Google Professional Cloud Architect- Course content

Section 1: Designing and planning a cloud solution architecture (24% of the exam)

1.1 Designing a solution infrastructure that meets business requirements. Considerations include:
- Business use cases and product strategy
- Cost optimization
- Supporting the application design
- Integration with external systems
- Movement of data
- Design decision trade-offs
- Build, buy, modify, or deprecate
- Success measurements (e.g., key performance indicators [KPI], return on investment [ROI], metrics)
- Compliance and observability

1.2 Designing a solution infrastructure that meets technical requirements. Considerations include:
- High availability and failover design
- Elasticity of cloud resources with respect to quotas and limits
- Scalability to meet growth requirements
- Performance and latency

1.3 Designing network, storage, and compute resources. Considerations include:
- Integration with on-premises/multicloud environments
- Cloud-native networking (VPC, peering, firewalls, container networking)
- Choosing data processing technologies
- Choosing appropriate storage types (e.g., object, file, databases)
- Choosing compute resources (e.g., preemptible, custom machine type, specialized workload)
- Mapping compute needs to platform products

1.4 Creating a migration plan (i.e., documents and architectural diagrams). Considerations include:
- Integrating solutions with existing systems
- Migrating systems and data to support the solution
- Software license mapping
- Network planning
- Testing and proofs of concept
- Dependency management planning

1.5 Envisioning future solution improvements. Considerations include:
- Cloud and technology improvements
- Evolution of business needs
- Evangelism and advocacy

Section 2: Managing and provisioning a solution infrastructure (15% of the exam)

2.1 Configuring network topologies. Considerations include:
- Extending to on-premises environments (hybrid networking)
- Extending to a multicloud environment that may include Google Cloud to Google Cloud communication
- Security protection (e.g. intrusion protection, access control, firewalls)

2.2 Configuring individual storage systems. Considerations include:
- Data storage allocation
- Data processing/compute provisioning
- Security and access management
- Network configuration for data transfer and latency
- Data retention and data life cycle management
- Data growth planning

2.3 Configuring compute systems. Considerations include:
- Compute resource provisioning
- Compute volatility configuration (preemptible vs. standard)
- Network configuration for compute resources (Google Compute Engine, Google Kubernetes Engine, serverless networking)
- Infrastructure orchestration, resource configuration, and patch management
- Container orchestration

Section 3: Designing for security and compliance (18% of the exam)

3.1 Designing for security. Considerations include:
- Identity and access management (IAM)
- Resource hierarchy (organizations, folders, projects)
- Data security (key management, encryption, secret management)
- Separation of duties (SoD)
- Security controls (e.g., auditing, VPC Service Controls, context aware access, organization policy)
- Managing customer-managed encryption keys with Cloud Key Management Service
- Remote access

3.2 Designing for compliance. Considerations include:
- Legislation (e.g., health record privacy, children's privacy, data privacy, and ownership)
- Commercial (e.g., sensitive data such as credit card information handling, personally identifiable information [PII])
- Industry certifications (e.g., SOC 2)
- Audits (including logs)

Section 4: Analyzing and optimizing technical and business processes (18% of the exam)

4.1 Analyzing and defining technical processes. Considerations include:
- Software development life cycle (SDLC)
- Continuous integration / continuous deployment
- Troubleshooting / root cause analysis best practices
- Testing and validation of software and infrastructure
- Service catalog and provisioning
- Business continuity and disaster recovery

4.2 Analyzing and defining business processes. Considerations include:
- Stakeholder management (e.g. influencing and facilitation)
- Change management
- Team assessment / skills readiness
- Decision-making processes
- Customer success management
- Cost optimization / resource optimization (capex / opex)

4.3 Developing procedures to ensure reliability of solutions in production (e.g., chaos engineering, penetration testing)

Section 5: Managing implementation (11% of the exam)

5.1 Advising development/operation teams to ensure successful deployment of the solution. Considerations include:
- Application development
- API best practices
- Testing frameworks (load/unit/integration)
- Data and system migration and management tooling

5.2 Interacting with Google Cloud programmatically. Considerations include:
- Google Cloud Shell
- Google Cloud SDK (gcloud, gsutil and bq)

- Cloud Emulators (e.g. Cloud Bigtable, Datastore, Spanner, Pub/Sub, Firestore)

Section 6: Ensuring solution and operations reliability (14% of the exam)

6.1 Monitoring/logging/profiling/alerting solution

6.2 Deployment and release management

6.3 Assisting with the support of deployed solutions

6.4 Evaluating quality control measures