [::]:*                  LISTEN
```

Different IP address than before, highlighted. Same TCP connections.

```
natalie@natalie-VirtualBox: ~  
$ ping ubuntu.com -c 10  
PING ubuntu.com(website-content-cache-3.canonical.com (2620:2d:4000:1::28)) 56  
data bytes  
64 bytes from website-content-cache-3.canonical.com (2620:2d:4000:1::28): icmp_  
seq=1 ttl=53 time=1023 ms  
64 bytes from website-content-cache-3.canonical.com (2620:2d:4000:1::28): icmp_  
seq=2 ttl=53 time=688 ms  
64 bytes from website-content-cache-3.canonical.com (2620:2d:4000:1::28): icmp_  
seq=3 ttl=53 time=531 ms  
64 bytes from website-content-cache-3.canonical.com (2620:2d:4000:1::28): icmp_  
seq=4 ttl=53 time=341 ms  
64 bytes from website-content-cache-3.canonical.com (2620:2d:4000:1::28): icmp_  
seq=5 ttl=53 time=278 ms  
64 bytes from website-content-cache-3.canonical.com (2620:2d:4000:1::28): icmp_  
seq=6 ttl=53 time=1028 ms  
64 bytes from website-content-cache-3.canonical.com (2620:2d:4000:1::28): icmp_  
seq=7 ttl=53 time=302 ms  
64 bytes from website-content-cache-3.canonical.com (2620:2d:4000:1::28): icmp_  
seq=8 ttl=53 time=1022 ms  
64 bytes from website-content-cache-3.canonical.com (2620:2d:4000:1::28): icmp_  
seq=9 ttl=53 time=467 ms  
64 bytes from website-content-cache-3.canonical.com (2620:2d:4000:1::28): icmp_  
seq=10 ttl=53 time=610 ms  
--- ubuntu.com ping statistics ---  
10 packets transmitted, 10 received, 0% packet loss, time 9058ms  
rtt min/avg/max/mdev = 278.446/629.042/1028.348/286.657 ms, pipe 2  
$
```

Here ping has "pipe 2" before it did not. But still able to reach ubuntu with connection.

Ubuntu [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

Activities Terminal Apr 7 13:03

natalie@natalie-VirtualBox: ~

```
natalie@natalie-VirtualBox:~$ host www.odu.edu
www.odu.edu has address 128.82.112.29
natalie@natalie-VirtualBox:~$ cat /etc/hosts
127.0.0.1    localhost
127.0.1.1    nhard010

# The following lines are desirable for IPv6 capable hosts
::1        ip6-localhost ip6-loopback
fe00::0    ip6-localnet
ff00::0    ip6-mcastprefix
ff02::1    ip6-allnodes
ff02::2    ip6-allrouters
```

No differences in these two steps (5 + 6)

```
ff02::1    ip6-allnodes
ff02::2    ip6-allrouters
natalie@natalie-VirtualBox:~$ cat /etc/resolv.conf
# This file is managed by man:systemd-resolved(8). Do not edit.
#
# 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 must 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
natalie@natalie-VirtualBox:~$
```

No differences. The DNS servers have remained the same.

Overall, not many differences when changing from NAT to Bridged Adapter.