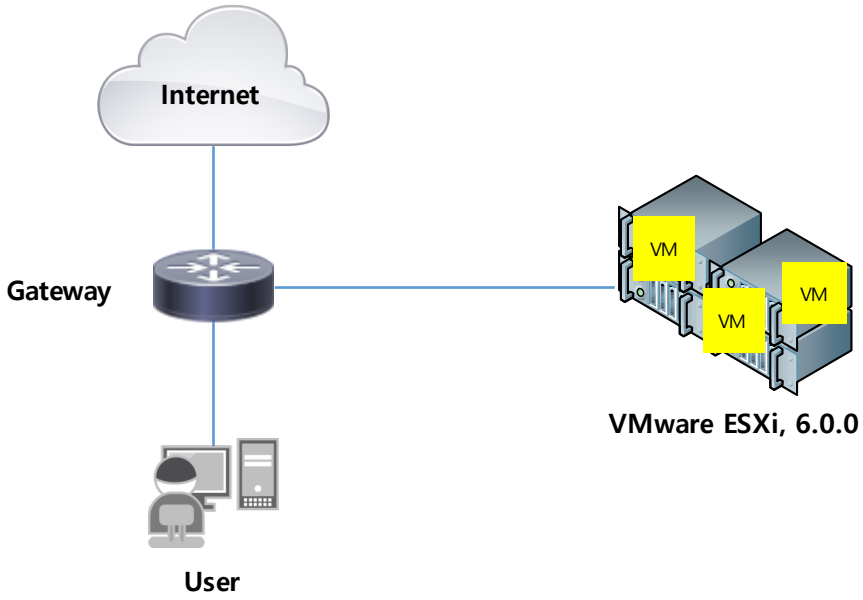
Openstack 스터디 발표

CH5. Creating Networks with Neutron

테스트 구성 환경

- OS: Ubuntu14.04
  - Vmware ESXi의 VM으로 구성
- controller01, compute01, compute02 의 Multi node 설치
- Learning OpenStack Networking(Neutron) Second Edition의 설치 과정대로 진행



Hostname	IP
controller01	10.0.0.30
compute01	10.0.0.31
compute02	10.0.0.32

Trouble shooting

1) 2장 설치 완료 후 dashboard 접속 시 Internal 500 에러 떨어짐

/etc/openstack-dashboard/local_settings.py 에서 OPENSTACK_HOST = "contorller01" 로 설정해줘야 함 **(책에는 " " 표기가 안되어 있음)**

2) Neutron database 생성 과정에서 mysql 접속 문제

아래와 같이 mysql.sock 파일의 소유권한 변경을 통해 해결

```
root@controller01:~# mysql -u root -p
Enter password:
ERROR 2002 (HY000): Can't connect to local MySQL server through socket '/var/run/mysqld/mysqld.sock' (111)

root@controller01:/var/lib# service mysql stop
 * Stopping MariaDB database server mysqld
   ...done.
root@controller01:/var/lib# chmod 755 -R /var/lib/mysql
root@controller01:/var/lib# chown mysql:mysql -R /var/lib/mysql
root@controller01:/var/lib# service mysql start
 * Starting MariaDB database server mysqld
   ...done.
 * Checking for corrupt, not cleanly closed and upgrade needing tab
```

Trouble shooting

3) 인스턴스 생성시 에러 발생-1

에러메시지: NoValidHost: No valid host was found. There are not enough hosts available.

compute 노드의 nova-compute.conf의 virt_type을 qemu로 변경 후 서비스 재시작

```
root@compute02:/etc/nova# more nova-compute.conf
[DEFAULT]
compute_driver=libvirt.LibvirtDriver
[libvirt]
virt_type=kvm
root@compute02:/etc/nova# vi nova-compute.conf
root@compute02:/etc/nova# more nova-compute.conf
[DEFAULT]
compute_driver=libvirt.LibvirtDriver
[libvirt]
virt_type=qemu
```

```
root@compute01:/var/log/nova# service nova-compute restart

nova-compute stop/waiting
nova-compute start/running, process 4597
```

4) 인스턴스 생성시 에러 발생-2

에러메시지: Failed to allocate the network(s), not rescheduling

compute 노드의 nova.conf의 Default에 vif_plugging_is_fatal: false, vif_plugging_timeout: 0 추가 후 서비스 재시작

```
[DEFAULT]
vif_plugging_is_fatal: false
vif_plugging_timeout: 0

dhcpbridge_flagfile=/etc/nova/nova.conf
dhcpbridge=/usr/bin/nova-dhcpbridge
logdir=/var/log/nova
state_path=/var/lib/nova
lock_path=/var/lock/nova
force_dhcp_release=True
```

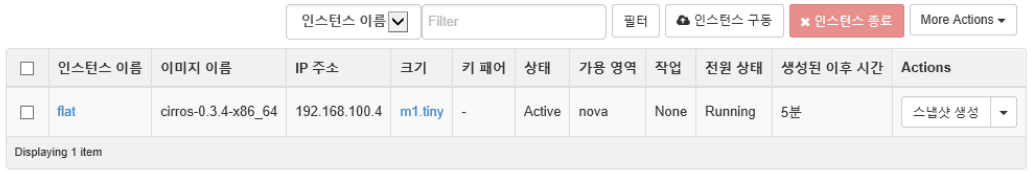
```
root@compute02:/var/log/nova# service nova-compute restart
nova-compute stop/waiting
nova-compute start/running, process 7854
```

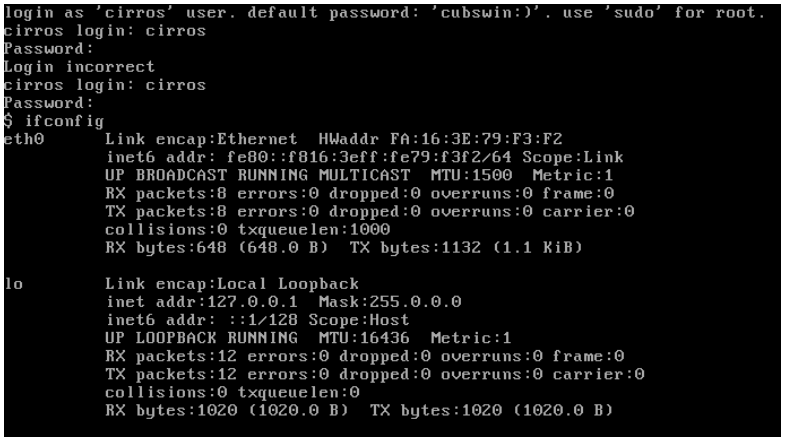
Trouble shooting

5) 인스턴스 생성시 에러 발생-3

증상: vxlan을 제외한 flat, vlan 네트워크에서 인스턴스 생성시 ip를 받아오지 못하는(?) 현상

인스턴스





[인스턴스 ifconfig 결과]

```
Starting network...
udhcpc (v1.20.1) started
Sending discover...
Sending discover...
Sending discover...
Usage: /sbin/cirros-dhcpc <up|down>
No lease, failing
WARN: /etc/rc3.d/S40-network failed
cirros-ds 'net' up at 189.15
checking http://169.254.169.254/2009-04-04/instance-id
failed 1/20: up 189.52. request failed
failed 2/20: up 191.92. request failed
failed 3/20: up 194.15. request failed
failed 4/20: up 196.37. request failed
failed 5/20: up 198.61. request failed
failed 6/20: up 200.85. request failed
failed 7/20: up 203.09. request failed
failed 8/20: up 205.33. request failed
failed 9/20: up 207.58. request failed
failed 10/20: up 209.82. request failed
failed 11/20: up 212.07. request failed
failed 12/20: up 214.33. request failed
failed 13/20: up 216.58. request failed
failed 14/20: up 218.85. request failed
failed 15/20: up 221.11. request failed
failed 16/20: up 223.37. request failed
failed 17/20: up 225.64. request failed
failed 18/20: up 227.91. request failed
failed 19/20: up 230.18. request failed
failed 20/20: up 232.46. request failed
failed to read iid from metadata. tried 20
no results found for mode=net. up 234.74. searched: nocloud configdrive ec2
failed to get instance-id of datasource
```

[인스턴스 콘솔 로그 일부]

Chapter5. Creating Networks with Neutron

- Creating a flat network in the CLI

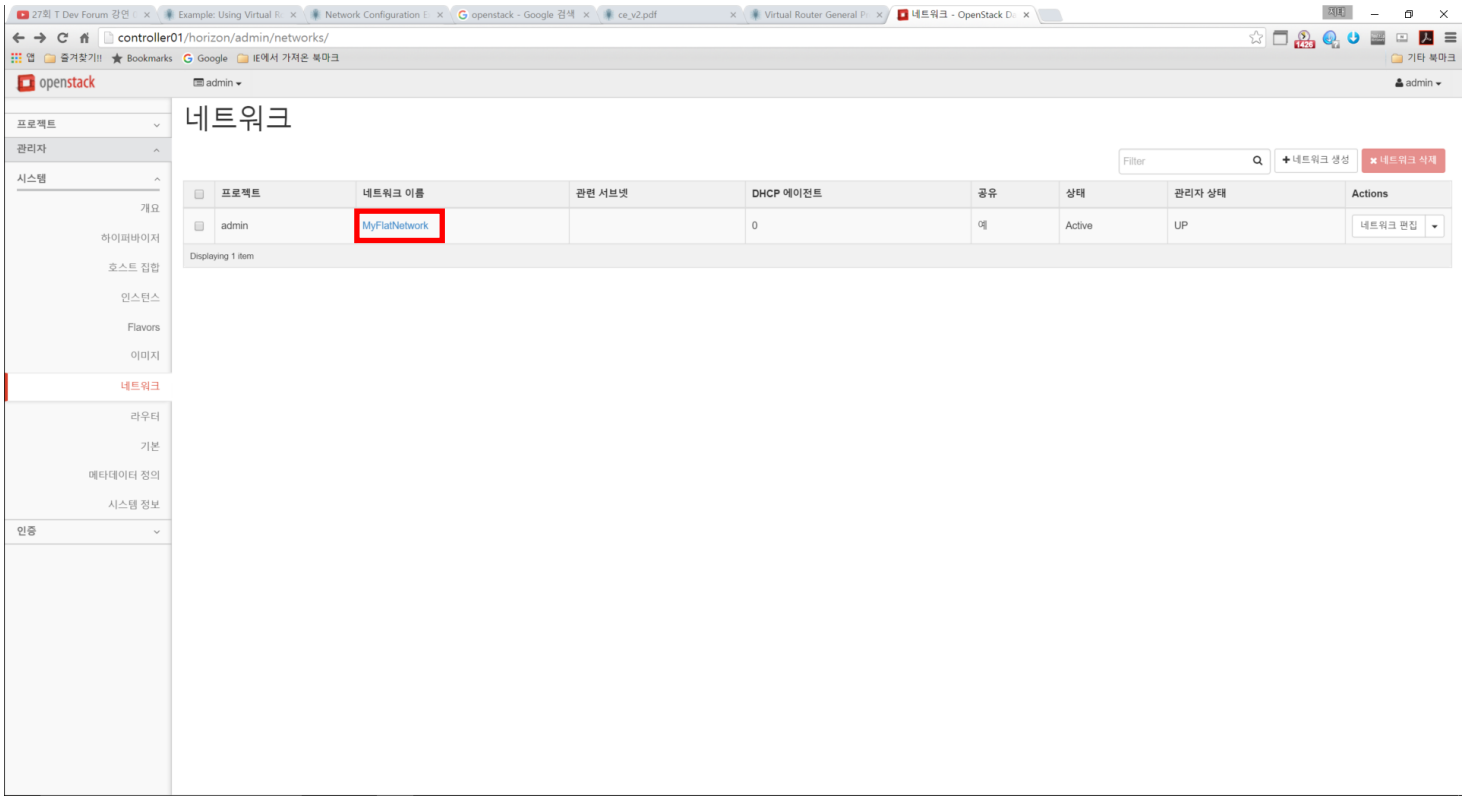
```
root@controller01:~# neutron net-create MyFlatNetwork --provider:network_type=flat \
> --provider:physical_network=physnet2 --shared
Created a new network:
+---------------------------+--------------------------------------+
| Field                     | Value                                |
+---------------------------+--------------------------------------+
| admin_state_up            | True                                 |
| id                        | fb4b52d4-fe18-4bb8-8d0c-d51b04b5779c |
| mtu                       | 0                                    |
| name                      | MyFlatNetwork                        |
| provider:network_type     | flat                                 |
| provider:physical_network | physnet2                             |
| provider:segmentation_id  |                                      |
| router:external           | False                                |
| shared                    | True                                 |
| status                    | ACTIVE                               |
| subnets                   |                                      |
| tenant_id                 | 142a4a2f4502495890b1d538b832f395     |
+---------------------------+--------------------------------------+
```

/etc/neutron/plugins/ml2/ml2_conf.ini

```
[ml2]
mechanism_drivers = linuxbridge,l2population
tenant_network_types = vxlan,vlan

[ml2_type_flat]
flat_networks = physnet2

[ml2_type_vlan]
network_vlan_ranges = physnet2:30:33

[ml2_type_vxlan]
vni_ranges = 1:1000

[securitygroup]
firewall_driver =
neutron.agent.linux.iptables_firewall.IptablesFirewallDriver

[linux_bridge]
physical_interface_mappings = physnet2:eth2

[vxlan]
enable_vxlan = true
l2_population = true
local_ip = 172.18.0.100
```

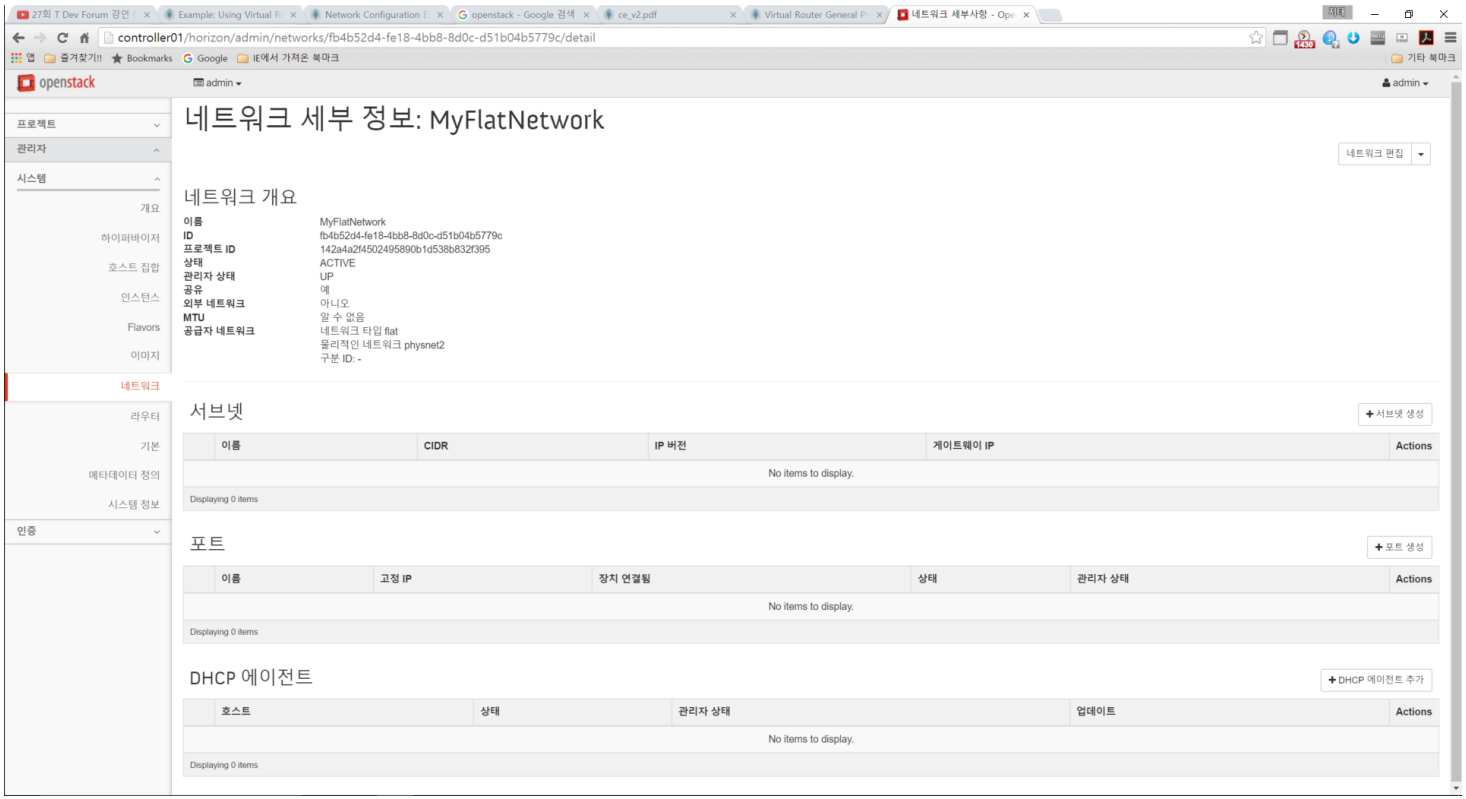
Chapter5. Creating Networks with Neutron

- Creating a flat network in the CLI



Chapter5. Creating Networks with Neutron

- Creating a flat network in the CLI



Chapter5. Creating Networks with Neutron

- Creating a flat network in the CLI

```
root@controller01:~# neutron net-create MyFlatNetwork --provider:network_type=flat \
> --provider:physical_network=physnet2 --shared
Created a new network:
+---------------------------+--------------------------------------+
| Field                     | Value                                |
+---------------------------+--------------------------------------+
| admin_state_up            | True                                 |
| id                        | fb4b52d4-fe18-4bb8-8d0c-d51b04b5779c |
| mtu                       | 0                                    |
| name                      | MyFlatNetwork                        |
| provider:network_type     | flat                                 |
| provider:physical_network | physnet2                             |
| provider:segmentation_id  |                                      |
| router:external           | False                                |
| shared                    | True                                 |
| status                    | ACTIVE                               |
| subnets                   |                                      |
| tenant_id                 | 142a4a2f4502495890b1d538b832f395     |
+---------------------------+--------------------------------------+
root@controller01:~#
root@controller01:~# neutron net-create MyFlatNetwork2 --provider:network_type=flat \
> --provider:physical_network=physnet2 --shared
Unable to create the flat network. Physical network physnet2 is in use.
```

- Linux bridge의 동일한 인터페이스에 추가적인 flat 네트워크를 생성하려고 하면 위와 같이 에러 발생

Chapter5. Creating Networks with Neutron

- Creating a VLAN network in the CLI

```
root@controller01:~# neutron net-create --provider:network_type=vlan --provider:physical_network=physnet2 \
> --provider:segmentation_id=200 --shared MyVLANNetwork
Created a new network:
+---------------------------+--------------------------------------+
| Field                     | Value                                |
+---------------------------+--------------------------------------+
| admin_state_up            | True                                 |
| id                        | d05c310a-48e7-4b28-80b4-71bfedf76e28 |
| mtu                       | 0                                    |
| name                      | MyVLANNetwork                        |
| provider:network_type     | vlan                                 |
| provider:physical_network | physnet2                             |
| provider:segmentation_id  | 200                                  |
| router:external           | False                                |
| shared                    | True                                 |
| status                    | ACTIVE                               |
| subnets                   |                                      |
| tenant_id                 | 142a4a2f4502495890b1d538b832f395     |
+---------------------------+--------------------------------------+
```

- MyVLANNetwork 라는 이름으로 VLAN 타입 네트워크 생성

Chapter5. Creating Networks with Neutron

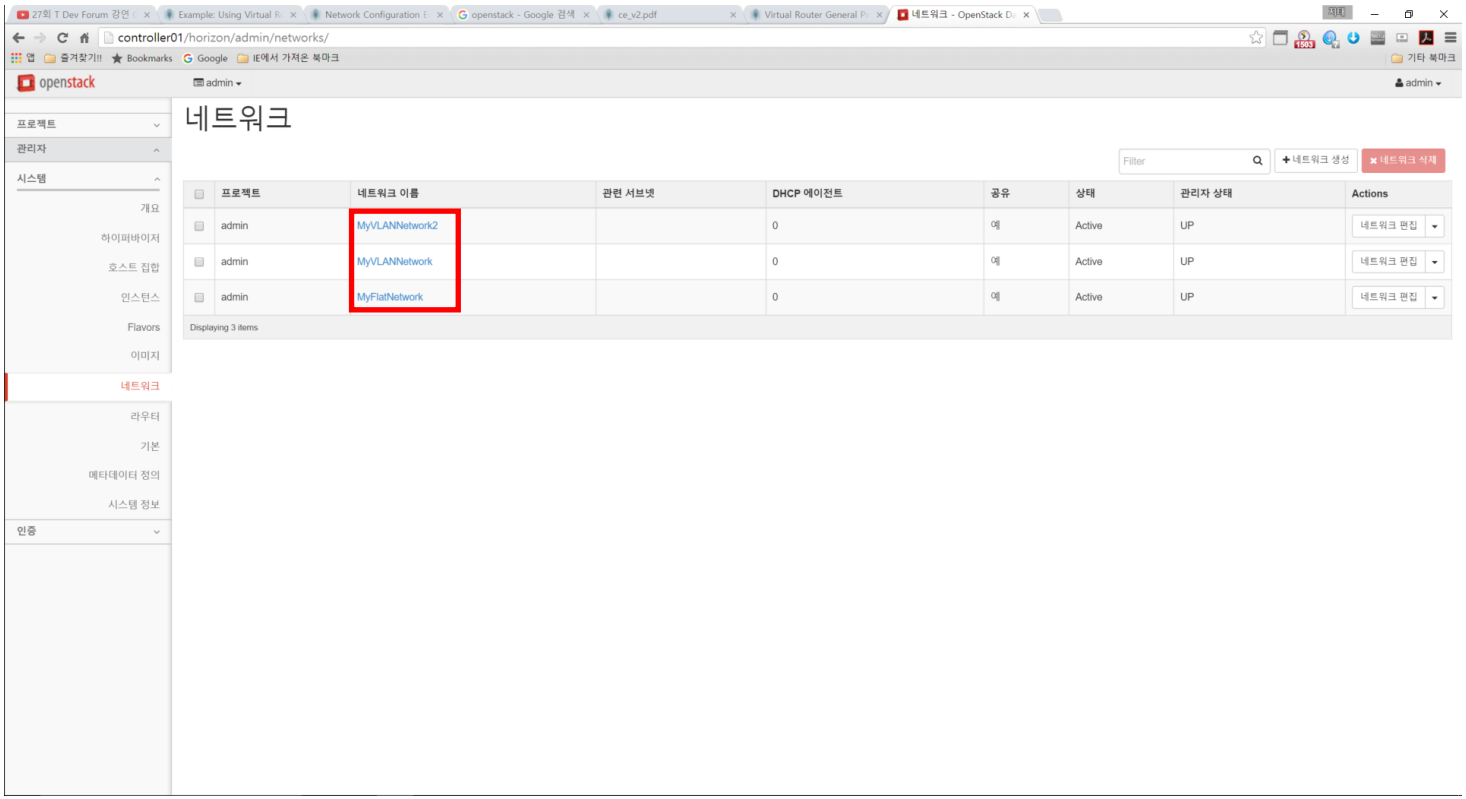
- Creating a VLAN network in the CLI

```
root@controller01:~# neutron net-create --provider:network_type=vlan --provider:physical_network=physnet2 \
> --provider:segmentation_id=201 --shared MyVLANNetwork2
Created a new network:
+---------------------------+--------------------------------------+
| Field                     | Value                                |
+---------------------------+--------------------------------------+
| admin_state_up            | True                                 |
| id                        | 521afb5d-1af5-4339-a676-261715ea305e |
| mtu                       | 0                                    |
| name                      | MyVLANNetwork2                       |
| provider:network_type     | vlan                                 |
| provider:physical_network | physnet2                             |
| provider:segmentation_id  | 201                                  |
| router:external           | False                                |
| shared                    | True                                 |
| status                    | ACTIVE                               |
| subnets                   |                                      |
| tenant_id                 | 142a4a2f4502495890b1d538b832f395     |
+---------------------------+--------------------------------------+
```

- MyVLANNetwork2 라는 이름으로 VLAN 타입 네트워크 생성(segmentation_id = 201)

Chapter5. Creating Networks with Neutron

- Creating a VLAN network in the CLI



Chapter5. Creating Networks with Neutron

- Listing networks in the CLI

```
root@controller01:~# neutron net-list
+--------------------------------------+----------------+---------+
| id                                   | name           | subnets |
+--------------------------------------+----------------+---------+
| 521afb5d-1af5-4339-a676-261715ea305e | MyVLANNetwork2 |         |
| d05c310a-48e7-4b28-80b4-71bfedf76e28 | MyVLANNetwork  |         |
| fb4b52d4-fe18-4bb8-8d0c-d51b04b5779c | MyFlatNetwork  |         |
+--------------------------------------+----------------+---------+
```

- Showing network properties in the CLI

```
root@controller01:~# neutron net-show MyVLANNetwork
+---------------------------+--------------------------------------+
| Field                     | Value                                |
+---------------------------+--------------------------------------+
| admin_state_up            | True                                 |
| id                        | d05c310a-48e7-4b28-80b4-71bfedf76e28 |
| mtu                       | 0                                    |
| name                      | MyVLANNetwork                        |
| provider:network_type     | vlan                                 |
| provider:physical_network | physnet2                             |
| provider:segmentation_id  | 200                                  |
| router:external           | False                                |
| shared                    | True                                 |
| status                    | ACTIVE                               |
| subnets                   |                                      |
| tenant_id                 | 142a4a2f4502495890b1d538b832f395     |
+---------------------------+--------------------------------------+
```

Chapter5. Creating Networks with Neutron

- Updating networks in the CLI

```
root@controller01:~# neutron net-update MyVLANNetwork --router:external=True --shared=False --admin-state-up=False
Updated network: MyVLANNetwork
root@controller01:~# neutron net-show MyVLANNetwork
+---------------------------+--------------------------------------+
| Field                     | Value                                |
+---------------------------+--------------------------------------+
| admin_state_up            | False                                |
| id                        | d05c310a-48e7-4b28-80b4-71bfedf76e28 |
| mtu                       | 0                                    |
| name                      | MyVLANNetwork                        |
| provider:network_type     | vlan                                 |
| provider:physical_network | physnet2                             |
| provider:segmentation_id  | 200                                  |
| router:external           | True                                 |
| shared                    | False                                |
| status                    | ACTIVE                               |
| subnets                   |                                      |
| tenant_id                 | 142a4a2f4502495890b1d538b832f395     |
+---------------------------+--------------------------------------+
```

다음 3개의 속성은 수정 가능(Boolean 값으로 지정)

- router:external: true로 설정하면 뉴트론 라우터에서 이 네트워크를 게이트웨이 네트워크로 사용
- shared: true로 설정하면 모든 테넌트가 이 네트워크를 사용할 수 있음
- admin-state-up: false로 설정하면 DHCP와 메타데이터 서비스를 사용할 수 없음

Chapter5. Creating Networks with Neutron

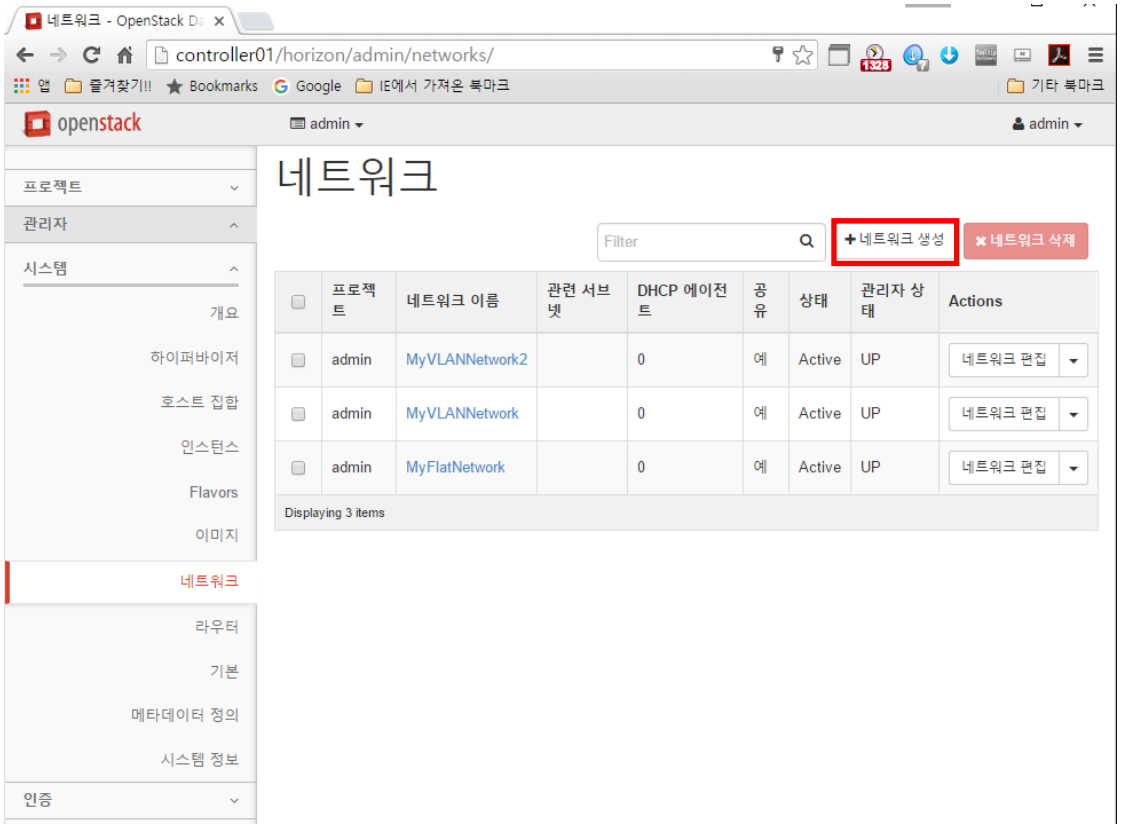
- Deleting networks in the CLI

Syntax: net-delete <네트워크 이름 or 네트워크 uuid>

```
root@controller01:~# neutron net-list
+--------------------------------------+---------------+---------+
| id                                   | name          | subnets |
+--------------------------------------+---------------+---------+
| 521afb5d-1af5-4339-a676-261715ea305e | MyVLANNetwork2 |         |
| d05c310a-48e7-4b28-80b4-71bfedf76e28 | MyVLANNetwork  |         |
| fb4b52d4-fe18-4bb8-8d0c-d51b04b5779c | MyFlatNetwork  |         |
+--------------------------------------+---------------+---------+
root@controller01:~#
root@controller01:~#
root@controller01:~# neutron net-delete MyVLANNetwork
Deleted network: MyVLANNetwork
root@controller01:~# neutron net-list
+--------------------------------------+---------------+---------+
| id                                   | name          | subnets |
+--------------------------------------+---------------+---------+
| 521afb5d-1af5-4339-a676-261715ea305e | MyVLANNetwork2 |         |
| fb4b52d4-fe18-4bb8-8d0c-d51b04b5779c | MyFlatNetwork  |         |
+--------------------------------------+---------------+---------+
root@controller01:~# neutron net-delete 521afb5d-1af5-4339-a676-261715ea305e
Deleted network: 521afb5d-1af5-4339-a676-261715ea305e
root@controller01:~# neutron net-list
+--------------------------------------+--------------+---------+
| id                                   | name         | subnets |
+--------------------------------------+--------------+---------+
| fb4b52d4-fe18-4bb8-8d0c-d51b04b5779c | MyFlatNetwork |         |
+--------------------------------------+--------------+---------+
```

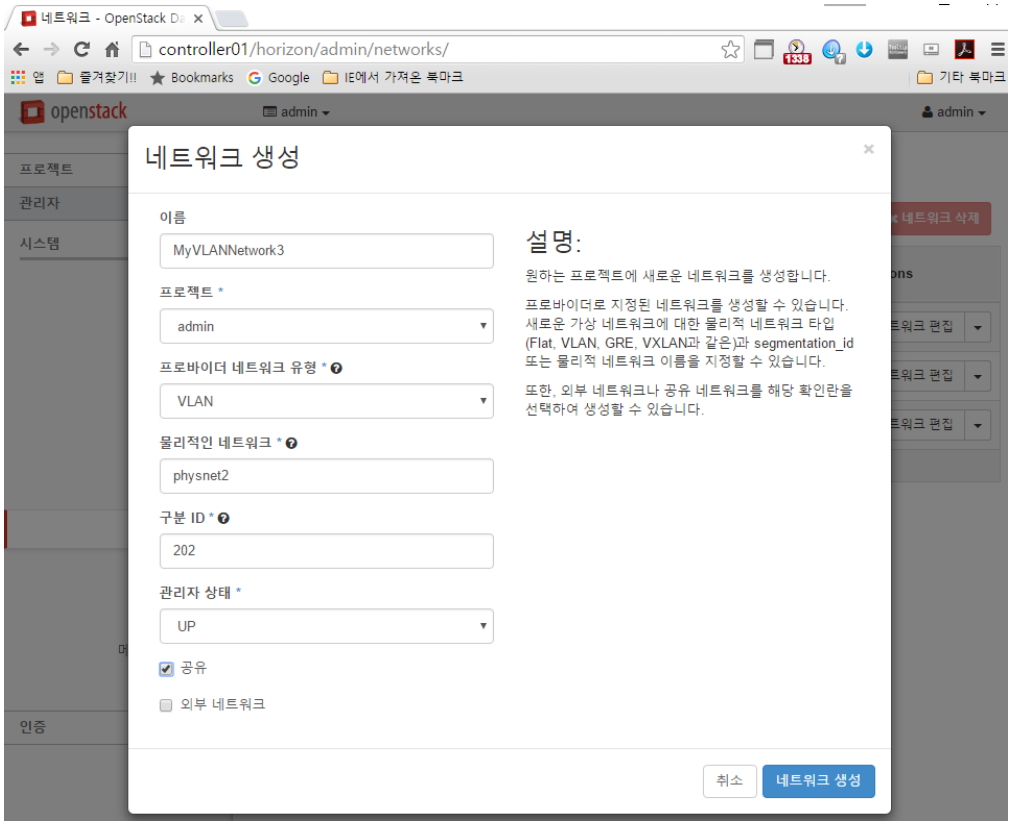
Chapter5. Creating Networks with Neutron

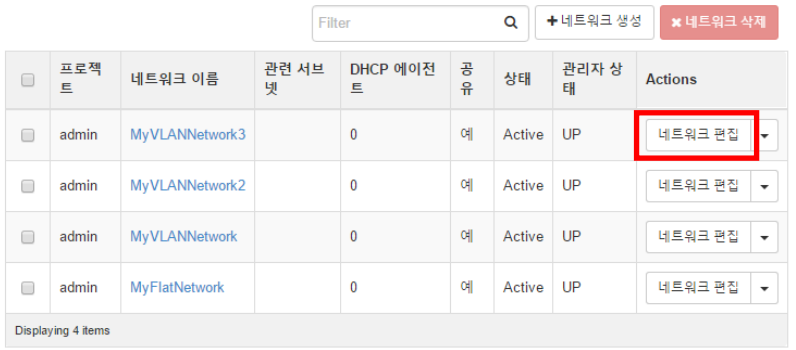
- Creating a network via the Admin tab as an administrator

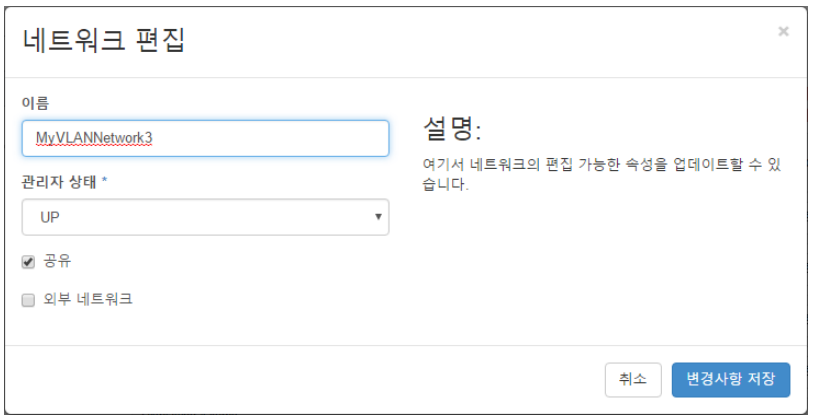


Chapter5. Creating Networks with Neutron

- Creating a network via the Admin tab as an administrator

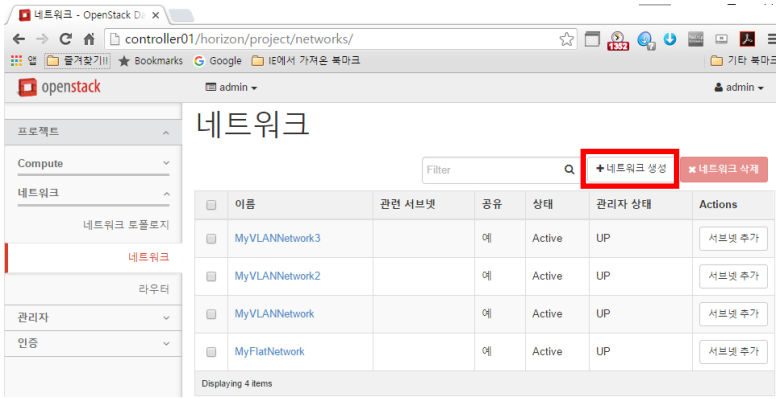


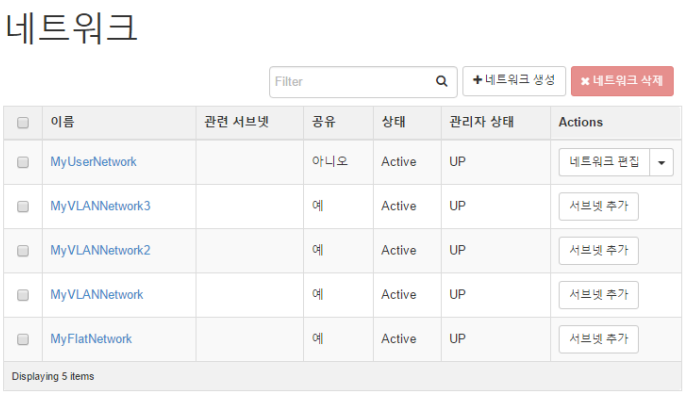




Chapter5. Creating Networks with Neutron

- Creating a network via the Project tab as a user (admin 계정으로 진행)





Chapter5. Creating Networks with Neutron

- Creating a subnet in the CLI

MyFlatNetwork에 다음과 같은 속성으로 서브넷 생성

- Internet Protocol: IPv4
- Subnet: 192.168.100.0/24
- Subnet mask: 255.255.255.0
- External gateway: 192.168.100.1
- DNS servers: 8.8.8.8, 8.8.4.4

```
root@controller01:~# neutron subnet-create MyFlatNetwork 192.168.100.0/24 --name MyFlatSubnet \
> --ip-version=4 --dns-nameservers 8.8.8.8 8.8.4.4
Created a new subnet:
+-------------------+------------------------------------------------------+
| Field             | Value                                                |
+-------------------+------------------------------------------------------+
| allocation_pools  | {"start": "192.168.100.2", "end": "192.168.100.254"} |
| cidr              | 192.168.100.0/24                                     |
| dns_nameservers   | 8.8.4.4                                              |
|                   | 8.8.8.8                                              |
| enable_dhcp       | True                                                 |
| gateway_ip        | 192.168.100.1                                        |
| host_routes       |                                                      |
| id                | baff2a8b-572e-4e29-899c-4elee331dc25                 |
| ip_version        | 4                                                    |
| ipv6_address_mode |                                                      |
| ipv6_ra_mode      |                                                      |
| name              | MyFlatSubnet                                         |
| network_id        | fb4b52d4-fel8-4bb8-8d0c-d51b04b5779c                 |
| subnetpool_id     |                                                      |
| tenant_id         | 142a4a2f4502495890b1d538b832f395                     |
+-------------------+------------------------------------------------------+
```

Chapter5. Creating Networks with Neutron

- Listing subnets in the CLI

```
root@controller01:~# neutron subnet-list
+--------------------------------------+-------------+-----------------+----------------------------------------------------+
| id                                   | name        | cidr            | allocation_pools                                   |
+--------------------------------------+-------------+-----------------+----------------------------------------------------+
| baff2a8b-572e-4e29-899c-4e1ee331dc25 | MyFlatSubnet | 192.168.100.0/24 | {"start": "192.168.100.2", "end": "192.168.100.254"} |
+--------------------------------------+-------------+-----------------+----------------------------------------------------+
```

- Showing subnet properties in the CLI

```
root@controller01:~# neutron subnet-show MyFlatSubnet
+-------------------+-----------------------------------------------------+
| Field             | Value                                               |
+-------------------+-----------------------------------------------------+
| allocation_pools  | {"start": "192.168.100.2", "end": "192.168.100.254"} |
| cidr              | 192.168.100.0/24                                    |
| dns_nameservers   | 8.8.4.4                                             |
|                   | 8.8.8.8                                             |
| enable_dhcp       | True                                                |
| gateway_ip        | 192.168.100.1                                       |
| host_routes       |                                                     |
| id                | baff2a8b-572e-4e29-899c-4e1ee331dc25                |
| ip_version        | 4                                                   |
| ipv6_address_mode |                                                     |
| ipv6_ra_mode      |                                                     |
| name              | MyFlatSubnet                                        |
| network_id        | fb4b52d4-fe18-4bb8-8d0c-d51b04b5779c                |
| subnetpool_id     |                                                     |
| tenant_id         | 142a4a2f4502495890b1d538b832f395                    |
+-------------------+-----------------------------------------------------+
```

Chapter5. Creating Networks with Neutron

- Updating a subnet in the CLI

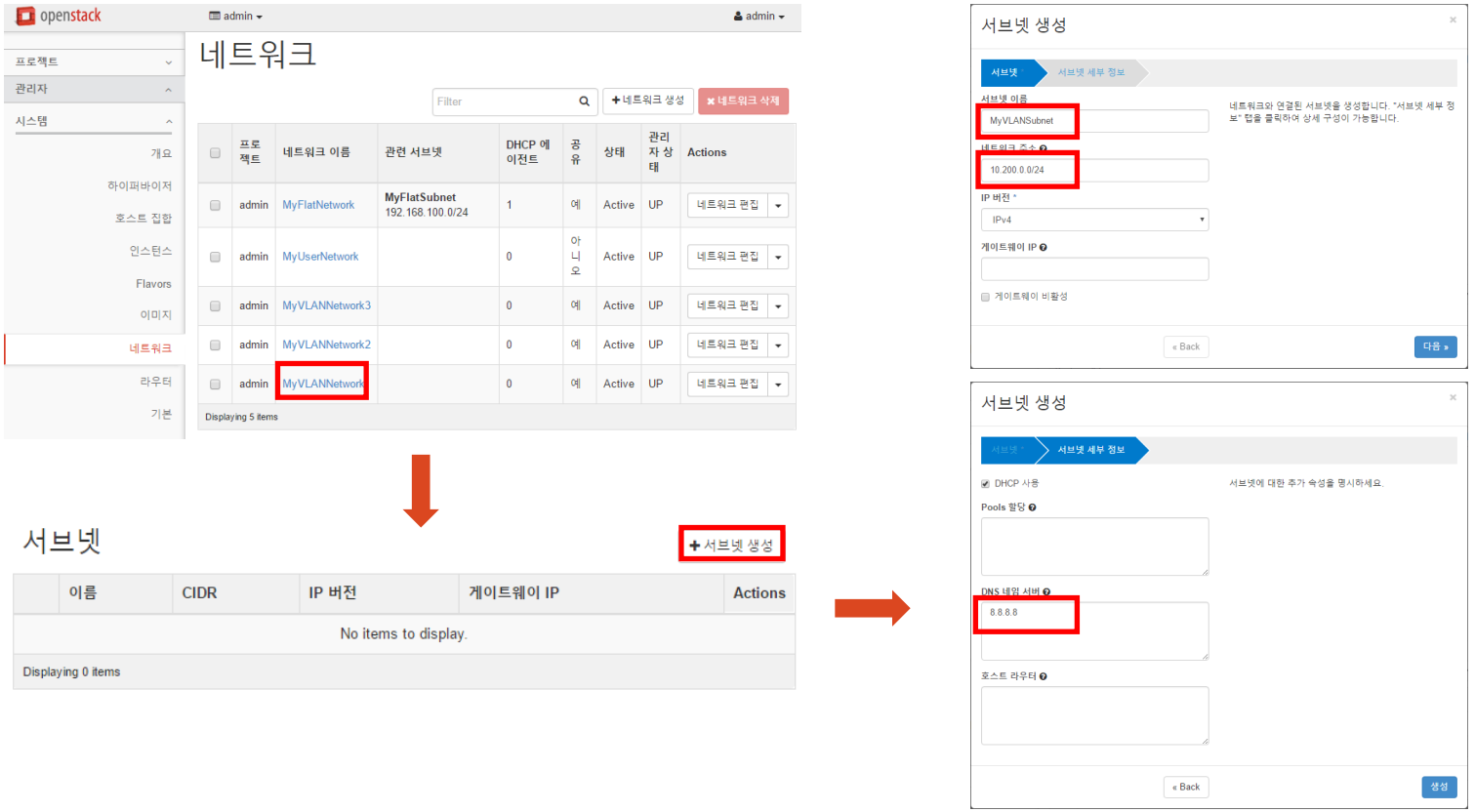
다음과 같은 속성은 업데이트 가능

• name, dns_nameservers, enable_dhcp/disable-dhcp, gateway_ip, allocation_pools, host_routes

```
root@controller01:~# neutron subnet-update MyFlatSubnet --dns-nameservers 168.126.63.1 168.126.63.2 --allocation-pool start=192.168.100
.2,end=192.168.100.22 --gateway_ip=192.168.100.100 --host-route destination=10.0.0.0/24,nexthop=192.168.100.100
Gateway ip 192.168.100.100 conflicts with allocation pool 192.168.100.2-192.168.100.254
root@controller01:~# neutron subnet-update MyFlatSubnet --dns-nameservers 168.126.63.1 168.126.63.2 --allocation-pool start=192.168.100
.2,end=192.168.100.22
Updated subnet: MyFlatSubnet
root@controller01:~# neutron subnet-update MyFlatSubnet  --gateway_ip=192.168.100.100 --host-route destination=10.0.0.0/24,nexthop=192.
168.100.100
Updated subnet: MyFlatSubnet
root@controller01:~# neutron subnet-show MyFlatSubnet
+-------------------+-----------------------------------------------------------+
| Field             | Value                                                     |
+-------------------+-----------------------------------------------------------+
| allocation_pools  | {"start": "192.168.100.2", "end": "192.168.100.22"}       |
| cidr              | 192.168.100.0/24                                          |
| dns_nameservers   | 168.126.63.1                                              |
|                   | 168.126.63.2                                              |
| enable_dhcp       | True                                                      |
| gateway_ip        | 192.168.100.100                                           |
| host_routes       | {"destination": "10.0.0.0/24", "nexthop": "192.168.100.100"} |
| id                | baff2a8b-572e-4e29-899c-4e1ee331dc25                      |
| ip_version        | 4                                                         |
| ipv6_address_mode |                                                           |
| ipv6_ra_mode      |                                                           |
| name              | MyFlatSubnet                                              |
| network_id        | fb4b52d4-fe18-4bb8-8d0c-d51b04b5779c                      |
| subnetpool_id     |                                                           |
| tenant_id         | 142a4a2f4502495890b1d538b832f395                          |
+-------------------+-----------------------------------------------------------+
```

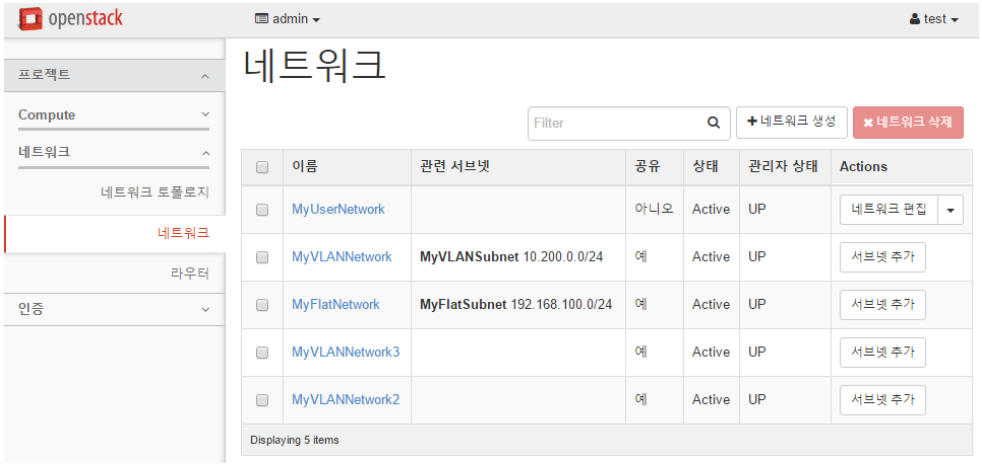
Chapter5. Creating Networks with Neutron

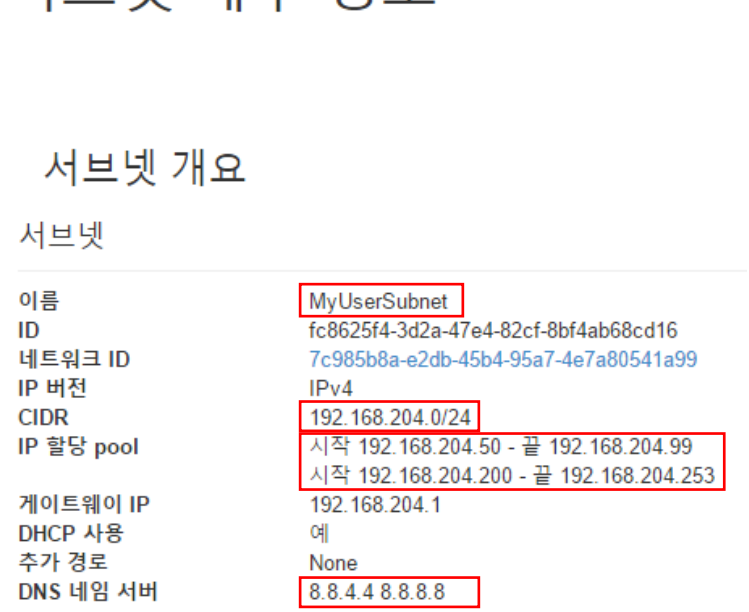
- Creating subnets via the Admin tab as an administrator



Chapter5. Creating Networks with Neutron

- Creating subnets via the Project tab as a user





Chapter5. Creating Networks with Neutron

- Neutron ports

- 뉴트론에서의 포트는 가상 네트워크 인터페이스를 서브넷에 논리적으로 연결
- 포트는 가상머신 인스턴스, DHCP서버, 라우터, 방화벽, 로드밸런서 들과 연결할 수 있음

```
root@controller01:~# neutron port-list
+--------------------------------------+------+-------------------+-----------------------------------------------------------------------------------------+
| id                                   | name | mac_address       | fixed_ips                                                                               |
+--------------------------------------+------+-------------------+-----------------------------------------------------------------------------------------+
| 05f14456-2ef0-498f-8654-e6ae3aada3b9 |      | fa:16:3e:b6:01:a5 | {"subnet_id": "baff2a8b-572e-4e29-899c-4elee331dc25", "ip_address": "192.168.100.2"}   |
| c5cefc11-542b-4942-af34-d442f04ba7c3 |      | fa:16:3e:02:b5:08 | {"subnet_id": "9a4b8803-4f5b-46b4-8cb2-284868e9aaaa", "ip_address": "10.200.0.2"}      |
| c7c8f326-348f-4b46-99e6-58aa83f77704 |      | fa:16:3e:6c:d8:7d | {"subnet_id": "fc8625f4-3d2a-47e4-82cf-8bf4ab68cd16", "ip_address": "192.168.204.50"} |
+--------------------------------------+------+-------------------+-----------------------------------------------------------------------------------------+
```

```
root@controller01:~# neutron port-show 05f14456-2ef0-498f-8654-e6ae3aada3b9
+-----------------------+-----------------------------------------------------------------------------------------+
| Field                 | Value                                                                                   |
+-----------------------+-----------------------------------------------------------------------------------------+
| admin_state_up        | True                                                                                    |
| allowed_address_pairs |                                                                                         |
| binding:host_id       | controller01.learningneutron.com                                                        |
| binding:profile       | {}                                                                                      |
| binding:vif_details   | {"port_filter": true}                                                                   |
| binding:vif_type      | bridge                                                                                  |
| binding:vnic_type     | normal                                                                                  |
| device_id             | dhcpcdedd354-5b13-51e7-8b25-47e9fd5b6ad3-fb4b52d4-fe18-4bb8-8d0c-d51b04b5779c           |
| device_owner          | network:dhcp                                                                            |
| extra_dhcp_opts       |                                                                                         |
| fixed_ips             | {"subnet_id": "baff2a8b-572e-4e29-899c-4elee331dc25", "ip_address": "192.168.100.2"}    |
| id                    | 05f14456-2ef0-498f-8654-e6ae3aada3b9                                                    |
| mac_address           | fa:16:3e:b6:01:a5                                                                       |
| name                  |                                                                                         |
| network_id            | fb4b52d4-fe18-4bb8-8d0c-d51b04b5779c                                                    |
| security_groups       |                                                                                         |
| status                | ACTIVE                                                                                  |
| tenant_id             | 142a4a2f4502495890b1d538b832f395                                                        |
+-----------------------+-----------------------------------------------------------------------------------------+
```

```
root@controller01:~# neutron net-list
+--------------------------------------+--------------+-----------------------------------------------------+
| id                                   | name         | subnets                                             |
+--------------------------------------+--------------+-----------------------------------------------------+
| a71298fc-8cd5-42ca-8b7b-359cbcf39f7c | MyVLANNetwork  | 9a4b8803-4f5b-46b4-8cb2-284868e9aaaa 10.200.0.0/24  |
| 7c985b8a-e2db-45b4-95a7-4e7a80541a99 | MyUserNetwork  | fc8625f4-3d2a-47e4-82cf-8bf4ab68cd16 192.168.204.0/24 |
| fb4b52d4-fe18-4bb8-8d0c-d51b04b5779c | MyFlatNetwork  | baff2a8b-572e-4e29-899c-4elee331dc25 192.168.100.0/24 |
| 3457b7c3-ca57-495a-90a1-e80b09ce117c | MyVLANNetwork3 |                                                     |
| 63f52af4-29dd-4895-a504-197695b616c9 | MyVLANNetwork2 |                                                     |
+--------------------------------------+--------------+-----------------------------------------------------+
```

Chapter5. Creating Networks with Neutron

- Neutron ports

- ip netns 명령어로 namespace 목록 조회 (qrouter, qdhcp namespace등 확인 가능)
- ip netns exec [namespace name] ip addr 명령어로 해당 namespace의 인터페이스 정보 확인
- 인터페이스명(ns-05f14456-2e@if9)은 뉴트론 포트 UUID로 표현

네트워크 네임스페이스 명명 룰

qdhcp-<네트워크 UUIID>
qrouter-<라우터 UUIID>
qlbaas-<로드 밸런서 UUIID>

※ Universally Unique IDentifier: 범용고유식별자

```
root@controller01:~# ip netns
qdhcp-7c985b8a-e2db-45b4-95a7-4e7a80541a99
qdhcp-a71298fc-8cd5-42ca-8b7b-359cbcf39f7c
qdhcp-fb4b52d4-fe18-4bb8-8d0c-d51b04b5779c
root@controller01:~#
root@controller01:~# ip netns exec qdhcp-fb4b52d4-fe18-4bb8-8d0c-d51b04b5779c ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: ns-05f14456-2e@if9: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether fa:16:3e:b6:01:a5 brd ff:ff:ff:ff:ff:ff
    inet 192.168.100.2/24 brd 192.168.100.255 scope global ns-05f14456-2e
       valid_lft forever preferred_lft forever
    inet 169.254.169.254/16 brd 169.254.255.255 scope global ns-05f14456-2e
       valid_lft forever preferred_lft forever
    inet6 fe80::f816:3eff:feb6:1a5/64 scope link
       valid_lft forever preferred_lft forever
```

network-id

openstack CLOUD SOFTWARE

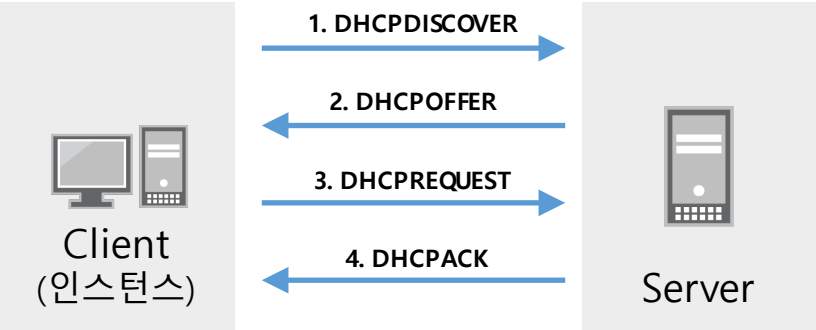
Chapter5. Creating Networks with Neutron

- Attaching instances to networks

- 처음 부팅할때 ***nova boot*** 명령어를 사용해 인스턴스를 네트워크에 붙이는 방법
- ***nova interface-attach*** 명령어를 사용해 실행중인 인스턴스를 네트워크에 붙이는 방법
- ***nova interface-detach*** 명령어를 사용해 neutron port db에서 인스턴스 제거

- Exploring how instances get their addresses

- 인스턴스가 주소를 얻는 과정(DHCP 동작 과정)



서브넷에 DHCP를 사용하도록 설정하면, 네트워크 UUID에 해당하는 네트워크 네임스페이스에서 dnsmasq 프로세스 구동

1. DHCP DISCOVER
- 클라이언트는 Broadcast를 통해 서버에 ip 요청

2. DHCP OFFER
- 서버는 클라이언트의 요청을 받고 임대 가능한 ip를 클라이언트에게 제안

3. DHCP REQUEST
- 서버가 제안한 ip를 선택하고, 이에 대해 할당 요청

4. DHCP ACK
- 최종적으로 ip할당(승인)

전체 구성도

- LinuxBridge 구성도(flat, vlan network)

```
root@controller01:~# brctl show
bridge name     bridge id               STP enabled     interfaces
brq87d7a307-66          8000.000c293d17a6       no              eth2.200
                                                        tap6fbbb00e-97
brqd4688bea-43          8000.000c293d17a6       no              eth2
                                                        tapd5cb9e78-d4
brqfb4b52d4-fe          8000.000000000000       no
```

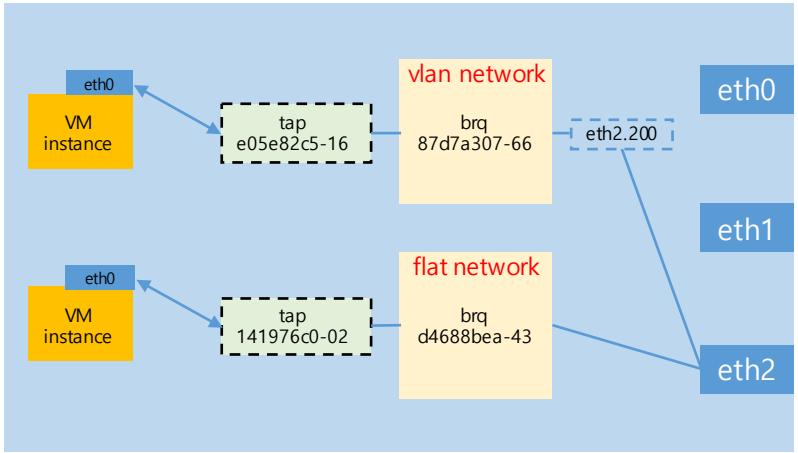
```
root@compute01:~# brctl show
bridge name     bridge id               STP enabled     interfaces
brq87d7a307-66          8000.000c2959a94d       no              eth2.200
                                                        tape05e82c5-16
brqd4688bea-43          8000.000c2959a94d       no              eth2
virbr0          8000.525400315fec       yes             virbr0-nic
```

```
root@compute02:~# brctl show
bridge name     bridge id               STP enabled     interfaces
brqd4688bea-43          8000.000c299174f0       no              eth2
                                                        tap141976c0-02
virbr0          8000.5254003c2658       yes             virbr0-nic
```

```
root@controller01:~# neutron net-list
+--------------------------------------+-------------+-------------------------------------------------------+
| id                                   | name        | subnets                                               |
+--------------------------------------+-------------+-------------------------------------------------------+
| d4688bea-43c5-4ffb-a86c-068e1a76881c | flatnetwork | 0de538fb-65f9-4d47-8660-81366b43521c 192.168.100.0/24 |
| 87d7a307-661b-4c09-8772-0501170fc8e2 | vlannetwork | e8445f7d-4133-413b-abe3-39332fd8ac74 10.200.100.0/24  |
+--------------------------------------+-------------+-------------------------------------------------------+
```

```
root@controller01:~# nova list
+--------------------------------------+------+--------+------------+-------------+---------------------------+
| ID                                   | Name | Status | Task State | Power State | Networks                  |
+--------------------------------------+------+--------+------------+-------------+---------------------------+
| bf6e5a8f-e517-4346-a73d-a195253ef657 | flat | ACTIVE | -          | Running     | flatnetwork=192.168.100.8 |
| 02f1991d-36c4-4ae5-8d6e-9f311a149464 | vlan | ACTIVE | -          | Running     | vlannetwork=10.200.100.3  |
+--------------------------------------+------+--------+------------+-------------+---------------------------+
```

```
root@controller01:~# neutron port-list
+--------------------------------------+------+-------------------+-------------------------------------------------------------------------------------------------------------+
| id                                   | name | mac_address       | fixed_ips                                                                                                   |
+--------------------------------------+------+-------------------+-------------------------------------------------------------------------------------------------------------+
| 141976c0-0256-48f7-ba98-6731a164a909 |      | fa:16:3e:67:5d:c9 | {"subnet_id": "0de538fb-65f9-4d47-8660-81366b43521c", "ip_address": "192.168.100.8"}                       |
| 6fbbb00e-979c-4a7f-993d-c7f1b55c6dc5 |      | fa:16:3e:d7:6e:55 | {"subnet_id": "e8445f7d-4133-413b-abe3-39332fd8ac74", "ip_address": "10.200.100.2"}                        |
| d5cb9e78-d446-4cc1-9a32-4823170a50a6 |      | fa:16:3e:c2:14:73 | {"subnet_id": "0de538fb-65f9-4d47-8660-81366b43521c", "ip_address": "192.168.100.2"}                       |
| e05e82c5-16da-4548-9598-644fd60f683d |      | fa:16:3e:03:20:a8 | {"subnet_id": "e8445f7d-4133-413b-abe3-39332fd8ac74", "ip_address": "10.200.100.3"}                        |
+--------------------------------------+------+-------------------+-------------------------------------------------------------------------------------------------------------+
```



Q. 각각의 qdhcp namespace의 tap device는 논리 구성도로 어떻게 표현할 수 있을지?