



# Generative AI Will Power Adaptive Applications

GenAI IS NOT ONLY CHANGING APPLICATION DEVELOPMENT, IT WILL CHANGE APPLICATIONS, TOO.

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A new era in application development is underway due to the promise of Generative AI. Initially, we witnessed the explosion of chatbots and code generators. But chatbots are just the beginning. Soon we will see enterprises incorporate GenAI across the organization and inside nearly every application. These apps will be adaptable and take on new behaviors, understand situations, offer better advice, and create hyper-personalized experiences for users. This is what Couchbase refers to as AI-powered adaptive applications.

## What is an adaptive application?

An adaptive application can adjust its behavior and features in real time based on various factors such as user preferences, environmental conditions, data inputs, or changing circumstances. The goal of adaptive applications is to provide a hyper-personalized and responsive user experience by dynamically tailoring its functionality to the specific needs and current context of the user.

## Characteristics of adaptive applications

**Hyper personalization:** Adaptive applications can customize their UI, content, and functionality to match the situation, preferences, and requirements of individual users.

**Context awareness:** The application can adapt based on the current context, which may include factors like location, device type, network conditions, time of day, and past and present behaviors.



**Learning and intelligence:** Adaptive applications will incorporate predictive machine learning, real-time aggregations, and GenAI conversations to continuously analyze user behavior and improve their ability to adapt. They can learn from past interactions to make tomorrow's experiences better.

**Customizability:** Users may have the option to adjust settings or provide feedback to help the application adapt to their needs.

**Automation:** They can automate certain tasks and processes, making it easier for users to accomplish their goals without manual intervention.

**Calculation:** They can instigate and respond to calculated data such as real-time inventory, capacity planning and estimation, or other real-time analytic metrics.

**Edge and mobile-enabled:** Adaptive applications will inherently be mobile and operate at the edge because handheld devices are the preferred interface to technology for most individuals.

**Situational:** Adaptive applications will anticipate and execute actions that bring data and application functionality to the user, without their having requested it.

## Adaptive application examples

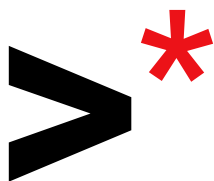
**E-commerce sites** will create dynamic, personalized product description content based on accumulated knowledge for each user. They will be able to match colors, and respond to requests such as, "match this shade of blue" for a pair of casual shoes.

**Streaming services** will be able to load your custom TV viewing playlist in your hotel room, and notify you when your team is about to score on another streaming service.

**Situational real-time offers**, such as responding to an entire geographic market when a sports team scores or goes into overtime, will become the norm. Say, "Yes domino!" for your pizza.

**Smartwatch applications** will dynamically schedule exercise, spa, medical, and dental appointments while avoiding vacations, and family occasions like birthdays.

**Mobile applications** will calculate when to execute ideal trades, including short sales, or equity purchases based on market news combined with your risk, investing strategy, and available funds.





## Requirements for adaptive applications

**Flexibility:** Adaptive applications will be flexible, feature-rich, and easily configurable. Data in adaptive applications should be available in flexible formats such as JSON to create or modify unanticipated data inputs, such as enhancing account profiles with new user attributes or storing conversation prompts and responses with LLMs.

**Exceptional performance:** Adaptive applications must be able to react in real time so as to avoid missing a response opportunity. Latency is the enemy of adaptive applications.

**Mobile** devices will run these applications and be a key supplier of data that drives adaptations. On-device responsiveness is critical to delivering a great user experience.

## Database needs for adaptive applications

Database platforms are evolving rapidly to support the variety of data required to power feature-rich adaptive applications. Platforms must support multiple data access patterns including high-speed key/value and JSON document access, text and vector search, LLM API support, SQL query, data streaming and eventing, analytics, and even graph traversals. Very few database management systems support all of these. Only Couchbase supports them for deployments on premises, across clouds, and within mobile devices.

Databases are adding capabilities to support vector search and retrieval-augmented generation (RAG) techniques to address the risks of conversing with GenAI. Those include oversharing sensitive and proprietary data as well as how to avoid untrustworthy responses (hallucinations) from AI models.

Couchbase offers the ability to query data across multiple data access patterns for the application and coordinate its interactions with AI models such that this intentional action in the app happens. Couchbase is unique in its ability to facilitate these interactions, including vector search, on users' mobile devices.

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Modern customer experiences need a flexible database platform that can power applications spanning from cloud to edge and everything in between. Couchbase's mission is to simplify how developers and architects develop, deploy and run modern applications wherever they are. We have reimagined the database with our fast, flexible and affordable cloud database platform Capella, allowing organizations to quickly build applications that deliver premium experiences to their customers – all with best-in-class price performance. More than 30% of the Fortune 100 trust Couchbase to power their modern applications. For more information, visit [www.couchbase.com](http://www.couchbase.com) and follow us on X (formerly Twitter) @couchbase.

