Презентация по лабораторной работе №12

Настройки сети в Linux

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Цели и задачи работы

Цель работы

Получить навыки настройки сетевых параметров системы, освоить команды `ip`, `ping`, `ss`, `nmcli` и `nmtui`.

Ход выполнения работы

Проверка конфигурации сети

```
eragdzhabekova@eragdzhabekova:~$ su
Password:
root@eragdzhabekova:/home/eragdzhabekova#
root@eragdzhabekova:/home/eragdzhabekova# 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
          2568      24      0       0       0       0
    TX:  bytes packets errors dropped carrier collsns
          2568      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 08:00:27:03:13:94 brd ff:ff:ff:ff:ff:ff
    RX:  bytes packets errors dropped  missed   mcast
         75767     245      0       0       0       2
    TX:  bytes packets errors dropped carrier collsns
         28445     279      0       0       0       0
    altname enx080027031394
root@eragdzhabekova:/home/eragdzhabekova# 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@eragdzhabekova:/home/eragdzhabekova# 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 08:00:27:03:13:94 brd ff:ff:ff:ff:ff:ff
    altname enx080027031394
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
       valid_lft 86127sec preferred_lft 86127sec
    inet6 fd17:625c:f037:2:a00:27ff:fe03:1394/64 scope global dynamic noprefixroute
       valid_lft 86129sec preferred_lft 14129sec
    inet6 fe80::a00:27ff:fe03:1394/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
root@eragdzhabekova:/home/eragdzhabekova#
```

Проверка подключения к Интернету

```
root@eragdzhabekova:/home/eragdzhabekova#
root@eragdzhabekova:/home/eragdzhabekova# 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=23.9 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=255 time=24.0 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=255 time=24.2 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=255 time=24.2 ms

--- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3004ms
rtt min/avg/max/mdev = 23.889/24.068/24.229/0.142 ms
root@eragdzhabekova:/home/eragdzhabekova#
root@eragdzhabekova:/home/eragdzhabekova# ip addr add 10.0.0.10/24 dev enp0s3
root@eragdzhabekova:/home/eragdzhabekova# 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 08:00:27:03:13:94 brd ff:ff:ff:ff:ff:ff
    altname enx080027031394
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
       valid_lft 85973sec preferred_lft 85973sec
    inet 10.0.0.10/24 scope global enp0s3
       valid_lft forever preferred_lft forever
    inet6 fd17:625c:f037:2:a00:27ff:fe03:1394/64 scope global dynamic noprefixroute
       valid_lft 85974sec preferred_lft 13974sec
    inet6 fe80::a00:27ff:fe03:1394/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
root@eragdzhabekova:/home/eragdzhabekova#
```


Рис. 2: Проверка соединения командой ping

Сравнение ifconfig и ip addr

```
root@eragdzhabekova:/home/eragdzhabekova# 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:fe03:1394  prefixlen 64  scopeid 0x20<link>
        inet6 fd17:625c:f037:2:a00:27ff:fe03:1394  prefixlen 64  scopeid 0x0<global>
        ether 08:00:27:03:13:94  txqueuelen 1000  (Ethernet)
        RX packets 270  bytes 77919 (76.0 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 312  bytes 31637 (30.8 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 2568 (2.5 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 24  bytes 2568 (2.5 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

root@eragdzhabekova:/home/eragdzhabekova# 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            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                  [::1]:ipp                         [::]:*
tcp         LISTEN       0            4096                      *:websm                          *:*
root@eragdzhabekova:/home/eragdzhabekova#
```

Рис. 3: Вывод команд ifconfig

Просмотр подключений

```
root@eragdzhabekova:/home/eragdzhabekova# nmcli connection show
NAME    UUID                                  TYPE      DEVICE
enp0s3  47a0c70a-48bd-34be-a7be-af89318e5400  ethernet  enp0s3
lo      19f03521-624d-45b8-8b5d-2867d538e210  loopback  lo
root@eragdzhabekova:/home/eragdzhabekova# nmcli connection add con-name "dhcp" type ethernet ifname enp0s3
Connection 'dhcp' (363f09e2-ade3-4ca8-b732-32f0204810ff) successfully added.
root@eragdzhabekova:/home/eragdzhabekova# 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' (7fa00193-7ffe-4a15-9def-5fd1195c54d9) successfully added.
root@eragdzhabekova:/home/eragdzhabekova# nmcli connection show
NAME    UUID                                  TYPE      DEVICE
enp0s3  47a0c70a-48bd-34be-a7be-af89318e5400  ethernet  enp0s3
lo      19f03521-624d-45b8-8b5d-2867d538e210  loopback  lo
dhcp    363f09e2-ade3-4ca8-b732-32f0204810ff  ethernet  --
static  7fa00193-7ffe-4a15-9def-5fd1195c54d9  ethernet  --
root@eragdzhabekova:/home/eragdzhabekova# nmcli connection up static
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/3)
root@eragdzhabekova:/home/eragdzhabekova# nmcli connection show
NAME    UUID                                  TYPE      DEVICE
static  7fa00193-7ffe-4a15-9def-5fd1195c54d9  ethernet  enp0s3
lo      19f03521-624d-45b8-8b5d-2867d538e210  loopback  lo
dhcp    363f09e2-ade3-4ca8-b732-32f0204810ff  ethernet  --
enp0s3  47a0c70a-48bd-34be-a7be-af89318e5400  ethernet  --
root@eragdzhabekova:/home/eragdzhabekova#
```

Рис. 4: Вывод команды nmcli connection show

Добавление DHCP и Static соединений

```
root@eragdzhabekova:/home/eragdzhabekova# 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 08:00:27:03:13:94 brd ff:ff:ff:ff:ff:ff
    altname enx080027031394
    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:a57c:7790:8538:cb85/64 scope global dynamic noprefixroute
       valid_lft 86373sec preferred_lft 14373sec
    inet6 fe80::83fb:88b5:8dab:d/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
root@eragdzhabekova:/home/eragdzhabekova#
```

Рис. 5: Вывод команды ip addr

Переключение обратно на DHCP

```
root@eragdzhabekova:/home/eragdzhabekova#
root@eragdzhabekova:/home/eragdzhabekova# nmcli connection up dhcp
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/4)
root@eragdzhabekova:/home/eragdzhabekova# nmcli connection show
NAME    UUID                                  TYPE      DEVICE
dhcp    363f09e2-ade3-4ca8-b732-32f0204810ff  ethernet  enp0s3
lo      19f03521-624d-45b8-8b5d-2867d538e210  loopback  lo
enp0s3  47a0c70a-48bd-34be-a7be-af89318e5400  ethernet  --
static  7fa00193-7ffe-4a15-9def-5fd1195c54d9  ethernet  --
root@eragdzhabekova:/home/eragdzhabekova# 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 08:00:27:03:13:94 brd ff:ff:ff:ff:ff:ff
    altname enx080027031394
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
       valid_lft 86392sec preferred_lft 86392sec
    inet6 fd17:625c:f037:2:f24d:4072:708a:dabd/64 scope global dynamic noprefixroute
       valid_lft 86395sec preferred_lft 14395sec
    inet6 fe80::1768:2858:d17b:6d13/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
root@eragdzhabekova:/home/eragdzhabekova#
```

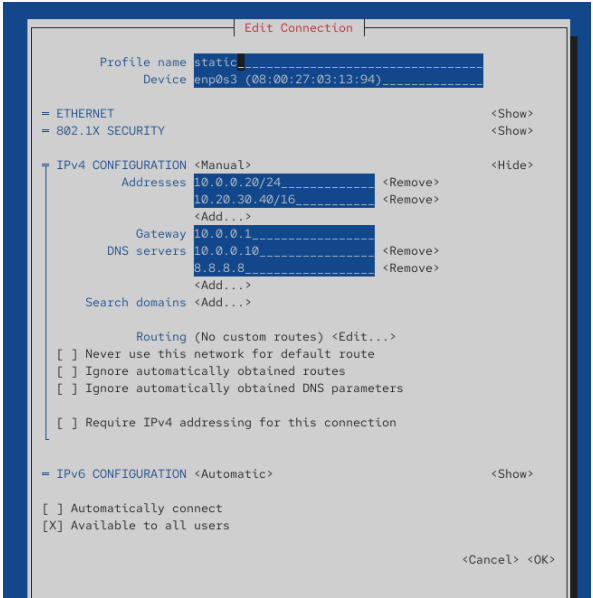
Рис. 6: Переключение на соединение dhcp

Настройка DNS и IP-адресов

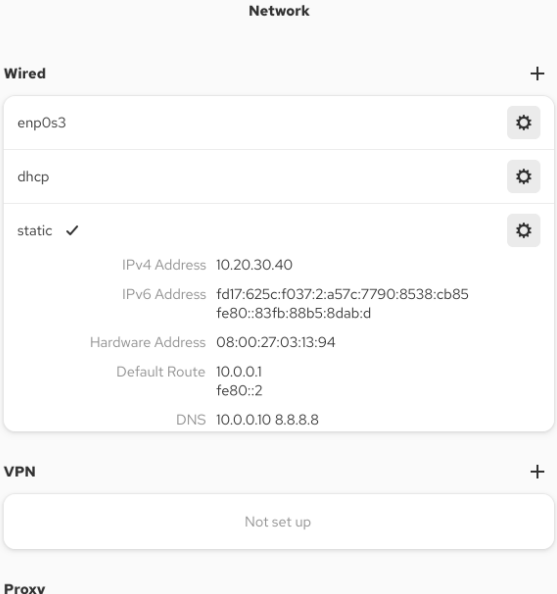
```
root@eragdzhabekova:/home/eragdzhabekova# nmcli connection modify static connection.autoconnect no
root@eragdzhabekova:/home/eragdzhabekova# nmcli connection modify static ipv4.dns 10.0.0.10
root@eragdzhabekova:/home/eragdzhabekova# nmcli connection modify static +ipv4.dns 8.8.8.8
root@eragdzhabekova:/home/eragdzhabekova# nmcli connection modify static ipv4.addresses 10.0.0.20/24
root@eragdzhabekova:/home/eragdzhabekova# nmcli connection modify static +ipv4.addresses 10.20.30.40/16
root@eragdzhabekova:/home/eragdzhabekova# nmcli connection up static
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/5)
root@eragdzhabekova:/home/eragdzhabekova# nmcli connection show
NAME    UUID                                  TYPE      DEVICE
static  7fa00193-7ffe-4a15-9def-5fd1195c54d9  ethernet  enp0s3
lo      19f03521-624d-45b8-8b5d-2867d538e210  loopback  lo
dhcp    363f09e2-ade3-4ca8-b732-32f0204810ff  ethernet  --
enp0s3  47a0c70a-48bd-34be-a7be-af89318e5400  ethernet  --
root@eragdzhabekova:/home/eragdzhabekova# 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 08:00:27:03:13:94 brd ff:ff:ff:ff:ff:ff
    altname enx080027031394
    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:a57c:7790:8538:cb85/64 scope global dynamic noprefixroute
       valid_lft 86376sec preferred_lft 14376sec
    inet6 fe80::83fb:88b5:8dab:d/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
root@eragdzhabekova:/home/eragdzhabekova#
```

Рис. 7: Изменение параметров соединения static

Просмотр параметров через nmtui



Графический интерфейс сети



Итоги работы

Вывод

В ходе лабораторной работы были изучены принципы настройки сетевых интерфейсов в Linux.

Получены навыки конфигурации DHCP и статической адресации, добавления маршрутов и DNS-серверов, а также использования инструментов `nmcli` и `nmtui` для управления соединениями.