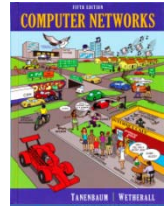


# Solutions – DHCP



*The solutions below are based on our capture and use of tools. Your answers will differ in the details if they are based on your own capture and use of tools in a different network setting. Nonetheless, we expect our solutions to help you understand whether your answers are correct.*

## Step 3: Details of DHCP Messages

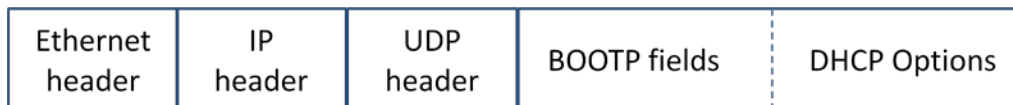


Figure 1: Structure of a DHCP message

Answers to the questions:

1. The two values are Boot Request (1) and Boot Reply (2).
2. The Transaction ID is 4 bytes long. Thus it is very unlikely that there will be collisions in a relatively small number of concurrent DHCP operations (until that number approaches  $2^{16}$ !)
3. The “Your (client) IP address” field carries the IP address being leased to the client.
4. The DHCP magic cookie value is 0x63825363.
5. The option value of 53 stands for DHCP Message Type.
6. It is typical for the Client Identifier to carry the Ethernet address of the client, but possible to use some other kind of identifier (e.g., hostname, serial number).
7. It is typical for the Server Identifier to carry the IP address of the DHCP server, but possible to use some other kind of identifier.
8. The option value of 50 stands for Requested IP Address and the value of 51 stands for IP Address Lease Time.
9. The end of the DHCP options is identified with a DHCP option called End with value 255.

## Step 4: DHCP Message Addressing

Answers to the questions:

1. The DHCP client (your computer) uses UDP port 68 and the DHCP server uses UDP port 67.
2. The source IP address is 0.0.0.0. It is a special address used during address initialization.
3. The destination IP address is 255.255.255.255. It is the broadcast address, which means the message is intended for all computers on the network. (It is not possible to use a more restricted subnet broadcast, e.g., 192.168.255.255, as the subnet mask is not yet known by the client.)
4. The source Ethernet address is simply your own computer’s Ethernet address, since that is already assigned to your NIC. The destination Ethernet address is ff:ff:ff:ff:ff:ff, the reserved broadcast Ethernet address, so that the packet reaches all computers on the local network.

5. The DHCP messages in a single exchange carry the same Transaction ID. Thus a computer looks for a DHCP reply such as an Ack with a Transaction ID that matches the value it placed on the earlier DHCP message such as a Request. (This is in addition to any Ethernet address filtering: if the reply is unicast then it will have the computer's Ethernet address as its destination.)

[END]