DHCP – the protocol

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DHCP as a language

- spoken between pairs of programs
  - a dhcp client program, e.g., dhclient
  - an dhcp server program, e.g., dhcpd
  - they’re written specially to speak it
- discussing server giving info it has, or gets, to client
- broadcast-response behavior
### DHCP message format

<table>
<thead>
<tr>
<th>op</th>
<th>htype</th>
<th>hlen</th>
<th>hops</th>
<th>transaction identifier</th>
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<td>seconds elapsed</td>
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<td>flags</td>
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<td>client IP address</td>
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<td>your IP address</td>
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<td>server IP address</td>
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<td>router IP address</td>
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<td>client hardware address (16 bytes...)</td>
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<td>server host name (64 bytes...)</td>
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<td>boot file name (128 bytes...)</td>
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<td>options (variable...)</td>
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### DHCP

- **Dynamic Host Configuration Protocol**
  - Allows "self-configuration" of computers
  - DHCP server assigns IP address mask etc
- RFC 951 and 1048 (BOOTP)
- RFC 2131 and 2132 DHCP
**DHCP Transaction**

Client - needs IP config  
Server supplies config

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**BOOTP Packet**

- Primary fields of interest
  - Client IP - If the client knows its IP it puts it here
  - Your IP - The IP address the server is offering the client
  - Server IP - The IP address of the server that generated this reply
  - Gateway - IP of gateway for trans-router DHCP
  - Client HW - MAC Address of client
Step 1 DHCP Discover

Client - sends Discover
All IP Fields 0.0.0.0
Client HW = MAC of client
Step 2 DHCP Offer

Server - replies with Offer
SAME TRANSACTION #
Client IP 0.0.0.0
Your IP = Offered IP
Server IP = Server IP
Client HW = MAC of client

Client - may get more than one offer

Client IP = 10.100.13.200
Server IP = 10.100.13.101
Step 3 DHCP Request

Client selects an offer and responds with Request

SAME TRANSACTION #

All IPs 0.0.0.0

Parameters in Request List
Step 4 DHCP ACK

Server confirms request
DHCPD

- DHCP Server process is dhcpd
- set configuration in /etc/dhcp/dhcpd.conf
- leases list in /var/lib/dhcp/dhcpd.leases
- set autorun-on-boot (with, e.g., chkconfig)

Minimal dhcpd.conf

```
[root@thermador root]# more /etc/dhcpd.conf
subnet 10.100.29.0 netmask 255.255.255.0 {
    range 10.100.29.50 10.100.29.100;
}
```

Many, many, more options, e.g.

- `option routers <ip address>`
- `....would be used to specify a gateway`
Biblio

- RFC 2131 – “Dynamic Host Configuration Protocol”
- RFC 1534 – “Interoperation Between DHCP and BOOTP”
- RFC 951 – “Bootstrap Protocol (bootp)”