INTERNET PROTOCOL LAB ASSIGNMNET-5

Name: Siriparapu Sparshika

Roll No: CYS22006

Date: 31-10-2022

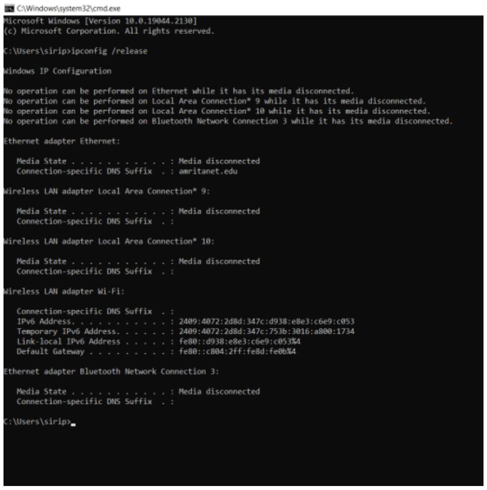
Title: Analyzing DHCP using protocol analyzer .

Aim: To analyze DHCP using protocol analyzer

PROCEDURE -

1. Perform the following steps to capture the DHCP traffic.

a) Begin by opening the Windows Command Prompt application. Type “ipconfig /release”.



C:\Windows\system32\cmd.exe

```
Microsoft Windows [Version 10.0.19044.2130]
(c) Microsoft Corporation. All rights reserved.

C:\Users\sirip>ipconfig /release

Windows IP Configuration

No operation can be performed on Ethernet while it has its media disconnected.
No operation can be performed on Local Area Connection* 9 while it has its media disconnected.
No operation can be performed on Local Area Connection* 10 while it has its media disconnected.
No operation can be performed on Bluetooth Network Connection 3 while it has its media disconnected.

Ethernet adapter Ethernet:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . : amritanet.edu

Wireless LAN adapter Local Area Connection* 9:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 10:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   IPv6 Address. . . . . . . . . . . : 2409:4072:2d8d:347c:d938:e8e3:c6e9:c053
   Temporary IPv6 Address. . . . . . : 2409:4072:2d8d:347c:753b:3016:a800:1734
   Link-local IPv6 Address . . . . . : fe80::d938:e8e3:c6e9:c053%4
   Default Gateway . . . . . . . . . : fe80::c804:2ff:fe8d:fe0b%4

Ethernet adapter Bluetooth Network Connection 3:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

C:\Users\sirip>
```

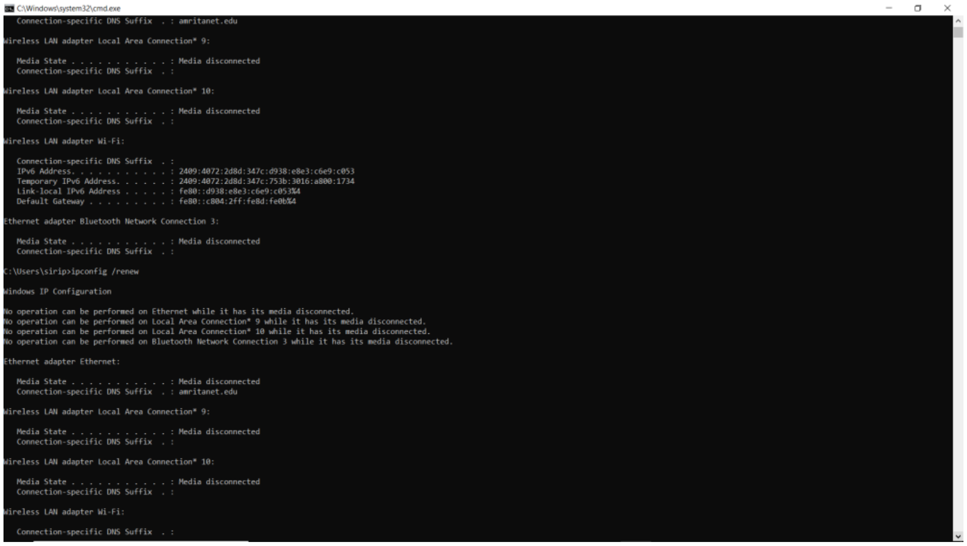
b) Start up the Wireshark packet sniffer.

c) Now go back to the Windows Command Prompt and enter “ipconfig /renew”.

d) Wait until the “ipconfig /renew” has terminated. Then enter the same command “ipconfig /renew” again

First we will run

1. ipconfig / release
2. Renew
3. Renew
4. Release
5. Renew



```
   Connection-specific DNS Suffix  . : amritanet.edu

Wireless LAN adapter Local Area Connection* 9:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 10:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   IPv6 Address. . . . . . . . . . . : 2409:4072:2d8d:347c:d938:e8e3:c6e9:c053
   Temporary IPv6 Address. . . . . . : 2409:4072:2d8d:347c:753b:3016:a800:1734
   Link-local IPv6 Address . . . . . : fe80::d938:e8e3:c6e9:c053%4
   Default Gateway . . . . . . . . . : fe80::c804:2ff:fe8d:fe0b%4

Ethernet adapter Bluetooth Network Connection 3:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

C:\Users\sirip>ipconfig /renew

Windows IP Configuration

No operation can be performed on Ethernet while it has its media disconnected.
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Ethernet adapter Ethernet:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . : amritanet.edu

Wireless LAN adapter Local Area Connection* 9:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 10:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
```
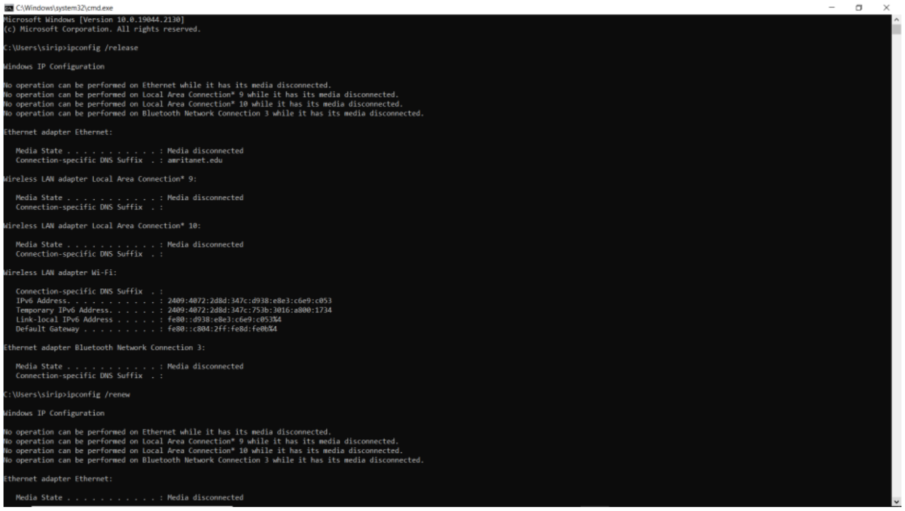
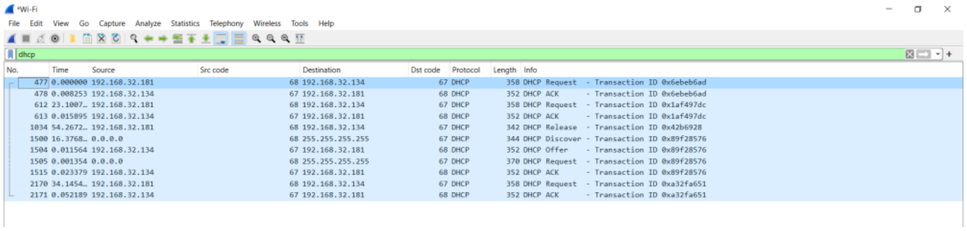

e) When the second “ipconfig /renew” terminates, enter the command “ipconfig/release” to release the previously-allocated IP address to your computer.



```
Microsoft Windows [Version 10.0.19044.2130]
(c) Microsoft Corporation. All rights reserved.

C:\Users\sirip>ipconfig /release

Windows IP Configuration

No operation can be performed on Ethernet while it has its media disconnected.
No operation can be performed on Local Area Connection* 9 while it has its media disconnected.
No operation can be performed on Local Area Connection* 10 while it has its media disconnected.
No operation can be performed on Bluetooth Network Connection 3 while it has its media disconnected.

Ethernet adapter Ethernet:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . : amritanet.edu

Wireless LAN adapter Local Area Connection* 9:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 10:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   IPv6 Address. . . . . . . . . . . : 2409:4072:2d8d:347c:d938:e8e3:c6e9:c053
   Temporary IPv6 Address. . . . . . : 2409:4072:2d8d:347c:753b:3016:a800:1734
   Link-local IPv6 Address . . . . . : fe80::d938:e8e3:c6e9:c053%4
   Default Gateway . . . . . . . . . : fe80::c804:2ff:fe8d:fe0b%4

Ethernet adapter Bluetooth Network Connection 3:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

C:\Users\sirip>ipconfig /renew

Windows IP Configuration

No operation can be performed on Ethernet while it has its media disconnected.
No operation can be performed on Local Area Connection* 9 while it has its media disconnected.
No operation can be performed on Local Area Connection* 10 while it has its media disconnected.
No operation can be performed on Bluetooth Network Connection 3 while it has its media disconnected.

Ethernet adapter Ethernet:

   Media State . . . . . . . . . . . : Media disconnected
```

f) Finally, enter “ipconfig /renew” to again be allocated an IP address for your computer.


*Wi-Fi
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
dhcp

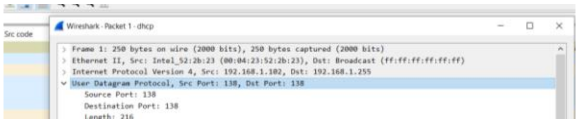
```
No.   Time     Source          Src code  Destination        Dst code Protocol Length Info
  477 0.000000 192.168.32.181            68 192.168.32.134        67 DHCP      358 DHCP Request  - Transaction ID 0x6ebeb6ad
  478 0.008253 192.168.32.134            67 192.168.32.181        68 DHCP      352 DHCP ACK      - Transaction ID 0x6ebeb6ad
  612 23.1007… 192.168.32.181            68 192.168.32.134        67 DHCP      358 DHCP Request  - Transaction ID 0x1af497dc
  613 0.015895 192.168.32.134            67 192.168.32.181        68 DHCP      352 DHCP ACK      - Transaction ID 0x1af497dc
 1034 54.2672… 192.168.32.181            68 192.168.32.134        67 DHCP      342 DHCP Release  - Transaction ID 0x42b6928
 1500 16.3768… 0.0.0.0                   68 255.255.255.255       67 DHCP      344 DHCP Discover - Transaction ID 0x89f28576
 1504 0.011564 192.168.32.134            67 192.168.32.181        68 DHCP      352 DHCP Offer    - Transaction ID 0x89f28576
 1505 0.001354 0.0.0.0                   68 255.255.255.255       67 DHCP      370 DHCP Request  - Transaction ID 0x89f28576
 1515 0.023379 192.168.32.134            67 192.168.32.181        68 DHCP      352 DHCP ACK      - Transaction ID 0x89f28576
 2170 34.1454… 192.168.32.181            68 192.168.32.134        67 DHCP      358 DHCP Request  - Transaction ID 0xa32fa651
 2171 0.052189 192.168.32.134            67 192.168.32.181        68 DHCP      352 DHCP ACK      - Transaction ID 0xa32fa651
```

g) Stop Wireshark packet capture.

2. Open the captured traffic file and given pcap file “dhcp” in Wireshark to answer the following questions.

a) Are DHCP messages sent over UDP or TCP?

All the dhcp packets are sent via UDP

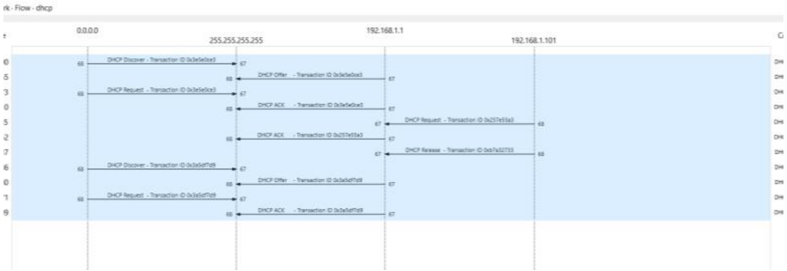


```
> Frame 1: 250 bytes on wire (2000 bits), 250 bytes captured (2000 bits)
> Ethernet II, Src: Intel_52:2b:23 (00:04:23:52:2b:23), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
> Internet Protocol Version 4, Src: 192.168.1.102, Dst: 192.168.1.255
v User Datagram Protocol, Src Port: 138, Dst Port: 138
    Source Port: 138
    Destination Port: 138
    Length: 216
```

If dhcp is ack will be added

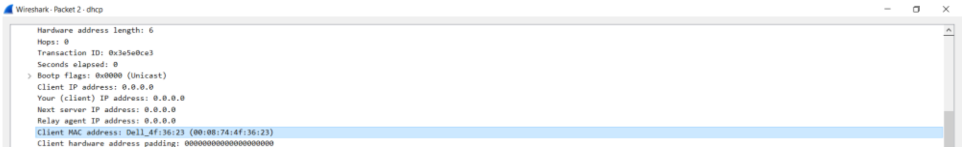
b) Draw a timing datagram illustrating the sequence of the first four-packet Discover/Offer/Request/ACK DHCP exchange between the client and server. For each packet, indicated the source and destination port numbers.

- For the DISCOVER and OFFER requests sent by the server the source port is 68 and destination port is 68. - For the REQ and ACK requests sent by the client , the source port is 68 and the destination port is 67.


rk · Flow · dhcp
0.0.0.0
255.255.255.255
192.168.1.1
192.168.1.101
68 DHCP Discover - Transaction ID 0x3e5e0ce3 67
68 DHCP Offer - Transaction ID 0x3e5e0ce3 67
68 DHCP Request - Transaction ID 0x3e5e0ce3 67
68 DHCP ACK - Transaction ID 0x3e5e0ce3 67
67 DHCP Request - Transaction ID 0x257e55a3 68
68 DHCP ACK - Transaction ID 0x257e55a3 67
67 DHCP Release - Transaction ID 0xb7a32733 68
68 DHCP Discover - Transaction ID 0x3a5df7d9 67
68 DHCP Offer - Transaction ID 0x3a5df7d9 67
68 DHCP Request - Transaction ID 0x3a5df7d9 67
68 DHCP ACK - Transaction ID 0x3a5df7d9 67

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

Link layer –MAC Address

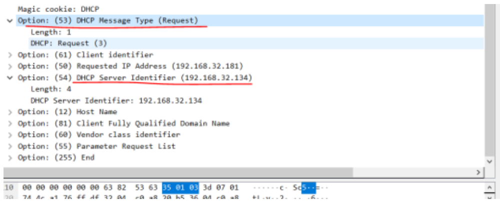


Wireshark · Packet 2 · dhcp

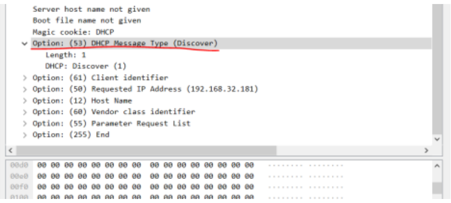
```
    Hardware address length: 6
    Hops: 0
    Transaction ID: 0x3e5e0ce3
    Seconds elapsed: 0
  > Bootp flags: 0x0000 (Unicast)
    Client IP address: 0.0.0.0
    Your (client) IP address: 0.0.0.0
    Next server IP address: 0.0.0.0
    Relay agent IP address: 0.0.0.0
    Client MAC address: Dell_4f:36:23 (00:08:74:4f:36:23)
    Client hardware address padding: 00000000000000000000
```

Its available at every message and we check at initialization only.

d) What values in the DHCP discover message differentiate this message from the DHCP request message?



```
  Magic cookie: DHCP
v Option: (53) DHCP Message Type (Request)
    Length: 1
    DHCP: Request (3)
> Option: (61) Client identifier
> Option: (50) Requested IP Address (192.168.32.181)
v Option: (54) DHCP Server Identifier (192.168.32.134)
    Length: 4
    DHCP Server Identifier: 192.168.32.134
> Option: (12) Host Name
> Option: (81) Client Fully Qualified Domain Name
> Option: (60) Vendor class identifier
> Option: (55) Parameter Request List
> Option: (255) End

10  00 00 00 00 00 00 63 82  53 63 35 01 03 3d 07 01   ······c· Sc5··=··
```

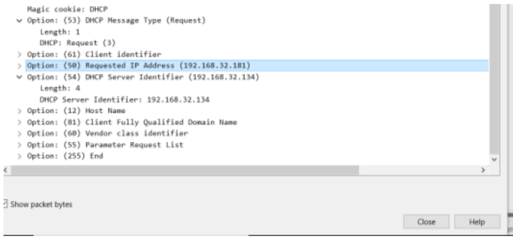


```
  Server host name not given
  Boot file name not given
  Magic cookie: DHCP
v Option: (53) DHCP Message Type (Discover)
    Length: 1
    DHCP: Discover (1)
> Option: (61) Client identifier
> Option: (50) Requested IP Address (192.168.32.181)
> Option: (12) Host Name
> Option: (60) Vendor class identifier
> Option: (55) Parameter Request List
> Option: (255) End

00d0  00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00   ········ ········
00e0  00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00   ········ ········
00f0  00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00   ········ ········
```

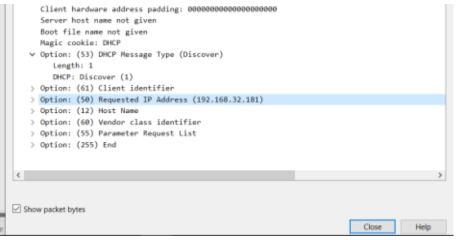
--

Acc to our knowledge that discover client will search for sever so it send 0000 and serer availvble it wills send ip address and dora is performed ‘

But here in discover has already has ip address, it will send : I have a prefered ip it will send to the prefered ip only like renew.



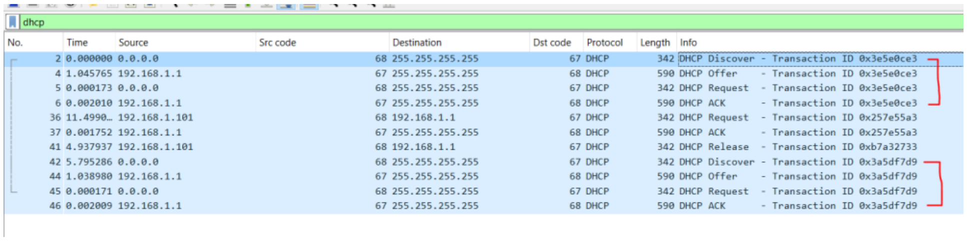
```
  Magic cookie: DHCP
v Option: (53) DHCP Message Type (Request)
    Length: 1
    DHCP: Request (3)
> Option: (61) Client identifier
> Option: (50) Requested IP Address (192.168.32.181)
v Option: (54) DHCP Server Identifier (192.168.32.134)
    Length: 4
    DHCP Server Identifier: 192.168.32.134
> Option: (12) Host Name
> Option: (81) Client Fully Qualified Domain Name
> Option: (60) Vendor class identifier
> Option: (55) Parameter Request List
> Option: (255) End
```



```
  Client hardware address padding: 00000000000000000000
  Server host name not given
  Boot file name not given
  Magic cookie: DHCP
v Option: (53) DHCP Message Type (Discover)
    Length: 1
    DHCP: Discover (1)
> Option: (61) Client identifier
> Option: (50) Requested IP Address (192.168.32.181)
> Option: (12) Host Name
> Option: (60) Vendor class identifier
> Option: (55) Parameter Request List
> Option: (255) End
```

e) 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?

We have transaction id to keep track of the information, loss and all.



dhcp

No.	Time	Source	Src code	Destination	Dst code	Protocol	Length	Info
2	0.000000	0.0.0.0	68	255.255.255.255	67	DHCP	342	DHCP Discover - Transaction ID 0x3e5e0ce3
4	1.045765	192.168.1.1	67	255.255.255.255	68	DHCP	590	DHCP Offer - Transaction ID 0x3e5e0ce3
5	0.000173	0.0.0.0	68	255.255.255.255	67	DHCP	342	DHCP Request - Transaction ID 0x3e5e0ce3
6	0.002010	192.168.1.1	67	255.255.255.255	68	DHCP	590	DHCP ACK - Transaction ID 0x3e5e0ce3
36	11.4990…	192.168.1.101	68	192.168.1.1	67	DHCP	342	DHCP Request - Transaction ID 0x257e55a3
37	0.001752	192.168.1.1	67	255.255.255.255	68	DHCP	590	DHCP ACK - Transaction ID 0x257e55a3
41	4.937937	192.168.1.101	68	192.168.1.1	67	DHCP	342	DHCP Release - Transaction ID 0xb7a32733
42	5.795286	0.0.0.0	68	255.255.255.255	67	DHCP	342	DHCP Discover - Transaction ID 0x3a5df7d9
44	1.038980	192.168.1.1	67	255.255.255.255	68	DHCP	590	DHCP Offer - Transaction ID 0x3a5df7d9
45	0.000171	0.0.0.0	68	255.255.255.255	67	DHCP	342	DHCP Request - Transaction ID 0x3a5df7d9
46	0.002009	192.168.1.1	67	255.255.255.255	68	DHCP	590	DHCP ACK - Transaction ID 0x3a5df7d9

f) 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.

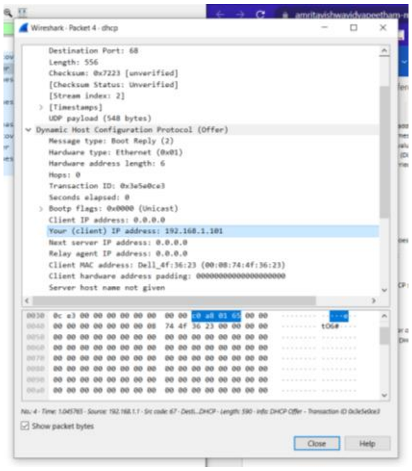
Source ip and destination ip

If IP address is not set until the end of the four message exchange , then 0.0.0.0 is used as the IP in the DHCP exchange. For Discover and Request , the source IP is 0.0.0.0 and dst IP is 255.255.255.255 For Offer and ACK , the source IP is 172.17.18.2 and dst IP is 172.17.136.155

Destination: its still broadcast as it doesn't know where to send

g) What is the IP address of your DHCP server?

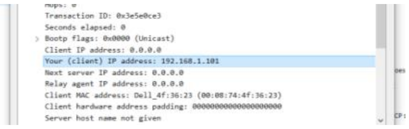
We get next server because it has already have an ip address.



```
    Destination Port: 68
    Length: 556
    Checksum: 0x7223 [unverified]
    [Checksum Status: Unverified]
    [Stream index: 2]
  > [Timestamps]
    UDP payload (548 bytes)
v Dynamic Host Configuration Protocol (Offer)
    Message type: Boot Reply (2)
    Hardware type: Ethernet (0x01)
    Hardware address length: 6
    Hops: 0
    Transaction ID: 0x3e5e0ce3
    Seconds elapsed: 0
  > Bootp flags: 0x0000 (Unicast)
    Client IP address: 0.0.0.0
    Your (client) IP address: 192.168.1.101
    Next server IP address: 0.0.0.0
    Relay agent IP address: 0.0.0.0
    Client MAC address: Dell_4f:36:23 (00:08:74:4f:36:23)
    Client hardware address padding: 00000000000000000000
    Server host name not given

0030  0c a3 00 00 00 00 00 00  00 00 c0 a8 01 65 00 00   ........ ......e..
0040  00 00 00 00 00 00 00 08  74 4f 36 23 00 00 00 00   ........ tO6#....
0050  00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00   ........ ........
0060  00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00   ........ ........
0070  00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00   ........ ........
0080  00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00   ........ ........
0090  00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00   ........ ........
00a0  00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00   ........ ........

No.: 4 · Time: 1.045765 · Source: 192.168.1.1 · Src code: 67 · Dest... DHCP · Length: 590 · Info: DHCP Offer – Transaction ID 0x3e5e0ce3
```

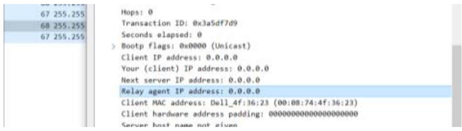
h) What IP address is the DHCP server offering to your host in the DHCP Offer message? Indicate which DHCP message contains the offered DHCP address.

The Second message that is- offer



```
    Hops: 0
    Transaction ID: 0x3e5e0ce3
    Seconds elapsed: 0
  > Bootp flags: 0x0000 (Unicast)
    Client IP address: 0.0.0.0
    Your (client) IP address: 192.168.1.101
    Next server IP address: 0.0.0.0
    Relay agent IP address: 0.0.0.0
    Client MAC address: Dell_4f:36:23 (00:08:74:4f:36:23)
    Client hardware address padding: 00000000000000000000
    Server host name not given
```

i) 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?



```
67 255.255      Hops: 0
68 255.255      Transaction ID: 0x3a5df7d9
67 255.255      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: Dell_4f:36:23 (00:08:74:4f:36:23)
                Client hardware address padding: 00000000000000000000
                Server host name not given
```

All the relay agent be 0000 as there is no relay agent.

j) Explain the purpose of the router and subnet mask lines in the DHCP offer message.

1.dhcp severer moved to another n/w

2. and also when wanted to know about the self n/w

the values are:

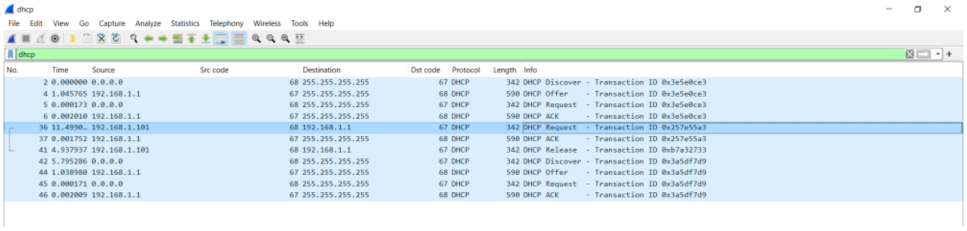
Router: 192.168.1.1

Subnet Mask: (255.255.255.0)

k) In the DHCP trace file, the DHCP server offers a specific IP address to the client.

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?

Yes , does the client accept this IP address I.e Requested IP Address (192.168.1.101)

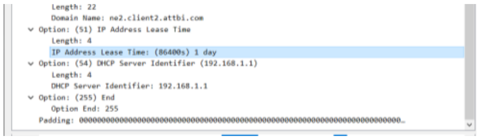


dhcp

No.	Time	Source	Src code	Destination	Dst code	Protocol	Length	Info
2	0.000000	0.0.0.0	68	255.255.255.255	67	DHCP	342	DHCP Discover - Transaction ID 0x3e5e0ce3
4	1.045765	192.168.1.1	67	255.255.255.255	68	DHCP	590	DHCP Offer - Transaction ID 0x3e5e0ce3
5	0.000173	0.0.0.0	68	255.255.255.255	67	DHCP	342	DHCP Request - Transaction ID 0x3e5e0ce3
6	0.002010	192.168.1.1	67	255.255.255.255	68	DHCP	590	DHCP ACK - Transaction ID 0x3e5e0ce3
36	11.4990…	192.168.1.101	68	192.168.1.1	67	DHCP	342	DHCP Request - Transaction ID 0x257e55a3
37	0.001752	192.168.1.1	67	255.255.255.255	68	DHCP	590	DHCP ACK - Transaction ID 0x257e55a3
41	4.937937	192.168.1.101	68	192.168.1.1	67	DHCP	342	DHCP Release - Transaction ID 0xb7a32733
42	5.795286	0.0.0.0	68	255.255.255.255	67	DHCP	342	DHCP Discover - Transaction ID 0x3a5df7d9
44	1.038980	192.168.1.1	67	255.255.255.255	68	DHCP	590	DHCP Offer - Transaction ID 0x3a5df7d9
45	0.000171	0.0.0.0	68	255.255.255.255	67	DHCP	342	DHCP Request - Transaction ID 0x3a5df7d9
46	0.002009	192.168.1.1	67	255.255.255.255	68	DHCP	590	DHCP ACK - Transaction ID 0x3a5df7d9

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

1 –day and it will be only in ack and request as it is sent by server



```
      Length: 22
      Domain Name: ne2.client2.attbi.com
  ˅ Option: (51) IP Address Lease Time
      Length: 4
      IP Address Lease Time: (86400s) 1 day
  ˅ Option: (54) DHCP Server Identifier (192.168.1.1)
      Length: 4
      DHCP Server Identifier: 192.168.1.1
  ˅ Option: (255) End
      Option End: 255
    Padding: 000000000000000000000000000000000000000000000000000000000000000000000000…
```

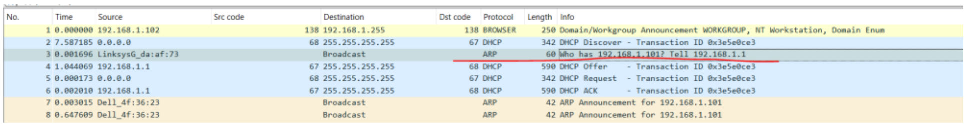
m) What is the purpose of the DHCP release message? Does the DHCP server issue an acknowledgment of receipt of the client’s DHCP request? What would happen if the client’s DHCP release message is lost?

Release- back to the server

If the release has been lost, server will wait until lease expires – will have same ip till then. The DHCP server doesn’t send an ACK receipt of client’s DHCP request.

n) Clear the DHCP 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.

Its checking for particular address, if it's there it will ask for new IP address.



No.	Time	Source	Src code	Destination	Dst code	Protocol	Length	Info
1	0.000000	192.168.1.102	138	192.168.1.255	138	BROWSER	250	Domain/Workgroup Announcement WORKGROUP, NT Workstation, Domain Enum
2	7.587185	0.0.0.0	68	255.255.255.255	67	DHCP	342	DHCP Discover - Transaction ID 0x3e5e0ce3
3	0.001696	LinksysG_da:af:73		Broadcast		ARP	60	Who has 192.168.1.101? Tell 192.168.1.1
4	1.044069	192.168.1.1	67	255.255.255.255	68	DHCP	590	DHCP Offer - Transaction ID 0x3e5e0ce3
5	0.000173	0.0.0.0	68	255.255.255.255	67	DHCP	342	DHCP Request - Transaction ID 0x3e5e0ce3
6	0.002010	192.168.1.1	67	255.255.255.255	68	DHCP	590	DHCP ACK - Transaction ID 0x3e5e0ce3
7	0.003015	Dell_4f:36:23		Broadcast		ARP	42	ARP Announcement for 192.168.1.101
8	0.647609	Dell_4f:36:23		Broadcast		ARP	42	ARP Announcement for 192.168.1.101

RESULT:

Hence , we successfully analyzed DHCP using protocol analyzer.