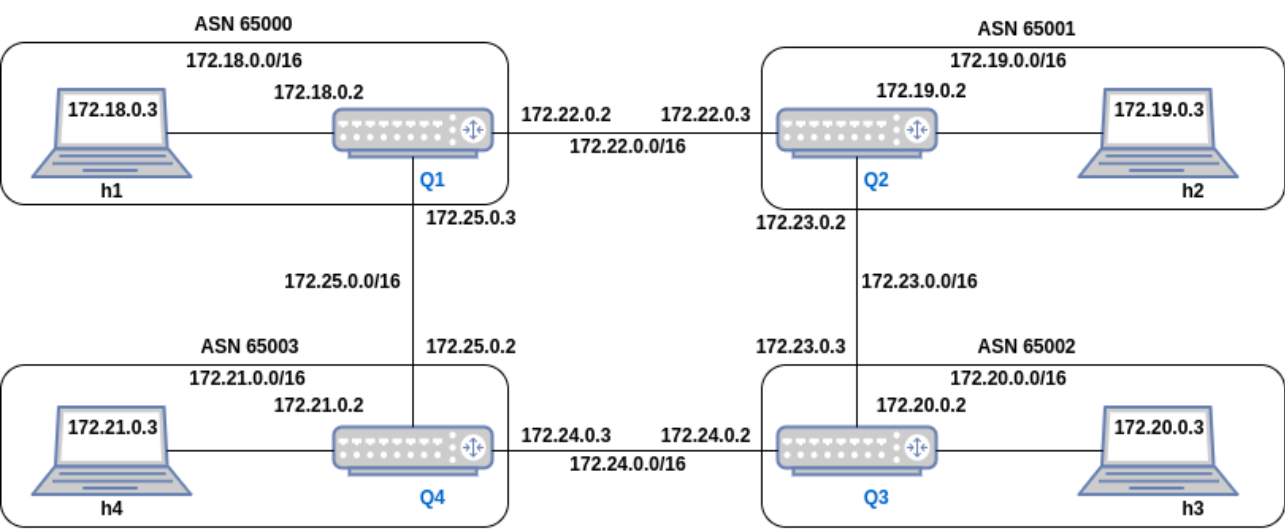


Lab 5 - VNF - virtual router

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1. Lab Topology



2. BGP Packet from Wireshark


```
root@Q1:/
root@Q1:/# 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:
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   2776   2779      0    0    0 02:18:41      2
172.25.0.2    4 65003   2778   2780      0    0    0 02:18:42      2
Total number of neighbors 2
```

bgpd

Q2

```
root@Q2:/
root@Q2:/# 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,
       0 - 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, eth0, 02:21:32
B>* 172.20.0.0/16 [20/0] via 172.23.0.3, eth1, 02:21:28
B>* 172.21.0.0/16 [20/0] via 172.22.0.2, eth0, 02:21:32
```

zebra

```
root@Q2:/
root@Q2:/# 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:
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   2847   2848      0    0    0 02:22:11      2
172.23.0.3    4 65002   2845   2849      0    0    0 02:22:07      2
Total number of neighbors 2
```

bgpd

Q3

```
root@Q3:/
root@Q3:/# telnet localhost 2601
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^J'.

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>* 172.18.0.0/16 [20/0] via 172.23.0.2, eth0, 02:24:30
B>* 172.19.0.0/16 [20/0] via 172.23.0.2, eth0, 02:24:30
B>* 172.21.0.0/16 [20/0] via 172.24.0.3, eth1, 02:24:28
```

zebra

```
root@Q3:/
root@Q3:/# telnet localhost 2605
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^J'.

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

User Access Verification

Password:
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   2902   2902       0    0    0 02:24:51      3
172.24.0.3    4 65003   2901   2904       0    0    0 02:24:49      3

Total number of neighbors 2
```

bgpd

Q4

```
root@Q4:/
root@Q4:/# telnet localhost 2601
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^J'.

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>* 172.18.0.0/16 [20/0] via 172.25.0.3, eth1, 02:27:02
B>* 172.19.0.0/16 [20/0] via 172.25.0.3, eth1, 02:26:57
B>* 172.20.0.0/16 [20/0] via 172.24.0.2, eth0, 02:26:55
```

zebra

```
root@Q4:/
root@Q4:/# 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:
R4> show ip bgp summary
BGP router identifier 172.25.0.2, 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   2956   2957      0    0    0 02:27:32      3
172.25.0.3    4 65000   2956   2958      0    0    0 02:27:39      3
Total number of neighbors 2
```

bgpd

4. What I have learned or solved

1. 將使用者加入到 **docker** 群組當中，這樣每次跑 docker 指令時就不用一直加上 sudo 了。

```
sudo usermod -aG docker <username>
```

2. 在跑 docker run 指令時，還可以加上 **hostname** 參數，以幫助識別當前是那一個 container。

```
docker run -it --name h1 --hostname h1 ubuntu:16.04
```

3. 本次的作業有 8 台 container 要設定，因此我改用 **docker-compose** 來建立與管理所有的 container，只要將主機與網路環境的設定寫入到 docker-compose.yml 當中，就可透過 docker-compose 輕輕鬆鬆將所有 container 給建立起來。設定 gateway 與 quagga 的部份，則是先寫好 shell script，放入到各個 container 當中，最後再設定自動執行該腳本即可。

原始碼、如何使用如下：

```
1 cd project5_0866007
2 docker-compose -d --build
```



shoulderhu/0866007-sdn-lab

https://github.com/shoulderhu/0866007-sdn-lab/tree/master/project5_0866007