Korea Transportation Card And Proposal

05.Dec. 2014
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01 Transportation Card Status

1. Transportation card Concept
2. Transportation Card Fare Payment players
3. Transportation Card Fare Payment Flow
1) Transportation card Concept

- **Definition**: When pay fare of mass transit, using electronic money and credit card. Electronic money is Pre-Paid transportation card ordinarily, credit card calls by post pay transportation card.

- **Form**: Classified as plastic cards, card and mobile accessories type card.
  - Plastic cards: ISO 7810 ID-1 standard (85.60 × 53.98 mm, thickness 0.76 mm) or ISO 7810 ID-00 standard (66 × 33 mm)
    - Accessory card: no standard about size and material
    - Mobile Card: mobile phone SIM chip standard (ISO 7810 ID-000)
2) Transportation Card Fare Payment players

Business Architecture and Technical Developing Point

Issuer System
- Card Management System
- Key Management System
- Authentication System
- Card Re-Load System
- Internet / Mobile

Card/SAM
- Card OS
- SAM OS

Center System
- Clearinghouse
  - Settlement & Clearing System
- Management System
- Inner/Outer Connection

Operator System and Terminal S/W Platform
- Operator System
  - Station System
  - Terminal Application System
- Standard Terminal Platform
  - Application Platform
  - Technical Platform

Global AFC Center System

Local AFC Center System

Operator System
3) Transportation Card Fare Payment Flow

- **Public Transport User**
  - Transportation service benefit
  - Fees

- **Public Transport Operator**
  - Clearance System service benefit
  - Franchisees fees

- **Settlement System Operator**
  - Clearance fees benefit
  - Management System

- **Issuer System**
  - Franchisees fees benefit
  - Settlement fees

**Card issued and charge**

1. Fee payment [Pre-Paid card/Credit card]
2. Use fee settlement [(fee-franchisees fee)+settlement fee]**
3. Use fee settlement [exclude franchisees fees]

**Card issued**

- User
- Bus
- Subway
- KSCC eBcard
- MyBCard
- Pre-paid Card
- KSCC eBcard MyBcard
- Credit Card
- Sinhancard
- Kbcard
- Bccard
- Lottecard

**Most pre-paid card operator operated in conjunction with Settlement system operator**
President Park’s Proposal
2014 APEC Submit

1. President Park’s Proposal Content
2. Concept of One Card One Asia Card
3. Technical Status
4. Background for One Card One Asia
5. Purpose of Technical Development
6. The estimated difficulties on proceed
1) President Park’s Proposal Content

- ONE CARD ONE ASIA

- Korea is proceeding 'One Card All Pass' policy that is available to all public transportation across the country by one transportation card.
  - Japan, Singapore, Taiwan and other Asian countries are being carried out in a similar policy.

- Furthermore, She hopes to work together for proceeding 'One Card, One Asia Project' that is available to all public transportation system across the Asia countries by one transportation card.
  - It is expected to be invigorated the intra-tourism because using public transportation become more convenient.

- For this, She proposed discussing concrete ways with experts of each country where 'APEC Transportation Working Conference' that will be held in the first half of next year in Korea.
2) Concept of One Card One Asia Card

- A service that integrate all transportation systems to a standard, and provides access to public transit, railroad, and highway access, conveniently in one card.
3) Technical Status

- Comparison by compatibility way
  - Existing compatibility way
    - It accommodate to install each card's chip (Purchase SAM)
  - One Card All Pass Standards and Technology principle
    - Accommodate all Nation-wide Interoperable Transportation Card from single compatible chip (Standard Purchase SAM)
3) Technical Status

- Installed Purchase SAM in card device
  - Bring double investment when each company's Purchase SAM installation.
  - Using ‘Standard Purchase SAM’

Now
Proposal Model
4) Background for One Card One Asia

- To construct common infrastructure for transportation card compatibility within Asia
- Because of payment problem, compatibility is promoting individually
- To prevent overlapped investment in each country

To lead Asia standard to international standard, discuss promoting 'One Card One Asia policy' ('04~present)
5) Purpose of Technical Development

The AP standard development

1 Step

‘14.12 AICF Conference (Singapore)
- To promoting APEC Conference, establish AICF's status
- Establish the way of APEC standardization
- Constitute promoting member and establish association with Organization for Standardization

2 Step

‘15 the first half year, APEC TPTW Conference (Korea)
- Discuss again integrating AP standard, payment problem, etc.

3 Step

‘15 AICF and APEC Conference
- Proceeding conference consistently
- Determine test method
- Budget preparation
6) The estimated difficulties on proceed

- Integrating standard between nations is technically possible
- It is expected to take a long period to enforcement, because a interest is complicated at the payment
03 Current state

1. Interoperable Transportation Card in Korea
2. Standardization state
1) Interoperable Transportation Card in Korea

- **Status**
  - ’96. 7 : Transportation card system introduced Seoul city bus for the first time in Korea.
  - ’03.10 : Introduction of Highway Tollgate Hi-pass
  - ’05. : Mobile Transportation Card Service(Card, KT, LGT, SKT)
  - ’11.~ : NFC(Near Field Communication) Transportation Card Service Promotion
  - ’13.~ : Nationwide interoperable transportation card issuance.
  - ’14.~ : Nationwide interoperable transportation card use

- Bus (bus token and ticket)
  - Token : 1977 ~ 1999
  - Ticket : 1979 ~ 2004

- Subway (ticket)
  - 1996 ~ 2009

- RF(Radio Frequency) Transportation Card
  - (1996 ~ )

- NFC Mobile Transportation Card
1) Interoperable Transportation Card in Korea

- Korea—Nationwide Interoperable Transportation Card Status

Prepayment

- Municipality
  - Card examples

- Corporation
  - Card examples

Deferred payment

- Credit-card company
  - Card examples

High-pas Card Status

- Pie chart showing the distribution of card usage:
  - Post-Paid Card: 9,298,000 (38.9%)
  - Pre-Paid Card: 7,934,000 (33.0%)
## 2) Standardization state

### ISO/SC17

#### ISO Standards related to Smart Card

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2) Standardization state

ISO/TC204/WG8

- **overview**

The ISO 24014 consists of 3 parts:

- Public transport: Interoperable fare management system – Part 1: Architecture (FDIS)
- Public transport: Interoperable fare management system
  - Part 2: Supplementary Concepts of Part 1 for Business Practices
- Public transport: Interoperable fare management system
  - Part 3: Complementary concepts to Part 1 for multi application media

Processing Item

- Open Payment System
  - Multiapplication
- Conformance Test
2) Standardization state

Conformance Test (Korea Proposal)
General Guide Line Based on ISO 24014

General Procedure
- Organisation
- Leader
- Media
- Related Std.

Physical Test
- CEN
- Jean Philippe
- Smart Card
- ISO 14443
- ISO 7816

Functional Test
- ISO
- Cord
- NFC Device
- NFC

Security Test
- * General Guide Line
  - National Based
  - TPO Based
- * Based on ISO 24014-3
- * Related to ISO SC27

* : it will be redefined and be a new item, if needed.
The objective of ISO 24014 is to define a reference functional architecture for IFMS (Interoperable Fare Management System) and to identify the requirements that are relevant to ensure interoperability between several Actors in the context of the use of electronic tickets.
## 2) Standardization state

### National Standards related to AFC System

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<td>• Surface transport applications. Elementary data types, general code lists and general data elements</td>
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<td>• Surface transport applications. Interoperable public transport applications framework</td>
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<td>ITSO Standard</td>
<td>• The Integrated Transport Smartcard Organization’s standard(In United Kingdom)</td>
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<td>• Contactless Fare Media Standard(In The United States of America)</td>
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<td>Calypso</td>
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Korea Proposal

1. Interoperable Method of Transportation Card
2. Interoperable Method of Transportation Card and Terminal
3. Clearance Standardization
4. Background for One Card One Asia
5. Purpose of Technical Development
1) Interoperable Method of Transportation Card

**The Standard of each Asian countries**
- JAPAN: SUICA
- Singapore: CEPAS
- KOREA: KSX6923

**Increase of Various media**
- ISO 14443 Type A & B
- Felica
- NFC
- Smart Phone

**For the convenience of Tourist**
- Many of tourists between the Asia countries

**Compatibility for compatibility between the nations**
- ISO TC204/WG8
- CEN TC278/WG3
- Absence of Asia Standard
1) Interoperable Method of Transportation Card

Development of Interoperable Asia Pacific Transportation Card

- The Standard of each country establish as the APEC standard
- Compatibility standards that can be acceptable to the Standard of each country

- Developing Standard document
  - Transportation Card and Terminal
  - Clearance System
  - Conformance Test

- Field Test
  - China, Japan, Korea, Singapore Site
2) Interoperable Method of Transportation Card and Terminal

- **Changing the card – ISO 24014**

**Advantage: No Infra Change!**

Main interesting view of PTO:
How secure download and managing the application?

Question:
How about existing cards?
Only possible ticket service, But how about pre-paid cards?
How many services possible?

Advantage: No Infra Change!
2) Interoperable Method of Transportation Card and Terminal

- Changing the Infra- Korea Smart card, ebCard, Mybe

Advantage: No Card Change! Using pre-paid cards, easily adaptable.

Main interesting point:
How shall clear the fare from each?

Question:
How can I change the infra by low cost?
What can I do at the coming a new PTO?
2) Interoperable Method of Transportation Card and Terminal

- Use Common Product – Korea Standard

**Advantage:** Nevertheless the new PTO, It’s OK if the new PTO adapts the common.

Main interesting point:
How shall clear the fare from each?

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**Infra 1**
- A’s Product
- CARD A’s Product

**Infra 2**
- B’s Product
- CARD B’s Product

**Infra 3**
- C’s Product
- CARD C’s Product

Compatibility:

- Infra 1: Common
  - C’s Product
  - B’s Product
  - A’s Product
- Infra 2: Common
  - B’s Product
  - A’s Product
- Infra 3: Common
  - C’s Product

**Question:** How define the common?
3) Clearance Standardization

Aggregate System

Urban Railway Corp.

Bus Union

Other...

Collect /Clearance System (Center)

Operating information (PL/BL)

Transactional information transmission

Settlement result transmission

Transactional information collection

Clearance System

Range of Standardization

Transactional information Authentication request

Operating information (PL/BL)

Other Issue System

Card Company (Prepayment, Deferred Payment)

Card Company (Prepayment, Deferred Payment)

Card Company (Prepayment, Deferred Payment)
4) Conformance Test Standardization

Lab and Field Test

- Development
  - Run Test (unit/integration)
  - Output

- Field Environment
  - Continuous monitoring
  - Condition change
  - Set of test conditions
  - Step-by-step application
  - Run Test
    - Output Application
      - Error range is exceeded
      - No problem
      - Restoration
      - Field Application

Redevelopment
5) Process of Asia Pacific Transportation Card

“The AP standard SW solution development

1 Stage

Development of Standards
Sophistication of traffic standard that shall apply domestic and AP area standard

2 Stage

Construct Environment
Development of AFC standard S/W that are based on standards and build the conformance test environment

3 Stage

Field test bed
Construction of operational pilot system that integrates the solutions of the units have been developed
Discussion Point

- Who is the right person to attend the APEC transportation meeting held at May, 2015?
  - Government Officer and experts
  - Korea government issues the invitation
- What is the role of AICF within APEC?
  - The leader group of APEC meeting
  - The core issuing objects deal by AICF
- How does AICF lead or cooperate with the APEC?
- What is the context of the APEC meeting?
  - Transportation Card
  - Subscriber(ID-based) or nonregistered card
  - Smart phone(NFC) transportation
- Next AICF meeting
  - May, 2015 near of the APEC meeting
  - 1 day conference and gala dinner
  - Seoul, Korea
Thank you for listening.