

Container Networking

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Outline

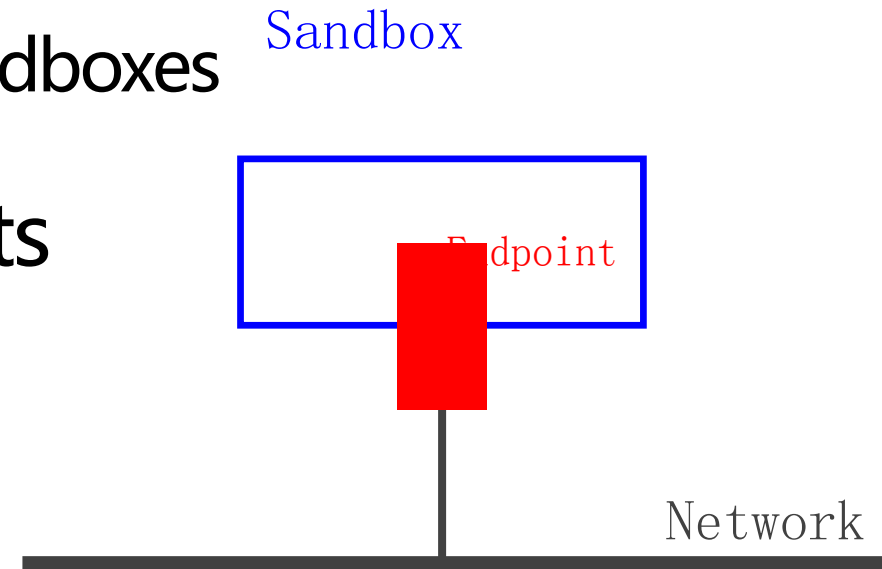
- Libnetwork
- Flannel and Weave
- Kubernetes
- Kuryr
- Neutron

Libnetwork

- Based on socketplane
- Separated networking module from the core Docker engine
- New pluggable architecture
- Implements the Container Network Model (CNM)
- Available in Docker 1.9.0

Libnetwork (cont.)

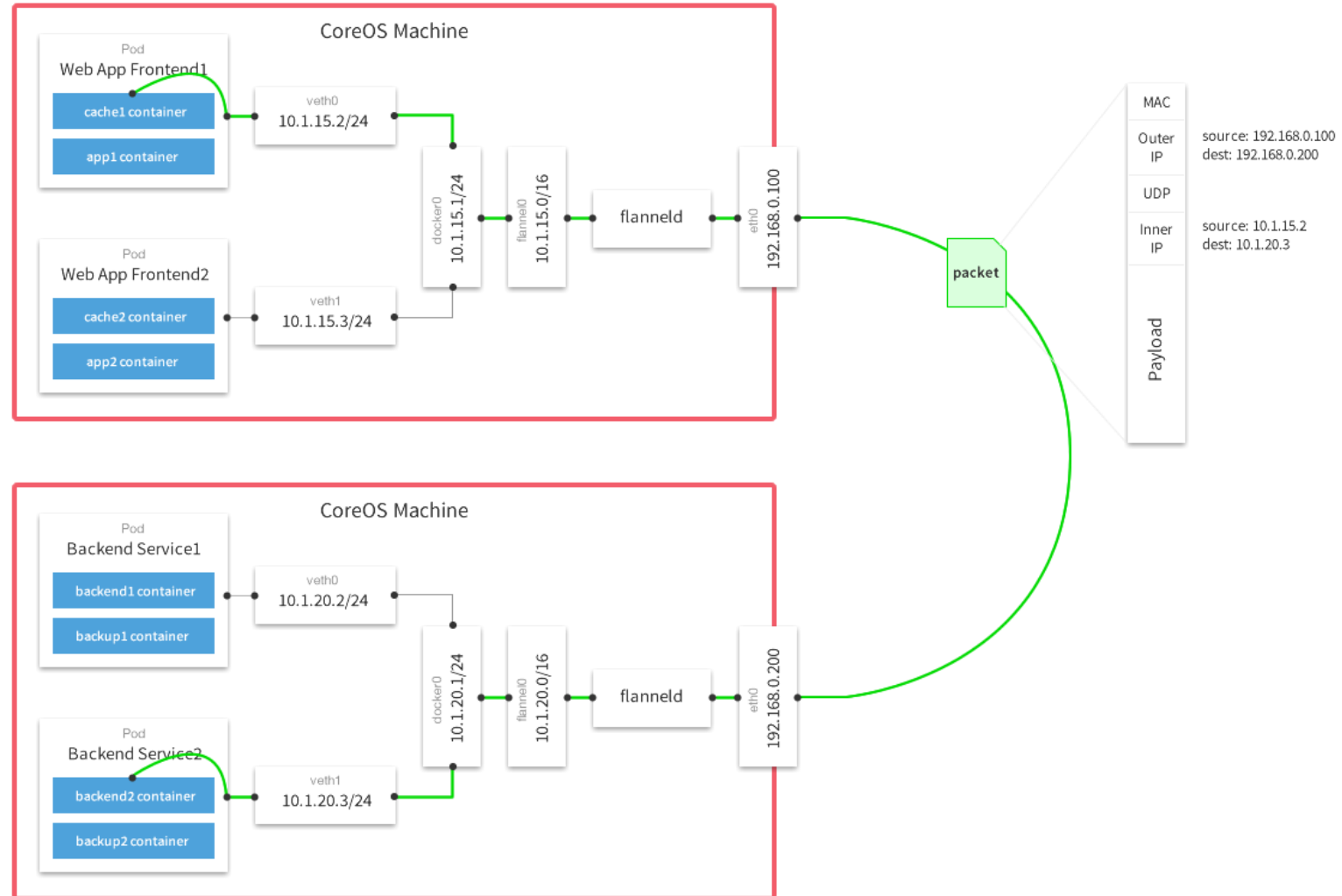
- Main Concepts:
 - Sandbox: Contains the configuration of a container's network stack
 - Network: Collection of Endpoints that can communicate with Each other
 - Endpoint: Connects networks to sandboxes
- Similar to Neutron Core concepts



Libnetwork (cont.)

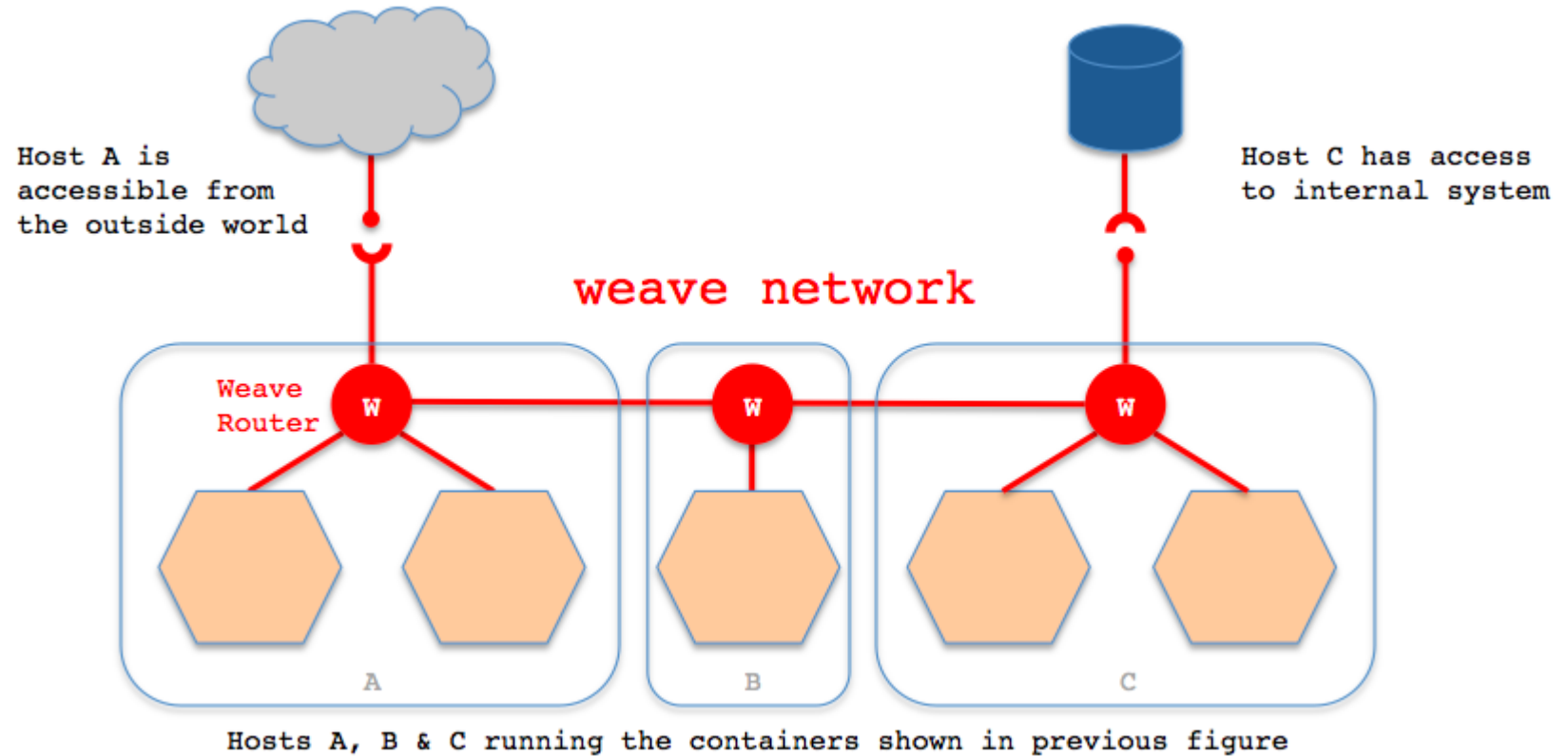
- Supported drivers:
 - Null: no network
 - Bridge: traditional Docker networking (new implementation)
 - Overlay: multi-host networking
 - Remote: Connecting to Docker Network plugins
 - Uses JSON-RPC
 - Can be used to utilize Neutron

Flannel



Weave

- weave



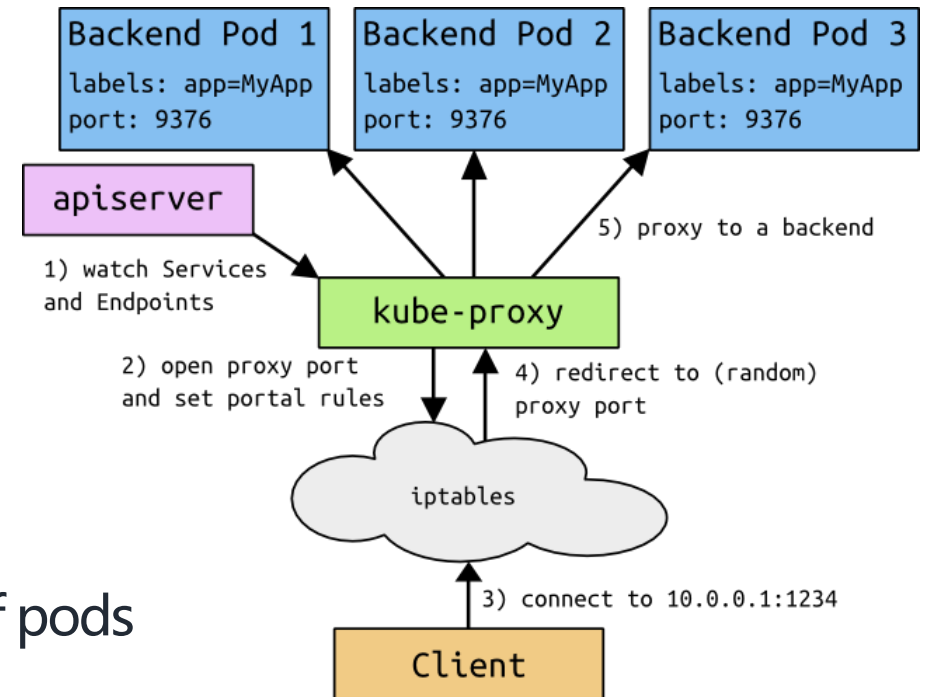
Docker Networking: Kubernetes

- Abstractions

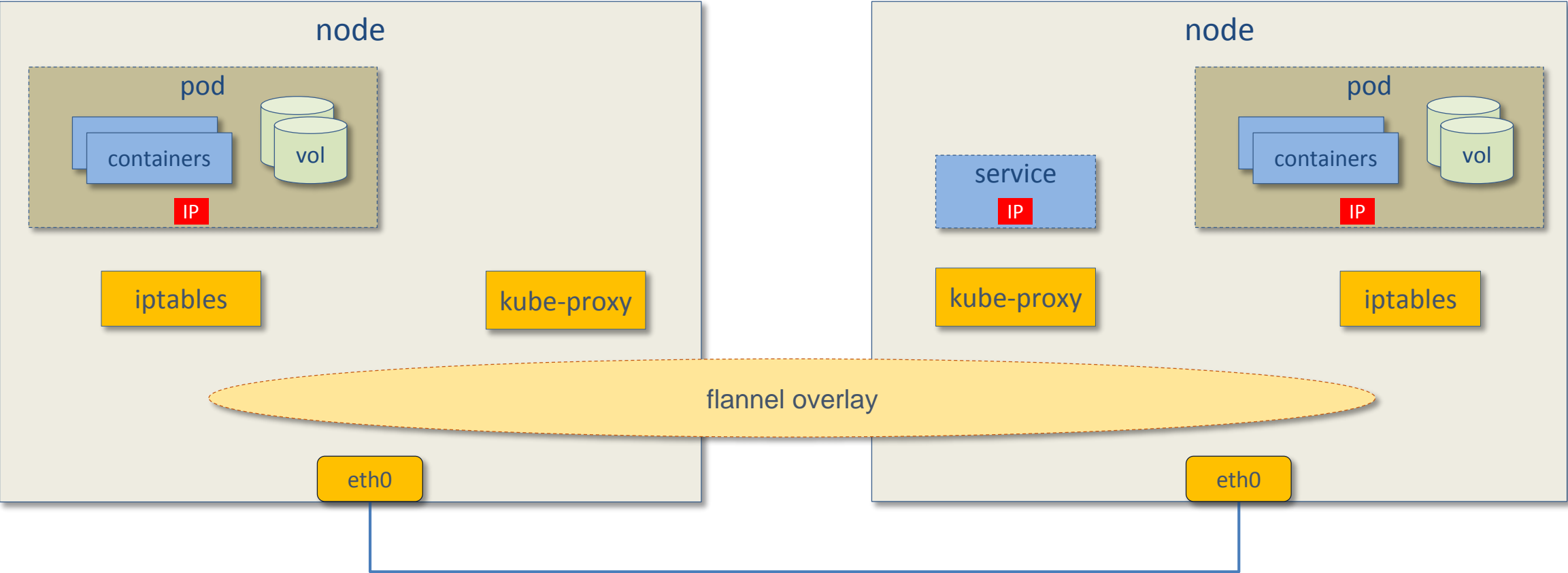
- pods:
 - group of containers on same host
 - IP per pod
- service:
 - proxy, load balancing
 - IP per service
 - replication controller: maintain exact number of pods

- Networking support

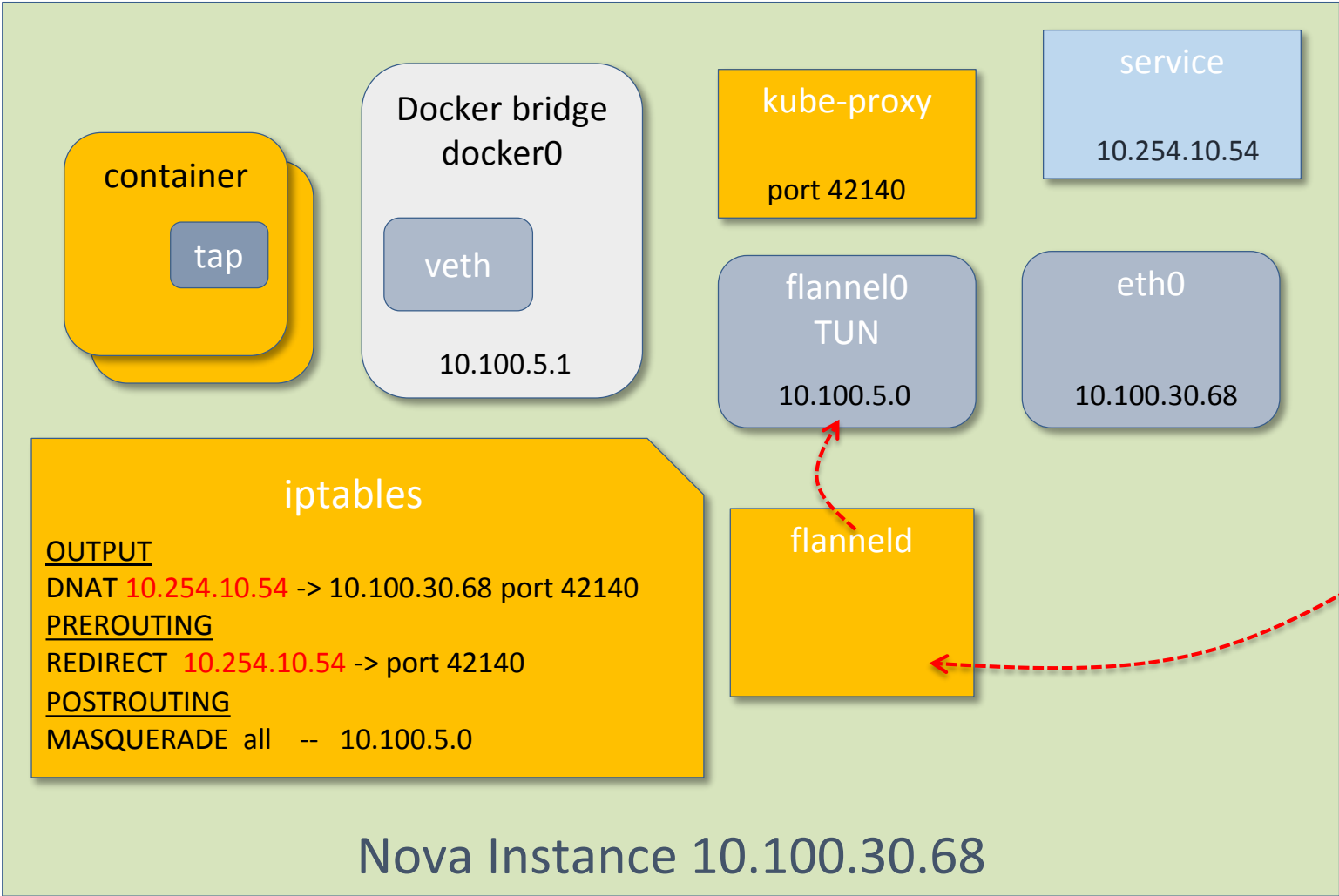
- kube-proxy: a Kubernetes component
- flannel: an overlay network (other options available)
- iptables rules: kernel support



Kubernetes Cluster in Operation



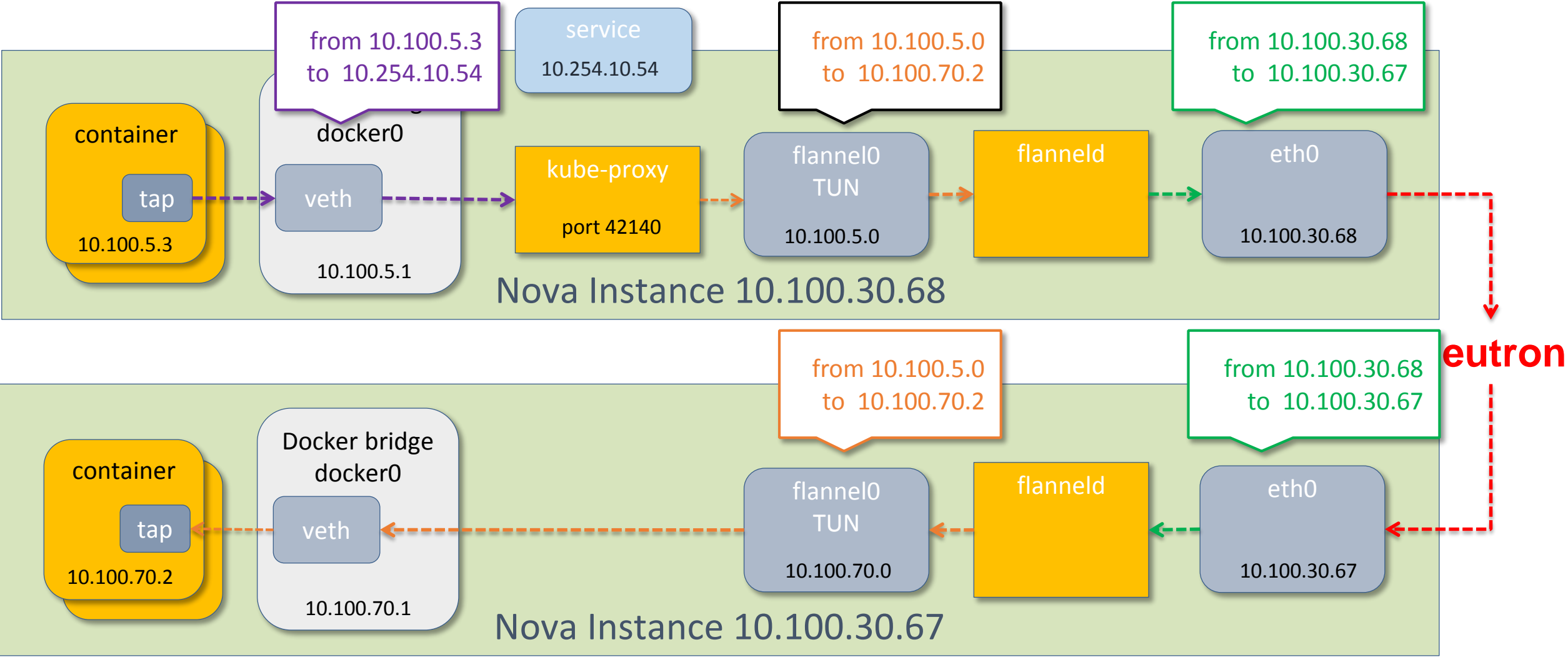
Networking Setup



```
JSON
├── action: "get"
├── node
│   ├── key: "/coreos.com/network/subnets"
│   ├── dir: true
│   └── nodes
│       ├── 0
│       │   ├── key: "/coreos.com/network/subnets/10.100.70.0-24"
│       │   ├── value: "{\"PublicIP\":\"10.100.30.67\"}"
│       │   ├── expiration: "2015-10-24T05:12:38.641417576Z"
│       │   ├── ttl: 50359
│       │   ├── modifiedIndex: 12
│       │   └── createdIndex: 12
│       └── 1
│           ├── key: "/coreos.com/network/subnets/10.100.5.0-24"
│           ├── value: "{\"PublicIP\":\"10.100.30.68\"}"
│           ├── expiration: "2015-10-24T05:12:44.454188039Z"
│           ├── ttl: 50364
│           ├── modifiedIndex: 13
│           └── createdIndex: 13
│   └── modifiedIndex: 12
│   └── createdIndex: 12
```

etcd

Container to Container Communication



Kuryr

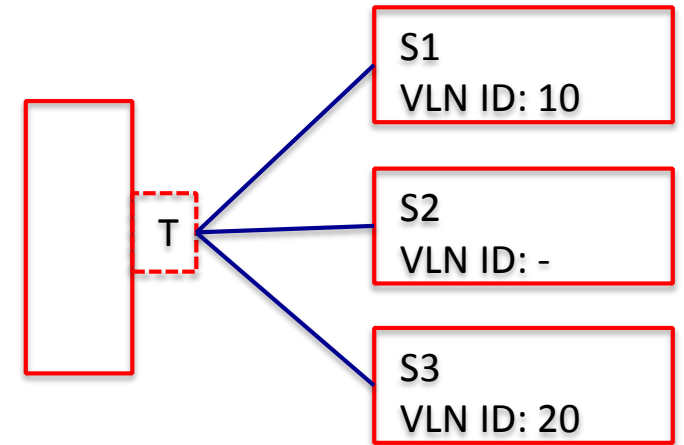
- Docker for Openstack Neutron
- Kuryr is a Docker network plugin that uses Neutron
 - Provides networking services to Docker containers
 - Will provide containerised images for the common Neutron plugins
- Part of OpenStack Ecosystem

Kuryr

- Docker Networks: Neutron networks
- Docker Endpoints: Neutron ports
 - Neutron subnets gets created from a predefined Neutron subnetpool
 - Docker IPAM driver for Kuryr in the works
- Docker Join/Leave: plug/unplug

Neutron: VLAN-Aware VMs

- Provides an efficient way for interconnecting containers deployed within VMs
- Avoids using overlays on top of overlays
- Define new types of Neutron Ports
 - Trunk ports
 - Parent/Children relationship
- Initial patches under review
- Building momentum with increased interest



T: Trunk Port
S: Subport

Q&A

