kubernetes

Deconstructed

Carson Anderson, DOMO @carsonoid

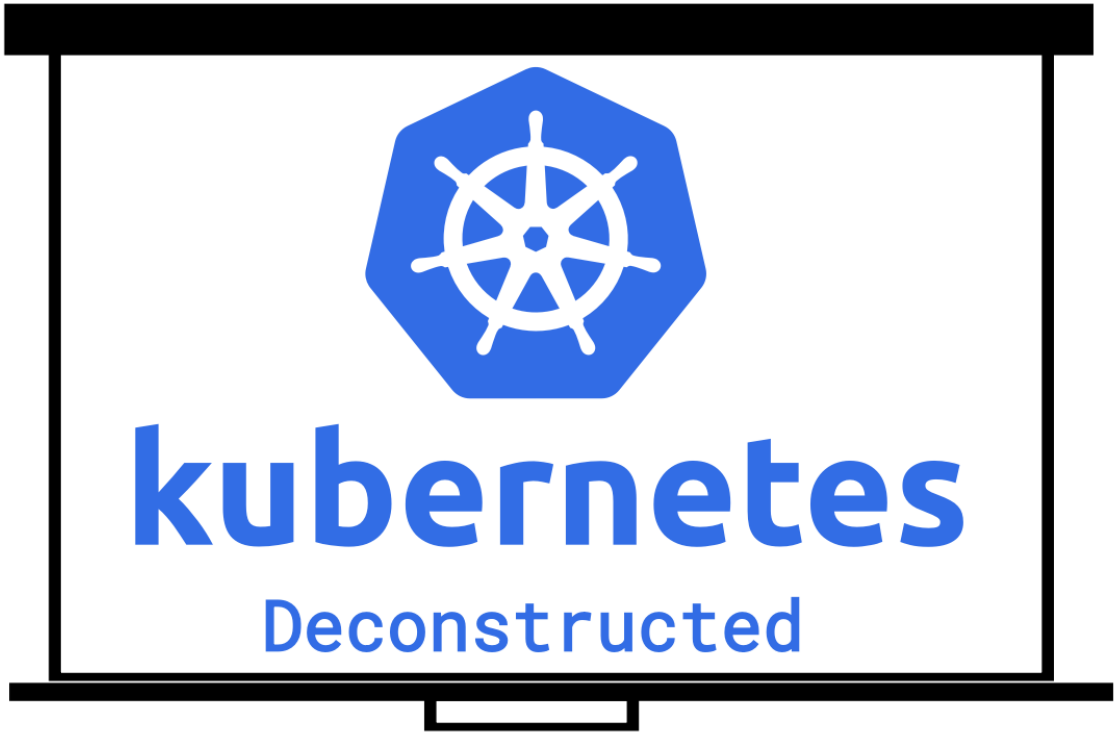
kubernetes

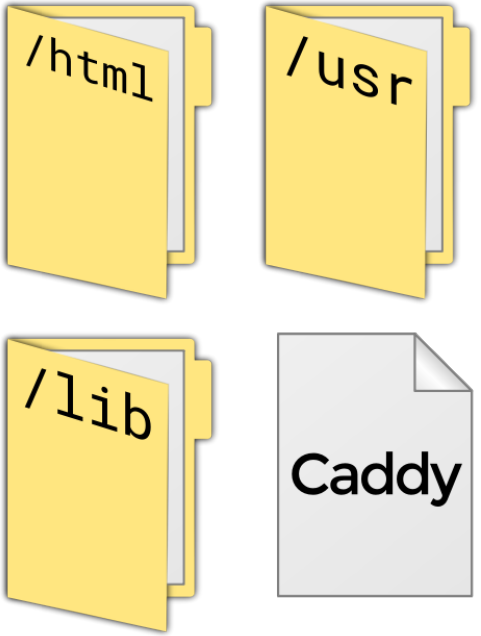
Deconstructed

User
Cluster
Network
Cloud
Linux
Power

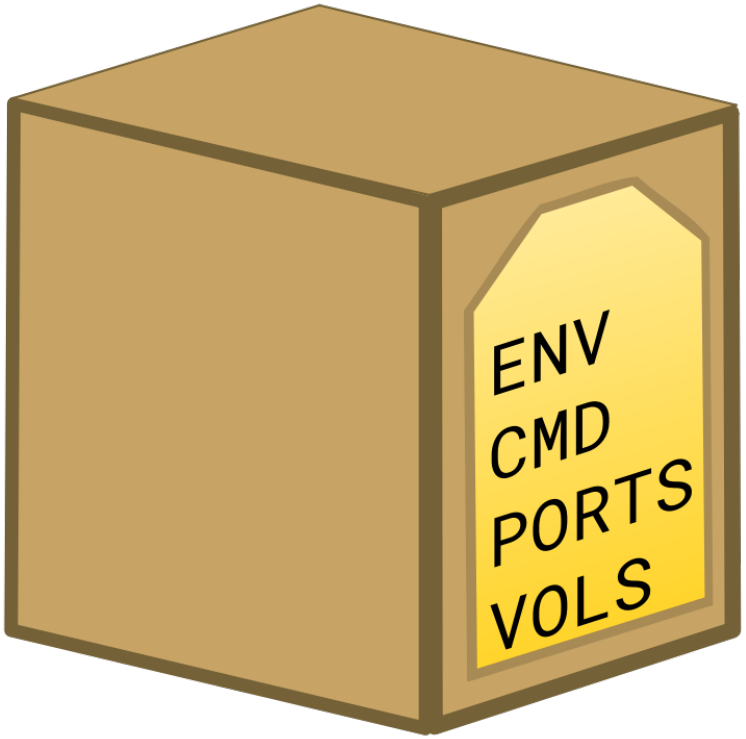
Kubernetes for the Basic User

Containers 101

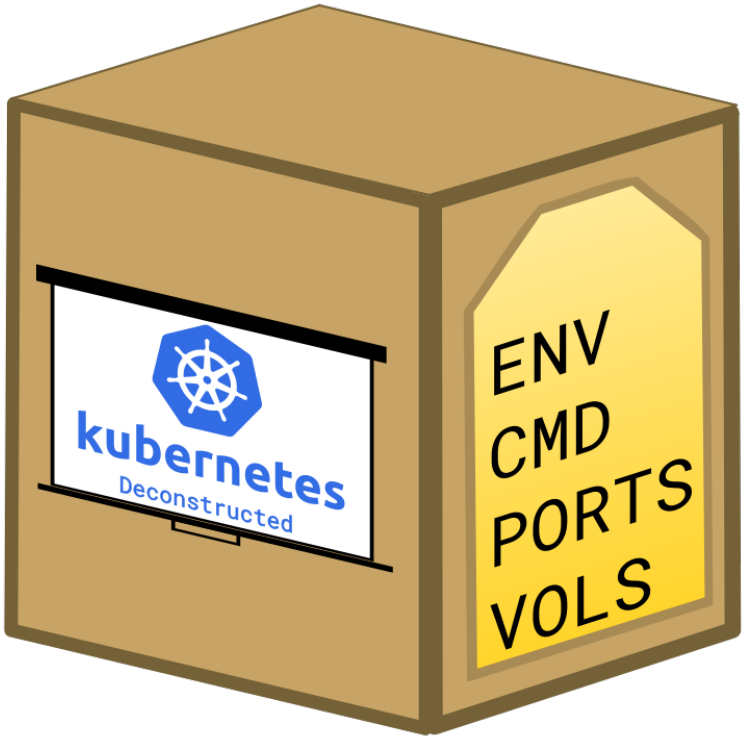

kubernetes
Deconstructed

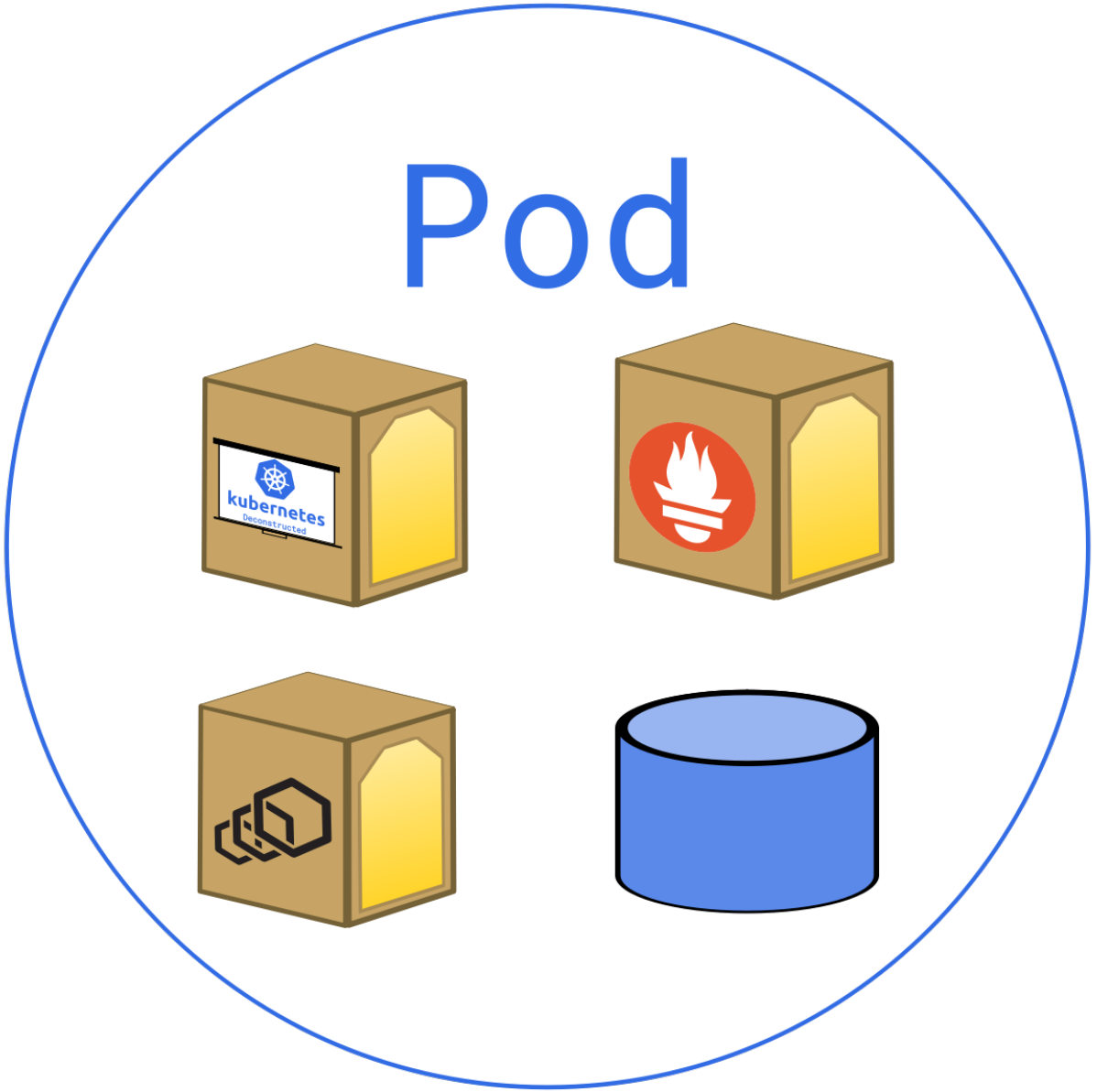

/html
/usr
/lib
Caddy

Metadata

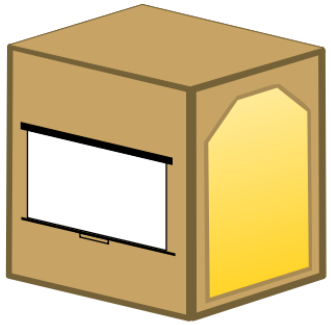


Label(s)

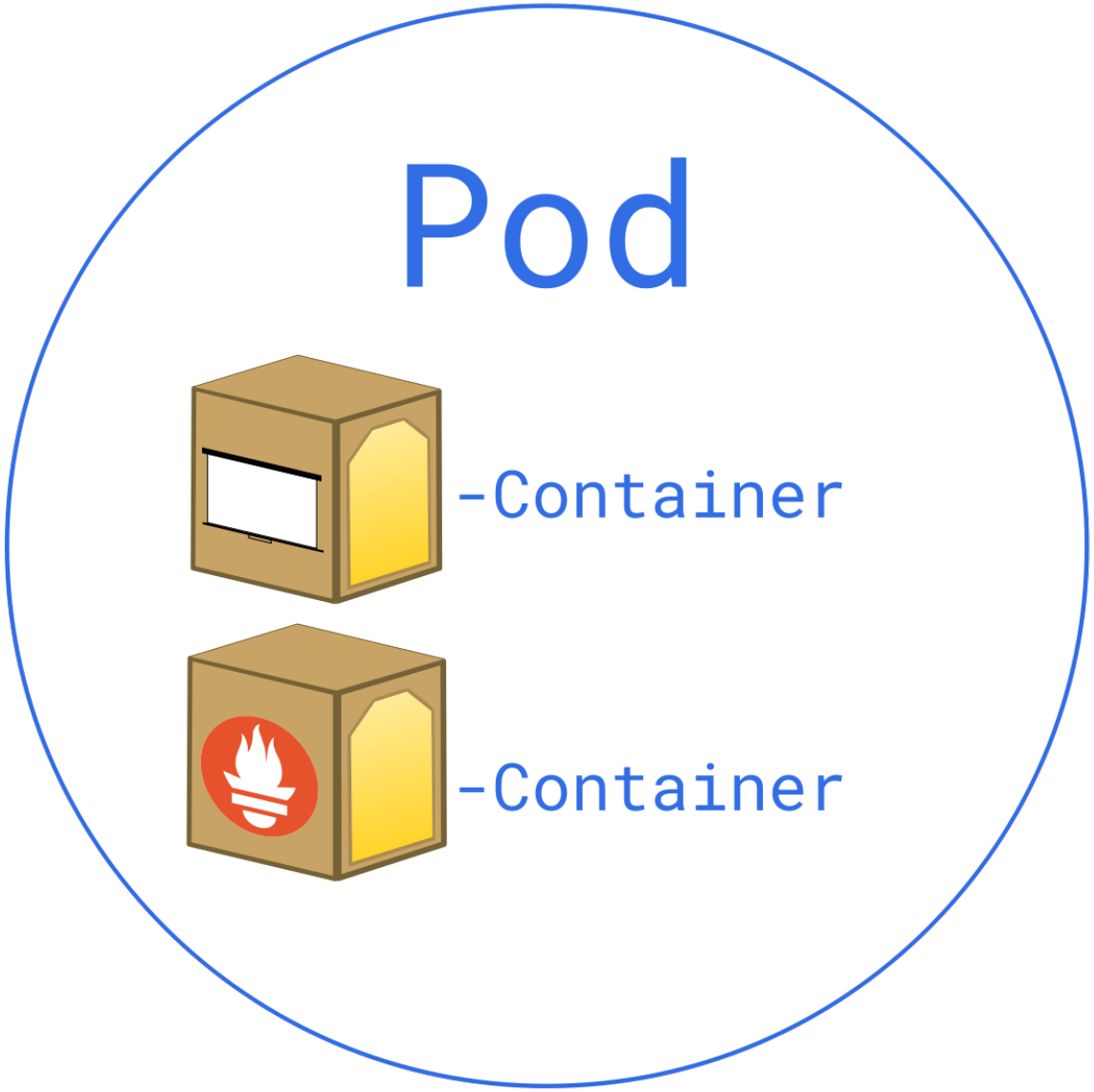


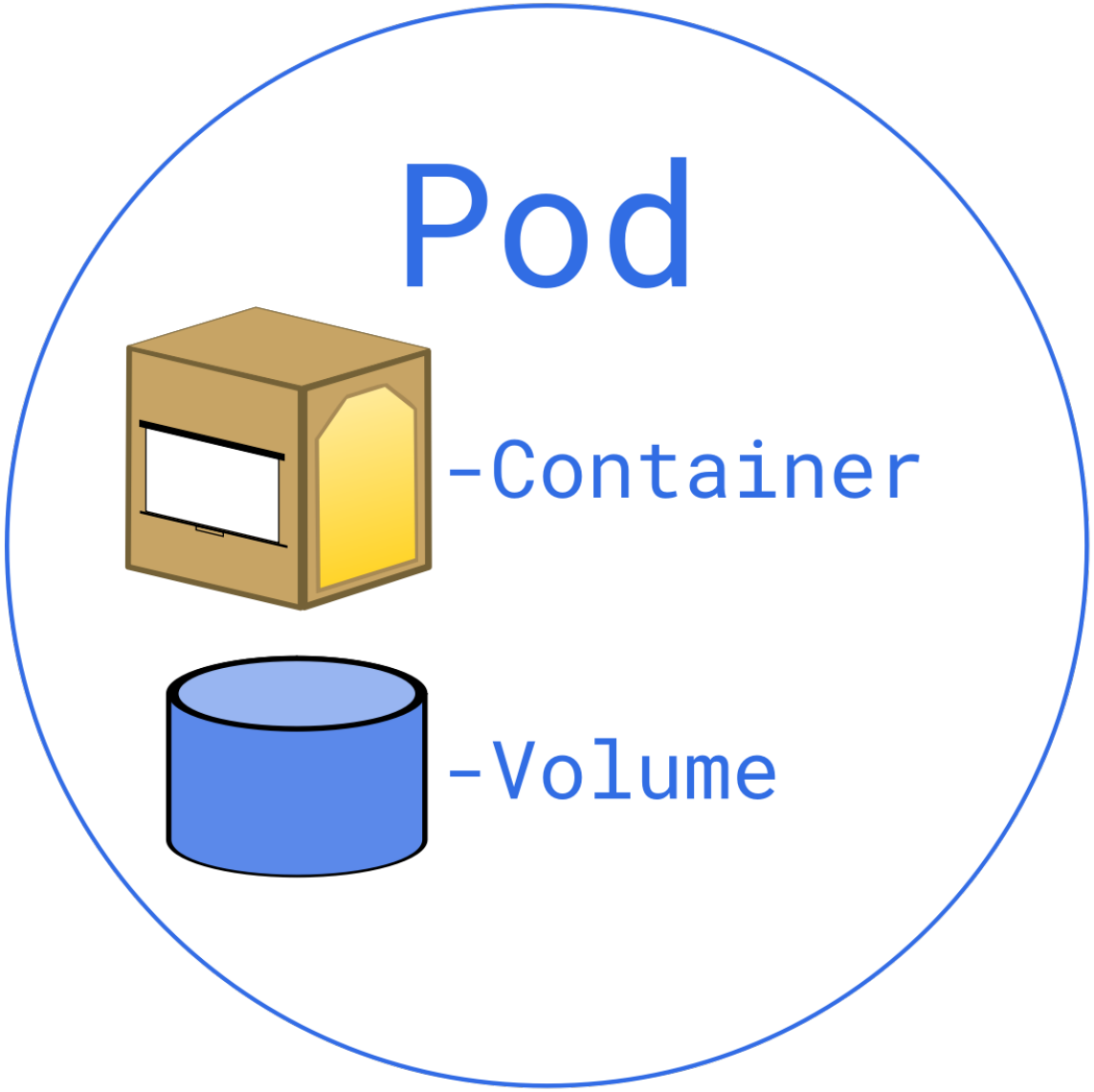

Pod
kubernetes
Deconstructed

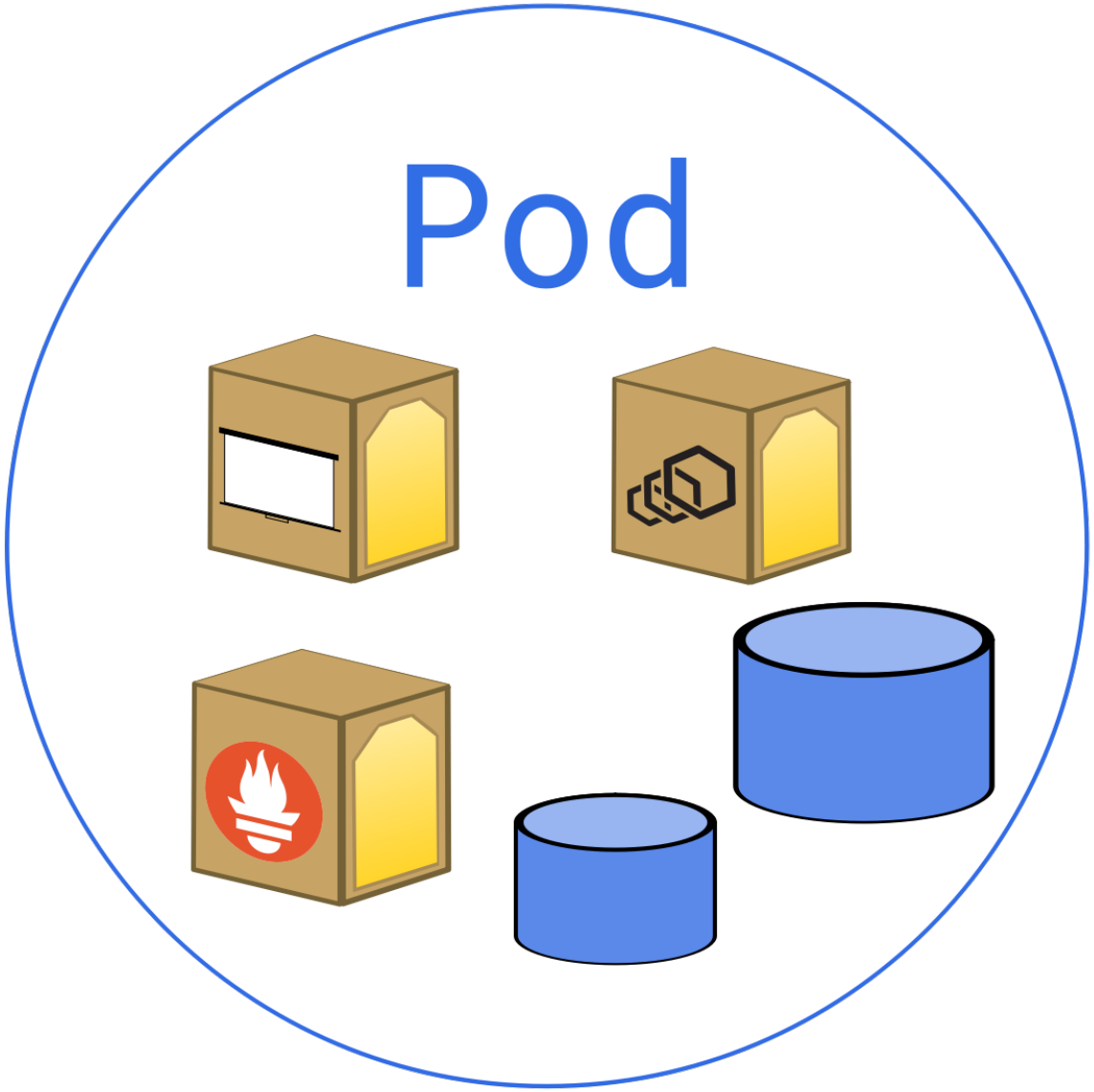
Pod



-Container


Pod
-Container
-Container

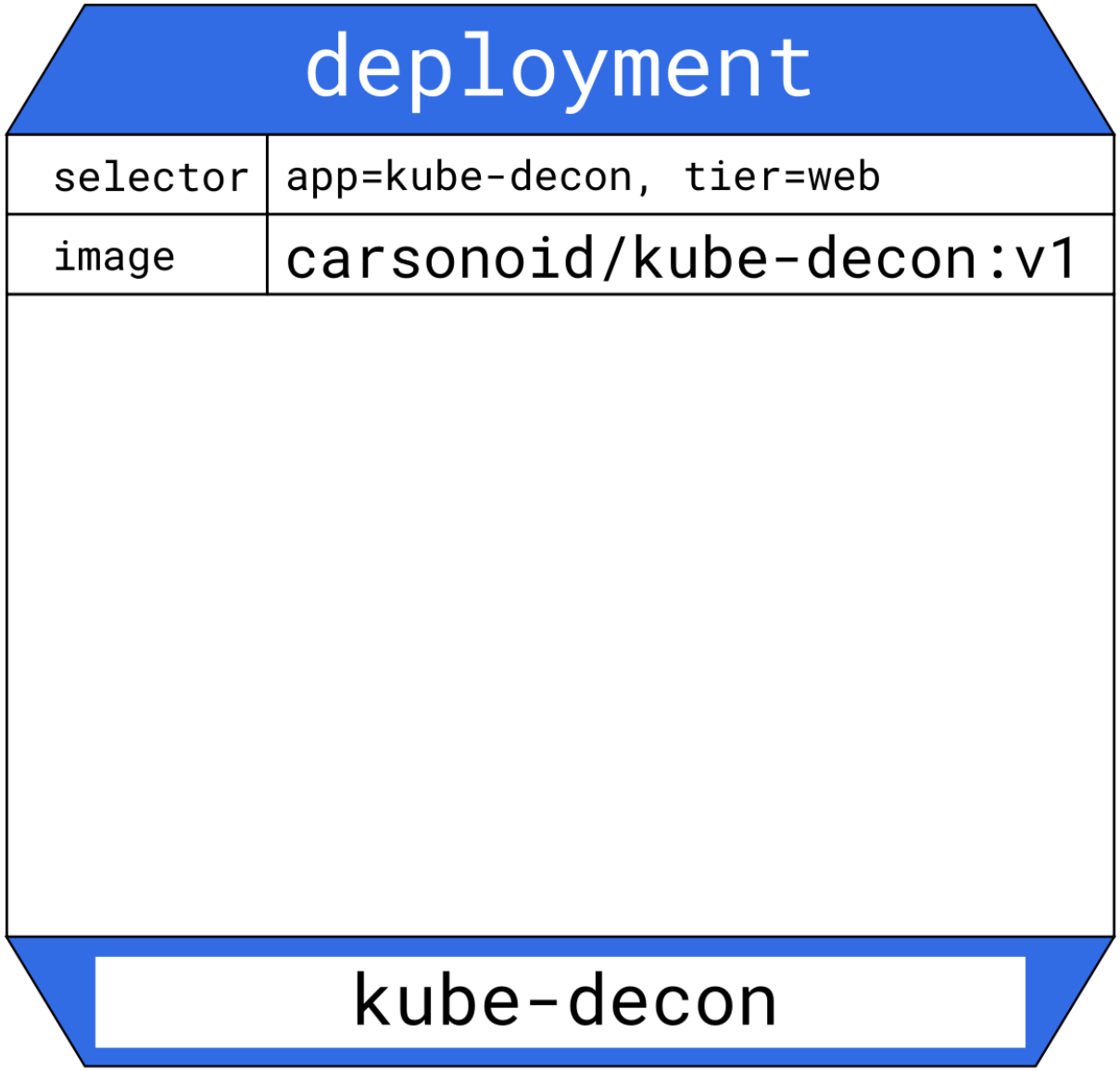

Pod
-Container
-Volume

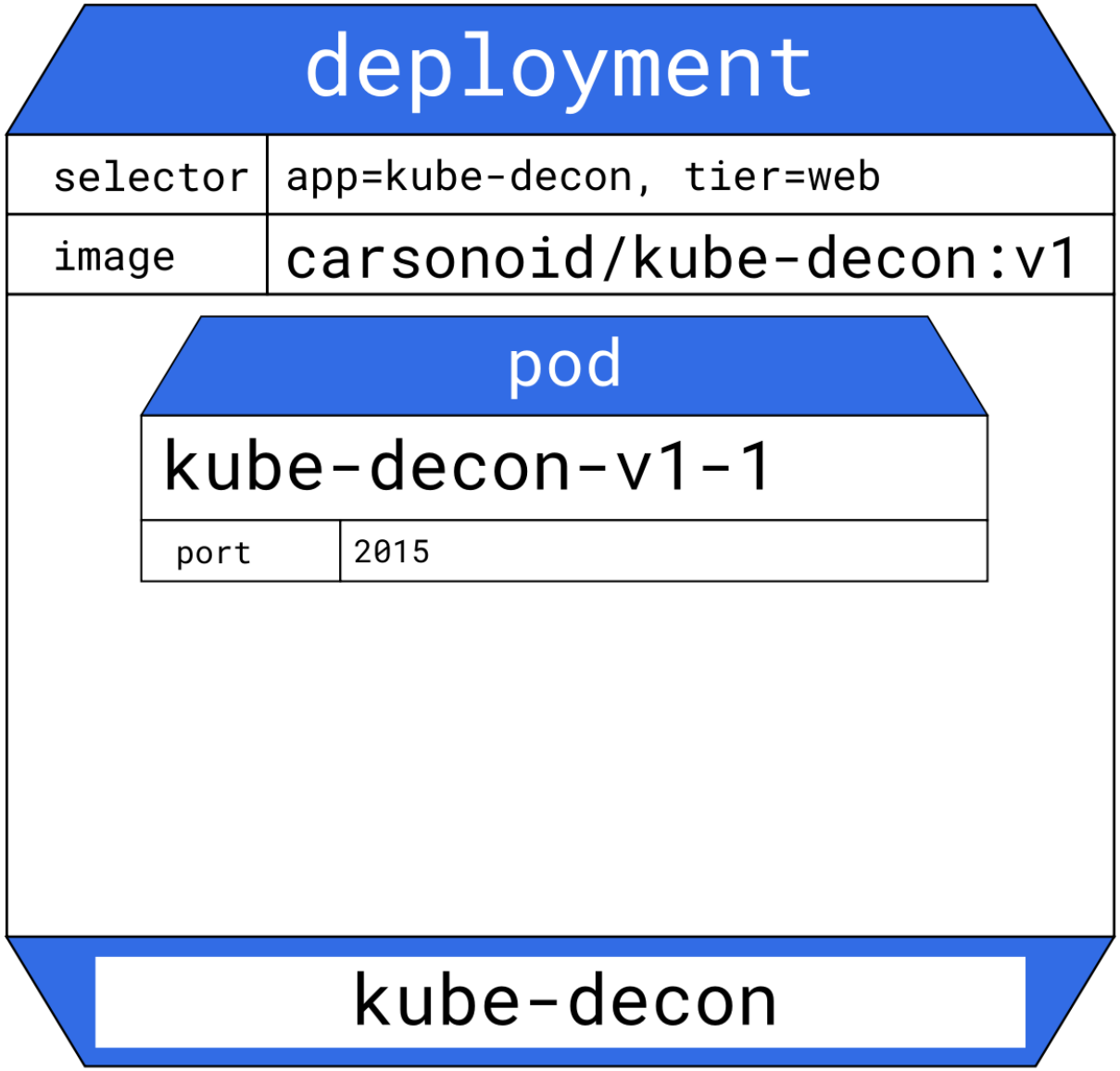

Pod

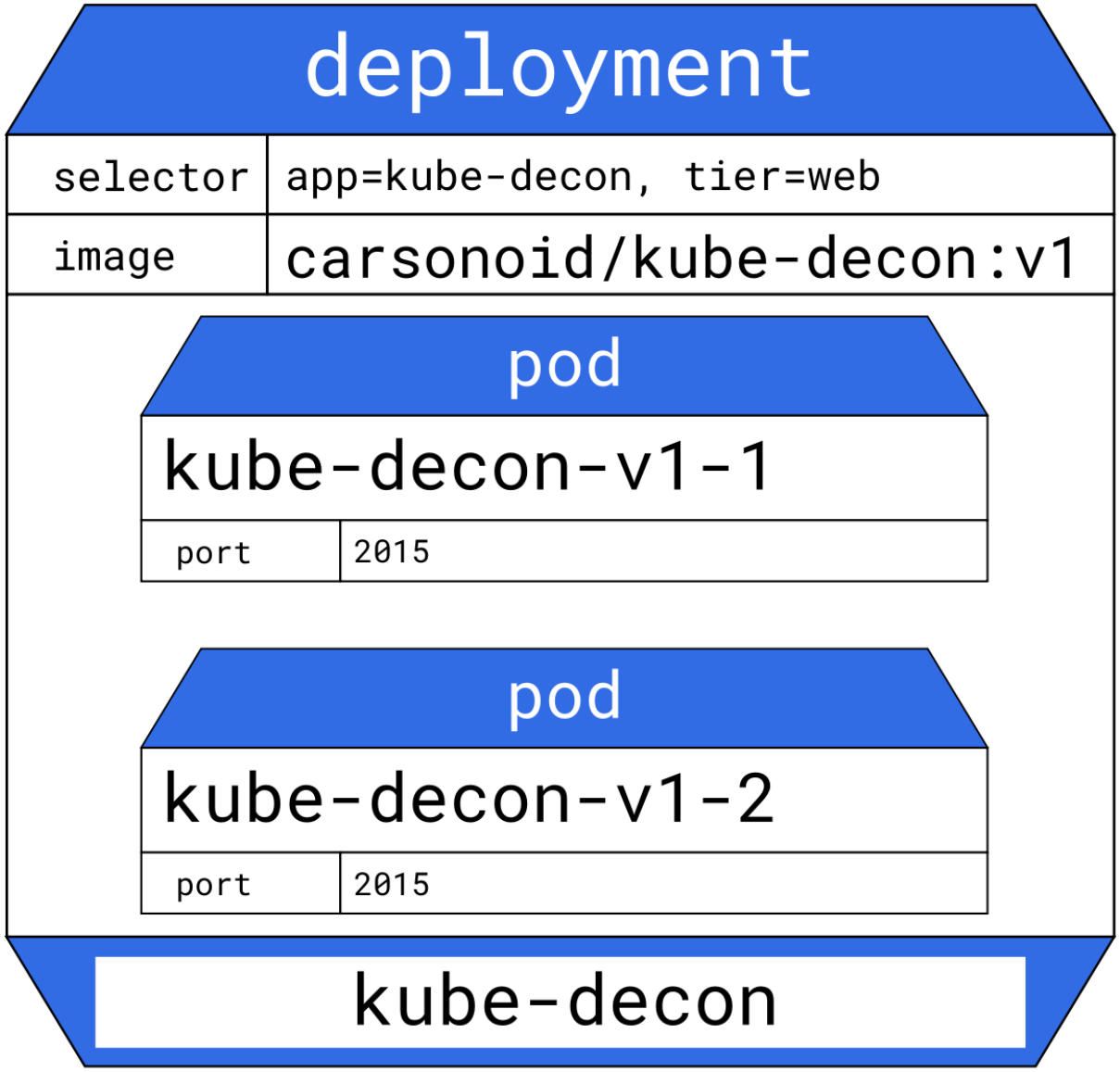

pod
kube-decon-1
port
2015

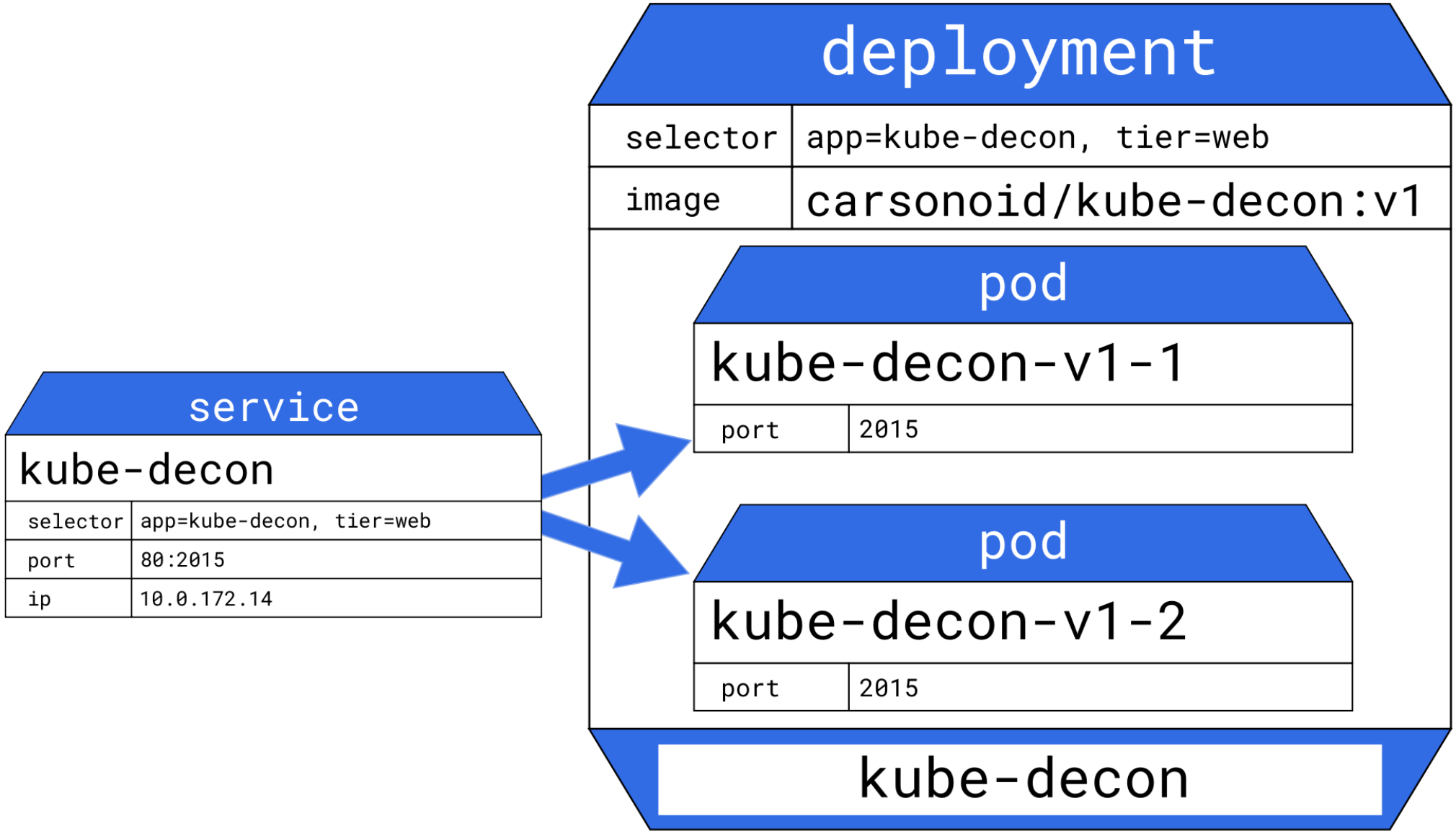

pod
kube-decon-1
port
2015

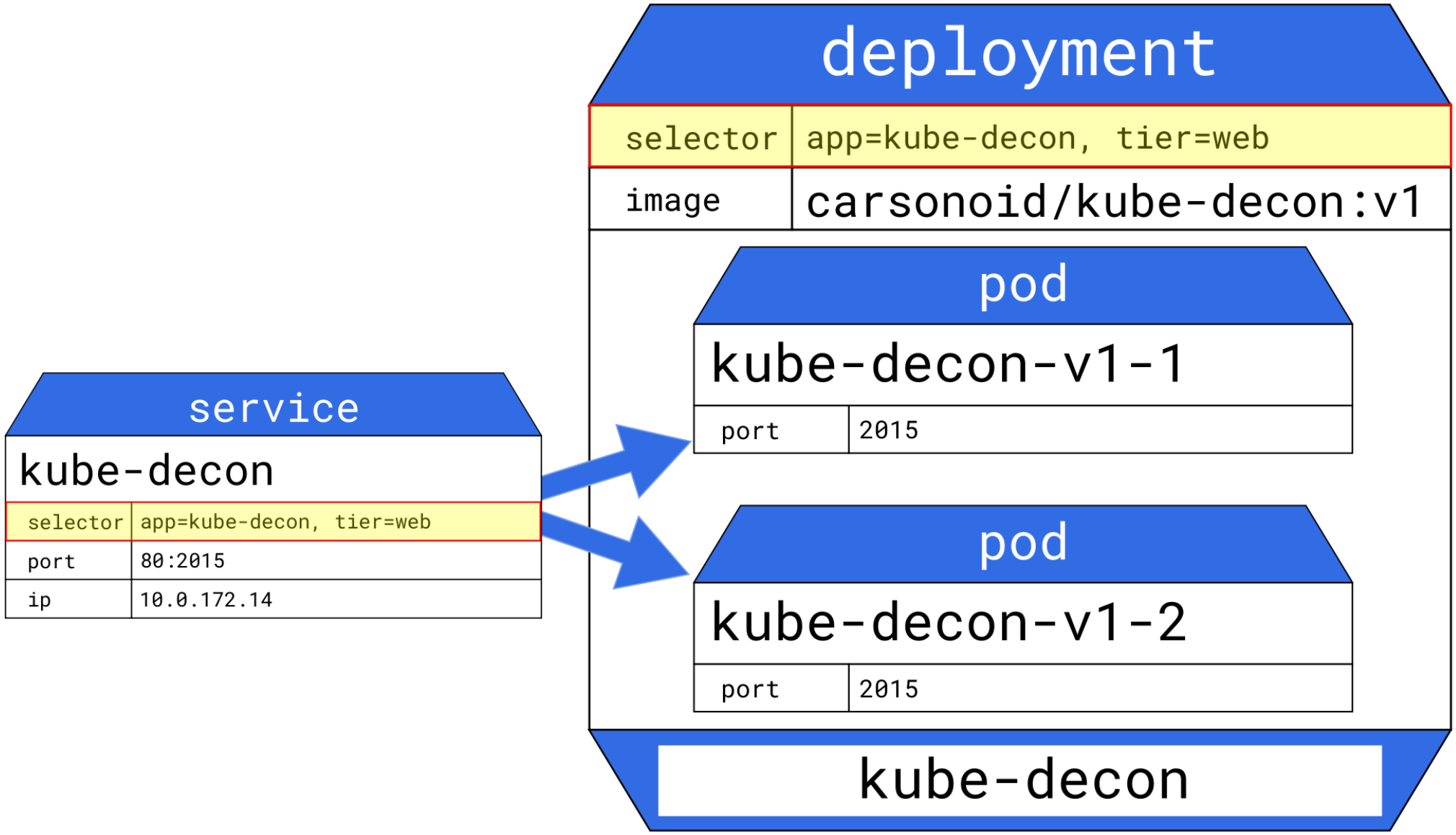

pod
kube-decon-2
port
2015

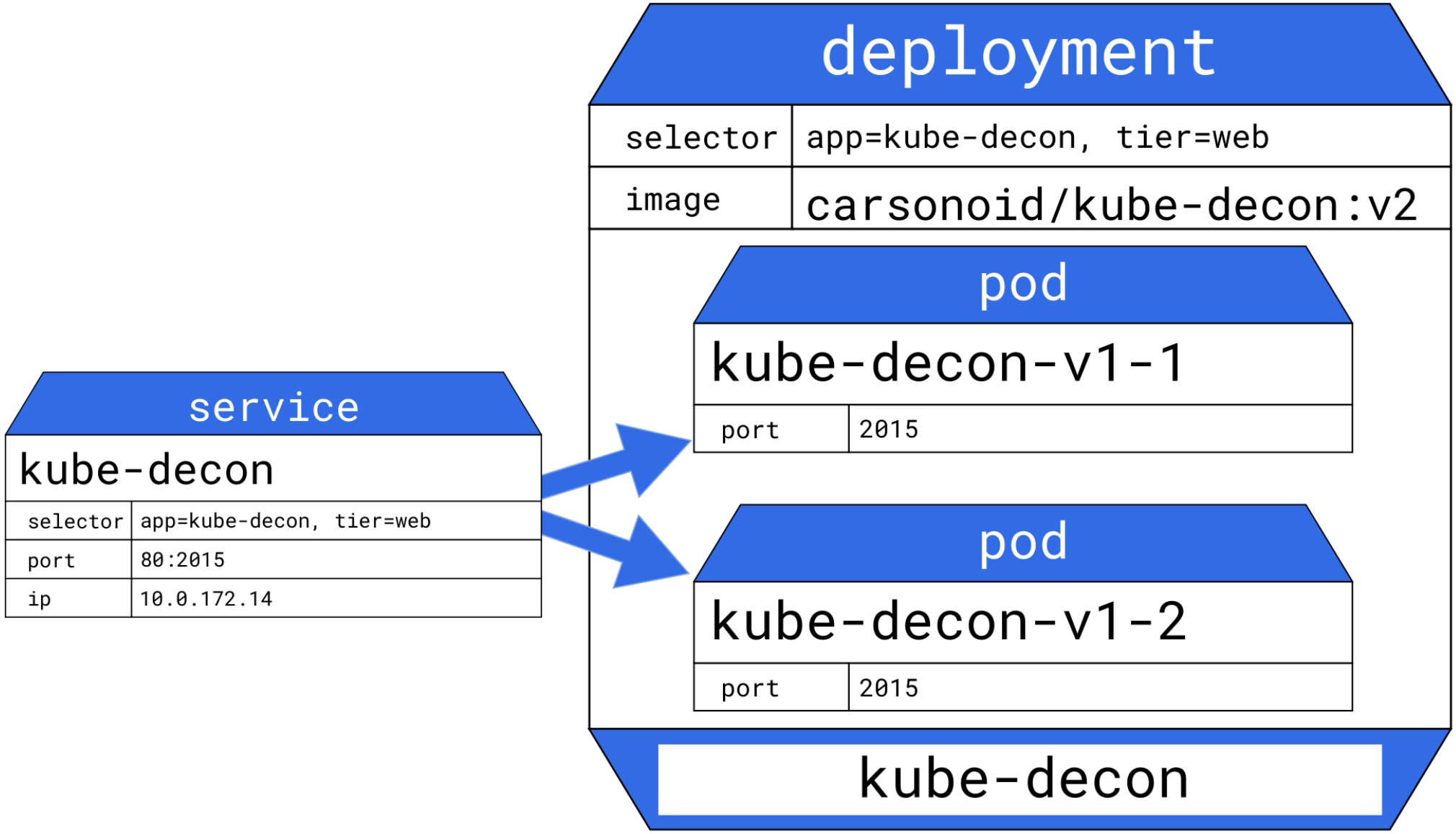

deployment
selector
app=kube-decon, tier=web
image
carsonoid/kube-decon:v1
kube-decon

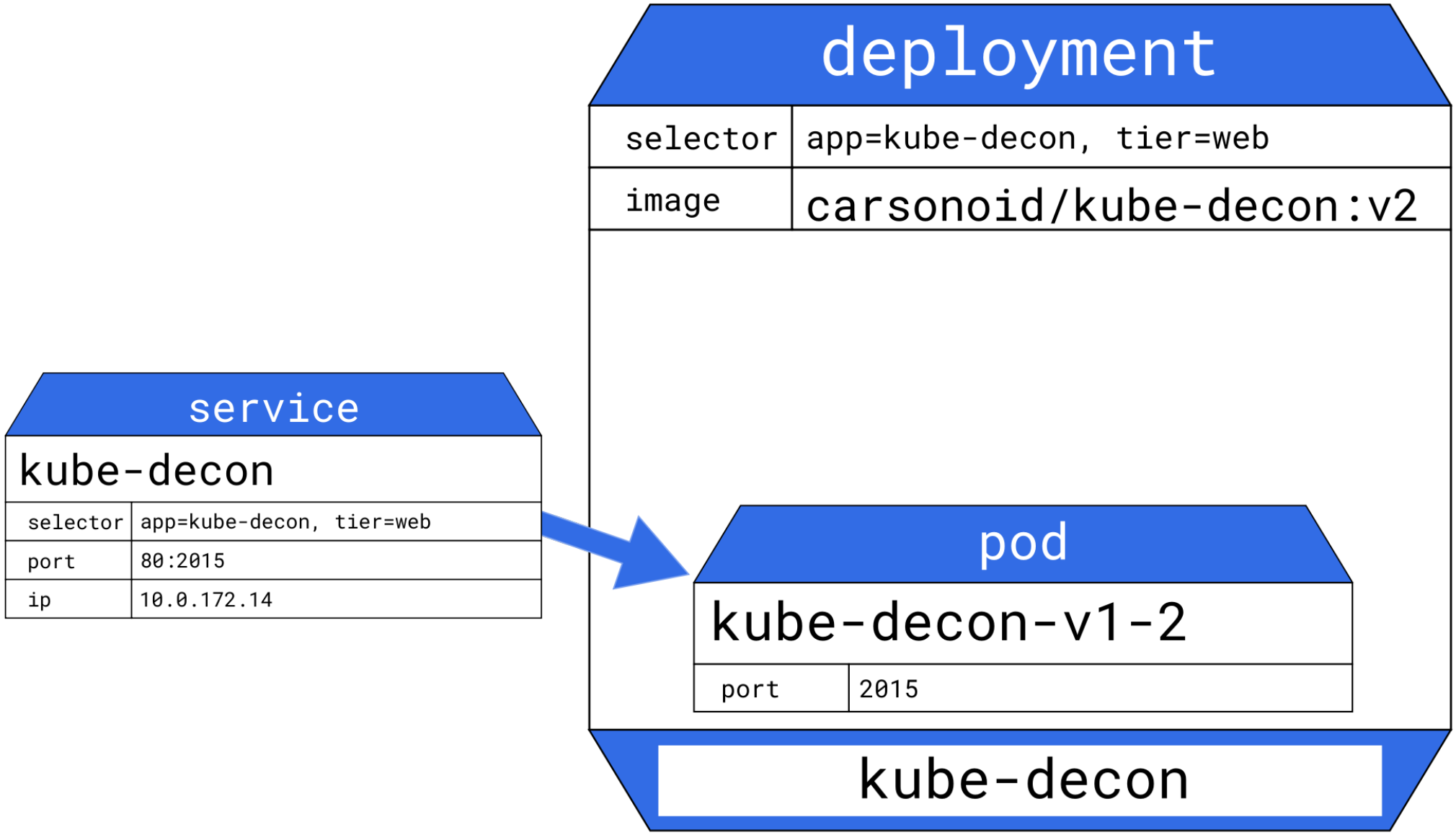

deployment
selector
app=kube-decon, tier=web
image
carsonoid/kube-decon:v1
pod
kube-decon-v1-1
port
2015
kube-decon

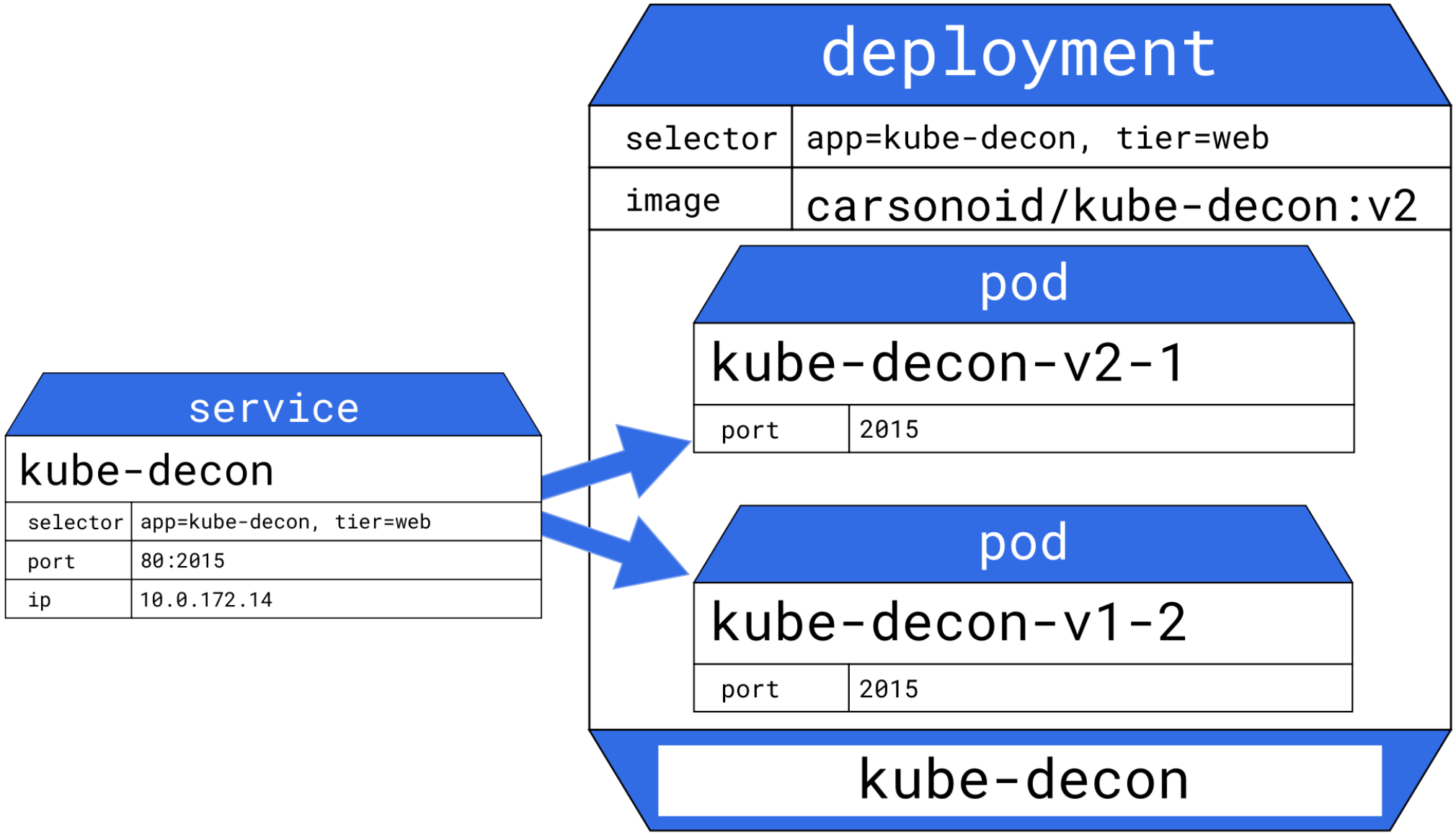

deployment
selector
app=kube-decon, tier=web
image
carsonoid/kube-decon:v1
pod
kube-decon-v1-1
port
2015
pod
kube-decon-v1-2
port
2015
kube-decon

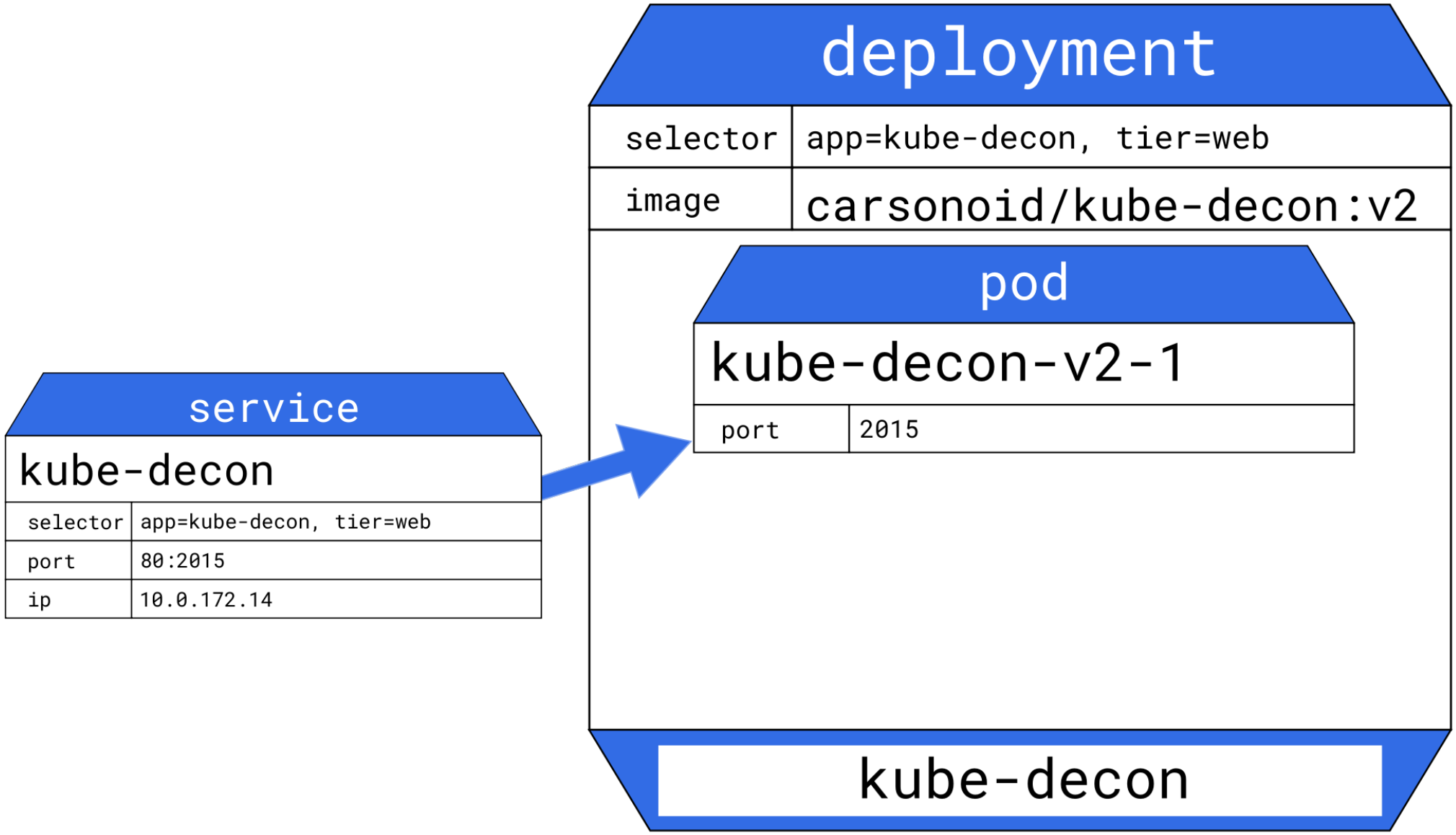

deployment
selector
app=kube-decon, tier=web
image
carsonoid/kube-decon:v1
pod
kube-decon-v1-1
port
2015
pod
kube-decon-v1-2
port
2015
kube-decon
service
kube-decon
selector
app=kube-decon, tier=web
port
80:2015
ip
10.0.172.14

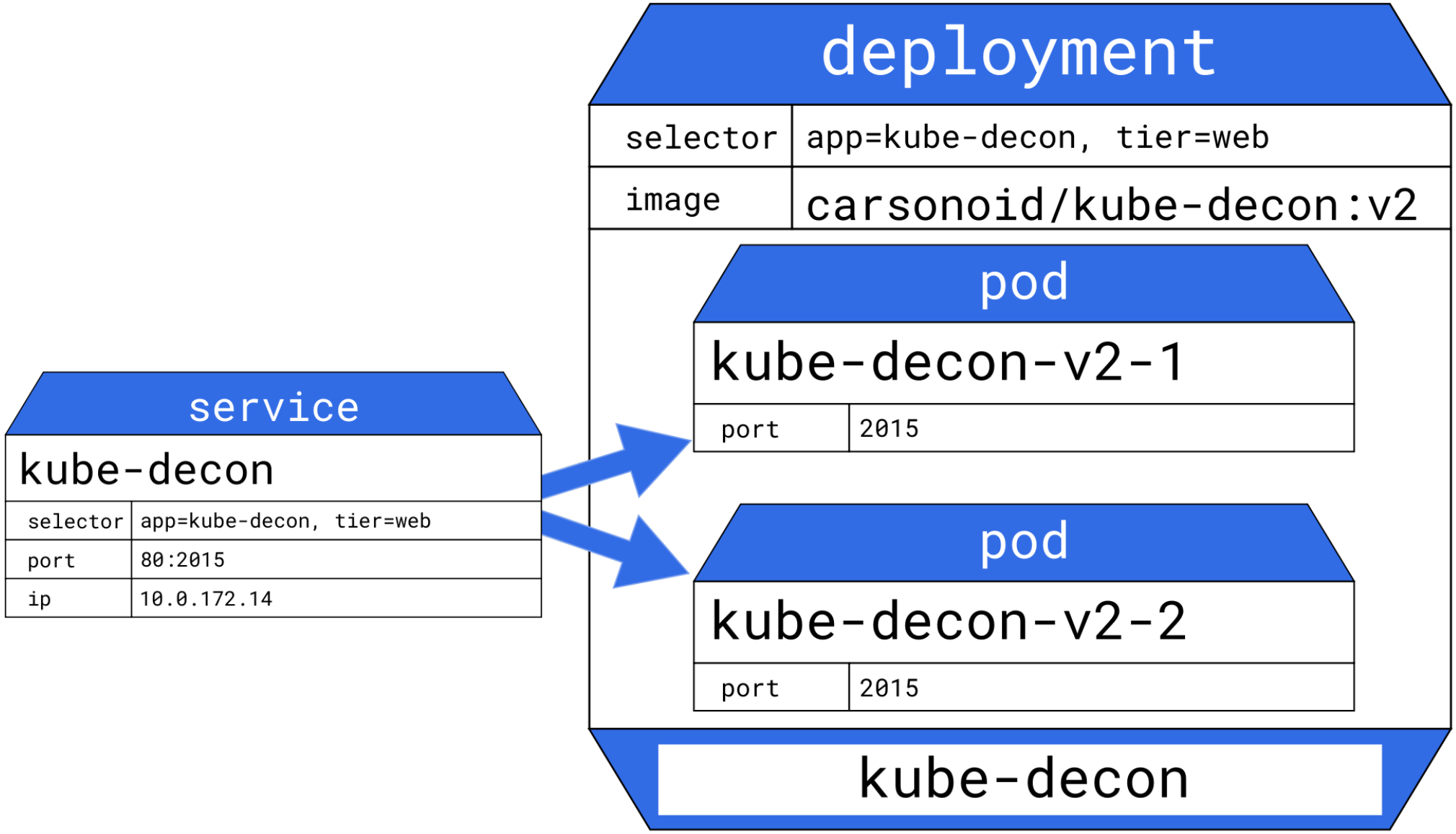

deployment
selector
app=kube-decon, tier=web
image
carsonoid/kube-decon:v1
pod
kube-decon-v1-1
port
2015
pod
kube-decon-v1-2
port
2015
kube-decon
service
kube-decon
selector
app=kube-decon, tier=web
port
80:2015
ip
10.0.172.14

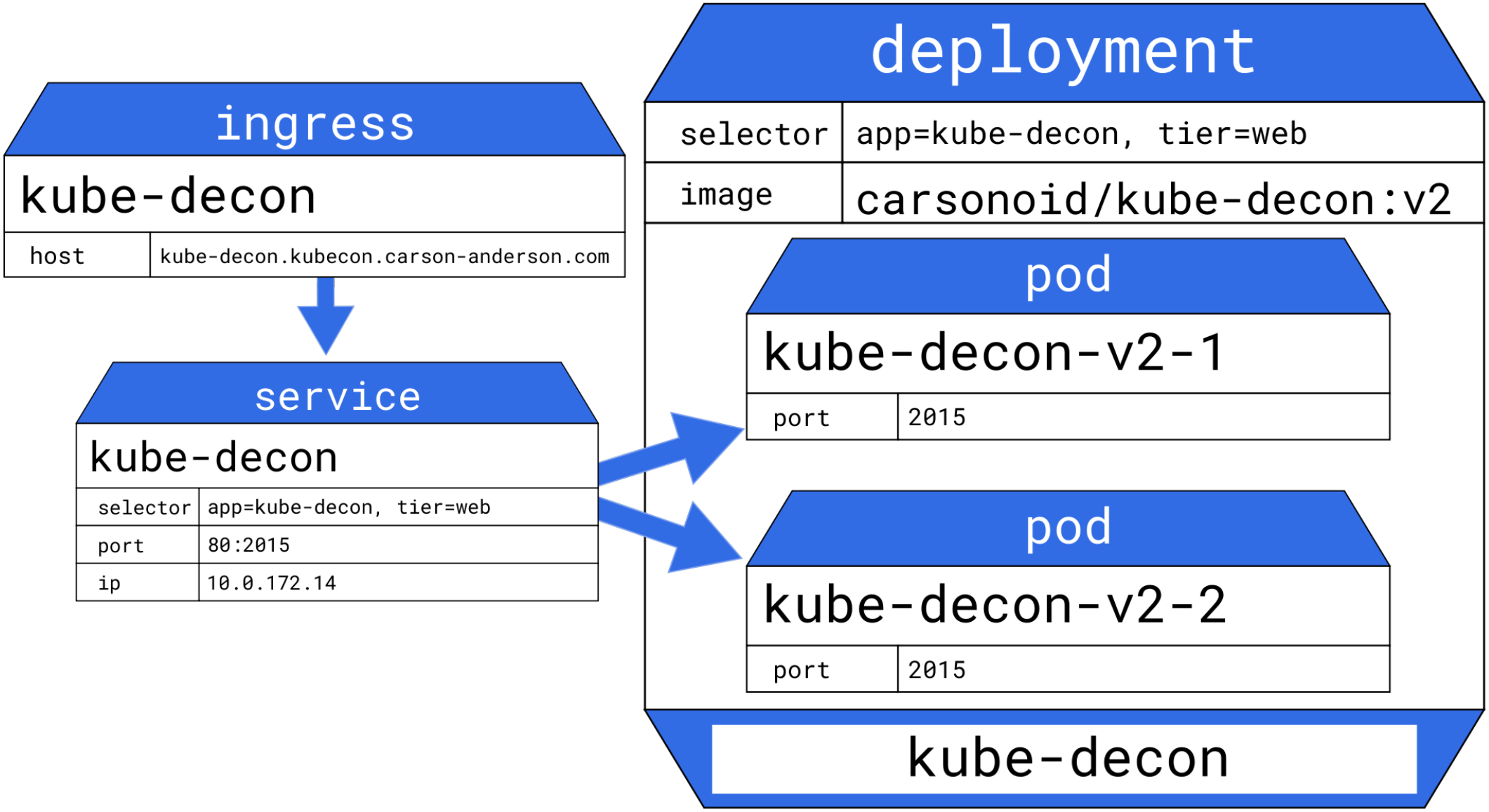

deployment
selector
app=kube-decon, tier=web
image
carsonoid/kube-decon:v2
pod
kube-decon-v1-1
port
2015
pod
kube-decon-v1-2
port
2015
kube-decon
service
kube-decon
selector
app=kube-decon, tier=web
port
80:2015
ip
10.0.172.14


deployment
selector
app=kube-decon, tier=web
image
carsonoid/kube-decon:v2
service
kube-decon
selector
app=kube-decon, tier=web
port
80:2015
ip
10.0.172.14
pod
kube-decon-v1-2
port
2015
kube-decon


deployment
selector
app=kube-decon, tier=web
image
carsonoid/kube-decon:v2
pod
kube-decon-v2-1
port
2015
pod
kube-decon-v1-2
port
2015
kube-decon
service
kube-decon
selector
app=kube-decon, tier=web
port
80:2015
ip
10.0.172.14


deployment
selector
app=kube-decon, tier=web
image
carsonoid/kube-decon:v2
pod
kube-decon-v2-1
port
2015
service
kube-decon
selector
app=kube-decon, tier=web
port
80:2015
ip
10.0.172.14
kube-decon


deployment
selector
app=kube-decon, tier=web
image
carsonoid/kube-decon:v2
pod
kube-decon-v2-1
port
2015
pod
kube-decon-v2-2
port
2015
kube-decon
service
kube-decon
selector
app=kube-decon, tier=web
port
80:2015
ip
10.0.172.14


ingress
kube-decon
host
kube-decon.kubecon.carson-anderson.com
service
kube-decon
selector
app=kube-decon, tier=web
port
80:2015
ip
10.0.172.14
deployment
selector
app=kube-decon, tier=web
image
carsonoid/kube-decon:v2
pod
kube-decon-v2-1
port
2015
pod
kube-decon-v2-2
port
2015
kube-decon

Management Access

Master URL

https://master.kubecon.carson-anderson.com

Credentials

User:Pass
Bearer Token
Client Certificate

```
$ kubectl create namespace kube-decon
```

```
$ kubectl create -f resource.yaml
```

```
apiVersion: apps/v1beta2
kind: Deployment
metadata:
 name: nginx-deployment
 labels:
 app: kube-decon
 tier: web
spec:
 replicas: 2
 selector:
 matchLabels:
 app: kube-decon
 tier: web
 template:
 metadata:
 labels:
 app: kube-decon
 tier: web
 spec:
 containers:
 - name: kube-decon
 image: carsonoid/kube-decon:latest
 ports:
 - containerPort: 2015
```

```
kind: Service
apiVersion: v1
metadata:
 name: kube-decon
spec:
 selector:
 app: kube-decon
 tier: web
 ports:
 - protocol: TCP
 port: 80
 targetPort: 2015
```

```
apiVersion: extensions/v1beta1
kind: Ingress
metadata:
 name: kube-decon
spec:
 rules:
 - host: kube-decon.kubecon.carson-anderson.com
 http:
 paths:
 - path: /
 backend:
 serviceName: kube-decon
 servicePort: 80
```

Management Access

Master URL

https://master.kubecon.carson-anderson.com

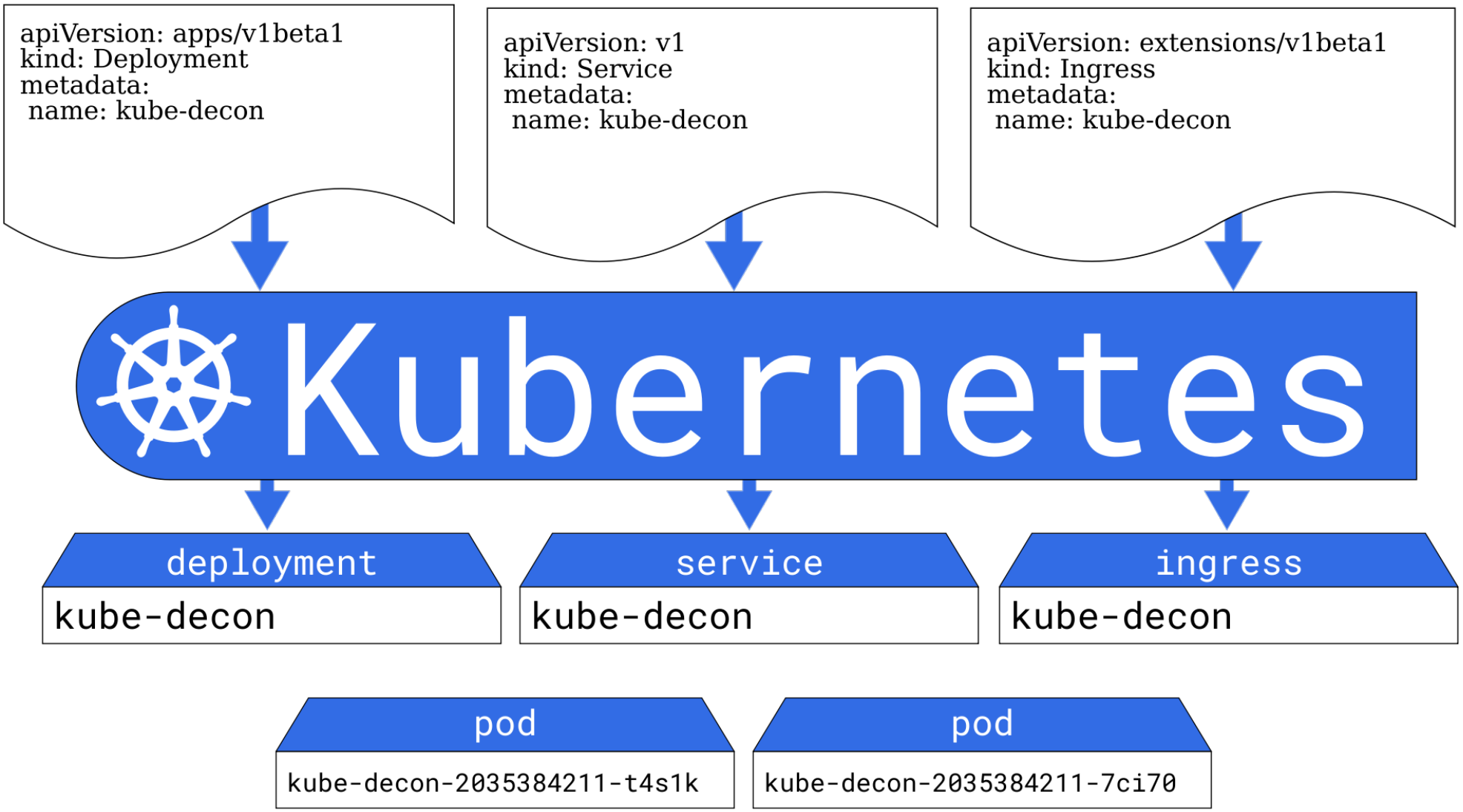
Credentials

User:Pass
Bearer Token
Client Certificate

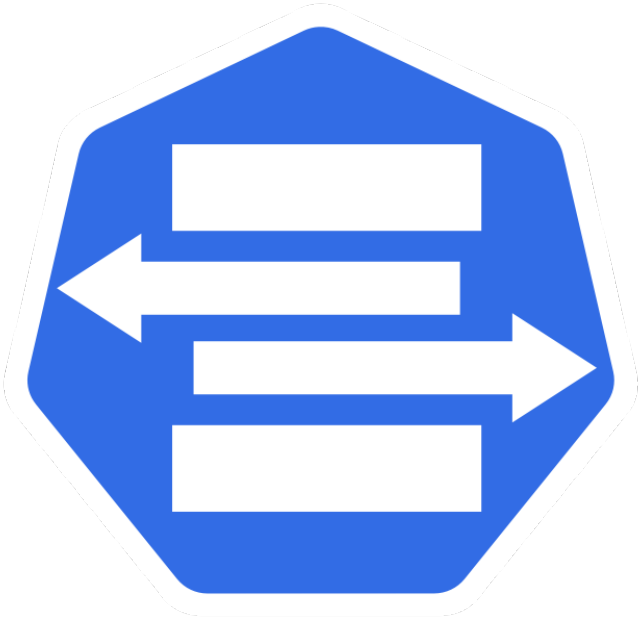
```
apiVersion: apps/v1beta1
kind: Deployment
metadata:
 name: kube-decon
```

```
apiVersion: v1
kind: Service
metadata:
 name: kube-decon
```

```
apiVersion: extensions/v1beta1
kind: Ingress
metadata:
 name: kube-decon
```


apiVersion: apps/v1beta1
kind: Deployment
metadata:
name: kube-decon
apiVersion: v1
kind: Service
metadata:
name: kube-decon
apiVersion: extensions/v1beta1
kind: Ingress
metadata:
name: kube-decon
Kubernetes
deployment
kube-decon
service
kube-decon
ingress
kube-decon
pod
kube-decon-2035384211-t4s1k
pod
kube-decon-2035384211-7ci70

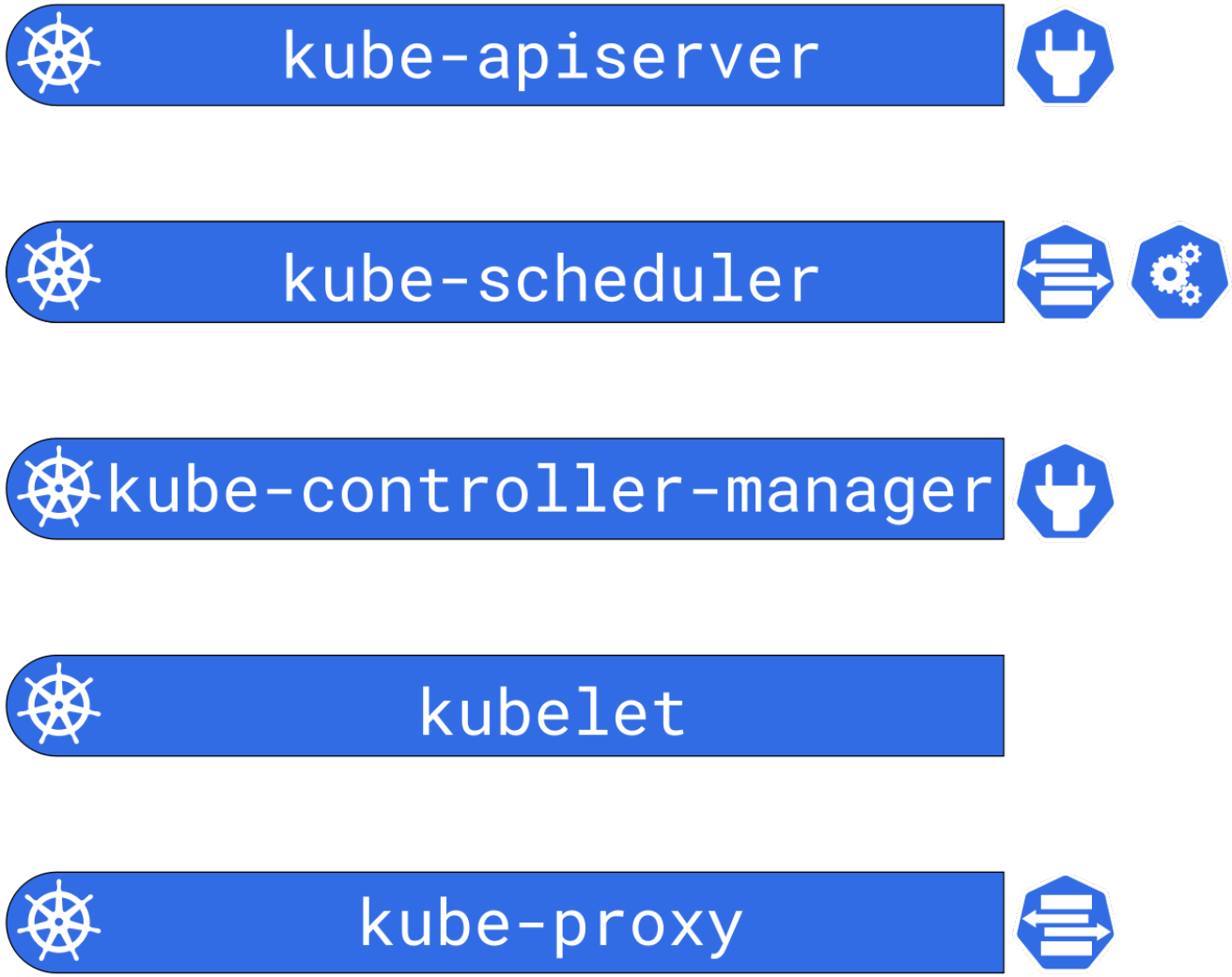
Kubernetes for the cluster admin



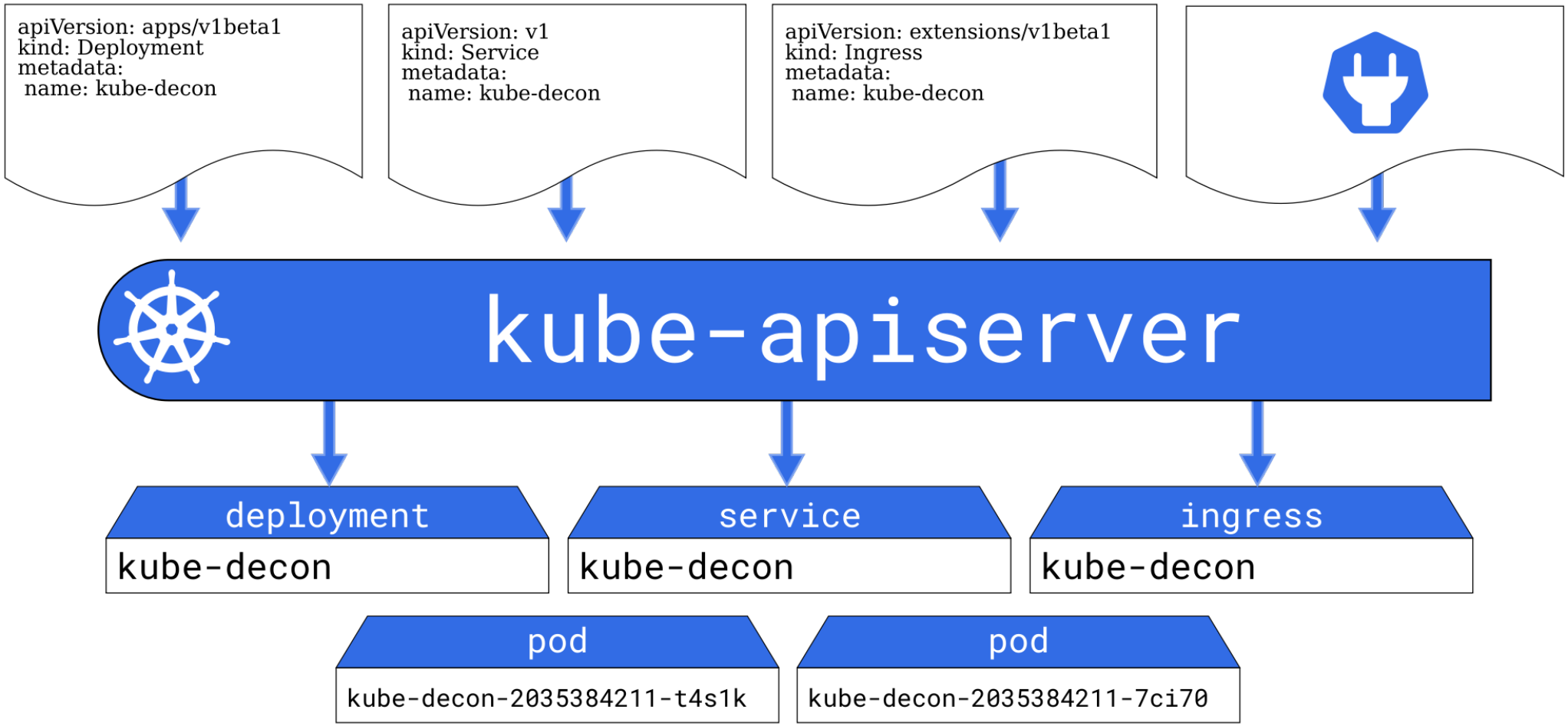
Replacement

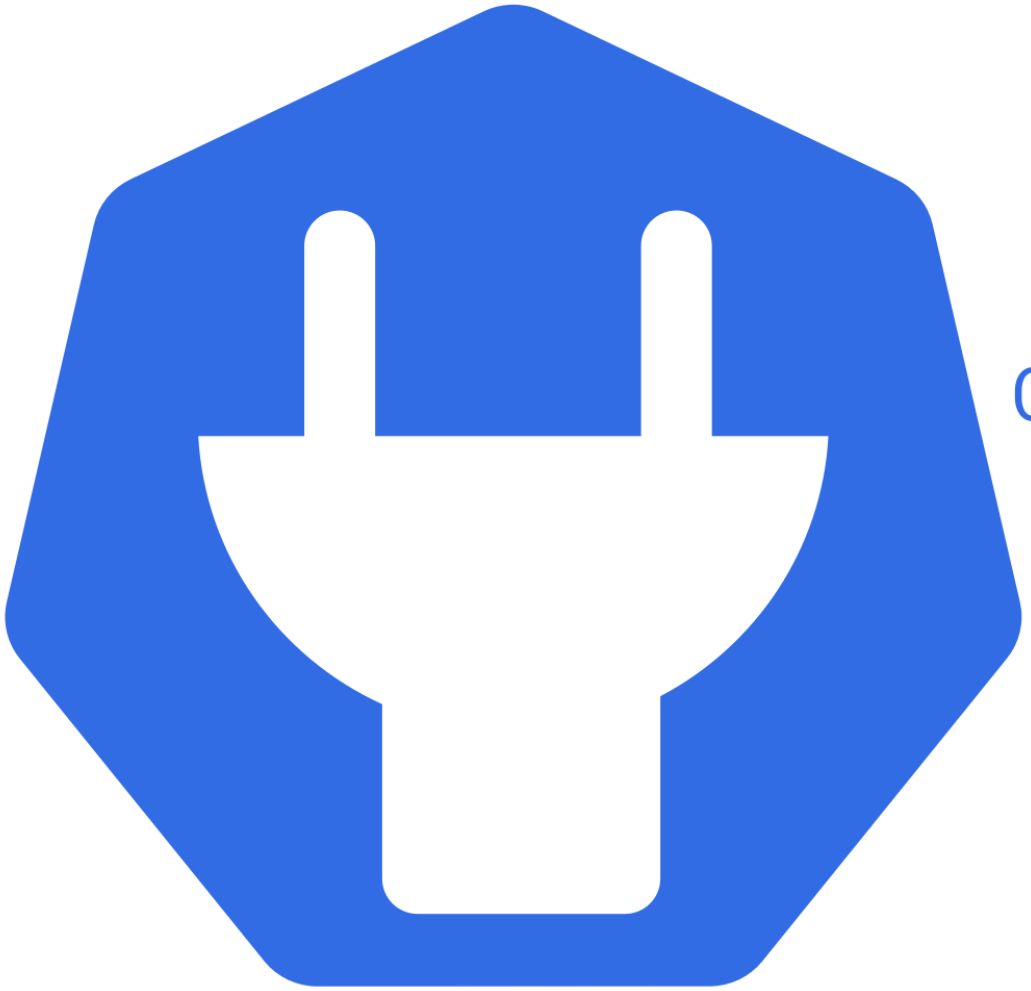
Plugin

Config


kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy

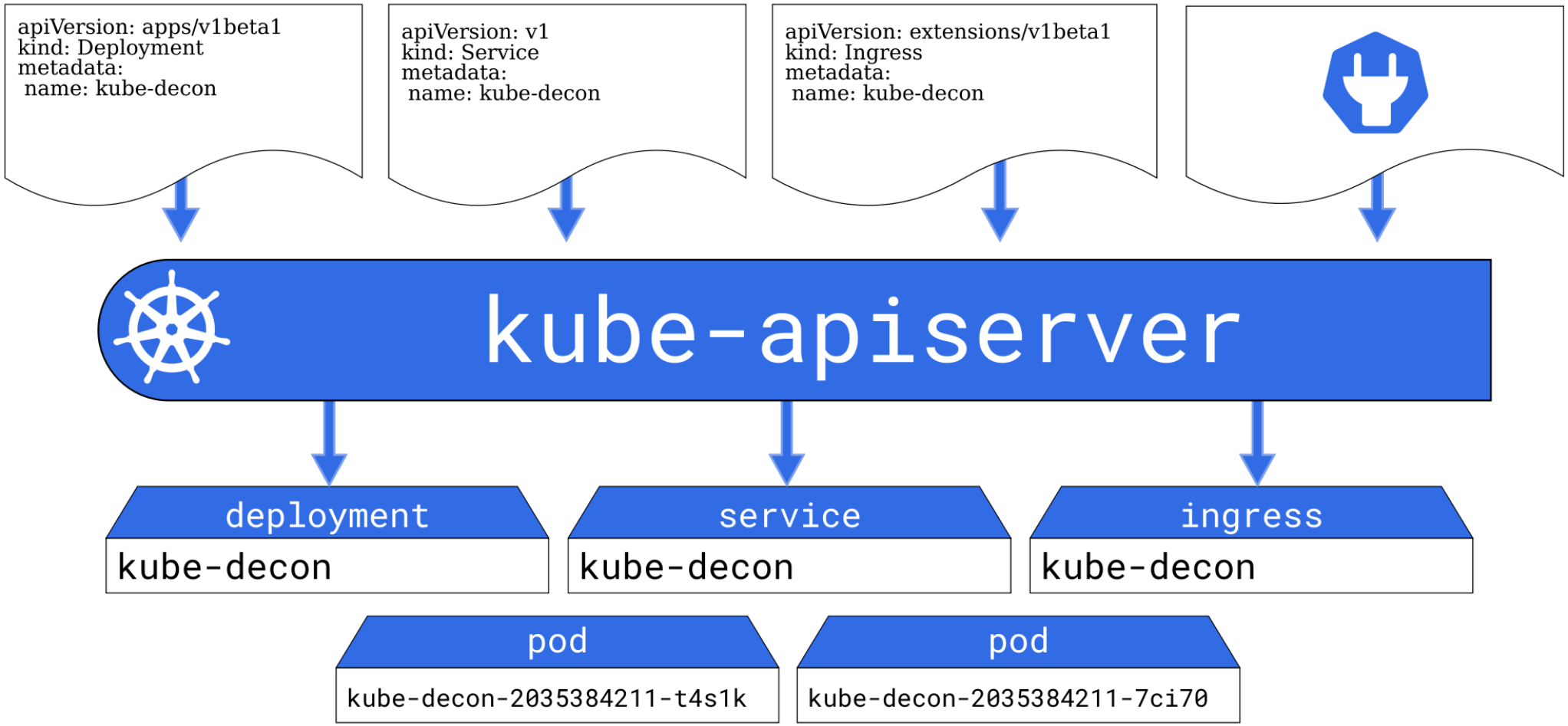

kube-apiserver

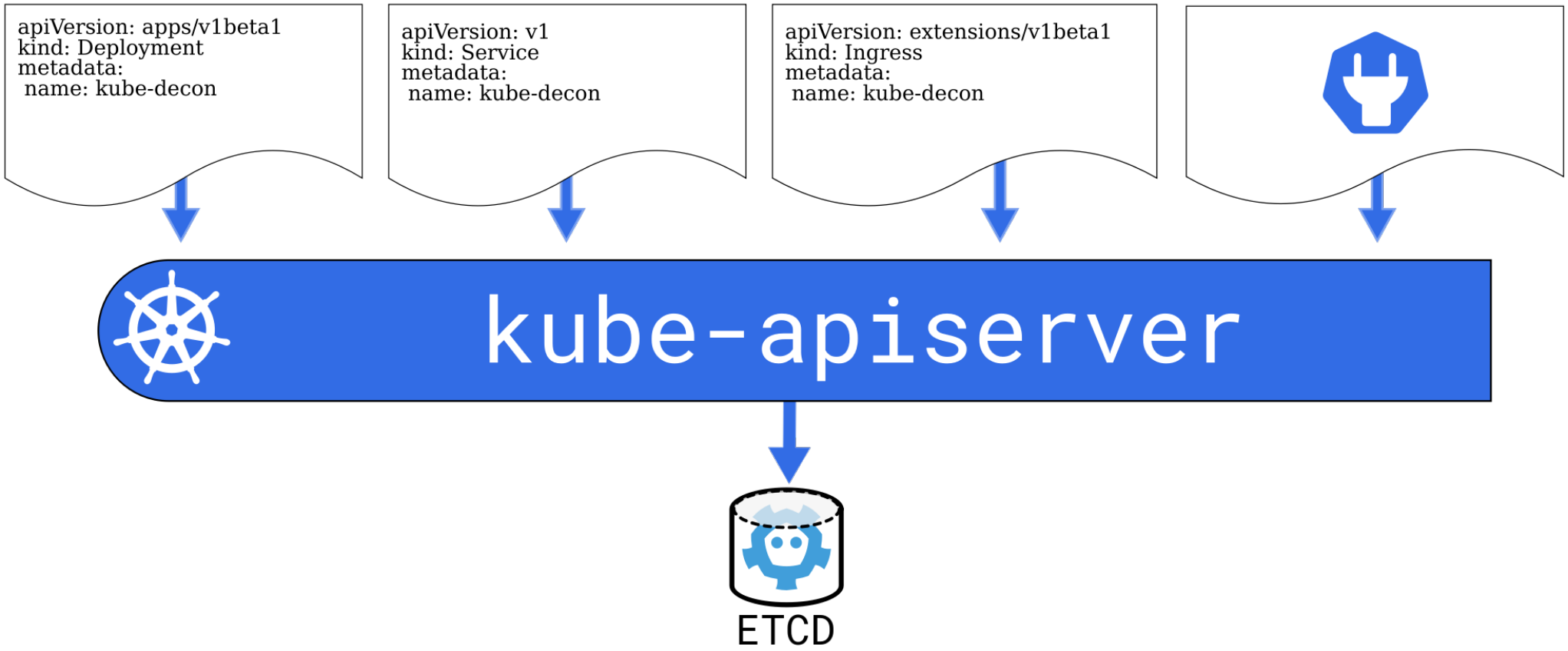

apiVersion: apps/v1beta1
kind: Deployment
metadata:
name: kube-decon
apiVersion: v1
kind: Service
metadata:
name: kube-decon
apiVersion: extensions/v1beta1
kind: Ingress
metadata:
name: kube-decon
kube-apiserver
deployment
kube-decon
service
kube-decon
ingress
kube-decon
pod
kube-decon-2035384211-t4s1k
pod
kube-decon-2035384211-7ci70

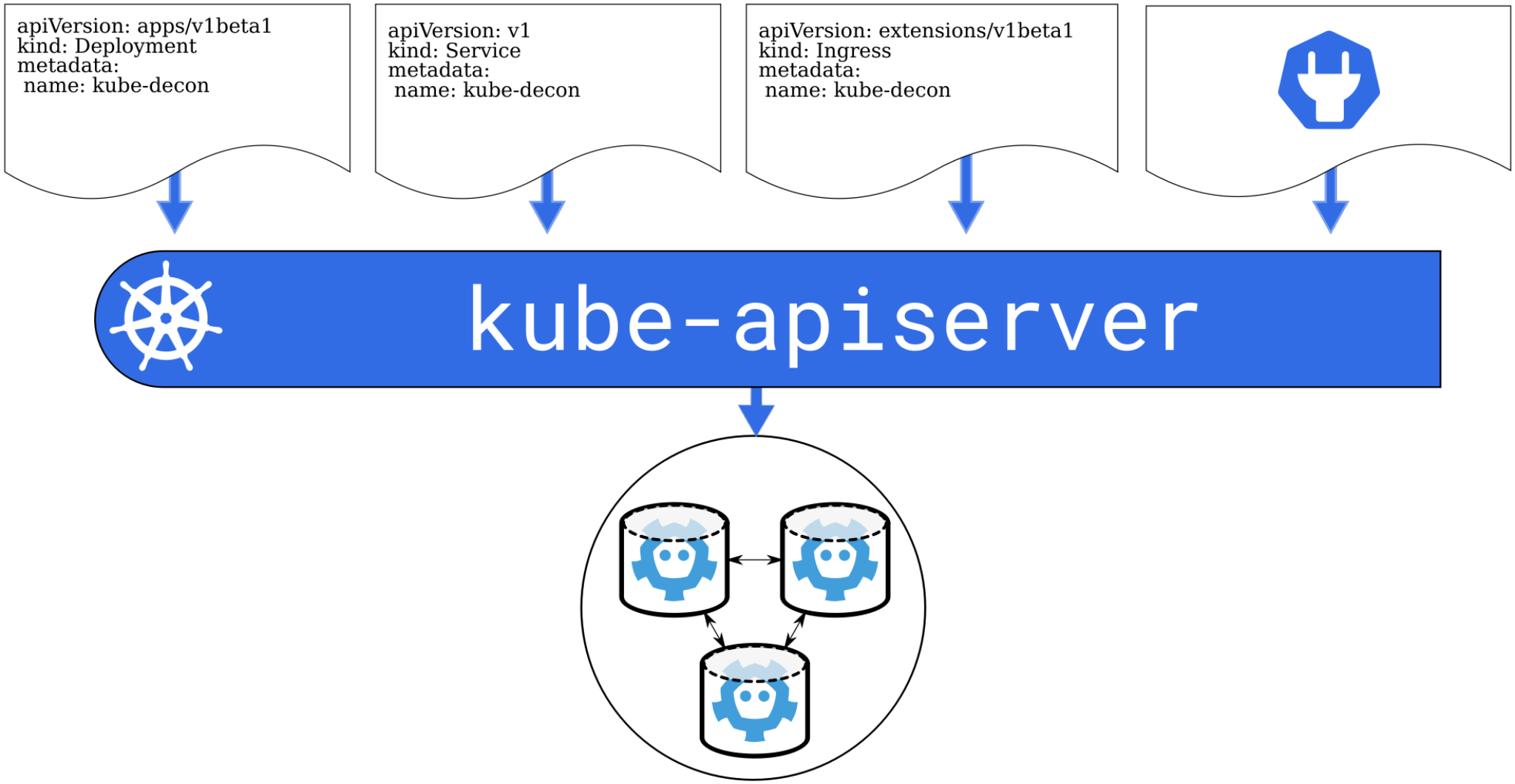


CustomResourceDefinitions

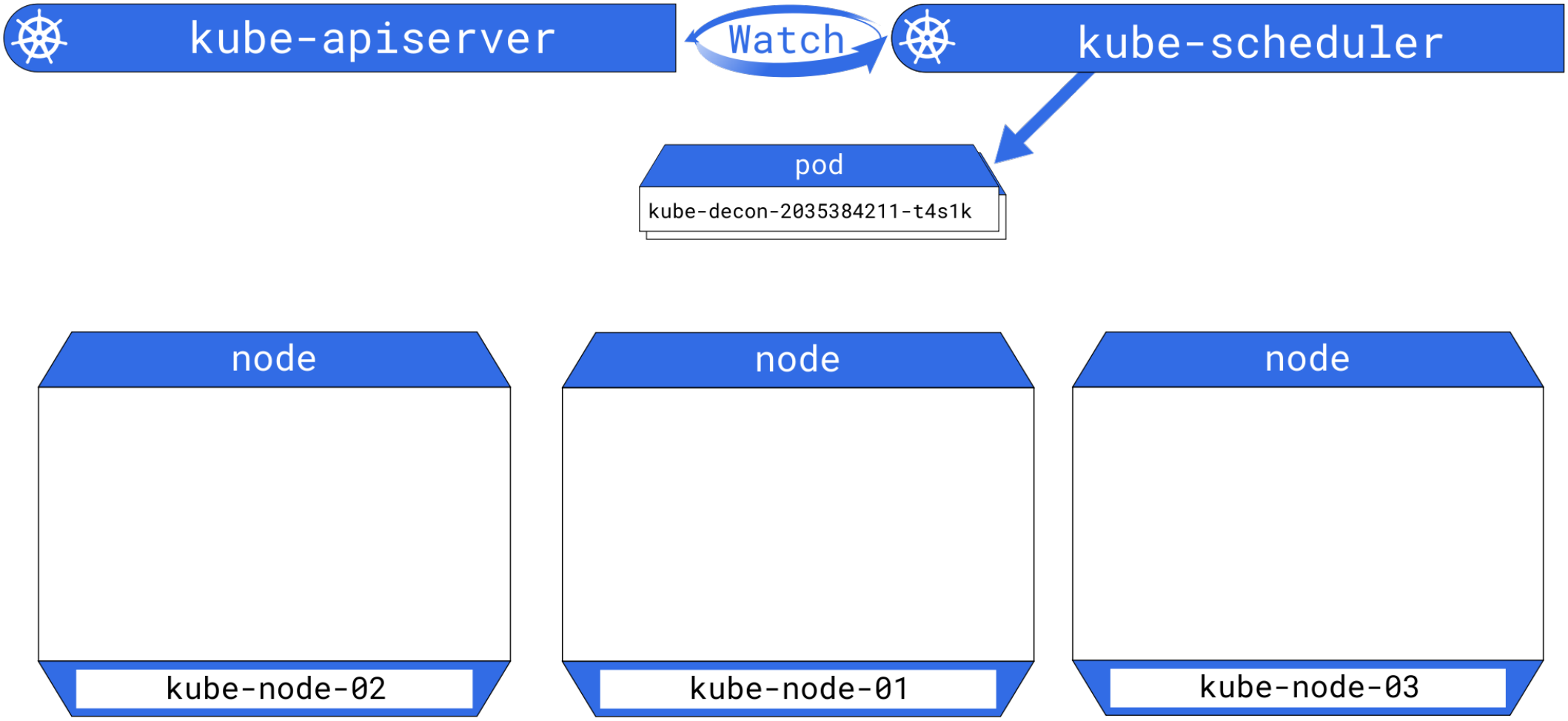
apiserver-aggregation

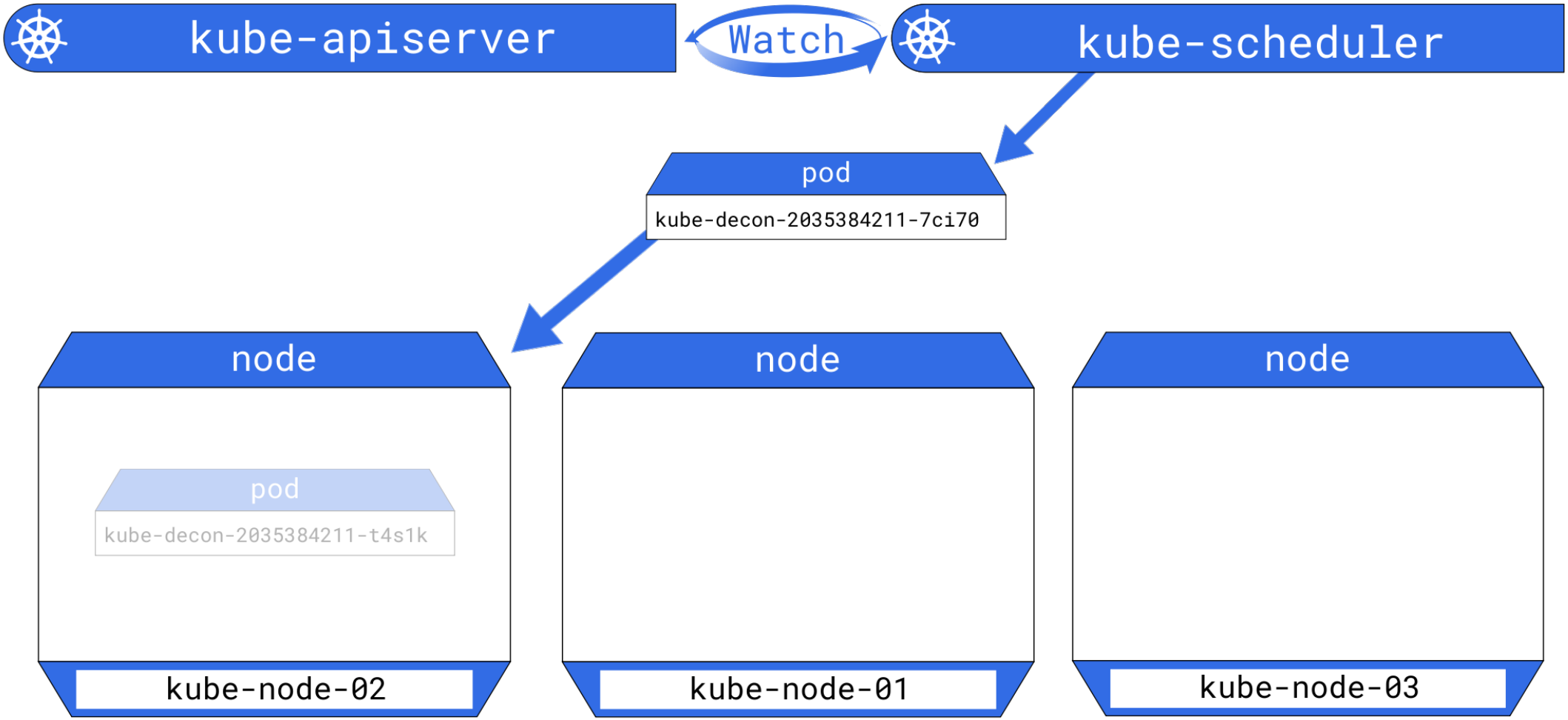

apiVersion: apps/v1beta1
kind: Deployment
metadata:
name: kube-decon
apiVersion: v1
kind: Service
metadata:
name: kube-decon
apiVersion: extensions/v1beta1
kind: Ingress
metadata:
name: kube-decon
kube-apiserver
deployment
kube-decon
service
kube-decon
ingress
kube-decon
pod
kube-decon-2035384211-t4s1k
pod
kube-decon-2035384211-7ci70

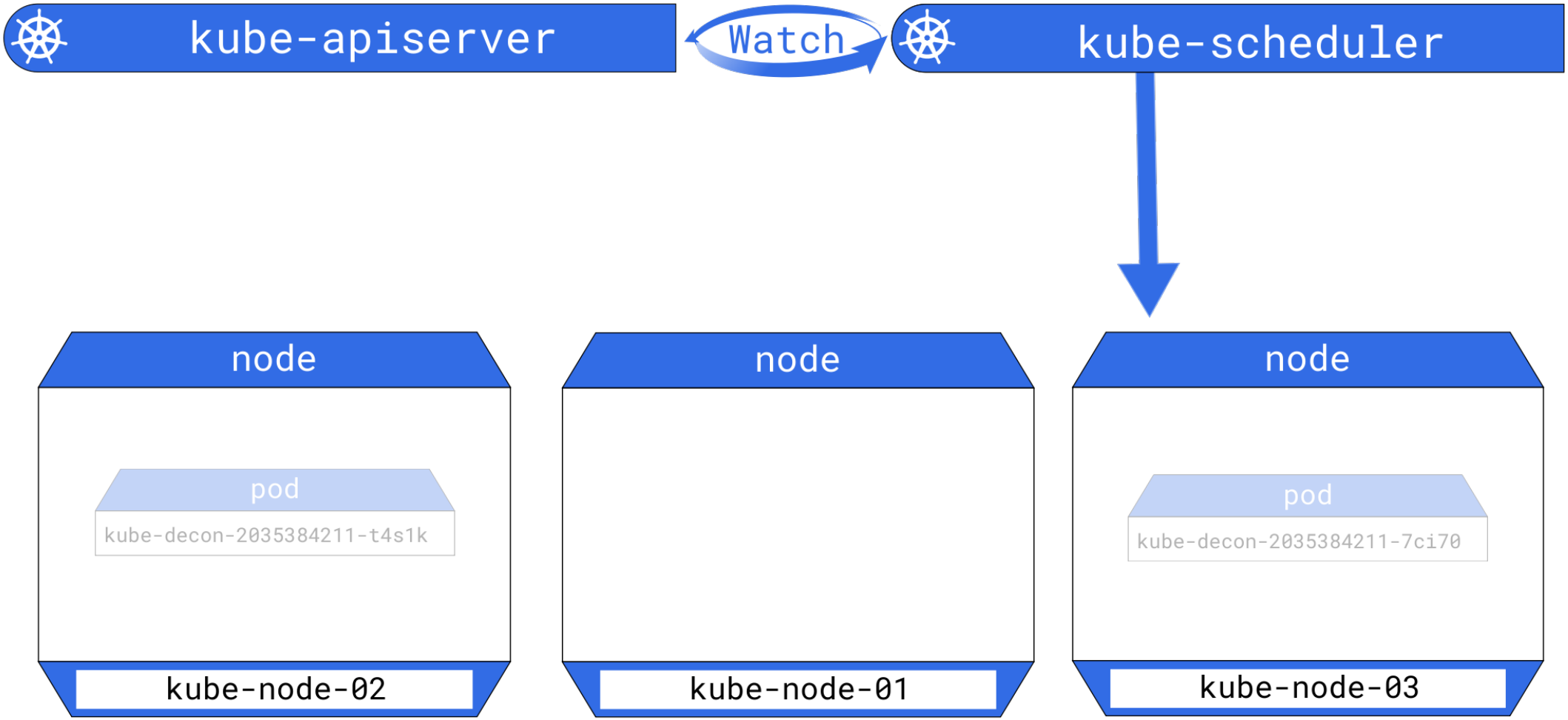

apiVersion: apps/v1beta1
kind: Deployment
metadata:
name: kube-decon
apiVersion: v1
kind: Service
metadata:
name: kube-decon
apiVersion: extensions/v1beta1
kind: Ingress
metadata:
name: kube-decon
kube-apiserver
ETCD


apiVersion: apps/v1beta1
kind: Deployment
metadata:
name: kube-decon
apiVersion: v1
kind: Service
metadata:
name: kube-decon
apiVersion: extensions/v1beta1
kind: Ingress
metadata:
name: kube-decon
kube-apiserver


kube-scheduler


kube-apiserver
Watch
kube-scheduler
pod
kube-decon-2035384211-t4s1k
node
kube-node-02
node
kube-node-01
node
kube-node-03

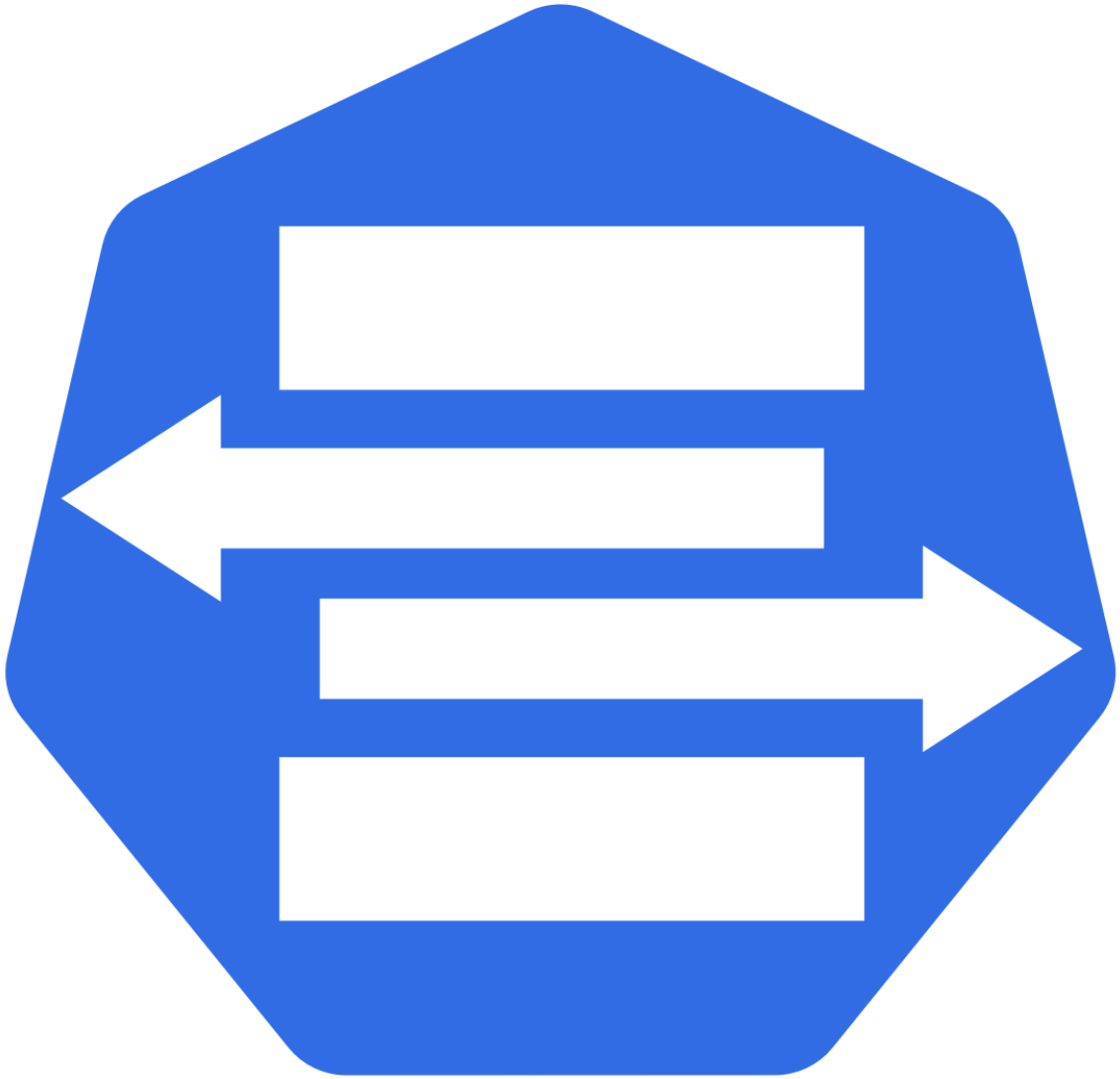

kube-apiserver
Watch
kube-scheduler
pod
kube-decon-2035384211-7ci70
node
pod
kube-decon-2035384211-t4s1k
kube-node-02
node
kube-node-01
node
kube-node-03


kube-apiserver
Watch
kube-scheduler
node
pod
kube-decon-2035384211-t4s1k
kube-node-02
node
kube-node-01
node
pod
kube-decon-2035384211-7ci70
kube-node-03


kube-apiserver
Watch
kube-scheduler

affinity/anti-affinity
nodeSelector
taints/tolerations
reservations/limits

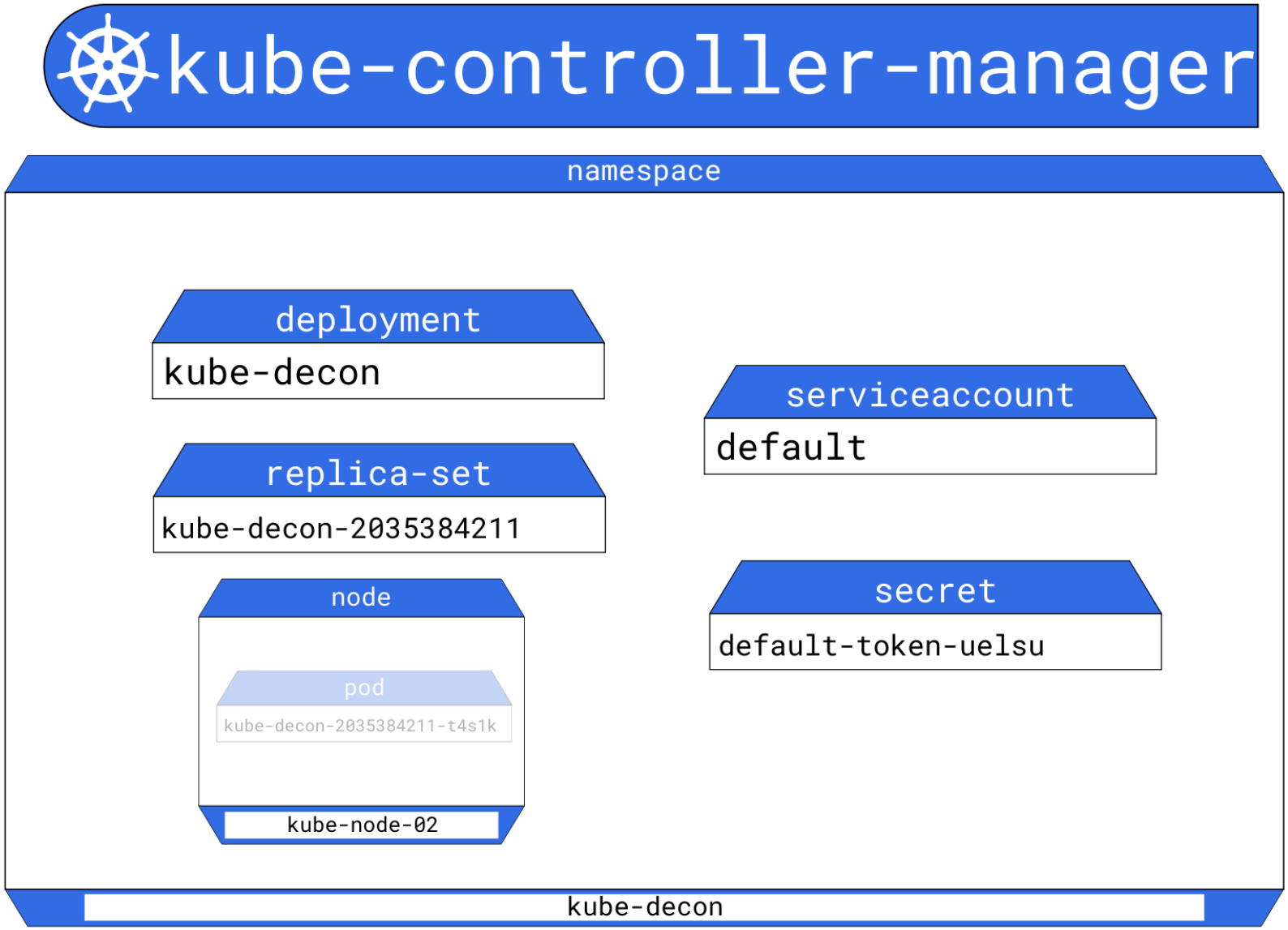

kube-apiserver
Watch

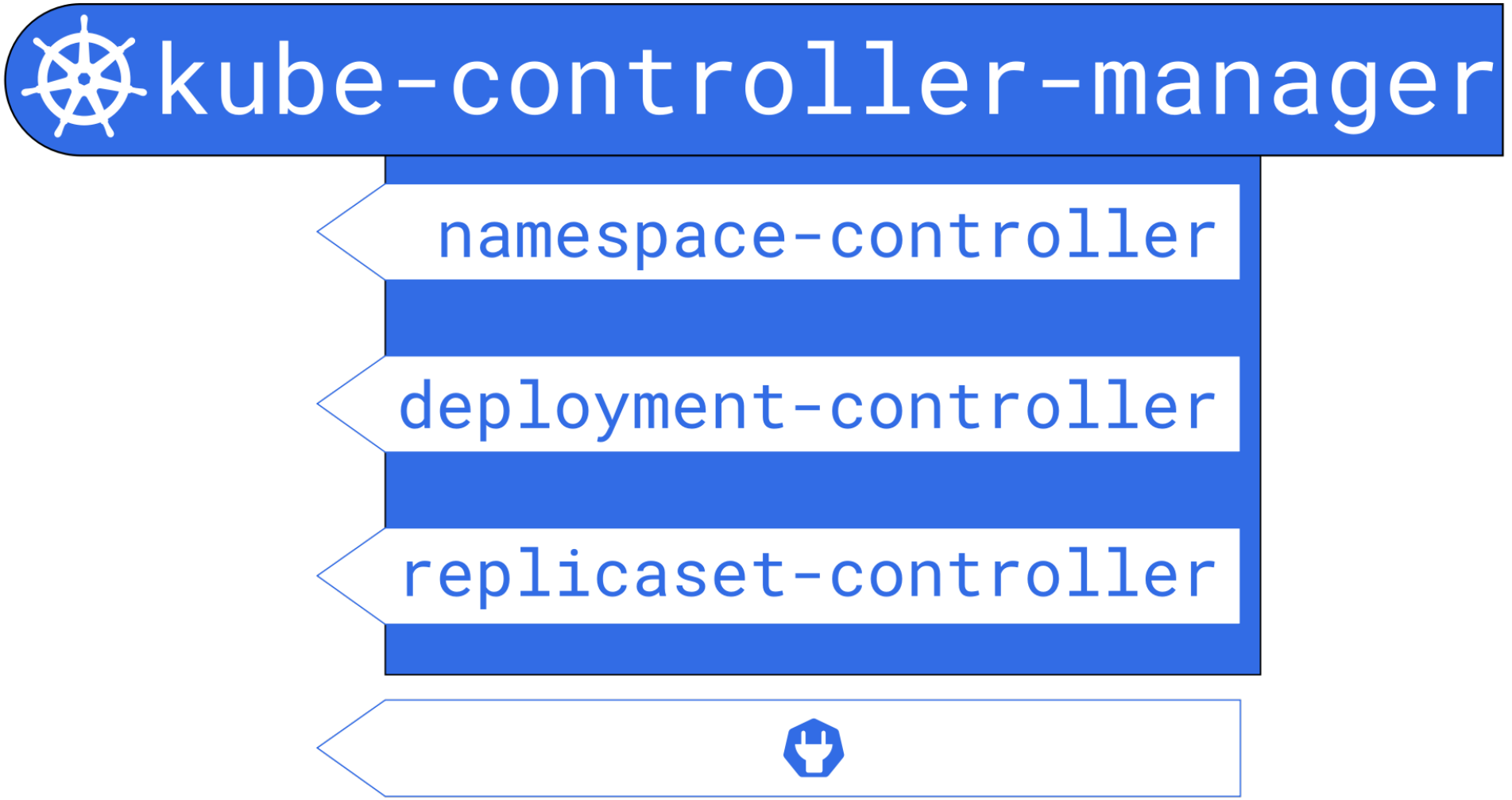


custom schedulers

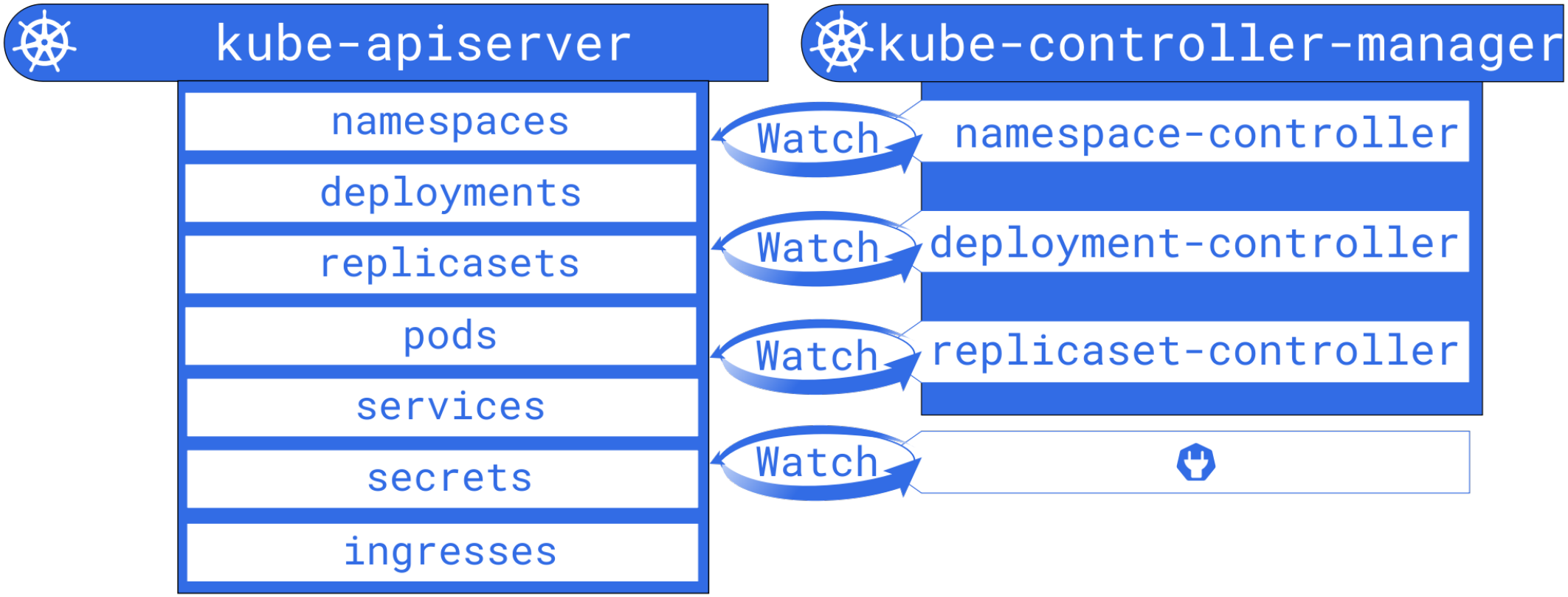

kube-apiserver
Watch
kube-scheduler

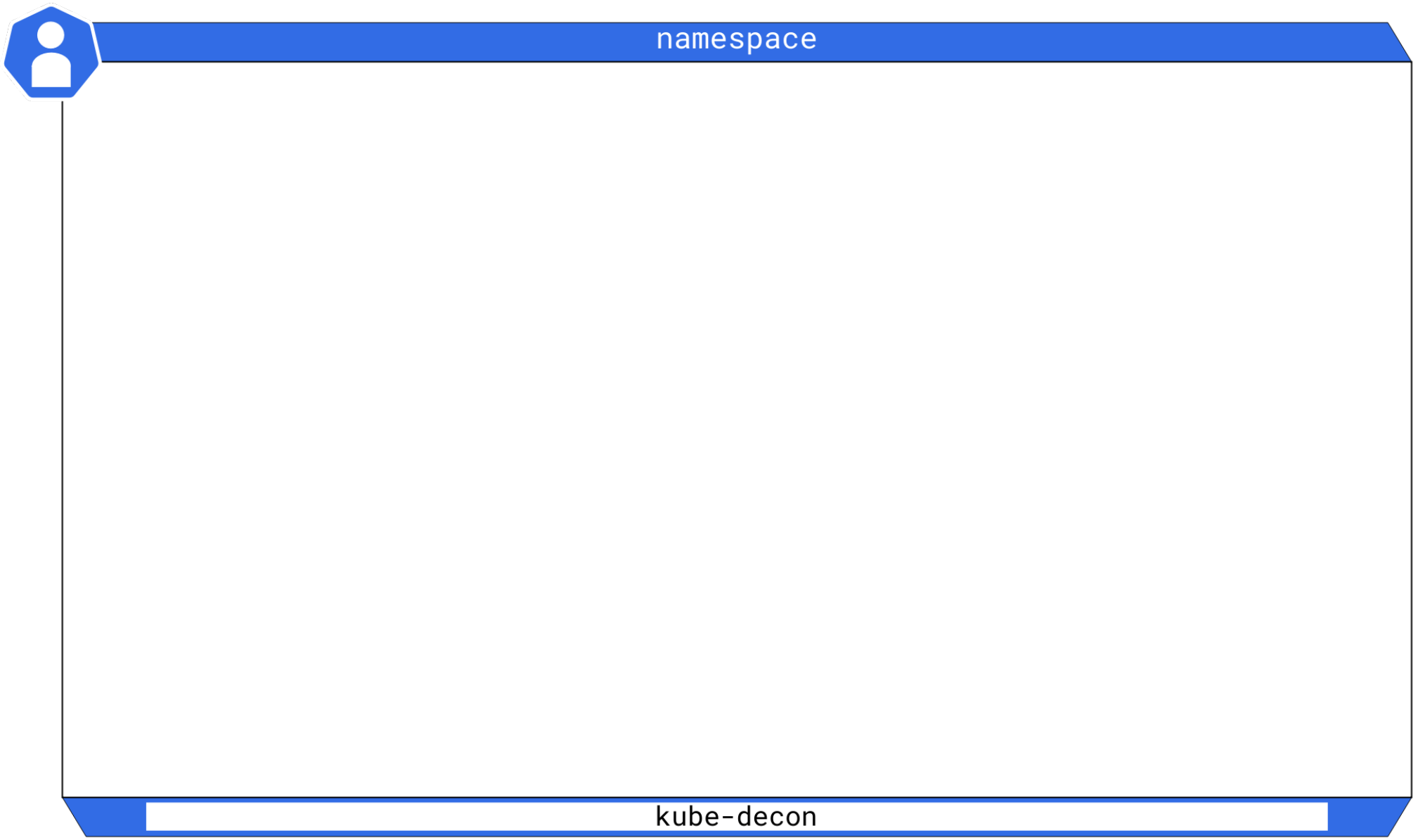

kube-controller-manager

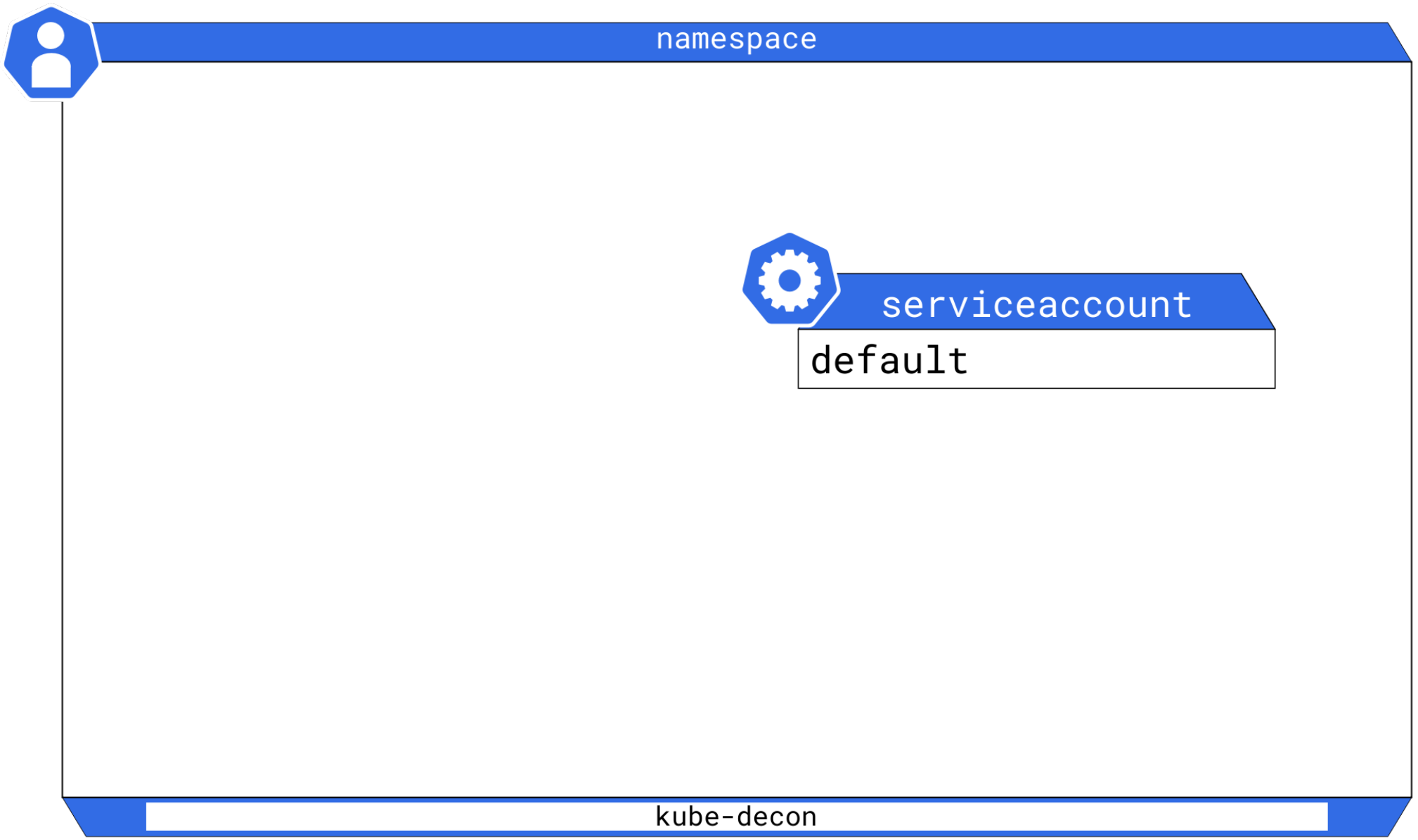

kube-controller-manager
namespace
deployment
kube-decon
replica-set
kube-decon-2035384211
node
pod
kube-decon-2035384211-t4s1k
kube-node-02
serviceaccount
default
secret
default-token-uelsu
kube-decon

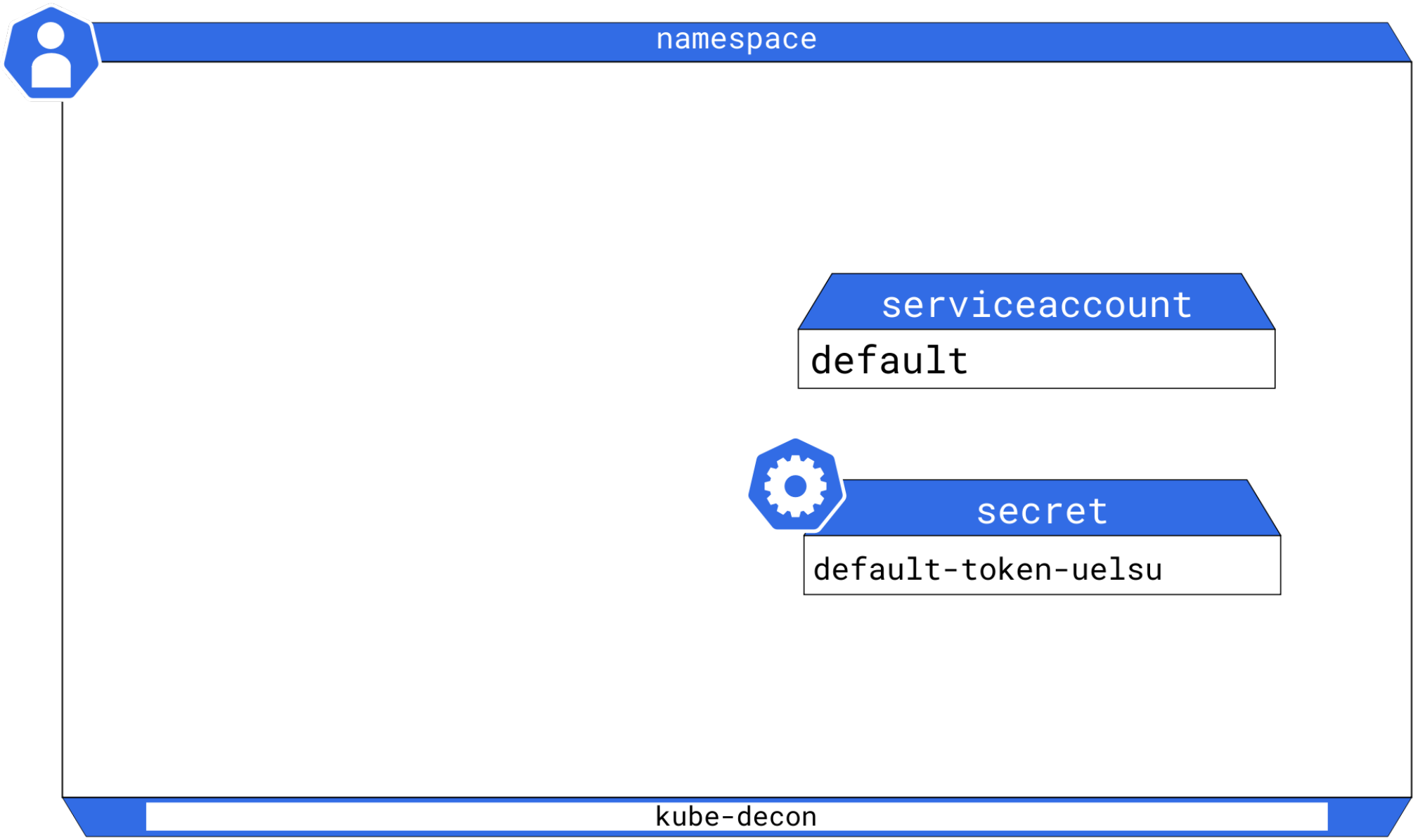

kube-controller-manager
namespace-controller
deployment-controller
replicaset-controller

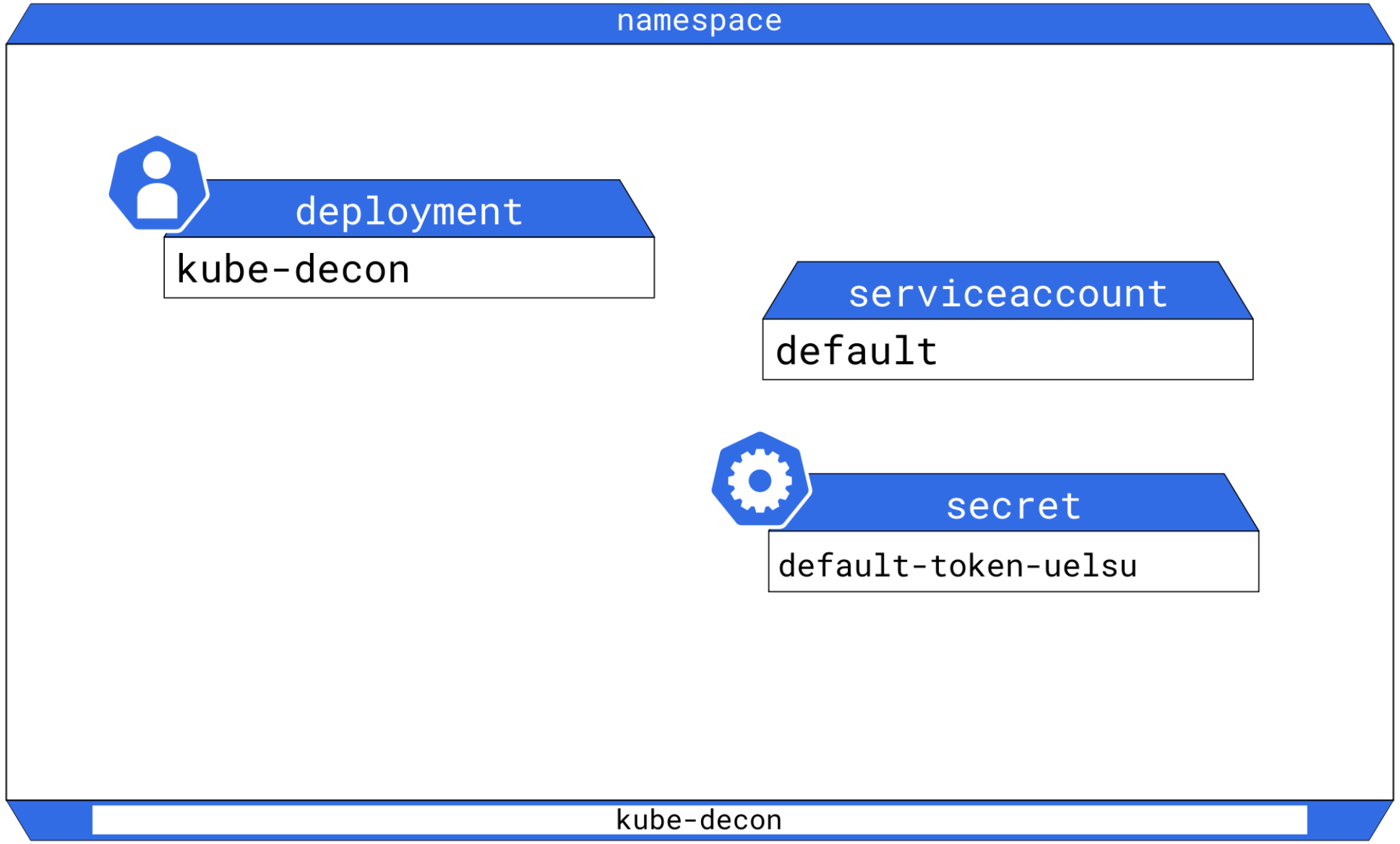
operators

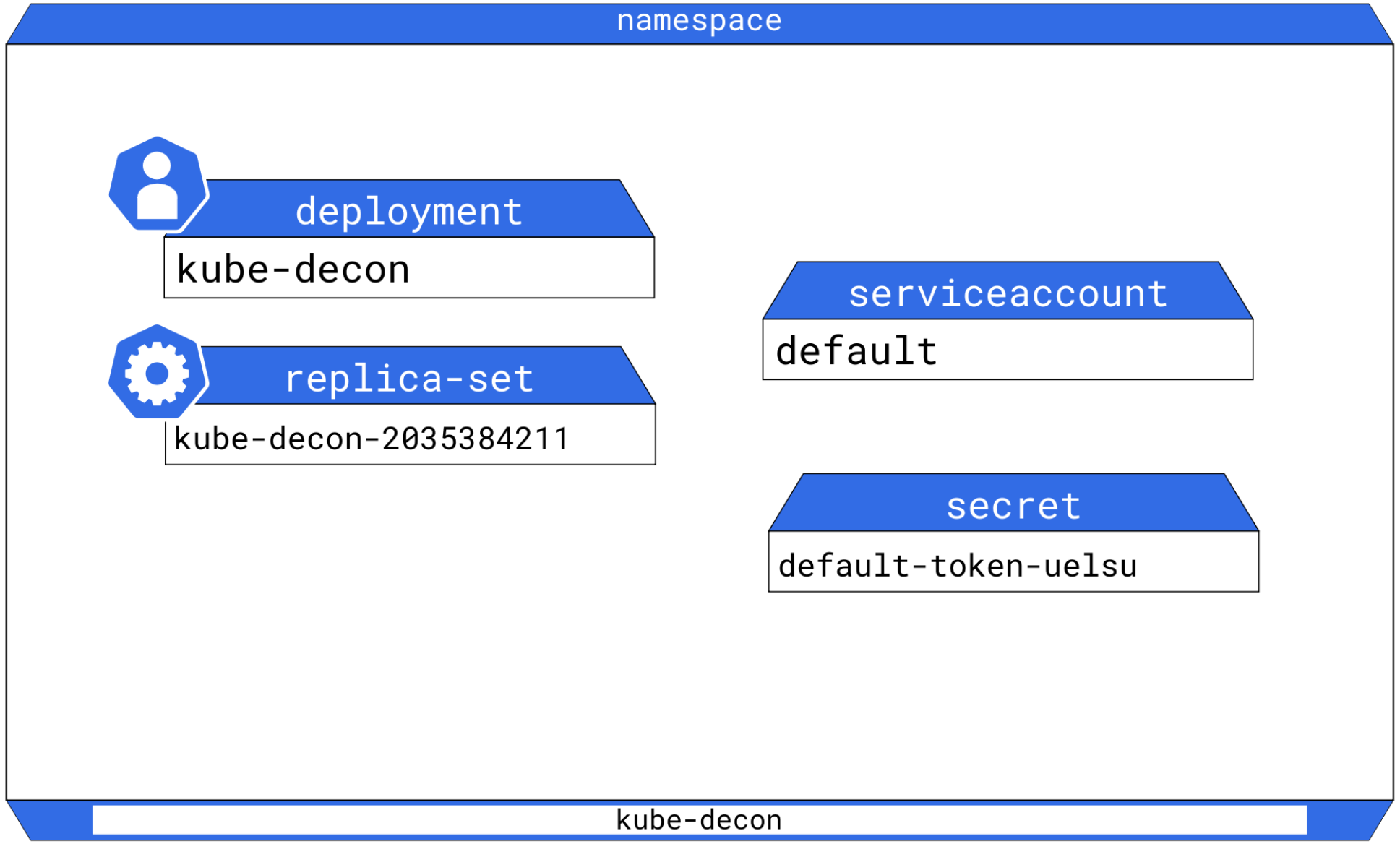

kube-apiserver
namespaces
deployments
replicasets
pods
services
secrets
ingresses
Watch
Watch
Watch
Watch
kube-controller-manager
namespace-controller
deployment-controller
replicaset-controller

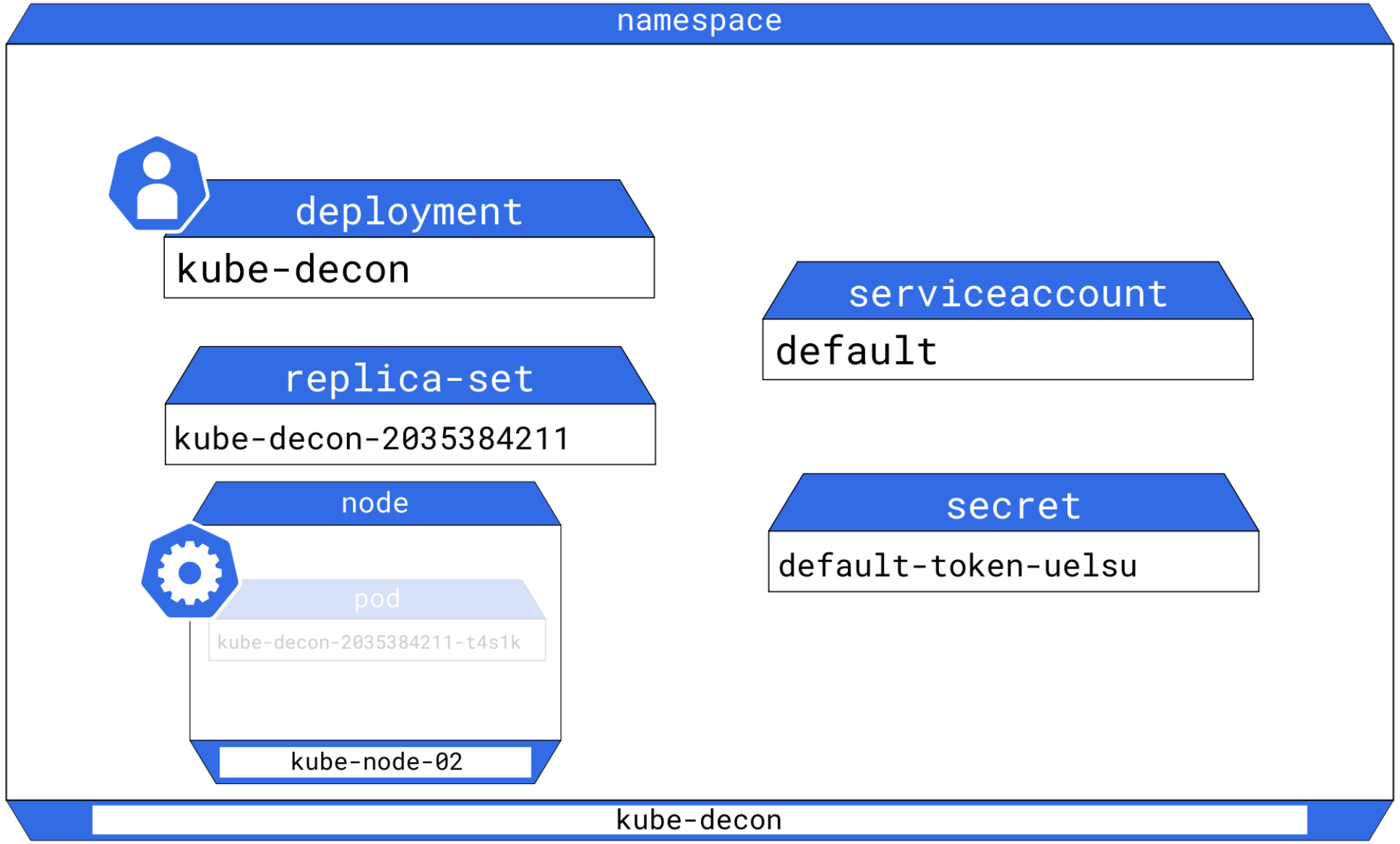

namespace
kube-decon

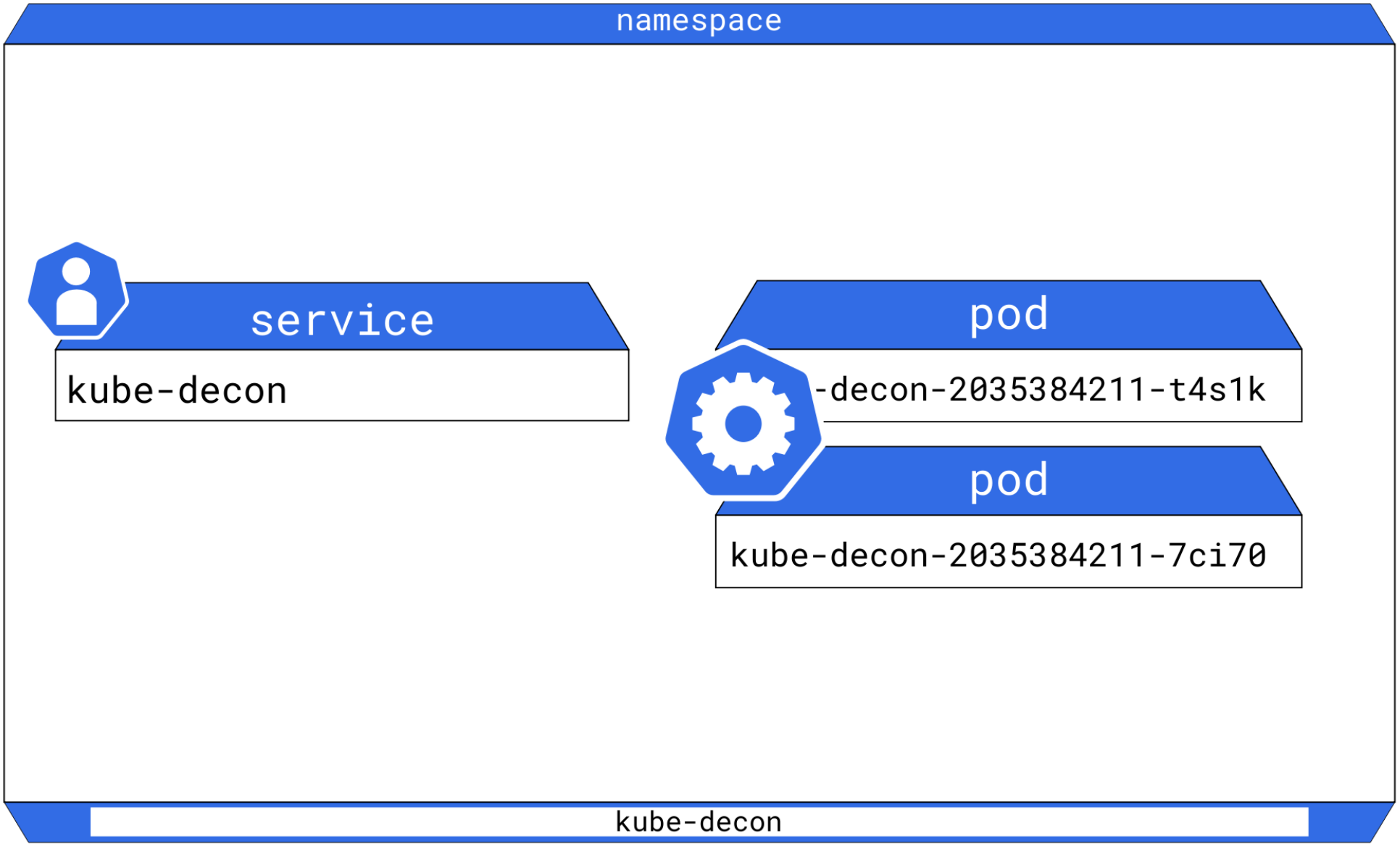

namespace
serviceaccount
default
kube-decon

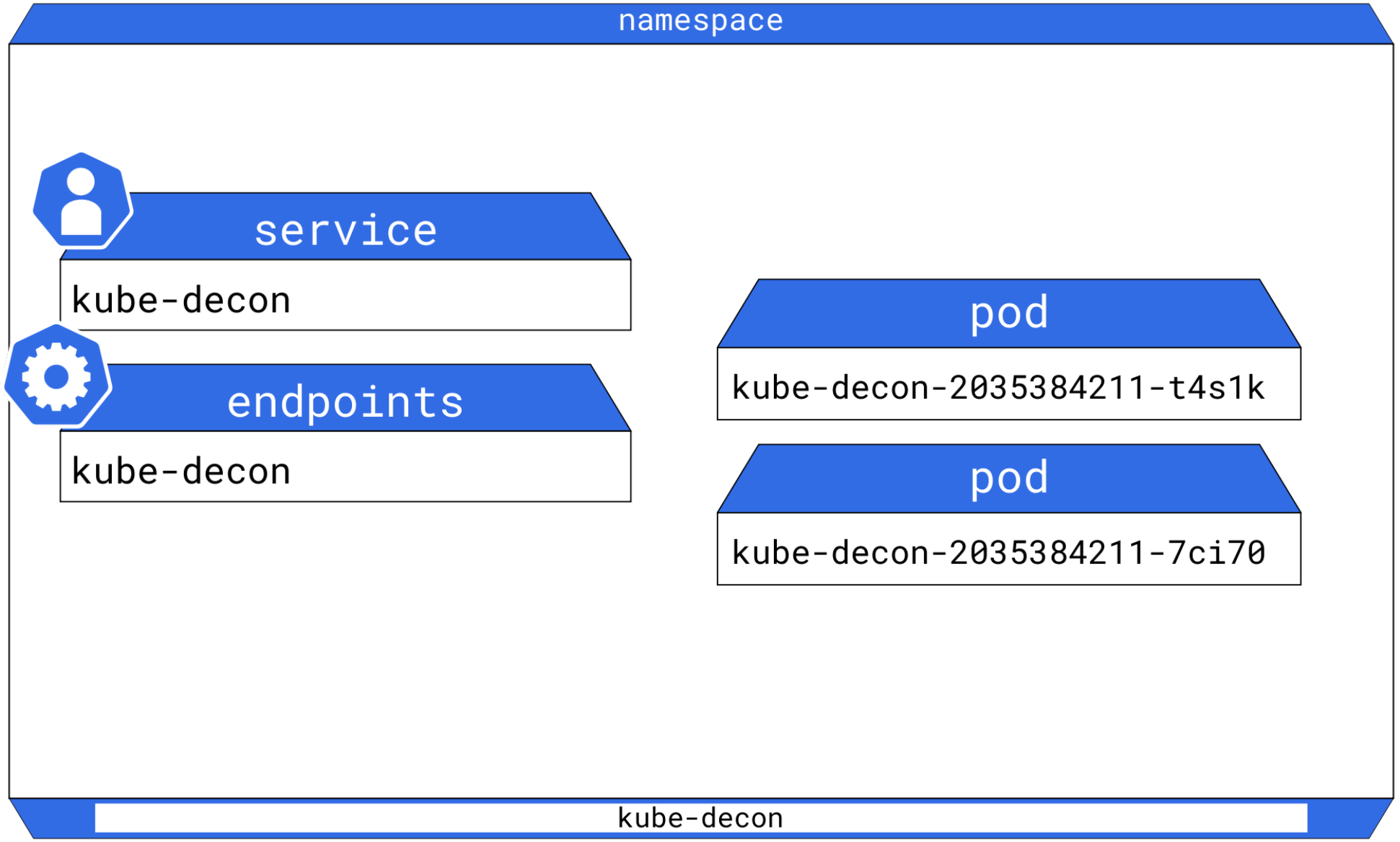

namespace
serviceaccount
default
secret
default-token-uelsu
kube-decon

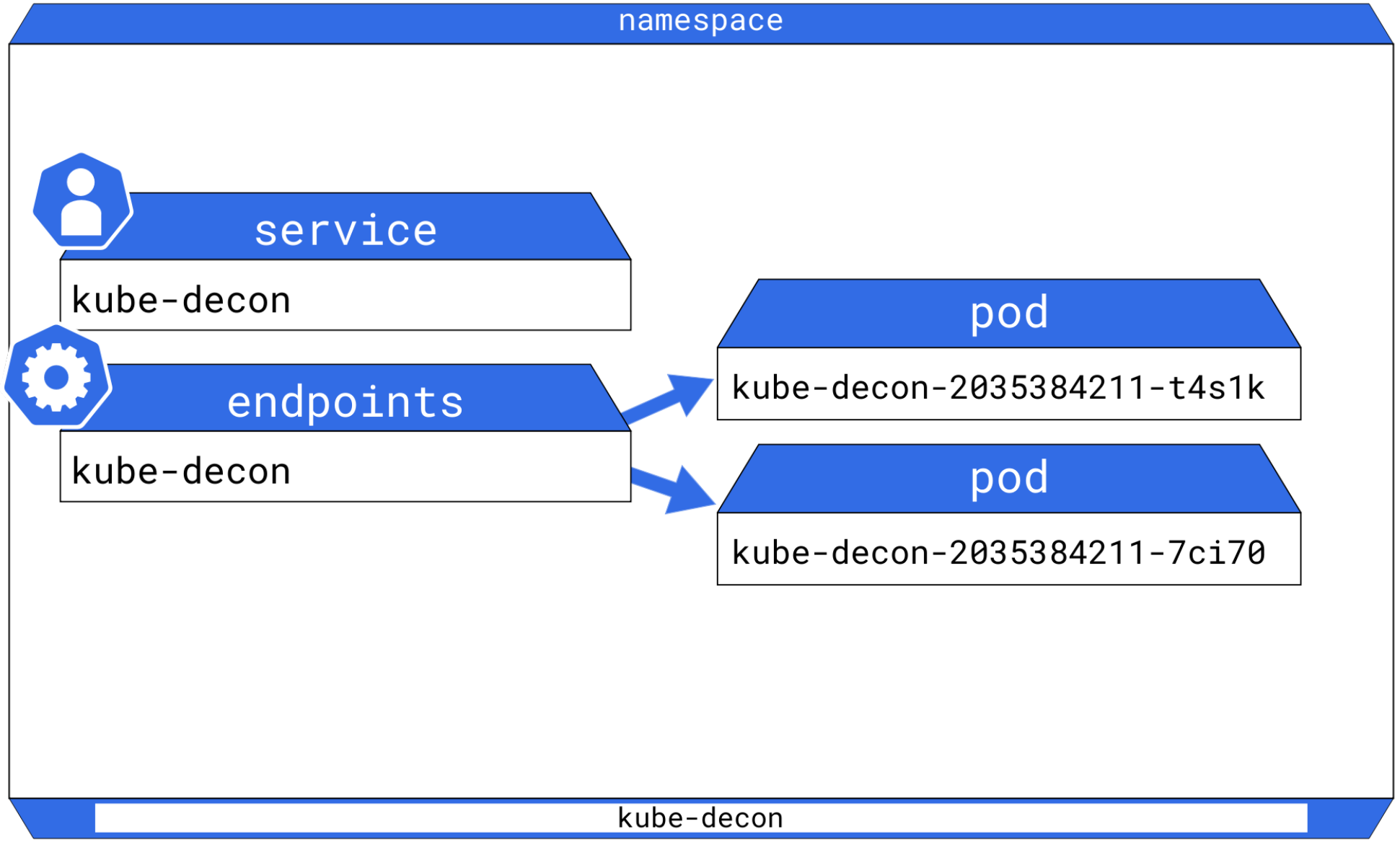

namespace
deployment
kube-decon
serviceaccount
default
secret
default-token-uelsu
kube-decon


namespace
deployment
kube-decon
replica-set
kube-decon-2035384211
serviceaccount
default
secret
default-token-uelsu
kube-decon

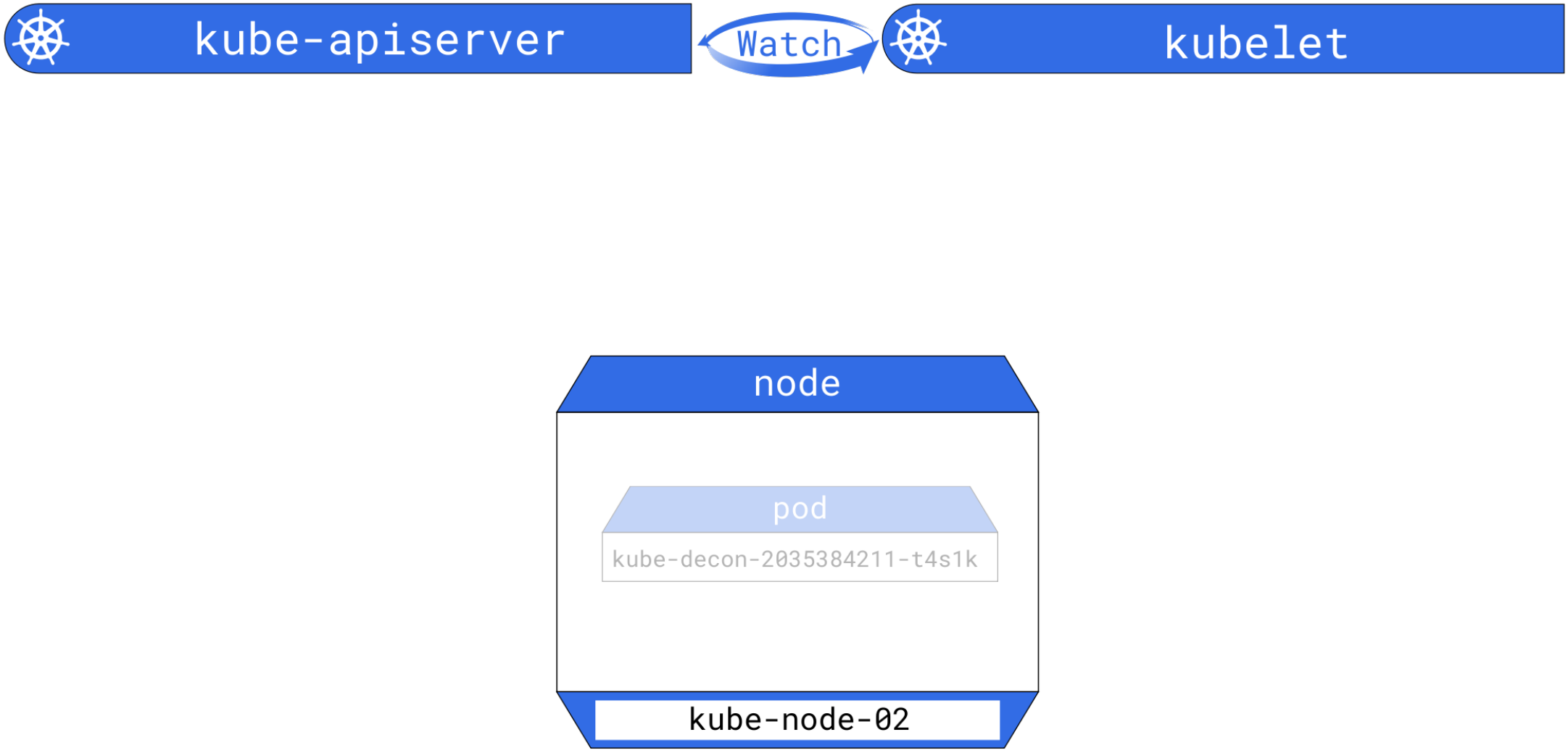

namespace
deployment
kube-decon
serviceaccount
default
replica-set
kube-decon-2035384211
node
pod
kube-decon-2035384211-t4s1k
kube-node-02
secret
default-token-uelsu
kube-decon

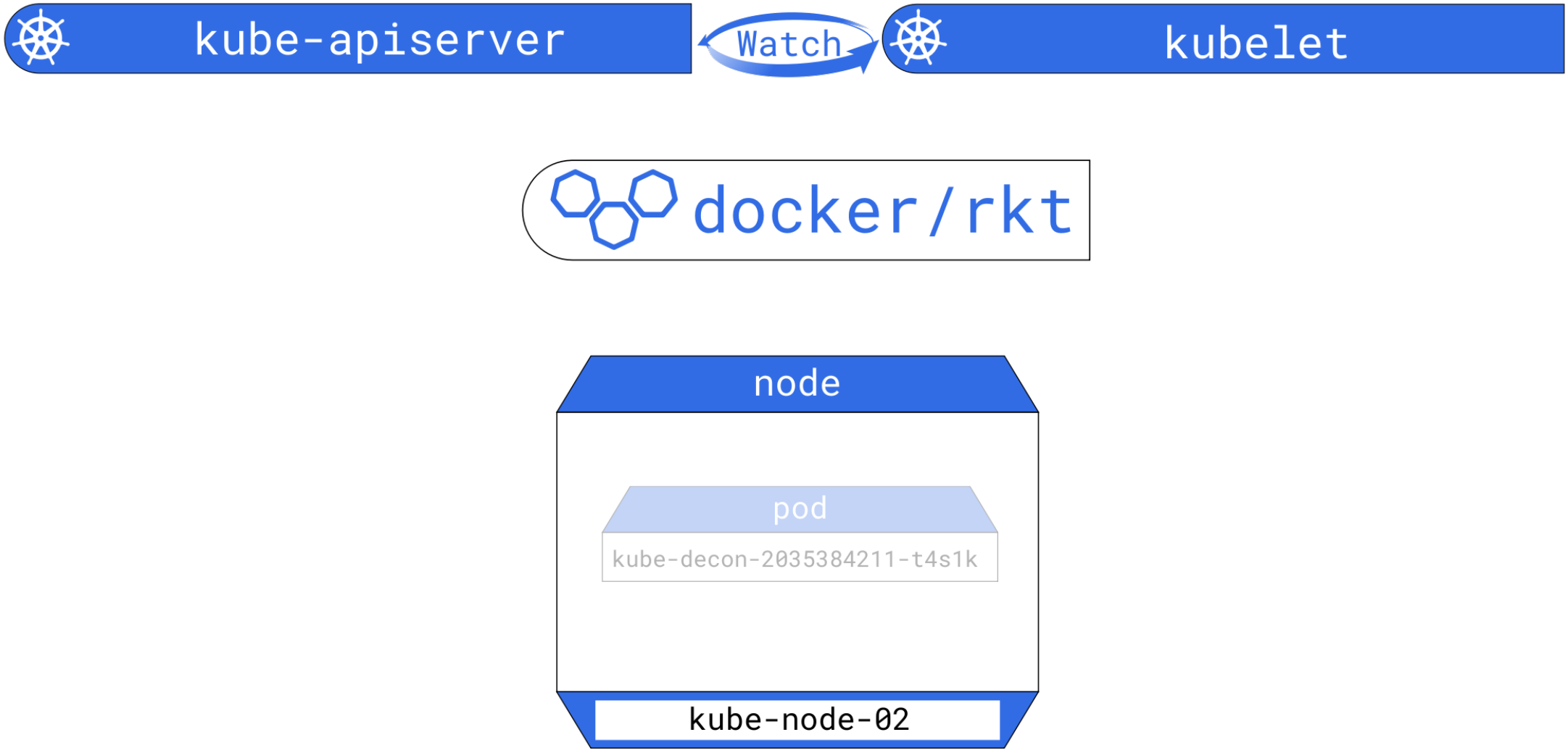

namespace
service
kube-decon
pod
-decon-2035384211-t4s1k
pod
kube-decon-2035384211-7ci70
kube-decon

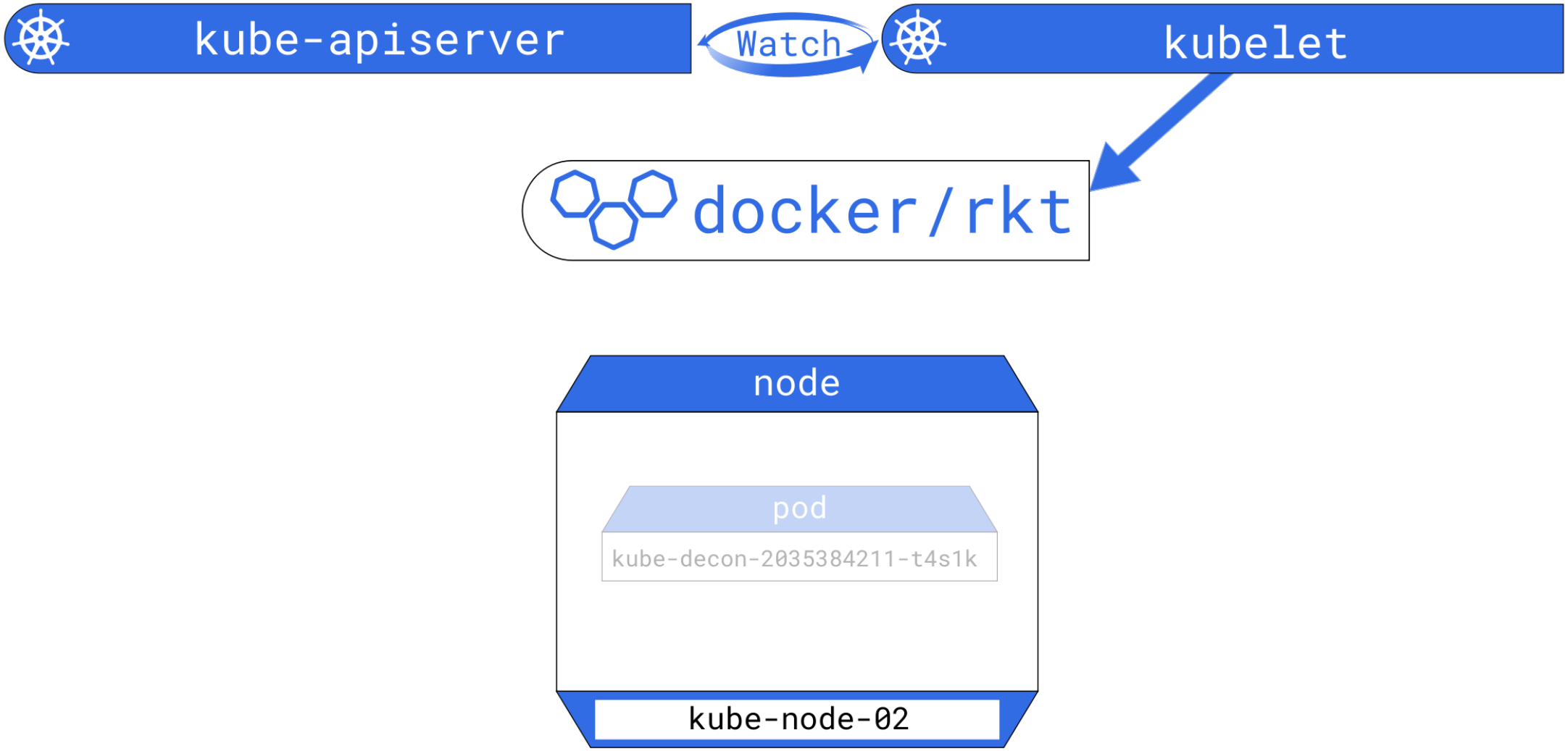

namespace
service
kube-decon
endpoints
kube-decon
pod
kube-decon-2035384211-t4s1k
pod
kube-decon-2035384211-7ci70
kube-decon

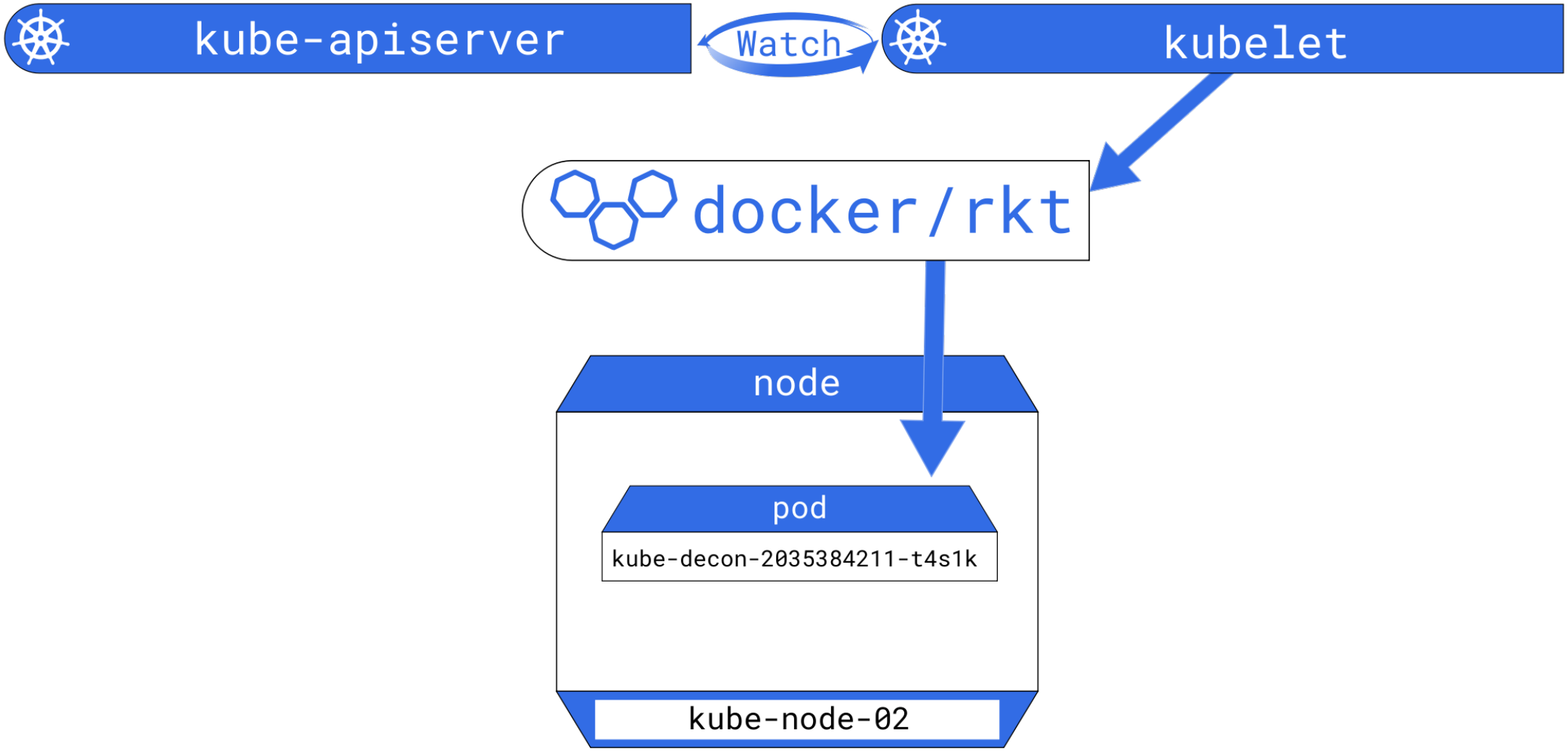

namespace
service
kube-decon
endpoints
kube-decon
pod
kube-decon-2035384211-t4s1k
pod
kube-decon-2035384211-7ci70
kube-decon

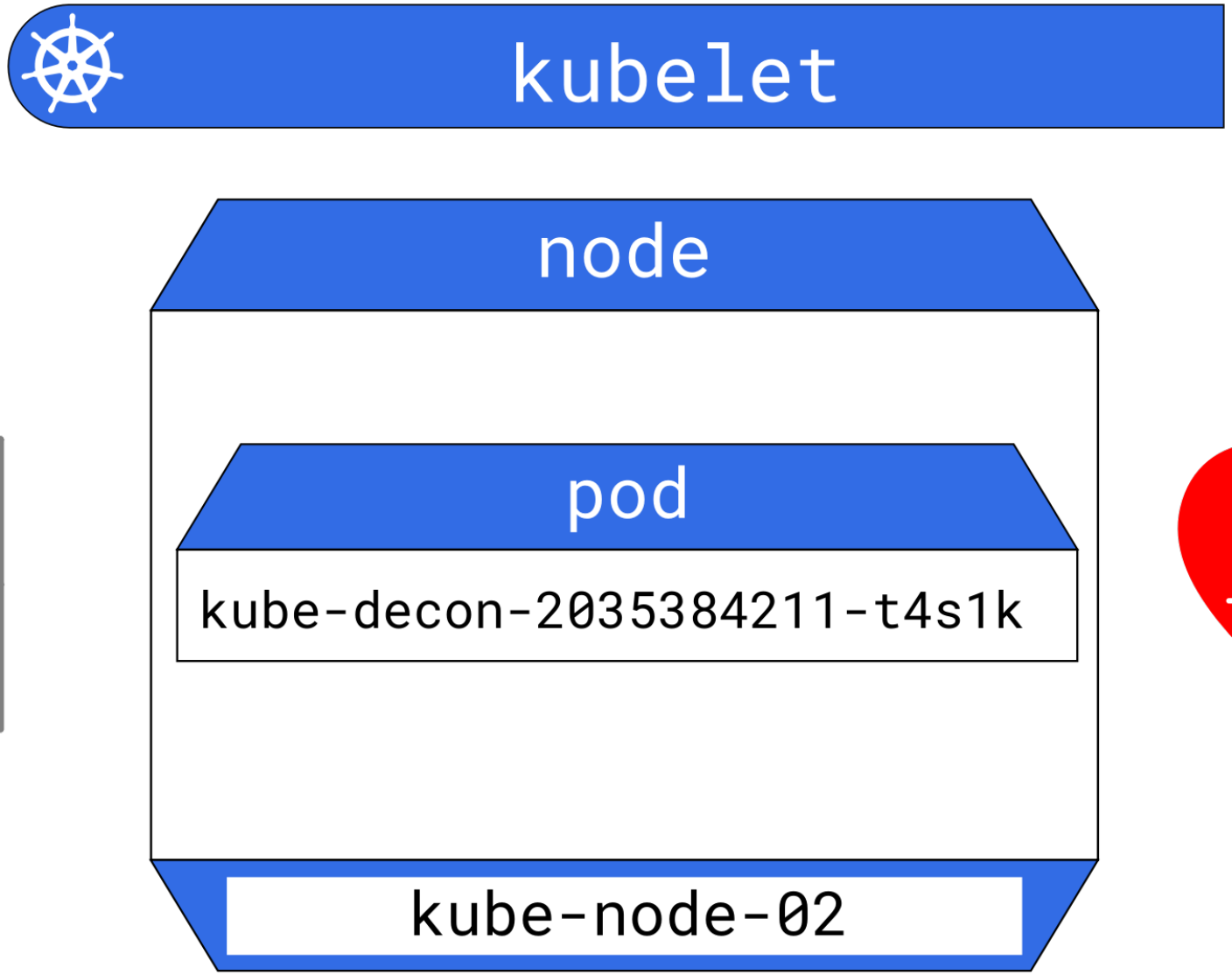

kubelet


kube-apiserver
Watch
kubelet
node
pod
kube-decon-2035384211-t4s1k
kube-node-02

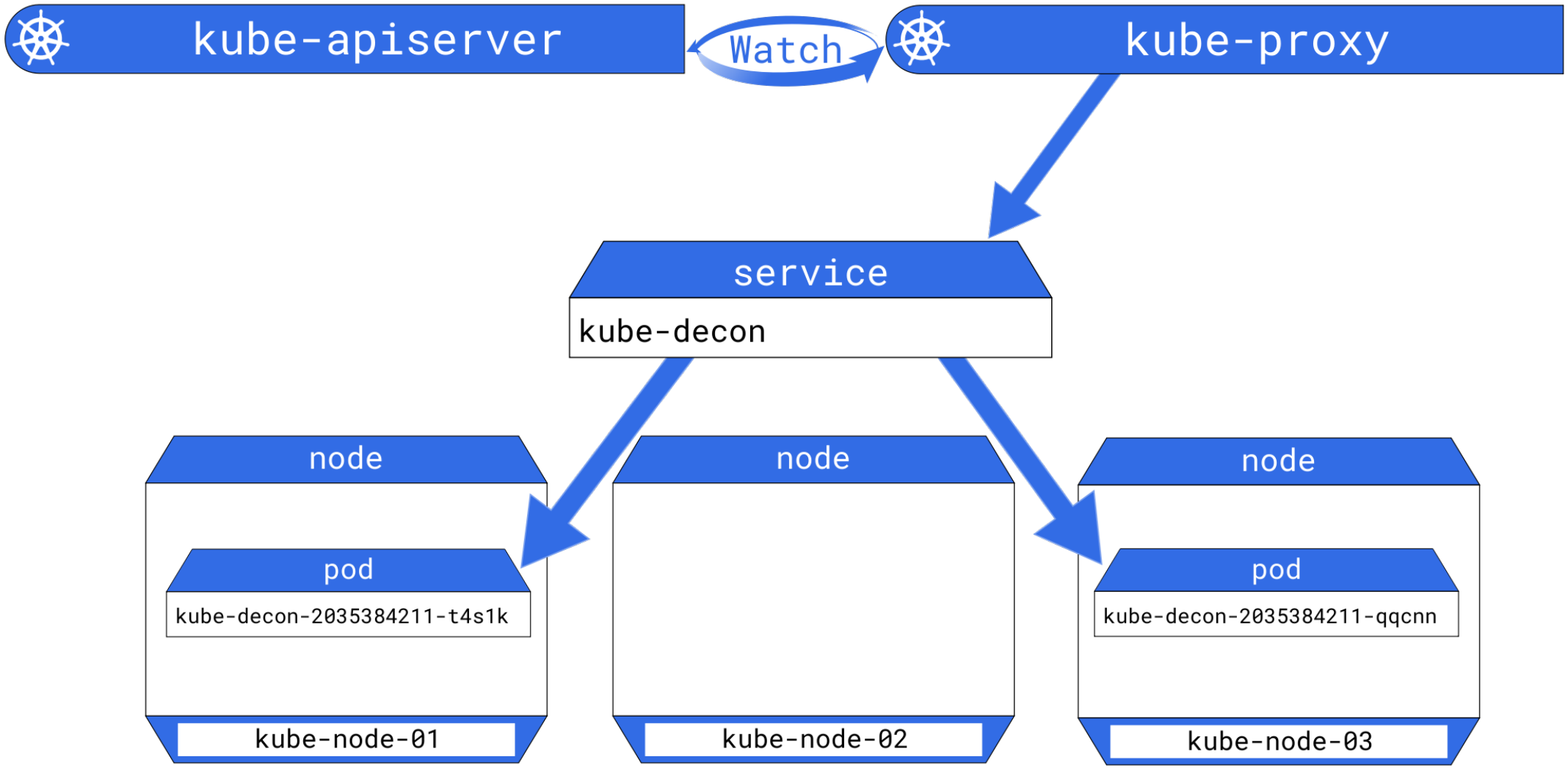

kube-apiserver
Watch
kubelet
docker/rkt
node
pod
kube-decon-2035384211-t4s1k
kube-node-02

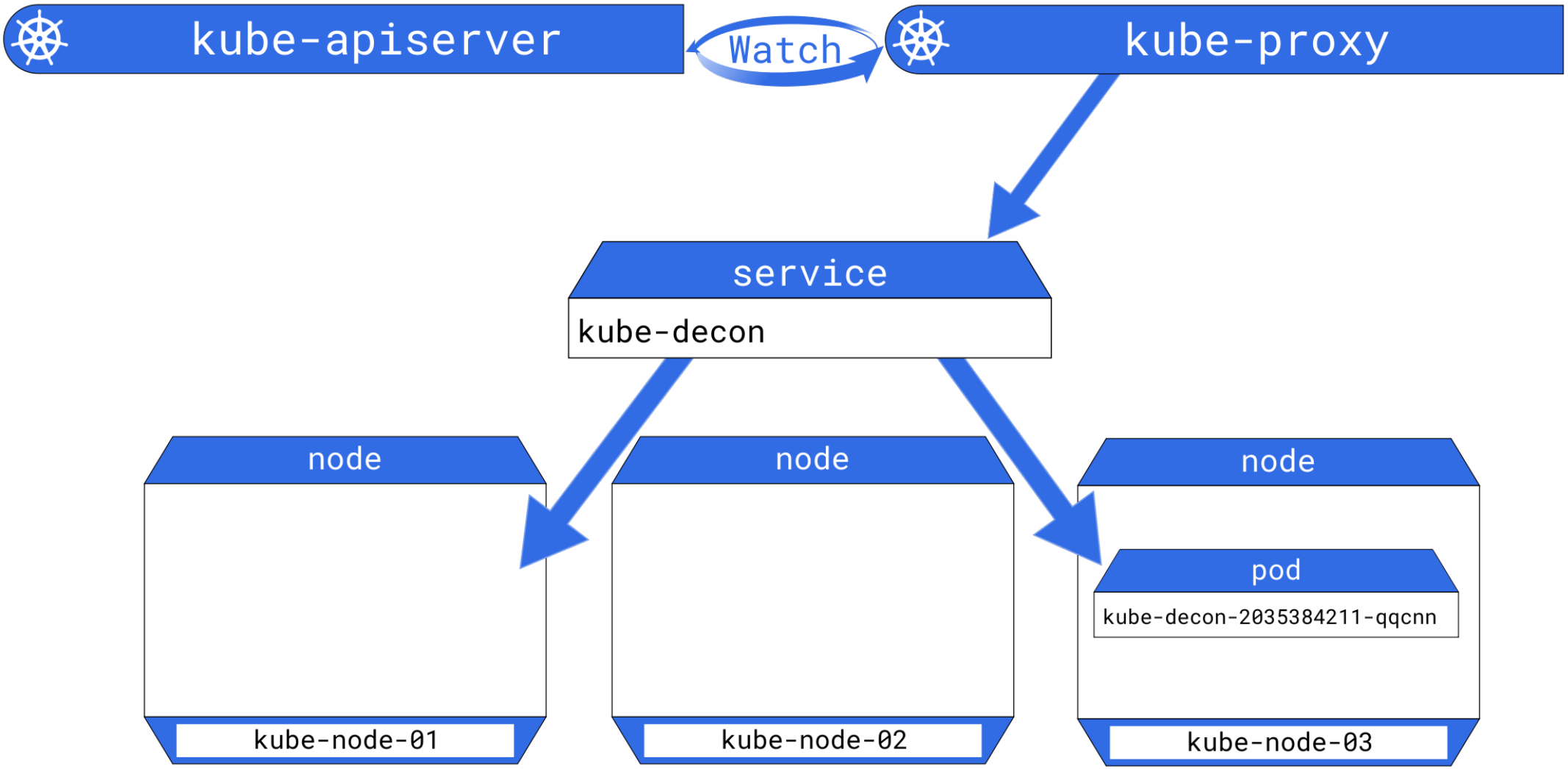

kube-apiserver
Watch
kubelet
docker/rkt
node
pod
kube-decon-2035384211-t4s1k
kube-node-02

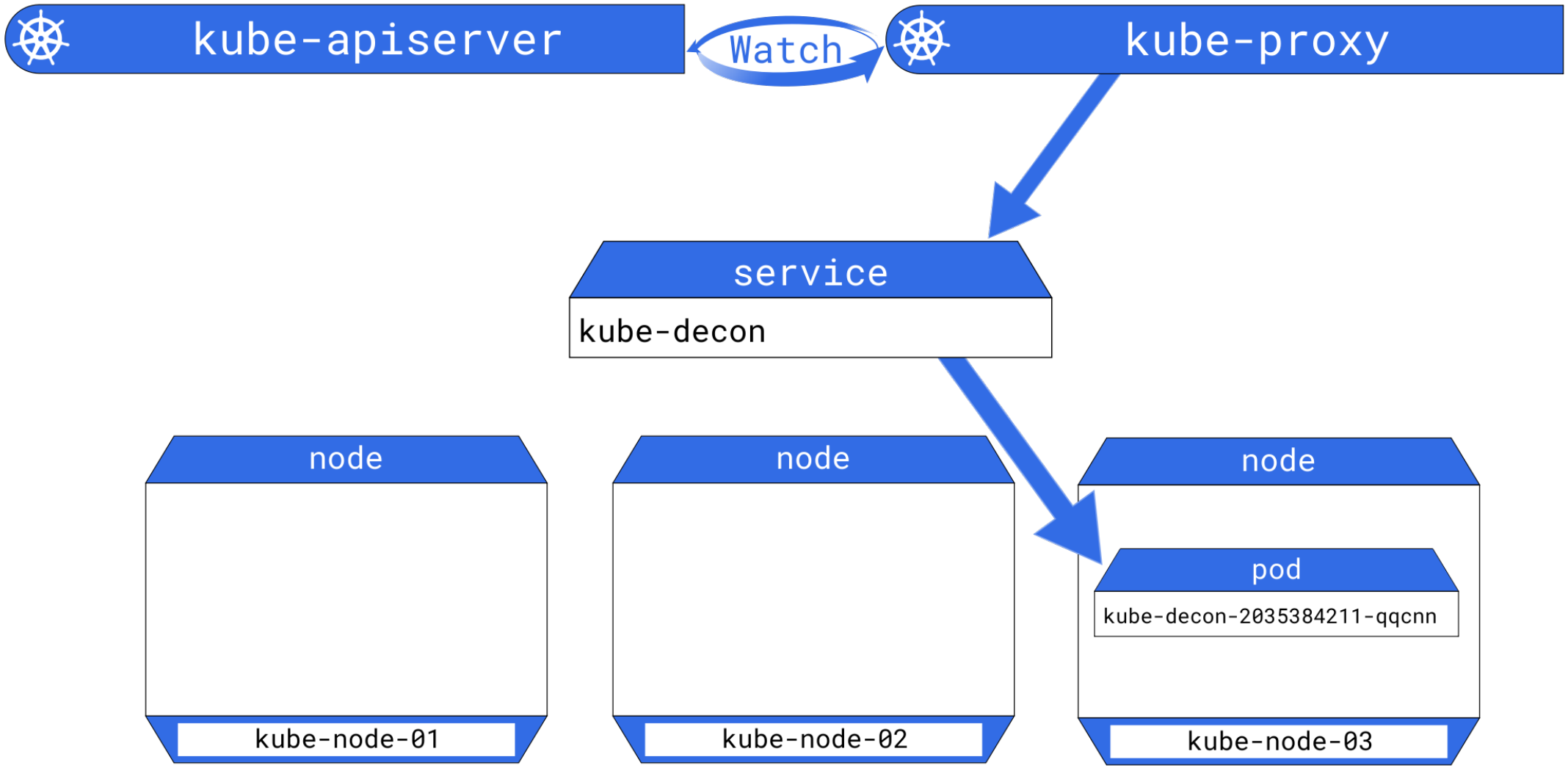

kube-apiserver
Watch
kubelet
docker/rkt
node
pod
kube-decon-2035384211-t4s1k
kube-node-02

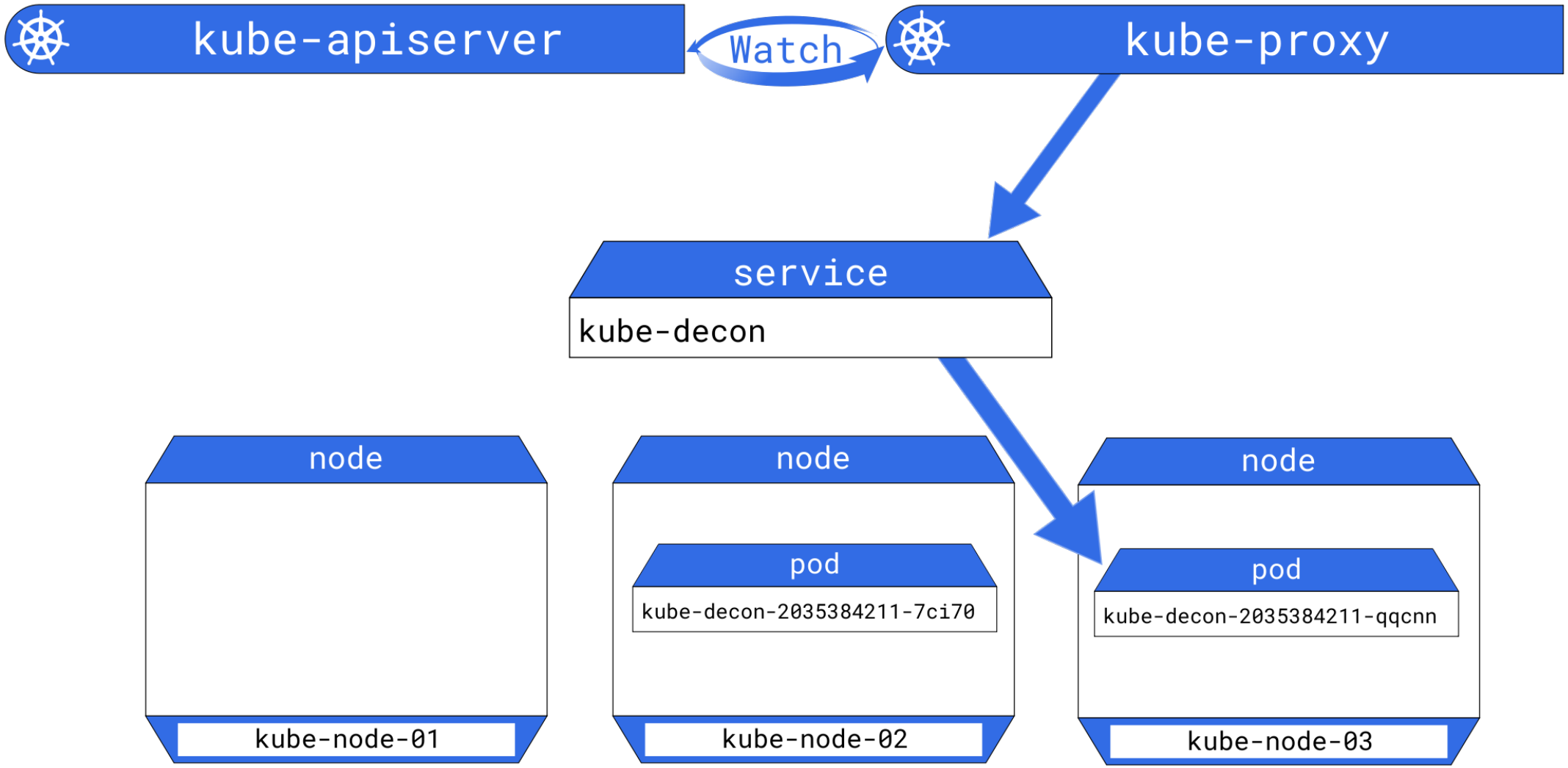

kubelet
node
pod
kube-decon-2035384211-t4s1k
kube-node-02

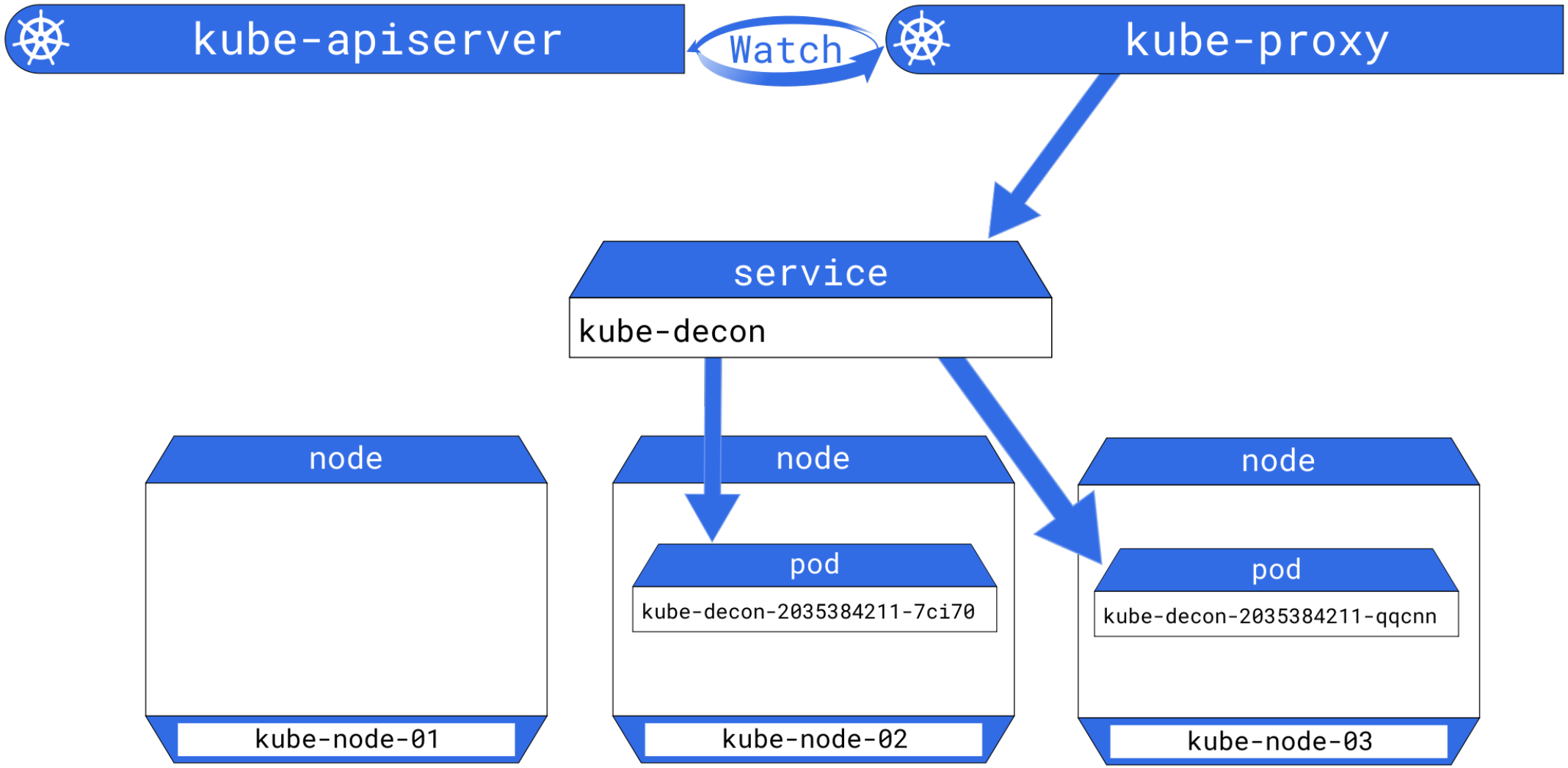

kube-proxy

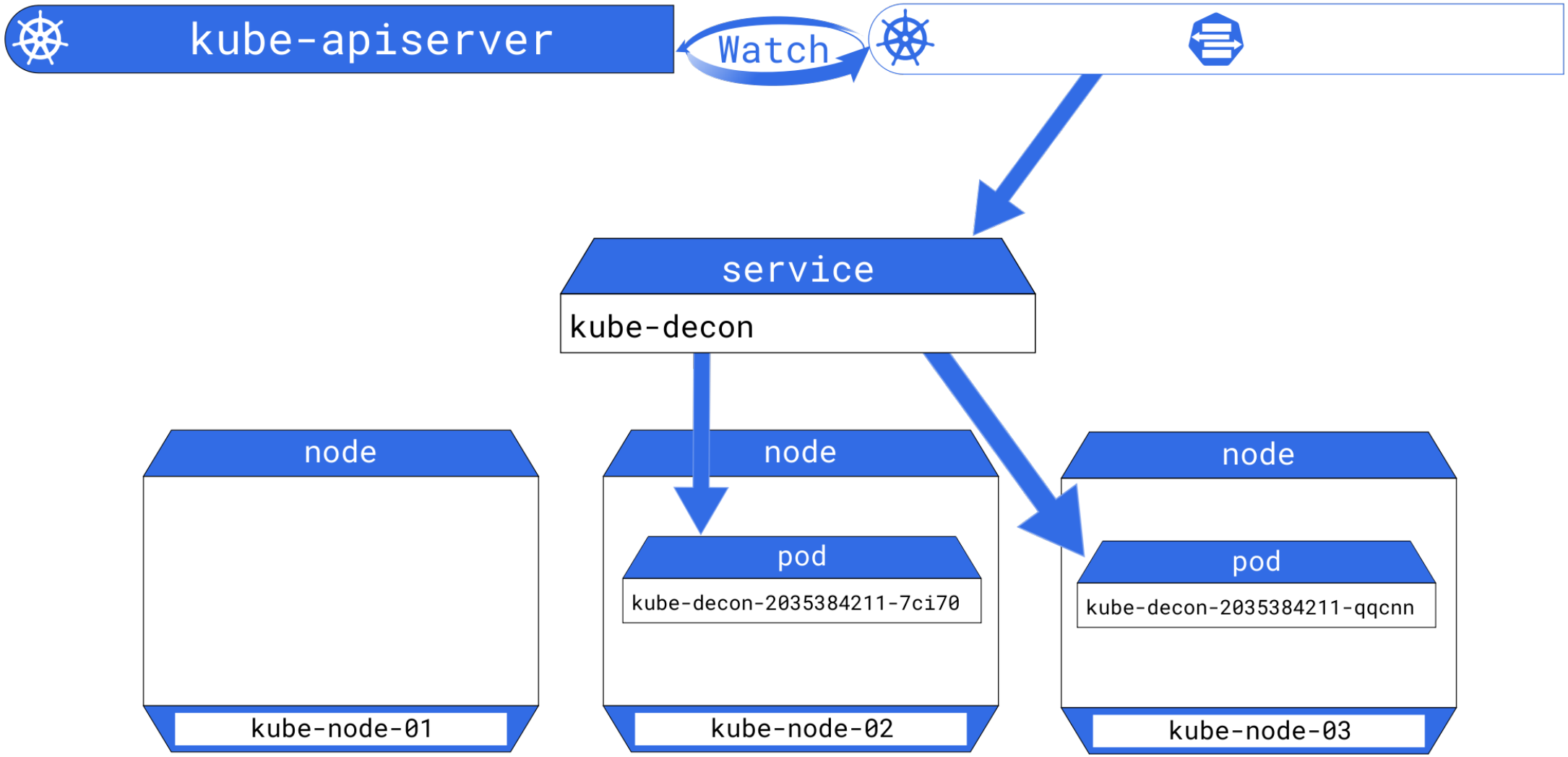

kube-apiserver
Watch
kube-proxy
service
kube-decon
node
pod
kube-decon-2035384211-t4s1k
kube-node-01
node
kube-node-02
node
pod
kube-decon-2035384211-qqcnn
kube-node-03

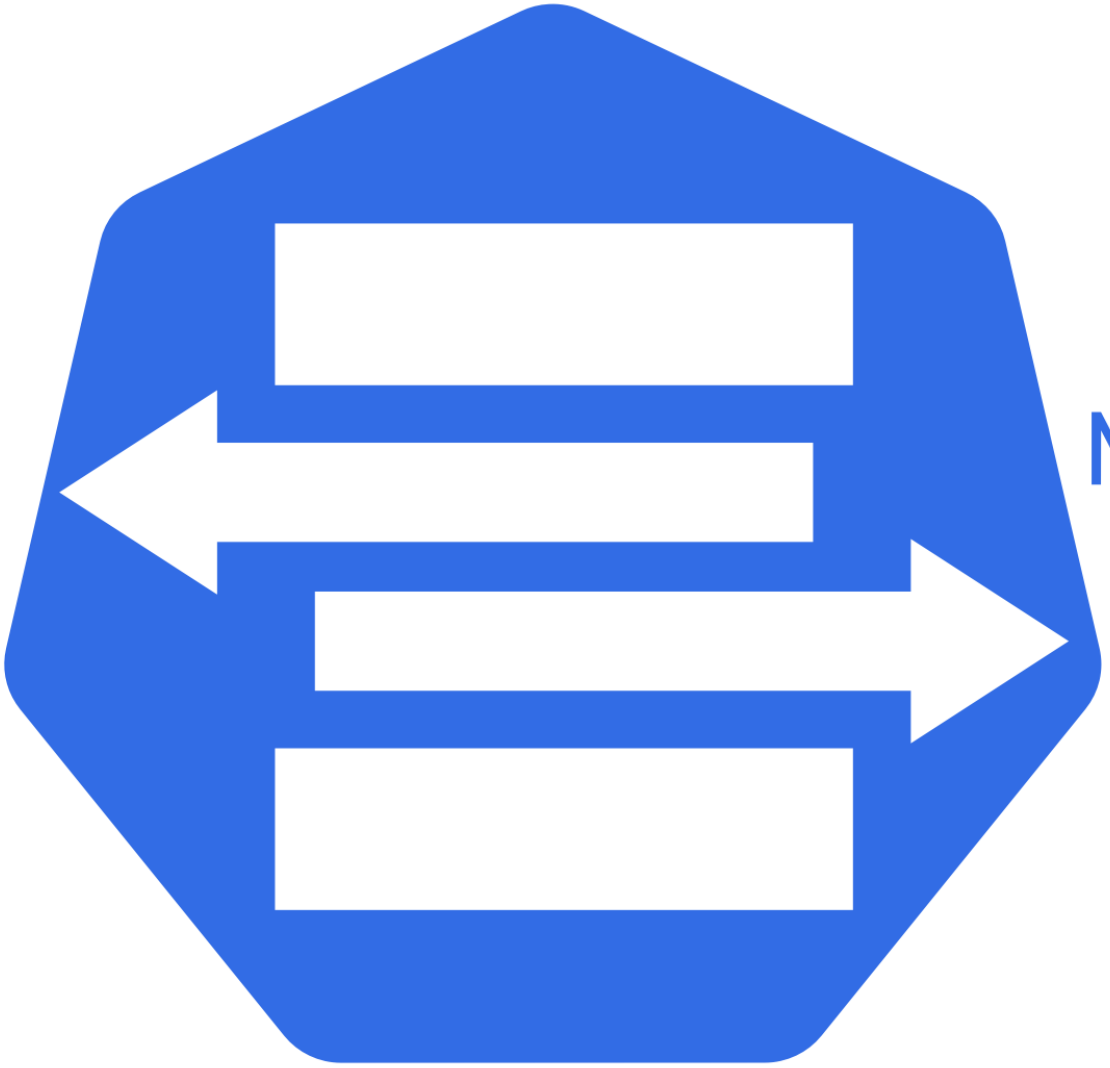

kube-apiserver
Watch
kube-proxy
service
kube-decon
node
kube-node-01
node
kube-node-02
node
pod
kube-decon-2035384211-qqcnn
kube-node-03


kube-apiserver
Watch
kube-proxy
service
kube-decon
node
kube-node-01
node
kube-node-02
node
pod
kube-decon-2035384211-qqcnn
kube-node-03


kube-apiserver
Watch
kube-proxy
service
kube-decon
node
kube-node-01
node
pod
kube-decon-2035384211-7ci70
kube-node-02
node
pod
kube-decon-2035384211-qqcnn
kube-node-03

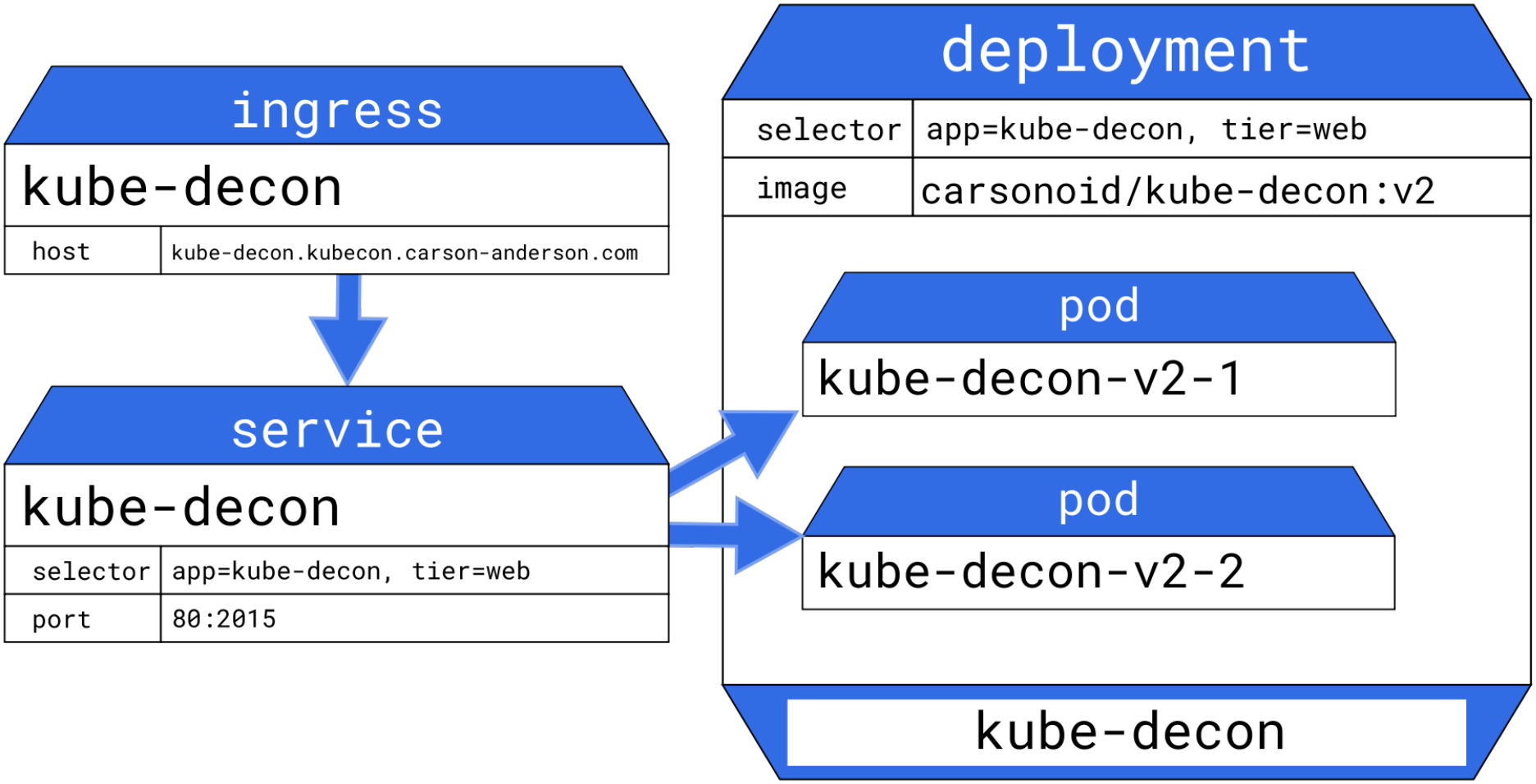

kube-apiserver
Watch
kube-proxy
service
kube-decon
node
kube-node-01
node
pod
kube-decon-2035384211-7ci70
kube-node-02
node
pod
kube-decon-2035384211-qqcnn
kube-node-03

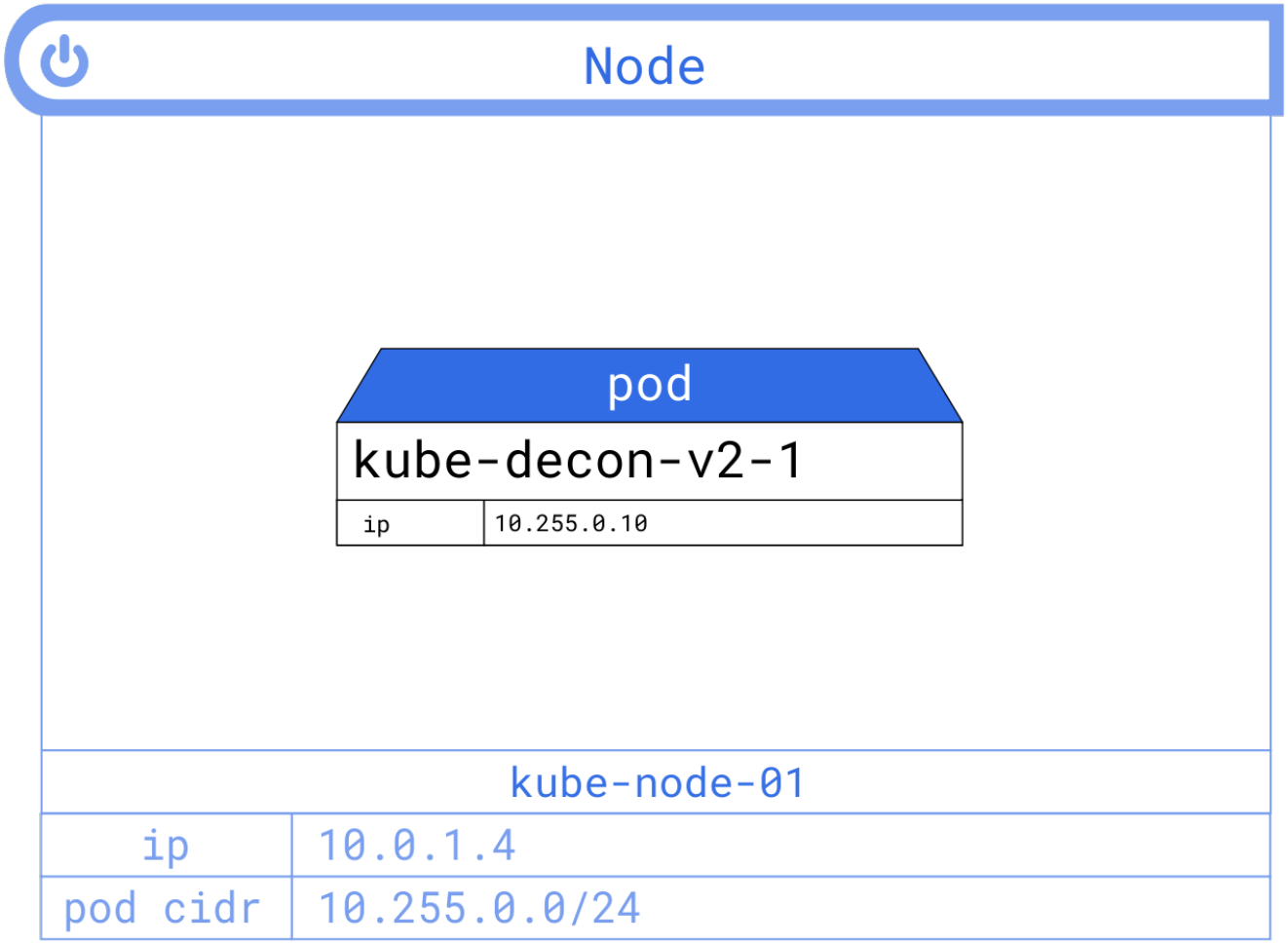

kube-apiserver
Watch
service
kube-decon
node
kube-node-01
node
pod
kube-decon-2035384211-7ci70
kube-node-02
node
pod
kube-decon-2035384211-qqcnn
kube-node-03

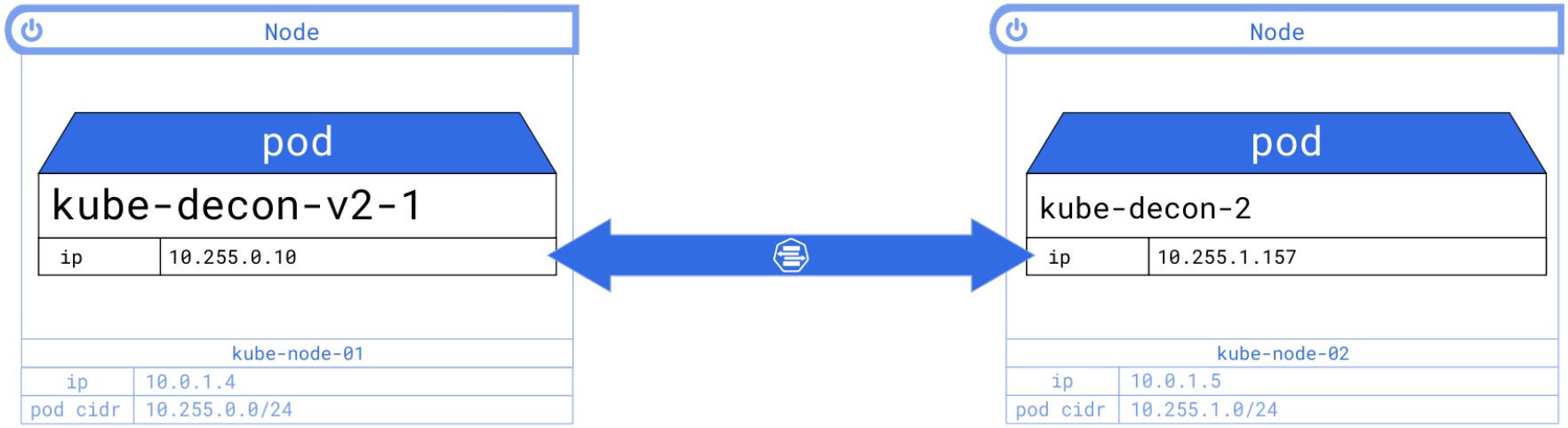


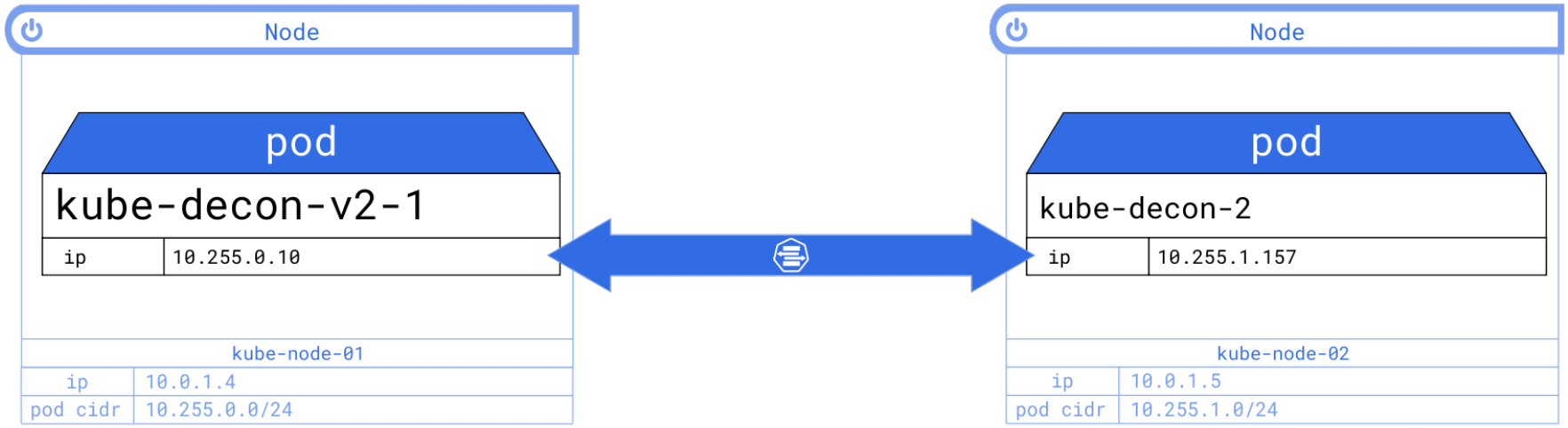
Network Providers
LoadBalancers

Kubernetes for the Network Admin


ingress
kube-decon
host
kube-decon.kubecon.carson-anderson.com
service
kube-decon
selector
app=kube-decon, tier=web
port
80:2015
deployment
selector
app=kube-decon, tier=web
image
carsonoid/kube-decon:v2
pod
kube-decon-v2-1
pod
kube-decon-v2-2
kube-decon


Node
pod
kube-decon-v2-1
ip
10.255.0.10
kube-node-01
ip
10.0.1.4
pod cidr
10.255.0.0/24


Node
pod
kube-decon-v2-1
ip
10.255.0.10
kube-node-01
ip
10.0.1.4
pod cidr
10.255.0.0/24
Node
pod
kube-decon-2
ip
10.255.1.157
kube-node-02
ip
10.0.1.5
pod cidr
10.255.1.0/24


Node
pod
kube-decon-v2-1
ip
10.255.0.10
kube-node-01
ip
10.0.1.4
pod cidr
10.255.0.0/24
Node
pod
kube-decon-2
ip
10.255.1.157
kube-node-02
ip
10.0.1.5
pod cidr
10.255.1.0/24

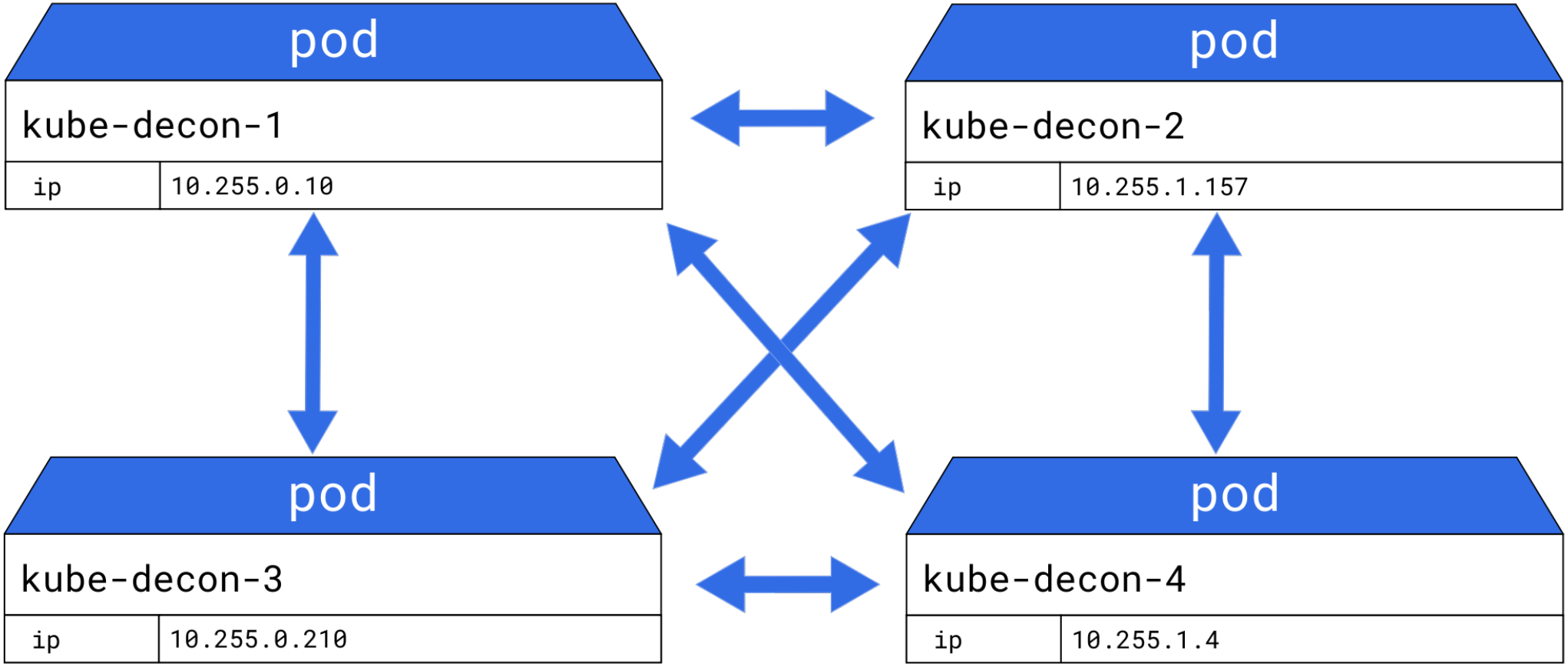
Cluster Networking

"All containers can communicate with all other containers without NAT"

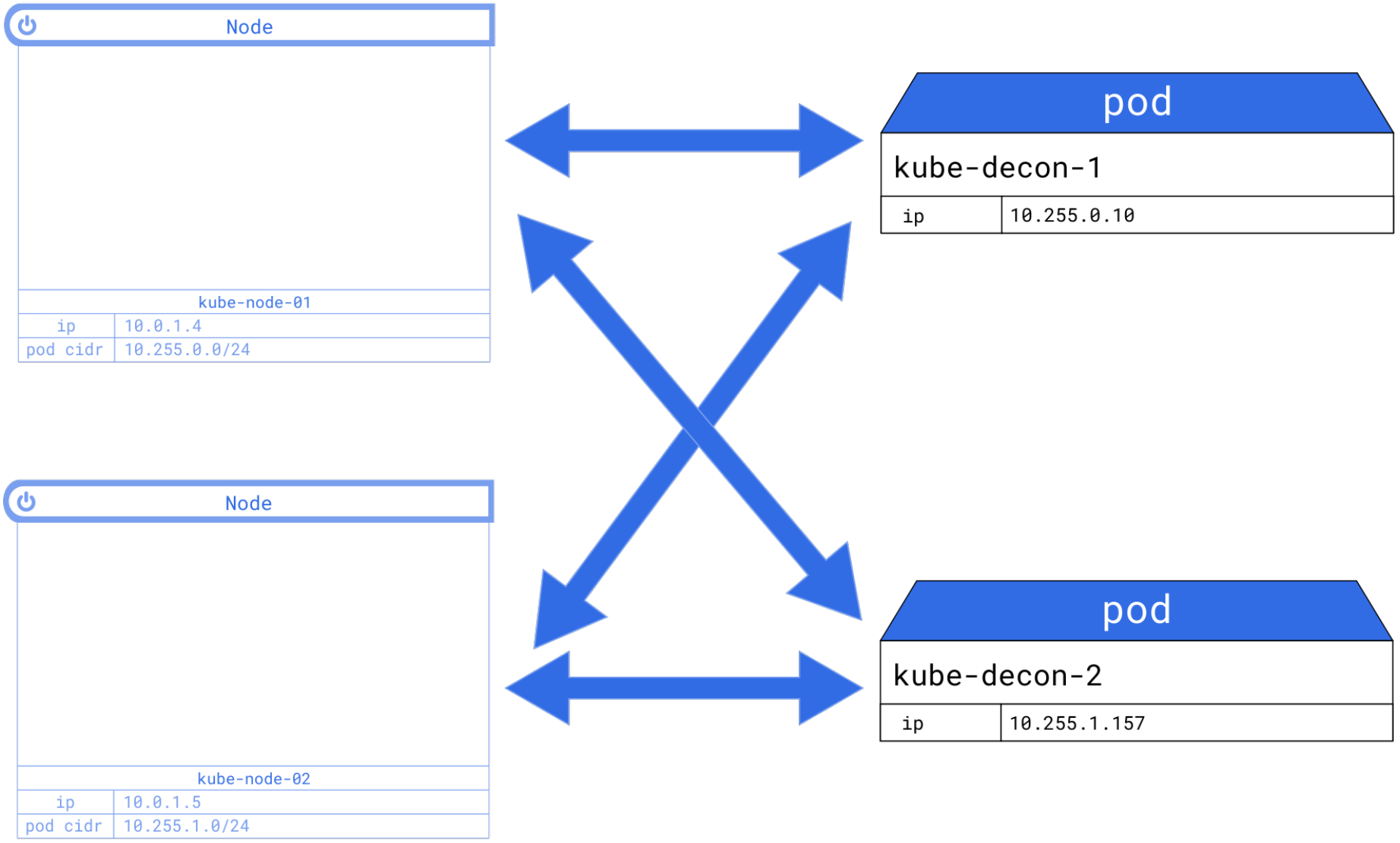
"All nodes can communicate with all containers (and vice-versa) without NAT"

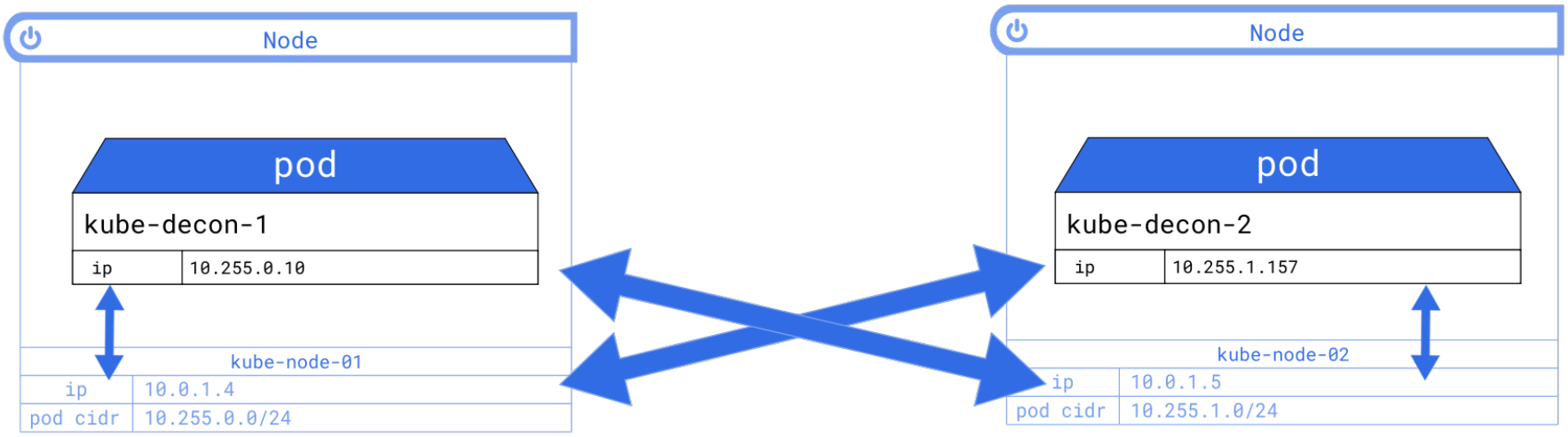
"The IP that a container sees itself as is the same IP that others see it as"

"All containers can communicate with all other containers without NAT"


pod
kube-decon-1
ip
10.255.0.10
pod
kube-decon-2
ip
10.255.1.157
pod
kube-decon-3
ip
10.255.0.210
pod
kube-decon-4
ip
10.255.1.4

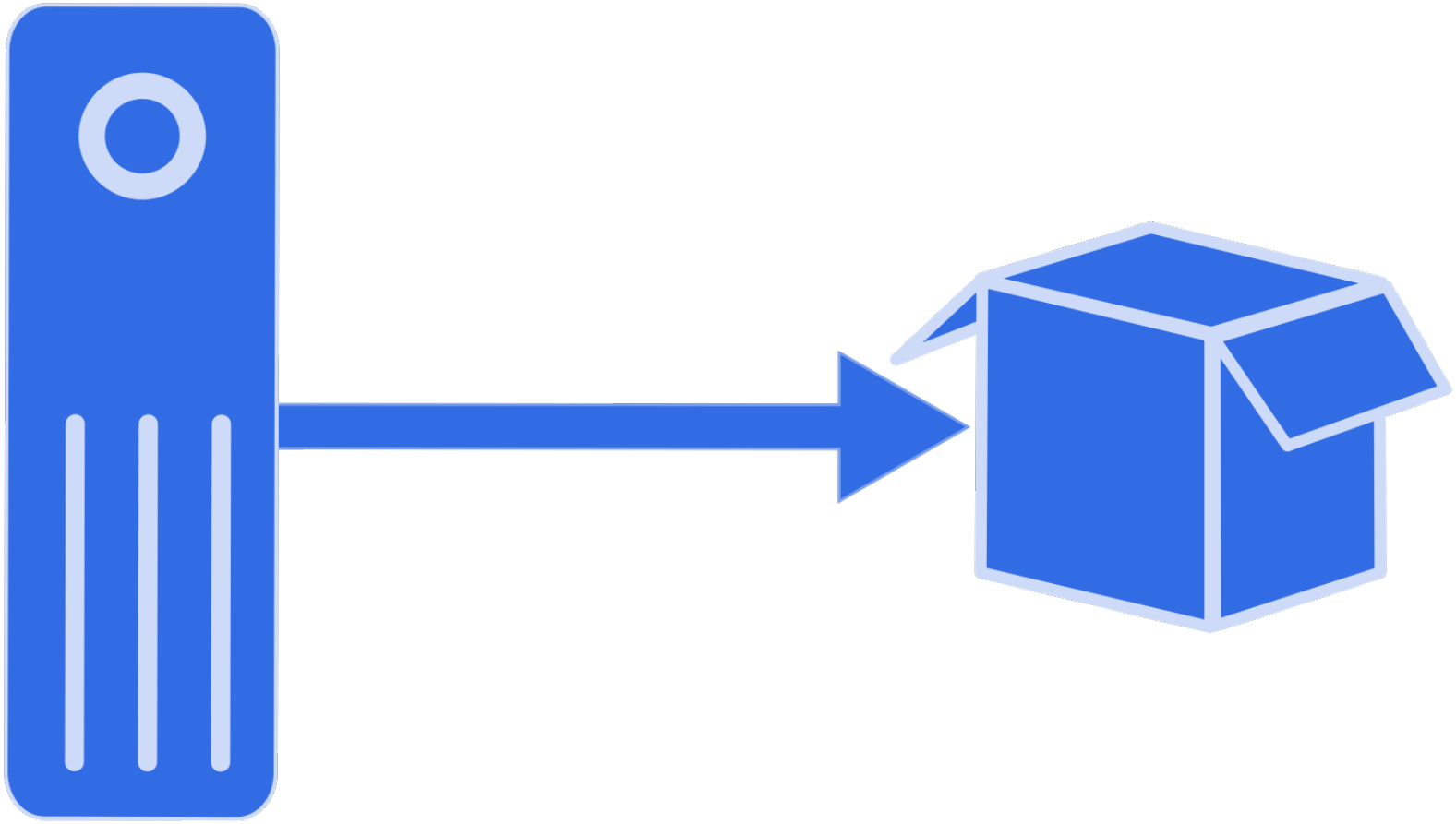
"All nodes can communicate with all containers (and vice-versa) without NAT"


Node
kube-node-01
ip
10.0.1.4
pod cidr
10.255.0.0/24
Node
kube-node-02
ip
10.0.1.5
pod cidr
10.255.1.0/24
pod
kube-decon-1
ip
10.255.0.10
pod
kube-decon-2
ip
10.255.1.157

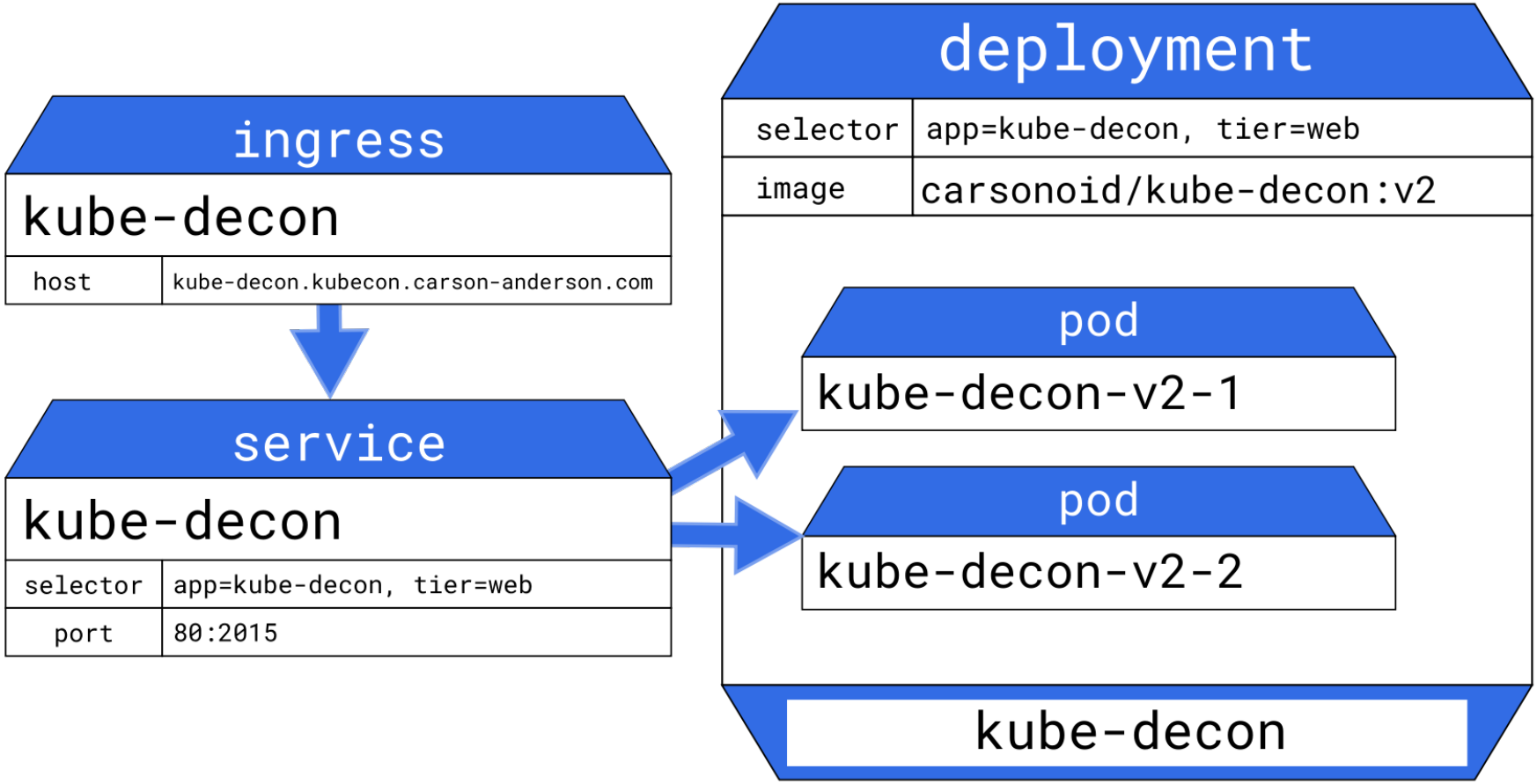

Node
pod
kube-decon-1
ip
10.255.0.10
kube-node-01
ip
10.0.1.4
pod cidr
10.255.0.0/24
Node
pod
kube-decon-2
ip
10.255.1.157
kube-node-02
ip
10.0.1.5
pod cidr
10.255.1.0/24

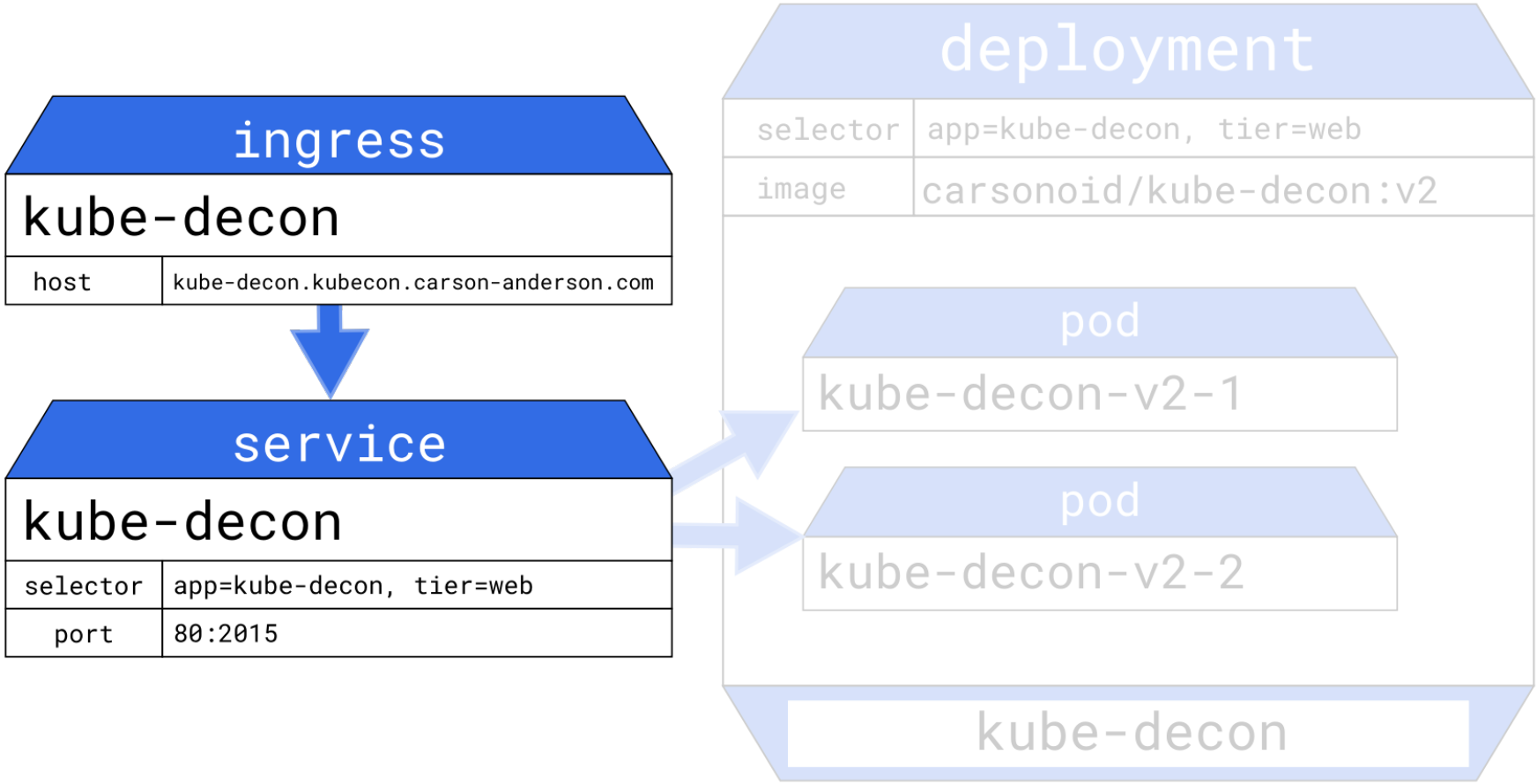
"The IP that a container sees itself

as is the same IP that others see it as"



Services

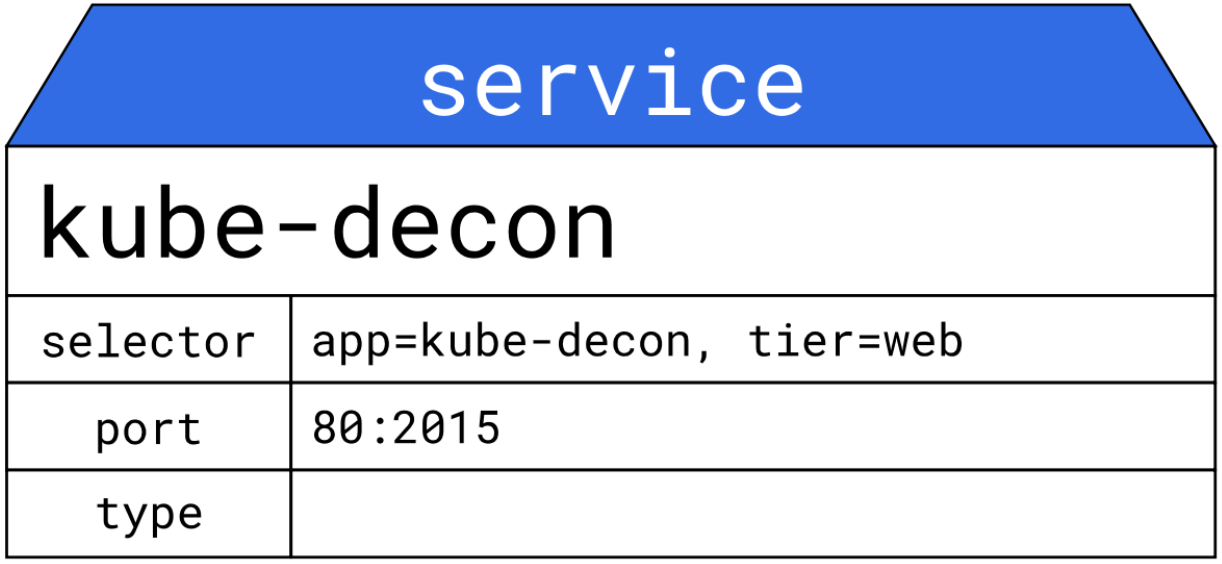

ingress
kube-decon
host
kube-decon.kubecon.carson-anderson.com
service
kube-decon
selector
app=kube-decon, tier=web
port
80:2015
deployment
selector
app=kube-decon, tier=web
image
carsonoid/kube-decon:v2
pod
kube-decon-v2-1
pod
kube-decon-v2-2
kube-decon


ingress
kube-decon
host
kube-decon.kubecon.carson-anderson.com
service
kube-decon
selector
app=kube-decon, tier=web
port
80:2015
deployment
selector
app=kube-decon, tier=web
image
carsonoid/kube-decon:v2
pod
kube-decon-v2-1
pod
kube-decon-v2-2
kube-decon

LoadBalancer

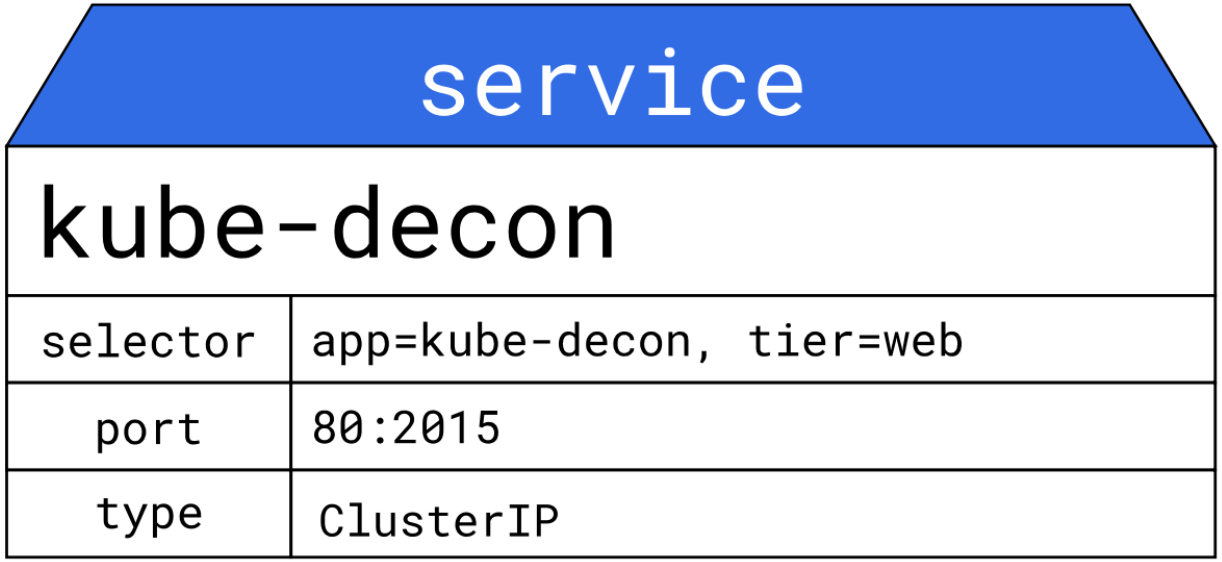
NodePort

ClusterIP



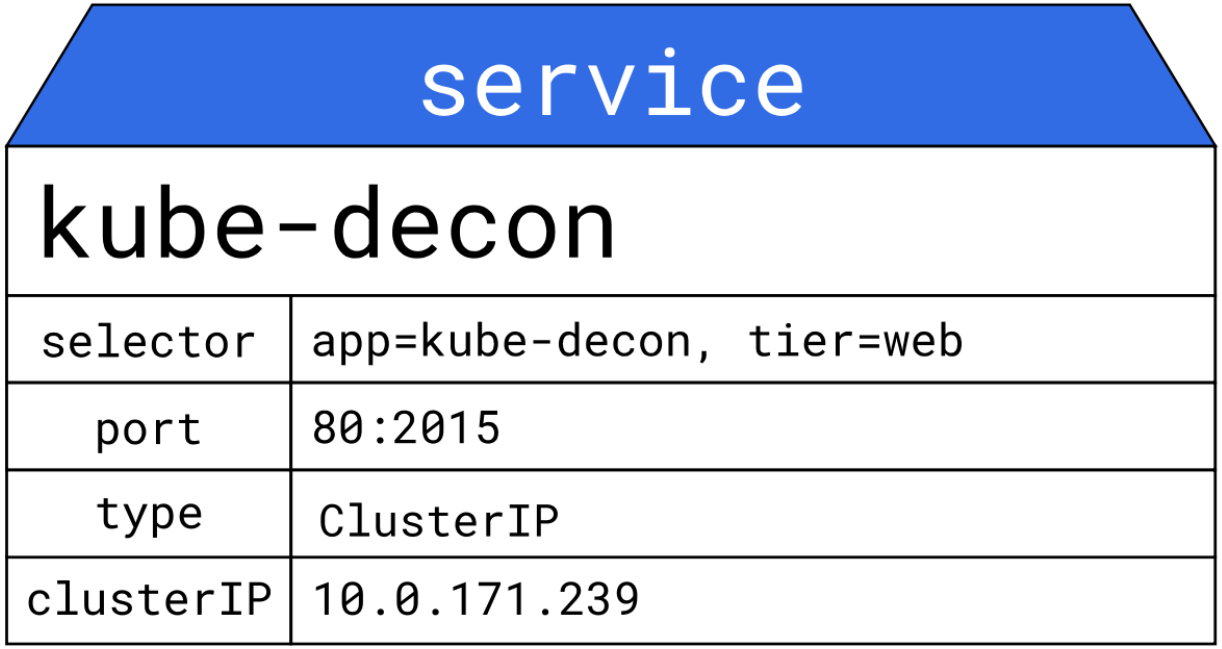
LoadBalancer

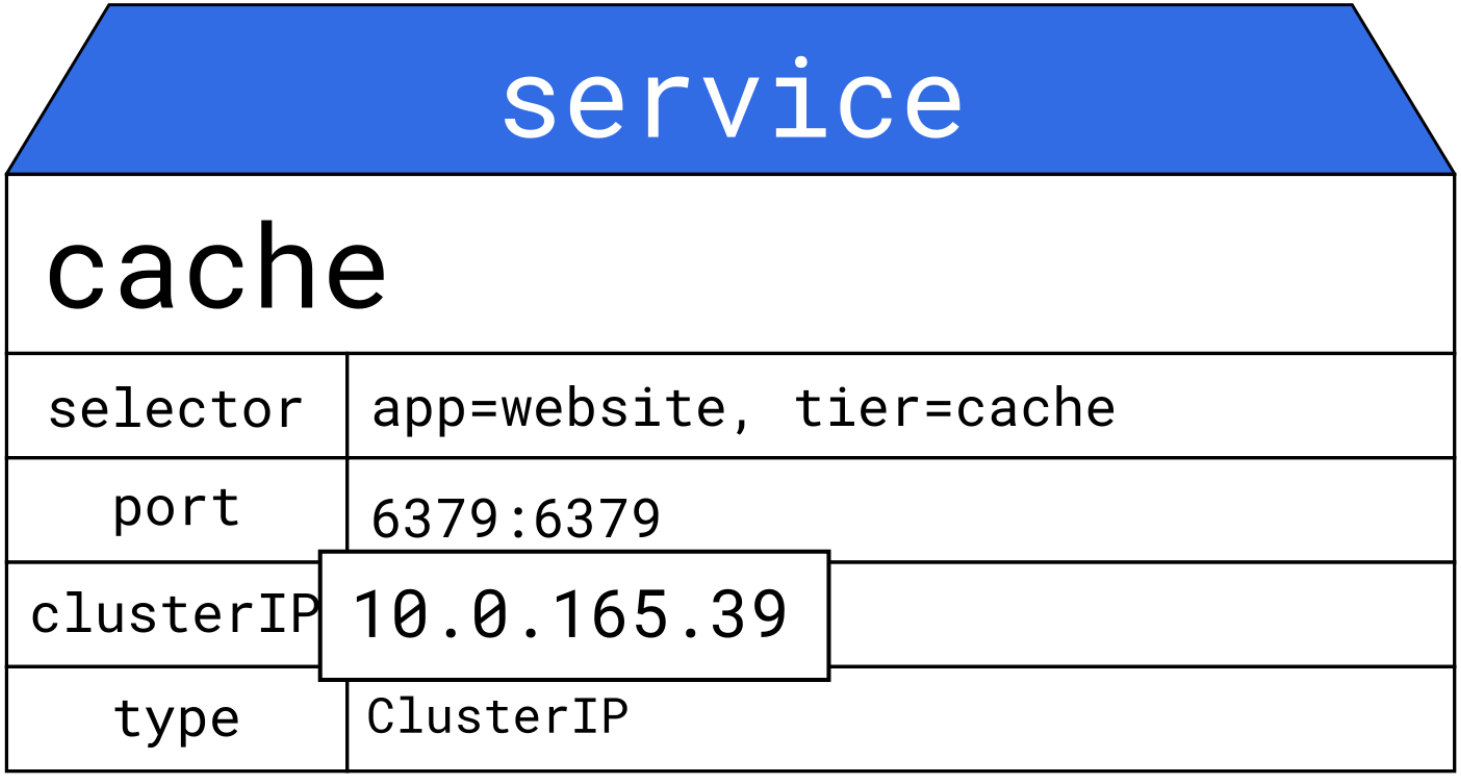
NodePort

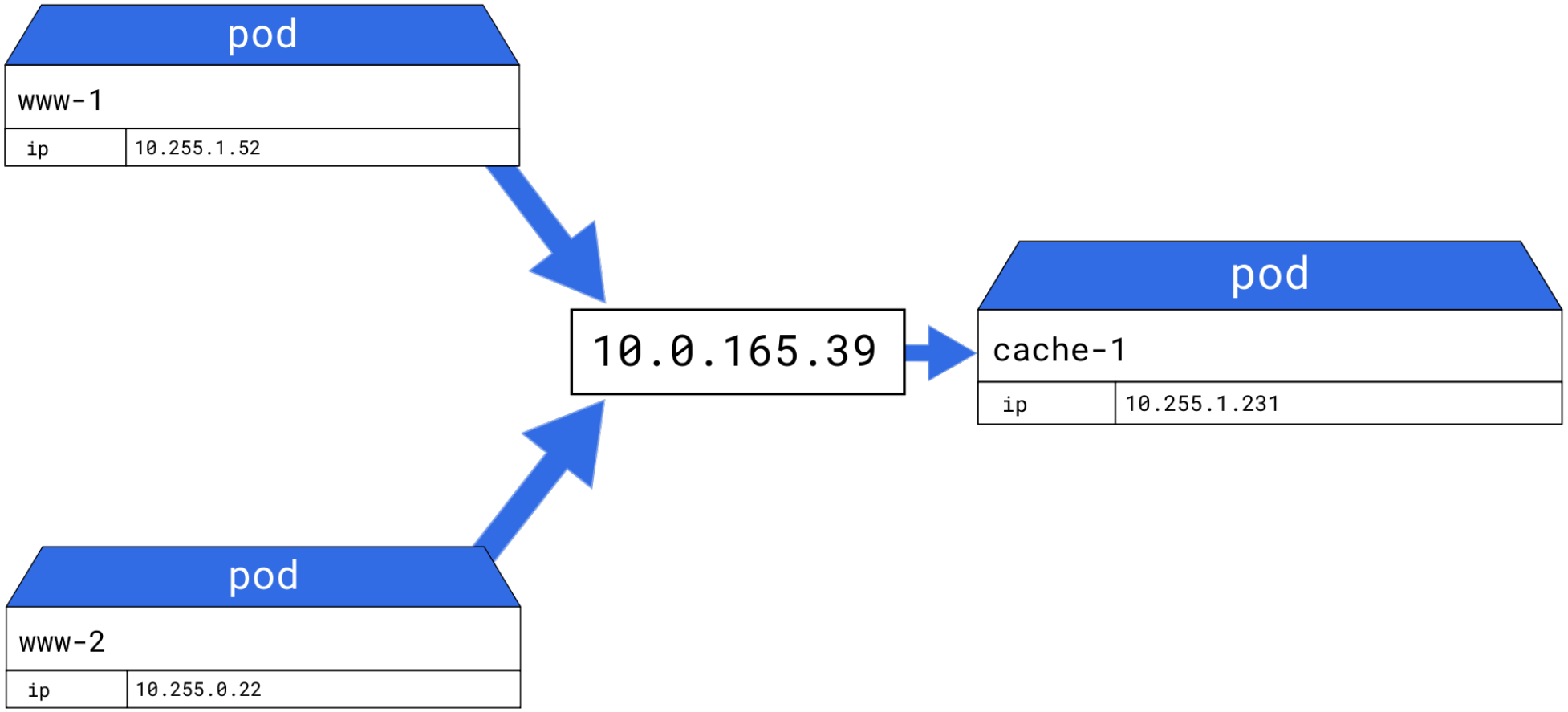


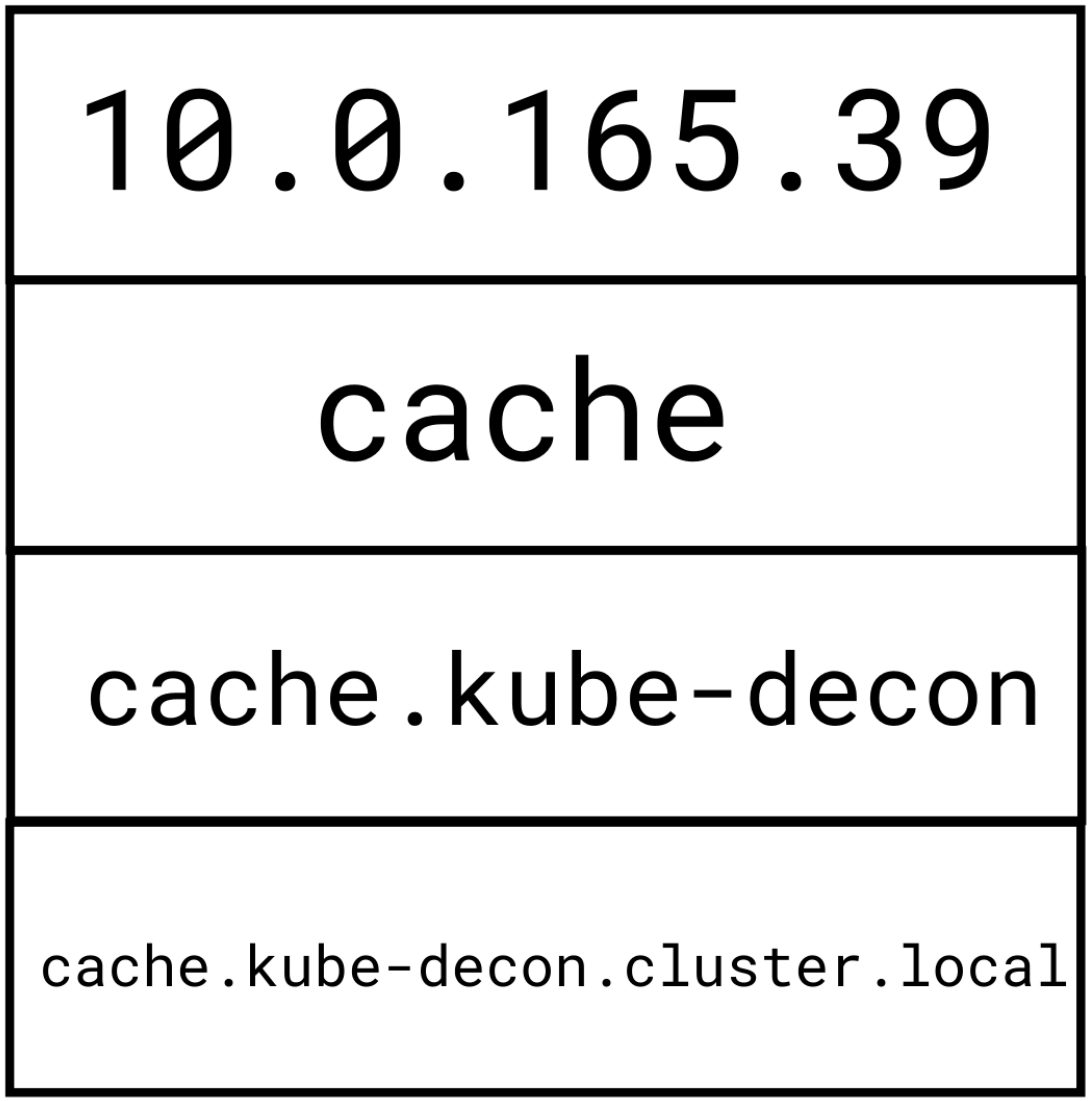
LoadBalancer

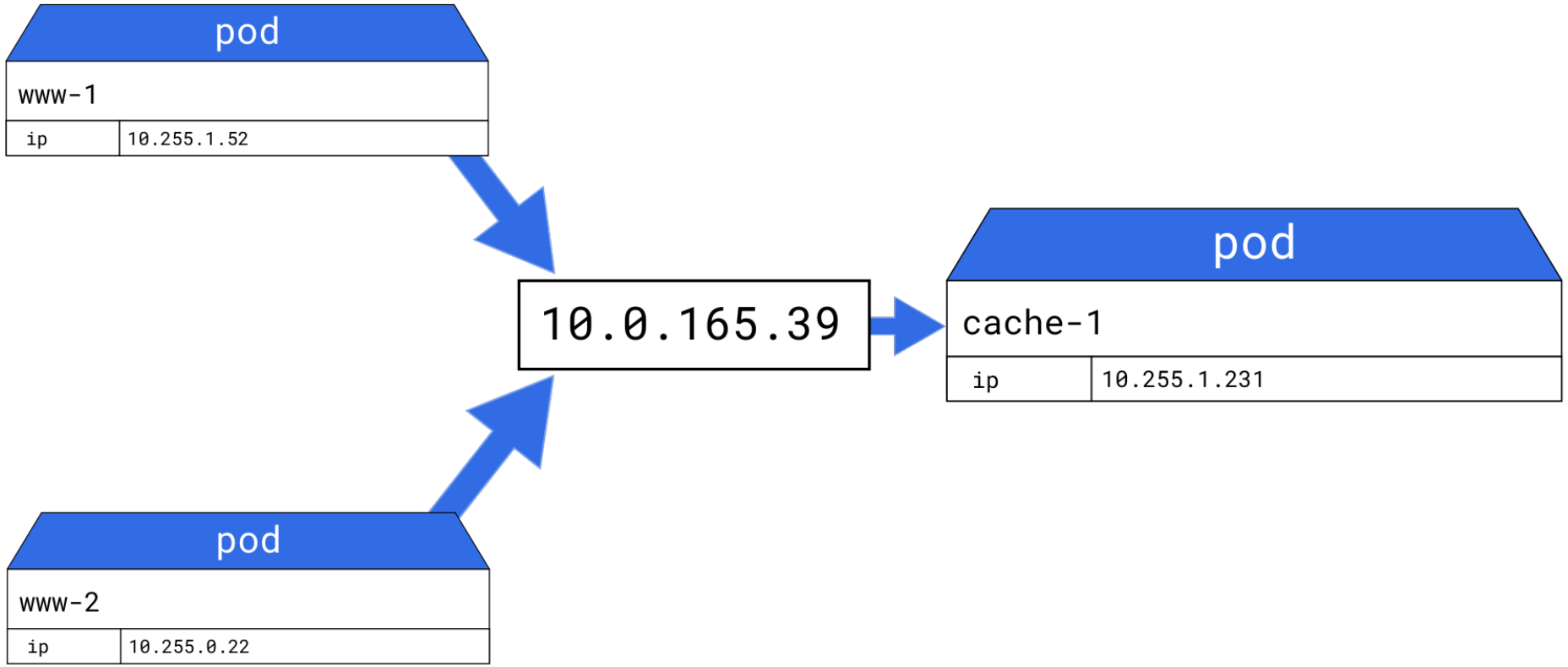
NodePort

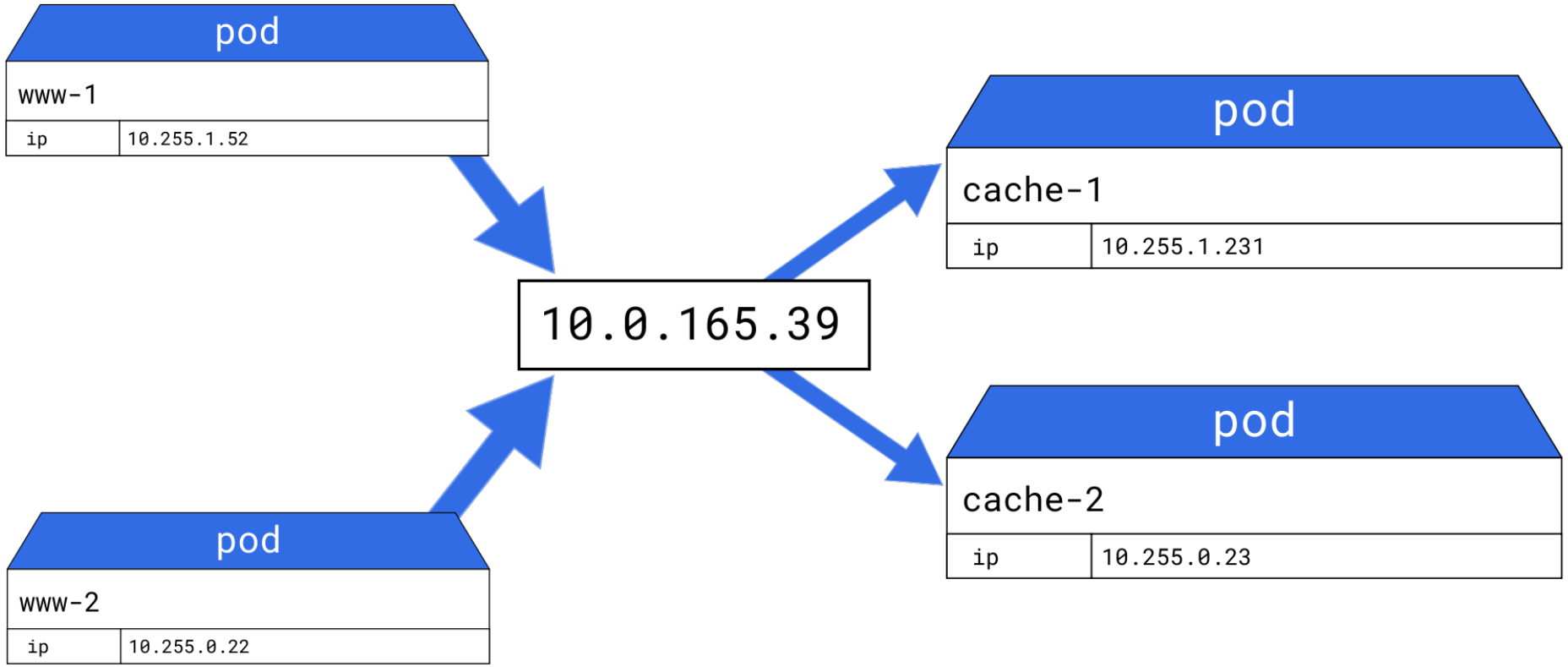


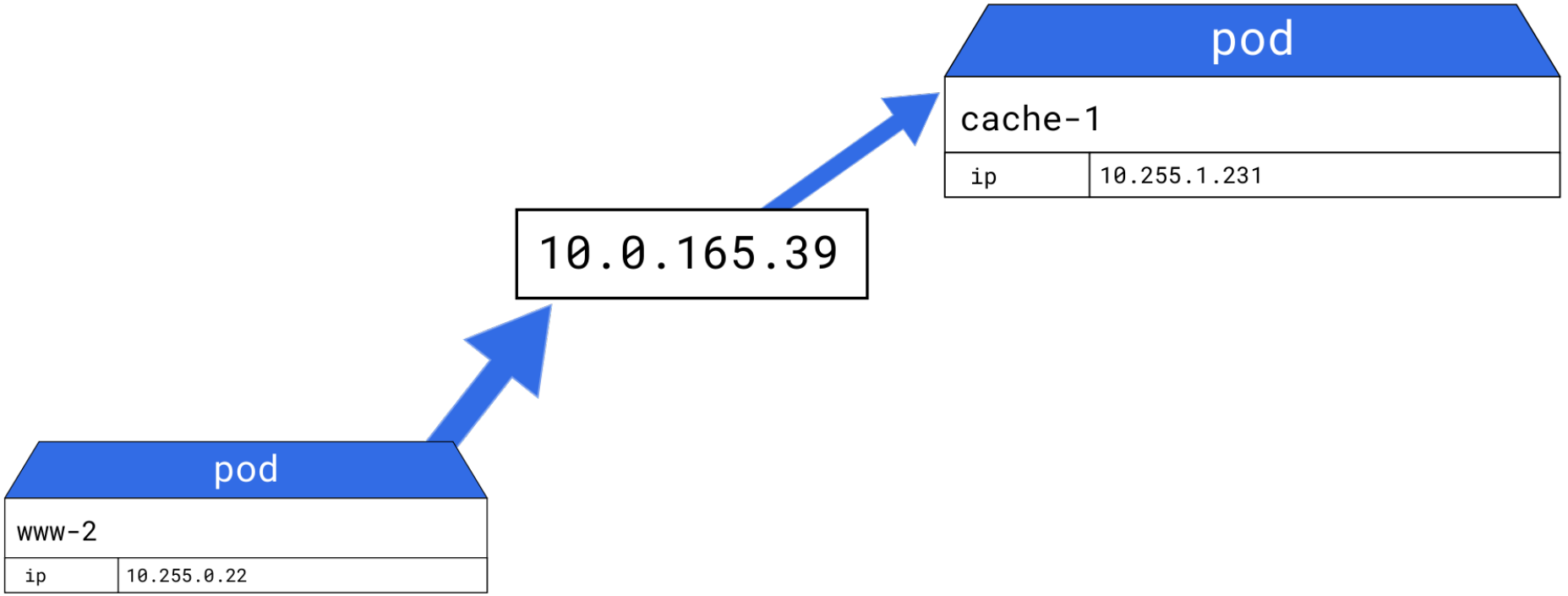

service
cache
selector
app=website, tier=cache
port
6379:6379
clusterIP
10.0.165.39
type
ClusterIP

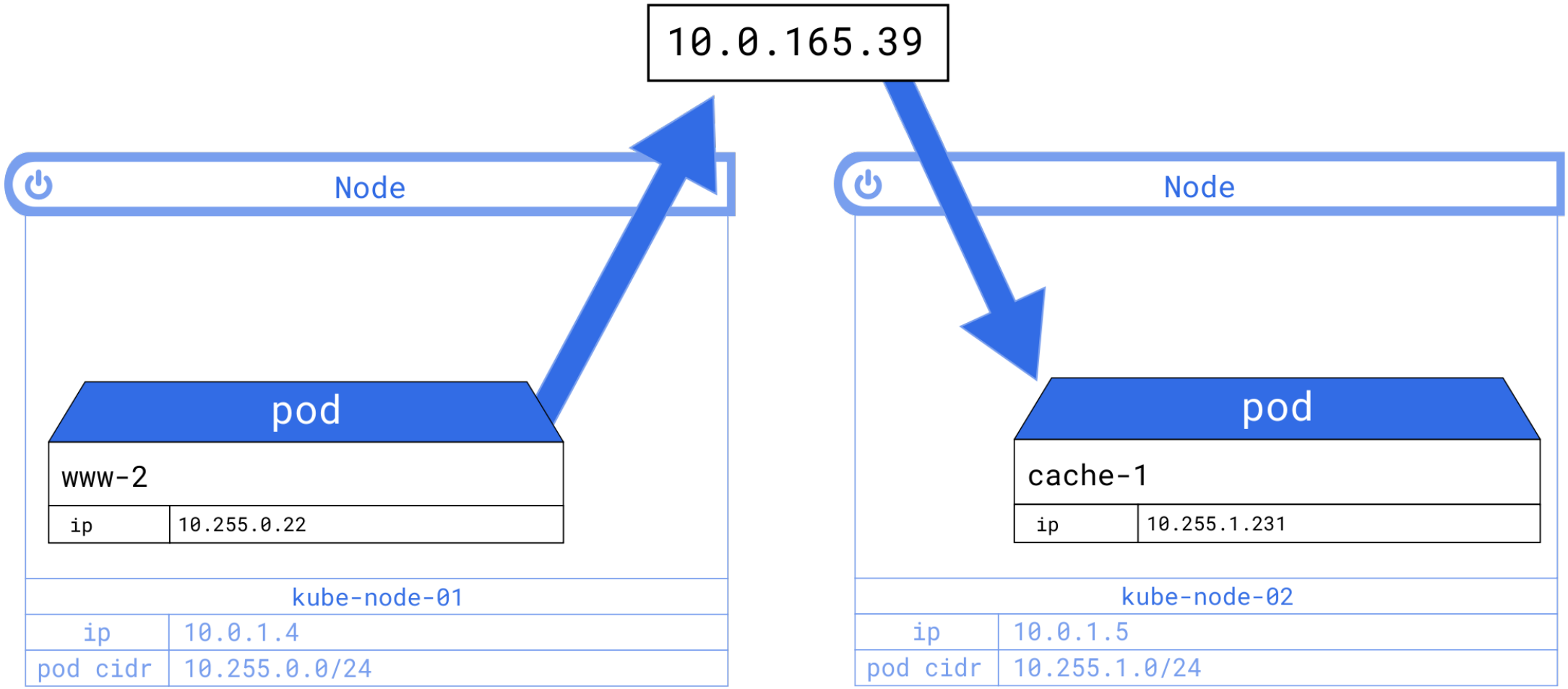

pod
www-1
ip
10.255.1.52
pod
www-2
ip
10.255.0.22
10.0.165.39
pod
cache-1
ip
10.255.1.231

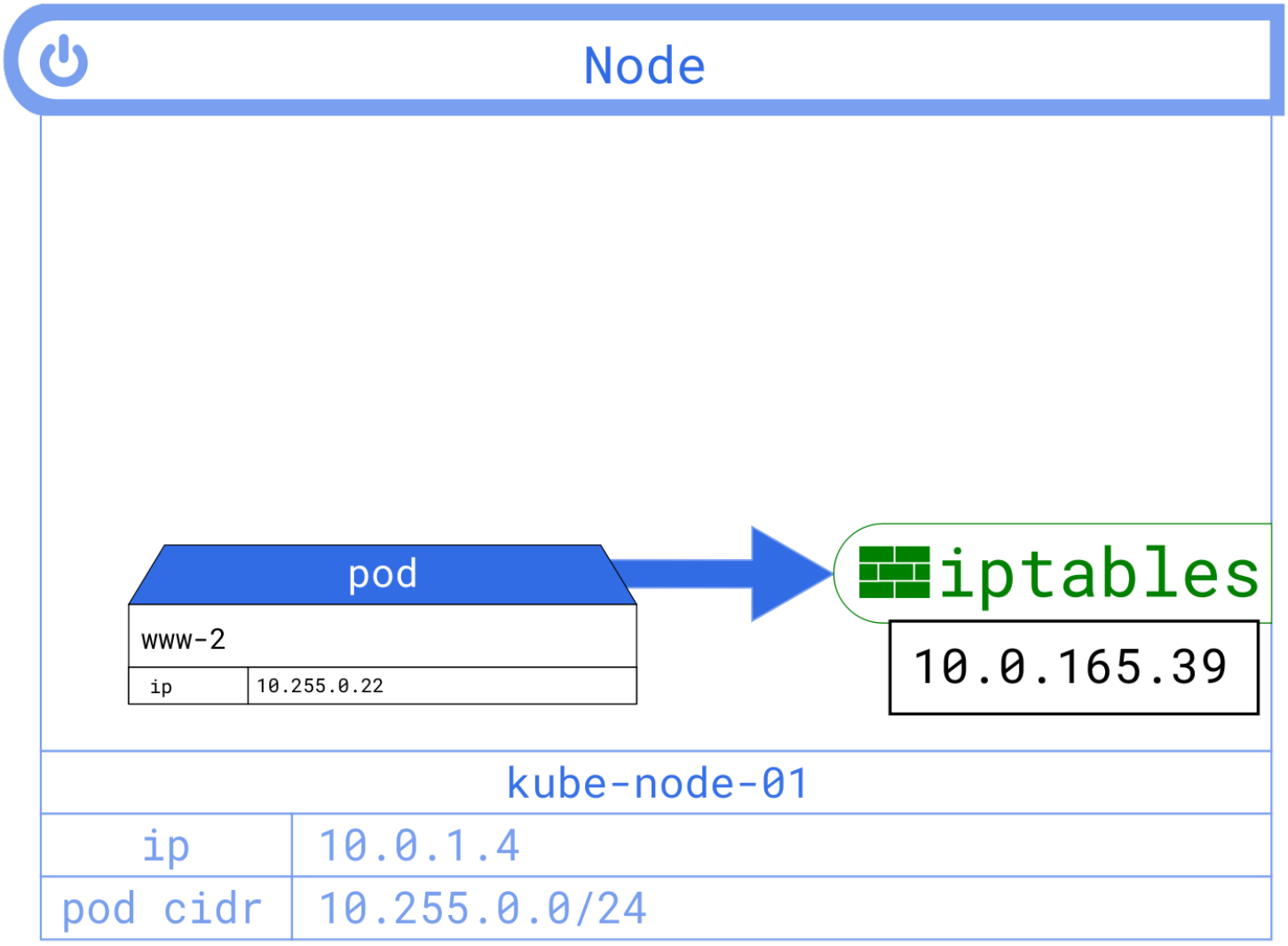

10.0.165.39
cache
cache.kube-decon
cache.kube-decon.cluster.local

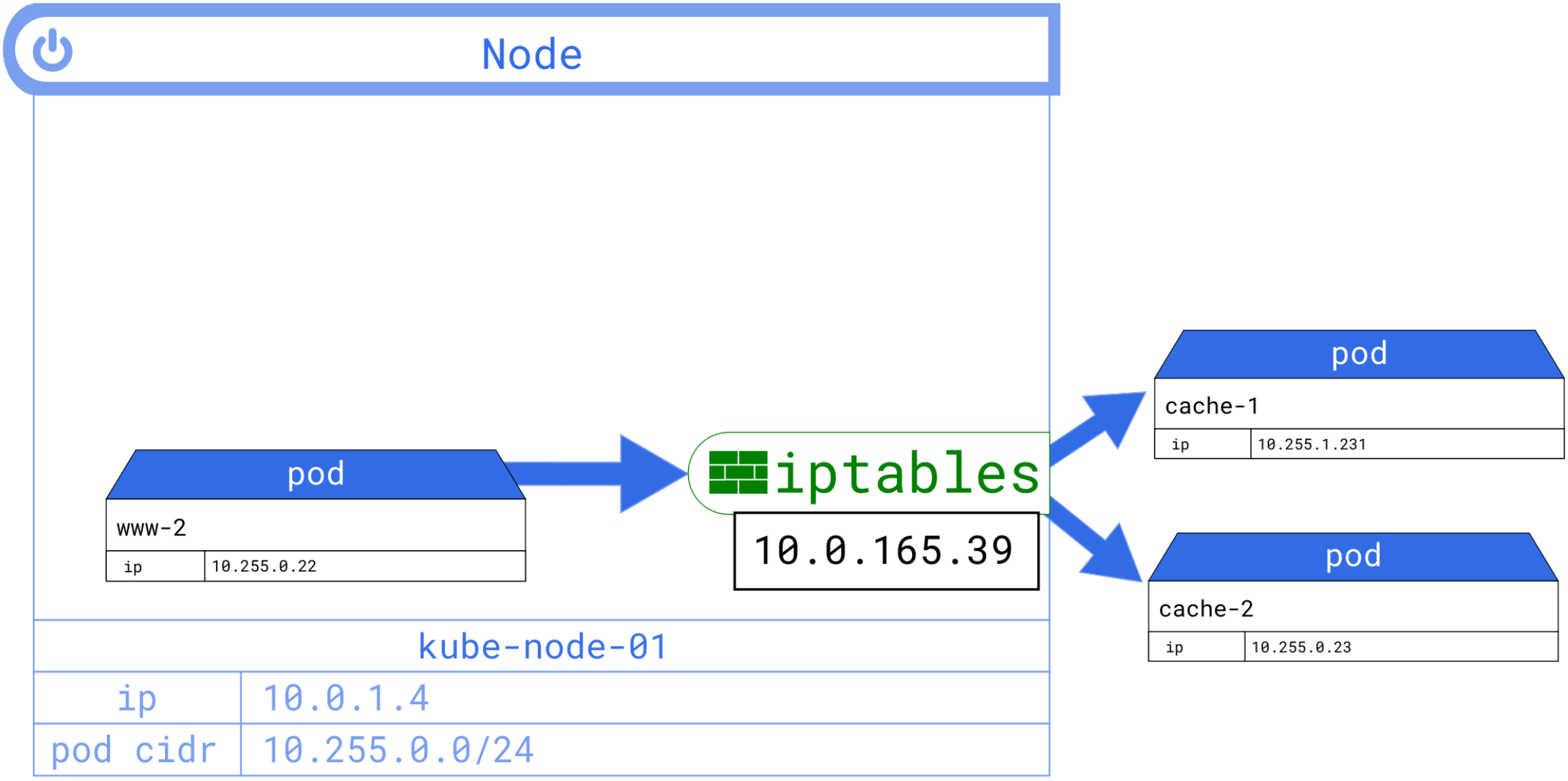

pod
www-1
ip
10.255.1.52
pod
www-2
ip
10.255.0.22
10.0.165.39
pod
cache-1
ip
10.255.1.231

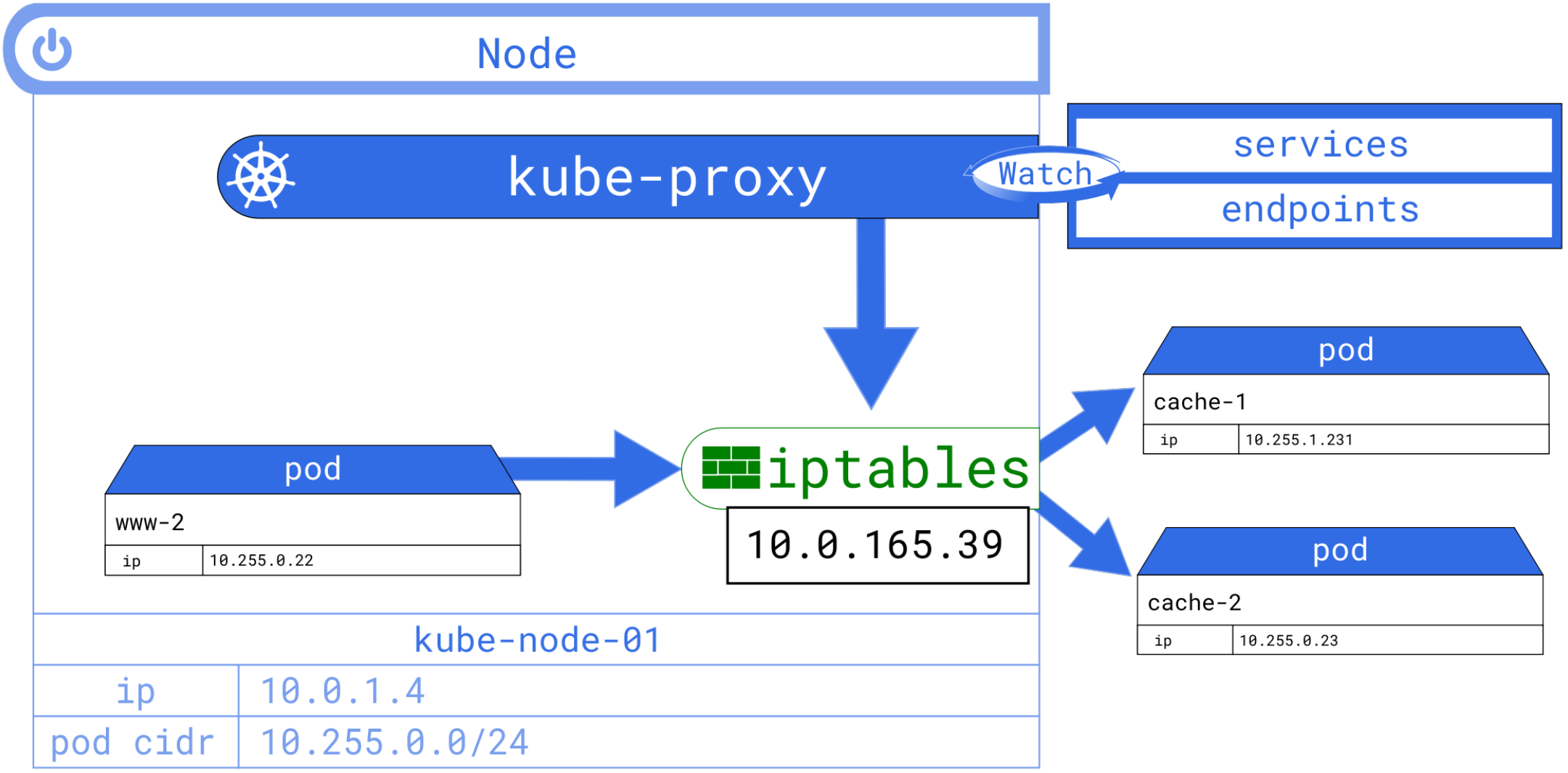

pod
www-1
ip
10.255.1.52
pod
www-2
ip
10.255.0.22
10.0.165.39
pod
cache-1
ip
10.255.1.231
pod
cache-2
ip
10.255.0.23

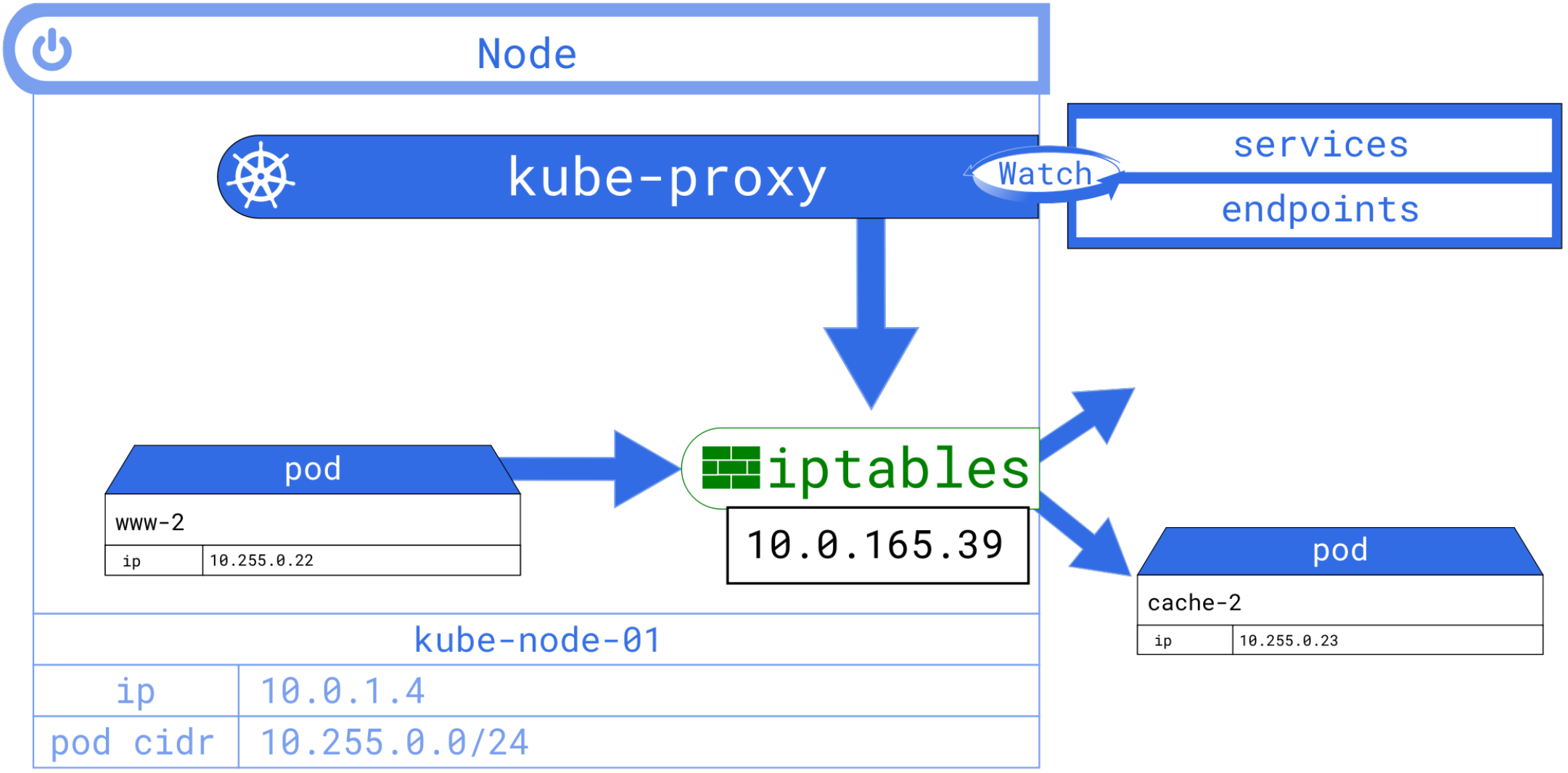

pod
cache-1
ip
10.255.1.231
10.0.165.39
pod
www-2
ip
10.255.0.22

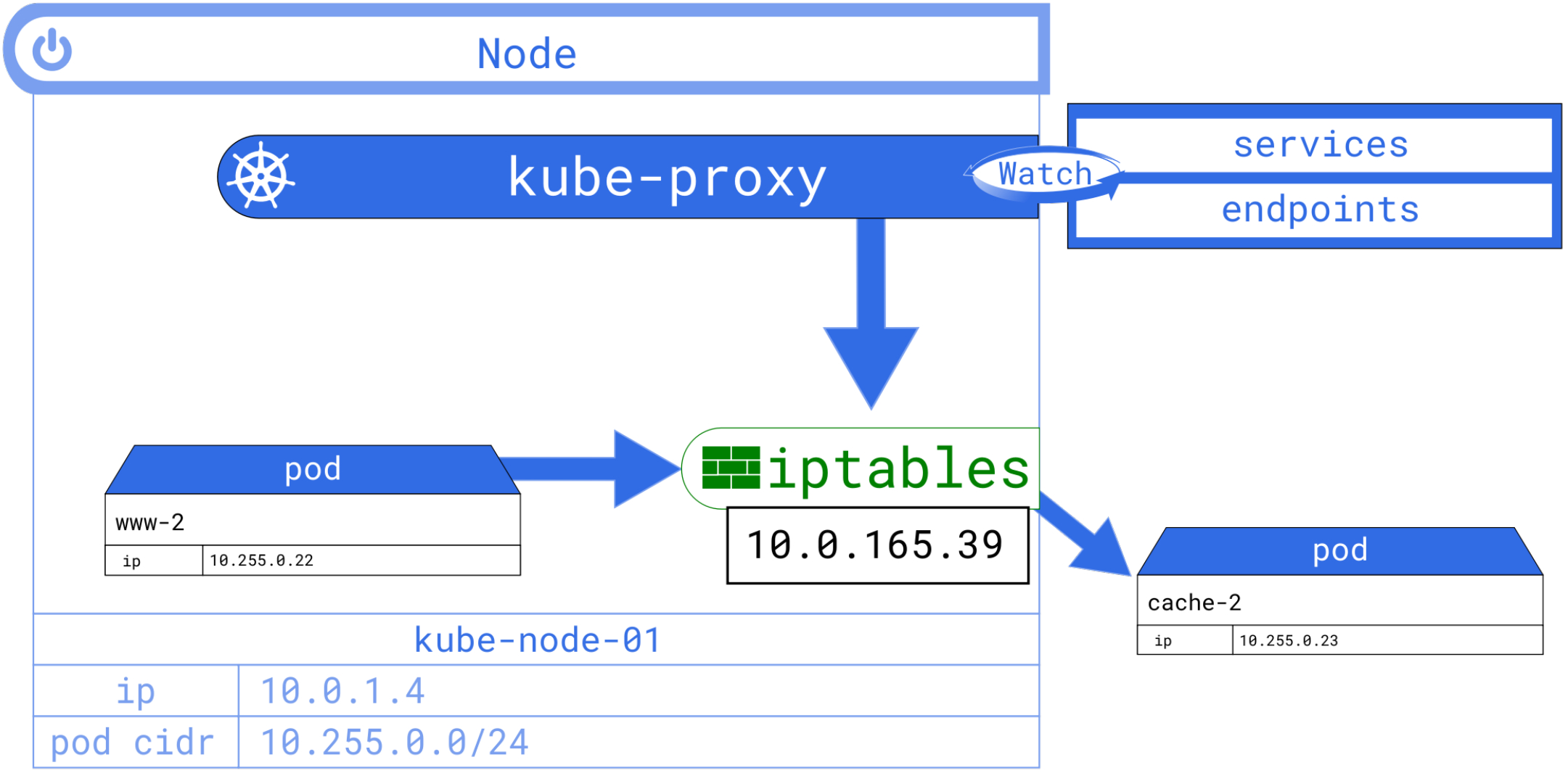

10.0.165.39
Node
pod
www-2
ip
10.255.0.22
kube-node-01
ip
10.0.1.4
pod cidr
10.255.0.0/24
Node
pod
cache-1
ip
10.255.1.231
kube-node-02
ip
10.0.1.5
pod cidr
10.255.1.0/24

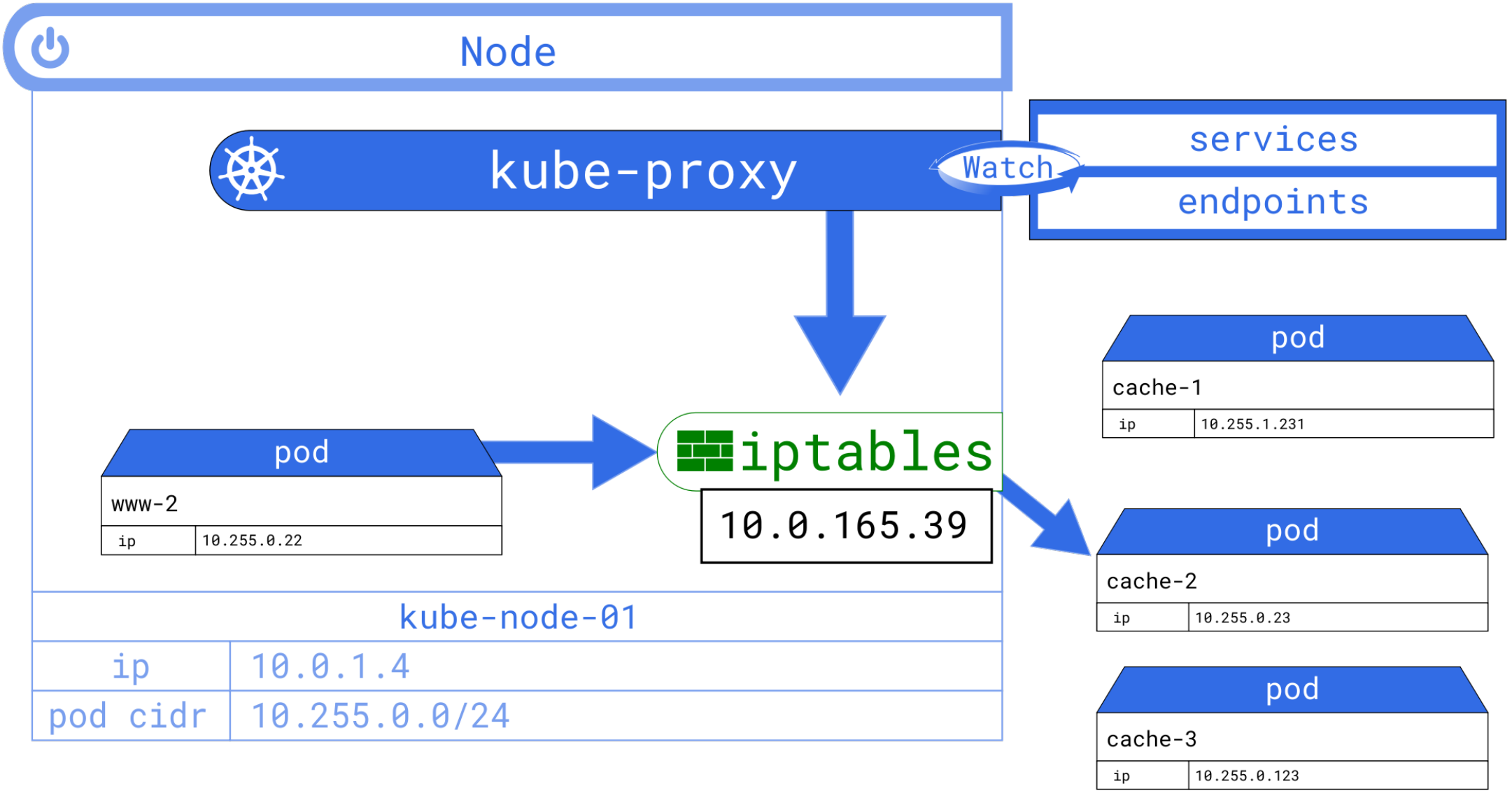

Node
pod
www-2
ip
10.255.0.22
iptables
10.0.165.39
kube-node-01
ip
10.0.1.4
pod cidr
10.255.0.0/24

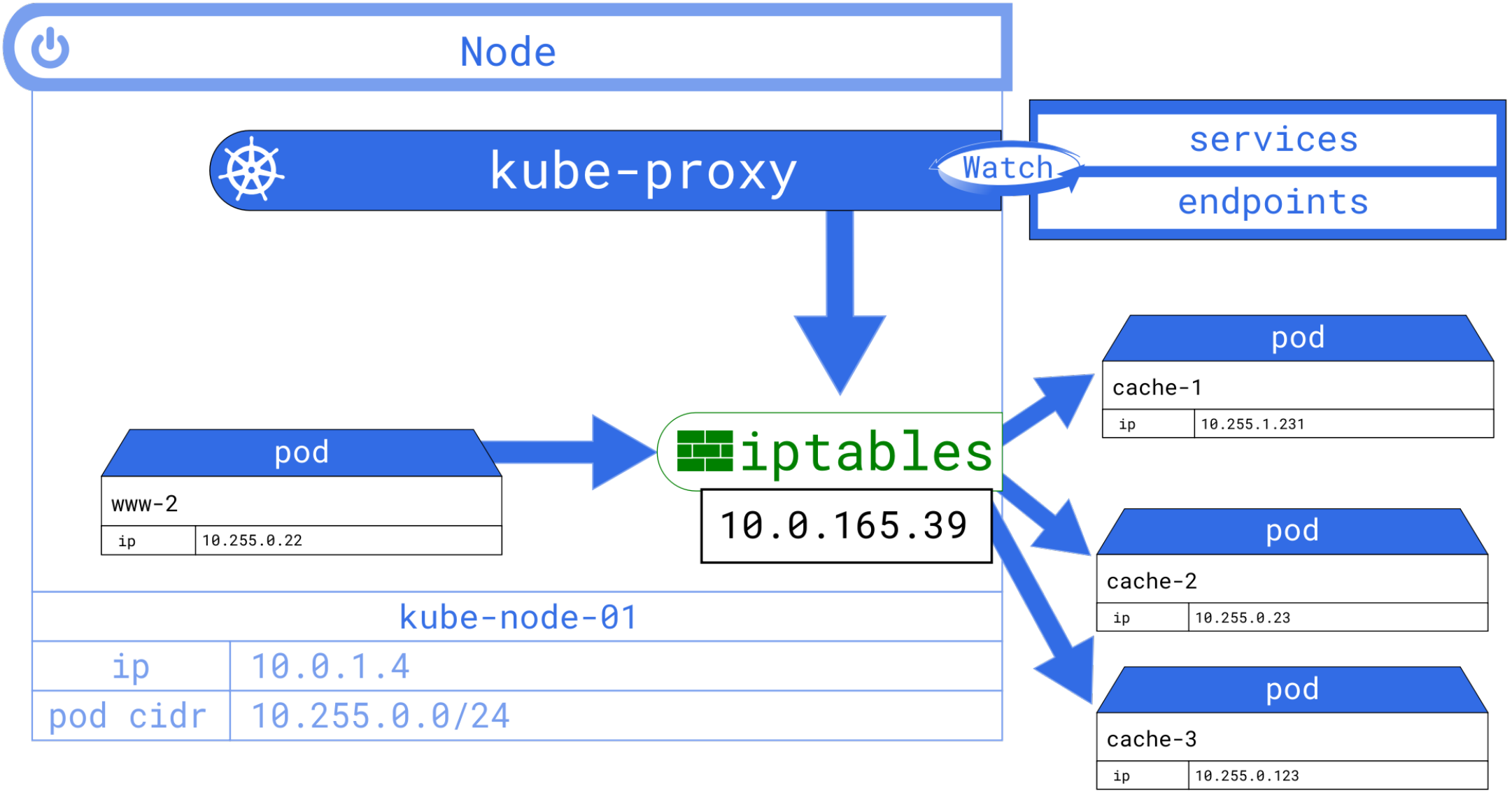

Node
pod
www-2
ip
10.255.0.22
iptables
10.0.165.39
pod
cache-1
ip
10.255.1.231
pod
cache-2
ip
10.255.0.23
kube-node-01
ip
10.0.1.4
pod cidr
10.255.0.0/24


Node
kube-proxy
Watch
services
endpoints
pod
www-2
ip
10.255.0.22
iptables
10.0.165.39
pod
cache-1
ip
10.255.1.231
pod
cache-2
ip
10.255.0.23
kube-node-01
ip
10.0.1.4
pod cidr
10.255.0.0/24


Node
kube-proxy
Watch
services
endpoints
pod
www-2
ip
10.255.0.22
iptables
10.0.165.39
pod
cache-2
ip
10.255.0.23
kube-node-01
ip
10.0.1.4
pod cidr
10.255.0.0/24

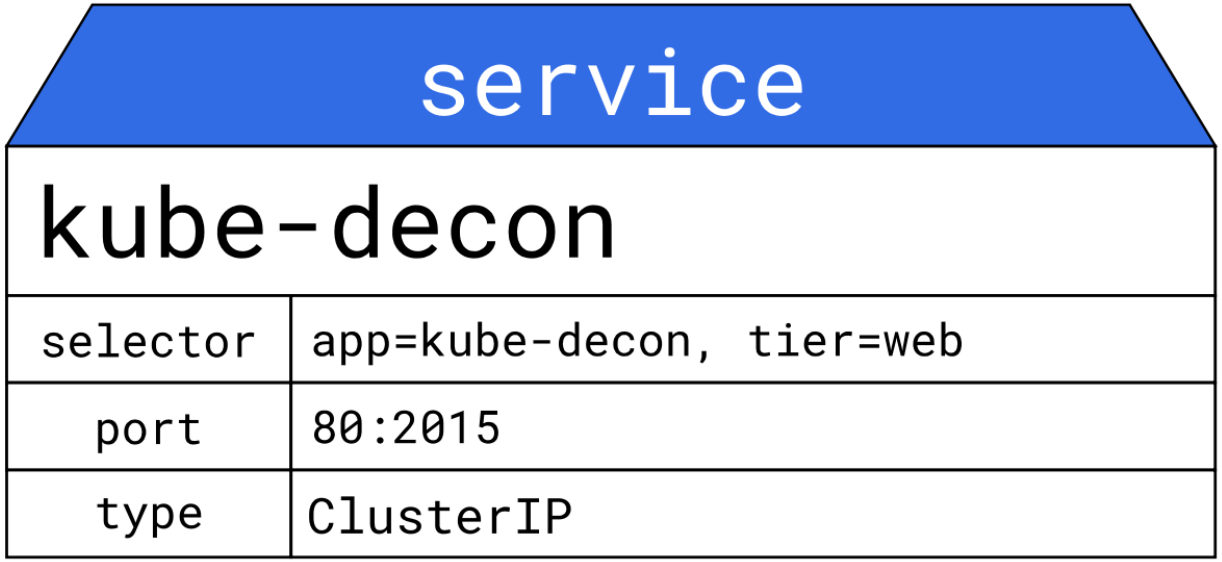

Node
kube-proxy
Watch
services
endpoints
pod
www-2
ip
10.255.0.22
iptables
10.0.165.39
pod
cache-2
ip
10.255.0.23
kube-node-01
ip
10.0.1.4
pod cidr
10.255.0.0/24


Node
kube-proxy
Watch
services
endpoints
pod
cache-1
ip
10.255.1.231
pod
www-2
ip
10.255.0.22
iptables
10.0.165.39
pod
cache-2
ip
10.255.0.23
pod
cache-3
ip
10.255.0.123
kube-node-01
ip
10.0.1.4
pod cidr
10.255.0.0/24


Node
kube-proxy
Watch
services
endpoints
pod
www-2
ip
10.255.0.22
iptables
10.0.165.39
pod
cache-1
ip
10.255.1.231
pod
cache-2
ip
10.255.0.23
pod
cache-3
ip
10.255.0.123
kube-node-01
ip
10.0.1.4
pod cidr
10.255.0.0/24

LoadBalancer

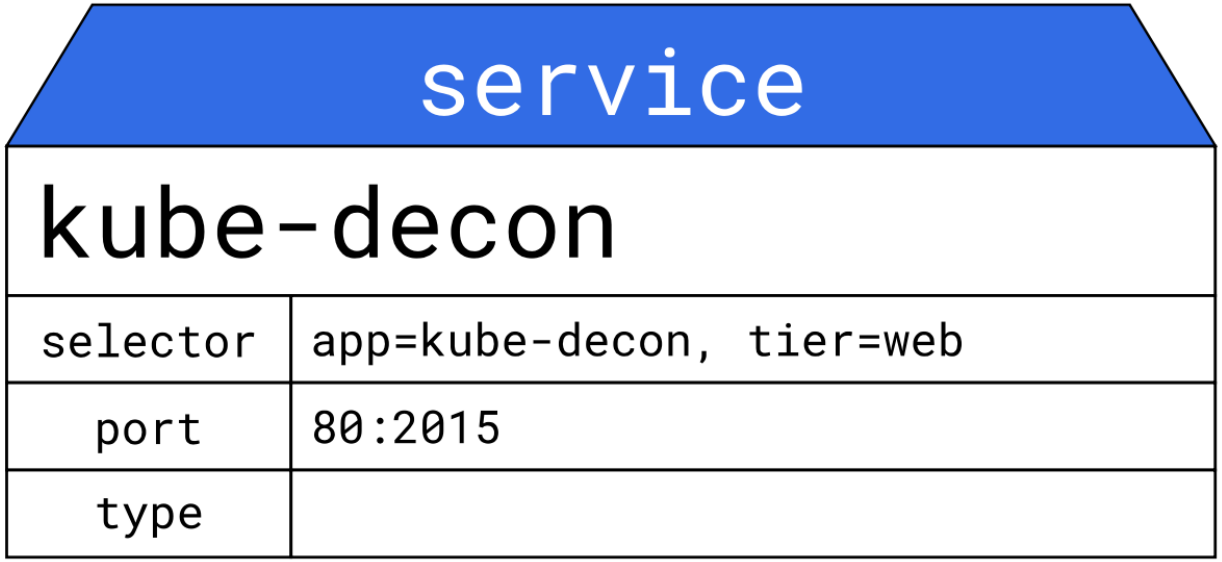
NodePort



LoadBalancer

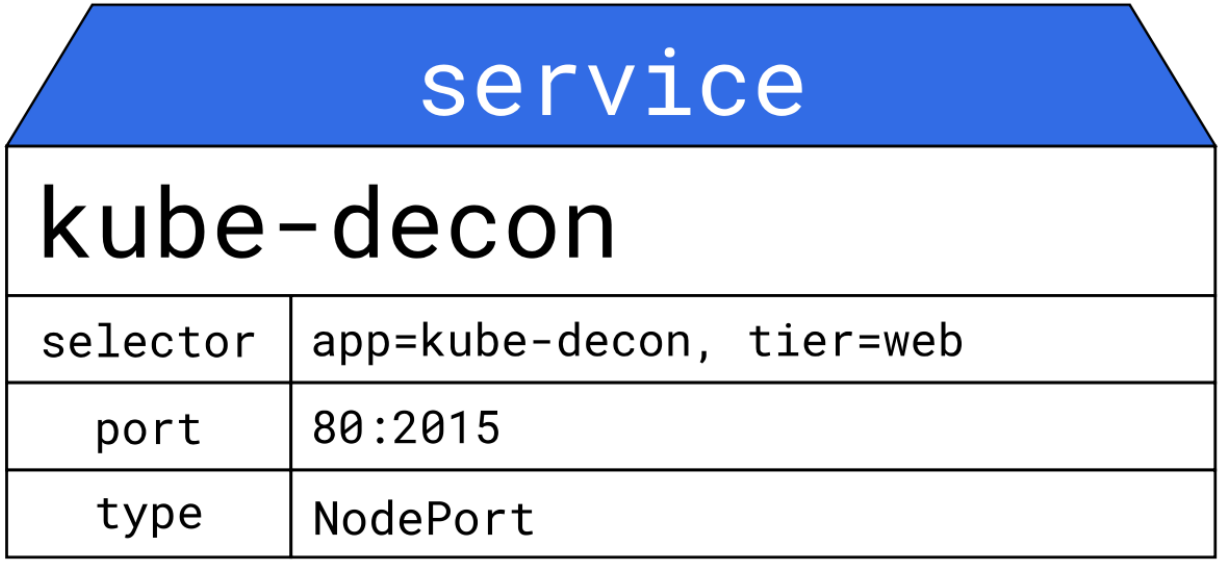
NodePort

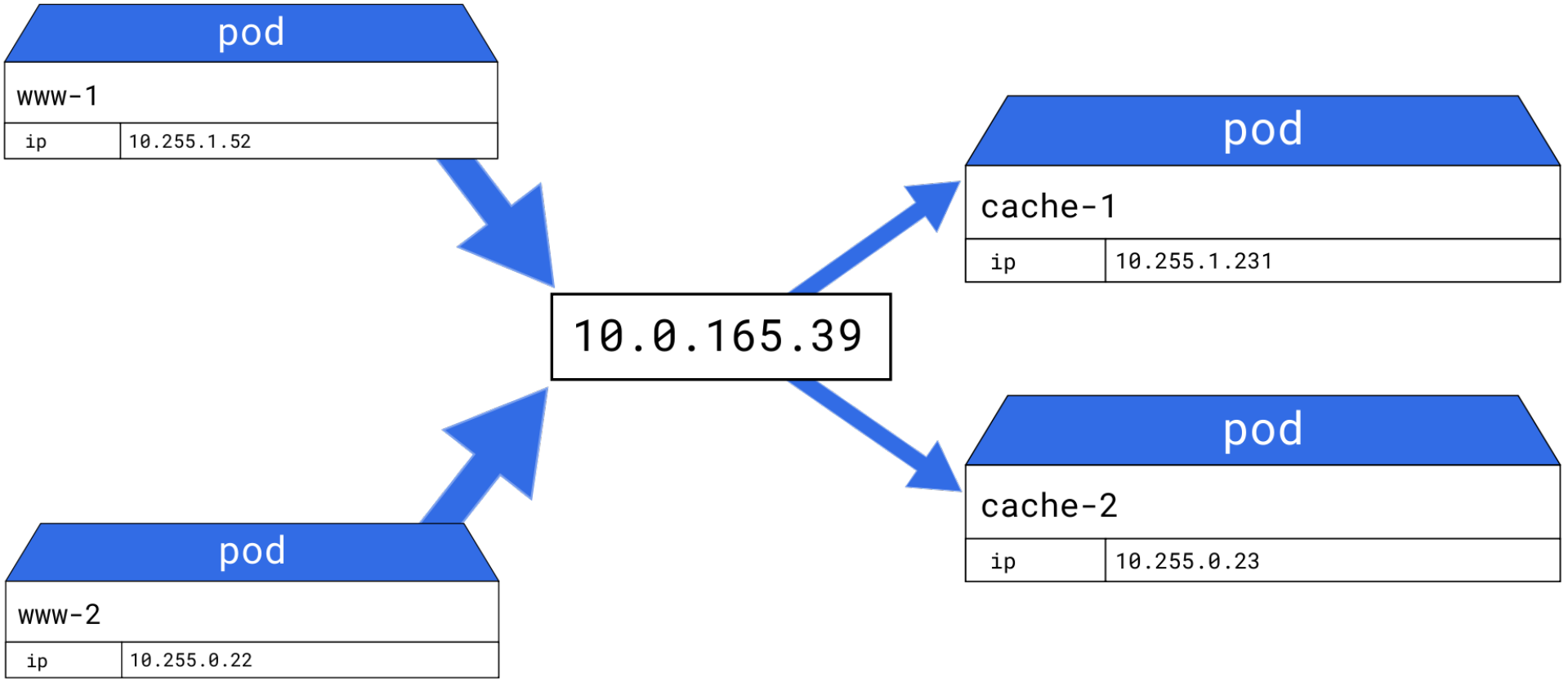
ClusterIP

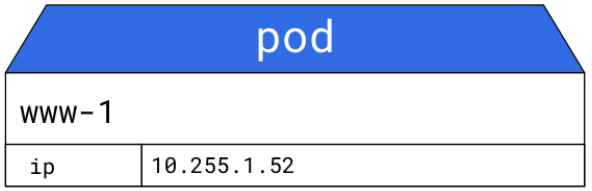


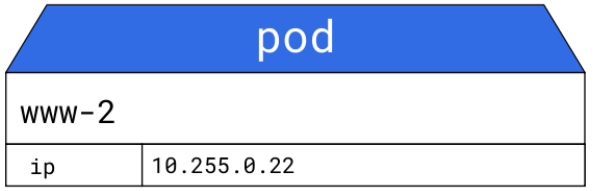
LoadBalancer

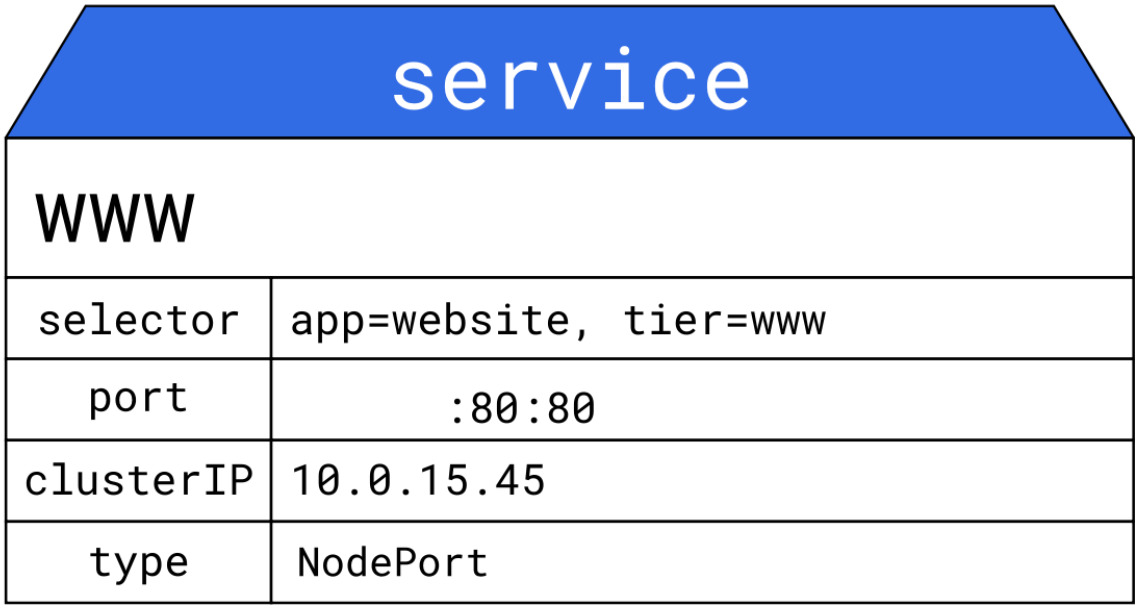
ClusterIP

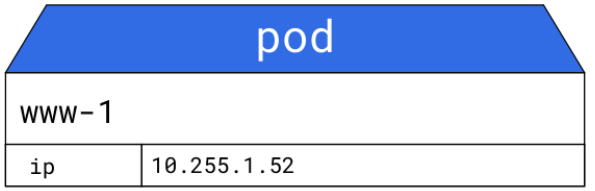


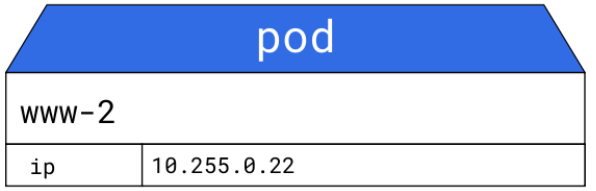

pod
www-1
ip
10.255.1.52
pod
www-2
ip
10.255.0.22
10.0.165.39
pod
cache-1
ip
10.255.1.231
pod
cache-2
ip
10.255.0.23

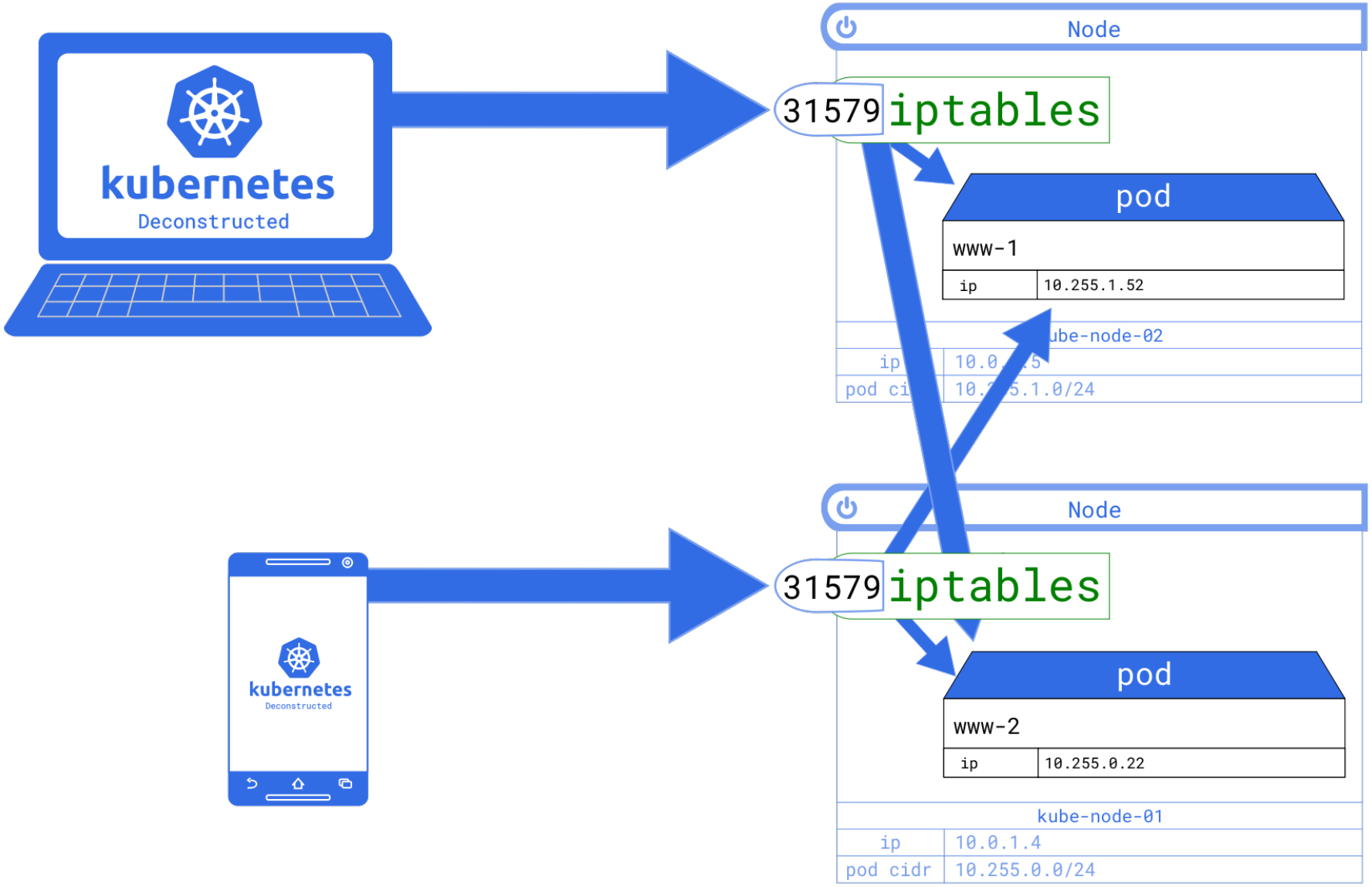

pod
www-1
ip
10.255.1.52


pod
www-2
ip
10.255.0.22

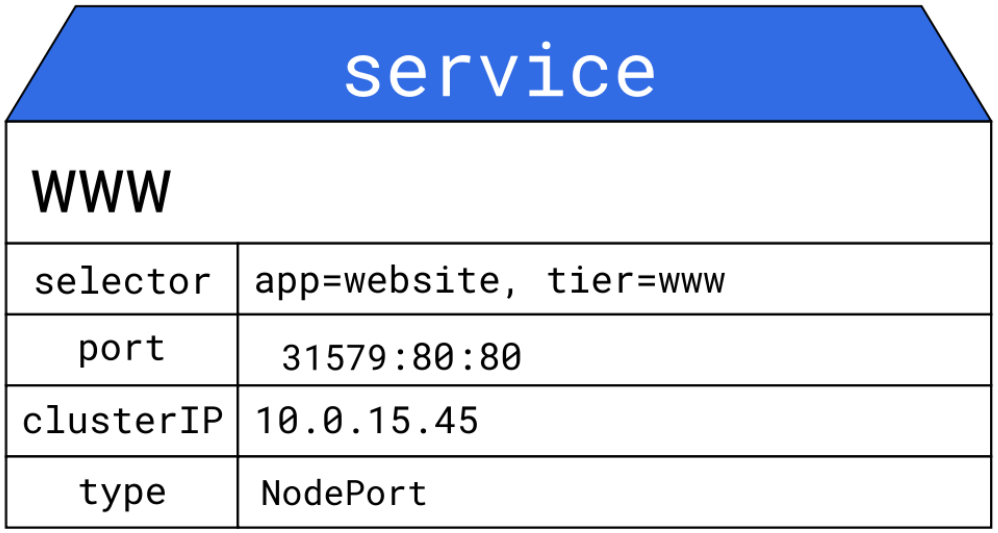

service
WWW
selector
app=website, tier=www
port
:80:80
clusterIP
10.0.15.45
type
NodePort


pod
www-1
ip
10.255.1.52


pod
www-2
ip
10.255.0.22


kubernetes
Deconstructed
Node
31579
iptables
pod
www-1
ip
10.255.1.52
ip
pod ci
10.255.1.0/24
kubernetes
Deconstructed
Node
31579
iptables
pod
www-2
ip
10.255.0.22
kube-node-01
ip
10.0.1.4
pod cidr
10.255.0.0/24

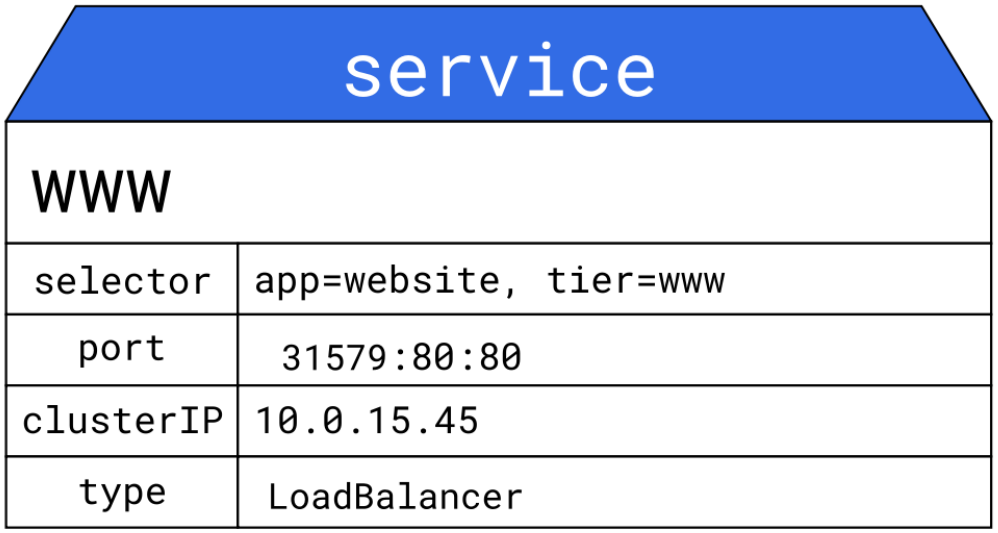
LoadBalancer

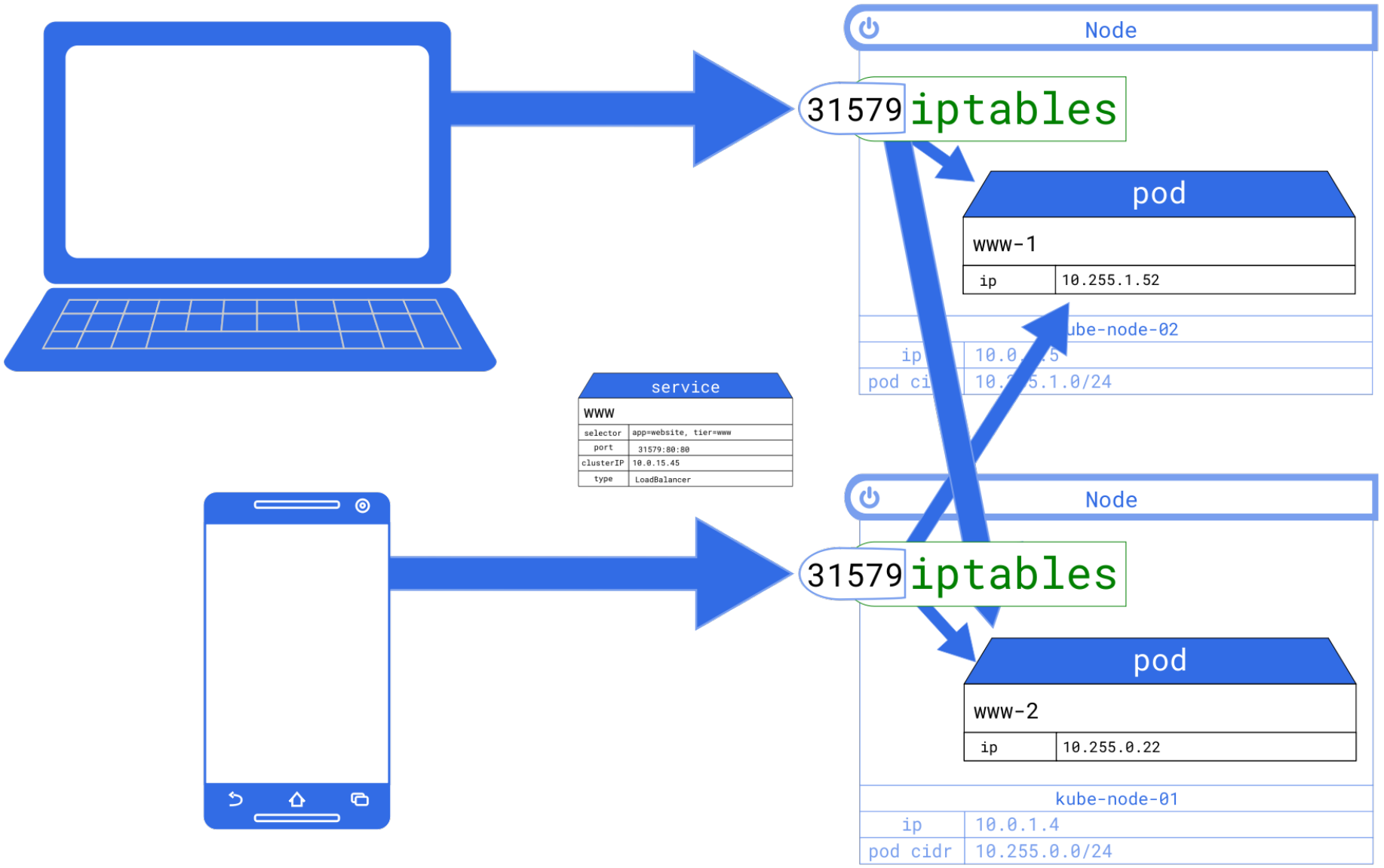


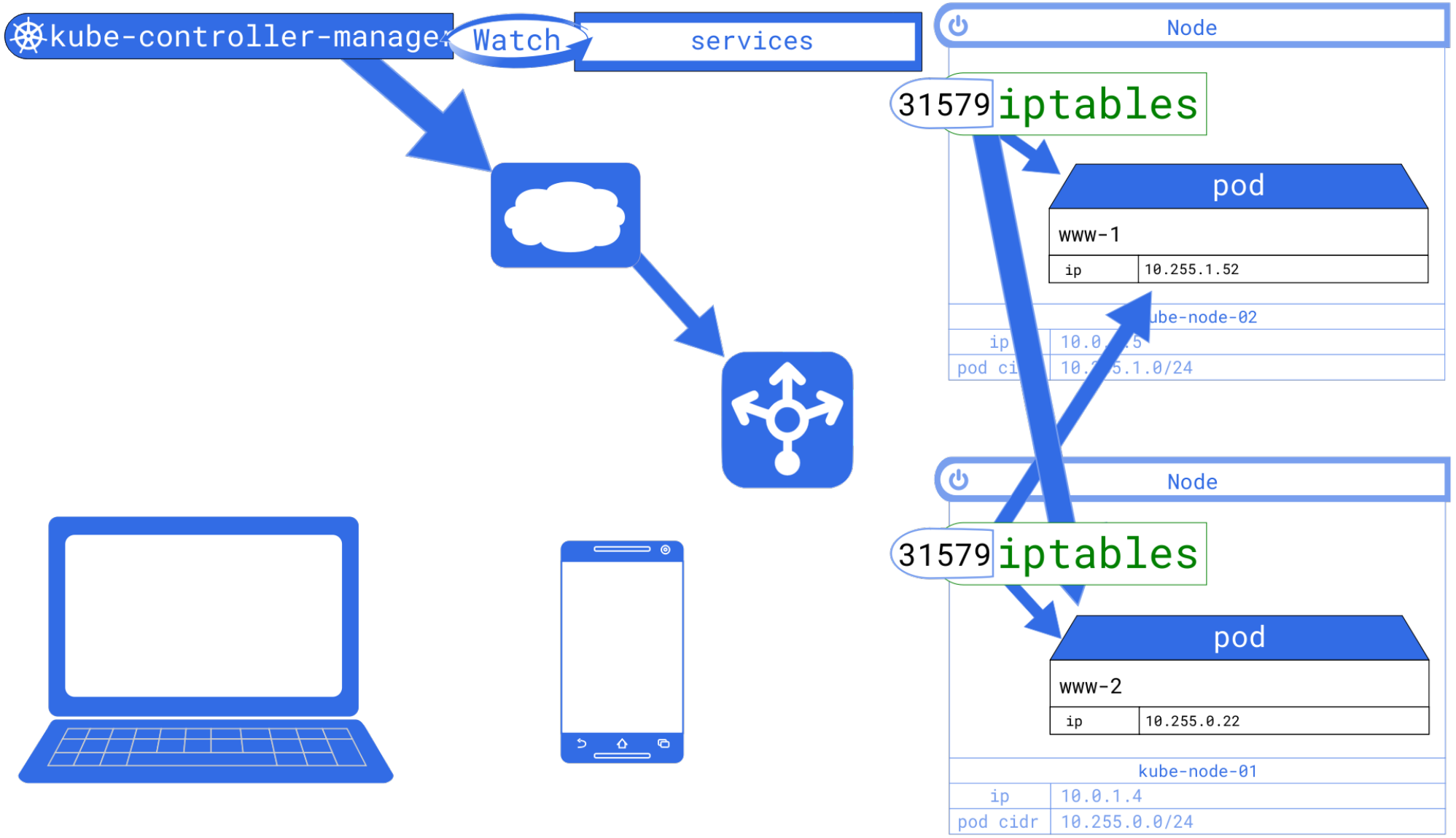
ClusterIP

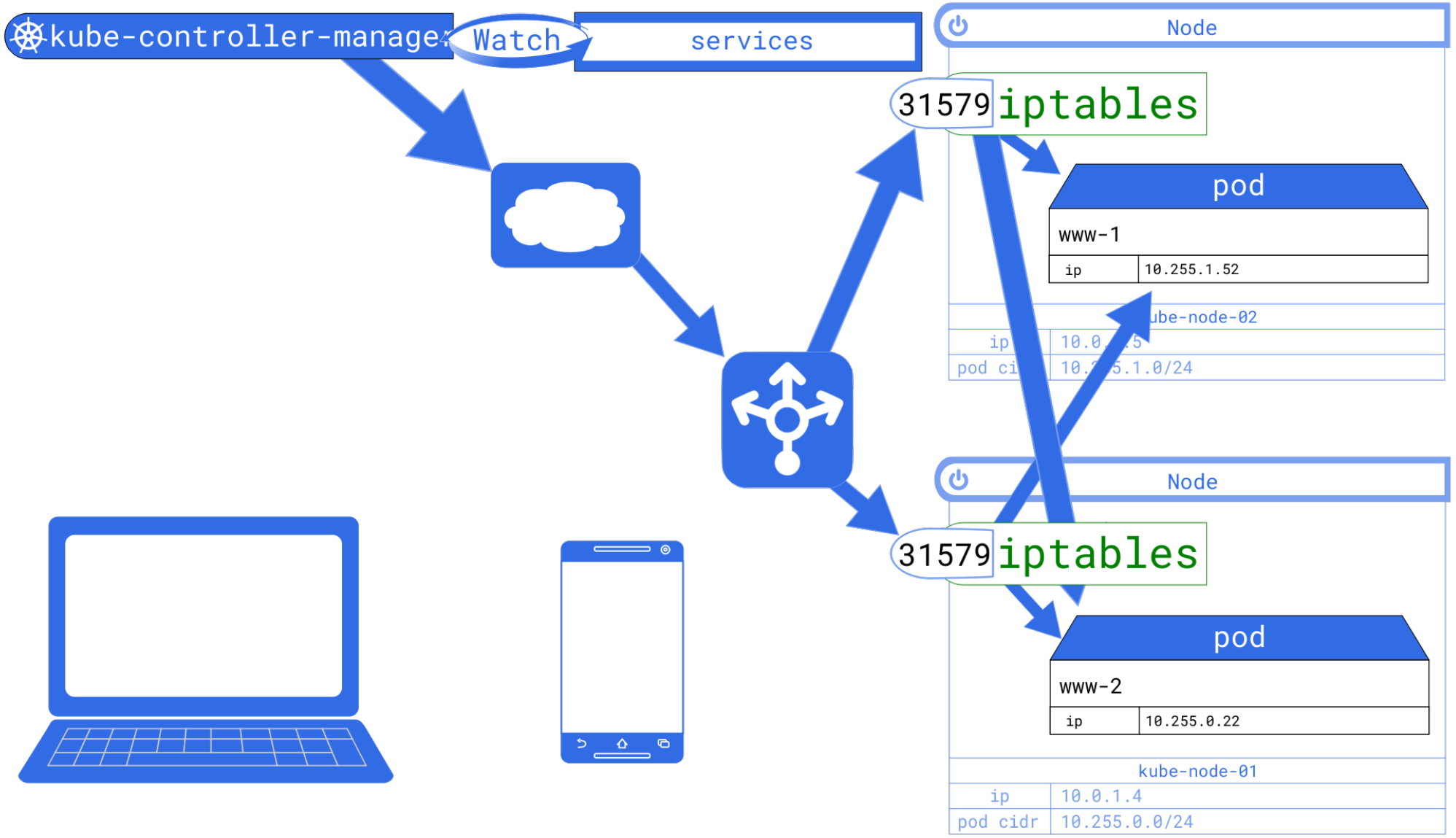
NodePort

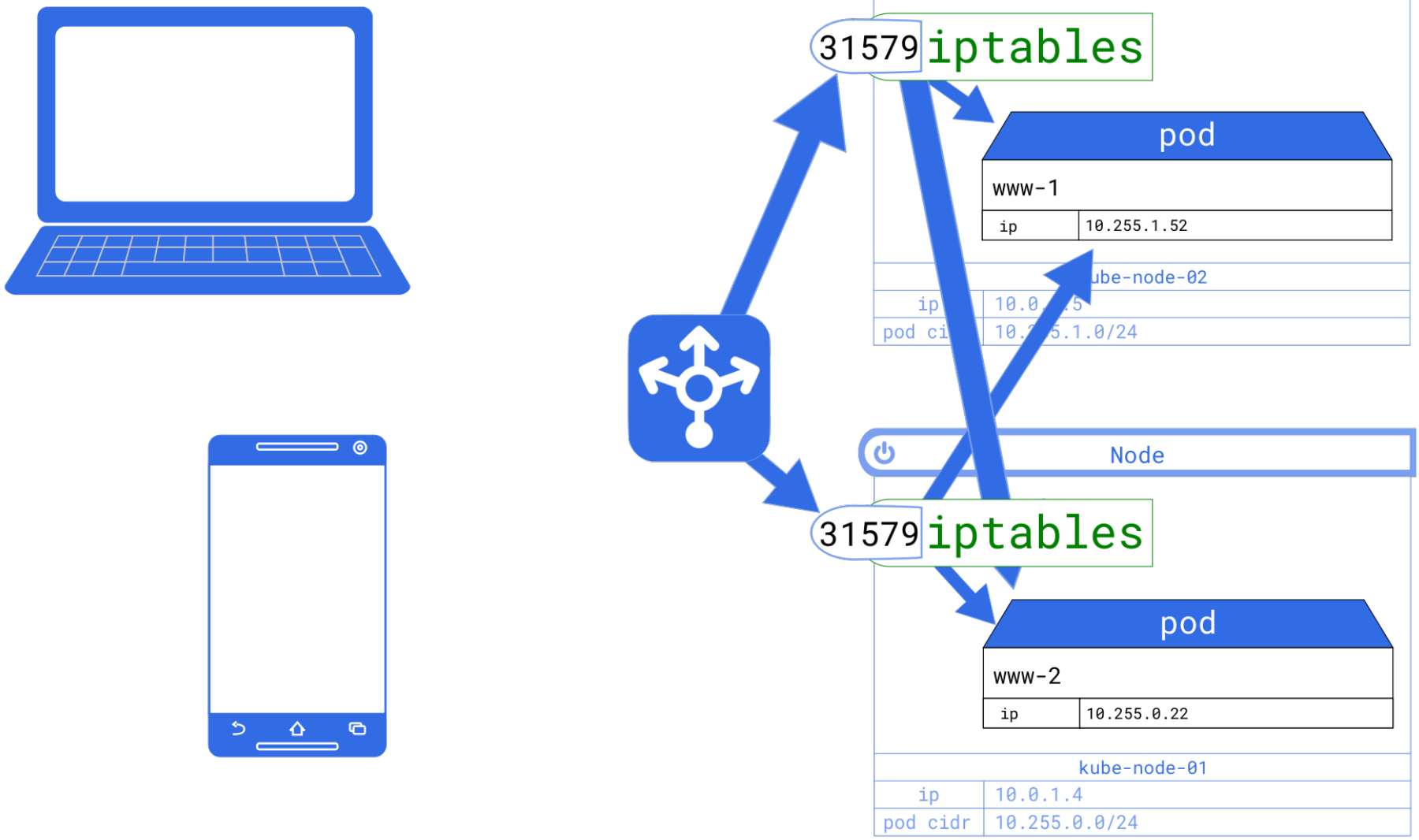
ClusterIP

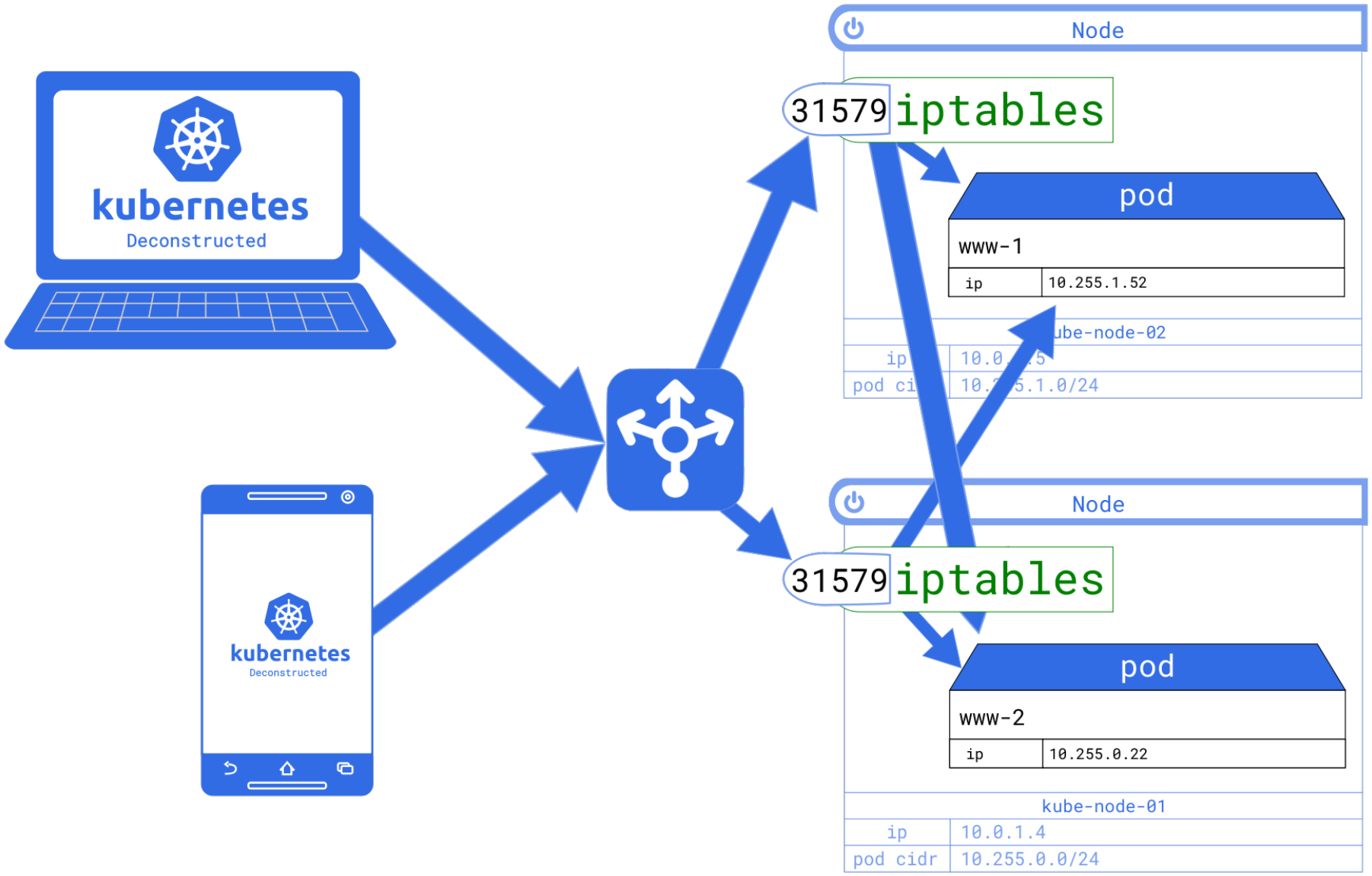



Node
31579
iptables
pod
www-1
ip
10.255.1.52
ip
pod ci
service
WWW
selector
app=website, tier=www
port
31579:80:80
clusterIP
10.0.15.45
type
LoadBalancer
Node
31579
iptables
pod
www-2
ip
10.255.0.22
kube-node-01
ip
10.0.1.4
pod cidr
10.255.0.0/24

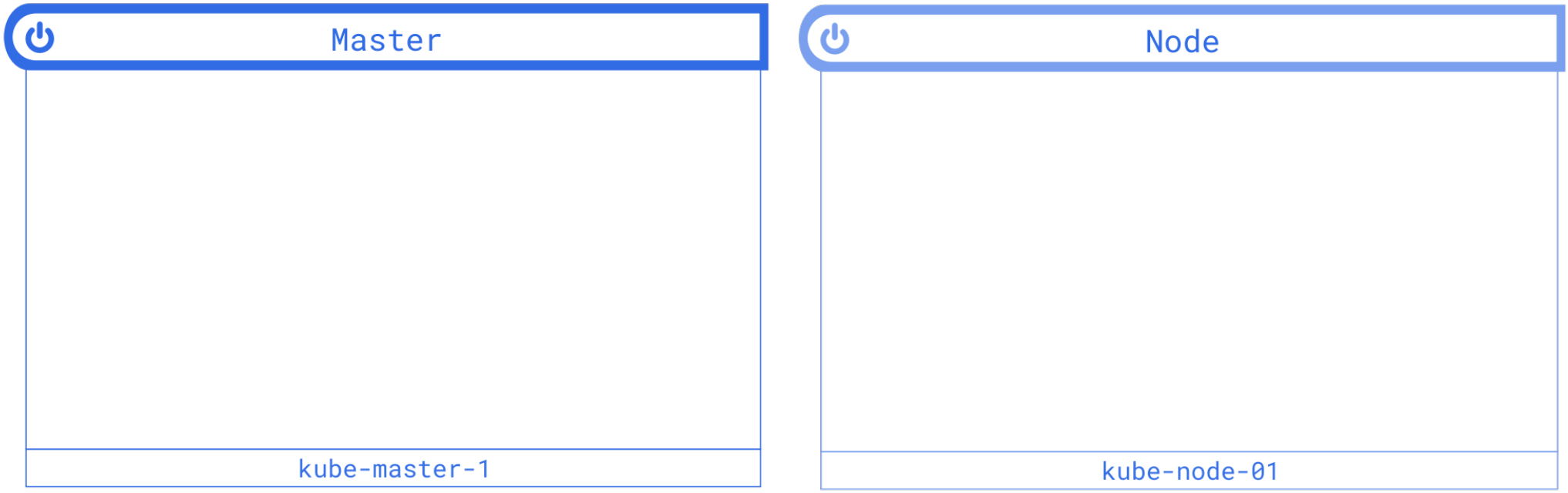

kube-controller-manager
Watch
services
Node
31579
iptables
pod
www-1
ip
10.255.1.52
ip
pod ci
Node
31579
iptables
pod
www-2
ip
10.255.0.22
kube-node-01
ip
10.0.1.4
pod cidr
10.255.0.0/24

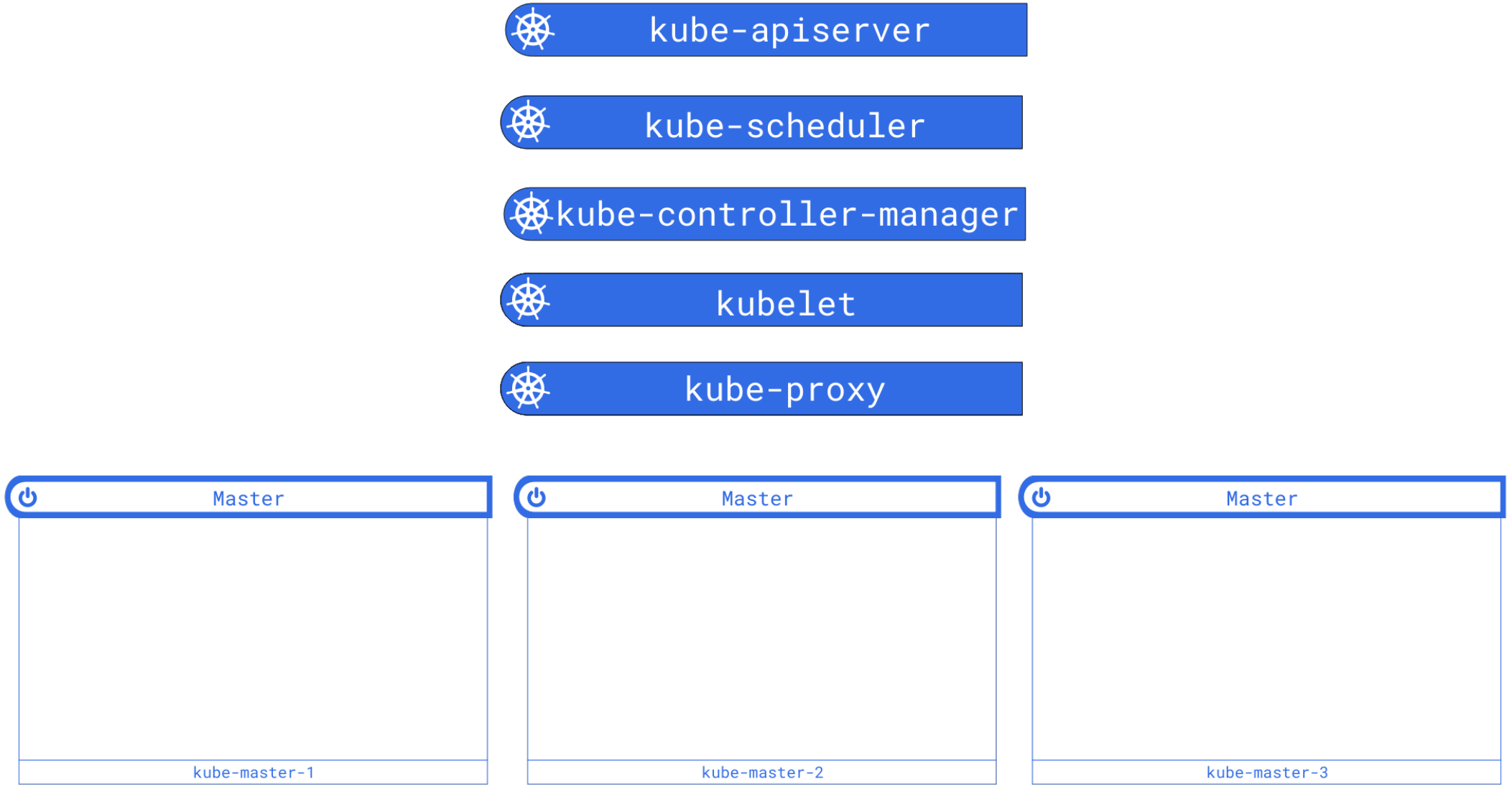

kube-controller-manager
Watch
services
Node
31579
iptables
pod
www-1
ip
10.255.1.52
ip
pod ci
Node
31579
iptables
pod
www-2
ip
10.255.0.22
kube-node-01
ip
10.0.1.4
pod cidr
10.255.0.0/24

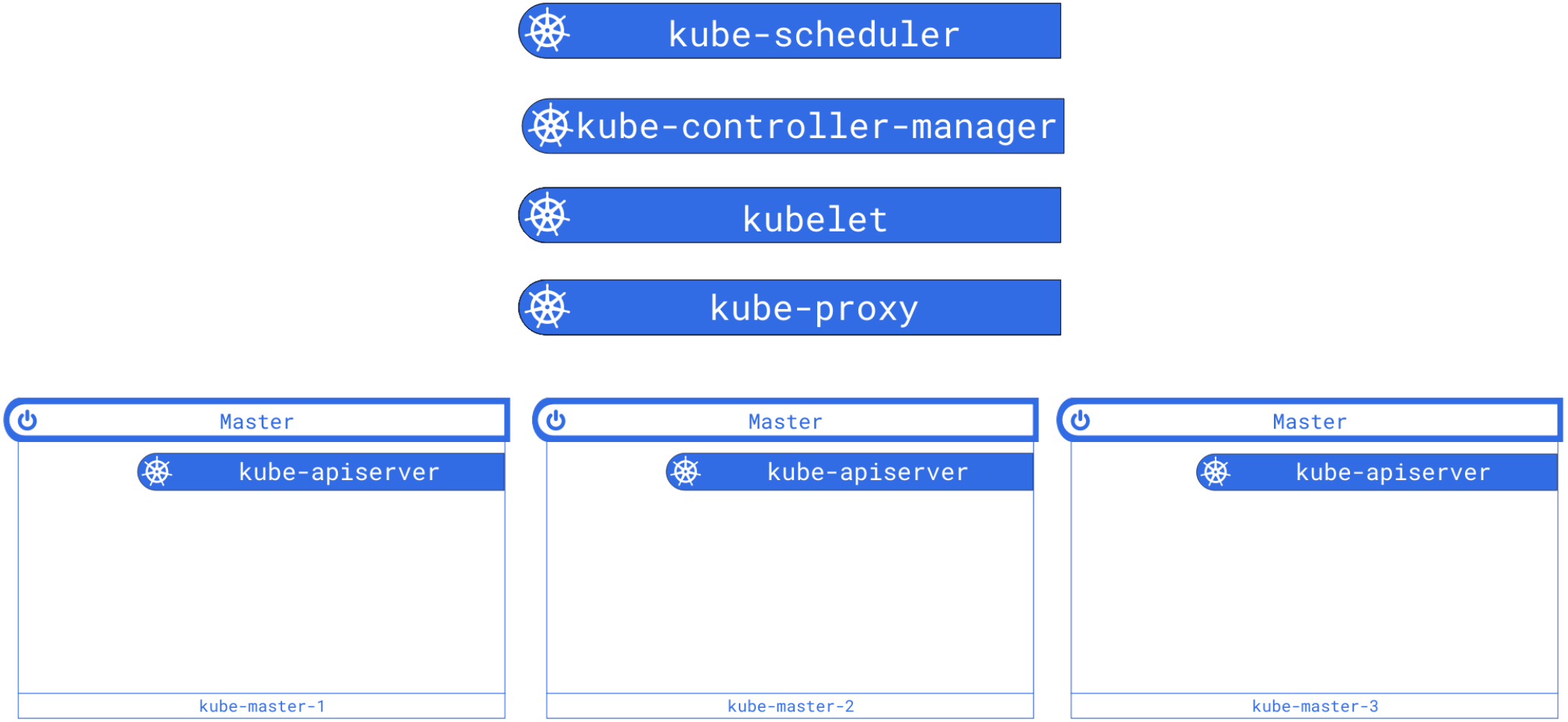

Node
31579
iptables
pod
www-1
ip
10.255.1.52
ip
pod ci
5.1.0/24
Node
31579
iptables
pod
www-2
ip
10.255.0.22
kube-node-01
ip
10.0.1.4
pod cidr
10.255.0.0/24

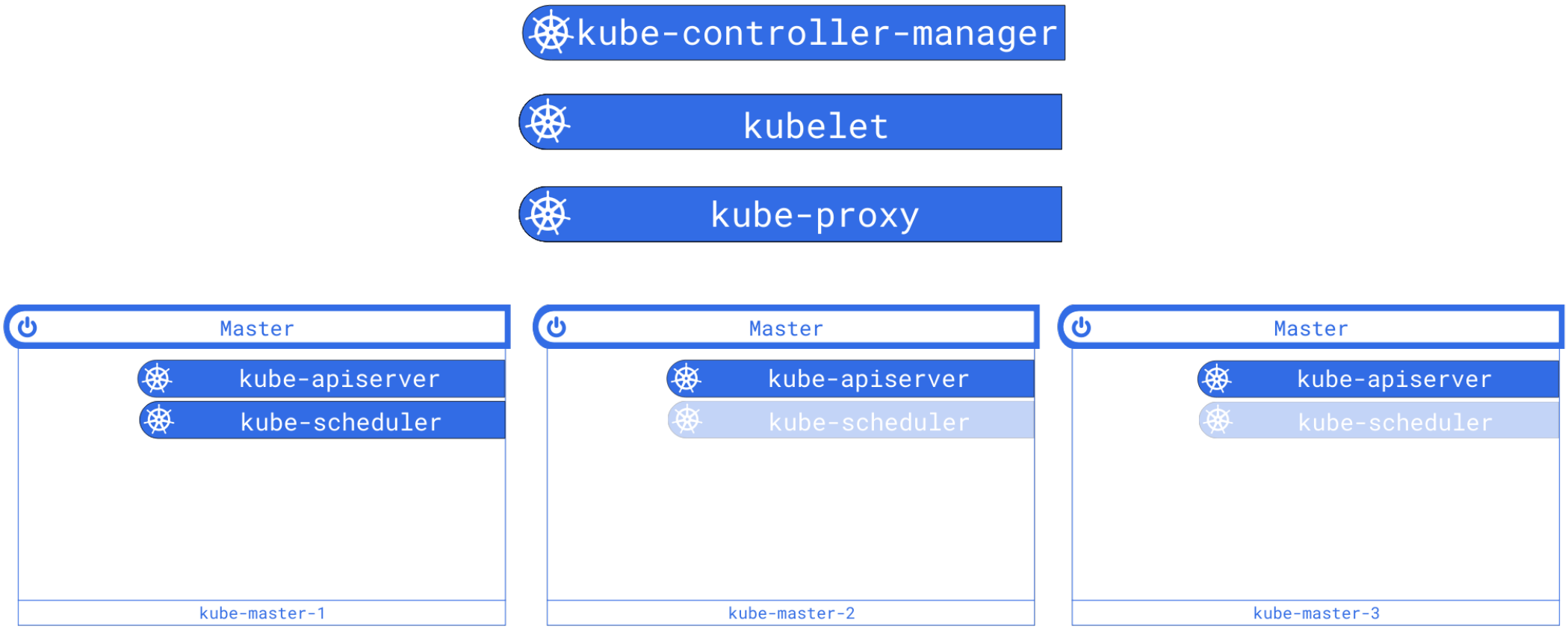

kubernetes
Deconstructed
kubernetes
Deconstructed
Node
31579
iptables
pod
www-1
ip
10.255.1.52
ip
pod ci
10.255.1.0/24
Node
31579
iptables
pod
www-2
ip
10.255.0.22
kube-node-01
ip
10.0.1.4
pod cidr
10.255.0.0/24

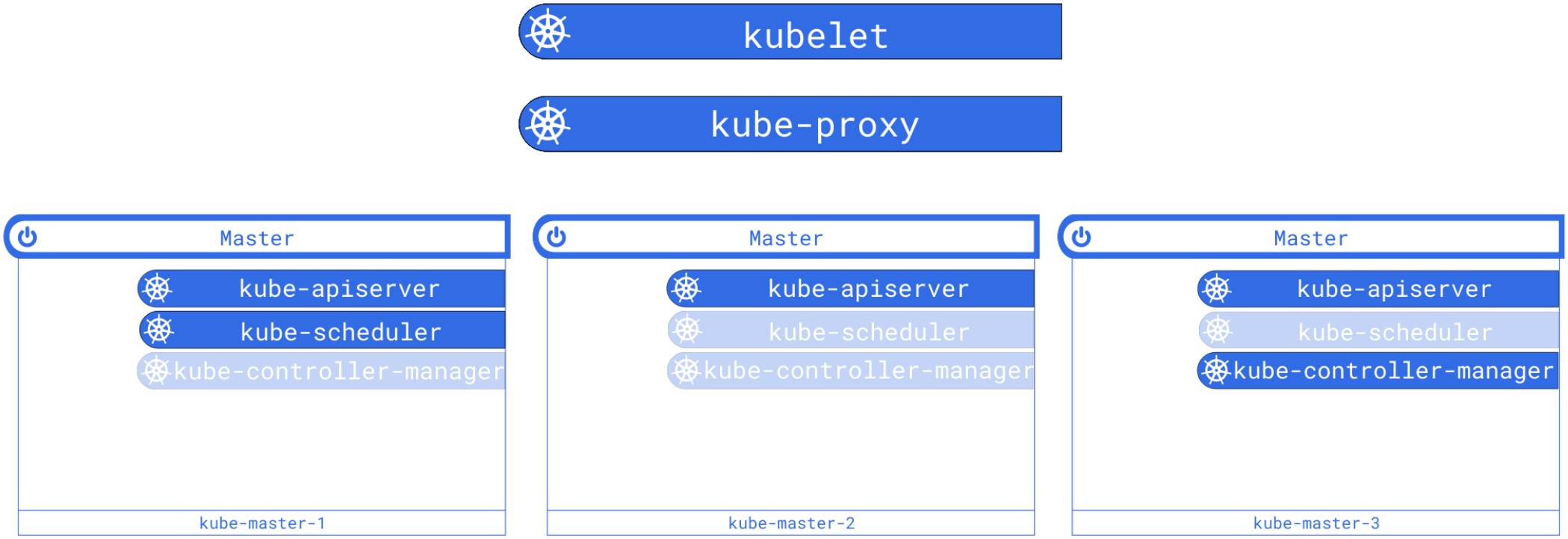
Kubernetes for the Cloud Admin

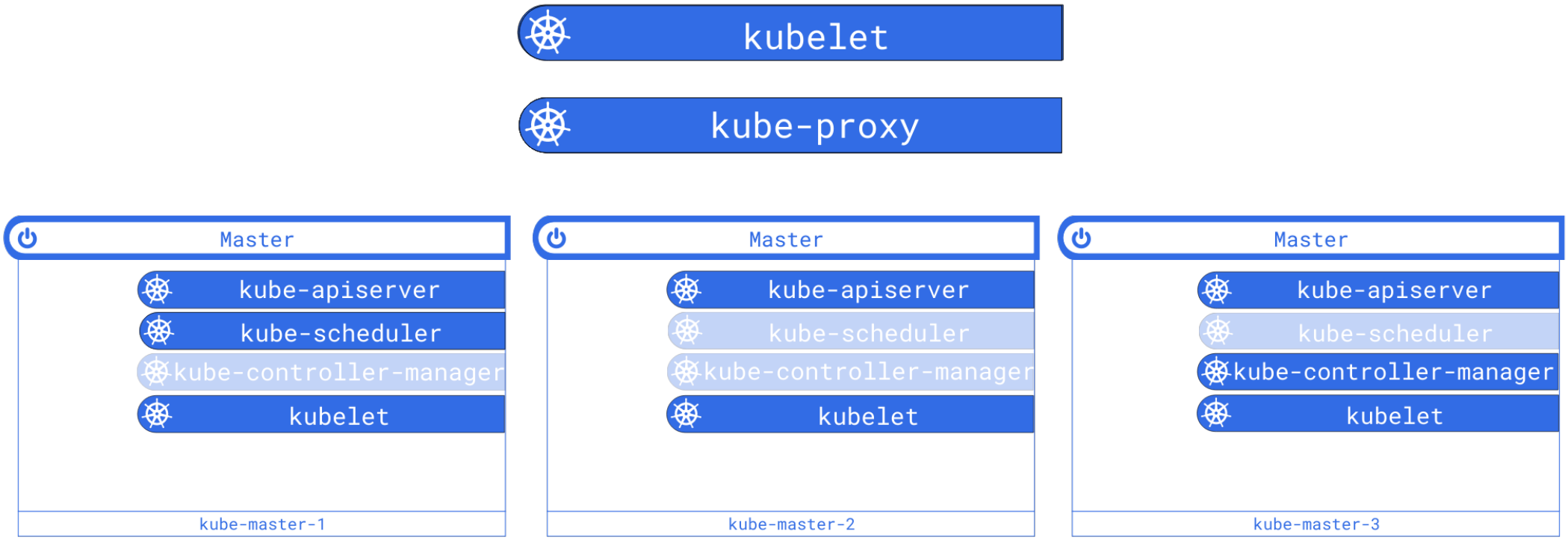

Master
kube-master-1
Node
kube-node-01

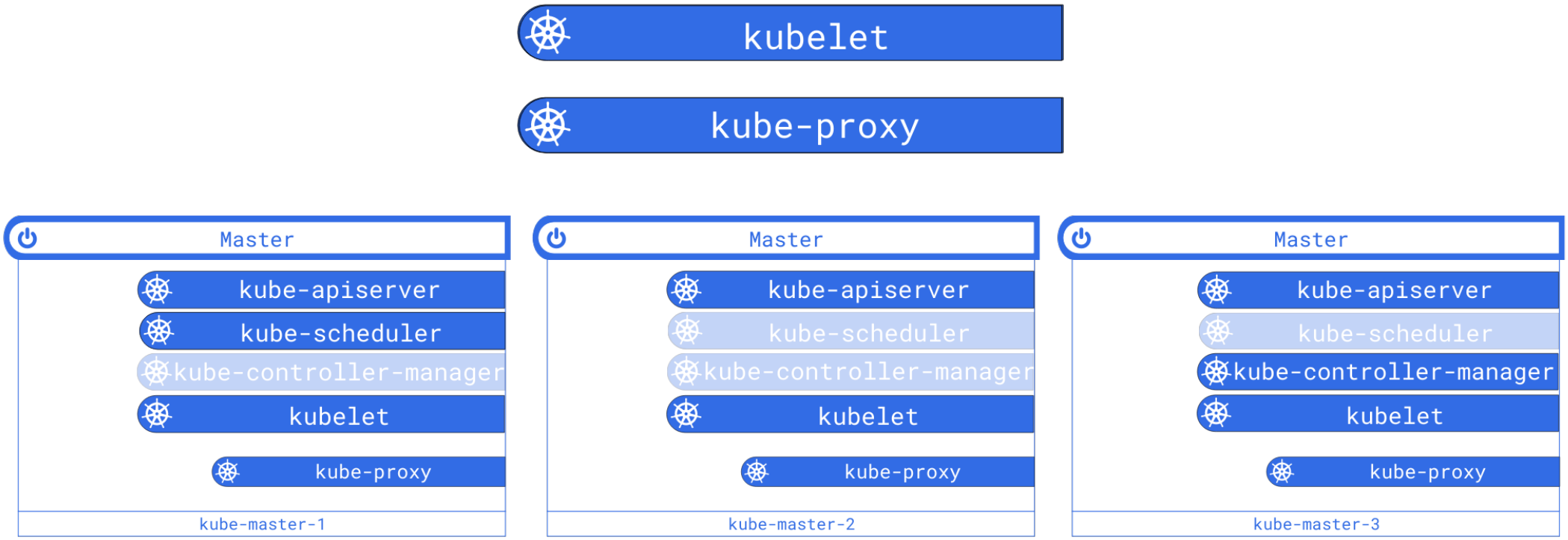

kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
Master
kube-master-1
Master
kube-master-2
Master
kube-master-3

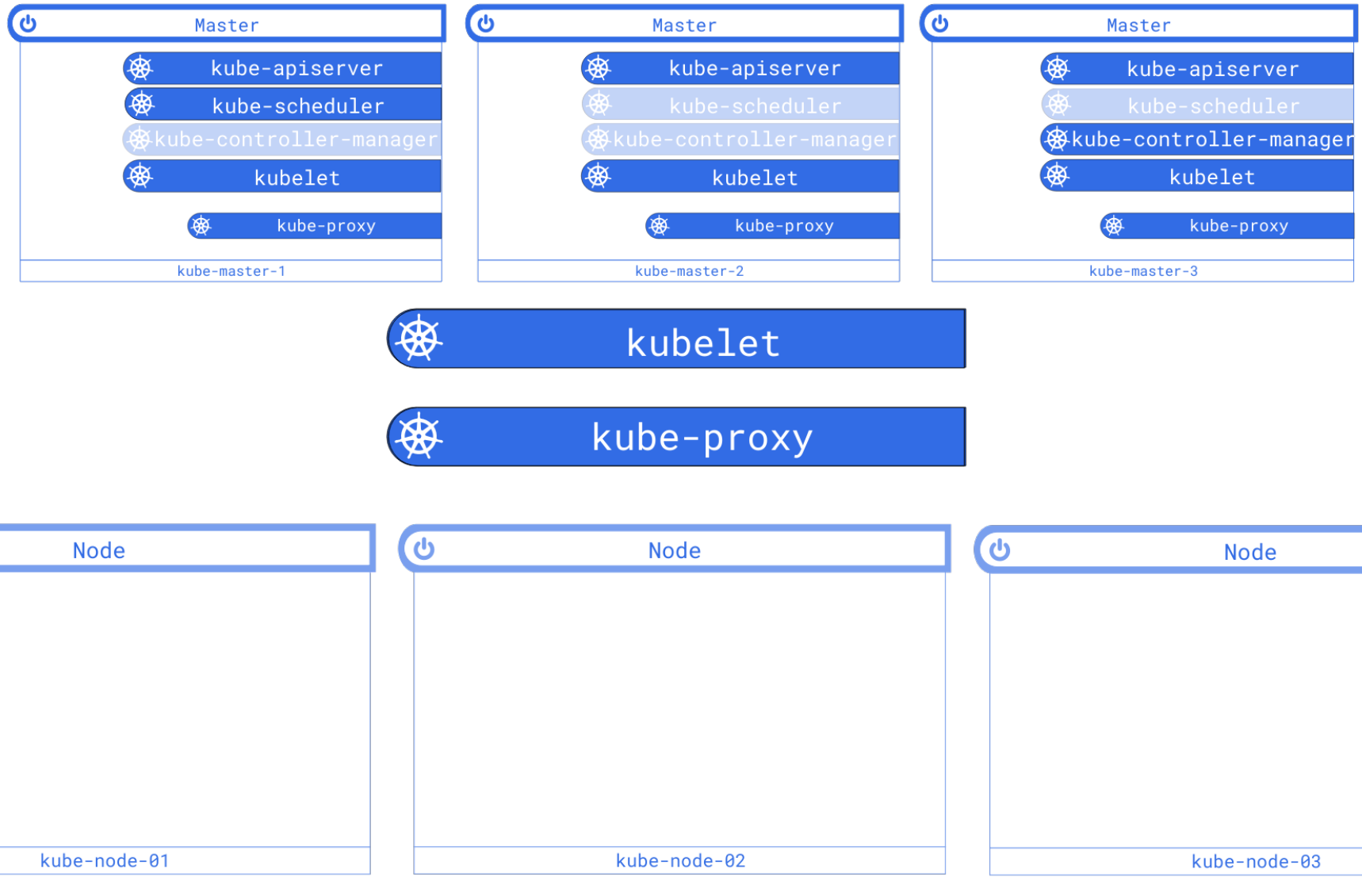

kube-scheduler
kube-controller-manager
kubelet
kube-proxy
Master
kube-apiserver
kube-master-1
Master
kube-apiserver
kube-master-2
Master
kube-apiserver
kube-master-3

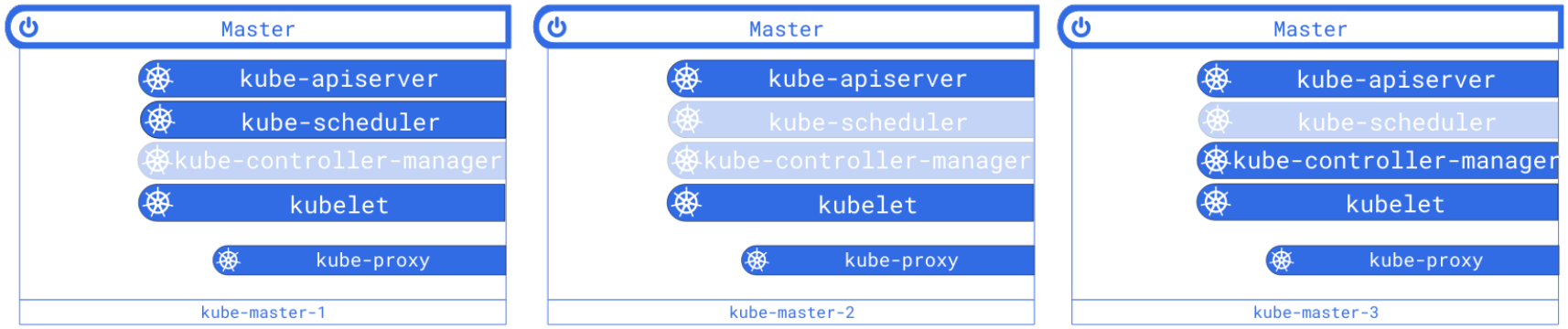

kube-controller-manager
kubelet
kube-proxy
Master
kube-apiserver
kube-scheduler
kube-master-1
Master
kube-apiserver
kube-scheduler
kube-master-2
Master
kube-apiserver
kube-scheduler
kube-master-3


kubelet
kube-proxy
Master
kube-apiserver
kube-scheduler
kube-controller-manager
kube-master-1
Master
kube-apiserver
kube-scheduler
kube-controller-manager
kube-master-2
Master
kube-apiserver
kube-scheduler
kube-controller-manager
kube-master-3

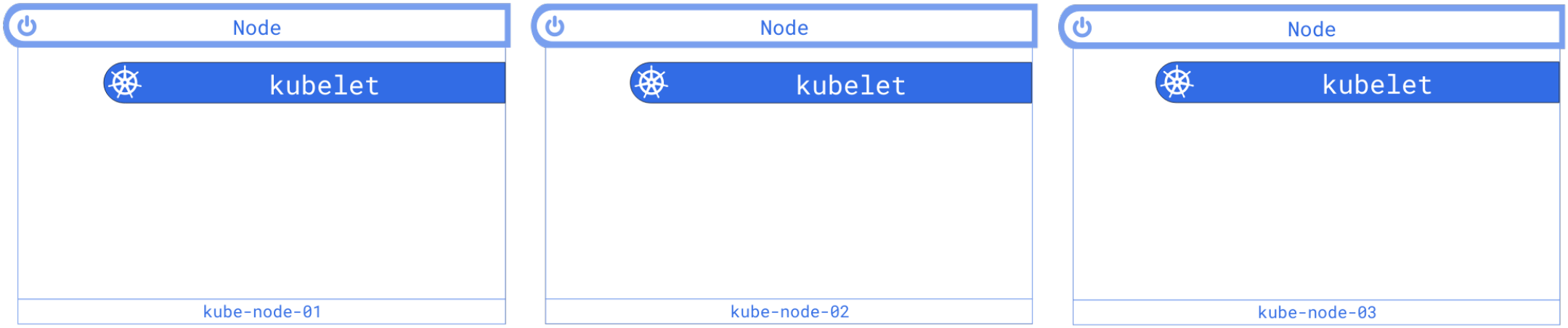

kubelet
kube-proxy
Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-master-1
Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-master-2
Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-master-3

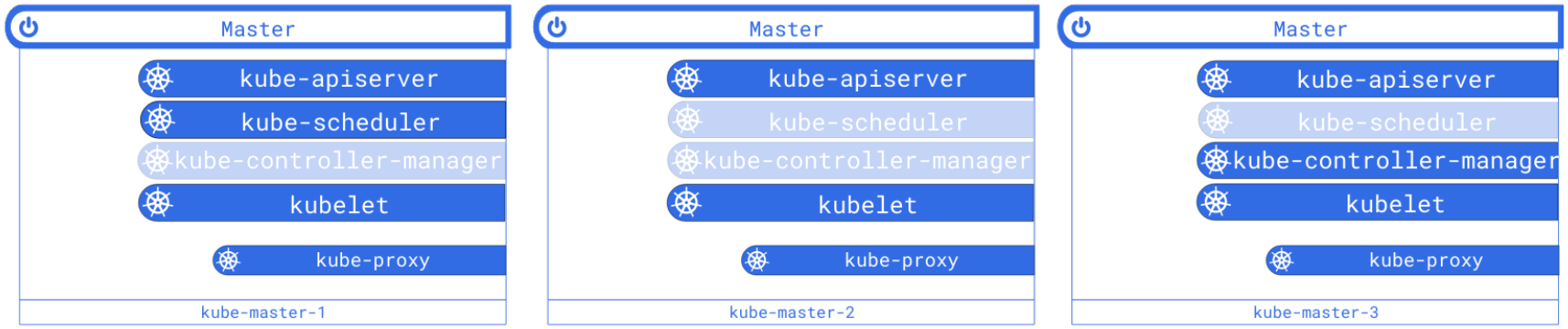

kubelet
kube-proxy
Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-1
Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-2
Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-3

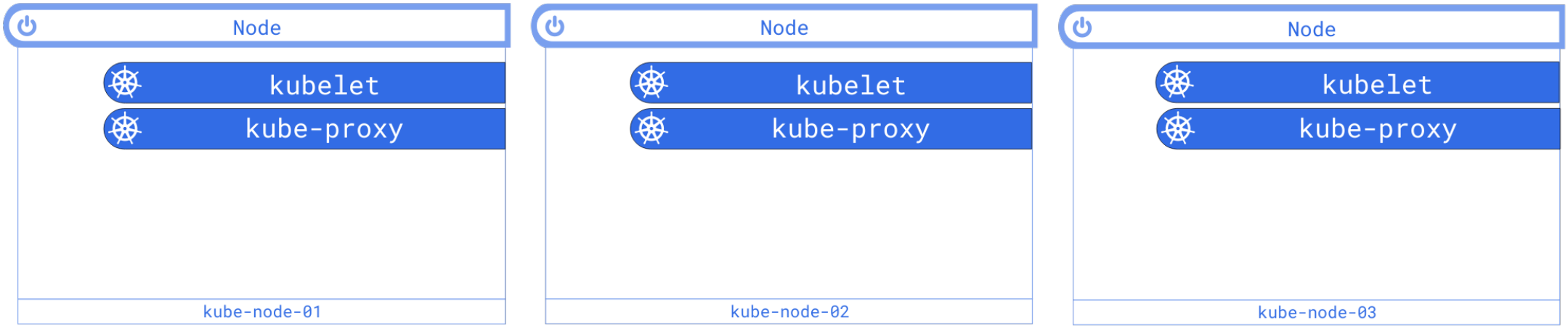

Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-1
Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-2
Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-3
kubelet
kube-proxy
Node
kube-node-01
Node
kube-node-02
Node
kube-node-03

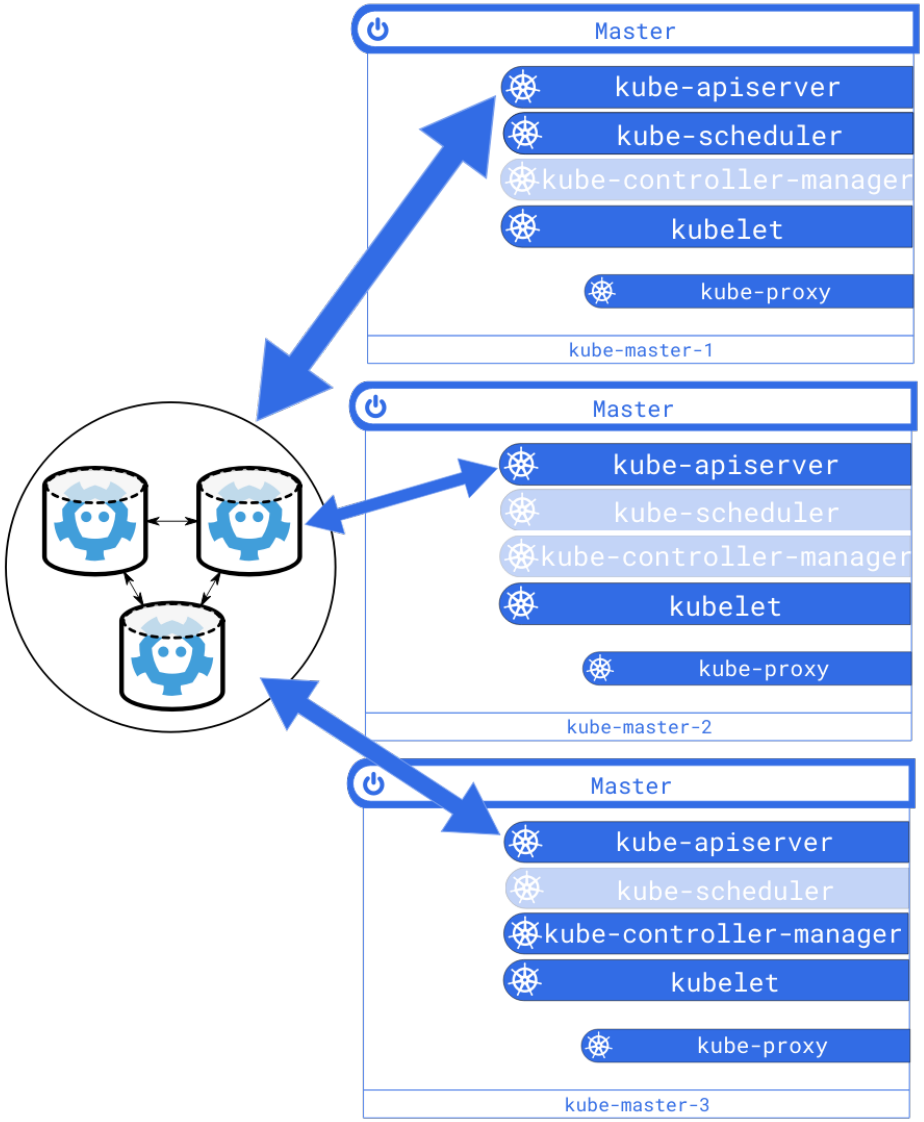

Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-1
Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-2
Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-3

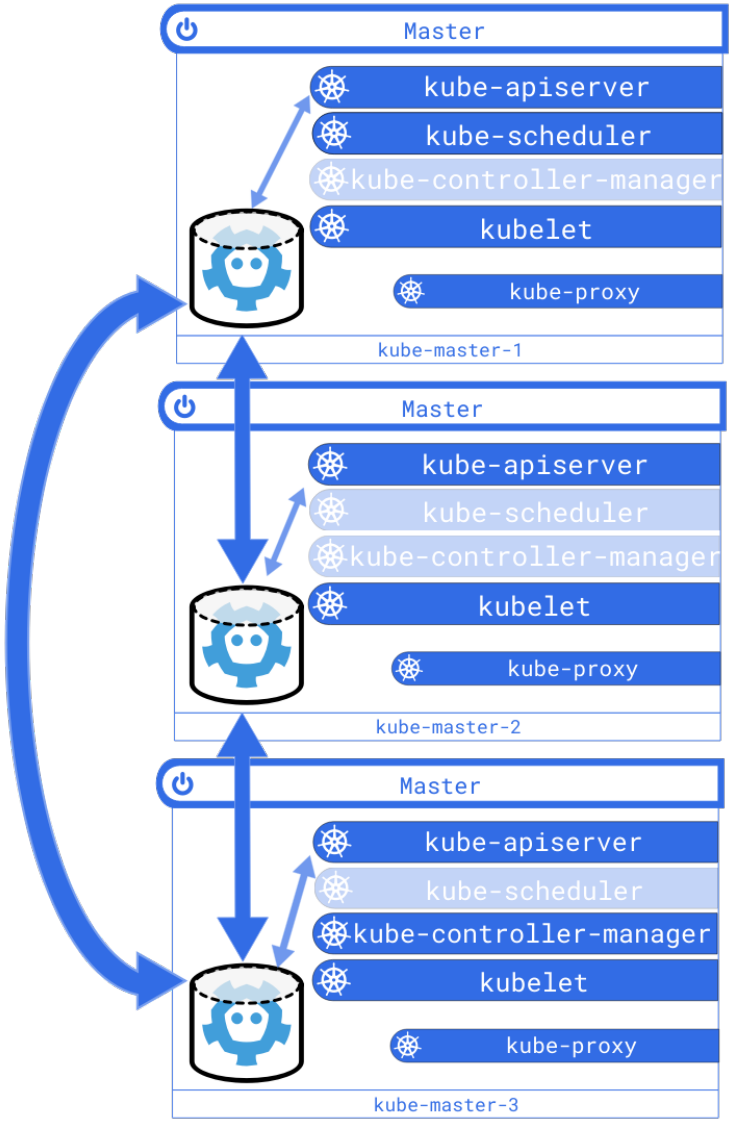

kube-proxy

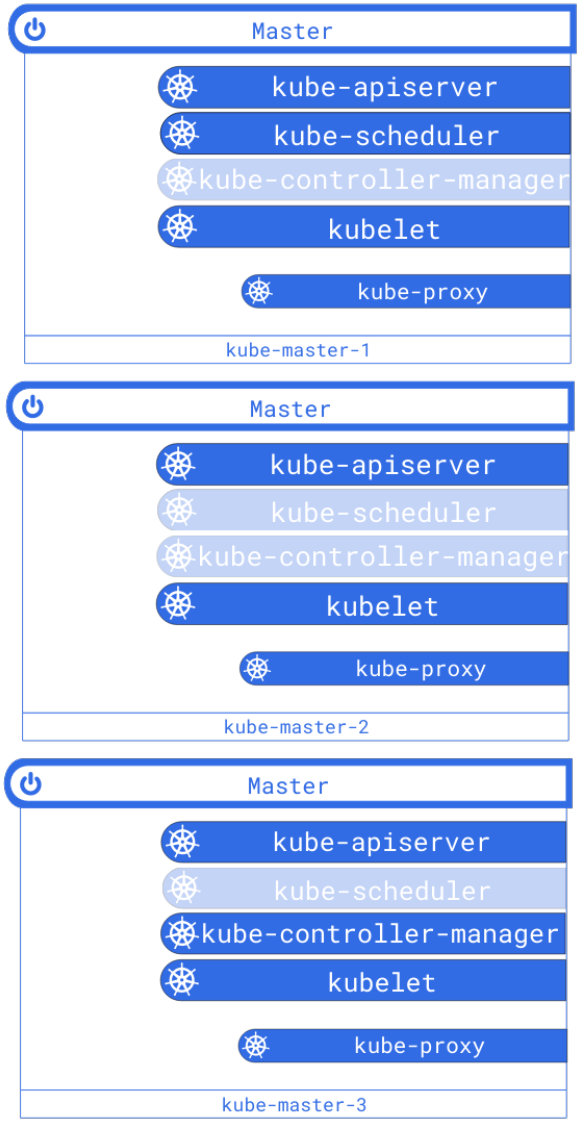

Node
kubelet
kube-node-01
Node
kubelet
kube-node-02
Node
kubelet
kube-node-03


Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-1
Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-2
Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-3


Node
kubelet
kube-proxy
kube-node-01
Node
kubelet
kube-proxy
kube-node-02
Node
kubelet
kube-proxy
kube-node-03


Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-1
Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-2
Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-3


Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-1
Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-2
Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-3



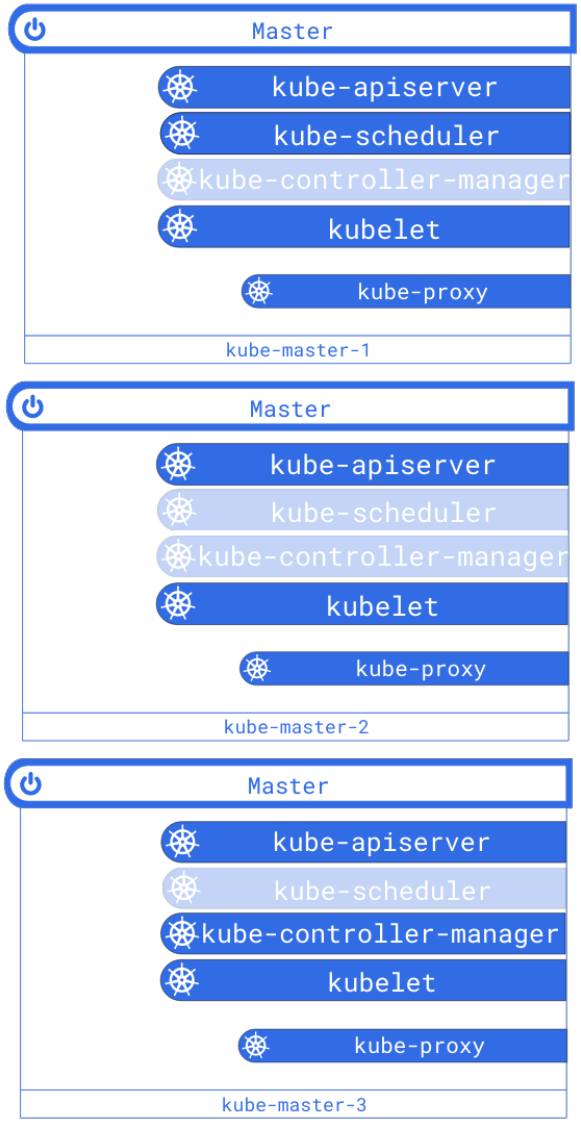
Management Access

Master URL

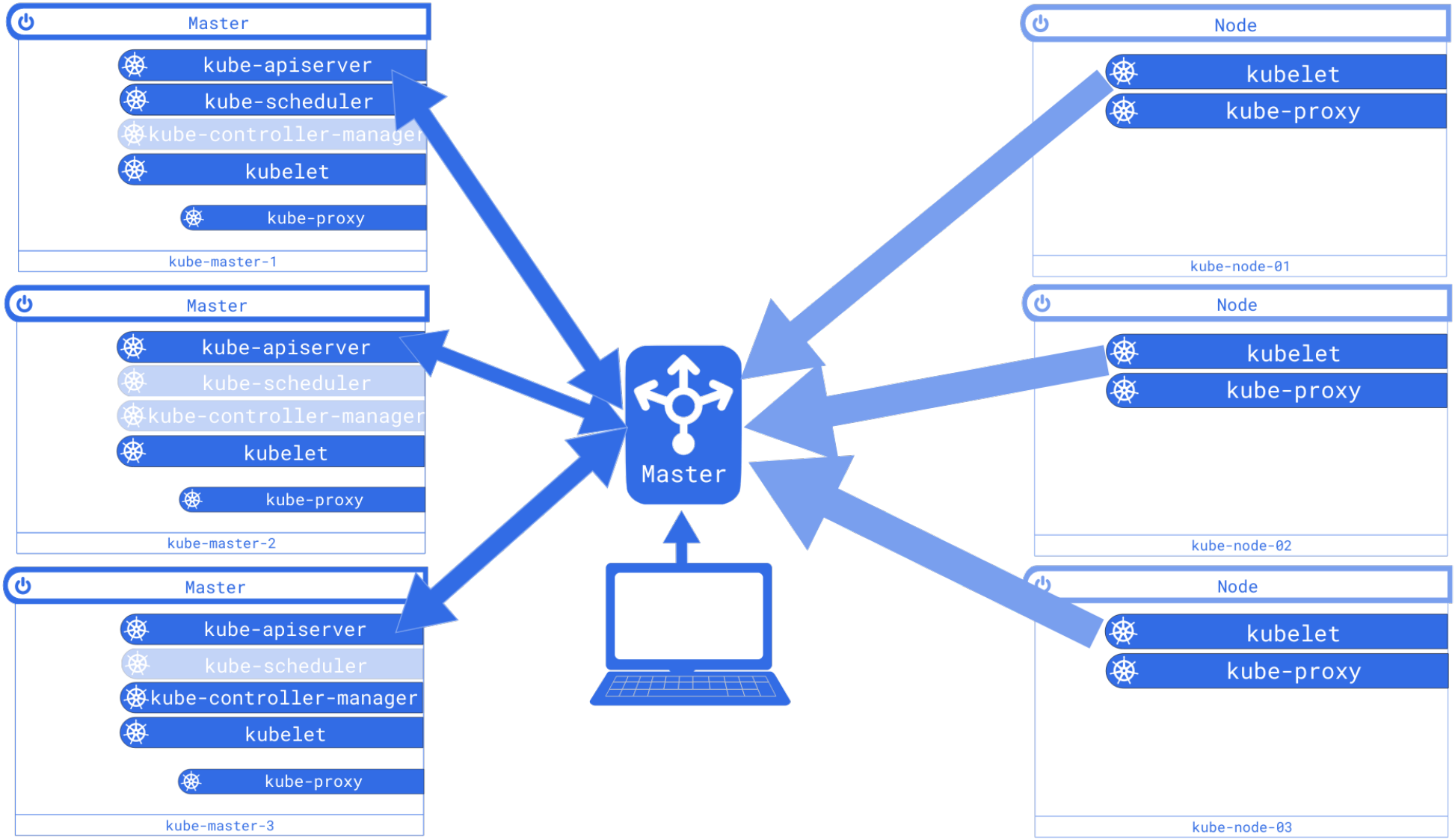
https://master.kubecon.carson-anderson.com

Credentials

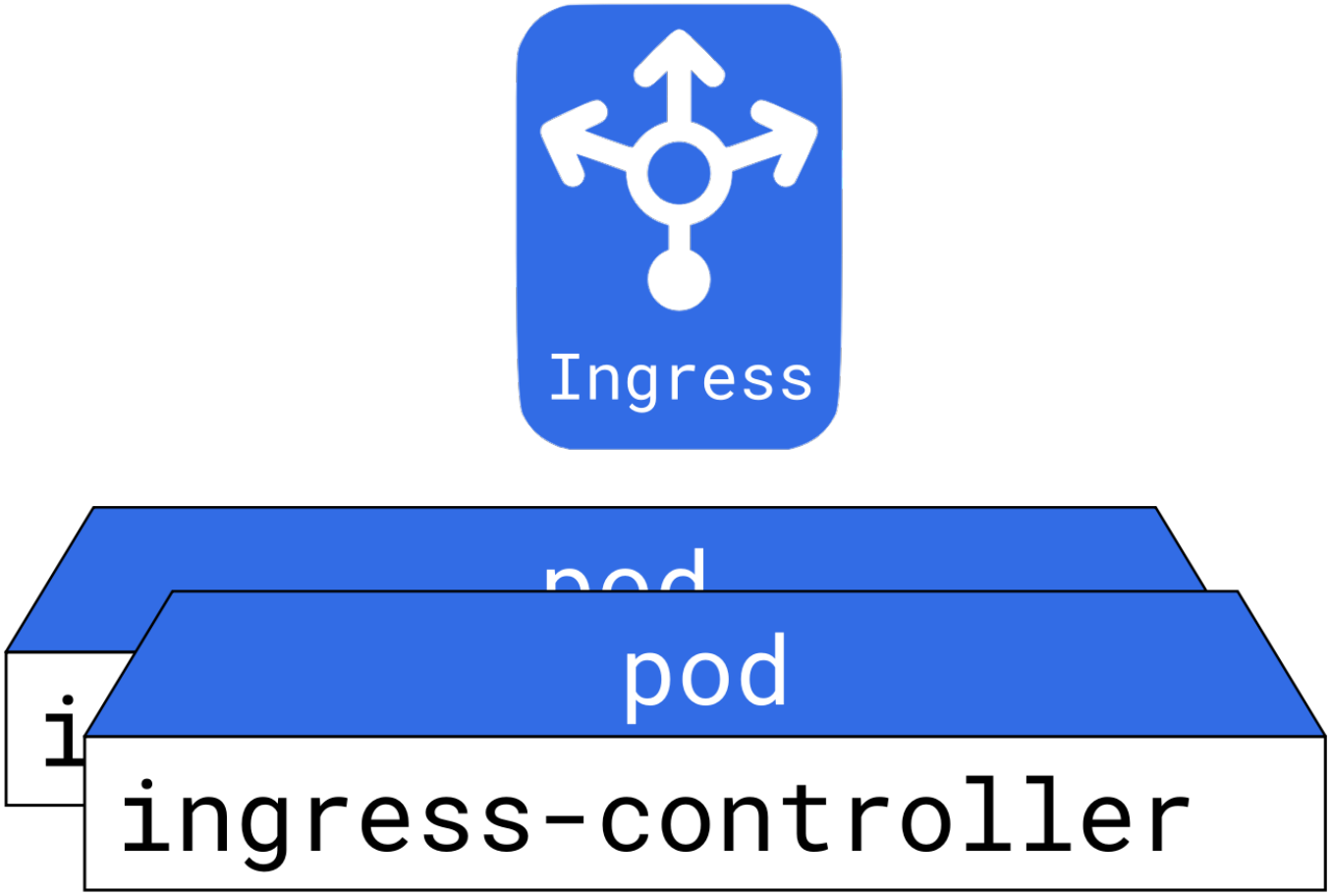
User:Pass
Bearer Token
Client Certificate

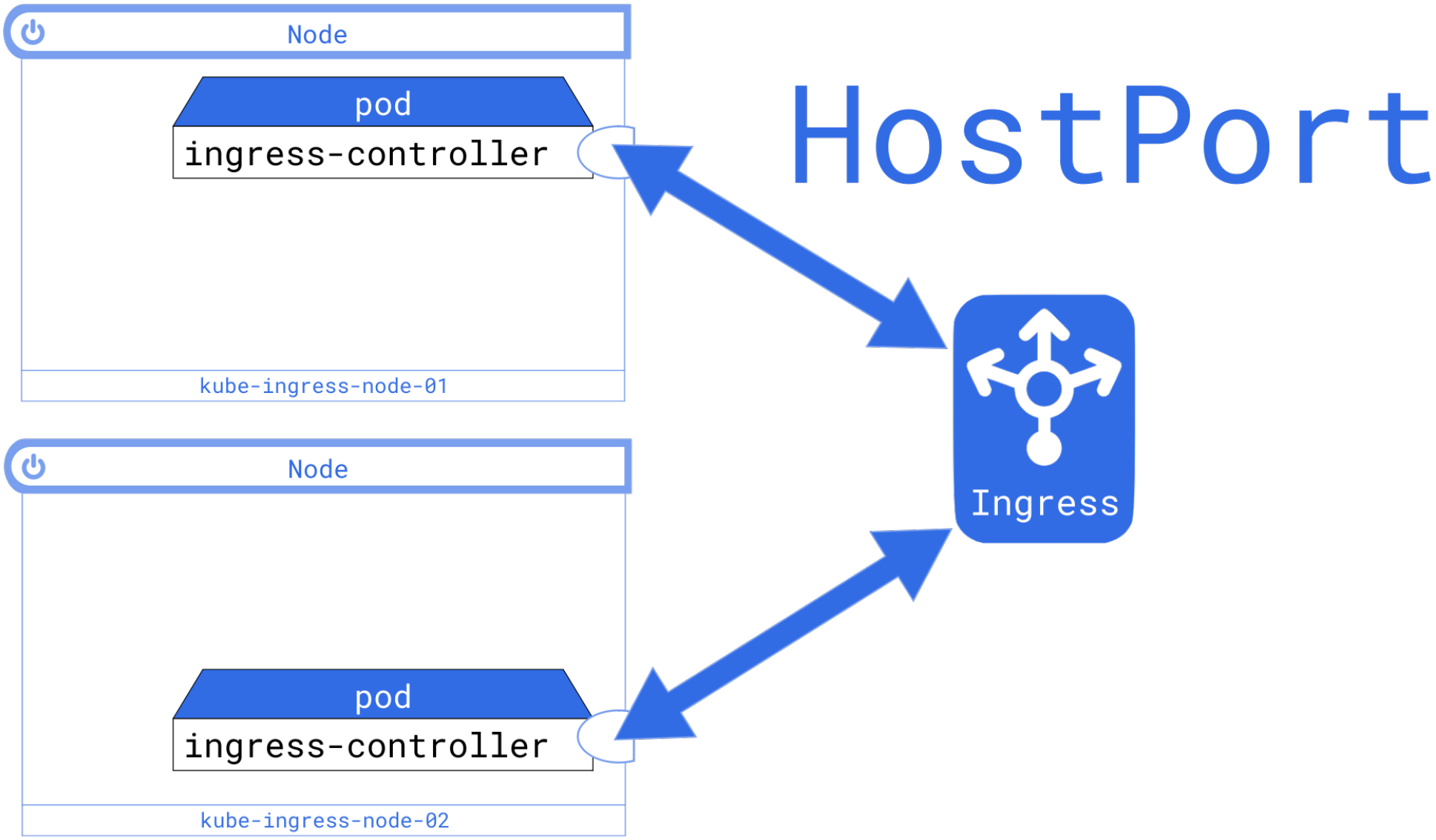

Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-1
Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-2
Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-3


Master

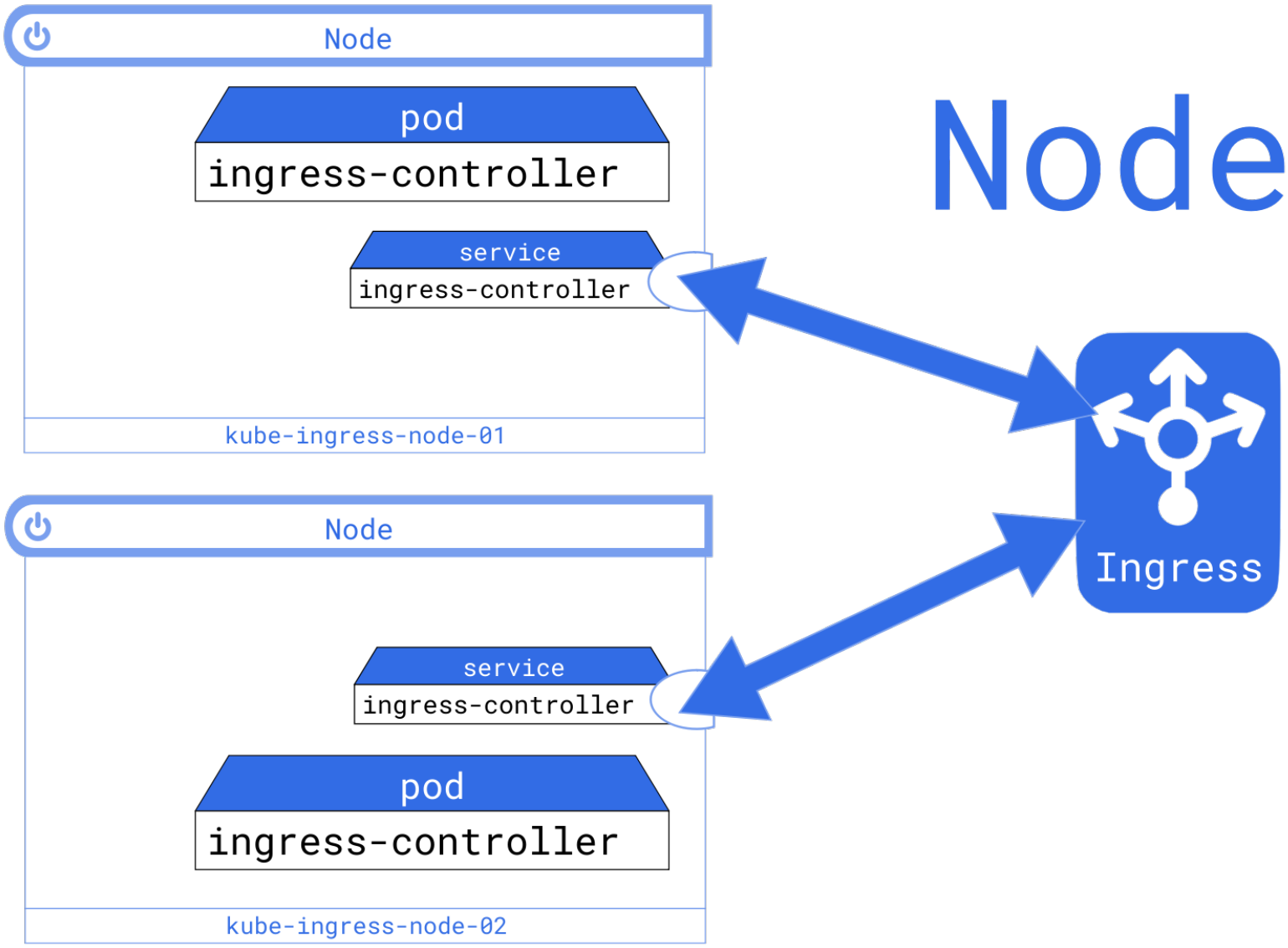

Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-1
Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-2
Master
kube-apiserver
kube-scheduler
kube-controller-manager
kubelet
kube-proxy
kube-master-3
Master
Node
kubelet
kube-proxy
kube-node-01
Node
kubelet
kube-proxy
kube-node-02
Node
kubelet
kube-proxy
kube-node-03


ingress
kube-decon
host
kube-decon.kubecon.carson-anderson.com

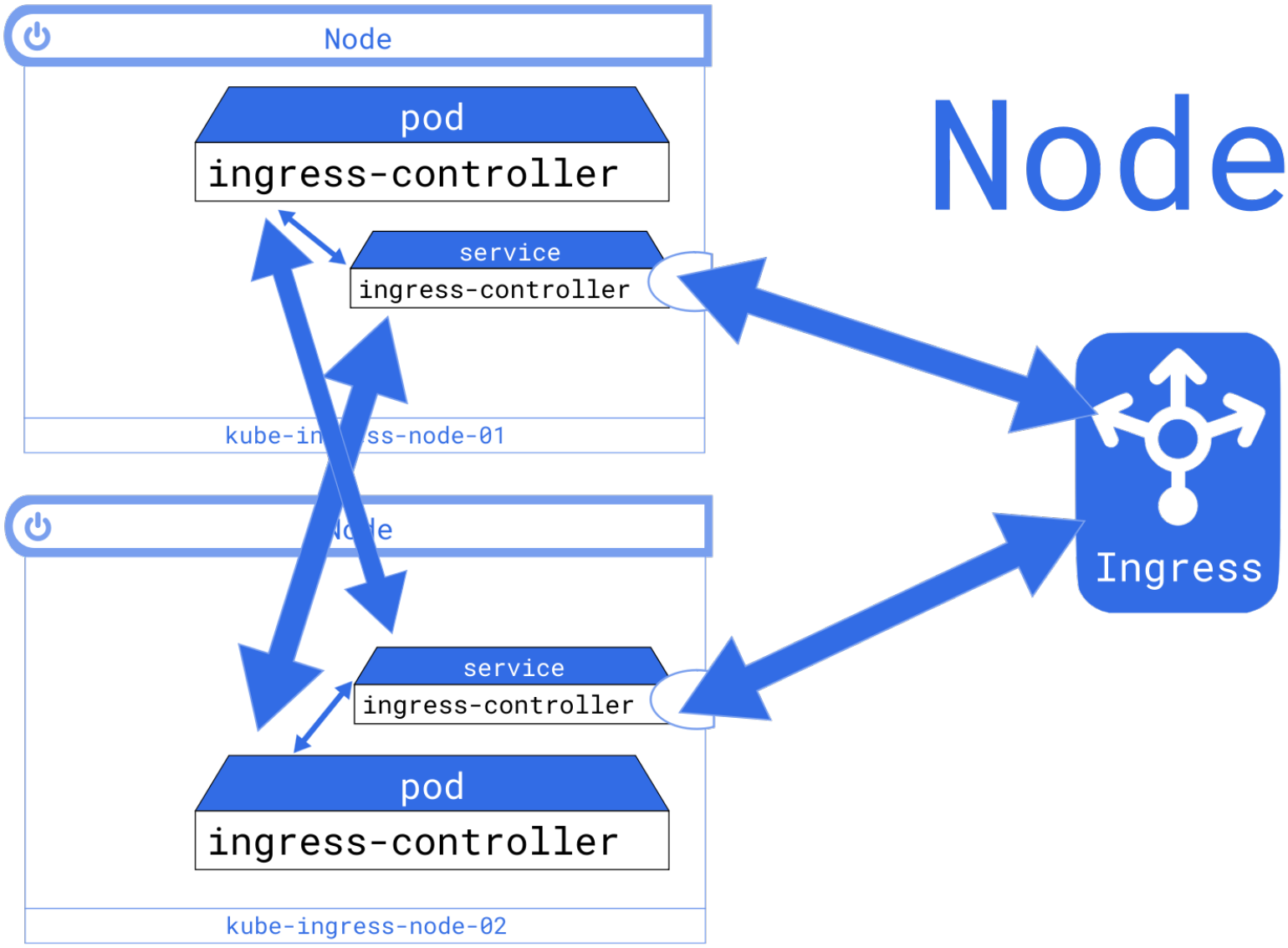

Ingress
pod
pod
ingress-controller

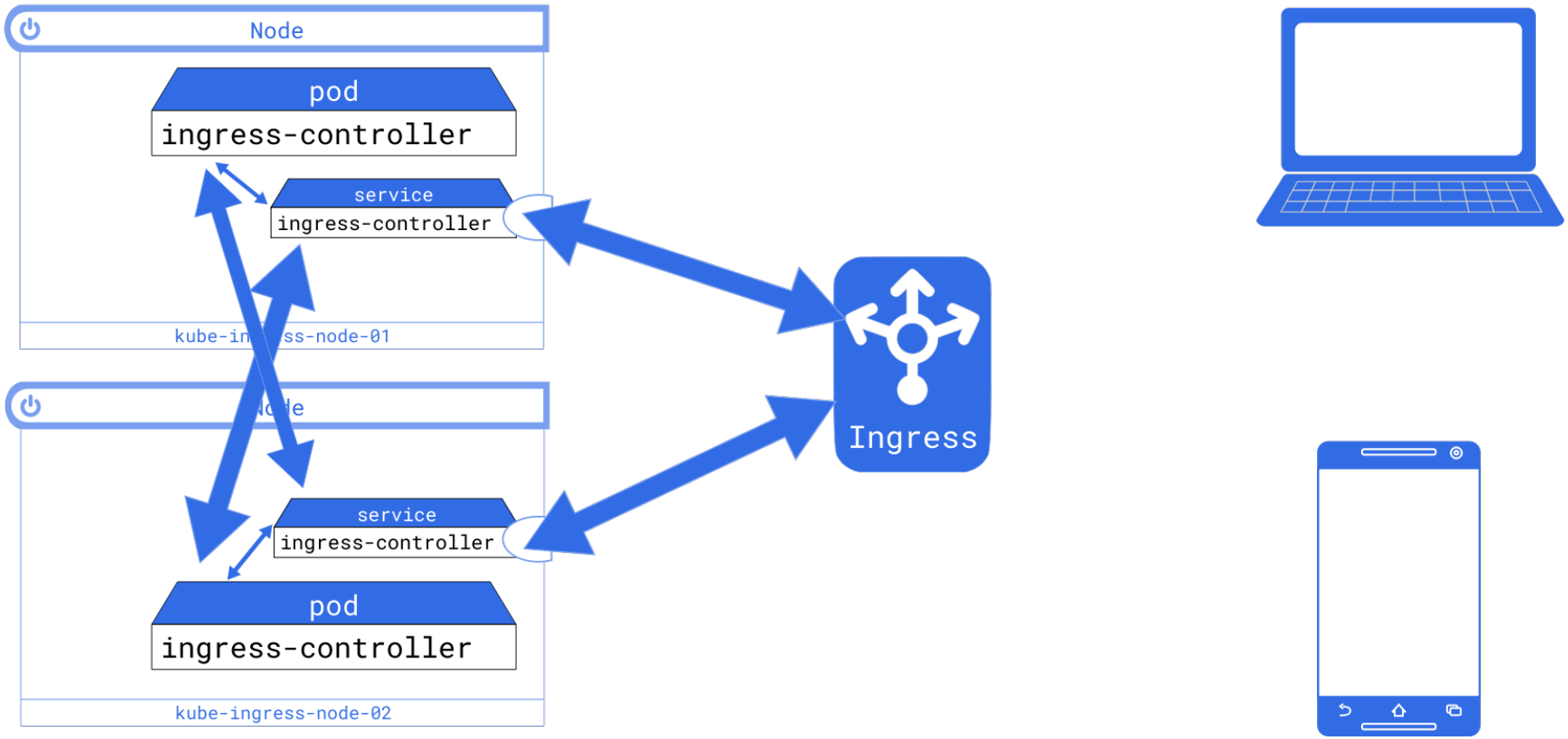

Node
pod
ingress-controller
kube-ingress-node-01
Node
pod
ingress-controller
kube-ingress-node-02
HostPort
Ingress

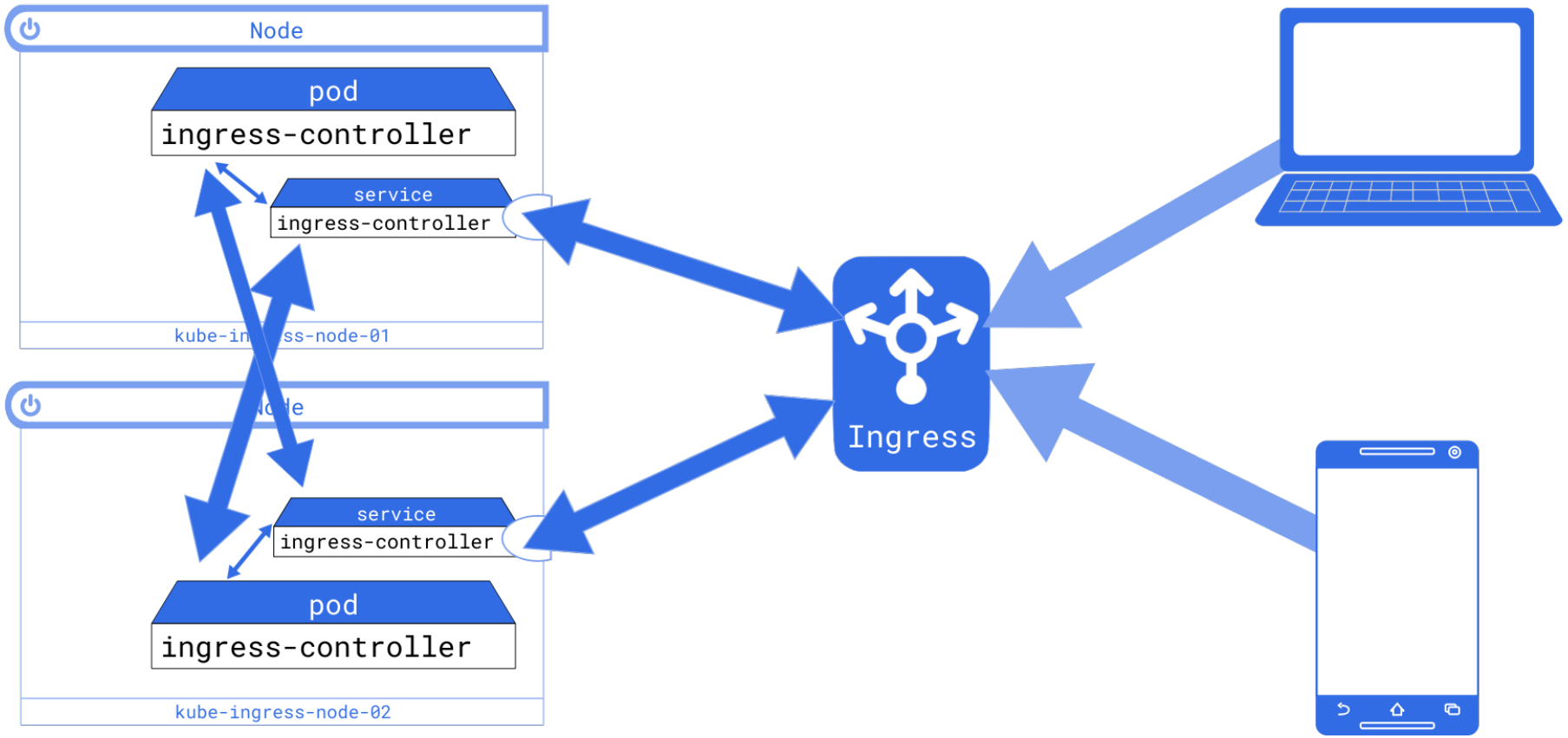
NodePort

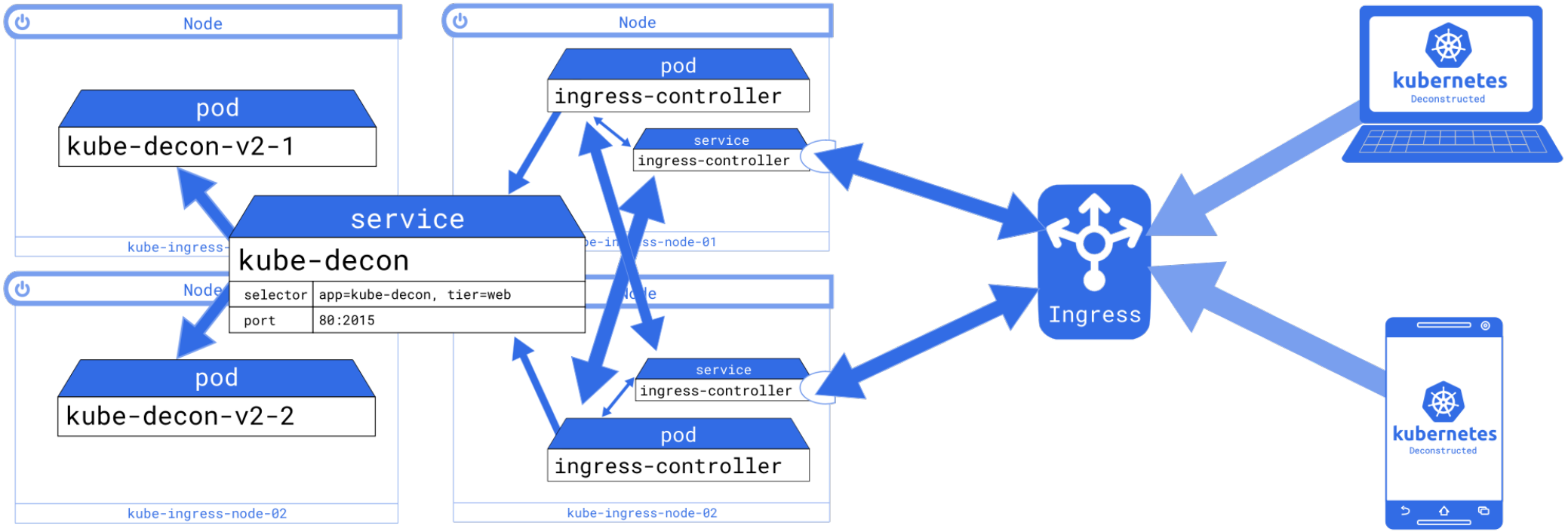

Node
pod
ingress-controller
service
ingress-controller
kube-ingress-node-01
Node
service
ingress-controller
pod
ingress-controller
kube-ingress-node-02
Ingress

NodePort


Node
pod
ingress-controller
service
ingress-controller
kube-in ss-node-01
Node
service
ingress-controller
pod
ingress-controller
kube-ingress-node-02
Ingress


Node
pod
ingress-controller
service
ingress-controller
kube-in ss-node-01
Node
service
ingress-controller
pod
ingress-controller
kube-ingress-node-02
Ingress


Node
pod
ingress-controller
service
ingress-controller
kube-in ss-node-01
Node
service
ingress-controller
pod
ingress-controller
kube-ingress-node-02
Ingress


Node
pod
kube-decon-v2-1
service
kube-decon
selector
app=kube-decon, tier=web
port
80:2015
Node
pod
kube-decon-v2-2
kube-ingress-node-02
Node
pod
ingress-controller
service
ingress-controller
service
ingress-controller
pod
ingress-controller
kube-ingress-node-02
Ingress
kubernetes
Deconstructed
kubernetes
Deconstructed

kubernetes

Deconstructed

User
Cluster
Network
Cloud
Linux
Power

kubernetes

Deconstructed

User
Cluster
Network
Cloud
Linux
Power

kubernetes

Deconstructed

User
Cluster
Network
Cloud
Linux
Power

Kubernetes for the Linux Admin

Container Essentials

Namespaces

Control Groups (cgroups)

Union File Systems

Namespaces


kubernetes
Deconstructed


kubernetes
Deconstructed


PID

PID

MNT

MNT

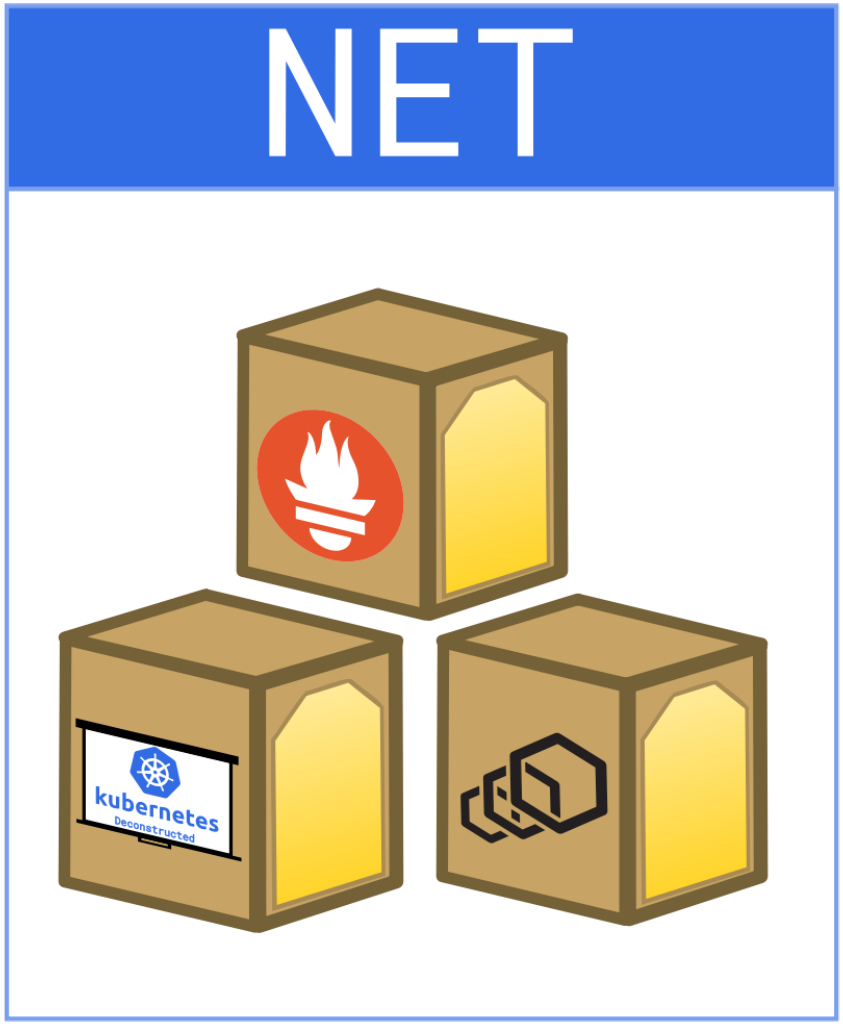
NET

MNT

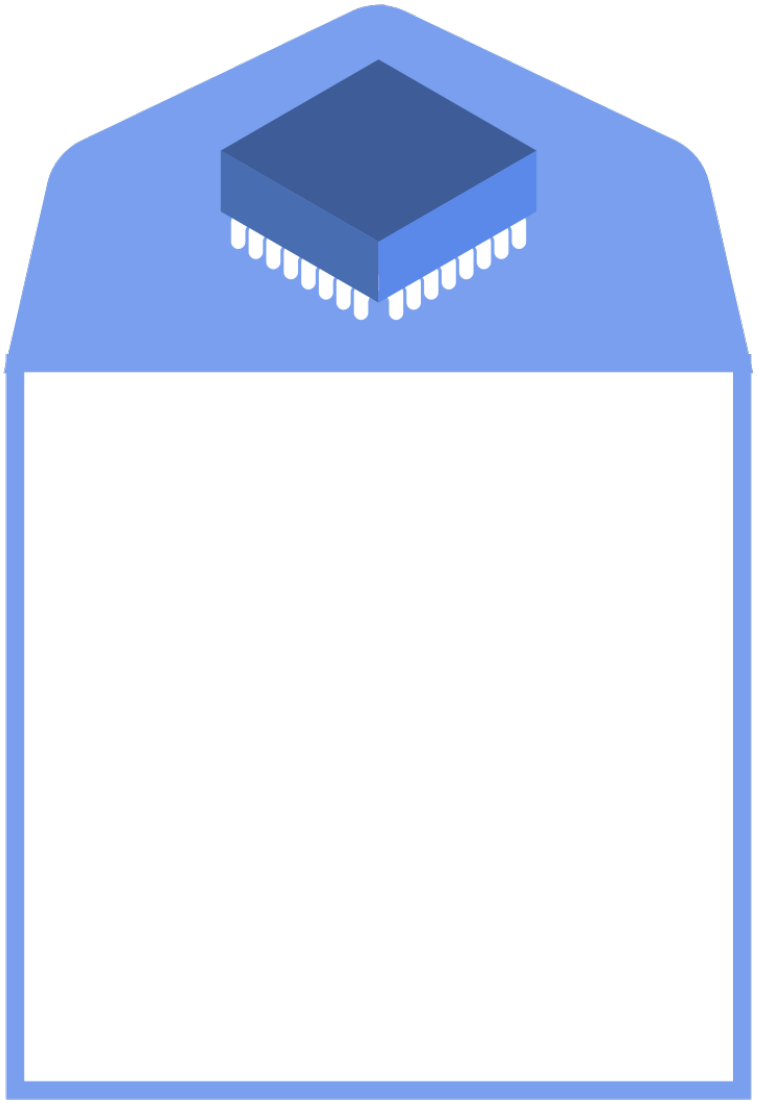
NET

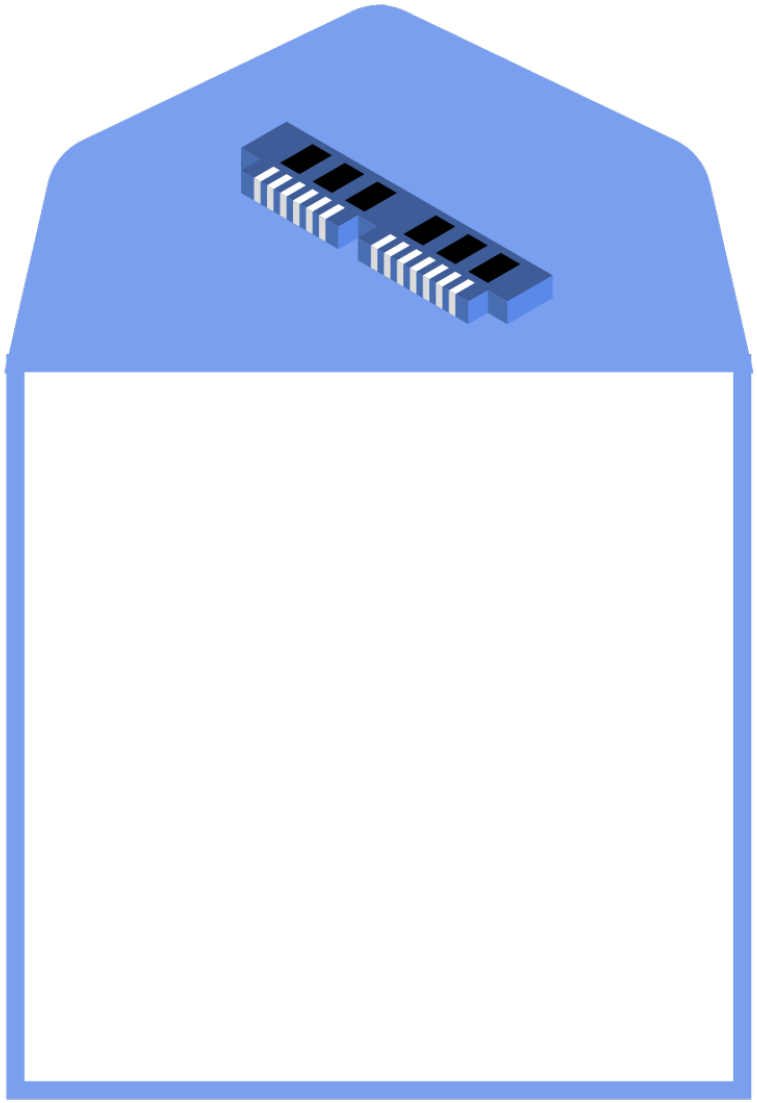
MNT

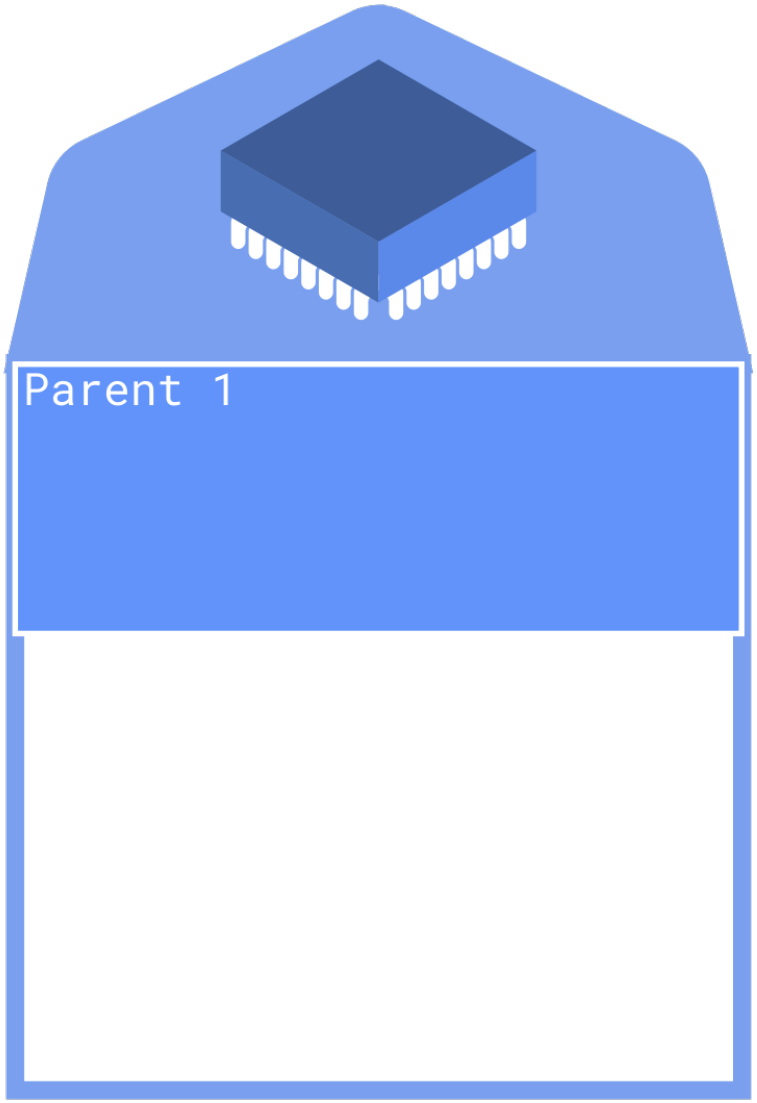
NET

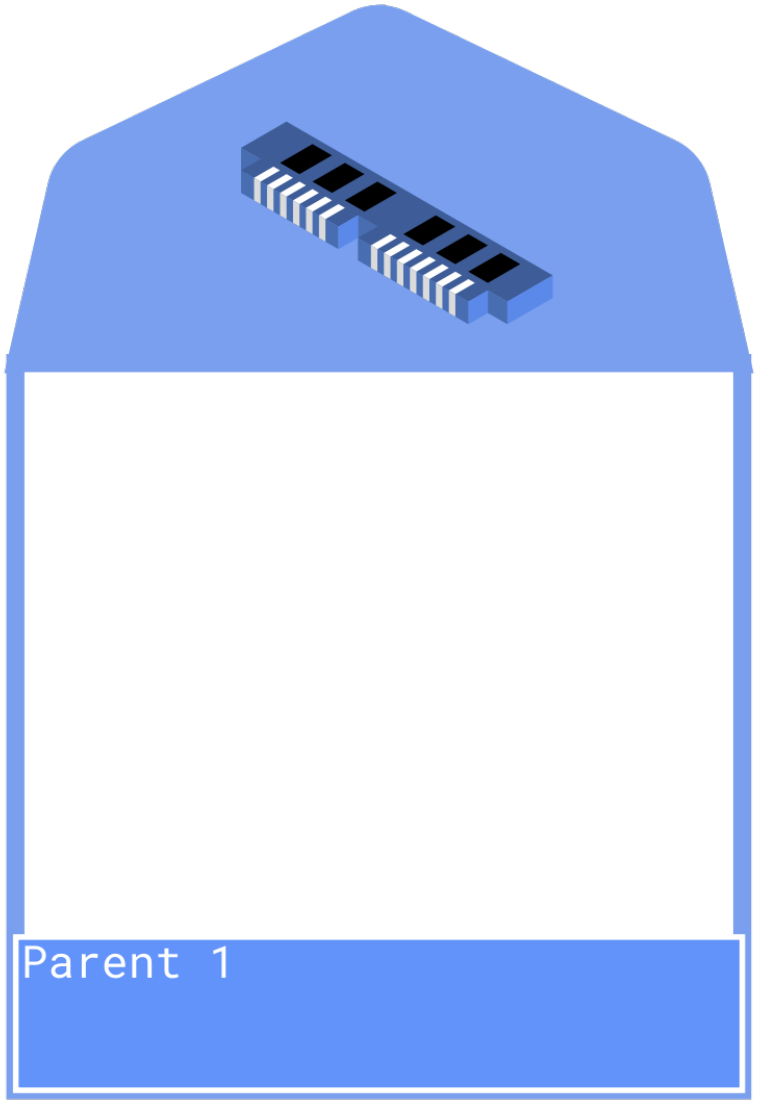

NET
kubernetes
Deconstructed

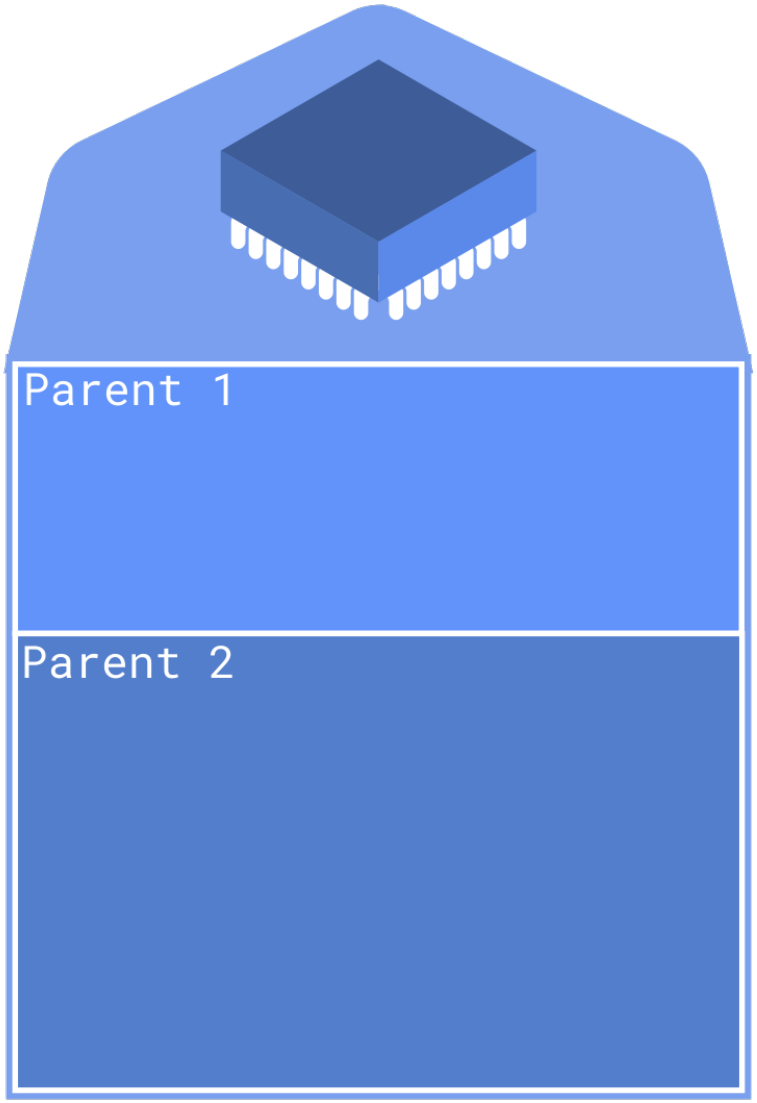
Control Groups (cgroups)

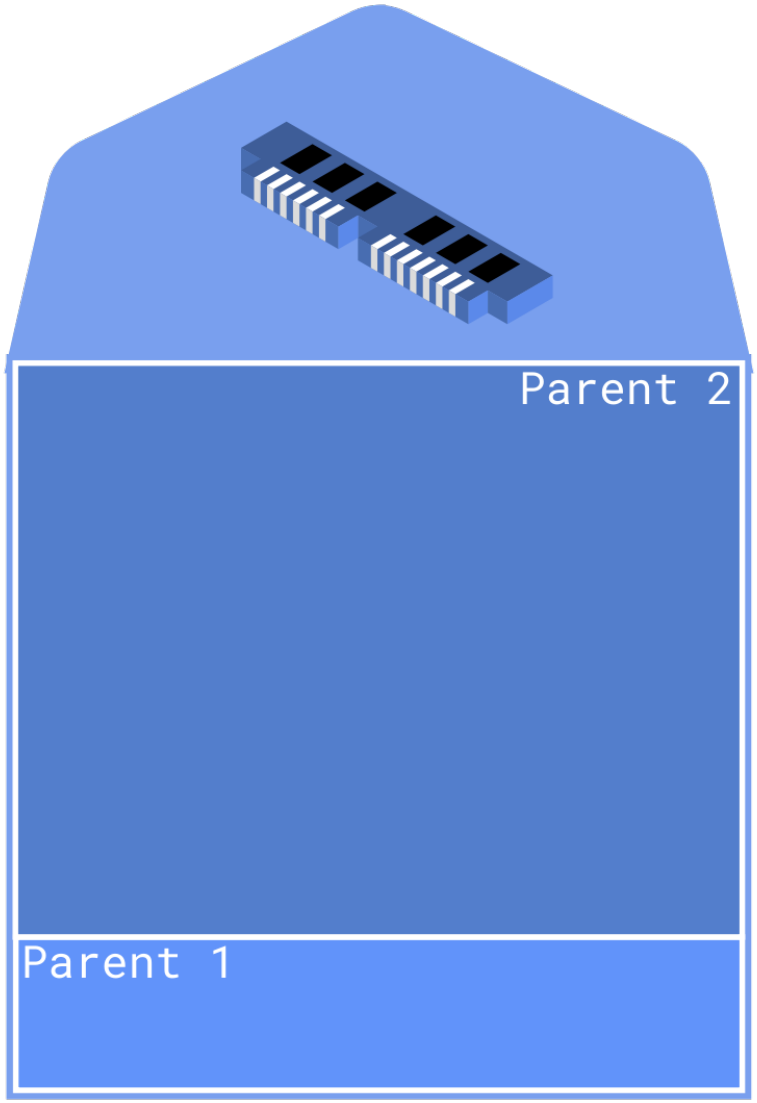


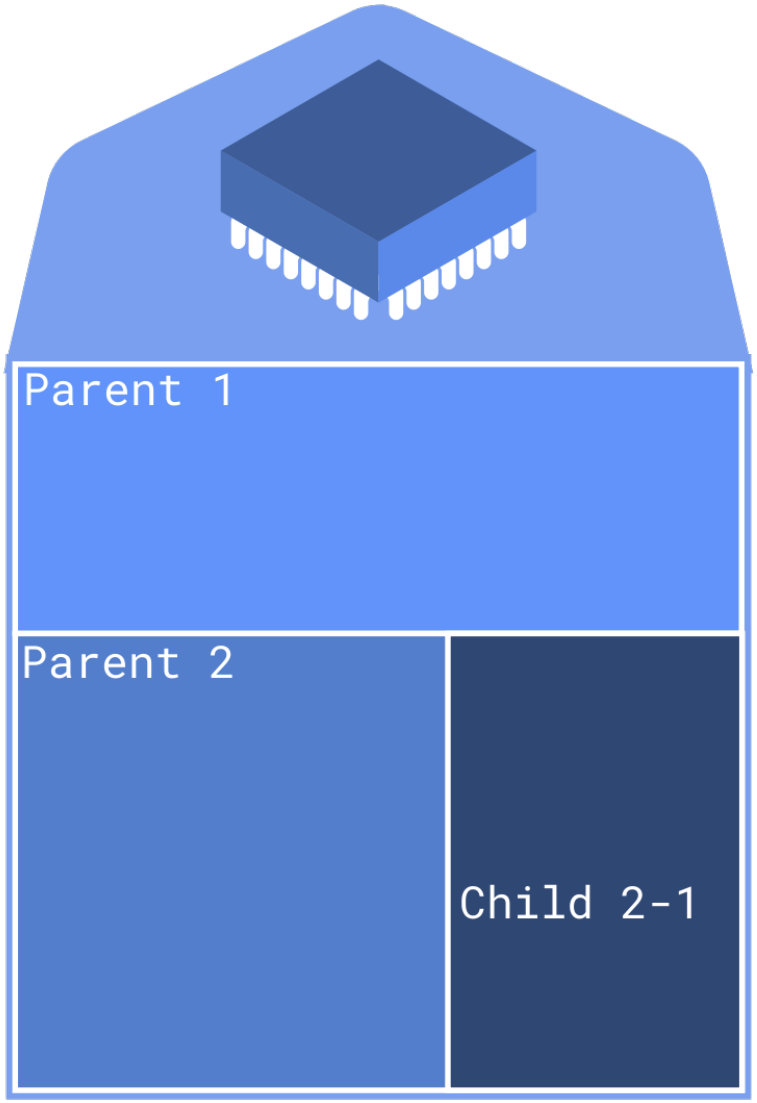


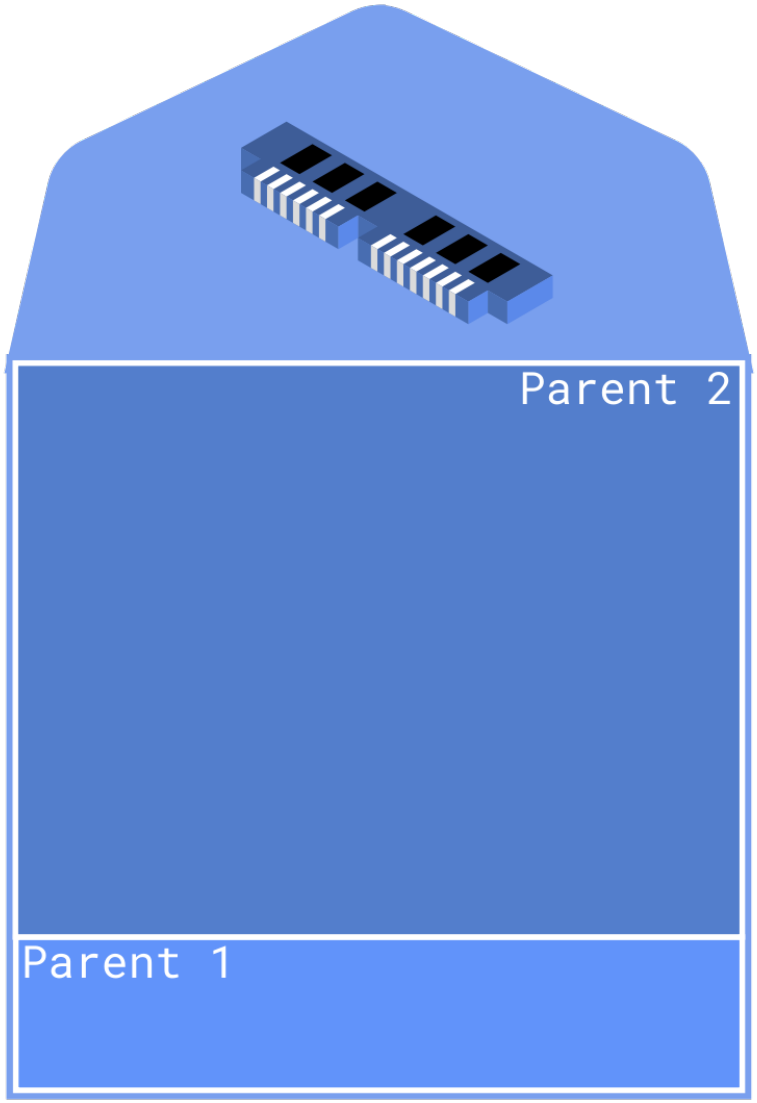

Parent 1

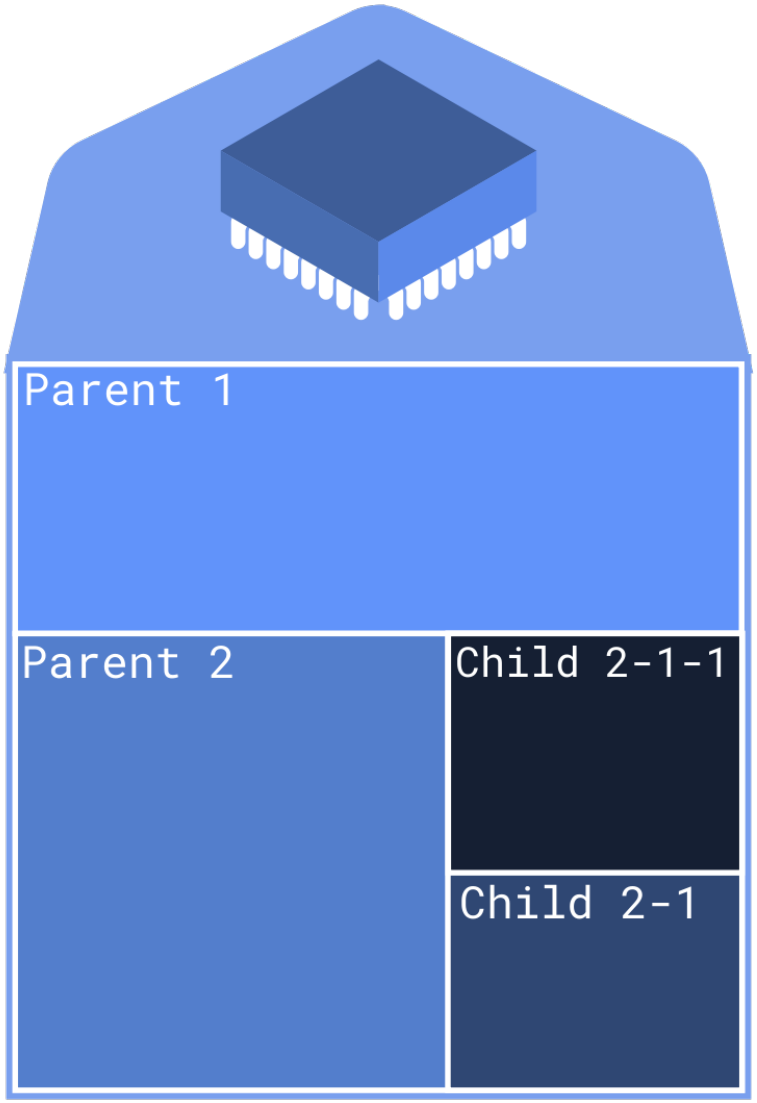

Parent 1

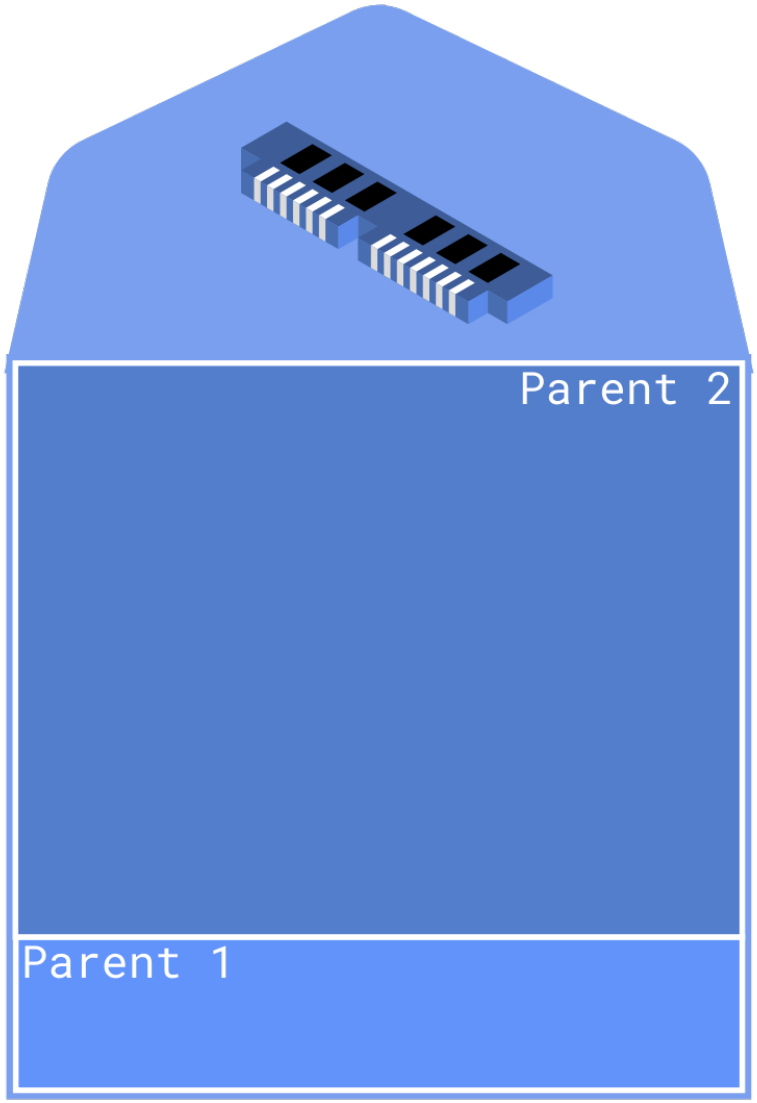

Parent 1
Parent 2

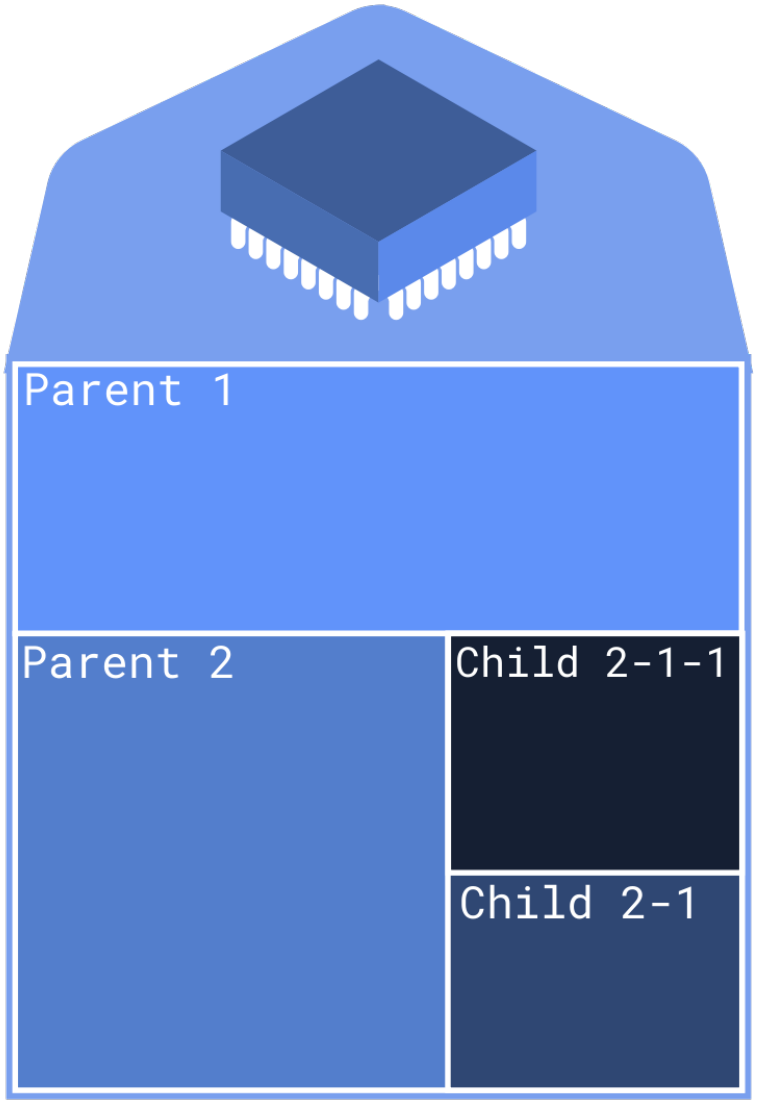

Parent 2
Parent 1

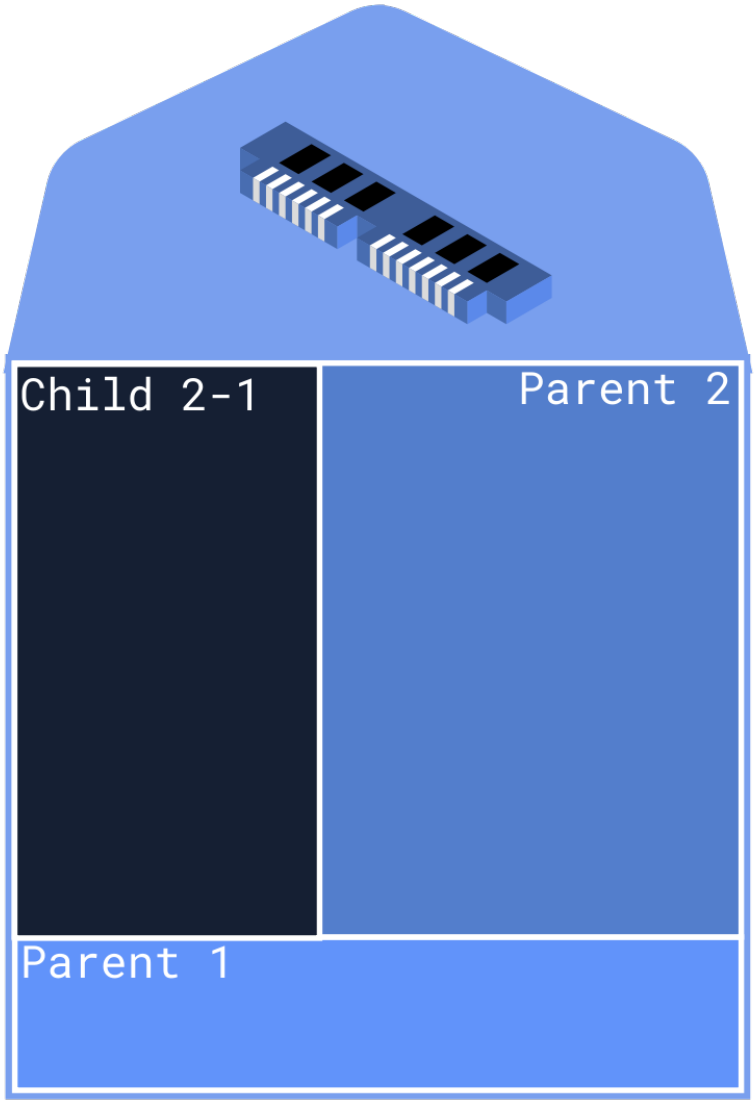

Parent 1
Parent 2
Child 2-1

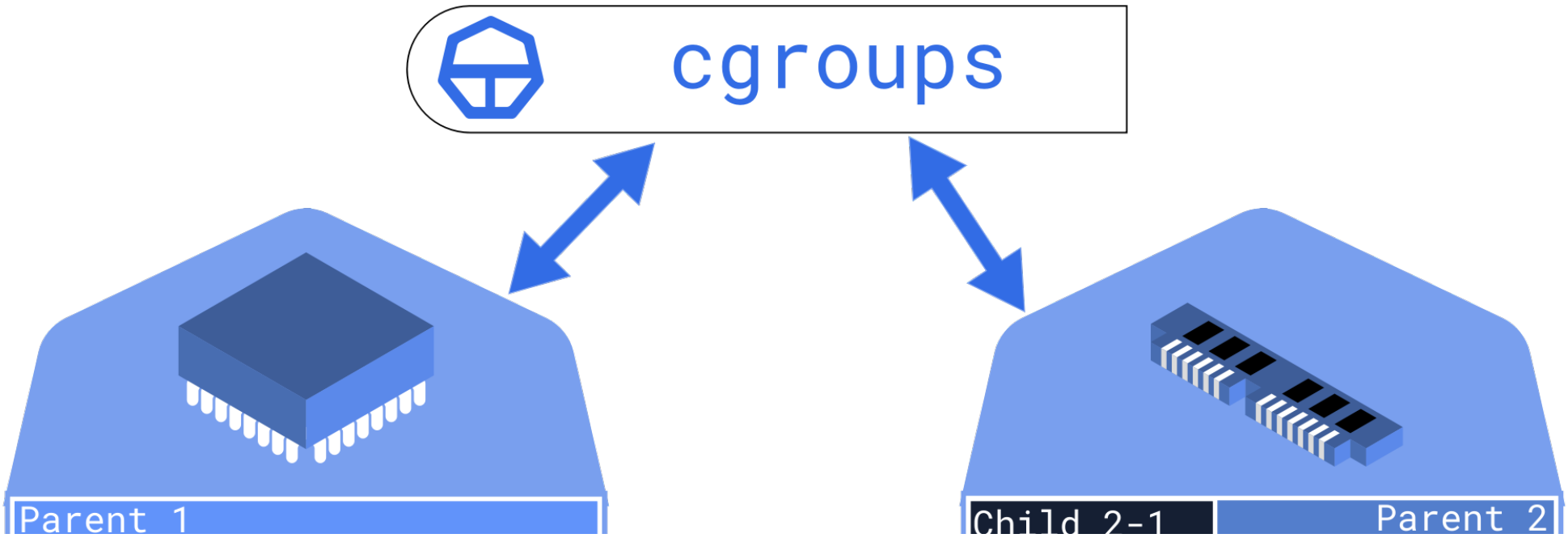

Parent 2
Parent 1

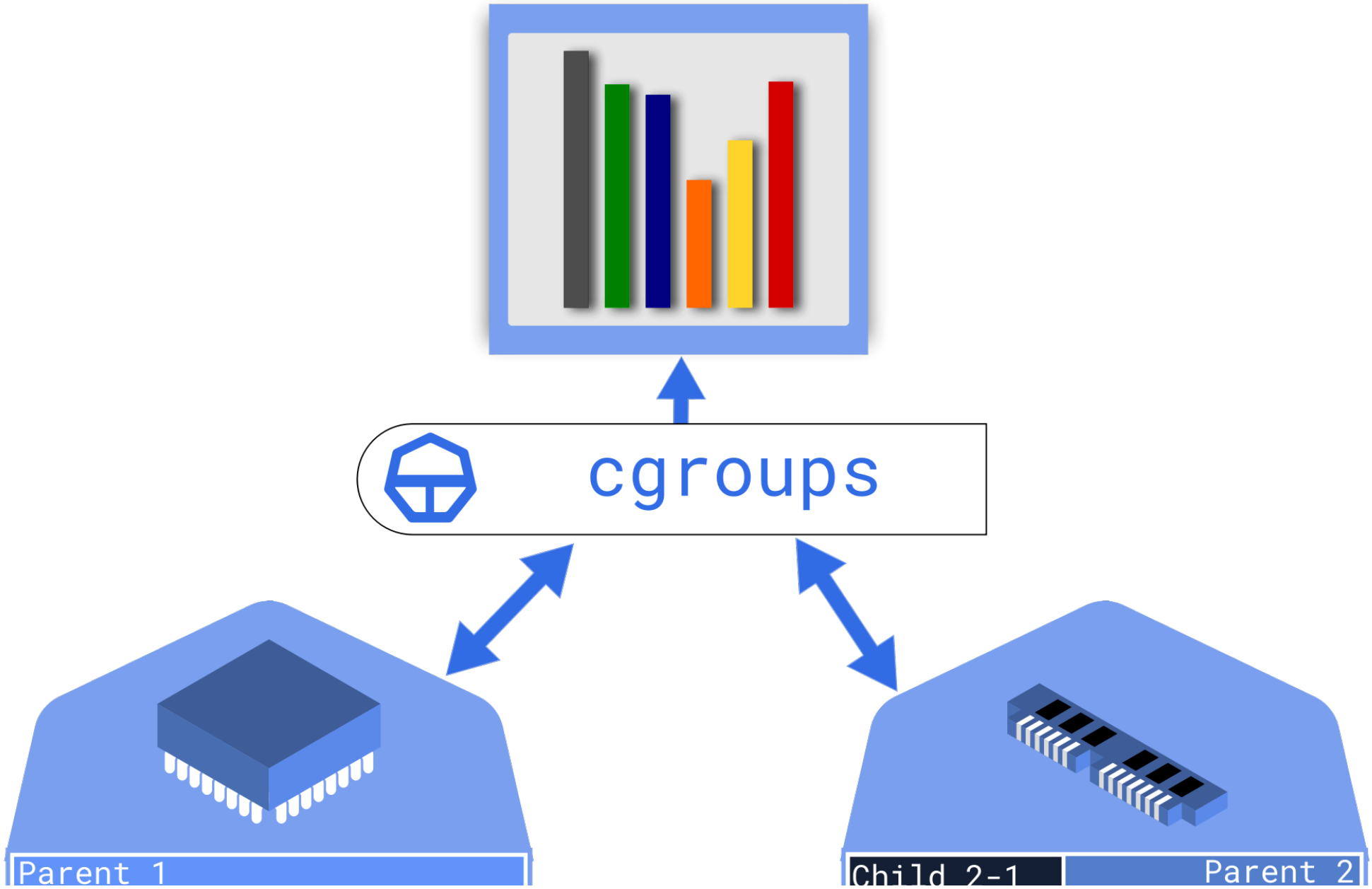

Parent 1
Parent 2
Child 2-1-1
Child 2-1


Parent 2
Parent 1

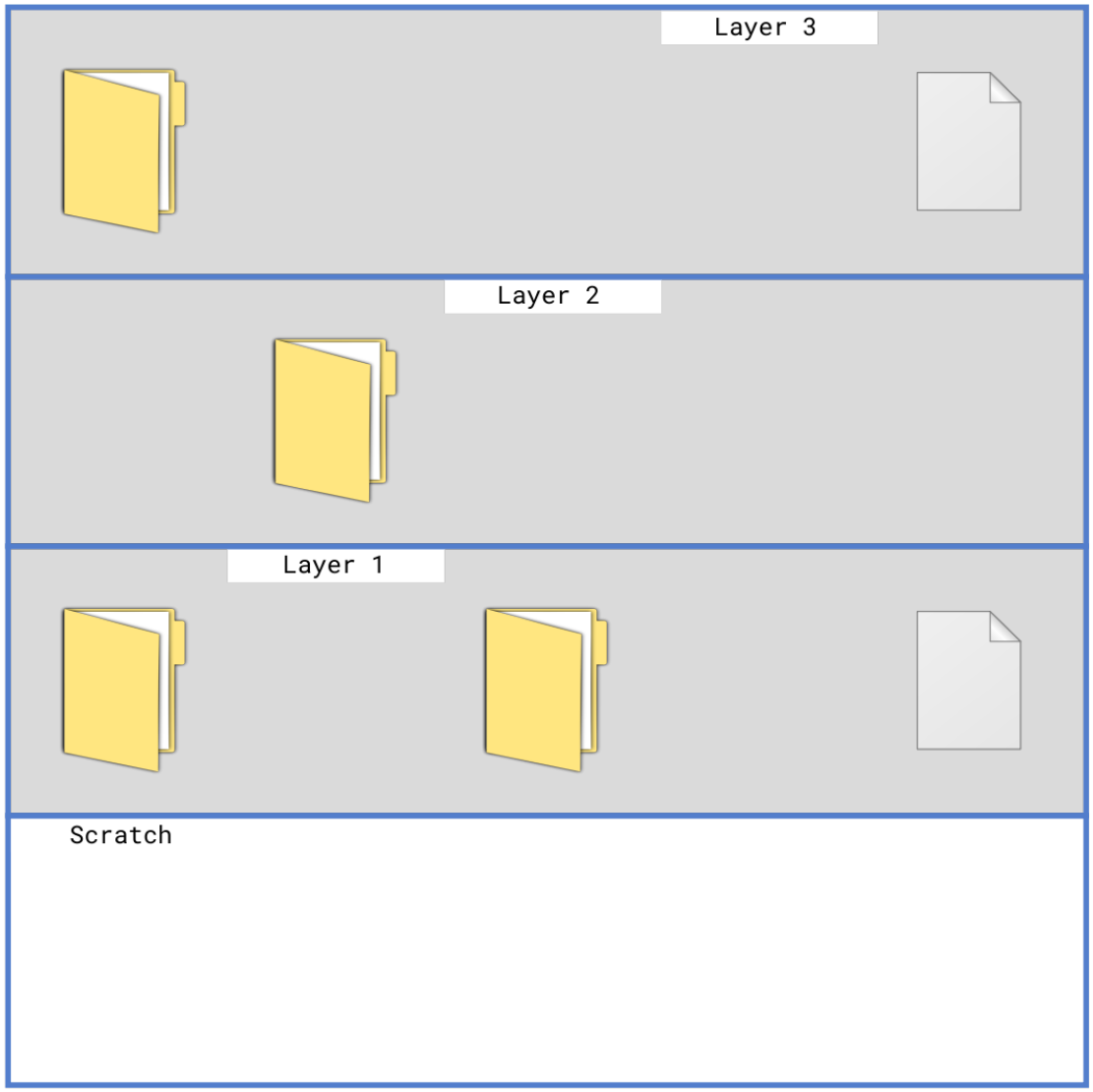

Parent 1
Parent 2
Child 2-1-1
Child 2-1

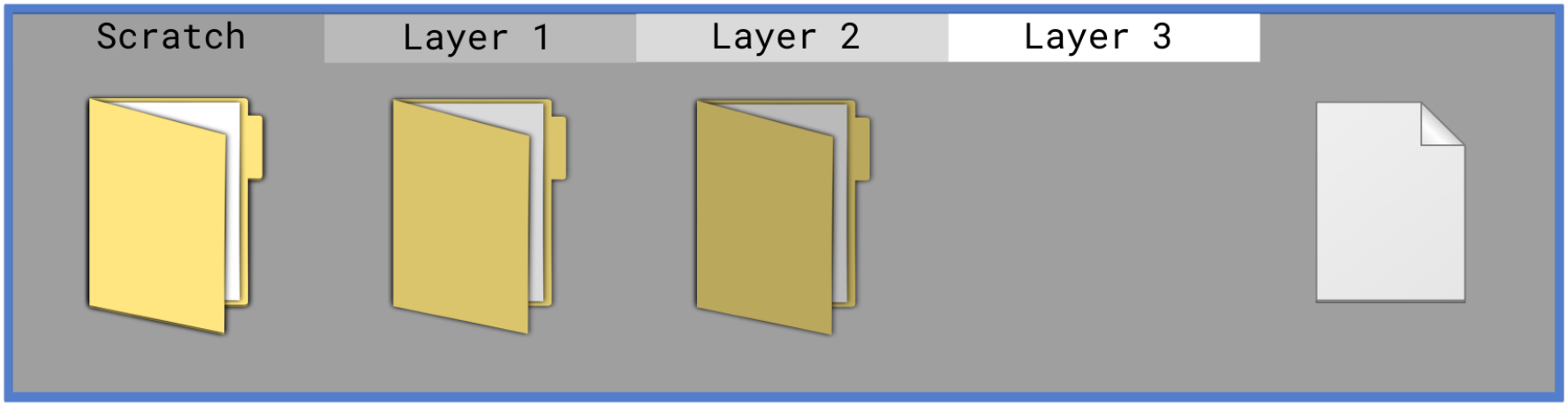

Child 2-1
Parent 2
Parent 1

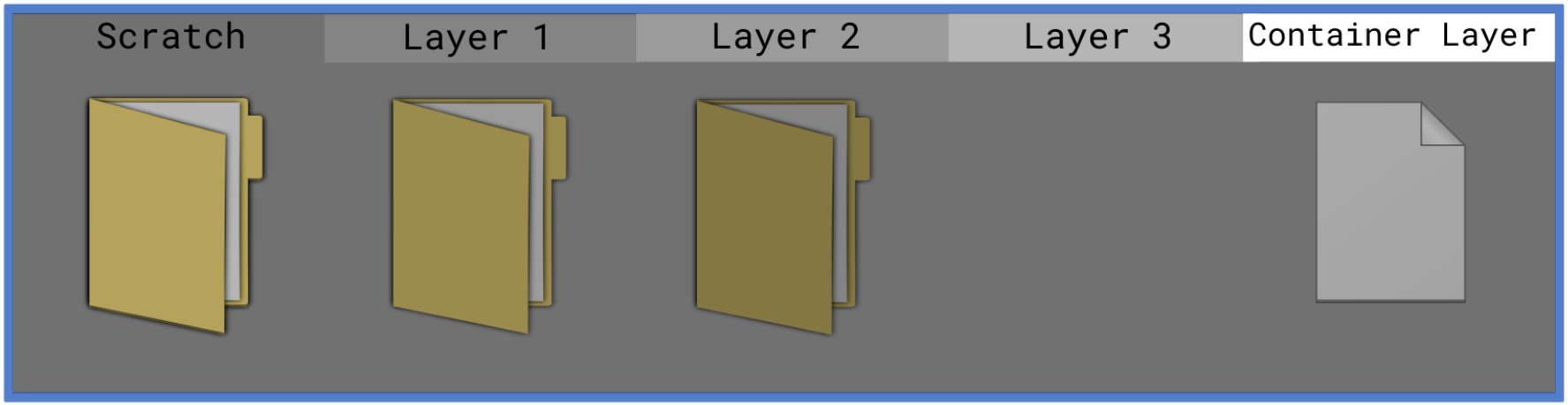

cgroups
Parent 1
Child 2-1
Parent 2

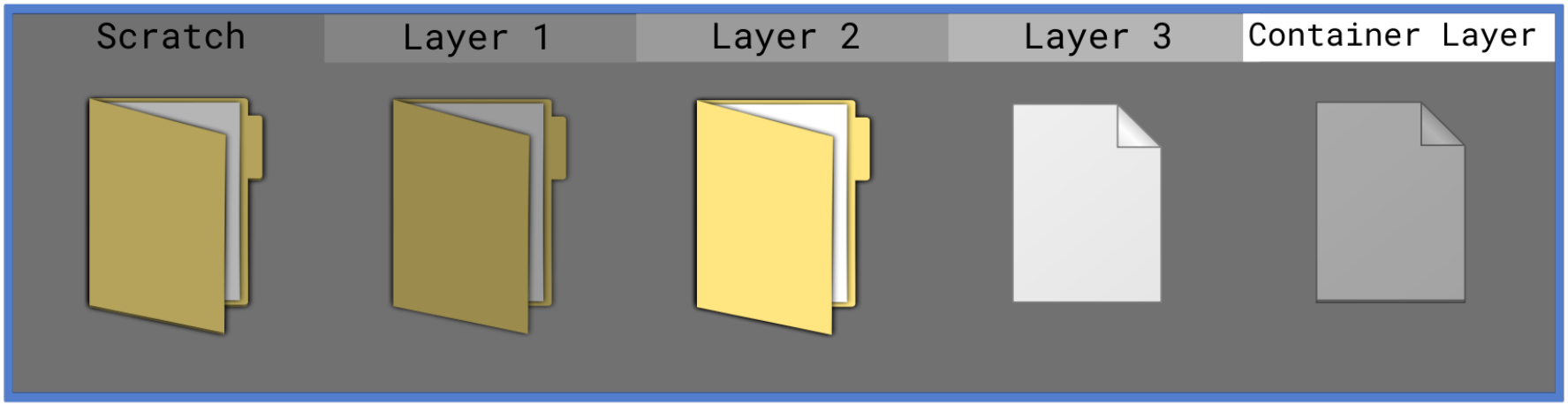

cgroups
Parent 1
Child 2-1
Parent 2

Union File Systems

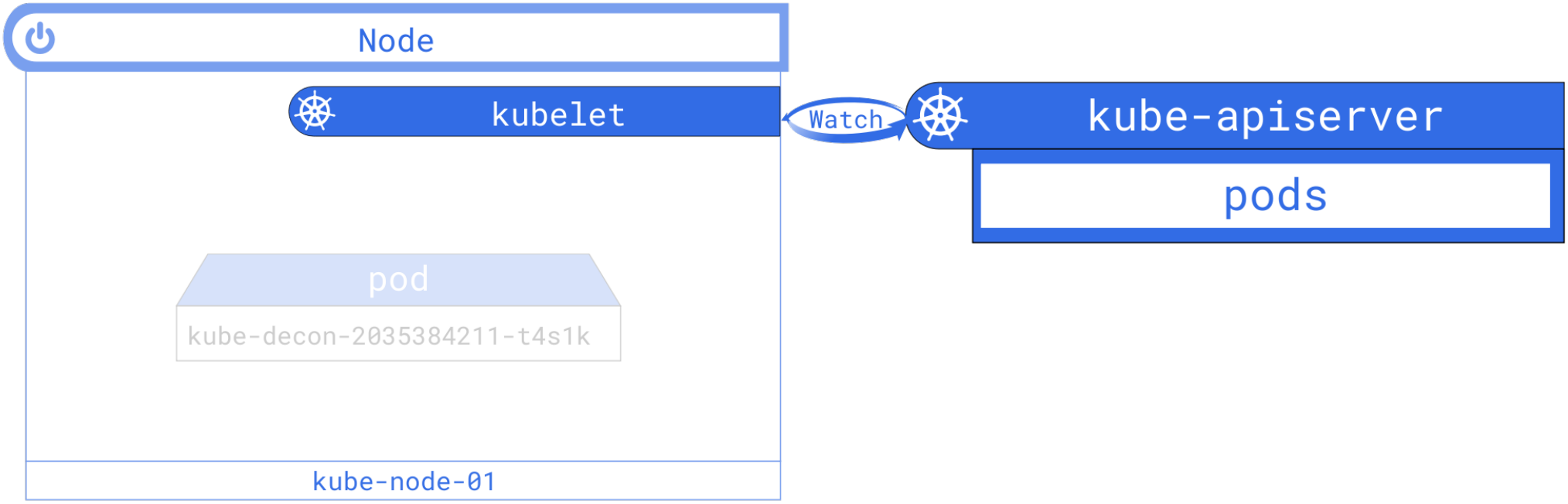

Layer 3
Layer 2
Layer 1
Scratch

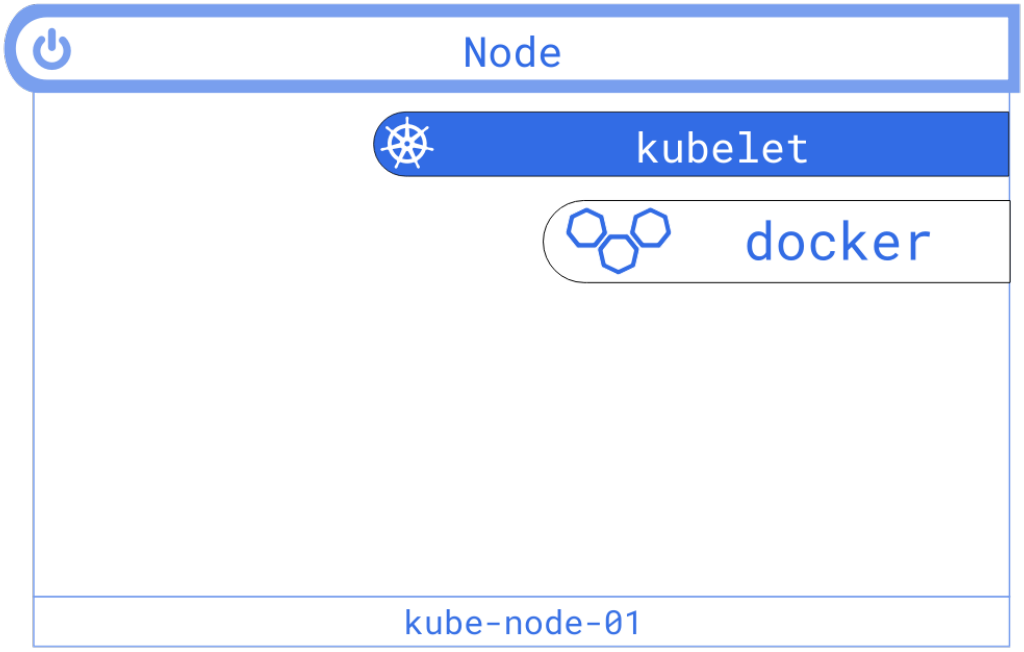

Scratch
Layer 1
Layer 2
Layer 3


Scratch
Layer 1
Layer 2
Layer 3
Container Layer

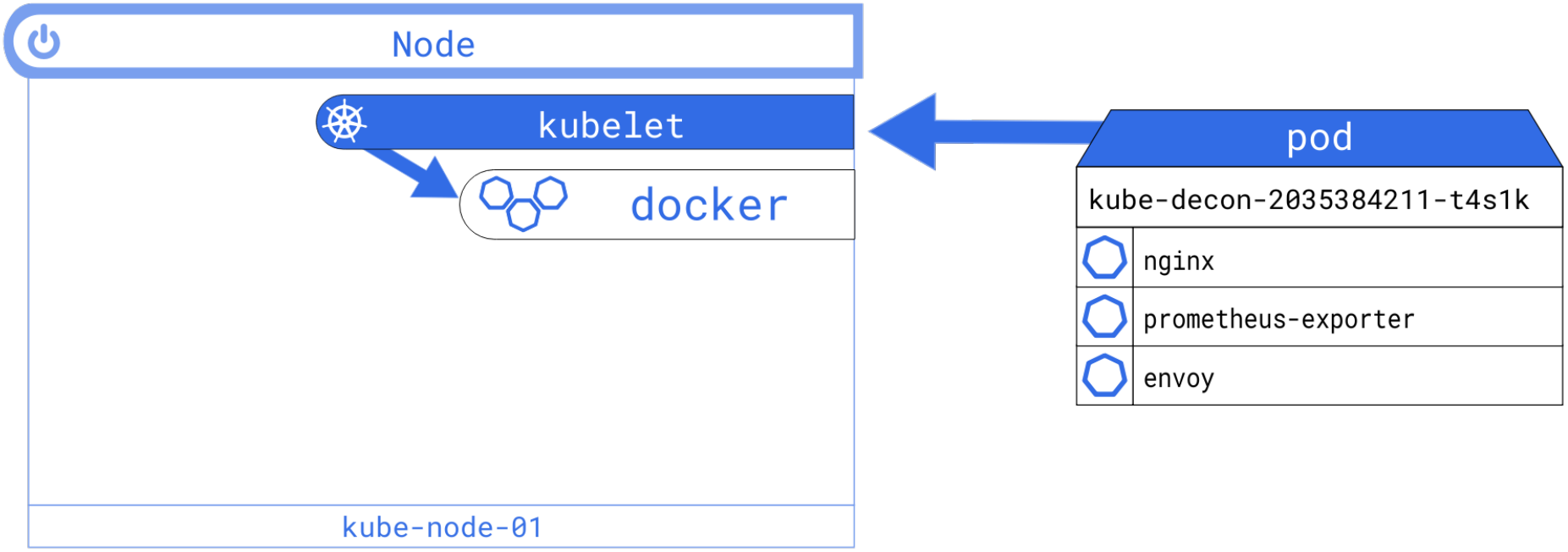

Scratch
Layer 1
Layer 2
Layer 3
Container Layer

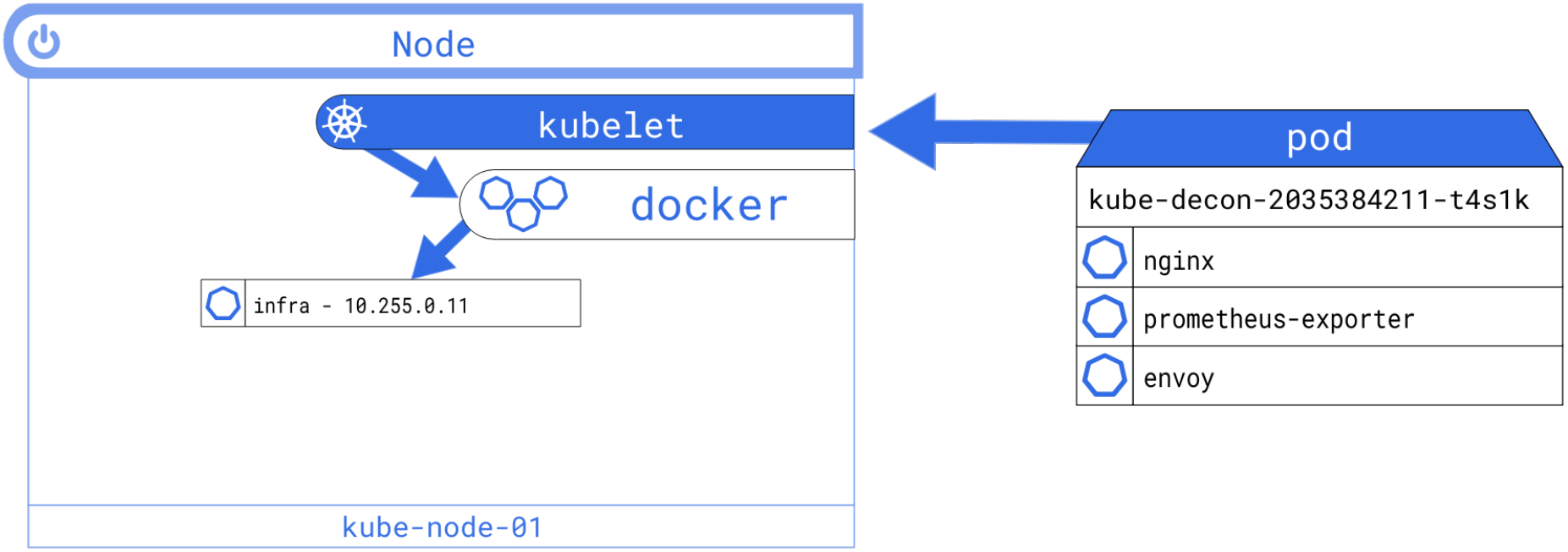
Kubernetes Nodes

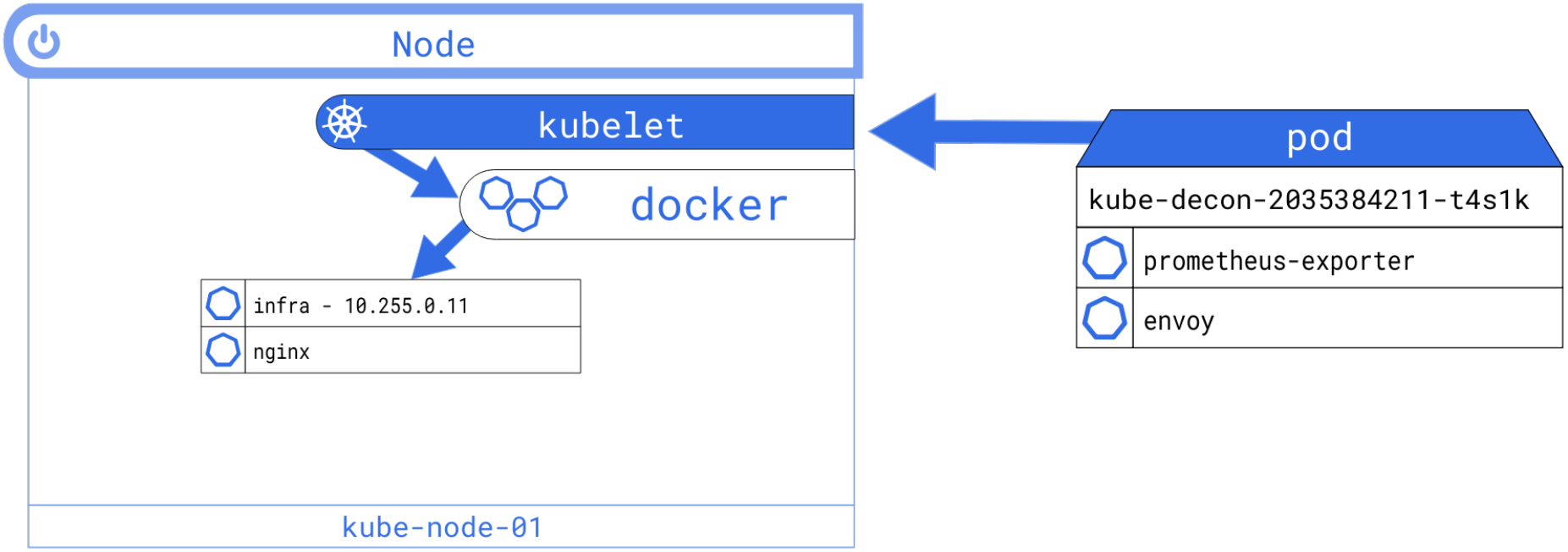

Node
kubelet
Watch
kube-apiserver
pods
pod
kube-decon-2035384211-t4s1k
kube-node-01

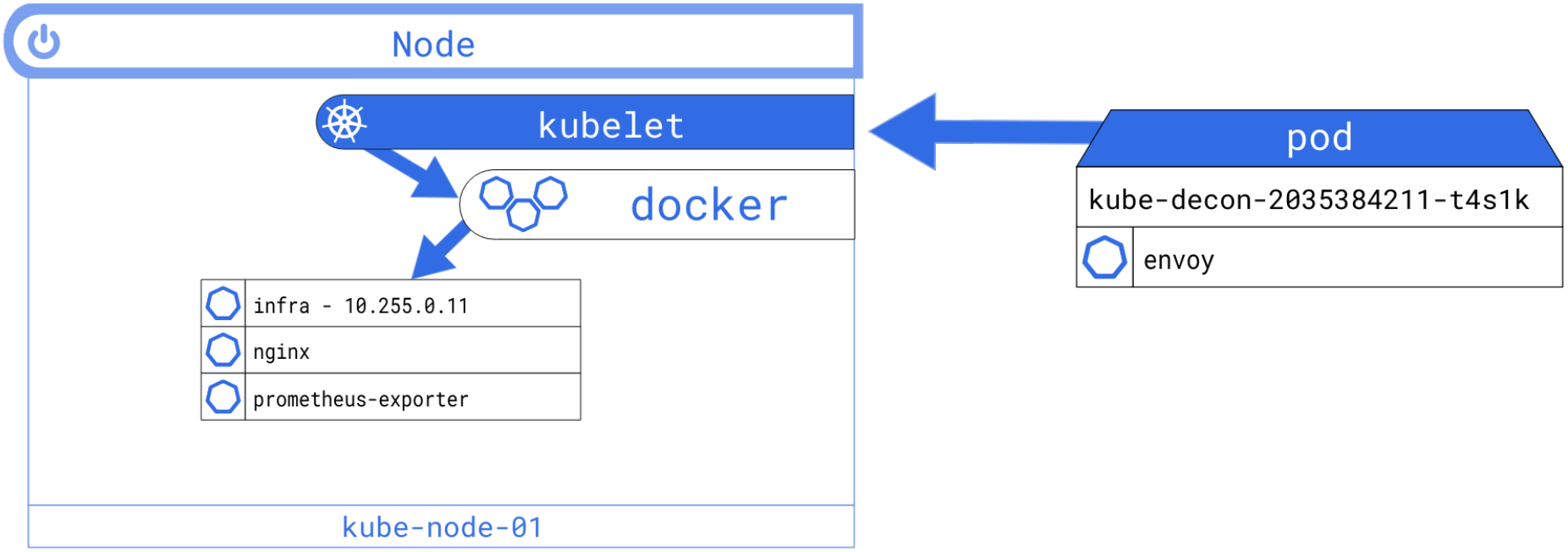

Node
kubelet
docker
kube-node-01

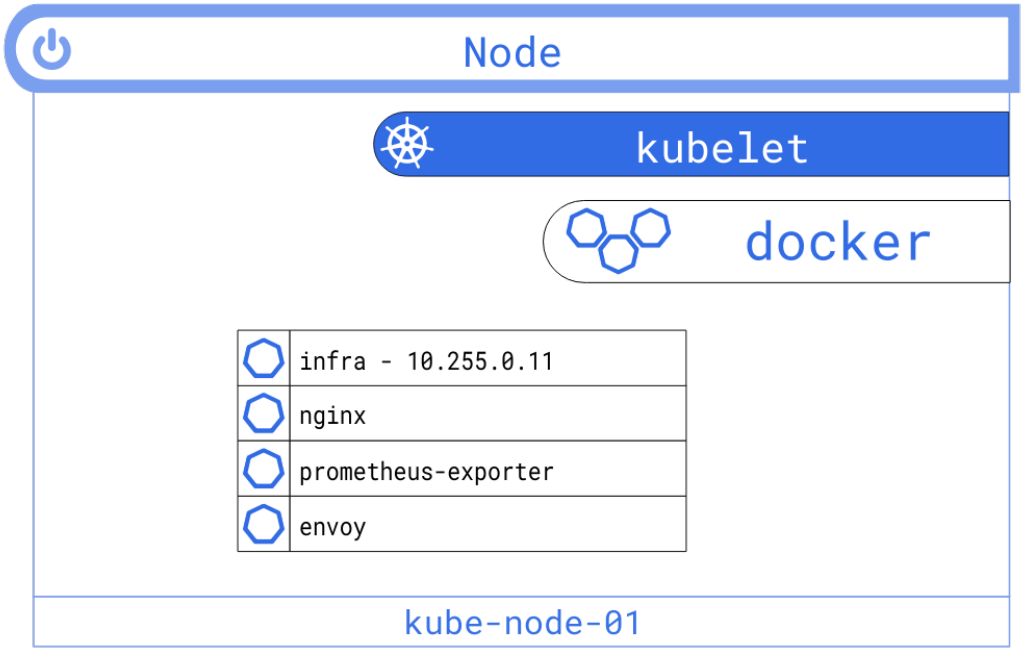

pod
kube-decon-2035384211-t4s1k
nginx
prometheus-exporter
envoy

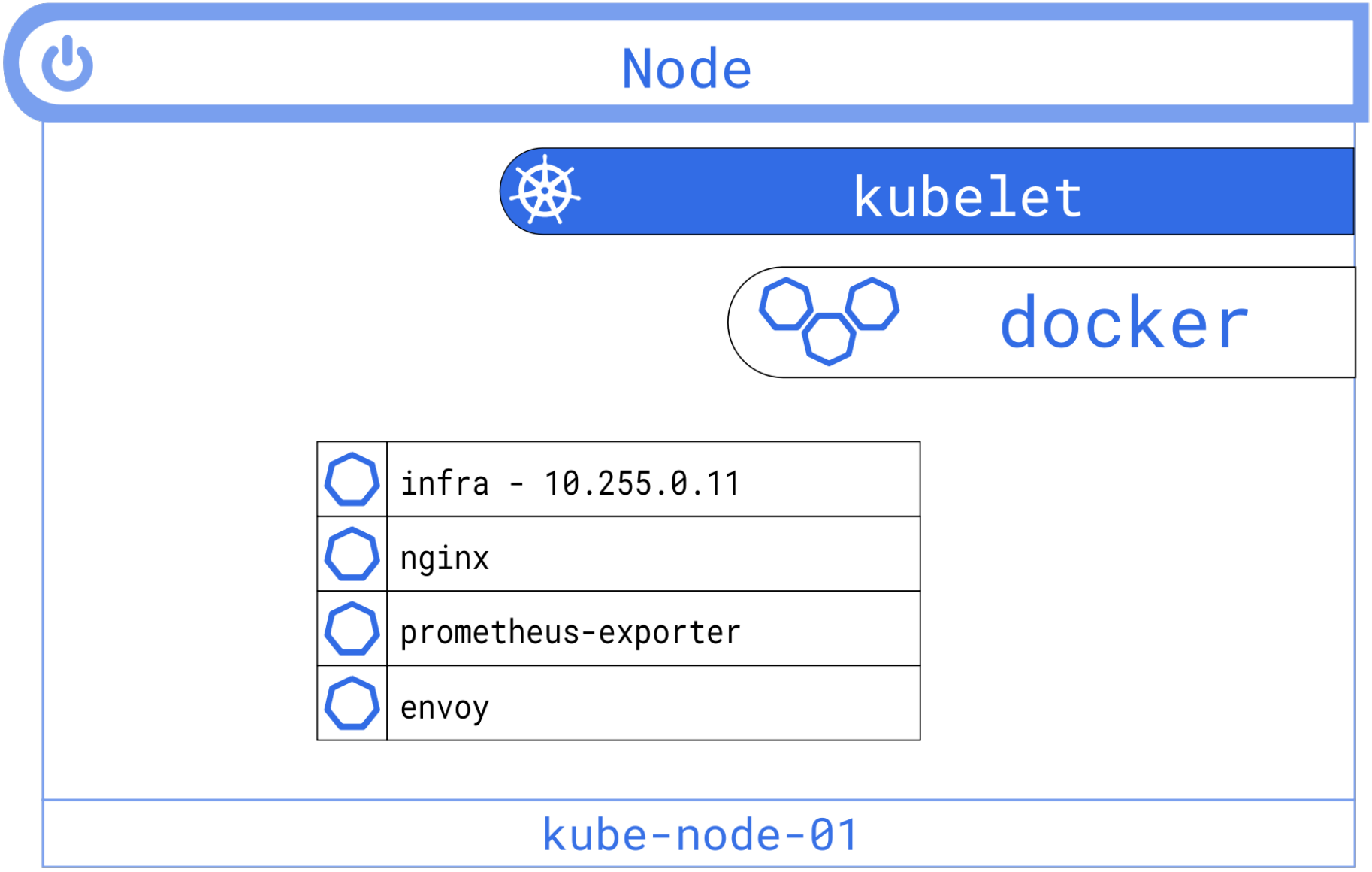

Node
kubelet
docker
kube-node-01
pod
kube-decon-2035384211-t4s1k
nginx
prometheus-exporter
envoy

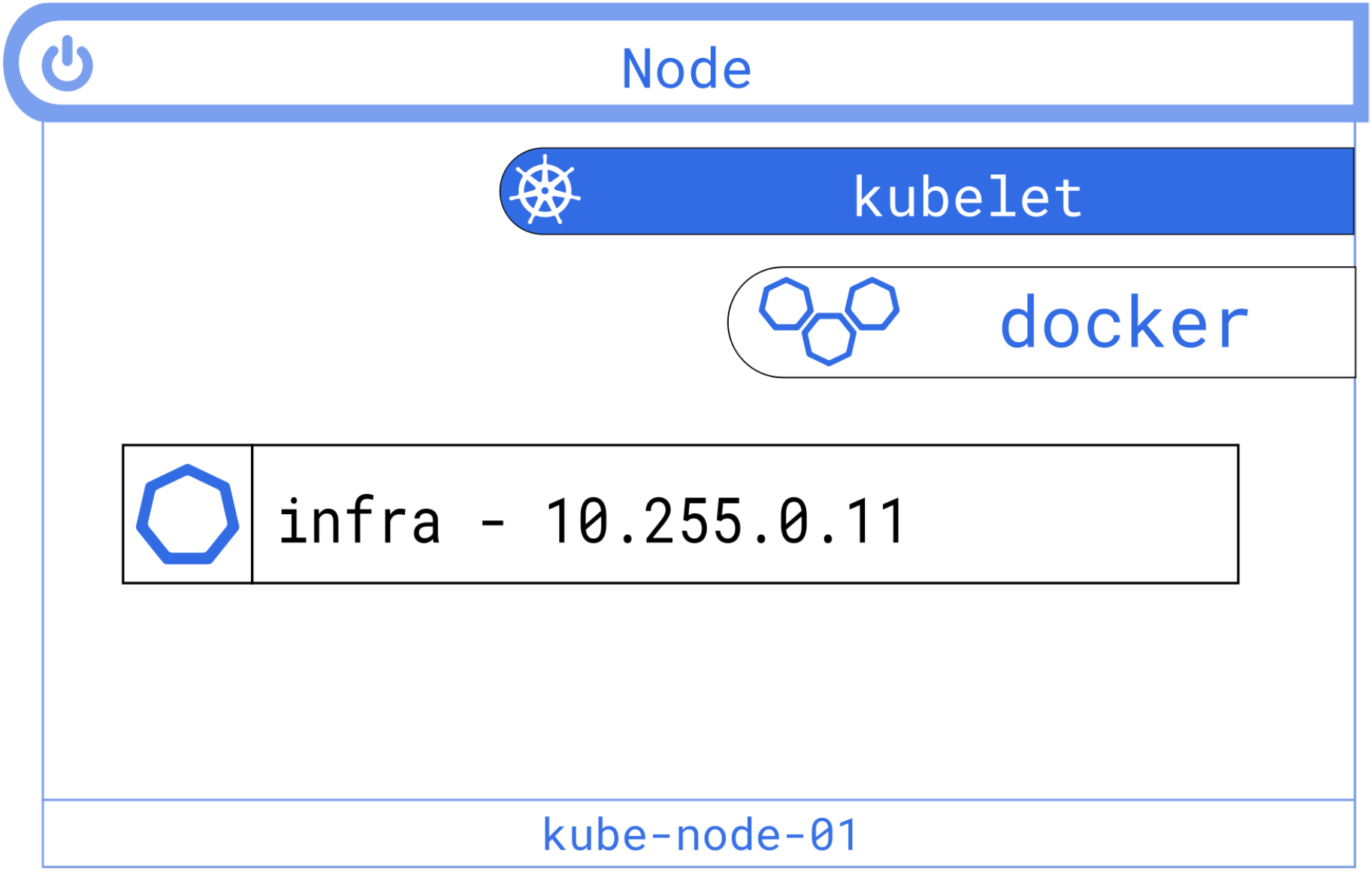

Node
kubelet
docker
infra - 10.255.0.11
kube-node-01
pod
kube-decon-2035384211-t4s1k
nginx
prometheus-exporter
envoy

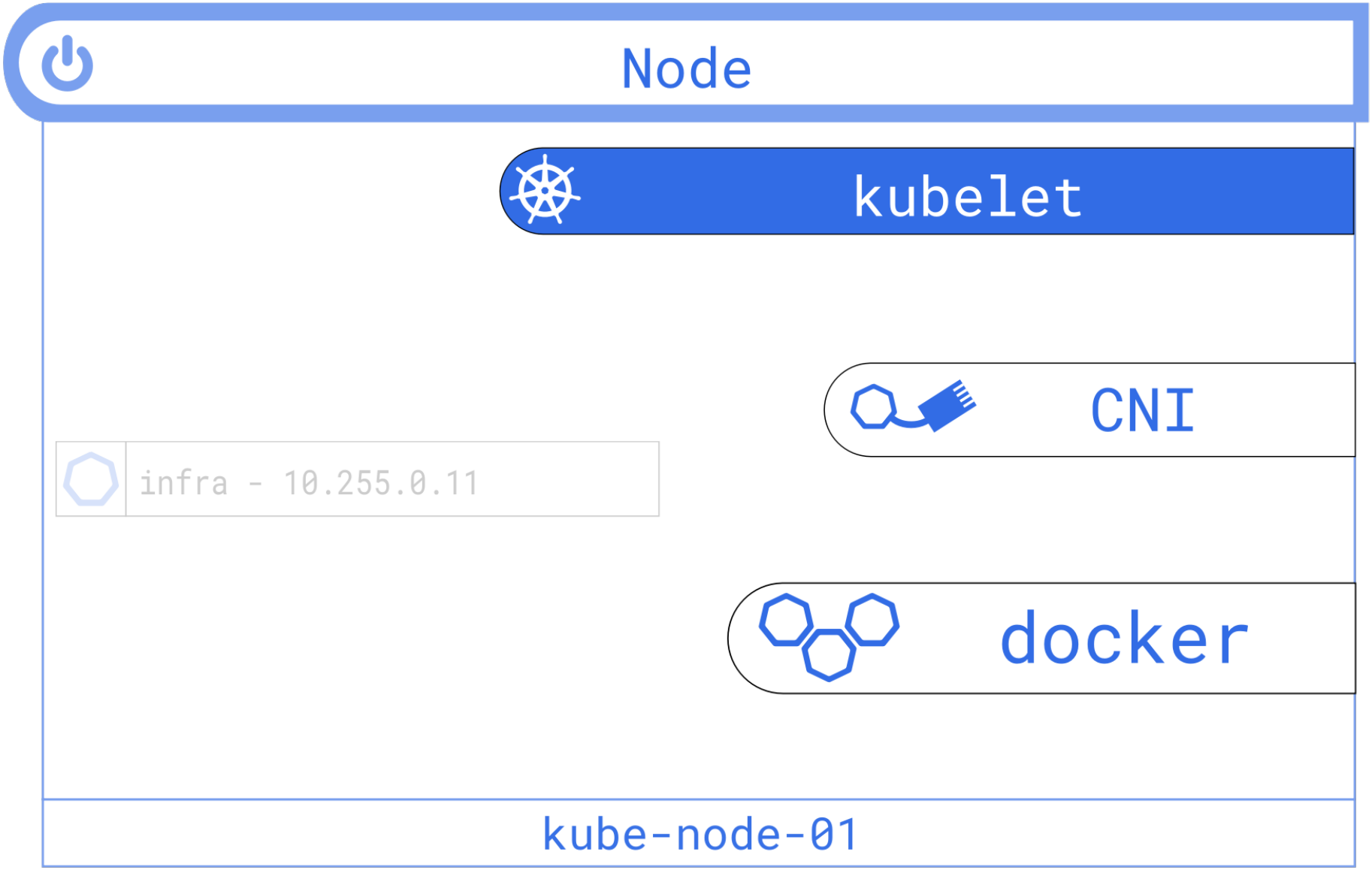

Node
kubelet
docker
infra - 10.255.0.11
nginx
kube-node-01
pod
kube-decon-2035384211-t4s1k
prometheus-exporter
envoy

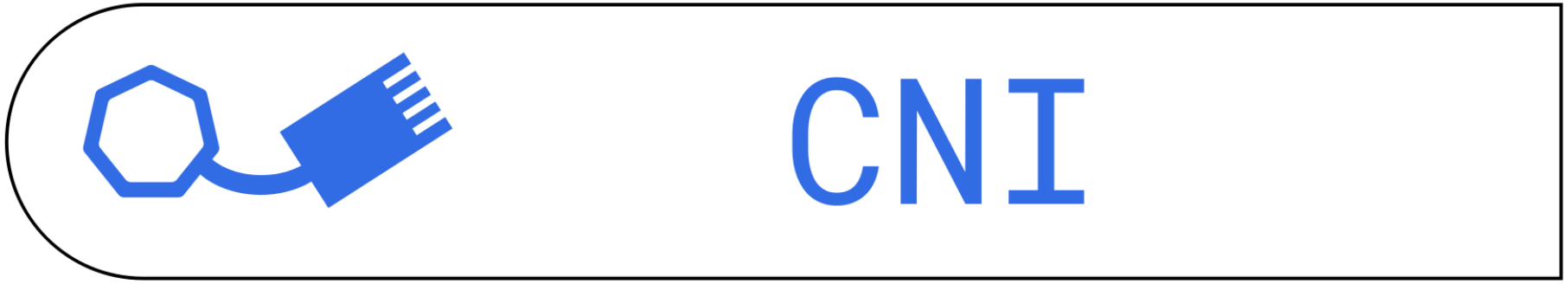

Node
kubelet
docker
infra - 10.255.0.11
nginx
prometheus-exporter
kube-node-01
pod
kube-decon-2035384211-t4s1k
envoy

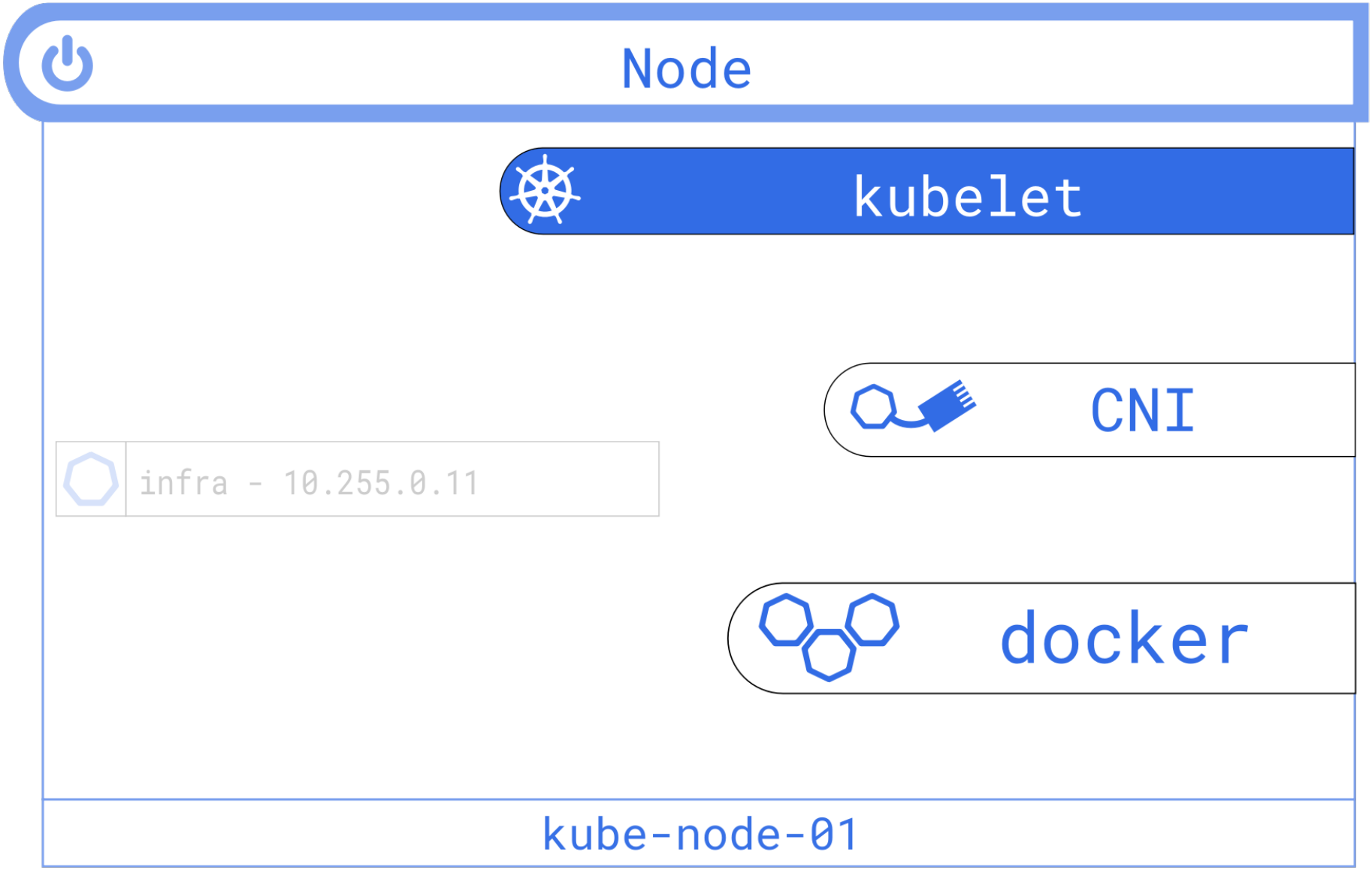

Node
kubelet
docker
infra - 10.255.0.11
nginx
prometheus-exporter
envoy
kube-node-01

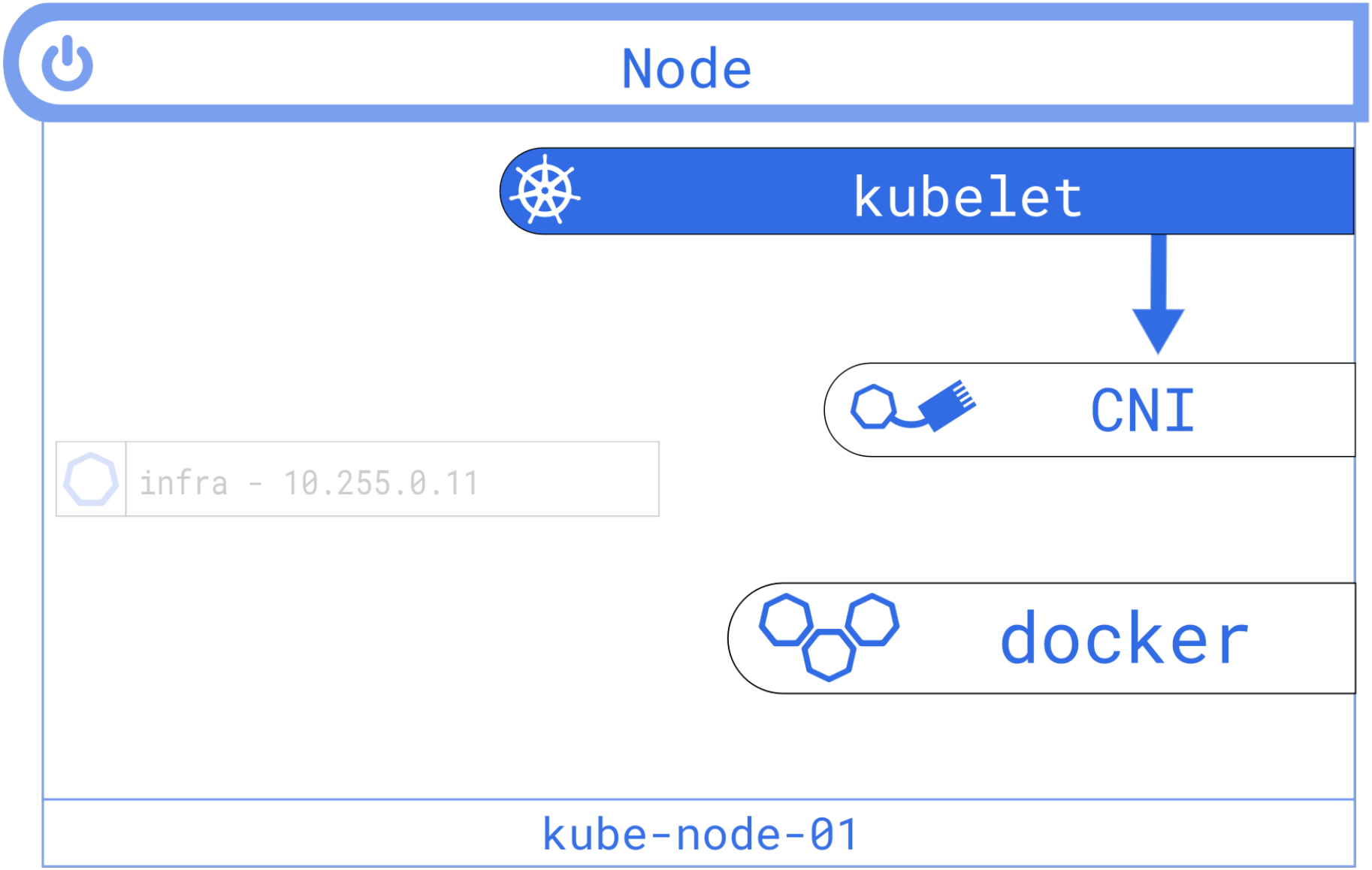

Node
kubelet
docker
infra - 10.255.0.11
nginx
prometheus-exporter
envoy
kube-node-01

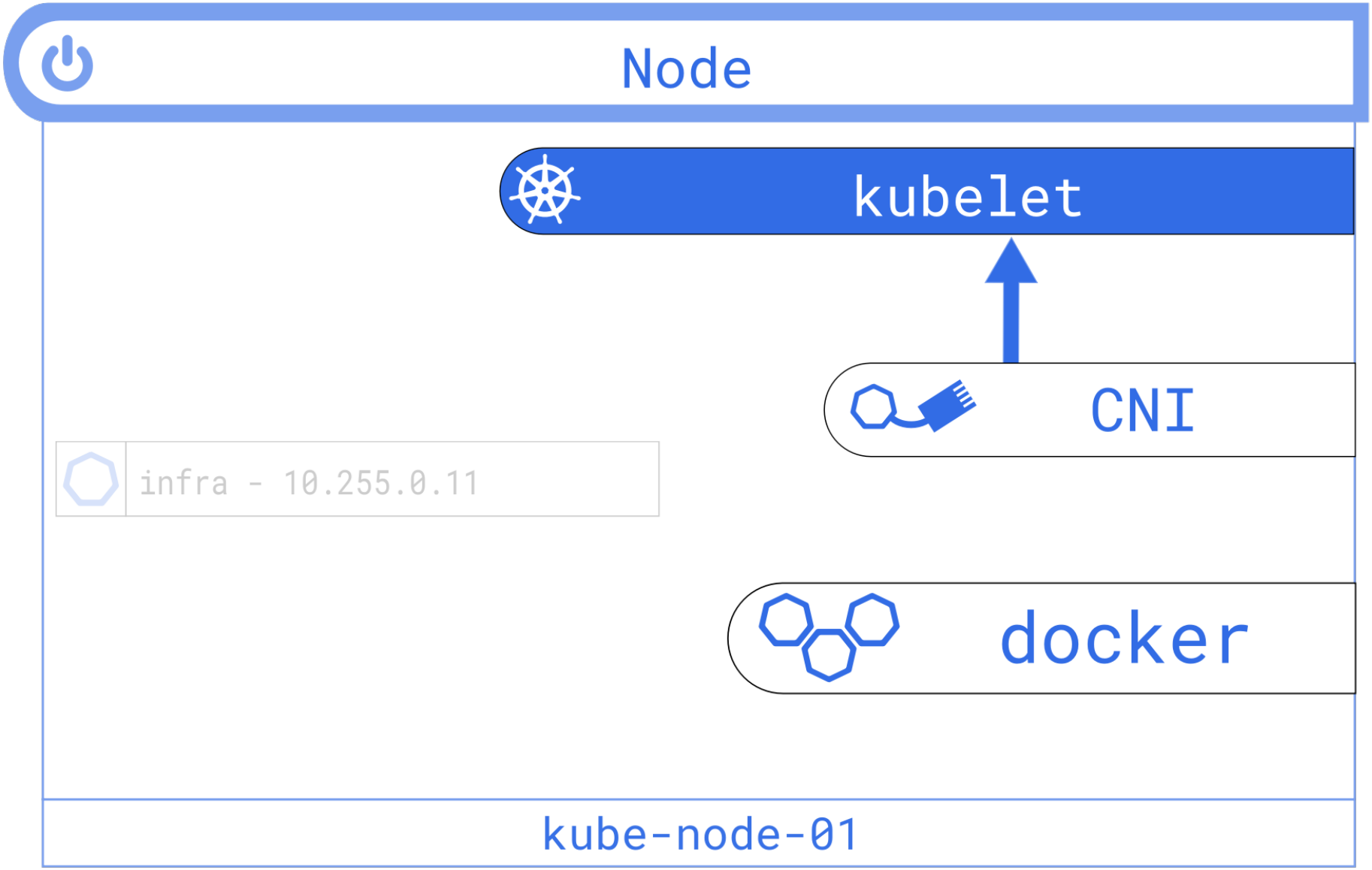

Node
kubelet
docker
infra - 10.255.0.11
kube-node-01

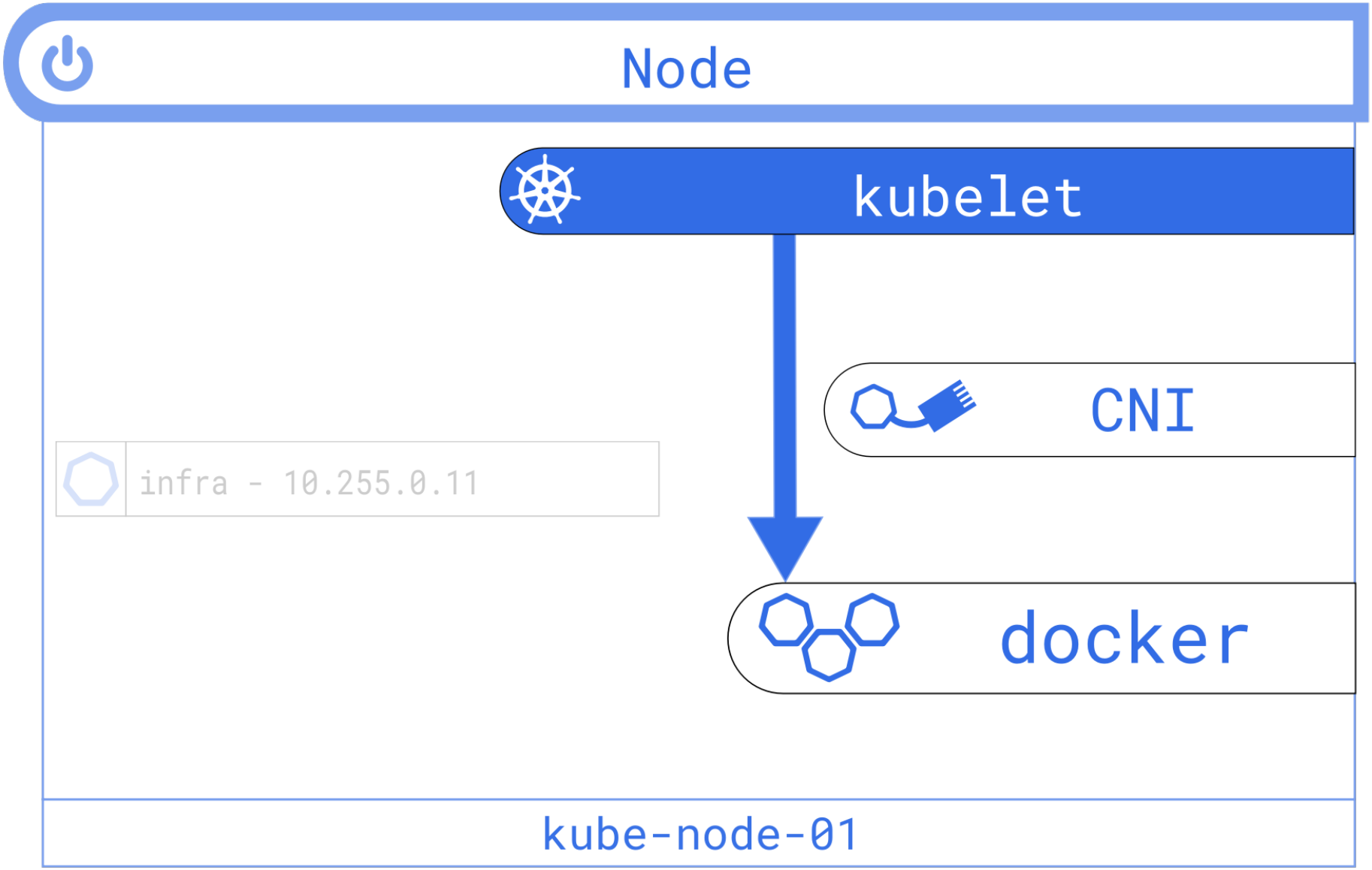

Node
kubelet
CNI
infra - 10.255.0.11
docker
kube-node-01

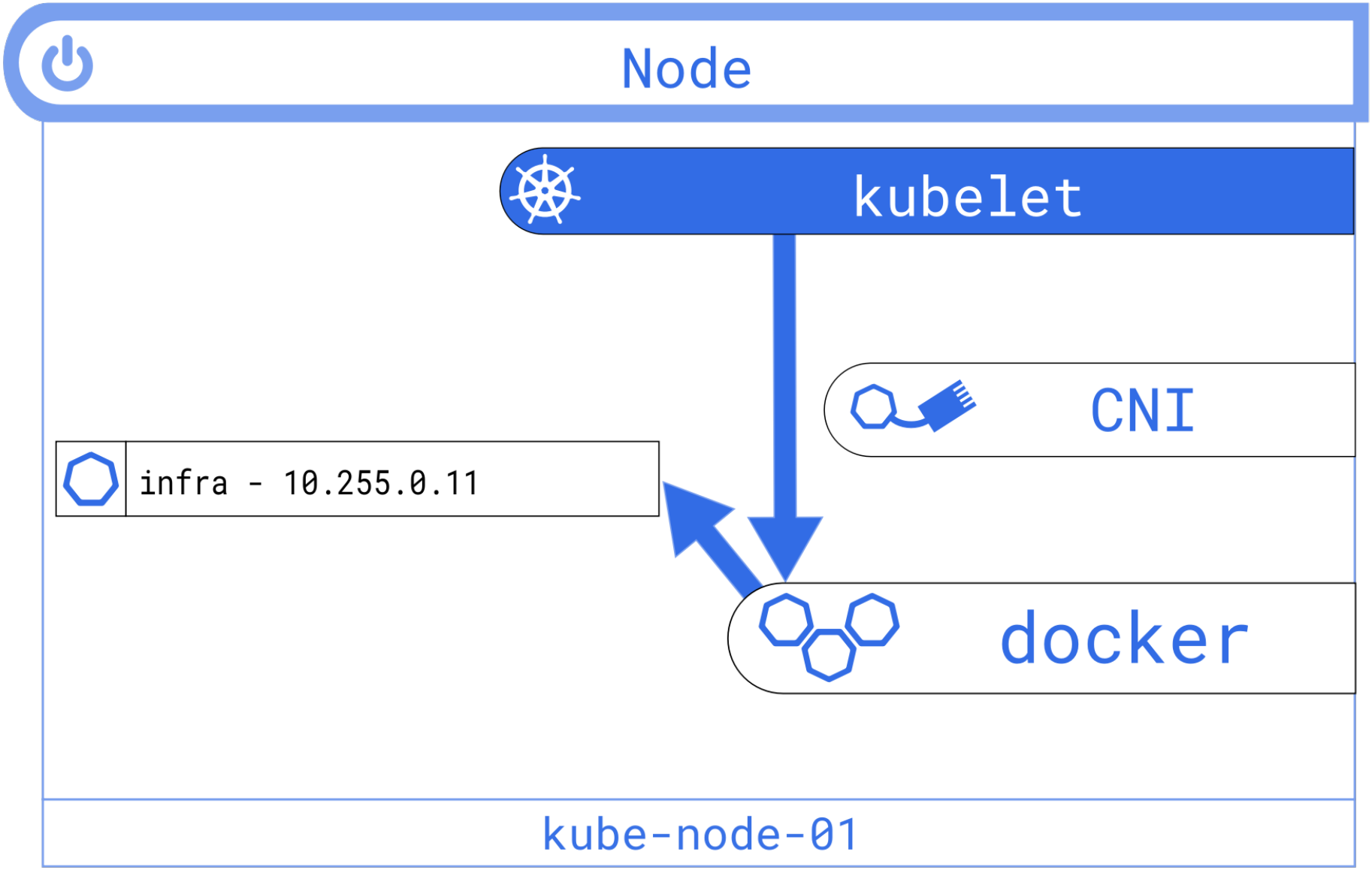

CNI

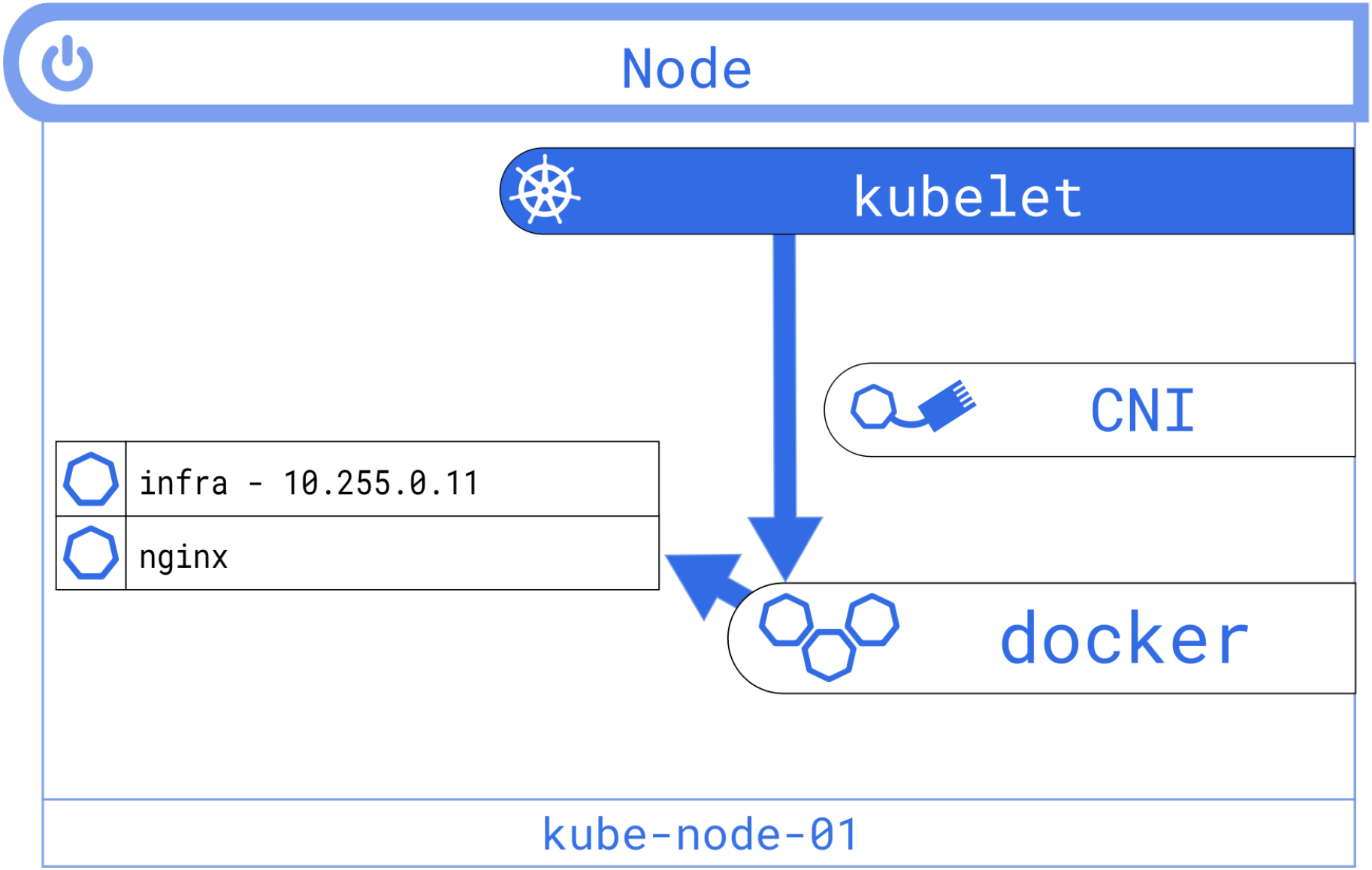

Node
kubelet
CNI
infra - 10.255.0.11
docker
kube-node-01

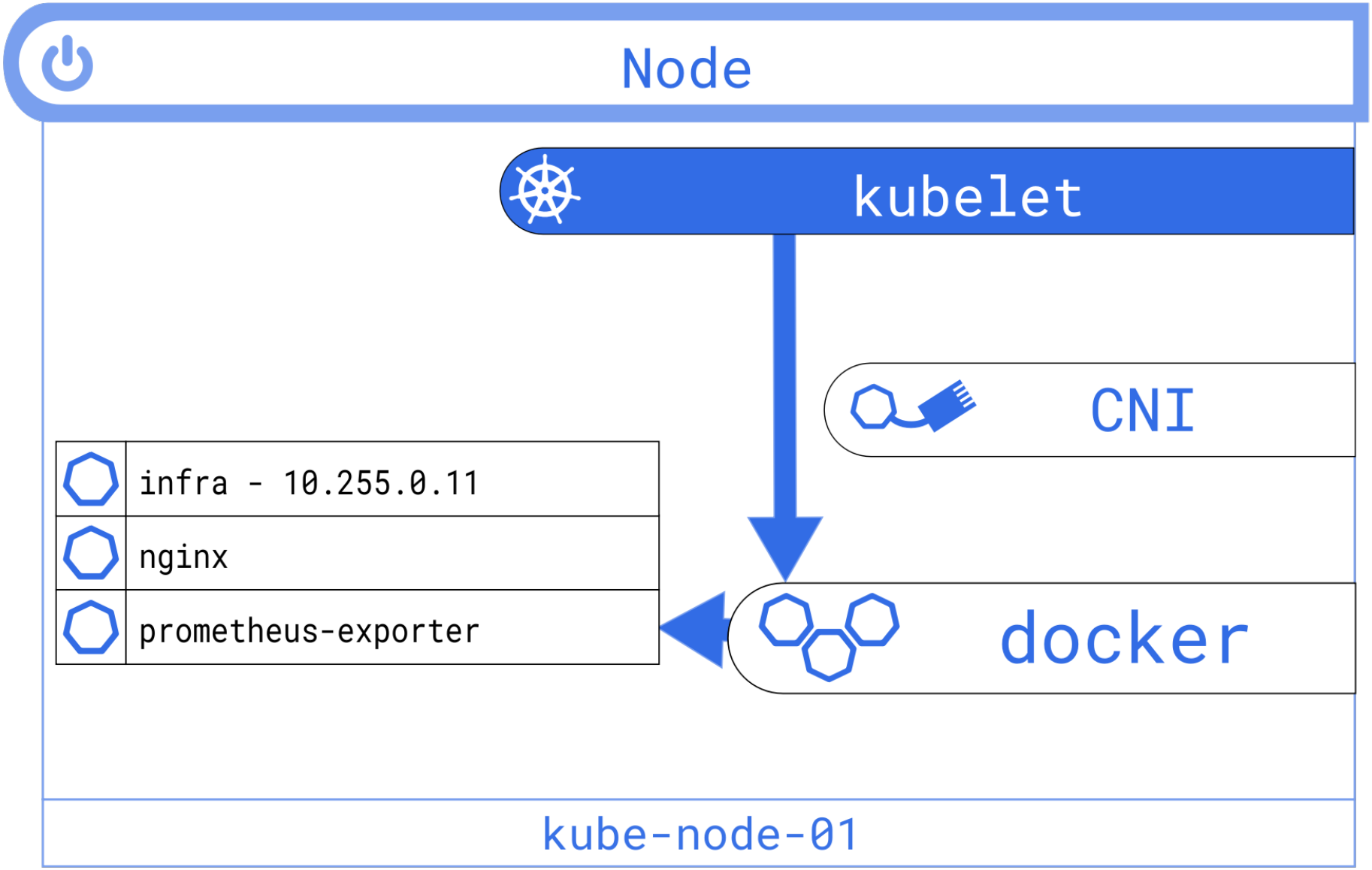

Node
kubelet
CNI
infra - 10.255.0.11
docker
kube-node-01

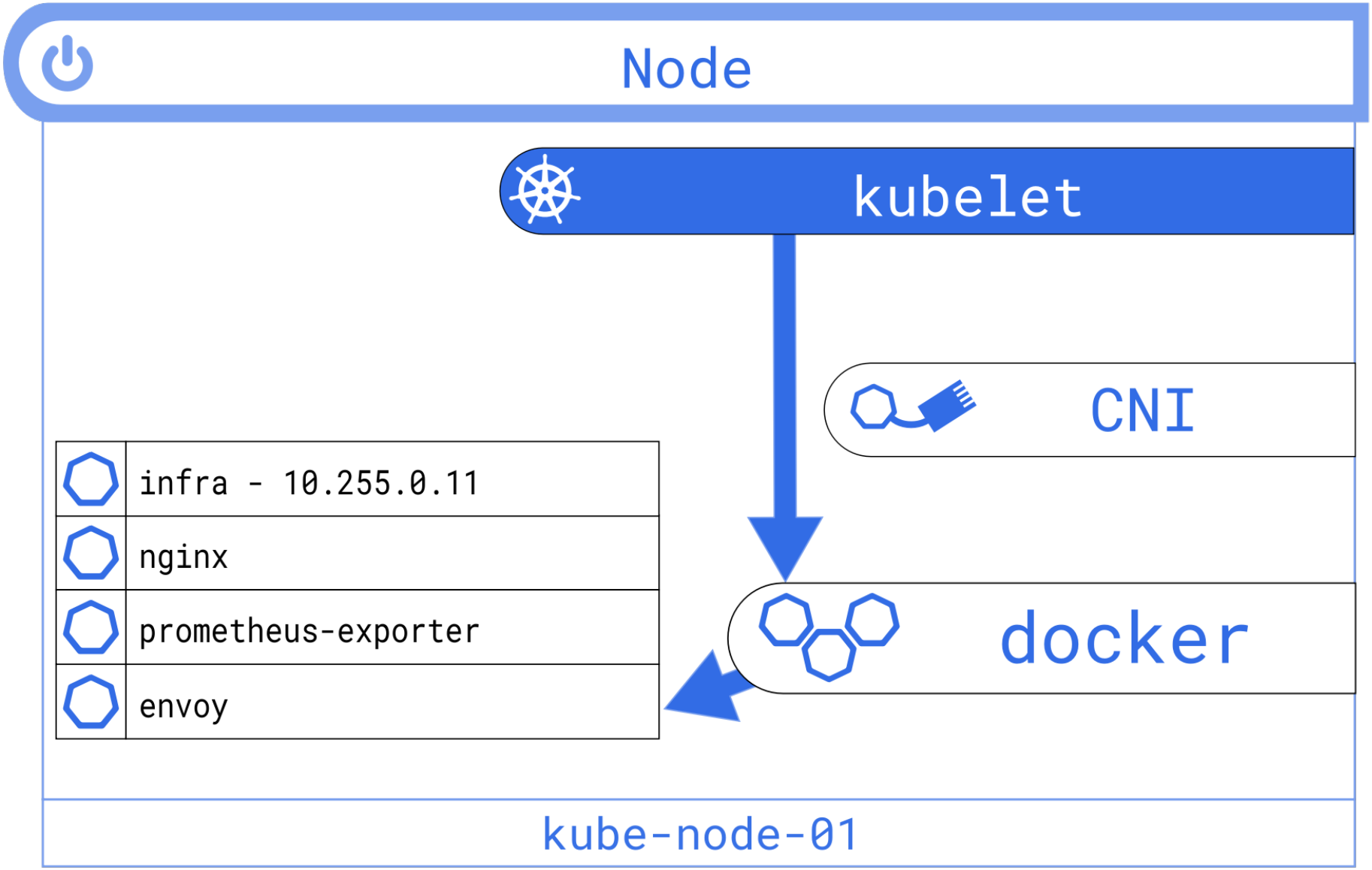

Node
kubelet
CNI
infra - 10.255.0.11
docker
kube-node-01

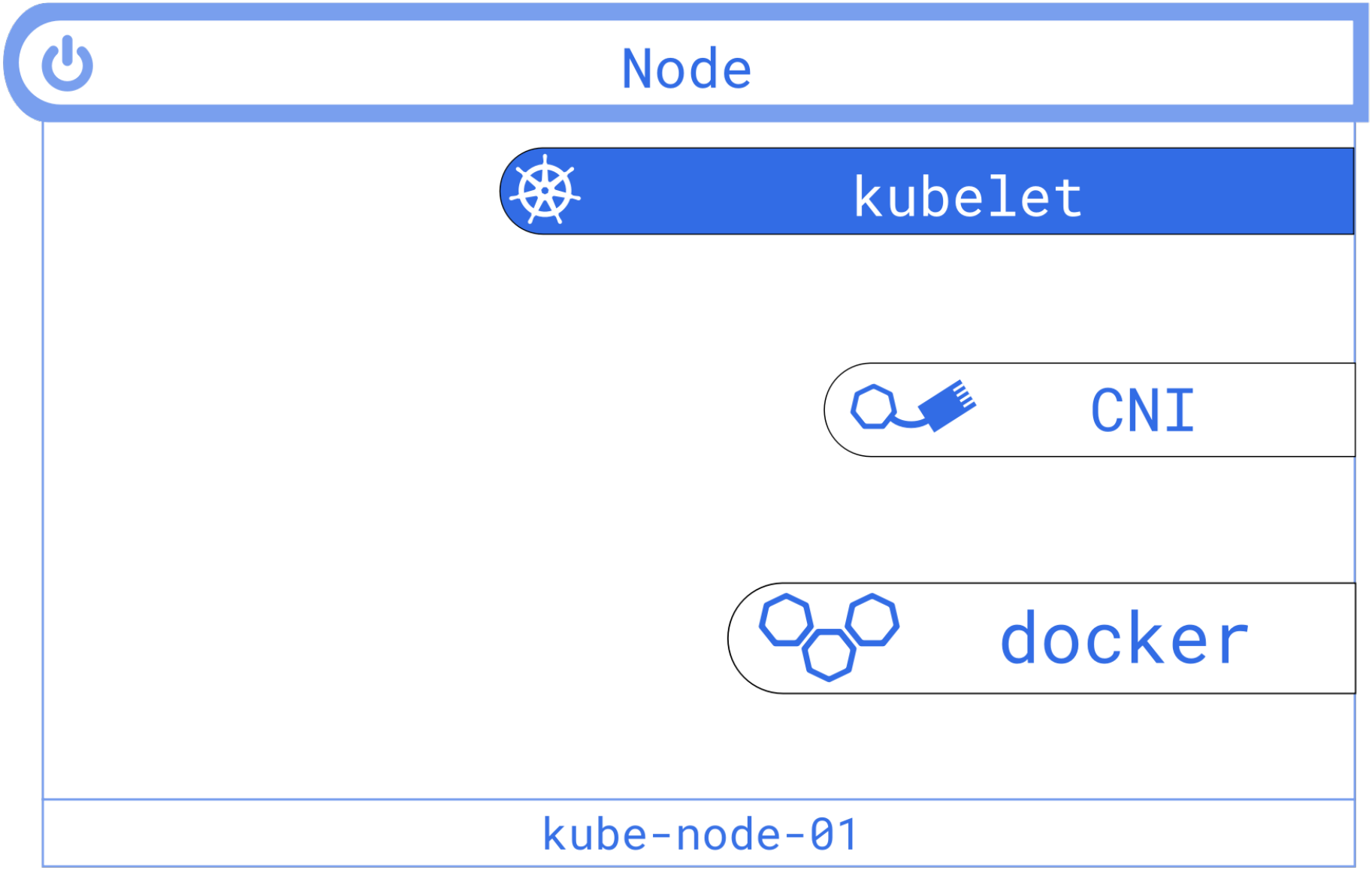

Node
kubelet
CNI
infra - 10.255.0.11
docker
kube-node-01

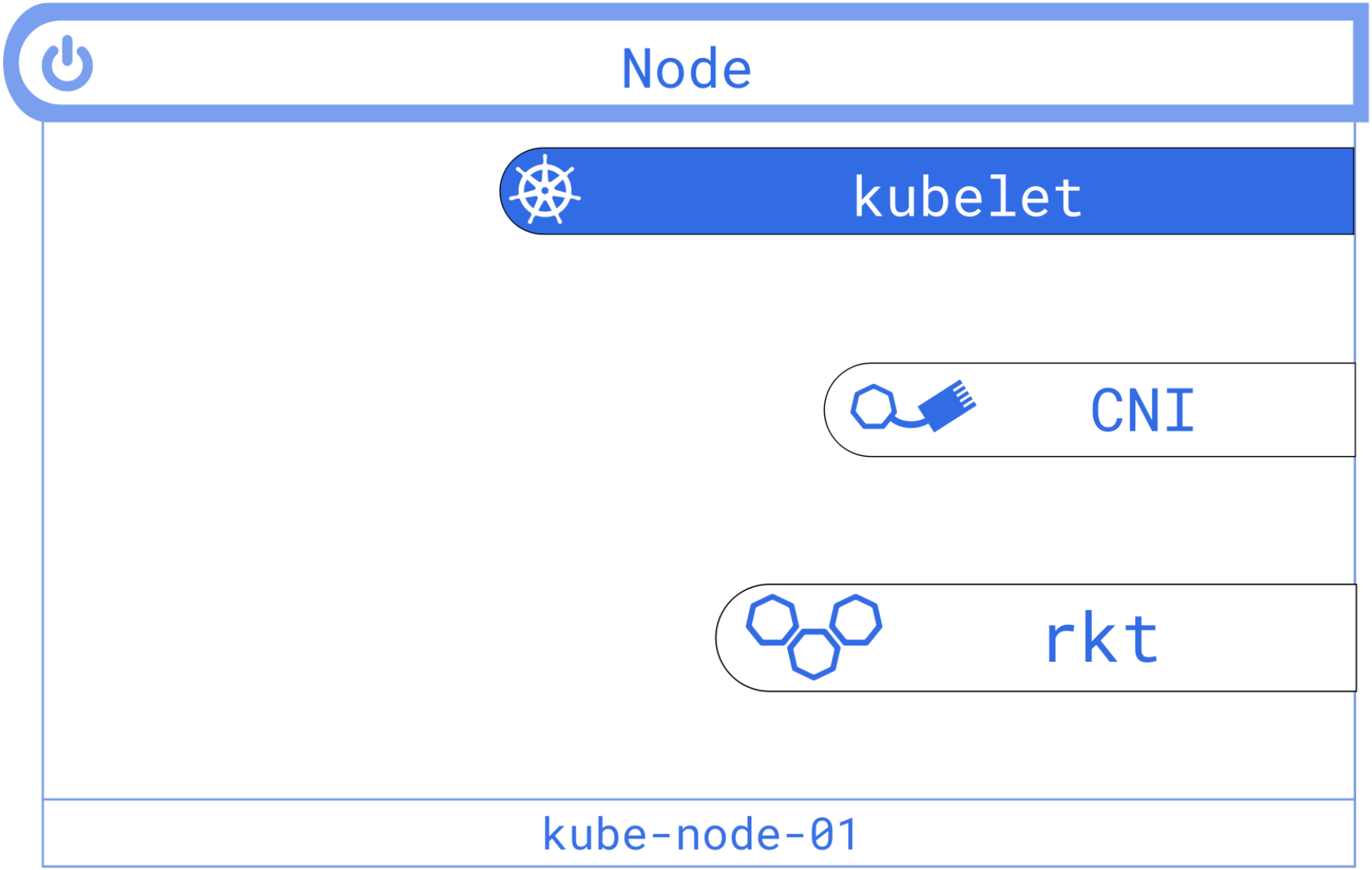

Node
kubelet
CNI
infra - 10.255.0.11
docker
kube-node-01


Node
kubelet
CNI
infra - 10.255.0.11
nginx
docker
kube-node-01

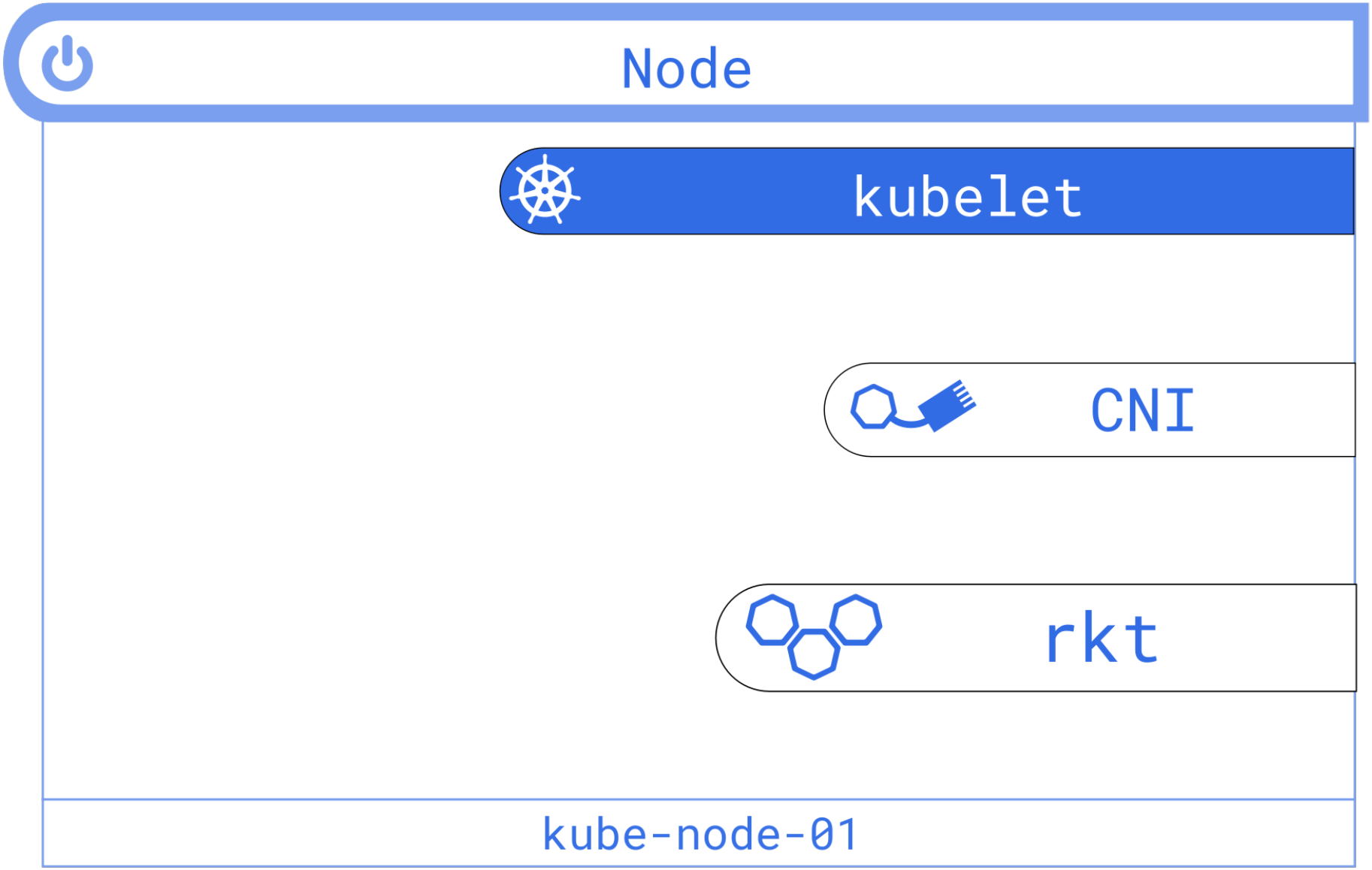

Node
kubelet
CNI
infra - 10.255.0.11
nginx
prometheus-exporter
docker
kube-node-01

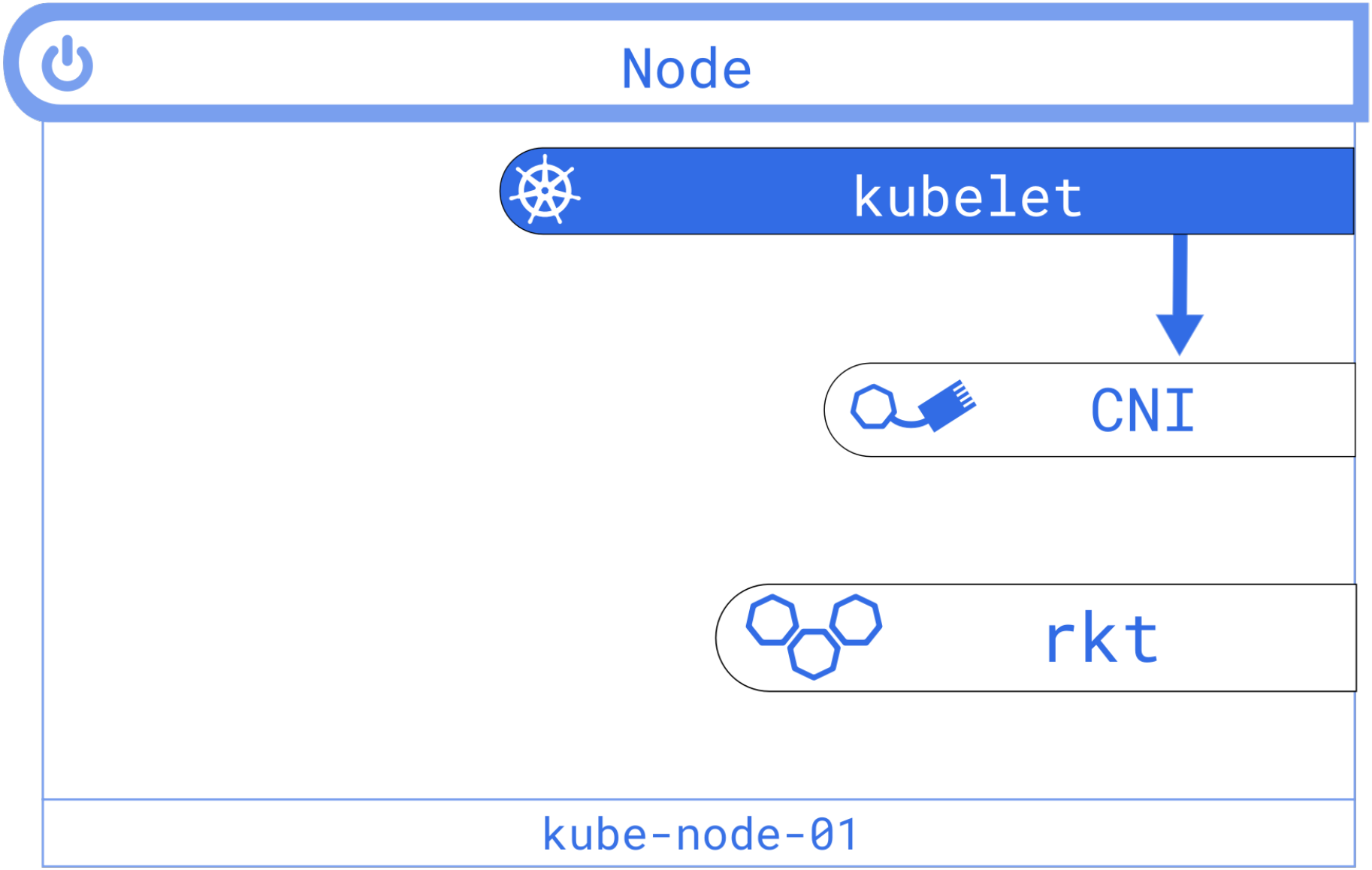

Node
kubelet
CNI
infra - 10.255.0.11
nginx
prometheus-exporter
envoy
docker
kube-node-01

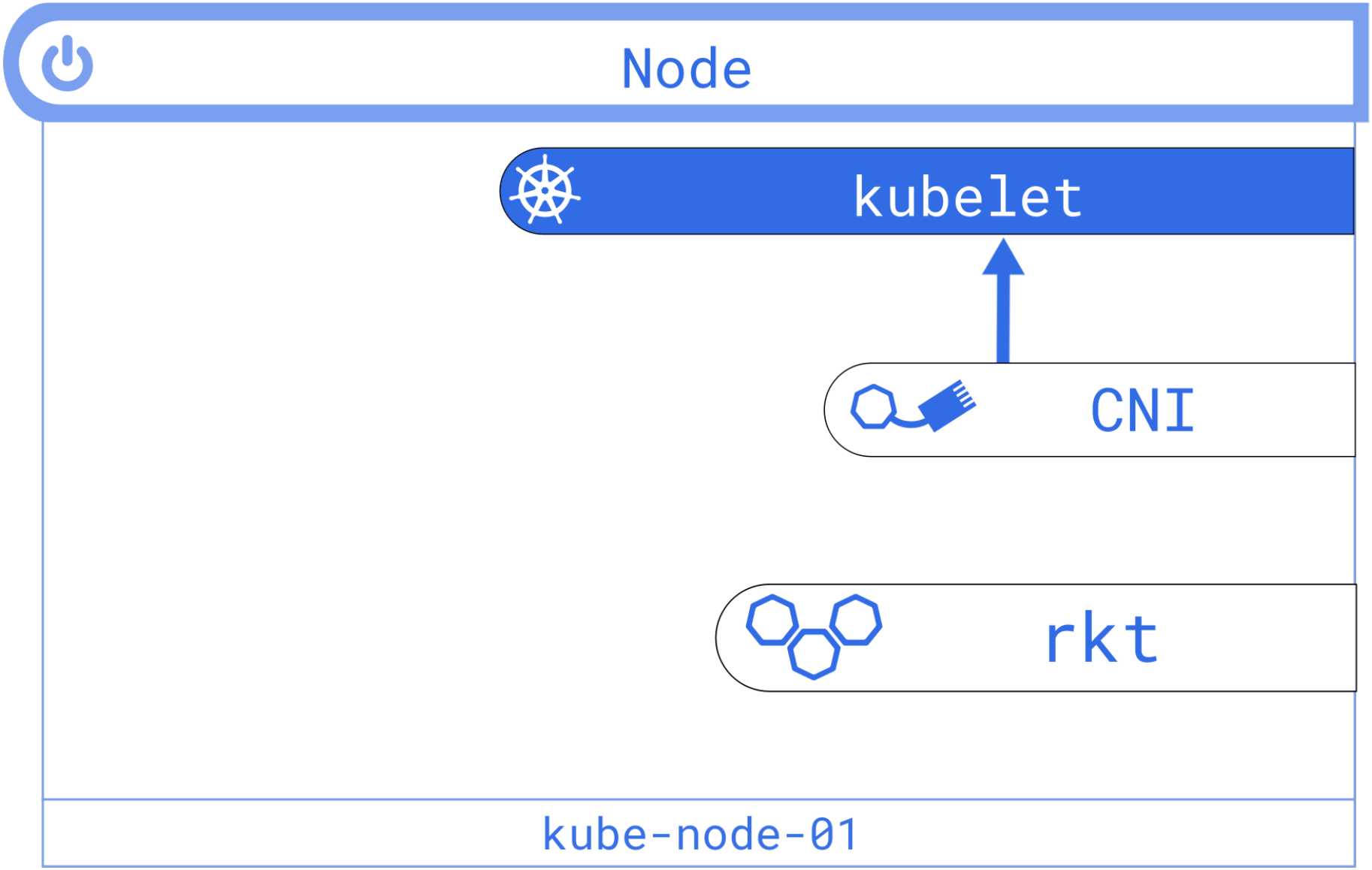

Node
kubelet
CNI
docker
kube-node-01

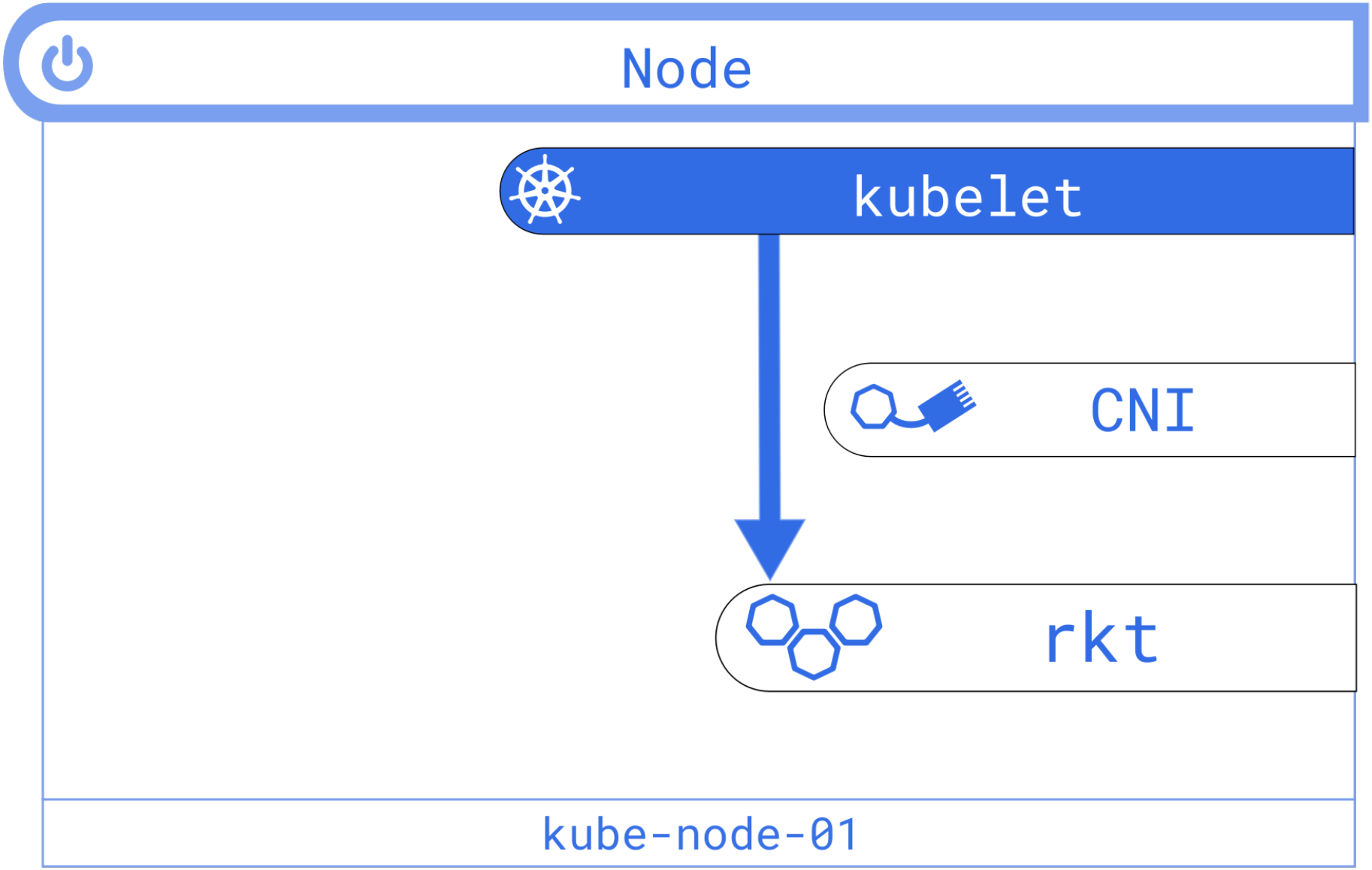

Node
kubelet
CNI
rkt
kube-node-01

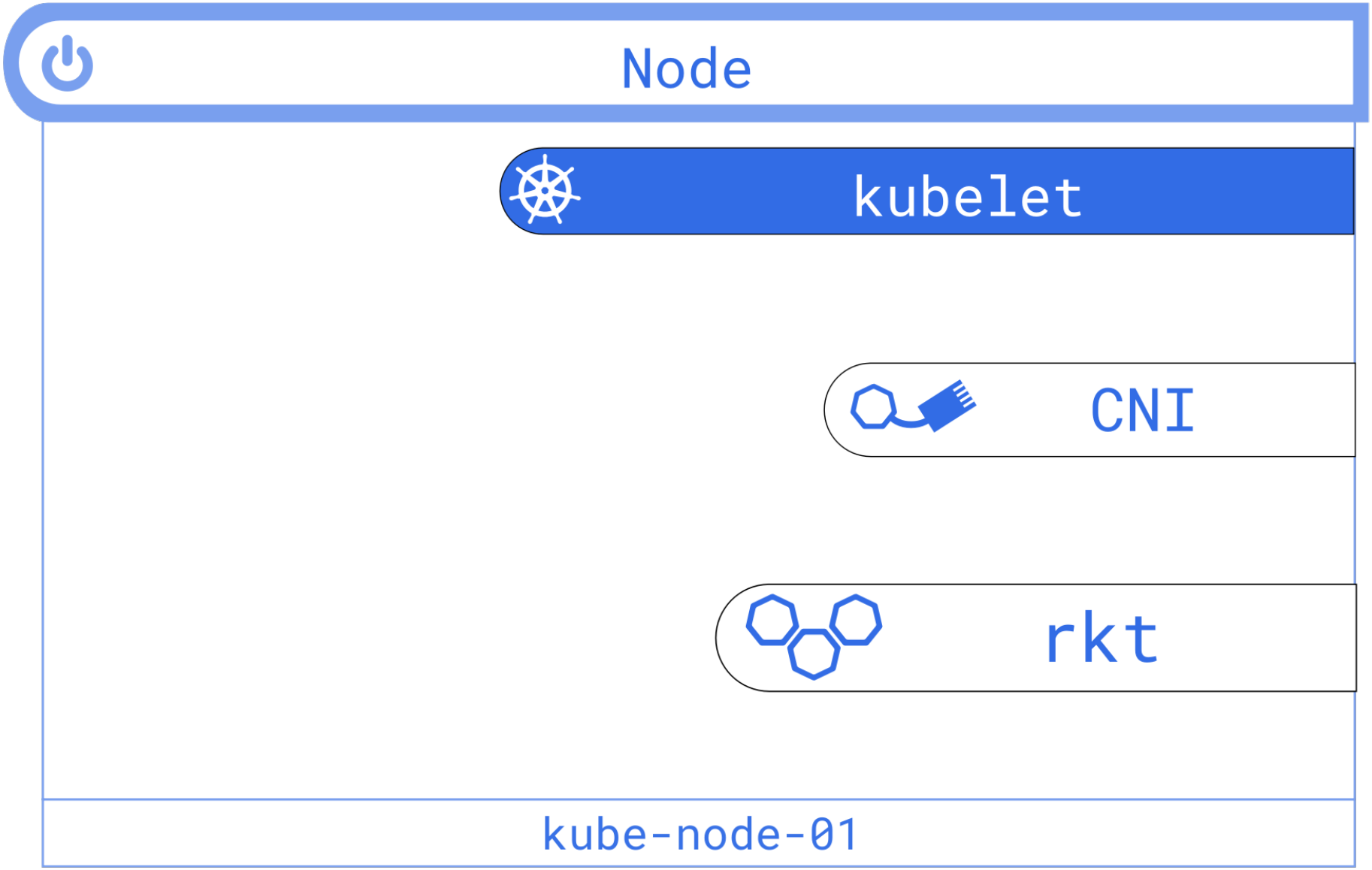

rkt


Node
kubelet
CNI
rkt
kube-node-01


Node
kubelet
CNI
rkt
kube-node-01


Node
kubelet
CNI
rkt
kube-node-01


Node
kubelet
CNI
rkt
kube-node-01


Node
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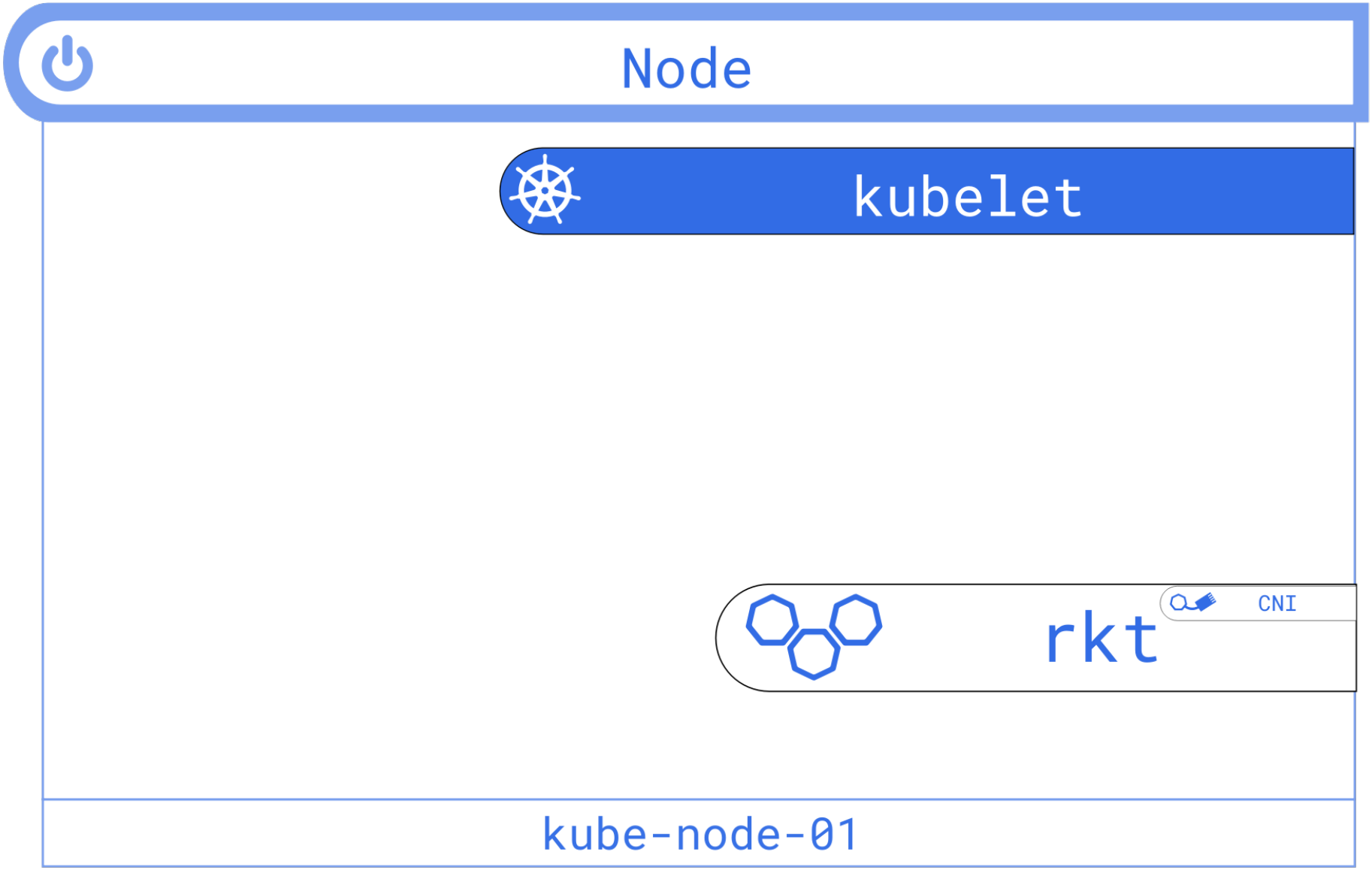
kube-node-01


Node
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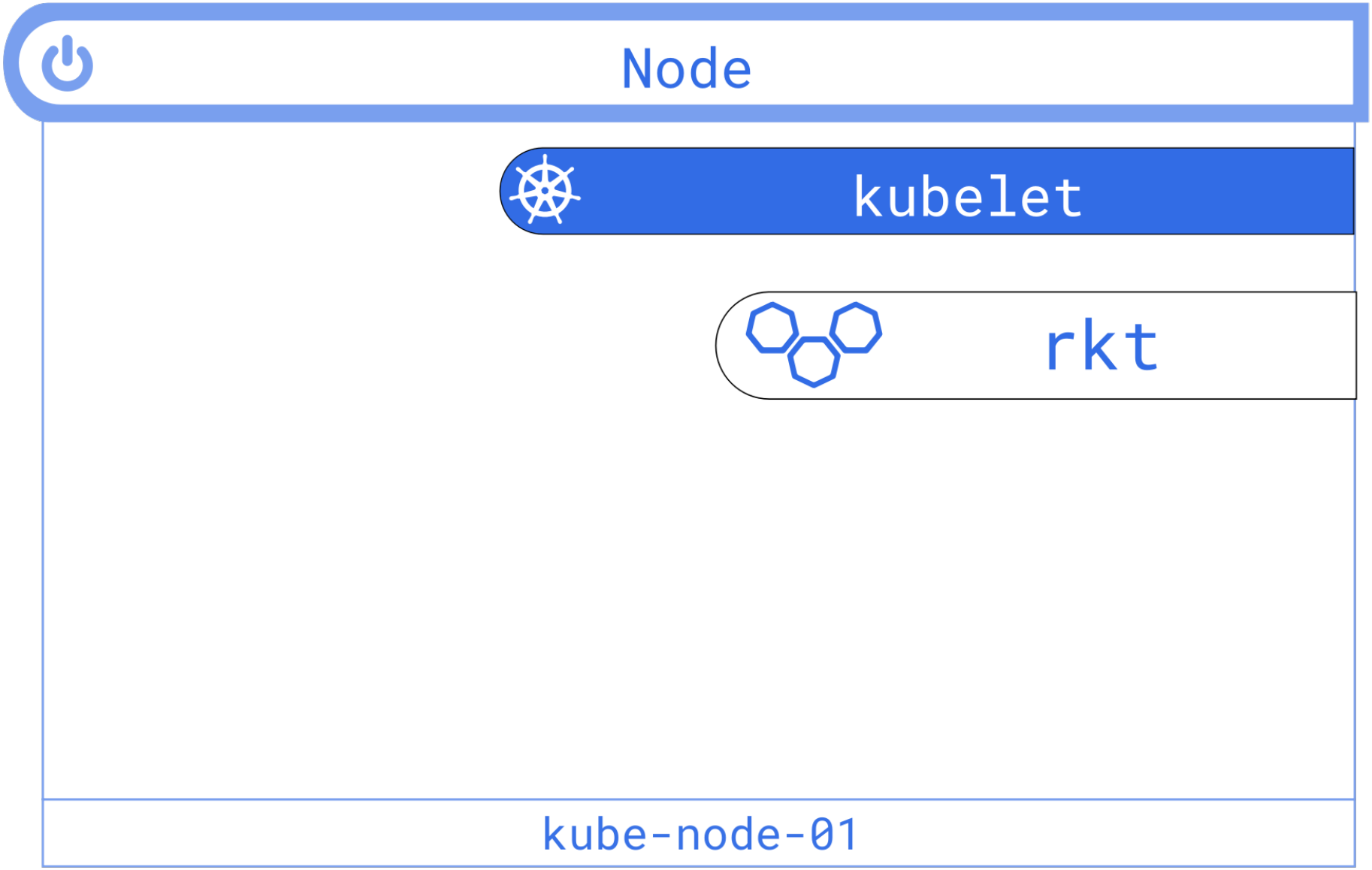
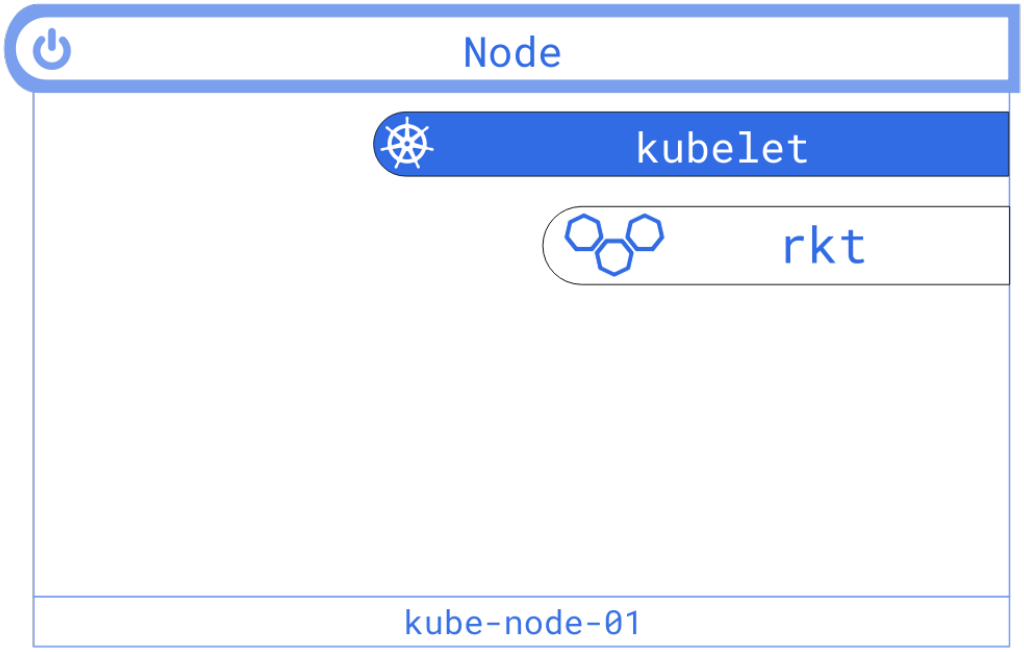
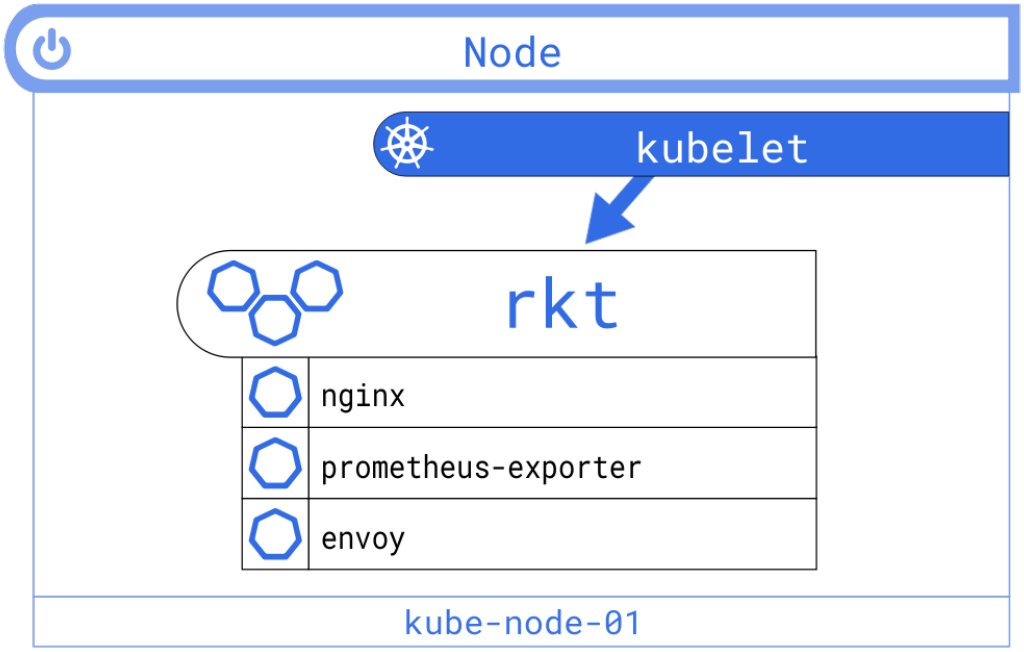
rkt
CNI
kube-node-01


Node
kubelet
rkt
kube-node-01


Node
kubelet
rkt
kube-node-01


pod
kube-decon-2035384211-t4s1k
nginx
prometheus-exporter
envoy


Node
kubelet
kube-node-01
rkt
nginx
prometheus-exporter
envoy


Node
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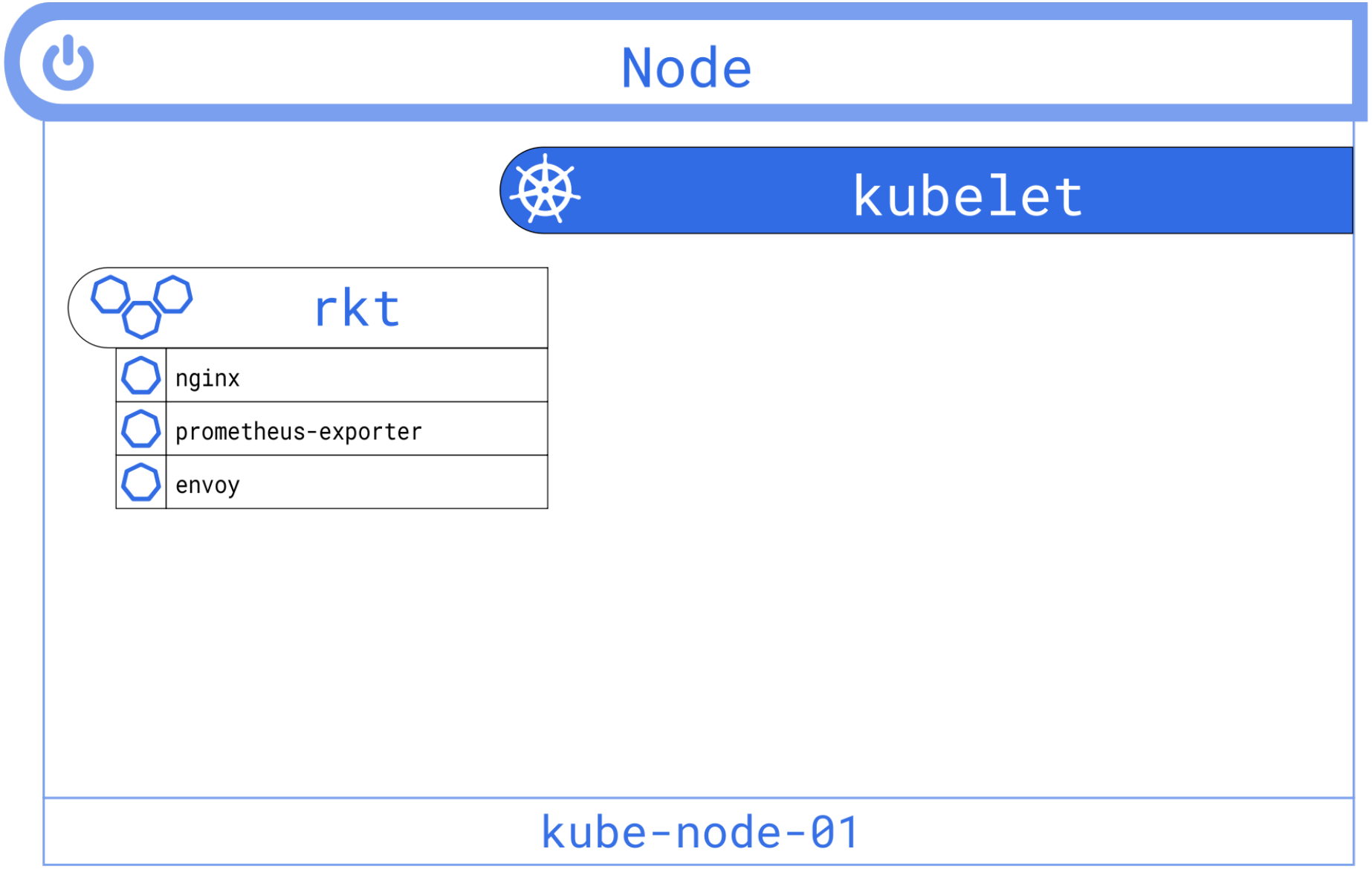
rkt
nginx
prometheus-exporter
envoy
kube-node-01


Node
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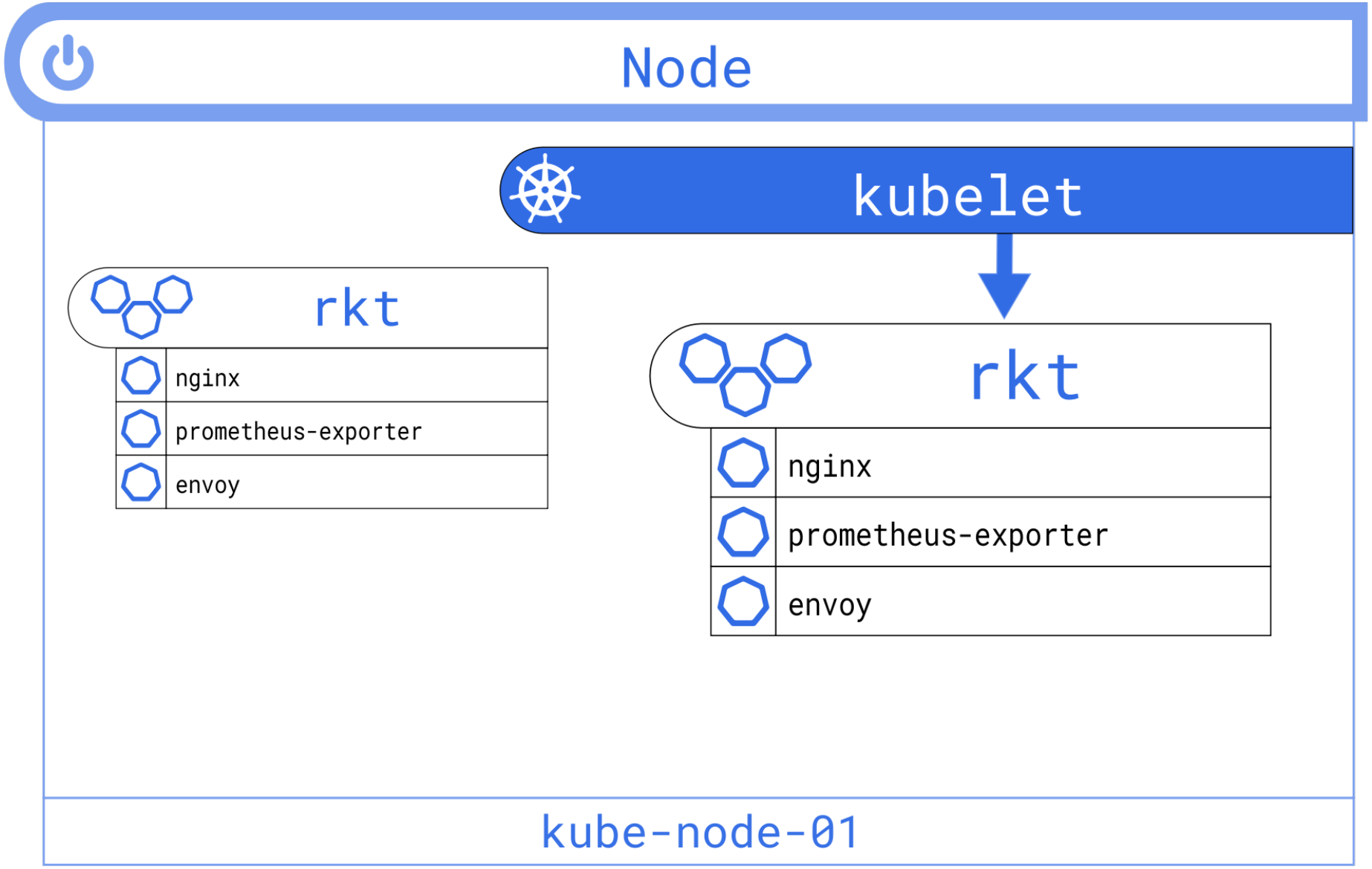
rkt
nginx
prometheus-exporter
envoy
kube-node-01


Node
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rkt
nginx
prometheus-exporter
envoy
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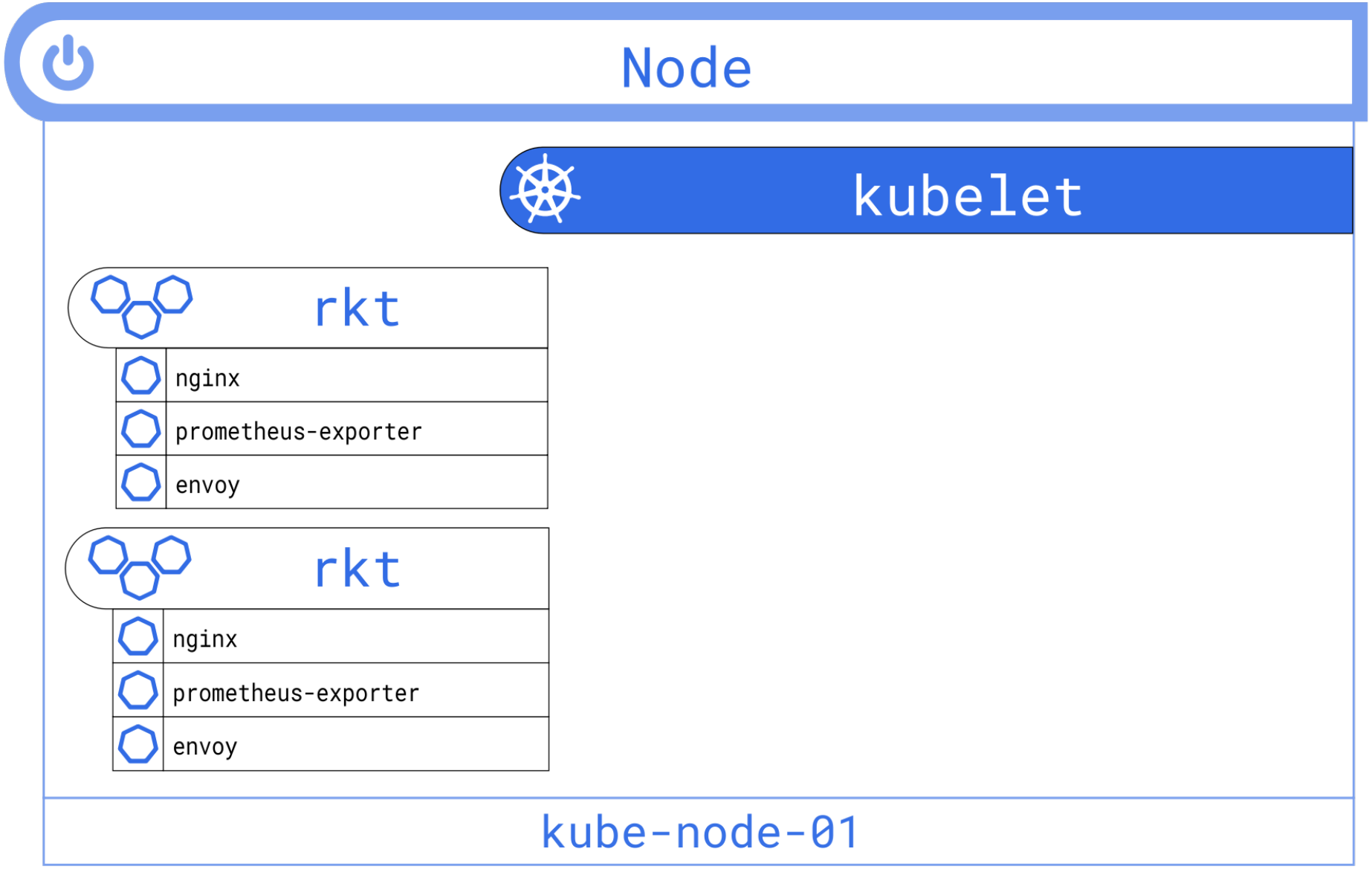
nginx
prometheus-exporter
envoy
kube-node-01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rkt
nginx
prometheus-exporter
envoy
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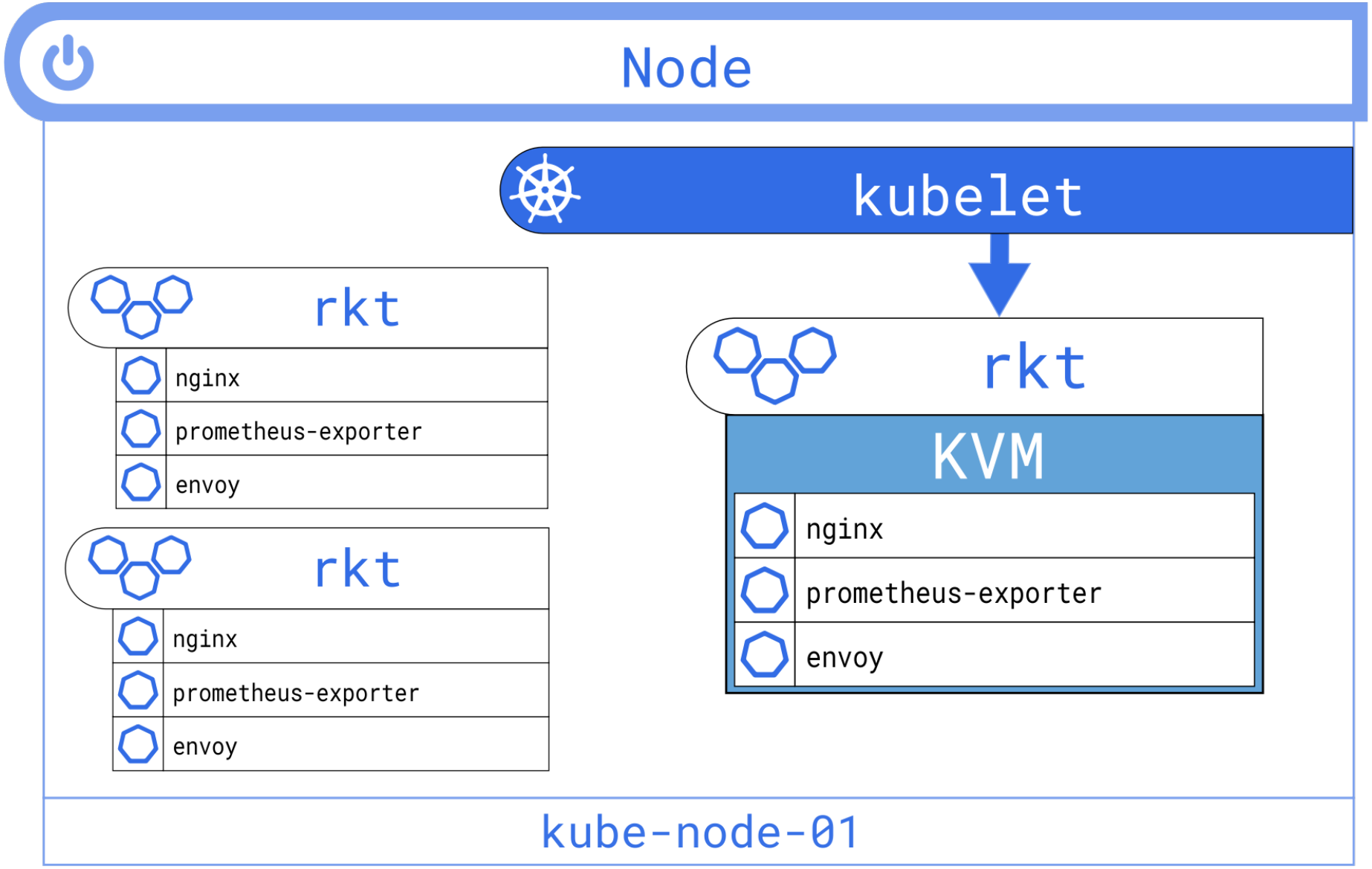
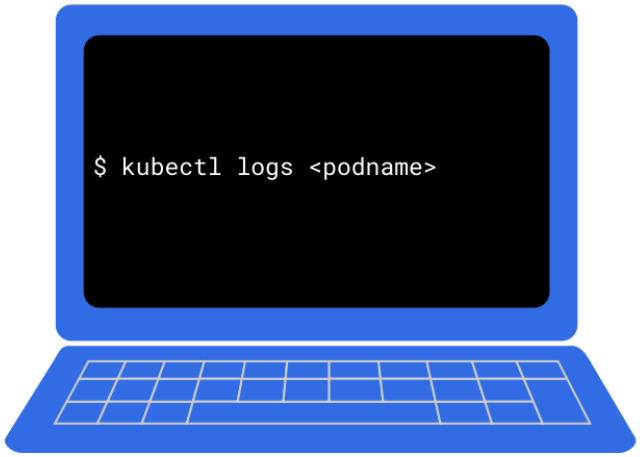
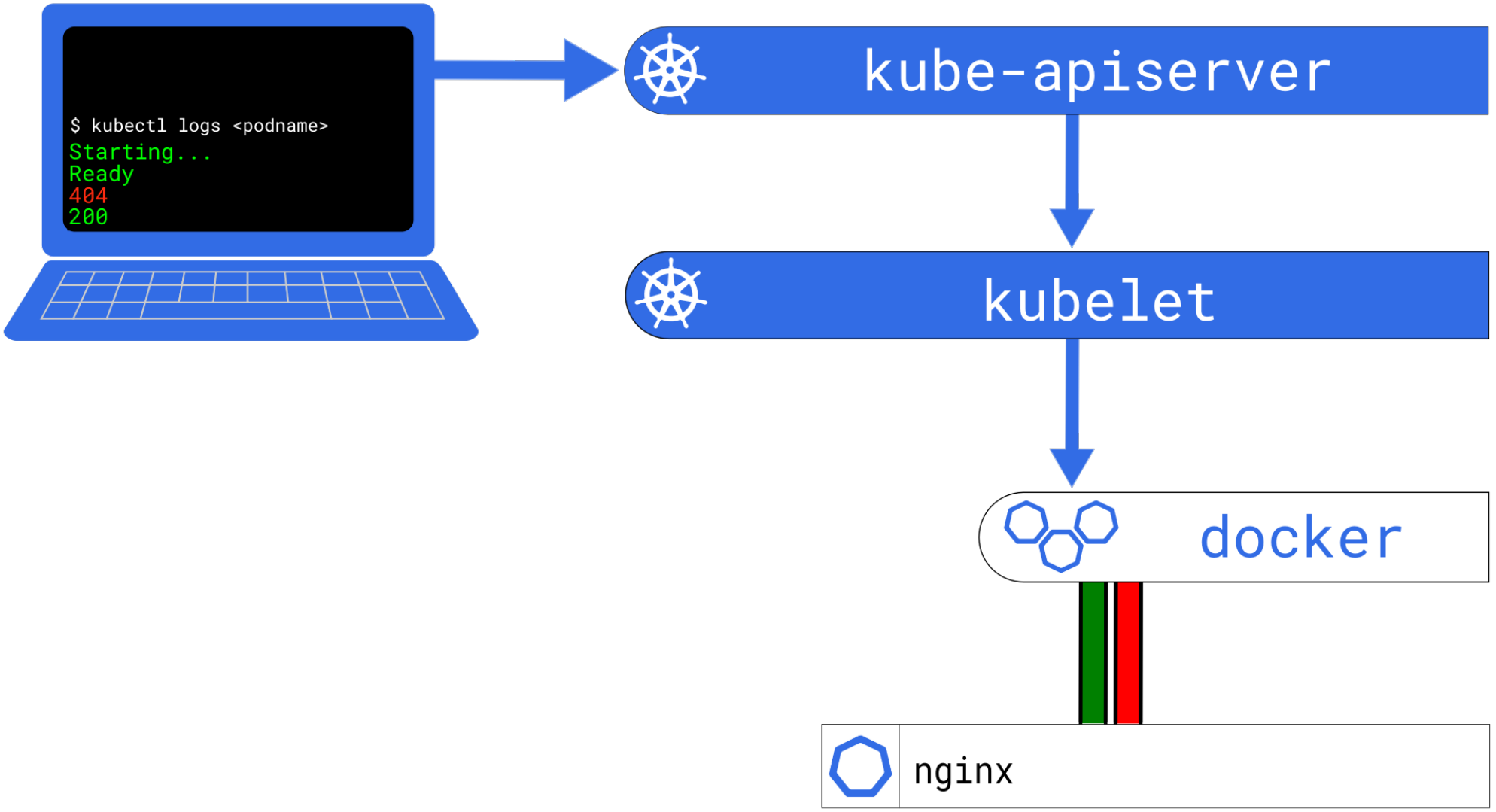
nginx
prometheus-exporter
envoy
kube-node-01

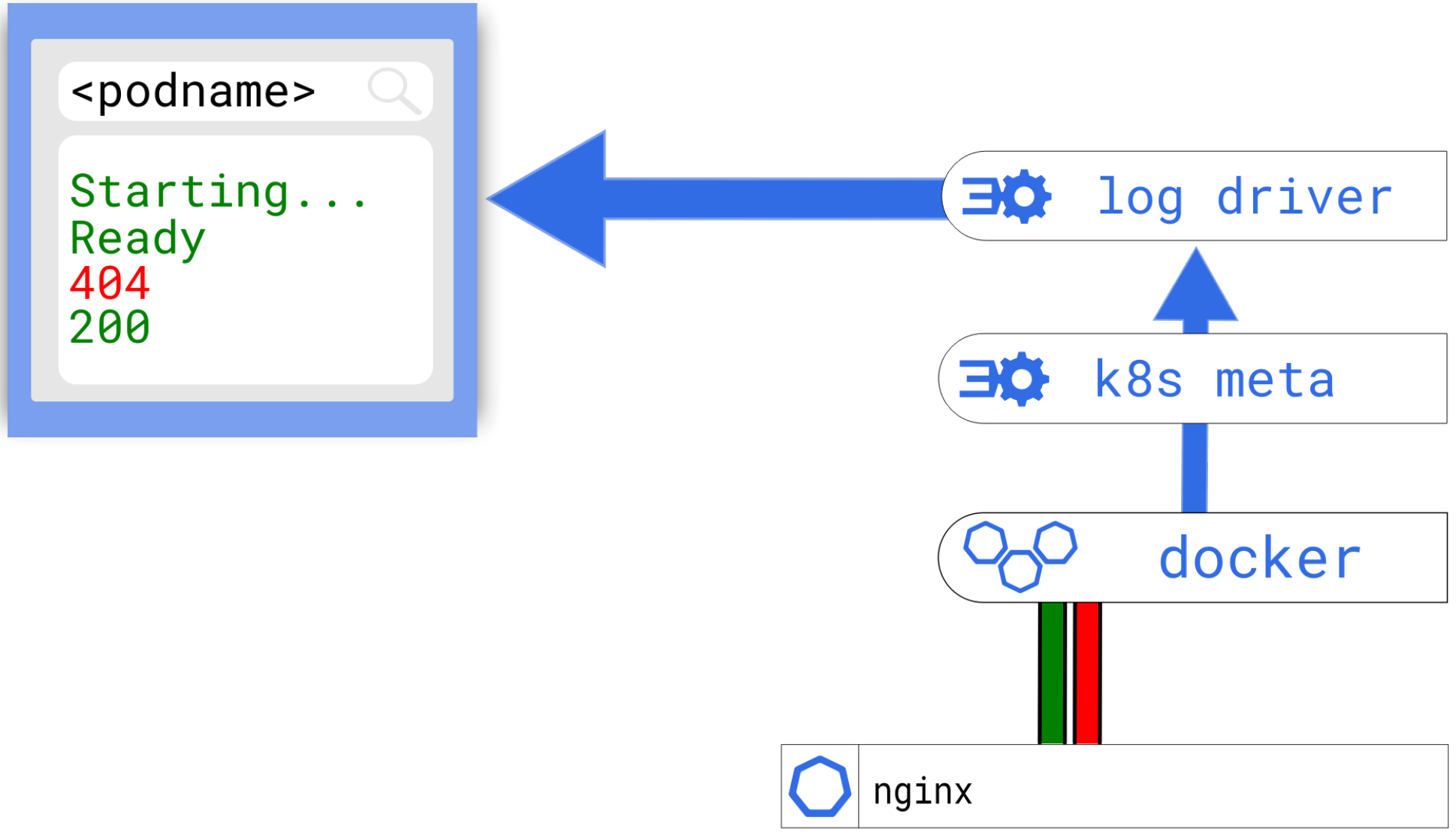

Node
kubelet
rkt
nginx
prometheus-exporter
envoy
rkt
nginx
prometheus-exporter
envoy
rkt
KVM
nginx
prometheus-exporter
envoy
kube-node-01

Logging

```
$ kubectl logs <podname>
```


$ kubectl logs <podname>


$ kubectl logs <podname>
Starting...
Ready
404
200
kube-apiserver
kubelet
docker
nginx


<podname>
Starting...
Ready
404
200
log driver
k8s meta
docker
nginx

Kubernetes for the Power User

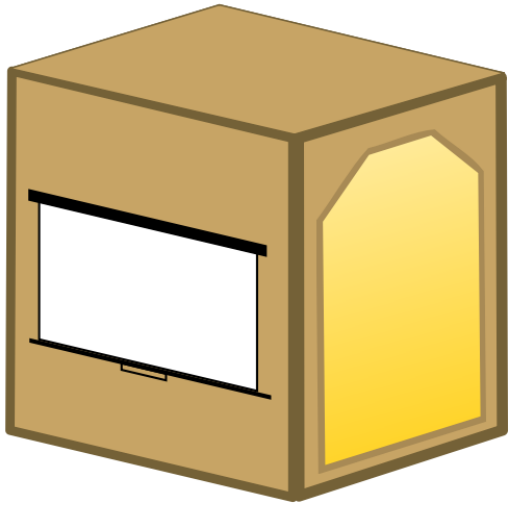
http://bit.do/kube-decon-power

http://kube-decon.kubecon.carson-anderson.com/markdown

SecurityContext

SecurityContext

Pod



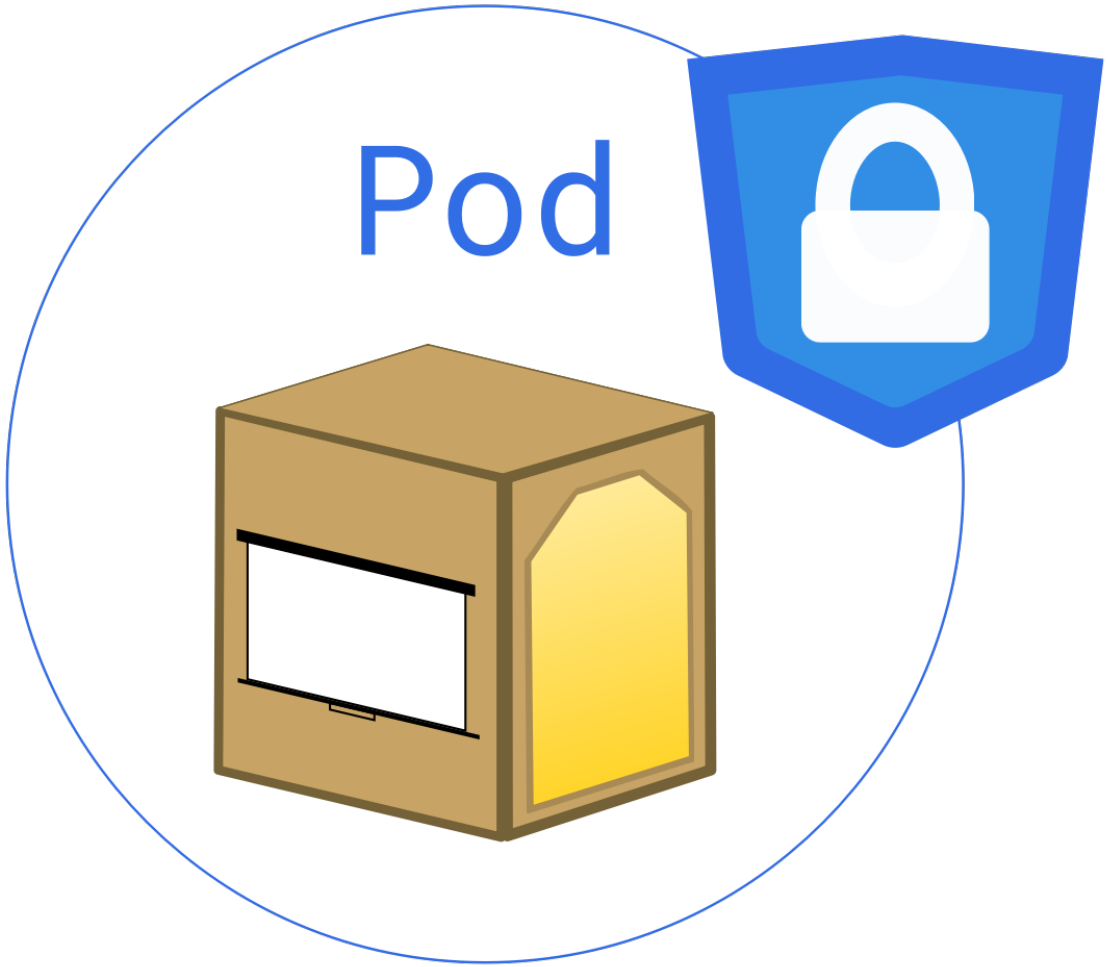
SecurityContext

Read Only
Root Allowed
Root Capabilities
Run User
Privileged

SecurityContext

SecurityContext

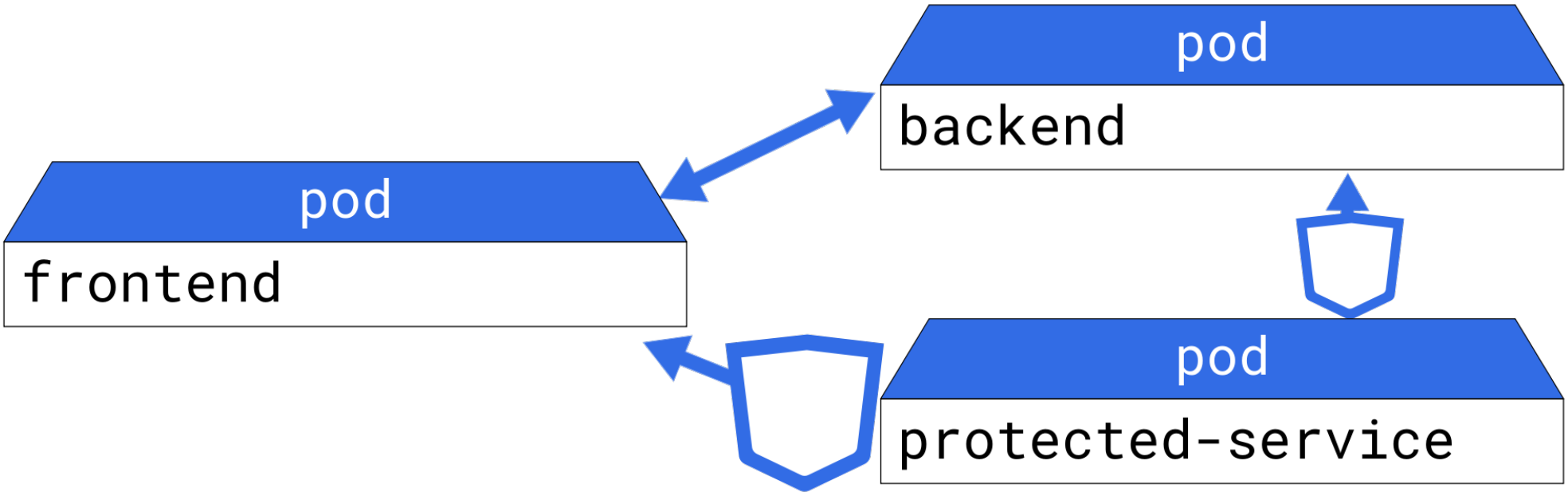
SecurityContext



SecurityContext

Network Policy

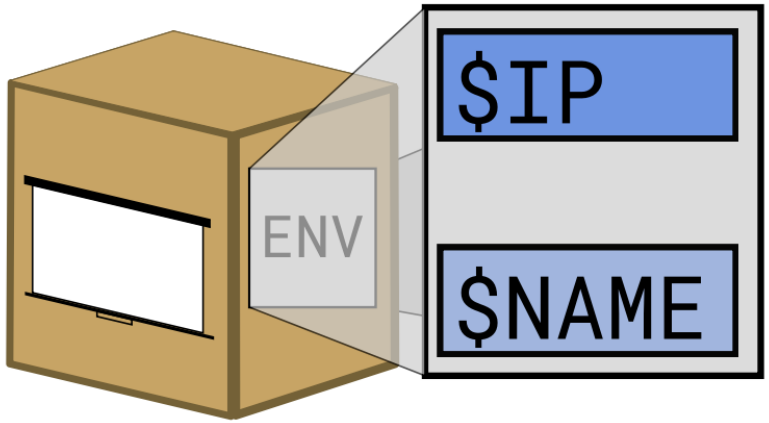
Network Policy



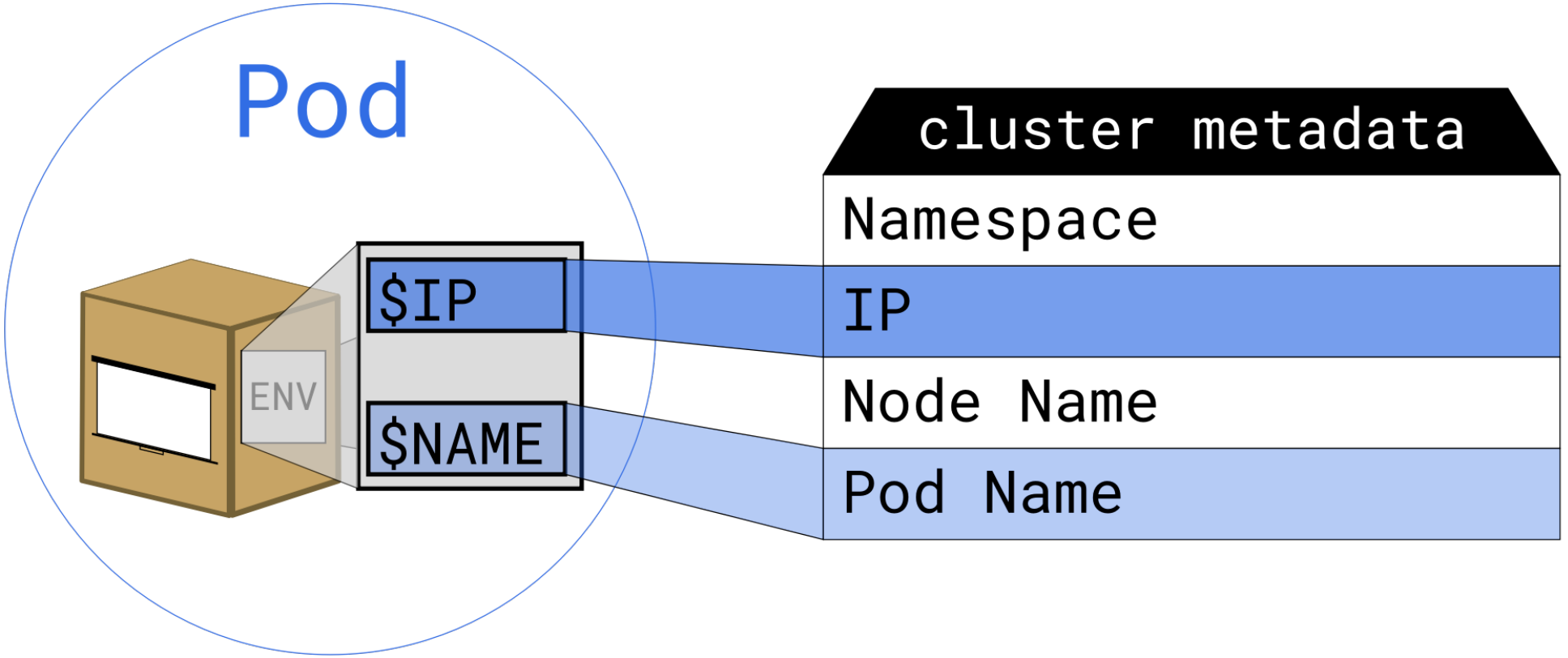
Downward API

Downward API

Pod

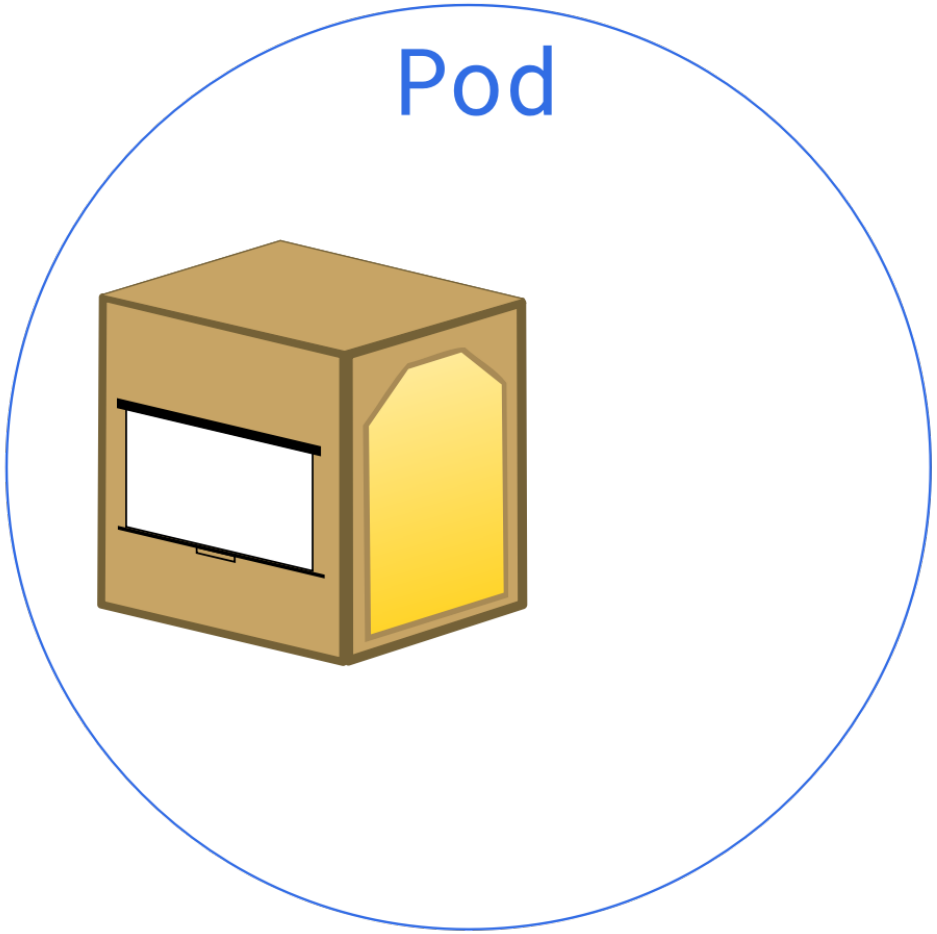


Downward API

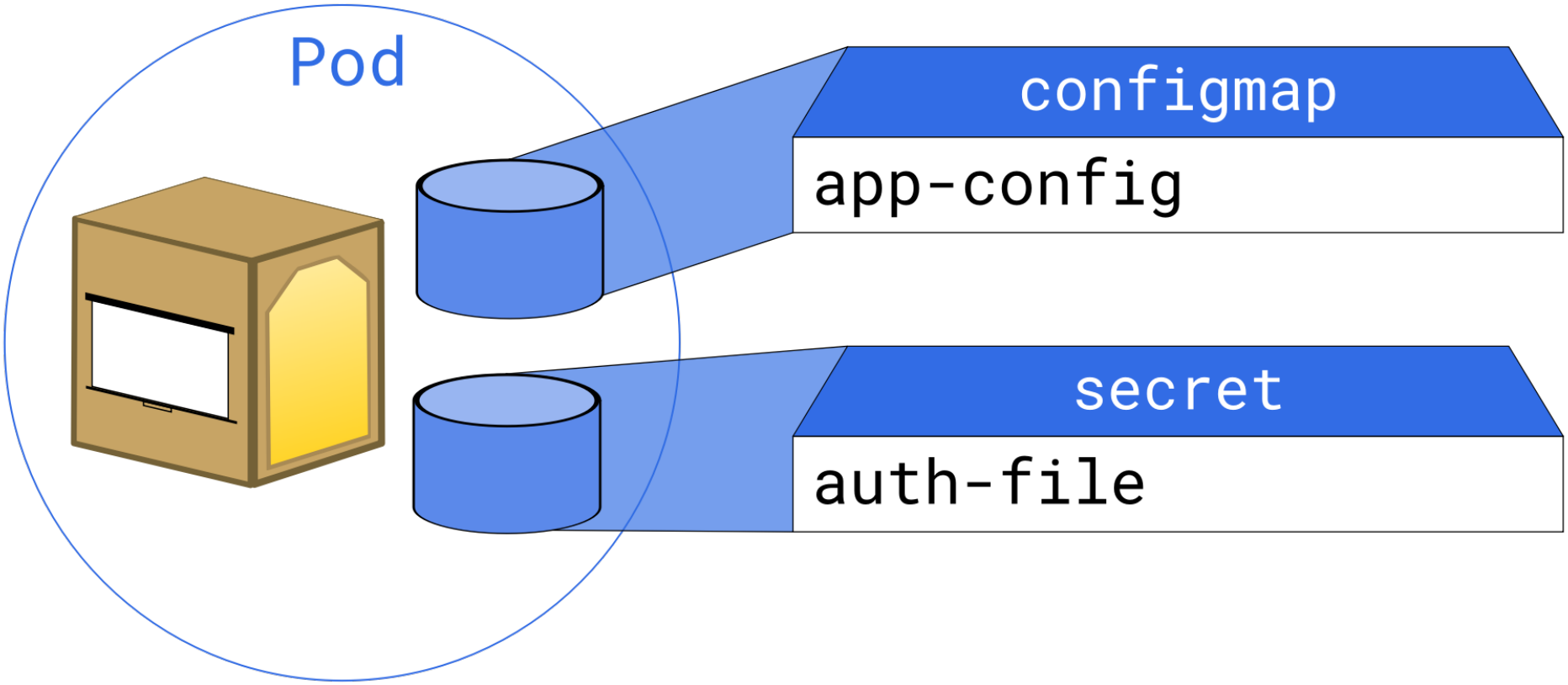


ConfigMaps/Secrets as Volumes

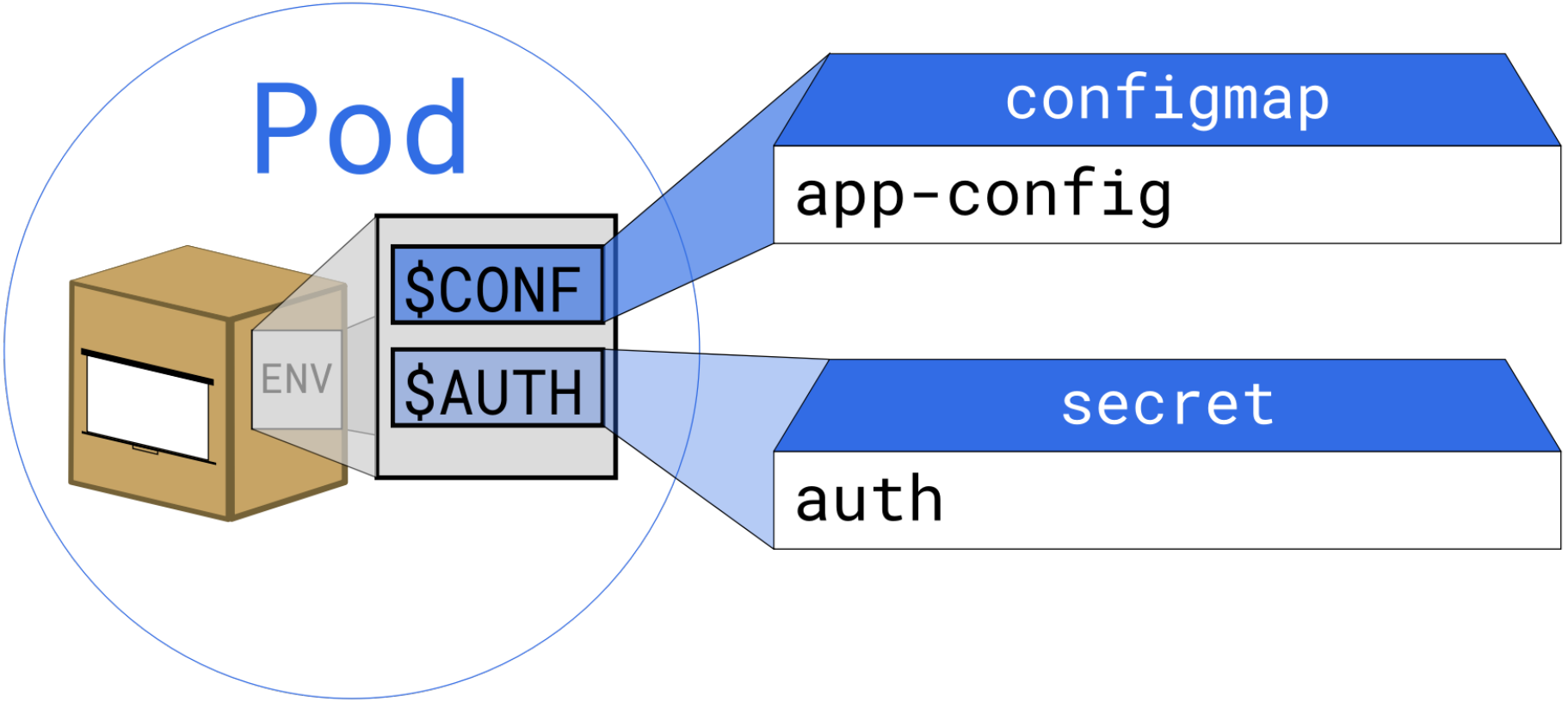
ConfigMaps/Secrets as Volumes



ConfigMaps/Secrets as Volumes

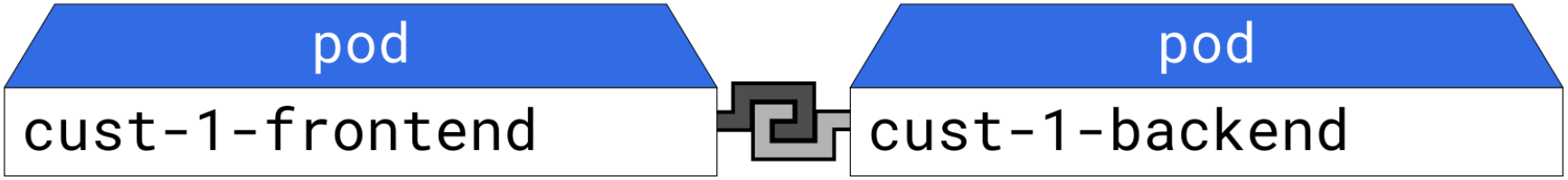


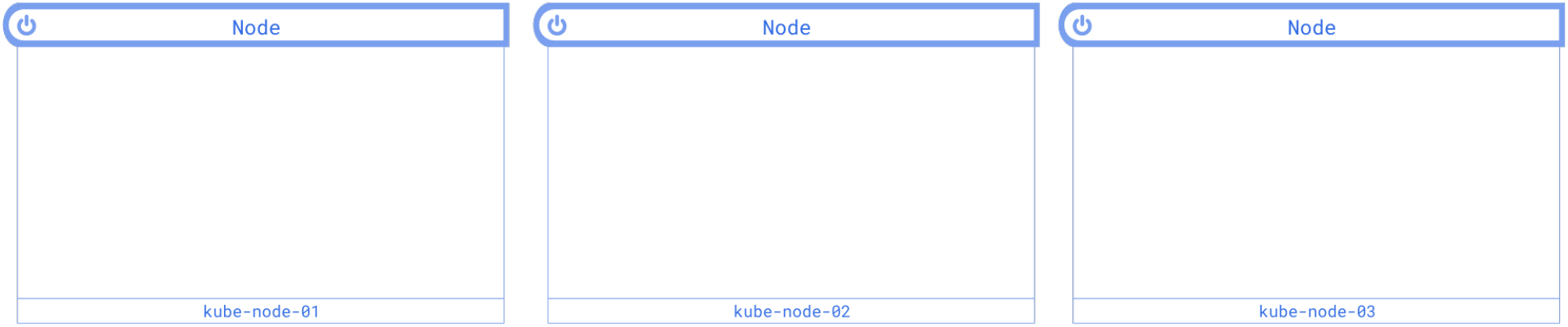
ConfigMaps/Secrets as ENV Vars



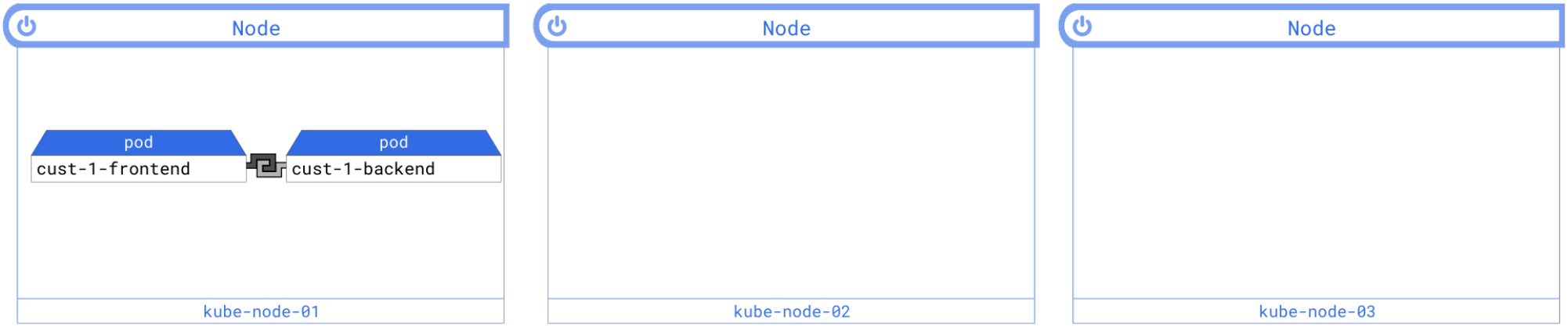
Affinity

Affinity

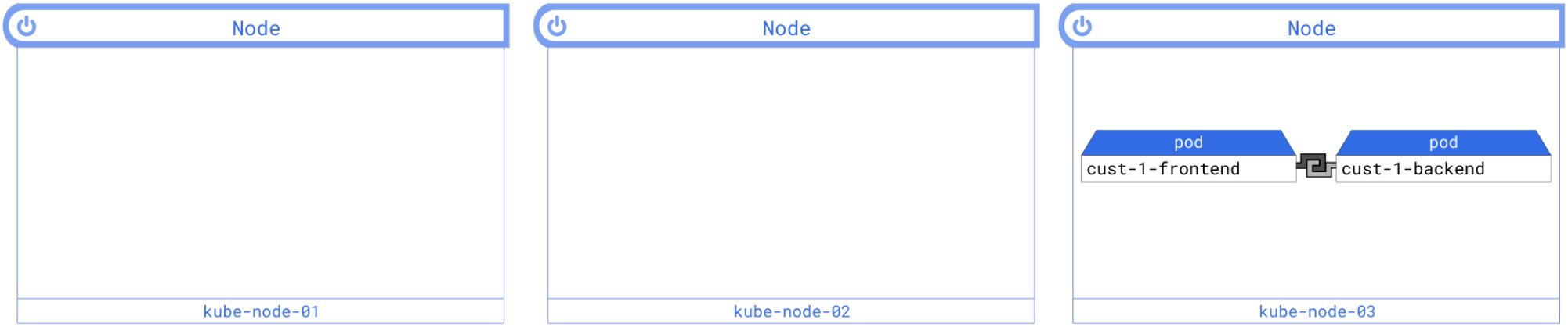

pod
cust-1-frontend
pod
cust-1-backend


Node
kube-node-01
Node
kube-node-02
Node
kube-node-03

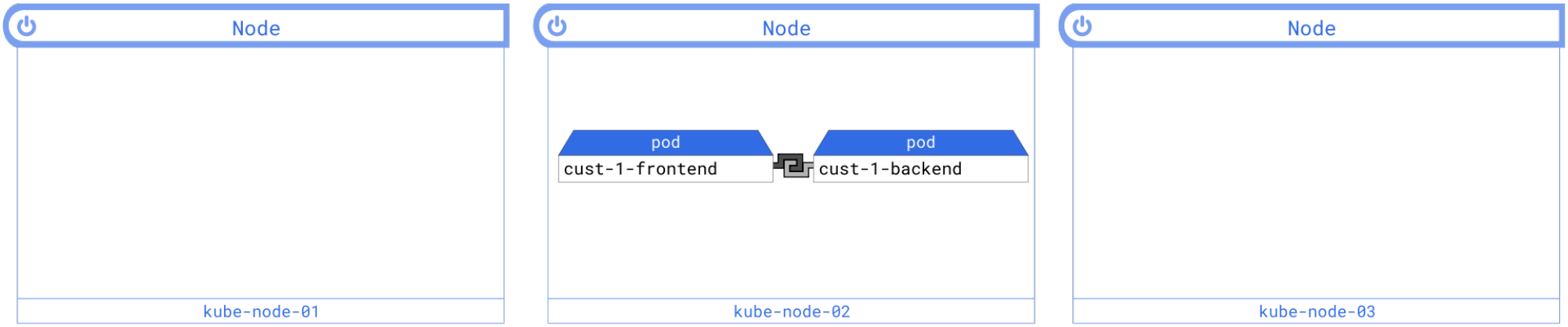
Affinity


Node
pod
cust-1-frontend
pod
cust-1-backend
kube-node-01
Node
kube-node-02
Node
kube-node-03

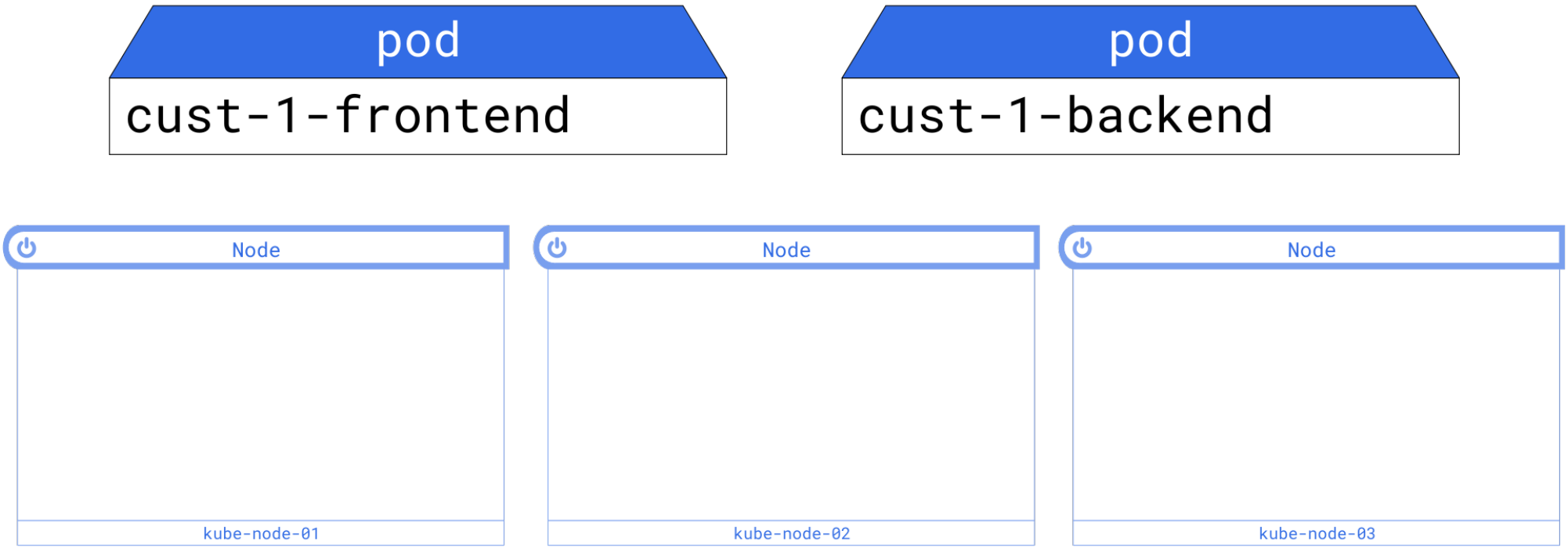
Affinity


Node
kube-node-01
Node
kube-node-02
Node
pod
cust-1-frontend
pod
cust-1-backend
kube-node-03

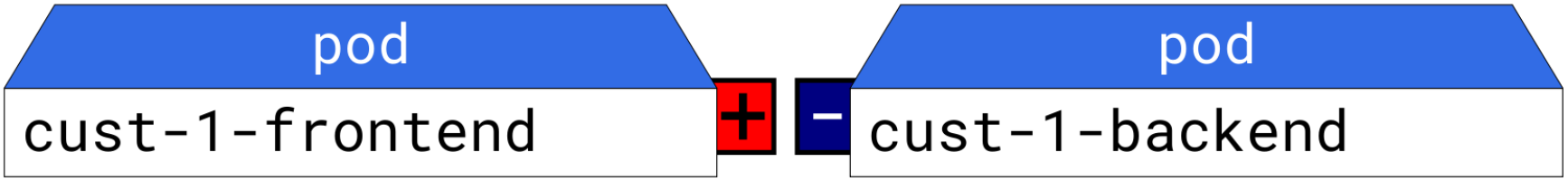
Affinity

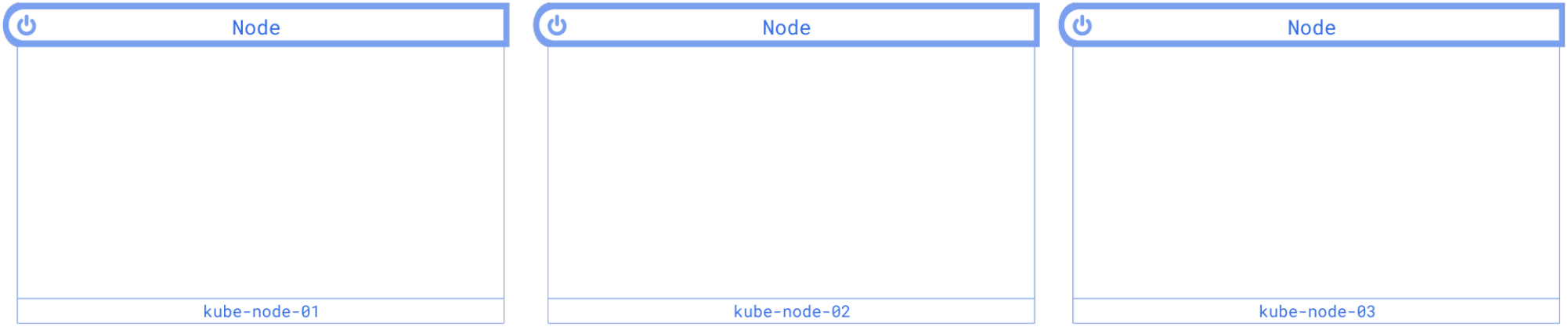

Node
Node
Node
pod
cust-1-frontend
pod
cust-1-backend
kube-node-01
kube-node-02
kube-node-03

Affinity

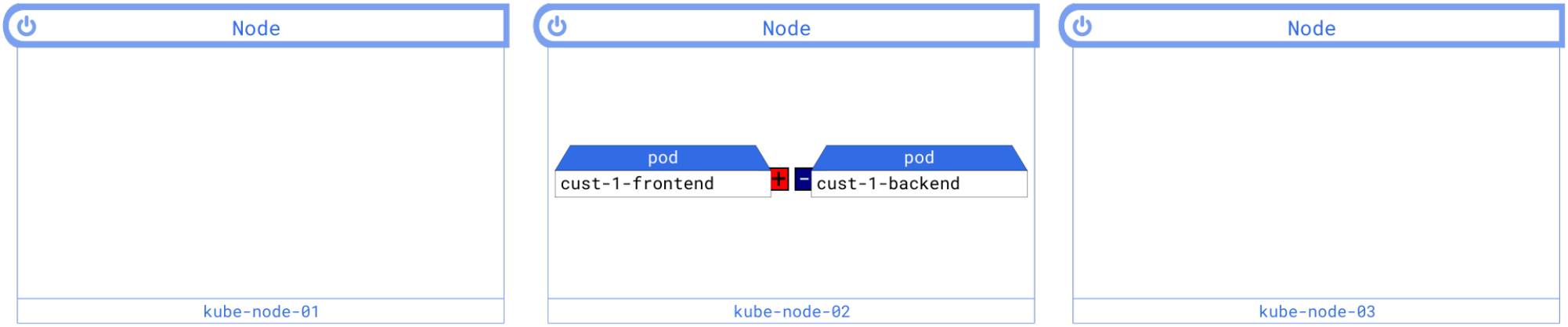

pod
cust-1-frontend
pod
cust-1-backend
Node
kube-node-01
Node
kube-node-02
Node
kube-node-03

Affinity

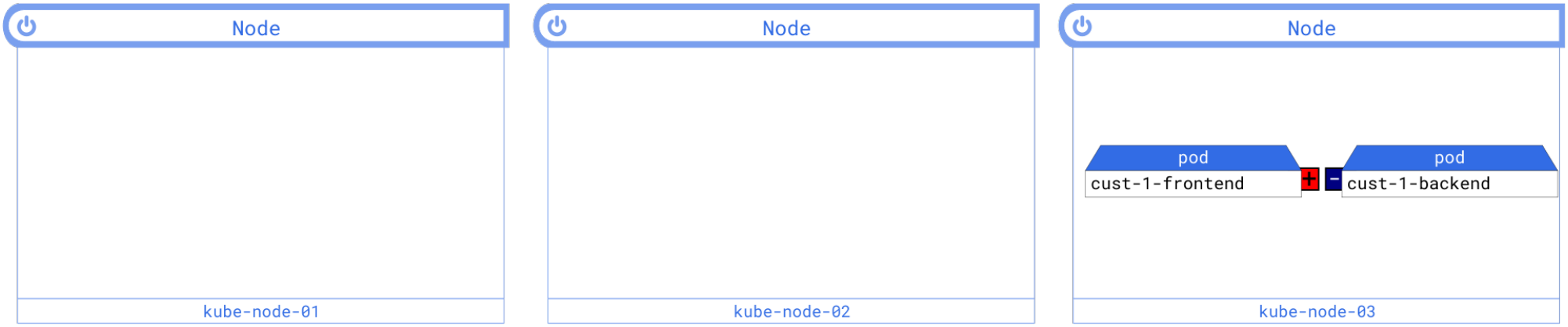

pod
cust-1-frontend
+
−
pod
cust-1-backend


Node
kube-node-01
Node
kube-node-02
Node
kube-node-03

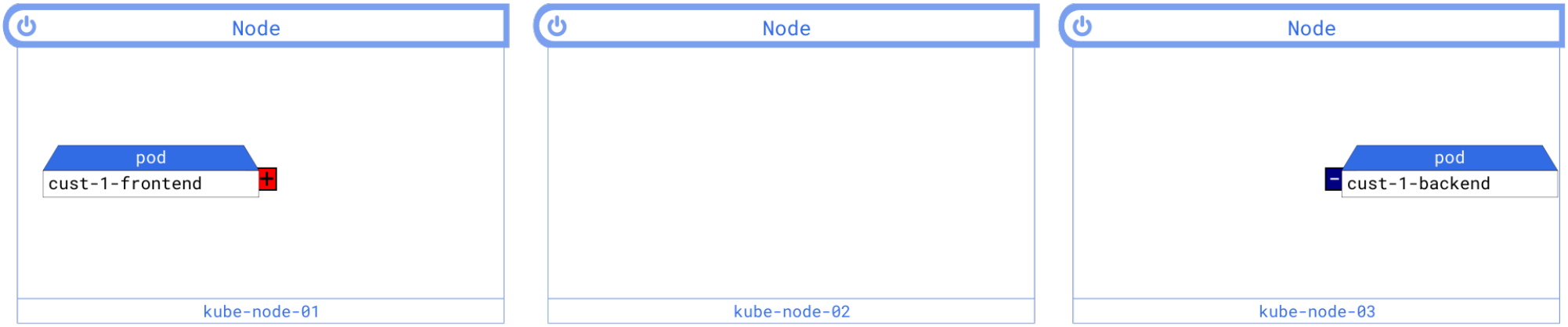
Affinity


Node
Node
Node
pod
cust-1-frontend
+
−
pod
cust-1-backend
kube-node-01
kube-node-02
kube-node-03

Affinity


Node
kube-node-01
Node
kube-node-02
Node
pod
cust-1-frontend
+
-
pod
cust-1-backend
kube-node-03

Affinity

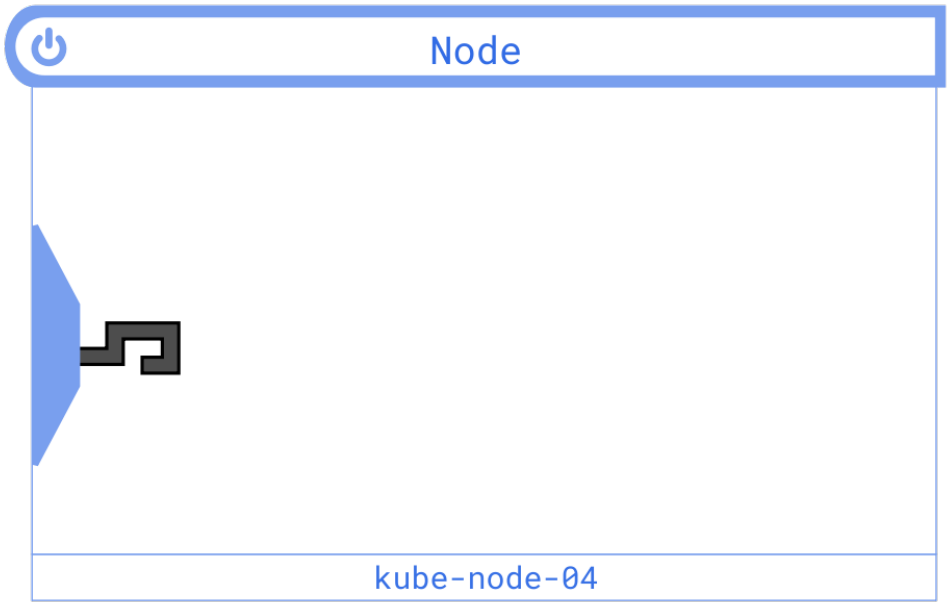

Node
pod
cust-1-frontend
kube-node-01
Node
kube-node-02
Node
pod
cust-1-backend
kube-node-03

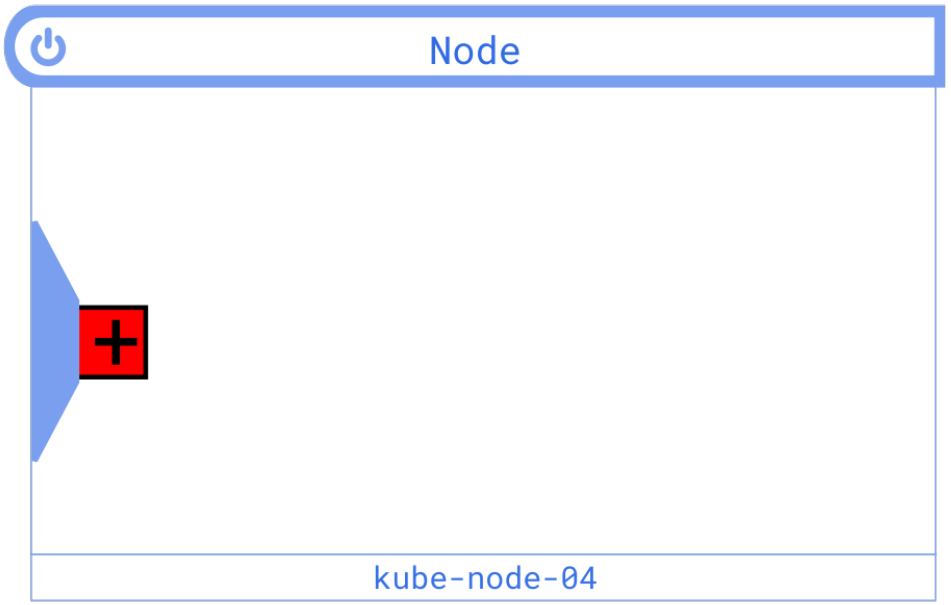
Affinity

Affinity


pod
cust-1-backend

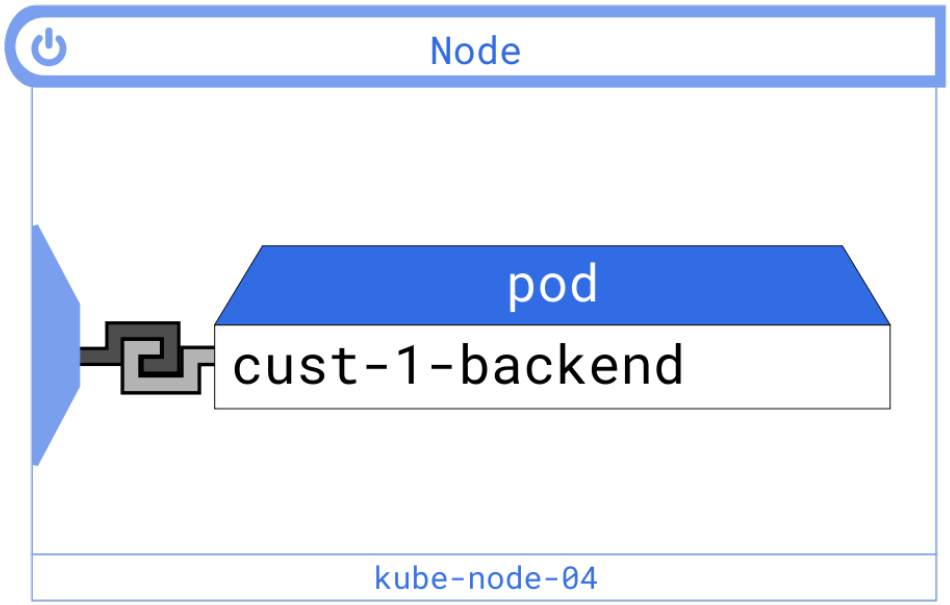

pod
cust-1-backend

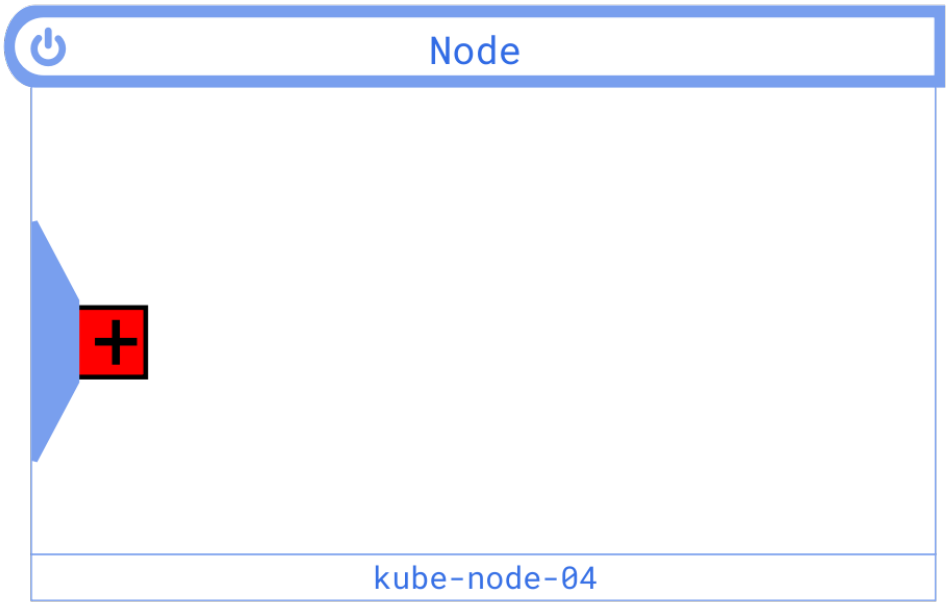

Node
kube-node-04


Node
kube-node-04

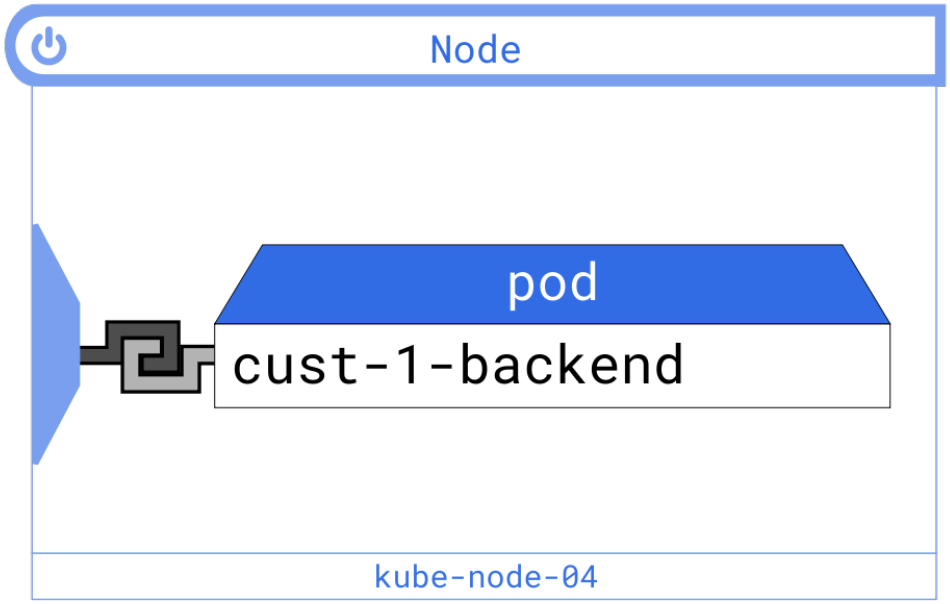
Affinity

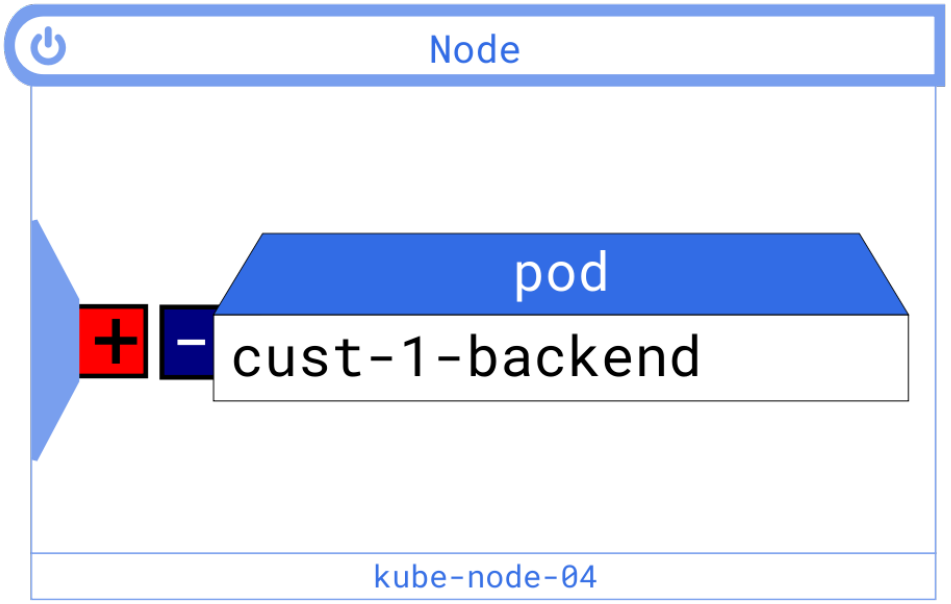

pod
cust-1-backend


Node
pod
cust-1-backend
kube-node-04


Node
kube-node-04

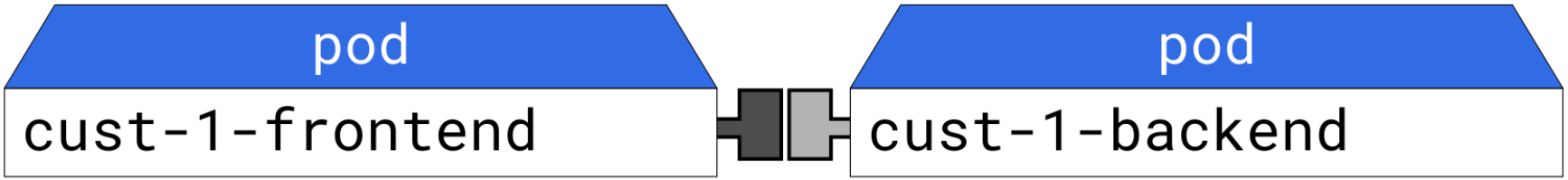
Affinity


Node
pod
cust-1-backend
kube-node-04

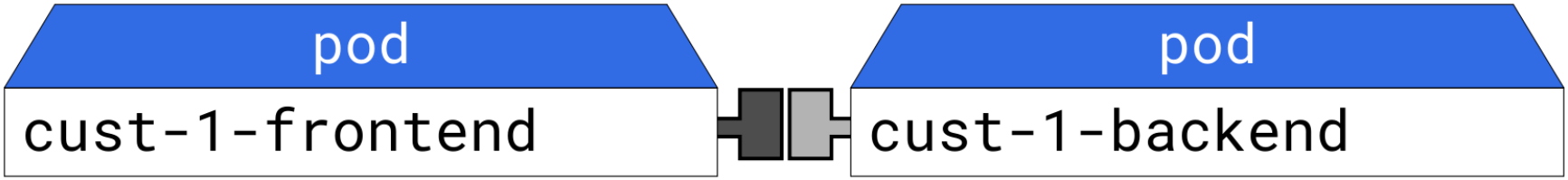

Node
pod
cust-1-backend
kube-node-04

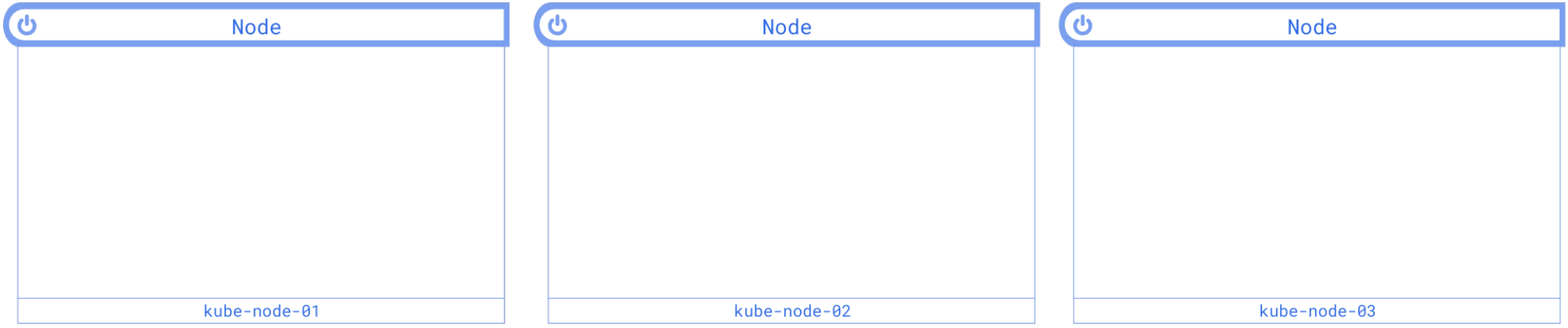
Anti-Affinity

Anti-Affinity

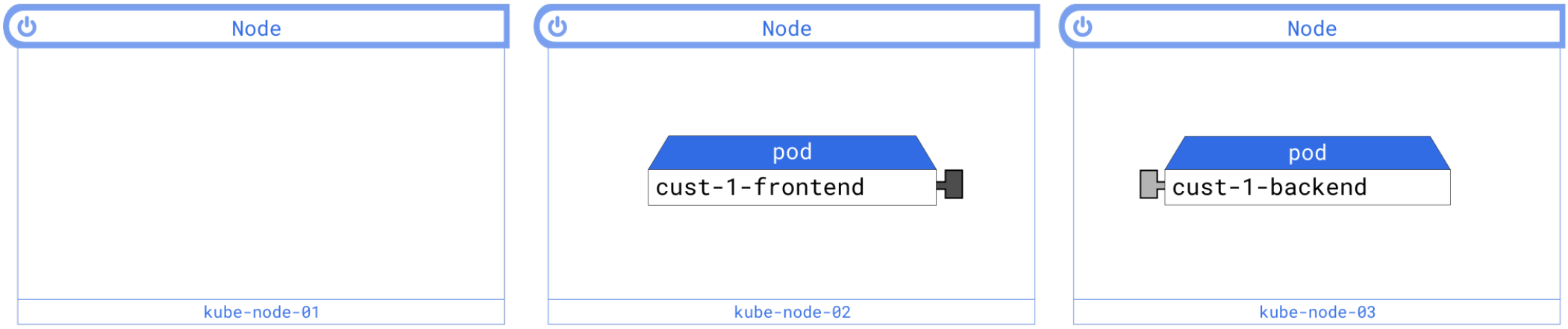


Anti-Affinity

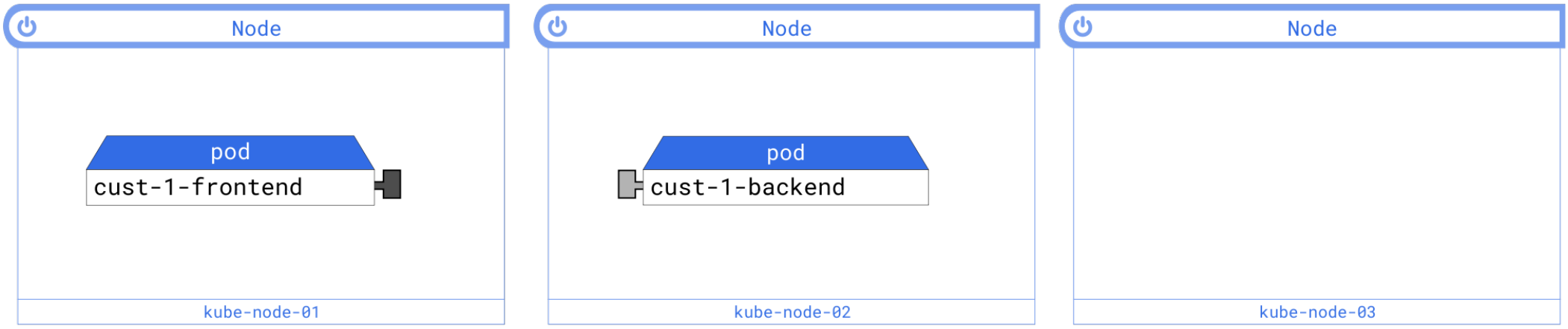




Anti-Affinity



Anti-Affinity



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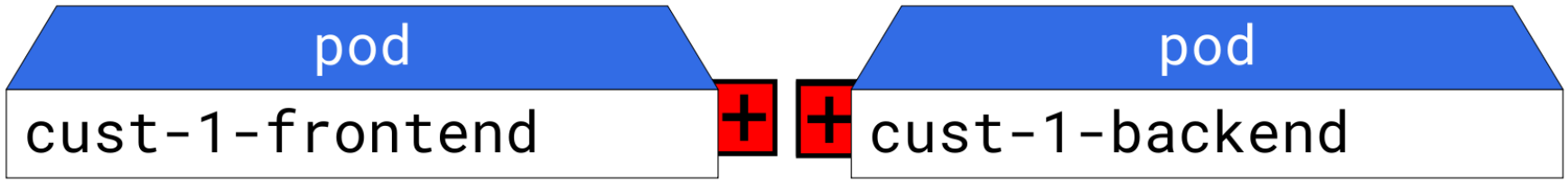

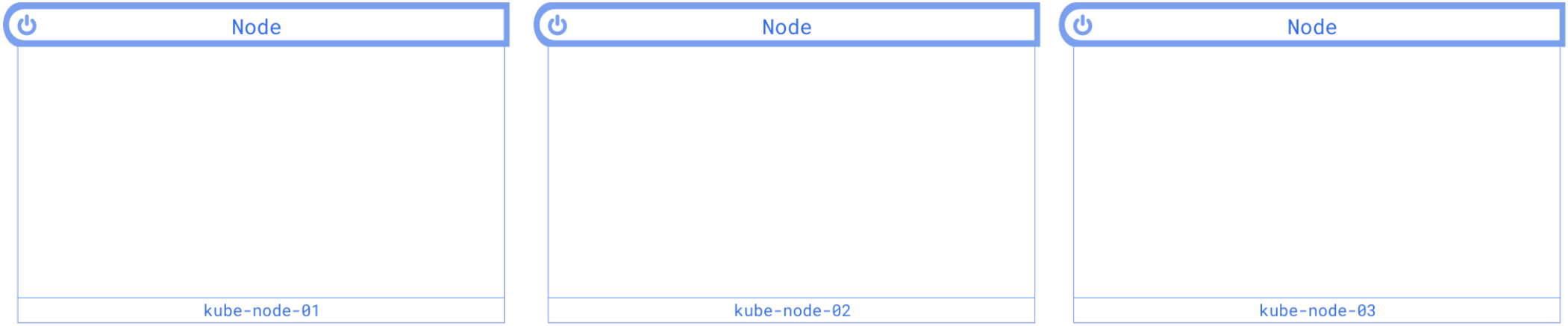

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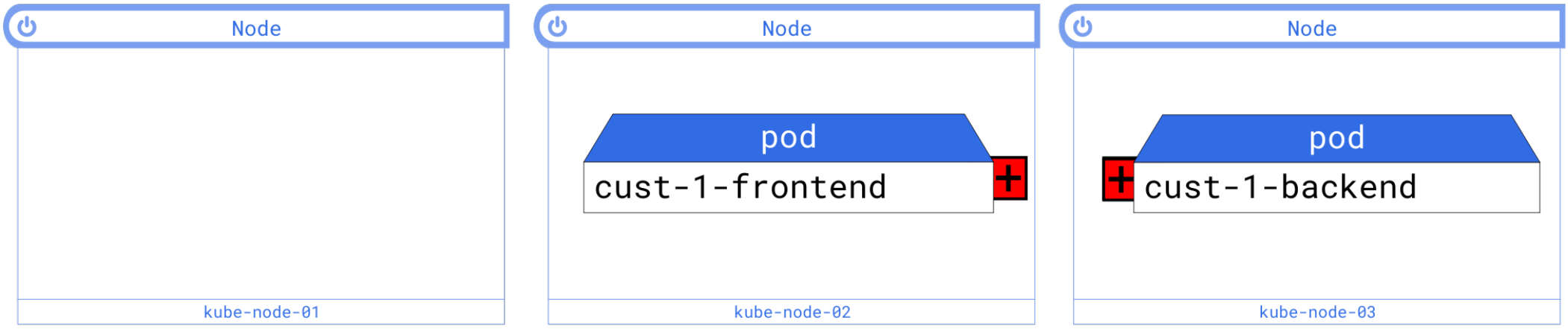

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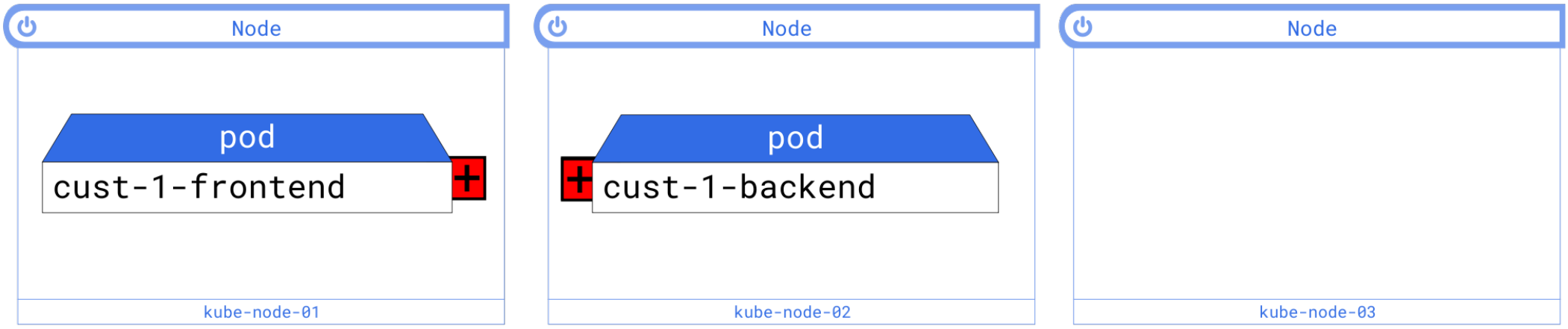

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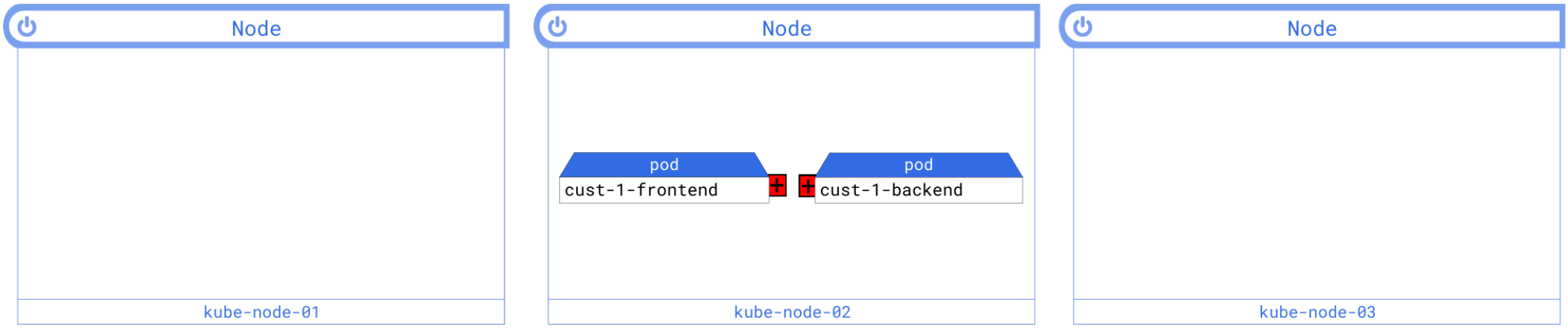

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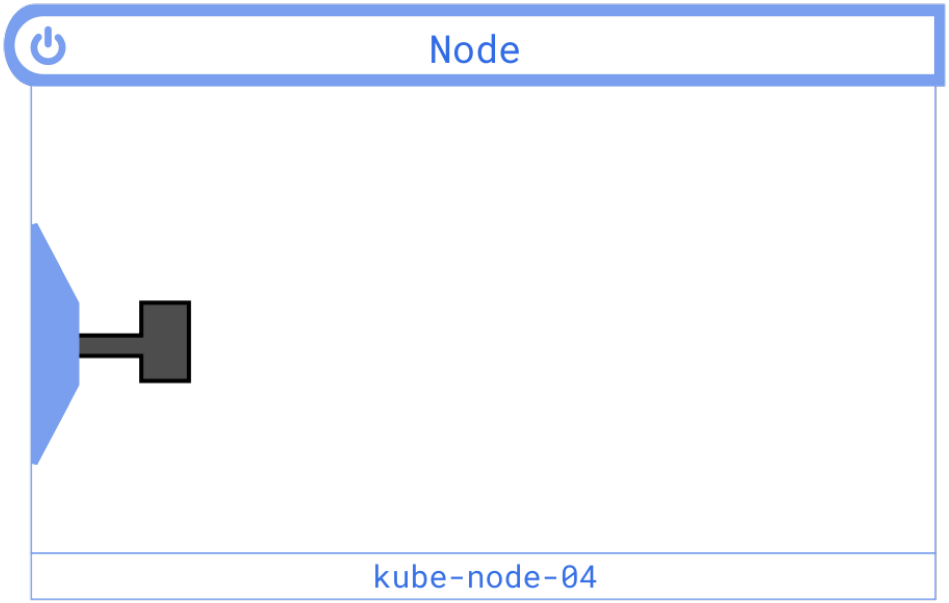

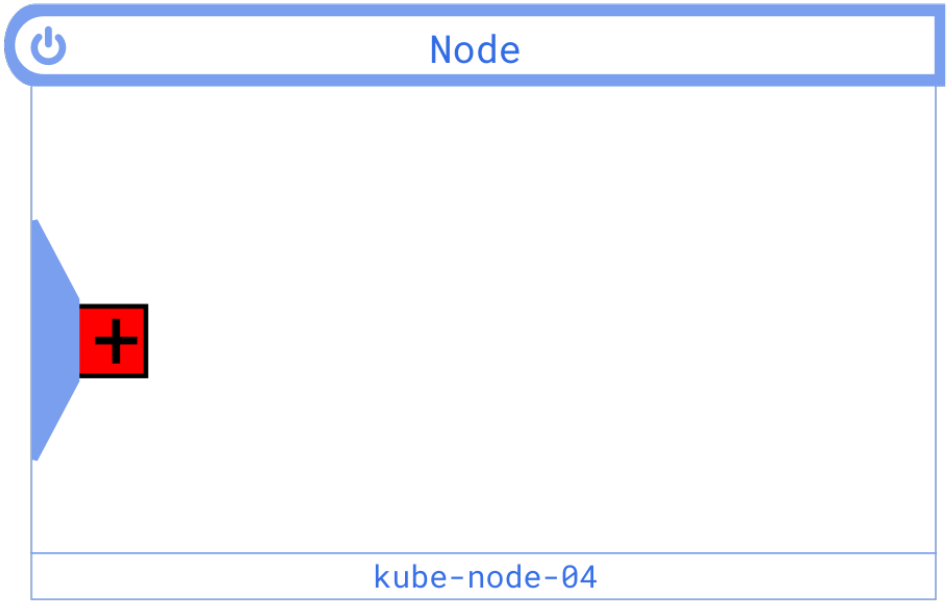

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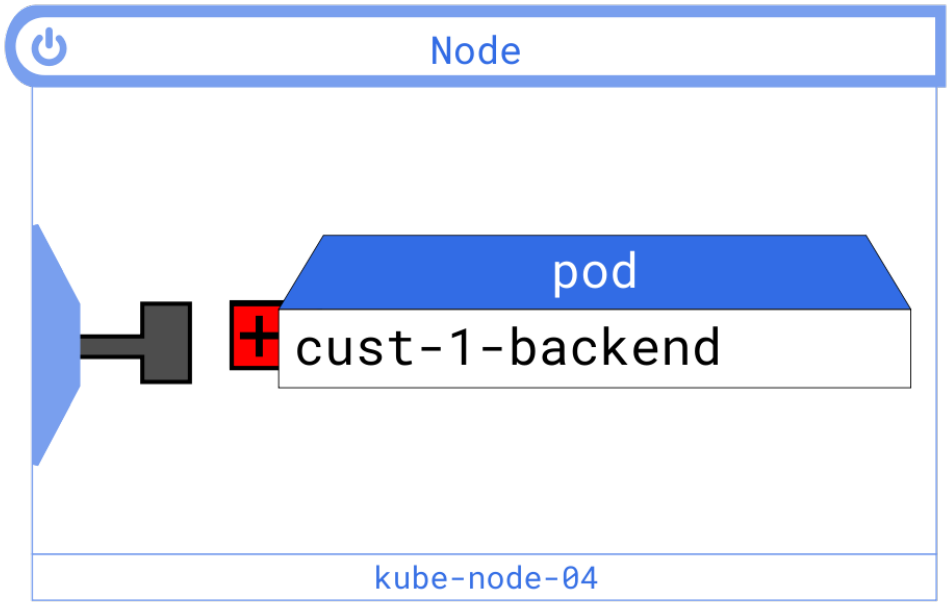

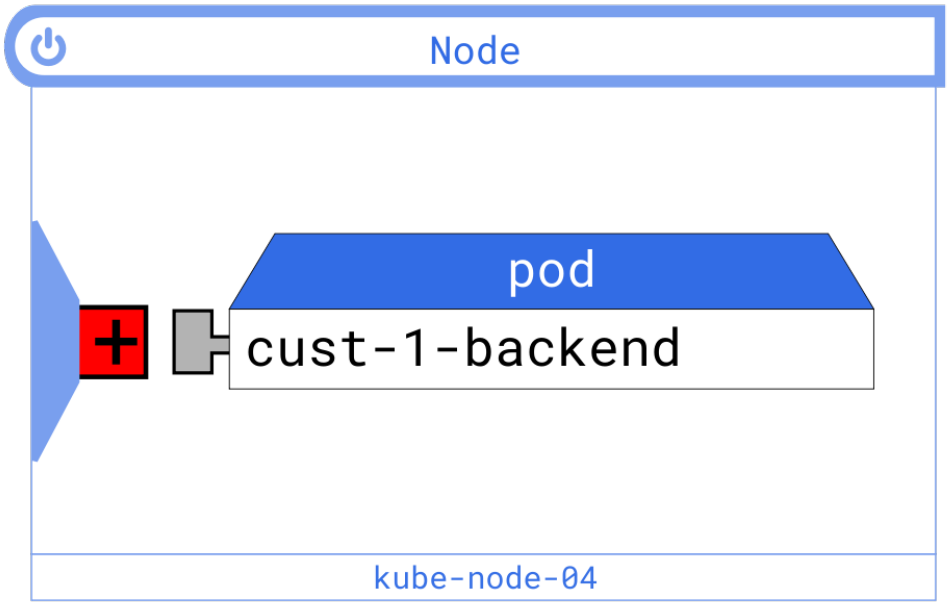

Sozi: @senshu
http://sozi.baierouge.fr/

Kubernetes Logo: Linux Foundation
Prometheus: Linux Foundation
Github Logo: Github Inc.
Etcd Logo: Coreo
Caddy Logo: Light Code Labs

openclipart.org:
- open box: mcol
- pull down screen: yish
- red virtual server: pydubreucq
- Firewall: cyberscooty
- DatabaseRed: ericlemerdy
- File Icon: jhnri4
- Tag Icon: jhnri4
- Sugar-cube-34345345: jhnri4
- Sample Folder: nikla88
- eco-systemedic-plug-A: dominiquechappard
- eco-green-machine-icon (Gears): dominiquechappard
- EKG Heart: GDJ
- SMIL animation (stoplight): ric5sch
- Laptop Computer Icon: kael_179
- Cell Phone Icon: kael_179
- CPU: Fabuio
- RAM Memory: Fabuio
- Statistics: hawk88

Questions?

Full Video: http://bit.do/kube-decon-full
Basic: http://bit.do/kube-decon
Power: http://bit.do/kube-decon-power
GitHub: @carsonoid