네트워크 네임스페이스 (최영락, 오픈스택 스터디) - [문제]

2016 년 4 월 22 일 금요일

[문제 1]

DevStack Kilo 버전에 해당하는 내용을 git 로 clone 하고 해당 파일 목록 스크린샷 찍어보기

(결과 스크린샷 예시)

```
ian@ianychoi:~/test$ cd devstack/
ian@ianychoi:~/test/devstack$ ls
clean.sh        extras.d        inc             README.md       stack.sh
doc             files           lib             rejoin-stack.sh tests
driver_certs    functions       LICENSE         run_tests.sh    tools
eucarc          functions-common MAINTAINERS.rst samples        tox.ini
exerciserc      FUTURE.rst      Makefile        setup.cfg       unstack.sh
exercises       gate            openrc          setup.py
exercise.sh     HACKING.rst     pkg             stackrc
ian@ianychoi:~/test/devstack$ head README.md
DevStack is a set of scripts and utilities to quickly deploy an OpenStack cloud.

# Goals

* To quickly build dev OpenStack environments in a clean Ubuntu or Fedora
  environment
* To describe working configurations of OpenStack (which code branches
  work together?  what do config files look like for those branches?)
* To make it easier for developers to dive into OpenStack so that they can
  productively contribute without having to understand every part of the
```

[문제 2]

다음과 같이 Linux Bridge 를 생성 후 인터페이스 추가 및 제거까지 확인해 봅니다. (스크린샷: Ubuntu 14.04 LTS 기준)

```
root@ianychoi:~# brctl show
The program 'brctl' is currently not installed. You can install it by typing:
apt-get install bridge-utils
root@ianychoi:~# apt-get install bridge-utils
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  linux-headers-3.16.0-38 linux-headers-3.16.0-38-generic
  linux-headers-3.16.0-53 linux-headers-3.16.0-53-generic
  linux-headers-3.16.0-60 linux-headers-3.16.0-60-generic
  linux-image-3.16.0-38-generic linux-image-3.16.0-53-generic
  linux-image-3.16.0-60-generic
Use 'apt-get autoremove' to remove them.
The following NEW packages will be installed:
  bridge-utils
0 upgraded, 1 newly installed, 0 to remove and 65 not upgraded.
Need to get 29.2 kB of archives.
After this operation, 146 kB of additional disk space will be used.
Get:1 http://azure.archive.ubuntu.com/ubuntu/ trusty/main bridge-utils amd64 1.5
-6ubuntu2 [29.2 kB]
Fetched 29.2 kB in 0s (64.1 kB/s)
Selecting previously unselected package bridge-utils.
(Reading database ... 277631 files and directories currently installed.)
Preparing to unpack .../bridge-utils_1.5-6ubuntu2_amd64.deb ...
Unpacking bridge-utils (1.5-6ubuntu2) ...
Processing triggers for man-db (2.6.7.1-1ubuntu1) ...
Setting up bridge-utils (1.5-6ubuntu2) ...
root@ianychoi:~# brctl show
bridge name     bridge id               STP enabled     interfaces
root@ianychoi:~# brctl addbr br0
root@ianychoi:~# ip link add type veth
root@ianychoi:~# brctl addif br0 vteh0
interface vteh0 does not exist!
root@ianychoi:~# brctl addif br0 veth0
root@ianychoi:~# brctl addif br0 veth1
root@ianychoi:~# brctl show
bridge name     bridge id               STP enabled     interfaces
br0             8000.4e92e57308d6       no              veth0
                                                        veth1
```

```
root@ianychoi:~# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group defaul
t
    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: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group defa
ult qlen 1000
    link/ether 00:0d:3a:40:35:dc brd ff:ff:ff:ff:ff:ff
    inet 10.0.0.4/24 brd 10.0.0.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::20d:3aff:fe40:35dc/64 scope link
       valid_lft forever preferred_lft forever
18: br0: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group default
    link/ether 4e:92:e5:73:08:d6 brd ff:ff:ff:ff:ff:ff
19: veth0: <BROADCAST,MULTICAST> mtu 1500 qdisc noop master br0 state DOWN group
 default qlen 1000
    link/ether 4e:92:e5:73:08:d6 brd ff:ff:ff:ff:ff:ff
20: veth1: <BROADCAST,MULTICAST> mtu 1500 qdisc noop master br0 state DOWN group
 default qlen 1000
    link/ether b2:c3:fe:28:de:e2 brd ff:ff:ff:ff:ff:ff
root@ianychoi:~#
root@ianychoi:~# brctl delif br0 veth0
root@ianychoi:~# brctl delif br0 veth1
root@ianychoi:~# brctl show
bridge name     bridge id               STP enabled     interfaces
br0             8000.000000000000       no
root@ianychoi:~# brctl delbr br0
root@ianychoi:~# ip link del veth0
```

[문제 3]

3 주차 예습 자료를 보고 직접 해 봅니다. 그리고

다음과 같이 네트워크 네임스페이스를 사용하여 직접 구성해 보는 과정을 직접 해 봅시다 ☺

- **veth-a: ns1 네임스페이스, IP 주소 / 서브넷 마스크: 172.16.1.1 / 255.255.255.0 할당**
- **veth-b: ns2 네임스페이스, IP 주소 / 서브넷 마스크: 172.16.1.2 / 255.255.255.0 할당**
- **veth-c: ns3 네임스페이스, IP 주소 / 서브넷 마스크: 172.16.1.1 / 255.255.255.0 할당**
- **veth-d: ns4 네임스페이스, IP 주소 / 서브넷 마스크: 172.16.1.2 / 255.255.255.0 할당**
- **veth-e: ns1 네임스페이스, IP 주소 / 서브넷 마스크: 172.16.2.1 / 255.255.255.0 할당**
- **veth-f: 디폴트 네임스페이스, IP 주소 / 서브넷 마스크: 172.16.2.2 / 255.255.255.0 할당**

확인 예시 (다음 스크린샷 참고)

Terminal 1 - Terminal - root@ianychoi: ~

```
root@ianychoi:~# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group defaul
t
    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: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group defa
ult qlen 1000
    link/ether 00:0d:3a:40:35:dc brd ff:ff:ff:ff:ff:ff
    inet 10.0.0.4/24 brd 10.0.0.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::20d:3aff:fe40:35dc/64 scope link
       valid_lft forever preferred_lft forever
15: veth-f: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP
 group default qlen 1000
    link/ether 82:28:4a:44:b0:f3 brd ff:ff:ff:ff:ff:ff
    inet 172.16.2.2/24 scope global veth-f
       valid_lft forever preferred_lft forever
    inet6 fe80::8028:4aff:fe44:b0f3/64 scope link
       valid_lft forever preferred_lft forever
root@ianychoi:~# ip netns exec ns1 ip a
1: lo: <LOOPBACK> mtu 65536 qdisc noop state DOWN group default
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
6: veth-a: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP
group default qlen 1000
    link/ether de:a3:36:d1:ad:64 brd ff:ff:ff:ff:ff:ff
    inet 172.16.1.1/24 scope global veth-a
       valid_lft forever preferred_lft forever
    inet6 fe80::dca3:36ff:fed1:ad64/64 scope link
       valid_lft forever preferred_lft forever
16: veth-e: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP
 group default qlen 1000
    link/ether 5a:59:2c:fa:44:00 brd ff:ff:ff:ff:ff:ff
    inet 172.16.2.1/24 scope global veth-e
       valid_lft forever preferred_lft forever
    inet6 fe80::5859:2cff:fefa:4400/64 scope link
       valid_lft forever preferred_lft forever
root@ianychoi:~# ip netns exec ns2 ip a
1: lo: <LOOPBACK> mtu 65536 qdisc noop state DOWN group default
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
5: veth-b: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP
group default qlen 1000
    link/ether 96:15:5d:29:70:d2 brd ff:ff:ff:ff:ff:ff
    inet 172.16.1.2/24 scope global veth-b
       valid_lft forever preferred_lft forever
    inet6 fe80::9415:5dff:fe29:70d2/64 scope link
       valid_lft forever preferred_lft forever
root@ianychoi:~#
```

Terminal 2 - Terminal - root@ianychoi: ~

```
root@ianychoi:~# ip netns
ns4
ns3
ns2
ns1
root@ianychoi:~# ip netns exec ns3 ip a
1: lo: <LOOPBACK> mtu 65536 qdisc noop state DOWN group default
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
14: veth-c: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP
 group default qlen 1000
    link/ether a6:3d:d4:a2:bf:10 brd ff:ff:ff:ff:ff:ff
    inet 172.16.1.1/24 scope global veth-c
       valid_lft forever preferred_lft forever
    inet6 fe80::a43d:d4ff:fea2:bf10/64 scope link
       valid_lft forever preferred_lft forever
root@ianychoi:~# ip netns exec ns4 ip a
1: lo: <LOOPBACK> mtu 65536 qdisc noop state DOWN group default
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
13: veth-d: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP
 group default qlen 1000
    link/ether 8e:0f:cf:75:e8:3c brd ff:ff:ff:ff:ff:ff
    inet 172.16.1.2/24 scope global veth-d
       valid_lft forever preferred_lft forever
    inet6 fe80::8c0f:cfff:fe75:e83c/64 scope link
       valid_lft forever preferred_lft forever
root@ianychoi:~#
```

Terminal - ian@ianychoi: ~

```
ian@ianychoi:~$ ping 172.16.2.1
PING 172.16.2.1 (172.16.2.1) 56(84) bytes of data.
64 bytes from 172.16.2.1: icmp_seq=1 ttl=64 time=0.033 ms
64 bytes from 172.16.2.1: icmp_seq=2 ttl=64 time=0.043 ms
64 bytes from 172.16.2.1: icmp_seq=3 ttl=64 time=0.042 ms
64 bytes from 172.16.2.1: icmp_seq=4 ttl=64 time=0.043 ms
^C
--- 172.16.2.1 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 2998ms
rtt min/avg/max/mdev = 0.033/0.040/0.043/0.006 ms
ian@ianychoi:~$
```

Terminal - root@ianychoi: ~

```
root@ianychoi:~# ip netns exec ns1 ping 172.16.2.2
PING 172.16.2.2 (172.16.2.2) 56(84) bytes of data.
64 bytes from 172.16.2.2: icmp_seq=1 ttl=64 time=0.030 ms
64 bytes from 172.16.2.2: icmp_seq=2 ttl=64 time=0.043 ms
64 bytes from 172.16.2.2: icmp_seq=3 ttl=64 time=0.049 ms
64 bytes from 172.16.2.2: icmp_seq=4 ttl=64 time=0.038 ms
^C
--- 172.16.2.2 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 2999ms
rtt min/avg/max/mdev = 0.030/0.040/0.049/0.007 ms
root@ianychoi:~#
```

Terminal - root@ianychoi: ~

```
ian@ianychoi:~$ sudo -i
root@ianychoi:~# clear
root@ianychoi:~# ip netns exec ns1 ping 172.16.1.2
PING 172.16.1.2 (172.16.1.2) 56(84) bytes of data.
64 bytes from 172.16.1.2: icmp_seq=1 ttl=64 time=0.030 ms
64 bytes from 172.16.1.2: icmp_seq=2 ttl=64 time=0.034 ms
64 bytes from 172.16.1.2: icmp_seq=3 ttl=64 time=0.042 ms
^C
--- 172.16.1.2 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 1999ms
rtt min/avg/max/mdev = 0.030/0.035/0.042/0.007 ms
root@ianychoi:~# ip netns exec ns2 ping 172.16.1.1
PING 172.16.1.1 (172.16.1.1) 56(84) bytes of data.
64 bytes from 172.16.1.1: icmp_seq=1 ttl=64 time=0.028 ms
64 bytes from 172.16.1.1: icmp_seq=2 ttl=64 time=0.050 ms
64 bytes from 172.16.1.1: icmp_seq=3 ttl=64 time=0.043 ms
^C
--- 172.16.1.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 1999ms
rtt min/avg/max/mdev = 0.028/0.040/0.050/0.010 ms
root@ianychoi:~# ip netns exec ns3 ping 172.16.1.2
PING 172.16.1.2 (172.16.1.2) 56(84) bytes of data.
64 bytes from 172.16.1.2: icmp_seq=1 ttl=64 time=0.033 ms
64 bytes from 172.16.1.2: icmp_seq=2 ttl=64 time=0.042 ms
64 bytes from 172.16.1.2: icmp_seq=3 ttl=64 time=0.044 ms
^C
--- 172.16.1.2 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 1999ms
rtt min/avg/max/mdev = 0.033/0.039/0.044/0.008 ms
root@ianychoi:~# ip netns exec ns4 ping 172.16.1.1
PING 172.16.1.1 (172.16.1.1) 56(84) bytes of data.
64 bytes from 172.16.1.1: icmp_seq=1 ttl=64 time=0.028 ms
64 bytes from 172.16.1.1: icmp_seq=2 ttl=64 time=0.044 ms
64 bytes from 172.16.1.1: icmp_seq=3 ttl=64 time=0.039 ms
^C
--- 172.16.1.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 1999ms
rtt min/avg/max/mdev = 0.028/0.037/0.044/0.006 ms
root@ianychoi:~# S
```

Terminal - root@ianychoi: ~ (left window)

```
root@ianychoi:~# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group defaul
t
    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: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group defa
ult qlen 1000
    link/ether 00:0d:3a:40:35:dc brd ff:ff:ff:ff:ff:ff
    inet 10.0.0.4/24 brd 10.0.0.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::20d:3aff:fe40:35dc/64 scope link
       valid_lft forever preferred_lft forever
15: veth-f: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP
 group default qlen 1000
    link/ether 82:28:4a:44:b0:f3 brd ff:ff:ff:ff:ff:ff
    inet 172.16.2.2/24 scope global veth-f
       valid_lft forever preferred_lft forever
    inet6 fe80::8028:4aff:fe44:b0f3/64 scope link
       valid_lft forever preferred_lft forever
root@ianychoi:~# ip netns exec ns1 ip a
1: lo: <LOOPBACK> mtu 65536 qdisc noop state DOWN group default
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
6: veth-a: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP
group default qlen 1000
    link/ether de:a3:36:d1:ad:64 brd ff:ff:ff:ff:ff:ff
    inet 172.16.1.1/24 scope global veth-a
       valid_lft forever preferred_lft forever
    inet6 fe80::dca3:36ff:fed1:ad64/64 scope link
       valid_lft forever preferred_lft forever
16: veth-e: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP
 group default qlen 1000
    link/ether 5a:59:2c:fa:44:00 brd ff:ff:ff:ff:ff:ff
    inet 172.16.2.1/24 scope global veth-e
       valid_lft forever preferred_lft forever
    inet6 fe80::5859:2cff:fefa:4400/64 scope link
       valid_lft forever preferred_lft forever
root@ianychoi:~# ip netns exec ns2 ip a
1: lo: <LOOPBACK> mtu 65536 qdisc noop state DOWN group default
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
5: veth-b: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP
group default qlen 1000
    link/ether 96:15:5d:29:70:d2 brd ff:ff:ff:ff:ff:ff
    inet 172.16.1.2/24 scope global veth-b
       valid_lft forever preferred_lft forever
    inet6 fe80::9415:5dff:fe29:70d2/64 scope link
       valid_lft forever preferred_lft forever
root@ianychoi:~#
```

Terminal - root@ianychoi: ~ (top middle window)

```
root@ianychoi:~# ip netns
ns4
ns3
ns2
ns1
root@ianychoi:~# ip netns exec ns3 ip a
1: lo: <LOOPBACK> mtu 65536 qdisc noop state DOWN group default
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
14: veth-c: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP
 group default qlen 1000
    link/ether a6:3d:d4:a2:bf:10 brd ff:ff:ff:ff:ff:ff
    inet 172.16.1.1/24 scope global veth-c
       valid_lft forever preferred_lft forever
    inet6 fe80::a43d:d4ff:fea2:bf10/64 scope link
       valid_lft forever preferred_lft forever
root@ianychoi:~# ip netns exec ns4 ip a
1: lo: <LOOPBACK> mtu 65536 qdisc noop state DOWN group default
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
13: veth-d: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP
 group default qlen 1000
    link/ether 8e:0f:cf:75:e8:3c brd ff:ff:ff:ff:ff:ff
    inet 172.16.1.2/24 scope global veth-d
       valid_lft forever preferred_lft forever
    inet6 fe80::8c0f:cfff:fe75:e83c/64 scope link
       valid_lft forever preferred_lft forever
root@ianychoi:~#
```

Terminal - ian@ianychoi: ~ (middle window)

```
ian@ianychoi:~$ ping 172.16.2.1
PING 172.16.2.1 (172.16.2.1) 56(84) bytes of data.
64 bytes from 172.16.2.1: icmp_seq=1 ttl=64 time=0.031 ms
64 bytes from 172.16.2.1: icmp_seq=2 ttl=64 time=0.037 ms
64 bytes from 172.16.2.1: icmp_seq=3 ttl=64 time=0.033 ms
64 bytes from 172.16.2.1: icmp_seq=4 ttl=64 time=0.025 ms
64 bytes from 172.16.2.1: icmp_seq=5 ttl=64 time=0.026 ms
64 bytes from 172.16.2.1: icmp_seq=6 ttl=64 time=0.032 ms
64 bytes from 172.16.2.1: icmp_seq=7 ttl=64 time=0.037 ms
64 bytes from 172.16.2.1: icmp_seq=8 ttl=64 time=0.031 ms
64 bytes from 172.16.2.1: icmp_seq=9 ttl=64 time=0.031 ms
64 bytes from 172.16.2.1: icmp_seq=10 ttl=64 time=0.043 ms
```

Terminal - root@ianychoi: ~ (bottom middle window)

```
root@ianychoi:~# ip netns exec ns1 ping 172.16.2.2
PING 172.16.2.2 (172.16.2.2) 56(84) bytes of data.
64 bytes from 172.16.2.2: icmp_seq=1 ttl=64 time=0.028 ms
64 bytes from 172.16.2.2: icmp_seq=2 ttl=64 time=0.040 ms
64 bytes from 172.16.2.2: icmp_seq=3 ttl=64 time=0.039 ms
64 bytes from 172.16.2.2: icmp_seq=4 ttl=64 time=0.032 ms
64 bytes from 172.16.2.2: icmp_seq=5 ttl=64 time=0.040 ms
64 bytes from 172.16.2.2: icmp_seq=6 ttl=64 time=0.036 ms
64 bytes from 172.16.2.2: icmp_seq=7 ttl=64 time=0.092 ms
64 bytes from 172.16.2.2: icmp_seq=8 ttl=64 time=0.031 ms
64 bytes from 172.16.2.2: icmp_seq=9 ttl=64 time=0.034 ms
```

Terminal - root@ianychoi: ~ (top right window)

```
root@ianychoi:~# ip netns exec ns1 ping 172.16.1.2
PING 172.16.1.2 (172.16.1.2) 56(84) bytes of data.
64 bytes from 172.16.1.2: icmp_seq=1 ttl=64 time=0.029 ms
64 bytes from 172.16.1.2: icmp_seq=2 ttl=64 time=0.032 ms
64 bytes from 172.16.1.2: icmp_seq=3 ttl=64 time=0.035 ms
64 bytes from 172.16.1.2: icmp_seq=4 ttl=64 time=0.024 ms
64 bytes from 172.16.1.2: icmp_seq=5 ttl=64 time=0.038 ms
64 bytes from 172.16.1.2: icmp_seq=6 ttl=64 time=0.036 ms
64 bytes from 172.16.1.2: icmp_seq=7 ttl=64 time=0.055 ms
```

Terminal - root@ianychoi: ~ (middle right window)

```
root@ianychoi:~# ip netns exec ns2 ping 172.16.1.1
PING 172.16.1.1 (172.16.1.1) 56(84) bytes of data.
64 bytes from 172.16.1.1: icmp_seq=1 ttl=64 time=0.024 ms
64 bytes from 172.16.1.1: icmp_seq=2 ttl=64 time=0.025 ms
64 bytes from 172.16.1.1: icmp_seq=3 ttl=64 time=0.026 ms
64 bytes from 172.16.1.1: icmp_seq=4 ttl=64 time=0.027 ms
64 bytes from 172.16.1.1: icmp_seq=5 ttl=64 time=0.027 ms
64 bytes from 172.16.1.1: icmp_seq=6 ttl=64 time=0.026 ms
64 bytes from 172.16.1.1: icmp_seq=7 ttl=64 time=0.037 ms
```

Terminal - root@ianychoi: ~ (lower right window)

```
root@ianychoi:~# ip netns exec ns3 ping 172.16.1.2
PING 172.16.1.2 (172.16.1.2) 56(84) bytes of data.
64 bytes from 172.16.1.2: icmp_seq=1 ttl=64 time=0.031 ms
64 bytes from 172.16.1.2: icmp_seq=2 ttl=64 time=0.035 ms
64 bytes from 172.16.1.2: icmp_seq=3 ttl=64 time=0.047 ms
64 bytes from 172.16.1.2: icmp_seq=4 ttl=64 time=0.046 ms
64 bytes from 172.16.1.2: icmp_seq=5 ttl=64 time=0.056 ms
64 bytes from 172.16.1.2: icmp_seq=6 ttl=64 time=0.043 ms
```

Terminal - root@ianychoi: ~ (bottom right window)

```
root@ianychoi:~# ip netns exec ns4 ping 172.16.1.1
PING 172.16.1.1 (172.16.1.1) 56(84) bytes of data.
64 bytes from 172.16.1.1: icmp_seq=1 ttl=64 time=0.025 ms
64 bytes from 172.16.1.1: icmp_seq=2 ttl=64 time=0.043 ms
S64 bytes from 172.16.1.1: icmp_seq=3 ttl=64 time=0.032 ms
64 bytes from 172.16.1.1: icmp_seq=4 ttl=64 time=0.030 ms
64 bytes from 172.16.1.1: icmp_seq=5 ttl=64 time=0.046 ms
```