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MẠNG MÁY TÍNH (CO3094)

Báo cáo Lab 2_4b: Wireshark Lab – DHCP

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Tp. Hồ Chí Minh, Tháng 10/2021

1. Are DHCP messages sent over UDP or TCP?
   UDP

2. Draw a timing datagram illustrating the sequence of the first four-packet Discover/Offer/Request/ACK DHCP exchange between the client and server. For each packet, indicated the source and destination port numbers. Are the port numbers the same as in the example given in this lab assignment?
   The port numbers are 67 and 68, they are the same as in the lab
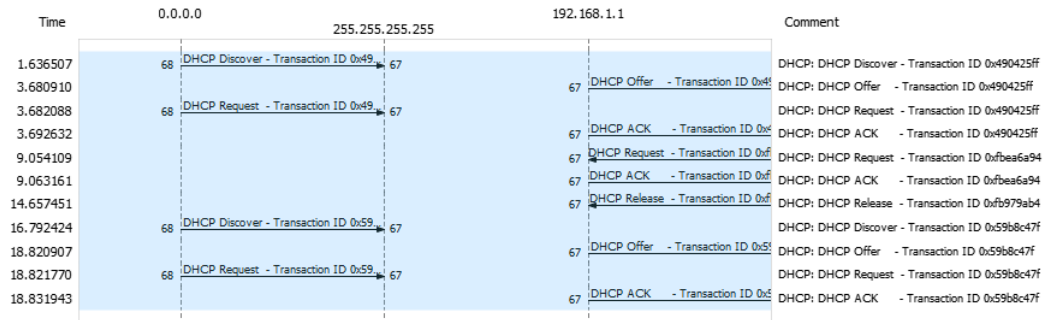
3. What is the link-layer (e.g., Ethernet) address of your host?
   The link-layer address of my host is (b8:08:cf:bf:77:e1)

4. What values in the DHCP discover message differentiate this message from the DHCP request message?
   Option 53 in the DHCP message type differs between discover and request

5. What is the value of the Transaction-ID in each of the first four (Discover/Offer/Request/ACK) DHCP messages? What are the values of the Transaction-ID in the second set (Request/ACK) set of DHCP messages? What is the purpose of the Transaction-ID field?

No.	Time	Source	Destination	Protocol	Length	Info	
250	1.636507	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover	- Transaction ID 0x490425ff
605	3.680910	192.168.1.1	192.168.1.92	DHCP	590	DHCP Offer	- Transaction ID 0x490425ff
608	3.682088	0.0.0.0	255.255.255.255	DHCP	358	DHCP Request	- Transaction ID 0x490425ff
609	3.692632	192.168.1.1	192.168.1.92	DHCP	590	DHCP ACK	- Transaction ID 0x490425ff
1761	9.054109	192.168.1.92	192.168.1.1	DHCP	346	DHCP Request	- Transaction ID 0xfbea6a94
1762	9.063161	192.168.1.1	192.168.1.92	DHCP	590	DHCP ACK	- Transaction ID 0xfbea6a94

The purpose of the transaction ID is so that the DHCP server can differentiate between client requests during the request process

6. A host uses DHCP to obtain an IP address, among other things. But a host's IP address is not confirmed until the end of the four-message exchange! If the IP address is not set until the end of the four-message exchange, then what values are used in the IP datagrams in the four-message exchange? For each of the four DHCP messages (Discover/Offer/Request/ACK DHCP), indicate the source and destination IP addresses that are carried in the encapsulating IP datagram.
    The DCHP client and server both use 255.255.255.255 as the destination address. The client uses source IP address 0.0.0.0, while the server uses its actual IP address as the source.

    For each of the four DHCP messages (Discover/Offer/Request/ACK DHCP), indicate the source and destination IP addresses that are carried in the encapsulating IP datagram.

2...	1.636507	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0x490425ff
6...	3.680910	192.168.1.1	192.168.1.92	DHCP	590	DHCP Offer - Transaction ID 0x490425ff
6...	3.682088	0.0.0.0	255.255.255.255	DHCP	358	DHCP Request - Transaction ID 0x490425ff
6...	3.692632	192.168.1.1	192.168.1.92	DHCP	590	DHCP ACK - Transaction ID 0x490425ff

7. What is the IP address of your DHCP server?
    192.168.1.1

8. What IP address is the DHCP server offering to your host in the DHCP Offer message? Indicate which DHCP message contains the offered DHCP address.
    The IP address offered by the DHCP server is 192.168.1.92

    The DHCP address is offered in the DHCP offer message

9. In the example screenshot in this assignment, there is no relay agent between the host and the DHCP server. What values in the trace indicate the absence of a relay agent? Is there a relay agent in your experiment? If so what is the IP address of the agent?
    The "Relay agent IP address" is 0.0.0.0, which indicates that there is no DHCP Relay used. There was no Relay Agent used in my experiment

```
> Bootp flags: 0x0000 (Unicast)
  Client IP address: 0.0.0.0
  Your (client) IP address: 0.0.0.0
  Next server IP address: 0.0.0.0
  Relay agent IP address: 0.0.0.0
  Client MAC address: IntelCor_bf:77:e1 (b8:08:cf:bf:77:e1)
  Client hardware address padding: 00000000000000000000
```

10. Explain the purpose of the router and subnet mask lines in the DHCP offer message.
    The router line indicates to the client what its default gateway should be. The subnet mask line tells the client which subnet maskit should use

```
  Magic cookie: DHCP
> Option: (53) DHCP Message Type (ACK)
> Option: (54) DHCP Server Identifier (192.168.1.1)
> Option: (51) IP Address Lease Time
> Option: (1) Subnet Mask (255.255.255.0)
v Option: (3) Router
      Length: 4
      Router: 192.168.1.1
```

11. In the DHCP trace file noted in footnote 2, the DHCP server offers a specific IP address to the client (see also question 8. above). In the client's response to the first server OFFER message, does the client accept this IP address? Where in the client's RESPONSE is the client's requested address?
    The client accepts the IP address offered by the DHCP server

The client's response is in option 50 of the Request message

```
Dynamic Host Configuration Protocol (Request)
        Message type: Boot Request (1)
        Hardware type: Ethernet (0x01)
        Hardware address length: 6
        Hops: 0
        Transaction ID: 0x490425ff
        Seconds elapsed: 0
      > Bootp flags: 0x0000 (Unicast)
        Client IP address: 0.0.0.0
        Your (client) IP address: 0.0.0.0
        Next server IP address: 0.0.0.0
        Relay agent IP address: 0.0.0.0
        Client MAC address: IntelCor_bf:77:e1 (b8:08:cf:bf:77:e1)
        Client hardware address padding: 00000000000000000000
        Server host name not given
        Boot file name not given
        Magic cookie: DHCP
      > Option: (53) DHCP Message Type (Request)
      > Option: (61) Client identifier
      v Option: (50) Requested IP Address (192.168.1.92)
            Length: 4
            Requested IP Address: 192.168.1.92
```

12. Explain the purpose of the lease time. How long is the lease time in your experiment?
The lease time is the amount of time the DHCP server assigns an IP address to a client. During the lease time, the DHCP server will not assign the IP given to the client to another client, unless it is released by the client. Once the lease time has expired, the IP address can be reusedby the DHCP server to give to another client. In my experiment, the lease time is 3 hours.

```
Dynamic Host Configuration Protocol (ACK)
        Message type: Boot Reply (2)
        Hardware type: Ethernet (0x01)
        Hardware address length: 6
        Hops: 0
        Transaction ID: 0x490425ff
        Seconds elapsed: 0
      > Bootp flags: 0x0000 (Unicast)
        Client IP address: 0.0.0.0
        Your (client) IP address: 192.168.1.92
        Next server IP address: 0.0.0.0
        Relay agent IP address: 0.0.0.0
        Client MAC address: IntelCor_bf:77:e1 (b8:08:cf:bf:77:e1)
        Client hardware address padding: 00000000000000000000
        Server host name not given
        Boot file name not given
        Magic cookie: DHCP
      > Option: (53) DHCP Message Type (ACK)
      > Option: (54) DHCP Server Identifier (192.168.1.1)
      v Option: (51) IP Address Lease Time
            Length: 4
            IP Address Lease Time: (10800s) 3 hours
```

13. What is the purpose of the DHCP release message? Does the DHCP server issue an acknowledgment of receipt of the client's DHCP request? What would happen if the client's DHCP release message is lost?
The client sends a DHCP Release message to cancel its lease on the IP address given to it by the DHCP server. The DHCP server does not send a message back to the client acknowledging the DHCP Release message. If the DHCP Release message from the client is lost, the DHCP server would have to wait until the lease period is over for that IP address until it could reuse it for another client

14. Clear the bootp filter from your Wireshark window. Were any ARP packets sent or received during the DHCP packet-exchange period? If so, explain the purpose of those ARP packets.
Yes, there are ARP requests made by the DHCP server. Before offering an IPaddress to a client, the DHCP server issues an ARP request for the offered IP tomake sure the IP address is not already in use by another workstation