

Computer Networks Lab

ASSIGNMENT – 11

Rahul Cheryala, 210010012

PART – 1

1. The 48-bit Ethernet Address of my computer is **c4:41:1e:75:b1:52**
2. The 48-bit destination address in the Ethernet frame, "00:1e:c1:7e:d9:01," does not correspond to the Ethernet address of "gaia.cs.umass.edu." Instead, it represents the address of the router to which my computer (the source computer) is connected. Specifically, the device with this Ethernet address is identified as "3ComEurope_7e:d9:01."
3. The hexadecimal value for the two-byte Frame type field in the Ethernet frame carrying the HTTP GET request is 0x0800. This corresponds to the upper layer protocol IPv4.
4. The ASCII "G" in "GET" appears after 66 bytes from the start.

```
0000 00 1e c1 7e d9 01 c4 41 1e 75 b1 52 08 00 45 02  ...~...A u R E
0010 02 97 00 00 40 00 40 06 4b 21 80 77 f7 42 80 77  ...@ @ K! w B w
0020 f5 0c d3 1a 00 50 df c1 db 19 56 32 7b c7 80 18  ...P ...V2{...
0030 08 0a 98 99 00 00 01 01 08 0a 08 e7 51 ba f7 d2  ... ..Q...
0040 96 a8 47 45 54 20 2f 77 69 72 65 73 68 61 72 6b  GET /w ireshark
0050 2d 6c 61 62 73 2f 48 54 54 50 2d 77 69 72 65 73  -labs/HT TP-wires
0060 68 61 72 6b 2d 6c 61 62 2d 66 69 6c 65 33 2e 68  hark-lab -file3.h
0070 74 6d 6c 20 48 54 54 50 2f 31 2e 31 0d 0a 48 6f  tml HTTP /1.1 Ho
0080 73 74 3a 20 67 61 69 61 2e 63 73 2e 75 6d 61 73  st: gaia .cs.umas
```

5. The value of the Ethernet source address is 00:1e:c1:7e:d9:01. This address does not belong to gaia.cs.umass.edu; instead, it belongs to the router to which my computer (the source computer) is connected. The device with this Ethernet address is identified as Cisco_13:2a:c2.

6. The destination address in the Ethernet frame is c4:41:1e:75:b1:52. This address corresponds to my computer (the source computer).

7. The hexadecimal value for the two-byte frame type field is 0x0800, which corresponds to the upper layer protocol IPv4.

8. In the Ethernet frame, the ASCII "O" in "OK" appears after 79 bytes.

In the HTTP packet, the ASCII "O" in "OK" appears after 13 bytes.

| | |
|---|--------------------|
| c4 41 1e 75 b1 52 00 1e c1 7e d9 01 08 00 45 02 | ·A·u·R· ··~····E· |
| 05 dc ed 6c 40 00 3f 06 5b 6f 80 77 f5 0c 80 77 | ···l@·?· [o·w···w |
| f7 42 00 50 d3 1a 56 32 7b c7 df c1 dd 7c 80 10 | ·B·P···V2 {···· ·· |
| 00 ec e4 36 00 00 01 01 08 0a f7 d2 96 ad 08 e7 | ···6···· ······ |
| 51 ba 48 54 54 50 2f 31 2e 31 20 32 30 30 20 4f | Q·HTTP/1 .1 200 0 |
| 4b 0d 0a 44 61 74 65 3a 20 54 75 65 2c 20 30 32 | K··Date: Tue, 02 |
| 20 4e 6f 76 20 32 30 32 31 20 31 37 3a 33 37 3a | Nov 202 1 17:37: |

9. In the capture, only one Ethernet frame carries data that is part of the complete HTTP "OK 200 ..." reply message.

PART – 2

1. No. of entries in the ARP cache = 8

```
PS C:\Users\Rahul\Documents\SEM-6\COMPUTER_NETWORKS\CN lab\lab_11> arp -a

Interface: 10.240.16.21 --- 0xd
Internet Address      Physical Address      Type
10.240.16.1           f8-7a-41-13-2a-c2     dynamic
10.240.16.2           44-b6-be-0a-9a-e1     dynamic
10.240.17.255         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
```

2. Each display entry is of the form: Internet Address (IP Address), Physical Address (MAC Address), Type (static/dynamic)

```
▼ Ethernet II, Src: BelkinIntern_75:b1:52 (c4:41:1e:75:b1:52), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
  ► Destination: Broadcast (ff:ff:ff:ff:ff:ff)
  ► Source: BelkinIntern_75:b1:52 (c4:41:1e:75:b1:52)
    Type: ARP (0x0806)
▼ Address Resolution Protocol (request)
  Hardware type: Ethernet (1)
  Protocol type: IPv4 (0x0800)
  Hardware size: 6
  Protocol size: 4
  Opcode: request (1)
  Sender MAC address: BelkinIntern_75:b1:52 (c4:41:1e:75:b1:52)
  Sender IP address: 128.119.247.66
  Target MAC address: 00:00:00_00:00:00 (00:00:00:00:00:00)
  Target IP address: 128.119.247.1
```

3. The hexadecimal value of the source address in the Ethernet frame containing the first ARP request message sent out by your computer is **c4:41:1e:75:b1:01:52**.

4. The hexadecimal value of the destination address in the Ethernet frame containing the first ARP request message sent out by your computer is

ff:ff:ff:ff:ff:ff. This indicates that this is a broadcast message, sent to all devices within the local network segment.

5. The hexadecimal value for the two-byte Ethernet frame type field, which is 0x0806, corresponds to the upper layer protocol ARP (Address Resolution Protocol).

6. The ARP (Address Resolution Protocol) opcode field begins at byte 21 from the very beginning of the Ethernet frame.

```
▶ Frame 1: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface en9, id 0
▼ Ethernet II, Src: 3ComEurope_7e:d9:01 (00:1e:c1:7e:d9:01), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
  ▶ Destination: Broadcast (ff:ff:ff:ff:ff:ff)
  ▶ Source: 3ComEurope_7e:d9:01 (00:1e:c1:7e:d9:01)
  ▶ Type: ARP (0x0806)
  ▶ Trailer: 0000000000000000000000000000000020202020
▼ Address Resolution Protocol (request)
  Hardware type: Ethernet (1)
  Protocol type: IPv4 (0x0800)
  Hardware size: 6
  Protocol size: 4
  Opcode: request (1)
  Sender MAC address: 3ComEurope_7e:d9:01 (00:1e:c1:7e:d9:01)
  Sender IP address: 128.119.247.1
  Target MAC address: 00:00:00_00:00:00 (00:00:00:00:00:00)
  Target IP address: 128.119.247.77
```

7. The value of the opcode filed within the ARP request message sent by our computer request (1)

8. The ARP request message includes the IP address of the sender, which is 128.119.247.66.

```
▼ Address Resolution Protocol (request)
  Hardware type: Ethernet (1)
  Protocol type: IPv4 (0x0800)
  Hardware size: 6
  Protocol size: 4
  Opcode: request (1)
  Sender MAC address: BelkinIntern_75:b1:52 (c4:41:1e:75:b1:52)
  Sender IP address: 128.119.247.66
  Target MAC address: 00:00:00_00:00:00 (00:00:00:00:00:00)
  Target IP address: 128.119.247.1
```

9. The IP address of the device for which the corresponding Ethernet address is being requested in the ARP request message sent by your computer is 129.119.247.1.

10. The opcode field within the ARP reply message is 2

11. The Ethernet address corresponding to the IP address that was specified in the ARP request message sent by our computer is **00:1e:c1:7e:d9:01**.

12. The absence of ARP reply messages in the trace for the other ARP request messages can be attributed to the fact that ARP replies are sent back to the sender's Ethernet address, not to the machine that originally sent the request. Therefore, the trace does not capture the ARP replies as they are directed back to the sender's Ethernet address and not recorded in the packet trace.