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# Ubuntu 16.04

BY SK · AUGUST 4, 2016



Fanless I  
Rugge

**DHCP**, abbreviation of **D**ynamic **H**ost **C**ontrol **P**rotocol, is a network protocol that assigns IP addresses automatically to client systems in the network. This

reduces the tedious task of manually assigning IP addresses in a large network that has hundreds of systems. We can define the IP range (Scopes) in the DHCP server, and distribute them across the network. The client systems in the network will automatically get the IP address.

In this tutorial, we will see how to install DHCP server in Ubuntu 16.04 LTS server, and configure the DHCP clients.

## Install DHCP Server in Ubuntu 16.04 LTS server

For the purpose of this tutorial, I will be using the following system as DHCP server.

### My DHCP Server:

- **OS** – Ubuntu 16.04 LTS 64 bit
- **IP Address** –  
192.168.1.105/24
- **Hostname** –  
ubuntuserver.ostechnix.lan



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Open Terminal and run the following command to install DHCP server:

```
sudo apt-get install isc
```

```
ostechnix@ubuntu:server: ~  
File Edit View Search Terminal Help  
ostechnix@ubuntu:server:~$ sudo apt-get install isc-dhcp-server  
[sudo] password for ostechnix:  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
The following additional packages will be installed:  
  libirs-export141 libiscfg-export140  
Suggested packages:  
  isc-dhcp-server-ldap policycoreutils  
The following NEW packages will be installed:  
  isc-dhcp-server libirs-export141 libiscfg-export140  
0 upgraded, 3 newly installed, 0 to remove and 7 not upgraded.  
Need to get 468 kB of archives.  
After this operation, 1,579 kB of additional disk space will be used.  
Do you want to continue? [Y/n]
```

*Install DHCP server in Ubuntu*

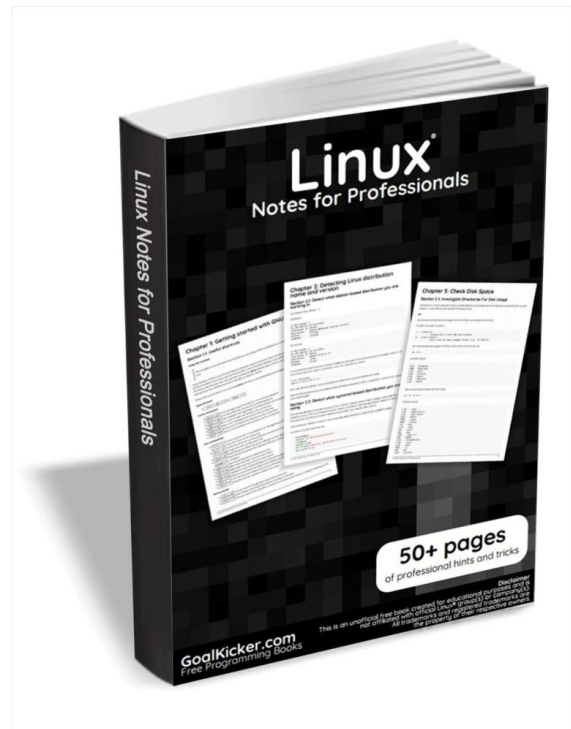
DHCP server has been installed. Now, let us go further and configure it to suit our needs.

## Configure DHCP server

The default configuration file of DHCP server is **/etc/default/isc-dhcp-server**. We need to edit and modify it as per our requirements.

If you have more than one Network interface card in your DHCP server, you need to mention on which interface should the DHCP server serve DHCP requests.

As I have only one NIC in my server, I assigned **'enp0s3'** as the



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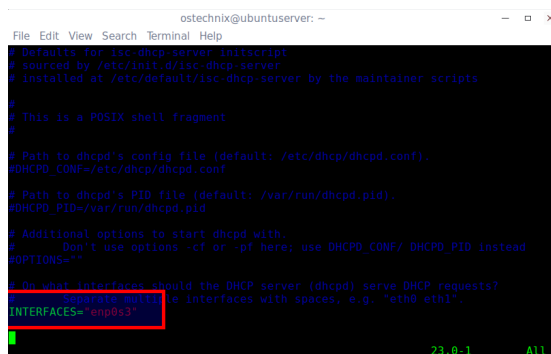
listening interface. Here, **enp0s3** is network card's name.

To do so, edit **/etc/default/isc-dhcp-server** configuration file:

```
sudo vi /etc/default/isc
```

Assign the network interface:

```
[...]  
INTERFACES="enp0s3"
```



```
ostechnix@ubuntu-server: ~  
File Edit View Search Terminal Help  
# defaults for isc-dhcp-server init script  
# sourced by /etc/init.d/isc-dhcp-server  
# installed at /etc/default/isc-dhcp-server by the maintainer scripts  
#  
# This is a POSIX shell fragment  
#  
# Path to dhcpd's config file (default: /etc/dhcp/dhcpd.conf).  
DHCPD_CONF=/etc/dhcp/dhcpd.conf  
# Path to dhcpd's PID file (default: /var/run/dhcpd.pid).  
DHCPD_PID=/var/run/dhcpd.pid  
# Additional options to start dhcpd with.  
# Don't use options -cf or -pf here; use DHCPD_CONF/ DHCPD_PID instead  
OPTIONS=""  
# On what interfaces should the DHCP server (dhcpd) serve DHCP requests?  
# Separate multiple interfaces with spaces, e.g. "eth0 eth1".  
INTERFACES="enp0s3"
```

If you have more than one interfaces, mention them with spaces, for example “eth0 eth1”.

Save and close the file.

Then, edit **dhcpd.conf** file,

```
sudo vi /etc/dhcp/dhcpd
```

Modify it as shown below. Replace the domain name with your own

How To Find The Port Number Of A Service In Linux

values.

Enter the **domain name** and **domain-name-servers**:

```
[...]  
  
# option definitions co  
option domain-name "os  
option domain-name-ser  
  
[...]
```

```
ostechnix@ubuntu: ~  
File Edit View Search Terminal Help  
# Sample configuration file for ISC dhcpd for Debian  
#  
# Attention: If /etc/ltsp/dhcpd.conf exists, that will be used as  
# configuration file instead of this file.  
#  
# The ddns-update-style parameter controls whether or not the server will  
# attempt to do a DNS update when a lease is confirmed. We default to the  
# behavior of the version 2 packages ('none', since DHCP v2 didn't  
# have support for DDNS.)  
ddns-update-style none;  
# option definitions common to all supported networks...  
option domain-name "ostechnix.lan";  
option domain-name-servers ubuntu:server.ostechnix.lan;  
default-lease-time 600;  
max-lease-time 7200;  
# If this DHCP server is the official DHCP server for the local  
# network, the authoritative directive should be uncommented.  
15,1 Top
```

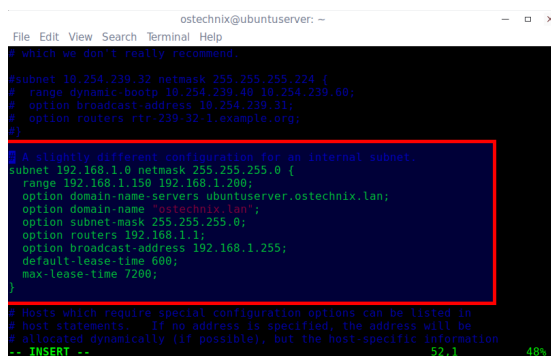
To make this server as official DHCP for your clients, find and uncomment the following line:

```
[...]  
authoritative;  
[...]
```

```
ostechnix@ubuntu: ~  
File Edit View Search Terminal Help  
#  
# The ddns-update-style parameter controls whether or not the server will  
# attempt to do a DNS update when a lease is confirmed. We default to the  
# behavior of the version 2 packages ('none', since DHCP v2 didn't  
# have support for DDNS.)  
ddns-update-style none;  
# option definitions common to all supported networks...  
option domain-name "ostechnix.lan";  
option domain-name-servers ubuntu:server.ostechnix.lan;  
default-lease-time 600;  
max-lease-time 7200;  
# If this DHCP server is the official DHCP server for the local  
# network, the authoritative directive should be uncommented.  
authoritative;  
# Use this to send dhcp log messages to a different log file (you also  
# have to have syslog.conf to complete the redirection).  
log-facility local7;  
23,1 5%
```

Scroll down little bit, and define the subnet, IP range, domain and domain name servers like below.

```
[...]  
# A slightly different  
  subnet 192.168.1.0 net  
  range 192.168.1.20 192  
  option domain-name-ser  
  option domain-name "os  
  option routers 192.168  
  option broadcast-addre  
  default-lease-time 600  
  max-lease-time 7200;  
}  
[...]
```



```
ostechnix@ubuntu:server: ~  
File Edit View Search Terminal Help  
# which we don't really recommend.  
#  
# subnet 10.254.239.32 netmask 255.255.255.224 {  
#   range dynamic-bootp 10.254.239.40 10.254.239.60;  
#   option broadcast-address 10.254.239.31;  
#   option routers rtr.239.32.1.example.org;  
# }  
#  
# A slightly different configuration for an internal subnet.  
# subnet 192.168.1.0 netmask 255.255.255.0 {  
#   range 192.168.1.150 192.168.1.200;  
#   option domain-name-servers ubuntu:server.ostechnix.lan;  
#   option domain-name "ostechnix.lan";  
#   option subnet-mask 255.255.255.0;  
#   option routers 192.168.1.1;  
#   option broadcast-address 192.168.1.255;  
#   default-lease-time 600;  
#   max-lease-time 7200;  
# }  
#  
# Hosts which require special configuration options can be listed in  
# host statements.  If no address is specified, the address will be  
# allocated dynamically (if possible), but the host-specific information  
# -- INSERT --  
52.1 48%
```

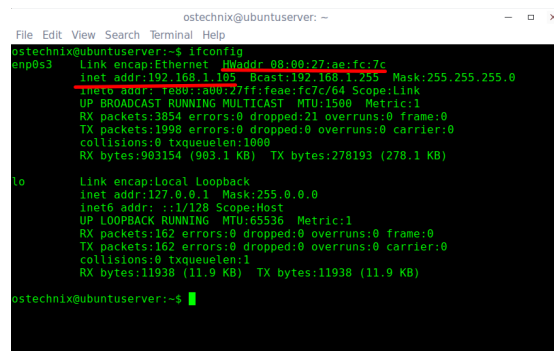
As you see in the above configuration, I have assigned IP range from 192.168.1.150 to 192.168.1.200. So, the DHCP clients will get the IP address from this range. But, what if you want assign a specific IP (fixed IP address) to a particular client? It's easy too. You can easily assign a specific IP to a client of your network by adding the MAC id of

that client with fixed IP address as shown below.

For example, let us say we want to assign IP 192.168.1.160 to client that has MAC id **00:22:64:4f:e9:3a**. To find out the IP and MAC addresses, use **'ifconfig'** command.

```
ifconfig
```

### Sample output:



```
ostechnix@ubuntu:~$ ifconfig
enp0s3: Link encap:Ethernet HWaddr 08:00:27:ae:fc:7c
        inet addr:192.168.1.105 Bcast:192.168.1.255 Mask:255.255.255.0
        inet6 addr: fe80::a00:27ff:feae:fc7c/64 Scope:Link
        UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
        RX packets:3854 errors:0 dropped:21 overruns:0 frame:0
        TX packets:1998 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1000
        RX bytes:903154 (903.1 KB)  TX bytes:278193 (278.1 KB)

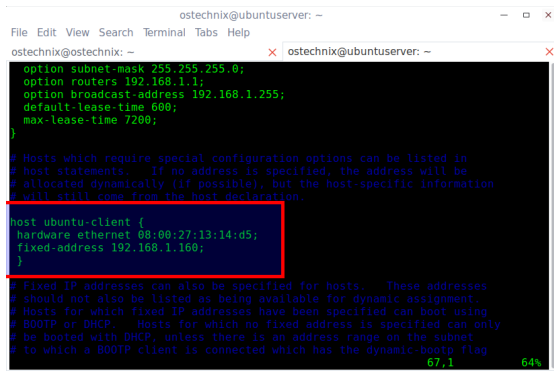
lo: Link encap:Local Loopback
        inet addr:127.0.0.1 Mask:255.0.0.0
        inet6 addr: ::1/128 Scope:Host
        UP LOOPBACK RUNNING  MTU:65536  Metric:1
        RX packets:162 errors:0 dropped:0 overruns:0 frame:0
        TX packets:162 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1
        RX bytes:11938 (11.9 KB)  TX bytes:11938 (11.9 KB)

ostechnix@ubuntu:~$
```

See the underlined words. Those are the IP and MAC addresses.

Assign the fixed IP and MAC id of the client as shown below.

```
[...]
host ubuntu-client {
    hardware ethernet 08:0
    fixed-address 192.168.
}
[...]
```



```
ostechnix@ubuntu:server: ~  
File Edit View Search Terminal Tabs Help  
ostechnix@ostechnix: ~  
ostechnix@ubuntu:server: ~  
option subnet-mask 255.255.255.0;  
option routers 192.168.1.1;  
option broadcast-address 192.168.1.255;  
default-lease-time 600;  
max-lease-time 7200;  
}  
# Hosts which require special configuration options can be listed in  
# host statements.  If no address is specified, the address will be  
# allocated dynamically (if possible), but the host-specific information  
# will still come from the host declaration.  
host ubuntu-client {  
    hardware ethernet 08:00:27:13:14:d5;  
    fixed-address 192.168.1.160;  
}  
# Fixed IP addresses can also be specified for hosts.  These addresses  
# should not also be listed as being available for dynamic assignment.  
# Hosts for which fixed IP addresses have been specified can boot using  
# BOOTP or DHCP.  Hosts for which no fixed address is specified can only  
# be booted with DHCP, unless there is an address range on the subnet  
# to which a BOOTP client is connected which has the dynamic-bootp flag  
# set.  
}
```

Once you modified all settings as per your requirements, save and close the file.

Now, restart dhcp service:

```
sudo systemctl restart
```

Make sure you haven't left any unused entries in the **dhcpd.conf** file. If there is any unused or unnecessary lines, just comment them out. Otherwise, DHCP service will not start.

Let us check if our DHCP service has been started or not using command:

```
sudo systemctl status i
```

**Sample output:**



```
ostechnix@ubuntuuser: ~$ sudo systemctl status isc-dhcp-server
● isc-dhcp-server.service: ISC DHCP IPv4 server
   Loaded: loaded (/lib/systemd/system/isc-dhcp-server.service; enabled; vendor
   Active: active (running) since Thu 2016-08-04 16:19:52 IST; 1min 37s ago
     Main PID: 3074 (dhcpd)
       Tasks: 1
      Memory: 9.3M
         CPU: 95ms
    CGroup: /system.slice/isc-dhcp-server.service
            └─3074 dhcpd -user dhcpd -group dhcpd -f -4 -pf /run/dhcp-server/dhcp

Aug 04 16:19:52 ubuntuuser sh[3074]: Wrote 0 new dynamic host decls to leases
Aug 04 16:19:52 ubuntuuser sh[3074]: Wrote 0 leases to leases file.
Aug 04 16:19:52 ubuntuuser dhcpd[3074]: Wrote 0 leases to leases file.
Aug 04 16:19:52 ubuntuuser dhcpd[3074]: Listening on LPF/enp0s3/08:00:27:ae:fc:7d
Aug 04 16:19:52 ubuntuuser sh[3074]: Listening on LPF/enp0s3/08:00:27:ae:fc:7d
Aug 04 16:19:52 ubuntuuser dhcpd[3074]: Sending on LPF/enp0s3/08:00:27:ae:fc:7d
Aug 04 16:19:52 ubuntuuser sh[3074]: Sending on LPF/enp0s3/08:00:27:ae:fc:7d
Aug 04 16:19:52 ubuntuuser dhcpd[3074]: Sending on Socket/fallback/fallback-net
Aug 04 16:19:52 ubuntuuser sh[3074]: Sending on Socket/fallback/fallback-net
Aug 04 16:19:52 ubuntuuser dhcpd[3074]: Server starting service.
lines 1-21/21 (END)
```

As you see in the above screenshot, DHCP server is running!

To start or stop DHCP service, use the following commands:

```
sudo systemctl start isc
```

```
sudo systemctl stop isc
```

At this stage, you will have a working DHCP server. The server side configuration part is over. Let's go ahead and configure the DHCP clients.

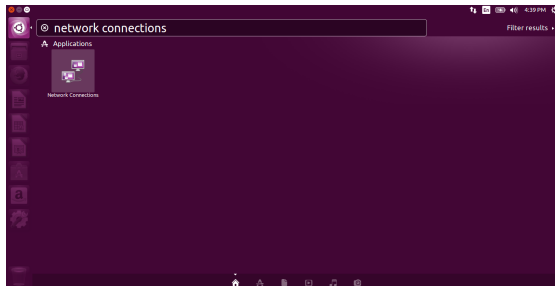
## Configure DHCP Clients

For the purpose of this tutorial, I will be using Ubuntu 16.04 LTS desktop as my DHCP client.

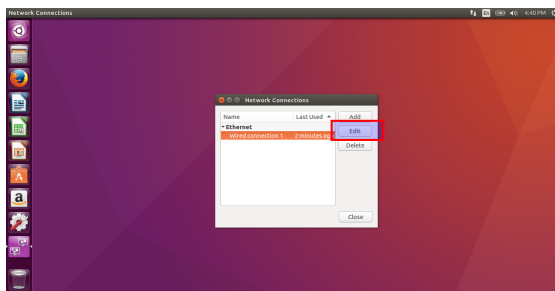
**My DHCP client:**

- **OS** – Ubuntu 16.04 LTS desktop
- **IP Address** – DHCP enabled

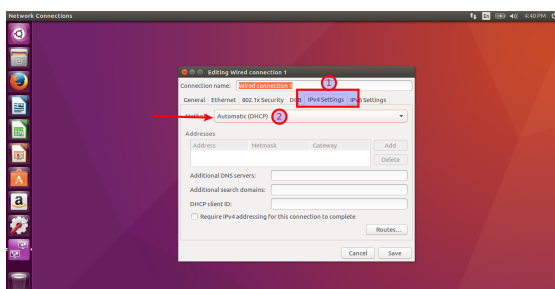
Open Network Connections either from Unity dash or Menu.



In the Network connections window, Select your Ethernet card and click **Edit**.



Click **IPv4 Settings**, and select **"Automatic (DHCP)"** option. Finally click **Save**.

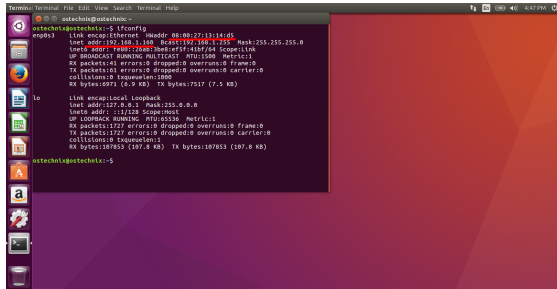


Now, restart your client system, and check the IP address of your client system.

```
ifconfig
```

## Sample output:

You will see a new IP address from IP range, which we defined in the DHCP server, is assigned to your client system.



As you see in the above screenshot, My Ubuntu 16.04 LTS desktop system, which has MAC id **08:00:27:13:14:d5**, has been assigned with a fixed IP address (**192.168.1.160**) from the DHCP server. Remember we have mentioned these values in **dhcpd.conf** file of our DHCP server.

Congratulations! DHCP server is working!!

Also read – **How to monitor DHCP server usage**

That's all for now. I will be here soon with another article. Until then, stay tuned with OSTechNix.

Cheers!



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🕒 August 4, 2016 at 7:09 pm

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**SK**

🕒 August 4, 2016 at 8:00 pm

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8:21 pm

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**SK**

🕒 August 5,

2016 at

11:11 am

Thank you  
brother.

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kindest  
feedback  
motivates  
me to  
write  
more  
stuffs.  
Keep  
visiting.

Reply



**Murad** 🕒 April 2, 2018 at 11:17 pm

Thank you but i used the same  
steps but the isc field in running  
i don't no way.

these is the status

isc-dhcp-server.service – ISC

DHCP IPv4 server

Loaded: loaded

(/lib/systemd/system/isc-dhcp-  
server.service; enabled; vendor  
preset: enabled)

Active: failed (Result: exit-code)  
since 13:44:14 02-04-2018 الاثنين  
EDT; 3s ago  
Docs: man:dhcpcd(8)  
Process: 2574 ExecStart=/bin/sh  
-ec  
CONFIG\_FILE=/etc/dhcp/dhcpcd.conf;  
if [ -f /etc/ltsp/dhcpcd.conf ];  
then CONFIG\_FILE=/etc/ltsp/dh  
Main PID: 2574 (code=exited,  
status=1/FAILURE)

Reply



**fips** ⌚ June 13, 2018 at 8:06 pm

Nicely done, just configured a  
tiny 16.04 LTS machine (old HP  
microserver) for a friend with  
the help of your articles.

Appreciate the effort you put in  
this.

Reply



**sk**

⌚ June 14, 2018 at 1:40 pm

You're welcome. Glad it  
helped you.

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