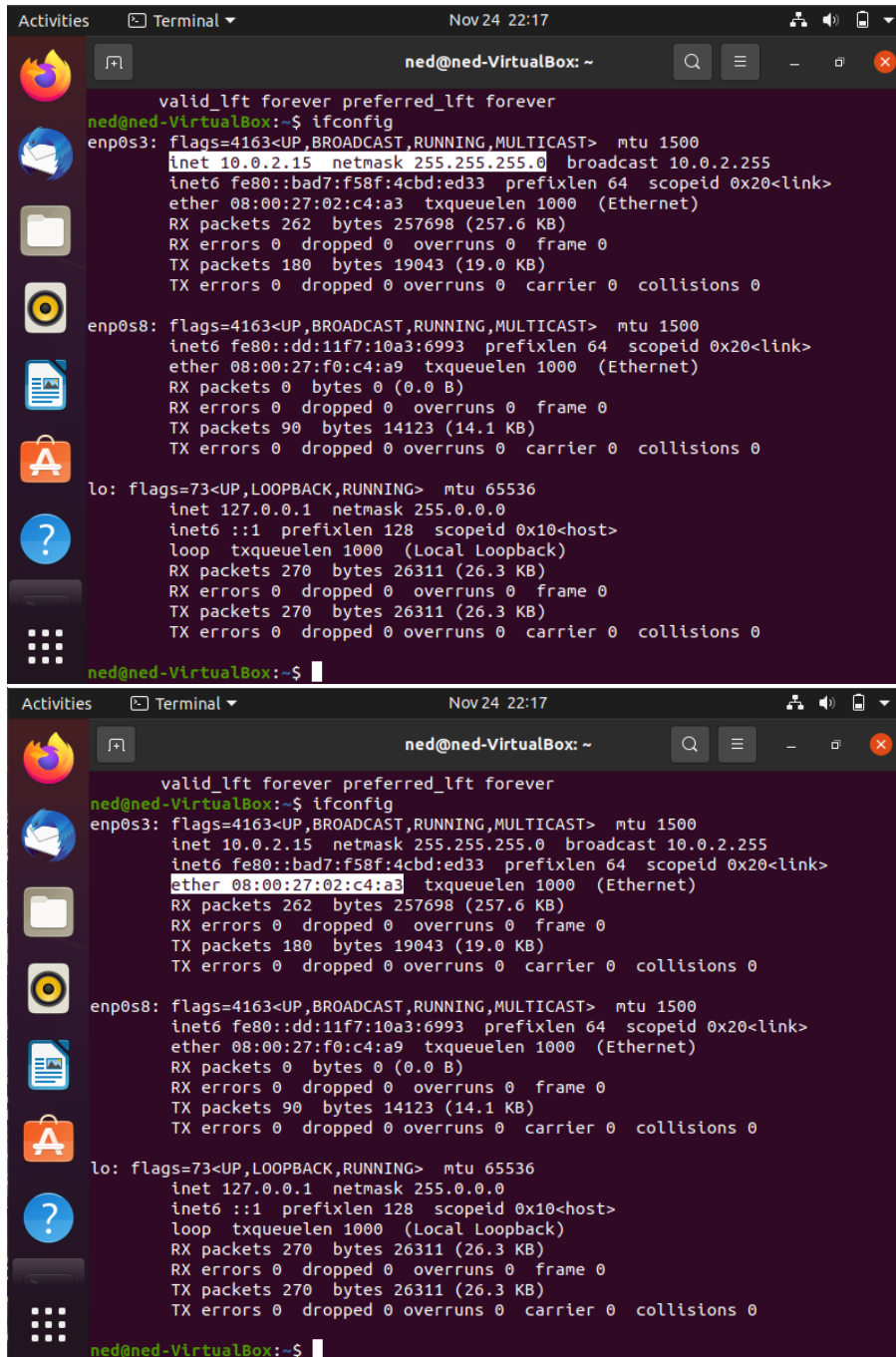


## Task A

### Step 1



The image shows two screenshots of a terminal window in a virtual machine named 'ned@ned-VirtualBox'. The terminal displays the output of the 'ifconfig' command. The first screenshot shows the configuration for interfaces enp0s3, enp0s8, and lo. The second screenshot shows the same output, but with some lines highlighted in yellow. The terminal window has a title bar with 'Activities', 'Terminal', and the date 'Nov 24 22:17'. The terminal output is as follows:

```
valid_lft forever preferred_lft forever
ned@ned-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::bad7:f58f:4cbd:ed33 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:02:c4:a3 txqueuelen 1000 (Ethernet)
    RX packets 262 bytes 257698 (257.6 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 180 bytes 19043 (19.0 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

enp0s8: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet6 fe80::dd:11f7:10a3:6993 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:f0:c4:a9 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 90 bytes 14123 (14.1 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 270 bytes 26311 (26.3 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 270 bytes 26311 (26.3 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

ned@ned-VirtualBox:~$
```

The second screenshot shows the same output, but with the following lines highlighted in yellow:

```
    inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
    inet6 fe80::bad7:f58f:4cbd:ed33 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:02:c4:a3 txqueuelen 1000 (Ethernet)
```

### Steps 2-4

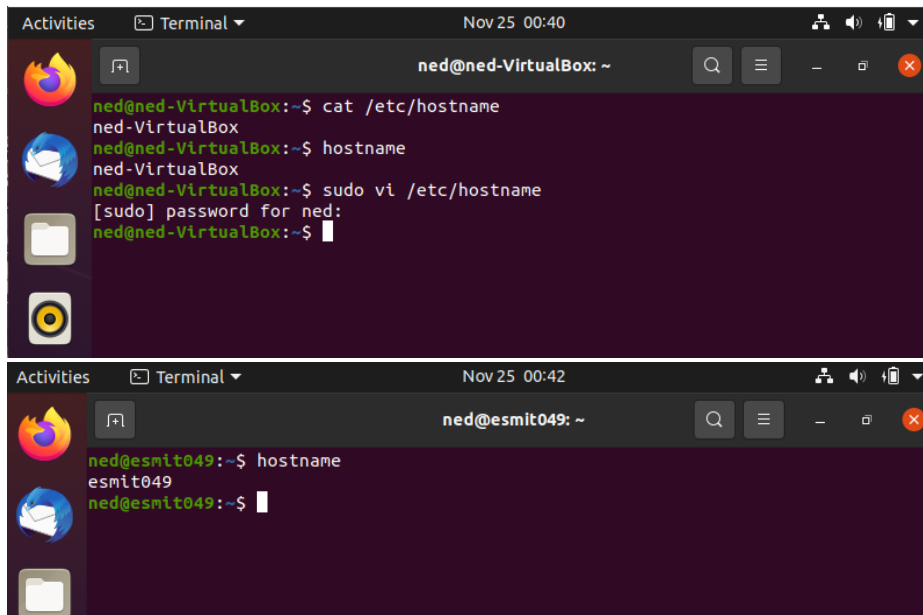
```
Activities Terminal Nov 24 23:39
ned@ned-VirtualBox: ~
ned@ned-VirtualBox:~$ route
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
default _gateway 0.0.0.0 UG 100 0 0 enp0s3
10.0.2.0 0.0.0.0 255.255.255.0 U 100 0 0 enp0s3
link-local 0.0.0.0 255.255.0.0 U 1000 0 0 enp0s3
ned@ned-VirtualBox:~$ netstat -t
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address Foreign Address State
```

```
ned@ned-VirtualBox:~$ ping 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=55 time=92.3 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=2 ttl=55 time=100 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=3 ttl=55 time=91.4 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=4 ttl=55 time=92.8 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=5 ttl=55 time=96.7 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=6 ttl=55 time=97.4 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=7 ttl=55 time=91.5 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=8 ttl=55 time=92.2 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=9 ttl=55 time=94.3 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=10 ttl=55 time=97.4 ms
^C
--- ubuntu.com ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9593ms
rtt min/avg/max/mdev = 91.360/94.600/100.044/2.903 ms
ned@ned-VirtualBox:~$
```

## Steps 5-7

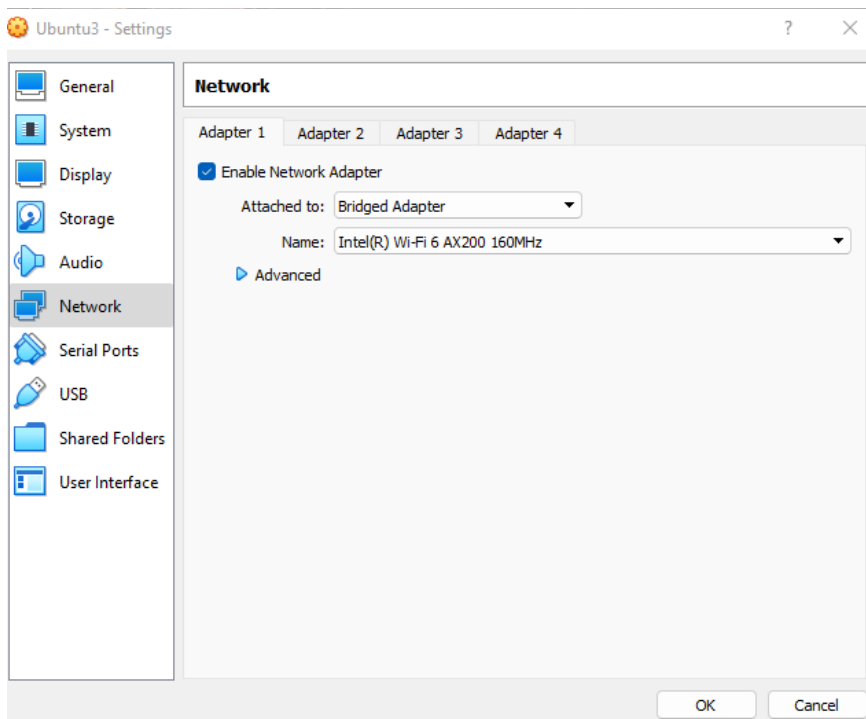
```
Activities Terminal Nov 24 23:56
ned@ned-VirtualBox: ~
ned@ned-VirtualBox:~$ host www.odu.edu
www.odu.edu has address 35.170.140.174
ned@ned-VirtualBox:~$ cat /etc/hostname
ned-VirtualBox
ned@ned-VirtualBox:~$ cat /etc/resolv.conf
# This file is managed by man:systemd-resolved(8). Do not edit.
#
# 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
search fios-router.home
ned@ned-VirtualBox:~$
```

## Step 8



## Task B

Switching to bridged adapter



Step 1

```
Activities Terminal Nov 25 00:51
ned@esmit049: ~
ned@esmit049:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.1.35 netmask 255.255.255.0 broadcast 192.168.1.255
    inet6 fe80::bad7:f58f:4cbd:ed33 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:02:c4:a3 txqueuelen 1000 (Ethernet)
    RX packets 224 bytes 26984 (26.9 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 141 bytes 15100 (15.1 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

enp0s8: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    ether 08:00:27:f0:c4:a9 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 100 bytes 15764 (15.7 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 271 bytes 26327 (26.3 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 271 bytes 26327 (26.3 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

ned@esmit049:~$
```

```
Activities Terminal Nov 25 00:53
ned@esmit049: ~
ned@esmit049:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.1.35 netmask 255.255.255.0 broadcast 192.168.1.255
    inet6 fe80::bad7:f58f:4cbd:ed33 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:02:c4:a3 txqueuelen 1000 (Ethernet)
    RX packets 386 bytes 54635 (54.6 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 155 bytes 16137 (16.1 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

enp0s8: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet6 fe80::dd:11f7:10a3:6993 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:f0:c4:a9 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 116 bytes 18236 (18.2 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 295 bytes 28373 (28.3 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 295 bytes 28373 (28.3 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

ned@esmit049:~$
```

The IP address is different, but the netmask and the MAC address are the same

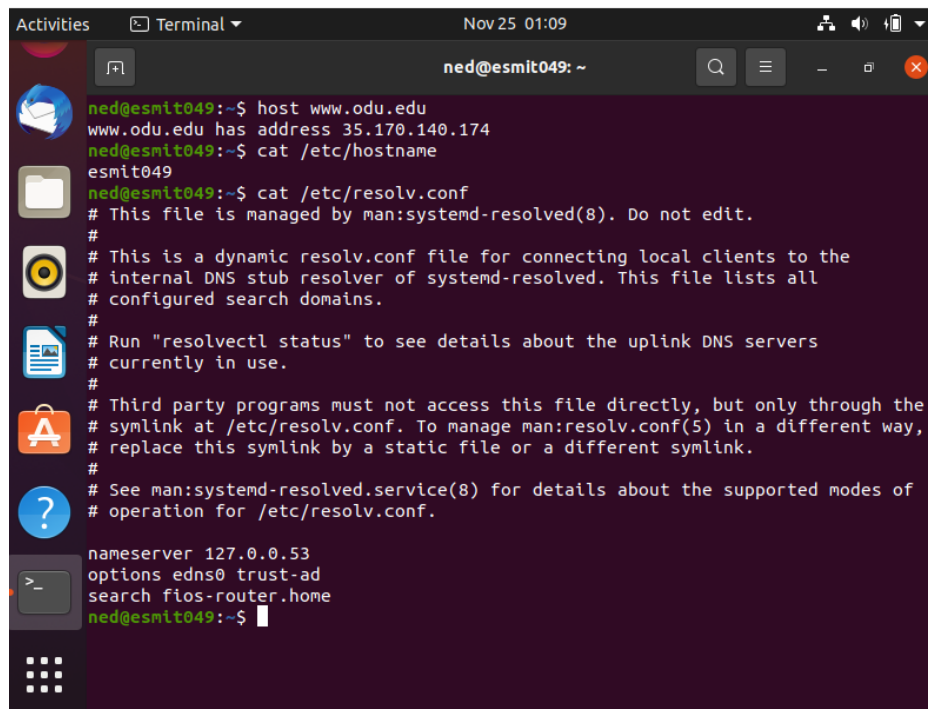
Steps 2-4

```
Activities Terminal Nov 25 01:03
ned@esmit049: ~
ned@esmit049:~$ route
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
default Fios_Quantum_Ga 0.0.0.0 UG 100 0 0 enp0s3
link-local 0.0.0.0 255.255.0.0 U 1000 0 0 enp0s3
192.168.1.0 0.0.0.0 255.255.255.0 U 100 0 0 enp0s3
ned@esmit049:~$ netstat -t
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address Foreign Address State
ned@esmit049:~$ ping 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=56 time=95.1 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=2 ttl=56 time=97.2 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=3 ttl=56 time=94.5 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=4 ttl=56 time=94.8 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=5 ttl=56 time=96.0 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=6 ttl=56 time=91.9 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=7 ttl=56 time=93.4 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=8 ttl=56 time=93.8 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=9 ttl=56 time=97.9 ms

Activities Terminal Nov 25 01:03
ned@esmit049: ~
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address Foreign Address State
ned@esmit049:~$ ping 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=56 time=95.1 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=2 ttl=56 time=97.2 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=3 ttl=56 time=94.5 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=4 ttl=56 time=94.8 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=5 ttl=56 time=96.0 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=6 ttl=56 time=91.9 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=7 ttl=56 time=93.4 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=8 ttl=56 time=93.8 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=9 ttl=56 time=97.9 ms
64 bytes from website-content-cache-2.ps5.canonical.com (185.125.190.21): icmp_
seq=10 ttl=56 time=99.0 ms
^C
--- ubuntu.com ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 15799ms
rtt min/avg/max/mdev = 91.892/95.351/99.040/2.083 ms
ned@esmit049:~$
```

The IP address is still different while the netmask and MAC address are still the same. In addition, it took the bridged network longer on average to ping the ubuntu.com website than the NAT network.

Step 5-7



A terminal window titled 'Terminal' with a timestamp of 'Nov 25 01:09'. The window shows a series of commands and their outputs in a dark purple theme. The commands include checking the IP of www.odu.edu, viewing the /etc/hostname file, and displaying the contents of /etc/resolv.conf. The output of /etc/resolv.conf shows standard DNS configuration for systemd-resolved, including nameserver, options, and search domains.

```
ned@esmit049:~$ host www.odu.edu
www.odu.edu has address 35.170.140.174
ned@esmit049:~$ cat /etc/hostname
esmit049
ned@esmit049:~$ 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
search fios-router.home
ned@esmit049:~$
```

There don't seem to be any changes, except for the hostname being my MIDAS instead of my name-virtualbox but that's most likely because I changed it in a previous step