Introduction to DHCP

Networks Three

Otago Polytechnic
Dunedin, New Zealand

Basic Network Configuration

We generally configure hosts with a few standard items of network configuration.

- IP address
- Network mask
- Gateway address
- DNS server addresses
- Others: syslog servers, proxy servers, NTP servers, etc.

We don't want to do this manually if we have very many (i.e., more than one) host on our network. We can use the Dynamic Host Configuration Protocol (DHCP) to manage this.

DHCP Lease

- The client outcome of the DHCP process is a *Lease*.
- A lease is a package of configuration information that the client is allotted for a specified period of time.

DHCP Process

- A DHCP client needing a lease begins by sending a DHCPDISCOVER to the broadcast address, 255.255.255.255 with source address 0.0.0.0.
- DHCP servers respond to DHCPDISCOVER messages with DHCPOFFER messages. The offers contain suggested network configuration parameters.
- The client accepts one offer by sending a DHCPREQUEST message to the offering server.
- The server responds with a DHCPACK containing the lease time and other parameters. If the client request was flawed it responds with a DHCPNAK instead.
- The client checks that the proposed address is available by checking ARP. If the address is already in use it complains to the server with a DHCPDECLINE message.
- The client may later renew or release the lease with a DHCPRENEW or DHCPRELEASE message.

Authoritative DHCP Servers

- Because many devices may provide DHCP services, you can configure a server to identify itself as *authoritative*.
- Clients *should* prefer offers from authoritative servers.
- This is not a security measure, however.

DHCP Relay

- Since the broadcast DHCPDISCOVER messages don't cross network boundaries, DHCP doesn't work across them.
- We get around this by running DHCP relay servers that relay DHCP messages to and from a central server.

DHCP Software

- The ISC DHCP server package is the preferred server implementation on *nix servers.
- Microsoft provides a server implementation for its server OSs.

Security Concerns

- Rogue DHCP servers
- Unauthorised clients getting access to information
- Denial of Service by exhausting the address pool.