GCP_Associate_Certification_Preparation_Complete Beginner Course

Module 1: Introduction to Google Cloud Platform

- Overview of Cloud Computing
- Introduction to Google Cloud Platform (GCP)
- GCP Resource Hierarchy and Projects
- GCP Core Services and Key Features

Module 2: Managing GCP Accounts and Projects

- Setting Up Cloud Projects and Accounts
- Understanding the Resource Hierarchy
- Implementing Organizational Policies
- Managing Users and Groups in Cloud Identity

Module 3: Billing and Cost Management in GCP

- Creating and Managing Billing Accounts
- Linking Projects to Billing Accounts
- Setting Up Budgets and Alerts
- Understanding Billing Exports

Module 4: GCP Command Line Interface Essentials

- Creating and Managing Billing Accounts
- Linking Projects to Billing Accounts
- Setting Up Budgets and Alerts
- Understanding Billing Exports

Module 5: GCP Identity and Access Management (IAM)

- Understanding IAM Roles and Permissions
- Creating and Managing IAM Policies
- Service Accounts and Service Account Key Management

Module 6: GCP Networking

- Virtual Private Cloud (VPC) Fundamentals
- Subnetting and IP Addressing
- Firewall Rules and Network Security
- Load Balancing in GCP
- Implementing VPCs, VPNs, and Firewalls
- Load Balancing Configuration for Traffic Distribution
- Deploying Solutions via Cloud Marketplace

Module 7: GCP Storage Services

- Overview of GCP Storage Options
- Cloud Storage Basics
- Cloud SQL and Cloud Spanner
- Cloud Datastore and Cloud Bigtable

Module 8: GCP Compute Services

- Introduction to Compute Engine
- Utilizing the Pricing Calculator
- Selecting Appropriate Compute Options (Compute Engine, GKE, Cloud Run, Cloud Functions)
- Working with Preemptible VMs and Custom Machine Types
- App Engine Deployment and Scaling

- Managing Containers with Kubernetes Engine
- Serverless Computing with Cloud Functions

Module 9: GCP Databases

- Overview of GCP Database Services
- Cloud SQL: Managed Relational Databases
- Cloud Datastore: NoSQL Database
- Bigtable: Highly Scalable NoSQL Database

Module 10: GCP Big Data and Machine Learning

- Overview of GCP Big Data Services
- Introduction to BigQuery
- Dataflow for Stream and Batch Processing
- AI and Machine Learning with GCP

Module 11: GCP Security and Compliance

- Overview of GCP Security Features
- Encryption and Key Management
- Security Best Practices in GCP
- GCP Compliance and Governance

Module 12: GCP Monitoring and Logging

- Overview of Monitoring and Logging in GCP
- Stackdriver Monitoring and Logging
- Alerts and Dashboards

Module 13: GCP Deployment and Automation

- Deployment Manager for Infrastructure as Code
- Cloud Deployment Strategies

- Continuous Integration and Continuous Deployment (CI/CD) with GCP

Module 14: GCP Exam Preparation

- Overview of GCP Certification Exams
- Exam Format and Tips
- Practice Tests and Mock Exams
- Q&A Session and Exam Strategies

Hands-on Projects

Project 1: Google Cloud Environment Setup

Global Tech Solutions

Problem Statement:

As Global Tech Solutions expands its operations, the company needs to establish a structured cloud environment on Google Cloud to support its growing tech stack and ensure compliance with organizational policies.

Objective:

Set up a comprehensive cloud solution environment on Google Cloud, including project creation, resource hierarchy setup, IAM roles configuration, and API enablement, aligning with best practices for security and governance.

Task Breakdown:

Task 1. Cloud Project and Account Configuration:

- Create a structured resource hierarchy to organize resources efficiently.
- Apply organizational policies at different levels of the resource hierarchy.
- Grant appropriate IAM roles within projects for differentiated access control.

Tasks 2. Billing and Budget Management:

- Create and link billing accounts to projects.
- Establish budget alerts to monitor cloud spend effectively.

Task 3. CLI Configuration:

Install and configure Cloud SDK for command-line access, setting up default projects and regions.

Deliverables:

- A structured Google Cloud environment ready for deploying various solutions, with documented setup processes and IAM policies.
- A billing and budget monitoring setup with alerts.
- CLI configuration guide and best practices for using Cloud SDK.

Project 2: Planning a Scalable Cloud Application

Innovative Startups Inc.

Problem Statement:

Innovative Startups Inc. is in the phase of developing a new cloud-native application. The company requires a scalable and cost-efficient cloud infrastructure on Google Cloud to support the application's compute, storage, and network needs.

Objective:

Design a cloud solution architecture for a scalable application, including compute resources, data storage options, and network configuration, ensuring cost-efficiency and performance optimization using Google Cloud services.

Task Breakdown:

Task 1. Compute Resource Planning:

- Select suitable compute options (Compute Engine, GKE, Cloud Run, Cloud Functions) based on application requirements.
- Estimate costs using the Pricing Calculator and plan for preemptible VMs and custom machine types.

Tasks 2. Data Storage Planning:

- Choose appropriate storage options (Cloud SQL, Firestore, Cloud Storage) considering data access patterns and storage costs.

Task 3. Network Resource Planning::

- Plan a VPC setup with subnets for application components.
- Estimate load balancing needs and configure Cloud DNS for domain management.

Deliverables:

- A structured Google Cloud environment ready for deploying various solutions, with documented setup processes and IAM policies.
- A billing and budget monitoring setup with alerts.
- CLI configuration guide and best practices for using Cloud SDK.

Project 3: Deploying a High-Availability Web Application

Digital Media Hub

Problem Statement:

Digital Media Hub is launching an online platform to host its digital content. The platform requires high availability, scalability, and global reach to serve its audience effectively.

Objective:

Deploy a high-availability web application on Google Cloud using Compute Engine, Google Kubernetes Engine, Cloud Run, and/or Cloud Functions, integrated with Cloud Storage and a Content Delivery Network for optimal performance.

Task Breakdown:

Task 1. Compute Engine and GKE Deployment:

- Deploy web application components on Compute Engine and GKE, ensuring cross-zone availability.
- Implement an autoscaling configuration based on traffic.

Tasks 2. Cloud Run and Cloud Functions:

- Deploy serverless components of the application on Cloud Run and Cloud Functions for dynamic scaling.

Task 3. Global Content Delivery:

- Store static assets in Cloud Storage and set up Cloud CDN for fast, global content delivery.

Deliverables:

- A fully deployed web application with backend services running on GKE/Compute Engine and serverless components on Cloud Run/Cloud Functions.
- Static assets delivery setup using Cloud Storage and Cloud CDN.
- Documentation on deployment processes, scaling configurations, and content delivery setup.

Project 4: Create a Custom Monitoring Dashboard

Digital Media Hub

Problem Statement:

As Widget Corp's cloud infrastructure grows, monitoring the health and performance of various GCP resources becomes increasingly complex. There's a need for a centralized, custom dashboard that not only displays key metrics across their GCP environment but also alerts the IT team to potential issues before they impact operations.

Objective:

Leverage Google's Operations Suite (formerly Stackdriver) to create a comprehensive custom monitoring dashboard. This dashboard will aggregate metrics, logs, and traces from GCP resources, providing real-time visibility into system health and performance. Additionally, configure alerting mechanisms to notify the team of anomalies or resource thresholds being breached.

Task Breakdown:

Task 1. Metrics and Logs Collection Setup:

- Configure Google Cloud Monitoring and Logging to collect metrics and logs from Compute Engine, GKE, Cloud Functions, and other GCP services in use.
- Ensure that custom application metrics and logs are properly ingested into the Operations Suite.

Tasks 2. Custom Dashboard Creation:

- Design and implement a custom dashboard in Google Cloud Monitoring that displays critical metrics such as CPU usage, memory consumption, network traffic, and error rates across all services.
- Include visualizations like charts, gauges, and tables to make data easily interpretable.

Task 3. Alerting Configuration:

- Define alerting policies based on specific metrics thresholds or log-based events that indicate system anomalies, performance degradation, or failures.
- Set up notifications to be sent via email, SMS, or integrated third-party tools like Slack or PagerDuty.

Deliverables:

- A custom monitoring dashboard in Google Cloud Operations Suite, providing a unified view of Widget Corp's cloud environment health and performance.
- Configured alerting policies for automated anomaly detection and notification.
- Comprehensive documentation detailing the setup process, dashboard customization, and alerting configuration, alongside best practices for ongoing monitoring and incident response.

Project 5: Develop a Content Delivery Network

StreamFlow Media

Problem Statement:

StreamFlow Media is expanding its digital footprint with a new static website to showcase its portfolio and services. To ensure a seamless user experience regardless of geographic location, the website must be highly available, performant, and secure.

Objective:

Set up a static website hosted on Google Cloud Storage, delivered globally through Google Cloud CDN. Ensure the site is accessible via a custom domain, managed with Google Cloud DNS, and secured with SSL/TLS encryption through Cloud Load Balancing.

Task Breakdown:

Task 1. Cloud Storage and Website Hosting:

- Create a Cloud Storage bucket configured for website hosting.
- Upload the static website files (HTML, CSS, JavaScript, images) to the bucket and configure public access.

Tasks 2. Content Delivery with Cloud CDN:

- Enable Cloud CDN for the Cloud Storage bucket to cache content at the edge of Google's network, reducing latency and improving load times for global users.

Task 3. Domain Management and SSL Configuration:

- Register and configure a custom domain using Google Cloud DNS.
- Set up Cloud Load Balancing with HTTPS support, using an SSL certificate to secure website traffic.

Deliverables:

- A globally accessible, static website hosted on Google Cloud Storage and delivered through Cloud CDN.
- Custom domain configuration with DNS management through Google Cloud DNS.
- SSL/TLS encryption setup for secure website access.
- Documentation covering the deployment process, CDN configuration, domain setup, and SSL certificate management.

Project 6: Secure Application Deployment on GKE

SafeTransact Inc.

Problem Statement:

SafeTransact Inc. is developing a new application that handles sensitive financial transactions. Given the nature of the data, the application must be deployed in a secure, isolated environment within GCP, with strict access controls.

Objective:

Deploy SafeTransact's containerized application on a private Google Kubernetes Engine (GKE) cluster. Implement GCP's best practices for network policies, IAM roles, and service accounts to ensure secure access to the application and its data.

Task Breakdown:

Task 1. Private GKE Cluster Setup:

- Deploy a private GKE cluster, ensuring it's isolated from public internet access.
- Configure cluster network policies to control pod-to-pod and external communications within the application.

Tasks 2. IAM and Service Accounts Configuration:

- Define IAM roles for team members to enforce the principle of least privilege.
- Create and assign service accounts to the application's pods, limiting their permissions to the minimum necessary for operation.

Task 3. Application Deployment and Security Hardening:

- Deploy the containerized application to the private GKE cluster using Helm charts or kubectl manifests.
- Implement additional security measures such as pod security policies, secrets management, and encrypted data storage.

Deliverables:

- A securely configured private GKE cluster hosting SafeTransact's financial transaction application.
- Configured network policies, IAM roles

Project 7: Data Analysis Pipeline

InsightFleet

Problem Statement:

InsightFleet, a logistics company, needs to analyze telemetry data from its fleet of vehicles in real-time to optimize operations, improve safety, and reduce costs. The current process is manual and not scalable, leading to delayed insights and decisions.

Objective:

Create a scalable data analysis pipeline using Google Cloud Platform services—Pub/Sub for data ingestion, Dataflow for stream processing, and BigQuery for data analysis. Utilize

Google Data Studio for creating dashboards and visualizations that offer real-time insights into fleet operations.

Task Breakdown:

Task 1. Data Ingestion with Pub/Sub:

- Configure Pub/Sub topics and subscriptions to ingest streaming telemetry data from vehicles.

Tasks 2. Stream Processing with Dataflow:

- Implement a Dataflow pipeline to process, transform, and enrich the incoming telemetry data in real-time.
- Ensure the pipeline filters out irrelevant data, aggregates necessary metrics, and flags anomalies for further investigation.

Task 3. Data Analysis and Storage with BigQuery:

- Design a schema and load processed data into BigQuery for advanced analytics.
- Use BigQuery's capabilities to run queries that identify operational inefficiencies, predict maintenance needs, and optimize routes.

Task 4. Visualization with Data Studio:

- Create interactive dashboards and reports in Data Studio that visualize key metrics and insights from the BigQuery dataset.
- Share dashboards with the operations team to aid in real-time decision-making.

Deliverables:

- A fully functional data analysis pipeline that automates the ingestion, processing, and analysis of vehicle telemetry data.
- Real-time dashboards and reports in Data Studio providing actionable insights to the operations team.
- Documentation detailing the architecture of the pipeline, setup instructions, and user guides for the dashboards.

Project 8: Disaster Recovery Strategy

SecureArch

Problem Statement:

SecureArch, a software architecture firm, relies heavily on cloud workloads for its design and simulation tools. A recent service outage highlighted the lack of a robust disaster recovery strategy, risking data loss and significant downtime.

Objective:

Implement a comprehensive disaster recovery strategy for SecureArch's critical workloads using Google Cloud Platform services. Utilize snapshots for VMs, versioning and cross-region replication in Cloud Storage for data resilience.

Task Breakdown:

Task 1. Snapshot and Backup Configuration:

- Configure regular snapshot schedules for critical VMs using Compute Engine to ensure point-in-time recovery options.

Tasks 2. Cloud Storage Versioning and Replication:

- Enable versioning on Cloud Storage buckets containing essential data to maintain historical versions.
- Set up cross-region replication to protect against regional outages and ensure data availability.

Task 3. Disaster Recovery Plan Documentation and Testing:

- Document the disaster recovery plan, including recovery point objectives (RPO) and recovery time objectives (RTO).
- Conduct disaster recovery drills to validate the effectiveness of the strategy and the team's readiness to execute the plan.

Deliverables:

- A disaster recovery plan encompassing snapshot management, data versioning, and cross-region replication strategies.
- Configured and tested Cloud Storage buckets and Compute Engine snapshots according to the disaster recovery plan.
- A report on disaster recovery drill outcomes, including any identified gaps and corrective actions taken.