

Измерение и тестирование пропускной способности сети. Интерактивный эксперимент

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Основной целью работы является знакомство с инструментом для измерения пропускной способности сети в режиме реального времени — iPerf3, а также получение навыков проведения интерактивного эксперимента по измерению пропускной способности моделируемой сети в среде Mininet

Выполнение задачи

```
mininet@mininet-vm:~$ sudo mn --topo=single,2 -x
*** Creating network
*** Adding controller
*** Adding hosts:
h1 h2
*** Adding switches:
s1
*** Adding links:
(h1, s1) (h2, s1)
*** Configuring hosts
h1 h2
*** Running terms on localhost:10.0
*** Starting controller
c0
*** Starting 1 switches
s1 ...X11 connection rejected because of wrong authentication.
X11 connection rejected because of wrong authentication.
X11 connection rejected because of wrong authentication.
X11 connection rejected because of wrong authentication.

*** Starting CLI:
mininet> net
h1 h1-eth0:s1-eth1
h2 h2-eth0:s1-eth2
s1 lo: s1-eth1:h1-eth0 s1-eth2:h2-eth0
c0
mininet> link
invalid number of args: link end1 end2 [up down]
mininet> dump
<Host h1: h1-eth0:10.0.0.1 pid=806>
<Host h2: h2-eth0:10.0.0.2 pid=808>
<OVSSwitch s1: lo:127.0.0.1,s1-eth1:None,s1-eth2:None pid=813>
<Controller c0: 127.0.0.1:6653 pid=799>
```

```
mininet> h2 iperf3 -s &
mininet> h1 iperf3 -c h2
Connecting to host 10.0.0.2, port 5201
[ 5] local 10.0.0.1 port 40682 connected to 10.0.0.2 port 5201
[ ID] Interval      Transfer    Bitrate      Retr  Cwnd
[ 5]  0.00-1.00  sec  4.08 GBytes  35.0 Gbits/sec    9   5.25 MBytes
[ 5]  1.00-2.00  sec  4.89 GBytes  42.0 Gbits/sec    2   10.6 MBytes
[ 5]  2.00-3.00  sec  5.12 GBytes  44.0 Gbits/sec    2   10.6 MBytes
[ 5]  3.00-4.00  sec  5.89 GBytes  50.6 Gbits/sec    0   10.6 MBytes
[ 5]  4.00-5.00  sec  5.91 GBytes  50.8 Gbits/sec    0   18.6 MBytes
[ 5]  5.00-6.00  sec  5.55 GBytes  47.7 Gbits/sec    0   18.6 MBytes
[ 5]  6.00-7.00  sec  5.93 GBytes  51.0 Gbits/sec    0   18.6 MBytes
[ 5]  7.00-8.00  sec  5.84 GBytes  50.2 Gbits/sec    0   18.6 MBytes
[ 5]  8.00-9.00  sec  5.66 GBytes  48.7 Gbits/sec    0   18.6 MBytes
[ 5]  9.00-10.00 sec  4.92 GBytes  42.2 Gbits/sec    8   18.6 MBytes
-----
[ ID] Interval      Transfer    Bitrate      Retr
[ 5]  0.00-10.00  sec  53.8 GBytes  46.2 Gbits/sec    21
[ 5]  0.00-10.00  sec  53.8 GBytes  46.2 Gbits/sec
                                     sender
                                     receiver

iperf Done.
```

Выполнение задачи

```
mininet> h2 killall iperf3
warning: this system does not seem to support IPv6 - trying IPv4
-----
Server listening on 5201
-----
Accepted connection from 10.0.0.1, port 40680
[ 5] local 10.0.0.2 port 5201 connected to 10.0.0.1 port 40682
[ ID] Interval      Transfer    Bitrate
[ 5]  0.00-1.00    sec  4.05 GBytes 34.8 Gbits/sec
[ 5]  1.00-2.00    sec  4.89 GBytes 42.0 Gbits/sec
[ 5]  2.00-3.00    sec  5.14 GBytes 44.2 Gbits/sec
[ 5]  3.00-4.00    sec  5.89 GBytes 50.6 Gbits/sec
[ 5]  4.00-5.00    sec  5.88 GBytes 50.5 Gbits/sec
[ 5]  5.00-6.00    sec  5.58 GBytes 47.9 Gbits/sec
[ 5]  6.00-7.00    sec  5.93 GBytes 51.0 Gbits/sec
[ 5]  7.00-8.00    sec  5.84 GBytes 50.2 Gbits/sec
[ 5]  8.00-9.00    sec  5.66 GBytes 48.7 Gbits/sec
[ 5]  9.00-10.00   sec  4.89 GBytes 42.0 Gbits/sec
-----
[ ID] Interval      Transfer    Bitrate
[ 5]  0.00-10.00   sec  53.8 GBytes 46.2 Gbits/sec
-----
Server listening on 5201
-----
iperf3: interrupt - the server has terminated
mininet>
```

```
"host: h2" <@mininet-vm>
root@mininet-vm:/home/mininet# iperf3 -s
warning: this system does not seem to support IPv6 - trying IPv4
-----
Server listening on 5201
-----
Accepted connection from 10.0.0.1, port 40700
[ 7] local 10.0.0.2 port 5201 connected to 10.0.0.1 port 40702
[ ID] Interval      Transfer    Bitrate
[ 7]  0.00-1.00    sec  6.08 GBytes 52.2 Gbits/sec
[ 7]  1.00-2.00    sec  5.54 GBytes 47.6 Gbits/sec
[ 7]  2.00-2.74    sec  4.39 GBytes 51.0 Gbits/sec
-----
[ ID] Interval      Transfer    Bitrate
[ 7]  0.00-2.74    sec  16.0 GBytes 50.2 Gbits/sec
-----
Server listening on 5201
-----
receiver

"host: h1" <@mininet-vm>
root@mininet-vm:/home/mininet# iperf3 -c 10.0.0.2 -n 16G
Connecting to host 10.0.0.2, port 5201
[ 7] local 10.0.0.1 port 40702 connected to 10.0.0.2 port 5201
[ ID] Interval      Transfer    Bitrate    Retr  Cwnd
[ 7]  0.00-1.00    sec  6.08 GBytes 52.2 Gbits/sec    0   1011 KBytes
[ 7]  1.00-2.00    sec  5.54 GBytes 47.6 Gbits/sec    0    1.70 MBytes
[ 7]  2.00-2.74    sec  4.39 GBytes 51.0 Gbits/sec    0    1.97 MBytes
-----
[ ID] Interval      Transfer    Bitrate    Retr
[ 7]  0.00-2.74    sec  16.0 GBytes 50.2 Gbits/sec    0
[ 7]  0.00-2.74    sec  16.0 GBytes 50.2 Gbits/sec    0
-----
iperf Done.
root@mininet-vm:/home/mininet#
sender
receiver
```

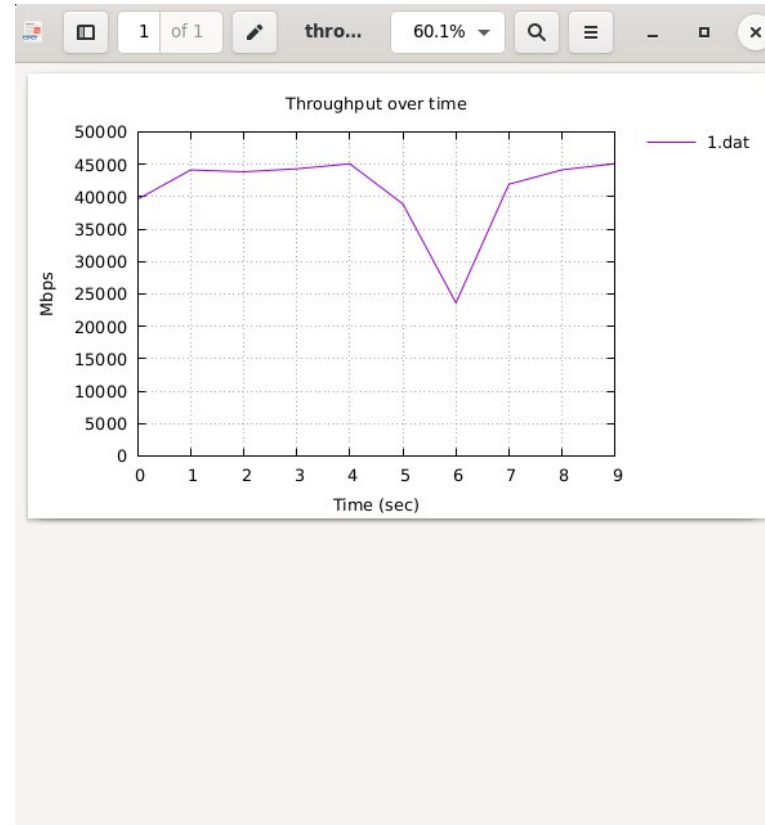
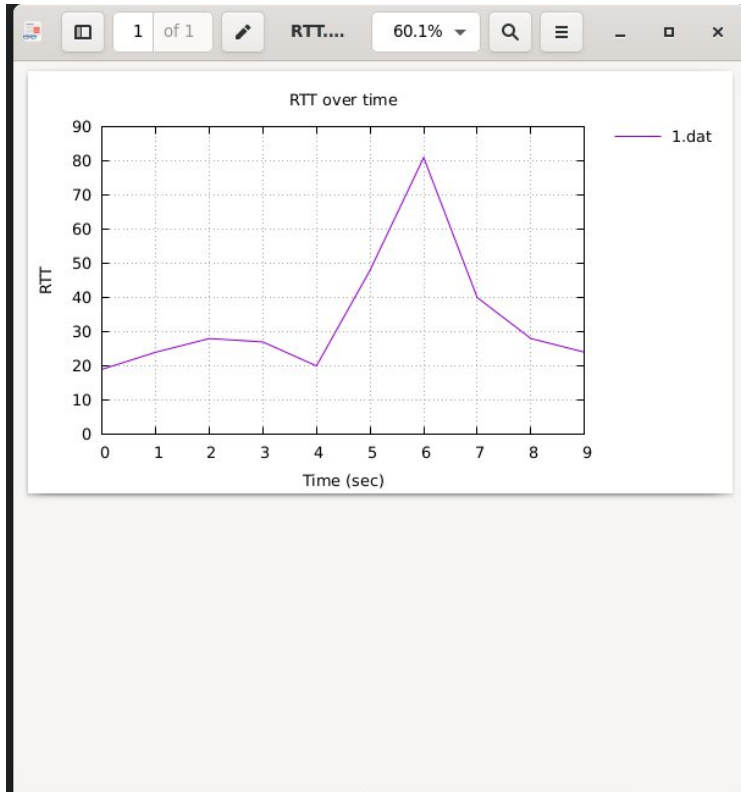
Выполнение задачи

```
"host: h2" <@mininet-vm>
Accepted connection from 10.0.0.1, port 40704
[ 7] local 10.0.0.2 port 5201 connected to 10.0.0.1 port 54797
[ ID] Interval          Transfer      Bitrate      Jitter      Lost/Total Datagrams
[ 7] 0.00-1.00 sec      129 KBytes    1.05 Mbits/sec  0.063 ms    0/91 (0%)
[ 7] 1.00-2.00 sec      129 KBytes    1.05 Mbits/sec  0.054 ms    0/91 (0%)
[ 7] 2.00-3.00 sec      127 KBytes    1.04 Mbits/sec  0.013 ms    0/90 (0%)
[ 7] 3.00-4.02 sec      126 KBytes    1.01 Mbits/sec  0.035 ms    0/89 (0%)
[ 7] 4.02-5.00 sec      130 KBytes    1.08 Mbits/sec  0.024 ms    0/92 (0%)
[ 7] 5.00-6.02 sec      119 KBytes    953 Kbits/sec  0.076 ms    0/84 (0%)
[ 7] 6.02-7.00 sec      136 KBytes    1.13 Mbits/sec  0.166 ms    0/96 (0%)
[ 7] 7.00-8.00 sec      130 KBytes    1.07 Mbits/sec  0.010 ms    0/92 (0%)
[ 7] 8.00-9.01 sec      127 KBytes    1.03 Mbits/sec  0.036 ms    0/90 (0%)
[ 7] 9.01-10.00 sec     129 KBytes    1.07 Mbits/sec  0.019 ms    0/91 (0%)
[ ID] Interval          Transfer      Bitrate      Jitter      Lost/Total Datagrams
[ 7] 0.00-10.00 sec     1.25 MBytes    1.05 Mbits/sec  0.019 ms    0/906 (0%) receiver

"host: h1" <@mininet-vm>
[ 7] local 10.0.0.1 port 54797 connected to 10.0.0.2 port 5201
[ ID] Interval          Transfer      Bitrate      Total Datagrams
[ 7] 0.00-1.00 sec      129 KBytes    1.05 Mbits/sec  91
[ 7] 1.00-2.00 sec      129 KBytes    1.05 Mbits/sec  91
[ 7] 2.00-3.00 sec      127 KBytes    1.04 Mbits/sec  90
[ 7] 3.00-4.02 sec      126 KBytes    1.02 Mbits/sec  89
[ 7] 4.02-5.00 sec      130 KBytes    1.08 Mbits/sec  92
[ 7] 5.00-6.02 sec      119 KBytes    953 Kbits/sec  84
[ 7] 6.02-7.00 sec      136 KBytes    1.13 Mbits/sec  96
[ 7] 7.00-8.00 sec      130 KBytes    1.07 Mbits/sec  92
[ 7] 8.00-9.01 sec      127 KBytes    1.03 Mbits/sec  90
[ 7] 9.01-10.00 sec     129 KBytes    1.07 Mbits/sec  91
[ ID] Interval          Transfer      Bitrate      Jitter      Lost/Total Datagrams
[ 7] 0.00-10.00 sec     1.25 MBytes    1.05 Mbits/sec  0.000 ms    0/906 (0%) sender
[ 7] 0.00-10.00 sec     1.25 MBytes    1.05 Mbits/sec  0.019 ms    0/906 (0%) receiver

iperf Done.
root@mininet-vm: /home/mininet#
```

Выполнение задачи



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