

DEVELOPER INTRO TO



kubernetes

Daniel Pokusa Paweł Młynarczyk

@dpokusa

@psmlynarczyk



<https://github.com/dpokusa/programistok-k8s>



minikube

<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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- Każda większa chmura aktualnie wspiera k8s!

KUBERNETES

- Cloud Native Computing Foundation (CNCF)
- kubernetes.io
- helm
- v1.12
- A lot of installation tools at the moment (such as juju, rancher, Kops, ...)
- Distributions



Illustrated The Children's Guide to Kubernetes

▶ ▶ | 0:42 / 8:02

HD □ []

The Illustrated Children's Guide to Kubernetes

80 891 wyświetleń

2 TYS.

18

UDOSTĘPNIJ

[] ...



The Illustrated Children's Guide to Kubernetes

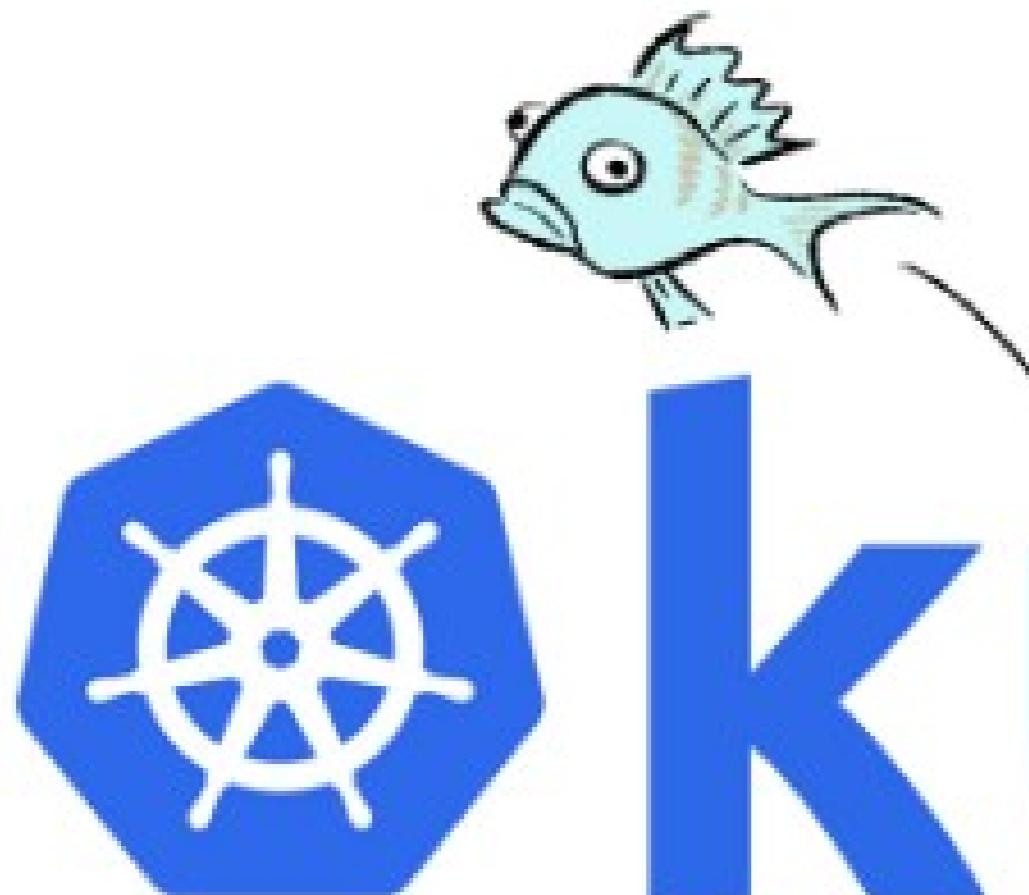
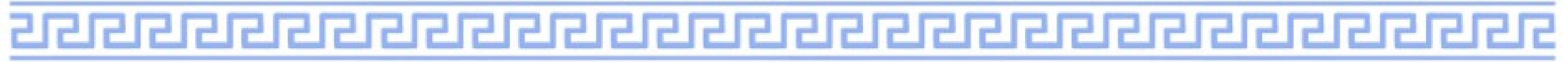
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...

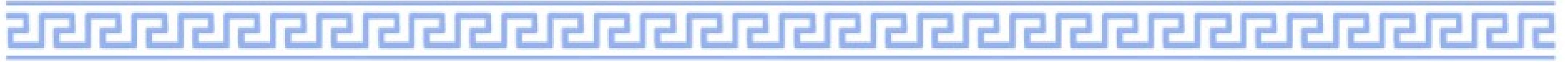
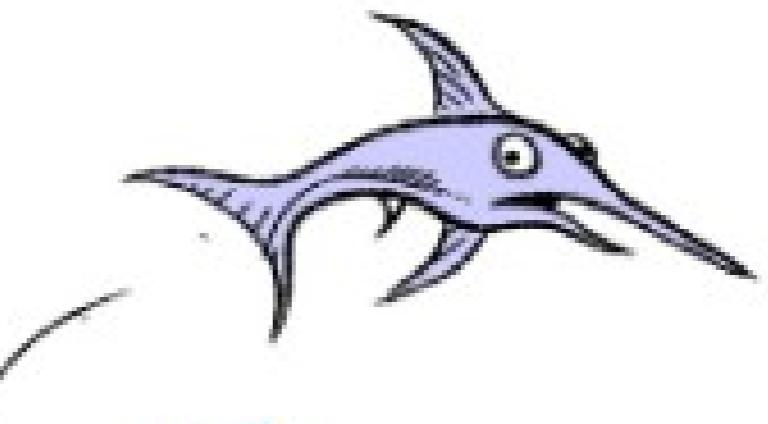


SMOOTH SAILING

WITH

kubernetes

LEARN ABOUT KUBERNETES AND HOW YOU CAN USE IT
FOR CONTINUOUS INTEGRATION AND DELIVERY.



FOR HERA'S SAKE,
WHO KNEW **DELIVERING**
THESE SERVICES WOULD
BE SO **HARD?**

WHY ISN'T MY
CODE UP YET??

OUR UPDATE CYCLES
ARE TOO SLOW!

WE CAN'T SCALE
UP FAST ENOUGH!

GAME'S GONNA GET
STALE, BOSS...

SORRY TO CALL
AT 3:00AM, BUT—

OH, CRAP—
POWER'S OUT AGAIN!

WHY CAN'T IT JUST
WORK ALL THE TIME?!

Docker: Now Powered by Swarm and Kubernetes

1

The best enterprise
container security and
management

Docker Enterprise Edition

3

Compatibility with
the Kubernetes and
Swarm ecosystems

Docker Community Edition



kubernetes



containerd

2

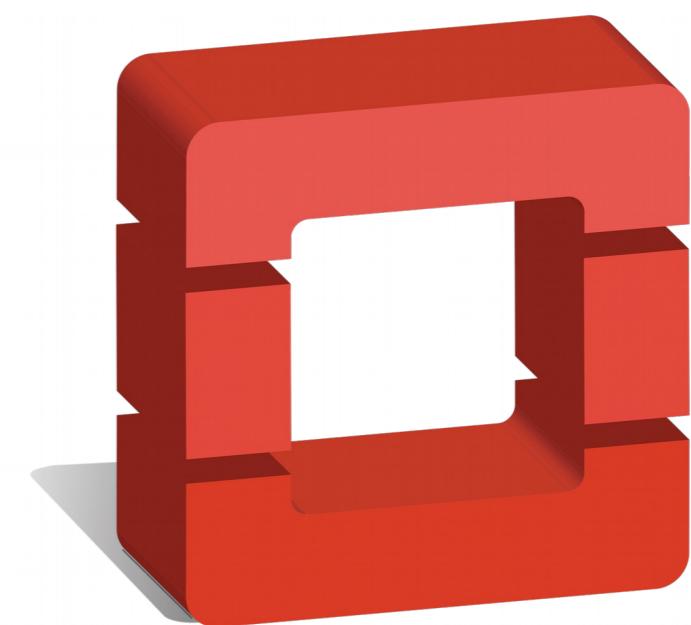
The best container
development workflow

4

Industry-standard
container runtime



Google Cloud Platform



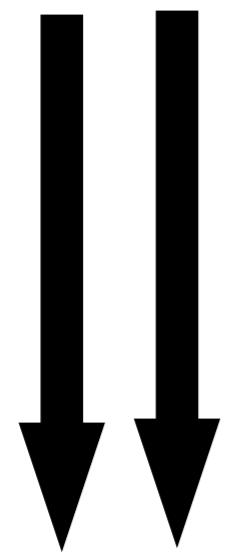
openstack®

DESIRED STATE MANAGEMENT



API

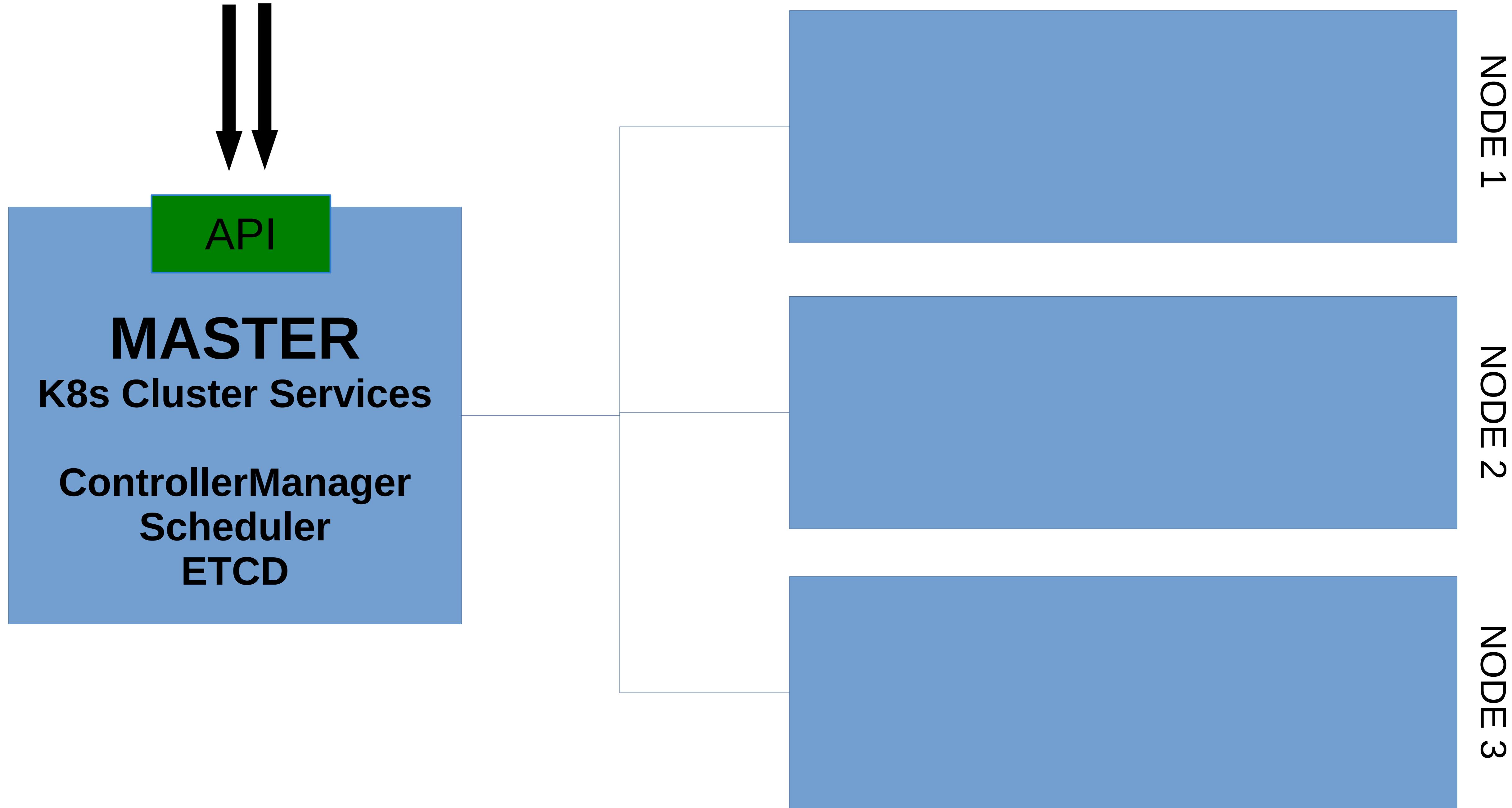
MASTER
K8s Cluster Services

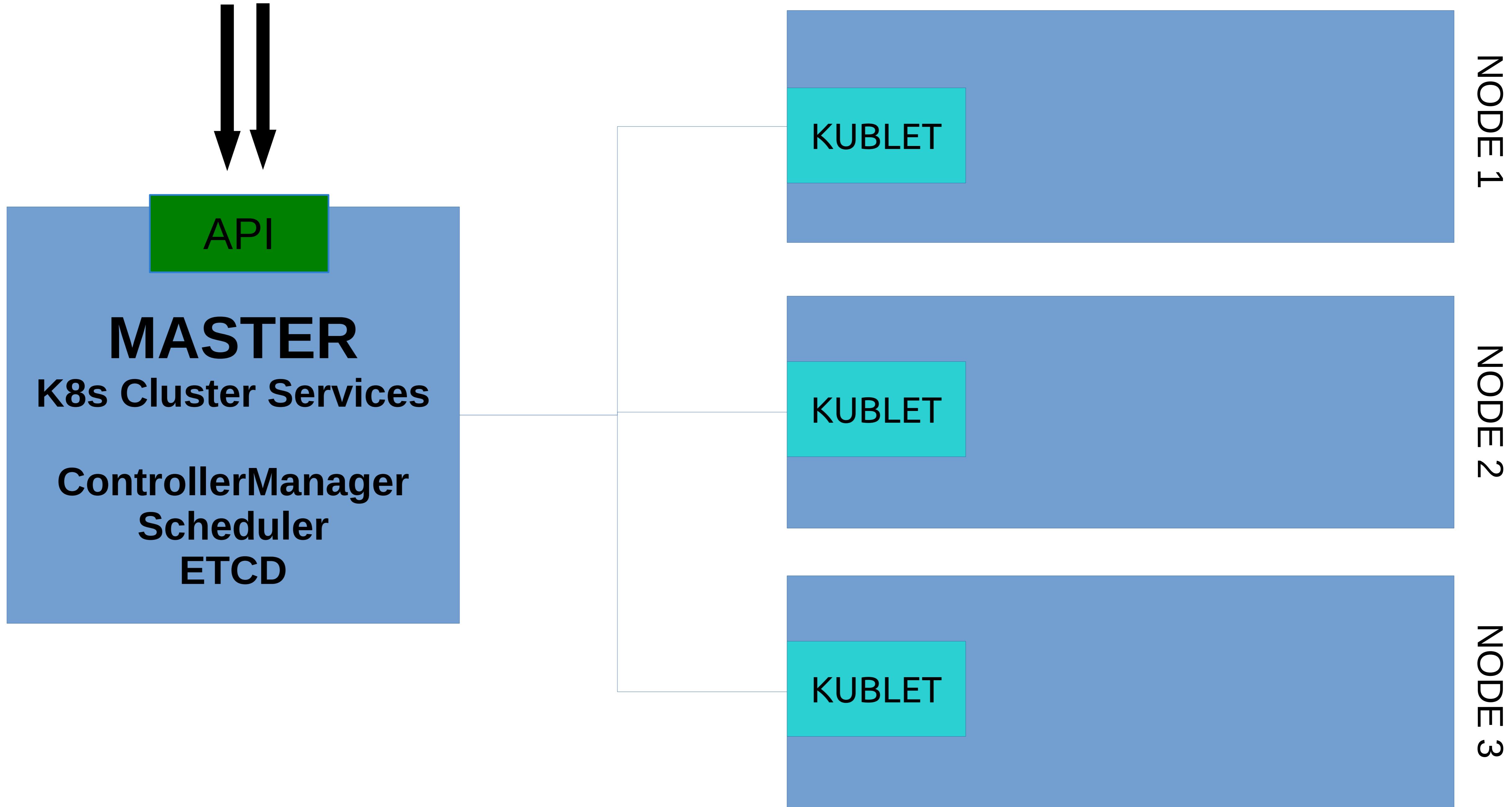


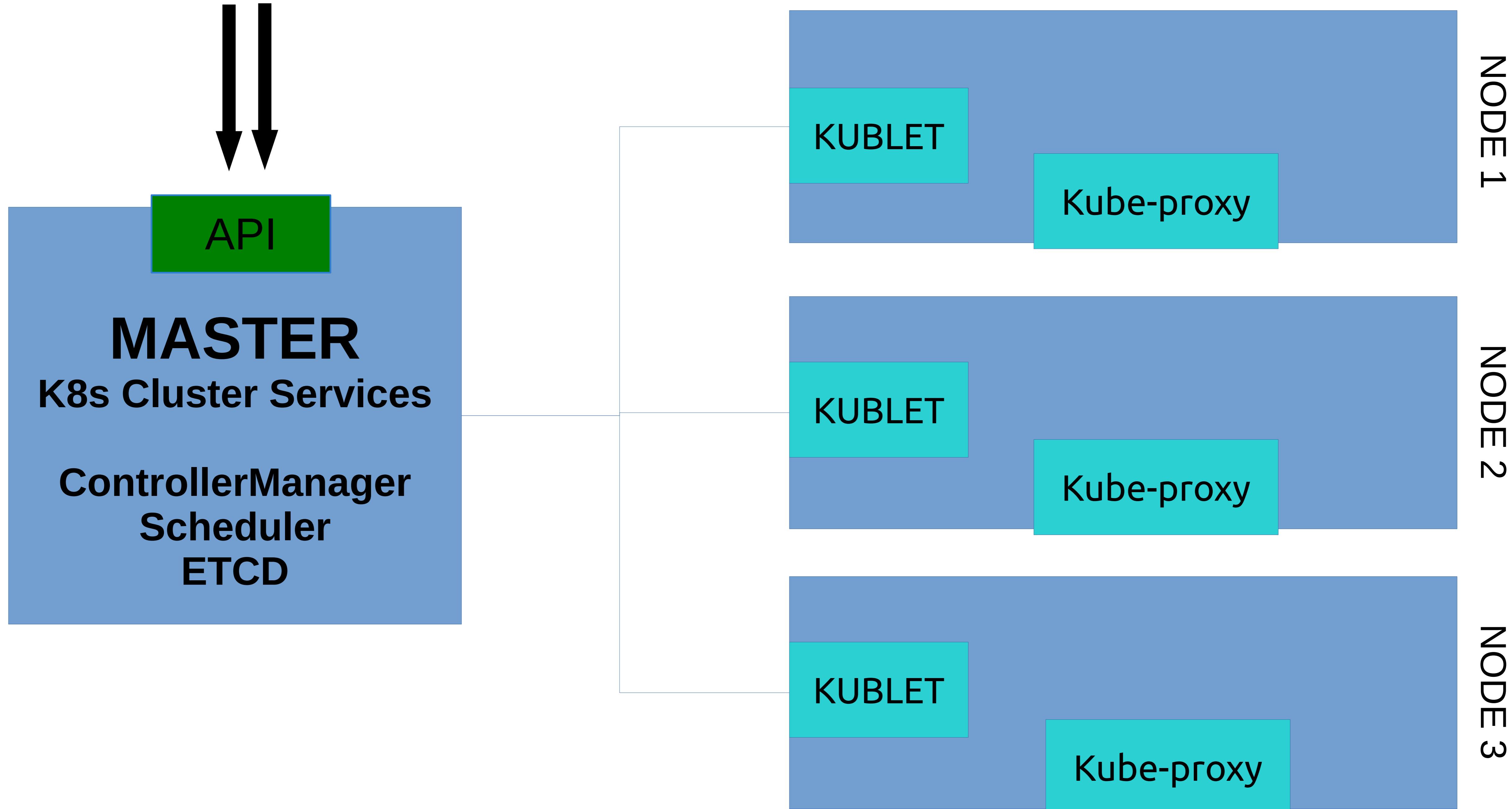
API

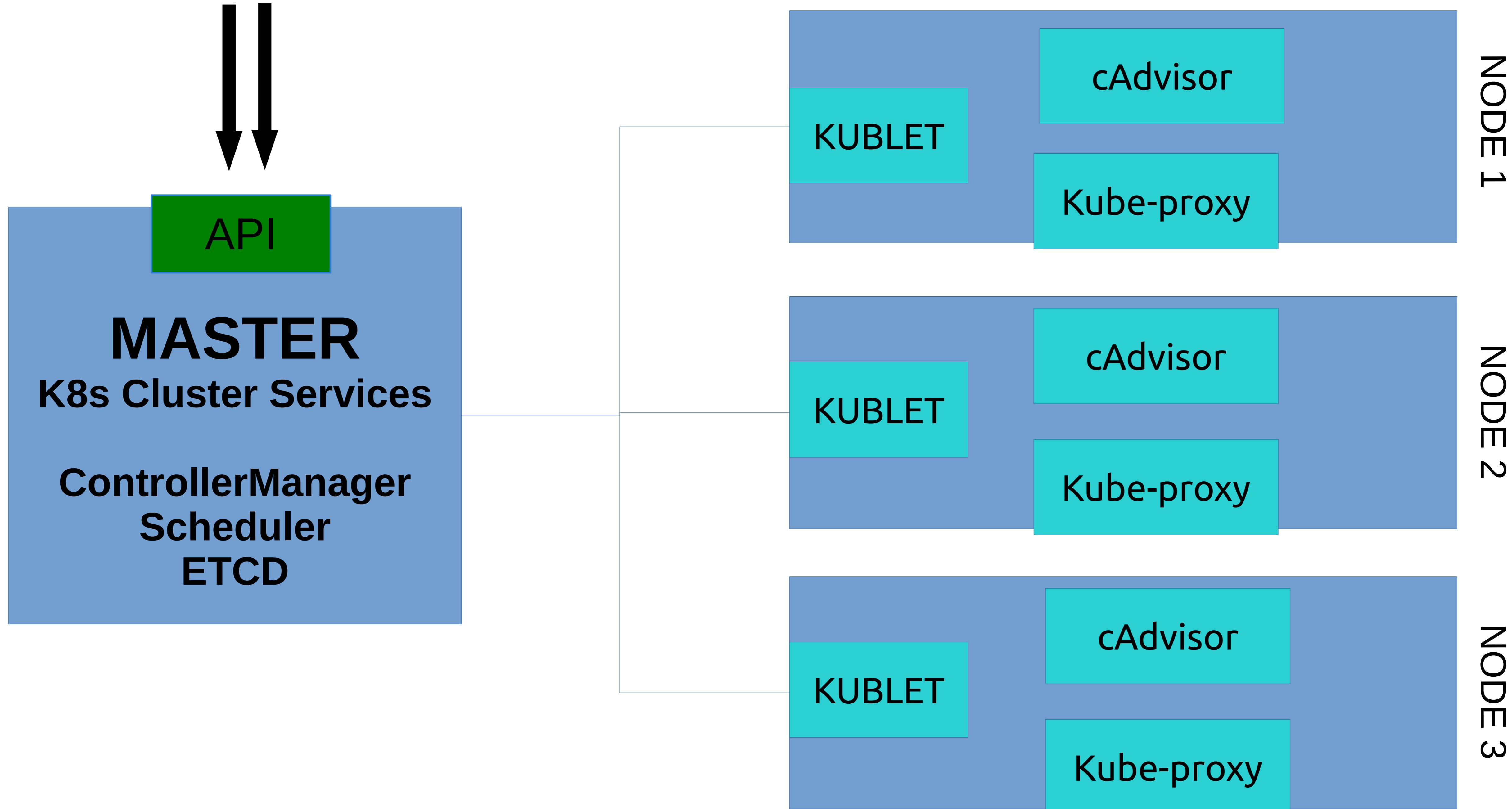
MASTER
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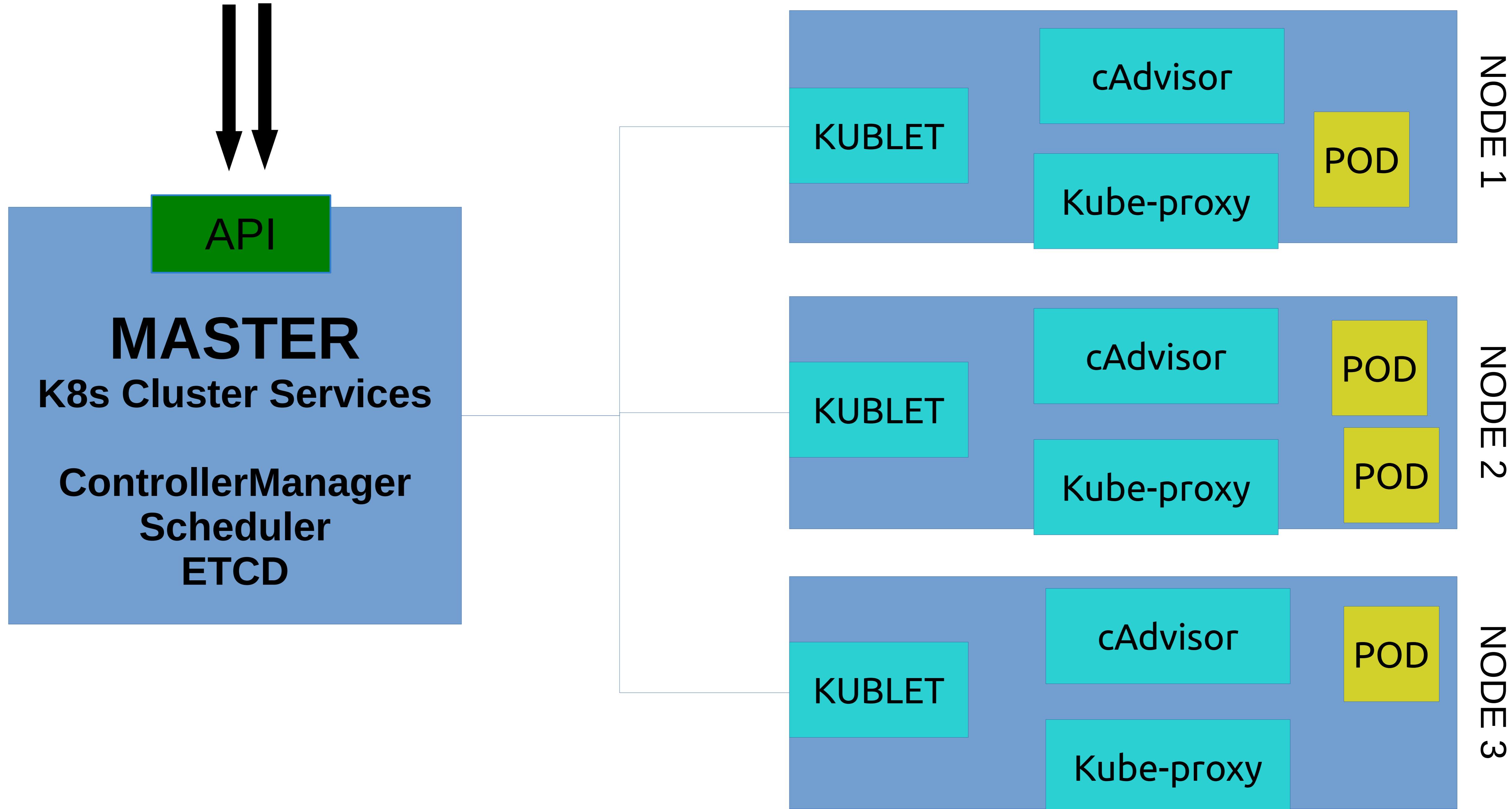
ControllerManager
Scheduler
ETCD

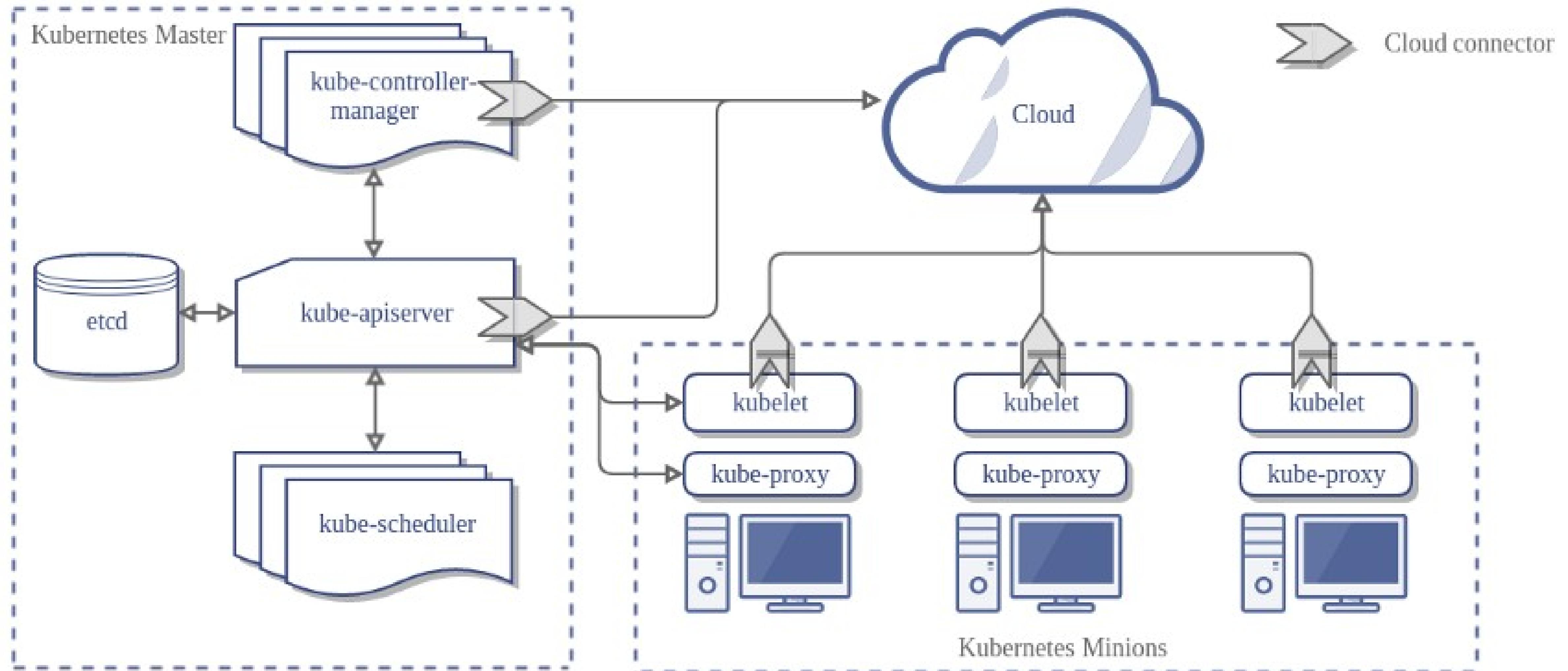














<https://github.com/dpokusa/programistok-k8s>

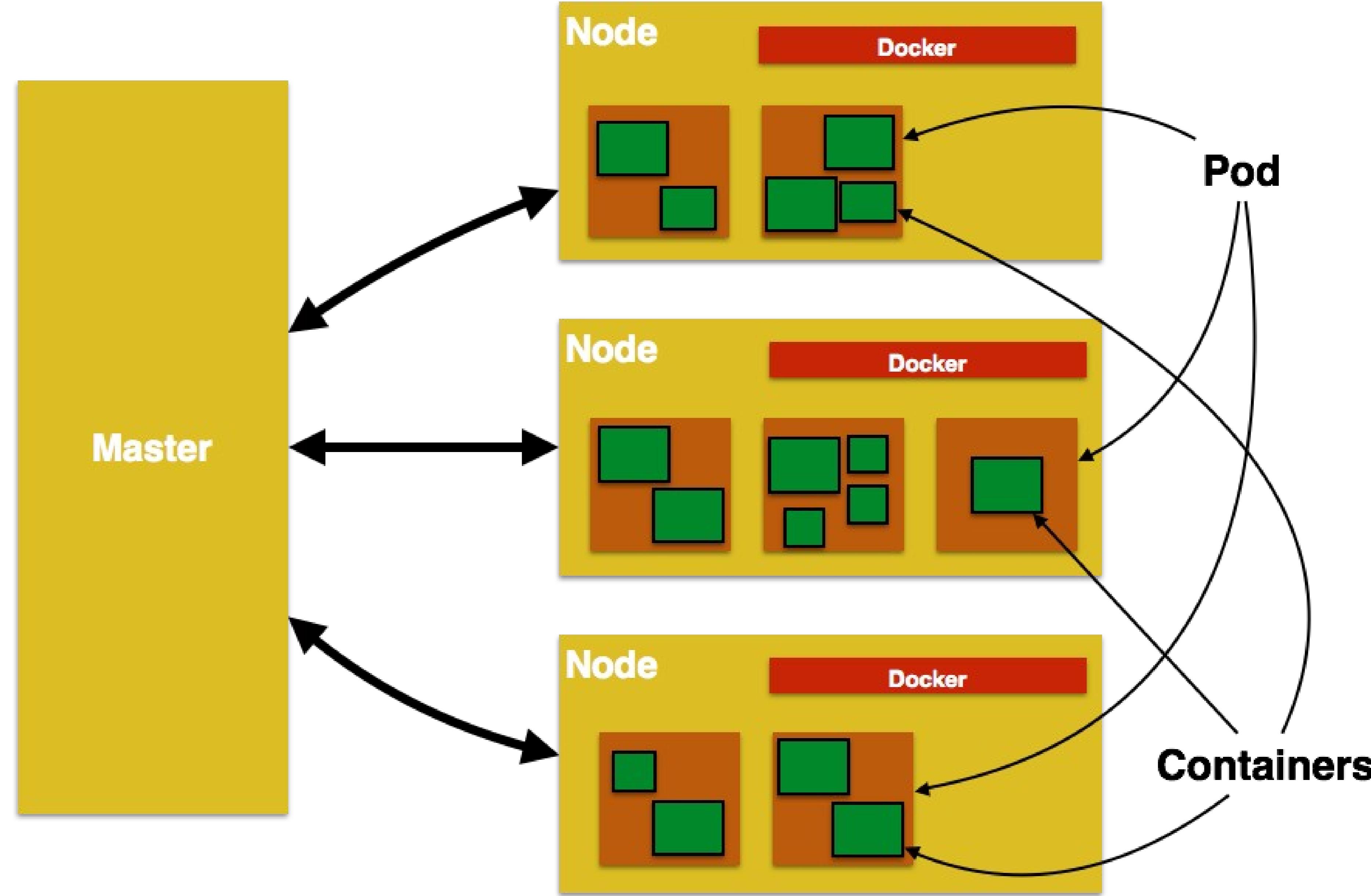
TASK 0

```
eval $(minikube docker-env)
```

```
minikube dashboard
```

TASK 1

POD



```
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

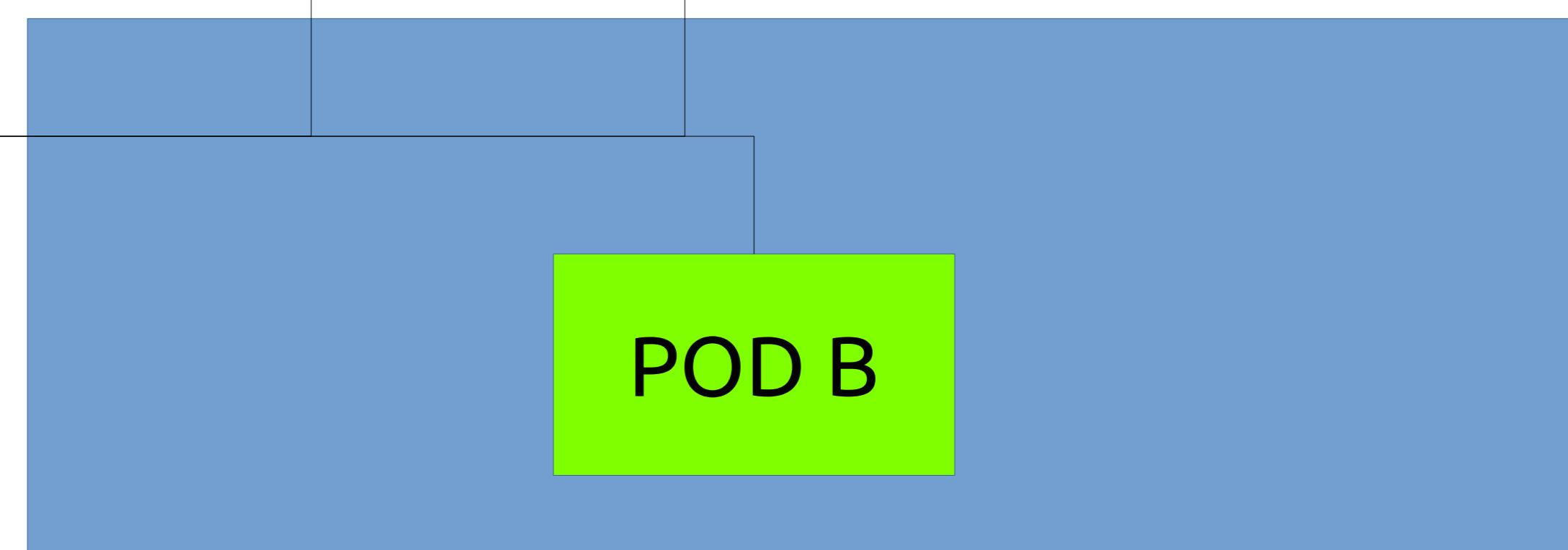
```
kind: Service
apiVersion: v1
metadata:
  name: my-service
spec:
  selector:
    app: MyApp
  ports:
  - protocol: TCP
    port: 80
    targetPort: 9376
```



A



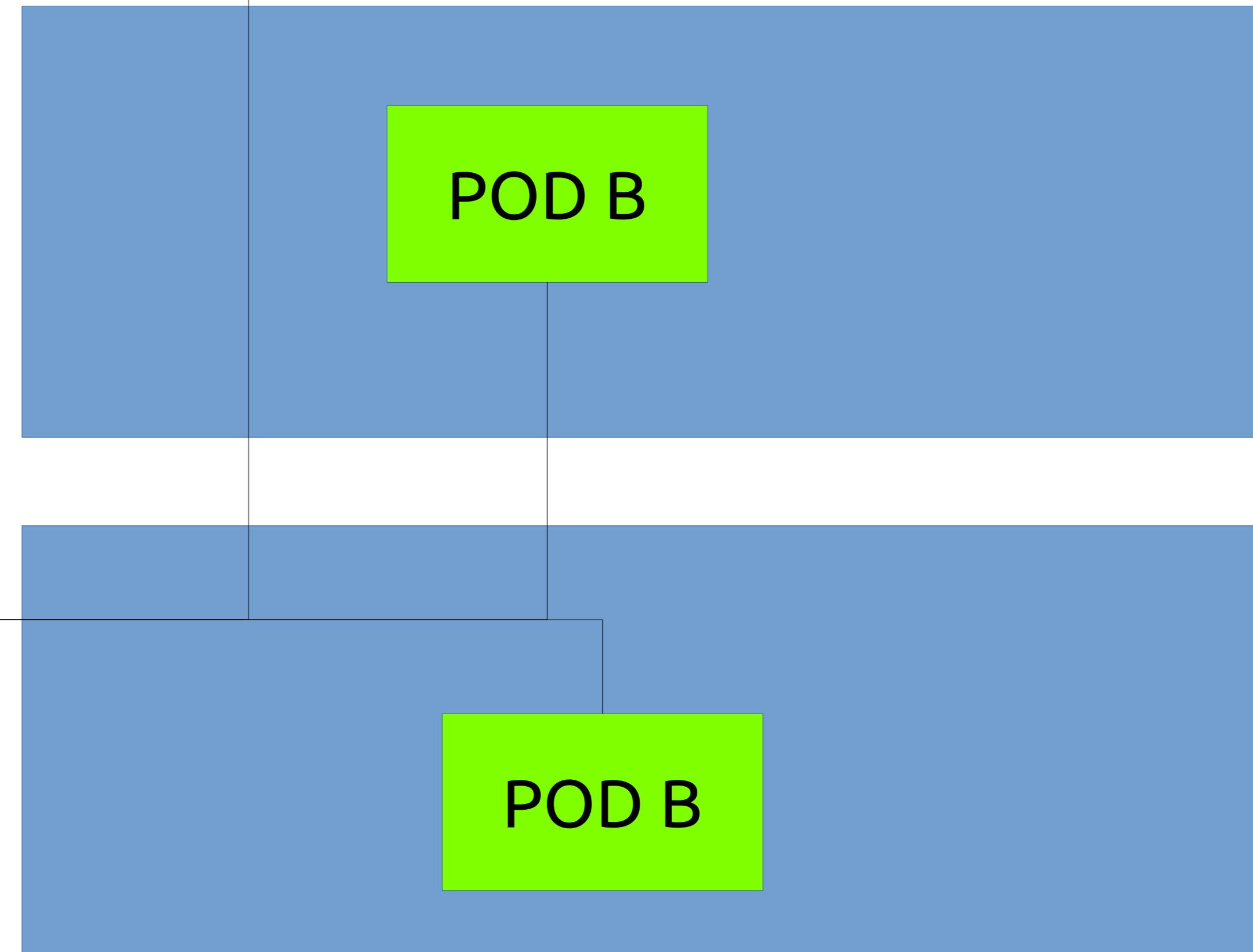
B



A



B



A

POD A

POD B

B

POD B

POD A

POD B

A

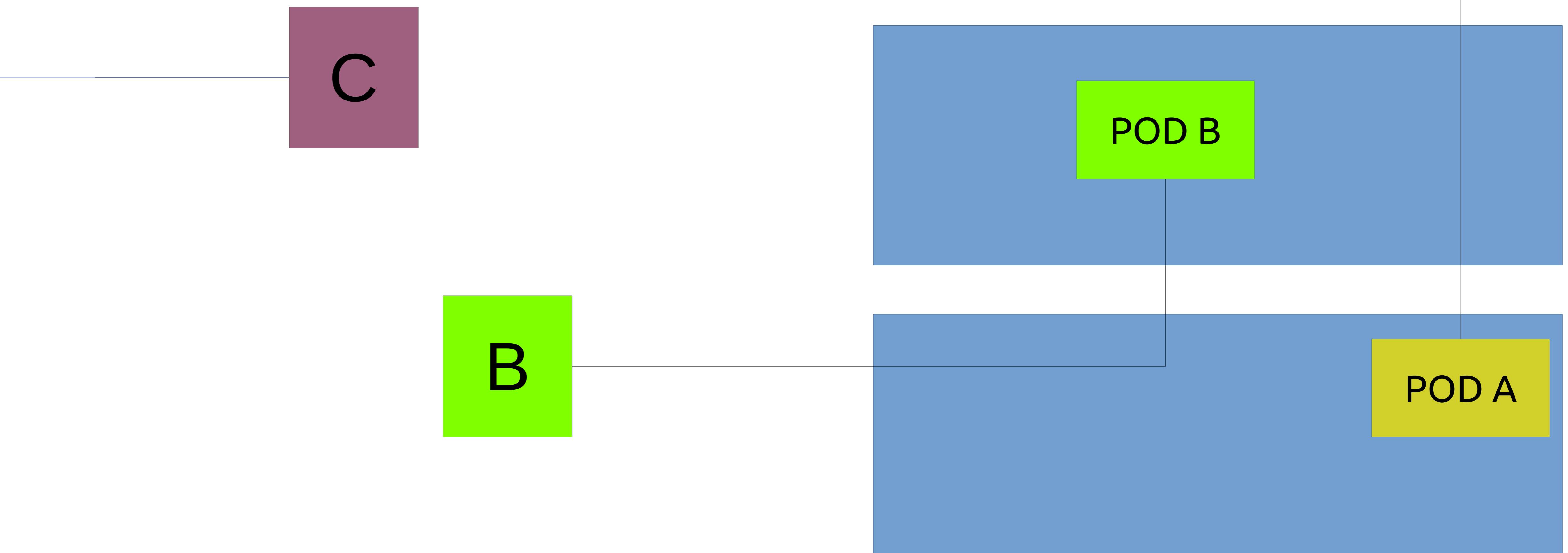
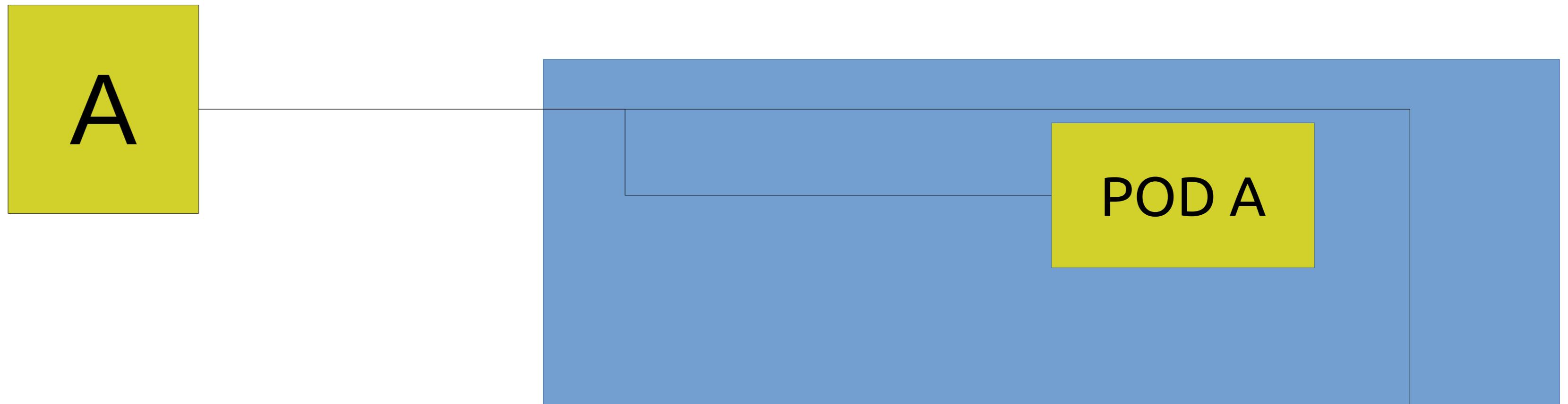
POD A

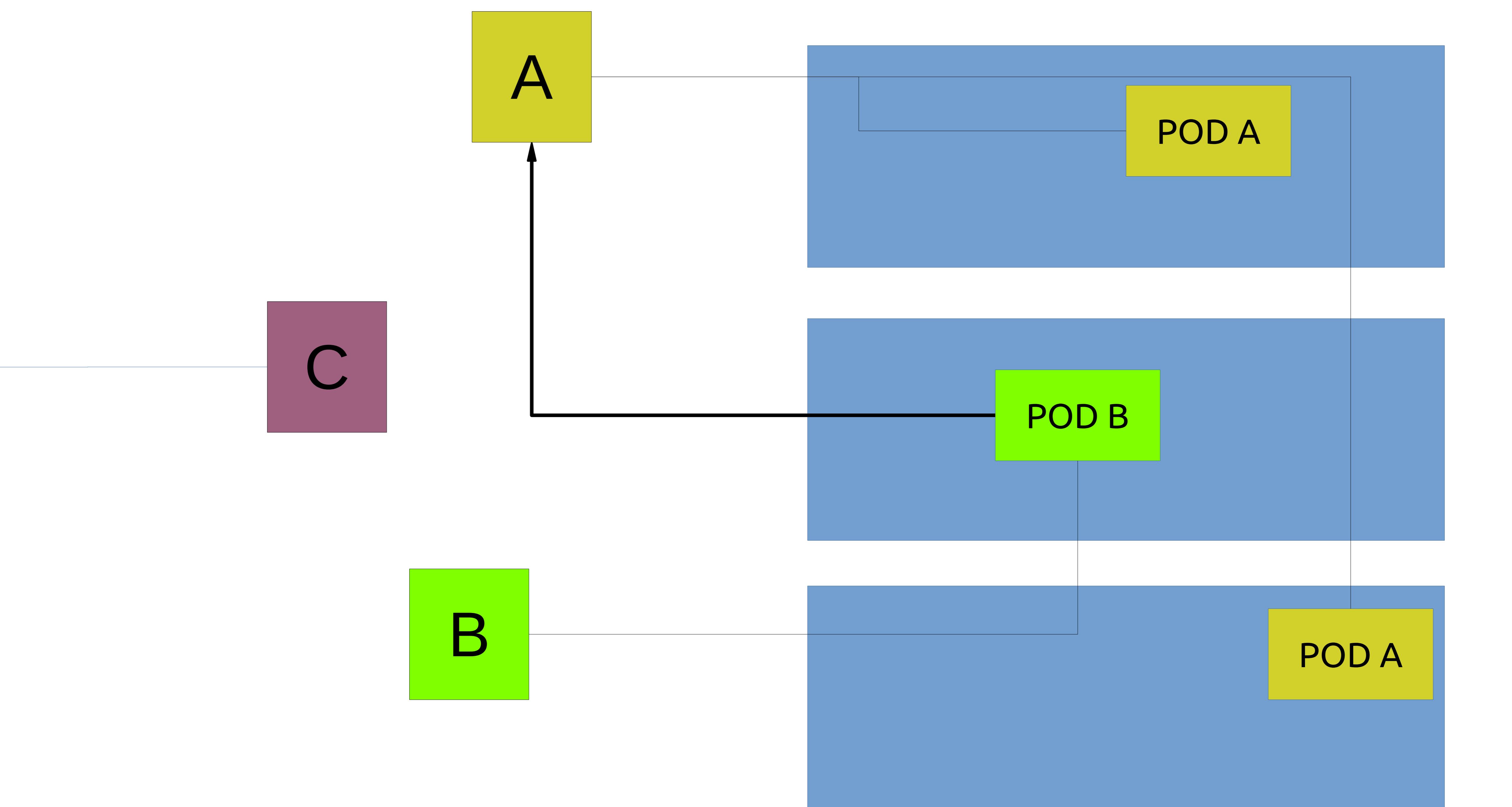
B

POD B

POD A

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

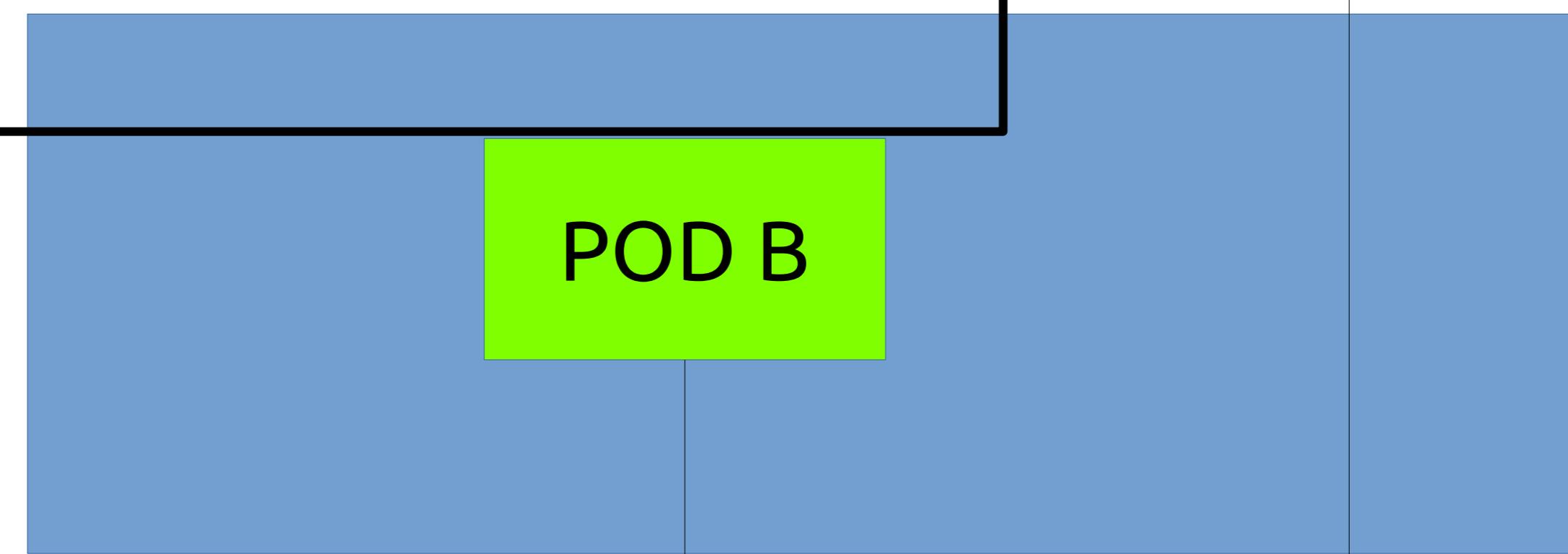




A

C

B



SERVICE DISCOVERY

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

TASK 3

DEPLOYMENT

```
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
```

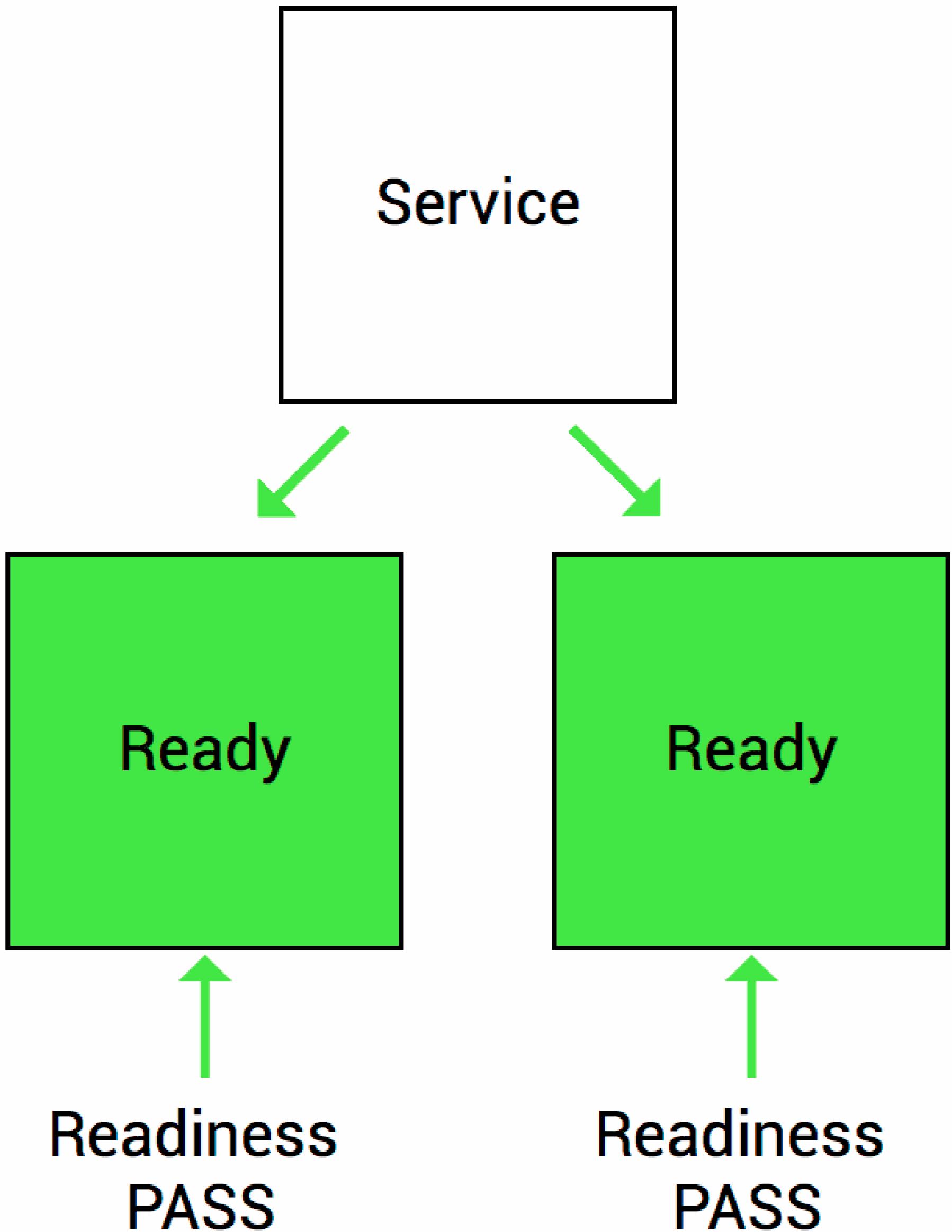
TASK 4

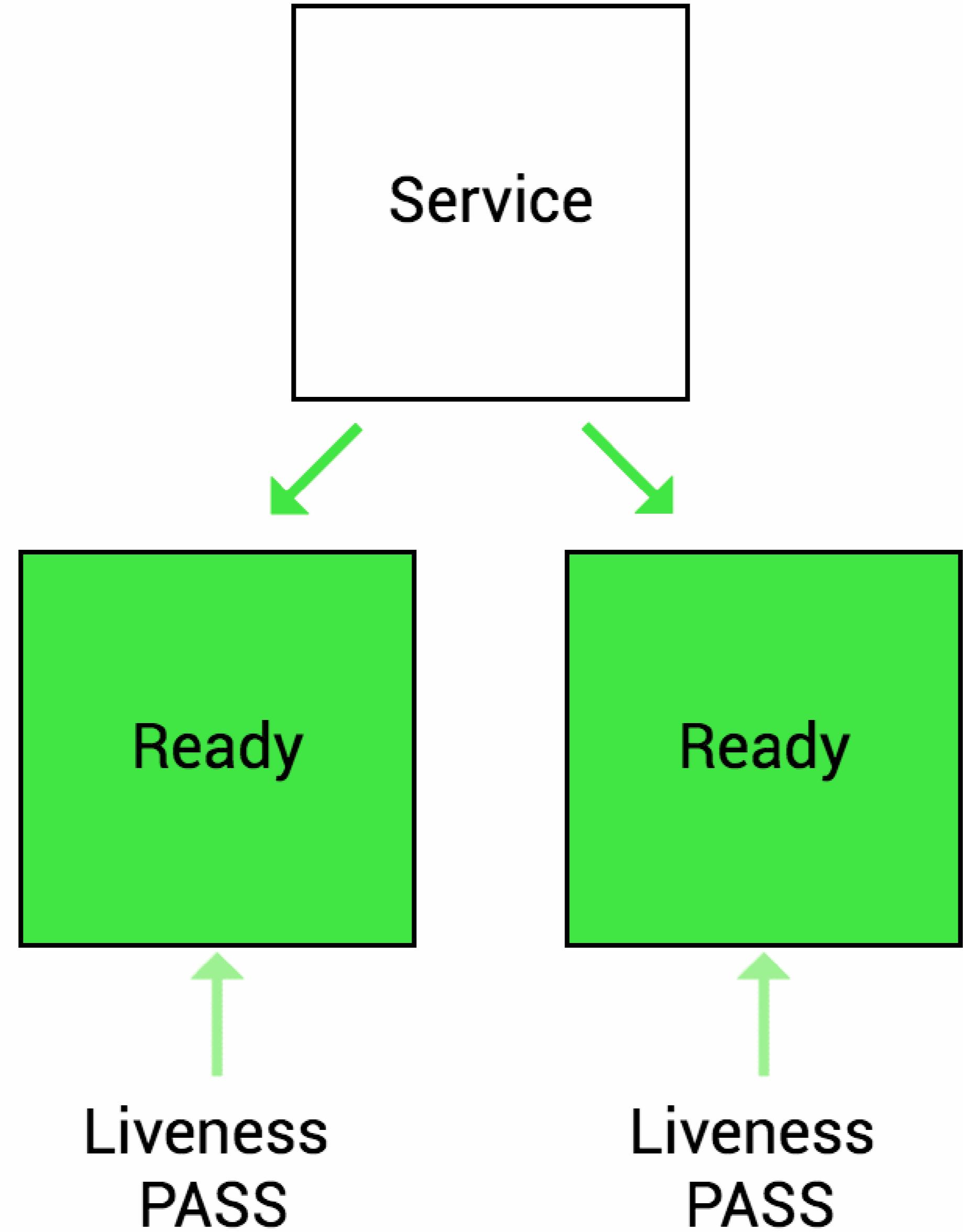
CONFIG MAPS

```
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

```
@Value("${issues.mongodb.password}")
```

```
private String password;
```

- name: LOG_APPENDER
value: Console
- name: ISSUES_MONGODB_PASSWORD
valueFrom:
secretKeyRef:
name: mongodb-credentials
key: password

TASK 7

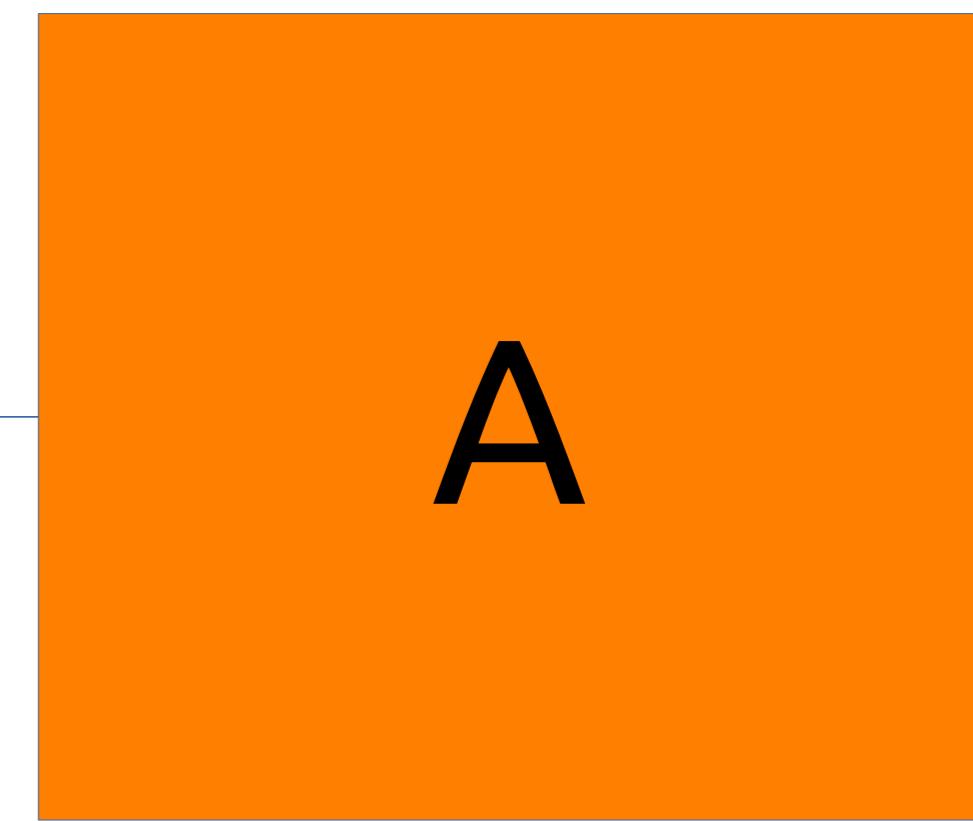
SCALING

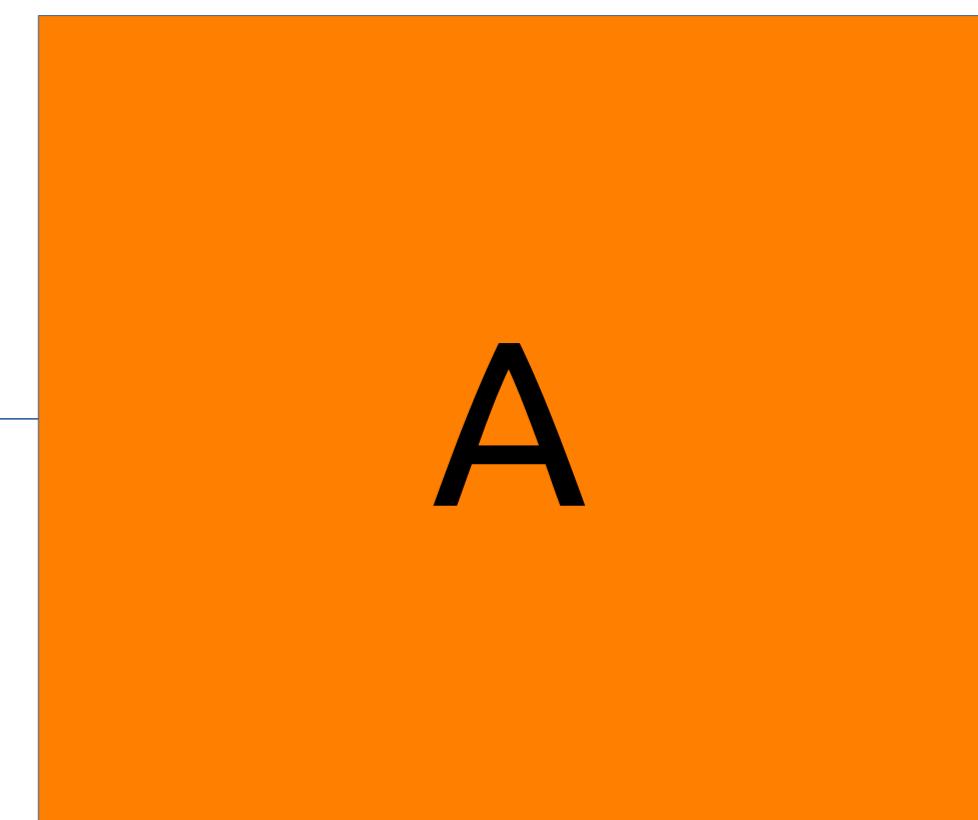
```
$ kubectl scale deployment nginx-deployment --replicas=5
```

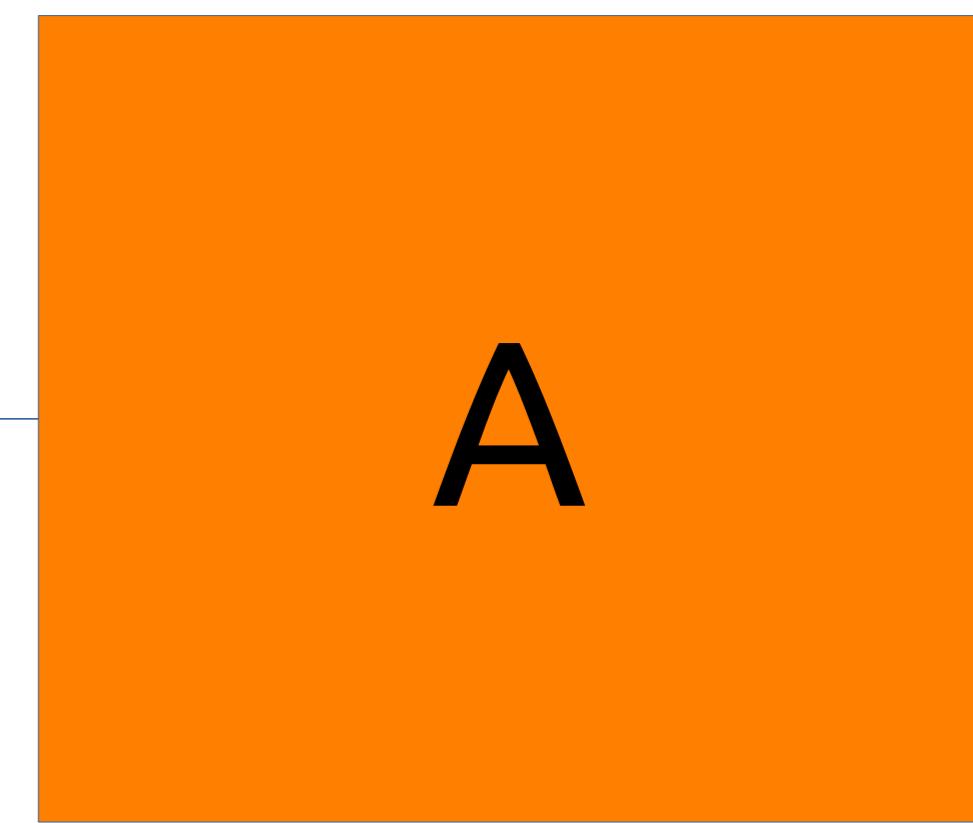
```
$ kubectl autoscale deployment nginx-deployment --min=10 --max=15 --cpu-percent=80
```

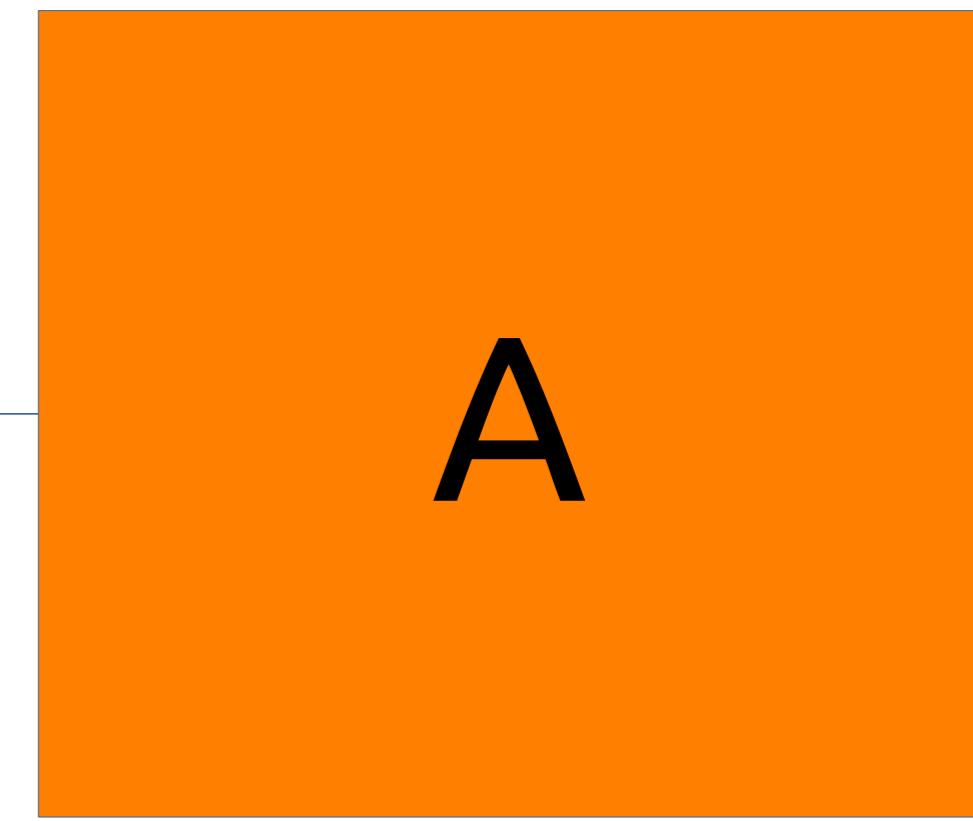
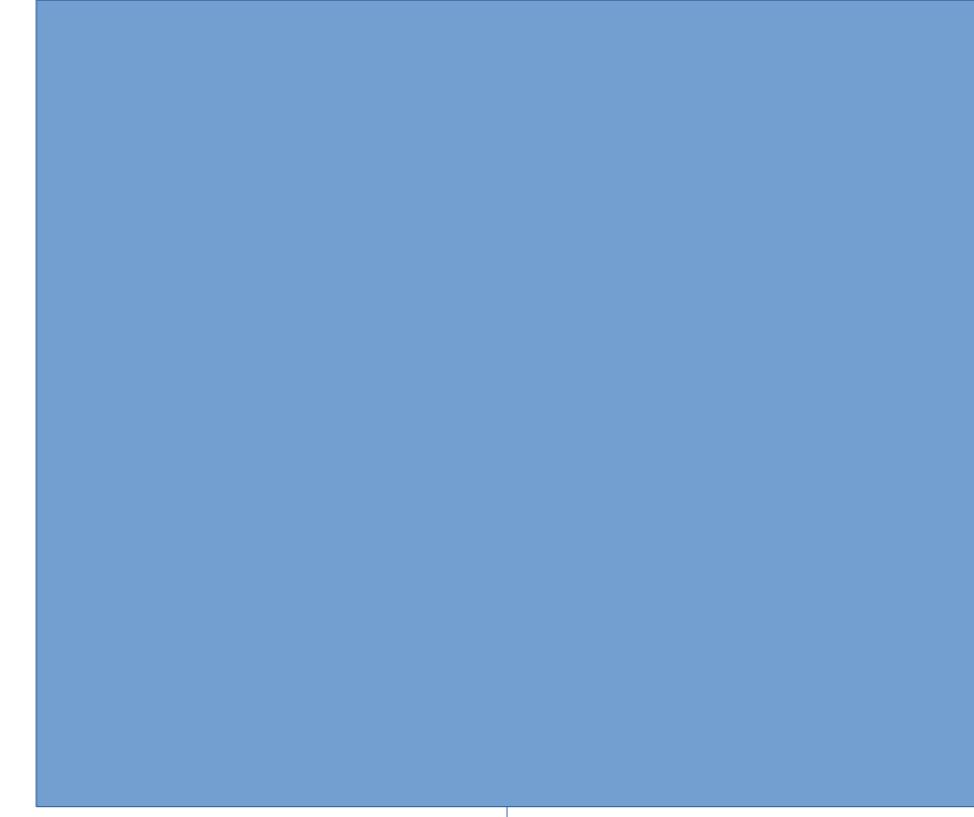
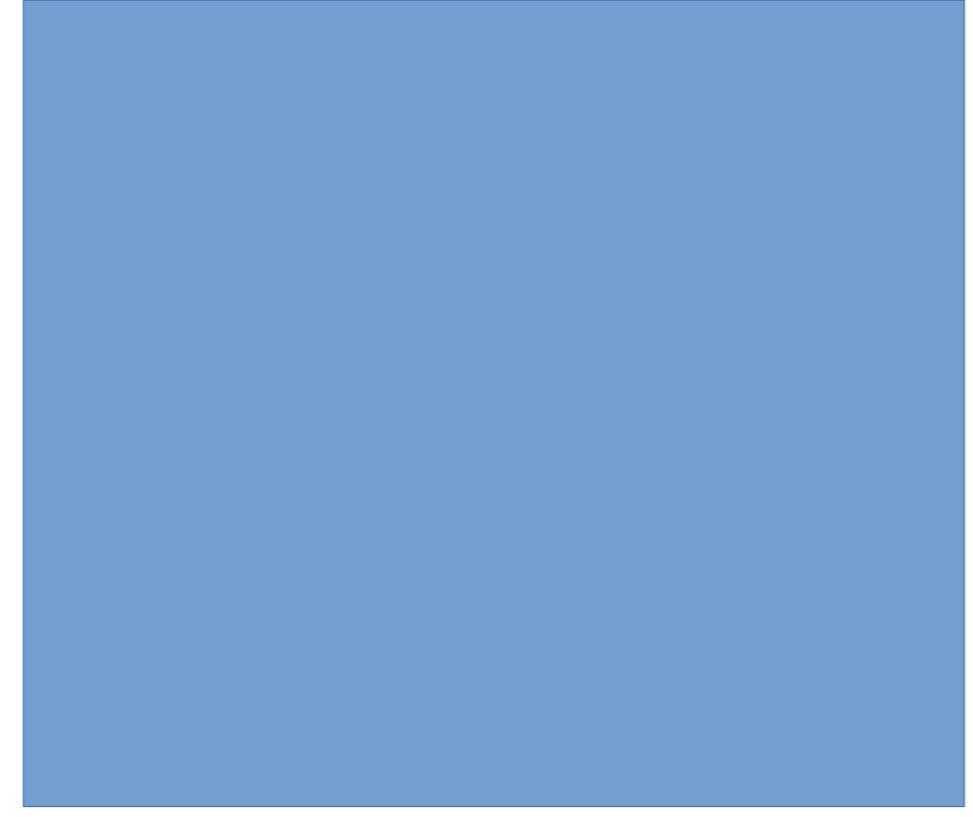
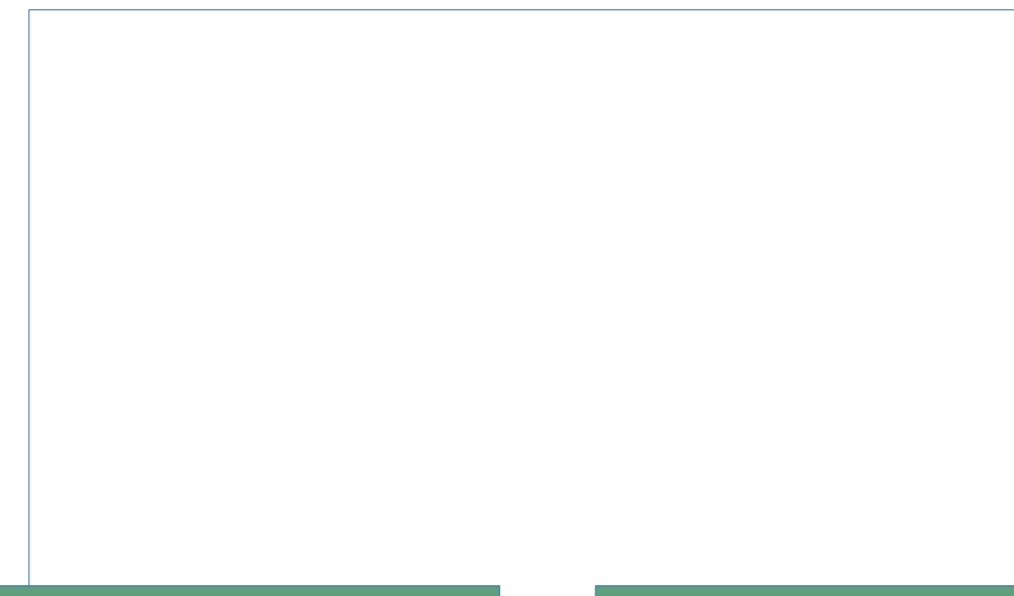
TASK 8

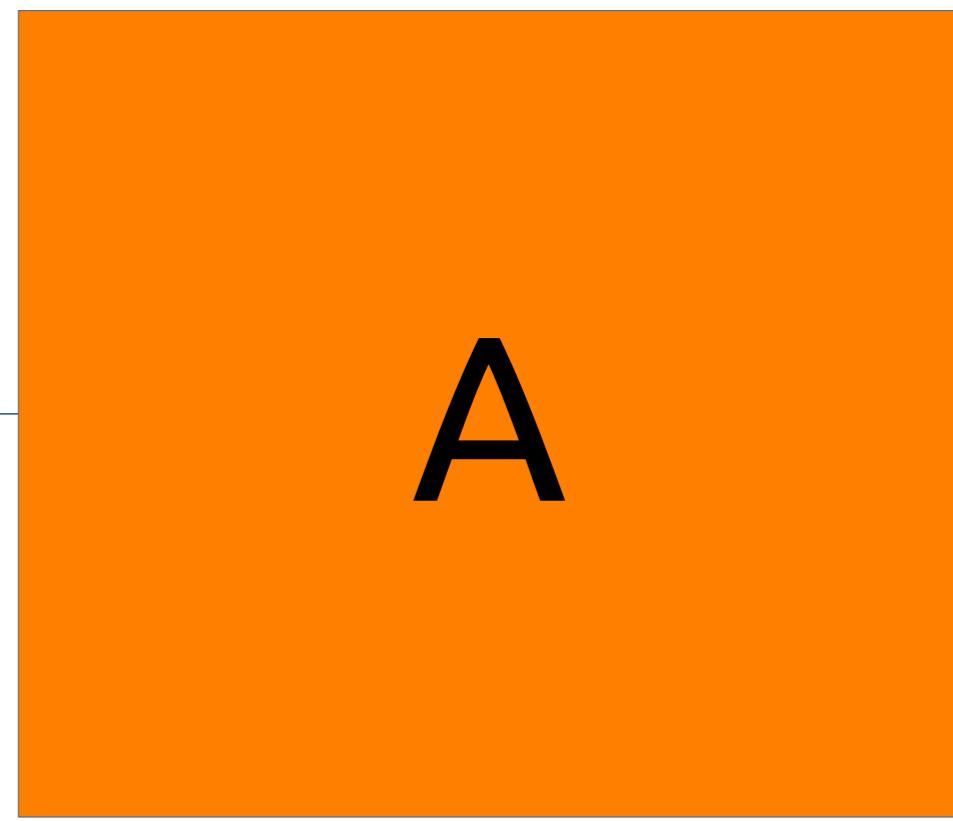
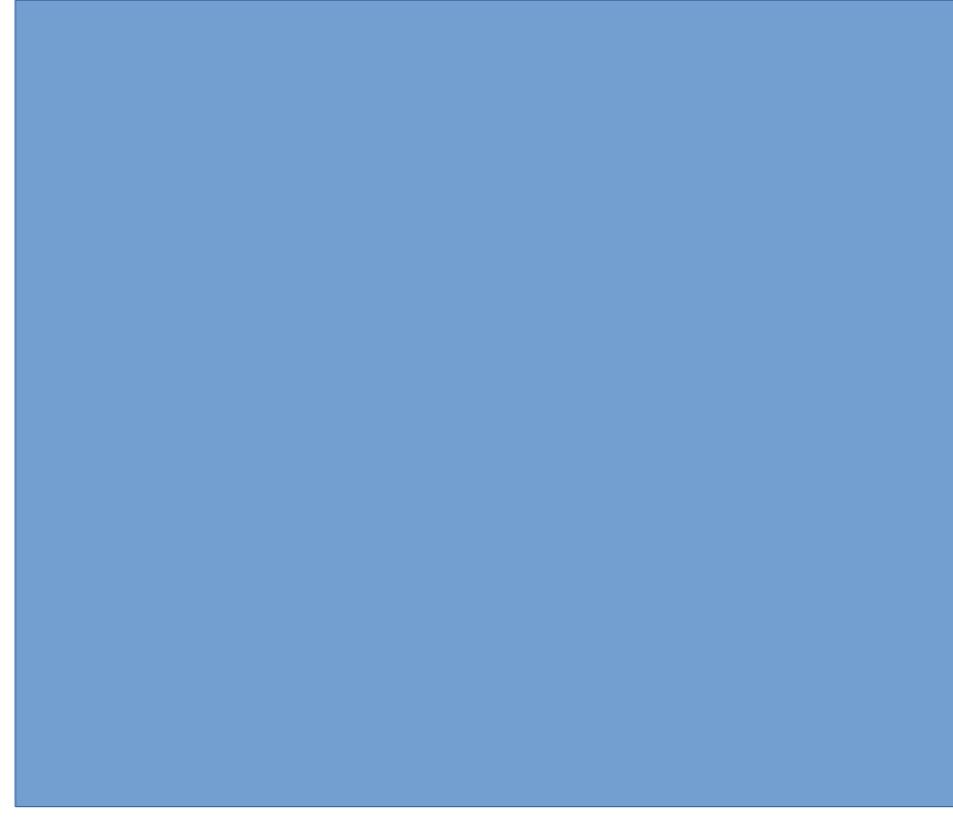
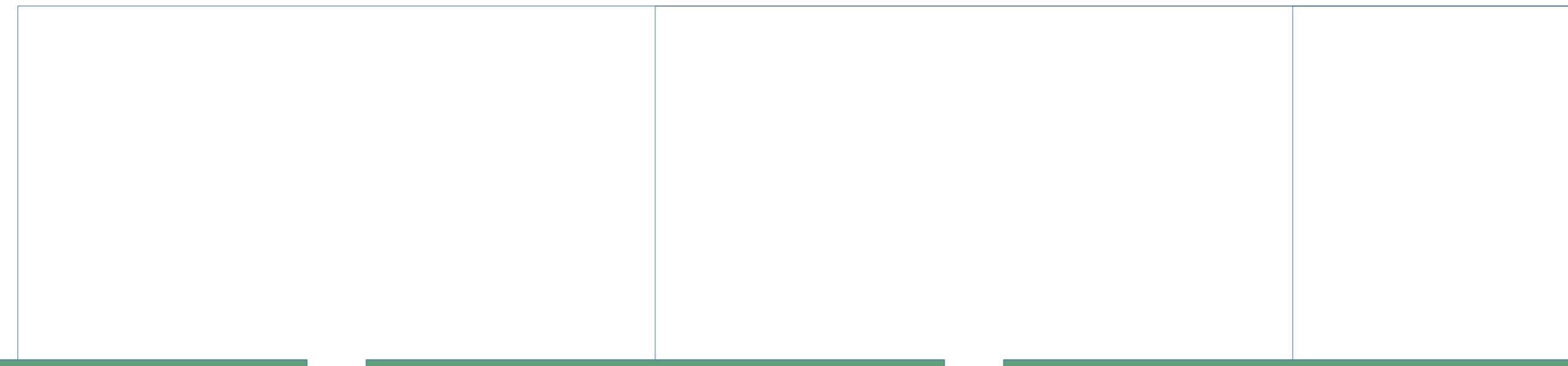
ROLLING UPDATE

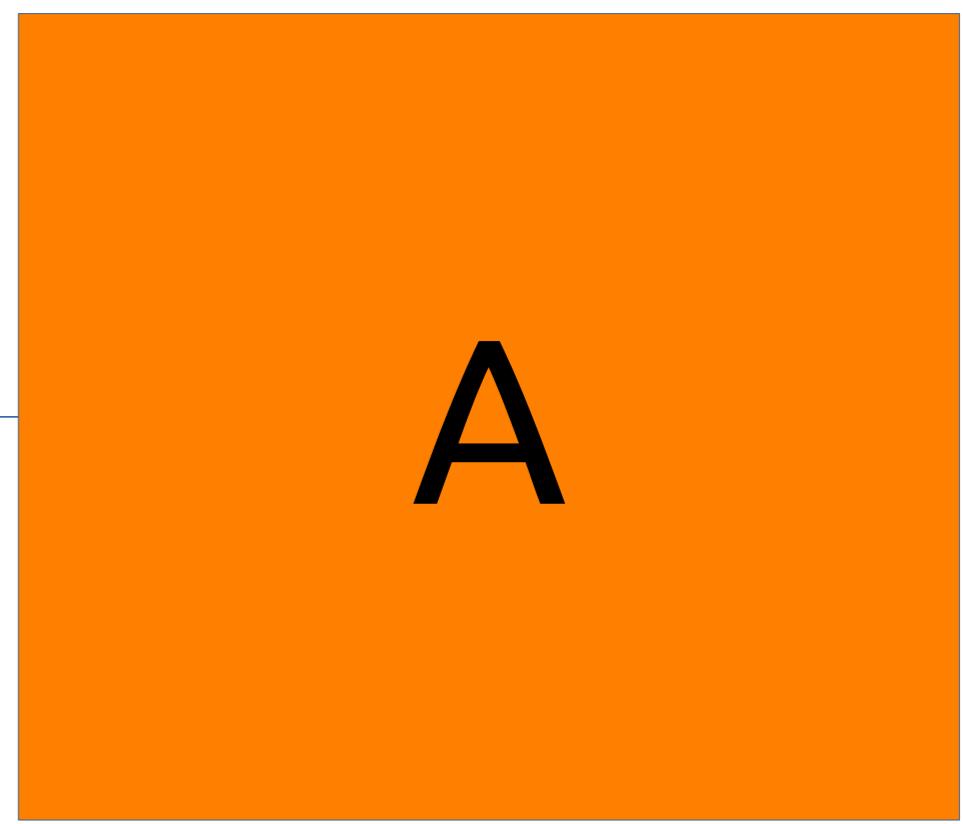
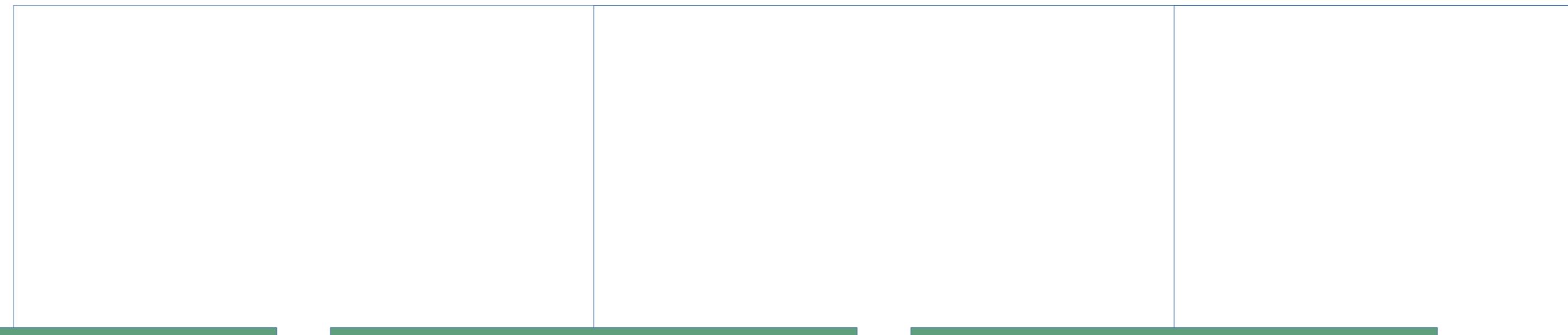












```
$ kubectl set image deployment/nginx-deployment nginx=nginx:1.91  
  
$ kubectl rollout status deployments nginx-deployment  
  
$ kubectl rollout history deployment/nginx-deployment  
  
$ kubectl rollout undo deployment/nginx-deployment
```

```
# [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]

```
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>
```

RECOMMENDED SOURCES

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

ABOUT



@psmlynarczyk

PAWEŁ MŁYNARCZYK

ABOUT



@dpokusa

DANIEL POKUSA
SOFTWARE-EMPATHY.PL

ABOUT

SPREADIT



SPREADIT.PL

Wrzesień 2019, Katowice

```
$ minikube stop
```

```
$ minikube delete
```