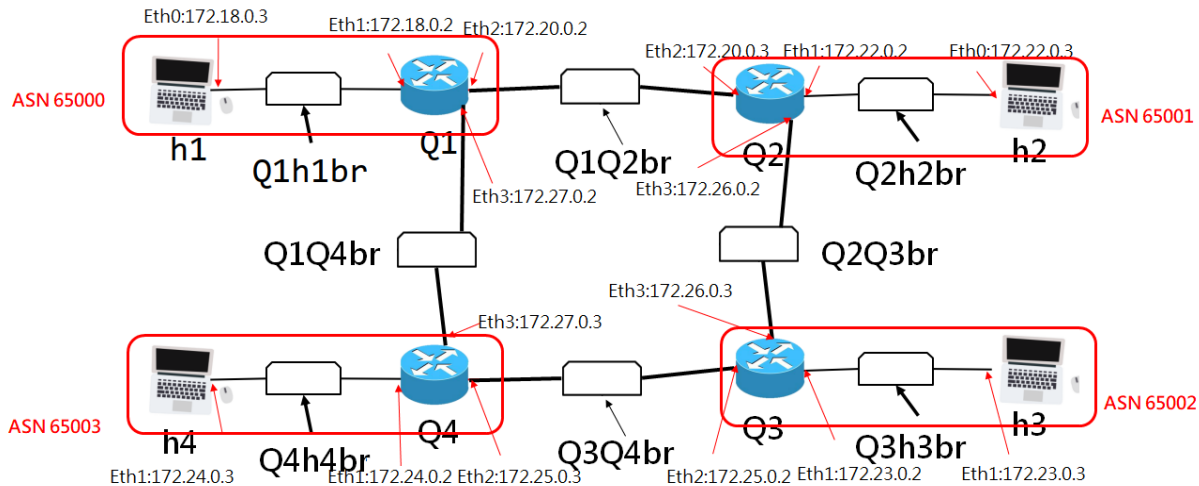


## SDN-NFV Project5 report

1



2

Wireshark capture of BGP KEEPALIVE messages between 172.26.0.3 and 172.26.0.2. The capture shows several BGP messages, including KEEPALIVE messages, with details of the BGP protocol and the specific message structure.

No.	Time	Source	Destination	Protocol	Length	Info
486	36.007293097	172.20.0...	172.20.0.2	BGP	87	KEEPALIVE Message
490	36.007358495	172.26.0...	172.26.0.2	BGP	87	KEEPALIVE Message
494	36.935472742	172.25.0...	172.25.0.2	BGP	87	KEEPALIVE Message
495	36.935475741	172.25.0...	172.25.0.3	BGP	87	KEEPALIVE Message
500	36.935508740	172.27.0...	172.27.0.2	BGP	87	KEEPALIVE Message
501	36.935509040	172.27.0...	172.27.0.3	BGP	87	KEEPALIVE Message

Frame 490: 87 bytes on wire (696 bits), 87 bytes captured (696 bits) on interface 0

- Linux cooked capture
- Internet Protocol Version 4, Src: 172.26.0.3, Dst: 172.26.0.2
- Transmission Control Protocol, Src Port: 34342, Dst Port: 179, Seq: 229, Ack: 248, Len: 19
- Border Gateway Protocol - KEEPALIVE Message

0000 00 03 00 01 00 06 02 42 ac 1a 00 03 00 00 08 00 .....B.....  
0010 45 c0 00 47 d1 c7 40 00 ff 06 50 ef ac 1a 00 03 E.G.@.P.....  
0020 ac 1a 00 02 86 26 00 b3 9f 8e 20 d4 e0 26 25 2f ..&...&%/...  
0030 80 18 01 f5 58 73 00 00 01 01 08 0a cc cd bd a0 ....Xs.....  
0040 d8 cb 12 61 ff ff ff ff ff ff ff ff ff ff ff ff ..a.....  
0050 ff ff ff ff 00 13 04 .....

## Q1

```

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>* 172.22.0.0/16 [20/0] via 172.20.0.3, eth2, 10:35:00
B>* 172.23.0.0/16 [20/0] via 172.27.0.3, eth3, 10:35:01
B>* 172.24.0.0/16 [20/0] via 172.27.0.3, eth3, 10:35:01
R1zebra>

```

```

R1> show ip bgp summary
BGP router identifier 172.27.0.2, 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
172.20.0.3    4 65001  12719   12722       0    0    0 10:35:48        3
172.27.0.3    4 65003  12720   12720       0    0    0 10:35:49        3

Total number of neighbors 2
R1>

```

```

root@d042f0c1e360:/# route
Kernel IP routing table
Destination    Gateway         Genmask         Flags Metric Ref    Use Iface
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
172.20.0.0     *              255.255.0.0     U        0      0        0 eth2
172.22.0.0     Q2.Q1Q2br      255.255.0.0     UG       0      0        0 eth2
172.23.0.0     Q4.Q1Q4br      255.255.0.0     UG       0      0        0 eth3
172.24.0.0     Q4.Q1Q4br      255.255.0.0     UG       0      0        0 eth3
172.27.0.0     *              255.255.0.0     U        0      0        0 eth3
root@d042f0c1e360:/#

```

## Q2

```

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 172.20.0.2, eth2, 10:36:51
B>* 172.23.0.0/16 [20/0] via 172.26.0.3, eth3, 10:42:04
B>* 172.24.0.0/16 [20/0] via 172.26.0.3, eth3, 10:36:53
R2zebra>

```

```

R2> show ip bgp summary
BGP router identifier 172.26.0.2, 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
172.20.0.2    4 65000  12865   12869       0    0    0 10:37:24        3
172.26.0.3    4 65002  12856   12862       0    0    0 10:42:37        3

Total number of neighbors 2
R2>

```

```

root@e6cb545f9646:/# route
Kernel IP routing table
Destination      Gateway         Genmask         Flags Metric Ref    Use Iface
default          172.20.0.1     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
172.20.0.0       *              255.255.0.0     U      0      0      0 eth2
172.22.0.0       *              255.255.0.0     U      0      0      0 eth1
172.23.0.0       Q3.Q2Q3br      255.255.0.0     UG    0      0      0 eth3
172.24.0.0       Q3.Q2Q3br      255.255.0.0     UG    0      0      0 eth3
172.26.0.0       *              255.255.0.0     U      0      0      0 eth3
root@e6cb545f9646:/#

```

### Q3

```

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 172.25.0.3, eth2, 10:38:14
B>* 172.22.0.0/16 [20/0] via 172.26.0.2, eth3, 10:43:29
B>* 172.24.0.0/16 [20/0] via 172.25.0.3, eth2, 10:38:24
R3zebra>

```

```

R3> show ip bgp summary
BGP router identifier 172.26.0.3, 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
172.25.0.3    4 65003  12886   12889       0    0    0 10:38:59        2
172.26.0.2    4 65001  12885   12887       0    0    0 10:44:04        2

Total number of neighbors 2
R3>

```

```

root@b184407a5ce0:/# route
Kernel IP routing table
Destination      Gateway         Genmask         Flags Metric Ref    Use Iface
default          172.26.0.1     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       Q4.Q3Q4br      255.255.0.0     UG    0      0      0 eth2
172.22.0.0       Q2.Q2Q3br      255.255.0.0     UG    0      0      0 eth3
172.23.0.0       *              255.255.0.0     U      0      0      0 eth1
172.24.0.0       Q4.Q3Q4br      255.255.0.0     UG    0      0      0 eth2
172.25.0.0       *              255.255.0.0     U      0      0      0 eth2
172.26.0.0       *              255.255.0.0     U      0      0      0 eth3
root@b184407a5ce0:/#

```

### Q4

```

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 172.27.0.2, eth3, 10:39:45
B>* 172.22.0.0/16 [20/0] via 172.25.0.2, eth2, 10:39:52
B>* 172.23.0.0/16 [20/0] via 172.25.0.2, eth2, 10:39:52
R4zebra>

```



```
R4> show ip bgp summary
BGP router identifier 172.27.0.3, 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
172.25.0.2	4	65002	12806	12809	0	0	0	10:40:16	2
172.27.0.2	4	65000	12804	12808	0	0	0	10:40:09	2

```
Total number of neighbors 2
R4>
```

```
root@b9092b1a20ca:/# route
Kernel IP routing table
```

Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface
default	172.27.0.1	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
172.22.0.0	Q3.Q3Q4br	255.255.0.0	UG	0	0	0	eth2
172.23.0.0	Q3.Q3Q4br	255.255.0.0	UG	0	0	0	eth2
172.24.0.0	*	255.255.0.0	U	0	0	0	eth1
172.25.0.0	*	255.255.0.0	U	0	0	0	eth2
172.27.0.0	*	255.255.0.0	U	0	0	0	eth3

```
root@b9092b1a20ca:/#
```

在這次的Project中，學習到了docker的基礎使用方式，也實際動手操作，了解整個BGP的實作方式。