Computer Networks Lab, Assignment 9

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1   DHCP Questions

1. Is this DHCP Discover message sent out using UDP or TCP as the underlying transport protocol?
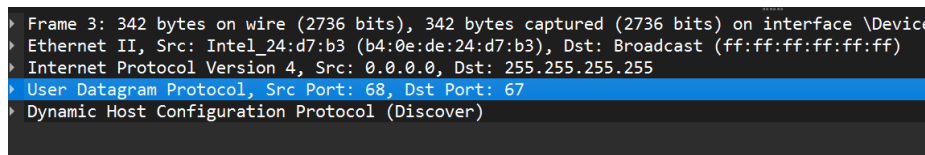
UDP

Figure 1: Q1. UDP

2. What is the source IP address used in the IP datagram containing the Discover message? Is there anything special about this address? Explain.

Source IPv4: **0.0.0.0**

In DHCP, the source IP address of 0.0.0.0 in a Discover message means the device hasn't been assigned an IP yet. This informs the DHCP server to allocate an IP address to the device.

3. What is the destination IP address used in the datagram containing the Discover message?
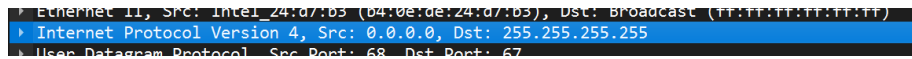
Figure 2: Q2, Q3. Source and Destination IP

Is there anything special about this address? Explain.

Destination IP: 255.255.255.255

It indicates a broadcast to all devices on the local network segment. It's like sending a message to everyone on the network, informing them that the sender needs an IP address.

4. What is the value in the transaction ID field of this DHCP Discover message?
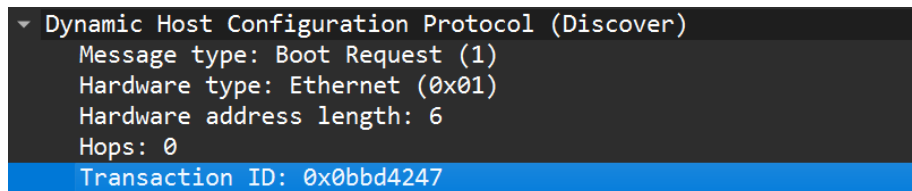
Transaction ID: 0x0bbd4247

Figure 3: Q4. Transaction ID: 0x0bbd4247

5. Now inspect the options field in the DHCP Discover message. What are five pieces of information (beyond an IP address) that the client is suggesting or requesting to receive from the DHCP server as part of this DHCP transaction?

The pieces of information that the client is suggesting or requesting to receive from the DHCP server as part of this DHCP transaction are:

- Host Name

- Vendor class identifier

- Parameter Request List

- End

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▶ Option: (50) Requested IP Address (10.200.244.69)
▶ Option: (12) Host Name
▶ Option: (60) Vendor class identifier
▶ Option: (55) Parameter Request List
▶ Option: (255) End
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Figure 4: Q5: Options

6. How do you know that this Offer message is being sent in response to the DHCP Discover message you studied in questions 1-5 above?

Because both Offer message and Discover message have same Transaction ID: 0x0bbd4247.

7. What is the source IP address used in the IP datagram containing the Offer message? Is there anything special about this address? Explain.

Source IP: 10.200.240.1

The source IP address 10.250.65.250 in the DHCP Offer message simply identifies the DHCP server.

8. What is the destination IP address used in the datagram containing the Offer message? Is there anything special about this address? Explain.

Destination IP: 10.200.244.69

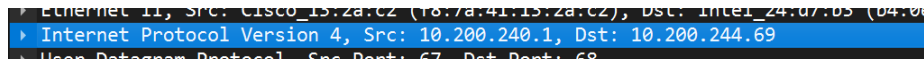It is the IP address that the DHCP server proposes to assign to the client.

Figure 5: Q7, Q8: Source and Destination IP

9. Now inspect the options field in the DHCP Offer message. What are five pieces of information that the DHCP server is providing to the DHCP client in the DHCP Offer message?

Information that the DHCP server is providing to the DHCP client in the DHCP Offer message are:

- DHCP Message Type (Offer)

- Client identifier

- DHCP Server Identifier (10.200.240.1)

- IP Address Lease Time

- Rebinding Time Value

- Subnet Mask (255.255.240.0)

- Domain Name Server

- Router

- End

10. What is the UDP source port number in the IP datagram containing the first DHCP Request message in your trace? What is the UDP destination port number being used?

User Datagram Protocol Src Port: 68,
Dst Port: 67

11. What is the source IP address in the IP datagram containing this Request message? Is

Figure 6: Q9: DHCP offer message options

Figure 7: Q10: Ports

there anything special about this address? Explain.

Source IP address: 0.0.0.0

It indicates that the host doesn't have an assigned IP address yet.

12. What is the destination IP address used in the datagram containing this Request message. Is there anything special about this address? Explain.

Source IP address: 255.255.255.255

It signifies a broadcast to all devices on the local network segment. This ensures that the request reaches all potential DHCP servers, allowing them to respond with the requested IP address.

Figure 8: Q11, Q12: Ports and IPs

13. What is the value in the transaction ID field of this DHCP Request message? Does it match the transaction IDs of the earlier Discover and Offer messages?

Transaction ID: 0x0bbd4247

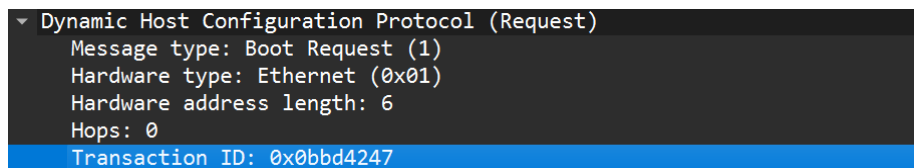Yes it is same as Transaction ID of earlier Discover and Offer messages.


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▾ Dynamic Host Configuration Protocol (Request)
    Message type: Boot Request (1)
    Hardware type: Ethernet (0x01)
    Hardware address length: 6
    Hops: 0
    Transaction ID: 0x0bbd4247
```

Figure 9: Q13: Transaction ID of Request

14. Now inspect the options field in the DHCP Discover message and take a close look at the "Parameter Request List". The DHCP RFC notes that The client can inform the server which configuration parameters the client is interested in by including the 'parameter request list' option. The data portion of this option explicitly lists the options requested by tag number. What differences do you see between the entries in the 'parameter request list' option in this Request message and the same list option in the earlier Discover message?

I found no difference between the entries in the 'Parameter Request List' options in the request message and the same list option in the earlier Discover message.

15. What is the source IP address in the IP datagram containing this ACK message? Is there

Figure 10: Q14: Parameter Request List of Discover

Figure 11: Q14: Parameter Request List of Request

anything special about this address? Explain.

Source: 10.200.240.1

The source IP address 10.200.240.1 in the DHCP Offer message simply identifies the DHCP server.

16. What is the destination IP address used in the datagram containing this ACK message. Is there anything special about this address? Explain.

Dst: 10.200.244.69

It is the new IP address allocated to the client. It's

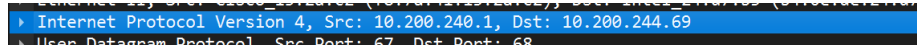where the server sends the acknowledgment to confirm that the IP address has been assigned successfully.

> Internet Protocol Version 4, Src: 10.200.240.1, Dst: 10.200.244.69

Figure 12: Q16: source and destination IPs

17. What is the name of the field in the DHCP ACK message (as indicated in the Wireshark window) that contains the assigned client IP address?

The name of the field in the DHCP ACK message that contains the assigned client IP address is **Your (client) IP address.**

Your (client) IP address: 10.200.244.69

Figure 13: Q17: Your (client) IP address

18. For how long a time (the so-called "lease time") has the DHCP server assigned this IP address to the client?

The DHCP server assigned this IP address to the client for 2 hours.

▾ Option: (51) IP Address Lease Time
    Length: 4
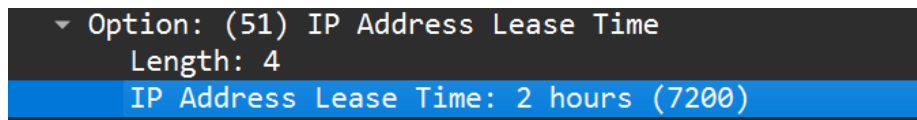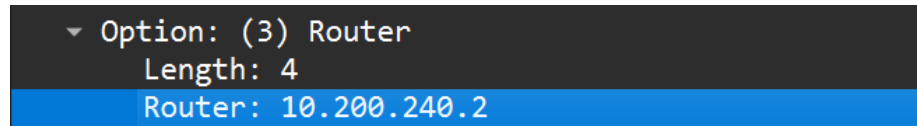   IP Address Lease Time: 2 hours (7200)

Figure 14: Q18: lease time

19. What is the IP address (returned by the DHCP server to the DHCP client in this DHCP ACK message) of the first-hop router on the de-

fault path from the client to the rest of the Internet?

Router: 10.200.240.2

Figure 15: Q19: IP