

# Developing Applications with Google Cloud

3 jour(s) / 21h

## What you'll learn

- Discuss best practices for application development in the cloud.
- Understand how to choose the appropriate data storage option for application use cases.
- Use authentication and authorization to secure an application.
- Describe use cases for the different Google Cloud compute options used for running applications.
- Describe the benefits and challenges of microservice-based architectures.
- Describe the advantages of event-driven applications.
- Identify the strengths of orchestration and choreography.
- Use Workflows, Eventarc, Cloud Tasks, and Cloud Scheduler to coordinate a microservices application on Google Cloud.
- Recognize the benefits of and use cases for Cloud Functions in modern application development.
- Understand how to build, test, and deploy Cloud Functions.
- Secure and connect Cloud Functions to resources and cloud databases.
- Use best practices with Cloud Functions.

## Who this course is for

Application developers, architects, and cloud engineers.

# Prerequisite

- Programming experience is recommended.
- Basic proficiency with command-line tools and Linux operating system environments is helpful.

## Course Outline

### **Module 1: Best Practices for Cloud Application Development**

#### Topics

- This module introduces the various Google Cloud tools you will use to develop your applications.

#### Objectives

- Discuss how the Google Cloud SDK lets you interact with Google Cloud services.
- Describe how Cloud Client Libraries can be used in your applications.
- Discuss how Cloud Code helps developers create cloud applications on Google Cloud.

#### Activities

- 1 quiz

### **Module 2: Getting Started with Google Cloud Development**

#### Topics

- This module introduces the various Google Cloud tools you will use to develop your applications.

#### Objectives

- Discuss how the Google Cloud SDK lets you interact with Google Cloud services.
- Describe how Cloud Client Libraries can be used in your applications.
- Discuss how Cloud Code helps developers create cloud applications on Google Cloud.

#### Activities

- 1 quiz

### **Module 3: Data Storage Options**

#### Topics

- This module compares the data storage and database services provided by Google Cloud.

#### Objectives

- Understand how to choose the appropriate data storage option for application use cases.
- Use Firestore to store document-based application data.
- Use Cloud Storage to store unstructured data.

#### Activities

- 1 lab, 1 quiz

### **Module 4: Handling Authentication and Authorization**

#### Topics

- This module explains how authentication and authorization are added to your cloud applications.

#### Objectives

- Discuss how Identity-Aware Proxy authenticates application users.
- Describe the use of federated identity for applications in Google Cloud.
- Describe how to authenticate your application to Google Cloud APIs based on how your application is deployed.
- Use authentication and authorization to secure an application.

#### Activities

- 1 quiz

### **Module 5: Adding Intelligence to Your Application**

#### Topics

- This module discusses how pretrained machine learning APIs and generative AI can improve your cloud applications.

## Objectives

- Describe how pretrained machine learning APIs can be called from applications.
- Differentiate the use cases for Google Cloud's pretrained machine learning APIs.
- Use a Google Cloud pretrained machine-learning API in an application.

## Activities

- 1 lab, 1 quiz

## **Module 6: Deploying Applications**

### Topics

- This module discusses how to build and deploy applications on Google Cloud.

### Objectives

- Discuss the features of a continuous integration and delivery pipeline.
- Describe how to build and store application container images.
- Create a container image by using Cloud Build.

### Activities

- 1 quiz

## **Module 7: Compute Options for Your Application**

### Topics

- This module discusses the compute options available for running your applications in Google Cloud.

### Objectives

- Describe use cases for the different compute options used for running applications on Google Cloud.
- Differentiate the benefits of different compute options on Google Cloud.

### Activities

- 1 quiz

## **Module 8: Monitoring and Performance Tuning**

## Topics

- This module discusses the application use cases of the services in Google Cloud's operations suite.

## Objectives

- Recognize the four golden signals.
- Describe benefits of the services in Google Cloud's operations suite.

## Activities

- 1 lab, 1 quiz

## **Module 9: Introduction to Microservices**

### Topics

- This module introduces you to microservices and discusses the benefits and challenges of using a microservices architecture for your applications.

### Objectives

- Describe the differences between monolithic applications, service-oriented architecture (SOA), and microservices.
- Describe the benefits and challenges of microservice-based architectures.

### Activities

- 1 quiz

## **Module 10: Event-Driven Applications**

### Topics

- This module introduces events and event-driven applications and discusses the benefits of choosing an event-driven architecture for your microservices applications.

### Objectives

- List the characteristics of an event.
- Describe the advantages of event-driven applications.

### Activities

- 1 quiz

## **Module 11: Choreography and Orchestration**

### Topics

- This module introduces two effective patterns for inter-service communication: choreography and orchestration. Eventarc uses the choreography pattern, which allows independent services to perform tasks when events are received. Workflows uses orchestration, and acts as a central orchestrator of the interactions between the services. You learn how Workflows, Eventarc, Cloud Tasks, and Cloud Scheduler can be used to build powerful microservices applications on Google Cloud.

### Objectives

- Understand how Pub/Sub and Eventarc can be used to connect services by using the choreography pattern.
- Explain the benefits of using CloudEvents for event metadata.
- Understand how Workflows can be used to orchestrate services.
- Differentiate the use cases for choreography and orchestration.
- Use Workflows, Eventarc, Cloud Tasks, and Cloud Scheduler to coordinate a microservices application on Google Cloud.

### Activities

- 1 lab, 1 quiz

## **Module 12: Introduction to Cloud Functions**

### Topics

- An introduction to Cloud Functions
- Benefits and use cases
- Types of Cloud Functions and language runtimes

### Objectives

- Define Cloud Functions.
- Identify the use cases, features, and benefits of Cloud Functions.
- Distinguish the types of Cloud Functions, and identify the supported languages for developing functions.
- Develop and deploy a Cloud Function using the Google Cloud console and gcloud CLI.

## Activities

- 1 lab, 1 quiz

## **Module 13: Calling and Connecting Cloud Functions**

### Topics

- Cloud Functions triggers
- Connecting Cloud Functions

### Objectives

- Understand the different kinds of triggers available, and learn how to specify triggers for functions.
- Connect services and functions with workflows.
- Connect functions to resources in a VPC network

## Activities

- 1 lab, 1 quiz

## **Module 14: Securing Cloud Functions**

### Topics

- Accessing and authenticating to functions
- Protecting functions and data

### Objectives

- Secure Cloud Functions with identity and network-based access controls.
- Understand function identity.
- Understand how to authenticate and authorize access to functions for invocation and administration.
- Protect functions and related data with encryption keys.

## Activities

- 1 quiz

## **Module 15: Integrating with Cloud Databases**

### Topics

- Integrate Cloud Functions with cloud databases

- Use secrets with Cloud Functions

## Objectives

- Integrate Cloud Functions with cloud databases such as Firestore, and Memorystore.
- Use secrets with Cloud Functions.
- Use environment variables with Cloud Functions.

## Activities

- 1 lab, 1 quiz

## **Module 16: Best Practices**

### Topics

- Cloud Functions best practices

### Objectives

- Use best practices when developing and implementing Cloud Functions.
- Understand how to retry event-driven Cloud Functions on failure.

### Activities

- 1 quiz