

Презентация по лабораторной работе №12

Настройки сети в Linux

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Цели и задачи работы

Получить практические навыки настройки сетевых параметров и управления сетевыми интерфейсами в ОС Linux.

Ход выполнения работы

Проверка конфигурации сети

```
aradzhigalieva@aradzhigalieva:~$ su
Password:
root@aradzhigalieva:/home/aradzhigalieva# 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
         2166      18      0      0      0      0
    TX: bytes packets errors dropped carrier collsns
         2166      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 08:00:27:12:16:f3 brd ff:ff:ff:ff:ff:ff
    RX: bytes packets errors dropped missed mcast
         81111     238      0      0      0      2
    TX: bytes packets errors dropped carrier collsns
         29338     269      0      0      0      0
    altnam enx0800271216f3
root@aradzhigalieva:/home/aradzhigalieva#
root@aradzhigalieva:/home/aradzhigalieva# 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@aradzhigalieva:/home/aradzhigalieva#
```

Рис. 1: Вывод информации о сетевых интерфейсах

Проверка конфигурации сети

```
root@aradzhigalieva:/home/aradzhigalieva#  
root@aradzhigalieva:/home/aradzhigalieva# 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 08:00:27:12:16:f3 brd ff:ff:ff:ff:ff:ff  
    altname enx0800271216f3  
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3  
        valid_lft 86198sec preferred_lft 86198sec  
    inet6 fd17:625c:f037:2:a00:27ff:fe12:16f3/64 scope global dynamic noprefixroute  
        valid_lft 86199sec preferred_lft 14199sec  
    inet6 fe80::a00:27ff:fe12:16f3/64 scope link noprefixroute  
        valid_lft forever preferred_lft forever  
root@aradzhigalieva:/home/aradzhigalieva#
```

Рис. 2: Информация об адресах интерфейсов

```
root@aradzhigalieva:/home/aradzhigalieva#  
root@aradzhigalieva:/home/aradzhigalieva# 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=21.1 ms  
64 bytes from 8.8.8.8: icmp_seq=2 ttl=255 time=21.2 ms  
64 bytes from 8.8.8.8: icmp_seq=3 ttl=255 time=21.2 ms  
64 bytes from 8.8.8.8: icmp_seq=4 ttl=255 time=21.6 ms  
  
--- 8.8.8.8 ping statistics ---  
4 packets transmitted, 4 received, 0% packet loss, time 3019ms  
rtt min/avg/max/mdev = 21.065/21.264/21.577/0.190 ms  
root@aradzhigalieva:/home/aradzhigalieva#
```

Рис. 3: Результаты проверки соединения

Добавление IP-адреса и просмотр маршрутов

```
root@aradzhigalieva:/home/aradzhigalieva# ip addr add 10.0.0.10/24 dev enp0s3
root@aradzhigalieva:/home/aradzhigalieva# 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 08:00:27:12:16:f3 brd ff:ff:ff:ff:ff:ff
    altname enx0800271216f3
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 86058sec preferred_lft 86058sec
    inet 10.0.0.10/24 scope global enp0s3
        valid_lft forever preferred_lft forever
    inet6 fd17:625c:f037:2:a00:27ff:fe12:16f3/64 scope global dynamic noprefixroute
        valid_lft 86367sec preferred_lft 14367sec
    inet6 fe80::a00:27ff:fe12:16f3/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
root@aradzhigalieva:/home/aradzhigalieva#
```

Рис. 4: Добавление нового IP-адреса


```
root@aradzhigalieva: /home/aradzhigalieva#  
root@aradzhigalieva: /home/aradzhigalieva# 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:fe12:16f3 prefixlen 64 scopeid 0x20<link>  
    inet6 fd17:625c:f037:2:a00:27ff:fe12:16f3 prefixlen 64 scopeid 0x0<global>  
    ether 08:00:27:12:16:f3 txqueuelen 1000 (Ethernet)  
    RX packets 267 bytes 84067 (82.0 KiB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 308 bytes 33166 (32.3 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 18 bytes 2166 (2.1 KiB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 18 bytes 2166 (2.1 KiB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
root@aradzhigalieva: /home/aradzhigalieva#
```

Рис. 5: Вывод команды ifconfig

```
root@aradzhigalieva:/home/aradzhigalieva# 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           [::1]:323              [::]:*
udp        UNCONN     0           0           [::]:mdns              [::]:*
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           511         *:http                  *:*
tcp        LISTEN     0           128         [::]:ssh                [::]:*
tcp        LISTEN     0           32          *:ftp                   *:*
tcp        LISTEN     0           4096        *:websm                 *:*
tcp        LISTEN     0           4096        [::1]:ipp               [::]:*
```

Рис. 6: Список прослушиваемых портов

Управление соединениями через nmcli

Создание подключений DHCP и Static

```
-----
root@aradzhigalieva:/home/aradzhigalieva# nmcli connection show
NAME      UUID                                  TYPE      DEVICE
enp0s3    fa86e494-44ef-337a-a1b7-261fa7a22628 ethernet  enp0s3
lo        38504993-c052-44b3-8d7b-157e09ca7bec loopback  lo
root@aradzhigalieva:/home/aradzhigalieva# nmcli connection add con-name "dhcp" type ethernet ifname enp0s3
Connection 'dhcp' (9b1fd952-1bda-4e82-9e5b-5241ccd8481a) successfully added.
root@aradzhigalieva:/home/aradzhigalieva# 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' (18d48e66-0694-4765-8e23-0db6ca2e8ed6) successfully added.
root@aradzhigalieva:/home/aradzhigalieva# nmcli connection show
NAME      UUID                                  TYPE      DEVICE
enp0s3    fa86e494-44ef-337a-a1b7-261fa7a22628 ethernet  enp0s3
lo        38504993-c052-44b3-8d7b-157e09ca7bec loopback  lo
dhcp      9b1fd952-1bda-4e82-9e5b-5241ccd8481a ethernet  --
static    18d48e66-0694-4765-8e23-0db6ca2e8ed6 ethernet  --
root@aradzhigalieva:/home/aradzhigalieva# nmcli connection up "static"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/3)
root@aradzhigalieva:/home/aradzhigalieva# nmcli connection show
NAME      UUID                                  TYPE      DEVICE
static    18d48e66-0694-4765-8e23-0db6ca2e8ed6 ethernet  enp0s3
lo        38504993-c052-44b3-8d7b-157e09ca7bec loopback  lo
dhcp      9b1fd952-1bda-4e82-9e5b-5241ccd8481a ethernet  --
enp0s3    fa86e494-44ef-337a-a1b7-261fa7a22628 ethernet  --
root@aradzhigalieva:/home/aradzhigalieva#
```

Рис. 7: Просмотр существующих соединений

```
root@aradzhigaliev:/home/aradzhigaliev#  
root@aradzhigaliev:/home/aradzhigaliev# 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 08:00:27:12:16:f3 brd ff:ff:ff:ff:ff:ff  
    altname enx0800271216f3  
    inet 10.0.0.10/24 brd 10.0.0.255 scope global noprefixroute enp0s3  
        valid_lft forever preferred_lft forever  
    inet6 fd17:625c:f037:2:93ce:1da:5168:d6ec/64 scope global dynamic noprefixroute  
        valid_lft 86379sec preferred_lft 14379sec  
    inet6 fe80::e144:5056:9eb7:fd28/64 scope link noprefixroute  
        valid_lft forever preferred_lft forever  
root@aradzhigaliev:/home/aradzhigaliev#
```

Рис. 8: Активация статического подключения

Переключение обратно на DHCP

```
root@aradzhigalieva:/home/aradzhigalieva# nmcli connection up "dhcp"
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/4)
root@aradzhigalieva:/home/aradzhigalieva# nmcli connection show
NAME      UUID                                  TYPE      DEVICE
dhcp      9b1fd952-1bda-4e82-9e5b-5241ccd8481a ethernet  enp0s3
lo        38504993-c052-44b3-8d7b-157e09ca7bec loopback  lo
enp0s3    fa86e494-44ef-337a-a1b7-261fa7a22628 ethernet  --
static    18d48e66-0694-4765-8e23-0db6ca2e8ed6 ethernet  --
root@aradzhigalieva:/home/aradzhigalieva# 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 08:00:27:12:16:f3 brd ff:ff:ff:ff:ff:ff
    altname enx0800271216f3
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 86317sec preferred_lft 86317sec
    inet6 fd17:625c:f037:2:76a3:60cd:ac5:86a9/64 scope global dynamic noprefixroute
        valid_lft 86318sec preferred_lft 14318sec
    inet6 fe80::9ea9:32dd:9d77:b2f2/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
root@aradzhigalieva:/home/aradzhigalieva#
```

Рис. 9: Переключение обратно на DHCP

Изменение параметров соединений

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

NAME	UUID	TYPE	DEVICE
static	18d48e66-0694-4765-8e23-0db6ca2e8ed6	ethernet	enp0s3
lo	38504993-c052-44b3-8d7b-157e09ca7bec	loopback	lo
dhcp	9b1fd952-1bda-4e82-9e5b-5241ccd8481a	ethernet	--
enp0s3	fa86e494-44ef-337a-a1b7-261fa7a22628	ethernet	--

```
root@aradzhigalieva:/home/aradzhigalieva#
```

Рис. 10: Изменение параметров соединения и добавление адресов


```
root@aradzhigalieva:/home/aradzhigalieva# 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 08:00:27:12:16:f3 brd ff:ff:ff:ff:ff:ff
    altname enx0800271216f3
    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:f037:2:93ce:1da:5168:d6ec/64 scope global dynamic noprefixroute
        valid_lft 86379sec preferred_lft 14379sec
    inet6 fe80::e144:5056:9eb7:fd28/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
root@aradzhigalieva:/home/aradzhigalieva#
```

Рис. 11: Проверка IP-адресов интерфейса

Просмотр параметров через nmtui

Edit Connection

Profile name static

Device enp0s3 (08:00:27:12:16:F3)

= ETHERNET <Show>

= 802.1X SECURITY <Show>

= IPv4 CONFIGURATION <Manual> <Hide>

Addresses 10.0.0.20/24 <Remove>

10.20.30.40/16 <Remove>

<Add...>

Gateway 10.0.0.1

DNS servers 10.0.0.10 <Remove>

8.8.8.8 <Remove>

<Add...>

Search domains <Add...>

Routing (No custom routes) <Edit...>

☐ Never use this network for default route

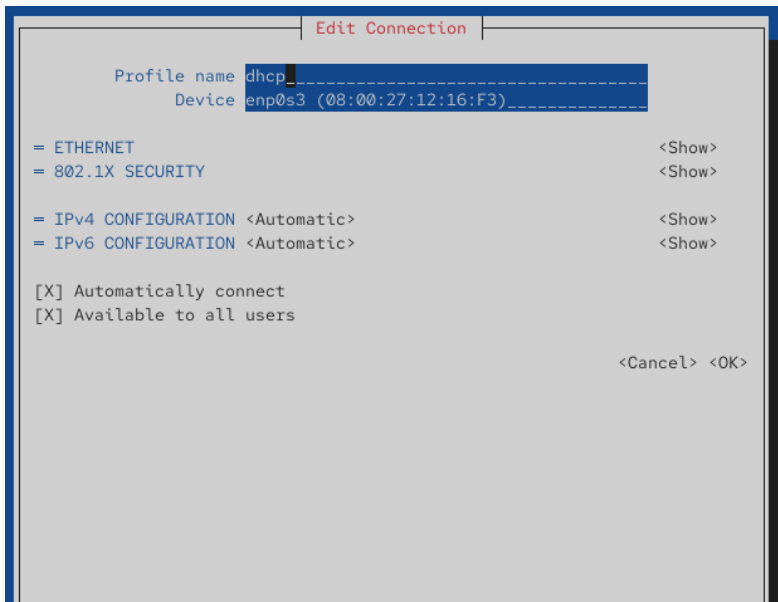
☐ Ignore automatically obtained routes

☐ Ignore automatically obtained DNS parameters

☐ Require IPv4 addressing for this connection

= IPv6 CONFIGURATION <Automatic> <Show>

☐ Automatically connect



Network

Wired



enp0s3



dhcp



static ✓



IPv4 Address 10.20.30.40

IPv6 Address fd17:625c:f037:2:93ce:1da:5168:d6ec
fe80::e144:5056:9eb7:fd28

Hardware Address 08:00:27:12:16:F3

Default Route 10.0.0.1
fe80::2

DNS 10.0.0.10 8.8.8.8

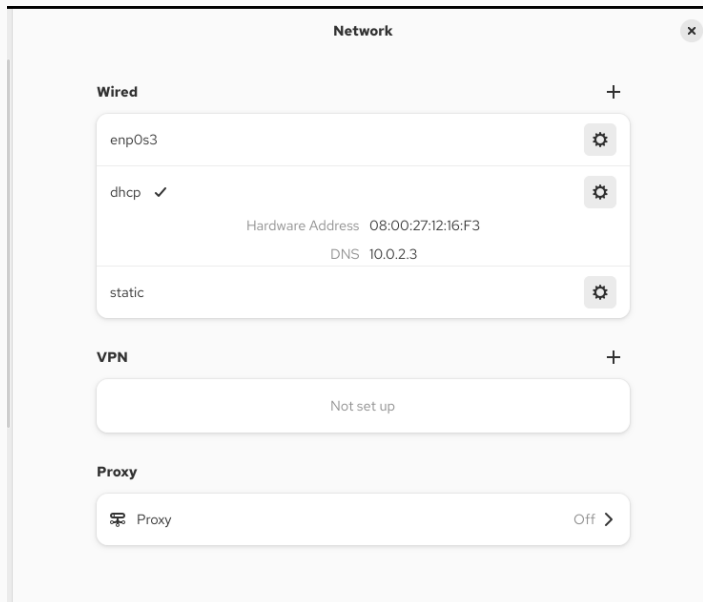
VPN



Not set up

Proxy

Переключение обратно на DHCP в GUI



Редактирование профиля Static в GUI

Cancel

static

Apply

Details Identity IPv4 IPv6 Security

IPv4 Method

☐ Automatic (DHCP)

☒ Manual

☐ Shared to other computers

☐ Link-Local Only

☐ Disable

Addresses

Address	Netmask	Gateway	
10.0.0.20	255.255.255.0	10.0.0.1	ⓧ
10.20.30.40	255.255.0.0		ⓧ
			ⓧ

DNS

Automatic ☒

10.0.0.10, 8.8.8.8

Separate IP addresses with commas

Routes

Automatic ☒

Address	Netmask	Gateway	Metric	
				ⓧ

Проверка после возврата к DHCP

Network

Wired



enp0s3



dhcp ✓



IPv4 Address 10.0.2.15

IPv6 Address fd17:625c:f037:2:76a3:60cd:ac5:86a9
fe80::9ea9:32dd:9d77:b2f2

Hardware Address 08:00:27:12:16:F3

Default Route 10.0.2.2
fe80::2

DNS 10.0.2.3

static



VPN



Not set up

Вывод

В ходе работы я изучила управление сетевыми параметрами и интерфейсами в Linux. Закрепила навыки использования `ip`, `nmcli`, `nmtui` и графических инструментов. Научилась настраивать статическую и динамическую адресацию, маршруты и DNS. Полученные знания важны для администрирования сетевой инфраструктуры и обеспечения стабильной работы системы.