iThome

Container Summit 2015

航向容器新世界

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Understand Docker Networks

Willy

About Me

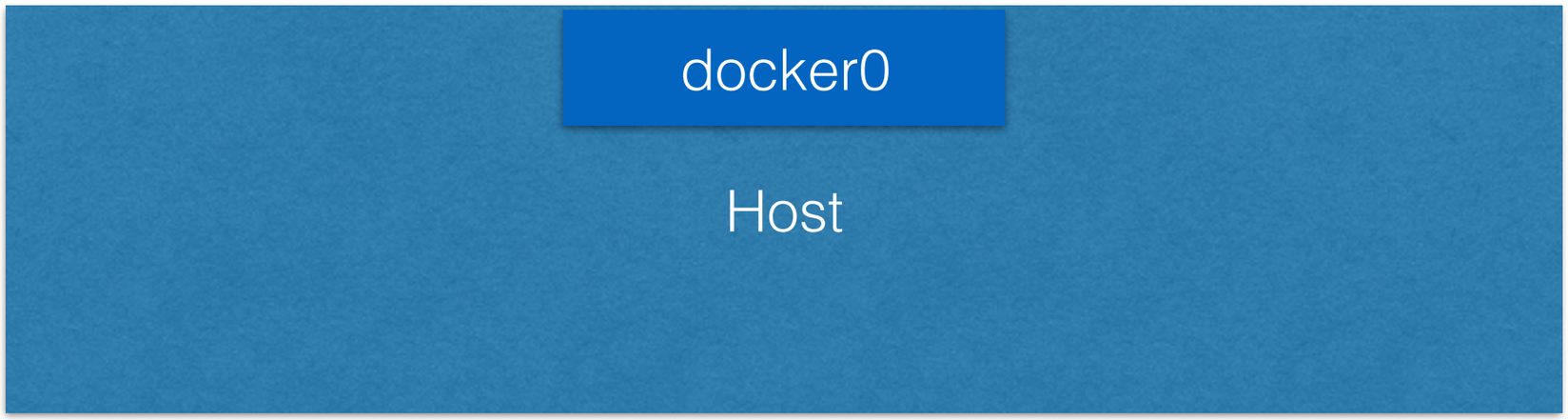
- Willy Kuo
- Founder & Organizer of Docker Taipei

Agenda

- Default Docker Network
- Network Modes
- Network Commands
- Overlay Network
- Network Plugins

- **Default Docker Network**
- Network Modes
- Network Commands
- Overlay Network
- Network Plugins

Host



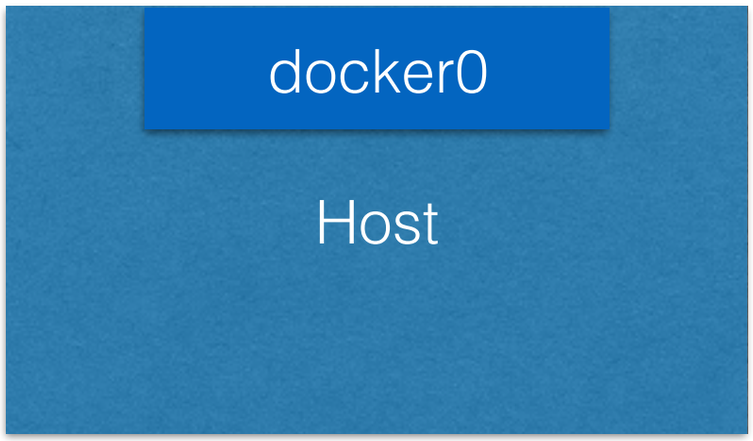

```
docker0   Link encap:Ethernet  HWaddr 02:42:EC:C3:E7:CF
          inet addr:172.17.0.1  Bcast:0.0.0.0  Mask:255.255.0.0
          UP BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

Create a Container


```
eth0      Link encap:Ethernet  HWaddr 02:42:ac:11:00:02
          inet addr:172.17.0.2  Bcast:0.0.0.0  Mask:255.255.0.0
          inet6 addr: fe80::42:acff:fe11:2/64 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:0
          RX bytes:648 (648.0 B)  TX bytes:648 (648.0 B)
```

Host & Container


```
eth0      Link encap:Ethernet  HWaddr 02:42:ac:11:00:02
          inet addr:172.17.0.2  Bcast:0.0.0.0  Mask:255.
          inet6 addr: fe80::42:acff:fe11:2/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metr
          RX packets:8 errors:0 dropped:0 overruns:0 fra
          TX packets:8 errors:0 dropped:0 overruns:0 car
          collisions:0 txqueuelen:0
          RX bytes:648 (648.0 B)  TX bytes:648 (648.0 B)
```

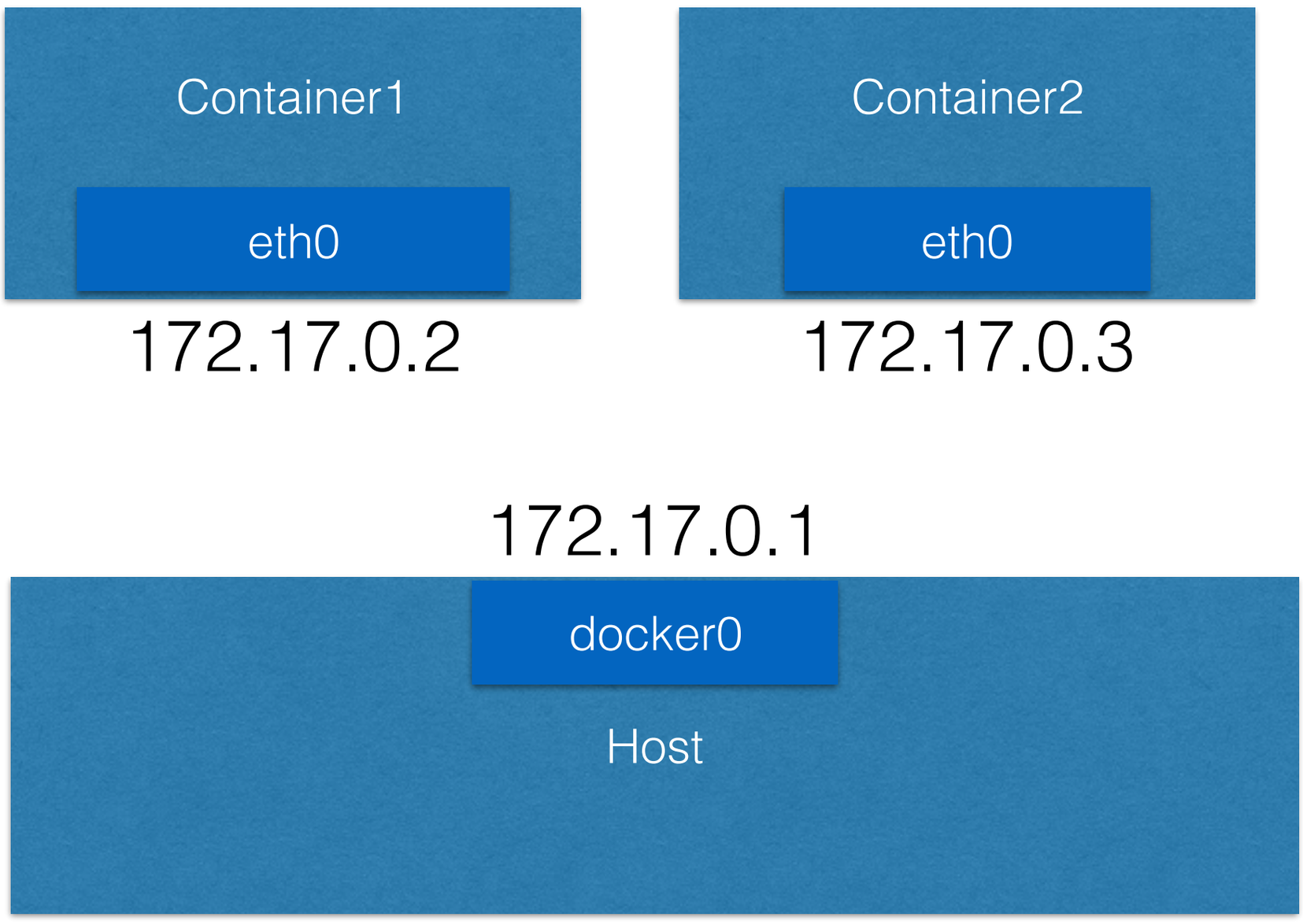



```
docker0   Link encap:Ethernet  HWaddr 02:42:EC:C3:
          inet addr:172.17.0.1  Bcast:0.0.0.0  Mas
          UP BROADCAST MULTICAST  MTU:1500  Metric
          RX packets:0 errors:0 dropped:0 overruns
          TX packets:0 errors:0 dropped:0 overruns
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

Create Another Container


```
eth0      Link encap:Ethernet  HWaddr 02:42:ac:11:00:03
          inet addr:172.17.0.3  Bcast:0.0.0.0  Mask:255.255.0.0
          inet6 addr: fe80::42:acff:fe11:3/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:5 errors:0 dropped:0 overruns:0 frame:0
          TX packets:6 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:418 (418.0 B)  TX bytes:508 (508.0 B)
```

Host & Containers



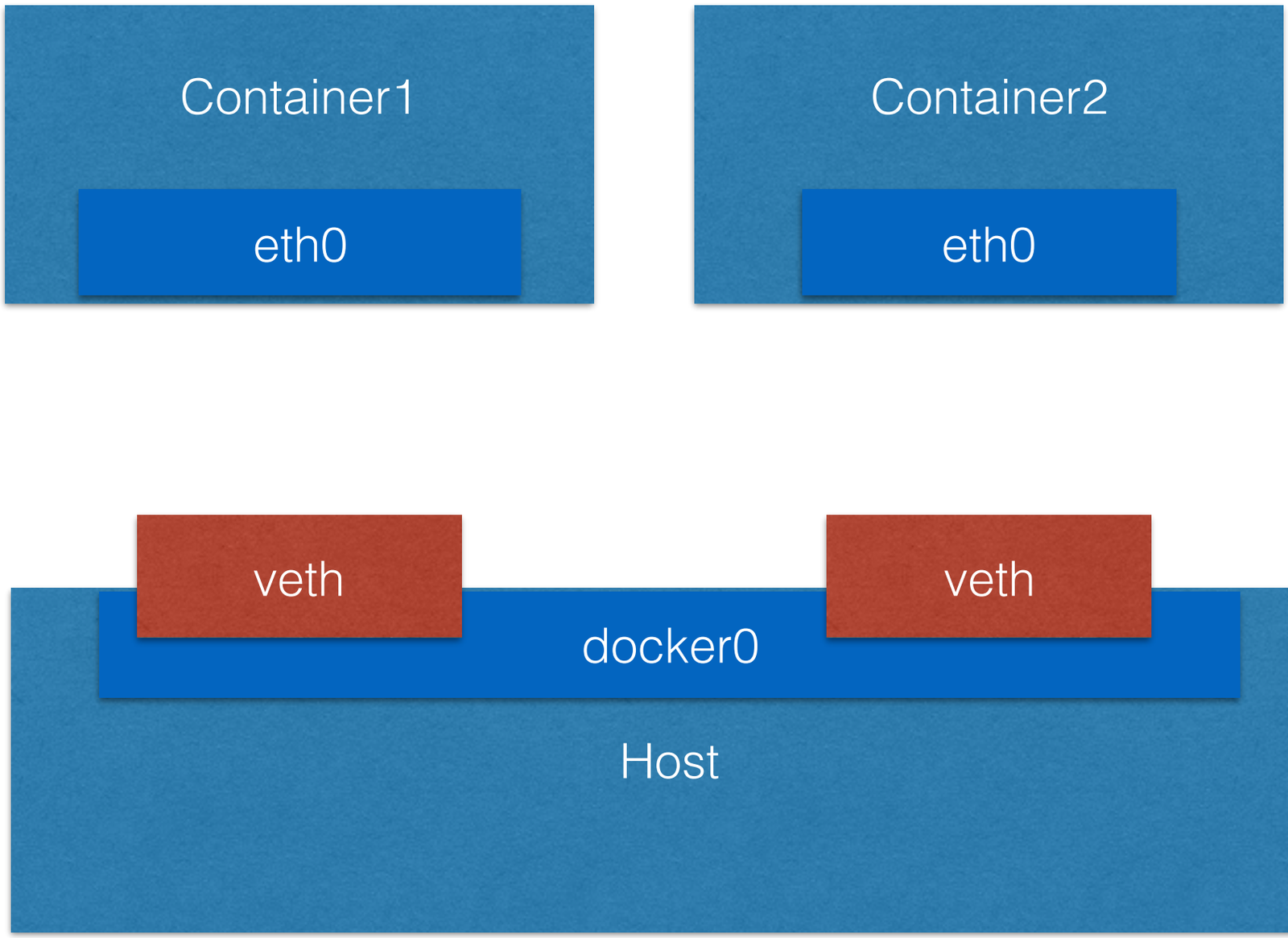
Demo

- Default Docker Network
- **Network Modes**
- Network Commands
- Overlay Network
- Network Plugins

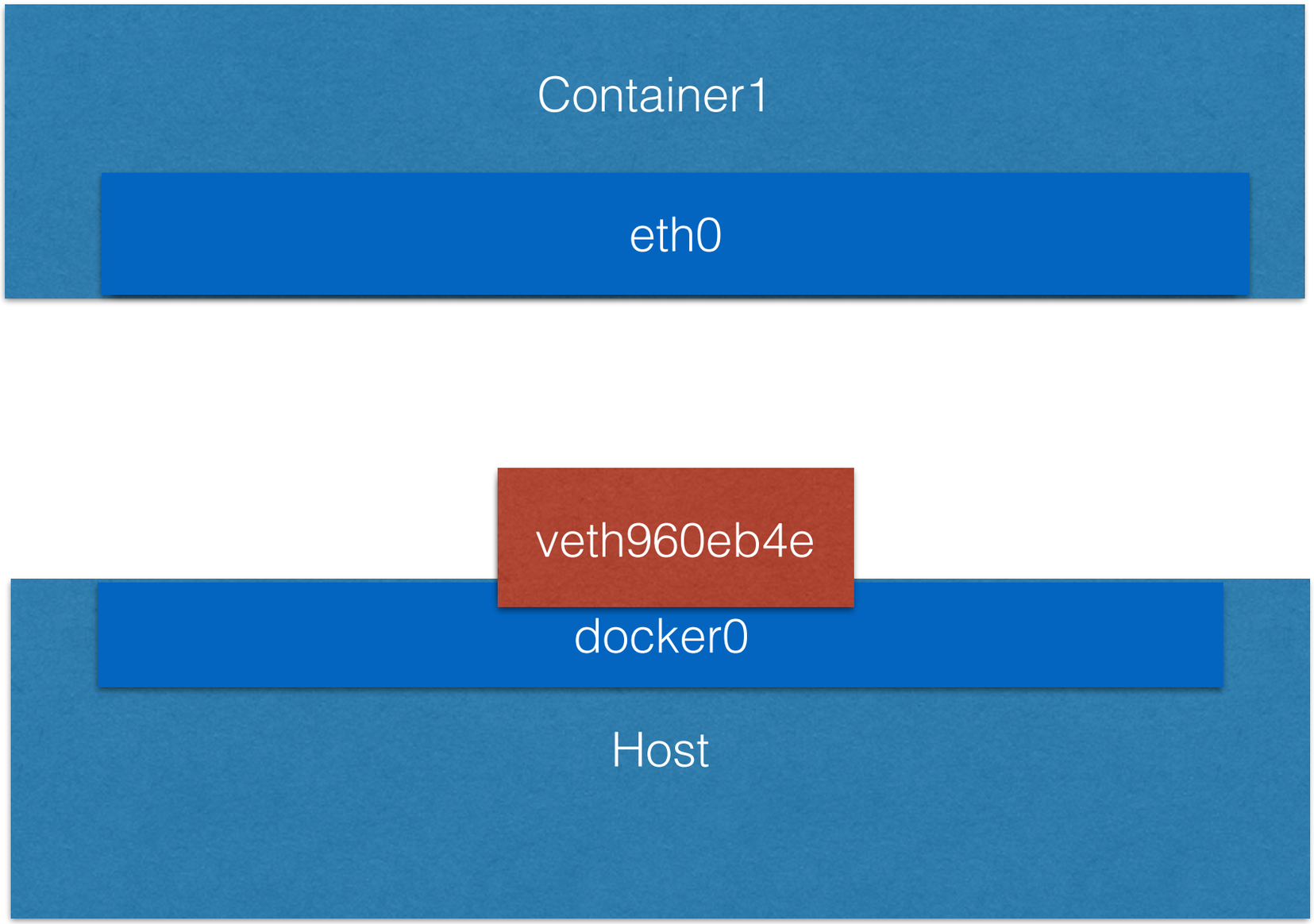
Docker Network Modes

- bridge (default)
- none
- host
- container
- Used-Defined Network

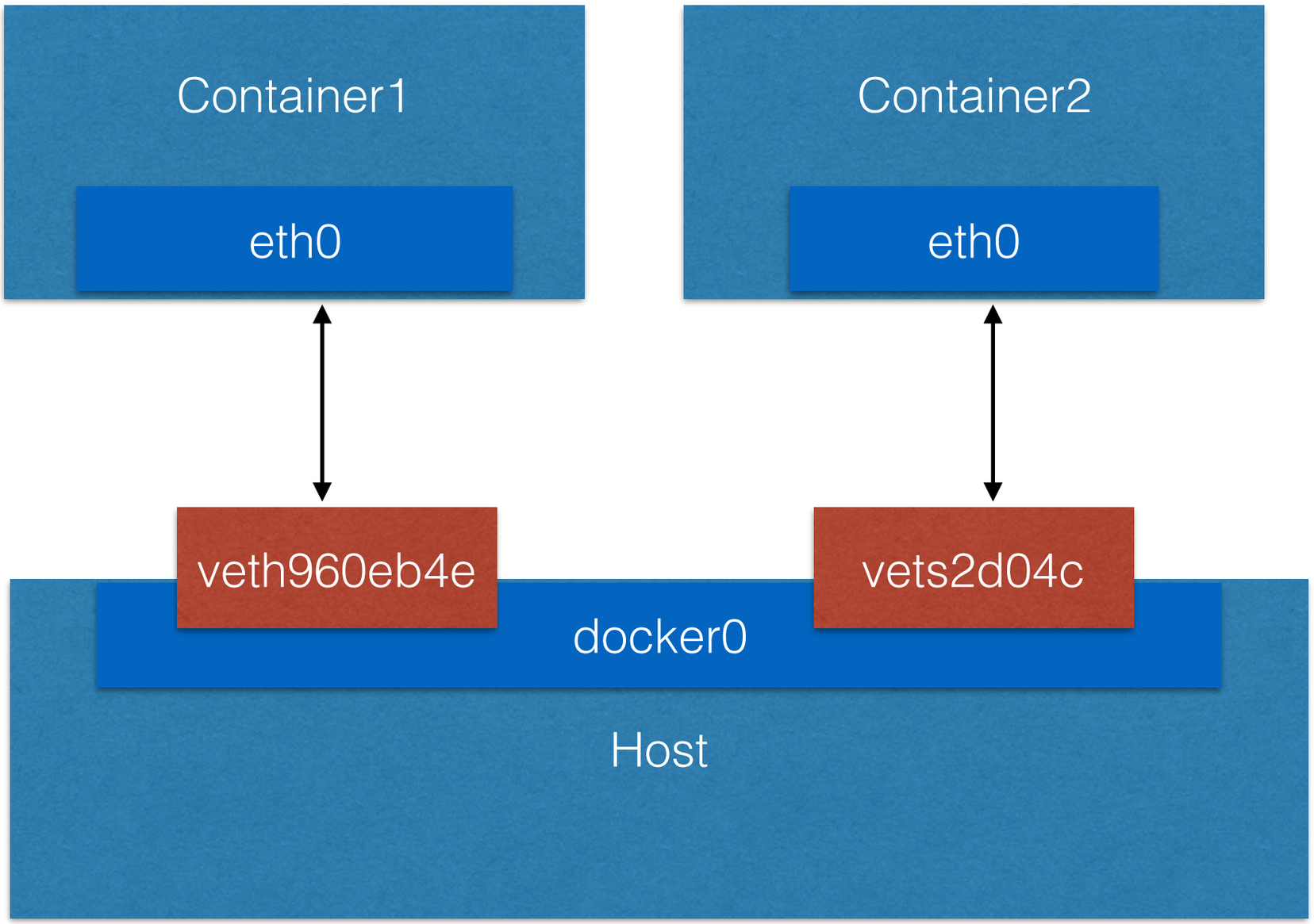
Bridge Mode



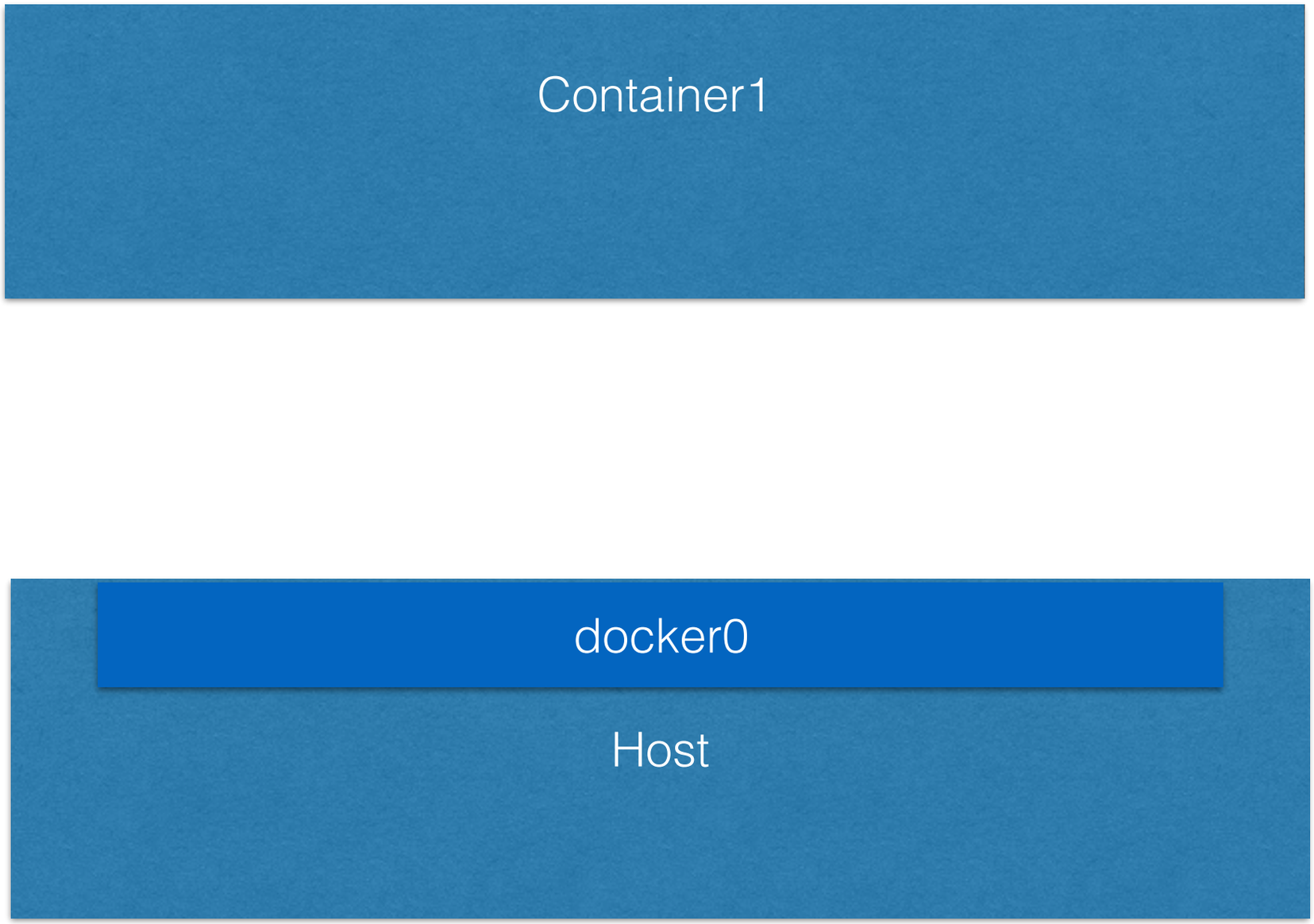
veth Piar



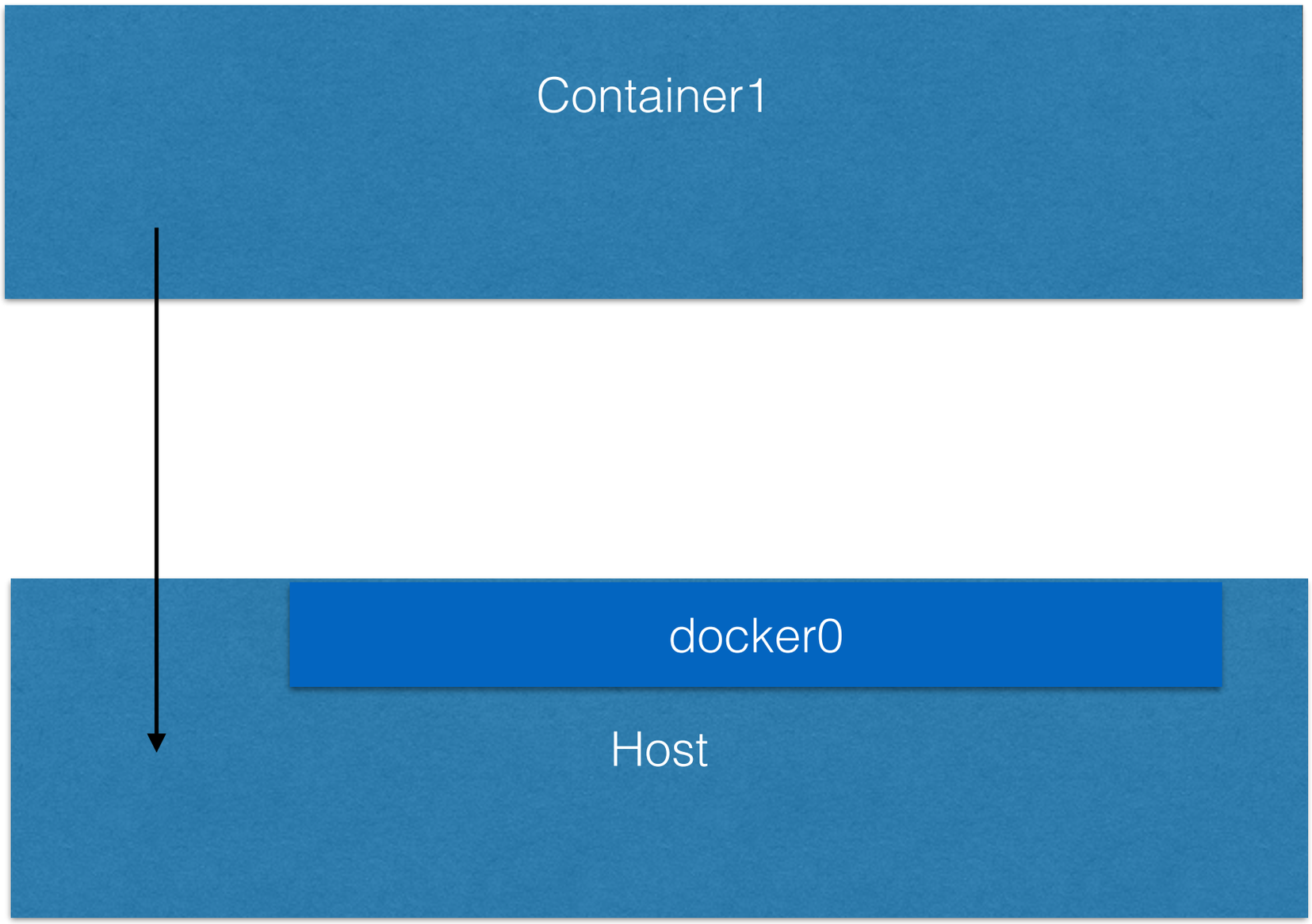
Bridge Mode


Container1
eth0
Container2
eth0
veth960eb4e
vets2d04c
docker0
Host

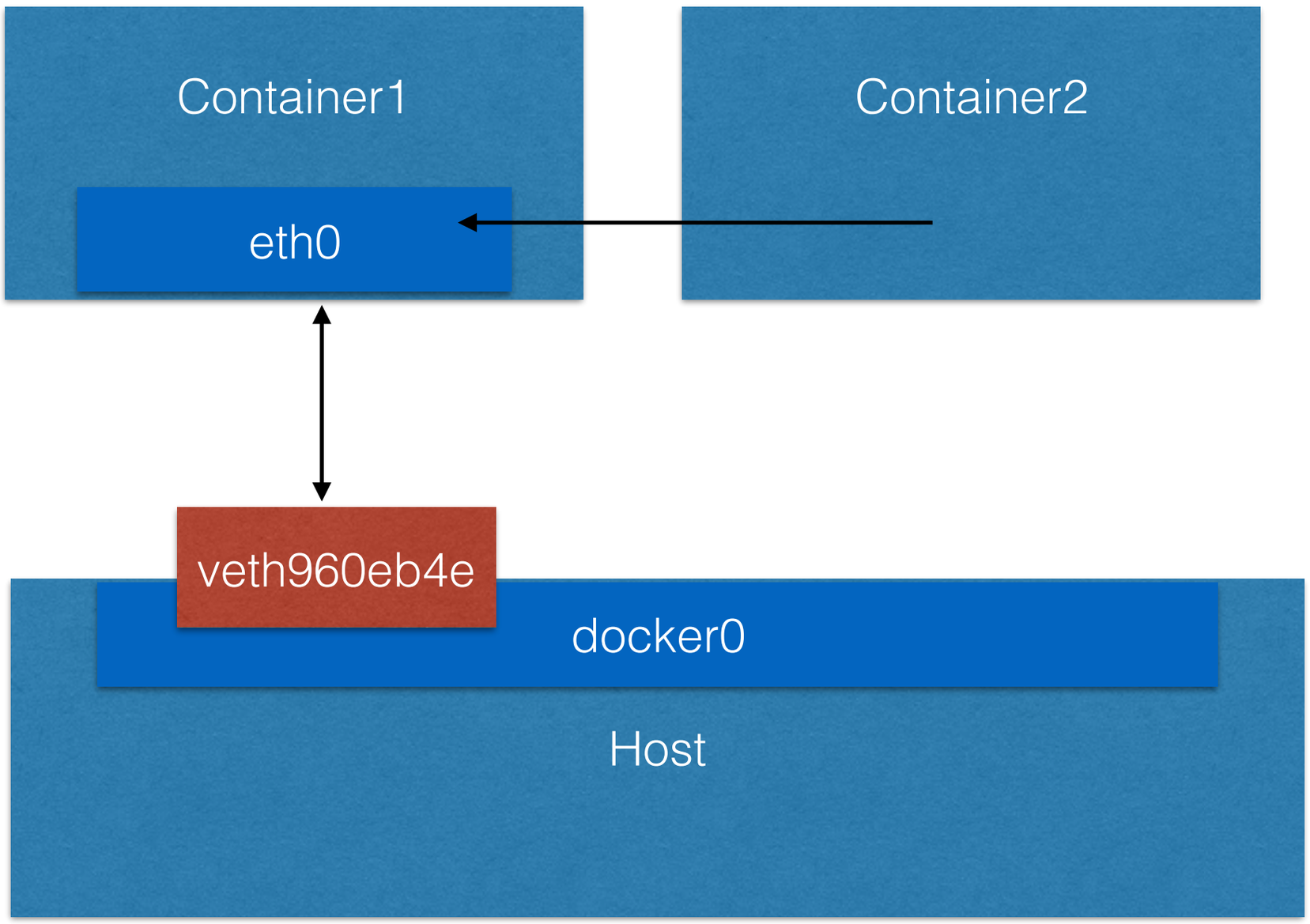
None Mode



Host Mode



Container Mode



Demo

- Default Docker Network
- Network Modes
- **Network Commands**
- Overlay Network
- Network Plugins

Docker Network Commands

- docker network create
- docker network connect
- docker network ls
- docker network rm
- docker network disconnect
- docker network inspect

docker network ls

- Lists all the networks
- Default:
  - bridge (docker0)
  - none
  - host

docker network inspect

- Displayed detailed information on a network

Demo

docker network create

- To create a new Docker Network
- Built-in network drivers:
  - bridge
  - overlay
- Can be extended by adding Docker Network Drivers

docker network rm

- Removes a network

Demo

docker network connect

- Connect a container to a network

docker network disconnect

- Disconnect a container to a network

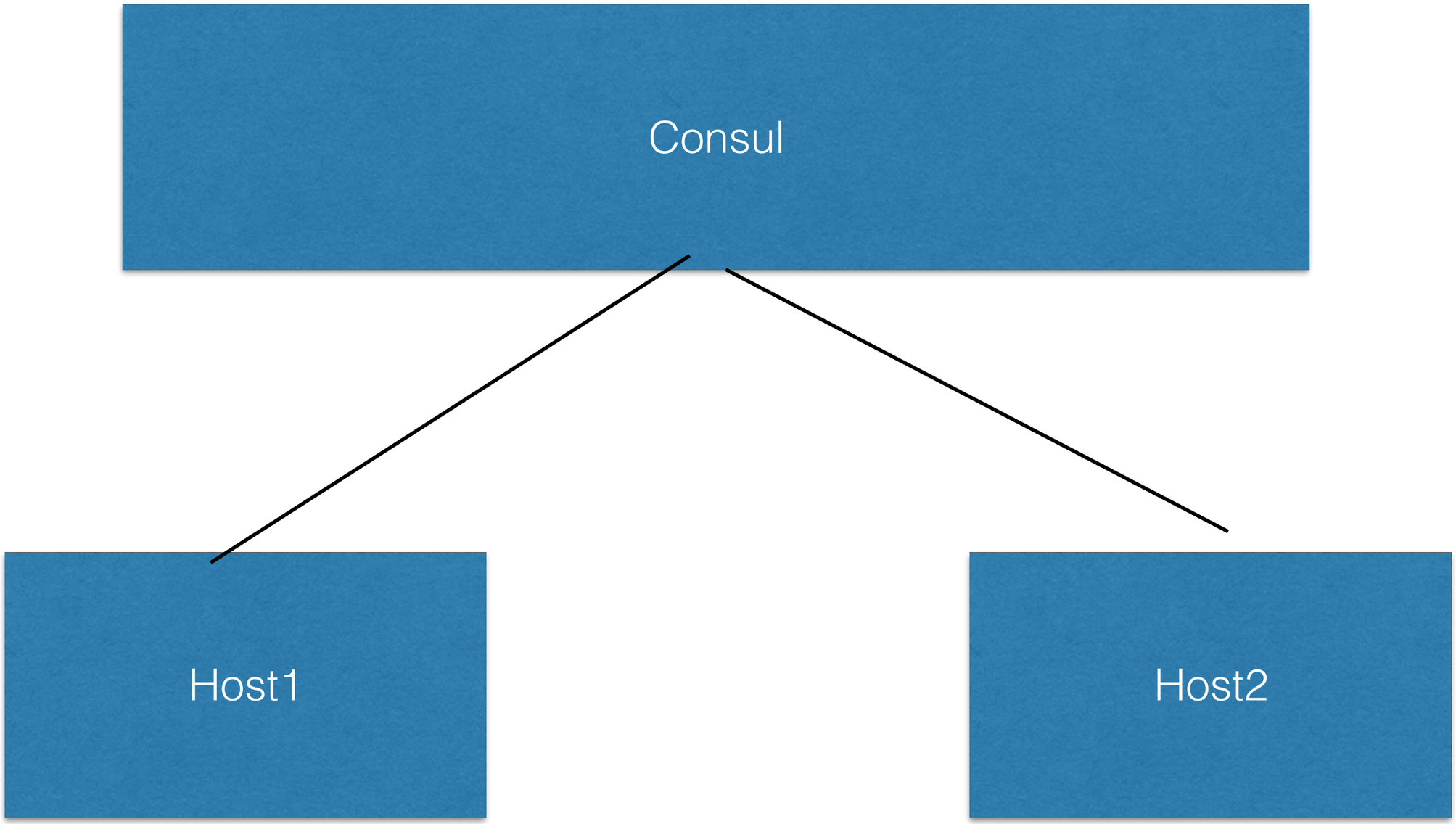
Demo

- Default Docker Network
- Network Modes
- Network Commands
- **Overlay Network**
- Network Plugins

Built-in VXLAN-based Overlay Network

- 1. Prepare a Key-Value Store (Consul, Etcd, Zookeeper)
- 2. Add cluster options to each docker engine
- 3. Create an Overlay network on “ONE” of the host

Prepare a Key-Value Store



Add Cluster Options to Docker Engines

- docker daemon $OTHER_OPTIONS

  --cluster-store=consul://IP:8500

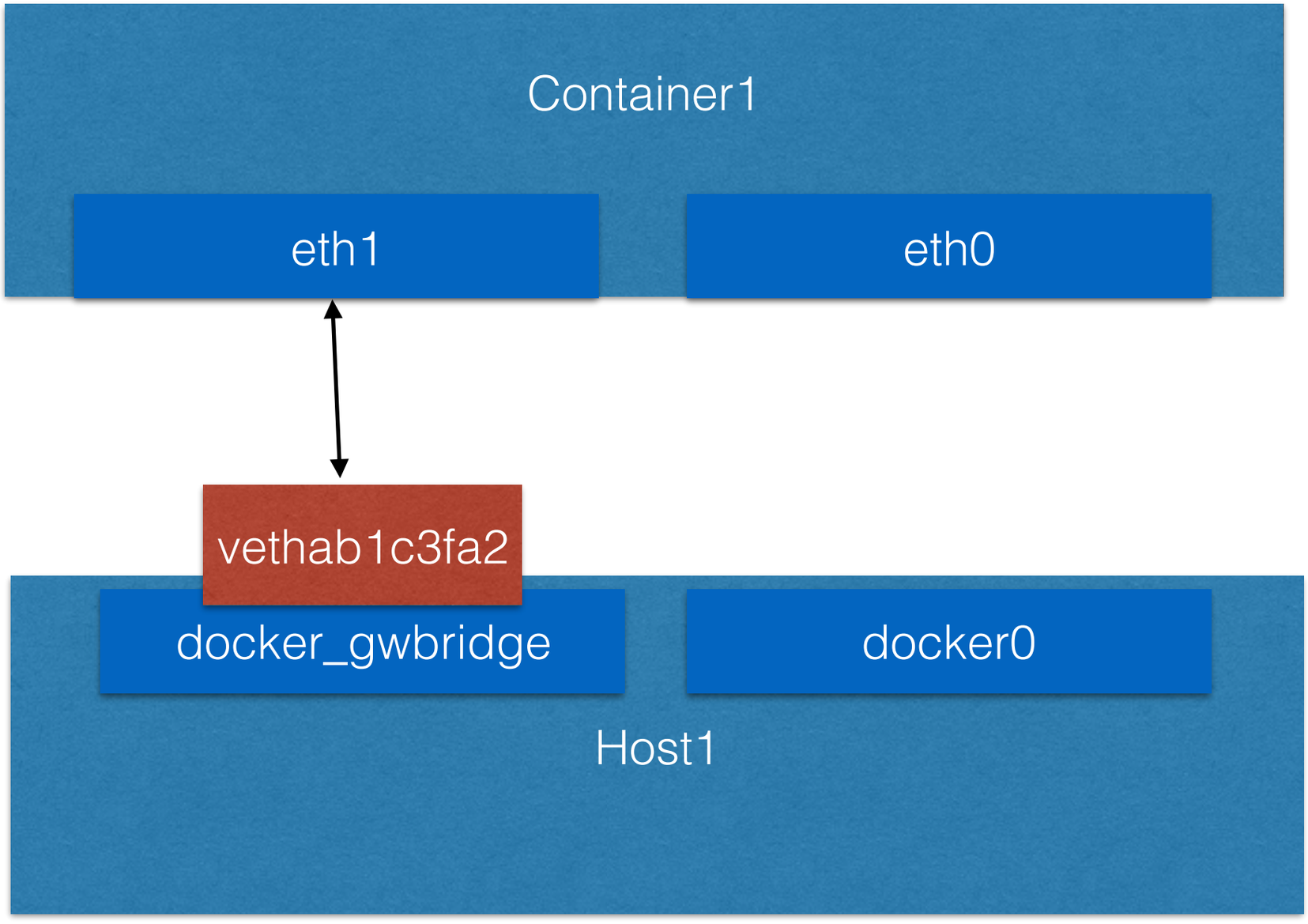
  --cluster-advertiser=eth1:2376

Create an Overlay Network

- Only need to run in “ONE” host
- $ docker network create -d overlay myoverlay

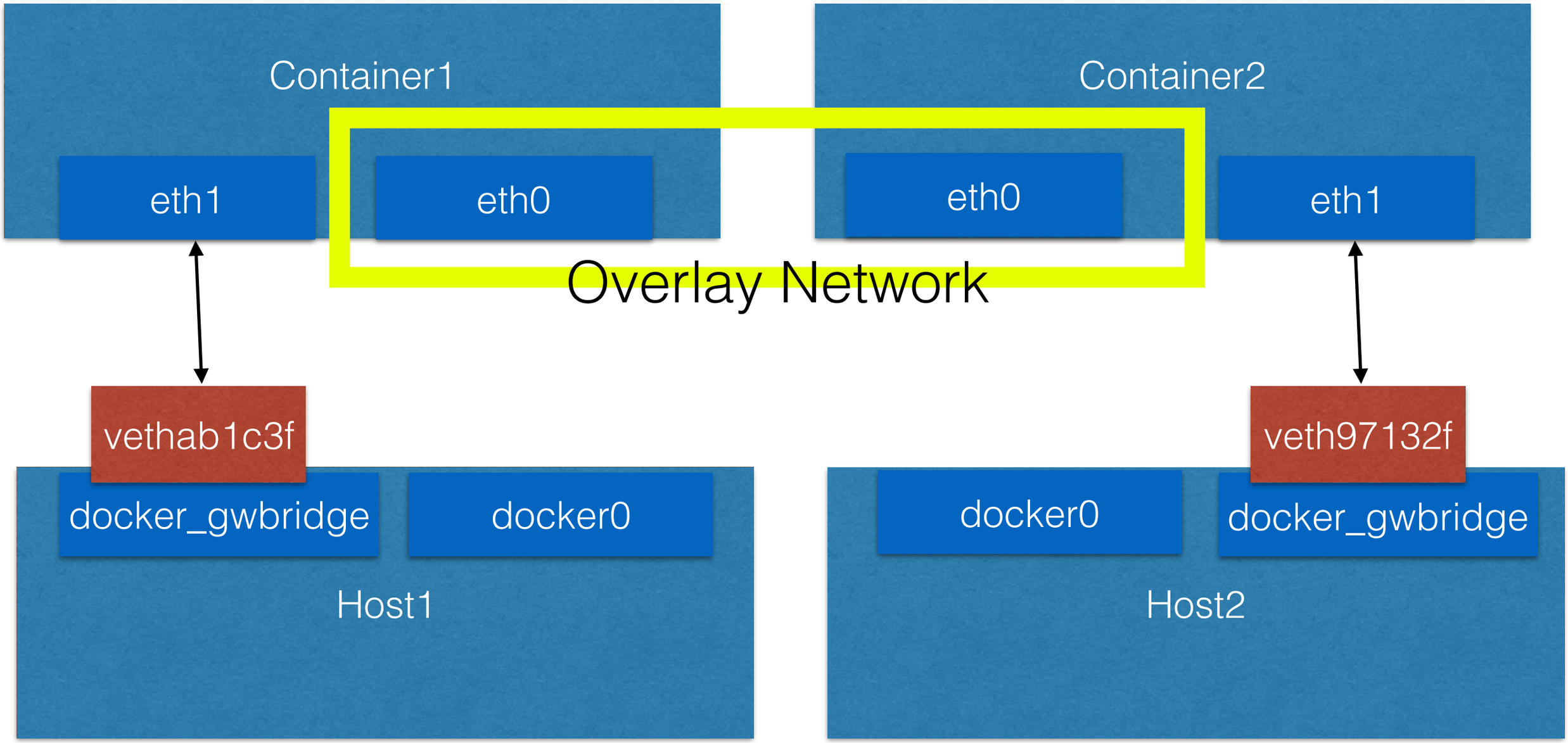
Run Container in Host1

- $ docker run --net=myoverlay IMAGE


Container1
eth1
eth0
vethab1c3fa2
docker_gwbridge
docker0
Host1

Run Container in Host2

- $ docker run --net=myoverlay IMAGE


Container1
Container2
eth1
eth0
eth0
eth1
Overlay Network
vethab1c3f
veth97132f
docker_gwbridge
docker0
docker0
docker_gwbridge
Host1
Host2

Microsoft Azure

Container1

eth1

eth0

vethab1c3f

docker_gwbridge

docker0

Host1

Overlay Network

Container2

eth0

eth1

veth97132f

docker0

docker_gwbridge

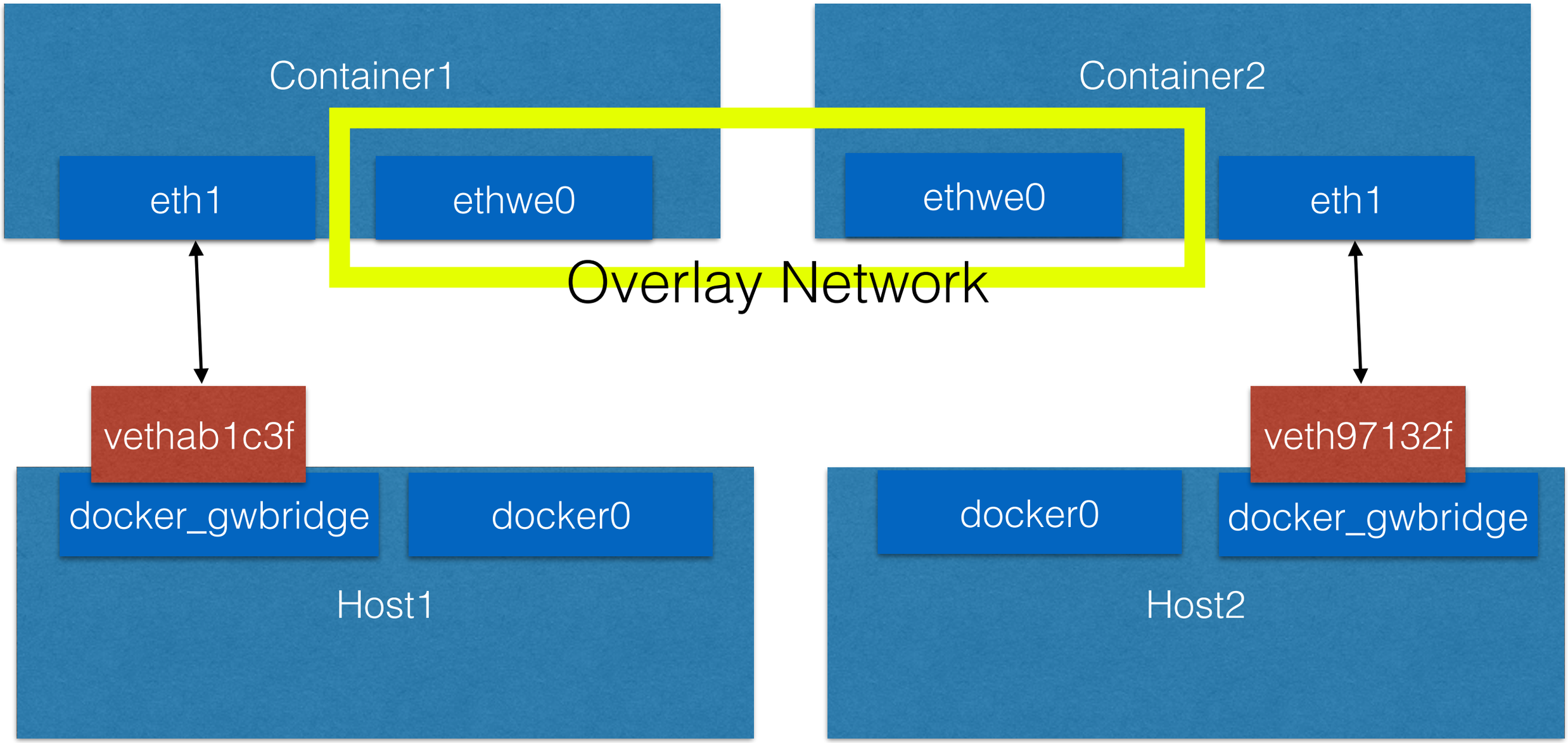
Host2

Demo

- Default Docker Network
- Network Modes
- Network Commands
- Overlay Network
- **Network Plugins**

Weave Network Plugin

- $ weave launch <other-hosts…>
- $ weave launch-plugin
- $ docker network create --driver=weave weave
- $ docker run --net=weave IMAGE


Container1
Container2
eth1
ethwe0
ethwe0
eth1
Overlay Network
vethab1c3f
veth97132f
docker_gwbridge
docker0
docker0
docker_gwbridge
Host1
Host2

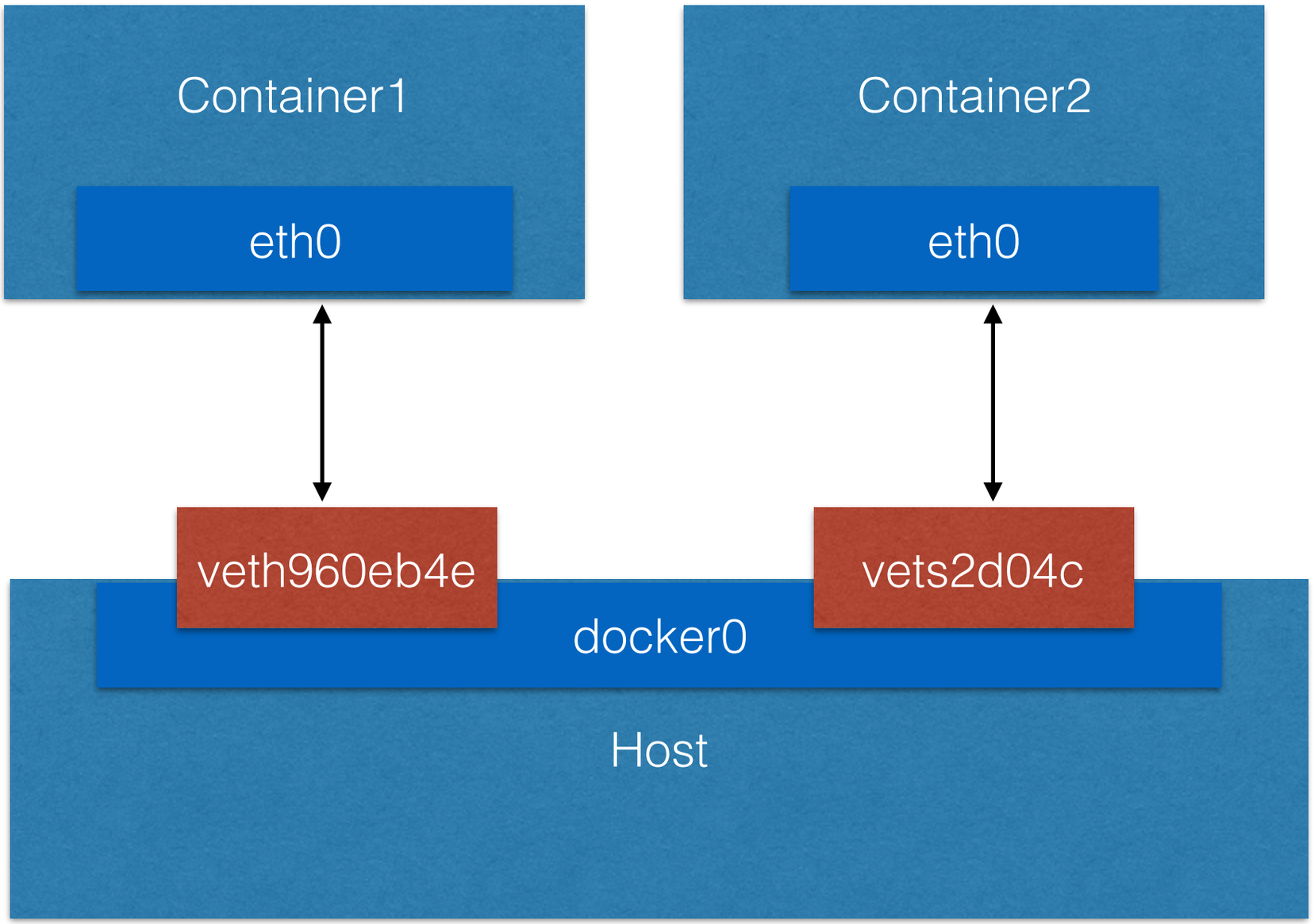
Weave Scope: Contain Visibility

- $ scope launch

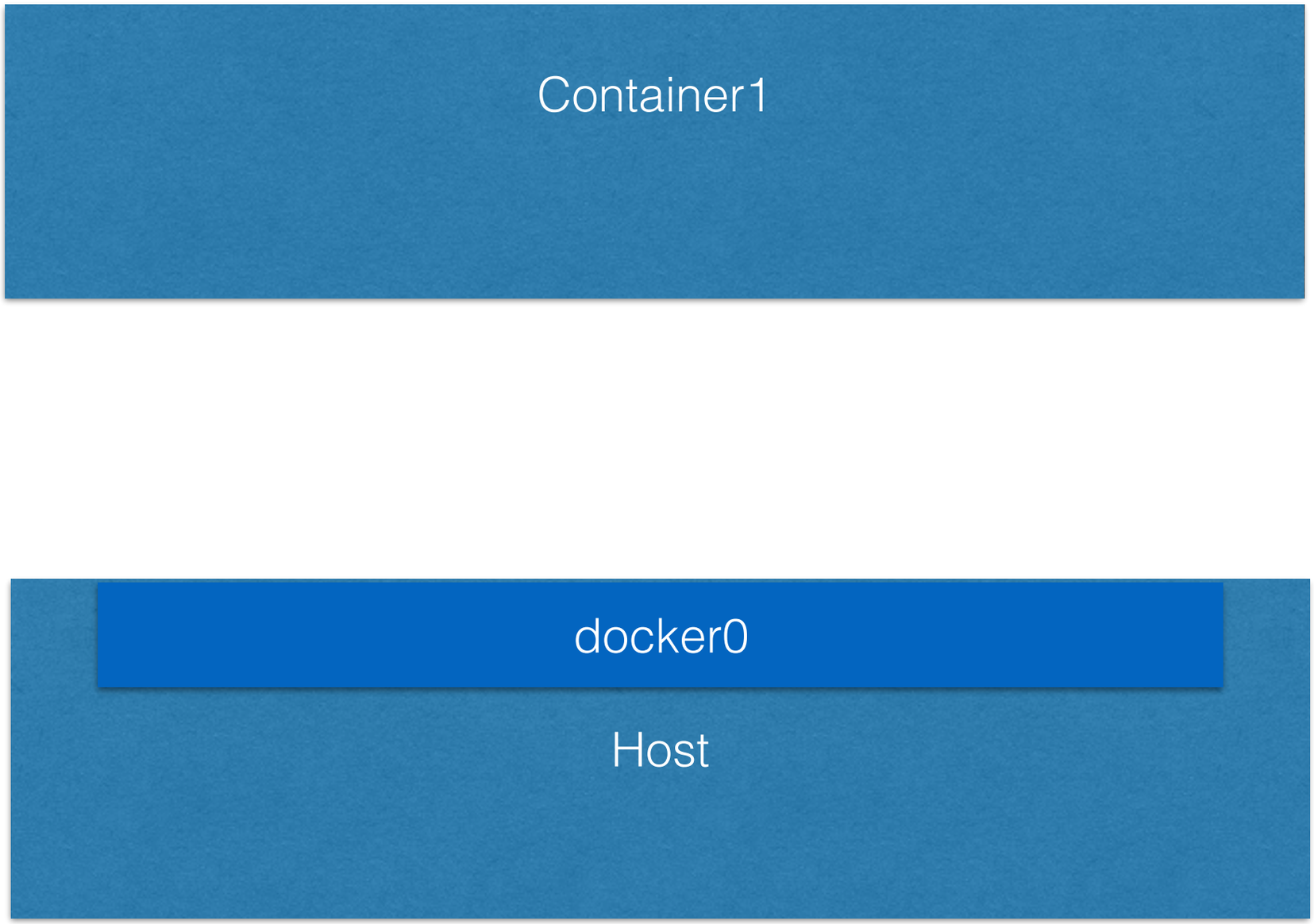
Demo

Recap

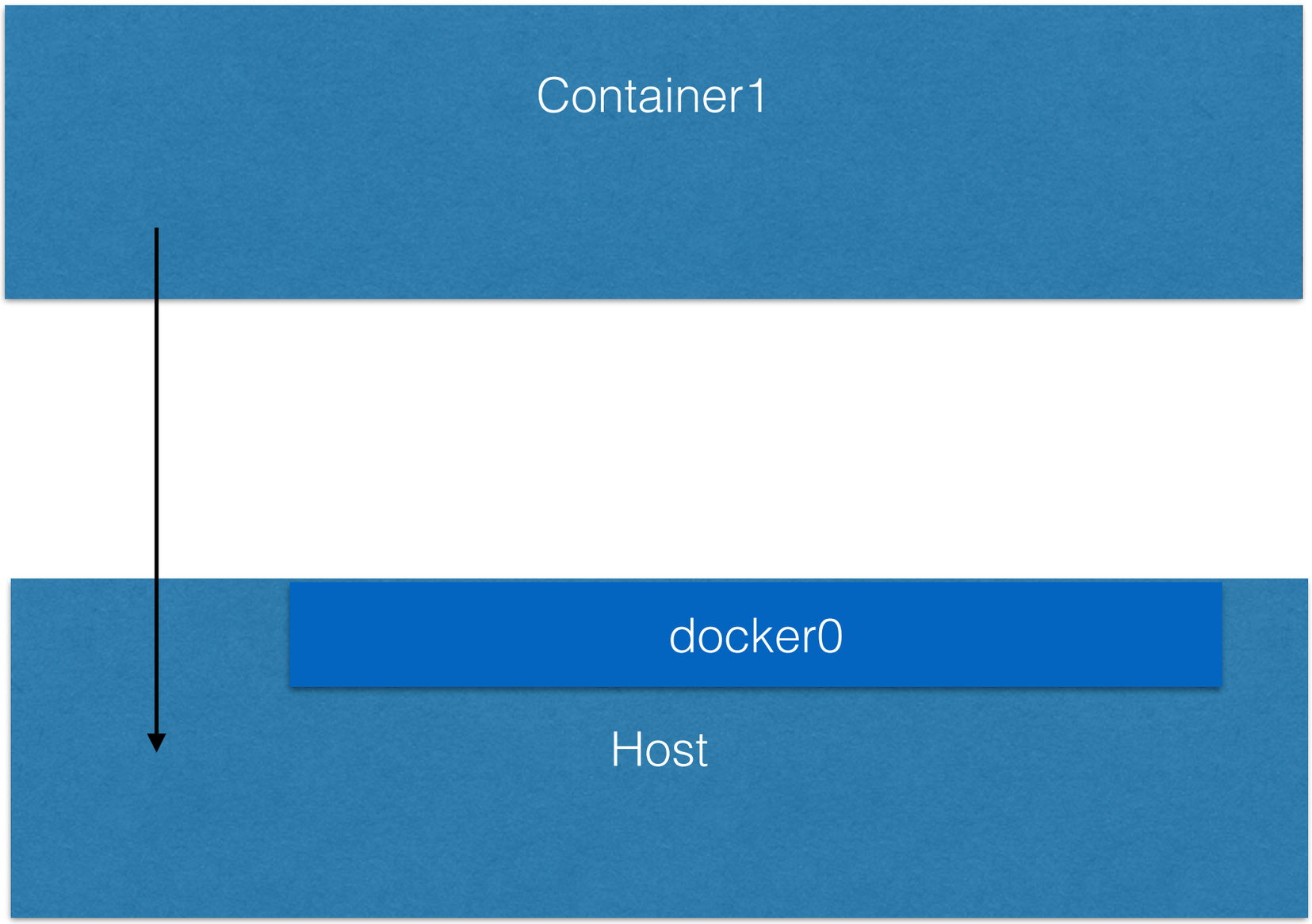
Bridge Mode


Container1
eth0
Container2
eth0
veth960eb4e
vets2d04c
docker0
Host

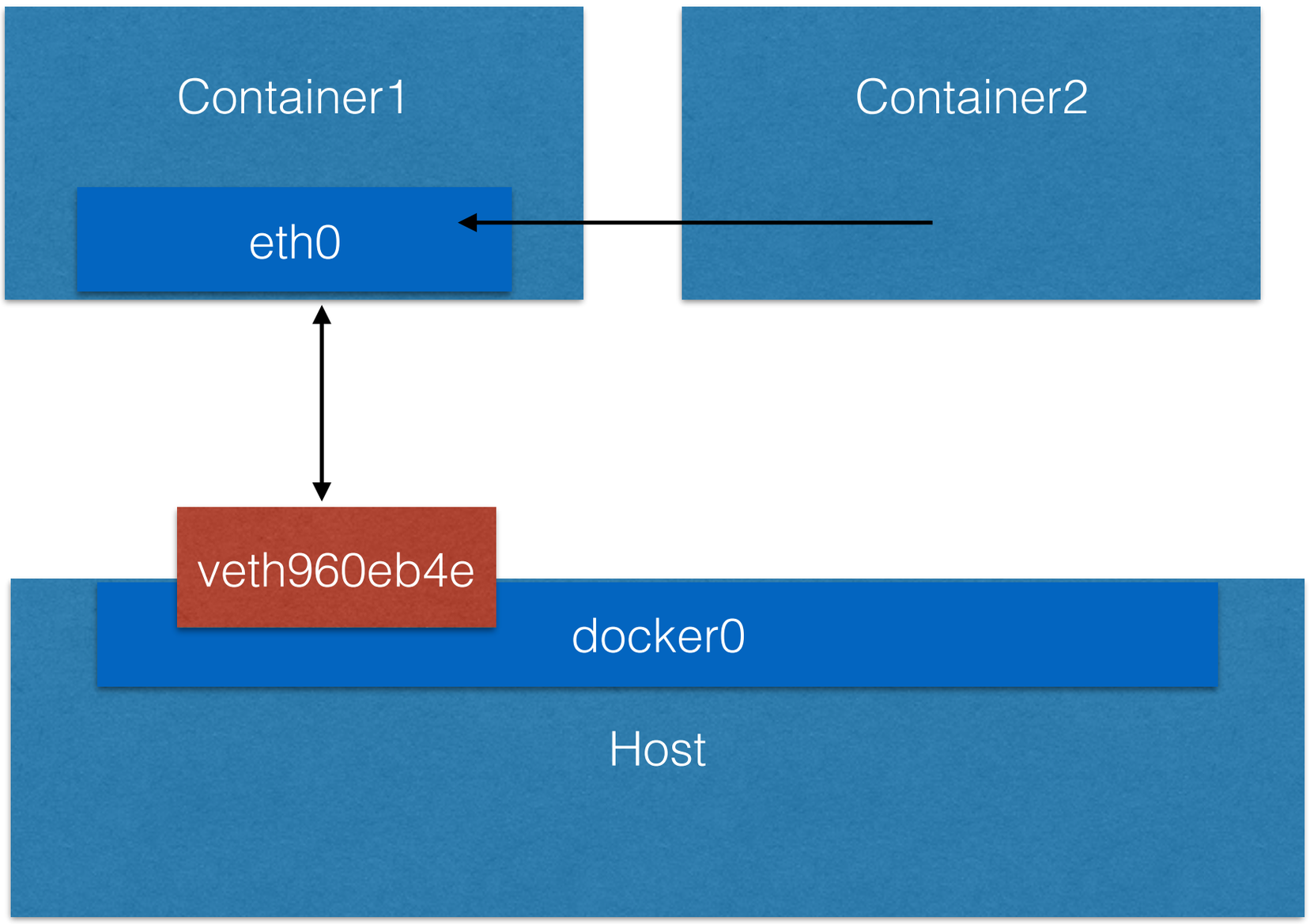
None Mode

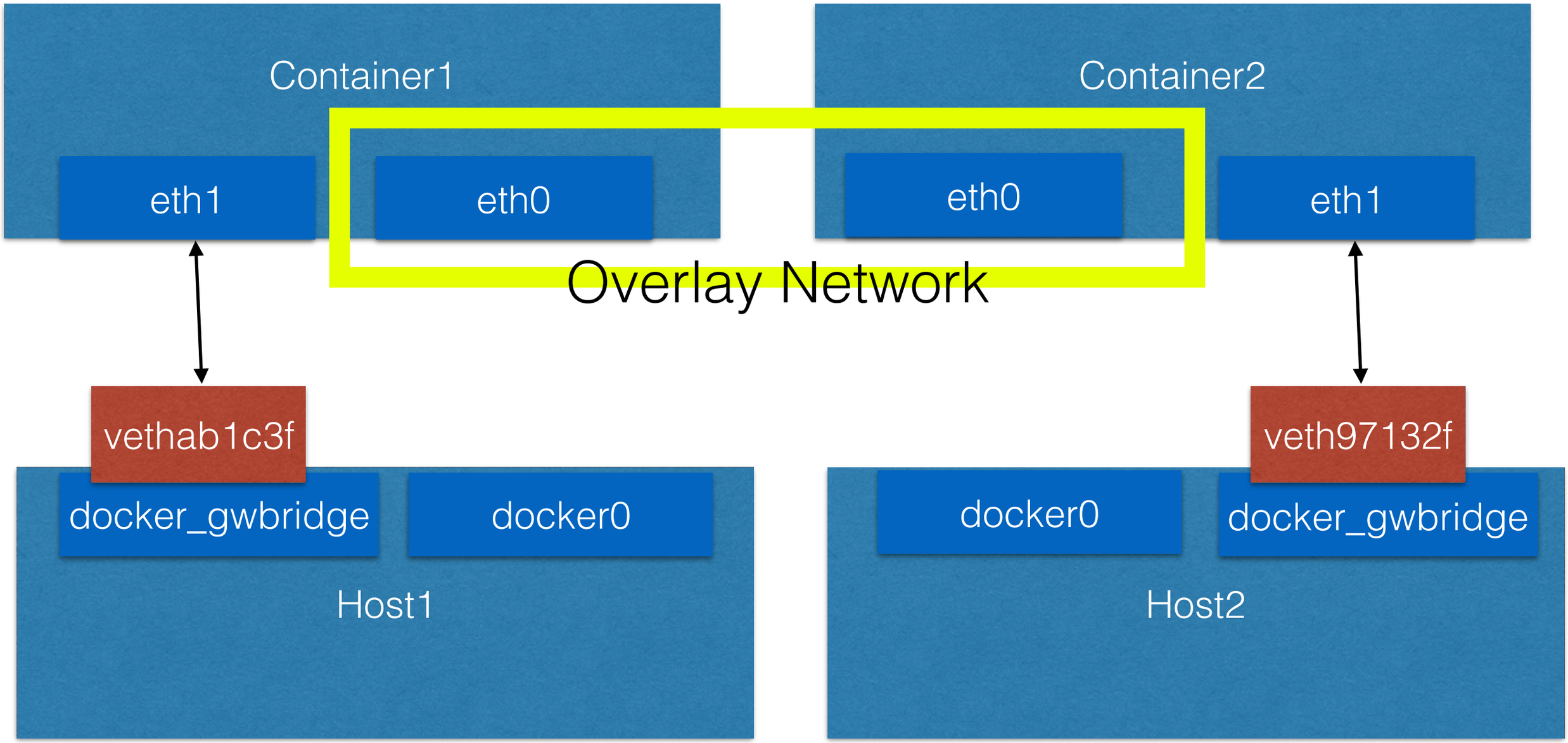


Host Mode



Container Mode




Container1
Container2
eth1
eth0
eth0
eth1
Overlay Network
vethab1c3f
veth97132f
docker_gwbridge
docker0
docker0
docker_gwbridge
Host1
Host2

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Thank you