



Singapore Land Transport Authority maximizes ridership to minimize traffic congestion

Overview

The Need

To allow more card issuers (providers) to issue cards for use in Singapore's public transit system, thus giving commuters more choice and a unified payment system for transport.

The Solution

LTA worked with IBM to develop a new fare processing system that allows any Smart Card compliant with Singapore's standard to be used in public transport.

What Makes it Smarter

Insights drawn from rider data enable LTA to configure more convenient routes, schedules and fares—making public transport more attractive and increasing long-term ridership.

The Result

"Our planners can use ridership data to develop more optimal routes, which ultimately will reduce congestion and make public transport more appealing."

— Silvester Prakasam, Director of Fare Systems, Singapore Land Transport Authority

Even in a part of the world known for its brisk growth, Singapore stands out as a beacon of economic vitality. An island nation with one of the world's highest per capita incomes, Singapore is committed to keeping the country a magnet for foreign investment.

With nearly five million people sharing an island smaller than New York City, Singapore faces a continuing challenge in managing the impact of its high population density, especially traffic congestion. Its record has been stellar. As a result of heavy investment in its public transportation infrastructure—including the deployment of the world's first congestion charging system—Singapore has created one of the most modern, affordable and heavily used public transport networks in the world, with nearly three million people riding the bus and 1,600,000 people riding the train on any given day.

More card choices

Even with this impressive record, Singapore realizes that its population growth—projected at 50 percent in the coming decades—requires it to find new ways to make public transportation more efficient and convenient in order to increase utilization and keep traffic congestion at bay. In addition to schedules and routes, the choices commuters have as to how they pay their fares is an important factor in the overall convenience equation.

Public transport payment options that are simpler, more flexible and more complementary to commuters' lifestyles are important pull factors to increase ridership. Most recently, the Singapore Land Transport Authority (LTA) worked with IBM to create a seamless national transport fare clearinghouse built on open standards, which allows customers a choice of cards to suit their needs, more accurate revenue apportionment for their transport operators and a platform for a more flexible fare structure that enables commuters to use a single card of their choice for fare transit payments as well as vehicle congestion charging and car parking.





Business Benefits

- Ability to accommodate multiple fare card issuers, increasing convenience for commuters and lowering costs
- 80 percent reduction in revenue leakage from “lost” transactions due to systems issues
- 2 percent reduction in the overall lifecycle cost of the fare processing system while doubling its performance capacity to 20 million fare transactions per day

Designed for speed and flexibility

Designed and implemented by the LTA in-house development team with support from IBM Software Services and the IBM High Performance On Demand Solutions team, the SeP solution runs on IBM Power Systems™ servers and leverages IBM DB2®. In designing its new fare system, the LTA was very conscious of the need to accommodate its future initiatives. This meant, for example, employing an SOA approach in the design of the solution to give the LTA the leeway to change any or all aspects of its business model down the road. Indeed, the fact that it took an SOA approach—enabled by the use of IBM open standard products—was critical to its strategy of supporting multiple card issuers.

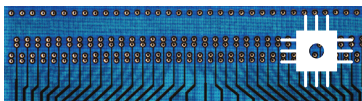
The inherent efficiency of SOA will enable the LTA to reduce the total lifecycle cost of its fare systems. Finally, the fact that SeP is based on SOA means that it can easily be configured to meet the different business rules and structural models of transportation agencies and operators around the world. That’s exactly what IBM and the LTA—who have formed a strategic partnership to co-market the solution—plan to do.

A fast track to benefits

The SeP solution is supporting the LTA’s mission on many levels. By eliminating the inconvenience of having to carry multiple cards, for instance, the solution accommodates the lifestyle choices of public transport riders—such as which card they choose to carry—rather than imposing that choice on them. In this respect, the solution works in sync with the LTA’s efforts to make public transport more attractive by improving payment convenience. This customer centric focus is also seen in the solution’s support for potential new payment methods as “readable” mobile phones.

Smarter Traffic:

Leveraging insights to optimize fares and scheduling



Instrumented

Card readers capture rider information at all points within the LTA network.



Interconnected

Flexible, open middleware is used to create a single national fare processing clearinghouse.



Intelligent

Gaining insights into rider travel patterns enables optimization of fare and schedule structures to promote maximum transport utilization.



Solution Components

Software

- IBM WebSphere® Application Server
- IBM WebSphere MQ
- IBM DB2® Enterprise Edition
- IBM Tivoli® Storage Manager
- IBM Rational®

Hardware

- IBM Power® 570 and Power 520
- IBM System x3650
- IBM SAN Storage DS4800
- IBM Tape Library TS3310

Services

- IBM Software Services
 - IBM High Performance On Demand Solutions Team (HiPODS)
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— Silvester Prakasam

By aggregating all transaction records, the LTA can look into the over-all commuter base and create profiles based on routes taken (linking departure and destination locations), connections made between transportation modes and how these patterns change over time, from time-of-day to seasonal differences. By analyzing patterns within this data, the LTA's planners gain insights into travel patterns, explains Silvester Prakasam, Director of Fare Systems for the LTA. “By unifying our payment systems, we can build composite models of typical journeys, such as a person driving a car into the city, being charged for congestion, parking his car, catching the bus and then the rail,” says Prakasam. “Our engineers can use the data we track to develop optimal routes, which will enhance the appeal of public transport.”

Since the Public Transport is not subsidized in Singapore, it is quite important that the system minimizes revenue leakages. So when the LTA implemented SeP, it specified IBM WebSphere® MQ to handle transaction messaging. The higher processing capacity allowed for the introduction of a recovery mechanism for missing transactions. As a result, the incidence of lost transactions has been reduced significantly.

In its continuing efforts to make Singapore's public transportation system even more “pro-rider,” the LTA plans to change its fare rules so that people only pay based on the actual distance they travel—a capability made possible by the seamless integration of SeP, as well as its ability to scale up to meet the roughly 40 million daily transactions this new scheme is projected to ultimately generate.

Promoting public transit

The LTA's Prakasam sees this as a clear example of how the new solution provides the level of flexibility in promoting the use of public transportation. “Our aim is to make Singapore's public transportation payment system the most efficient, convenient and affordable in the world,” says Prakasam. “By leveraging IBM's technology and expertise, we've put a firm foundation in place whose benefits will be felt for years to come.”

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