



Couchbase

**How Travel and Hospitality
Companies are Transforming
their Customer Experience in the
Age of Kayak, Airbnb and Uber**



amadeus

Flight availability, booking,
and pricing analytics



Inventory and pricing
recommendations



Real-time crew
management, scheduling,
and resources

EXECUTIVE SUMMARY

In the competitive hospitality industry customers are demanding a better, more personalized experience. Despite increased consumer spending, operational expenses are putting brands under pressure leading them to search for new efficiency. Mergers, new partnerships, personalization, and digitization are causing the volumes of data to grow. Older technologies aren't keeping up with the change despite rising maintenance costs.

Travel companies must contend with a complex set of ever-changing products and services. Hospitality companies require the ability to provide premium services at a lower cost. Meanwhile, airlines are forced to compete with low-cost alternatives.

Everyone in this sector must personalize the travel experience and cultivate customer loyalty, and make each experience one that delights customers and brings them back. Information is at the heart of all of these issues. Personalization and digital transformation require data. The only way to meet all of the data needs is to implement a database that supports these efforts efficiently even when things change.



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 Atanosov
Lead Developer

INTRODUCTION

According to the Deloitte 2019 Travel and Hospitality Outlook, the past 10 years have seen a huge increase in travel. From 2009 to 2018, US hotel bookings increased by \$69 billion. Airline revenue surged by \$67 billion. More consumers started traveling again, benefitting the cruise, ground transportation, and restaurant industries as well. Business travel has also been a driver in increasing the numbers for travel and hospitality companies.

To facilitate travel smoothly, the travel and hospitality industry depends on a complex network of interactions between travelers, consolidators, suppliers, maintenance providers, call centers, web services, and management services. Additionally, look-to-book ratios have doubled annually to a staggering 1000:1 in the past decade alone. This makes it nearly impossible to support such an ecosystem with existing transactional and analytical systems.

Like many other industries, the travel and hospitality industry is seeing a need to improve customer service and use data more effectively to do so. Technology is making the biggest impact on the industry, but customer expectations have also shifted as a result.

Companies Need to Compete for International Travel Dollars

While plenty of travel occurs within the US, travel and hospitality companies also must compete with providers who offer packages to destinations around the world. According to Deloitte, destinations like Portugal and Vietnam are seeing growing visitation rates of 20 to 30 percent annually. Hotel and airline companies are expanding into these marketplaces, particularly as the demand for inbound travel into the US decreases – from 13.8% in 2015 to 12.2% in 2017.

Expenses Threaten to Overcome Revenues

The ease with which consumers can book travel from aggregator sites, directly from the provider, or even through a travel agent has only made travel and hospitality companies more cost-conscious. Even as revenue is increasing, margins are decreasing. Due to this pressure, travel companies fight for precious traveler dollars against a glut of low-cost providers. This struggle is especially pronounced in the airline industry.

Bigger Businesses Create Bigger Problems

While business growth isn't in itself a bad thing, mergers and acquisitions can create their own unique problems. There's the issue of integrating data to ensure customers are receiving the best possible service, as well as storing and analyzing that data.

Non-Traditional Providers Create New Competition

Customer service is even more important when travel and hospitality companies face non-traditional providers. While the airlines are already feeling the pinch from low-cost alternatives, ground transportation and hotel providers are also forced to compete against ride-share services and private rentals. The only way travel and hospitality companies can compete is to offer things that these alternatives don't – namely, personalized service.

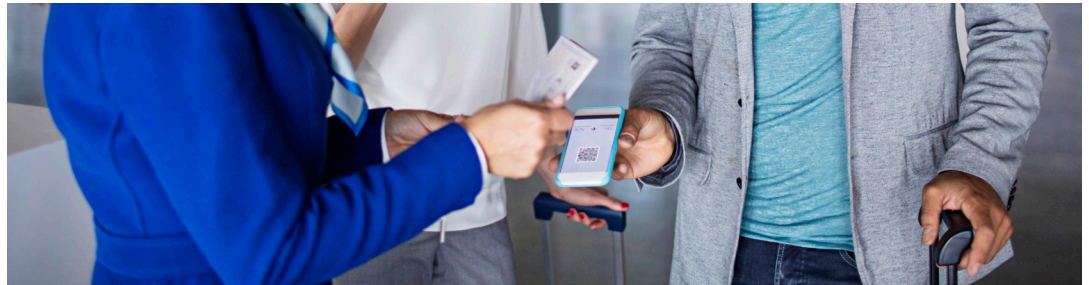
Legacy Systems Can't Handle the Data

Faced with the need for personalization, data security, and simply massive data storage, legacy systems are taxed to their breaking point. Moreover, many are too rigid to adapt to new and more diverse types of data. It becomes too costly for travel and hospitality companies to keep adding to these systems. When they do, it often results in a patchwork of solutions, particularly during mergers and acquisitions.





4K
transactions / second



COUCHBASE IN ACTION

There are many ways that travel and hospitality companies can use Couchbase to modernize their legacy systems and meet the challenges of the fiercely competitive travel industry. Here are just a few.

- **Inventory and pricing:** Let customers search availability and compare pricing at any time, on any device, in real time.
- **Reservation and PNR:** Keep up to date on availability, changes, promotions, and passenger name records (PNR) to provide the best possible customer service.
- **Price/product catalog:** Add a flexible, scalable price/product catalog to booking engines and keep up with changing inventory.
- **Booking engine:** Add a shopping cart service and get customers to book now instead of abandoning their shopping cart. The booking engine can include components like the price/product catalog, an inventory/pricing engine, and more and leverage Couchbase's built-in cache.
- **Crew services:** Maintain accurate and up-to-date information from multiple application data silos, service all information channels, and build and maintain FAA-approved mobile applications to improve the employee experience and increase efficiency.

The Couchbase Advantage

Many databases can be used in one or more of the applications above. When it comes to running in production, there's a tradeoff. To achieve flexibility in the data model, organizations may not be able to add or remove nodes without seriously impacting performance. Couchbase delivers an excellent developer experience and is administered easily, all while providing outstanding performance at scale.

With years of experience in the travel and hospitality industry, Couchbase offers a breadth of expertise and knowledge to keep companies competing in an ever-changing world. Our customers include airlines, hotels, ground transportation, travel aggregation sites, and train operators. We help them manage customer data and handle booking, inventory, and pricing, leveraging APIs and microservices for a seamless experience.



AMADEUS

8M
ops / second

<2.5ms
response time

TRAVEL AND HOSPITALITY COMPANIES CAN MODERNIZE AND TRANSFORM

These challenges aren't insurmountable. Travel and hospitality companies have the ability to modernize and undergo a digital transformation to compete with their biggest sticking points: airfare and hotel aggregators, private rentals, or ride-share providers. They can attract new customers and retain their most loyal ones. One of the biggest ways they can do that is lay the foundation for their data by using a NoSQL database.

Amadeus Successfully Delivers Personalization at Scale

As one of the largest processors of travel bookings in the world, latency is an important matter for Amadeus, which handles 3.7 million bookings per day. Look-to-book ratios were increasing, but the performance of its existing database was not. Scaling the system to meet the performance needs required for the increased demand and new customers would be a costly undertaking, one that potentially would not yield the results it sought.

Amadeus had already started moving its traffic-heavy applications to a Couchbase NoSQL database to take advantage of the horizontal scalability, increased flexibility, and high availability. The ability to cost-effectively scale the database to onboard new customers and provide an exceptional customer experience was paramount. Moving the customer experience management system (CEM) to the Couchbase database made the most sense. Couchbase's SQL-based query language (N1QL) made it easy to translate the data model and queries from a relational model to Couchbase. Reusing their existing SQL language skills was a big win in terms of accelerating the adoption and migration. Minimal training was necessary to take full advantage of Couchbase using SQL, and the project could be completed in-house, creating further cost-savings. This new flexibility allowed Amadeus to unlock previously unachievable personalization scenarios for travelers around the world. For instance, the digital data of airlines can now be linked with their reservation systems, in order to provide personalization across the whole journey, from booking to flying.

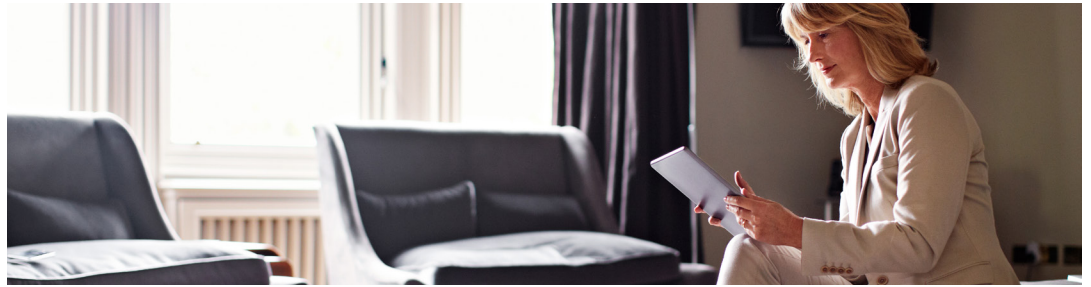
At the same time, Amadeus has also begun to move some of its offer applications to public cloud infrastructure. As a cloud-native data platform, Couchbase is a key enabler for this strategy. Thanks to cross datacenter replication (XDCR), a hybrid cloud deployment has become a reality; moreover, very high levels of resilience can be achieved by spanning data across multiple replicated regions. Last but not least, as a cloud-agnostic solution, Couchbase helps Amadeus to not be locked-in to any particular cloud vendor. The recent release of the Couchbase Autonomous Operator for Kubernetes and OpenShift is a further step in this direction, and Amadeus is looking forward to the new possibilities offered by this direct integration of Couchbase with the Kubernetes platform ecosystem.

The benefits Amadeus has seen are already adding to its business. Traffic flows have clearly improved as a result of reduced latency even while throughput continues to increase. Where once certain complex queries were taking hundreds of milliseconds under a relatively low customer load, Amadeus is now seeing those same queries take single-digit milliseconds on Couchbase without any degradation as the load ramps up. This simple digital transformation means that Amadeus will be able to handle the demand from customers for years to come, scaling as needed.





After an evaluation against MongoDB™ and Cassandra, Marriott chose Couchbase to replace its legacy infrastructure.



Marriott Builds on NoSQL Database to Modernize Infrastructure

Global hotel chain Marriott knew it needed NoSQL technology to replace its aging legacy infrastructure. The company processes 38 million reservations annually; a single mainframe with 160GB of memory wasn't what it needed to compete in what it called the "digital economy." It was a risk with a business as large as Marriott's, but ultimately it made sense to move its reservations and inventory systems off the legacy mainframe and onto Couchbase's NoSQL database.

Now, the hotel giant can process 200 transactions per second. Marriott has also been able to make its move into the open source, cloud-based model that allows it to quickly deploy applications and speed up its systems. Today, 13 million documents are stored on Couchbase.

United Airlines Flight Operations Soar with Couchbase

As airlines search for ways to improve their margins, modernizing flight operations technology can prove to be critical in cost savings, as it leads to happier employees, increased efficiency, and more satisfied customers. United Airlines, one of the largest airlines in the world, embarked on its own modernization journey to upgrade the flight operations technology for its over 40,000 pilots, flight attendants, and flight schedulers. Called the "Crew Modernization" program, United Airlines knew it needed a scalable, reliable, and flexible underpinning. It chose to house its modernization on Couchbase Server and Couchbase Mobile.

The result is that United Airlines can maintain accurate and up-to-date information from multiple mainframe application data silos. It was able to build a foundational technology platform that services all information channels, and quickly build and deploy FAA-approved mobile applications. The Crew Modernization program now provides pilots with flight information, simplifies flight attendant tasks, and streamlines information to personnel across geographies, time zones, and devices. Going forward, United Airlines plans to roll out additional Couchbase-based applications, including personalized customer information synchronization, airport agent real-time flight updates, and gate display information management. This all addresses the underlying challenges of providing a stellar customer experience in a time of stiff competition from budget carriers.



AMADEUS

Amadeus, the leading Global Distribution System (GDS) and the largest processor of travel bookings in the world, looked to NoSQL and Couchbase – shifting away from Oracle – to meet stringent data management needs within a demanding industry. In 2008, Amadeus implemented Memcached on a MySQL database. Today, Amadeus uses Couchbase in seven applications which are able to process petabytes of data in upwards of 2.5 million operations per second.

The Benefits of Couchbase

The one thing Amadeus, Marriott, and United Airlines have in common is their use of an agile, flexible, and high-performance NoSQL database. Using this allows them to:

- **Work with changing data models.** Couchbase allows developers to use a flexible JSON model for continuous delivery and quick schema changes.
- **Leverage SQL to JSON.** Storage, retrieval, structured queries, full-text search, real-time analytics, and triggers can all be handled in the cloud or on mobile devices.
- **Scale without hassle.** Application behavior stays the same on 1-node development laptops to multi-node production deployments.
- **Achieve consistent performance.** Intelligent, direct application to node data access doesn't require additional routing and proxying, and independent data and index partitioning optimizes various and mixed workloads.
- **Lower total cost of ownership.** A single platform integrates storage, access, transport, and enterprise-grade security on premises and across multiple clouds and mobile devices, making it easier to manage and lowering costs.
- **Integrate mobile applications.** Travelers rely on mobile applications throughout their journeys. Travel and hospitality companies need to extend their NoSQL database to mobile applications.

WHY COUCHBASE

Easier, More Affordable Scalability

Couchbase's network-centric architecture with a high-performance replication backbone allows the database to be easily extended while maintaining performance at scale. Unlike relational databases like Oracle and MySQL, Couchbase supports ever-increasing look-to-book ratios and highly seasonal workloads in heavy travel seasons which cause significant spikes in throughput demands. Couchbase scales (in, out, up, or down) easily and without disruption to meet these demands. Unlike MongoDB™, Couchbase won't run out of steam when you need it most.

Immediate Responsiveness

Aggregation sites such as Kayak and Skyscanner present results in the order they get them – first come, first served. Customers see flights, hotels, and rentals that are returned the fastest. At all layers of the booking experience, customers expect immediate responsiveness, regardless of geography, time, or channel (web, mobile, etc.). Through its distributed nature and fully integrated cache, Couchbase's memory-centric architecture gives your application the sub-millisecond responsiveness it requires.



Built-in High Availability and Disaster Recovery

Travel applications and services need to be available 24/7. Couchbase provides five-nines availability with built-in high availability and flexible cross datacenter replication (XDCR) that supports disaster recovery and data locality requirements. Couchbase also supports ship-to-shore topologies, allowing vehicles and machines to operate even when not connected. With Couchbase, you have full control over the topology – unidirectional, bidirectional, or any configuration you need.

Lower Costs, Faster Time to Market

The variety of products, characteristics, and options that need to be represented is constantly changing. Integrating completely separate business systems, as the result of a merger or acquisition, is an ongoing challenge. Couchbase's powerful query language allows developers to easily query JSON data using familiar, SQL-like expressions. Tightly integrated full-text search, real-time analytics, and powerful eventing services make it easy to add new features to your application on the fly without moving data into and managing myriad database technologies, finally putting an end to database sprawl.

Support for Omnichannel Experiences

Couchbase is the only NoSQL database that supports experiences 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), includes peer-to-peer replication, and enables locally connected applications like in-flight services.

To learn more about what Couchbase can do for you, visit www.couchbase.com/solutions/nosql-for-travel-and-hospitality.

About Couchbase

Unlike other NoSQL databases, Couchbase provides an enterprise-class, multicloud to edge database that offers the robust capabilities required for business-critical applications on a highly scalable and available platform. Couchbase is built on open standards, combining the best of NoSQL with the power and familiarity of SQL, to simplify the transition from mainframe and relational databases.

Couchbase has become pervasive in our everyday lives; our customers include industry leaders Amadeus, American Express, Carrefour, Cisco, Comcast/Sky, Disney, eBay, LinkedIn, Marriott, Tesco, Tommy Hilfiger, United, Verizon, as well as hundreds of other household names. For more information, visit www.couchbase.com.

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