# Лабораторная работа №1.

Введение в Mininet

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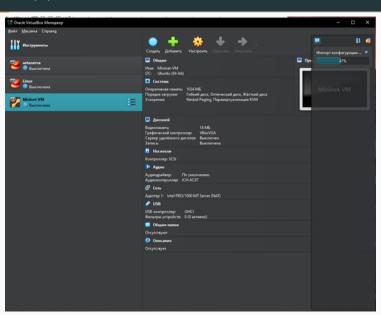
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Цели и задачи работы —

### Цели и задачи работы

Основной целью работы является развёртывание в системе виртуализации (например, в VirtualBox) mininet, знакомство с основными командами для работы с Mininet через командную строку и через графический интерфейс.

### Настройка стенда виртуальной машины Mininet



### Подключение к виртуальной машине

```
Ubuntu 20.04.1 LTS mininet-vm tty1
mininet-vm login: mininet
Passuord:
Welcome to Ubuntu 20.04.1 LTS (GNU/Linux 5.4.0-42-generic x86 64)
* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support:
                 https://ubuntu.com/advantage
Last login: Wed Feb 10 21:03:31 PST 2021 on ttuS0
igninet@mininet-vm:~$ ifconf
eth0: flags=4163<UP.BROADCAST.RUNNING.MULTICAST> mtu 1500
       inet 192,168,56,101 netmask 255,255,255.0 broadcast 192,168,56,255
       ether 08:00:27:99:90:Za txgueuelen 1000 (Ethernet)
       RX packets Z butes 1180 (1.1 KB)
       RX errors 0 dropped 0 overruns 0 frame 0
       TX packets 2 butes 684 (684.0 B)
       TX errors 0 dropped 0 overrups 0 carrier 0 collisions 0
lo: flags=73<UP.LOOPBACK.RUNNING> mtu 65536
       inet 127.0.0.1 netmask 255.0.0.0
       loop txqueuelen 1000 (Local Loopback)
       RX packets 48 butes 3688 (3.6 KB)
       RX errors 0 dropped 0 overruns 0 frame 0
       TX packets 48 butes 3688 (3.6 KB)
       TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
mininet@mininet-vm:~$
```

### Подключение к виртуальной машине

```
[aatazaeva@aatazaeva ~] $ ssh -Y mininet@192.168.56.101

Welcome to Ubuntu 20.04.1 LTS (GNU/Linux 5.4.0-42-generic x86_64)

* Documentation: https://help.ubuntu.com

* Management: https://landscape.canonical.com

* Support: https://ubuntu.com/advantage

Failed to connect to https://changelogs.ubuntu.com/meta-release-lts. Check your Internet connection or proxy settings

Last login: Sat Nov 16 04:30:19 2024 from 192.168.56.1

mininet@mininet-vm:-$ S
```

**Рис. 4:** Подключение к виртуальной машине через терминал хостовой машины с настроенным ssh-подсоединением

#### Обновление версии mininet

```
mininet@mininet-vm:~$ cd ~/mininet
mininet@mininet-vm:~/mininet$ sudo make install
cc -Wall -Wextra \
-DVFRSION=\"`PYTHONPATH=, python -B bin/mn --version 2>&1`\" mnexec.c -o mnexec
install -D mnexec /usr/bin/mnexec
PYTHONPATH=, help2man -N -n "create a Mininet network." \
--no-discard-stderr "python -B bin/mn" -o mn.1
help2man -N -n "execution utility for Mininet." \
-h "-h" -v "-v" --no-discard-stderr ./mnexec -o mnexec.1
install -D -t /usr/share/man/man1 mn.1 mnexec.1
python -m pip uninstall -v mininet || true
Found existing installation: mininet 2.3.0
Uninstalling mininet-2.3.0:
  Successfully uninstalled mininet-2.3.0
python -m pip install .
Processing /home/mininet/mininet
Requirement already satisfied: setuptools in /usr/lib/python3/dist-packages (from mi
ninet==2.3.1b4) (45.2.0)
Building wheels for collected packages: mininet
  Building wheel for mininet (setup.pv) ... done
  Created wheel for mininet: filename=mininet-2.3.1b4-pv3-none-anv.whl size=160942 s
ha256=8f26ca24ad074d6226de96eae71d29a9936ad2d0cf99216361e8ed266deec0bc
  Stored in directory: /tmp/pip-ephem-wheel-cache-li2i8v05/wheels/cd/7d/a7/aafelb3ea
ff31efd6ba4e2ea6c9690a717bdf739db6cfe8d45
Successfully built mininet
Installing collected packages: mininet
Successfully installed mininet-2.3.1b4
```

```
mininet@mininet-vm:~$ sudo mn
*** Creating network
*** Adding controller
*** Adding hosts:
h1 h2
*** Adding switches:
s1
*** Adding links:
(h1, s1) (h2, s1)
*** Configuring hosts
h1 h2
*** Starting controller
c0
*** Starting 1 switches
s1 ...
*** Starting CLI:
mininet>
```

```
mininet> nodes
available nodes are:
c0 h1 h2 <u>s</u>1
```

Рис. 7: Команда nodes

```
mininet> net
h1 h1-eth0:s1-eth1
h2 h2-eth0:s1-eth2
s1 lo: s1-eth1:h1-eth0 s1-eth2:h2-eth0
c0
```

**Рис. 8:** Команда net

```
mininet> h1 ping 10.0.0.2

PING 10.0.0.2 (10.0.0.2) 56(84) bytes of data.

64 bytes from 10.0.0.2: icmp_seq=1 ttl=64 time=1.50 ms

64 bytes from 10.0.0.2: icmp_seq=2 ttl=64 time=0.144 ms

64 bytes from 10.0.0.2: icmp_seq=3 ttl=64 time=0.043 ms

64 bytes from 10.0.0.2: icmp_seq=4 ttl=64 time=0.045 ms

^C
--- 10.0.0.2 ping statistics ---

4 packets transmitted, 4 received, 0% packet loss, time 3029ms

rtt min/avg/max/mdev = 0.043/0.431/1.495/0.615 ms
```

Рис. 9: Проверка связности между узлами h1 и h2



Рис. 10: MiniEdit

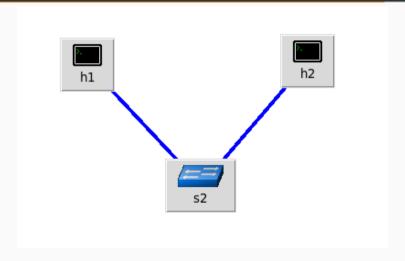


Рис. 11: Топология

```
root@mininet-vm:/home/mininet# ifconfig
h1-eth0: flags=4163<UP, BROADCAST, RUNNING, MULTICAST> mtu 1500
        inet 10.0.0.1 netmask 255.0.0.0 broadcast 10.255.255.255
        ether 6a:17:53:b2:7a:7e txgueuelen 1000 (Ethernet)
        RX packets 0 bytes 0 (0.0 B)
        RX errors 0 dropped 0 overruns 0 frame 0
        TX packets 0 bytes 0 (0.0 B)
        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
        loop txqueuelen 1000 (Local Loopback)
        RX packets 914 bytes 258032 (258.0 KB)
        RX errors 0 dropped 0 overruns 0 frame 0
        TX packets 914 bytes 258032 (258.0 KB)
        TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
root@mininet-vm:/home/mininet# ping 10.0.0.2
PING 10.0.0.2 (10.0.0.2) 56(84) bytes of data.
64 bytes from 10.0.0.2: icmp seg=1 ttl=64 time=0.172 ms
64 bytes from 10.0.0.2: icmp seg=2 ttl=64 time=0.045 ms
64 bytes from 10.0.0.2: icmp seg=3 ttl=64 time=0.041 ms
64 bytes from 10.0.0.2: icmp seg=4 ttl=64 time=0.042 ms
64 bytes from 10.0.0.2: icmp_sed=5 ttl=64 time=0.042 ms
```

Preferences			×
IP Base: Default Terminal: x Start CLI: Default Switch: C Open vSwitch OpenFlow 1.0: ♥ OpenFlow 1.1: □ OpenFlow 1.2: □ OpenFlow 1.3: □		SFlow Profile for Open vSwitch Target: Sampling:   400 Header:   128 Polling:   30  NetFlow Profile for Open vSwitch Target: Active Timeout:   600 Add ID to Interface:	
dpctl port:	ОК	Cancel	

Рис. 13: Edit Preferences

Выводы по проделанной работе

### Выводы по проделанной работе

В ходе лабораторной работы мною была развёрнута в системе виртуализации VirtualBox виртуальная среда mininet. Я познакомилась с основными командами для работы с Mininet через командную строку и через графический интерфейс.