



Queensland Motorways addresses congestion in fast-growing Brisbane

Overview

The Need

Queensland Motorways, which runs Brisbane's major toll roads and bridges, sought a way to minimize the traffic congestion and help keep Brisbane from choking on its success.

The Solution

Queensland Motorways worked with IBM to develop an intelligent Central System for tolling.

What Makes it Smarter

In the future Queensland Motorways will be in a position to combine its knowledge of each commuter's travel patterns with real-time data on traffic conditions to recommend fastest routes and avoid congestion.

The Result

"Giving customers the information they need to optimize their travel plans is the direction that the smart cities in the world are going. IBM is helping us to make our vision a reality."

– Phil Mumford, CEO,
Queensland Motorways

Ten years ago, Australia's third-largest city and the state capital of Queensland, Brisbane, formulated a strategy for making itself an economic powerhouse. The city's key stakeholders had looked to the north and seen opportunity in an 80 square km swath of prime industrial land bounded by Brisbane Airport to the west and the Port of Brisbane to the east. Since then, the rapid growth of that economic zone—now known as the Australia TradeCoast—has made Brisbane an export hub, one of Australia's fastest-growing cities and the headquarters location of over 7,000 businesses. Brisbane's adjacent Central Business District (CBD) has experienced a similar economic transformation.

Population growth has been an important factor in Brisbane's emergence as a vital commercial center. If trade was the engine of economic growth, the city's expanding population of skilled professionals was its lubricant. At some point, however, Brisbane reached a crossover point where its population growth began to exert an adverse impact in the form of traffic congestion. In recent years, the rising number of workers commuting to the port, airport and CBD, along with freight-laden truck traffic to and from the port, and a road infrastructure that hadn't kept up, saw traffic congestion escalate with the Gateway Motorway and Bridge heavily affected.

Meeting the challenge of growth

With the number of CBD and Australia TradeCoast workers projected to nearly double in the next 20 years, the government and Queensland Motorways, which owns and operates major toll roads and bridges in Brisbane, recognized the need to act boldly to lessen the chokehold of traffic on Brisbane's future. The government announced the \$1.88 billion Gateway Upgrade Project designed to help bring the city's road and bridge capacity in line with demand. However, while physical infrastructure investments were part of the long-term solution, the government and Queensland Motorways realized that other





Business Benefits

- Reduced congestion during peak traffic hours
 - Improved travel experience for Brisbane's commuters
 - Continued local economic prosperity by avoiding traffic snarls to and from commercial loading areas
 - Increased revenue opportunities for Queensland Motorways, providing a strong basis for funding future road infrastructure initiatives
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sustainable, efficient and effective traffic mitigation strategies focused on understanding—and ultimately shaping—commuter driving behavior were also required. In 2007 the government and Queensland Motorways announced it would introduce free-flow tolling on the Gateway and Logan motorways by July 2009.

To advance this vision, Queensland Motorways formed the Free-Flow Tolling Project and established partnerships with leading industry and technology vendors including IBM, Thales Australia and Vitronic, to put in place an intelligent roadside and central tolling management system that would complement its physical infrastructure investments by promoting the more efficient use of Queensland Motorways' road network. The solution's immediate benefit was reducing the traffic bottlenecks caused by manual cash toll payment on the road, delivering more reliable travel times and enhancing safety for motorists. The solution's combination of advanced sensing capabilities at the roadside and a smart Central System also provides Queensland Motorways with a platform for future technology products more closely aligned to customers' individual needs based on factors.

IBM Global Business Services had primary design responsibility for the Central System. The solution was implemented and tested by IBM Global Technology Services, drawing on resources from Europe, the Philippines, India and China, and working alongside Queensland Motorways project and technical staff. Architecturally, the solution is comprised of two main systems. The core function of the roadside system, which was developed by Thales Australia in partnership with

Smarter Traffic:

Sensing commuters and tailoring the trip



Instrumented

As vehicles drive under toll gantries, license plates are captured by cameras and decoded via OCR engines.



Interconnected

Toll gantries are connected to an intelligent rating system to calculate toll amounts based on location and vehicle class.



Intelligent

Queensland Motorways' ability to capture a range of characteristics about passing vehicles and calculate tolls accordingly provides the foundation for a targeted and flexible traffic shaping capability. Embedded business intelligence (BI) capabilities have the ability to enable Queensland Motorways to create travel profiles for each customer.



Solution Components

Software

- IBM WebSphere® Application Server
- IBM WebSphere MQ
- IBM Tivoli® Access Manager
- IBM Rational® Portfolio Manager
- Linux®, Red Hat Enterprise
- SAP Business Suite
- SAP Customer Relationship Management
- SAP Business Warehouse (BW)

Hardware

- IBM Power® 570
- IBM BladeCenter® E Chassis
- IBM BladeCenter HS21
- IBM System Storage™ DS8100

Services

- IBM Global Business Services
 - IBM Global Technology Services
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“Billion-dollar infrastructure projects are not individually going to solve long-term congestion problems. For that, we also need the ability to manage the demand on our network.”

– Phil Mumford

Vitronic, is to use multiple sensing technologies to identify vehicles as they move through toll gantries. Vehicles are identified either by an in-vehicle tag or by analyzing footage of their number plates using two optical character recognition (OCR) engines, one at the roadside and a Dacolian engine at the Central System.

A key part of IBM's solution, known as the Identification, Rating and Interoperability Services (IRIS) subsystem, picks up the information generated at the roadside and uses stored business logic to execute a series of toll-related transactions. Upon receiving the roadside information, IRIS runs it against an SAP CRM database, within which the solution maintains a comprehensive record of vehicle and owner profile information. Based on this information—as well as other key parameters collected at the time of passage—the IRIS system calculates the required toll and sends it (via IBM WebSphere® MQ, the solution's core middleware) to SAP FI-CA, which then issues a bill against the customer's prepaid toll account, or stores the data so that payment can be applied up to three days after travel. Running on top of IBM WebSphere Application Server, the IRIS solution employs a mix of IBM Power Systems™ and BladeCenter® servers, as well as IBM System Storage™ DS8100 for customer data storage. IBM Rational® Portfolio Manager was used for project management.

Shaping the future

Faced with the challenge of a growing volume of commuter and freight traffic on its road network, Queensland Motorways has gained a powerful, versatile and flexible tool, adaptable to changing tolling principles, to manage and mitigate congestion. Looking at the big picture, Phil Mumford believes that the best is still to come: “Under our old systems, we didn't have the flexibility to obtain some of the data that will greatly assist us in making better business decisions. We now also have a system that will enable us to offer tailor-made solutions to our customers—total flexibility, total mobility.”

Free to seize opportunity

Maintaining a transportation infrastructure is an expensive proposition, as evidenced by the nearly \$2 billion Queensland Motorways is spending on its current Gateway Upgrade Project alone. Queensland Motorways realized that to meet its future funding challenges, it needed to ensure maximum flexibility in its business model to efficiently capture revenue opportunities. To achieve this, Queensland Motorways called for a tolling solution able to be used as a shared service—following a modular, service-orientated architecture (SOA)

approach—that would enable Queensland Motorways to offer free-flow tolling as a service to other transit authorities in the future. CEO Phil Mumford cites IBM’s groundbreaking congestion management project in Stockholm as the key reason for choosing to work with IBM. “Giving customers the information they need to make informed travel decisions is the direction that the smart cities in the world are going,” explains Mumford. “IBM is helping us to make our vision a reality.”

For more information

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