Containers & Orchestration

By Garvit Singh

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Containers

- Containers are lightweight, standalone, and executable packages that include everything needed to run a piece of software, including the code, runtime, system tools, libraries, and settings.
- Containers provide consistency across development, testing, and production environments.
- They can run consistently on any platform that supports containerization, regardless of differences in the underlying infrastructure.
- Docker is one of the most popular containerization platforms.

- Developers use Docker to create, deploy, and run applications in containers.
- Docker containers are isolated from one another and share the host operating system's kernel, making them efficient and portable.

Kubernetes

- Kubernetes is an open-source container orchestration platform originally developed by Google and now maintained by the Cloud Native Computing Foundation (CNCF).
- It provides a way to automate the deployment, scaling, and management of containerized applications.
- Kubernetes abstracts away the underlying infrastructure, allowing you to define how your application should run and scale in a declarative way.
- You specify the desired state of your application, and Kubernetes takes care of making it happen.

- Kubernetes includes features for automated load balancing, scaling, rolling updates, self-healing, and more.
- It can manage containerized applications across a cluster of machines, whether on-premises or in the cloud.

Container Orchestration Tools

- Container orchestration tools are used to automate the management of containers in a production environment. Kubernetes is the most widely used tool for this purpose, but there are alternative solutions, such as:
    - Docker Swarm: A simple and integrated orchestration tool provided by Docker, designed for smaller-scale container deployments.
    - Apache Mesos: An open-source cluster manager that can run various workloads, including containers, in a distributed and efficient manner.

- Amazon ECS (Elastic Container Service): A managed container orchestration service from AWS that simplifies container management and deployment in the AWS cloud.

Container orchestration tools help with the following tasks:

- **Service Discovery**: Automatically detecting and routing traffic to running containers.
- **Load Balancing**: Distributing incoming traffic across containers to ensure high availability and performance.
- **Scaling**: Automatically adjusting the number of container instances based on resource usage or incoming requests.
- **Rolling Updates**: Replacing old container versions with new ones without causing service downtime.
- **Health Monitoring**: Continuously checking the health of containers and restarting or replacing unhealthy ones.

Thanks For Reading! 💙

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