R&D Information

A Voucher Trading Service Platform that Transforms Mobile Phones and IC Cards into the Ultimate Wallet—One that is Secure, Reliable, and Convenient

NTT has announced the development of the Voucher Trading Service Platform, an information distribution platform that enables high-speed and secure reservation, purchase, and confirmation of tickets or other electronic values or items of value using various types of user devices, *e.g.*, mobile phones and IC cards.

The Voucher Trading Service Platform can digitize various assets, including tickets, prepaid cards, point cards, coupons, and membership cards which can be freely used in both online and bricks-and-mortar stores. It securely, reliably, and freely enables the reservation of tickets, the purchasing of tickets, shopping, and the confirmation of railway or amusement facility tickets. NTT has already developed a system that offers high-speed processing through the use of highly secure public key encryption[*1]. Its speed surpasses that of existing contactless IC card systems.

To fully utilize the high performance available, the platform allows each IC card to hold various kinds of electronic values to cover significantly more application areas. In addition, NTT has developed a user device called the "IC Card Booster." It enables existing contact-type IC cards, which are widely used in financial applications, to be used for contactless high-speed processing. Furthermore, by using the infrared communications (IrDA)[*2] links provided by advanced mobile phones and PDAs to confirm and settle vouchers, NTT has further expanded the utility of existing user devices. Development of this platform has brought to life an information distribution platform that supports full-scale voucher trading services. Practical voucher trading businesses can now be implemented.

Usage scenarios

The voucher trading service platform transforms the mobile phones and IC cards to which most people are accustomed into the ultimate wallet, one that combines various settlement and ticket examining functions. Two representative usage scenarios are described below (Fig. 1).

(1) Shopping

When shopping in a store, a customer can now complete a transaction by using a combination of electronic values, such as money, credit points, and coupons. A customer can use a device other than a contactless IC card, such as a mobile phone or PDA, with which people are more familiar. Customers hesitate to use traditional IC cards because they are unable to confirm the balance on the card before or after presenting it for payment. By using the display function of a mobile phone or IC Card Booster, a customer can check the balance and complete a transaction without anxiety. Moreover, the IC Card Booster greatly extends the application area of conventional contact-type IC cards, which are widely used in the financial area, by making them into contactless-type cards.

(2) Ticket collection

Ticket collection and ticket confirmation at railway stations, concert halls, amusement facilities, *etc*. can be performed faster than ever. As with shopping, patrons can use their mobile phones, PDAs, or existing contact-type IC cards. A user can easily confirm the contents of a ticket and then board a train or enter a facility by simply flashing the card at the ticket examination
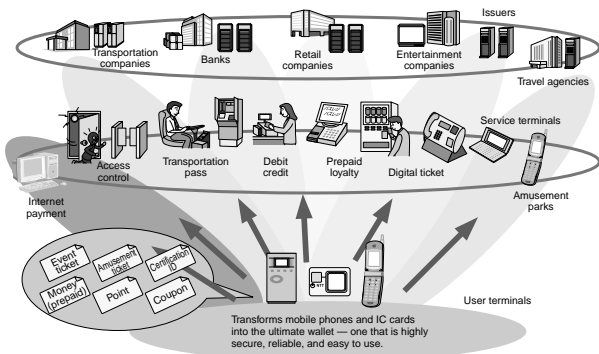
Fig. 1. Overview of Voucher Trading Service Platform.

machine or gate equipment (wicket).

Technological points

(1) Public key encryption support and high-speed payment processing

Based on the use of public key encryption, a different secret key is stored in each card, and the terminal discloses only the public information. Unlike a shared-key-based system, even if the secret key is disclosed in some way, the damage is localized. In addition, this platform completes payment processing within 60 milliseconds, faster than ever before for a contactless IC card.

(2) Service control technology widens application areas

The service control technology developed for the platform enables an IC card to hold several types of vouchers. Using this technology, even an IC card with low memory capacity can support a number of services.

(3) IC Card Booster

The use of contact-type IC cards is spreading to banks and stores. The IC Card Booster enables these cards to also be used for contactless payments via local communications links such as IrDA ones. The booster's display can be used to check the card's balance and examine digital ticket information. In effect, an IC card is given a display. These advances should lead to further enhancements in the convenience of using IC cards.

(4) Utilizing mobile phones and PDAs

Technology based on IrDA, two-dimensional barcodes, and RFID tags[*3] enables mobile phones and PDAs to be used to pay for prepaid services and as terminals for confirming digital tickets. For example, a PDA or mobile phone can be used to pay for goods or services at a vending machine or to confirm digital tickets off-line at high speed. Due to the IrDA technology now being incorporated in mobile phones and PDAs, settlement methods and digital tickets have attracted much attention. Standardization of IrFM[*4] is now progressing, and NTT is actively contributing to the achievement of a global standard.

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*3 RFID tag: An RFID (radio frequency identification) tag is an IC tag based on wireless identification technology. An extremely thin tag comprising a microchip and data transmission antenna, several millimeters square, is embedded into an object. An auto-recognition system reads the information in the tag.

*4 IrFM (infrared financial messaging): IrFM defines a model and protocols for proximity payment as developed by the IrDA. The first version of IrFM was published in January 2003.

Future expansion

The voucher trading service platform will change the trading of physical merchandise into the trading of "assets" by providing a platform that enables digitized "rights" and "values" to be passed from enterprises to individuals, individuals to individuals, and individuals to enterprises in a secure, reliable, and cost-effective manner. It will revolutionize existing supply chains.

NTT Information Sharing Platform Laboratories, in cooperation with businesses and academic institutions, is working toward the development of products targeted at expanding the use of this platform in conjunction with the expansion of voucher trading services.