

CASE STUDY:

How Ryanair Increased App Performance with Couchbase Mobile



Over the last 30 years, Ryanair has experienced exponential growth. Since we launched our new mobile app supported by Couchbase, we have increased app performance and decreased flight booking times from 5 minutes to 2 minutes. Couchbase Mobile has helped us achieve our user experience goals.

— Vladimir Atanasov,
Lead Developer,



Introduction

This paper explains how Ryanair used Couchbase Mobile to optimize Semi-Static Data management for its mobile application used by over 3 million travelers – resulting in 60% faster booking times, 87% less data transfer, a better user experience, and significantly higher app store ratings.

Semi-Static Data is data that is updated infrequently. In Ryanair's case, it's data like airline seating maps, airport stations, and airline routes. Semi-Static Data can be difficult to manage efficiently within a mobile application. When one of the Ryanair airline routes changes, for example, the change must be reflected in the app in real-time so users can accurately book flights.

In the past, there were two main ways to approach this challenge:

1. Bundle the resources in your application
2. Retrieve the resources over the network

Each of these approaches has constraints. The first, bundling the resources, is constrained by a combination of release time and app store approval time. The second, network retrieval, solves for the release time and app store reliance constraints but requires the app to constantly pull data from the cloud. This is resource intensive and constrained by network availability and performance.

As the Ryanair case shows, network retrieval of Semi-Static Data was resource-intensive and negatively impacted app performance. They faced the challenge of optimizing Semi-Static Data management to increase app performance and user experience while avoiding the constraints associated with resource bundling and network retrieval.

Couchbase Mobile helped them solve this challenge.

The Ryanair Mobile Application

Ryanair is both the largest European airline by scheduled passengers carried and the busiest international airline by passenger numbers. It operates more than 1,600 daily flights from 72 bases, connecting 192 destinations in 31 countries with over 300 aircraft — and estimates carrying 103 million passengers per year this year, with plans to grow traffic to 160 million per year by 2024.

The Ryanair mobile app faced performance challenges associated with continuous retrieval of Semi-Static Data from the cloud. This was having a significant negative effect on user experience.

Moving to Couchbase Mobile enabled the Ryanair mobile development team to optimize the management of Semi-Static Data, significantly improving performance and user experience. No major re-architecture was required to integrate Couchbase Mobile into existing iOS and Android apps.

This paper will detail:

- The old and new architectures of Ryanair's mobile app
- How Ryanair reduced the time required to complete a booking in the app via Semi-Static Data management optimization
- How Ryanair decreased data transfer to their app via Semi-Static Data management optimization

The Challenge: App Performance

Ryanair's 3 million+ mobile users rely on the app to plan their trips – everything from completing bookings to viewing boarding passes, seating maps, airport information and more.

Prior to moving to Couchbase Mobile, the Ryanair mobile app relied on real-time Semi-Static Data from the cloud to drive this app functionality. The wait time for retrieving this data was a significant portion of the time users spent performing tasks within the app.

Users faced several application issues:

- The 5 minutes it took to complete a booking was much longer than users liked
- User experience was unpredictable due to network availability and performance
- A large amount of data was required to be transferred to the mobile device over the network for features to work

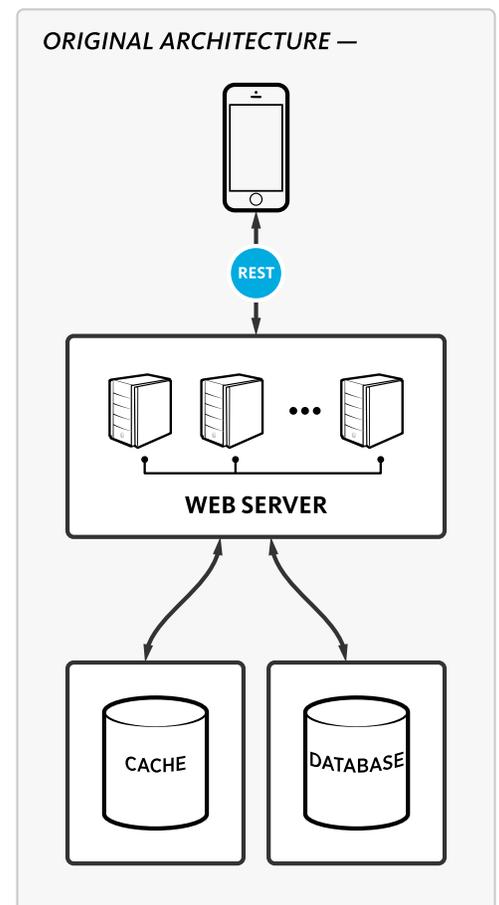
Poor app performance and unpredictability yielded an inadequate experience for Ryanair mobile users, and the app received negative feedback in app stores and in the press as a result.

Original App Architecture

The original application architecture was a hybrid mobile app using REST services backed by a relational database and cache. In this architecture, the mobile device talks to the Web Server, via REST, which retrieves data from the cache and/or database. The cache and database are separate systems.

With this architecture:

- Bookings took more than five minutes to complete
- Semi-Static Data had to be retrieved from the server during each booking request, increasing the amount of time to complete a booking
- Over 80 GB of Semi-Static Data was being transferred to mobile apps per day to drive the booking process



The Solution: Couchbase Mobile

Semi-Static Data Management with Couchbase Mobile

The development team selected Couchbase Mobile to address the experience and performance issues associated with the length of the booking process. Couchbase Mobile brings the full power and flexibility of NoSQL to mobile. It's engineered to provide fast and consistent access to data, with or without a network connection, removing the network dependency that traditional service-based approaches require.

Couchbase Mobile is comprised of three components:

- **Couchbase Lite**, an embedded NoSQL database that runs locally on a mobile device
- **Couchbase Sync Gateway**, a cloud component that enables secure data synchronization over the internet
- **Couchbase Server**, an enterprise NoSQL database that runs in the cloud

Integrating Couchbase Mobile into their existing Android and iOS apps did not require significant application re-architecture: they embedded the Couchbase Lite database in the app, changed their app code to retrieve the data from the database instead of from the server, and configured the database to sync changes to the data using Sync Gateway. The rest of the app stayed exactly the same.

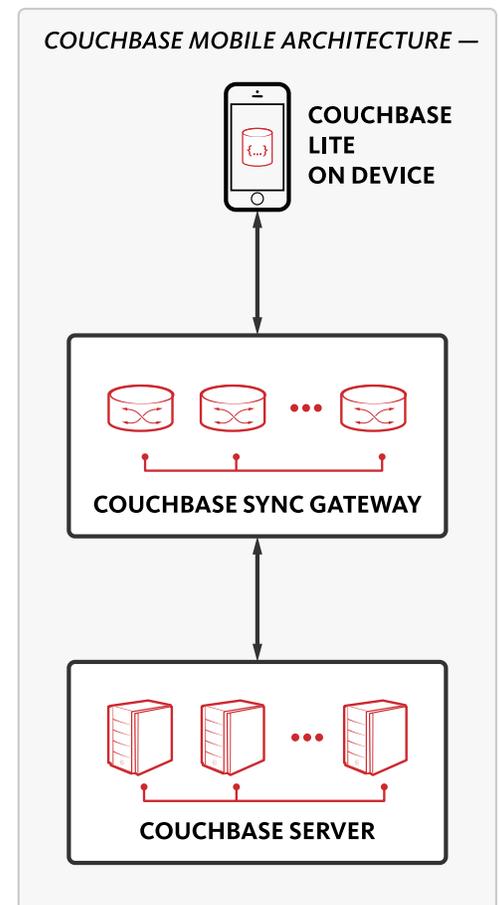
New App Architecture

With Couchbase Mobile, Ryanair moved to a synchronization architecture. Semi-Static Data is stored in the embedded Couchbase Lite database locally on the device and automatically updated via Sync Gateway when it changes in the cloud. The app always retrieves the data from the embedded database, eliminating the need to constantly request this data from the server.

Couchbase Server has built-in in-memory cache, eliminating the need for a separate cache.

Under this new architecture, Semi-Static Data is stored locally on the device, eliminating unneeded trips to the cloud.

Additionally, the Ryanair team did not have to build their own storage and synchronization solution. Critical features like synchronization, storage, and security are all included in Couchbase Mobile.



The Result: Better User Experience and Increased App Performance

Couchbase Mobile helped Ryanair increase their app performance and enhance their user experience. Ryanair was also able to overhaul their app experience without significant re-architecture to their existing app.

With Couchbase Mobile, Ryanair:

- Can easily manage Semi-Static Data
- Did not have to implement their own synchronization and storage solution
- Was able to integrate with existing Android and iOS apps without significant re-architecture

The mobile app experience is now faster and better —

- The booking process is **60%+ faster** (slashed from over 5 minutes to under 2)
- Network traffic to drive bookings is **87% more efficient** (reduced from 80 GB/day to 10 GB/day)
- The user experience is **vastly improved**, as evidenced by an increase from X to Y app store ratings.

See the [difference in app performance](#).

[Watch the presentation by Ryanair](#) on their use of Couchbase Mobile.

Get started with Couchbase Mobile at <http://developer.couchbase.com/mobile/>.



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About Couchbase

Couchbase delivers the world's highest performing NoSQL distributed database platform. Developers around the world use the Couchbase platform to build enterprise web, mobile, and IoT applications that support massive data volumes in real time. The Couchbase platform includes Couchbase Server, Couchbase Lite - the first mobile NoSQL database, and Couchbase Sync Gateway. Couchbase is designed for global deployments, with configurable cross data center replication to increase data locality and availability. All Couchbase products are open source projects. Couchbase customers include industry leaders like AOL, AT&T, Bally's, Beats Music, BSkyB, Cisco, Comcast, Concur, Disney, eBay, KDDI, Nordstorm, Neiman Marcus, Orbitz, PayPal, Rakuten / Viber, Tencent, Verizon, Wells Fargo, Willis Group, as well as hundreds of other household names. Couchbase investors include Accel Partners, Adams Street Partners, Ignition Partners, Mayfield Fund, North Bridge Venture Partners, and West Summit.