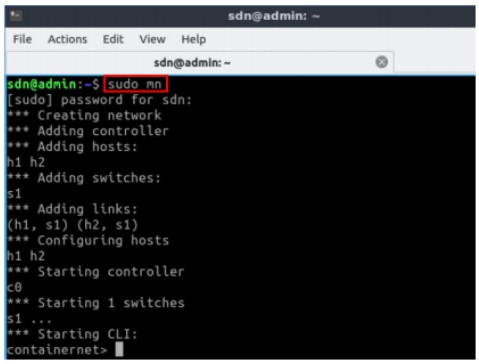
Introduction to Mininet and OpenFlow

Objective:

- Understand Mininet and know how to use it
- Construct and configure network topology from the CLI
- Configure the interface of a router using the CLI
- Understand OpenFlow and its messages

Part 1: Introduction to Mininet

- Install Mininet (Follow the Walkthrough)
- Start a minimal topology : one OpenFlow kernel switch, 2 hosts and one OpenFlow controller ($ sudo mn)



- Test connectivity between hosts:
    - Open Wireshark ($ sudo wireshark) in the background
    - Ping between hosts and capture the traffic and all the message exchanged
- Create different network topologies using Mininet (--topo)
- Modify a network topology manually: add/del hosts and switches

Part 2: Introduction to OpenFlow

- Start a topology with 1 switch and 4 hosts
- Manage the flow entries in the created network manually using 'ovs-ofctl' command (http://www.openvswitch.org//support/dist-docs-2.5/ovs-ofctl.8.pdf)
    - Check current status of the switch
    - Check flow entries in the switch and modify them (add/remove)
    - Implementing some basic forwarding entries with 'ovs-ofctl' command: Host 1 can send packets to any host, host 2 can send packets to host 4, drop all packets from host 3
        - Use port number information
        - Use MAC address information
        - Use IP address information
- Run Ryu controller on host 4 of the created network
    - Capture all the message exchanged between the Ryu controller and the switch
    - Send an 'OFPPortStatsRequest' to get current network statistics https://ryu.readthedocs.io/en/latest/ofproto_v1_3_ref.html