

Отчёт по лабораторной работе №12

Настройки сети в Linux

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20 ноября 2025

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Цель работы

Цель

Получить навыки настройки сетевых параметров и управления сетевыми соединениями в Linux.

Выполнение лабораторной работы

Получение полномочий администратора

```
dsyakovleva@dsyakovleva:~$ su -
Password:
Last login: Wed Nov 19 22:19:59 MSK 2025 on pts/0
root@dsyakovleva:~# 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
        2550      24      0      0      0      0
    TX: bytes packets errors dropped carrier collsns
        2550      24      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 08:00:27:3a:6e:6b brd ff:ff:ff:ff:ff:ff
    RX: bytes packets errors dropped missed mcast
        2097088    2553      0      0      0     15
    TX: bytes packets errors dropped carrier collsns
        829896    1512      0      0      0      0
    altname enx0800273a6e6b
root@dsyakovleva:~# 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@dsyakovleva:~# SS
```

Рис. 1: Переход к root

Просмотр состояния интерфейсов

```
root@dsyakovleva:~# 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 08:00:27:3a:6e:6b brd ff:ff:ff:ff:ff:ff
    altname enx0800273a6e6b
        inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
            valid_lft 81486sec preferred_lft 81486sec
        inet6 fd17:625c:f037:2:a00:27ff:fe3a:6e6b/64 scope global dynamic noprefixroute
            valid_lft 86324sec preferred_lft 14324sec
        inet6 fe80::a00:27ff:fe3a:6e6b/64 scope link noprefixroute
            valid_lft forever preferred_lft forever
root@dsyakovleva:~# 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=18.3 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=255 time=19.6 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=255 time=18.4 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=255 time=17.7 ms

--- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3010ms
rtt min/avg/max/mdev = 17.668/18.497/19.606/0.700 ms
root@dsyakovleva:~#
```

Рис. 2: Информация ip -s link

Таблица маршрутов

```
root@dsyakovleva:~# ip addr add 10.0.0.10/24 dev enp0s3
root@dsyakovleva:~# 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 08:00:27:3a:6e:6b brd ff:ff:ff:ff:ff:ff
    altname enx0800273a6e6b
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 81359sec preferred_lft 81359sec
    inet 10.0.0.10/24 scope global enp0s3
        valid_lft forever preferred_lft forever
    inet6 fd17:625c:f037:2:a00:27ff:fe3a:6e6b/64 scope global dynamic noprefixroute
        valid_lft 86197sec preferred_lft 14197sec
    inet6 fe80::a00:27ff:fe3a:6e6b/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
```

Рис. 3: Маршруты

IP-адреса интерфейсов

```
root@dsyakovleva:~# 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:fe3a:6e6b  prefixlen 64  scopeid 0x20<link>
        inet6 fd17:625c:f037:2:a00:27ff:fe3a:6e6b  prefixlen 64  scopeid 0x0<global>
          ether 08:00:27:3a:6e:6b  txqueuelen 1000  (Ethernet)
            RX packets 2559  bytes 2097654 (2.0 MiB)
            RX errors 0  dropped 0  overruns 0  frame 0
            TX packets 1525  bytes 831390 (811.9 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 24  bytes 2550 (2.4 KiB)
            RX errors 0  dropped 0  overruns 0  frame 0
            TX packets 24  bytes 2550 (2.4 KiB)
            TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0
```

```
root@dsyakovleva:~# 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           [:1]: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        [:1]:ipp             [::]:*
tcp        LISTEN      0           4096        *:websm              *:*
tcp        LISTEN      0           511         *:http               *:*
tcp        LISTEN      0           128         [::]:ssh              [::]:*
```

```
root@dsyakovleva:~#
```

Список соединений

```
root@dsyakovleva:~# nmcli connection show
NAME      UUID                                  TYPE      DEVICE
enp0s3    7bf0d86a-f11b-3c65-8d78-7acdb4d025db  ethernet  enp0s3
lo        223fb114-5777-457a-a27d-06224e62d9ff  loopback  lo
root@dsyakovleva:~# nmcli connection add con-name "dhcp" type ethernet ifname
Error: value for 'ifname' is missing.
root@dsyakovleva:~# nmcli connection add con-name "dhcp" type ethernet ifname enp0s3
Connection 'dhcp' (2a046eea-9db1-4aca-a65c-8b06ec552c8a) successfully added.
root@dsyakovleva:~# nmcli connection add con-name "static" ifname enp0s3
Error: 'type' argument is required.
root@dsyakovleva:~# autoconnect no type ethernet ip4 10.0.0.10/24 gw4 10.0.0.1
bash: autoconnect: command not found...
root@dsyakovleva:~# nmcli connection add con-name "static" ifname enp0s3 autoconnect no type etherne
t ip4 10.0.0.10/24 gw4 10.0.0.1
Connection 'static' (32f546db-6558-418d-8d22-d776a679a429) successfully added.
root@dsyakovleva:~#
```

Рис. 5: Список соединений

Создание профиля dhcp

```
root@dsyakovleva:~# nmcli connection show
NAME      UUID                                  TYPE      DEVICE
enp0s3    7bf0d86a-f11b-3c65-8d78-7acdb4d025db  ethernet  enp0s3
lo        223fb114-5777-457a-a27d-06224e62d9ff   loopback  lo
dhcp      2a046eea-9db1-4aca-a65c-8b06ec552c8a  ethernet  --
static    32f546db-6558-418d-8d22-d776a679a429  ethernet  --
root@dsyakovleva:~# nmcli connection up "static"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnecti
on/3)
root@dsyakovleva:~# nmcli connection show
NAME      UUID                                  TYPE      DEVICE
static    32f546db-6558-418d-8d22-d776a679a429  ethernet  enp0s3
lo        223fb114-5777-457a-a27d-06224e62d9ff   loopback  lo
dhcp      2a046eea-9db1-4aca-a65c-8b06ec552c8a  ethernet  --
enp0s3    7bf0d86a-f11b-3c65-8d78-7acdb4d025db  ethernet  --
root@dsyakovleva:~# 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 100
    link/ether 08:00:27:3a:6e:6b brd ff:ff:ff:ff:ff:ff
    altname enx0800273a6e6b
    inet 10.0.0.10/24 brd 10.0.0.255 scope global noprefixroute enp0s3
        valid_lft forever preferred_lft forever
    inet6 fd17:625c:f037:2:5723:9bb7:50c1:a5fd/64 scope global dynamic noprefixroute
        valid_lft 86372sec preferred_lft 14372sec
    inet6 fe80::d296:f973:4dd6:8d3b/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
root@dsyakovleva:~#
```

Создание профиля static

```
root@dsyakovleva:~# nmcli connection up "dhcp"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/4)
root@dsyakovleva:~# nmcli connection show
NAME      UUID                                  TYPE      DEVICE
dhcp      2a045eea-9db1-4aca-a65c-8b06ec552c8a  ethernet  enp0s3
lo        223fb114-5777-457a-a27d-06224e62d9ff  loopback  lo
enp0s3    7bf0d86a-f11b-3c65-8d78-7acdb4d025db  ethernet  --
static    32f546db-6558-418d-8d22-d776a679a429  ethernet  --
root@dsyakovleva:~# 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
        inetc6 ::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 08:00:27:3a:6e:6b brd ff:ff:ff:ff:ff:ff
    altname enx0800273a6e6b
        inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
            valid_lft 86389sec preferred_lft 86389sec
        inetc6 fd17:625c:f037:2:4506:ed21:717d:c25c/64 scope global dynamic noprefixroute
            valid_lft 86391sec preferred_lft 14391sec
        inetc6 fe80::98bc:11b7:bc65:7445/64 scope link noprefixroute
            valid_lft forever preferred_lft forever
root@dsyakovleva:~#
```

Рис. 7: Создание static

Модификация static

```
root@dsyakovleva:~# nmcli connection modify "static" connection.autoconnect no
root@dsyakovleva:~# nmcli connection modify "static" ipv4.dns 10.0.0.10
root@dsyakovleva:~# nmcli connection modify "static" +ipv4.dns 8.8.8.8
root@dsyakovleva:~# nmcli connection modify "static" +ipv4.addresses 10.0.0.20/24
root@dsyakovleva:~# nmcli connection modify "static" ipv4.addresses 10.0.0.20/24
root@dsyakovleva:~# nmcli connection modify "static" +ipv4.addresses 10.20.30.40/16
root@dsyakovleva:~# nmcli connection up "static"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/5)
root@dsyakovleva:~#
```

Рис. 8: Изменение параметров

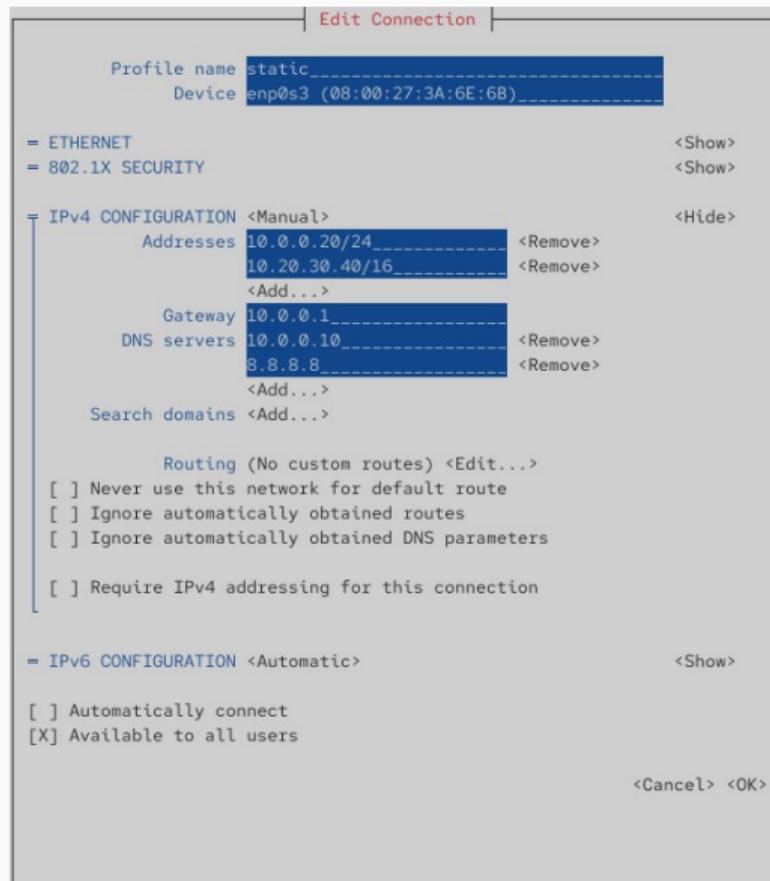
Дополнительные DNS и IP-адреса

```
root@dsyakovleva:~# nmcli con show
NAME      UUID                                  TYPE      DEVICE
static    32f546db-6558-418d-8d22-d776a679a429  ethernet  enp0s3
lo        223fb114-5777-457a-a27d-06224e62d9ff  loopback  lo
dhcp     2a046eea-9db1-4aca-a65c-8b06ec552c8a  ethernet  --
enp0s3   7bf0d86a-f11b-3c65-8d78-7acdb4d025db  ethernet  --

root@dsyakovleva:~# 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 08:00:27:3a:6e:6b brd ff:ff:ff:ff:ff:ff
    altname enx0800273a6e6b
        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:f037:2:5723:9bb7:50c1:a5fd/64 scope global dynamic noprefixroute
            valid_lft 86273sec preferred_lft 14273sec
        inet6 fe80::d296:f973:4dd6:8d3b/64 scope link noprefixroute
            valid_lft forever preferred_lft forever
root@dsyakovleva:~#
```

Рис. 9: Модификация DNS и адресов

Профиль static



Профиль dhcp

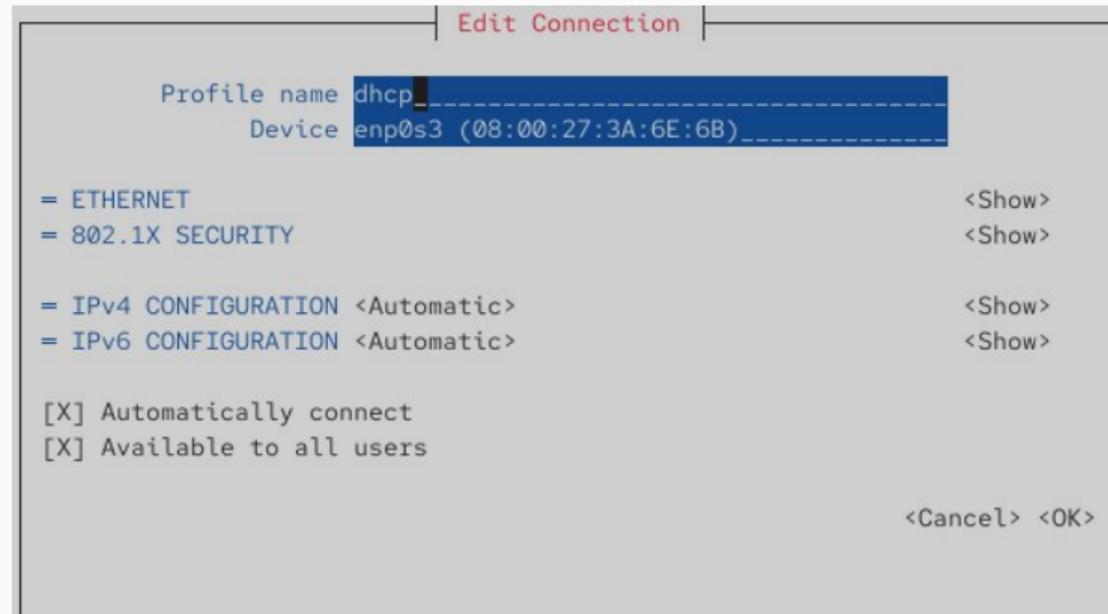


Рис. 11: nmtui dhcp

Профиль enp0s3

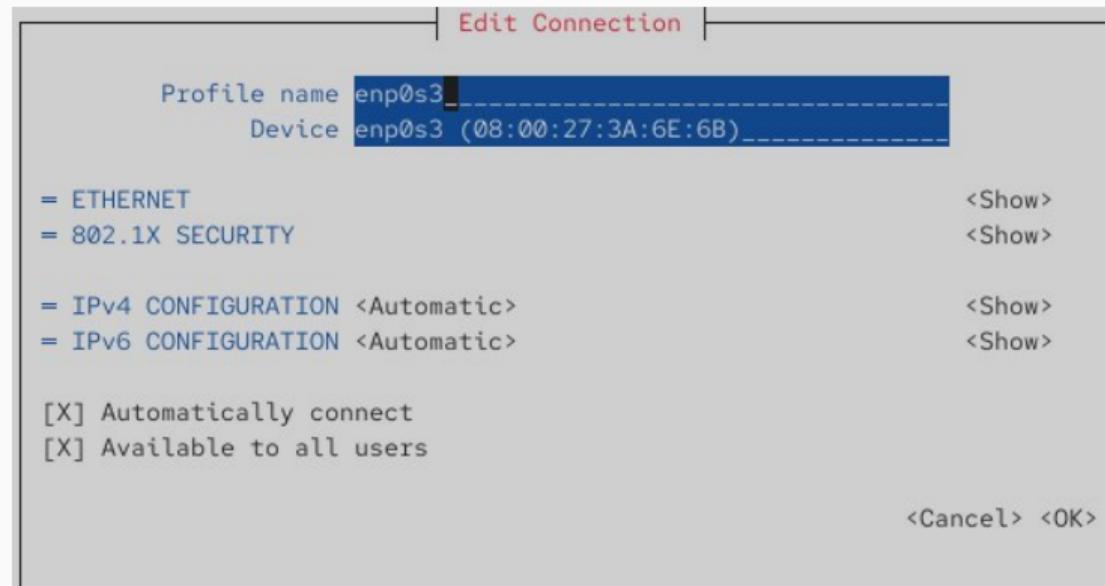


Рис. 12: nmtui enp0s3

static b GUI

Cancel **static** Apply

Details Identity IPv4 **IPv6** Security

IPv4 Method

Automatic (DHCP) Manual Link-Local Only Disable Shared to other computers

Addresses

Address	Netmask	Gateway	X
10.0.0.20	255.255.255.0	10.0.0.1	X
10.20.30.40	255.255.0.0		X
			X

DNS Automatic
10.0.0.10, 8.8.8.8
Separate IP addresses with commas

Routes Automatic

Address	Netmask	Gateway	Metric	X
				X

dhcp в GUI

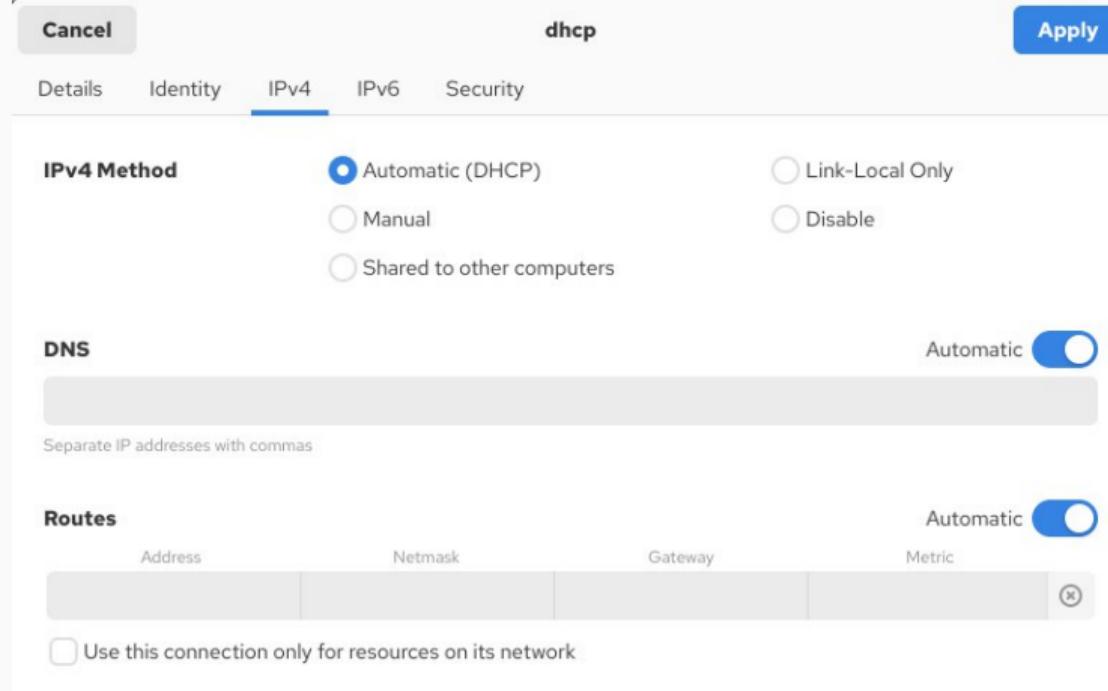


Рис. 14: GUI dhcp

enp0s3 в GUI

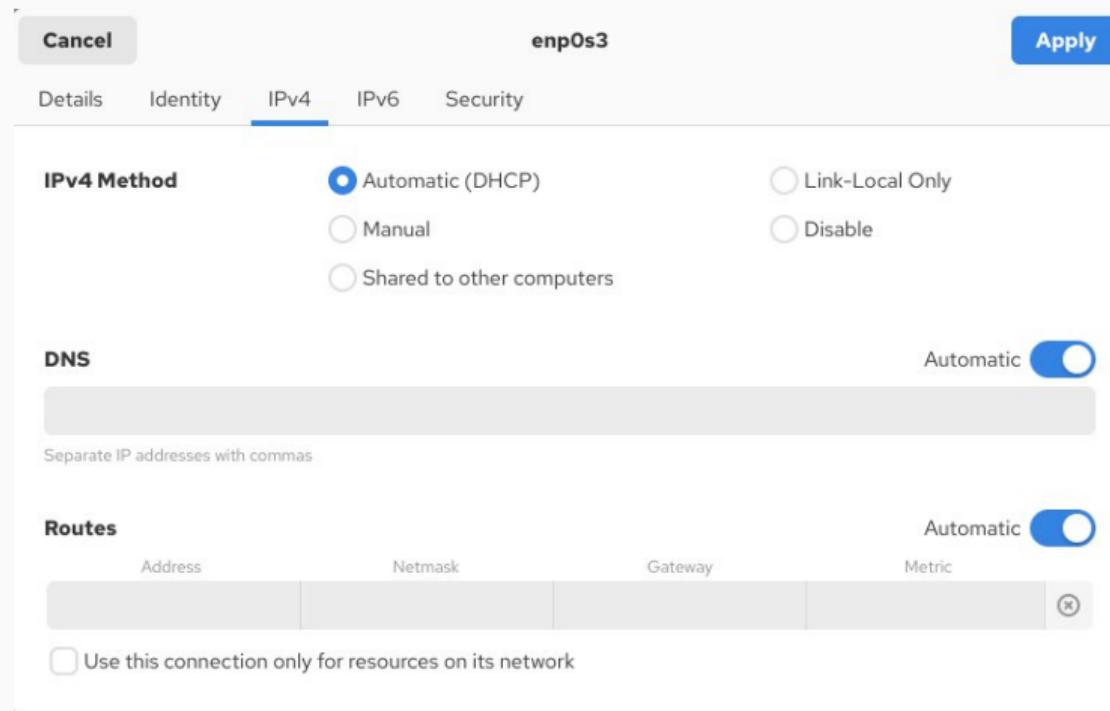


Рис. 15: GUI enp0s3

Контрольные вопросы

- Статус устройств: `nmcli device status`
- Служба сети: `NetworkManager`
- Имя устройства: `/etc/hostname`
- Изменение имени: `hostnamectl set-hostname`

- Локальное разрешение имён: `/etc/hosts`
- Маршруты: `ip route show`
- Статус NetworkManager: `systemctl status NetworkManager`
- Изменение IP:
`nmcli connection modify <имя> ipv4.addresses <адрес>`

Итоги работы

Получены навыки:

- просмотра статуса интерфейсов и маршрутов
- добавления IP-адресов
- работы с профилями nmcli и nmtui
- изменения параметров сети

Практически освоены методы управления сетевыми настройками Linux.