SDNFV – Lab 2

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Part 1:

1. 9

2 & 3. There are   distinct "OFPT_FLOW_MOD" headers during the experiment

Match fields	Actions	Timeout values
ETH_TYPE=IPv4	OUTPUT_PORT=OFPP_CONTROLLER	0
ETH_TYPE=LLDP	OUTPUT_PORT=OFPP_CONTROLLER	0
ETH_TYPE=0x8942	OUTPUT_PORT=OFPP_CONTROLLER	0
ETH_TYPE=ARP	OUTPUT_PORT=OFPP_CONTROLLER	0
IN_PORT=1 ETH_DST=0e:65:97:9e:81:57 ETH_SRC=66:32:78:7a:fd:07	OUTPUT_PORT=2	0
IN_PORT=2 ETH_DST=66:32:78:7a:fd:07 ETH_SRC=0e:65:97:9e:81:57	OUTPUT_PORT=1	0

Part 2:

```
mininet> h1 arping h2
ARPING 10.0.0.2
42 bytes from c2:69:5a:03:d5:d9 (10.0.0.2): index=0 time=707.222 usec
42 bytes from c2:69:5a:03:d5:d9 (10.0.0.2): index=1 time=3.657 usec
42 bytes from c2:69:5a:03:d5:d9 (10.0.0.2): index=2 time=3.712 usec
42 bytes from c2:69:5a:03:d5:d9 (10.0.0.2): index=3 time=3.286 usec
```

```
mininet> h1 ping 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=3.08 ms
64 bytes from 10.0.0.2: icmp_seq=2 ttl=64 time=0.071 ms
64 bytes from 10.0.0.2: icmp_seq=3 ttl=64 time=0.051 ms
64 bytes from 10.0.0.2: icmp_seq=4 ttl=64 time=0.049 ms
```

Part 3:

There are a huge amount of packets generated by the switches transmitting between the switches and hosts because I applied the flow rule which will broadcast the ARP packets to every port to every switches.

```
SDN-NFV (運作時間: 6 日 05:08:06)

 i  狀態                                    running
 ♥  高可用性狀態                                  無
 ▤  節點                                        pve

 ▣  CPU 使用量                     98.66% 於 2 CPU
 ▭  記憶體使用量           95.04% (7.60 GiB 於 8.00 GiB)
 ⎙  開機磁碟大小                            32.00 GiB
```

Part 4:
1. h1 sent an ARP request packet, flow rules missed.
2. Data plane sent the ARP request to controller (packet-in).
3. Controller tell the data plane how to forward (packet-out).
4. h2 sent an ARP reply packet, flow rules missed.
5. Data plane sent the ARP reply to controller (packet-in).
6. Controller tell the data plane how to forward (packet-out).
7. h1 sent an ICMP echo request packet, flow rules missed.
8. Data plane sent the ICMP echo request to controller (packet-in).
9. Controller tell the data plane how to forward (packet-out).
10. h2 received the first ICMP request

Also, after the ICMP reply delivered, controller sent extra FLOW_MOD packets to add flow rules to the switch.

Part 5:
1. I learned how controllers use FLOW_MOD add a flow rule.
2. I learned how to add/remove flow rules.
3. I learned how the broadcast storm is formed.
4. I learned how the reactive forwarding works.