Kubernetes for Developers
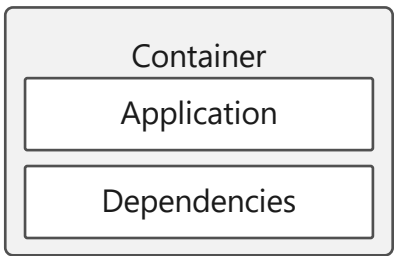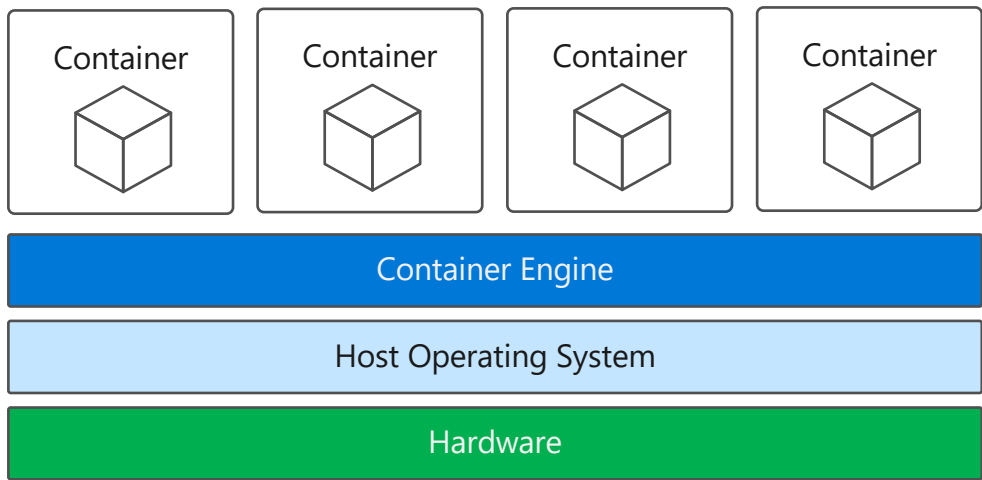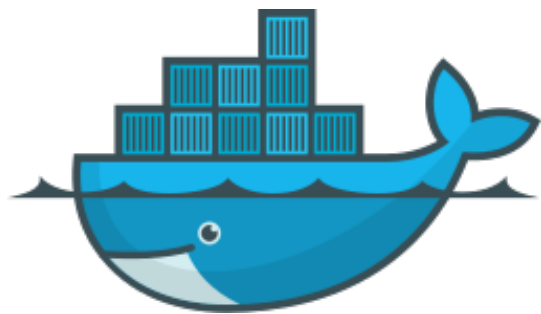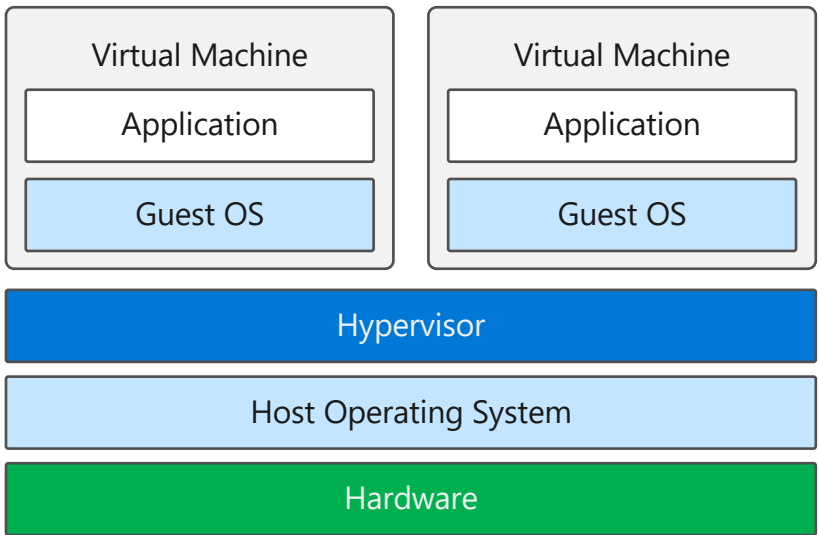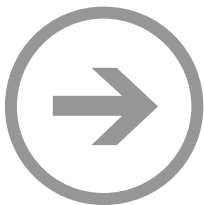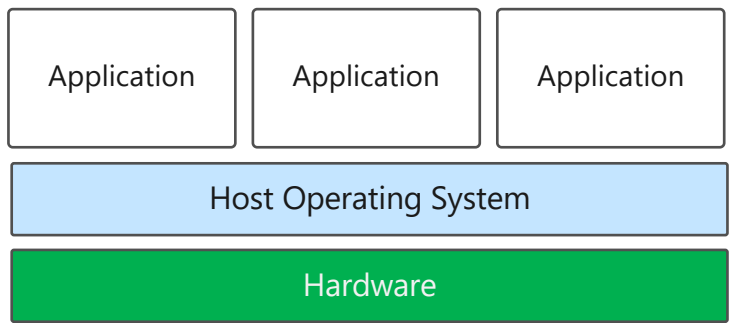
Hossam Barakat

Lead Consultant at Telstra Purple

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Agenda

- What is Kubernetes?
- Why Kubernetes?
- Kubernetes Architecture
- Deploy Web App with DB on Kubernetes

Containers

Application Application Application

Host Operating System

Hardware

→

Virtual Machine
Application
Guest OS

Virtual Machine
Application
Guest OS

Hypervisor

Host Operating System

Hardware

Container Container Container Container

Container Engine

Host Operating System

Hardware

Container
Application
Dependencies

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The application is deployed to production

Then the application went viral

Containers bring scalability challenges!

Container orchestration platforms to rescue
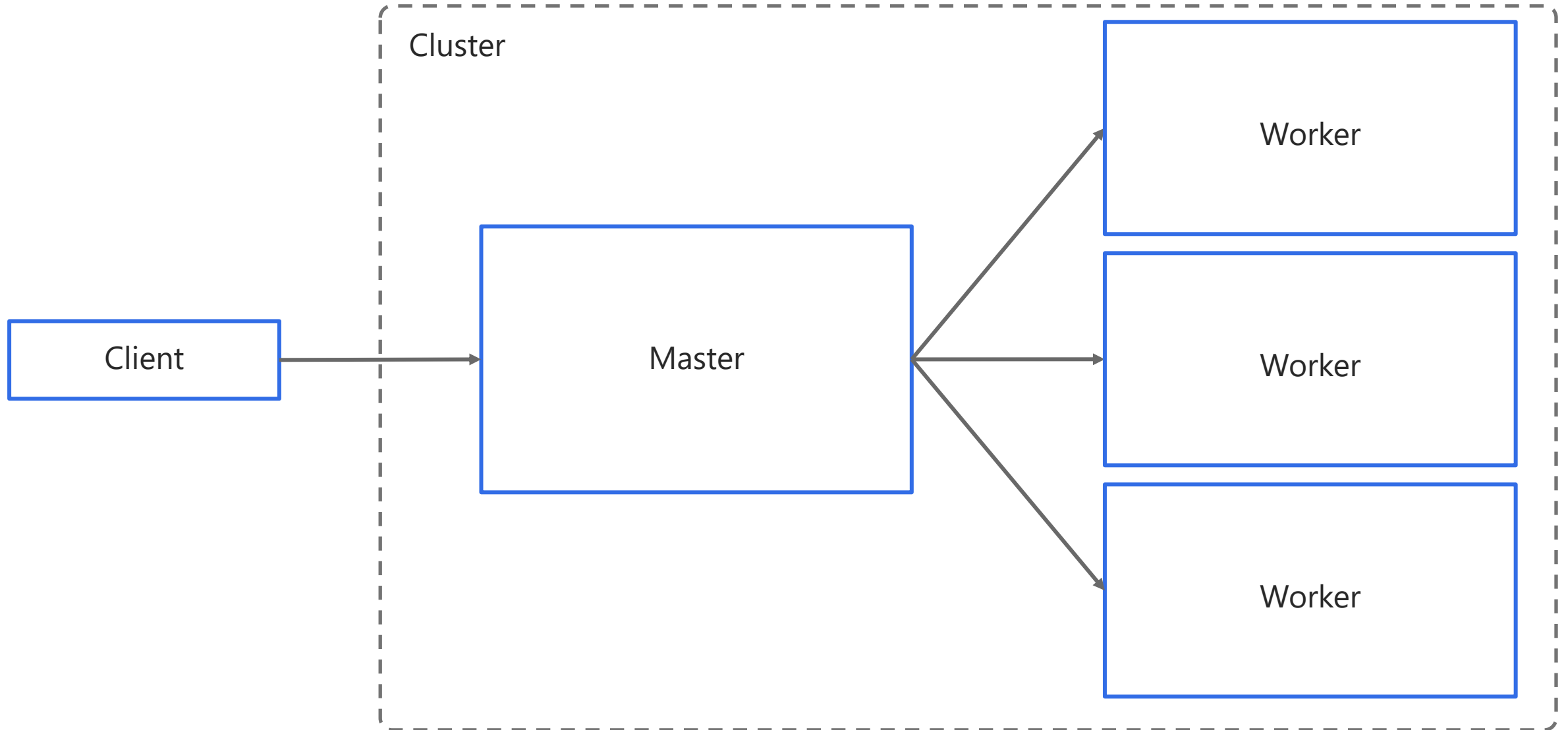
Container Orchestration

- Service discovery
- Scaling
- Health monitoring
- Failover
- Networking
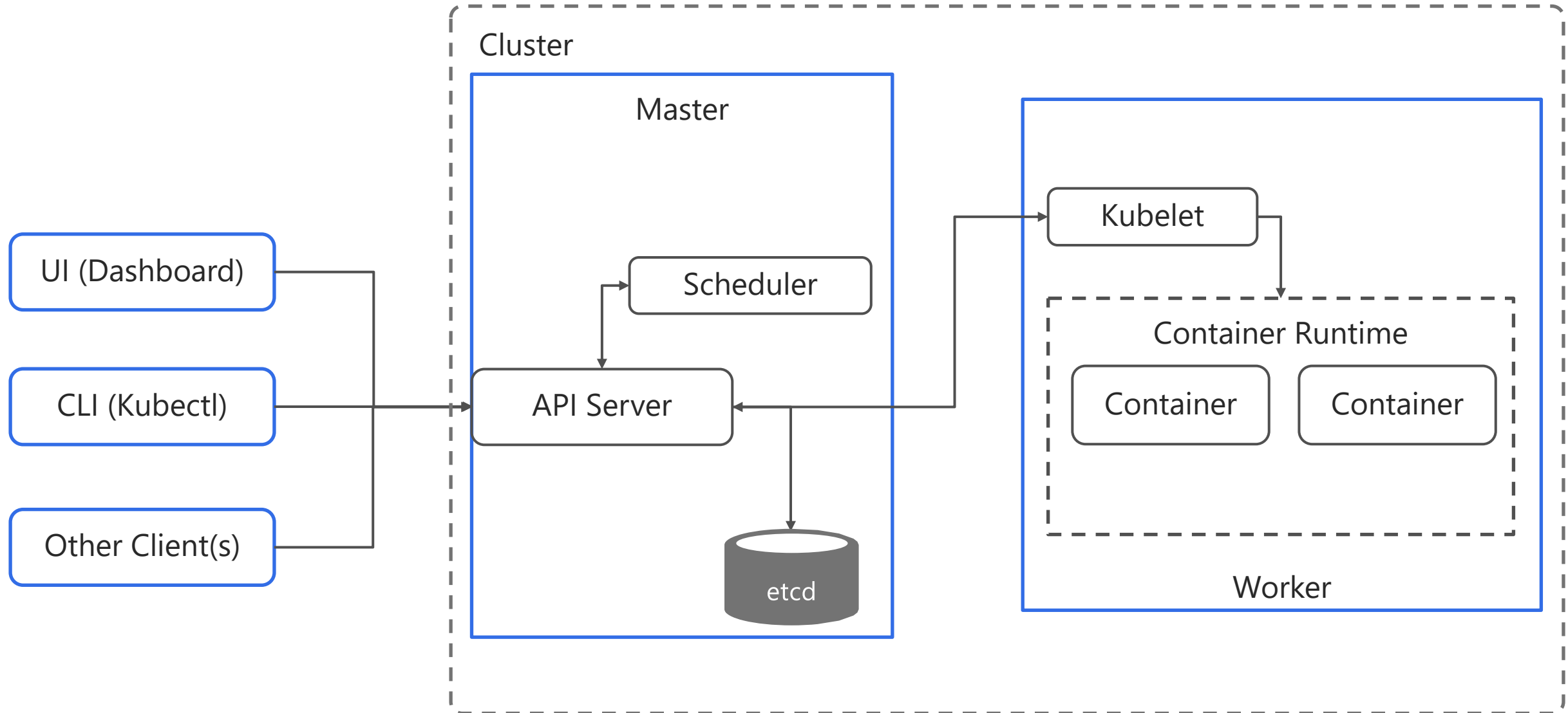- Scheduling
- Coordinated app upgrades

Kubernetes

Kubernetes is an open-source system for automating deployment, scaling, and management of containerized applications.
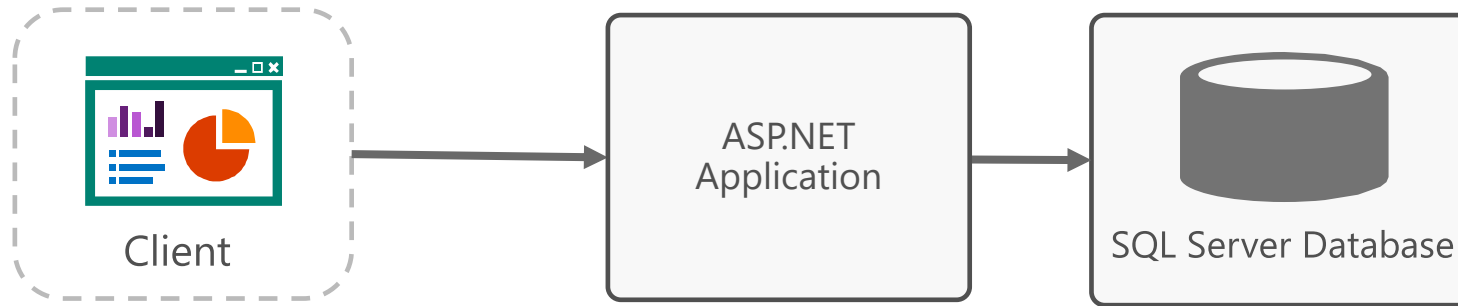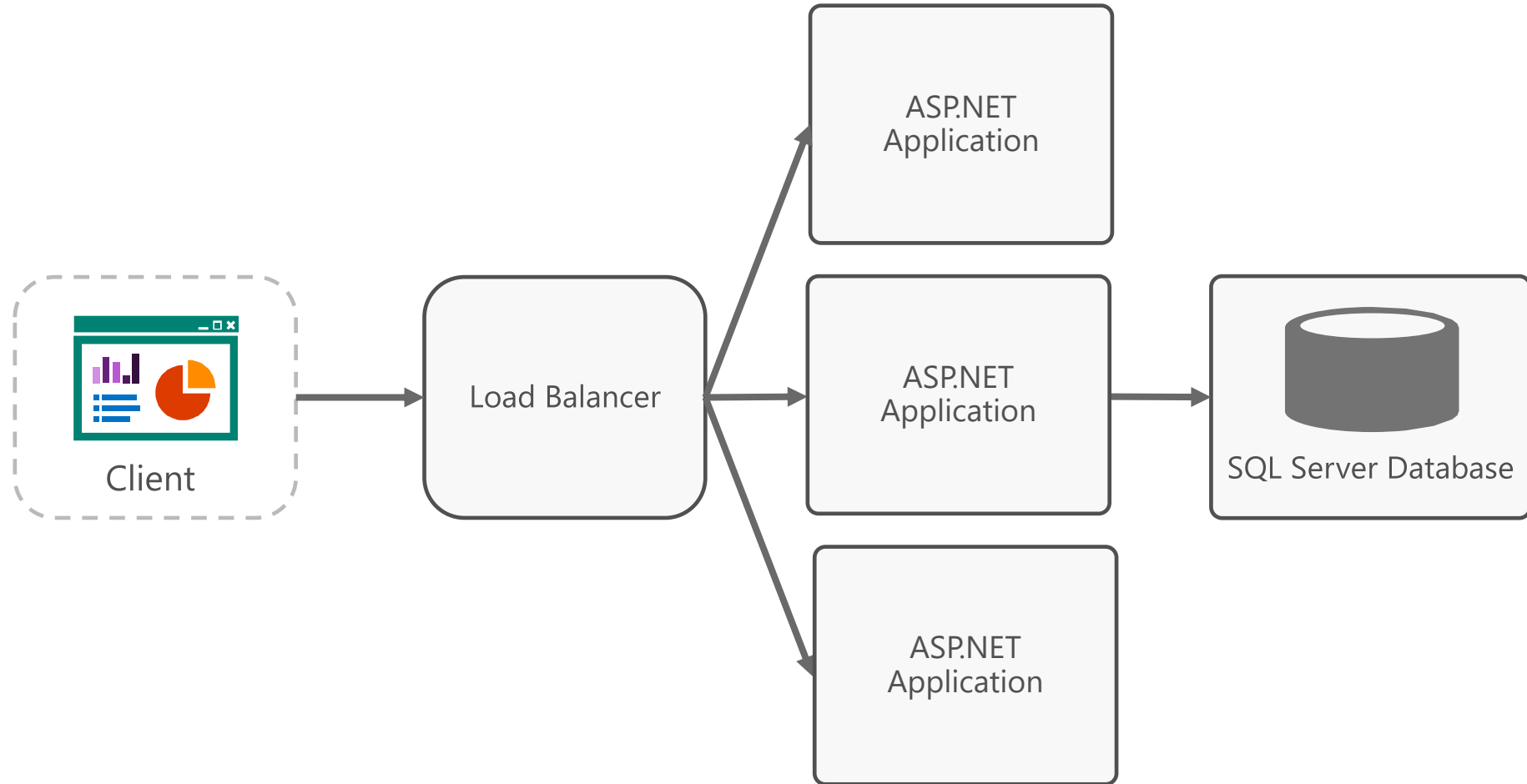
Kubernetes Architecture

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Kubernetes Architecture

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ASP.NET App On Kubernetes

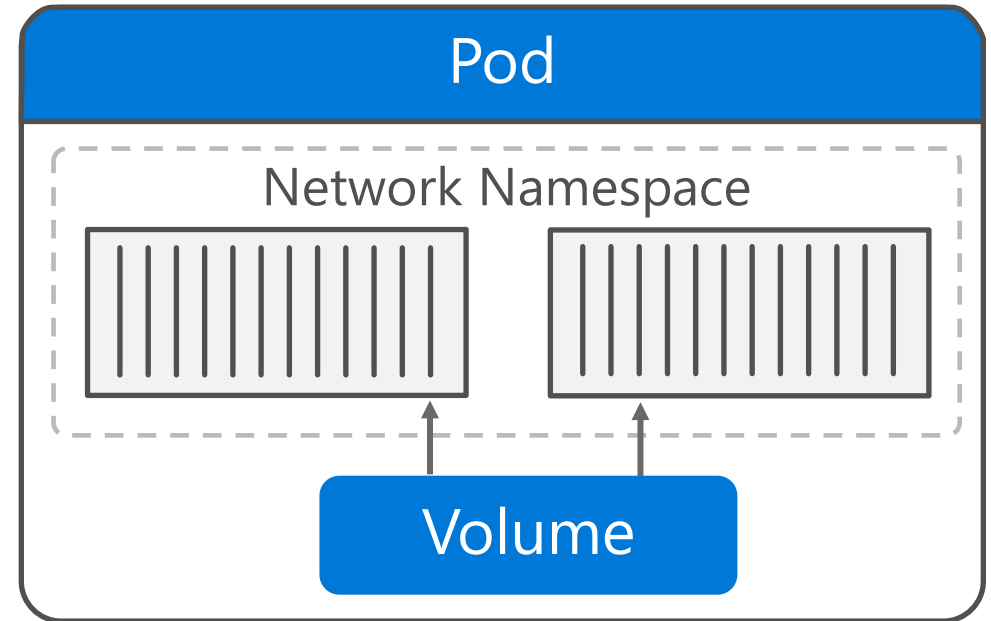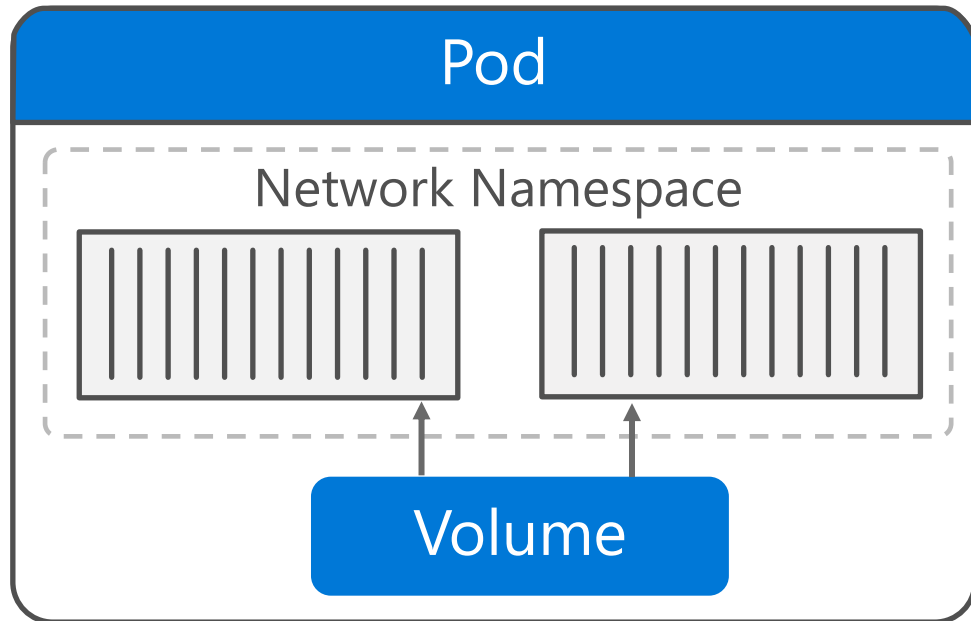# ASP.NET App On Kubernetes

Pods

Pods

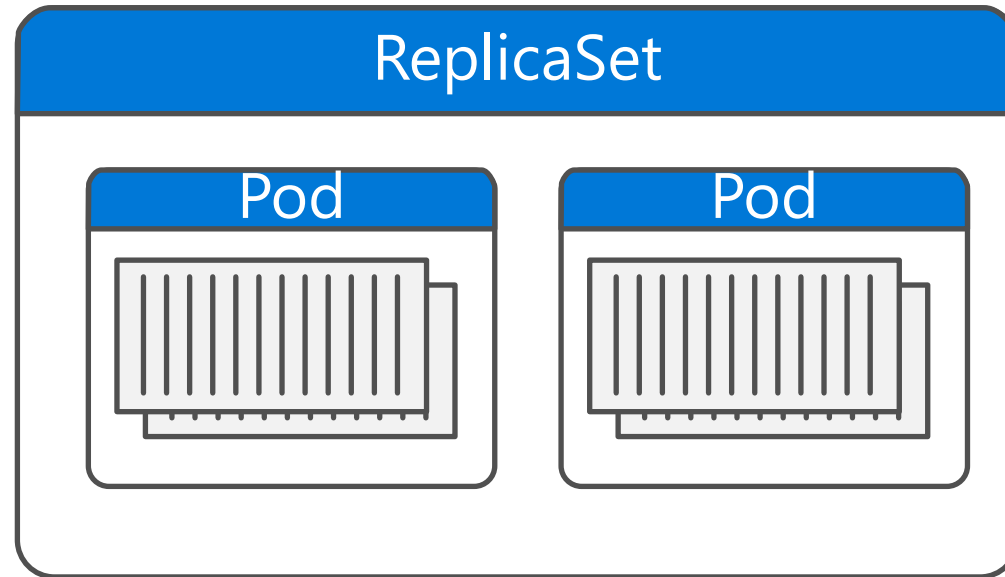# Pods Scaling

Pod
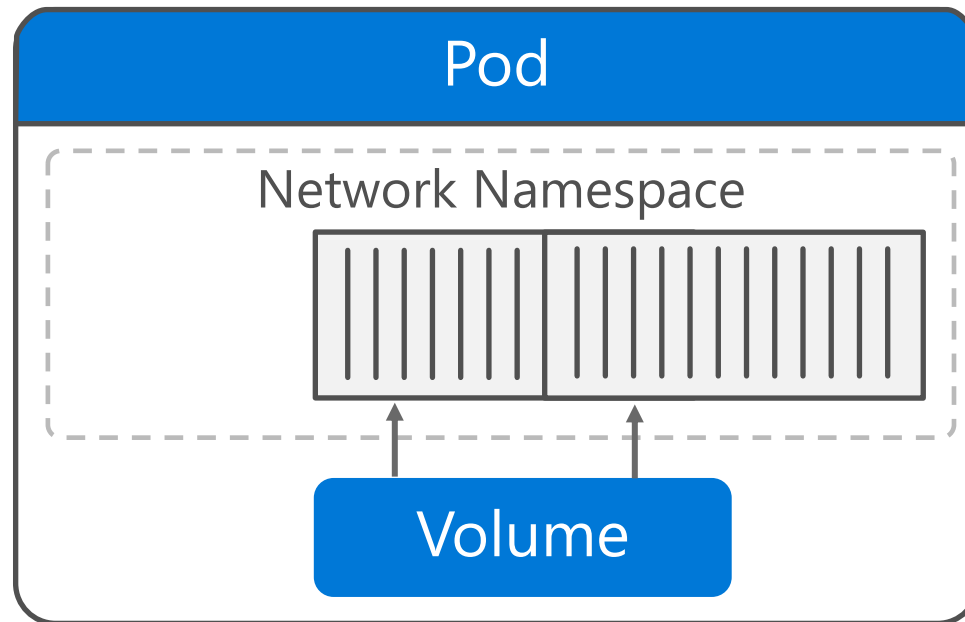
```yaml
kind: Pod
apiVersion: v1
metadata:
  name: tasks-app
spec:
  containers:
  - name: tasks-app
    image: hossambarakat/tasklist
    ports:
      - containerPort: 80
```

```
$ Kubectl apply -f pod.yaml
```

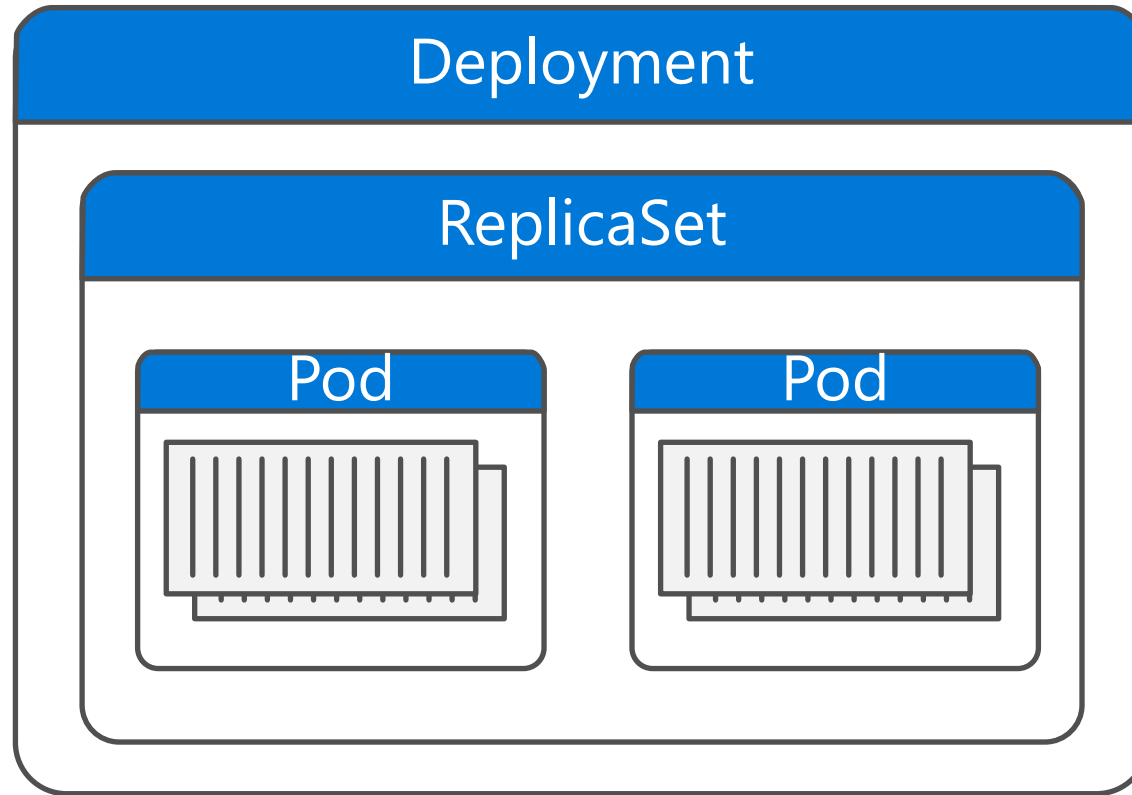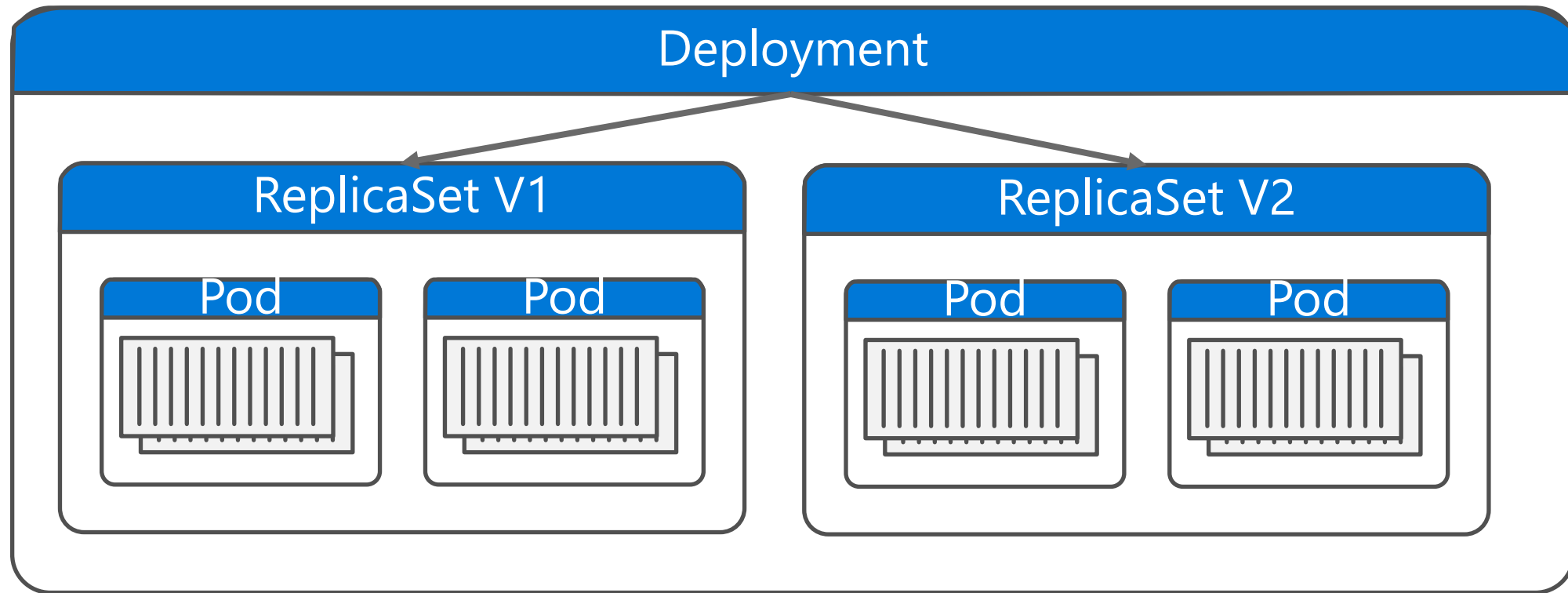But wait... what happens if the pod dies?

ReplicaSets

Demo

ReplicaSet

Deployment

Deployment Rollout

Demo

Deploy Deployment

Connecting to Pods

Service

Pod A
10.0.0.1

Service
IP: 10.0.0.30
DNS: myservice

Pod B
10.0.0.2

Pod C
10.0.0.3
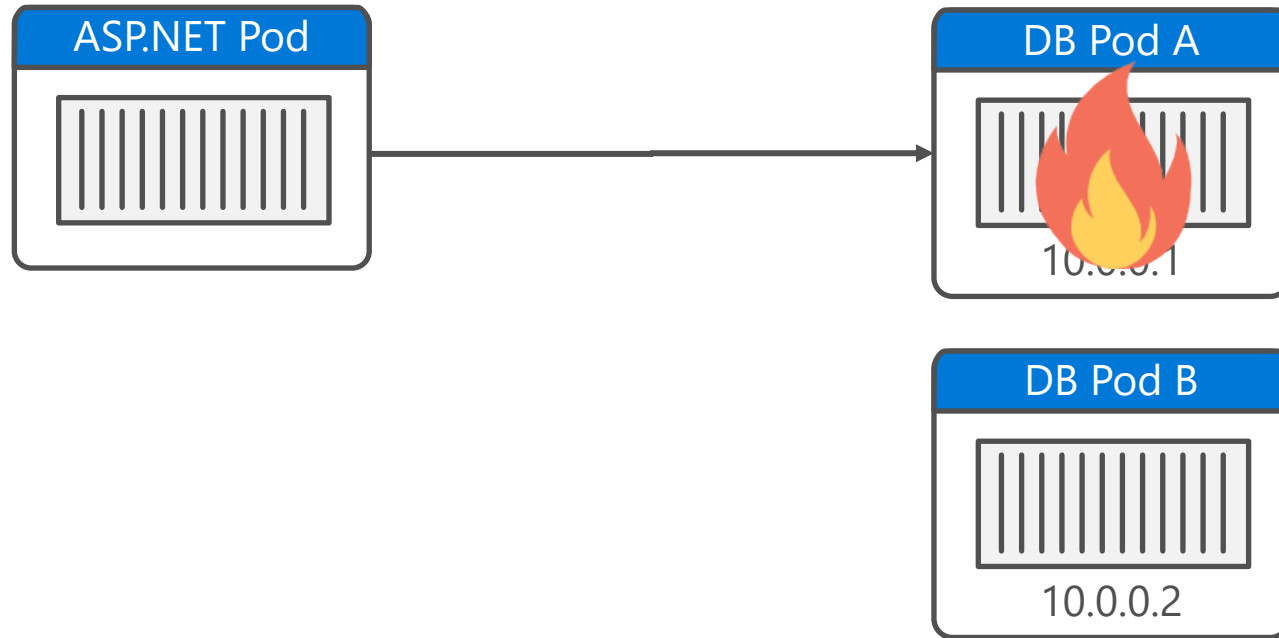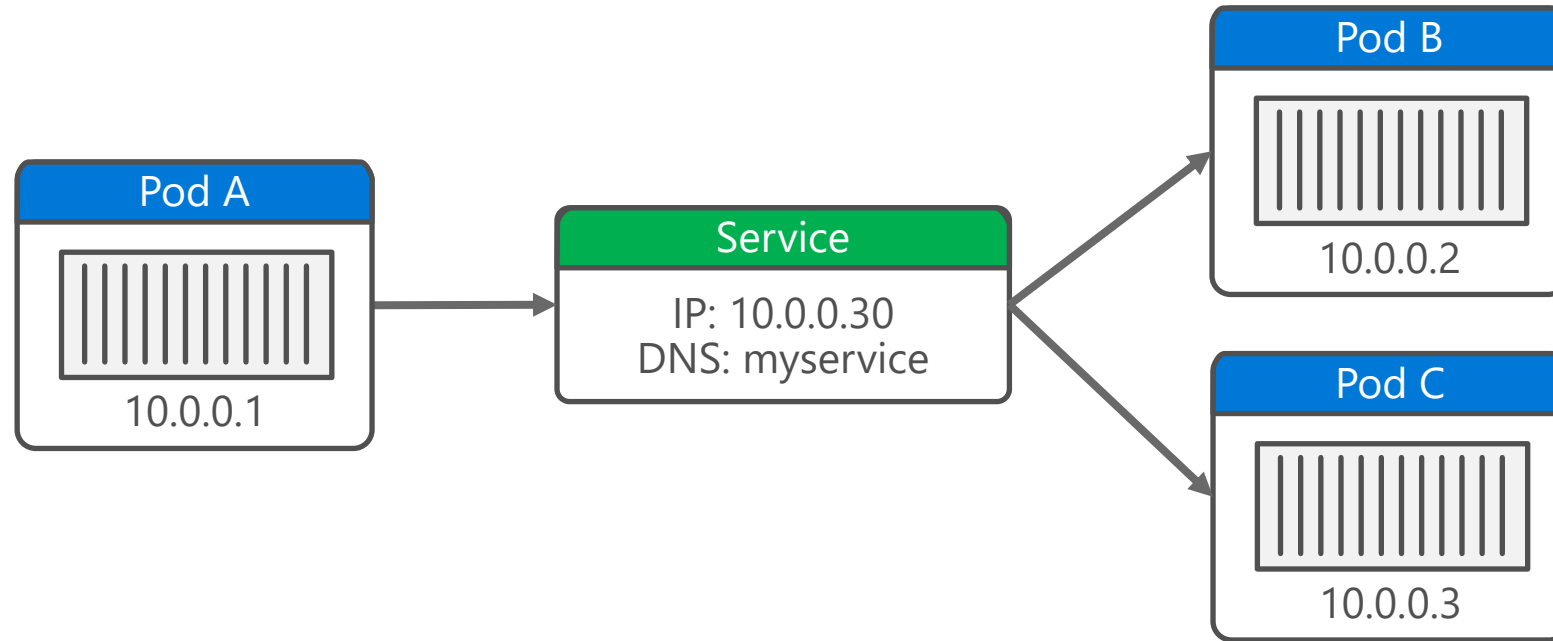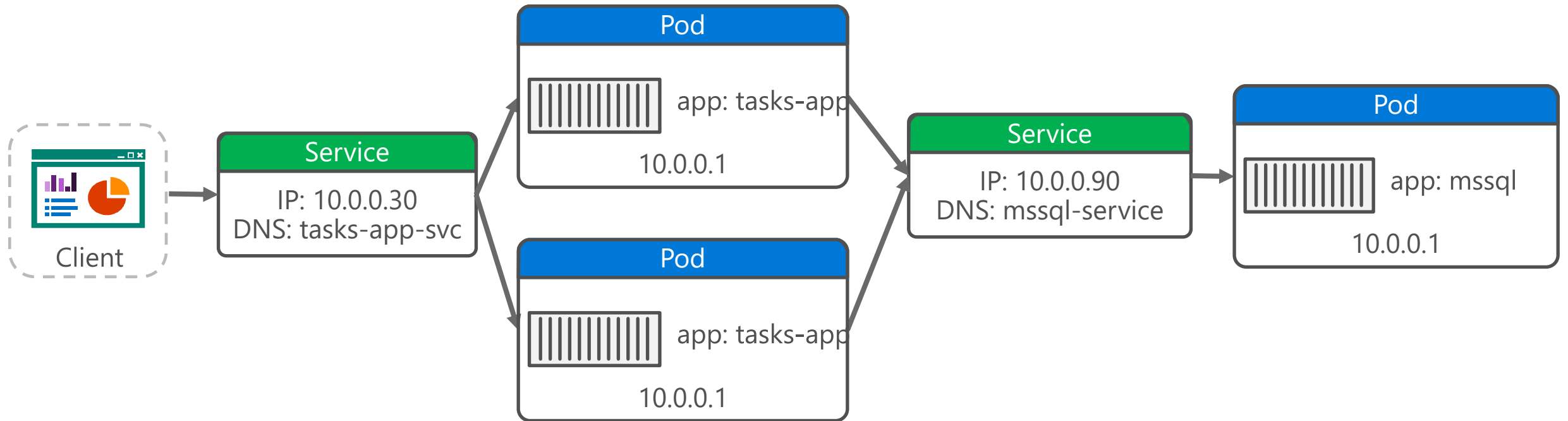
Service

Demo

Services

Kubernetes in the cloud

Azure AKS

```
$ az aks create -g myResourceGroup -n myCluster --generate-ssh-keys
```

AKS Cluster Autoscaler

- Scale agent nodes based on pending pods and nodes utilization

- Scans the cluster periodically to check for pending pods or empty nodes and increases the size if possible

Summary

- Kubernetes Architecture
- Deploy application using different workloads
- Kubernetes in the cloud

Resources

- https://github.com/hossambarakat/TaskList
- Introduction to Kubernetes (edX)
- Learn Kubernetes using Interactive Hands-on Scenarios (Katacoda)
- https://kubernetes.io/docs/

Questions?

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