

Лабораторная работа №12

Настройки сети в Linux

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Цель работы

Получить навыки настройки сетевых параметров системы и управления соединениями с помощью инструментов Linux.

Ход выполнения работы

```
mlabsi@mlabsi:~$ 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
         2313      20      0      0      0      0
    TX:  bytes packets errors dropped carrier collsns
         2313      20      0      0      0      0
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP mode DEFAULT group de
fault qlen 1000
    link/ether 08:00:27:3e:70:b3 brd ff:ff:ff:ff:ff:ff
    RX:  bytes packets errors dropped missed mcast
        150651511 109332      0      0      0      3
    TX:  bytes packets errors dropped carrier collsns
        1801277 29544      0      3      0      0
    altnam enx0800273e70b3
mlabsi@mlabsi:~$ su
Password:
root@mlabsi:/home/mlabsi# 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@mlabsi:/home/mlabsi#
```

Рис. 1: Вывод команды ip -s link

Анализ таблицы маршрутов и IP-адресов

```
root@mlabsi:/home/mlabsi#  
root@mlabsi:/home/mlabsi# 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 08:00:27:3e:70:b3 brd ff:ff:ff:ff:ff:ff  
    altname enx0800273e70b3  
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3  
        valid_lft 86133sec preferred_lft 86133sec  
    inet6 fd17:625c:f037:2:a00:27ff:fe3e:70b3/64 scope global dynamic noprefixroute  
        valid_lft 86361sec preferred_lft 14361sec  
    inet6 fe80::a00:27ff:fe3e:70b3/64 scope link noprefixroute  
        valid_lft forever preferred_lft forever  
root@mlabsi:/home/mlabsi#
```

Рис. 2: Информация о сетевых адресах

Добавление дополнительного IP и проверка

```
root@mlabsi:/home/mlabsi# ip addr add 10.0.0.10/24 dev enp0s3
root@mlabsi:/home/mlabsi# 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 08:00:27:3e:70:b3 brd ff:ff:ff:ff:ff:ff
    altname enx0800273e70b3
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 85965sec preferred_lft 85965sec
    inet 10.0.0.10/24 scope global enp0s3
        valid_lft forever preferred_lft forever
    inet6 fd17:625c:f037:2:a00:27ff:fe3e:70b3/64 scope global dynamic noprefixroute
        valid_lft 86194sec preferred_lft 14194sec
    inet6 fe80::a00:27ff:fe3e:70b3/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
root@mlabsi:/home/mlabsi#
```

Рис. 3: Добавление дополнительного адреса

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

```
root@mlabsi:/home/mlabsi#
```

Рис. 4: Прослушиваемые порты TCP и UDP


```
root@mlabsi:/home/mlabsi#  
root@mlabsi:/home/mlabsi# nmcli connection show  
NAME      UUID                                  TYPE      DEVICE  
enp0s3    e4523cbd-c0b5-3b2c-a6a0-8fc99b156616 ethernet  enp0s3  
lo        fb9962d5-bf8d-40b4-8190-1e27a94e66df loopback   lo  
root@mlabsi:/home/mlabsi# nmcli connection add con-name "dhcp" type ethernet ifname enp0s3  
Connection 'dhcp' (0aefcb88-486d-4ce0-95cd-0ae05f252188) successfully added.  
root@mlabsi:/home/mlabsi# 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' (d87810e4-b117-48b4-919d-cea7b977edd5) successfully added.  
root@mlabsi:/home/mlabsi# nmcli connection show  
NAME      UUID                                  TYPE      DEVICE  
enp0s3    e4523cbd-c0b5-3b2c-a6a0-8fc99b156616 ethernet  enp0s3  
lo        fb9962d5-bf8d-40b4-8190-1e27a94e66df loopback   lo  
dhcp      0aefcb88-486d-4ce0-95cd-0ae05f252188 ethernet  --  
static    d87810e4-b117-48b4-919d-cea7b977edd5 ethernet  --  
root@mlabsi:/home/mlabsi#
```

Рис. 5: Текущие соединения nmcli

Переключение режимов

```
root@mlabsi:/home/mlabsi#
root@mlabsi:/home/mlabsi# nmcli connection up dhcp
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/4)
root@mlabsi:/home/mlabsi# nmcli connection show
NAME      UUID                                  TYPE      DEVICE
dhcp      0aefcb88-486d-4ce0-95cd-0ae05f252188 ethernet  enp0s3
lo        fb9962d5-bf8d-40b4-8190-1e27a94e66df loopback   lo
enp0s3    e4523cbd-c0b5-3b2c-a6a0-8fc99b156616 ethernet  --
static    d87810e4-b117-48b4-919d-cea7b977edd5 ethernet  --
root@mlabsi:/home/mlabsi# 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 08:00:27:3e:70:b3 brd ff:ff:ff:ff:ff:ff
    altname enx0800273e70b3
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 86396sec preferred_lft 86396sec
    inet6 fd17:625c:f037:2:4d2e:a0a2:826:fea4/64 scope global dynamic noprefixroute
        valid_lft 86397sec preferred_lft 14397sec
    inet6 fe80::e367:513f:8017:776d/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
root@mlabsi:/home/mlabsi#
```

Рис. 6: Переключение обратно на DHCP

```
root@mlabsi:/home/mlabsi# nmcli connection modify static connection.autoconnect no
root@mlabsi:/home/mlabsi# nmcli connection modify static ipv4.dns 10.0.0.10
root@mlabsi:/home/mlabsi# nmcli connection modify static +ipv4.dns 8.8.8.8
root@mlabsi:/home/mlabsi# nmcli connection modify static ipv4.addresses 10.0.0.20/24
root@mlabsi:/home/mlabsi# nmcli connection modify static +ipv4.addresses 10.20.30.40/16
root@mlabsi:/home/mlabsi# nmcli connection up static
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/5)
root@mlabsi:/home/mlabsi# nmcli connection show
NAME        UUID                                  TYPE      DEVICE
static      d87810e4-b117-48b4-919d-cea7b977edd5 ethernet  enp0s3
lo          fb9962d5-bf8d-40b4-8190-1e27a94e66df loopback   lo
dhcp        0aefcb88-486d-4ce0-95cd-0ae05f252188 ethernet  --
enp0s3      e4523cbd-c0b5-3b2c-a6a0-8fc99b156616 ethernet  --
root@mlabsi:/home/mlabsi# 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 08:00:27:3e:70:b3 brd ff:ff:ff:ff:ff:ff
    altnames enx0800273e70b3
    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:f037:2:65d9:48b0:9e27:c1b5/64 scope global dynamic noprefixroute
        valid_lft 86387sec preferred_lft 14387sec
    inet6 fe80::f7c:463c:6823:18ae/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
root@mlabsi:/home/mlabsi#
```

Проверка через nmtui

Edit Connection

Profile name static

Device enp0s3 (08:00:27:3E:70:B3)

= 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

☒ Available to all users

static [Cancel] [Apply]

Details Identity **IPv4** IPv6 Security

IPv4 Method

☐ Automatic (DHCP) ☐ Link-Local Only

☒ **Manual** ☐ Disable

☐ Shared to other computers

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

Рис. 9: Конфигурация static в графическом интерфейсе

Заключение

В ходе работы изучены инструменты **ip**, **nmcli**, **nmtui** и **ifconfig**, а также конфигурационные файлы Linux.

Получены практические навыки настройки IP, шлюзов, DNS и проверки состояния сети. Освоенные приёмы позволяют эффективно администрировать сетевую инфраструктуру в системах на базе RHEL.