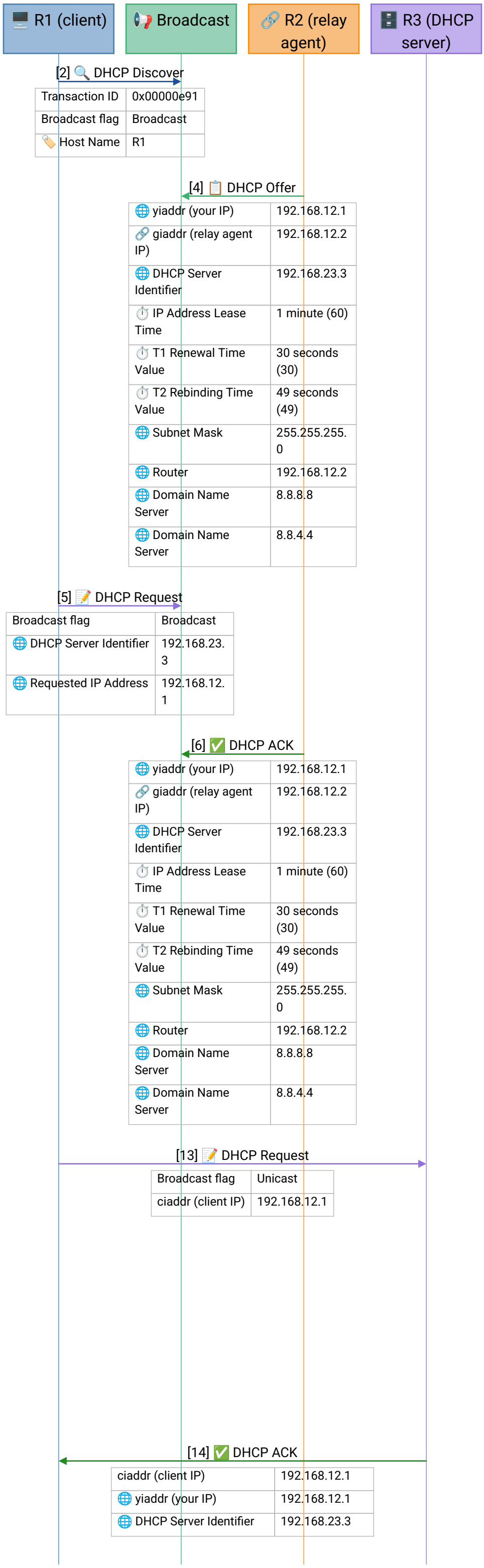
dhcp-lease-renewal.annotated



[Frame 2] Discover from R1.

R1 broadcasts its Discover (transaction ID `0xe91`, broadcast flag set). The server R3 is on another subnet, so R2 relays this to it; that relayed copy isn't in the capture.

[Frame 4] Offer, delivered by the relay R2.

About 2 seconds after the Discover, R2 broadcasts the server's Offer onto R1's LAN. `giaddr 192.168.12.2` shows it came through the relay, and the `Server Identifier` names the real server, R3 at `192.168.23.3`.

Look at the lease: **60 seconds,** with T1 at 30 s and T2 at 49 s. The lab shortens it so renewals happen within a minute instead of 12 hours.

[Frame 5] Request, broadcast.

R1 requests `192.168.12.1` from server `192.168.23.3`. This is the normal Request of the DORA exchange (the client is in the SELECTING state), so it is broadcast and carries both the Server Identifier and the Requested IP Address.

[Frame 6] ACK: lease granted for 60 s.

R1 now owns `192.168.12.1`. Its T1 timer starts: at 30 s it will try to renew.

[Frame 13] Renewal Request at T1: unicast, straight to the server.

34 seconds after the ACK, R1 renews. RFC 2131 asks clients to add a little random variation around T1, so 34 s rather than exactly 30 s is expected.

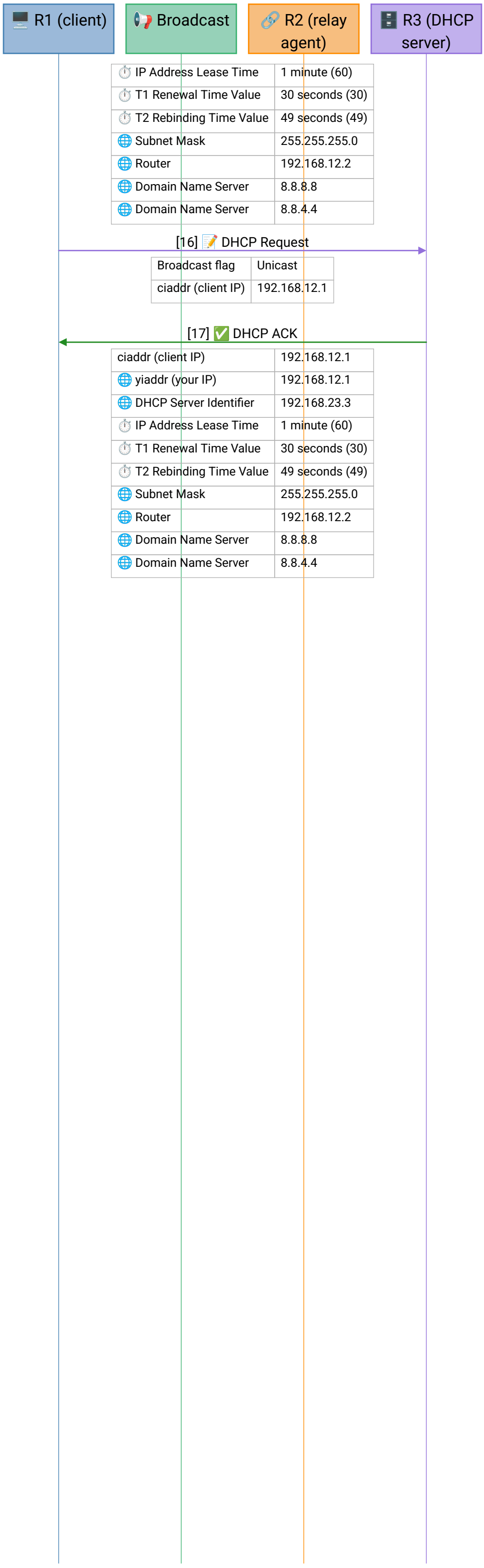
This Request looks different from the one in frame 5:

Field	Frame 5 (new lease)	This frame (renewal)
IP source	`0.0.0.0`	`192.168.12.1`
IP destination	broadcast	`192.168.23.3` (server)
`ciaddr`	empty	`192.168.12.1`
Server Identifier	present	absent
Requested IP	present	absent

In the RENEWING state the client already has a working address, so it talks to the server directly by unicast. `ciaddr` identifies the lease; RFC 2131 forbids the other two options here. R2 only routes this packet, it doesn't relay it, so `giaddr` stays empty.

[Frame 14] ACK: lease extended.

R3 answers by unicast to `192.168.12.1`, with a fresh 60-second lease. Its IP TTL is 254, one less than the 255 R3 sent: it crossed R2 as an ordinary routed packet. The renewal is invisible to the relay function.



[Frame 16] Second renewal.

33 seconds after the first renewal ACK, the cycle repeats: unicast Request with `ciaddr`, no Server Identifier, no Requested IP.

[Frame 17] Second ACK.

Another 60-second lease. As long as the server keeps answering at T1, the client never reaches T2 (49 s). At T2 it would give up on its server and broadcast the renewal to any server (the REBINDING state); if the lease then expired, it would have to stop using the address and start over with a Discover.