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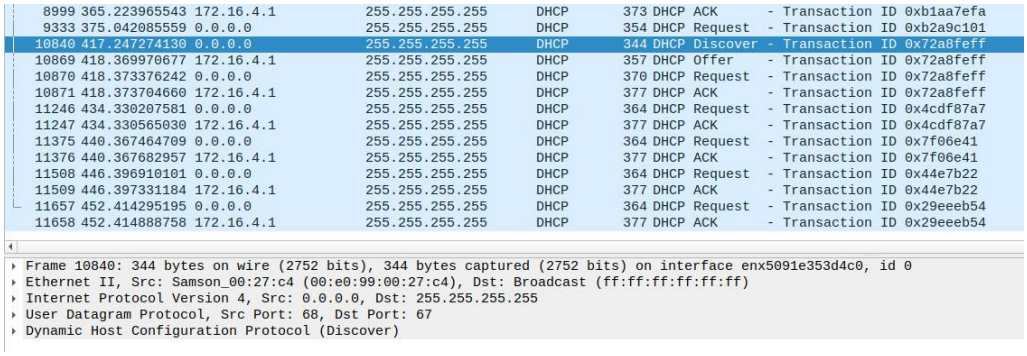
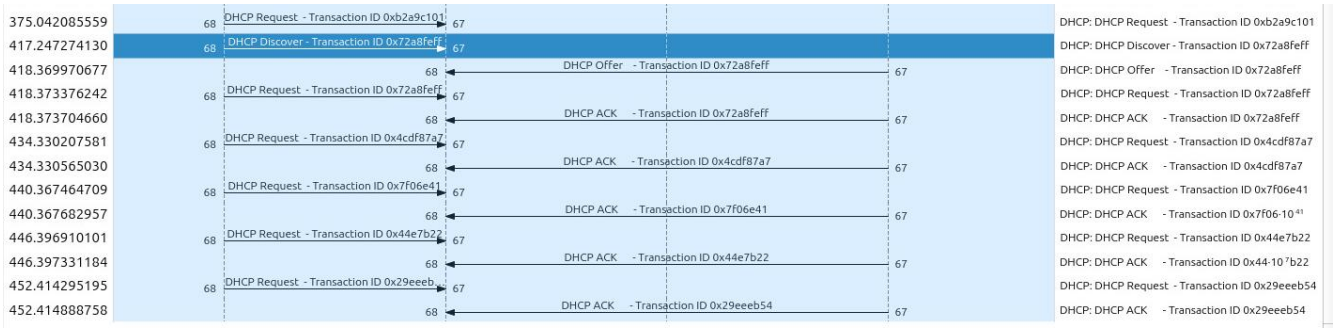
Assignment 1

1. Are DHCP messages sent over UDP or TCP?

Ans: 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, indicate the source and destination port numbers.



Discover :
- src port = 68
- dest port = 67

Offer :
- src port = 67
- dest port = 68

Request :
- src port = 68
- dest port = 67

Ack :
- src port = 67
- dest port = 68

3. What is the link-layer (e.g., Ethernet) address of your host?

00:e0:99:00:27:c4

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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: Samson_00:27:c4 (00:e0:99:00:27:c4)
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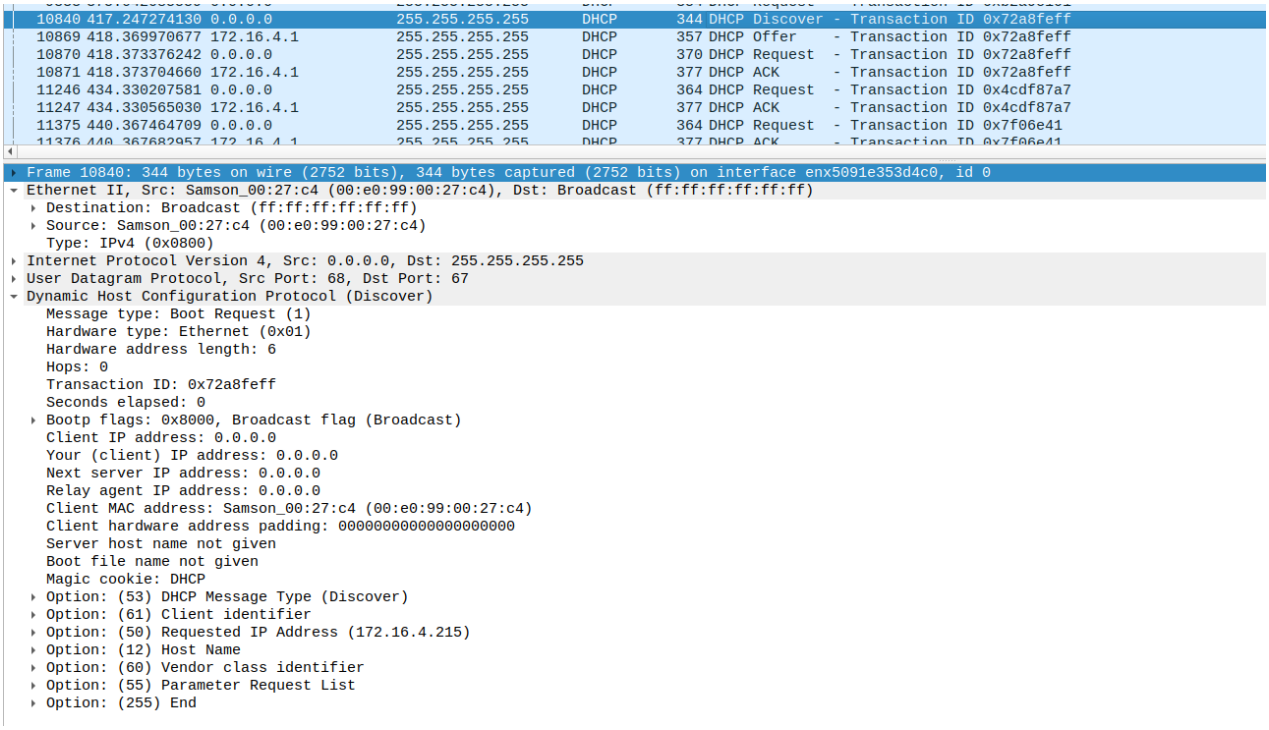
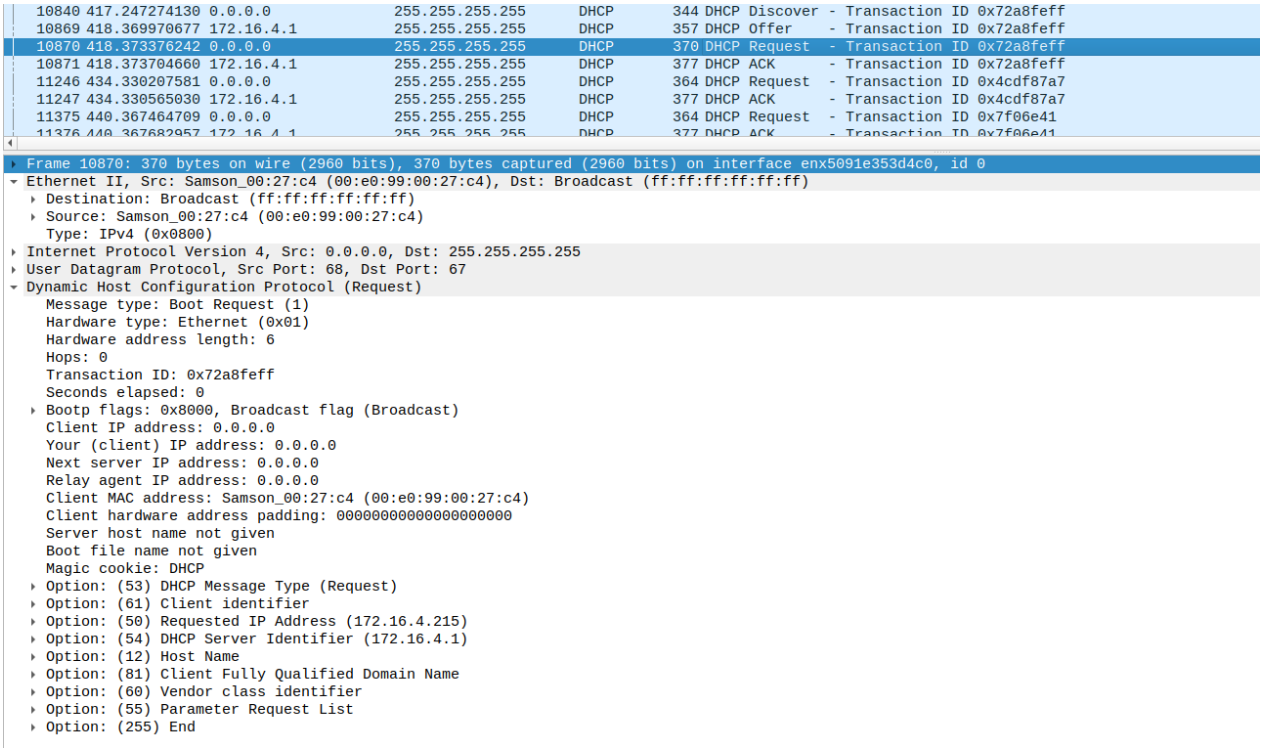
4. What values in the DHCP discover message differentiate this message from the DHCP request message?

Option 53:DHCP Message Type

Discover:

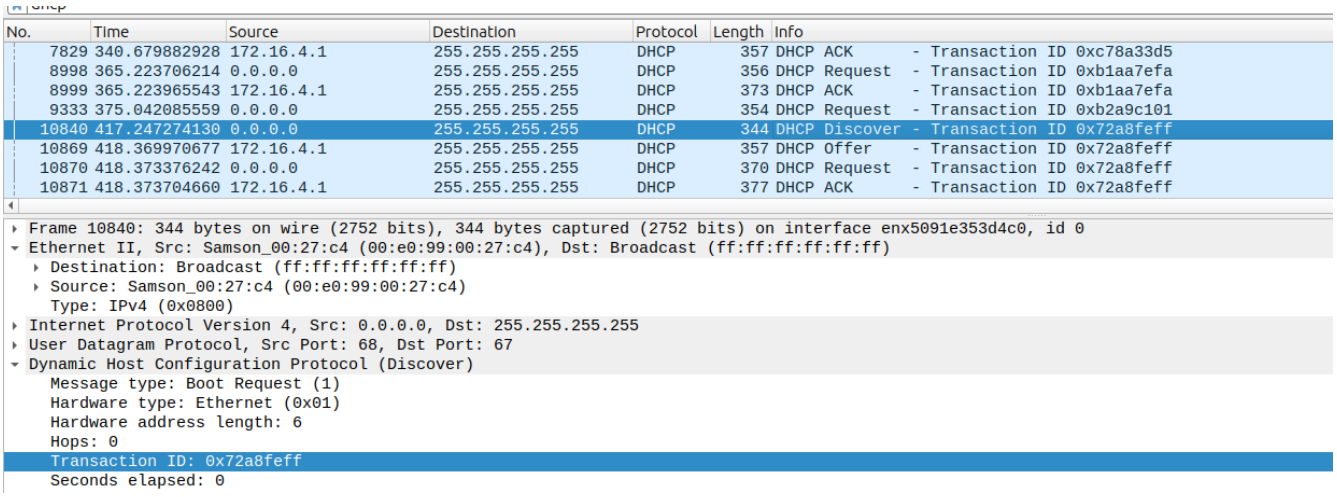


Request:



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

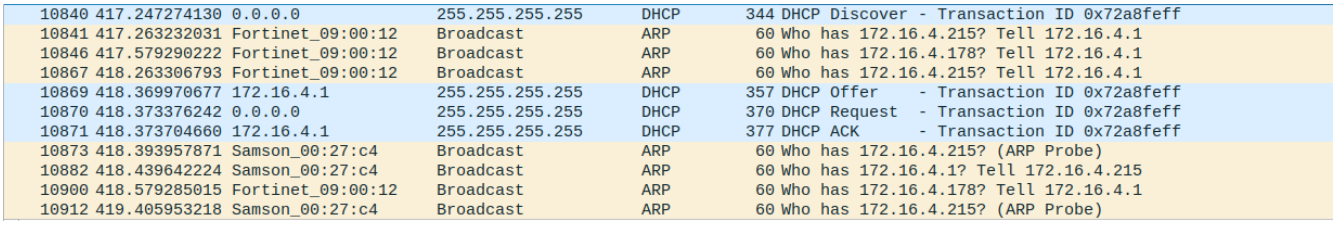
Transaction id : 0x72a8feff
Purpose :
DHCP operates in a client-server (multiple clients allowed); therefore this id helps both client and server to correlate message and respond correctly. This also ensures that a client can identify responses from the correct server, preventing confusion and potential conflicts in configuration.
Id ensures that each DHCP transaction is unique



6. 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.

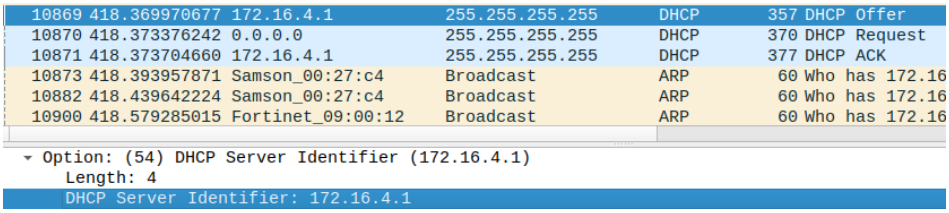
Destination IP : 255.255.255.255

Source IP:
- discover = 0.0.0.0
- offer = 172.16.4.1
- request = 0.0.0.0
- ack = 172.16.4.1



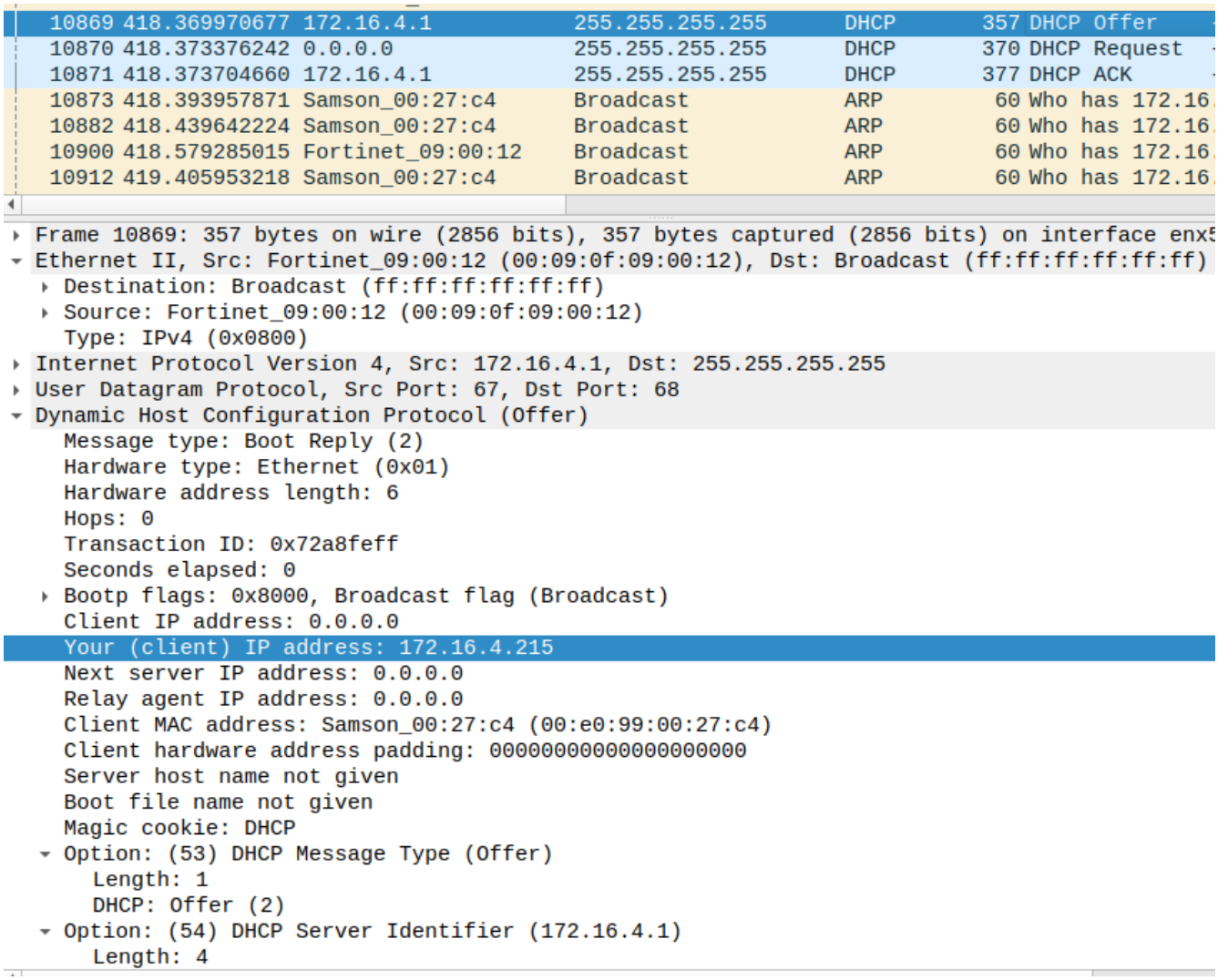
7. What is the IP address of your DHCP server?

Ans: 172.16.4.1



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 DHCP server offered the IP address 172.16.4.215 to the client machine. The DHCP message with "DHCP Message Type (Offer)" contains the offered DHCP address.



9. Explain the purpose of the lease time. How long is the lease time in your experiment?

Lease time : 1 hour

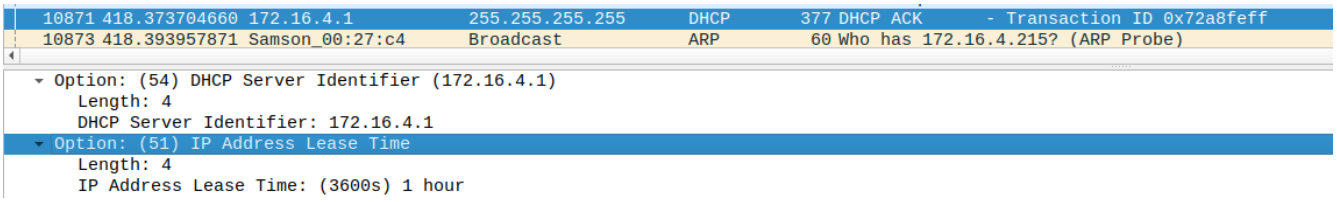
- duration for which a client is allowed to use the IP address assigned to it by the DHCP server

Purpose :

1. Ensures IP addresses are not permanently tied up inactive or disconnected devices. After the lease expires the IP address can be reclaimed by DHCP server

2. Network stability → appropriate lease durations can minimize disruptions caused by frequent IP address changes

3. Security → shorter lease time reduces the risk of unauthorized devices obtaining and holding onto IP address for extended periods



10. Were any ARP packets sent or received during the DHCP packet-exchange period? If so, explain the purpose of those ARP packets.

Ans:

Yes, 3 ARP packets were broadcast-ed during the DHCP packet-exchange period.
Its main purpose is to perform availability check of the IP address it intends to offer to the client. Since there is no response to ARP request, it indicates that the IP address is not currently in use on the network therefore the DHCP server proceeds to offer the IP address to the client.