DEVELOPER INTRO TO kubernetes

Daniel Pokusa Paweł Młynarczyk

https://github.com/kubernetes/minikube

```
$ minikube start
$ minikube start --memory=6000
```

VT-x enabled in BIOS

Installed kubectl

Virtualization system installed

(virtualbox, vmwarefusion, KVM, xhyve, Hyper-V)

KUBERNETES

- Google

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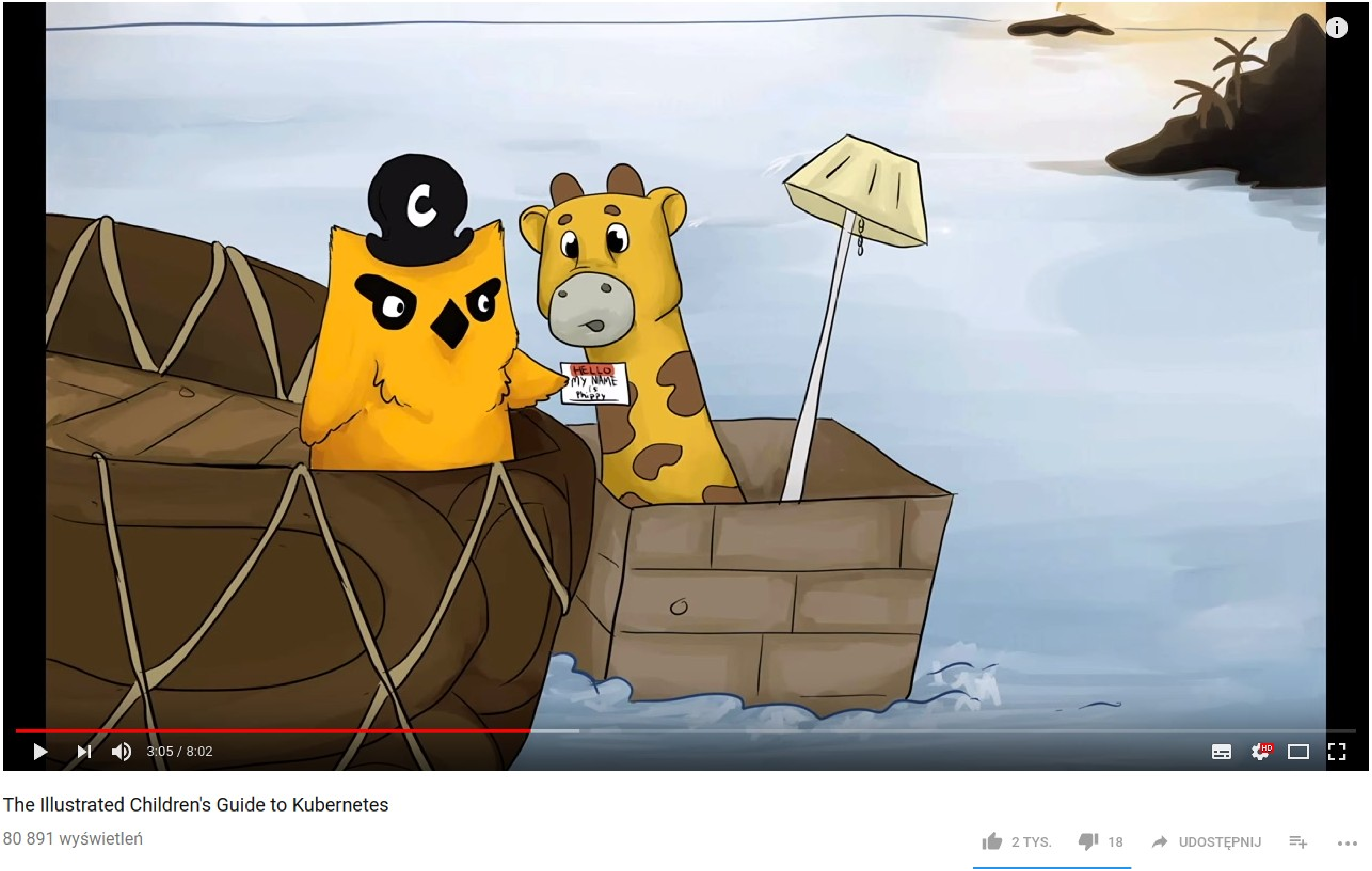
- Z greckiego “*Sternik*” (helmsman or pilot)
- Każda większa chmura aktualnie wspiera k8s!

The Illustrated Children's Guide to Kubernetes

80 891 wyświetleń



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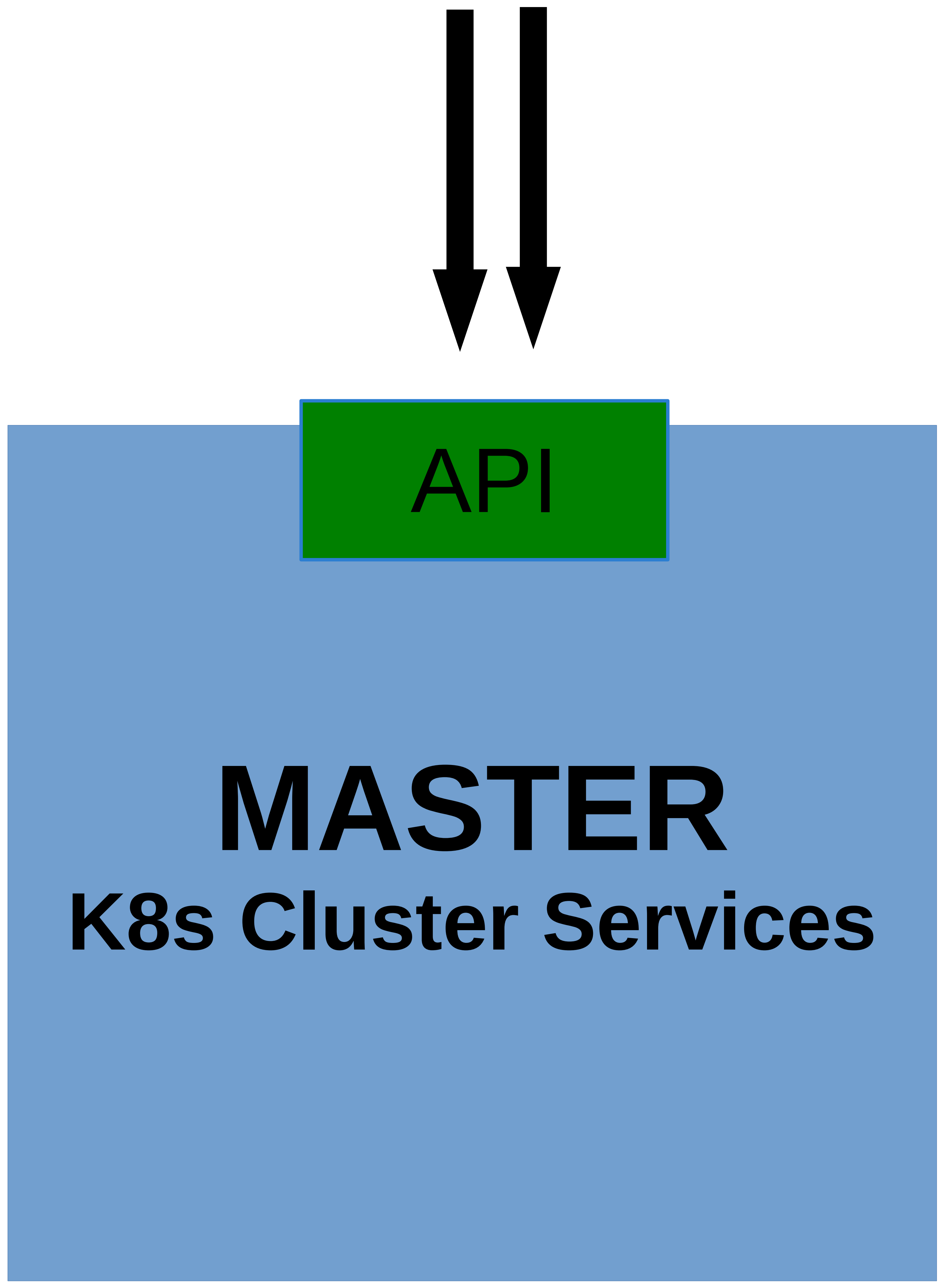
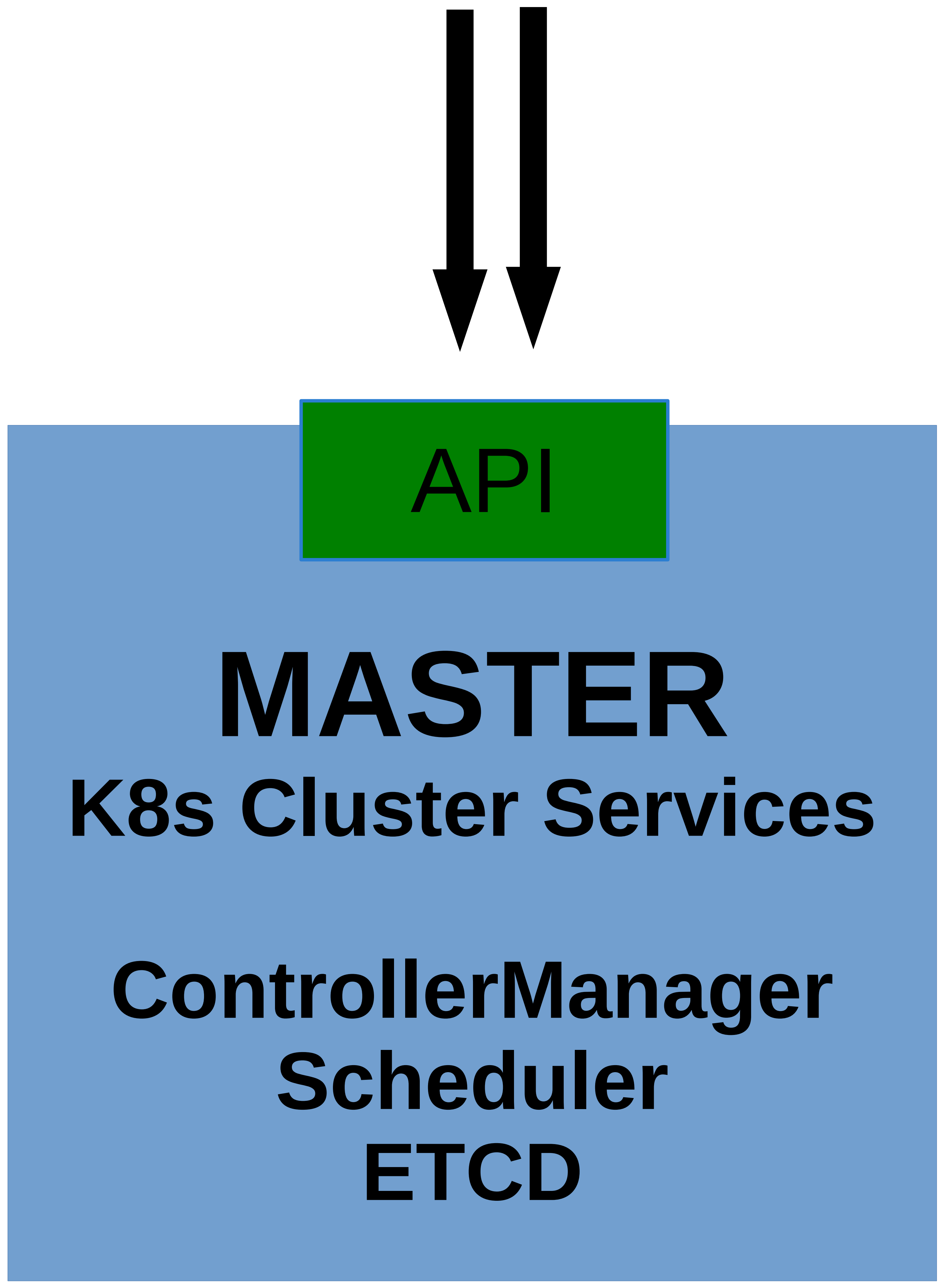
DESIRED STATE MANAGEMENT



API

MASTER

K8s Cluster Services

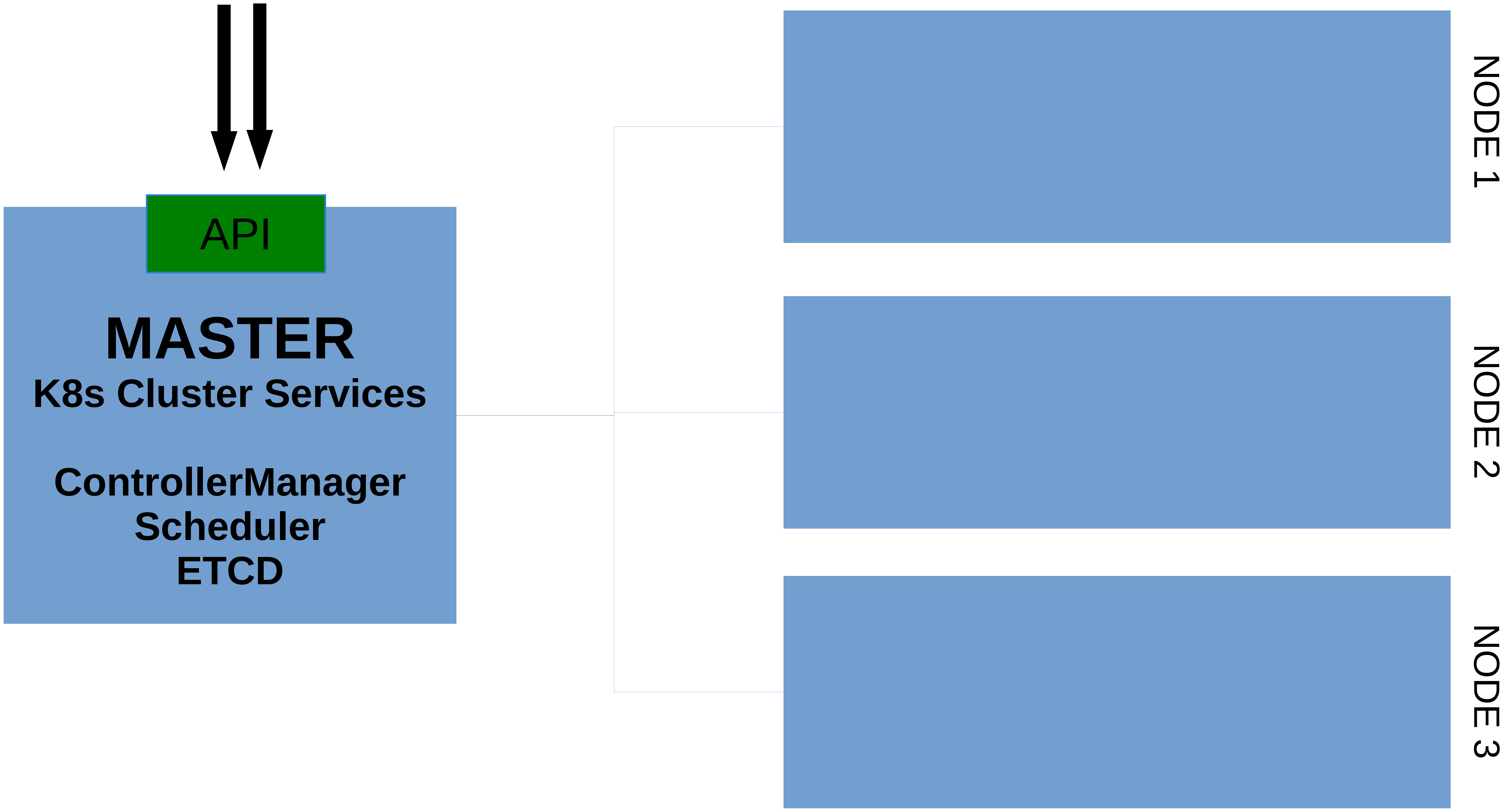


API

MASTER

K8s Cluster Services

ControllerManager
Scheduler
ETCD



API

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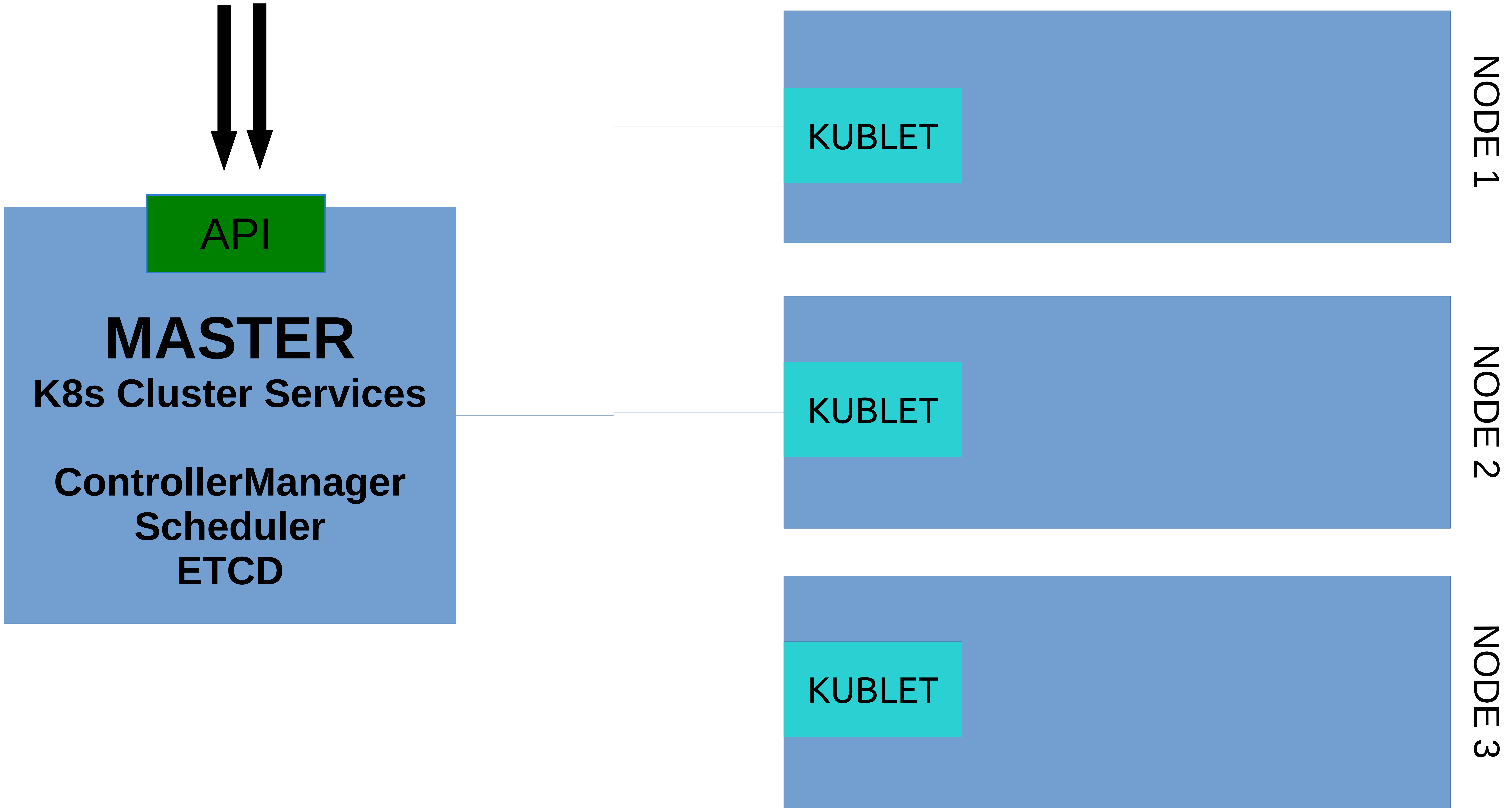
NODE 1

NODE 2

NODE 3



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KUBLET

NODE 1

KUBLET

NODE 2

KUBLET

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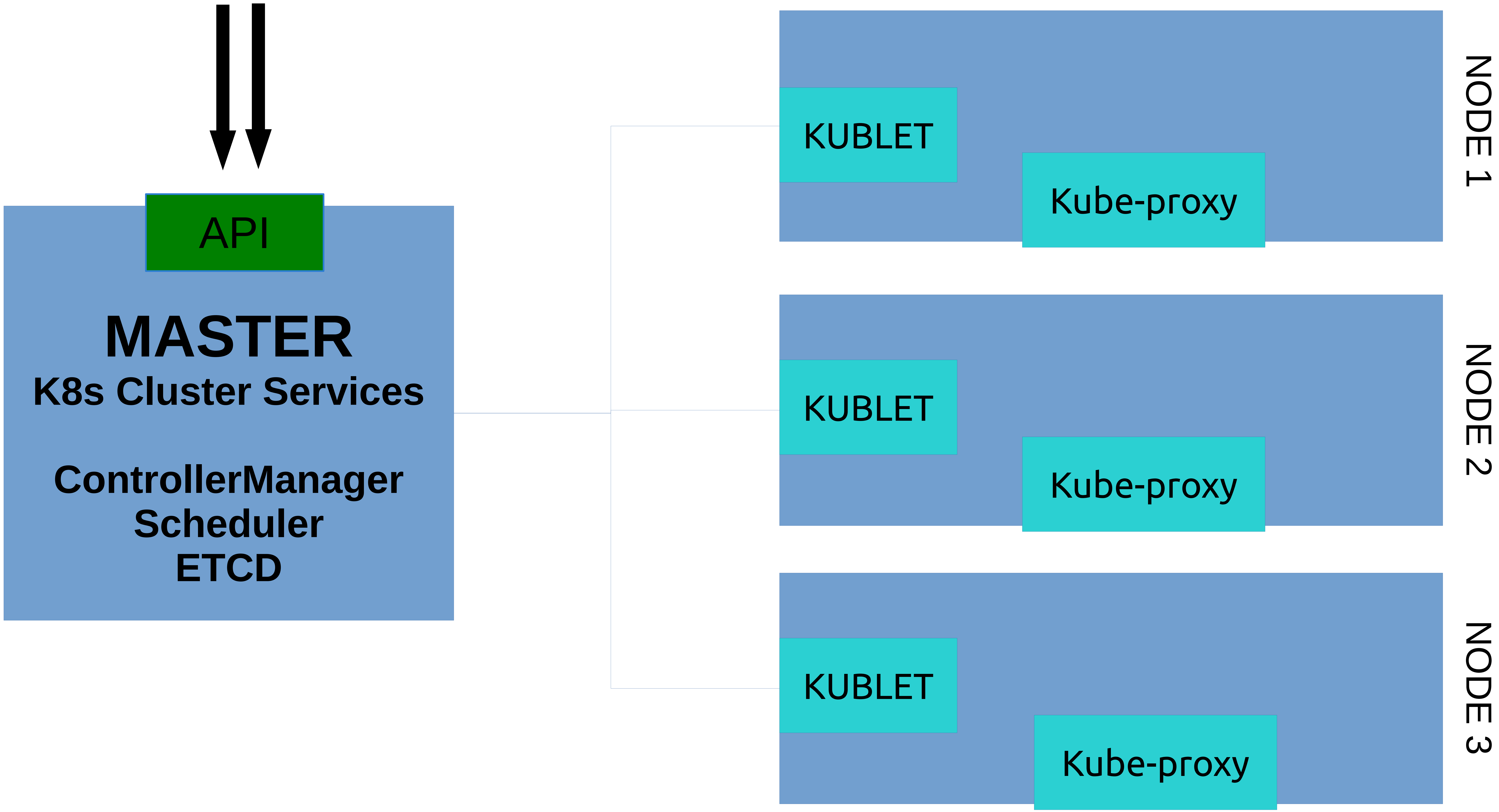

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KUBLET

Kube-proxy

NODE 1

KUBLET

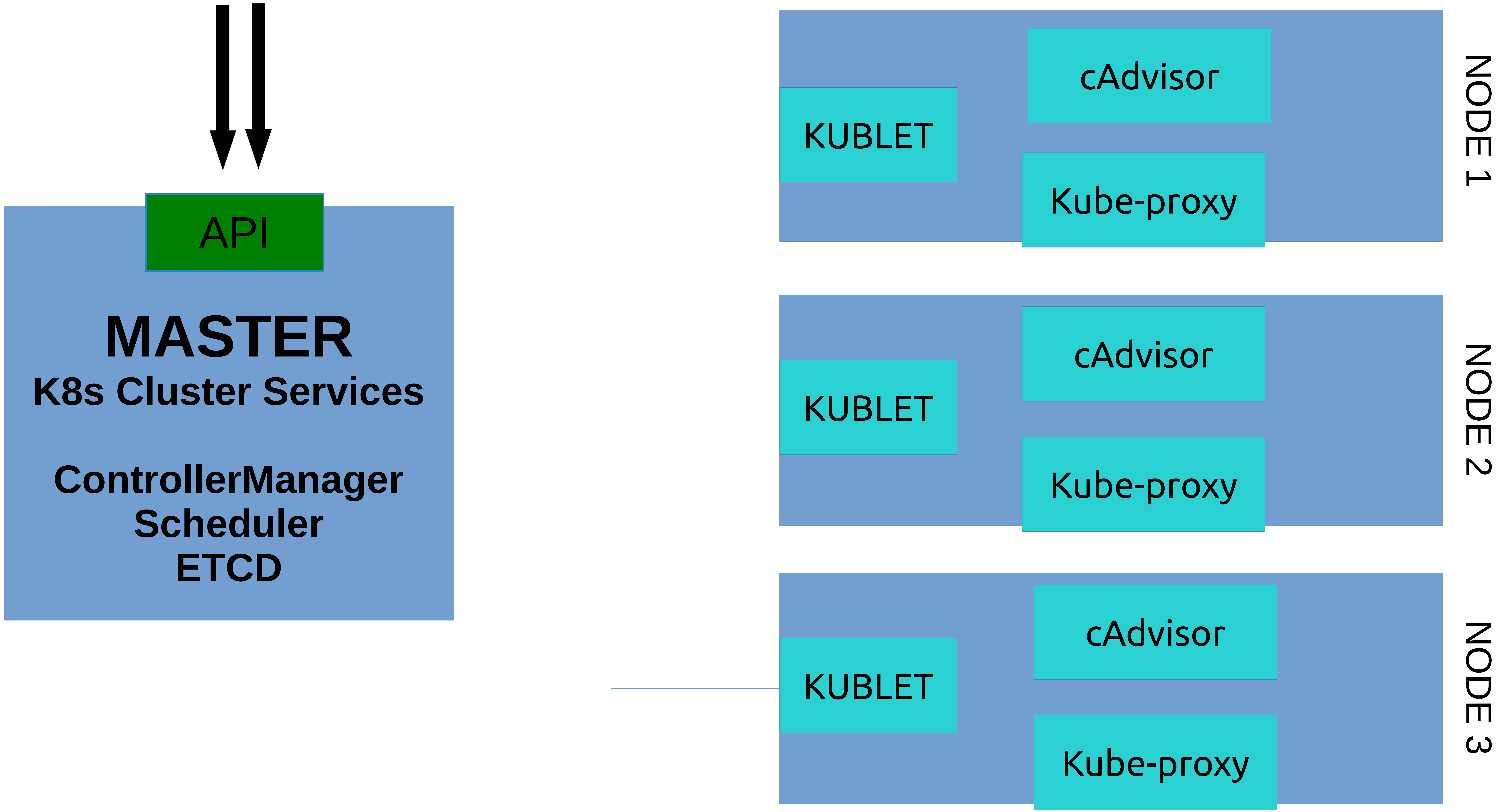
Kube-proxy

NODE 2

KUBLET

Kube-proxy

NODE 3



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KUBLET

cAdvisor

Kube-proxy

NODE 1

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KUBLET

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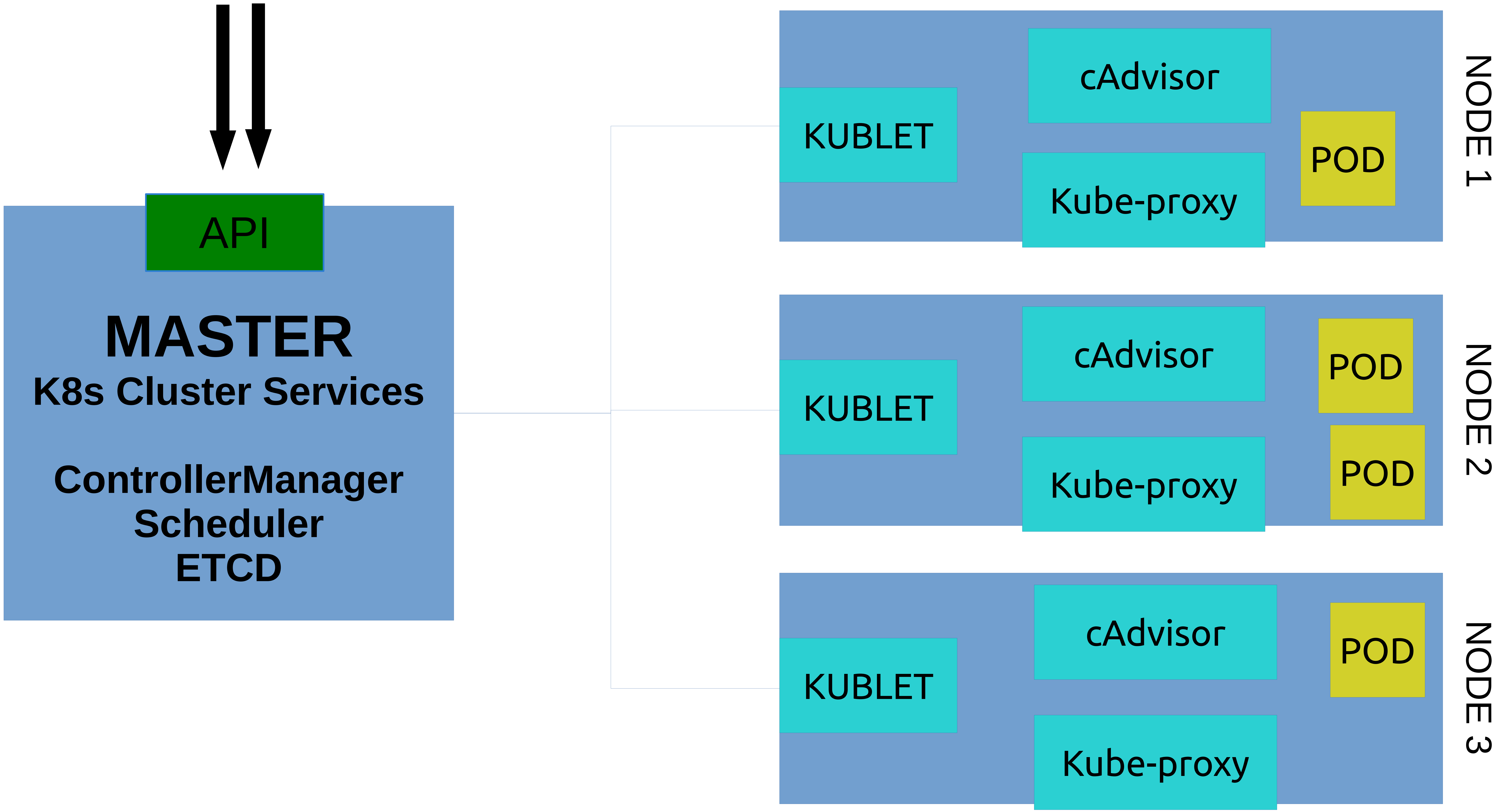
NODE 3



API

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POD

NODE 1

KUBLET

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NODE 2

KUBLET

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Kube-proxy

POD

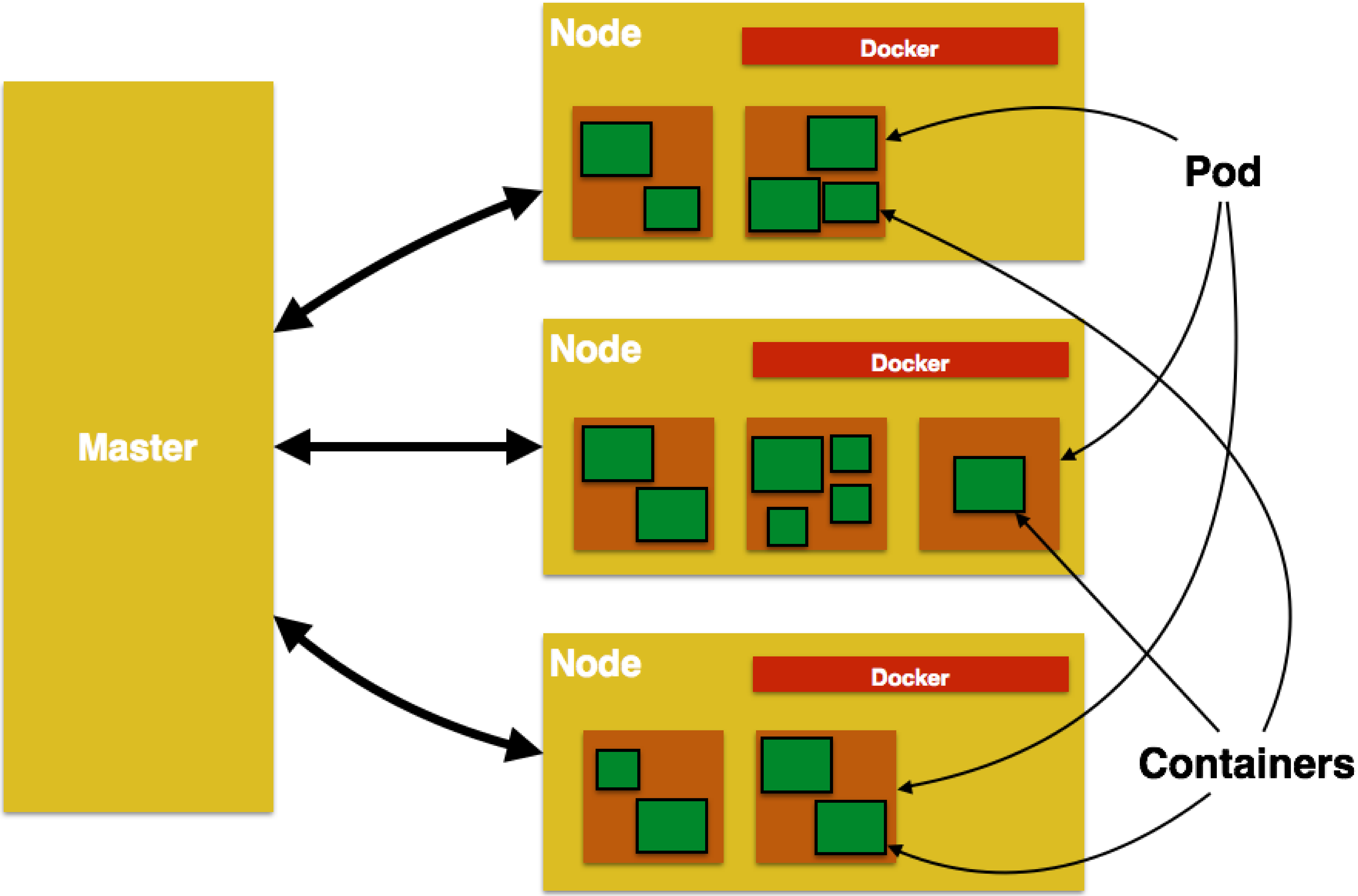
NODE 3

TASK 0

```
 eval $(minikube docker-env)

minikube dashboard
```

TASK 1

POD



http://blog.arungupta.me/wp-content/uploads/2015/07/kubernetes-key-concepts.png

```yaml
apiVersion: v1
kind: Pod
metadata:
  name: my-pod
  labels:
    component: my-pod
spec:
  containers:
    - image: some-image:1.0
      name: my-pod
      ports:
        - containerPort: 8080
```

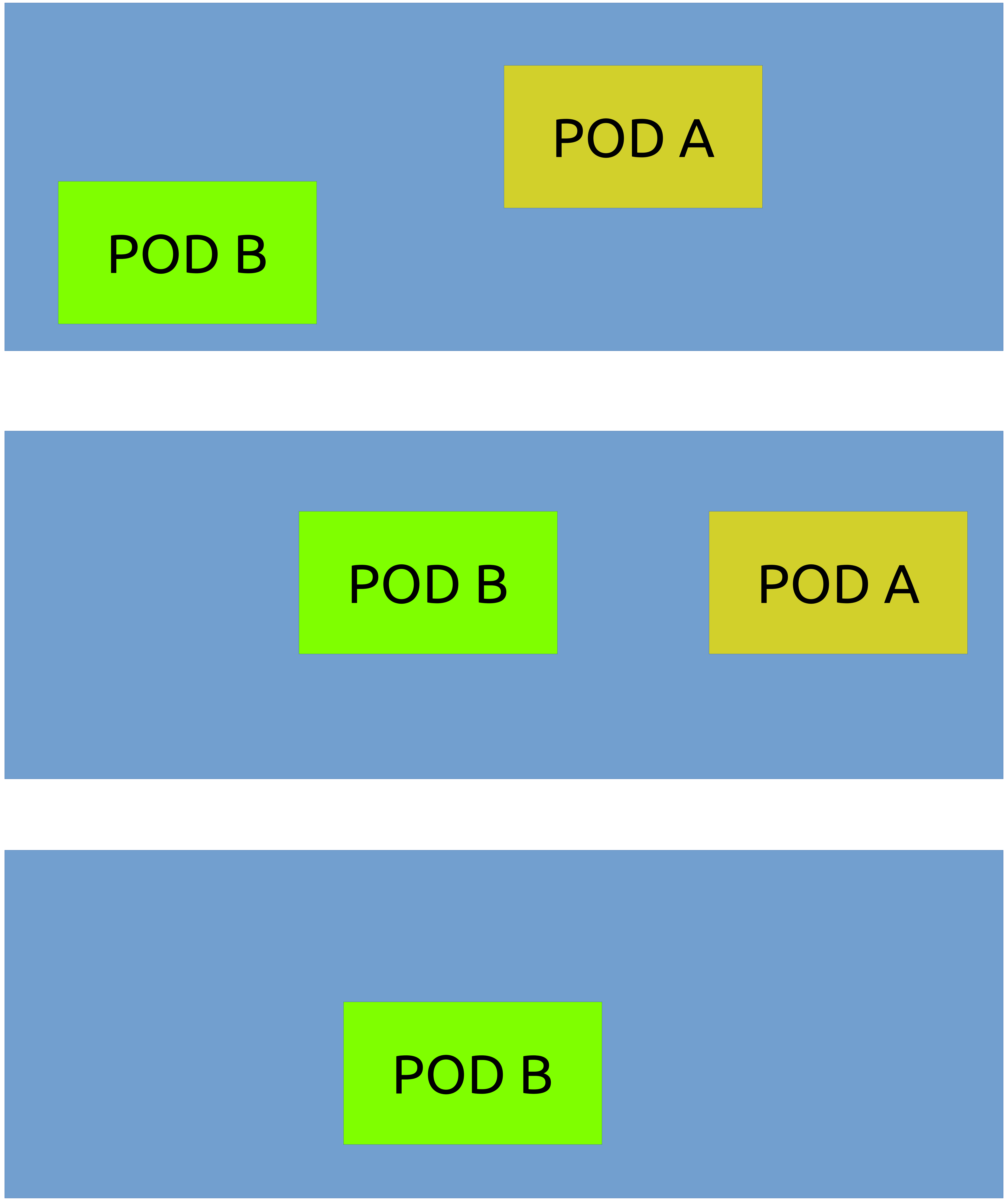
kubectl

```
kubectl create

kubectl delete

kubectl get

kubectl describe

kubectl logs

kubectl exec
```

TASK 2

SERVICE

```yaml
kind: Service
apiVersion: v1
metadata:
  name: my-service
spec:
  selector:
    app: MyApp
  ports:
  - protocol: TCP
    port: 80
    targetPort: 9376
```



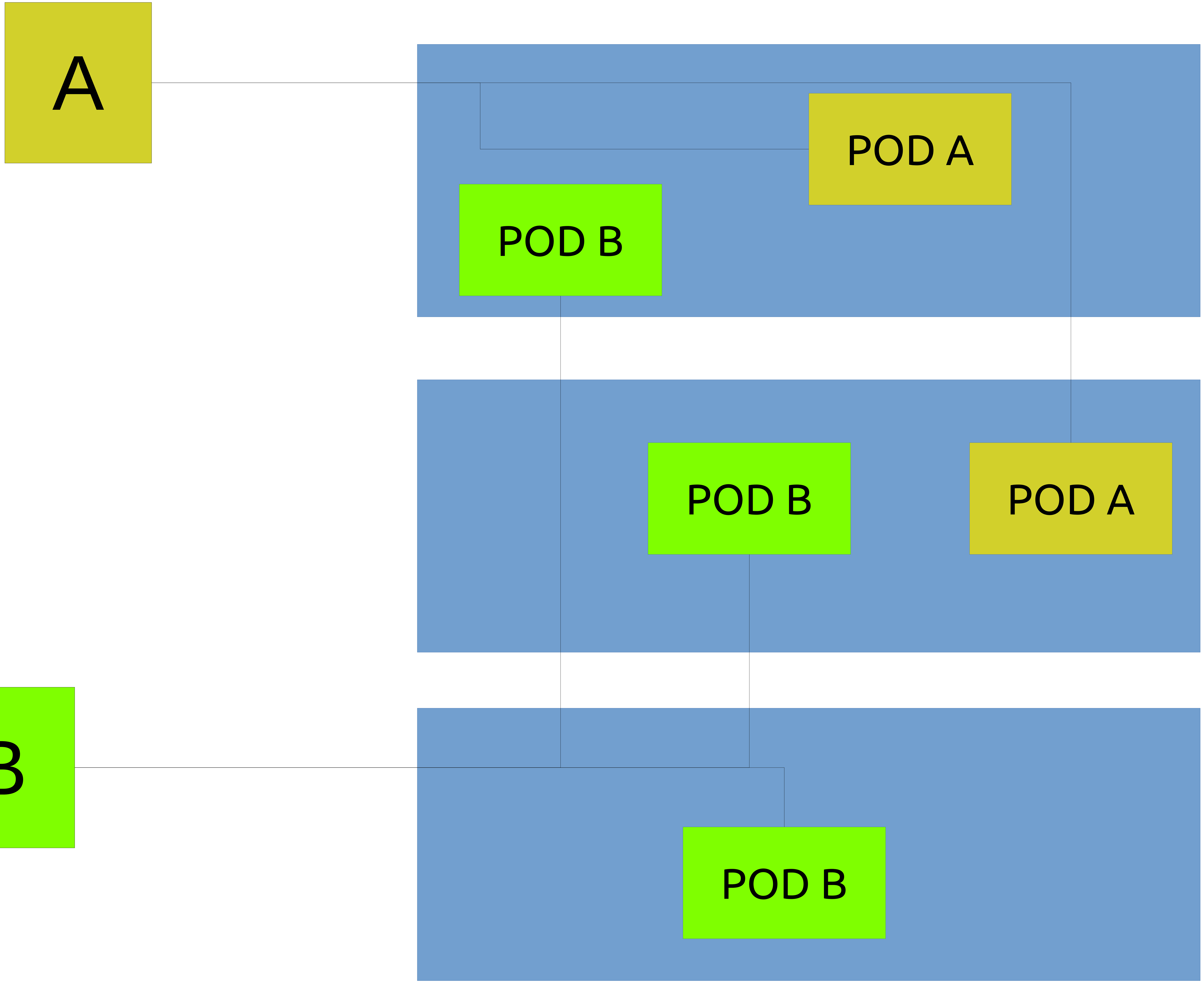
POD A

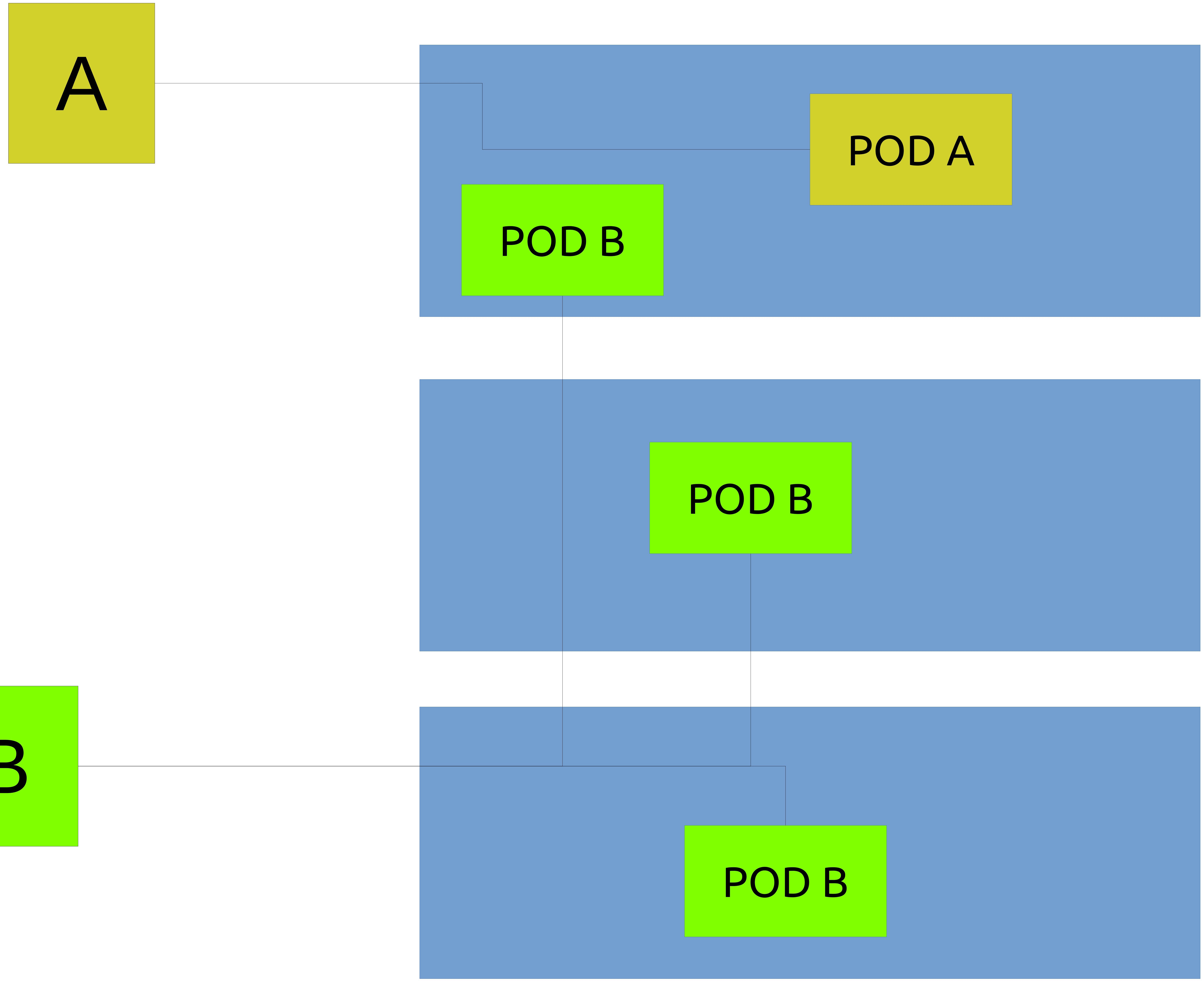
POD B

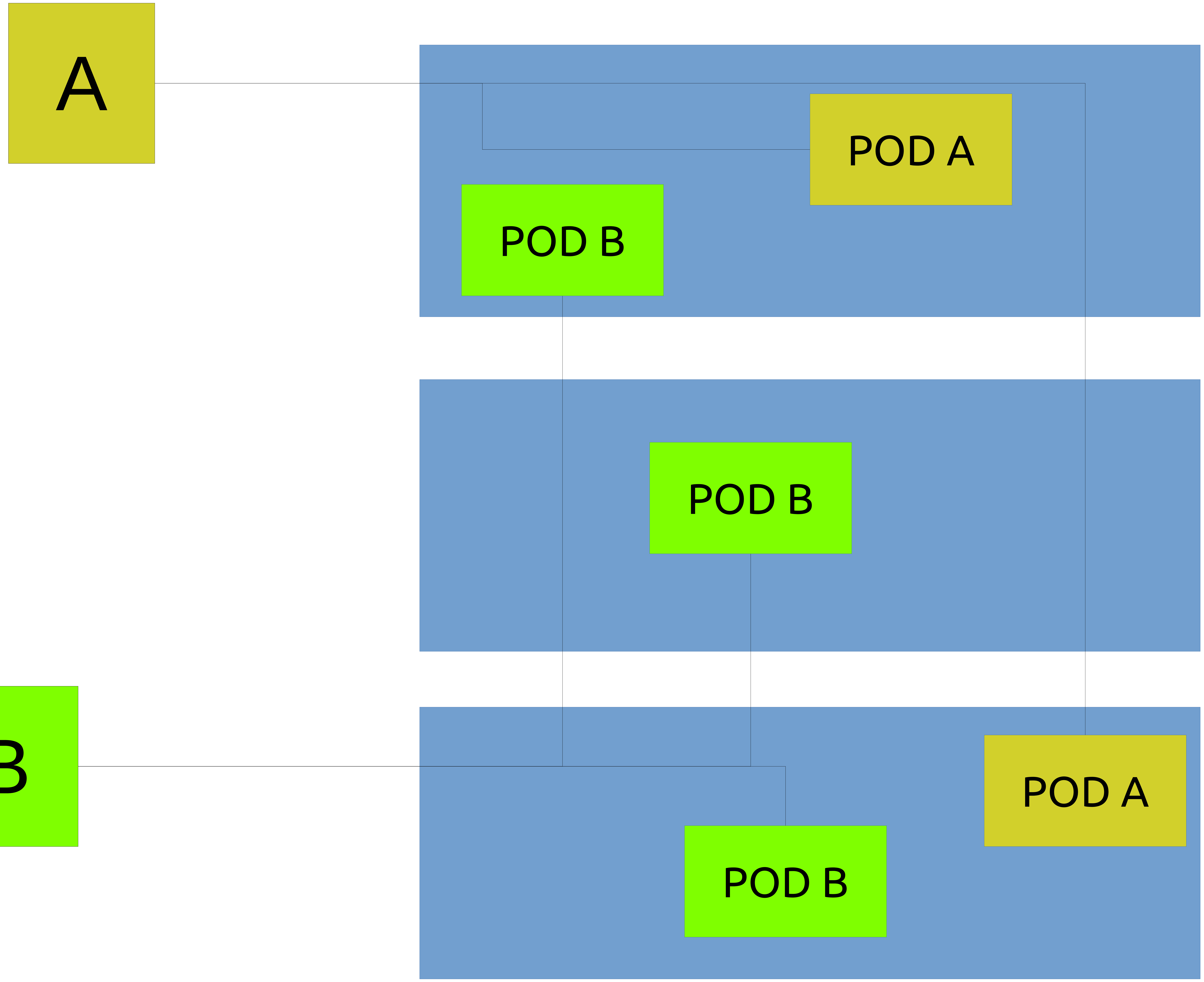
POD B

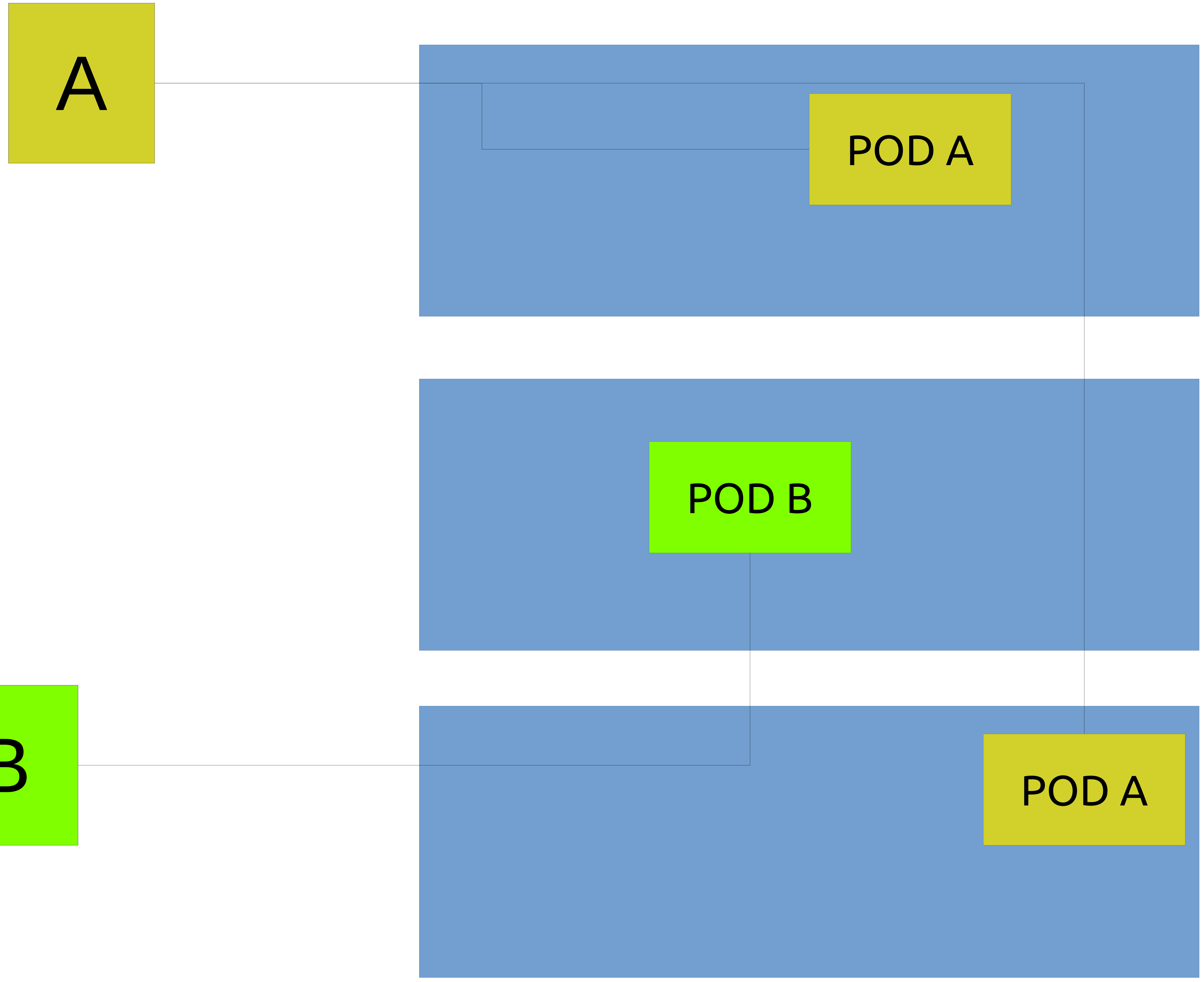
POD A

POD B

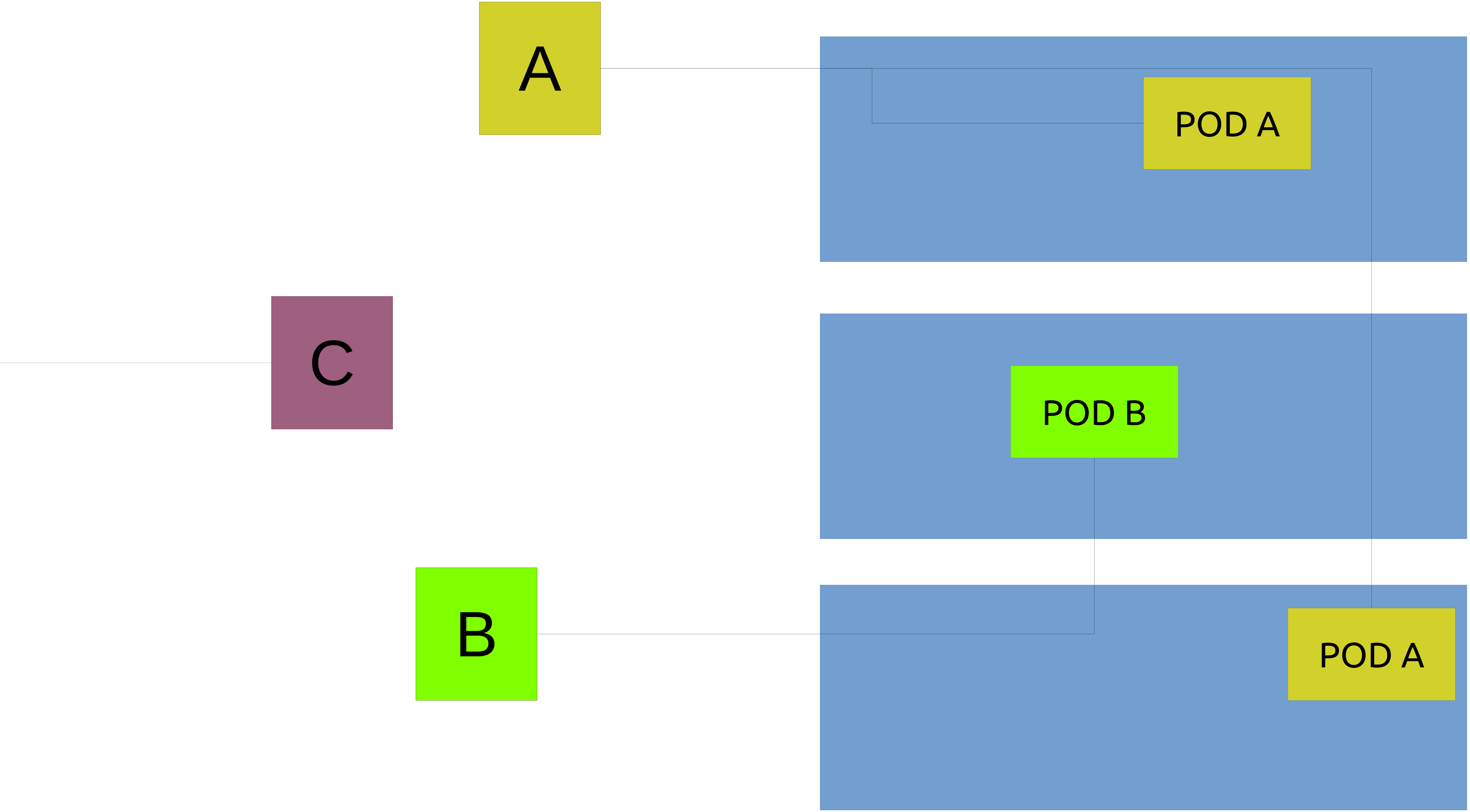

A
POD A
POD B
POD B
POD A
B
POD B

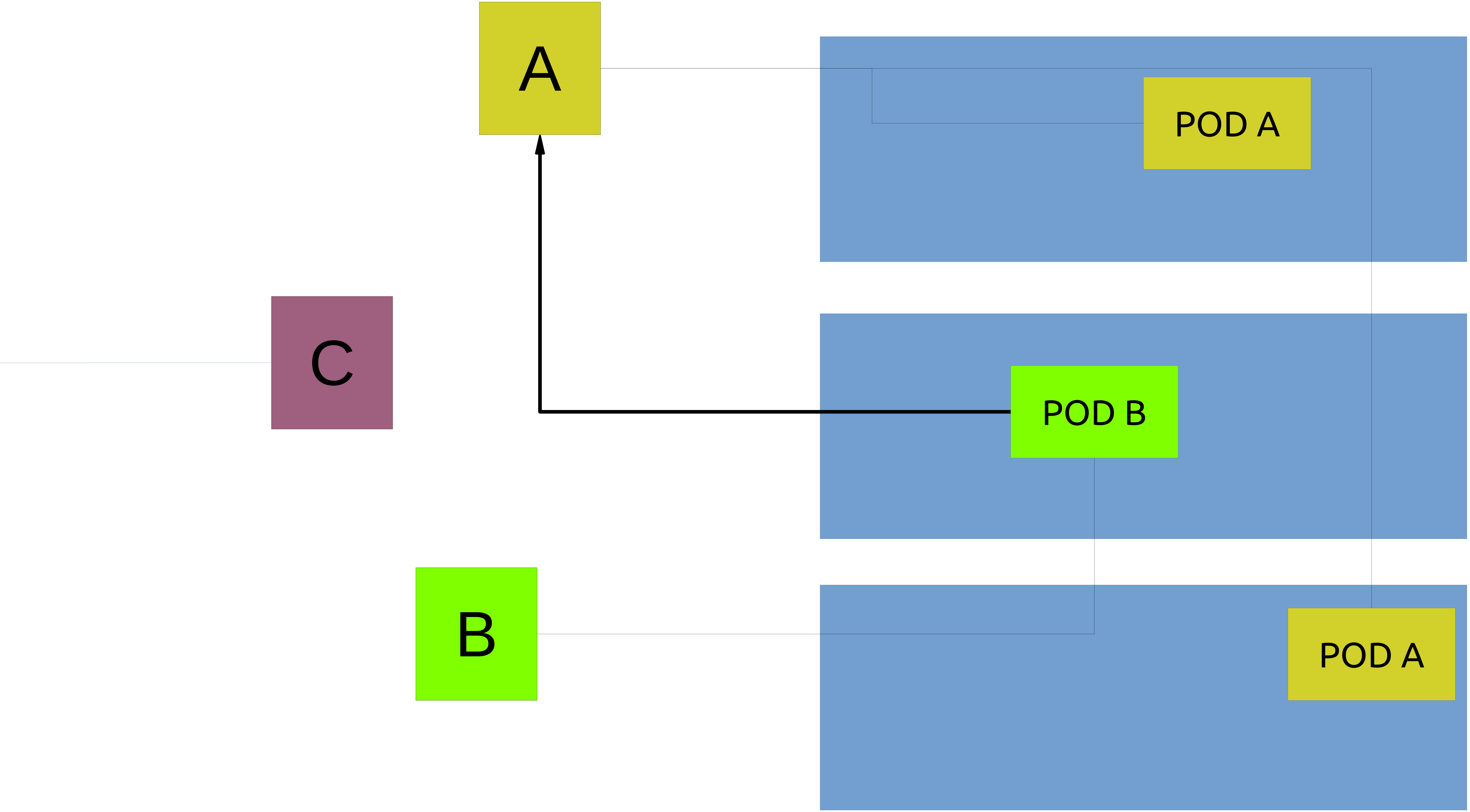

A
POD A
POD B
POD B
B
POD B

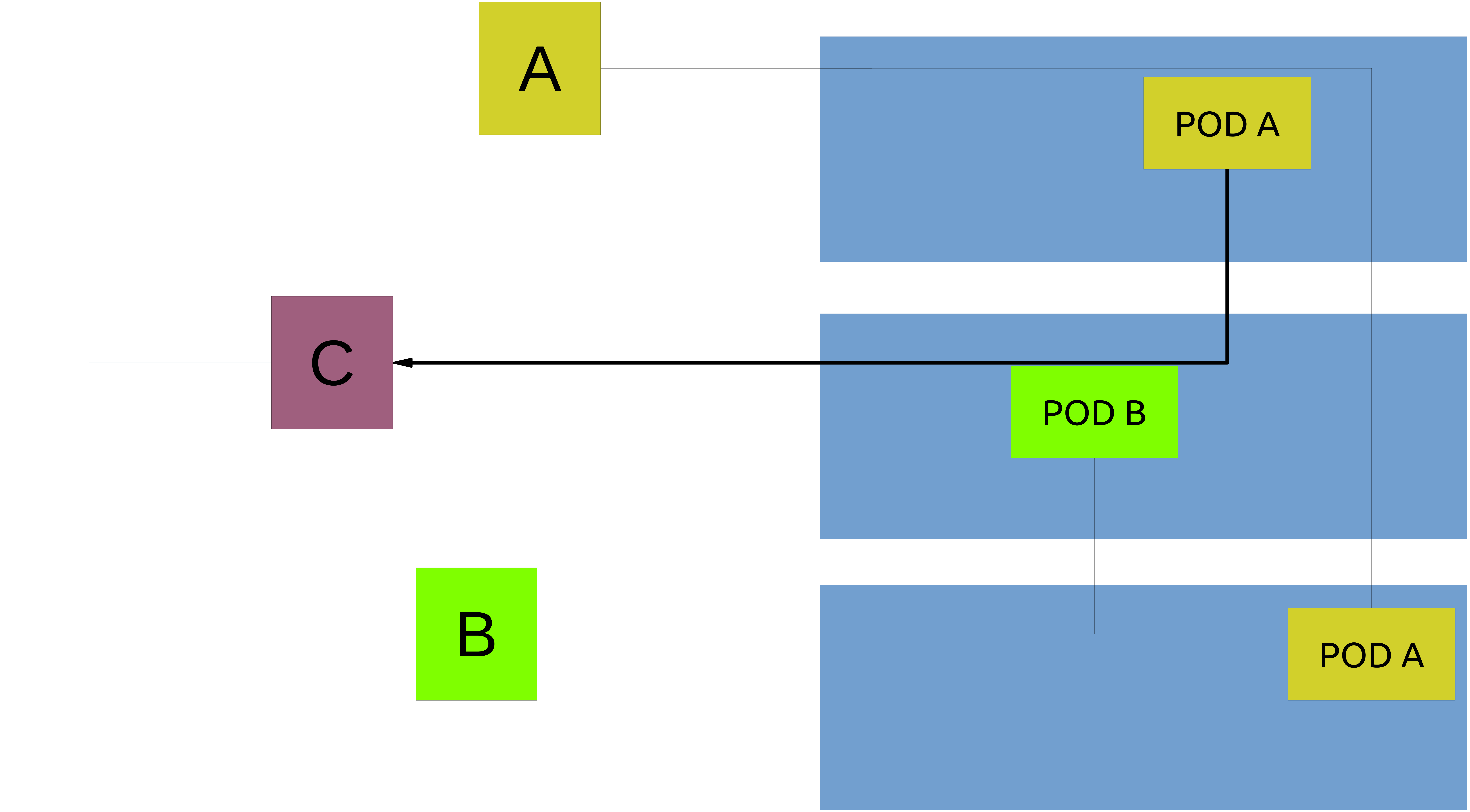

A
POD A
POD B
POD B
B
POD A
POD B


A
POD A
POD B
B
POD A

```yaml
kind: Service
apiVersion: v1
metadata:
  name: my-service
  namespace: prod
spec:
  type: ExternalName
  externalName: my.database.example.com
```


A
POD A
C
POD B
B
POD A


A
POD A
C
POD B
B
POD A


A
POD A
C
POD B
B
POD A

SERVICE DISCOVERY

```
kubectl run curl --image=radial/busyboxplus:curl -i --tty
```

TASK 3

DEPLOYMENT

```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx-deployment
  labels:
    app: nginx
spec:
  replicas: 1
  selector:
    matchLabels:
      app: nginx
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
      - name: nginx
        image: nginx:1.7.9
        ports:
        - containerPort: 80
```

TASK 4

CONFIG MAPS

```
kubectl create configmap spring-app-config
  --from-file=src/main/resources/application.properties
```

TASK 5

HEALTH

TASK 6

SECRETS

```
kubectl create secret generic mongodb-credentials
    --from-literal=username=user -from-literal=password=pass
```

```
spec:
      containers:
        - name: my-app
          image: my-app:0.0.1-SNAPSHOT
          ports:
          - containerPort: 8080
          env:
          - name: LOG_APPENDER
            value: Console
          - name: HRPROJECTS_MONGODB_PASSWORD
            valueFrom:
              secretKeyRef:
                name: mongodb-credentials
                key: password
```

```
kubectl create secret generic mongodb-credentials
    --from-literal=username=user -from-literal=password=pass
```

```
spec:
      containers:
        - name: my-app
          image: my-app:0.0.1-SNAPSHOT
          - name: LOG_APPENDER
            value: Console
          - name: HRPROJECTS_MONGODB_PASSWORD
            valueFrom:
              secretKeyRef:
                name: mongodb-credentials
                key: password
```

```
@Value("${hrprojects.mongodb.password}")
private String password;
```

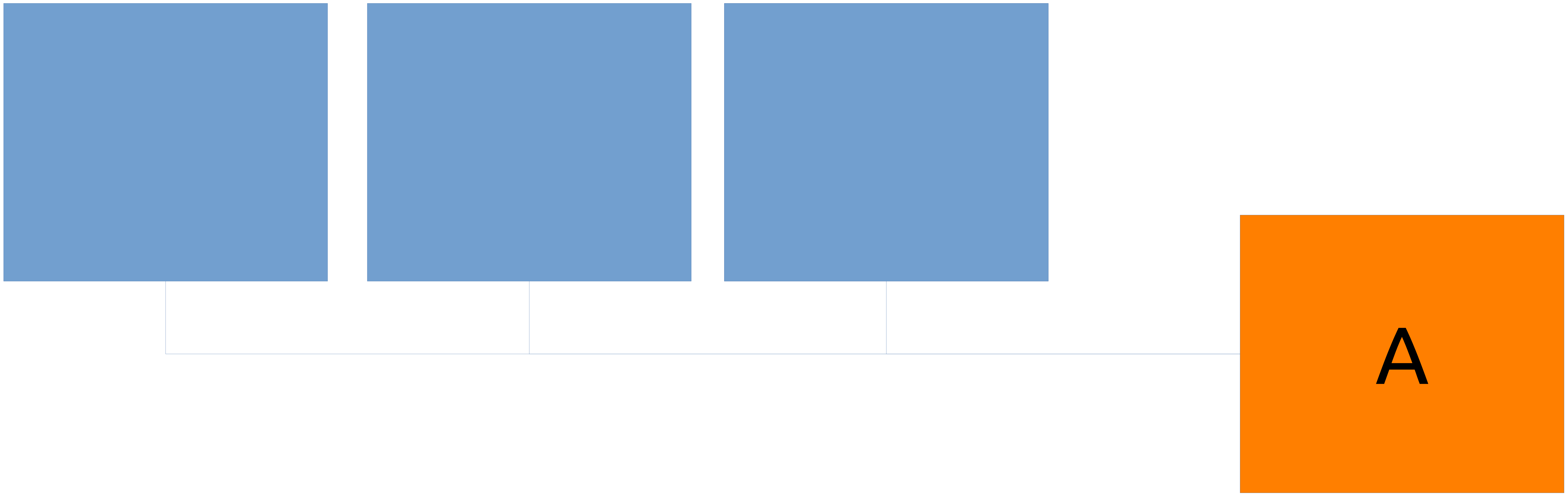
TASK 7

SCALING

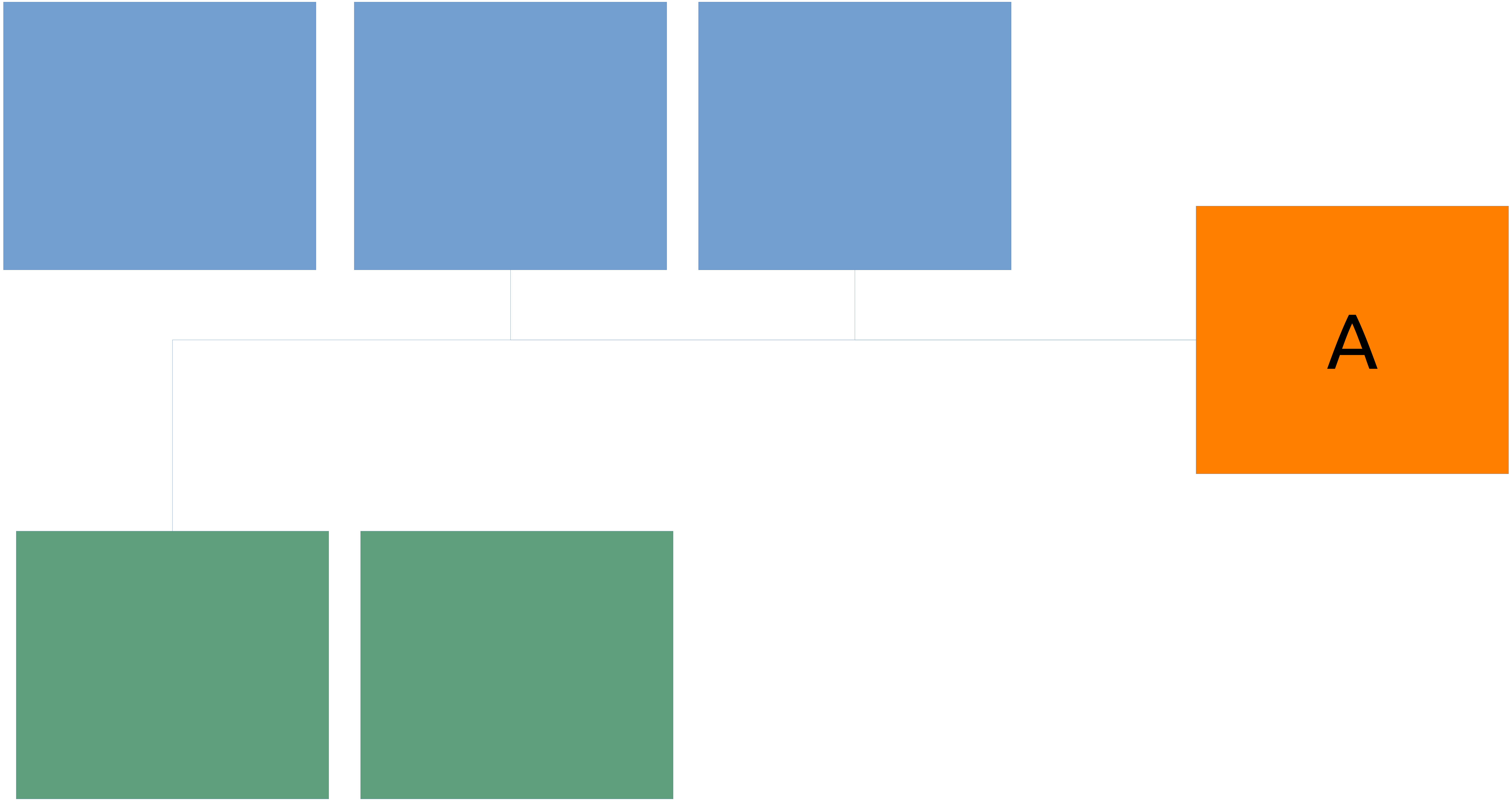
```
$ kubectl scale deployment nginx-deployment --replicas=5

$ kubectl autoscale deployment nginx-deployment --min=10 --max=15 --cpu-percent=80
```

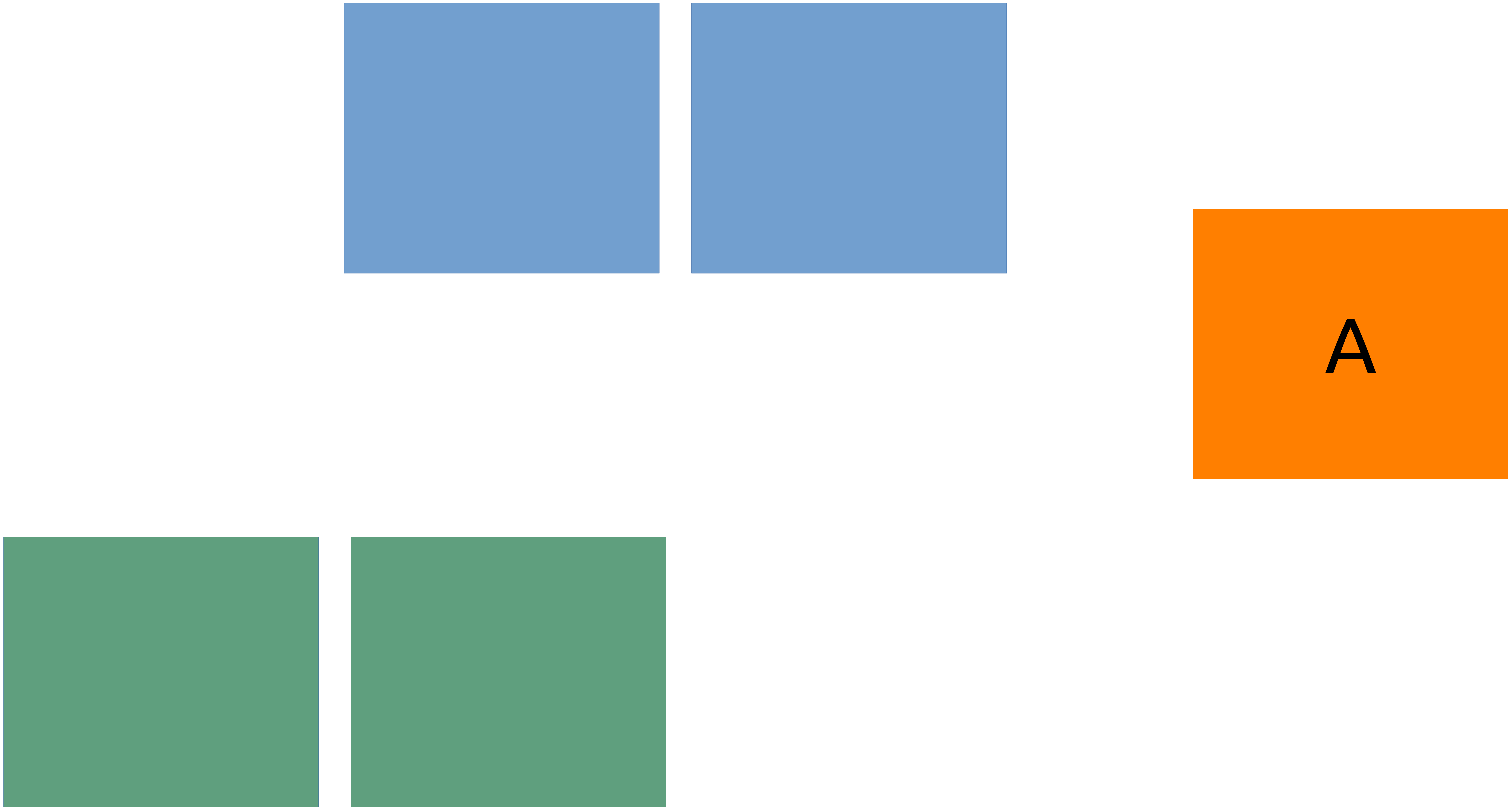
TASK 8

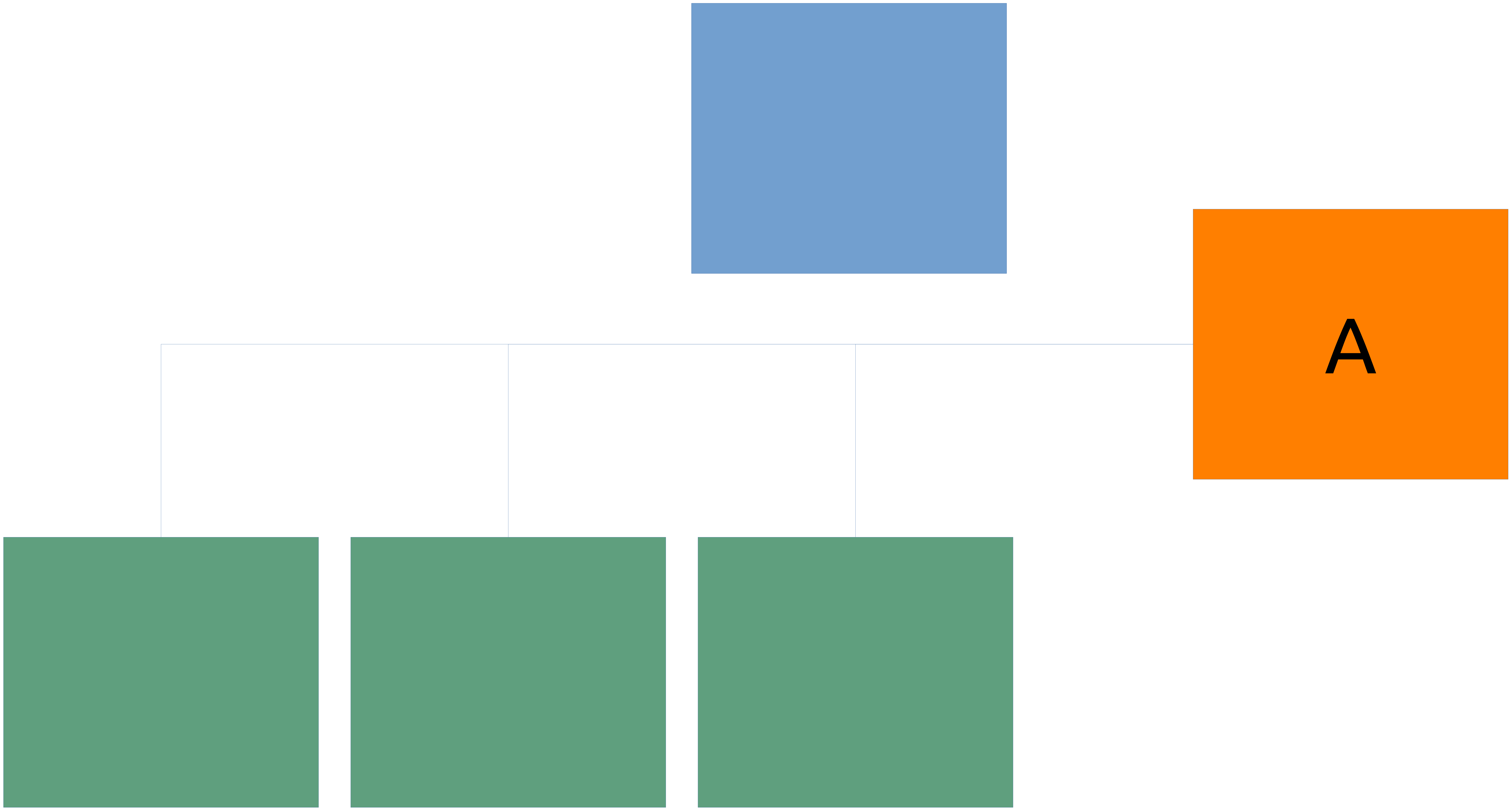
ROLLING UPDATE


A

A


A


A


A

A

```
$ kubectl set image deployment/nginx-deployment nginx=nginx:1.91

$ kubectl rollout status deployments nginx-deployment

$ kubectl rollout history deployment/nginx-deployment

$ kubectl rollout undo deployment/nginx-deployment
```

```
#[Mean    =      907.002, StdDeviation   =      861.077]
#[Max     =     4313.088, Total count    =         7625]
#[Buckets =           27, SubBuckets     =         2048]
----------------------------------------------------------
  7627 requests in 10.01s, 1.58MB read
Requests/sec:    762.30
Transfer/sec:    161.81KB
```

```
#[Mean    =     2866.439, StdDeviation   =     2311.337]
#[Max     =     8552.448, Total count    =         3342]
#[Buckets =           27, SubBuckets     =         2048]
----------------------------------------------------------
  3344 requests in 10.01s, 709.26KB read
  Socket errors: connect 0, read 0, write 4, timeout 111
Requests/sec:    333.96
Transfer/sec:     70.83KB
```

YOU ARE READY!

BUT THERE IS MORE!

VOLUMES

```
kind: PersistentVolume
apiVersion: v1
metadata:
  name: graphite-storage-pv
  labels:
    type: local
spec:
  accessModes:
    - ReadWriteOnce
  capacity:
    storage: 1000Mi
  hostPath:
    path: "/hosthome/dpokusa/tmp/graphite-minikube-storage"
```

```
kind: PersistentVolumeClaim
apiVersion: v1
metadata:
  name: graphite-storage-claim
  labels:
    type: local
spec:
  volumeName: graphite-storage-pv
  accessModes:
    - ReadWriteMany
  resources:
    requests:
      storage: 1000Mi
```

```
spec:
  containers:
    - name: monitoring
      image: xxx/graphite-grafana:0.2.0
      ports:
        - containerPort: 80
          name: grafana
        - containerPort: 81
          name: graphite
        - containerPort: 8125
          name: statsd
        - containerPort: 8126
          name: statsd-admin
        # statsD administrative port: 8126
      volumeMounts:
      - mountPath: /opt/graphite/storage
        name: graphite-storage
      - mountPath: /opt/grafana/storage
        name: grafana-storage
  volumes:
  - name: graphite-storage
    persistentVolumeClaim:
      claimName: graphite-storage-claim
  - name: grafana-storage
    persistentVolumeClaim:
      claimName: grafana-storage-claim
```

JOBS

```
apiVersion: batch/v1
kind: Job
metadata:
  name: pi
spec:
  template:
    metadata:
      name: pi
    spec:
      containers:
      - name: pi
        image: perl
        command: ["perl",  "-Mbignum=bpi", "-wle", "print bpi(2000)"]
      restartPolicy: Never
      backoffLimit: 4
```

PETS
(STATEFUL SETS)

```yaml
apiVersion: apps/v1beta2
kind: StatefulSet
metadata:
  name: web
spec:
  selector:
    matchLabels:
      app: nginx # has to match .spec.template.metadata.labels
  serviceName: "nginx"
  replicas: 3 # by default is 1
  template:
    metadata:
      labels:
        app: nginx # has to match .spec.selector.matchLabels
  spec:
    terminationGracePeriodSeconds: 10
    containers:
    - name: nginx
      image: gcr.io/google_containers/nginx-slim:0.8
      ports:
      - containerPort: 80
        name: web
      volumeMounts:
      - name: www
        mountPath: /usr/share/nginx/html
volumeClaimTemplates:
- metadata:
    name: www
  spec:
    accessModes: [ "ReadWriteOnce" ]
    storageClassName: my-storage-class
    resources:
      requests:
        storage: 1Gi
```

INGRESS

DAEMON SETS

SPRING BOOT K8 INTERGATION

```
<dependency>
      <groupId>io.fabric8</groupId>
      <artifactId>spring-cloud-kubernetes-core</artifactId>
</dependency>
```

RECCOMENDED SOURCES

- kubernetes.io
- *http://blog.arungupta.me*
- *https://github.com/kubernetes/minikube*

ABOUT

ONWELO

WE DELIVER YOUR IDEAS

PAWEŁ MŁYNARCZYK

@psmlynarczyk

ABOUT

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@dpokusa

DANIEL POKUSA

SOFTWARE-EMPATHY.PL

ABOUT

SPREAD IT

SPREADIT.PL

Wrzesień 2018, Katowice

```
$ minikube stop
$ minikube delete
```