ANDASIS NETWORK PROGRAMMING MAKE-UP EXAM REPORT

This report explains all how the project was proceeded with images and the codes are uploaded in the GitHub repository as well.

1.Setting up environment:

Mininet

A docker container of Mininet was used for this project, it has to be installed to the system, however, while installation is done Mininet docker container requires “bazel-6.0.0-pre.20220421.3”. This version of bazel should be downloaded and installed manually, only then will it work.

Mininet link: https://hub.docker.com/r/iwaseyusuke/mininet/

ONOS

As a controller for mininet ONOS was used. The installation of ONOS is in the is documentation web page. If documentation is followed, ONOS would work just fine. However, after running onos-service, a ssh connection should be established to “ssh onos@127.0.0.1 -p 8101” with the password “rocks”. After accessing ONOS CLI the commands:

“app activate org.onosproject.fwd”

“app activate org.onosproject.openflow”

“apps -a -s”

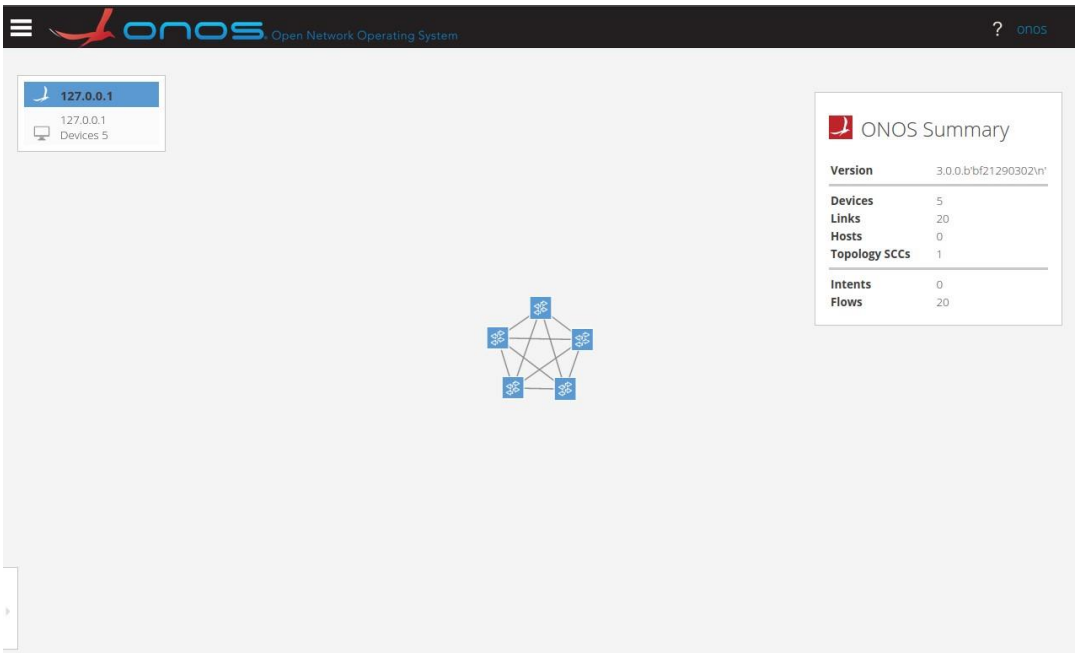
Should be executed so that all devices created by Mininet are able to communicate with each other. In addition, after the steps mentioned above ONOS UI will be accessible as well.

ONOS UI: http://localhost:8181/onos/ui/#/topo2

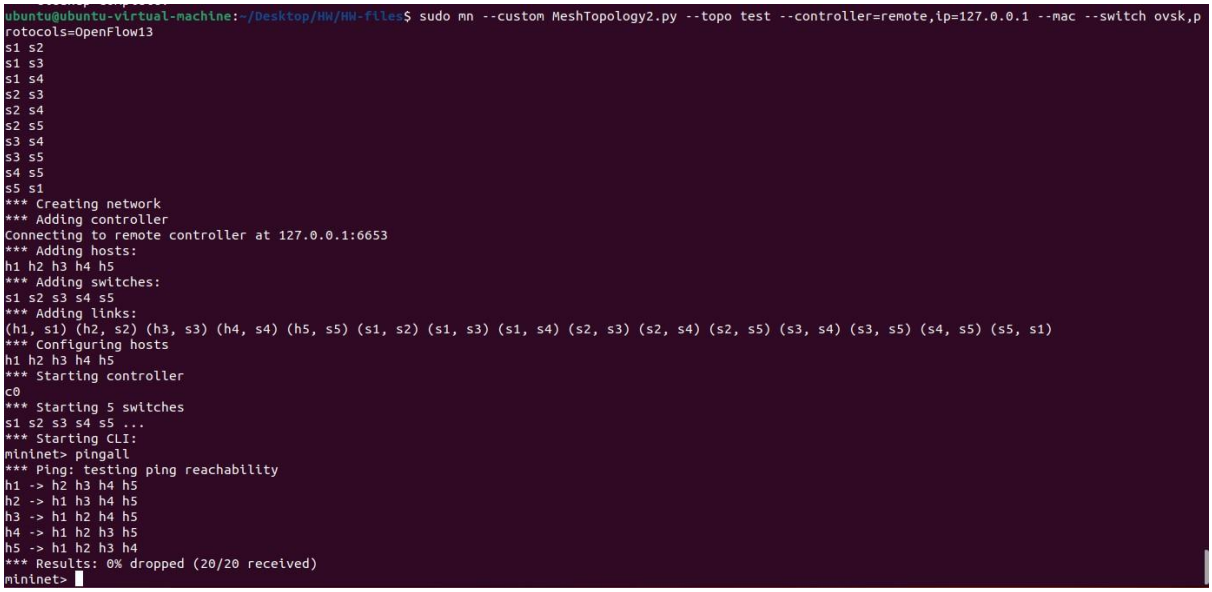
2. Mesh topology:

Python script for creating a mesh topology is added in the GitHub repository. However, graphical representations of it is provided in this section.

Mesh topology.



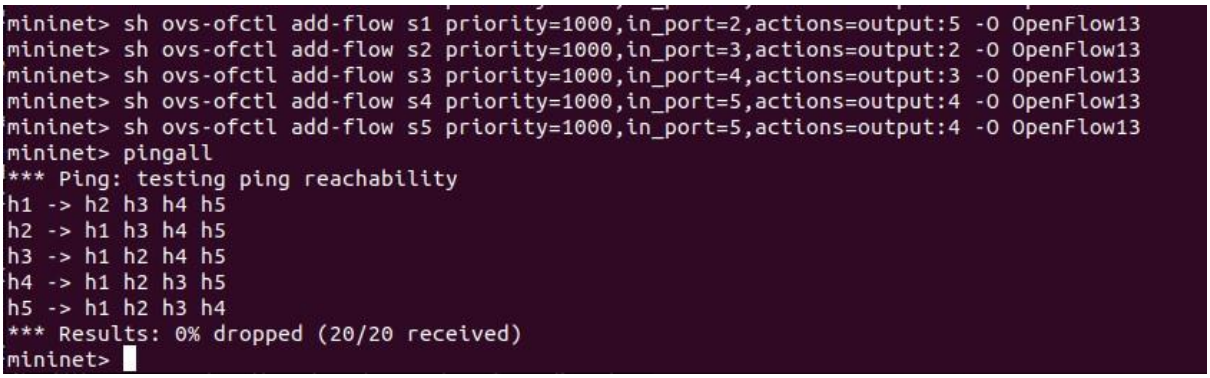
This image shows that a mesh topology is created and all devices are pingable.



3. CLI Case

For this section images are provided to represent graphically.

In this image some basic OpenFlow rules are configured.



Images below are representation of dump flow, checking OpenFlow rules.

```
mininet> sh ovs-ofctl dump-flows s1 -O OpenFlow13
 cookie=0x10000021b41dc, duration=758.045s, table=0, n_packets=8, n_bytes=784, send_flow_rem priority=5,ip actions=
CONTROLLER:65535,clear_actions
 cookie=0x100009465555a, duration=758.045s, table=0, n_packets=976, n_bytes=135664, send_flow_rem priority=40000,dl
_type=0x88cc actions=CONTROLLER:65535,clear_actions
 cookie=0x100007a585b6f, duration=758.045s, table=0, n_packets=976, n_bytes=135664, send_flow_rem priority=40000,dl
_type=0x8942 actions=CONTROLLER:65535,clear_actions
 cookie=0x10000ea6f4b8e, duration=758.045s, table=0, n_packets=16, n_bytes=672, send_flow_rem priority=40000,arp ac
tions=CONTROLLER:65535,clear_actions
mininet> sh ovs-ofctl dump-flows s2 -O OpenFlow13
 cookie=0x100002341485c, duration=768.070s, table=0, n_packets=8, n_bytes=784, send_flow_rem priority=5,ip actions=
CONTROLLER:65535,clear_actions
 cookie=0x10000c70edd85, duration=768.070s, table=0, n_packets=16, n_bytes=672, send_flow_rem priority=40000,arp ac
tions=CONTROLLER:65535,clear_actions
 cookie=0x10000dc56d70b, duration=768.069s, table=0, n_packets=988, n_bytes=137332, send_flow_rem priority=40000,dl
_type=0x8942 actions=CONTROLLER:65535,clear_actions
 cookie=0x1000002bbd8d4, duration=768.069s, table=0, n_packets=988, n_bytes=137332, send_flow_rem priority=40000,dl
_type=0x88cc actions=CONTROLLER:65535,clear_actions
mininet> sh ovs-ofctl dump-flows s3 -O OpenFlow13
 cookie=0x10000646f55aa, duration=774.867s, table=0, n_packets=1000, n_bytes=139000, send_flow_rem priority=40000,d
l_type=0x88cc actions=CONTROLLER:65535,clear_actions
 cookie=0x10000a6288ee9, duration=774.867s, table=0, n_packets=16, n_bytes=672, send_flow_rem priority=40000,arp ac
tions=CONTROLLER:65535,clear_actions
 cookie=0x10000be641e06, duration=774.867s, table=0, n_packets=8, n_bytes=784, send_flow_rem priority=5,ip actions=
CONTROLLER:65535,clear_actions
 cookie=0x10000464e5575, duration=774.866s, table=0, n_packets=1000, n_bytes=139000, send_flow_rem priority=40000,d
l_type=0x8942 actions=CONTROLLER:65535,clear_actions
mininet>
```

```
mininet> sh ovs-ofctl dump-flows s4 -O OpenFlow13
 cookie=0x1000011326ce6, duration=826.478s, table=0, n_packets=16, n_bytes=672, send_flow_rem priority=40000,arp ac
tions=CONTROLLER:65535,clear_actions
 cookie=0x10000810531f2, duration=826.478s, table=0, n_packets=8, n_bytes=784, send_flow_rem priority=5,ip actions=
CONTROLLER:65535,clear_actions
 cookie=0x10000261e0911, duration=826.478s, table=0, n_packets=1068, n_bytes=148452, send_flow_rem priority=40000,d
l_type=0x88cc actions=CONTROLLER:65535,clear_actions
 cookie=0x10000687421fe, duration=826.478s, table=0, n_packets=1068, n_bytes=148452, send_flow_rem priority=40000,d
l_type=0x8942 actions=CONTROLLER:65535,clear_actions
mininet> sh ovs-ofctl dump-flows s5 -O OpenFlow13
 cookie=0x1000008697ae4, duration=837.472s, table=0, n_packets=8, n_bytes=784, send_flow_rem priority=5,ip actions=
CONTROLLER:65535,clear_actions
 cookie=0x10000e1a5f53e, duration=837.472s, table=0, n_packets=16, n_bytes=672, send_flow_rem priority=40000,arp ac
tions=CONTROLLER:65535,clear_actions
 cookie=0x10000c0cb82c3, duration=837.472s, table=0, n_packets=1080, n_bytes=150120, send_flow_rem priority=40000,d
l_type=0x8942 actions=CONTROLLER:65535,clear_actions
 cookie=0x10000ee9234f2, duration=837.472s, table=0, n_packets=1080, n_bytes=150120, send_flow_rem priority=40000,d
l_type=0x88cc actions=CONTROLLER:65535,clear_actions
mininet>
```