Docker & Kubernetes Fundamentals

Duration: 2 Days

COURSE DESCRIPTION

This 2-day course provides hands-on training in containerization technologies, focusing on Docker and Kubernetes fundamentals. Participants will learn to containerize applications using Docker, create and manage container images, and orchestrate multi-container applications with Docker Compose. The course progresses to introduce Kubernetes architecture and core concepts, enabling learners to deploy and manage containerized applications at scale. Through practical exercises and real-world scenarios, participants will gain proficiency in modern container technologies essential for DevOps and cloud-native development. By course completion, participants will have the skills to implement containerization strategies in their development workflows and understand the transition from Docker to Kubernetes orchestration, preparing participants for advanced container orchestration challenges.

COURSE OBJECTIVES

By the end of this course, learners will be able to:

- Understand the core concepts of containerization and why Docker is used.
- Install and configure Docker on various operating systems.
- Create, manage, and debug Docker containers and images.
- Use Dockerfiles to automate container image creation.
- Work with Docker Volumes and Networks for persistent storage and container communication.
- Leverage Docker Compose to define and run multi-container applications.
- Understand best practices for container security and image optimization.

COURSE OUTLINE

Day 1

Module 1: Introduction to Docker

- What is Docker?
- History of containerization
- Benefits of Docker over traditional virtualization
- Key concepts: Images, Containers, Registries

Module 2: Setting Up Docker

- Installing Docker on Windows, macOS, and Linux
- Docker Desktop overview
- Understanding Docker architecture: Client, Daemon, Registry

Module 3: Working with Docker Containers

- Pulling images from Docker Hub
- Running containers: docker run
- Managing containers: start, stop, restart, rm
- Interactive vs Detached mode

Module 4: Docker Images and Dockerfile

- Creating custom images using Dockerfile
- Image layering and caching
- Tagging and versioning images
- Best practices in writing Dockerfiles

Module 5: Volumes and Persistence

- Understanding volumes vs bind mounts
- Data persistence in Docker

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Day 2

Module 6: Docker Networking

- Basic container communication
- Bridge and Host networks
- Creating user-defined networks

Module 7: Docker Compose

- Introduction to YAML
- Defining simple multi-container apps
- Docker Compose lifecycle

Module 8: Kubernetes Fundamentals

- What is Kubernetes?
- Why Kubernetes over Docker Compose?
- Kubernetes architecture: Pod, Node, Cluster
- Key objects: Deployment, Service, Namespace
- YAML basics in Kubernetes
- Hands-on: Create and apply a simple Deployment

PREREQUISITES

- Basic understanding of Linux command line
- Familiarity with software development or system administration
- Knowledge of basic networking concepts
- Some experience with virtualization tools like VirtualBox or VMware

WHO SHOULD ATTEND

- Software Developers
- DevOps Engineers
- System Administrators
- QA/Test Engineers
- Cloud Engineers
- IT Students or Fresh Graduates

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