

[Network] K8S Overlay Network (IPIP -> VXLAN)

K8S Overlay Network

IPIP -> VXLAN

) POD가
(pod 가)

Calico IP-IP Network VXLAN

Node : Controller / Worker01 / Worker02

Controller

Mode IPIPMode

calicoctl get ippool -o wide

NAME	CIDR	NAT	IPIPMode
VXLANMode	DISABLED	DISABLEBGPEXPORT	SELECTOR
default-ipv4-ippool	192.168.0.0/16	true	Always
false	false		Never

all()

Manifest YAML

kubectl delete -f calico.yml

Controller / Worker

가 tunl0 가
sudo rm -rf /var/run/calico/
sudo rm -rf /var/lib/calico/
sudo rm -rf /etc/cni/net.d/
sudo rm -rf /var/lib/cni/
sudo reboot

Controller

Manifest. calico.yml VXLAN

```

livenessProbe:
  exec:
    command:
      - /bin/calico-node
      - -felix-live
      # - -bird-live          // VXLAN    bird(BGP)

    periodSeconds: 10
    initialDelaySeconds: 10
    failureThreshold: 6
    timeoutSeconds: 10
  readinessProbe:
    exec:
      command:
        - /bin/calico-node
        - -felix-ready
        # - -bird-ready      //

# Enable IPIP
- name: CALICO_IPV4POOL_IPIP
  value: "Never"          // Always --> Never

# Enable or Disable VXLAN on the default IP pool.
- name: CALICO_IPV4POOL_VXLAN
  value: "Always"         // Never --> Always

```

```

kind: ConfigMap
apiVersion: v1
metadata:
  name: calico-config
  namespace: kube-system
data:
  # Typha is disabled.
  typha_service_name: "none"
  # Configure the backend to use.
  calico_backend: "vxlan"          // "bird" --> "vxlan"

```

```

#
kubectl apply -f calico.yaml

```

```
# Calico Node . Ready .
kubectl get nodes -o wide -A
```

```
# Calico Pod . kube-system PoD 가
kubectl get pod -o wide -A
```

```
# Calico Type . BIRD
sudo calicoctl node status
Calico process is running.
The BGP backend process (BIRD) is not running.
```

```
# Network VXLANMODE 가
calicoctl get ippool -o wide
NAME CIDR NAT IPIPMode
VXLANMODE DISABLED DISABLEBGPEXPORT SELECTOR
default-ipv4-ippool 192.168.0.0/16 true Never
Always false false
all()
```

```
# tunl0 가 vxlan 가
# vxlan 가
```

```
hostway@controller:~$ route -n
Kernel IP routing table
Destination Gateway Genmask Flags Metric
Ref Use Iface
0.0.0.0 10.10.10.1 0.0.0.0 UG 0 0
0 ens18
10.10.10.0 0.0.0.0 255.255.255.0 U 0 0
0 ens18 // External (SNAT)
172.17.0.0 0.0.0.0 255.255.0.0 U 0 0
0 docker0 // Container Runtime Bridge
192.168.5.0 192.168.5.0 255.255.255.192 UG 0 0
0 vxlan.calico // Worker01
192.168.30.64 192.168.30.64 255.255.255.192 UG 0 0
0 vxlan.calico // Worker02
192.168.49.0 0.0.0.0 255.255.255.192 U 0 0
0 * // Controller vxlan
192.168.49.1 0.0.0.0 255.255.255.255 UH 0 0
0 cali09ae4a7064b // Node(Worker01)가 GW
192.168.49.2 0.0.0.0 255.255.255.255 UH 0 0
0 cali1fdac863dc5 // Node(Worker02)가 GW
```

Worker

```
hostway@controller:~$ ip net | grep vxlan
192.168.5.0 dev vxlan.calico lladdr 66:8c:33:86:44:ce
PERMANENT
192.168.30.64 dev vxlan.calico lladdr 66:fb:72:20:22:a1
PERMANENT
```

VXLAN Traffic Port UDP

```
udp 0 0 0.0.0.0:4789 0.0.0.0:*
```

PoD

```
hostway@controller:~$ kubectl create deployment sampleos --
image=gcr.io/google-samples/kubernetes-bootcamp:v1 --
replicas=3
```

deployment.apps/sampleos created

```
hostway@controller:~$ kubectl get pod -o wide
```

NAME		READY	STATUS	RESTARTS	AGE
IP	NODE	NOMINATED	NODE	READINESS GATES	
sampleos-646dc9654b-8xjw9		1/1	Running	0	45s
192.168.5.11	worker01	<none>		<none>	
sampleos-646dc9654b-gxn75		1/1	Running	0	45s
192.168.5.10	worker01	<none>		<none>	
sampleos-646dc9654b-snkxg		1/1	Running	0	45s
192.168.30.75	worker02	<none>		<none>	

VXLAN

// Controller

1) worker01 worker02 POD Ping

```
hostway@controller:~$ kubectl exec -it
sampleos-646dc9654b-8xjw9 -- ping 192.168.30.75
```

PING 192.168.30.75: 56 data bytes

64 bytes from 192.168.30.75: icmp_seq=0 ttl=115 time=92.124 ms

64 bytes from 192.168.30.75: icmp_seq=1 ttl=115 time=79.735 ms

64 bytes from 192.168.30.75: icmp_seq=2 ttl=115 time=79.233 ms

2) tcpdump

```
sudo tcpdump -i ens18 -w vxlan.pcap
```

3) Wireshark . UDP

vxlan.pcap

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No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.5.11	192.168.49.2	DNS	158	Standard query 0x475e A storage.googleapis.com.default.svc.cluster.local
2	0.000001	192.168.5.11	192.168.49.2	DNS	158	Standard query 0xdf0e AAAA storage.googleapis.com.default.svc.cluster.local
3	0.002360	192.168.49.2	192.168.5.11	DNS	251	Standard query response 0xdf0e No such name AAAA storage.googleapis.com.default.s
4	0.002958	192.168.49.2	192.168.5.11	DNS	251	Standard query response 0x475e No such name A storage.googleapis.com.default.s
5	0.003747	192.168.5.11	192.168.49.2	DNS	150	Standard query 0xebca A storage.googleapis.com.svc.cluster.local
6	0.003939	192.168.5.11	192.168.49.2	DNS	150	Standard query 0x7f90 AAAA storage.googleapis.com.svc.cluster.local

<

> Frame 2: 158 bytes on wire (1264 bits), 158 bytes captured (1264 bits)

> Ethernet II, Src: 76:2d:1c:43:96:bd (76:2d:1c:43:96:bd), Dst: 56:44:d0:06:59:33 (56:44:d0:06:59:33)

> Internet Protocol Version 4, Src: 10.10.10.25, Dst: 10.10.10.26 Worker01 --> Worker02 물리 IP

> User Datagram Protocol, Src Port: 48384, Dst Port: 4789

Source Port: 48384

Destination Port: 4789 VXLAN Port (UDP)

Length: 124

Checksum: 0xab5 [unverified]

[Checksum Status: Unverified]

[Stream index: 0]

> [Timestamps]

UDP payload (116 bytes)

> Virtual eXtensible Local Area Network

> Flags: 0x0800, VXLAN Network ID (VNI)

Group Policy ID: 0

VXLAN Network Identifier (VNI): 4096 VNI 식별

Reserved: 0

> Ethernet II, Src: 66:8c:33:86:44:cc (66:8c:33:86:44:cc), Dst: 66:f7:9a:22:22:c3 (66:f7:9a:22:22:c3)

> Internet Protocol Version 4, Src: 192.168.5.11, Dst: 192.168.49.2 Calico VXLAN Interface

> User Datagram Protocol, Src Port: 47490, Dst Port: 53

> Domain Name System (query)