

Отчёт о лабораторной работе

Лабораторная работа 12. Настройки сети в Linux

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Содержание

1. Цель работы

Получить навыки настройки сетевых параметров системы.

2. Задание

1. Продемонстрируйте навыки использования утилиты `ip` (см. раздел 12.4.1).
2. Продемонстрируйте навыки использования утилиты `nmcli` (см. раздел 12.4.2 и 12.4.3).

3. Выполнение лабораторной работы

3.1 Работа с утилитой `ip`

Получаем полномочия администратора и просматриваем информацию о сетевых интерфейсах (рис. [fig:001?]).

```
Activities Terminal Sep 9 12:17 en
root@ndbaranov:~

[baranov@ndbaranov ~]$ su -
Password:
su: Authentication failure
[baranov@ndbaranov ~]$ su -
Password:
[root@ndbaranov ~]# 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
         2195      19      0      0      0      0
    TX:  bytes packets errors dropped carrier collsns
         2195      19      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 08:00:27:2a:f0:35 brd ff:ff:ff:ff:ff:ff
    RX:  bytes packets errors dropped missed mcast
        14332650  14678      0      0      0      7
    TX:  bytes packets errors dropped carrier collsns
        2713548    7518      0      0      0      0
[root@ndbaranov ~]# 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@ndbaranov ~]# 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
        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 08:00:27:2a:f0:35 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 84615sec preferred_lft 84615sec
    inet6 fd17:025c:f037:2:a00:27ff:fe2a:f035/64 scope global dynamic noprefixroute
        valid_lft 85971sec preferred_lft 13971sec
    inet6 fe80::27:2a:f035:2/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
[root@ndbaranov ~]# 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=53.1 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=255 time=50.5 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=255 time=44.4 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=255 time=65.3 ms

--- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3011ms
rtt min/avg/max/mdev = 44.446/53.341/65.283/7.576 ms
[root@ndbaranov ~]# ip addr add 10.0.0.10/24 dev ^C
[root@ndbaranov ~]# ip addr add 10.0.0.10/24 dev enp0s3
[root@ndbaranov ~]#
```

Информация о сетевых интерфейсах

Информация об интерфейсе enp0s3: - Состояние: UP, LOWER_UP - интерфейс включен и активен - MTU: 1500 - максимальный размер передаваемого блока - MAC-адрес: 08:00:27:23:10:35 - Статистика RX: получено 14678 пакетов (14.3 МВ) - Статистика TX: отправлено 7518 пакетов (2.7 МВ) - Ошибки: отсутствуют

Просматриваем информацию о маршрутах (рис. [fig:001?]).

```
Activities Terminal Sep 9 12:17 en
root@ndbaranov:~

[baranov@ndbaranov ~]$ su -
Password:
su: Authentication failure
[baranov@ndbaranov ~]$ su -
Password:
[root@ndbaranov ~]# 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
         2195      19      0      0      0      0
    TX:  bytes packets errors dropped carrier collsns
         2195      19      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 08:00:27:2a:f0:35 brd ff:ff:ff:ff:ff:ff
    RX:  bytes packets errors dropped missed mcast
        14332650  14678      0      0      0      7
    TX:  bytes packets errors dropped carrier collsns
        2713548    7518      0      0      0      0
[root@ndbaranov ~]# 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@ndbaranov ~]# 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
        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 08:00:27:2a:f0:35 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 84615sec preferred_lft 84615sec
    inet6 fd17:025c:f037:2:a00:27ff:fe2a:f035/64 scope global dynamic noprefixroute
        valid_lft 85971sec preferred_lft 13971sec
    inet6 fe80::27:2a:f0:35/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
[root@ndbaranov ~]# 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=53.1 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=255 time=50.5 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=255 time=44.4 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=255 time=65.3 ms

--- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3011ms
rtt min/avg/max/mdev = 44.446/53.341/65.283/7.576 ms
[root@ndbaranov ~]# ip addr add 10.0.0.10/24 dev ^C
[root@ndbaranov ~]# ip addr add 10.0.0.10/24 dev enp0s3
[root@ndbaranov ~]#
```

Таблица маршрутизации

Информация о маршрутах: - Маршрут по умолчанию: default via 10.0.2.2 dev enp0s3 - шлюз 10.0.2.2 через интерфейс enp0s3 - Локальная сеть: 10.0.2.0/24 dev enp0s3 - сеть 10.0.2.0/24 доступна через enp0s3 - Протокол: dhcp - адрес получен по DHCP

Просматриваем информацию о назначенных IP-адресах (рис. [fig:001?], [fig:002?]).

```
Activities Terminal Sep 9 12:17 en
root@ndbaranov:~

[baranov@ndbaranov ~]$ su -
Password:
su: Authentication failure
[baranov@ndbaranov ~]$ su -
Password:
[root@ndbaranov ~]# 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
         2195      19      0      0      0      0
    TX: bytes packets errors dropped carrier collsns
         2195      19      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 08:00:27:2a:f0:35 brd ff:ff:ff:ff:ff:ff
    RX: bytes packets errors dropped missed mcast
        14332650    14678      0      0      0      7
    TX: bytes packets errors dropped carrier collsns
        2713548     7518      0      0      0      0

[root@ndbaranov ~]# 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@ndbaranov ~]# 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
        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 08:00:27:2a:f0:35 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 84615sec preferred_lft 84615sec
    inet6 fd17:625c:f037:2:a00:27ff:fe2a:f035/64 scope global dynamic noprefixroute
        valid_lft 85971sec preferred_lft 13971sec
    inet6 fe80::a00:27ff:fe2a:f035/64 scope link noprefixroute
        valid_lft forever preferred_lft forever

[root@ndbaranov ~]# 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=53.1 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=255 time=50.5 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=255 time=44.4 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=255 time=65.3 ms

--- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 301ms
rtt min/avg/max/mdev = 44.446/53.341/65.283/7.576 ms
[root@ndbaranov ~]# ip addr add 10.0.10/24 dev ^C
[root@ndbaranov ~]# ip addr add 10.0.10/24 dev enp0s3
[root@ndbaranov ~]#

Activities Terminal Sep 9 12:19 en
root@ndbaranov:~

[root@ndbaranov ~]# 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
        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 08:00:27:2a:f0:35 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 84297sec preferred_lft 84297sec
    inet 10.0.10/24 scope global enp0s3
        valid_lft forever preferred_lft forever
    inet6 fd17:625c:f037:2:a00:27ff:fe2a:f035/64 scope global dynamic noprefixroute
        valid_lft 86092sec preferred_lft 14092sec
    inet6 fe80::a00:27ff:fe2a:f035/64 scope link noprefixroute
        valid_lft forever preferred_lft forever

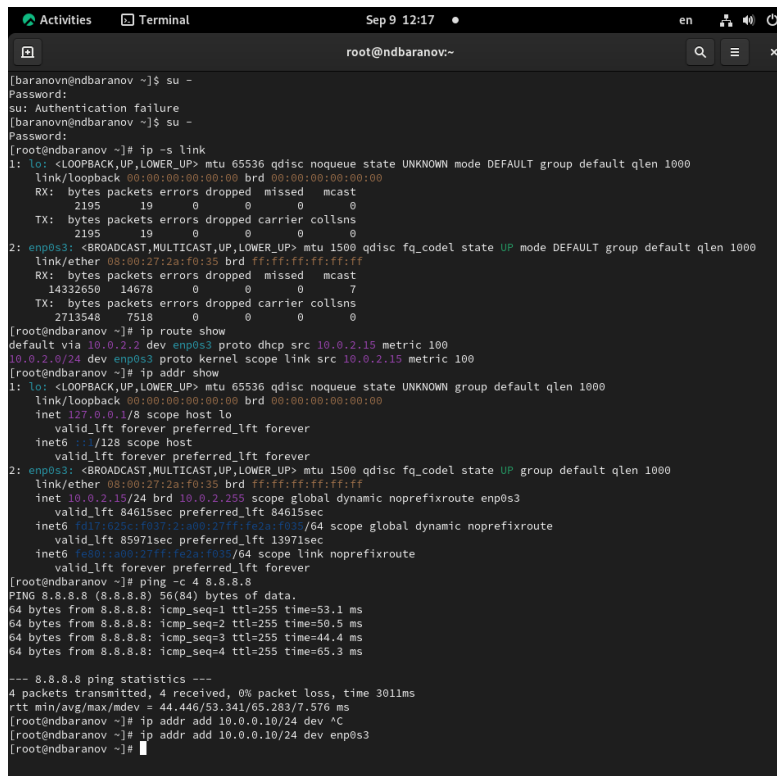
[root@ndbaranov ~]# ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
    inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
    inet6 fd17:625c:f037:2:a00:27ff:fe2a:f035  prefixlen 64  scopeid 0x0<global>
    inet6 fe80::a00:27ff:fe2a:f035  prefixlen 64  scopeid 0x20<link>
    ether 08:00:27:2a:f0:35  txqueuelen 1000  (Ethernet)
    RX packets 25556  bytes 28268820 (26.9 MiB)
    RX errors 0  dropped 0  overruns 0  frame 0
    TX packets 11301  bytes 2954918 (2.8 MiB)
    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 19  bytes 2195 (2.1 KiB)
    RX errors 0  dropped 0  overruns 0  frame 0
    TX packets 19  bytes 2195 (2.1 KiB)
    TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0

[root@ndbaranov ~]# 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           511         *:http                 *:+
tcp        LISTEN    0           32          *:ftp                  *:+
tcp        LISTEN    0           128         [::]:ssh               [::]:*
tcp        LISTEN    0           4096        [::]:ipp               [::]:*
```

Информация об интерфейсе enp0s3: - IPv4-адрес: 10.0.2.15/24 - основной адрес с маской /24 - IPv6-адреса: глобальный и link-local адреса - Broadcast: 10.0.2.255 - Тип: dynamic - адрес получен динамически

Проверяем подключение к интернету (рис. [fig:001?]).



```
[baranov@ndbaranov ~]$ su -
Password:
su: Authentication failure
[baranov@ndbaranov ~]$ su -
Password:
[root@ndbaranov ~]# 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
         2195      19        0        0        0        0
    TX: bytes packets errors dropped carrier collsns
         2195      19        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 08:00:27:2a:f0:35 brd ff:ff:ff:ff:ff:ff
    RX: bytes packets errors dropped missed mcast
        14332650    14678        0        0        7
    TX: bytes packets errors dropped carrier collsns
        2713548     7518        0        0        0
[root@ndbaranov ~]# 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@ndbaranov ~]# 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
        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 08:00:27:2a:f0:35 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 84615sec preferred_lft 84615sec
    inet6 fe80::27:2a:f0:35/64 scope global dynamic noprefixroute
        valid_lft 85971sec preferred_lft 13971sec
    inet6 fe80::27:2a:f0:35/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
[root@ndbaranov ~]# 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=53.1 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=255 time=50.5 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=255 time=44.4 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=255 time=65.3 ms

--- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 301ms
rtt min/avg/max/mdev = 44.446/53.341/65.283/7.576 ms
[root@ndbaranov ~]# ip addr add 10.0.0.10/24 dev ^C
[root@ndbaranov ~]# ip addr add 10.0.0.10/24 dev enp0s3
[root@ndbaranov ~]#
```

Проверка ping

Результат ping: - 4 пакета отправлено на 8.8.8.8 - 4 пакета получено (0% потерь) - Время отклика: 44.4-65.3 мс

Добавляем дополнительный IP-адрес к интерфейсу (рис. [fig:001?]).

```
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root@ndbaranov:~

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Password:
su: Authentication failure
[baranov@ndbaranov ~]$ su -
Password:
[root@ndbaranov ~]# 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
         2195      19      0      0      0      0
    TX: bytes packets errors dropped carrier collsns
         2195      19      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 08:00:27:2a:f0:35 brd ff:ff:ff:ff:ff:ff
    RX: bytes packets errors dropped missed mcast
    14332650 14678      0      0      0      7
    TX: bytes packets errors dropped carrier collsns
    2713548 7518      0      0      0      0
[root@ndbaranov ~]# 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@ndbaranov ~]# 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
        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 08:00:27:2a:f0:35 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 84615sec preferred_lft 84615sec
    inet6 fd17:025c:f037:2:a00:27ff:fe2a:f035/64 scope global dynamic noprefixroute
        valid_lft 85971sec preferred_lft 13971sec
    inet6 fe80::27:2a:f0:35/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
[root@ndbaranov ~]# 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=53.1 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=255 time=50.5 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=255 time=44.4 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=255 time=65.3 ms

--- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3011ms
rtt min/avg/max/mdev = 44.446/53.341/65.283/7.576 ms
[root@ndbaranov ~]# ip addr add 10.0.0.10/24 dev ^C
[root@ndbaranov ~]# ip addr add 10.0.0.10/24 dev enp0s3
[root@ndbaranov ~]#
```

Добавление IP-адреса

Проверяем добавление адреса (рис. [fig:002?]).

```
Activities Terminal Sep 9 12:19 en
root@ndbaranov:~

[root@ndbaranov ~]# 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
        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 08:00:27:2a:f0:35 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 84297sec preferred_lft 84297sec
    inet 10.0.0.10/24 scope global enp0s3
        valid_lft forever preferred_lft forever
    inet6 fd17:625c:f037:2:a00:27ff:fe2a:f035/64 scope global dynamic noprefixroute
        valid_lft 86092sec preferred_lft 14092sec
    inet6 fe80::a00:27ff:fe2a:f035/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
[root@ndbaranov ~]# 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 fd17:625c:f037:2:a00:27ff:fe2a:f035 prefixlen 64 scopeid 0x0<global>
    inet6 fe80::a00:27ff:fe2a:f035 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:2a:f0:35 txqueuelen 1000 (Ethernet)
    RX packets 25558 bytes 28268020 (26.9 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 11301 bytes 2954918 (2.8 MiB)
    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 19 bytes 2195 (2.1 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 19 bytes 2195 (2.1 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

[root@ndbaranov ~]# 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 0 511 *:http *:*
tcp LISTEN 0 32 *:ftp *:*
tcp LISTEN 0 128 [::]:ssh [::]:*
tcp LISTEN 0 4096 [::]:ipp [::]:*
```

Проверка добавленного адреса

Сравниваем вывод утилит ip и ifconfig (рис. [fig:002?]).

```
Activities Terminal Sep 9 12:19 en
root@ndbaranov:~

[root@ndbaranov ~]# 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
        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 08:00:27:2a:f0:35 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 84297sec preferred_lft 84297sec
    inet 10.0.0.10/24 scope global enp0s3
        valid_lft forever preferred_lft forever
    inet6 fd17:625c:f037:2:a00:27ff:fe2a:f035/64 scope global dynamic noprefixroute
        valid_lft 86092sec preferred_lft 14092sec
    inet6 fe80::a00:27ff:fe2a:f035/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
[root@ndbaranov ~]# 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 fd17:625c:f037:2:a00:27ff:fe2a:f035 prefixlen 64 scopeid 0x0<global>
    inet6 fe80::a00:27ff:fe2a:f035 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:2a:f0:35 txqueuelen 1000 (Ethernet)
    RX packets 25558 bytes 28268020 (26.9 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 11301 bytes 2954918 (2.8 MiB)
    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 19 bytes 2195 (2.1 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 19 bytes 2195 (2.1 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

[root@ndbaranov ~]# 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 0 511 *:http *:*
tcp LISTEN 0 32 *:ftp *:*
tcp LISTEN 0 128 [::]:ssh [::]:*
tcp LISTEN 0 4096 [::]:ipp [::]:*
```

Сравнение *ip* и *ifconfig*

Просматриваем открытые порты системы (рис. [fig:002?]).


```
root@ndbaranov:~# 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
        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 08:00:27:2a:f0:35 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 84297sec preferred_lft 84297sec
    inet 10.0.0.10/24 scope global enp0s3
        valid_lft forever preferred_lft forever
    inet6 fe80::a00:27ff:fe2a:f035/64 scope global dynamic noprefixroute
        valid_lft 86092sec preferred_lft 14092sec
    inet6 fe80::a00:27ff:fe2a:f035/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
root@ndbaranov:~# 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 fd17:625c:f037:2:a00:27ff:fe2a:f035 prefixlen 64 scopeid 0x0<global>
    inet6 fe80::a00:27ff:fe2a:f035 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:2a:f0:35 txqueuelen 1000 (Ethernet)
    RX packets 25558 bytes 28268020 (26.9 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 11301 bytes 2954918 (2.8 MiB)
    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 19 bytes 2195 (2.1 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 19 bytes 2195 (2.1 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

root@ndbaranov:~# 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:ftp 0.0.0.0:*
tcp LISTEN 0 128 0.0.0.0:ssh 0.0.0.0:*
tcp LISTEN 0 511 *:http *:*
tcp LISTEN 0 32 *:ftp *:*
tcp LISTEN 0 128 [::]:ssh [::]:*
tcp LISTEN 0 4096 [::]:ftp [::]:*
```

Список открытых портов

Открытые порты: - SSH: порт 22 (прослушивается на всех интерфейсах) -
HTTP: порт 80 (прослушивается на всех интерфейсах) - FTP: порт 21
(прослушивается на всех интерфейсах) - DNS: порт 53 (прослушивается на
localhost)

3.2 Работа с NetworkManager через nmcli

Просматриваем текущие соединения (рис. [fig:003?]).

Текущие сетевые соединения

Текущие сетевые соединения

Создаем соединение dhcp (рис. [fig:003?]).

Создание DHCP соединения

Создание DHCP соединения

Создаем статическое соединение (рис. [fig:003?]).

Создание статического соединения

Создание статического соединения

Активируем статическое соединение и проверяем (рис. [fig:003?]).

Активация статического соединения

Активация статического соединения

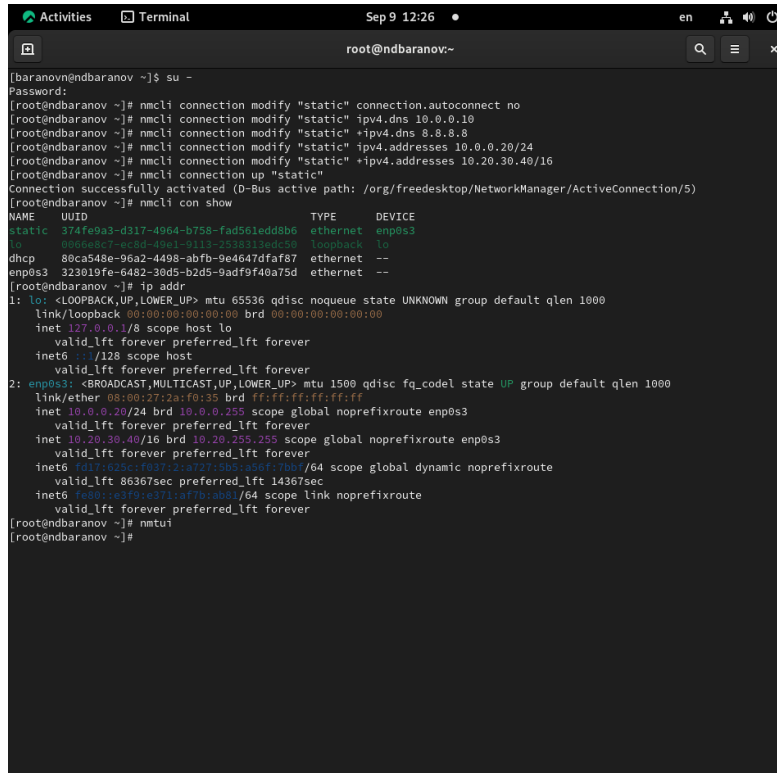
Возвращаемся к DHCP соединению (рис. [fig:003?]).

Возврат к DHCP соединению

Возврат к DHCP соединению

3.3 Настройка дополнительных параметров

Отключаем автоподключение и настраиваем DNS (рис. [fig:004?]).



```
[baranov@ndbaranov ~]$ su -
Password:
[root@ndbaranov ~]# nmcli connection modify "static" connection.autoconnect no
[root@ndbaranov ~]# nmcli connection modify "static" ipv4.dns 10.0.0.10
[root@ndbaranov ~]# nmcli connection modify "static" +ipv4.dns 8.8.8.8
[root@ndbaranov ~]# nmcli connection modify "static" ipv4.addresses 10.0.0.20/24
[root@ndbaranov ~]# nmcli connection modify "static" +ipv4.addresses 10.20.30.40/16
[root@ndbaranov ~]# nmcli connection up "static"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/5)
[root@ndbaranov ~]# nmcli con show
NAME      UUID                                  TYPE      DEVICE
static    374fe9a3-d217-4964-b758-fad561edd8b6 ethernet  enp0s3
lo        00000000-0000-0000-0000-000000000000 loopback  lo
dhcp      80ca548e-96a2-4498-abfb-9e4647dfaf87 ethernet  --
enp0s3    323019fe-6482-30d5-b2d5-9adf9f40a75d ethernet  --
[root@ndbaranov ~]# 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
        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 08:00:27:2a:f0:35 brd ff:ff:ff:ff:ff:ff
    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:c22c:f977:2::827:5b5:a667:7ba7/64 scope global dynamic noprefixroute
        valid_lft 86367sec preferred_lft 14367sec
    inet6 fe80::e3f9:e371:a77b:ab61/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
[root@ndbaranov ~]# nmcli
[root@ndbaranov ~]#
```

Настройка DNS и автоподключения

Изменяем IP-адреса соединения (рис. [fig:004?]).

```
Activities Terminal Sep 9 12:26 en
root@ndbaranov:~
[baranov@ndbaranov ~]$ su -
Password:
[root@ndbaranov ~]# nmcli connection modify "static" connection.autoconnect no
[root@ndbaranov ~]# nmcli connection modify "static" ipv4.dns 10.0.0.10
[root@ndbaranov ~]# nmcli connection modify "static" +ipv4.dns 8.8.8.8
[root@ndbaranov ~]# nmcli connection modify "static" ipv4.addresses 10.0.0.20/24
[root@ndbaranov ~]# nmcli connection modify "static" +ipv4.addresses 10.20.30.40/16
[root@ndbaranov ~]# nmcli connection up "static"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/5)
[root@ndbaranov ~]# nmcli con show
NAME        UUID                                  TYPE      DEVICE
static      374fe9a3-d317-4064-b758-fad561edd8b6 ethernet  enp0s3
lo          00000000-0000-0000-0000-000000000000 loopback  lo
dhcp       80ca548e-96a2-4498-abfb-9e4647dfaf87 ethernet  --
enp0s3     323019fe-6482-30d5-b2d5-9adf9f40a75d ethernet  --
[root@ndbaranov ~]# 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
        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:f0:35:brd ff:ff:ff:ff:ff:ff
    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 fd00::c3f9:e371:a77b:ab81/64 scope global dynamic noprefixroute
        valid_lft 86367sec preferred_lft 14367sec
    inet6 fe80::e3f9:e371:a77b:ab81/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
[root@ndbaranov ~]# nmcli
[root@ndbaranov ~]#
```

Изменение IP-адресов

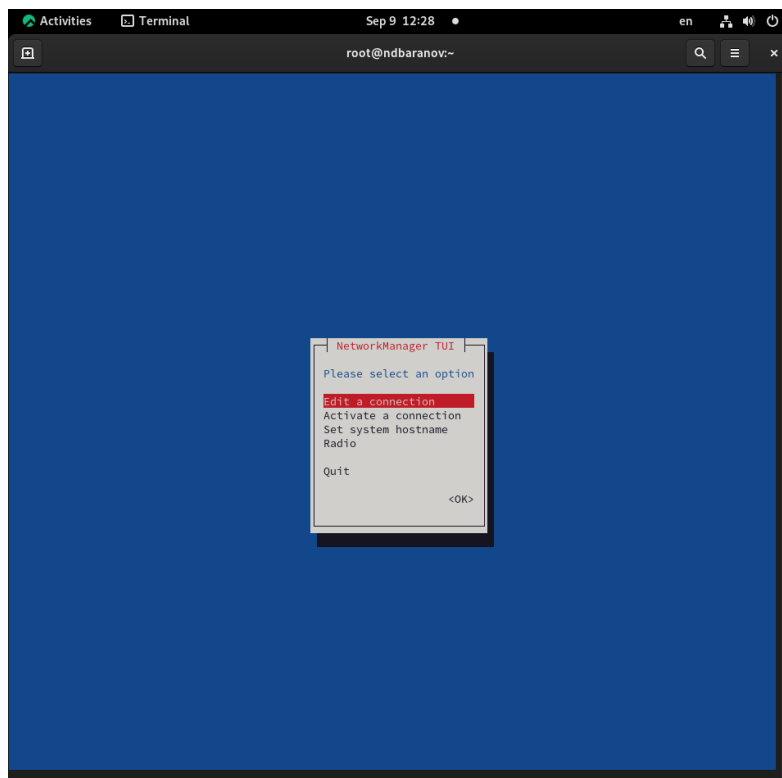
Активируем измененное соединение (рис. [fig:004?]).

```
Activities Terminal Sep 9 12:26 en
root@ndbaranov:~
[baranov@ndbaranov ~]$ su -
Password:
[root@ndbaranov ~]# nmcli connection modify "static" connection.autoconnect no
[root@ndbaranov ~]# nmcli connection modify "static" ipv4.dns 10.0.0.10
[root@ndbaranov ~]# nmcli connection modify "static" +ipv4.dns 8.8.8.8
[root@ndbaranov ~]# nmcli connection modify "static" ipv4.addresses 10.0.0.20/24
[root@ndbaranov ~]# nmcli connection modify "static" +ipv4.addresses 10.20.30.40/16
[root@ndbaranov ~]# nmcli connection up "static"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/5)
[root@ndbaranov ~]# nmcli con show
NAME        UUID                                  TYPE      DEVICE
static      374fe9a3-d317-4064-b758-fad561edd8b6 ethernet  enp0s3
lo          00000000-0000-0000-0000-000000000000 loopback  lo
dhcp       80ca548e-96a2-4498-abfb-9e4647dfaf87 ethernet  --
enp0s3     323019fe-6482-30d5-b2d5-9adf9f40a75d ethernet  --
[root@ndbaranov ~]# 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
        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 08:00:27:2a:f0:35 brd ff:ff:ff:ff:ff:ff
    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 fd7:cccc:c42:::120:ab7:cccc:bb7/64 scope global dynamic noprefixroute
        valid_lft 86367sec preferred_lft 14367sec
    inet6 fe80::e3f9:e371:a77b:ab81/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
[root@ndbaranov ~]# nmtui
[root@ndbaranov ~]#
```

Активация измененного соединения

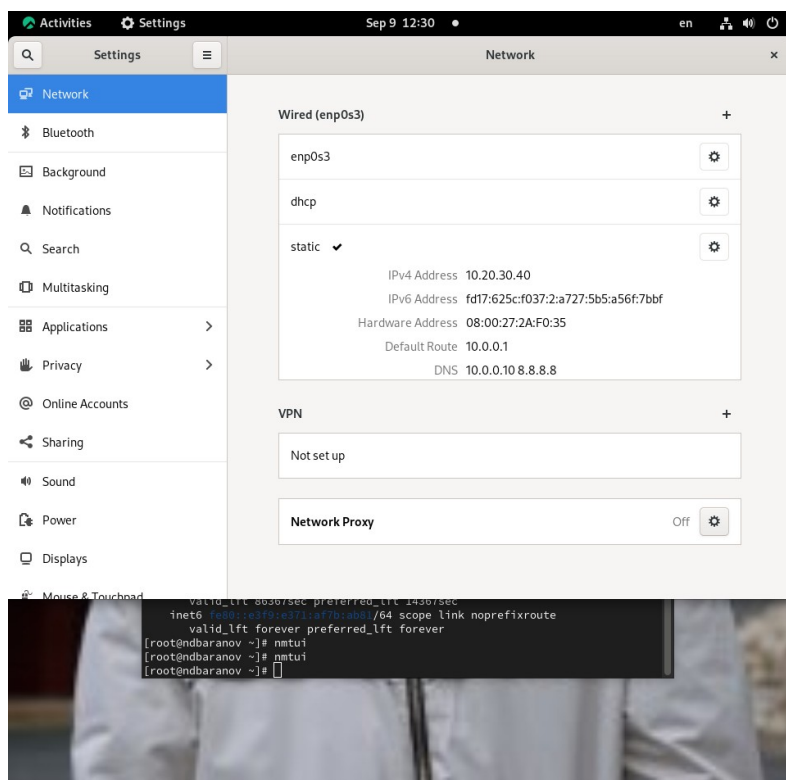
3.4 Работа с nmtui

Запускаем текстовый интерфейс NetworkManager (рис. [fig:005?]).



Интерфейс nmtui

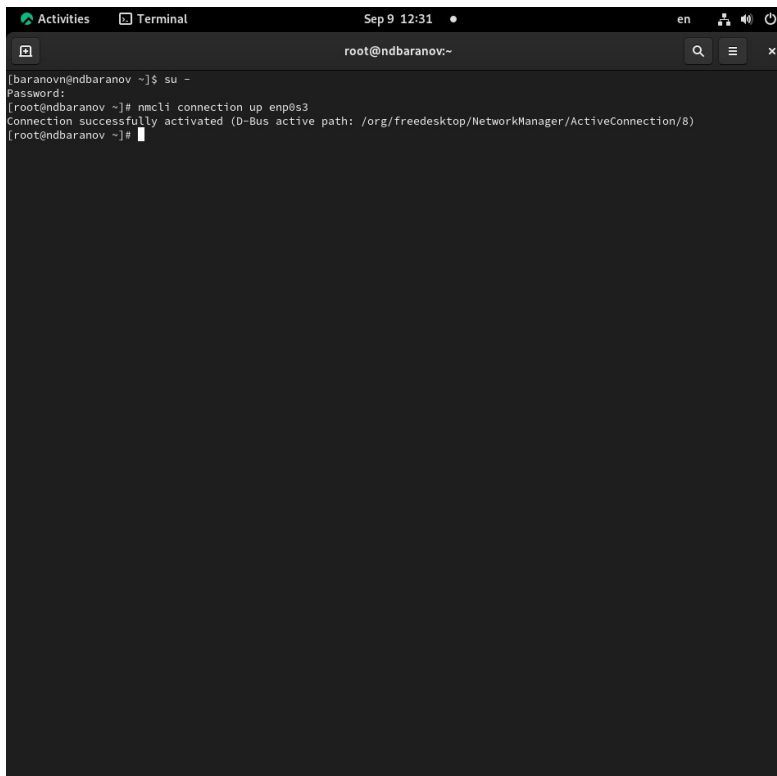
Просматриваем настройки сети в графическом интерфейсе (рис. [fig:006?]).



Настройки сети в графическом интерфейсе

Настройки сети: - Интерфейс: enp0s3 - IPv4-адрес: 10.20.30.40 - IPv6-адрес: fd17:625c:f037:2:a727:5b5:a56f:7bbf - MAC-адрес: 08:00:27:2A:F0:35 - Шлюз по умолчанию: 10.0.0.1 - DNS-серверы: 10.0.0.10, 8.8.8.8

Возвращаемся к первоначальному соединению (рис. [fig:007?]).



```
Activities Terminal Sep 9 12:31 en
root@ndbaranov:~
[baranov@ndbaranov ~]$ su -
Password:
[root@ndbaranov ~]# nmcli connection up enp0s3
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/8)
[root@ndbaranov ~]#
```

Возврат к первоначальному соединению

4. Выводы

Мы получили навыки настройки сетевых параметров системы.

Список литературы