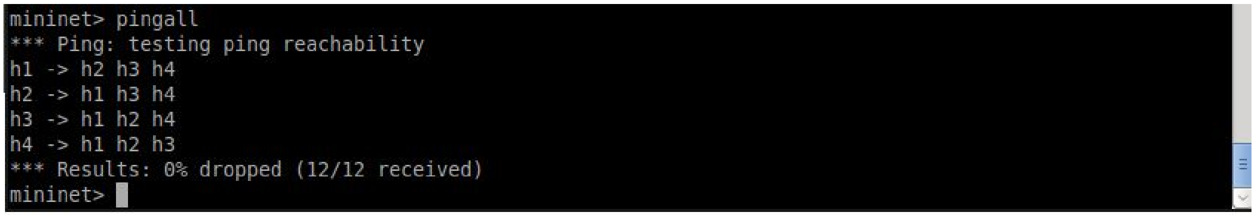
Peter Jiang
CMPE150
Lab3
2/23/2019

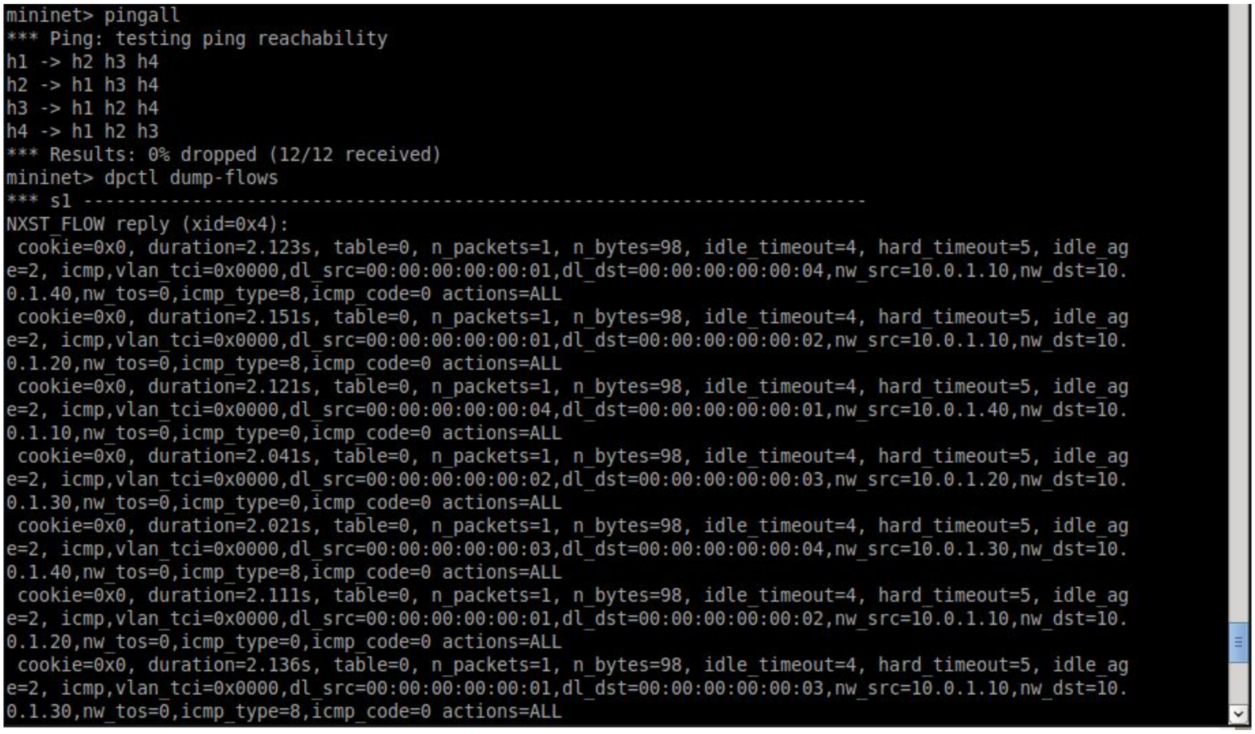
1. pingall
   This tests reachability between hosts. The image below shows no packets dropped so the ping was successful for all hosts. Pingall only accounts for the ICMP and ARP packets, which is why no packets are dropped for TCP



```
mininet> pingall
*** Ping: testing ping reachability
h1 -> h2 h3 h4
h2 -> h1 h3 h4
h3 -> h1 h2 h4
h4 -> h1 h2 h3
*** Results: 0% dropped (12/12 received)
mininet> 
```

2. dpctl dump--flows

This command shows entries that I installed into the switch with of_flow_mod. Below there are multiple entries. The amount of entries also depends on the idle and hard timeout that I set. I also tried using this command before pingall command, and zero entries were shown. This is because the switch is only informed of the rules after receiving packets and if no packets are received yet, there will be no rules shown.



```
mininet> pingall
*** Ping: testing ping reachability
h1 -> h2 h3 h4
h2 -> h1 h3 h4
h3 -> h1 h2 h4
h4 -> h1 h2 h3
*** Results: 0% dropped (12/12 received)
mininet> dpctl dump-flows
*** s1 ----------------------------------------------------------------------
NXST_FLOW reply (xid=0x4):
 cookie=0x0, duration=2.123s, table=0, n_packets=1, n_bytes=98, idle_timeout=4, hard_timeout=5, idle_ag
e=2, icmp,vlan_tci=0x0000,dl_src=00:00:00:00:00:01,dl_dst=00:00:00:00:00:04,nw_src=10.0.1.10,nw_dst=10.
0.1.40,nw_tos=0,icmp_type=8,icmp_code=0 actions=ALL
 cookie=0x0, duration=2.151s, table=0, n_packets=1, n_bytes=98, idle_timeout=4, hard_timeout=5, idle_ag
e=2, icmp,vlan_tci=0x0000,dl_src=00:00:00:00:00:01,dl_dst=00:00:00:00:00:02,nw_src=10.0.1.10,nw_dst=10.
0.1.20,nw_tos=0,icmp_type=8,icmp_code=0 actions=ALL
 cookie=0x0, duration=2.121s, table=0, n_packets=1, n_bytes=98, idle_timeout=4, hard_timeout=5, idle_ag
e=2, icmp,vlan_tci=0x0000,dl_src=00:00:00:00:00:04,dl_dst=00:00:00:00:00:01,nw_src=10.0.1.40,nw_dst=10.
0.1.10,nw_tos=0,icmp_type=0,icmp_code=0 actions=ALL
 cookie=0x0, duration=2.041s, table=0, n_packets=1, n_bytes=98, idle_timeout=4, hard_timeout=5, idle_ag
e=2, icmp,vlan_tci=0x0000,dl_src=00:00:00:00:00:02,dl_dst=00:00:00:00:00:03,nw_src=10.0.1.20,nw_dst=10.
0.1.30,nw_tos=0,icmp_type=0,icmp_code=0 actions=ALL
 cookie=0x0, duration=2.021s, table=0, n_packets=1, n_bytes=98, idle_timeout=4, hard_timeout=5, idle_ag
e=2, icmp,vlan_tci=0x0000,dl_src=00:00:00:00:00:03,dl_dst=00:00:00:00:00:04,nw_src=10.0.1.30,nw_dst=10.
0.1.40,nw_tos=0,icmp_type=8,icmp_code=0 actions=ALL
 cookie=0x0, duration=2.111s, table=0, n_packets=1, n_bytes=98, idle_timeout=4, hard_timeout=5, idle_ag
e=2, icmp,vlan_tci=0x0000,dl_src=00:00:00:00:00:01,dl_dst=00:00:00:00:00:02,nw_src=10.0.1.10,nw_dst=10.
0.1.20,nw_tos=0,icmp_type=0,icmp_code=0 actions=ALL
 cookie=0x0, duration=2.136s, table=0, n_packets=1, n_bytes=98, idle_timeout=4, hard_timeout=5, idle_ag
e=2, icmp,vlan_tci=0x0000,dl_src=00:00:00:00:00:01,dl_dst=00:00:00:00:00:03,nw_src=10.0.1.10,nw_dst=10.
0.1.30,nw_tos=0,icmp_type=8,icmp_code=0 actions=ALL
```

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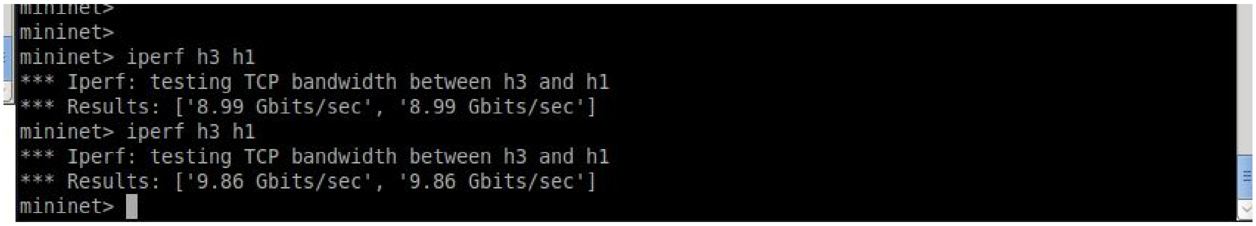
3. The iperf command tests bandwidth and network performance between hosts. In this case it is specifically for TCP packets. Using the command between h3 and h1 will succeed, but using it on any other hosts will make the system delay because the traffic will be blocked by the firewall.



```
mininet>
mininet>
mininet> iperf h3 h1
*** Iperf: testing TCP bandwidth between h3 and h1
*** Results: ['8.99 Gbits/sec', '8.99 Gbits/sec']
mininet> iperf h3 h1
*** Iperf: testing TCP bandwidth between h3 and h1
*** Results: ['9.86 Gbits/sec', '9.86 Gbits/sec']
mininet> 
```