

- 1) What is the purpose of DHCP?

DHCP is intended to streamline the connection of new devices to a network. Rather than having a sysadmin hard-code a relationship between hardware (MAC) addresses and IP-addresses, a new device can enter a network and automatically obtain an IP address valid in the network.

- 2) Give the steps undergone when a new device enters a DHCP-enabled network.

1. A new device attaches to a network. It broadcasts a “DHCP discover” message on the MAC broadcast address (later we’ll learn this is FF:FF:FF:FF:FF:FF), containing its own MAC address.
2. A DHCP-enabled server will pick up this message and send back a “DHCP offer” message to the MAC address of the new device.
3. The new device sends a “DHCP request” message, again to the MAC broadcast address, requesting an IP address.
4. The DHCP-enabled server, in response, sends a “DHCP acknowledgement” message, including a new complete IP address for the device, to the device’s hardware address. It also records the relationship between this IP address, and the device’s hardware address, in a table.

- 3) Why does an arriving DHCP client have to broadcast its hardware address?

An arriving DHCP client has no IP address. By broadcasting its hardware address to the entire network, it is received by the DHCP server. The DHCP server can then offer an IP address lease to the client, by sending to its (unique) hardware address?

- 4) Is IP address space exhaustion a problem?

This depends on your outlook. There are some mechanisms that are proving a stopgap, but really we’ve already run out. More on this in the discussion questions!