Recitation 8

Kubernetes

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What are containers? Why do we need them ?

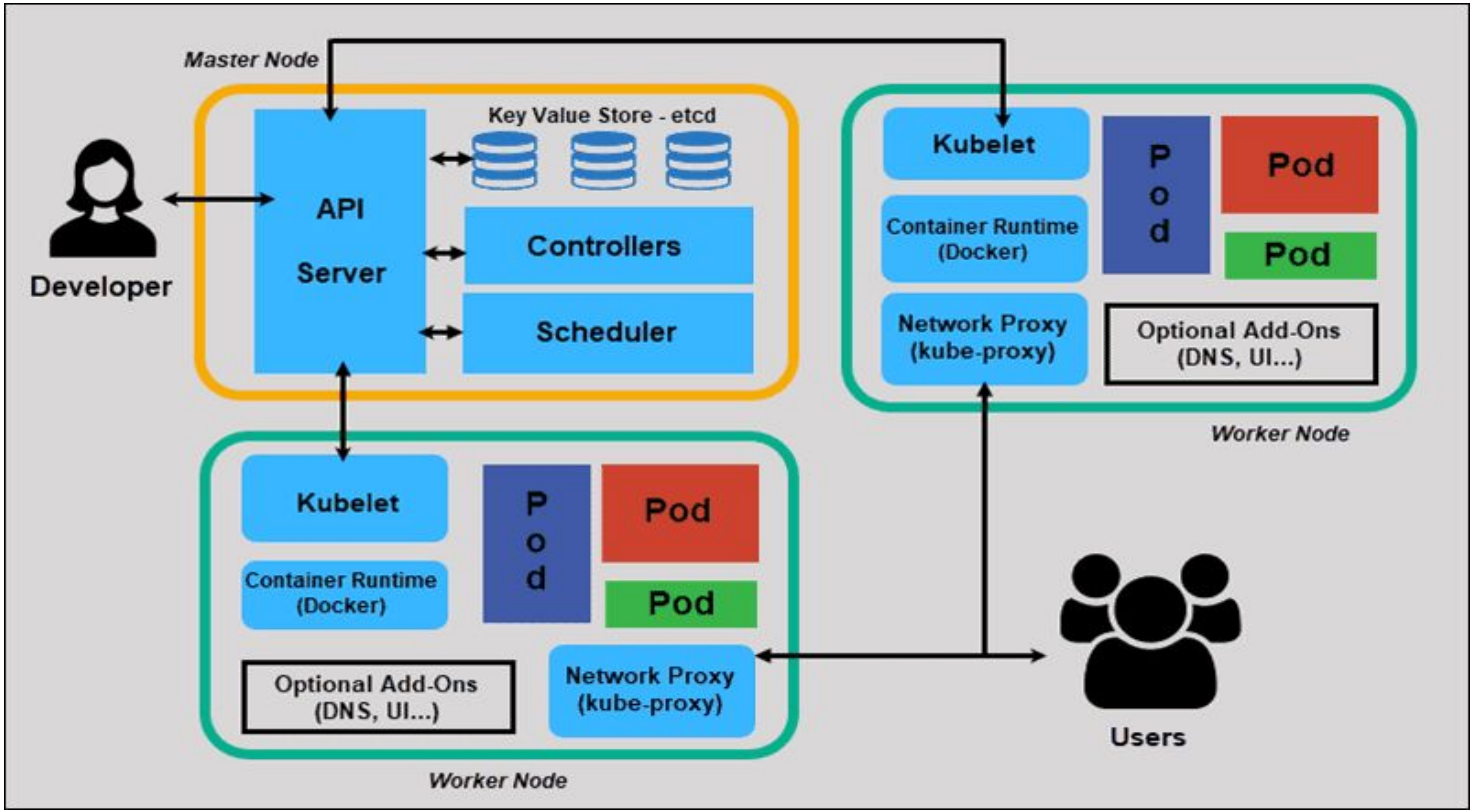
- Application and process delivery mechanism
- Stateless with all included dependencies
- Fast start, can bundle a lot of dependencies, and portable

Why do we need a solution to manage them ?

- Manage state / health / lifecycle
- Manage networking, discoverability, etc.
- Manage sensitive data
- Scale!

Kubernetes

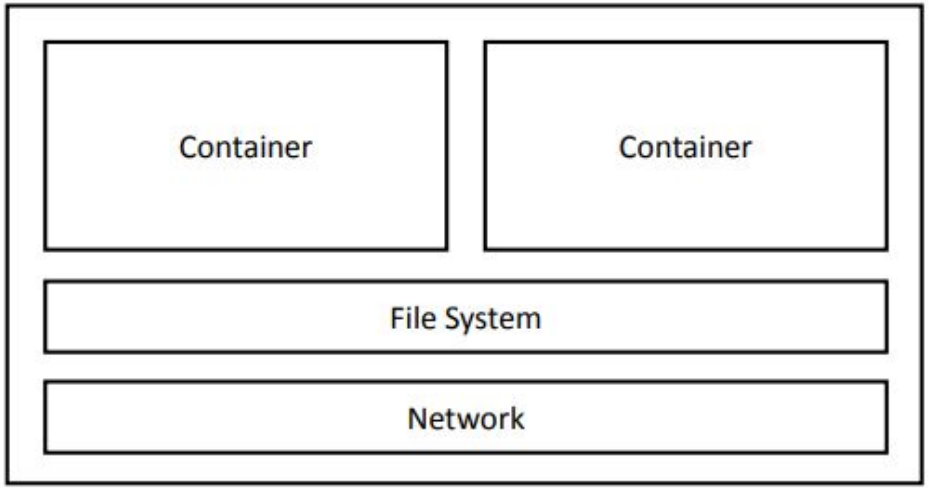
- ***OSS platform for managing containerized solution with a declarative configuration***



Concepts - Pod

The primary primitive for running containerized workload.

- Single Unit of scheduling / resource envelope
- May contain one or more containers sharing network, volumes, etc.



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The primary primitive for running containerized workload.

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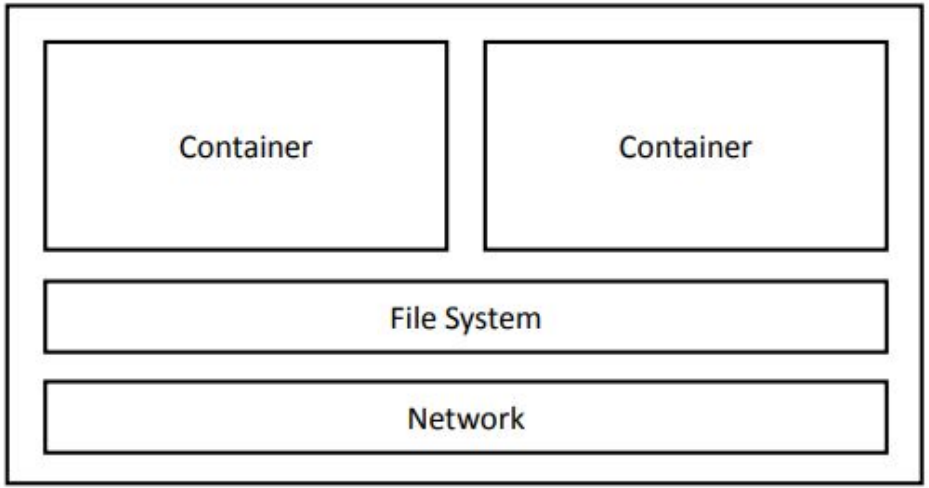
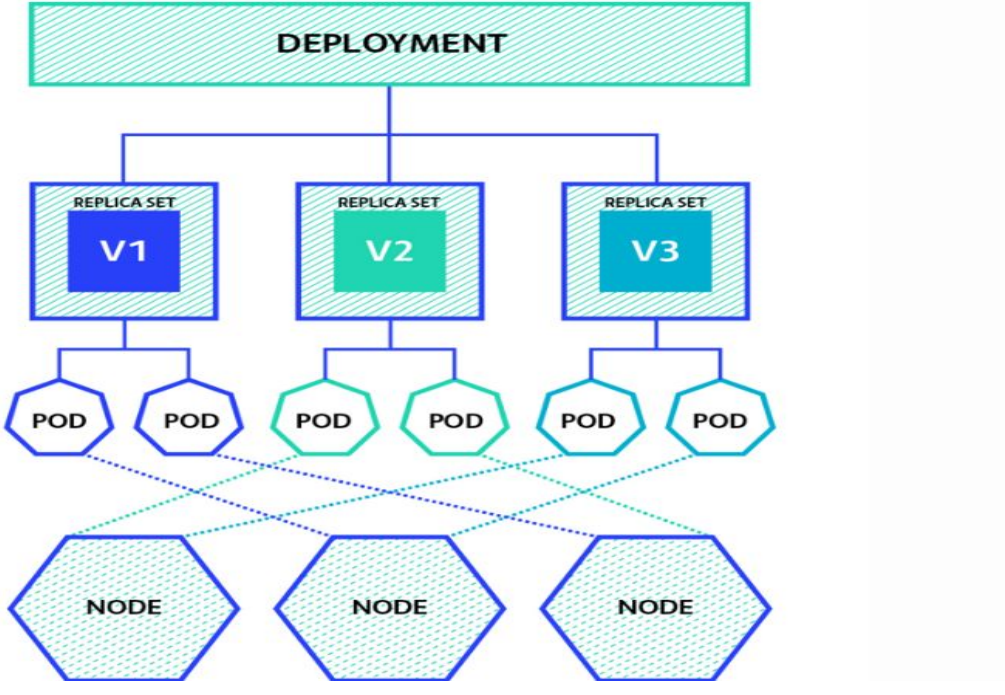
- **Ephemeral!**



Concepts - Deployments

Simply put, a pod scheduling abstraction

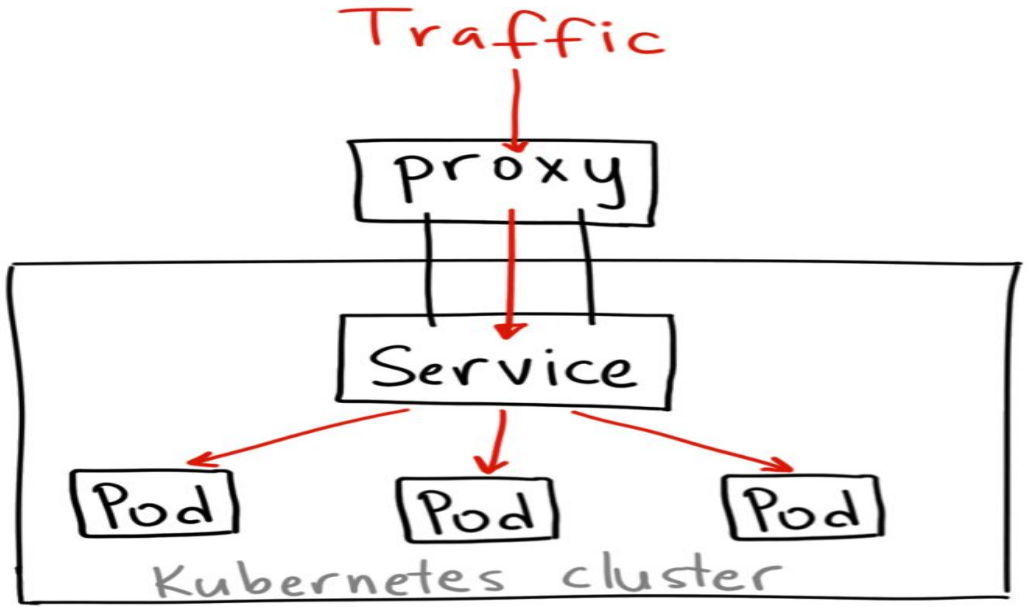
- Contains details about the Pod, Container, Image etc.
- Mainly, details the replica spec – which is how many instances of a pod



Concepts - Services

Kubernetes concept expressing pod networking endpoint (internal / external IP address).

- Service is associate with pod through label selector
- Types: ClusterIP, NodePort, LoadBalancer



Concepts - Manifest Files

- Kubernetes Manifest is a YAML file to declare desired state of Kubernetes object types.

```yaml
apiVersion: apps/v1beta1
kind: Deployment
metadata:
  name: azure-vote-front
spec:
  replicas: 1
  template:
    metadata:
      labels:
        app: azure-vote-front
    spec:
      containers:
      - name: azure-vote-front
        image: microsoft/azure-vote-front:redis-v1
        ports:
        - containerPort: 80
        env:
        - name: REDIS
          value: "azure-vote-back"
```

Demo - Minikube and simple webapp deployment

- Minikube is a tool that makes it easy to run Kubernetes locally. Minikube runs a single-node Kubernetes cluster inside a Virtual Machine (VM) on your laptop for users

- Ideal to run kubernetes when you just have access to one server.

- We will see how to
  - Spin up a minikube server
  - Configuring a simple application with a deployment and service
  - Kubectl commands to deploy and manage a simple application
  - 0 downtime deployments by maintain multiple replicas

Thanks!

References

1. Introduction to Kubernetes
2. Understanding Kubernetes Diagrams