Docker and Rancher Overview – Fast Track Mode

Duration: 3 days (8hrs/day)

Prerequisites: Basic knowledge of Linux.

Course Objective: The Docker Customized course teaches you how to use Docker for managing containers, images, and networks. You will learn how to install Docker, work with containers, create custom images, and use Docker Compose for running multiple containers together. The course also gives you an overview of Kubernetes and Rancher for managing Kubernetes.. Additionally, you'll explore container security, storage, and logging to ensure you can handle Docker containers.

Docker Version: Latest

Kubernetes Version: Latest

Lab Requirement: Koenig DC (CentOS 9)

Module 1 - Introduction to Containers & Installation

- **Introduction to Containerization**
- What Are Containers?
- Difference Between VMs & Containers
- Benefits of Using Containers
- **Docker Installation & Setup**
- Sizing Requirements for Installation
- Setting Up Repositories & Selecting a Storage Driver
- Installing the Docker Engine
- Understanding Docker Images vs. Containers
- **Lab:** Installing Docker on Linux

Module 2 - Working with Docker Containers

- **Managing Containers**
- Running & Stopping Containers
- Understanding Container Identification

• Understanding Port Binding

• Default Container Commands

• **Lab:** Running Containers in Attached & Detached Modes

• **Lab:** Port Binding

• **Lab:** Restart Policies in Docker

• **Executing Commands Inside Containers**

• Using docker exec & docker attach

• Overriding Default Commands

• **Lab:** Running Commands in a Container

• **Lab:** Overriding Default Container Commands

• **Lab:** Automatically Deleting Containers on Exit

• **Container Lifecycle & Clean up**

• Removing Containers & Images

• Managing Disk Usage

• **Lab:** Removing Docker Containers & Images

• **Lab:** Monitoring Docker Disk Usage

Module 3 - Docker Image Management

• **Understanding Docker Images**

• Layers & UnionFS

• Difference Between Base & Custom Images

• **Building & Optimizing Docker Images**

• Writing an Efficient Dockerfile

• Using ADD, COPY, EXPOSE, ENTRYPOINT & WORKDIR

• Environment Variables & Arguments

• **Lab:** Creating Docker Images Using Dockerfile

• **Lab:** COPY vs. ADD Instructions

• **Lab:** ENTRYPOINT & WORKDIR Instructions

• **Lab:** Tagging & Inspecting Docker Images

• **Managing Image Repositories**

• Overview of Docker Registries (DockerHub, Private Repos)

• Pushing & Pulling Images

• Image Versioning & Tagging

• **Lab:** Pushing Images to a Private Registry

• **Lab:** Pruning Unused Images

Module 4 - Docker Networking

• **Docker Networking Overview**

• Bridge, Host & None Networks

• Understanding Container Communication

• **Lab:** Creating User-Defined Bridge Networks

• **Lab:** Configuring a Host Network

• **Lab:** Exposing & Publishing Ports

Module 5 – Docker Compose

• **Introduction to Docker Compose**

• Overview of Docker Compose

• **Deploying Multi-Container Applications**

• Understanding docker-compose.yml

• Defining Services in Compose

• **Lab:** Writing a docker-compose.yml File

• **Lab:** Deploying Multi-Service Applications with Docker Compose

• **Scaling & Networking with Compose**

• Scaling Services

• Networking in Docker Compose

• **Lab:** Scaling Services with Docker Compose

• **Lab:** Networking custom networking Docker Compose

Module 6 - Kubernetes & Rancher Overview

• **Why Kubernetes?**

• **Kubernetes Core Concepts**

• Understanding Pods

• Understanding Kubernetes Objects

• Understanding Services

• **Lab:** Deploying a Simple Kubernetes Pod

• **Lab:** Understanding Kubernetes Networking (NodePort & ClusterIP)

• **Introduction to Rancher (For Kubernetes Management)**

• What is Rancher?

• Rancher vs. Other Kubernetes Management Tools

• **Lab:** Accessing Rancher UI

• **Lab:** Importing an Existing Kubernetes Cluster into Rancher

• **Lab:** Managing Kubernetes Workloads via Rancher

Module 7 - Security Best Practices

• **Container Security Fundamentals**

• Docker Daemon & Default Security Settings

• Managing Capabilities of Containers

• **Network & Access Control**

• Understanding Docker Network Security

• Implementing RBAC in Kubernetes

• **Lab:** Managing Capabilities

• **Lab:** Setting Up Docker Network Security

Module 8 - Storage & Data Management

• **Understanding Docker Storage Drivers**

• Block vs. Object Storage

• Changing Storage Drivers

• **Volumes & Persistent Storage**

• Docker Volumes vs. Bind Mounts

• Overview of Device Mapper

• **Lab:** Managing Volumes in Docker

• **Lab:** Automatically Removing Volumes on Container Exit

• **Logging & Monitoring**

• Understanding Docker Logging Drivers

• **Lab:** Configuring Logging Drivers using Syslog and Journald