Google Compute Fundamentals with Terraform

Course Duration: 24 Hours **Course code: GCFT**

1. Course Overview

This course provides a comprehensive understanding of Google Cloud compute services along with Infrastructure as Code (IaC) using Terraform. Learners will gain hands-on experience in provisioning, managing, and automating compute resources such as virtual machines, instance groups, and scaling solutions on Google Cloud. The course emphasizes automation, scalability, and best practices for managing cloud infrastructure efficiently.

2. What you'll learn?

By the end of the course, you will be able to:

- Understand Google Cloud compute services and architecture
- Deploy and manage virtual machines (Compute Engine)
- Use Terraform to automate infrastructure provisioning
- Create reusable infrastructure templates
- Implement autoscaling and load balancing
- Manage networking for compute resources
- Apply security and IAM best practices
- Monitor, optimize, and troubleshoot compute environments

3. Target Audience

- Cloud Engineers
- DevOps Engineers
- System Administrators
- Infrastructure Engineers
- IT Professionals and Beginners in Cloud Automation

Phone: +91-999-911-1686 **Mail Us:** info@ssdntech.com

4. Pre-Requisites

Before taking this course, you should have:

- Basic understanding of cloud computing concepts
- Familiarity with Google Cloud Platform
- Basic knowledge of networking and virtual machines
- Basic command-line experience
- Introduction to scripting (optional but helpful)

5. Course content

Module 1: Course Introduction

- Course objectives and structure
- Overview of Google Cloud compute services
- Introduction to Infrastructure as Code (IaC)

Module 2: Google Compute Engine Fundamentals

- Introduction to Compute Engine
- Virtual machine concepts
- Machine types and pricing models
- Disk types and storage options

Module 3: Creating and Managing VM Instances

- Creating VM instances using Console and CLI
- Managing VM lifecycle
- SSH access and instance configuration
- Custom images and snapshots

Module 4: Networking for Compute Resources

- VPC fundamentals
- Subnets and IP addressing
- Firewall rules and network tags

- External and internal IP management

Module 5: Introduction to Terraform

- What is Terraform
- Terraform architecture and workflow
- Installing and configuring Terraform
- Writing basic Terraform configurations

Module 6: Terraform Core Concepts

- Providers and resources
- Variables and outputs
- State files and backend configuration
- Dependency management

Module 7: Provisioning Compute Resources with Terraform

- Creating VM instances using Terraform
- Managing disks and networks
- Using modules for reusable code
- Infrastructure provisioning best practices

Module 8: Instance Groups and Load Balancing

- Managed and unmanaged instance groups
- Autoscaling policies
- Load balancing concepts
- Configuring load balancers

Module 9: Automation and Scaling

- Automating infrastructure deployment
- Scaling applications with instance groups
- Rolling updates and deployments

- High availability strategies

Module 10: Security and IAM

- Identity and Access Management (IAM)
- Service accounts and roles
- Securing compute resources
- Best practices for access control

Module 11: Monitoring and Logging

- Google Cloud Operations Suite
- Monitoring VM performance
- Logging and alerting
- Troubleshooting compute issues

Module 12: Cost Optimization and Best Practices

- Pricing models and cost factors
- Optimizing compute resources
- Rightsizing instances
- Budget monitoring and alerts

Module 13: Advanced Terraform Features

- Terraform modules and workspaces
- Remote state management
- Provisioners and dynamic blocks
- Integration with CI/CD pipelines

Module 14: Hands-On Labs and Real-World Scenarios

- Deploying infrastructure using Terraform
- Automating VM provisioning
- Implementing scaling and load balancing

- Troubleshooting real-world issues

Module 15: Capstone Project

- Design and deploy a scalable compute infrastructure
- Automate deployment using Terraform
- Implement networking, security, and monitoring
- Final project evaluation and presentation

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