DevOps Training Curriculum

Course Details

Duration: 10-12 Weeks

Module 1: Introduction to DevOps and Software Development Lifecycle (SDLC)

- Overview of DevOps and its importance in modern IT
- History and evolution of DevOps
- Differences between DevOps and traditional IT models
- Key DevOps principles and lifecycle
- Introduction to DevOps tools: Git, Docker, Kubernetes, Jenkins, Terraform
- Practical: Installation and setup of Linux, Git, Docker, and Jenkins
- Practical: Creating and managing a GitHub repository

Module 2: Linux Fundamentals for DevOps

- Introduction to Linux operating systems
- Basic Linux commands and file system structure
- User and group management
- Networking in Linux
- Process management and system monitoring (ps, top, netstat)
- Introduction to shell scripting for automation
- Practical: Writing a basic shell script for automation
- Practical: Managing file permissions and networking
- Relevant Certification: RHCSA

Module 3: Version Control with Git and GitHub

- Introduction to version control systems
- Git installation and setup
- Basic Git commands (commit, push, pull, clone, branch)

- Branching, merging, and rebasing strategies

- Using GitHub for collaboration

- Introduction to GitHub Actions for CI/CD

- Practical: Setting up a GitHub repository with branching and merging

- Practical: Configuring a GitHub Action for automated CI/CD

- Relevant Certification: GitHub Actions

Module 4: Continuous Integration and Continuous Deployment (CI/CD)

- Introduction to CI/CD and its importance in DevOps

- Overview of Jenkins and GitHub Actions

- Setting up a Jenkins pipeline

- Automating testing and deployment

- Best practices for CI/CD implementation

- Practical: Setting up a Jenkins pipeline for automated deployment

- Practical: Implementing a CI/CD workflow using GitHub Actions

- Relevant Certification: GitHub Actions, Jenkins

Module 5: Infrastructure as Code (IaC) with Terraform

- Introduction to Infrastructure as Code (IaC)

- Terraform installation and setup

- Writing Terraform scripts to manage cloud infrastructure

- Deploying AWS infrastructure using Terraform

- Introduction to AWS CloudFormation

- Practical: Deploying a virtual machine using Terraform

- Practical: Automating AWS infrastructure provisioning using CloudFormation

- Relevant Certification: AWS Certified Cloud Practitioner

Module 6: Configuration Management with Ansible

- Introduction to configuration management

- Installing and setting up Ansible

- Writing Ansible playbooks

- Automating server provisioning and configuration

- Practical: Creating an Ansible playbook for server configuration

- Relevant Certification: RHCSA

Module 7: Containerization with Docker

- Introduction to containerization and Docker

- Understanding Docker architecture

- Installing and setting up Docker

- Running and managing Docker containers

- Writing and using Dockerfiles

- Introduction to Docker Compose for multi-container applications

- Practical: Creating and deploying a Docker container

- Practical: Using Docker Compose for a multi-service application

- Relevant Certification: Docker Certified Associate (DCA)

Module 8: Container Orchestration with Kubernetes

- Introduction to Kubernetes and its architecture

- Setting up a Kubernetes cluster

- Deploying applications using Kubernetes

- Managing Kubernetes pods, deployments, and services

- Using Helm Charts for Kubernetes

- Practical: Deploying a web application on Kubernetes

- Practical: Managing Kubernetes services and scaling

- Relevant Certification: Kubernetes and Cloud Native Associate (KCNA)

Module 9: Cloud Computing and DevOps Integration

- Introduction to cloud computing

- Overview of AWS, Azure, and Google Cloud

- Key cloud services: EC2, S3, IAM (AWS); Virtual Machines, Blob Storage (Azure); Compute Engine, Cloud Storage (Google Cloud)

- Deploying applications on cloud platforms

- Practical: Deploying a web application on AWS, Azure, or Google Cloud

- Relevant Certifications: AWS Certified Cloud Practitioner, AZ-900, Google Associate Cloud Engineer

Module 10: Monitoring and Logging

- Importance of monitoring in DevOps

- Introduction to Prometheus and Grafana

- Setting up monitoring for applications and infrastructure

- Using the ELK Stack (Elasticsearch, Logstash, Kibana) for logging

- Centralized logging and alerting in a DevOps environment

- Practical: Setting up Prometheus and Grafana for monitoring

- Practical: Configuring log analysis using the ELK Stack

- Relevant Certification: Cloud Monitoring

Projects

Project 1: Automating CI/CD Pipeline for a Web Application

This project involves setting up a CI/CD pipeline using Jenkins and GitHub Actions. It will automate the testing, building, and deployment of a web application.

Key Deliverables:

- Set up a GitHub repository and integrate with Jenkins

- Implement CI/CD pipeline using Jenkins and GitHub Actions

- Automate deployment on AWS EC2 instance

Project 2: Deploying a Multi-Tier Web Application on Kubernetes

This project focuses on deploying a multi-tier application using Kubernetes and Helm charts.

Key Deliverables:

- Create and configure Kubernetes clusters

- Deploy a frontend, backend, and database using Helm charts

- Implement auto-scaling and monitoring using Prometheus

Major Project: In-House to Cloud Migration

This project involves migrating an existing in-house application infrastructure to a cloud environment (AWS/Azure/GCP).

Key Deliverables:

- Assess the current on-premises infrastructure and define the migration strategy

- Use Terraform to provision cloud infrastructure

- Implement containerization using Docker and Kubernetes

- Configure CI/CD pipeline and monitoring for the cloud environment