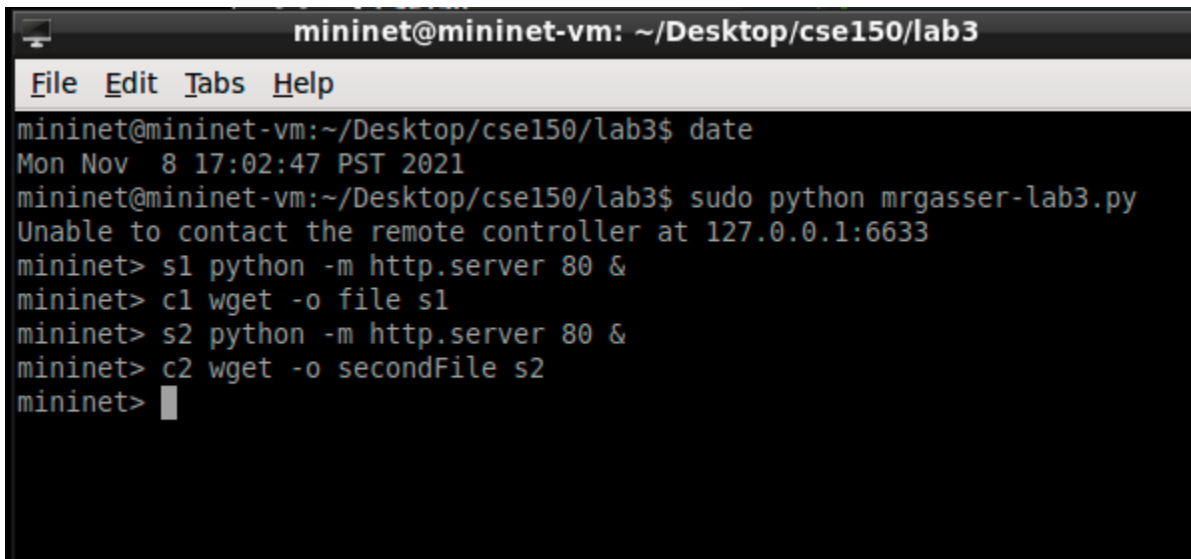
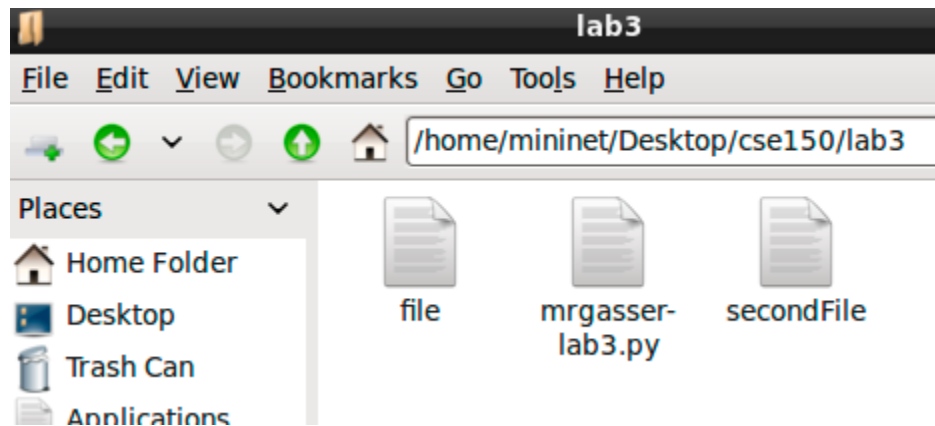


Max Gasser  
Cse150  
Lab 3

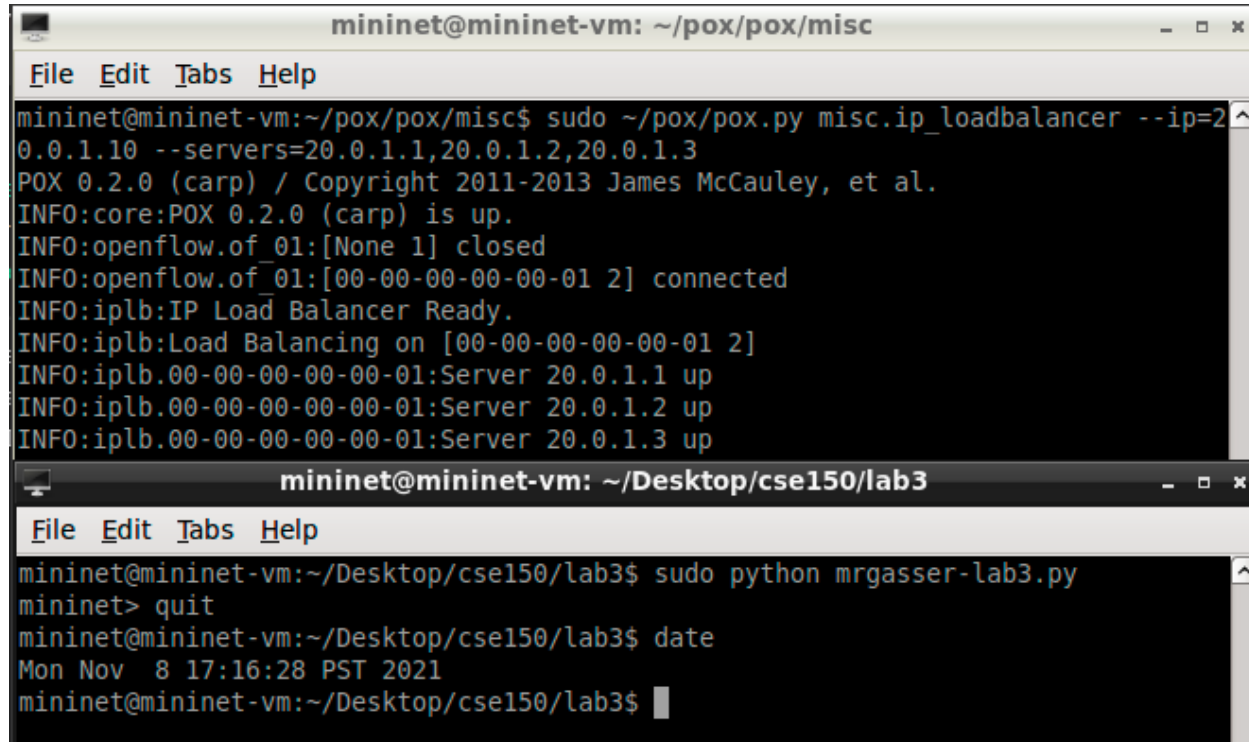
1. In mrgasser-lab3.py
2. Commands can be found in the screenshot



```
mininet@mininet-vm: ~/Desktop/cse150/lab3
File Edit Tabs Help
mininet@mininet-vm:~/Desktop/cse150/lab3$ date
Mon Nov  8 17:02:47 PST 2021
mininet@mininet-vm:~/Desktop/cse150/lab3$ sudo python mrgasser-lab3.py
Unable to contact the remote controller at 127.0.0.1:6633
mininet> s1 python -m http.server 80 &
mininet> c1 wget -o file s1
mininet> s2 python -m http.server 80 &
mininet> c2 wget -o secondFile s2
mininet>
```



3. What the output is describing here is that the client is connected and the IP is up and running along with the three servers. The client is also connected to the three servers as the load balancer is balancing the load across all 3 servers.



The image shows two terminal windows from a Mininet virtual machine. The top window, titled 'mininet@mininet-vm: ~/pox/pox/misc', shows the execution of 'sudo ~/pox/pox.py misc.ip\_loadbalancer --ip=20.0.1.10 --servers=20.0.1.1,20.0.1.2,20.0.1.3'. The output indicates that POX 0.2.0 (carp) is up, OpenFlow is connected, and the IP Load Balancer is ready, with three servers (20.0.1.1, 20.0.1.2, 20.0.1.3) listed as up. The bottom window, titled 'mininet@mininet-vm: ~/Desktop/cse150/lab3', shows the execution of 'sudo python mrgasser-lab3.py', followed by 'quit' and 'date', which returns 'Mon Nov 8 17:16:28 PST 2021'.

```
mininet@mininet-vm: ~/pox/pox/misc
File Edit Tabs Help
mininet@mininet-vm:~/pox/pox/misc$ sudo ~/pox/pox.py misc.ip_loadbalancer --ip=20.0.1.10 --servers=20.0.1.1,20.0.1.2,20.0.1.3
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
INFO:iplb:IP Load Balancer Ready.
INFO:iplb:Load Balancing on [00-00-00-00-00-01 2]
INFO:iplb.00-00-00-00-00-01:Server 20.0.1.1 up
INFO:iplb.00-00-00-00-00-01:Server 20.0.1.2 up
INFO:iplb.00-00-00-00-00-01:Server 20.0.1.3 up

mininet@mininet-vm: ~/Desktop/cse150/lab3
File Edit Tabs Help
mininet@mininet-vm:~/Desktop/cse150/lab3$ sudo python mrgasser-lab3.py
mininet> quit
mininet@mininet-vm:~/Desktop/cse150/lab3$ date
Mon Nov 8 17:16:28 PST 2021
mininet@mininet-vm:~/Desktop/cse150/lab3$
```

4. Running iperf between c1 and s3 seems to just drop all of the packets and report open flow errors from the controller. This is probably the case since iperf uses TCP and we drop all tcp packets other than those from s1 to c1 and s2 to c2. The controller seems to be reporting some sort of open flow error that has to do with the requests being bad, per the OFPET\_BAD\_REQUEST. I found somewhere on the internet that this may mean the version of openflow my switch is using is not supported. Just like with the first iperf messages between c2 and s2 will be getting dropped if they originate from c2 thus the connection can never be made.

```

mininet@mininet-vm: ~
File Edit Tabs Help
mininet@mininet-vm:~$ sudo python mrgasser-lab3.py
mininet> iperf
*** Iperf: testing TCP bandwidth between c1 and s3
^C
Interrupt
mininet> quit
mininet@mininet-vm:~$ date
Mon Nov 8 21:39:30 PST 2021
mininet@mininet-vm:~$

mininet@mininet-vm: ~
File Edit Tabs Help
06 [.....]
[00-00-00-00-01 2] Error: 0020: 00 01 00 00 14 00 01 0a 14 00 01 03 00 00 00
00 [.....]
[00-00-00-00-01 2] Error: 0030: 00 00 00 00 00 00 00 00 00 00 00 1e 00 1e 80
00 [.....]
ERROR:openflow.of_01:[00-00-00-00-01 2] OpenFlow Error:
[00-00-00-00-01 2] Error: header:
[00-00-00-00-01 2] Error: version: 1
[00-00-00-00-01 2] Error: type: 1 (OFPET_ERROR)
[00-00-00-00-01 2] Error: length: 76
[00-00-00-00-01 2] Error: xid: 16
[00-00-00-00-01 2] Error: type: OFPET_BAD_REQUEST (1)
[00-00-00-00-01 2] Error: code: OFPBRC_BUFFER_EMPTY (7)
[00-00-00-00-01 2] Error: datalen: 64
[00-00-00-00-01 2] Error: 0000: 01 0e 00 48 00 00 00 10 00 00 00 01 00 00 00
00 [...]
[00-00-00-00-01 2] Error: 0010: 00 00 00 07 00 00 00 00 00 01 ff ff 00 00 08
06 [...]
[00-00-00-00-01 2] Error: 0020: 00 02 00 00 14 00 01 03 14 00 01 0a 00 00 00
00 [...]
[00-00-00-00-01 2] Error: 0030: 00 00 00 00 00 00 00 00 00 00 00 1e 00 1e 80
00 [...]
INFO:openflow.of_01:[00-00-00-00-01 2] closed

```

```

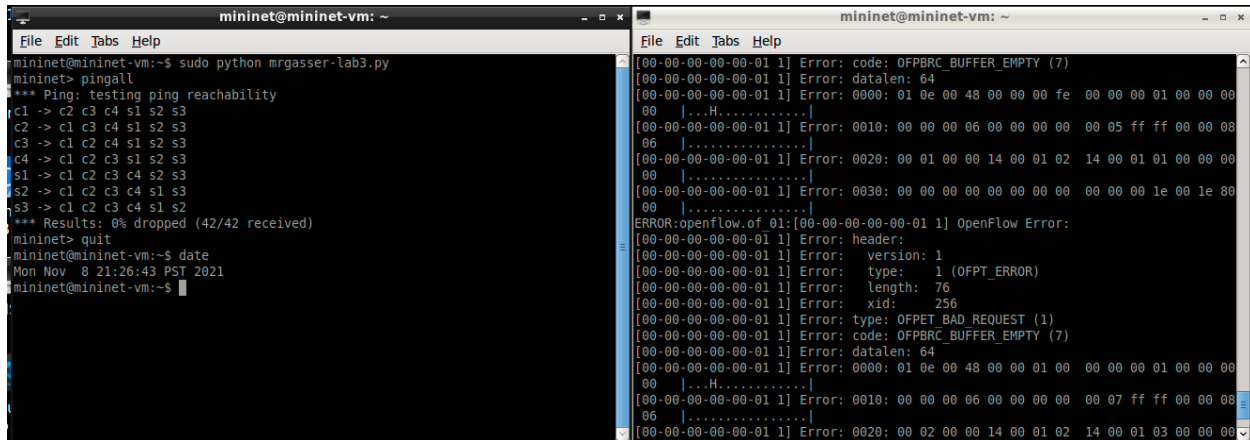
mininet@mininet-vm: ~
File Edit Tabs Help
mininet@mininet-vm:~$ date
Mon Nov 8 21:57:14 PST 2021
mininet@mininet-vm:~$ sudo python mrgasser-lab3.py
mininet> iperf c2 s2
*** Iperf: testing TCP bandwidth between c2 and s2
doing firewall

mininet@mininet-vm: ~
File Edit Tabs Help
06 [.....]
[00-00-00-00-01 2] Error: 0020: 00 01 00 00 14 00 01 0b 14 00 01 02 00 00 00
00 [.....]
[00-00-00-00-01 2] Error: 0030: 00 00 00 00 00 00 00 00 00 00 00 32 00 32 80
00 [.....2.2..]
ERROR:openflow.of_01:[00-00-00-00-01 2] OpenFlow Error:
[00-00-00-00-01 2] Error: header:
[00-00-00-00-01 2] Error: version: 1
[00-00-00-00-01 2] Error: type: 1 (OFPET_ERROR)
[00-00-00-00-01 2] Error: length: 76
[00-00-00-00-01 2] Error: xid: 10
[00-00-00-00-01 2] Error: type: OFPET_BAD_REQUEST (1)
[00-00-00-00-01 2] Error: code: OFPBRC_BUFFER_EMPTY (7)
[00-00-00-00-01 2] Error: datalen: 64
[00-00-00-00-01 2] Error: 0000: 01 0e 00 48 00 00 00 0a 00 00 00 01 00 00 00
00 [...]
[00-00-00-00-01 2] Error: 0010: 00 00 00 06 00 00 00 00 00 02 ff ff 00 00 08
06 [...]
[00-00-00-00-01 2] Error: 0020: 00 02 00 00 14 00 01 02 14 00 01 0b 00 00 00
00 [...]
[00-00-00-00-01 2] Error: 0030: 00 00 00 00 00 00 00 00 00 00 00 32 00 32 80
00 [.....2.2..]

```

```
75 def drop(self, packet, packet_in):
```

5. From using pingall I expect every host to send packets through the switch to all other hosts connected. In this case that occurred. I also expect none of the packets to be dropped or lost since TCP is not being used in this case and it is instead icmp which all packets are accepted.



```
mininet@mininet-vm: ~  
File Edit Tabs Help  
mininet@mininet-vm:~$ sudo python mrgasser-lab3.py  
mininet> pingall  
*** Ping: testing ping reachability  
c1 -> c2 c3 c4 s1 s2 s3  
c2 -> c1 c3 c4 s1 s2 s3  
c3 -> c1 c2 c4 s1 s2 s3  
c4 -> c1 c2 c3 s1 s2 s3  
s1 -> c1 c2 c3 c4 s2 s3  
s2 -> c1 c2 c3 c4 s1 s3  
s3 -> c1 c2 c3 c4 s1 s2  
*** Results: 0% dropped (42/42 received)  
mininet> quit  
mininet@mininet-vm:~$ date  
Mon Nov 8 21:26:43 PST 2021  
mininet@mininet-vm:~$
```

```
mininet@mininet-vm: ~  
File Edit Tabs Help  
[00-00-00-00-00-01 1] Error: code: OFPBRG_BUFFER_EMPTY (7)  
[00-00-00-00-00-01 1] Error: datalen: 64  
[00-00-00-00-00-01 1] Error: 0000: 01 0e 00 48 00 00 00 fe 00 00 00 01 00 00 00  
00 [...H.....]  
[00-00-00-00-00-01 1] Error: 0010: 00 00 00 06 00 00 00 00 00 05 ff ff 00 00 08  
06 [........]  
[00-00-00-00-00-01 1] Error: 0020: 00 01 00 00 14 00 01 02 14 00 01 01 00 00 00  
00 [........]  
[00-00-00-00-00-01 1] Error: 0030: 00 00 00 00 00 00 00 00 00 00 00 1e 00 1e 80  
00 [........]  
ERROR:openflow.of_01:[00-00-00-00-00-01 1] OpenFlow Error:  
[00-00-00-00-00-01 1] Error: header:  
[00-00-00-00-00-01 1] Error: version: 1  
[00-00-00-00-00-01 1] Error: type: 1 (OFPT_ERROR)  
[00-00-00-00-00-01 1] Error: length: 76  
[00-00-00-00-00-01 1] Error: xid: 256  
[00-00-00-00-00-01 1] Error: type: OFPET_BAD_REQUEST (1)  
[00-00-00-00-00-01 1] Error: code: OFPBRG_BUFFER_EMPTY (7)  
[00-00-00-00-00-01 1] Error: datalen: 64  
[00-00-00-00-00-01 1] Error: 0000: 01 0e 00 48 00 00 01 00 00 00 00 01 00 00 00  
00 [...H.....]  
[00-00-00-00-00-01 1] Error: 0010: 00 00 00 06 00 00 00 00 00 07 ff ff 00 00 08  
06 [........]  
[00-00-00-00-00-01 1] Error: 0020: 00 02 00 00 14 00 01 02 14 00 01 03 00 00 00
```

6. The command to modify switches is config, this allows for someone to set rules for the switch to follow. For modifying the amount of time an entry stays in the switch you can change the delay values to be longer so that packets remain there waiting for longer.