docker 虛擬化技術 = 隔離 獨立主機

計算机網路 底層技術

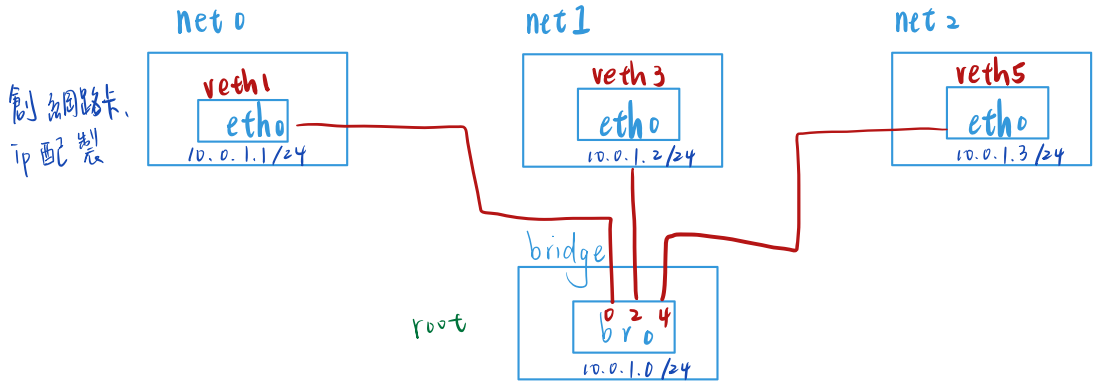
network 、 process 、 UTS namespace (獨立主机名稱、域名) 、 user 、 mount

IPC

PID (不容易，PID 可以一樣)

mininet 使用了 network namespace 創造了不同的網路空間

Test 1: network namespace 隔離



apt install bridge-utils

創立一個 bridge br0

ip link add br0 type bridge
ip link set dev br0 up

br0

brctl show

創造一個 namespace

ip netns add net1
ip netns ls

net1

創 veth pair (虛擬的乙太網路卡) (被創造出來的時候是一对)

ip link add type veth x3
ip link

... veth1
) -x3
... veth0

ifconfig -a

... veth1

... veth0

給 veth pair 設 ip

創網路空間 [NAME]

ip netns add net0 /net1 /net2
ip netns ls

net0
net1
net2

在網路空間中執行命令

ip netns exec net0 ip addr
ip netns exec net0 bash
ip addr

把 veth1 加进去 net0

```
# ip link set dev veth1 netns net0
```

把 veth1 改成 eth0

```
# ip netns exec net0 ip link set dev veth1 name eth0
```

配置 ip

```
# ip netns exec net0 ip addr add 10.0.1.1/24 dev eth0
```

启动.

```
# ip netns exec net0 ip link set dev eth0 up

# ip netns exec net0 ip addr show
```

eth0

:

inet 10.0.1.1/24

把 veth3 加进去 net1

```
# ip link set dev veth3 netns net1

# ip netns exec net0 ip link set dev veth3 name eth0

# ip netns exec net1 ip addr add 10.0.1.2/24 dev eth0

# ip netns exec net1 ip link set dev eth0 up

# ip netns exec net1 ip addr show
```

把 veth5 加进去 net2

```
# ip link set dev veth5 netns net2

# ip netns exec net2 ip link set dev veth5 name eth0

# ip netns exec net2 ip addr add 10.0.1.3/24 dev eth0

# ip netns exec net2 ip link set dev eth0 up

# ip netns exec net2 ip addr show
```

bridge

加进去

```
# ip link set dev veth0 master br0
```

2
4

brctl show

bridge name
br0

interface
veth0.2
veth0.4

啟動

ip link set dev veth0.2 up
ip link set dev veth0.4 up

ifconfig

br0
:
veth0.2
veth0.4

ip netns exec net0 ping 10.0.1.2 -c 3

---

window 2 # ip netns exec net1 tcpdump -nn -i eth0

1 # ip netns exec net0 ping 10.0.1.2 -c

---

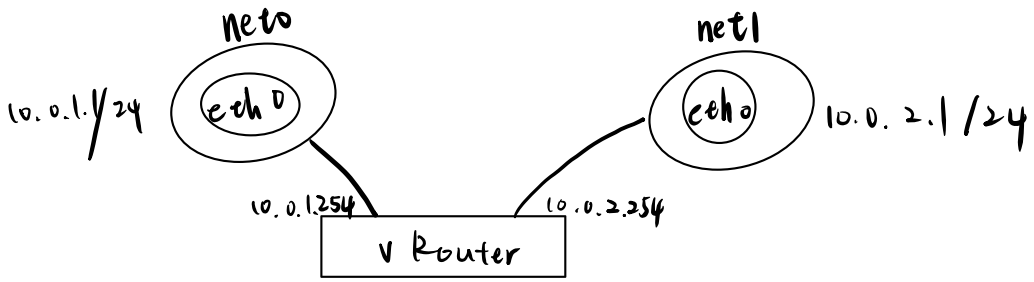
2 # ip netns exec net1 echo hi > hi.htm
ip netns exec net1 python -m SimpleHTTPServer 80

1 # ip netns exec net0 curl http://10.0.1.2/hi.htm

刪除 #brctl delif dr0 veth0.2 veth0.4

```
# ip link delete veth0
                   2
                   4

# ifconfig delbr br0
# brctl delbr br0
# ip netns del net0
                1
                2
```

模擬 不同網路之間如何通訊



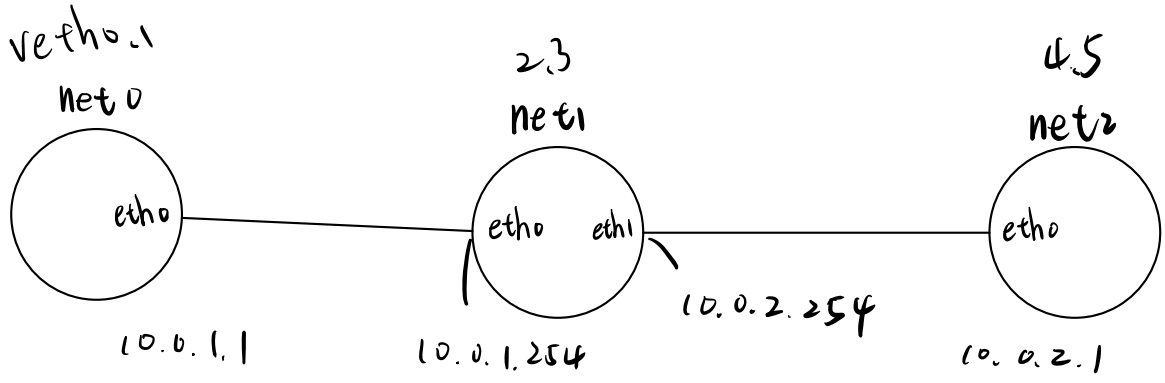
啟動路由功能

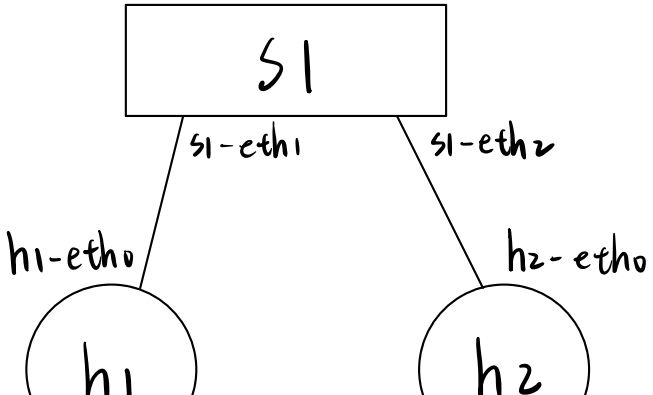
```
# cat /proc/sys/net/ipv4/ip_forward
  1⇒開
開 # echo 1 > /proc/sys/net/ipv4/ip_foward
關 # echo 0 > /proc/sys/net/ipv4/ip_foward
```

```
# ip netns add net0 /net1
# ip netns ls

# ip link add type veth x2

# ip link set dev veth1 netns net0
# ip netns exec net0 ip link set dev veth1 name eth0
# ip netns exec net0 ip addr add 10.0.1.1 /24 dev eth0
# ip netns exec net0 ip link set dev eth0 up

# ip netns exec net0 ip addr show

# ip netns exec net0 ip route add default via 10.0.1.254
                                  "       show
```

```
# ip link set dev veth1 netns net0
# ip netns exec net0 ip link set dev veth1 name eth0
# ip netns exec net0 ip addr add 10.0.1.1/24 dev eth0
# ip netns exec net0 ip link set dev eth0 up

# ip netns exec net0 ip addr show

# ip netns exec net0 ip route add default via 10.0.1.254
                                  show

# ifconfig veth0 up
# ip addr add 10.0.1.254/24 dev veth0

# ifconfig

# ip netns exec net0 ping 10.0.2.1

# ip link delete veth0

# ip netns del net0
              net1
```

H.W.





mn --topo single,3

> net