Common IC Card Ticket Project for Greater Tokyo Area

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The start of the common IC card ticket service on 18 March 2007, offering full interoperability for JR East's Suica card and the PASMO card of other railway and bus operators in Greater Tokyo (Metropolitan Tokyo, Kawasaki, Yokohama, Kanagawa and Saitama), was an instant success with public transport users, gaining more than 32 million in its first year. Rejuvenating the convenience of public transport in Greater Tokyo has long been an imperative for public transport operators in securing more passengers and stable fare revenues in a greying society where numbers of commuting office workers and students are expected to decline greatly in coming decades. This article briefly explains the efforts to accomplish the goal, and the status since the service start.

Project Overview

When JR East introduced Suica (see pp 6) in 2001, several different prepaid ticket cards were already in use, including Passnet magnetic tickets for 22 public and private railways in Greater Tokyo, and magnetic Common Bus Cards used by 62 bus operators. However, there was great demand for a single IC card that could support easy seamless travel on any operator in Tokyo's complex transport network. In light of this need, transport operators using Suica, Passnet, and the Common Bus Card pooled their expertise to develop a single IC card ticket system based around the increasingly popular Suica system. The project's aim was to develop a system for all operators in the Tokyo area that could be deployed simultaneously to many operators, as well as to develop and introduce PASMO, an IC-card version of Passnet and the Common Bus Card.

System Deployment Issues

There are more than 30 railway companies in the Greater Tokyo area with an extremely complex network and running services that include through operations. As a consequence, most operators had to introduce a common IC card simultaneously because phased introduction by some but not others would have confused passengers. Moreover, each operator had slightly different hardware and software running ticket vending machines, ticket gates, and other devices; modifying all devices to secure an integrated and stable common IC card ticketing throughout Greater Tokyo was obviously going to be a very difficult issue to solve.

Basic Scheme

After long discussions, in the end, it was decided to adopt a scheme using a prepayment method based on JR East's successful Suica system. On leaving the station, the fare for each operator in the travelled sections is calculated taking into account sections covered by commuter passes and transfer discounts; this is then subtracted from the value on the card. If there are several possible routes between the entry and exit stations, the calculation assumes that the least expensive route was used.

Fare collection data created at each exit station is stored in a joint Suica/PASMO accounting server along with data on bus use. Fares collected by all operators and account amounts between Suica and PASMO are calculated once a month for settlement (Figure 1).

System and Development

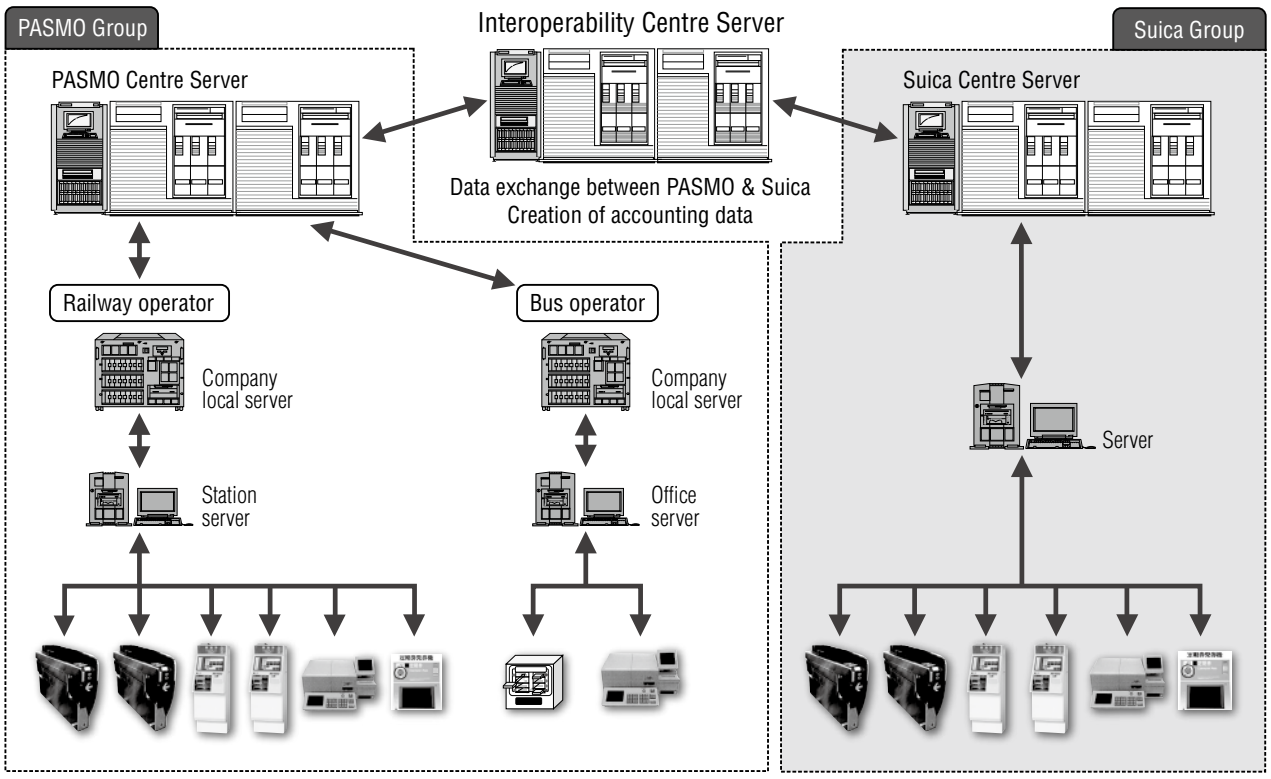
A fare evaluation IC module was jointly developed for railway ticket gates used by all railway operators to process complex fare calculations quickly and secure quality across Greater Tokyo. IC-card processors in all bus fareboxes use a standardized IC unit developed to support any farebox from any manufacturer.

Any fare calculation mistakes by the evaluation IC module would seriously impact system operation, so the 15-month testing period included 1.23 billion different fare verifications. Furthermore, approximately 400,000 cross tests were conducted on more than 200 devices and cards as well as servers at the test centre. To ensure total system quality, cards were tested over their entire design lifecycle.

Post-start System Status

Passengers in Greater Tokyo greeted the system start enthusiastically; more than 4 million PASMO cards were sold in the first 2 months and individual Suica card usage as well

Figure 1 Suica/PASMO System Configuration



Gates (left) and ticket vending machines (right) under test at equipment test centre

as overall IC card usage in the previously Suica-only areas jumped dramatically. Just over 1 year later, about 70% of all passengers in Greater Tokyo now use IC cards for transport.

The impact of the common IC card system on the social infrastructure of Greater Tokyo has been enormous. The next targets include expansion of stable operation to other cities in Japan and achieving 100% IC card ticketing. ■

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