

## Lab Exercise – DHCP Ying Di

### Step 3: Details of DHCP Messages

*drawing of a DHCP message:*

Ethernet Header	IP Header	UDP Header	BOOTP fields	DHCP options
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*1. What are the two values of the BOOTP Message Type field?*

A: BOOTREQUEST:1; BOOTREPLY: 2

*2. How long is the Transaction ID field? Say whether it is likely that concurrent DHCP operations done by different computers will happen to pick the same Transaction ID.*

A: the Transaction ID field is 4 bytes long. It is not likely that concurrent DHCP operations done by different computers will happen to pick the same Transaction ID, because the number of concurrent DHCP operations is limited

*3. What is the name of the field that carries the IP address that is being assigned to the client? You will find this field filled in on the DHCP Ack, as that message is completing the assignment.*

A: It is client IP address

*4. What is the value of the Magic Cookie that stands for DHCP?*

A: The value of the Magic Cookie that stands for DHCP is 0x63825363.

*5. The first DHCP option is DHCP Message Type. What option value stands for this type?*

A: The option value is 53

*6. DHCP Requests will typically have a Client Identifier option. Look at the value of this option. How does it identify the client? Take a guess.*

A: It uses client Ethernet address, such as “Client MAC address”, to identify the client.

*7. DHCP Acks will typically have a Server Identifier option. Look at the value of this option. How does it identify the server? Take a guess.*

A: It uses client server IP address to identify the server

8. What option value stands for the Requested IP Address option? And for the IP Address Lease Time option? 9. How does the recipient of a DHCP message know that it has reached the last option?

A: Requested IP Address option: 50; IP Address Lease Time option: 51

9. How does the recipient of a DHCP message know that it has reached the last option?

A: When it reaches “(255) End”, then a DHCP message know that it has reached the last option

#### Step 4: DHCP Message Addressing

1	0.000000	0.0.0.0	255.255.255.255	DHCP	342	DHCP Request	- Transaction ID 0xb4829515
2	1.940422	0.0.0.0	255.255.255.255	DHCP	342	DHCP Request	- Transaction ID 0xb4829515
3	1.947951	192.168.1.1	192.168.1.7	DHCP	342	DHCP ACK	- Transaction ID 0xb4829515

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▶ Frame 1: 342 bytes on wire (2736 bits), 342 bytes captured (2736 bits) on interface 0
▶ Ethernet II, Src: Apple_6f:e9:2e (88:e9:fe:6f:e9:2e), 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
▼ Bootstrap Protocol (Request)

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    Message type: Boot Request (1)
    Hardware type: Ethernet (0x01)
    Hardware address length: 6
    Hops: 0
    Transaction ID: 0xb4829515
    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: Apple_6f:e9:2e (88:e9:fe:6f:e9:2e)
      Client hardware address padding: 00000000000000000000
      Server host name not given
      Boot file name not given
      Magic cookie: DHCP
    ▶ Option: (53) DHCP Message Type (Request)
    ▶ Option: (55) Parameter Request List

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0000  ff ff ff ff ff ff 88 e9  fe 6f e9 2e 08 00 45 00  .....o...E.
0010  01 48 ac fc 00 00 ff 11  0d a9 00 00 00 00 ff ff  .H.....
0020  ff ff 00 44 00 43 01 34  82 d7 01 01 06 00 b4 82  ...D.C.4 .....
0030  95 15 00 00 00 00 00 00  00 00 00 00 00 00 00 00  .....o.....
0040  00 00 00 00 00 00 88 e9  fe 6f e9 2e 00 00 00 00  .....o.....
0050  00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00  .....

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1. What port number does the DHCP client use, and what port number does the DHCP server use? Ports matter because UDP messages are addressed using ports. Both of these port numbers are on the Request in the source and destination port fields (and you will also see them on the Ack)

A : DHCP client uses port 68, DHCP server use port 67

*2. What source IP address is put on the Request message? It is a special value meaning “this host on this network” used for initialization.*

A: the source IP address is 0.0.0.0

*3. What destination IP address is put on the Request message? It is also a reserved value designed to reach the DHCP server wherever it is on the local network.*

A: the destination IP address is 255.255.255.255

*4. What source Ethernet address is put on the Request message, and what destination Ethernet address is put on the Request message? One of these addresses is a reserved address.*

A: The source Ethernet address is “Ethernet II: Src: Apple\_6f:e9:2e (88:e9:fe:6f:e9:2e)”; the destination Ethernet address is “Ethernet II: Dst: Broadcast (ff:ff:ff:ff:ff:ff)”

*5. How does a computer work out whether a DHCP message it receives is intended as a reply to its DHCP Request message, and not a reply to another computer? Hint: if you are not sure then go over the fields you inspected previously in Step 2 above.*

A: In a DHCP message, a unique (random) transaction ID is needed. The computer would check the transaction ID, if the a DHCP message it receives has the same transaction ID as its DHCP Request message, the DHCP message is intended as a reply to the DHCP Request message, otherwise not.