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COIT11238 – Networked Infrastructure Foundations

Term 1, 2022

Assessment 3 Portfolio Final

Version 2

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Week 01:

Part 1:

Q1: The fundamental difference between bits and Bytes is the quantity of the data. A Byte is 8 bits, and a bit is equal to .125 Bytes. Furthermore, a bit is represented with a lowercase 'b' whereas a Byte is represented with an uppercase 'B'.

Q2: There are 3 main counting methods that are used in almost all situations of computer calculation. They are hexadecimal, binary and decimal. These differ significantly, as a base-2 system binary is represented as 0's and 1's. decimal is determined based on its position relevant to the decimal point and the code is formulated by the specific placement of each digit. Hexadecimal is a base-16 numbering system which would be made up of 16 unique variables which are between 1-9 and A-F.

Q3: The conversion of 12,345,678 Bytes to MB can be done by 12345678/10^6 with the incorporation of scientific notation or by adding a decimal after the first two digits. The conversion of 0.04567s into ms can be done by multiplying the initial value by 1000 to achieve 45.67

Q4: My PC's CPU manufacturer is Intel, specifically an Intel Core i3-10105f. It's a 4 core 8 thread CPU with a base clock speed of 3700000000hz with an overclockable speed of 4400000000hz.

Q5: When storing 10TB of data and investigating different storage methods you could expect to pay (on average):

- For a Hard Drive (HDD) ~$350.
- To supplement the same amount of storage with SSD a greater option would be to use multiple as there are no commercially developed SSD's with that much storage capacity. The closest you could get are 2x5TB with the price totalling ~$564.
- The best I could find for 10TB cloud storage is subscription based in Google Drive totalling ~$68.10 per month.

The (HDD) sacrifices quality for quantity as with the development of faster technologies like the (SSD). The user may experience cheaper storage but slower transfer speeds and could also fall victim to malfunctions and data loss as the device ages. The SSD is an appropriate go to but has a noticeably higher price point, however, this price is justifiable based on the transfer speeds and compact nature of the product. The cloud storage like GD is also a worthy contender as it boasts large storage amounts and lacks mechanical components on the user's side, although the price point for repeated transactions and lack of offline access when permanent data solutions are available is a downside.

Q6:

(Q7): By pressing ctrl+shift+esc I can quickly access the task manager and see the performance of my pc under various stresses. Now the most demanding constraint on my RAM is the amount of Chrome tabs that are open. My CPU is a performance one and wont really experience any load unless a video game or a million programs are open. You can stop a program or process that is unresponsive by clicking the item in the list and pressing the end task button.

Part 2:

No technical issues thus far however I will need to practise the mathematical side of the unit conversions and incorporate new learning strategies as I get more exposure to complex methods. Here is what I am currently working with in terms of my PC's specifications:

Processor	
Processor	Intel(R) Core(TM) i3-10105F CPU @ 3.70GHz
Number of Cores	8
Speed	4.3 GHz
Stepping	3
Family	06
Model	A5
CPU ID	BFEBFBFF000A0653

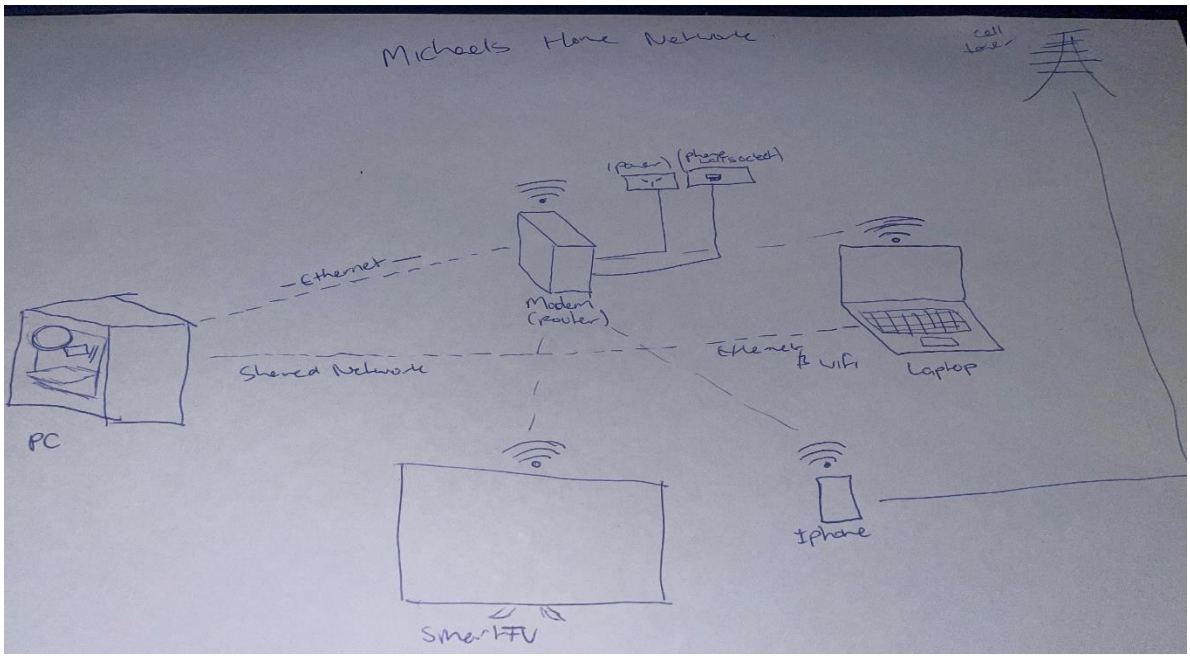
Memory	
RAM	16 GB

Video Card	
Video Card	AMD Radeon R9 200 Series
Chipset	AMD Radeon R9 200 Series
Manufacturer	ATI
Hardware T&L	Yes
Total Menmory	11 GB
Dedicated Memory	4.0 GB

Week 02:

Q1: My home internet is a Telstra Smart modem, which achieves connection via NBN or (Hybrid Fibre Coaxial) My PC connects to the router via Ethernet Cable and my laptop and phone connect via Wi-Fi.

Q2:



Q3: Using ipconfig in the command prompt I identified the following:

- My Ipv4: 192.168.0.238
- My MAC/Eth address: D8-BB-C1-51-20-8F.

The addresses listed on my other computer are similar but hold different values.

Q4: By Pinging my other PC (2001:8003:6438:dc00:15c5:2850:f63f:fca4) There was 4 packets sent with 0% loss.

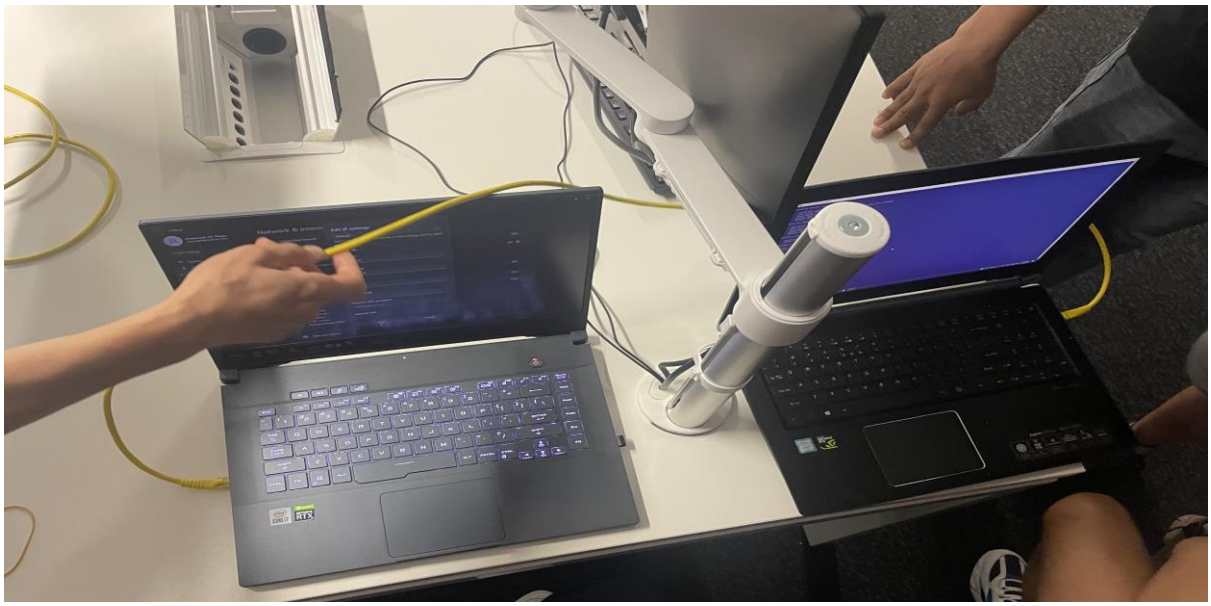
Q5: Upon running an internet speed test my download speed was 52.1 mb/s and my upload was 18.7mb/s. The university's speed earlier was around triple my value. This is because my internet is not very cheap, and I chose to have it capped at 50 mb/s.

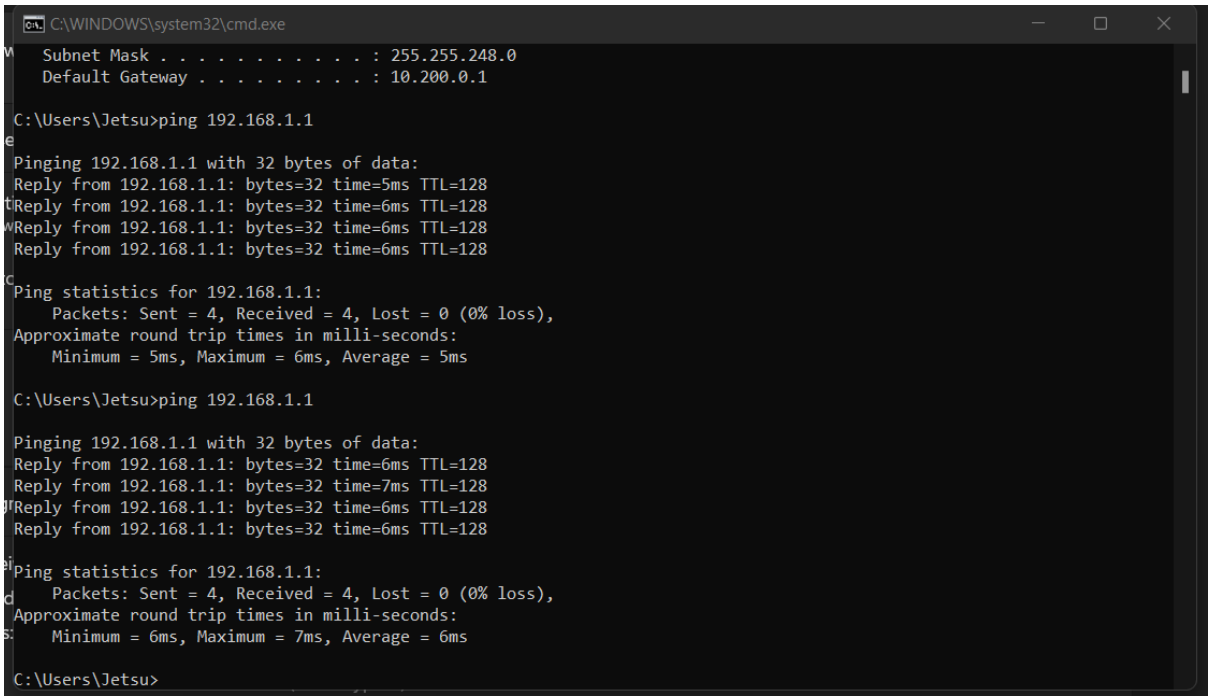
Part 2:

The only technical issue I experienced was when trying to set up remote desktop on my home laptop to control from my pc. The reason for this was Windows does not support RD in Home edition, the remedy for this was acquiring and upgrading to a professional copy of windows; however, I could've used a program such as Team Viewer.

Week 03

Lab exercise report: To Build a Simple Network with Two Computers





- Table the MAC and IP addresses details of the two computers

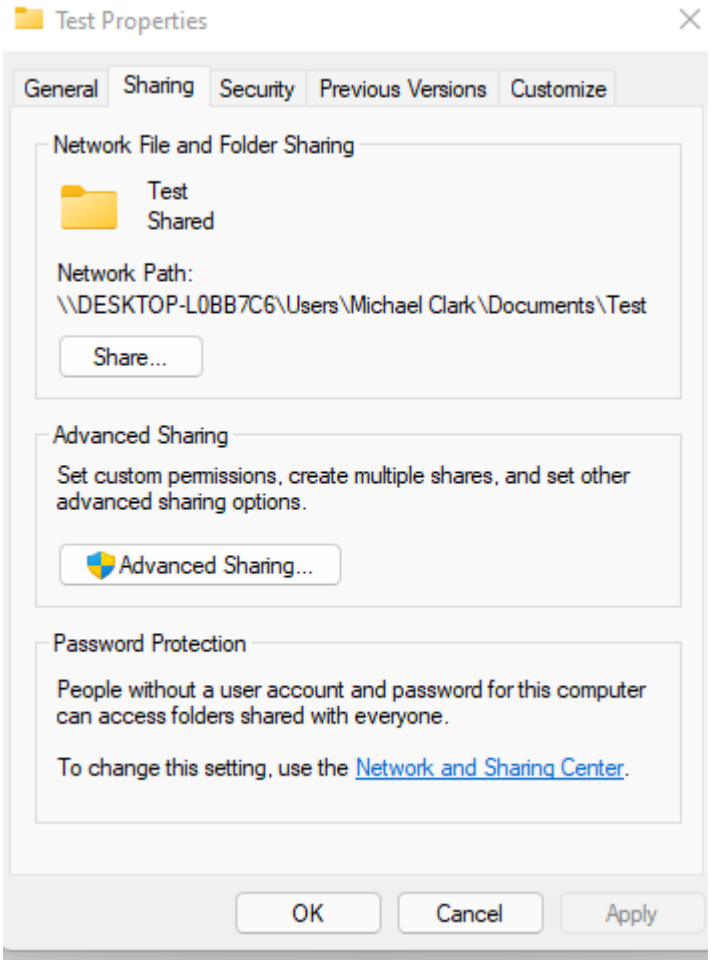
(table will be my home pc and laptop as I did not grab other details

Computer	MAC	IPv4
PC	D8-BB-C1-51-20-8F	192.168.0.120
Laptop	D8-F3-BC-76-93-BF	192.168.0.1

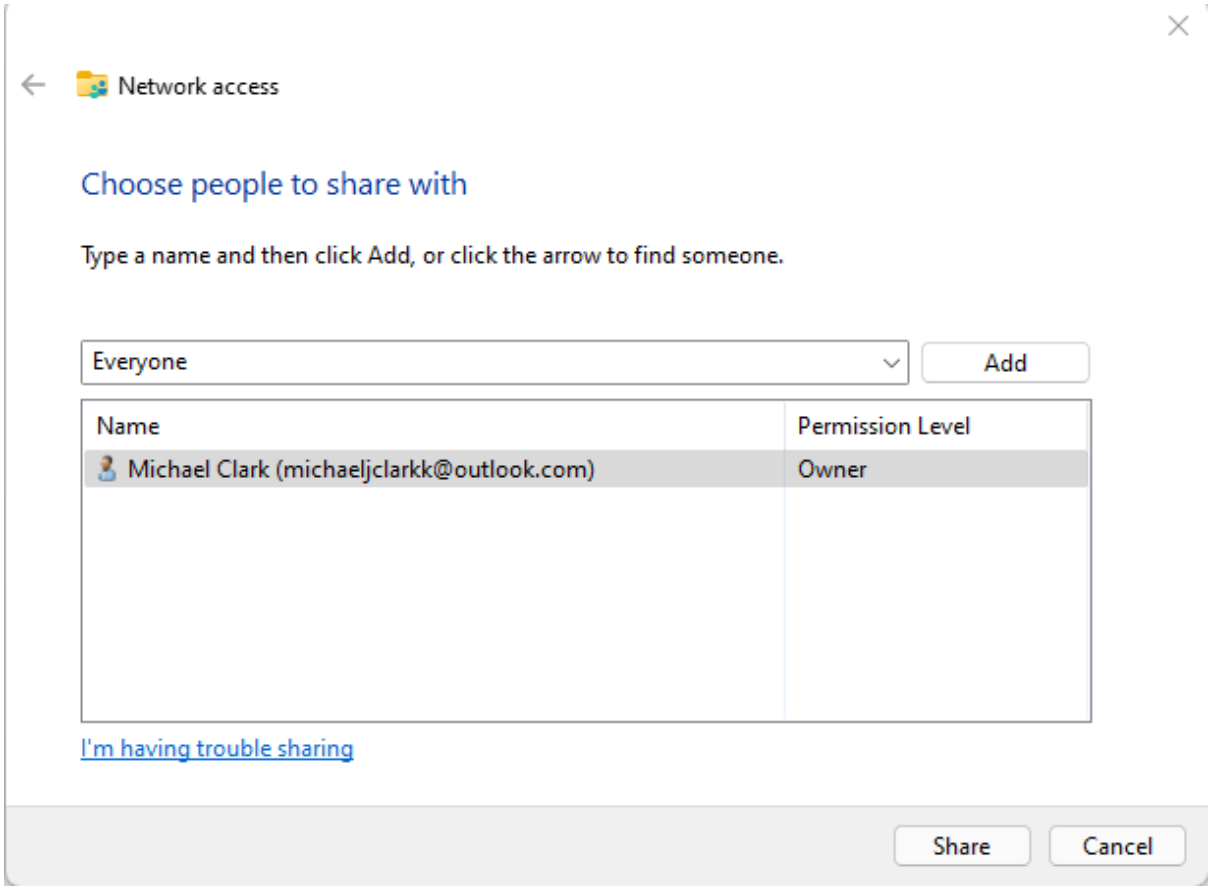
Record the steps of creating a file sharing service on the built network.

1. Right click on folder you wish to share:

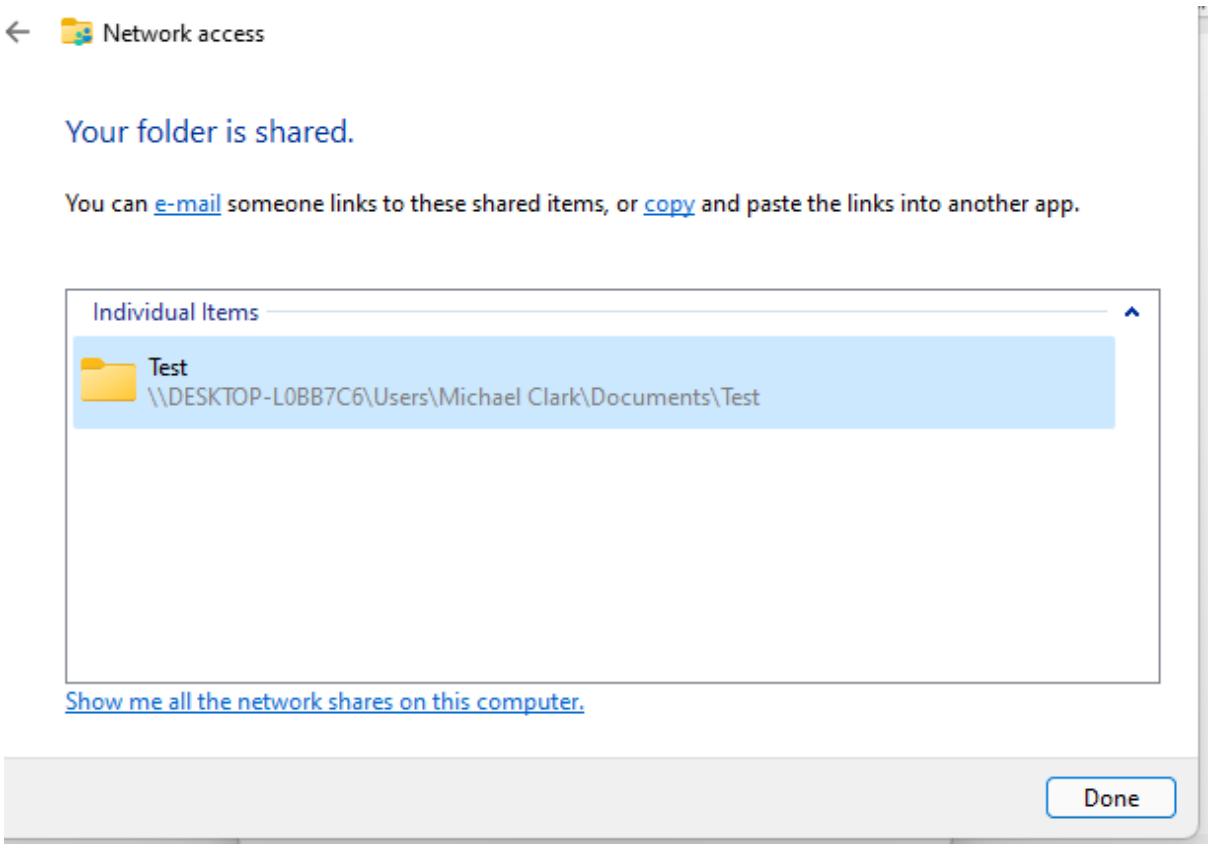
2. Select properties:



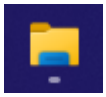
3. Select Share…:



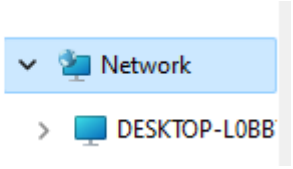
4. Click on drop down bar and select everyone:
5. Select Share:



6. On the other networked computer open File explorer:



7. Make sure file sharing is turned on:
8. Select Network at the bottom left:



9. Select the PC that is established in the network containing the shared folder:
10. Follow the address to desired folder:

11. Open Shared folder:

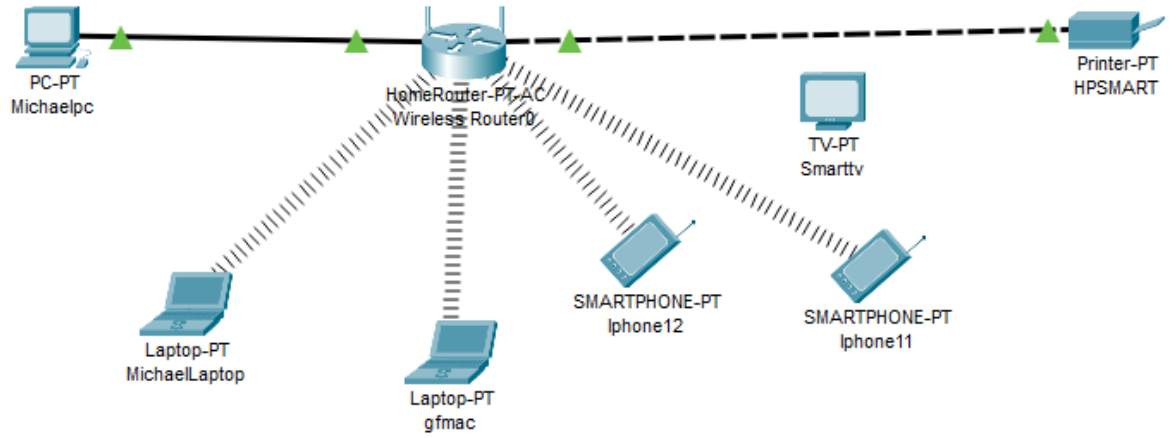
Part 2:

In summary thus far, I have learned new definitions and gained some fundamental knowledge of the concepts implemented in this in this portfolio; this includes mapping out my home network and various commands from LAN and Wifi to reach and share data between multiple computers. I have also learned how to Investigate the costs of items for data storage.

Week 04

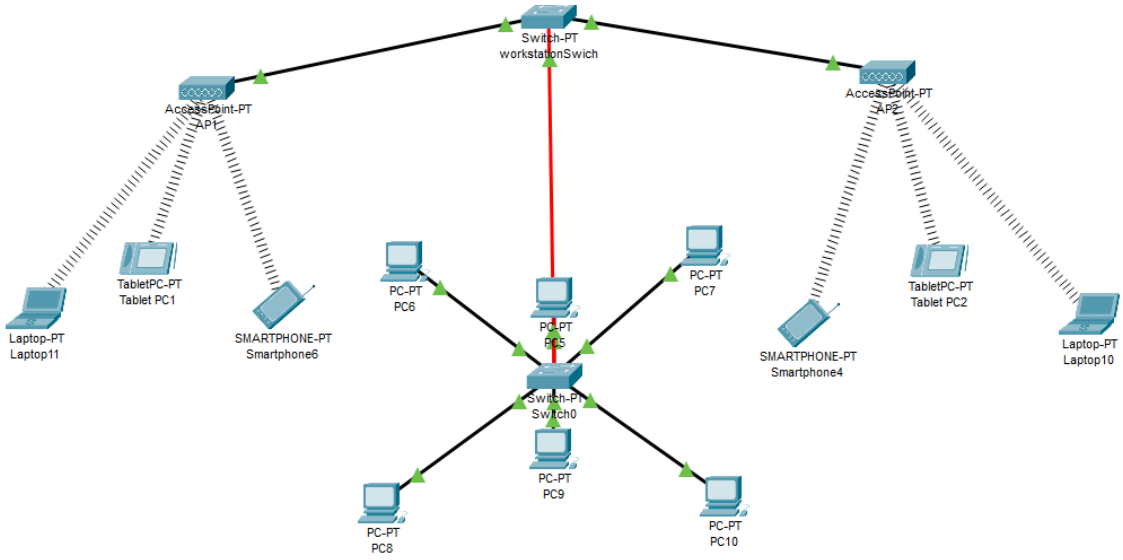
Part 1:

Q1:



- In my Cisco Diagram I used logical and Physical Star topology to outline my home network setup with devices such as my PC and Printer achieving data transfer via Ethernet and my Laptops and phones achieving through Wi-Fi.
- The differences between Physical and Logical topologies are Physical Topologies demonstrate the arrangement of cables that make up the devices in the network, whereas Logical Topologies describe the method of which data exchanges occur within the network devices.

Q2:



The advantages of Star topology are its Centralized nature, its reliability, extendibility, and its manageability as well as its user friendliness. Some disadvantages include its high price point and maintenance and up-keep as well as immobility. Also noted that its Wireless components can prove slower transfer speeds.

Q3:

The supported standards of the FS S3900-24T4S are:

- 128Gbps/176Gbps switching capacity
- IEEE 802.1D, IEEE 802.1w,

Its number of ports are:

- 24 1G downlink ports and 4 10G uplinks.

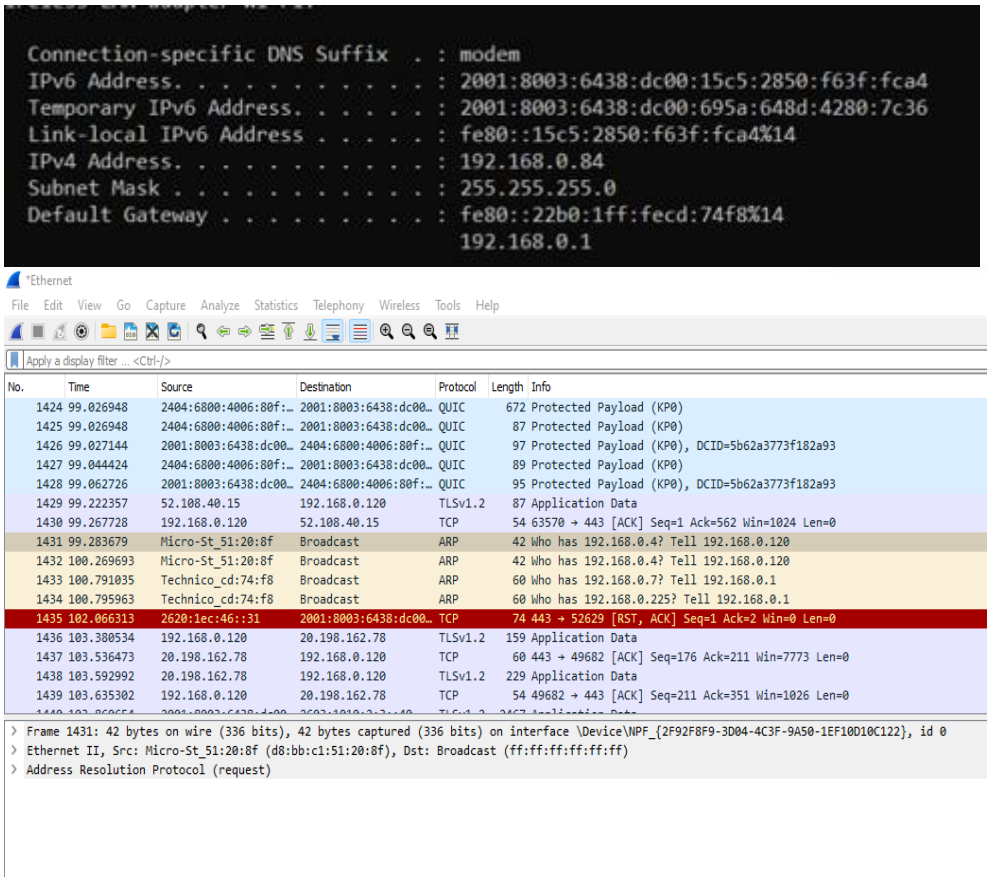
The supported standards of the TL-SF1005D are:

- IEEE 802.3, IEEE 802.3u, IEEE 802.3x, IEEE 802.1s,
- BPDU Guard/filtering/transparent
- Root Guard
- Loopback Detection

Its number of ports are:

- 5 port 10/100mb.

Q4:



Ethernet II, Src: Micro-St_51:20:8f (d8:bb:c1:51:20:8f), Dst: Broadcast (ff:ff:ff:ff:ff:ff)

```
ff ff ff ff ff ff d8 bb  c1 51 20 8f 08 06 00 01    ........ ·Q ···
```

This frame has a length pf 42 Bytes:

```
Frame Length: 42 bytes (336 bits)
0000  ff ff ff ff ff ff d8 bb  c1 51 20 8f 08 06 00 01
0010  08 00 06 04 00 01 d8 bb  c1 51 20 8f c0 a8 00 78
0020  00 00 00 00 00 00 c0 a8  00 04
```

The data in an ICMP message consists of:
Address, IG bit, Hardware type, Protocol type, Hardware size, Protocol size, OP Code, Sender MAC address, Target MAC address, Target IP Address.

Part 2:

For a brief reflection of this week, I implemented network topologies to represent my current home network as well as designing a Star topology for a hypothetical office scenario. I also described the difference between logical and physical topologies and outlined some advantages and disadvantages of Star topology implementation. From there I captured packets using Wireshark and outlined the frame and IMCP continents. There were no technical issues in this week's ongoings.

Week 05

Q1: *Find made CAT5e/CAT6 cables for sale online, check the prices.*
The cheapest CAT5e Pre made cables can be acquired at Inkstation for $2.98, that is for half a meter, meter prices cost ~$5.00. For CAT6 the cheapest I can find per m for premade is at Officeworks, which will set you back $6.98 per meter.

Select different cables (UTP/STP), RJ45 connectors and needed tools in an online store if you want to make a CAT5e/CAT6 by yourself. Will need the Cable, I have selected UTP, RJ45 connectors suit CAT6E and the cable crimpers and strippers.

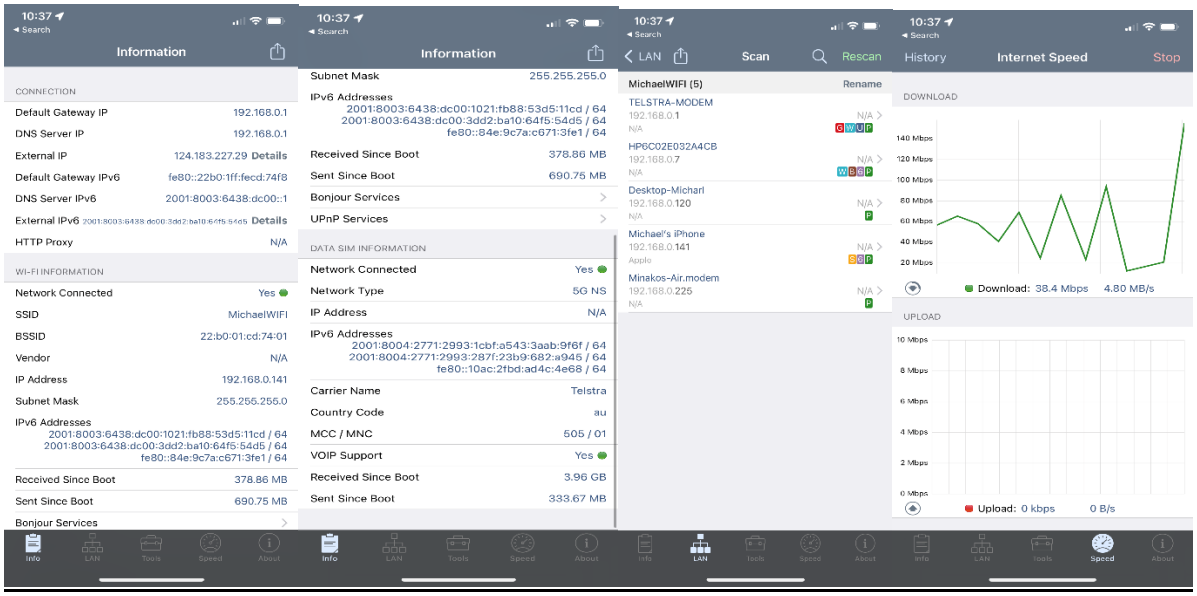
$1.98 p/m

$14.95 (10pk)

$22.95

$18.95

Q2:



- The SSID of my current network is called MichaelWiFi.
- iPhone Net analyser does not contain other AP's or signal strength but according to my settings I have 5 other connectable AP's and my signal strength is very good.
- The other information in the App shows my Default Gateway, DNS IP, my ipv4 and ipv6 as well as my SSID and Carrier details. This app can also do Graphed network speed tests.

Q3:


1


2

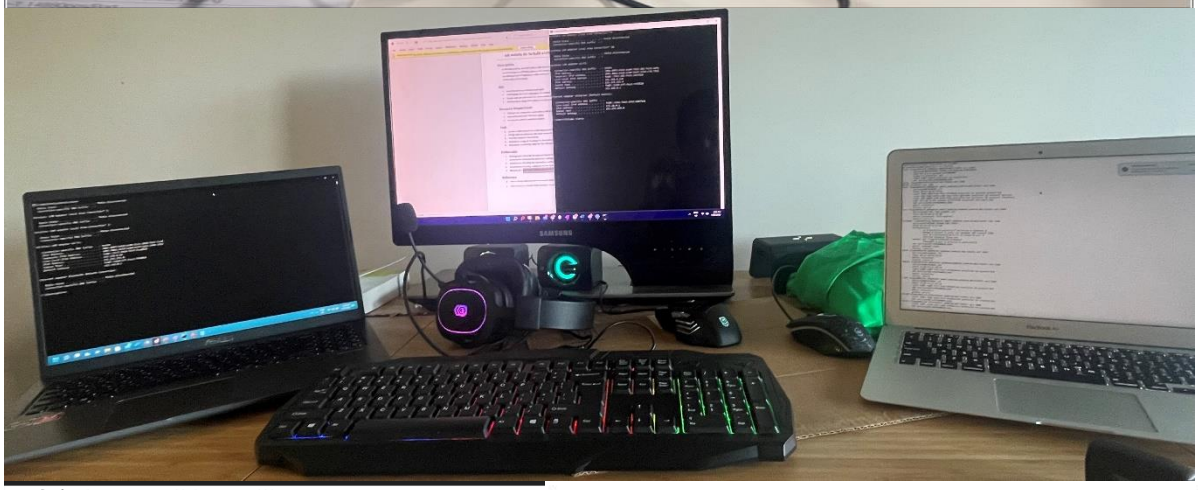

3

Name	Price	Specifications/Standards
(1) Netgear Nighthawk AX4/4-Stream AX3000	$399.00	3Gbps with 4-stream connectivity, IEEE 802.3, IEEE 802.3u, IEEE 802.3x, IEEE 802.1s,
(2) ASUS RT-AC68U	$189.00	1900Mbps, IEEE 802.1D, IEEE 802.1w
(3) SECURITY/NAT/VPN/U-LINK ROUTER	$2,995.52	100mbps 3g/4g (But it can survive extreme weather conditions)

Part 2:

In summary of week 5's activities I Learned how to create rj45 cat5e/cat6 ethernet cables and included the tools needed for such an activity, these include cable strippers and crimpers and connectors themselves. Later in the tutorial I purchased a WIFI Analyser application for my iPhone. This app allows me to analyse my local network connection, and gives me other information such as address details, signal strengths and other Access Points. The only technical difficulty of this week was the lack of support for proper analyser applications on iPhone's resulting in me having to purchase the application.

Week 6:



```
Last login: Sun May  1 16:29:34 on ttys000
minakolawrence@Minakos-Air ~ % ifconfig
lo0: flags=8049<UP,LOOPBACK,RUNNING,MULTICAST> mtu 16384
        options=1203<RXCSUM,TXCSUM,TXSTATUS,SW_TIMESTAMP>
        inet 127.0.0.1 netmask 0xff000000
        inet6 ::1 prefixlen 128
        inet6 fe80::1%lo0 prefixlen 64 scopeid 0x1
        nd6 options=201<PERFORMNUD,DAD>
gif0: flags=8010<POINTOPOINT,MULTICAST> mtu 1280
stf0: flags=0<> mtu 1280
en0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=400<CHANNEL_IO>
        ether e0:eb:40:eb:1d:42
        inet6 fe80::88d:fc84:f3bc:1faf%en0 prefixlen 64 secured scopeid 0x4
        inet6 2001:8003:6438:dc00:18ea:9f45:6a2:b3d6 prefixlen 64 autoconf secured
        inet6 2001:8003:6438:dc00:245b:ab14:3f75:654 prefixlen 64 autoconf temporary
        inet 192.168.0.225 netmask 0xffffff00 broadcast 192.168.0.255
        nd6 options=201<PERFORMNUD,DAD>
        media: autoselect
        status: active
en1: flags=8963<UP,BROADCAST,SMART,RUNNING,PROMISC,SIMPLEX,MULTICAST> mtu 1500
        options=460<TSO4,TSO6,CHANNEL_IO>
        ether 82:18:69:47:27:00
        media: autoselect <full-duplex>
        status: inactive
bridge0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=63<RXCSUM,TXCSUM,TSO4,TSO6>
        ether 82:18:69:47:27:00
        Configuration:
                id 0:0:0:0:0:0 priority 0 hellotime 0 fwddelay 0
                maxage 0 holdcnt 0 proto stp maxaddr 100 timeout 1200
                root id 0:0:0:0:0:0 priority 0 ifcost 0 port 0
                ipfilter disabled flags 0x0
        member: en1 flags=3<LEARNING,DISCOVER>
                ifmaxaddr 0 port 5 priority 0 path cost 0
        nd6 options=201<PERFORMNUD,DAD>
        media: <unknown type>
        status: inactive
p2p0: flags=8843<UP,BROADCAST,RUNNING,SIMPLEX,MULTICAST> mtu 2304
        options=400<CHANNEL_IO>
        ether 02:eb:40:eb:1d:42
        media: autoselect
        status: inactive
awdl0: flags=8943<UP,BROADCAST,RUNNING,PROMISC,SIMPLEX,MULTICAST> mtu 1484
        options=400<CHANNEL_IO>
        ether c2:8f:f1:a7:d9:10
        inet6 fe80::c08f:f1ff:fea7:d910%awdl0 prefixlen 64 scopeid 0x8
        nd6 options=201<PERFORMNUD,DAD>
        media: autoselect
        status: active
llw0: flags=8863<UP,BROADCAST,SMART,RUNNING,SIMPLEX,MULTICAST> mtu 1500
        options=400<CHANNEL_IO>
        ether c2:8f:f1:a7:d9:10
        inet6 fe80::c08f:f1ff:fea7:d910%llw0 prefixlen 64 scopeid 0x9
        nd6 options=201<PERFORMNUD,DAD>
        media: autoselect
        status: active
utun0: flags=8051<UP,POINTOPOINT,RUNNING,MULTICAST> mtu 1380
        inet6 fe80::7401:d453:6672:9d25%utun0 prefixlen 64 scopeid 0xa
        nd6 options=201<PERFORMNUD,DAD>
utun1: flags=8051<UP,POINTOPOINT,RUNNING,MULTICAST> mtu 2000
        inet6 fe80::2168:5dd1:ae0e:6f85%utun1 prefixlen 64 scopeid 0xb
        nd6 options=201<PERFORMNUD,DAD>
```

```
Connection-specific DNS Suffix  . : modem
IPv6 Address. . . . . . . . . . . : 2001:8003:6438:dc00:15c5:2850:f63f:fca4
Temporary IPv6 Address. . . . . . : 2001:8003:6438:dc00:3d37:fbed:3dbf:34ca
Link-local IPv6 Address . . . . . : fe80::15c5:2850:f63f:fca4%14
IPv4 Address. . . . . . . . . . . : 192.168.0.84
Subnet Mask . . . . . . . . . . . : 255.255.255.0
Default Gateway . . . . . . . . . : fe80::22b0:1ff:fecd:74f8%14
                                    192.168.0.1

Connection-specific DNS Suffix  . : modem
IPv6 Address. . . . . . . . . . . : 2001:8003:6438:dc00:7963:d85:fac6:2efb
Temporary IPv6 Address. . . . . . : 2001:8003:6438:dc00:91e9:33bb:c70:7945
Link-local IPv6 Address . . . . . : fe80::7963:d85:fac6:2efb%20
IPv4 Address. . . . . . . . . . . : 192.168.0.238
Subnet Mask . . . . . . . . . . . : 255.255.255.0
Default Gateway . . . . . . . . . : fe80::22b0:1ff:fecd:74f8%20
                                    192.168.0.1
```

cpe-124-183-227-29.q...	124.183.227.29	124.183.227.29	86	0	0%	86	Succeeded	2	64
LAPTOP-NE2AOQD4....	192.168.0.84	192.168.0.84	86	0	0%	86	Succeeded	6	128

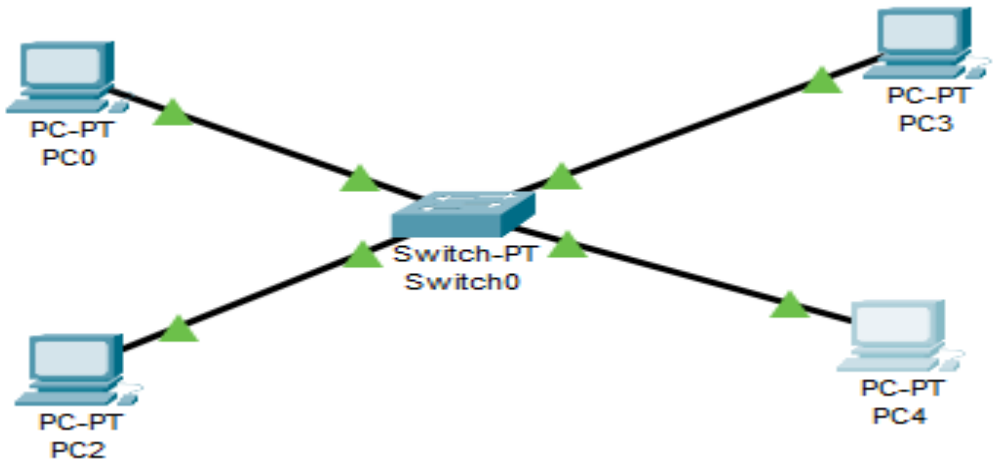
Properties

Host Name:	cpe-124-183-227-29.qb02.qld.asp.telst
IP Address:	124.183.227.29
Reply IP Address:	124.183.227.29
Succeed Count:	64
Failed Count:	0
Consecutive Failed Count:	
Max Consecutive Failed Count:	
Max Consecutive Failed Time:	
% Failed:	0%
Total Sent Pings:	64
Last Ping Status:	Succeeded
Last Ping Time:	2
Last Ping TTL:	64
Average Ping Time:	2
Description:	
Last Succeed On:	1/05/2022 4:49:35 PM
Last Failed On:	
Minimum Ping Time:	1
Maximum Ping Time:	5
Order:	1
Disabled:	No

Sent On	Reply IP Address	Ping Time	Ping TTL	Ping Status	Pings Count
1/05/2022 4:49:3...	124.183.227.29	2	64	Succeeded	1
1/05/2022 4:49:3...	124.183.227.29	1	64	Succeeded	1
1/05/2022 4:49:4...	124.183.227.29	1	64	Succeeded	1
1/05/2022 4:49:4...	124.183.227.29	3	64	Succeeded	1
1/05/2022 4:49:4...	124.183.227.29	2	64	Succeeded	1
1/05/2022 4:49:4...	124.183.227.29	1	64	Succeeded	1
1/05/2022 4:49:4...	124.183.227.29	2	64	Succeeded	1
1/05/2022 4:49:5...	124.183.227.29	2	64	Succeeded	1
1/05/2022 4:49:5...	124.183.227.29	2	64	Succeeded	1
1/05/2022 4:49:5...	124.183.227.29	2	64	Succeeded	1
1/05/2022 4:49:5...	124.183.227.29	2	64	Succeeded	1
1/05/2022 4:50:0...	124.183.227.29	1	64	Succeeded	1
1/05/2022 4:50:0...	124.183.227.29	2	64	Succeeded	1
1/05/2022 4:50:0...	124.183.227.29	2	64	Succeeded	1
1/05/2022 4:50:0...	124.183.227.29	2	64	Succeeded	1
1/05/2022 4:50:0...	124.183.227.29	2	64	Succeeded	1
1/05/2022 4:50:1...	124.183.227.29	1	64	Succeeded	1
1/05/2022 4:50:1...	124.183.227.29	2	64	Succeeded	1
1/05/2022 4:50:1...	124.183.227.29	1	64	Succeeded	1
1/05/2022 4:50:1...	124.183.227.29	1	64	Succeeded	1
1/05/2022 4:50:1...	124.183.227.29	1	64	Succeeded	1
1/05/2022 4:50:2...	124.183.227.29	1	64	Succeeded	1
1/05/2022 4:50:2...	124.183.227.29	2	64	Succeeded	1

```
C:\Users\micha>ping 124.183.227.29

Pinging 124.183.227.29 with 32 bytes of data:
Reply from 124.183.227.29: bytes=32 time=2ms TTL=64
Reply from 124.183.227.29: bytes=32 time=3ms TTL=64
Reply from 124.183.227.29: bytes=32 time=2ms TTL=64
Reply from 124.183.227.29: bytes=32 time=2ms TTL=64

Ping statistics for 124.183.227.29:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 3ms, Average = 2ms

C:\Users\micha>ping 192.168.0.238

Pinging 192.168.0.238 with 32 bytes of data:
Reply from 192.168.0.238: bytes=32 time=8ms TTL=128
Reply from 192.168.0.238: bytes=32 time=3ms TTL=128
Reply from 192.168.0.238: bytes=32 time=3ms TTL=128
Reply from 192.168.0.238: bytes=32 time=3ms TTL=128

Ping statistics for 192.168.0.238:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 3ms, Maximum = 8ms, Average = 4ms
```

```
minakolawrence — -zsh — 1
Last login: Sun May  1 16:30:31 on ttys000
minakolawrence@Minakos-Air ~ % ping 192.168.0.84
PING 192.168.0.84 (192.168.0.84): 56 data bytes
64 bytes from 192.168.0.84: icmp_seq=0 ttl=128 time=3.769 ms
64 bytes from 192.168.0.84: icmp_seq=1 ttl=128 time=5.089 ms
64 bytes from 192.168.0.84: icmp_seq=2 ttl=128 time=5.625 ms
64 bytes from 192.168.0.84: icmp_seq=3 ttl=128 time=7.986 ms
64 bytes from 192.168.0.84: icmp_seq=4 ttl=128 time=4.671 ms
64 bytes from 192.168.0.84: icmp_seq=5 ttl=128 time=4.288 ms
64 bytes from 192.168.0.84: icmp_seq=6 ttl=128 time=4.922 ms
64 bytes from 192.168.0.84: icmp_seq=7 ttl=128 time=4.841 ms
64 bytes from 192.168.0.84: icmp_seq=8 ttl=128 time=4.273 ms
^C
--- 192.168.0.84 ping statistics ---
9 packets transmitted, 9 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 3.769/5.052/7.986/1.154 ms
minakolawrence@Minakos-Air ~ % ping 192.168.0.238
PING 192.168.0.238 (192.168.0.238): 56 data bytes
64 bytes from 192.168.0.238: icmp_seq=0 ttl=128 time=6.082 ms
64 bytes from 192.168.0.238: icmp_seq=1 ttl=128 time=5.372 ms
64 bytes from 192.168.0.238: icmp_seq=2 ttl=128 time=5.644 ms
64 bytes from 192.168.0.238: icmp_seq=3 ttl=128 time=4.368 ms
64 bytes from 192.168.0.238: icmp_seq=4 ttl=128 time=3.316 ms
64 bytes from 192.168.0.238: icmp_seq=5 ttl=128 time=3.073 ms
64 bytes from 192.168.0.238: icmp_seq=6 ttl=128 time=3.378 ms
64 bytes from 192.168.0.238: icmp_seq=7 ttl=128 time=3.975 ms
^C
--- 192.168.0.238 ping statistics ---
8 packets transmitted, 8 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 3.073/4.401/6.082/1.089 ms
minakolawrence@Minakos-Air ~ %
```



Mac Address	Port Number
00:66:c6:b6:ed:73	P1
69:b1:97:a1:1e:63	P2
29:b3:53:fd:f4:9d	P3
80:a5:47:a5:82:0a	P4

Part 2:

Is I was not present for the lab exercise in week 6 I had to re-create the Exercise at home, This was not difficult as I had multiple devices available for the joint network, the only technical downside would have been the lack of a physical switch to gather the data in a proper switching table in the command prompt.

Week 7:

Q1:

- Ipconfig
- My ipv4 address: 10.200.0.130 Binary: 00001010.11001000.00000000.10000010
- My IP address belongs to class A. Private IPs as opposed to public are regarded as better mainly because of their boasted security aspects and the lack of visibility to the broader aspects of the internet.

Q2:

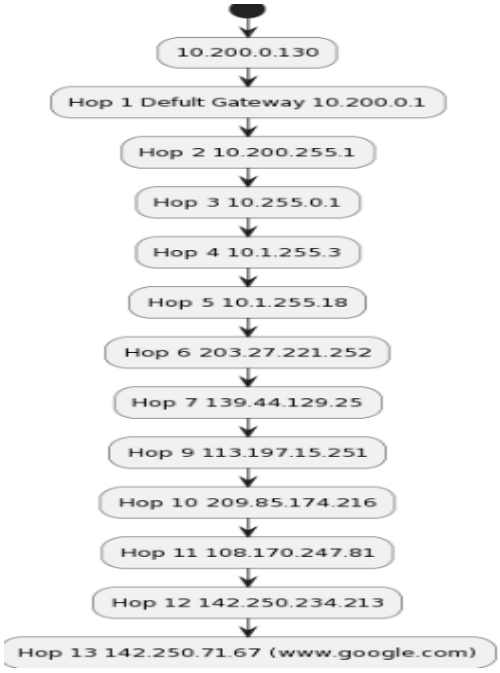
- `Subnet Mask . . . . . : 255.255.248.0`
- The 0's in my IPv4 Address represent the host's portion. In this instance The network ID is 10.200.0.0, and the host ID is 0.0.0.130.
- Subnetting is splitting a single network into multiple, some advantages include routing efficiency enhancement, security benefits and proper management

Q3:

- Use tracert (or a similar command, e.g., traceroute in macOS or trace path in Linux) to find the path from your computer to a web server, e.g., google.com. From the output:
- www.google.com server IP address: [142.250.71.68]
- The default gateway is 10.200.0.1

```
 1    13 ms     7 ms    27 ms  10.200.0.1
 2    25 ms     8 ms     9 ms  10.200.255.1
 3    21 ms   136 ms    16 ms  rock019-wan-sun100.cqu.edu.au [10.255.0.1]
 4    21 ms    77 ms   122 ms  core-rok19wan-p2p.cqu.edu.au [10.1.255.3]
 5    29 ms    13 ms    71 ms  10.1.255.18
 6    23 ms    51 ms    15 ms  rok019-border.cqu.edu.au [203.27.221.252]
 7    36 ms    89 ms   102 ms  xe-5-0-6-205.pe1.fvly.qld.aarnet.net.au [138.44.129.25]
 8    55 ms   114 ms    46 ms  et-0-3-0.pe1.mcqp.nsw.aarnet.net.au [113.197.15.6]
 9    42 ms    49 ms    91 ms  et-0-0-0.bdr1.mcqd.nsw.aarnet.net.au [113.197.15.251]
10   212 ms   113 ms    33 ms  209.85.174.216
11    43 ms   118 ms    58 ms  108.170.247.81
12   118 ms   104 ms   216 ms  142.250.234.213
13   106 ms    75 ms    93 ms  syd15s17-in-f4.1e100.net [142.250.71.68]
```

Draw a diagram to show the path.

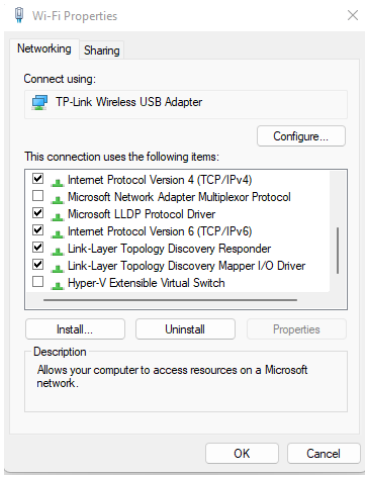


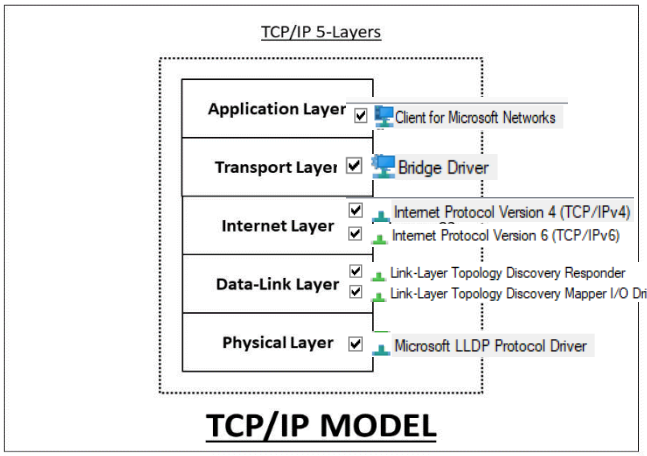
- Tracert also gives other information such as [-d] [-h maximum hops] [-j host-list] [-w timeout] [-R] [-S srcaddr] [-4] [-6] target name.

Q4: Ipv6:

- Ipv-4 is limited by its smaller address size, Ipv-4 does not have built in IP security, it is not as efficient in the managing of data packets. Ipv-6 has optimization to extend the lifetime of bandwidth and other services. Ipv-6 has also brought the simplification of network administration as well as its reliability is far higher than Ipv-4. Some disadvantages of Ipv-6 however include Its amount of incompatibility with devices still running Ipv-4, as well as investment costs as it is more expensive to make the switch.
- Coexistence of both Ipv4 and Ipv6's compatibility can be made via three methods, Dual stacking, as well as tunnelling either protocol through another or there is also the usage of NAP-PT (Network Address Translation-Protocol Translation (NAT-PT)) This is when a translation of Ipv-6 packets into Ipv-4 Packets takes place.

Q5:





Part 2:

To conclude this week's work; in summary I converted my Ip address to binary, I used the command 'tracert' to track the path from my pc to accessing google. From there I developed a UML Diagram to outline the path of the hops. I made definitive comparisons between Ipv4 and Ipv6 and discussed how they can co-exist. Wrapping this week up I Identified 5 Layers of Tcp/Ip within my Wifi Properties, // note I only had access to a wifi adaptor at home for my pc and due to time constraints, I missed documenting it in the tutorial.

Week 8:

Q1:

A switches ports are assigned via checking its memory for a dynamic table that stores physical (MAC) addresses and port numbers, from there the switch knows the pathway it shall forward frames.

MAC	Port #
00-14-22-01-23-45	2
00-04-DC-53-3D-4F	3
00-38-6B-00-28-0C	2
00-38-6B-00-28-0C	3

Q2:

"Network destination" determines the destination of the route, "Netmask Presents partitions the user's route into subnets. The "Gateway" is the hosts exit point for the route. The "Interface" is the point of which the route goes from the user's pc onto the network. The "Metric" is the assigned value for the specific interface.

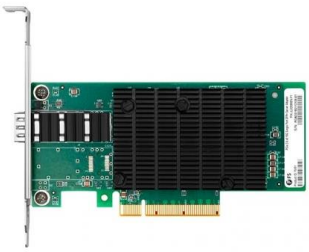
```
IPv4 Route Table
===========================================================================
Active Routes:
Network Destination        Netmask          Gateway       Interface  Metric
          0.0.0.0          0.0.0.0      192.168.0.1    192.168.0.238     35
        127.0.0.0        255.0.0.0         On-link         127.0.0.1    331
        127.0.0.1  255.255.255.255         On-link         127.0.0.1    331
  127.255.255.255  255.255.255.255         On-link         127.0.0.1    331
       172.28.0.0    255.255.240.0         On-link        172.28.0.1   5256
       172.28.0.1  255.255.255.255         On-link        172.28.0.1   5256
    172.28.15.255  255.255.255.255         On-link        172.28.0.1   5256
      192.168.0.0    255.255.255.0         On-link     192.168.0.238    291
    192.168.0.238  255.255.255.255         On-link     192.168.0.238    291
    192.168.0.255  255.255.255.255         On-link     192.168.0.238    291
        224.0.0.0        240.0.0.0         On-link         127.0.0.1    331
        224.0.0.0        240.0.0.0         On-link        172.28.0.1   5256
        224.0.0.0        240.0.0.0         On-link     192.168.0.238    291
  255.255.255.255  255.255.255.255         On-link         127.0.0.1    331
  255.255.255.255  255.255.255.255         On-link        172.28.0.1   5256
  255.255.255.255  255.255.255.255         On-link     192.168.0.238    291
===========================================================================
```

Q3:

Wireless settings that build an efficient coffee shop free Wifi (SSID BEST COFFEE_freeWifi):
Use Proxy service to block:

- Limit Data usage.
- Encrypt the wifi with WPA2 or newer to ensure password protection at the highest level.
- Only allow users access via Email verification/upon connection route users browser to email signup.
- Incorporation of a physical Directional/Omni Directional Antenna. To limit strong signal to inside the building.
- Mac Filter (Inapplicable).
- Firewall Dos protection.

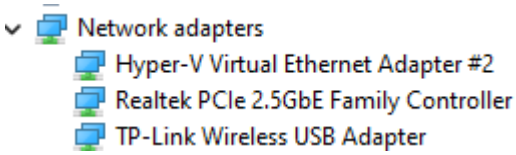
Q4:

NIC	**BUS Size**	**Transfer Rate**	**Common Use**
 Intel 82599EN $266.20	PCIe3.0	10GB/s	Office work/ Gaming/ HD video Streaming/ Downloading/Small Network Management
 NVIDIA Mellanox MCX623106AN $1,665.40	PCIe4.0	100GB/s	Extreme/Data Transfers/Ultra HD Video Streaming/Ultra RDP/Cloud Gaming/Multiple Large Downloads/Network Virtualization.
 Kogan unbranded $17.00	PCIe1.0	100mb/s	Light Gaming/ Medium Quality Streaming/Small Downloads/ Light Office use/ Cheap Option

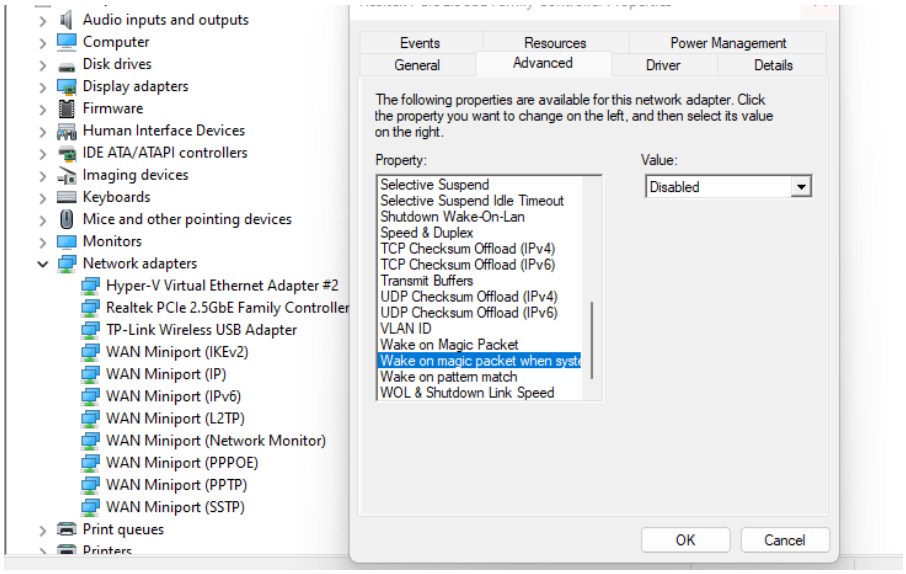
Shared Adaptor/ System memory: Drivers like the Miniport can be utilized to allocate shared memory usage for the Network Interface Card. If the model has an optional *On-board Co-Processor,* It can help share the load of networking functions, This helps free up your PC's CPU so it can return to its normal usages.

Remotely power on PC by accessing its NIC.

1. First ensure prior access to computer connected by ethernet.
2. Then use the search function to open device management.
3. Scroll down to "Network adaptors."
4. Find your NIC:



5. Right click and select "Properties" -> "Advanced" -> "Wake up with Magic Packet."



If using WIFI Adaptor:

←

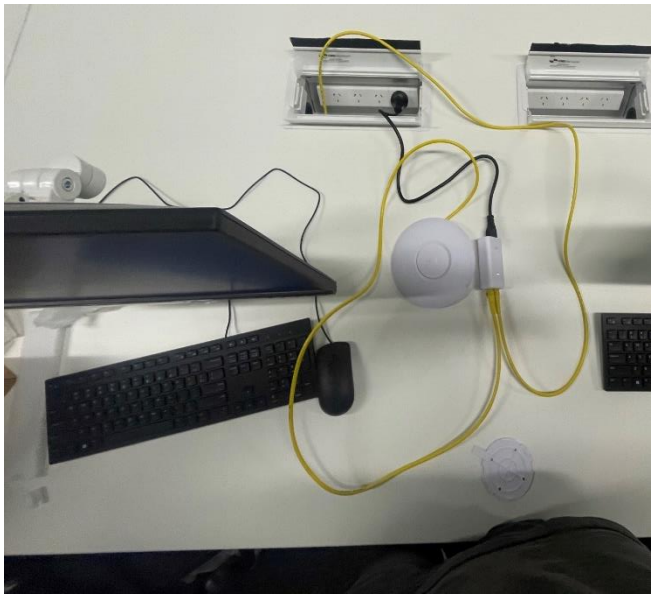
6. Note you may need to have certain bios settings enabled; However, with the above done you should be able to send magic packets to WOL enabled computers to wake/power them on via NIC. This can be done via CMD, or a WOL enabled application such as TeamViewer. If doing it through CMD this will work similar to a ping command if computer details are known. For example
7. Enter “wolcmd *MAC address* *Ip address* *Subnet mask* * Port #*
   Example = "wolcmd 0066c6b6ed73 192.168.0.1 255.255.255.0 1."
8. Press enter and this should power/wake your pc on the network.

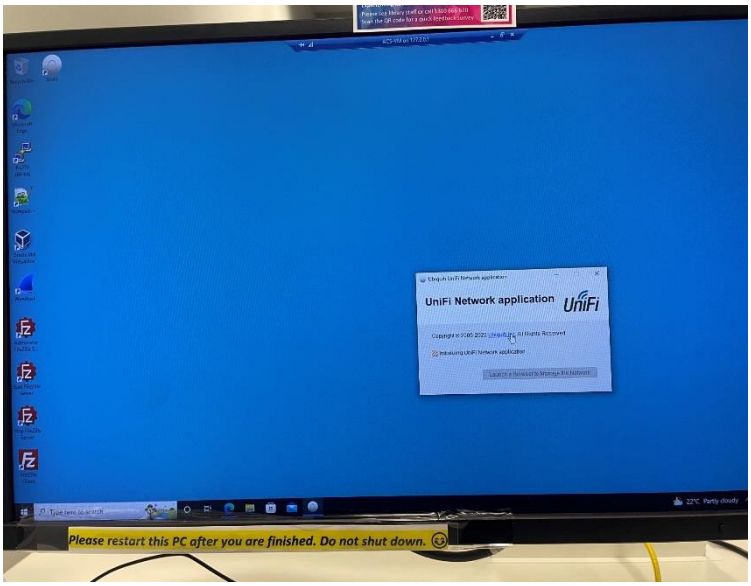
Part 2:

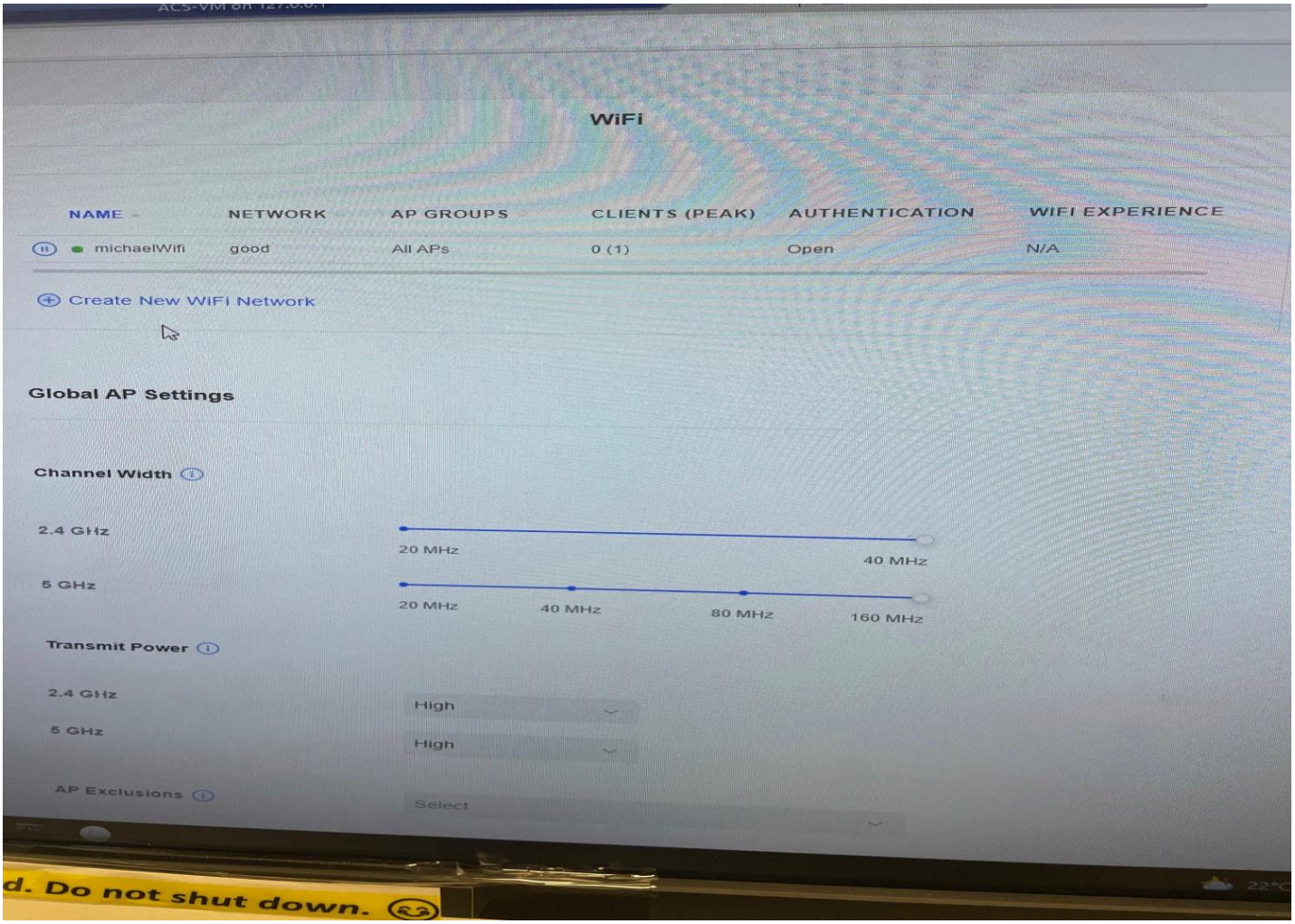
Week 8 began with a Switch table questionnaire, what followed was a break down of the “route print’’ command. From there we examined a hypothetical situation for a coffee shop free wifi and incorporated ideas of how to create a secure wifi network. Question 4 had me making a comparison between 3 NIC’s based on BUS size, Transfer speeds etc. I then delved into advanced aspects of NIC cards and features for sharing/allocating memory. Week 8 Concluded with demonstrating wake on Lan (Wol) capabilities to allow the user to send “Magic packets” and wake/power on networked machines.

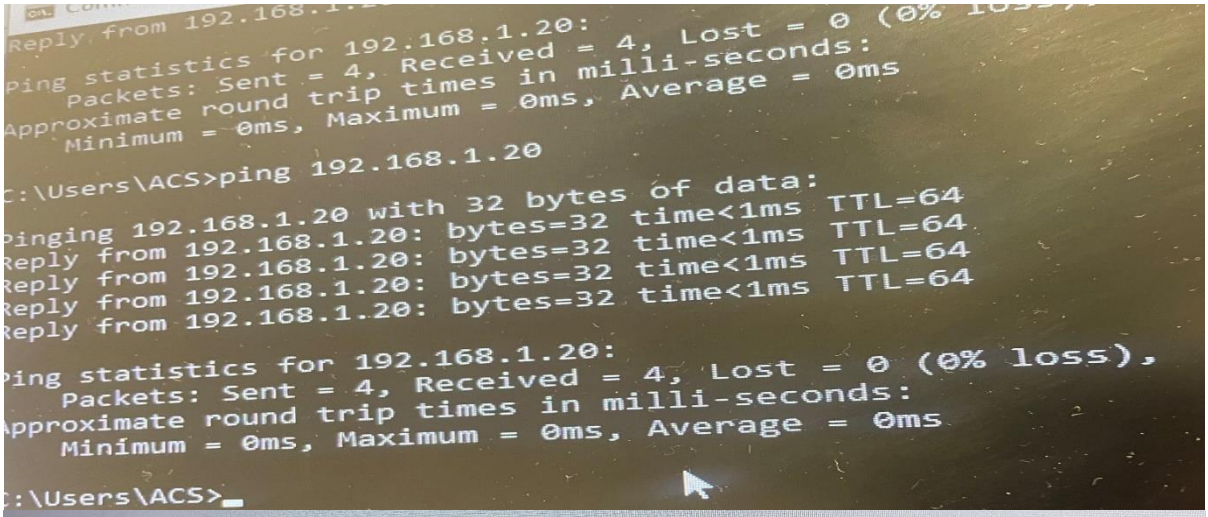
Week 9:

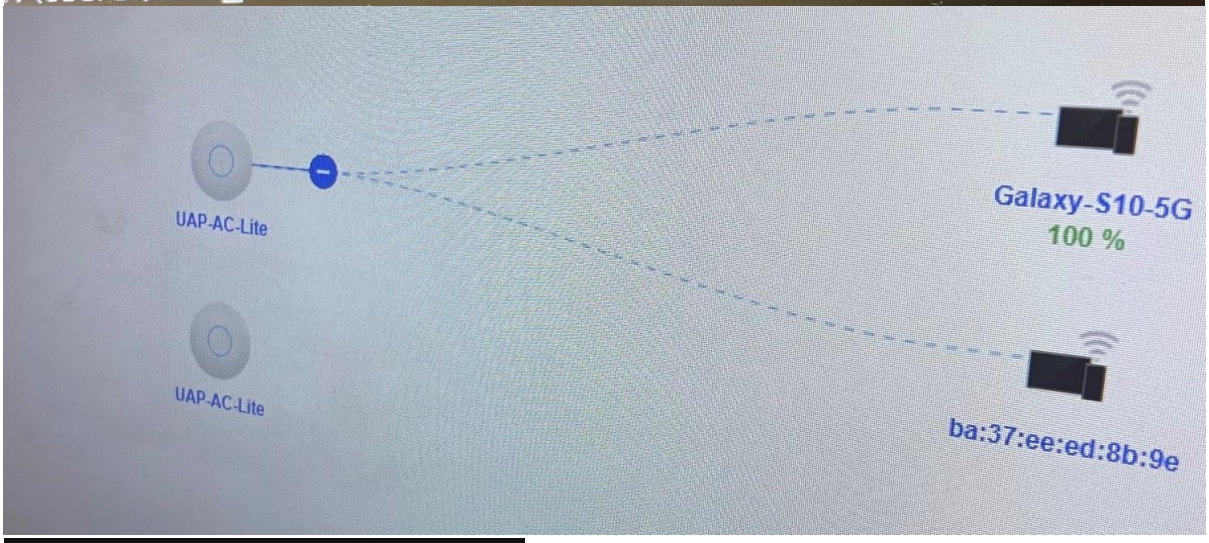
Based on The “deliverable” aspect of the week 9 tutorial:

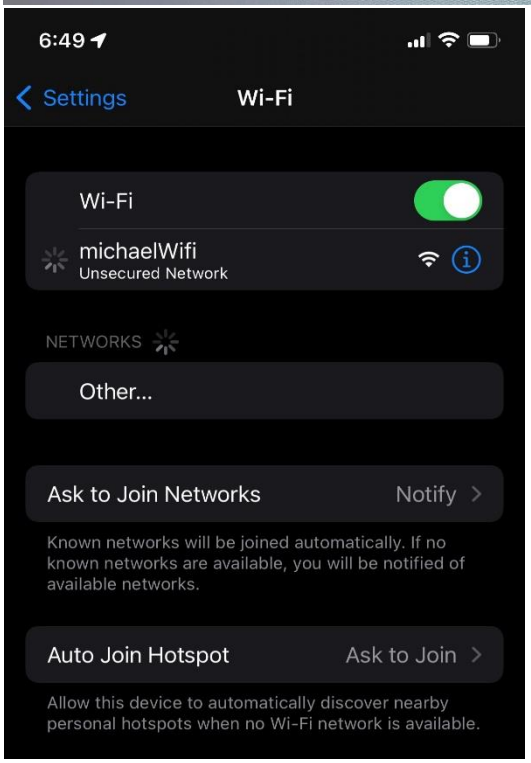







Reply from 192.168.1.20:
Ping statistics for 192.168.1.20:
Packets: Sent = 4, Received = 4, Lost = 0 (0%
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\Users\ACS>ping 192.168.1.20
Pinging 192.168.1.20 with 32 bytes of data:
Reply from 192.168.1.20: bytes=32 time<1ms TTL=64
Reply from 192.168.1.20: bytes=32 time<1ms TTL=64
Reply from 192.168.1.20: bytes=32 time<1ms TTL=64
Reply from 192.168.1.20: bytes=32 time<1ms TTL=64
Ping statistics for 192.168.1.20:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\Users\ACS>


UAP-AC-Lite
UAP-AC-Lite
Galaxy-S10-5G
100 %
ba:37:ee:ed:8b:9e


6:49
Settings
Wi-Fi
Wi-Fi
michaelWifi
Unsecured Network
NETWORKS
Other...
Ask to Join Networks
Notify
Known networks will be joined automatically. If no known networks are available, you will be notified of available networks.
Auto Join Hotspot
Ask to Join
Allow this device to automatically discover nearby personal hotspots when no Wi-Fi network is available.

Part 2:

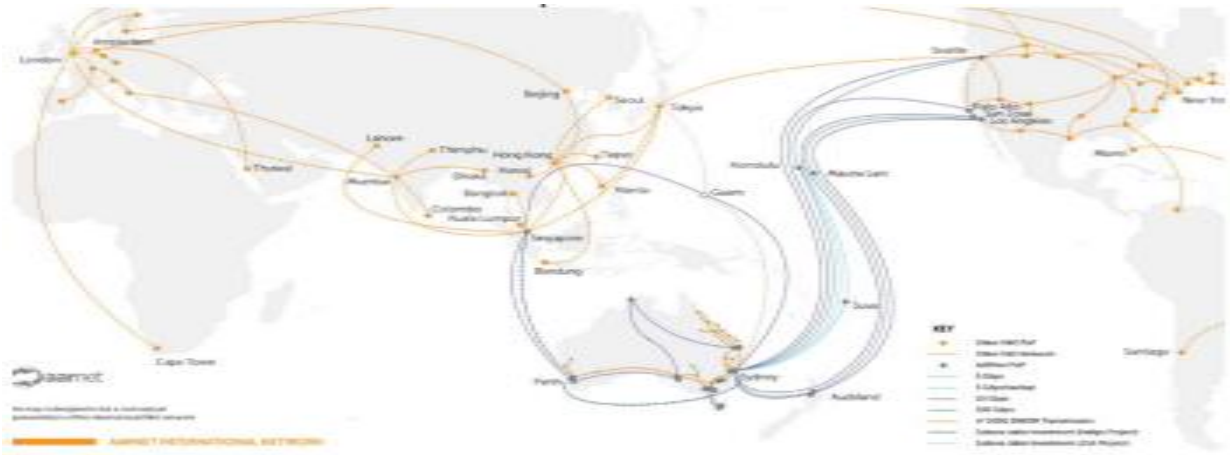
To summarize week 9's tutorial lesson we endeavored into the field of using a UnFi AP to create our own wireless network, I demonstrated my ability within the hardware installation process and implementation of a virtual Machine to bypass CQUniversity Administrator restrictions. The Access point and Wi-Fi network called "michaelWifi" Was able to be detected across devices locally and various settings and signal strength etc. can be seen above.

Week 10:

Q1:

- Support Fast Ethernet/Gigabit Ethernet/10GbE ports, OC3~OC48 POS/CPOS, and ATM ports.
- Provides up to 420 Mpps.
- 2 Tbps switching capacity.
- The router supports Ipv4 & Ipv6.
- Uses Layer 1, Layer 2 and Layer 3 VPN (MPLS) and ATM
- 17.17cm(w) x 18.9cm(d) x 8.66cm(h) in (43.6 x 48 x 22 cm) (5U height) 50.15 lb. (22.75 kg).

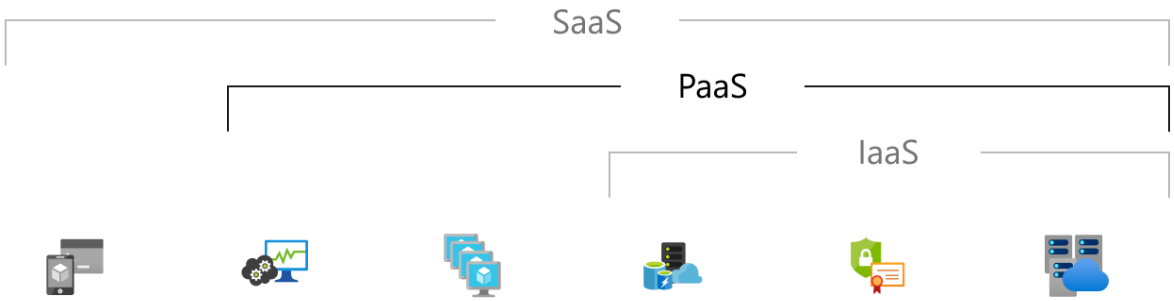
Q2:



- It uses Fiber Optic Cable
- It would take 80 seconds to transfer 100GB's of data from Darwin to Brisbane.
- 100Gbps from Sydney to Honolulu seizing at Seattle and it is not direct.

Q3.

- One drive, Drop Box, Google Drive, iCloud**,** Microsoft 365.
- Infrastructure IAAS: Like a naked computer (You can install your OS, then you can install any software.) PAAS Provide computer with preinstalled OS, Clients. SAAS Specific application run on the program.

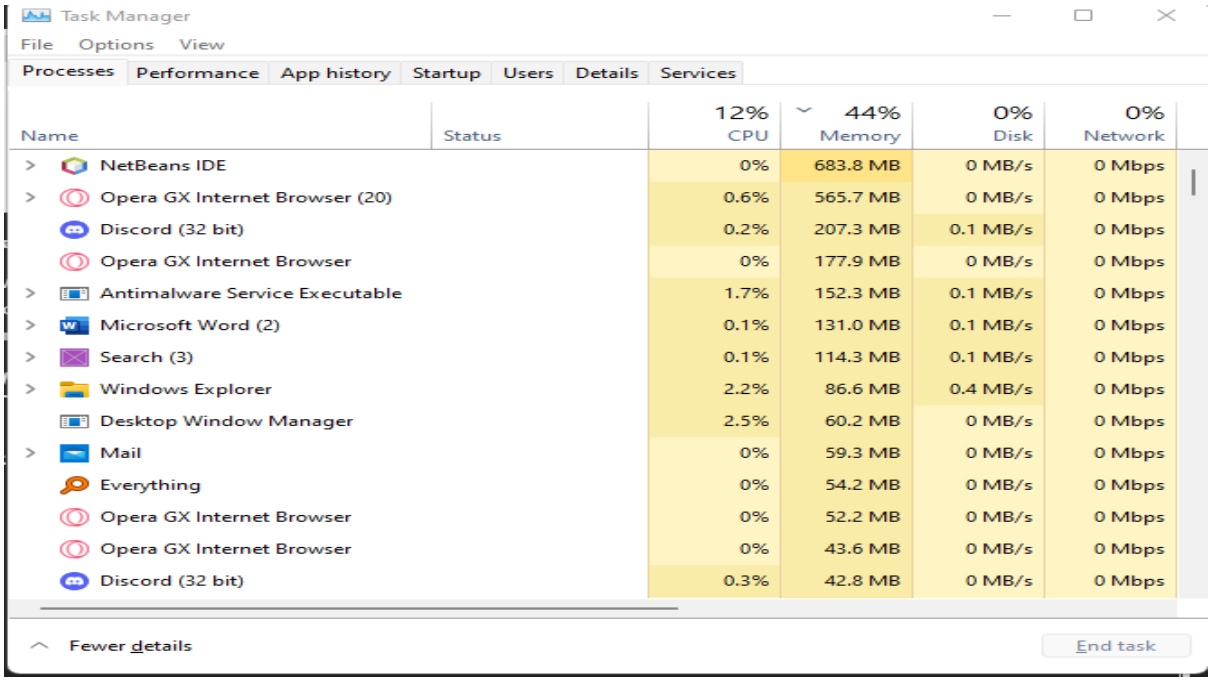


Part 2:

Week 10 was smaller than usual as we described various features of an Industrial level Router, Then we moved on to determine route efficiency from Australia to The East coast of America. We wrapped week 10 up by talking about SaaS, PaaS, and IaaS.

Week 11:

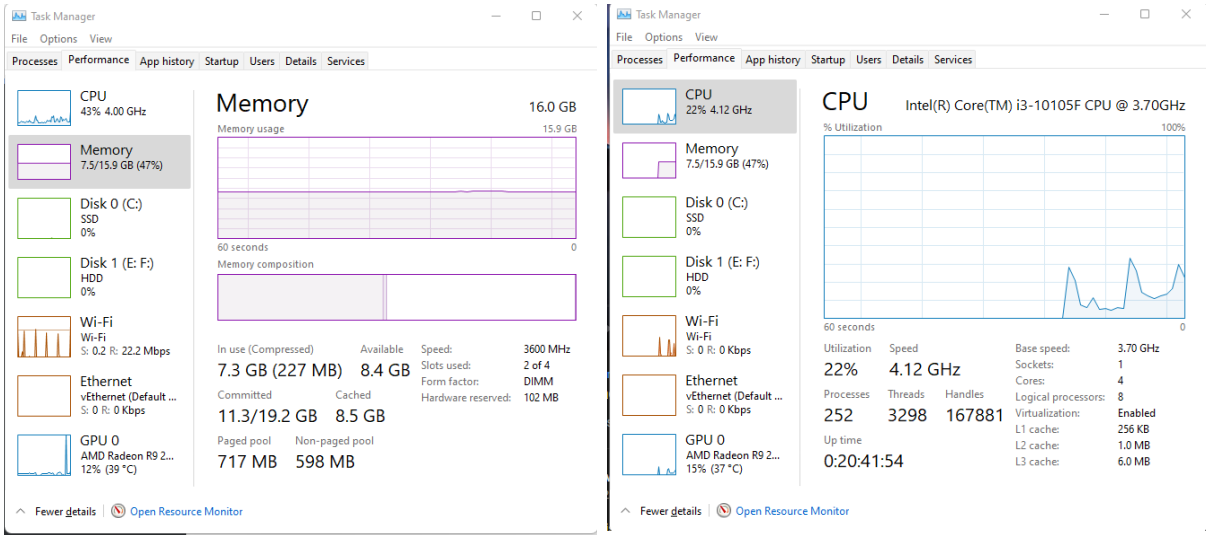
Q1:



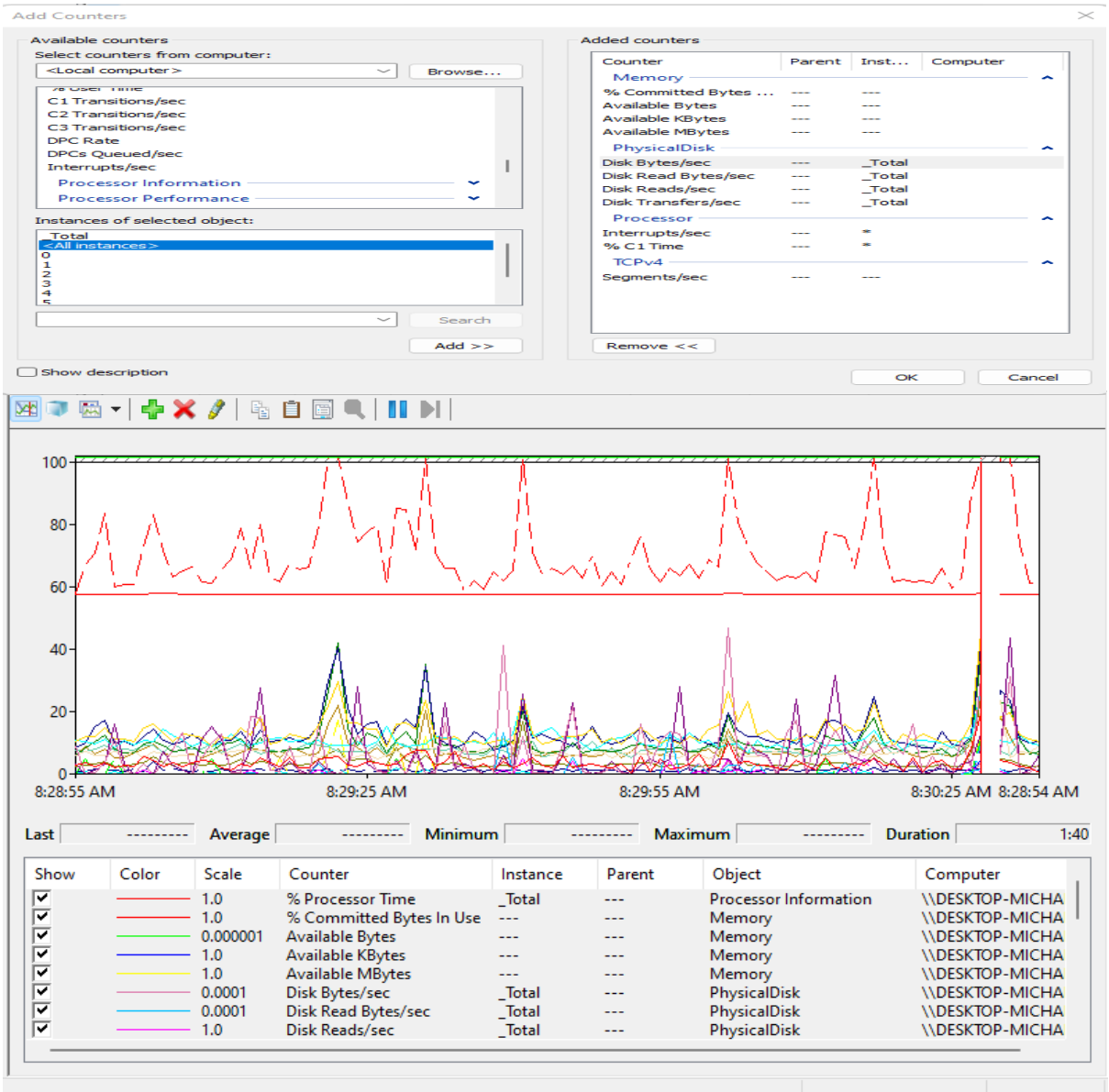
The processes consuming the most resources are my Java IDE “NetBeans,” which is using 683MB of ram out of 16GB and my current internet browser Opera GX which is using 565MB. My processor is a powerhouse, so it Is relatively unscathed on normal multitasking.

Q2.

Some observed changes when opening a video is my CPU usage % nearly doubles and its speed jumps well over its base clock. My Ram usage % has hardly changed however as Opera browser supports limiting the Ram usage and my limiter is set to 1GB ram.


Task Manager
File Options View
Processes Performance App history Startup Users Details Services
CPU
43% 4.00 GHz
Memory
7.5/15.9 GB (47%)
Disk 0 (C:)
SSD
0%
Disk 1 (E: F:)
HDD
0%
Wi-Fi
Wi-Fi
S: 0.2 R: 22.2 Mbps
Ethernet
vEthernet (Default ...
S: 0 R: 0 Kbps
GPU 0
AMD Radeon R9 2...
12% (39 °C)
Memory
16.0 GB
Memory usage
15.9 GB
60 seconds
0
Memory composition
In use (Compressed)
7.3 GB (227 MB)
Available
8.4 GB
Committed
11.3/19.2 GB
Cached
8.5 GB
Paged pool
717 MB
Non-paged pool
598 MB
Speed:
3600 MHz
Slots used:
2 of 4
Form factor:
DIMM
Hardware reserved:
102 MB
Fewer details
Open Resource Monitor
Task Manager
File Options View
Processes Performance App history Startup Users Details Services
CPU
22% 4.12 GHz
Memory
7.5/15.9 GB (47%)
Disk 0 (C:)
SSD
0%
Disk 1 (E: F:)
HDD
0%
Wi-Fi
Wi-Fi
S: 0 R: 0 Kbps
Ethernet
vEthernet (Default ...
S: 0 R: 0 Kbps
GPU 0
AMD Radeon R9 2...
15% (37 °C)
CPU
Intel(R) Core(TM) i3-10105F CPU @ 3.70GHz
% Utilization
100%
60 seconds
0
Utilization
22%
Speed
4.12 GHz
Processes
252
Threads
3298
Handles
167881
Up time
0:20:41:54
Base speed:
3.70 GHz
Sockets:
1
Cores:
4
Logical processors:
8
Virtualization:
Enabled
L1 cache:
256 KB
L2 cache:
1.0 MB
L3 cache:
6.0 MB
Fewer details
Open Resource Monitor

Q4.

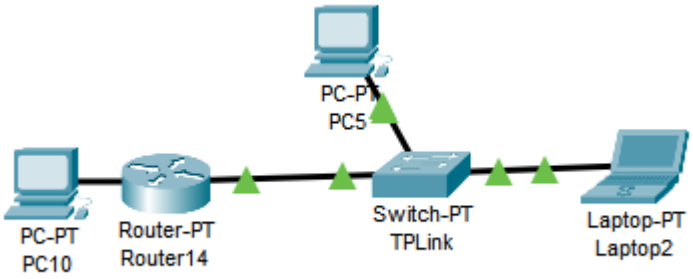

Add Counters
Available counters
Select counters from computer:
<Local computer>
Browse...
C1 Transitions/sec
C2 Transitions/sec
C3 Transitions/sec
DPC Rate
DPCs Queued/sec
Interrupts/sec
Processor Information
Processor Performance
Instances of selected object:
_Total
<All instances>
0
1
2
3
4
5
Search
Add >>
Show description
Added counters
Counter
Parent
Inst...
Computer
Memory
% Committed Bytes ...
Available Bytes
Available KBytes
Available MBytes
PhysicalDisk
Disk Bytes/sec
Disk Read Bytes/sec
Disk Reads/sec
Disk Transfers/sec
Processor
Interrupts/sec
% C1 Time
TCPv4
Segments/sec
Remove <<
OK
Cancel
100
80
60
40
20
0
8:28:55 AM
8:29:25 AM
8:29:55 AM
8:30:25 AM
8:28:54 AM
Last
Average
Minimum
Maximum
Duration
1:40
Show
Color
Scale
Counter
Instance
Parent
Object
Computer
1.0 % Processor Time _Total --- Processor Information \\DESKTOP-MICHA
1.0 % Committed Bytes In Use --- --- Memory \\DESKTOP-MICHA
0.000001 Available Bytes --- --- Memory \\DESKTOP-MICHA
1.0 Available KBytes --- --- Memory \\DESKTOP-MICHA
1.0 Available MBytes --- --- Memory \\DESKTOP-MICHA
0.0001 Disk Bytes/sec _Total --- PhysicalDisk \\DESKTOP-MICHA
0.0001 Disk Read Bytes/sec _Total --- PhysicalDisk \\DESKTOP-MICHA
1.0 Disk Reads/sec _Total --- PhysicalDisk \\DESKTOP-MICHA

Part 2:

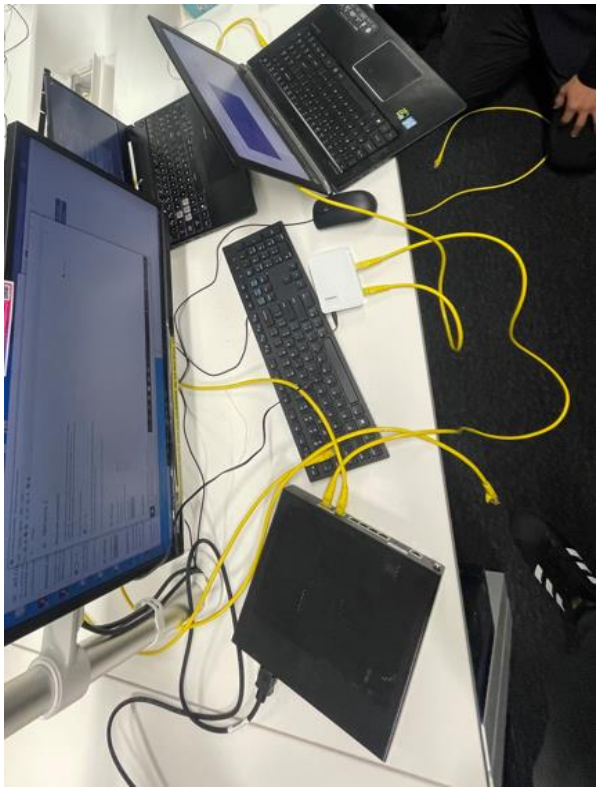
Week 11's lighter workload had me performing basic tasks in windows task manager and examining the processes causing the most load on my pc. From there I added some load to it by playing a YouTube video and observing the changes in the performance section of the task manager. I then added counters into windows performance monitor such as TCPv4, Disk Transfer, and processing schematics to track patterns and so on.

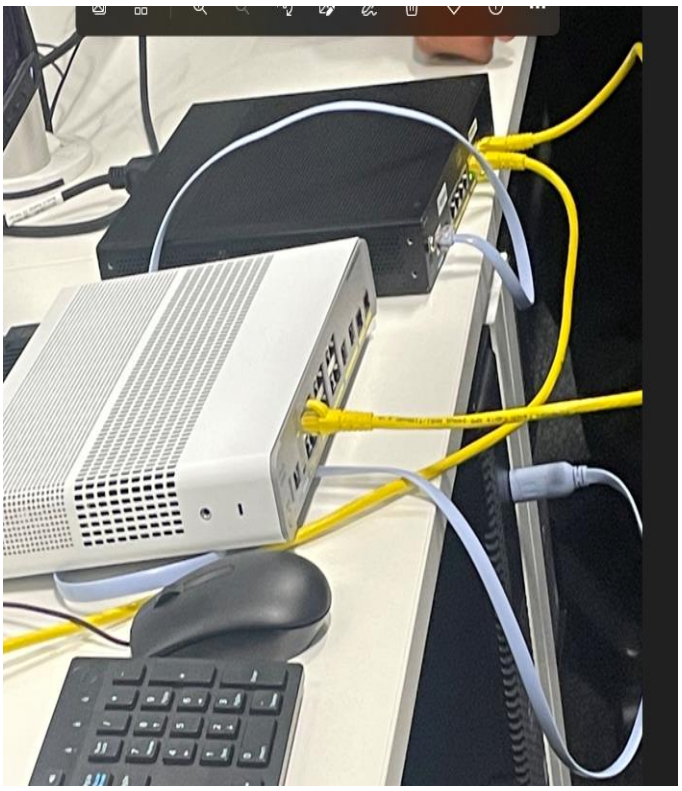
Week 12

- A diagram for the network design (drawing by hand)



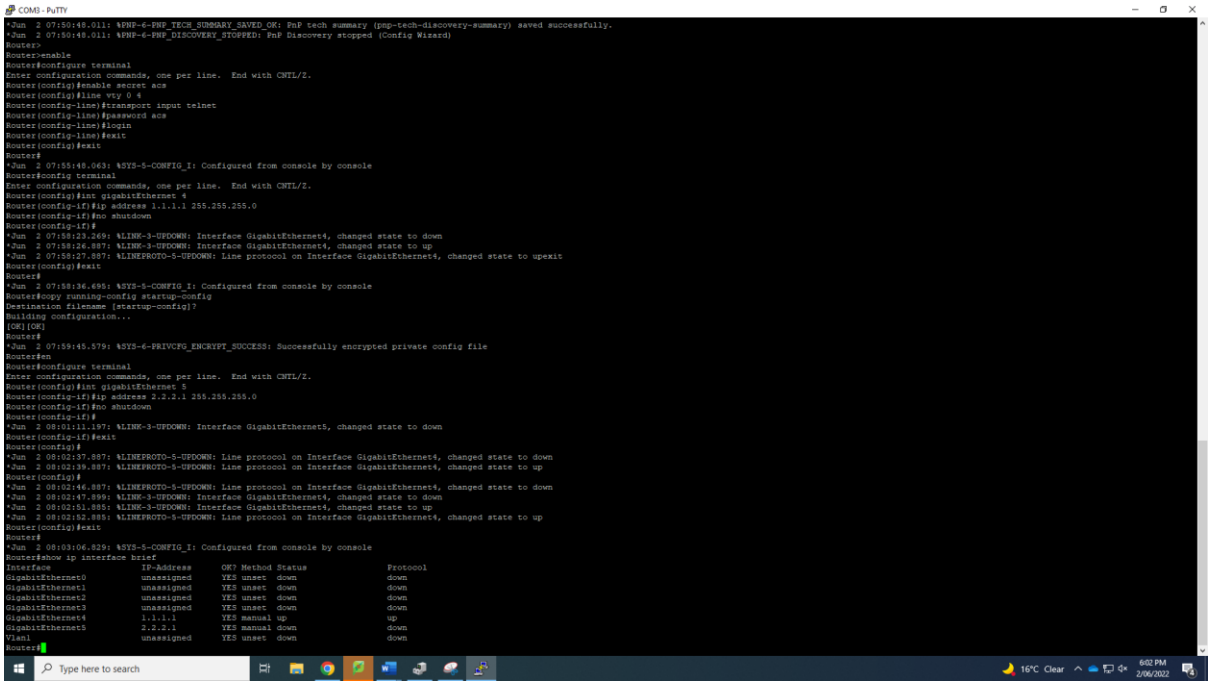
- Photographs showing the physical built internetwork



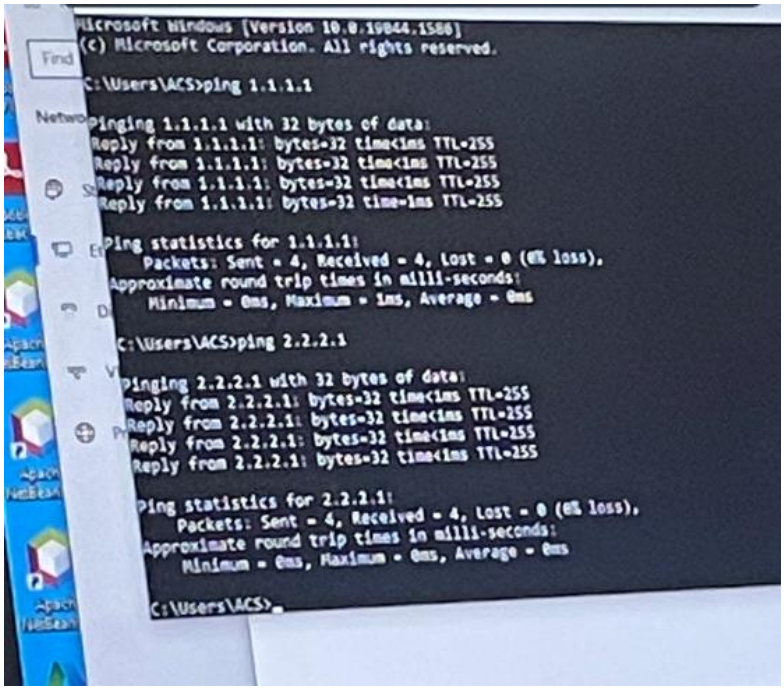


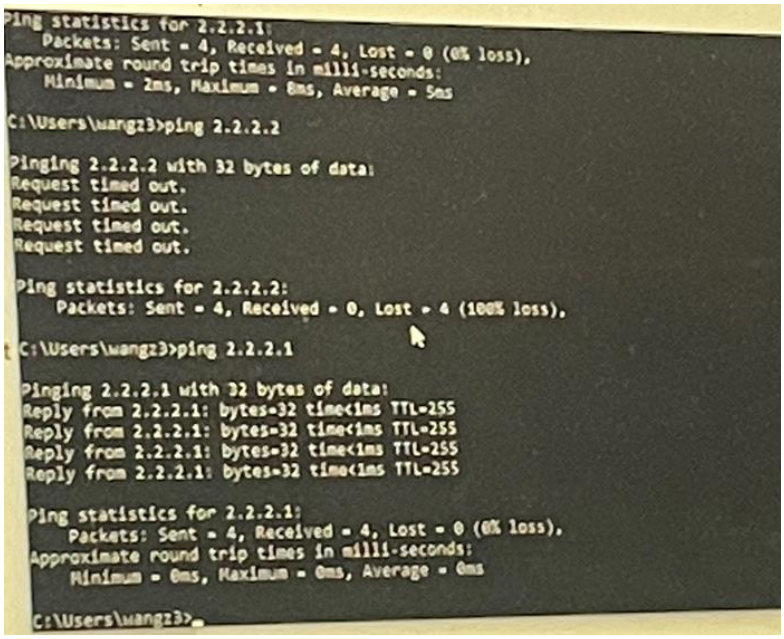
//The routing table is to demonstrate that I am able to generate one and is not used in the above network.

```
IPv4 Route Table
===========================================================================
Active Routes:
Network Destination        Netmask          Gateway       Interface  Metric
          0.0.0.0          0.0.0.0      192.168.0.1    192.168.0.238     35
        127.0.0.0        255.0.0.0         On-link         127.0.0.1    331
        127.0.0.1  255.255.255.255         On-link         127.0.0.1    331
  127.255.255.255  255.255.255.255         On-link         127.0.0.1    331
      172.19.16.0    255.255.240.0         On-link       172.19.16.1   5256
      172.19.16.1  255.255.255.255         On-link       172.19.16.1   5256
    172.19.31.255  255.255.255.255         On-link       172.19.16.1   5256
      192.168.0.0    255.255.255.0         On-link    192.168.0.238    291
    192.168.0.238  255.255.255.255         On-link    192.168.0.238    291
    192.168.0.255  255.255.255.255         On-link    192.168.0.238    291
        224.0.0.0        240.0.0.0         On-link         127.0.0.1    331
        224.0.0.0        240.0.0.0         On-link       172.19.16.1   5256
        224.0.0.0        240.0.0.0         On-link    192.168.0.238    291
  255.255.255.255  255.255.255.255         On-link         127.0.0.1    331
  255.255.255.255  255.255.255.255         On-link       172.19.16.1   5256
  255.255.255.255  255.255.255.255         On-link    192.168.0.238    291
===========================================================================
```



- Screenshots showing the testing communication in the internetwork





Part 2:

In summary for our final Tutorial, we connected devices in multiple LANs to a switch and then to a router, The router was configured via its own GUI which was connected to one of the PC's With USB, From there we made communication to the various devices in the network via the "Ping" Command.