

Terraform with Vault & Terragrunt

Duration: 5 days (8hrs/day)

Prerequisites: Basic knowledge of Cloud Azure/AWS.

Course Objective: This course covers Terraform fundamentals, including setup, infrastructure creation, configuration management, and state handling. Participants will learn advanced topics such as Terraform modules, provisioners, remote state management, and integration with version control. Additionally, the course explores Terraform Cloud, HashiCorp Vault, and Terragrunt for automated infrastructure deployment and secure secrets management. Through hands-on labs, learners will gain practical skills essential for managing cloud infrastructure with Terraform effectively.

Cloud Platform: Azure/AWS, **Terraform Version:** Latest

Lab Requirement: Participant Cloud Free-Trial Account Required

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

Understanding Terraform Providers

Authenticate AWS 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 EC2 instances in AWS

Lab: Provisioning Virtual Networks, Subnets, Elastic IPs, and Network Interfaces

Lab: Deploying Windows and Linux EC2

Lab: Configuring S3 Storage, Security Groups

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 Object & Tuple type constraint

Understanding Meta-Arguments – (for_each, count, depends_on, provider, lifecycle)

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

Understanding Functions

Lab: Using Functions – element, zipmap, lookup

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 file, 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

Module 6 - Remote State Management

Integrating Terraform with Git for team collaboration

Understanding Basic Working of Git

Lab: Handling Git commands (initialize, commit, push, tagging, branching)

Challenges and security considerations in Terraform state

Lab: Remote state management with Terraform, including importing existing resources

Terraform State Backend Configuration

Lab: Putting terraform state file on AWS S3

Module 7 – Terraform Cloud and Enterprise Overview

Introduction to Terraform Cloud

Creating infrastructure with Terraform Cloud

Overview of Sentinel Security in Terraform

Lab: Deploying Infrastructure with Terraform Cloud and Sentinel Security

Module 8 – Hashicorp Vault & Terragrunt

Understanding Basics of Vault

Understanding random provider in terraform

Lab: Installing & Configuring Vault

Lab: Generate Secrets Dynamically and Save in Vault using terraform

Lab: Using vault key-value secrets in terraform configuration

Understanding Terragrunt

Understanding Directory Structure of terragrunt

Lab: Installing Terragrunt & Implementing terragrunt

Understanding terragrunt.hcl

Understanding terragrunt commands – plan/apply/destroy

Lab: Implementing DRY Principle using terragrunt.hcl

Lab: Deploying infra using terragrunt in different environment