

# 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 Infrastructure 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 – CI/CD 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:** Integrating Jenkins with Ansible and Terraform

