

DevOps: Docker, Kubernetes, Jenkins & Terraform (Koenig Original)

Learn to build, containerise, orchestrate and automate infrastructure and pipelines with Docker, Kubernetes, Ansible, Terraform, Maven, Jenkins and Azure DevOps.

20 Days

8 HOURS A DAY

51

MODULES

256

TOPICS

8

HANDS-ON ACTIVITIES

COURSE OVERVIEW

This course begins with Linux fundamentals, DevOps concepts and Git version control before moving into containerisation with Docker, including images, networking and volumes. It then covers Kubernetes in depth, from cluster installation and resource scheduling through security, storage, networking, Helm charts and troubleshooting, followed by configuration management and automation with Ansible, including playbooks, roles, variables and Vault. The course continues with infrastructure provisioning using Terraform and its modules, build automation with Maven, and pipeline creation with Azure DevOps and Jenkins, covering credentials, security, integration with Maven, Nexus and SonarQube, and monitoring with ELK and Prometheus. It closes with an introduction to Jira and Confluence for project tracking and collaboration.

WHO THIS COURSE IS FOR

DevOps Engineers

System Administrators

Infrastructure Engineers

Build and Release Engineers

Software Developers

Site Reliability Engineers

LEARNING OBJECTIVES

- Explain core DevOps concepts and the DevOps lifecycle
- Apply Git commands for version control and branching
- Build and manage Docker images, containers and volumes
- Configure and administer Kubernetes clusters and resources
- Implement Kubernetes security, storage and networking features
- Develop Ansible playbooks, roles and templates for automation
- Provision infrastructure using Terraform and reusable modules
- Configure Jenkins pipelines integrated with Maven, Nexus and SonarQube

51 Modules, 256 Topics

01

Linux Fundamentals

TOPICS

- What is Linux
- Basic Linux Commands
- Understanding Linux File System Structure
- Creating Files and Directories
- Copying Files and Directories
- Basics of VIM Editor
- Managing Users
- Understand Linux File System Permissions
- Changing Permissions
- Managing Services
- Installing and Updating Software Packages with YUM

01

Introduction to DevOps

TOPICS

History of DevOps · What is DevOps? · Why DevOps? · How Does DevOps work? · Life Cycle of DevOps · DevOps Tools · DevOps Benefits

01

Git

TOPICS

- Introduction to Version Control System
- History of Git
- Git Basics
- States in Git
- Installing Git
- Configuration of Git
- Working with Repositories
- Basic Git Commands
- Working with Remotes
- Tagging
- Git Branching

Docker

TOPICS

- Introduction to Containers
- Introduction to Docker
- Downloading and Installing Docker
- Docker Essential Commands
- Docker Engine
- Running your First Container
- Docker Image
- Build Image with Docker file
- Private Registry
- Storing and Retrieving Docker Images from Docker Hub
- Networking Docker Containers
- Data Persistence with Volumes

01

Core Concepts

TOPICS

Overview of Container Orchestration · Introduction to Kubernetes · Kubernetes Architecture

02

Installation, Configuration & Validation

TOPICS

Design a Kubernetes Cluster · Installation of Kubernetes Master and Nodes · Choose a Network Solution · Verify Installation

03

Managing Resources

TOPICS

Managing Pods · Managing Labels & Selector · Managing Replication Controller & Replica Set · Managing Service

04

Scheduling

TOPICS

Manual Scheduling · Taint and Tolerations · Node Selector · Node Affinity

05

Application Lifecycle Management

TOPICS

Overview of Deployment · Deployment Strategies · Managing Deployment · Canary Deployment · Blue-Green Deployment

06

Environment Variable

TOPICS

Plain Key · Config Map · Secret · Mount Variable as Volume

07

Storage

TOPICS

Volumes · Persistent Volumes · Persistent Volume Claim

08

Security

TOPICS

- Kubernetes Authentication
- Managing Users in Kubernetes
- Service Account
- Managing Roles and Role Binding
- Managing Cluster Role and Cluster Role Binding
- Security Context

09

Cluster Maintenance

TOPICS

OS Upgrade · Upgrade Cluster Version · Static Pod · ETCD Backup · Cron Job

10

Logging and Monitoring

TOPICS

- Understand how to Monitor all Cluster Components
- Understand how to Monitor Applications
- Manage Cluster Components Logs
- Manage Application Logs
- Prometheus Tool

11

Networking in Kubernetes

TOPICS

Kubernetes Networking · Understand CNI · Understand Pod Networking Concepts · Configure DNS · Configure and Manage Ingress Rule · Namespace

12

Managing Helm Chart

TOPICS

Introduction to Helm · Helm Installation · Use community Helm Chart · Create Helm Chart · Upgrade Helm Chart · Downgrade Helm Chart

13

Troubleshooting

TOPICS

Troubleshoot ETCD Failure · Troubleshoot Kubelet Failure · Troubleshoot Container Runtime Failure · Troubleshoot Scheduler Failure

01

Introduce Ansible

TOPICS

Introduction to Ansible · Current IT Automation State · Configuration Management · Ansible History · How Ansible Works?

02

Understanding of Ansible Framework

TOPICS

Case Study · Ansible way of Configuration Management · Infrastructure as a Code (IaC) · Idempotency · Ansible Terminologies

03

Ansible Deployment

TOPICS

Pre-requisites for Controller Node · Installation and Configuration · Ansible Configuration File · Pre-requisites for Managed Node · Ansible Inventory · Ansible Communication · Ansible Architecture

04

Ad-hoc Commands

TOPICS

Introduction to Ansible Module · Ad-hoc Remote Executions · Ansible Commands · Privilege Escalation

05

Managing Playbooks

TOPICS

YAML Structure · Ansible Playbooks · Structure of Playbook · Syntax Check of Playbook · Run Playbook

06

Variables in Ansible

TOPICS

Introduction to Ansible Variables · Defining Ansible Variable in Ansible Code · Use Variable File · Host Vars and Group Vars · Ansible Facts · Facts in Playbooks · Use Cases of Facts · Disabling Facts

07

Conditionals, Loops, Handlers and Error Handling

TOPICS

Conditionals in Ansible · Loops in Ansible · Loops with Variables · Notify and Handlers in Ansible · Register and Debug · Ignore Errors · Block and Rescue

08

Ansible Roles and Galaxy

TOPICS

Introduction to Role · Understanding Role Structure · Managing Roles · Introduction to Ansible Galaxy · Download and Use Roles from Ansible Galaxy

09

Ansible Vault

TOPICS

Introduction to Ansible Vault · Encrypt and Decrypt Playbooks · Use File as Password for Ansible Playbooks · Ansible Vault Commands

10

Jinja 2 Templates

TOPICS

Introduction to Jinja2 Template · Create Jinja2 Template · Template with Looping · Template with Conditions

11

Linux Administration

TOPICS

Managing Packages · Managing Users and Groups · Managing Partition · Starting and Stopping Services · Managing SSH Keys

01**Exercise**

Introduction to Terraform

TOPICS

Introduction to Terraform · Infrastructure Automation · Install Terraform · Providers · Resources · Basic Syntax

02**Lab Exercise**

Getting Started with Terraform

TOPICS

Terraform Plan, Show, Apply and Destroy · Exploring Terraform Registry · Interpolation · Tainting and Updating Resources · Terraform Console and Output · Terraform Variables · Breaking Out Our Variable and Outputs

03**4 Lab Exercises**

Terraform Modules

TOPICS

Introduction to Modules · Module Repositories · First Basic Module · The Module Codes · Main Terraform Code · Using Git Repositories to Save Modules

04**2 Labs**

Terraform Troubleshooting and Testing

TOPICS

Terraform Plan Revisited · Debugging the Script · Terraform Testing

01

Maven Basics

TOPICS

How Maven Help a Developer? · Setting up your first Maven Project · First Maven Dependency · Understand How to Build a Jar · Maven Goals – Compile, Test and Install · Understand Maven Build Life Cycle

02

Maven Dependency Management

TOPICS

Understand Maven POM – Project Object Model · Transitive Dependencies · Excluding Dependencies in Maven · Scope of a Dependency · Versioning of Dependencies

03

How Does Maven Work?

TOPICS

- Maven Super POM and Effective POM – Convention over Configuration
- Understand How Maven Downloads Dependencies
- Maven Plugins
- Maven from Command Line

04

Advanced Maven

TOPICS

Basics of Multi Module Maven Project · Best Practices of Multi Module Maven Project · Running Web Application in Tomcat · Maven Commands – Tips and Tricks · Creating Projects with Maven Archetypes

01

Introduction to Azure DevOps

TOPICS

What is Azure DevOps? · Why Azure DevOps? · Benefits of Azure DevOps

02

Automate Containerization with Azure DevOps Pipeline

TOPICS

- Automatically Build Image and Push to Azure Container Registry
- Once Image is Pushed then Deploy/Update to Kubernetes Cluster

03

Automate Ansible and Terraform with Azure DevOps Pipeline

TOPICS

- Create Infrastructure using Terraform with Azure DevOps
- Once Machines are Deployed then Automate Servers with Ansible

01

Introduction to Jenkins

TOPICS

Introduction to Jenkins · Jenkins Installation · Introduction to Jenkins UI · Create First Job · Add Parameters to your Job

02

Add SSH Node Credentials in Jenkins

TOPICS

Install SSH Plugin in Jenkins · Add Credentials of Node · Integrate Node SSH Server with Jenkins

03

Build Job on Remote Machine

TOPICS

- Deploy Web Server Automatically through Jenkins

04

Jenkins Security

TOPICS

- Enable/Disable Login in Jenkins
- Allow Users to Sign up
- Create Users Manually in the Jenkins DB Create and Manage Roles for Jenkins Users

05

Jenkins and Maven

TOPICS

Introduction to Jenkins and Maven · Install the Maven Plugin · Clone Git Repository from Jenkins · Build a Jar using Maven · Test your Code · Deploy your Jar with Jenkins · Archive the artifact

06

Jenkins File

TOPICS

Introduction to Pipeline · Introduction to JenkinsFile · Install the Jenkins Pipeline Plugin · Creating First Pipeline · Add Multi-Stages to your Pipeline · Environment Variable · Post Actions

07

Jenkins and Maven

TOPICS

Introduction to Jenkins and Maven · Install the Maven Plugin · Clone Git Repository from Jenkins · Build a Jar using Maven · Test your Code · Deploy your Jar with Jenkins · Archive the artifact

08

Nexus and SonarQube

TOPICS

Storage Artifacts on Nexus · Storage Docker Images on Nexus · Check Bugs of Application using SonarQube

09

Build Auto Image and Deploy to Kubernetes with Jenkins

TOPICS

- Create image using Jenkins then Push to Registry
- Automatically Create/Update Image to Kubernetes with Jenkins

10

Monitoring Jenkins

TOPICS

- Integrate ELK with Jenkins for Logging
- Integrate Prometheus and Grafana for Monitoring

01

Introduction

TOPICS

Introduction to Jira · Introduction to Agile Terms ·
Need of Jira · Introduction to Jira Terms · Setting up
JIRA Cloud

02

Introduction to Confluence

TOPICS

Introduction to Confluence · Need of Confluence ·
Benefits of Confluence

HANDS-ON ACTIVITIES

Practise What You Learn

#	MODULE	ACTIVITY
01	Introduction to Terraform	Exercise: Your First Script main.tf
02	Getting Started with Terraform	Lab Exercise: Breaking Down main.tf into variables.tf, output.tf
03	Terraform Modules	LAB EXERCISE ■ Modules for Docker ■ The Docker Image Module ■ Module the Container Platform ■ Modules – The Root Module
04	Terraform Troubleshooting and Testing	LAB ■ Writing Test Scripts for Terraform ■ Testing with Docker

WHAT IS INCLUDED

Everything You Need to Succeed

- Koenig course material for every module
- Delivery by certified instructors and subject matter experts
- Hands-on exercises throughout the course
- Course completion certificate from Koenig

ABOUT KOENIG

Who We Are

Established in 1993, Koenig Solutions is a globally recognised training provider with 35+ technology partnerships, 5,000+ training programmes and a network of certified instructors and subject matter experts, supporting individuals and enterprise teams worldwide.

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