HO CHI MINH UNIVERSITY OF TECHNOLOGY
Faculty of Computer Science and Engineering

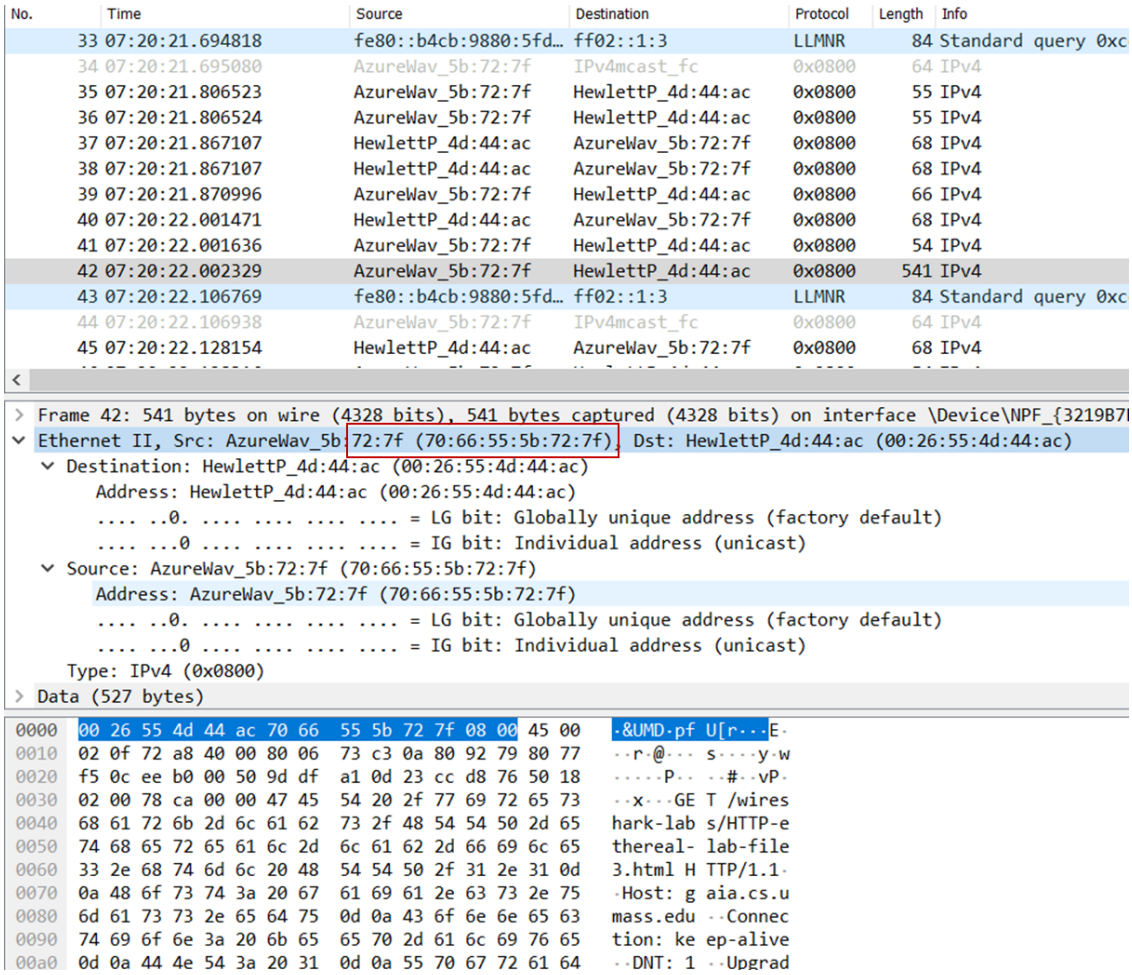
Computer Networks

Report for lab 6

Lecturer: Nguyễn Mạnh Thìn
Student name: Đặng Trần Khánh-1852037

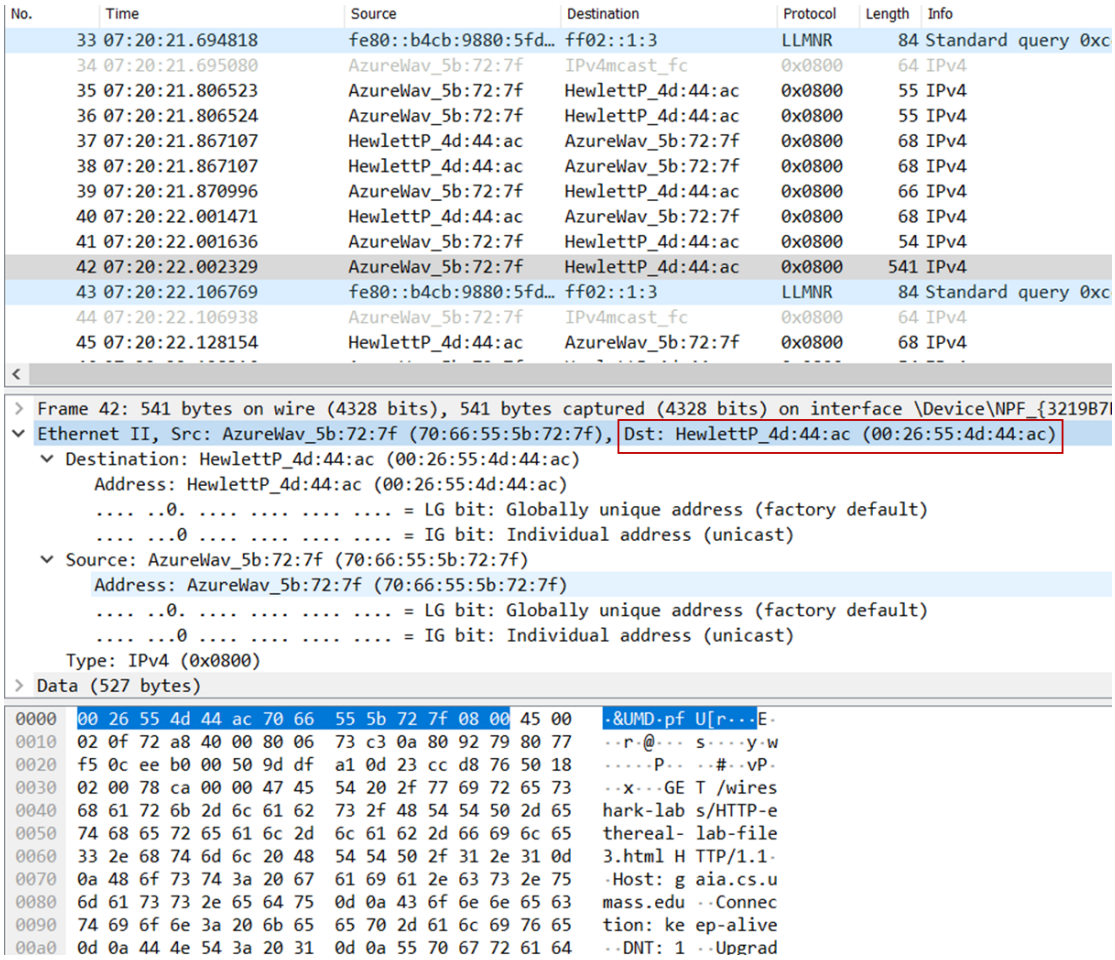
1/ What is the 48-bit Ethernet address of your computer?

Answer: The 48-bit Ethernet address of my computer is 70:66:55:5b:72:7f



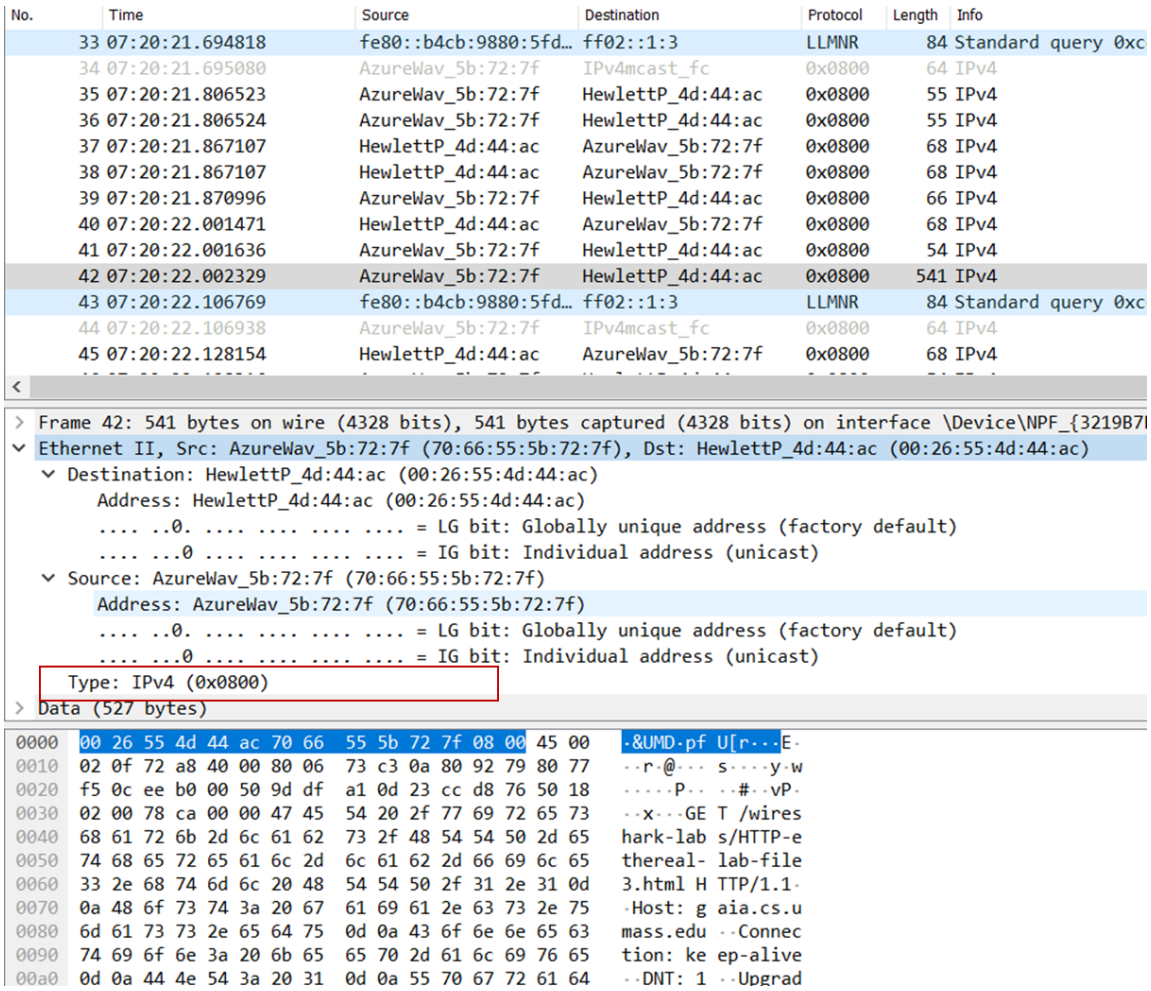
2/ What is the 48-bit destination address in the Ethernet frame? Is this the Ethernet address of gaia.cs.umass.edu? What device has this as its Ethernet address?

Answer: The 48-bit destination address in the Ethernet frame is 00:26:55:4d:44:ac. This is not the address of gaia.cs.umass.edu. This is the address of the router that my computer has to go through in order to reach the destination.



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

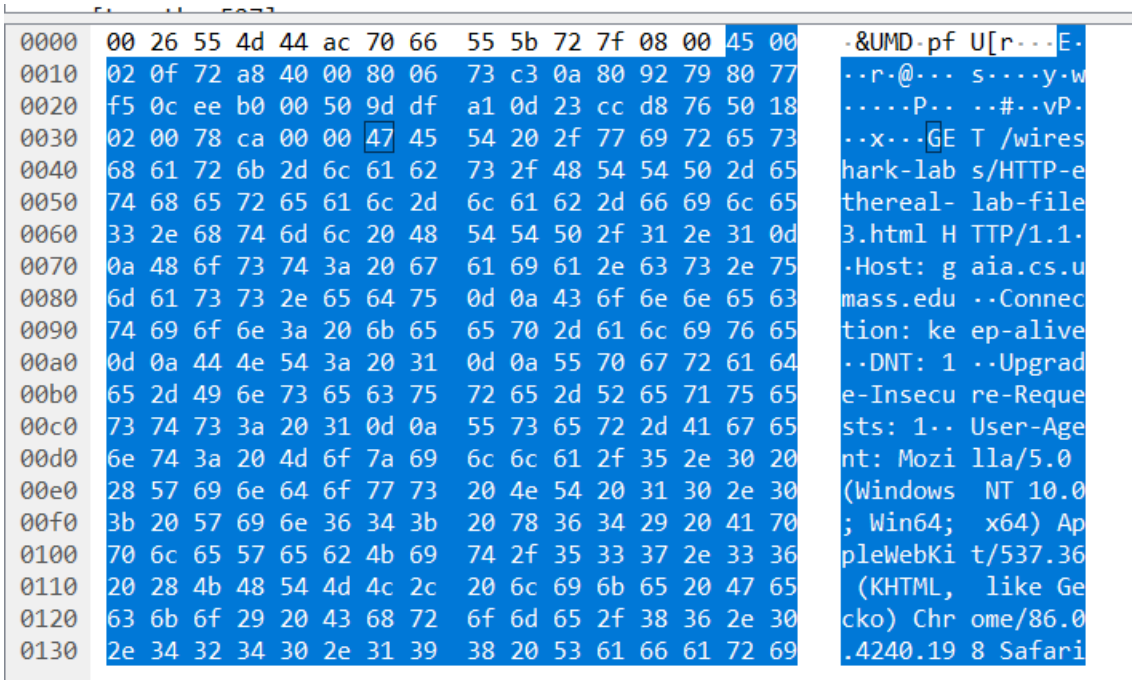
Answer: The hexadecimal value for the two-byte frame type field is 0x0800. This corresponds to the IP protocol (the frame type filed indicates that the nest layer above IP – the layer to which the payload of the Ethernet frame will connect to IP.



4/ How many bytes from the very start of the Ethernet frame does the ASCII "G" in "GET" appear in the Ethernet frame?

Answer: The ASCII "G" appears 54 bytes from the start of the Ethernet frame.

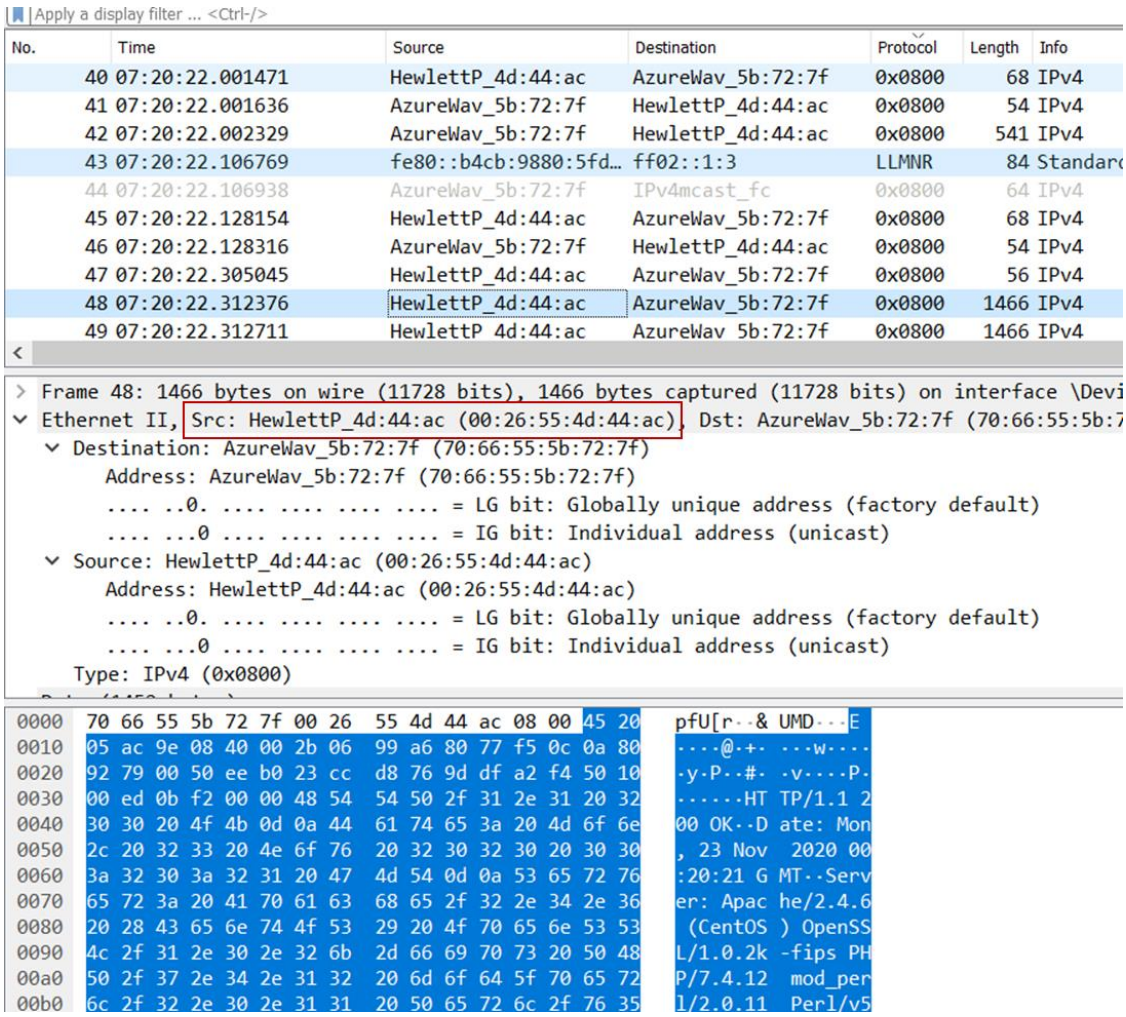
- The ethernet frame (first 14 bytes containing destination address, source address, and frame type)
- The IP header (20 bytes)
- The TCP header (20 bytes)



```
0000  00 26 55 4d 44 ac 70 66  55 5b 72 7f 08 00 45 00   ·&UMD·pf U[r···E·
0010  02 0f 72 a8 40 00 80 06  73 c3 0a 80 92 79 80 77   ··r·@··· s····y·w
0020  f5 0c ee b0 00 50 9d df  a1 0d 23 cc d8 76 50 18   ·····P·· ··#··vP·
0030  02 00 78 ca 00 00 47 45  54 20 2f 77 69 72 65 73   ··x···GE T /wires
0040  68 61 72 6b 2d 6c 61 62  73 2f 48 54 54 50 2d 65   hark-lab s/HTTP-e
0050  74 68 65 72 65 61 6c 2d  6c 61 62 2d 66 69 6c 65   thereal- lab-file
0060  33 2e 68 74 6d 6c 20 48  54 54 50 2f 31 2e 31 0d   3.html H TTP/1.1·
0070  0a 48 6f 73 74 3a 20 67  61 69 61 2e 63 73 2e 75   ·Host: g aia.cs.u
0080  6d 61 73 73 2e 65 64 75  0d 0a 43 6f 6e 6e 65 63   mass.edu ··Connec
0090  74 69 6f 6e 3a 20 6b 65  65 70 2d 61 6c 69 76 65   tion: ke ep-alive
00a0  0d 0a 44 4e 54 3a 20 31  0d 0a 55 70 67 72 61 64   ··DNT: 1 ··Upgrad
00b0  65 2d 49 6e 73 65 63 75  72 65 2d 52 65 71 75 65   e-Insecu re-Reque
00c0  73 74 73 3a 20 31 0d 0a  55 73 65 72 2d 41 67 65   sts: 1·· User-Age
00d0  6e 74 3a 20 4d 6f 7a 69  6c 6c 61 2f 35 2e 30 20   nt: Mozi lla/5.0
00e0  28 57 69 6e 64 6f 77 73  20 4e 54 20 31 30 2e 30   (Windows  NT 10.0
00f0  3b 20 57 69 6e 36 34 3b  20 78 36 34 29 20 41 70   ; Win64;  x64) Ap
0100  70 6c 65 57 65 62 4b 69  74 2f 35 33 37 2e 33 36   pleWebKi t/537.36
0110  20 28 4b 48 54 4d 4c 2c  20 6c 69 6b 65 20 47 65    (KHTML,  like Ge
0120  63 6b 6f 29 20 43 68 72  6f 6d 65 2f 38 36 2e 30   cko) Chr ome/86.0
0130  2e 34 32 34 30 2e 31 39  38 20 53 61 66 61 72 69   .4240.19 8 Safari
```

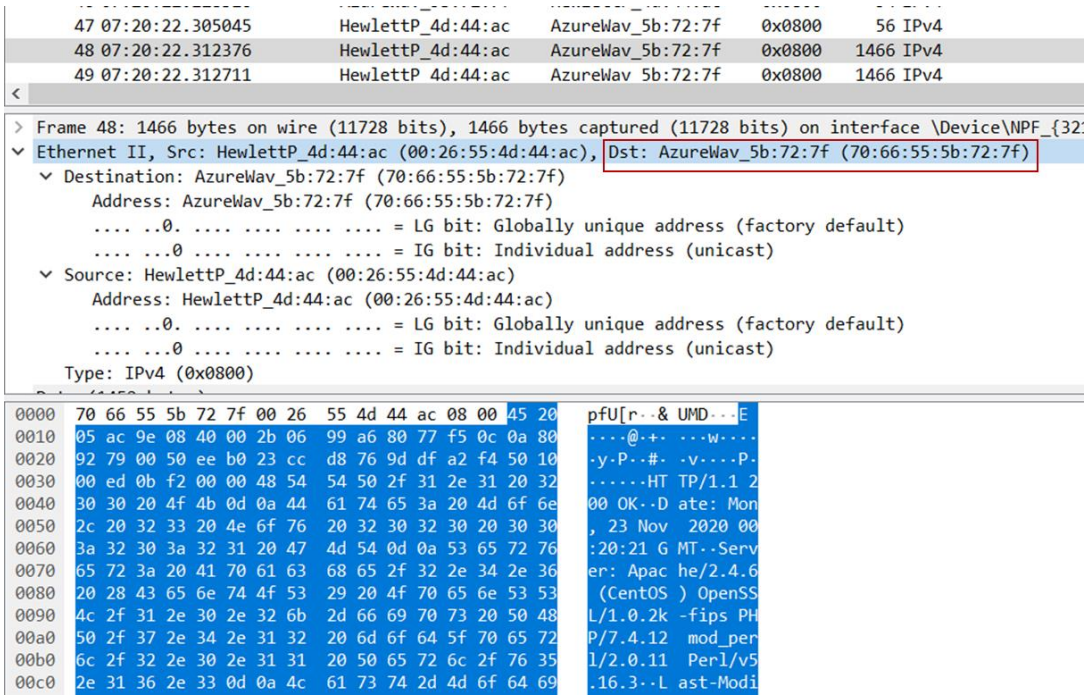
5/ What is the value of the Ethernet source address? Is this the address of your computer, or of gaia.cs.umass.edu (Hint: the answer is no). What device has this as its Ethernet address?

Answer: The value of the Ethernet source address is 00:26:55:4d:44:ac, this is not the address of my computer or gaia.cs.umass.edu. This is once again the address of the router that has recieved the ok message and forwarded it to my computer.



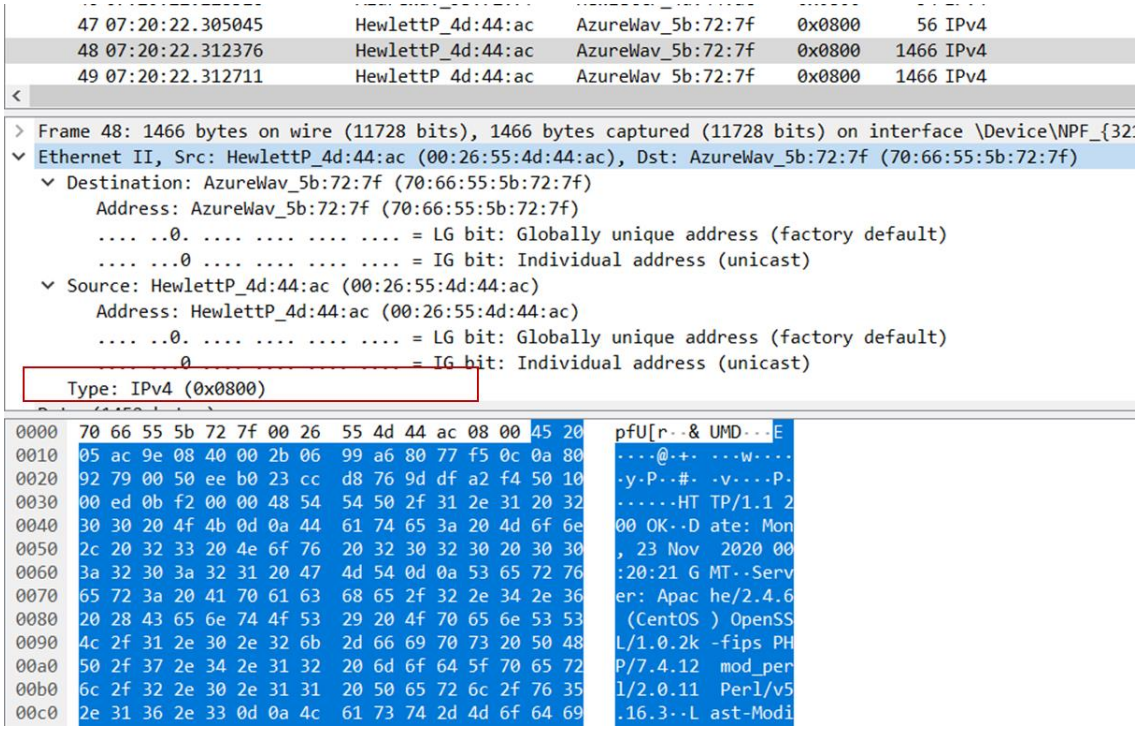
6/ What is the destination address in the Ethernet frame? Is this the Ethernet address of your computer?

Answer: The destination address is 70:66:55:5b:72:7f. This is the address This is the address of my computer.



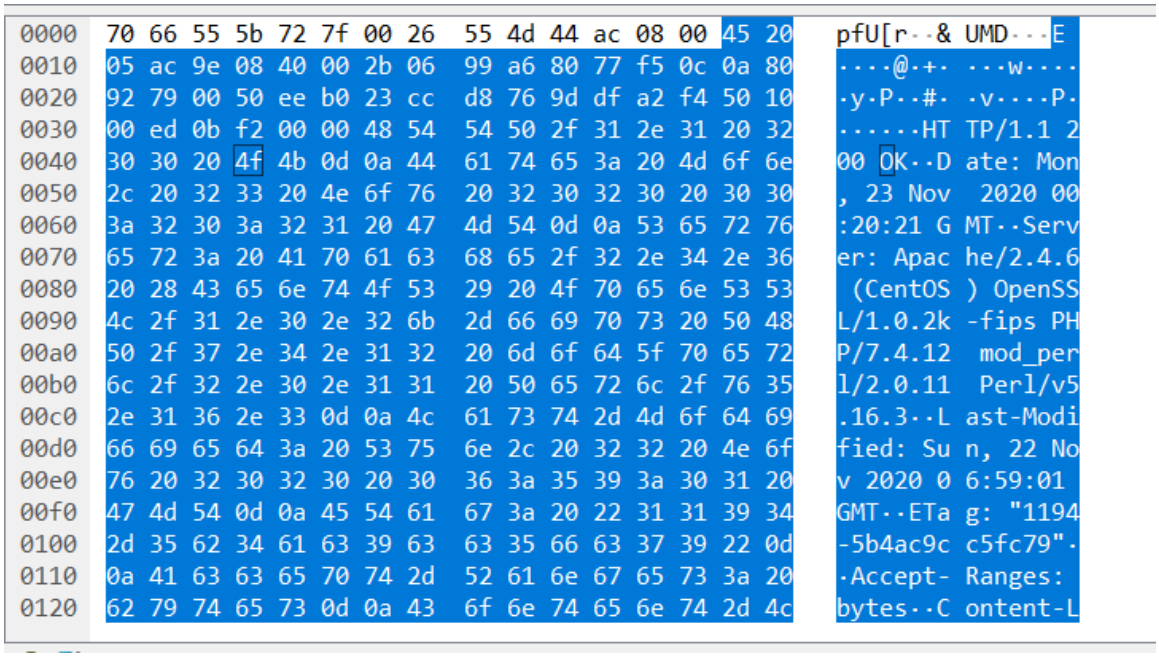
7/ Give the hexadecimal value for the two-byte Frame type field. What upper layer protocol does this correspond to?

Answer: The hex value of this field is 0x0800. This corresponds to the IP protocol.



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?

Answer: There are 67 bytes before the "O" (or "O" appears as the 68th byte). These bytes include the ethernet frame, the IP header, the TCP header, and some HTTP preamble text.



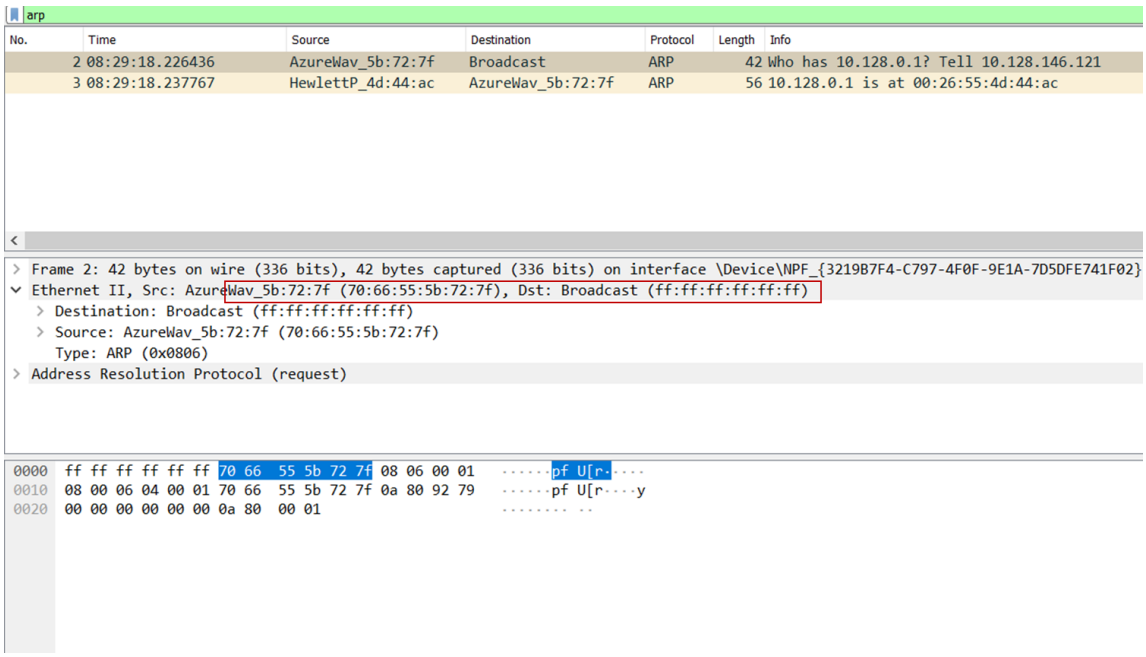
9/ Write down the contents of your computer's ARP cache. What is the meaning of each column value?

Answer: The columns show the internet address (IPv4) and the physical address (Ethernet). The last column shows whether the IPv4 address is dynamic or static.

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

Interface: 10.128.146.121 --- 0x5
  Internet Address      Physical Address      Type
  10.128.0.1            00-26-55-4d-44-ac     dynamic
  10.128.255.255        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 --- 0x8
  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

Interface: 169.254.168.189 --- 0xe
  Internet Address      Physical Address      Type
  169.254.255.255       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
```

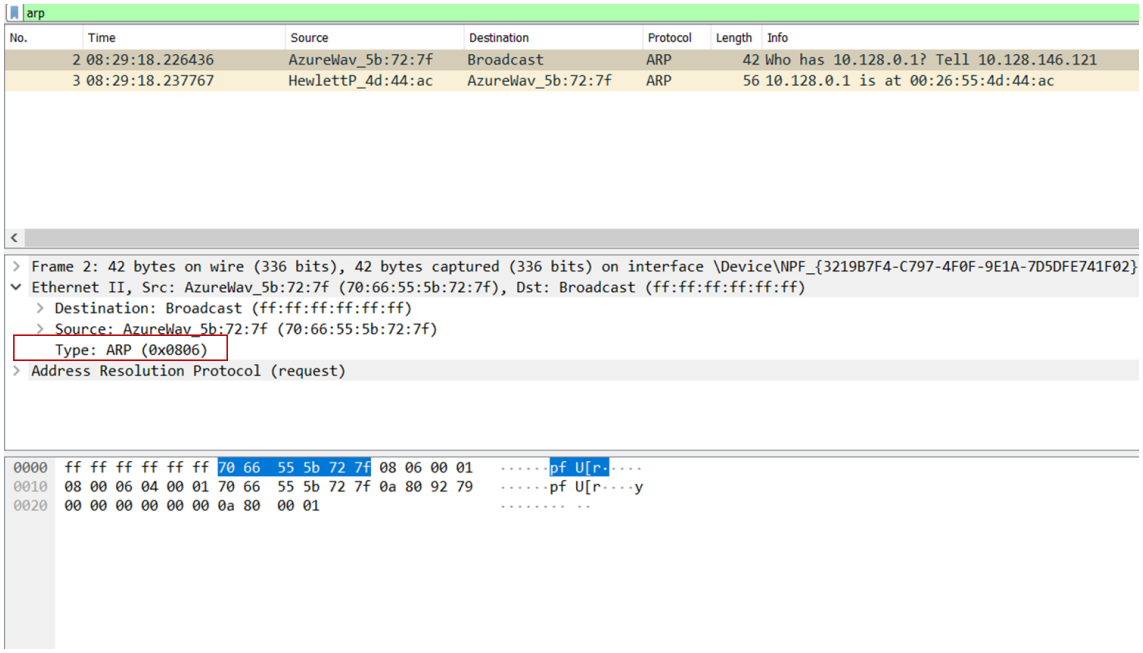
10/ What are the hexadecimal values for the source and destination addresses in the Ethernet frame containing the ARP request message?

Answer: The source address is (70:66:55:5b:72:7f), the destination address is (ff:ff:ff:ff:ff:ff). The source address is the Ethernet address of my computer and the destination address is broadcast.



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

Answer: The type value is 0x0806 which corresponds to ARP.



12/

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

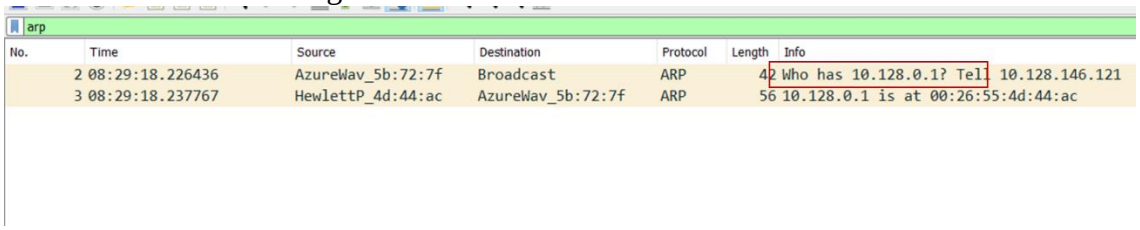
Answer: The opcode field starts 20 bytes from the beginning of the frame.

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?

Answer: The opcode has a hex value of 0x0001, which is for request.

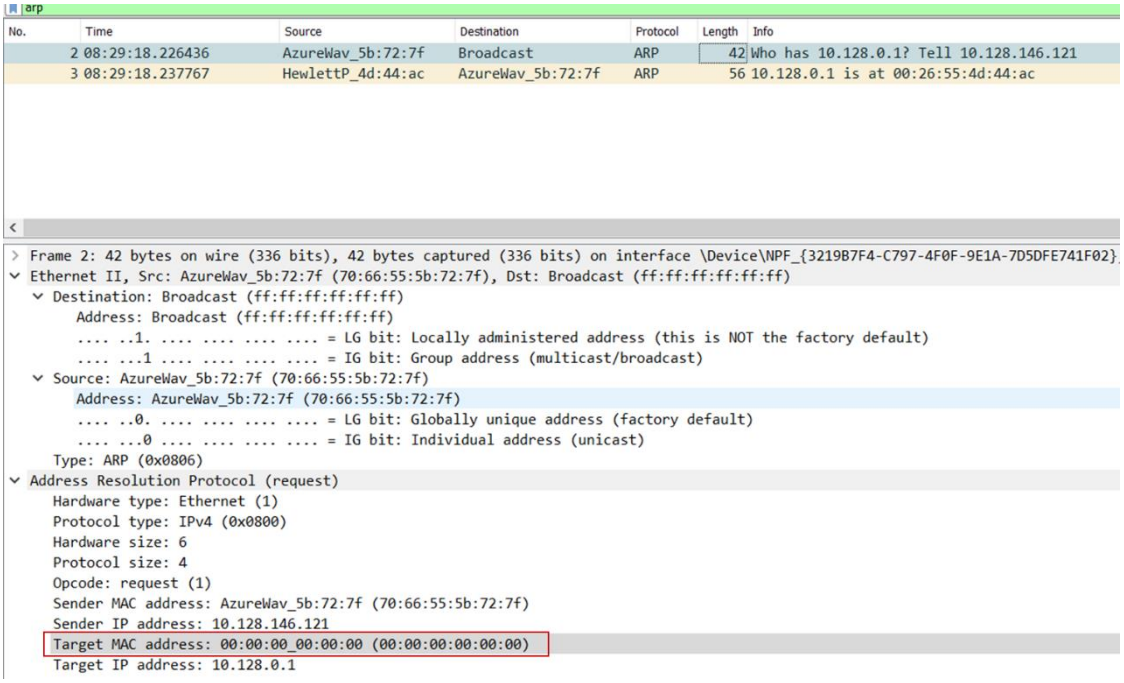
c/ Does the ARP message contain the IP address of the sender?

Answer: The ARP message contains the IP address 10.128.0.1



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

Answer: The "question" is in the field Target MAC address, which is set to :00:00:00:00:00



13/

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

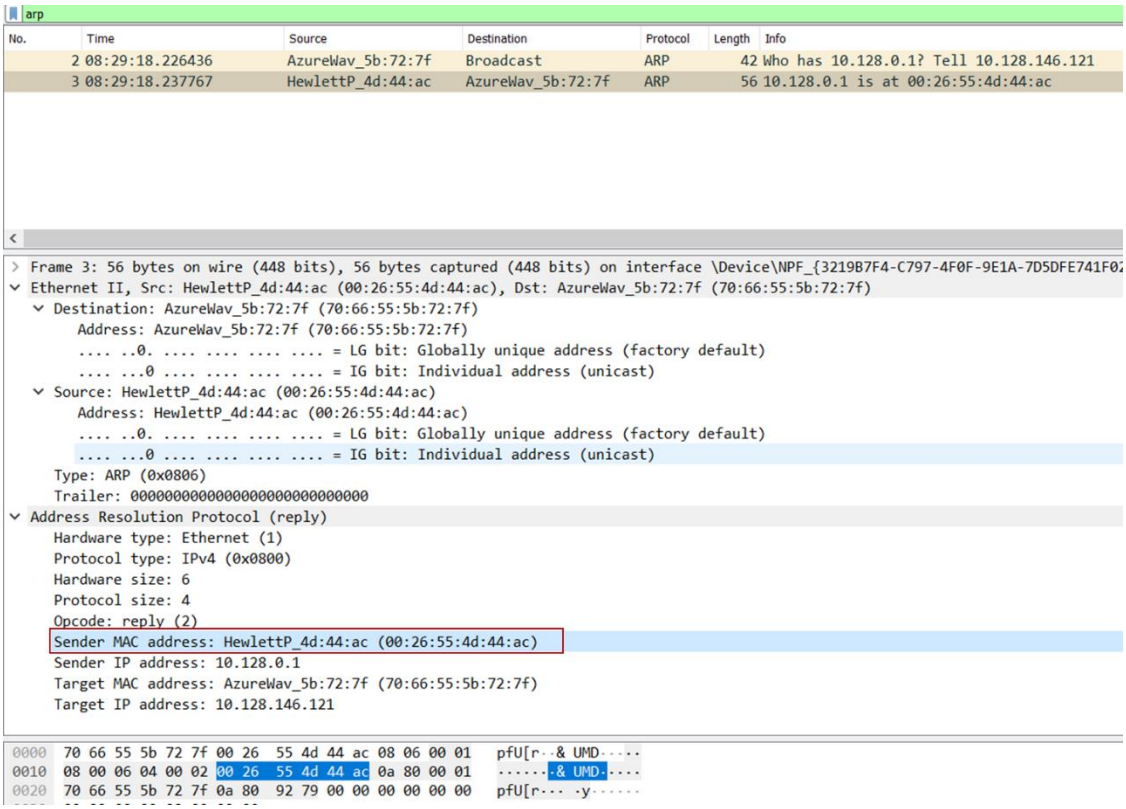
Answer: The opcode field begins 20 bytes from the beginning of the frame.

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?

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

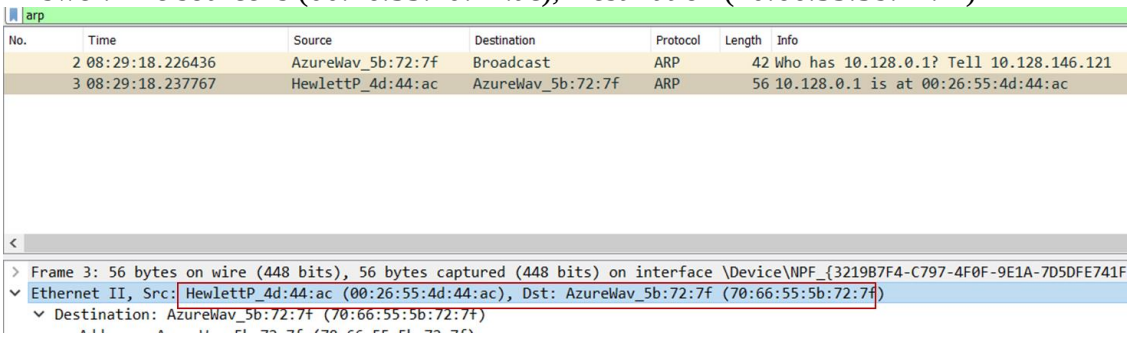
c/ Where in the ARP message does the "answer" to the earlier ARP request appear – the IP address of the machine having the Ethernet address whose corresponding IP address is being queried?

Answer: The answer to the earlier ARP request appears in the "Sender MAC address" field, which contains the Ethernet address 00:26:55:4d:dd:ac for the sender with IP address 10.128.0.1



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

Answer: The source is (00:26:55:4d:44:ac), Destination (70:66:55:5b:72:7f)



15/

Answer: There is no reply in this trace, because we are not at the machine that sent the request. The ARP request is broadcast, but the ARP reply is sent back directly to the sender's Ethernet address.