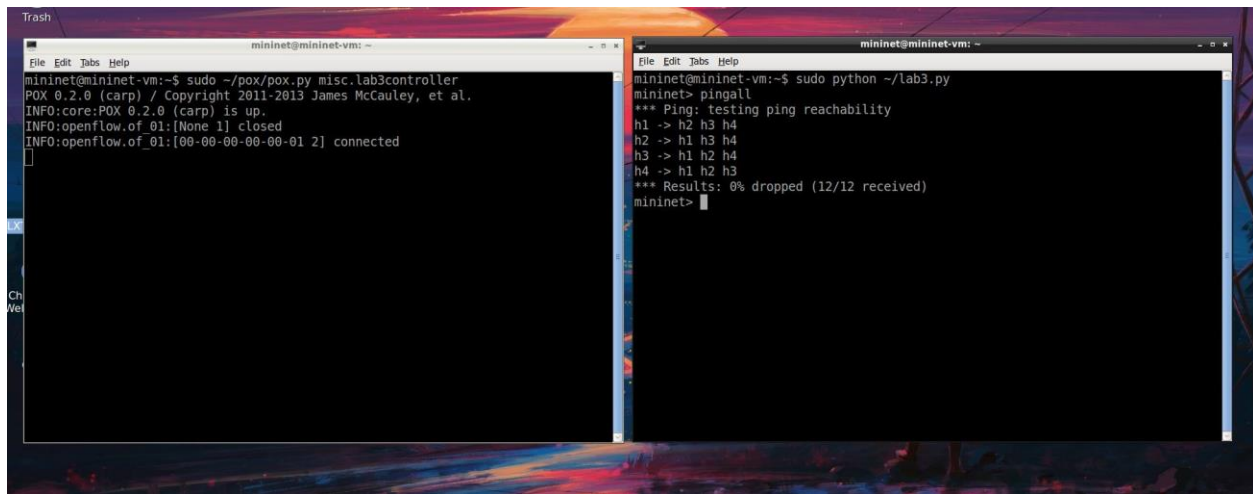


1. pingall –



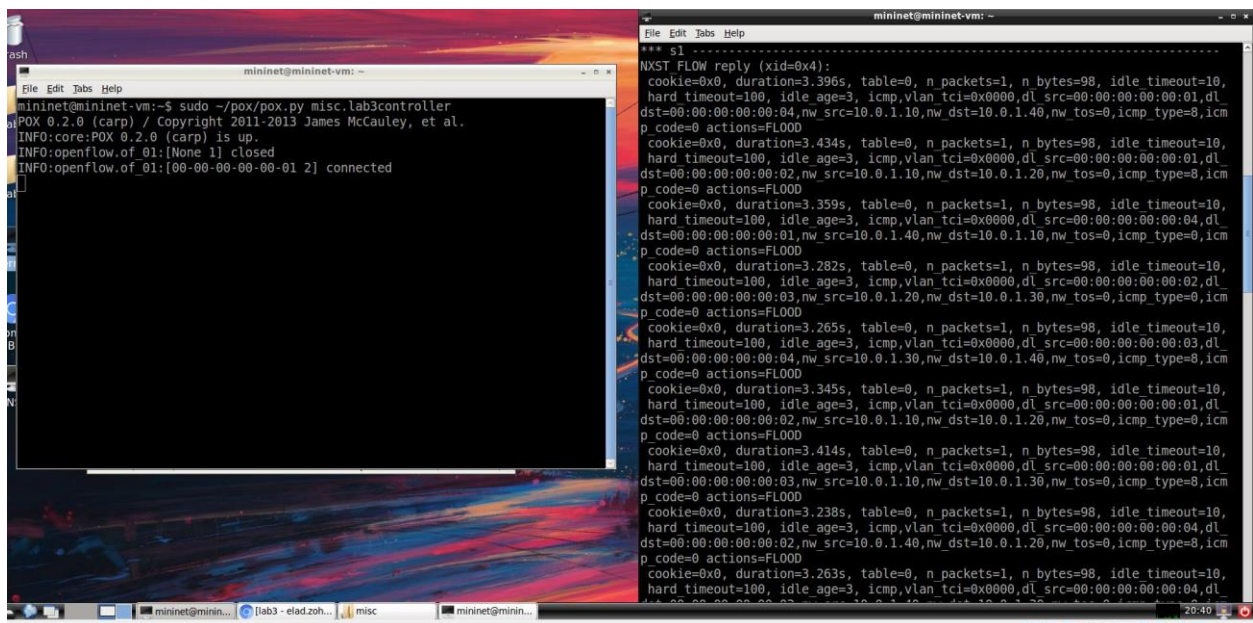
```
mininet@mininet-vm: ~$ sudo ~/pox/pox.py misc.lab3controller
POX 0.2.0 (carp) / Copyright 2011-2013 James McCauley, et al.
INFO:core:POX 0.2.0 (carp) is up.
INFO:openflow.of_01:[None 1] closed
INFO:openflow.of_01:[00-00-00-00-00-01 2] connected

mininet@mininet-vm: ~$ sudo python ~/Lab3.py
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>
```

Explanation:

In the lab3.py the network is designed to connect the 4 hosts through a single switch. The fact that all 12 were received shows that the network was built correctly and all hosts are able to communicate with other hosts.

2. dpctl dump-flows –



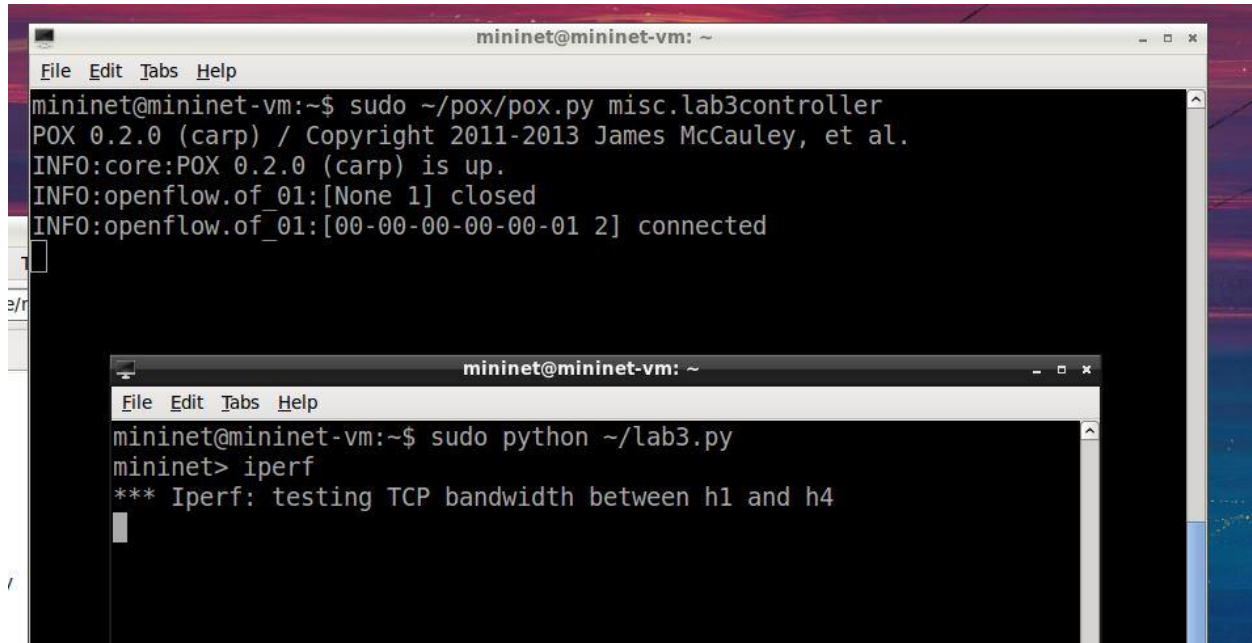
```
mininet@mininet-vm: ~$ sudo ~/pox/pox.py misc.lab3controller
POX 0.2.0 (carp) / Copyright 2011-2013 James McCauley, et al.
INFO:core:POX 0.2.0 (carp) is up.
INFO:openflow.of_01:[None 1] closed
INFO:openflow.of_01:[00-00-00-00-00-01 2] connected

mininet@mininet-vm: ~$ sudo python ~/Lab3.py
mininet> dpctl dump-flows
*** s1 ***
NXST FLOW reply (xid=0x4):
cookie=0x0, duration=3.396s, table=0, n_packets=1, n_bytes=98, idle timeout=10,
hard timeout=100, idle age=3, icmp,vlan_tci=0x0000,d1_src=00:00:00:00:00:01,d1_
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,icm
p_code=0 actions=FL000
cookie=0x0, duration=3.434s, table=0, n_packets=1, n_bytes=98, idle timeout=10,
hard timeout=100, idle age=3, icmp,vlan_tci=0x0000,d1_src=00:00:00:00:00:01,d1_
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,icm
p_code=0 actions=FL000
cookie=0x0, duration=3.359s, table=0, n_packets=1, n_bytes=98, idle timeout=10,
hard timeout=100, idle age=3, icmp,vlan_tci=0x0000,d1_src=00:00:00:00:00:01,d1_
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,icm
p_code=0 actions=FL000
cookie=0x0, duration=3.282s, table=0, n_packets=1, n_bytes=98, idle timeout=10,
hard timeout=100, idle age=3, icmp,vlan_tci=0x0000,d1_src=00:00:00:00:00:02,d1_
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,icm
p_code=0 actions=FL000
cookie=0x0, duration=3.265s, table=0, n_packets=1, n_bytes=98, idle timeout=10,
hard timeout=100, idle age=3, icmp,vlan_tci=0x0000,d1_src=00:00:00:00:00:03,d1_
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,icm
p_code=0 actions=FL000
cookie=0x0, duration=3.345s, table=0, n_packets=1, n_bytes=98, idle timeout=10,
hard timeout=100, idle age=3, icmp,vlan_tci=0x0000,d1_src=00:00:00:00:00:01,d1_
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,icm
p_code=0 actions=FL000
cookie=0x0, duration=3.414s, table=0, n_packets=1, n_bytes=98, idle timeout=10,
hard timeout=100, idle age=3, icmp,vlan_tci=0x0000,d1_src=00:00:00:00:00:01,d1_
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,icm
p_code=0 actions=FL000
cookie=0x0, duration=3.238s, table=0, n_packets=1, n_bytes=98, idle timeout=10,
hard timeout=100, idle age=3, icmp,vlan_tci=0x0000,d1_src=00:00:00:00:00:04,d1_
dst=00:00:00:00:00:02,nw_src=10.0.1.40,nw_dst=10.0.1.20,nw_tos=0,icmp_type=8,icm
p_code=0 actions=FL000
cookie=0x0, duration=3.263s, table=0, n_packets=1, n_bytes=98, idle timeout=10,
hard timeout=100, idle age=3, icmp,vlan_tci=0x0000,d1_src=00:00:00:00:00:04,d1_
dst=00:00:00:00:00:03,nw_src=10.0.1.30,nw_dst=10.0.1.40,nw_tos=0,icmp_type=0,icm
p_code=0 actions=FL000
```

Explanation:

After a little bit of messing around with the idle and hard timeouts I was able to get a good number of flow entries from dump-flows. Dpctl displays the information about packets that have successfully passed through the system in the last 5 seconds. This is good for verifying that the packets were implemented the way we expected them to.

3. iperf –

The image shows a screenshot of a terminal window titled 'mininet@mininet-vm: ~'. The terminal displays the output of the command 'sudo ~/pox/pox.py misc.lab3controller'. The output includes: 'POX 0.2.0 (carp) / Copyright 2011-2013 James McCauley, et al.', 'INFO:core:POX 0.2.0 (carp) is up.', 'INFO:openflow.of_01:[None 1] closed', and 'INFO:openflow.of_01:[00-00-00-00-00-01 2] connected'. Below this, a second terminal window is shown, also titled 'mininet@mininet-vm: ~'. It displays the command 'sudo python ~/lab3.py' followed by 'mininet> iperf'. The output of 'iperf' is '*** Iperf: testing TCP bandwidth between h1 and h4'.

```
mininet@mininet-vm:~$ sudo ~/pox/pox.py misc.lab3controller
POX 0.2.0 (carp) / Copyright 2011-2013 James McCauley, et al.
INFO:core:POX 0.2.0 (carp) is up.
INFO:openflow.of_01:[None 1] closed
INFO:openflow.of_01:[00-00-00-00-00-01 2] connected

mininet@mininet-vm:~$ sudo python ~/lab3.py
mininet> iperf
*** Iperf: testing TCP bandwidth between h1 and h4
```

Explanation:

This command measures the bandwidth/network quality of the mininet network. If the test fails it means that the TCP packets that are being used for measuring the bandwidth are being blocked. The firewall program only allows ICMP and ARP packets and blocks TCP packets from passing through, meaning that it is causing the iperf command to get stuck in a “loop” while it searches for the TCP packets.