DATE : 16.04.2025

DT/NT : DT

LESSON : KUBERNETES

SUBJECT: OBJECTS

BATCH : B 303

AWS-DEVOPS

TECHPRO EDUCATION

techproeducation.com +1 (585) 304 29 59

Table of Contents

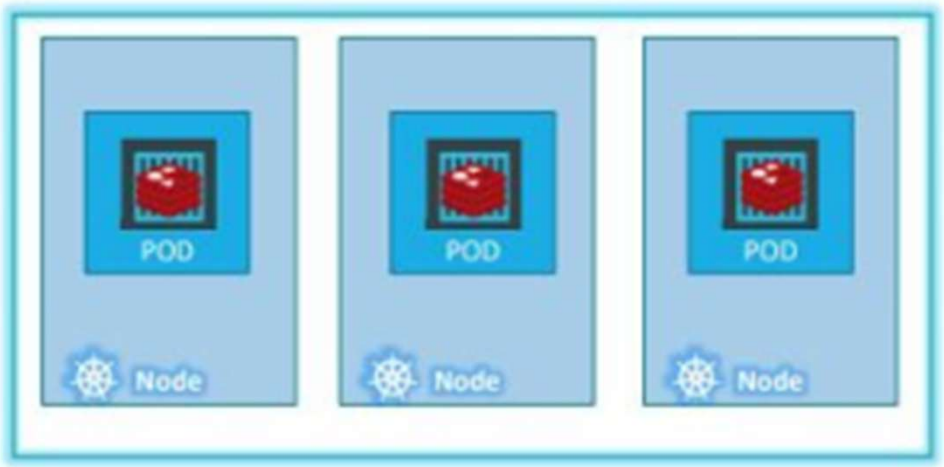
Kubernetes Objects

Kubernetes Objects

- Kubernetes objects are persistent entities in the Kubernetes system.

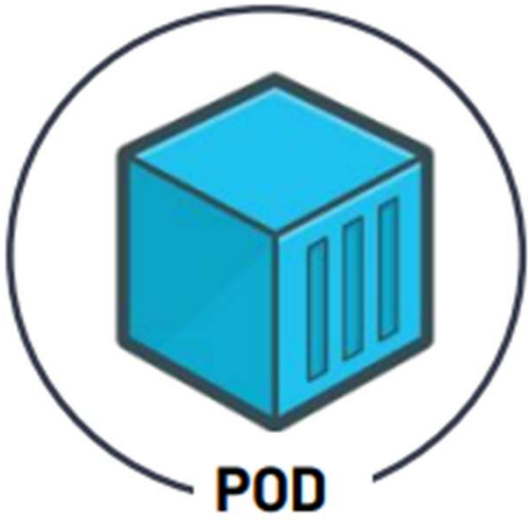
- Kubernetes uses these entities to manage the cluster.

PODs



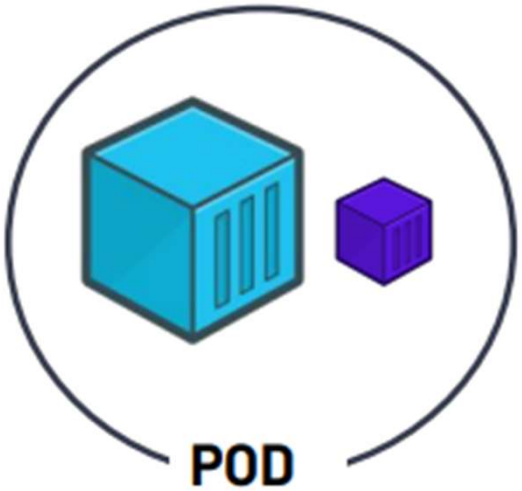
PODs

- Kubernetes doesn't deal with containers directly.
- PODs are Kubernetes objects that encapsulate the containers.
- Pods are the smallest deployable units of computing that you can create and manage in Kubernetes.

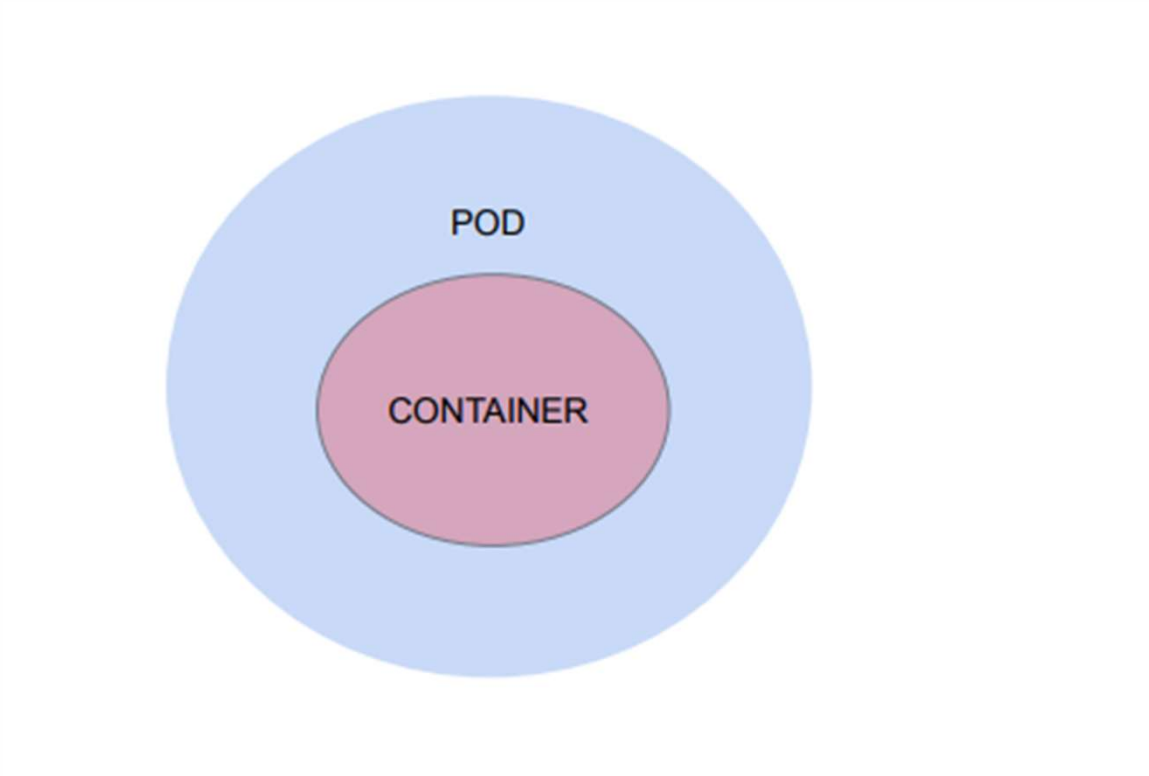


PODs

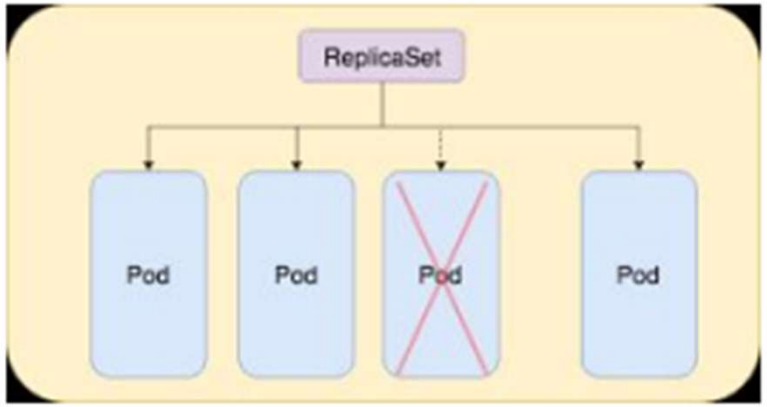
- A POD can have multiple containers.
- Sometimes an application need a helper container, such as logging, monitoring, etc.
- These helper containers should coexist with your application container.



PODs



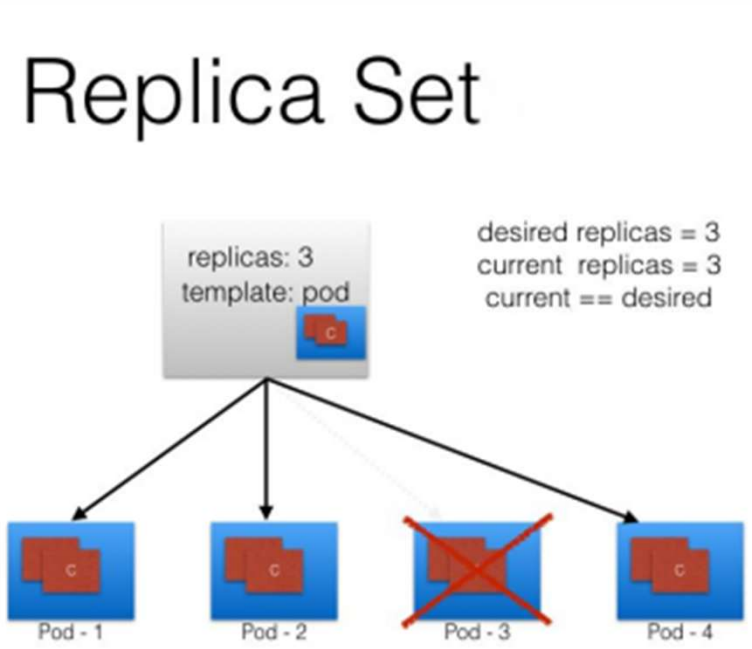
ReplicaSets



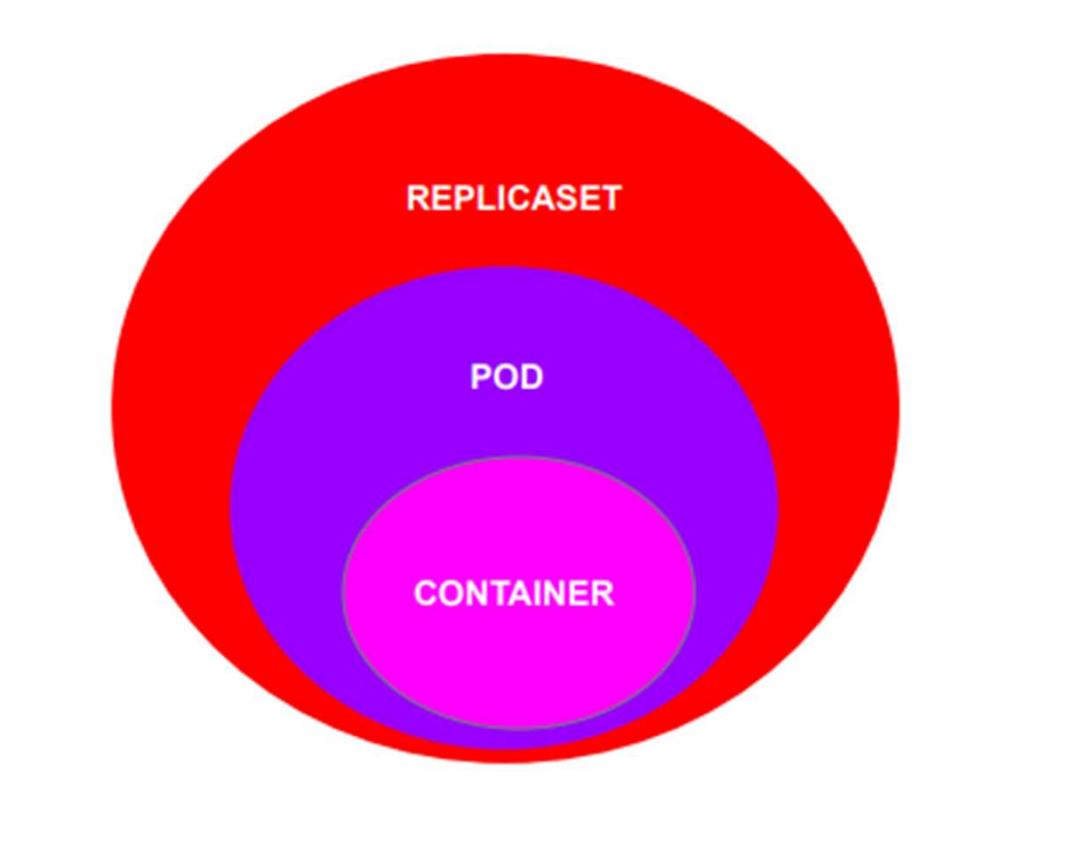
ReplicaSets

- A ReplicaSet's purpose is to maintain a stable set of replica Pods running at any given time.

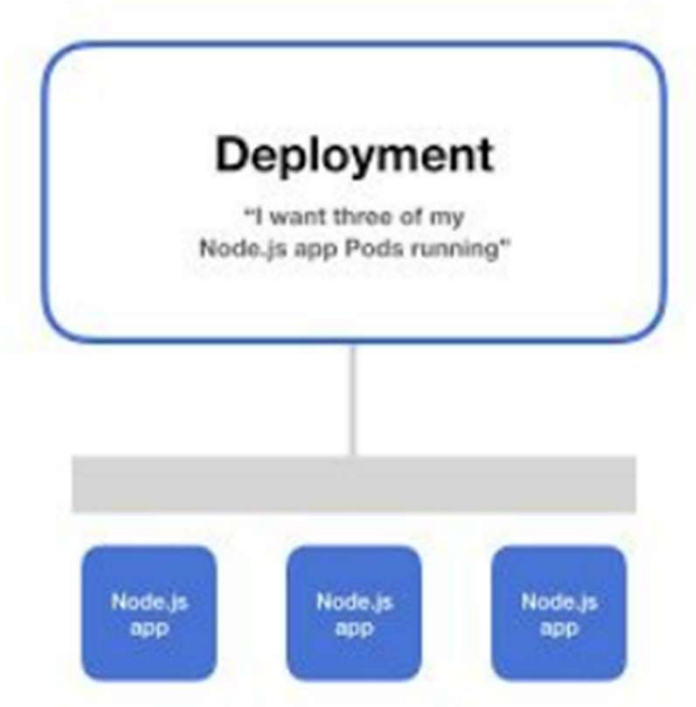
- Even if you have a single POD, the ReplicaSet will bring up a new POD when the existing one fails.



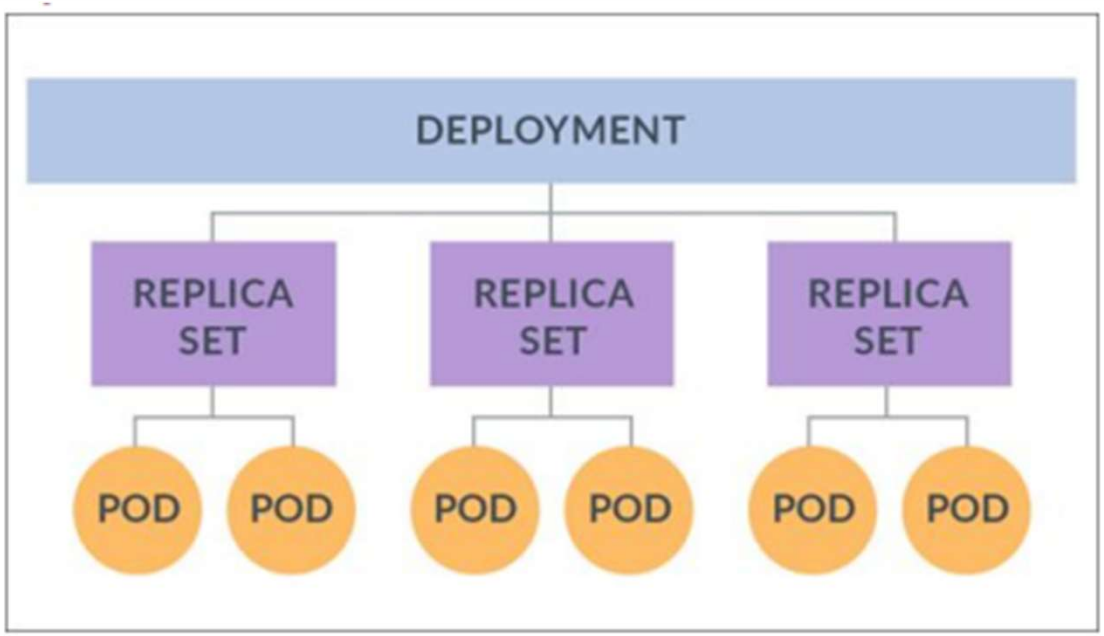
ReplicaSets



Deployment

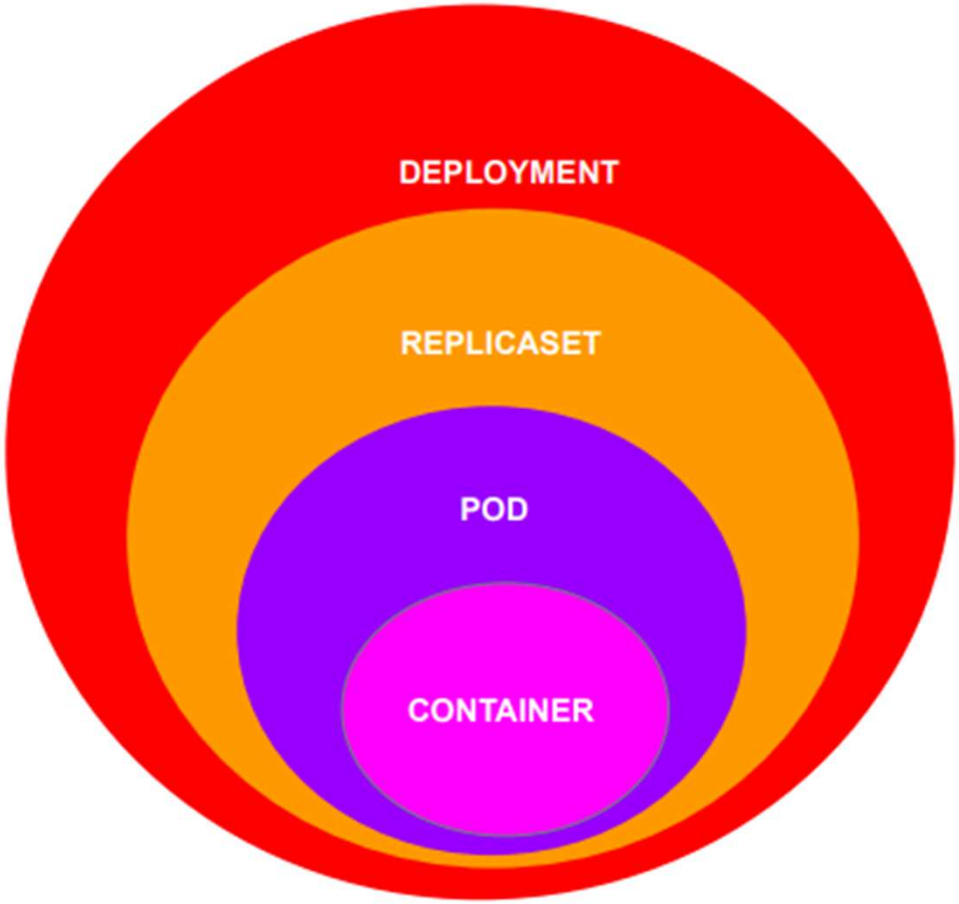

Deployment
"I want three of my
Node.js app Pods running"
Node.js
app
Node.js
app
Node.js
app

Deployment



- One step higher in the hierarchy, deployments provides declarative updates for Pods and ReplicaSets.

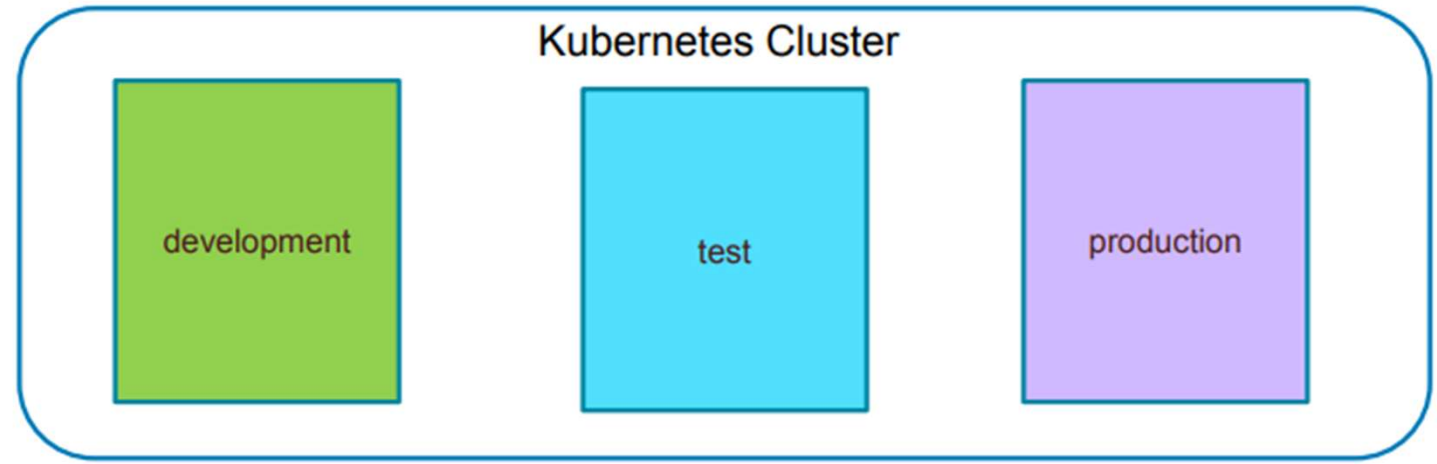
Deployment



Namespaces

Namespaces

- Kubernetes supports multiple virtual clusters backed by the same physical cluster. These virtual clusters are called namespaces.
- Namespaces are intended for use in environments with many users spread across multiple teams, or projects.



Object Model

Object Model

All objects must have apiVersion, kind, metadata and spec fields.

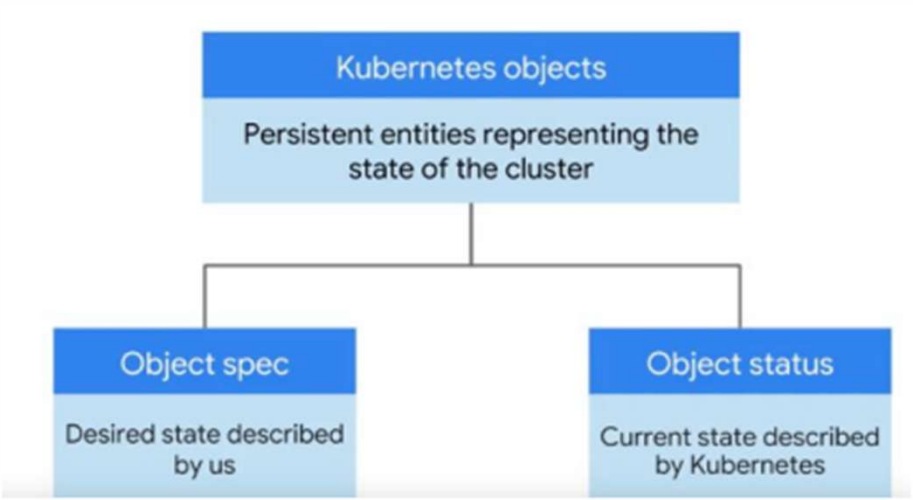
- **apiVersion:** Which version of the Kubernetes API you're using to create this object
- **kind:** What kind of object you want to create
- **metadata:** Data that helps uniquely identify the object, including a **name** string, **labels**, and optional **namespace**
- **spec:** What state you desire for the object

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx-deployment
spec:
  selector:
    matchLabels:
      app: nginx
  replicas: 2
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
      - name: nginx
        image: nginx:1.14.2
        ports:
        - containerPort: 80
```

Object Model

- Once the Deployment object is created, the Kubernetes system attaches the **status** field to the object.

- **status** is managed by Kubernetes and describes the **actual state** of the object and its history.



Object Model

Pod to ReplicaSet

```yaml
apiVersion: v1
kind: Pod
metadata:
 name: nginx-pod
 labels:
   app: nginx
spec:
 containers:
 - name: mynginx
   image: nginx:1.19
   ports:
   - containerPort: 80
```

```yaml
apiVersion: apps/v1
kind: ReplicaSet
metadata:
 name: nginx-rs
 labels:
   environment: dev
spec:
 replicas: 3
 selector:
   matchLabels:
     app: nginx
 template:
   metadata:
     labels:
       app: nginx
   spec:
     containers:
     - name: mynginx
       image: nginx:1.19
       ports:
       - containerPort: 80
```

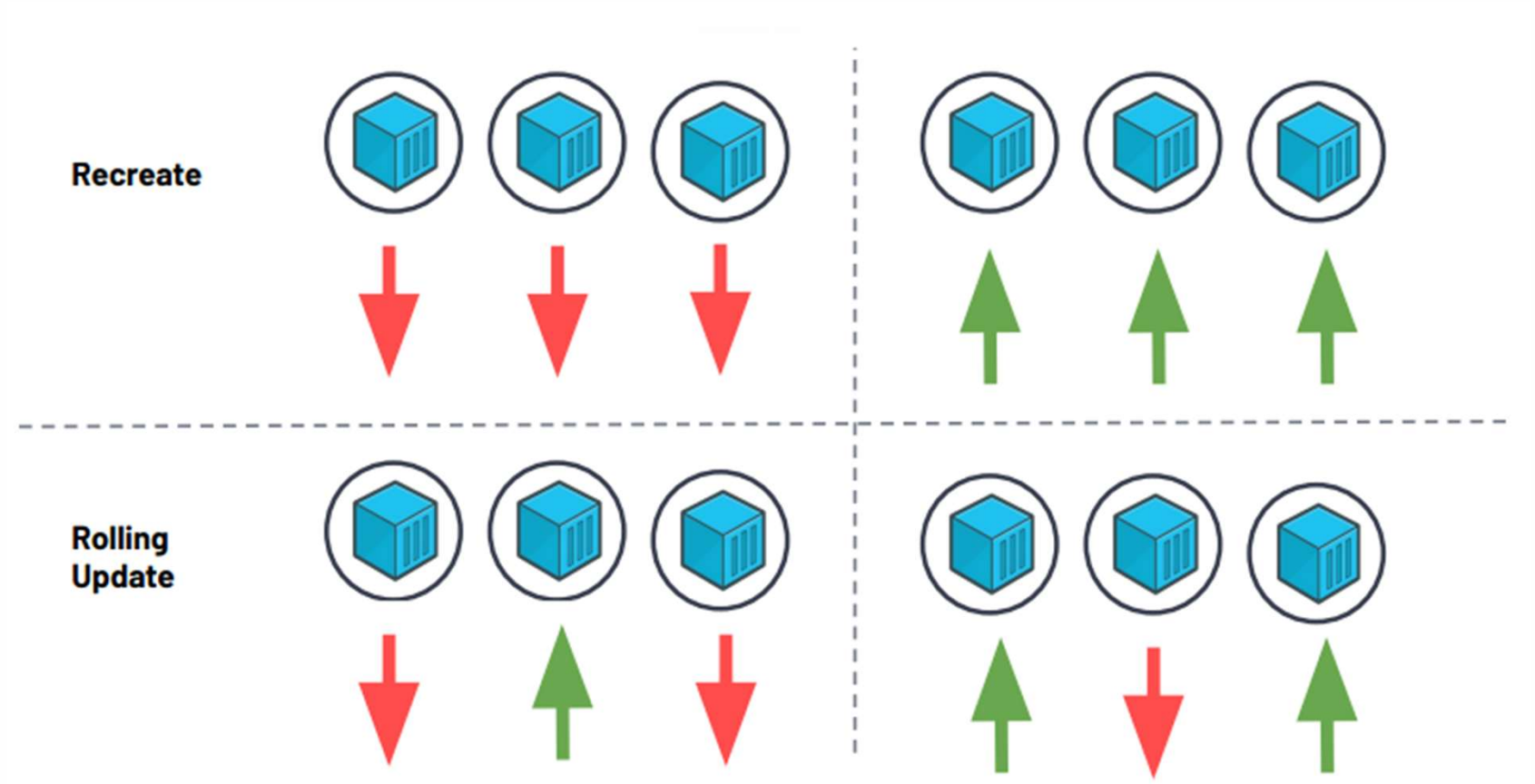
TECHPRO EDUCATION

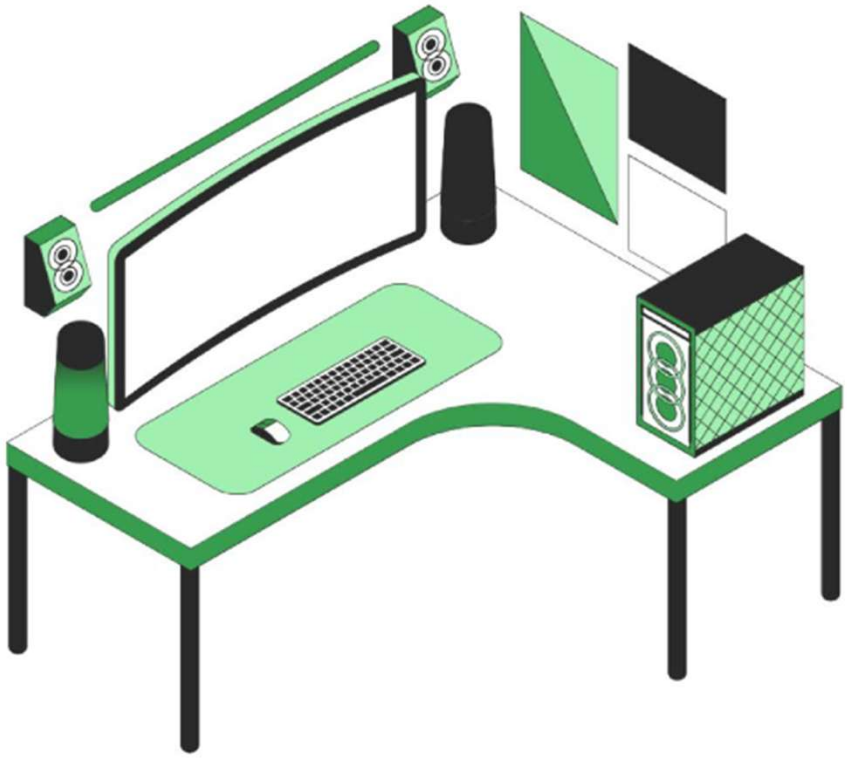
Object Model

Pod Selector

```yaml
apiVersion: apps/v1
kind: ReplicaSet
metadata:
 name: nginx-rs
 labels:
   environment: dev
spec:
 replicas: 3
 selector:
   matchLabels:
     app: nginx
 template:
   metadata:
     labels:
       app: nginx
   spec:
     containers:
     - name: mynginx
       image: nginx:1.19
       ports:
       - containerPort: 80
```

Deployment Strategy





Do you have any questions?

Send it to us! We hope you learned something new.