

Practical No. 1

Aim: Install DHCP Server in Ubuntu 16.04

- **DHCP**, abbreviation of **Dynamic Host Control Protocol**, 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.

Steps:

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

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

2. To configure dhcp , we need to open dhcp.config file.

```
sudo nano /etc/dhcp/dhcp.conf
```

To exit gnu nano editor: Ctrl + X then press N

- 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 '**ens33**' as the listening interface. Here, **ens33** is network card's name.
- To do so, edit **/etc/default/isc-dhcp-server** configuration file:

```
sudo nano /etc/dhcp/dhcp.conf
```

- Assign the network interface: **/etc/default/isc-dhcp-server**
[...]

```
INTERFACES="ens33"
```

- 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 nano /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 "ubuntu";
option domain-name-servers 10.0.0.1;
[...]
```

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

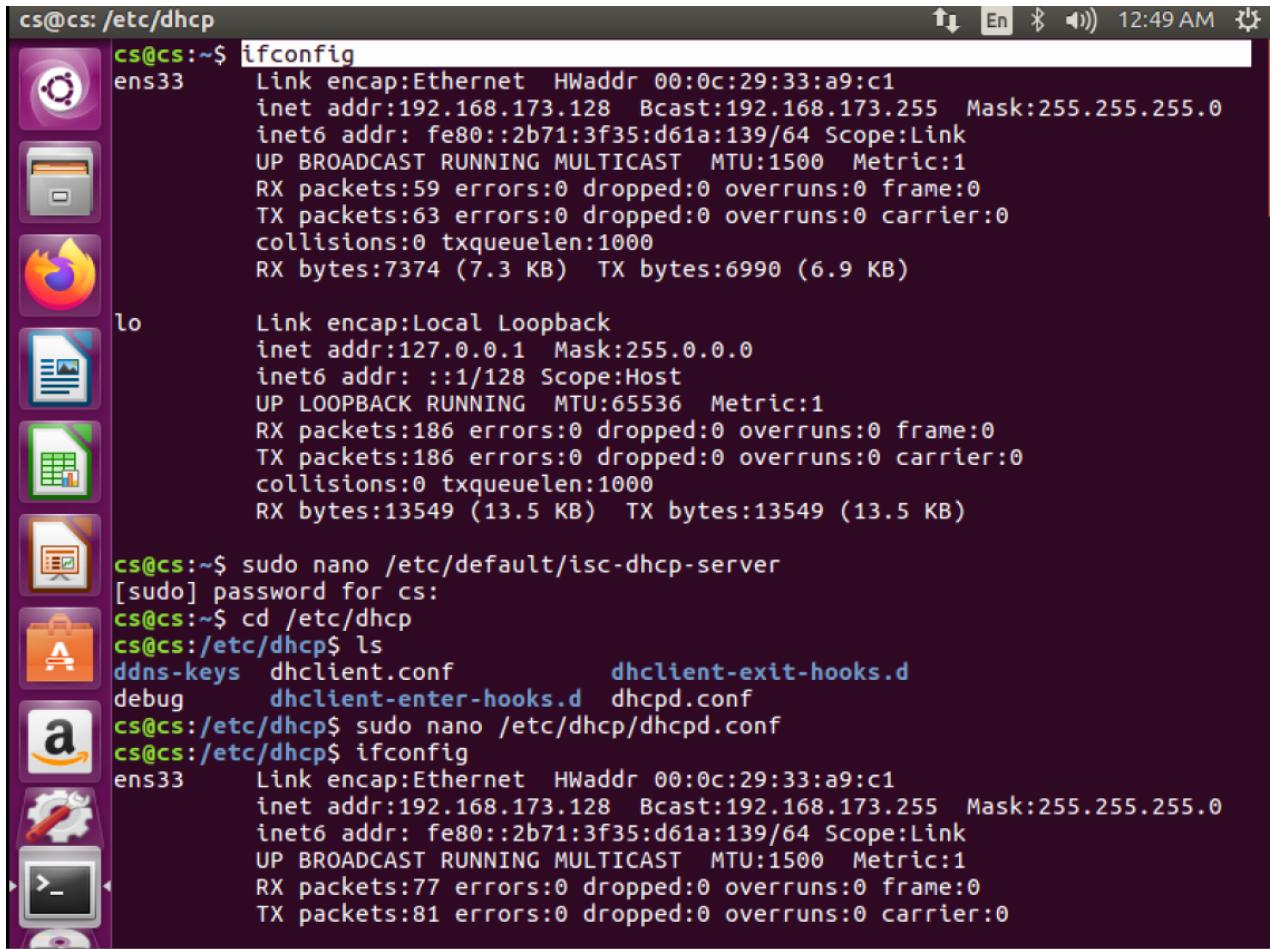
```
[...]
authoritative;
```

[...]

To exit from nano editor: Ctrl+x then enter Y(yes)

sudo /etc/init.d/isc-dhcp-server start

sudo /etc/init.d/isc-dhcp-server status

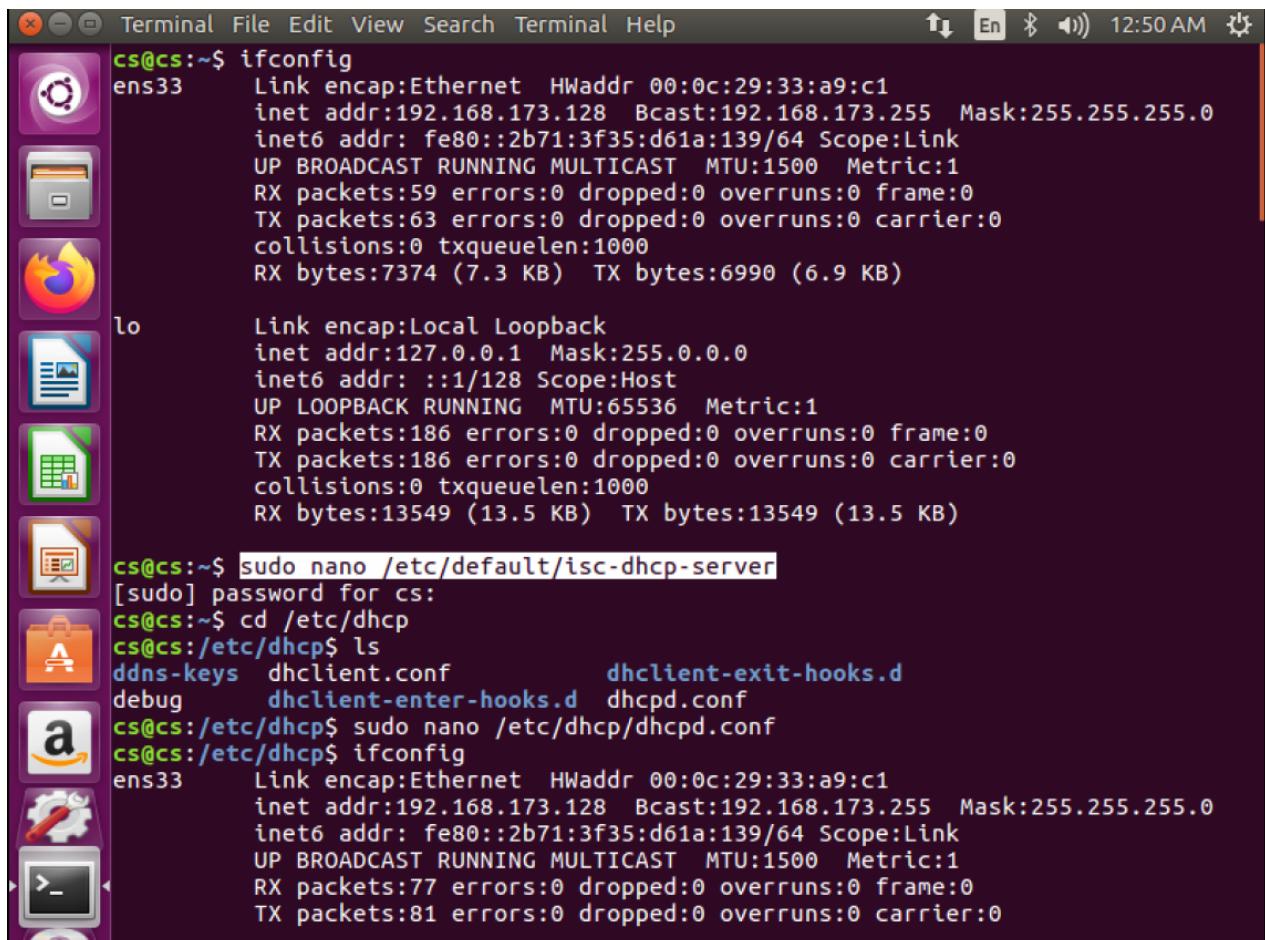


cs@cs: /etc/dhcp

```
cs@cs:~$ ifconfig
ens3      Link encap:Ethernet HWaddr 00:0c:29:33:a9:c1
          inet addr:192.168.173.128 Bcast:192.168.173.255 Mask:255.255.255.0
          inet6 addr: fe80::2b71:3f35:d61a:139/64 Scope:Link
            UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
            RX packets:59 errors:0 dropped:0 overruns:0 frame:0
            TX packets:63 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:1000
            RX bytes:7374 (7.3 KB) TX bytes:6990 (6.9 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:186 errors:0 dropped:0 overruns:0 frame:0
            TX packets:186 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:1000
            RX bytes:13549 (13.5 KB) TX bytes:13549 (13.5 KB)

cs@cs:~$ sudo nano /etc/default/isc-dhcp-server
[sudo] password for cs:
cs@cs:~$ cd /etc/dhcp
cs@cs:/etc/dhcp$ ls
ddns-keys dhclient.conf          dhclient-exit-hooks.d
debug      dhclient-enter-hooks.d dhcpd.conf
cs@cs:/etc/dhcp$ sudo nano /etc/dhcp/dhcpd.conf
cs@cs:/etc/dhcp$ ifconfig
ens3      Link encap:Ethernet HWaddr 00:0c:29:33:a9:c1
          inet addr:192.168.173.128 Bcast:192.168.173.255 Mask:255.255.255.0
          inet6 addr: fe80::2b71:3f35:d61a:139/64 Scope:Link
            UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
            RX packets:77 errors:0 dropped:0 overruns:0 frame:0
            TX packets:81 errors:0 dropped:0 overruns:0 carrier:0
```

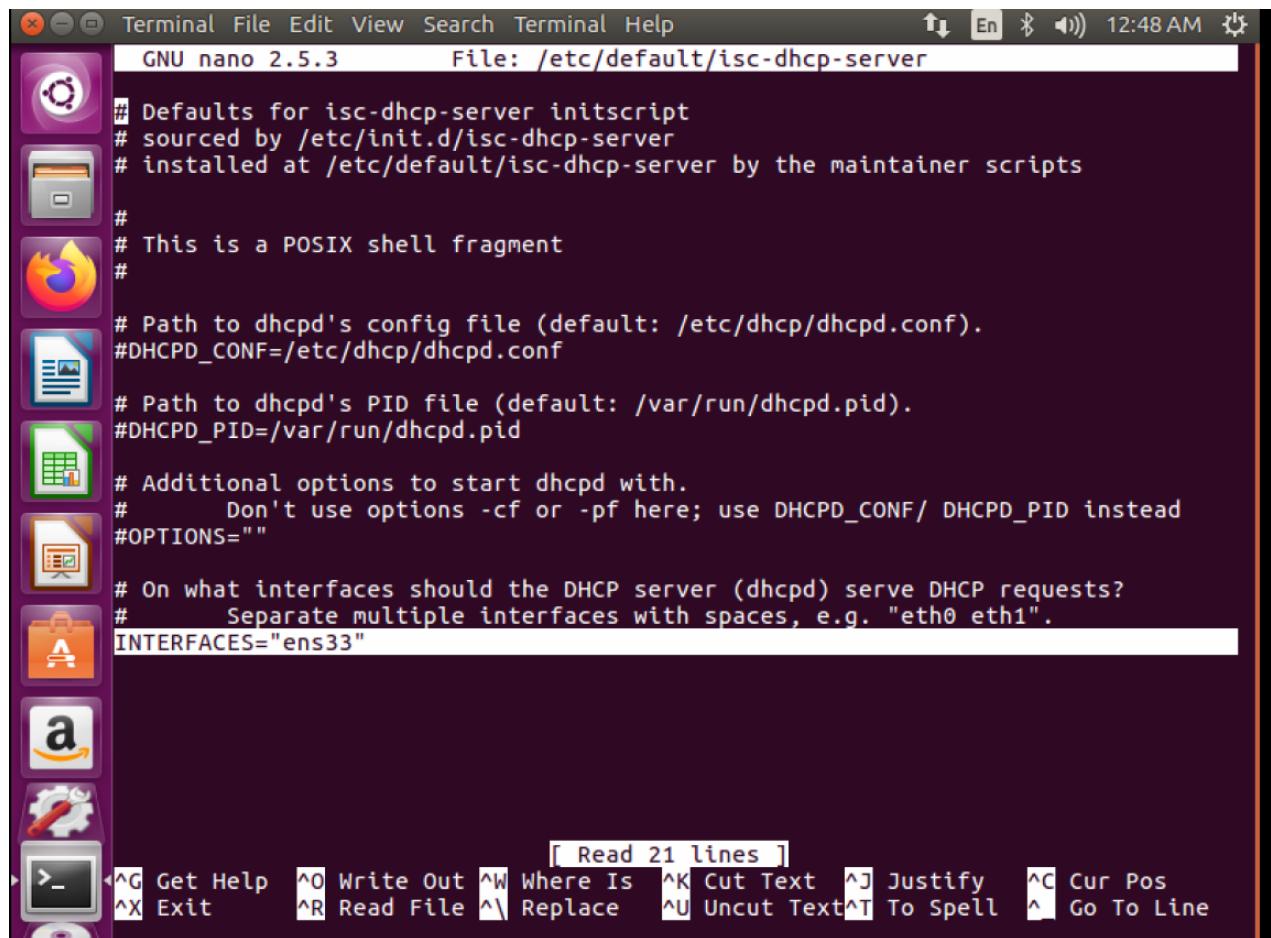


A screenshot of an Ubuntu desktop environment showing a terminal window. The terminal window has a dark background and contains the following text:

```
Terminal File Edit View Search Terminal Help
En 12:50 AM
cs@cs:~$ ifconfig
ens3      Link encap:Ethernet HWaddr 00:0c:29:33:a9:c1
          inet addr:192.168.173.128 Bcast:192.168.173.255 Mask:255.255.255.0
          inet6 addr: fe80::2b71:3f35:d61a:139/64 Scope:Link
            UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
            RX packets:59 errors:0 dropped:0 overruns:0 frame:0
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            collisions:0 txqueuelen:1000
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            RX packets:186 errors:0 dropped:0 overruns:0 frame:0
            TX packets:186 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:1000
            RX bytes:13549 (13.5 KB) TX bytes:13549 (13.5 KB)

cs@cs:~$ sudo nano /etc/default/isc-dhcp-server
[sudo] password for cs:
cs@cs:~$ cd /etc/dhcp
cs@cs:/etc/dhcp$ ls
ddns-keys dhclient.conf      dhclient-exit-hooks.d
debug      dhclient-enter-hooks.d  dhcpd.conf
cs@cs:/etc/dhcp$ sudo nano /etc/dhcp/dhcpd.conf
cs@cs:/etc/dhcp$ ifconfig
ens3      Link encap:Ethernet HWaddr 00:0c:29:33:a9:c1
          inet addr:192.168.173.128 Bcast:192.168.173.255 Mask:255.255.255.0
          inet6 addr: fe80::2b71:3f35:d61a:139/64 Scope:Link
            UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
            RX packets:77 errors:0 dropped:0 overruns:0 frame:0
            TX packets:81 errors:0 dropped:0 overruns:0 carrier:0
```



A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window title bar reads "GNU nano 2.5.3" and "File: /etc/default/isc-dhcp-server". The window contains configuration code for the ISC DHCP server. The code includes comments about sourcing from /etc/init.d/isc-dhcp-server and being maintained at /etc/default/isc-dhcp-server. It defines paths for the config file (DHCPD_CONF) and PID file (DHCPD_PID). It also specifies additional options (OPTIONS), the interfaces to serve (INTERFACES), and a note about not using -cf or -pf options. The bottom of the terminal shows a series of keyboard shortcuts for nano editor commands.

```
# 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 dhcpcd's config file (default: /etc/dhcp/dhcpcd.conf).
#DHCPD_CONF=/etc/dhcp/dhcpcd.conf

# Path to dhcpcd's PID file (default: /var/run/dhcpcd.pid).
#DHCPD_PID=/var/run/dhcpcd.pid

# Additional options to start dhcpcd with.
#       Don't use options -cf or -pf here; use DHCPD_CONF/ DHCPD_PID instead
#OPTIONS=""

# On what interfaces should the DHCP server (dhcpcd) serve DHCP requests?
#       Separate multiple interfaces with spaces, e.g. "eth0 eth1".
INTERFACES="ens33"

[ Read 21 lines ]
^G Get Help  ^O Write Out  ^W Where Is  ^K Cut Text  ^J Justify  ^C Cur Pos
^X Exit      ^R Read File  ^\ Replace   ^U Uncut Text^T To Spell  ^_ Go To Line
```

```
Terminal File Edit View Search Terminal Help
collisions:0 txqueuelen:1000
RX bytes:13549 (13.5 KB) TX bytes:13549 (13.5 KB)

cs@cs:~$ sudo nano /etc/default/isc-dhcp-server
[sudo] password for cs:
cs@cs:~$ cd /etc/dhcp
cs@cs:/etc/dhcp$ ls
ddns-keys dhclient.conf dhclient-exit-hooks.d
debug dhclient-enter-hooks.d dhcpd.conf
cs@cs:/etc/dhcp$ sudo nano /etc/dhcp/dhcpd.conf
cs@cs:/etc/dhcp$ ifconfig
ens33      Link encap:Ethernet HWaddr 00:0c:29:33:a9:c1
           inet addr:192.168.173.128 Bcast:192.168.173.255 Mask:255.255.255.0
           inet6 addr: fe80::2b71:3f35:d61a:139/64 Scope:Link
             UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
             RX packets:77 errors:0 dropped:0 overruns:0 frame:0
             TX packets:81 errors:0 dropped:0 overruns:0 carrier:0
             collisions:0 txqueuelen:1000
             RX bytes:8856 (8.8 KB) TX bytes:8472 (8.4 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:202 errors:0 dropped:0 overruns:0 frame:0
             TX packets:202 errors:0 dropped:0 overruns:0 carrier:0
             collisions:0 txqueuelen:1000
             RX bytes:15470 (15.4 KB) TX bytes:15470 (15.4 KB)

cs@cs:/etc/dhcp$ sudo nano /etc/dhcp/dhcpd.conf
cs@cs:/etc/dhcp$ sudo nano /etc/dhcp/dhcpd.conf
cs@cs:/etc/dhcp$ sudo systemctl start isc-dhcp-server
cs@cs:/etc/dhcp$ sudo systemctl status isc-dhcp-server
```

```
Terminal File Edit View Search Terminal Help ↑ ↓ En 12:51 AM ⚙
collisions:0 txqueuelen:1000
RX bytes:13549 (13.5 KB) TX bytes:13549 (13.5 KB)

cs@cs:~$ sudo nano /etc/default/isc-dhcp-server
[sudo] password for cs:
cs@cs:~$ cd /etc/dhcp
cs@cs:/etc/dhcp$ ls
ddns-keys dhclient.conf dhclient-exit-hooks.d
debug dhclient-enter-hooks.d dhcpd.conf
cs@cs:/etc/dhcp$ sudo nano /etc/dhcp/dhcpd.conf
cs@cs:/etc/dhcp$ ifconfig
ens33      Link encap:Ethernet HWaddr 00:0c:29:33:a9:c1
           inet addr:192.168.173.128 Bcast:192.168.173.255 Mask:255.255.255.0
           inet6 addr: fe80::2b71:3f35:d61a:139/64 Scope:Link
             UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
             RX packets:77 errors:0 dropped:0 overruns:0 frame:0
             TX packets:81 errors:0 dropped:0 overruns:0 carrier:0
             collisions:0 txqueuelen:1000
             RX bytes:8856 (8.8 KB) TX bytes:8472 (8.4 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:202 errors:0 dropped:0 overruns:0 frame:0
             TX packets:202 errors:0 dropped:0 overruns:0 carrier:0
             collisions:0 txqueuelen:1000
             RX bytes:15470 (15.4 KB) TX bytes:15470 (15.4 KB)

cs@cs:/etc/dhcp$ sudo nano /etc/dhcp/dhcpd.conf
cs@cs:/etc/dhcp$ sudo nano /etc/dhcp/dhcpd.conf
cs@cs:/etc/dhcp$ sudo systemctl start isc-dhcp-server
cs@cs:/etc/dhcp$ sudo systemctl status isc-dhcp-server
```

```
Terminal File Edit View Search Terminal Help
collisions:0 txqueuelen:1000
RX bytes:13549 (13.5 KB) TX bytes:13549 (13.5 KB)

cs@cs:~$ sudo nano /etc/default/isc-dhcp-server
[sudo] password for cs:
cs@cs:~$ cd /etc/dhcp
cs@cs:/etc/dhcp$ ls
ddns-keys dhclient.conf dhclient-exit-hooks.d
debug dhclient-enter-hooks.d dhcpd.conf
cs@cs:/etc/dhcp$ sudo nano /etc/dhcp/dhcpd.conf
cs@cs:/etc/dhcp$ ifconfig
ens33      Link encap:Ethernet HWaddr 00:0c:29:33:a9:c1
           inet addr:192.168.173.128 Bcast:192.168.173.255 Mask:255.255.255.0
           inet6 addr: fe80::2b71:3f35:d61a:139/64 Scope:Link
             UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
             RX packets:77 errors:0 dropped:0 overruns:0 frame:0
             TX packets:81 errors:0 dropped:0 overruns:0 carrier:0
             collisions:0 txqueuelen:1000
             RX bytes:8856 (8.8 KB) TX bytes:8472 (8.4 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:202 errors:0 dropped:0 overruns:0 frame:0
             TX packets:202 errors:0 dropped:0 overruns:0 carrier:0
             collisions:0 txqueuelen:1000
             RX bytes:15470 (15.4 KB) TX bytes:15470 (15.4 KB)

cs@cs:/etc/dhcp$ sudo nano /etc/dhcp/dhcpd.conf
cs@cs:/etc/dhcp$ sudo nano /etc/dhcp/dhcpd.conf
cs@cs:/etc/dhcp$ sudo systemctl start isc-dhcp-server
cs@cs:/etc/dhcp$ sudo systemctl status isc-dhcp-server
```

cs@cs: /etc/dhcp

En 12:47 AM

```
GNU nano 2.5.3          File: /etc/dhcp/dhcpd.conf

#
# Sample configuration file for ISC dhcpcd 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 "example.org";
#option domain-name-servers ns1.example.org, ns2.example.org;

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;
```

^G Get Help **^O** Write Out **^W** Where Is **^K** Cut Text **^J** Justify **^C** Cur Pos
^X Exit **^R** Read File **^** Replace **^U** Uncut Text **^T** To Spell **^** Go To Line

Terminal File Edit View Search Terminal Help

GNU nano 2.5.3 File: /etc/dhcpd/dhcpd.conf

```
# Sample configuration file for ISC dhcpcd for Debian
#
# Attention: If /etc/ltsp/dhcpcd.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 "example.org";
#option domain-name-servers ns1.example.org, ns2.example.org;

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;
```

^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit ^R Read File ^I Replace ^U Uncut Text ^T To Spell ^L Go To Line

Terminal File Edit View Search Terminal Help

GNU nano 2.5.3 File: /etc/dhcpd.conf

```
#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 192.168.173.0 netmask 255.255.255.0 {
    range 192.168.173.100 192.168.173.200;
    #option domain-name-servers ns1.internal.example.org;
    #option domain-name "internal.example.org";
    option subnet-mask 255.255.255.0;
    option routers 192.168.173.255;
    option broadcast-address 192.168.173.255;
    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 passacaglia {
#    hardware ethernet 0:0:c0:5d:bd:95;
#    filename "vmunix.passacaglia";
#    server-name "toccata.fugue.com";
#}

^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit ^R Read File ^\ Replace ^U Uncut Text ^T To Spell ^_ Go To Line
```

cs@cs: /etc/dhcp

↑ En ⚡ 12:52 AM ⚡

```
cs@cs:/etc/dhcp$ sudo nano /etc/dhcp/dhcpd.conf
cs@cs:/etc/dhcp$ sudo nano /etc/dhcp/dhcpd.conf
cs@cs:/etc/dhcp$ sudo systemctl start isc-dhcp-server
cs@cs:/etc/dhcp$ 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 Mon 2021-07-12 00:14:39 IST; 17s ago
     Docs: man:dhcpd(8)
   Main PID: 2354 (dhcpd)
     CGroup: /system.slice/isc-dhcp-server.service
             └─2354 dhcpd -user dhcpd -group dhcpd -f -4 -pf /run/dhcp-server/dhcp

Jul 12 00:14:39 cs sh[2354]: Wrote 0 leases to leases file.
Jul 12 00:14:39 cs dhcpd[2354]: For info, please visit https://www.isc.org/softw
Jul 12 00:14:39 cs dhcpd[2354]: Wrote 0 leases to leases file.
Jul 12 00:14:39 cs dhcpd[2354]: Listening on LPF/ens33/00:0c:29:33:a9:c1/192.168
Jul 12 00:14:39 cs sh[2354]: Listening on LPF/ens33/00:0c:29:33:a9:c1/192.168.17
Jul 12 00:14:39 cs sh[2354]: Sending on   LPF/ens33/00:0c:29:33:a9:c1/192.168.17
Jul 12 00:14:39 cs sh[2354]: Sending on   Socket/fallback/fallback-net
Jul 12 00:14:39 cs dhcpd[2354]: Sending on   LPF/ens33/00:0c:29:33:a9:c1/192.168
Jul 12 00:14:39 cs dhcpd[2354]: Sending on   Socket/fallback/fallback-net
Jul 12 00:14:39 cs dhcpd[2354]: Server starting service.

cs@cs:/etc/dhcp$ sudo systemctl enable isc-dhcp-server
Synchronizing state of isc-dhcp-server.service with SysV init with /lib/systemd/
systemd-sysv-install...
Executing /lib/systemd/systemd-sysv-install enable isc-dhcp-server
cs@cs:/etc/dhcp$ sudo ufw status
Status: inactive
cs@cs:/etc/dhcp$ dhcp-lease-list
To get manufacturer names please download http://standards.ieee.org/regauth/oui/
oui.txt to /usr/local/etc/oui.txt
```

```
Terminal File Edit View Search Terminal Help ↑ En ⚡ 12:52 AM ⚡  
Ubuntu icon  
File icon  
Firefox icon  
Document icon  
Image icon  
Database icon  
Application icon  
Terminal icon  
Jul 12 00:14:39 cs sh[2354]: Wrote 0 leases to leases file.  
Jul 12 00:14:39 cs dhcpcd[2354]: For info, please visit https://www.isc.org/softw  
Jul 12 00:14:39 cs dhcpcd[2354]: Wrote 0 leases to leases file.  
Jul 12 00:14:39 cs dhcpcd[2354]: Listening on LPF/ens33/00:0c:29:33:a9:c1/192.168  
Jul 12 00:14:39 cs sh[2354]: Listening on LPF/ens33/00:0c:29:33:a9:c1/192.168.17  
Jul 12 00:14:39 cs sh[2354]: Sending on LPF/ens33/00:0c:29:33:a9:c1/192.168.17  
Jul 12 00:14:39 cs sh[2354]: Sending on Socket/fallback/fallback-net  
Jul 12 00:14:39 cs dhcpcd[2354]: Sending on LPF/ens33/00:0c:29:33:a9:c1/192.168  
Jul 12 00:14:39 cs dhcpcd[2354]: Sending on Socket/fallback/fallback-net  
Jul 12 00:14:39 cs dhcpcd[2354]: Server starting service.  
  
cs@cs:/etc/dhcp$ sudo systemctl enable isc-dhcp-server  
Synchronizing state of isc-dhcp-server.service with SysV init with /lib/systemd/  
systemd-sysv-install...  
Executing /lib/systemd/systemd-sysv-install enable isc-dhcp-server  
cs@cs:/etc/dhcp$ sudo ufw status  
Status: inactive  
cs@cs:/etc/dhcp$ dhcp-lease-list  
To get manufacturer names please download http://standards.ieee.org/regauth/oui/  
oui.txt to /usr/local/etc/oui.txt  
Cannot open /var/db/dhcpcd.leases: No such file or directory at /usr/sbin/dhcp-lease-list line 69.  
cs@cs:/etc/dhcp$ ls  
ddns-keys dhclient.conf dhclient-exit-hooks.d  
debug dhclient-enter-hooks.d dhcpcd.conf  
cs@cs:/etc/dhcp$ dhc  
No command 'dhc' found, did you mean:  
Command 'dc' from package 'dc' (main)  
Command 'dtc' from package 'device-tree-compiler' (main)  
Command 'ghc' from package 'ghc' (universe)  
Command 'hc' from package 'httpcode' (universe)  
Command 'dht' from package 'pkg-haskell-tools' (universe)
```

```
Jul 12 00:14:39 cs dhcpcd[2354]: Listening on LPF/ens33/00:0c:29:33:a9:c1/192.168
Jul 12 00:14:39 cs sh[2354]: Listening on LPF/ens33/00:0c:29:33:a9:c1/192.168.17
Jul 12 00:14:39 cs sh[2354]: Sending on   LPF/ens33/00:0c:29:33:a9:c1/192.168.17
Jul 12 00:14:39 cs sh[2354]: Sending on   Socket/fallback/fallback-net
Jul 12 00:14:39 cs dhcpcd[2354]: Sending on   LPF/ens33/00:0c:29:33:a9:c1/192.168
Jul 12 00:14:39 cs dhcpcd[2354]: Sending on   Socket/fallback/fallback-net
Jul 12 00:14:39 cs dhcpcd[2354]: Server starting service.

cs@cs:/etc/dhcp$ sudo systemctl enable isc-dhcp-server
Synchronizing state of isc-dhcp-server.service with SysV init with /lib/systemd/
systemd-sysv-install...
Executing /lib/systemd/systemd-sysv-install enable isc-dhcp-server
cs@cs:/etc/dhcp$ sudo ufw status
Status: inactive

cs@cs:/etc/dhcp$ dhcp-lease-list
To get manufacturer names please download http://standards.ieee.org/regauth/oui/
oui.txt to /usr/local/etc/oui.txt
Cannot open /var/db/dhcpcd.leases: No such file or directory at /usr/sbin/dhcp-le
ase-list line 69.

cs@cs:/etc/dhcp$ ls
ddns-keys  dhclient.conf          dhclient-exit-hooks.d
debug       dhclient-enter-hooks.d  dhcpcd.conf
cs@cs:/etc/dhcp$ dhc
No command 'dhc' found, did you mean:
  Command 'dc' from package 'dc' (main)
  Command 'dtc' from package 'device-tree-compiler' (main)
  Command 'ghc' from package 'ghc' (universe)
  Command 'hc' from package 'httpcode' (universe)
  Command 'dht' from package 'pkg-haskell-tools' (universe)
  Command 'shc' from package 'shc' (universe)
  Command 'dsc' from package 'dsc-statistics-collector' (universe)
  Command 'mhc' from package 'mhc-utils' (universe)
  Command 'dh' from package 'debservice' (main)
```

```
cs@cs: /etc/dhcp$ sudo ufw status
Status: inactive
cs@cs: /etc/dhcp$ dhcp-lease-list
To get manufacturer names please download http://standards.ieee.org/regauth/oui/
oui.txt to /usr/local/etc/oui.txt
Cannot open /var/db/dhcpd.leases: No such file or directory at /usr/sbin/dhcp-le
ase-list line 69.
cs@cs: /etc/dhcp$ ls
ddns-keys dhclient.conf          dhclient-exit-hooks.d
debug      dhclient-enter-hooks.d  dhcpd.conf
cs@cs: /etc/dhcp$ dhc
No command 'dhc' found, did you mean:
Command 'dc' from package 'dc' (main)
Command 'dtc' from package 'device-tree-compiler' (main)
Command 'ghc' from package 'ghc' (universe)
Command 'hc' from package 'httpcode' (universe)
Command 'dht' from package 'pkg-haskell-tools' (universe)
Command 'shc' from package 'shc' (universe)
Command 'dsc' from package 'dsc-statistics-collector' (universe)
Command 'mhc' from package 'mhc-utils' (universe)
Command 'dh' from package 'debscripter' (main)
Command 'dfc' from package 'dfc' (universe)
Command 'duc' from package 'duc' (universe)
Command 'dch' from package 'devscripts' (main)
Command 'rhc' from package 'rhc' (universe)
Command 'drc' from package 'drc' (universe)
dhc: command not found
cs@cs: /etc/dhcp$ dhcp
No command 'dhcp' found, did you mean:
Command 'chcp' from package 'nilfs-tools' (universe)
Command 'dccb' from package 'dcap' (universe)
Command 'dhcpx' from package 'irpas' (multiverse)
Command 'dhcpd' from package 'isc-dhcp-server' (main)
```

On client Side:

Terminal

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

```
cs2@cs2:~$ sudo nano /etc/network/interfaces
[sudo] password for cs2:
cs2@cs2:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
        inet 127.0.0.1/8 scope host lo
            valid_lft forever preferred_lft forever
            inet6 ::1/128 scope host
                valid_lft forever preferred_lft forever
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 00:0c:29:f1:27:64 brd ff:ff:ff:ff:ff:ff
        inet 192.168.173.129/24 brd 192.168.173.255 scope global dynamic ens33
            valid_lft 1254sec preferred_lft 1254sec
            inet6 fe80::7b37:9455:55f5:f575/64 scope link
                valid_lft forever preferred_lft forever
cs2@cs2:~$ sudo nano /etc/network/interfaces
cs2@cs2:~$ sudo systemctl restart networking
cs2@cs2:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
        inet 127.0.0.1/8 scope host lo
            valid_lft forever preferred_lft forever
            inet6 ::1/128 scope host
                valid_lft forever preferred_lft forever
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
```

The screenshot shows a Linux desktop environment with a terminal window open. The terminal window title bar reads "File Edit View Search Terminal Help" and "GNU nano 2.5.3 File: /etc/network/interfaces". The main content of the terminal is the following configuration file:

```
# interfaces(5) file used by ifup(8) and ifdown(8)
auto lo
iface lo inet loopback
auto ens33
iface ens33 inet dhcp
```

The desktop interface includes a vertical dock on the left containing icons for various applications like the Dash, Home, and System settings. The terminal window has a standard window control bar at the top.

To check clients connected :

```
Terminal File Edit View Search Terminal Help
dhc: command not found
cs@cs:/etc/dhcp$ dh
The program 'dh' is currently not installed. You can install it by typing:
sudo apt install debhelper
cs@cs:/etc/dhcp$ cd
cs@cs:~$ cd /etc/dhcp
cs@cs:/etc/dhcp$ dhcpd
Internet Systems Consortium DHCP Server 4.3.3
Copyright 2004-2015 Internet Systems Consortium.
All rights reserved.
For info, please visit https://www.isc.org/software/dhcp/
unable to create icmp socket: Operation not permitted
Config file: /etc/dhcp/dhcpd.conf
Database file: /var/lib/dhcp/dhcpd.leases
PID file: /var/run/dhcpd.pid
Can't open /var/lib/dhcp/dhcpd.leases for append.

If you think you have received this message due to a bug rather
than a configuration issue please read the section on submitting
bugs on either our web page at www.isc.org or in the README file
before submitting a bug. These pages explain the proper
process and the information we find helpful for debugging..

exiting.
cs@cs:/etc/dhcp$ sudo nano /var/lib/dhcp/dhcpd.leases
cs@cs:/etc/dhcp$ dhcpcd-lease-list
No command 'dhcpcd-lease-list' found, did you mean:
  Command 'dhcp-lease-list' from package 'isc-dhcp-server' (main)
dhcpcd-lease-list: command not found
cs@cs:/etc/dhcp$ sudo nano /var/lib/dhcp/dhcpd.leases
cs@cs:/etc/dhcp$ sudo nano /etc/dhcp/dhcpd.conf
cs@cs:/etc/dhcp$ sudo nano /etc/default/isc-dhcp-server
cs@cs:/etc/dhcp$
```

Terminal File Edit View Search Terminal Help 12:54 AM

GNU nano 2.5.3 File: /var/lib/dhcp/dhcpd.leases

```
# The format of this file is documented in the dhcpcd.leases(5) manual page.
# This lease file was written by isc-dhcp-4.3.3

server-duid "\000\001\000\001{}370\227\000\014)3\251\301";

lease 192.168.173.100 {
    starts 0 2021/07/11 18:53:30;
    ends 0 2021/07/11 19:03:30;
    cltt 0 2021/07/11 18:53:30;
    binding state active;
    next binding state free;
    rewind binding state free;
    hardware ethernet 00:0c:29:f1:27:64;
    client-hostname "cs2";
}
lease 192.168.173.128 {
    starts 0 2021/07/11 18:54:30;
    ends 0 2021/07/11 19:04:30;
    cltt 0 2021/07/11 18:54:30;
    binding state active;
    next binding state free;
    rewind binding state free;
    hardware ethernet 00:0c:29:33:a9:c1;
    client-hostname "cs";
}
lease 192.168.173.100 {
    starts 0 2021/07/11 18:58:09;
    ends 0 2021/07/11 19:08:09;
}

[ Read 121 lines ]
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit ^R Read File ^\ Replace ^U Uncut Text ^T To Spell ^_ Go To Line
```