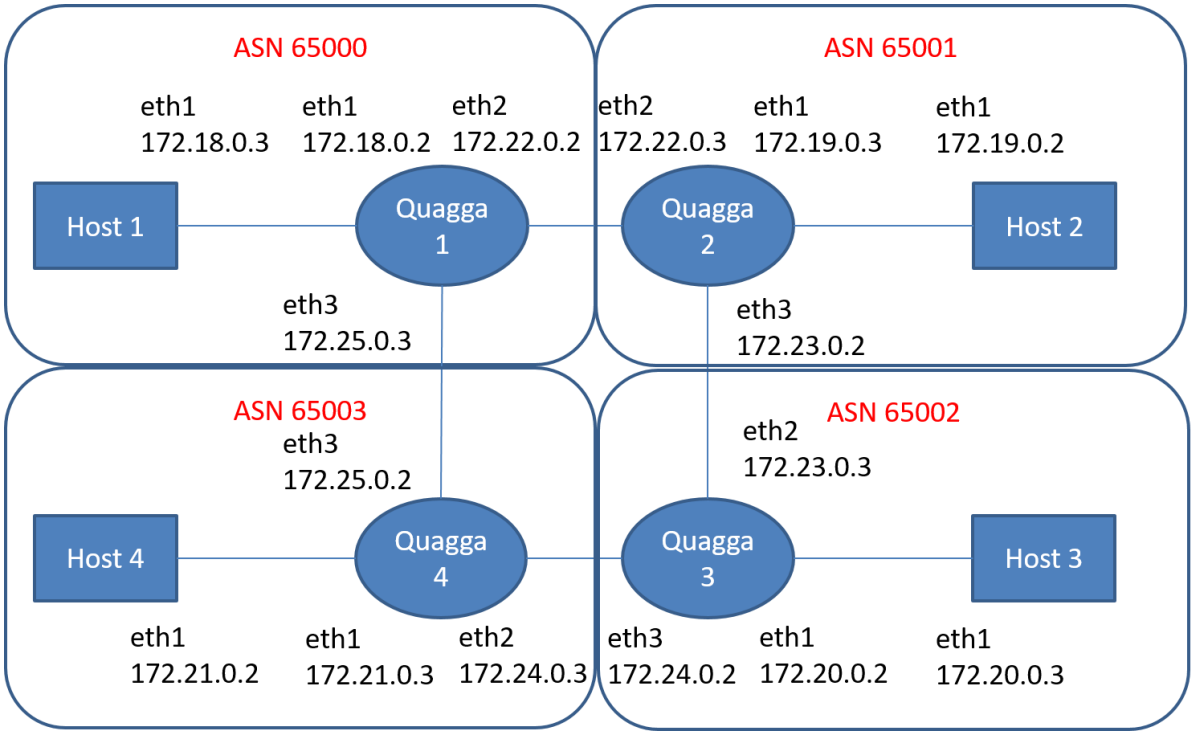
SDN-NFV

0516045 張凱翔

Topology:



BGP Packet:

bgp

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	172.23.0.2	172.23.0.3	BGP	85	KEEPALIVE Message
2	0.004132650	172.23.0.3	172.23.0.2	BGP	85	KEEPALIVE Message
4	3.001003943	172.23.0.2	172.23.0.3	BGP	85	KEEPALIVE Message
5	3.011238653	172.23.0.3	172.23.0.2	BGP	85	KEEPALIVE Message
7	6.003666014	172.23.0.2	172.23.0.3	BGP	85	KEEPALIVE Message
8	6.015467684	172.23.0.3	172.23.0.2	BGP	85	KEEPALIVE Message
10	9.004948099	172.23.0.2	172.23.0.3	BGP	85	KEEPALIVE Message
11	9.024971720	172.23.0.3	172.23.0.2	BGP	85	KEEPALIVE Message
13	12.006081183	172.23.0.2	172.23.0.3	BGP	85	KEEPALIVE Message
14	12.026836683	172.23.0.3	172.23.0.2	BGP	85	KEEPALIVE Message

```
▸ Frame 1: 85 bytes on wire (680 bits), 85 bytes captured (680 bits) on interface 0
▸ Ethernet II, Src: 02:42:ac:17:00:02 (02:42:ac:17:00:02), Dst: 02:42:ac:17:00:03 (02:42:ac:17:00:03)
▸ Internet Protocol Version 4, Src: 172.23.0.2, Dst: 172.23.0.3
▸ Transmission Control Protocol, Src Port: 179, Dst Port: 53290, Seq: 1, Ack: 1, Len: 19
▸ Border Gateway Protocol - KEEPALIVE Message
```

```
0000  02 42 ac 17 00 03 02 42  ac 17 00 02 08 00 45 c0   ·B·····B ······E·
0010  00 47 f0 61 40 00 ff 06  32 5b ac 17 00 02 ac 17   ·G·a@··· 2[······
0020  00 03 00 b3 d0 2a e9 e6  7c 14 a9 64 11 b5 80 18   ·····*·· |··d····
0030  00 3b 58 6d 00 00 01 01  08 0a da 81 1b 4a 4a ee   ·;Xm···· ·····JJ·
0040  3c 3a ff ff ff ff ff ff  ff ff ff ff ff ff ff ff   <:······ ········
0050  ff ff 00 13 04                                    ·····
```

Q1:

```
root@f5981f0a903f:/# route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         172.22.0.1      0.0.0.0         UG    0      0        0 eth2
172.17.0.0      *               255.255.0.0     U     0      0        0 eth0
172.18.0.0      *               255.255.0.0     U     0      0        0 eth1
172.19.0.0      Q2.Q1Q2br       255.255.0.0     UG    0      0        0 eth2
172.20.0.0      Q2.Q1Q2br       255.255.0.0     UG    0      0        0 eth2
172.21.0.0      Q4.Q1Q4br       255.255.0.0     UG    0      0        0 eth3
172.22.0.0      *               255.255.0.0     U     0      0        0 eth2
172.25.0.0      *               255.255.0.0     U     0      0        0 eth3
```

```
R1zebra> show ip route bgp
Codes: K - kernel route, C - connected, S - static, R - RIP,
       O - OSPF, I - IS-IS, B - BGP, P - PIM, A - Babel,
       > - selected route, * - FIB route

B>* 172.19.0.0/16 [20/0] via 172.22.0.3, eth2, 00:04:15
B>* 172.20.0.0/16 [20/0] via 172.22.0.3, eth2, 00:04:15
B>* 172.21.0.0/16 [20/0] via 172.25.0.2, eth3, 00:04:13
```

```
R1> show ip bgp summary
BGP router identifier 172.25.0.3, local AS number 65000
RIB entries 7, using 784 bytes of memory
Peers 2, using 9136 bytes of memory

Neighbor        V         AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
172.22.0.3      4 65001      99      101        0    0    0 00:04:45        3
172.25.0.2      4 65003     100      103        0    0    0 00:04:44        3
```

Q2:

```
root@dac30944bae6:/# route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         172.22.0.1      0.0.0.0         UG    0      0        0 eth2
172.17.0.0      *               255.255.0.0     U     0      0        0 eth0
172.18.0.0      Q1.Q1Q2br       255.255.0.0     UG    0      0        0 eth2
172.19.0.0      *               255.255.0.0     U     0      0        0 eth1
172.20.0.0      Q3.Q2Q3br       255.255.0.0     UG    0      0        0 eth3
172.21.0.0      Q3.Q2Q3br       255.255.0.0     UG    0      0        0 eth3
172.22.0.0      *               255.255.0.0     U     0      0        0 eth2
172.23.0.0      *               255.255.0.0     U     0      0        0 eth3
```

```
R2zebra> show ip route bgp
Codes: K - kernel route, C - connected, S - static, R - RIP,
       O - OSPF, I - IS-IS, B - BGP, P - PIM, A - Babel,
       > - selected route, * - FIB route

B>* 172.18.0.0/16 [20/0] via 172.22.0.2, eth2, 00:09:10
B>* 172.20.0.0/16 [20/0] via 172.23.0.3, eth3, 00:10:26
B>* 172.21.0.0/16 [20/0] via 172.23.0.3, eth3, 00:10:26
```

```
R2> show ip bgp summary
BGP router identifier 172.23.0.2, local AS number 65001
RIB entries 7, using 784 bytes of memory
Peers 2, using 9136 bytes of memory

Neighbor        V         AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
172.22.0.2      4 65000     213      227        0    0    0 00:09:50        2
172.23.0.3      4 65002     227      230        0    0    0 00:11:07        2
```

Q3:

```
root@2e51de1d0493:/# route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         172.23.0.1      0.0.0.0         UG    0      0        0 eth2
172.17.0.0      *               255.255.0.0     U     0      0        0 eth0
172.18.0.0      Q2.Q2Q3br       255.255.0.0     UG    0      0        0 eth2
172.19.0.0      Q2.Q2Q3br       255.255.0.0     UG    0      0        0 eth2
172.20.0.0      *               255.255.0.0     U     0      0        0 eth1
172.21.0.0      Q4.Q3Q4br       255.255.0.0     UG    0      0        0 eth3
172.23.0.0      *               255.255.0.0     U     0      0        0 eth2
172.24.0.0      *               255.255.0.0     U     0      0        0 eth3
```

```
R3zebra> show ip route bgp
Codes: K - kernel route, C - connected, S - static, R - RIP,
       O - OSPF, I - IS-IS, B - BGP, P - PIM, A - Babel,
       > - selected route, * - FIB route

B>* 172.18.0.0/16 [20/0] via 172.23.0.2, eth2, 00:11:11
B>* 172.19.0.0/16 [20/0] via 172.23.0.2, eth2, 00:12:31
B>* 172.21.0.0/16 [20/0] via 172.24.0.3, eth3, 1d01h30m
```

```
R3> show ip bgp summary
BGP router identifier 172.24.0.2, local AS number 65002
RIB entries 7, using 784 bytes of memory
Peers 2, using 9136 bytes of memory

Neighbor        V         AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
172.23.0.2      4 65001     503     510        0    0    0 00:13:03        2
172.24.0.3      4 65003     506     510        0    0    0 00:25:02        2
```

Q4:

```
root@eddb85c01a87:/# route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         172.25.0.1      0.0.0.0         UG    0      0        0 eth3
172.17.0.0      *               255.255.0.0     U     0      0        0 eth0
172.18.0.0      Q1.Q1Q4br       255.255.0.0     UG    0      0        0 eth3
172.19.0.0      Q3.Q3Q4br       255.255.0.0     UG    0      0        0 eth2
172.20.0.0      Q3.Q3Q4br       255.255.0.0     UG    0      0        0 eth2
172.21.0.0      *               255.255.0.0     U     0      0        0 eth1
172.24.0.0      *               255.255.0.0     U     0      0        0 eth2
172.25.0.0      *               255.255.0.0     U     0      0        0 eth3
```

```
R4zebra> show ip route bgp
Codes: K - kernel route, C - connected, S - static, R - RIP,
       O - OSPF, I - IS-IS, B - BGP, P - PIM, A - Babel,
       > - selected route, * - FIB route

B>* 172.18.0.0/16 [20/0] via 172.25.0.3, eth3, 00:13:06
B>* 172.19.0.0/16 [20/0] via 172.24.0.2, eth2, 00:14:22
B>* 172.20.0.0/16 [20/0] via 172.24.0.2, eth2, 1d01h32m
```

```
R4> show ip bgp summary
BGP router identifier 172.24.0.3, local AS number 65003
RIB entries 7, using 784 bytes of memory
Peers 2, using 9136 bytes of memory

Neighbor        V         AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
172.24.0.2      4 65002    1446    1446        0    0    0 00:26:43        3
172.25.0.3      4 65000    1444    1453        0    0    0 00:13:26        3
```

Learned or Solved:

在網路規劃與管理實務的課上有接觸過 bgp，所以這次的作業比較輕鬆一些。這次作業讓我知道除了 mininet 之外，還有另一種可以在電腦中建立虛擬網路的軟體。