

[] Network Namespace

: CentOS 7.6.1810
: root

Network Namespace

가 .
Network Space() , , IP

Host .

Default Network Namespace Check

Local Host



```
# Host      Network Namespace
$ lsns -t net -o pid,uid,user,command
PID  UID USER  COMMAND
  1    0 root  /sbin/init maybe-ubiquity
```

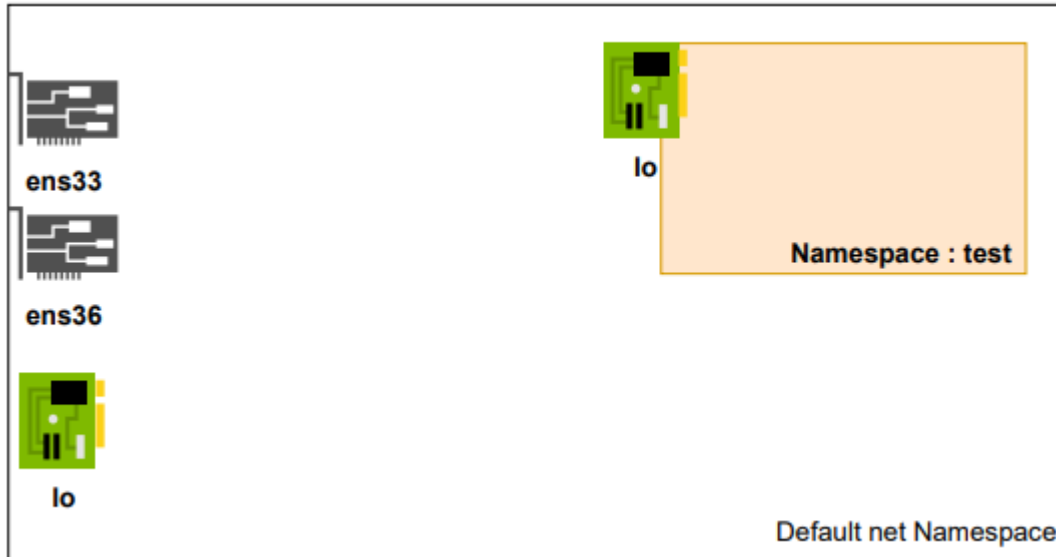
Host PID 1 (Init)

.

가 nic(: eth0) lo 가

Create Network Namespace

Local Host



lo 가

```
# test 가 Namespace
```

```
$ ip netns add test
```

```
$ ip netns  
test
```

```
# Check
```

PID 가 lsns

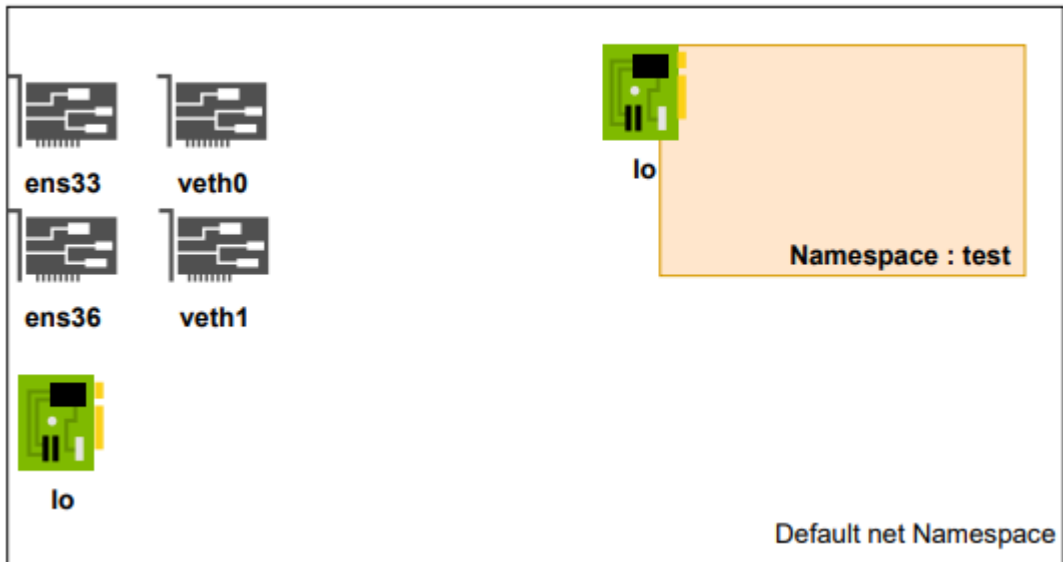
```
$ lsns -t net
```

```
PID USER TYPE COMMAND
```

```
1 root net /usr/lib/systemd/systemd --switched-root --  
system --deserialize 22
```

Namespace Network 1 – 가

Local Host



가 Network Namespace 가
veth

veth HOST <--->

HOST 가 가 . veth type peer pair

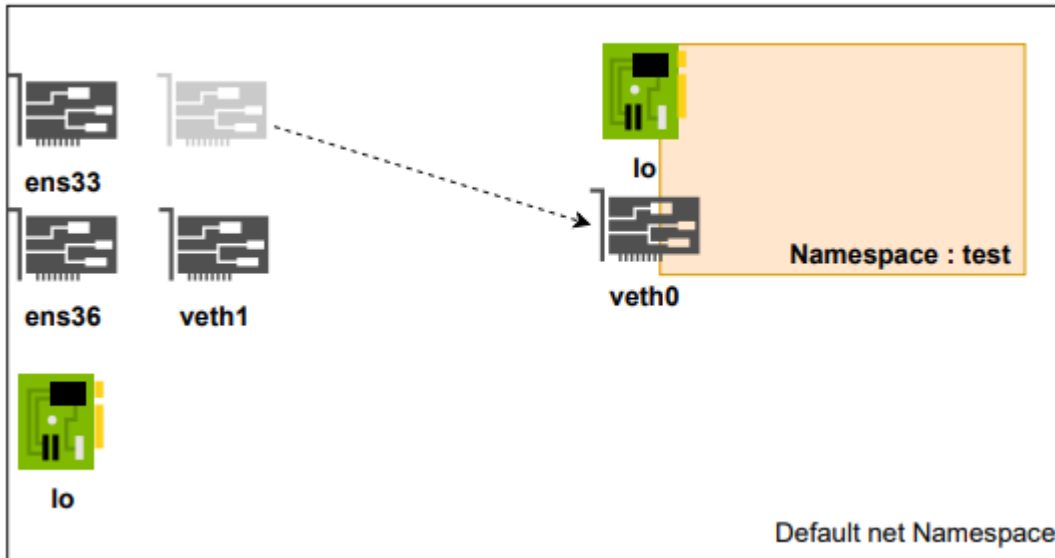
\$ ip link add veth0 type veth peer name veth1

HOST veth0/veth1 2 가 가 .

\$ ip -br -c addr			
lo	UNKNOWN	127.0.0.1/8	
ens33	UP	211.239.150.48/23	
ens36	UP	192.168.0.2/24	
veth1@veth0	DOWN		
veth0@veth1	DOWN		

Namespace Network 2 – 가

Local Host



가 , test

```
# veth0 test Namespace Set
$ ip link set veth0 netns test
```

```
# HOST veth0 test namespace
```

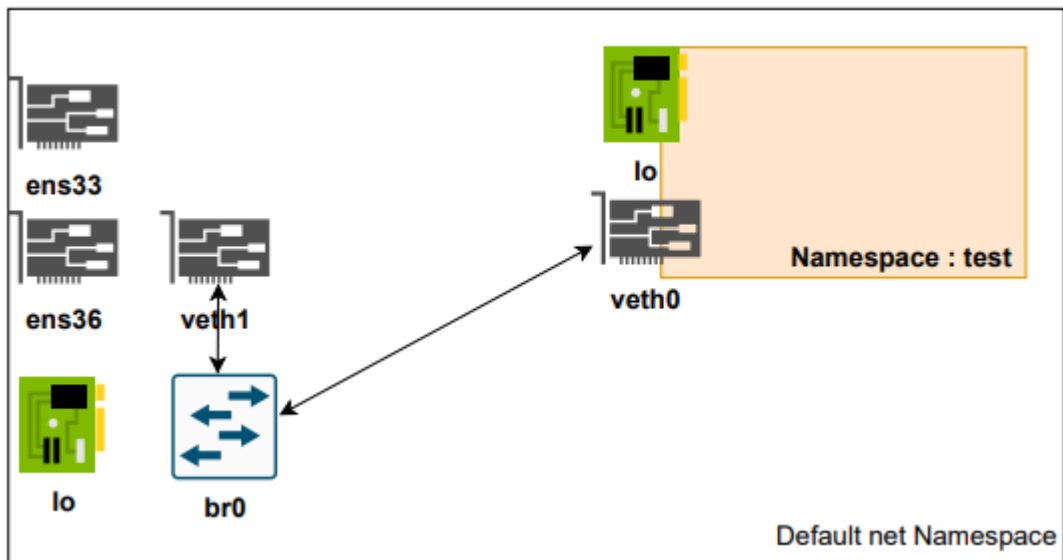
```
$ ip -br -c addr
lo UNKNOWN 127.0.0.1/8
ens33 UP 211.239.150.48/23
ens36 UP 192.168.0.2/24
veth1@if5 DOWN
```

```
test namespace 가 veth0
```

```
# test namespace netns exec
$ ip netns exec test ip -br addr
lo DOWN
veth0@if4 DOWN
```

Namespace Network 3 - bridge

Local Host



HOST test namespace veth0 veth1 가
DOWN
가
HOST IP
(bridge)
가

```
# Check
$ ( 가 ) yum install -y bridge-utils-1.5-9.el7.x86_64
$ brctl show
bridge name      bridge id      STP enabled
interfaces
```

가 . br0 HOST

```
# Bridge Create & Check
$ ip link add br0 type bridge

$ brctl show
bridge name      bridge id      STP enabled
interfaces
br0              8000.000000000000  no
```

```
# 가
$ ip -br -c addr
lo              UNKNOWN      127.0.0.1/8
```

```
ens33          UP          211.239.150.48/23
ens36          UP          192.168.0.2/24
veth1@if5      DOWN
br0            DOWN
```

```
br0    vethx
```

```
# HOST          veth1    Host    br0
$ ip link set veth1 master br0
```

```
# check bridge veth1 가
$ brctl show
bridge name      bridge id                STP enabled
interfaces
br0              8000.46df623e69e4        no          veth1
```

```
가
,
, IP
ifconfig          net-util          ip
```

```
# netns exec          test Namespace    veth0          IP
UP
$ ip netns exec test ip addr add 10.10.10.2/24 dev veth0
$ ip netns exec test ip link set veth0 up
```

```
# host veth1          bridge          up
$ ip link set br0 up
$ ip link set veth1 up
```

```
# UP check          가          UP
$ ip -br -c addr
lo                UNKNOWN          127.0.0.1/8
ens33            UP          211.239.150.48/23
ens36            UP          192.168.0.2/24
veth1@if5        UP
br0              UP
```

```
# test namespace          UP
```

```
$ ip netns exec test ip link
1: lo: <LOOPBACK> mtu 65536 qdisc noop state DOWN mode DEFAULT
group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
5: veth0@if4: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc
noqueue state UP mode DEFAULT group default qlen 1000
    link/ether f2:1c:09:d4:47:fc brd ff:ff:ff:ff:ff:ff link-
netnsid 0
```

```
# lo          가 DOWN          가
. UP          UNKNOWN
$ ip netns exec test ip link set dev lo up
$ ip netns exec test ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state
UNKNOWN group default qlen 1000
```

```
# Check
$ ip netns exec test ping 127.0.0.1
PING 127.0.0.1 (127.0.0.1) 56(84) bytes of data.
64 bytes from 127.0.0.1: icmp_seq=1 ttl=64 time=0.063 ms
64 bytes from 127.0.0.1: icmp_seq=2 ttl=64 time=0.058 ms
```

```
# Check 2
Host
Gateway          IP
Routing          가          ,          ip
.
```

```
#          IP
```

```
$ ip addr add 10.10.10.200/24 dev br0
```

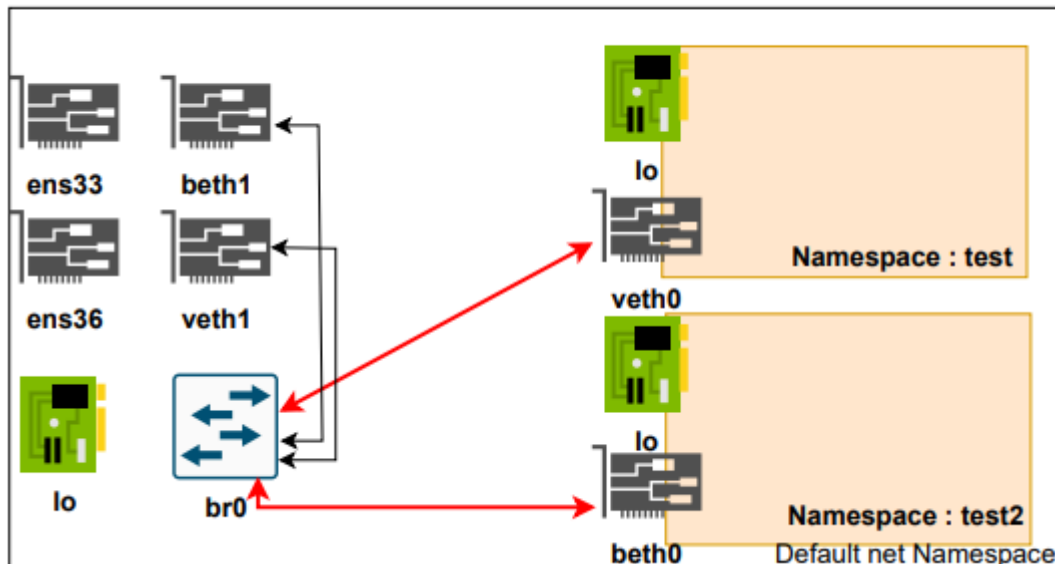
```
# test          veth0          Ping
$ ping 10.10.10.2
ping 10.10.10.2 -c 2
PING 10.10.10.2 (10.10.10.2) 56(84) bytes of data.
64 bytes from 10.10.10.2: icmp_seq=1 ttl=64 time=0.073 ms
64 bytes from 10.10.10.2: icmp_seq=2 ttl=64 time=0.071 ms
```

```
--- 10.10.10.2 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 999ms
```

rtt min/avg/max/mdev = 0.071/0.072/0.073/0.001 ms

Namespace Network 4 -

Local Host



test namespace 가

가 , 가 .

test2 namespace 가 beth0/beth1

IP test <---> test2 Ping

```
ip netns add test2
ip link add beth0 type veth peer name beth1
ip link set beth0 netns test2
ip link set beth1 master br0
ip netns exec test2 ip addr add 10.10.10.3/24 dev beth0
ip netns exec test2 ip link set beth0 up
ip netns exec test2 ip link set dev lo up
ip link set beth1 up
```

test2 namespace

```
$ ip netns
test2 (id: 1)
test (id: 0)
```

```
$ ip -br -c addr
```

lo	UNKNOWN	127.0.0.1/8
ens33	UP	211.239.150.48/23
ens36	UP	192.168.0.2/24
veth1@if5	UP	
br0	UP	
beth1@if8	UP	

```
$ brctl show
```

bridge name	bridge id	STP enabled	interfaces
br0	8000.2e0e64ccb0e5	no	beth1 veth1

```
# test namespace veth0(10.10.10.2) Ping
```

```
ip netns exec test2 ping 10.10.10.2 -c 2
```

```
PING 10.10.10.2 (10.10.10.2) 56(84) bytes of data.
```

```
64 bytes from 10.10.10.2: icmp_seq=1 ttl=64 time=0.112 ms
```

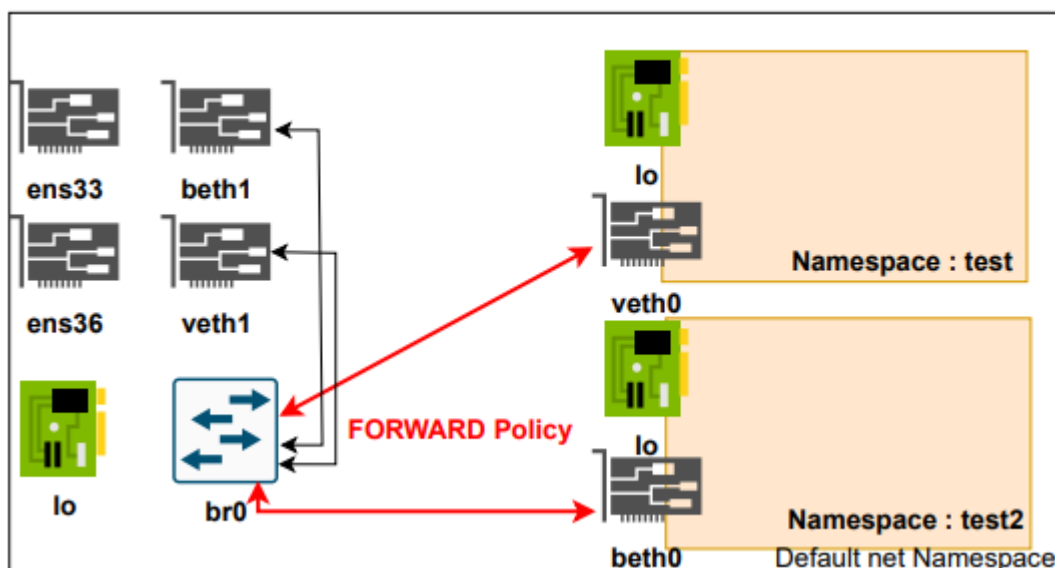
```
64 bytes from 10.10.10.2: icmp_seq=2 ttl=64 time=0.076 ms
```

```
--- 10.10.10.2 ping statistics ---
```

```
2 packets transmitted, 2 received, 0% packet loss, time 1000ms
```

```
rtt min/avg/max/mdev = 0.076/0.094/0.112/0.018 ms
```

Local Host



```
#  
HOST
```

```
?  
lo ( )
```

```
, Host
```

```

NAT
ip4 FORWARD HOST

# HOST iptables FORWARD ACCEPT
$ iptables -nL | grep -i forward
Chain FORWARD (policy DROP)

#
$ iptables --policy FORWARD ACCEPT
$ iptables -nL | grep -i forward
Chain FORWARD (policy ACCEPT)

$ service iptables save ( OS )

# ip4v.forward
echo 1 > /proc/sys/net/ipv4/ip_forward
sysctl --system

# check
#
```