

Linux Operating System

DHCP Installation

Amirhossein Ghasemi

2024

Project2



OS : CentOS 9
Name : YourNameProjectFW
IP Address ens01: DHCP / Bridge
IP Address ens02: 192.168.10.5 / Host Only
Service :DHCP



OS : Windows 10
Name : YourNameProjectClient
IP Address ens01: Automatic / Host Only

Step 1: Install the DHCP Server

Configuring DHCP Service

DHCP (Dynamic Host Configuration Protocol) service is one of the basic services for advanced network management, which is defined in RFC 2131.

The main task of this service is to manage and assign IPs to machines on a computer network. This protocol saves time and money on managing users and network systems by using a dynamic IP repository. When making changes to the structure of networks based on this service (such as changing the default gateway or DNS server address), it is enough to apply the changes only to the DHCP server and there is no need to apply a new configuration to each machine.

How DHCP service works

- 1- First, each machine on the network and under the DHCP server at the time of system startup, requests to receive an IP from this server.
- 2- DHCP server by referring to its IP repository and from among the available IPs, selects and assigns IP to the request sent by the Client machine.

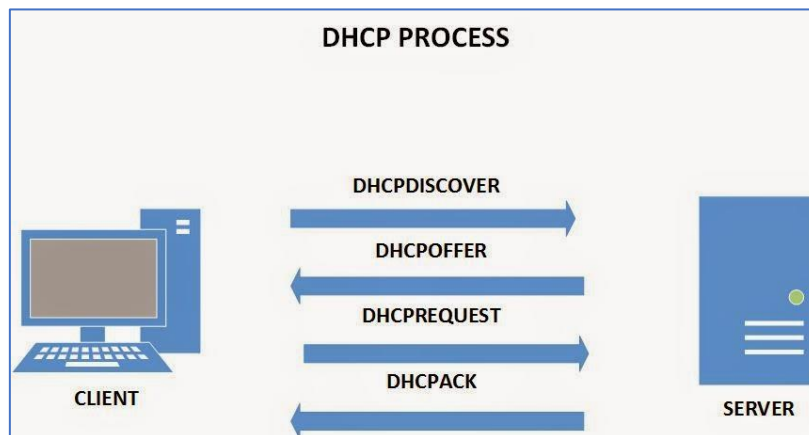
3- The DHCP requesting machine completes the IP assignment process by announcing the IP and MAC record of the requesting computer. Other information required from the requesting machine, including the default gateway address and the network's DNS server , are also provided by the DHCP server. Each of the assigned IP addresses is leased to a specific machine.

If the machine does not use this IP within the specified time, the assigned IP will be revoked. Typically, your DHCP server must be present in the subnet that gives the IP to its systems. Therefore, this service is considered as a local service.

Today, using the capabilities that network tools such as switches and routers provide to network administrators, it is possible to provide this service to other existing networks that do not have this server.

The DHCP service is installed and usable by default on other Linux distributions. This service is usually used in standalone form and its configuration file is placed in the **/etc directory**.

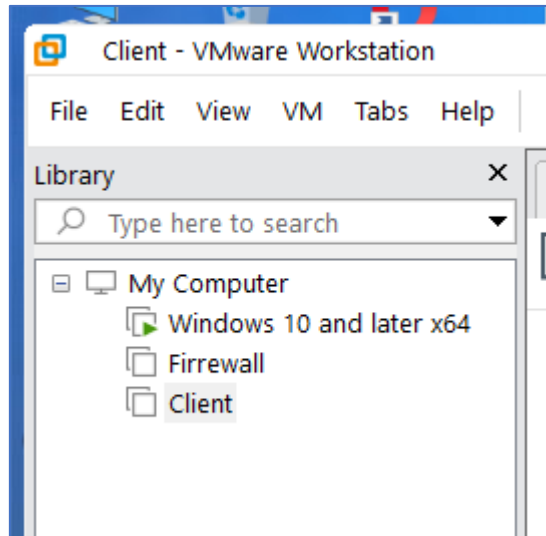
This guide describes how to install and configure a Dynamic Host Configuration Protocol (DHCP) server in a CentOS 7 Linux distribution. Note that all steps are performed with root user access. Here in this lab, we will configure a DHCP server on the **SRV02 server** . The configuration will be used to give a network configuration to the client.



Prerequisites

DNS servers must be configured and functional in order to successfully install the DHCP server.

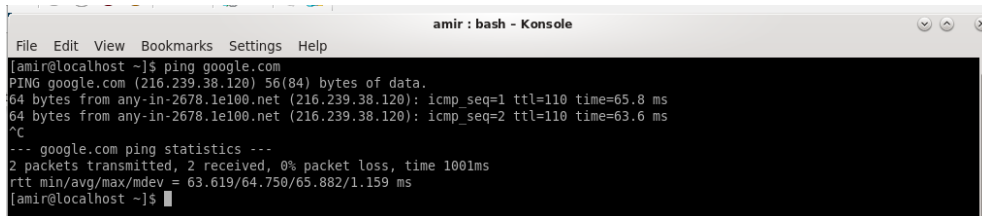
Make sure the machines below are working:



DHCP Server Installation and Configuration (SRV02)

To install a DHCP server, run the following command in the terminal:

```
# ping google.com
```



Check if the dnf is updated and do it:

```
# dnf check-update
```

```
# dnf upgrade
```

```
[root@chaosnet amir]# dnf check-update
Updating Subscription Management repositories.
Unable to read consumer identity

This system is not registered with an entitlement server. You can use "rhc" or "subscription-manager" to register.

Last metadata expiration check: 0:06:05 ago on Wed 11 Sep 2024 09:58:33 AM.
[root@chaosnet amir]#
[root@chaosnet amir]#
[root@chaosnet amir]# dnf upgrade
Updating Subscription Management repositories.
Unable to read consumer identity

This system is not registered with an entitlement server. You can use "rhc" or "subscription-manager" to register.

Last metadata expiration check: 0:06:46 ago on Wed 11 Sep 2024 09:58:33 AM.
Dependencies resolved.
Nothing to do.
Complete!
[root@chaosnet amir]#
```

dnf install dhcp - server - y

```
[root@localhost amir]# dnf install dhcp-server -y
Updating Subscription Management repositories.
Unable to read consumer identity

This system is not registered with an entitlement server. You can use "rhc" or "subscription-manager" to register.

Last metadata expiration check: 1:08:57 ago on Sun 08 Sep 2024 06:27:24 PM.
Dependencies resolved.
=====
Package                Architecture      Version           Repository        Size
=====
Installing:
dhcp-server             x86_64            12:4.4.2-19.b1.el9    baseos            1.2 M
=====
Transaction Summary
=====
Install 1 Package

Total download size: 1.2 M
Installed size: 3.9 M
Downloading Packages:
dhcp-server-4.4.2-19.b1.el9.x86_64.rpm                8.7 MB/s | 1.2 MB    00:00
-----
Total                                                    3.7 MB/s | 1.2 MB    00:00
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing                :                               1/1
  Running scriptlet: dhcp-server-12:4.4.2-19.b1.el9.x86_64 1/1
  Installing            : dhcp-server-12:4.4.2-19.b1.el9.x86_64 1/1
  Running scriptlet: dhcp-server-12:4.4.2-19.b1.el9.x86_64 1/1
```

Look at the contents of the DHCP server configuration file.

Copy the sample file to the configuration directory and use it as a reference.

#cp /usr/share/doc/dhcp*/dhcpd.conf.example/etc/dhcp

```
amir : bash - Konsole
File Edit View Bookmarks Settings Help
[root@localhost amir]# cp /usr/share/doc/dhcp*/dhcpd.conf.example /etc/dhcp
[root@localhost amir]#
```

Once the copy is done, we will not have to make a backup copy because the original file will still be one in the /usr/share/doc/dhcp*/ folder.

We will create our own configuration as follows:

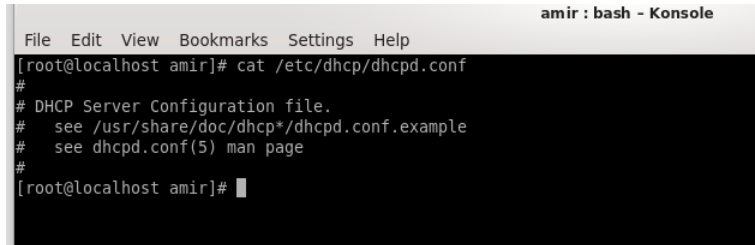
```
#cat /etc/dhcp/dhcpd.conf
```

To follow up on the command, you will have a result similar to this:

```
#DHCP Server Configuration file.
```

```
# see /usr/share/doc/dhcp*/dhcpd.conf.example
```

```
# see dhcpd.conf (5) man page
```

A terminal window titled 'amir : bash - Konsole' showing the output of the command 'cat /etc/dhcp/dhcpd.conf'. The output is: '# DHCP Server Configuration file. # see /usr/share/doc/dhcp*/dhcpd.conf.example # see dhcpd.conf(5) man page'. The prompt is '[root@localhost amir]#'.

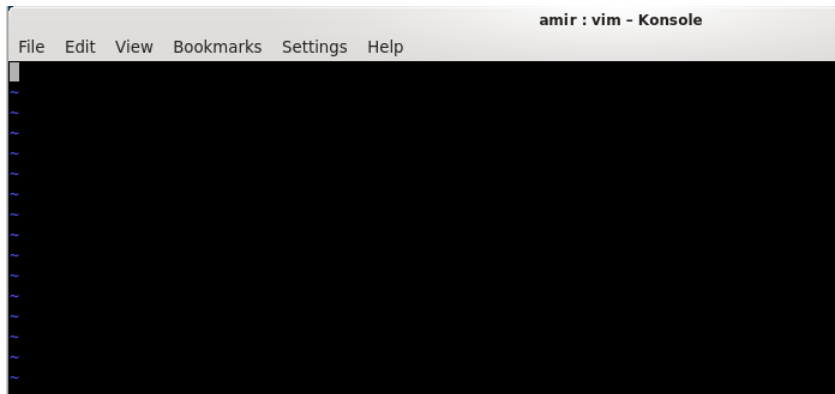
```
File Edit View Bookmarks Settings Help
[amir@localhost ~]$ cat /etc/dhcp/dhcpd.conf
#
# DHCP Server Configuration file.
#   see /usr/share/doc/dhcp*/dhcpd.conf.example
#   see dhcpd.conf(5) man page
#
[amir@localhost ~]$
```

The DHCP service configuration file is located at /etc/dhcp/dhcpd.conf .

is usually empty after installation, but there is an example configuration file in the path /usr/share/doc/dhcp/dhcpd.conf.example where you can see the configuration settings along with the description .

Edit the /etc/dhcp/dhcpd.conf file .

```
#vim /etc/dhcp/dhcpd.conf
```

A terminal window titled 'amir : vim - Konsole' showing the vim editor interface. The editor is open to the file /etc/dhcp/dhcpd.conf. The interface shows a menu bar with 'File Edit View Bookmarks Settings Help' and a large black area for editing. The prompt is '[amir@localhost ~]\$'.

```
File Edit View Bookmarks Settings Help
[amir@localhost ~]$ vim /etc/dhcp/dhcpd.conf
```

The message indicates that there is a sample configuration file that we can use to start our configuration.

```
authoritative; ..
```

```
default-lease-time 28800;
```

max-lease-time 86400;

subnet 192.168.10.0 netmask 255.255.255.0 {

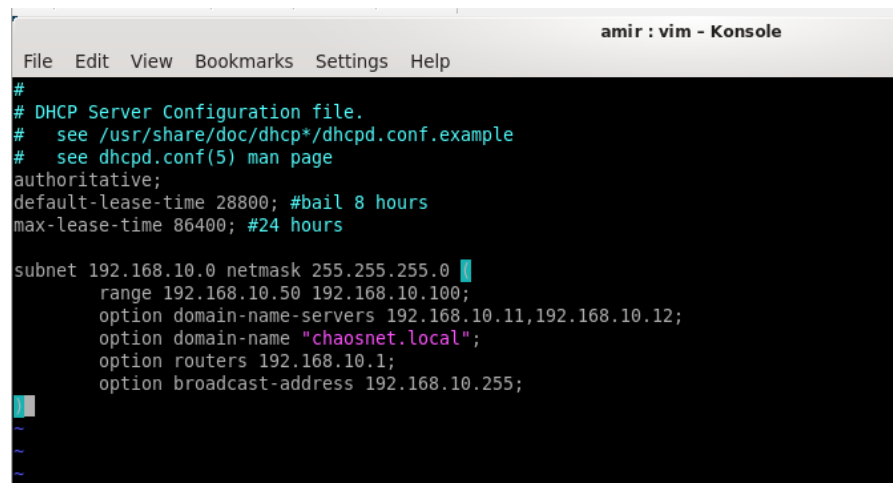
. range 192.168.10.50 192.168.10.100;

. option domain-name-servers 192.168.10.11,192.168.10.12;

. option domain-name "chaosnet.local";

. option routers 192.168.10.1;

. option broadcast-address 192.168.10.255;



```
#
# DHCP Server Configuration file.
#   see /usr/share/doc/dhcp*/dhcpd.conf.example
#   see dhcpd.conf(5) man page
authoritative;
default-lease-time 28800; #bail 8 hours
max-lease-time 86400; #24 hours

subnet 192.168.10.0 netmask 255.255.255.0 {
    range 192.168.10.50 192.168.10.100;
    option domain-name-servers 192.168.10.11,192.168.10.12;
    option domain-name "chaosnet.local";
    option routers 192.168.10.1;
    option broadcast-address 192.168.10.255;
}
```

Setup Description

- **Authority:** Used to specify a primary DHCP server. This is usually to prevent interference from users and service providers.
- **default lease time:** how long an IP ADDRESS is leased to each network machine (in seconds)
- **maximum rental time:** specifies the maximum time to assign an IP address to a machine (in seconds)
- **subnet:** setting the network on which the DHCP server should respond to requests
- **scope:** IP address range for clients
- **optional domain name servers:** IP addresses of DNS servers
- **option domain name:** Domain in which they are
- **Options routers:** Default gateway
- **broadcast address option:** Broadcast address

Zone Configuration

Run the following commands (on srv02) to open access to the service in the firewall:

```
# firewall -cmd --permanent --zone=internal --add-service= dhcp
```

```
# firewall -cmd --reload
```

```
amir : bash - Konsole
File Edit View Bookmarks Settings Help
[root@localhost amir]# firewall-cmd --permanent --zone=internal --add-service=dhcp
success
[root@localhost amir]# firewall-cmd --reload
success
[root@localhost amir]#
```

Set the hostname as: chaosnet.local

```
amir : bash - Konsole
File Edit View Bookmarks Settings Help
[root@localhost amir]# hostnamectl set-hostname "chaosnet.local"
[root@localhost amir]# hostnamectl
  Static hostname: chaosnet.local
            Icon name: computer-vm
            Chassis: vm
      Machine ID: 7a43726e9ea44d4887ce285a09c7825c
        Boot ID: 81e2540665f949fea42998fd9c66c777
  Virtualization: microsoft
Operating System: CentOS Linux 7 (Core)
       CPE OS Name: cpe:/o:centos:centos:7
         Kernel: Linux 3.10.0-1160.el7.x86_64
   Architecture: x86-64
[root@localhost amir]#
```

Run DHCP service

Run the following command to run the DHCP service.

```
#systemctl restart dhcpd
```

```
amir : bash - Konsole
File Edit View Bookmarks Settings Help
[root@localhost amir]# systemctl restart dhcpd
[root@localhost amir]#
```

Also use the following command to automatically run the DHCP service on system startup:

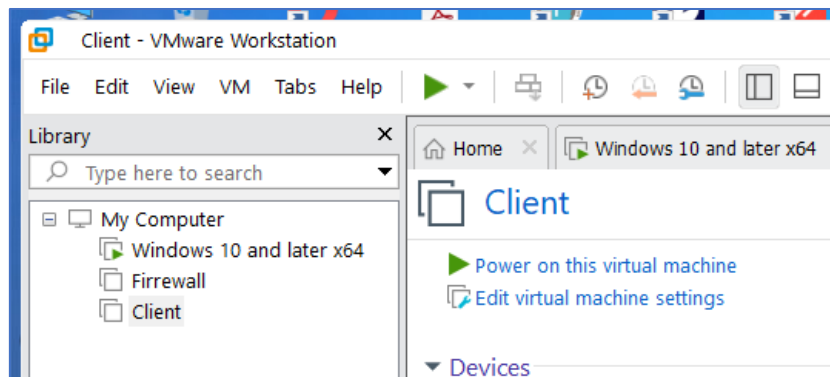
```
#systemctl enable dhcpd
```

```
#systemctl start dhcpd
```



```
amir : bash - Konsole
File Edit View Bookmarks Settings Help
[root@localhost amir]# systemctl enable dhcpd
Created symlink from /etc/systemd/system/multi-user.target.wants/dhcpd.service to /usr/lib/systemd/system/dhcpd.service.
[root@localhost amir]# systemctl start dhcpd
[root@localhost amir]#
```

Step 2: Test our DHCP server configuration



Run cmd

ipconfig

```
Win10 on LAPTOP-ID6026OL - Virtual Machine Connection
File Action Media View Help
C:\Users\Amir>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

    Connection-specific DNS Suffix  . : chaosnet.local
    Link-local IPv6 Address . . . . . : fe80::5d5c:5670:1dbf:652b%9
    IPv4 Address. . . . . : 192.168.10.50
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.10.1
```