9.1 Learning Objectives

By the end of this lesson, you will be able to:

- Describe the concepts of cloud computing
- Explain the importance of cloud in DevOps
- Explain the need for AWS in DevOps
- Demonstrate the use of Kubernetes

9.2 Overview of Cloud Computing

Cloud Computing

Cloud Computing Characteristics

Advantages of Cloud Computing

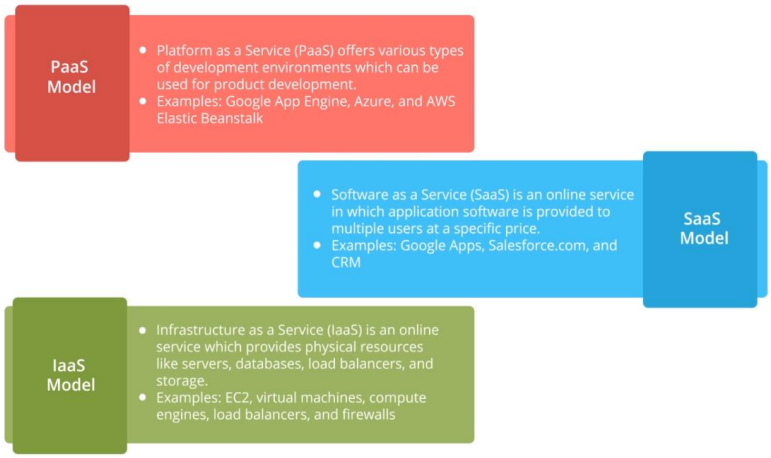
- Helps to manage infrastructure
- Provides updated applications and services
- Provides cost-effective measures
- Follows a pay-per-use model
- Stores applications and data on servers
- Helps users easily access the changes

Disadvantages of Cloud Computing

- Internet connection
- Security threats
- Issues when internet connection is slow
- No backup strategies
- Lacks in features
- Slow performance

9.3 Cloud Services and Models

Cloud Service Models

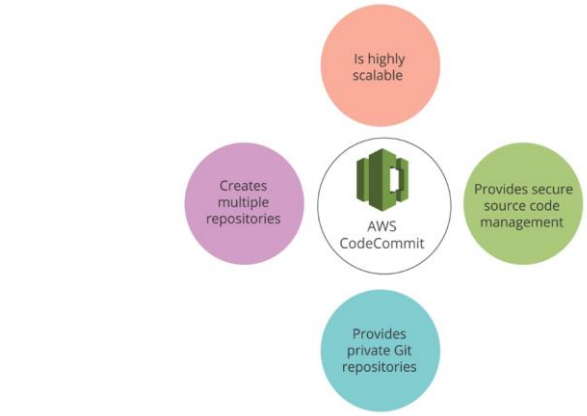


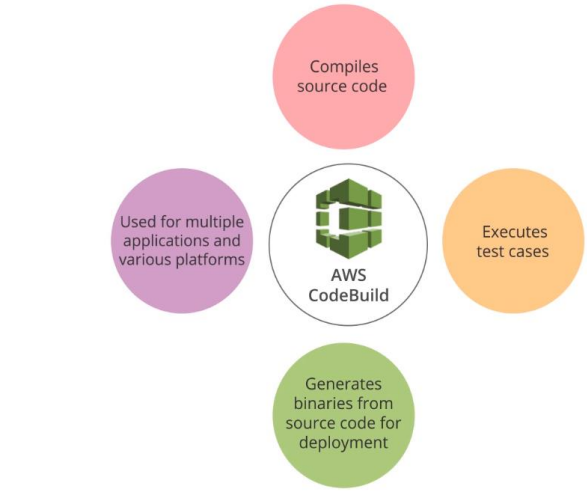
Cloud Models

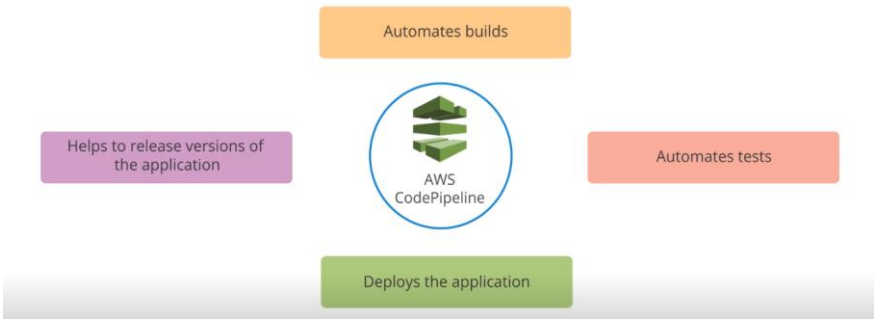
9.4 Using AWS in DevOps

CI/CD in AWS

CI/CD Services in AWS


Is highly scalable
Creates multiple repositories
AWS CodeCommit
Provides secure source code management
Provides private Git repositories

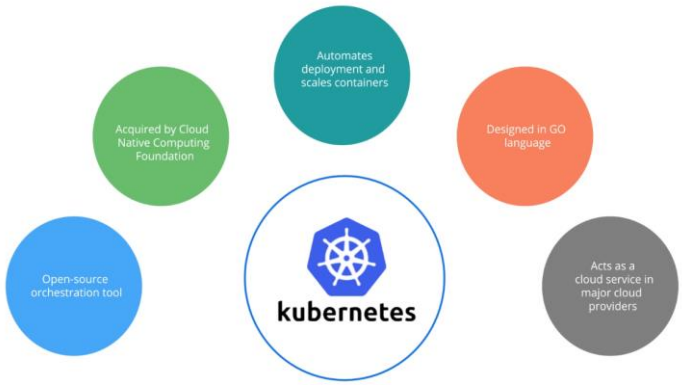

Compiles source code
Used for multiple applications and various platforms
AWS CodeBuild
Executes test cases
Generates binaries from source code for deployment


Automates builds
Helps to release versions of the application
AWS CodePipeline
Automates tests
Deploys the application

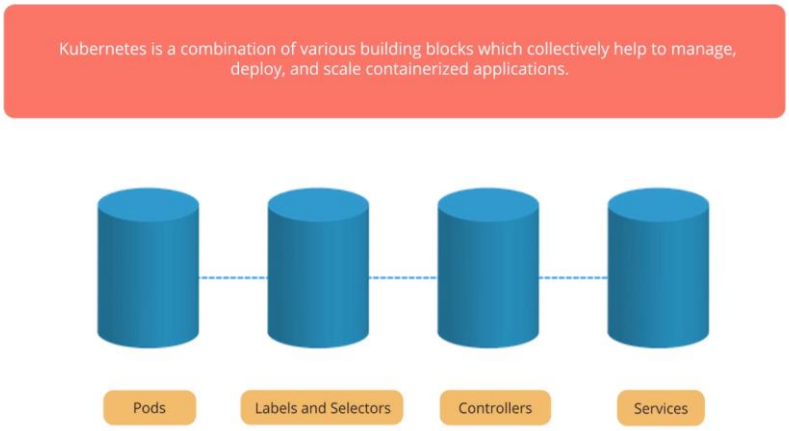

Eliminates the additional step of configuring Jenkins
AWS CodeDeploy
Performs deployment automation on EC2 servers, Lambda, Elastic Beanstalk, and other physical systems
Supports easy deployment

9.5 Kubernets

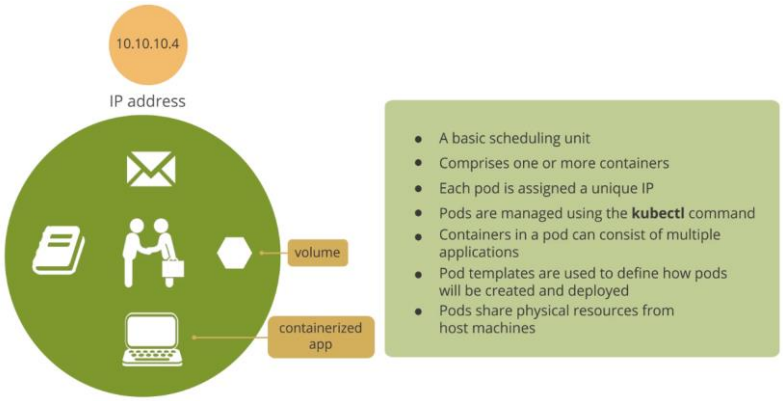
Kubernetes



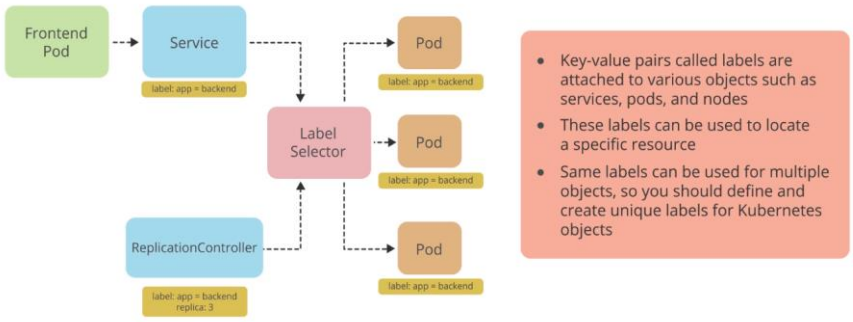
Kubernetes Components



Pods



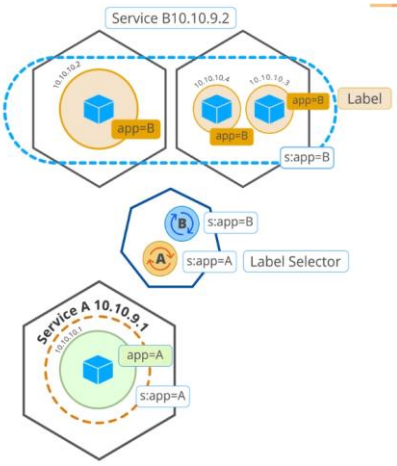
Lables and Selectors



- Key-value pairs called labels are attached to various objects such as services, pods, and nodes
- These labels can be used to locate a specific resource
- Same labels can be used for multiple objects, so you should define and create unique labels for Kubernetes objects

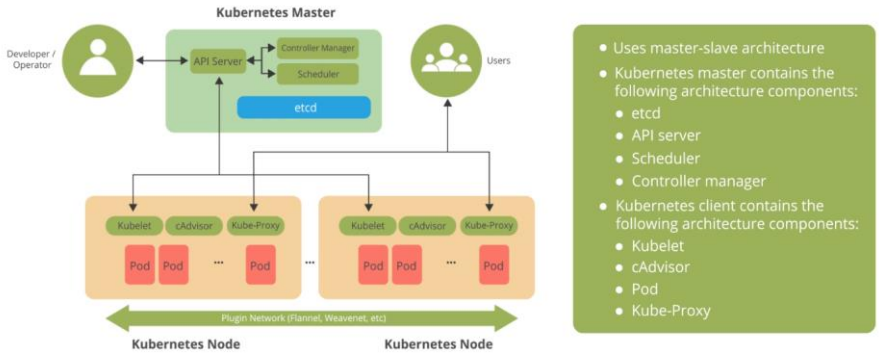
Controllers

Services



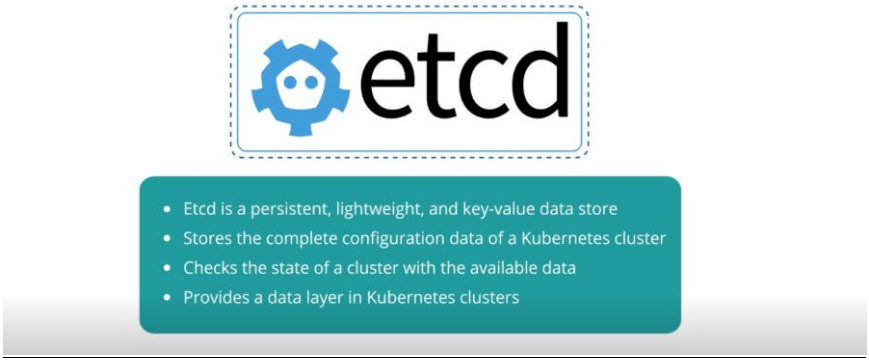
- Collection of pods are bundled together in a service
- Kubernetes allocates a unique port and DNS to each service. The port and DNS details are changed only if the service object is recreated
- There can be multiple replicated pods in a service
- In case of multiple pods, an in-built load balancer is used to share the load between pods running on different nodes
- A service implements high availability and load share for containerized applications
- If a pod is terminated, a replacement pod will be initialized automatically

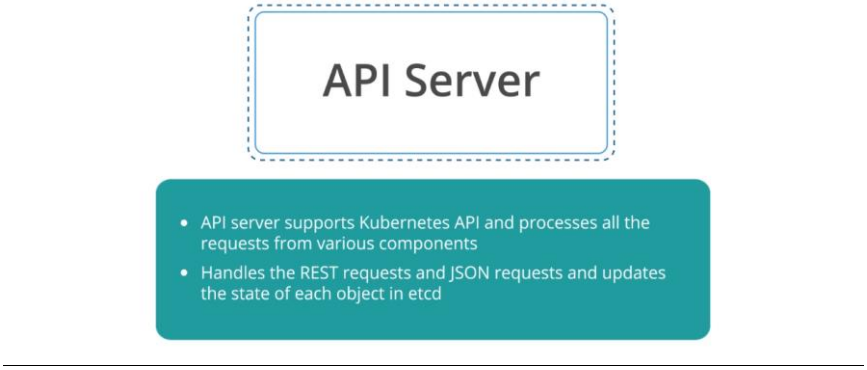
Kubernetes Architecture

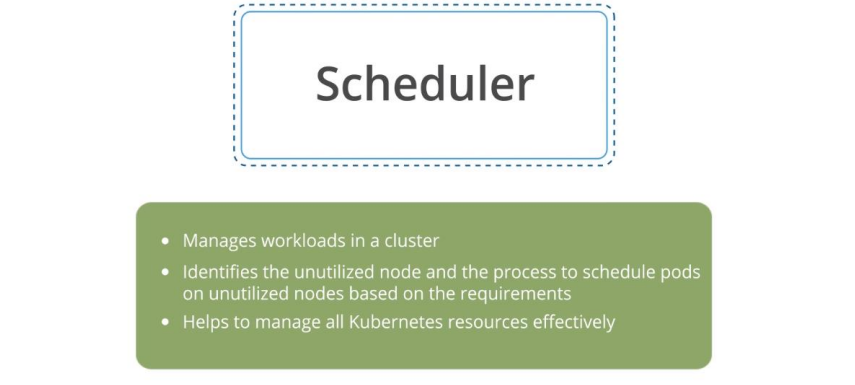


- Uses master-slave architecture
- Kubernetes master contains the following architecture components:
  - etcd
  - API server
  - Scheduler
  - Controller manager
- Kubernetes client contains the following architecture components:
  - Kubelet
  - cAdvisor
  - Pod
  - Kube-Proxy

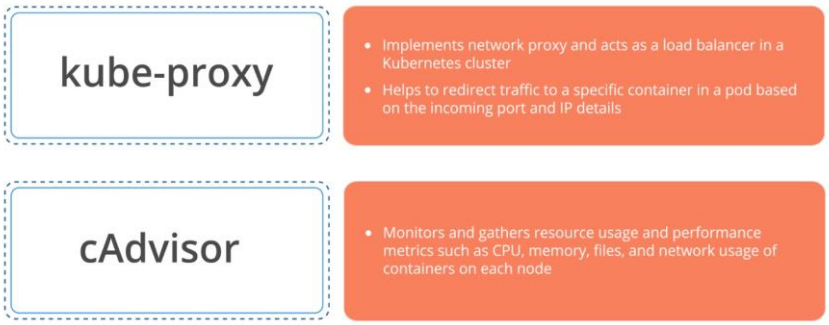
Kubernetes Master Components

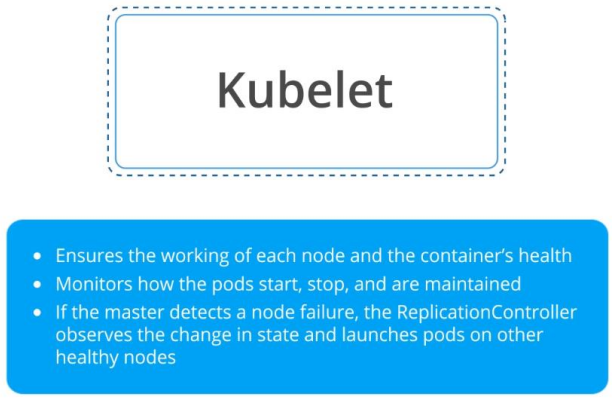






Kubernetes Node Components





9.6. Add a Linux Node to the Kubernetes Cluster

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9.7 Key Takeaways

Continuos Monitoring

You are now able to:

- Describe the concepts of cloud computing
- Explain the importance of cloud in DevOps
- Explain the need for AWS in DevOps
- Demonstrate the use of Kubernetes