

Wireshark Experiment – 02

Address Resolution Protocol

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Address Resolution Protocol

Address Resolution Protocol (ARP) is a network protocol used to map an IP address to a MAC (Media Access Control) address within a local network segment (e.g., a LAN). ARP operates at the Data Link Layer (Layer 2) and interacts with the Network Layer (Layer 3) in the OSI model. It is critical for communication between devices in a network where hardware addresses (MAC) are needed to send data to the correct recipient.

Types of ARP

1. **Proxy ARP:** A router responds to ARP requests on behalf of another device, enabling communication across different networks.
 2. **Gratuitous ARP:** A device broadcasts an ARP reply without receiving a request, often used to update other devices' ARP tables or detect IP conflicts.
 3. **Reverse ARP (RARP):** Used by a device to request its own IP address from a gateway or server based on its MAC address (used in older systems)
1. Write down the contents of your computer's ARP cache. What is the meaning of each column value? The Internet Address column contains the IP address, the Physical Address column contains the MAC address, and the type indicates the protocol type

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Command Prompt
Microsoft Windows [Version 10.0.26100.2454]
(c) Microsoft Corporation. All rights reserved.

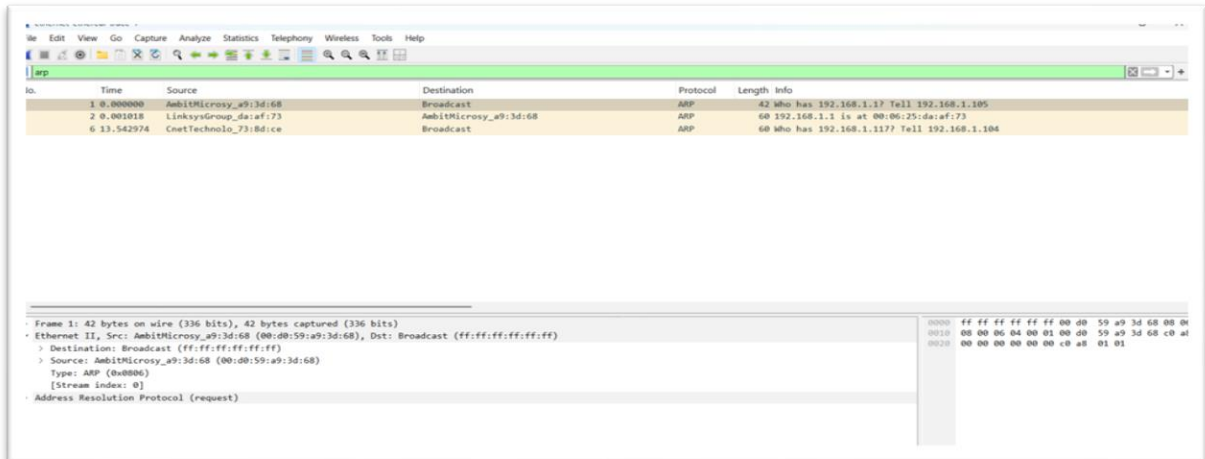
C:\Users\user>arp -a

Interface: 192.168.29.65 --- 0x12
Internet Address      Physical Address      Type
192.168.29.1          f0-ed-b8-7b-90-d1     dynamic
192.168.29.87          20-17-42-e4-71-46     dynamic
192.168.29.93          a6-68-8f-70-13-de     dynamic
192.168.29.213         0a-ea-aa-1c-0d-b8     dynamic
192.168.29.255         ff-ff-ff-ff-ff-ff     static
224.0.0.22            01-00-5e-00-00-16     static
224.0.0.251           01-00-5e-00-00-fb     static
224.0.0.252           01-00-5e-00-00-fc     static
239.255.255.250       01-00-5e-7f-ff-fa     static
255.255.255.255       ff-ff-ff-ff-ff-ff     static

C:\Users\user>
```

2. What are the hexadecimal values for the source and destination addresses in the Ethernet frame containing the ARP request message?

Ans : The hex value for the source address is 00:d0:59:a9:3d:68. The hex value for the destination address is ff:ff:ff:ff:ff:ff, the broadcast address.

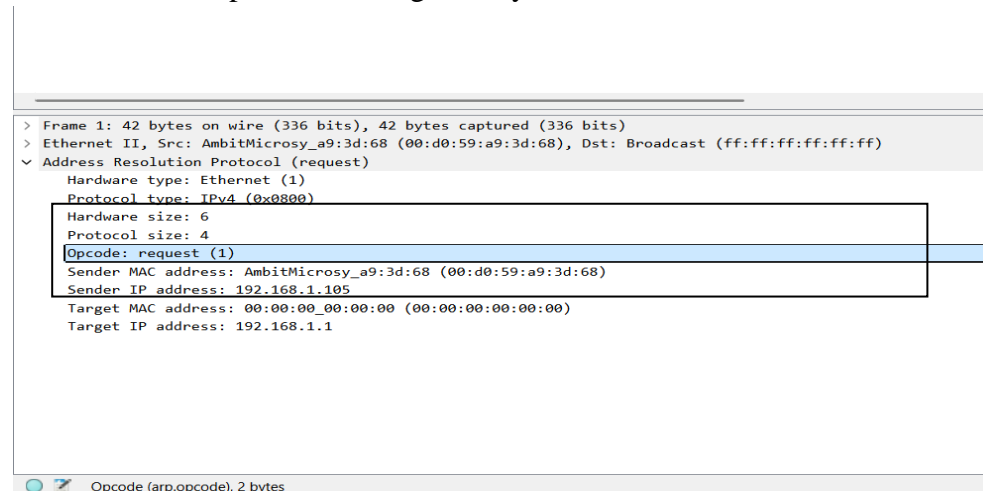


3. Give the hexadecimal value for the two-byte Ethernet Frame type field. What do the bit(s) whose value is 1 mean within the flag field?

Ans : The hex value for the Ethernet Frame type field is 0x0806, for ARP.

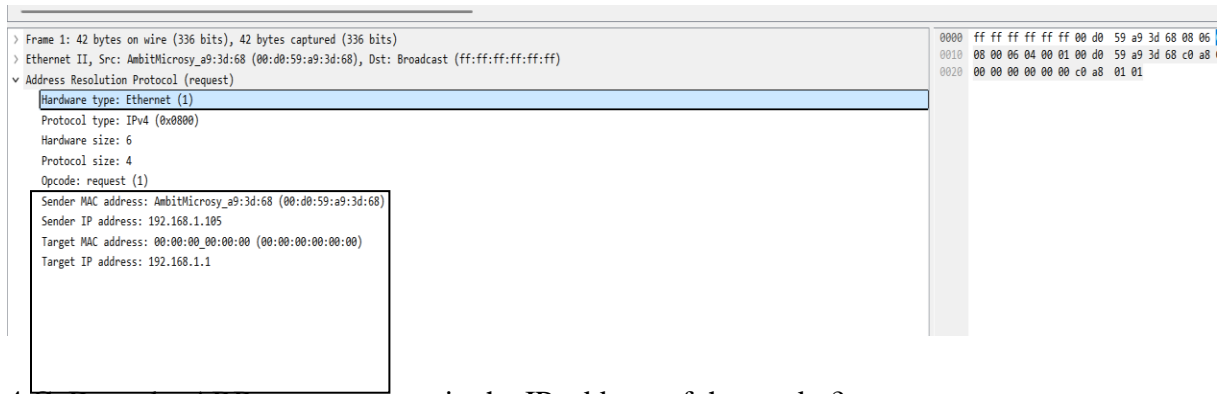
4. A How many bytes from the very beginning of the Ethernet frame does the ARP opcode field begin?

Ans : The ARP opcode field begins 2 bytes



4 b . What is the value of the opcode field within the ARP-payload part of the Ethernet frame in which an ARP request is made?

Ans : The hex value for opcode field withing theARP-payload of the requestis 0x0001, forrequest.



4 C. Does the ARP message contain the IP address of the sender?

Yes, the ARP message containing the IP address 192.168.1.105 for the sender

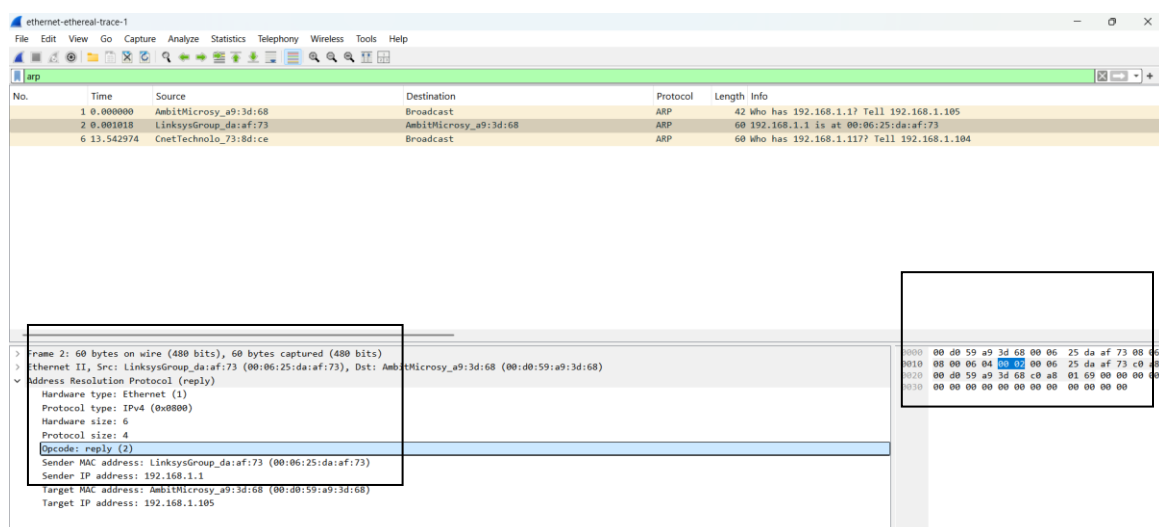
4 d Where in the ARP request does the “question” appear – the Ethernet address of the machine whose corresponding IP address is being queried?

The field “Target MAC address” is set to 00:00:00: 00:00:00 to question the machine whose corresponding IP address (192.168.1.1) is being queried.

5. Now find the ARP reply that was sent in response to the ARP request

A. How many bytes from the very beginning of the Ethernet frame does the ARP opcode field begin?

Ans : The ARP opcode field begins 2 bytes.



- B. What is the value of the opcode field within the ARP-payload part of the Ethernet frame in which an ARP response is made?

Ans : The hex value for opcode field withing the ARP-payload of the request is 0x0002, for reply.

- C. Where in the ARP message does the “answer” to the earlier ARP request appear – the IP address of the machine having the Ethernet

Ans : The answer to the earlier ARP request appears in the”Sender MAC address” field, which contains the Ethernet address 00:06:25:da:af:73 for the sender with IP address 192.168.1.1.

6. What are the hexadecimal values for the source and destination addresses in the Ethernet frame containing the ARP reply message? The hex value for the ANS: source address is 00:06:25: da:af:73 and for the destination is 00:d0:59:a9:3d:68 .