

Voraussetzungen für die Übung:

- ISO-File für Linux Mint runterladen
- Rufus runterladen und einen bootfähigen USB-Stick erstellen
- Windows Client an einem Schul-PC installieren

In Anlehnung zu: <https://linuxhint.com/configure-dhcp-server-linux-mint/>

How to configure DHCP server on Linux Mint

DHCP is easier to maintain as it is a network management protocol, especially as your network grows and shrinks, compared with static addressing.

Also added benefits over static addressing are the ability to manage IP addresses centrally which means that you can configure and reconfigure your network in no time.

DHCP offers another advantage of preventing configuration errors caused by manually entering IP address information on every host by assigning IP addresses automatically.

It provides each device on a network with a dynamic IP address and other network setup settings to connect with other IP networks.

But there is a possibility that your system is not configured correctly or configured with a static IP.

This article is a comprehensive guide on how to configure a DHCP server on Linux Mint system:

Als Voraussetzung muss der PC zuerst eine gültige Internetverbindung haben um Updates seiner Datenpakete installieren zu können, im konkreten Fall wird das Paket DHCP-Server upgedatet.

How to configure DHCP server on Linux Mint

A DHCP server listens to the network and assigns the IP address and services to the host computer (DHCP client) based on that from the pool of addresses that is currently available.

You can configure your DHCP server based on your IP address and for that, you need to type.

Dazu muss die Konsole geöffnet werden und folgender Befehl eingegeben werden:

```
ip a
```

This command will provide you the name of the interface which is "ens33" in our case and also the IP address which is 192.168.114.135 that will be different in your case.

Dabei ist laut beispielhafter Ausgabe „ens33“ der aktuelle Name des Interfaces, seine statische IP-Adresse lautet „192.168.114.135“, siehe Bilder unten.

```
taimoor@taimoor: ~  
File Edit View Search Terminal Help  
taimoor@taimoor:~$ 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 fq_codel  
state UP group default qlen 1000  
    link/ether 00:0c:29:1d:cb:4e brd ff:ff:ff:ff:ff:ff  
    inet 192.168.114.135/24 brd 192.168.114.255 scope global dynamic  
noprofixroute ens33  
        valid_lft 1141sec preferred_lft 1141sec  
    inet6 fe80::50f7:72ea:d729:5ca0/64 scope link noprefixroute  
        valid_lft forever preferred_lft forever  
taimoor@taimoor:~$
```

In unserem konkreten Fall muss der zu konfigurierende Schul-PC eine gültige offizielle IP-Adresse aus der IP-Range 172.18.xxx.xxx haben und das Internet muss am PC funktionieren.

You need to first install the DHCP server utility to configure it by typing

Der DHCP-Server wird aus dem WEB upgedatet, dazu wird folgender Befehl in der Konsole verwendet:

sudo apt install isc-dhcp-server

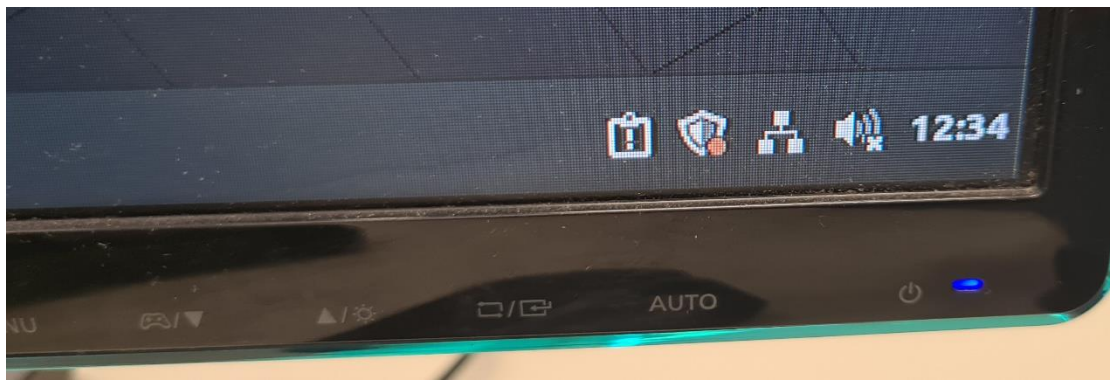
```
taimoor@taimoor:~$ sudo apt install isc-dhcp-server  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
The following additional packages will be installed:  
  libirs-export161 libiscfg-export163  
Suggested packages:  
  isc-dhcp-server-ldap policycoreutils  
The following NEW packages will be installed  
  isc-dhcp-server libirs-export161 libiscfg-export163  
0 to upgrade, 3 to newly install, 0 to remove and 0 not to upgrade.  
Need to get 519 kB of archives.  
After this operation, 1,865 kB of additional disk space will be used.  
Do you want to continue? [Y/n] y  
Get:1 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 lib  
6+dfsg-3~ubuntu1 [45.9 kB]  
Get:2 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 lib  
fsg-3~ubuntu1 [18.6 kB]  
Get:3 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 isc  
ntu5.20.04.2 [455 kB]  
Fetched 519 kB in 4s (147 kB/s)  
Preconfiguring packages ...
```

In unserem konkreten Fall müsste folgendes Bild nach der Befehlseingabe erscheinen, siehe Bild unten:

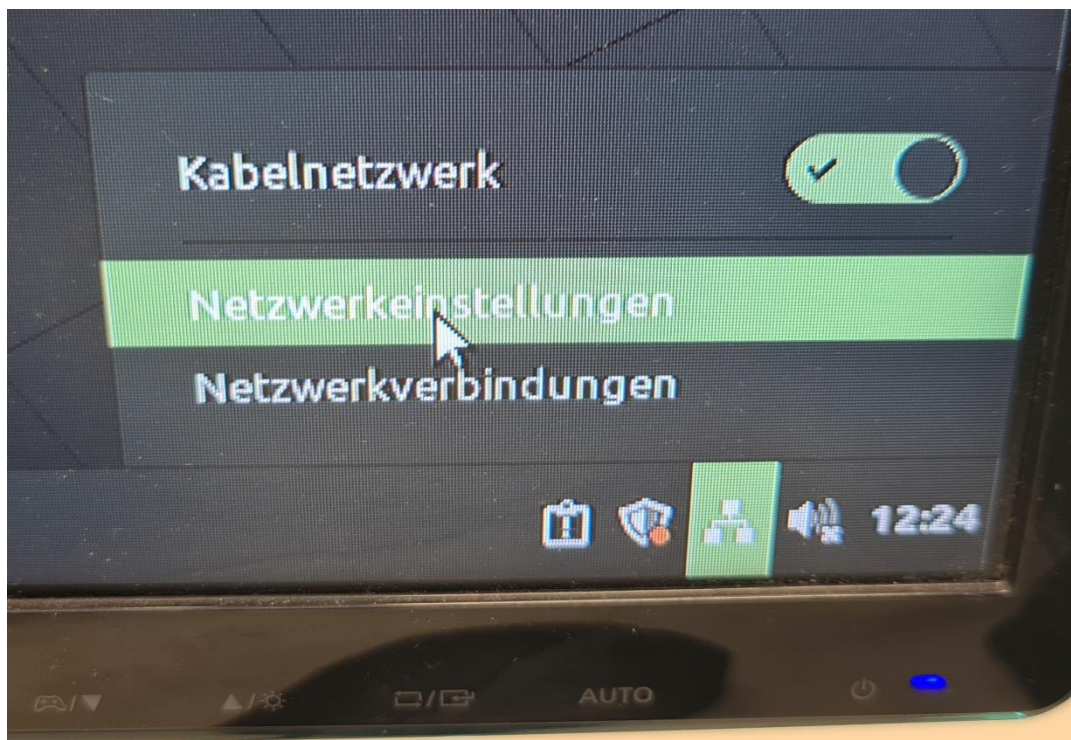
```
cws@cws-Linux:~$ sudo apt install isc-dhcp-server
Paketlisten werden gelesen... Fertig
Abhängigkeitsbaum wird aufgebaut.
Statusinformationen werden eingelesen.... Fertig
isc-dhcp-server ist schon die neueste Version (4.4.1-2.1ubuntu5.20.04.2).
0 aktualisiert, 0 neu installiert, 0 zu entfernen und 159 nicht aktualisiert.
cws@cws-Linux:~$
```

Anschließend muss der PC, bevor der DHCP-Server konfiguriert wird eine fixe gültige IP-Adresse per „static-IP“ zugeordnet bekommen, das Interface aktiv gemacht werden als auch der Name des Interfaces herausgefunden werden.

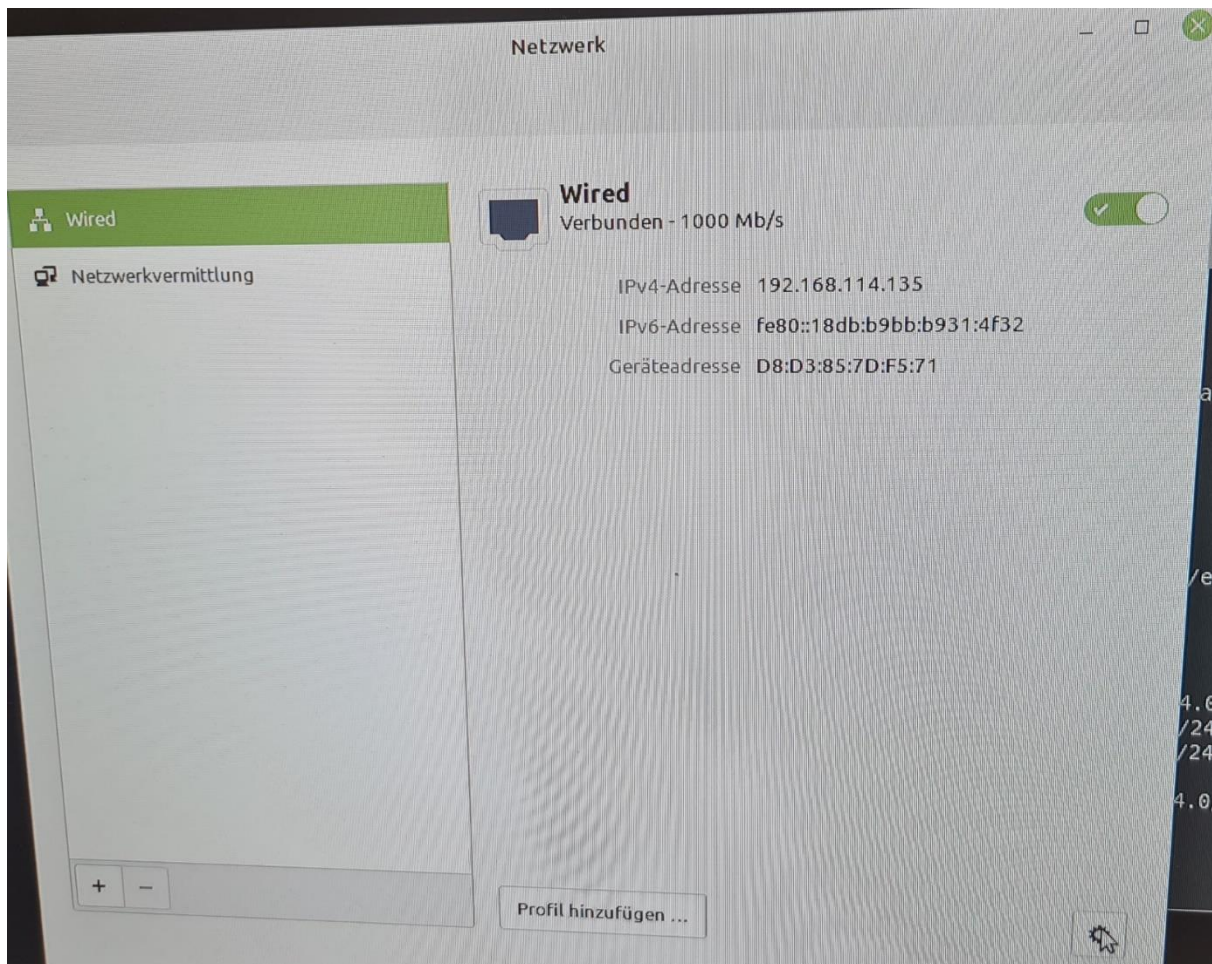
Dazu hier eine Bildergalerie



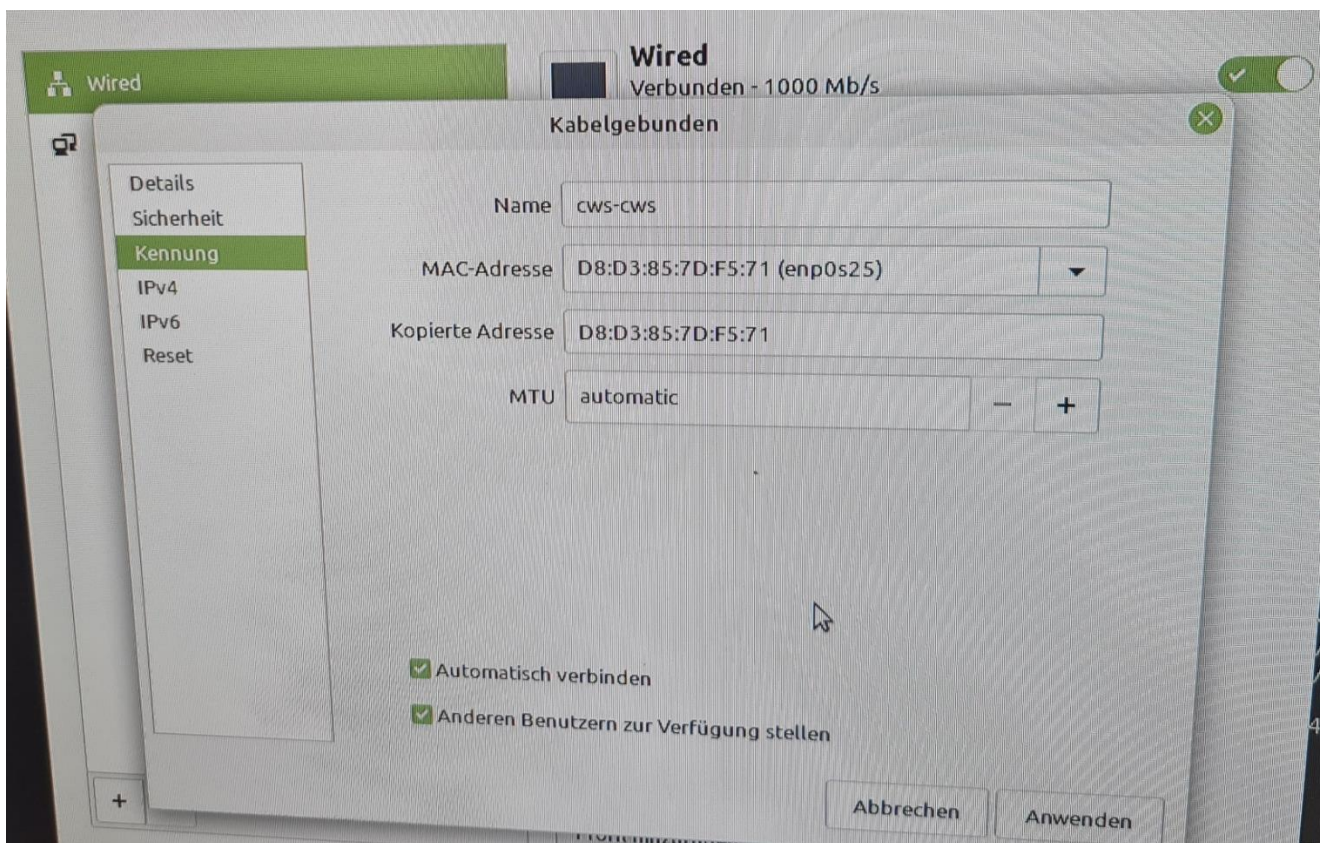
Hier auf das „Netzwerksymbol“ klicken, siehe Bild oben



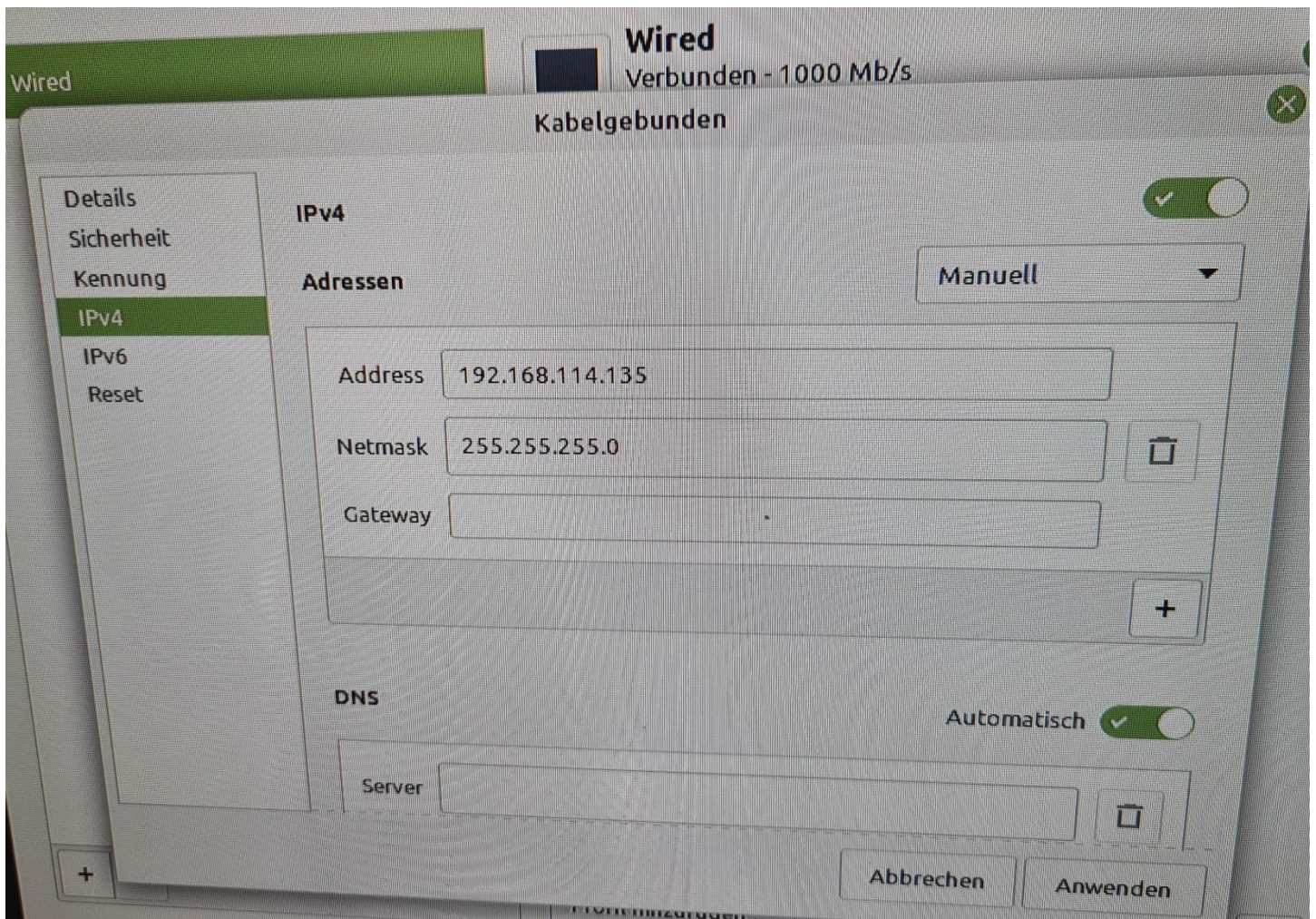
Auf „Netzwerkeinstellungen“ klicken, siehe Bild oben



Kontrolle ob „Wired“ aktiviert ist, anschließend auf das Symbol „Zahnrad“ klicken, siehe Bild oben.



Den Befehl: „**ip a**“ in der Konsole eingeben und dahingehend den richtigen Namen des Interfaces verwenden, siehe nachfolgende Beschreibung, indem in das Feld „Name“ geklickt wird, siehe Bild oben.



Unter „IPv4“ manuell IP-Adresse und Subnetzmaske wie folgt eingeben, anschließend auf die Schaltfläche „Anwenden“ klicken, siehe Bild oben.

Folgendes soll nach der Befehlseingabe „**ip a**“ in der Konsole betreffend 2: stehen, siehe Bild unten.

```
cws@cws-Linux:~$ 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: enp0s25: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether d8:d3:85:7d:f5:71 brd ff:ff:ff:ff:ff:ff
    inet 192.168.114.135/24 brd 192.168.114.255 scope global noprefixroute enp0s25
        valid_lft forever preferred_lft forever
    inet6 fe80::18db:b9bb:b931:4f32/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
cws@cws-Linux:~$
```

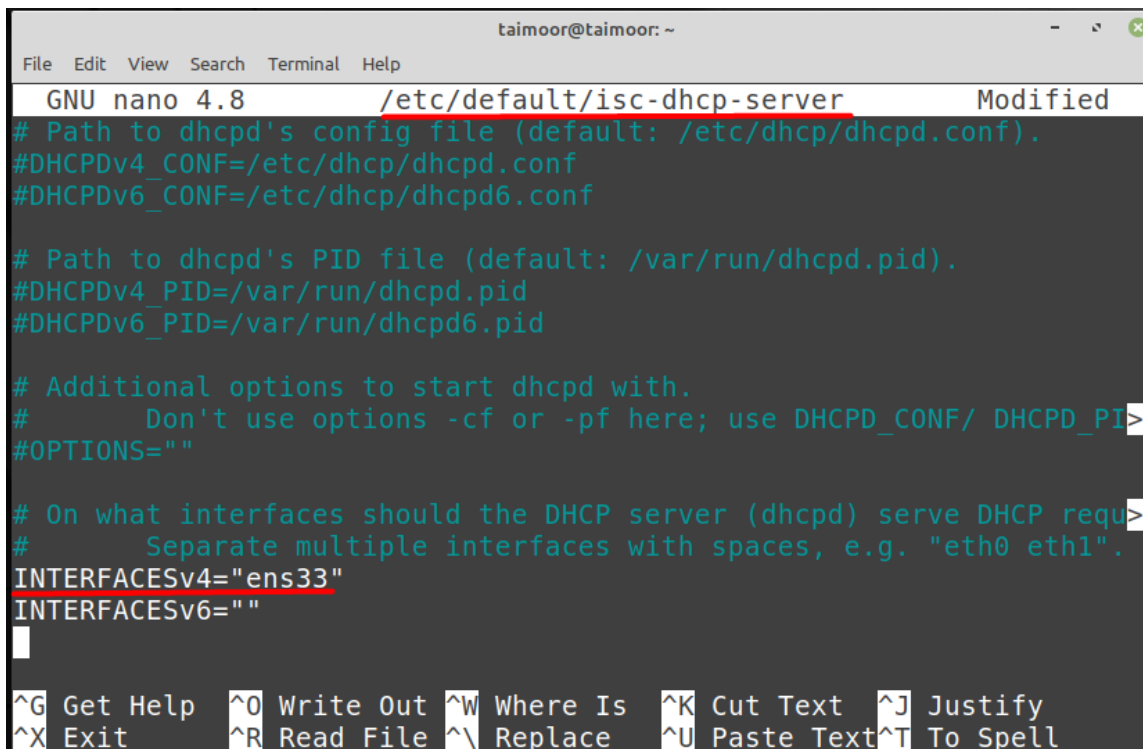
Now the next thing is to configure the DHCP server file which you can find by accessing

/etc/default/isc-dhcp-server by typing:

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

Now, you need to provide the network interface name which is “ens33” in our case against the **Interfacesv4** field that we got from the previous step as shown below.

This is a necessary step as you are telling the server that this is my network address and you need to use this for communication.



```
GNU nano 4.8 /etc/default/isc-dhcp-server Modified
# Path to dhcpd's config file (default: /etc/dhcp/dhcpd.conf).
#DHCPDv4_CONF=/etc/dhcp/dhcpd.conf
#DHCPDv6_CONF=/etc/dhcp/dhcpd6.conf

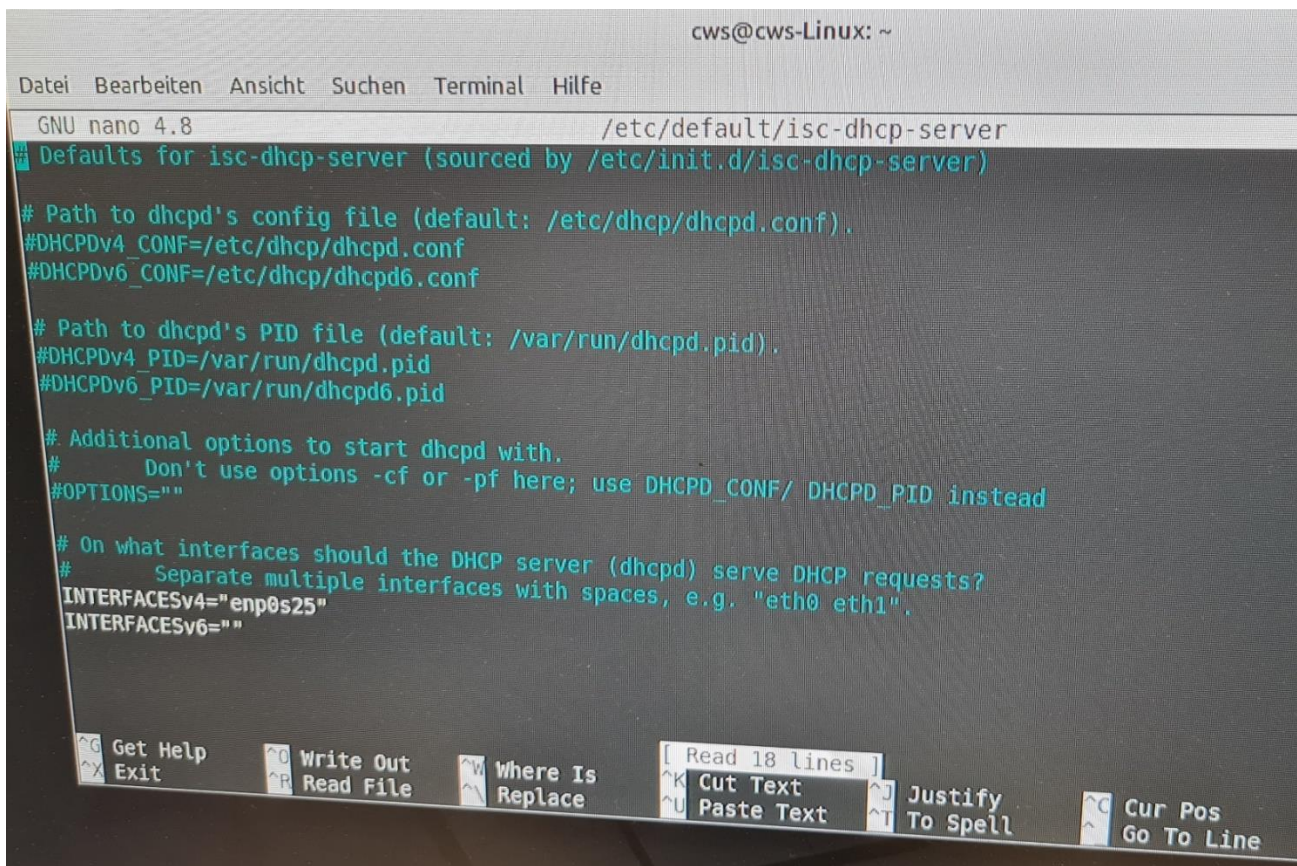
# Path to dhcpd's PID file (default: /var/run/dhcpd.pid).
#DHCPDv4_PID=/var/run/dhcpd.pid
#DHCPDv6_PID=/var/run/dhcpd6.pid

# 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".
INTERFACESv4="ens33"
INTERFACESv6=""

^G Get Help  ^O Write Out ^W Where Is  ^K Cut Text  ^J Justify
^X Exit      ^R Read File ^\ Replace  ^U Paste Text ^T To Spell
```

Konkret in unserem Beispiel soll nach erfolgreichem editieren, folgendes erscheinen, siehe Bild unten:



```
cws@cws-Linux: ~
Datei Bearbeiten Ansicht Suchen Terminal Hilfe
GNU nano 4.8 /etc/default/isc-dhcp-server
Defaults for isc-dhcp-server (sourced by /etc/init.d/isc-dhcp-server)
# Path to dhcpd's config file (default: /etc/dhcp/dhcpd.conf).
#DHCPDv4_CONF=/etc/dhcp/dhcpd.conf
#DHCPDv6_CONF=/etc/dhcp/dhcpd6.conf

# Path to dhcpd's PID file (default: /var/run/dhcpd.pid).
#DHCPDv4_PID=/var/run/dhcpd.pid
#DHCPDv6_PID=/var/run/dhcpd6.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".
INTERFACESv4="enp0s25"
INTERFACESv6=""

[ Read 18 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 Paste Text ^T To Spell ^_ Go To Line
```

Die „#“ bei Interfacesv4 muss entfernt werden und folgender Eintrag erstellt werden: `INTERFACESv4="enp0s25"` als auch `INTERFACESv6=""`

Mit „Ctrl + X“ wird der Editor verlassen und mit „Y“ werden die neuen Einträge in das File gespeichert.

After that, you need to open and configure another file which is `/etc/dhcp/dhcpd.conf` by typing.

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

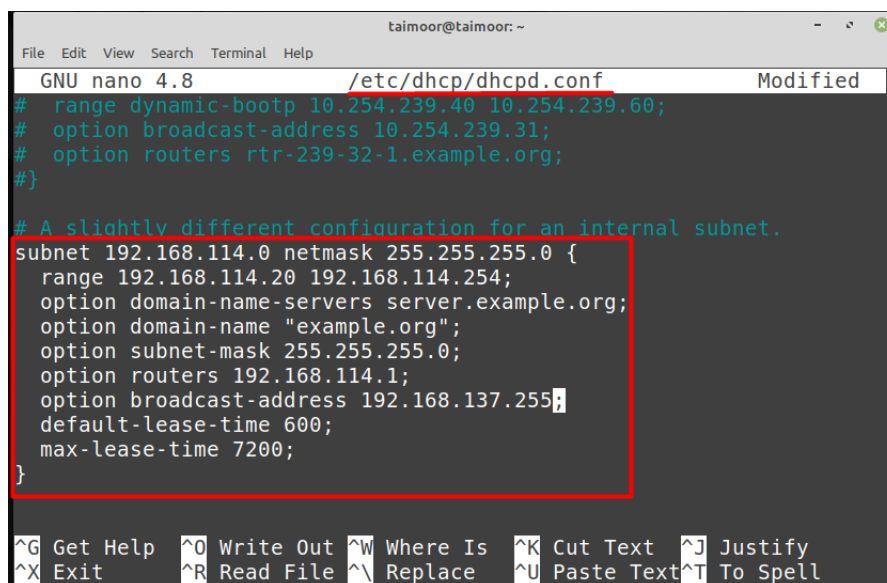
After opening this file you need to scroll down and look for the line which states

“A slightly different configuration for an internal subnet”.

The values that you can see in the below image are all available by default, you just need to uncomment them starting from the subnet and end at max-lease-time till the bracket (}).

Now I set these values as per my network configuration.

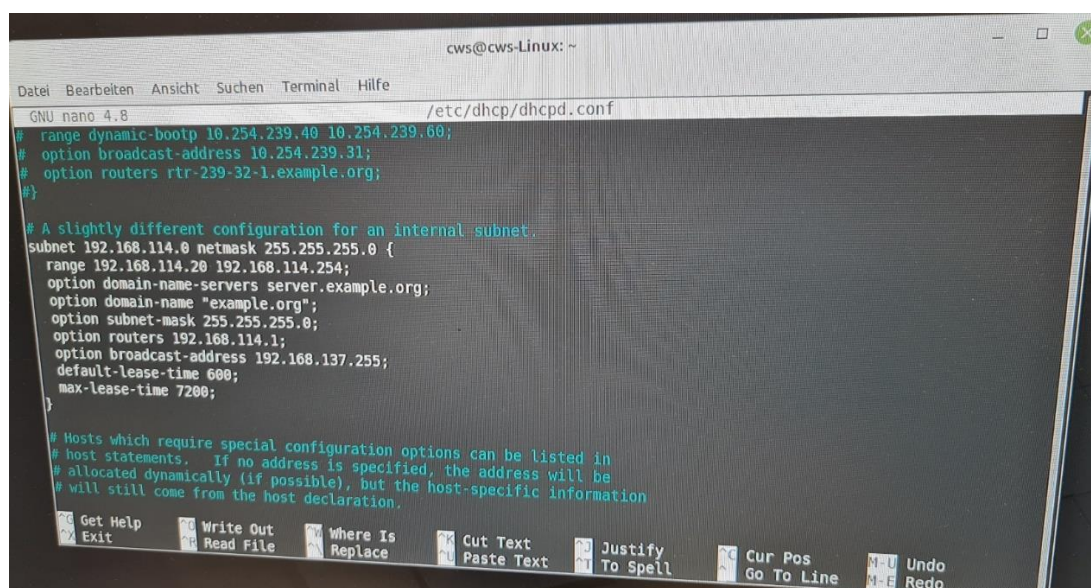
You need to set them accordingly as per your network.



```
GNU nano 4.8 /etc/dhcp/dhcpd.conf Modified
# 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 192.168.114.0 netmask 255.255.255.0 {
  range 192.168.114.20 192.168.114.254;
  option domain-name-servers server.example.org;
  option domain-name "example.org";
  option subnet-mask 255.255.255.0;
  option routers 192.168.114.1;
  option broadcast-address 192.168.137.255;
  default-lease-time 600;
  max-lease-time 7200;
}
```

Konkret in unserem Beispiel soll nach erfolgreichem editieren, folgendes erscheinen, siehe Bild unten:



```
cws@cws-Linux: ~
Datei Bearbeiten Ansicht Suchen Terminal Hilfe
GNU nano 4.8 /etc/dhcp/dhcpd.conf
# 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 192.168.114.0 netmask 255.255.255.0 {
  range 192.168.114.20 192.168.114.254;
  option domain-name-servers server.example.org;
  option domain-name "example.org";
  option subnet-mask 255.255.255.0;
  option routers 192.168.114.1;
  option broadcast-address 192.168.137.255;
  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.

Get Help Write Out Where Is Cut Text Justify
Exit Read File Replace Paste Text To Spell Cur Pos
Go To Line M-U Undo
M-E Redo
```

Mit „Ctrl + X“ kann vor dem Ausstieg, mit „Y“ gespeichert werden.

A subnet is another name of your IP or network address so you need to write the first three octets of your own IP address and you can set forth one to 0 just like we did.

The next one is the netmask where you are providing the range of network addresses that can communicate with your network server.

You also need to define the range of the IP address that you want to lease so you can write any range as you like.

Now next you need to change is the option router which is also known as the default gateway so you need to set this value as per your IP address as well.

After this modification, you need to save and exit this file and restart the service of the DHCP server to apply these newly made settings by typing.

sudo systemctl restart isc-dhcp-server



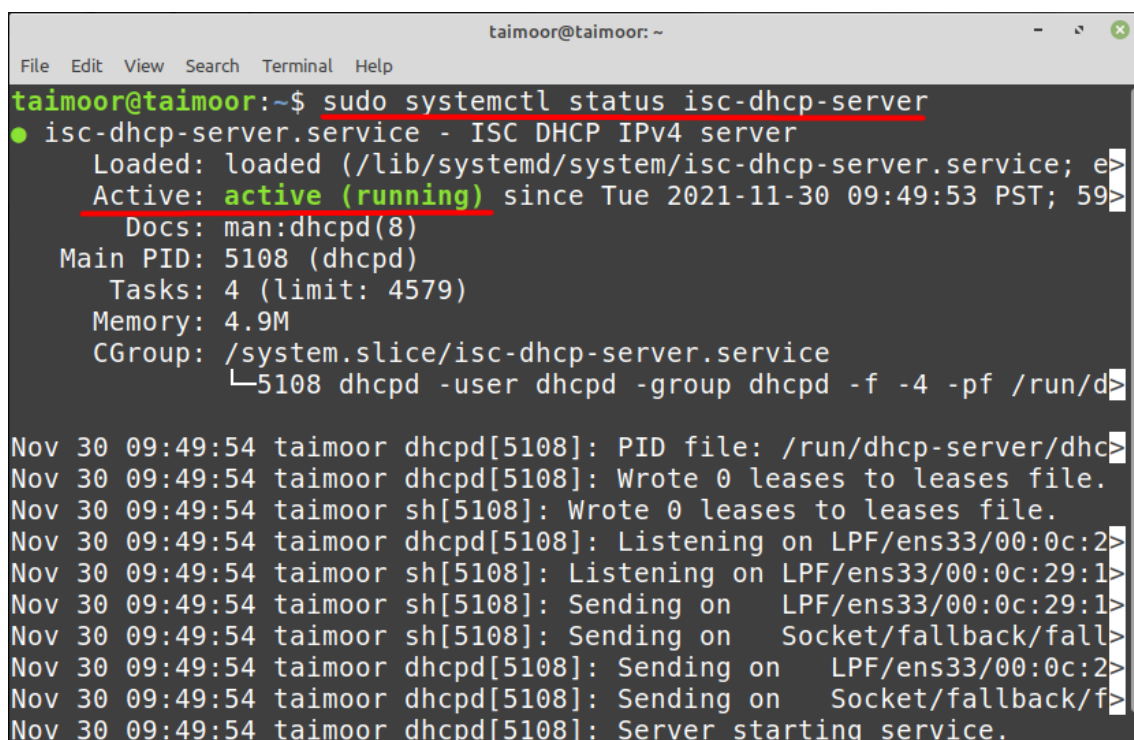
```
taimoor@taimoor: ~  
File Edit View Search Terminal Help  
taimoor@taimoor:~$ sudo systemctl restart isc-dhcp-server  
taimoor@taimoor:~$
```

Konkret in unserem Beispiel soll nach erfolgreicher Eingabe, der Cursor in die nächste Zeile springen, siehe Bild unten:

```
|cws@cws-Linux:~$ sudo systemctl restart isc-dhcp-server
```

So, if you have followed the above process correctly, then you should be able to activate your DHCP server that you can see in our case by typing.

sudo systemctl status isc-dhcp-server



```
taimoor@taimoor: ~  
File Edit View Search Terminal Help  
taimoor@taimoor:~$ sudo systemctl status isc-dhcp-server  
● isc-dhcp-server.service - ISC DHCP IPv4 server  
   Loaded: loaded (/lib/systemd/system/isc-dhcp-server.service; e>  
   Active: active (running) since Tue 2021-11-30 09:49:53 PST; 59>  
     Docs: man:dhcpd(8)  
    Main PID: 5108 (dhcpd)  
      Tasks: 4 (limit: 4579)  
     Memory: 4.9M  
    CGroup: /system.slice/isc-dhcp-server.service  
            └─5108 dhcpd -user dhcpd -group dhcpd -f -4 -pf /run/d>  
  
Nov 30 09:49:54 taimoor dhcpd[5108]: PID file: /run/dhcp-server/dhc>  
Nov 30 09:49:54 taimoor dhcpd[5108]: Wrote 0 leases to leases file.  
Nov 30 09:49:54 taimoor sh[5108]: Wrote 0 leases to leases file.  
Nov 30 09:49:54 taimoor dhcpd[5108]: Listening on LPF/ens33/00:0c:2>  
Nov 30 09:49:54 taimoor sh[5108]: Listening on LPF/ens33/00:0c:29:1>  
Nov 30 09:49:54 taimoor sh[5108]: Sending on   LPF/ens33/00:0c:29:1>  
Nov 30 09:49:54 taimoor sh[5108]: Sending on   Socket/fallback/fall>  
Nov 30 09:49:54 taimoor dhcpd[5108]: Sending on   LPF/ens33/00:0c:2>  
Nov 30 09:49:54 taimoor dhcpd[5108]: Sending on   Socket/fallback/f>  
Nov 30 09:49:54 taimoor dhcpd[5108]: Server starting service.
```

Konkret in unserem Beispiel soll nach erfolgreicher Eingabe, keine Fehlermeldung, zumeist in roter Farbe angezeigt, erscheinen und „Active: active (running)“ in grüner Farbe erscheinen, siehe Bild unten:

```
cws@cws-Linux:~$ 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 preset: enabled)
   Active: active (running) since Tue 2022-03-01 12:31:42 CET; 59s ago
     Docs: man:dhcpcd(8)
    Main PID: 2316 (dhcpcd)
      Tasks: 4 (limit: 9289)
     Memory: 4.9M
    CGroup: /system.slice/isc-dhcp-server.service
            └─2316 dhcpcd -user dhcpcd -group dhcpcd -f -4 -pf /run/dhcp-server/dhcpcd.pid -cf /etc/dhcp/dhcpcd.conf

Mär 01 12:31:42 cws-Linux dhcpcd[2316]: PID file: /run/dhcp-server/dhcpcd.pid
Mär 01 12:31:42 cws-Linux dhcpcd[2316]: Wrote 1 leases to leases file.
Mär 01 12:31:42 cws-Linux sh[2316]: Wrote 1 leases to leases file.
Mär 01 12:31:42 cws-Linux dhcpcd[2316]: Listening on LPF/enp0s25/d8:d3:85:7d:f5:71/192.168.114.0/24
Mär 01 12:31:42 cws-Linux sh[2316]: Listening on LPF/enp0s25/d8:d3:85:7d:f5:71/192.168.114.0/24
Mär 01 12:31:42 cws-Linux sh[2316]: Sending on LPF/enp0s25/d8:d3:85:7d:f5:71/192.168.114.0/24
Mär 01 12:31:42 cws-Linux dhcpcd[2316]: Sending on Socket/fallback/fallback-net
Mär 01 12:31:42 cws-Linux dhcpcd[2316]: Sending on LPF/enp0s25/d8:d3:85:7d:f5:71/192.168.114.0/24
Mär 01 12:31:42 cws-Linux dhcpcd[2316]: Sending on Socket/fallback/fallback-net
Mär 01 12:31:42 cws-Linux dhcpcd[2316]: Server starting service.
lines 1-26/26 (END)
```

Conclusion

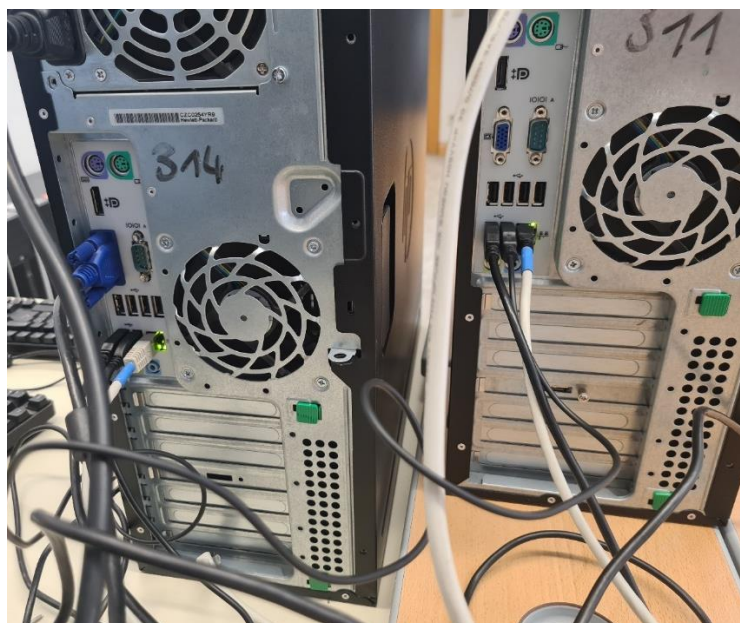
DHCP is a protocol that automatically configures your network settings, saving you the time and effort of manually configuring them.

It also monitors your network and gives you the best possible settings, ensuring that it is reliable and efficient.

So, if your network speed is poor or not operating correctly on Linux Mint OS, you need to verify if it is properly configured to DHCP, and you can obtain all the necessary information from this page.

Zusammenfassung

Wenn man die vorhanden Schritt-für-Schritt-Anleitung mit seinen persönlichen Einstellungen des vorhandenen Interfaces und einer gültigen IP-Adresse aus angegebener IP-Range adaptiert und den DHCP-Server mit dem DHCP-Client verkabelt ist die Übung schnell erfolgreich zu lösen.



Der DHCP-Server wird mit einem LAN-Kabel mit dem DHCP-Client verbunden, siehe Bild oben.

Der Client müsste dann abrufbar über die Konsole mit dem Befehl: „ipconfig /all“ die statische IP-Adresse: 192.168.114.20 erhalten, dies kann auch grafisch in den erweiterten Netzwerkeinstellungen kontrolliert werden, siehe Bild unten:

