

Отчёт по лабораторной работе №12

Управление сетями

Борисенкова София Павловна

13 ноября 2025

Российский университет дружбы народов, Москва, Россия

Цель работы

Получить навыки настройки сетей в Linux

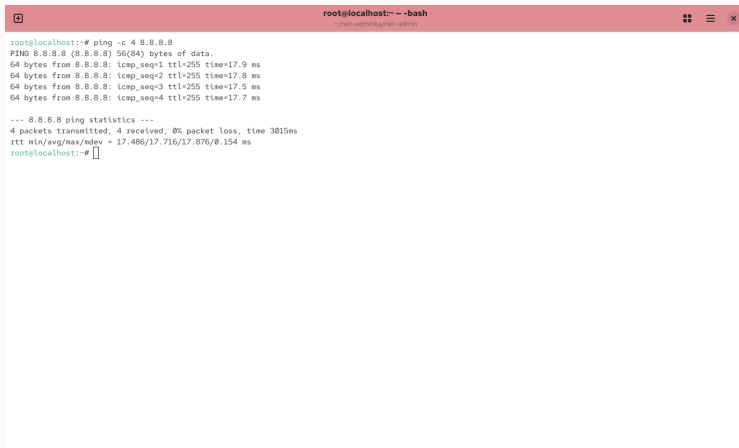
Выполнение лабораторной работы

##Сетевые подключения

```
root@localhost:~ --bash
~/net-adminka/net-admin

spborisenkova@localhost:~/net-adminka/net-admin$ su -
Password:
Last login: Sat Sep 13 19:40:57 MSK 2025 on pts/0
root@localhost:~# 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
         2514      24      0      0      0      0
    TX: bytes packets errors dropped carrier collsns
         2514      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 08:00:27:52:82:81 brd ff:ff:ff:ff:ff:ff
    RX: bytes packets errors dropped missed mcast
        35890555    33508      0      0      0    118
    TX: bytes packets errors dropped carrier collsns
        2533331    11916      0      0      0      0
        altnam enx080027528281
root@localhost:~# ip root show
Object "root" is unknown, try "ip help".
root@localhost:~# 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@localhost:~# 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 08:00:27:52:82:81 brd ff:ff:ff:ff:ff:ff
    altnam enx080027528281
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 46742sec preferred_lft 46742sec
    inet6 fd17:625c:f037:2:a00:27ff:fe52:8281/64 scope global dynamic noprefixroute
        valid_lft 86340sec preferred_lft 14340sec
    inet6 fe80::a00:27ff:fe52:8281/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
```

Рис. 1: Запуск терминала и получение полномочий администратора



```
root@localhost:~ -- -bash
~/net-adminka/net-admin

root@localhost:~# 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=17.9 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=255 time=17.8 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=255 time=17.5 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 3015ms
rtt min/avg/max/mdev = 17.486/17.716/17.876/0.154 ms
root@localhost:~#
```

Рис. 2: Отправка четырёх пакетов на IP-адрес 8.8.8.8

Дополнительный адрес

```
root@localhost:~ -- -bash
~/net-adminka/net-admin

root@localhost:~# ip addr add 10.0.0.10/24 dev enp0s3
root@localhost:~# 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 08:00:27:52:82:81 brd ff:ff:ff:ff:ff:ff
    altname enx080027528281
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 46378sec preferred_lft 46378sec
    inet 10.0.0.10/24 scope global enp0s3
        valid_lft forever preferred_lft forever
    inet6 fd17:625c:f037:2:a00:27ff:fe52:8281/64 scope global dynamic noprefixroute
        valid_lft 86346sec preferred_lft 14346sec
    inet6 fe80::a00:27ff:fe52:8281/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
root@localhost:~#
```

Рис. 3: Добавление дополнительного адреса

```
root@localhost:~ -- -bash
~/net-adminka/net-admin

root@localhost:~# ip
Usage: ip [ OPTIONS ] OBJECT { COMMAND | help }
       ip [ -force ] -batch filename
where  OBJECT := { address | addrlabel | fou | help | ila | ioam | l2tp | link |
                  macsec | maddress | monitor | mptcp | mroute | mrule |
                  neighbor | neighbour | netconf | netns | nexthop | ntable |
                  ntbl | route | rule | sr | stats | tap | tcpmetrics |
                  token | tunnel | tuntap | vrf | xfrm }
      OPTIONS := { -V[ersion] | -s[tatistics] | -d[etails] | -r[esolve] |
                  -h[uman-readable] | -i[c] | -j[son] | -p[retty] |
                  -f[amily] { inet | inet6 | mpls | bridge | link } |
                  -4 | -6 | -M | -B | -0 |
                  -l[oops] { maximum-addr-flush-attempts } | -echo | -br[ief] |
                  -o[neline] | -t[imestamp] | -ts[hort] | -b[atch] [filename] |
                  -rc[vbuf] [size] | -n[etns] name | -N[umeric] | -a[ll] |
                  -c[olor]}

root@localhost:~#
```

Рис. 4: вывод информации от утилиты ip


```
root@localhost:~ -- -bash
~/net-adminka/net-admin

root@localhost:~# ifconfig
enp@s3: 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:fe52:8281  prefixlen 64  scopeid 0x20<link>
    inet6 fd17:625c:f037:2:a00:27ff:fe52:8281  prefixlen 64  scopeid 0x0<global>
    ether 08:00:27:52:82:81  txqueuelen 1000  (Ethernet)
    RX packets 34812  bytes 37105211 (35.3 MiB)
    RX errors 0  dropped 0  overruns 0  frame 0
    TX packets 12455  bytes 2622238 (2.5 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 24  bytes 2514 (2.4 KiB)
    RX errors 0  dropped 0  overruns 0  frame 0
    TX packets 24  bytes 2514 (2.4 KiB)
    TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0

root@localhost:~#
```

Рис. 5: 1.5. Вывод информации после команды ifconfig.

```
root@localhost:~# ss -tul
```

Netid	State	Recv-Q	Send-Q	Local Address:Port	Peer Address:Port
udp	UNCONN	0	0	0.0.0.0:mdns	0.0.0.0:*
udp	UNCONN	0	0	127.0.0.1:323	0.0.0.0:*
udp	UNCONN	0	0	:::mdns	:::*
udp	UNCONN	0	0	:::1:323	:::*
tcp	LISTEN	0	128	0.0.0.0:ssh	0.0.0.0:*
tcp	LISTEN	0	4096	127.0.0.1:ipp	0.0.0.0:*
tcp	LISTEN	0	128	:::ssh	:::*
tcp	LISTEN	0	4096	:::websm	:::*
tcp	LISTEN	0	4096	:::1:ipp	:::*

```
root@localhost:~#
```

Рис. 6: Вывод списка всех прослушиваемых системой портов

```
root@localhost:~ -- -bash
~/net-admin/~/net-admin

root@localhost:~# nmcli connection show
NAME      UUID                                  TYPE      DEVICE
enp0s3    39143592-527f-32f2-b267-6a55422b6ed0 ethernet  enp0s3
lo        d9fc7c0b-b852-435b-b866-6e4f19ad6a8d loopback   lo
root@localhost:~# nmcli connection add con-name "dhcp" type ethernet ifname enp0s3
Connection 'dhcp' (f016c929-a62d-4df6-bd63-8874a115c14e) successfully added.
root@localhost:~# nmcli connection add con-name "static" ifname autoconnect no type ethernet ip4 10.0.0.10/24 gw4 10.0.0.1 ifname enp0s3
Error: invalid <setting>.<property> 'no'.
root@localhost:~# nmcli connection add con-name "static" ifname autoconnect no type ethernet ip4 10.0.0.10/24 gw4 10.0.0.1 ifname enp0s3.
Error: invalid <setting>.<property> 'no'.
root@localhost:~# 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' (4d7e9ce1-9744-496f-9273-a7de7c8fe263) successfully added.
root@localhost:~# nmcli connection show
NAME      UUID                                  TYPE      DEVICE
enp0s3    39143592-527f-32f2-b267-6a55422b6ed0 ethernet  enp0s3
lo        d9fc7c0b-b852-435b-b866-6e4f19ad6a8d loopback   lo
dhcp      f016c929-a62d-4df6-bd63-8874a115c14e ethernet   --
static    4d7e9ce1-9744-496f-9273-a7de7c8fe263 ethernet   --
root@localhost:~# nmcli connection up "static"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/3)
root@localhost:~#
```

Рис. 7: Вывод на экран информации о текущих соединениях

Проверка переключения

```
root@localhost:~ -- -bash
~/net-adminka/net-admin

root@localhost:~# nmcli connection show
NAME      UUID                                  TYPE      DEVICE
static    4d7e9ce1-9744-496f-9273-a7de7c8fe263 ethernet  enp0s3
lo        d9fc7c0b-b852-435b-b866-6e4f19ad6a8d loopback   lo
dhcp      f016c929-a62d-4df6-bd63-8874a115c14e ethernet   --
enp0s3    39143592-527f-32f2-b267-6a55422b6ed0 ethernet   --

root@localhost:~# 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 08:00:27:52:82:81 brd ff:ff:ff:ff:ff:ff
    altname enx080027528281
    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:f88e:fc8c:3938:efe9/64 scope global dynamic noprefixroute
        valid_lft 86347sec preferred_lft 14347sec
    inet6 fe80::34ef:a97a:b118:29e9/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
root@localhost:~#
```

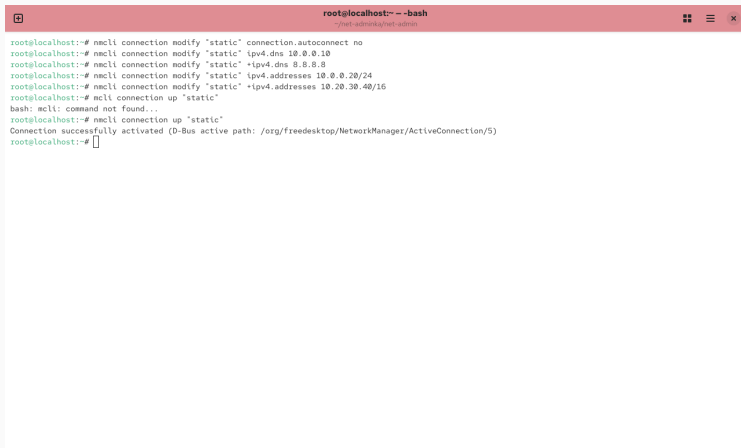
Рис. 8: Проверка переключения

Соединение dhcp

```
root@localhost:~ -- -bash
~/net-admin/~/net-admin

root@localhost:~# nmcli connection up "dhcp"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/4)
root@localhost:~# nmcli connection show
NAME      UUID                                  TYPE      DEVICE
dhcp      f016c929-a62d-4df6-bd63-8874a115c14e ethernet  enp0s3
lo        d9fc7c0b-b852-435b-b866-6e4f19ad6a8d loopback   lo
enp0s3    39143592-527f-32f2-b267-6a55422b6ed0 ethernet   --
static    4d7e9ce1-9744-496f-9273-a7de7c8fe263 ethernet   --
root@localhost:~# 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 00:00:27:52:82:81 brd ff:ff:ff:ff:ff:ff
    altname enx00027528281
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 86384sec preferred_lft 86384sec
    inet6 fd17:625c:f037:2:82ae:49b6:76ca:1a5c/64 scope global dynamic noprefixroute
        valid_lft 86385sec preferred_lft 14385sec
    inet6 fe80::4a82:c95d:ff76:334/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
root@localhost:~#
```

Рис. 9: Возвращение к соединению dhcp и последующая проверка успешности переключения.



```
root@localhost:~ -- -bash
~/net-admin/na/net-admin

root@localhost:~# nmcli connection modify "static" connection.autoconnect no
root@localhost:~# nmcli connection modify "static" ipv4.dns 10.0.0.10
root@localhost:~# nmcli connection modify "static" +ipv4.dns 8.8.8.8
root@localhost:~# nmcli connection modify "static" ipv4.addresses 10.0.0.20/24
root@localhost:~# nmcli connection modify "static" +ipv4.addresses 10.20.30.40/16
root@localhost:~# nmcli connection up "static"
bash: nmcli: command not found...
root@localhost:~# nmcli connection up "static"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/5)
root@localhost:~#
```

Рис. 10: Отключение автоподключения статического соединения

Настройки сетевых соединений

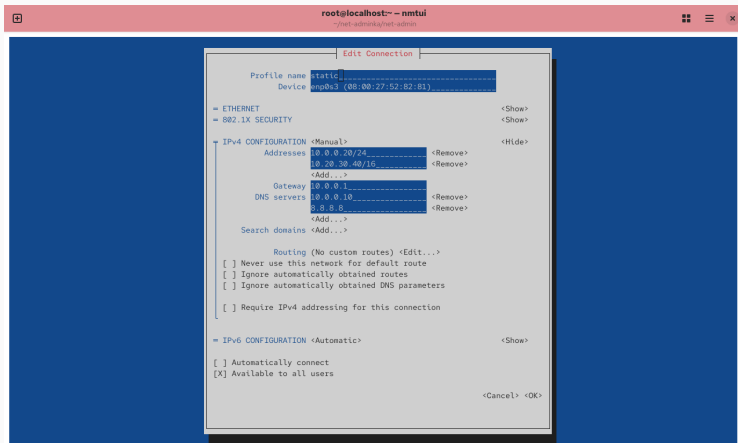


Рис. 11: Просмотр настроек сетевых соединений

Вывод

В ходе работы были изучены методы настройки сетей