**DEVOPS PROJECT – JENKINS/K8S**

**Project Showcase:**

Implementing CI/CD Pipeline along with infrastructure creation for Microservices Architecture

**Overview:**

Designed and implemented a comprehensive CI/CD pipeline for automating deployment, scaling and operations of application containers across clusters of hosts for a microservices-based application. The project aimed to improve development efficiency, ensure code quality and accelerate the delivery.

**Requirements:**

1. Implement a git workflow

2. Build should be triggered automatically whenever changes are made to the code in Github using CICD

3. Code should be containerized with the help of dockerfile and must be built everytime there is a push to Github

4. Use Kubernetes cluster and the containerized code from dockerhub should be deployed with 2 replicas along with the nodeport service

**Roles and Responsibilities:**

* Solely responsible for architecting and implementing the CI/CD pipeline and infrastructure creation from the scratch.
* Implement Devops lifcycle such that all the requirements are met without any change in the Docker containers manually.
* Manage versioning, configuration, containerization and deployment of the CI/CD tools and infrastructure.

**Technologies and Tools used:**

Cloud : AWS

Version Control : Git, GitHub

Continuous Integration : Jenkins

Containerization : Docker, DockerHub

Orchestration : Kubernetes

Infrastructure : Terraform

Configuration management : Ansible

Deployment : Kubernetes Deployment YAMLs

**Solution:**

* Used 4 AWS EC2 instances to accomplish the tasks - one for Jenkins/ansible master, another for k8s master and the other 2 as slave nodes

A diagram of a machine

Description automatically generated

A diagram of a server

Description automatically generated

* Automated the infrastructure creation using terraform script to launch the EC2 instances
* Used ansible playbook to create the necessary softwares on the instances (Jenkins, Java, docker, kubernetes)
* Created the K8s cluster and configured master/slave nodes.
* Configured K8s master machine as a node in Jenkins dashboard to create a deployment with 2 replicas
* Containerized the code using Dockerfile in GitHub
* Created a Jenkins pipeline script which will clone the Git repository, Build docker image from dockerfile and push it to dockerhub, create k8s deployment and service using yaml files.
* Configured webhooks in GitHub and Jenkins to facilitate automated build and deployment
* Demonstrated automated deployment on the slave nodes with 2 replicas

**Achievements and Impact:**

* Reduced deployment time, enabling faster iteration and delivery.
* Enhanced collaboration between development and operations teams with improved code quality and automated testing.

**Skills Demonstrated:**

* Proficiency in CI/CD pipeline design and implementation using Jenkins.
* Expertise in containerization and orchestration with Docker and Kubernetes.
* Strong problem-solving skills and ability to address scalability and reliability challenges in complex architectures.
* Experience with Infrastructure as code (IaC) and configuration management principles.

**GitHub Repository:**

[Link to GitHub repository containing CI/CD pipeline configuration and documentation]