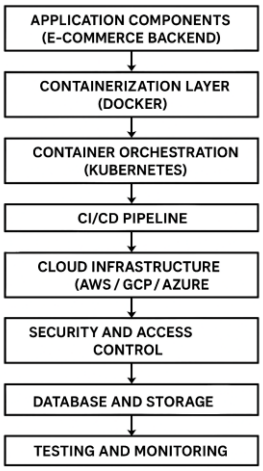
CloudCommerce

Introduction

In today's digital era, e-commerce platforms need scalable and reliable backend systems. This project designs and deploys a containerized e-commerce backend—handling user registration and product listing—using Docker and Kubernetes. Integrated with a CI/CD pipeline for automated deployment, the system is hosted on cloud platforms like AWS, GCP, or Azure to ensure high availability and performance.

1. General Architecture / Block Diagram / Flow Diagram

The general architecture of CloudCommerce consists of the following components:



- **Application Components:** Handles core business logic like user accounts and product listings
- **Containerization Layer:** Packages the application into portable containers.
- **Container Orchestration:** Manages container deployment, scaling and health automatically.
- **CI/CD Pipeline:** Automates code building, testing and deployment processes.
- **Cloud Infrastructure:** Provides the compute, networking and storage backbone.
- **Security and Access Control:** Secures services with roles, policies and authentication.
- **Database and Storage:** Stores application data like users, products and orders.
- **Testing and Monitoring:** Ensures reliability through error detection and performance tracking.

2. Application

CloudCommerce has numerous applications in:

1. Scalable Backend Services: Enables automatic scaling of services based on user demand.

2. Fault–Tolerant Architecture: Ensures high availability and reliability by isolating failures using Kubernets.

3. Resource Optimization: Efficient use of compute resources via container orchestration lowers infrastructure costs.

4. Environment Consistency: Docker ensures the same environment from development to production, reducing bugs.

3. Problem Statement

This project focuses on building a scalable e-commerce backend with user registration and product listing, using Docker, Kubernetes and CI/CD for automated cloud deployment (AWS, GCP or Azure), Key challenges include:

1. Scalability: Handling growing traffic and data efficiently.
2. High Availability: Ensuring services remain uninterrupted during updates or failures.

By addressing these challenges, the project delivers a reliable and scalable backend solution for modern e-commerce applications.