

```
stack@ostack-PowerEdge-R430:~/devstack/nvo_lab8_main$ python3 main.py
```

```
***** Creating Networks and Subnets *****
```

```
Network net1 with ID ff32e388-d502-4bbe-9e06-124fa93425e9 is created  
Subnet subnet1 with ID 4397ab17-5ae0-4800-a996-bed97d62e76e is created  
Network net2 with ID 35cca874-ebf8-4713-9d46-17c1ef533166 is created  
Subnet subnet2 with ID 6b86d186-af33-477a-93cb-d9b83b276c50 is created
```

```
***** Done creating Networks and Subnets *****
```

```
***** Adding ingress rules to allow ICMP and TCP to default SG *****
```

```
Rule added to allow ICMP  
Rule added to allow TCP
```

```
***** Done adding ingress rules to allow ICMP and TCP to default SG *****
```

```
***** Creating Instances *****
```

```
New Instance vm11 is created in network net1  
New Instance vm12 is created in network net1  
New Instance vm21 is created in network net2  
New Instance vm22 is created in network net2
```

```
***** Done creating Instances *****
```

```
***** Creating Router and adding ports *****
```

```
Created router lab8_router with ID e6d22c14-14c4-4dd5-aa6a-b5a21d628836  
Added public gateway to router lab8_router with ID e6d22c14-14c4-4dd5-aa6a-b5a21d628836  
Added port p1 to network 4397ab17-5ae0-4800-a996-bed97d62e76e  
Added port p2 to network 6b86d186-af33-477a-93cb-d9b83b276c50
```

```
***** Done creating Router and adding ports *****
```

***** Done creating Router and adding ports *****

***** Creating and associating Floating IPs *****

Associated Floating IP for Instance 0c03c9aa-576c-45fe-9fdb-19a159df2edd
Associated Floating IP for Instance 1e641596-75fc-4c5d-b315-f230acbd48b4
Associated Floating IP for Instance 246bb4f2-8643-418d-86cb-78f0203cdb2b
Associated Floating IP for Instance 77b7b5b8-c207-4898-bad3-0c45a9b02e4d

***** Done creating and associating Floating IPs *****

Unable to find image 'osrg/ryu:latest' locally
latest: Pulling from osrg/ryu
34667c7e4631: Pull complete
d18d76a881a4: Pull complete
119c7358fbfc: Pull complete
2aaf13f3eff0: Pull complete
d9a4985f3aca: Pull complete
Digest: sha256:863c63d95a53f45ebdc7b6f111af0032af275e427e0d8d26355f6fc8e57747c8
Status: Downloaded newer image for osrg/ryu:latest
8a558ae0a06bc2ec4df2d490c809089ecd73a59bdaddbedbe75ac5710274908c

***** Running containers *****

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
8a558ae0a06b	osrg/ryu	"/bin/bash"	9 seconds ago	Up Less than a second		ryu

***** Copying BGP conf python file to ryu container *****

***** Updating packages on container and installing paramiko *****

Get:1 http://security.ubuntu.com/ubuntu xenial-security InRelease [109 kB]
Get:2 http://archive.ubuntu.com/ubuntu xenial InRelease [247 kB]
Get:3 http://security.ubuntu.com/ubuntu xenial-security/main amd64 Packages [2003 kB]
Get:4 http://archive.ubuntu.com/ubuntu xenial-updates InRelease [109 kB]
Get:5 http://security.ubuntu.com/ubuntu xenial-security/restricted amd64 Packages [15.9 kB]
Get:6 http://security.ubuntu.com/ubuntu xenial-security/universe amd64 Packages [984 kB]
Get:7 http://archive.ubuntu.com/ubuntu xenial-backports InRelease [107 kB]

```
Get:7 http://archive.ubuntu.com/ubuntu xenial-backports InRelease [107 kB]
Get:8 http://security.ubuntu.com/ubuntu xenial-security/multiverse amd64 Packages [8820 B]
Get:9 http://archive.ubuntu.com/ubuntu xenial/main amd64 Packages [1558 kB]
Get:10 http://archive.ubuntu.com/ubuntu xenial/restricted amd64 Packages [14.1 kB]
Get:11 http://archive.ubuntu.com/ubuntu xenial/universe amd64 Packages [9827 kB]
Get:12 http://archive.ubuntu.com/ubuntu xenial/multiverse amd64 Packages [176 kB]
Get:13 http://archive.ubuntu.com/ubuntu xenial-updates/main amd64 Packages [2511 kB]
Get:14 http://archive.ubuntu.com/ubuntu xenial-updates/restricted amd64 Packages [16.4 kB]
Get:15 http://archive.ubuntu.com/ubuntu xenial-updates/universe amd64 Packages [1540 kB]
Get:16 http://archive.ubuntu.com/ubuntu xenial-updates/multiverse amd64 Packages [26.2 kB]
Get:17 http://archive.ubuntu.com/ubuntu xenial-backports/main amd64 Packages [10.9 kB]
Get:18 http://archive.ubuntu.com/ubuntu xenial-backports/universe amd64 Packages [12.6 kB]
Fetched 19.3 MB in 5s (3673 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
72 packages can be upgraded. Run 'apt list --upgradable' to see them.
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  python-crypto python-ecdsa python-six
Suggested packages:
  python-crypto-dbg python-crypto-doc
The following NEW packages will be installed:
  python-crypto python-ecdsa python-paramiko python-six
0 upgraded, 4 newly installed, 0 to remove and 72 not upgraded.
Need to get 403 kB of archives.
After this operation, 2265 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu xenial-updates/main amd64 python-crypto amd64 2.6.1-6ubuntu0.16.04.3 [246 kB]
Get:2 http://archive.ubuntu.com/ubuntu xenial/main amd64 python-six all 1.10.0-3 [10.9 kB]
Get:3 http://archive.ubuntu.com/ubuntu xenial-updates/main amd64 python-ecdsa all 0.13-2ubuntu0.16.04.1 [36.2 kB]
Get:4 http://archive.ubuntu.com/ubuntu xenial-updates/main amd64 python-paramiko all 1.16.0-1ubuntu0.2 [110 kB]
Fetched 403 kB in 0s (445 kB/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package python-crypto.
(Reading database ... 6689 files and directories currently installed.)
Preparing to unpack .../python-crypto_2.6.1-6ubuntu0.16.04.3_amd64.deb ...
Unpacking python-crypto (2.6.1-6ubuntu0.16.04.3) ...
Selecting previously unselected package python-six.
Preparing to unpack .../python-six_1.10.0-3_all.deb ...
Unpacking python-six (1.10.0-3) ...
```

```
Preparing to unpack .../python-six_1.10.0-3_all.deb ...
Unpacking python-six (1.10.0-3) ...
Selecting previously unselected package python-ecdsa.
Preparing to unpack .../python-ecdsa_0.13-2ubuntu0.16.04.1_all.deb ...
Unpacking python-ecdsa (0.13-2ubuntu0.16.04.1) ...
Selecting previously unselected package python-paramiko.
Preparing to unpack .../python-paramiko_1.16.0-1ubuntu0.2_all.deb ...
Unpacking python-paramiko (1.16.0-1ubuntu0.2) ...
Setting up python-crypto (2.6.1-6ubuntu0.16.04.3) ...
Setting up python-six (1.10.0-3) ...
Setting up python-ecdsa (0.13-2ubuntu0.16.04.1) ...
Setting up python-paramiko (1.16.0-1ubuntu0.2) ...
```

***** Running the copied BGP conf file *****

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
8a558ae0a06b	osrg/ryu	"/bin/bash"	30 seconds ago	Up 21 seconds		ryu

***** Before FRR image pull *****

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
<none>	<none>	fd6fcb5fb1a1	15 minutes ago	338MB
osrg/ryu	latest	ab10e91ba3b6	23 months ago	294MB

Using default tag: latest
latest: Pulling from frROUTING/frr-debian
Digest: sha256:d5010a76c0095d43d961eccd6926ec621fc9a43f76bf021e925e61f77a592cd6
Status: Downloaded newer image for frROUTING/frr-debian:latest
docker.io/frROUTING/frr-debian:latest

***** After FRR image pull *****

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
<none>	<none>	fd6fcb5fb1a1	15 minutes ago	338MB
frROUTING/frr-debian	latest	3211a198b7ee	31 hours ago	338MB
osrg/ryu	latest	ab10e91ba3b6	23 months ago	294MB

5501407f1ff4b400e9a5c824cba4fea3590b66e49d90b6a15b74558e729a6d86

***** Running containers *****

***** Running containers *****

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
5501407f1ff4	frrouting/frr-debian	"/usr/sbin/docker-st..."	3 seconds ago	Up Less than a second		quagga1
8a558ae0a06b	osrg/ryu	"/bin/bash"	39 seconds ago	Up 30 seconds		ryu

***** Copying python file to container quagga1 to change daemons file *****

***** Changing daemons file *****

sysctl: setting key "net.ipv4.ip_forward": Read-only file system
sysctl: setting key "net.ipv6.conf.all.forwarding": Read-only file system

***** Committing new image *****

sha256:a54ce0b532a9e2459ce8cb6ef6eb0927249b9efcf6068e9a7f5922dacc882758

***** Running new container with new image and copying configs for BGP *****

539b04c9b891f764884a0abfae7cc635db54cf514a8265f6e6485598996d5764

***** Running containers *****

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
539b04c9b891	quagga/new	"/usr/sbin/docker-st..."	7 seconds ago	Up 5 seconds		quagga_new
5501407f1ff4	frrouting/frr-debian	"/usr/sbin/docker-st..."	12 seconds ago	Up 9 seconds		quagga1
8a558ae0a06b	osrg/ryu	"/bin/bash"	48 seconds ago	Up 39 seconds		ryu

***** Checking ip BGP neighbors *****

BGP neighbor is 172.17.0.2, remote AS 2, local AS 1, external link
BGP version 4, remote router ID 172.17.0.2, local router ID 10.0.0.1
BGP state = Established, up for 00:00:04
Last read 00:00:04, Last write 00:00:04
Hold time is 40, keepalive interval is 13 seconds
Neighbor capabilities:
 4 Byte AS: advertised and received
 AddPath:
 IPv4 Unicast: RX advertised IPv4 Unicast

```
AddPath:
  IPv4 Unicast: RX advertised IPv4 Unicast
  Route refresh: advertised and received(new)
  Address Family IPv4 Unicast: advertised and received
  Hostname Capability: advertised (name: 539b04c9b891, domain name: n/a) not received
  Graceful Restart Capability: advertised
Graceful restart information:
  Local GR Mode: Helper*
  Remote GR Mode: Disable
  R bit: False
Timers:
  Configured Restart Time(sec): 120
  Received Restart Time(sec): 0
Message statistics:
  Inq depth is 0
  Outq depth is 0

      Sent      Rcvd
Opens:          1          1
Notifications:  0          0
Updates:        0          1
Keepalives:     1          1
Route Refresh:  0          0
Capability:      0          0
Total:          2          3
Minimum time between advertisement runs is 0 seconds

For address family: IPv4 Unicast
Update group 1, subgroup 1
Packet Queue length 0
Community attribute sent to this neighbor(all)
Inbound path policy configured
Outbound path policy configured
Incoming update prefix filter list is *ryu-routes
Route map for outgoing advertisements is frr-routes
0 accepted prefixes

Connections established 1; dropped 0
Last reset 00:00:05, Waiting for peer OPEN
Local host: 172.17.0.4, Local port: 59544
Foreign host: 172.17.0.2, Foreign port: 179
NextHop: 172.17.0.4

NextHop: 172.17.0.4
NextHop global: ::
NextHop local: ::
BGP connection: shared network
BGP Connect Retry Timer in Seconds: 120
Read thread: on Write thread: on FD used: 23

IPv4 Unicast Summary:
BGP router identifier 10.0.0.1, local AS number 1 vrf-id 0
BGP table version 1
RIB entries 1, using 192 bytes of memory
Peers 1, using 21 KiB of memory

Neighbor      V      AS  MsgRcvd  MsgSent  TblVer  InQ  OutQ  Up/Down  State/PfxRcd  PfxSnt
172.17.0.2    4        2        3        3        0     0     0 00:00:04          0          1

Total number of neighbors 1

stack@ostack-PowerEdge-R430:~/devstack/nvo_lav8_main$
```

Total number of neighbors 1

***** Establishing SSH connection to the Cirros VM *****

***** Established SSH connection to the Cirros VM *****

***** Checking hostname *****

vm21

***** pinging from above host to Internet and every other host*****

PING 8.8.8.8 (8.8.8.8): 56 data bytes

64 bytes from 8.8.8.8: seq=0 ttl=113 time=3.826 ms

64 bytes from 8.8.8.8: seq=1 ttl=113 time=2.685 ms

--- 8.8.8.8 ping statistics ---

2 packets transmitted, 2 packets received, 0% packet loss

round-trip min/avg/max = 2.685/3.255/3.826 ms

PING 172.24.4.17 (172.24.4.17): 56 data bytes

64 bytes from 172.24.4.17: seq=0 ttl=63 time=1.229 ms

64 bytes from 172.24.4.17: seq=1 ttl=63 time=0.805 ms

--- 172.24.4.17 ping statistics ---

2 packets transmitted, 2 packets received, 0% packet loss

round-trip min/avg/max = 0.805/1.017/1.229 ms

PING 172.24.4.184 (172.24.4.184): 56 data bytes

64 bytes from 172.24.4.184: seq=0 ttl=63 time=1.334 ms

64 bytes from 172.24.4.184: seq=1 ttl=63 time=0.838 ms

--- 172.24.4.184 ping statistics ---

2 packets transmitted, 2 packets received, 0% packet loss

round-trip min/avg/max = 0.838/1.086/1.334 ms

PING 172.24.4.206 (172.24.4.206): 56 data bytes

64 bytes from 172.24.4.206: seq=0 ttl=63 time=1.690 ms

64 bytes from 172.24.4.206: seq=1 ttl=63 time=0.855 ms

--- 172.24.4.206 ping statistics ---

2 packets transmitted, 2 packets received, 0% packet loss

round-trip min/avg/max = 0.855/1.272/1.690 ms

```
API method flowspec.add_local called with args: {'rules': {'inner_vlan_id': '<3000', 'dst_mac': 'BE:EF:C0:FF:EE:00', 'ether_type': 2048, 'llc_dsap': 66, 'inner_vlan_cos': '<=5', 'vlan_id': '>4000', 'llc_s
sap': 66, 'vlan_cos': '>=3', 'llc_control': 108, 'snap': 74565, 'src_mac': '12:34:56:78:90:AB'}, 'flowspec_family': 'l2vpnfs', 'route_dist': '65001:350', 'actions': {'redirect': {'local_administrator': 10
0, 'as_number': 10}, 'traffic_rate': {'rate_info': 100.0, 'as_number': 0}, 'traffic_action': {'action': 3}, 'traffic_marking': {'dscp': 24}, 'tpid_action': {'tpid_2': 300, 'tpid_1': 200, 'actions': 49152}
, 'vlan_action': {'cos_1': 3, 'vlan_1': 3000, 'vlan_2': 4000, 'cos_2': 2, 'actions_1': 192, 'actions_2': 32}}}
Starting ssh server at localhost:4990
Connection to peer: 172.17.0.4 established
```