

How Google Cloud helps organizations innovate with generative AI



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Introduction

Artificial intelligence (AI) has the potential to unlock tremendous value. We've already seen this happen with a number of technological shifts: client servers, the internet, mobile, and cloud. What unites the stories behind each of these technologies is the value they are able to unleash. We are currently experiencing one of the most significant technological shifts in history, and among that is the emergence of generative AI in particular.

Generative AI represents possibly the single greatest opportunity that many business leaders have encountered in their careers. It has the potential to transform entire businesses and even entire industries. And what's encouraging is that, even more so than in the past, businesses are piloting, prototyping, and exploring with value as the point of departure. For the enterprise, this means asking the question, "How do I apply this technology?"

In this guide, written for executives, we'll cover:

- What Google is doing to make AI helpful for everyone
- How you can use generative AI to make real-world impact
- Our approach to responsible AI
- How you can use Google Cloud for AI-driven innovation

Making AI helpful for everyone

Google is an AI-first company. Having already built some of the industry's leading AI capabilities, we continue to focus on making it easier and more scalable for organizations to innovate with AI. We continue to align our portfolio directly to your most important business needs, and we partner with you to address your unique industry challenges in this new era.

We do this by bringing together innovations from across Google and our partner ecosystem to help companies build a new way forward with leading-edge data intelligence, modern infrastructure, integrated productivity tools, and invisible security – all powered by the same AI technology that powers many of the Google products used by billions across the globe.



And, everything is underpinned by global infrastructure and tools that help developers work more sustainably.

AI is also instrumental in helping Google Cloud deliver on our mission, which is to accelerate every organization's ability to digitally transform its business and industry. Google Cloud has a long history of bringing AI innovations to enterprises, extending our core advancements and embedding them into every element of cloud computing.

With Google Cloud, we are bringing generative AI to enterprises, small businesses, and governments and helping you to:

- Create amazing content
- Synthesize and organize information
- Automate business processes
- Build engaging customer experiences

REAL-WORLD EXAMPLE

Canva is solving for AI-powered design, for everyone

"We are incredibly excited to be working with Google Cloud as we test and explore ways to bring even more magic to our community. Earlier this year we launched Magic Translate and what that enables you to do with just a couple of clicks is turn any of your designs into over a hundred languages. Magic video is a time-saver for marketers and teachers who want to be able to cater to a diverse audience."

— [Melanie Perkins, Co-founder & CEO, Canva](#)



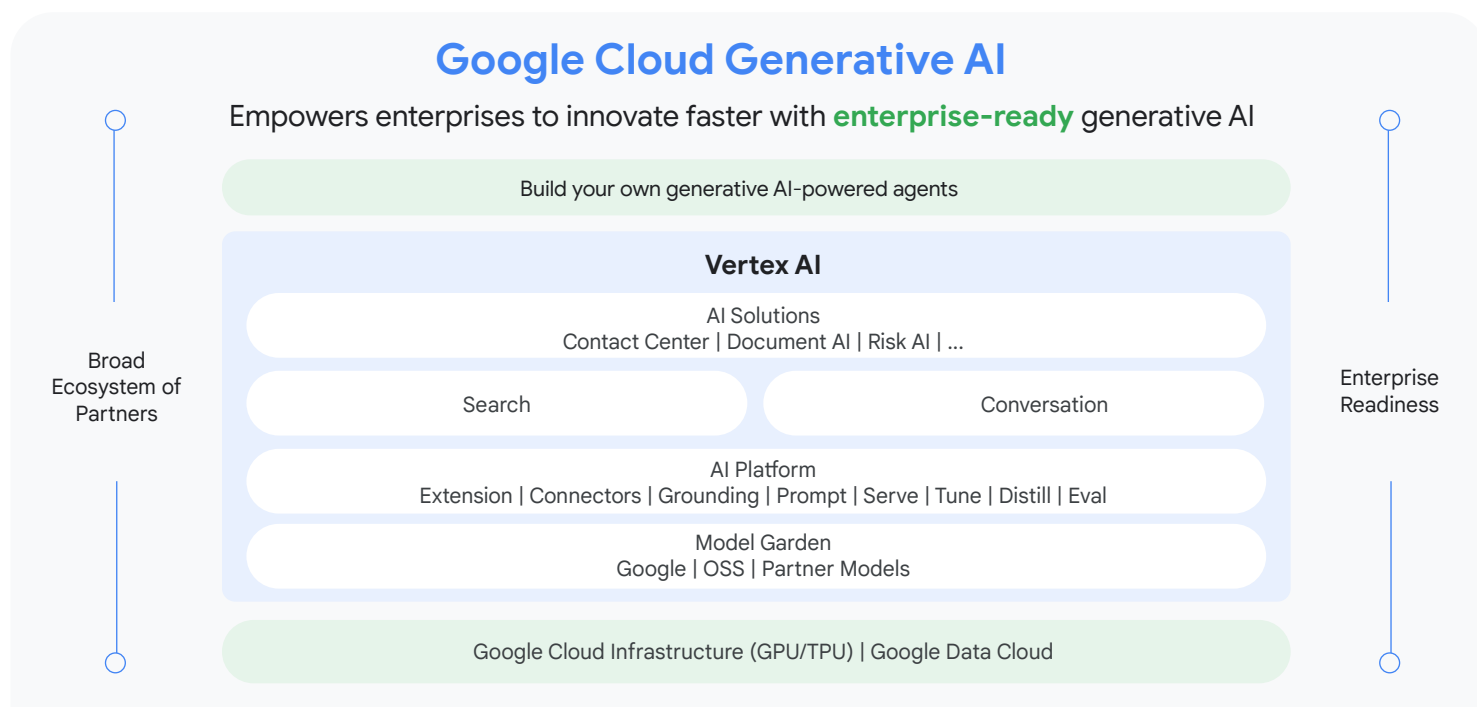
It's an exciting time in tech, and Google is delivering on the promise of generative AI by focusing on five priorities: (1) providing world-class AI infrastructure; (2) building a multi-model foundation model currently with multiple capabilities; (3) enabling customers to build their own applications through our platform; (4) integrating generative AI capabilities into Google Cloud and Google Workspace; and (5) working with a broad ecosystem of partners to give you choice.



First, let's start with infrastructure. Google provides world-class AI infrastructure, which includes our global network and advanced TPU and GPU capabilities, for training and serving models. We have a comprehensive platform through which nearly anyone can be an AI developer - even users who have varying levels of expertise can create innovative enterprise search, chat, and vision apps. Google enables both business and technical practitioners to be more productive using AI assistants.

Second, Google has built a multi-modal model called PaLM 2 on this infrastructure, based on our breakthrough research in machine learning and responsible AI. This model currently supports chat, text, code, image, and speech, and these capabilities are used broadly across Google and our customers. PaLM 2 is powering generative AI features and tools at Google such as Bard and the PaLM API.

Third, we allow customers to build their own Gen AI applications through Vertex AI, which lets you build search as well as chat experiences. Vertex AI is also our single platform for foundation models and MLOperations, as well the ability to build AI solutions such as CCAI and DocAI.



Fourth, Google is integrating generative AI capabilities deeply into Google Cloud and Google Workspace with Duet AI, an always-on collaboration partner that provides help to users of varying skill levels. With Duet AI in Google Workspace, we've embedded the power of generative AI across all the Workspace apps. These features help you write, help you organize, help you visualize, help you accelerate workflows, have richer meetings and much more. With Duet for Google Cloud, we believe that having an assistant who is constantly evolving by your side will not only reduce an already overwhelmed developer's workload but also bring back the excitement of cloud development.

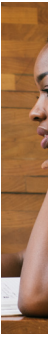
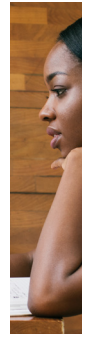
Fifth, we are working with a broad ecosystem of partners to provide choice for companies and governments while maximizing opportunities for innovation. Generative AI is a platform that requires [an open ecosystem of partners](#) to deliver real customer solutions, and our trusted community of partners can help you move from experimentation, to acceleration, to scale.

A deeper look into generative AI

Let's look at generative AI in more detail to better understand its power and potential, starting with foundation models. A foundation model is a large AI model that is trained on a vast corpus of data. It recognizes, predicts, and generates words, images, videos and more through a process called self-supervised learning. It can then be optimized using techniques such as adaptation, distillation, and transfer learning to be made available in smaller, more cost-efficient configurations for different applications.

At Google, we started with our foundation model called PaLM 2, and over time we have optimized it for different tasks and different sizes. For example, the Vertex AI PaLM API for **text** lets you design prompts with flexibility in terms of their structure and formats, whereas the Vertex AI PaLM API for chat is optimized for multi-turn **chat**. We also provide models that are trained on industry-specific data, such as Med-PaLM for healthcare and life sciences, and Sec-PaLM for cybersecurity.





We also operate other foundation models (Imagen, Chirp, Codey) that are all generally available and include text generation, chat, images, speech, and software code, with audio and video generation to follow. We also offer our models in a range of sizes with different performance, latency cost, and memory requirements.

As mentioned, Google is also taking advantage of these same technologies in our own products and deeply integrating into our enterprise platforms, Google Cloud and Google Workspace. Our vision is to provide an AI collaborator (Duet AI) that provides real-time, expert contextual assistance to you as you work.

From the very beginning, Google Workspace was built to allow you to collaborate in real-time with other people. Now, you can also collaborate using AI, and customers are already reaping the benefits of these new experiences. They are using the technology to help them write, whether it's refining existing work, or helping them get started in Gmail and Google Docs. They're also using it to create original images from text, right within Google Slides, just by describing the image they want (even if it never existed before).

Duet AI is also helping the people who work in Google Cloud. In particular, the technology:

- helps Google Cloud developers write better code;
- helps Google Cloud operators manage infrastructure more efficiently and get deeper insights into ways to optimize it;
- helps Data Cloud analysts and data people get insight out of their data, organize data, and share helpful views of data with others;
- helps Google Cloud security teams identify the latest threats, more effectively configure security; and speed up cyberthreat responses.

Using generative AI responsibly

While it's exciting to realize the potential of generative AI, it's also important to scale AI responsibly. Google is tapping into our cutting-edge research in areas such as safety and responsibility, and we're applying the lessons we've learned from years of deploying massive machine learning systems in Google's own products. To help organizations scale AI responsibly, we're taking a thoughtful approach – from how we develop our models, to how we work with our customers to evaluate risks and create guardrails, to how we've architected the entire approach to provide you with control of your data.

What's at the core of our approach?

First, your data is YOUR data. We do not use customer data to train Google's models, and we only process your data according to your instructions. In fact, we were the first in the industry to publish an [AI/ML Privacy Commitment](#) that outlines our belief that you should have the highest level of security and control of your data and how it's used for AI/ML. That commitment extends to all Google Workspace users. We have years of experience reviewing the data privacy designs of each of Google's new products and perform ongoing reviews of our operations.



You own and control your data, not Google

We ensure responsible use of data for Cloud AI/ML with these commitments to customers



By default we do not use customer data to train our models, in accordance with [GCP Terms](#) and [Cloud Data Processing Addendum](#). Your customer data is only processed according to your instructions.



You benefit from our privacy experience and commitments to transparency, compliance with regulations such as the GDPR, and privacy best practices.



Our extensive data governance & security controls provide you with confidence in the protection of your data from other customers, users, attackers, and unauthorized access by Google employees.

In addition to our data governance and privacy approach, Google provides security and compliance support to help you meet your commitments to your users and to help meet regulatory expectations. Your data protection is core to everything we do, and Google's generative AI offerings are built on Google Cloud as the foundation. Not only do we build industry-leading security and threat detection software, we also design our own custom hardware and run our own data centers so that you have high standards of logical and physical security. Google Cloud infrastructure is designed to deliver defense-in-depth at scale.

Across our Google Cloud products, we invest heavily in compliance so that your applications are running in an up-to-date environment and in line with important industry standards and regional and regulatory frameworks. We also regularly undergo independent verifications and commit to continuing this practice for our generative AI offerings.

In terms of safety and responsibility, Google was one of the first companies to publish AI principles. [These principles](#) were crafted with input from customers and partners, and they are at the core of how we design and operate our generative AI products to ensure that we, with our customers, collectively achieve the intended benefits and avoid any unintended potential harms of these technologies.

Google AI Principles

AI Should

- 01 be socially beneficial
- 02 avoid creating reinforcing unfair bias
- 03 be built and tested for safety
- 04 be accountable to people
- 05 incorporate privacy design principles
- 06 uphold high standards of scientific excellence
- 07 be made available for uses that accord with these principles
 - Primary purpose and use
 - Nature and uniqueness
 - Scale
 - Nature of Google's Involvement

Areas we will not pursue

- 01 likely to cause overall harm
- 02 principal purpose to direct injury
- 03 surveillance violating internationally accepted norms
- 04 purpose contravenes international law and human rights



How Google Cloud helps organizations through AI-driven innovation

Google Cloud is the only cloud that brings together innovations from across Google to help organizations achieve transformative business outcomes. We deliver AI-infused solutions for data, infrastructure, productivity, and security, and tools that help developers build more sustainably.

Through our Data and AI Cloud, we help organizations innovate faster using data and AI in ways that were previously unimaginable. Here's how our customers are using our technology:

Using AI with their data for predictions, decisions, and generative AI apps.

Now more than ever, it's critical for organizations to use their data and derive insights quickly and easily to realize value faster — and eliminating barriers between data and AI is key to making this happen. This is why we help customers bring Google's AI capabilities together with their own data, so they can get the insights they need and act on them quickly.



Getting fresh insights at scale with a complete and unified data and AI solution.

To help organizations get fresh insights at scale, our Data and AI Cloud is a complete and unified intelligent data platform. With leading solutions such as [BigQuery](#), [Vertex AI](#), [Cloud Spanner](#), and [Looker](#), you can manage each stage of the data lifecycle.



Unlocking the full potential of their data with a Data and AI Cloud that is open and standards based.

Only an open data cloud ecosystem can unlock the full potential of data. It allows organizations to avoid vendor lock-in, stay agile, and adapt quickly to market needs. This is why we're working to build the most open cloud in the industry, so organizations can utilize all their data, from all sources, in all storage formats and styles of analysis, and across the cloud providers and platforms of their choice.



REAL-WORLD EXAMPLE

Deutsche Bank accelerates financial decision-making

Deutsche Bank is testing Google's generative AI and LLMs at scale to provide new insights to financial analysts, driving operational efficiencies and execution velocity. There is an opportunity to significantly reduce the time it takes to perform banking operations and financial analysts' tasks, empowering employees by increasing their productivity.

"Generative AI is transforming how we find, sort and analyze information at scale — helping us to support our client's global ambitions."

— [Bernd Leukert, Chief Technology, Data and Innovation Officer, Deutsche Bank](#)

Through our Modern Infrastructure Cloud, we help businesses and governments build quickly, securely, and cost effectively with the next generation of infrastructure that's optimized for AI workloads. Our infrastructure is built to deliver the global scale and performance demanded by Google products such as YouTube, Gmail, Google Maps, Google Play, and Android that serve billions of users. Our infrastructure is also designed to meet the intensive workload required for training and serving large language models. And together with our industry hardware partners, we provide customers with the widest range of AI-optimized compute options across TPUs, GPUs, and CPUs for training and serving data-intensive models.

Through our Collaboration Cloud, Google Workspace is helping teams of all sizes do their best work. Teams can focus on what matters and bring their ideas to life with Duet AI, which serves as a collaborative partner and brings AI-powered features to Gmail, Docs, Sheets, Slides, Meet and more, inspiring new ideas and helping people to create and connect like never before. With Google Workspace, users can harness the power of generative AI to unleash creativity in the new era of work.



Through our Security Cloud, Google is helping customers transform their cybersecurity with our frontline intelligence and AI-driven cloud innovation. This means leveraging AI to help address security challenges. We've been building AI to improve security outcomes since 2011, and we are actively building it into our products and services to help businesses protect what matters. Our latest AI innovations continue to help address threat overload, toilsome tools, and the talent gap.

Lastly, through our sustainable innovation, Google Cloud helps customers decarbonize their business and increase their resilience to climate change by accelerating sustainable action with AI. We help you to leverage high-quality data and AI to move past ambition and take action, enabling real-time decision making that helps shape more sustainable business practices, reduce emissions, and mitigate climate risks.

Your path to AI-driven success

With all of this in mind, you may be asking, "How do I get started?"

At its heart, AI-driven success starts with systematically identifying large-model use cases and working with a trusted partner to move from experimentation, to acceleration, to scale. You don't necessarily need to set up an internal AI practice. In fact, getting started has less to do with a solution and more with the service to guide and support in the process.

Our customers partner with us to investigate how they can bring their use cases to life - to delight customers, discover new opportunities, and reduce operational drudgery. There is a lot to learn and a lot to consider in this new era of AI-enabled transformation. Google Cloud and our extensive partner ecosystem are here to collaborate with you and turn the future promise of AI into value today.



About Google Cloud

Google helps organizations innovate faster with enterprise-ready generative AI.

We look forward to helping you hit the ground running with generative AI, too. To learn more about our suite of generative AI tools, visit cloud.google.com/ai/generative-ai and workspace.google.com/solutions/ai. Contact us about getting started today.