Integrated E-Ticket System for multimodal Public Transport Network:
Toward a multi application e-purse
A Review on Tehran Project

Farshad Jalali
Tehran Traffic Control Company – Iran

Hojat Behrooz
Tehran Traffic Control Company - Iran
Traffic & Transportation Network

- Total Highway Network: 374 km
- Primary Roads: 299 km
- Secondary Roads: 459 km
- Road Network Density: 6.8 km/Sq km Surface
- Road Network Coverage: 641 km / per million residents

More than 3.5 million private cars exist in Tehran from which more than 2.2 million cars are active each day,
Traffic & Transportation Network

- **Urban Railway Service (Metro)**
  - 127 kilometer active network in 4 lines
  - More than 1.8 million passengers per day
  - More than 448 million passenger/travel per year

- **Bus Service**
  - More than 3800 km bus service network
  - More than 7000 vehicles active bus fleet organized in 346 lines
  - More than 4.4 million passenger transit per day
Daily Trips Distribution

- More than 15.6 million journeys equal to more than 20.1 million trips from which about 20 percent belongs to non residents

For this **Huge** and **Complex** Traffic Systems,
A **Well Designed** and **Integrated** Management Structure is needed
Electronic Ticketing in Public Transport System – A brief review

- More than 40 years of using paper tickets in Bus system
- Development of first generation of magnetic tickets after Metro System opening in 1998
- Electronic Ticket based on RFID Technology in 2001 in Metro System
- First experience of e-ticketing system in Bus Network in 2007 in Tehran’s 1st BRT Corridor using customized readers of metro
- 1st version of AFC Master Plan formulated in 2008 based on multimodal public transport system
Developing Multi Modal e-ticket In Tehran: Whys?

- Easy and Accurate usage data collection by automatically logging transactions
- Eliminating paper tickets and cash interactions
- Better planning and optimization of services
- Flexible pricing schemes based on distance, usage and multimodal transit
- Easy access to combined services (e.g. park & ride, commuter train, city bus, etc.)
- Customer satisfaction through easy payment and card usage concessions
- Secure financial management in public transport sector
Early Approach to Multimodal Integrated E-ticket

- The acquiring systems include METRO and BUS service
- Tehran Metro issues the card, provides sales and charging services
- Tehran Metro receives the consumption data from Bus System and clears account with PTOs and AFC service provider
- All revenues from selling and reloading e-tickets goes to Metro account
- AFC system in Bus Network is an extension of existing System in Metro
Early Approach to Multimodal E-ticket
A philosophical mutation in AFC Architecture

**Reasons**

- Metro could not afford to fulfill the increasing for Electronic Ticket especially in outside applications.
- Metro was not supposed to play role as the AFC Integrated CMS (charge and acquiring).
- There was a great **POTENTIAL** and **NEED** for expanding e-ticket application to other Public Transport usages (taxi, on-street and off-street parking, etc.).
- the new **High-Level Strategy** to manage all citizen public services transactions through electronic payments.
- The road ahead toward small amount payments management with a **single citizenship e-purse**.
A philosophical mutation in AFC Architecture

New Approach

- Separating the Card Acquirers and a single body as Card Issuer, selling and charging service provider
- Establishing a centralized bank account as the Tehran AFC System Account to manage financial turnover between sales and charging system and acquiring systems
- Establishing a Central Database to collect, process and validate both Charging and discharging data
- Establishing a Centralized Clearance and Settlement System interconnected with the Agent Bank and Central Database
Sales and Charging Service for multimodal e-ticket clearance and settlement by agent bank.

Data process and validation, clearance and issuing bank statements.
Private Investor buys Credit from Municipality

Agent Bank:
Settlement with stakeholders based on electronic statements

Tehran AFC Central Account

Sending settlement orders to Bank’s switch

Sales and charge detail Transactions

Central AFC Database

Acquirers detail Transactions

Validate Consumption Transactions

Clearance and issuing Bank Statements
Main Elements of the Integrated AFC System

- E-ticket acquiring systems
  - Bus Acquiring System including On-board readers in 6100 buses, BRT stands in 200 stations in 6 trunks (based on r BOT contract with private investor)
  - Metro Acquiring System including 850 gates in 70 stations, based on BOT contract with private company
  - Park meter system including 2000 sets for 15000 parking spaces, based on BOT contract with private company

- Sales, Charge and Clearance System
  - A single private investor with a 10 year investment and operation contract, managing 2000 point of service with more than 6 million cards in circulation

- Public Transport Operators (public and private)
- Agent Bank
- System Management
From a Multimodal E-Ticket
Toward an Interoperable E-Purse

- **Key features:**
  - The Citizen shall be able to travel with the same medium across all transport organizations within the Interoperable Fare Management System (IFMS).
  - The Citizen shall be able to purchase and reload and refund products from all sales points within IFMS.
  - A Central System manages Products and their Distribution, it will be in charge of settlement claims.
  - The system is modular any new PTOs and service provider like parking and retail stores can be added to the system.
Key features (cont’d):

- The IFMS must have this capability to collect all transactions from access points in a secure and integrated manner.
- The system must be able to prevent all frauds through high security standards.
- All components shall have unique identifiers for tracking purposes.
- The IFMS is designed based on multi-application architecture and media shall be capable of accommodating several applications.
- There must be an inter-city interoperability for the medium as a means of payment.
Medium upgrade: from an e-ticket to an e-purse
IFMS Schematic Model
Thank you

Tehran municipality
Tehran Traffic Control Company