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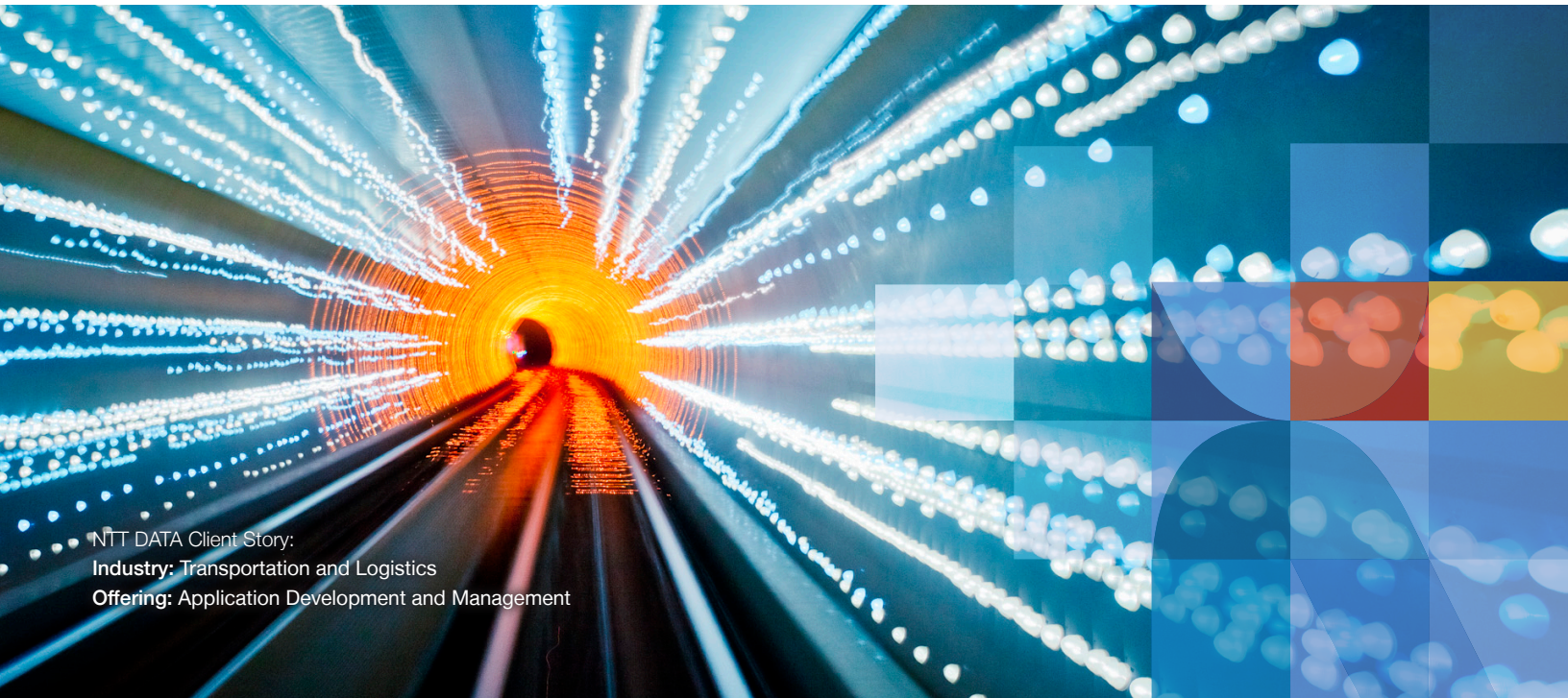
Public Transportation Shifts Gears with Smart Card Technology



Abstract

Through the late 90s and early 2000s public transport fares in metropolitan Melbourne were paid for using magnetic stripe tickets, with a variety of paper tickets used on regional rail, bus, and coach services. The contract for the magnetic stripe system was coming to an end, and the Victorian Government sought to introduce a smart card ticketing system that would operate across much of the state and process transactions and fare payments for a patronage of more than 450 million annual customers.

The scope of the system was to integrate fare payment for much of the state's modes of public transportation: trams, metropolitan buses, metropolitan trains, and regional commuter belt buses and trains.

Public Transport Victoria (PTV), formerly the Transport Ticketing Authority (TTA), was established to implement the public transport ticketing system named "myki," on behalf of the State Government of Victoria. In July 2005, KAMCO, now NTT DATA Victorian Ticketing System (NTT DATA VTS), was awarded the contract to build, install, and operate myki.

By 2011, NTT DATA VTS had completed the massive conversion to the smart card ticketing system, spanning from Melbourne to major regional centers across Victoria. The myki ticketing system radiates up to 300 kilometers from Melbourne, making myki one of the largest mass transit smart card systems in the world by geographical area.

Challenge

An objective of the myki project was to integrate fare collection systems to allow customers to travel seamlessly throughout the public transport network with a single card across the various modes and transport operators. This included delivering all features, functions, and advantages inherent on a fixed wire solution to also execute on the mobile network. It was imperative to implement the new solution without disrupting fare collection and customers' travel during implementation. The new system would also provide data that could be used by the government as an input to long-term transportation planning.

The myki project was intended to enable a single, smart card–based, ticketing system for public transportation throughout most of the state of Victoria. As with all projects of such magnitude, there were a series of other challenges that had to be met:

» **Ease of use**
A single smart card to access most modes of transport in the Victorian transportation network

» **Consistency**
Aligning business rules, capping calculations, zone overlaps, passenger concessions, etc., across each mode, both mobile and fixed

» **Purchasing convenience**
Availability of smart cards at retail outlets, rail stations, major tram stops and bus interchanges, and via phone and the Internet, along with the ability to top up cards for regular commuters

» **Transaction convenience**
Ability to easily check a card's value and add funds to the card at major tram stops, rail stations, and bus interchanges, and to establish automatic top up transactions

» **Equipment durability**
The need for longer lifetimes for electronic devices often located in unattended environments

» **Value protection**
Easy blocking or deactivation of registered cards if cards are lost or stolen, and decreased cash-in-hand transactions

» **Reduction of ticket stock handling and costs**
A longer shelf life for tickets through adoption of a plastic card system

Solution

NTT DATA established a project team in Melbourne to build the smart card ticketing system, while simultaneously establishing an operating company to develop the business processes, transport operator relationships, and knowledge of local fare structures that would enable continued maintenance of the system.

The team used off-the-shelf components and an open systems architecture to build the myki "back office" system with the goal of increasing future flexibility by being able to integrate new components when needed. The transaction clearing house was developed on technology successfully adopted in large transportation ticketing systems in Europe, Hong Kong, Singapore, and the US.

The transition of customers, transport operators, transport supply organizations, and the transport authority itself to myki began in 2008 on buses in the regional city of Geelong and progressively rolled out to a number of select regional bus networks. Rollout was completed in 2010 for regional bus networks and all modes in metropolitan Melbourne, with regional rail completing in 2013.

Customers immediately began to adopt myki and its "touch on" technology, aided by an extensive awareness campaign. The myki system ran in parallel with the old magnetic stripe system as people transitioned to the new technology.

Results

Today, the myki system operates across 13 of Victoria's transport zones and five transport modes, encompassing the metropolitan Melbourne rail, tram, and bus networks and on regional commuter rail and bus services. The network is made up of more than 480 trams, 265 train stations, 800 retail outlets and 2,400 buses.

More than 1 billion trips have been carried out using myki, more than $4 billion of funds have been processed, and over $2 billion of that is revenue collected. More than 12.8 million myki cards have been sold to local, interstate and international customers.

myki enables the government to gather and analyze hundreds of types of data to improve transportation efficiency and planning. Data collected includes passenger type; fare statistics; methods of payment; location of journeys; routes and stops of each vehicle, including departure and arrival times; and number of customers dismounting vehicles at each stop. This valuable information will continue to help the government maintain and improve services to commuters throughout the state.

Customers touch on at a myki reader at the start of their journey and touch off at the end. The system calculates the best possible fare for the completed travel. The fare is then stored on the card and used to calculate the cost of further travel based on fare rules, such as applying a cap on a daily maximum spend within certain zone and time parameters.

The majority of cards (39%) are purchased at retail outlets, followed by regional and metropolitan train stations (34%), and vending machines at train stations and tram stops (14%). Customers can set up auto top up via an online account that links to their credit card or bank account. Auto top up automatically tops up the customer's card with a predetermined amount set by the customer when the value on their myki drops below a certain threshold.

Future

NTT DATA VTS is excited to bring technology roadmaps to the unique Victorian public transport market for all sectors of the myki project from validation mediums, next generation devices, and new ways for customers and stakeholders to interact with myki. NTT DATA VTS is actively engaged with the PTV team to deliver the best mix of technologies for maximum customer convenience, stakeholder support, and benefit to the people of Victoria.

NTT DATA VTS has built a solid foundation in Victoria to understand the uniqueness of the operating environment, fare structure, and behavior of both customers and operators. This foundation, coupled with the open architecture of the myki system, has allowed NTT DATA VTS to already begin to implement next generation equipment into the solution.

Key Factors of Success

There are no simple rules for successfully implementing an upgrade of this magnitude. However, the myki team points to several factors that were critical to achieving its goal of developing a state-of-the-art system without disruption to service.

These factors include NTT's in-depth understanding of the client's objectives and knowledge of key stakeholder groups; outstanding technical skills and an implementation roadmap; skilled management of subcontractors and other stakeholders; effective change management processes; and a comprehensive communications program that educated commuters on the myki project.