

МИНОБРНАУКИ РОССИИ
САНКТ-ПЕТЕРБУРГСКИЙ ГОСУДАРСТВЕННЫЙ
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ОТЧЕТ
По лабораторной работе №6
По дисциплине «Информатика»
Тема: Анализ сетевой конфигурации компьютера

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Цель работы

Исследовать сетевую конфигурацию компьютера

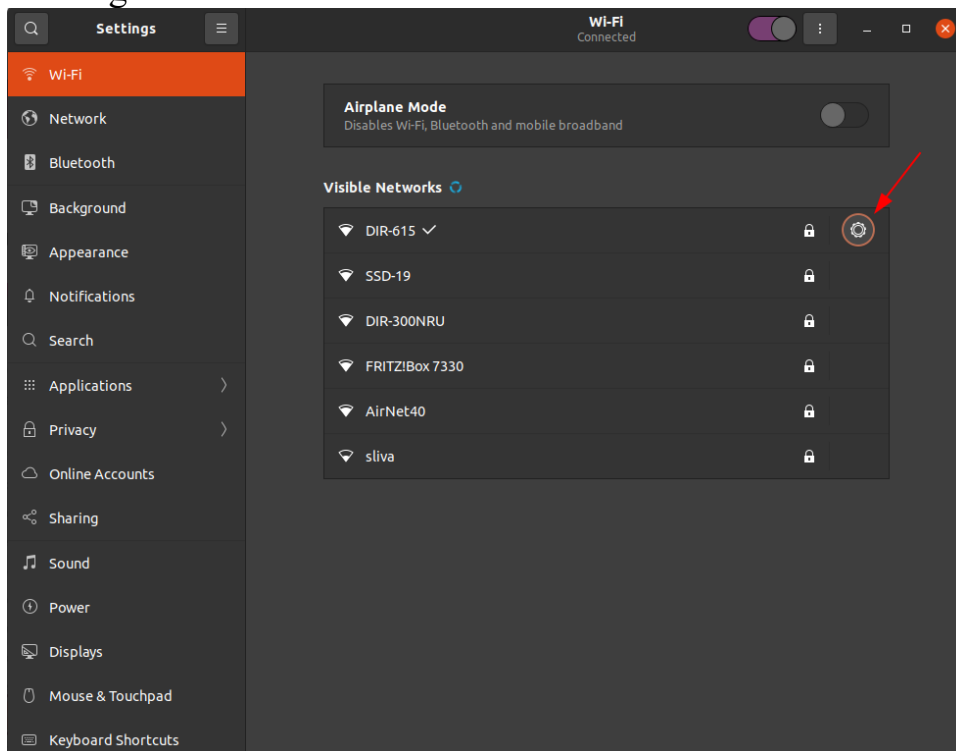
Задание

1. Просмотреть сетевую конфигурацию ОС через визуальные инструменты
2. Просмотр сетевой конфигурации через инструменты
3. Проверка работоспособности сетевой конфигурации
4. Отключить сетевой адаптер, например, через старый визуальный интерфейс. Если не получится – объяснить, почему

Результаты

Работа выполнена на Ubuntu 20.04.3 LTS

1. «settings» -> «wi-fi»:



Данные конфигурации:

Cancel
DIR-615
Apply

Details
Identity
IPv4
IPv6
Security

Signal Strength

Good

Link speed

78 Mb/s (2.5 GHz)

Security

WPA2

IPv4 Address

192.168.0.74

IPv6 Address

fd01::8f7:8f2b:f6de:c7c9

Hardware Address

8C:C8:4B:94:C3:59

Supported Frequencies

2.4 GHz / 5 GHz

Default Route

192.168.0.1

DNS

192.168.0.1

☒ Connect automatically

☒ Make available to other users

☐ Metered connection: has data limits or can incur charges
Software updates and other large downloads will not be started automatically.

Forget Connection

Cancel
DIR-615
Apply

Details
Identity
IPv4
IPv6
Security

IPv4 Method

☒ Automatic (DHCP)
☐ Link-Local Only
☐ Manual
☐ Disable
☐ Shared to other computers

DNS

Automatic

Separate IP addresses with commas

Routes

Automatic

Address

Netmask

Gateway

Metric

☐ Use this connection only for resources on its network

IP адрес: 192.168.0.74

Маска подсети: не указана

Адрес маршрутизатора по умолчанию: 192.168.0.1

Получен ли адрес автоматически: Да

Адрес DNS сервера (или серверов): 192.168.0.1

Физический (MAC) адрес: 8C:C8:4B:94:C3:59

Скорость линии: 78 Mb/s

2. Команда «ifconfig»:

```
greg@gregory-ubuntu: ~  
greg@gregory-ubuntu:~$ ifconfig  
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 2176 bytes 244467 (244.4 KB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 2176 bytes 244467 (244.4 KB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
wlp1s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500  
    inet 192.168.0.74 netmask 255.255.255.0 broadcast 192.168.0.255  
    inet6 fd01::8f7:8f2b:f6de:c7c9 prefixlen 128 scopeid 0x0<global>  
    inet6 fe80::c145:2363:f804:648c prefixlen 64 scopeid 0x20<link>  
    ether 8c:c8:4b:94:c3:59 txqueuelen 1000 (Ethernet)  
    RX packets 76958 bytes 71205773 (71.2 MB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 59538 bytes 26960972 (26.9 MB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
greg@gregory-ubuntu:~$
```

Другой способ (команда «ip a»):

```
greg@gregory-ubuntu: ~  
greg@gregory-ubuntu:~$ ip a  
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: wlp1s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000  
    link/ether 8c:c8:4b:94:c3:59 brd ff:ff:ff:ff:ff:ff  
    inet 192.168.0.74/24 brd 192.168.0.255 scope global dynamic noprefixroute wlp1s0  
        valid_lft 82316sec preferred_lft 82316sec  
    inet6 fd01::8f7:8f2b:f6de:c7c9/128 scope global dynamic noprefixroute  
        valid_lft 185sec preferred_lft 185sec  
    inet6 fe80::c145:2363:f804:648c/64 scope link noprefixroute  
        valid_lft forever preferred_lft forever  
greg@gregory-ubuntu:~$
```

3. Ping - проверяет сколько времени занимает отправка и получение пакета через сеть (используется протокол ICMP, размер пакета с заголовками по умолчанию - 64 байта)

- а. ping -?: список возможных параметров («man ping» для полной информации)

```

greg@gregory-ubuntu:~$ ping -?

Usage
  ping [options] <destination>

Options:
  <destination>      dns name or ip address
  -a                  use audible ping
  -A                  use adaptive ping
  -B                  sticky source address
  -c <count>          stop after <count> replies
  -D                  print timestamps
  -d                  use SO_DEBUG socket option
  -f                  flood ping
  -h                  print help and exit
  -I <interface>      either interface name or address
  -i <interval>        seconds between sending each packet
  -L                  suppress loopback of multicast packets
  -l <preload>         send <preload> number of packages while waiting replies
  -m <mark>           tag the packets going out
  -M <pmtud opt>       define mtu discovery, can be one of <do|dont|want>
  -n                  no dns name resolution
  -O                  report outstanding replies
  -p <pattern>         contents of padding byte
  -q                  quiet output
  -Q <tclass>          use quality of service <tclass> bits
  -s <size>            use <size> as number of data bytes to be sent
  -S <size>            use <size> as SO_SNDBUF socket option value
  -t <tttl>            define time to live
  -U                  print user-to-user latency
  -v                  verbose output
  -V                  print version and exit
  -w <deadline>        reply wait <deadline> in seconds
  -W <timeout>         time to wait for response

IPv4 options:
  -4                  use IPv4
  -b                  allow pinging broadcast
  -R                  record route
  -T <timestamp>       define timestamp, can be one of <tsonly|tsandaddr|tsprespec>

IPv6 options:
  -6                  use IPv6
  -F <flowlabel>       define flow label, default is random
  -N <nodeinfo opt>    use icmp6 node info query, try <help> as argument

For more details see ping(8).
greg@gregory-ubuntu:~$

```

- b. ping 127.0.0.1 - Отправляет пакеты на этот же ПК и выводит время их получения. Для прекращения процесса и получения общего результата нужно нажать Ctrl+C

```
greg@gregory-ubuntu: ~  
64 bytes from 127.0.0.1: icmp_seq=288 ttl=64 time=0.069 ms  
64 bytes from 127.0.0.1: icmp_seq=289 ttl=64 time=0.036 ms  
64 bytes from 127.0.0.1: icmp_seq=290 ttl=64 time=0.066 ms  
64 bytes from 127.0.0.1: icmp_seq=291 ttl=64 time=0.044 ms  
64 bytes from 127.0.0.1: icmp_seq=292 ttl=64 time=0.047 ms  
64 bytes from 127.0.0.1: icmp_seq=293 ttl=64 time=0.048 ms  
64 bytes from 127.0.0.1: icmp_seq=294 ttl=64 time=0.064 ms  
64 bytes from 127.0.0.1: icmp_seq=295 ttl=64 time=0.040 ms  
64 bytes from 127.0.0.1: icmp_seq=296 ttl=64 time=0.035 ms  
64 bytes from 127.0.0.1: icmp_seq=297 ttl=64 time=0.036 ms  
64 bytes from 127.0.0.1: icmp_seq=298 ttl=64 time=0.067 ms  
64 bytes from 127.0.0.1: icmp_seq=299 ttl=64 time=0.064 ms  
64 bytes from 127.0.0.1: icmp_seq=300 ttl=64 time=0.069 ms  
64 bytes from 127.0.0.1: icmp_seq=301 ttl=64 time=0.048 ms  
64 bytes from 127.0.0.1: icmp_seq=302 ttl=64 time=0.067 ms  
64 bytes from 127.0.0.1: icmp_seq=303 ttl=64 time=0.046 ms  
64 bytes from 127.0.0.1: icmp_seq=304 ttl=64 time=0.068 ms  
64 bytes from 127.0.0.1: icmp_seq=305 ttl=64 time=0.066 ms  
64 bytes from 127.0.0.1: icmp_seq=306 ttl=64 time=0.068 ms  
64 bytes from 127.0.0.1: icmp_seq=307 ttl=64 time=0.071 ms  
64 bytes from 127.0.0.1: icmp_seq=308 ttl=64 time=0.039 ms  
64 bytes from 127.0.0.1: icmp_seq=309 ttl=64 time=0.052 ms  
64 bytes from 127.0.0.1: icmp_seq=310 ttl=64 time=0.059 ms  
64 bytes from 127.0.0.1: icmp_seq=311 ttl=64 time=0.068 ms  
64 bytes from 127.0.0.1: icmp_seq=312 ttl=64 time=0.054 ms  
64 bytes from 127.0.0.1: icmp_seq=313 ttl=64 time=0.058 ms  
64 bytes from 127.0.0.1: icmp_seq=314 ttl=64 time=0.035 ms  
64 bytes from 127.0.0.1: icmp_seq=315 ttl=64 time=0.043 ms  
64 bytes from 127.0.0.1: icmp_seq=316 ttl=64 time=0.067 ms  
64 bytes from 127.0.0.1: icmp_seq=317 ttl=64 time=0.067 ms  
64 bytes from 127.0.0.1: icmp_seq=318 ttl=64 time=0.068 ms  
64 bytes from 127.0.0.1: icmp_seq=319 ttl=64 time=0.057 ms  
64 bytes from 127.0.0.1: icmp_seq=320 ttl=64 time=0.038 ms  
64 bytes from 127.0.0.1: icmp_seq=321 ttl=64 time=0.039 ms  
64 bytes from 127.0.0.1: icmp_seq=322 ttl=64 time=0.048 ms  
64 bytes from 127.0.0.1: icmp_seq=323 ttl=64 time=0.044 ms  
64 bytes from 127.0.0.1: icmp_seq=324 ttl=64 time=0.067 ms  
64 bytes from 127.0.0.1: icmp_seq=325 ttl=64 time=0.068 ms  
64 bytes from 127.0.0.1: icmp_seq=326 ttl=64 time=0.070 ms  
64 bytes from 127.0.0.1: icmp_seq=327 ttl=64 time=0.041 ms  
64 bytes from 127.0.0.1: icmp_seq=328 ttl=64 time=0.070 ms  
64 bytes from 127.0.0.1: icmp_seq=329 ttl=64 time=0.066 ms  
64 bytes from 127.0.0.1: icmp_seq=330 ttl=64 time=0.030 ms  
64 bytes from 127.0.0.1: icmp_seq=331 ttl=64 time=0.045 ms  
^C  
--- 127.0.0.1 ping statistics ---  
331 packets transmitted, 331 received, 0% packet loss, time 337917ms  
rtt min/avg/max/mdev = 0.022/0.058/0.341/0.021 ms  
greg@gregory-ubuntu:~$
```

c. ping 8.9.0.1 - пытается получить ответ от хоста с данным адресом.

Ответ так и не был получен

```
greg@gregory-ubuntu:~$ ping 8.9.0.1  
PING 8.9.0.1 (8.9.0.1) 56(84) bytes of data.  
^C  
--- 8.9.0.1 ping statistics ---  
238 packets transmitted, 0 received, 100% packet loss, time 242690ms  
greg@gregory-ubuntu:~$
```

d. ping 8.8.8.8 - используется для доступа к серверам Google.
используется для проверки проблем соединения с интернетом (с серверами Google)

```
greg@gregory-ubuntu: ~  
64 bytes from 8.8.8.8: icmp_seq=79 ttl=108 time=6.96 ms  
64 bytes from 8.8.8.8: icmp_seq=80 ttl=108 time=6.79 ms  
64 bytes from 8.8.8.8: icmp_seq=81 ttl=108 time=6.58 ms  
64 bytes from 8.8.8.8: icmp_seq=82 ttl=108 time=8.72 ms  
64 bytes from 8.8.8.8: icmp_seq=84 ttl=108 time=6.63 ms  
64 bytes from 8.8.8.8: icmp_seq=85 ttl=108 time=6.74 ms  
64 bytes from 8.8.8.8: icmp_seq=86 ttl=108 time=112 ms  
64 bytes from 8.8.8.8: icmp_seq=87 ttl=108 time=26.3 ms  
64 bytes from 8.8.8.8: icmp_seq=88 ttl=108 time=7.49 ms  
64 bytes from 8.8.8.8: icmp_seq=89 ttl=108 time=104 ms  
64 bytes from 8.8.8.8: icmp_seq=90 ttl=108 time=5.72 ms  
64 bytes from 8.8.8.8: icmp_seq=91 ttl=108 time=76.5 ms  
64 bytes from 8.8.8.8: icmp_seq=92 ttl=108 time=111 ms  
64 bytes from 8.8.8.8: icmp_seq=93 ttl=108 time=6.66 ms  
64 bytes from 8.8.8.8: icmp_seq=94 ttl=108 time=89.9 ms  
64 bytes from 8.8.8.8: icmp_seq=95 ttl=108 time=72.5 ms  
64 bytes from 8.8.8.8: icmp_seq=96 ttl=108 time=6.94 ms  
^C  
--- 8.8.8.8 ping statistics ---  
96 packets transmitted, 95 received, 1.04167% packet loss, time 95149ms  
rtt min/avg/max/mdev = 4.652/37.914/207.753/50.920 ms  
greg@gregory-ubuntu:~$
```

Как мы видим, потеря пакетов составляет 1 процент. Также мы можем оценить скорость соединения (минимум, максимум, среднее значение).

е. ping 192.168.0.1 - проверка соединения с маршрутизатором

```
greg@gregory-ubuntu: ~  
64 bytes from 192.168.0.1: icmp_seq=21 ttl=64 time=90.3 ms  
64 bytes from 192.168.0.1: icmp_seq=22 ttl=64 time=172 ms  
64 bytes from 192.168.0.1: icmp_seq=23 ttl=64 time=38.8 ms  
64 bytes from 192.168.0.1: icmp_seq=24 ttl=64 time=12.7 ms  
64 bytes from 192.168.0.1: icmp_seq=25 ttl=64 time=3.59 ms  
64 bytes from 192.168.0.1: icmp_seq=26 ttl=64 time=21.1 ms  
64 bytes from 192.168.0.1: icmp_seq=27 ttl=64 time=3.60 ms  
64 bytes from 192.168.0.1: icmp_seq=28 ttl=64 time=3.67 ms  
64 bytes from 192.168.0.1: icmp_seq=29 ttl=64 time=3.65 ms  
64 bytes from 192.168.0.1: icmp_seq=30 ttl=64 time=3.67 ms  
64 bytes from 192.168.0.1: icmp_seq=31 ttl=64 time=3.65 ms  
64 bytes from 192.168.0.1: icmp_seq=32 ttl=64 time=3.95 ms  
64 bytes from 192.168.0.1: icmp_seq=33 ttl=64 time=3.64 ms  
64 bytes from 192.168.0.1: icmp_seq=34 ttl=64 time=3.52 ms  
64 bytes from 192.168.0.1: icmp_seq=35 ttl=64 time=3.47 ms  
64 bytes from 192.168.0.1: icmp_seq=36 ttl=64 time=79.9 ms  
64 bytes from 192.168.0.1: icmp_seq=37 ttl=64 time=111 ms  
^C  
--- 192.168.0.1 ping statistics ---  
38 packets transmitted, 37 received, 2.63158% packet loss, time 37060ms  
rtt min/avg/max/mdev = 3.248/26.192/172.341/44.506 ms  
greg@gregory-ubuntu:~$
```

f. traceroute 8.8.8.8 - аналог pathping для Linux. Выводит время получения ответа от каждого узла на пути к хосту с указанным ip-адресом. Если использовать эту команду несколько раз с разными серверами, можно заметить, что первые несколько узлов не меняются. Таким образом можно узнать ip-адреса локальной сети и адреса подсетей провайдера.

g. ping www.microsoft.com


```

greg@gregory-ubuntu: ~/Downloads
64 bytes from a95-101-172-129.deploy.static.akamaitechnologies.com (95.101.172.129): icmp_seq=194 ttl=56 time=11.9 ms
64 bytes from a95-101-172-129.deploy.static.akamaitechnologies.com (95.101.172.129): icmp_seq=195 ttl=56 time=237 ms
64 bytes from a95-101-172-129.deploy.static.akamaitechnologies.com (95.101.172.129): icmp_seq=196 ttl=56 time=11.5 ms
64 bytes from a95-101-172-129.deploy.static.akamaitechnologies.com (95.101.172.129): icmp_seq=197 ttl=56 time=11.5 ms
64 bytes from a95-101-172-129.deploy.static.akamaitechnologies.com (95.101.172.129): icmp_seq=198 ttl=56 time=112 ms
64 bytes from a95-101-172-129.deploy.static.akamaitechnologies.com (95.101.172.129): icmp_seq=199 ttl=56 time=63.3 ms
64 bytes from a95-101-172-129.deploy.static.akamaitechnologies.com (95.101.172.129): icmp_seq=200 ttl=56 time=46.3 ms
64 bytes from a95-101-172-129.deploy.static.akamaitechnologies.com (95.101.172.129): icmp_seq=201 ttl=56 time=55.9 ms
64 bytes from a95-101-172-129.deploy.static.akamaitechnologies.com (95.101.172.129): icmp_seq=202 ttl=56 time=11.8 ms
64 bytes from a95-101-172-129.deploy.static.akamaitechnologies.com (95.101.172.129): icmp_seq=203 ttl=56 time=11.5 ms
64 bytes from a95-101-172-129.deploy.static.akamaitechnologies.com (95.101.172.129): icmp_seq=204 ttl=56 time=20.2 ms
64 bytes from a95-101-172-129.deploy.static.akamaitechnologies.com (95.101.172.129): icmp_seq=205 ttl=56 time=13.5 ms
64 bytes from a95-101-172-129.deploy.static.akamaitechnologies.com (95.101.172.129): icmp_seq=207 ttl=56 time=116 ms
64 bytes from a95-101-172-129.deploy.static.akamaitechnologies.com (95.101.172.129): icmp_seq=208 ttl=56 time=13.7 ms
64 bytes from a95-101-172-129.deploy.static.akamaitechnologies.com (95.101.172.129): icmp_seq=209 ttl=56 time=11.7 ms
64 bytes from a95-101-172-129.deploy.static.akamaitechnologies.com (95.101.172.129): icmp_seq=210 ttl=56 time=119 ms
^C
--- e13678.dscb.akamaiedge.net ping statistics ---
210 packets transmitted, 208 received, 0.952381% packet loss, time 209273ms
rtt min/avg/max/mdev = 11.361/33.842/236.906/44.695 ms
greg@gregory-ubuntu:~/Downloads$

```

h. ping blom.microsoft.com

```

greg@gregory-ubuntu: ~
greg@gregory-ubuntu:~$ ping blom.microsoft.com
ping: blom.microsoft.com: Name or service not known
greg@gregory-ubuntu:~$

```

Судя по всему, такого адреса не существует

i. ping ftp.microsoft.com

```

greg@gregory-ubuntu:~$ ping ftp.microsoft.com
PING ftp.microsoft.akadns.net (134.170.188.232) 56(84) bytes of data.
^C
--- ftp.microsoft.akadns.net ping statistics ---
88 packets transmitted, 0 received, 100% packet loss, time 89087ms

```

Сервер не отвечает

j. ping www.tttnnnmmm.com

```

greg@gregory-ubuntu: ~
greg@gregory-ubuntu:~$ ping www.tttnnnmmm.com
ping: www.tttnnnmmm.com: Name or service not known
greg@gregory-ubuntu:~$

```

Ping не может найти адрес

k. ping www.gluposti.com

```

greg@gregory-ubuntu:~$ ping www.gluposti.com
PING hdr-lb-1866061388.us-east-2.elb.amazonaws.com (3.134.31.172) 56(84) bytes of data.
^C
--- hdr-lb-1866061388.us-east-2.elb.amazonaws.com ping statistics ---
15 packets transmitted, 0 received, 100% packet loss, time 14341ms

```

4. Отключаем сетевой интерфейс:

```

greg@gregory-ubuntu:~$ sudo ifconfig wlp1s0 down
greg@gregory-ubuntu:~$

```

Проверяем работоспособность:

```
greg@gregory-ubuntu:~$ ping 127.0.0.1
PING 127.0.0.1 (127.0.0.1) 56(84) bytes of data.
64 bytes from 127.0.0.1: icmp_seq=1 ttl=64 time=0.052 ms
64 bytes from 127.0.0.1: icmp_seq=2 ttl=64 time=0.064 ms
64 bytes from 127.0.0.1: icmp_seq=3 ttl=64 time=0.045 ms
64 bytes from 127.0.0.1: icmp_seq=4 ttl=64 time=0.065 ms
64 bytes from 127.0.0.1: icmp_seq=5 ttl=64 time=0.060 ms
^C
--- 127.0.0.1 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4089ms
rtt min/avg/max/mdev = 0.045/0.057/0.065/0.007 ms
greg@gregory-ubuntu:~$
```

```
greg@gregory-ubuntu:~$ ping 8.9.0.1
ping: connect: Network is unreachable
greg@gregory-ubuntu:~$ ping 8.8.8.8
ping: connect: Network is unreachable
greg@gregory-ubuntu:~$
```

Включаем сетевой интерфейс обратно:

```
greg@gregory-ubuntu:~$ sudo ifconfig wlp1s0 up
greg@gregory-ubuntu:~$
```

Вывод: команды не работают в сетях, к которым компьютер не имеет доступа. Отключение сетевого интерфейса не влияет на localhost

Вывод

В ходе данной работы я изучил конфигурацию сети, ознакомился с такими командами, как ping, traceroute, ip, ifconfig и тд.

Список литературы

1. Ubuntu Enable and Disable the Network Interface - <https://linuxhint.com/ubuntu-enable-and-disable-the-network-interface/>
2. КОМАНДА TRACEROUTE LINUX - <https://losst.ru/komanda-traceroute-linux>
3. How to Do a Ping Test - <https://www.hellotech.com/guide/for/how-to-do-a-ping-test-windows-10#:~:text=If%20you%20are%20doing%20a,connection%20to%20a%20certain%20site.>
4. How to find my IP address on Ubuntu 20.04 Focal Fossa Linux - <https://linuxconfig.org/how-to-find-my-ip-address-on-ubuntu-20-04-focal-fossa-linux>