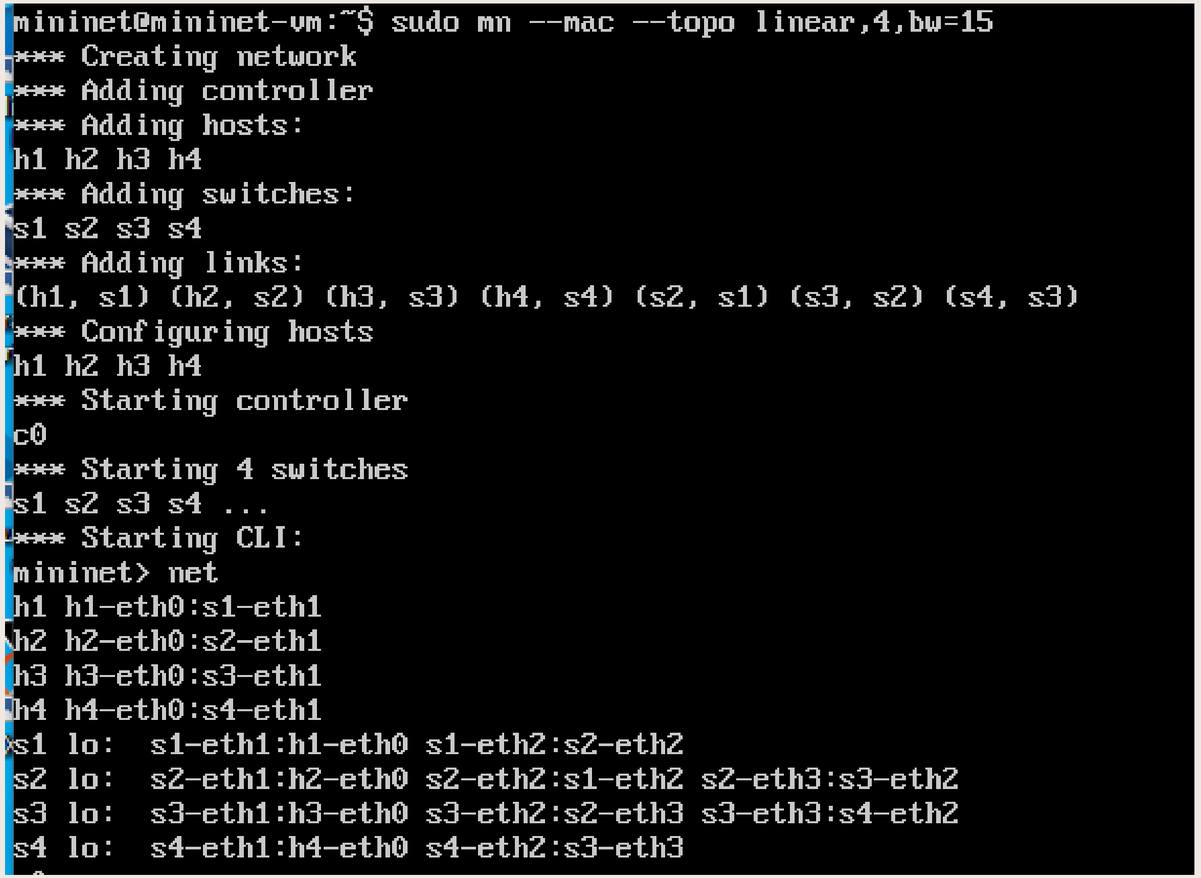
1º TRABALHO DE MININET

Joyce da Costa



A

Criação da topologia considerando o endereço map padronizado, larguras de banda bw de 15Mbps e o controlador sem ser especificado.

```
mininet> h1 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 00:00:00:00:00:01  txqueuelen 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 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

mininet> h2 ifconfig
h2-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.0.2  netmask 255.0.0.0  broadcast 10.255.255.255
        ether 00:00:00:00:00:02  txqueuelen 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 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
```

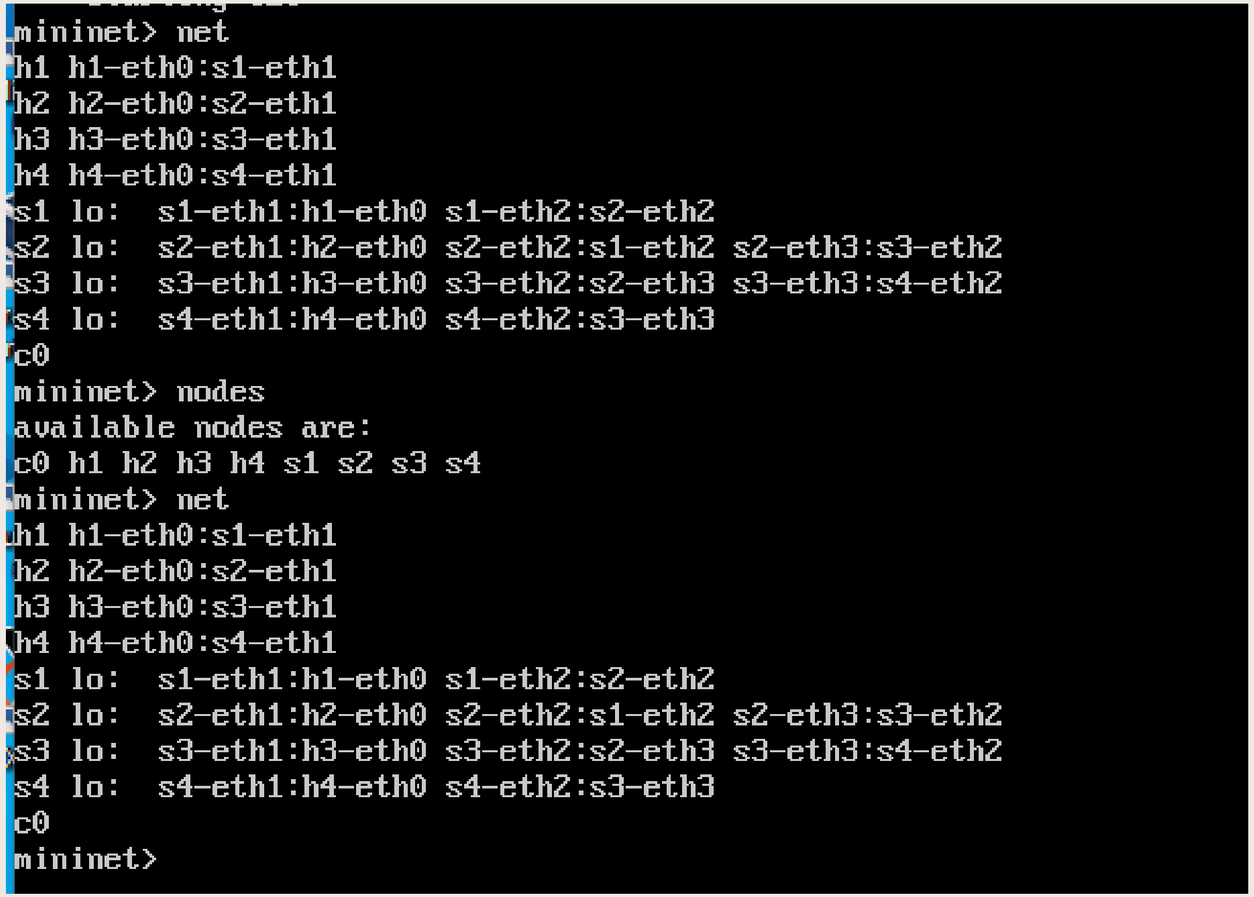
B

Inspeção das informações da interfaces, endereços MAC, ip e portas através de linhas de comando.

```
mininet> h3 ifconfig
h3-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.0.3  netmask 255.0.0.0  broadcast 10.255.255.255
        ether 00:00:00:00:00:03  txqueuelen 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 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

mininet> h4 ifconfig
h4-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.0.4  netmask 255.0.0.0  broadcast 10.255.255.255
        ether 00:00:00:00:00:04  txqueuelen 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 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
```

B

Inspeção das informações da interfaces, endereços MAC, ip e portas através de linhas de comando.



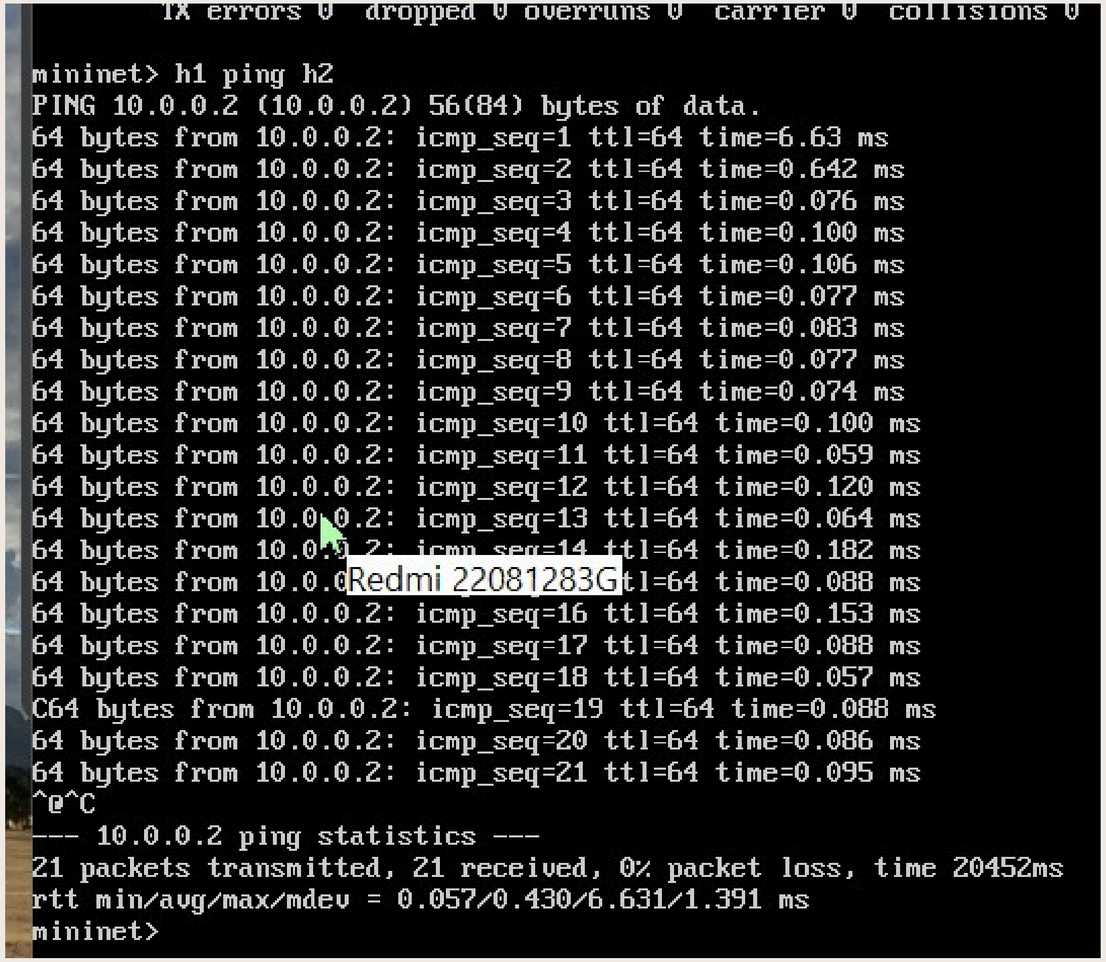
B

Inspeção das informações da interfaces, endereços MAC, ip e portas através de linhas de comando.

Host	Endereço IP	ENDEREÇO MAC
h1	10.0.0.1	00:00:00:00:00:01
H2	10.0.0.2	00:00:00:00:00:02
H3	10.0.0.3	00:00:00:00:00:03
H4	10.0.0.4	00:00:00:00:00:04

C

Criação de um desenho ilustrativo da topologia com todas as informações obtidas.



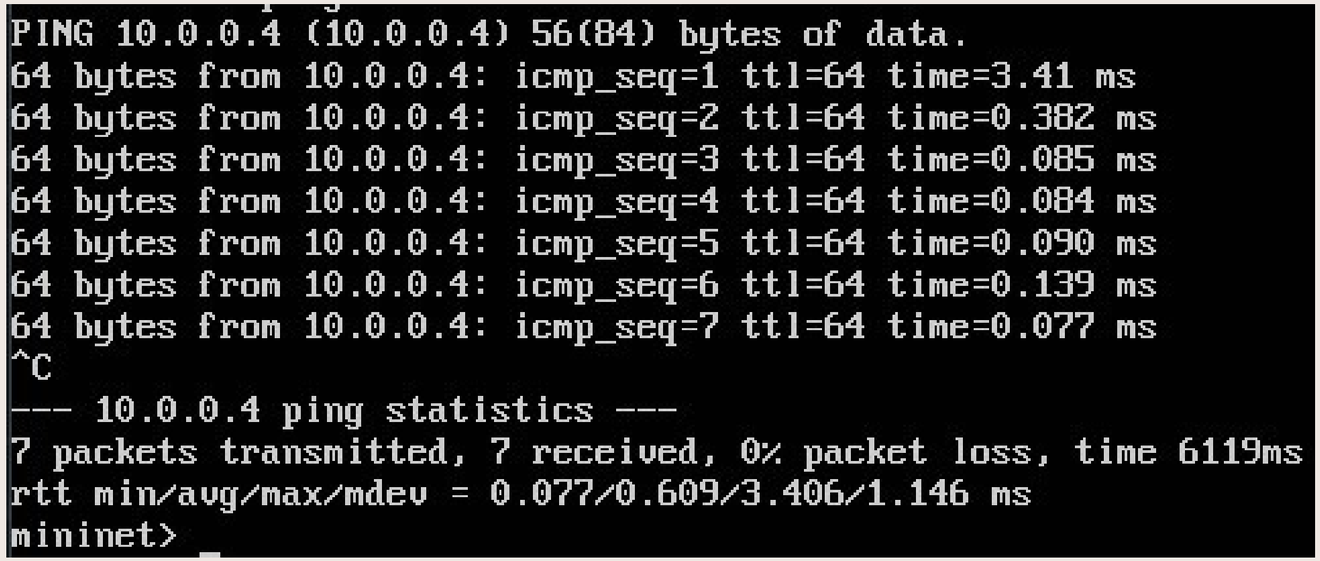
D

Testes de ping entre os diferentes nós, além de mostrar os pacotes chegando nos nós.

```
mininet> h2 ping h3
PING 10.0.0.3 (10.0.0.3) 56(84) bytes of data.
64 bytes from 10.0.0.3: icmp_seq=1 ttl=64 time=2.90 ms
64 bytes from 10.0.0.3: icmp_seq=2 ttl=64 time=0.437 ms
64 bytes from 10.0.0.3: icmp_seq=3 ttl=64 time=0.063 ms
64 bytes from 10.0.0.3: icmp_seq=4 ttl=64 time=0.168 ms
64 bytes from 10.0.0.3: icmp_seq=5 ttl=64 time=0.091 ms
64 bytes from 10.0.0.3: icmp_seq=6 ttl=64 time=0.117 ms
64 bytes from 10.0.0.3: icmp_seq=7 ttl=64 time=0.066 ms
64 bytes from 10.0.0.3: icmp_seq=8 ttl=64 time=0.077 ms
^C
--- 10.0.0.3 ping statistics ---
8 packets transmitted, 8 received, 0% packet loss, time 7134ms
rtt min/avg/max/mdev = 0.063/0.490/2.904/0.919 ms
mininet>
```

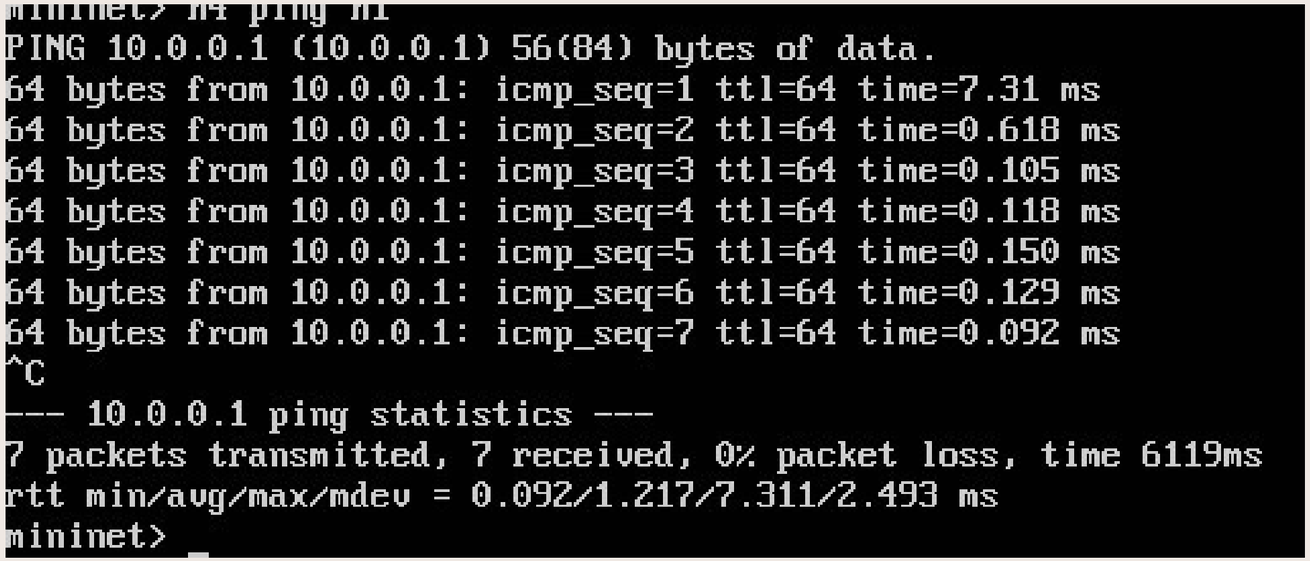
D

Testes de ping entre os diferentes nós, além de mostrar os pacotes chegando nos nós.



D

Testes de ping entre os diferentes nós, além de mostrar os pacotes chegando nos nós.



D

Testes de ping entre os diferentes nós, além de mostrar os pacotes chegando nos nós.

```
mininet@mininet-vm:~$ sudo mn --topo linear,4,bw=1 --mac
*** Creating network
*** Adding controller
*** Adding hosts:
h1 h2 h3 h4
*** Adding switches:
s1 s2 s3 s4
*** Adding links:
(h1, s1) (h2, s2) (h3, s3) (h4, s4) (s2, s1) (s3, s2) (s4, s3)
*** Configuring hosts
h1 h2 h3 h4
*** Starting controller
c0
*** Starting 4 switches
s1 s2 s3 s4 ...
*** Starting CLI:
mininet> h1 iperf -s -p 5555 &
mininet> h2 iperf -c 10.0.0.1 -p 5555 -t 10 -i 1
------------------------------------------------------------
Client connecting to 10.0.0.1, TCP port 5555
TCP window size:  416 KByte (default)
------------------------------------------------------------
[  3] local 10.0.0.2 port 42462 connected with 10.0.0.1 port 5555
[ ID] Interval       Transfer     Bandwidth
[  3]  0.0- 1.0 sec  2.05 GBytes  17.6 Gbits/sec
[  3]  1.0- 2.0 sec  2.11 GBytes  18.2 Gbits/sec
[  3]  2.0- 3.0 sec  1.95 GBytes  16.8 Gbits/sec
[  3]  3.0- 4.0 sec  2.00 GBytes  17.2 Gbits/sec
[  3]  4.0- 5.0 sec  1.92 GBytes  16.5 Gbits/sec
[  3]  5.0- 6.0 sec  1.97 GBytes  17.0 Gbits/sec
[  3]  6.0- 7.0 sec  1.99 GBytes  17.1 Gbits/sec
[  3]  7.0- 8.0 sec  2.02 GBytes  17.3 Gbits/sec
^C[  3]  0.0- 8.4 sec  16.7 GBytes  17.2 Gbits/sec
```

E

Especifique que o host 1 na porta 5555 vai ser um servidor TCP e o host 2 um cliente e execute testes de iperf, considere um relatório por segundocom teste de 10segundos. Faça os testes para larguras de banda bw de 1, 3, 12 e 18Mbps

```
mininet@mininet-vm:~$ sudo mn --topo linear,4,bw=3 --mac
*** Creating network
*** Adding controller
*** Adding hosts:
h1 h2 h3 h4
*** Adding switches:
s1 s2 s3 s4
*** Adding links:
(h1, s1) (h2, s2) (h3, s3) (h4, s4) (s2, s1) (s3, s2) (s4, s3)
*** Configuring hosts
h1 h2 h3 h4
*** Starting controller
c0
*** Starting 4 switches
s1 s2 s3 s4 ...
*** Starting CLI:
mininet> h1 iperf -s -p 5555 &
mininet> h2 iperf -c 10.0.0.1 -p 5555 -t 10 -i 1
------------------------------------------------------------
Client connecting to 10.0.0.1, TCP port 5555
TCP window size: 1.13 MByte (default)
------------------------------------------------------------
[  3] local 10.0.0.2 port 42474 connected with 10.0.0.1 port 5555
[ ID] Interval       Transfer     Bandwidth
[  3]  0.0- 1.0 sec  2.07 GBytes  17.8 Gbits/sec
[  3]  1.0- 2.0 sec  2.03 GBytes  17.5 Gbits/sec
[  3]  2.0- 3.0 sec  2.06 GBytes  17.7 Gbits/sec
[  3]  3.0- 4.0 sec  1.93 GBytes  16.6 Gbits/sec
[  3]  4.0- 5.0 sec  1.99 GBytes  17.1 Gbits/sec
[  3]  5.0- 6.0 sec  2.01 GBytes  17.3 Gbits/sec
[  3]  6.0- 7.0 sec  2.07 GBytes  17.8 Gbits/sec
^C[  3]  0.0- 7.4 sec  15.1 GBytes  17.4 Gbits/sec
mininet>
```

E

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```
*** Adding controller
*** Adding hosts:
h1 h2 h3 h4
*** Adding switches:
s1 s2 s3 s4
*** Adding links:
(h1, s1) (h2, s2) (h3, s3) (h4, s4) (s2, s1) (s3, s2) (s4, s3)
*** Configuring hosts
h1 h2 h3 h4
*** Starting controller
c0
*** Starting 4 switches
s1 s2 s3 s4 ...
*** Starting CLI:
mininet> h1 iperf -s -p 5555 &
mininet> h2 iperf -c 10.0.0.1 -p 5555 -t 10 -i 1
------------------------------------------------------------
Client connecting to 10.0.0.1, TCP port 5555
TCP window size:  450 KByte (default)
------------------------------------------------------------
[  3] local 10.0.0.2 port 42486 connected with 10.0.0.1 port 5555
[ ID] Interval       Transfer     Bandwidth
[  3]  0.0- 1.0 sec  2.05 GBytes  17.6 Gbits/sec
[  3]  1.0- 2.0 sec  2.10 GBytes  18.1 Gbits/sec
[  3]  2.0- 3.0 sec  2.11 GBytes  18.2 Gbits/sec
[  3]  3.0- 4.0 sec  1.98 GBytes  17.0 Gbits/sec
[  3]  4.0- 5.0 sec  1.95 GBytes  16.8 Gbits/sec
[  3]  5.0- 6.0 sec  1.93 GBytes  16.5 Gbits/sec
[  3]  6.0- 7.0 sec  1.93 GBytes  16.5 Gbits/sec
[  3]  7.0- 8.0 sec  1.98 GBytes  17.0 Gbits/sec
[  3]  8.0- 9.0 sec  1.95 GBytes  16.7 Gbits/sec
[  3]  9.0-10.0 sec  2.04 GBytes  17.5 Gbits/sec
```

E

Especifique que o host 1 na porta 5555 vai ser um servidor TCP e o host 2 um cliente e execute testes de iperf, considere um relatório por segundocom teste de 10segundos. Faça os testes para larguras de banda bw de 1, 3, 12 e 18Mbps

```
mininet@mininet-vm:~$ sudo mn --topo linear,4,bw=18 --mac
*** Creating network
*** Adding controller
*** Adding hosts:
h1 h2 h3 h4
*** Adding switches:
s1 s2 s3 s4
*** Adding links:
(h1, s1) (h2, s2) (h3, s3) (h4, s4) (s2, s1) (s3, s2) (s4, s3)
*** Configuring hosts
h1 h2 h3 h4
*** Starting controller
c0
*** Starting 4 switches
s1 s2 s3 s4 ...
*** Starting CLI:
mininet> h1 iperf -s -p 5555 &
mininet> h2 iperf -c 10.0.0.1 -p 5555 -t 10 -i 1
------------------------------------------------------------
Client connecting to 10.0.0.1, TCP port 5555
TCP window size:  612 KByte (default)
------------------------------------------------------------
[  3] local 10.0.0.2 port 42498 connected with 10.0.0.1 port 5555
[ ID] Interval       Transfer     Bandwidth
[  3]  0.0- 1.0 sec  1.99 GBytes  17.1 Gbits/sec
[  3]  1.0- 2.0 sec  1.89 GBytes  16.2 Gbits/sec
[  3]  2.0- 3.0 sec  2.03 GBytes  17.5 Gbits/sec
[  3]  3.0- 4.0 sec  1.95 GBytes  16.7 Gbits/sec
[  3]  4.0- 5.0 sec  2.06 GBytes  17.7 Gbits/sec
[  3]  5.0- 6.0 sec  2.01 GBytes  17.2 Gbits/sec
[  3]  6.0- 7.0 sec  1.97 GBytes  17.0 Gbits/sec
[  3]  7.0- 8.0 sec  2.06 GBytes  17.7 Gbits/sec
[  3]  8.0- 9.0 sec  2.08 GBytes  17.9 Gbits/sec
[  3]  9.0-10.0 sec  2.09 GBytes  18.0 Gbits/sec
[  3]  0.0-10.0 sec  20.1 GBytes  17.3 Gbits/sec
mininet>
```

E

Especifique que o host 1 na porta 5555 vai ser um servidor TCP e o host 2 um cliente e execute testes de iperf, considere um relatório por segundocom teste de 10segundos. Faça os testes para larguras de banda bw de 1, 3, 12 e 18Mbps