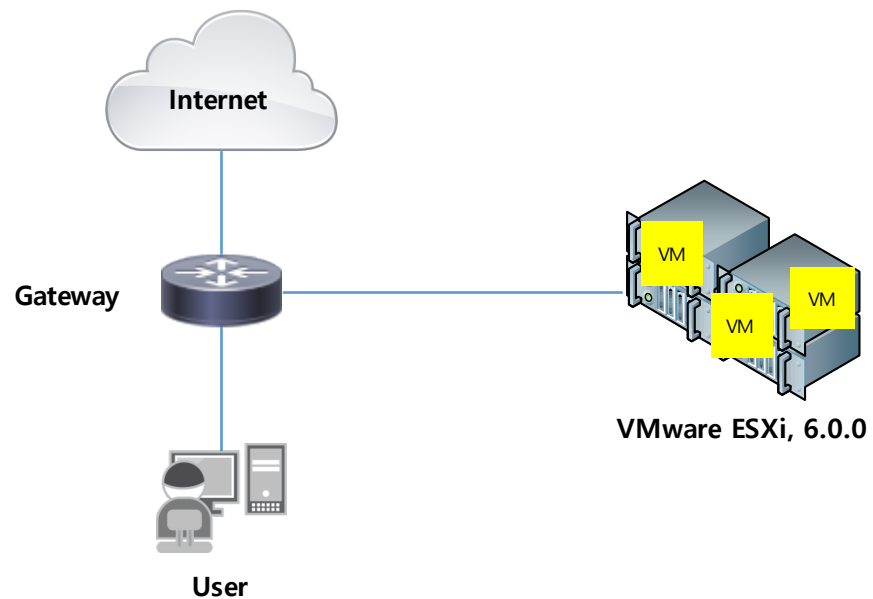


Openstack 스터디 발표

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

<input type="checkbox"/>	인스턴스 이름	이미지 이름	IP 주소	크기	키 패어	상태	가용 영역	작업	전원 상태	생성된 이후 시간	Actions
<input type="checkbox"/>	flat	cirros-0.3.4-x86_64	192.168.100.4	m1.tiny	-	Active	nova	None	Running	5분	스냅샷 생성 ▼

Displaying 1 item

```
login as 'cirros' user. default password: 'cubswin:)', use 'sudo' for root.
cirros login: cirros
Password:
Login incorrect
cirros login: cirros
Password:
$ ifconfig
eth0      Link encap:Ethernet  HWaddr FA:16:3E:79:F3:F2
          inet6 addr: fe80::f816:3eff:fe79:f3f2/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:8 errors:0 dropped:0 overruns:0 frame:0
          TX packets:8 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:648 (648.0 B)  TX bytes:1132 (1.1 KiB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:12 errors:0 dropped:0 overruns:0 frame:0
          TX packets:12 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:1020 (1020.0 B)  TX bytes:1020 (1020.0 B)
```

[인스턴스 ifconfig 결과]

```
Starting network...
udhcpc (v1.20.1) started
Sending discover...
Sending discover...
Usage: /sbin/cirros-dhpc <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
```

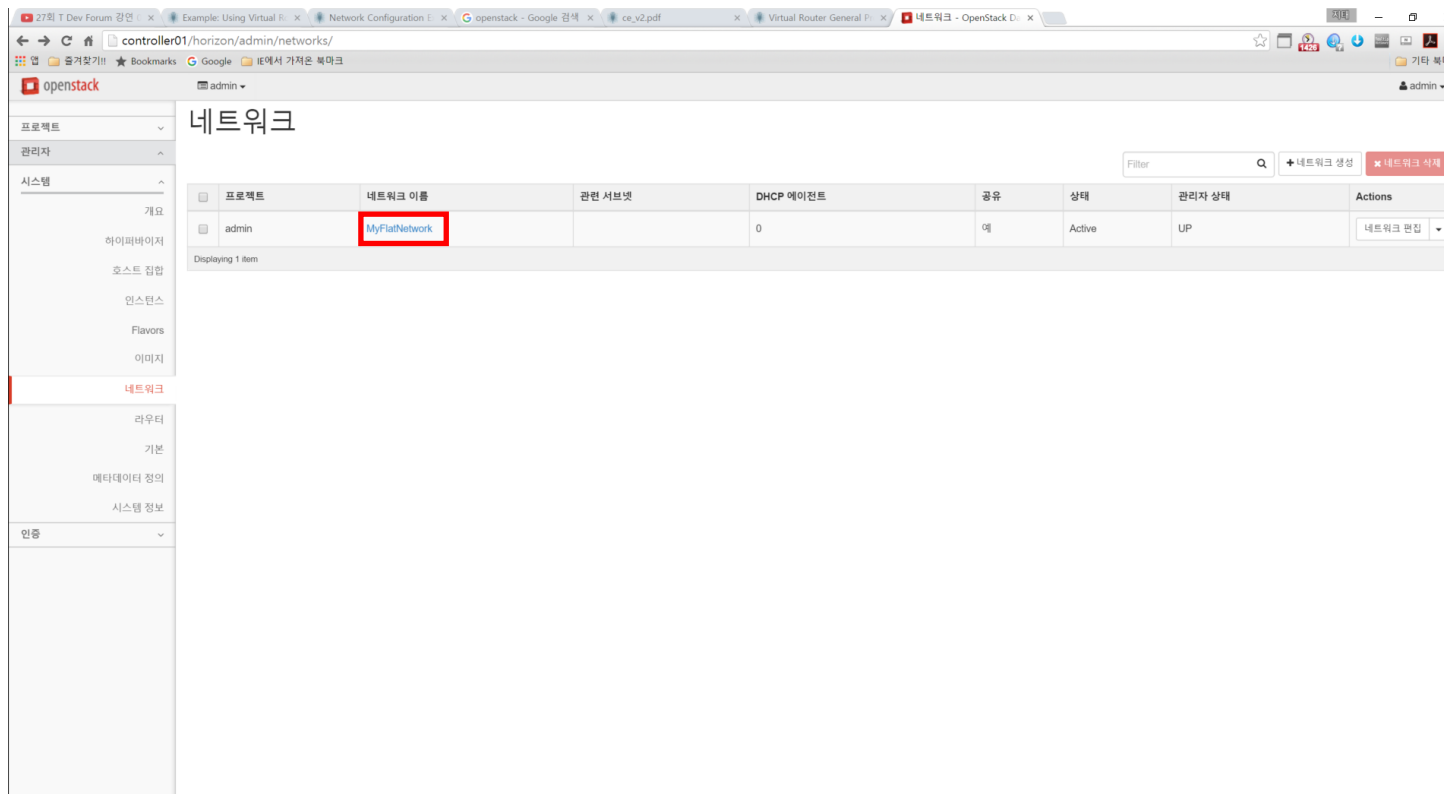
```
[securitygroup]
firewall_driver =
neutron.agent.linux.iptables_firewall.IptablesFirewallDriver
```

```
[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

The screenshot shows the OpenStack Horizon dashboard with the 'Network Configuration' tab selected. The main content area displays the details for a network named 'MyFlatNetwork'. The left sidebar shows the 'Networks' section selected. The main content area is divided into several sections: 'Network Summary', 'Subnets', 'Ports', and 'DHCP Agents'.

네트워크 세부 정보: MyFlatNetwork

네트워크 개요

이름	MyFlatNetwork
ID	fb4b52d4-fe18-4bb8-8d0c-d51b04b5779c
프로젝트 ID	142a4a24502495890b1d538b832f395
상태	ACTIVE
관리자 상태	UP
공유	예
외부 네트워크	아니오
MTU	알 수 없음
공급자 네트워크	네트워크 타입 flat 물리적인 네트워크 physnet2 구분 ID: -

서브넷

이름	CIDR	IP 버전	게이트웨이 IP	Actions
No items to display.				

Displaying 0 items

포트

이름	고정 IP	장치 연결됨	상태	관리자 상태	Actions
No items to display.					

Displaying 0 items

DHCP 에이전트

호스트	상태	관리자 상태	업데이트	Actions
No items to display.				

Displaying 0 items

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

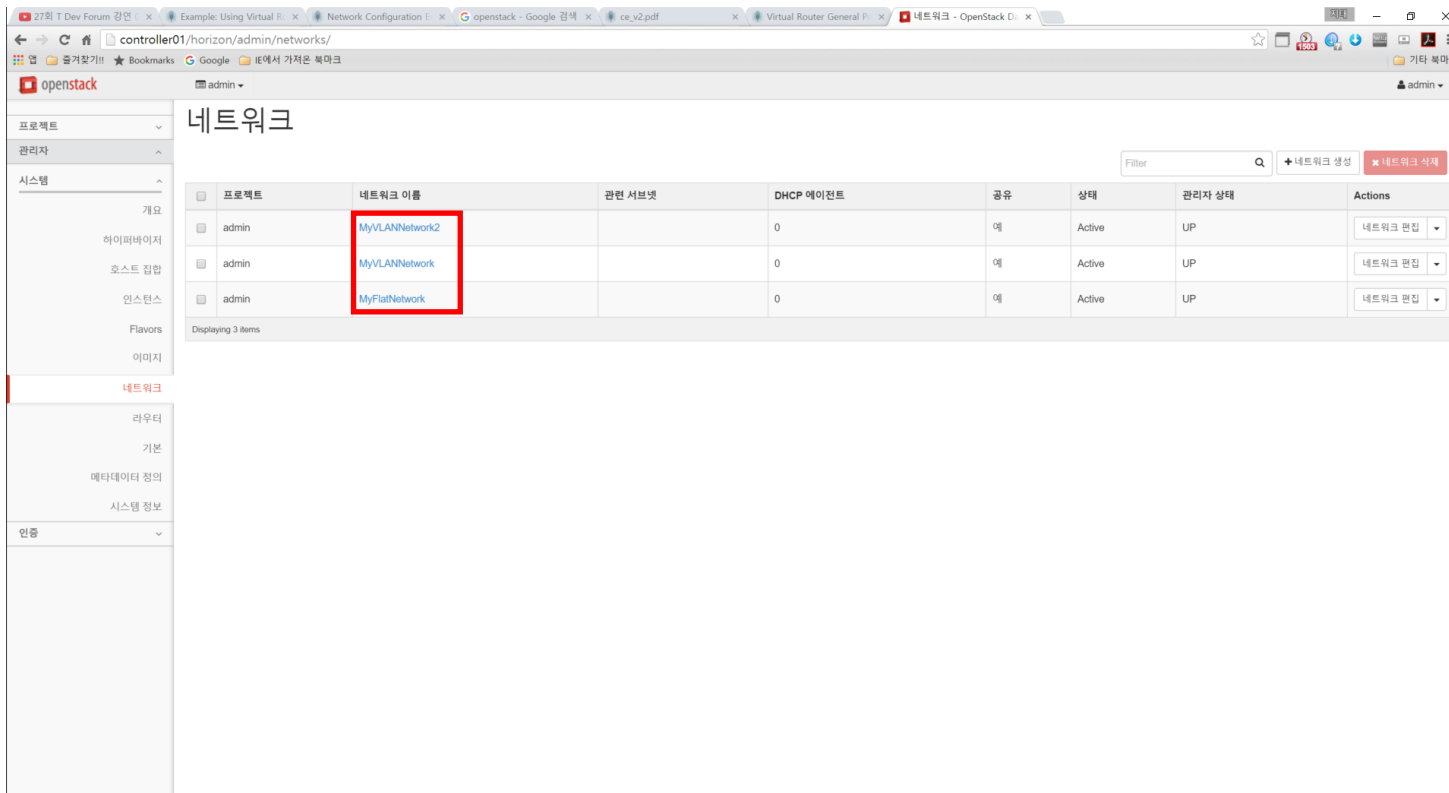
- Creating a VLAN network in the CLI

```
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



The screenshot shows the OpenStack Horizon dashboard with the '네트워크' (Networks) page selected. The table displays the following data:

프로젝트	네트워크 이름	관련 서브넷	DHCP 에이전트	공유	상태	관리자 상태	Actions
admin	MyVLANNetwork2		0	예	Active	UP	네트워크 편집
admin	MyVLANNetwork		0	예	Active	UP	네트워크 편집
admin	MyFlatNetwork		0	예	Active	UP	네트워크 편집

The '네트워크 이름' column contains the names 'MyVLANNetwork2', 'MyVLANNetwork', and 'MyFlatNetwork'. The 'MyVLANNetwork2' entry is highlighted with a red box.

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

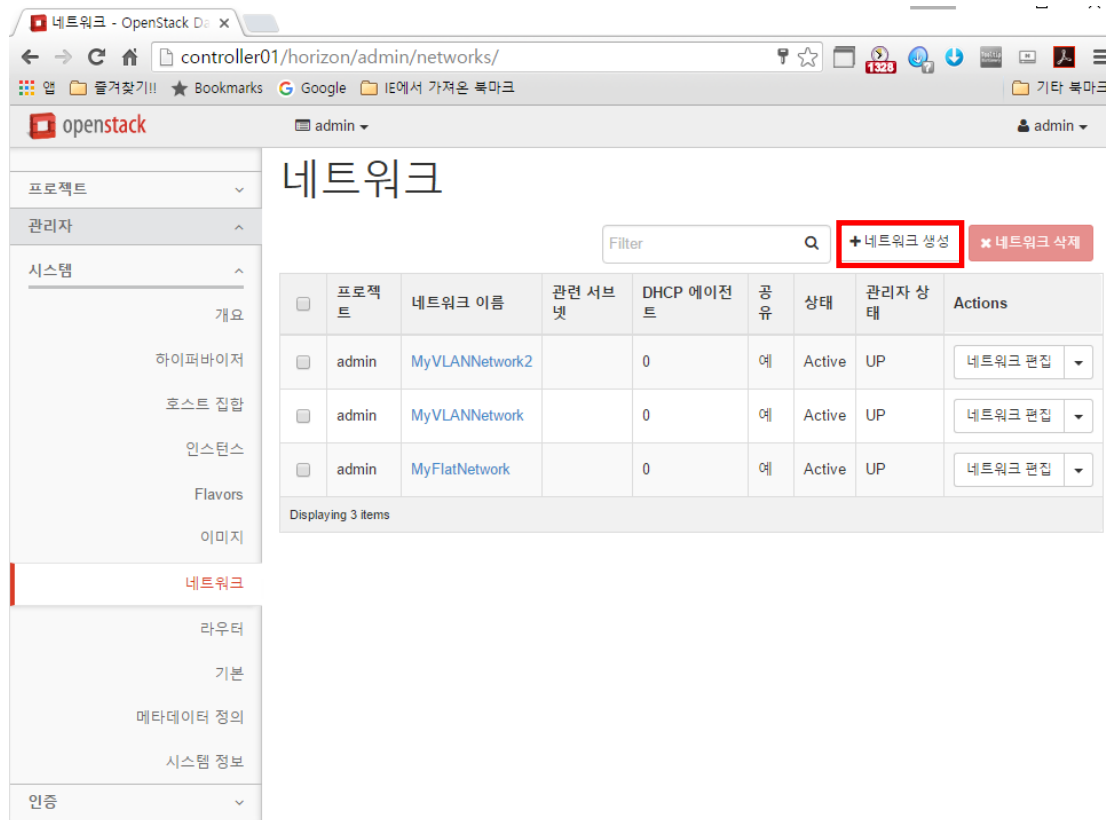
- Deleting networks in the CLI

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



The screenshot shows the OpenStack Horizon Admin interface for network management. The left sidebar contains a navigation menu with options like '프로젝트', '관리자', '시스템', '개요', '하이퍼바이저', '호스트 집합', '인스턴스', 'Flavors', '이미지', '네트워크', '라우터', '기본', '메타데이터 정의', '시스템 정보', and '인증'. The main content area is titled '네트워크' (Networks) and includes a search filter, a '+ 네트워크 생성' (Create Network) button (highlighted with a red box), and a '- 네트워크 삭제' (Delete Network) button. Below these buttons is a table listing three networks:

프로젝트	네트워크 이름	관련 서브넷	DHCP 에이전트	공유	상태	관리자 상태	Actions
admin	MyVLANNetwork2		0	예	Active	UP	네트워크 편집
admin	MyVLANNetwork		0	예	Active	UP	네트워크 편집
admin	MyFlatNetwork		0	예	Active	UP	네트워크 편집

Displaying 3 items

Chapter5. Creating Networks with Neutron

- Creating a network via the Admin tab as an administrator

The screenshot shows the OpenStack Admin interface with a modal dialog titled '네트워크 생성' (Create Network). The dialog contains the following fields and options:

- 이름 (Name):** MyVLANNetwork3
- 프로젝트 (Project):** admin
- 프로바이더 네트워크 유형 (Provider Network Type):** VLAN
- 물리적인 네트워크 (Physical Network):** physnet2
- 구분 ID (Segment ID):** 202
- 관리자 상태 (Admin State):** UP
- 공유 (Shared):** ☒ 공유, ☐ 외부 네트워크

설명 (Description): 원하는 프로젝트에 새로운 네트워크를 생성합니다. 프로바이더로 지정된 네트워크를 생성할 수 있습니다. 새로운 가상 네트워크에 대한 물리적 네트워크 타입 (Flat, VLAN, GRE, VXLAN과 같은)과 segmentation_id 또는 물리적 네트워크 이름을 지정할 수 있습니다. 또한, 외부 네트워크나 공유 네트워크를 해당 확인란을 선택하여 생성할 수 있습니다.

Buttons at the bottom: 취소 (Cancel), 네트워크 생성 (Create Network).

네트워크

Filter

Q

+ 네트워크 생성

× 네트워크 삭제

<input type="checkbox"/>	프로젝트	네트워크 이름	관련 서브넷	DHCP 에이전트	공유	상태	관리자 상태	Actions
<input type="checkbox"/>	admin	MyVLANNetwork3		0	예	Active	UP	네트워크 편집
<input type="checkbox"/>	admin	MyVLANNetwork2		0	예	Active	UP	네트워크 편집
<input type="checkbox"/>	admin	MyVLANNetwork		0	예	Active	UP	네트워크 편집
<input type="checkbox"/>	admin	MyFlatNetwork		0	예	Active	UP	네트워크 편집

Displaying 4 items

The screenshot shows the OpenStack Admin interface with a modal dialog titled '네트워크 편집' (Edit Network). The dialog contains the following fields and options:

- 이름 (Name):** MyVLANNetwork3
- 관리자 상태 (Admin State):** UP
- 공유 (Shared):** ☒ 공유, ☐ 외부 네트워크

설명 (Description): 여기서 네트워크의 편집 가능한 속성을 업데이트할 수 있습니다.

Buttons at the bottom: 취소 (Cancel), 변경사항 저장 (Save Changes).

Chapter5. Creating Networks with Neutron

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

네트워크

이름	관련 서브넷	공유	상태	관리자 상태	Actions
MyVLANNetwork3		예	Active	UP	서브넷 추가
MyVLANNetwork2		예	Active	UP	서브넷 추가
MyVLANNetwork		예	Active	UP	서브넷 추가
MyFlatNetwork		예	Active	UP	서브넷 추가

Displaying 4 items



네트워크 생성

네트워크 이름: MyUserNetwork

관리자 상태: UP

새 네트워크를 생성합니다. 또한, 네트워크에 연결된 서브넷은 다음 패널에서 생성 가능합니다.

취소 < 뒤로 다음 >



네트워크 생성

서브넷

서브넷 생성

"네트워크 주소"를 지정해야되는 경우, 새 네트워크에 연결되는 서브넷을 만듭니다. 서브넷 없이 새로운 네트워크를 생성하려면, "서브넷 만들기" 체크를 해제합니다.

취소 < 뒤로 생성



네트워크

Filter

Q

+ 네트워크 생성

× 네트워크 삭제

<div><div></div></div> 이름	관련 서브넷	공유	상태	관리자 상태	Actions
<div><div></div></div> MyUserNetwork		아니오	Active	UP	<div>네트워크 편집</div>
<div><div></div></div> MyVLANNetwork3		예	Active	UP	<div>서브넷 추가</div>
<div><div></div></div> MyVLANNetwork2		예	Active	UP	<div>서브넷 추가</div>
<div><div></div></div> MyVLANNetwork		예	Active	UP	<div>서브넷 추가</div>
<div><div></div></div> MyFlatNetwork		예	Active	UP	<div>서브넷 추가</div>

Displaying 5 items

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-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

- 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,nextthop=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,nextthop=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", "nextthop": "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

The screenshot shows the OpenStack Admin console interface. On the left, there's a sidebar with navigation links like '프로젝트', '관리자', '시스템', '개요', '하이퍼바이저', '호스트 집합', '인스턴스', 'Flavors', '이미지', '네트워크', '라우터', and '기본'. The main area is titled '네트워크' and contains a table of subnets. The table has columns: '프로젝트', '네트워크 이름', '관련 서브넷', 'DHCP 에이전트', '공유', '상태', '관리자 상태', and 'Actions'. The 'MyVLANNetwork2' subnet is highlighted with a red box. Below the table, it says 'Displaying 5 items'.

서브넷

이름	CIDR	IP 버전	게이트웨이 IP	Actions
No items to display.				
Displaying 0 items				

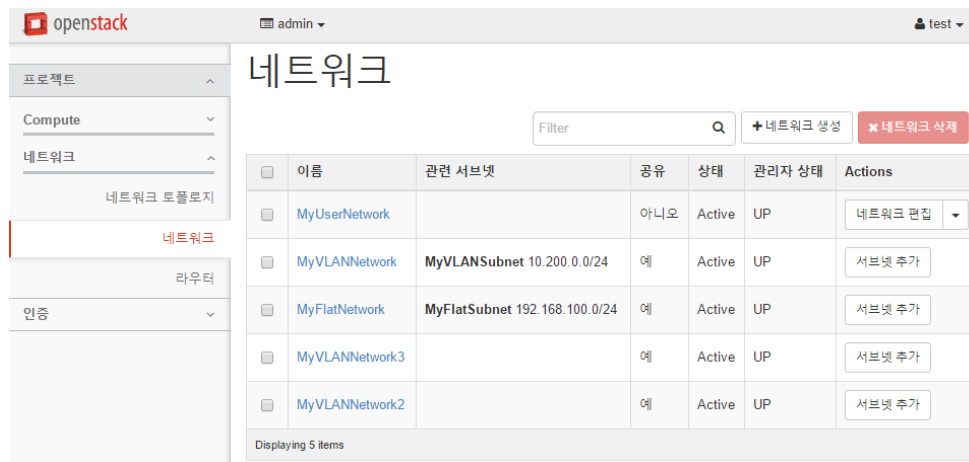
+ 서브넷 생성

The screenshot shows the '서브넷 생성' (Create Subnet) form. It has tabs for '서브넷' and '서브넷 세부 정보'. The '서브넷' tab is active. The form fields are: '서브넷 이름' (Subnet Name) with value 'MyVLANSubnet', '네트워크 주소' (Network Address) with value '10.200.0.0/24', 'IP 버전' (IP Version) with value 'IPv4', and '게이트웨이 IP' (Gateway IP) which is empty. There is a checkbox for '게이트웨이가 비활성' (Gateway is disabled). At the bottom, there are 'Back' and '다음' (Next) buttons.

The screenshot shows the '서브넷 생성' (Create Subnet) form, specifically the '서브넷 세부 정보' (Subnet Details) tab. The form fields are: 'DHCP 사용' (Use DHCP) with a checked checkbox, 'Pools 할당' (Assign Pools) which is empty, 'DNS 서버' (DNS Server) with value '8.8.8.8', and '포스트 라우터' (Post Route) which is empty. At the bottom, there are 'Back' and '생성' (Create) buttons.

Chapter5. Creating Networks with Neutron

- Creating subnets via the Project tab as a user



이름	관련 서브넷	공유	상태	관리자 상태	Actions
MyUserNetwork		아니오	Active	UP	네트워크 편집
MyVLANNetwork	MyVLANSubnet 10.200.0.0/24	예	Active	UP	서브넷 추가
MyFlatNetwork	MyFlatSubnet 192.168.100.0/24	예	Active	UP	서브넷 추가
MyVLANNetwork3		예	Active	UP	서브넷 추가
MyVLANNetwork2		예	Active	UP	서브넷 추가

서브넷 세부 정보

서브넷 개요

서브넷

이름	MyUserSubnet
ID	fc8625f4-3d2a-47e4-82cf-8bf4ab68cd16
네트워크 ID	7c985b8a-e2db-45b4-95a7-4e7a80541a99
IP 버전	IPv4
CIDR	192.168.204.0/24
IP 할당 pool	시작 192.168.204.50 - 끝 192.168.204.99 시작 192.168.204.200 - 끝 192.168.204.253
게이트웨이 IP	192.168.204.1
DHCP 사용	예
추가 경로	None
DNS 네임 서버	8.8.4.4 8.8.8.8

Chapter5. Creating Networks with Neutron

- Neutron ports

- 뉴트론에서의 포트는 가상 네트워크 인터페이스를 서브넷에 논리적으로 연결
- 포트는 가상머신 인스턴스, DHCP서버, 라우터, 방화벽, 로드밸런서 등과 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-4e1ee331dc25", "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:vnict_type	normal
device_id	dhcpcdd354-5b13-51e7-8b25-47e9fd5b6ad3-fb4b52d4-fe18-4bb8-8d0c-d51b04b5779c
device_owner	network:dhcp
extra_dhcp_opts	
fixed_ips	{"subnet_id": "baff2a8b-572e-4e29-899c-4e1ee331dc25", "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-4e1ee331dc25 192.168.100.0/24
3457b7c3-ca57-495a-90a1-e80009ce117c	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 UUID>
qrouter- <라우터 UUID>
qlbaas- <로드 밸런서 UUID>

※ 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
```

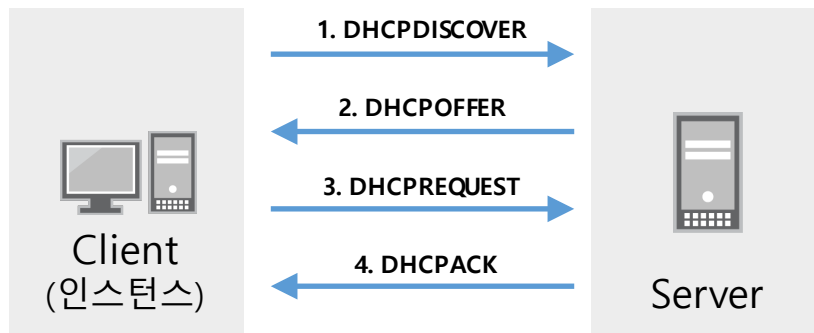
Chapter5. Creating Networks with Neutron

- 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
brqd4688bea-43    8000.000c293d17a6        no           tap6fbbb00e-97
brqfb4b52d4-fe    8000.000000000000        no           tapd5cb9e78-d4
```

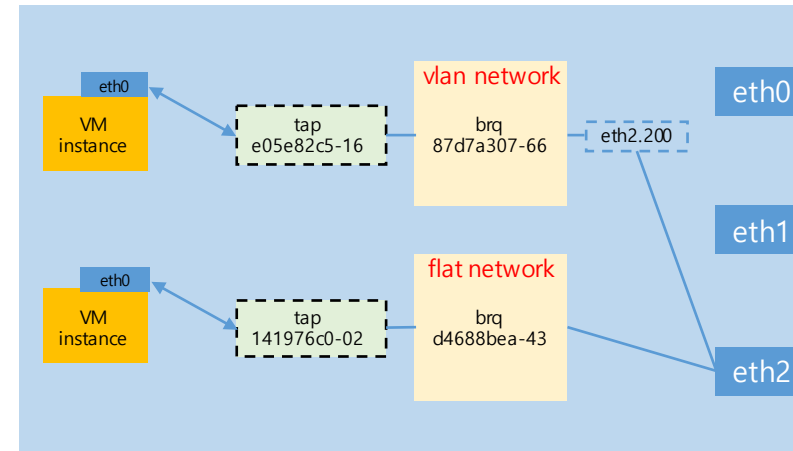
```
root@compute01:~# brctl show
bridge name      bridge id                STP enabled  interfaces
brq87d7a307-66    8000.000c2959a94d        no           eth2.200
brqd4688bea-43    8000.000c2959a94d        no           tap05e82c5-16
virbr0           8000.525400315fec        yes          virbr0-nic
```

```
root@compute02:~# brctl show
bridge name      bridge id                STP enabled  interfaces
brqd4688bea-43    8000.000c299174f0        no           eth2
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?