

21CY681 - INTERNET PROTOCOL LAB - V

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Date: 31st October 2022

Assignment Topic: Analyzing DHCP using protocol Analyser

AIM: Analyzing DHCP using protocol Analyser

PROCEDURE:

1. Perform the following steps to capture the DHCP traffic.
 - a) Begin by opening the Windows Command Prompt application. Type “ipconfig /release”.
 - 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.
 - e) When the second “ipconfig /renew” terminates, enter the command “ipconfig/release” to release the previously-allocated IP address to your computer.
 - f) Finally, enter “ipconfig /renew” to again be allocated an IP address for your computer.
 - g) Stop Wireshark packet capture.

Ans:

ipconfig /release will release the IP address

DHCP message sequences are DHCP Discover,DHCP Offer,DHCP Request and DHCP Ack.

Time	From	Source	Destination	Protocol	Length	Info
2022/3/4 23:05:29.5...	55	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x696bf340
2022/3/4 23:05:29.5...	57	192.168.43.1	192.168.43.64	DHCP	352	DHCP Offer - Transaction ID 0x696bf340
2022/3/4 23:05:29.5...	58	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Transaction ID 0x696bf340
2022/3/4 23:05:29.6...	59	192.168.43.1	192.168.43.64	DHCP	352	DHCP ACK - Transaction ID 0x696bf340
2022/3/4 23:07:39.2...	988	192.168.43.64	192.168.43.1	DHCP	358	DHCP Request - Transaction ID 0xc86bfc1b
2022/3/4 23:07:39.3...	989	192.168.43.1	192.168.43.64	DHCP	352	DHCP ACK - Transaction ID 0xc86bfc1b
2022/3/4 23:08:03.0...	1273	192.168.43.64	192.168.43.1	DHCP	342	DHCP Release - Transaction ID 0x41d63de8

dhcp						
Time	No.	Source	Destination	Protocol	Length	Info
2022/304 23:05:29.5...	55	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0x696bf340
2022/304 23:05:29.5...	57	192.168.43.1	192.168.43.64	DHCP	352	DHCP Offer - Transaction ID 0x696bf340
2022/304 23:05:29.5...	58	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Transaction ID 0x696bf340
2022/304 23:05:29.6...	59	192.168.43.1	192.168.43.64	DHCP	352	DHCP ACK - Transaction ID 0x696bf340
2022/304 23:07:39.2...	988	192.168.43.64	192.168.43.1	DHCP	358	DHCP Request - Transaction ID 0xc86bfc1b
2022/304 23:07:39.3...	989	192.168.43.1	192.168.43.64	DHCP	352	DHCP ACK - Transaction ID 0xc86bfc1b
2022/304 23:08:03.0...	1273	192.168.43.64	192.168.43.1	DHCP	342	DHCP Release - Transaction ID 0x41d63de8
2022/304 23:08:58.8...	1575	0.0.0.0	255.255.255.255	DHCP	344	DHCP Discover - Transaction ID 0xfce8476b
2022/304 23:08:58.9...	1576	192.168.43.1	192.168.43.64	DHCP	352	DHCP Offer - Transaction ID 0xfce8476b
2022/304 23:08:58.9...	1577	0.0.0.0	255.255.255.255	DHCP	370	DHCP Request - Transaction ID 0xfce8476b
2022/304 23:08:58.9...	1578	192.168.43.1	192.168.43.64	DHCP	352	DHCP ACK - Transaction ID 0xfce8476b

> Frame 55: 344 bytes on wire (2752 bits), 344 bytes captured (2752 bits) on interface > Ethernet II, Src: AzureWav_fb:e3:f3 (80:d2:1d:fb:e3:f3), Dst: Broadcast (ff:ff:ff:ff:ff:ff) > 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 (Discover)		0000 ff ff ff ff ff ff 80 d2 1d fb e3 f3 08 00 45 00E. 0010 01 4a de 9e 00 00 00 11 5b 05 00 00 00 ff ff -].....[..... 0020 ff ff 00 44 00 43 01 36 05 72 01 01 06 00 69 6b ...D-C-6-p....ik 0030 f3 40 00 00 00 00 00 00 00 00 00 00 00 00 00 @..... 0040 00 00 00 00 00 00 80 d2 1d fb e3 f3 00 00 00 00 0050 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 0070 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 0090 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 00b0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00c0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00d0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
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```
C:\WINDOWS\system32>ipconfig /release
```

Windows IP Configuration

No operation can be performed on Ethernet 2 while it has its media disconnected.
No operation can be performed on Local Area Connection* 1 while it has its media disconnected.
No operation can be performed on Local Area Connection* 2 while it has its media disconnected.

Ethernet adapter Ethernet 2:

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

Ethernet adapter VirtualBox Host-Only Network:

Connection-specific DNS Suffix . :
Link-local IPv6 Address : fe80::5890:9542:683:4d7d%11
IPv4 Address. : 192.168.56.1
Subnet Mask : 255.255.255.0
Default Gateway :

Wireless LAN adapter Local Area Connection* 1:

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

Wireless LAN adapter Local Area Connection* 2:

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

Wireless LAN adapter Wi-Fi:

Connection-specific DNS Suffix . :
IPv6 Address. : 2409:4072:6d04:7bc:8181:96a9:19f3:33c4
Temporary IPv6 Address. : 2409:4072:6d04:7bc:1ca1:780c:8f9f:68ca
Link-local IPv6 Address : fe80::8181:96a9:19f3:33c4%10
Default Gateway : fe80::dc66:42ff:fef5:ed89%10

```
C:\WINDOWS\system32>ipconfig /renew
```

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Subnet Mask : 255.255.255.0
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Link-local IPv6 Address : fe80::8181:96a9:19f3:33c4%10
IPv4 Address. : 192.168.43.64
Subnet Mask : 255.255.255.0
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Subnet Mask : 255.255.255.0
Default Gateway :

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Connection-specific DNS Suffix . :

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Connection-specific DNS Suffix . :

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Link-local IPv6 Address : fe80::8181:96a9:19f3:33c4%10
Default Gateway : fe80::dc66:42ff:fef5:ed89%10

```
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```

Connection-specific DNS Suffix . : 
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Link-local IPv6 Address . . . . . : fe80::8181:96a9:19f3:33c4%10
IPv4 Address. . . . . : 192.168.43.64
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : fe80::dc66:42ff:fe5:ed89%10
                             192.168.43.1

```

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?

Ans: DHCP messages are sent over UDP. The DHCP employs a connectionless service model, using the User Datagram Protocol (UDP). It is implemented with two UDP port numbers for its operations. UDP port number 67 is the port used by the server, and UDP port number 68 is used by the client.

dhcp						
Time	No.	Source	Destination	Protocol	Length	Info
2004/242 22:27:46.9...	46	192.168.1.1	255.255.255.255	DHCP	590	DHCP ACK - Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	44	192.168.1.1	255.255.255.255	DHCP	590	DHCP Offer - Transaction ID 0x3a5df7d9
2004/242 22:27:35.1...	37	192.168.1.1	255.255.255.255	DHCP	590	DHCP ACK - Transaction ID 0x257e55a3
2004/242 22:27:23.6...	6	192.168.1.1	255.255.255.255	DHCP	590	DHCP ACK - Transaction ID 0x3e5e0ce3
2004/242 22:27:23.6...	4	192.168.1.1	255.255.255.255	DHCP	590	DHCP Offer - Transaction ID 0x3e5e0ce3
2004/242 22:27:46.9...	45	0.0.0.0	255.255.255.255	DHCP	342	DHCP Request - Transaction ID 0x3a5df7d9
2004/242 22:27:45.8...	42	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0x3a5df7d9
2004/242 22:27:40.1...	41	192.168.1.101	192.168.1.1	DHCP	342	DHCP Release - Transaction ID 0xb7a32733
2004/242 22:27:35.1...	36	192.168.1.101	192.168.1.1	DHCP	342	DHCP Request - Transaction ID 0x257e55a3
2004/242 22:27:23.6...	5	0.0.0.0	255.255.255.255	DHCP	342	DHCP Request - Transaction ID 0x3e5e0ce3
2004/242 22:27:22.6...	2	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0x3e5e0ce3


```

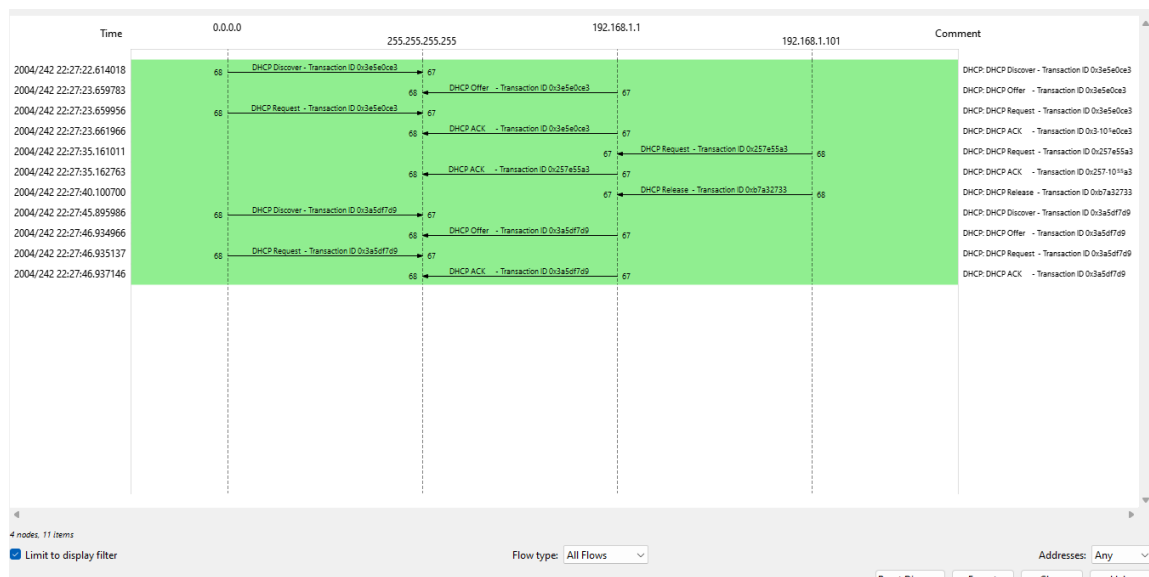
.... 0101 = Header Length: 20 bytes (5)
> Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
  Total Length: 328
  Identification: 0xb32f (45871)
> 000. .... = Flags: 0x0
  ...0 0000 0000 0000 = Fragment Offset: 0
  Time to Live: 128
  Protocol: UDP (17)
  Header Checksum: 0x8676 [validation disabled]
  [Header checksum status: Unverified]
  Source Address: 0.0.0.0
  Destination Address: 255.255.255.255
> User Datagram Protocol, Src Port: 68, Dst Port: 67
> Dynamic Host Configuration Protocol (Discover)

```

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.

Ans:





DHCP ACK	- Transaction ID 0x3a5df7d9	67	68 255.255.255.255
DHCP Offer	- Transaction ID 0x3a5df7d9	67	68 255.255.255.255
DHCP ACK	- Transaction ID 0x257e55a3	67	68 255.255.255.255
DHCP ACK	- Transaction ID 0x3e5e0ce3	67	68 255.255.255.255
DHCP Offer	- Transaction ID 0x3e5e0ce3	67	68 255.255.255.255
DHCP Request	- Transaction ID 0x3a5df7d9	68	67 255.255.255.255
DHCP Discover	- Transaction ID 0x3a5df7d9	68	67 255.255.255.255
DHCP Release	- Transaction ID 0xb7a32733	68	67 192.168.1.1
DHCP Request	- Transaction ID 0x257e55a3	68	67 192.168.1.1
DHCP Request	- Transaction ID 0x3e5e0ce3	68	67 255.255.255.255
DHCP Discover	- Transaction ID 0x3e5e0ce3	68	67 255.255.255.255

67-source port number

68-destination port number

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

Ans:

Time	No.	Source	Destination	Protocol	Length	Info
2004/242 22:27:22.6...	2	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0x3e5e0ce3
2004/242 22:27:23.6...	4	192.168.1.1	255.255.255.255	DHCP	590	DHCP Offer - Transaction ID 0x3e5e0ce3
2004/242 22:27:23.6...	5	0.0.0.0	255.255.255.255	DHCP	342	DHCP Request - Transaction ID 0x3e5e0ce3
2004/242 22:27:23.6...	6	192.168.1.1	255.255.255.255	DHCP	590	DHCP ACK - Transaction ID 0x3e5e0ce3
2004/242 22:27:35.1...	36	192.168.1.101	192.168.1.1	DHCP	342	DHCP Request - Transaction ID 0x257e55a3
2004/242 22:27:35.1...	37	192.168.1.1	255.255.255.255	DHCP	590	DHCP ACK - Transaction ID 0x257e55a3
2004/242 22:27:40.1...	41	192.168.1.101	192.168.1.1	DHCP	342	DHCP Release - Transaction ID 0xb7a32733
2004/242 22:27:45.8...	42	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	44	192.168.1.1	255.255.255.255	DHCP	590	DHCP Offer - Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	45	0.0.0.0	255.255.255.255	DHCP	342	DHCP Request - Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	46	192.168.1.1	255.255.255.255	DHCP	590	DHCP ACK - Transaction ID 0x3a5df7d9

Transaction ID: 0x3e5e0ce3	0040 00 00 00 00 00 00 08 74 4f 36 23 00 00 00 00t06#....
Seconds elapsed: 0	0050 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
Bootp flags: 0x0000 (Unicast)	0060 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
Client IP address: 0.0.0.0	0070 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
Your (client) IP address: 192.168.1.101	0080 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
Next server IP address: 0.0.0.0	0090 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
Relay agent IP address: 0.0.0.0	00a0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
Client MAC address: Dell_4f:36:23 (00:08:74:4f:36:23)	00b0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
Client hardware address padding: 00000000000000000000	00c0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
Server host name not given	00d0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
Boot file name not given	00e0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
Magic cookie: DHCP	00f0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
Option: (53) DHCP Message Type (Offer)	0100 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
Option: (1) Subnet Mask (255.255.255.0)	0110 00 00 00 00 00 00 00 63 82 53 63 35 01 02 01 04 ffc-Sc5....
Option: (3) Router	0120 00 00 00 00 00 00 00 63 82 53 63 35 01 02 01 04 ffc-Sc5....

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

Ans :DHCP Message Type and DHCP Server Identifier

Time	No.	Source	Destination	Protocol	Length	Info
2004/242 22:27:22.6...	2	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0x3e5e0ce3
2004/242 22:27:23.6...	4	192.168.1.1	255.255.255.255	DHCP	590	DHCP Offer - Transaction ID 0x3e5e0ce3
2004/242 22:27:23.6...	5	0.0.0.0	255.255.255.255	DHCP	342	DHCP Request - Transaction ID 0x3e5e0ce3
2004/242 22:27:23.6...	6	192.168.1.1	255.255.255.255	DHCP	590	DHCP ACK - Transaction ID 0x3e5e0ce3
2004/242 22:27:35.1...	36	192.168.1.101	192.168.1.1	DHCP	342	DHCP Request - Transaction ID 0x257e55a3
2004/242 22:27:35.1...	37	192.168.1.1	255.255.255.255	DHCP	590	DHCP ACK - Transaction ID 0x257e55a3
2004/242 22:27:40.1...	41	192.168.1.101	192.168.1.1	DHCP	342	DHCP Release - Transaction ID 0xb7a32733
2004/242 22:27:45.8...	42	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	44	192.168.1.1	255.255.255.255	DHCP	590	DHCP Offer - Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	45	0.0.0.0	255.255.255.255	DHCP	342	DHCP Request - Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	46	192.168.1.1	255.255.255.255	DHCP	590	DHCP ACK - Transaction ID 0x3a5df7d9

Client MAC address: Dell_4f:36:23 (00:08:74:4f:36:23)	0050 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
Client hardware address padding: 00000000000000000000	0060 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
Server host name not given	0070 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
Boot file name not given	0080 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
Magic cookie: DHCP	0090 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
Option: (53) DHCP Message Type (Discover)	00a0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
Length: 1	00b0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
DHCP: Discover (1)	00c0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
Option: (116) DHCP Auto-Configuration	00d0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
Option: (61) Client identifier	00e0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
Option: (50) Requested IP Address (192.168.1.101)	00f0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
Option: (12) Host Name	0100 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00t06#....
Option: (60) Vendor class identifier	0110 00 00 00 00 00 00 00 63 82 53 63 35 01 01 74 01 01t06#....
Option: (55) Parameter Request List	0120 3d 07 01 00 00 74 4f 36 23 32 04 c0 a8 01 65 0ct06#....
Option: (75) End	

Time	No.	Source	Destination	Protocol	Length	Info
2004/242 22:27:22.6...	2	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0x3e5e0ce3
2004/242 22:27:23.6...	4	192.168.1.1	255.255.255.255	DHCP	590	DHCP Offer - Transaction ID 0x3e5e0ce3
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2004/242 22:27:35.1...	37	192.168.1.1	255.255.255.255	DHCP	590	DHCP ACK - Transaction ID 0x257e55a3
2004/242 22:27:40.1...	41	192.168.1.101	192.168.1.1	DHCP	342	DHCP Release - Transaction ID 0xb7a32733
2004/242 22:27:45.8...	42	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	44	192.168.1.1	255.255.255.255	DHCP	590	DHCP Offer - Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	45	0.0.0.0	255.255.255.255	DHCP	342	DHCP Request - Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	46	192.168.1.1	255.255.255.255	DHCP	590	DHCP ACK - Transaction ID 0x3a5df7d9

Client MAC address: Dell_4f:36:23 (00:08:74:4f:36:23)	0050 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Client hardware address padding: 00000000000000000000	0060 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Server host name not given	0070 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Boot file name not given	0080 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Magic cookie: DHCP	0090 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Option: (53) DHCP Message Type (Request)	00a0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Length: 1	00b0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
DHCP: Request (3)	00c0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Option: (61) Client identifier	00d0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Length: 7	00e0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Hardware type: Ethernet (0x01)	00f0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Client MAC address: Dell_4f:36:23 (00:08:74:4f:36:23)	0100 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Option: (50) Requested IP Address (192.168.1.101)	0110 00 00 00 00 00 00 63 82 53 63 35 01 03 3d 07 01
Length: 4	0120 00 08 74 4f 36 23 32 04 c0 a8 01 65 36 04 c0 a8 ...t06#2...e6...
Requested IP Address: 192.168.1.101	

DHCP/BOOTP option type (dhcp.option.type), 3 bytes Packets: 63 - Displayed: 11 (17.5%) Profile: Default

Server host name not given

Boot file name not given

Magic cookie: DHCP

- > Option: (53) DHCP Message Type (Request)
- > Option: (61) Client identifier
- > Option: (50) Requested IP Address (192.168.1.101)
- > Option: (54) DHCP Server Identifier (192.168.1.1)
- > Option: (12) Host 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

- > Option: (53) DHCP Message Type (Discover)
- > Option: (116) DHCP Auto-Configuration
- > Option: (61) Client identifier
- > Option: (50) Requested IP Address (192.168.1.101)
- > 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?

Ans:

2004/242 22:27:22.6...	2 0.0.0.0	255.255.255.255	DHCP	342 DHCP Discover	- Transaction ID 0x3e5e0ce3
2004/242 22:27:23.6...	4 192.168.1.1	255.255.255.255	DHCP	590 DHCP Offer	- Transaction ID 0x3e5e0ce3
2004/242 22:27:23.6...	5 0.0.0.0	255.255.255.255	DHCP	342 DHCP Request	- Transaction ID 0x3e5e0ce3
2004/242 22:27:23.6...	6 192.168.1.1	255.255.255.255	DHCP	590 DHCP ACK	- Transaction ID 0x3e5e0ce3
2004/242 22:27:35.1...	36 192.168.1.101	192.168.1.1	DHCP	342 DHCP Request	- Transaction ID 0x257e55a3
2004/242 22:27:35.1...	37 192.168.1.1	255.255.255.255	DHCP	590 DHCP ACK	- Transaction ID 0x257e55a3
2004/242 22:27:40.1...	41 192.168.1.101	192.168.1.1	DHCP	342 DHCP Release	- Transaction ID 0xb7a32733
2004/242 22:27:45.8...	42 0.0.0.0	255.255.255.255	DHCP	342 DHCP Discover	- Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	44 192.168.1.1	255.255.255.255	DHCP	590 DHCP Offer	- Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	45 0.0.0.0	255.255.255.255	DHCP	342 DHCP Request	- Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	46 192.168.1.1	255.255.255.255	DHCP	590 DHCP ACK	- Transaction ID 0x3a5df7d9

The transaction ID in the first four packets is 0x3e5e0ce3

The transaction ID in the second set of DHCP messages is 0x3a5d7d9

To keep a track of message that are coming or is used by the server to identify or take a note of which message was sent by which computer. If the process is new the Id will be new.

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.

Ans : 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

Time	No.	Source	Destination	Protocol	Length	Info
2004/242 22:27:22.6...	2	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0x3e5e0ce3
2004/242 22:27:23.6...	4	192.168.1.1	255.255.255.255	DHCP	590	DHCP Offer - Transaction ID 0x3e5e0ce3
2004/242 22:27:23.6...	5	0.0.0.0	255.255.255.255	DHCP	342	DHCP Request - Transaction ID 0x3e5e0ce3
2004/242 22:27:23.6...	6	192.168.1.1	255.255.255.255	DHCP	590	DHCP ACK - Transaction ID 0x3e5e0ce3
2004/242 22:27:35.1...	36	192.168.1.101	192.168.1.1	DHCP	342	DHCP Request - Transaction ID 0x257e55a3
2004/242 22:27:35.1...	37	192.168.1.1	255.255.255.255	DHCP	590	DHCP ACK - Transaction ID 0x257e55a3
2004/242 22:27:40.1...	41	192.168.1.101	192.168.1.1	DHCP	342	DHCP Release - Transaction ID 0xb7a32733
2004/242 22:27:45.8...	42	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	44	192.168.1.1	255.255.255.255	DHCP	590	DHCP Offer - Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	45	0.0.0.0	255.255.255.255	DHCP	342	DHCP Request - Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	46	192.168.1.1	255.255.255.255	DHCP	590	DHCP ACK - Transaction ID 0x3a5df7d9

DHCP ACK	- Transaction ID 0x3a5df7d9	67	68 255.255.255.255
DHCP Offer	- Transaction ID 0x3a5df7d9	67	68 255.255.255.255
DHCP ACK	- Transaction ID 0x257e55a3	67	68 255.255.255.255
DHCP ACK	- Transaction ID 0x3e5e0ce3	67	68 255.255.255.255
DHCP Offer	- Transaction ID 0x3e5e0ce3	67	68 255.255.255.255
DHCP Request	- Transaction ID 0x3a5df7d9	68	67 255.255.255.255
DHCP Discover	- Transaction ID 0x3a5df7d9	68	67 255.255.255.255
DHCP Release	- Transaction ID 0xb7a32733	68	67 192.168.1.1
DHCP Request	- Transaction ID 0x257e55a3	68	67 192.168.1.1
DHCP Request	- Transaction ID 0x3e5e0ce3	68	67 255.255.255.255
DHCP Discover	- Transaction ID 0x3e5e0ce3	68	67 255.255.255.255

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

Ans: The IP address of the DHCP server is 192.168.1.1

```
2004/242 22:27:23.6... 4 192.168.1.1 255.255.255.255 DHCP 590 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.

Ans: The DHCP offered address is 192.168.1.101

```

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
Boot file 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?

Ans: There is no relay agent, so the value for relay agent is 0.0.0.0

2004/242 22:27:22.6...	2 0.0.0.0	255.255.255.255	DHCP	342 DHCP Discover	- Transaction ID 0x3e5e0ce3
2004/242 22:27:23.6...	4 192.168.1.1	255.255.255.255	DHCP	590 DHCP Offer	- Transaction ID 0x3e5e0ce3
2004/242 22:27:23.6...	5 0.0.0.0	255.255.255.255	DHCP	342 DHCP Request	- Transaction ID 0x3e5e0ce3
2004/242 22:27:23.6...	6 192.168.1.1	255.255.255.255	DHCP	590 DHCP ACK	- Transaction ID 0x3e5e0ce3
2004/242 22:27:35.1...	36 192.168.1.101	192.168.1.1	DHCP	342 DHCP Request	- Transaction ID 0x257e55a3
2004/242 22:27:35.1...	37 192.168.1.1	255.255.255.255	DHCP	590 DHCP ACK	- Transaction ID 0x257e55a3
2004/242 22:27:40.1...	41 192.168.1.101	192.168.1.1	DHCP	342 DHCP Release	- Transaction ID 0xb7a32733
2004/242 22:27:45.8...	42 0.0.0.0	255.255.255.255	DHCP	342 DHCP Discover	- Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	44 192.168.1.1	255.255.255.255	DHCP	590 DHCP Offer	- Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	45 0.0.0.0	255.255.255.255	DHCP	342 DHCP Request	- Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	46 192.168.1.1	255.255.255.255	DHCP	590 DHCP ACK	- Transaction ID 0x3a5df7d9

Message type: Boot Reply (2)	0040 00 00 00 00 00 00 08 74 4f 36 23 00 00 00 00 t06#
Hardware type: Ethernet (0x01)	0050 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Hardware address length: 6	0060 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Hops: 0	0070 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Transaction ID: 0x3e5e0ce3	0080 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Seconds elapsed: 0	0090 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
> Bootp flags: 0x0000 (Unicast)	00a0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Client IP address: 0.0.0.0	00b0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Your (client) IP address: 192.168.1.101	00c0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Next server IP address: 0.0.0.0	00d0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Relay agent IP address: 0.0.0.0	00e0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Client MAC address: Dell_4f:36:23 (00:08:74:4f:36:23)	00f0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Client hardware address padding: 00000000000000000000	0100 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Server host name not given	0110 00 00 00 00 00 63 82 53 63 35 01 02 01 04 ff c- Sc5-
Root file name not given	

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

Ans: For connecting with internet we need router. 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

```
> Option: (53) DHCP Message Type (Offer)
  Option: (1) Subnet Mask (255.255.255.0)
    Length: 4
    Subnet Mask: 255.255.255.0
  Option: (3) Router
    Length: 4
    Router: 192.168.1.1
```

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?

Ans: Yes, in the client's response to the first server OFFER message, the client accepts this IP address. The client IP requested address is mentioned in the packet is shown below:


```

> 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
Boot file name not given
Magic cookie: DHCP

```

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

Ans:

dhcp						
Time	No.	Source	Destination	Protocol	Length	Info
2004/242 22:27:22.6...	2	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0x3e5e0ce3
2004/242 22:27:23.6...	4	192.168.1.1	255.255.255.255	DHCP	590	DHCP Offer - Transaction ID 0x3e5e0ce3
2004/242 22:27:23.6...	5	0.0.0.0	255.255.255.255	DHCP	342	DHCP Request - Transaction ID 0x3e5e0ce3
2004/242 22:27:23.6...	6	192.168.1.1	255.255.255.255	DHCP	590	DHCP ACK - Transaction ID 0x3e5e0ce3
2004/242 22:27:35.1...	36	192.168.1.101	192.168.1.1	DHCP	342	DHCP Request - Transaction ID 0x257e55a3
2004/242 22:27:35.1...	37	192.168.1.1	255.255.255.255	DHCP	590	DHCP ACK - Transaction ID 0x257e55a3
2004/242 22:27:40.1...	41	192.168.1.101	192.168.1.1	DHCP	342	DHCP Release - Transaction ID 0xb7a32733
2004/242 22:27:45.8...	42	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	44	192.168.1.1	255.255.255.255	DHCP	590	DHCP Offer - Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	45	0.0.0.0	255.255.255.255	DHCP	342	DHCP Request - Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	46	192.168.1.1	255.255.255.255	DHCP	590	DHCP ACK - Transaction ID 0x3a5df7d9

<ul style="list-style-type: none"> Option: (6) Domain Name Server <ul style="list-style-type: none"> Length: 8 Domain Name Server: 63.240.76.19 Domain Name Server: 204.127.198.19 Option: (15) Domain Name <ul style="list-style-type: none"> Length: 22 Domain Name: ne2.client2.attbi.com Option: (51) IP Address Lease Time <ul style="list-style-type: none"> Length: 4 IP Address Lease Time: (86400s) 1 day Option: (54) DHCP Server Identifier (192.168.1.1) <ul style="list-style-type: none"> Length: 4 DHCP Server Identifier: 192.168.1.1 Option: (255) End <ul style="list-style-type: none"> Option End: 255 	<pre> 0140 2e 61 74 74 62 69 2e 63 6f 6d 00 33 04 00 01 51 .attbi.com-3...Q 0150 80 36 04 c0 a8 01 01 ff 00 00 00 00 00 00 00 6..... 0160 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0170 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0180 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0190 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 01a0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 01b0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 01c0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 01d0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 01e0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 01f0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0200 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0210 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 </pre>
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DHCP/BOOTP option type (dhcp.option.type), 6 bytes Packets: 63 · Displayed: 11 (17.5%) Profile: Default

Time	No.	Source	Destination	Protocol	Length	Info
2004/242 22:27:22.6...	2	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0x3e5e0ce3
2004/242 22:27:23.6...	4	192.168.1.1	255.255.255.255	DHCP	590	DHCP Offer - Transaction ID 0x3e5e0ce3
2004/242 22:27:23.6...	5	0.0.0.0	255.255.255.255	DHCP	342	DHCP Request - Transaction ID 0x3e5e0ce3
2004/242 22:27:23.6...	6	192.168.1.1	255.255.255.255	DHCP	590	DHCP ACK - Transaction ID 0x3e5e0ce3
2004/242 22:27:35.1...	36	192.168.1.101	192.168.1.1	DHCP	342	DHCP Request - Transaction ID 0x257e55a3
2004/242 22:27:35.1...	37	192.168.1.1	255.255.255.255	DHCP	590	DHCP ACK - Transaction ID 0x257e55a3
2004/242 22:27:40.1...	41	192.168.1.101	192.168.1.1	DHCP	342	DHCP Release - Transaction ID 0xb7a32733
2004/242 22:27:45.8...	42	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	44	192.168.1.1	255.255.255.255	DHCP	590	DHCP Offer - Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	45	0.0.0.0	255.255.255.255	DHCP	342	DHCP Request - Transaction ID 0x3a5df7d9
2004/242 22:27:46.9...	46	192.168.1.1	255.255.255.255	DHCP	590	DHCP ACK - Transaction ID 0x3a5df7d9

<ul style="list-style-type: none"> Option: (6) Domain Name Server <ul style="list-style-type: none"> Length: 8 Domain Name Server: 63.240.76.19 Domain Name Server: 204.127.198.19 Option: (15) Domain Name <ul style="list-style-type: none"> Length: 22 Domain Name: ne2.client2.attbi.com Option: (51) IP Address Lease Time <ul style="list-style-type: none"> Length: 4 IP Address Lease Time: (86400s) 1 day Option: (54) DHCP Server Identifier (192.168.1.1) <ul style="list-style-type: none"> Length: 4 DHCP Server Identifier: 192.168.1.1 Option: (255) End <ul style="list-style-type: none"> Option End: 255 	<pre> 0140 2e 61 74 74 62 69 2e 63 6f 6d 00 33 04 00 01 51 .attbi.c om-3...Q 0150 80 36 04 c0 a8 01 01 ff 00 00 00 00 00 00 00 00 -6..... 0160 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0170 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0180 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0190 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 01a0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 01b0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 01c0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 01d0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 01e0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 01f0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0200 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0210 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 </pre>
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DHCP/BOOTP option type (dhcp.option.type), 6 bytes Packets: 63 - Displayed: 11 (17.5%) Profile: Default

The lease time of the IP for an computer is 1day.

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?

Ans:The purpose of release message is to release the IP address assigned to the computer. The DHCP server doesn't send an ACK receipt of client's DHCP request.If the client's DHCP message is lost then the server might not know whether the client issued an release request or not . So the IP assigned to the computer previously still remains the same.

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.

Ans:Yes.We can see many ARP packets that were transferred in the experiment since the server verifies whether the IP which is to be allocated to the requested computer is used already by any other computer.

arp						
Time	No.	Source	Destination	Protocol	Length	Info
2004/242 22:27:22.6...	3	LinksysG_da:af:73	Broadcast	ARP	60	Who has 192.168.1.101? Tell 192.168.1.1
2004/242 22:27:23.6...	7	Dell_4f:36:23	Broadcast	ARP	42	ARP Announcement for 192.168.1.101
2004/242 22:27:24.3...	8	Dell_4f:36:23	Broadcast	ARP	42	ARP Announcement for 192.168.1.101
2004/242 22:27:25.3...	9	Dell_4f:36:23	Broadcast	ARP	42	ARP Announcement for 192.168.1.101
2004/242 22:27:26.3...	11	LinksysG_da:af:73	Broadcast	ARP	60	Who has 192.168.1.101? Tell 192.168.1.1
2004/242 22:27:26.3...	12	Dell_4f:36:23	LinksysG_da:af:73	ARP	42	192.168.1.101 is at 00:08:74:4f:36:23
2004/242 22:27:31.1...	23	Dell_4f:36:23	Broadcast	ARP	42	Who has 192.168.1.117? Tell 192.168.1.101
2004/242 22:27:31.1...	24	Hp-UxE90_0d:c8:06	Dell_4f:36:23	ARP	60	192.168.1.117 is at 00:10:83:0d:c8:06
2004/242 22:27:45.8...	43	LinksysG_da:af:73	Broadcast	ARP	60	Who has 192.168.1.101? Tell 192.168.1.1
2004/242 22:27:46.9...	47	Dell_4f:36:23	Broadcast	ARP	42	ARP Announcement for 192.168.1.101
2004/242 22:27:47.3...	48	Dell_4f:36:23	Broadcast	ARP	42	ARP Announcement for 192.168.1.101
2004/242 22:27:48.3...	49	Dell_4f:36:23	Broadcast	ARP	42	ARP Announcement for 192.168.1.101

> Frame 3: 60 bytes on wire (480 bits), 60 bytes captured (480 bits)	0000	ff ff ff ff ff ff 00 06 25 da af 73 08 06 00 01%..s....
> Ethernet II, Src: LinksysG_da:af:73 (00:06:25:da:af:73), Dst: Broadcast (ff:ff:ff:ff:ff:ff)	0010	08 00 06 04 00 01 00 06 25 da af 73 c0 a8 01 01%..s....
> Address Resolution Protocol (request)	0020	00 00 00 00 00 00 c0 a8 01 65 00 00 00 00 00 00e.....
	0030	00 00 00 00 00 00 00 00 00 00 00 00

RESULT:Analyzed DHCP using protocol Analyser.

