

## CS359: ASSIGNMENT-6

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1)

a) The Transaction ID is 4 bytes (32 bits) long. As a result, collisions in a relatively small number of concurrent DHCP processes are quite improbable.

|     |                 |                 |                 |      |                   |                             |
|-----|-----------------|-----------------|-----------------|------|-------------------|-----------------------------|
| 237 | 11:56:06.052265 | 0.0.0.0         | 255.255.255.255 | DHCP | 344 DHCP Discover | - Transaction ID 0xc681aaf7 |
| 241 | 11:56:06.149807 | 192.168.126.120 | 192.168.126.187 | DHCP | 352 DHCP Offer    | - Transaction ID 0xc681aaf7 |
| 242 | 11:56:06.152237 | 0.0.0.0         | 255.255.255.255 | DHCP | 370 DHCP Request  | - Transaction ID 0xc681aaf7 |
| 243 | 11:56:06.166846 | 192.168.126.120 | 192.168.126.187 | DHCP | 352 DHCP ACK      | - Transaction ID 0xc681aaf7 |

b) The “Your (client) IP address” field (in DHCP Ack) carries the IP address being leased to the client.

|   |   |
|---|---|
| ▼ | Dynamic Host Configuration Protocol (ACK) |
|   | Message type: Boot Reply (2)              |
|   | Hardware type: Ethernet (0x01)            |
|   | Hardware address length: 6                |
|   | Hops: 0                                   |
|   | Transaction ID: 0xc681aaf7                |
|   | Seconds elapsed: 0                        |
| > | Bootp flags: 0x0000 (Unicast)             |
|   | Client IP address: 0.0.0.0                |
|   | Your (client) IP address: 192.168.126.187 |
|   | Next server IP address: 192.168.126.120   |

c) The option value of 53 stands for DHCP Message Type.

|   |   |
|---|---|
|   | Magic cookie: DHCP                                    |
| > | Option: (53) DHCP Message Type (ACK)                  |
| > | Option: (54) DHCP Server Identifier (192.168.126.120) |
| > | Option: (51) IP Address Lease Time                    |
| > | Option: (58) Renewal Time Value                       |
| > | Option: (59) Rebinding Time Value                     |
| > | Option: (1) Subnet Mask (255.255.255.0)               |
| > | Option: (28) Broadcast Address (192.168.126.255)      |
| > | Option: (3) Router                                    |
| > | Option: (6) Domain Name Server                        |
| > | Option: (43) Vendor-Specific Information              |
| > | Option: (255) End                                     |

Client identifier option value: 61

```
> Option: (53) DHCP Message Type (Request)
> Option: (61) Client identifier
> Option: (50) Requested IP Address (192.168.126.187)
```

It is typical for the Client Identifier to carry the Ethernet address of the client, however it is possible to use another type of identifier (e.g., hostname, serial number).

d) Client identifier option value: 54

```
> Option: (54) DHCP Server Identifier (192.168.126.120)
```

It is typical for the Server Identifier to carry the IP address of the DHCP server, however it is possible to use some other kind of identifier.

e) The option value of 50 stands for Requested IP Address while the value of 51 stands for IP Address Lease Time.

```
> Option: (50) Requested IP Address (192.168.126.187)
```

```
> Option: (51) IP Address Lease Time
```

f) The end of the DHCP options is identified with a DHCP option called End having value 255.

```
> Option: (255) End
```

---

2)

a) UDP port 68 is used by the DHCP client, while UDP port 67 is used by the DHCP server.

```
▼ User Datagram Protocol, Src Port: 68, Dst Port: 67
    Source Port: 68
    Destination Port: 67
```

b) The source IP address is 0.0.0.0 which is a special address used during address initialization.

c) The destination IP address is 255.255.255.255. It's a broadcast address, which indicates the message is meant for everyone on the network.

```
▼ Internet Protocol Version 4, Src: 0.0.0.0, Dst: 255.255.255.255
```

```
Source Address: 0.0.0.0
Destination Address: 255.255.255.255
```

d) The source Ethernet address is 58:a0:23:79:08:1f. The destination Ethernet address is ff:ff:ff:ff:ff:ff, the reserved broadcast Ethernet address, to ensure that the packet reaches all computers on the local network

```
▼ Ethernet II, Src: IntelCor_79:08:1f (58:a0:23:79:08:1f), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
  > Destination: Broadcast (ff:ff:ff:ff:ff:ff)
  > Source: IntelCor_79:08:1f (58:a0:23:79:08:1f)
  Type: IPv4 (0x0800)
```

e) The Transaction ID for all DHCP messages in a single exchange is the same. As a result, a computer looks for a DHCP reply such as Ack with a Transaction ID that matches the value it assigned to the earlier DHCP message, such as a Request.

|     |                 |                 |                 |      |                  |                             |
|-----|-----------------|-----------------|-----------------|------|------------------|-----------------------------|
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| 243 | 11:56:06.166846 | 192.168.126.120 | 192.168.126.187 | DHCP | 352 DHCP ACK     | - Transaction ID 0xc681aaf7 |