CI CD with Ansible and Terraform

Duration: 8 Days (8 hours/day)

Prerequisites:
1) Basic knowledge of Linux OS
2) Basic knowledge of Cloud Azure.

Course Objective: In this course participants will learn how to automate Linux Server with Ansible, Deploy Infrastructure on Azure, Versioning of Files using Git and Jenkins to automate Infrastructre Lifecycle.

Cloud Platform: Microsoft Azure, **Terraform Version**: Latest, **Ansible Version:** Latest Open Source

Lab Requirement: Koenig DC (CentOS 9) & Participant Azure Account

Git and GitHub

Module 1 – Git

Introduction to Version Control System History of GIT
Git Basics
States in Git Installing Git
Lab: Installation of GIT on system
Configuration of Git
Working with Repositories
Lab: Create GIT repository
Basic Git Commands
Lab: Create commits and switch in between commits
Working with Remotes
Lab: Create repository on GITHUB and then push local repository on GITHUB repository
Tagging
Lab: Give tag to commits
Git Branching
Lab: Create branch and then switch and merge branches

Automation with Ansible

Module 1 – Introduction to Ansible

Evolution of Infrastructure
Overview of Infrastructure as a Code What is Configuration Management Ansible Overview
Case Study

Module 2 – Ansible Architecture and Installation

Ansible Architecture and It's Working Ansible in DevOps
Installation and Configuration Working with Command Line Tools
Lab: Installation and configuration of Ansible on machine

Module 3 – Ansible Modules

Overview of Modules Types of Modules Core Modules
Extras Modules Return Values
Ad-Hoc Commands Case Study
Lab: Run Ansible modules with Ansible Ad-Hoc Commands

Module 4 – The Playbook Grammar

Introduction to YAML Playbook YAML Definition Playbook Terms
Playbook Tasks
Writing Ansible Playbooks
Lab: Create playbook for running multiple task on managed nodes

Module 5 – Variables, Conditions, Loops, Handlers and Jinja2 Templates

Variables
Lab: Run playbook by using variables
Loops
Lab: Run playbook by using loop
Notify and Handlers
Lab: Run playbook by using notify and handlers
Jinja2 Templates
Lab: Create jinja2 templates file and use in playbook

Module 6 – AWX Tower

Installing AWX Tower Features of Ansible Tower Managing Jobs
Lab: Installation and configuration of AWX Tower on system
Manage and Track Inventory Remote Command Execution
Lab: Run playbooks on AWX Tower
Case Study

Terraform with Azure

Module 1 - Getting Started & Setting Up Labs

Introduction to Infrastructure as Code and Terraform
Lab: Installation of Terraform on Windows
Comparison between Terraform and Ansible
Introduction to Azure CLI
Understanding Terraform Providers
Authenticate Azure with Terraform
Lab: Setting Up Terraform on Windows and Azure Authentication
Basic Terraform commands: init, plan, apply
Lab: Defining Provider & Using Basic Terraform commands

Module 2 – Building Cloud Infrastructure with Terraform

Lab: Creating Resource Groups in Azure
Lab: Provisioning Virtual Networks, Subnets, Public Ips, and Network Interfaces
Lab: Deploying Windows and Linux VMs
Lab: Configuring Azure Storage, Security Groups, and Load Balancers
Understanding Terraform State file
Understanding Working of State file – Desired State & Current State
Terraform Provider Versioning
Lab: Methods to define Terraform Provider Versions

Module 3 – Read, Generate, Modify Configurations

Understanding Attributes and Output Values in Terraform
Lab: Handling Terraform attributes and output values
Lab: Referencing attributes across resources
Understanding Terraform Variables and Data Types – (String, Number, Boolean, List, Map)
Lab: Methods to Define Variables & Variable Arguments
Lab: Fetching Data from List & Map in Variables
Understanding Meta-Arguments – (for_each, count, depends_on)
Lab: Using Meta-Arguments
Understanding conditional expression and locals
Lab: Using Conditional expression and Locals
Understanding Expressions – for & Splat expression
Lab: Using for and Splat expression
Understanding Data Sources & Dynamic Blocks
Lab: Using Data Sources
Lab: Using Dynamic Blocks
Lab: Exploring debugging techniques in Terraform
Terraform Commands – validate, fmt
Lab: Using terraform validate and terraform fmt

Lab: Replacing Resource in terraform manually – taint and replace
Lab: Using Terraform Graph utility
Lab: Saving Terraform Plan to a file and apply from plan file

Module 4 - Terraform Provisioners

Understanding provisioners in Terraform
Understanding Connection Block
Types of provisioners
Lab: Implementing remote-exec and local-exec provisioners

Module 5 - Terraform Modules & Workspaces

Applying the DRY (Don't Repeat Yourself) principle
Understanding Usage of Terraform Modules
Standard Structure of Terraform Modules
Lab: Creating and Using local Modules
Lab: Utilizing Modules from Terraform Registry
Understanding and implementing Terraform workspaces
Lab: Working with Terraform Workspaces

CI/CD Tool - Jenkins

Module 1 – Introduction to Jenkins

Introduction to Jenkins
Jenkins Installation
Introduction to Jenkins UI
Create First Job
Lab: Installation of Jenkins

Module 2 – Add SSH Node Credentials in Jenkins

Install SSH Plugin in Jenkins Add Credentials of Node
Lab: Install SSH Plugin in Jenkins and add SSH server credentials for authentication
Integrate Node SSH Server with Jenkins
Lab: Integration of SSH server with Jenkins to run projects

Module 3 – Build Job on Remote Machine

Deploy Web Server Automatically through Jenkins
Lab: Deploy Web Server by using Jenkins and access Web Server from browser

Module 4 – Jenkins Security

Enable/Disable Login in Jenkins Allow Users to Sign up
Lab: Enable/Disable Login for users
Create Users Manually in the Jenkins DB Create and Manage Roles for Jenkins Users
Lab: Create users and roles and give privileges to users as per roles

Module 5 – Jenkins Email Integration

Install a Mail Plugin Integration Jenkins and G-mail
Add notifications to your jobs
Lab: Configure and enable Gmail notification for Jenkins Projects

Module 6 – Jenkins Ansible Integration

Store Playbooks, Inventory and Configuration Files on GitHub Automatically Pull Code from GitHub
then Run on Ansible Server
Lab: Integration of Jenkins with Ansible and pull playbooks from GITHUB and run on Ansible server

Module 7 – CICD with Jenkins and Terraform

Store Terraform Files, Playbooks, Inventory and Configuration Files on GitHub
Automatically Deploy VMs With the Help of Terraform and Once Machine is Deployed then Run
Ansible to Configure Those VMs
Lab: Intergrating Jenkins with Ansible and Terraform