Architecting with Google Cloud: Design and Process Training

Duration: **2 Day**

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Architecting with Google Cloud: Design and Process is a two-day, instructor-led advanced course focused on designing reliable, secure, scalable and cost-efficient solutions on Google Cloud using established architectural patterns and design practices.

The programme continues from **Architecting with Google Compute Engine** or **Architecting with Google Kubernetes Engine** and assumes participants already have practical experience with the technologies introduced in either course.

Through instructor presentations, architecture design activities and hands-on labs, participants learn how to translate application needs into measurable objectives, determine suitable microservice boundaries, select appropriate storage and deployment services, and design cloud and hybrid network architectures.

The course also addresses critical architectural considerations such as high availability, resilience, security, automation, cost optimisation and service-level monitoring, helping participants make more informed design decisions across the complete lifecycle of a Google Cloud solution.

Prerequisites

Participants should have completed one of the following or have equivalent practical experience:

- Architecting with Google Compute Engine
- Architecting with Google Kubernetes Engine

Participants should also have:

- Basic proficiency with command-line tools
- Experience working in Linux operating system environments
- Systems operations experience
- Experience deploying and managing applications either on-premises or in a public cloud environment

Who Should Attend

This course is particularly suitable for:

- Cloud Solutions Architects
- Site Reliability Engineers
- Systems Operations professionals
- DevOps Engineers
- IT managers
- Professionals designing new solutions on Google Cloud
- Technical teams integrating existing systems, applications and infrastructure with Google Cloud

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What You Will Learn

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

- Apply structured questions, techniques and design considerations when architecting cloud solutions
- Translate application requirements into measurable KPIs, SLOs and SLIs
- Analyse application requirements to establish appropriate microservice boundaries
- Use Google Cloud development tools to create modern automated deployment pipelines
- Select suitable Google Cloud storage services according to application requirements
- Architect cloud and hybrid networks
- Design reliable, scalable and resilient applications while balancing performance and cost
- Select appropriate Google Cloud deployment services for different application requirements
- Design controls to protect cloud applications, infrastructure and data
- Monitor service-level objectives and operational costs using Google Cloud monitoring capabilities

Training Outline

Module 1: Defining the Service

Establish clear and measurable requirements as the foundation of an effective cloud architecture.

- Describe users through roles and personas
- Develop qualitative requirements using user stories
- Define quantitative requirements through KPIs
- Evaluate KPIs with SLOs and SLIs
- Assess application requirements using SMART criteria

Module 2: Microservice Design and Architecture

Explore how applications can be structured into scalable, reliable and loosely coupled services.

- Decompose monolithic applications into microservices
- Determine appropriate microservice boundaries
- Design stateful and stateless services for scalability and reliability
- Apply 12-factor best practices
- Build loosely coupled services through effective REST architecture
- Design consistent and standard RESTful service APIs

Module 3: DevOps Automation

Learn how automation and cloud development tools can improve application delivery.

- Automate deployments through CI/CD pipelines
- Use Cloud Source Repositories for source and version control
- Automate builds with Cloud Build and build triggers
- Manage container images with Google Container Registry
- Implement Infrastructure as Code using Deployment Manager and Terraform

Module 4: Choosing Storage Solutions

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Evaluate Google Cloud storage options against technical and commercial requirements.

- Select storage according to use case, durability, availability, scalability and cost
- Store binary data with Cloud Storage
- Manage relational data with Cloud SQL and Spanner
- Store NoSQL data using Firestore and Cloud Bigtable
- Use Memorystore for high-speed caching
- Build data warehouse solutions with BigQuery

Module 5: Google Cloud and Hybrid Network Architecture

Design networking solutions that connect cloud services and existing infrastructure securely and efficiently.

- Design VPC networks for cost, security and performance
- Configure global and regional load balancers
- Reduce latency and network egress with Cloud CDN
- Evaluate network architecture with Cloud Network Intelligence Center
- Connect networks using peering and VPN
- Build hybrid connectivity between Google Cloud and on-premises data centres with Cloud Interconnect

Module 6: Deploying Applications to Google Cloud

Evaluate deployment options and select services that match different application architectures.

- Choose suitable Google Cloud deployment services
- Build scalable and resilient infrastructure with Instance Templates and Groups
- Orchestrate microservices using Kubernetes and GKE
- Use App Engine as a managed Platform as a Service environment
- Develop serverless applications with Cloud Functions

Module 7: Designing Reliable Systems

Apply architectural techniques for building systems that remain available and resilient under changing conditions.

- Design for availability, durability and scalability
- Eliminate single points of failure
- Reduce correlated and cascading failures
- Manage overload using circuit breaker and truncated exponential backoff patterns
- Create resilient data storage through lazy deletion
- Analyse potential disaster scenarios
- Develop disaster recovery approaches using cost and risk analysis

Module 8: Security

Explore security principles for protecting applications, identities, resources, data and networks.

- Apply separation of concerns
- Implement the principle of least privilege
- Use regular security audits
- Identify vulnerabilities with Cloud Security Command Center

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- Simplify governance using organisational policies and folders
- Protect users with IAM roles, Identity-Aware Proxy and Identity Platform
- Control machine and process access with service accounts
- Protect networks with private IP addresses, firewalls and Private Google Access
- Reduce DDoS risk using Cloud DNS and Cloud Armor

Module 9: Maintenance and Monitoring

The final module focuses on maintaining services effectively after deployment.

- Manage releases using rolling updates
- Implement blue/green deployments
- Use canary releases
- Forecast and monitor costs using the Google Cloud pricing calculator and billing reports
- Analyse billing information to optimise spending
- Monitor SLO performance using Cloud Monitoring and dashboards
- Check service availability with Uptime Checks
- Respond to outages using Cloud Monitoring Alerts