Lab 3 Report

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The Lab

Resources

https://openflow.stanford.edu/display/ONL/POX+Wiki.html

Specifically looked at “Match Structure” section and the example code.

http://flowgrammable.org/sdn/openflow/classifiers/

Helped with dissecting packages.

pingall

```
mininet> pingall
*** Ping: testing ping reachability
h1 -> X X X
h2 -> X X X
h3 -> X X X
h4 -> X X X
*** Results: 100% dropped (0/12 received)
```

Figure 1: Result of pingall

Explanation:

0/12 pings received which is wanted. This is because the firewall code I added to the lab3controller.py only allows ARP and TCP to be accepted. Pings are done through Internet Control Message Protocol (ICMP) by sending request packages and waiting for a response. ICMP packages are dropped.

dpctl dump--flows

```
mininet> dpctl dump-flows
*** s1 ------------------------------------------------------------------------
NXST_FLOW reply (xid=0x4):
 cookie=0x0, duration=23.704s, table=0, n_packets=0, n_bytes=0, idle_timeout=25,
 hard_timeout=50, idle_age=23, icmp,vlan_tci=0x0000,dl_src=00:00:00:00:00:04,dl_
dst=00:00:00:00:00:03,nw_src=10.0.1.40,nw_dst=10.0.1.30,nw_tos=0,icmp_type=8,icm
p_code=0 actions=drop
 cookie=0x0, duration=17.693s, table=0, n_packets=1, n_bytes=42, idle_timeout=25
, hard_timeout=50, idle_age=16, arp,vlan_tci=0x0000,dl_src=00:00:00:00:00:03,dl_
dst=00:00:00:00:00:04,arp_spa=10.0.1.30,arp_tpa=10.0.1.40,arp_op=2 actions=ALL
 cookie=0x0, duration=18.743s, table=0, n_packets=2, n_bytes=84, idle_timeout=25
, hard_timeout=50, idle_age=16, arp,vlan_tci=0x0000,dl_src=00:00:00:00:00:04,dl_
dst=00:00:00:00:00:03,arp_spa=10.0.1.40,arp_tpa=10.0.1.30,arp_op=1 actions=ALL
```

Figure 2: Result of dpctl dump--flows after pingall

Explanation:

At first, I had low timeouts and no flows were echoed back. I then increased it and eventually, I got some to show. I put 25 idle seconds and 3 popped up which is enough to see what is going on. The first entry is an ICMP while the other two are ARP. We can see under the attribute “actions” that ICMP is dropped while ARPs are not.

iperf

```
mininet> iperf
*** Iperf: testing TCP bandwidth between h1 and h4
*** Results: ['9.03 Gbits/sec', '9.04 Gbits/sec']
```

Figure 3: Result of iperf

```
mininet> dpctl dump-flows
*** s1 ------------------------------------------------------------------------
NXST_FLOW reply (xid=0x4):
 cookie=0x0, duration=13.047s, table=0, n_packets=4, n_bytes=272, idle_timeout=2
5, hard_timeout=50, idle_age=10, tcp,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=16,tp_src=43671,
tp_dst=5001 actions=ALL
 cookie=0x0, duration=12.056s, table=0, n_packets=3, n_bytes=206, idle_timeout=2
5, hard_timeout=50, idle_age=10, tcp,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,tp_src=5001,tp
_dst=43671 actions=ALL
 cookie=0x0, duration=9.609s, table=0, n_packets=45000, n_bytes=2972780, idle_ti
meout=25, hard_timeout=50, idle_age=3, tcp,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,tp_src=5
001,tp_dst=43672 actions=ALL
 cookie=0x0, duration=10.602s, table=0, n_packets=203719, n_bytes=5665789318, id
le_timeout=25, hard_timeout=50, idle_age=3, tcp,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,tp_
src=43672,tp_dst=5001 actions=ALL
```

Figure 4: Result of dpctl dump--flows after iperf

Explanation:

iperf succeeds because we are working with TCP now which is not dropped in the firewall. The dump shows all packages going through.