SDNFV Project1 Report

Part 1

1.

- org.onosproject.hostprovider
- org.onosproject.lldpprovider
- org.onosproject.openflow-base
- org.onosproject.optical-model

開啟前

	Title	App ID	Version	Category	Origin
✓	Default Drivers	org.onosproject.drivers	2.7.0	Drivers	ONOS Community
✓	ONOS GUI2	org.onosproject.gui2	2.7.0	Graphical User Interface	ONOS Community

開啟後

	Title	App ID	Version	Category	Origin
✓	Default Drivers	org.onosproject.drivers	2.7.0	Drivers	ONOS Community
✓	Host Location Provider	org.onosproject.hostprovider	2.7.0	Provider	ONOS Community
✓	LLDP Link Provider	org.onosproject.lldpprovider	2.7.0	Provider	ONOS Community
✓	ONOS GUI2	org.onosproject.gui2	2.7.0	Graphical User Interface	ONOS Community
✓	OpenFlow Base Provider	org.onosproject.openflow-base	2.7.0	Provider	ONOS Community
✓	OpenFlow Provider Suite	org.onosproject.openflow	2.7.0	Provider	ONOS Community
✓	Optical Network Model	org.onosproject.optical-model	2.7.0	Optical	ONOS Community

2. H1 無法ping H2，因為預設並沒有啟用reactive forwarding的app

3. 6633, 6653

```
yuchen@yuchen-VirtualBox:~/onos$ netstat -nlpt
(Not all processes could be identified, non-owned process info
 will not be shown, you would have to be root to see it all.)
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State       PID/Program name
tcp        0      0 127.0.0.53:53           0.0.0.0:*               LISTEN      -
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN      -
tcp        0      0 0.0.0.0:6656            0.0.0.0:*               LISTEN      -
tcp        0      0 127.0.0.1:5005          0.0.0.0:*               LISTEN      7452/java
tcp        0      0 0.0.0.0:6655            0.0.0.0:*               LISTEN      -
tcp        0      0 0.0.0.0:6654            0.0.0.0:*               LISTEN      -
tcp        0      0 127.0.0.1:631           0.0.0.0:*               LISTEN      -
tcp6       0      0 :::9876                 :::*                    LISTEN      7452/java
tcp6       0      0 127.0.0.1:44931         :::*                    LISTEN      7452/java
tcp6       0      0 :::1099                 :::*                    LISTEN      7452/java
tcp6       0      0 ::1:41815               :::*                    LISTEN      3771/bazel(onos)
tcp6       0      0 :::37811                :::*                    LISTEN      7452/java
tcp6       0      0 ::1:631                 :::*                    LISTEN      -
tcp6       0      0 :::22                   :::*                    LISTEN      -
tcp6       0      0 :::8101                 :::*                    LISTEN      7452/java
tcp6       0      0 :::8181                 :::*                    LISTEN      7452/java
tcp6       0      0 :::6633                 :::*                    LISTEN      7452/java
tcp6       0      0 :::6653                 :::*                    LISTEN      7452/java
```

4. org.onosproject.openflow

關閉該app後，使用netstat會發現6633, 6653的port變成未開啟，而使用mininet建立的拓樸也無法在ONOS的GUI上看到。

Part 2

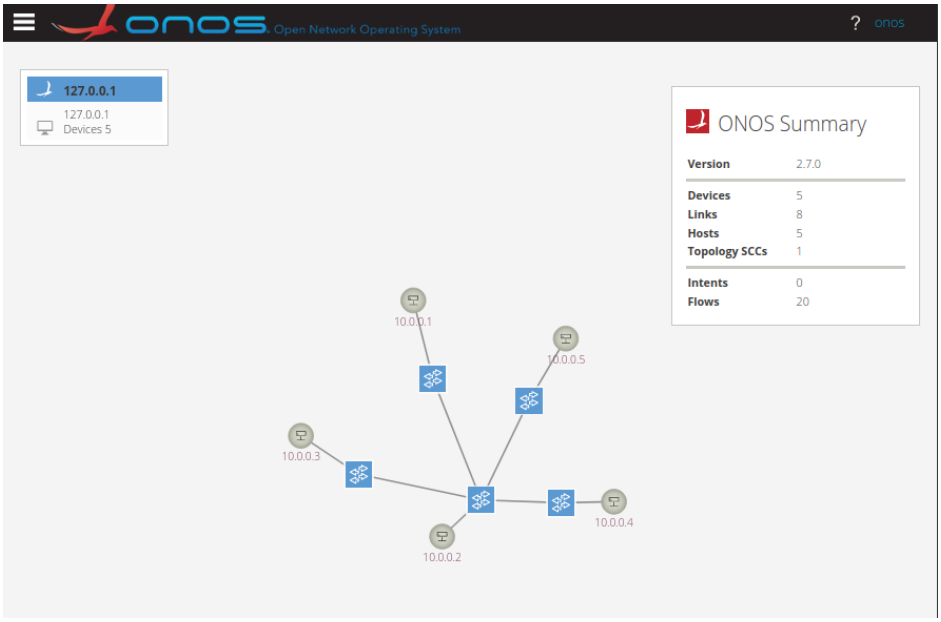
用一個python檔案 (project1_part2_311552013.py) 來建立自定義拓樸，其中使用了從Topo繼承的函式 (addHost, addSwitch, addLink)。

重新建立一個乾淨的ONOS環境：
$ sudo mn -c
$ cd $ONOS_ROOT
$ bazel run onos-local -- clean debug

開啟reactive forwarding的app。

用mininet建立拓樸：
$ sudo mn --custom=project1_part2_311552013.py
--topo=topo_part2_311552013
--controller=remote,ip=127.0.0.1,port=6653
--switch=ovs,protocols=OpenFlow14

pingall，讓controller得知host的存在：
$ mininet> pingall



Part 3

用一個python檔案 (project1_part3_311552013.py) 來建立自定義拓樸，其中使用了從Topo繼承的函式 (addHost, addSwitch, addLink)。與part2不同的是，這次要指定ip位置和子網路遮罩 (ip='192.168.0.x/27')。

重新建立一個乾淨的ONOS環境：
$ sudo mn -c
$ cd $ONOS_ROOT
$ bazel run onos-local -- clean debug

開啟reactive forwarding的app。

用mininet建立拓樸：
$ sudo mn --custom=project1_part3_311552013.py
--topo=topo_part3_311552013
--controller=remote,ip=127.0.0.1,port=6653
--switch=ovs,protocols=OpenFlow14

使用dump和ifconfig指令觀察每個host的ip位置和子網路遮罩。

```
mininet> dump
<Host h1: h1-eth0:192.168.0.1 pid=15494>
<Host h2: h2-eth0:192.168.0.2 pid=15496>
<Host h3: h3-eth0:192.168.0.3 pid=15498>
<Host h4: h4-eth0:192.168.0.4 pid=15500>
<Host h5: h5-eth0:192.168.0.5 pid=15502>
<OVSSwitch{'protocols': 'OpenFlow14'} s1: lo:127.0.0.1,s1-eth1:None,s1-eth2:None pid=15
507>
<OVSSwitch{'protocols': 'OpenFlow14'} s2: lo:127.0.0.1,s2-eth1:None,s2-eth2:None,s2-eth
3:None,s2-eth4:None,s2-eth5:None pid=15510>
<OVSSwitch{'protocols': 'OpenFlow14'} s3: lo:127.0.0.1,s3-eth1:None,s3-eth2:None pid=15
513>
<OVSSwitch{'protocols': 'OpenFlow14'} s4: lo:127.0.0.1,s4-eth1:None,s4-eth2:None pid=15
516>
<OVSSwitch{'protocols': 'OpenFlow14'} s5: lo:127.0.0.1,s5-eth1:None,s5-eth2:None pid=15
519>
<RemoteController{'ip': '127.0.0.1:6653'} c0: 127.0.0.1:6653 pid=15487>
```

```
mininet> h1 ifconfig
h1-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.0.1  netmask 255.255.255.224  broadcast 192.168.0.31
        inet6 fe80::8c33:90ff:fef0:9b74  prefixlen 64  scopeid 0x20<link>
        ether 8e:33:90:f0:9b:74  txqueuelen 1000  (Ethernet)
        RX packets 279  bytes 36137 (36.1 KB)
        RX errors 0  dropped 220  overruns 0  frame 0
        TX packets 36  bytes 2840 (2.8 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

```
mininet> h2 ifconfig
h2-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.0.2  netmask 255.255.255.224  broadcast 192.168.0.31
        inet6 fe80::5467:16ff:fe01:de5f  prefixlen 64  scopeid 0x20<link>
        ether 56:67:16:01:de:5f  txqueuelen 1000  (Ethernet)
        RX packets 409  bytes 53968 (53.9 KB)
        RX errors 0  dropped 346  overruns 0  frame 0
        TX packets 37  bytes 2910 (2.9 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

```
mininet> h3 ifconfig
h3-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.0.3  netmask 255.255.255.224  broadcast 192.168.0.31
        inet6 fe80::a47f:41ff:fedf:135b  prefixlen 64  scopeid 0x20<link>
        ether a6:7f:41:df:13:5b  txqueuelen 1000  (Ethernet)
        RX packets 444  bytes 58792 (58.7 KB)
        RX errors 0  dropped 380  overruns 0  frame 0
        TX packets 37  bytes 2910 (2.9 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

```
mininet> h4 ifconfig
h4-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.0.4  netmask 255.255.255.224  broadcast 192.168.0.31
        inet6 fe80::4c42:abff:fe11:f08c  prefixlen 64  scopeid 0x20<link>
        ether 4e:42:ab:11:f0:8c  txqueuelen 1000  (Ethernet)
        RX packets 464  bytes 61434 (61.4 KB)
        RX errors 0  dropped 398  overruns 0  frame 0
        TX packets 37  bytes 2910 (2.9 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

```
mininet> h5 ifconfig
h5-eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.0.5  netmask 255.255.255.224  broadcast 192.168.0.31
        inet6 fe80::a88b:6ff:fe86:d0a5  prefixlen 64  scopeid 0x20<link>
        ether aa:8b:06:86:d0:a5  txqueuelen 1000  (Ethernet)
        RX packets 478  bytes 63380 (63.3 KB)
        RX errors 0  dropped 412  overruns 0  frame 0
        TX packets 37  bytes 2910 (2.9 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

學到或解決了什麼?

在這個project中，我學到了環境架設，以及ONOS和mininet的基本觀念和操作。