Computer Comm & Networks - ITCS 8166 (Assignment – 3)

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Software Details

1. Host Operating System and version: macOS (Version: 10.15.7)
2. Virtualization tool name and version: VirtualBox (Version: 6.1.16)

Milestones

1. Your application should learn the switches, links and hosts by observing the Packet_In event. To generate Packet_In event, use the mininet pingall function.

Answer:

Code attached code/aislam6_topo.py and code/aislam6_ryu.py

2. Print the network topology to show links, hosts and switches. ()

Answer:

Run the code (attached in Q1) using the following command:

```
> sudo python aislam6_topo.py
> ryu-manager aislam6_ryu.py --observe-links
```

Program code: Code attached code/aislam6_topo.py and code/aislam6_ryu.py
Verification and required information/output: Screenshot attached below

```
mininet@mininetvm:~/Spring-2021-ITCS-8166-ComputerCommNetworks/assignments/assignment-3/code$ ryu-manager ryu.py --observe-links
loading app ryu.py
loading app ryu.topology.switches
loading app ryu.controller.ofp_handler
instantiating app ryu.py of SimpleSwitch13
instantiating app ryu.topology.switches of Switches
instantiating app ryu.controller.ofp_handler of OFPHandler
        Current Hosts:
                Host<mac=3e:d2:ae:74:90:5d, port=Port<dpid=6, port_no=1, LIVE>,::,fe80::3cd2:aeff:fe74:905d>
                Host<mac=86:e1:e3:18:30:2f, port=Port<dpid=1, port_no=1, LIVE>,fe80::84e1:e3ff:fe18:302f>
                Host<mac=b2:64:ec:16:b2:06, port=Port<dpid=4, port_no=1, LIVE>,::,fe80::b064:ecff:fe16:b206>
                Host<mac=1e:af:41:e7:63:ba, port=Port<dpid=5, port_no=1, LIVE>,::,fe80::1caf:41ff:fee7:63ba>
                Host<mac=86:6f:c3:a3:6c:e0, port=Port<dpid=3, port_no=1, LIVE>,::,fe80::846f:c3ff:fea3:6ce0>
                Host<mac=7e:87:4a:ec:d3:c0, port=Port<dpid=2, port_no=1, LIVE>,::,fe80::7c87:4aff:feec:d3c0>
        Current Switches:
                Switch<dpid=1, Port<dpid=1, port_no=1, LIVE> Port<dpid=1, port_no=2, LIVE> Port<dpid=1, port_no=3, LIVE> Port<dpid=1, port_no=4, LIVE> >
                Switch<dpid=2, Port<dpid=2, port_no=1, LIVE> Port<dpid=2, port_no=2, LIVE> >
                Switch<dpid=3, Port<dpid=3, port_no=1, LIVE> Port<dpid=3, port_no=2, LIVE> Port<dpid=3, port_no=3, LIVE> >
                Switch<dpid=4, Port<dpid=4, port_no=1, LIVE> Port<dpid=4, port_no=2, LIVE> >
                Switch<dpid=5, Port<dpid=5, port_no=1, LIVE> Port<dpid=5, port_no=2, LIVE> Port<dpid=5, port_no=3, LIVE> >
                Switch<dpid=6, Port<dpid=6, port_no=1, LIVE> Port<dpid=6, port_no=2, LIVE> >
        Current Links:
                Link: Port<dpid=6, port_no=2, LIVE> to Port<dpid=5, port_no=3, LIVE>
                Link: Port<dpid=1, port_no=3, LIVE> to Port<dpid=3, port_no=2, LIVE>
                Link: Port<dpid=1, port_no=4, LIVE> to Port<dpid=5, port_no=2, LIVE>
                Link: Port<dpid=4, port_no=2, LIVE> to Port<dpid=3, port_no=3, LIVE>
                Link: Port<dpid=3, port_no=3, LIVE> to Port<dpid=4, port_no=2, LIVE>
                Link: Port<dpid=3, port_no=2, LIVE> to Port<dpid=1, port_no=3, LIVE>
                Link: Port<dpid=5, port_no=2, LIVE> to Port<dpid=1, port_no=4, LIVE>
                Link: Port<dpid=5, port_no=3, LIVE> to Port<dpid=6, port_no=2, LIVE>
                Link: Port<dpid=2, port_no=2, LIVE> to Port<dpid=1, port_no=2, LIVE>
                Link: Port<dpid=1, port_no=2, LIVE> to Port<dpid=2, port_no=2, LIVE>
***Measuring Bandwidth***
iperf server log: ('', None)
iperf --server on h6 with ip 10.0.0.6 and iperf --client in h1
/home/mininet/mininet/util/m: line 24: [: too many arguments
iperf client log: ('', None)
iperf --server on h6 with ip 10.0.0.6 and iperf --client in h4
/home/mininet/mininet/util/m: line 24: [: too many arguments
iperf client log: ('', None)
iperf --server on h6 with ip 10.0.0.6 and iperf --client in h5
/home/mininet/mininet/util/m: line 24: [: too many arguments
```

3. Now, you have the network topology. Using iperf, measure the bandwidth(bw) between hosts and include the resulting bw as cost of the link. Since the link from host to switch is unconstrained, the bw you measure between two adjacent hosts will be bandwidth of links connecting two adjacent switches of the hosts.

Answer:

Run iperf server and client program in the ryu-controller to measure the bandwidth between the hosts.

Output: Screenshot attached below

4. Print the network topology along with list costs.

Attached above.