Devops Syllabus

Month 1: Introduction to DevOps and AWS Fundamentals

Week 1: DevOps Fundamentals

- What is DevOps? Principles and Culture
- Overview of DevOps Lifecycle (CI/CD)
- DevOps Tools Overview
- Introduction to Virtualization and Cloud Computing
- Project: Set up a basic CI/CD pipeline

Week 2: AWS Fundamentals

- Introduction to AWS
- AWS Global Infrastructure: Regions, Availability Zones, Edge Locations
- Understanding AWS EC2, AMI, and EBS
- Creating and Managing EC2 Instances
- AWS IAM (Identity & Access Management)
- Project: Launch and manage EC2 instances and set up security with IAM

Week 3: Networking and Storage on AWS

- VPC (Virtual Private Cloud) Overview
- Subnets, Route Tables, Security Groups, and Network ACLs
- AWS S3: Buckets, Object Storage, Permissions
- AWS RDS: Databases in the Cloud
- Project: Set up a VPC with EC2 instances, S3 bucket, and RDS instance

Week 4: Terraform Basics

- Introduction to Infrastructure as Code (IaC)
- Terraform Installation and Setup
- Creating EC2 Instances using Terraform
- Terraform State, Providers, and Modules
- Project: Provision AWS infrastructure (VPC, EC2, S3) using Terraform

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Month 2: Continuous Integration & Continuous Delivery (CI/CD)

Week 1: GitLab for Version Control and CI

- GitLab Overview and Setting up Repositories
- GitLab CI/CD Pipelines
- Integrating GitLab with AWS EC2
- Working with GitLab Runners
- Project: Create a GitLab CI pipeline to deploy a web application on AWS

Week 2: Jenkins for Automation

- Introduction to Jenkins and Installation
- Jenkins Pipeline Basics (Declarative vs. Scripted Pipelines)
- Setting up Jenkins Jobs and Pipelines
- Jenkins Integration with AWS
- Project: Create a Jenkins pipeline to automate AWS EC2 deployment

Week 3: Docker and Containerization

- Introduction to Containers and Docker
- Docker Architecture, Images, and Containers
- Creating Dockerfiles and Managing Docker Containers
- Docker Compose for Multi-Container Applications
- Project: Containerize an application and deploy it using Docker Compose

Week 4: Ansible for Configuration Management

- Introduction to Ansible and Setup
- Ansible Playbooks and Inventory Files
- Automating EC2 Instance Configurations with Ansible
- Ansible Roles and Variables
- Project: Automate infrastructure configuration on AWS EC2 using Ansible

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Month 3: Advanced DevOps Tools and Cloud Automation

Week 1: Terraform Advanced Concepts

- Terraform Remote State Management
- Terraform Modules for Reusability
- Managing Multiple Environments (dev, prod) using Terraform Workspaces
- Handling Terraform Errors and Debugging
- Project: Use Terraform to manage a multi-environment AWS setup (dev and prod)

Week 2: Jenkins Advanced

- Jenkins Integration with Docker and Kubernetes
- Jenkins Declarative Pipelines (Advanced Features)
- Jenkins with GitLab for Automated CI/CD Workflows
- Automating Multi-Environment Deployments with Jenkins
- Project: Automate multi-environment deployments using Jenkins and Terraform

Week 3: GitLab CI with Kubernetes

- Introduction to Kubernetes (K8s)
- Setting Up a Kubernetes Cluster (using Minikube or EKS)
- GitLab CI Integration with Kubernetes
- Automating Kubernetes Deployments with GitLab CI/CD
- Project: Deploy an application on Kubernetes using GitLab CI pipelines

Week 4: JFrog Artifactory for Artifact Management

- Introduction to JFrog Artifactory
- Managing Docker Images and Binaries
- Integrating Jenkins with JFrog Artifactory
- Automating Artifact Management and Deployments
- Project: Manage Docker images and automate deployments using JFrog Artifactory and Jenkins

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Month 4: DevOps Monitoring, Security, and Final Project

Week 1: Monitoring with Prometheus and Grafana

- Introduction to Prometheus and Grafana
- Setting up Monitoring for AWS Infrastructure
- Monitoring Docker Containers and Kubernetes Clusters
- Creating Dashboards in Grafana
- Project: Monitor AWS resources and Docker containers using Prometheus and Grafana

Week 2: AWS CloudFormation and Lambda

- Introduction to AWS CloudFormation
- Writing and Managing CloudFormation Templates
- Serverless Computing with AWS Lambda
- Automating Infrastructure Deployments using CloudFormation and Lambda
- Project: Automate serverless application deployment with CloudFormation and Lambda

Week 3: DevOps Security Practices

- Introduction to DevSecOps
- Securing AWS Environments (IAM, Security Groups, VPC)
- Docker Security Best Practices
- Jenkins Security Best Practices
- Project: Implement security best practices for a CI/CD pipeline (AWS, Jenkins, Docker)

Week 4: Final Project

- Build a complete CI/CD pipeline using Jenkins, GitLab CI, Terraform, Ansible, Docker, and JFrog
- Deploy a multi-container application to AWS (EC2, Kubernetes)
- Automate infrastructure provisioning, deployment, monitoring, and artifact management

- Include monitoring with Prometheus and Grafana, and security best practices