

Analysing simple L2 switching on the Sandbox:

Lesson 2

Please don't write anything on this paper!

Objectives:

The objective of this task to understand the basic principles of SDN on a L2 switching network and understand the basics of the OpenFlow protocol.

Tasks:

You will need a sheet of paper to write down your answers. Please don't use this paper as it is re-used among classes

Observe the OpenFlow channel between the switch and the controller. To do so open wireshark as sudo while forwarding your screen session

Start a simple topology of a single switch with 3 hosts:

```
$ sudo mn --topo single,3 --mac --switch ovsk,protocols=OpenFlow13 --controller remote -x
```

Observe the flow table of switch S1. You can use tool ovs-ofctl for this purpose

```
$ sudo ovs-ofctl -O OpenFlow13 dump-flows [switchid]
```

Question 1:

Write your answers on a sheet of paper

- What do you see in the Flow table? Are there any entries? Why? **0,5 pts**

Now start your ryu controller with the simple L2 switching app:

```
root@ryu-vm:~# ryu-manager --verbose ryu.app.simple_switch_13
```

Question 2:

Write your answers on a sheet of paper

- What do you see in the flow table now? What that / these entries mean? **0,5 pts**
- Explain the messages sent between the controller and switch during the initialization phase. Use the openflow specification for further information **0,5 pts**

Start pinging between two hosts e.g. h1 and h2 by typing **h1 ping h2** to the mininet console

Question 3:

Write your answers on a sheet of paper

- What do you see in the flow table now? Explain the entries. **0,5 pts**
- Draw a sequence diagram what happened during this ping operation. Use the wireshark output to solve this task. On the sequence diagram display the two hosts, switch, controller and all the exchanged messages during the L2 learning procedure with MAC and IP addresses of the hosts. **1 pts**

- Start a new ping, do you see any new OpenFlow messages? Why? **0 pts**

Present the results to your supervisor

Ryu L2 switching manual + OpenFlow 1.3 manual:

http://osrg.github.io/ryu-book/en/html/switching_hub.html#execution-of-ryu-application

<https://www.opennetworking.org/wp-content/uploads/2013/04/openflow-spec-v1.3.1.pdf>