

DevOps Tools

Duration: 10 Days

Prerequisites: Linux Knowledge Required

Course Objective: This course covers all the key DevOps tools and practices to help you automate and manage software development and deployment. You'll learn about version control with GitHub, infrastructure automation with Terraform and Ansible, and CI/CD pipelines with Jenkins and GitLab. The course also includes monitoring with tools like ELK, Prometheus, and Grafana, and testing automation with Selenium. Through hands-on projects, you'll gain practical experience in building, deploying, and managing systems efficiently in real-world scenarios.

Lab Requirement: Koenig-DC (<https://linuxlab.koenig-solutions.com>)

Module 1 – DevOps Overview

What is DevOps

Why Culture is Important to DevOps

Why Automation is Important to DevOps

How DevOps can Improve Lead Time

How DevOps can Improve Stability

How DevOps can Reduce Operational Costs

Module 2 – GitHub

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

Module 3 – Automation with Ansible Introduction to Ansible

Ansible Architecture

Installation and Configure

Ansible AD-Hoc Commands

Managing Playbooks

Managing Variables

Managing Loops

Managing Notify and Handlers

Jinja2 Templates

Managing Roles

Terraform with Azure

Module 1 - Getting Started & Setting Up Labs

Choosing a right Infrastructure as Code tool Terraform Overview

Installing Terraform - Windows Users Installing Terraform - MacOS and Linux Users

Choosing Right IDE for Terraform IAC development Setting up Azure Account

Terraform init, plan and apply

Module 2 – Building Cloud Infrastructure with Terraform

Introduction to Terraform with Azure Azure Resource Manager

Azure Virtual Networks

Authentication with Azure and Create a Resource Group Azure Virtual Network

Azure VMs Azure Storage Security Groups Load Balancers

Understanding Terraform State files Understanding Desired & Current States Terraform

Provider Versioning

Types of Terraform Providers Create template for azure web app

Deploy storage account, container and blob

Module 3 - Read, Generate, Modify Configurations

Understanding Attributes and Output Values in Terraform Referencing Cross-Account

Resource Attributes Terraform Variables

Approaches for Variable Assignment Data Types for Variables

Fetching Data from Maps and List in Variable Count and Count Index

Conditional Expressions Local Values

Terraform Functions Data Sources Debugging in Terraform Terraform Format

Validating Terraform Configuration Files Load Order & Semantics

Dynamic Blocks Tainting Resources Splat Expressions Terraform Graph

Saving Terraform Plan to File

Module 4 - Terraform Provisioners

Understanding Provisioners in Terraform Types of Provisioners Implementing remote-exec provisioners

Implementing local-exec provisioners as element numbers

Module 5 - Terraform Modules & Workspaces

Understanding DRY principle Variables and Terraform Modules Terraform Registry

Terraform Workspace

Implementing Terraform Workspace

Jenkins and GitLab with Real Time Projects

Module 1 – Introduction to Jenkins

Introduction to Jenkins

Jenkins Installation

Introduction to Jenkins UI

Create First Job

Add Parameters to your Job

Module 2 – Jenkins and Docker

Configure SSH for Docker Container

Install SSH Plugin in Jenkins

Integrate Docker SSH Server with Jenkins

Run a Jenkins Job on Docker Remote Host through SSH

Module 3 – Jenkins and Ansible

Install Ansible

SSH Key Based Authentication

Create Ansible Inventory File

Create Playbook

Integrate Ansible and Jenkins

Execute Playbooks from a Jenkins Job

Add Parameters to Ansible and Jenkins

Module 4 – Jenkins Security

Enable/Disable Login in Jenkins

Allow Users to Sign up

Create Users Manually in the Jenkins DB

Create and Manage Roles for Jenkins Users

Module 5 – Jenkins Email Integration

Install a Mail Plugin

Integration Jenkins and Gmail

Add notifications to your jobs

Module 6 – Jenkins and Maven

Introduction to Jenkins and Maven

Install the Maven Plugin

Install the GIT Plugin

Clone Git repository from Jenkins

Build a JAR using Maven

Test your Code

Deploy your Jar locally

Archive the artifact

Module 7 – Jenkinsfile

Introduction to Pipeline

Introduction to Jenkinsfile

Install the Jenkins Pipeline Plugin

Create first Pipeline

Add multi-steps to your Pipeline

Environment Variables

Post Actions

Module 8 – Gitlab CI Fundamentals

Introduction to Gitlab

Create a New Project

Building the project locally

Building the project using Gitlab CI

Adding a test stage

Running jobs in parallel

Running jobs in the background

Module 9 – Gitlab CI to Build and Deploy Java Application

Introduction to the Java Application

Continuous Integration Pipeline

Overview Building a Java Application Locally

Building a Java Application with Gitlab CI

Deploy to Servers from Gitlab CI

Module 10 – Monitoring

Introduction to Elasticsearch, Logstash, Beats, Fluentd and Kibana

Deploy Elasticsearch, Logstash, Fluentd and Kibana

Configure Elasticsearch

Configure fluentd for collect the logs from Kubernetes Microservices

Configure Index Pattern

Kibana Visualization

Install Prometheus and Grafana

Monitor application with Prometheus and Grafana

Module 11 – Testing

Introduction to Selenium

Set up Selenium Project

Static Analysis of Selenium Source Code

Integrate Selenium with Jenkins

Send notification to Email ID

Module 12 – Projects

Project 1: Build infrastructure and manage servers on Azure with Terraform and Ansible Integration

Project 2: Integration of SonarCloud with GitLab

Project 3: Automate everything (Continuous Development, Continuous Integration, Testing, Monitoring, Continuous Delivery and Deployment)