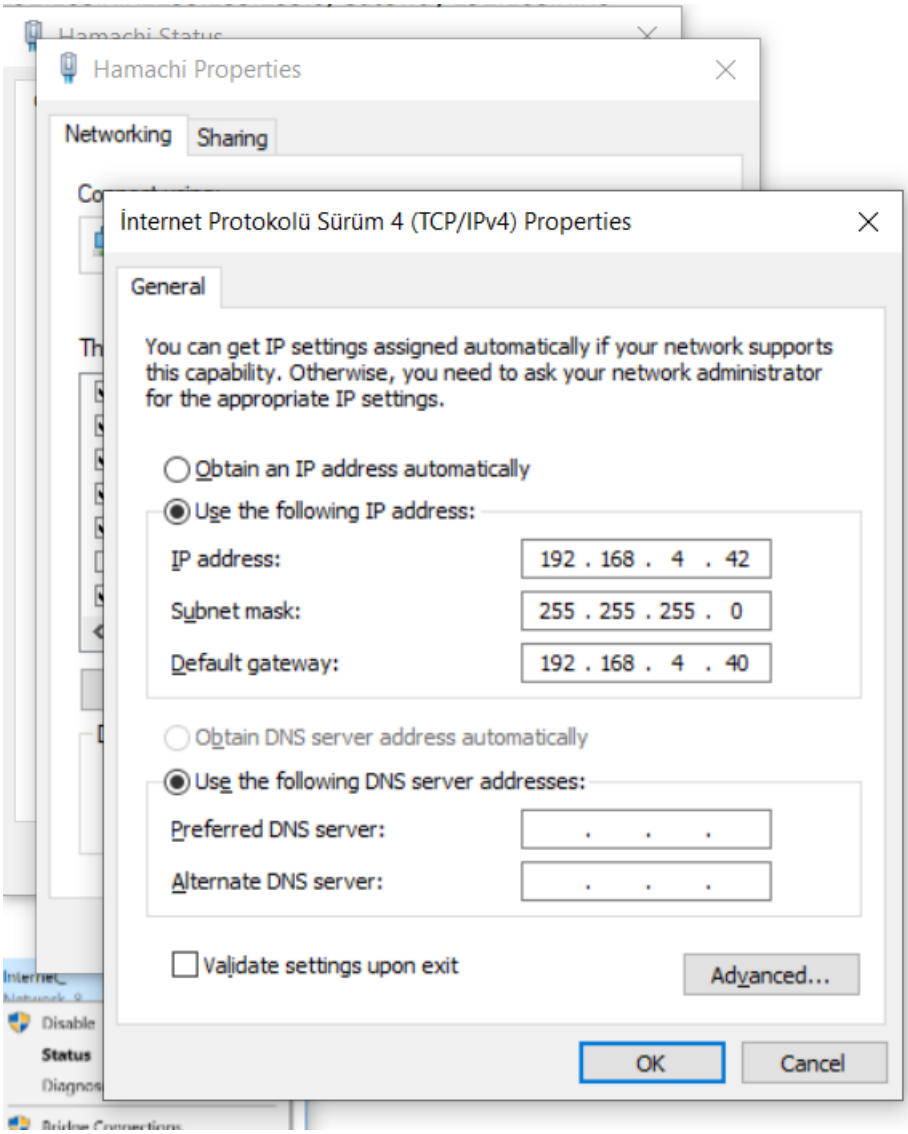
Laboratory tasks Data link layer - Ethernet

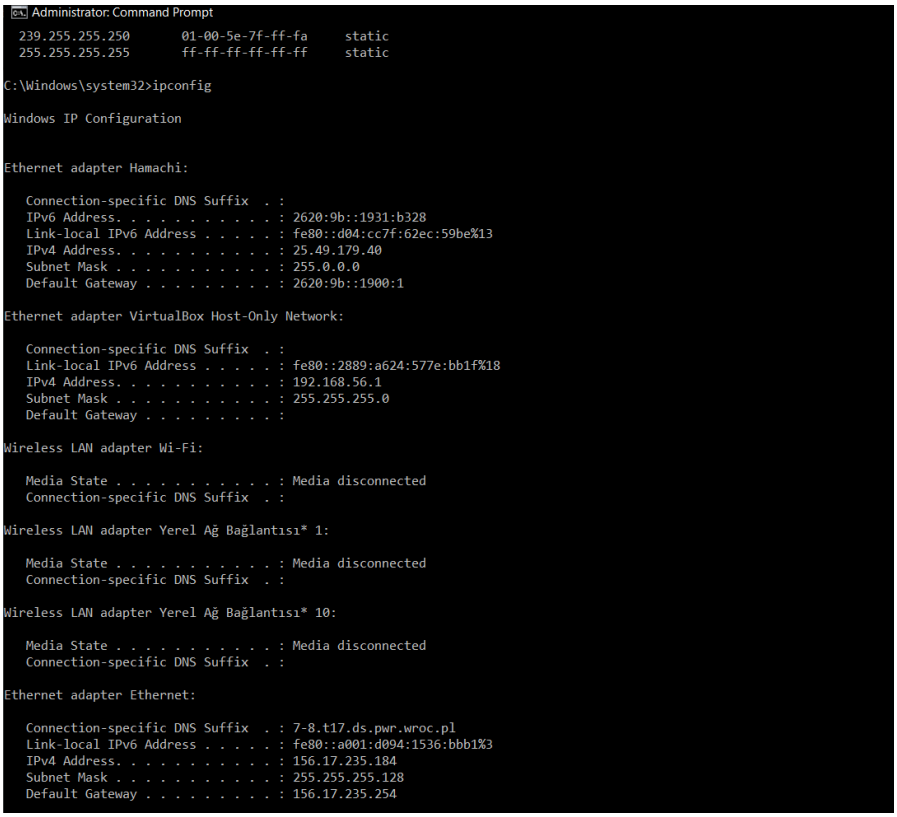
TASK 1

Configure the IP address to static.

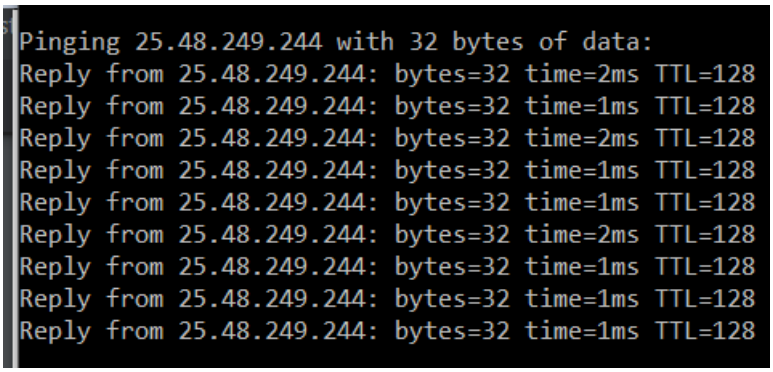


After the configuration we should make IP address to dynamic for connection to teammate using Hamachi.

Hamachi ethernet adapter configurations.

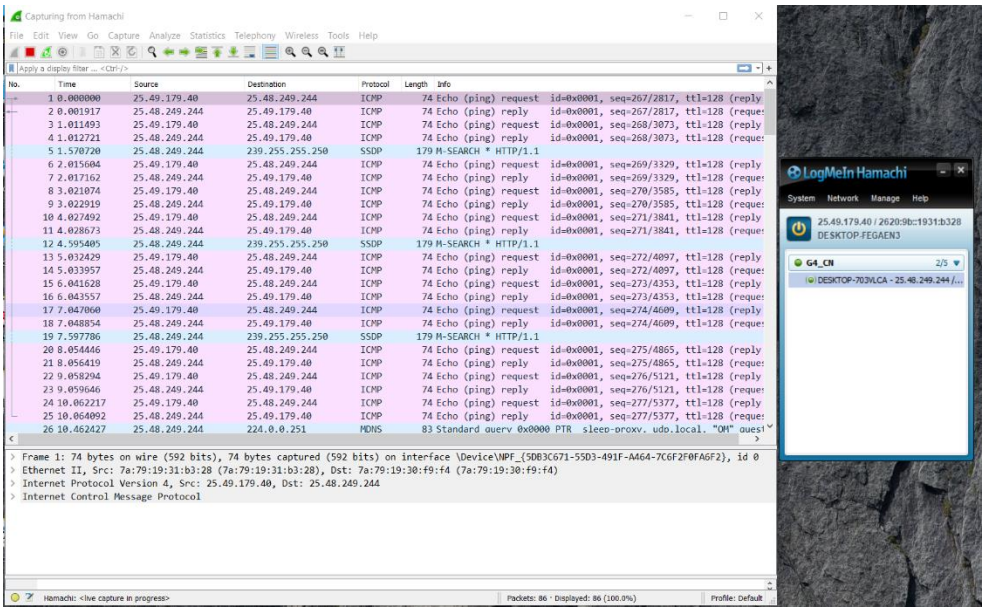


Pinging to teammate.

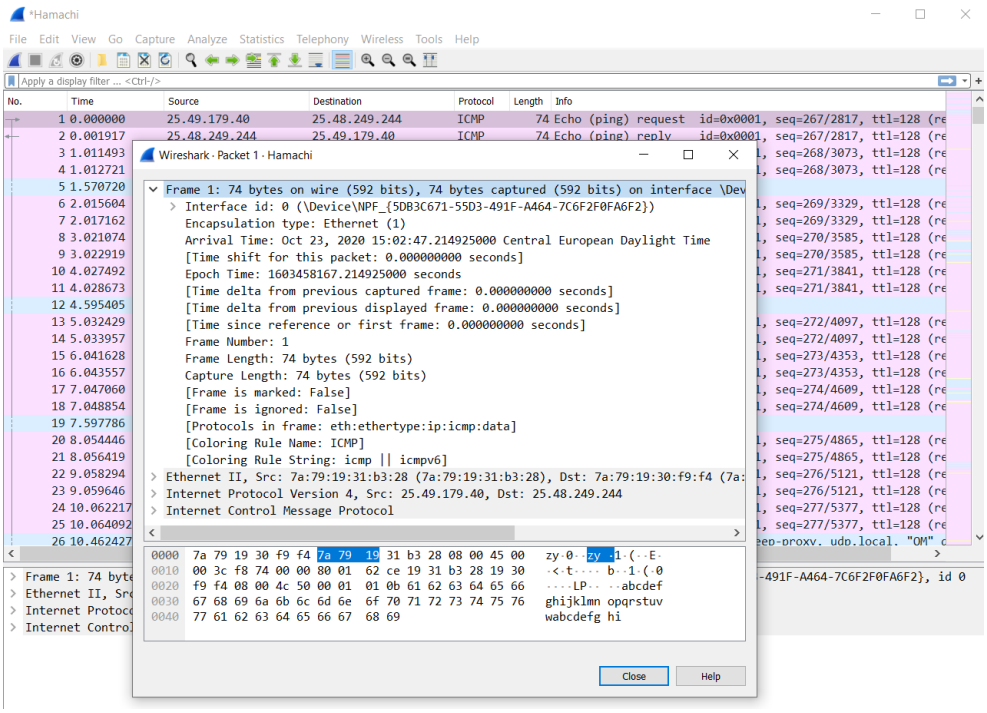


Task 2

Tracking ICMP protocols (sending ping to teammate) in Wireshark program



Analyze the Ethernet frame



Frame ID 1

Analyze the Ethernet frame. Find and write the following data:

Frame 1: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface \Device\NPF_{5DB3C671-55D3-491F-A464-7C6F2F0FA6F2}, id 0

Ethernet II, Src: 7a:79:19:31:b3:28 (7a:79:19:31:b3:28), Dst: 7a:79:19:30:f9:f4 (7a:79:19:30:f9:f4)

0000 7a 79 19 30 f9 f4 7a 79 19 31 b3 28 08 00

Recipient MAC Address : 7a:79:19:30:f9:f4

Sender MAC Address : 7a:79:19:31:b3:28

Internet Protocol Version 4, Src: 25.49.179.40, Dst: 25.48.249.244

Internet Control Message Protocol

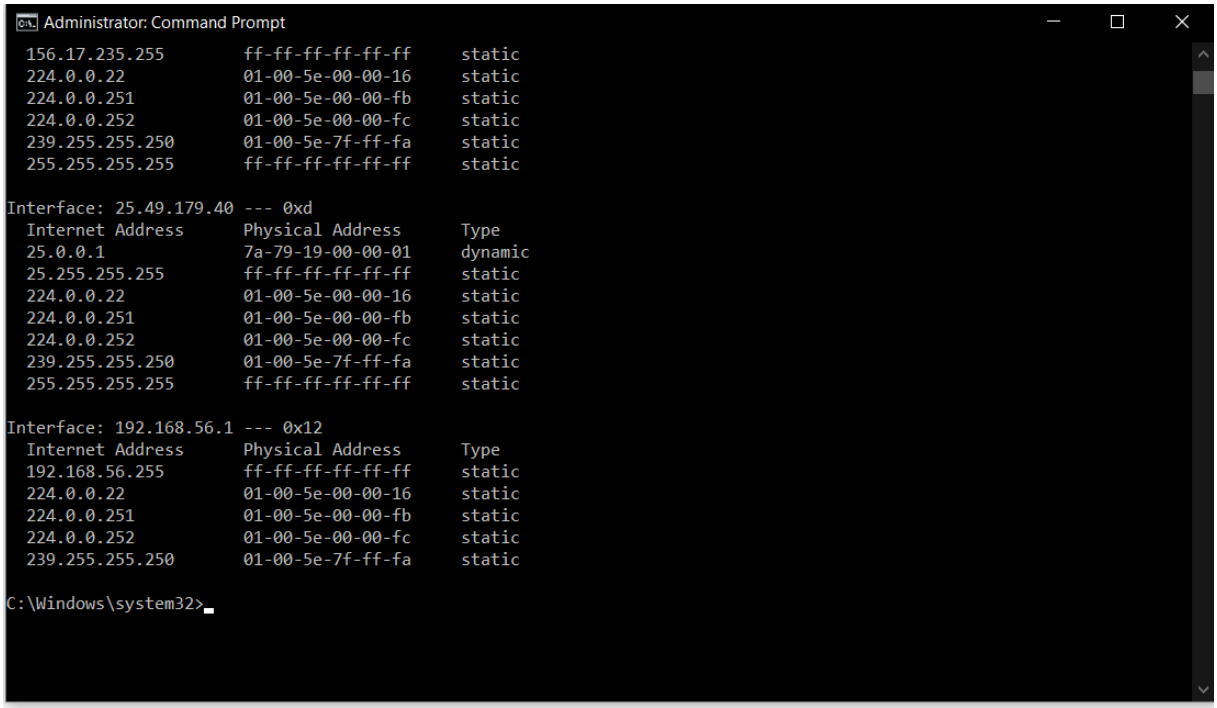
Destination MAC Address -> 7a:79:19:30:f9:f4 -> 7a79.1930.f9f4

Source MAC Address -> 7a:79:19:31:b3:28 -> 7a79.1931.b328

When we compare these, destination physical address (MAC addresses) is lower than source physical address. Because in the second part of addresses, 1 is bigger than 0. That means destination is lower and source is higher.

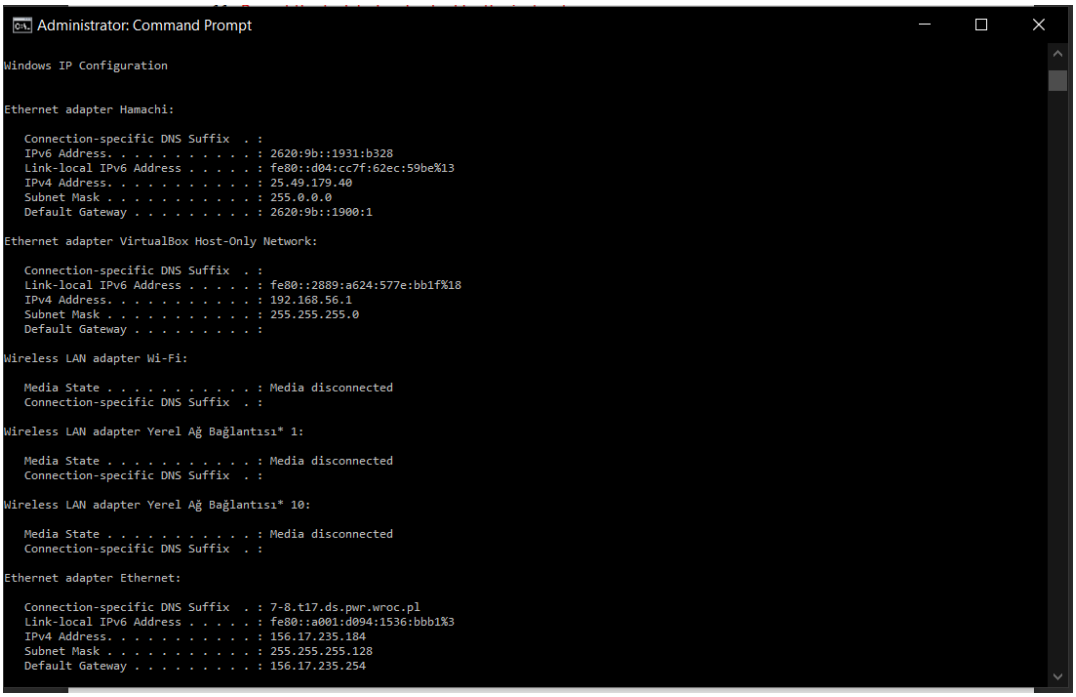
TASK 3

Check the IP addresses on the PC interfaces connected to the external network

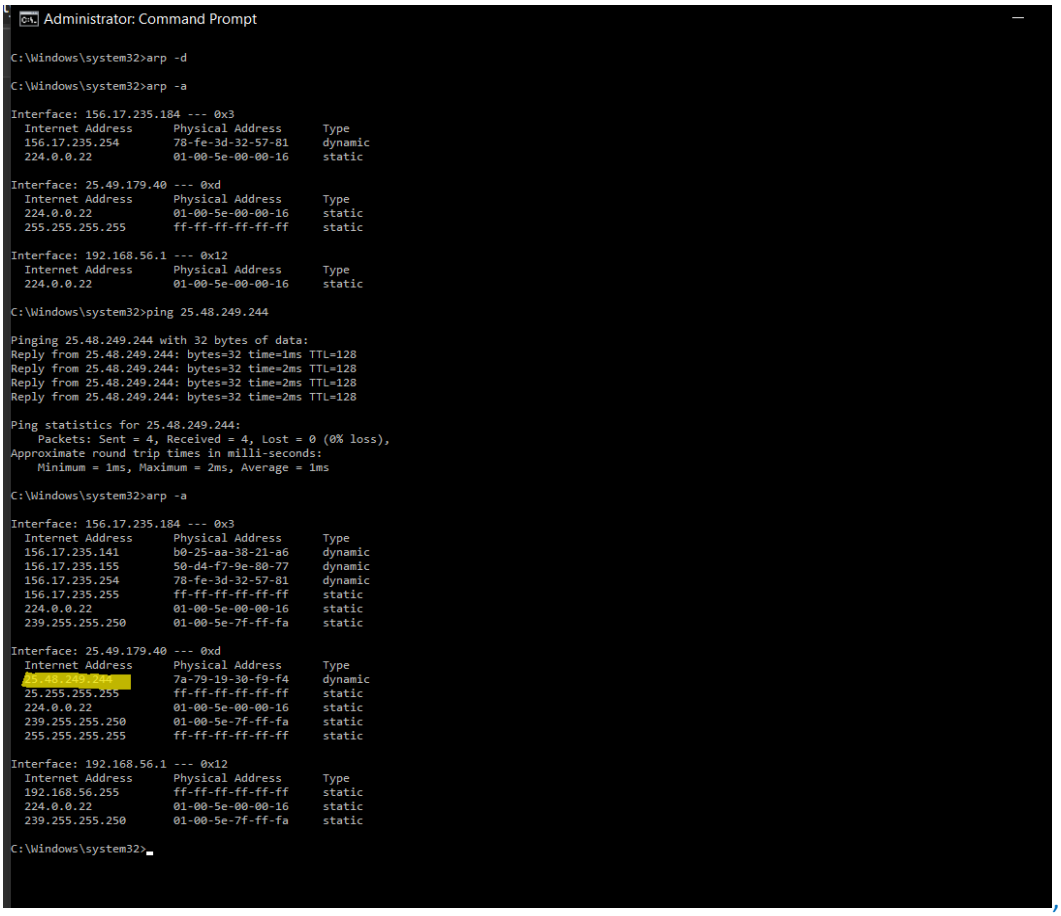


Analysis of the ARP3 protocol.

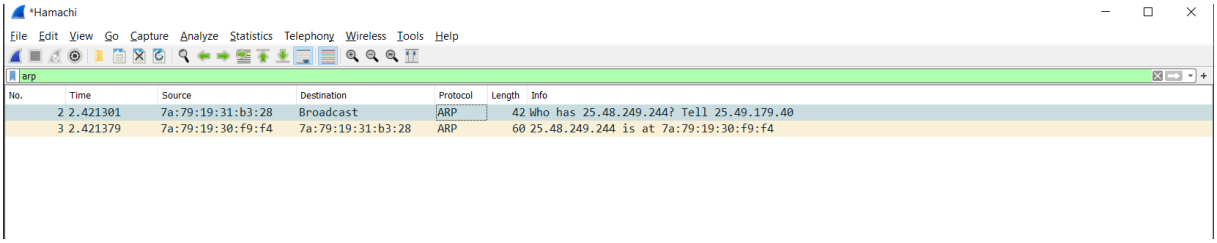
3. Checking physical addresses of external PC network interfaces



4. Analyze the contents of the ARP table of PCs in Windows.



9. Arp Frames



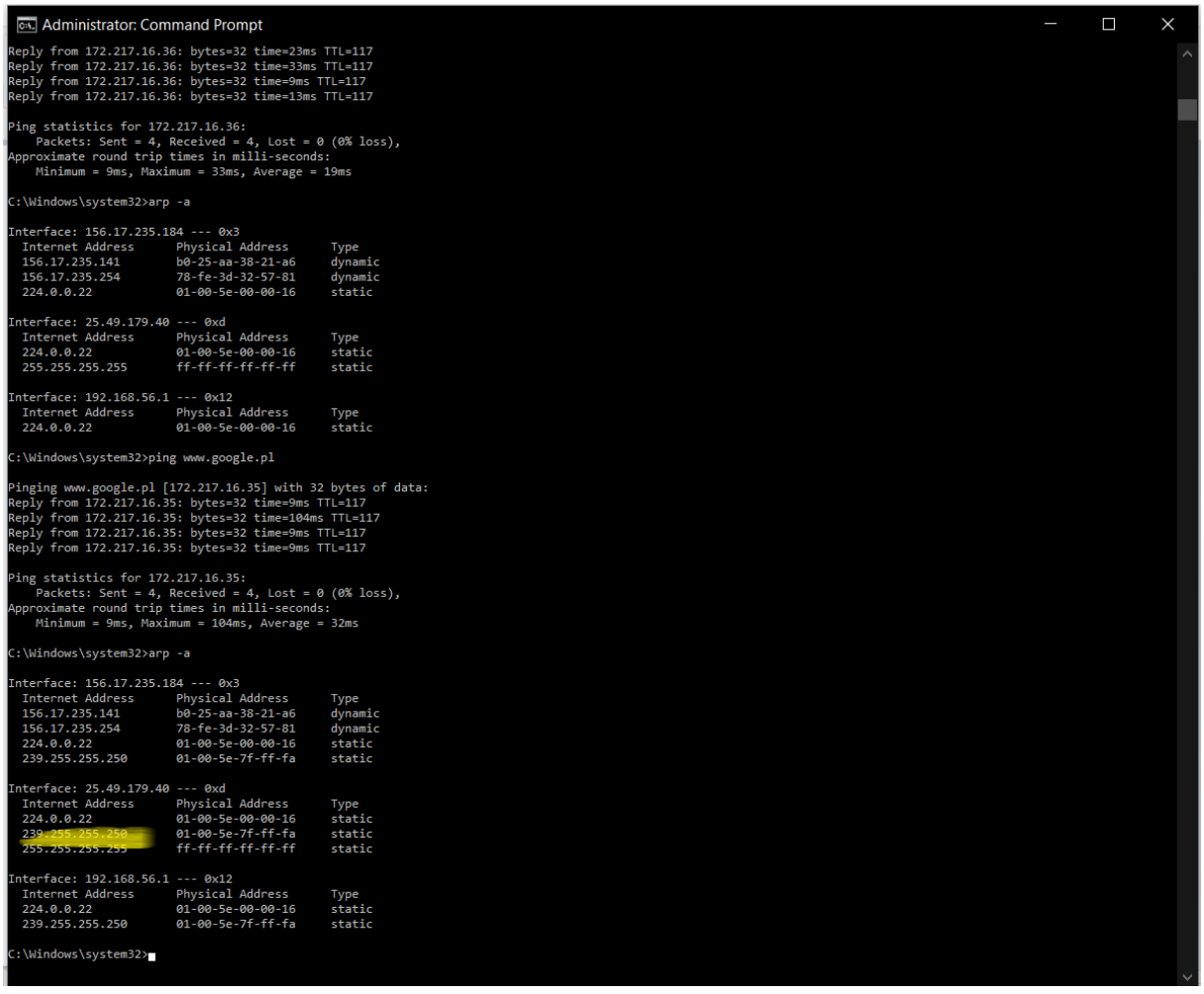
ID – Source and Destination MAC addresses – ARP content

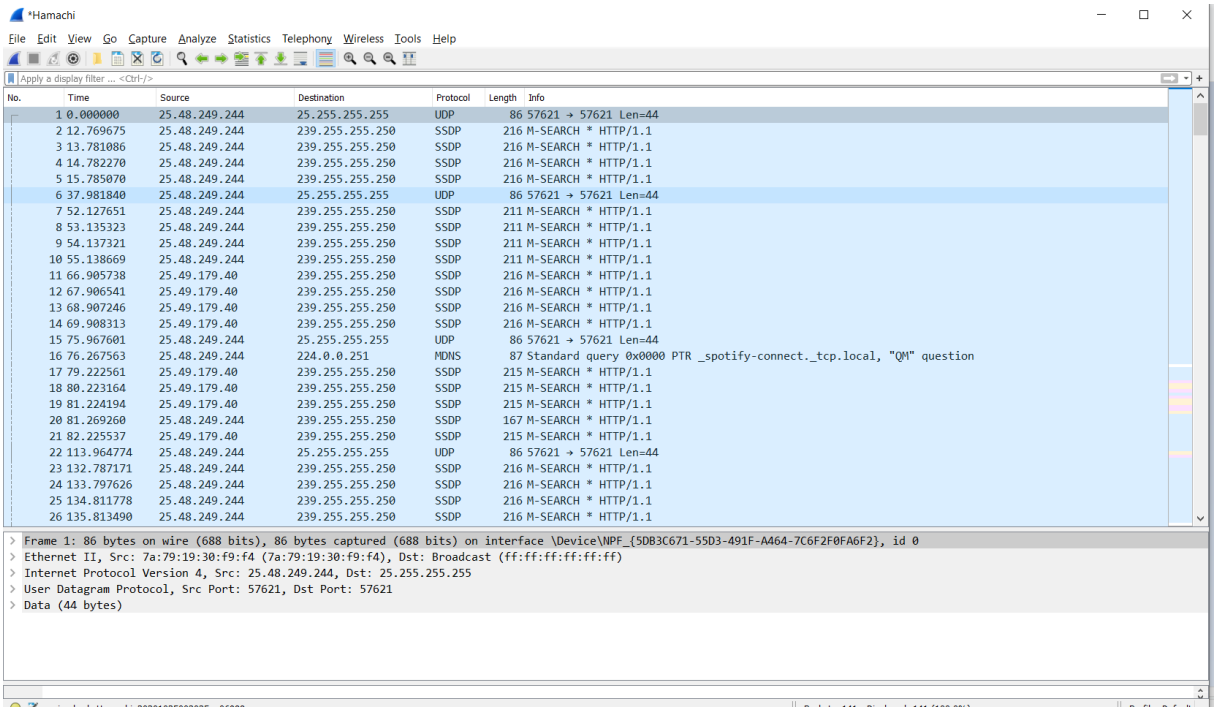
```
> Frame 2: 42 bytes on wire (336 bits), 42 bytes captured (336 bits) on interface \Device\NPF_{5DB3C671-55D3-491F-A464-7C6F2F0FA6F2}, id 0
> Ethernet II, Src: 7a:79:19:31:b3:28 (7a:79:19:31:b3:28), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
> Address Resolution Protocol (request)
```

```
> Frame 3: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface \Device\NPF_{5DB3C671-55D3-491F-A464-7C6F2F0FA6F2}, id 0
> Ethernet II, Src: 7a:79:19:30:f9:f4 (7a:79:19:30:f9:f4), Dst: 7a:79:19:31:b3:28 (7a:79:19:31:b3:28)
> Address Resolution Protocol (reply)
```

ARP protocol analysis for external hosts communication. Analysis of MAC addresses of external hosts

239.255.255.250 IP is added to ARP table. This address is used UPnP / SSDP discover devices on a VLAN. That's the answer of *"why these addresses are not different from each other". So all data are sent via SSDP.*




*Hamachi
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
Apply a display filter ... <Ctrl-/>
No. Time Source Destination Protocol Length Info
1 0.000000 25.48.249.244 25.255.255.255 UDP 86 57621 → 57621 Len=44
2 12.769675 25.48.249.244 239.255.255.250 SSDP 216 M-SEARCH * HTTP/1.1
3 13.781086 25.48.249.244 239.255.255.250 SSDP 216 M-SEARCH * HTTP/1.1
4 14.782270 25.48.249.244 239.255.255.250 SSDP 216 M-SEARCH * HTTP/1.1
5 15.785070 25.48.249.244 239.255.255.250 SSDP 216 M-SEARCH * HTTP/1.1
6 37.981840 25.48.249.244 25.255.255.255 UDP 86 57621 → 57621 Len=44
7 52.127651 25.48.249.244 239.255.255.250 SSDP 211 M-SEARCH * HTTP/1.1
8 53.135323 25.48.249.244 239.255.255.250 SSDP 211 M-SEARCH * HTTP/1.1
9 54.137321 25.48.249.244 239.255.255.250 SSDP 211 M-SEARCH * HTTP/1.1
10 55.138669 25.48.249.244 239.255.255.250 SSDP 211 M-SEARCH * HTTP/1.1
11 66.905738 25.49.179.40 239.255.255.250 SSDP 216 M-SEARCH * HTTP/1.1
12 67.906541 25.49.179.40 239.255.255.250 SSDP 216 M-SEARCH * HTTP/1.1
13 68.907246 25.49.179.40 239.255.255.250 SSDP 216 M-SEARCH * HTTP/1.1
14 69.908313 25.49.179.40 239.255.255.250 SSDP 216 M-SEARCH * HTTP/1.1
15 75.967601 25.48.249.244 25.255.255.255 UDP 86 57621 → 57621 Len=44
16 76.267563 25.48.249.244 224.0.0.251 MDNS 87 Standard query 0x0000 PTR _spotify-connect._tcp.local, "QM" question
17 79.222561 25.49.179.40 239.255.255.250 SSDP 215 M-SEARCH * HTTP/1.1
18 80.223164 25.49.179.40 239.255.255.250 SSDP 215 M-SEARCH * HTTP/1.1
19 81.224194 25.49.179.40 239.255.255.250 SSDP 215 M-SEARCH * HTTP/1.1
20 81.269260 25.48.249.244 239.255.255.250 SSDP 167 M-SEARCH * HTTP/1.1
21 82.225537 25.49.179.40 239.255.255.250 SSDP 215 M-SEARCH * HTTP/1.1
22 113.964774 25.48.249.244 25.255.255.255 UDP 86 57621 → 57621 Len=44
23 132.787171 25.48.249.244 239.255.255.250 SSDP 216 M-SEARCH * HTTP/1.1
24 133.797626 25.48.249.244 239.255.255.250 SSDP 216 M-SEARCH * HTTP/1.1
25 134.811778 25.48.249.244 239.255.255.250 SSDP 216 M-SEARCH * HTTP/1.1
26 135.813490 25.48.249.244 239.255.255.250 SSDP 216 M-SEARCH * HTTP/1.1
Frame 1: 86 bytes on wire (688 bits), 86 bytes captured (688 bits) on interface \Device\NPF_{5DB3C671-55D3-491F-A464-7C6F2F0FA6F2}, id 0
Ethernet II, Src: 7a:79:19:30:f9:f4 (7a:79:19:30:f9:f4), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
Internet Protocol Version 4, Src: 25.48.249.244, Dst: 25.255.255.255
User Datagram Protocol, Src Port: 57621, Dst Port: 57621
Data (44 bytes)