

## Lab 03 – Ethernet-ARP-Analysis

**Author:** Nicholas Leoncito

**Course Number/Section:** IS 3413-ON2

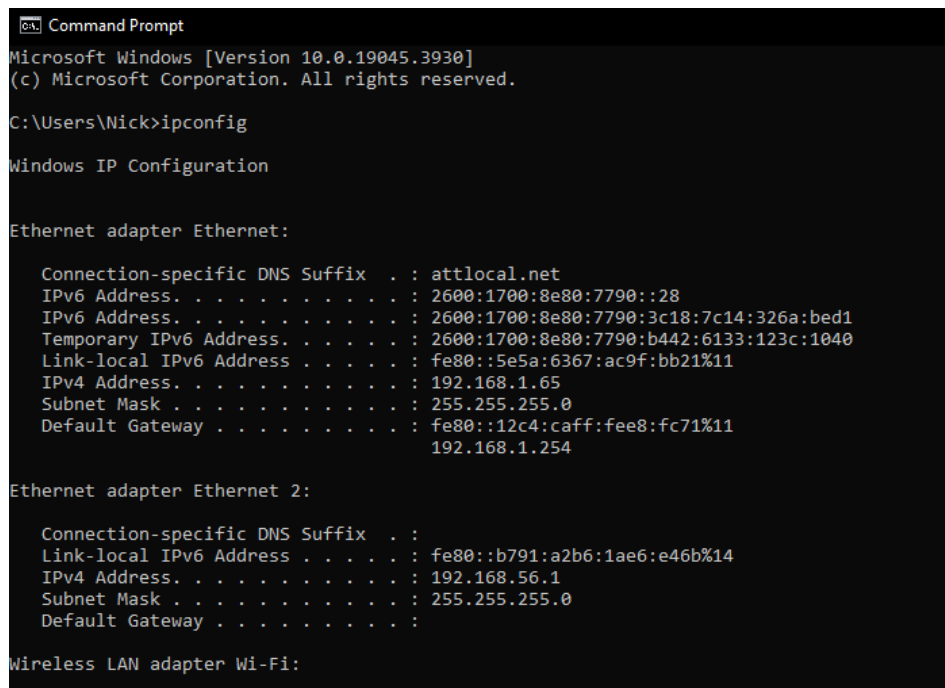
**Date:** 2/13/2024

### INTRODUCTION

This lab delves into the intricacies of Ethernet and Address Resolution Protocol (ARP), highlighting their pivotal roles in network communication and data packet routing. Through hands-on analysis, we aim to unravel the operational dynamics of ARP within an Ethernet-based network environment.

### BREAKPOINT 1

I used the ipconfig command, to provide details on IP configurations and network connections.



```
Command Prompt
Microsoft Windows [Version 10.0.19045.3930]
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C:\Users\Nick>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

    Connection-specific DNS Suffix  . : attlocal.net
    IPv6 Address. . . . . : 2600:1700:8e80:7790::28
    IPv6 Address. . . . . : 2600:1700:8e80:7790:3c18:7c14:326a:bed1
    Temporary IPv6 Address. . . . . : 2600:1700:8e80:7790:b442:6133:123c:1040
    Link-local IPv6 Address . . . . . : fe80::5e5a:6367:ac9f:bb21%11
    IPv4 Address. . . . . : 192.168.1.65
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : fe80::12c4:caff:fee8:fc71%11
                                192.168.1.254

Ethernet adapter Ethernet 2:

    Connection-specific DNS Suffix  . :
    Link-local IPv6 Address . . . . . : fe80::b791:a2b6:1ae6:e46b%14
    IPv4 Address. . . . . : 192.168.56.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . :

Wireless LAN adapter Wi-Fi:
```



Following that, I used the `netstat -r` command to display the routing table, revealing the paths for packet transmission and identifying the primary gateway.

```
C:\Users\Nick>netstat -r
=====
Interface List
=====
 11...a8 a1 59 42 4f 4c .....Realtek PCIe GbE Family Controller
 14...0a 00 27 00 00 0e .....VirtualBox Host-Only Ethernet Adapter
  6...bc 54 2f 2e f3 c9 .....Intel(R) Dual Band Wireless-AC 3168
 18...bc 54 2f 2e f3 ca .....Microsoft Wi-Fi Direct Virtual Adapter
 19...be 54 2f 2e f3 c9 .....Microsoft Wi-Fi Direct Virtual Adapter #2
  5...bc 54 2f 2e f3 cd .....Bluetooth Device (Personal Area Network)
  1.....Software Loopback Interface 1
=====

IPv4 Route Table
=====
Active Routes:
Network Destination        Netmask          Gateway          Interface        Metric
0.0.0.0                    0.0.0.0          192.168.1.254    192.168.1.65     25
127.0.0.0                  255.0.0.0        On-link          127.0.0.1        331
```

I then used `arp -a` to list the ARP table entries, showcasing the mapping of IP addresses to MAC addresses within the network. This step set the foundational knowledge necessary for analyzing ARP packet exchanges in subsequent sections.

```
C:\Users\Nick>arp -a

Interface: 192.168.1.65 --- 0xb
 Internet Address      Physical Address      Type
192.168.1.254          10-c4-ca-e8-fc-71     dynamic
192.168.1.255          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

Interface: 192.168.56.1 --- 0xe
 Internet Address      Physical Address      Type
192.168.56.255         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
```



## BREAKPOINT 2

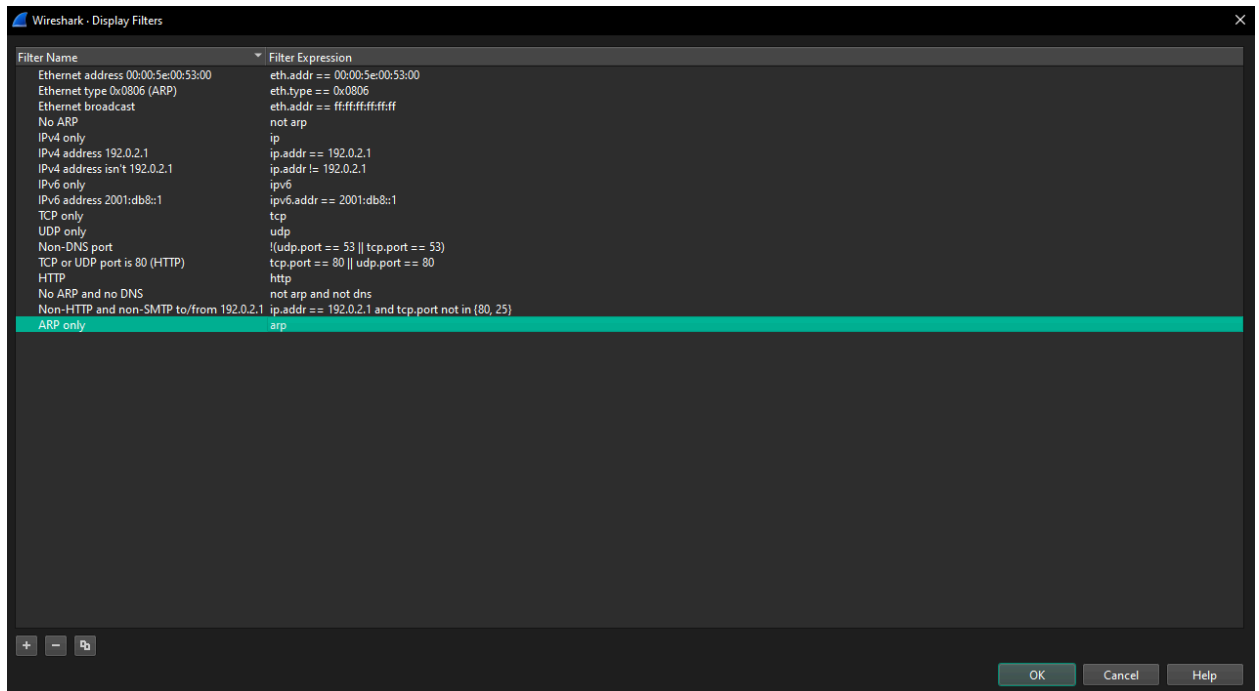
*After running wireshark on my main ethernet for about a minute i have collected some ARP packets*

No.	Time	Source	Destination	Protocol	Length
964	2024/042 05:14:51.616410	192.168.1.65	162.159.135.234	TCP	5
965	2024/042 05:14:51.888282	162.159.135.234	192.168.1.65	TLSv1.2	20
966	2024/042 05:14:51.933813	192.168.1.65	162.159.135.234	TCP	5
967	2024/042 05:14:52.495135	HUMAX_e8:fc:71	Broadcast	0x7373	12
968	2024/042 05:14:52.495359	HUMAX_e8:fc:71	Spanning-tree-(for-...	STP	6
969	2024/042 05:14:52.559459	162.159.135.234	192.168.1.65	TLSv1.2	19
970	2024/042 05:14:52.600559	192.168.1.65	162.159.135.234	TCP	5
971	2024/042 05:14:53.519204	HUMAX_e8:fc:71	Broadcast	0x7373	12
972	2024/042 05:14:53.519425	HUMAX_e8:fc:71	Spanning-tree-(for-...	STP	6
973	2024/042 05:14:53.548822	192.168.1.65	35.168.188.231	TLSv1.2	9
974	2024/042 05:14:53.617996	35.168.188.231	192.168.1.65	TCP	6
975	2024/042 05:14:54.203548	HUMAX_e8:fc:71	Broadcast	ARP	6
976	2024/042 05:14:54.203656	HUMAX_e8:fc:71	Broadcast	ARP	6
977	2024/042 05:14:54.203768	HUMAX_e8:fc:71	Broadcast	ARP	6
978	2024/042 05:14:54.203887	HUMAX_e8:fc:71	Broadcast	ARP	6
979	2024/042 05:14:54.203993	HUMAX_e8:fc:71	Broadcast	ARP	6
980	2024/042 05:14:54.204104	HUMAX_e8:fc:71	Broadcast	ARP	6
981	2024/042 05:14:54.204111	ASRockIncorp_42:4f:...	HUMAX_e8:fc:71	ARP	4
982	2024/042 05:14:54.204216	HUMAX_e8:fc:71	Broadcast	ARP	6
983	2024/042 05:14:54.543095	HUMAX_e8:fc:71	Broadcast	0x7373	12
984	2024/042 05:14:54.543332	HUMAX_e8:fc:71	Spanning-tree-(for-...	STP	6
985	2024/042 05:14:55.039873	162.159.135.234	192.168.1.65	TLSv1.2	10
986	2024/042 05:14:55.087108	192.168.1.65	162.159.135.234	TCP	5
987	2024/042 05:14:55.503179	HUMAX_e8:fc:71	Spanning-tree-(for-...	STP	6
988	2024/042 05:14:55.567070	HUMAX_e8:fc:71	Broadcast	0x7373	12
989	2024/042 05:14:55.946288	162.159.135.234	192.168.1.65	TLSv1.2	64
990	2024/042 05:14:55.946528	162.159.135.234	192.168.1.65	TLSv1.2	33

The main interfaces i decided to run are having spotify play as well as having a youtube buffer in the background.

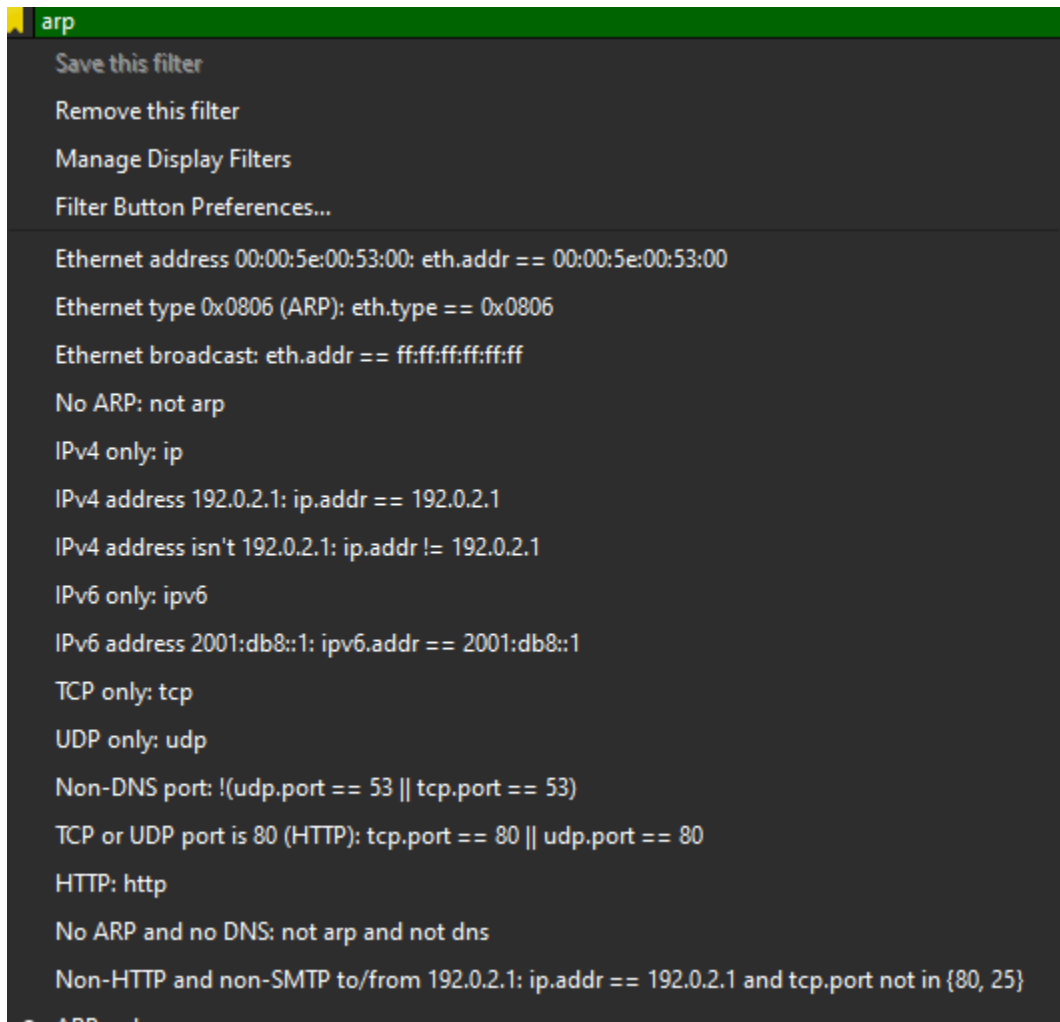
I then created a filter to show only ARP packets in wireshark.







Then i applied the filter to wireshark



No.	Time	Source	Destination	Protocol	Length	Info
7	2024/042 05:13:31.949693	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.68? Tell 192.168.1.254
8	2024/042 05:13:31.949803	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.66? Tell 192.168.1.254
9	2024/042 05:13:31.949915	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.67? Tell 192.168.1.254
10	2024/042 05:13:31.950027	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.72? Tell 192.168.1.254
11	2024/042 05:13:31.950155	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.70? Tell 192.168.1.254
12	2024/042 05:13:31.950267	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.65? Tell 192.168.1.254
13	2024/042 05:13:31.950274	ASRockIncorp_42:4f:...	HUMAX_e8:fc:71	ARP	42	192.168.1.65 is at a8:a1:59:42:4f:4c
14	2024/042 05:13:31.950380	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.73? Tell 192.168.1.254
90	2024/042 05:13:42.570588	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.68? Tell 192.168.1.254
91	2024/042 05:13:42.570710	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.66? Tell 192.168.1.254
92	2024/042 05:13:42.570821	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.67? Tell 192.168.1.254
93	2024/042 05:13:42.570933	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.72? Tell 192.168.1.254
94	2024/042 05:13:42.571045	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.70? Tell 192.168.1.254
95	2024/042 05:13:42.571157	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.65? Tell 192.168.1.254
96	2024/042 05:13:42.571164	ASRockIncorp_42:4f:...	HUMAX_e8:fc:71	ARP	42	192.168.1.65 is at a8:a1:59:42:4f:4c
97	2024/042 05:13:42.571269	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.73? Tell 192.168.1.254
182	2024/042 05:13:52.037660	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.68? Tell 192.168.1.254
183	2024/042 05:13:52.037790	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.66? Tell 192.168.1.254
184	2024/042 05:13:52.037918	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.67? Tell 192.168.1.254
185	2024/042 05:13:52.038030	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.72? Tell 192.168.1.254
186	2024/042 05:13:52.038126	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.70? Tell 192.168.1.254
187	2024/042 05:13:52.038237	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.65? Tell 192.168.1.254
188	2024/042 05:13:52.038245	ASRockIncorp_42:4f:...	HUMAX_e8:fc:71	ARP	42	192.168.1.65 is at a8:a1:59:42:4f:4c
189	2024/042 05:13:52.038350	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.73? Tell 192.168.1.254
307	2024/042 05:14:02.873494	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.68? Tell 192.168.1.254
308	2024/042 05:14:02.873605	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.66? Tell 192.168.1.254
309	2024/042 05:14:02.873734	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.67? Tell 192.168.1.254



7	2024/042	05:13:31.949693	HUMAX_e8:fc:71	Broadcast	ARP
8	2024/042	05:13:31.949803	HUMAX_e8:fc:71	Broadcast	ARP
9	2024/042	05:13:31.949915	HUMAX_e8:fc:71	Broadcast	ARP
10	2024/042	05:13:31.950027	HUMAX_e8:fc:71	Broadcast	ARP
11	2024/042	05:13:31.950155	HUMAX_e8:fc:71	Broadcast	ARP
12	2024/042	05:13:31.950267	HUMAX_e8:fc:71	Broadcast	ARP
13	2024/042	05:13:31.950274	ASRockIncorp 42:4f:...	HUMAX_e8:fc:71	ARP
14	2024/042	05:13:31.950380	HUMAX_e8:fc:71	Broadcast	ARP
90	2024/042	05:13:42.570588	HUMAX_e8:fc:71	Broadcast	ARP
91	2024/042	05:13:42.570710	HUMAX_e8:fc:71	Broadcast	ARP
92	2024/042	05:13:42.570821	HUMAX_e8:fc:71	Broadcast	ARP
93	2024/042	05:13:42.570933	HUMAX_e8:fc:71	Broadcast	ARP
94	2024/042	05:13:42.571045	HUMAX_e8:fc:71	Broadcast	ARP
95	2024/042	05:13:42.571157	HUMAX_e8:fc:71	Broadcast	ARP
96	2024/042	05:13:42.571164	ASRockIncorp 42:4f:...	HUMAX_e8:fc:71	ARP
97	2024/042	05:13:42.571269	HUMAX_e8:fc:71	Broadcast	ARP
182	2024/042	05:13:52.037660	HUMAX_e8:fc:71	Broadcast	ARP
183	2024/042	05:13:52.037790	HUMAX_e8:fc:71	Broadcast	ARP
184	2024/042	05:13:52.037918	HUMAX_e8:fc:71	Broadcast	ARP
185	2024/042	05:13:52.038030	HUMAX_e8:fc:71	Broadcast	ARP
186	2024/042	05:13:52.038126	HUMAX_e8:fc:71	Broadcast	ARP
187	2024/042	05:13:52.038237	HUMAX_e8:fc:71	Broadcast	ARP
188	2024/042	05:13:52.038245	ASRockIncorp 42:4f:...	HUMAX_e8:fc:71	ARP
189	2024/042	05:13:52.038350	HUMAX_e8:fc:71	Broadcast	ARP
307	2024/042	05:14:02.873494	HUMAX_e8:fc:71	Broadcast	ARP
308	2024/042	05:14:02.873605	HUMAX_e8:fc:71	Broadcast	ARP
309	2024/042	05:14:02.873734	HUMAX_e8:fc:71	Broadcast	ARP

I've decided to use the ASROCK Incorp ARP Packets for analysis because my motherboard is an asrock so i believe those are my packets.

### BREAKPOINT 3

I analyzed two ARP (Address Resolution Protocol) packets exchanged between my network card [ASRock Inc.] and my router [HUMAX]. Initially, my computer's network card issues an ARP request to resolve the router's MAC (Media Access Control) address, corresponding to its IP address. This process is crucial for enabling direct packet exchange within the local network, such as requesting data from the internet, which could include streaming a YouTube video. Contrary to the initial description, the ARP request from my computer specifically targets the router's IP address, and the router responds with an ARP reply containing its MAC address. ARP does not involve sending packets to all devices to find a matching MAC address; instead, it directly queries a specific IP address or responds to such queries within the network.



**\*Ethernet**

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

eth.addr eq 10:c4:ca:e8:fc:71 and eth.addr eq a8:a1:59:42:4f:4c

No.	Time	Source	Destination	Protocol	Length	Info
1	2024/042 05:13:31.171547	162.159.135.234	192.168.1.65	TLSv1.2	190	Application Data
2	2024/042 05:13:31.221188	192.168.1.65	162.159.135.234	TCP	54	57649 → 443 [ACK] Seq=1
3	2024/042 05:13:31.454152	162.159.135.234	192.168.1.65	TLSv1.2	266	Application Data
4	2024/042 05:13:31.508265	192.168.1.65	162.159.135.234	TCP	54	57649 → 443 [ACK] Seq=1
13	2024/042 05:13:31.950274	ASRockIncorp_42:4f:...	HUMAX_e8:fc:71	ARP	42	192.168.1.65 is at a8:a1:59:42:4f:4c
15	2024/042 05:13:32.488415	2607:f8b0:4008:805:...	2600:1700:8e80:7790:...	UDP	100	443 → 62101 Len=38
17	2024/042 05:13:32.508578	2600:1700:8e80:7790:...	2607:f8b0:4008:805:...	UDP	95	62101 → 443 Len=33
19	2024/042 05:13:32.698621	2600:1700:8e80:7790:...	2607:f8b0:4008:805:...	UDP	91	62101 → 443 Len=29
20	2024/042 05:13:32.782565	2607:f8b0:4008:805:...	2600:1700:8e80:7790:...	UDP	88	443 → 62101 Len=26
21	2024/042 05:13:32.984676	2600:1700:8e80:7790:...	2607:f8b0:4008:805:...	UDP	91	62101 → 443 Len=29
22	2024/042 05:13:33.068348	2607:f8b0:4008:805:...	2600:1700:8e80:7790:...	UDP	88	443 → 62101 Len=26
23	2024/042 05:13:33.270742	2600:1700:8e80:7790:...	2607:f8b0:4008:805:...	UDP	91	62101 → 443 Len=29
24	2024/042 05:13:33.324688	162.159.135.234	192.168.1.65	TLSv1.2	199	Application Data
25	2024/042 05:13:33.354303	2607:f8b0:4008:805:...	2600:1700:8e80:7790:...	UDP	88	443 → 62101 Len=26
26	2024/042 05:13:33.378688	192.168.1.65	162.159.135.234	TCP	54	57649 → 443 [ACK] Seq=1
27	2024/042 05:13:33.423966	162.159.135.234	192.168.1.65	TLSv1.2	110	Application Data
28	2024/042 05:13:33.472780	192.168.1.65	162.159.135.234	TCP	54	57649 → 443 [ACK] Seq=1
30	2024/042 05:13:33.566809	2600:1700:8e80:7790:...	2607:f8b0:4008:805:...	UDP	91	62101 → 443 Len=29
32	2024/042 05:13:33.650601	2607:f8b0:4008:805:...	2600:1700:8e80:7790:...	UDP	88	443 → 62101 Len=26
33	2024/042 05:13:33.662766	192.168.1.65	151.101.203.9	TCP	55	58223 → 443 [ACK] Seq=1
34	2024/042 05:13:33.675638	151.101.203.9	192.168.1.65	TCP	66	443 → 58223 [ACK] Seq=1
35	2024/042 05:13:33.852867	2600:1700:8e80:7790:...	2607:f8b0:4008:805:...	UDP	91	62101 → 443 Len=29
36	2024/042 05:13:33.936613	2607:f8b0:4008:805:...	2600:1700:8e80:7790:...	UDP	88	443 → 62101 Len=26
37	2024/042 05:13:34.138939	2600:1700:8e80:7790:...	2607:f8b0:4008:805:...	UDP	91	62101 → 443 Len=29
38	2024/042 05:13:34.222803	2607:f8b0:4008:805:...	2600:1700:8e80:7790:...	UDP	88	443 → 62101 Len=26
40	2024/042 05:13:34.631065	2600:1700:8e80:7790:...	2607:f8b0:4008:805:...	UDP	91	62101 → 443 Len=29
576	2024/042 05:14:23.048469	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.67? Tell 192.168.1.254
577	2024/042 05:14:23.048596	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.72? Tell 192.168.1.254
578	2024/042 05:14:23.048708	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.70? Tell 192.168.1.254
579	2024/042 05:14:23.048821	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.65? Tell 192.168.1.254
580	2024/042 05:14:23.048828	ASRockIncorp_42:4f:...	HUMAX_e8:fc:71	ARP	42	192.168.1.65 is at a8:a1:59:42:4f:4c
581	2024/042 05:14:23.048916	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.73? Tell 192.168.1.254
681	2024/042 05:14:32.591117	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.68? Tell 192.168.1.254
682	2024/042 05:14:32.591228	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.66? Tell 192.168.1.254
683	2024/042 05:14:32.591340	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.67? Tell 192.168.1.254
684	2024/042 05:14:32.591484	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.72? Tell 192.168.1.254
685	2024/042 05:14:32.591595	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.70? Tell 192.168.1.254
686	2024/042 05:14:32.591708	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.65? Tell 192.168.1.254
687	2024/042 05:14:32.591715	ASRockIncorp_42:4f:...	HUMAX_e8:fc:71	ARP	42	192.168.1.65 is at a8:a1:59:42:4f:4c
688	2024/042 05:14:32.591804	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.73? Tell 192.168.1.254
787	2024/042 05:14:43.249960	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.68? Tell 192.168.1.254
788	2024/042 05:14:43.250084	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.66? Tell 192.168.1.254
789	2024/042 05:14:43.250236	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.67? Tell 192.168.1.254
790	2024/042 05:14:43.250308	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.72? Tell 192.168.1.254
791	2024/042 05:14:43.250427	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.70? Tell 192.168.1.254
792	2024/042 05:14:43.250532	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.65? Tell 192.168.1.254
793	2024/042 05:14:43.250539	ASRockIncorp_42:4f:...	HUMAX_e8:fc:71	ARP	42	192.168.1.65 is at a8:a1:59:42:4f:4c
794	2024/042 05:14:43.250646	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.73? Tell 192.168.1.254
975	2024/042 05:14:54.203548	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.68? Tell 192.168.1.254
976	2024/042 05:14:54.203656	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.66? Tell 192.168.1.254
977	2024/042 05:14:54.203768	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.67? Tell 192.168.1.254
978	2024/042 05:14:54.203887	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.72? Tell 192.168.1.254

**Address Resolution Protocol (reply)**

Hardware type: Ethernet (1)  
Protocol type: IPv4 (0x0800)  
Hardware size: 6  
Protocol size: 4  
Opcode: reply (2)  
Sender MAC address: ASRockIncorp\_42:4f:4c (a8:a1:59:42:4f:4c)  
Sender IP address: 192.168.1.65  
Target MAC address: HUMAX\_e8:fc:71 (10:c4:ca:e8:fc:71)  
Target IP address: 192.168.1.254

96	2024/042 05:13:42.571164	ASRockIncorp_42:4f:...	HUMAX_e8:fc:71	ARP	42	192.168.1.65 is at a8:a1:59:42:4f:4c
97	2024/042 05:13:42.571269	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.73? Tell 192.168.1.254
182	2024/042 05:13:52.037660	HUMAX_e8:fc:71	Broadcast	ARP	60	Who has 192.168.1.68? Tell 192.168.1.254



```
Address: HUMAX_e8:fc:71 (18:c4:ca:e8:fc:71)
.... 0. .... = LG bit: Globally unique address (factory default)
.... 0. .... = IG bit: Individual address (unicast)
Type: ARP (0x0806)
Padding: 00000000000000000000000000000000
+ Address Resolution Protocol (request)
  Hardware type: Ethernet (1)
  Protocol type: IPv4 (0x0800)
  Hardware size: 6
  Protocol size: 4
  Opcode: request (1)
  Sender MAC address: HUMAX_e8:fc:71 (18:c4:ca:e8:fc:71)
  Sender IP address: 192.168.1.254
  Target MAC address: Broadcast (ff:ff:ff:ff:ff:ff)
  Target IP address: 192.168.1.73
```

## LIMITATIONS/CONCLUSION

This Labs exploration into Ethernet and ARP protocols has shed light on the underlying mechanisms that ensure efficient network communication. Despite the focused scope, the insights garnered from analyzing specific ARP packets offer a foundational understanding of network interactions and their impact on data transmission.

## REFERENCES

Zydyk, Mariusz. "Address Resolution Protocol (ARP)." *Networking*, 1 Dec. 2023,

[www.techtarget.com/searchnetworking/definition/Address-Resolution-Protocol-ARP](https://www.techtarget.com/searchnetworking/definition/Address-Resolution-Protocol-ARP).

## COLLABORATION

I worked alone on this lab.