F29DC 2024 Lab 4
DHCP and NAT

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Part 1 - Topology Configuration

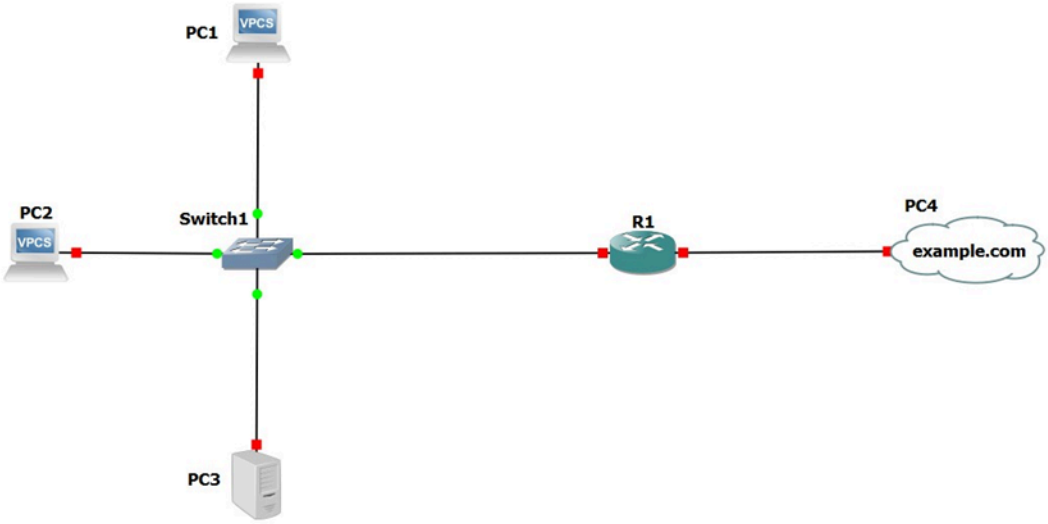

Image 1.1: Setting up the connection between PC1, PC2, PC3, PC4, Switch1 and R1.

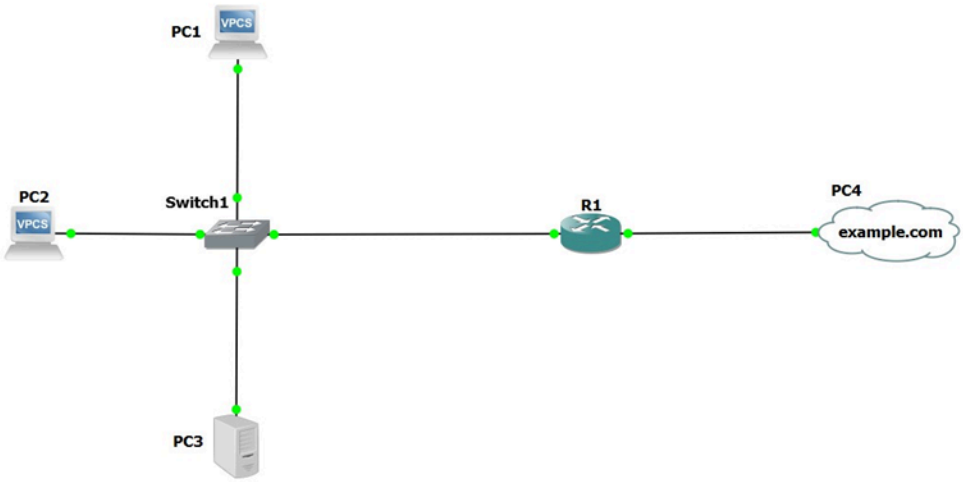

Image 1.2: Starting all the connections.

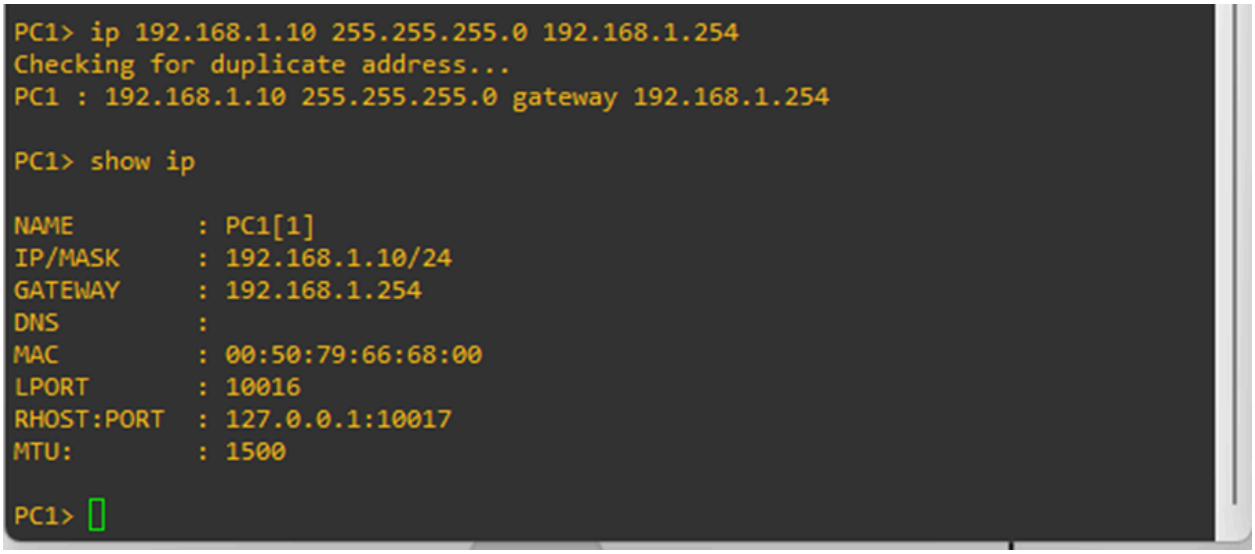

Image 1.3 : Providing the IP address for PC1 with the gateway and also showing the IP's.

Ip 192.168.1.10 255.255.255.0 192.168.1.254

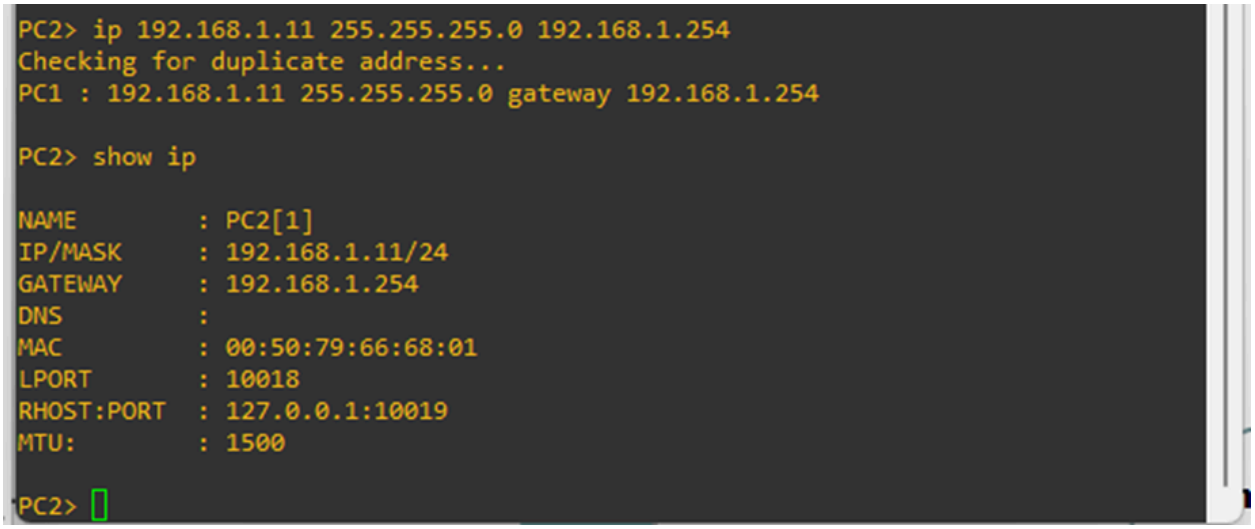

Image 1.4 : Providing the IP address for PC2 with the gateway and also showing the IP's.

Ip 192.168.1.11 255.255.255.0 192.168.1.254

Image 1.5 : Providing the IP address for PC3.

Ip 192.168.1.201

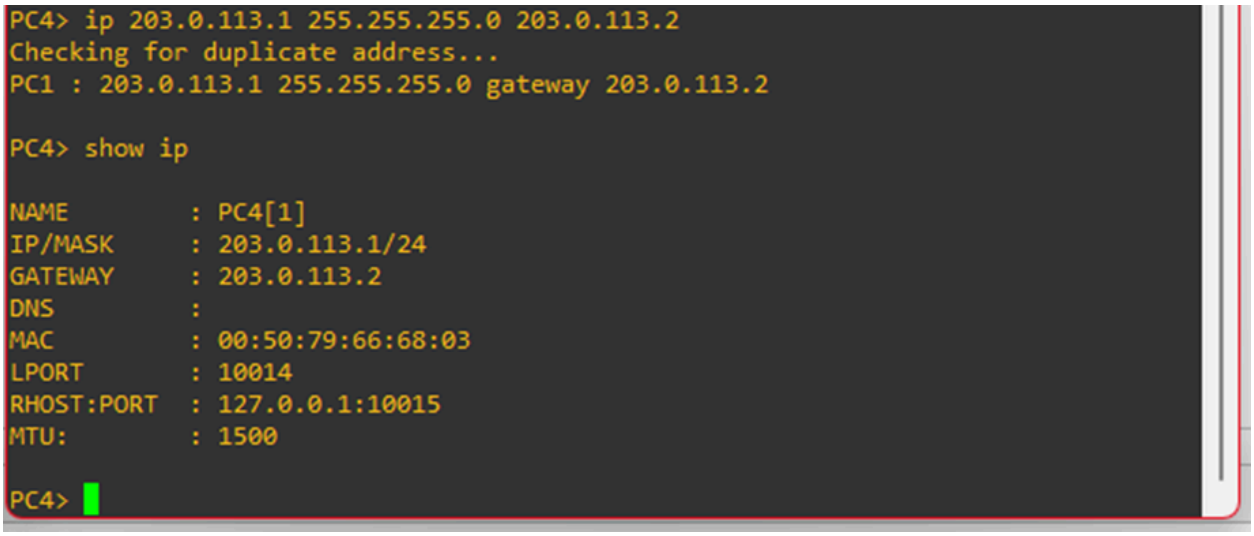

Image 1.6 : Providing the IP address for PC4 with the gateway and also showing the IP's.

Ip 203.0.113.1 255.255.255.0 203.0.113.2

```
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#interface fastEthernet 0/0
R1(config-if)#ip address 192.168.1.254 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#^Z
R1#
*Mar  1 00:21:51.667: %SYS-5-CONFIG_I: Configured from console by console
R1#
*Mar  1 00:21:52.867: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state
to up
*Mar  1 00:21:53.867: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEther
net0/0, changed state to up
R1#
```

Image 1.7 : Setting up R1 router with fast Ethernet 0/0 with ip address 192.168.1.254 255.255.255.0.

```
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#interface fastEthernet 0/1
R1(config-if)#ip address 203.0.113.2 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#^Z
R1#
*Mar  1 00:23:32.175: %SYS-5-CONFIG_I: Configured from console by console
R1#
*Mar  1 00:23:33.331: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state
to up
*Mar  1 00:23:34.331: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEther
net0/1, changed state to up
R1#
```

Image 1.8 : Setting up R1 router with fastEthernet 0/1 with ip address 203.0.113.2 255.255.255.0.

```
R1#write
Building configuration...
[OK]
R1#
```

Image 1.9 : Using the write command to save the ip configuration of R1 router.

Part 2 - DHCP Server

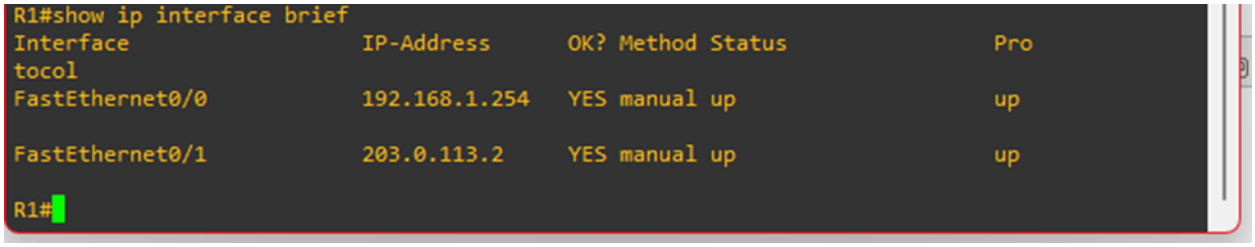

Image 2.1 : Using the show ip interface brief to check if we have provided the IP addresses correctly.

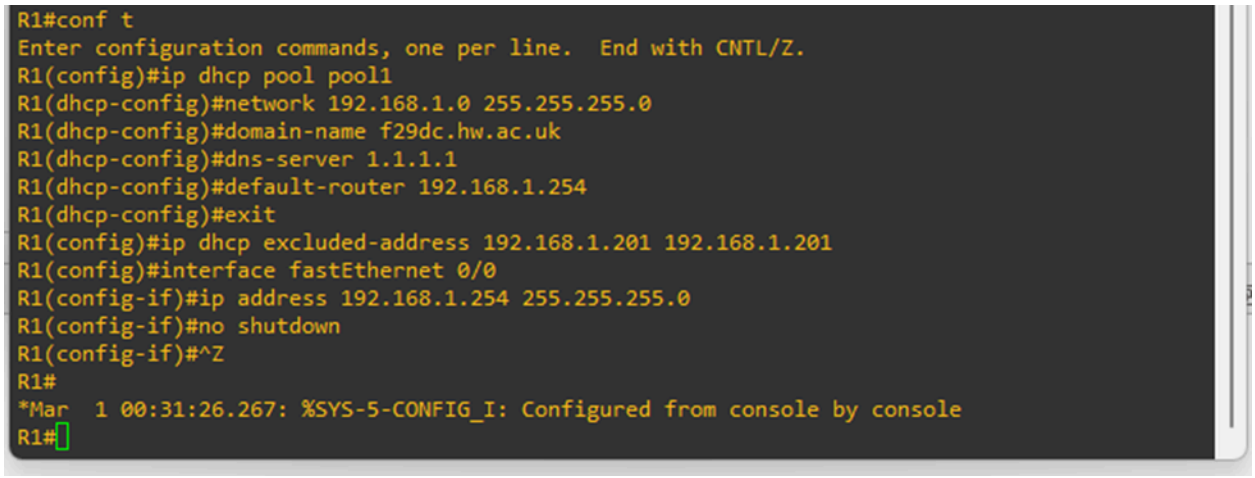

Image 2.2 : Entering configure mode and configuring network address via DHCP pool.

Then, Providing the ip address 192.168.1.0 255.255.255.0 and a domain-name called f29dc.hw.ac.uk.

Later, Setting up a dns-server with ip 1.1.1.1 and a default router with ip 192.168.1.254 and later exiting.

Finally, An DHCP excluded-address has been added with ip address 192.168.1.201 192.168.1.201. then we set up with a fast ethernet 0/0 with an ip address 192.168.1.254 255.255.255.0.

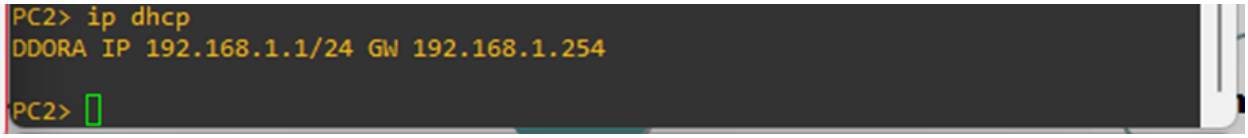

Image 2.3 : Checking the ip address and gateway using the command ip dhcp for PC2.

<u>It uses the DORA process.</u>

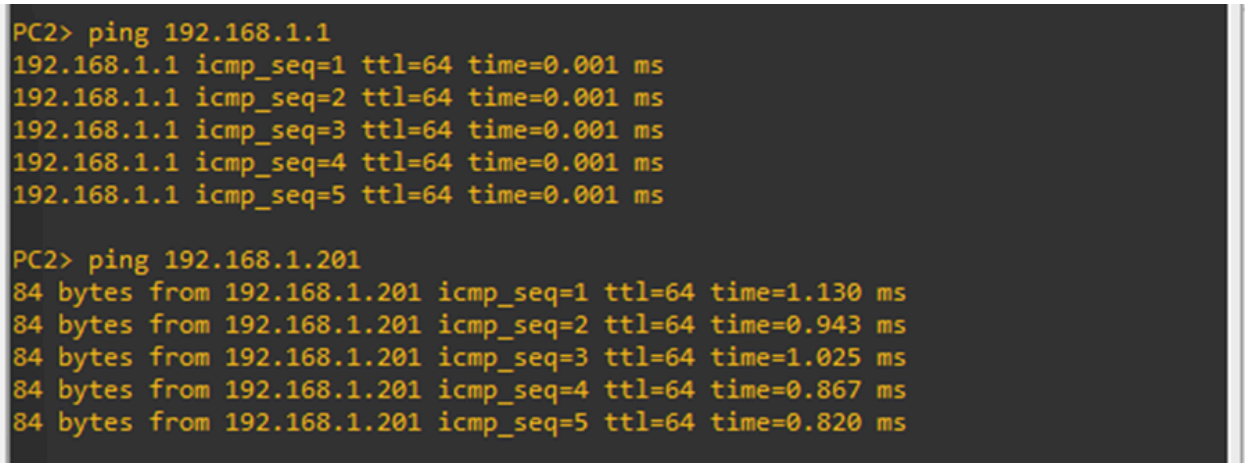

Image 2.4 : trying to ping both the ip addresses from PC2

192.168.1.1

192.168.1.201

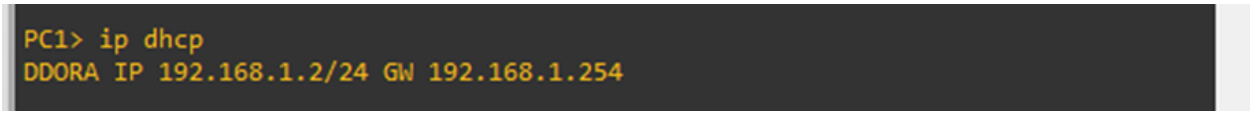

Image 2.5 : Checking the ip address and gateway using the command ip dhcp for PC2.

It uses the DORA process.

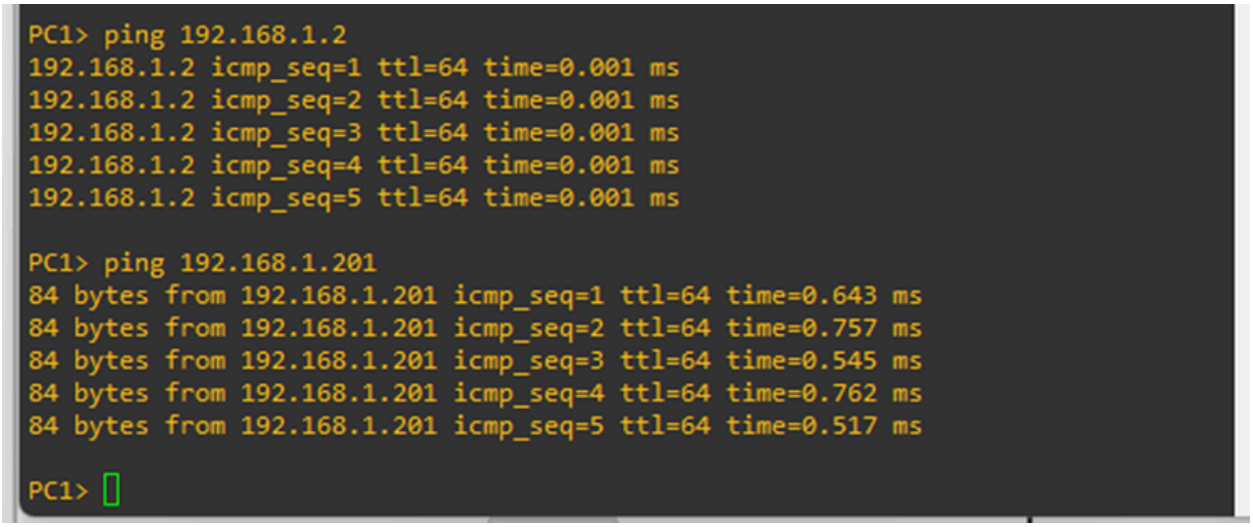

Image 2.6 : trying to ping both the ip addresses from PC1

192.168.1.2

192.168.1.201

Part 2 - NAT

```
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#interface fastEthernet 0/0
R1(config-if)#interface fastEthernet 0/1
R1(config-if)#ip address 203.0.113.2 255.255.255.0
R1(config-if)#ip route 0.0.0.0 0.0.0.0 203.0.113.1
R1(config)#interface fastEthernet 0/0
R1(config-if)#ip nat outside

*Mar  1 00:45:50.311: %LINEPROTO-5-UPDOWN: Line protocol on Interface NVI0, changed state to
 up
```

Image 3.1 : Entering configure mode in R1 router and setting up fast ethernet 0/0 and 0/1 with ip address 203.0.113.2 255.255.255.0.
Then, we provide the ip route 0.0.0.0 0.0.0.0 203.0.113.1 and set up fast Ethernet 0/0 and finally ip nat outside.
This sets the interface of the router as WAN for 0/1.

```
R1(config-if)#exit
R1(config)#interface fastEthernet 0/0
R1(config-if)#ip address 192.168.1.254 255.255.255.0
R1(config-if)#ip nat inside
R1(config-if)#exit
R1(config)#access-list 1 permit 192.168.1.0 0.0.0.255
R1(config)#ip nat inside source list 1 interface fastEthernet 0/1 overload
R1(config)#exit
R1#
*Mar  1 00:47:29.735: %SYS-5-CONFIG_I: Configured from console by console
```

Image 3.2 : For the ip nat inside, exiting the ip nat outside and setting up fast Ethernet 0/0 with ip address 192.168.1.254 255.255.255.0 and exiting.

Then, accessing the list 1 and permitting ip address 192.168.1.0 0.0.0.255.

Finally, we overload the fastEthernet 0/1 and exiting.

This sets the interface of the router as LAN.

```
PC1> ping 203.0.113.1
84 bytes from 203.0.113.1 icmp_seq=1 ttl=63 time=20.466 ms
84 bytes from 203.0.113.1 icmp_seq=2 ttl=63 time=19.440 ms
84 bytes from 203.0.113.1 icmp_seq=3 ttl=63 time=19.489 ms
84 bytes from 203.0.113.1 icmp_seq=4 ttl=63 time=11.383 ms
84 bytes from 203.0.113.1 icmp_seq=5 ttl=63 time=14.713 ms

PC1>
```

Image 3.3 : Pinging the ip 203.0.113.1 from PC1.

```
PC2> ping 203.0.113.1
84 bytes from 203.0.113.1 icmp_seq=1 ttl=63 time=17.819 ms
84 bytes from 203.0.113.1 icmp_seq=2 ttl=63 time=17.254 ms
84 bytes from 203.0.113.1 icmp_seq=3 ttl=63 time=16.272 ms
84 bytes from 203.0.113.1 icmp_seq=4 ttl=63 time=20.275 ms
84 bytes from 203.0.113.1 icmp_seq=5 ttl=63 time=16.849 ms

PC2>
```

Image 3.4 : Pinging the ip 203.0.113.1 from PC2.

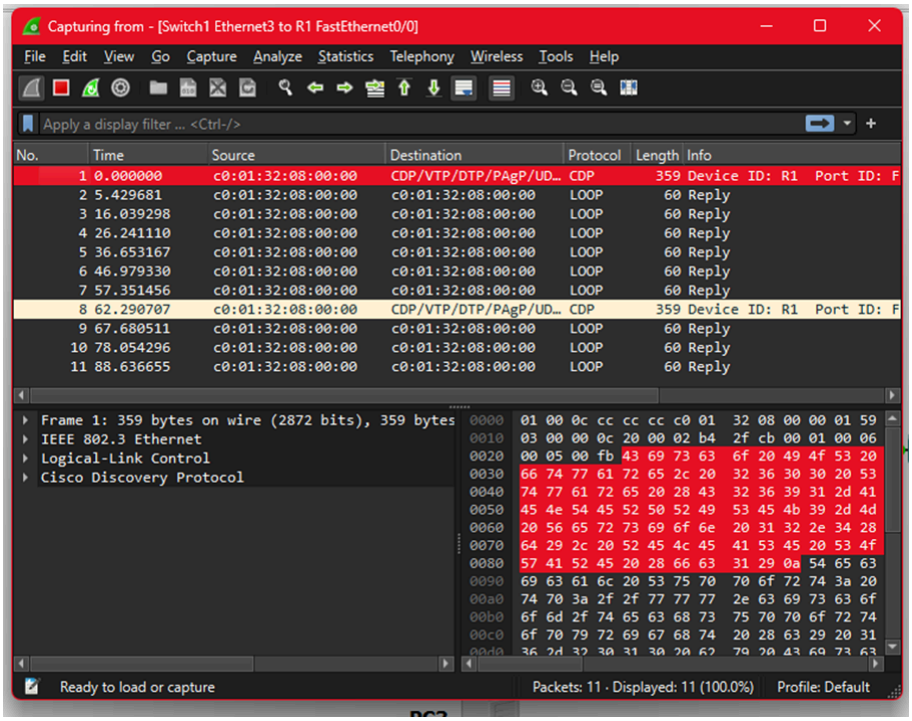

Image 3.5 : Using wireshark on the connection between Switch and R1.

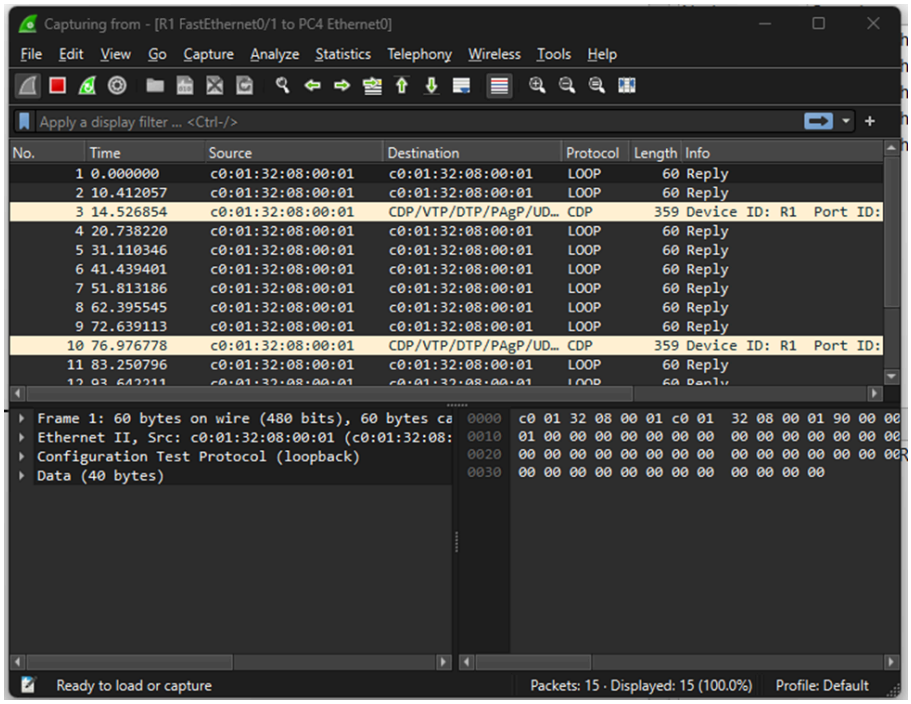

Image 3.6 : Using the wireshark on the connection between R1 and PC4.
