

Deploy Java App to Minikube Automated with Jenkins

1. Overview

Automating the deployment of a Java application to Minikube using Jenkins involves building the application, creating a Docker image, pushing it to a container registry, and deploying it to Minikube using Kubernetes manifests.

2. Key Concepts

A. Jenkins Pipeline

Jenkins automates the CI/CD process using a declarative pipeline. The pipeline consists of multiple stages such as:

- **SCM Checkout:** Fetches code from a repository (GitHub/GitLab).
 - **Build & Test:** Uses Maven (mvn package) to compile and test the Java application.
 - **Docker Build & Push:** Builds a Docker image of the application and pushes it to Docker Hub.
 - **Deploy to Minikube:** Uses kubectl to apply Kubernetes deployment and service files.
-

B. Minikube

Minikube is a lightweight Kubernetes cluster for local development and testing. It allows developers to run Kubernetes locally and deploy applications without needing a cloud-based cluster.

Commands to Start Minikube:

```
sh
```

```
CopyEdit
```

```
minikube start
```

```
kubectl cluster-info
```

kubectl get nodes

C. Docker

Docker is used to package the Java application into a container image, making it portable and easy to deploy across environments.

Dockerfile Example:

dockerfile

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FROM openjdk:11

COPY target/webapp.jar /app/webapp.jar

WORKDIR /app

CMD ["java", "-jar", "webapp.jar"]

D. Kubernetes Deployment

Kubernetes YAML files define how the application should be deployed inside the Minikube cluster.

Deployment YAML Example:

yaml

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apiVersion: apps/v1

kind: Deployment

metadata:

name: webapp

spec:

replicas: 1

selector:

matchLabels:

```
  app: webapp
template:
  metadata:
    labels:
      app: webapp
  spec:
    containers:
      - name: webapp
        image: saranavinashb/webapp1
        ports:
          - containerPort: 8080
```

Apply Deployment:

sh

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```
kubectl apply -f deployment.yml
```

```
kubectl get pods
```

```
pipeline {
  agent any
```

```
  stages {
    stage('scm') {
      steps {
        git branch: "
      }
    }
  }
}
```

```
}  
stage('builb-clean') {  
    steps {  
        sh "mvn clean"  
    }  
}  
  
stage('build-validate') {  
    steps {  
        sh "mvn validate"  
    }  
}  
  
stage('build-com') {  
    steps {  
        sh "mvn compile"  
    }  
}  
  
stage('build-test') {  
    steps {  
        sh "mvn test"  
    }  
}  
  
stage('build-install') {  
    steps {  
        sh "mvn package"  
    }  
}
```

```

}
stage('build to images') {
    steps {
        script{
            sh 'docker build -t .'
        }
    }
}
stage('push to hub') {
    steps {
        script{
            withDockerRegistry(credentialsId: 'Docker_cred', url: 'https://index.docker.io/v1/') {
                sh 'docker push '
            }
        }
    }
}
stage('Deploy App') {
    steps {
        withKubeConfig(caCertificate: '', clusterName: 'minikube', contextName: 'minikube',
credentialsId: 'mukubeconfig_011', namespace: '', restrictKubeConfigAccess: false, serverUrl:
'https://192.168.49.2:8443') {
            sh 'kubectl apply -f deployment.yml --validate=false'
        }
    }
}
stage('Test') {

```

```
steps {  
    withKubeConfig(caCertificate: "", clusterName: 'minikube', contextName: 'minikube',  
credentialsId: 'mukubeconfig_011', namespace: '', restrictKubeConfigAccess: false, serverUrl:  
'https://192.168.49.2:8443') {  
  
        sh 'minikube service my-service --url | xargs curl'  
    }  
}  
}  
}  
}
```

Configure

- General
- Triggers
- Pipeline
- Advanced

```
12      sh 'mvn clean'
13    }
14  }
15  stage('Build-validate') {
16  steps {
17    sh 'mvn validate'
18  }
19 }
20 stage('Build-com') {
21 steps {
22   sh 'mvn compile'
23 }
24 }
25 stage('Build-test') {
26 steps {
27   sh 'mvn test'
28 }
29 }
30 stage('Build-pac') {
31 steps {
32   sh 'mvn package'
33 }
34 }
35 stage('Build to images') {
36 steps {
37   script {
38     sh 'docker build -t aswinprabhusiva/webappl .'
39   }
40 }
41 }
42 stage('Push to hub') {
43 steps {
44   script {
45     withDockerRegistry(credentialsId: 'docker_cred', toolName: 'docker', url: 'https://index.docker.io/v1/') {
46       sh 'docker push aswinprabhusiva/webappl'
47     }
48   }
49 }
50 }
51 stage('Deploy to Kubernetes') {
52 steps {
53   withKubeConfig(caCertificate: '', clusterName: 'minikube', contextName: 'minikube', credentialsId: 'minikube_cred', name: 'minikube') {
54     sh 'kubectl apply -f dep.yml --validate=false'
55   }
56 }
57 }
58 }
59 }
60 }
```

Save

Apply

Configure

- General
- Triggers
- Pipeline
- Advanced

Define your Pipeline using Groovy directly or pull it from source control.

Definition

Pipeline script

Script ?

```
1 pipeline {
2   agent any
3   tools { maven "maven" }
4   stages {
5     stage('SCM') {
6       steps {
7         git branch: 'main', url: 'https://github.com/ASWINPRABUSIVA/webapp.git'
8       }
9     }
10    stage('Build-clean') {
11      steps {
12        sh 'mvn clean'
13      }
14    }
15    stage('Build-validate') {
16      steps {
17        sh 'mvn validate'
18      }
19    }
20    stage('Build-com') {
21      steps {
22        sh 'mvn compile'
23      }
24    }
25    stage('Build-test') {
26      steps {
27        sh 'mvn test'
28      }
29    }
30    stage('Build-pac') {
31      steps {
32        sh 'mvn package'
33      }
34    }
35    stage('Build to images') {
36      steps {
37        script {
38          sh 'docker build -t aswinprabhusiva/webappl .'
39        }
40      }
41    }
42  }
43 }
```

Save

Apply

speed test - Google Search

javaapplication [Jenkins]

Prometheus Time Series C

Node Exporter

Grafana

KEC_DevOps_Erode Daily

+

localhost:8080/job/javaapplication/

Jenkins

log out

Dashboard > javaapplication >

Status

Changes

Build Now

Configure

Delete Pipeline

Full Stage View

Stages

Rename

Pipeline Syntax

Builds

Filter

March 21, 2025

#9 10:32 AM

#8 10:27 AM

javaapplication

Add description

Stage View

Average stage times: (full run time: ~46s)

	Declarative: Tool Install	SCM	Build-clean	Build-validate	Build-com	Build-test	Build-pac	Build to images	Push to hub	Deploy to Kubernetes
#9	101ms	6s	2s	1s	2s	2s	2s	3s	23s	558ms
#8	188ms	1s	2s	1s	2s	2s	2s	3s	1min 7s	failed

Permalinks

- Last build (#9), 21 hr ago
- Last stable build (#9), 21 hr ago
- Last successful build (#9), 21 hr ago
- Last failed build (#8), 21 hr ago
- Last unsuccessful build (#8), 21 hr ago

Jenkins

log out

Dashboard >

New Item

Build History

Project Relationship

Check File Fingerprint

Manage Jenkins

My Views

Build Queue

No builds in the queue.

Build Executor Status

(0 of 2 executors busy)

All

+

S	W	Name	Last Success	Last Failure	Last Duration
✓	☁	javaapplication	21 hr #9	21 hr #8	46 sec
...	☀	maven	N/A	N/A	N/A
✓	☁	mvn	2 days 21 hr #10	2 days 21 hr #7	50 sec
...	☀	pipeline	N/A	N/A	N/A

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