***Networked Systems Coursework 1: Mininet and SDN***

**Deliverable 1**

topo1.py contains 4 hosts in same subnet connected to one switch

A screen shot of a computer

Description automatically generated‘h1 ping h4’

‘iperf h1 h4’**A black screen with white text

Description automatically generated**

A black screen with white text

Description automatically generated‘dump’

‘pingall’

A screen shot of a computer

Description automatically generated

**Deliverable 2**

Running l2\_learning controller in background, then topo2.py

‘h1 ping h4’ followed by ‘dpctl dump-flows’

A screenshot of a computer

Description automatically generated

There are two rules installed by the controller.

The first matches ICMP packets coming from MAC address 00:00:00:00:00:01 and IP address 10.0.1.2 (which is host h1), with destination MAC address 00:00:00:00:00:04 and IP address 10.0.1.3 (which is host h4). These packets arrive on port “s1-eth1”. The rule for these packets is to forward them to port “s1-eth4”.

The second matches ICMP packets coming from MAC address 00:00:00:00:00:04 and IP address 10.0.1.3 (which is host h4), with destination MAC address 00:00:00:00:00:01 and IP address 10.0.1.2 (which is host h1). These packets arrive on port “s1-eth4”. The rule for these packets is to forward them to port “s1-eth1”.

l2\_learning.py is a layer 2 ethernet switch that learns which ports to forward packets on as it receives them. The first time a packet from host h1 is received by the switch, it will store the port (P1) that the packet arrived on as a port which h1 can be reached through. It doesn’t know which port to forward it on to reach h4. Due to this, it will broadcast the packet (send it through all ports except it’s own). Then, once h4 receives the packet, it will reply back to h1. This reply will be sent via the switch, which now stores the port the reply came through (P4) as a port that h4 can be reached through. Thus, any new packets arriving intended for h4 will be forwarded via port P4, and any new packets arriving intended for h1 will be forwarded via port P1.

There are separate mapping rules stored for ARP queries and ICMP (ping) messages.

When ‘h1 ping h4’ is run, there is a chance of receiving an ICMP packet in h2, since the first time the switch receives a packet it has no mappings (hasn’t learnt anything). So it will broadcast the packet on all ports (including port “s1-eth2”). This means that h2 could receive an ICMP packet.

**Deliverable 3**