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# DEVOPS WITH KUBERNETES Live Project Training

#### **Overview of DevOps**

**Goal:**In this module, you will be introduced to the DevOps environment.

Objectives: After completing this module, you should be able to

- Understand the benefits of DevOps over other software development processes
- Gain insights into the DevOps environment
- Get an overview of different DevOps Tools
- Get a picture of the working of the DevOps Delivery Pipeline

#### **Topics:**

- Introduction to DevOps
- Benefits of working in a DevOps environment
- DevOps Lifecycle
- DevOps Stages
- DevOps Delivery Pipeline

#### **Version Control with Git**

**Goal:** In this module, you will gain insights into Source Control Management and learn the functionalities of Git.

Objectives: After completing this module, you should be able to

- Understand Version Control
- Perform management of files for small as well as large projects
- Perform various Git commands such as git add, git fetch, git commit, git init, etc.
- Work with remote repositories

- Version Control
- Git Introduction
- Git Installation
- Commonly used commands in Git
- Working with Remote repository

#### **Hands On:**

- Git Common Commands
- Working with Remote Repository

Git, Jenkins & Maven Integration

**Goal**: In this module, you will learn about the different actions performed through Git and will be

Introduced to Jenkins and Maven.

**Objectives**: After completing this module, you should be able to:

- Execute branching and merging operations
- Perform various Git commands
- Understand Maven Architecture and dependencies
- Learn about Continuous Integration & its importance
- Understand Jenkins and its features

#### **Topics:**

- Branching and merging in Git
- Merge Conflicts
- Stashing, Rebasing, Reverting and Resetting
- Git Workflows
- Introduction to Maven
- Maven Architecture
- Introduction to Continuous Integration
- Introduction to Jenkins

#### **Hands On:**

- Branching and Merging
- Merge Conflicts
- Stashing, Rebasing, Reverting, and Reseting
- Configuring Maven

### **Continuous Integration using Jenkins**

**Goal**: In this module, learn how to perform Continuous Integration by building applications with the

help of Maven and create deployment pipelines using Jenkins.

Objectives: After completing this module, you should be able to

- Managing authorization in Jenkins
- Jenkins notification management
- Master-slave architecture in Jenkins
- Add a slave node to Jenkins master
- Build and deploy codes using Jenkins
- Build pipeline plugin in Jenkins
- Use Declarative pipeline in Jenkins

#### **Topics:**

- Jenkins Architecture
- Plugin Management in Jenkins
- Jenkins Security Management
- Notification in Jenkins
- Jenkins Master-slave architecture
- Jenkins Delivery Pipeline
- Jenkins Declarative pipeline

#### **Hands On:**

- Create pipeline view
- Adding Slave node in Jenkins
- Build declarative Pipeline project

#### **Configuration Management Using Ansible**

**Goal**:Learn how to manage and configure your infrastructure using Ansible Ad-Hoc commands,

Playbooks, and Roles.

Objectives: After completing this module, you should be able to

- Utilize Ansible CLI
- Execute Ansible Ad-Hoc Commands for one-off tasks
- Automate host servers using Ansible Playbooks
- Use Variables in Playbooks
- Using Handlers

- Introduction to Configuration Management
- Infrastucture as Code
- Introduction to Ansible
- Ansible Architecture

- Inventory Management
- **Ansible Modules**
- **AD-HOC Commands**
- Ansible Playbooks
- Ansible Roles

#### **Hands On:**

- 4 Ad-Hoc Commands
- Running a Simple Playbook
- Using Variables and handlers
- Using Ansible Roles

#### Containerization using Docker Part - I

**Goal:** This module introduces learners to the core concepts and technology behind Docker. Learn in

detail about containers and various operations performed on them.

**Objectives**: After completing this module, you should be able to

- Understand Containerization
- Learn the evolution of virtualization to containers
- Understand the Docker Architecture
- Perform Various actions using Docker CLI
- Bind container ports to the Machine ports
- Run containers in different modes
- ♣ Write and build a Dockerfile to create a Docker Image

- Containerization
- Namespaces
- Docker
- Docker Architecture
- Container Lifecycle
- Docker CLI
- Port Binding
- Detached and Foreground Mode
- Dockerfile
- Dockerfile Instructions
- Docker Image

#### **Hands On:**

- Docker CLI Commands
- Port Binding
- Starting Containers in Different Modes
- Writing a Dockerfile to Create an Image

#### Containerization using Docker Part – II

**Goal**: Learn how to use Docker Hub registry, deploy a multi-tier application using Docker Compose,

and create a swarm cluster.

Objectives: After completing this module, you should be able to

- Use Docker Hub to store custom Images
- **Store data in Container Volumes for persistent storage**
- Setup Docker Compose
- Deploy a multi-container application using Docker Compose
- Deploy a Swarm Cluster
- **4** Topics:
- Docker Registry
- Container Storage
- Volumes
- Docker Compose
- Docker Swarm

#### **Hands On:**

- Setting up Docker Hub
- Docker Volumes
- Installing Docker Compose
- Installing a Multi-Container Application using Compose

Orchestration using Kubernetes Part - I

**Goal:** In this module, you will learn about Container Orchestration and Basic of container

Management using Kubernetes.

Objectives: After completing this module, you should be able to

- Understand Container Orchestration
- Learn about Kubernetes Core Concept

- Deploy Pods
- Create Deployments to manage Pods
- ♣ Launch DaemonSets for Background applications
- Update and Rollback your Deployments
- Scale your containerized Applications

#### **Topics:**

- Introduction to Container Orchestration
- Kubernetes Core Concepts
- Understanding Pods
- ReplicaSet and Replication Controller
- Deployments
- DaemonSets
- Rolling Updates and Rollbacks
- Scaling Application

#### Hands On:

- Kubectl Common Commands
- Deployments
- DaemonSets
- Rolling-update and Rollbacks
- Scaling in Kubernetes

### **Orchestration using Kubernetes Part - II**

**Goal**: Learn and deploy different service discovery mechanisms, utilize Volumes for persistent storage And deploy StatefulSets for stateful applications.

Objectives: After completing this module, you should be able to

- Deploy different Kubernetes Services
- Utilize Volumes to store Persistent Data
- Create Persistent Volume Claims to attach volumes to Pods
- Understand Persistent Volume Claims Primitives
- Use Headless Services in Stateful Sets
- Deploy Helm Charts

- Services
- Persistent Storage in Kubernetes
- Primitives for Persistent Volume Claims

- Secrets and ConfigMaps
- Headless Services
- StatefulSets
- Helm Charts
- Hands On:
- Deploying Services
- Persistent Volumes and Persistent Volume Claims
- StatefulSets
- ConfigMaps and Secrets

#### **Monitoring using Prometheus and Grafana**

**Goal:** In this module, you will learn how to collect, monitor, and visualize data using Prometheus and Grafana.

**Objectives**: After completing this module, you should be able to

- Understand Continuous Monitoring
- Use Prometheus to monitor services
- Create an alerting mechanism using Prometheus
- 🖶 Deploy Grafana dashboards to visualize data
- Integrate Prometheus and Grafana to monitor a full pipeline

#### **Topics:**

- Introduction to Prometheus and Grafana
- Prometheus and Grafana Setup
- Monitoring using Prometheus
- Dashboard Visualization using Grafana
- Creating a Dashboard to monitor the Pipeline

#### **Hands On:**

- Monitoring Service using Prometheus
- Alerting using Prometheus
- Grafana Dashboards
- Monitoring a Pipeline

### Provisioning using Terraform Part – I

**Goal**: Learn how to provision and manage infrastructure on a Cloud Platform (AWS) using Terraform

Configuration Files.

Objectives: After completing this module, you should be able to-

- Understand Provisioning using Terraform
- Learn the Difference between Terraform vs Ansible
- Understand Terraform Architecture
- Deploy a Terraform Configuration File
- Use Basic Terraform Commands
- Manage Terraform Resources

#### **Topics:**

- Introduction to Terraform
- Terraform vs Ansible
- Terraform Architecture
- Terraform Configuration
- Terraform Common Commands
- Managing Terraform Resources

#### **Hands On:**

- Setting Up AWS and Terraform
- Executing a Terraform Configuration
- Managing Terraform Resources
- Referencing Terraform Resources

#### **Provisioning using Terraform Part - II**

**Goal**: Use Terraform State commands to manage the current state of your infrastructure. Deploy a

Fully usable and working infrastructure using Terraform.

**Objectives**: After completing this module, you should be able to

- Perform Terraform State Commands
- Deploy a Terraform Project on AWS

- Terraform State
- Terraform Project
- Hands On: Terraform State Commands, Terraform Live Project

















































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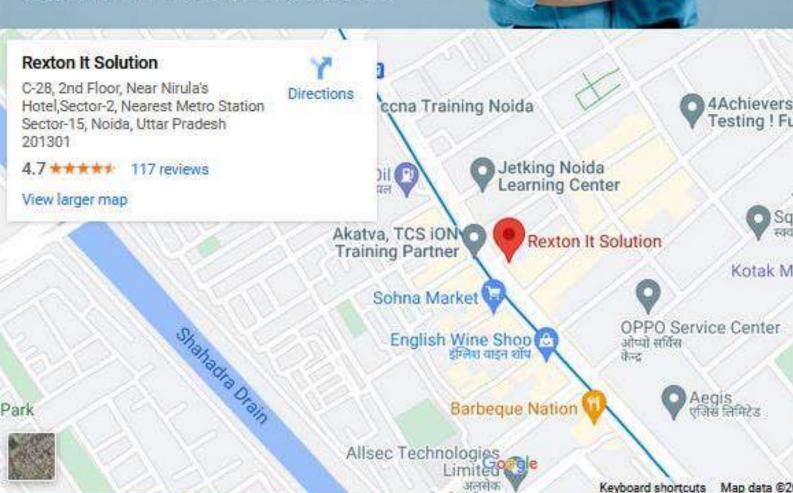
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# Thank You