



KAFKA ON KUBERNETES: DOES IT HAVE TO BE THE HARD WAY?

FEBRUARY / ATLANTA, GA 2019

@GAMUSSA

#DEVNEXUS

@CONFLUENTINC



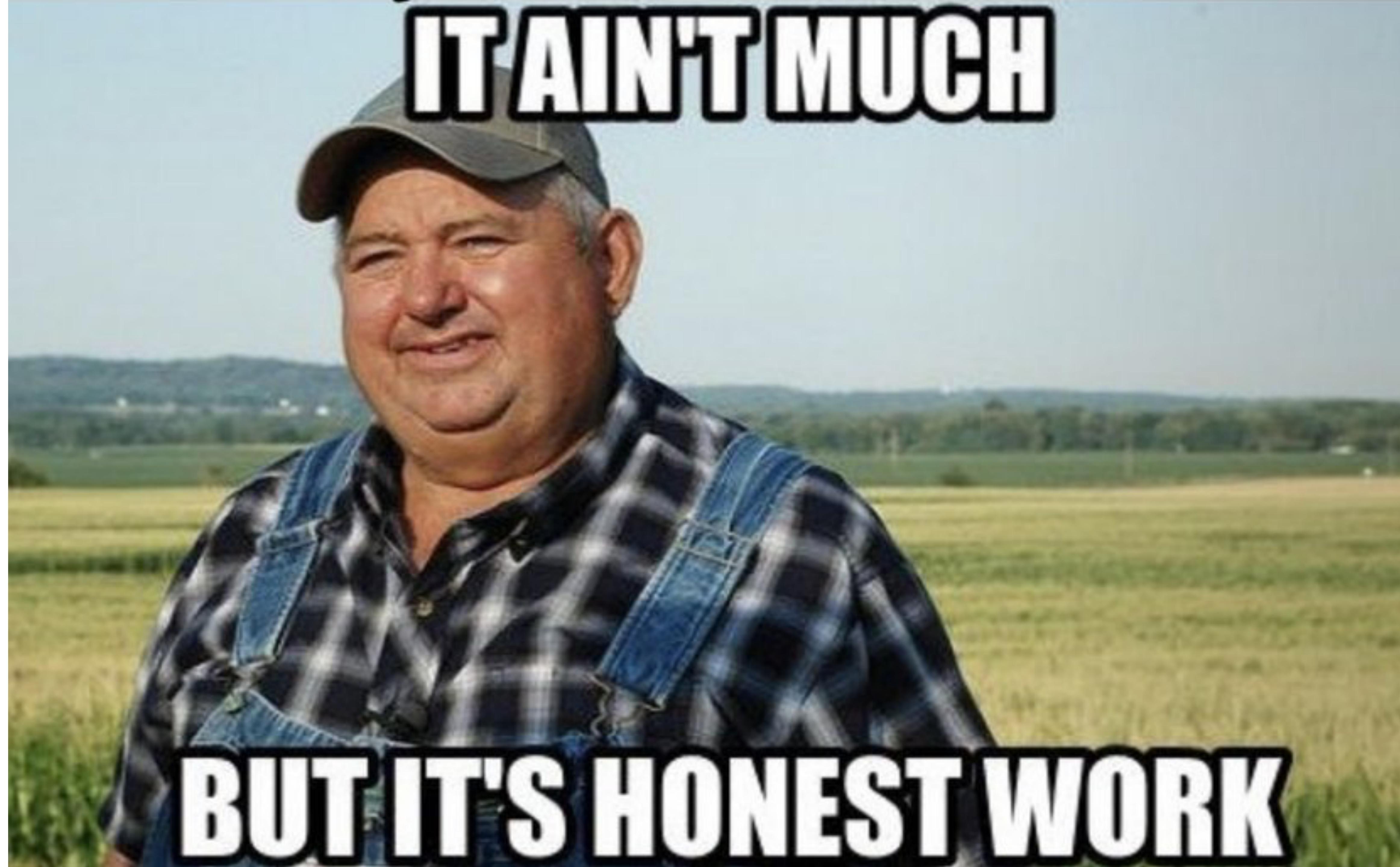
@GAMUSSA | #DEVNEXUS | @CONFLUENTINC

I BUILD HIGHLY SCALABLE

Hello World

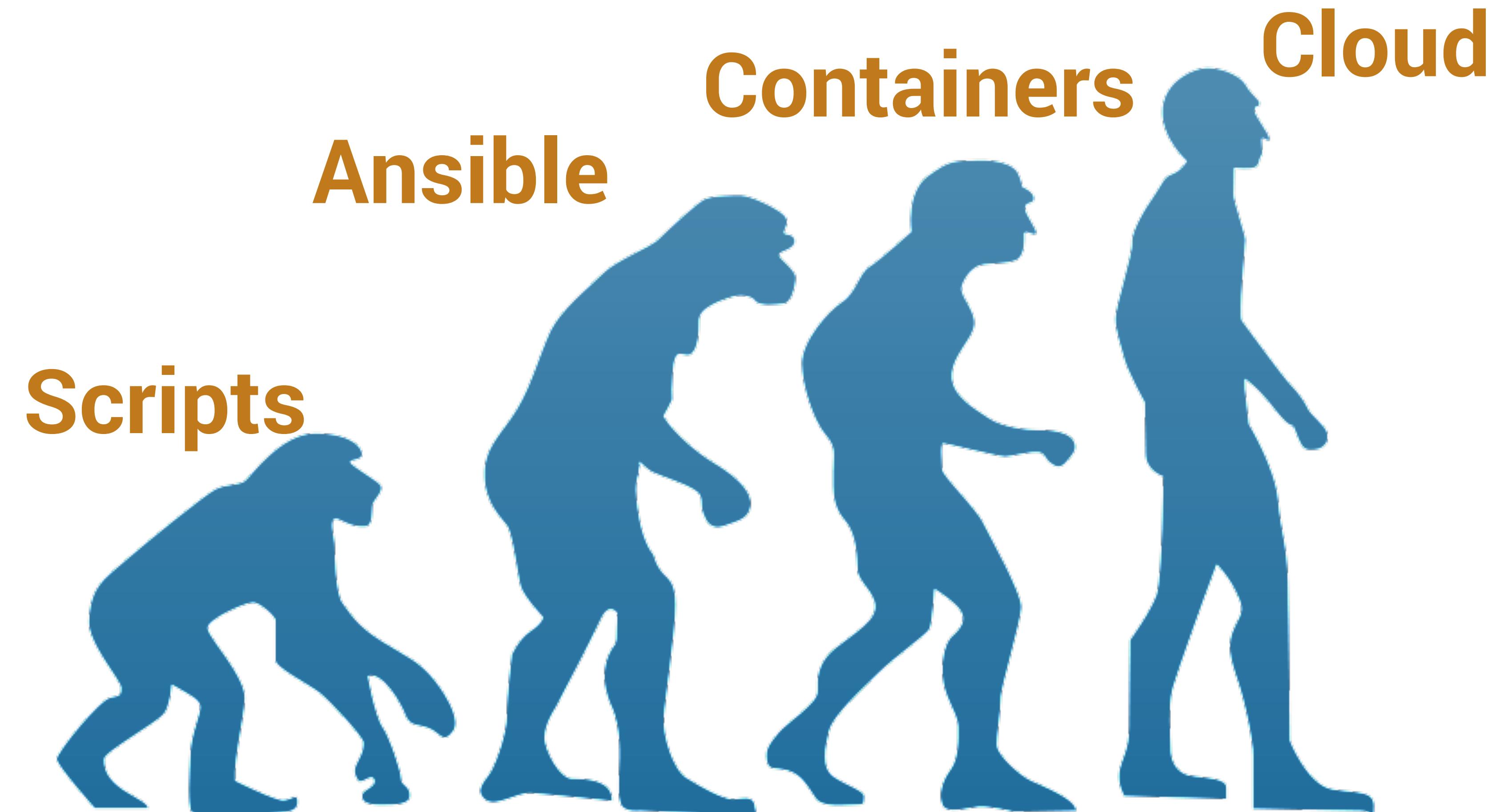
APPS

IT AIN'T MUCH

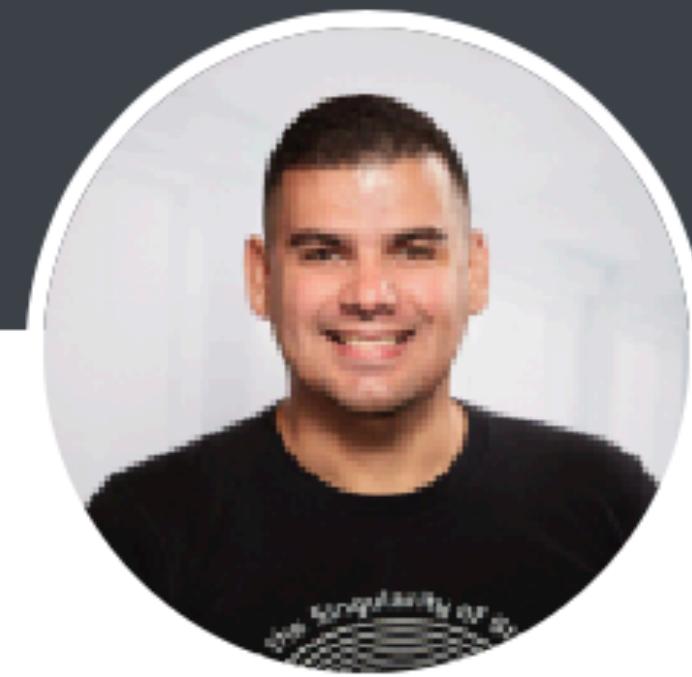


BUT IT'S HONEST WORK

EVOLUTION OF #DEVKAFKAOPS



The Rise of Managed Services for Apache Kafka



Ricardo Ferreira

September 20, 2019



As a distributed system for collecting, storing, and processing data at scale, Apache Kafka® comes with its own deployment complexities. Luckily for on-premises scenarios, a myriad of deployment options are available, such as the [Confluent Platform](#) which can be deployed on bare metal, virtual

Is the service offered a managed service for Kafka?

Key design decisions abstracted from the user



Requires the user to take the wheel and decide





Claes Mogren
@claesmogren

"Kubernetes is of course named after the Greek god of spending money on cloud services." - [@QuinnyPig](#)

3:54 PM · Mar 20, 2019 · [Twitter Web Client](#)

68 Retweets **233** Likes <https://twitter.com/claesmogren/status/1108456688175079424>



Corey Quinn @QuinnyPig · 10h

Replying to @timbray

▼

Proper pronunciations include but are not limited to:

Kubernetes

Kubernetis

Cooper nets

KuBERneties

Kate's

K 8 s

Cubernetes

Kyoober nets

Kuiper Ned's

Kubernandos

Kuberkitties

Cue bernettes

Kubernoots

Koober neats

Kubernetix

Clueberneties

2

4

25

↑

<https://twitter.com/QuinnyPig/status/1150927901782499330>





**WHO RUN STATELESS APPS IN
KUBERNETES?**

**WHO THINKS IT'S A GOOD
IDEA?**

**WHO RUN STATEFUL APPS IN
KUBERNETES?**

**WHO THINKS IT'S A GOOD
IDEA?**

#DEVKAFKAOPS



WELL, IT'S TRICKY ©

Translating an existing architecture to Kubernetes

External access to brokers and other components

Persistent Storage options on prem and clouds

Security Configuration and Upgrades

KAFKAESQUE WORLD OF KAFKA ON KUBERNETES

Kubernetes can only meet stateful workloads half way and I lack the expertise to manage a production configuration of Kafka, RabbitMQ, or Postgres on static infrastructure, let alone a Kubernetes cluster.

9:06 AM - 13 Feb 2018

18 Retweets 71 Likes

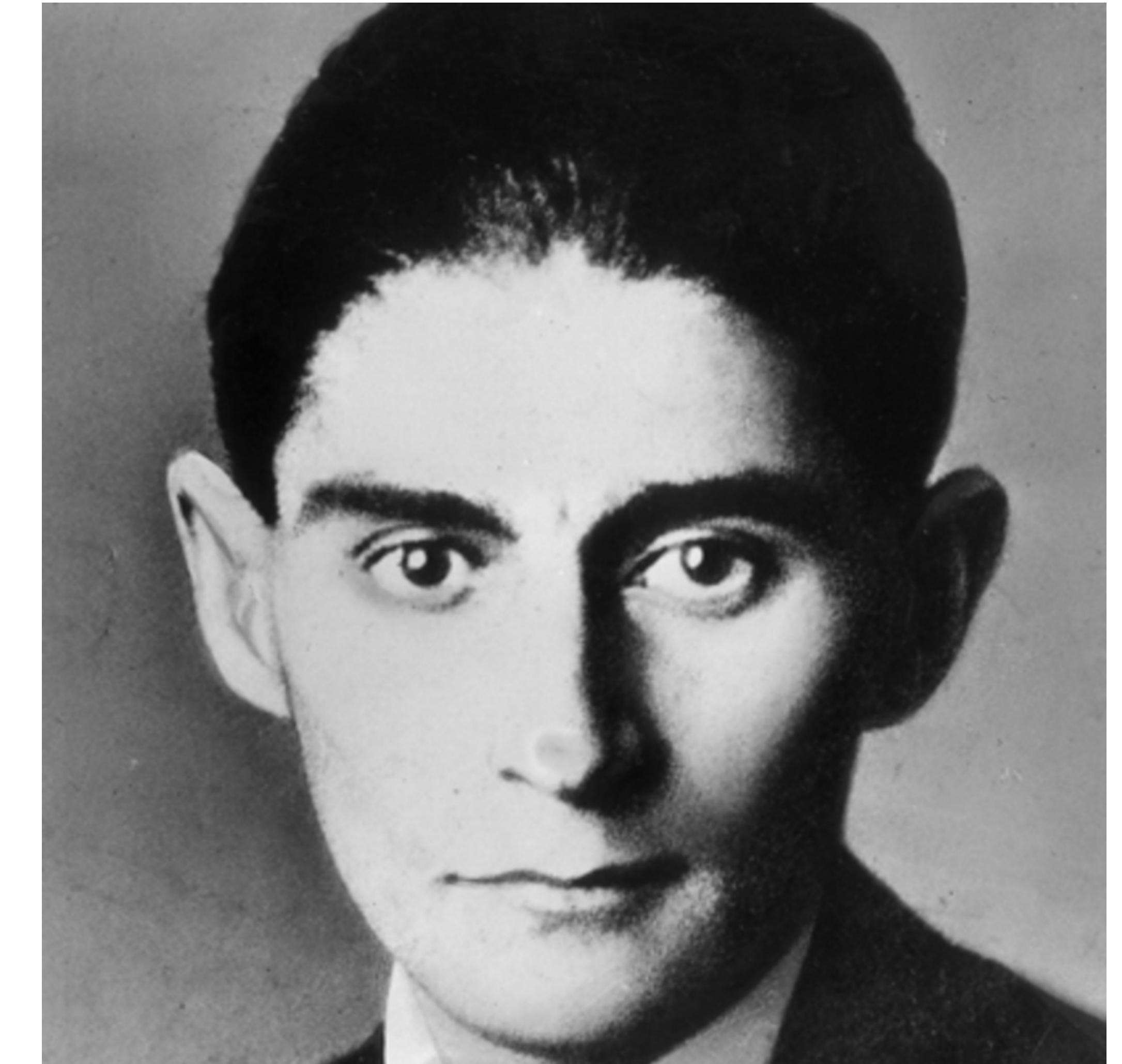
Gwen (Chen) Shapira
@gwenshap

Stateful apps on Kubernetes basically depend on having great shared storage. This is available in the cloud but incredibly rare on-prem. [@psynikal](#) spent few days helping someone with 400ms write latency to figure out why Kafka and ZK are unstable.

10:06 PM - 23 Jul 2018

7 Retweets 42 Likes

**DUDE, YOU SAID
=>IT DOESN'T HAVE
TO BE HARD WAY=<**



DO KAFKA ON KUBERNETES DEMO



AND EVERYONE LOOSSES THEIR MINDS

TWEET, YEAH



- Follow @gamussa @confluentinc



- Tag @gamussa

- With #devnexus

LET'S TALK KUBERNETES

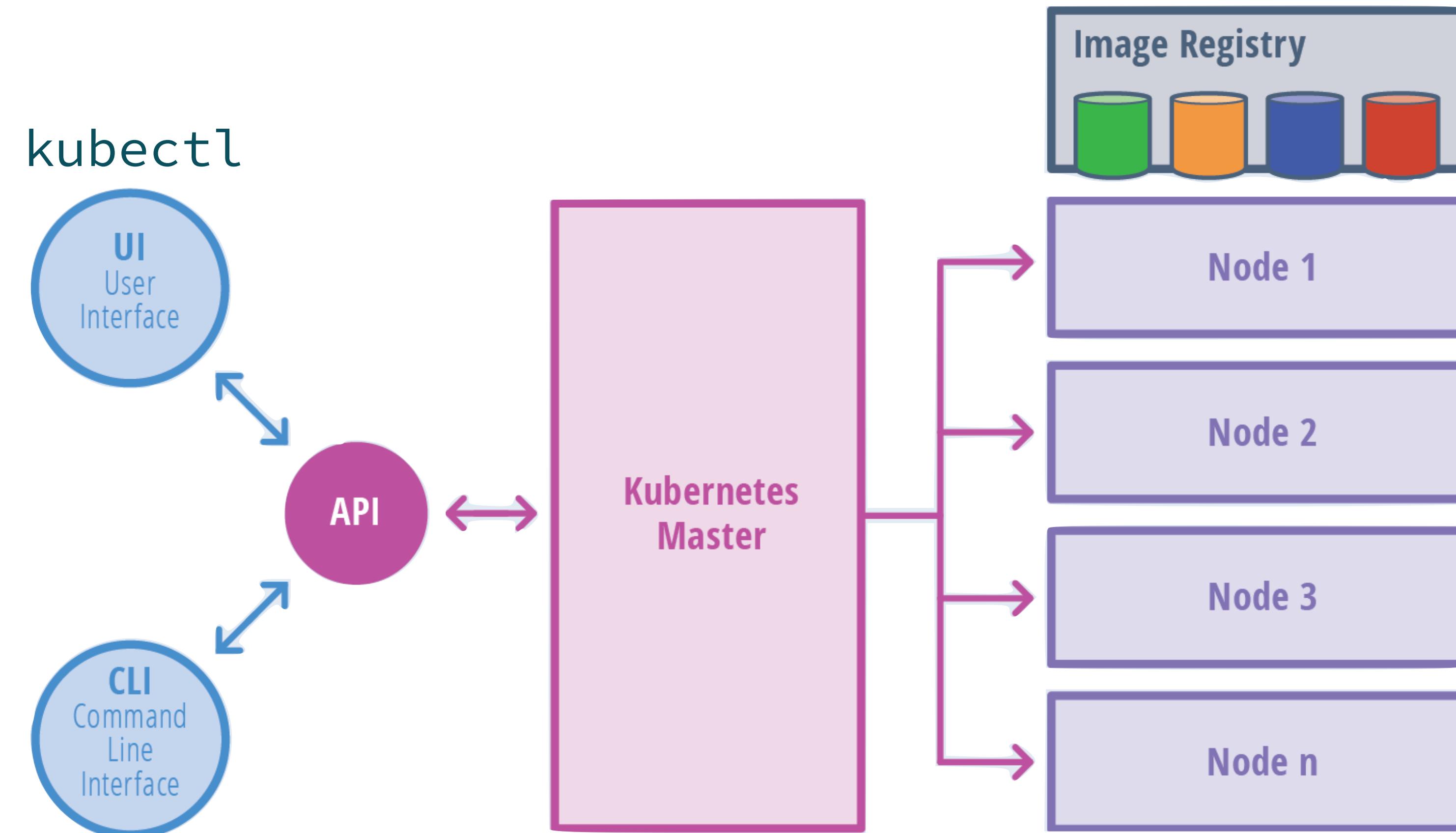


KUBERNETES

- Schedules and allocates resources
- Networking between Pods
- Storage
- Service Discovery



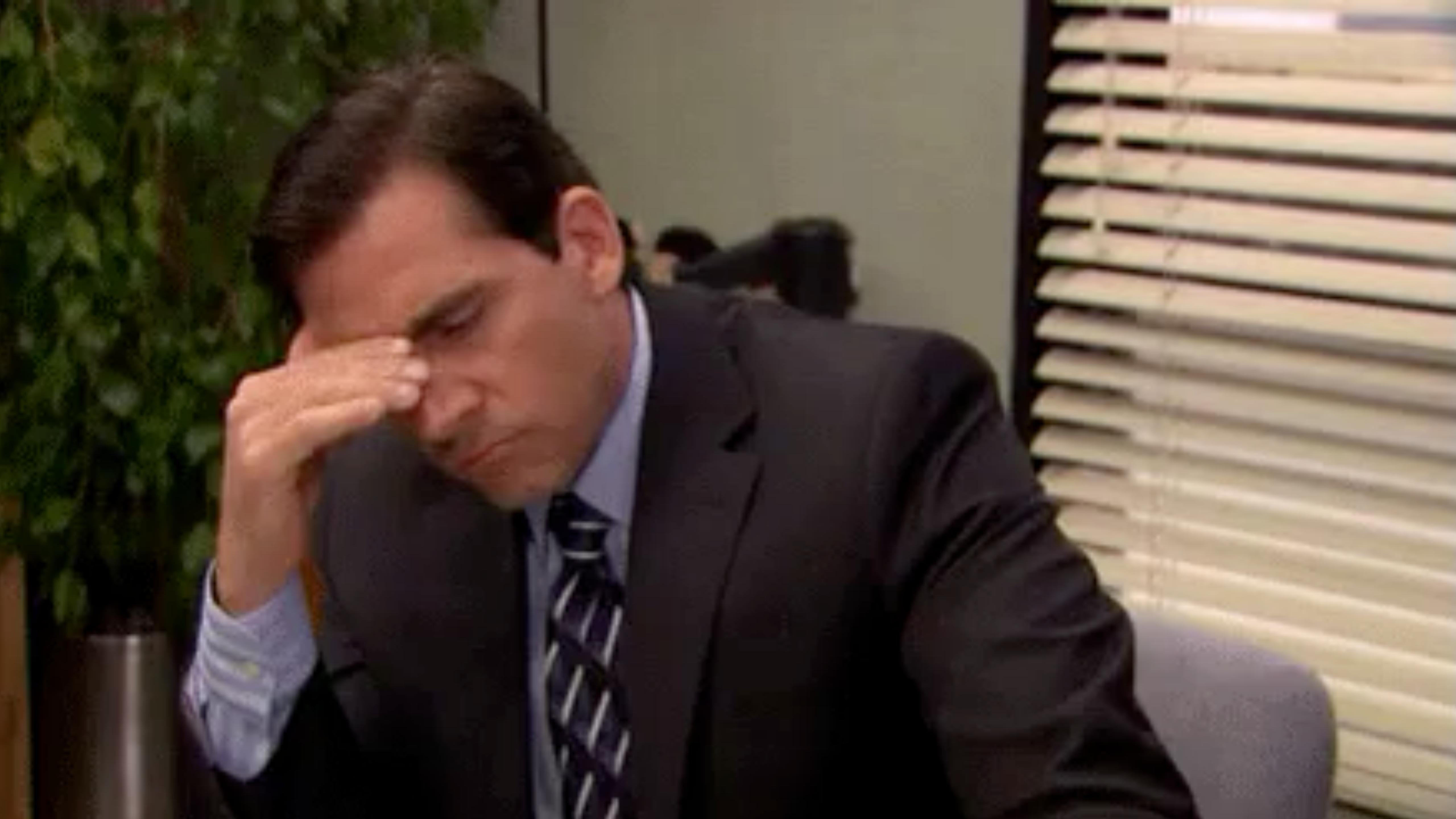
KUBERNETES ARCHITECTURE



Source: Janakiram MSV

THE NEW STACK

<https://thenewstack.io/kubernetes-an-overview/>





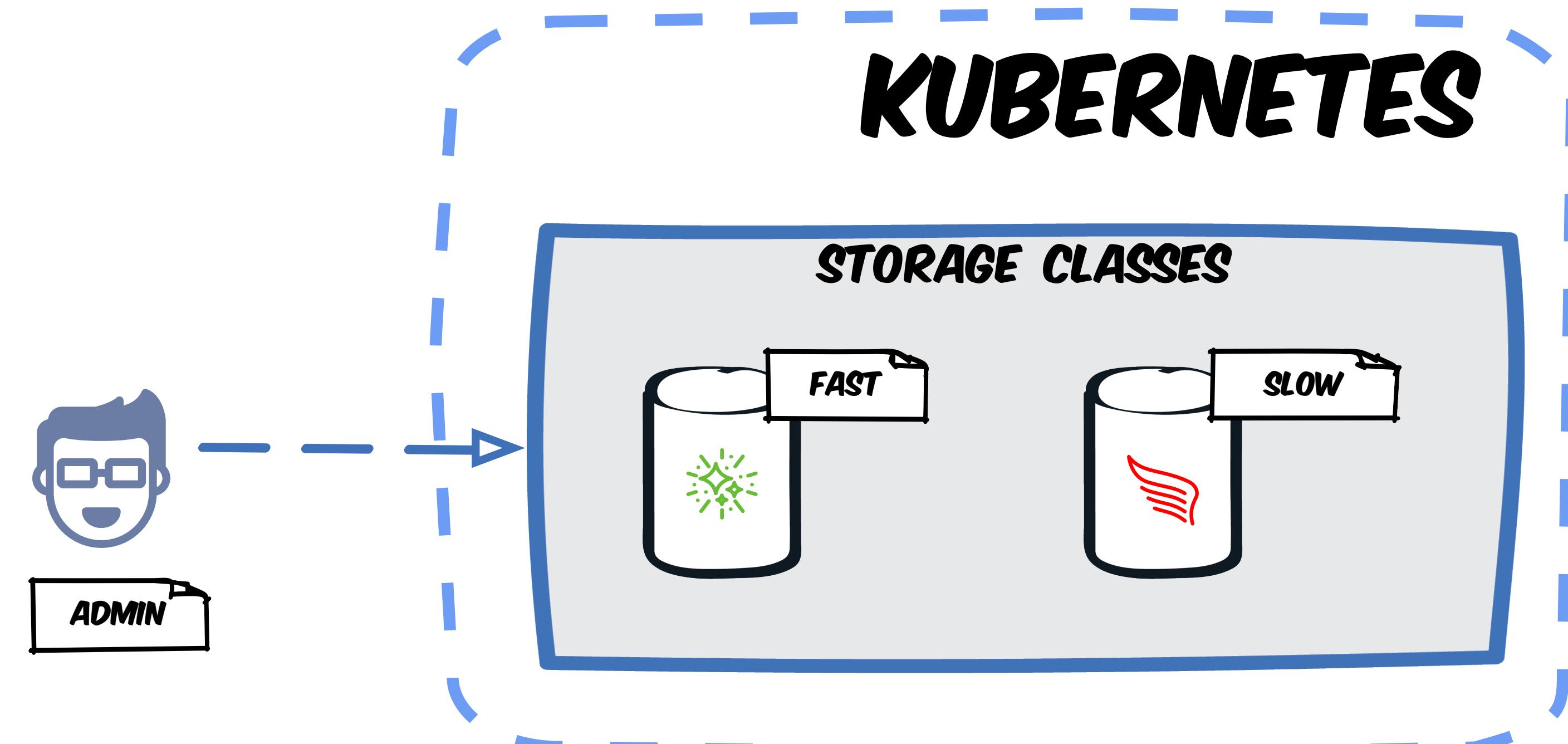
POD

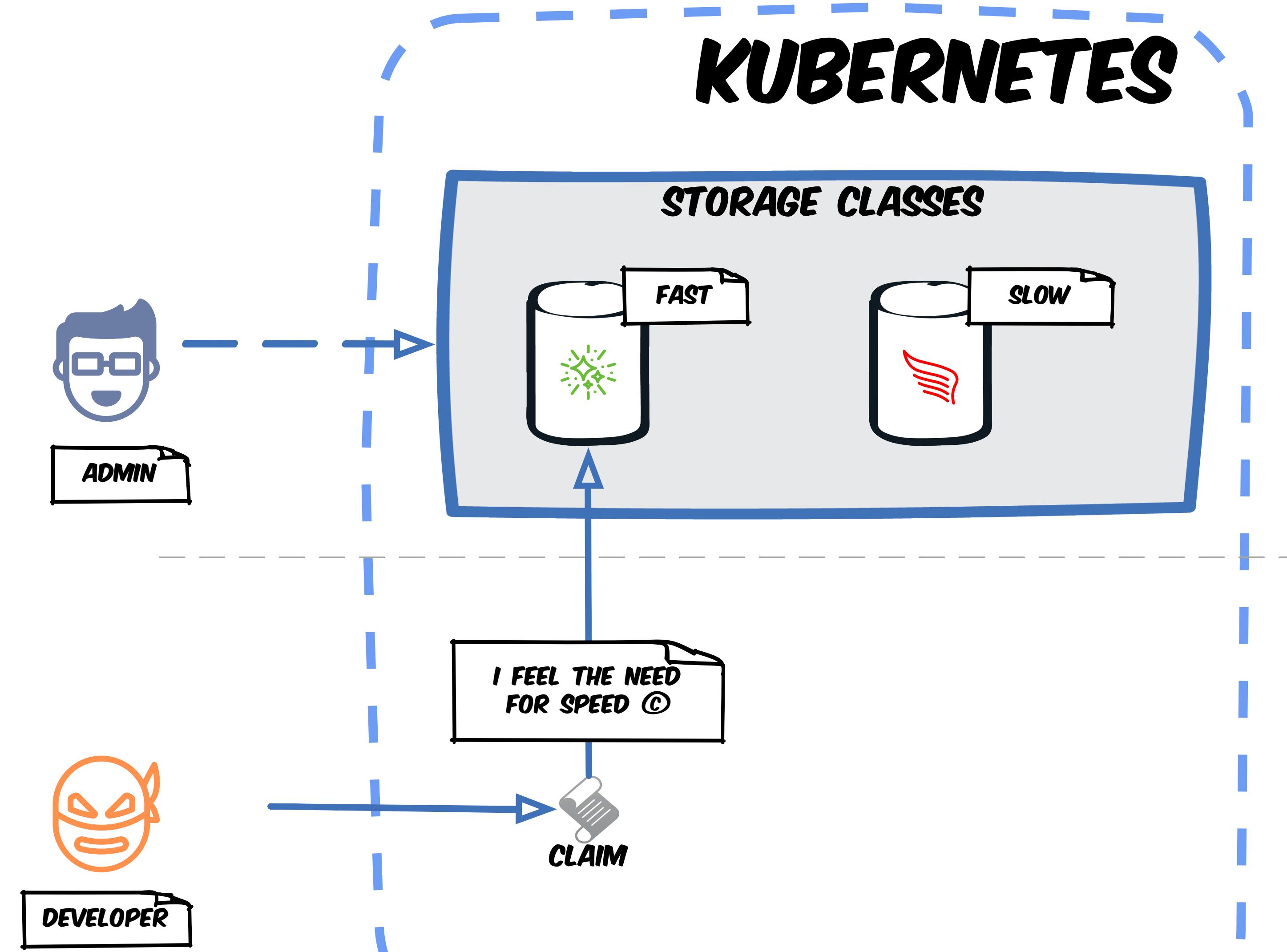
- Basic Unit of Deployment in Kubernetes
- A collection of containers sharing:
 - Namespace
 - Network
 - Volumes

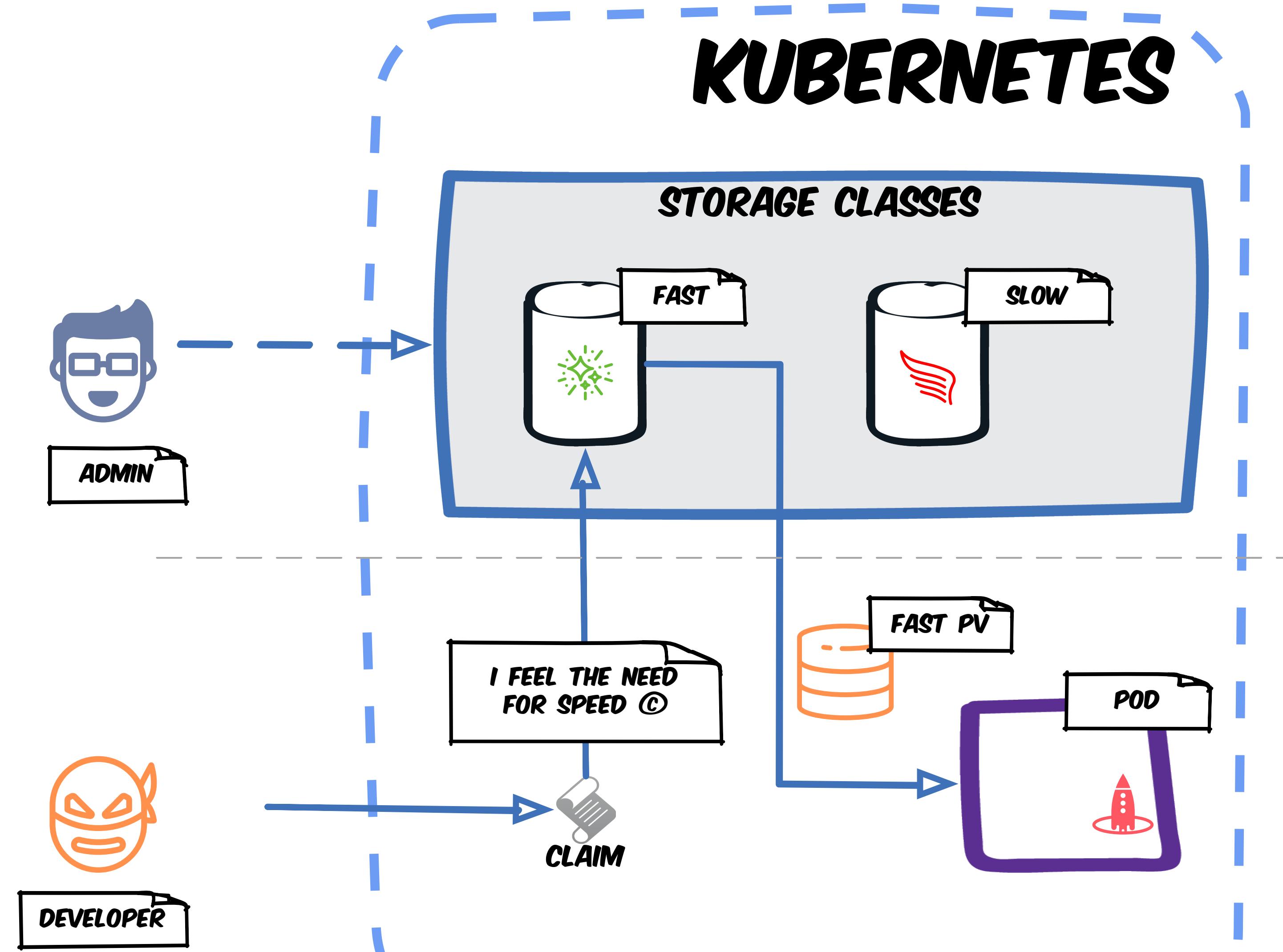
STORAGE

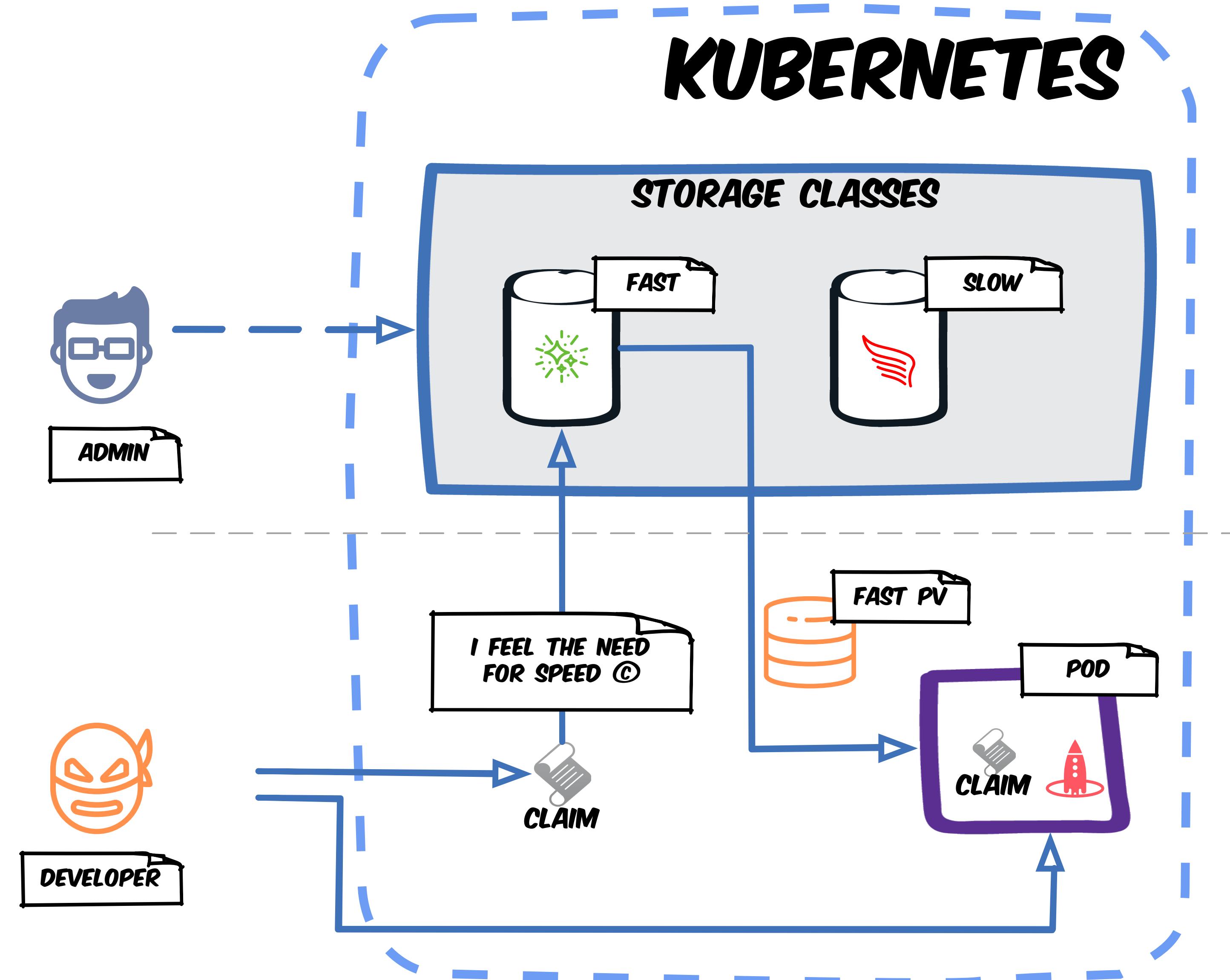
- Persistent Volume (PV) & Persistent Volume Claim (PVC)
 - PV is a piece of storage that is provisioned dynamic or static of any individual pod that uses the PV



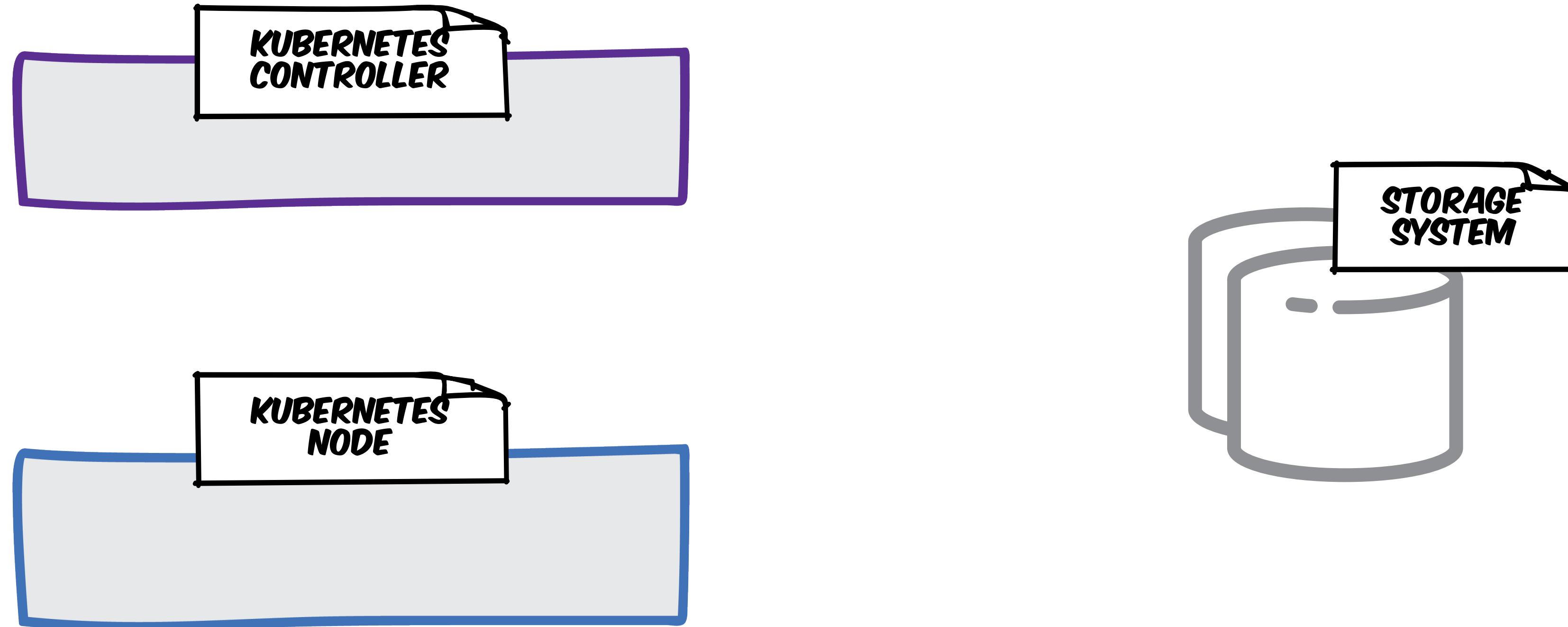




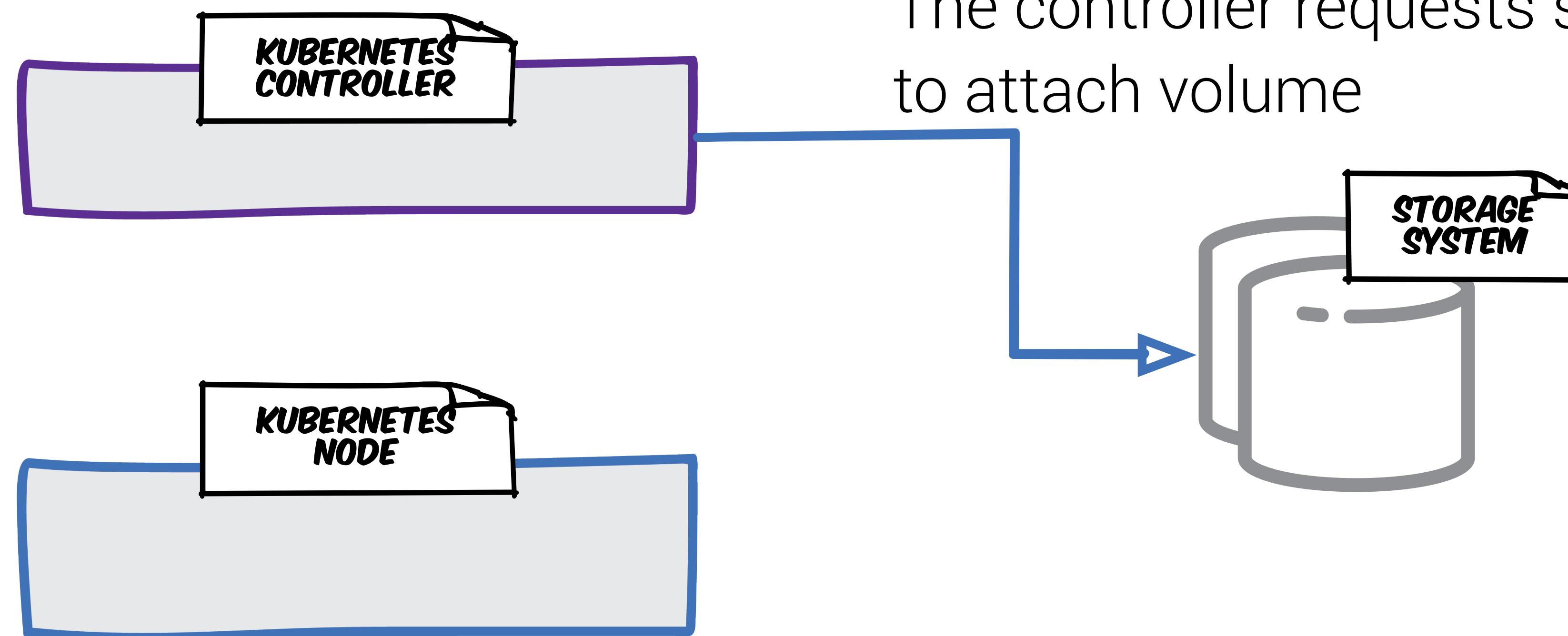




PROVISIONING STORAGE IN KUBERNETES

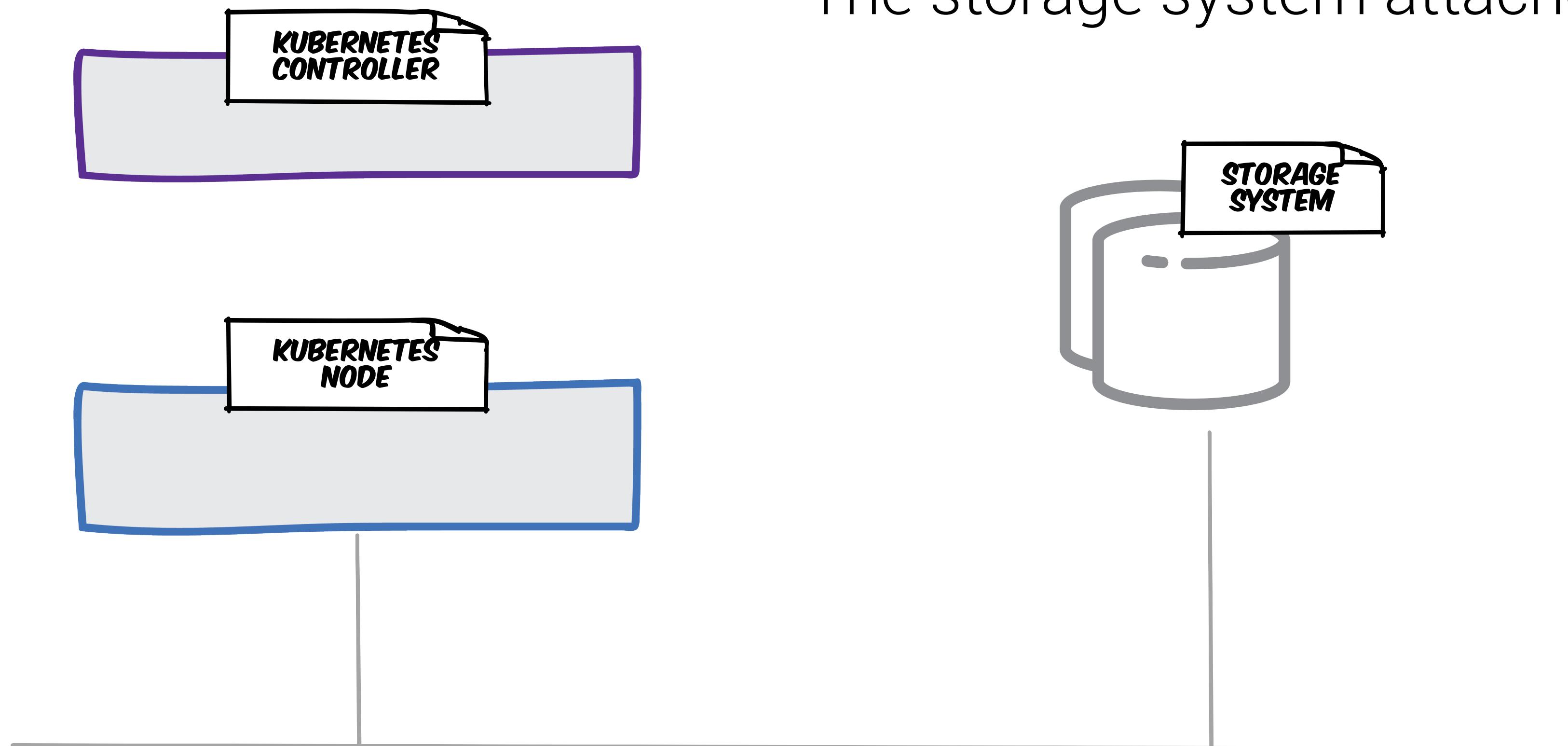


PROVISIONING STORAGE IN KUBERNETES



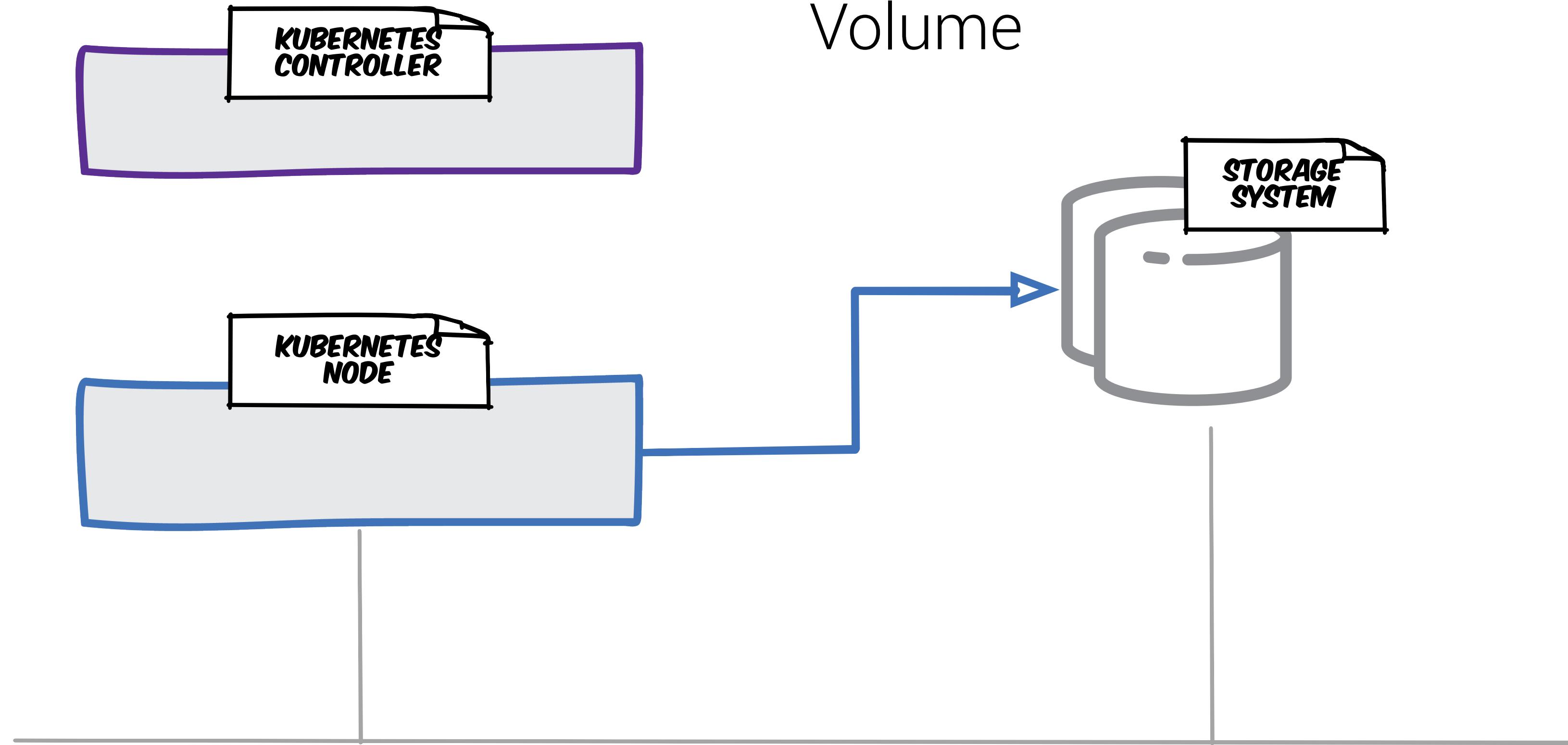
PROVISIONING STORAGE IN KUBERNETES

The storage system attaches the volume



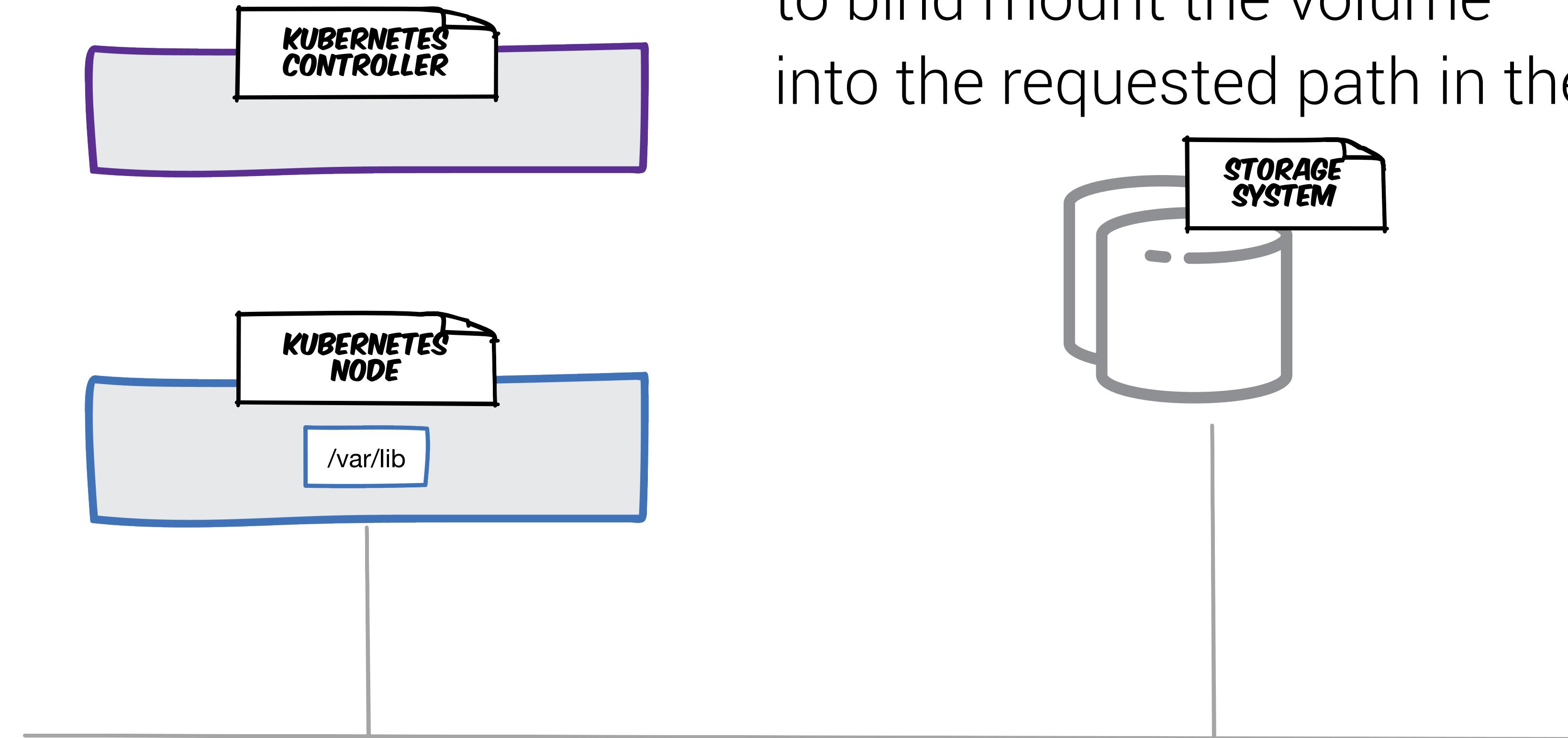
PROVISIONING STORAGE IN KUBERNETES

Kubelet requests storage system to mount Volume

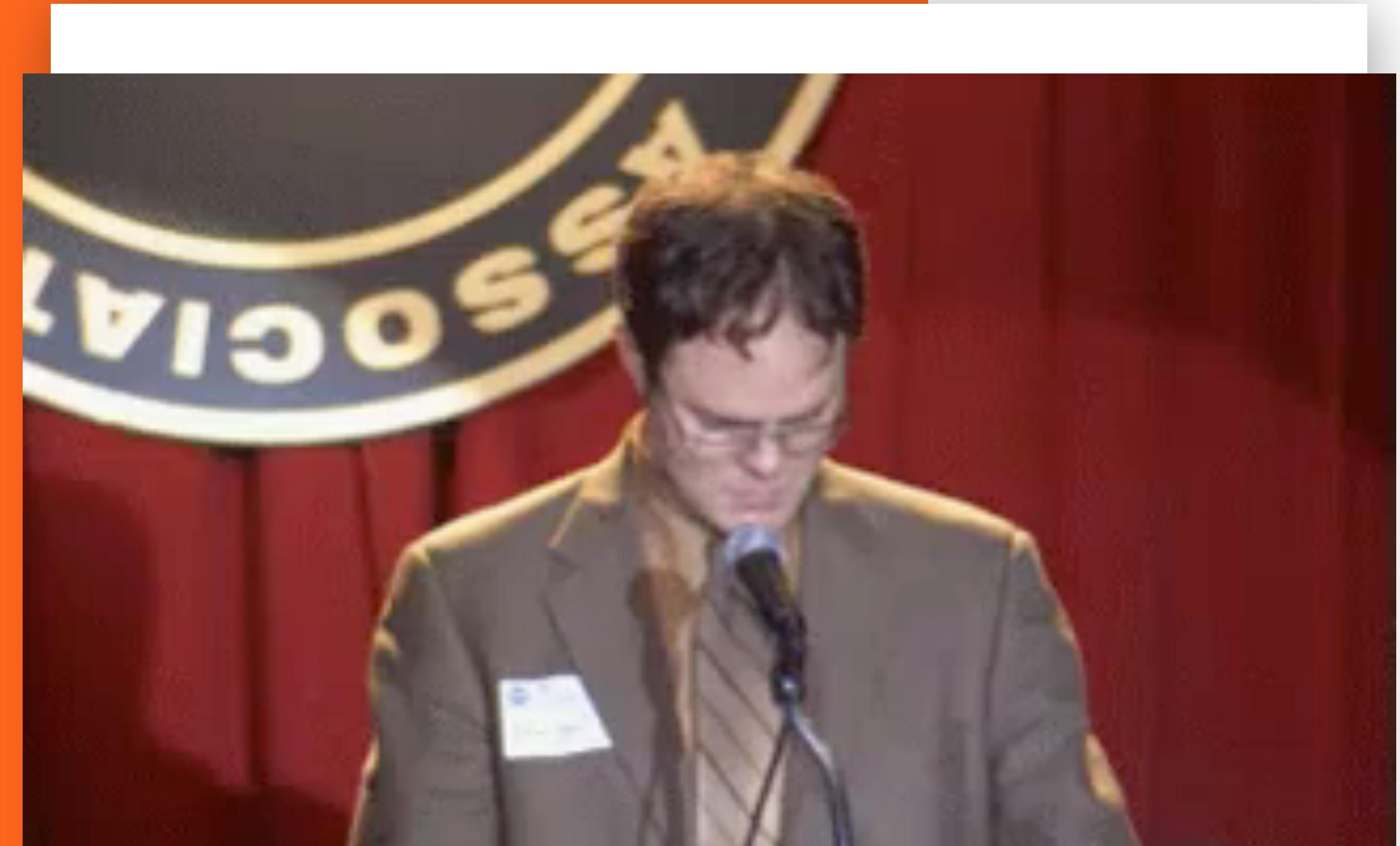


PROVISIONING STORAGE IN KUBERNETES

Kubelet can now request container runtime to bind mount the volume into the requested path in the container.



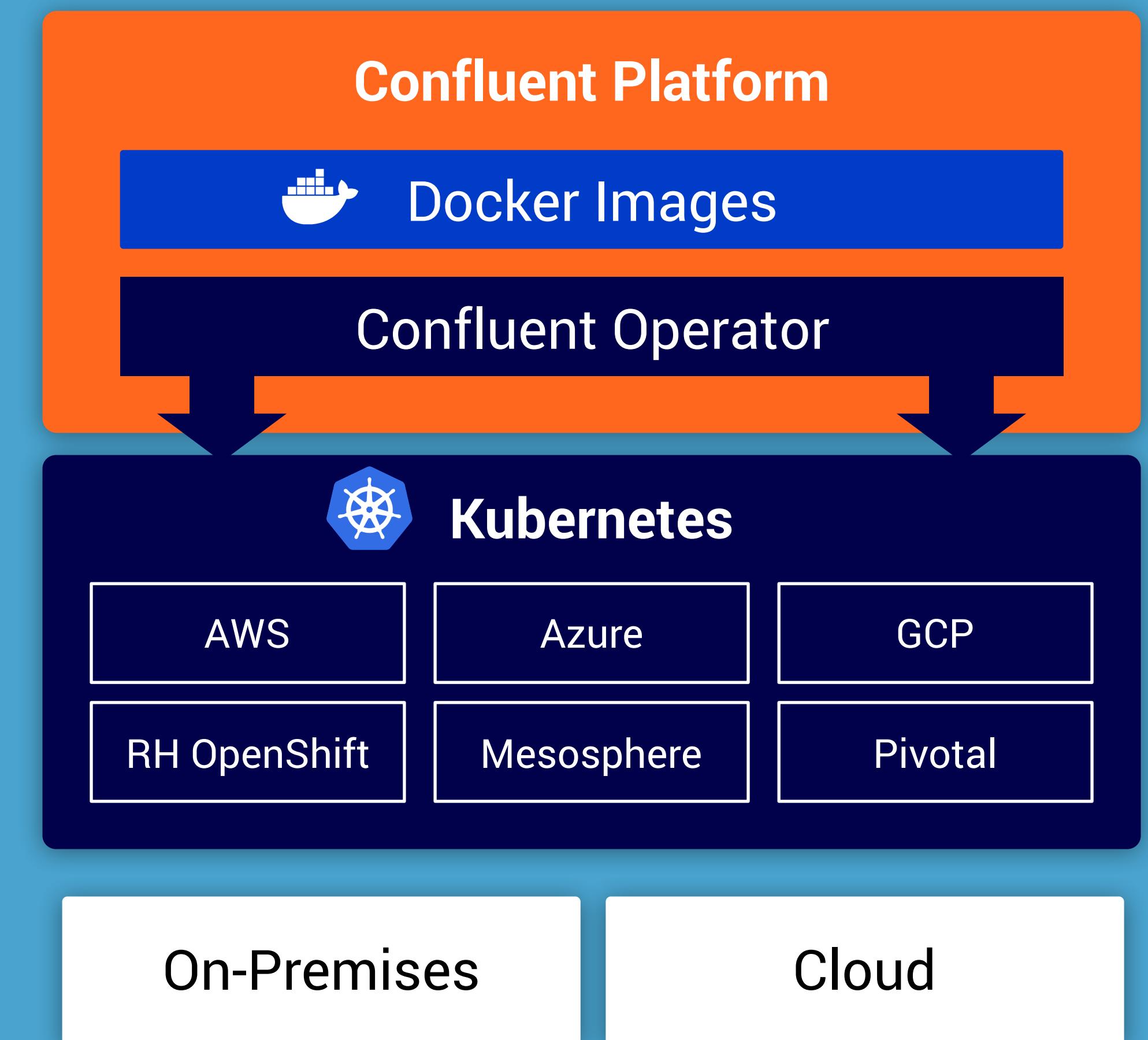
BUT I
JUST
WANT TO
DEPLOY
KAFKA





CONFLUENT OPERATOR: APACHE KAFKA ON KUBERNETES MADE SIMPLE

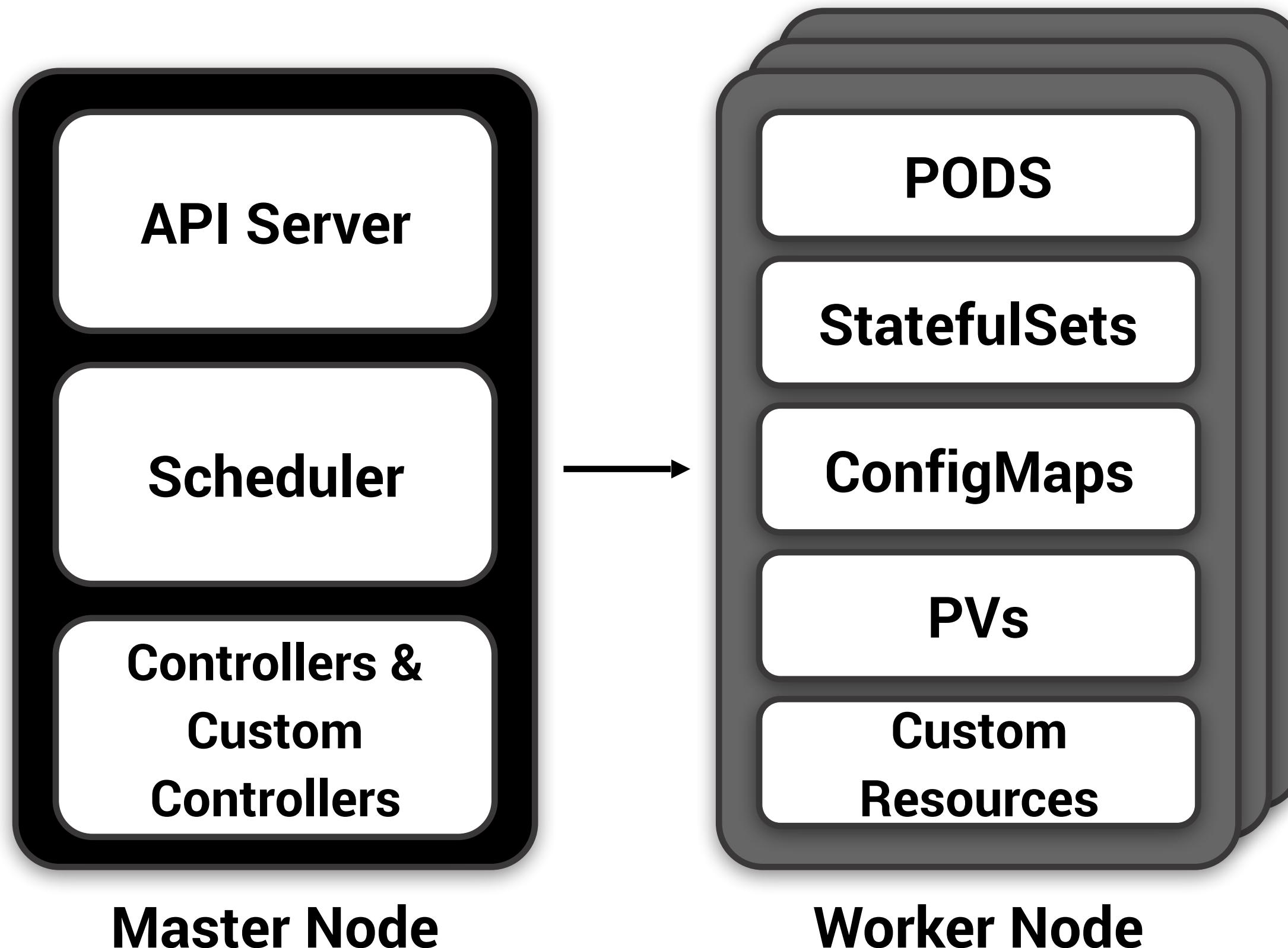
Run Apache Kafka and Confluent Platform as a cloud-native application on Kubernetes to **minimize operating complexity** and **increase developer agility**



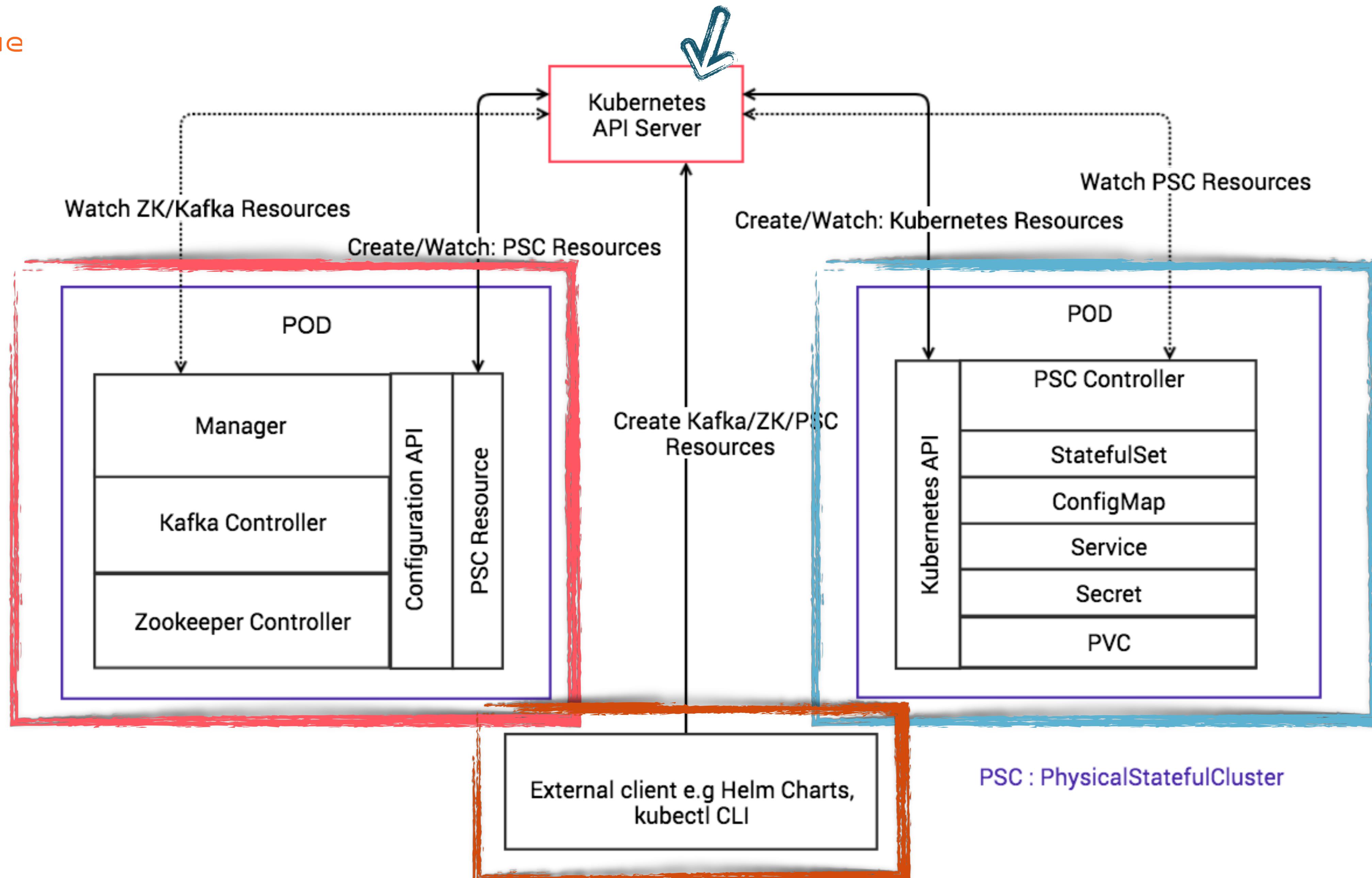
CUSTOM RESOURCE CONTROLLER



A CUSTOM KUBERNETES CONTROLLER



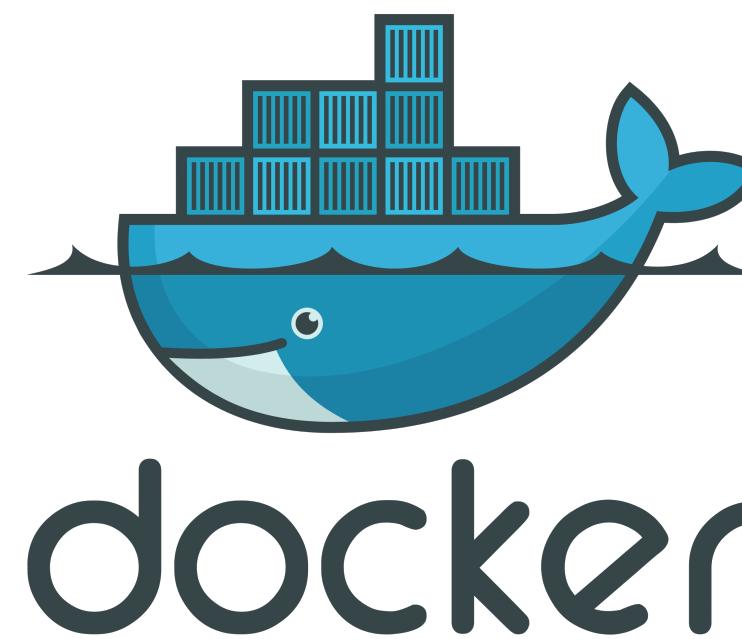
- Nodes and pods are where Applications run on Kubernetes
- Applications use objects like StatefulSets, Configmaps, PVs
- Custom Controllers create custom resources that provide unique application functionality:
 - Upgrades, elasticity, Kafka Operational Logic



WORKLOADS DEPLOYMENT

USUAL SUSPECTS

Certified
container images



Operator Helm Charts



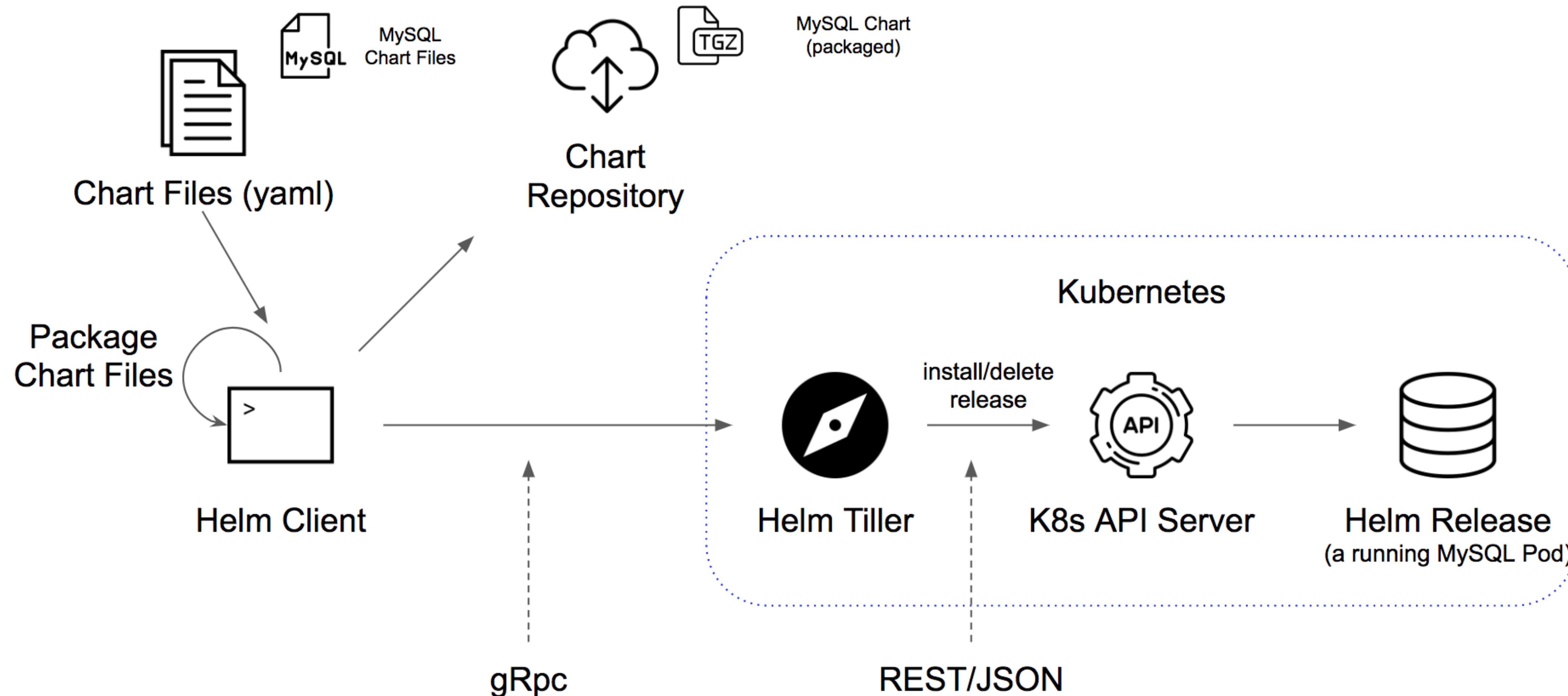


We just need to
deploy **Kafka** on
Kubernetes

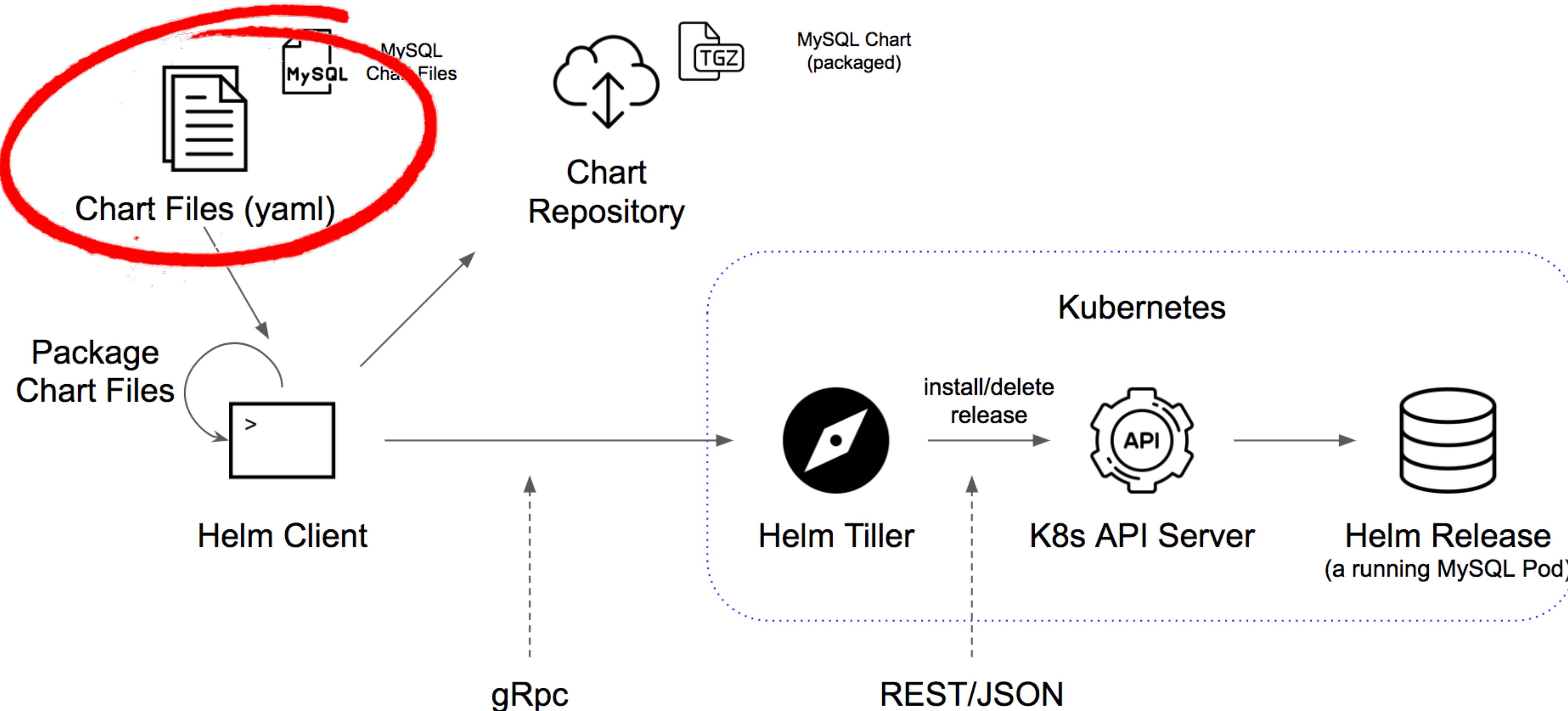


We will use
**confluentinc/cp-helm-
charts**

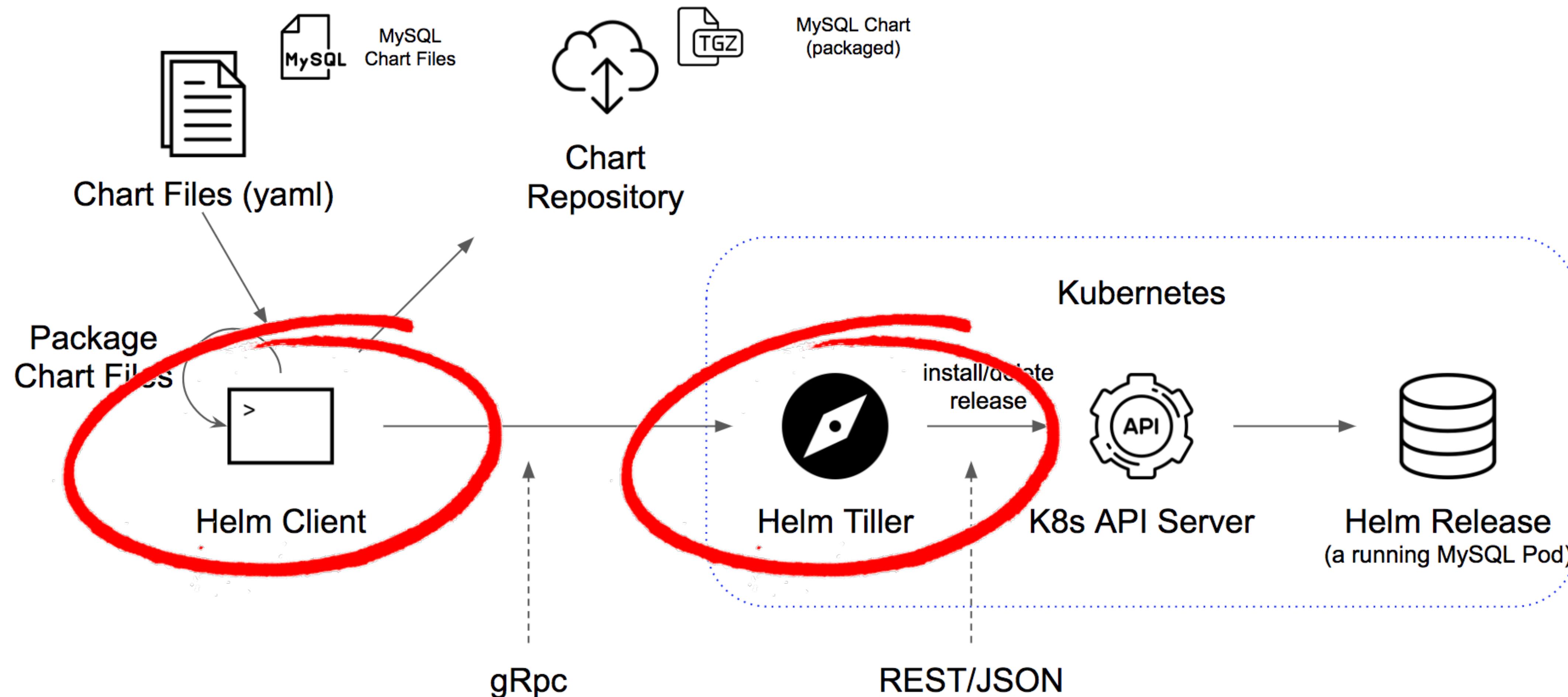
HELM CHARTS

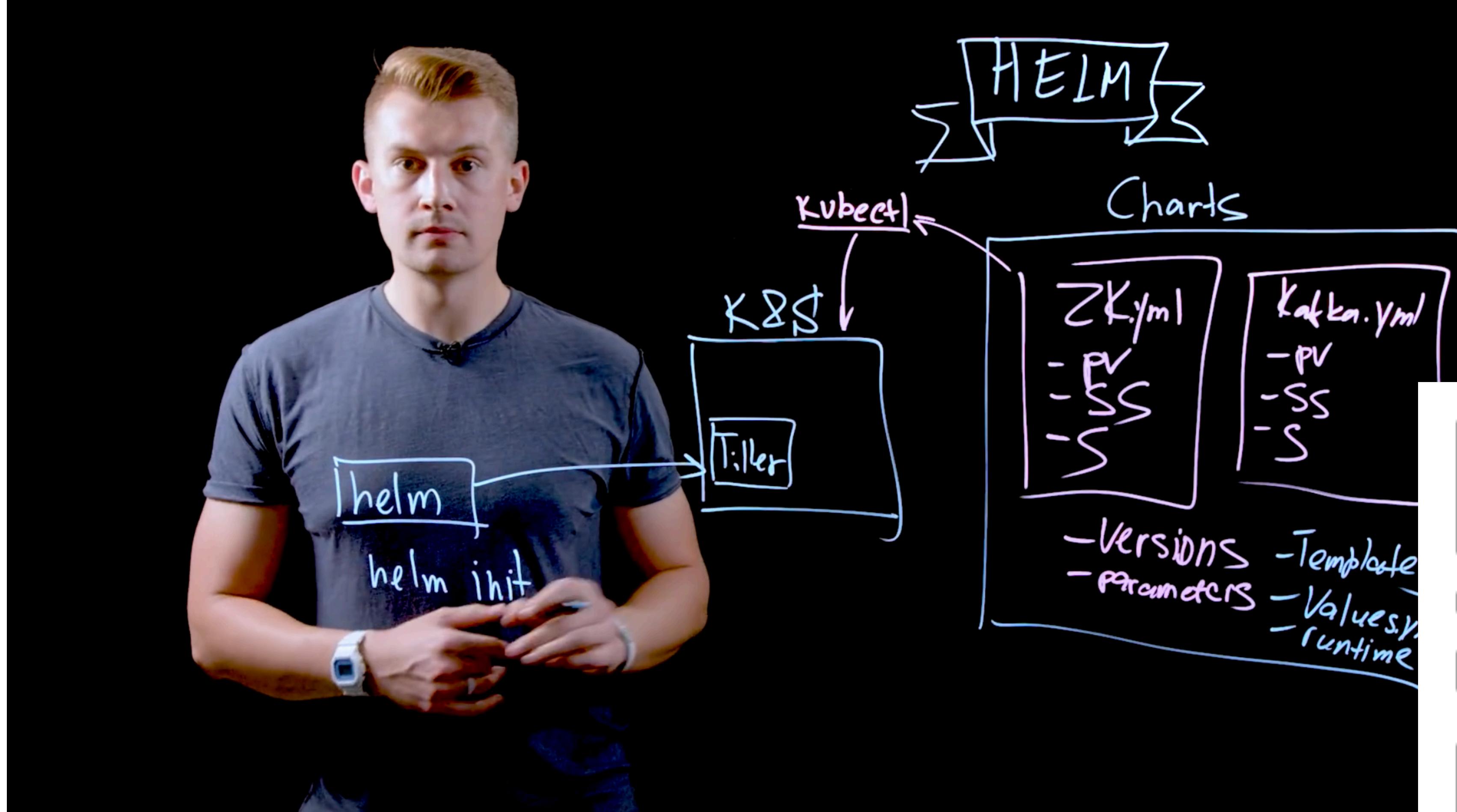


HELM CHARTS



HELM CHARTS





https://cnfl.io/helm_video





Helm Charts is just a GO
Templates.

How Charts help with
rolling update?



We will use
StatefulSets
with **OrderedReady**



We need SRE /
Operator knowledge to
manage the platform.
You need Operator!



ROLLING UPGRADE

Kafka Broker Upgrades:

1. Stop the broker, upgrade Kafka
2. Wait for Partition Leader reassignment
3. Start the upgraded broker
4. Wait for zero under-replicated partitions
5. Upgrade the next broker



```
> cat kafka_new.yml
```

```
## Kafka Cluster
```

```
##
```

```
kafka:
```

```
  name: kafka
```

```
  replicas: 5
```

```
  version: 5.1.0
```

```
> helm upgrade -f kafka_new.yml --name kafka
```

WILL IT SCALE

Spin up new brokers, connect workers
easily

Manual Rebalance required in v1.0

Determine balancing plan

Execute balancing plan

Monitor Resources



```
> cat kafka_new.yml
```

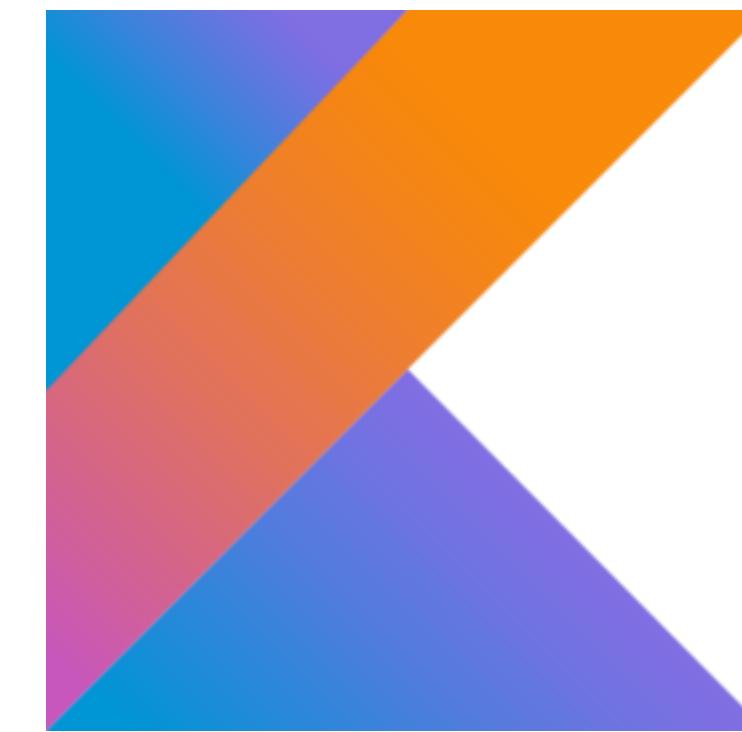
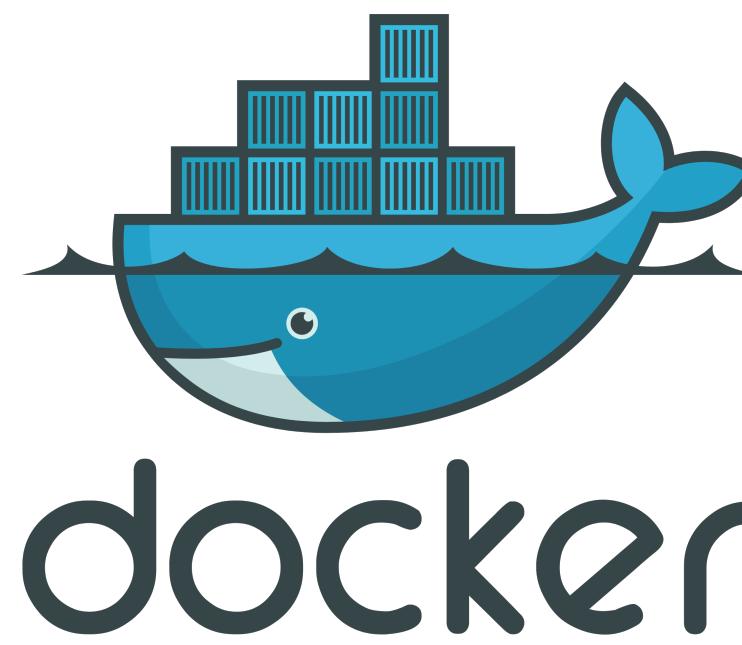
```
## Kafka Cluster
##
kafka:
  name: kafka
  replicas: 5
  version: 5.0.0
```

```
> helm upgrade -f kafka_new.yml --name kafka
```

One More Thing...

USUAL SUSPECTS

Certified
container images

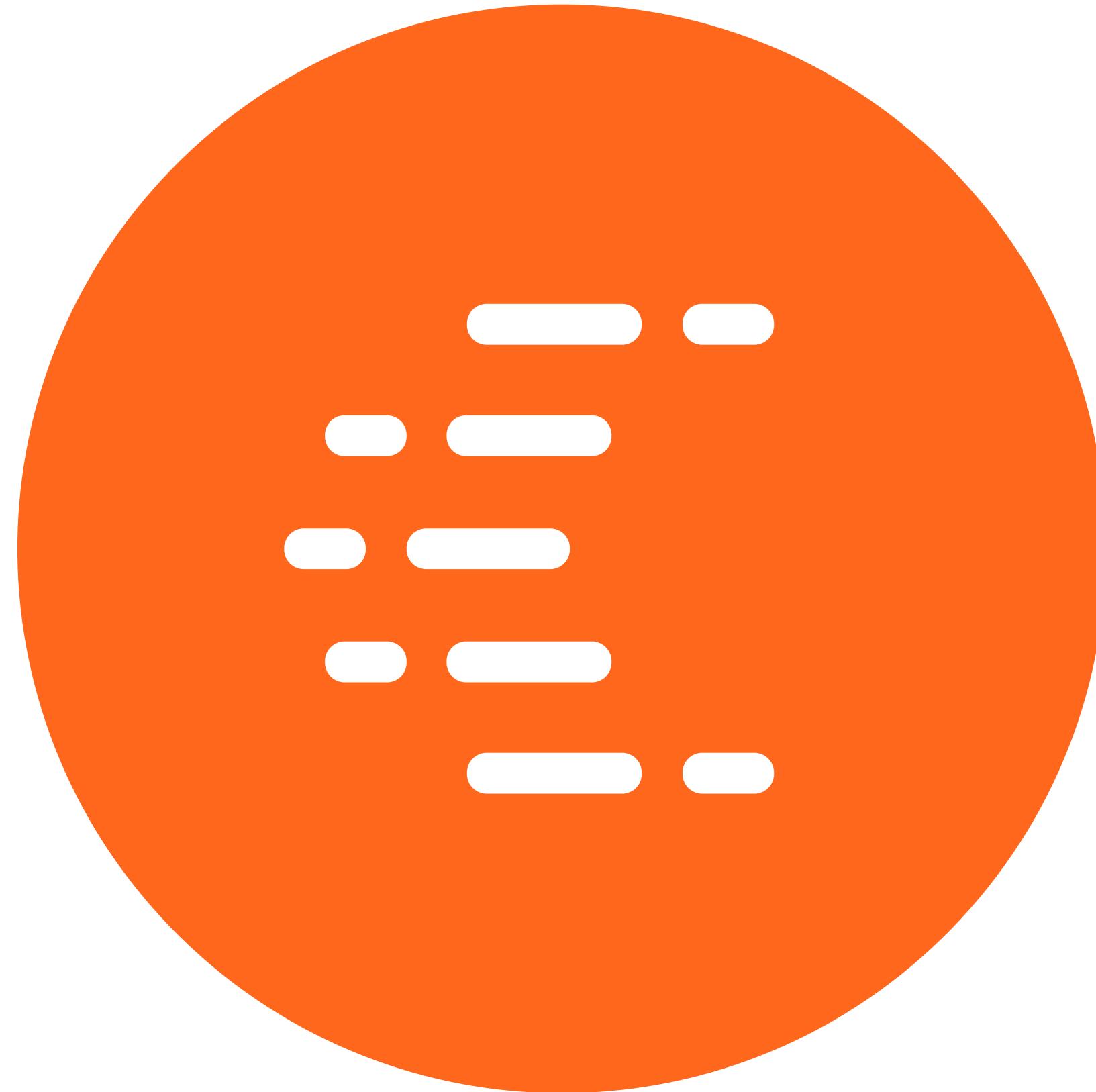




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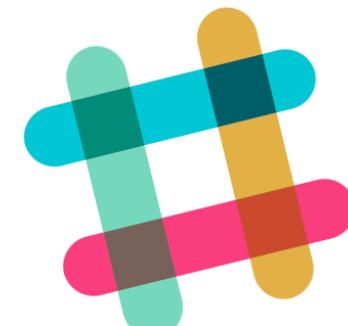
#DEVNEXUS

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THANKS!

@gamussa
viktor@confluent.io



<https://slackpass.io/confluentcommunity>
#kubernetes

