

Road Map for the long-term development strategy – conceptual outline

Deliverable 7.2

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I. Introduction

On 01 January 2008 the Interoperable Fare Management Project (IFM Project) started its work.

The IFM Project aims to be a European wide initiative dedicated to the establishment of attractive access to public transportation with modern fare management which is safe, reliable and convenient for both users and operators. Once achieved, this may serve as a model for many further countries outside Europe faced with the need to strengthen the use of public transport.

The “IFM Project” is the first step of the IFM initiative. The ultimate goal of the IFM Project at the end of the two-years is a European-wide agreed concept (Road Map) developing shared back-office rules for cross-border data exchange and the associated downloadable European Security Platform and Application

. It will create a documented framework by 2010 to deliver the requirements for secure, fully-interoperable portable object for seamless mobility on public transport accessible to all European Citizens. In a second step comprising Research and Technological Development (RTD) and field operational tests, a European interoperable fare management standard will be developed and implemented by 2010.

The EU-IFM Road Map will describe the process and necessary action to achieve this objective. It covers the formation of an EU-wide IFM organisation, with the ability to support cross border security systems, both for the security keys or the Security Platform and Application that uses them to verify transactions and media. Field Operation Tests are included to prove the concept and gain widespread support.

EU-wide implementation of Interoperable Fare Management, together with a tool set for national transport authorities to use when building Fare and Distribution agreements, including how their back offices will interact, is a key deliverable from the EU-IFM Project Phase I. The Trust and Privacy Models will be the key to gaining customer and operator acceptance alike, as will the availability and acceptability of suitable media of the widest possible range. This is all expected deliver material cost benefits over and above the benefits to Mobility and Social Inclusion.

The Support Action “IFM Project” will build the foundation for a follow-up RTD action (IFM Project Phase II) which should lead to common implement able European IFM. The latter will be developed by a consortium drawn from stakeholders across European countries.

II. Status of the IFM Project – Phase I (6 of 24 months)

Since January '08 the IFM Project is active. In that starting phase pre-dominantly the basic work, such as inventories and surveys are under preparation:

- A questionnaire for an inventory of existing Trust Management Models in Europe has been prepared (WP1)
- A survey of existing set of rules to protect privacy applicable to transport IFM applications by national institutions and regulations in different contractors European countries will be developed. A corresponding online questionnaire for transport operators is provided at the webpage www.ifm-project.eu (WP 2).
- The development of a survey on state of the art on interoperable media and multi application management is ongoing. (WP 3)
- A questionnaire aiming at an “Inventory report on the functions of the existing IFM systems “as developed and reviewed by the members of the project team. The questionnaire was distributed to selected experts. (WP 4)

- An inventory of generic system and security architectures, interfaces and processes was started as planned in June, 2008. First inputs have been discussed so far. (WP 5)
- The dissemination to and involvement of a wider audience has been facilitated by the IFM Forum. (WP 6)
- The webpage (www.ifm-project.eu) containing both an internal area with restricted access and a public section with free access has been provided. The corresponding IFM Forum webpage is under construction. (WP 7)

III. IFM Project Phase II (“IFM2”)

III.1 Objective

IFM-Project Phase II has the primary aim to make public transport more user-friendly by facilitating seamless accessibility to different public transport networks across Europe using smart media. By 2015 we can expect that the payment processes shall no longer be a barrier for the users of public transport; the objective of the EU-IFM Project is therefore to provide travellers with common styles of contact-less media throughout Europe which can be used for loading multiple transport products in different geographic areas. They can also be seen as potentially and successfully encouraging sustainable modal switching, such as the use of “Park and Ride”- unlike existing smart media which are restricted to specific city or regional geographies or operators.

There is a growing expectation across the European Community that interoperable smart media will significantly lower the barriers to mobility, and encourage social inclusion, particularly amongst migrant workers or extended families. Smart media can also be expected to encourage the use of public rather than private transport, contributing to a reduction of carbon emissions and the reduction or elimination of paper tickets and the environmental impact they create. Interoperable smart media can be expected to further enhance the impact of smart media on the environment and on the efficiency of public transport. Interoperable smart media will make it possible to tailor the media to assist specific groups such as existing concessionary travellers, disabled passengers, benefit recipients or part-time or migrant workers as well as delivering overall improvements to the customer experience and reducing barriers to switching modes. Furthermore, IFM will provide a complementary contribution to the EC initiative of the “encouragement of the integrated air-rail ticketing” applicable to urban, suburban and regional PT.¹

There is a major prize to be gained if a customer can use the one smart media to buy and hold a range of tickets. This can be achieved. This Project is aimed at gaining widespread recognition for the benefits of IFM and smart media ticketing. National schemes such as ITSO, VdV-KA, Translink and others or national standards as it exists in France are already delivering IFM solutions at the national level; the EU-IFM Project aims to raise the game and deliver IFM pan-European.

CALYPSO and TRIANGLE European projects already defined possibilities, but their conclusions must be extended to take account of the existing schemes and of the new possibilities of multi-application.

As an early Proof of Concept, it is proposed to develop a smart media downloadable Application Platform together with a Demonstration Project across three or more regional

¹ European Commission, DGTREN, Directorate F, Unit 4, Development of Integrated Ticketing for Air and Rail Transport, Public consultation document of the European Commission services Directorate-General “Energy and Transport” (Consultation deadline 30/09/08).

IFMs. This Demonstration Project will be used as input to the other Work Packages before their final report and deliverables.

This Project and its Work Packages are forecast to run for 4 years, ensuring the vision seen for 2015 is effectively and efficiently implemented and tested within that timeframe.

III.2 Draft Work Plan - Work Package Proposals

The proposed draft work plan consists of four main work packages / sub-projects

- Specification of an EU-IFM System and Proof of feasibility of a EU downloadable IFM Platform
- EU Security Platform and Application and EU-IFM Key Exchange Trust Centre
- Standardisation and Testing of Customer Human-Machine Interface for smart-enabled Ticket machines supporting EU-IFM
- EU-IFM Organisation and Trust Scheme

1. Specification of an EU-IFM System

a. Proposal

International (ISO) and European (CEN) standards are already in place for an Interoperable Fare Management (IFM) System (ISO EN 24014), the smart media application (EN15320), and the data elements (EN1545). This proposal will work with the relevant CEN Technical Committees and Working Groups (CEN TC224WG11 and TC278WG3) to maintain these specifications as relevant to the EU-IFM System.

b. Work Package

This WP will liaise with the relevant CEN Committees and national IFM and Standardisation Bodies and the EU-IFM Forum to prepare a written, published and open Specification for the EU-IFM. This Specification will form the contractual framework for the Proof of Feasibility, Trust Centre and ultimately the award of the Field Operations Trial and full implementation of the EU-IFM.

c. Deliverables

The WP will deliver a usable Specification for the EU-IFM based directly on the relevant CEN standards.

2. Proof of feasibility of a EU downloadable IFM Platform

a. Proposal

A number of EU Member states already have either national or regional Interoperable Fare Management Schemes (e.g. Germany, UK, and the Netherlands).

Others have defined national standards that are used for regional or local applications with the objective to make them interoperable when adopted by national transport authorities (e.g. France.)

This proposal, an early Proof of Concept validation and “quick win” of the assumptions made in the overall Project, is to create a trial smart downloadable Platform that can be downloaded with local, regional and national applications and which fulfils the requirements of each system.

This can then be used with cross border interoperability across three or more IFM. As the media used should be as wide as practicable, this is likely to include Mobile Phones. This is important point, as experience with today’s mobile phone pilots shows that downloads of applications should be user friendly in spite of the great number of different types of phones and operating systems.

b. Work Package

The WP will develop a simple IFM Application Package suitable for secure downloading through the internet for use on a smart media platform that will then support its use across a number of existing national, regional or local IFM Schemes. The first step will be a laboratory demonstration of technical feasibility. The smart media platform will then be distributed to a selected customer base for evaluation and feedback as Proof of Concept. This will involve the following:

- harmonization of application downloads
- developing the business case and web platform from where a customer can download an application.
- developing a ticket download platform for each IFM included

It will be naturally inspired by the conclusions of the existing IFM project WP3.

Partners for this Work Package will include existing IFM Schemes, media providers (including Telecom and Mobile Phone suppliers), SIM/NFC Suppliers, Web Host, Trust Centre and Transport Operators.

c. Deliverables

This Work Package will have the following deliverables:

- Web based Servers enabling customers to download an Application to allow their smart media to support use across a number of different existing IFM Schemes
- Web based Platform to allow the customer to purchase tickets for the IFM included in the scheme and to download them to the customer's smart media
- Proof of Concept Demonstration Trial over 1 year and across 3 or more existing IFM Schemes with not less than 1000 media in use
- Final Report on customer and operator feedback, issues encountered and recommendations for wider use across the EU-IFM Project
- Feedback to all other WPs before their final report and deliverables

3. EU Security Platform and Application and EU-IFM Key Exchange Trust Centre

a. Proposal

In order to deliver a truly interoperable EU-wide IFM, with smart media usable across national, regional and local transport schemes, the physical requirements for a Trust Scheme identified in IFM-Project must be implemented. Central to any EU-wide Trust Scheme is a downloadable Security Platform and Application suitable for loading onto Secure Application Modules that secure the dialogue with the media and protect and validate the products loaded onto it.

- Secure to attack
- Able to apply the Security Algorithms that support national and local IFM Schemes (including 3-DES, RSA, AES, etc.)
- Able to securely hold and apply the national and local smart media IFM Applications
- Securely hold and apply the "Public" Keys and / or Certificates associated with those Applications
- Ensure loss-less and secure transmission of back-office messages that support the media and the products loaded onto it, including the necessary data to support the media issuer and their relationship with the customer.

It is proposed that as part of the development of the EU Security Platform and Application, a review of Security Best Practice will look for additional security algorithms such as elliptical curves that should be included in the Security Platform to support further development either as part of existing national or local IFM, or within the Proof of Feasibility Trial. The review will also define the relevant criteria and level of security assessment to be used in assessing local or national applications.

Additionally a EU-Trust Centre and Key Distribution Network will need to be developed that interacts with each and every local and national IFM, and holds and securely delivers the respective Public Key sets, Certificates and Applications that allow smart media to operate across different IFM and accept and hold local IFM Products (tickets). There are also back-office requirements that must be met to ensure local IFM are provided with the necessary transactional data to ensure smart media data is loss-less and customers supported in case of loss or fraud. It should be noted that the EU Trust Centre will be only relaying media keys and will NOT be acting as a Global Distribution System (GDS) for products or their keys. These will remain the property of the local or national IFM and subject to their commercial and business rules.

b. Work Package

The WP will take the outline requirements from the IFM-Project WP1 (Trust Model) WP5 (Back Office requirements) and WP4 (Generic architectures) and translate them into a Requirements Specification for an EU Security Platform and Application and an EU-Trust Centre. It will then commission and test the necessary hardware and infrastructure to support the Field Operation Trial.

Partners for this Work Package will include existing IFM Schemes, media providers (including Telecom and Mobile Phone suppliers), SAM Providers, SIM/NFC Suppliers, Web Host, and Trust Centre.

c. Deliverables

This Work Package will have the following Deliverables:

- Statement of Best Practice in contactless security and the algorithms that should be supported by the downloadable EU Security Platform and Application
- Requirements Specification for EU Security Platform and Application
- Requirements Specification for EU-Trust Centre and Application and Certificate / Key Distribution Network
- Invitation to Tender for development of EU-SAM
- Bench testing of downloadable Security Platform and Application and Certification
- This first stage will take the EU Security Platform and Application to laboratory demonstration only. This will be followed by Invitation to Tender for EU-Trust Centre and Key Distribution Network

4. Standardisation of Customer Human-Machine Interface for smart-enabled Ticket machines supporting EU-IFM

a. Proposal

The initial IFM-Project WP3 will deliver a definition of the media types, applications and customer objects that will make up an interoperable EU-IFM. Each time a customer uses their media, the Point of Service/Ticket machine will need to recognise their media as being from an alternative IFM to the host system. The customer will need to be greeted in their native language and presented with instructions that are within their comfort zone and provide assurance that the machine is approved and

will operate in an understandable fashion. Additionally, where the media is a mobile phone or other smart media there may be other applications providing the customer interface which the IFM application will have to interact or deliver messages through. This will require the IFM to work closely with other service providers such as Telecom Companies.

b. Work Package

This Work Package will agree the standard Human-Machine Interface to be presented to the customer on all Point of Service to ensure they are communicated with in their native language, given assurance that the application is secure and approved, and are presented with standard pictograms for commonly used tasks.

Partners for this Work Package will include existing IFM Schemes, media providers (including Telecom and Mobile Phone suppliers), SIM/NFC Suppliers, and Transport Operators.

c. Deliverables

This Work Package will have the following Deliverables:

- a standard set of welcome screens or indicator lights in native languages for all sub-sets of Point of Service Terminals (eg Ticket Offices, Vending Machines, Internet, Validation, Gates etc.)
- a standard method of giving the customer assurance the Point of Service is approved
- a standard set of pictograms for commonly used tasks

5. **EU-IFM Organisation and Trust Scheme**

a. Proposal

To support the Field Operation Trial, it will be necessary to implement an Organisation and Trust Scheme that applied the requirements identified in the IFM-Project WP1 (Trust Model), maintains the local and pan-EU Privacy defined in WP2 (Privacy Model) and the necessary back office transactions

b. Work Package

The WP will combine the requirements identified in the IFM-Project into a full set of Articles and Role Descriptions for the creation of an EU-IFM Organisation and Trust Scheme.

Partners for this Work Package will include existing IFM Schemes, Trust Centre and Transport Operators, UITP.

c. Deliverables

This Work Package will have the following Deliverables:

- a set of Articles for the incorporation of an EU-IFM
- Roles and Responsibilities for its Stakeholders
- Operational Structure to support the Organisation

6. **Further Work Plans not included in this Proposal: EU-IFM Field Operation Trial (FOT)**

The above Work Packages are designed to develop the necessary Specification and Contractual Framework for a European-wide IFM. This will be designed specifically for the tendering and award of a Contract for the FOT and full System implementation.

a. Proposal

A Field Operation Trial (FOT) will be defined, tended for, implemented, and assessed to prove and commence implementation of the practical application of an EU-IFM covering a suitably diverse set of local and national IFM.

b. Work Package

The WP will identify the actors and prepare the specification and measurable deliverables of the FOT and Project Manage it through tendering to award with its agreed deliverables. It will implement the outputs from the above work packages for EU-SAM, Application and Certificate / Key Exchange Trust Centre, standardised Customer Interface, and EU-IFM organisation.

Partners for this Work Package will include existing IFM Schemes, media providers (including Telecom and Mobile Phone suppliers), SIM/NFC Suppliers, Web Host, Trust Centre and Transport Operators.

c. Deliverables

This Work Package will have the following Deliverables:

- Requirements Specification for EU-IFM Scheme
- Define deliverables against which the FOT will be measured
- Project manage the FOT
- Measure the overall success and communicate

If successful, this work package will manage the transition of the FOT into a fully operational EU-IFM.

III.3 The draft consortium

The consortium of the IFM Project phase I comprises a core group of contractors coming from UK, France and Germany, which are the countries leading the technological and operational development of IFM in Europe. They will work in close cooperation and coordination with the other relevant organisations in Europe and work towards a European wide agreed solution.

Their work will be highly focussed. Nevertheless for those who are not contractors, an involvement via the IFM Forum has been ensured.

The Support Action "IFM Project" provides the foundation for a follow-up RTD action which should lead to common implement able European IFM. The latter will be developed by a consortium drawn from stakeholders across all European countries.

Based on the experiences made so far it is suggested to complement the IFM Project I consortium in a target-oriented way

Potential consortium

From IFM Project I

- ITSO LIMITED, United Kingdom
- TUV Rheinland Consulting GmbH, Germany
- VdV-Kernapplikations GmbH & Co. KG, Germany
- Union Internationale des Transports Publics, Belgium
- University of Newcastle upon Tyne, United Kingdom
- URBA 2000, France
- Société Nationale des Chemins de fer Français, France
- Université de Paris X – Nanterre, France
- Régie Autonome des Transports Parisiens, France

Potential new partners

- Four further national schemes (that provide so far not represented approaches): suggested is Austria, Hungary, Netherlands and Norway
- One or two hardware providers (e.g. SAGEM, G&D, chip manufacturers, NXP, etc.)
- Mobile phone Suppliers (e.g. Nokia, Samsung, Sony-Ericsson, NXP)
- Trust Centre Operators (T-System, Logica, EDS)
- Clearing organisation (e.g. EMV or bank)

In parallel it is recommended that the IFM Forum should continue its work.

Besides the IFM Project contractors, it should also comprise the associated partners such as:

- further operators and application owners,
- suppliers and industry
- commercial companies from sectors such as telecommunication, credit business, etc.
- other bodies such as CLUB, KONTIKI and CNA.

It can be an option to assign the IFM Forum a more active function within the whole initiative.

III.4 Financing

The IFM Project was initiated in order to provide the knowledge basis for more ambitious actions. Formally it is a FP7 Support Action which provides a financing of 100% of the direct costs.

From 2010 the initiative will have a new character. It will comprise Industrial research, Experimental development and Demonstration. This requires that beneficiaries (and future owners of IPR) provide partially own financing contributions. Nevertheless there is still a substantial risk of a failing research work which makes a public co-financing essential.

Therefore, an implementation as Collaborative Project (small- and medium size or large scale) in the FP7 will be highly appreciated by the stakeholders involved.

III.5 Time frame

January 2008	IFM Project start
September 2008	Draft Road Map IFM Phase II
November 2008:	Approval of Road Map I in IFM Forum
November 2008:	Publication of ICT Call 4 "FP7-ICT-2009-1" (Closure March 2009)
February 2009	IFM Phase II proposal draft in IFM Forum
March 2009:	Submission of an IFM Phase II proposal
January 2010:	Start IFM Project II

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