

Everybody Local Everywhere

Electronic Ticketing Interoperability and Fare Management Cooperation

Efficient operations and customer service

Public transport contributes significantly to the transportation of citizens, not only within the borders of cities, regions and nations, but increasingly also beyond these borders. Right now, in many regions and nations, high investments are being made for the implementation of electronic ticketing projects with the goal to contribute to customer convenience and efficiency of public transport operations. Like in other industries in a competitive environment (banking and telecoms sector), technical interoperability and organisational cooperation should be established to make effective use of developments and to serve the customer better.

The vision *Everybody Local Everywhere* expresses the idea that public transport customers should feel welcome and comfortable anywhere they travel. They should be delivered coherent service with simplified interchanges, thorough information and hassle-free ticketing. When abroad, the travel experience should be as easy as for local travellers. The vision is one of seamless travel and seamless fares, as outlined below.

This UITP Focus Paper deals exclusively with developments within public transport related systems. However, it does not exclude the possibility of working with other sectors to develop and exploit innovative solutions to the issues discussed. The paper presents an overview of the issues and opportunities for electronic ticketing over the next decade in the light of current developments:

- **Competitive procurement**

Standardised requirements for ticketing equipment, components and back-office services to ensure

competitive supply for public transport organisations in an open market in which also small and medium-sized organisations can participate.

- **Interoperable platform media**

To allow loading of ticketing applications on a variety of physical supports, ranging from smart cards to mobile telephones. Customers will be able to choose their favourite media, acting as a wallet for carrying their virtual transport tickets, and other applications of their choosing. Fare systems may become managed by owners of ticketing applications rather than issuers of electronic media.

- **Seamless travel and fares**

The ability of citizens to travel within, between and through different cities, regions and borders without the need to change the ticketing media they use. Seamless journeys require agreements between ticketing application managers regarding the cooperative or integrated management of loading ticketing applications on to interoperable media. The vision of seamless fares starts with retail agreements. Fully seamless fares are achieved with cooperation between fare authorities, and an agreement to create common products and to organize their settlement.

- **Clever use of new distribution channels**

Shared vision with regard to the implementation of emerging mobile technologies and internet developments that will also allow remote vending facilities with real-time information.

Background

Electronic ticketing started with the replacement of paper tickets by magnetic stripe, memory chip and microprocessor chip cards with contact or contactless (radio-frequency) interfaces. The electronic media and the associated electronic back-offices have allowed for more convenient and efficient integrated ticketing and fare systems, largely relying on automated ticket issuing and access control.

Current electronic ticketing schemes rely on media and ticket contracts designed for clearly delimited fare systems. Future developments will not replace integrated ticketing systems, but open up their boundaries and make them interoperable with each other and with other customer applications, such as customer information.

Current situation

Implementations of e-ticketing

Many countries have implemented, or are in the process of developing specifications for regional or city-wide fare management systems using a smart card interface for the citizen. Implemented schemes include SUICA (Tokyo, Japan), Octopus (Hong Kong), EZLINK (Singapore), T-Money (Korea, Seoul), SmarTrip (Washington, USA), Oyster (London, UK), NAVIGO (Ile de France, France), regional schemes of Schwäbisch Hall and Rhein-Ruhr area (Germany) or Rhône-Alpes Region (France). Numerous other schemes are currently being deployed globally.

In principle, these systems are able to cooperate, but direct interaction and a mutual acceptance between these systems is not currently possible. This is not only because of the different technical implementations - specifically linked to security specifications - but crucially because the different rules and regulations of the systems have not been designed with greater regional interoperability in mind.

Standardisation and cooperation

Though multi-operator projects to date have been restricted to local or regional areas, the developments in Europe (VDV-Kernapplikation, Germany; Intercode & Interbob, France; ITSO, UK and the SDOA, Netherlands) have pushed the European standardisation. They have jointly developed some basic concepts for European e-ticketing.

A suite of three standards which serve as a generic framework has been published: a standard for data elements (EN 1545), a standard for a framework for interoperable ticketing (EN 15320, also known as "IOPTA"), and a basic standard for the functional interoperable fare management system architecture (ISO 24014-1, also known as "IFM SA") which was additionally jointly developed with US and Japanese experts.

Steps for Progress

a) Some primary preconditions for defining the vision for greater regions

- Greater region IFM areas will only be possible by cooperation between the national systems solutions and key regional or city implementations within the greater region which are based on the greater regional and ISO Standards.
- It is necessary to establish an IFM Forum for each greater region to foster this level of cooperation and push the development of best practice to foster the development of general business and the organisational and technical conditions for greater regional cooperation between the existing IFM systems.
- To start this cooperation, each greater region needs to work out an agreement between the responsible IFM system managers regarding the possible developments of the IFM systems to serve common political goals for citizens and public transport organisations alike.

b) Realising the vision in steps

Definition of possible migration paths

- o The essential elements of existing systems - Media technology, Platform applications, Ticketing applications, Security strategies and Product descriptions / Retail agreements / Common products - have to be studied, from both a technical and organisational point of view.
- o Migration paths have to be plotted, first with the emphasis on technology (which can be used as a first step towards integration of organisational activities) and then progressing ever closer to integrated cooperation between different organisations. The existing technology and the technical developments have to be taken into consideration when defining the migration paths.
- o A 'Route map' will define where the greater region is heading, and look for potential 'quick wins' through pilot schemes.
- o Starting with quick wins will lead to initial results in the short term and can be used as an appetiser to increase cooperation activities, laying the foundations for more complex steps to be taken.

Major steps in e-ticketing interoperability

Experience has shown there are a number of areas which must be developed jointly to achieve interoperability. For each greater region these areas include:

- o Development of joint security requirements and joint privacy concepts;
- o Development of joint certification requirements, accreditation of Test Houses and processes for testing system components (customer media, terminals, back offices etc);

- o Development of specifications and certification process for joint interoperable security access modules – SAM;
- o Development of unique identifiers and the interface to the registrar of the greater region;
- o Development of interfaces between existing systems;
- o Assessment of new technologies to be developed and standardisation of their interfaces and processes.

Major steps in fare management cooperation

- o Development of possible solutions for the migration steps, taking into consideration:
 - The business requirements
 - The organisational and contractual requirements
- o Definition of the organisations and the rules and regulations for the migration steps and the interoperable cooperation;
- o Pilot Schemes will test the feasibility of connecting IFMSA within a common framework of data and security.

Alternatives for Interoperability

From the customer's point of view interoperability could mean that he / she is able to use products or values, application, and media, with a –at best– common customer interface.

An electronic fare-management-system consists of different technical and organisational items, such as:

- Products / Values
- Application on Secure Access Module
- Security System / Keys
- Rules & Regulations
- Application on customer media
- Application on front-end terminals
- Back office
- Business case
- Customer interface

To realise the vision of interoperability, independent separate fare-management-schemes can work together in different ways:

Common IFM-System

A common Interoperable Fare Management Scheme would involve all parties using the same IFM specifications and set of rules. The common IFM system might be a long term vision but, thanks to the reduction of operative costs by joint development and maintenance of the IFM specifications and joint set of rules, business cases could be positive.

Overall acceptance

Overall acceptance would imply all parties wishing to be interoperable accepting each others' systems. This would result in an expensive system as each party would have to implement the technology of any

other participating system. Both ways of achieving interoperability are currently difficult to implement.

Partial common system

From a technical point of view there are several alternatives. Three of these are identified below:

▪ Additional low-cost-application

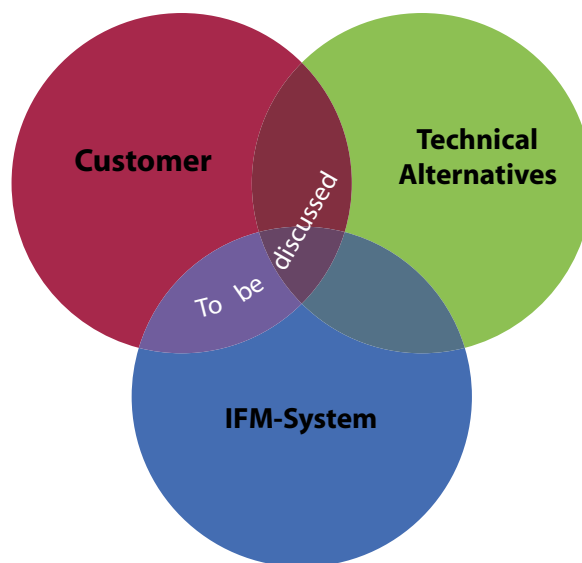
Interoperability achieved by an additional application for tickets for seamless journeys with only limited products, adapted to the common accepted security.

▪ Joint SAM (Security Access Modules)

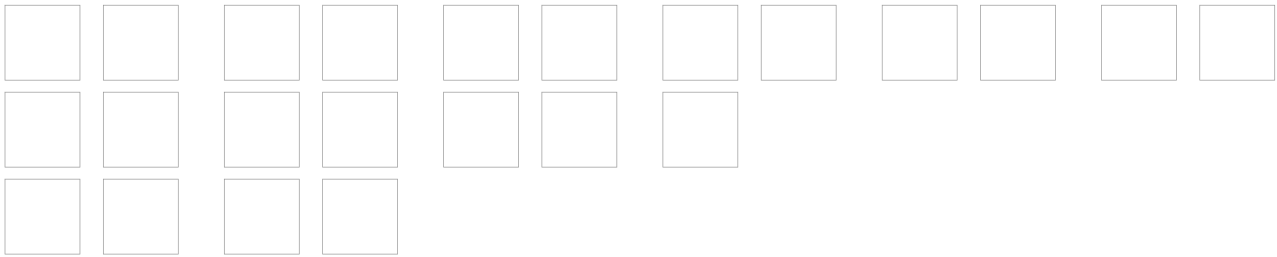
Interoperability achieved by a joint SAM with all applications and – if agreed – all security keys. This SAM has some business opportunities because it will reduce the costs of a SAM (quantity effects and joint certification) for all participating schemes.

▪ Application download

Interoperability achieved by the joint possibility of downloading the regional applications on a multi-application customer media, which has to be accepted by all IFM systems.



The objective is to ensure competitive procurement through standardised systems. IFM managers of the greater regions must therefore explore the different generic architectures that can support extended interoperability throughout their greater region. The different solutions, that all bring progress towards seamless travel, should be studied and eventually tested. Decisions for enlarged interoperability should be balanced between better customer service and extra costs through a business case study - including developments, operating and maintenance costs, common back-office expenses - versus better attractiveness of public transport.



UITP recommendations

This focus paper provides a quick overview of electronic ticketing issues for the coming years. Key topics relate to the technological foundations of electronic ticketing and the organisation of retail agreements and integrated fare systems. For each of these issues, UITP provides the appropriate global or regional discussion platforms for public transport fare system managers to arrive at common understanding, positions and action. UITP encourages public transport fare system managers to participate in this work and to liaise with other industries, with multi-service platform issuers and with standardisation processes (ISO, etc.) to provide them with information and guidelines appropriate to the needs of public transport industry in their greater region.

Media technologies and platform applications depend on several global industries and standards. Electronic ticketing is a user of these standards and public transport has higher requirements regarding speed, privacy, reliability and security of these technologies than most other users. Modern native smart card media meet these requirements. It must be ensured that the platform media of the near future will meet them, too. UITP therefore invites public transport fare system managers to organise themselves globally so as to formulate and update their specific requirements and to ensure that their position is known and taken into account when future standards are set.

Ticketing applications used to be proprietary technologies of commercial system integrators. Fare system managers have progressively gained control of these technologies, mainly in order to maintain the competition among system integrators and component providers. UITP encourages fare systems managers to cooperate and to jointly develop a limited number of ticketing applications, for native and for platform media, so as to share development costs, enhance competition between suppliers and, last but not least, make their ticketing systems more interoperable.

UITP acknowledges the efforts undertaken in order to produce international standards (ISO, etc.) and guidelines for the administration of seamless fares. In addition to interoperable ticketing systems, the establishment of retail agreements, seamless fares, or larger integrated fare systems require the standardisation of fare system data formats and the *building of common institutions* or agreements for the management of security keys, fare revenue and customer relations.

This is an official position of UITP, the International Association of Public Transport. UITP has over 2900 members in 90 countries throughout the world and represents the interests of key players in this sector. Its membership includes transport authorities, operators, both private and public, in all modes of collective passenger transport, and the industry. UITP addresses the economic, technical, organisation and management aspects of passenger transport, as well as the development of policy for mobility and public transport world-wide.

This Focus Paper has been prepared by the UITP Information Technology and Innovation Commission working group on eTicketing and has been approved by the UITP Policy Board.

It is available on www.uitp.org in French, German and Spanish

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