



IFM
PROJECT
INTEROPERABLE FARE MANAGEMENT

Road map for the long term development strategy – final version

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Summary of IFM Project IFM1 Outputs

The customer deliverable of a simple European interoperable Fare Management is feasible and achievable in a stepwise two track approach to facilitate early engagement and ensure quick and meaningful gains. An important first step is the building of an EU-IFM Alliance that becomes the owner of the EU-IFM-Brand and that is in charge of following the road map and of the implementation of EU-IFM. This cooperative approach requires EC funded support .

Common IFM road map:

Track 1- PRIORITY LANE

- Use Multi-Application Platform
- Provide Portal to load remote multiple IFM Applications onto a single locally-issued media
- Update existing EU IFM Standards

Track 2- LONG HAUL

- Develop common EU-IFM Application
- Develop common Product Template
- Develop common Fare collection processes



1. The vision of the EU-IFM Initiative

There is a growing expectation across the European Community that interoperable smartcards will significantly lower the barriers to mobility, and encourage social inclusion, particularly amongst migrant workers or extended families. Smart ticketing, currently implemented on smartcards 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 meet customer needs and further enhance the efficiency of public transport and its positive impact on the environment. Interoperability 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.

Europe has adopted the International Standard ISO EN 24014 as the global model to define the systems and processes required to manage the distribution and use of fare products in an interoperable Public Transport environment. The EU-IFM Initiative aims to build on this standard and create a European wide initiative dedicated to the establishment of attractive access to public transportation with modern fare management which is safe, secure, 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.

Seamless customer accessibility to different public transport networks across Europe using smart media means that by 2015 we can expect that the access processes to the networks shall no longer be a barrier for the users of public transport; travellers being provided with common styles of contact-less media throughout Europe which they can use for loading multiple transport products in different geographic areas.

Fare Management is by its nature regionally and commercially driven. The EU-IFM Initiative aims to encourage IFM Scheme Operators to co-operate through the interoperability of the smart media used to hold individual Products and the use of multiple applications. In this there is convergence with other markets such as mobile communications (through the use of NFC) and contactless payment.

The key is the adoption of a common specification. Common Media will allow individual Schemes and their Products to co-exist on a single media held by the customer whilst at the same time conforming with the need to respect the customer's trust and privacy.

2. The EU-IFM Project (IFM1)

2.1. Outline

The current IFM project (IFM1) has been funded by the European Commission under the 7th Community Framework Programme for research and technological development, as the first project of the IFM initiative.

The aim was to ensure cross-border interoperability of transport smart ticketing by removing the obstacles for the customer to switching transport modes:

- All ticketing needs for through journey in one place and on their local transport smart media even outside their home network
- Simple registration
- Standardised machine interface
- Easy access in own language

The main drivers were:

- Social Inclusion;
- Mobility;
- Harmonisation;
- Procurement;
- Scale economics; and

Support for the Green Agenda by supporting public transport as a more environmentally sustainable form of travel.

2.2. Benefits

Although multiple EU-IFMs will continue in parallel with the development of the single EU-IFM Application and Product Template, the benefits of the EU-IFM will still be achievable. In particular the benefits from using a single media, with access through the downloading of local IFM Applications, will encourage customers to switch to Public Transport. The commonality of media (and CEN Specifications) will encourage ETM and other Manufacturers and suppliers to build equipment capable of pan-European use and, through competition, major benefits in procurement costs.

Thus initially there will be islands of major IFM schemes across Europe, each benefiting from complementary Specifications built on common EU Standards. This, together with the evolution towards common interoperable media hosting multiple applications, will bring IFM to the citizens' attention. The benefits will be increased Modal Switching, increased pressure for access to mobility, and societal switching from private cars to Public Transport.

2.3. The EU-IFM Forum

The EU-IFM Forum has been developed from a Focus paper produced by the UITP on the future of smartcards in transport. The UITP and the Forum are committed to supporting an action plan for ICT in smart ticketing and supporting the urban / suburban / regional Mobility Action Plan.

The initial creation of the Forum has been supported through IFM1 funding as WP6 to enhance consensus further than the small number of stakeholders of the project.

The EU-IFM Forum will continue under the auspices of the UITP to further promote IFM Concepts and encourage debate on its direction and adoption.

3. Thematic outputs from EU-IFM Project (IFM1)

This initial DG INFSO funded IFM Project is now coming to a close, the results may be found on the IFM Web site at <http://www.ifm-project.eu/>.

The leading IFM organisations have built a shared vision to:

- Create an EU-IFM network to provide direction, coordination, networking of best practices and implementation planning of pan- European IFMS initiatives.
- Promote further European Standards for transport smartcards including Security and Certification equipment.
- Develop a multi-application solution to interoperable ticketing that can be implemented by steps.

Even if the ultimate solution appears to be a common EU-IFM Application, Customer Media will be Multi-Application and this must be the first step in the roadmap to interoperability. It allows customers to hold their Transport Applications and means of payment on one single convenient media in their pocket.

The Project forecasts that local schemes will one day, and at their own pace, migrate to the next interoperable level. There is the opportunity to prepare a standard Application for them to adopt at this time at reasonable modification costs without the need to develop their own specific Application with the associated cost and delay.

The discussions and consensus building in the IFM Forum (WP6 of the EU-IFM Project) confirmed that this vision is commercially and technically feasible, brings positive customer benefits, and is politically acceptable.

Each of the five “thematic” EU-IFM Project Work Packages (WP1 to WP5) have contributed main outputs that have been considered when building the proposed Road Map:

3.1. Media (Work Package 3)

The application and interoperable media work package (WP3) has identified valuable benefits for using multi-application media to enlarge interoperability across Schemes (see IFM Project Deliverable D3.1):

- Coexistence of multiple ticketing applications on the same media is the most cost effective and immediate way to enlarge interoperability.
- It enables every participating IFM to keep on using its existing local applications and products.

Hence, there is a need for defining **interoperability for the application download** which shall serve both the short term vision of local applications download and long term vision of the universal EU IFM application download.

Common requirements on interoperable contactless media and multi-application management for Public Transport have been defined (see IFM Project Deliverable D3.2) based on widely used open standard from the industry. At the moment these are:

- Media must implement a microprocessor based multi-application Secure Element which hosts and executes the ticketing application.
- Several form factors can be used for contactless media (e.g. smart card, USB key, NFC phones)
- Java Card as a secure multi application environment and Global Platform for application management interoperability have been identified as mandatory technologies.
- The Global Platform technology can be used for Over-The-Air (OTA) or Over-The-Internet (OTI) remote application loading, installation and personalisation allowing matching with the preferred scenario selected by each IFM scheme.
- One of the key findings was that there were no transport specific requirements preventing to load a ticketing applications in non transport dedicated media (such as an NFC phone or a contactless payment card).

A certification process must be defined to limit dependence between media certification and application certification and to identify EU IFM compliant media. This certification process must be handled at a cross industry level and a transportation representation is needed for this.

As a final outcome, the Media WP has listed the main type of ticketing applications in Europe and issued recommendations for migration path to multi-application media (D3.3).

- Main identified types of ticketing application in Europe are based on VDV KA, Calypso and MIFARE Classic or DESfire.
- Most of the legacy applications using proprietary algorithms are now considering migrating to standard algorithms usage (including 3DES, AES, RSA).
- Ticketing application shall be available as a JAVA card applet which is the case for most of them except for MIFARE Classic or DESfire which still requires a dedicated HW environment for execution.
- Management of ticketing applications shall be achievable with Global Platform which is the case for Calypso, on going for VDV KA but still an issue with MIFARE Classic.

It has been encouraging through the WP achievement to confirm that most of the IFM were using or migrating towards the usage of ticketing applications compliant with the EU IFM media requirements, confirming that the approach of transporting existing local application into multi applications media sounds quite realistic and pragmatic from now. This should be validated through a pilot as a logical next step for the EU IFM project.

In conjunction with the IFM Forum, a demonstration was carried out in May 2010 to load a French Calypso Application and a UK ITSO Application onto a multi-application card issued by VDV in Germany. The card was loaded with Transport Products from all three IFM Schemes and successfully demonstrated on their respective ticket machines / validators. Each schemes' individual security was maintained throughout and without the need to share security keys. This demonstration proved both the feasibility and practicality of the first step of IFM project based on a multi application media approach.

3.2. Organisation (Work Package 4)

The key output of this Work Package is the proposal for an EU-IFM Alliance that complies fully with the organisational requirements and use cases of ISO 24014-1

The organisation model meets the following essential requirements:

- help the customer to find the appropriate application and product(s) (Portal function),
- provide downloading of the local or EU Application (retail) in a secure manner,
- sell the most appropriate Product (retail) in a secure manner,
- support cashless payment in the distribution channel chosen by the customer in a secure manner,
- support the acceptance by the service operator,
- support the convenient use by the customer on all PT networks and
- ensure the revenues and revenue sharing between the participating parties.

That means the following prerequisite for a viable EU-IFM:

The existing systems and standards used can generally be mapped to the role model from ISO EN 24014-1. So a general basis for the formation of a European organisation model is given, which also includes the existing national organisation units that can fit the role model. Therefore the following items have to be realized:

- The development of contactless media with an ISO/IEC 14443 Interface that fulfils the requirements of the EU-IFM for Storage Capacity, Performance, and Operating System.
- Development of an Application that can be downloaded by the Internet and/or over-the-air by UMTS/GSM
- Secure element is agreed within the media and conditions to use it in a trustful way are defined
- The development of an initial joint EU IFM organisation based on the voluntary participation of each IFM local/regional schemes, which is responsible for EU-Application ownership (which can be third party developed and operated), supply and management of IFM Portal(s), the Security of the IFM, and the Registrar.
- Regional/local products that are available to issue into the EU-Application
- Interoperable EU-Products are defined and available to issue by the customer contract partner which the customer chose

The EU-IFM Alliance is the steering body of the European IFM and is responsible both for its management, funding (both by Membership fees and central funding) and its promotion. An important part will be the establishing of a business plan and the marketing of the idea of EU-IFM.

3.3. Privacy (Work Package 2)

The customer data stored in the system and in the customer medium are used for the benefit of customers to process payments, deliver entitlements and for a more user friendly interface.

They are also used to mitigate the risks of misuse, manipulation or passing-on of the media to unauthorised persons that could incur commercial damage to the service operators.

Protection of the customer's privacy is an ethical requirement of confidentiality, un-linkability, un-observability and anonymity.

A low level of protection not only could be punished as a violation of the law but would damage customer acceptance.

In the European wide context, common agreements can be of two sorts:

3.3.1. Common privacy charter

Privacy respectful schemes will apply the charter and accept to be audited about it while applying for interoperability of fare management systems between European countries. Stakeholders and third parties will themselves be privacy respectful parties.

The charter is oriented to defend the following principles:

- Anonymous accessibility
- Protection against risks of abusive use of personal data from applications in the media
- Protection against risks of abusive use of personal data by staff
- Protection against risks of abusive usage of abnormal events
- Protection against risk of abuse of direct marketing tools
- Protection against risks of hacking and criminal use of personal data in back-offices
- Protection against risks of uncontrolled dissemination of identity data

3.3.2. Common rules to define “privacy by design” systems.

The Customer Media has to ensure absolute data isolation between applications to guarantee application code and data privacy.

The Global Platform secure messaging chosen for the media, as described above, provides confidential loading for the application code and confidential application personalisation ensures data privacy for the Application Owner and Application Retailer with the actors involved in the operational process (including Media/SE Owner, Media/SE loader, Controlling Authority).

A common database, if any, will be required to organize separately its customer data and transport data.

3.4. Trust (Work Package 1)

Customers' trust will depend from the initial development of the interoperable offer and from the quality of users' interfaces (transaction speed, man-machine messages in the customer's own language, etc). The customer offering is critical to the success of IFM and must be defined early in IFM2.

The IFM Brand label that a customer can trust is paramount and must be present whenever the customer accesses the IFM Portal or loads its Products; it identifies compliant media and acceptability at Points of Service.

At a technical level the original brief for WP1 included the specification for an EU-SAM. The development of security algorithms in the time since the proposals for IFM Project were published and agreed by DGINFSO, particularly through developments in relation to contactless payment cards has meant that PKI is now a valid security option to be considered, and one that may not require a SAM. Multi-application in principle does not require security keys to be routed from one IFM to the other. However agreements and

possibly exchange of keys will be necessary to secure the loading of the different applications within the framework of GlobalPlatform to a single medium.

The media must be contactless and the technical level of trust i.e. the protection profile of the media, must not affect the performance of the transport application, e.g. a bank card must still perform at an acceptable level in terms of transaction speed for a transport application loaded on it.

The storage of keys will still be required although this may be achieved by using the native SAM. However a common security agreement (trust model) will still be required amongst the EU IFM members.

A certification regime must exist which in essence creates the EU IFM Brand. This may be achieved however in part by an acceptance of other certification regimes.

The EU portal and the possible use of other portals to download the EU application creates not only a new 'role' but with that role a new set of trust requirements which must be defined and agreed (see IFM Project Deliverables D4.3 & 5.2).

The technical requirements and also the commercial aspects of the schemes e.g. the back office will create liabilities which must be clear in any accepted trust model (see D4.3).

3.5. Back-office Functions (Work Package 5)

The objective of this Work package is to analyse the scenarios identified in the IFM road map with the goal of identifying points that require the interaction of IFM local, regional or national schemes (here combined as regional) and to establish requirements which will assure effective interaction at these points. In this way we can obtain an overview of the areas that will be critical for implementing the different degrees of interoperability described in the road map.

To this end a generic system model for an IFM according to ISO 24014-1 is proposed at a the technical system level which identifies generic components and interfaces as well as generic elementary processes.

A set of regional IFMs can then be viewed as encapsulated in such a model IFM and the analysis will strive to identify the processes at this encapsulated level which will require the interaction of the established regional (sub-) systems. Components and interfaces for the generic system model and elementary processes between them are listed.

For the various scenarios of the IFM road map the elementary processes are identified for which interaction of the regional IFMs will be necessary in order to achieve the degree of interoperability represented in the respective scenarios.

Finally, specific aspects of the identified "interactive" processes are singled out which should be "standardized" in order to assure interoperability. These aspects may include

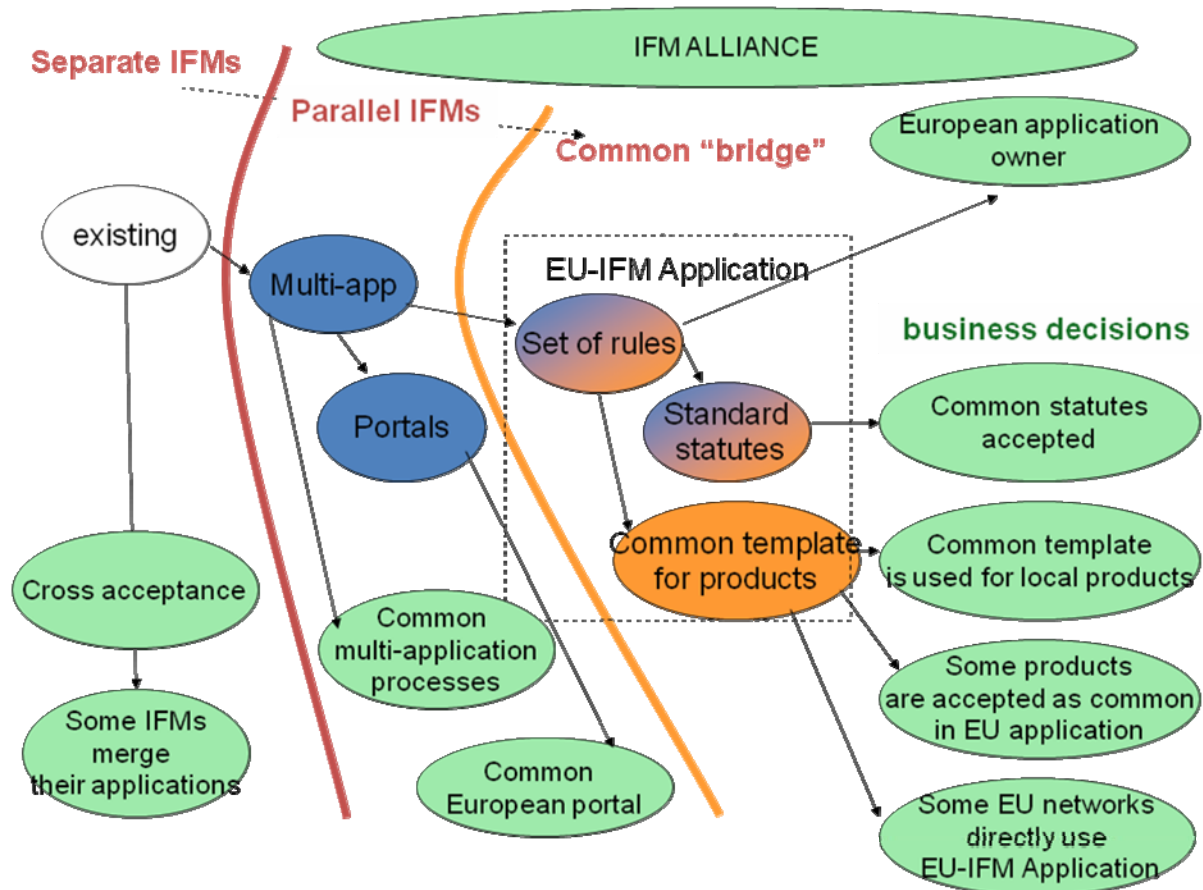
- data structures and communication
- security measures,

- assignment of residual risk,
- cooperation agreements (rules),
- commercial agreements and
- service level agreements.

It also considers on which aspects common ground already exist, what alternatives there are for a common standard and which alternative is to be recommended.

4. Development of multi-application Interoperable Fare Management

The following figure has been agreed after the first six months of the project and used as the common base by all work packages to illustrate the main principle of the proposed roadmap for the long term development of Interoperable Fare management across the EU. Short-cuts may be possible between Scenarios for some Member States.



- **Status Quo:** Interoperability can be only achieved by mutual agreements between EFM schemes to accept each other's media
- **EU IFM Media:** EU IFM media are issued and customers can download the EFM applications they need as they move.
- **EU IFM Application:** A common EU-Application is defined. The customer can have this application downloaded in his media. Customer profile and EFM products can be loaded into the EU-Application.
- **EU Web Portal:** Customers will find a common European web-portal from where to download the Public Transport applications and products they need
- **EU Product:** Some common cross-border products (EU products) are proposed and hosted in the EU-Application.
- **Migration to EFM applications and products:** European IFMs migrate from their own EFM Applications to use only the EU Application with EU product templates.

Analysed technically, the figure shows two successive technical transitions (illustrated by the curved plain lines). These show how the transitions from the current situation where IFM applications are separate and native in the media occur.

As expected in the objectives of the project, these two technical steps provide the Competent Authorities with increasing tool boxes to conclude commercial policies and business agreements following two independent axes to implement EU-IFM across Europe: product agreements and retail agreements.

Key to these transitions is the formation of an EU-wide IFM Alliance to own and manage the process.

4.1. Continued operation of the IFM Forum

The UITP has agreed that they will organise and manage the IFM Forum beyond the period of 2-year funding by the IFM Project to continue disseminating Best Practices and speeding the adoption of common systems and policies.

It will be the role of the IFM Forum to promote the EU-IFM concept and gain buy-in in advance of the pilot roll-out.

4.2. Creation and Participation in the EU IFM Alliance

The creation of an EU-IFM Ticketing Alliance to promote Interoperable Fare Management will develop primarily through the benefits to be gained by individual schemes through co-operation. No specific EC Directives or specific Regulations are seen necessary at this stage.

There is already outline agreement from a number of National and Regional IFM in Europe to join and create an IFM Alliance. This organisation will progress towards contractual agreement and initiate the technical steps necessary to create the EU-IFM.

With the competent authorities willing to manage the first roll-out of Interoperable Fare Management schemes and to assist expanding it across the EU and other relevant countries.

The multi-application EU-IFM Environment must be capable of supporting multiple local IFM Applications on locally-issued platforms complying with a single common set of specifications. Each will need to support a set of Brand Values that encourage customers to access the IFM Portal and be willing and trust the downloading of non-local IFM Applications and Products onto their media

There are needs to set up organisation covering:

- EU Rules and Register of players, applications, issuers, products, retailers and operators
- Conditions for the certification and use of different media and Applications
- The procurement, development and testing of the EU IFM Portal necessary for the convenience of the customers and attractiveness of the commercial offers.
- Development of the IFM Brand and the Values it supports for customers

The permanent governance and funding of this organisation should be established on a cooperative mode by the participants through Membership Fees rather than by European Legislation. Incentive funding and backing by the EC covering the initial development of the IFM Alliance should encourage harmonisation and extension of the principles of IFM across Europe. This Business Case is an agenda that requires ongoing funding by the Commission to promote IFM amongst Competent Bodies.

The EU-IFM Ticketing Alliance is expected to become quickly self sustaining and any public funding would only be seen as necessary during its initial set-up when it will be necessary to complete and disseminate the appropriate Specifications, Applications and Internet Portal.

4.3. Technical steps

In the first step of parallel IFMs, individual Schemes keep their independent applications but start issuing them as applets. Participating IFM agree to accepting them being loaded on the same media with the same processes. The customer can benefit from multi-application media to adapt the content of his media to his needs, accessing other IFM Applications and their Products through an EU-IFM Portal(s). And when a customer is not yet in possession of a suitable media, he is re-directed to a suitable Issuer such as their Mobile Network Operator or an IFM Scheme Operator.

In the second step, a common so called EU-Application is developed that can be added or substituted to the existing ones and used by schemes as a tool for long term convergence.

4.4. Products Agreements

There can be three different types of Product Agreement between IFM organisations, each developing and building on the other.

The first reflects the current situation. Each scheme defines its set of fare products, i.e. fare structure and pricing, and the attached fare management processes. Each operates independently of each other.

Secondly schemes can remain independent of each other and define and manage their own fare structure and pricing. But they can agree to use common fare collection and payment processes, e.g. common stored value systems or customer accounts and attached clearing processes.

Finally Schemes can agree selected common EU-wide fare structures where pricing and the attached central settlement processes are defined and implemented.

4.5. Retail Agreements

As with Product Agreements, Schemes can enter into different levels of Retail Agreement. The base level is mainly the current situation where each scheme defines its distribution channels and retailers.

Schemes can still remain independent to define their own specific distribution channels and retailers, but they agree that one or more common EU-Portals will route the customers' demands to one or more of their Retailers. The customer makes a separate payment to each retailer; no new financial flow and no new B2B retail contract is created.

Finally Schemes can agree that one or more EU-Portals will act as a common Retailer on behalf of all Schemes. The customer can therefore make one single payment for different products, and the common retailer then settles the different products to their different owners.

4.6. Overview of organisational levels and delivery to the customer

The table below shows the necessity of organisational agreements to increase the service to the customers.

Organisation Level	Organisational Structures	Conditions of Participation in IFM System	Customer Satisfaction
(Status Quo) Interoperability can be achieved by mutual agreements to accept each other's media or Interoperability can be achieved by mutual agreements to accept each other's media or countries agree a common standard across country borders	None	N.A.	No seamless travel over the border of existing EFM scheme.
Downloading existing PT-Applications	IFM Alliance designated/elected representatives of IFM Treaty members + EU-Security Manager for EU IFM media certification + EU-Registrar for EU IFM media registration	EU IFM Participating parties have to agree - Security requirements on SE - Security requirements for application download - Usage agreements	Application download and product retailing available at the visited EFM only (via local channels or over the web - see level 1b/2b)
Issuing of Additional EU-Application (with Common Template for Products)	IFM Alliance Application Owner for EU IFM application definition + EU Product Owner for definition of EFM products based on the EU IFM Common template + EU-Security Manager for EU IFM application certification + EU-Registrar for EU IFM application & product registration	+ Agreements for : - Certification process for EU-application and EU-product - Blacklist Service	EU application can be natively provided on EU IFM media and then available "at home" Products are only valid per EFM.
Application Issuing over Web-Portal and Product Download	+ organisation of EU Web Portal	+Agreement for : - the EU-Web-Portal and Links to EFM-Web-Portals	Application "at home" via web download. Products are only valid per EFM.
EU-Application Issuing by one EU-Application Owner, Issuing of EU-Products by one EU-Product Owner on every PT Medium	IFM Alliance Product Owner for EU IFM products definition + Collecting & Forwarding regard. EU-Product Transactions	+Agreements for : - the EU-product acceptance and issuance - Clearing and revenue sharing agreements - Risk sharing and liability model	EU IFM application "at home" EU IFM Products are available and accepted at every participating EU IFM.

5. IFM2 Global Road Map : Priority Lane and Long Haul

The Global Roadmap is a two-track one towards a long term vision with a series of quick wins. These are not to be engaged sequentially but started together. Track 1 will feed into Track 2. Both Track 1 and Track 2 constitute the request for support and funding for IFM2.

The IFM Initiative must now be continued to make this future possible and implement it. The suggestion from IFM1 Project is to define two parallel tracks.

The key Actors are the European Commission (DGMOVE and DGINFO) to set up the agenda for supporting Public Transport and encouraging Modal Switching; and Member State IFM Organisations who set the individual Specifications for Schemes, Products and Media that need to complement EU-IFM and be compatible with it.

Member State Ministries of Transport, who set national Priorities, set Strategies for Modal Switching and Carbon Reduction, and support Public Transport Initiatives, will also be a key target for the introduction of EU-IFM.

In addition to these Public Bodies, the IFM implementation will also appeal to major Transport Companies (road, rail, ferry etc) who will be setting their own commercial strategies to utilise smartcards, potentially paralleling (and utilising at marginal cost) the national IFM Schemes. This will encourage equipment and system developers and integrators to design pan-European solutions based on EU-IFM architecture and standards and reduce the incidence and proliferation of bespoke solutions.

Engagement will be necessary with all actors at the strategic, technical and commercial level.

The most significant non-business drivers are those associated with Social Inclusion and Mobility, with the encouragement of Modal Switching in support of a Carbon Reduction policy. EU-IFM will significantly reduce barriers for car drivers and encourage a switch to Public Transport for part or all of their needs regardless of their location within the Community.

5.1. Priority Lane for quick wins : Track 1

- Establish funding of an EU-IFM Alliance aiming to short term objectives
- Create Interoperability for customers through common multi-application processes on a single media in the customer's possession
- Create a Common Portal for customers to remotely load local applications together with the development of an "IFM Brand" to provide assurance and focus
- Update and harmonise current CEN Standards to support EU-IFM
- Create a Pilot operation in a number of Member States in preparation for wider roll-out

The key target markets for the Priority lane are existing IFM organisations that already support the proposed EU-IFM Media Standard Platform (Global Platform and Java), together with large closed schemes that wish to upgrade their infrastructure to support Interoperability and enhance their security processes.

5.2. Long Haul towards Long Term Vision: Track 2

- Establish funding of the EU-IFM Alliance aiming to its long term objectives
- Develop a Common EU-IFM Application and Common Product Templates supporting an extension of the “IFM Brand”
- Develop a commercial and technical framework for the sales and settlement of EU-IFM Products
- Extend functionalities to facilitate inter-modality between road and rail, and support for Demand Management for all transport modes (urban, suburban, regional and inter-urban)
- Engage and merge with existing IFM Systems and other ITS transport modes (including private): e.g. road tolling, bicycle hire, parking, air, ferry
- Extend to non-transport applications and market external to EU

The Long Haul supports both long-term aspirations for full pan-European compatibility and to reduce the costs barriers and time-line to implementation for small Schemes still to adopt interoperable smartcards.

5.3. Requirements for Immediate Action on Track 1 and Track 2

The first priority is to establish the detailed Action List that includes all necessary actions to achieve Track 1 and initialise the first implementations of the EU-IFM initiative, as well as the preparatory standardisation work necessary for Track 2.

It needs an early adoption to avoid wasted expenditure. The objective is to start quickly enough to benefit from the dynamics of IFM1 and of the other relevant projects such as LINK or E-Travel. It therefore needs to take in account the current state of organisation of Public Transport in the European countries as well as the current state of deployment of technologies in the existing ticketing schemes and to define a valuable but restricted use-case for a the first implementations.

We believe this requires the strong involvement of a first group of participants, agreeing to be the first actors of the initiative, with the active support of the Commission.

5.3.1. Gain Support and Funding from the European Commission

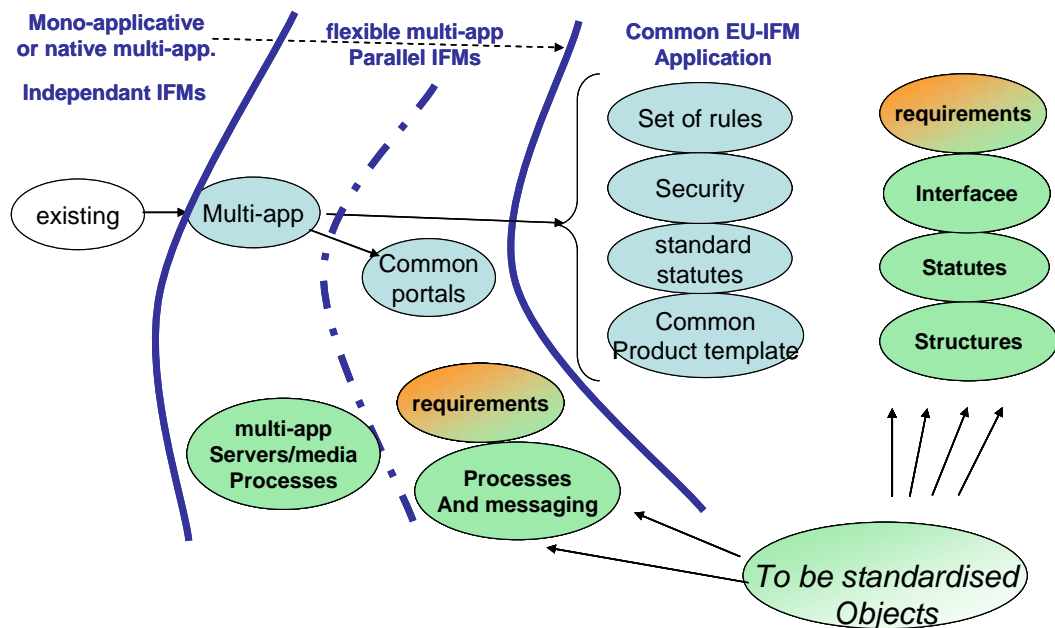
In order to engage key Early Implementer Schemes in a multi-application environment it is necessary to gain early support from the Commission (e.g. DG MOVE). This support will be oriented to give the stakeholders of the EU-IFM organisation the means to initialise the IFM Alliance and to lead the following tasks that have been identified.

5.3.1.1. Maintain and develop CEN Standards for implementing IFM.

Standardisation work should be supported by the Commission and be actioned as a project under the authority of CEN. Specific new standards are required in the areas of:

- Platform and back office
- Links to NFC and EMV
- Common dictionary

For that reason, the IFM project recommends that CEN should reorganise its technical committees to end the current split of PT IFM work items between TC224 and TC278 together with the rail technical committee CEN TC256 and ETSI.



It is also proposed that the EU_IFM Alliance engage with EPC (the European Payments Council) to ensure that new standards being developed for the use of multi-application contactless payment cards, and the standards being proposed by the NFC Forum fully support the needs of the EU-IFM.

It is proposed that the Common Criteria and certification proposals from EPC are reviewed for possible adoption directly by the EU-IFM Alliance.

This work should be completed by 2012 in order to avoid duplicated work by Member States and allow individual IFM Scheme Bodies to migrate and converge Specifications onto the proposed IFM Specification, including revision to EN1545 and IOPTA. This will follow the work already completed for IFM1 and the EU-IFM Demonstration. The key milestone is for CEN TC224 to complete its work plan for the revision of the Standards during 2011.

5.3.1.2. Create an operating IFM Scheme Pilot

The outputs of the trial would be to prove the IFM 1 outputs and deliver practical experience and means of testing the implementing the key findings and recommendations:

- Extend the use of interoperable media to Mobile Phones;
- Create the EU IFM-Portal(s) and the IFM Brand to accompany them;
- Promote the downloading of local products through the EU IFM-Portals;
- Translate customers' profiles to enable and facilitate 'foreign scheme' eligibility.
- Develop an initial EU- Interface to test and facilitate the customer process to download local applications and products

This Pilot will need funding from participant Schemes, and potentially the support of DGMOVE for the initial creation of an EU-IFM Portal and associated branding and promotion.

Extension to the use of mobile phones will require extension of the engagement to both hand-set suppliers and those participating Mobile Network Operators who will load IFM Applications. It is anticipated that in the Pilot, MNOs will load IFM Applications without charge.

The IFM Scheme Pilot should be implemented by end 2012.

5.4. Long Haul implementation Actions

The needs, the standards and the first basis of organisation will be established in parallel by the Priority Lane Track. The objective of this track is to provide the competent authorities with the tool box and Brand to support their decision making process towards implementing the common EU-Application.

Its funding will have to be determined and organised by the established EU-wide IFM Alliance.

5.5. Development of EU- Interface and Common Portal(s)

The IFM Alliance will deliver a definition of the media types, applications and customer objects that will make up an interoperable EU-IFM and support its Brand Values. Each time a customer uses their media, the local Point of Service (ticket machine, gate or validator) will need to recognise their media as being from an alternative IFM to their host system. The customer will need to be greeted in their native language and a recognisable Brand and that they are presented with instructions that are within their comfort zone. The IFM Brand will provide customers with assurance that the machine is approved and will operate in an understandable fashion.

IFMs will continue as individual initiatives predominantly within Member States, but each benefiting from the Common IFM Portal and the transportability of Media from one Scheme to another without the need to re-issue new media.

The common IFM Portal(s) will allow the support of both direct retailing by IFM Schemes and support for the development of a secondary market through 3rd party retailers

The cost of developing the IFM interface and Portal will require external funding in the first instance, potentially through the Commission (e.g. DGMOVE), but a recoverable fee could be levied on each local Application loaded to reflect the reduced cost of issuing new media.

5.6. Development of EU-IFM Application

The action is to write a simple IFM Application Package. The EU-IFM Application will be suitable for loading onto a range of media and devices. This to include SIM-centric devices, bank-issued media and transport issued USB-keys etc. The EU-IFM Application will be designed as an entry-level Application for new IFM Schemes, or those switching from older or proprietary technologies that are not interoperable. A recoverable charge may be made to encourage IT Service Providers to market the EU-IFM.

The Pilot will be used to confirm the smartcard platform that will then support its use across a number of existing national or regional IFM Schemes. The smartcard platform will then be distributed to a selected customer base for evaluation and feedback as Proof of Concept.

5.7. Creation of EU-IFM Application Owner

At the EU-IFM level, the IFM Alliance needs to carry out the necessary steps covering:

- New EU Application, its Ownership, its Security Management and set of rules
- Contract for use of Application
- Development of the concept of an IFM “Brand” in customers’ minds and the values it stands for.

5.8. Creation of EU- IFM Products

By creating the opportunity to create EU-IFM Products, there is scope within the IFM Alliance for expanded functionalities and services covering:

- Organisation
- Back office functions
- Business needs and models for fare collection sub systems.
- Expansion of the “IFM Brand Values” to cover Products as well as the Application and its Portal

Although individual EFMs may continue within the overall IFM Framework, over time the costs of maintaining Individual Schemes may be overtaken by the benefits of migrating to the common EU-IFM Application and Product Templates, particularly where technology refresh is necessary. With the encouragement of cross-border travel products, and links to long-distance rail and bus travel, there will be an increasing commercial case for the EU-IFM Ticket Templates. Where the EU-IFM Product Templates are to be used for real common Products, then the necessary Commercial Agreements will be needed to support these Products, including Settlement and Clearing.

5.9. Creation of EU- IFM Ticketing Alliance

The opportunity to implement the EU-IFM Application and Product Templates already exists in a number of Member States and there is a need to create the IFM Ticketing Alliance at the earliest opportunity. This will assist in promotion and consensus building of the proposal and for the setting up of the necessary functionalities and services for the Portal, Back Office and creation and promotion of a Brand. This Alliance will be independent in nature and not-for-profit, and made up from members who either have existing IFM, or support the migration of existing ticketing to the EU-IFM concept.

Strong endorsement from the Commission towards its objectives is essential to its success.

5.10. Consensus and Dissemination through the EU-IFM Forum

The EU-IFM Forum has been used throughout the course of the EU-IFM Project to present each step of the Project, to gain consensus agreement at each meeting and to give participants the opportunity to input ideas and Best Practice. Each Work Package

has used this mechanism for consensus building and agreement. The UITP has agreed to continue to support the EU-IFM Forum beyond the Project funding period to ensure the value of the Project continues to reach across Member States.

5.11. Long Term Funding

The EU-IFM Initiative will be created through the initiative of the members of the IFM project and the countries that have already expressed their intention to join. Its aims will be disseminated through the UITP-funded IFM Forum.

Initial funding will be required to complete the Standardisation work and create the necessary Application and Internet Portal to allow individual IFM Scheme Applications to be loaded onto common media; there are some necessary back office and organisational issues that need to be addressed in parallel.

Longer Term the Initiative will be self-funded through Membership Fees and contributions to cost by Individual Schemes for the use of the Portal to load individual Products. Individual IFM Schemes will gain benefit through fast-track implementation of common Specifications, avoidance of the cost of media issue, and the encouragement of multi-modal / cross-border travel on Public Transport.

6. Suggestions for the piloting of IFM2 (New FP7 Research Action)

The Development of IFM Project IFM2 is complementary to the parallel developments of Real Time Information in Public Transport, Journey Planners, and the ITS initiatives geared to encouraging Modal Switching from cars to Public Transport.

The EU-IFM Project Proposals are recommended on the following basis:

6.1. Key Drivers

IFM lies at the heart of a logical series of Drivers for travellers:

- Promotion and Awareness of Public Transport and its benefits
- Support in Journey Planning across modes and for all aspects and modes of the Journey from origin to destination including maps, directions, timetables and the opportunity to buy tickets in advance
- Ticketing Portals that allow both advance purchase of tickets for all or part of the journey plus the opportunity to load the necessary Applications onto the customer's local media to hold Products for different aspects of the journey and/or the value to purchase tickets en-route
- Real-time information to encourage and inform customers before and during their journey both of their progress and any necessary modifications to plans en-route
- Payment mechanisms that allow journeys to be completed regardless of the route chosen and whether a ticket has been pre-purchased, and all held on the customer's single common media

In addition to the key Customer Drivers, IFM2 is built up on the benefits from using a Common Specification allowing new Schemes (and those migrating from Legacy Technologies) to avoid unnecessary expenditure on developing their own unique Specification and Procurement. There will be considerable time and cost benefits from common procurement as well as the ability to use customer media already issued for other Schemes (inter-regional or cross-border) or for other sectors (such as mobile communications (NFC) or contactless payment). Suppliers will also benefit from scale economics for Product development, the opening of new markets and the opportunity to market a world-class range of products outside Europe.

6.2. Target Market

The recent IFM1 demonstration of interoperable media holding three existing independent IFM Schemes Applications and Products on the same media has been Proof of Concept for the EU-IFM Project. IFM2 will pilot an advanced service for cross border travellers to allow them to hold multiple independent local IFM transport applets on the same personal media device. The pilot will be expanded towards full operation as soon as practicable as (and no later than 12 months) across the EU to gain the full advantage of harmonisation and delivery of IFM Principles and the benefits to customers of a customer "Brand" for IFM.

These citizens, mainly moving for business or employment, fall into two categories: those that travel between main capital cities such as London, Paris, Brussels etc. These are the most likely to adapt themselves to a new offer and to be already equipped with the

appropriate devices and willing to bear the cost of Over-The-Air (Mobile) or Over-The-Internet access. Secondly, the IFM Pilot could support existing cross-border or cross-regional travel such as occurs in Luxemburg or Maastricht-Aachen-Liege or Flanders-Brussels-Wallonia. These travellers have a different profile.

The IFM2 should attempt to implement support for Schemes that are both cross-regional as well as cross-border including turnkey new projects and migration from existing Legacy Technologies.

6.3. Partners in initial IFM Alliance

The concept of IFM Alliance not only covers the technical organisation that may manage the appropriate specifications. It is essential to build trust between stakeholders of the field and to be an attractive brand both for customers and decision makers in the decentralised world of PT. It also will be the platform where stakeholders will consolidate the business case for interoperability.

The IFM Alliance should gather partners from at least the 3 main countries represented in the original Project plus a cross section of other countries representing the full range of Member States, some of them possibly only accepting to participate as initial pilot implementations.

The following Competent Bodies have expressed interest in being stakeholders and members of the Pilot phase:

- ITSO (UK)
- SNCF/GART/RATP (France)
- VDV-Kernapplikations GmbH & Co. KG (Germany)
- TransLink Systems (Netherlands)
- ATAC (Italy)
- Prague (Czech Republic)
- Brussels & Regions (Belgium)

The schemes (represented by their Competent Authorities and/or Operators and Partners) are hoped to be drawn from the representatives of different public transport environments such as:

- Long distance Transport operators
- Big PT IFM schemes
- Smaller IFM schemes

The Pilot scope would include identifying actual flows of travellers and traveller profiles for the Schemes proposed for the Pilot and the expected impact analysis. Secondly for each category of traveller, their existing e-ticketing Scheme will be identified and what kinds of media and products are involved in their journey. Thirdly the IFM Alliance needs to identify the possible measurable improvements IFM will offer whether using media with multiple Applications, the acceptance of other media from outside Schemes, and the deployment of specific products to encourage cross-border travel.

It is also hoped Mobile Network operators will be willing to participate.

6.4. Risks

Risks within the IFM2 Project and the creation of the IFM Alliance include

6.4.1. Commercial

- Legacy costs and migration
- Initial costs for early adopters
- Speed of implementation
- Risk Management and Trust
- Access to partner funding
- Sanctions

6.4.2. Technology

- Maturity of technology
- Security
- Hot Listing and fraud control
- Alternative technologies, should they emerge

6.4.3. Statutory

- No National Transport Authority in every EU country
- Different national requirements for Privacy and Competition Policy

6.5. Evaluation

The IFM1 Steering Group, on the basis of experience gained to date believes that the IFM2 Project should be evaluated on the basis of:

- Establishment of a Road Map and technical/contractual guidelines to progress from these pilot schemes to full implementation of IFM across Europe within an agreed timeframe
- Consensus and Commitment of local and national IFM and the EU-IFM Forum
- Preparation and agreement to a Business Plan for the creation and organisation of the IFM Alliance and the local strategies of the participants.

7. CONCLUSIONS

The objective of this European-funded Project was to develop a road map towards this Europe-wide concept by providing Transport authorities of the Member States with a toolset to build new fare and distribution agreements in order to progressively implement EU-wide Interoperable Fare Management

This tool set will deliver:

- standardised specifications for non-proprietary open platform and application benefiting from easiest procurement with scale economics
- the associated EU security and back office interactions.

Trust and Privacy Models are the key to gaining customer and operator acceptance alike, as is the availability and acceptability of suitable media of the widest possible range.

The objective is not to reduce competition, but to encourage co-operation and commonality between Schemes and ensure the smart media used are complementary, interoperable and capable of multi-application use.

The feasibility of an EU-wide IFM using common multi-application media has now been demonstrated; this EU-IFM Project proposes a two-part Road Map for its implementation. The creation of an EU-IFM Alliance will deliver quick wins with multi-application media, a common Internet Portal offering Applications that use harmonised Standards for local, regional and cross-border IFM Products. Longer Term, Product Templates will be developed with the framework to extend functionality and settle Products on behalf of Alliance Members.

Both Quick Win and Long Haul tracks will deliver measurable social and economic benefits for travellers, Scheme Operators and Suppliers, each closely aligned to the objectives of promoting multi-modal Public Transport, reduced barriers to use for all Stakeholders, and supporting the Social Mobility and Green Agendas.

The Partners who participated in this current EU-IFM Project (IFM1) are committed to moving the Project into a working EU-IFM Alliance. The wide reaching IFM Forum has allowed widespread dissemination of its conclusions and there is considerable support across European Transport Operators, existing IFM Schemes and Member States to move forward with the Commission's support.