Pods and Namespaces

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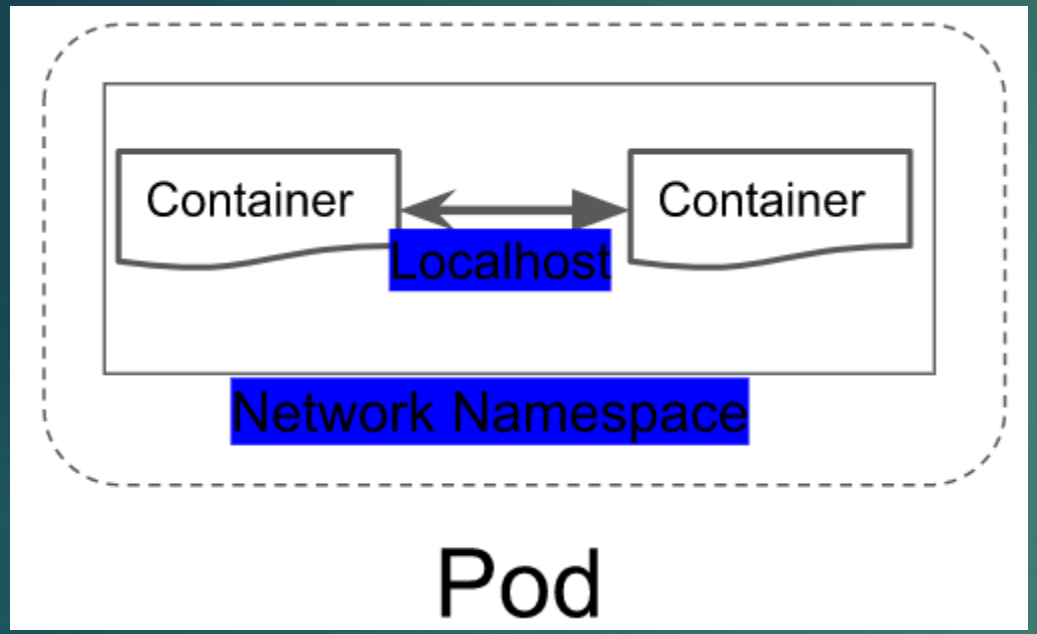


- Logical Collection of one or more containers
- Smallest unit of work
- Namespaces – Divide the cluster resources between multiple users
- Names of resources are unique within a namspace

Pods

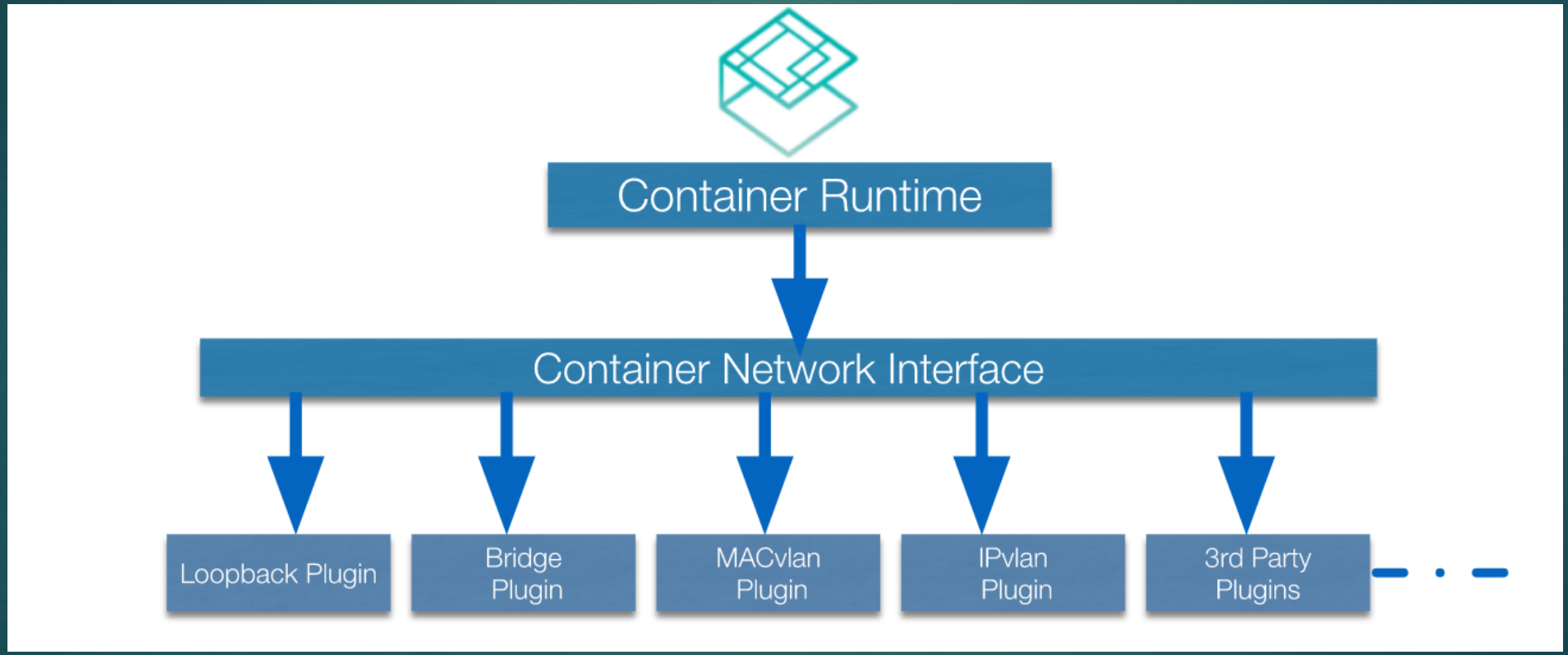
Every Pod gets its own IP address. This means you do not need to explicitly create links between Pods and you almost never need to deal with mapping container ports to host ports. This creates a clean, backwards-compatible model where Pods can be treated much like VMs or physical hosts from the perspectives of port allocation, naming, service discovery, load balancing, application configuration, and migration.

Kubernetes imposes the following fundamental requirements on any networking implementation (barring any intentional network segmentation policies):

- Pods on a node can communicate with all pods on all nodes without NAT
- Agents on a node (e.g. system daemons, kubelet) can communicate with all pods on that node

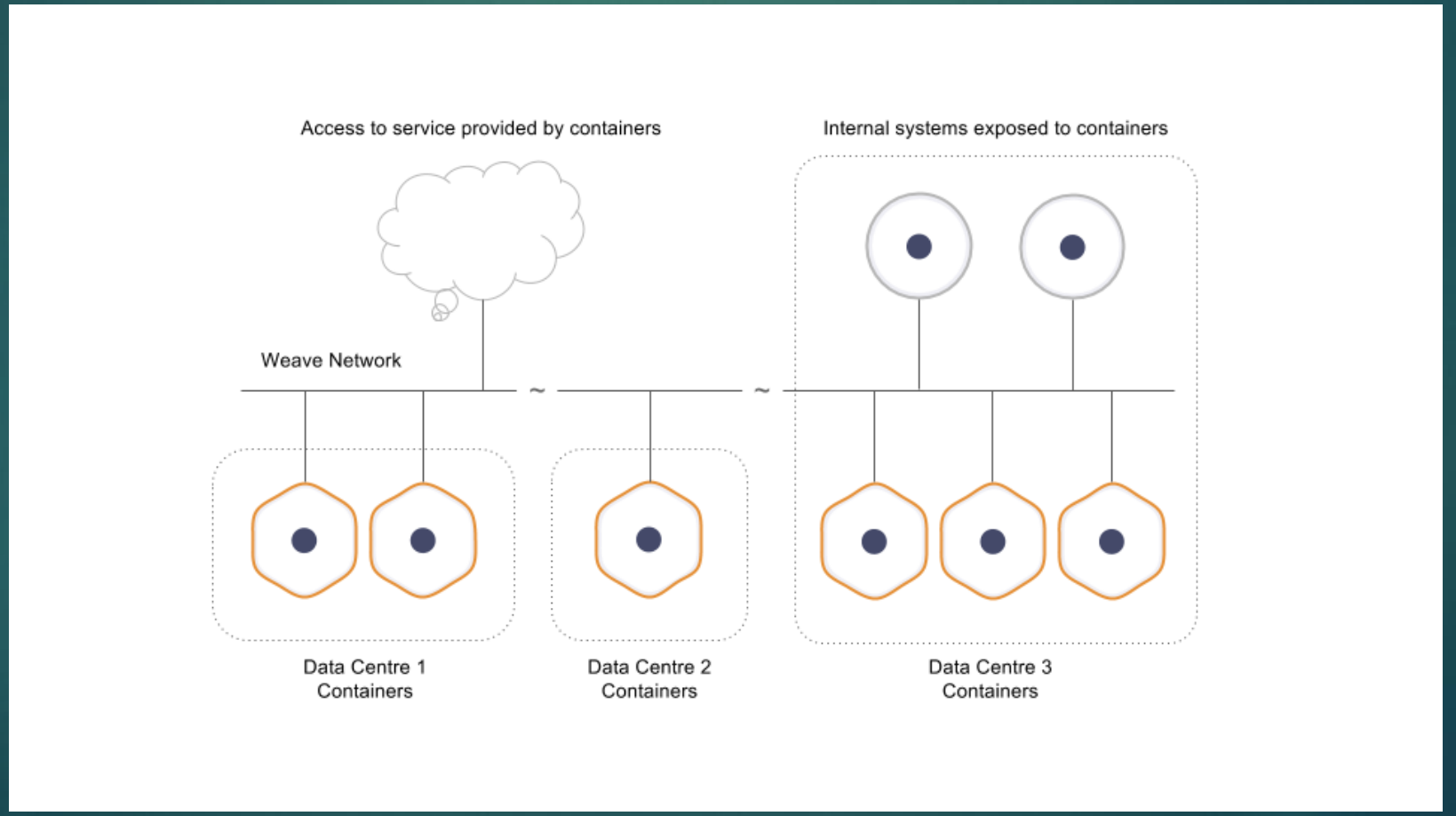
Kubernetes IP addresses exist at the Pod scope - containers within a Pod share their network namespaces - including their IP address. This means that containers within a Pod can all reach each other's ports on localhost. This also means that containers within a Pod must coordinate port usage, but this is no different from processes in a VM. This is called the "IP-per-pod" model.

Container Network Interface



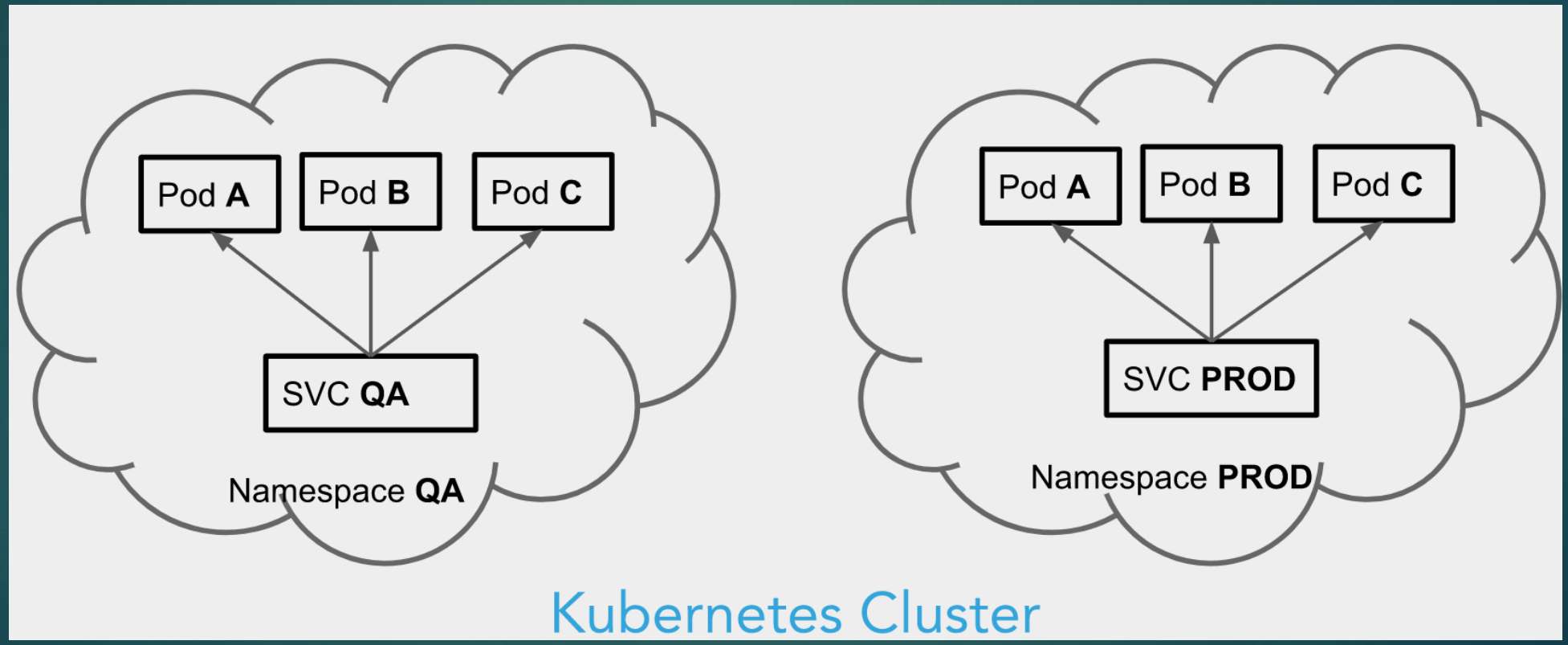
CNI Plugins

- Calico
- Flannel
- Weave



Namespaces

- Used to divide the cluster resources between multiple users
- Names of resources are unique within a namespace



Kubernetes Namespace

- Kubernetes objects which partitions a single Kubernetes Cluster into multiple Virtual Clusters
- By default the below 3 namespaces are created in a Kubernetes Cluster
  - default
  - kube-system
  - kube-public

Creating new namespace

- From Command Line

  kubectl create ns my-namespace

- Using YAML file

```
apiVersion:v1
kind:Namespace
metadata:
    name:test-ns
```

Use Cases of Namespaces

- To segregate cluster resources across different teams, users and applications
- Specify Resource Consumption policies like Resource Quota
- Ability to specify Access Policy like Role Based Access Control (RBAC)

Resource Quota

- Provides constraints that limit total resource consumption per namespace
- To limit the number of objects that can be created in a namespace.
- To limit the resource consumption of compute resources by objects created in a namespace

THANK YOU