Infrastructure as Code (IaC)

COURSE OVERVIEW

As enterprises seek to deploy and maintain increasingly complex cloud infrastructure, there is a necessity to use "Infrastructure as Code" (IaC) tools, like Terraform. An open-source, state management tool developed by HashiCorp, Terraform allows developers to use a common coding interface to work through their various clouds safely and efficiently. Attendees will leave being able to write and understand Terraform code (HCL), have a clear understanding of Terraform's various components and supporting tools, as well as when to reach for Terraform over another IaC tool, such as Ansible.

WHO WILL BENEFIT FROM THIS COURSE?

- DevOps Engineers
- Software Developers
- Technical Managers and Leads
- System and Cloud Administrators
- Network Engineers and Developers

PREREQUISITES

Although not required, students with some experience programming, or pre-existing knowledge of cloud architecture, will most appreciate the technical nature of this hands-on course.

COURSE OBJECTIVES

- Writing Terraform HCL code
- Deploying into common clouds such as AWS, Azure, Google Cloud, Docker, Oracle, Kubernetes, and VMWare
- Where Terraform fits in the Enterprise CI/CD model
- Differences between Terraform and Ansible
- Best practices
- Prepare for HashiCorp's Terraform Associate Certification

COURSE OUTLINE

Up and Running with Terraform

- Terraform Overview
- Defining "declarative"
- How to think about Terraform (versus Ansible)
- Reviewing the Terraform Configuration
- Running the Terraform Configuration
- Provisioners

Syntax

- "Low Level" HCL syntax
- Style Conventions
- Comments
- Blocks
- Arguments
- JSON Configuration Syntax

Resources

- Keywords:
  - depends_on
  - count
  - for_each
  - provider
  - lifecycle
- Data Sources

Variables and Output

- Input Variables
- Output Values
- Local Values

Modules

- Module Blocks
- Module Sources
- Meta Arguments

Terraform Templates

- templatefile Function
- Template Demonstration
- Introducing Data Sources
- Creating an External Data Source
- Building tftpl template files

Expressions

- Types and Values
- Strings and Templates
- Reference to Values
- Operators
- Function Calls
- Conditionals
- For Expressions
- Splat Expressions
- Dynamic Blocks
- Type Constraints
- Version Constraints

Functions

- String
- Collection
- Numeric
- Encoding
- Filesystem
- Date and Time
- Hash and Crypto
- IP Network
- Type Conversion

State

- Understanding the importance of state
- State storage and locking
- importing existing resources
- Remote State
- What to do when local state is lost

CICD Pipelines with Terraform

- Terraform and GitLab pipelines
- Terraform and Jenkins pipelines

Enterprise Case Studies

- Terraform and Docker
- Terraform and Kubernetes
- Terraform and Amazon AWS
- Terraform and Azure
- Terraform and Google Cloud Platform (GCP)
- Terraform and VMWare
- Terraform and Oracle
- Understanding how to apply Terraform to your unique infrastructure

Beyond Basics

- Intro to Go Programming
- Terraform Cloud
- Additional HashiCorp Offerings
- Backends
- Secrets

Hands-On Labs

Software Control Management

- SCM Option #1 - GitHub
- SCM Option #2 - GitLab

Overview of Terraform

- Terraform Install

Terraform Modules

- Up and Running with Terraform
- Terraform Variables
- Output Values
- CHALLENGE - Terraform and Docker

Beyond Basics

- Terraform CLI Workspaces
- Terraform Expressions and Errors
- Resources - replace vs taint
- Dynamic Operations with Functions
- Creating a Terraform Module
- Moving State - terraform state mv
- Dynamic Provisioning with tfvars Files
- Data Sources and HTTP Provider

Loops

- Looping Constructs - for_each

Provisioning

- local-exec Provisioner
- Creating Delays
- Terraform - templatefile Function

Terraform Cloud

- Terraform Cloud and Terraform Enterprise
- Triggering Cloud Builds via Git Commits

Dynamic Blocks

- Dynamic Blocks

AWS

- Terraform and AWS
- Output Values and AWS
- AWS and looping with count vs for_each
- Correcting Resource Drift and AWS
- CHALLENGE - Terraform and AWS

Azure

- Terraform and Azure

Google Cloud Platform

- Terraform and Google Cloud Platform

Oracle

- Terraform and Oracle Cloud Infrastructure

Terraform and Enterprise

- Deploy a Go RESTful API microservice with Terraform
- Terraform and Ansible

VMWare

- Terraform and VMWare

Helpful DevOps Tools (OPTIONAL)

- Open Policy Agents and Terraform
- GitHub Actions - GitLeaks
- GitHub Actions - Terraform

Terraform Review

- HashiCorp Terraform Study Guide

Appendix

- Glossary

WHY TRAIN WITH SUNSET LEARNING INSTITUTE?

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