Couchbase

8 Data Requirements Transforming Retail Applications

Replatforming your retail technology stack to deliver omnichannel experiences
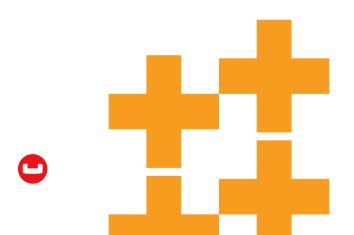
THE OVERARCHING GOAL IS TO UNIFY ALL CUSTOMER INTERACTIONS ACROSS WEB, MOBILE, AND IN-STORE TO CREATE A SEAMLESS EXPERIENCE THAT ENHANCES YOUR BRAND AND CUSTOMER RETENTION, AND IT'S CRITICAL TO CHOOSE A DATABASE PLATFORM THAT WILL ALLOW YOU TO SCALE AND ADD NEW SERVICES.

Today's leading retailers and e-commerce companies – Tesco, Carrefour, eBay, Fanatics, StubHub, Staples, and hundreds more – are faced with many IT challenges. They face increasing demands to deliver great customer experiences – i.e., fast, personalized, context – and location-aware. At the same time, they have to manage growing volumes of users and data, while reducing costs and time to market. These rising expectations, coupled with competitive pressures with behemoths like Amazon, are driving the need to replatform their existing applications.

Replatforming legacy systems may be a daunting task, especially for established retail companies. Thousands of physical stores along with an online presence and a mobile app typically means that data is siloed across various systems. And it's likely that most of these services and applications have grown organically over time and don't provide a cohesive experience to customers.

The overarching goal is to unify all customer interactions across web, mobile, and in-store to create a seamless experience that enhances your brand and customer retention, and it's critical to choose a database platform that will allow you to scale and add new services.

How companies are replatforming today

Today's retailer has likely acquired new business units, added new channels, or implemented programs like customer loyalty tracking, and as a result has gone through a number of technology evolutions. A typical technical journey might begin with a physical store, then adding a separate loyalty program, building an online store as a completely separate business unit, and developing a corresponding mobile app. The user experience across the top of all this may include in-store, online, mobile purchases, home delivery, click-and-collect, and a loyalty and rewards/points program.

When it comes to the technologies in use, a current e-commerce platform may be built on technologies such as Oracle ATG, Oracle MDM, IBM Digital Commerce, SAP Hybris, Magento, and more. This represents a monolithic system of systems, making it hard to add more data and give users a better experience due to the inability to customize and upgrade – there's simply no agility.

While a total replatform at once is often not possible, it is feasible to focus piece by piece. With this strategy, many companies start by building out a microservices-based approach to help them tackle replatforming in a manageable way.

An example technology stack might look something like this:

- Many backend databases storing product, pricing, and inventory information which is then distributed to physical stores and used to feed the website.

- Physical stores each have one or more SQL Server databases serving the point-of-sale systems. The daily transactions are uploaded on a nightly basis by exporting to a CSV file and FTP'ing back to the corporate datacenter where they are imported into a master database.

- The mobile app is a thin client accessing the same web-based services as the online store.

- Loyalty programs, click and collect, and home delivery are under one umbrella but are run as completely separate business units.

Overhauling the entire estate is easier if put into phases. Below, we lay out a four-phased approach as an example of a path a Chief Architect might take:

1. **Customer 360 –** aggregating customer information and unifying their experience.

2. **Catalog and Inventory –** enhancing the product catalog to support faster publishing, more flexible search/navigation, and cross-sell opportunities.

3. **Field Service –** delivering a series of employee-facing applications to enhance the in-store as well as home delivery experience.

4. **IoT Data Management –** implementing an automatic checkout experience and fleet tracking.

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Why retailers are leveraging Couchbase as their platform of choice

To meet the demands of today's digital consumer, retailers are leveraging the Couchbase NoSQL database as they move away from monolithic solutions to microservices-based architectures. Below, we'll explore how these companies are building their product and pricing catalogs with Couchbase, including data modeling and querying.

The following table shows the requirements needed to engage today's digital customer, how Couchbase addresses those requirements, and examples of customer use cases.

Requirements Needed	How Couchbase meets these requirements
Service data requests with submillisecond latency	**Built-in data cache** that can serve documents with sub-millisecond latency. Criteo deploys massive amounts of data to handle real-time queries within 30 ms response time.
Scale to meet peak demand (e.g., Black Friday, Christmas), easily and affordably	Easy scalability with a **single node type**. New nodes are added with no downtime. Scale out with peak demand or scale down after peak. PMU, a French racing company, relies on elastic scalability to handle the European Grand Prix. They simply add a node for a day and remove it after Grand Prix.
Provide 24x7x365 availability	**Intra-cluster replication and auto-failover** within a cluster provides high availability. **Enterprise support** ensures high availability and diagnostics whenever a failure occurs. **Professional services** help tune the architecture to meet the availability needed.
Applications are moving to the cloud	Scaling on demand to support more customers, and store more data. Operating fully managed applications on a global scale to support customers worldwide. Minimizing infrastructure and operating costs, achieving a faster time to market.
Replicate data across datacenters globally	Cross datacenter replication (XDCR) allows **active/active replication** between datacenters to meet SLA requirements. Most Couchbase retail customers deploy Couchbase in two datacenters.
Integrate mobile capabilities to support omnichannel experiences	Couchbase is the only NoSQL database that supports interactions online, in store, or on the go. **Couchbase Mobile extends Couchbase Server to the edge** with an embedded NoSQL database (Couchbase Lite) and a web gateway (Sync Gateway), enabling use cases such as in-store personalized apps, point-of-sale systems, real-time coupons and rewards, and mobile retail catalogs.
Accommodate evolving data types and queries	Couchbase is a **document database**, with a **JSON document** model, **SQL queries**, and **fast in-memory indexing** (memory-optimized index). A large sport retailer in France is using a semi-structured data model to handle product categorization and inheritance by denormalizing the catalog.
Integrate with big data tools like Hadoop, Spark, Kafka, and others	Couchbase offers connectors to Spark, Kafka, Elasticsearch, and other big data technologies.
Accelerate and simplify development	Couchbase is a perfect fit to deploy microservices and accelerate development. The Couchbase Autonomous Operator for Kubernetes enables cloud portability and automates operational best practices for deploying and managing Couchbase. Tesco completely redesigned their platform using Couchbase as the main database behind microservices for their product catalog, profile, and more.

COUCHBASE IN RETAIL: CUSTOMER CASE STUDIES

Rue du Commerce is a leading e-commerce company in France with business solely done through the web. They replaced Elasticsearch and MariaDB with Couchbase to power their product catalog indexing application.

Main business challenges with Elasticsearch and MariaDB:	What they achieve with Couchbase:
• Needed scalable, high-performance indexing for superior shopping experience, even at peak periods • Required real-time price indexing to provide accurate omnichannel pricing	• Accurate product indexing by Google • Web traffic increased from 25% to 40% (15% traffic increase) • 500K products indexed in 5 minutes instead of 50 minutes (10x faster) • Product seen by Google in 50 ms vs. 1.4 sec previously (28x faster)

Facing issues around storing product catalog data in their relational database, Tesco, the third-largest retailer in the world, evaluated MongoDB™ but ultimately chose Couchbase as a consolidated product catalog database with microservices. Data is ingested via REST API from multiple MDM feeds (CSV, XML) and JSON documents capture multiple data structures: SKUs, product and accounting hierarchies, GTINs (barcodes, ISBNs, etc.).

Main business challenges with a relational database:	What they achieve with Couchbase:
• Product data stored in multiple relational databases, driving up maintenance costs • Deliver fast, easy access/sharing for product data throughout the company and ability to store and update product data for 10M items • Support frequently changing data and multiple data structures while improving customer experience across multiple purchase channels • Improve performance for peak periods like Black Friday, avoiding lengthy delays that resulted in lost revenue	• Scales easily and inexpensively to support 10 million products and 35 thousand requests per second • Low-latency access to millions of documents for great customer experiences • JSON improves developer agility through flexible schema for changing SKUs and support for SQL and text-based queries • First Black Friday success in 2016, earning excellent press reviews

STAPLES

Staples needed to better manage custom B2B product catalogs using 1.6 billion rules applied in real time. While it explored MongoDB™, an inability to scale easily and affordably led to canceled projects. Couchbase enabled Staples to simplify its catalog management using N1QL and JSON while also improving database performance and reliability.

Main business challenges with MongoDB™:	What they achieve with Couchbase:
• Needed to better manage personalized catalogs for B2B shoppers online, a practice that involved 1.6 billion rules applied in real time at time of purchase • Cancelled digital transformation projects due to inability to scale MongoDB™ and Db2 easily and affordably • Needed simplified replication, easy scalability to continue to grow infrastructure	• Simplified management of B2B product catalogs customized for each buyer with N1QL and JSON • Enhanced user experience by adding performance, boosting scalability, and enhancing reliability • Improved responsiveness and availability of e-commerce pricing engine

LOUIS VUITTON

Louis Vuitton used Couchbase to replace manual tablet inventory updating, bringing its full product catalog directly to the mobile devices of every store employee. By synchronizing catalog data in real time, sales reps can instantly access up-to-date information, including availability in store and at other locations.

Main business challenges with a traditional database:	What they achieve with Couchbase:
• Overcome long, manual updates for each in-store tablet every morning to sync product catalog • Deliver up-to-date product catalog and real-time pricing despite poor network connectivity • Push data from cloud to 10,000 devices • Support 3 datacenters and Microsoft Azure cloud infrastructure • Deliver high availability to keep catalog online 24/7	• Always-on access to product catalog and store inventory • Sync time to mobile devices reduced by 92% • From less than 40% of employee users to 80%+ • Quick and easy deployment with Microsoft Azure

Couchbase

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