

Architecting with Google Cloud Design and Process

This course features a combination of lectures, design activities, and hands-on labs to show you how to use proven design patterns on Google Cloud to build highly reliable and efficient solutions and operate deployments that are highly available and cost-effective. This course was created for those who have already completed the Architecting with Google Compute Engine or Architecting with Google Kubernetes Engine course.

**DURATION**

2 days

**LEVEL**

200 - Intermediate

**FORMAT**

Instructor-led, On-demand

What you'll learn

- Apply a tool set of questions, techniques and design considerations
- Define application requirements and express them objectively as KPIs, SLO's and SLI's
- Decompose application requirements to find the right microservice boundaries
- Leverage Google Cloud developer tools to set up modern, automated deployment pipelines
- Choose the appropriate Google Cloud Storage services based on application requirements
- Discuss Google Cloud network architectures, including hybrid architectures
- Implement reliable, scalable, resilient applications balancing key performance metrics with cost
- Choose the right Google Cloud deployment services for your applications
- Secure cloud applications, data and infrastructure
- Monitor service level objectives and costs using Cloud Monitoring

Overview	9 modules · 82 videos · 3 labs · 25 total classroom activities
Who this course is for	• Cloud Solutions Architects, Site Reliability Engineers, Systems Operations professionals, DevOps Engineers, IT managers, and individuals using Google Cloud to create new solutions or to integrate existing systems, application environments, and infrastructure with Google Cloud.
Products	• App Hub • Cloud Build Catalog • Confidential Cloud Run • Advanced Networking • Access Context Manager • Privileged Access Manager • Application Load Balancer • Advanced Compute Images • App Engine • Cloud Functions • IAM • Cloud Load Balancing • Compute Engine • Cloud Build • Container Registry • VPC Networking
Prerequisites	• Have completed Architecting with Google Compute Engine, Architecting with Google Kubernetes Engine, 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

Module 01

Defining the Service

Topics	• Describe users in terms of roles and personas • Evaluate KPIs using SLOs and SLIs • Determine the quality of application requirements using SMART criteria
Objectives	• Classify application users using structured roles and personas • Formulate quantitative Service Level Objectives (SLOs) and Indicators (SLIs) from business KPIs • Validate technical requirements against SMART design criteria
Activities	• 3 activities • quiz

Module 02

Microservice Design and Architecture

Topics	• Decompose monolithic applications into microservices • Recognize appropriate microservice boundaries • Design consistent, standard RESTful service APIs • Identify the 12-factor best practices for implementing services
Objectives	• Architect the refactoring of monolithic applications into decoupled microservices • Define optimal domain boundaries to minimize inter-service coupling • Formulate standardized RESTful API specifications for enterprise integration • Apply 12-factor cloud-native application development principles to microservice implementations
Activities	• 2 activities • 1 quiz

Module 03

DevOps Automation

Topics	• Discuss the automation of service deployment using CI/CD pipelines • Explain how to leverage Cloud Source Repositories for source and version control • Automate builds with Cloud Build and build triggers • Manage container images with Container Registry
Objectives	• Design automated continuous integration and delivery (CI/CD) deployment pipelines • Implement version control workflows utilizing secure source repositories • Configure automated build triggers and execution steps via Cloud Build • Manage containerized artifacts securely inside private container registries
Activities	• 1 lab • 1 quiz

Module 04

Choosing Storage Solutions

Topics	• Identify the use cases for Spanner • Identify the use cases for Cloud SQL • Identify the use cases for Firestore • Identify the use cases for Memorystore
Objectives	• Evaluate relational data consistency requirements to select Cloud Spanner architectures • Configure fully managed MySQL and PostgreSQL deployments using Cloud SQL • Implement document-oriented NoSQL persistence using Firestore • Integrate low-latency in-memory caching layers using Memorystore
Activities	• 2 activities • 1 quiz

Module 05

Google Cloud and Hybrid Network Architecture

Topics	• Discuss the design of VPC networks to optimize for cost, security, and performance • Describe how global and regional load balancers provide access to services • Connect networks using peering and VPNs • Define hybrid networks between Google Cloud and on-premises data centers using Cloud Interconnect
Objectives	• Architect VPC network topologies optimized for security isolation and low-latency routing • Configure global and regional load balancing tiers to distribute application traffic • Implement secure interconnectivity utilizing network peering and encrypted VPN tunnels • Design enterprise hybrid network links connecting cloud resources with on-premises data centers via Cloud Interconnect
Activities	• 2 activities • 1 quiz

Module 06

Deploying Applications to Google Cloud

Topics	• Choose the appropriate Google Cloud deployment service for your applications • Configure scalable, resilient infrastructure using Instance Templates and Groups • Orchestrate microservice deployments using Kubernetes and GKE • Leverage App Engine for a completely automated platform as a service (PaaS)
Objectives	• Select optimal compute execution environments based on operational automation requirements • Deploy highly available compute clusters utilizing managed instance groups and templates • Orchestrate containerized microservice architectures using Google Kubernetes Engine (GKE) • Deploy fully managed web applications leveraging App Engine platform-as-a-service
Activities	• 1 lab • 1 quiz

Module 07

Designing Reliable Systems

Topics	• Discuss the design of services to meet requirements for availability, durability, and scalability • Identify the failures to be avoided to implement a fault-tolerant system
Objectives	• Architect application services to achieve high availability, durability, and elastic scalability • Implement failure mitigation strategies to construct fault-tolerant enterprise systems
Activities	• 2 activities • 1 quiz

Module 08

Security

Topics	• Identify the best practices for designing secure systems • Discuss the use of organizational policies and folders to simplify cloud governance • Identify Google Cloud services that can be leveraged for access management • Identify Google Cloud services that can be leveraged to mitigate DDoS attacks
Objectives	• Incorporate defense-in-depth security principles across cloud application architectures • Enforce centralized cloud governance utilizing resource folders and organization policies • Implement robust access control architectures via Cloud Identity and IAM • Configure Cloud Armor and edge security layers to mitigate distributed denial-of-service (DDoS) attacks
Activities	• 1 activity • 1 quiz

Module
09

Maintenance and Monitoring

Topics

- Discuss different ways to manage new service versions
- Describe how to forecast, monitor, and optimize service costs
- Observe if your services are meeting their SLOs using Cloud Monitoring and Dashboards
- Use Uptime Checks to determine service availability
- Respond to service outages using Cloud Monitoring Alerts

Objectives

- Execute zero-downtime deployment strategies including canary releases and blue-green updates
- Analyze and optimize ongoing operational consumption utilizing cloud financial tools
- Verify service level compliance using custom Cloud Monitoring dashboards
- Configure automated uptime verification checks across global testing regions
- Establish incident response workflows triggered by automated monitoring alerts

Activities

- 1 activity
- 1 lab
- 1 quiz