Linux networking & services

Networking commends:

netstat – the networking statics (netstat)commends tool used for troubleshooting and configuration, that can also serve as a monitoring tool for connection over the network.

Syntax:

netstat

netstat -tulpn – display list of networks, their current states, and their associated port.

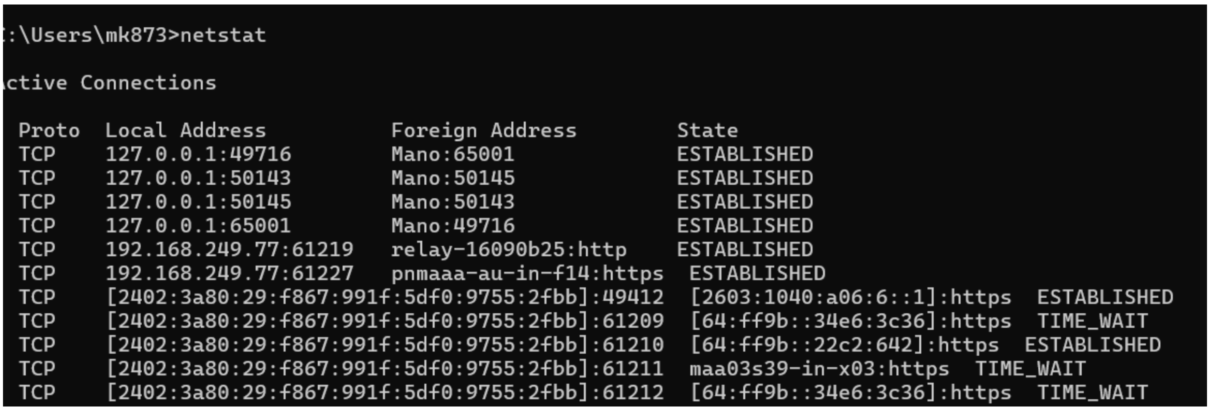
t – Tcp connected sessions.

u – Udp connected sessions.

I – listening port (on TCP&UDP)

P – process ID of listening tcp\udp port

n – show IP address instead od DNS names on the listening port.



```
:\Users\mk873>netstat

ctive Connections

 Proto  Local Address          Foreign Address        State
 TCP    127.0.0.1:49716        Mano:65001             ESTABLISHED
 TCP    127.0.0.1:50143        Mano:50145             ESTABLISHED
 TCP    127.0.0.1:50145        Mano:50143             ESTABLISHED
 TCP    127.0.0.1:65001        Mano:49716             ESTABLISHED
 TCP    192.168.249.77:61219   relay-16090b25:http    ESTABLISHED
 TCP    192.168.249.77:61227   pnmaaa-au-in-f14:https  ESTABLISHED
 TCP    [2402:3a80:29:f867:991f:5df0:9755:2fbb]:49412  [2603:1040:a06:6::1]:https  ESTABLISHED
 TCP    [2402:3a80:29:f867:991f:5df0:9755:2fbb]:61209  [64:ff9b::34e6:3c36]:https  TIME_WAIT
 TCP    [2402:3a80:29:f867:991f:5df0:9755:2fbb]:61210  [64:ff9b::22c2:642]:https  ESTABLISHED
 TCP    [2402:3a80:29:f867:991f:5df0:9755:2fbb]:61211  maa03s39-in-x03:https  TIME_WAIT
 TCP    [2402:3a80:29:f867:991f:5df0:9755:2fbb]:61212  [64:ff9b::34e6:3c36]:https  TIME_WAIT
```

Ipconfig – ipconfig interface configurator.it is one of the most basic commands used in network inspection.

Config is used to initialise an interface, configure it with an IP address and enable or disable it. It also used the route and the network interface.

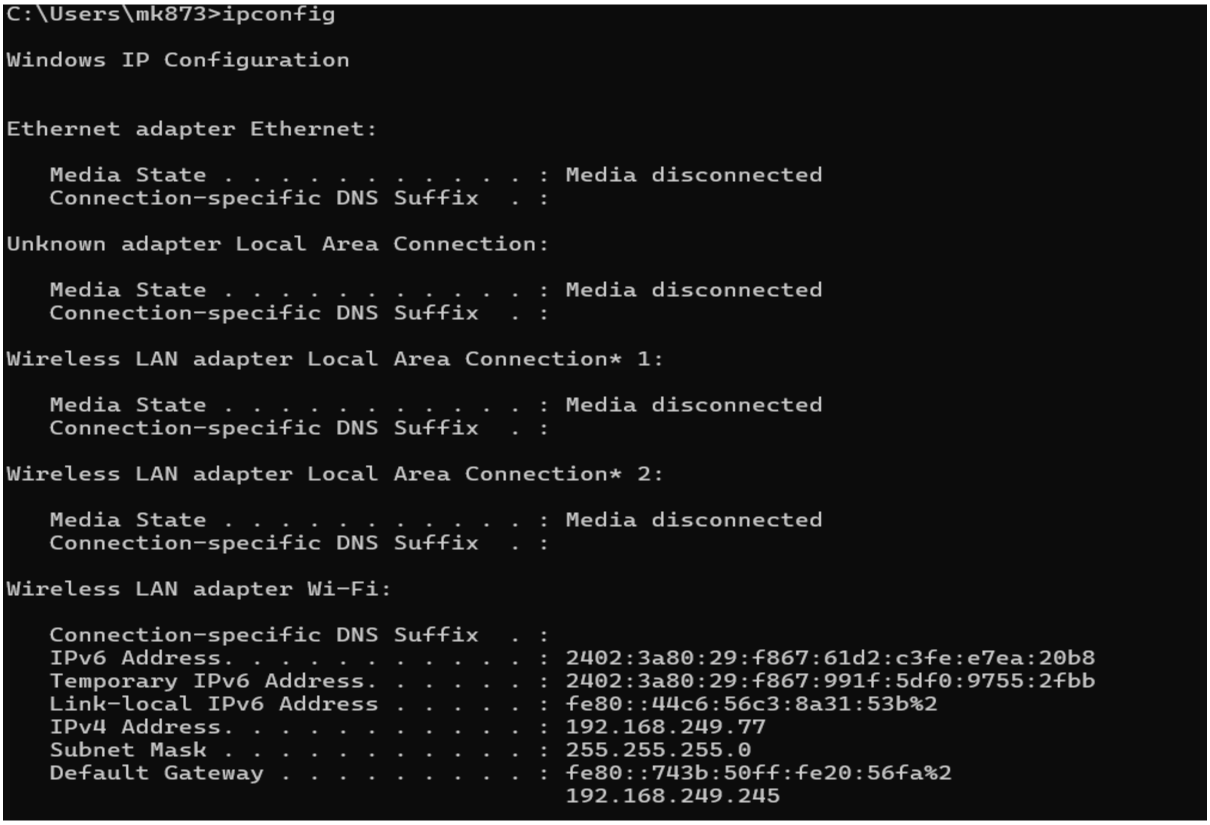
Basics information displayed upon using ifconfig are:

IP address

MAC address

MTU (Maximum Transmission Unit)

Using this command, you can get details of a specific interface.



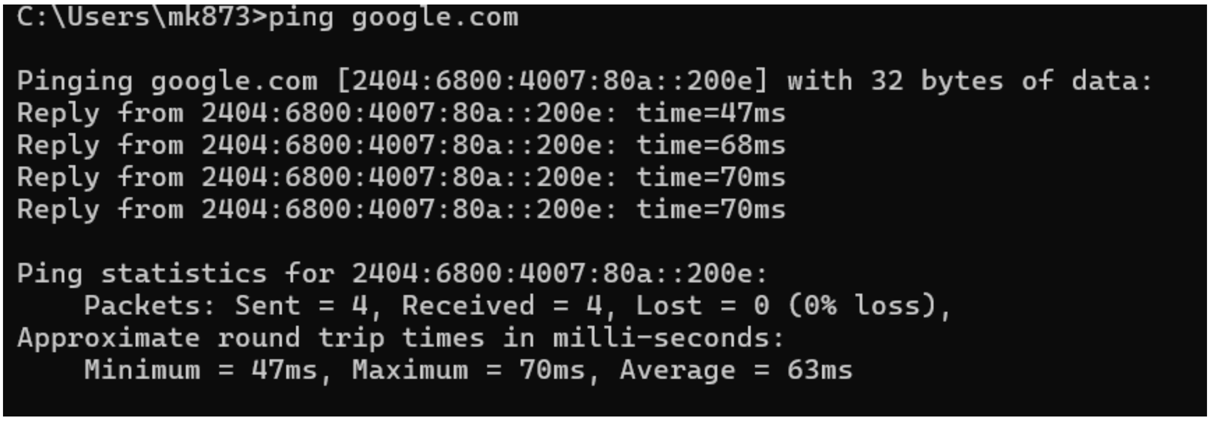
```
C:\Users\mk873>ipconfig

Windows IP Configuration


Ethernet adapter Ethernet:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Unknown adapter Local Area Connection:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 1:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 2:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   IPv6 Address. . . . . . . . . . . : 2402:3a80:29:f867:61d2:c3fe:e7ea:20b8
   Temporary IPv6 Address. . . . . . : 2402:3a80:29:f867:991f:5df0:9755:2fbb
   Link-local IPv6 Address . . . . . : fe80::44c6:56c3:8a31:53b%2
   IPv4 Address. . . . . . . . . . . : 192.168.249.77
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : fe80::743b:50ff:fe20:56fa%2
                                       192.168.249.245
```

Ping – ping (packet Internet Groper) commends is used to check the network connectivity between host and server.

Commend:

ping [domain name]

ping -c 5 [domain name] -> send only 5 packets.



```
C:\Users\mk873>ping google.com

Pinging google.com [2404:6800:4007:80a::200e] with 32 bytes of data:
Reply from 2404:6800:4007:80a::200e: time=47ms
Reply from 2404:6800:4007:80a::200e: time=68ms
Reply from 2404:6800:4007:80a::200e: time=70ms
Reply from 2404:6800:4007:80a::200e: time=70ms

Ping statistics for 2404:6800:4007:80a::200e:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 47ms, Maximum = 70ms, Average = 63ms
```

Ip – this is the latest and updated version on ifconfig command.

IP stands for Internet protocol. This commend is used to show or manipulate routing, devices and tunnels.

Syntax:

Ip a

Ip addr

This commends gives the details of all networks like the config.

These comments can also be used to get details of specific interfaces.

Syntax:

Ip a show eth0 – show details of interface eth0

Enable or disable interface using ip commends

Syntax:

Ip link set eth0 up – enable interface eth0

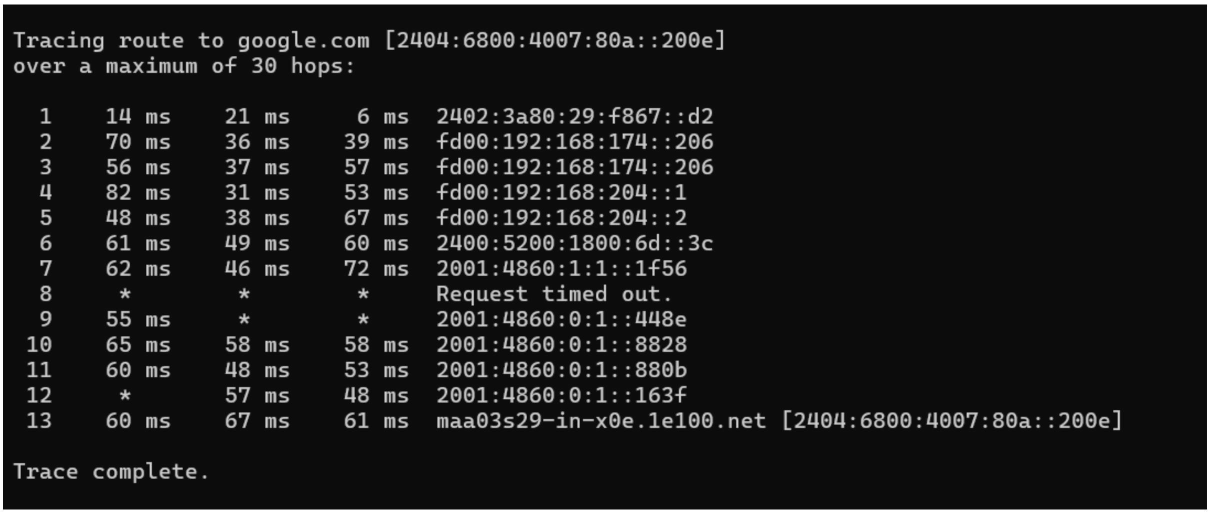
Ip link set eth0 down – disable interface eth0

traceroute – traceroute commands in Linux print the route that a packet takes to reach the host.

This command is useful when you want to know about the route of all the hops that a packet takes.

Syntax:

traceroute: google.com – trace the route used to reach google.com



```
Tracing route to google.com [2404:6800:4007:80a::200e]
over a maximum of 30 hops:

  1    14 ms    21 ms     6 ms  2402:3a80:29:f867::d2
  2    70 ms    36 ms    39 ms  fd00:192:168:174::206
  3    56 ms    37 ms    57 ms  fd00:192:168:174::206
  4    82 ms    31 ms    53 ms  fd00:192:168:204::1
  5    48 ms    38 ms    67 ms  fd00:192:168:204::2
  6    61 ms    49 ms    60 ms  2400:5200:1800:6d::3c
  7    62 ms    46 ms    72 ms  2001:4860:1:1::1f56
  8     *        *        *     Request timed out.
  9    55 ms     *        *     2001:4860:0:1::448e
 10    65 ms    58 ms    58 ms  2001:4860:0:1::8828
 11    60 ms    48 ms    53 ms  2001:4860:0:1::880b
 12     *       57 ms    48 ms  2001:4860:0:1::163f
 13    60 ms    67 ms    61 ms  maa03s29-in-x0e.1e100.net [2404:6800:4007:80a::200e]

Trace complete.
```

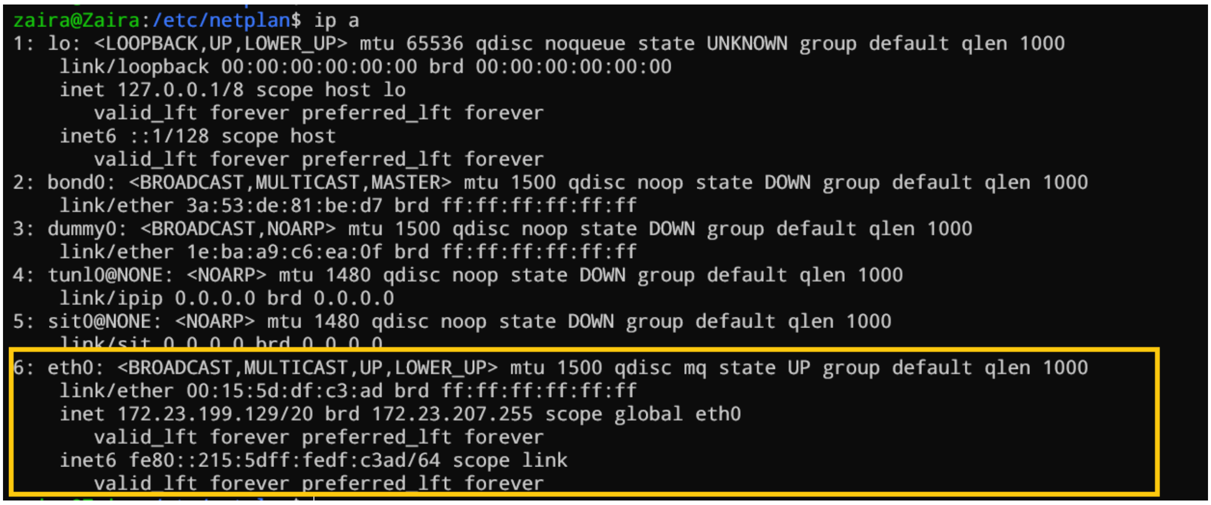
Configure static IP

Identify ethernet interface

To configure your system to use static address assignment, create a netplan configuration in the file /etc/netplan/99_config.yaml. The example below assumes you are configuring your first Ethernet interface identified as eth0. Change the addresses, routes, and nameservers values to meet the requirements of your network.

- launch the terminal using the shortcut.
- We will need our current network details such as the current assigned IP, subnet mask, and the network adapter name so that we can apply the necessary changes in the configurations.Use the command below to find details of the available adapters and the respective IP information.

Commend: Ip a

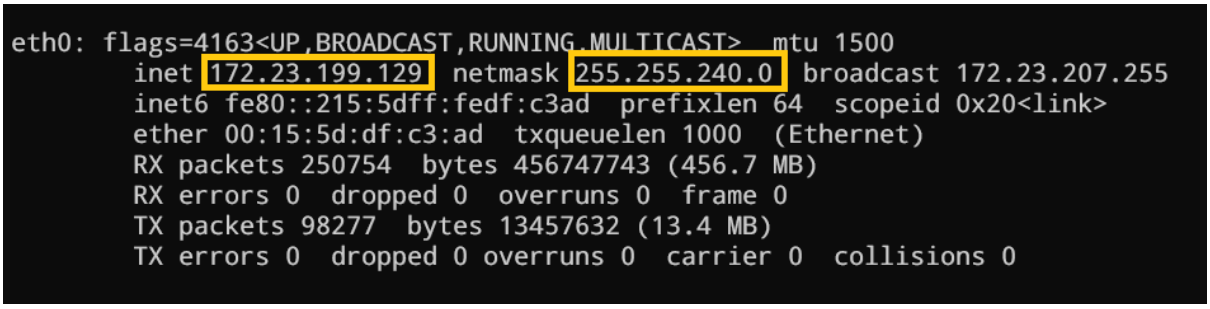


```
zaira@Zaira:/etc/netplan$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: bond0: <BROADCAST,MULTICAST,MASTER> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether 3a:53:de:81:be:d7 brd ff:ff:ff:ff:ff:ff
3: dummy0: <BROADCAST,NOARP> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether 1e:ba:a9:c6:ea:0f brd ff:ff:ff:ff:ff:ff
4: tunl0@NONE: <NOARP> mtu 1480 qdisc noop state DOWN group default qlen 1000
    link/ipip 0.0.0.0 brd 0.0.0.0
5: sit0@NONE: <NOARP> mtu 1480 qdisc noop state DOWN group default qlen 1000
    link/sit 0.0.0.0 brd 0.0.0.0
6: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:15:5d:df:c3:ad brd ff:ff:ff:ff:ff:ff
    inet 172.23.199.129/20 brd 172.23.207.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fedf:c3ad/64 scope link
       valid_lft forever preferred_lft forever
```

For my network, the current adapter is eth0 It could be different for your system.

- We can find the subnet mask details.

Command: ifconfig -a



```
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 172.23.199.129  netmask 255.255.240.0  broadcast 172.23.207.255
        inet6 fe80::215:5dff:fedf:c3ad  prefixlen 64  scopeid 0x20<link>
        ether 00:15:5d:df:c3:ad  txqueuelen 1000  (Ethernet)
        RX packets 250754  bytes 456747743 (456.7 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 98277  bytes 13457632 (13.4 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

IP is 172.23.199.129 *and the subnet mask* is *255.255.240.0*
Based on the class and subnet mask, the usable host IP range for my network is: 172.23.192.1 - 172.23.207.254.

Make configuration changes

- Netplan is the default network management tool for the latest Ubuntu versions. Configuration files for Netplan are written using YAML and end with the extension. yaml.
- Go to the netplan directory located at /etc/netplan.
- **ls** into the /etc/netplan directory.

create a file named 01-network-manager-all.yaml.

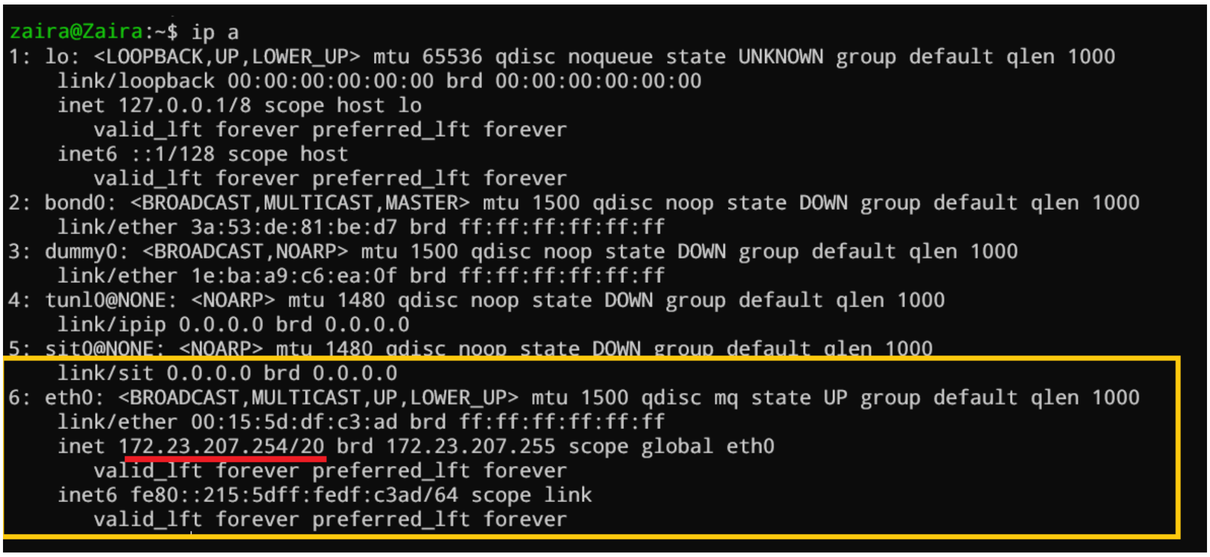
Apply and test the changes

We can test the changes first before permanently applying them using this command:

Sudo netplan fry

If there are no errors, it will ask if you want to apply these settings.

Now, finally, test the changes with the command ip a and you'll see that the static IP has been applied.



```
zaira@Zaira:~$ 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: bond0: <BROADCAST,MULTICAST,MASTER> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether 3a:53:de:81:be:d7 brd ff:ff:ff:ff:ff:ff
3: dummy0: <BROADCAST,NOARP> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether 1e:ba:a9:c6:ea:0f brd ff:ff:ff:ff:ff:ff
4: tunl0@NONE: <NOARP> mtu 1480 qdisc noop state DOWN group default qlen 1000
    link/ipip 0.0.0.0 brd 0.0.0.0
5: sit0@NONE: <NOARP> mtu 1480 qdisc noop state DOWN group default qlen 1000
    link/sit 0.0.0.0 brd 0.0.0.0
6: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:15:5d:df:c3:ad brd ff:ff:ff:ff:ff:ff
    inet 172.23.207.254/20 brd 172.23.207.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fedf:c3ad/64 scope link
       valid_lft forever preferred_lft forever
```

Create custom service – systemctl

The systemctl command in Ubuntu is used to **manage systemd services and the system state**. systemd is the init system used by Ubuntu (and most modern Linux distributions) to bootstrap the user space and manage system processes after booting.

Syntax:
Systemctl [commend][service-name]

Creating a Basic Service File

Step 1: Write a Script: create the script or program that you want to run as a service. This script should be executable and contain the code you want to run in the background.
For example, let's assume you have a script named my_service.sh
Step 2: Move the Script to a Suitable Location: It's a good practice to place custom service scripts in /usr/local/bin or a similar directory dedicated to user scripts. Make sure the script is executable (**chmod +x my_service.sh**).
Step 3: **Create a Service Configuration File**: Create a service configuration file with a. service extension in the /etc/systemd/system/ directory. You can name it something descriptive like my_service.service

---

```
sudo nano /etc/systemd/system/my_service.service
```

Add the following content:

```
[Unit]
Description=My Custom Service
After=network.target
```

```
[Service]
ExecStart=/usr/local/bin/my_service.sh
Restart=always

[Install]
WantedBy=multi-user.target
```

- **Description:** A description of your service.
- **After:** Specifies that this service should start after the network services have started (you can adjust this as n eeded).
- **ExecStart:** Specifies the command to start your service.
- **Restart:** Specifies how the service should behave when it exits (in this case, it will always restart).

Step 4: Reload Systemd: After creating the service file, reload systemd to pick up the changes:

```
sudo systemctl daemon-reload
```

Step 5: Enable and Start the Service: Enable the service to start at boot:

```
sudo systemctl enable my_service
```

- Start the service

```
sudo systemctl start my_service
```

Step 6: Check the Status:

```
sudo systemctl status my_service
```