

## COURSE OUTLINE

# Developing Applications with Google Cloud Platform

**Duration:** 3 Days

**Course Description:**

In this course, application developers learn how to design, develop, and deploy applications that seamlessly integrate components from the Google Cloud ecosystem. Through a combination of presentations, demos, and hands-on labs, participants learn how to use GCP services and pre-trained machine learning APIs to build secure, scalable, and intelligent cloud-native applications.

**Course Objectives:**

- Application developers who want to build cloud-native applications or redesign existing applications that will run on Google Cloud Platform
- This course teaches participants the following skills:
- Use best practices for application development.
- Choose the appropriate data storage option for application data.
- Implement federated identity management.
- Develop loosely coupled application components or microservices.
- Integrate application components and data sources.
- Debug, trace, and monitor applications.
- Perform repeatable deployments with containers and deployment services.
- Choose the appropriate application runtime environment; use Google Container Engine as a runtime environment and later switch to a no-ops solution with Google App Engine Flex.

**Prerequisites:**

To get the most benefit from this course, participants should have the following prerequisites:

- Completed Google Cloud Platform Fundamentals or have equivalent experience
- Working knowledge of Node.js
- Basic proficiency with command line tools and Linux operating system environments

**Audience:**

This class is intended for the following:

- Application developers who want to build cloud-native applications or redesign existing applications that will run on Google Cloud Platform

**Course Outlines:**

### 1. Best Practices for Application Development

- Code and environment management
- Design and development of secure, scalable, reliable, loosely coupled application components and microservices
- Continuous integration and delivery
- Re-architecting applications for the cloud

### 2. Google Cloud Client Libraries, Google Cloud SDK, and Google Firebase SDK

- How to set up and use Google Cloud Client Libraries, Google Cloud SDK, and Google Firebase SDK
- Lab: Set up Google Client Libraries, Google Cloud SDK, and Firebase SDK on a Linux instance and set up application credentials

### 3. Overview of Data Storage Options

- Overview of options to store application data
- Use cases for Google Cloud Storage, Google Cloud Datastore, Cloud Bigtable, Google Cloud SQL, and Cloud Spanner

### 4. Best Practices for Using Cloud Datastore

- Best practices related to the following:
- Queries, Built-in and composite indexes, Inserting and deleting data (batch operations)
- Transactions, Error handling and Bulk-loading data into Cloud Datastore by using Google Cloud Dataflow
- Lab: Store application data in Cloud Datastore

### 5. Performing Operations on Buckets and Objects

- Operations that can be performed on buckets and objects
- Consistency model
- Error handling

### 6. Best Practices for Using Cloud Storage

- Naming buckets for static websites and other uses
- Naming objects (from an access distribution perspective)
- Performance considerations
- Setting up and debugging a CORS configuration on a bucket
- Lab: Store files in Cloud Storage

### 7. Securing Your Application

- Cloud Identity and Access Management (IAM) roles and service accounts
- User authentication by using Firebase Authentication
- User authentication and authorization by using Cloud Identity-Aware Proxy
- Lab: Authenticate users by using Firebase Authentication

### 8. Using Google Cloud Pub/Sub to Integrate Components of Your Application

- Topics, publishers, and subscribers
- Pull and push subscriptions
- Use cases for Cloud Pub/Sub
- Lab: Develop a backend service to process messages in a message queue

### 9. Adding Intelligence to Your Application

- Overview of pre-trained machine learning APIs such as Cloud Vision API and Cloud Natural Language Processing API

### 10. Using Cloud Functions for Event-Driven Processing

- Key concepts such as triggers, background functions, HTTP functions
- Use cases, Developing and deploying functions
- Logging, error reporting, and monitoring

### 11. Managing APIs with Google Cloud Endpoints

- Open API deployment configuration
- Lab: Deploy an API for your application

### 12. Cloud Deploying an Application by Using Google Cloud Container Builder, Google Cloud Container Registry, and Google Deployment Manager

- Creating and storing container images
- Repeatable deployments with deployment configuration and templates
- Lab: Use Deployment Manager to deploy a web application into Google App Engine flexible environment test and production environments

### 13. Execution Environments for Your Application

- Considerations for choosing an execution environment for your application or service:
- Google Compute Engine
- Kubernetes Engine
- App Engine flexible environment
- Cloud Functions
- Cloud Dataflow
- Repeatable deployments with deployment configuration and templates
- Lab: Deploying your application on App Engine flexible environment

### 14. Debugging, Monitoring, and Tuning Performance by Using Google Stackdriver

- Stackdriver Debugger
- Stackdriver Error Reporting
- Lab: Debugging an application error by using Stackdriver Debugger and Error Reporting
- Stackdriver Logging
- Key concepts related to Stackdriver Trace and Stackdriver Monitoring. Lab: Use Stackdriver Monitoring and Stackdriver Trace to trace a request across services, observe, and optimize performance

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