Assignment 4

Understanding network emulation software, Mininet Megha: 2021337

Q1. Python file :

```
from mininet.topo import Topo
class customTopo(Topo):
 def build(self):
   H1 S1 = self.addHost( 'h1' )
   H2 S1 = self.addHost( 'h2')
   H3 S2 = self.addHost( 'h3' )
   H4 S2 = self.addHost( 'h4' )
   H5 S2 = self.addHost( 'h5' )
   H6 S3 = self.addHost( 'h6' )
   H7 S3 = self.addHost( 'h7')
   H8 S3 = self.addHost( 'h8' )
   s1 Switch = self.addSwitch( 's1')
   s2 Switch = self.addSwitch( 's2')
   s3 Switch = self.addSwitch( 's3')
   self.addLink( H1 S1, s1 Switch )
   self.addLink( s2 Switch, s1 Switch )
   self.addLink( H2 S1, s1 Switch )
   self.addLink( H3 S2, s2 Switch )
   self.addLink( H5 S2, s2 Switch )
   self.addLink( H6 S3, s3 Switch )
   self.addLink( H7 S3, s3 Switch )
   self.addLink( H8 S3, s3 Switch )
topos = { 'mytopo': ( lambda: customTopo() ) }
```

\$sudo mn --custom ~/mininet/custom/topo-3sw-8host.py --topo mytopo --mac --switch ovsk --controller remote

```
mininet@mininet-vm: ~/mininet/custom
                                                                                      ×
File Edit Tabs Help
mininet@mininet-vm:~/mininet/custom$ nano topo-3sw-8host.py
mininet@mininet-vm:~/mininet/custom$ sudo mn --custom ~/mininet/custom/topo-3sw-8host
.py --topo mytopo --mac --switch ovsk --controller remote
*** Creating network
*** Adding controller
Unable to contact the remote controller at 127.0.0.1:6653
Unable to contact the remote controller at 127.0.0.1:6633
Setting remote controller to 127.0.0.1:6653
*** Adding hosts:
h1 h2 h3 h4 h5 h6 h7 h8
*** Adding switches:
s1 s2 s3
*** Adding links:
(h1, s1) (h2, s1) (h3, s2) (h4, s2) (h5, s2) (h6, s3) (h7, s3) (h8, s3) (s2, s1) (s2,
s3)
*** Configuring hosts
h1 h2 h3 h4 h5 h6 h7 h8
*** Starting controller
c0
*** Starting 3 switches
s1 s2 s3 ...
*** Starting CLI:
mininet>
```

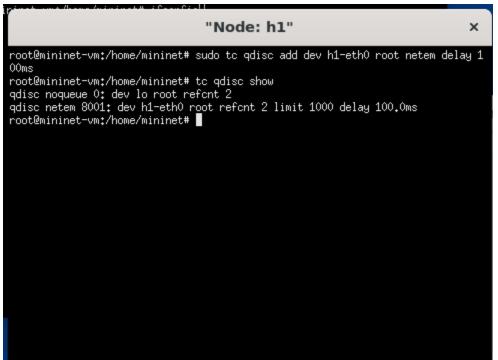
net

```
File Edit Tabs Help
(s2, s3)
*** Configuring hosts
h1 h2 h3 h4 h5 h6 h7 h8
*** Starting controller
c0
*** Starting 3 switches
s1 s2 s3 ...
*** Starting CLI:
mininet> net
h1 h1-eth0:s1-eth1
h2 h2-eth0:s1-eth3
h3 h3-eth0:s2-eth2
h4 h4-eth0:s2-eth4
h5 h5-eth0:s2-eth5
h6 h6-eth0:s3-eth2
h7 h7-eth0:s3-eth3
h8 h8-eth0:s3-eth4
s1 lo: s1-eth1:h1-eth0 s1-eth2:s2-eth1 s1-eth3:h2-eth0
s2 lo: s2-eth1:s1-eth2 s2-eth2:h3-eth0 s2-eth3:s3-eth1 s2-eth4:h4-eth0 s2-eth5:h5-eth0
s3 lo: s3-eth1:s2-eth3 s3-eth2:h6-eth0 s3-eth3:h7-eth0 s3-eth4:h8-eth0
mininet>
```

a. sudo tc qdisc add dev h1-eth0 root netem delay 100ms

Delay = 100ms

To show delay: tc qdisc show



b. iperf -s

```
"Node: h1"

root@mininet-vm:/home/mininet/mininet/custom# sudo to qdisc add dev h1-eth0 roo t netem delay 100ms
Error: Exclusivity flag on, cannot modify.
root@mininet-vm:/home/mininet/mininet/custom# iperf -s

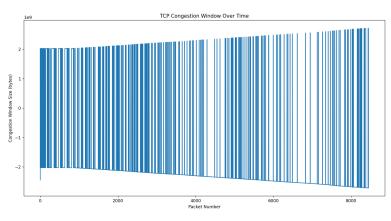
Server listening on TCP port 5001
TCP window size: 85.3 KByte (default)
```

iperf -c 10.0.0.6

C.

```
mininet> xterm h1 h6
mininet> h1 tcpdump -i h1-eth0 -w h2_capture.pcap
tcpdump: listening on h1-eth0, link-type EN10MB (Ethernet), capture size 262144
bytes
```

d. Graph



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