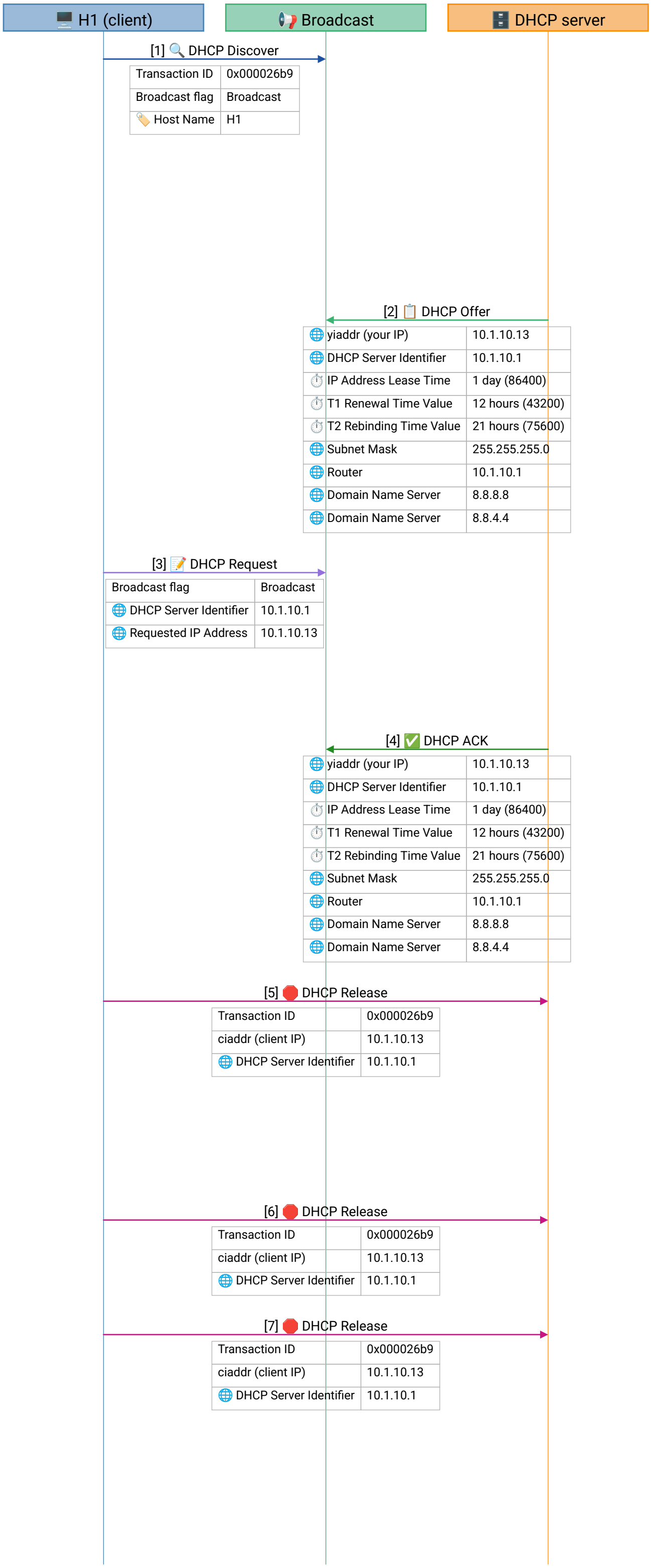
dhcp-dora-and-release.annotated



[Frame 1] Discover: "is there a DHCP server out there?"

H1 has no IP address yet, so it sends from `0.0.0.0` to the limited broadcast address `255.255.255.255`, UDP port 68 to 67. Every host on the segment receives it, including any DHCP server.

- `Transaction ID 0x26b9` ties every message of this exchange together. Watch it come back in all seven frames.
- The broadcast flag is set: H1 asks the server to broadcast its replies, because a client without an address may not accept a unicast packet sent to an address it doesn't have yet.
- `Host Name :` H1 lets the server log or register the client by name.

[Frame 2] Offer: the server proposes an address.

The offer arrives 0.14 ms after the Discover. The server proposes `yiaddr` ("your IP") `10.1.10.13` and attaches the configuration the client will need:

- Subnet mask `255.255.255.0`, default router `10.1.10.1`, DNS servers `8.8.8.8` and `8.8.4.4`.
- A one-day lease, with the renewal timer T1 at 12 hours (50%) and the rebinding timer T2 at 21 hours (87.5%). These are the default fractions in RFC 2131.
- `Server Identifier 10.1.10.1 :` how the client names this server in its reply.

It is broadcast, as the Discover's broadcast flag asked. Nothing is committed yet; the server is only offering.

[Frame 3] Request: "I'll take that one."

H1 accepts by echoing two values from the Offer: the `Server Identifier (10.1.10.1)` and the `Requested IP Address (10.1.10.13)`.

The Request is still broadcast, even though H1 knows which server it is answering. That is deliberate: if several servers had made offers, each one sees this Request and learns from the Server Identifier whether it was chosen. The servers that lost free up the addresses they offered.

[Frame 4] ACK: the lease is committed.

The server confirms `10.1.10.13` with the same lease and options as the Offer. From this moment H1 owns the address for one day and may configure its interface.

The whole Discover, Offer, Request, ACK exchange (DORA) took about 0.7 ms on this lab segment.

[Frame 5] Release: giving the address back.

About 30 seconds later H1 releases the lease, for example because its interface was shut down. Now that it owns an address, it sends from `10.1.10.13` straight to the server by unicast, with:

- `ciaddr` (client IP) `10.1.10.13 :` the address being returned.
- `Server Identifier 10.1.10.1 :` the server that granted it.

The Release reuses the transaction ID from the DORA exchange.

[Frame 6] Release, again (0.4 s later).

An identical copy. RFC 2131 defines no reply to a Release, so the client can never confirm it arrived. This client covers that by sending it more than once.

[Frame 7] Release, a third time (2 s later).

The third and last copy. The server answers none of them, which is normal. If every Release were lost, the address would simply stay reserved until the one-day lease expired.