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Pre-Lab

- 1. groups <user>
- 2. exit status of most recent command
- 3. CTRL+z then type bg
- 4. uname -r -n
- 5. . is current dir, .. is parent dir, ~ is home dir, / is root dir
- 6. PID is process ID. ps will list running PID and ps ax | grep <name> for a specific one.
- 7. cut -d: -f1,7 /etc/passwd
- 8. sudo runs a single command with current user permission while su runs with root privileges. Both require passwords respectively for user/root privilege.
- 9. watch -n 1800 <command> or crontab then 30**** <command>
- 10. <MichaelLau-script.sh> I got help from https://unix.stackexchange.com/questions/26723/

1. <MichaelLau-topo.py>

2.

```
mininet@mininet-vm: ~
File Edit Tabs Help
mininet@mininet-vm:~$ sudo ./MichaelLau-topo.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> dump
<Host h1: h1-eth0:10.0.0.1 pid=3316>
<Host h2: h2-eth0:10.0.0.2 pid=3319>
<Host h3: h3-eth0:10.0.0.3 pid=3321>
<Host h4: h4-eth0:10.0.0.4 pid=3323>
<OVSSwitch s1: lo:127.0.0.1,s1-eth1:None,s1-eth2:None,s1-eth3:None,s1-eth4:None</pre>
pid=3328>
<Controller c0: 127.0.0.1:6633 pid=3309>
mininet>
```

pingall pings every host to test reachability.

Dump shows every every host, switch, and controller PID and ip.

3.

```
mininet> iperf

*** Iperf: testing TCP bandwidth between h1 and h4

*** Results: ['33.6 Gbits/sec', '33.7 Gbits/sec']

mininet>
```

The connection has a speed of approx ~33.6-33.7 Gbit/sec

4a.

112 138.005/010(12/.0.0.1	12/.0.0.1	OF 1.0	/4 of echo_request
113 138.0062070(127.0.0.1	127.0.0.1	OF 1.0	74 of_echo_reply
115 139.0252840(10.0.0.1	10.0.0.2	OF 1.0	182 of_packet_in
116 139.0255460(127.0.0.1	127.0.0.1	0F 1.0	90 of_packet_out
118 139.0256550(10.0.0.2	10.0.0.1	OF 1.0	182 of_packet_in
119 139.0258340(127.0.0.1	127.0.0.1	OF 1.0	146 of_flow_add
128 140.0247710(10.0.0.1	10.0.0.2	OF 1.0	182 of_packet_in
129 140.0250130(127.0.0.1	127.0.0.1	OF 1.0	146 of_flow_add
151 144.0327490(6a:d1:bb:d6:38:bd	e2:2f:27:8f:3d:cb	OF 1.0	126 of_packet_in
152 144.0329670(127.0.0.1	127.0.0.1	OF 1.0	146 of_flow_add
154 144.0331450(e2:2f:27:8f:3d:cb	6a:d1:bb:d6:38:bd	OF 1.0	126 of_packet_in
155 144.0332850(127.0.0.1	127.0.0.1	OF 1.0	146 of_flow_add

There were 5 of_packet_in.

- 4b. The 5 source>destinations for 4a
 - 1. 10.0.0.1 to 10.0.0.2
 - 2. 10.0.0.2 to 10.0.0.1
 - 3. 10.0.0.1 to 10.0.0.2
 - 4. 6a:d1:bb:d6:38:bd to e2:2f:27:8f:3d:cb
 - 5. e2:2f:27:8f:3d:cb to 6a:d1:bb:d6:38:bd

116 139.0255460(127.0.0.1 127.0.0.1	OF 1.0	90 of_packet_out
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The source>destination for OFPT_PACKET_OUT 127.0.0.1 to 127.0.01

4c.

110	15.00583500(10.0.0.1	10.0.0.2	ICMP	98	Echo	(ping)	request	1d=0x118e,	seq=1/256,	ttl=64	
111	15.00893500(10.0.0.1	10.0.0.3	ICMP	98	Echo	(ping)	request	id=0x118f,	seq=1/256,	ttl=64	
112	15.01233800(10.0.0.1	10.0.0.4	ICMP	98	Echo	(ping)	request	id=0x1190,	seq=1/256,	ttl=64	(reply in 113)
113	15.01234700(10.0.0.4	10.0.0.1	ICMP	98	Echo	(ping)	reply	id=0x1190,	seq=1/256,	ttl=64	(request in 112)
114	15.01702700(10.0.0.2	10.0.0.4	ICMP	98	Echo	(ping)	request	id=0x1193,	seq=1/256,	ttl=64	(reply in 115)
115	15.01703400(10.0.0.4	10.0.0.2	ICMP	98	Echo	(ping)	reply	id=0x1193,	seq=1/256,	ttl=64	(request in 114)
116	15.02098700(10.0.0.3	10.0.0.4	ICMP	98	Echo	(ping)	request	id=0x1196,	seq=1/256,	ttl=64	(reply in 117)
117	15.02099400(10.0.0.4	10.0.0.3	ICMP	98	Echo	(ping)	reply	id=0x1196,	seq=1/256,	ttl=64	(request in 116)
118	15.02216100(10.0.0.4	10.0.0.1	ICMP	98	Echo	(ping)	request	id=0x1197,	seq=1/256,	ttl=64	(reply in 119)
119	15.02262200(10.0.0.1	10.0.0.4	ICMP	98	Echo	(ping)	reply	id=0x1197,	seq=1/256,	ttl=64	(request in 118)
120	15.02340000(10.0.0.4	10.0.0.2	ICMP	98	Echo	(ping)	request	id=0x1198,	seq=1/256,	ttl=64	(reply in 121)
121	15.02386100(10.0.0.2	10.0.0.4	ICMP	98	Echo	(ping)	reply	id=0x1198,	seq=1/256,	ttl=64	(request in 120)
122	15.02467500(10.0.0.4	10.0.0.3	ICMP	98	Echo	(ping)	request	id=0x1199,	seq=1/256,	ttl=64	(reply in 123)
123	15.02517600(10.0.0.3	10.0.0.4	ICMP	98	Echo	(ping)	reply	id=0x1199,	seq=1/256,	ttl=64	(request in 122)

There are 123-67=56 entries for icmp && not of. There were of ICMP protocols of type reply and request.