

# Лаб №1 по дисциплине Компьютерный практикум по статистическому анализу данных

Введение в Mininet

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Шаповалова Диана Дмитриевна

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Российский университет дружбы народов, Москва, Россия

## Вводная часть

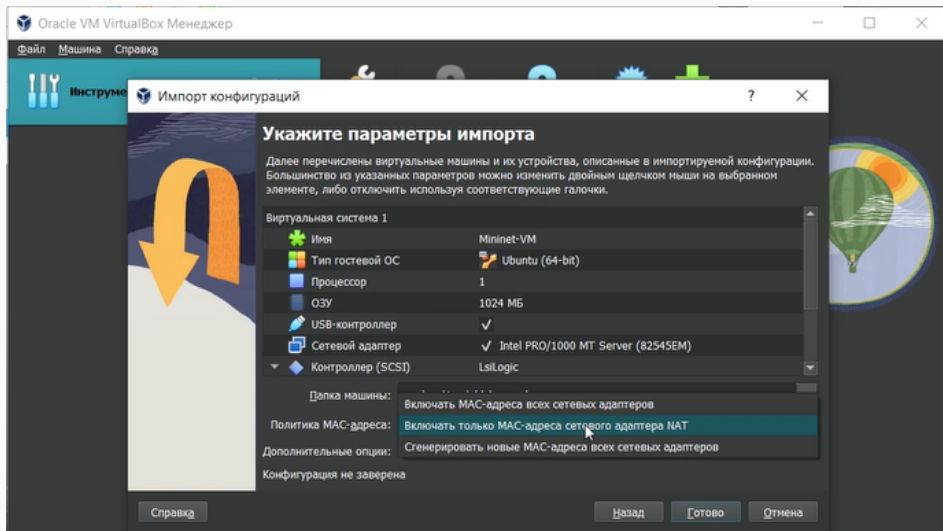
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Основной целью работы является развёртывание в системе виртуализации (например, в VirtualBox) mininet, знакомство с основными командами для работы с Mininet через командную строку и через графический интерфейс.

## Выполнение лабораторной работы

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# Настройка образа VirtualBox



## Подключение к виртуальной машине

```
Mininet-VM [Работает] - Oracle VM VirtualBox
Файл  Машина  Вид  Ввод  Устройства  Справка

Ubuntu 20.04.1 LTS mininet-vm tty1

mininet-vm login: mininet
Password:
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 ttyS0
mininet@mininet-vm:~$ ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
    inet 192.168.56.102 netmask 255.255.255.0 broadcast 192.168.56.255
    ether 08:00:27:88:49:d9  txqueuelen 1000  (Ethernet)
    RX packets 2  bytes 1180 (1.1 KB)
    RX errors 0  dropped 0  overruns 0  frame 0
    TX packets 2  bytes 684 (684.0 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 88  bytes 6752 (6.7 KB)
    RX errors 0  dropped 0  overruns 0  frame 0
    TX packets 88  bytes 6752 (6.7 KB)
    TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0

mininet@mininet-vm:~$
```

```
Mininet-VM [Работает] - Oracle VM VirtualBox
Файл  Машина  Вид  Ввод  Устройства  Справка
The following NEW packages will be installed:
  libssh2-1 mc mc-data unzip
3 upgraded, 4 newly installed, 0 to remove and 84 not upgraded.
Need to get 1,986 kB of archives.
After this operation, 8,587 kB of additional disk space will be used.
Do you want to continue? [Y/n] Y
get:1 http://us.archive.ubuntu.com/ubuntu focal/universe amd64 libssh2-1 amd64 1.8.0-2.1build1 [75.4
kB]
get:2 http://us.archive.ubuntu.com/ubuntu focal/universe amd64 mc-data all 3:4.8.24-2ubuntu1 [1,265
kB]
get:3 http://us.archive.ubuntu.com/ubuntu focal/universe amd64 mc amd64 3:4.8.24-2ubuntu1 [477 kB]
get:4 http://us.archive.ubuntu.com/ubuntu focal/main amd64 unzip amd64 6.0-25ubuntu1 [169 kB]
Fetched 1,986 kB in 3s (738 kB/s)
Selecting previously unselected package libssh2-1:amd64.
Reading database ... 101729 files and directories currently installed.)
Preparing to unpack .../libssh2-1_1.8.0-2.1build1_amd64.deb ...
Unpacking libssh2-1:amd64 (1.8.0-2.1build1) ...
Selecting previously unselected package mc-data.
Preparing to unpack .../mc-data_3:4.8.24-2ubuntu1_all.deb ...
Unpacking mc-data (3:4.8.24-2ubuntu1) ...
Selecting previously unselected package mc.
Preparing to unpack .../mc_3:4.8.24-2ubuntu1_amd64.deb ...
Unpacking mc (3:4.8.24-2ubuntu1) ...
Selecting previously unselected package unzip.
Preparing to unpack .../unzip_6.0-25ubuntu1_amd64.deb ...
Unpacking unzip (6.0-25ubuntu1) ...
Setting up unzip (6.0-25ubuntu1) ...
Setting up mc-data (3:4.8.24-2ubuntu1) ...
Setting up libssh2-1:amd64 (1.8.0-2.1build1) ...
Setting up mc (3:4.8.24-2ubuntu1) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for mime-support (3.64ubuntu1) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
Processing triggers for libc-bin (2.31-0ubuntu9) ...
```

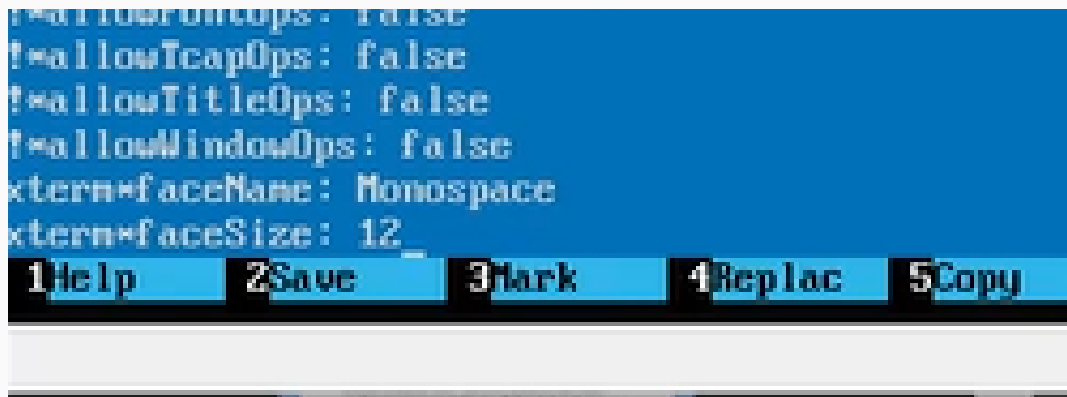


Рис. 6: Редактируем файл `/etc/X11/app-defaults/XTerm`



## Настройка соединения X11 для суперпользователя

```
mininet@mininet-vm:~$ xauth list $DISPLAY
mininet-vm/unix:11 MIT-MAGIC-COOKIE-1 efec696b82b464b26d4631f8b6c173f4
mininet@mininet-vm:~$ ^C
mininet@mininet-vm:~$ mininet-vm/unix:11 MIT-MAGIC-COOKIE-1 efec696b82b464b26d
4631f8b6c173f4
-bash: mininet-vm/unix:11: No such file or directory
mininet@mininet-vm:~$ xauth add mininet-vm/unix:11 MIT-MAGIC-COOKIE-1 efec696b
82b464b26d4631f8b6c173f4
mininet@mininet-vm:~$ sudo -i
root@mininet-vm:~# xterm
PuTTY X11 proxy: No authorisation provided
Warning: This program is an suid-root program or is being run by the root user.
The full text of the error or warning message cannot be safely formatted
in this environment. You may get a more descriptive message by running the
program as a non-root user or by removing the suid bit on the executable.
xterm: Xt error: Can't open display: %s
root@mininet-vm:~# xauth add mininet-vm/unix:11 MIT-MAGIC-COOKIE-1 efec696b82b
464b26d4631f8b6c173f4
root@mininet-vm:~#
```

Рис. 7: Настраиваем соединение X11

## Работа с Mininet из-под Windows

```
PS C:\Windows\system32> choco install putty -y
Chocolatey v2.3.0
Installing the following packages:
putty
By installing, you accept licenses for the packages.
Downloading package from source 'https://community.chocolatey.org/api/v2/'
Progress: Downloading putty.portable 0.81.0... 100%

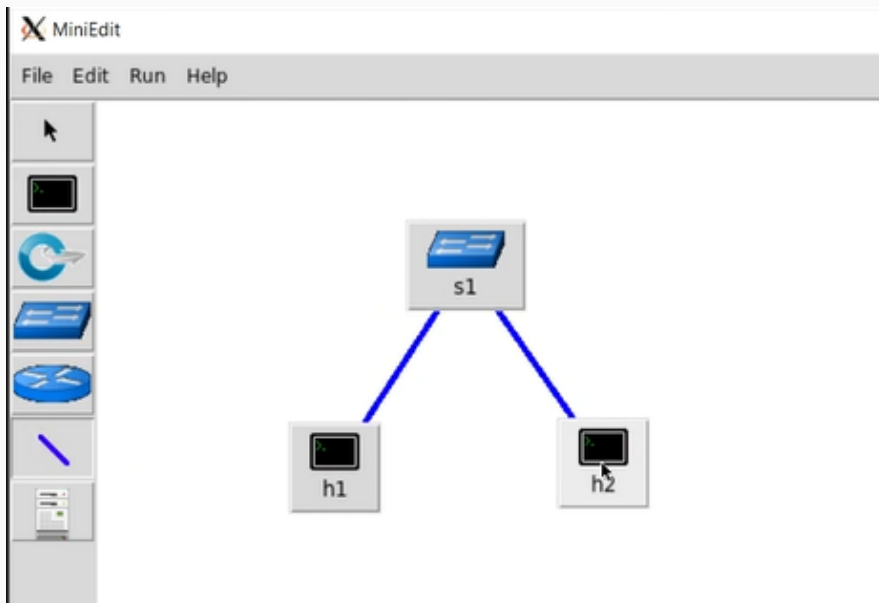
putty.portable v0.81.0 [Approved]
putty.portable package files install completed. Performing other installation steps.
Extracting 64-bit C:\ProgramData\chocolatey\lib\putty.portable\tools\putty_x64.zip to C:\ProgramData\chocolatey\lib\putty.portable\tools...
C:\ProgramData\chocolatey\lib\putty.portable\tools
ShimGen has successfully created a gui shim for PAGEANT.EXE
ShimGen has successfully created a shim for PLINK.EXE
ShimGen has successfully created a shim for PSCP.EXE
ShimGen has successfully created a shim for PSFTP.EXE
ShimGen has successfully created a gui shim for PUTTY.EXE
ShimGen has successfully created a gui shim for PUTTYGEN.EXE
The install of putty.portable was successful.
  Deployed to 'C:\ProgramData\chocolatey\lib\putty.portable\tools'
Downloading package from source 'https://community.chocolatey.org/api/v2/'
Progress: Downloading putty 0.81.0... 100%

putty v0.81.0 [Approved]
putty package files install completed. Performing other installation steps.
The install of putty was successful.
  Deployed to 'C:\ProgramData\chocolatey\lib\putty'

Chocolatey installed 2/2 packages.
See the log for details (C:\ProgramData\chocolatey\logs\chocolatey.log).
```

```
mininet@mininet-vm: ~  
dump      intfs  links      pingall    ports      sh      wait  
exit      iperf  net        pingallfull px          source  x  
  
You may also send a command to a node using:  
  <node> command {args}  
For example:  
  mininet> h1 ifconfig  
  
The interpreter automatically substitutes IP addresses  
for node names when a node is the first arg, so commands  
like  
  mininet> h2 ping h3  
should work.  
  
Some character-oriented interactive commands require  
noecho:  
  mininet> noecho h2 vi foo.py  
However, starting up an xterm/gterm is generally better:  
  mininet> xterm h2  
  
mininet> nodes  
available nodes are:  
c0 h1 h2 s1  
mininet>
```

## Построение и эмуляция сети в Mininet с использованием графического интерфейса



## Выводы

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Мы развернули в системе виртуализации mininet, познакомились с основными командами для работы с Mininet через командную строку и через графический интерфейс.