

Case Study



Fortune 200 Hospitality Company

Fortune 200 Hospitality Company Uses Neo4j to Fight Off Airbnb and Booking.com

INDUSTRY

Hotels & Hospitality

USE CASE

Graph-Based Pricing & Recommendations

GOAL

Develop a new IT and pricing strategy to counter online companies entering the hotel market

CHALLENGE

Conventional relational database could not handle the calculations required for faster, more flexible price setting on website and mobile platforms

SOLUTION

Neo4j graph database is driving a much faster pricing recommendations engine

RESULTS

- Average time to refresh prices online cut from over 4 minutes to 13 seconds
- Significant growth in business

Faced with new digital rivals, this Fortune 200 hospitality company needed faster IT to deliver a more innovative pricing strategy. After adopting the Neo4j database, the company has transformed its pricing performance, achieved significant business growth and cut its hardware costs by 50%.

The Company

This hospitality company is one of the world's largest hotel and hospitality groups, with revenues of over \$17 billion. They have grown from a small nine-seat 'stand' selling root beer, to a Fortune 200 giant with more than 6,000 hotels and lodgings in over 120 countries.

The Challenge

For decades, the company has successfully competed with rival hoteliers like Hyatt and Hilton. But it now faces a new breed of competitor – technology-driven firms like Airbnb, Expedia and Booking.com who don't have hotels, they have data. These firms can connect guests to hotel rooms from any company anywhere, potentially undercutting and outsmarting the more traditional players.

In response, the company's senior director said: "We're transforming to become an IT company. This culture has really taken hold in the past few years."

Pricing is the main battleground: they have to offer its online and mobile channel customers the right competitive price on all of its 1 million-plus rooms, at all times.

To do this, it built a High Performance Pricing (HPP) engine in 2012. This provided each hotel manager with a recommended price for every room 90 days ahead, based on intensive calculations factoring in the guest (corporate or not), the season, mid-week or weekend, and a complex web of fixed rates, advanced booking discounts, cancellation policies and promotions.

Using HPP, hotels could begin to refresh and re-publish their prices daily. But, with around 650,000 different rate programs worldwide, this involved processing hundreds of millions of updates a day – and the hospitality group's existing Oracle relational database was not up to the job.

"We were experiencing a pain point where our publishing for some properties was taking minutes to process. We encountered backlogs where it could take hours to update prices. That can be extremely problematic," continued the executive.

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"We've seen a 300% growth in the price changes that properties are generating. This has driven a significant amount of business growth."

– Senior Director,
Fortune 200 Hospitality Chain

A low point came in 2014 with the New York Super Bowl. Snow was forecast and the game was potentially going to shift from Sunday to Monday. The company's 82 New York hotels were in turmoil: raise room rates for Monday? Cut them for Sunday? "They were trying to change prices almost hourly, and for five days we could not process the pricing update, not just for New York but globally because the New York properties were publishing so much. There was tremendous amount of frustration with the system. It simply wasn't working."

The Solution

They looked for inspiration and saw that social media giants like Twitter and Facebook were using graph databases to "achieve incredible performance at massive scale with data that is related to each other". After detailed research, in Q3 2014 the company piloted the Neo4j graph database as a potential "transformative new solution".

The prototype showed Neo4j could process the 1,600 different rate programs for the hotel's most complex property in just 34 seconds.

The Results

After first clustering its data to improve scalability, the company introduced its Neo4j-based pricing recommendations system in 2016. The improvement was stark. "We've taken average processing response time from over 4 minutes before Neo4j, to about 13 seconds. We had a response time goal of within 60 seconds – we now process 99% of all of our publishes within 22 seconds."

This performance boost in turn produced other benefits. Because users were now confident in the system, they were more willing to update prices in response to market shifts. "We've seen a 300% growth in the price changes that properties are generating (from 650,000 a day to 1.7 million). That leads our hotels to be more price-sensitive to the market. That's very good from a business standpoint."

They are also using Neo4j to track how closely each hotel's actual pricing matches the upfront recommendations, which has driven business growth. Another "surprising" benefit is that the company has cut its hardware costs by 50% because: "With Neo4j, we're using an order of magnitude less CPU compute. We can actually run production volume on a single four-core laptop. It's truly mind-blowing."

As for the future, he said: "There are other areas where it would strategically make sense to use Neo4j to connect our data. This project is really setting the stage to enable real-time pricing capabilities."

"Graphs are everywhere," he said. "We had a fundamental business problem but didn't know how we were going to approach it." Neo4j was the answer.

Neo4j is the leader in graph database technology. As the world's most widely deployed graph database, we help global brands – including [Comcast](#), [NASA](#), [UBS](#), and [Volvo Cars](#) – to reveal and predict how people, processes and systems are interrelated.

Using this relationships-first approach, applications built with Neo4j tackle connected data challenges such as [analytics and artificial intelligence](#), [fraud detection](#), [real-time recommendations](#), and [knowledge graphs](#). Find out more at [neo4j.com](#).

Questions about Neo4j?

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