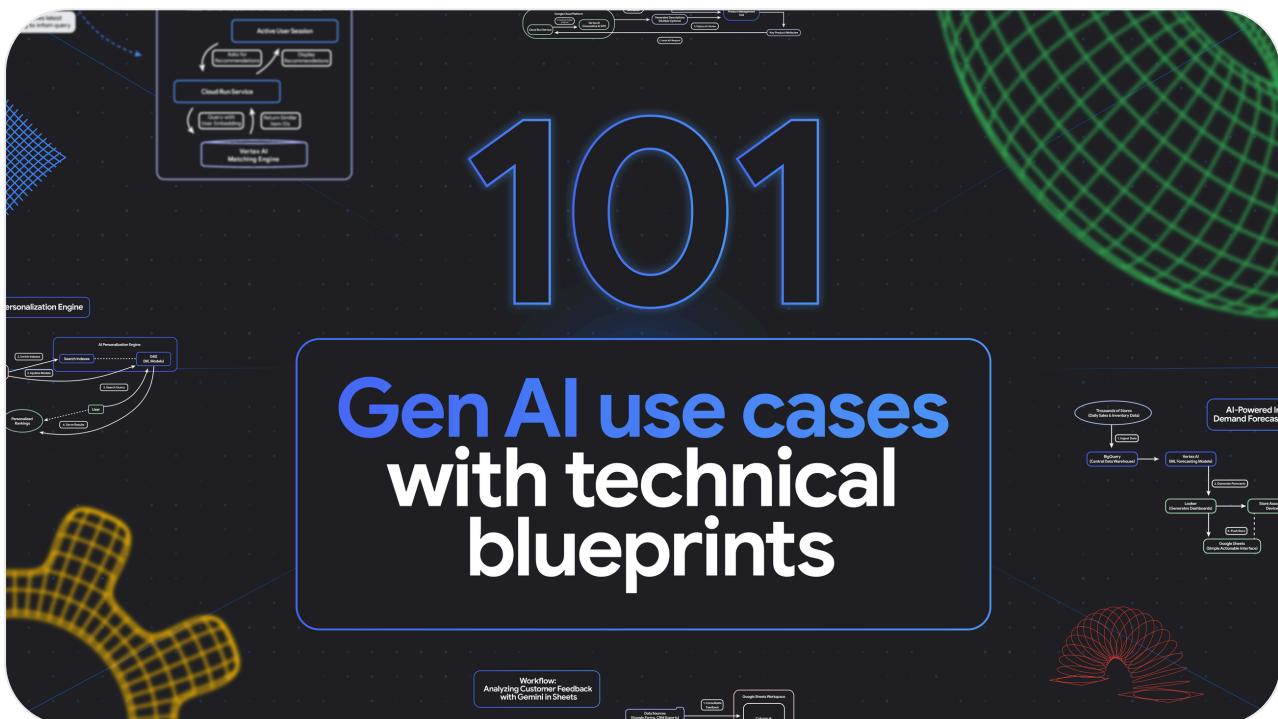


[AI & Machine Learning](#)

101+ gen AI use cases with technical blueprints

August 22, 2025

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A little over a year ago, we published a list of generative AI use cases that has since grown to include [more than 600 examples](#) of how organizations are putting AI to work. Yet for many developers and business leaders, inspiration has

To help, we've created a technical complement to our most impactful, customer-inspired use cases. This guide contains **101 architectural blueprints** as illustrative starting points to give you a practical foundation for your next project.

Each blueprint shows a design pattern and a corresponding Google Cloud tech stack to solve real-world challenges, from automating document summarization and forecasting sales, to improving patient outcomes and preventing fraud.

Let's dive in.

The list is organized by 10 major industry groups.

Retail



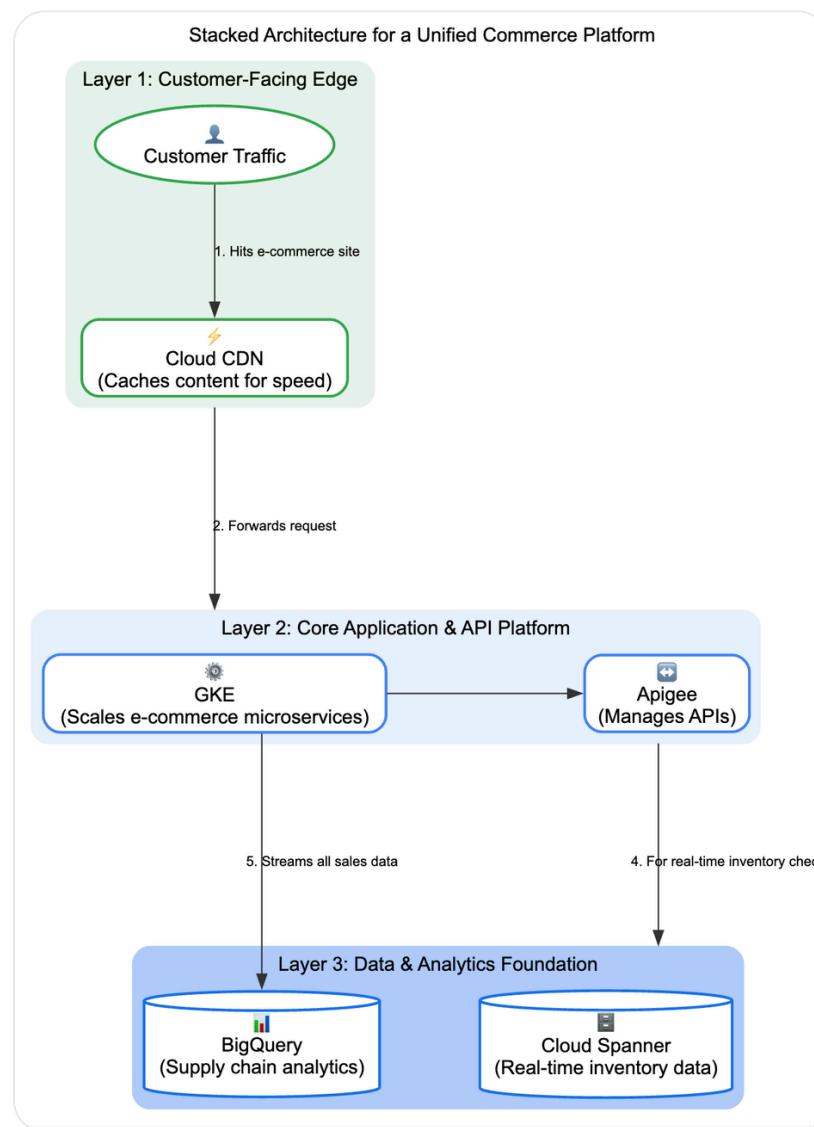
These architectural blueprints are inspired by customers who are using AI in the retail industry such as Mercari, Target, Carrefour Taiwan, The Home Depot, Unilever, and [more](#).

1. Unify online and in-store retail experiences

- **Business challenge:** You're a large retailer with valuable physical stores and a growing e-commerce channel. These two worlds operate

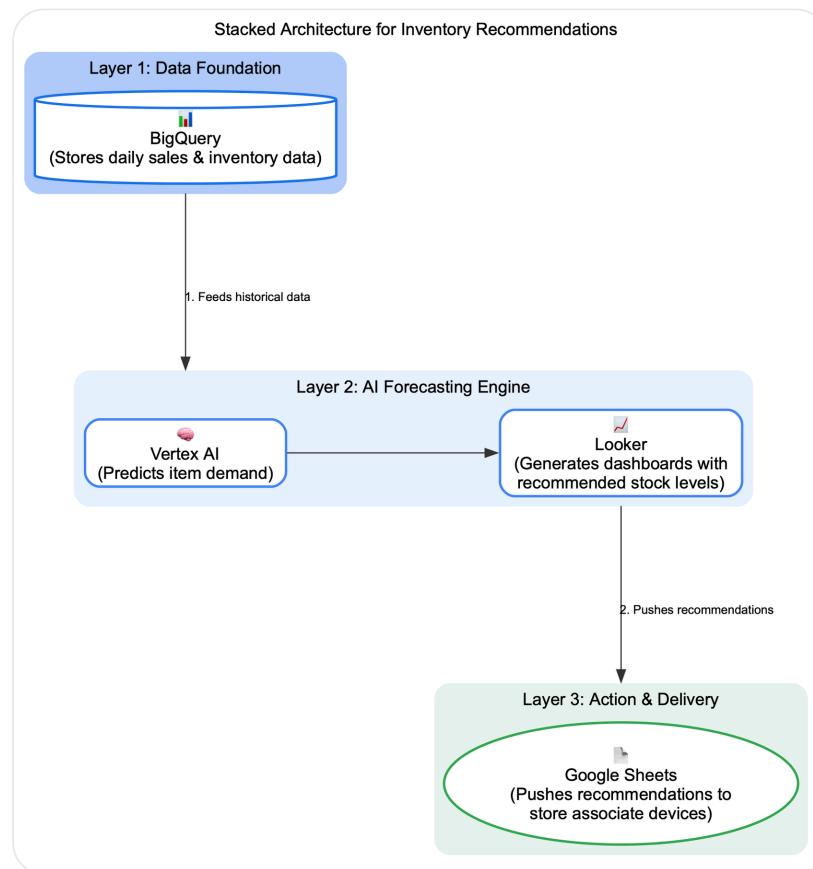
promotions, and inventory levels.

- **Tech stack:** Google Kubernetes Engine (GKE), BigQuery, Cloud CDN, Apigee, Cloud Spanner.
- **Blueprint:** Customer traffic hits your e-commerce site → Cloud CDN caches static content for speed → GKE scales containerized e-commerce microservices based on demand → Apigee manages APIs for real-time inventory checks against store-level data → All sales data streams into BigQuery for supply chain analytics and demand forecasting



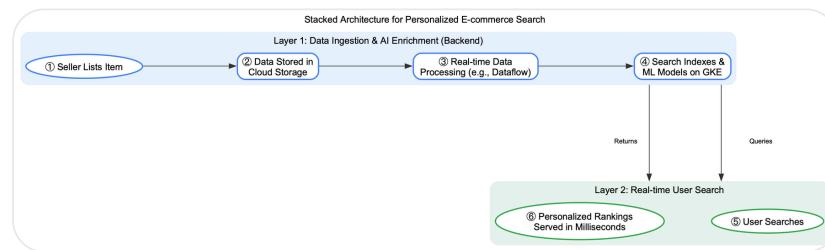
Real-world gen AI use case: Real-time inventory

- **Business challenge:** You want to boost efficiency by giving your store managers accurate, real-time inventory recommendations.
- **Tech stack:** BigQuery, Vertex AI, Looker, Google Workspace.
- **Blueprint:** Daily sales and inventory data from thousands of stores is ingested into BigQuery -> Vertex AI models process historical data to predict demand for each item -> Looker generates dashboards with recommended stock levels -> Recommendations are pushed to store associates' devices, often via a simple interface like Google Sheets.



Personalize search results for items on your online site

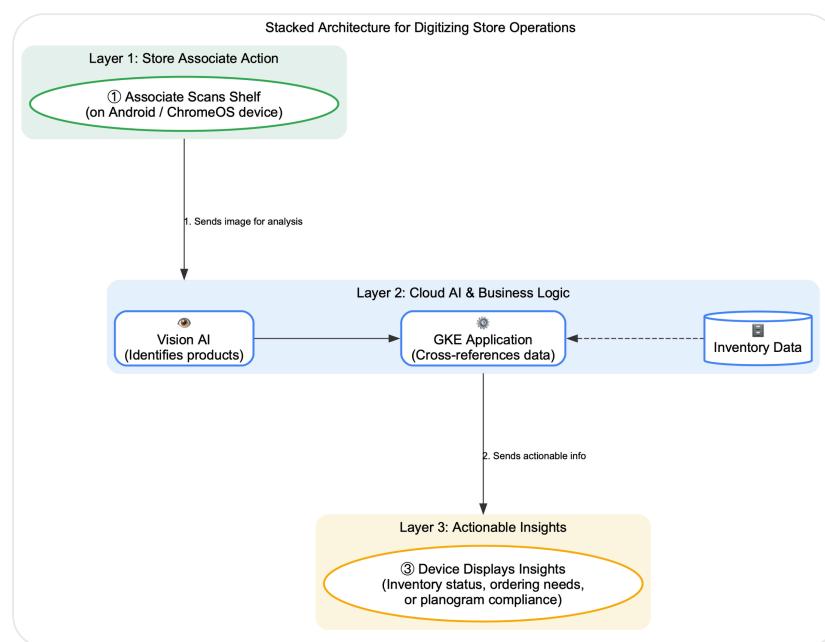
- **Business challenge:** You have millions of unique, non-standard items needed to provide a highly relevant, fast, and personalized search experience for its users.
- **Tech stack:** Google Cloud Storage, Dataflow, BigQuery, GKE.
- **Blueprint:** A seller lists a new item, and its data is stored in Cloud Storage -> Dataflow processes item details and user interaction data in real-time -> This data enriches search indexes and feeds machine learning models running on GKE -> When a user searches, the models provide personalized rankings, which are served in milliseconds.



4. Modernize in-store operations with AI

- **Business challenge:** You're a retailer who needs to digitize and streamline legacy, paper-based processes for store associates to improve productivity and customer service.

- **Blueprint:** An associate uses a mobile device to scan a product shelf -> Vertex AI Vision analyzes the image to identify products and price tags -> An application, running on GKE, cross-references this with inventory data -> The device displays inventory status, ordering needs, or planogram compliance information.

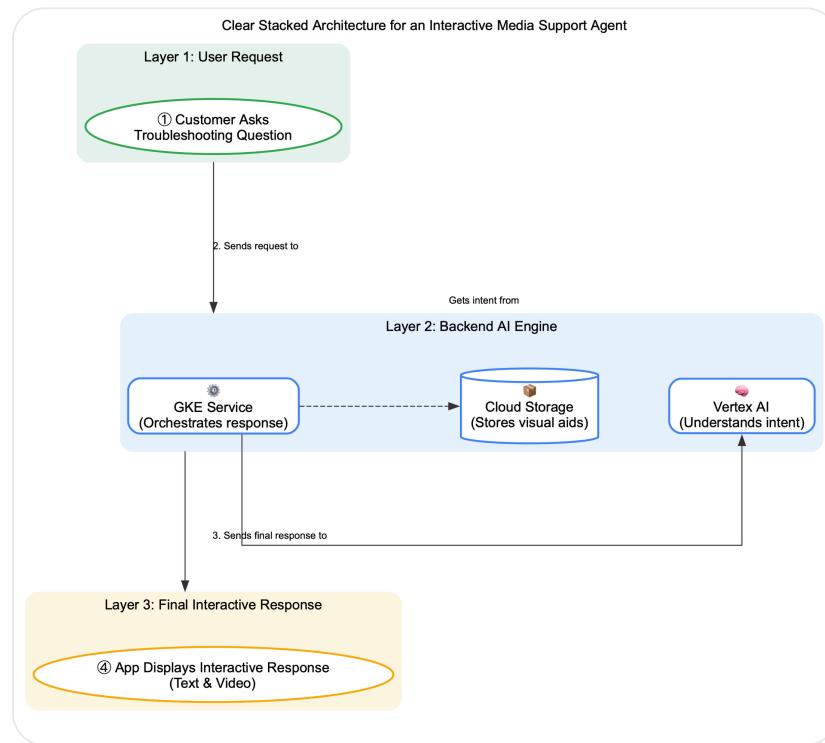


5. Create an assistant for a better shopping experience

- **Business challenge:** You're a brand whose traditional support channels, like text-based chatbots and FAQs, feel impersonal, can't visually guide customers through complex processes, and might not create a genuine connection with your audience.

SPEECH-TO-TEXT & TEXT-TO-SPEECH APIs

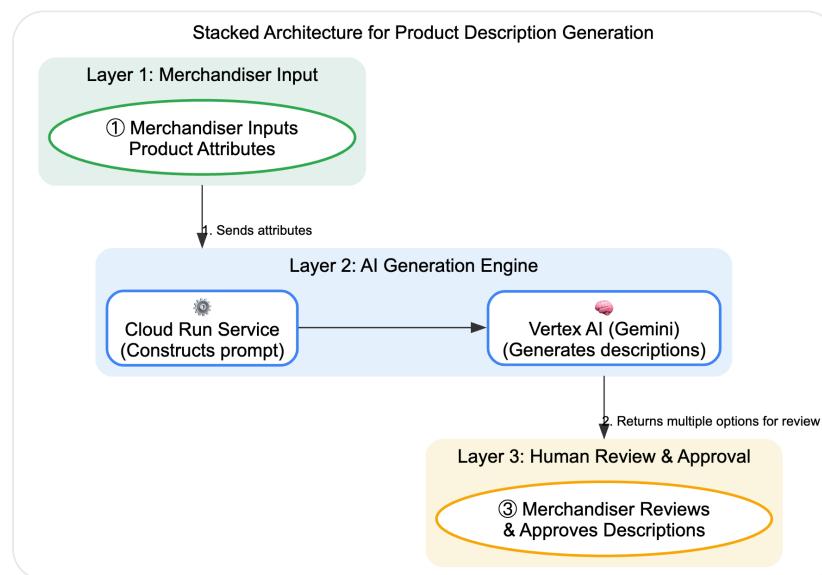
- **Blueprint:** A customer asks a troubleshooting question in your app (e.g., "How do I replace the water filter in my coffee machine?"). → The request (voice or text) is sent to the conversational AI "brain" on Vertex AI, which identifies the intent. → The AI generates a text response and identifies the corresponding visual aid (e.g., `filter_replacement_step1.mp4`). → A service on GKE retrieves this video clip from Google Cloud Storage. → The app displays the text and plays the short video, visually guiding the customer through the process and resolving their issue quickly.



6. Write differentiated product descriptions

unique, high-quality, and SEO-friendly product descriptions for thousands of items at scale, reducing manual effort and avoiding duplicate content.

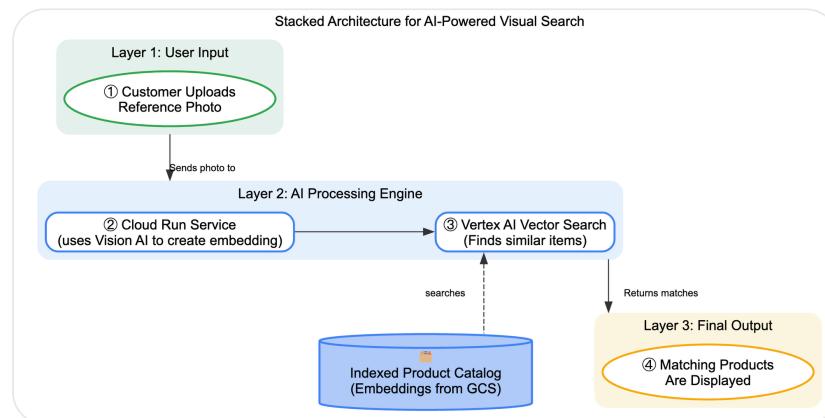
- **Tech stack:** Vertex AI, Cloud Run, BigQuery.
- **Blueprint:** A merchandiser inputs key product attributes (e.g., material, color, target audience) into a product management tool -> These attributes are sent to a service on Cloud Run -> The service constructs a detailed prompt and calls the Vertex AI Generative AI API -> Vertex AI analyzes the attributes and returns multiple unique description options -> The descriptions are displayed to the merchandiser for review, editing, and final approval.



7. Help users find your products using photos as a reference

(e.g. clothing) using a photo as a reference.

- **Tech stack:** Vertex AI Vision, Vector Search, Google Cloud Storage, Cloud Run.
- **Blueprint:** A customer uploads a reference photo in the app -> The app sends the photo to a service on Cloud Run -> The service uses Vertex AI Vision to convert the photo into a vector embedding -> This embedding is used to query the Vector Search , which finds the most visually similar product embeddings from the indexed catalog -> The service returns the matching products to the customer in seconds.

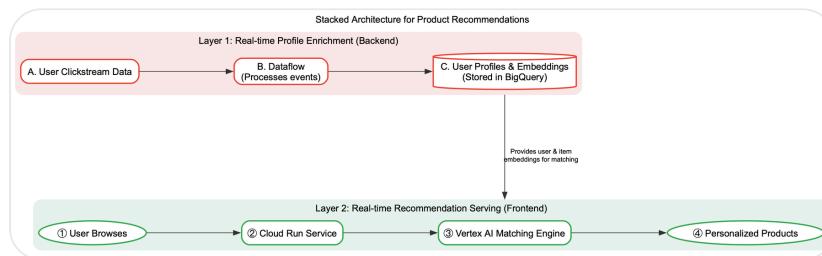


8. Build a real-time product recommendation engine

- **Business challenge:** You're a digital retailer trying to increase basket size and customer loyalty. Traditional recommendation engines are too simplistic, often failing to understand a customer's true intent or style beyond basic keywords. This leads to generic suggestions, poor discoverability for unique items in your

Significant revenue on the table.

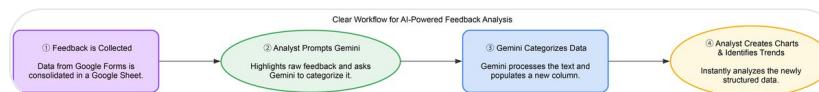
- **Tech stack:** BigQuery, Vector Search, Dataflow, Cloud Run.
- **Blueprint:** User clickstream data streams into Dataflow -> Dataflow processes and enriches these events, updating user profiles and embeddings in real-time (in BigQuery or a feature store) -> As a user browses, a request is sent to a service on Cloud Run -> The service queries Vector Search with the user's embedding to find the most relevant or complementary items -> A personalized list of products is returned and displayed to the user in milliseconds.



9. Quickly identify trends and improve customer interactions

- **Business challenge:** Your valuable feedback is buried in thousands of rows of unstructured text from surveys, reviews, and support tickets. Manually reading, tagging, and categorizing this data is a slow and tedious process that delays critical insights and

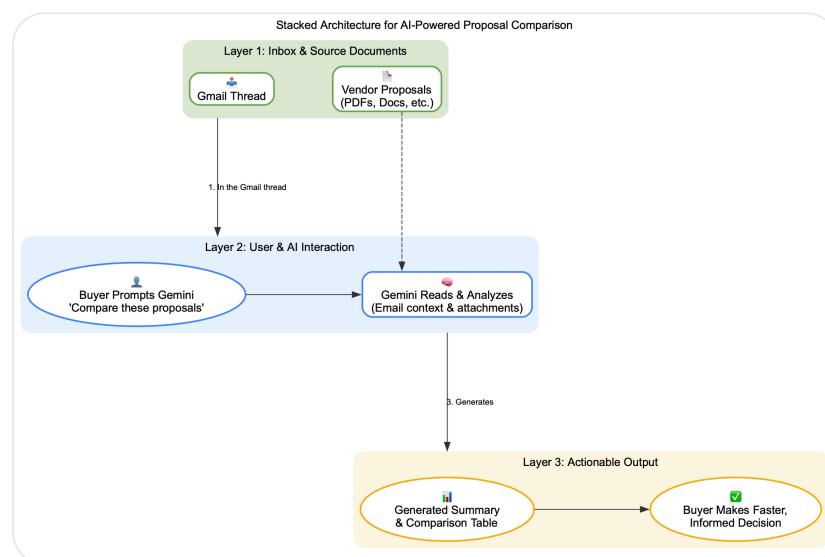
- **Tech stack:** Google Sheets, Gemini for Google Workspace, Google Forms (as a data source).
- **Blueprint:** Customer feedback is collected from sources like Google Forms and consolidated into a Google Sheet -> An analyst highlights the column of raw feedback and uses the integrated Gemini feature with a prompt like "Categorize this feedback" -> Gemini processes the text in each cell and populates a new column with the corresponding categories -> The analyst can then create charts and pivot tables on this newly structured data to identify trends.



10. Compare vendor proposals, right from your email

- **Business challenge:** You're a buyer or department head responsible for making purchasing decisions. But complex vendor proposals arrive in different formats, burying key details like costs, timelines, and deliverables across dozens of pages. Manually creating a comparison is slow, tedious, and prone to human error, creating the risk that you'll miss a critical detail and make a costly decision.

- **Blueprint:** A buyer receives multiple emails with vendor proposals as attachments (PDFs, Docs, etc.) -> In the Gmail thread, the user activates Gemini and provides a prompt like, "Create a table comparing the cost, timeline, and key deliverables from the attached proposals" -> Gemini reads the context of the emails and the content of the attachments -> It generates a concise summary and a comparison table directly in the Gmail interface -> The buyer can then make a faster, more informed decision without manually cross-referencing documents.

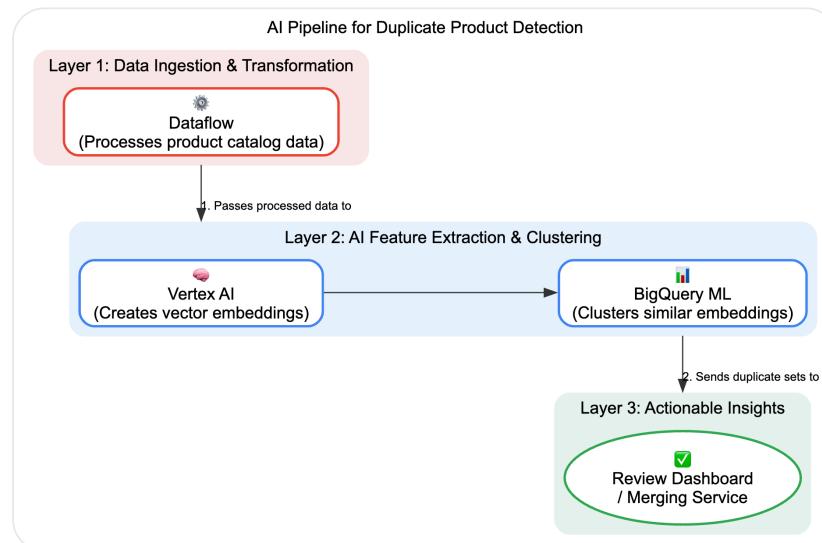


11. Merge and duplicate product listings

- **Business challenge:** You're an e-commerce catalog manager responsible for a massive product catalog sourced from multiple vendors. Inconsistent data creates countless duplicate listings for the same item. This

foreseeing impossible) and harms your search rankings, all while your team spends countless hours manually trying to find and merge them.

- **Tech stack:** BigQuery, Vertex AI, Dataflow
- **Blueprint:** Product catalog data is processed by a data processing pipeline (Dataflow) -> Dataflow calls a Vertex AI model to convert product text and images into vector embeddings -> The embeddings are stored in BigQuery -> A BigQuery ML clustering model groups items with similar embeddings into duplicate sets -> These duplicate sets are sent to a review dashboard or an automated merging service.



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Media, Marketing & Gaming

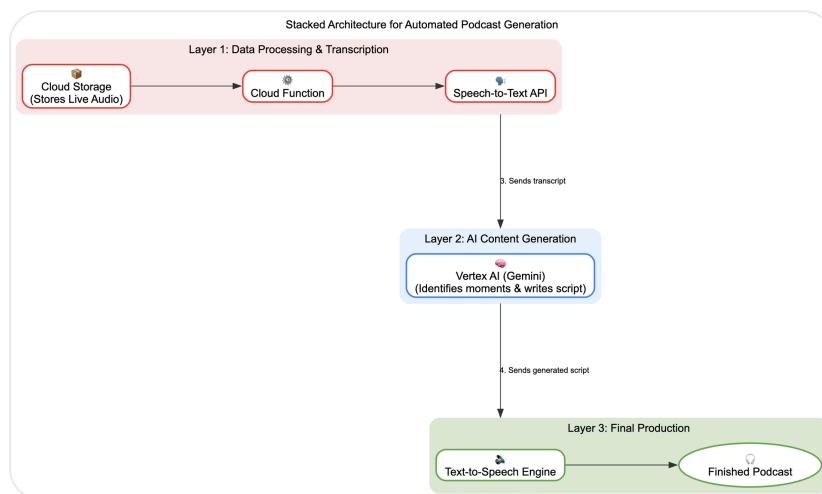


These architectural blueprints are inspired by customers who are using AI in the media, marketing, and gaming industry, such as: Formula E, The Golden State Warriors, Spotify, Warner Bros Discovery, and [more](#).

12. Summarize commentary into podcasts

- **Business challenge:** You're a broadcaster or sports league with hours of live commentary for each event. Manually creating highlight reels, summaries, or daily podcasts is time-consuming, labor-intensive, and slow, causing you to miss opportunities for timely fan engagement.
- **Tech stack:** Google Cloud Speech-to-Text, Vertex AI, Cloud Functions, and Google Cloud Storage.
- **Blueprint:** Live audio commentary is captured and stored in Google Cloud Storage → A Cloud Function is triggered, which sends the audio file to the Speech-to-Text API to generate a full, time-stamped transcript → The transcript is sent to a Vertex AI generative

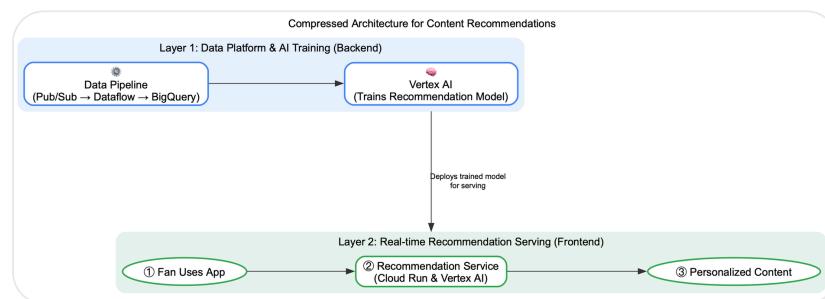
transcript based on exclamation, keywords (e.g., 'overtake', 'crash'), and sentiment. For each moment, create a 30-second summary script" → The generated podcast script is then sent to a text-to-speech engine or a human host to be recorded, creating a "daily highlights" podcast in minutes instead of hours.



13. Build a content recommendation engine

- Business challenge:** You're a sports franchise or media company that has consolidated all of its fan data into a unified data foundation. You want to deliver relevant, personalized content to every fan—including real-time game highlights, scores, and alerts about ticket sales or events—to deepen engagement and increase revenue.
- Tech stack:** BigQuery, Vertex AI Search, Vector Search, Dataflow, and Cloud Run.

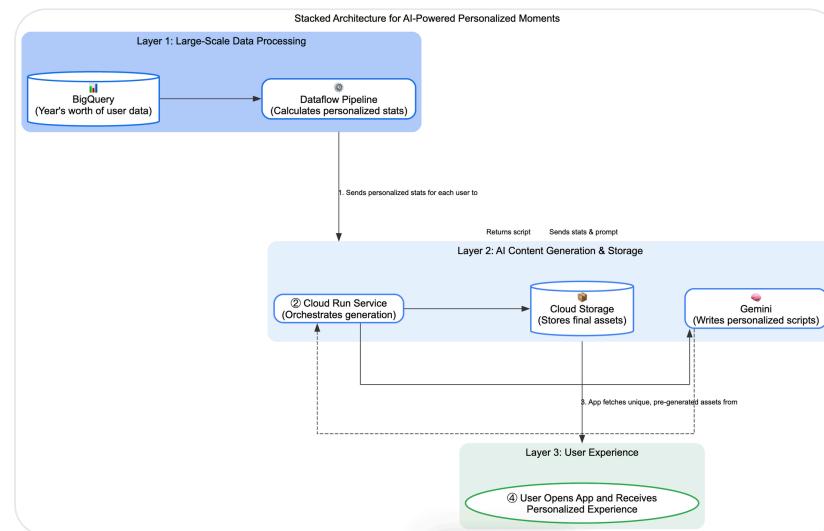
→ A Dataflow pipeline processes and enriches this data, updating fan profiles in the BigQuery unified data foundation → Vertex AI uses this historical and real-time data to train a recommendation model → When a fan uses the team's app, a request is sent to a service on Cloud Run → The service queries Vertex AI Vertex AI Search with the fan's ID, which returns a personalized list of content (highlights, articles, ticket alerts) → The app displays the personalized recommendations to the fan in real time.



14. Create ultra-personalized media campaigns

- **Business challenge:** You want to move beyond generic marketing and create deeply personal, shareable moments for every single user.
- **Tech stack:** BigQuery, Vertex AI, Dataflow, Cloud Run, and Google Cloud Storage.
- **Blueprint:** A large-scale **Dataflow** pipeline processes a year's worth of user interaction data from **BigQuery** to calculate personalized

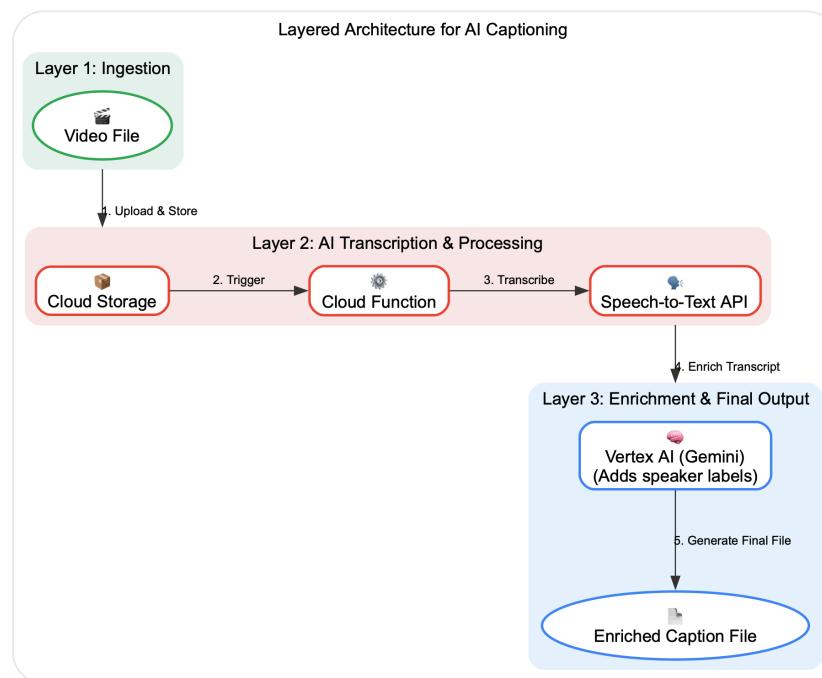
favorite artist, most-played song) to the **Gemini API** with a prompt like, "Generate a fun, upbeat script for a podcast summarizing these listening habits" → The Cloud Run service uses the generated text to create personalized assets (audio clips, social media images) and stores them in **Google Cloud Storage** → When the user opens their app, it fetches their unique, pre-generated assets from Cloud Storage to deliver their personalized experience.



15. Build an AI captioning tool

- **Business challenge:** You're a major media company with a massive archive of video content. Your challenge is making this content accessible and searchable by creating accurate, time-stamped captions and transcripts, a process that is incredibly slow and expensive to do manually.

- **Blueprint:** A video file is uploaded to **Google Cloud Storage**. → A **Cloud Function** triggers and sends the video's audio track to the **Speech-to-Text API**, specifying a model trained for media content. → The API returns a detailed, time-stamped transcript. → For added context, the transcript can be sent to a **Gemini** model with a prompt like, *"Identify the different speakers in this transcript and label their lines,"* providing a rich, searchable, and accessible caption file.

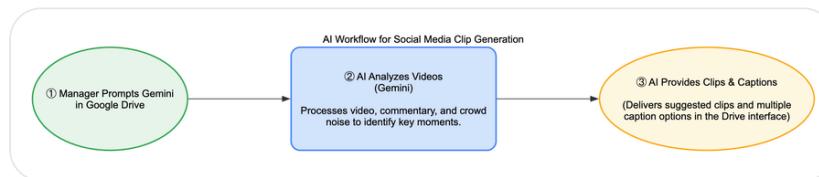


16. Write social media captions

- **Business challenge:** You're a sports league or broadcaster with hours of event footage. Your challenge is quickly creating engaging social media clips to capitalize on exciting moments,

Clip, and write a caption.

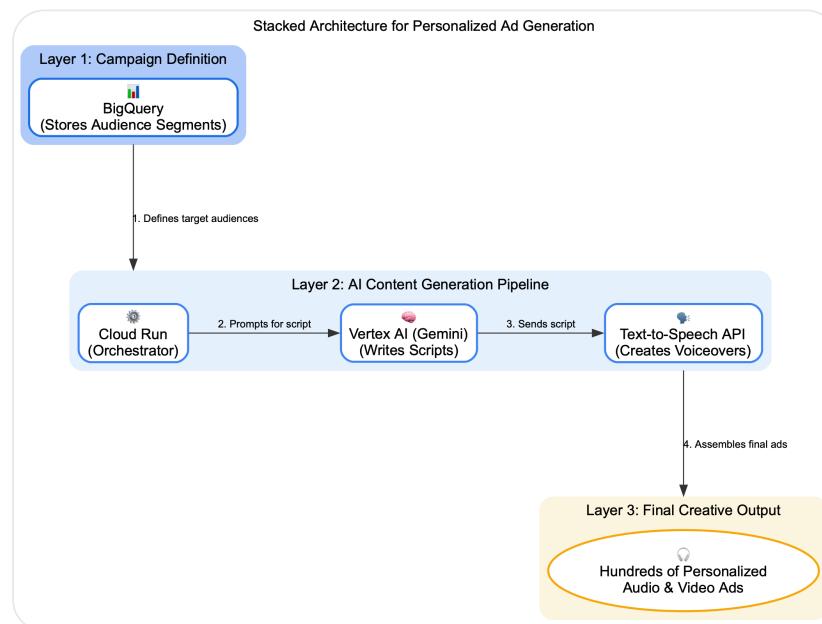
- **Tech stack:** Gemini for Google Drive, Google Drive.
- **Blueprint:** All broadcast footage from an event is saved to a shared folder in **Google Drive**. → A social media manager opens the **Gemini in Drive** side panel. → They use a prompt like, *"Analyze the video files in this folder from the last hour. Find the top 3 most exciting moments based on commentary and crowd noise. For each, suggest a 5-second video clip and write three different engaging social media captions with relevant hashtags."* → Gemini provides the clips and captions directly in the Drive interface, turning an hours-long task into a single prompt.



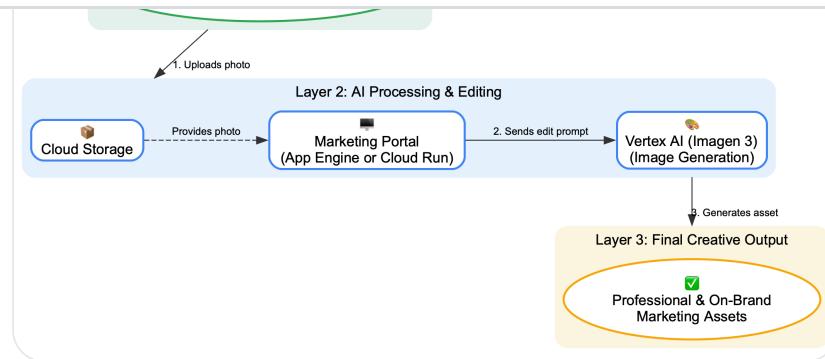
17. Create hundreds of hyper-personalized video and audio ad variations in minutes

- **Business challenge:** You're a digital advertising platform, and your clients want to move beyond one-size-fits-all ads. Your challenge is creating hundreds of personalized ad variations tailored to different audiences, a

- **Tech stack:** Vertex AI, Text-to-Speech API, Cloud Run, BigQuery.
- **Blueprint:** An advertiser defines a campaign with multiple target audience segments stored in **BigQuery** (e.g., "young professionals," "college students"). → For each segment, a service on **Cloud Run** calls the **Gemini API** with a prompt like, "*Generate a 15-second audio ad script for a new coffee brand, targeting 'young professionals'. The tone should be sophisticated and energetic.*" → Gemini generates a unique script for each audience. → The scripts are sent to the **Text-to-Speech API** to create audio voiceovers in various styles. → These audio files are combined with background music, creating hundreds of personalized ad variations in minutes.

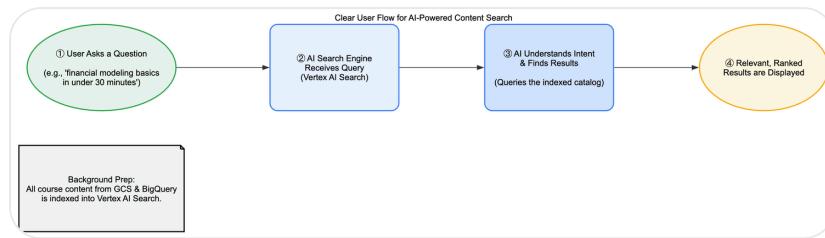


- **Business challenge:** You're a franchise business and you need to create high-quality, professional marketing materials for hundreds of local branches. Your challenge is that local owners are not graphic designers, and hiring designers for every local ad is not scalable.
- **Tech stack:** Vertex AI, Google Cloud Storage, a custom marketing portal (built on App Engine or Cloud Run).
- **Blueprint:** A local studio owner logs into a central marketing portal. → They upload a photo of their students to **Google Cloud Storage**. → The portal provides an editing interface powered by **Imagen 3**, Google's image generation model. → The owner can use simple prompts like, *"Extend the background of this photo to fit a vertical social media post,"* or *"Create a dynamic 'new student special' graphic using this photo."* → The AI generates professional-quality, on-brand marketing assets, empowering local franchises to create their own materials without design expertise



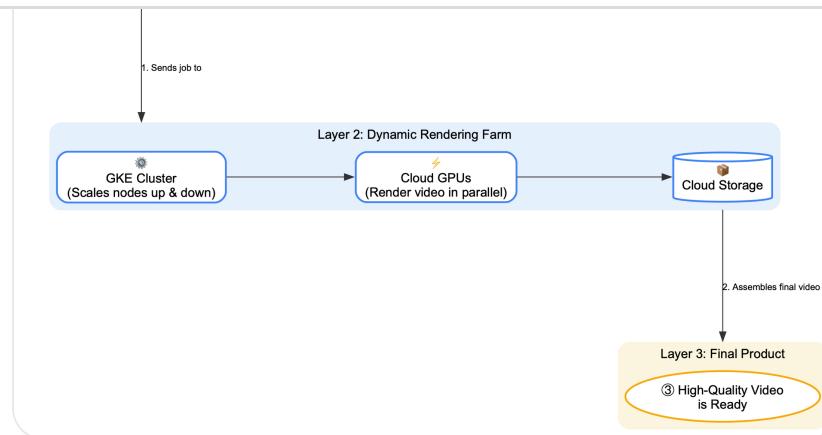
19. Search data across tens of thousands of courses

- **Business challenge:** You're a large media or education company with tens of thousands of courses, articles, and learning materials. Your challenge is helping users find the specific information they need when it's buried across this massive and diverse content library.
- **Tech stack:** Vertex AI Search, BigQuery, Google Cloud Storage.
- **Blueprint:** All course content, including text, videos, and metadata, is indexed from sources like **Google Cloud Storage** and **BigQuery** into **Vertex AI Search**. → A user goes to the learning platform and uses a natural language search query like, "*I want to learn about the basics of financial modeling in spreadsheets, but I only have 30 minutes.*" → Vertex AI Search understands the multiple intents (topic, format, duration) and queries across the entire catalog. → It returns a ranked list of the most relevant results, such as a specific 10-minute video lecture and a 20-minute practical



20. Make video content generation faster

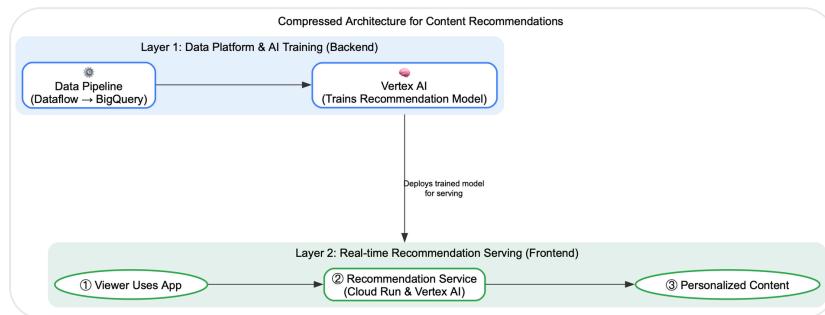
- **Business challenge:** You're a company creating AI-powered video content, such as digital avatars or automated news reports. Your challenge is the immense computational power required to render high-quality video quickly, which can create a bottleneck and slow down your entire production pipeline.
- **Tech stack:** Cloud GPUs (or TPUs), Google Kubernetes Engine (GKE), Google Cloud Storage.
- **Blueprint:** A user submits a script and selects a digital avatar for a new video. → The request is sent to a rendering application running on a **GKE** cluster. → GKE automatically scales up a pool of nodes equipped with powerful **Cloud GPUs**. → The GPUs work in parallel to process the AI models and render the video frames at high speed. → Once rendering is complete, the final video file is saved to **Google Cloud Storage**, and the GPU-powered nodes scale down automatically, optimizing for both speed and cost.



21. Create a recommendations experience

- **Business challenge:** You're a major broadcaster with a huge catalog of content, from live sports to soap operas. Your challenge is to keep viewers engaged by surfacing content that is personally relevant to them from across your entire diverse portfolio, rather than just showing them what's popular.
- **Tech stack:** BigQuery, Vertex AI, Dataflow, Cloud Run.
- **Blueprint:** Real-time viewer interaction data streams into a **Dataflow** pipeline, which processes the events and updates viewer profiles in **BigQuery**. → The unified viewer data in BigQuery is used to train a **Vertex AI Vertex AI Search** model. → When a viewer opens the streaming app, a request is sent to a service on **Cloud Run**. → The service queries the Vertex AI Search model with the viewer's ID. → The model returns a

Like this sports documentary, creating a highly engaging and personalized experience.



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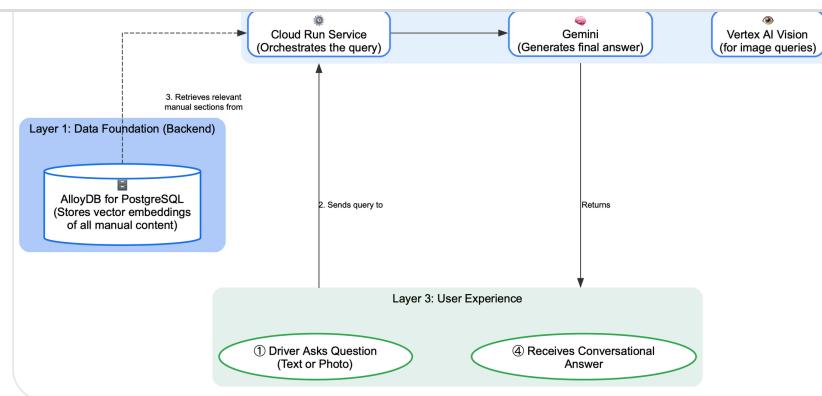
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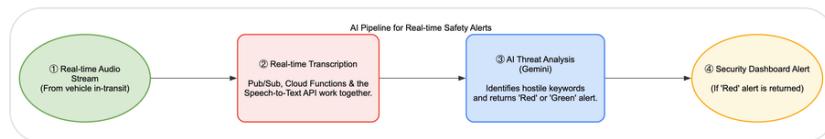
These architectural blueprints are inspired by customers who are using AI in the automotive and logistics industry, such as: Volkswagen of America, PODS, Uber, UPS, BMW Group, and [more](#).

- **Business challenge:** You're an automaker or manufacturer of complex products. Your challenge is that traditional paper owner's manuals are cumbersome, difficult to search, and rarely used by customers, leading to frustration and increased calls to support centers for simple questions.
- **Tech stack:** Vertex AI, AlloyDB for PostgreSQL, Cloud Run, Google Cloud Storage
- **Blueprint:** All owner's manual content is processed and chunked into vector embeddings, which are stored in AlloyDB. → When a driver uses the app to ask a question like, "*How do I change a flat tire?*" , and the query is sent to a service on Cloud Run. → For multimodal queries, the user points their phone's camera at a dashboard light; the image is sent to Vertex AI Vision to identify it, and this information is added to the query. → The service finds the most relevant manual sections from AlloyDB and sends them, along with the user's question, to Gemini, which generates a clear, conversational answer.



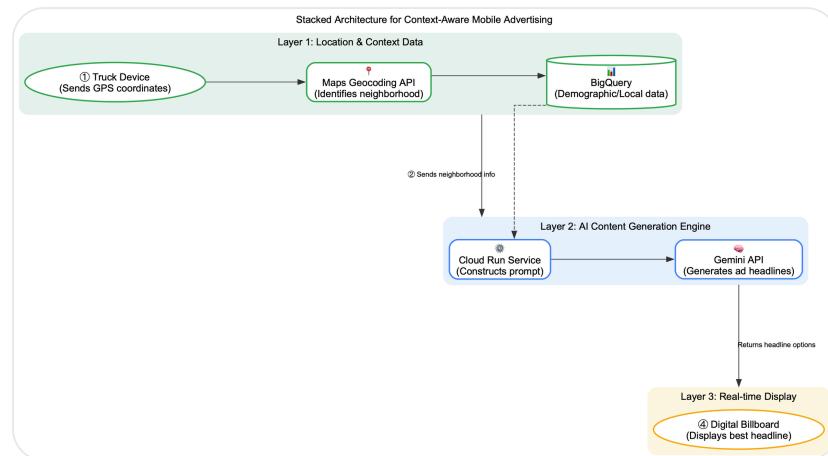
23. Monitor real-time audio for in-transit safety alerts

- **Business challenge:** You're a transportation or logistics company responsible for the safety of thousands of drivers and passengers every day. Your challenge is reacting to dangerous situations quickly enough, as traditional methods rely on passengers or drivers manually triggering an alarm, which is often too late.
- **Tech stack:** Speech-to-Text API, Vertex AI, Pub/Sub, Cloud Functions
- **Blueprint:** During a trip, audio from the vehicle is streamed in chunks to Pub/Sub. → A Cloud Function is triggered, which sends the audio snippet to the Speech-to-Text API for transcription. → The resulting text is sent to a Gemini model with a prompt like, *"Analyze this text for keywords related to distress or hostility ('robbery', 'help'). Return a 'Red' alert if found, otherwise 'Green'."* → If a 'Red' alert is returned, the system automatically notifies a



24. Deploy dynamic, location-aware digital advertising

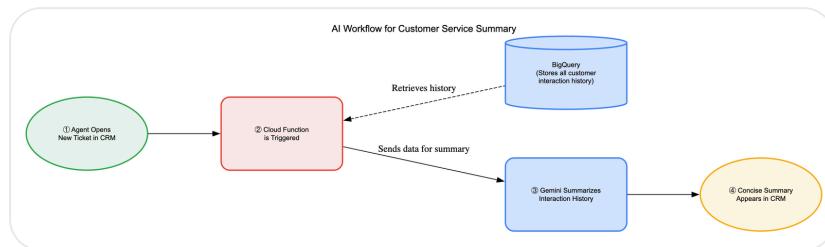
- **Business challenge:** Your company has a large mobile physical presence (like a fleet of trucks) and you want to move beyond displaying static logos. Your challenge is creating advertising that is hyper-relevant and context-aware, to capture the attention of people in specific neighborhoods with unique messaging.
- **Tech stack:** Gemini, Google Maps Platform (Geocoding API), Cloud Run, BigQuery
- **Blueprint:** A device on a truck periodically sends its GPS coordinates to a service on Cloud Run. → The service calls the Google Maps Geocoding API to identify the current neighborhood and queries BigQuery for demographic or local interest data associated with that area. → These details are used to construct a prompt for Gemini, such as *"Create a witty, 10-word billboard headline for a moving company in a neighborhood known for its young families and parks."* → Gemini returns multiple headline options, and the



25. Build a productivity agent for customer service teams

- **Business challenge:** You're a large enterprise with a customer service team that handles thousands of interactions daily. Your agents spend significant time writing summaries instead of focusing on high-quality problem-solving.
- **Tech stack:** Vertex AI, BigQuery, Cloud Functions
- **Blueprint:** All customer service interactions (chats, emails) are stored in a central data store like BigQuery. → When an agent opens a new ticket, a Cloud Function is triggered. → The function retrieves the customer's entire interaction history from BigQuery and sends it to Gemini with a prompt like, *"Summarize the key issues from this customer's past 5 interactions and list their current sentiment."* → The concise summary appears directly in

effective and empathetic response.

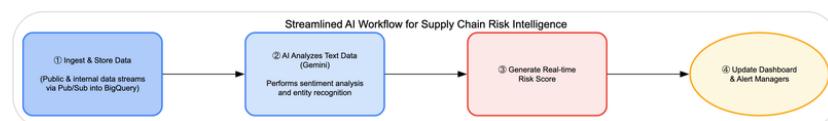


26. Analyze large-scale telematics data for fleet optimization

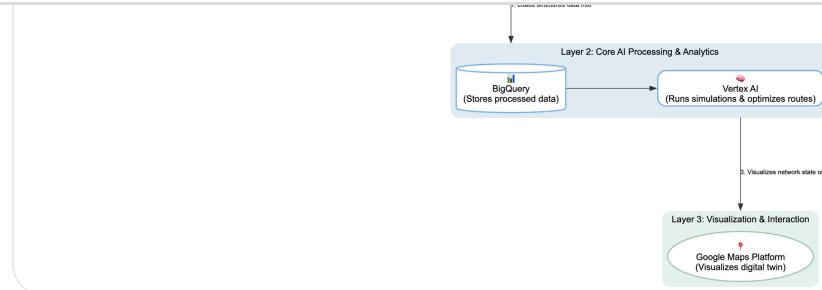
- **Business challenge:** You're a global logistics or telematics company managing millions of connected vehicles. Your challenge is processing the immense volume of daily data points that can help you improve fleet efficiency, driver safety, and sustainability.
- **Tech stack:** BigQuery, Vertex AI, Looker
- **Blueprint:** Billions of data points from millions of vehicles stream directly into BigQuery daily. → BigQuery ML uses that data to train models directly within the data warehouse to identify patterns related to fuel consumption, unsafe driving habits, or optimal routing. → The models run continuously, analyzing new data as it arrives and outputting insights such as "vehicles on Route 88 are experiencing 15% higher fuel consumption due to traffic patterns." → These insights are visualized in a Looker dashboard, allowing fleet managers to

27. Create an AI-powered supply chain risk intelligence platform

- **Business challenge:** You're a global enterprise with a complex, multi-tiered supply chain. Your challenge is a lack of visibility into potential disruptions — from financial instability and labor issues to geopolitical events — deep within your supplier network, putting you at risk of costly delays and compliance failures.
- **Tech stack:** Gemini, Pub/Sub, BigQuery
- **Blueprint:** The system continuously ingests data from public sources (news, social media, financial reports) via Pub/Sub. → This data, along with a company's internal supplier data, is stored and processed in BigQuery. → Gemini models analyze the unstructured text data, performing sentiment analysis and entity recognition to identify potential risks associated with specific suppliers (e.g., "news reports indicate labor strikes at Factory X"). → The system generates a risk score for each supplier, which is updated in real-time on a dashboard, alerting managers to potential disruptions before they impact the supply chain.

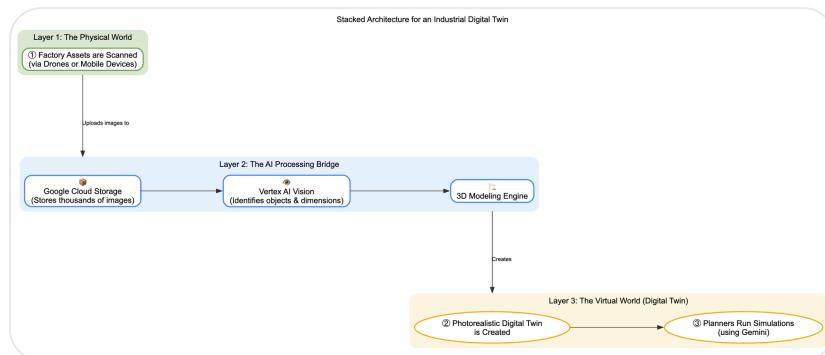


- **Business challenge:** You're a logistics and shipping company operating a vast, complex network of vehicles, warehouses, and sorting facilities. Your challenge is a lack of a single, real-time view of your entire operation, making it difficult to optimize routes, predict delays, and provide customers with accurate tracking information.
- **Tech stack:** Pub/Sub, Dataflow, BigQuery, Vertex AI, Google Maps Platform
- **Blueprint:** IoT sensors on packages, vehicles, and in facilities stream real-time location and status data to Pub/Sub. → A **Dataflow** pipeline processes this massive stream of data, cleansing and structuring it before loading it into **BigQuery**. → **Vertex AI** models use this historical and real-time data to run thousands of simulations, predicting potential bottlenecks and optimizing routes. → The entire network state is visualized on a **Google Maps Platform** interface, creating a "digital twin" that allows operators to see the entire network at a glance and customers to track their packages with pinpoint accuracy.



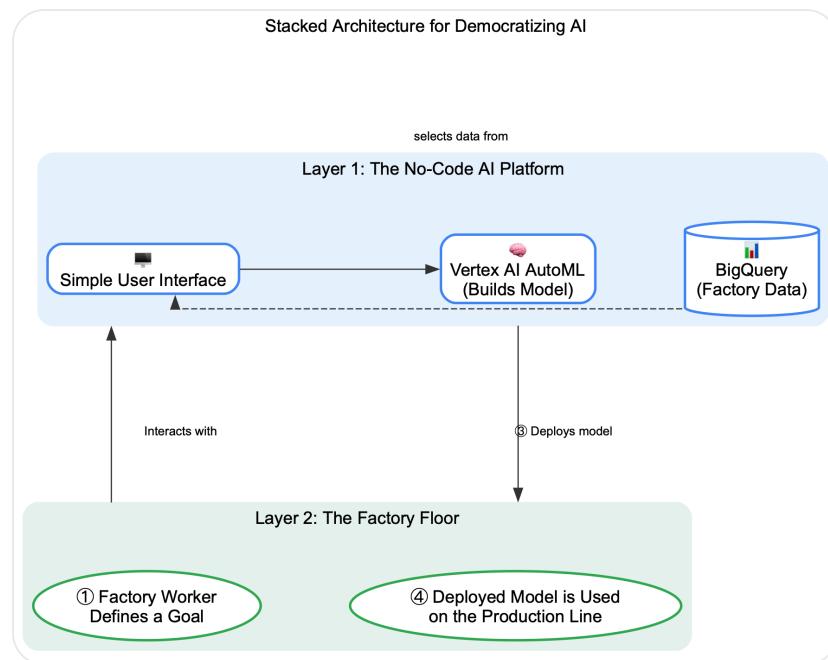
29. Optimize industrial planning with 3D digital twins

- **Business challenge:** You're a manufacturer with complex factory layouts and supply chains. Your challenge is that optimizing facility design, production line flow, or warehouse logistics is incredibly difficult and expensive to test in the physical world.
- **Tech stack:** Vertex AI, a 3D modeling engine, Google Cloud Storage
- **Blueprint:** Factory assets are scanned using mobile devices or drones, capturing thousands of images. → The images are uploaded to Google Cloud Storage and processed by Vertex AI Vision models to identify objects and their dimensions. → This structured data is fed into a 3D modeling engine to create a photorealistic digital twin of the facility. → Planners can then use this digital twin to run thousands of simulations with Gemini, asking questions like *"What is the most efficient path for a robot to move from station A to station B?"* to optimize processes



30. Bring your employees up to speed on AI

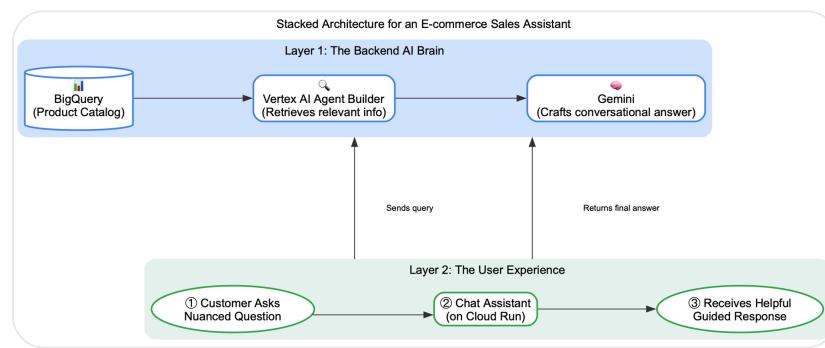
- **Business challenge:** You're a manufacturing company with a wealth of operational knowledge about the factory floor, but your expert workers lack the coding skills to build AI solutions. Your challenge is finding a way to make it easy to give your frontline teams ways to solve their own problems with AI, so they can improve efficiency and quality control.
- **Tech stack:** Vertex AI, BigQuery, a simplified user interface (e.g., built on App Engine)
- **Blueprint:** Factory sensor and quality control data is collected and stored in BigQuery. → A simple, no-code user interface is created where a factory worker can select a dataset and define a goal, such as "*Predict which parts are likely to have a defect based on these sensor readings.*" → The interface calls the Vertex AI AutoML API, which automatically trains, tests, and deploys a custom machine learning model without the worker writing any code. → The deployed model can then be



31. Build an AI-powered sales assistant for e-commerce

- **Business challenge:** You're a retailer with a sophisticated online storefront. Your challenge is that customers often have nuanced questions or need guidance that a simple search bar or FAQ can't provide, leading to abandoned carts and missed sales opportunities.
- **Tech stack:** Vertex AI, BigQuery, Cloud Run
- **Blueprint:** Your entire product catalog and customer interaction history are indexed from BigQuery into Vertex AI Agent Builder. → When a customer interacts with the chat assistant on your website, their query is sent to a service on Cloud Run. → The service uses the Agent

complex or conversational queries, the retrieved information is passed to Gemini with a prompt like, "A customer is asking for a durable, family-friendly car. Based on these three models, explain which is the best fit and why." → Gemini generates a helpful, conversational response that guides the customer to the right product, increasing conversion.

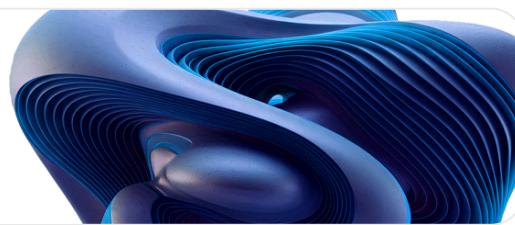


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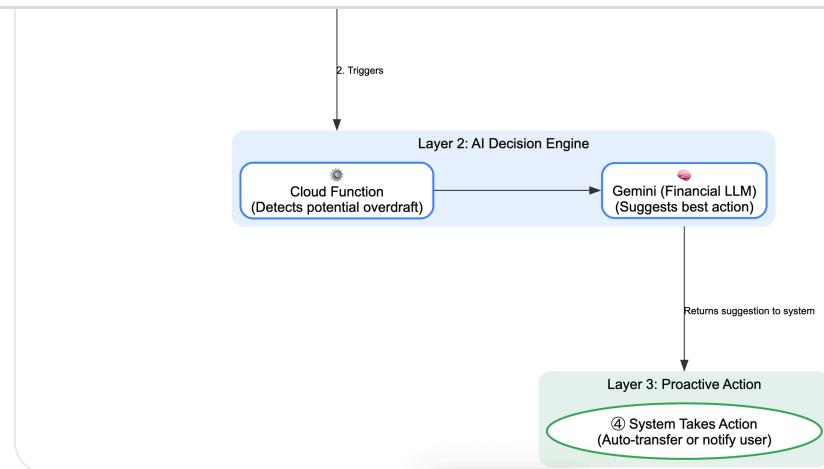
Financial Services



services industry, such as [Duu Financial](#), [Deutsche Bank](#), [Discover Financial](#), [Scotiabank](#), and [more](#).

32. Automate banking tasks with a financial LLM

- **Business challenge:** You're a neobank or financial institution serving a digitally native customer base. Your challenge is that customers expect intelligent and proactive service that traditional banking workflows can't provide, such as automatically preventing an overdraft.
- **Tech stack:** Vertex AI, Cloud Functions, Pub/Sub, BigQuery.
- Blueprint: Real-time transaction data streams into Pub/Sub and is analyzed by a Cloud Function → If a potential overdraft is detected, the function calls a fine-tuned Gemini model (a Financial LLM) with a prompt like, "*This user is about to overdraft. Based on their account history, suggest the best action.*" → Gemini might respond with, "*Move \$50 from their 'Savings' account.*" → The system can then either automatically execute the transfer or send a proactive notification to the user, preventing the fee and improving their financial health.

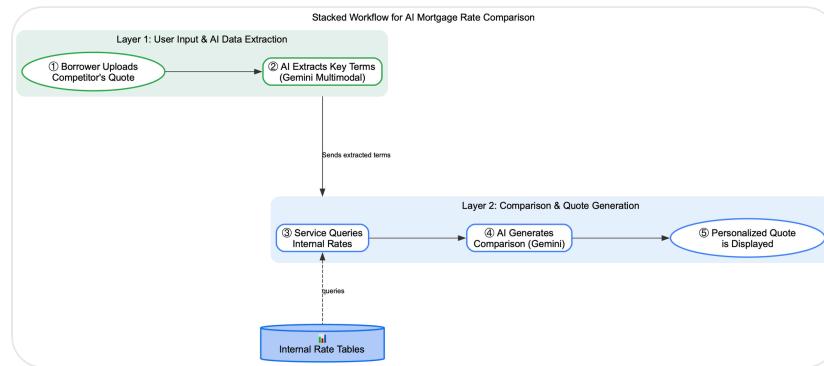


33. Create an AI mortgage agent to personalize quotes

- **Business challenge:** You're a digital mortgage lender in a highly competitive market. Your challenge is that potential borrowers are often comparison shopping and will abandon your site if they can't get a fast, clear, and personalized rate quote without a lengthy application process.
- **Tech stack:** Vertex AI, Cloud Run, a secure document store (e.g., Cloud Storage).
- **Blueprint:** A borrower uses a feature like "Beat this Rate" and uploads a competitor's quote sheet to Cloud Storage. → The document is sent to a service on Cloud Run, which calls a multimodal Gemini model. → Gemini extracts the key terms (rate, points, term length) from the document. → The service uses this data to query internal rate tables and constructs a new prompt for

2.95% rate is better than this competitor's

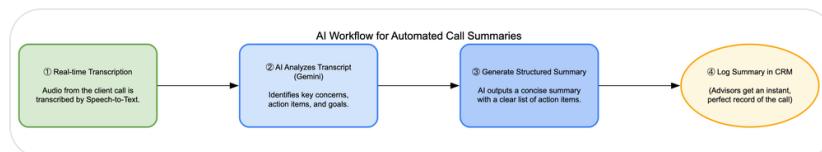
3.15% rate." → The personalized quote and comparison are displayed to the borrower in seconds.



34. Build an AI agent to enhance wealth management advisory

- **Business challenge:** You're a wealth management firm where financial advisors spend significant time on administrative tasks like writing call summaries. Your challenge is freeing up advisors from this manual work so they can focus on high-value client relationship building and strategic advice.
- **Tech stack:** Speech-to-Text API, Vertex AI, a CRM system.
- **Blueprint:** During a client call, the audio is transcribed in real-time by the Speech-to-Text API. → After the call, the full transcript is sent to a Gemini model with a prompt like, *"Summarize this financial advisory call. Identify key client concerns, action items for*

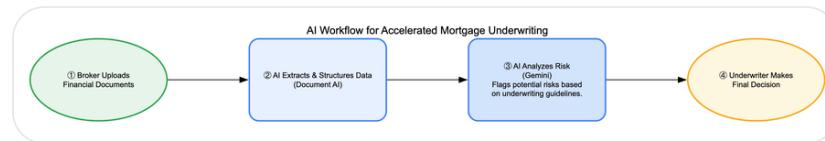
summary and a list of action items. → This summary is automatically logged into the firm's CRM system, saving the advisor significant time and ensuring a consistent record of every interaction.



35. Accelerate underwriting with AI-powered document analysis

- **Business challenge:** You're a mortgage lender or broker dealing with thousands of loan applications. Your challenge is the slow, manual process of underwriting, where humans must read through complex financial documents, leading to long closing times and high operational costs.
- **Tech stack:** Document AI, Vertex AI, BigQuery, Cloud Run.
- **Blueprint:** A broker uploads a borrower's financial documents (pay stubs, bank statements) to a portal. → A service on Cloud Run sends the documents to Document AI to extract and structure all the raw data (income, assets, debts). → The structured data is stored in BigQuery and sent to a Gemini model with a prompt like, "Analyze this borrower's financial

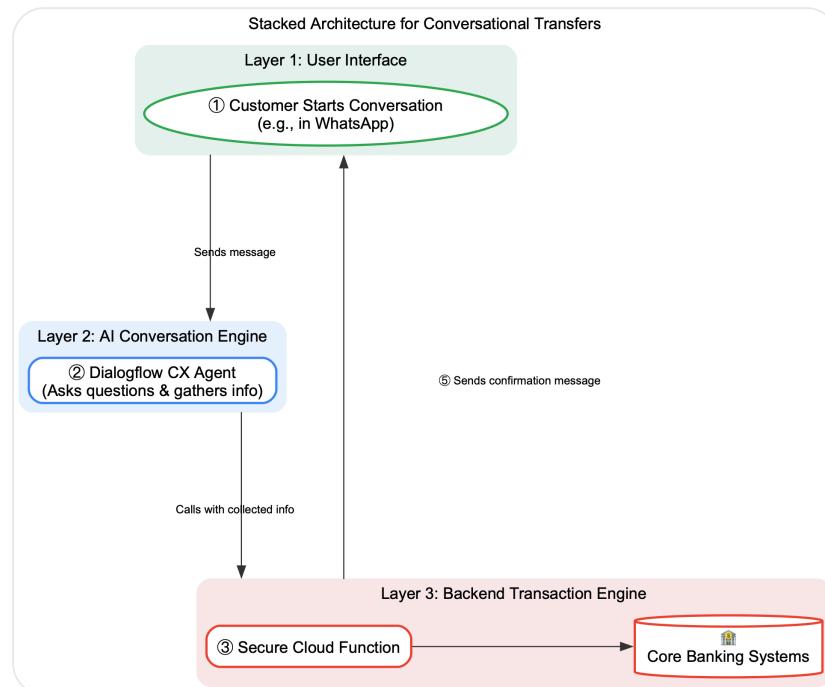
a risk analysis, allowing a human underwriter to make a final decision in minutes instead of hours, dramatically increasing productivity.



36. Automate international transfers via a chat interface

- **Business challenge:** You're a financial institution specializing in currency exchange. Initiating international transfers often requires customers to navigate complex online forms or visit a branch during business hours, creating a slow and inconvenient experience.
- **Tech stack:** A chat platform API, Dialogflow CX (or Vertex AI Conversation), Cloud Functions.
- **Blueprint:** A customer starts a conversation and says, "*I want to send \$500 to my brother in the UK.*" → The message is sent to a Dialogflow CX agent, which is trained to handle transfer requests. → The agent asks clarifying questions (e.g., "*What is the recipient's bank information?*"). → Once all the necessary information is collected, Dialogflow calls a secure Cloud Function. → The Cloud Function executes the transfer via the bank's core systems and sends a confirmation

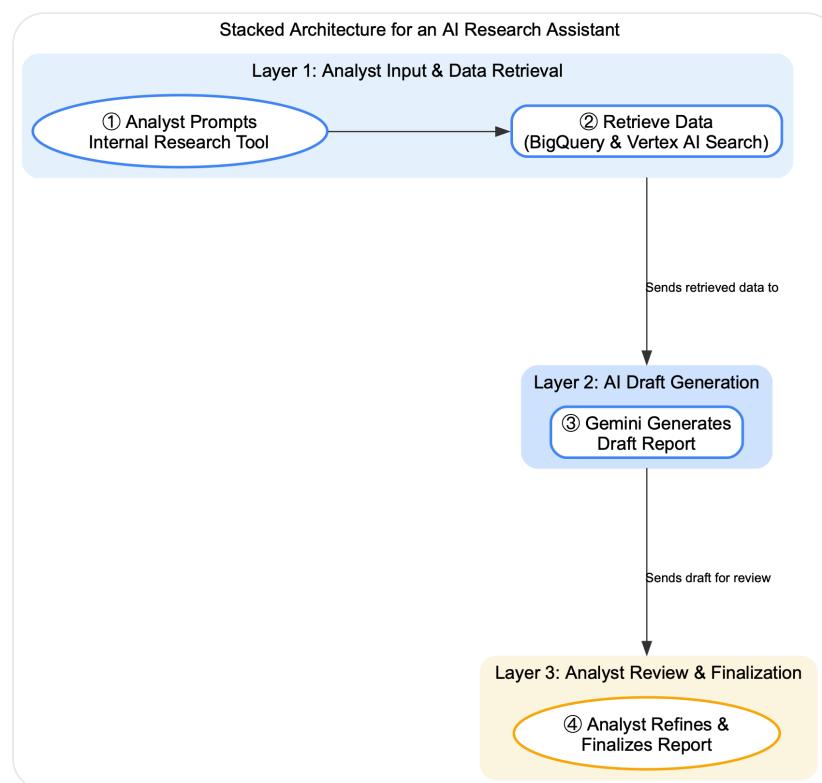
transaction 24/7 without human intervention.



37. Build an AI research assistant for financial analysts

- **Business challenge:** You're a financial institution where analysts spend hours, or even days, gathering data and synthesizing information to produce research reports. Your challenge is accelerating this process to deliver more timely insights to clients while maintaining the highest standards of data privacy.
- **Tech stack:** Vertex AI, BigQuery.
- **Blueprint:** A financial analyst uses an internal research tool and gives it a prompt like, *"Draft a research note on the semiconductor industry's Q3 performance, focusing on*

datasets in BigQuery and external, approved market data sources using Vertex AI Search. → The retrieved data is passed to a Gemini model with a detailed prompt to generate a draft report. → The model produces a structured draft with key insights, charts, and summaries, allowing the analyst to refine and finalize the report in minutes instead of days.

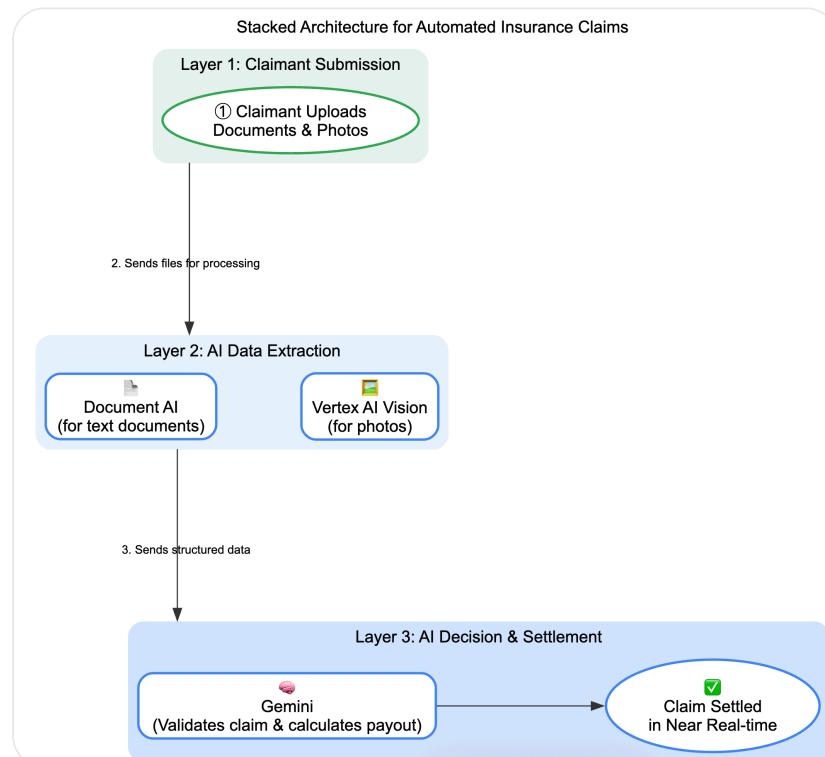


38. Automate insurance claims processing with multimodal AI

- **Business challenge:** You're an insurance provider, and your claims process relies on adjustors manually reviewing various documents (photos, repair estimates, police

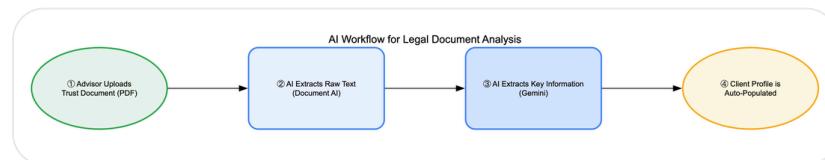
STRESSFUL TIME.

- **Tech stack:** Document AI, Vertex AI, Cloud Run.
- **Blueprint:** A claimant uploads all their documents and photos for a claim. → A service on Cloud Run sends text documents to Document AI and images to Vertex AI Vision to extract and structure all relevant information. → This structured data is then passed to a Gemini model with a prompt like, *"Based on this police report, repair estimate, and photos of the damage, is this auto claim valid under policy #12345? Calculate the estimated payout."* → The model returns a validation decision and payout amount, allowing simple claims to be settled in near real-time.



documents

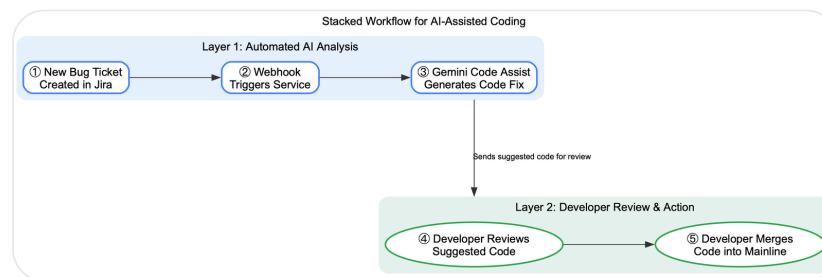
- **Business challenge:** You're a financial advisory or wealth management firm. Your challenge is the time-consuming and highly manual process of reading through lengthy, complex legal documents like wills and trusts to extract key information for estate planning.
- **Tech stack:** Document AI, Vertex AI.
- **Blueprint:** A financial advisor uploads a client's lengthy trust document (a PDF). → The document is processed by Document AI to extract all the raw text while preserving its structure. → The extracted text is then sent to a fine-tuned Gemini model with a prompt like, *"From this trust document, extract the beneficiaries, trustees, asset distribution rules, and any specific conditions for inheritance."* → The model returns the key information in a structured format (like JSON), which can be used to automatically populate the client's profile in the planning platform, saving the advisor hours of manual reading.



40. Automate software bug ticket-to-code generation

Developers spend significant time translating bug reports or feature requests from project management tickets into actual code, slowing down the development cycle.

- **Tech stack:** Vertex AI, a project management tool API (e.g., Jira).
- **Blueprint:** When a new bug ticket is created in Jira, a webhook triggers a service. → The service retrieves the ticket's description, which details the bug (e.g., "*The 'export' button is not working on the user dashboard for accounts in 'pending' status.*"). → This description is used to construct a detailed prompt for Gemini Code Assist, which has been trained on the company's private codebase. → The prompt is, "*Given our codebase, write the Python code to fix the bug described in this ticket.*" → The model generates a code snippet or a pull request with the suggested fix, which a developer can then review, test, and merge, significantly speeding up the process.



41. Build an anti-fraud and credit analysis engine

loans. Your challenge is accurately assessing credit risk and detecting fraudulent transactions in real-time to protect both your business and your customers, without slowing down the user experience.

- **Tech stack:** BigQuery, Vertex AI, Dataflow.
- **Blueprint:** Real-time transaction and user behavior data streams through Dataflow and is stored in BigQuery. → Vertex AI machine learning models are continuously trained on this historical data to learn the patterns of both legitimate and fraudulent activity. → When a new transaction occurs, the data is sent to the deployed fraud detection model in real-time. → The model returns a risk score in milliseconds. → If the score is high, the transaction can be automatically blocked or flagged for manual review, preventing fraud before it happens.

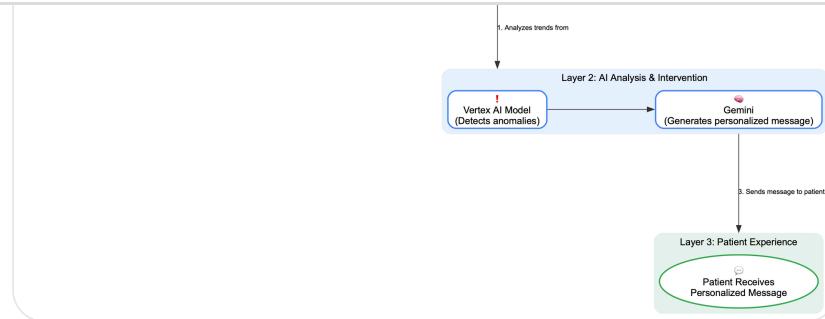
Healthcare & Life Sciences



These architectural blueprints are inspired by customers who are using AI in the healthcare and life sciences industry, such as: Bayer, Mayo Clinic, Clivus, Orby, Hackensack Meridian Health, and [more](#).

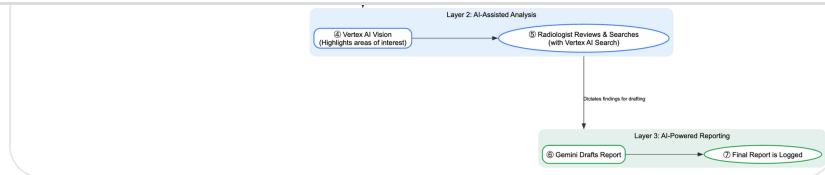
monitoring

- **Business challenge:** You're a healthcare provider managing a large population of patients with chronic conditions like diabetes. Your challenge is that periodic check-ins don't provide a complete picture of a patient's health, making it difficult to offer timely, personalized advice or intervene before complications arise.
- **Tech stack:** IoT devices (or mobile app), Pub/Sub, Dataflow, BigQuery, Vertex AI.
- **Blueprint:** Real-time patient data from sources like glucose monitors is streamed to **Pub/Sub** → A **Dataflow** pipeline processes and normalizes the data, storing it in **BigQuery** against the patient's record → The system uses a **Vertex AI** model to analyze trends, and if an anomaly is detected (e.g., consistently high blood sugar), it triggers an alert → **Gemini** then generates a personalized message for the patient, like "*We've noticed your glucose levels have been high in the evenings. Try a short walk after dinner and let's see how your numbers look tomorrow.*"



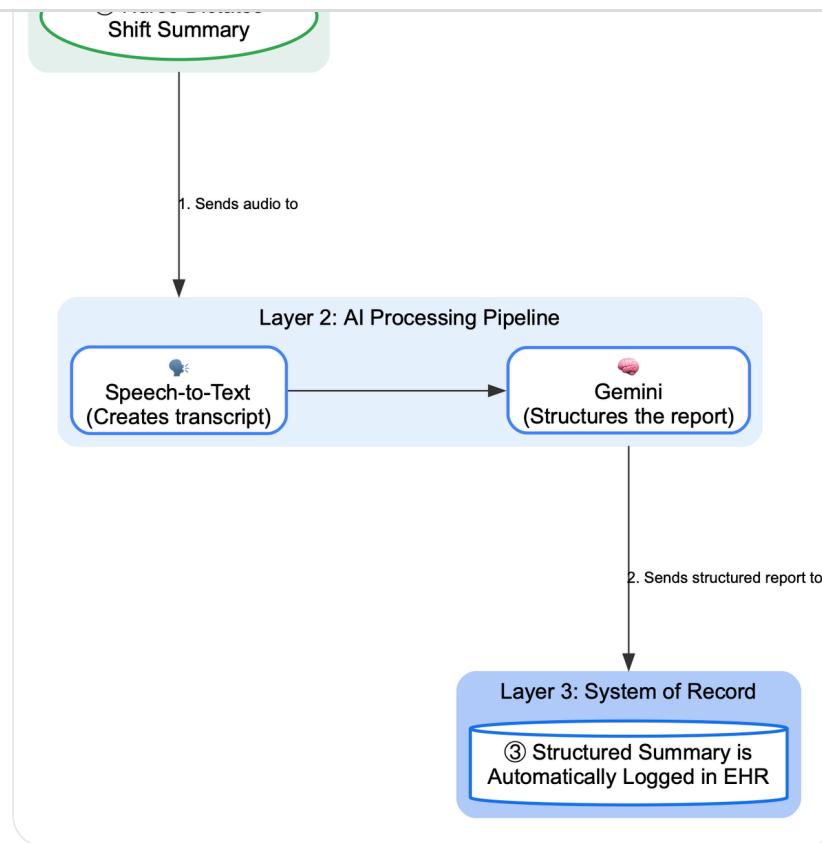
43. Build an AI assistant for radiology workflows

- **Business challenge:** You're a healthcare provider, and your radiologists are facing immense pressure from increasing workloads. Your challenge is helping them analyze complex images, search for relevant prior studies, and create regulatory-compliant reports more efficiently and accurately.
- **Tech stack:** Vertex AI, Google Cloud Healthcare API, PACS system.
- **Blueprint:** A new radiology image is ingested and de-identified via the **Healthcare API** and stored in a **PACS**. → The image is sent to a **Vertex AI** vision model to detect and highlight potential areas of interest → A radiologist can use **Vertex AI Search**, which is indexed on millions of prior anonymized studies, to find similar cases → After review, the radiologist dictates their findings, and **Gemini** helps draft a structured, compliant report, which is then finalized and logged, freeing up the radiologist to focus on complex diagnostic work.



44. Create a virtual assistant for caregiver shift handoffs

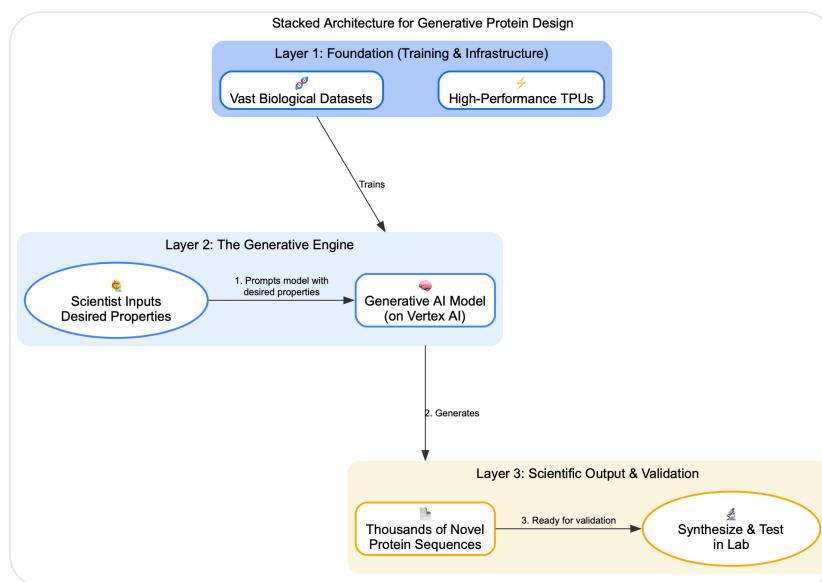
- **Business challenge:** You're a large healthcare network, and a critical point of failure is the shift change between nurses or caregivers. Your challenge is ensuring that crucial context and patient status details are not lost during this handoff, which can impact the continuity and quality of care.
- **Tech stack:** Speech-to-Text API, Vertex AI, an Electronic Health Record (EHR) system.
- **Blueprint:** As a nurse ends their shift, they speak into a device and summarize their patient's status. → **Speech-to-Text** transcribes their summary in real-time. → The transcript is sent to **Gemini** with a prompt like, "*Convert this unstructured shift summary into a structured report with sections for 'Vitals', 'Medication Administered', 'Patient Observations', and 'Action Items for Next Shift'.*" → The structured summary is automatically placed in the patient's **EHR**, allowing the incoming caregiver to get a complete and consistent overview in seconds.
[For a more detailed example, check out this blog.](#)



45. Accelerate drug discovery with generative protein design

- **Business challenge:** You're a biotech or pharmaceutical company, and the traditional process of drug discovery is incredibly slow and expensive. Your challenge is finding a way to rapidly design and test novel proteins that could become the basis for new medicines.
- **Tech stack:** Vertex AI, Google Cloud TPUs.
- **Blueprint:** Scientists input the desired properties of a protein (e.g., *"Design a protein that binds to target X to inhibit its function"*).
 - This request is sent to a generative AI model running on high-performance **TPUs** on

Thousands of novel proteins that meet the specified criteria. → These AI-designed proteins can then be synthesized and tested in the lab, drastically shortening the initial R&D phase from years to weeks.



46. Automate pharmaceutical documentation and formatting

- **Business challenge:** You're a pharmaceutical company that deals with a high volume of complex documents, from lab results to FDA compliance paperwork. Your challenge is the time-consuming, manual process of transcribing, formatting, and summarizing this information, which slows down operations.
- **Tech stack:** Gemini for Google Workspace, Document AI.

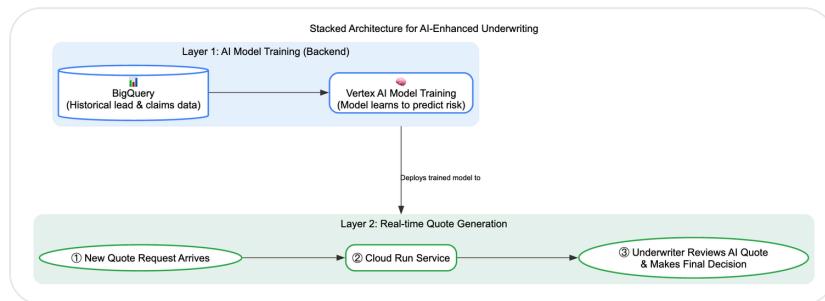
employee uses Gemini in Gmail with a prompt like, "Extract the key values from this attached lab result and format them into the standard table in this Google Doc template."

→ Gemini leverages **Document AI** capabilities to parse the PDF, extract the structured data, and populate the Google Doc. → This reduces a multi-step manual process into a single command, saving hours per week.

47. Build an AI-enhanced underwriting model for insurers

- **Business challenge:** You're a commercial insurer, and quoting policies for complex risks requires underwriters to manually assess vast amounts of data, a process that can take days. Your challenge is to automate and accelerate this process to provide faster quotes and gain a competitive edge.
- **Tech stack:** BigQuery, Vertex AI, Cloud Run.
- **Blueprint:** Historical data on leads, quotes, and claims outcomes is stored and processed in **BigQuery**. → This data is used to train a **Vertex AI** machine learning model to predict the risk associated with a new lead. → When a new request for a quote arrives, the data is sent to a service on **Cloud Run**. → The service calls the deployed Vertex AI model, which returns a risk score and a suggested premium in seconds. → This automates the initial

Final decision in minutes instead of days.



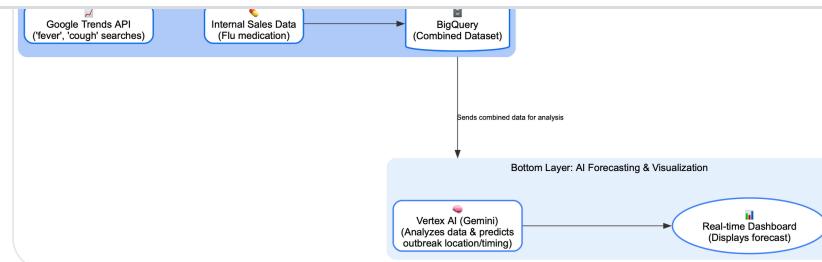
48. Build an intelligent search platform for clinical research

- **Business challenge:** You're a large research hospital or institution with petabytes of valuable clinical data. Your challenge is that this data is often siloed and difficult for researchers to access and analyze, creating a major roadblock to scientific discovery.
- **Tech stack:** Vertex AI Search, BigQuery, Google Cloud Healthcare API.
- **Blueprint:** Petabytes of clinical data are de-identified using the **Healthcare API** and consolidated into **BigQuery**. → The entire dataset, including unstructured notes and structured data, is indexed into **Vertex AI Search**. → A researcher can now use a simple, natural language search bar to ask complex questions like, *"Find all patient cohorts over the age of 50 with a history of heart disease who responded positively to drug X."* → Vertex AI Search retrieves the relevant, anonymized

minutes.

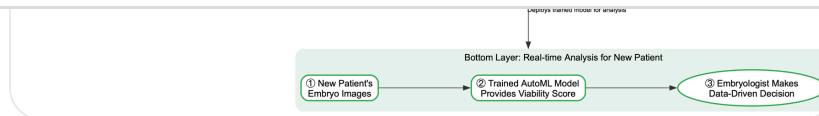
49. Predict disease outbreaks with public and private data

- **Business challenge:** You're a pharmaceutical company or public health organization. Your challenge is to move from reacting to seasonal outbreaks like the flu to proactively predicting them, allowing for better resource planning, vaccine distribution, and public health messaging.
- **Tech stack:** BigQuery, Vertex AI, Google Trends API.
- **Blueprint:** Anonymized, aggregated Google Search trend data (via the **Trends API**) for terms like "fever" and "cough" is combined with internal historical sales data for flu medication in **BigQuery**. → A **Gemini** model is used to analyze these combined datasets to identify correlations and predict future outbreaks on a location-specific basis. → The system generates a forecast, such as "*A 20% increase in search traffic for 'flu symptoms' in Ohio predicts a spike in cases in 7-10 days.*", which is then visualized on a dashboard for real-time healthcare planning.



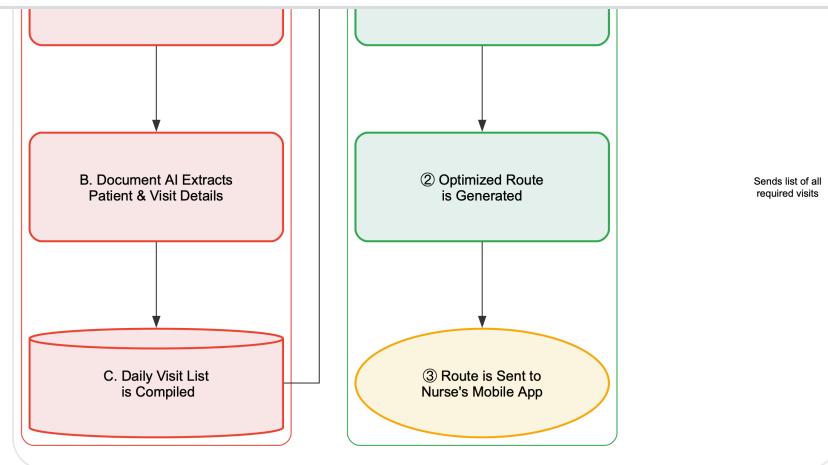
50. Enhance IVF outcomes with AI-powered embryo analysis

- **Business challenge:** You're a fertility clinic, and one of the most critical and difficult parts of the IVF process is selecting the embryo with the highest chance of a successful pregnancy. Your challenge is improving the accuracy of this selection process to give patients the best possible outcomes.
- **Tech stack:** Vertex AI, Google Cloud Storage.
- **Blueprint:** High-resolution images of embryos are uploaded to **Google Cloud Storage**. → A **Vertex AI Vision** model analyzes the images, extracting hundreds of morphological features that are imperceptible to the human eye. → This feature data, along with the eventual outcome data (successful implantation or not), is used to train an **AutoML** model. → When analyzing a new patient's embryos, the model provides a viability score for each one, helping embryologists make a more data-driven decision and increasing the likelihood of a successful IVF cycle.



51. Automate routing and medical order processing for home health

- **Business challenge:** You're a home health company managing a fleet of nurses who conduct thousands of patient visits. Your challenge is optimizing their daily routes to be as efficient as possible while also speeding up the manual, paper-based process of handling medical orders.
- **Tech stack:** Google Maps Platform (Routes API), Document AI, Cloud Run.
- **Blueprint:** A patient's medical order (PDF or image) is uploaded to the system. → A service on **Cloud Run** sends the file to **Document AI**, which automatically extracts the patient details, required services, and location. → Each day, the system sends the list of all required visits to the **Google Maps Routes API**, which calculates the most efficient multi-stop route for each nurse. → The optimized route is sent to the nurse's mobile app, saving time and fuel, while the automated order processing reduces administrative overhead.



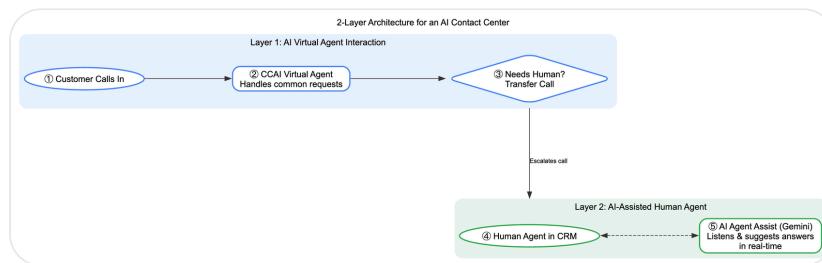
Telecommunication

These architectural blueprints are inspired by customers who are using AI in the telecommunication industry, such as: Bell Canada, Verizon, Vodafone, Nokia, Orange, and [more](#).

52. Build a customizable AI contact center solution

- **Business challenge:** You're a telecommunications provider serving business customers who need to modernize their own customer service. Your challenge is providing a flexible, AI-powered contact center solution that can both handle calls automatically and assist human agents in real-time.
- **Tech stack:** Contact Center AI Platform (CCAI), Vertex AI, a CRM system.

Contact Center AI. → The agent handles common requests, such as checking an account balance. → If the caller needs to speak to a human, the call is transferred. → As the human agent speaks, the "Agent Assist" feature listens to the conversation, transcribes it in real-time, and uses **Gemini** to provide the agent with relevant knowledge base articles and next-step suggestions directly in their **CRM** interface.

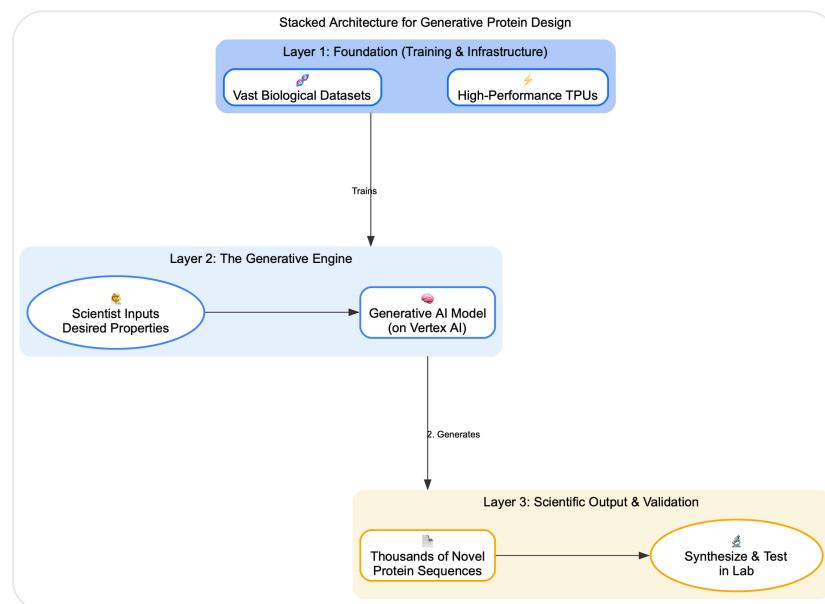


53. Empower your workforce with generative AI tools

- **Business challenge:** You're a large telecommunications company, and you want to empower your entire workforce with AI. Your challenge is providing easy access to generative AI tools while maintaining strict security, privacy, and compliance controls over your sensitive company data.
- **Tech stack:** Vertex AI, Identity and Access Management (IAM), Google Cloud Storage.
- **Blueprint:** An internal "AI Sandbox" platform is built using **Vertex AI Agent Builder**. → The

technical docs) stored securely in Google

Cloud Storage. → Employees access the sandbox through their corporate identity, with **IAM** rules ensuring they can only access data they are permissioned to see. → An employee can then ask questions like “*Summarize our new data privacy policy*” and receive an answer from **Gemini** that is based solely on the trusted internal documents, democratizing information securely.



54. Automate call summarization and quality assurance

- **Business challenge:** You're a telecom operator with a large customer service center. Your challenge is ensuring consistent quality and identifying best practices from thousands of daily calls, a task that requires managers to

- **Tech stack:** Speech-to-Text API, Vertex AI, BigQuery, Looker.
- **Blueprint:** Audio from all customer service calls is transcribed by the **Speech-to-Text API**, and the text is stored in **BigQuery**. → A scheduled job sends the transcripts to **Gemini** with a prompt like, *"Summarize this call, classify the customer's reason for calling, and rate the agent's effectiveness based on our quality rubric."* → The structured analysis is written back to **BigQuery**. → Managers use a **Looker** dashboard to see trends, identify top-performing agents, and find calls that can be used as examples for team training.

55. Use AI to analyze complex commercial contracts

- **Business challenge:** You're a global telecommunications operator with thousands of complex interconnection agreements and vendor contracts. Your challenge is quickly finding specific commercial terms, obligations, or renewal dates buried within these dense legal documents.
- **Tech stack:** Document AI, Vertex AI Search, Vertex AI.
- **Blueprint:** Thousands of contracts are processed by **Document AI** to extract and structure the raw text, which is then indexed into **Vertex AI Search**. → A member of the

like, *Find all contracts with Operator X that have a termination clause requiring 90 days' notice.*" → Vertex AI Search retrieves the relevant contract sections. → For further analysis, **Gemini** can be used to compare terms across multiple retrieved documents in a side-by-side table.

56. Build a "network as code" platform for developers

- **Business challenge:** You're a 5G network operator, and you want to enable developers to create innovative applications that leverage the unique capabilities of your network (e.g., low latency, high bandwidth). Your challenge is abstracting the complexity of the network into simple, programmable APIs.
- **Tech stack:** Vertex AI, Google Kubernetes Engine (GKE), network APIs.
- **Blueprint:** A "Network as Code" platform exposes complex network functions via simple APIs, hosted on **GKE**. → A developer wants to build a telehealth app that requires a guaranteed high-quality connection for a remote surgery consultation. → They use the platform's SDK and interact with a **Gemini**-powered assistant, prompting, *"Generate the Python code to request a dedicated, low-latency network slice between the hospital and the patient's home for the next 60*

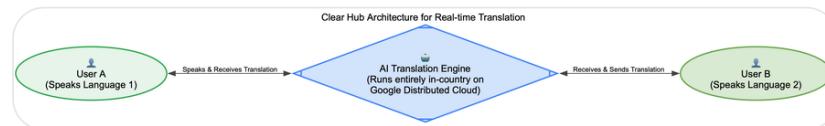
provision the network resources dynamically.

57. Create a unified customer view for enhanced service

- **Business challenge:** You're a large telecom provider, and your customer data is fragmented across multiple systems (billing, CRM, network usage). Your challenge is creating a single, 360-degree view of each customer to provide proactive, personalized service and make informed business decisions.
- **Tech stack:** BigQuery, Dataflow, Vertex AI, Looker.
- **Blueprint:** Data from all source systems is streamed via **Dataflow** into **BigQuery**, which acts as the central data warehouse. → **Vertex AI** models analyze the unified data to identify patterns, such as a customer experiencing poor network quality in a specific location. → The system can then create an actionable insight, like "*This customer is at high risk of churn due to repeated dropped calls.*" → This insight is surfaced to a customer service agent via a **Looker** dashboard, prompting them to proactively reach out with a solution, like offering a network extender.

IoT data

- **Business challenge:** You're an Internet of Things (IoT) provider for commercial clients, collecting millions of data points from sensors and devices. Your challenge is that non-technical users, like fleet managers or building operators, cannot easily access or understand this complex data to get the insights they need.
- **Tech stack:** BigQuery, Vertex AI, Looker (or another BI tool).
- **Blueprint:** All IoT data is streamed and stored in **BigQuery**. → The data is exposed through a BI tool like **Looker** with an embedded natural language chat interface. → A non-technical user asks a question in plain English, such as "*Which of our vehicles have been idling for more than 30 minutes today in the downtown area?*" → The request is sent to **Gemini**, which understands the user's intent and translates the question into a SQL query. → The query is run against **BigQuery**, and the results are returned as a simple table or map directly in the chat interface, reducing time-to-insight by 88%.



sovereignty

- **Business challenge:** You're a multinational telecom operator serving countries with strict data residency laws. Your challenge is to leverage powerful AI capabilities, like real-time translation, while ensuring that local customer data never leaves the country of origin.
- **Tech stack:** Google Distributed Cloud, Vertex AI, Speech-to-Text, Text-to-Speech.
- **Blueprint:** An instance of **Google Distributed Cloud (GDC)** is deployed within the local country's data center. → A user makes a call that requires real-time translation. → The audio stream is processed entirely within the GDC environment. → **Speech-to-Text** and **Text-to-Speech** services, along with **Vertex AI** translation models running on GDC, handle the translation. → The translated audio is sent back to the user with super-low latency, delivering the AI service while guaranteeing all data remains in-country to comply with sovereignty regulations.

60. Accelerate cybersecurity threat detection and response

- **Business challenge:** You're a critical infrastructure provider, and you face a constant barrage of sophisticated cyber

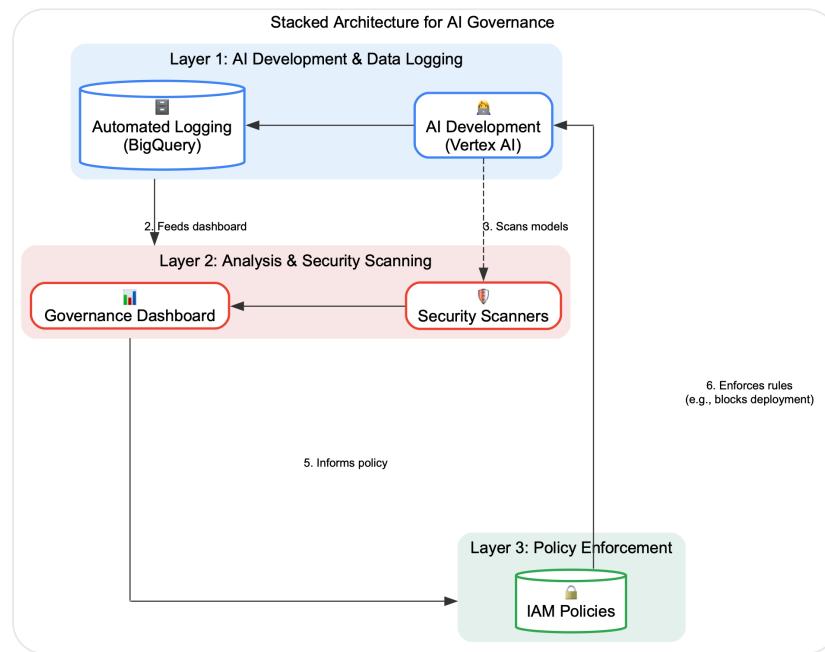
prevent breaches, a task that is difficult for human analysts to manage at scale.

- **Tech stack:** Google Security Operations (SecOps), Gemini in Security.
- **Blueprint:** Security logs and telemetry from across the entire organization are ingested into the **Google Security Operations** platform. → The platform's AI capabilities automatically correlate signals to detect potential threats that a human might miss. → When a high-priority event is detected, a security analyst can use the integrated **Gemini in Security** to ask, "*Summarize this threat. What is the potential impact, and what is the recommended remediation?*" → Gemini provides a concise summary and a step-by-step playbook, allowing the analyst to close investigations faster.

61. Establish data-driven AI security governance

- **Business challenge:** You're a large enterprise with thousands of internal developers and data scientists building AI models. Your challenge is establishing a robust governance layer to ensure that all AI development is secure, compliant, and data-driven without stifling innovation.
- **Tech stack:** Vertex AI, BigQuery, open-source tools (e.g., for model scanning), IAM.

Metadata, training data sources, and dependencies are automatically logged in **BigQuery**. → Automated security tools scan models for vulnerabilities. → A governance dashboard provides a single view of all AI projects, showing compliance status and data lineage. → **IAM** policies enforce rules, such as "a model cannot be deployed to production if it was trained on unapproved customer data," creating a robust, data-driven governance framework.



Hospitality & Travel

These architectural blueprints are inspired by customers who are using AI in the hospitality and travel industry, such as: Alaska Airlines, Gymshark,

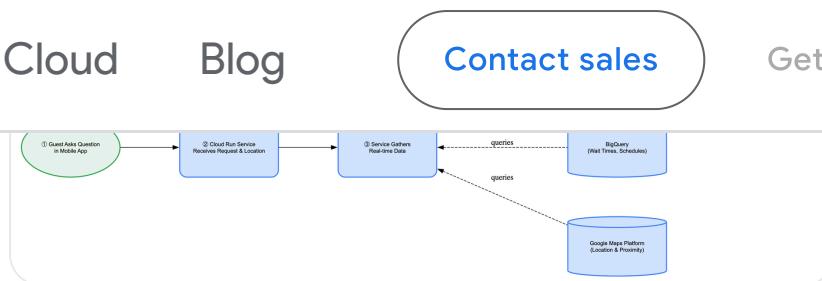
62. Build a conversational AI travel agent

- **Business challenge:** You're an airline or online travel agency. Your challenge is that traditional booking websites with complex filters and forms can be frustrating and impersonal for travelers who just want to ask a simple question, leading to abandoned searches and lost bookings.
- **Tech stack:** Vertex AI, Cloud Run, backend booking system APIs.
- **Blueprint:** A traveler interacts with a chatbot on the website or app, asking, "*I want to fly from Seattle to Miami next month for about \$400.*" → The request is sent to a service on **Cloud Run**, which uses **Vertex AI Agent Builder** to understand the user's intent and extract entities (origin, destination, date, price). → The service calls the airline's **booking APIs** to find matching flights. → The flight options are passed to **Gemini** with a prompt like, "*Here are three flights. Present them in a friendly, conversational way and ask the user which one they prefer.*" → The chatbot presents the options, streamlining the booking process into a simple conversation.



63. Create an in-park digital assistant for theme parks

- **Business challenge:** You're a theme park or large entertainment venue operator. Your challenge is that guests can feel overwhelmed trying to navigate the park, find showtimes, and check ride wait times, which can detract from their overall experience.
- **Tech stack:** Google Maps Platform, Vertex AI, BigQuery, Cloud Run.
- **Blueprint:** Real-time park data (ride wait times, show schedules, character locations) is streamed into **BigQuery**. → A guest opens the park's mobile app and asks the digital assistant, "*What's a fun ride with a wait time under 20 minutes near me?*" → The app sends the request and the user's location to a service on **Cloud Run**. → The service queries **BigQuery** for current wait times and uses the **Google Maps Platform** to find nearby attractions. → **Gemini** synthesizes this information to provide a personalized recommendation, such as, "*The Goliath roller coaster is a 5-minute walk from you and has a 15-minute wait!*"



64. Build predictive tools for food orders and loyalty

- **Business challenge:** You're a quick-service restaurant or pizza chain. Your challenge is managing inventory and kitchen prep time effectively during peak hours while also encouraging repeat business through generic loyalty programs that often fail to engage customers.
- **Tech stack:** BigQuery, Vertex AI, Cloud Run.
- **Blueprint:** All historical order data is stored in **BigQuery**. → **Vertex AI** forecasting models analyze this data to predict order volumes for specific times and locations (e.g., *"Predict a 30% spike in pepperoni pizza orders in downtown locations on Friday night"*). → When a loyalty member opens the app, a service on **Cloud Run** retrieves their order history and sends it to **Gemini** with a prompt like, *"This user frequently orders on Tuesdays. Create a personalized offer for a free side item with their next Tuesday order."* → This predictive prep and personalized marketing increases efficiency and customer loyalty.

Accommodation accommodations

- **Business challenge:** You're a hotel booking platform or vacation rental site. Your challenge is that users often have specific, nuanced needs (like "a quiet hotel near the beach with a pool for kids") that are difficult to express using standard check-box filters.
- **Tech stack:** Vertex AI Search, BigQuery.
- **Blueprint:** Detailed data for millions of hotel listings, including amenities, reviews, and location info, is indexed from **BigQuery** into **Vertex AI Search**. → A user types a free-text query like, *"Find me a pet-friendly hotel in downtown Austin with a rooftop bar for under \$300 a night."* → Vertex AI Search processes the natural language to understand the multiple intents (pet-friendly, location, amenity, price). → The engine returns a ranked list of hotels that best match all the specified criteria, creating a more intuitive and personalized search experience.

66. Create an AI-driven virtual fitness coach

- **Business challenge:** You're a fitness brand or gym, and your customers want personalized training plans. Your challenge is that providing one-on-one human coaching is expensive and

- **Tech stack:** Vertex AI, a mobile application, wearable device integration.
- **Blueprint:** A user inputs their fitness goals and performs a series of assessment exercises, which are recorded through their phone's camera. → A **computer vision model** on **Vertex AI** analyzes the video to assess form and fitness level. → This data, along with input from their wearable device, is sent to a **Gemini** model with a prompt like, *"Create a 4-week progressive fitness program for a user with intermediate strength whose goal is fat loss."* → The AI generates a hyper-personalized daily workout program, acting as a virtual trainer that adapts over time based on the user's performance.

67. Personalize advertising campaigns at scale

- **Business challenge:** You're a global hotel group, and you need to run advertising campaigns across many different regions and customer segments. Your challenge is creating ad copy and imagery that resonates with each specific audience, a task that is slow and difficult to scale manually.
- **Tech stack:** BigQuery, Vertex AI, Google Ads API.
- **Blueprint:** Customer and campaign performance data is consolidated in **BigQuery**. → The marketing team defines a

Spain. → A service sends this context to **Gemini** with a prompt like, "Generate 5 different ad headlines and descriptions for a family-friendly hotel in Barcelona, highlighting the pool and proximity to attractions." → Gemini creates multiple ad variations, which are then automatically pushed to the **Google Ads API** to create a highly targeted and personalized campaign, boosting ad team productivity and revenue.

68. Automate data governance for airline operations

- **Business challenge:** You're a major airline dealing with petabytes of data from dozens of systems, from flight operations to customer loyalty. Your challenge is managing and governing this data, as manually classifying tables and managing metadata is a massive, costly, and error-prone undertaking.
- **Tech stack:** BigQuery, Gemini, Dataplex.
- **Blueprint:** As new data tables are created in **BigQuery**, a process is triggered. → The table schema and sample data are sent to a **Gemini** model with a prompt like, "Analyze this table and generate a business-friendly description, assign data quality rules, and classify any columns that contain PII." → The model returns structured metadata. → This metadata is used to automatically populate the

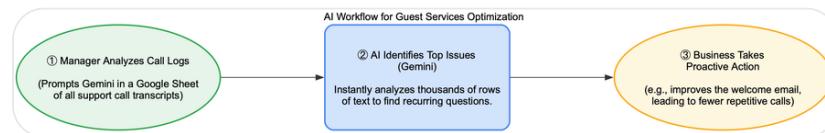
governed without significant manual effort.

69. Automatically classify real-time traveler security alerts

- **Business challenge:** You're a tour operator responsible for the safety of thousands of travelers around the world. Your challenge is monitoring and filtering a high volume of global security alerts to identify the ones that pose an actual, immediate risk to your specific customers.
- **Tech stack:** Vertex AI, Pub/Sub, a traveler itinerary database.
- **Blueprint:** A stream of global security alerts from various news and government sources flows into **Pub/Sub**. → For each alert, a function is triggered that retrieves the location and topic. → The function queries the **itinerary database** to see if any travelers are currently in the affected area. → If there are, the alert text is sent to **Gemini** with a prompt like, *"Based on this alert about a protest in Paris, classify the risk level for a tourist located 5 miles away as 'Low', 'Medium', or 'High'."* → The classified alert appears on a security dashboard, allowing the team to ignore low-risk noise and focus only on credible threats, reducing manual effort.

analyst

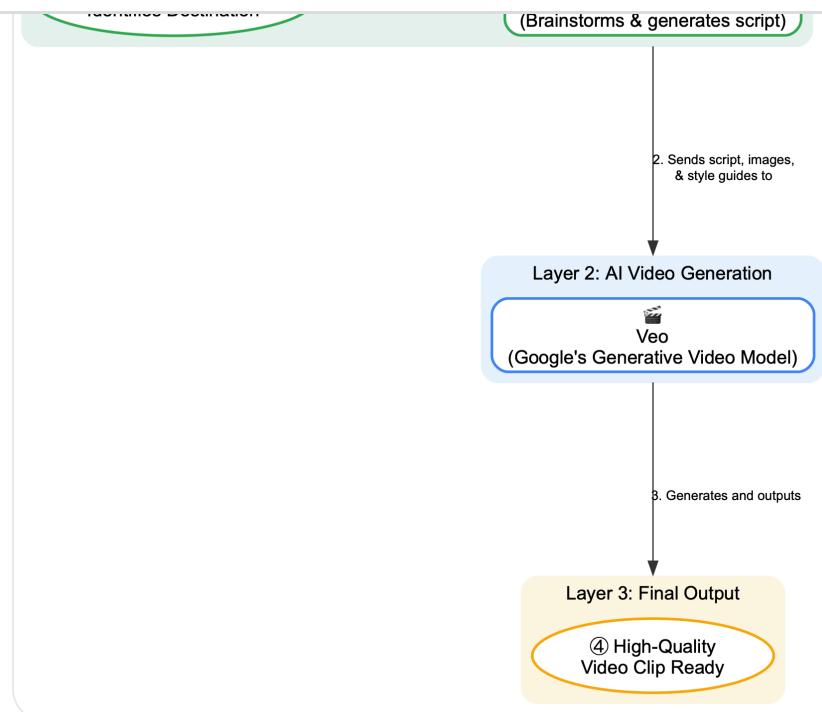
- **Business challenge:** You're a property manager for vacation rentals or corporate housing. Your challenge is that new arrivals frequently call with the same set of questions (e.g., "What's the wifi password?", "How does the thermostat work?"), overwhelming your support staff.
- **Tech stack:** Gemini for Google Workspace, a call logging system.
- **Blueprint:** All support call logs and transcripts are consolidated into a central **Google Sheet**.
→ A manager uses the integrated **Gemini** feature with a prompt like, *"Analyze all the calls from the last 30 days and identify the top 5 most common questions asked by new arrivals."* → Gemini analyzes the text and returns a summary, revealing that "Wifi password" is the most common issue. → The business can then take proactive steps, like sending a more prominent welcome email with the wifi details, leading to a reduction in these repetitive calls.



71. Generate AI-powered video ad content

Stream or fresh video content to promote various destinations for in-flight entertainment and online ads. Your challenge is that traditional video production is expensive and time-consuming.

- **Tech stack:** Google's Veo, Vertex AI.
- **Blueprint:** The marketing team identifies a destination to promote, for example, "Kyoto in autumn." → They use **Gemini** to brainstorm concepts and generate a script, with a prompt like, *"Create a 30-second video script about the serene beauty of Kyoto's temples during autumn."* → This script, along with reference images and style guides, is then fed into **Veo**, Google's generative video model. → Veo generates a high-quality video clip based on the text and image prompts, allowing the team to create new, compelling ad content in a fraction of the time and cost of a traditional film shoot.



Manufacturing Industrial & Electronics



These architectural blueprints are inspired by customers who are using AI in the manufacturing, industrial and electronics industry, such as: Motorola, AES, Broadcom, COI Energy, Bayer Crop Science, and [more](#).

72. Build a better, more responsive AI home companion robot

- **Business challenge:** You're a consumer electronics manufacturer looking to create a

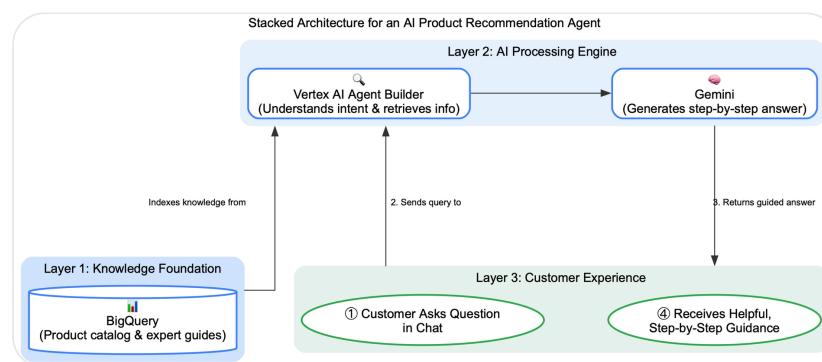
commands to create a truly helpful home companion that can understand natural conversation and interact intelligently with its environment.

- **Tech stack:** Vertex AI, on-device AI models, Home API
- **Blueprint:** The home robot ("Max") uses on-device microphones to capture a user's command via the Speech-to-Text API. → The user's request is sent to a Gemini model, which understands the conversational context and intent. → If the request is to control a smart home device (e.g., "turn on the living room lights"), Gemini sends the appropriate command to the Google Home Platform APIs. → Gemini generates a natural language response (e.g., "Okay, I've turned the lights on for you."), which is converted to audio via the Text-to-Speech API and played through the robot's speakers.

73. Create an AI-powered product recommendation agent

- **Business challenge:** You're a manufacturer of consumer products with a wide and varied catalog, like gardening supplies. Your challenge is that customers are often novices and don't know which specific product is right for their needs, leading to confusion and lost sales.

with expert knowledge and guides, is indexed into **Vertex AI Agent Builder** from a source like **BigQuery**. → A customer interacts with the AI agent on your website, asking, "My lawn has brown patches and I live in Texas. What should I do?" → The agent understands the user's intent and location. → The retrieved product information and user query are sent to **Gemini** to generate a helpful, step-by-step answer, such as "*It sounds like you have a grub problem, common in Texas this time of year. I recommend our product, and here's how to apply it...*", guiding the customer to the correct purchase.



74. Automate industrial safety audits with AI

- **Business challenge:** You're a global energy or manufacturing company, and conducting safety audits across dozens of facilities is a slow, manual, and expensive process. Your challenge is to streamline these audits to ensure compliance and safety without

- **Tech stack:** Vertex AI, Google Cloud Storage, a mobile application.
- **Blueprint:** An auditor on-site uses a mobile app to take photos and videos of equipment, which are uploaded to **Google Cloud Storage**. → **Vertex AI Vision** analyzes the imagery to identify equipment and check for visual compliance (e.g., "is the safety guard in place?"). → The visual data, along with text from checklists, is fed to a **Gemini** model that has been trained on the company's safety protocols. → The model automatically generates a complete audit report, flagging non-compliant items and citing the specific safety rule, reducing a two-week process to one hour.

75. Automate sales quotes for configurable products

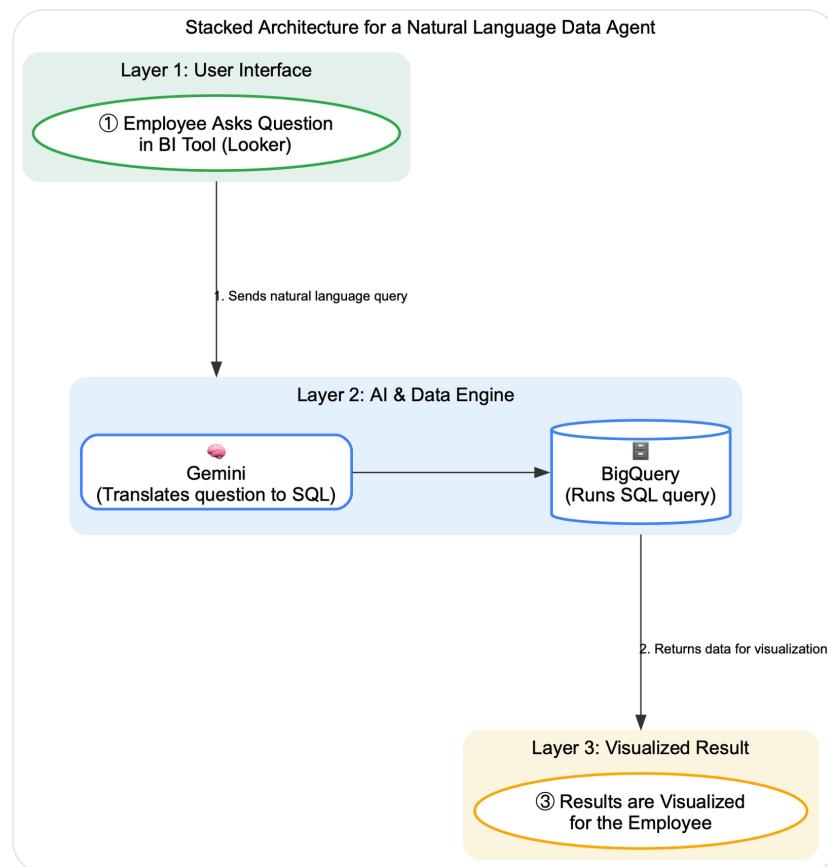
- **Business challenge:** You're a manufacturer of configurable products like solar panel systems. Your challenge is that creating an accurate quote is a slow, manual process requiring an expert to assess customer-specific variables (like roof size), which creates a bottleneck in your sales process.
- **Tech stack:** Google Maps Platform (Aerial View API), Vertex AI, Document AI.
- **Blueprint:** A prospective customer provides their address. → A service calls the **Google Maps Aerial View API** to get high-resolution

the roof's dimensions and identity obstructions. → The system calculates the optimal number of solar panels and generates a quote. → If the customer uploads a utility bill via **Document AI**, the system can even calculate potential savings, delivering a complete, accurate quote in 15 minutes instead of two hours.

76. Democratize data access with a natural language to SQL agent

- **Business challenge:** You're a large manufacturing enterprise with valuable data locked away in complex databases. Your challenge is that only a small number of technical employees can write SQL queries, creating a bottleneck and preventing business users from getting the insights they need.
- **Tech stack:** BigQuery, Vertex AI, Looker or another BI tool.
- **Blueprint:** All critical company data (e.g., SAP Materials data) is consolidated into **BigQuery**. → An employee uses an internal BI tool and types a natural language question, such as *"What was our total pulp production in Q2 for the southern region, and how does that compare to Q1?"*. → The question is sent to a **Gemini** model that has been trained on the company's BigQuery schema. → The model translates the natural language question into

results are returned and visualized for the employee, reducing query time.

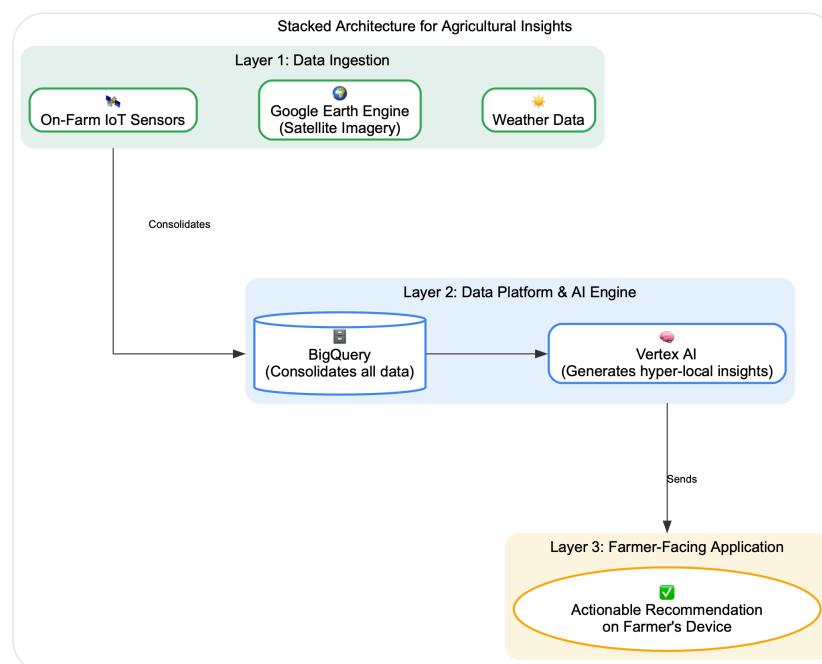


77. Build an AI-powered agricultural insights platform

- Business challenge:** You're a company in the agricultural science sector. Your challenge is helping farmers move from traditional farming methods to a more data-driven approach, enabling them to increase yields and operate more sustainably in the face of changing climate conditions.
- Tech stack:** BigQuery, Vertex AI, Google Earth Engine, IoT sensors.

and weather data are all consolidated into

BigQuery. → Vertex AI models analyze this multi-layered dataset to generate hyper-local insights for a specific field. → A farmer receives a recommendation on their device, such as *"Your soil moisture in Section B is 15% below optimal. Based on the 7-day forecast, I recommend irrigating with 1 inch of water tomorrow morning to maximize yield."*



78. Embed on-device AI for frontline worker efficiency

- Business challenge:** You're a manufacturer of specialized hardware, like mobile computing devices for retail workers. You want to differentiate your product by providing intelligent, built-in features that help frontline workers make better, faster decisions on the job.

platform.

- **Blueprint:** A retail worker scans a shelf with their device. → An **on-device** computer vision model recognizes the products and counts the inventory. → The device compares the count to the store's inventory data and identifies a low-stock item. → A lightweight, on-device model generates an alert and a suggested action, such as "*Only 2 units of 'Product X' left on the shelf. The backroom has 25. Suggest creating a restocking task.*", empowering the worker to prevent a stockout in the moment.

79. Forecast energy grid CO2 intensity with AI

- **Business challenge:** You're an energy transmission provider committed to sustainability. Your challenge is understanding and predicting the real-time carbon intensity of your electricity grid, which is necessary to optimize the use of renewables and reduce overall emissions.
- **Tech stack:** Vertex AI, BigQuery, Cloud Run.
- **Blueprint:** Real-time data on energy generation from all sources (solar, wind, gas, coal) is streamed into **BigQuery**. → A **Vertex AI** forecasting model analyzes this data, along with weather forecasts, to predict the CO2 intensity of the grid for the next 24 hours. → A service on **Cloud Run** exposes this forecast via an API. → This allows the grid operator to

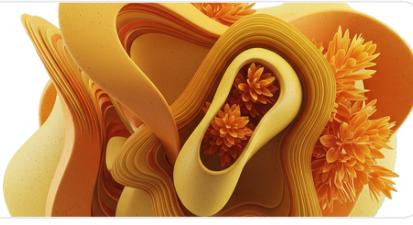
renewable energy is plentiful and CO₂ intensity is lowest.

80. Identify and monetize underutilized energy capacity

- **Business challenge:** You're an energy services company focused on grid stability and social equity. Your challenge is identifying small pockets of underutilized energy capacity across thousands of commercial buildings that could be aggregated and redirected to benefit communities in need.
- **Tech stack:** Vertex AI, BigQuery, IoT smart meters.
- **Blueprint:** Data from **IoT smart meters** in commercial buildings is streamed into **BigQuery**. → **Vertex AI** models analyze the energy consumption patterns of thousands of buildings to identify "underutilized capacity"—for example, an office building that consistently uses 20% less power on Friday afternoons. → The system aggregates these small, distributed energy "assets." → This aggregated capacity can then be offered to utilities to stabilize the grid or provided as energy credits to low-income households, creating a new, equitable energy economy.

sector

- **Business challenge:** You're an energy company, and signing up new customers is a manual process that involves processing documents like previous utility bills and personal IDs. Your challenge is to automate this workflow to make onboarding faster, reduce fraud, and improve the customer experience.
- **Tech stack:** Document AI, Vertex AI, Cloud Run.
- **Blueprint:** A new customer uploads a photo of their old utility bill and their driver's license to your website. → The files are sent to a service on **Cloud Run**, which uses **Document AI** to extract structured data from both documents.
→ The service calls a **Gemini Flash** model with a prompt like, *"Does the name and address on this utility bill match the name and address on this driver's license?"* → Upon receiving a positive confirmation, the system automatically creates the new customer account, completing the onboarding and verification process in seconds.



Public Sector & Nonprofits

and nonprofits are seeing from using AI.

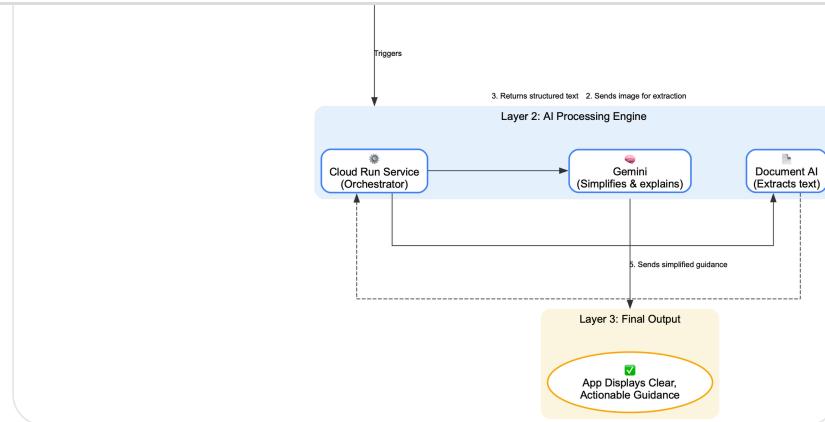
Customers include Alma, Beyond 12, Bower, Climate Ride, Code Path, Pepperdine University and [more](#).

82. Build a conversational coach for student success

- **Business challenge:** You're a nonprofit or educational institution focused on helping first-generation students from under-resourced communities succeed in college. Your challenge is providing personalized, scalable coaching that can address each student's unique history and goals without making them feel compared to others.
- **Tech stack:** Vertex AI, BigQuery, a student-facing mobile app.
- **Blueprint:** A student's academic history, goals, and previous interactions are stored in **BigQuery**. → When the student interacts with the AI coach in their app, their query is sent to a service that retrieves their personal context from BigQuery. → This history and the student's question are sent to a **Gemini** model with a prompt like, *"This student is feeling overwhelmed with their chemistry class. Based on their goal of becoming a nurse, provide an encouraging response and suggest two specific campus resources that can help."* → The AI delivers a personalized, empathetic response, acting as a scalable mentor.

immigration

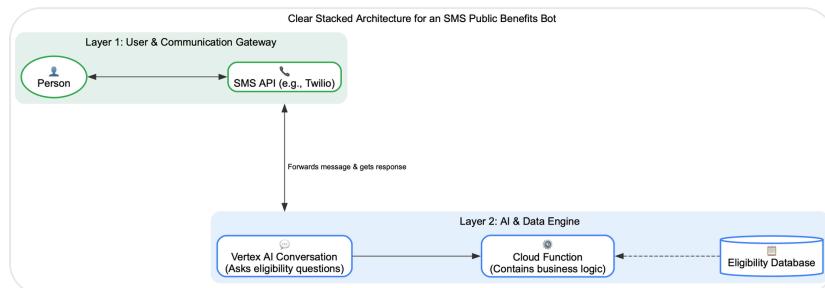
- **Business challenge:** You're a legal aid nonprofit. Your challenge is that clients are often overwhelmed by complex legal documents and don't know what their next steps are, while your staff has limited bandwidth to provide one-on-one guidance for every query.
- **Tech stack:** Document AI, Vertex AI, Cloud Run.
- **Blueprint:** An asylum seeker uses their phone to take a picture of a legal letter they received.
→ The image is uploaded to a service on **Cloud Run**, which sends it to **Document AI** to extract all the text and key entities like dates and case numbers. → The extracted text is then sent to a fine-tuned **Gemini** model with a prompt like, *"Based on this legal notice, explain what it means in simple terms and list the top 3 most important next steps the recipient should take."* → The app displays the simplified explanation and actionable guidance, empowering the user to navigate the complex legal process.



84. Develop an SMS chatbot for public benefits applications

- **Business challenge:** You're a government agency or nonprofit administering a public benefits program like SNAP. Your challenge is that the application process is often complex and confusing, creating a barrier for eligible individuals and families who need assistance.
- **Tech stack:** Vertex AI, SMS API, a benefits eligibility database.
- **Blueprint:** A person sends a text message like "FOOD" to a designated number. → The **SMS API** receives the message and forwards it to a **Vertex AI Conversation** agent. → The agent initiates a conversation, asking simple, conversational questions to determine eligibility (e.g., *"How many people are in your household?"*). → Based on the user's responses, the agent checks the eligibility database. → The chatbot provides an immediate response, such as *"Based on your*

use applications, turning a multi-day process into minutes.



85. Create a digital case manager to assist social workers

- **Business challenge:** You're a nonprofit where caseworkers are responsible for large caseloads. Your challenge is that these workers spend dozens of hours per week on administrative tasks like writing action plans and summaries, taking time away from direct, high-impact work with beneficiaries.
- **Tech stack:** Vertex AI, a case management system (e.g., Salesforce), Cloud Functions.
- **Blueprint:** A caseworker finishes a meeting with a beneficiary. → The notes from the meeting are saved in their case management system, which triggers a **Cloud Function**. → The function retrieves the new notes along with the beneficiary's entire case history. → This information is sent to a **Gemini** model with a prompt like, *"Based on this beneficiary's history and the notes from today's meeting, draft a detailed action plan"*

time, ready for the caseworker to review and approve, saving them hours of writing.

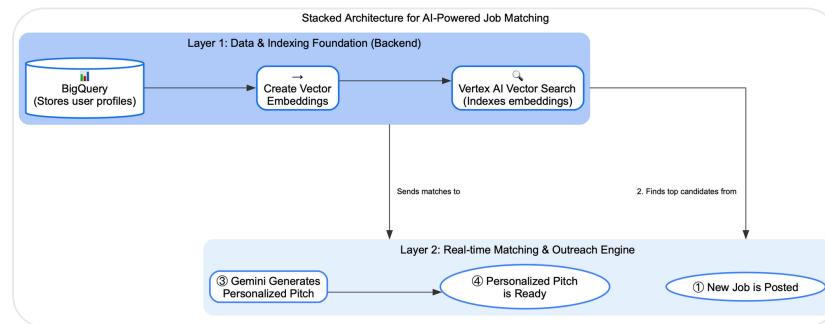
86. Accelerate grant writing for nonprofits

- **Business challenge:** You're a nonprofit that relies on grant funding to operate. Your challenge is that grant writing is a time-consuming, repetitive process that pulls your small team away from delivering on your core mission.
- **Tech stack:** Gemini for Google Workspace.
- **Blueprint:** A grant writer opens a **Google Doc** using a template for a new grant proposal. → The template contains standard sections like "Organization History," "Mission Statement," and "Program Budget." → For a repetitive section, the writer uses the integrated **Gemini** feature with a prompt like, *"Write a 200-word summary of our organization's mission, based on our website and past proposals."* → Gemini generates the text, filling in the routine information instantly. → This allows the grant writer to focus their time and creativity on the unique, strategic parts of the proposal, cutting grant-writing time.

87. Build a platform to match talent with job opportunities

development. Your challenge is connecting qualified candidates, especially those from non-traditional backgrounds, with relevant job opportunities in the private sector efficiently and at scale.

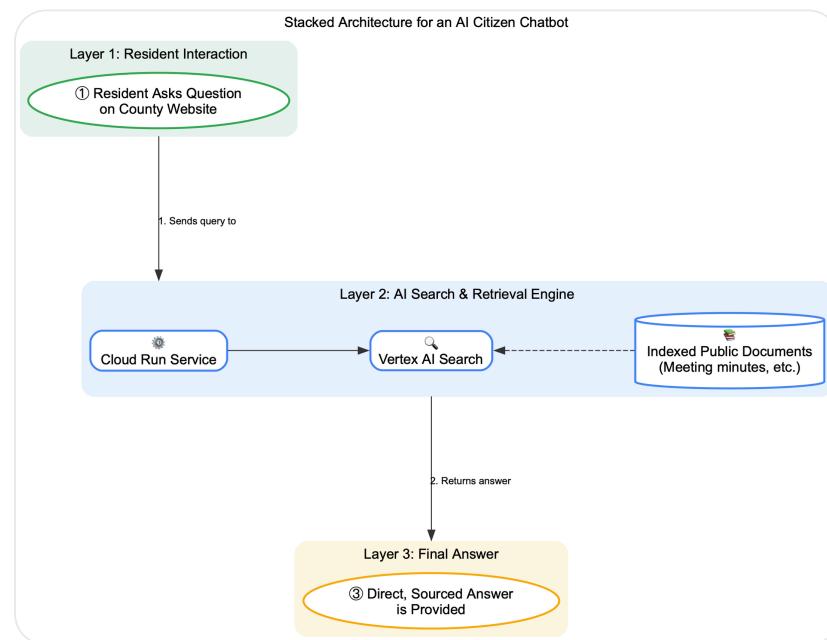
- **Tech stack:** Vector Search, BigQuery, Cloud Run.
- **Blueprint:** Job seekers and employers create profiles on the platform, and the data is stored in **BigQuery**. → Candidate skills and job requirements are converted into vector embeddings and indexed in **Vector Search**. → When a new job is posted, the system uses the Vector Search to find the top candidate profiles with the most similar embeddings. → For each match, **Gemini** can be used to generate a personalized pitch, such as "*This candidate seems like a strong fit for your 'Software Engineer' role because their project experience in 'X' aligns with your need for 'Y.'*"



88. Enhance government transparency with a citizen chatbot

providing residents with quick and accurate answers to their questions, as your small staff can get overwhelmed with calls, and information on your website can be hard to find.

- **Tech stack:** Vertex AI Search, Cloud Run.
- **Blueprint:** All public county documents, meeting minutes, and website pages are indexed into **Vertex AI Search**. → A resident visits the county website and uses a chatbot to ask, *"When is the next town hall meeting about the new park?"* → The query is sent to a service on **Cloud Run**, which passes it to Vertex AI Search. → The system finds the relevant information from the indexed documents and provides a direct answer with a link to the source. → This empowers residents with self-service access to information and frees up county staff.



- **Business challenge:** You're a municipal finance office responsible for tax collection. Your challenge is ensuring that tax classifications on invoices are correct, as manual audits can only cover a tiny fraction of submissions, leading to significant lost revenue from misclassifications.
- **Tech stack:** Document AI, Vertex AI, BigQuery.
- **Blueprint:** When a company submits an invoice, it is automatically processed by **Document AI** to extract the service descriptions and declared tax category. → The extracted data is stored in **BigQuery**. → A **Vertex AI** classification model, trained on historical data of correct and incorrect classifications, analyzes the service description from the new invoice. → If the model predicts a different category than the one declared by the taxpayer (e.g., it classifies a "consulting" service as "software development," which has a higher tax rate), the invoice is flagged for human review, improving accuracy and tax collection.

90. Detect and combat misinformation at scale

- **Business challenge:** You're a nonprofit fact-checking organization. Your challenge is the sheer volume of new information being

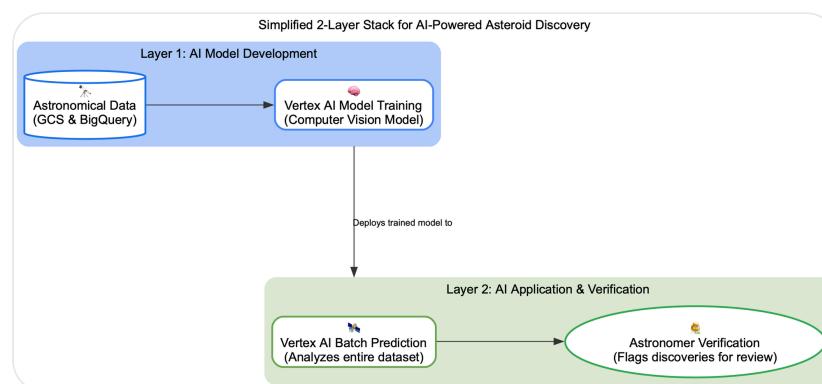
every truth and identify which claims need to be addressed most urgently.

- **Tech stack:** Pub/Sub, Vertex AI, Cloud Functions.
- **Blueprint:** A constant stream of content from news sites and social media APIs flows into **Pub/Sub**. → A **Cloud Function** is triggered for each new piece of content. → The content is sent to a **Gemini** model with a prompt like, *"Analyze this news article. Identify any verifiable claims and check them against our database of known misinformation. Flag any new, rapidly-spreading, or potentially-harmful claims."* → The system automatically filters out noise and surfaces a prioritized list of new, high-impact claims for human fact-checkers to investigate, allowing them to focus their efforts where it matters most.

91. Accelerate discovery of hidden objects

- **Business challenge:** You're a scientific institute. Your challenge is finding "hidden" objects like asteroids in massive astronomical datasets, a task that is like finding a needle in a haystack for human researchers.
- **Tech stack:** BigQuery, Vertex AI, Google Cloud Storage.
- **Blueprint:** Petabytes of astronomical image data from telescope surveys are stored in **Google Cloud Storage** and cataloged in

signs of moving objects against the background of stars. → The model is run on the entire historical dataset, analyzing images that have already been reviewed by humans. → The AI flags potential new asteroid discoveries that were missed by previous methods, which are then presented to astronomers for verification, dramatically accelerating the rate of discovery.



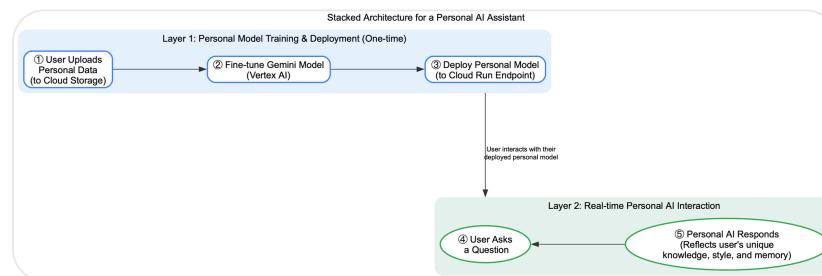
Technology

These architectural blueprints are inspired by customers who are using AI in the technology industry, such as: Personal AI, Causal, Abstrakt, BMC, Snap, Augment, Box, Twilio, and [more](#).

92. Build a personal AI that learns from your data

assistant. Your challenge is moving beyond generic, one-size-fits-all models to create an AI that is trained exclusively on an individual's own data, facts, and opinions, ensuring privacy and a perfectly tailored experience.

- **Tech stack:** Vertex AI, Google Cloud Storage, Cloud Run.
- **Blueprint:** A user uploads their personal data (documents, emails, notes) to a secure **Google Cloud Storage** bucket. → A fine-tuning job is initiated on **Vertex AI**, training a baseline **Gemini** model exclusively on this personal data corpus. → The resulting "personal language model" is deployed to a secure endpoint on **Cloud Run**. → When the user interacts with their personal AI, their queries are sent only to their own custom model, allowing it to provide responses that reflect their unique knowledge, style, and memory.



93. Create an AI-powered financial planning wizard

- **Business challenge:** You're a fintech company providing financial planning software

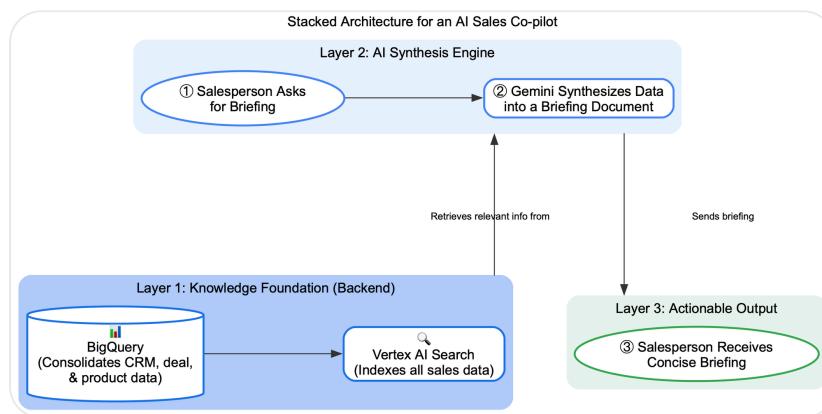
requires connecting disparate data sources and building complex financial models from scratch.

- **Tech stack:** Vertex AI, BigQuery, connections to third-party data source APIs.
- **Blueprint:** A new user signs up and grants access to their financial data sources (e.g., accounting software, bank accounts). → An AI wizard ingests the data into **BigQuery**. → The wizard sends the consolidated data to **Gemini** with a prompt like, *"Analyze this company's financial data. Identify key revenue streams, cost centers, and growth patterns, then generate a standard three-statement financial model."* → Gemini generates the baseline model, which is then presented to the user, turning a multi-hour setup process into minutes.

94. Develop a sales co-pilot to help B2B sellers

- **Business challenge:** You're a B2B sales technology company. Your challenge is helping sales representatives navigate complex organizational data to find the right insights to close deals, a process that often involves manually sifting through CRM data, past deals, and product documentation.
- **Tech stack:** Vertex AI, BigQuery, CRM integration.

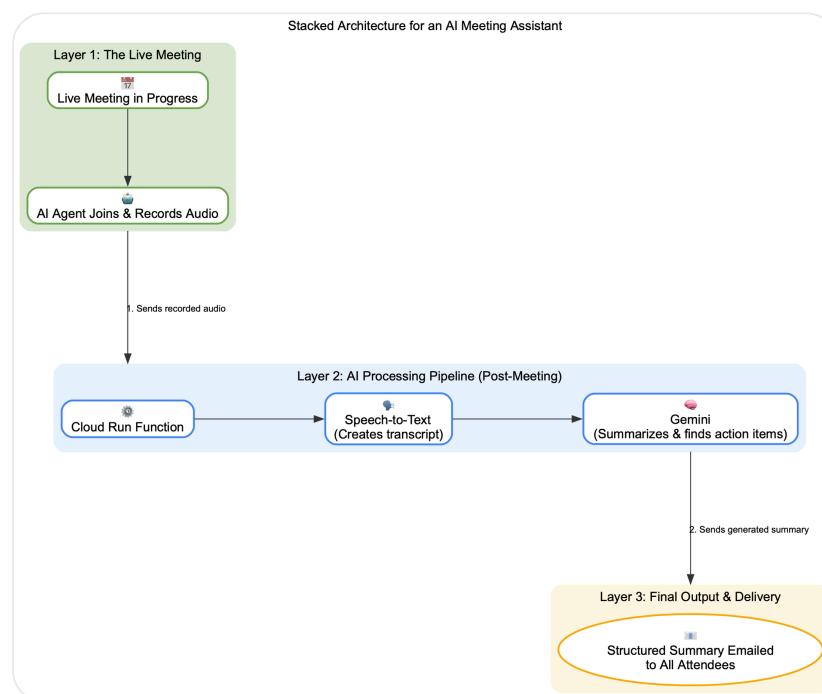
information—is consolidated in **BigQuery** and indexed into **Vertex AI Search**. → A salesperson preparing for a call uses a co-pilot and asks, “*I’m about to call a prospect in the manufacturing industry. Give me key talking points, relevant case studies, and potential objections.*” → The co-pilot uses Vertex AI Search to find the most relevant information. → **Gemini** synthesizes this data into a concise briefing document, empowering the salesperson to have a more strategic and effective conversation.



95. Build an AI agent to transcribe and analyze meetings

- Business challenge:** You're a collaboration software company. Valuable information shared in voice conversations and video meetings is often lost or requires hours of manual work to transcribe and summarize for those who couldn't attend.

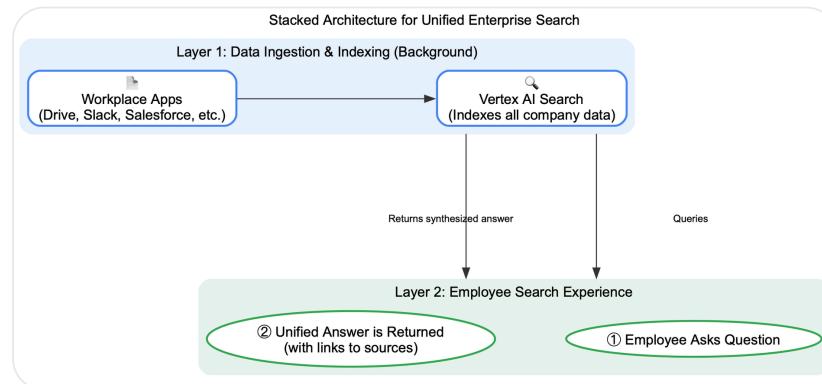
- **Blueprint:** A user connects the AI agent to their calendar. → When a meeting starts, the agent joins the call and records the audio. → After the meeting, a **Cloud Run function** sends the audio file to the **Speech-to-Text API** for a full transcription. → The transcript is then sent to **Gemini** with a prompt like, *"Summarize this meeting transcript, identify all action items and assign them to the correct person, and list the key decisions that were made."* → The structured summary and action items are then emailed to all attendees, saving time and improving collaboration.



96. Create an enterprise search engine for workplace knowledge

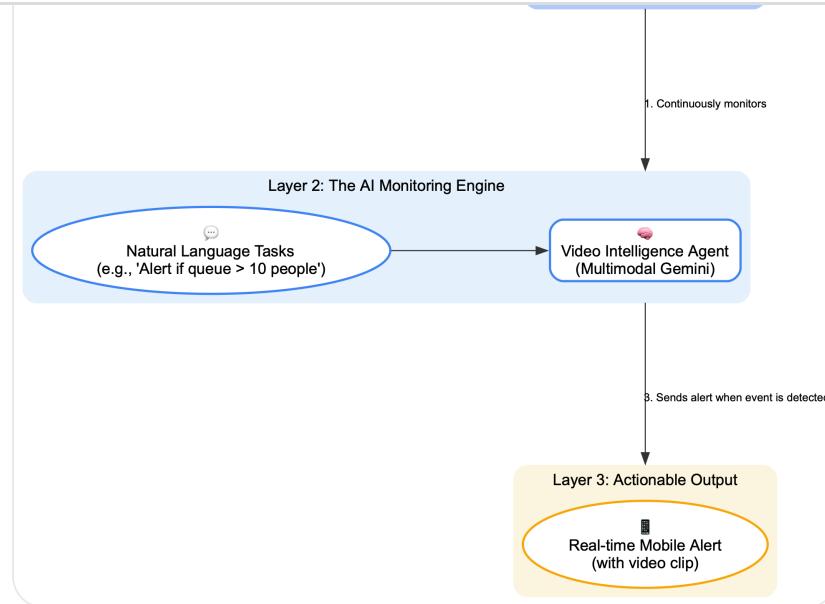
applications (like Slack, Google Drive, Salesforce, Confluence). Your challenge is that valuable company knowledge is fragmented across these silos, making it nearly impossible for employees to find the information they need to do their jobs effectively.

- **Tech stack:** Vertex AI Search, connectors to various enterprise applications.
- **Blueprint:** Secure **connectors** are used to index all of a company's data from its various workplace apps into **Vertex AI Search**, respecting all existing user permissions. → An employee uses a single search bar and asks a question like, "*What was our Q3 marketing strategy for the new product launch?*" → Vertex AI Search queries across all connected data sources—finding the strategy document in Google Drive, the related conversations in Slack, and the campaign results in Salesforce. → It returns a unified, synthesized answer with links to the original sources, allowing employees to find information.



97. Deploy video intelligence agents for any

- **Business challenge:** You're a business with hundreds of CCTV cameras for security. Your challenge is that these cameras generate thousands of hours of passive video footage that is only reviewed after an incident occurs, providing no proactive operational or business insights.
- **Tech stack:** Vertex AI, Cloud Storage, a mobile alerting system.
- **Blueprint:** Live video feeds from CCTV cameras are streamed to **Google Cloud Storage**. → A multimodal **Gemini** model, acting as a "video intelligence agent," continuously monitors the feeds. → The agent is given specific tasks via natural language prompts, such as "*Monitor the store entrance and send an alert if more than 10 people are waiting in line for over 5 minutes,*" or "*Alert security if anyone enters the warehouse after 10 PM.*" → When the AI agent detects a specified event, it automatically sends a real-time alert with a video clip to the relevant personnel's mobile device.



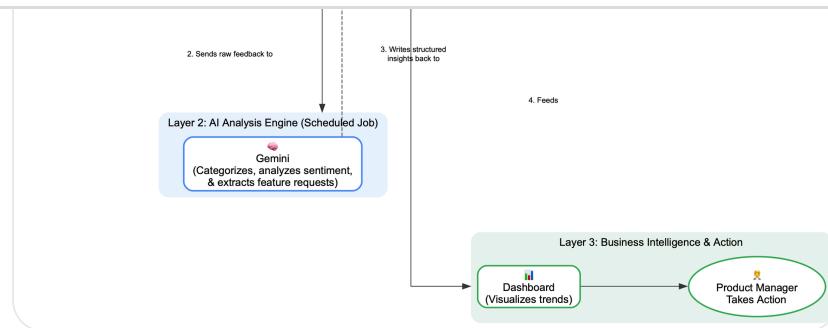
98. Build an agent for B2B workflow automation

- **Business challenge:** You're a B2B technology company, and you recognize that your clients in different departments (e.g., sales, HR, finance) have unique, complex workflows that are difficult to automate with one-size-fits-all software.
- **Tech stack:** Vertex AI, various third-party API connectors.
- **Blueprint:** A platform provides a framework for building specialized AI agents. → A company can create an "HR Onboarding Agent" and give it access to their HR systems.
 - When a new employee is hired, the agent automatically executes a multi-step workflow: it creates their user account, assigns required training, and schedules orientation meetings.
 - The agent uses **Gemini** to orchestrate

departmental workflow that would otherwise require significant manual coordination.

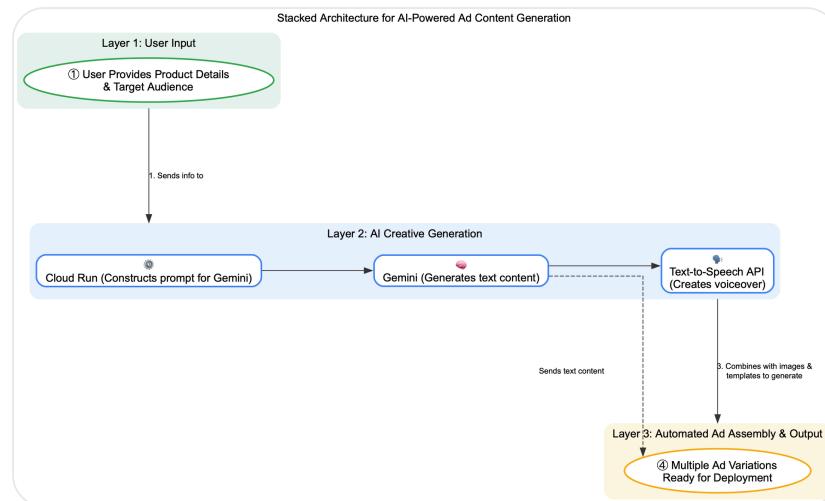
99. Transform customer feedback into product insights

- **Business challenge:** You're a product development company, and you need to understand how customers feel about your product, but their feedback is scattered across support tickets, app store reviews, and social media. Manually analyzing this unstructured text is a massive challenge.
- **Tech stack:** Vertex AI, BigQuery, data ingestion tools (e.g., Pub/Sub).
- **Blueprint:** All customer feedback streams from various sources into **BigQuery**. → A scheduled job sends batches of new feedback to a **Gemini** model. → The model is given a prompt like, "Analyze this feedback. Categorize each comment by topic (e.g., 'UI/UX', 'Pricing', 'Bug Report'), determine the sentiment (Positive, Negative, Neutral), and extract any feature requests." → The structured, analyzed data is written back to BigQuery. → Product managers can now use a simple dashboard to see trends, like "There was a 30% increase in negative comments about 'login issues' this week," allowing them to take data-driven action.



100. Automate the creative process in marketing campaigns

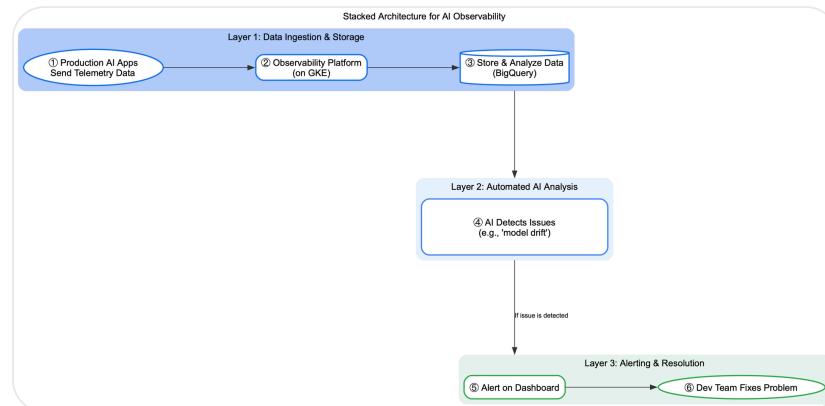
- **Business challenge:** You're a digital marketing platform, and your clients need to create a high volume of ads for different products and channels. Your challenge is automating the creative process so they can launch effective campaigns without needing a large design team.
- **Tech stack:** Vertex AI, Text-to-Speech API, Cloud Run.
- **Blueprint:** A user provides a few key details about their product and a target audience. → This information is sent to a service on **Cloud Run**, which constructs a prompt for **Gemini** like, *"Generate three different ad headlines and a short script for a 15-second video ad for a new running shoe targeting marathon runners."* → Gemini generates the text. → The service then sends the script to the **Text-to-Speech API** to create a voiceover. → The text and voiceover are then combined with product images using a template, automatically



101. Provide an AI observability platform for LLM evaluation

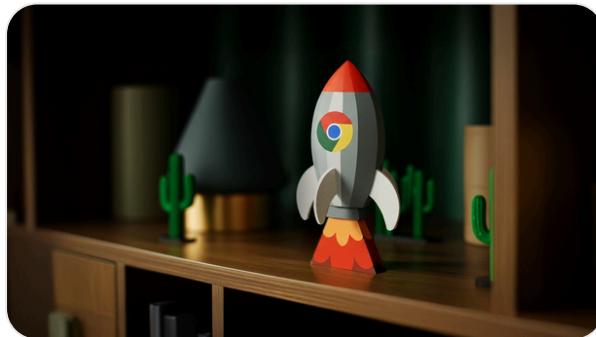
- **Business challenge:** You're an enterprise that is deploying multiple AI applications, but you lack the tools to monitor, troubleshoot, and evaluate their performance in production. Your challenge is ensuring these AI systems are accurate, safe, and effective once they are live.
- **Tech stack:** Google Kubernetes Engine (GKE), BigQuery, Vertex AI.
- **Blueprint:** An enterprise's AI applications send their inputs, outputs, and model telemetry data to an observability platform running on **GKE**. → This data is processed and stored in **BigQuery** for large-scale analysis. → The platform uses **Vertex AI** models to automatically detect issues like "model drift" (when a model's performance degrades over

Issue is detected, the platform sends an alert to the development team via a dashboard, allowing them to quickly diagnose and fix problems with their production AI systems.



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