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Subject: Computer Networks (01CT0503)	**Aim: Monitor the live/real time network and analyze the concepts of various networking protocols like ARP, RARP, DHCP, HTTP, etc.**	
Experiment No: 12	**Date: 18-11-2024**	**Enrolment No: 92200133021**

Aim: Monitor the live/real time network and analyze the concepts of various networking protocols like ARP, RARP, DHCP, HTTP, etc.

Address Resolution Protocol: It is a network protocol used to map an IP address (logical address)to a corresponding MAC address (physical address) within a local network. ARP operates at the Data Link Layer (Layer 2) and is crucial for communication within a LAN (Local Area Network.

ARP Packet Header	
Hardware type (2B)	Protocol type (2B)
Hardware Address length (1B)	Protocol Address length (1B)
Opcode (2B) 1: ARP_request 2: ARP_reply	
Sender IP Address	
Sender MAC Address	
Target IP Address	
Target MAC Address	
Ethernet Header	
Ethernet Sender Address	
Ethernet Target Address	
Ethernet Frame Type	

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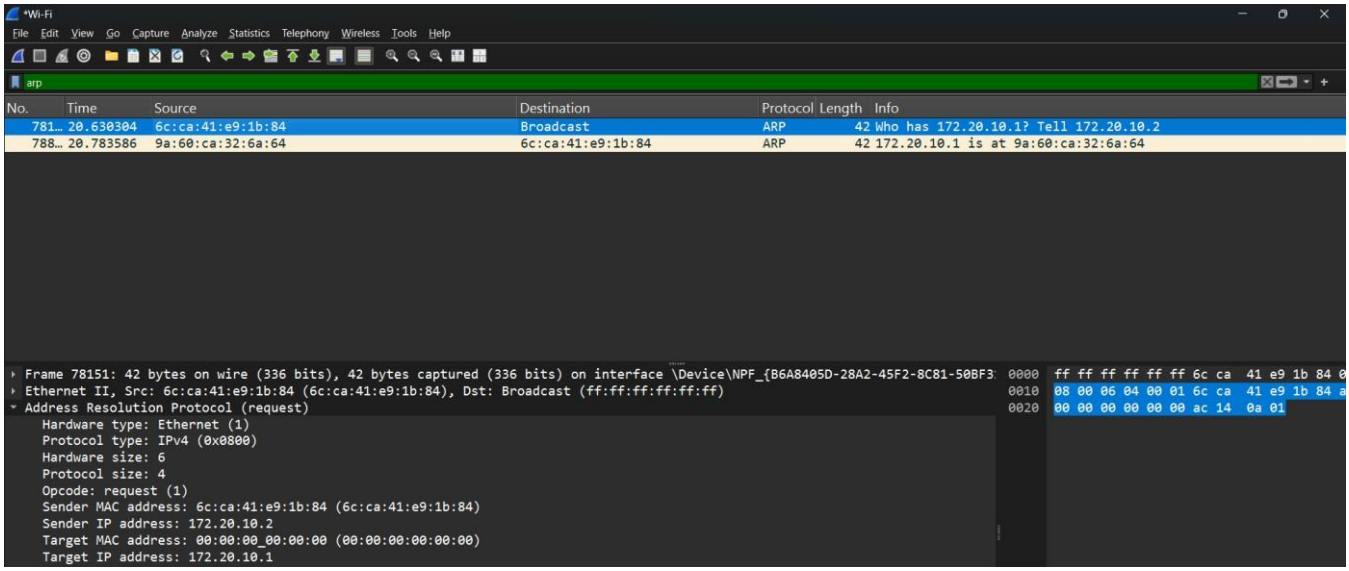
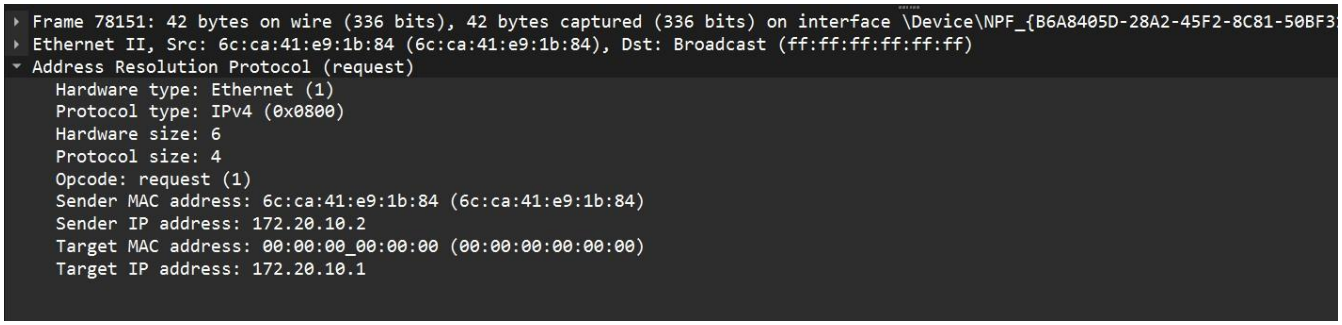
First select the Wireshark Select Wifi interface and Put the display filter of arp Then we would like to remove our ARP map we can do that by opeing the command prompt as administrator type arp -d hit enter it will remove the ARP data and system will put request for to ARP and we will see the pacakge in Wireshark.



Here we can ARP request and reply



This is a request as the opcode is 1 and it's broadcast

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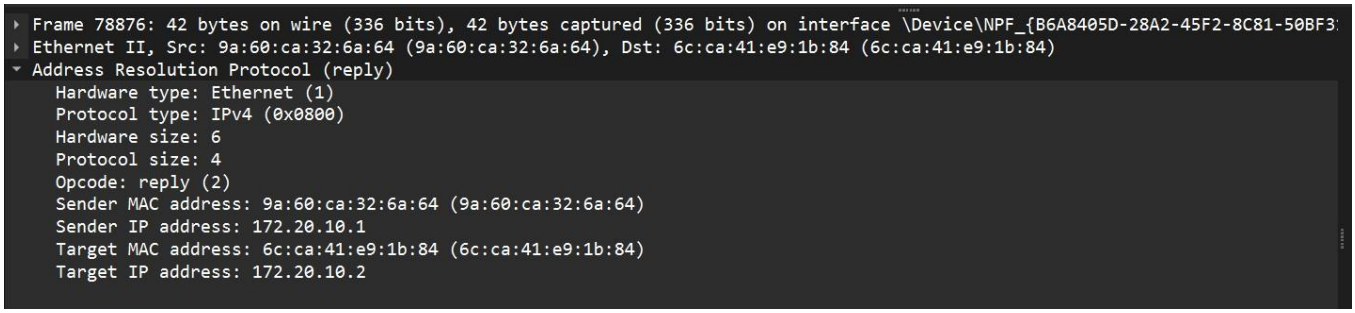

This is a reply as the opcode is 2. And we get the MAC address of target device that is 6c:ca:41:e9:1b:84 (6c:ca:41:e9:1b:84)

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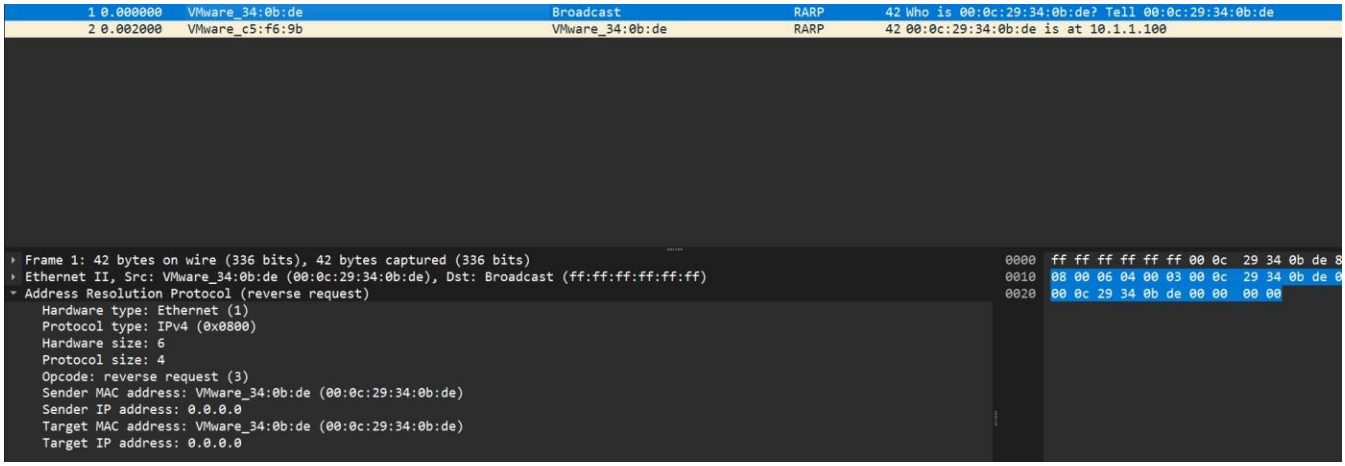
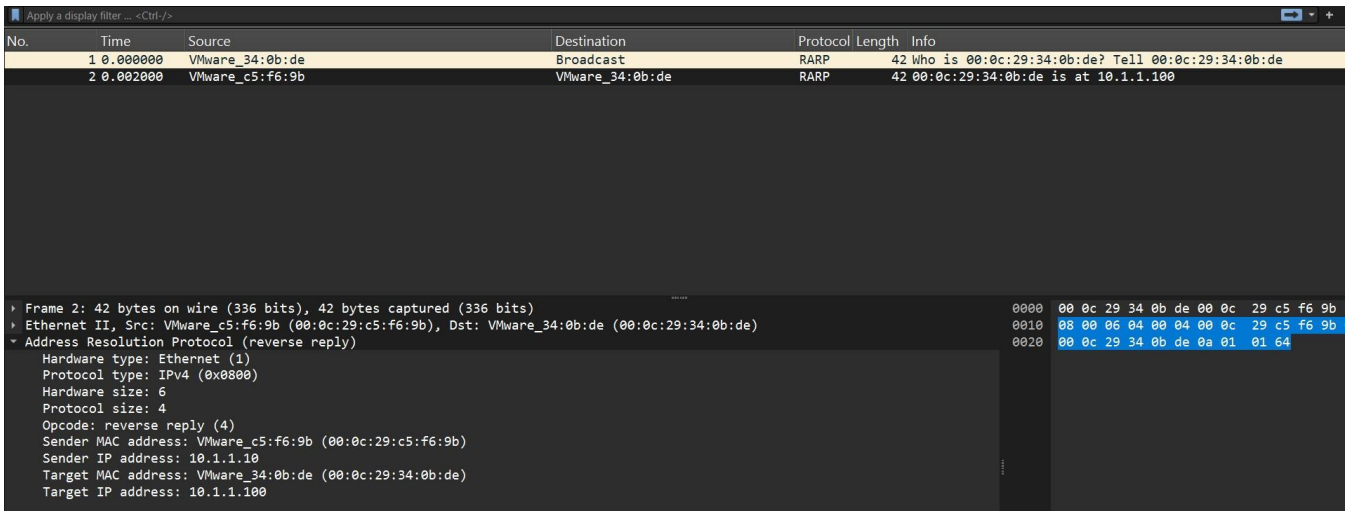
Reverse Address Resolution Protocol: RARP stands for Reverse Address Resolution Protocol. It's a networking protocol that allows a device to obtain its IP address by broadcasting its MAC address to a RARP server on the same network. This isthe opposite of the more common Address Resolution Protocol (ARP), which maps an IP address to a MAC address.

RARP has the same fromat as ARP with few chagnes such as operation field in either 3 or 4 ie. 3-RARP request and 4-RARP reply.

There is no way for client PC to do RARP request and reply and in a established network. So I will be using a thrid party file.



This is the broadcast request to find the devices IP from it's MAC



This is the RARP reply for with the target IP address.

This was all about the ARP and RAPR protocol.

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*Dynamic Host Configuration Protocol (DHCP):*Dynamic Host Configuration Protocol (DHCP) is a network management protocol used to dynamicallyassign an IP address to nay device, or node, on a network so they can communicate using IP (Internet Protocol). DHCP automates and centrally manages these configurations. There is no need to manually assign IP addresses to new devices. Therefore, there is no requirement for any user configuration to connect to a DHCP based network.

```
C:\Windows\System32>ipconfig -renew

Windows IP Configuration

No operation can be performed on Local Area Connection* 1 while it has its media disconnected.
No operation can be performed on Local Area Connection* 2 while it has its media disconnected.
No operation can be performed on Bluetooth Network Connection while it has its media disconnected.

Wireless LAN adapter Local Area Connection* 1:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 2:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   IPv6 Address. . . . . . . . . . . : 2402:3a80:4428:8d66:9ecb:9b16:923d:5dbd
   Temporary IPv6 Address. . . . . . : 2402:3a80:4428:8d66:c49b:905f:ab57:a74
   Link-local IPv6 Address . . . . . : fe80::7ffd:429:5d54:985e%17
   IPv4 Address. . . . . . . . . . . : 172.20.10.2
   Subnet Mask . . . . . . . . . . . : 255.255.255.240
   Default Gateway . . . . . . . . . : fe80::9860:caff:fe32:6a64%17
                                       172.20.10.1

Ethernet adapter Bluetooth Network Connection:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

C:\Windows\System32>ipconfig -release
```

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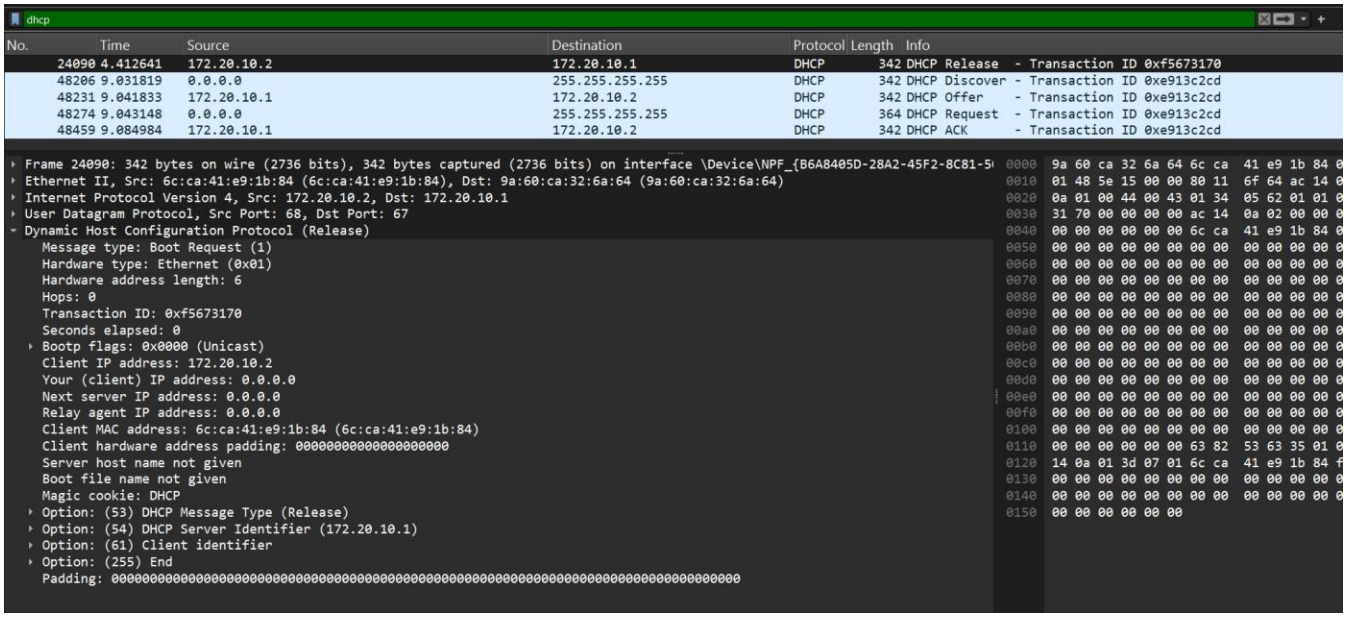
Now to analyse DHCP in Wireshark we will first realse our current DHCP ip and request a new one by the commands ipconfig -release and ipconfig -renew
Now make sure when you type these commands make sure Wireshark is running and is on. After this put dhcp in display filter and see that first DHCP package would be a release.



And the other 4 packages are DORA in the end of which we are assigned a IP for a time period mentioned in lease time 1 hr.

So this was DHCP now

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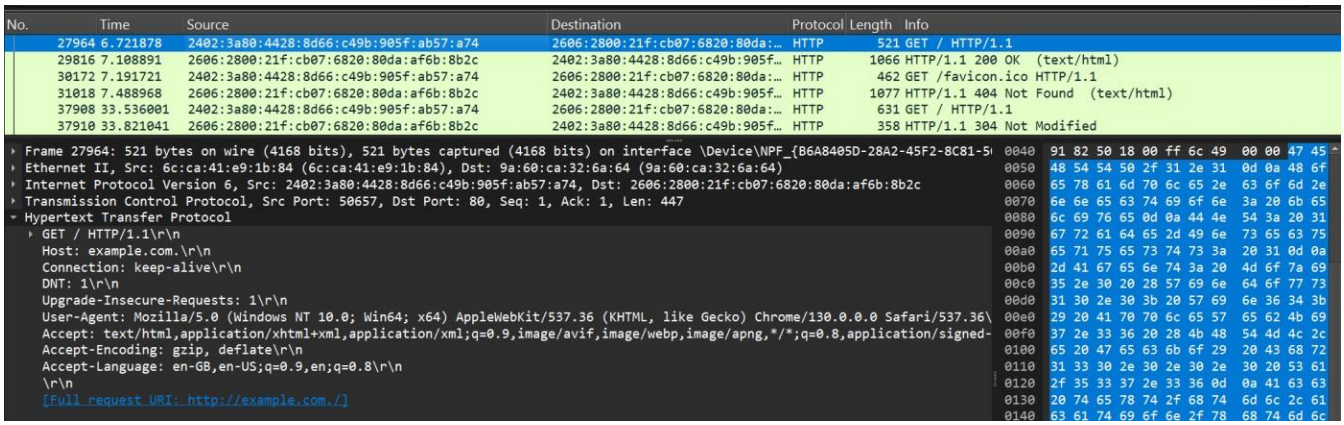
Hypertext Transfer Protocol(HTTP: it is the foundational communication protocol of the World Wide Web, enabling the transfer of data such as HTML documents, images, videos, and other resources between a client (browser) and a server. It operates on a **request-response model** and is the backbone of web communication.



Here is HTTP reuest that is request page from http://example.com

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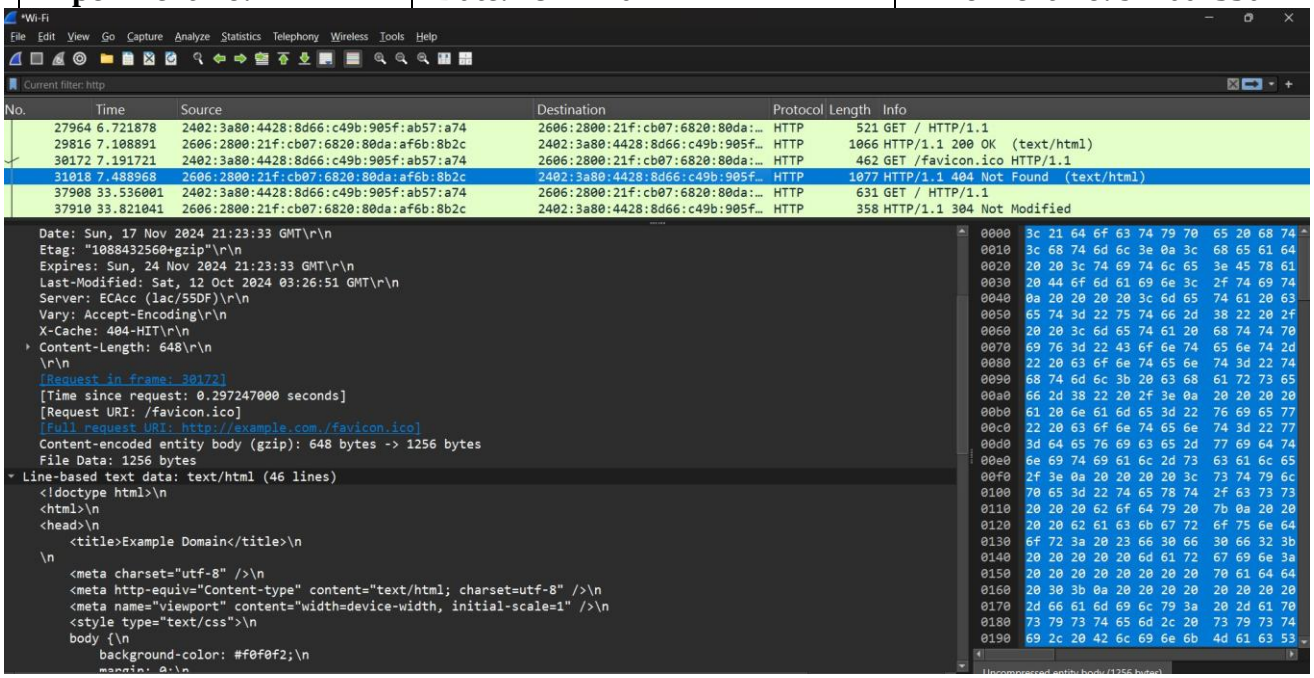

We are getting the HTML text in the response.

Conclusion:

Using Wireshark, I explored networking protocols like ARP, RARP, DHCP, and HTTP, uncovering their functionality and limitations. ARP and RARP enable local address mapping but remain confined to local networks. DHCP simplifies IP address assignment through the DORA process but revealed potential connectivity issues during disruptions. HTTP's request-response mechanism facilitates web communication, yet its lack of encryption exposes vulnerabilities. This complies the essential roles of these protocols while underscoring their shortcomings in addressing modern network security and reliability challenges.

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