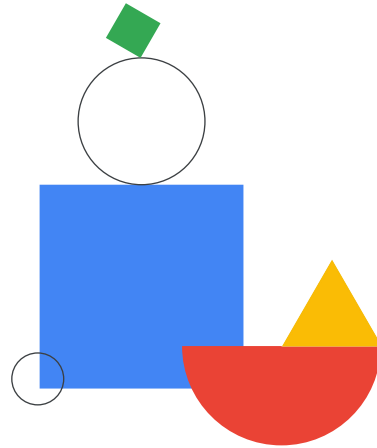
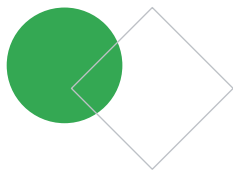


# Developing Applications with Google Cloud



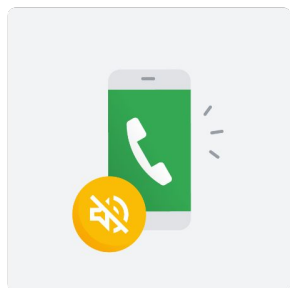


**Full name**

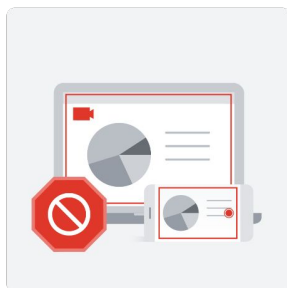
Role, organization



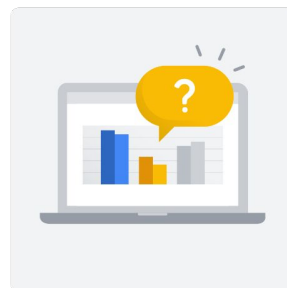
# Etiquette



No calls



No recording



Ask questions

To ensure an effective and respectful learning environment for everyone here today:

- Please silence your phone and take calls outside the classroom.
- Refrain from recording this class. It's prohibited.
- Ask questions when you have them.

# Application development learning path



## Application development

Modernize legacy services or build cloud-native applications.

The courses in this learning path are designed for application developers and programmers who want to learn how to design, develop, and deploy cloud applications.

1

Google Cloud Fundamentals:  
Core Infrastructure

2

Developing Applications with  
Google Cloud

3

Application Development with  
Cloud Run

4

Getting started with Google  
Kubernetes Engine

The **Developing Applications with Google Cloud** course is part of the [Application development learning path](#). This path is designed for IT professionals, such as Cloud Developers and Cloud DevOps Engineers, who are responsible for designing, developing, deploying, and maintaining applications in the cloud.

The prerequisite for this course is the [Google Cloud Fundamentals: Core Infrastructure](#) course.

## Target audience and prerequisites

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



Completed **Google Cloud Fundamentals: Core Infrastructure** or have equivalent experience



Working knowledge of Node.js



Basic proficiency with command-line tools and Linux operating system environments

This course is targeted at application developers who want to build cloud native applications or redesign existing applications to run on Google Cloud.

Ideally, you've completed the **Google Cloud Fundamentals: Core Infrastructure** course, or have equivalent Google Cloud experience. While a working knowledge of Node.js, Java, or Python will be helpful when working on the hands-on labs, don't worry if you're not proficient in those programming languages. The lab instructions have all the code that you need to complete the lab. A basic knowledge of the Linux operating system and command line tools will also be helpful.

# Objectives

- 01 Learn best practices for application development
- 02 Learn how to implement applications that use Google Cloud services for: data storage, integration between application components, security, and reliability
- 03 Learn how to choose the appropriate application runtime environment



Let's take a look at the overall objectives of the course.

To build a strong foundation, you'll start by learning some best practices for application development.


Then you'll learn how to implement applications that use Google Cloud services for: data storage, integration between application components, security, and reliability. If you're unsure whether to run your application in Compute Engine, Google Kubernetes Engine (GKE), Cloud Run, or another environment, we have just the right information to help you make a choice.

To solidify your learning, the course design enables you to learn concepts and then apply them in immersive hands-on labs.



## Day 1 agenda:

### Getting Started with Application Development



- 01 **Best Practices for Application Development**
- 02 **Getting Started with Google Cloud Development**  
Lab: Setting up a Development Environment
- 03 **Overview of Data Storage Options**
- 04 **Best Practices for Using Datastore**  
Lab: Storing Application Data in Datastore
- 05 **Performing Operations on Buckets and Objects**
- 06 **Best Practices for Using Cloud Storage**  
Lab: Storing Image and Video Files in Cloud Storage

This course is broken into three parts that are roughly distributed over the three days of this course.

**Getting Started with Application Development** is the first part of the course.

You'll begin with Best Practices for Application Development.


You'll learn how Cloud APIs, the Google Cloud SDK, Cloud Client Libraries, and Cloud Code can benefit your apps and scripts.

Next, you'll dive into Firestore, Cloud Bigtable, Cloud Storage, Cloud SQL, Cloud Spanner, and other managed services to store your application data.



## Day 2 agenda:

### Securing and Integrating Components of Your Application



- 07 **Handling Authentication and Authorization**  
Lab: Adding User Authentication to your Application
- 08 **Using Pub/Sub to Integrate Components of Your Application**  
Lab: Developing a Backend Service
- 09 **Adding Intelligence to Your Application**
- 10 **Using Cloud Functions for Event-Driven Processing**  
Lab: Process Pub/Sub Data Using Cloud Functions
- 11 **Managing APIs with Cloud Endpoints**  
Lab: Deploying an API for the Quiz Application

In day 2, **Securing and Integrating Components of Your Application**, we explain how to handle user authentication and authorization.

You'll learn how to build loosely coupled applications and integrate components of your application using Pub/Sub, Cloud Functions and Cloud Endpoints.


Then, you'll explore the exciting possibilities for adding intelligence to your application using Google's machine learning APIs, and pre-trained models.





## Day 3 agenda:

Deployment, Debugging,  
and Performance

- 
- 12 **Deploying Applications**  
Lab: Deploying the Application into Google Kubernetes Engine
  - 13 **Compute Options for Your Application**
  - 14 **Monitoring and Performance Tuning**  
Lab: Harnessing Cloud Trace and Cloud Monitoring
  - 15 **Completion**

Finally, day 3 is **App Deployment, Debugging, and Performance**.

In the module Deploying Applications, you learn how to create repeatable deployments and develop strong build and release systems by treating infrastructure as code.

We explain ideal use cases and factors to consider when choosing a platform to run your applications. For example, when should you run your application on Compute Engine, GKE, Cloud Run, or Cloud Functions?

Debugging, monitoring and performance tuning are crucial to running robust applications. In this module, you'll learn how to use the features of Google Cloud's operations suite to debug and monitor applications in development and production environments.

By the end of the course, you will have learned and applied the skills to build highly scalable and reliable Cloud native applications.

## Lab environment

For each lab, Qwiklabs offers:

- A free set of resources for a fixed amount of time
- A clean environment with permissions



Qwiklabs provisions you with Google account credentials, so you can access the Cloud Console for each lab at no cost. Specifically, for each lab, Qwiklabs offers:

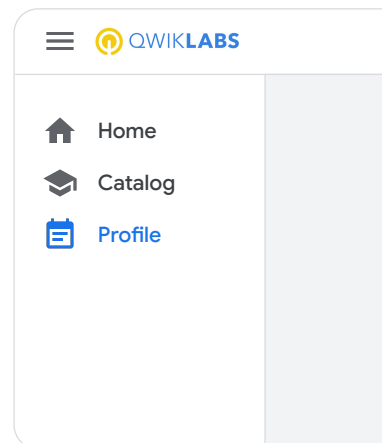
- A free set of resources for a fixed amount of time
- A clean environment with permissions

# Open Qwiklabs

- 1 Open an incognito window (or private/anonymous window).
- 2 Go to the Qwiklabs URL your instructor provides.
- 3 Sign In with existing account or Join with new account (with email you used to register for the course).
- 4 Launch the course from **Profile**.

## Access issues

The process to open Qwiklabs can differ based on credentials used. Please reach out to your trainer if you have any access issues.



Google Cloud

Let's go ahead and open Qwiklabs:

1. **Open an incognito window** (or private/anonymous window). Use of an incognito browser window reduces the risk that you will accidentally do the labs using your own Google Cloud account rather than Qwiklabs'.
2. **Go** to the Qwiklabs URL your instructor provides.
3. **Sign In** with existing account or **Join** with new account (with email you used to register for the course).
4. Launch the course from **Profile**.

## View your labs

Do **NOT** launch a lab until instructed to do so!

The screenshot shows a user interface with two tabs: 'Labs' (selected) and 'Lecture Notes'. Below the tabs is a list of four lab entries, each represented by a row with a status icon, a progress bar, and a label.

Status Icon	Progress Bar	Label
Green checkmark	Full bar	Lab completed
Empty circle	Empty bar	To be completed
Warning triangle	Empty bar	Lab Currently Disabled
Warning triangle	Empty bar	Lab Currently Disabled

Arrows on the right side of the image point to the status icons and labels:

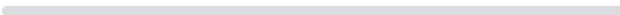







- ← Lab completed
- ← To be completed
- ← Not yet available (points to the two disabled labs)

After you launch the course, you can view your labs. The lab list will indicate if a lab is:

- Completed (by you)
- Active
- Or not yet available

Your instructor will let you know when it's time to launch a lab. Once you start a lab, you won't be able to pause and restart it, so you'll need a continuous block of time to complete the work.

## View lecture notes

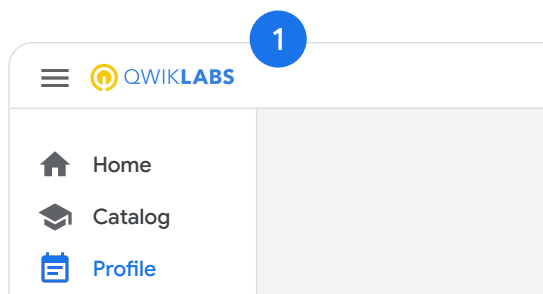
Labs	Lecture Notes
01	 
02	 
03	 
04	 

You can download  
these as PDF files

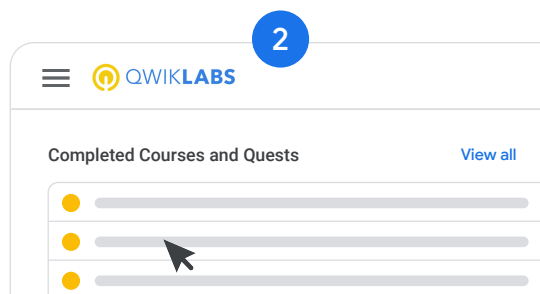
Within the course, you can also view the lecture notes. You can download these as PDF files.

## End of class - Materials

Materials are available for 2 years



Click on **Profile** in the left-hand navigation bar



Select the class from the **Completed Courses** list

You can view the course materials within Qwiklabs as follows:

1. Click on **Profile** in the left-hand navigation bar.
2. Scroll down to the **Completed Courses** section.
3. Select the class from the **Completed Courses** list.

Materials are available for 2 years following the completion of a course.

