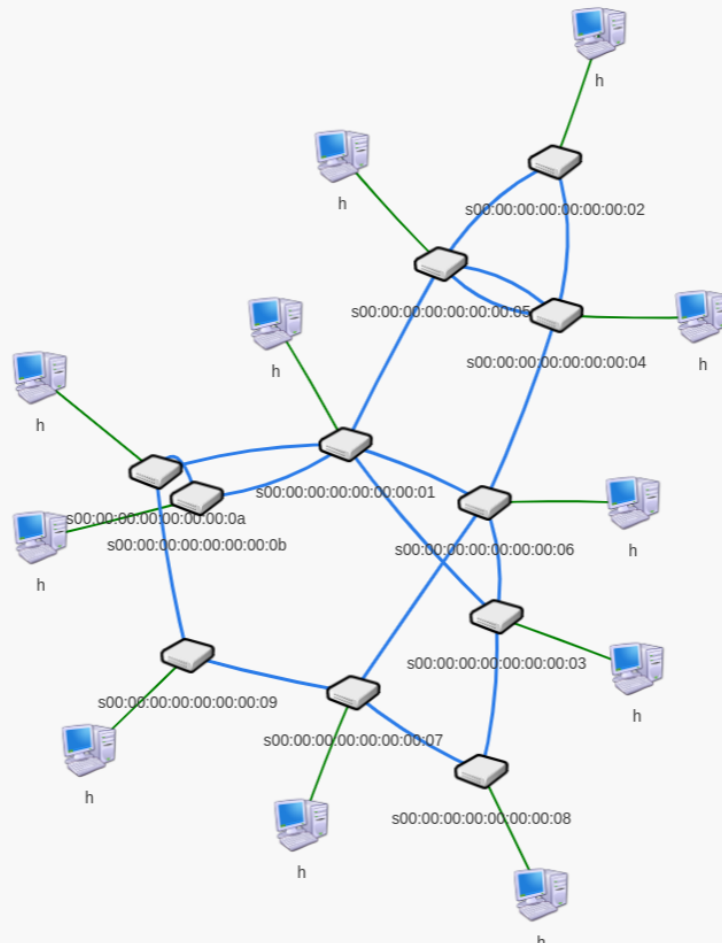


بسم الله الرحمن الرحيم
امير ارسلان ياورى
٩٨٣٠٣٥٣

```
00:00:00:00:00:00:04, port=1, activeSince=Tue Jun 14 17:09:04 IRDT 2022, lastSeen=Tue Jun 14 17:09:04 IRDT 2022], AttachmentPoint [sw=00:00:00:00:00:00:05, port=4, activeSince=Tue Jun 14 17:09:04 IRDT 2022, lastSeen=Tue Jun 14 17:09:04 IRDT 2022], AttachmentPoint [sw=00:00:00:00:00:00:06, port=4, activeSince=Tue Jun 14 17:09:04 IRDT 2022, lastSeen=Tue Jun 14 17:09:04 IRDT 2022], AttachmentPoint [sw=00:00:00:00:00:00:07, port=3, activeSince=Tue Jun 14 17:09:04 IRDT 2022, lastSeen=Tue Jun 14 17:09:04 IRDT 2022], AttachmentPoint [sw=00:00:00:00:00:00:08, port=1, activeSince=Tue Jun 14 17:09:04 IRDT 2022, lastSeen=Tue Jun 14 17:09:04 IRDT 2022], AttachmentPoint [sw=00:00:00:00:00:00:0a, port=3, activeSince=Tue Jun 14 17:09:04 IRDT 2022, lastSeen=Tue Jun 14 17:09:04 IRDT 2022], AttachmentPoint [sw=00:00:00:00:00:00:0b, port=1, activeSince=Tue Jun 14 17:09:04 IRDT 2022, lastSeen=Tue Jun 14 17:09:04 IRDT 2022]] newmap null
2022-06-14 17:09:04.977 INFO [n.f.t.TopologyManager] Recomputing topology due to: link-discovery-updates
2022-06-14 17:09:10.312 INFO [n.f.l.i.LinkDiscoveryManager] Sending LLD P packets out of all the enabled ports
2022-06-14 17:09:10.410 INFO [n.f.h.ControllerLogic] [ControllerLogic] Election timed out, setting Controller 1 as LEADER!
2022-06-14 17:09:10.410 INFO [n.f.h.ControllerLogic] [ControllerLogic] Getting Leader: 1
2022-06-14 17:09:10.479 INFO [n.f.t.TopologyManager] Recomputing topology due to: link-discovery-updates
2022-06-14 17:09:10.527 INFO [n.f.d.i.Device] updateAttachmentPoint: ap [AttachmentPoint [sw=00:00:00:00:00:00:00:07, port=2, activeSince=Tue Jun 14 17:09:04 IRDT 2022, lastSeen=Tue Jun 14 17:09:04 IRDT 2022]] newmap ap null
2022-06-14 17:09:10.528 INFO [n.f.d.i.Device] updateAttachmentPoint: ap [AttachmentPoint [sw=00:00:00:00:00:00:00:09, port=1, activeSince=Tue Jun 14 17:09:04 IRDT 2022, lastSeen=Tue Jun 14 17:09:04 IRDT 2022]] newmap ap null
2022-06-14 17:09:25.320 INFO [n.f.l.i.LinkDiscoveryManager] Sending LLD P packets out of all the enabled ports

arya ... > net2 > project3 > main > cd ..
arya ... > 6th > net2 > project3 > ls
files main tmp.py 'سید لطف لودی'
floodlight mehrdadd 'س. مزوب - 4002.pdf'
arya ... > 6th > net2 > project3 > cd files/
arya ... > net2 > project3 > files > ls
alaki.py flows.json flows.py topo-11sw-11host.py
arya ... > net2 > project3 > files > ls
arya ... > net2 > project3 > files > ls
alaki.py flows.json flows.py topo-11sw-11host.py
arya ... > net2 > project3 > files > arya ... > net2 > project3 > file
s arya ... > net2 > project3 > files
arya ... > net2 > project3 > files > arya ... > net2 > project3 > file
s arya ... > net2 > project3 > files sudo mn --custom topo-11sw-11hos
t.py --topo mytopo --controller=remote,ip=127.0.0.1,port=6653
[sudo] password for arya:
*** Creating network
*** Adding controller
*** Adding hosts:
h1 h2 h3 h4 h5 h6 h7 h8 h9 h10 h11
*** Adding switches:
s1 s2 s3 s4 s5 s6 s7 s8 s9 s10 s11
*** Adding links:
(h1, s1) (h2, s2) (h3, s3) (h4, s4) (h5, s5) (h6, s6) (h7, s7) (h8, s8)
(h9, s9) (h10, s10) (h11, s11) (s1, s3) (s1, s5) (s1, s6) (s2, s4) (s2, s5) (s3, s6) (s3, s8) (s4, s5) (s4, s6) (s5, s4) (s6, s7) (s7, s9) (s8, s7) (s9, s10) (s10, s1) (s10, s11) (s11, s1)
*** Configuring hosts
h1 h2 h3 h4 h5 h6 h7 h8 h9 h10 h11
*** Starting controller
c0
*** Starting 11 switches
s1 s2 s3 s4 s5 s6 s7 s8 s9 s10 s11 ...
*** Starting CLI:
mininet>
```

(1)



(2)

[OBJ]

(3)

```
*** Starting 11 switches
s1 s2 s3 s4 s5 s6 s7 s8 s9 s10 s11 ...
*** Starting CLI:
mininet> h1 ping h10
PING 10.0.0.10 (10.0.0.10) 56(84) bytes of data.
64 bytes from 10.0.0.10: icmp_seq=1 ttl=64 time=74.6 ms
64 bytes from 10.0.0.10: icmp_seq=2 ttl=64 time=0.454 ms
^C
--- 10.0.0.10 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1002ms
rtt min/avg/max/mdev = 0.454/37.540/74.626/37.086 ms
mininet> h1 ping h9
PING 10.0.0.9 (10.0.0.9) 56(84) bytes of data.
64 bytes from 10.0.0.9: icmp_seq=1 ttl=64 time=11.9 ms
64 bytes from 10.0.0.9: icmp_seq=2 ttl=64 time=0.371 ms
^C
--- 10.0.0.9 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1002ms
rtt min/avg/max/mdev = 0.371/6.114/11.857/5.743 ms
mininet> h1 ping h8
PING 10.0.0.8 (10.0.0.8) 56(84) bytes of data.
64 bytes from 10.0.0.8: icmp_seq=1 ttl=64 time=14.2 ms
64 bytes from 10.0.0.8: icmp_seq=2 ttl=64 time=0.414 ms
^C
--- 10.0.0.8 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1000ms
rtt min/avg/max/mdev = 0.414/7.301/14.188/6.887 ms
mininet>
```

"Arsalan" 17:14 14-Jun-22

(4)

دستور **nodes**: تمام دستگاه های موجود در شبکه است. طبق توضیحات پروژه ی قبل.
دستور **net** برای نشان دادن روابط میان نودهاست. (هر نود به چه نودی و از طریق چه چیزی متصل است).

دستور **dump** نیز برای نمایش نام نود، **network interface** به همراه آدرس **ip** آن به علاوه ی پروسس آیدی آن در سیستم را نشان می دهد.

```
mininet> nodes
available nodes are:
c0 h1 h10 h11 h2 h3 h4 h5 h6 h7 h8 h9 s1 s10 s11 s2 s3 s4 s5 s6 s7 s8 s9
mininet> net
h1 h1-eth0:s1-eth6
h2 h2-eth0:s2-eth3
h3 h3-eth0:s3-eth4
h4 h4-eth0:s4-eth5
h5 h5-eth0:s5-eth5
h6 h6-eth0:s6-eth5
h7 h7-eth0:s7-eth4
h8 h8-eth0:s8-eth3
h9 h9-eth0:s9-eth3
h10 h10-eth0:s10-eth4
h11 h11-eth0:s11-eth3
s1 lo: s1-eth1:s5-eth1 s1-eth2:s3-eth1 s1-eth3:s6-eth1 s1-eth4:s10-eth2 s
1-eth5:s11-eth2 s1-eth6:h1-eth0
s2 lo: s2-eth1:s5-eth2 s2-eth2:s4-eth2 s2-eth3:h2-eth0
s3 lo: s3-eth1:s1-eth2 s3-eth2:s8-eth1 s3-eth3:s6-eth2 s3-eth4:h3-eth0
s4 lo: s4-eth1:s5-eth3 s4-eth2:s2-eth2 s4-eth3:s6-eth3 s4-eth4:s5-eth4 s4
-eth5:h4-eth0
s5 lo: s5-eth1:s1-eth1 s5-eth2:s2-eth1 s5-eth3:s4-eth1 s5-eth4:s4-eth4 s5
-eth5:h5-eth0
s6 lo: s6-eth1:s1-eth3 s6-eth2:s3-eth3 s6-eth3:s4-eth3 s6-eth4:s7-eth1 s6
-eth5:h6-eth0
s7 lo: s7-eth1:s6-eth4 s7-eth2:s9-eth1 s7-eth3:s8-eth2 s7-eth4:h7-eth0
s8 lo: s8-eth1:s3-eth2 s8-eth2:s7-eth3 s8-eth3:h8-eth0
s9 lo: s9-eth1:s7-eth2 s9-eth2:s10-eth1 s9-eth3:h9-eth0
s10 lo: s10-eth1:s9-eth2 s10-eth2:s1-eth4 s10-eth3:s11-eth1 s10-eth4:h10-
eth0
s11 lo: s11-eth1:s10-eth3 s11-eth2:s1-eth5 s11-eth3:h11-eth0
c0
mininet>
```

"Arsalan" 17:20 14-Jun-22

```
[root@Arsalan files]# iperf -s -p 5566 -i 1
Server listening on TCP port 5566
TCP window size: 85,3 KByte (default)
-----
[ 1] local 10.0.0.8 port 5566 connected with 10.0.0.1 port 44728 (icwnd/mss/irt
t=14/1448/13748)
[ ID] Interval      Transfer    Bandwidth
[ 1] 0.00-1.00 sec  5.03 GBytes 43,2 Gbits/sec
[ 1] 1.00-2.00 sec  5.52 GBytes 47,4 Gbits/sec
[ 1] 2.00-3.00 sec  5.41 GBytes 46,4 Gbits/sec
[ 1] 3.00-4.00 sec  5.27 GBytes 45,2 Gbits/sec
[ 1] 4.00-5.00 sec  5.42 GBytes 46,5 Gbits/sec
[ 1] 0.00-5.20 sec  26,6 GBytes 44,0 Gbits/sec
[ 1]

[ 1] local 10.0.0.1 port 44728 connected with 10.0.0.8 port 5566 (icwnd/mss/irt
t=14/1448/16374)
[ ID] Interval      Transfer    Bandwidth
[ 1] 0.00-5.23 sec  26,6 GBytes 43,8 Gbits/sec
[ 1]
[root@Arsalan files]#

s8 lo: s8-eth1:s3-eth2 s8-eth2:s7-eth3 s8-eth3:h8-eth0
s9 lo: s9-eth1:s7-eth2 s9-eth2:s10-eth1 s9-eth3:h9-eth0
s10 lo: s10-eth1:s9-eth2 s10-eth2:s1-eth4 s10-eth3:s11-eth1 s10-eth4:h10-eth0
s11 lo: s11-eth1:s10-eth3 s11-eth2:s1-eth5 s11-eth3:h11-eth0
c0
mininet> xterm h1
mininet> xterm h8
mininet>

"Arsalan" 20:56 14-Jun-22
```

اطلاعات مشاهده‌شده در پنجره‌های بالا بیانگر دیتای انتقال یافته از h1 به h8 طی مدت 5 ثانیه است. (درواقع داره پهنای باند رو نشون میده)

```
> python flows.py
(200, 'OK', b'{"status" : "Entry pushed"}')
(200, 'OK', b'{"status" : "Entry pushed"}')
(200, 'OK', b'{"status" : "Entry pushed"}')
(200, 'OK', b'{"status" : "Entry pushed"}')
(200, 'OK', b'{"status" : "Entry pushed"}')
(200, 'OK', b'{"status" : "Entry pushed"}')
(200, 'OK', b'{"status" : "Entry pushed"}')
(200, 'OK', b'{"status" : "Entry pushed"}')
(200, 'OK', b'{"status" : "Entry pushed"}')
(200, 'OK', b'{"status" : "Entry pushed"}')
(200, 'OK', b'{"status" : "Entry pushed"}')
(200, 'OK', b'{"status" : "Entry pushed"}')
(200, 'OK', b'{"status" : "Entry pushed"}')
(200, 'OK', b'{"status" : "Entry pushed"}')
(200, 'OK', b'{"status" : "Entry pushed"}')
```

فایل `flows.py` در کنار این داکيومنت قرار گرفته شده است؛ این فایل پیکربندی خود را از فایل `flows.json` میخواند که سه مسیر به شکل زیر در آن تعریف شده است:

1 -> a -> 9 -> 7 -> 8

2 -> 4 -> 6 -> 7 -> 9

4 -> 5 -> 1 -> a

برای مثال اگر `h1` بخواهد `h8` را پی‌نگ بگیرد یا هر بسته‌ای برای آن ارسال کند طبق فلوی تعریف شده باید از مسیر 1 به `a` به 9 به 7 به 8 عبور کند.

(خسته نباشید :)