



3. Network Services Involved in the Deployment of a Web Application

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Web Application Deployment

2nd C-VET Web Application Development



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1. Goals.

1. Install and configure web servers on virtual machines and/or the cloud.
2. Perform functional tests on web and application servers.
3. Document the installation and configuration processes performed on web and application servers.

2. Introduction.

The acronym DHCP stands for *Dynamic Host Configuration Protocol* and its mission is to configure the network parameters of its client systems. Basically DHCP assigns to a client system the values corresponding to the IP address, netmask and gateway by default, and it is also common to configure the values of the DNS servers.

3. DHCP Server Installation

To install the necessary files from our DHCP server we can use apt command from a root console:

```
$ sudo apt update
```

```
$ sudo apt install isc-dhcp-server
```

In this way we would install the necessary programs to have our own DHCP server.

4. DHCP Server Configuration

As mentioned above, a DHCP server provides IP addresses and other parameters to DHCP clients so that their configuration can be determined automatically without having to do it manually, which is especially useful when the number of PCs on our local network is large.

The DHCP server must know which ranges of IP addresses it can 'hire' and what additional parameters (gateway, DNS servers, etc...) it must provide to clients so that the configuration of these is complete and as desired.

A minimum TCP/IP configuration must contain at least the IP address and subnet mask, therefore, those are the two minimum data that a DHCP server can provide to a client, however, a DHCP server usually provides many more parameters:

- IP address
- Subnet Mask
- Broadcast address
- Gateway
- DNS servers, etc...

In addition, there are a series of parameters that define the conditions of the 'rental' or 'transfer' of the IP configuration to a client, such as:

- Default Release Time
- Maximum release time, and a few more parameters.

This information makes up the DHCP server configuration.

Important: The DHCP service can only serve subnets where your system has a network interface configured. That is, if our server, for example, has a single network card: 192.168.200.1/24, it will be able to provide DHCP service on this subnet, but it will not be able to be a DHCP server on 10.10.10.0/8 for example.

4.1. DHCP Server Configuration File

Like all applications on Linux, the DHCP server has its own configuration file. It is the file `/etc/dhcp/dhcpd.conf` (DHCP Server Configuration File)

```
$ sudo gedit /etc/dhcp/dhcpd.conf
```

This configuration file consists of a first main part where the general parameters that define the 'rental' and the additional parameters that will be provided to the customer are specified.

The rest of the configuration file consists of a series of sections that mainly specify ranges of IP addresses that will be transferred to clients upon request (subnet section) and specific equipment specifications (host section). The parameters of the sections should be in curly brackets '{' and '}'.

The values of the parameters specified at the beginning of the file are applied as default values to the rest of the sections, although if any of the parameters are redefined within a section, it will be applied ignoring the default value.

IP address ranges are specified in sections that start with the keyword 'subnet' followed by the network address of the subnet, followed by the word 'netmask' followed by the netmask. Below will be the list of parameters for that section enclosed in curly brackets.

For example, suppose that in our local network we have addresses belonging to the subnet 192.168.1.0/24 (/24 means subnet mask 255.255.255.0 or what would be 24 'ones' in binary) and we want our DHCP server to rent addresses in the range between the address 192.168.1.60 and 192.168.1.90. The subnet section that we must create will be:

```
// Lease Range

subnet 192.168.1.0 netmask 255.255.255.0 {

range 192.168.1.60 192.168.1.90;

}
```

Attention: The lease range must belong to the same subnet to which the server IP belongs, it is necessary for clients to be able to communicate with the DHCP server to process renewals. For example, if a server has the IP 192.168.1.1/24, it cannot give up addresses in the range 10.0.0.0/8 because that range is outside the scope of the server's subnet.

If, in addition to providing the client with the IP address and mask, we want them to also provide the address of the gateway and the addresses of two DNS servers so that they can browse the Internet, the subnet section that we must create will be:

```
// Lease range and additional parameters

subnet 192.168.1.0 netmask 255.255.255.0 {

    option routers 192.168.1.254;

    option domain-name-servers 80.58.0.33, 80.58.32.97;

    range 192.168.1.60 192.168.1.90;

}
```

It is possible to set a specific configuration to a specific client by identifying it by the MAC address of its network card. Remember that the MAC address is a unique number, made up of 6 octets, recorded in the ROM memory of the ethernet network cards and is set from the factory. The 6 octets are usually written in hexadecimal separated by a colon ':'. All network cards have a MAC address that is unique in the world. It's like a serial number. The first three octets indicate the manufacturer and the next three indicate the serial number in manufacture. On Linux you can find out the MAC address using the `ifconfig` command. On Windows systems you can use the `ipconfig`.

To set a computer configuration, you need to create a host section. For example, if we want the client whose MAC address is 00:0c:29:c9:46:80 to always be configured (IP address reservation) with the IP address 192.168.1.50 and gateway 192.168.1.254, that its domain name is "iesjoancoromines.org" and the netbios name server is "192.168.1.250" the host section that we must create will be:


```
// Create a host IP address allocation

Teacher { hardware ethernet 00:0c:29:c9:46:80;

fixed-address 192.168.1.50;

option routers 192.168.1.254;

option domain-name "iesjoancoromines.org";

option netbios-name-servers 192.168.1.250; }
```

When the PC whose MAC address is '00:0c:29:c9:46:80' requests an IP address from the DHCP server, it will receive the 192.168.1.50.

5. Service Management

With the following commands executed as an administrator user we can manage the server process that serves this service:

```
# service isc-dhcp-server start or with # systemctl start  
isc-dhcp-server (start)
```

```
# service isc-dhcp-server stop or with # systemctl stop isc-  
dhcp-server (stop)
```

```
# service isc-dhcp-server restart or with # systemctl  
restart isc-dhcp-server (restart)
```

```
# service isc-dhcp-server status or with # systemctl status  
isc-dhcp-server (check process status)
```

It should be noted that if there is an error in the configuration file `/etc/dhcp/dhcpd.conf` or the defined subnets do not match the IPs associated with the network cards of the system, the DHCP service will not start.

With the command: `ps -ax | grep dhcpd` we can check if the DHCP server process is running.

Web Links

In this section, you will find the relevant links of interest necessary to expand and explore the contents of the unit.

- [Dynamic Host Configuration Protocol - Wikipedia](#)
- [Dynamic Host Configuration Protocol \(DHCP\) – Microsoft Learn](#)
- [Introduction to DHCP – Baeldung](#)
- [DHCP: The Essential Guide to Understanding and Configuring DHCP - Zenarmor](#)