

Лабораторная работа №12

Настройки сети в Linux

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Цель работы

Получение практических навыков настройки сетевых параметров системы с использованием утилит **ip**, **nmcli** и **nmtui** в ОС семейства RHEL.

Проверка конфигурации сети

```
haoladar@haoladar:~$ su
Password:
root@haoladar:/home/haoladar# 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
         2130      18      0      0      0      0
    TX:  bytes packets errors dropped carrier collsns
         2130      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 08:00:27:61:1c:23 brd ff:ff:ff:ff:ff:ff
    RX:  bytes packets errors dropped missed mcast
        150757858 112515      0      0      0      1
    TX:  bytes packets errors dropped carrier collsns
        2005027   33010      0      0      0      0
    altnam enx080027611c23
root@haoladar:/home/haoladar#
root@haoladar:/home/haoladar# 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@haoladar:/home/haoladar#
```

Рис. 1: Вывод команды ip -s link

```
root@haoladar:~# 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 08:00:27:61:1c:23 brd ff:ff:ff:ff:ff:ff
    altname enx080027611c23
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 86249sec preferred_lft 86249sec
    inet6 fd17:625c:f037:2:a00:27ff:fe61:1c23/64 scope global dynamic noprefixroute
        valid_lft 86250sec preferred_lft 14250sec
    inet6 fe80::a00:27ff:fe61:1c23/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
root@haoladar:~#
```

Рис. 2: Вывод ip addr show

```
root@naoladar:/nome/naoladar#  
root@haoladar:/home/haoladar# 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=21.0 ms  
64 bytes from 8.8.8.8: icmp_seq=2 ttl=255 time=21.4 ms  
64 bytes from 8.8.8.8: icmp_seq=3 ttl=255 time=22.0 ms  
64 bytes from 8.8.8.8: icmp_seq=4 ttl=255 time=21.8 ms  
  
--- 8.8.8.8 ping statistics ---  
4 packets transmitted, 4 received, 0% packet loss, time 2998ms  
rtt min/avg/max/mdev = 20.986/21.550/22.004/0.395 ms  
root@haoladar:/home/haoladar#
```

Рис. 3: Проверка подключения к интернету

Добавление дополнительного IP-адреса

```
root@haoladar:/home/haoladar#
root@haoladar:/home/haoladar# ip addr add 10.0.0.10/24 dev enp0s3
root@haoladar:/home/haoladar# 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 08:00:27:61:1c:23 brd ff:ff:ff:ff:ff:ff
    altname enx080027611c23
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 86154sec preferred_lft 86154sec
    inet 10.0.0.10/24 scope global enp0s3
        valid_lft forever preferred_lft forever
    inet6 fd17:625c:f037:2:a00:27ff:fe61:1c23/64 scope global dynamic noprefixroute
        valid_lft 86155sec preferred_lft 14155sec
    inet6 fe80::a00:27ff:fe61:1c23/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
root@haoladar:/home/haoladar#
```

Рис. 4: Добавление адреса к интерфейсу


```
root@haoladar:/home/haoladar# 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:fe61:1c23 prefixlen 64 scopeid 0x0<global>
    inet6 fe80::a00:27ff:fe61:1c23 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:61:1c:23 txqueuelen 1000 (Ethernet)
    RX packets 112539 bytes 150759946 (143.7 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 33040 bytes 2007903 (1.9 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 18 bytes 2130 (2.0 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 18 bytes 2130 (2.0 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

root@haoladar:/home/haoladar#
```

Рис. 5: Вывод ifconfig

```
root@haoladar:/home/haoladar# 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	4096	*:websm	*:*
tcp	LISTEN	0	511	*:http	*:*
tcp	LISTEN	0	32	*:ftp	*:*
tcp	LISTEN	0	128	:::ssh	:::*
tcp	LISTEN	0	4096	:::1:ipp	:::*

```
root@haoladar:/home/haoladar#
```

Рис. 6: Прослушиваемые порты TCP и UDP

```
root@haoladar:/home/haoladar# nmcli connection show
NAME      UUID                                  TYPE      DEVICE
enp0s3    f1986581-5db5-3f91-9cd2-0abdeb1d37c1 ethernet  enp0s3
lo        40b35c2b-c086-4b7a-824d-bc0774bc7116 loopback   lo
root@haoladar:/home/haoladar# nmcli connection add con-name "dhcp" type ethernet ifname enp0s3
Connection 'dhcp' (3e5fd209-a829-4524-b2bc-d8e565a1bb45) successfully added.
root@haoladar:/home/haoladar# nmcli connection add con-name "static" ifname enp0s3 autoconnect no type ether
net ip4 10.0.0.10/24 gw4 10.0.0.1 ifname enp0s3
Connection 'static' (e82768de-3126-4c18-b698-72fc44445ef7) successfully added.
root@haoladar:/home/haoladar# nmcli connection show
NAME      UUID                                  TYPE      DEVICE
enp0s3    f1986581-5db5-3f91-9cd2-0abdeb1d37c1 ethernet  enp0s3
lo        40b35c2b-c086-4b7a-824d-bc0774bc7116 loopback   lo
dhcp      3e5fd209-a829-4524-b2bc-d8e565a1bb45 ethernet   --
static    e82768de-3126-4c18-b698-72fc44445ef7 ethernet   --
root@haoladar:/home/haoladar# █
```

Рис. 7: Просмотр существующих подключений

Создание соединений dhcp и static

```
root@haoladar:/home/haoladar# nmcli connection up static
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/3)
root@haoladar:/home/haoladar# nmcli connection show
NAME      UUID                                  TYPE      DEVICE
static    e82768de-3126-4c18-b698-72fc44445ef7 ethernet  enp0s3
lo        40b35c2b-c086-4b7a-824d-bc0774bc7116 loopback   lo
dhcp      3e5fd209-a829-4524-b2bc-d8e565a1bb45 ethernet   --
enp0s3    f1986581-5db5-3f91-9cd2-0abdeb1d37c1 ethernet   --
root@haoladar:/home/haoladar# 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 08:00:27:61:1c:23 brd ff:ff:ff:ff:ff:ff
    altname enx080027611c23
    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:afd9:2891:2681:409f/64 scope global dynamic noprefixroute
        valid_lft 86391sec preferred_lft 14391sec
    inet6 fe80::be56:8c1e:8cf8:8148/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
root@haoladar:/home/haoladar#
```

Рис. 8: Создание соединений

Переключение между соединениями

```
root@haoladar:/home/haoladar# nmcli connection up "dhcp"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/4)
root@haoladar:/home/haoladar# nmcli connection show
NAME      UUID                                  TYPE      DEVICE
dhcp      3e5fd209-a829-4524-b2bc-d8e565a1bb45 ethernet  enp0s3
lo        40b35c2b-c086-4b7a-824d-bc0774bc7116 loopback   lo
enp0s3    f1986581-5db5-3f91-9cd2-0abdeb1d37c1 ethernet   --
static    e82768de-3126-4c18-b698-72fc44445ef7 ethernet   --
root@haoladar:/home/haoladar# 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 08:00:27:61:1c:23 brd ff:ff:ff:ff:ff:ff
    altname enx080027611c23
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 86397sec preferred_lft 86397sec
    inet6 fd17:625c:f037:2:cc8f:8cbe:3b8b:c2c5/64 scope global dynamic noprefixroute
        valid_lft 86398sec preferred_lft 14398sec
    inet6 fe80::9865:5d2:2de7:a4df/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
root@haoladar:/home/haoladar#
```

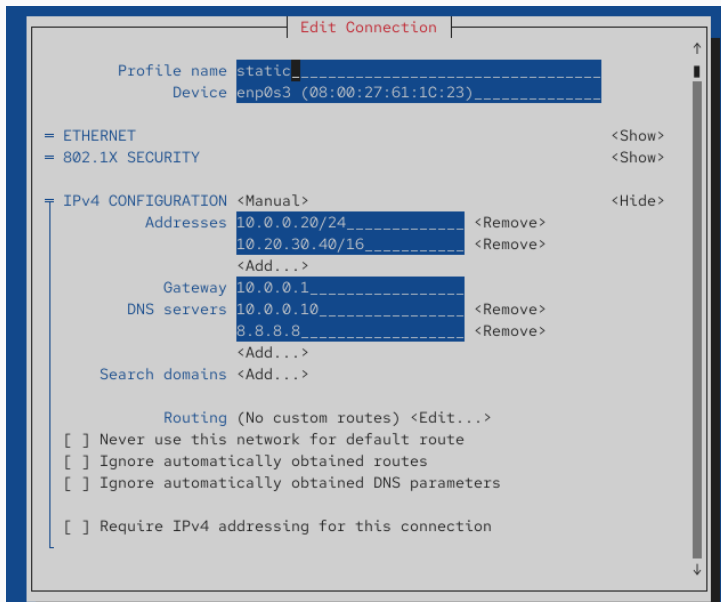
Рис. 9: Переключение между DHCP и Static

```
root@haoladar: /home/haoladar#  
root@haoladar:/home/haoladar# nmcli connection modify static connection.autoconnect no  
root@haoladar:/home/haoladar# nmcli connection modify static ipv4.dns 10.0.0.10  
root@haoladar:/home/haoladar# nmcli connection modify static +ipv4.dns 8.8.8.8  
root@haoladar:/home/haoladar# nmcli connection modify static ipv4.addresses 10.0.0.20/24  
root@haoladar:/home/haoladar# nmcli connection modify static +ipv4.addresses 10.20.30.40/16  
root@haoladar:/home/haoladar# nmcli connection up static  
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/5)  
root@haoladar:/home/haoladar# nmcli connection show  
NAME      UUID                                  TYPE      DEVICE  
static    e82768de-3126-4c18-b698-72fc44445ef7 ethernet  enp0s3  
lo        40b35c2b-c086-4b7a-824d-bc0774bc7116 loopback  lo  
dhcp      3e5fd209-a829-4524-b2bc-d8e565a1bb45 ethernet  --  
enp0s3    f1986581-5db5-3f91-9cd2-0abdeb1d37c1 ethernet  --  
root@haoladar:/home/haoladar#
```

Рис. 10: Активация статического соединения после изменений

```
root@haoladar:/home/haoladar# 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 08:00:27:61:1c:23 brd ff:ff:ff:ff:ff:ff
    altname enx080027611c23
    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:afd9:2891:2681:409f/64 scope global dynamic noprefixroute
        valid_lft 86374sec preferred_lft 14374sec
    inet6 fe80::be56:8c1e:8cf8:8148/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
root@haoladar:/home/haoladar#
```

Рис. 11: Вывод ip addr после изменений



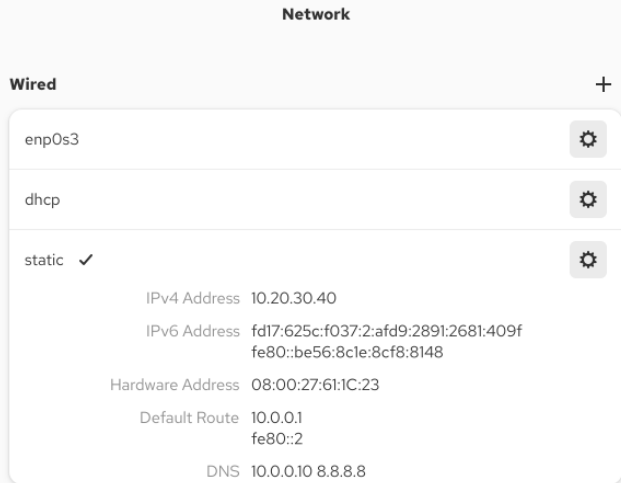


Рис. 13: Настройки сети в GUI

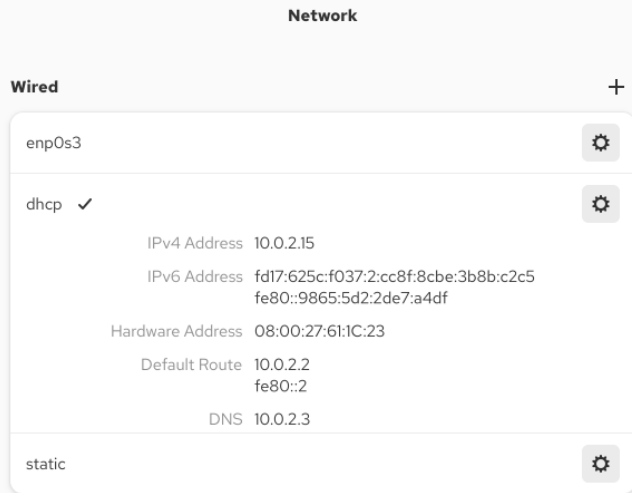


Рис. 14: Переключение на DHCP

Итоги работы

- Освоены утилиты `ip`, `nmcli`, `nmtui`
- Настроены статические и динамические соединения
- Изучены DNS и маршрутизация
- Получены навыки работы с сетевыми профилями и параметрами интерфейсов