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Linux Lab 11

Task A

1.

```
(josiah@josiah)~$ ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
    inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
    inet6 fd00::8c12:ac62:cc19:ad40  prefixlen 64  scopeid 0x0<global>
    inet6 fe80::a00:27ff:feef:6736  prefixlen 64  scopeid 0x20<link>
    inet6 fd00::a00:27ff:feef:6736  prefixlen 64  scopeid 0x0<global>
    ether 08:00:27:ef:67:36  txqueuelen 1000  (Ethernet)
    RX packets 2915  bytes 1239389 (1.1 MiB)
    RX errors 0  dropped 0  overruns 0  frame 0
    TX packets 3084  bytes 515592 (503.5 KiB)
    TX errors 0  dropped 20  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 36  bytes 1988 (1.9 KiB)
    RX errors 0  dropped 0  overruns 0  frame 0
    TX packets 36  bytes 1988 (1.9 KiB)
    TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0
```

2.

```
(josiah@josiah)~$ route
Kernel IP routing table
Destination    Gateway         Genmask         Flags Metric Ref    Use Iface
default        10.0.2.2       0.0.0.0         UG    100    0      0 eth0
10.0.2.0      0.0.0.0       255.255.255.0   U     100    0      0 eth0
```

3.

```
(josiah@josiah)~$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
udp        0      0 10.0.2.15:bootpc       10.0.2.2:bootps        ESTABLISHED

Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type       State         I-Node  Path
unix  3      [ ]      STREAM    CONNECTED   9583     /run/user/1000/bus
unix  3      [ ]      STREAM    CONNECTED   8843     /run/user/1000/at-spi/bus_0
unix  3      [ ]      STREAM    CONNECTED   8925     /run/user/1000/at-spi/bus_0
unix  3      [ ]      STREAM    CONNECTED   8870
unix  3      [ ]      STREAM    CONNECTED   9641
unix  3      [ ]      STREAM    CONNECTED   9498
unix  3      [ ]      STREAM    CONNECTED   8226
unix  3      [ ]      STREAM    CONNECTED   3730234  /run/user/1000/bus
unix  3      [ ]      STREAM    CONNECTED   8837     @/tmp/.ICE-unix/875
unix  3      [ ]      STREAM    CONNECTED   8218     /run/dbus/system_bus_socket
unix  3      [ ]      STREAM    CONNECTED   9628
unix  3      [ ]      STREAM    CONNECTED   9344
unix  3      [ ]      STREAM    CONNECTED   8952
unix  3      [ ]      STREAM    CONNECTED   8863     @/tmp/.X11-unix/X0
unix  3      [ ]      STREAM    CONNECTED   9577     /run/systemd/journal/stdout
unix  3      [ ]      STREAM    CONNECTED   8850     @/tmp/.X11-unix/X0
unix  3      [ ]      STREAM    CONNECTED   9556     @/tmp/.ICE-unix/875
unix  3      [ ]      STREAM    CONNECTED   8919     @/tmp/.X11-unix/X0
unix  3      [ ]      STREAM    CONNECTED   8228     /run/user/1000/pipewire-0
unix  3      [ ]      STREAM    CONNECTED   7293     /run/systemd/journal/stdout
unix  3      [ ]      STREAM    CONNECTED   9636
unix  3      [ ]      STREAM    CONNECTED   8869     /run/user/1000/at-spi/bus_0
unix  3      [ ]      STREAM    CONNECTED   8854     /run/user/1000/at-spi/bus_0
```

4.

```
(josiah@josiah)-[~]
$ sudo netstat --tcp
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
```

5.

```
(josiah@josiah)-[~]
$ ping ubuntu.com
PING ubuntu.com (185.125.190.20) 56(84) bytes of data.
64 bytes from website-content-cache-1.ps5.canonical.com (185.125.190.20): icmp_seq=1 ttl=255 time=88.6 ms
64 bytes from website-content-cache-1.ps5.canonical.com (185.125.190.20): icmp_seq=2 ttl=255 time=86.5 ms
64 bytes from website-content-cache-1.ps5.canonical.com (185.125.190.20): icmp_seq=3 ttl=255 time=84.6 ms
64 bytes from website-content-cache-1.ps5.canonical.com (185.125.190.20): icmp_seq=4 ttl=255 time=86.8 ms
64 bytes from website-content-cache-1.ps5.canonical.com (185.125.190.20): icmp_seq=5 ttl=255 time=91.8 ms
64 bytes from website-content-cache-1.ps5.canonical.com (185.125.190.20): icmp_seq=6 ttl=255 time=84.5 ms
64 bytes from website-content-cache-1.ps5.canonical.com (185.125.190.20): icmp_seq=7 ttl=255 time=94.9 ms
64 bytes from website-content-cache-1.ps5.canonical.com (185.125.190.20): icmp_seq=8 ttl=255 time=87.1 ms
64 bytes from website-content-cache-1.ps5.canonical.com (185.125.190.20): icmp_seq=9 ttl=255 time=87.7 ms
64 bytes from website-content-cache-1.ps5.canonical.com (185.125.190.20): icmp_seq=10 ttl=255 time=89.1 ms
^C
--- ubuntu.com ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9014ms
rtt min/avg/max/mdev = 84.484/88.157/94.873/3.028 ms
```

6.

```
(josiah@josiah)-[~]
$ cat /etc/hostname
josiah
```

7.

```
(josiah@jthom216)-[~]
$ cat /etc/resolv.conf
# Generated by NetworkManager
search wlan.odu.edu
nameserver 10.0.2.3
```

8.

```
(josiah@josiah)-[~]
$ sudo vi /etc/hostname
[sudo] password for josiah:

(josiah@josiah)-[~]
$ cat /etc/hostname
jthom216
```

Task B

1.

Adapter 1 Adapter 2 Adapter 3 Adapter 4

☒ Enable Network Adapter

Attached to: Bridged Adapter

Name: MediaTek MT7921 Wi-Fi 6 802.11ax PCIe Adapter

Adapter Type: Intel PRO/1000 MT Desktop (82540EM)

Promiscuous Mode: Deny

MAC Address: 080027EF6736

☒ Cable Connected

2. NAT gives internal address; Bridged gives LAN IP which has less network connection.

```
(josiah@jthom216)-[~]
$ ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.254.5.5 netmask 255.255.0.0 broadcast 10.254.255.255
    inet6 fe80::a00:27ff:feef:6736 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:ef:67:36 txqueuelen 1000 (Ethernet)
    RX packets 30 bytes 3192 (3.1 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 30 bytes 4078 (3.9 KiB)
    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 8 bytes 480 (480.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 8 bytes 480 (480.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

Virtual gateway configuration through the hypervisor defines NAT while physical router gateway configuration defines bridged mode.

```
Kernel IP routing table
Destination    Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0        10.254.0.1     0.0.0.0         UG    100    0      0 eth0
10.254.0.0     0.0.0.0        255.255.0.0     U    100    0      0 eth0

(josiah@jthom216)-[~]
```

There is no difference they both are technically blank.

```
(josiah@jthom216)-[~]
$ netstat -t
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
```

The ping request failed because of Odu restricted network. NAT enables outgoing requests through shared Internet, but Bridged networking requires direct network access that may be blocked.

```
(josiah@jthom216)-[~]
$ ping ubuntu.com
ping: ubuntu.com: Temporary failure in name resolution
```

The NAT configuration relies on a virtual DNS server, yet Bridged networks depend on the DNS server of your physical network.

```
(josiah@jthom216)-[~]
$ host www.odu.edu
;; communications error to 128.82.95.20#53: timed out
;; communications error to 128.82.95.20#53: timed out
;; no servers could be reached
```

Network modes do not alter the hostname unless users explicitly modify it.

```
(josiah@jthom216)-[~]
$ cat /etc/hostname
jthom216
```

This file contains different DNS servers which depend on network mode to show either virtual or real network configuration.

```
(josiah@jthom216)-[~]
$ cat /etc/resolv.conf
# Generated by NetworkManager
search wlan.odu.edu
nameserver 128.82.95.20
```