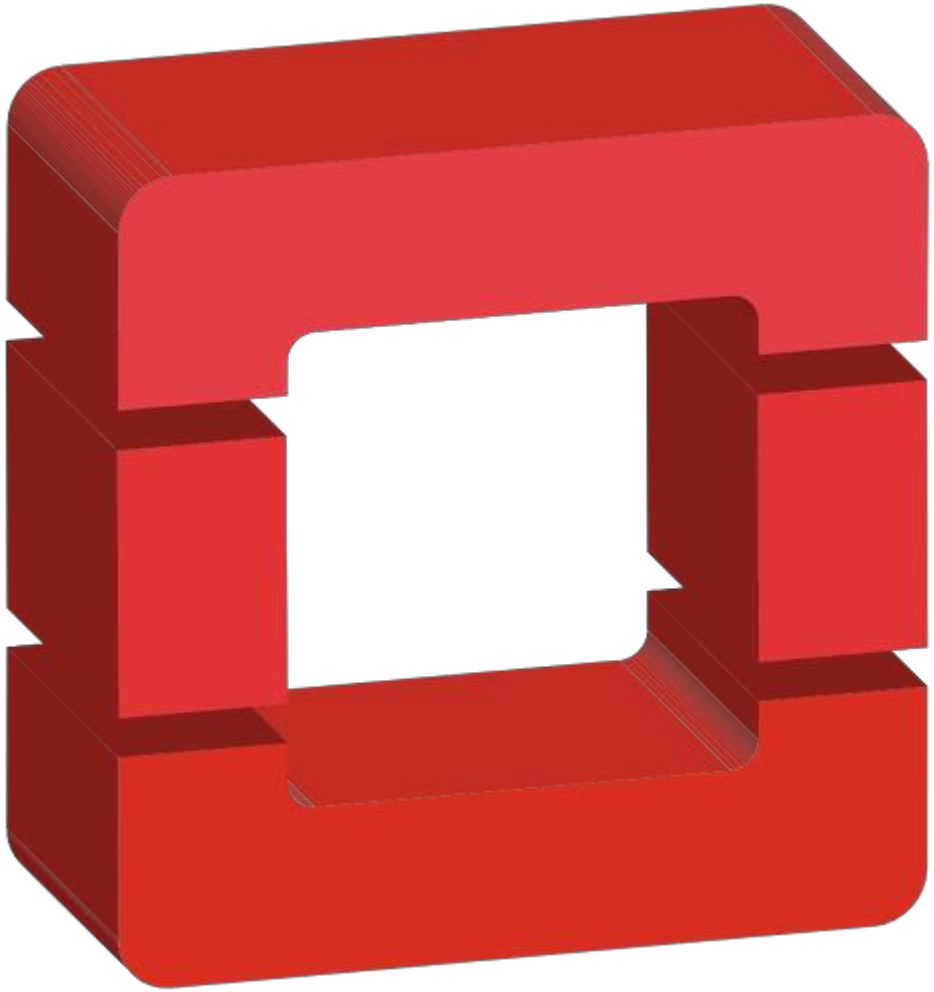


OpenStack Networking and Installation with Linux Bridge

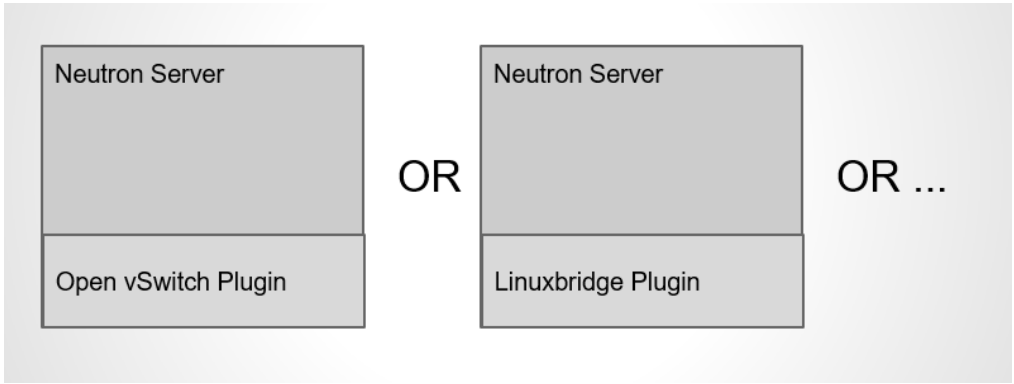
System Engineering Laboratory
koain@naver.com
Kim Young Woo

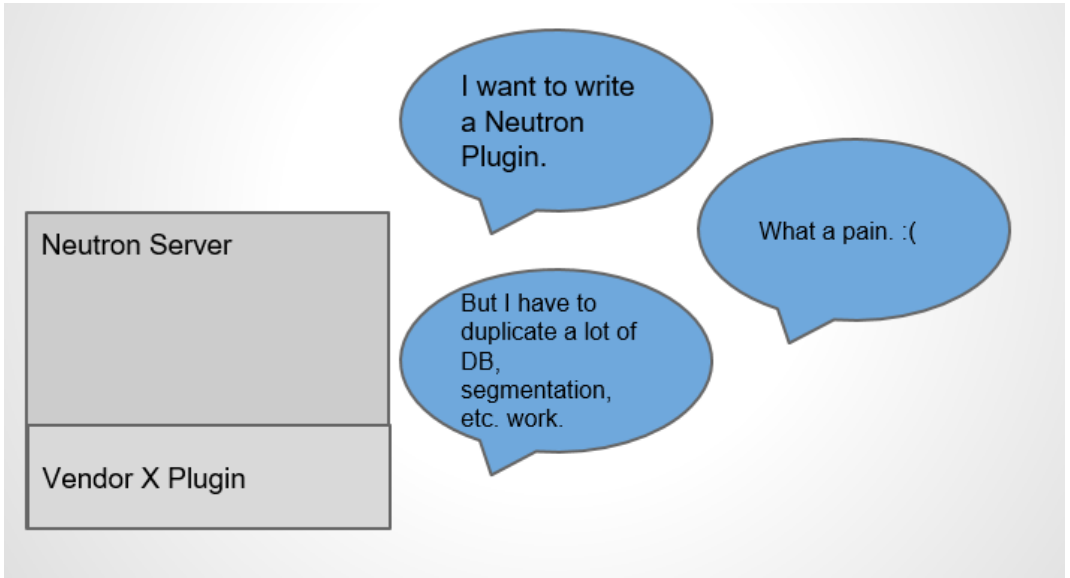
부정확합니다. 전부 믿지 마세요.

Contents

- Openstack Network
  - ML2
  - Provider Networks and Self-Service Networks(Tenant Networks?, Project Network?)
  - Network Type : Local, Flat, VLAN, GRE and VxLAN
- 설치 환경 및 구성
- Trouble Shooting
- 결론

- 기존에 사용되던 L2 Agent(Linux Bridge, OVS)

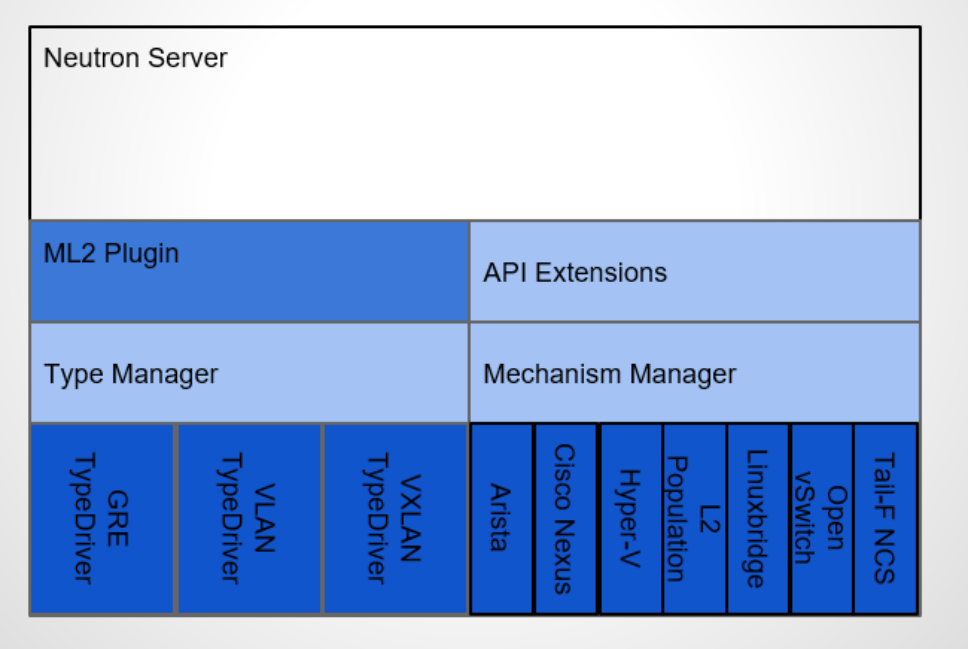




- 새로운 Plug-in을 작성할 때마다 해줘야 할게 너무 많다.
- 쓸 때 없는 코드들 줄이자
- 개발 및 유지 비용을 줄이자

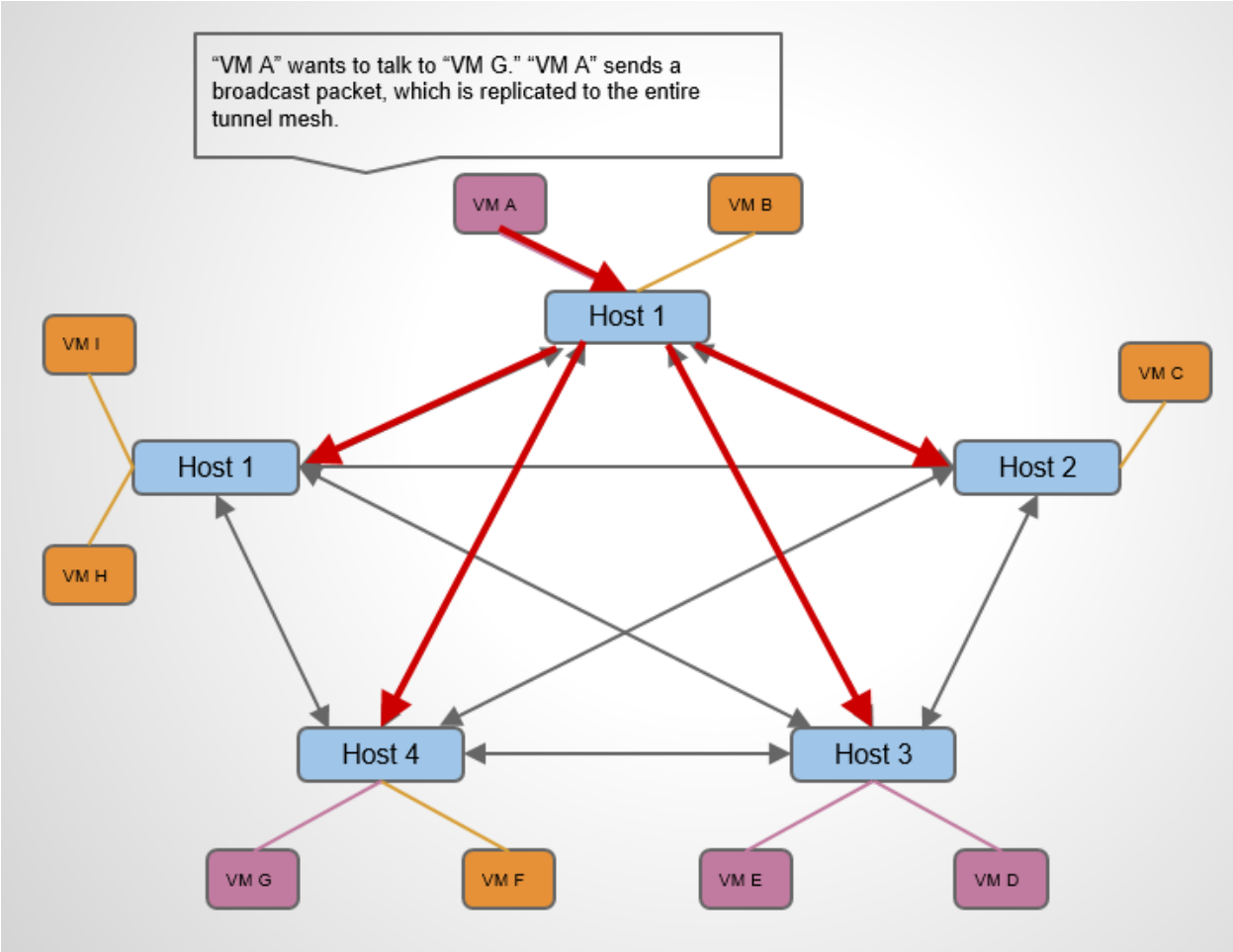
출처 : https://www.openstack.org/assets/presentation-media/ML2-Past-Present-and-Future.pptx

- ML2 : Layer 2의 다양하고 복잡한 기술들을 동시에 이용가능하게 하는 Plugin
- Linux Bridge, OVS agent들을 포함하는 상위 개념
- Driver를 통해 Type과 Mechanism을 Pluggable 하게 만든다.
- 같은 네트워크 내에서도 다양한 Mechanism Driver를 이용이 가능하다.



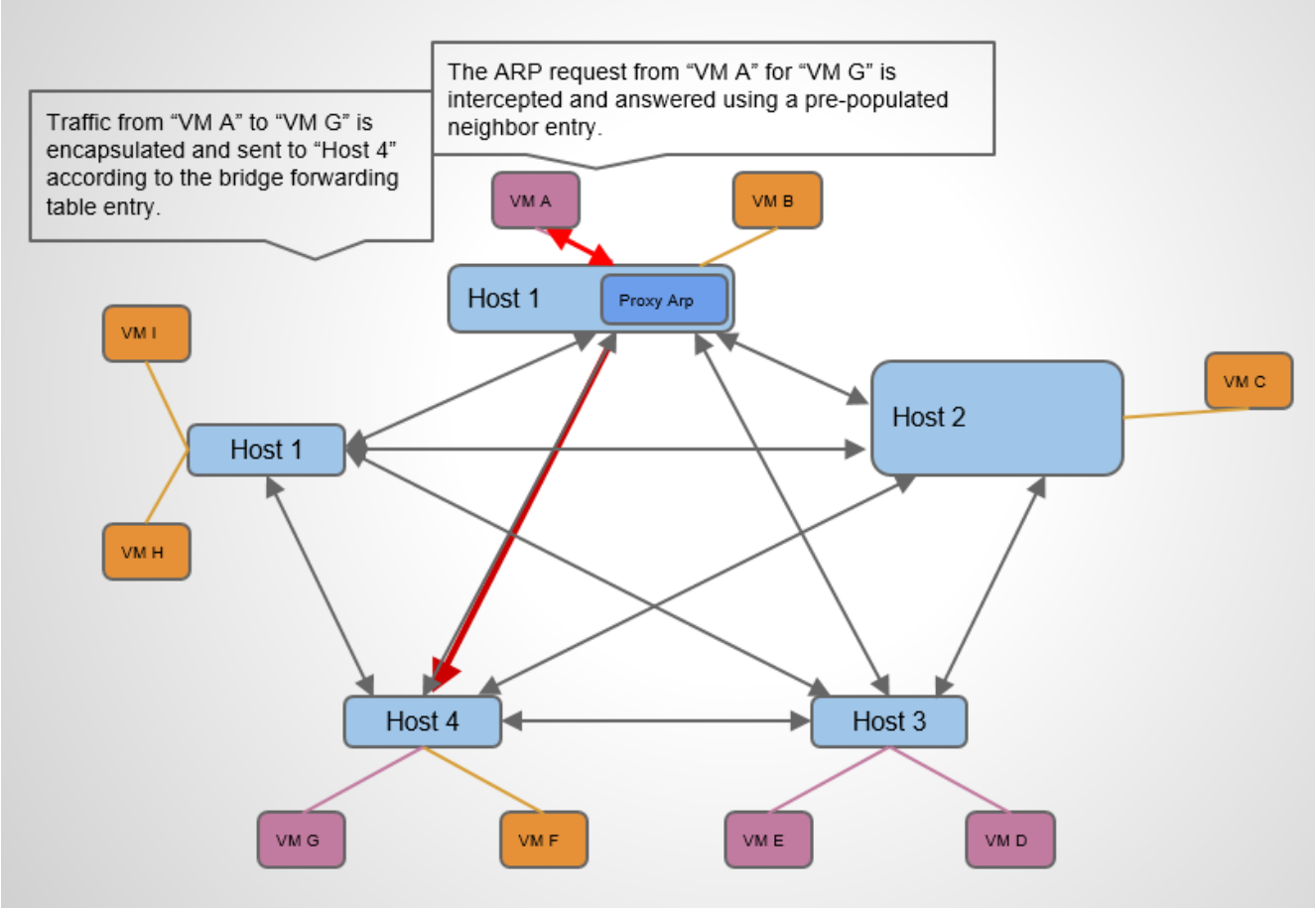
출처 : https://www.openstack.org/assets/presentation-media/ML2-Past-Present-and-Future.pptx

- ML2 L2 Population 적용 전



출처 : https://www.openstack.org/assets/presentation-media/ML2-Past-Present-and-Future.pptx

- ML2 L2 Population 적용 전



출처 : https://www.openstack.org/assets/presentation-media/ML2-Past-Present-and-Future.pptx

- Provider Network와 Self-Service Network(Tenant Networks?, Project Network?)

- Provider Network : L2 서비스와 VLAN 세그멘테이션을 가장 간단하게 구축, L3 서비스에 대해서는 물리 네트워크 인프라에 의존함. VM 간의 Private network, L3 서비스(라우팅), LBaas, FWaas 지원 안함.

- Self-Service Network : VxLAN과 같은 Overlay 세그멘테이션 방식을 사용하여 self-service를 가능하게 할 수 있음. LBaas, FWaas 지원

- 내가 이해한 두 네트워크의 차이 : 인프라 관리자가 아닌 사람도 가상 네트워크 인프라를 만드는 것이 가능한 네트워크 Self-Service Network. 관리자만 관리가 가능하고 외부 네트워크를 가능하게 해주는 것이 Provider Network.

출처 : http://docs.openstack.org/liberty/install-guide-rdo/overview.html

- Local : 동일한 컴퓨트 노드와 동일한 네트워크에 있는 인스턴스끼리 통신 가능

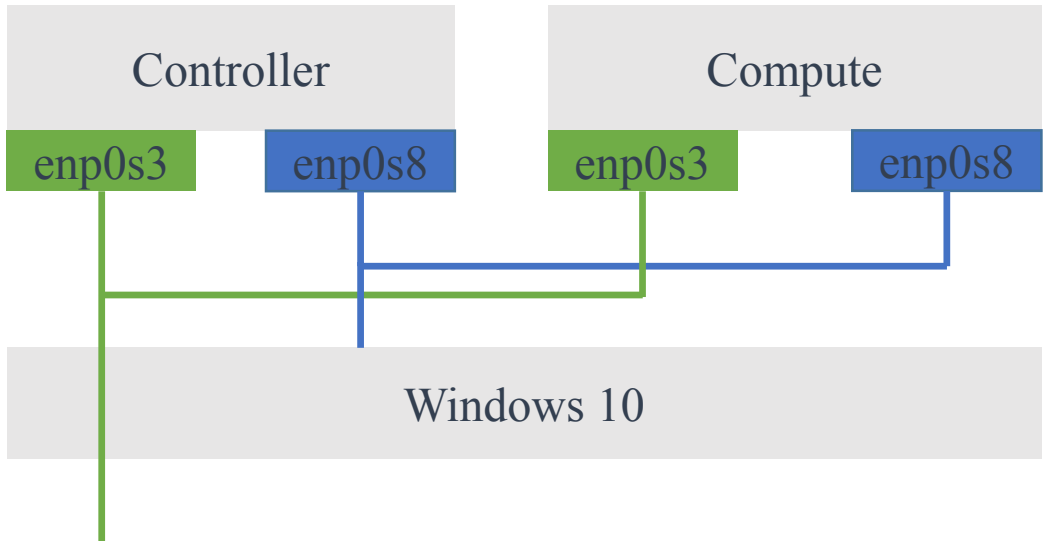
- Flat(nova-network??) : 모두가 같은 네트워크 대역에 놓여있는 상태. 다른 테넌트에 있는 인스턴스끼리 트래픽 확인이 가능(보안 문제)

- VLAN : VLAN ID(802.1Q tagging)를 이용하여 네트워크를 분리. 같은 VLAN에 있는 인스턴스는 같은 네트워크에 있다고 취급. 다른 테넌트에 있는 인스턴스에 같은 IP할당 가능. 관리자입장에서는 각 테넌트가 같은 Subnet, IP를 사용하더라도 상관없으므로 편리 해졌음. VLAN 수 4096개 제한은 VLAN ID 비트 수가 12개 때문.

- VxLAN and GRE : 오버레이 네트워크를 형성하여 모든 호스트 간 터널을 뚫어 P2P 통신을 가능하게 함(Mesh Network 구성). 24비트 VxLAN ID로 대략 1600만개의 LAN 구성 가능

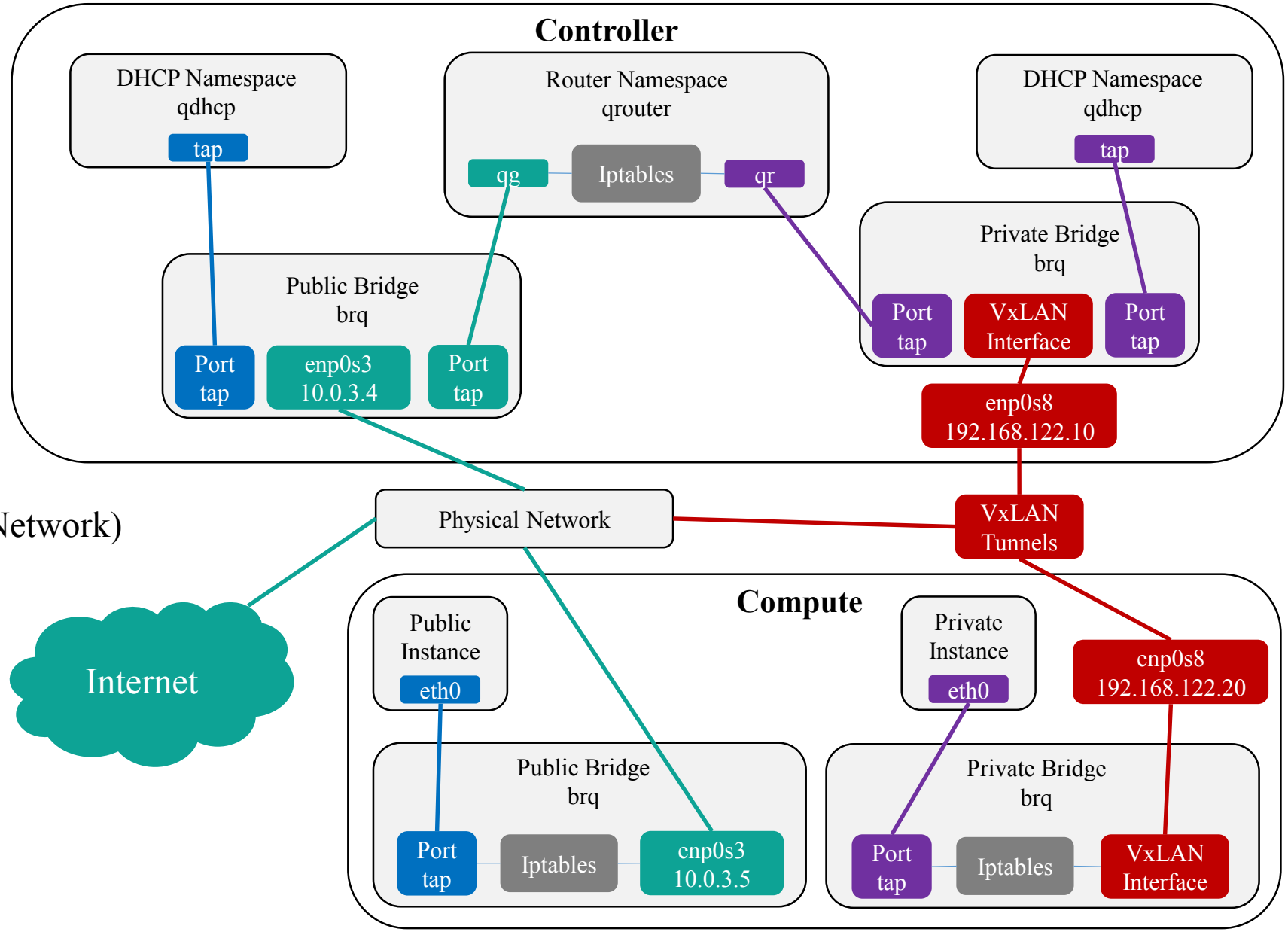
출처 : http://docs.openstack.org/liberty/networking-guide/intro-os-networking-overview.html

- Liberty 멀티 노드 설치 문서를 참고하여 설치
- Host : Windows 10 Virtual Box 이용
- Controller node(Centos 7) 1대 (192.168.122.10, 10.0.3.4) (3core, 6GB)
- Compute node(Centos 7) 1대 (192.168.122.20, 10.0.3.5) (3core, 6GB)
- Keystone, Glance, Nova, Neutron, Horizon 설치
- Provider Network : Flat, Project Network : VxLAN



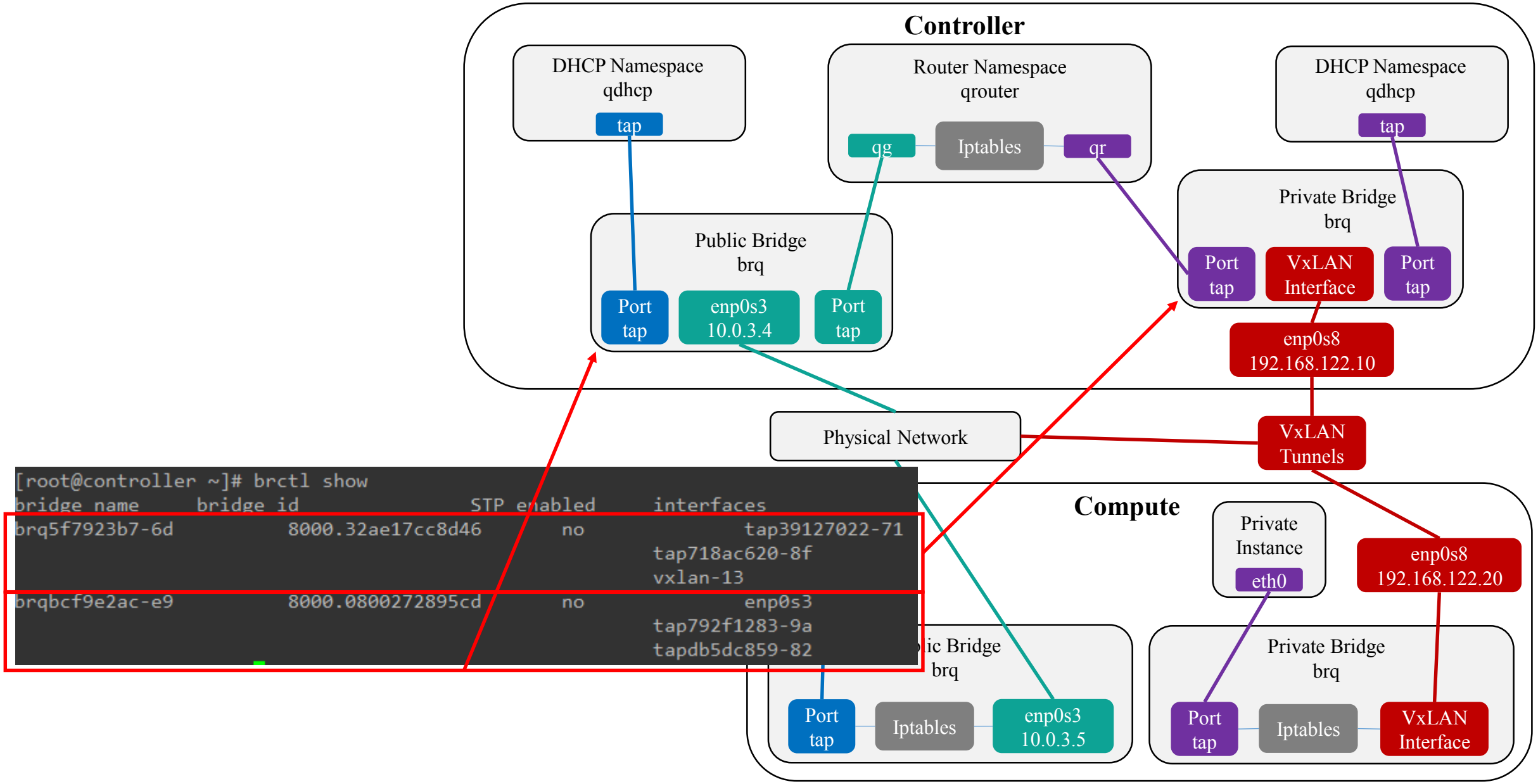
Management Network(Host-only Network)
192.168.122.x/24

External Network(Nat Network)
10.0.3.x/24

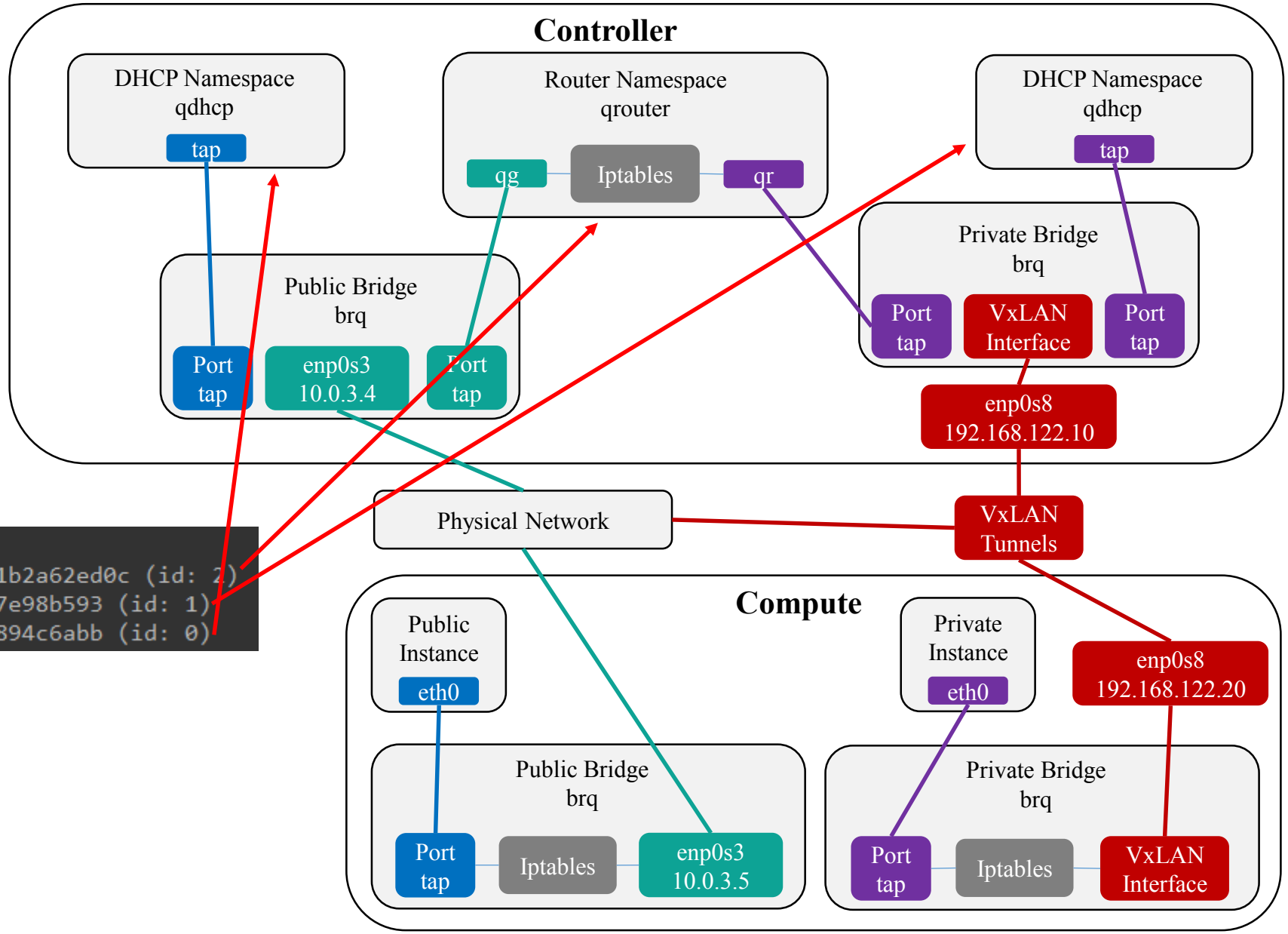


- Management Network(Host-only Network)
  192.168.122.x/24
- External Network(Nat Network)
  10.0.3.x/24
- Public Provider Network
  10.0.3.x/24
- Private Project Network
  10.0.4.x/24

설치 환경 및 구성


Controller
DHCP Namespace
qdhcp
tap
Router Namespace
qrouter
qg
Iptables
qr
DHCP Namespace
qdhcp
tap
Private Bridge
brq
Port
tap
VxLAN
Interface
Port
tap
Public Bridge
brq
Port
tap
enp0s3
10.0.3.4
Port
tap
enp0s8
192.168.122.10
Physical Network
VxLAN
Tunnels
[root@controller ~]# brctl show
bridge name bridge id STP enabled interfaces
brq5f7923b7-6d 8000.32ae17cc8d46 no tap39127022-71
tap718ac620-8f
vxlan-13
brqbcf9e2ac-e9 8000.0800272895cd no enp0s3
tap792f1283-9a
tapdb5dc859-82
Compute
Private
Instance
eth0
enp0s8
192.168.122.20
ic Bridge
brq
Port
tap
Iptables
enp0s3
10.0.3.5
Private Bridge
brq
Port
tap
Iptables
VxLAN
Interface

설치 환경 및 구성


Controller
DHCP Namespace
qdhcp
tap
Router Namespace
qrouter
qg
Iptables
qr
DHCP Namespace
qdhcp
tap
Private Bridge
brq
Port
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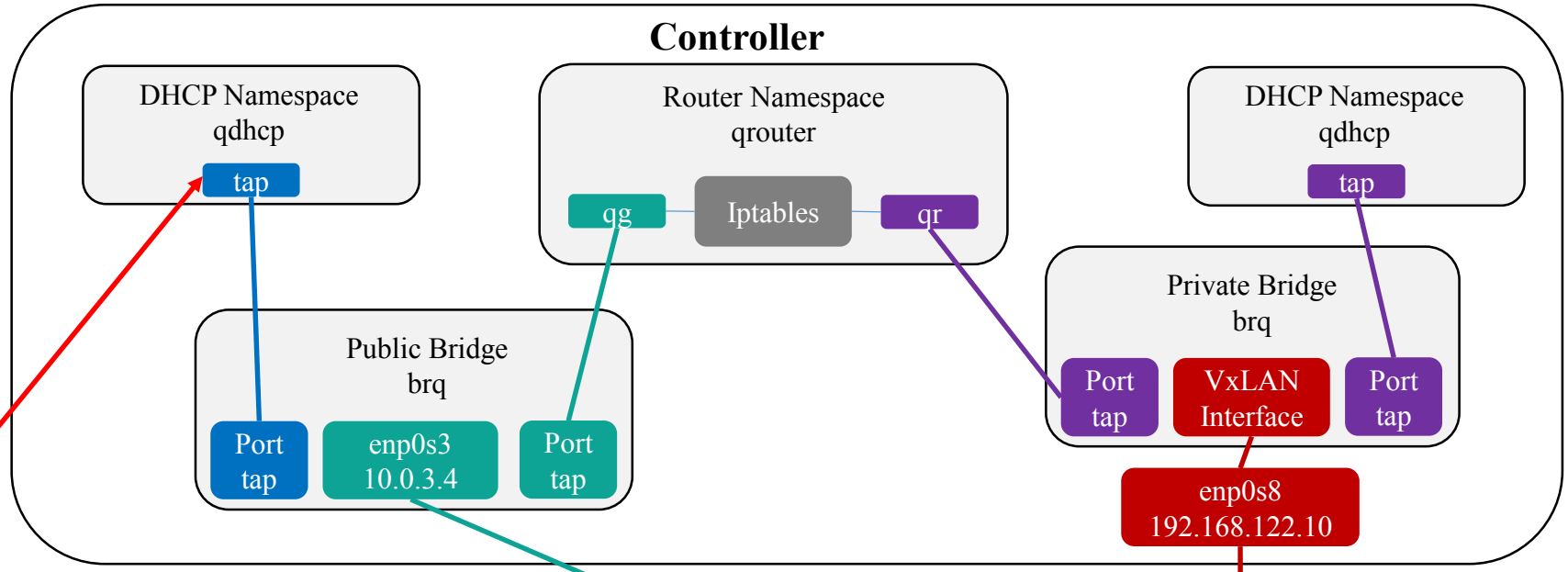
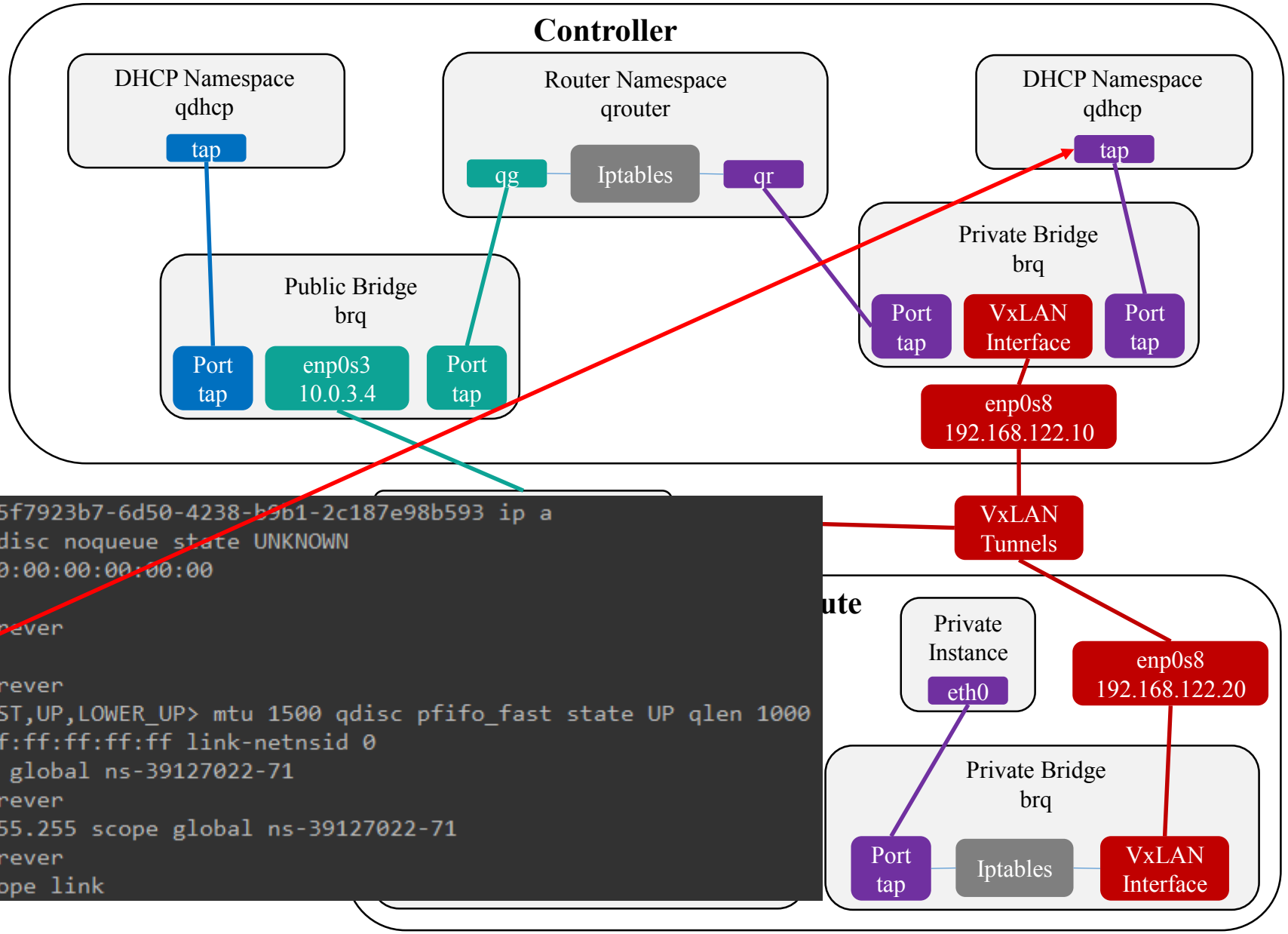
VxLAN
Interface
Port
tap
Public Bridge
brq
Port
tap
enp0s3
10.0.3.4
Port
tap
enp0s8
192.168.122.10
Physical Network
VxLAN
Tunnels
[root@controller ~]# ip netns show
qrouter-1c7b3b5f-3d90-4db8-b4ff-211b2a62ed0c (id: 2)
qdhcp-5f7923b7-6d50-4238-b9b1-2c187e98b593 (id: 1)
qdhcp-bcf9e2ac-e92b-4ff7-82d1-bf82894c6abb (id: 0)
Compute
Public
Instance
eth0
Private
Instance
eth0
enp0s8
192.168.122.20
Public Bridge
brq
Port
tap
Iptables
enp0s3
10.0.3.5
Private Bridge
brq
Port
tap
Iptables
VxLAN
Interface

설치 환경 및 구성



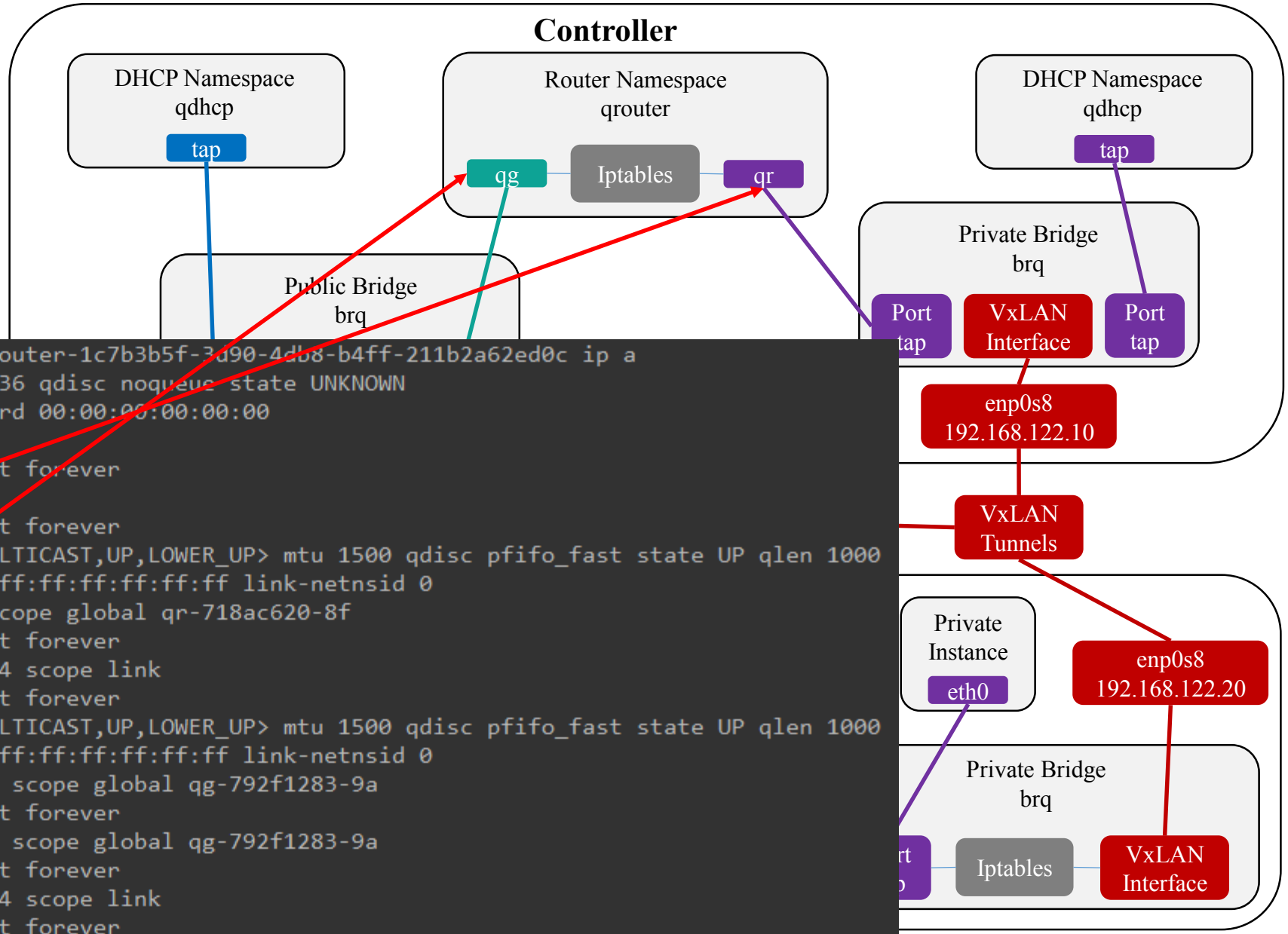

```
[root@controller ~]# ip netns exec qdhcp-bcf9e2ac-e92b-4ff7-82d1-bf82894c6abb ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: ns-db5dc859-82@if6: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP qlen 1000
    link/ether fa:16:3e:02:84:76 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 10.0.3.100/24 brd 10.0.3.255 scope global ns-db5dc859-82
       valid_lft forever preferred_lft forever
    inet 169.254.169.254/16 brd 169.254.255.255 scope global ns-db5dc859-82
       valid_lft forever preferred_lft forever
    inet6 fe80::f816:3eff:fe02:8476/64 scope link
       valid_lft forever preferred_lft forever
```

설치 환경 및 구성



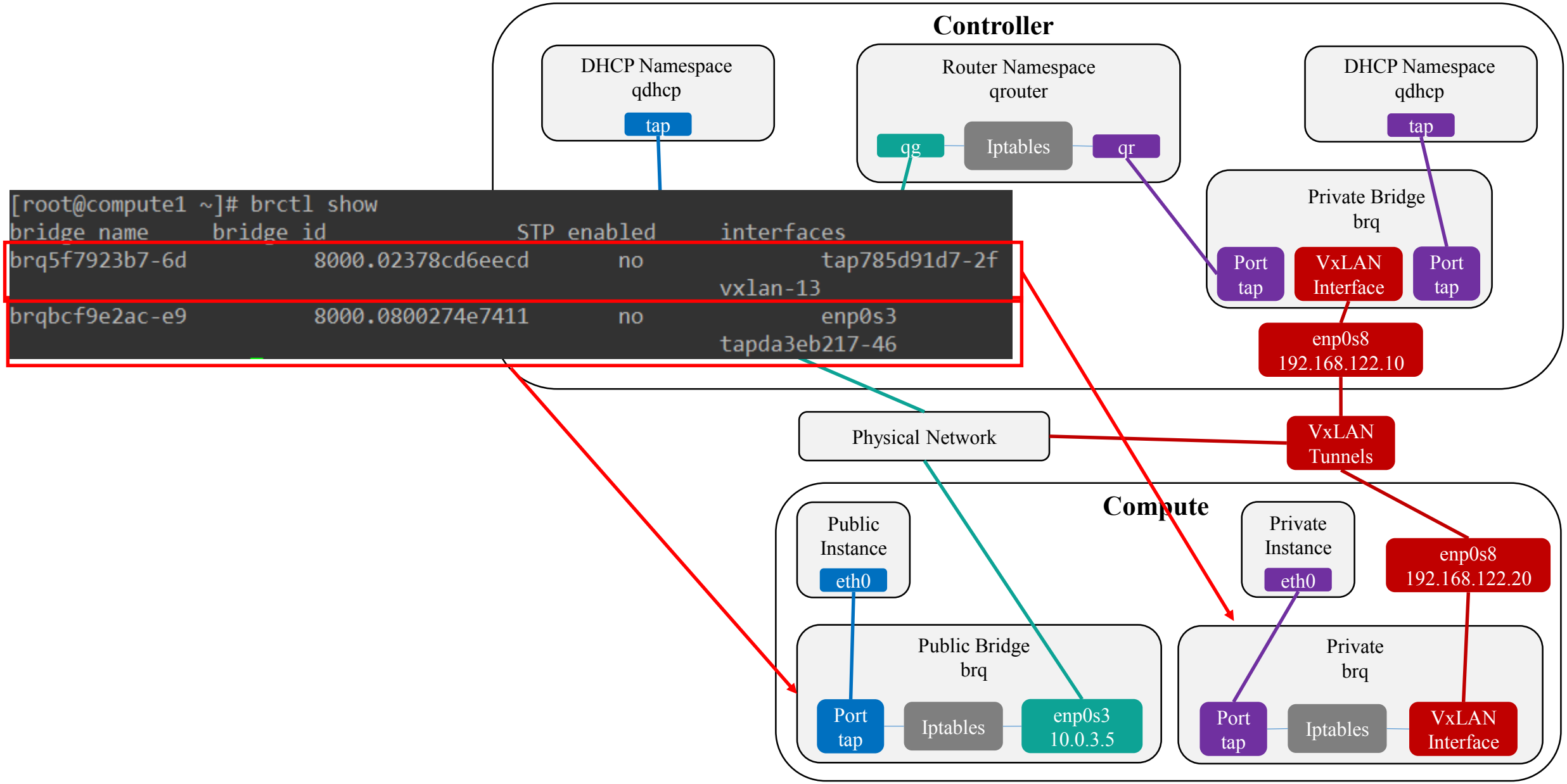

```
[root@controller ~]# ip netns exec qdhcp-5f7923b7-6d50-4238-b9b1-2c187e98b593 ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: ns-39127022-71@if8: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP qlen 1000
    link/ether fa:16:3e:56:82:d0 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 10.0.4.2/24 brd 10.0.4.255 scope global ns-39127022-71
       valid_lft forever preferred_lft forever
    inet 169.254.169.254/16 brd 169.254.255.255 scope global ns-39127022-71
       valid_lft forever preferred_lft forever
    inet6 fe80::f816:3eff:fe56:82d0/64 scope link
```

설치 환경 및 구성

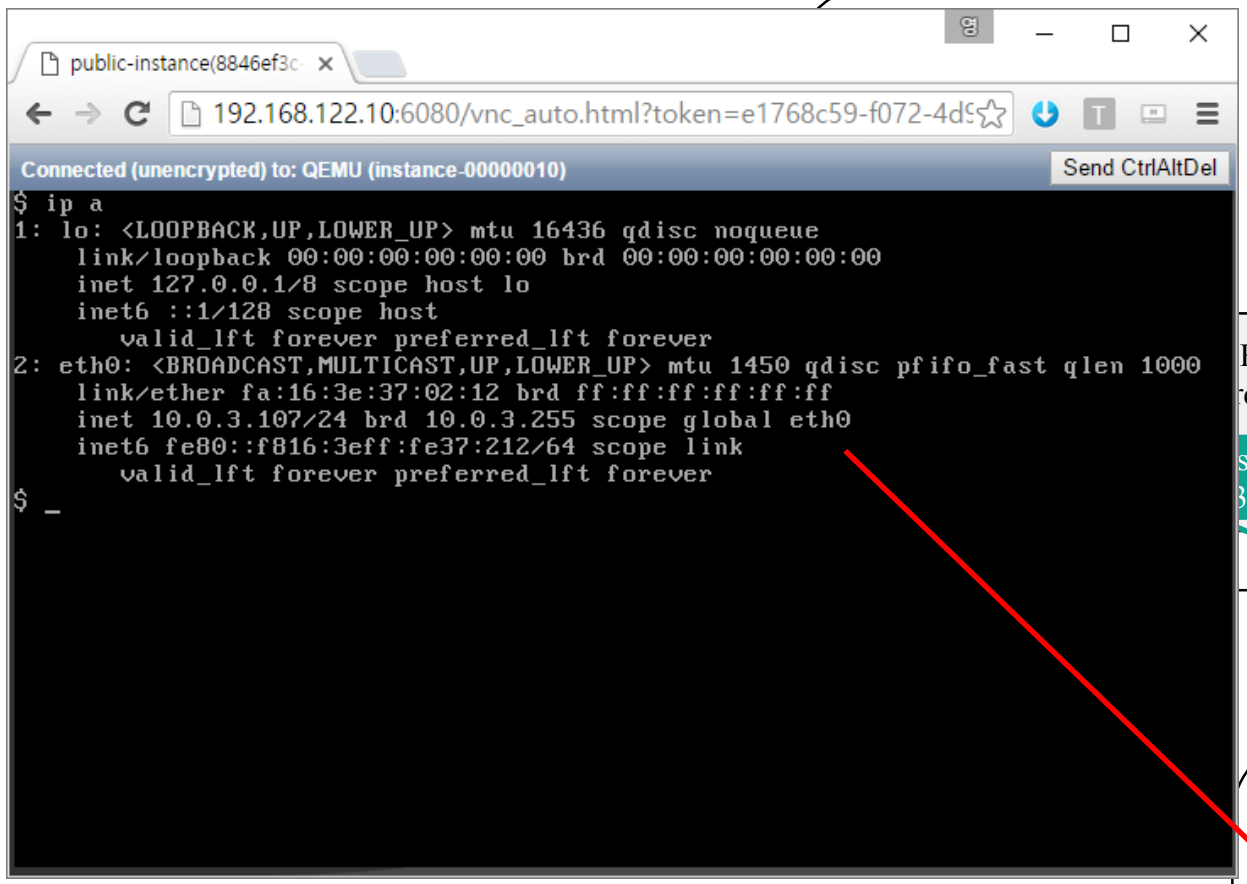


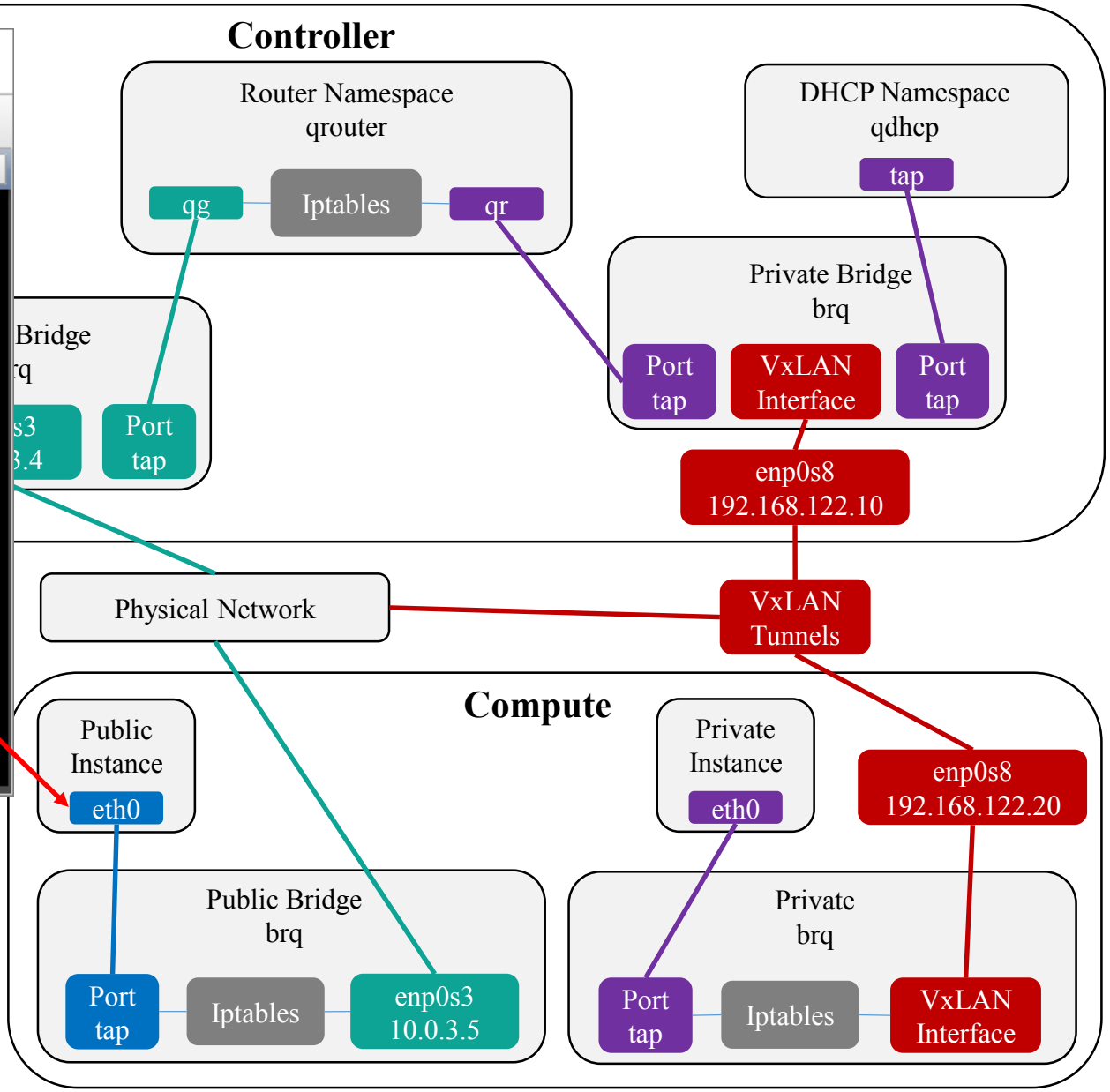

```
[root@controller ~]# ip netns exec qrouter-1c7b3b5f-3d90-4db8-b4ff-211b2a62ed0c ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: qr-718ac620-8f@if11: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP qlen 1000
    link/ether fa:16:3e:aa:a9:bc brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 10.0.4.1/24 brd 10.0.4.255 scope global qr-718ac620-8f
       valid_lft forever preferred_lft forever
    inet6 fe80::f816:3eff:feaa:a9bc/64 scope link
       valid_lft forever preferred_lft forever
3: qg-792f1283-9a@if12: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP qlen 1000
    link/ether fa:16:3e:3a:30:39 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 10.0.3.101/24 brd 10.0.3.255 scope global qg-792f1283-9a
       valid_lft forever preferred_lft forever
    inet 10.0.3.108/32 brd 10.0.3.108 scope global qg-792f1283-9a
       valid_lft forever preferred_lft forever
    inet6 fe80::f816:3eff:fe3a:3039/64 scope link
       valid_lft forever preferred_lft forever
```

설치 환경 및 구성


Controller
DHCP Namespace
qdhcp
tap
Router Namespace
qrouter
qg
Iptables
qr
DHCP Namespace
qdhcp
tap
Private Bridge
brq
Port
tap
VxLAN
Interface
Port
tap
enp0s8
192.168.122.10
[root@compute1 ~]# brctl show
bridge name bridge id STP enabled interfaces
brq5f7923b7-6d 8000.02378cd6eecd no tap785d91d7-2f
vxlan-13
brqbcf9e2ac-e9 8000.0800274e7411 no enp0s3
tapda3eb217-46
Physical Network
VxLAN
Tunnels
Compute
Public
Instance
eth0
Private
Instance
eth0
enp0s8
192.168.122.20
Public Bridge
brq
Port
tap
Iptables
enp0s3
10.0.3.5
Private
brq
Port
tap
Iptables
VxLAN
Interface

설치 환경 및 구성


public-instance(8846ef3c
192.168.122.10:6080/vnc_auto.html?token=e1768c59-f072-4d
Connected (unencrypted) to: QEMU (instance-00000010)
Send CtrlAltDel
$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 16436 qdisc noqueue
link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
inet 127.0.0.1/8 scope host lo
inet6 ::1/128 scope host
valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1450 qdisc pfifo_fast qlen 1000
link/ether fa:16:3e:37:02:12 brd ff:ff:ff:ff:ff:ff
inet 10.0.3.107/24 brd 10.0.3.255 scope global eth0
inet6 fe80::f816:3eff:fe37:212/64 scope link
valid_lft forever preferred_lft forever
$ _


Controller
Router Namespace
qrouter
qg
Iptables
qr
DHCP Namespace
qdhcp
tap
Private Bridge
brq
Port
tap
VxLAN
Interface
Port
tap
Bridge
rq
s3
3.4
Port
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enp0s8
192.168.122.10
Physical Network
VxLAN
Tunnels
Compute
Public
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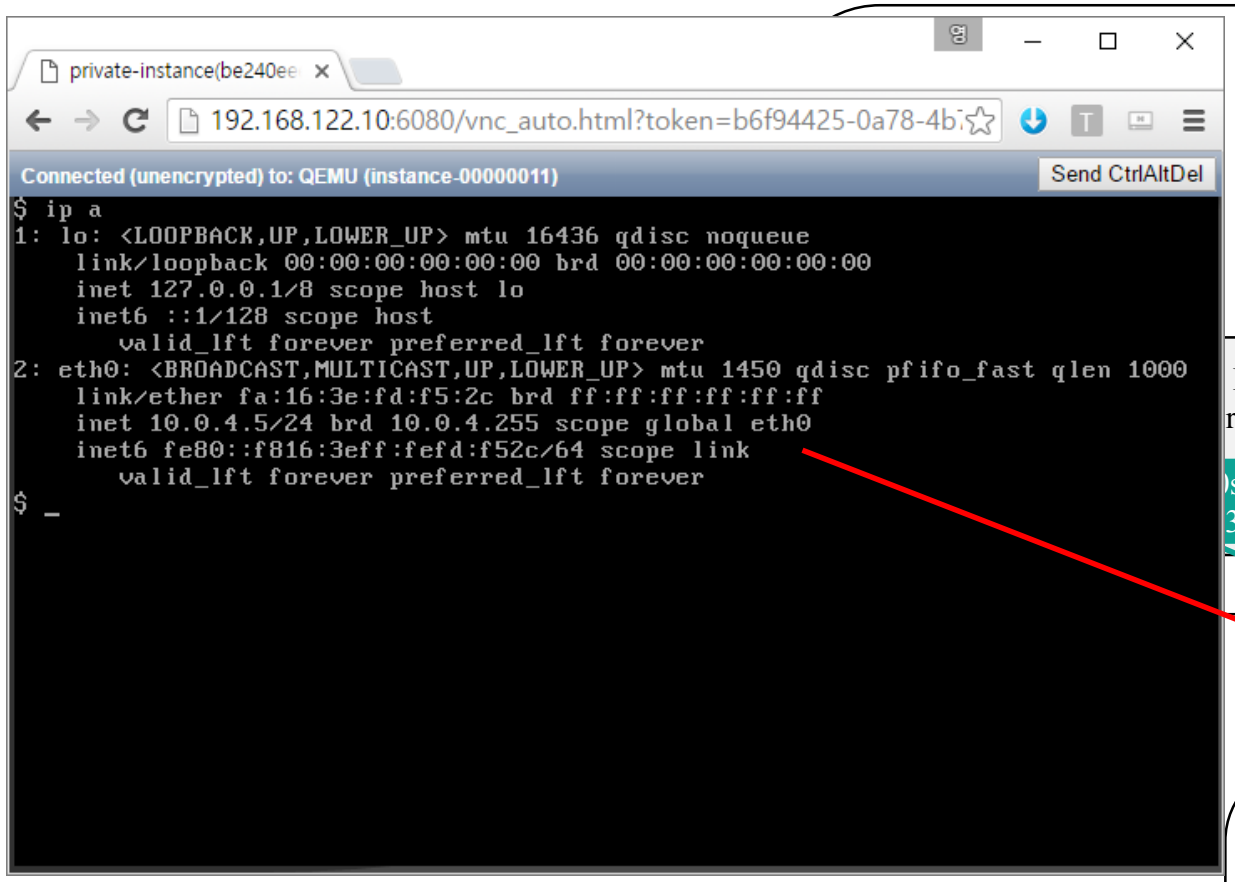
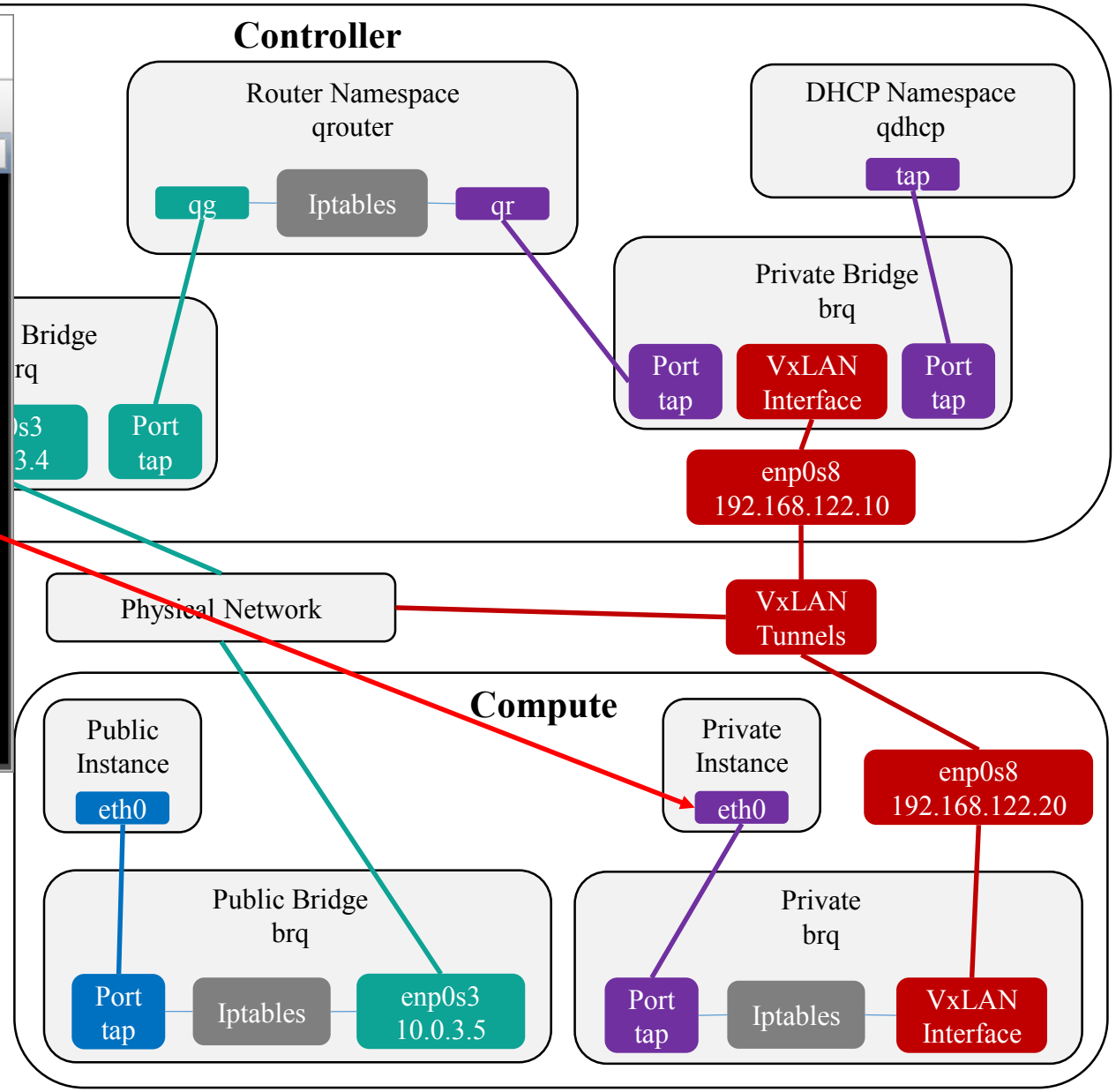
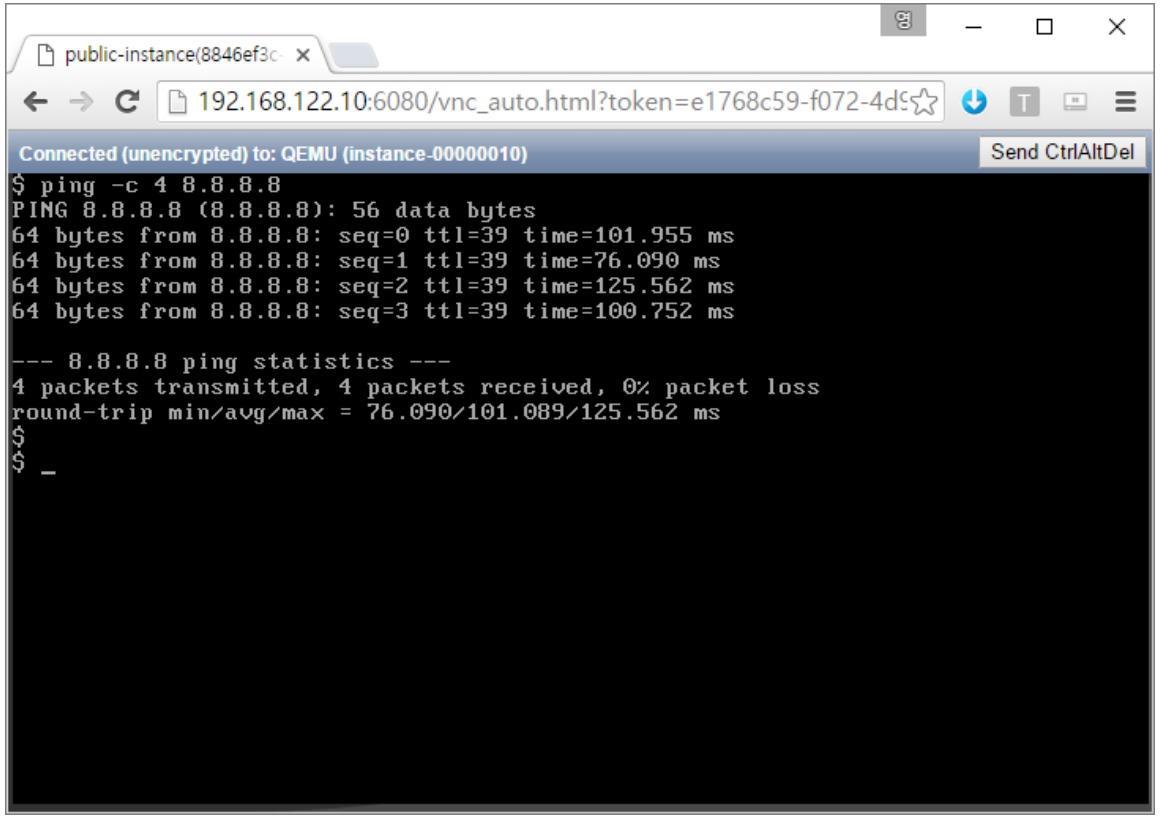
eth0
Private
Instance
eth0
enp0s8
192.168.122.20
Public Bridge
brq
Port
tap
Iptables
enp0s3
10.0.3.5
Private
brq
Port
tap
Iptables
VxLAN
Interface

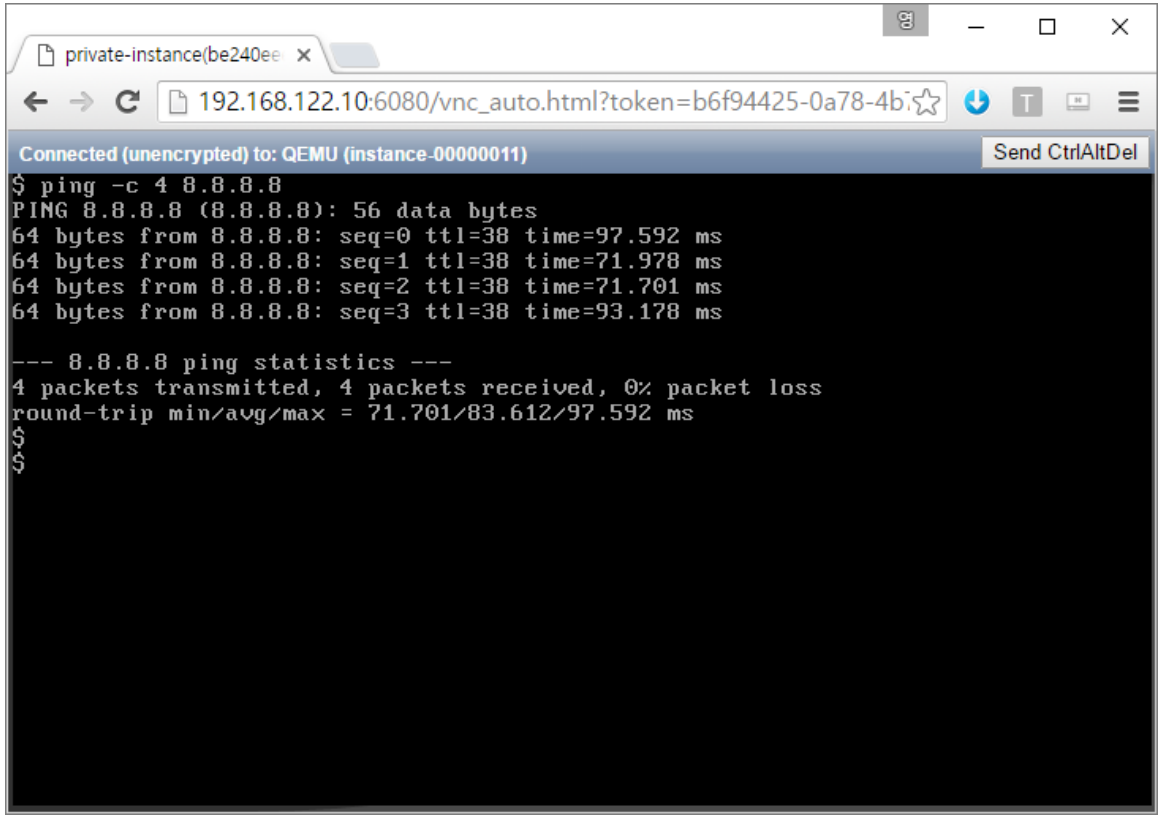
설치 환경 및 구성


private-instance(be240ee
192.168.122.10:6080/vnc_auto.html?token=b6f94425-0a78-4b
Connected (unencrypted) to: QEMU (instance-00000011)
Send CtrlAltDel
$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 16436 qdisc noqueue
link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
inet 127.0.0.1/8 scope host lo
inet6 ::1/128 scope host
valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1450 qdisc pfifo_fast qlen 1000
link/ether fa:16:3e:fd:f5:2c brd ff:ff:ff:ff:ff:ff
inet 10.0.4.5/24 brd 10.0.4.255 scope global eth0
inet6 fe80::f816:3eff:fefd:f52c/64 scope link
valid_lft forever preferred_lft forever
$ _

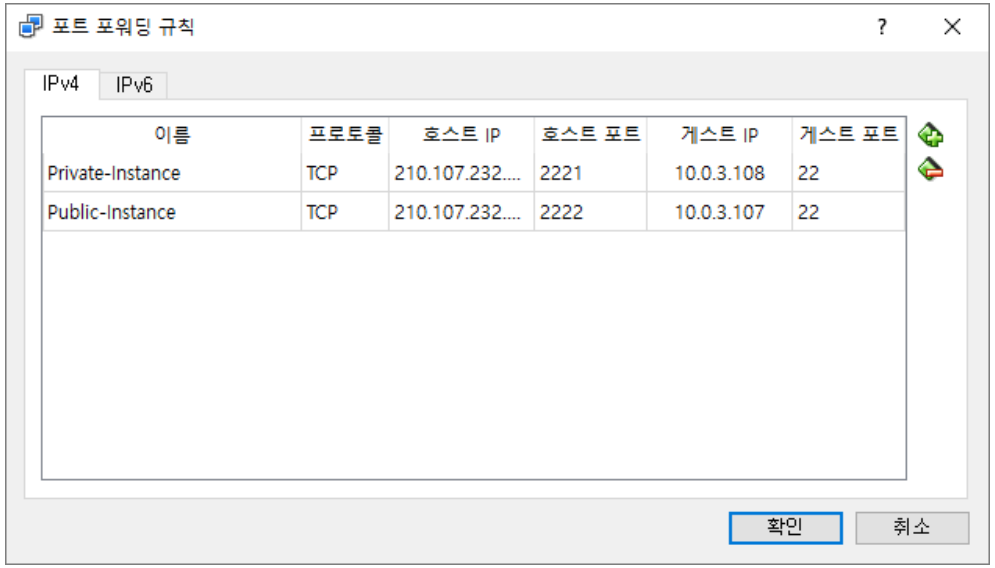

Controller
Router Namespace
qrouter
qg
Iptables
qr
DHCP Namespace
qdhcp
tap
Private Bridge
brq
Port
tap
VxLAN
Interface
Port
tap
Bridge
rq
Port
tap
enp0s8
192.168.122.10
Physical Network
VxLAN
Tunnels
Compute
Public
Instance
eth0
Private
Instance
eth0
enp0s8
192.168.122.20
Public Bridge
brq
Port
tap
Iptables
enp0s3
10.0.3.5
Private
brq
Port
tap
Iptables
VxLAN
Interface

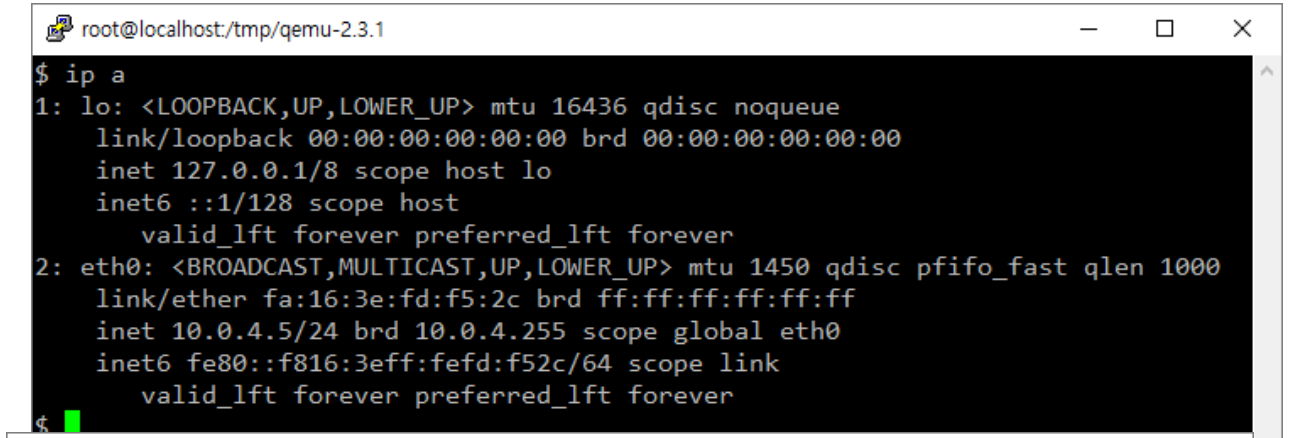
- Nova-vnc로 접속

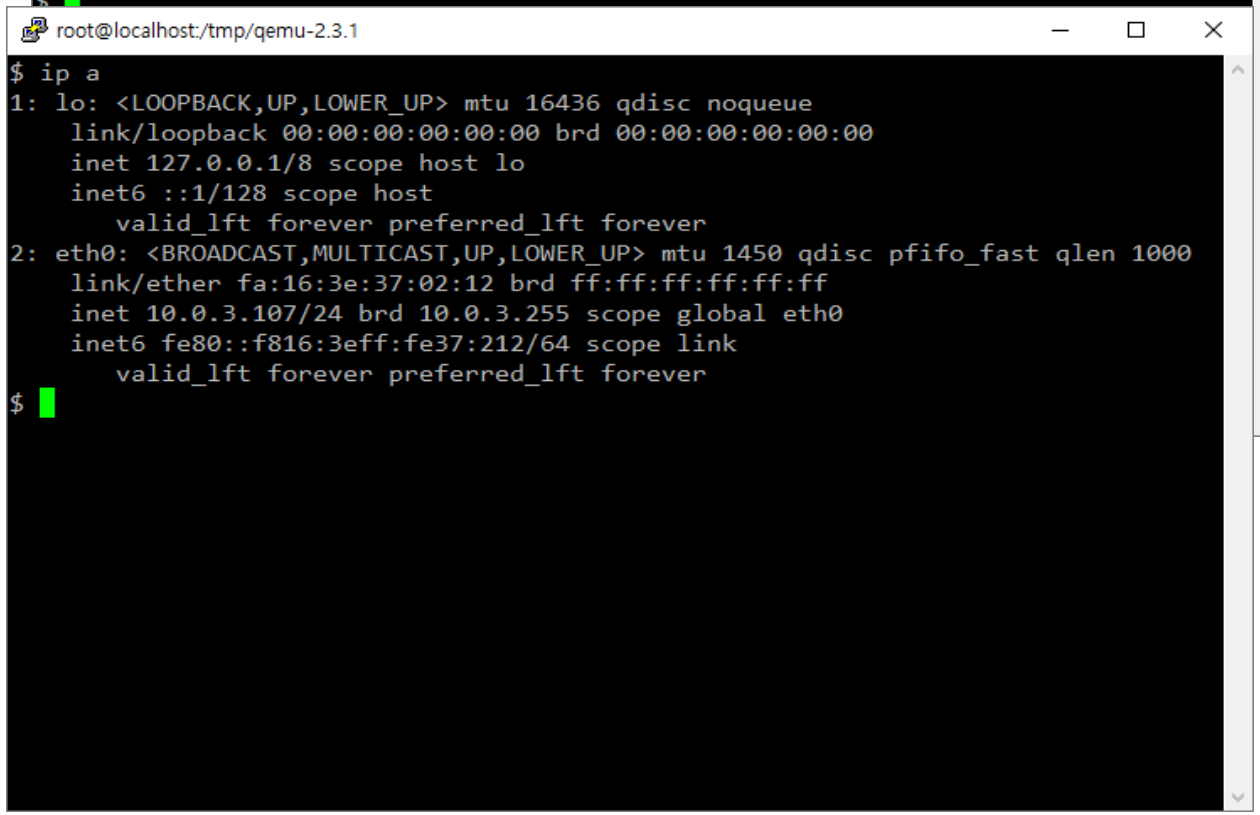

public-instance(8846ef3c
192.168.122.10:6080/vnc_auto.html?token=e1768c59-f072-4d
Connected (unencrypted) to: QEMU (instance-00000010)
Send CtrlAltDel
$ ping -c 4 8.8.8.8
PING 8.8.8.8 (8.8.8.8): 56 data bytes
64 bytes from 8.8.8.8: seq=0 ttl=39 time=101.955 ms
64 bytes from 8.8.8.8: seq=1 ttl=39 time=76.090 ms
64 bytes from 8.8.8.8: seq=2 ttl=39 time=125.562 ms
64 bytes from 8.8.8.8: seq=3 ttl=39 time=100.752 ms
--- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 76.090/101.089/125.562 ms
$
$ _


private-instance(be240ee
192.168.122.10:6080/vnc_auto.html?token=b6f94425-0a78-4b
Connected (unencrypted) to: QEMU (instance-00000011)
Send CtrlAltDel
$ ping -c 4 8.8.8.8
PING 8.8.8.8 (8.8.8.8): 56 data bytes
64 bytes from 8.8.8.8: seq=0 ttl=38 time=97.592 ms
64 bytes from 8.8.8.8: seq=1 ttl=38 time=71.978 ms
64 bytes from 8.8.8.8: seq=2 ttl=38 time=71.701 ms
64 bytes from 8.8.8.8: seq=3 ttl=38 time=93.178 ms
--- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 71.701/83.612/97.592 ms
$
$

- 포트 포워딩으로 외부에서 접속







- 질문!!
- Private Network의 인스턴스에게 Floating IP를 할당했는데 왜 NIC는 늘어나지 않는지… 상태는 왜 비활성화되어 있는지

```
[root@controller ~]# nova floating-ip-list
+--------------------------------------+------------+--------------------------------------+----------+--------+
| Id                                   | IP         | Server Id                            | Fixed IP | Pool   |
+--------------------------------------+------------+--------------------------------------+----------+--------+
| eafe2165-0457-42bb-928c-014d6df9f30d | 10.0.3.108 | be240eee-aa00-4edc-b438-81e13a072028 | 10.0.4.5 | public |
+--------------------------------------+------------+--------------------------------------+----------+--------+
[root@controller ~]# ping -c 4 10.0.3.108
PING 10.0.3.108 (10.0.3.108) 56(84) bytes of data.
64 bytes from 10.0.3.108: icmp_seq=1 ttl=63 time=1.46 ms
64 bytes from 10.0.3.108: icmp_seq=2 ttl=63 time=0.891 ms
64 bytes from 10.0.3.108: icmp_seq=3 ttl=63 time=1.36 ms
64 bytes from 10.0.3.108: icmp_seq=4 ttl=63 time=1.73 ms

--- 10.0.3.108 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3003ms
rtt min/avg/max/mdev = 0.891/1.364/1.737/0.306 ms
```

☐	이름	고정 IP	장치 연결됨	상태	관리자 상태	작업
☐	(1d5ee1e2-cf01)	10.0.3.108	network:floatingip	N/A	UP	포트 편집 ▾

• NTP 설정 문제

- 매뉴얼대로 하면 Controller 노드와 Compute 노드가 동기화가 안됨
- 방화벽 설정 필요

```
# firewall-cmd --permanent --zone=public --add-port=123/udp
# firewall-cmd --reload
```

• DB Access deny 에러

- 예) 1045, "Access denied for user 'neutron'@'controller'
- 계정 설정 문제, DB 비밀번호 및 설정 파일 확인

• Rabbitmq 통신 에러

- ERROR oslo.messaging._drivers.impl_rabbit [req-0387616a-9695-471a-8520-21bd503285ce - - - - -] AMQP server on controller:5672 is unreachable: [Errno 113] EHOSTUNREACH. Trying again in 2 seconds.]
- 방화벽 문제

firewall-cmd --permanent --zone=public --add-port=5672/tcp

firewall-cmd --reload

• Rabbitmq 통신 에러

- [compute node, nova log] AMQP server controller:5672 closed the connection. Check login credentials: Socket close
- [controller rabbitmq log]

```
=ERROR REPORT==== 15-May-2016::10:27:23 ===
closing AMQP connection <0.7769.0> (192.168.122.10:34042 -> 192.168.122.10:5672):
{handshake_error,starting,0,
        {amqp_error,access_refused,
                "AMQPLAIN login refused: user 'openstack' - invalid credentials",
                'connection.start_ok'}}
```

- Rabbitmq 계정 문제

```
# rabbitmqctl add_user openstack "PASSWORD“
# rabbitmqctl set_permissions openstack ".*" ".*" ".*"
```

• Neutron linuxbridge 에러

- [controller neutron linuxbridge log] AMQP server controller:5672 closed the connection. Check login credentials: Socket close

- [compute neutron linuxbridge log] AttributeError: 'LinuxBridgeNeutronAgentRPC' object has no attribute 'plugin_rpc'

- 원인 모름 재부팅 후 해결

• 문제의 시작

- 각 머신에서 호스트 네임을 안 바꿔서 그런지 nova-manage service list나 neutron agent-list와 같은 명령어를 입력했을 때 host가 “localhost.localdomain”으로 출력
- 마음에 들지 않음 각 머신 호스트 네임을 바꾸고 재시작
- 명령어 입력 시 이전의 호스트네임이 남아있음… 더 마음에 안 듬…

```
[root@controller ~]# neutron agent-list
+--------------------------------------+--------------------+-----------------------+-------+----------------+---------------------------+
| id                                   | agent_type         | host                  | alive | admin_state_up | binary                    |
+--------------------------------------+--------------------+-----------------------+-------+----------------+---------------------------+
| 237587b8-d8ef-4ff1-9a3d-2f1ba6ac7154 | DHCP agent         | localhost.localdomain | xxx   | True           | neutron-dhcp-agent        |
| 361fc8c2-044d-4750-8d78-0ce75094a5b1 | L3 agent           | localhost.localdomain | xxx   | True           | neutron-l3-agent          |
| 78e9bd8a-f240-4625-a4f2-fb4d6c69f672 | Metadata agent     | localhost.localdomain | xxx   | True           | neutron-metadata-agent    |
| 83c51c44-cb5d-47c5-9363-9ddace66763f | Linux bridge agent | controller            | :-)   | True           | neutron-linuxbridge-agent |
| a0d90937-a285-457c-883f-1b4008682381 | DHCP agent         | controller            | :-)   | True           | neutron-dhcp-agent        |
| a31fe6c1-7013-4efa-8c00-b80029b70f02 | L3 agent           | controller            | :-)   | True           | neutron-l3-agent          |
| d0fd4567-38fc-4ed7-b5fb-e1a36151d2ad | Linux bridge agent | localhost.localdomain | xxx   | True           | neutron-linuxbridge-agent |
| eaf61748-6271-469a-8560-1558a40eb12f | Metadata agent     | controller            | :-)   | True           | neutron-metadata-agent    |
+--------------------------------------+--------------------+-----------------------+-------+----------------+---------------------------+
```

• 문제의 시작

- Nova와 Neutron DB에 접근해서 직접 삭제

• 인스턴스 구동 시 문제

- nova hypervisor list 명령어 시 에러가 남. 하이퍼바이저를 못 찾아서 구동이 안 되는 건가?

- LinuxBridge 로그에 계속해서 에러
- Error in agent loop. Devices info: {'current': set(['tap4e0eaaa4-d9', 'tapc5683608-db', 'tap164d30dd-3d', 'tapbd79f0fd-b1']), 'removed': set([]), 'added': set(['tap4e0eaaa4-d9', 'tapc5683608-db', 'tap164d30dd-3d', 'tapbd79f0fd-b1']), 'updated': set([])}Error in agent loop. Devices info: {'current': set(['tap4e0eaaa4-d9', 'tapc5683608-db', 'tap164d30dd-3d', 'tapbd79f0fd-b1']), 'removed': set([]), 'added': set(['tap4e0eaaa4-d9', 'tapc5683608-db', 'tap164d30dd-3d', 'tapbd79f0fd-b1']), 'updated': set([])}
- Nova api 로그에도 에러, 여기저기 에러~
- Exception.**ComputeHostNotFound**(host=host)\ 2016-05-17 06:42:37.514 3155 ERROR nova.api.openstack.extensions Compute HostNotFound: Compute host **localhost.localdomain** could not be found.

- 인스턴스 구동 시 문제

- DB에서 호스트네임을 가져오는 듯 함

```
2016-05-17 06:42:37.514 3155 ERROR nova.api.openstack.extensions [req-f72de71f-8c8c-48c4-8821-d5ed314e2a03 ad891ed7de464dbb82173ab92f746862
258420b6db8f4ea49f13fce7b4e0838a - - -] Unexpected exception in API method
2016-05-17 06:42:37.514 3155 ERROR nova.api.openstack.extensions Traceback (most recent call last):
2016-05-17 06:42:37.514 3155 ERROR nova.api.openstack.extensions   File "/usr/lib/python2.7/site-packages/nova/api/openstack/extensions.py",
 line 478, in wrapped
2016-05-17 06:42:37.514 3155 ERROR nova.api.openstack.extensions     return f(*args, **kwargs)
2016-05-17 06:42:37.514 3155 ERROR nova.api.openstack.extensions   File "/usr/lib/python2.7/site-packages/nova/api/openstack/compute/hypervi
sors.py", line 88, in index
2016-05-17 06:42:37.514 3155 ERROR nova.api.openstack.extensions     for hyp in compute_nodes])
2016-05-17 06:42:37.514 3155 ERROR nova.api.openstack.extensions   File "/usr/lib/python2.7/site-packages/nova/compute/api.py", line 3504, i
n service_get_by_compute_host
2016-05-17 06:42:37.514 3155 ERROR nova.api.openstack.extensions     return objects.Service.get_by_compute_host(context, host_name)
2016-05-17 06:42:37.514 3155 ERROR nova.api.openstack.extensions   File "/usr/lib/python2.7/site-packages/oslo_versionedobjects/base.py", li
ne 171, in wrapper
2016-05-17 06:42:37.514 3155 ERROR nova.api.openstack.extensions     result = fn(cls, context, *args, **kwargs)
2016-05-17 06:42:37.514 3155 ERROR nova.api.openstack.extensions   File "/usr/lib/python2.7/site-packages/nova/objects/service.py", line 222
, in get_by_compute_host
2016-05-17 06:42:37.514 3155 ERROR nova.api.openstack.extensions     db_service = db.service_get_by_compute_host(context, host)
2016-05-17 06:42:37.514 3155 ERROR nova.api.openstack.extensions   File "/usr/lib/python2.7/site-packages/nova/db/api.py", line 139, in serv
ice_get_by_compute_host
2016-05-17 06:42:37.514 3155 ERROR nova.api.openstack.extensions     use_slave=use_slave)
2016-05-17 06:42:37.514 3155 ERROR nova.api.openstack.extensions   File "/usr/lib/python2.7/site-packages/nova/db/sqlalchemy/api.py", line 5
00, in service_get_by_compute_host
2016-05-17 06:42:37.514 3155 ERROR nova.api.openstack.extensions     raise exception.ComputeHostNotFound(host=host)
2016-05-17 06:42:37.514 3155 ERROR nova.api.openstack.extensions ComputeHostNotFound: Compute host localhost.localdomain could not be found.
2016-05-17 06:42:37.514 3155 ERROR nova.api.openstack.extensions
```

- 인스턴스 구동 시 문제

- DB에서 호스트네임을 가져오는 듯 함

```
def index(self, req):
    context = req.environ['nova.context']
    authorize(context)
    compute_nodes = self.host_api.compute_node_get_all(context)
    req.cache_db_compute_nodes(compute_nodes)
    return dict(hypervisors=[self._view_hypervisor(
                             hyp,
                             self.host_api.service_get_by_compute_host(
                                 context, hyp.host),
                             False)
                             for hyp in compute_nodes])
```

```
def compute_node_get_all(context):
    """Get all computeNodes.

    :param context: The security context

    :returns: List of dictionaries each containing compute node properties
    """
    return IMPL.compute_node_get_all(context)
```

```
def compute_node_get_all(self, ctxt, hypervisor_match=None):
    """Return list of compute nodes in all cells."""
    responses = self.msg_runner.compute_node_get_all(ctxt,
            hypervisor_match=hypervisor_match)
    # 1 response per cell.  Each response is a list of compute_node
    # entries.
    ret_nodes = []
    for response in responses:
        nodes = response.value_or_raise()
        for node in nodes:
            node = cells_utils.add_cell_to_compute_node(node,
                                                        response.cell_name)
            ret_nodes.append(node)
```

```
MariaDB [nova]> select id, deleted, host_ip, hypervisor_hostname from compute_nodes;
+----+---------+---------------+-----------------------+
| id | deleted | host_ip       | hypervisor_hostname   |
+----+---------+---------------+-----------------------+
|  1 |       0 | 192.168.122.20 | localhost.localdomain |
|  2 |       0 | 192.168.122.20 | compute1              |
+----+---------+---------------+-----------------------+
2 rows in set (0.00 sec)
```

- 인스턴스 구동 시 문제

- Nova DB의 compute_nodes 테이블의 해당 튜플 삭제
- Nova hypervisor-list 정상적으로 동작

- 그래도 인스턴스 구동 안됨 ㅋㅋㅋㅋ

- 한참을 헤매다가 컴퓨트 노드의 local_ip 설정이 잘 못 되어 있는 것 발견. 드디어 해결.

- 네트워크는 어렵다.
- 설치 진행하기 전에 호스트네임을 꼭 바꾸자. 설치 중간에 절대 바꾸지 말자.
- 정신 똑바로 차리고 오타 내지 말자.