COMP476
Networked Computer Systems

# Dynamic Host Configuration Protocol

## DHCP

The **D**ynamic **H**ost **C**onfiguration **P**rotocol provides IP configuration information for computers when they are booted.

When DHCP is used, you do not have to configure the IP address and other information when you install TCP/IP on a computer.

## DHCP Servers

- DHCP servers provide configuration information created by the domain administrator.
- The DHCP service can be installed on a computer that is also a DNS.
- All DHCP communications are done over UDP ports 67 and 68.

## DHCP Address Types

- DHCP can be configured with a list of known HW address : IP address pairs.
- A pool of available IP addresses can be created for computers that were previously unknown to the DHCP server.
- Most **I**nternet **S**ervice **P**roviders use pools of available addresses.

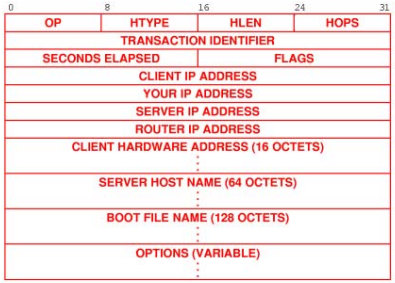
## DHCP Address Requests

- If the DHCP request comes from a known hardware address, the server will always send the same assigned IP address. This is necessary for web servers.
- Requests from unknown hardware addresses can be assigned an IP address from a pool of available addresses. These addresses can be recycled when released.

## A&T DHCP Requests

- When a faculty member turns on his computer, it broadcasts a DHCP request. Their computer's MAC address is registered with the DHCP server. The DHCP server always sends the computer the same IP address.
- When a student in the dorms turns on her computer, it broadcasts a DHCP request. The DHCP server sends it an available address from the pool.

## DHCP Message Format




## Using DHCP

To get configuration information when a machine boots, it follows the following protocol:

- **IP lease request** – The client initializes a limited version of IP and broadcasts a request for the location of a DHCP server.
- **IP lease offer** – All DHCP servers send an offer to the client.
- **IP lease selection** – The client selects the IP address from the first offer it receives and broadcasts a message requesting to lease the IP address in the offer.
- **IP lease acknowledgement** – The DHCP server that made the offer responds to the message. All other DHCP servers withdraw their offers.

## IP Address & DHCP

- IP addresses are "leased" to a client for a limited period of time.
- When ½ of the time period expires, the client will attempt to renew its lease with the DHCP server where it obtained its lease.
- If it doesn't get a renewal after 7/8 of the lease has expired, it will broadcast a renewal request to any DHCP server.
- If the client doesn't renew its lease or if the lease is refused by the server, the client must immediately discontinue using the IP address.

## Without DHCP

If you are to connect a computer to an IP network without using DHCP, you will need to provide:

- IP name
- IP address
- default gateway IP address
- DNS IP address
- subnet mask