

Architecting with Google Compute Engine

This course will familiarize you with Google Cloud's flexible infrastructure and platform services, with a specific focus on Compute Engine. This course uses a combination of lectures, demos, and hands-on labs to explore and deploy solution elements, including infrastructure components like networks, systems, and application services. You'll also learn how to deploy practical solutions such as hybrid networking, customer-supplied encryption keys, security and access management, quotas and billing, and resource monitoring.

**DURATION**

3 days

**LEVEL**

200 - Intermediate

**FORMAT**

Instructor-led, On-demand

What you'll learn

- Manage and examine billing of Google Cloud resources
- Monitor resources using Google Cloud services
- Connect your infrastructure to Google Cloud
- Configure load balancers and autoscaling for VM instances
- Automate the deployment of Google Cloud infrastructure services
- Leverage managed services in Google Cloud
- Explain how quotas and resource hierarchies protect and organize Google Cloud environments.

Overview	11 modules · 133 videos · 17 labs · 28 classroom activities
Who this course is for	• Cloud Solutions Architects, DevOps Engineers, and individuals using Google Cloud to create new solutions or to integrate existing systems, application environments, and infrastructure, with a focus on Compute Engine.
Products	• Cloud VPN • Advanced Compute Images • Spanner • BigQuery Studio • Cross-Cloud Interconnect • Google Cloud Observability • Advanced Networking • Access Context Manager • Privileged Access Manager • Storage Insights • Spanner Studio • Firebase Studio • Application Load Balancer • Database Center • Compute Engine • VPC Networking • Identity and Access Management (IAM) • Cloud Storage • Cloud SQL • Cloud Spanner • Firestore • Cloud Bigtable • BigQuery • Resource Manager • Cloud Monitoring • Cloud Logging • Cloud Interconnect • Cloud Load Balancing

Prerequisites	• Have completed Google Cloud Fundamentals: Core Infrastructure or have equivalent experience • Have basic proficiency with command-line tools and Linux operating system environments • Have systems operations experience, including deploying and managing applications, either on-premises or in a public cloud environment
Not covered	• Google Kubernetes Engine • App Engine • Cloud Functions • Cloud Run

Module 01

Introduction to Google Cloud

Topics	• Interact with the Google Cloud console and Cloud Shell • Create Cloud Storage buckets • Deploy solutions using Google Cloud Marketplace
Objectives	• Differentiate between available administrative interfaces for Google Cloud • Navigate and execute commands inside the Google Cloud console and Cloud Shell • Configure Cloud Storage buckets to store solution assets • Deploy ready-to-use software stacks using Google Cloud Marketplace
Activities	• Lab: Console and Cloud Shell • Lab: Infrastructure Preview • Module quiz

Module 02

Virtual Networks

Topics	• Explore VPC Networking • Implement Private Google Access and Cloud NAT
Objectives	• Identify core Virtual Private Cloud (VPC) network resources and topologies • Configure custom VPC networks and subnetworks • Implement Private Google Access and Cloud NAT for secure internal communication
Activities	• Lab: VPC Networking • Lab: Implement Private Google Access and Cloud NAT • Module quiz

Module 03

Virtual Machines

Topics	• Recall the CPU and memory options for virtual machines • Describe the disk options for virtual machines • Explain VM pricing and discounts • Create and customize VM instances using Compute Engine
Objectives	• Evaluate virtual machine machine types based on CPU and memory workload requirements • Select appropriate persistent disk options for latency-sensitive applications • Calculate cost optimizations utilizing sustained use and committed use discounts • Provision and configure customized VM instances using Compute Engine
Activities	• Lab: Creating Virtual Machines • Lab: Working with Virtual Machines • Module quiz

Module 04

Identity and Access Management (IAM)

Topics	• Describe the IAM resource hierarchy • Explain the different types of IAM roles • Recall the different types of IAM members • Implement access control for resources using IAM
Objectives	• Illustrate the organizational resource hierarchy for centralized IAM governance • Distinguish between basic, predefined, and custom IAM roles • Assign administrative permissions across users, groups, and service accounts • Enforce least-privilege access control on cloud resources using IAM policies
Activities	• Lab: Cloud IAM • Module quiz

Module 05

Storage and Database Services

Topics	• Differentiate between Cloud Storage, Cloud SQL, Cloud Spanner, Firestore and Cloud Bigtable • Choose a data storage service based on your requirements • Implement data storage services
Objectives	• Compare relational, object, and NoSQL storage options across Google Cloud • Select an optimal data storage service based on schema, consistency, and throughput constraints • Deploy and connect applications to managed cloud storage and database instances
Activities	• Lab: Cloud Storage • Lab: Implementing Cloud SQL • Module quiz

Module 06

Resource Management

Topics	• Describe the cloud resource manager hierarchy • Recognize how quotas protect Google Cloud customers • Organize resources using labels • Explain the behavior of budget alerts in Google Cloud • Examine billing data with BigQuery
Objectives	• Structure enterprise resources using organizations, folders, and projects • Configure allocation quotas to prevent accidental resource overconsumption • Categorize cloud infrastructure components programmatically using labels • Configure automated budget thresholds and expenditure notifications • Execute analytical queries on exported billing data using BigQuery
Activities	• Lab: Examining Billing Data with BigQuery • Module quiz

Module 07

Resource Monitoring

Topics	• Describe the services for monitoring, logging, error reporting, tracing, and debugging • Create charts, alerts, and uptime checks for resources with Cloud Monitoring • Identify and fix errors using Cloud Debugger
Objectives	• Examine integrated observability capabilities across logging, monitoring, and tracing • Configure custom metric dashboards, alerting policies, and uptime checks via Cloud Monitoring • Analyze application exceptions and trace execution flow using cloud debugging tools
Activities	• Lab: Resource Monitoring • Lab: Error Reporting and Debugging • Module quiz

Module 08

Interconnecting Networks

Topics	- Recall the Google Cloud interconnect and peering services available to connect your infrastructure to Google Cloud - Determine which Google Cloud interconnect or peering service to use in specific circumstances - Create and configure Google Cloud HA VPN - Recall when to use Shared VPC and when to use VPC Network Peering
Objectives	- Compare Dedicated Interconnect, Partner Interconnect, and Carrier Peering architectures - Select suitable hybrid connectivity solutions based on bandwidth and reliability SLA requirements - Provision secure site-to-site tunnels using High Availability (HA) VPN - Differentiate between centralized Shared VPC administration and decentralized VPC Network Peering
Activities	- Lab: Virtual Private Networks (VPN) - Module quiz

Module 09

Load Balancing and Autoscaling

Topics	- Recall the various load balancing services - Determine which Google Cloud load balancer to use in specific circumstances - Describe autoscaling behavior - Configure load balancers and autoscaling
Objectives	- Differentiate between external, internal, Layer 4, and Layer 7 Cloud Load Balancing architectures - Select appropriate load balancers based on protocol, region, and SSL termination needs - Design elastic compute groups governed by dynamic autoscaling policies - Configure managed instance groups behind HTTP(S) load balancers
Activities	- Lab: ILT Configure an HTTP Load Balancer with Autoscaling - Lab: Configuring an Internal Load Balancer - Module quiz

Module 10

Infrastructure Automation

Topics	• Automate the deployment of Google Cloud services using Terraform • Outline the Google Cloud Marketplace
Objectives	• Develop infrastructure-as-code configurations to provision cloud resources via Terraform • Evaluate third-party production software solutions available within Google Cloud Marketplace
Activities	• Lab: Automating the Deployment of Infrastructure Using Terraform • Module quiz

Module 11

Managed Services

Topics	• Describe the managed services for data processing in Google Cloud
Objectives	• Differentiate between managed serverless analytics and data processing platforms on Google Cloud • Evaluate serverless execution models to reduce operational overhead for data pipelines
Activities	• Module quiz