

# How Travel and Hospitality Companies Are Adapting With AI

Travel companies drive customer loyalty through personalized experiences



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## EXECUTIVE SUMMARY

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In the competitive travel and hospitality industry customers are demanding a better, more personalized experience. The sector is rapidly embracing digital solutions to meet these expectations. Mobile technologies enable seamless travel experiences, allowing travelers to handle everything from booking to payments on their devices, enhancing convenience and safety through contactless interactions.

Despite increased consumer spending, operational expenses are putting brands under pressure and 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 personalize the customer experience and cultivate loyalty. Artificial intelligence is transforming customer service, utilizing chatbots to offer round-the-clock assistance and personalized recommendations, streamlining the booking process, and elevating customer engagement. Personalization and digital transformation requires 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.

**amadeus**

Flight availability, booking,  
and pricing analytics

 **Marriott**

Inventory and pricing  
recommendations

**UNITED** 

Real-time crew  
management, scheduling,  
and resources



# INTRODUCTION

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“Right now, we produce more information on a single MedallionClass cruise than would have been created in the whole history of the cruise line. All that intelligence has to be processed on the edge so it can be invested back into the guest experience in real time.”

—JOHN PADGETT, PRESIDENT,  
CARNIVAL CORPORATION

The travel industry continues to boom, particularly through revenue generated from online channels. Studies show that 73% of all travel and hospitality revenue will be generated from online channels by 2026. Online travel bookings and data is expected to double in the next five years. 70% of hospitality firms have IoT projects and applications to enable personalization, energy savings, logistics efficiency, promotions, and more.

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 – including generative AI tools – but customer expectations have also shifted as a result.

## Personalization and customer experience enhancement

Travel and hospitality companies need to meet – and lead – customer expectations for personalization through systems and applications. Leveraging data on customer preferences, booking behaviors, and feedback for real-time applications for marketing efforts, recommendations, and services to individual travelers. Internet of Things (IoT) technology is being implemented in hotels and resorts to create smart rooms that offer personalized experiences for guests. Room preferences, such as lighting, temperature, and entertainment, can be controlled via mobile devices, enhancing comfort and satisfaction.

## Mobile integration and contactless services

The widespread use of smartphones has transformed travel experiences, from mobile check-ins and boarding passes to contactless payments and room access in hotels. These conveniences enhance guest experiences by offering seamless, efficient, and hygienic interactions.

## 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. Inconsistent data can lead to errors in product availability, pricing, or customer information, potentially affecting the customer experience and order fulfillment. Delays in real-time data processing can impact personalized recommendations, marketing campaigns, and dynamic content delivery, affecting user engagement and conversion rates.



## Utilizing artificial intelligence and chatbots for improved customer service

Customer service is even more important when travel and hospitality companies face non-traditional providers. AI-powered chatbots and virtual assistants are becoming increasingly common for customer service in the travel and hospitality industry. They provide instant responses to inquiries, assist with bookings, and offer personalized recommendations, improving service efficiency and personalization. Utilizing these technologies is a way for travel and hospitality to compete with the low-cost alternatives.

## COUCHBASE IN ACTION

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4K  
transactions/second

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 trade-off. 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.



# 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 (SQL++) 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 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



**amadeus**

**20M**  
ops/second

**<2.5ms**  
response time





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.

## 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.



AFTER AN EVALUATION  
AGAINST MONGODB™  
AND CASSANDRA,  
MARRIOTT CHOSE  
COUCHBASE TO  
REPLACE ITS LEGACY  
INFRASTRUCTURE.



## 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.

In this rapidly evolving world of generative AI, it's easy to imagine where travel and hospitality companies could take applications even further. For example, with United's Crew Modernization program, using AI tools could enhance the program to improve operational efficiency, crew satisfaction, and proper rest. The AI system could leverage crew data, including past work schedules, rest periods, flight preferences, skill sets, and personal requests for time off. It could also incorporate



# 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.

external data such as weather forecasts, anticipated travel demand fluctuations, and airport restrictions to generate optimized flight schedules that meet operational needs while also prioritizing crew wellness and preferences. As generative AI tools continue to become more widespread, these are the types of adaptive applications travel companies will look to develop.

## 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

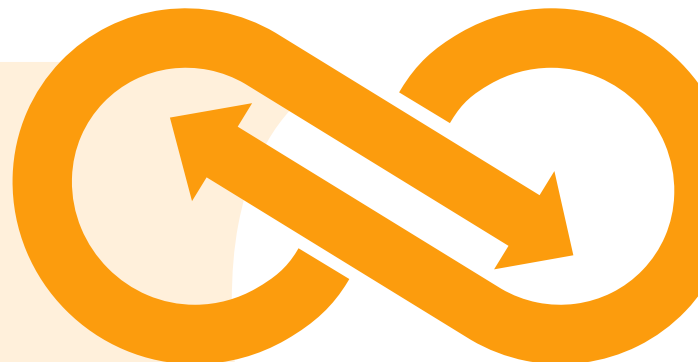
Travel applications and services need to be available 24/7. Couchbase provides five-nines availability with built-in high availability and flexible cross datacenter replication (XDCR) that supports disaster recovery and data locality requirements. Couchbase also supports ship-to-shore topologies, allowing 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](http://www.couchbase.com/solutions/nosql-for-travel-and-hospitality).





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](https://www.couchbase.com) and follow us on X (formerly Twitter) @couchbase.

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