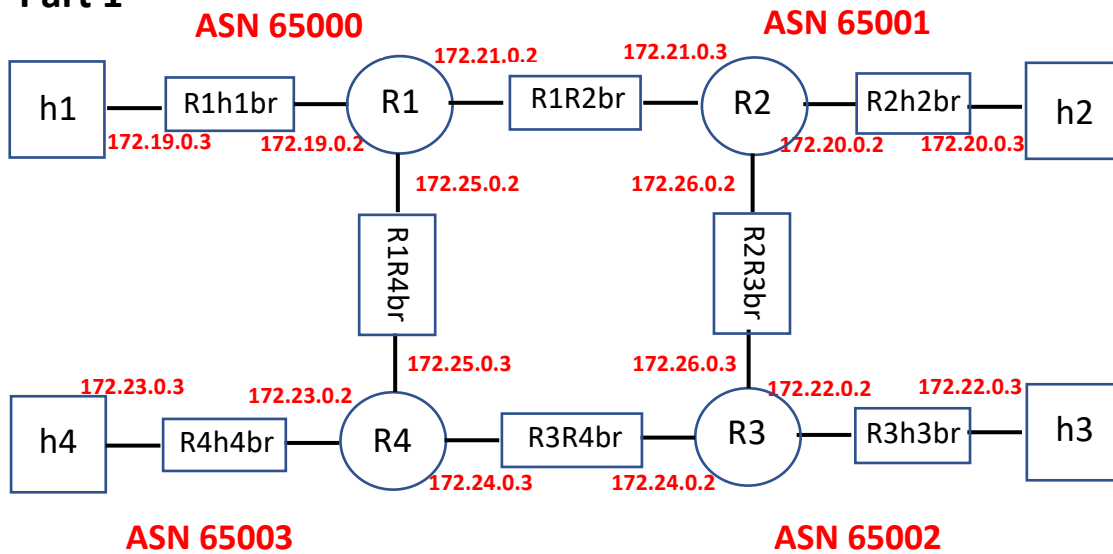


Part 1



Part 2

No.	Time	Source	Destination	Protocol	Length	Info
93	72.072721108	172.21.0.2	172.21.0.3	BGP	85	KEEPALIVE Message
95	75.074667526	172.21.0.3	172.21.0.2	BGP	85	KEEPALIVE Message
96	75.074677799	172.21.0.2	172.21.0.3	BGP	85	KEEPALIVE Message
99	78.075734502	172.21.0.2	172.21.0.3	BGP	85	KEEPALIVE Message
100	78.075738584	172.21.0.3	172.21.0.2	BGP	85	KEEPALIVE Message
103	81.076851702	172.21.0.3	172.21.0.2	BGP	85	KEEPALIVE Message
105	81.076924535	172.21.0.2	172.21.0.3	BGP	85	KEEPALIVE Message
107	84.085786707	172.21.0.3	172.21.0.2	BGP	85	KEEPALIVE Message
108	84.085786390	172.21.0.2	172.21.0.3	BGP	85	KEEPALIVE Message
111	87.086701293	172.21.0.2	172.21.0.3	BGP	85	KEEPALIVE Message
113	87.086804190	172.21.0.3	172.21.0.2	BGP	85	KEEPALIVE Message
115	90.087638488	172.21.0.3	172.21.0.2	BGP	85	KEEPALIVE Message
117	90.087703923	172.21.0.2	172.21.0.3	BGP	85	KEEPALIVE Message

▶ Frame 99: 85 bytes on wire (680 bits), 85 bytes captured (680 bits) on interface 0
 ▶ Ethernet II, Src: 02:42:ac:15:00:02 (02:42:ac:15:00:02), Dst: 02:42:ac:15:00:03 (02:42:ac:15:00:03)
 ▶ Internet Protocol Version 4, Src: 172.21.0.2, Dst: 172.21.0.3
 ▶ Transmission Control Protocol, Src Port: 179, Dst Port: 36894, Seq: 495, Ack: 495, Len: 19
 ▶ Border Gateway Protocol - KEEPALIVE Message

```

0000 02 42 ac 15 00 03 02 42 ac 15 00 02 08 00 45 c0  -B....B....E-
0010 00 47 a6 a4 40 00 ff 06 7c 1c ac 15 00 02 ac 15  -G..@...|.....
0020 00 03 00 b3 90 1e d5 a7 15 e9 38 12 80 ea 80 18  -.....8.....
0030 01 fd 58 69 00 00 01 01 08 0a ad f8 92 40 f7 64  -..X1.....@..d
0040 bb 0b ff ff ff ff ff ff ff ff ff ff ff ff ff  -.....
0050 ff ff 00 13 04  -...
  
```

⇒ Capture the packet between R1 (172.21.0.2) and R2 (172.21.0.3)

Part 3

R1

```
root@6b219cef3b43:/# telnet localhost 2601
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.

Hello, this is Quagga (version 0.99.24.1).
Copyright 1996-2005 Kunihiro Ishiguro, et al.
```

User Access Verification

Password:

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>* 172.20.0.0/16 [20/0] via 172.21.0.3, eth0, 00:28:33
B>* 172.22.0.0/16 [20/0] via 172.21.0.3, eth0, 00:28:28
B>* 172.23.0.0/16 [20/0] via 172.25.0.3, eth3, 00:28:28
R1zebra>
```

```
root@6b219cef3b43:/# telnet localhost 2605
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.

Hello, this is Quagga (version 0.99.24.1).
Copyright 1996-2005 Kunihiro Ishiguro, et al.
```

User Access Verification

Password:

R1bgp> show ip bgp summary

BGP router identifier 172.25.0.2, 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	Stat
172.21.0.3	4	65001	648	651	0	0	0	00:32:18	2
172.25.0.3	4	65003	647	651	0	0	0	00:32:13	2

Total number of neighbors 2

```
root@4fa45ce0f32b:/# 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
172.19.0.0     R2.R2R3br      255.255.0.0     UG    0      0      0 eth3
172.20.0.0     R2.R2R3br      255.255.0.0     UG    0      0      0 eth3
172.22.0.0     *              255.255.0.0     U      0      0      0 eth1
172.23.0.0     R4.R3R4br      255.255.0.0     UG    0      0      0 eth2
172.24.0.0     *              255.255.0.0     U      0      0      0 eth2
172.26.0.0     *              255.255.0.0     U      0      0      0 eth3
root@4fa45ce0f32b:/#
```

R2

```
root@e0112f4b9fb9:/# telnet localhost 2601
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.

Hello, this is Quagga (version 0.99.24.1).
Copyright 1996-2005 Kunihiro Ishiguro, et al.

User Access Verification

Password:
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>* 172.19.0.0/16 [20/0] via 172.21.0.2, eth0, 00:28:37
B>* 172.22.0.0/16 [20/0] via 172.26.0.3, eth3, 00:28:34
B>* 172.23.0.0/16 [20/0] via 172.21.0.2, eth0, 00:28:27
```

```
root@e0112f4b9fb9:/# telnet localhost 2605
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.

Hello, this is Quagga (version 0.99.24.1).
Copyright 1996-2005 Kunihiro Ishiguro, et al.

User Access Verification

Password:
R2bgp> 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/P
fxRcd
172.21.0.2    4 65000    652    653       0   0   0 00:32:27    2
172.26.0.3    4 65002    651    653       0   0   0 00:32:24    2

Total number of neighbors 2
```

```
root@54d2a11a59ee:/# 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
172.19.0.0     R1.R1R4br      255.255.0.0     UG    0     0      0 eth3
172.20.0.0     R1.R1R4br      255.255.0.0     UG    0     0      0 eth3
172.22.0.0     R3.R3R4br      255.255.0.0     UG    0     0      0 eth2
172.23.0.0     *              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
root@54d2a11a59ee:/#
```

R3

```
root@4fa45ce0f32b:/# telnet localhost 2601
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.

Hello, this is Quagga (version 0.99.24.1).
Copyright 1996-2005 Kunihiro Ishiguro, et al.

User Access Verification

Password:
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>* 172.19.0.0/16 [20/0] via 172.26.0.2, eth3, 00:28:33
B>* 172.20.0.0/16 [20/0] via 172.26.0.2, eth3, 00:28:33
B>* 172.23.0.0/16 [20/0] via 172.24.0.3, eth2, 00:28:28
```

```
root@4fa45ce0f32b:/# telnet localhost 2605
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.

Hello, this is Quagga (version 0.99.24.1).
Copyright 1996-2005 Kunihiro Ishiguro, et al.

User Access Verification

Password:
R3bgp> 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
172.24.0.3        4 65003   655     660       0    0    0 00:32:17    3
172.26.0.2        4 65001   650     654       0    0    0 00:32:22    3

Total number of neighbors 2
```

```
root@6b219cef3b43:/# route
Kernel IP routing table
Destination        Gateway             Genmask             Flags Metric Ref    Use Iface
default            172.21.0.1         0.0.0.0             UG    0      0      0 eth0
172.17.0.0          *                  255.255.0.0         U      0      0      0 eth2
172.19.0.0          *                  255.255.0.0         U      0      0      0 eth1
172.20.0.0          R2.R1R2br          255.255.0.0         UG    0      0      0 eth0
172.21.0.0          *                  255.255.0.0         U      0      0      0 eth0
172.22.0.0          R2.R1R2br          255.255.0.0         UG    0      0      0 eth0
172.23.0.0          R4.R1R4br          255.255.0.0         UG    0      0      0 eth3
172.25.0.0          *                  255.255.0.0         U      0      0      0 eth3
root@6b219cef3b43:/#
```


R4

```
root@54d2a11a59ee:/# telnet localhost 2601
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.

Hello, this is Quagga (version 0.99.24.1).
Copyright 1996-2005 Kunihiro Ishiguro, et al.

User Access Verification

Password:
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>* 172.19.0.0/16 [20/0] via 172.25.0.2, eth3, 00:28:35
B>* 172.20.0.0/16 [20/0] via 172.25.0.2, eth3, 00:28:35
B>* 172.22.0.0/16 [20/0] via 172.24.0.2, eth2, 00:28:32
```

```
root@54d2a11a59ee:/# telnet localhost 2605
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.

Hello, this is Quagga (version 0.99.24.1).
Copyright 1996-2005 Kunihiro Ishiguro, et al.

User Access Verification

Password:
R4bgp> show ip bgp summary
BGP router identifier 172.25.0.3, 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/P
fxRcd
172.24.0.2    4 65002    649    650       0    0    0 00:32:13    3
172.25.0.2    4 65000    650    650       0    0    0 00:32:16    3

Total number of neighbors 2
```

```
root@e0112f4b9fb9:/# route
Kernel IP routing table
Destination    Gateway         Genmask         Flags Metric Ref    Use Iface
default        172.21.0.1     0.0.0.0         UG    0      0      0 eth0
172.17.0.0     *              255.255.0.0     U     0      0      0 eth2
172.19.0.0     R1.R1R2br     255.255.0.0     UG    0      0      0 eth0
172.20.0.0     *              255.255.0.0     U     0      0      0 eth1
172.21.0.0     *              255.255.0.0     U     0      0      0 eth0
172.22.0.0     R3.R2R3br     255.255.0.0     UG    0      0      0 eth3
172.23.0.0     R1.R1R2br     255.255.0.0     UG    0      0      0 eth0
172.26.0.0     *              255.255.0.0     U     0      0      0 eth3
root@e0112f4b9fb9:/#
```

Part 4

這次作業學到了一些有關 docker 安裝的知識，以及 bgpd 和 zebra 的用途，我認為只要按照 spec 慢慢地去執行，其實算是較容易的作業，但過程必須細心，否則很容易因為一個 address 填錯，而導致 route 連線不上。