CSC 541 Project 2 Explanation with Output Screenshots

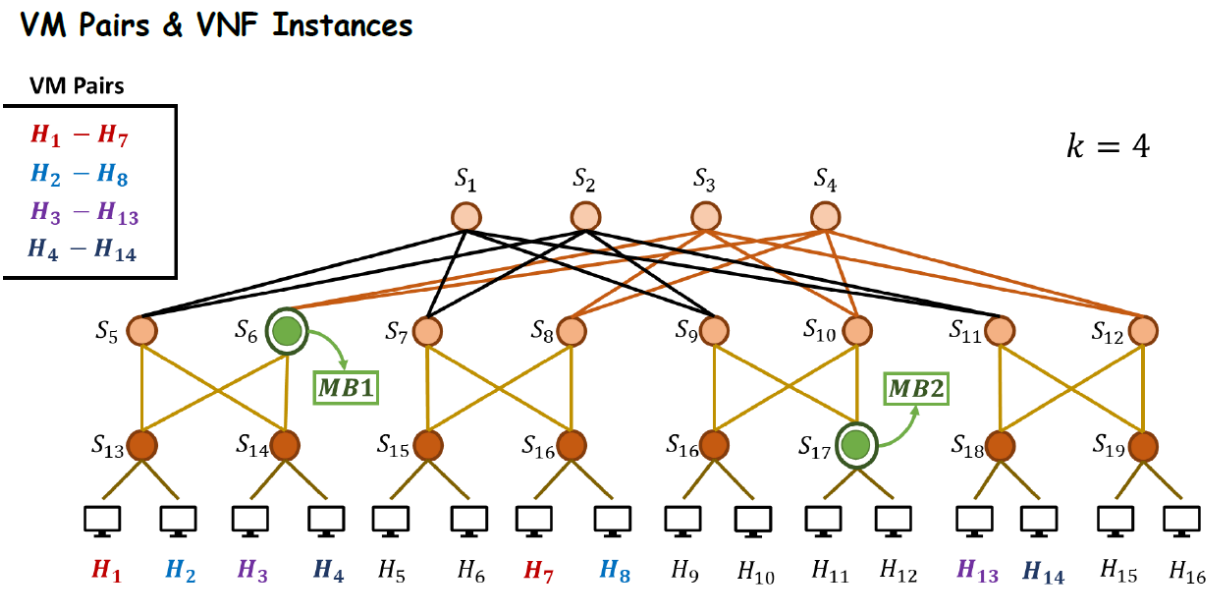
Name: Jaspreet Singh & Susmita Patange

Student ID: 210555347 & 210551057

Email: fjaspreetsingh1@toromail.csudh.edu & spatange1@toromail.csudh.edu

Github: https://github.com/JaspreetToro/CSC541_Project2

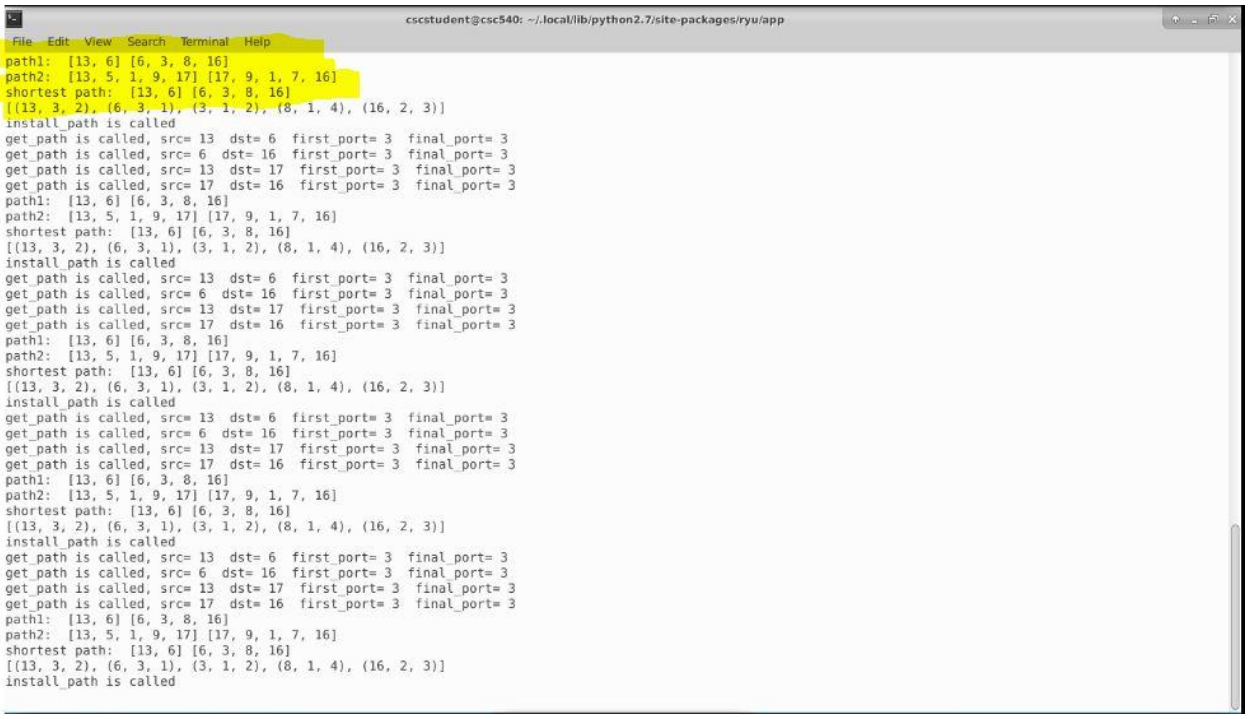
S No.	MB Based	VM Based
1.	In this algorithm, for each MB instance, it is assigned κ VM pairs among all the VM pairs that give the minimum energy consumption when going through that MB instance.	For each VM pair, it is assigned to an MB instance such that it gives the minimum energy consumption for this VM pair among all the MB instances, while satisfying this MB instance's capacity.



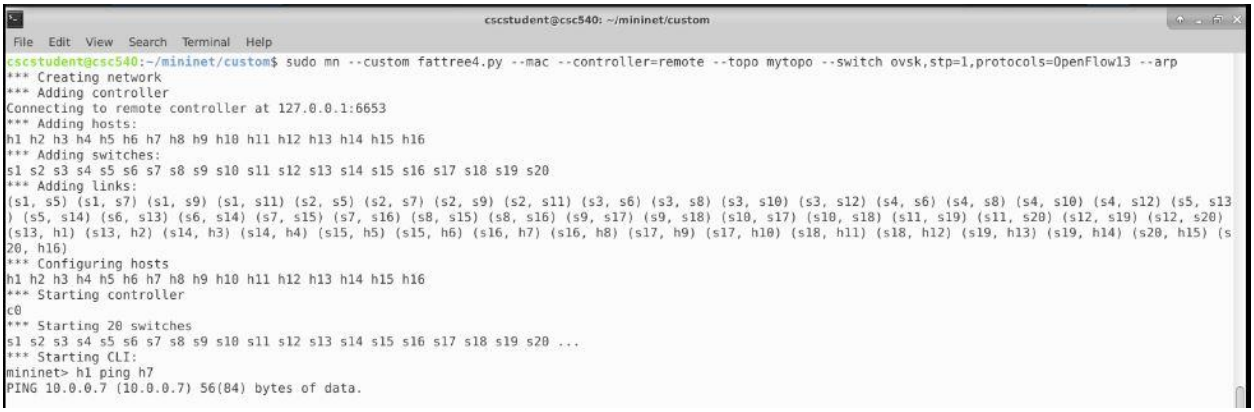
MB Based - We have selected VM pair "H1-H7" and verified shortest path my making them pass each time through MB1 and MB2 as shown in above figure. Based on the above calculation shortest path between the two will selected. In this case while routing from "H1-H7" path taken will be **[H1 > S13 > S6 > S3 > S8 > S16 > H7]:**

Implementation:

ryu-manager dijkstra_ryu_mb.py --observe-links

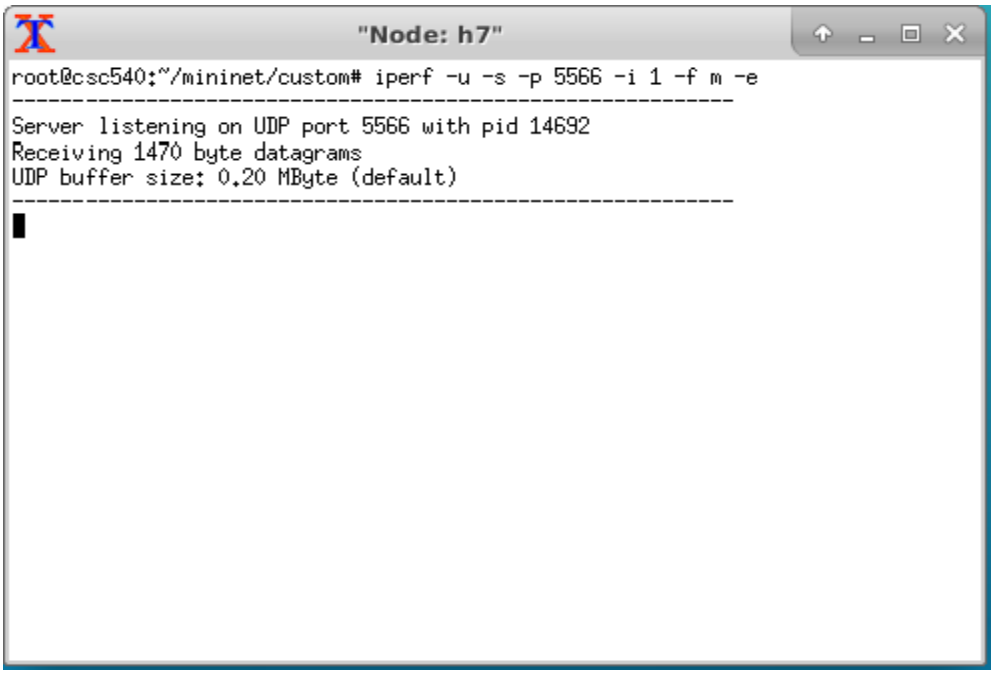


sudo mn --custom fattree4.py --mac --controller=remote --topo mytopo --switch ovsk,stp=1,protocols=OpenFlow13 --arp

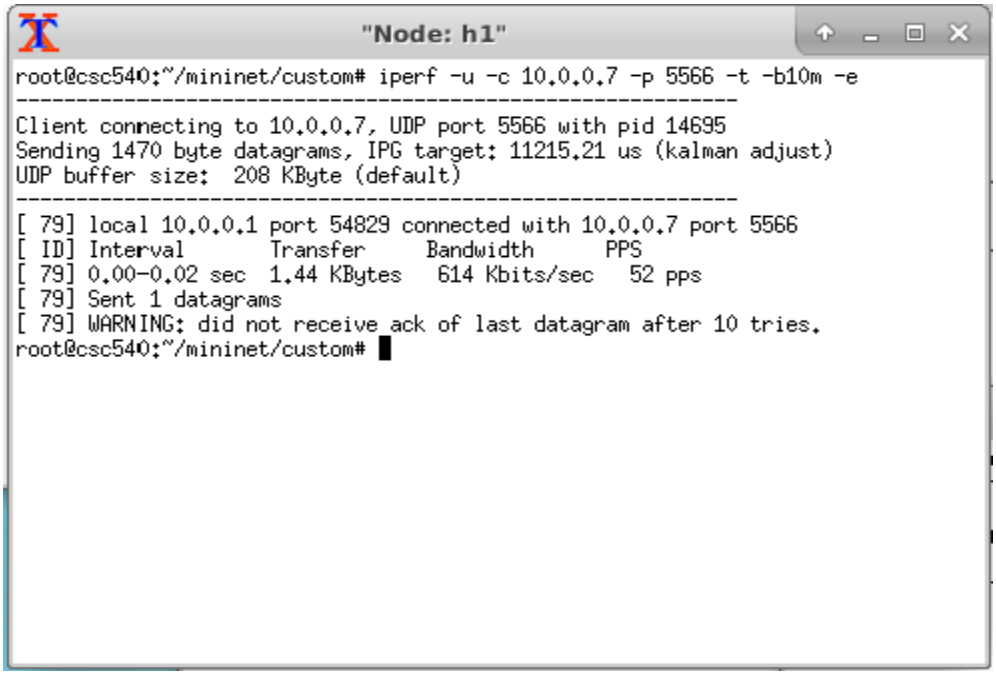


xterm h1 h7

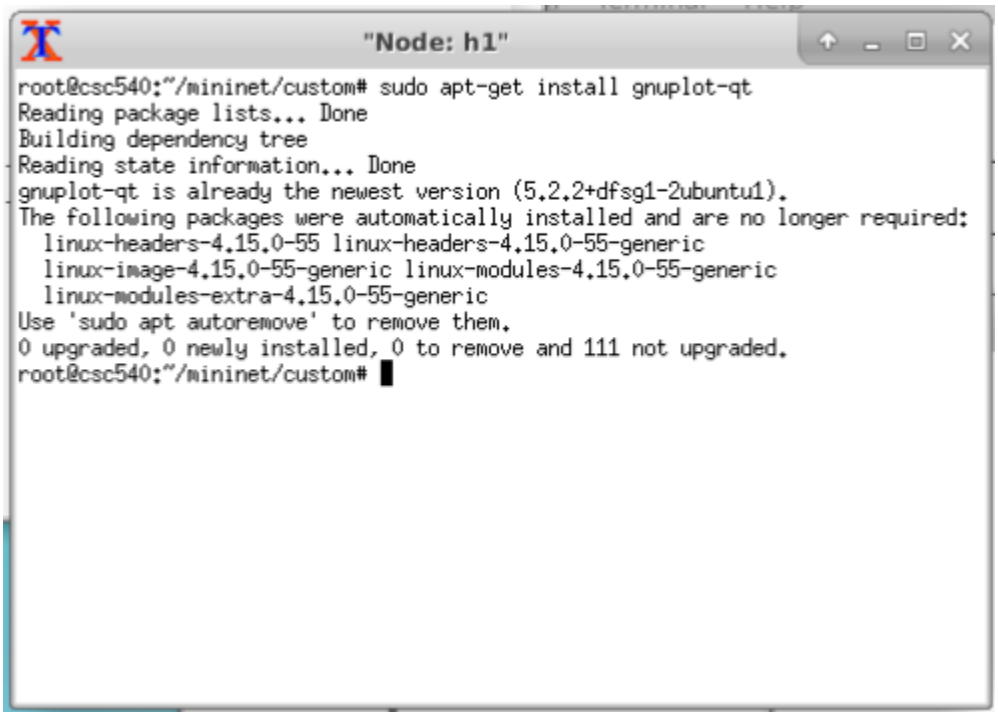
iperf -u -s -p 5566 -i 1 -f m -e

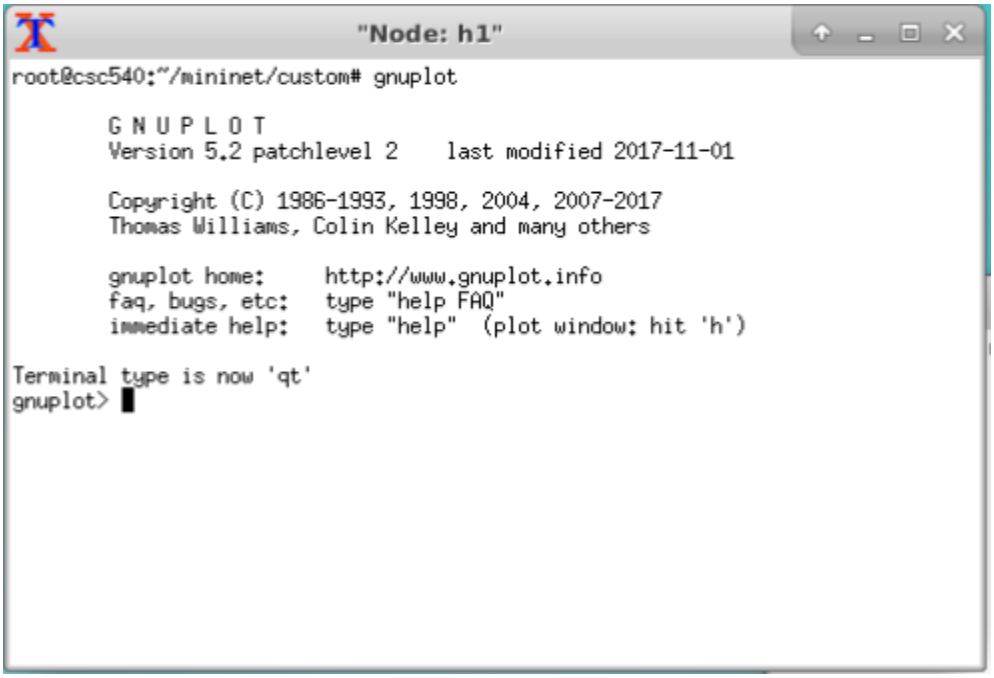


iperf -u -c 10.0.0.7 -p 5566 -t 300 -b10m -e

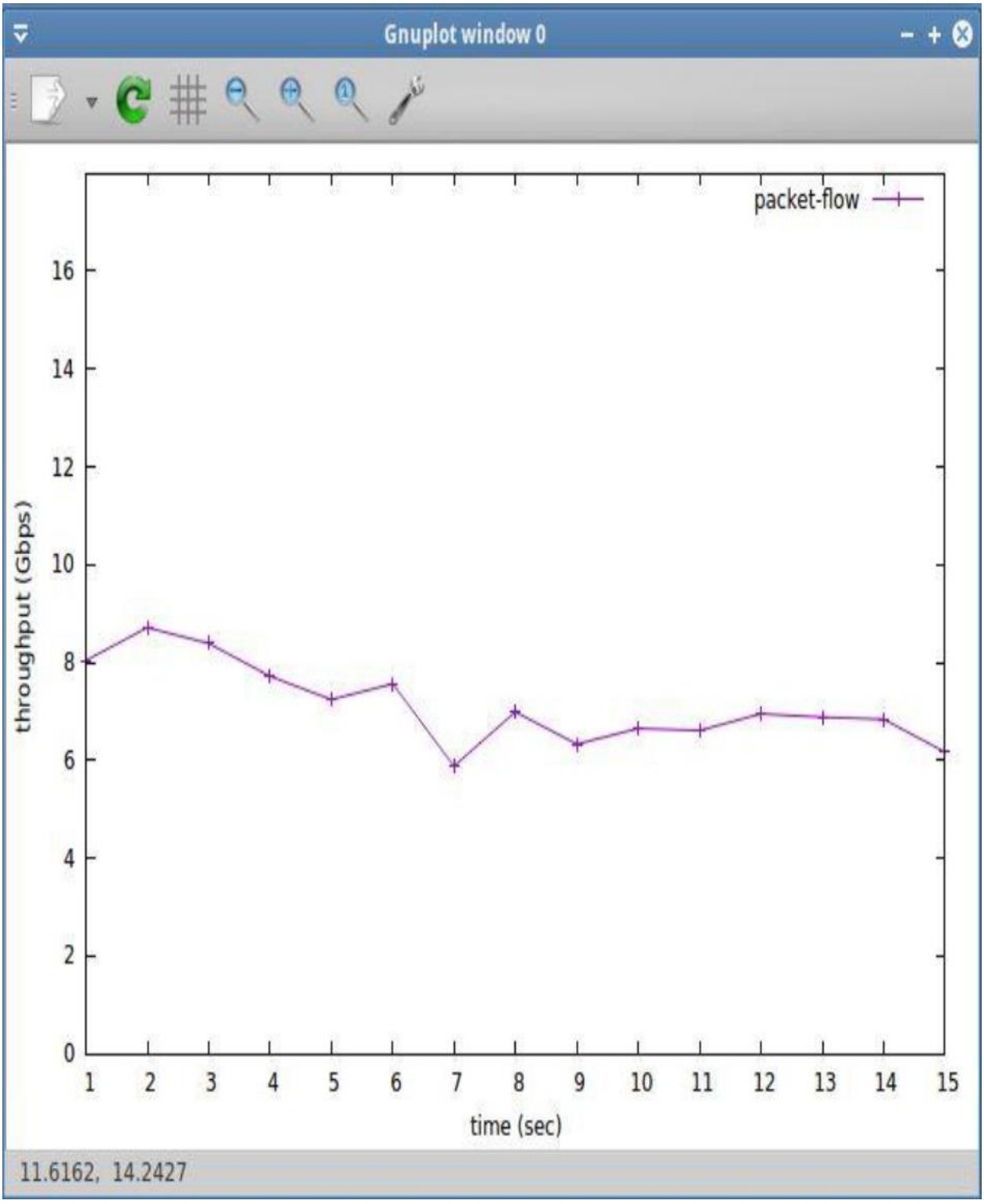


sudo apt-get install gnuplot-qt //installing gnuplot library

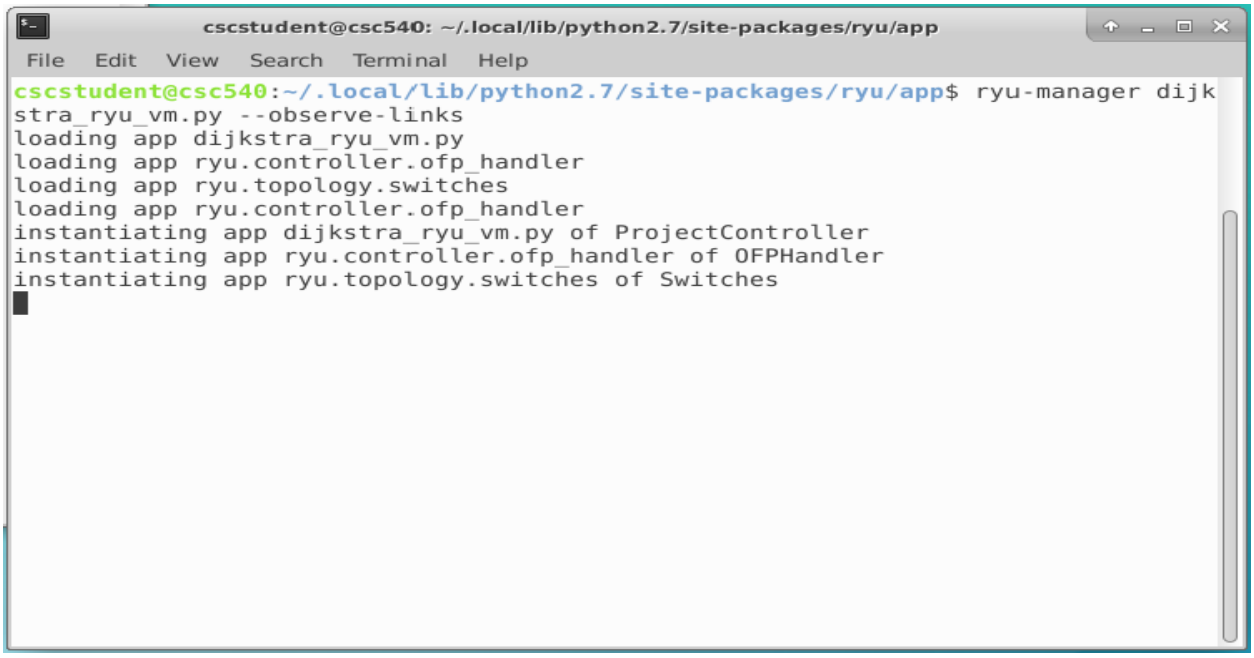


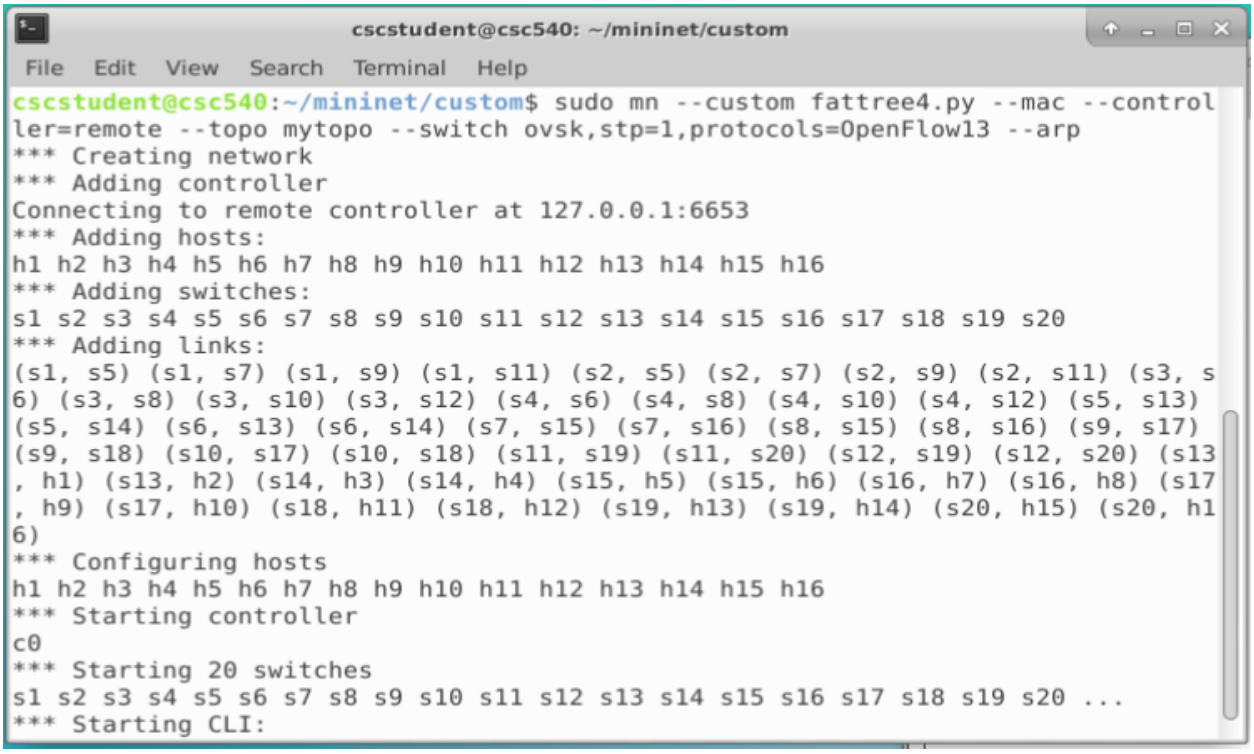


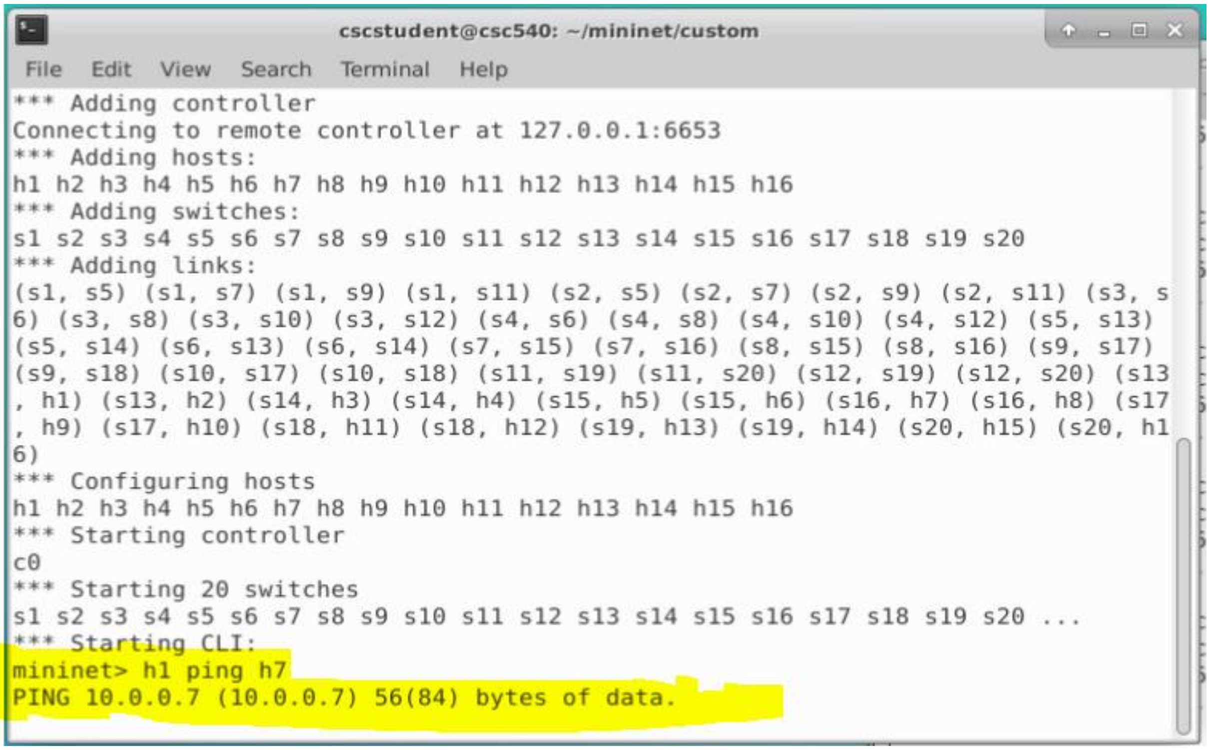
Results:


Gnuplot window 0
packet-flow
throughput (Gbps)
time (sec)
0
2
4
6
8
10
12
14
16
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
11.6162, 14.2427

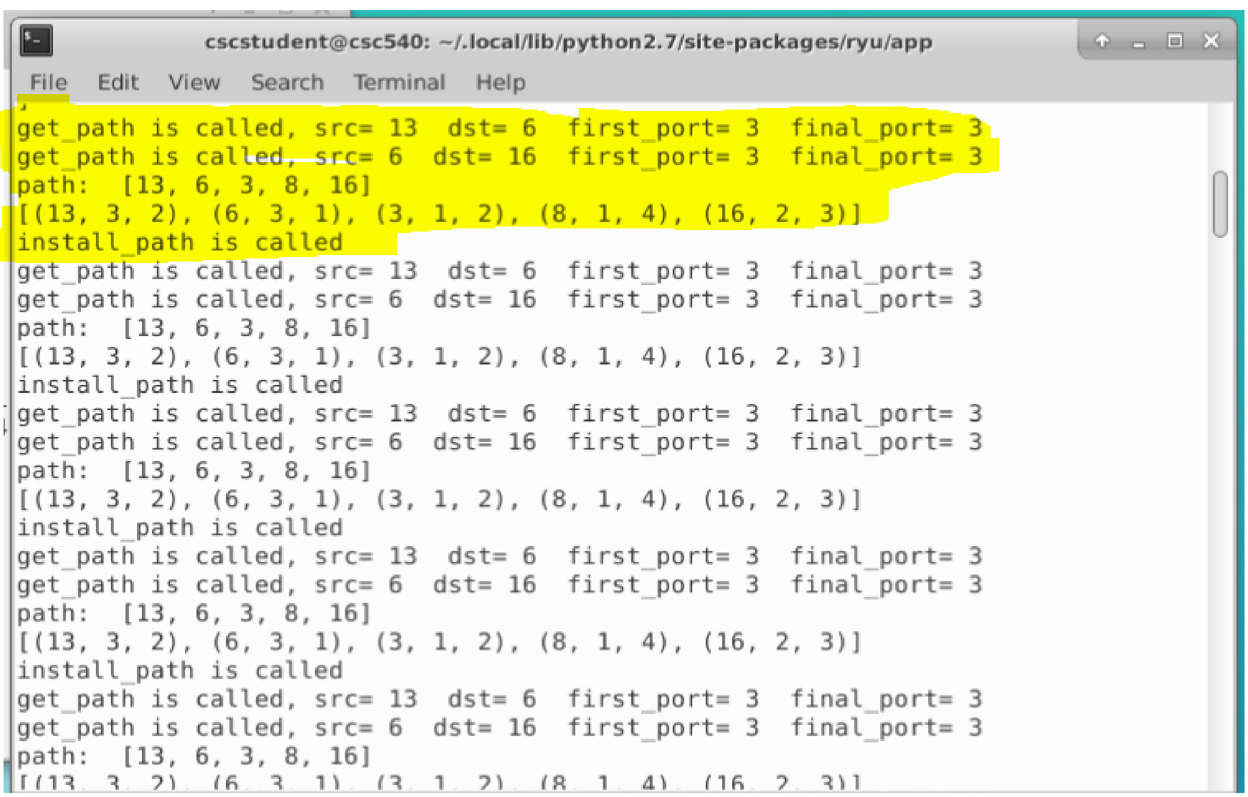
VM Based - We have selected VM pair “H1-H7” and assigned MB1 to this pair. In any case “H1-H7” will be routed through MB1 i.e. switch 6. This is also applicable to VM pair “H2-H8” via MB1 i.e. switch 6. Similarly, “H3-H13” VM pair which is routed through MB2 i.e. Switch 17. Below are the screenshots for the same:



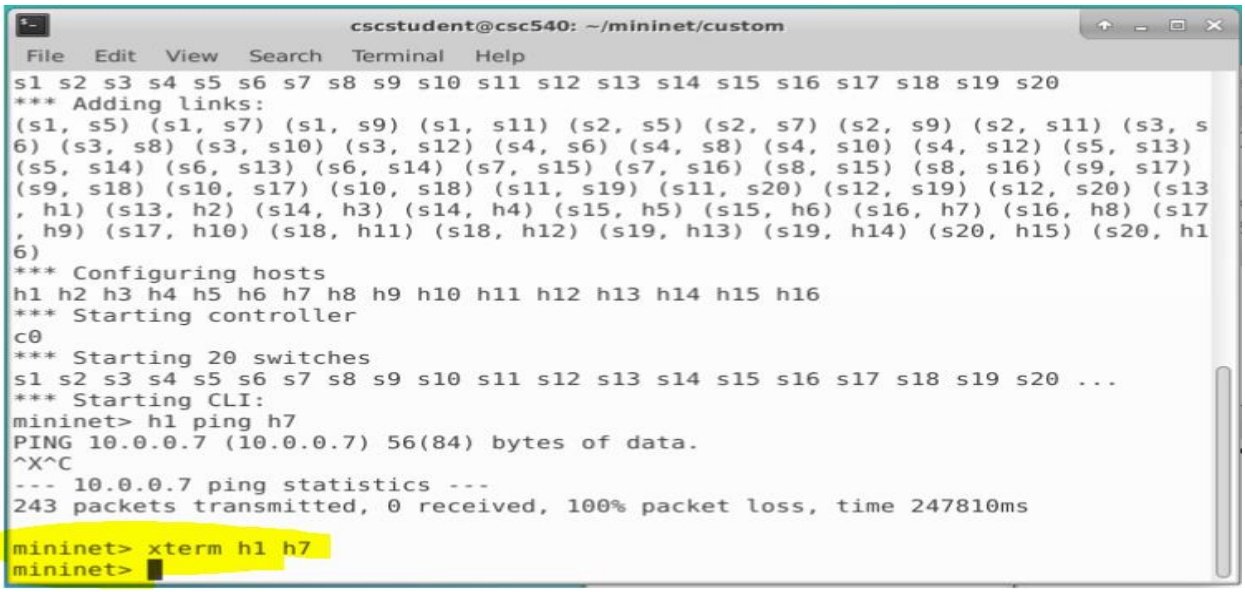


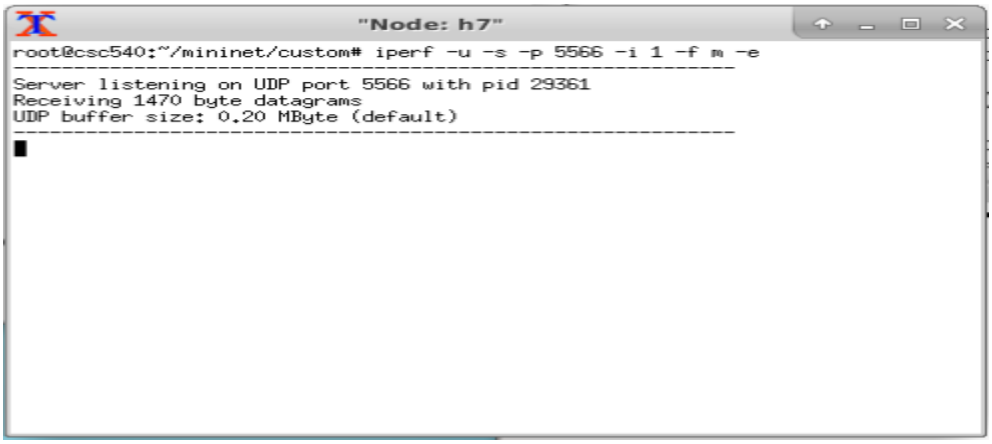


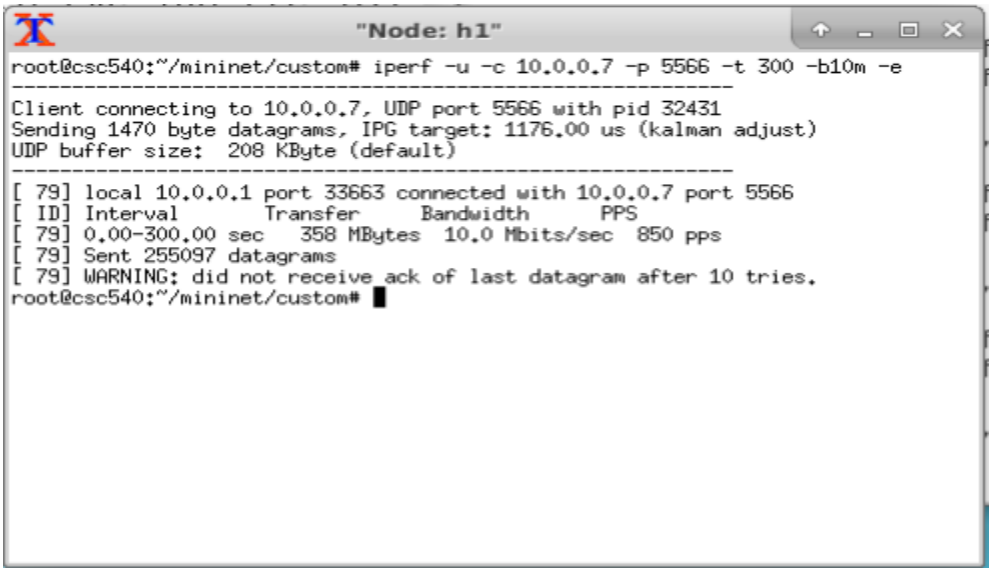
```
cscstudent@csc540: ~/mininet/custom
File Edit View Search Terminal Help
*** Adding controller
Connecting to remote controller at 127.0.0.1:6653
*** Adding hosts:
h1 h2 h3 h4 h5 h6 h7 h8 h9 h10 h11 h12 h13 h14 h15 h16
*** Adding switches:
s1 s2 s3 s4 s5 s6 s7 s8 s9 s10 s11 s12 s13 s14 s15 s16 s17 s18 s19 s20
*** Adding links:
(s1, s5) (s1, s7) (s1, s9) (s1, s11) (s2, s5) (s2, s7) (s2, s9) (s2, s11) (s3, s
6) (s3, s8) (s3, s10) (s3, s12) (s4, s6) (s4, s8) (s4, s10) (s4, s12) (s5, s13)
(s5, s14) (s6, s13) (s6, s14) (s7, s15) (s7, s16) (s8, s15) (s8, s16) (s9, s17)
(s9, s18) (s10, s17) (s10, s18) (s11, s19) (s11, s20) (s12, s19) (s12, s20) (s13
, h1) (s13, h2) (s14, h3) (s14, h4) (s15, h5) (s15, h6) (s16, h7) (s16, h8) (s17
, h9) (s17, h10) (s18, h11) (s18, h12) (s19, h13) (s19, h14) (s20, h15) (s20, h1
6)
*** Configuring hosts
h1 h2 h3 h4 h5 h6 h7 h8 h9 h10 h11 h12 h13 h14 h15 h16
*** Starting controller
c0
*** Starting 20 switches
s1 s2 s3 s4 s5 s6 s7 s8 s9 s10 s11 s12 s13 s14 s15 s16 s17 s18 s19 s20 ...
*** Starting CLI:
mininet> h1 ping h7
PING 10.0.0.7 (10.0.0.7) 56(84) bytes of data.
```

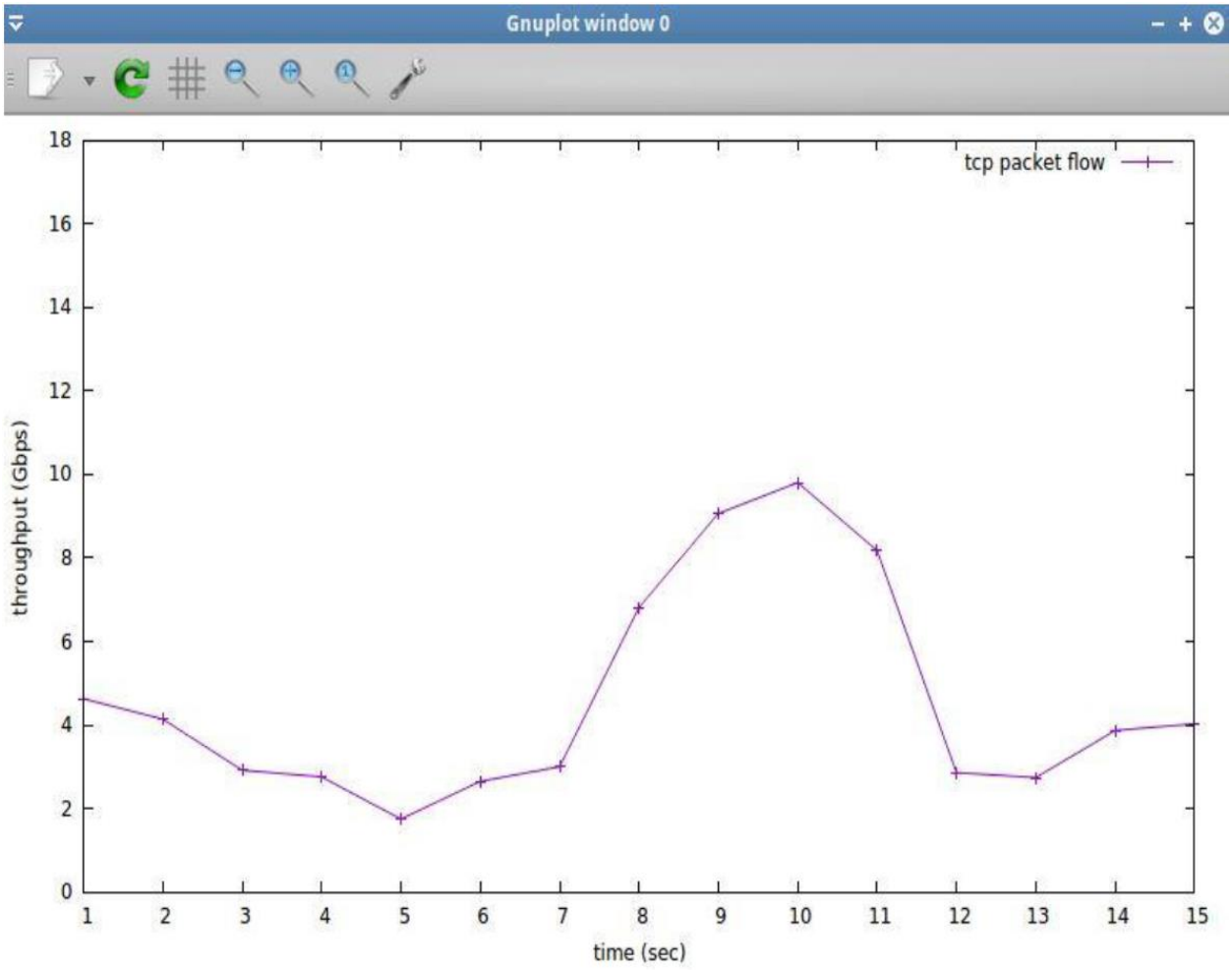


```
cscstudent@csc540: ~/.local/lib/python2.7/site-packages/ryu/app
File Edit View Search Terminal Help
get_path is called, src= 13  dst= 6  first_port= 3  final_port= 3
get_path is called, src= 6  dst= 16  first_port= 3  final_port= 3
path:  [13, 6, 3, 8, 16]
[(13, 3, 2), (6, 3, 1), (3, 1, 2), (8, 1, 4), (16, 2, 3)]
install_path is called
get_path is called, src= 13  dst= 6  first_port= 3  final_port= 3
get_path is called, src= 6  dst= 16  first_port= 3  final_port= 3
path:  [13, 6, 3, 8, 16]
[(13, 3, 2), (6, 3, 1), (3, 1, 2), (8, 1, 4), (16, 2, 3)]
install_path is called
get_path is called, src= 13  dst= 6  first_port= 3  final_port= 3
get_path is called, src= 6  dst= 16  first_port= 3  final_port= 3
path:  [13, 6, 3, 8, 16]
[(13, 3, 2), (6, 3, 1), (3, 1, 2), (8, 1, 4), (16, 2, 3)]
install_path is called
get_path is called, src= 13  dst= 6  first_port= 3  final_port= 3
get_path is called, src= 6  dst= 16  first_port= 3  final_port= 3
path:  [13, 6, 3, 8, 16]
[(13, 3, 2), (6, 3, 1), (3, 1, 2), (8, 1, 4), (16, 2, 3)]
install_path is called
get_path is called, src= 13  dst= 6  first_port= 3  final_port= 3
get_path is called, src= 6  dst= 16  first_port= 3  final_port= 3
path:  [13, 6, 3, 8, 16]
[(13, 3, 2), (6, 3, 1), (3, 1, 2), (8, 1, 4), (16, 2, 3)]
```


cscstudent@csc540: ~/mininet/custom
File Edit View Search Terminal Help
s1 s2 s3 s4 s5 s6 s7 s8 s9 s10 s11 s12 s13 s14 s15 s16 s17 s18 s19 s20
*** Adding links:
(s1, s5) (s1, s7) (s1, s9) (s1, s11) (s2, s5) (s2, s7) (s2, s9) (s2, s11) (s3, s
6) (s3, s8) (s3, s10) (s3, s12) (s4, s6) (s4, s8) (s4, s10) (s4, s12) (s5, s13)
(s5, s14) (s6, s13) (s6, s14) (s7, s15) (s7, s16) (s8, s15) (s8, s16) (s9, s17)
(s9, s18) (s10, s17) (s10, s18) (s11, s19) (s11, s20) (s12, s19) (s12, s20) (s13
, h1) (s13, h2) (s14, h3) (s14, h4) (s15, h5) (s15, h6) (s16, h7) (s16, h8) (s17
, h9) (s17, h10) (s18, h11) (s18, h12) (s19, h13) (s19, h14) (s20, h15) (s20, h1
6)
*** Configuring hosts
h1 h2 h3 h4 h5 h6 h7 h8 h9 h10 h11 h12 h13 h14 h15 h16
*** Starting controller
c0
*** Starting 20 switches
s1 s2 s3 s4 s5 s6 s7 s8 s9 s10 s11 s12 s13 s14 s15 s16 s17 s18 s19 s20 ...
*** Starting CLI:
mininet> h1 ping h7
PING 10.0.0.7 (10.0.0.7) 56(84) bytes of data.
^X^C
--- 10.0.0.7 ping statistics ---
243 packets transmitted, 0 received, 100% packet loss, time 247810ms
mininet> xterm h1 h7
mininet>


"Node: h7"
root@csc540:~/mininet/custom# iperf -u -s -p 5566 -i 1 -f m -e
Server listening on UDP port 5566 with pid 29361
Receiving 1470 byte datagrams
UDP buffer size: 0.20 MByte (default)


"Node: h1"
root@csc540:~/mininet/custom# iperf -u -c 10.0.0.7 -p 5566 -t 300 -b10m -e
Client connecting to 10.0.0.7, UDP port 5566 with pid 32431
Sending 1470 byte datagrams, IPG target: 1176.00 us (kalman adjust)
UDP buffer size: 208 KByte (default)
[79] local 10.0.0.1 port 33663 connected with 10.0.0.7 port 5566
[ID] Interval Transfer Bandwidth PPS
[79] 0.00-300.00 sec 358 MBytes 10.0 Mbits/sec 850 pps
[79] Sent 255097 datagrams
[79] WARNING: did not receive ack of last datagram after 10 tries.
root@csc540:~/mininet/custom#



Contribution:

Susmita: Research on MB Based, VM Based Algorithms.

Jaspreet Singh: Implementation of MB Based and VM Based Algorithms.

References:

[1] http://csie.nqu.edu.tw/smallko/sdn/dijkstra_ryu.htm

[2] http://csie.nqu.edu.tw/smallko/sdn/iperf_mininet.htm