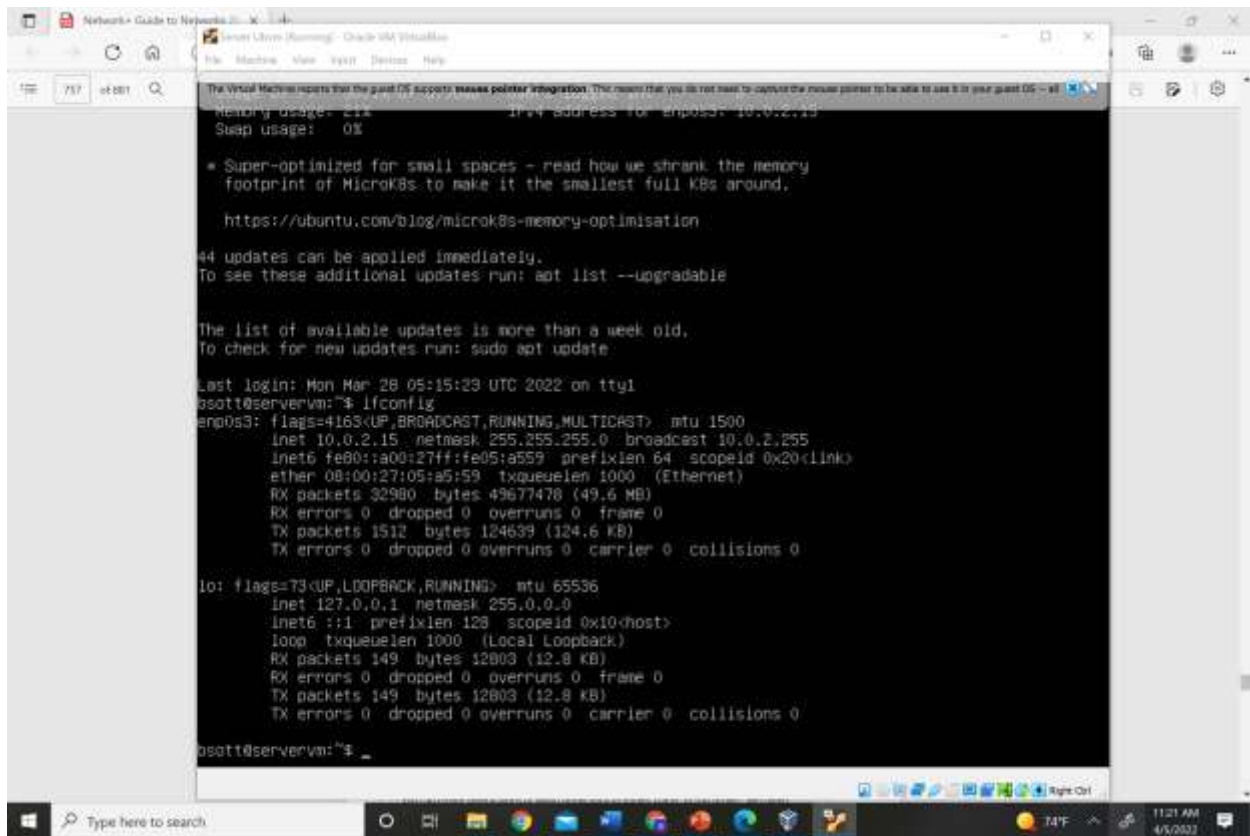


## Project 12.4

A screenshot of a Windows 10 desktop. The taskbar at the bottom shows the Start button, a search bar, and several application icons including File Explorer, Microsoft Edge, and the Task View button. A terminal window titled "Server VM (Running) - Oracle VM VirtualBox" is open, displaying the output of the 'ifconfig' command. The terminal shows details for the 'ens3' interface, including its IP address (10.0.2.15), netmask (255.255.255.0), and MAC address (08:00:27:05:a5:59). It also shows details for the 'lo' loopback interface. The terminal window has a dark background with white text. A browser window titled "Network+ Guide to Networks" is partially visible in the background.

```
Memory usage: 21%
Swap usage: 0%

* Super-optimized for small spaces - read how we shrank the memory
  footprint of MicroK8s to make it the smallest full K8s around.

  https://ubuntu.com/blog/microk8s-memory-optimisation

44 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

Last login: Mon Mar 28 05:15:29 UTC 2022 on tty1
bsott@servervm:~$ ifconfig
ens3: 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::a00:27ff:fe05:a559 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:05:a5:59 txqueuelen 1000 (Ethernet)
    RX packets 32980 bytes 49677470 (49.6 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 1512 bytes 124639 (124.6 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 149 bytes 12803 (12.8 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 149 bytes 12803 (12.8 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

bsott@servervm:~$
```

IP address: 10.0.2.15

MTU: 1500

Network Mask: 255.255.255.0

MAC address: 08:00:27:05:a5:59



```
bsott@servervm:/etc/netplan$ route -n
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
0.0.0.0 10.0.2.2 0.0.0.0 UG 100 0 0 enp0s3
10.0.2.0 0.0.0.0 255.255.255.0 U 0 0 0 enp0s3
10.0.2.2 0.0.0.0 255.255.255.255 UH 100 0 0 enp0s3
bsott@servervm:/etc/netplan$
```

```
bsott@servervm:/etc/netplan$ ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data:
64 bytes from 8.8.8.8: icmp_seq=1 ttl=117 time=50.6 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=117 time=21.2 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=117 time=47.6 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=117 time=68.9 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=117 time=21.5 ms
64 bytes from 8.8.8.8: icmp_seq=6 ttl=117 time=24.0 ms
64 bytes from 8.8.8.8: icmp_seq=7 ttl=117 time=67.7 ms
64 bytes from 8.8.8.8: icmp_seq=8 ttl=117 time=47.4 ms
64 bytes from 8.8.8.8: icmp_seq=9 ttl=117 time=44.6 ms
^C
--- 8.8.8.8 ping statistics ---
9 packets transmitted, 9 received, 0% packet loss, time 800ms
rtt min/avg/max/mdev = 21.226/43.716/68.899/17.244 ms
bsott@servervm:/etc/netplan$
```

```
bsott@servervm:/etc/netplan$ sudo ifconfig enp0s3 10.0.0.100 netmask 255.255.255.0
[sudo] password for bsott:
bsott@servervm:/etc/netplan$ ping 8.8.8.8
ping: connect: Network is unreachable
bsott@servervm:/etc/netplan$ ping 8.8.8.8
ping: connect: Network is unreachable
bsott@servervm:/etc/netplan$
```

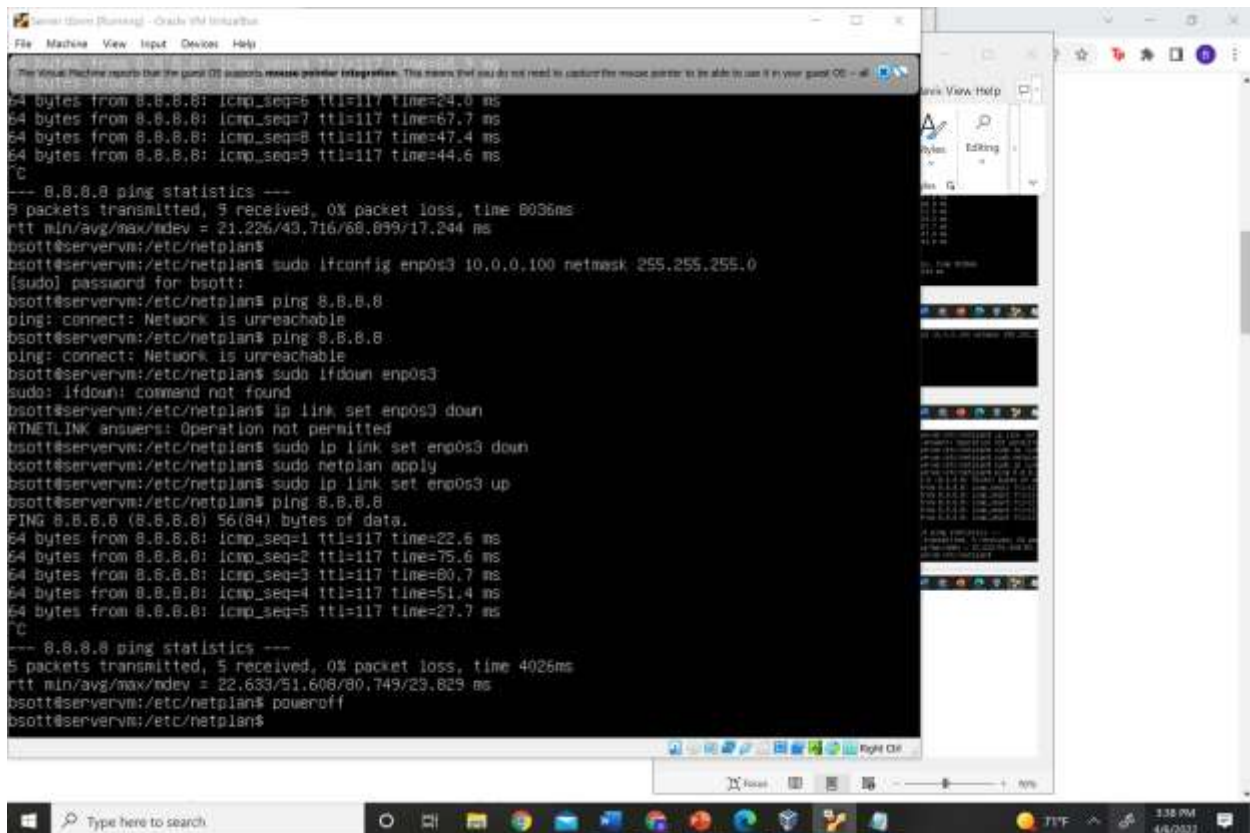
```
ip link set enp3s0 up
ip link set enp3s0 down
```

See `man ip` for more information on how to manipulate the devices, interfaces and tunnels.

## Prevent waiting for interfaces

Interfaces that are not required for booting or should not be booting should have the `optional: true` key added to them. This will prevent waiting for interfaces that may not come up.

```
bsott@servervm:/etc/netplan$ ip link set enp0s3 down
RTNETLINK answers: Operation not permitted
bsott@servervm:/etc/netplan$ sudo ip link set enp0s3 down
bsott@servervm:/etc/netplan$ sudo netplan apply
bsott@servervm:/etc/netplan$ sudo ip link set enp0s3 up
bsott@servervm:/etc/netplan$ ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data:
64 bytes from 8.8.8.8: icmp_seq=1 ttl=117 time=22.6 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=117 time=75.6 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=117 time=80.7 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=117 time=51.4 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=117 time=27.7 ms
^C
--- 8.8.8.8 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4026ms
rtt min/avg/max/mdev = 22.633/51.608/80.749/23.829 ms
bsott@servervm:/etc/netplan$
```



Capstone 4.1

