

# Assignment 9: DHCP

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## Part1

Q1] Is this DHCP Discover message sent out using UDP or TCP as the underlying transport protocol?

A] DHCP Message is sent on UDP.

Q2. What is the source IP address used in the IP datagram containing the Discover message? Is there anything special about this address? Explain.

A] Source Address = 0.0.0.0. This address is non-routable (indicates that this address **cannot be used for routing data packets** across a network). It is a special address that serves a specific purpose beyond regular communication. This signifies that the actual source address is **unknown** or **not yet assigned**.

3. What is the destination IP address used in the datagram containing the Discover message? Is there anything special about this address?

A] Destination IP 255.255.255.255

The **IP address 255.255.255.255** serves a unique purpose in networking, especially during the **DHCP (Dynamic Host Configuration Protocol)** process.

- **255.255.255.255** is the **broadcast address** for an IPv4 network. When a **DHCP client** (such as a computer or device seeking an IP address) sends a **DHCPDISCOVER** message, it uses **255.255.255.255** as the **destination address**.
- This address signifies a **broadcast to all devices** on the local network segment.
- Supports Network configuration for clients without assigned IP.

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

A] Transaction ID :0x04186130

No.	Time	Source	Destination	Protocol	Length	Info
6	2024-03-07 09:03:48.235702	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0x4186130
24	2024-03-07 09:03:50.242686	10.200.176.1	10.200.182.201	DHCP	342	DHCP Offer - Transaction ID 0x4186130
25	2024-03-07 09:03:50.244304	0.0.0.0	255.255.255.255	DHCP	350	DHCP Request - Transaction ID 0x4186130
26	2024-03-07 09:03:50.248849	10.200.176.1	10.200.182.201	DHCP	342	DHCP ACK - Transaction ID 0x4186130
201	2024-03-07 09:03:52.128289	10.200.182.201	10.200.176.1	DHCP	342	DHCP Request - Transaction ID 0x5e1be4d4
203	2024-03-07 09:03:52.170681	10.200.176.1	10.200.182.201	DHCP	342	DHCP ACK - Transaction ID 0x5e1be4d4

Hardware type: Ethernet (0x01)	0000	ff ff ff ff ff ff 10 6f d9 0c 7f 77 08 00 45 00	.....o...w..E..
Hardware address length: 6	0010	01 48 60 17 00 00 80 11 d9 8e 00 00 00 ff ff	..H'.....
Hops: 0	0020	ff ff 00 44 00 43 01 34 8d ff 01 01 06 00 64 18	..D.C.4.....
Transaction ID: 0x4186130	0030	61 30 00 00 00 00 00 00 00 00 00 00 00 00 00	..a0.....
	0040	00 00 00 00 00 00 10 6f d9 0c 7f 77 00 00 00 00	.....o...w.....

Q5] 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?

A]

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v Option: (55) Parameter Request List
  Length: 14
  Parameter Request List Item: (1) Subnet Mask
  Parameter Request List Item: (3) Router
  Parameter Request List Item: (6) Domain Name Server
  Parameter Request List Item: (15) Domain Name
  Parameter Request List Item: (31) Perform Router Discover
  Parameter Request List Item: (33) Static Route
  Parameter Request List Item: (43) Vendor-Specific Information
  Parameter Request List Item: (44) NetBIOS over TCP/IP Name Server
  Parameter Request List Item: (46) NetBIOS over TCP/IP Node Type
  Parameter Request List Item: (47) NetBIOS over TCP/IP Scope
  Parameter Request List Item: (119) Domain Search
  Parameter Request List Item: (121) Classless Static Route
  Parameter Request List Item: (249) Private/Classless Static Route (Microsoft
  Parameter Request List Item: (252) Private/Proxy autodiscovery
> Option: (255) End

```

Q6] . 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?

A] The message type is set as offer and has same Transaction ID as in the Discover message sent above.

Q7] . What is the source IP address used in the IP datagram containing the Offer message? Is there anything special about this address? Explain

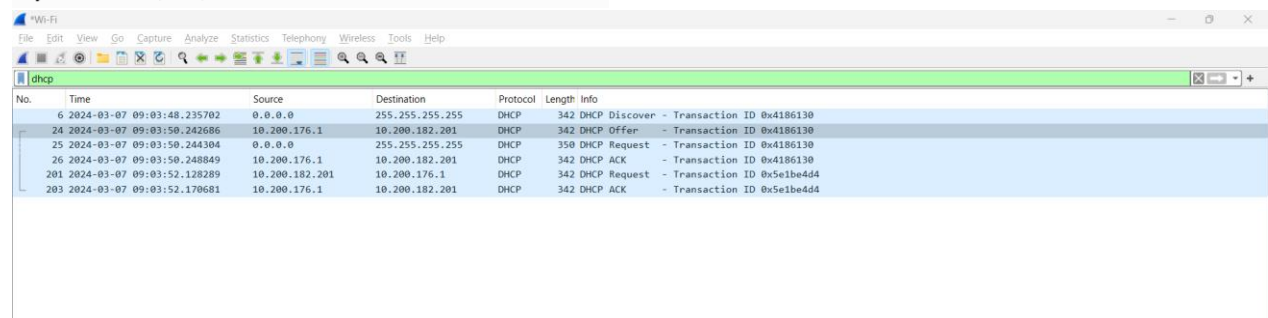
A] The source IP address = 10.200.176.1  
This is the DHCP server IP address.

Q8] What is the destination IP address used in the datagram containing the Offer message? Is there anything special about this address? Explain.

A] Destination IP address: 10.200.182.201

This is my systems IPv4 address.

Type of sign-in into:	Microsoft: Protected EAP (PEAP)
Network band:	2.4 GHz
Network channel:	11
Link speed (Receive/Transmit):	57/57 (Mbps)
Link-local IPv6 address:	fe80::806d:d66c:df5f:4626%21
IPv4 address:	10.200.182.201
IPv4 DNS servers:	10.250.200.3 (Unencrypted)
Physical address (MAC):	10-6F-D9-0C-7F-77



No.	Time	Source	Destination	Protocol	Length	Info
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Q9] 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?

A]

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Magic cookie: DHCP
✓ Option: (53) DHCP Message Type (Offer)
  Length: 1
  DHCP: Offer (2)
✓ Option: (61) Client identifier
  Length: 7
  Hardware type: Ethernet (0x01)
  Client MAC address: CloudNetwork_0c:7f:77 (10:6f:d9:0c:7f:77)
> Option: (54) DHCP Server Identifier (10.200.176.1)
✓ Option: (51) IP Address Lease Time
  Length: 4
  IP Address Lease Time: 1 hour (3600)
✓ Option: (58) Renewal Time Value
  Length: 4
  Renewal Time Value: 30 minutes (1800)
✓ Option: (59) Rebinding Time Value
  Length: 4
  Rebinding Time Value: 52 minutes, 30 seconds (3150)
✓ Option: (1) Subnet Mask (255.255.248.0)
  Length: 4
  Subnet Mask: 255.255.248.0
✓ Option: (6) Domain Name Server
  Length: 4
  Domain Name Server: 10.250.200.3
✓ Option: (3) Router
  Length: 4
  Router: 10.200.176.2
✓ Option: (255) End
  Option End: 255
  Padding: 0000000000
```

Q10] 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?

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

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Internet Protocol Version 4, Src: 0.0.0.0, Dst: 255.255.255.255
User Datagram Protocol, Src Port: 68, Dst Port: 67
Dynamic Host Configuration Protocol (Request)
```

Q11] What is the source IP address in the IP datagram containing this Request message? Is there anything special about this address? Explain.

A] Internet Protocol Version 4, Src: 0.0.0.0

Q12] . What is the destination IP address used in the datagram containing this Request message. Is there anything special about this address? Explain

A] Dst: 255.255.255.255. The use of 255.255.255.255 as the destination address in the DHCP request packet allows the client to broadcast its request effectively and efficiently, ensuring that it reaches all potential DHCP servers within the broadcast domain.

Q13] 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?

A] Transaction ID = 0x04186130

Yes it matches the transaction ID from the earlier Discover and Offer Message

Q14] 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?

A] There is no difference in the Parameter Lists.

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  v Option: (55) Parameter Request List
    Length: 14
    Parameter Request List Item: (1) Subnet Mask
    Parameter Request List Item: (3) Router
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    Parameter Request List Item: (252) Private/Proxy autodiscovery
```

Q15] What is the source IP address in the IP datagram containing this ACK message? Is there anything special about this address? Explain.

A] Internet Protocol Version 4, Src: 10.200.176.1. This is the IP of the DHCP server that has responded by providing the acknowledgement to the client

Q16] What is the destination IP address used in the datagram containing this ACK message. Is there anything special about this address? Explain

A] Destination IP: 10.200.182.201

This is the IP of my system, or the client to which the acknowledgement is being sent.

Q17] 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?

A] Your client's IP Address field contains the IP of my system 10.200.182.201.

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> Internet Protocol Version 4, Src: 10.200.176.1, Dst: 10.200.182.201
> User Datagram Protocol, Src Port: 67, Dst Port: 68
√ Dynamic Host Configuration Protocol (ACK)
  Message type: Boot Reply (2)
  Hardware type: Ethernet (0x01)
  Hardware address length: 6
  Hops: 0
  Transaction ID: 0x04186130
  Seconds elapsed: 0
> Bootp flags: 0x0000 (Unicast)
  Client IP address: 0.0.0.0
  Your (client) IP address: 10.200.182.201
  Next server IP address: 0.0.0.0
  Relay agent IP address: 0.0.0.0
  Client MAC address: CloudNetwork_0c:7f:77 (10:6f:d9:0c:7f:77)
  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: (61) Client identifier
> Option: (54) DHCP Server Identifier (10.200.176.1)
> Option: (51) IP Address Lease Time
> Option: (58) Renewal Time Value

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Q18] For how long a time (the so-called “lease time”) has the DHCP server assigned this IP address to the client?

A] Lease Time = 1hour = 3600 s

√ Option: (51) IP Address Lease Time

Length: 4

IP Address Lease Time: 1 hour (3600)

Q19] 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 default path from the client to the rest of the Internet?

A] IP Address of Next Hop is 10.200.176.2

√ Option: (3) Router

Length: 4

Router: 10.200.176.2