

Kubernetes容器多网络

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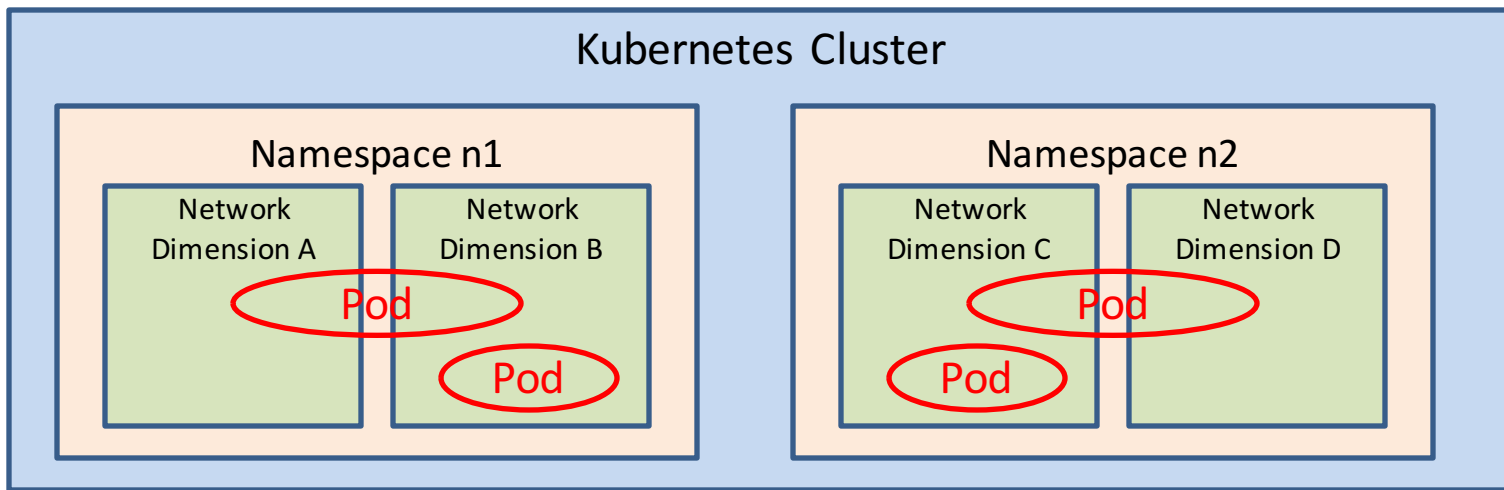


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多网络定义

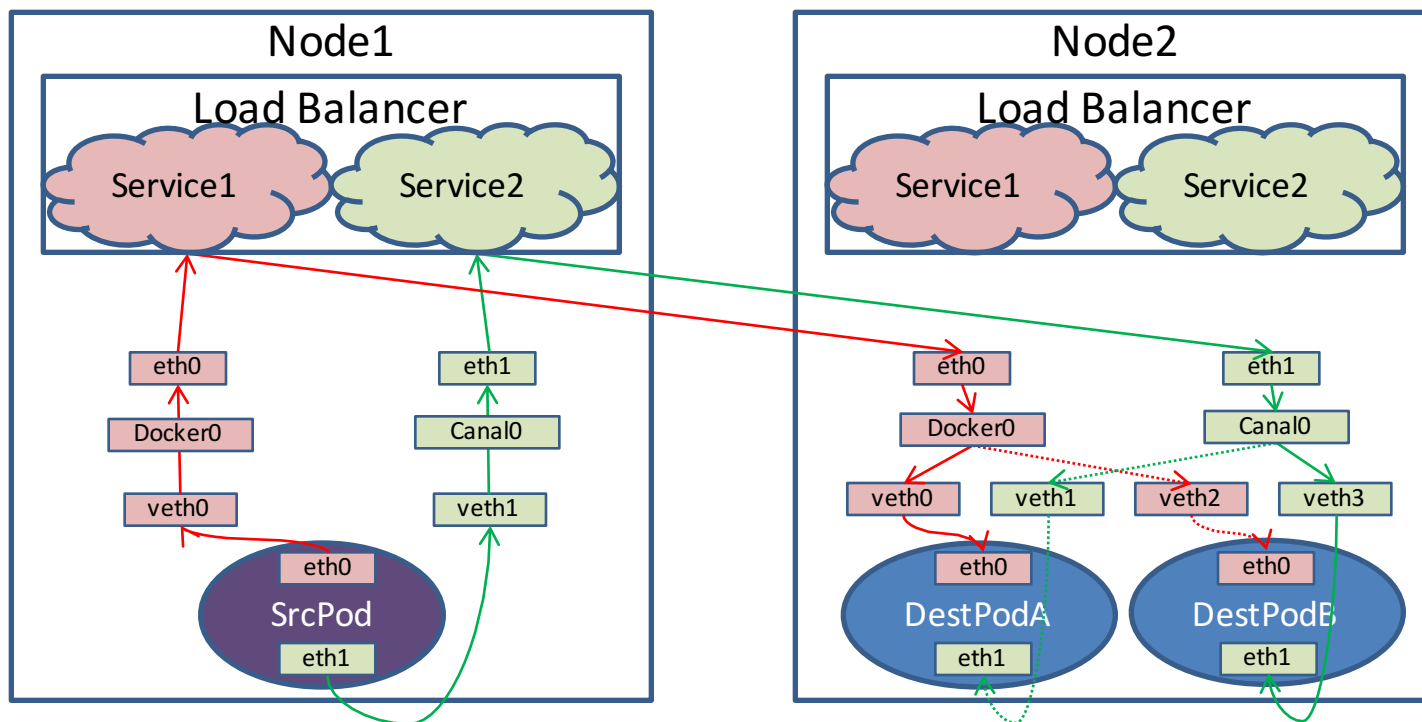
- 多物理网络
- 多逻辑网络
 - 支持容器多网卡
 - 支持多个容器网络插件/解决方案
 - 多个网络平面



为什么需要多网络平面

- 网络平面/网络域
- 网络隔离
- 使用多个网络插件
- 使用场景:
 - NFV: VNF网元区分控制平面、数据平面、管理平面等
 - 应用区分内部和外部访问网络
 - 分别使用IPv4和IPv6网络
 - 隔离不同的客户端

多网络拓扑

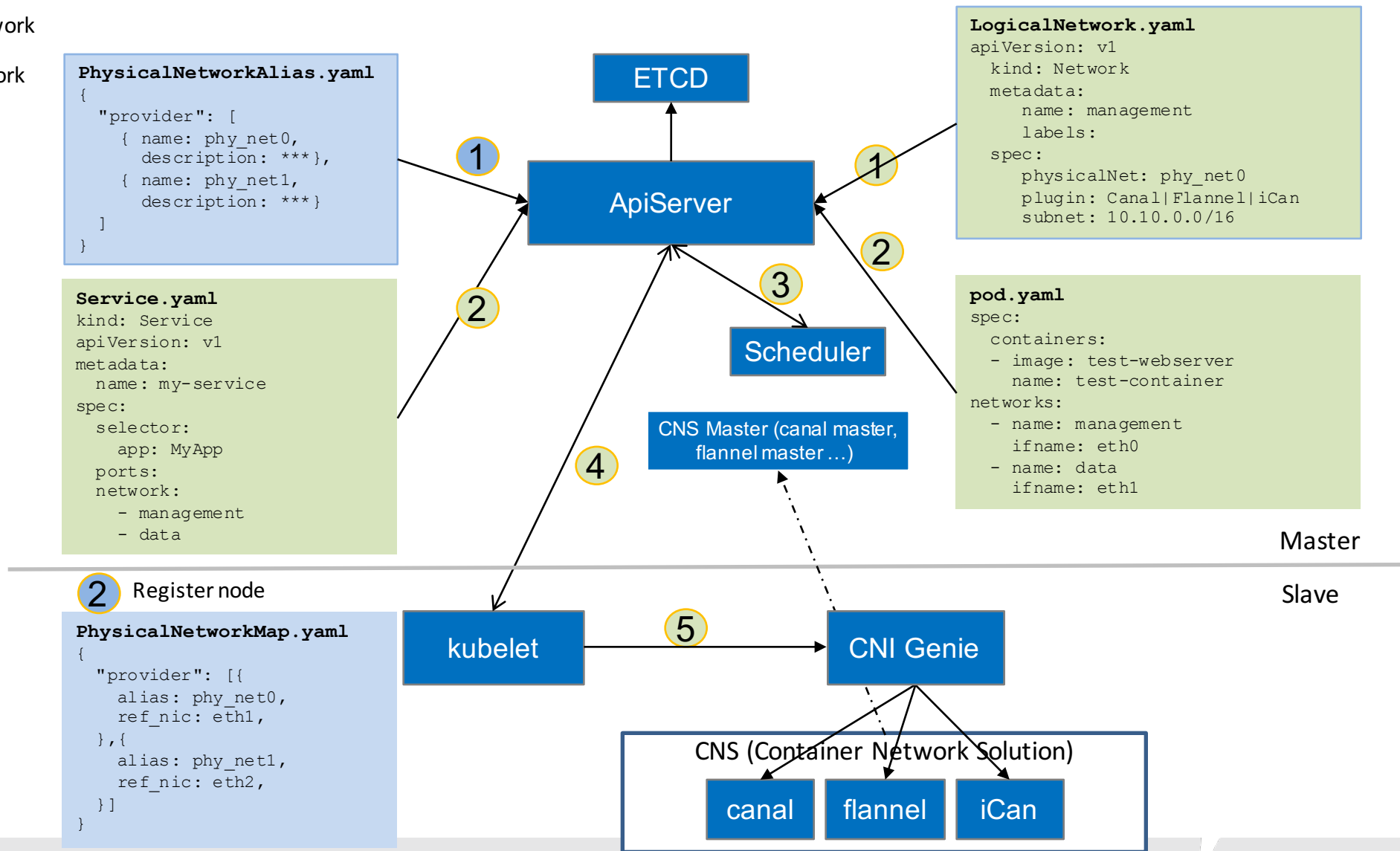


Kubernetes修改点

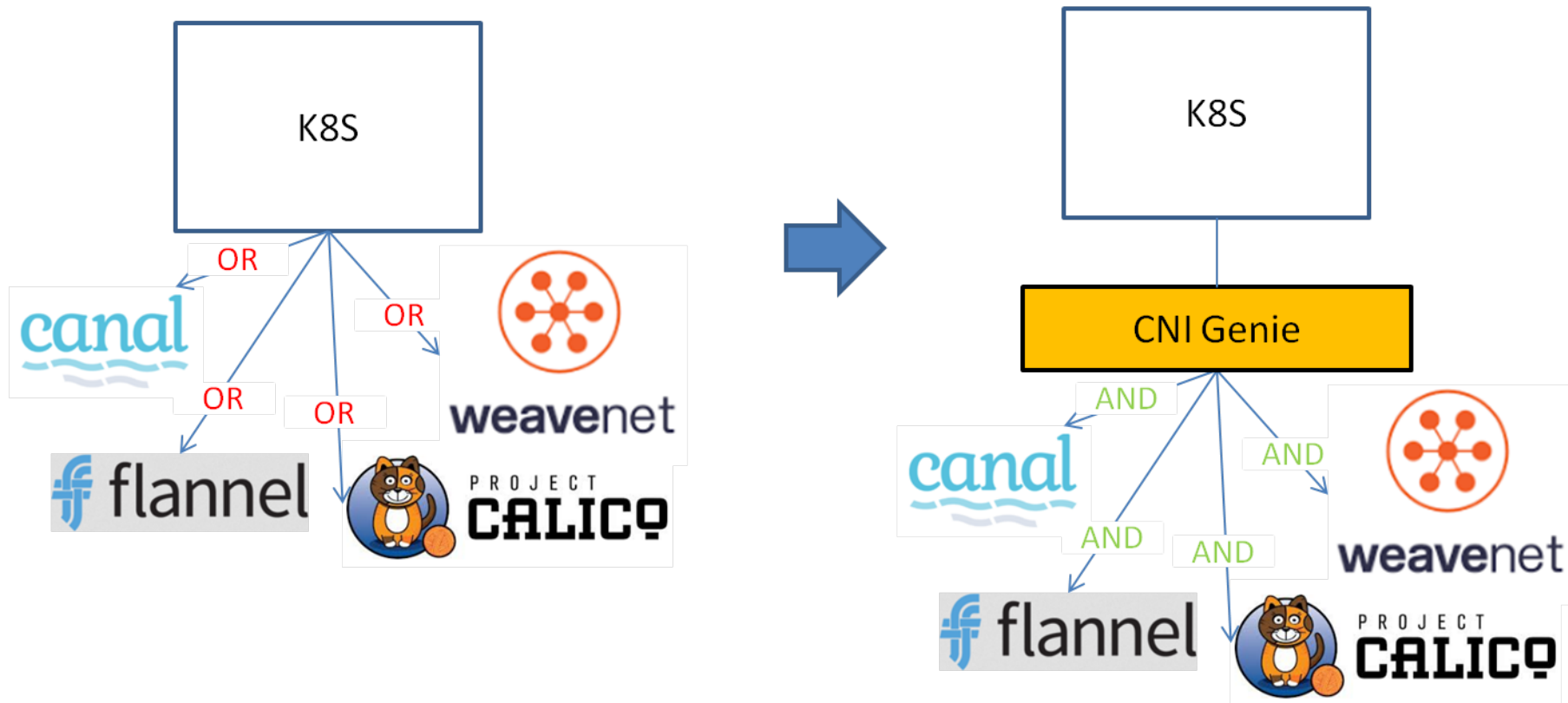
- 新增 physical network对象
- 新增 logical network 对象
- 修改Pod 对象
- 修改Service对象
- 增加基于Network的应用调度
- CNI Genie (CNI网络插件管理器)

Kubernetes多网络工作流程

- Physical network
- Logical network



CNI-Genie介绍



Demo实例

节点列表

```
SHA1000136564:/home/test # /opt/paas/kubernetes/kubectl --client-certificate=tls.crt --client-key=tls.key --certificate-authority=ca.crt -s
https://100.106.74.140:5443 get nodes -n multinet
NAME          STATUS    AGE
multinet-1    Ready     5d
multinet-2    Ready     6d
multinet-3    Ready     6d
```

节点描述

```
SHA1000136564:/home/test # /opt/paas/kubernetes/kubectl --client-certificate=tls.crt --client-key=tls.key --certificate-authority=ca.crt -s
https://100.106.74.140:5443 get node multinet-1 -n multinet -o yaml
apiVersion: v1
kind: Node
metadata:
  annotations:
    network.alpha.kubernetes.io/mappings: networkmapping1
    volumes.kubernetes.io/controller-managed-attach-detach: "true"
  creationTimestamp: 2017-06-08T06:18:15Z
  enable: true
  labels:
    beta.kubernetes.io/arch: amd64
    beta.kubernetes.io/os: linux
    kubernetes.io/hostname: multinet-1
    network.alpha.kubernetes.io/phynet1: eth1
    os.architecture: amd64
```

物理网络平面列表

```
SHA1000136564:/home/test # /opt/paas/kubernetes/kubectl --client-certificate=tls.crt --client-key=tls.key --certificate-authority=ca.crt -s
https://100.106.74.140:5443 get pn
NAME      TYPE      PVID      AGE
phynet1   overlay_l2  1          6d
```

容器网络平面列表

```
SHA1000136564:/home/test # /opt/paas/kubernetes/kubectl --client-certificate=tls.crt --client-key=tls.key --certificate-authority=ca.crt -s
https://100.106.74.140:5443 get net
NAME      PHYNET  TYPE      SUBNET      AGE
net1      phynet1 overlay_l2  122.20.0.0/16 6d
```

Demo实例

Pod定义

```
SHA1000136564:/home/test # cat pod-nginx.yaml
apiVersion: v1
kind: Pod
metadata:
  name: nginx
  labels:
    name: nginx
  annotations:
    network.alpha.kubernetes.io/network: '[{"name":"net1", "interface":"eth1"}]'
  namespace: multinet
spec:
  containers:
  - image: 100.106.74.140:20202/canal/nginx:1.7.8
    imagePullPolicy: IfNotPresent
    name: nginx
    ports:
      - containerPort: 443
  restartPolicy: Always
  securityContext: {}
  serviceAccount: default
  serviceAccountName: default
```

```
SHA1000136564:/home/test # /opt/paas/kubernetes/kubectl --client-certificate=tls.crt --client-key=tls.key --certificate-authority=ca.crt -s
https://100.106.74.140:5443 create -f pod-nginx.yaml
pod "nginx" created
```

Pod列表

```
SHA1000136564:/home/test # /opt/paas/kubernetes/kubectl --client-certificate=tls.crt --client-key=tls.key --certificate-authority=ca.crt -s
https://100.106.74.140:5443 get pods -n multinet -o wide
```

NAME	READY	STATUS	RESTARTS	AGE	IP	NODE
fuxi-72bds	1/1	Running	0	6d	100.106.122.158	multinet-3
fuxi-qltmm	1/1	Running	0	6d	100.106.122.215	multinet-2
fuxi-x08dj	1/1	Running	0	5d	100.106.75.232	multinet-1
nginx	1/1	Running	0	4m	172.16.0.99,122.20.0.99	multinet-1

开源计划

- CNI Genie已开源
 - <https://github.com/Huawei-PaaS/CNI-Genie>
 - 通过在Pods中添加 annotation使用多个网络插件
- 在k8s社区中逐步实现多网络方案
 - 多网络插件 (CNI-Genie已支持)
 - POD多IP地址 (CNI-Genie已支持)
 - 引入容器网络定义
 - 服务支持多网络平面
 - 支持多物理平面
 - 基于网络维度的应用调度



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