Aidan Bernstein
1676767

Lab 1

2. [30 pts] Save a screenshot of dump and pingall output. Explain what is being shown in the screenshot.

```
mininet> dump
<Host h1: h1-eth0:10.0.0.1 pid=1826>
<Host h2: h2-eth0:10.0.0.2 pid=1830>
<Host h3: h3-eth0:10.0.0.3 pid=1832>
<Host h4: h4-eth0:10.0.0.4 pid=1834>
<Host h5: h5-eth0:10.0.0.5 pid=1836>
<Host h6: h6-eth0:10.0.0.6 pid=1838>
<OVSSwitch s1: lo:127.0.0.1,s1-eth1:None,s1-eth2:None,s1-eth3:None pid=1843>
<OVSSwitch s2: lo:127.0.0.1,s2-eth1:None,s2-eth2:None,s2-eth3:None pid=1846>
<OVSSwitch s3: lo:127.0.0.1,s3-eth1:None,s3-eth2:None,s3-eth3:None,s3-eth4:None
pid=1849>
<Controller c0: 127.0.0.1:6633 pid=1819>
```

```
mininet> pingall
*** Ping: testing ping reachability
h1 -> h2 h3 h4 h5 h6
h2 -> h1 h3 h4 h5 h6
h3 -> h1 h2 h4 h5 h6
h4 -> h1 h2 h3 h5 h6
h5 -> h1 h2 h3 h4 h6
h6 -> h1 h2 h3 h4 h5
*** Results: 0% dropped (30/30 received)
mininet>
```

Dump - shows all information about the nodes. It shows the connections between hosts nodes and switches. It also shows the ip addresses that have to do with the nodes themselves. Like I said it dumps all the information about the nodes.
pingall - pings all the connections between nodes. This shows if the connections are done sufficiently and in my case no packets were dropped which reflects the connections are sufficient.

3. [10 pts] Run the iperf command as well, and screenshot the output, how fast is the connect?

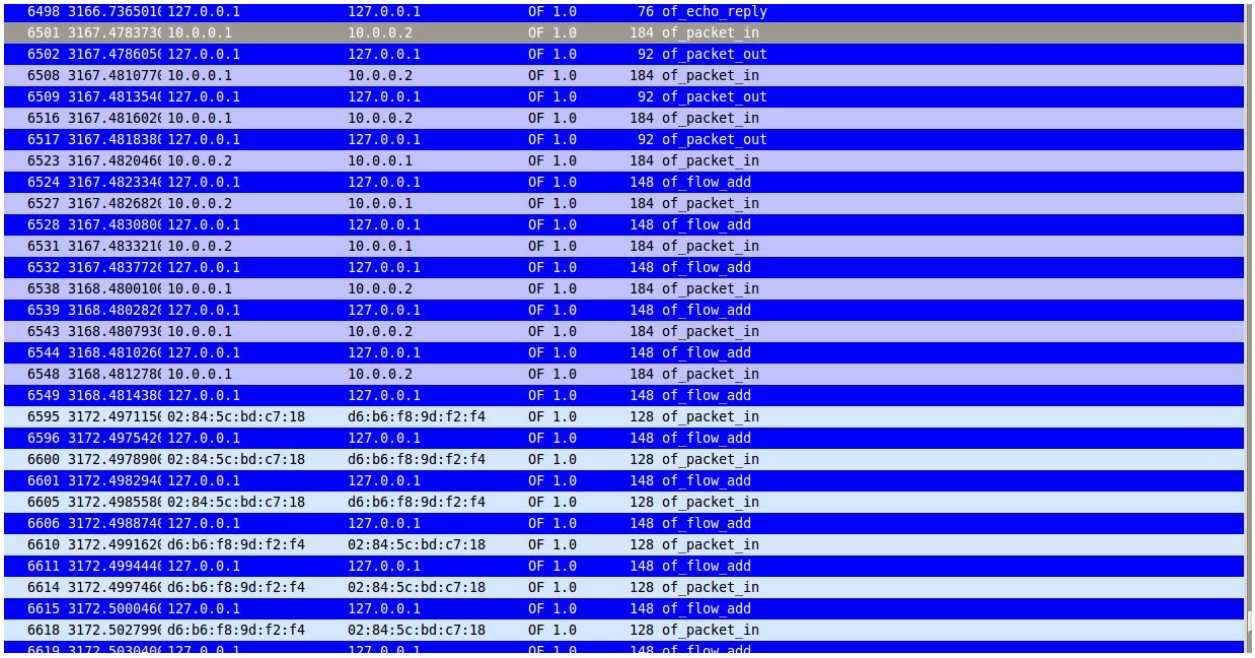
```
mininet> iperf
*** Iperf: testing TCP bandwidth between h1 and h6
*** Results: ['31.5 Gbits/sec', '31.5 Gbits/sec']
mininet>
```

The connect is 31.5 gbits a second

Aidan Bernstein
1676767

4. Run wireshark, and using the display filter, filter for “of”. Note: When you run wireshark you should do so as “sudo wireshark”. When you choose an interface to capture on, you should select “any”.

a. [20 pts] Run ping from a host to any other host using hX ping -c 5 hY. How many of_packet_in messages show up? Take a screenshot of your results.



6498	3166.736501(	127.0.0.1	127.0.0.1	OF 1.0	76 of_echo_reply
6501	3167.478373(	10.0.0.1	10.0.0.2	OF 1.0	184 of_packet_in
6502	3167.478605(	127.0.0.1	127.0.0.1	OF 1.0	92 of_packet_out
6508	3167.481077(	10.0.0.1	10.0.0.2	OF 1.0	184 of_packet_in
6509	3167.481354(	127.0.0.1	127.0.0.1	OF 1.0	92 of_packet_out
6516	3167.481602(	10.0.0.1	10.0.0.2	OF 1.0	184 of_packet_in
6517	3167.481838(	127.0.0.1	127.0.0.1	OF 1.0	92 of_packet_out
6523	3167.482046(	10.0.0.2	10.0.0.1	OF 1.0	184 of_packet_in
6524	3167.482334(	127.0.0.1	127.0.0.1	OF 1.0	148 of_flow_add
6527	3167.482682(	10.0.0.2	10.0.0.1	OF 1.0	184 of_packet_in
6528	3167.483080(	127.0.0.1	127.0.0.1	OF 1.0	148 of_flow_add
6531	3167.483321(	10.0.0.2	10.0.0.1	OF 1.0	184 of_packet_in
6532	3167.483772(	127.0.0.1	127.0.0.1	OF 1.0	148 of_flow_add
6538	3168.480010(	10.0.0.1	10.0.0.2	OF 1.0	184 of_packet_in
6539	3168.480282(	127.0.0.1	127.0.0.1	OF 1.0	148 of_flow_add
6543	3168.480793(	10.0.0.1	10.0.0.2	OF 1.0	184 of_packet_in
6544	3168.481026(	127.0.0.1	127.0.0.1	OF 1.0	148 of_flow_add
6548	3168.481278(	10.0.0.1	10.0.0.2	OF 1.0	184 of_packet_in
6549	3168.481438(	127.0.0.1	127.0.0.1	OF 1.0	148 of_flow_add
6595	3172.497115(	02:84:5c:bd:c7:18	d6:b6:f8:9d:f2:f4	OF 1.0	128 of_packet_in
6596	3172.497542(	127.0.0.1	127.0.0.1	OF 1.0	148 of_flow_add
6600	3172.497890(	02:84:5c:bd:c7:18	d6:b6:f8:9d:f2:f4	OF 1.0	128 of_packet_in
6601	3172.498294(	127.0.0.1	127.0.0.1	OF 1.0	148 of_flow_add
6605	3172.498558(	02:84:5c:bd:c7:18	d6:b6:f8:9d:f2:f4	OF 1.0	128 of_packet_in
6606	3172.498874(	127.0.0.1	127.0.0.1	OF 1.0	148 of_flow_add
6610	3172.499162(	d6:b6:f8:9d:f2:f4	02:84:5c:bd:c7:18	OF 1.0	128 of_packet_in
6611	3172.499444(	127.0.0.1	127.0.0.1	OF 1.0	148 of_flow_add
6614	3172.499746(	d6:b6:f8:9d:f2:f4	02:84:5c:bd:c7:18	OF 1.0	128 of_packet_in
6615	3172.500046(	127.0.0.1	127.0.0.1	OF 1.0	148 of_flow_add
6618	3172.502799(	d6:b6:f8:9d:f2:f4	02:84:5c:bd:c7:18	OF 1.0	128 of_packet_in

```
mininet> h1 ping -c 5 h2
PING 10.0.0.2 (10.0.0.2) 56(84) bytes of data.
64 bytes from 10.0.0.2: icmp_seq=1 ttl=64 time=5.67 ms
64 bytes from 10.0.0.2: icmp_seq=2 ttl=64 time=2.34 ms
64 bytes from 10.0.0.2: icmp_seq=3 ttl=64 time=0.861 ms
64 bytes from 10.0.0.2: icmp_seq=4 ttl=64 time=0.041 ms
64 bytes from 10.0.0.2: icmp_seq=5 ttl=64 time=0.074 ms

--- 10.0.0.2 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4003ms
rtt min/avg/max/mdev = 0.041/1.800/5.679/2.111 ms
mininet>
```

There were 15 packets of_packet_in

b. [20 pts] What is the source and destination IP addresses for these entries? Find another packet that matches the “of” filter with the OpenFlow typefield set to OFPT_PACKET_OUT. What is the source and destination IP address for this entry? Take screenshots showing your results.

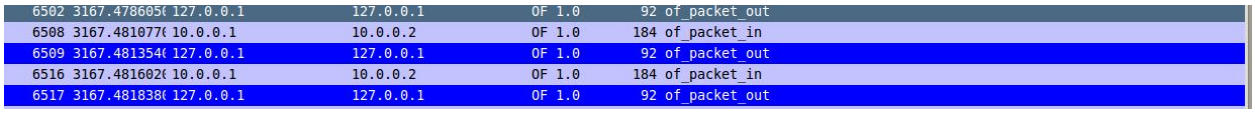
Source and destination for of_packet_in =

Source - 10.0.0.2

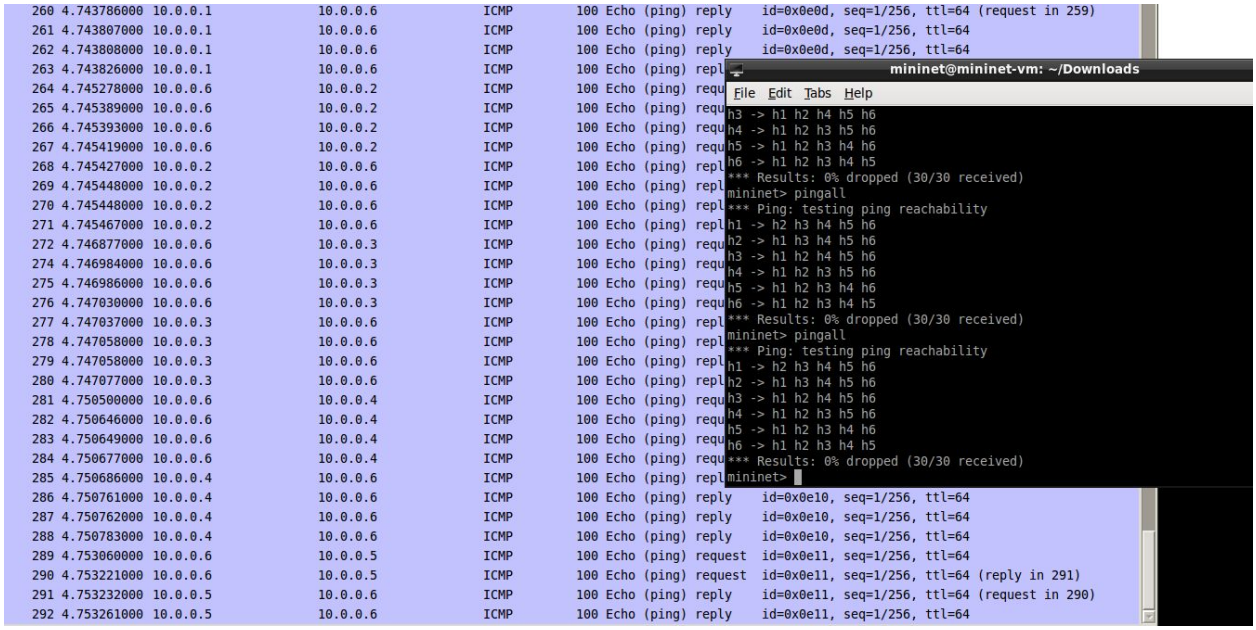
Aidan Bernstein
1676767

Destniation - 10.0.0.2, 10.0.0.1

Source and destination for of_packet_ot
127.0.0.1



c. [20 pts] Replace the display filter for “of” to “icmp && not of”. Run pingall again, how many entries are generated in wireshark? What types of icmp entries show up? Take a screenshot of your results.



292 entries are made with pingall
Types: Echo (ping) reply
Echo (ping) request