ET2599: SOFTWARE DEFINED NETWORKING

LAB 3: OPENFLOW VIA MININET

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Here I installed every application in **"ET2599VM32"**

1) Write another "dpctl add-flow" command to make ping to h3 possible from h1 and h2.

$ dpctl add-flow tcp:127.0.0.1:6654 in_port=1,idle_timeout=1000,actions=output:2,output:3
$ dpctl add-flow tcp:127.0.0.1:6654 in_port=2,idle_timeout=1000,actions=output:1,output:3

Pinging to h3 from h1 and h2,

dpctl add-flow tcp:127.0.0.1:6654 in_port=3,idle_timeout=1000,actions=output:1,output:2

By this following command its possible to make ping to h3 possible from h1 and h2

2) Find and compare controller generated flow table with the one which was created by hand.

the flow rules we implemented by hand have few differences from the table created by the controller . Table generated by the controller has lot more information than the hand written table. For example source and destination ip addresses,different byte numbers,duration's and priority's. And in_port=1 and actions=output:2 are similar to the hand written rules.

3) Is it efficient to replicate the flow tables by hand? In what situations this may be required?

It will be time consuming while using hand written rules instead of using the controller.However, for learning the rules,basic principles or in special case where we want implement special rules we can use hand written rules.In addition to that , if someone wants to track to specific rules then it can be more useful.

4) Find and write out the flow rules for communication between h1 and h2

For communication, from hosts **h1** to **h2** and **h2** to **h1** , packet passes over switches from **s1**and **s2** and the prots are 6654 and 6655 accordingly.

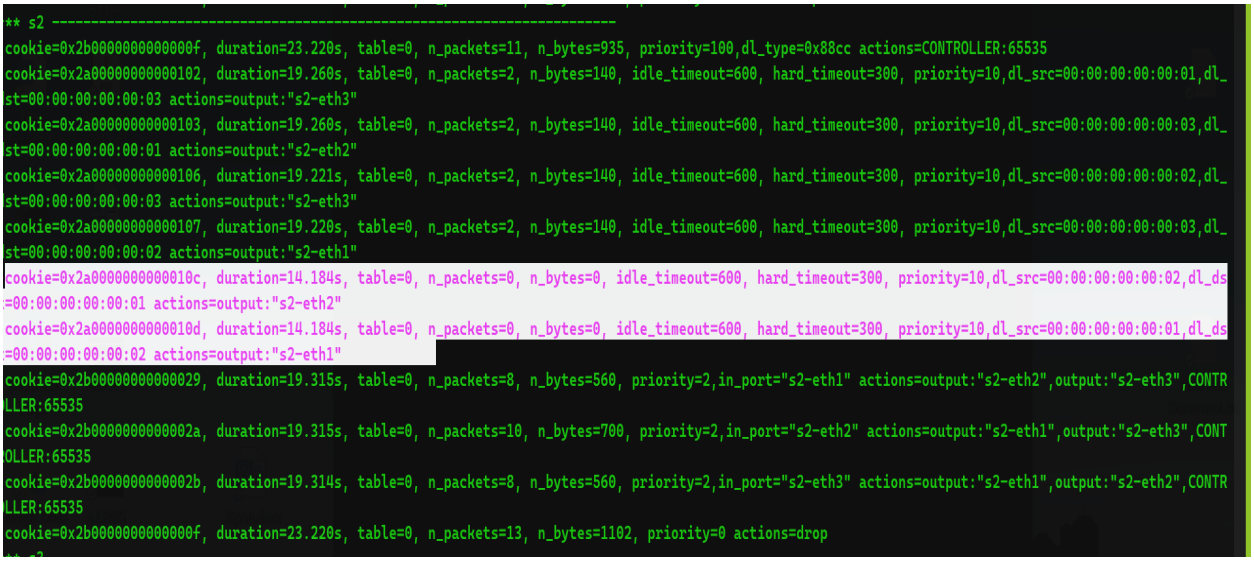
dl_src=00:00:00:00:00:01,dl_dst=00:00:00:00:00:02

dl_src=00:00:00:00:00:02,dl_dst=00:00:00:00:00:01

For s1:

```
** s1 ------------------------------------------------------------------------
cookie=0x2b00000000000010, duration=23.139s, table=0, n_packets=5, n_bytes=425, priority=100,dl_type=0x88cc actions=CONTROLLER:65535
cookie=0x2a00000000000100, duration=19.252s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:01,dl_
st=00:00:00:00:00:03 actions=output:"s1-eth2"
cookie=0x2a00000000000101, duration=19.252s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:03,dl_
st=00:00:00:00:00:01 actions=output:"s1-eth1"
cookie=0x2a000000000010e, duration=14.176s, table=0, n_packets=0, n_bytes=0, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:02,dl_ds
=00:00:00:00:00:01 actions=output:"s1-eth1"
cookie=0x2a000000000010f, duration=14.176s, table=0, n_packets=0, n_bytes=0, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:01,dl_ds
=00:00:00:00:00:02 actions=output:"s1-eth2"
cookie=0x2b00000000000027, duration=19.307s, table=0, n_packets=8, n_bytes=560, priority=2,in_port="s1-eth1" actions=output:"s1-eth2",CONTROLLER:65535
cookie=0x2b00000000000028, duration=19.307s, table=0, n_packets=18, n_bytes=1260, priority=2,in_port="s1-eth2" actions=output:"s1-eth1",CONTROLLER:65535
cookie=0x2b00000000000010, duration=23.139s, table=0, n_packets=10, n_bytes=824, priority=0 actions=drop
** s2 ------------------------------------------------------------------------
```

For s2



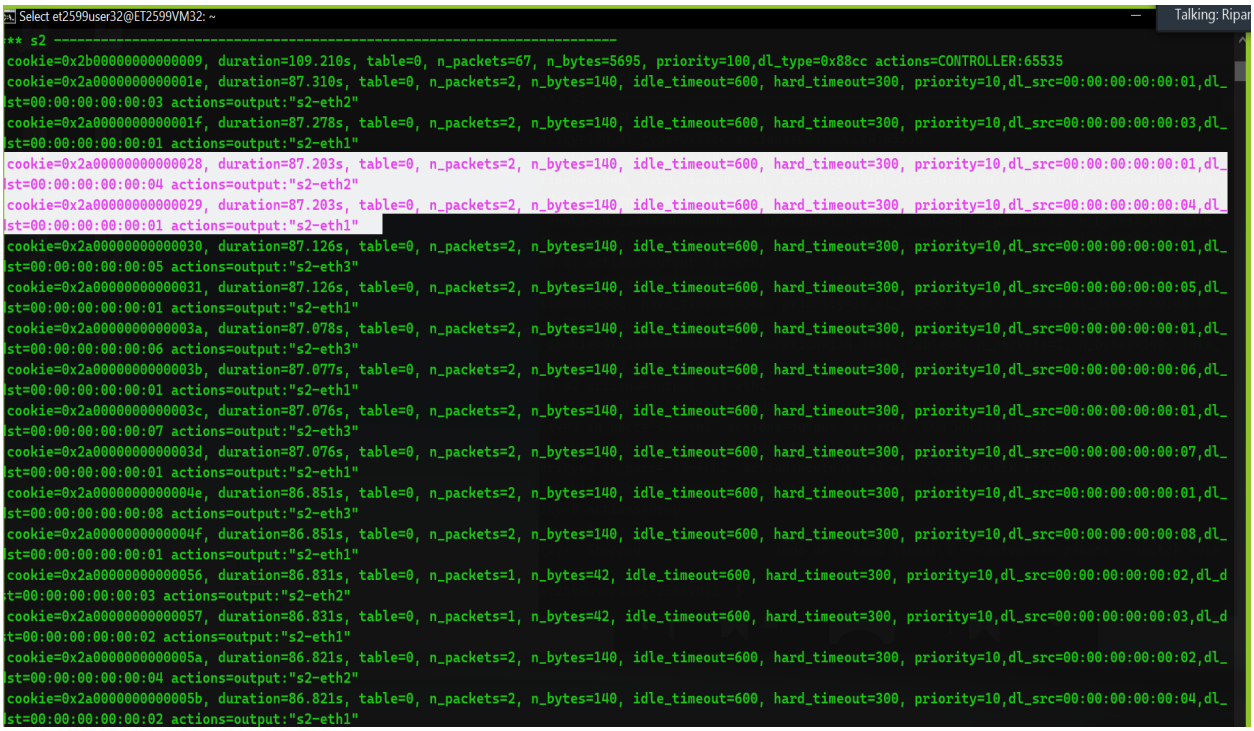
5) Find and write out the flow rules for communication between h1 and h4.

Here, in this topology Host **h1** and host **h2** will communicate through **s3,s2** and **s4** switches.

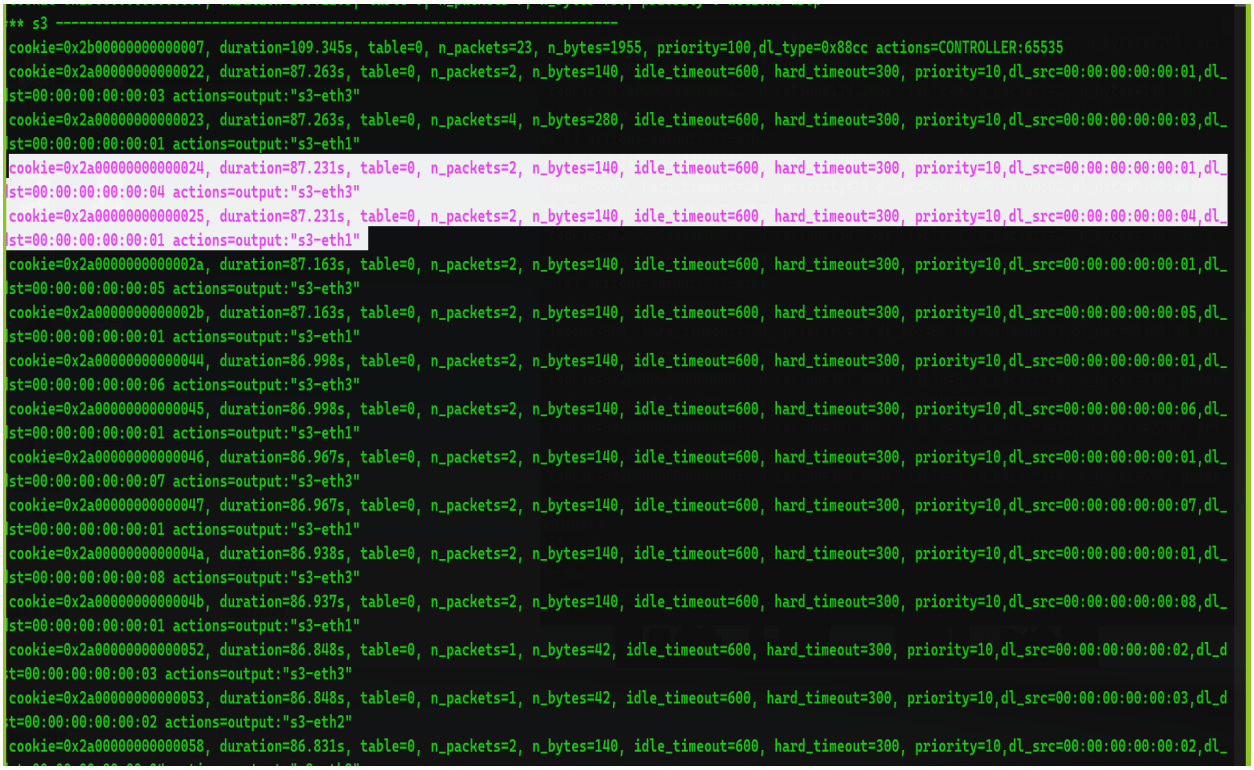
dl_src=00:00:00:00:00:01,dl_dst=00:00:00:00:00:04

dl_src=00:00:00:00:00:04,dl_dst=00:00:00:00:00:01

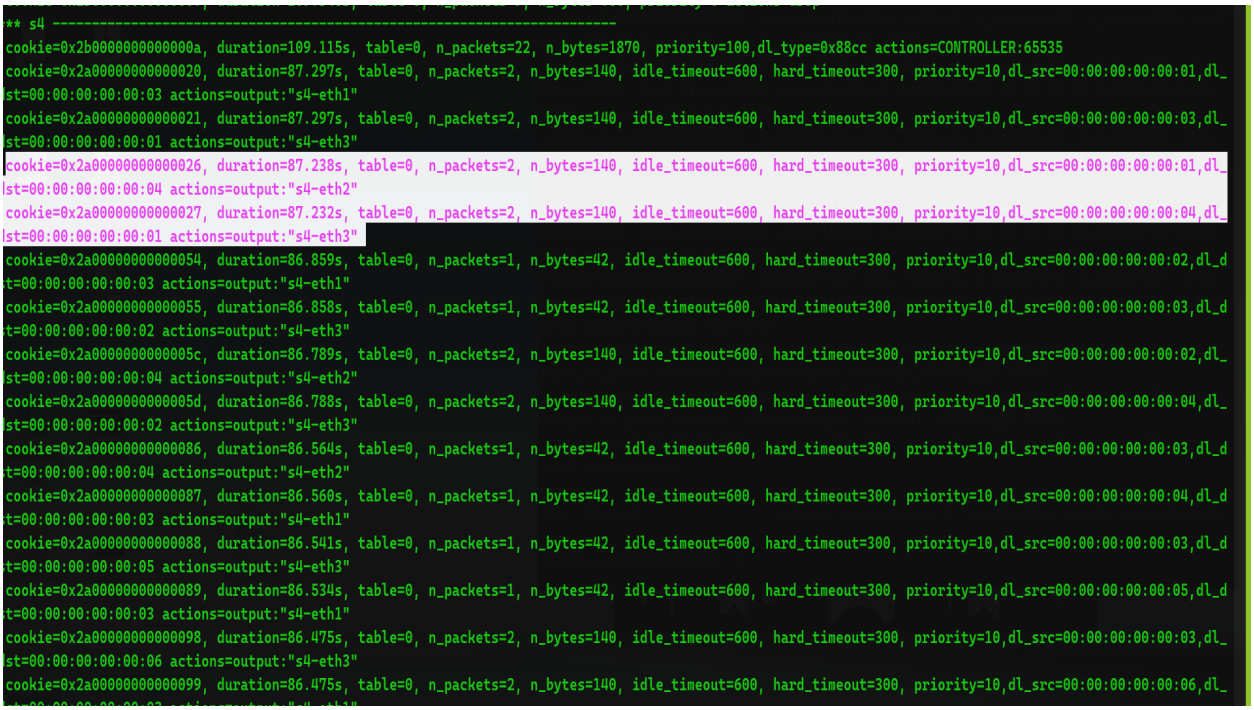
For S2:


Select et2599user32@ET2599VM32: ~
Talking: Ripar
** s2 ----------
cookie=0x2b00000000000009, duration=109.210s, table=0, n_packets=67, n_bytes=5695, priority=100,dl_type=0x88cc actions=CONTROLLER:65535
cookie=0x2a0000000000001e, duration=87.310s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:01,dl_
st=00:00:00:00:00:03 actions=output:"s2-eth2"
cookie=0x2a0000000000001f, duration=87.278s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:03,dl_
st=00:00:00:00:00:01 actions=output:"s2-eth1"
cookie=0x2a00000000000028, duration=87.203s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:01,dl_
st=00:00:00:00:00:04 actions=output:"s2-eth2"
cookie=0x2a00000000000029, duration=87.203s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:04,dl_
st=00:00:00:00:00:01 actions=output:"s2-eth1"
cookie=0x2a00000000000030, duration=87.126s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:01,dl_
st=00:00:00:00:00:05 actions=output:"s2-eth3"
cookie=0x2a00000000000031, duration=87.126s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:05,dl_
st=00:00:00:00:00:01 actions=output:"s2-eth1"
cookie=0x2a000000000003a, duration=87.078s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:01,dl_
st=00:00:00:00:00:06 actions=output:"s2-eth3"
cookie=0x2a000000000003b, duration=87.077s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:06,dl_
st=00:00:00:00:00:01 actions=output:"s2-eth1"
cookie=0x2a000000000003c, duration=87.076s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:01,dl_
st=00:00:00:00:00:07 actions=output:"s2-eth3"
cookie=0x2a000000000003d, duration=87.076s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:07,dl_
st=00:00:00:00:00:01 actions=output:"s2-eth1"
cookie=0x2a000000000004e, duration=86.851s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:01,dl_
st=00:00:00:00:00:08 actions=output:"s2-eth3"
cookie=0x2a000000000004f, duration=86.851s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:08,dl_
st=00:00:00:00:00:01 actions=output:"s2-eth1"
cookie=0x2a00000000000056, duration=86.831s, table=0, n_packets=1, n_bytes=42, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:02,dl_d
t=00:00:00:00:00:03 actions=output:"s2-eth2"
cookie=0x2a00000000000057, duration=86.831s, table=0, n_packets=1, n_bytes=42, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:03,dl_d
t=00:00:00:00:00:02 actions=output:"s2-eth1"
cookie=0x2a000000000005a, duration=86.821s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:02,dl_
st=00:00:00:00:00:04 actions=output:"s2-eth2"
cookie=0x2a000000000005b, duration=86.821s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:04,dl_
st=00:00:00:00:00:02 actions=output:"s2-eth1"

For S3:


** s3 ----------
cookie=0x2b00000000000007, duration=109.345s, table=0, n_packets=23, n_bytes=1955, priority=100,dl_type=0x88cc actions=CONTROLLER:65535
cookie=0x2a00000000000022, duration=87.263s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:01,dl_
st=00:00:00:00:00:03 actions=output:"s3-eth3"
cookie=0x2a00000000000023, duration=87.263s, table=0, n_packets=4, n_bytes=280, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:03,dl_
st=00:00:00:00:00:01 actions=output:"s3-eth1"
cookie=0x2a00000000000024, duration=87.231s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:01,dl_
st=00:00:00:00:00:04 actions=output:"s3-eth3"
cookie=0x2a00000000000025, duration=87.231s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:04,dl_
st=00:00:00:00:00:01 actions=output:"s3-eth1"
cookie=0x2a000000000002a, duration=87.163s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:01,dl_
st=00:00:00:00:00:05 actions=output:"s3-eth3"
cookie=0x2a00000000000002b, duration=87.163s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:05,dl_
st=00:00:00:00:00:01 actions=output:"s3-eth1"
cookie=0x2a00000000000044, duration=86.998s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:01,dl_
st=00:00:00:00:00:06 actions=output:"s3-eth3"
cookie=0x2a00000000000045, duration=86.998s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:06,dl_
st=00:00:00:00:00:01 actions=output:"s3-eth1"
cookie=0x2a00000000000046, duration=86.967s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:01,dl_
st=00:00:00:00:00:07 actions=output:"s3-eth3"
cookie=0x2a00000000000047, duration=86.967s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:07,dl_
st=00:00:00:00:00:01 actions=output:"s3-eth1"
cookie=0x2a0000000000004a, duration=86.938s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:01,dl_
st=00:00:00:00:00:08 actions=output:"s3-eth3"
cookie=0x2a0000000000004b, duration=86.937s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:08,dl_
st=00:00:00:00:00:01 actions=output:"s3-eth1"
cookie=0x2a00000000000052, duration=86.848s, table=0, n_packets=1, n_bytes=42, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:02,dl_d
t=00:00:00:00:00:03 actions=output:"s3-eth3"
cookie=0x2a00000000000053, duration=86.848s, table=0, n_packets=1, n_bytes=42, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:03,dl_d
t=00:00:00:00:00:02 actions=output:"s3-eth2"
cookie=0x2a00000000000058, duration=86.831s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:02,dl_

For S4:


** s4 ----------
cookie=0x2b0000000000000a, duration=109.115s, table=0, n_packets=22, n_bytes=1870, priority=100,dl_type=0x88cc actions=CONTROLLER:65535
cookie=0x2a00000000000020, duration=87.297s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:01,dl_
st=00:00:00:00:00:03 actions=output:"s4-eth1"
cookie=0x2a00000000000021, duration=87.297s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:03,dl_
st=00:00:00:00:00:01 actions=output:"s4-eth3"
cookie=0x2a00000000000026, duration=87.238s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:01,dl_
st=00:00:00:00:00:04 actions=output:"s4-eth2"
cookie=0x2a00000000000027, duration=87.232s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:04,dl_
st=00:00:00:00:00:01 actions=output:"s4-eth3"
cookie=0x2a00000000000054, duration=86.859s, table=0, n_packets=1, n_bytes=42, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:02,dl_d
t=00:00:00:00:00:03 actions=output:"s4-eth1"
cookie=0x2a00000000000055, duration=86.858s, table=0, n_packets=1, n_bytes=42, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:03,dl_d
t=00:00:00:00:00:02 actions=output:"s4-eth3"
cookie=0x2a0000000000005c, duration=86.789s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:02,dl_
st=00:00:00:00:00:04 actions=output:"s4-eth2"
cookie=0x2a0000000000005d, duration=86.788s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:04,dl_
st=00:00:00:00:00:02 actions=output:"s4-eth3"
cookie=0x2a00000000000086, duration=86.564s, table=0, n_packets=1, n_bytes=42, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:03,dl_d
t=00:00:00:00:00:04 actions=output:"s4-eth2"
cookie=0x2a00000000000087, duration=86.560s, table=0, n_packets=1, n_bytes=42, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:04,dl_d
t=00:00:00:00:00:03 actions=output:"s4-eth1"
cookie=0x2a00000000000088, duration=86.541s, table=0, n_packets=1, n_bytes=42, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:03,dl_d
t=00:00:00:00:00:05 actions=output:"s4-eth3"
cookie=0x2a00000000000089, duration=86.534s, table=0, n_packets=1, n_bytes=42, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:05,dl_d
t=00:00:00:00:00:03 actions=output:"s4-eth1"
cookie=0x2a00000000000098, duration=86.475s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:03,dl_
st=00:00:00:00:00:06 actions=output:"s4-eth3"
cookie=0x2a00000000000099, duration=86.475s, table=0, n_packets=2, n_bytes=140, idle_timeout=600, hard_timeout=300, priority=10,dl_src=00:00:00:00:00:06,dl_