

The Era of Gemini 2.0

The background is a dark blue field filled with a complex, glowing network of lines and shapes. These include squares, circles, and rectangles, some of which are interconnected by thin lines, creating a sense of a digital or neural network. A prominent, bright blue line curves from the lower left towards the center, ending in a small, glowing point. The overall aesthetic is futuristic and technological.

Google Cloud AI Developer Relations

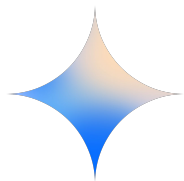
Google is the Pioneer in AI



3,000 Researchers

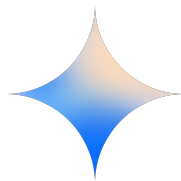
7,000 Publications

Google Cloud AI



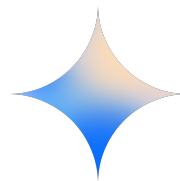
A deep history of research and innovation

Google's predictive and generative AI builds on over 20 years of internal R&D across search, databases, hardware, & AI



A deeply integrated, AI optimized portfolio

From super scalable AI infra, to world-class models from a variety of sources, to an intuitive AI development and deployment platform, to AI-powered assistants – you will find the right AI for your skills and needs.

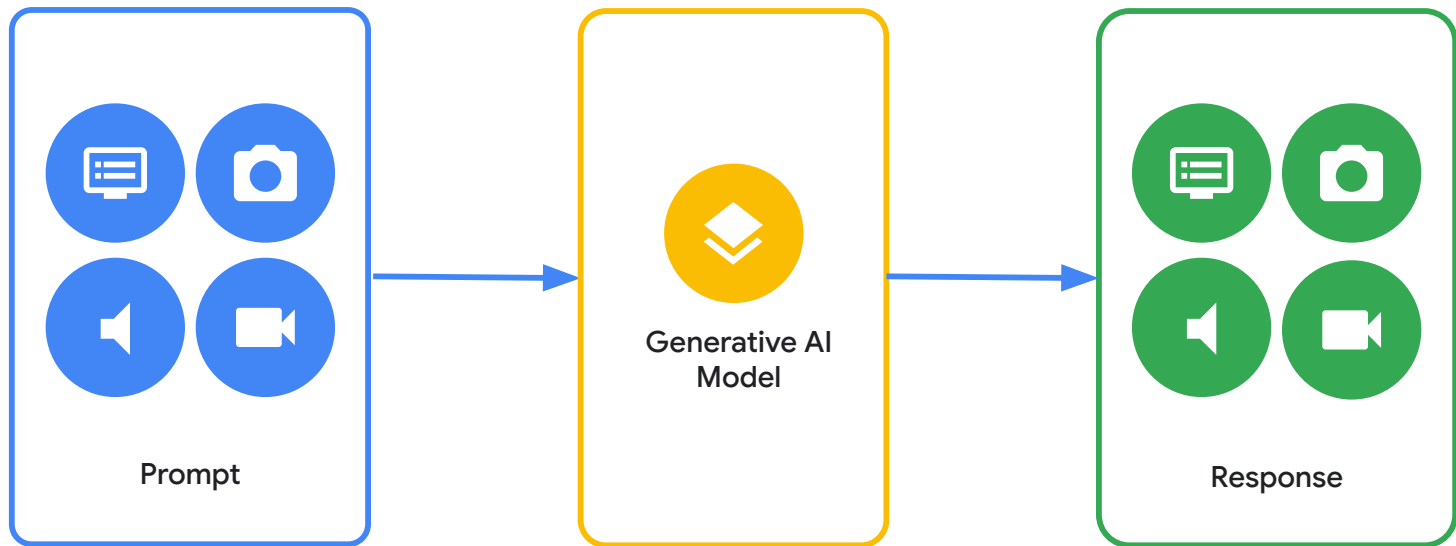


Built on a foundation of enterprise readiness

Go to production with the peace of mind provided by data governance and indemnity, security and compliance, and safety and responsible AI.

What is ?

- Multimodal Generative AI Model (LLM)
 - Text, Code, Images, Documents, Audio, & Video Input



What's New with Gemini?

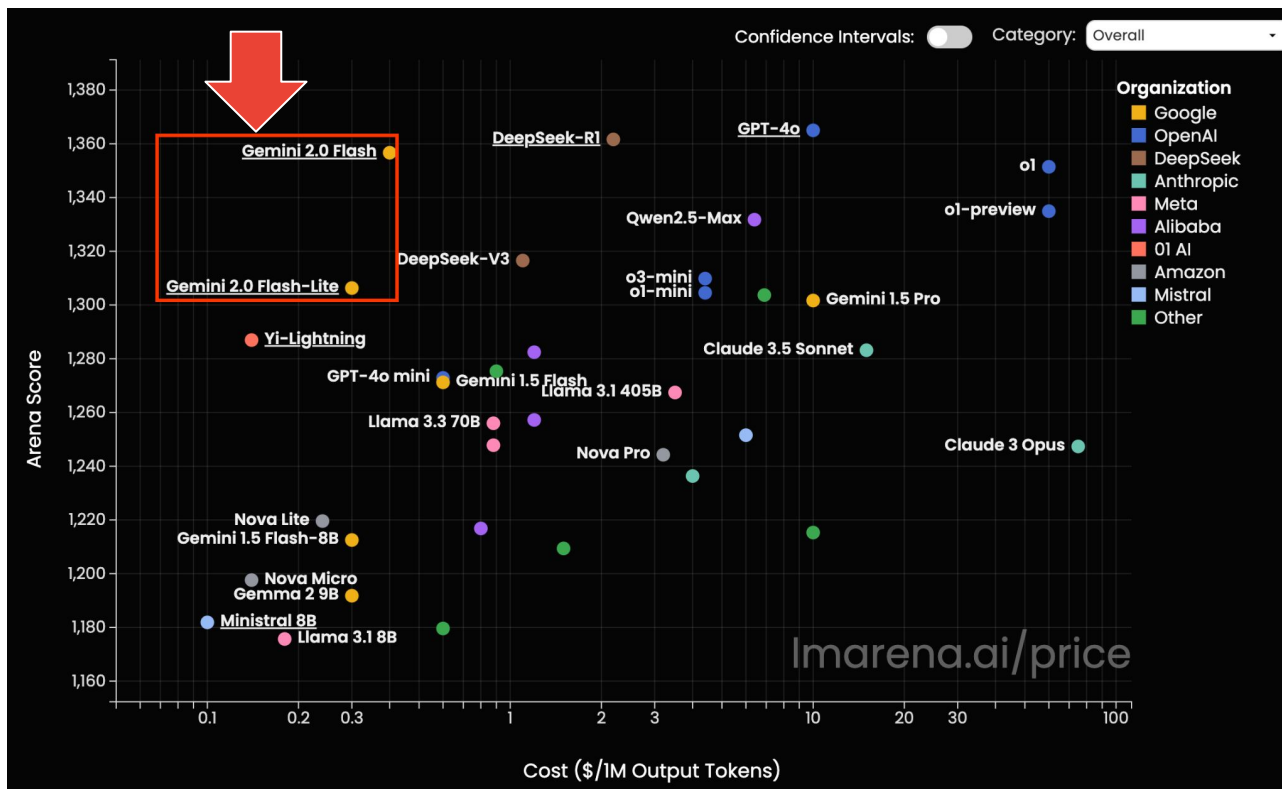
New Capabilities in Gemini 2.0

	What it is	Why it matters
Private Preview	Multimodal: Audio output <ul style="list-style-type: none">• Generate high-quality, steerable voice outputs	<ul style="list-style-type: none">• Richer, more engaging user experiences• Example: Interactive educational apps, voice-enabled assistants with visuals
Private Preview	Multimodal: Inline image output <ul style="list-style-type: none">• Generate text with inline images; conversationally edit images	<ul style="list-style-type: none">• Seamlessly blend text and visuals• Example: Interactive tutorials with embedded videos, dynamic social media content
Public Preview	Multimodal Live API <ul style="list-style-type: none">• Bidirectional streaming API• Real-time voice interactions, natural conversation mechanics (e.g. interruptions)	<ul style="list-style-type: none">• For applications requiring immediate feedback• Example: Chatbots, live translation, interactive gaming
GA	Tool use: Code execution, search <ul style="list-style-type: none">• Access up-to-date info• Perform calculations• Interact with data sources	<ul style="list-style-type: none">• Build apps without complex integrations
GA	Unified SDK <ul style="list-style-type: none">• Single interface for Gemini across AI Studio and Vertex AI	<ul style="list-style-type: none">• Simplified development, consistent experience

Gemini 2.0 - Model Versions

		What it is	Why it matters
GA	Gemini 2.0 Flash	First production-ready Gemini 2.0 model	Offers the same 1M context window as 1.5 Flash but with expanded capabilities (e.g., sophisticated integration and tool use) and better performance, exceeding 1.5 Pro on key benchmarks at twice the speed
Public Preview	Gemini 2.0 Flash-Lite	Low-cost, high-performance Gemini 2.0 model	Offers the same 1M context window as 1.5 Flash but with improved performance and a lower price for workloads that blend small- and large-context inputs and outputs.
Experimental	Gemini 2.0 Pro	Superior intelligence with a 2M context window	Ideal for coding, reasoning, complex prompts, and long context

Gemini 2.0 Flash Balances Quality & Cost



Source: <https://lmarena.ai/?price>

(As of February 11, 2025)

Gemini Model Features

	Models				
	1.5 Flash	2.0 Flash-Lite	2.0 Flash 001	2.0 Pro Exp	2.0 Flash Exp
Launch status	GA	Public Preview	GA	Experimental	Experimental
MM Input (Text, Vision, Audio)	✓	✓	✓	✓	✓
Context Window	1M	1M	1M	2M	1M
Text Output	✓	✓	✓	✓	✓
MM Output (Audio, Image)	✗	✗	✗ Coming Soon	✗ Coming Soon	✓ Private Preview
Native Tool use (Search, Code Exec)	✗	✗	✓ 1500 free Search queries	✓ 10K free Search queries	✓
Multimodal Live API	✗	✗	✗ Coming Soon	✗ Coming Soon	✓ Public Preview
QPM	DSQ	60 QPM	DSQ	10 QPM	10 QPM

Gemini Unlocks a Developer's Creativity

Gemini 2.0 Spatial Reasoning Demo

Public
Preview



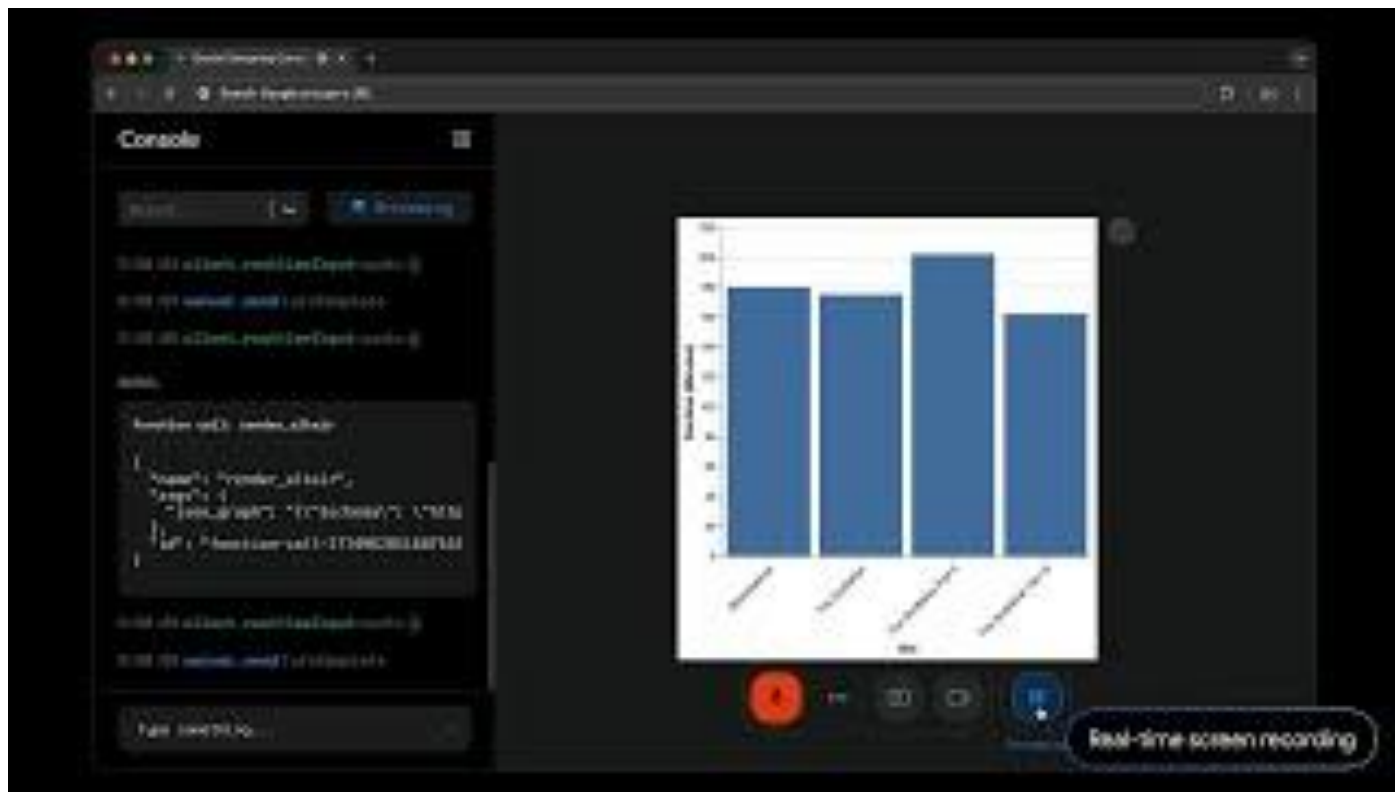
Gemini 2.0 Native Image Output Demo

Private
Preview

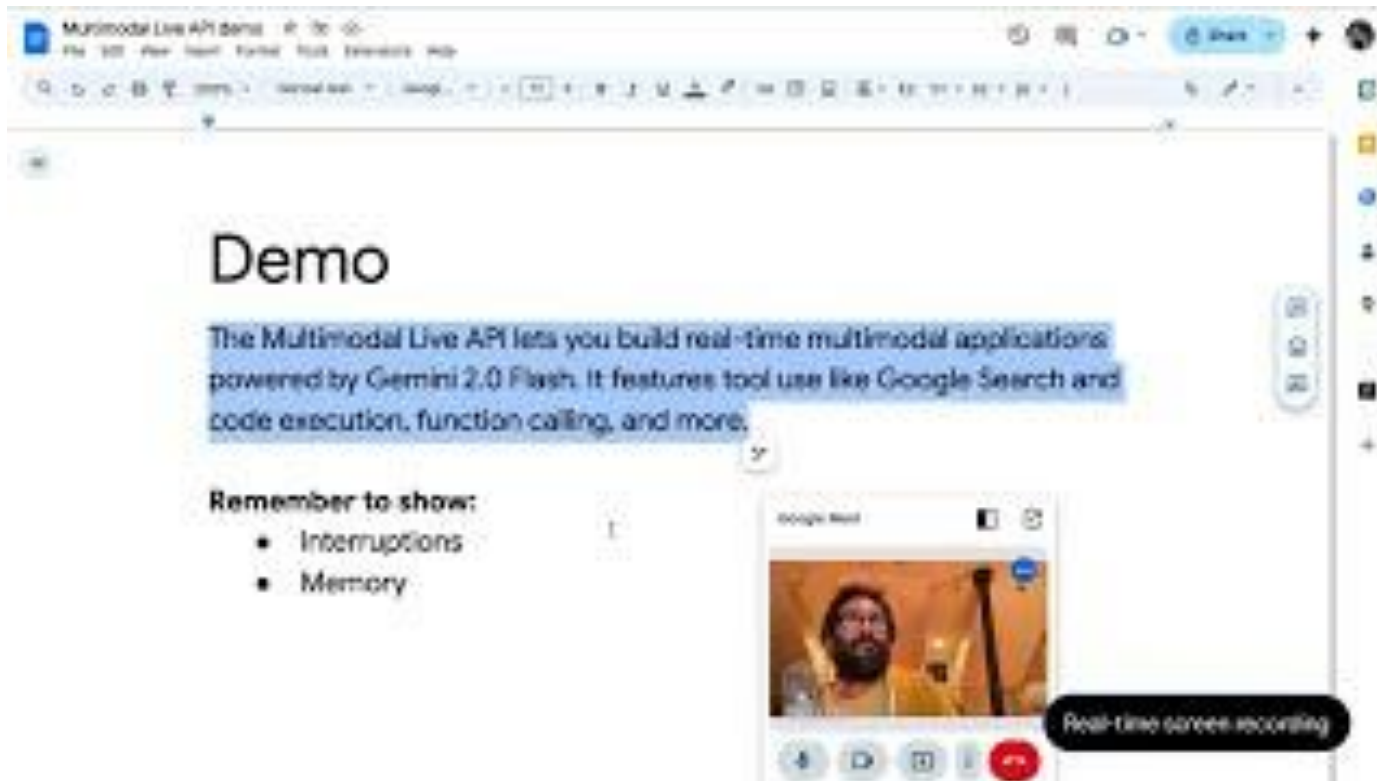


Turn this car into a convertible.

Gemini 2.0 Native Tool Use Demo



Gemini 2.0 Multimodal Live Streaming Demo

Public
Preview

Google Cloud AI Ecosystem

What is Vertex AI?

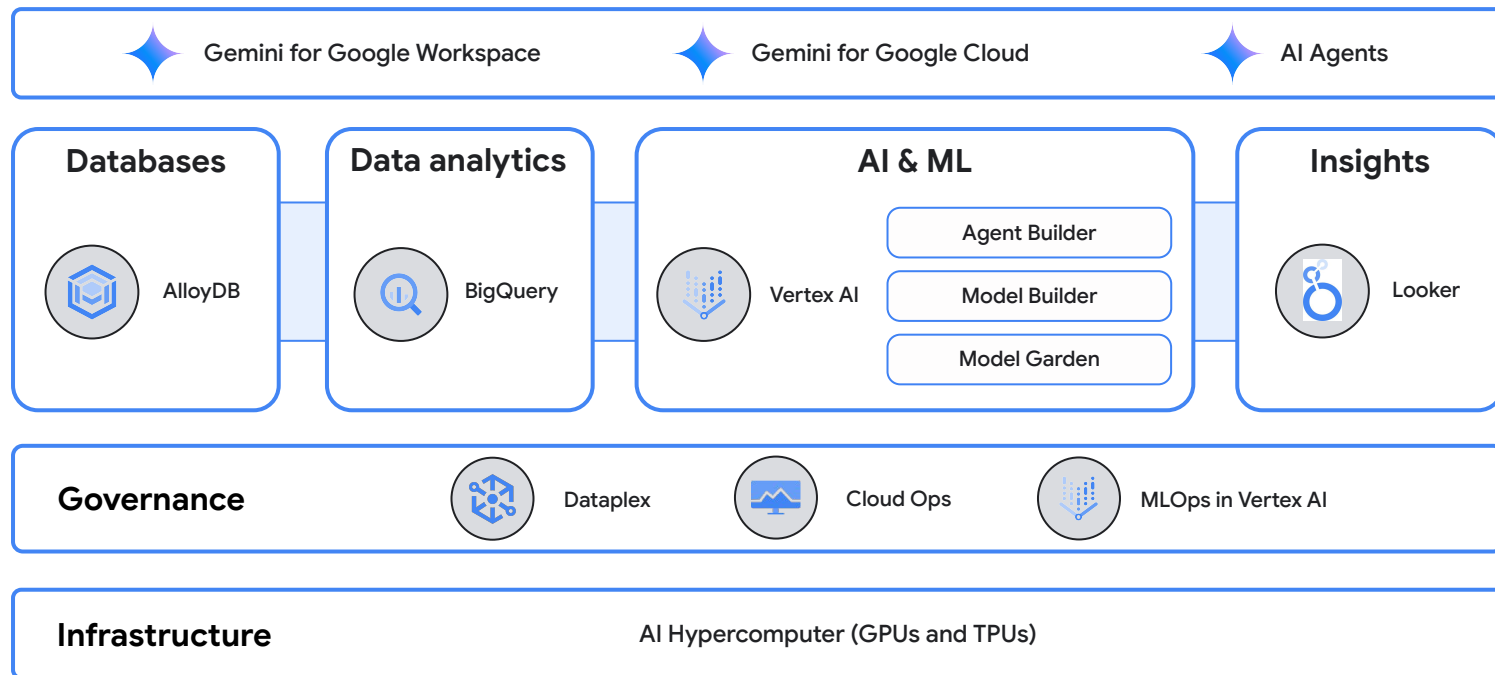


Vertex AI

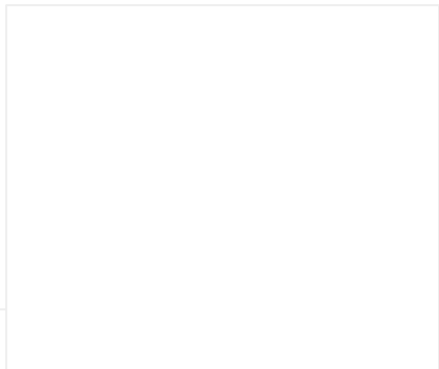
cloud.google.com/vertex-ai

- Managed, End-to-End **AI & ML Platform on Google Cloud**
- **Model Garden** - Generative & Predictive AI Models from Google, Partners and Open Source
- **Vertex AI Studio** - Experiment with Models
- **Custom Models** - Training/Prediction Pipelines
- **Vector Search** for Embeddings
- **Colab Enterprise** for Jupyter Notebooks
- **Enterprise-Grade** Security/Reliability

Unified Data & AI Platform for All Your Predictive, Generative, and Agentic Needs

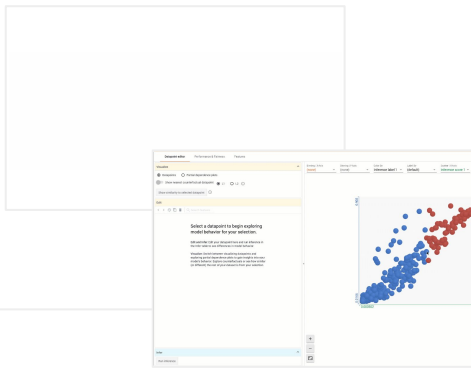


No Code, Low Code, & Full Code Tooling Options



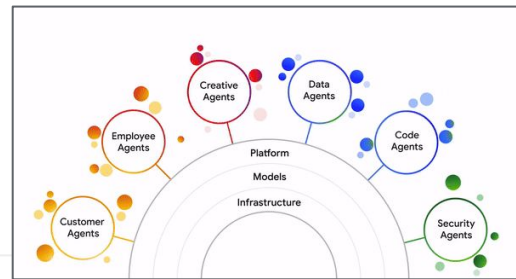
Generative AI foundation models and APIs

No training data needed –
get started right away



Customize AI with BigQuery ML, AutoML, training, and tuning

Easily differentiate by customizing models



Build agents with Agent Builder

Build AI-powered applications quickly
and/or with full customization

Predictive & Generative AI

Google Cloud Generative Media

GenMedia on Vertex AI

Generate high quality media using Google's state of the art models



Imagen: High quality image generation, editing, and customization

GA



Veo: HD videos with high image and motion quality

Preview



Lyria: high quality music
Multi-speaker voices and voice cloning

Experimental



Gemini: Analyze and enhance creative content with multimodal capabilities

Imagen 3 on Vertex AI

Status as of
Feb. 11, 2025

Generation

Text-to-image > high quality and speed

- Aspect ratios 1:1, 9:16, 16:9, 3:4, 4:3
- Digital watermarking with SynthID



GA

Editing

Make changes to an existing image with a mask

- Inpaint - insert & remove
- Outpainting
- Product / Background Edit



GA (Approved Users)

Customization

Create from a reference image with no mask

- Instruct customization
- Product customization
- Subject customization
- Style customization
- Controlled customization



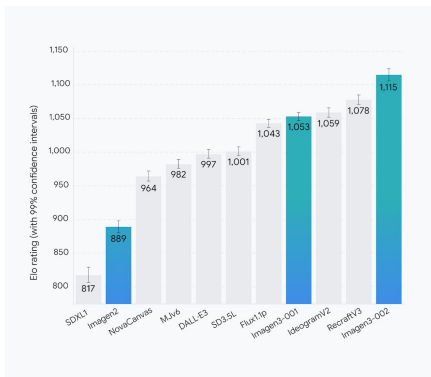
GA (Approved Users)

Safety Filters and Watermark

Imagen 3 Generation

Delivers industry-leading quality with a prompt rewriter to increase accuracy and creativity

Imagen 3 Generation Version 002 brings higher visual aesthetics, prompt-image alignment, and overall user preference. Images are brighter, better composed, and can be generated in more diverse art styles.



Human evaluation on GenAI-Bench: Elo scores on overall preference benchmark for Imagen 3 vs other models.

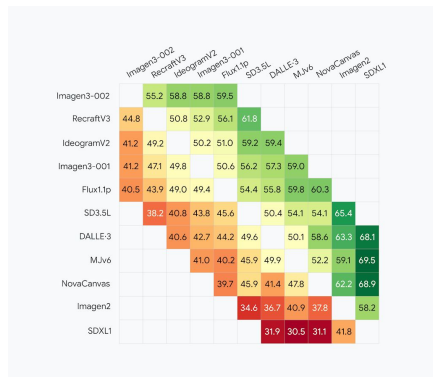


Imagen 3 Prompt Rewriter is an LLM-based feature to deliver higher quality images that better reflect the original prompt's intent.

Settings

Model
Imagen 3

Aspect ratio

1:1

9:16

16:9

3:4

4:3

Number of results
4

☒ Enable prompt enhancement
Use an LLM-based prompt rewriting feature to deliver higher quality images that better reflect the original prompt's intent. Disabling this feature may impact image quality and prompt adherence.

Veo on Vertex AI

Status as of
Feb. 11, 2025

Length: 6 seconds

Resolution: 720p

Frame rate: 24 -30 fps

Aspect ratios: Portrait and landscape

Interface: API and Vertex console

Safety: Watermark, configurable safety filters, indemnification

Text to Video

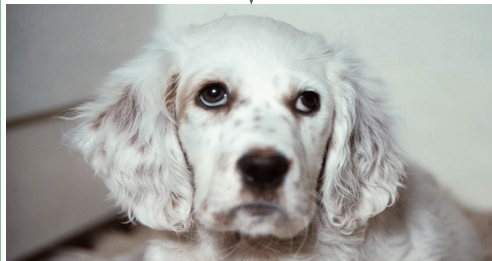
Generate videos from a prompt



Preview

Image to Video

Add motion to existing images



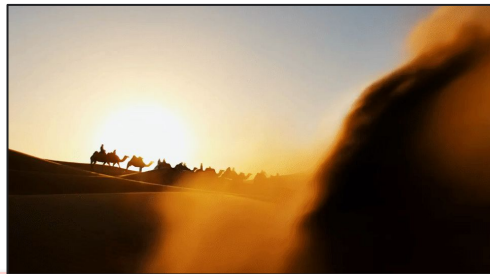
Preview

Safety Filters and Watermark

Veo: Generate Short Clips in Any Style



Prompt: A closeup shot, in 8K resolution and slow-motion, captures a large rainbow-colored blob of what appears to be paint as it explodes above a white table, erupting into smaller blobs and disintegrating into droplets. As this material splashes against the table, an apple emerges from the refracted wave as if it were revealed by the blob's contents.



Prompt: The video begins with a wide shot, tracking the passage of a long line of camels past a line of sand dunes. The camels and their riders appear in silhouette, moving slowly toward the golden light and orange sky of the desert sunset that lies ahead of them. Their silhouettes, along with the line of dunes, are briefly obscured as a swirl of wind blows a large plume of sand up into the air.



Prompt: An initial close up shot shows furry paws noting and strumming the strings of an electric guitar. The action cuts to a Dutch angle shot of the musician, a teddy bear wearing sunglasses, as it dances around in a jungle setting, playing its instrument. Finally, the view cuts to a wide-angle shot of the headbanging bear, revealing a dramatic waterfall in the background.



Prompt: A lone sailboat navigates a dramatic, stormy sea at sunset. A dynamic tracking shot follows the boat as it bravely cuts through powerful waves, its white sails billowing against the fiery sky. The camera emphasizes the contrast between the boat's small size and the immensity of the ocean, creating a sense of both danger and awe, using slow-motion to highlight the power of the waves and the grace of the sailboat.

Getting Started with Google Gen AI Models

Which Gemini?

There are a lot of Geminis out there!

Google AI Studio is a great place to start with the Gemini API.

Vertex AI is a great place to go when you need to productionize and add components.

Gemini Model

Generative AI model behind all of these

Gemini Web App (fka "Bard")

gemini.google.com

Gemini in Workspace/Cloud/* (fka "Duet AI")

workspace.google.com/solutions/ai/

cloud.google.com/products/gemini

Google AI Studio & Gemini Developer API

aistudio.google.com

Vertex AI Studio & Gemini API in Vertex AI

console.cloud.google.com/vertex-ai/studio

Vertex AI Studio

Try Gemini 2.0 models and more

← Untitled prompt ✎ History Compare Notes API reference Evaluate

Save <> Get code >|

System instructions ⓘ

Give the model context to understand the task and provide tailored responses


Prompt ⓘ Insert Media ⓘ Add examples Add variable Clear Prompt

Write a prompt, or create one with [Help me write](#)


0 tokens

⬇ ▶

Response Refine response Markdown

 **Question answering about an image**

Answer knowledge-extensive questions about an image

 **Extract video chapters**

Extract the chapters in a video as structured JSON

[Browse prompt gallery](#)

Model

gemini-2.0-flash-001 ⓘ

Region *

us-central1 (Iowa) ⓘ



Temperature ⓘ

0 ————— 2 1

Output token limit ⓘ

1 ————— 8192 8192

Grounding ⓘ

 Source:  Google Search

Customize

Text format

Plain text ⓘ Edit

Safety Filter Settings

> Advanced

Reset parameters

console.cloud.google.com/vertex-ai/studio

Google Gen AI SDK

- Unified SDK for:
 - Gemini Developer API
 - Gemini API on Vertex AI
- Change one (ish) line to switch between them
- Supports Gemini 1.5 & above
- Language support
 - Current: Python, Go
 - Future: Java, JavaScript








```
pip install google-genai
```

```
from google import genai

# Gemini Developer API
client = genai.Client(api_key="YOUR_API_KEY")

# Vertex AI API
client = genai.Client(
    vertexai=True,
    project="your-project-id",
    location="us-central1",
)
```

Google Cloud Generative AI GitHub

	Description
 gemini/	Discover Gemini through starter notebooks, use cases, function calling, sample apps, and more.
 search/	Use this folder if you're interested in using Vertex AI Search , a Google-managed solution to help you rapidly build search engines for websites and across enterprise data. (Formerly known as Enterprise Search on Generative AI App Builder)
 rag-grounding/	Use this folder for information on Retrieval Augmented Generation (RAG) and Grounding with Vertex AI. This is an index of notebooks and samples across other directories focused on this topic.
 conversation/	Use this folder if you're interested in using Vertex AI Conversation , a Google-managed solution to help you rapidly build chat bots for websites and across enterprise data. (Formerly known as Chat Apps on Generative AI App Builder)
 language/	Use this folder if you're interested in building your own solutions from scratch using Google's language foundation models (Vertex AI PaLM API).
 vision/	Use this folder if you're interested in building your own solutions from scratch using features from Imagen on Vertex AI (Vertex AI Imagen API). These are the features that Imagen on Vertex AI offers: <ul style="list-style-type: none">• Image generation• Image editing• Visual captioning• Visual question answering
 audio/	Use this folder if you're interested in building your own solutions from scratch using features from Chirp, a version of Google's Universal Speech Model (USM) on Vertex AI (Vertex AI Chirp API).



goo.gle/gen-ai-github