

山东大学\_\_\_\_\_计算机\_\_\_\_\_学院

\_\_\_\_\_计算机网络\_\_\_\_\_课程实验报告

学号：	姓名：	班级：
实验题目： Ethernet and ARP		
实验学时： 2h	实验日期： 2023. 05. 08	
实验目的： 学习有关 Ethernet 和 ARP 的相关知识		
硬件环境： Windows10 家庭版		
软件环境： Wireshark		
实验步骤与内容： 实验内容： 1. What is the 48-bit Ethernet address of your computer?  2. What is the 48-bit destination address in the Ethernet frame? Is this the Ethernet address of gaia.cs.umass.edu? (Hint: the answer is <i>no</i> ). What device has this as its Ethernet address? [Note: this is an important question, and one that students sometimes get wrong. Re-read pages 468-469 in the text and make sure you understand the answer here.  3. Give the hexadecimal value for the two-byte Frame type field. What upper layer protocol does this correspond to?  4. How many bytes from the very start of the Ethernet frame does the ASCII “G” in “GET” appear in the Ethernet frame?  5. What is the value of the Ethernet source address? Is this the address of your computer, or of gaia.cs.umass.edu (Hint: the answer is <i>no</i> ). What device has this as its Ethernet address?  6. What is the destination address in the Ethernet frame? Is this the Ethernet address of your computer?  7. Give the hexadecimal value for the two-byte Frame type field. What upper layer protocol does this correspond to?  8. How many bytes from the very start of the Ethernet frame does the ASCII “O” in “OK” (i.e., the HTTP response code) appear in the Ethernet frame?  9. Write down the contents of your computer’s ARP cache. What is the meaning of each column value?  10. What are the hexadecimal values for the source and destination addresses in the Ethernet frame		

containing the ARP request message?

11. Give the hexadecimal value for the two-byte Ethernet Frame type field. What upper layer protocol does this correspond to?

12. Download the ARP specification from <ftp://ftp.rfc-editor.org/in-notes/std/std37.txt>. A readable, detailed discussion of ARP is also at <http://www.erg.abdn.ac.uk/users/gorry/course/inet-pages/arp.html>.

a) How many bytes from the very beginning of the Ethernet frame does the ARP *opcode* field begin?

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?

c) Does the ARP message contain the IP address of the sender?

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

13. 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?

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?

c) Where in the ARP message does the “answer” to the earlier ARP request appear – the IP address of the machine having the Ethernet address whose corresponding IP address is being queried?

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

15. Open the *ethernet-ethereal-trace-1* trace file in

<http://gaia.cs.umass.edu/wireshark-labs/wireshark-traces.zip>. The first and second ARP packets in this trace correspond to an ARP request sent by the computer running Wireshark, and the ARP reply sent to the computer running Wireshark by the computer with the ARP-requested Ethernet address. But there is yet another computer on this network, as indicated by packet 6 – another ARP request. Why is there no ARP reply (sent in response to the ARP request in packet 6) in the packet trace?

实验步骤：

根据实验指导书进行抓包，并查看相应的封包，本实验主要学习 ARP 的内容，在命令行中输入 `arp -a` 可以查看相关缓存信息。

1. 本机的 48 位以太网地址是 14:5a:fc:1f:d7:61。

2425	26.404...	172.25.149.189	128.119.245.12	HTTP	493 GET /wireshark-labs/HTTP-ethereal-lab-file3.html HTTP/1.1
2451	26.665...	128.119.245.12	172.25.149.189	HTTP	535 HTTP/1.1 200 OK (text/html)
2453	26.692...	172.25.149.189	128.119.245.12	HTTP	450 GET /favicon.ico HTTP/1.1
2469	26.963...	128.119.245.12	172.25.149.189	HTTP	539 HTTP/1.1 404 Not Found (text/html)

>	Frame 2425: 493 bytes on wire (3944 bits), 493 bytes captured (3944 bits) on interface \Device\NPF	0000	28 a2 4b f6
▼	Ethernet II, Src: LiteonTe_1f:d7:61 (14:5a:fc:1f:d7:61), Dst: JuniperN_f6:12:a0 (28:a2:4b:f6:12:a0)	0010	01 df 91 82
	> Destination: JuniperN_f6:12:a0 (28:a2:4b:f6:12:a0)	0020	f5 0c 34 9d
	> Source: LiteonTe_1f:d7:61 (14:5a:fc:1f:d7:61)	0030	02 01 70 f3
	Type: IPv4 (0x0800)	0040	68 61 72 6b

2. 以太网帧中的目标地址是 28:a2:4b:f6:12:a0, 并不是 gaia.cs.umass.edu 的以太网地址, 而是我们连接该子网路由器的 MAC 地址。

3. 16 进制的值是 0x0800, 对应的上层协议是 IPv4。

2425	26.404...	172.25.149.189	128.119.245.12	HTTP	493 GET /wireshark-labs/HTTP-ethereal-lab-file3.html HTTP/1.1
2451	26.665...	128.119.245.12	172.25.149.189	HTTP	535 HTTP/1.1 200 OK (text/html)
2453	26.692...	172.25.149.189	128.119.245.12	HTTP	450 GET /favicon.ico HTTP/1.1
2469	26.963...	128.119.245.12	172.25.149.189	HTTP	539 HTTP/1.1 404 Not Found (text/html)

>	Frame 2425: 493 bytes on wire (3944 bits), 493 bytes captured (3944 bits) on interface \Device\NPF	0000	28 a2 4b f6
▼	Ethernet II, Src: LiteonTe_1f:d7:61 (14:5a:fc:1f:d7:61), Dst: JuniperN_f6:12:a0 (28:a2:4b:f6:12:a0)	0010	01 df 91 82
	> Destination: JuniperN_f6:12:a0 (28:a2:4b:f6:12:a0)	0020	f5 0c 34 9d
	> Source: LiteonTe_1f:d7:61 (14:5a:fc:1f:d7:61)	0030	02 01 70 f3
	Type: IPv4 (0x0800)	0040	68 61 72 6b

4. 可以看到 GET 前面有 16\*3+6=54 个字节, 而 G 出现在以太网帧中的 55 个字节。

0101 .... = Header Length: 20 bytes (5)	0000 28 a2 4b f6 12 a0 14 5a fc 1f d7 61 08 00 45 00 (-K....Z...a..E..
Flags: 0x018 (PSH, ACK)	0010 01 df 91 82 40 00 80 06 b0 3b ac 19 95 bd 80 77 ....@...;.....w
Window: 513	0020 f5 0c 34 9d 00 50 29 b3 93 52 07 c1 19 b1 50 18 ...4..P).....P-
[Calculated window size: 131328]	0030 02 01 70 f3 00 00 47 45 54 20 2f 77 69 72 65 73 ...p...GET /wires
[Window size scaling factor: 256]	0040 68 61 72 6b 2d 6c 61 62 73 2f 48 54 50 2d 65 hark-lab s/HTTP-e
Checksum: 0x70f3 [unverified]	0050 74 68 65 72 65 61 6c 2d 6c 61 62 2d 66 69 6c 65 thereal- lab-file
[Checksum Status: Unverified]	0060 33 2e 68 74 6d 6c 20 48 54 50 2f 31 2e 31 0d 3.html H TTP/1.1
Urgent Pointer: 0	0070 0a 48 6f 73 74 3a 20 67 61 69 61 2e 63 73 2e 75 *Host: g aia.cs.u
[Timestamps]	0080 6d 61 73 73 2e 65 64 75 0d 0a 55 73 65 72 2d 41 gent: Mo zilla/5.
[SEQ/ACK analysis]	0090 67 65 6e 74 3a 20 4d 6f 7a 69 6c 6c 61 2f 35 2e 0 (Windo ws NT 10
TCP payload (439 bytes)	00a0 30 20 28 57 69 6e 64 6f 77 73 20 4e 54 20 31 30 .0; Win6 4; x64;
Hypertext Transfer Protocol	00b0 2e 30 3b 20 57 69 6e 64 34 3b 20 78 36 34 3b 20 rv:109.0.) Gecko/
GET /wireshark-labs/HTTP-ethereal-lab-file3.html HTTP/1.1\r\n	00c0 72 76 3a 31 30 39 2e 30 29 20 47 65 63 6b 6f 2f 20100101 Firefox
> [Expert Info (chat/Sequence): GET /wireshark-labs/HTTP-ethereal-lab-file3.html HTTP/1.1\r\n	00d0 32 30 31 30 30 31 30 31 20 46 69 72 65 66 6f 78 /112.0.. Accept:
Request Method: GET	00e0 2f 31 31 32 2e 30 0d 0a 41 63 63 65 70 74 3a 20 text/htm l,applic
	00f0 74 65 78 74 2f 68 74 6d 6c 2c 61 70 70 6c 69 63 ation/xh tml+xml.
	0100 61 74 69 6f 6e 2f 78 68 74 6d 6c 2b 78 6d 6c 2c

5. 以太网源地址的值是 28:a2:4b:f6:12:a0，这是连接该子网的路由器的 MAC 地址。

2451 26.665...	128.119.245.12 172.25.149.189 HTTP	535 HTTP/1.1 200 OK (text/html)
2453 26.692...	172.25.149.189 128.119.245.12 HTTP	450 GET /favicon.ico HTTP/1.1
2469 26.963...	128.119.245.12 172.25.149.189 HTTP	539 HTTP/1.1 404 Not Found (text/html)

> Frame 2451: 535 bytes on wire (4280 bits), 535 bytes captured (4280 bits) on interface \Device\NPF
▼ Ethernet II, Src: JuniperN_f6:12:a0 (28:a2:4b:f6:12:a0), Dst: LiteonTe_1f:d7:61 (14:5a:fc:1f:d7:61)
> Destination: LiteonTe_1f:d7:61 (14:5a:fc:1f:d7:61)
> Source: JuniperN_f6:12:a0 (28:a2:4b:f6:12:a0)
Type: IPv4 (0x0800)
> Internet Protocol Version 4, Src: 128.119.245.12, Dst: 172.25.149.189
> Transmission Control Protocol, Src Port: 80, Dst Port: 13469, Seq: 4381, Ack: 440, Len: 481
> [4 Reassembled TCP Segments (4861 bytes): #2448(1460), #2449(1460), #2450(1460), #2451(481)]
> Hypertext Transfer Protocol
> Line-based text data: text/html (98 lines)

6. 以太网帧中的目标地址是 14:5a:fc:1f:d7:61，是本机的以太网地址。

2451	26.665...	128.119.245.12	172.25.149.189	HTTP	535	HTTP/1.1 200 OK (text/html)
2453	26.692...	172.25.149.189	128.119.245.12	HTTP	450	GET /favicon.ico HTTP/1.1
2469	26.963...	128.119.245.12	172.25.149.189	HTTP	539	HTTP/1.1 404 Not Found (text/html)

```
<
> Frame 2451: 535 bytes on wire (4280 bits), 535 bytes captured (4280 bits) on interface \Device\NPF_
v Ethernet II, Src: JuniperN_f6:12:a0 (28:a2:4b:f6:12:a0), Dst: LiteonTe_1f:d7:61 (14:5a:fc:1f:d7:61)
  > Destination: LiteonTe_1f:d7:61 (14:5a:fc:1f:d7:61)
  > Source: JuniperN_f6:12:a0 (28:a2:4b:f6:12:a0)
  Type: IPv4 (0x0800)
> Internet Protocol Version 4, Src: 128.119.245.12, Dst: 172.25.149.189
> Transmission Control Protocol, Src Port: 80, Dst Port: 13469, Seq: 4381, Ack: 440, Len: 481
> [4 Reassembled TCP Segments (4861 bytes): #2448(1460), #2449(1460), #2450(1460), #2451(481)]
> Hypertext Transfer Protocol
> Line-based text data: text/html (98 lines)
```

7. 16 进制的值是 0x0800，对应的上层协议是 IPv4 协议。

71	4.012825	128.119.245.12	172.25.140.185	HTTP	535	HTTP/1.1 200 OK (text/html)
74	4.079538	172.25.140.185	128.119.245.12	HTTP	450	GET /favicon.ico HTTP/1.1
86	4.412436	128.119.245.12	172.25.140.185	HTTP	539	HTTP/1.1 404 Not Found (text/html)

```
<
> Frame 71: 535 bytes on wire (4280 bits), 535 bytes captured (4280 bits) on interface \Device\NPF_{
v Ethernet II, Src: Hangzhou_5b:93:e0 (d4:61:fe:5b:93:e0), Dst: LiteonTe_1f:d7:61 (14:5a:fc:1f:d7:61)
  > Destination: LiteonTe_1f:d7:61 (14:5a:fc:1f:d7:61)
  > Source: Hangzhou_5b:93:e0 (d4:61:fe:5b:93:e0)
  Type: IPv4 (0x0800)
> Internet Protocol Version 4, Src: 128.119.245.12, Dst: 172.25.140.185
```

8. OK 前面有 13 个字节，OK 出现在以太网帧中的 14 个字节。



0000	48 54 54 50 2f 31 2e 31 20 32 30 30 20 4f 4b 0d	HTTP/1.1 200 OK
0010	0a 44 61 74 65 3a 20 4d 6f 6e 2c 20 30 38 20 4d	Date: Mon, 08 May 2023 06:19:18
0020	61 79 20 32 30 32 33 20 30 36 3a 31 39 3a 31 38	GMT Server: Apache/2.4.6 (Cent
0030	20 47 4d 54 0d 0a 53 65 72 76 65 72 3a 20 41 70	OS) OpenSSL/1.0.2k-fips
0040	61 63 68 65 2f 32 2e 34 2e 36 20 28 43 65 6e 74	PHP/7.4.33 mod_perl/2.0.11
0050	4f 53 29 20 4f 70 65 6e 53 53 4c 2f 31 2e 30 2e	Perl/v5.16.3
0060	32 6b 2d 66 69 70 73 20 50 48 50 2f 37 2e 34 2e	Last-Modified: Mon, 08 May 2023
0070	33 33 20 6d 6f 64 5f 70 65 72 6c 2f 32 2e 30 2e	05:59:01 GMT
0080	31 31 20 50 65 72 6c 2f 76 35 2e 31 36 2e 33 0d	ETag: "1194-5fb2855de42bc"
0090	0a 4c 61 73 74 2d 4d 6f 64 69 66 69 65 64 3a 20	Accept-Ranges: bytes
00a0	4d 6f 6e 2c 20 30 38 20 4d 61 79 20 32 30 32 33	Content-Length:
00b0	20 30 35 3a 35 39 3a 30 31 20 47 4d 54 0d 0a 45	
00c0	54 61 67 3a 20 22 31 31 39 34 2d 35 66 62 32 38	
00d0	35 35 64 65 34 32 62 63 22 0d 0a 41 63 63 65 70	
00e0	74 2d 52 61 6e 67 65 73 3a 20 62 79 74 65 73 0d	
00f0	0a 43 6f 6e 74 65 6e 74 2d 4c 65 6e 67 74 68 3a	

9. 第一列的值是 IP 地址，第二列的值是 MAC 地址，而第三列的值则是类型。

```

接口: 172.25.149.189 --- 0x3
Internet 地址      物理地址      类型
172.25.255.254    28-a2-4b-f6-12-a0 动态
172.25.255.255    ff-ff-ff-ff-ff-ff 静态
224.0.0.22        01-00-5e-00-00-16 静态
224.0.0.251       01-00-5e-00-00-fb 静态
224.0.0.252       01-00-5e-00-00-fc 静态
239.255.255.250   01-00-5e-7f-ff-fa 静态

接口: 2.0.0.1 --- 0x9
Internet 地址      物理地址      类型
2.0.0.255         ff-ff-ff-ff-ff-ff 静态
224.0.0.22        01-00-5e-00-00-16 静态
224.0.0.251       01-00-5e-00-00-fb 静态
224.0.0.252       01-00-5e-00-00-fc 静态
239.255.255.250   01-00-5e-7f-ff-fa 静态

接口: 192.168.182.1 --- 0xd
Internet 地址      物理地址      类型
192.168.182.254   00-50-56-e7-9f-33 动态
192.168.182.255   ff-ff-ff-ff-ff-ff 静态
224.0.0.22        01-00-5e-00-00-16 静态
224.0.0.251       01-00-5e-00-00-fb 静态
224.0.0.252       01-00-5e-00-00-fc 静态
239.255.255.250   01-00-5e-7f-ff-fa 静态

接口: 192.168.213.1 --- 0x14
Internet 地址      物理地址      类型
192.168.213.254   00-50-56-f4-e1-be 动态
192.168.213.255   ff-ff-ff-ff-ff-ff 静态
224.0.0.22        01-00-5e-00-00-16 静态
224.0.0.251       01-00-5e-00-00-fb 静态
224.0.0.252       01-00-5e-00-00-fc 静态
239.255.255.250   01-00-5e-7f-ff-fa 静态

```

10. 源地址是 00:d0:59:a9:3d:68，目标地址是 ff:ff:ff:ff:ff:ff。

1	0.000000	AmbitMic_a9:...	Broadcast	ARP	42	Who has 192.168.1.1? Tell 192.168.1.105
2	0.001018	LinksysG_da:...	AmbitMic_a9:...	ARP	60	192.168.1.1 is at 00:06:25:da:af:73
6	13.542...	CnetTech_73:...	Broadcast	ARP	60	Who has 192.168.1.117? Tell 192.168.1.104

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- > Frame 1: 42 bytes on wire (336 bits), 42 bytes captured (336 bits)
- ▼ Ethernet II, Src: AmbitMic\_a9:3d:68 (00:d0:59:a9:3d:68), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
  - > Destination: Broadcast (ff:ff:ff:ff:ff:ff)
  - > Source: AmbitMic\_a9:3d:68 (00:d0:59:a9:3d:68)
  - Type: ARP (0x0806)

11. 十六进制的值是 0x0806，对应的上层协议是 ARP。

- > Frame 1: 42 bytes on wire (336 bits), 42 bytes captured (336 bits)
- ▼ Ethernet II, Src: AmbitMic\_a9:3d:68 (00:d0:59:a9:3d:68), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
  - ▼ Destination: Broadcast (ff:ff:ff:ff:ff:ff)
    - Address: Broadcast (ff:ff:ff:ff:ff:ff)
    - .... ..1. .... = LG bit: Locally administered address (this is NOT the facto..)
    - .... ..1. .... = IG bit: Group address (multicast/broadcast)
  - ▼ Source: AmbitMic\_a9:3d:68 (00:d0:59:a9:3d:68)
    - Address: AmbitMic\_a9:3d:68 (00:d0:59:a9:3d:68)
    - .... ..0. .... = LG bit: Globally unique address (factory default)
    - .... ..0. .... = IG bit: Individual address (unicast)
  - Type: ARP (0x0806)
- > Address Resolution Protocol (request)

12.

(1) 从最开头开始 20 个字节。

<ul style="list-style-type: none"> <li>&gt; Frame 1: 42 bytes on wire (336 bits), 42 bytes captured (336 bits)</li> <li>&gt; Ethernet II, Src: AmbitMic_a9:3d:68 (00:d0:59:a9:3d:68), Dst: Broadcast (ff:ff:ff:ff:ff:ff)</li> <li>▼ Address Resolution Protocol (request)               <ul style="list-style-type: none"> <li>Hardware type: Ethernet (1)</li> <li>Protocol type: IPv4 (0x0800)</li> <li>Hardware size: 6</li> <li>Protocol size: 4</li> <li>Opcode: request (1)</li> <li>Sender MAC address: AmbitMic_a9:3d:68 (00:d0:59:a9:3d:68)</li> <li>Sender IP address: 192.168.1.105</li> <li>Target MAC address: 00:00:00_00:00:00 (00:00:00:00:00:00)</li> <li>Target IP address: 192.168.1.1</li> </ul> </li> </ul>	<table border="0"> <tr><td>0000</td><td>ff ff ff ff ff ff 00 d0 59 a9 3d 68 08 06 00 01</td></tr> <tr><td>0010</td><td>08 00 06 04 00 01 00 d0 59 a9 3d 68 c0 a8 01 69</td></tr> <tr><td>0020</td><td>00 00 00 00 00 00 c0 a8 01 01</td></tr> </table>	0000	ff ff ff ff ff ff 00 d0 59 a9 3d 68 08 06 00 01	0010	08 00 06 04 00 01 00 d0 59 a9 3d 68 c0 a8 01 69	0020	00 00 00 00 00 00 c0 a8 01 01
0000	ff ff ff ff ff ff 00 d0 59 a9 3d 68 08 06 00 01						
0010	08 00 06 04 00 01 00 d0 59 a9 3d 68 c0 a8 01 69						
0020	00 00 00 00 00 00 c0 a8 01 01						

(2) 操作码字段的值是 1。

(3) 包括了发送方的 IP 地址。

1	0.000000	AmbitMic_a9:...	Broadcast	ARP	42	Who has 192.168.1.1? Tell 192.168.1.105
2	0.001018	LinksysG_da:...	AmbitMic_a9:...	ARP	60	192.168.1.1 is at 00:06:25:da:af:73
6	13.542...	CnetTech_73:...	Broadcast	ARP	60	Who has 192.168.1.117? Tell 192.168.1.104

<
> Frame 1: 42 bytes on wire (336 bits), 42 bytes captured (336 bits)
> Ethernet II, Src: AmbitMic_a9:3d:68 (00:d0:59:a9:3d:68), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
▼ Address Resolution Protocol (request)
Hardware type: Ethernet (1)
Protocol type: IPv4 (0x0800)
Hardware size: 6
Protocol size: 4
Opcode: request (1)
Sender MAC address: AmbitMic_a9:3d:68 (00:d0:59:a9:3d:68)
Sender IP address: 192.168.1.105
Target MAC address: 00:00:00_00:00:00 (00:00:00:00:00:00)
Target IP address: 192.168.1.1

(4) 从操作码的值可以看出，值为 1 表示 ARP 请求，也就是查询响应 IP 的以太网地址。

13.

(1) 最开头开始的 20 个字节。

2	0.001018	LinksysG_da:...	AmbitMic_a9:...	ARP	60	192.168.1.1 is at 00:06:25:da:af:73
6	13.542...	CnetTech_73:...	Broadcast	ARP	60	Who has 192.168.1.117? Tell 192.168.1.104

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> Frame 2: 60 bytes on wire (480 bits), 60 bytes captured (480 bits)
> Ethernet II, Src: LinksysG_da:af:73 (00:06:25:da:af:73), Dst: AmbitMic_a9:3d:68 (00:d0:59:a9:3d:68)
▼ Address Resolution Protocol (reply)
Hardware type: Ethernet (1)
Protocol type: IPv4 (0x0800)
Hardware size: 6
Protocol size: 4
Opcode: reply (2)
Sender MAC address: LinksysG_da:af:73 (00:06:25:da:af:73)
Sender IP address: 192.168.1.1
Target MAC address: AmbitMic_a9:3d:68 (00:d0:59:a9:3d:68)
Target IP address: 192.168.1.105

0000	00 d0 59 a9 3d 68 00 06 25 da af 73 08 06 00 01
0010	08 00 06 04 00 06 25 da af 73 c0 a8 01 01
0020	00 d0 59 a9 3d 68 c0 a8 01 69 00 00 00 00 00
0030	00 00 00 00 00 00 00 00 00 00 00 00 00 00

(2) 操作码的值是 2。

(3) 放在 Sender MAC address 里面。

14. 源地址的十六进制值是 00:06:25:da:af:73, 而目标地址的十六进制值是 00:d0:59:a9:3d:68。



2	0.001018	LinksysG_da:...	AmbitMic_a9:...	ARP	60	192.168.1.1 is at 00:06:25:da:af:73
6	13.542...	CnetTech_73:...	Broadcast	ARP	60	Who has 192.168.1.117? Tell 192.168.1.104

<						
> Frame 2: 60 bytes on wire (480 bits), 60 bytes captured (480 bits)						
> Ethernet II, Src: LinksysG_da:af:73 (00:06:25:da:af:73), Dst: AmbitMic_a9:3d:68 (00:d0:59:a9:3d:68)						
v Address Resolution Protocol (reply)						
Hardware type: Ethernet (1)						
Protocol type: IPv4 (0x0800)						
Hardware size: 6						
Protocol size: 4						
Opcode: reply (2)						
Sender MAC address: LinksysG_da:af:73 (00:06:25:da:af:73)						
Sender IP address: 192.168.1.1						
Target MAC address: AmbitMic_a9:3d:68 (00:d0:59:a9:3d:68)						
Target IP address: 192.168.1.105						

15. 查询 APR 报文是在广播帧中发送的（子网中的所有电脑都能收到），而响应 APR 报文在一个标准帧中发送（只有发送请求的那台电脑能收到），其他的主机发现请求的 IP 地址不匹配会丢弃。

结论分析与体会：

通过本次实验对 ARP 的相关知识有了更多的了解，通过查看相关信息，来学习 ARP 的知识，对以太网以及以太网帧有了更进一步的认知。