

# Лабораторная работа №12

## Настройки сети в Linux

---

Сулейм Гамбердов

1 ноября 2025

Российский университет дружбы народов, Москва, Россия

## Цель работы

---

## Основная цель

---

Получить навыки настройки и управления сетевыми параметрами системы Linux с использованием инструментов `ip`, `nmcli` и `nmtui`.

## Ход выполнения работы

---

# Проверка конфигурации сети

```
sigamberdov@sigamberdov:~$ su
Password:
root@sigamberdov:/home/sigamberdov# ip -s link
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    RX: bytes packets errors dropped missed mcast
        2148      18      0      0      0      0
    TX: bytes packets errors dropped carrier collsns
        2148      18      0      0      0      0
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP mode DEFAULT group default qlen 1000
    link/ether 08:00:27:e1:8b:2d brd ff:ff:ff:ff:ff:ff
    RX: bytes packets errors dropped missed mcast
        74352     231      0      0      0      1
    TX: bytes packets errors dropped carrier collsns
        26336     252      0      0      0      0
    altname enx080027e18b2d
root@sigamberdov:/home/sigamberdov#
root@sigamberdov:/home/sigamberdov# ip route show
default via 10.0.2.2 dev enp0s3 proto dhcp src 10.0.2.15 metric 100
10.0.2.0/24 dev enp0s3 proto kernel scope link src 10.0.2.15 metric 100
root@sigamberdov:/home/sigamberdov#
```

Рис. 1: Информация о сетевых интерфейсах и статистике пакетов

## Назначенные IP-адреса

```
root@sigamberdov:/home/sigamberdov# ip addr show
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 noprefixroute
            valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:e1:8b:2d brd ff:ff:ff:ff:ff:ff
    altname enx080027e18b2d
        inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
            valid_lft 86007sec preferred_lft 86007sec
        inet6 fd17:625c:f037:2:a00:27ff:fe1:8b2d/64 scope global dynamic noprefixroute
            valid_lft 86372sec preferred_lft 14372sec
        inet6 fe80::a00:27ff:fe1:8b2d/64 scope link noprefixroute
            valid_lft forever preferred_lft forever
root@sigamberdov:/home/sigamberdov#
```

Рис. 2: Информация о назначенных IP-адресах

## Проверка подключения к Интернету

```
root@sigamberdov:/home/sigamberdov# ping -c 4 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=255 time=24.2 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=255 time=24.5 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=255 time=25.0 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=255 time=24.6 ms

--- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3062ms
rtt min/avg/max/mdev = 24.191/24.588/24.979/0.280 ms
root@sigamberdov:/home/sigamberdov#
```

Рис. 3: Проверка подключения к Интернету

## Добавление дополнительного IP-адреса

```
root@sigamberdov:/home/sigamberdov# ip addr add 10.0.0.10/24 dev enp0s3
root@sigamberdov:/home/sigamberdov# ip addr show
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 noprefixroute
            valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:e1:8b:2d brd ff:ff:ff:ff:ff:ff
    altname enx080027e18b2d
        inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
            valid_lft 85948sec preferred_lft 85948sec
        inet 10.0.0.10/24 scope global enp0s3
            valid_lft forever preferred_lft forever
        inet6 fd17:625c:f037:2:a00:27ff:fe1:8b2d/64 scope global dynamic noprefixroute
            valid_lft 86313sec preferred_lft 14313sec
        inet6 fe80::a00:27ff:fe1:8b2d/64 scope link noprefixroute
            valid_lft forever preferred_lft forever
root@sigamberdov:/home/sigamberdov#
```

Рис. 4: Добавление дополнительного IP-адреса

## Сравнение ip и ifconfig

```
root@sigamberdov:/home/sigamberdov#  
root@sigamberdov:/home/sigamberdov# ifconfig  
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500  
        inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255  
          inet6 fe80::a00:27ff:fe1:8b2d prefixlen 64 scopeid 0x20<link>  
          inet6 fd17:625c:f037:2:a00:27ff:fe1:8b2d prefixlen 64 scopeid 0x0<global>  
            ether 08:00:27:e1:8b:2d txqueuelen 1000 (Ethernet)  
              RX packets 256 bytes 76550 (74.7 KiB)  
              RX errors 0 dropped 0 overruns 0 frame 0  
              TX packets 286 bytes 29670 (28.9 KiB)  
              TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536  
        inet 127.0.0.1 netmask 255.0.0.0  
          inet6 ::1 prefixlen 128 scopeid 0x10<host>  
            loop txqueuelen 1000 (Local Loopback)  
              RX packets 18 bytes 2148 (2.0 KiB)  
              RX errors 0 dropped 0 overruns 0 frame 0  
              TX packets 18 bytes 2148 (2.0 KiB)  
              TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
root@sigamberdov:/home/sigamberdov#
```

Рис. 5: Сравнение вывода команд ip и ifconfig

## Прослушиваемые TCP и UDP порты

```
root@sigamberdov:/home/sigamberdov# ss -tul
Netid      State      Recv-Q      Send-Q          Local Address:Port          Peer Address:Port
udp        UNCONN      0            0              127.0.0.1:323            0.0.0.0:*
udp        UNCONN      0            0              0.0.0.0:mdns             0.0.0.0:*
udp        UNCONN      0            0              [::]:323                [::]:*
udp        UNCONN      0            0              [::]:mdns               [::]:*
tcp        LISTEN      0            4096           127.0.0.1:ipp            0.0.0.0:*
tcp        LISTEN      0            128             0.0.0.0:ssh             0.0.0.0:*
tcp        LISTEN      0            4096           *:websm                *:*
tcp        LISTEN      0            32              *:ftp                  *:*
tcp        LISTEN      0            128             [::]:ssh                [::]:*
tcp        LISTEN      0            4096           [::]:ipp                [::]:*
tcp        LISTEN      0            511             *:http                 *:*
```

root@sigamberdov:/home/sigamberdov#

Рис. 6: Прослушиваемые TCP и UDP порты

# Список активных соединений

```
root@sigamberdov:/home/sigamberdov#  
root@sigamberdov:/home/sigamberdov# nmcli connection show  
NAME      UUID                                  TYPE      DEVICE  
enp0s3    110dae5e-e81a-a6a9-d5f02d5f4e2f  ethernet  enp0s3  
lo        66985216-59fb-4d17-9c61-185d7ddd2700  loopback  lo  
root@sigamberdov:/home/sigamberdov# nmcli connection add con-name "dhcp" type ethernet ifname enp0s3  
Connection 'dhcp' (e5be1b5b-8c64-4d38-9a29-daae2dcc7e21) successfully added.  
root@sigamberdov:/home/sigamberdov# nmcli connection add con-name "static" ifname enp0s3 autoconnect no type  
ethernet ip4 10.0.0.10/24 gw4 10.0.0.1 ifname enp0s3  
Connection 'static' (ced669f0-3c06-446e-8125-02e2ac4aeed5) successfully added.  
root@sigamberdov:/home/sigamberdov# nmcli connection show  
NAME      UUID                                  TYPE      DEVICE  
enp0s3    110dae5e-e81a-a6a9-d5f02d5f4e2f  ethernet  enp0s3  
lo        66985216-59fb-4d17-9c61-185d7ddd2700  loopback  lo  
dhcp      e5be1b5b-8c64-4d38-9a29-daae2dcc7e21  ethernet  --  
static    ced669f0-3c06-446e-8125-02e2ac4aeed5  ethernet  --  
root@sigamberdov:/home/sigamberdov#
```

Рис. 7: Просмотр текущих соединений

## Переключение на статическое соединение

```
root@sigamberdov:~/home/sigamberdov# nmcli connection up "static"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/3)
root@sigamberdov:~/home/sigamberdov# nmcli connection show
NAME      UUID                                  TYPE      DEVICE
static    ced669f0-3c06-446e-8125-02e2ac4aeed5  ethernet  enp0s3
lo        66985216-59fb-4d17-9c61-185d7ddd2700  loopback  lo
dhcp     e5be1b5b-8c64-4d38-9a29-daae2dcc7e21  ethernet  --
enp0s3   110dae5e-e81a-37aa-a6a9-d5f02d5f4e2f  ethernet  --
root@sigamberdov:~/home/sigamberdov# ip addr
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 noprefixroute
            valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:e1:8b:2d brd ff:ff:ff:ff:ff:ff
    altname enx080027e18b2d
        inet 10.0.0.10/24 brd 10.0.0.255 scope global noprefixroute enp0s3
            valid_lft forever preferred_lft forever
        inet6 fd17:625c:f037:2:588b:9424:80d6:b80e/64 scope global dynamic noprefixroute
            valid_lft 86395sec preferred_lft 14395sec
        inet6 fe80::d7f8:bc68:bc11:117/64 scope link noprefixroute
            valid_lft forever preferred_lft forever
root@sigamberdov:~/home/sigamberdov#
```

Рис. 8: Активация статического соединения

## Возврат к DHCP-соединению

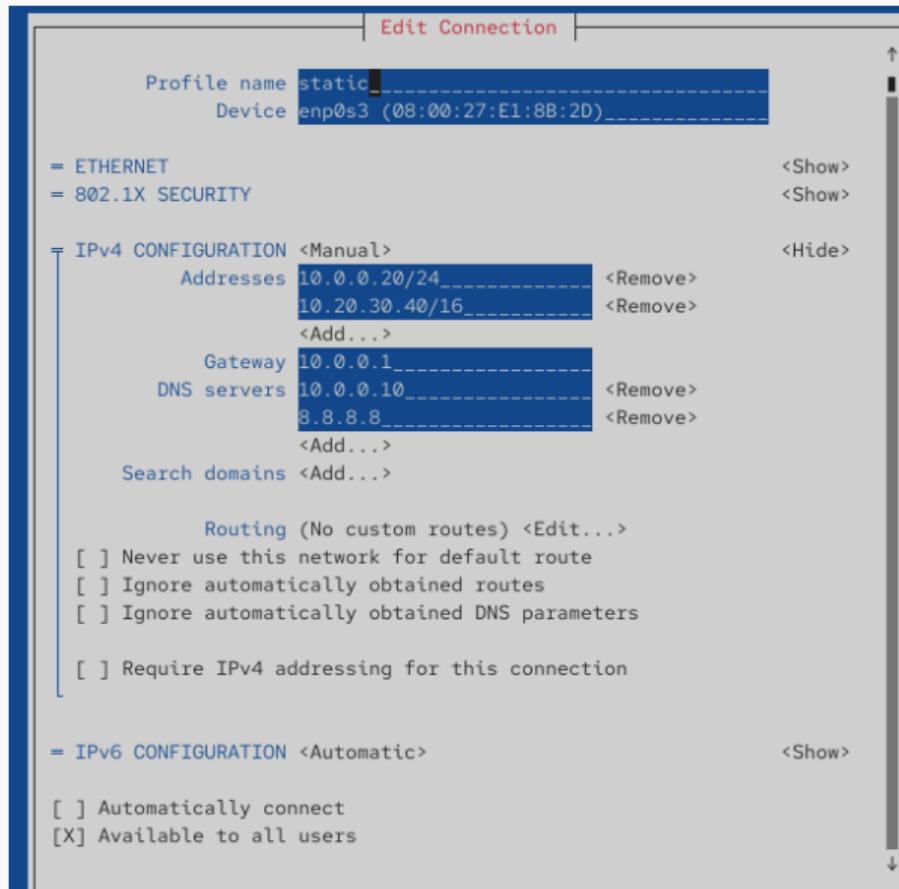
```
root@sigamberdov:/home/sigamberdov# nmcli connection up "dhcp"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/4)
root@sigamberdov:/home/sigamberdov# nmcli connection show
NAME      UUID                                  TYPE      DEVICE
dhcp      e5be1b5b-8c64-4d38-9a29-daae2dcc7e21  ethernet  enp0s3
lo        66985216-59fb-4d17-9c61-185d7ddd2700  loopback  lo
enp0s3    110dae5e-e81a-37aa-a6a9-d5f02d5f4e2f  ethernet  --
static    ced669f0-3c06-446e-8125-02e2ac4aeed5  ethernet  --
root@sigamberdov:/home/sigamberdov# ip addr
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 noprefixroute
            valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:e1:8b:2d brd ff:ff:ff:ff:ff:ff
    altname enx080027e18b2d
        inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
            valid_lft 86395sec preferred_lft 86395sec
        inet6 fd17:625c:f037:2:9f36:7461:4ee4:c6ef/64 scope global dynamic noprefixroute
            valid_lft 86397sec preferred_lft 14397sec
        inet6 fe80::bde3:bd4a:e063:5d87/64 scope link noprefixroute
            valid_lft forever preferred_lft forever
root@sigamberdov:/home/sigamberdov#
```

Рис. 9: Переключение обратно на DHCP-соединение

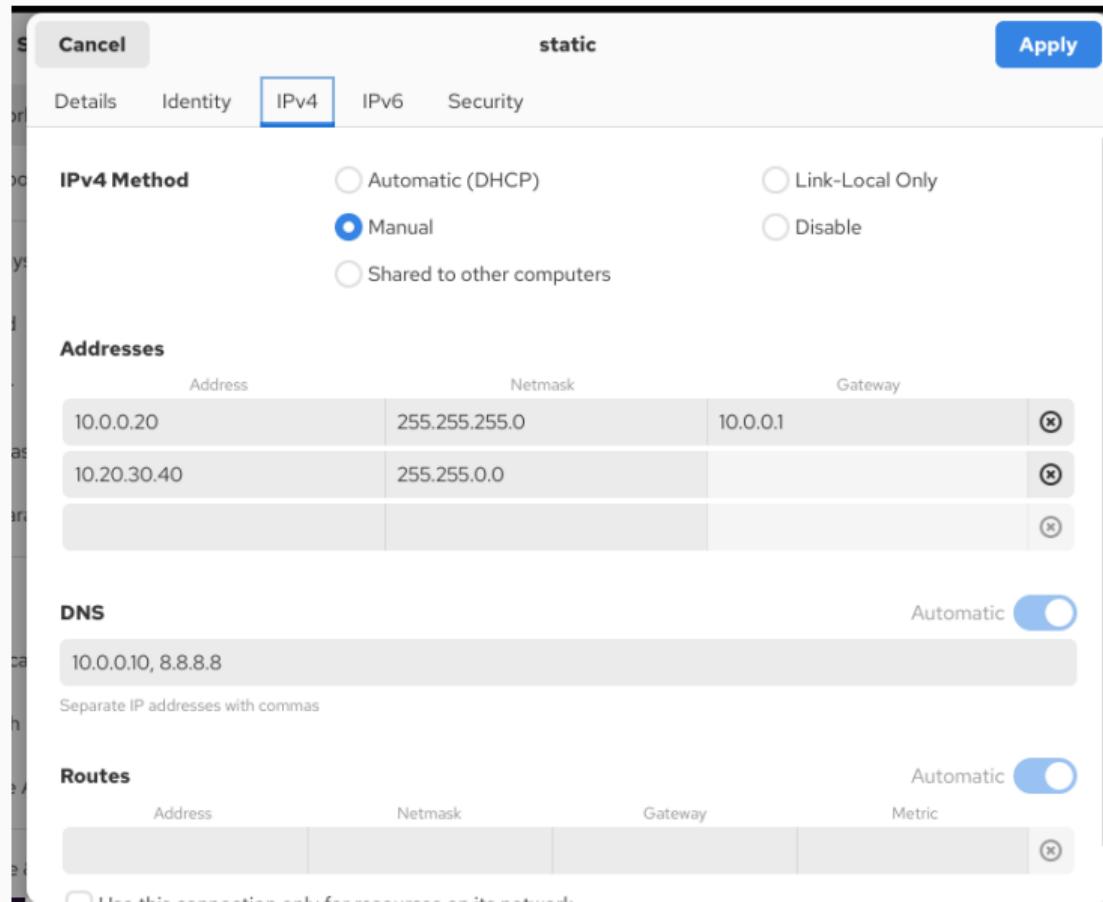
# Настройка DNS и IP-адресов

```
root@sigamberdov:/home/sigamberdov# nmcli connection modify "static" connection.autoconnect no
root@sigamberdov:/home/sigamberdov# nmcli connection modify "static" ipv4.dns 10.0.0.10
root@sigamberdov:/home/sigamberdov# nmcli connection modify "static" +ipv4.dns 8.8.8.8
root@sigamberdov:/home/sigamberdov# nmcli connection modify "static" ipv4.addresses 10.0.0.20/24
root@sigamberdov:/home/sigamberdov# nmcli connection modify "static" +ipv4.addresses 10.20.30.40/16
root@sigamberdov:/home/sigamberdov# nmcli connection up "static"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/5)
root@sigamberdov:/home/sigamberdov# nmcli connection show
NAME      UUID              TYPE      DEVICE
static    ced669f0-3c06-446e-8125-02e2ac4aeed5  ethernet  enp0s3
lo        66985216-59fb-4d17-9c61-185d7ddd2700  loopback  lo
dhcp      e5be1b5b-8c64-4d38-9a29-daae2dcc7e21  ethernet  --
enp0s3   110dae5e-e81a-37aa-a6a9-d5f02d5f4e2f  ethernet  --
root@sigamberdov:/home/sigamberdov# ip addr
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 noprefixroute
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:e1:8b:2d brd ff:ff:ff:ff:ff:ff
    altname enx080027e18b2d
    inet 10.0.0.20/24 brd 10.0.0.255 scope global noprefixroute enp0s3
        valid_lft forever preferred_lft forever
    inet 10.20.30.40/16 brd 10.20.255.255 scope global noprefixroute enp0s3
        valid_lft forever preferred_lft forever
    inet6 fd17:625c:f037:2:588b:9424:80d6:b80e/64 scope global dynamic noprefixroute
        valid_lft 86390sec preferred_lft 14390sec
    inet6 fe80::d7f8:bc68:bca1:117/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
root@sigamberdov:/home/sigamberdov#
```

## Просмотр параметров через nmtui



# Проверка соединений в интерфейсе GNOME



## Итоги работы

---

В ходе работы были изучены основные приёмы настройки и управления сетевыми подключениями в Linux.

Были освоены команды `ip`, `nmcli`, `nmtui`, а также методы добавления IP-адресов, настройки маршрутов и DNS.

Полученные знания позволяют уверенно администрировать сетевую инфраструктуру и диагностировать сетевые проблемы.