

Лабораторная работа №12

Настройки сети в Linux

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Информация

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Цели и задачи

- Получить навыки настройки сетевых параметров системы.
- Продемонстрируйте навыки использования утилиты `ip` (см. раздел 12.4.1).
- Продемонстрируйте навыки использования утилиты `nmcli` (см. раздел 12.4.2 и 12.4.3).

Материалы и методы

- Linux (дистрибутив Rocky 9.6)
- Linux Fedora Sway (Markdown)
- Oracle VirtualBox

Выполнение лабораторной работы

Проверка конфигурации сети: Список сетевых подключений ip link

ip -s link

```
[aeakunaeva@aeakunaeva ~]$ su -
Password:
[root@aeakunaeva ~]# 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
         10302      114        0        0        0        0
    TX:  bytes packets errors dropped carrier collsns
         10302      114        0        0        0        0
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP mode DEFAULT group
up default qlen 1000
    link/ether 08:00:27:a7:34:e6 brd ff:ff:ff:ff:ff:ff
    RX:  bytes packets errors dropped missed mcast
         15423066    10593        0        0        0        3
    TX:  bytes packets errors dropped carrier collsns
         360461      5759        0        0        0        0
```

Список текущих маршрутов ip route

ip route show

```
[root@aeakunaeva ~]# 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
```

Список текущих назначений адресов ip addr

ip addr show

```
[root@aeakunaeva ~]# 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@aeakunaeva ~]# 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 ql
en 1000
    link/ether 08:00:27:a7:34:e6 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 85656sec preferred_lft 85656sec
    inet6 fd17:625c:f037:2:a00:27ff:fea7:34e6/64 scope global dynamic noprefixroute
        valid_lft 85773sec preferred_lft 13773sec
    inet6 fe80::a00:27ff:fea7:34e6/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
```

Проверка действия и добавление адреса к интерфейсу

```
ping -c 4 8.8.8.8
```

```
ip addr add 10.0.0.10/24 dev enp0s3
```

```
ip addr show
```

```
[root@aeakunaeva ~]# 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=19.2 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=255 time=18.6 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=255 time=18.6 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=255 time=18.3 ms

--- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3007ms
rtt min/avg/max/mdev = 18.280/18.673/19.203/0.333 ms
[root@aeakunaeva ~]# ip addr add 10.0.0.10/24 dev enp0s3
[root@aeakunaeva ~]# 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 ql
en 1000
    link/ether 08:00:27:a7:34:e6 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 85436sec preferred_lft 85436sec
    inet 10.0.0.10/24 scope global enp0s3
        valid_lft forever preferred_lft forever
    inet6 fd17:625c:f037:2:a00:27ff:fea7:34e6/64 scope global dynamic noprefixroute
        valid_lft 86294sec preferred_lft 14294sec
```

Порты ifconfig и UDP, TCP

ifconfig

ss -tul

```
[root@aeakunaeva ~]# 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:fea7:34e6  prefixlen 64  scopeid 0x20<link>
        inet6 fd17:625c:f037:2:a00:27ff:fea7:34e6  prefixlen 64  scopeid 0x0<global>
        ether 08:00:27:a7:34:e6  txqueuelen 1000  (Ethernet)
        RX packets 10617  bytes 15425350 (14.7 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 5795  bytes 363985 (355.4 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 114  bytes 10302 (10.0 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 114  bytes 10302 (10.0 KiB)
        TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0
```

```
[root@aeakunaeva ~]# 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	32	*:ftp	*:*
tcp	LISTEN	0	4096	:::1:ipp	:::*

Управление сетевыми подключениями с помощью nmcli

```
nmcli connection show
```

```
nmcli connection add con-name "dhcp" type ethernet ifname enp0s3
```

```
nmcli connection add con-name "static" ifname <ifname> autoconnect no type et
```

```
nmcli connection up "static"
```

```
[root@aeakunaeva ~]# nmcli connection show
NAME      UUID                                  TYPE      DEVICE
enp0s3    d88d283f-1d4b-308d-9107-97ff630e19f1 ethernet  enp0s3
lo        f4fec77f-645e-44ea-b17a-e464e8ae422a loopback  lo

[root@aeakunaeva ~]# nmcli connection add con-name "dhcp" type ethernet ifname enp0s3
Connection 'dhcp' (41a6fde2-ce8b-4747-899f-5607b294e182) successfully added.
[root@aeakunaeva ~]# nmcli connection add con-name "static" ifname enp0s3
Error: 'type' argument is required.
[root@aeakunaeva ~]# 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' (f3085935-b463-4212-9b48-871b4e3b08b9) successfully added.
[root@aeakunaeva ~]# nmcli connection show
NAME      UUID                                  TYPE      DEVICE
enp0s3    d88d283f-1d4b-308d-9107-97ff630e19f1 ethernet  enp0s3
lo        f4fec77f-645e-44ea-b17a-e464e8ae422a loopback  lo
dhcp      41a6fde2-ce8b-4747-899f-5607b294e182 ethernet  --
static    f3085935-b463-4212-9b48-871b4e3b08b9 ethernet  --

[root@aeakunaeva ~]# nmcli connection up "static"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveCo
nnection/3)
[root@aeakunaeva ~]# nmcli connection show
NAME      UUID                                  TYPE      DEVICE
static    f3085935-b463-4212-9b48-871b4e3b08b9 ethernet  enp0s3
lo        f4fec77f-645e-44ea-b17a-e464e8ae422a loopback  lo
dhcp      41a6fde2-ce8b-4747-899f-5607b294e182 ethernet  --
enp0s3    d88d283f-1d4b-308d-9107-97ff630e19f1 ethernet  --
```

Переключения на новые соединения

nmcli connection up "dhcp"

```
[root@aeakunaeva ~]# 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:a7:34:e6 brd ff:ff:ff:ff:ff:ff
    inet 10.0.0.10/24 brd 10.0.0.255 scope global noprefixroute enp0s3
        valid_lft forever preferred_lft forever
    inet6 fd17:625c:f037:2:9dbc:f5fa:7568:25cb/64 scope global dynamic noprefixroute
        valid_lft 86386sec preferred_lft 14386sec
    inet6 fe80::536e:244f:abc8:2d7a/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
[root@aeakunaeva ~]# nmcli connection up "dhcp"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/4)
[root@aeakunaeva ~]# nmcli connection show
```

NAME	UUID	TYPE	DEVICE
dhcp	41a6fde2-ce8b-4747-899f-5607b294e182	ethernet	enp0s3
lo	f4fec77f-645e-44ea-b17a-e464e8ae422a	loopback	lo
enp0s3	d88d283f-1d4b-308d-9107-97ff630e19f1	ethernet	--
static	f3085935-b463-4212-9b48-871b4e3b08b9	ethernet	--

Проверка переключения ip addr и nmcli con show

nmcli connection show

ip addr

```
[root@aeakunaeva ~]# 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 ql
en 1000
    link/ether 08:00:27:a7:34:e6 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 86392sec preferred_lft 86392sec
    inet6 fd17:625c:f037:2:1789:511:68fb:a06a/64 scope global dynamic noprefixroute
        valid_lft 86394sec preferred_lft 14394sec
    inet6 fe80::63fe:452f:52ec:20d1/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
```


Добавление и изменение DNS-серверов

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

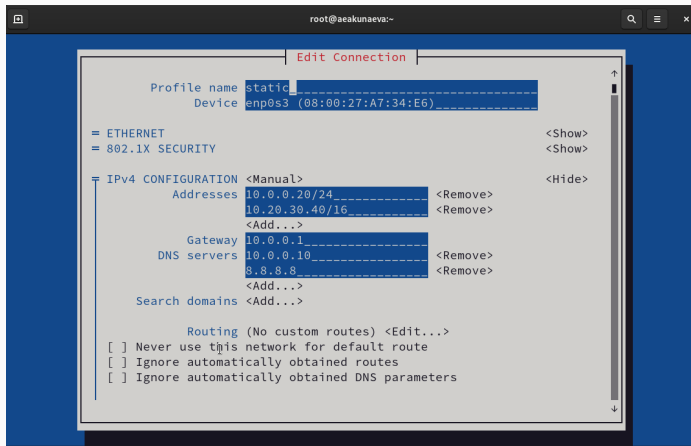
NAME	UUID	TYPE	DEVICE
static	f3085935-b463-4212-9b48-871b4e3b08b9	ethernet	enp0s3
lo	f4fec77f-645e-44ea-b17a-e464e8ae422a	loopback	lo
dhcp	41a6fde2-ce8b-4747-899f-5607b294e182	ethernet	--
enp0s3	d88d283f-1d4b-308d-9107-97ff630e19f1	ethernet	--

Проверка переподключения и nmtui. nmcli

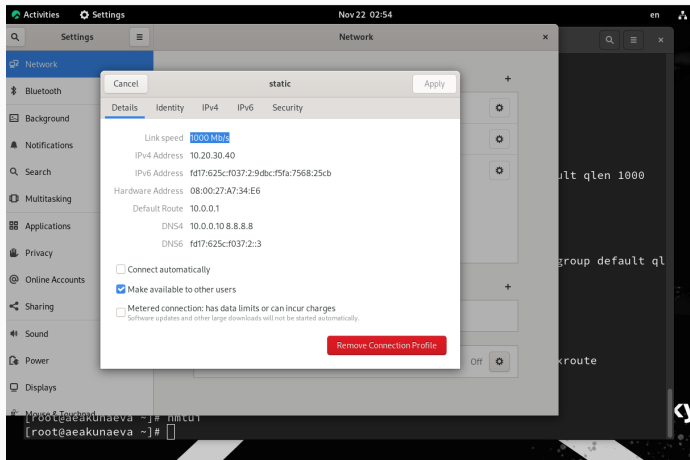
```
[root@aeakunaeva ~]# ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        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:a7:34:e6 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 fd17:625c:f037:2:9dbc:f5fa:7568:25cb/64 scope global dynamic noprefixroute
        valid_lft 86388sec preferred_lft 14388sec
    inet6 fe80::536e:244f:abc8:2d7a/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
[root@aeakunaeva ~]# nmtui
[root@aeakunaeva ~]# nmcli connection up "enp0s3"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/9)
[root@aeakunaeva ~]#
```

Настройки сети на устройстве nmtui

nmtui



Настройки сети в граф. интерфейсе системы



Выводы

Я получила навыки настройки сетевых параметров системы.