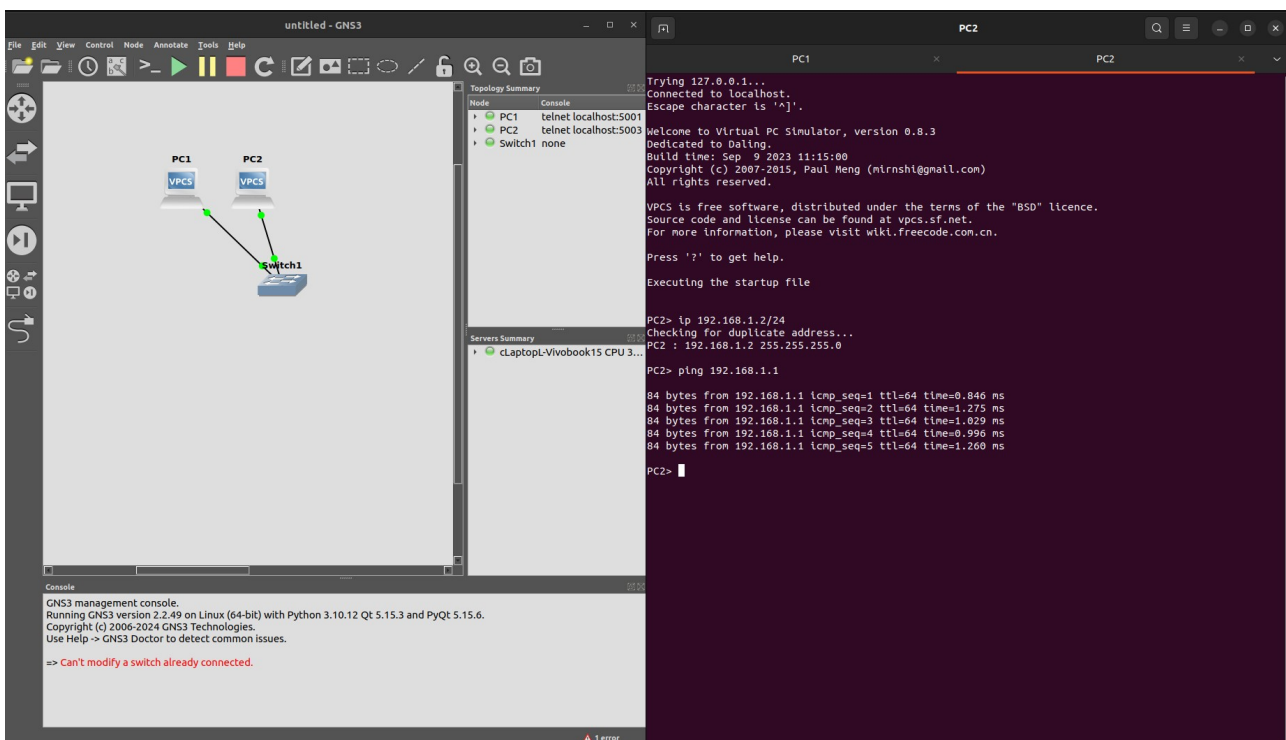


# Data Communications and Networking

## Lab 1 - Connectivity, VPCs, Subnets, VLANs

Calum Murray-Submission

### Part 1:



## Part 2:

```
PC3> ip 192.168.1.129/25
Checking for duplicate address...
PC3 : 192.168.1.129 255.255.255.128
```

```
PC3> ping 192.168.1.130

84 bytes from 192.168.1.130 icmp_seq=1 ttl=64 time=0.832 ms
84 bytes from 192.168.1.130 icmp_seq=2 ttl=64 time=0.866 ms
84 bytes from 192.168.1.130 icmp_seq=3 ttl=64 time=1.077 ms
84 bytes from 192.168.1.130 icmp_seq=4 ttl=64 time=0.892 ms
84 bytes from 192.168.1.130 icmp_seq=5 ttl=64 time=1.169 ms
```

```
PC4> ip 192.168.1.130/25
Checking for duplicate address...
PC4 : 192.168.1.130 255.255.255.128
```

```
PC4> ping 192.168.1.129

84 bytes from 192.168.1.129 icmp_seq=1 ttl=64 time=1.024 ms
84 bytes from 192.168.1.129 icmp_seq=2 ttl=64 time=1.172 ms
84 bytes from 192.168.1.129 icmp_seq=3 ttl=64 time=0.734 ms
84 bytes from 192.168.1.129 icmp_seq=4 ttl=64 time=0.842 ms
84 bytes from 192.168.1.129 icmp_seq=5 ttl=64 time=0.994 ms
```

You can't ping pc3/4 from pc1 because they are on different subnets.

The screenshot displays the GNS3 network simulator interface. On the left, a topology diagram shows four PCs (PC1, PC2, PC3, PC4) connected to a central switch (Switch1). PC1 and PC2 are connected to the top of the switch, while PC3 and PC4 are connected to the bottom. The console output on the right shows the following commands and results:

```
PC1> ip 192.168.1.1/24
Checking for duplicate address...
PC1 : 192.168.1.1 255.255.255.0

PC1> ip 192.168.1.1/25
Checking for duplicate address...
PC1 : 192.168.1.1 255.255.255.128

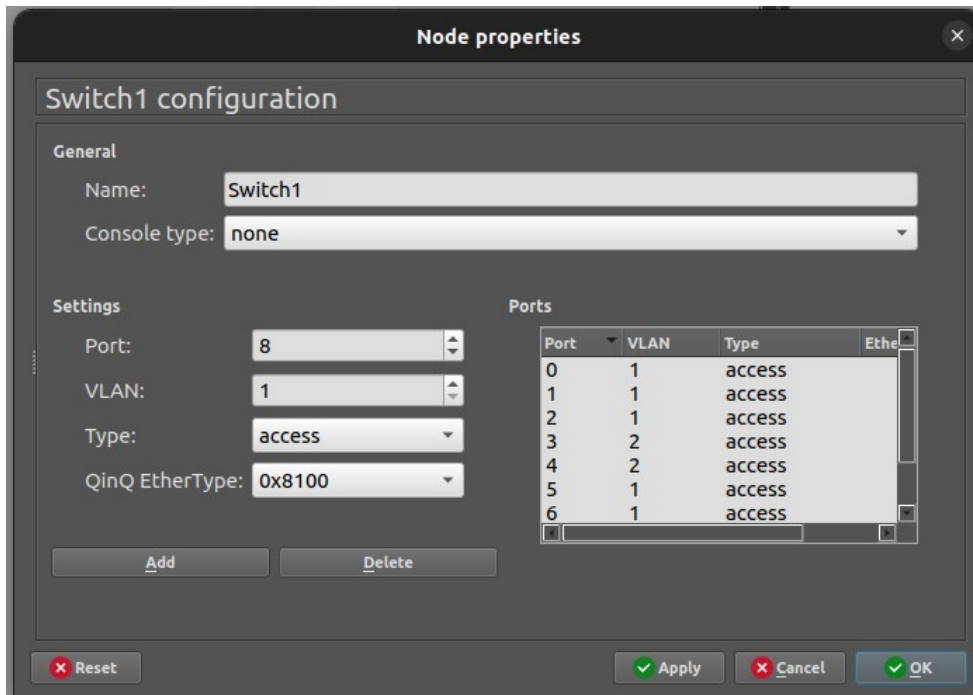
PC1> ping 192.168.1.129
No gateway found

PC1> ping 192.168.1.130
No gateway found

PC1> 5
```

The console also shows the GNS3 management console output, including the version (2.2.49) and the fact that it is running on Linux (64-bit) with Python 3.10.12 and PyQt 5.15.6.

## Part 3:



The image shows a 'Node properties' dialog box for 'Switch1 configuration'. It has a 'General' tab with fields for 'Name' (Switch1) and 'Console type' (none). Below is a 'Settings' section with 'Port' (8), 'VLAN' (1), 'Type' (access), and 'QinQ EtherType' (0x8100). To the right is a 'Ports' table with 7 rows. At the bottom are 'Add', 'Delete', 'Reset', 'Apply', 'Cancel', and 'OK' buttons.

Port	VLAN	Type	EtherType
0	1	access	
1	1	access	
2	1	access	
3	2	access	
4	2	access	
5	1	access	
6	1	access	

```
PC2> ping 192.168.1.1
```

```
84 bytes from 192.168.1.1 icmp_seq=1 ttl=64 time=0.915 ms
84 bytes from 192.168.1.1 icmp_seq=2 ttl=64 time=1.221 ms
84 bytes from 192.168.1.1 icmp_seq=3 ttl=64 time=1.093 ms
84 bytes from 192.168.1.1 icmp_seq=4 ttl=64 time=1.385 ms
84 bytes from 192.168.1.1 icmp_seq=5 ttl=64 time=1.287 ms
```

Could ping  
because  
same VLAN

```
PC1> ping 192.168.1.3
```

```
host (192.168.1.3) not reachable
```

Couldn't ping because different  
VLAN

```
PC2> ping 192.168.1.4
```

```
host (192.168.1.4) not reachable
```

Couldn't ping because  
different VLAN

```
PC3> ping 192.168.1.4
```

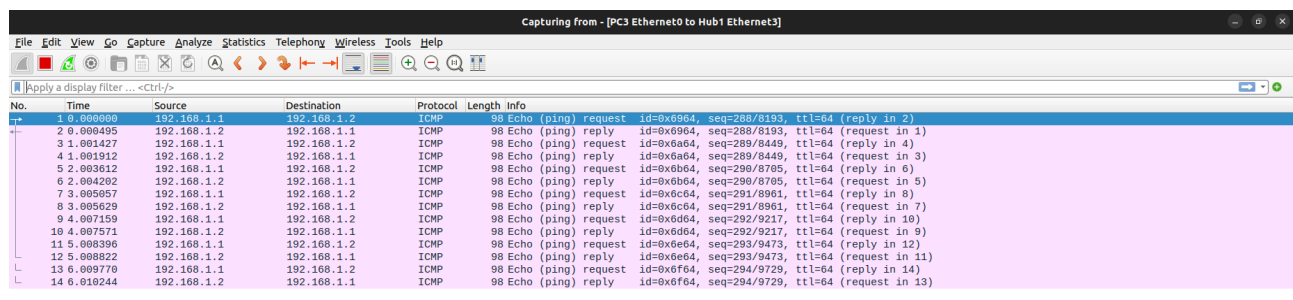
```
84 bytes from 192.168.1.4 icmp_seq=1 ttl=64 time=0.651 ms
84 bytes from 192.168.1.4 icmp_seq=2 ttl=64 time=0.786 ms
84 bytes from 192.168.1.4 icmp_seq=3 ttl=64 time=0.977 ms
84 bytes from 192.168.1.4 icmp_seq=4 ttl=64 time=1.028 ms
84 bytes from 192.168.1.4 icmp_seq=5 ttl=64 time=0.983 ms
```

Could ping  
because  
same VLAN

## Part 4:

### ICMP - internet message control protocol

Can't see ping from pc3 capture, because swiches send privately to mac address



The image shows a Wireshark packet capture window titled "Capturing from - [PC3 Ethernet0 to Hub1 Ethernet3]". The packet list table displays 14 packets, all of which are ICMP Echo (ping) requests or replies. The source and destination IP addresses are 192.168.1.1 and 192.168.1.2. The protocol column shows "ICMP" for all packets. The length column shows "98" for all packets. The info column shows the details of each packet, including the ID, sequence number, and TTL.

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.1	192.168.1.2	ICMP	98	Echo (ping) request id=0x6964, seq=288/8193, ttl=64 (reply in 2)
2	0.000495	192.168.1.2	192.168.1.1	ICMP	98	Echo (ping) reply id=0x6964, seq=288/8193, ttl=64 (request in 1)
3	1.001427	192.168.1.1	192.168.1.2	ICMP	98	Echo (ping) request id=0x6a64, seq=289/8449, ttl=64 (reply in 4)
4	1.001912	192.168.1.2	192.168.1.1	ICMP	98	Echo (ping) reply id=0x6a64, seq=289/8449, ttl=64 (request in 3)
5	2.003612	192.168.1.1	192.168.1.2	ICMP	98	Echo (ping) request id=0x6b64, seq=290/8705, ttl=64 (reply in 6)
6	2.004202	192.168.1.2	192.168.1.1	ICMP	98	Echo (ping) reply id=0x6b64, seq=290/8705, ttl=64 (request in 5)
7	3.005057	192.168.1.1	192.168.1.2	ICMP	98	Echo (ping) request id=0x6c64, seq=291/8961, ttl=64 (reply in 8)
8	3.005629	192.168.1.2	192.168.1.1	ICMP	98	Echo (ping) reply id=0x6c64, seq=291/8961, ttl=64 (request in 7)
9	4.007159	192.168.1.1	192.168.1.2	ICMP	98	Echo (ping) request id=0x6d64, seq=292/9217, ttl=64 (reply in 10)
10	4.007571	192.168.1.2	192.168.1.1	ICMP	98	Echo (ping) reply id=0x6d64, seq=292/9217, ttl=64 (request in 9)
11	5.008396	192.168.1.1	192.168.1.2	ICMP	98	Echo (ping) request id=0x6e64, seq=293/9473, ttl=64 (reply in 12)
12	5.008822	192.168.1.2	192.168.1.1	ICMP	98	Echo (ping) reply id=0x6e64, seq=293/9473, ttl=64 (request in 11)
13	6.009770	192.168.1.1	192.168.1.2	ICMP	98	Echo (ping) request id=0x6f64, seq=294/9729, ttl=64 (reply in 14)
14	6.010244	192.168.1.2	192.168.1.1	ICMP	98	Echo (ping) reply id=0x6f64, seq=294/9729, ttl=64 (request in 13)

You can see all pings from hubs as they broadcast to each port