

Faster Performance, Lower Costs, and Offline Resilience: ButfitSeoul Levels Up with Couchbase

ButfitSeoul is a fast-growing fitness technology startup that operates an integrated online and offline fitness platform. Founded in 2018, the company offers services like TEAMBUTFIT (group exercise programs) and BUTFITGROUND (a premium gym facility). Following the COVID-19 pandemic, ButfitSeoul pivoted and scaled rapidly. To support this growth, they chose Couchbase for its performance, offline sync capabilities, and scalability – enabling a more seamless and resilient user experience across their platform.

Challenges

- **Centralized bottlenecks under peak traffic:** Legacy RDBMS architecture couldn't support real-time performance at scale, leading to lag, downtime, and poor user experiences during busy periods.
- **High infrastructure and maintenance overhead:** Scaling high-availability DB instances and maintaining API logic strained resources and slowed innovation.
- **Lack of offline resilience:** Users experienced service disruptions when network connectivity dropped, impacting engagement and trust in the platform.

Outcomes

- **70% reduction in API calls per session:** Couchbase Mobile offloaded traffic to local storage, cutting API requests from ~37 to just 10 per session and reducing backend load.
- **Instant, responsive user experience – even offline:** Near-instant screen loading, retry logic, and offline sync delivered a seamless, gamified fitness journey regardless of connectivity.
- **Lower operational costs and faster development:** Decentralized architecture and automated sync enabled leaner infrastructure and faster iteration on new features.

Industry

- [Healthcare & High Tech](#)

Customer Application

- Real-time fitness tracking app

Use Case

- [Caching and Session Management](#)
- [Personalization and Profiles](#)

Product

- [Couchbase Server](#)
- [Couchbase Sync Gateway & Mobile](#)

Key Features

- [In-Memory/Caching](#)
- [Mobile](#)

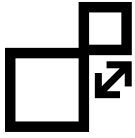
Cloud Provider

- [AWS](#)

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— Munkyo Seo, Head of Engineering, Butfitseoul

Key to Butfit's success has been delivering real-time, gamified cardio tracking experiences to users. This makes workouts more engaging and motivating through visualized competition. When members use equipment like treadmills or rowing machines, they can connect directly to the Butfit app. This displays real-time data such as distance, time, and speed on the screen. Completed workouts result in points, which can be redeemed for items like protein shakes, coffees, or branded merchandise. In this way, exercise is being turned into a gamified experience.



THE CHALLENGE: REAL-TIME PERFORMANCE UNDER PRESSURE

ButfitSeoul's legacy architecture was built on a conventional model:

- Frontend → Backend API → Queue & Worker → Cache → RDBMS

This RDBMS architecture was simple and widely used, but it could not meet the demands of real-time services. All traffic funneled through a central point, which made scaling difficult and caused performance issues during peak usage. The team tried introducing a cache to offload some of the traffic, but the overall structure still couldn't avoid bottlenecks. As the number of locations and users grew, this real-time, centralized request pattern pushed the database to its limits. ButfitSeoul needed a new architecture – one that could scale flexibly without requiring heavy maintenance, reduce costs, and improve both performance and user experience.



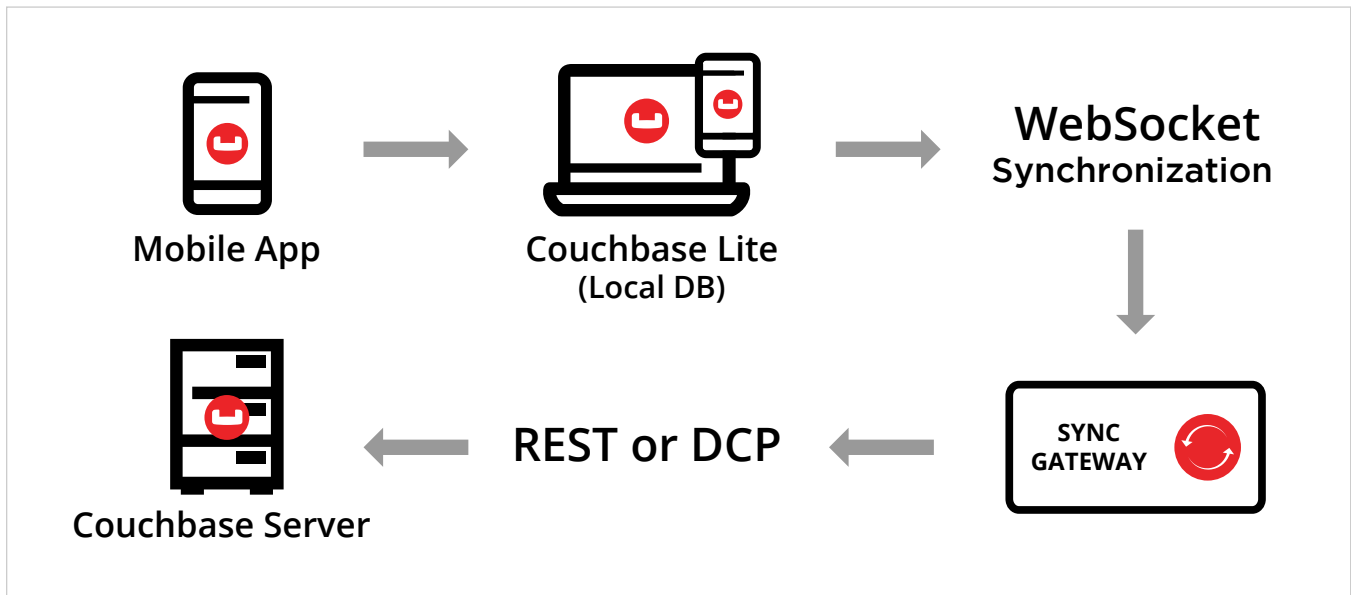
THE SOLUTION: A MOBILE-FIRST, RESILIENT ARCHITECTURE WITH COUCHBASE

The first goal in adopting Couchbase was to decentralize the data flow. To reduce structural bottlenecks, the system was redesigned so that data could be handled at the device level instead of centrally. Instead of a single point of failure, the load was distributed across devices and systems – greatly improving stability, scalability, and performance from the user's perspective.

The second goal was to reduce operational resources. With traffic distributed, the company no longer needed to scale expensive high-availability DB instances, and could cut down on repetitive or one-off logic in the API servers. This led to reduced infrastructure costs and allowed engineers to focus more on developing core features.



The company adopted Couchbase Mobile to cache user data directly in a local database within the app. Sync Gateway handles real-time bidirectional sync between the mobile client and the server without separate API calls, significantly reducing the need for additional sync development and network load. Conflict resolution is handled automatically via revision IDs for smooth data handling. With this setup, even if the network is unstable or the server connection is temporarily lost, the app continues to function normally – and once the connection is restored, it syncs automatically.



“Introducing Couchbase Mobile in our app led to API traffic being reduced as most operations are now synchronized locally. This led to faster app responsiveness, reduced server load, and reliable offline usability,” explained Munkyo Seo, Head of Engineering at ButfitSeoul.

To support this mobile-first architecture, ButfitSeoul runs Couchbase on Amazon Web Services (AWS) alongside Couchbase Sync Gateway & Mobile, enabling a powerful and flexible infrastructure that supports real-time data processing, automatic sync, and offline-first functionality. With Couchbase Mobile caching data on-device and Couchbase Server deployed on AWS, users experience instant responsiveness and reliable syncing across sessions and locations.

Couchbase’s distributed architecture and memory-first design, combined with AWS EC2, give ButfitSeoul the scalability and performance needed to handle traffic spikes during peak workout times – while maintaining a smooth and engaging user experience. Leveraging Amazon S3 for data durability and backup ensures data remains safe and accessible, while AWS’s pay-as-you-go model keeps infrastructure costs efficient as the platform grows.





THE RESULTS: A FAST, SCALABLE FITNESS PLATFORM BUILT FOR GROWTH

Before adopting Couchbase, ButfitSeoul compared several synchronization solutions, including Firebase, Realm, and AWS AppSync. Couchbase stood out as the most well-balanced solution in key areas, including:

- 1. Reliable real-time bidirectional synchronization** – Couchbase provides WebSocket-based replication, enabling fast and consistent data updates without delay
- 2. Channel- and role-based access control**, to display data differently for each user or branch
- 3. Flexible integration** with external systems via Webhooks
- 4. Effectively minimizing operational resources** – Reducing the server load made it much easier to manage API server costs and DevOps workload

"Couchbase was the only all-in-one solution that delivered real-time performance, architectural flexibility, and operational efficiency. Since our platform processes real-time fitness data and faces traffic spikes during peak hours, these criteria were crucial," said Mr. Seo.

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After adopting Couchbase, ButfitSeoul experienced a number of benefits.

- **Improved performance** – Reduced API load under peak usage
 - API calls reduced from ~37 to just 10 per session
 - Initial app load time dropped from 3s to under 1s
 - Seamless UI with near-instant screen loading
- **Enhanced user experience** – Users enjoy a faster and smoother experience even offline. With retry logic and a dead letter queue (DLQ), data syncs correctly – ensuring reliability and trust
- **Operational efficiency** – Lower server load, faster dev cycles

Couchbase enabled ButfitSeoul to completely rethink its architecture and service delivery. With real-time syncing, reduced infrastructure cost, and offline resilience, ButfitSeoul now supports a fast, scalable, and reliable fitness platform – designed for peak traffic and high user engagement.

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 reimaged 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 and follow us on X (formerly Twitter) @couchbase.

