Training: Google Cloud
Developing Applications with Google Cloud

Google Cloud

TRAINING GOALS:

In this 3-day instructor-led course, you learn the fundamentals of application development on Google Cloud. You learn best practices for designing cloud applications, and how to choose compute and data options for your apps. You learn about authentication and authorization, generative AI for developers, and continuous integration and delivery for your apps running in Google Cloud. You learn about event-based applications and the use of service orchestration and choreography to coordinate microservices. You learn about Cloud Functions, which allows you to implement single-purpose functions that respond to HTTP requests and process events within your cloud infrastructure.

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.

Audience

This class is primarily intended for the following participants: Application developers, architects, and cloud engineers.

CONSPECT:

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- Module 01 Best Practices for Cloud Application Development
  - Topics
    - This module introduces best practices for developing applications that run in the cloud.
  - Objectives
    - Discuss best practices for application development in the cloud.
    - Describe patterns for improving stability and reliability of cloud applications.
- Module 02 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.
- Module 03 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.
- Module 04 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.
- Module 05 Adding Intelligence to Your Application
  - Topics
    - This module discusses how pretrained machine learning APIs and generative AI can

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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.

- Module 06 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.

- Module 07 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.

- Module 08 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.

- Module 09 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.

- Module 10 Event-Driven Applications
  - Topics
    - This module introduces events and event-driven applications and discusses the

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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.

- 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.

- 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.

- 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

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triggers for functions.
- Connect services and functions with workflows.
- Connect functions to resources in a VPC network.

- 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.
- 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.
- 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.

REQUIREMENTS:

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

Difficulty level

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CERTIFICATE:

The participants will obtain certificates signed by Google Cloud.

TRAINER:

Authorized Google Cloud Trainer.

ADDITIONAL INFORMATION:

This course is a combination of these three courses:

- Developing Applications with Google Cloud: Foundations
- Service Orchestration and Choreography on Google Cloud
- Developing Applications with Cloud Functions on Google Cloud

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