

Quick tip: Review the prerequisites before you run the lab

End Lab 00:51:56

Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked.
[Learn more.](#)

[Open Google Cloud console](#)

Username

student-04-bf213715ab1a@



Password

sDmnfqUey7HF



Project ID

qwiklabs-gcp-02-7c93534c



Introduction to Function Calling with Gemini

Lab 1 hour No cost Intermediate



This lab may incorporate AI tools to support your learning.

Lab instructions and tasks

GSP1227

100/100

Overview

Objectives

Setup and requirements

Task 1. Open the notebook in Vertex AI Workbench

Task 2. Set up the notebook

Task 3. Using function calling for structured Google Store queries

Task 4. Using function calling to geocode addresses with a maps API

Task 5. Using function calling for entity extraction

Congratulations!

GSP1227

Google Cloud Self-Paced Labs

Overview

Function calling lets developers create a description of a function in their code, then pass that description to a language model in a request. The response from the model includes the name of a function that matches the description and the arguments to call it with.

Function calling is similar to Vertex AI Extensions in that they both generate information about functions. The difference between them is that function calling returns JSON data with the name of a function and the arguments to use in your code, whereas Vertex AI Extensions returns the function and calls it for you.

Gemini

[Gemini](#) is a family of powerful generative AI models developed by Google DeepMind, capable of understanding and generating various forms of content, including text, code, images, audio, and video.

Gemini API in Vertex AI

The Gemini API in Vertex AI provides a unified interface for interacting with Gemini models. This allows developers to easily integrate these powerful AI capabilities into their applications. For the most up-to-date details and specific features of the latest versions, please refer to the official [Gemini documentation](#).

Gemini Models

- [Gemini Pro](#): Designed for complex reasoning, including:

- Analyzing and summarizing large amounts of information.
- Sophisticated cross-modal reasoning (across text, code, images, etc.).
- Effective problem-solving with complex codebases.

- [Gemini Flash](#): Optimized for speed and efficiency, offering:

- Sub-second response times and high throughput.
- High quality at a lower cost for a wide range of tasks.
- Enhanced multimodal capabilities, including improved spatial understanding, new output modalities (text, audio, images), and native tool use (Google Search, code execution, and third-party functions).

Prerequisites

Before starting this lab, you should be familiar with:

- Basic Python programming.
- General API concepts.
- Running Python code in a Jupyter notebook on [Vertex AI Workbench](#).

Objectives

In this lab, you learn how to:

- Install the Google Gen AI SDK for Python
- Use the Gemini API in Vertex AI to interact with the Gemini 2.0 Flash (`gemini-2.0-flash`) model:
 - Generate function calls from a text prompt to help customers get information about products in the Google Store
 - Generate function calls from a text prompt and call an external API to geocode addresses
 - Generate function calls from a text prompt to extract entities from log data

Setup and requirements

Before you click the Start Lab button

Read these instructions. Labs are timed and you cannot pause them. The timer, which starts when you click **Start Lab**, shows how long Google Cloud resources are made available to you.

This hands-on lab lets you do the lab activities in a real cloud environment, not in a simulation or demo environment. It does so by giving you new, temporary credentials you use to sign in and access Google Cloud for the duration of the lab.

To complete this lab, you need:

- Access to a standard internet browser (Chrome browser recommended).

Note: Use an Incognito (recommended) or private browser window to run this lab. This prevents conflicts between your personal account and the student account, which may cause extra charges incurred to your personal account.

- Time to complete the lab—remember, once you start, you cannot pause a lab.

Note: Use only the student account for this lab. If you use a different Google Cloud account, you may incur charges to that account.

How to start your lab and sign in to the Google Cloud console

1. Click the **Start Lab** button. If you need to pay for the lab, a dialog opens for you to select your payment method. On the left is the Lab Details pane with the following:

- The Open Google Cloud console button
- Time remaining
- The temporary credentials that you must use for this lab
- Other information, if needed, to step through this lab

2. Click **Open Google Cloud console** (or right-click and select **Open Link in Incognito Window** if you are running the Chrome browser).

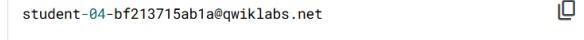
The lab spins up resources, and then opens another tab that shows the Sign in

...the first step of the lab, click the **Sign in** button on the right side of the page.

Tip: Arrange the tabs in separate windows, side-by-side.

Note: If you see the **Choose an account** dialog, click **Use Another Account**.

3. If necessary, copy the **Username** below and paste it into the **Sign in** dialog.



You can also find the Username in the Lab Details pane.

4. Click **Next**.

5. Copy the **Password** below and paste it into the **Welcome** dialog.



You can also find the Password in the Lab Details pane.

6. Click **Next**.

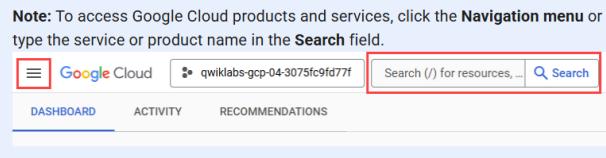
Important: You must use the credentials the lab provides you. Do not use your Google Cloud account credentials.

Note: Using your own Google Cloud account for this lab may incur extra charges.

7. Click through the subsequent pages:

- Accept the terms and conditions.
- Do not add recovery options or two-factor authentication (because this is a temporary account).
- Do not sign up for free trials.

After a few moments, the Google Cloud console opens in this tab.



Note: To access Google Cloud products and services, click the **Navigation menu** or type the service or product name in the **Search** field.

Task 1. Open the notebook in Vertex AI Workbench

1. In the Google Cloud console, on the **Navigation menu** (≡), click **Vertex AI > Workbench**.
2. Find the **generative-ai-jupyterlab** instance and click on the **Open JupyterLab** button.

The JupyterLab interface for your Workbench instance opens in a new browser tab.

Task 2. Set up the notebook

1. Open the **intro_function_calling** file.

2. In the **Select Kernel** dialog, choose **Python 3** from the list of available kernels.

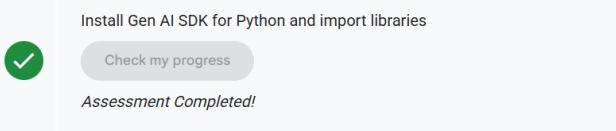
3. Run through the **Getting Started** and the **Import libraries** sections of the notebook.

- For **Project ID**, use `qwiklabs-gcp-02-7c93534d3d32`, and for **Location**, use `us-east1`.

Note: You can skip any notebook cells that are noted *Colab only*. If you experience a 429 response from any of the notebook cell executions, wait 1 minute before running the cell again to proceed.

In the following sections, you will run through the notebook cells to see how to use the Gemini API in Vertex AI with the Google Gen AI SDK for Python.

Click **Check my progress** to verify the objective.



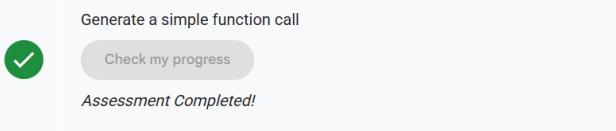
Task 3. Using function calling for structured Google Store queries

When working with a generative text model, it can be difficult to coerce the LLM to give consistent responses in a structured format such as JSON. Function calling makes it easy to work with LLMs via prompts and unstructured inputs, and have the LLM return a structured response that can be used to call an external function.

You can think of function calling as a way to get structured output from user prompts and function definitions, use that structured output to make an API request to an external system, then return the function response to the LLM to generate a response to the user. In other words, function calling in Gemini extracts structured parameters from unstructured text or messages from users. In this example, you'll use function calling along with the chat modality in the Gemini model to help customers get information about products in the Google Store.

1. In this task, run through the notebook cells to see how to use the Gemini model to help customers get information about products in the Google Store.

Click **Check my progress** to verify the objective.



Task 4. Using function calling to geocode addresses with a maps API

In this example, you'll use the text modality in the Gemini API to define a function that takes multiple parameters as inputs. You'll use the function call response to then make a live API call to convert an address to latitude and longitude coordinates.

1. In this task, run through the notebook cells to see how to use the Gemini Flash model to generate a function call to geocode an address.

Here we used the [OpenStreetMap Nominatim API](#) to geocode an address to make it easy to use and learn in this notebook. If you're working with large amounts of maps or geolocation data, you can use the [Google Maps Geocoding API](#).

Click **Check my progress** to verify the objective.

Generate a complex function call



Check my progress

Assessment Completed!

Task 5. Using function calling for entity extraction

In the previous examples, you made use of the entity extraction functionality within Gemini Function Calling so that you could pass the resulting parameters to a REST API or client library. However, you might want to only perform the entity extraction step with Gemini Function Calling and stop there without actually calling an API. You can think of this functionality as a convenient way to transform unstructured text data into structured fields.

In this example, you'll build a log extractor that takes raw log data and transforms it into structured data with details about error messages.

1. In this task, run through the notebook cells to see how to use the Gemini Flash model to generate function calls to extract entities from log data.

Click **Check my progress** to verify the objective.

Generate function calls from a chat prompt



Check my progress

Assessment Completed!

Congratulations!

Congratulations! In this lab, you learned how to use the Gemini API in Vertex AI to generate function calls from text prompts. You used the Gemini Flash model to generate function calls to help customers get information about products in the Google Store, geocode addresses, and extract entities from log data.

Next steps / learn more

Check out the following resources to learn more about Gemini:

- [Gemini Overview](#)
- [Generative AI on Vertex AI Documentation](#)
- [Generative AI on YouTube](#)
- Explore the Vertex AI [Cookbook](#) for a curated, searchable gallery of notebooks for Generative AI.
- Explore other notebooks and samples in the [Google Cloud Generative AI repository](#).

Google Cloud training and certification

...helps you make the most of Google Cloud technologies. [Our classes](#) include technical skills and best practices to help you get up to speed quickly and continue your learning journey. We offer fundamental to advanced level training, with on-demand, live, and virtual options to suit your busy schedule. [Certifications](#) help you validate and prove your skill and expertise in Google Cloud technologies.

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Lab Last Tested May 14, 2025

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