

<https://www.ostechnix.com/dhcp-server-in-ubuntu->

Install DHCP Server in Ubuntu 16.04

by [sk](#) ·

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

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

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

```
ostechnix@ubuntuserver: ~  
File Edit View Search Terminal Help  
ostechnix@ubuntuserver:~$ 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-**. 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 listening interface. Here, **enp0s3** is network card's name.

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

```
sudo vi /etc/default/isc-dhcp-server
```

Assign the network interface:

[...]

```
INTERFACES="enp0s3"
```

```
ostechnix@ubuntuserver: ~
File Edit View Search Terminal Help
# Defaults for isc-dhcp-server initscript
# 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"
23,0-1
```

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.conf
```

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

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

[...]

```
# option definitions common to all supported networks...
option domain-name "ostechnix.lan";
option domain-name-servers ubuntuserver.ostechnix.lan;
```

[...]

```
ostechnix@ubuntuserver: ~
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-updates-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 ubuntuserver.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

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

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

```
ostechnix@ubuntuserver: ~
File Edit View Search Terminal Help
#
#
# The ddns-updates-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 ubuntuserver.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 hack syslog.conf to complete the redirection).
log-facility local7;

23,1
```

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

```
[...]
# A slightly different configuration for an internal subnet.
subnet 192.168.1.0 netmask 255.255.255.0 {
    range 192.168.1.20 192.168.1.30;
    option domain-name-servers ubuntuserver.ostechnix.lan;
    option domain-name "ostechnix.lan";
    option routers 192.168.1.1;
    option broadcast-address 192.168.1.255;
    default-lease-time 600;
    max-lease-time 7200;
}
[...]
```

```
ostechnix@ubuntuserver: ~
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 ubuntuserver.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
```

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@ubuntuserver: ~  
File Edit View Search Terminal Help  
ostechnix@ubuntuserver:~$ 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@ubuntuserver:~$ █
```

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 08:00:27:13:14:d5;  
    fixed-address 192.168.1.160;  
}  
[...]
```

```
ostechnix@ubuntuserver: ~
File Edit View Search Terminal Tabs Help
ostechnix@ostechnix: ~ ostechnix@ubuntuserver: ~
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
67,1
```

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

Now, restart dhcp service:

```
sudo systemctl restart isc-dhcp-server
```

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 isc-dhcp-server
```

Sample output:


```
ostechnix@ubuntuserver: ~
File Edit View Search Terminal Help
ostechnix@ubuntuserver:~$ sudo systemctl status isc-dhcp-server
● isc-dhcp-server.service - ISC DHCP IPv4 server
   Loaded: loaded (/lib/systemd/system/isc-dhcp-server.service; enabled; v
   Active: active (running) since Thu 2016-08-04 16:19:52 IST; 1min 37s ag
     Docs: man:dhcpd(8)
    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-serve

Aug 04 16:19:52 ubuntuserver sh[3074]: Wrote 0 new dynamic host decls to l
Aug 04 16:19:52 ubuntuserver sh[3074]: Wrote 0 leases to leases file.
Aug 04 16:19:52 ubuntuserver dhcpd[3074]: Wrote 0 leases to leases file.
Aug 04 16:19:52 ubuntuserver dhcpd[3074]: Listening on LPF/enp0s3/08:00:27
Aug 04 16:19:52 ubuntuserver sh[3074]: Listening on LPF/enp0s3/08:00:27:ae
Aug 04 16:19:52 ubuntuserver dhcpd[3074]: Sending on   LPF/enp0s3/08:00:27
Aug 04 16:19:52 ubuntuserver sh[3074]: Sending on   LPF/enp0s3/08:00:27:ae
Aug 04 16:19:52 ubuntuserver dhcpd[3074]: Sending on   Socket/fallback/fal
Aug 04 16:19:52 ubuntuserver sh[3074]: Sending on   Socket/fallback/fallba
Aug 04 16:19:52 ubuntuserver 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-dhcp-server
```

```
sudo systemctl stop isc-dhcp-server
```

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.

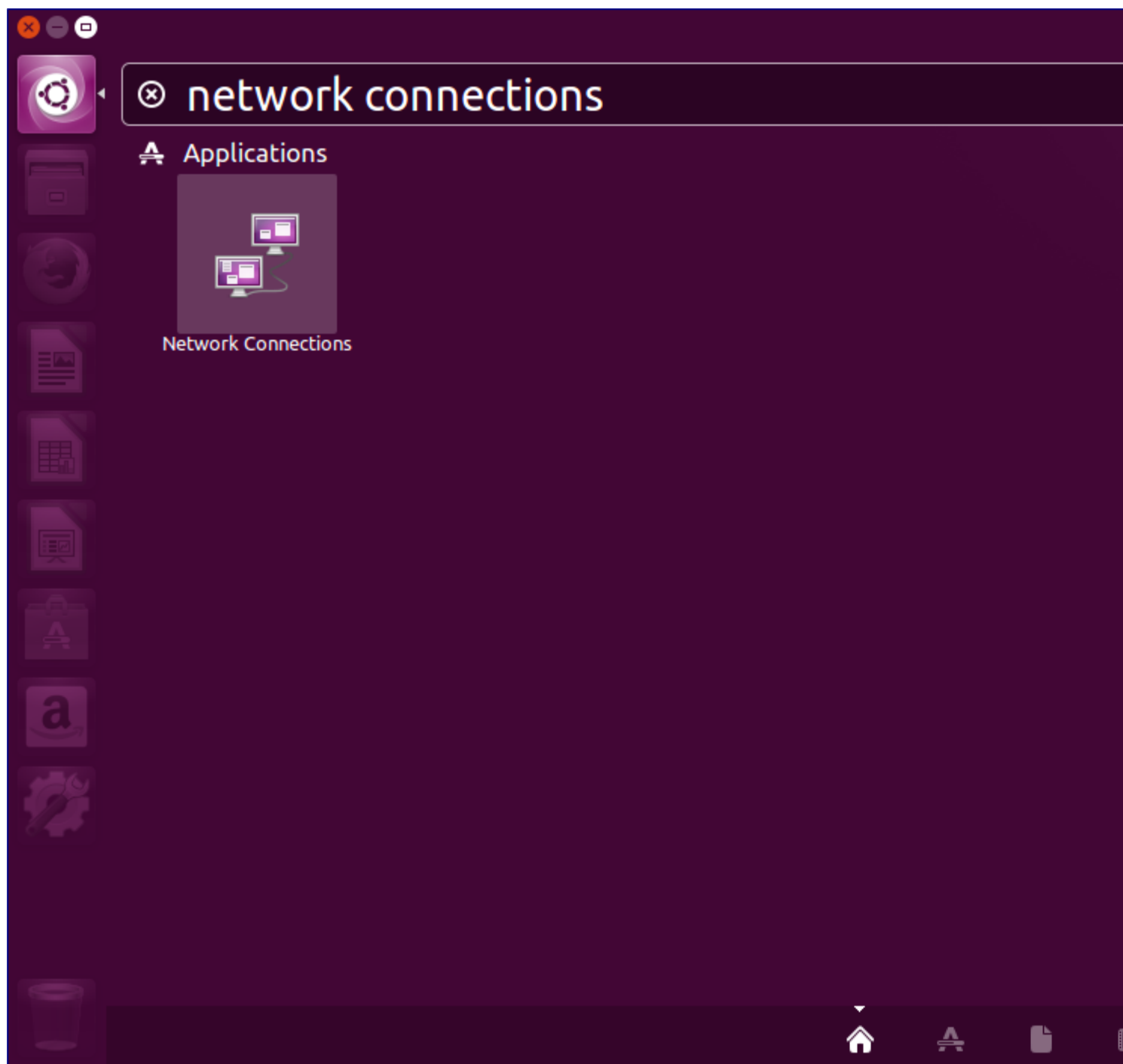
Configure DHCP Clients

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

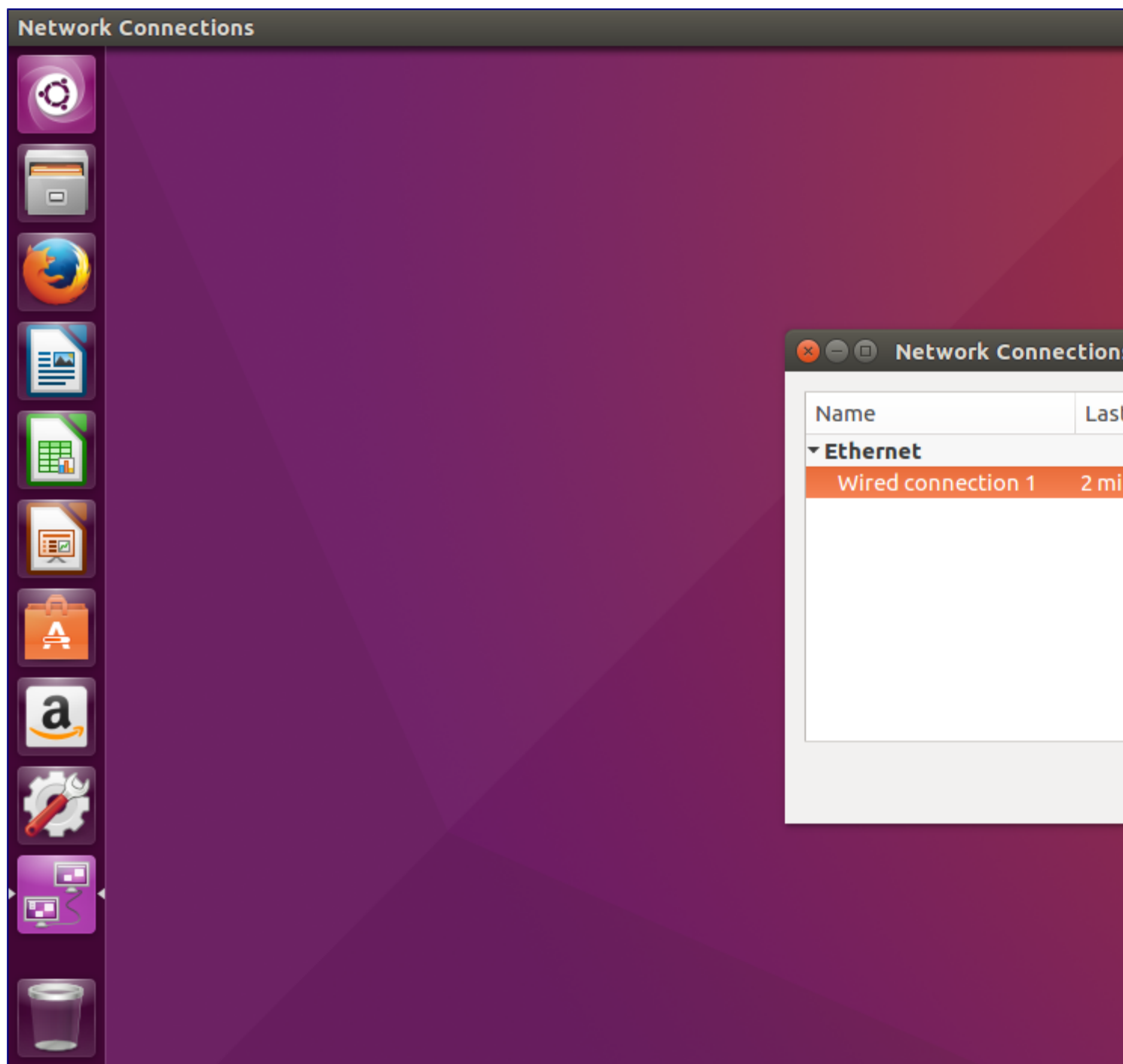
My DHCP client:

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

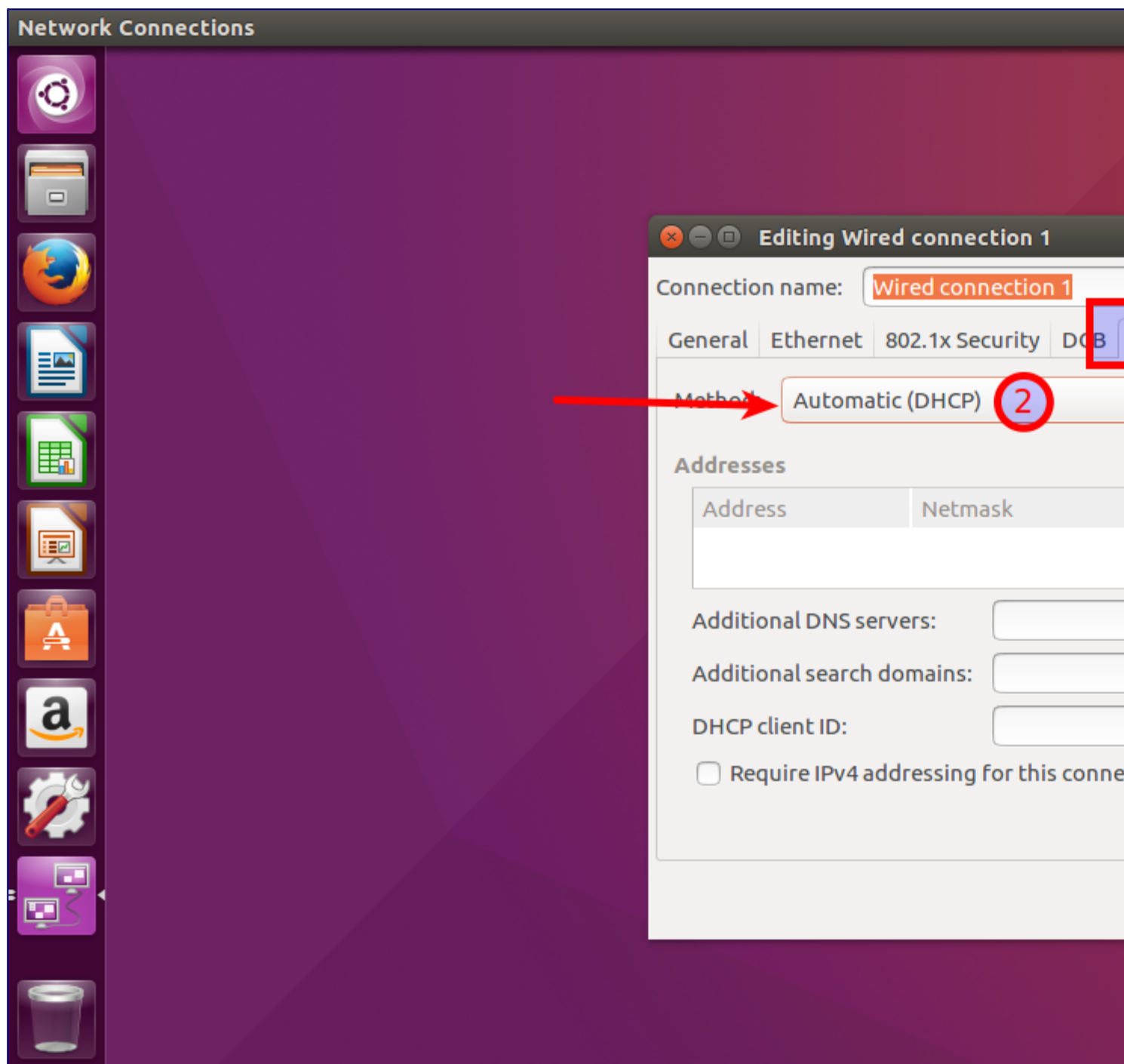
Open Network Connections either from Unity dash or Menu.



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.

```
Terminal Terminal File Edit View Search Terminal Help
ostechnix@ostechnix: ~
ostechnix@ostechnix:~$ ifconfig
enp0s3      Link encap:Ethernet  HWaddr 08:00:27:13:14:d5
            inet addr:192.168.1.160  Bcast:192.168.1.255  Mask:255.255.255.0
            inet6 addr: fe80::26ab:3be8:ef5f:41bf/64  Scope:Link
            UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
            RX packets:41 errors:0 dropped:0 overruns:0 frame:0
            TX packets:61 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:1000
            RX bytes:6971 (6.9 KB)  TX bytes:7517 (7.5 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:1727 errors:0 dropped:0 overruns:0 frame:0
            TX packets:1727 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:1
            RX bytes:107853 (107.8 KB)  TX bytes:107853 (107.8 KB)

ostechnix@ostechnix:~$
```

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!!