



# Introduction to Kubernetes

# Kubernetes

A platform for building orchestrators



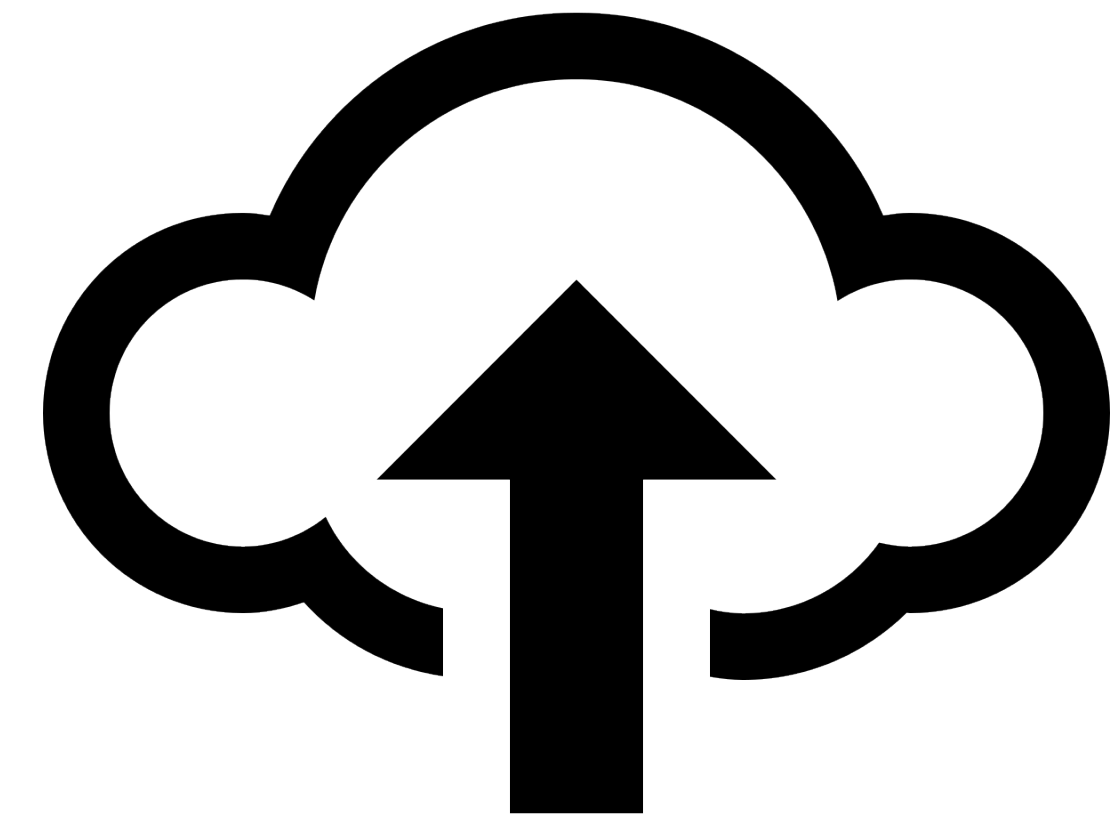
# Orchestrator

Directs how an application should *run*



# Run

Deploy, scale, upgrade etc.



# MinIO Operator

Deploy, scale, upgrade MinIO tenants

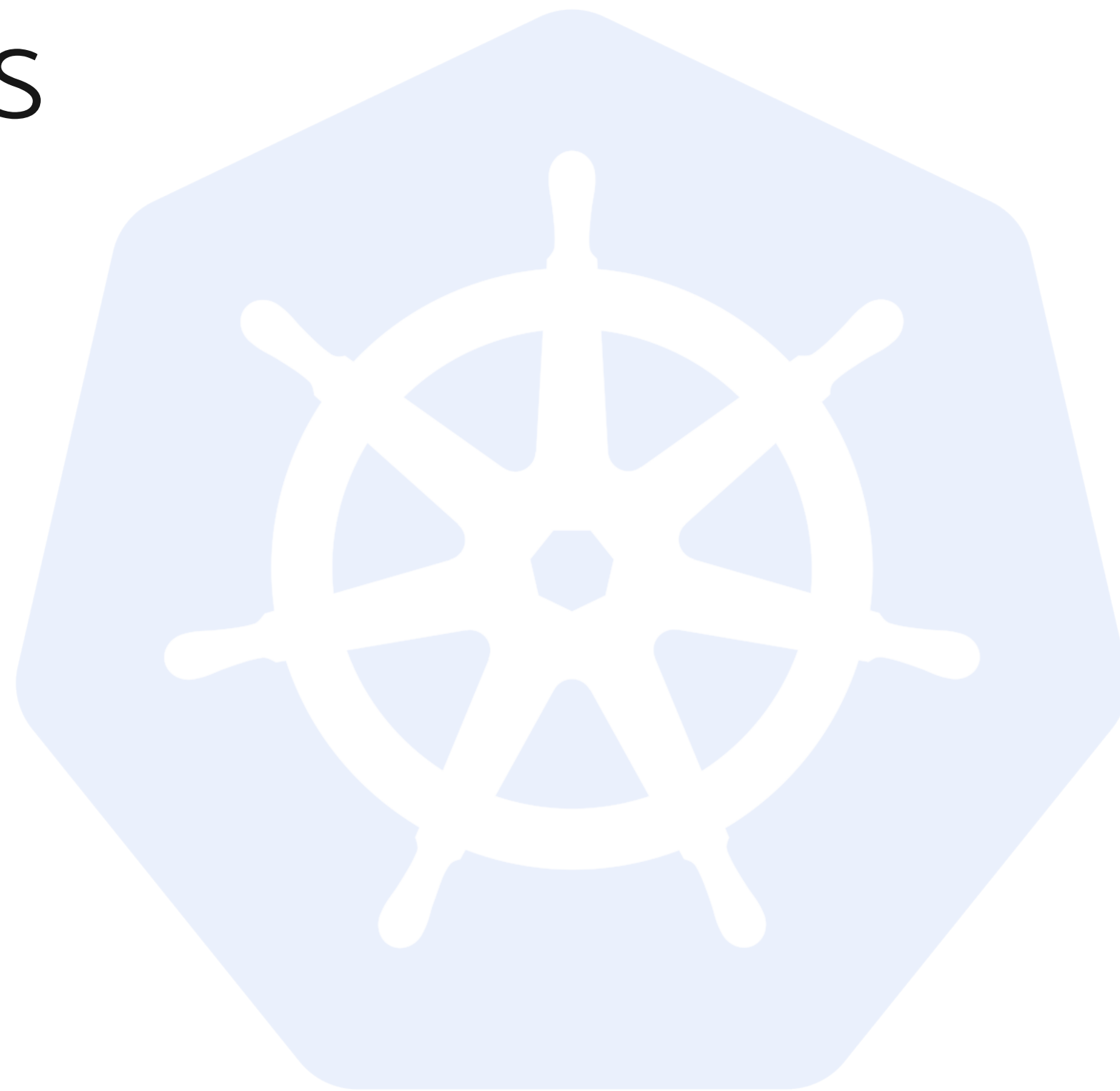
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# Kubernetes Core Primitives

Pod

Replication Controllers

Service



# Core Primitive

Pod

```
apiVersion: v1
kind: Pod
metadata:      Unit of Work
  name: demo-pod
  labels:
    name: demo
spec:
  containers:
  - name: ubuntu
    image: ubuntu
    command:
    - "/bin/sh"
```

# Core Primitive

Pod

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apiVersion: v1
kind: Pod
metadata:
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Unit of Work

Collection of co-located containers



# Core Primitive

## Pod

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kind: Pod
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```

Unit of Work

Collection of co-located containers

Containers share the same lifecycle

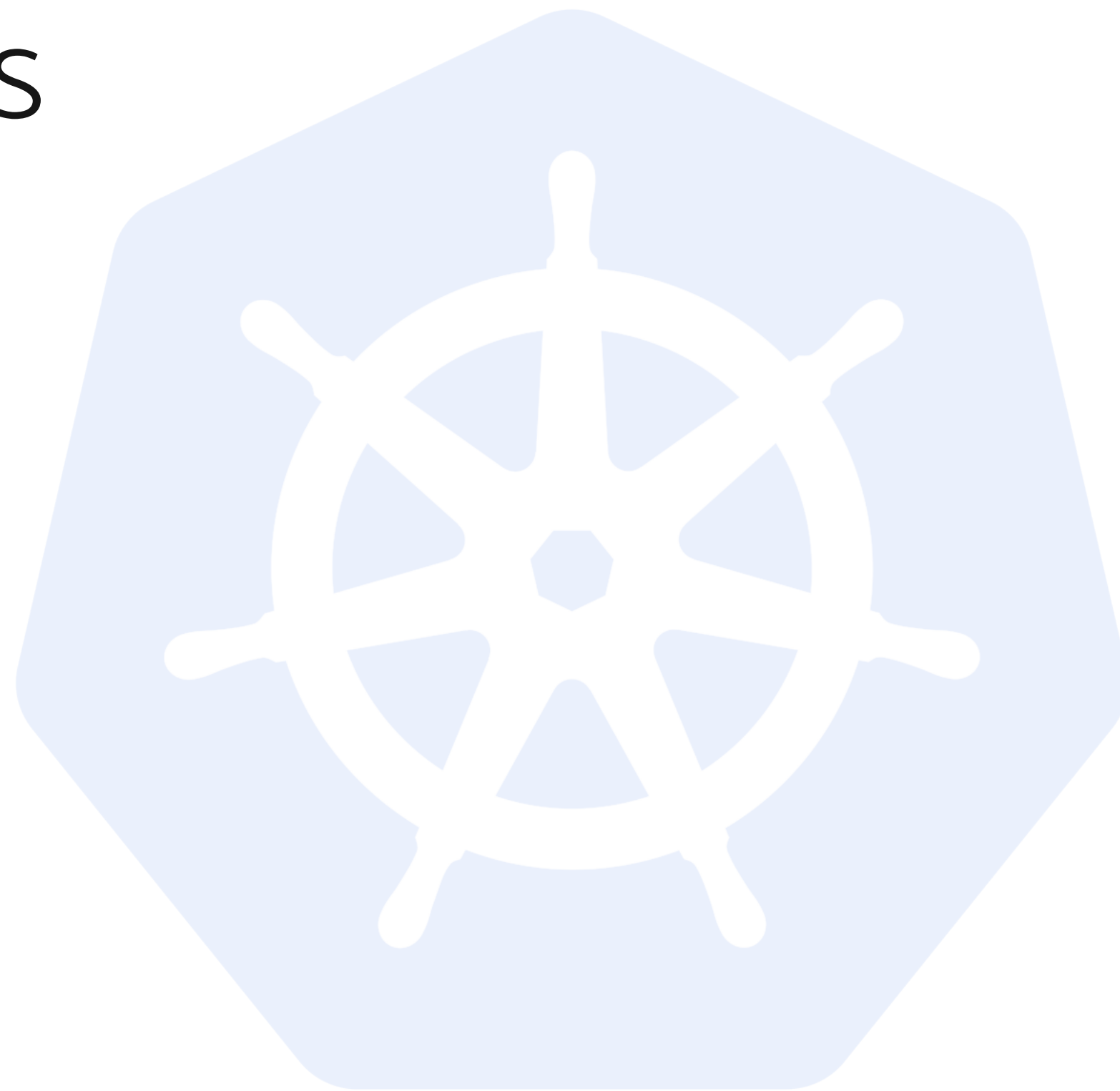
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# Kubernetes Core Primitives

Pod

Replication Controllers

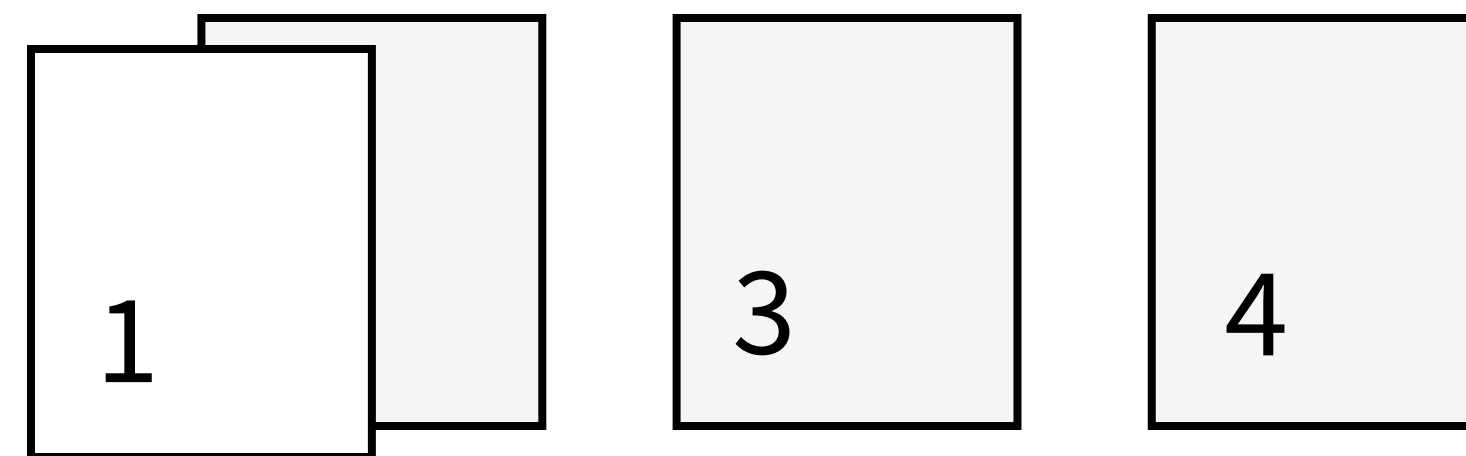
Service



# Core Primitive

Replication Controllers

Replicates instances of Pods



# Core Primitive

Patterns of Replication

Deployment

DaemonSet

StatefulSet

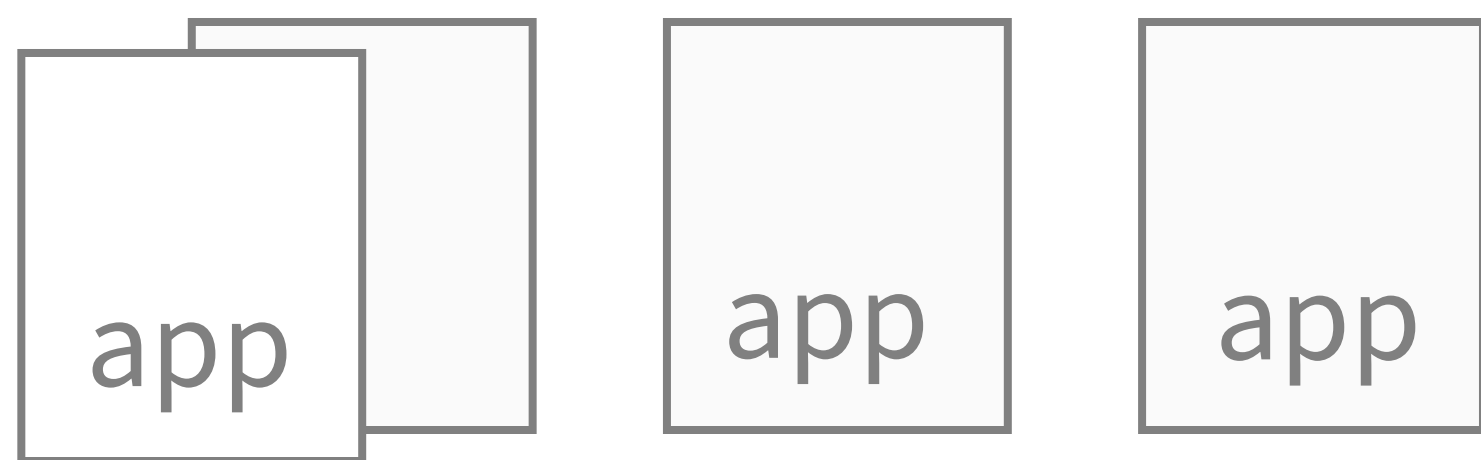
Job

...

# Core Primitive

## Deployment

Ensures ***n*** replicas of a Pod is always present

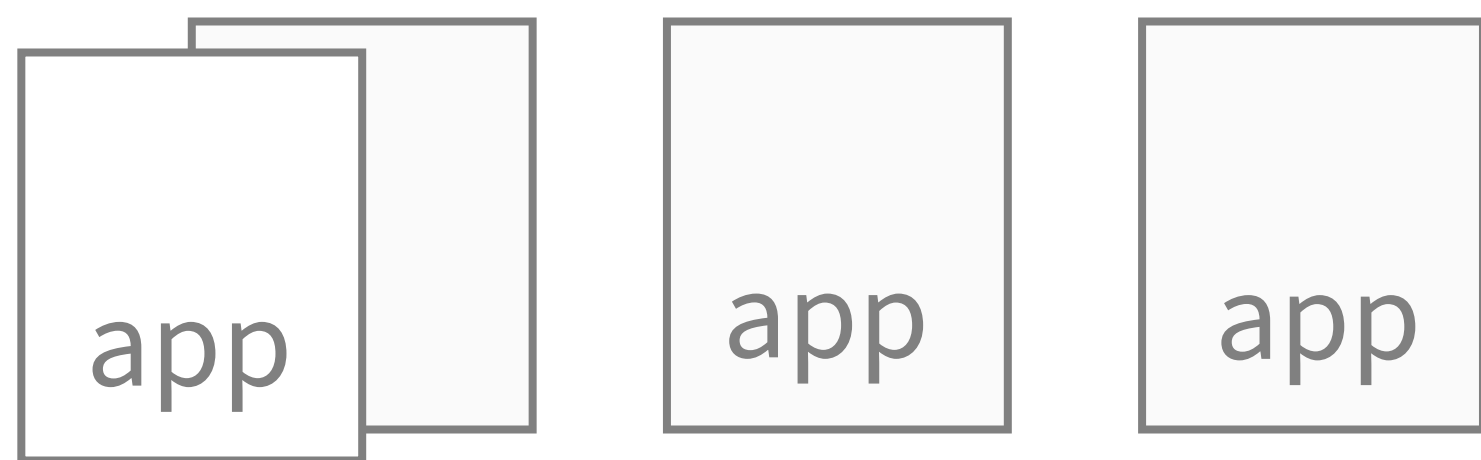


# Core Primitive

## Deployment

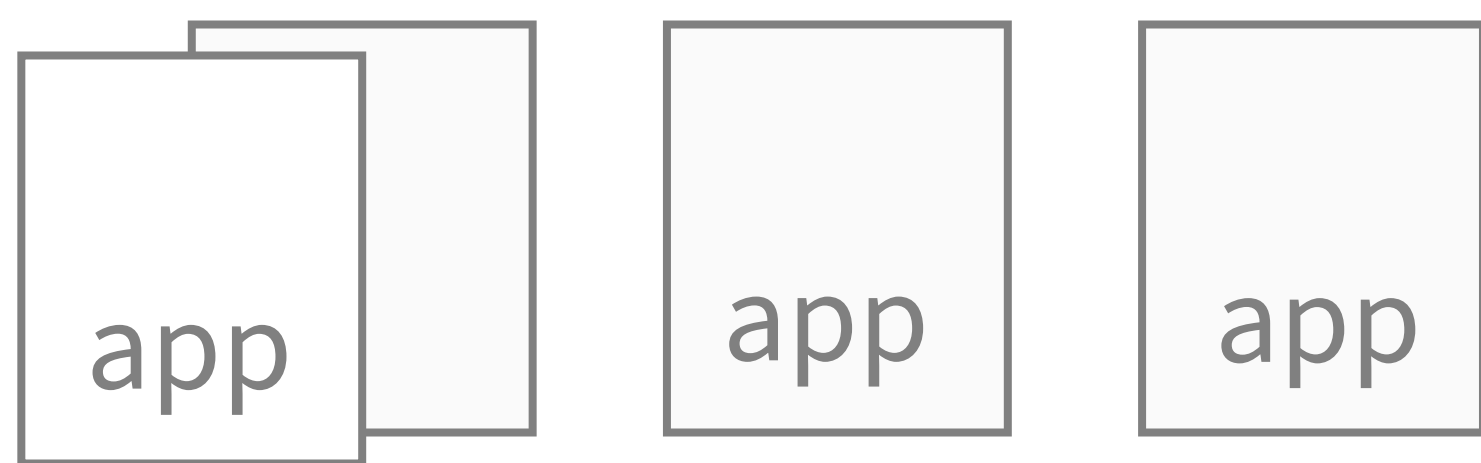
Ensures ***n*** replicas of a Pod is always present

Each replica of a pod does not have its own unique identity



# Core Primitive

## Deployment



Ensures ***n*** replicas of a Pod is always present

Each replica of a pod does not have its own unique identity

Stateless Applications

# Core Primitive

Patterns of Replication

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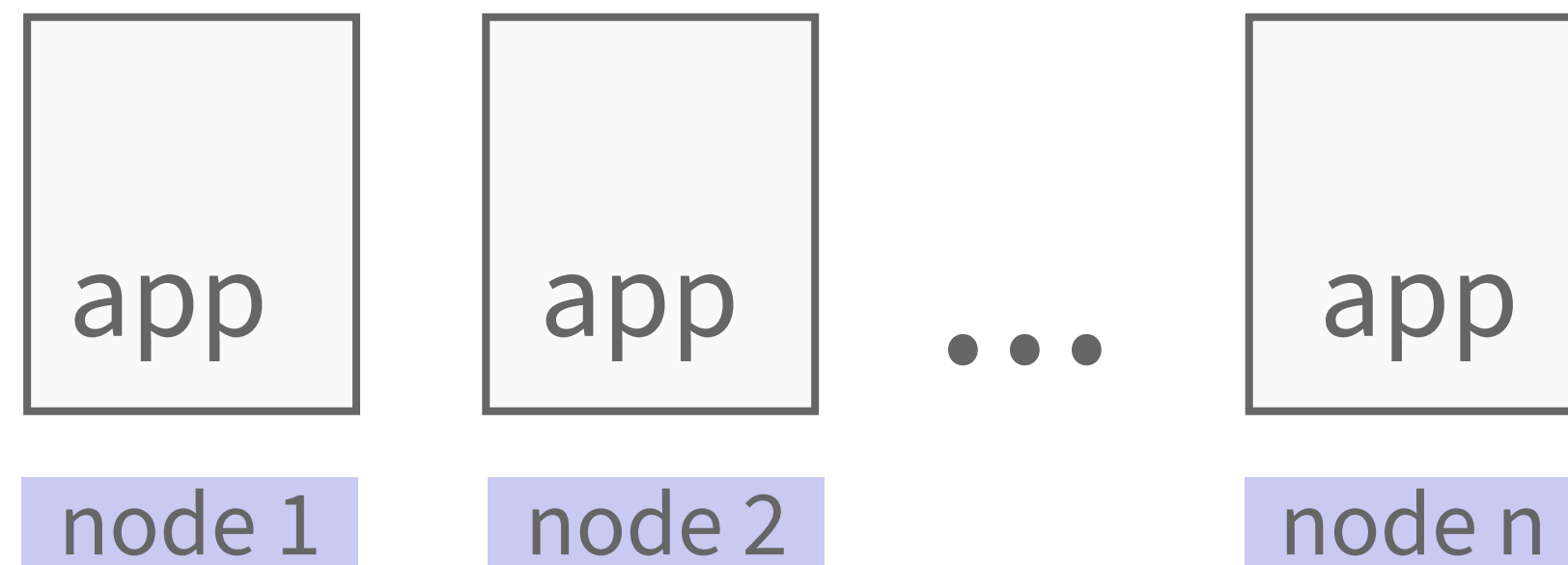
...



# Core Primitive

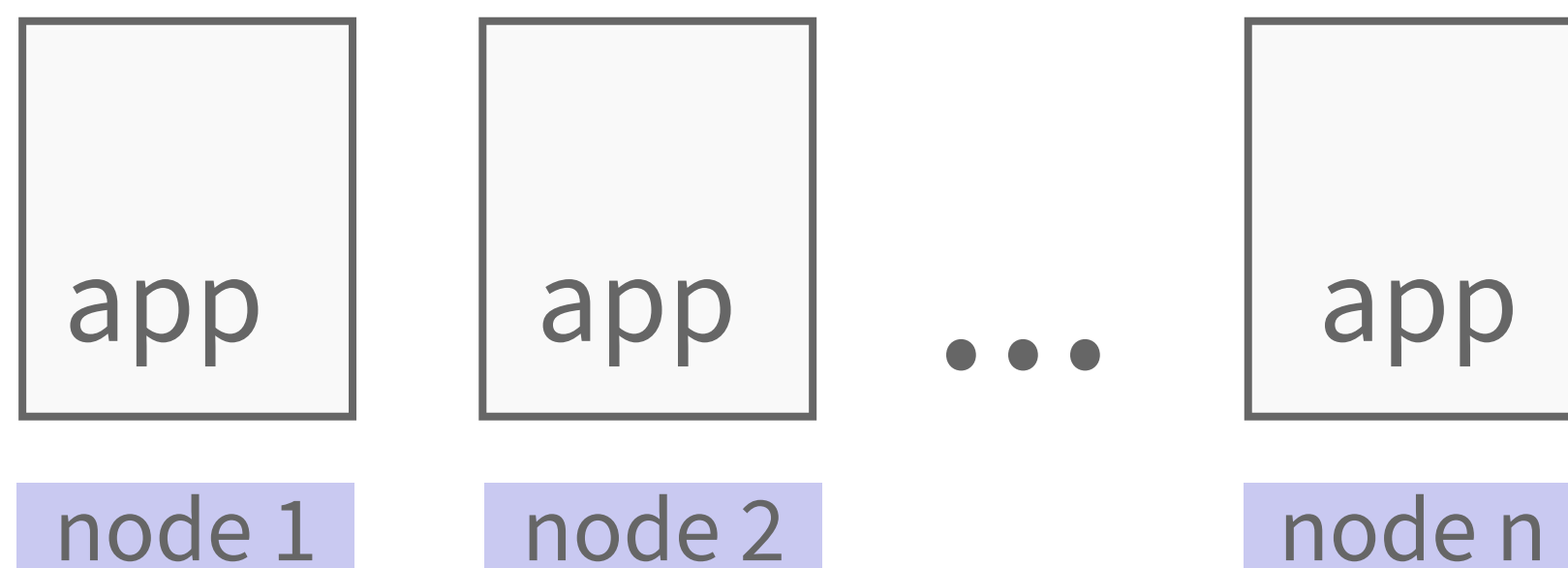
## DaemonSet

Ensures 1 instance of a Pod is always present on ***every node*** in the cluster



# Core Primitive

## DaemonSet



Ensures 1 instance of a Pod is always present on ***every node*** in the cluster

Useful for system/infra applications:

- LoadBalancers
- CSI Drivers
- Log Aggregators

# Core Primitive

Patterns of Replication

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StatefulSet

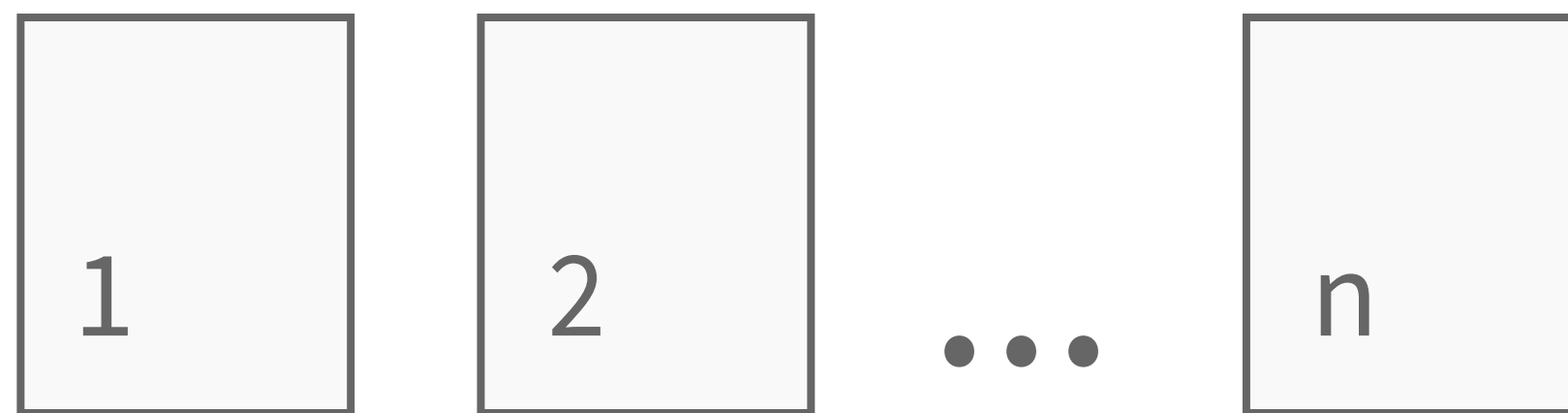
Job

...

# Core Primitive

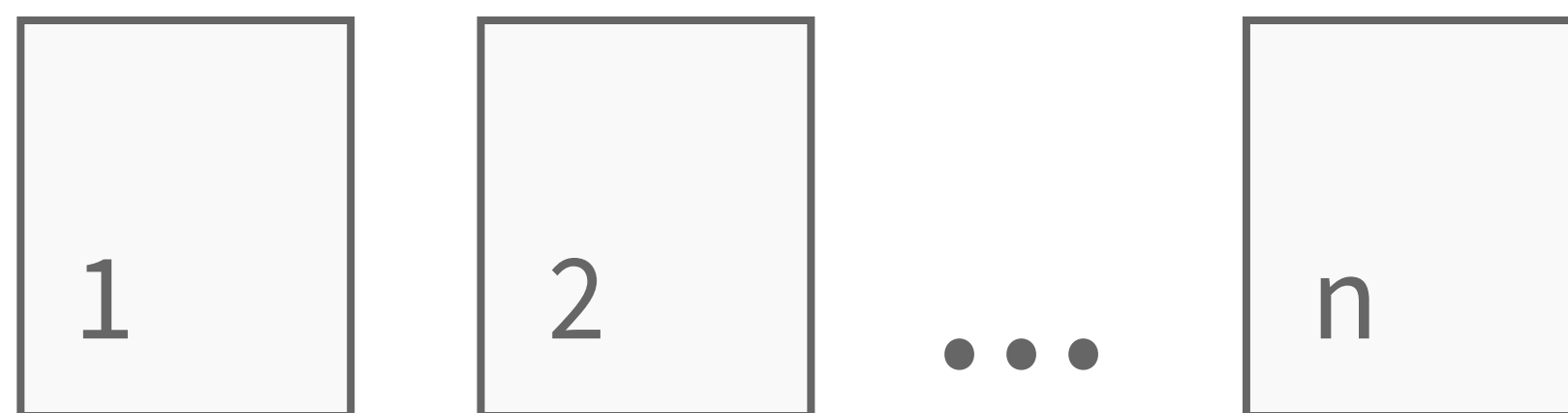
StatefulSet

Ensures ***n*** replicas of a Pod is always present



# Core Primitive

## StatefulSet



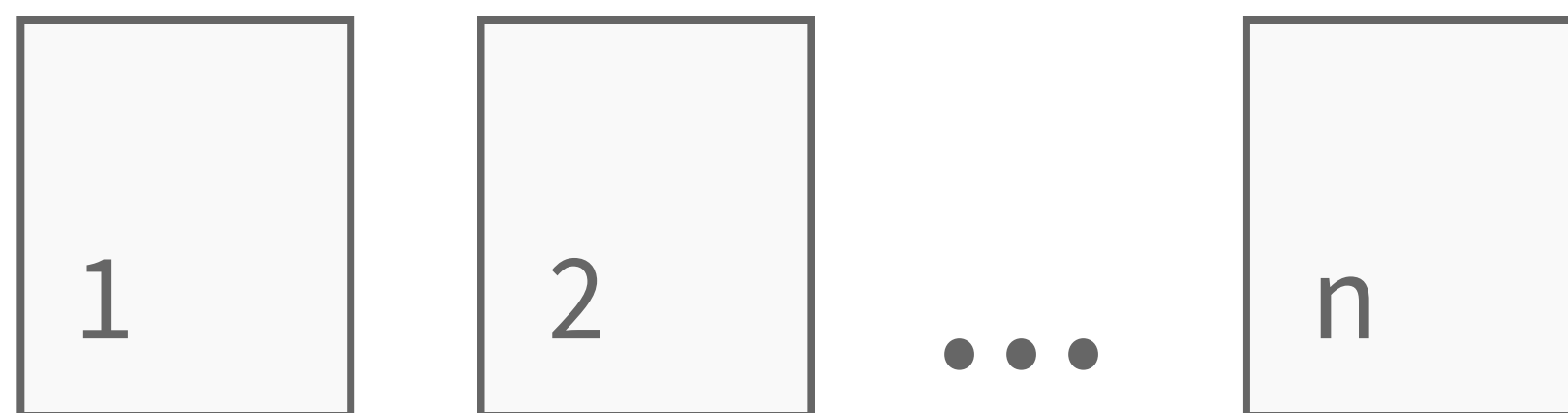
Ensures ***n*** replicas of a Pod is always present

Each replica has its own unique identity

- DNS address
- Persistent Volume

# Core Primitive

## StatefulSet



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Stateful Applications

# Core Primitive

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StatefulSet

Job

...

# Core Primitive

Runs a pod to completion

Job





# Core Primitive

Job

Runs a pod to completion

Repetitive tasks can be run periodically



# Core Primitive

Job



Runs a pod to completion

Repetitive tasks can be run periodically

Useful for periodic maintenance tasks:

- Data Backup
- Unused container image cleanup

# Core Primitive

Patterns of Replication

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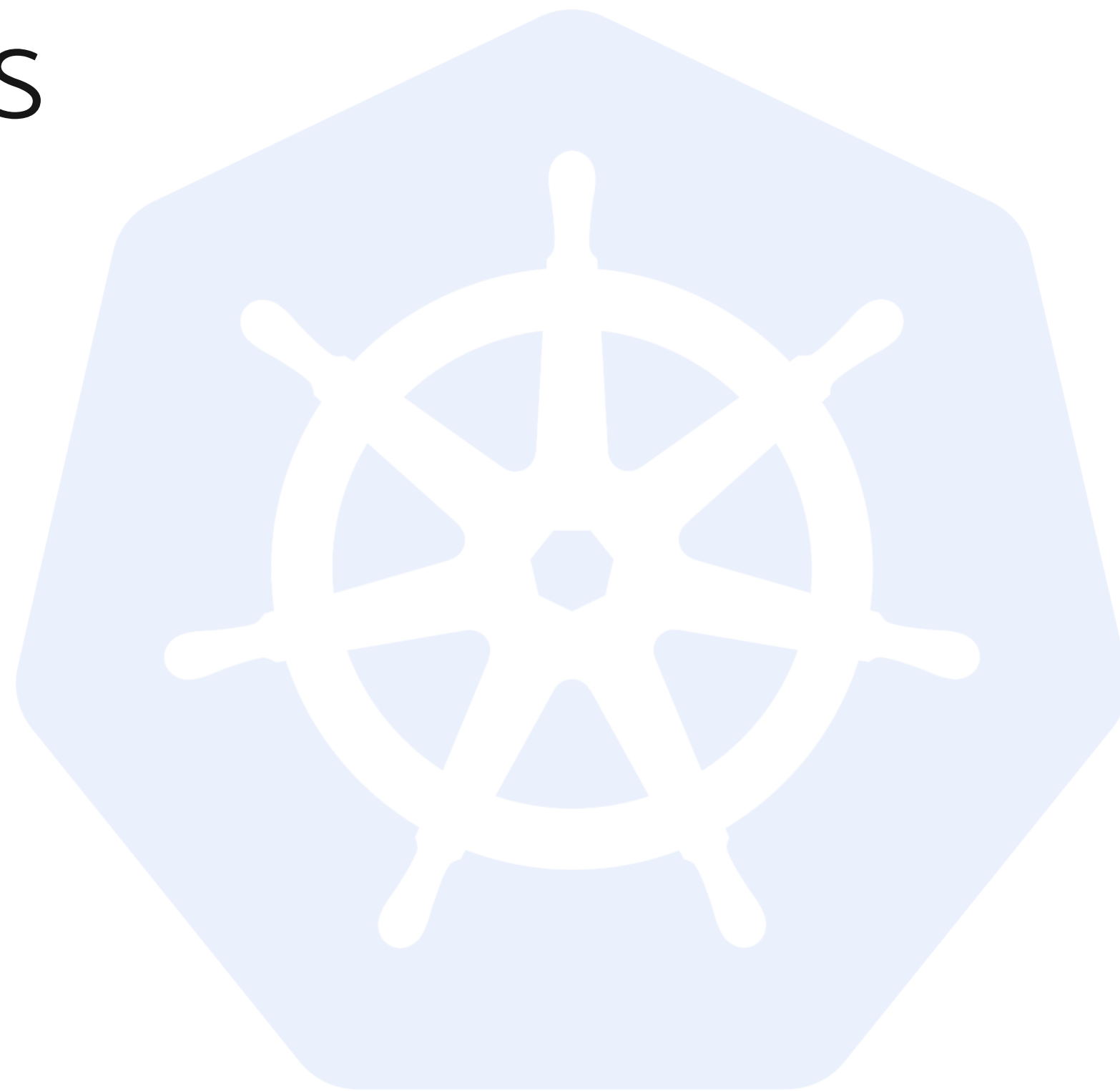
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# Core Primitive

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Routes traffic to pods in a set of replicas

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Routes traffic to pods in a set of replicas

Single DNS address

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Routes traffic to pods in a set of replicas

Single DNS address

Purely a network construct

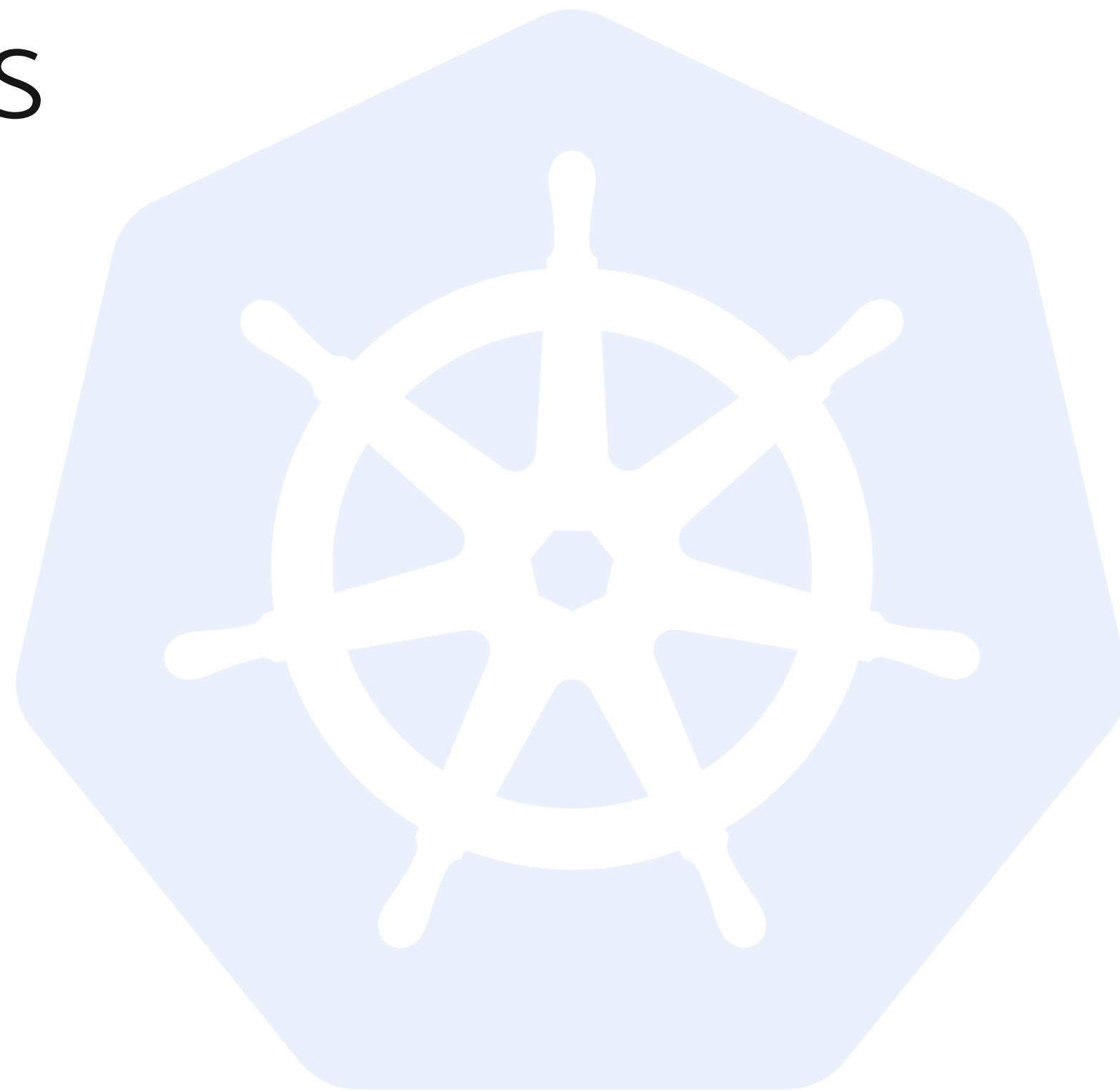
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# Kubernetes Core Primitives

Pod

Replication Controllers

Service





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# Thank you!

[github.com/wlan0/k8s-intro](https://github.com/wlan0/k8s-intro)



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# Kubernetes Core Philosophy

Declarative API

Pull based architecture

Closed circuit control loops