



# Docker and Kubernetes

## Overview

Kubernetes is a technology created by Google to make it easier to manage and scale containerized applications. Containers are like little packages that hold software, and Docker is a tool used to create and run these containers.

When you have many containers and applications to manage, it can become difficult to keep track of them all. This is where Kubernetes comes in - it helps automate the management, scaling, and deployment of these containerized applications.

The Docker Kubernetes training teaches you how to use Docker and Kubernetes together to build, test, and deploy applications. This training is designed for professionals who want to learn how to manage and scale containerized applications more effectively.

Although Docker and Kubernetes are often used together, they are different tools that perform different functions. When used together, they can create even better results.

## Who should enroll?

- Software Developers
- IT Professionals & Architects
- Operational Engineers

## Prerequisite

This course doesn't require you to have any specific qualifications before attending. However, having knowledge in certain concepts could be helpful. These concepts are:

- Virtualization - Knowing about how virtualization works and how it can be used to run multiple operating systems on one machine.
- Linux & Networking Fundamentals - Having a basic understanding of Linux operating systems and computer networking concepts.
- Installing and Configuring Applications - Being familiar with the process of installing and configuring software applications on a computer.

While not mandatory, having knowledge in these areas can help you better understand the concepts covered in the course.

## Learning Outcome

In this course, you will learn about several important topics related to containerization and orchestration:

- VMs & Containers - Discover the purpose of containers and how they differ from virtual machines.
- Monolithic & Microservices applications - Understand the differences between monolithic and microservices applications.
- Docker installation - Learn how to install Docker and gain knowledge about its architecture and components.
- Docker Registry - Explore Docker Registry and learn how to pull and push images and use its features.
- Docker Volumes & Networks - Learn about Docker Volumes and how Docker Networks operate.
- Docker Orchestration - Gain an understanding of Docker Orchestration Services like Docker Compose and Docker Swarm.
- Kubernetes - Explore Kubernetes and learn about its features, how to use it, and the benefits it provides.
- Docker Swarm & Kubernetes - Understand how Docker Swarm works and how it differs from Kubernetes, and which one is better.
- Create with Kubernetes - Learn how to create Pods, deployments, and services using Kubernetes, and the advantages of using Kubernetes for application deployment and management.

## Course Outline

### 1. Introduction to Dockers & Containers:

- Evolution of Dockers & Containers
- Differences between VM's and Containers
- Docker Use Cases
- Benefits of using Containers
- Working with Docker Commands
- Case Study

## **2. Docker Installation & Architecture**

- Installing & Configuring Docker toolbox on Windows
- Installing & configuring Docker in Amazon Linux EC2

## **3. Docker Images, Docker Volumes & Docker Networking:**

- Images & Layers
- Container Layers
- Working with Docker Images
- Building own Images using Dockerfile
- Working with Docker Volumes and Docker Networking
- Case Study

## **4. Docker Registries:**

- Overview of Registries- Public and Private
- Deep Dive into Docker Hub
- Other Public & Private Registries
- Case Study

## **5. Docker Orchestration:**

- Overview of Docker Compose
- Defining and running multi-container applications
- Overview of Docker Swarm
- Build your own Docker Swarm Cluster
- Filtering & Scheduling Containers
- Case Study

## **6. Introduction to Kubernetes:**

- Evolution of Kubernetes
- What is Kubernetes • Kubernetes Use Cases
- Differences between Kubernetes and Docker Swarm

## **7. Kubernetes Architecture:**

- Understand Kubernetes Architecture
- Introduction to Kubernetes Master
- Components of Kubernetes Master
- Introduction to Node Components

## 8. Installing Kubernetes:

- Installing & Configuring Kubernetes locally via Minikube
- Creating Kubernetes Cluster in Google Cloud
- Creating Kubernetes Cluster in AWS Cloud
- Case Study

## 9. Deploying applications on Kubernetes Cluster:

- Introduction to Pods
- Pods Lifecycle
- Working with Pods to manage multiple containers
- Deploying Pods via Replication Controllers
- Case Study

## 10. Services, Labels and Replica Sets:

- Overview of Services • Labels and Selectors
- Scale out deployment using Replicas
- Horizontal Pod Autoscaling
- Load Balancing
- Rolling Updates
- Case Study

## 11. Managing State with Deployments:

- Working with StatefulSet
- Pod Management policies
- OnDelete & Rolling Update Strategies
- Cluster DNS
- Persistent Volumes

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