

DHCP Configuration Report

COS370 / COS372 — Computer Networks

1. Network Topology

The DHCP lab was set up using two virtual machines connected within VMware. The client machine and DHCP server communicate over UDP — the client uses port 68 and the server listens on port 67.

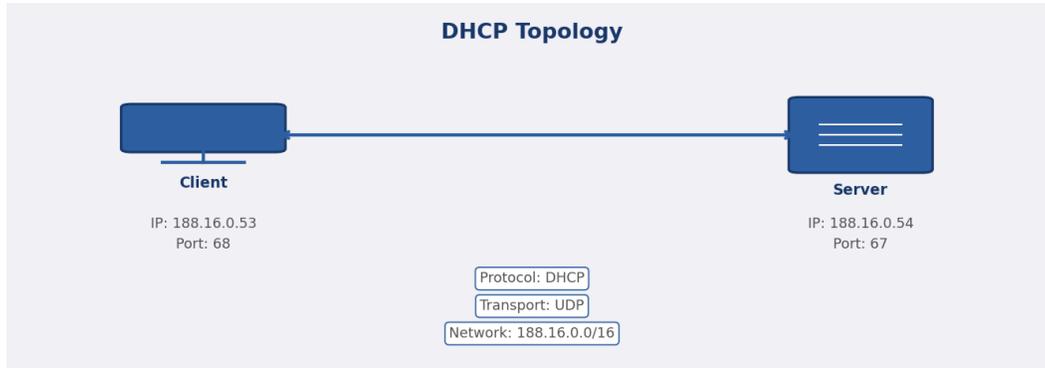


Figure 1 — DHCP Client-Server Topology

2. DHCP Message Flow (DORA)

DHCP uses a four-step handshake called DORA (Discover → Offer → Request → ACK). The sequence below shows both the initial lease acquisition and a subsequent renewal.

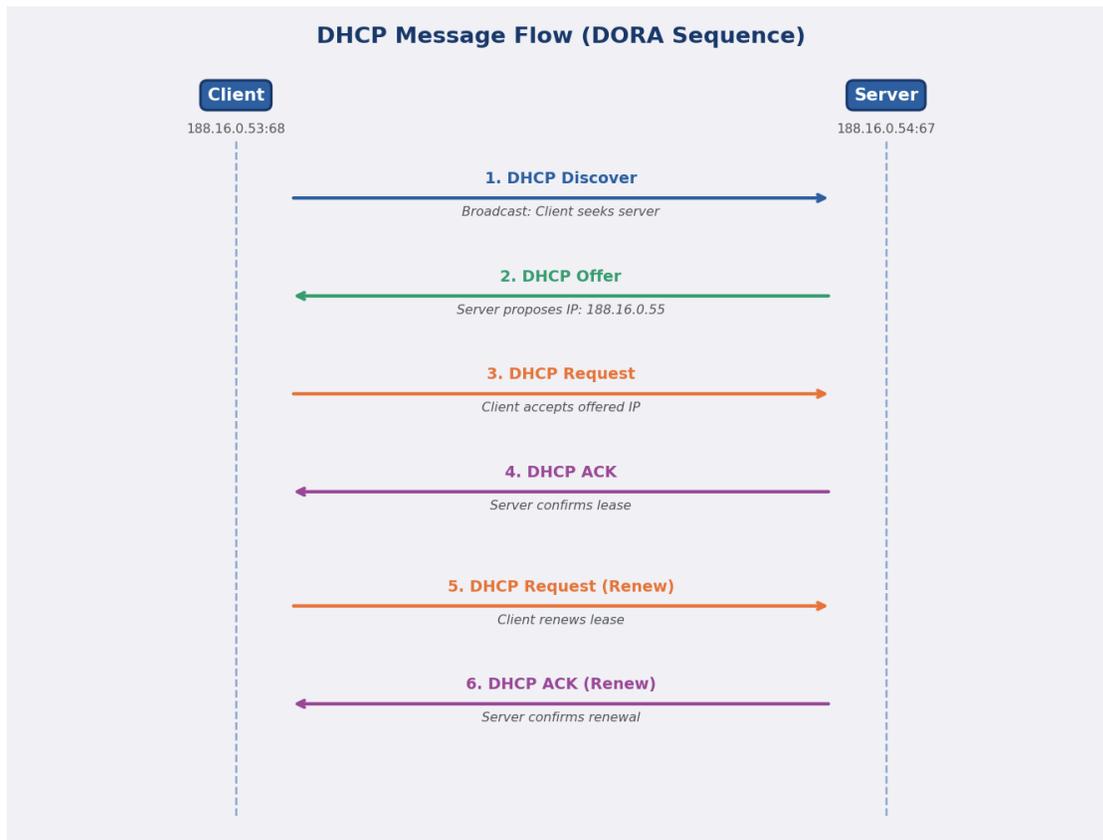


Figure 2 — DHCP DORA Message Flow

3. Wireshark Capture

The following table summarises the six DHCP packets captured in Wireshark during the session. Packets 1–4 represent the initial DORA exchange; packets 5–6 represent lease renewal.

Wireshark Capture – DHCP Packets					
#	Time	Source	Destination	Message	Transaction ID
1	0.000000	0.0.0.0	255.255.255.255	DHCP Discover	0x23dd9790
2	0.000321	188.16.0.53	255.255.255.255	DHCP Offer	0x23dd9790
3	0.000408	0.0.0.0	255.255.255.255	DHCP Request	0x23dd9790
4	0.000833	188.16.0.53	255.255.255.255	DHCP ACK	0x23dd9790
5	4.279398	188.16.0.54	188.16.0.53	DHCP Request	0x89d24e59
6	4.279828	188.16.0.53	188.16.0.54	DHCP ACK	0x89d24e59

Figure 3 — Captured DHCP Packets

4. DHCP Packet Structure

Each field in the DHCP packet is numbered ①—⑮. The structure diagram below shows the layout; the reference table beneath it explains the role of every field.

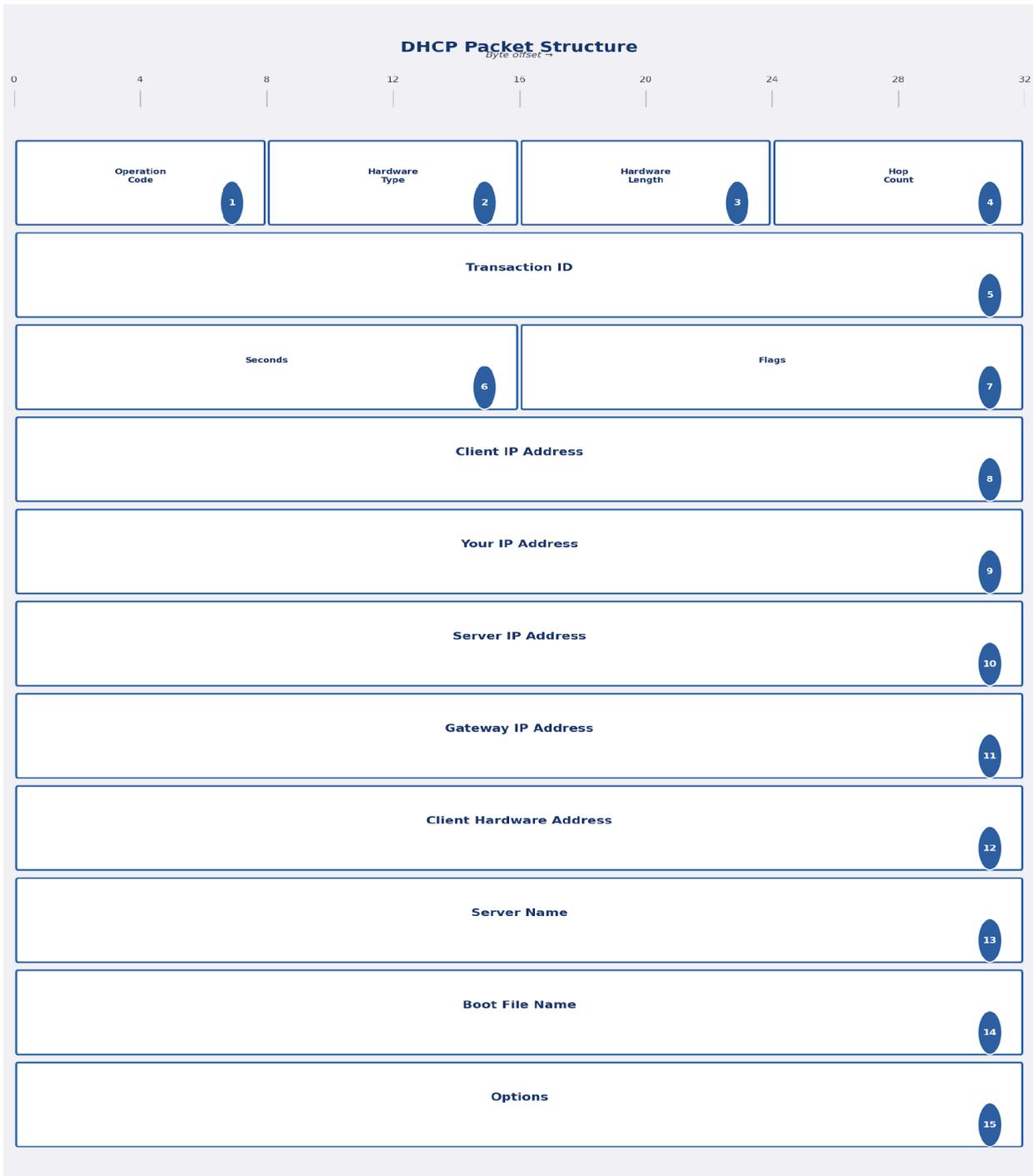


Figure 4a — DHCP Packet Field Layout (numbered)

DHCP Packet Field Reference		
#	Field Name	Role / Notes
1	Operation Code	1 = BOOTREQUEST, 2 = BOOTREPLY
2	Hardware Type	Network type (1 = Ethernet)
3	Hardware Length	MAC address length (6 bytes)
4	Hop Count	Relay agent hop counter
5	Transaction ID	Random ID linking request ↔ reply
6	Seconds	Seconds elapsed since client started
7	Flags	Broadcast flag (bit 15)
8	Client IP Address	Client IP if already configured (else 0.0.0.0)
9	Your IP Address	IP address offered / assigned by server
10	Server IP Address	Next-server for TFTP boot
11	Gateway IP Address	Relay agent (giaddr) IP address
12	Client Hardware Address	Client MAC address (16 bytes; 6 used)
13	Server Name	Optional null-terminated server hostname
14	Boot File Name	Optional boot filename path
15	Options	Magic Cookie (0x63825363) + TLV options (Discover / Offer / Request / ACK data)

Figure 4b — DHCP Packet Field Reference Table

5. DHCP Discover — Options

#	Option	Hex / Value
1	Magic Cookie: DHCP	63825363
2	Option (53) DHCP Message Type: Discover	350101 → 0x35 0x01 0x01
3	Option (61) Client Identifier	3d0701000c29e50290
4	Option (50) Requested IP Address (188.16.0.55)	3204bc100037
5	Option (12) Host Name	0c0f57494e2d543239364137...
6	Option (60) Vendor Class Identifier	3c084d5346542035 2e30
7	Option (55) Parameter Request List	370c010f03062c2e2f1f2179f92b
8	Option (255) End	ff

6. DHCP Offer — Options

#	Option	Hex / Value
1	Magic Cookie: DHCP	63825363
2	Option (53) DHCP Message Type: Offer	350102
3	Option (1) Subnet Mask (255.255.0.0)	0104ffff0000
4	Option (58) Renewal Time Value	3a04000000 1e
5	Option (59) Rebinding Time Value	3b0400000034
6	Option (51) IP Address Lease Time	33040000003c
7	Option (54) DHCP Server Identifier (188.16.0.53)	3604bc100035
8	Option (255) End	ff

7. DHCP Request — Options

#	Option	Hex / Value
1	Magic Cookie: DHCP	63825363
2	Option (53) DHCP Message Type: Request	350103
3	Option (61) Client Identifier	3d0701000c29e50290
4	Option (50) Requested IP Address (188.16.0.55)	3204bc100037
5	Option (54) DHCP Server Identifier (188.16.0.53)	3604bc100035
6	Option (12) Host Name	0c0f57494e2d54323936...
7	Option (81) Client FQDN	51120000 00057494e2d...
8	Option (60) Vendor Class Identifier	3c084d5346542035 2e30
9	Option (55) Parameter Request List	370c010f03062c2e2f...
10	Option (255) End	ff

8. DHCP ACK — Options

#	Option	Hex / Value
1	Magic Cookie: DHCP	63825363
2	Option (53) DHCP Message Type: ACK	350105
3	Option (58) Renewal Time Value	3a04000000 1e
4	Option (59) Rebinding Time Value	3b04000000 34
5	Option (51) IP Address Lease Time	33040000003c
6	Option (54) DHCP Server Identifier (188.16.0.53)	3604bc100035
7	Option (1) Subnet Mask (255.255.0.0)	0104ffff0000
8	Option (81) Client FQDN	510300ff ff0x30...ff
9	Option (255) End	ff