Starting April 29, 2025, Gemini 1.5 Pro and Gemini 1.5 Flash models are not available in projects that have no prior usage of these models, including new projects. For details, see Model versions and lifecycle (/vertex-ai/generative-ai/docs/learn/model-versions#legacy-stable).

Execute code with the Gemini API

The Gemini API code execution feature enables the model to generate and run Python code and learn iteratively from the results until it arrives at a final output. You can use this code execution capability to build applications that benefit from code-based reasoning and that produce text output. For example, you could use code execution in an application that solves equations or processes text.

The Gemini API provides code execution as a tool, similar to function calling (/vertex-ai/generative-ai/docs/model-reference/function-calling). After you add code execution as a tool, the model decides when to use it.

Supported models

- Gemini 2.0 Flash with Live API (/vertex-ai/generative-ai/docs/models/gemini/2-0-flash)
- Vertex AI Model Optimizer (/vertex-ai/generative-ai/docs/model-reference/vertex-ai-model-optimizer)
- Gemini 2.5 Pro (/vertex-ai/generative-ai/docs/models/gemini/2-5-pro)
- Gemini 2.5 Flash (/vertex-ai/generative-ai/docs/models/gemini/2-5-flash)
- Gemini 2.0 Flash (/vertex-ai/generative-ai/docs/models/gemini/2-0-flash)

Limitations

- The feature doesn't support file I/O.
- Code execution can run for a maximum of 30 seconds before timing out.

Example syntax

curl

```
PROJECT_ID = myproject
REGION = us-central1
MODEL_ID = gemini-2.0-flash-001

https://${REGION}-aiplatform.googleapis.com/v1/projects/${PROJECT_ID}/locations
  -d '{
    "contents": [{
      ...
    }],
    "tools": [{
      "code_execution":  {}
    }]
  }'
```

Parameter list

See examples (#examples) for implementation details.

Python

To enable code execution, specify a code execution `tool` in your request.

`CodeExecution`

Tool that executes code generated by the model, and automatically returns the result to the model. See also ExecutableCode (#executablecode) and CodeExecutionResult (#codeexecutionresult) which are input and output to this tool.

`Part`

`executable_code`	Optional: `ExecutableCode` Code generated by the model that is meant to be executed. See Code Execution [API].
`code_execution_result`	Optional: `CodeExecutionResult`

	Result of executing the [ExecutableCode]. See Code Execution [API].

ExecutableCode

language	Required: **string (enum)** Supported programming languages for the generated **code**. Supported: • **PYTHON**
code	Required: **string** The code to be executed. See Code Execution [API].

CodeExecutionResult

outcome	Required: **string (enum)** Outcome of the code execution. Possible outcomes: • Code execution completed successfully. (**OUTCOME_OK**) • Code execution finished but with a failure. **stderr** should contain the reason. (**OUTCOME_FAILED**) • Code execution ran for too long, and was cancelled. There may or may not be a partial output present. (**OUTCOME_DEADLINE_EXCEEDED**)
output	Required: **string** Contains **stdout** when code execution is successful, **stderr** or other description otherwise. See Code Execution [API].

Examples

Here are illustrations of how you can submit a query and function declarations to the model.

Basic use case

curl|Python (#python)
(#curl)

```
PROJECT_ID = myproject
REGION = us-central1
MODEL_ID = gemini-2.0-flash-001

curl -X POST \
  -H "Authorization: Bearer $(gcloud auth print-access-token)" \
  -H "Content-Type: application/json" \
  https://${REGION}-aiplatform.googleapis.com/v1/projects/${PROJECT_ID}/locatio
  -d '{
    "contents": [{
      "role": "user",
      "parts": [{
        "text": "Calculate 20th fibonacci number. Then find the nearest palindr
      }]
    }],
    "tools": [{'codeExecution': {}}],
  }'
```

Enable code execution on the model

To enable basic code execution, see Code execution (/vertex-ai/generative-ai/docs/multimodal/code-execution#enable_code_execution_on_the_model).

What's next

- Learn more about the Gemini API (/vertex-ai/generative-ai/docs/model-reference/gemini).
- Learn more about Function calling (/vertex-ai/generative-ai/docs/multimodal/function-calling).
- Learn more about Generating content with Gemini (/vertex-ai/generative-ai/docs/model-reference/inference).

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