BOOTP & DHCP

What pieces of information a host needs to begin a communication?
- The IP address
- Its Subnet mask
- The IP address of a "default" router who knows rest.
- The IP address of a name server

Bootstrap Protocol is a client/server protocol designed to provide a "memoryless" or "diskless" computer these four pieces of information at the startup.

RARP vs. BOOTP?
Same Network Operation of BOOTP

BOOTP Operation Across Two Networks

Why reply is sent to port 67?
Why use UDP Port 68?

BOOTP Packet Format

- Opcode
  - REQUEST(1), REPLY(2)
- Hardware Type
  - Ethernet(1), ..
- HopCount
  - Number of HOP the packet can travel.
- Transaction ID
  - Identifies the query
- Number of Seconds
  - Seconds elapsed in client since the request.
- Server Name
  - Optional domain name of the server.
- BootFile
  - Optional 128 byte field filled by the server in reply consisting of boot file path
- Options
  - If magic IP “99.13083.99” optional information is sent.
Dynamic Host Configuration Protocol (DHCP)

- BOOTP supplies a static binding, while DHCP offers both static and dynamic IP allocation.
  - BOOTP server consults a table that matches a physical address to an IP. DHCP has access to this table.
  - DHCP also has a second database with a pool of available IP addresses. When a client requests temporary IP address these are leased.
  - DHCP is backward compatible with BOOTP and uses same packet format.
DHCP Packet

- **Flag F**
  - A 1-bit flag indicates that client specify a forced broadcast reply.

- **Options**
  - With option tag 53 DHCP can specify following additional options.

<table>
<thead>
<tr>
<th>Value</th>
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<tbody>
<tr>
<td>1</td>
<td>DHCPDISCOVER</td>
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<tr>
<td>2</td>
<td>DHCPOFFER</td>
</tr>
<tr>
<td>3</td>
<td>DHCPREQUEST</td>
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<td>4</td>
<td>DHCPDECLINE</td>
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<tr>
<td>5</td>
<td>DHCPACK</td>
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<tr>
<td>6</td>
<td>DHCNPACK</td>
</tr>
<tr>
<td>7</td>
<td>DHCPRELEASE</td>
</tr>
</tbody>
</table>

DHCP Transition Diagram
Quiz

- Quiz 601: A frame is carrying a DHCP packet. How many headers it has?

- Quiz 602: A frame is carrying an RARP packet. How many headers it has?

- Quiz 603:
- IP - Internet Protocol
  - Addressing Scheme
  - Address Resolution
  - Datagram Forwarding
  - Encapsulation, Fragmentation & Reassembly

- TCP - Transmission Control Protocol
  - Connection startup & shutdown
  - Reliability: ordering, missing data handling