

Setting up DHCP

Purpose of DHCP
How DHCP Works
Setting up a DHCP Server
Testing DHCP Connection



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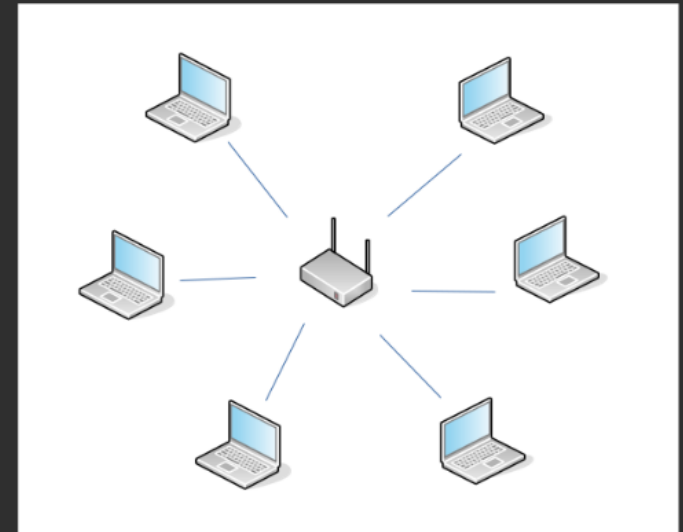
The term **DHCP** stands for **Dynamic Host Configuration Protocol**.

DHCP allows computers (eg. workstations, notebooks, smart-phones) to be automatically configured so that they can communicate over a network. This automatic configuration has gained popularity over the years, especially as the need for detecting and configuring **mobile computer devices** increases.

DHCP configuration allows for various setups including configurations:

- Dynamic
- Automatic
- Hybrid of both Dynamic and Static

The DHCP daemon (**dhcpcd**) runs in the background waiting for offers of connection from potential clients.



Setting up DHCP

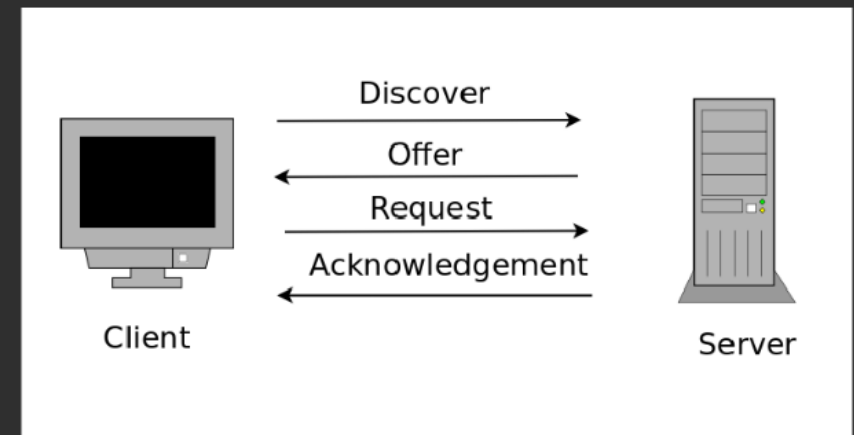
The term **DORA** best describes how DHCP Works:

Discovery: The client broadcasts a message (IP lease request) on a sub-network to discover available DHCP servers.

Offer: The DHCP server receives the request from the client, reserves an IP ADDRESS for the client and sends a DHCPOFFER.

Request: The DHCP server broadcasts a message request for acceptance, but also notifies other DHCP servers.

Acknowledgment: The client sends a message of acceptance to the server. In turn, the client receives from the server a packet of information containing the lease duration and other configuration information.



Setting up a DHCP Server

Depending on your Linux server installation, the DHCP package might already be installed.

In order to verify, you can issue the Linux command:

```
rpm -q dhclient
```

If it does not appear to be installed, you can install the package by issuing the Linux command:

```
yum install dhcp
```

Setting up a DHCP Server

The `/etc/dhcp/dhcpd.conf` file allows the Linux system administrator to customize the DHCP server.

Generally this file contains **global settings** (options that apply throughout entire network) and **subnet declarations** (options that apply only to that subnet).

Whenever changes are made to this file, the DHCP service needs to be restarted to allow new settings to take effect (eg. `systemctl restart dhcpd`)

NOTE: Any errors in this file (such as typos or missing semi-colons) can cause the DHCP server not to restart!

```
#####  
# /etc/dhcp/dhcpd.conf  
#  
# Purpose: Configuration file for DHCP server  
#####  
  
# GLOBAL OPTIONS - (i.e. SYSTEM WIDE OPTIONS )  
default-lease-time 600;           # Time in seconds  
max-lease-time 7200;             # Time in seconds  
option subnet-mask 255.255.255.0;  
option broadcast-address 192.168.1.255;  
option routers 192.168.1.254;  
option domain-name-servers 192.168.1.1, 192.168.1.2;  
option domain-name "mydomain.org";  
  
# SUBNET DECLARATION - (i.e. OPTIONS FOR SUBNET ONLY)  
  
subnet 192.168.1.0 netmask 255.255.255.0 {  
    range 192.168.1.10 192.168.1.100;  
    range 192.168.1.150 192.168.1.200;  
}
```

Setting up a DHCP Server

Some **common global options** for the DHCP Server are:
(<http://www.computernetworkingnotes.com/70-291-study-guide/dhcp-server-configuration-options.html>)

IP Address Range

This option allows you to specify the starting and ending IP addresses that define the range of the scope, along with the subnet mask you want to assign to the distributed addresses.

Lease Duration

This option allows you to define the lease duration values. These lease durations are then assigned to DHCP clients.

Setting up a DHCP Server

Some **common global options** for the DHCP Server / Cont...
(<http://www.computernetworkingnotes.com/70-291-study-guide/dhcp-server-configuration-options.html>)

Router (Default Gateway) (optional)

This option allows you to specify which default gateway (and alternates) should be assigned to DHCP clients.

Domain Name And DNS Servers (optional)

This option allows you to specify both the parent domain to be assigned to client computers and the addresses of DNS servers to be assigned to the client.

Link to most dhcp server options:

<https://linux.die.net/man/5/dhcp-options>

Connecting to a DHCP Server

Once you have restarted the `dhcpcd` service, it is important to verify that the service is running correctly.

Aside from running `systemctl status dhcpcd`, you can:

- View the message log in "real-time" to see DORA process
`tail -f /var/log/messages`
- Make a dhcp request from another computer on the same network. You can do this by logging into the other network machine, and as root issue the command: `dhclient`
then then view the "real-time" message log.

Connecting to a DHCP Server

There are other files (both on the dhcp server and dhcp client) that contain proof of a successful DHCP connection other than simply viewing the message log. These logs can be used to verify connections for trouble-shooting DHCP problems:

`/var/lib/dhcpd/dhcpd.leases` (dhcp server)

dhcpd records the address leases in this file. If the service is restarted it reads in the file to know which addresses are currently leased and for how long.

`/var/lib/dhclient` (client)

The files in this directory is where the dhclient stores its record of leases.

Connecting to a DHCP Server

Even though DHCP gives out IP address dynamically, it also has the ability to **reserve an IP address** for a certain computer.

In this sense, it's almost as if the client computer has a static IP even though it uses DHCP to get it.

This is useful if you want to be able to put entries in your **/etc/hosts** file and not have to worry about the entry becoming invalid over time.

In Linux we refer to this as **supplying a fixed address to a host**. Microsoft refers to it as a **reservation**.

DNS Configuration

- In order to setup DNS, the Linux sysadmin will customize name server settings in a configuration file called `/etc/named.conf`.
- What name servers actually store are **zone records** (along with a few other things).
- Each **zone** record links to a file that has entries that describe the machines & services available in the zone, and the name servers for zones in sub-domains.

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