DHCP and Netboot in (large) organisations

Wouter Borremans - 0461911

February 2005

1 Introduction

This report describes BOOTP and DHCP. Each protocol will be discussed shortly.

2 DHCP

DHCP (Dynamic Host configuration Protocol) is a protocol which enables system administrators to dynamically assign an IP address to hosts. Without using DHCP, each address for a host or workstation has to be assigned manually. DHCP lets a network administrator supervise and distribute IP addresses from a central point and automatically sends a new IP address when a computer is plugged into a different place in the network.

When a client has DHCP enabled, the first thing it does is sending a so called 'DHCPDISCOVER' request. Any DHCP server on a network can reply with an 'DHCPOFFER' packet saying that it can offer DHCP information. The client chooses a DHCP server and sends and reply (DHCPREQUEST) containing the message 'i want to have an IP address, this is my MAC-address'. The server replies with a 'DHCPACK' containing the IP adress, the lease time and additional information which the client may ask for. After assigning an IP address to a host, the DHCP server marks the just assigned IP-address as used. When a client is done with it's work, it may send a 'DHCPRELEASE' request . This request informs the DHCP server that it is not in use anymore.

DHCP offers more then only assigning IP-addresses to hosts. It also can hold:

- Gateway and DNS information
- Location of images for netbooting

DHCP can also be used to let clients boot from a server. There are a few additions needed to make this possible:

- TFTP Daemon which makes a client able to download an image

- NFS Daemon which makes the clients able to mount their root filesystem on

An additional parameter needs to be added to the DHCP lease to tell the client where it can find the boot image.

DHCP is the most powerful IP-address assignment tools that is available at the moment. The future looks still bright because it is also implemented in IPv6.

3 BOOTP

A TCP/IP network protocol that lets "dumb" network nodes request configuration information from a BOOTP server node. At boot time, the dumb node sends a broadcast message requesting information and waits for a reply. The BOOTP host, if configured, provides the dumb node with an IP address, the IP address of a load host (usually itself), and the name of the download file. The dumb node needs only know its own hardware address, as this is what the BOOTP server uses to decide whether it can help the node and what information to provide.

4 Conclusion

DHCP is a powerfull tool to dynamically assign IP-addresses to a host. It also has some extra fields to store additional data which makes it suitable for use in combination with netboot, this makes the life of an administrator much easier looking at centralization of network administration. BOOTP is mostly used in combination with DHCP. It provides also discovery services to be able to get an IP-adress from a (boot) server.

References

[1] DHCP, web-definitions Google http://www.google.com/search?q=define:+dhcp&ie=UTF-8&oe=UTF-8

[2] DHCP, Scientific Computing Devision http://www.scd.ucar.edu/nets/presentations/DHCP-in-SCD/sld013.htm

[3] BOOTP www.lantronix.com/support/docs/html/eps_ref/gloss.htm