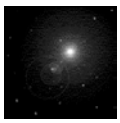
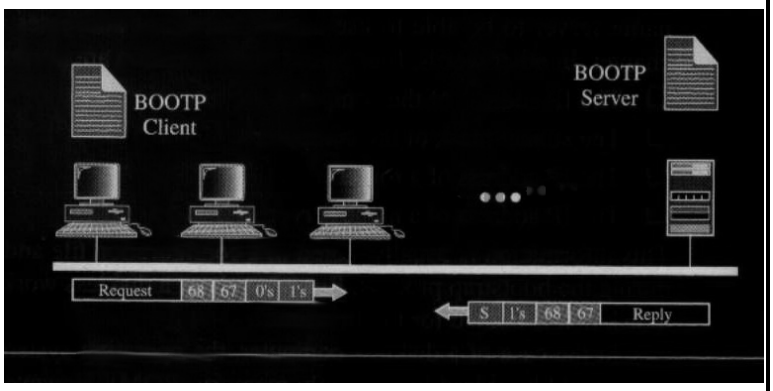
BOOTP & DHCP

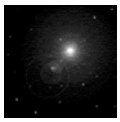
BOOTP

- 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 has been designed to provide a "memoryless" or "diskless" computer these four pieces of information at the startup.
- RARP vs. BOOTP?

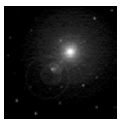


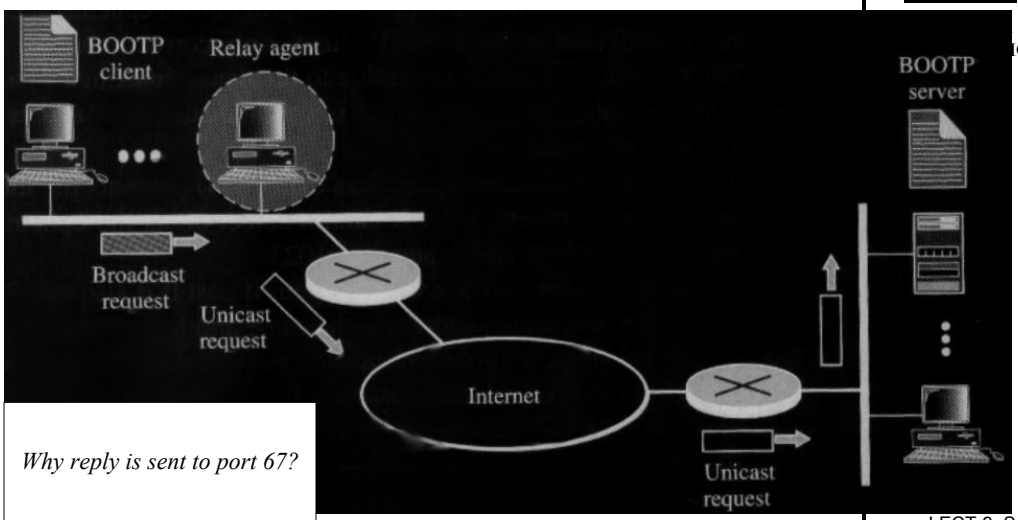
Same Network Operation of BOOTP





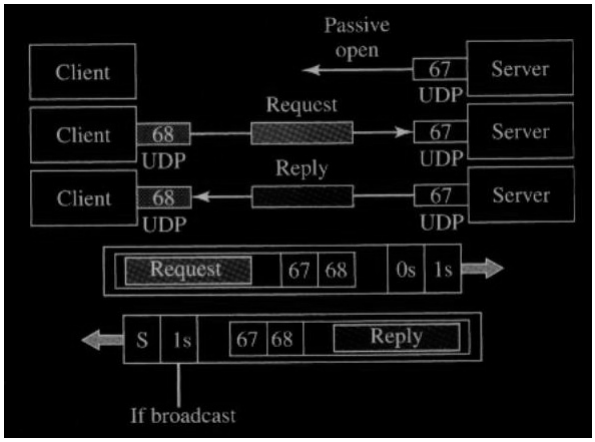
BOOTP Operation Across Two Networks

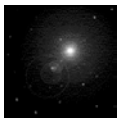




Why reply is sent to port 67?

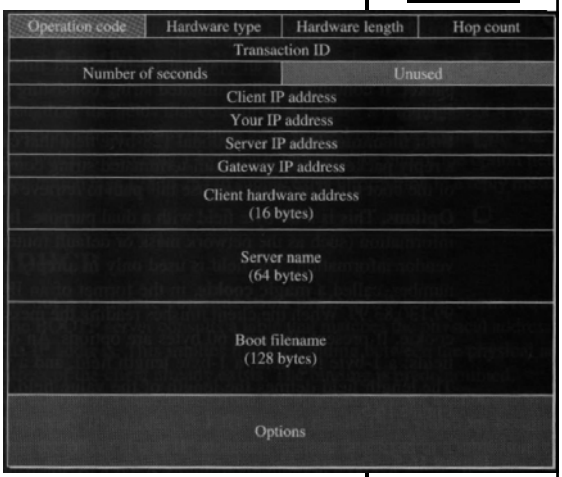
Why use UDP Port 68?

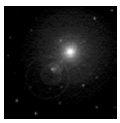




BOOTP Packet Format

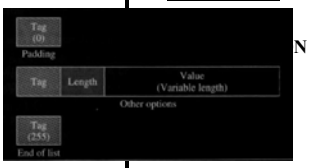
- Opcode
  - REQUEST(1), REPLY(2)
- Hardware Type
  - Ethernet(1), ..
- HopCount
  - Number of HOP the packet can travel.
- Transaction ID
  - Identifies the query
- Number of Seconds
  - Seconds elapsed in client since the request.
- Server Name
  - Optional domain name of the server.
- BootFile
  - 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.





BOOTP Options

Description	*Tag*	*Length*	*Value*
Padding	0		
Subnet mask	1	4	Subnet mask
Time offset	2	4	Time of the day
Default routers	3	Variable	IP addresses
Time servers	4	Variable	IP addresses
DNS servers	6	Variable	IP addresses
Print servers	9	Variable	IP addresses
Host name	12	Variable	DNS name
Boot file size	13	2	Integer
Vendor specific	128–254	Variable	Specific information
End of list	255		



Dynamic Host Configuration Protocol (DHCP)

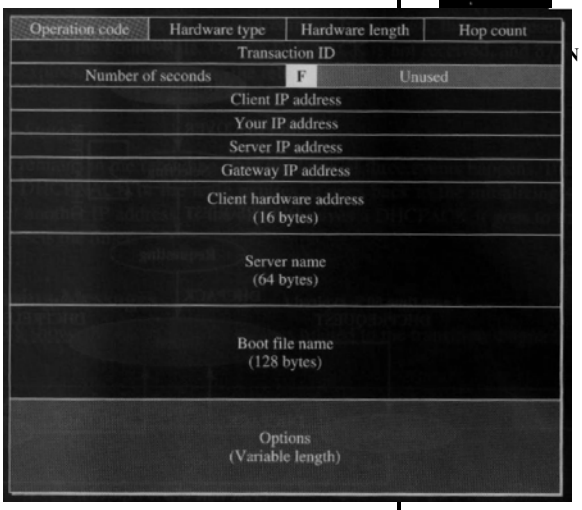
- BOOTP supplies a static binding, while DHCP offers both static and dynamic IP allocation.
  - BOOTP server consults a table that matches a physical address to an IP. DHCP has access to this table.
  - DHCP also has a second database with a pool of available IP addresses. When a client requests temporary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

COMPUTER COMMUNICATION NETWORK

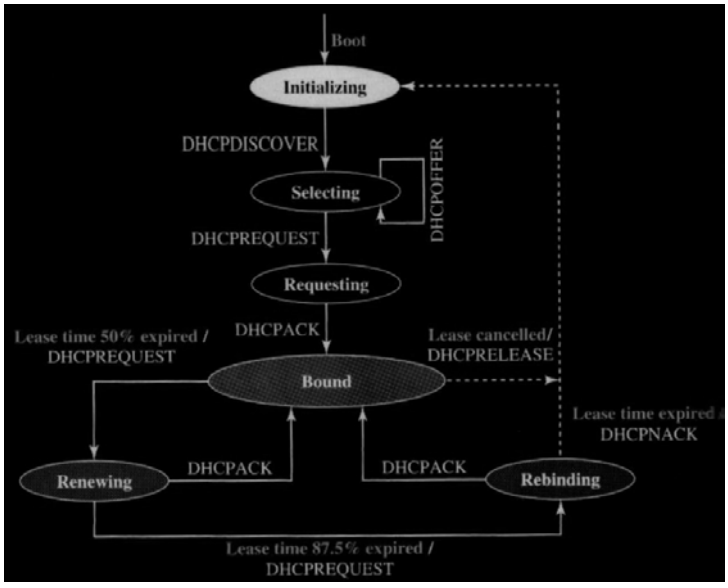
DHCP Packet

- 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.

Value	Value
1 DHCPDISCOVER	5 DHCPACK
2 DHCPOFFER	6 DHCPNACK
3 DHCPREQUEST	7 DHCPRELEASE
4 DHCPDECLINE	

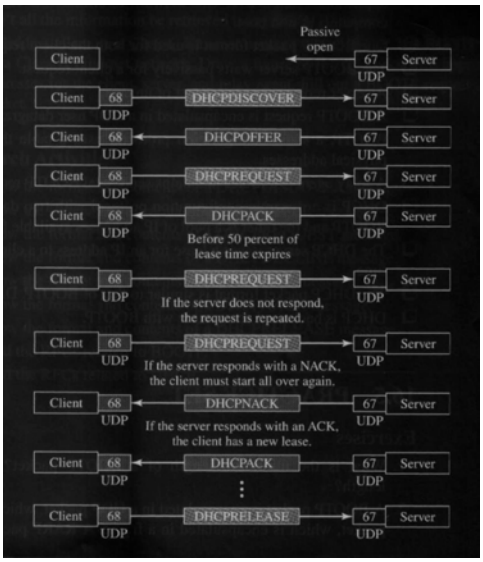


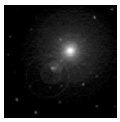
DHCP Transition Diagram



COMPUTER COMMUNICATION NETWORK

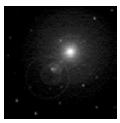
DHCP Message Exchange



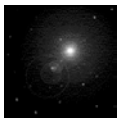


Quiz

- 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?
- Quiz603:



- IP- Internet Protocol
  - Addressing Scheme
  - Address Resolution
  - Datagram Forwarding
  - Encapsulation, Fragmentation & Reassembly
- TCP- Transmission Control Protocol
  - Connection startup & shutdown
  - Reliability: ordering, missing data handling



COMPUTER COMMUNICATION NETWORK