Deliverable D500.7.2

Detailed Plan to move into Phase 3 – Second Version

WP 500 – Task 570

The FIspace Project

Leveraging on outcomes of two complementary Phase 1 use case projects (FIspace & SmartAgriFood), aim of FIspace is to pioneer towards fundamental changes on how collaborative business networks will work in future. FIspace will develop a multi-domain Business Collaboration Space (short: FIspace) that employs FI technologies for enabling seamless collaboration in open, cross-organizational business networks, establish eight working Experimentation Sites in Europe where Pilot Applications are tested in Early trials for Agri-Food, Transport & Logistics and prepare for industrial uptake by engaging with players & associations from relevant industry sectors and IT industry.

Project Summary

As a use case project in Phase 2 of the FI-PPP, FIspace aims at developing and validating novel Future-Internet-enabled solutions to address the pressing challenges arising in collaborative business networks, focussing on use cases from the Agri-Food, Transport and Logistics industries. FIspace will focus on exploiting, incorporating and validating the Generic Enablers provided by the FI-PPP Core Platform with the aim of realising an extensible collaboration service for business networks together with a set of innovative test applications that allow for radical improvements in how networked businesses can work in the future. Those solutions will be demonstrated and tested through early trials on experimentation sites across Europe. The project results will be open to the FI-PPP program and the general public, and the pro-active engagement of larger user communities and external solution providers will foster innovation and industrial uptake planned for Phase-3 of the FI-PPP.

Project Consortium

- DLO; Netherlands
- ATB Bremen; Germany
- ATOS; Spain
- The Open Group; United Kingdom
- CentMa; Germany
- iMinds; Belgium
- Marintek; Norway
- University Politecnica Madrid; Spain
- Arcelik; Turkey
- EuroPoolSystem; Germany
- GS1 Germany; Germany
- Mieloo & Alexander; Netherlands
- OPEKEPE; Greece
- Innovators; Greece

- Kühne + Nagel; Switzerland
- University Duisburg Essen; Germany
- IBM; Israel
- KocSistem; Turkey
- Aston University; United Kingdom
- ENoLL; Belgium
- KTBL; Germany
- NKUA; Greece
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Dissemination Level

PU	Public	X
PP	Restricted to other program participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Change History

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001	Creation of the document	17.02.2013
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final	Version for publication	

Document Summary

The report contains the ideas the FIspace project currently has on expansion of its platform in large-scale experimentation. Aim of the report is to inform the FI-PPP Phase 3 project and the SME / web entrepreneurs that will propose innovative applications in the open calls of these projects. Also a look into the future of FIspace, as it is growing into a commercial platform is taken.

In Phase 3 of the FI-PPP programme out of the 16 new projects, 5 are FIspace based. This means that after the end of Phase 3 in 2016 around 150 apps will be available at the FIspace platform. The apps in combination with apps developed by organisations from outside the FI-PPP community can contribute to the goal, to develop FIspace into a commercial platform, viable without funding of the EC. Expansion of the platform outside the current community is of the essence to extend the life expectancy of the platform.

This deliverable serves as a handle to App developers who will be working with FIspace and App developers who come from outside the FI-PPP community. The current state of technical and commercial aspects of the platform; the support Phase 3 projects can expect from FIspace; and opportunities for expansion outside the FI-PPP community can be found in the deliverable.

Abbreviations

App	Software Application		iMinds	IMINDS VZW
ARC	Arcelik A.S.		IP	Intellectual Property
ASTON	Aston UNiversity		IPR	Intellectual Property Rights
ATB	Institut für Angewandte Systemtechnik Bremen Gmbh		K+N	Kuehne + Nagel Management AG
ATOS	ATOS Spain SA		KOCSISTEM	KOCSISTEM Bilgi ve Iletisim Hizmetleri A.S.
CentMa	CentMa GmbH		KPI	Key Performance Indicator
D	Deliverable		KTBL	Kuratorium fuer Technik und Bauwesen in der Landwirtschaft E.V.
DLO	Stichting Dienst Landbouwkundig Onderzoek		M	Month
DoW	Description of Work		MRTK	Norsk Marinteknisk Forskningsinstitutt AS
EC	European Commission			
e.g.	Exempli gratia = for example		NKUA	National and Kapodistrian University of Athens
ENoLL	European Network of Living Labs		PC	Project Coordinator
EU	European Union		PlusFresc	Supermercats pujol S.L.
EuroPool	Euro Pool System International Deutschland Gmbh		RTD	Research and Technological Development
FI-PPP	Future Internet Public Private Partnership		SDK	Software Development Kit
			SME	Small and Medium Sized Enterprise
Floricode	Stichting Floricode		ST	Sub-Task
GA	Grant Agreement		T	Task
GE	Generic Enabler		TOG	X/OPEN Company LimiteD
GPLv3	General Public License version 3		UDE	Universitaet Duisburg-Essen
GS1 G	GS 1 GERMANY GMBH		UPM	Universidad Politecnica DE Madrid
IBM	IBM Israel - Science and Technology Ltd		WG	Working Group
ICT	Information and Communication Technology		WP	Work Package
			WU	Wageningen University
IDM	Identity Management			
i.e.	id est = that is to say			

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1.   Introduction

FIspace is a collaborative business platform that leverages Future Internet technology to establish a business ecosystem of companies, as well as service providers and app developers. These players are able to connect more easily with each other in the online world. They conduct business and enrich their business activities through the use of specific services embedded in apps.

FIspace is developed in the Future Internet PPP, a large European Public-Private Partnership to shape Europe's Internet for the future. The FI-PPP consists of three phases. FIspace is one of the projects in the second phase, and builds a platform for business collaboration. Within this project, work package WP500 aims at:

(1) Mobilizing, engaging and preparing stakeholders across Europe for participation as application and service developers building on and extending the large-scale trials;

(2) Fostering and demonstrating potential for innovation of FIspace (related to market impact in the food and logistics sector); and

(3) Delivering a consistent plan to move into the Phase 3.

The above objectives are supported by Task 570 'Plan to move into FI-PPP Phase-3'. The major outcome of this task is to deliver a detailed plan to move into Phase-3, including detailed plans for the large-scale expansion of platform usage facilitated by local and regional stakeholders including SMEs. This report is the result of that task. It has been written after the first twelve months of the FIspace project, mainly to inform projects in the FI-PPP Phase 3 projects and other interested stakeholders. It follows up an earlier version (Poppe & De Smet, 2013) that was written after 6 months in the project to inform bidders for projects in the FI-PPP Phase 3 project.

The report contains the ideas the FIspace project currently has on expansion of its platform in large-scale experimentation and commercial exploitation. Undoubtedly, these ideas will evolve. An update of this report will be made in 2014. Currently we foresee that we will then provide information on the progress of the accelerator projects in Phase 3 and how they will help to expand the FIspace platform in commercial exploitation.

The next chapter gives more information on FIspace and what it wants to achieve, in a non-technical way. Chapter 3 extends this introduction with more technical and commercial details. Chapter 4 presents the FI-PPP Phase-3 Accelerator projects for large-scale experimentation of the FIspace concept. This is followed by a chapter that provides information on how FIspace as a Phase-2 project will support that experimentation in Phase-3. In chapter 6 we discuss other options for large scale experimentation. We end with some reflections in an epilogue.

2.   FIspace – the collaborative business platform

Paperwork is still an essential part of traditional business life. Business cards have to be exchanged, contracts written, delivery notes signed, and invoices sent. Small and Medium Enterprises (SMEs) have a particularly difficult time competing against large companies who have the financial and technical resources to invest in paperless solutions such as Customer Relationship Management and Enterprise Resource Planning (ERP) systems. Because of their lack of resources, SMEs still exchange a considerable amount of data on paper, between themselves and in interaction with large companies and government agencies.

SMEs and other resource poor organizations are ill equipped to handle the wealth of data that could be accessed from modern sensor based systems. Production monitoring and business process systems, for example, produce rich data about operations that could be put to use by these organizations to improve their competitive position, especially if such data could be exchanged with business partners (advisors, business chain partners). Unfortunately, lacking appropriate resources to have such systems developed (ERP-like systems in the cloud hardly exist) and operate such systems, these companies are unable to leverage these data to their advantage and thus they, and their supply chain partners, fail to obtain the benefits that such rich information could bring to them.

What is missing to prepare businesses, both small and large alike, for the future is a mechanism that allows them to derive more value from the data that is accessible through their internal operations, or external to them (e.g., open data). New Business-to-Consumer (B2C) platforms, such as those used in the mobile telephone domain, provide one example of just such a mechanism. With an easy to use platform organizations can interact and communicate with each other. Both SMEs and large organizations can link to collaborate on an equal footing to execute intercompany activities. FIspace is the platform that allows such business collaborations.

FIspace leverages Future Internet technology to establish a business ecosystem of companies, as well as service providers and app developers. These players are able to connect more easily with each other in the online world. They conduct business and enrich their business activities through the use of specific services embedded in apps. FIspace is the collaborative business platform.

2.1.   The concept of FIspace

FIspace can best be imagined as a business-to-business (B2B) software platform that combines features comparable to LinkedIn for collaboration, with app integration capabilities that go beyond mobile telephone app store applications. The collaboration service of FIspace connects companies instead of individuals. For companies, registration is an easy and secure process. Following the registration, businesses can contact each other to negotiate collaborations, detail a contract, exchange data, manage intercompany business processes, or perform other value adding services.

Sharing such data is as easy as uploading a photo on to Facebook, but here the analogy with the social media in private life ends. Actually, and in contrast to B2C social network users, companies require more control of their data. They want to ensure that only those individuals or organizations that they have authorized have access and use of these data. Because companies should be able to maintain control of their data, FIspace does not store the data exchanged between companies. It only stores the links between companies and the rules that have been specified to share their data.

Another difference between companies and consumers is that companies need much higher standards of security for their data management. The Future Internet technology on which FIspace is built makes this possible, e.g. by encryption or selective access rights.

Once data is available it becomes attractive to employ it in business processes using applications. For this reason, FIspace incorporates an app store where app developers can market and sell their software. The development of apps can, for example, be triggered by a company that has a particular need for some operational service. Apps could help interpret data streams (e.g. a domain specific advisory app or a track and trace app). Others would be useful in finding business partners or detailing a data exchange. App developers can be contacted through FIspace to request the development of new apps or to add functionality to their existing apps.

2.2. Agile formation of business networks: finding & binding before facilitating data exchange

Companies can access FIspace via an app on their mobile device (e.g., phone or tablet) or on FIspace's web page via their browser. In addition, companies may integrate FIspace into existing software that is used in an industry.

Creating a simple business profile opens the door for companies to search for, and find each other – as individuals do on Facebook or LinkedIn. FIspace is, therefore, especially of interest to business communities that are dynamic and made up of many small players; creative industries, self-employed individuals, city food webs or regional construction industries, to name just a few. Since the platform aims at reaching a large number of businesses, FIspace will also provide ways for the platform users to sort out their contacts, e.g. by allowing users to rate another partners' reliability or performance (e.g. in the form of reviews, 'likes' or stars).

Industries with stable relations (e.g., farmers and their cooperatives, government agencies, or logistics service providers) can use FIspace to enlarge their business networks and more transparently manage their inter-organizational process execution activities. They can also easily integrate novel apps into their production and distribution processes, thus providing innovative services to their customers.

2.3. Seamless collaboration and data exchange

Firms connected in FIspace can grant each other access to approved parts of their datasets. This makes it possible for the two firms' applications to start using each other's data and checking in real time whether new data are available. Apps from the FIspace app store can be used by these firms to enhance their collaborations and hence the value of the data streams moving between the organizations.

FIspace can coordinate the movement of all types of data. These data coordination activities can include administrative data such as contracts, delivery notes, invoices, laboratory reports, etc. FIspace is especially built to support access to operational data such as measured or sensor data generated through automation or manual input.

To provide partners with access to its data via FIspace, a firm has to describe its data by using standards such as EDI, XBRL and UN/CEFACT. For so-called back-end ICT integrators that connect existing ERP, CRM, Farm Management Systems and other software via FIspace, FIspace provides mapping services for integrating the internal systems of firms via such standards.

FIspace does not store the data that firms provide to each other. Each company maintains control of who can access their data and can specify conditions of use using FIspace data security and management services.

2.4. Deployment of apps and services

FIspace provides an app store from which firms can buy apps to work with the (combined) data flows of their business partners. In addition to the data of the business partners, 'open data' from public services can be used in such apps.

Some of the apps that can be found in FIspace reduce transaction costs between business partners. FIspace enables its users to detail their business relationships, for example through contracts with service level agreements. Other examples of apps are apps that run auctions, or that help firms conclude a contract under a particular legal system.

2.5. Benefits for app providers

FIspace is an attractive platform for app developers. Developers can write apps for specific industries (e.g. dairy farms or freight train companies) and market them on the platform. They can also do this in collaboration with specific companies for their clients and make them available free. It means that apps can be tailor-made to solve an organization's particular problems. Alternatively, developers can release apps and services to be provided in the app store to the general population of FIspace users and that address general issues that might arise in a B2B collaboration.

The platform sets out to build a community (ecosystem) on an international scale. A diverse set of companies are already implementing and testing FIspace within the European Union's Future Internet Public Private Partnership (FI-PPP) programme. The FIspace ecosystem makes it much easier for smaller ICT companies, specialised in a certain industry, to scale up to provide services to a broader, international market. This is an attractive outcome for FIspace community members as some national markets are too small to attract investors and innovators.

The platform's approach to managing data flows also assists ICT companies as they do not need to worry about data flow management for their apps. FIspace services reduce the development costs of a successful app and allow app developers to focus on creating innovative functionality unencumbered by overhead worries.

From a technical perspective, FIspace provides app developers with easy-to-use guides and templates; a software development toolkit; and a testing and certification service for apps. FIspace also supports peer learning between app developers where they can connect to, and learn from, each other.

2.6. Benefits for governments

In some respects governments resemble large businesses: they exchange a considerable amount of data with commercial organizations, particularly in regulated industries such as logistics and agriculture. This means that governments can also benefit from using FIspace for exchanging data with businesses. In this respect Business-to-government (B2G) collaboration is similar to B2B collaboration.

Governments have also another role: governing the economy at large. In this role governments should realise that FIspace creates and strengthens markets for IT platforms, for apps and even

for data. It lowers transaction costs in doing business, especially for SMEs. FIspace brings inno-vation (and economic growth) as it will help to realise economies in supply chains, and help ICT companies and service providers to compete on an international scale, instead of only in their national or local markets. With better data exchange it also contributes to public issues in areas such as food safety, sustainability, etc.

2.7.   How will FIspace be introduced to the market?

At the moment FIspace is being developed through European research and development funds within the FI-PPP programme by a large international consortium. An initial release of FIspace will be available in April 2015 for the companies and app developers in the FI-PPP FIspace.

FIspace can benefit any industry in which B2B collaboration occurs. FIspace is currently being tested in the logistics, agriculture and food industries through eight test trials (see Figure 1).
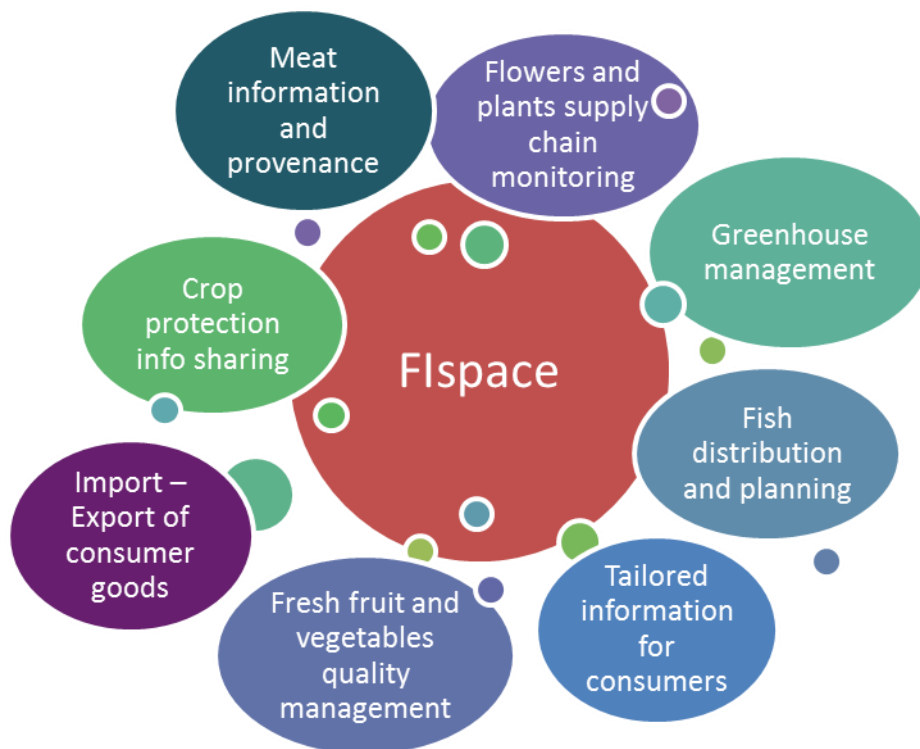
Figure 1:   FIspace trials

2.8.   The future of FIspace

The story of FIspace is the story of its users. Platform development is currently driven by the FIspace consortium. Such development builds on the requirements and demands of the busi-ness partners who are participating in the project's trials.

FIspace is open for commercialization strategies once the development phase terminates. It is planned that the initial released version of the platform will be open source. It is currently an-ticipated that interested companies will build on this initial release to commercialize the plat-form. This means that it is possible to have several FIspace versions (or 'platforms'), just as there are several internet browsers (like Chrome, Safari, Internet Explorer etc.) or mail applica-tions. A platform like FIspace has potential in many areas and many configurations.

The partners currently conducting the FIspace trials indicate that the services of FIspace have a clear value for businesses. The value that these trials demonstrate is the basis for a revenue

stream that can underpin any investment needed to bring FIspace from its initial release in April 2015 to one or several commercial software platforms by a technology provider.

The FIspace development project offers potential investors the open specifications of the FIspace platform as well as open source implementations of most of the FIspace platform build-ing blocks. The FIspace specifications come with an initial release that has been tested in eight business trials. Interested firms and app developers in the eight trials wish to expand the trials and they will be joined by several projects in the third phase of the FI-PPP. These planned activi-ties will result in an ecosystem of app developers and a repository of a significant number of value adding apps in the app store of FIspace.

3.   Technical and commercial aspects of the FIspace platform

3.1.   The origin of FIspace[1]

The rationale of FIspace was discussed in Chapter 2, as a laymen's introduction to the need for Future Internet tools in the business environment: there is no such a thing as a Facebook for businesses that supports interaction with your business partners, easily leverages your business opportunities, or facilitates the collaborative monitoring and management of cross-organizational business processes.

The need for such a collaboration and integration service was explored in the FI-PPP Phase 1 projects SmartAgriFood and FInest. SmartAgriFood mapped the needs of business from farm to fork (and back) in farming and the food (and flower) industry. FInest studied needs in transport and logistics, be it transporting consumer electronics from China to Germany or the logistics of fish from Norway through EU ports to European as well as Brazilian consumers.

At first blush the two domains of agri-food and transport and logistics do not appear to have much in common. Indeed, one does need to move agricultural products from the greenhouse, farm, or ranch to processing locations and retailers so there is an element of transport and logistics embedded in the domain. However, this would seem to be a peripheral element of the domain where more central activities of growing, harvesting and selling differ extensively from the conduct of operations in the transport and logistics domain.

When looked at on a micro level all businesses are different. What integrates them into a comprehensible whole is the application of a logical framework that provides useful abstractions from the particular to the general. Such a framework allows surfacing commonalities between seemingly disparate activities, such as terminal management, farm operations and greenhouse operations, which allows them to be supported by general-purpose Future Internet services and, more particular to this proposal, collaboration services.

A framework that provides an integrative metaphor for this is that of production. In a production operation one must source materials so that they can be converted by the "production" process into finished items that can be distributed and consumed. In performing all of these functional activities, the business person (whether farmer or logistics service provider) creates plans, contracts with third parties, manages financial flows, provides information to regulatory and consumer bodies, and controls their operations. This business person, using personal contacts and contacts recommended by trusted partners, collaborates with other product and service providers to bring their prod-

Figure 2:   A stylized cross-domain operations framework

ucts to market as efficiently and effectively as possible. Figure 3 summarizes the motivation and impact of FIspace.

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[1]   Adapted from the FIspace Description of Work
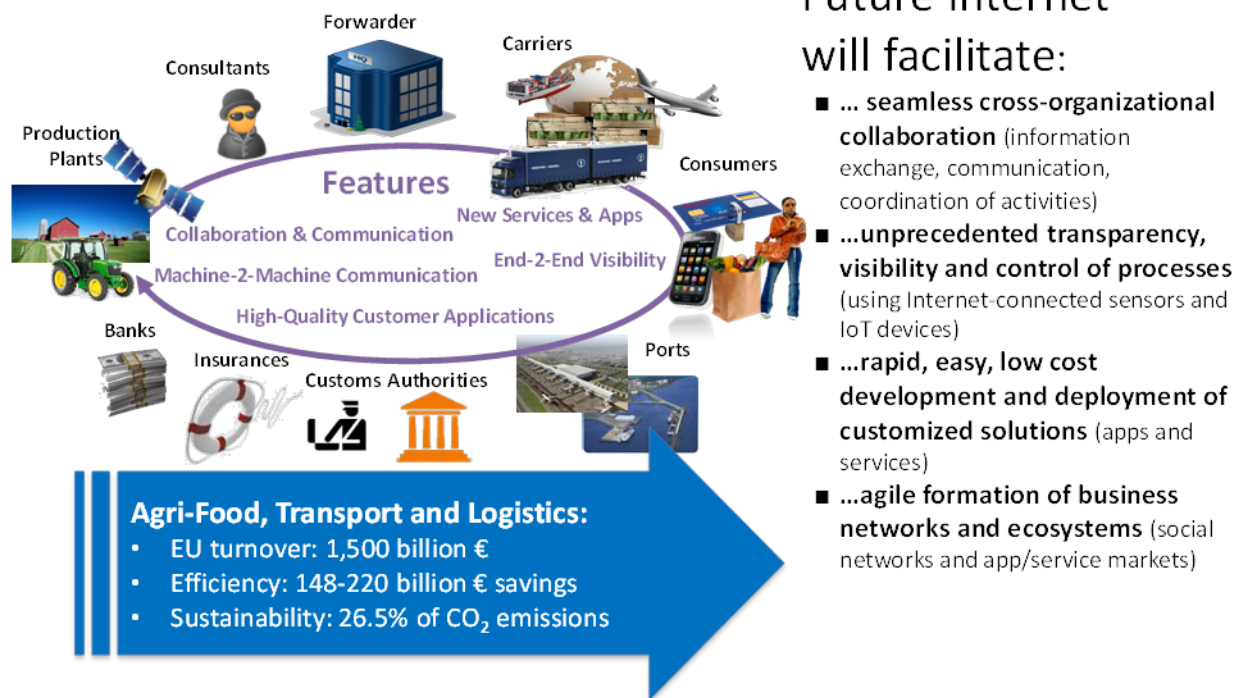
Figure 3:   Motivation and impact of FIspace

Using the production metaphor allows one to see how transport and logistics operations inte-
grate and support the operation of agri-food businesses, and how different agri-food opera-
tions actually fit within a total production chain. The general nature of the framework also
demonstrates how producers in one domain operate in a similar manner to those in other do-
mains. For instance, a producer of consumer goods actually operates in a manner similar to an
agri-food producer. This framework integrates the FInest and SmartAgriFood use case projects
from Phase I of the FI-PPP program.

3.2.   The FIspace concept[2]

FIspace develops a multi-domain collaboration and integration service, based on the FI-WARE core platform and Future-Internet technologies, enabling new business models that overcome these deficiencies (Figure 4).
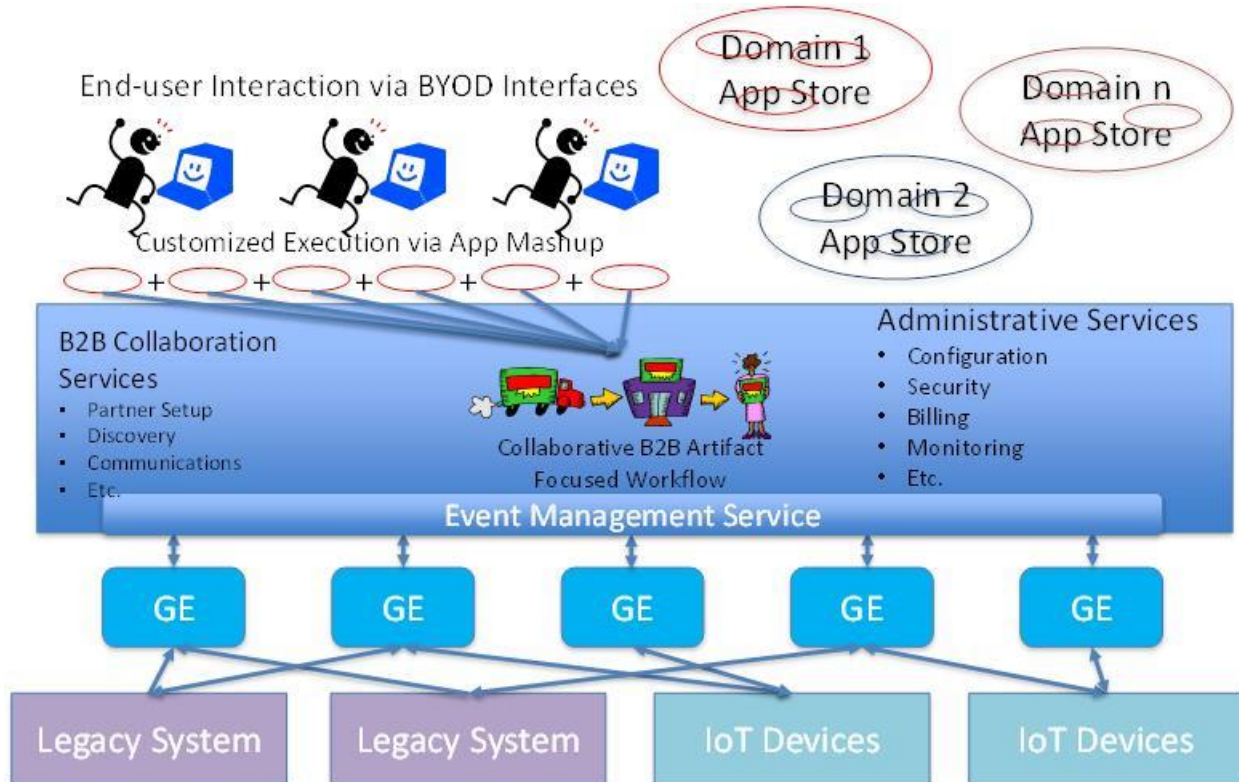
Figure 4:   The function of FIspace in relation to legacy systems, Internet of Things and Generic enablers (GE)

The central features of the FIspace collaboration service are as follows:

–   Provisioning of the FIspace service will follow the Software as a Service delivery model, which means that FIspace services can be accessed anywhere at any time via any device;

–   The FIspace service is an open service that can be extended and customized for specific stakeholder demands by integrating domain apps (similar to the iOS (iPhone) and Android business models);

–   A domain app store facilitates the marketing of targeted applications that take advantage of the collaboration and mash up services of the FIspace and its underlying FI-WARE generic enablers;

–   A collaboration manager for business-to-business networks supports the planning and execution of business operations from a global perspective with message-based coordination among the involved business partners;

–   Integrated techniques are available for monitoring and tracking on the basis of data integration from the Internet of Things, including sensor systems and smart item technologies accessible via FI-WARE Generic Enablers;

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[2]   Adapted from the FIspace Description of Work

- Information integration from legacy and third party systems is enabled through a ser-vice-based integration layer that is enabled and supported by FI-WARE Generic Enablers;
- Role-based views for the individual participants in the business networks along with in-tegrated security and privacy management offer fine-grained access control to confiden-tial information.

The architecture of FIspace is given at a high level in Figure 5.
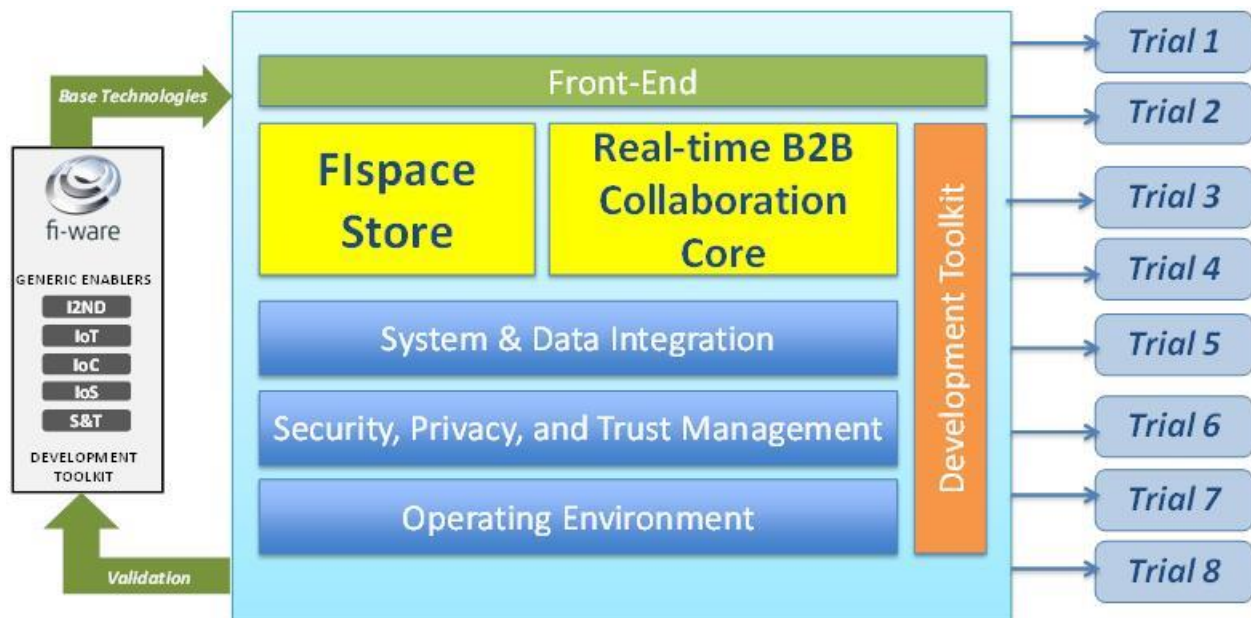
Figure 5:   The high level architecture of FIspace

As indicated in Figure 5 (at the left side), the platform will be fully based on FI-Ware Generic Enablers. The yellow-coloured components indicate the core features that will support business collaboration: the FIspace App Store and the real-time B2B Collaboration Core that keeps track of the underlying business processes in these collaborations. A System & Data Integration mod-ule will take care of the needed integration with existing (legacy) systems and databases. Secu-rity, Privacy & Trust Management is also a basic overarching component that has to guarantee these issues at all time during business collaboration support. An Operating Environment is needed to make it all work together. The orange-coloured component represents the Software Development Toolkit that is needed for App developers to guide their developments and pro-vide certain FIspace-specific requirements for their Apps. A more detailed description of the FIspace platform architecture is published in deliverable D200.2 on the website www.fispace.eu.

In the FIspace project, there are eight use case trials that are used to develop and test the FIspace platform and will provide already several baseline functionalities. More information about the trials will follow in the next section.

The green-coloured component in Figure 5 represents the Front-End layer. The FIspace plat-form will be approachable in different manners, also without an explicit user interface (ma-chine-to-machine communication). A user interface will most likely look like a kind of dash-board (e.g. LinkedIn or Google+ interface), but can also be integrated in back-end software or in specific apps.

3.3.   The FIspace project

The project realizing the FIspace platform started, as the other FI-PPP Phase 2 projects, on April 1, 2013 and will run for two years. That implies that it partly overlaps with the Phase-3 large-scale trial projects that are expected to start summer 2014 and will start calling web-developers and app-builders for proposals in the autumn of 2014. Figure 6 gives an insight into the project activities and the main milestones of FIspace. Those milestones include release dates for the software that becomes available for Phase-3 projects.
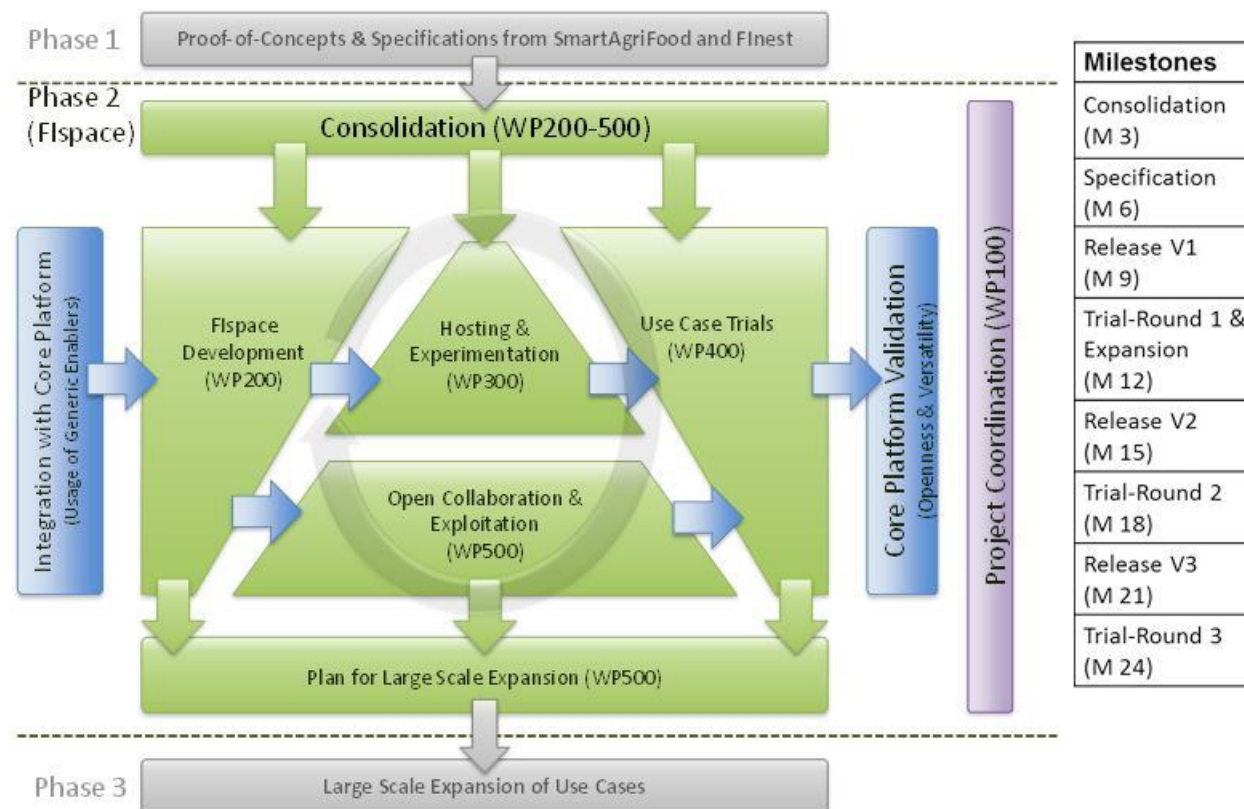
Figure 6:   Approach and key results of FIspace

The FIspace project builds the FIspace business collaboration platform in different releases with interaction between the central development (based on so called Generic Enablers from the FI-WARE project and domain specific enablers developed in FIspace) and a number of use case trials. These trials build upon experiences in the projects Finest and SmartAgriFood and are described in Table 1.

Table 1:   Description of use case trials in FIspace.

Name	Main topics	Project partners and location
Crop protection info sharing	Farming in the cloud trial where actors in the chain exchange data on crop protection under operational circumstances	DLO, Kverneland, LimeTri; the Netherlands
Greenhouse management	Farming in the cloud trial where actors in the chain optimize the operational management of a greenhouse	NKUA, OPEKEPE, Innov; Greece
Fish distribution and planning	Intelligent perishable goods logistics trial with fish import and re-export	MRTK, NCL; Germany, Norway

Name	Main topics	Project partners and location
Fresh fruit and vegetables quality management	Intelligent perishable goods logistics trial for quality management of fruit and vegetables using RFID chipped boxes	CentMa, GS1, Euro Pool Systems; Germany
Flowers and plants supply chain monitoring	Intelligent perishable goods logistics trial for optimizing waste and quality management of flowers and plants	DLO, Florecom, GS1, Mieloo & Alexander; the Netherlands
Meat information and provenance	Smart distribution and consumption trial for tracing and tracking of meat from farm to fork	WU, GS1; the Netherlands
Import – Export of consumer goods	Smart distribution and consumption trial for the global logistics of consumer goods	ARC, K+N; China, Turkey, Germany
Tailored information for consumers	Smart distribution and consumption trial to match data from the production and logistics chain with consumer profile on handhelds of consumers	ATOS, UPM, PlusFresc; Spain

3.4.   The FIspace Business Model

A multi-domain collaboration and integration service will only be successful if it has a sound business model, in particular in terms of value proposition (i.e. what does FIspace provide and to whom?) compared to competing platforms, and what costs and revenues can be envisaged for both the platform itself as well as for partners that are conducting business via the platform. FIspace report D500.5.1 contains a more detailed market analysis, this section can be considered as a brief summary and update from the latest insights.

3.4.1.   What will FIspace offer?

Core to the understanding of FIspace's business features is the fact that FIspace can best be imagined as a business-to-business (B2B) software platform. FIspace will enable services for businesses, with a focus on business collaboration and data integration. The platform will be cloud-based and, although initially tested in the logistic and agri-food domains, will not be restricted to these domains, i.e. whereas the software services might be specific, the platform itself will be industry agnostic. Based on FI-WARE core platform components and Future-Internet technologies, it will be an open platform that can be extended and customized by integrating services in the form of (domain specific or more generic) apps. These apps will be provided on an app store (the FIspace store) and can be mashed-up with – and reused by – other apps. The core of the platform is a business collaboration 'engine' that supports the planning and execution of business operations. It also includes integrated techniques for monitoring, tracking (and integrating) data provided by the Internet of Things (e.g. sensor systems); from legacy and third-party systems. This is enabled through a service-based integration layer stemming from the FI-WARE Generic Enablers. It should be noted however that this integration happens in the backend. For its business users, the platform will appear as one without any the Generic Enablers visible. The platform will accommodate role-based views for the individual actors (buyers, sellers, administrators that assign roles within a company, app developers etc.)

in the business networks along with integrated security and privacy management for access control to confidential information (see also Section 3.5.2 and 3.5.4).

3.4.2. Problems addressed

FIspace addresses the overall problem of limited use of ICT in business collaboration networks and the limited access to innovative ICT developments by SMEs. It will thus unleash so far unrealised efficiency gains. Current enterprise databases and information systems are generally closed and limited to one company. Interoperability between systems is limited. Human intervention, i.e., the use of paper, fax, phone, mail, etc. characterize these systems. This makes it difficult to track and trace back products or components of products. Smooth data exchange system pertains particularly to smaller companies, for which business software has been too expensive and difficult to implement. They are however still required to provide data on their products to vendors or suppliers, or in other words bothersome administration on top of their regular business operations. Apart from that, the only ICT innovations accessible to SMEs, often coping with small budgets and without dedicated staff, are standardised off-the-shelf products. An app platform will put ICT innovations within reach of smaller companies, and due to its scale and platformisation will make these SMEs a worthwhile customer segment to developers.

3.4.3. Positioning

FIspace differentiates itself from existing solutions through its openness, the possibility to construct a business collaboration on the platform and the possibility to mash-up and reuse applications and application components. Existing commercial platforms, e.g. GT Nexus, are closed and do not include any app store. Some experimental platforms, e.g. the Logota Logistics Mall (formerly Fraunhofer Logistics Mall), come close, but require from app developers to make full-service applications.

3.4.4. Actors on the FIspace platform

FIspace is envisioned to operate as a multi-level and multi-sided platform. First, the platform mediates industry partners initially from the logistics and agricultural food sector and app developers that develop and provide sector-specific apps on the FIspace store. Second, each app that is developed and hosted on the platform, mediates two sides of a market (with possible expansion to even more sides, such as advertisers) most often buyers and sellers of a product or service. Hence, there are four key actors at the core of the FIspace value network:

Business user - buyer: An actor that needs a service, product or information, and seeks to establish a business relationship with service or product providers (a Logistics Services Client, e.g. a shipper that needs to ship goods, a manufacturer who needs material, a farmer that needs spraying advice). The buyer is not only interested in contacting a seller, but also wants to use the platform to draw up a contract and plan the execution of the contract, including its monitoring which requires an exchange of data.

Business user – seller: An actor that wants to sell a service or product to another business user, e.g. a Logistics Service Providers (LSPs) that provides logistics execution services for performing transport operations on behalf of a shipper or a Farm management System (FMS) provider that supports spraying planning. The seller is not only interested in contacting a buyer, but also wants to use the platform to draw up a contract and plan the execution of the contract, including its monitoring which requires an exchange of data.

Application developers/providers: Entities that develop reusable apps (or app components) in conformance with the FIspace platform's app development requirements. Apps are provided via the FIspace store, and will often be linked to current services (e.g. spraying advice).

Platform Operator/Provider: A company or other entity that operates the platform, including its maintenance and the FIspace store, and provides the necessary support and toolkits to app developers. The platform operators may also take on the roles of developing the platform and its components as well as hosting the platform, but these roles could also be performed by other companies. Exactly which roles the platform operator/provider should take up are still under consideration in the FIspace project.

Additional actors foreseen includes consultants (or business architects) who support the business users in deploying the applications, financial service providers and, possibly in the future, advertisers who would seek to advertise their goods or services on the platform.

3.4.5. Value proposition

FIspace will be commercially viable only insofar as it creates value for its users. In general FIspace proposes to offer the following business benefits to its **business users – sellers and buyers**:

- Better satisfy customer requirements, such as:
  - end-to-end visibility and event management;
  - enhanced monitoring and tracking of goods as they move along the value chain;
  - less expensive and better tailored offers of goods and services;
  - immediate notification of deviations and the occurrence of hazardous events;
  - lower environmental impacts (e.g. significantly reduced waste of perishable products) through increased network efficiencies; and
  - more transparent operations.
- Increase business efficiency and optimization throughout the value chain by:
  - significantly reducing manual efforts for planning and re-planning;
  - enhancing interoperability among heterogeneous systems based on business standards;
  - automating support for coordination of operational activity execution;
  - providing accessibility anywhere, anytime and via any device; and
  - facilitating the rapid identification and contracting of capable business partners.
- Facilitate new business opportunities by:
  - providing more efficient and transparent service offer management;
  - optimizing partner contract negotiations;
  - facilitating new business partner interactions and collaboration opportunities; and
  - providing access to true end-to-end business and consumer performance metrics.

In relation to the latter, FIspace allows all business users access to a greater variety of sellers as a result of the platforms search capability. One crucial aim for FIspace is indeed to allow smaller service providers to be active on the platform thanks to amongst others:

- easier customization of business processes,
- the possibility to pay only 'per-use' (i.e. transaction-based fees),
- automated contracting,

- service level management, and
- the establishment of payment services.

For **application developers** FIspace's main value proposition lies in allowing them to easily develop new applications that can be provided to a large market (i.e. the FIspace ecosystem)

While the above envisioned business benefits are specified in FIspace's Description of Work, this value proposition needs to be translated into KPIs, i.e. measureable indicators, validated, refined and adapted to different domains through testing and business impact assessment in the trials.

3.4.6. Platform revenues

Key to the sustainability of business model of the platform is that it is able to generate revenues.

The main source of revenue is likely to come from the business users of the platform. Several revenue models can be foreseen including:

- entry fees,
- subscriptions or flat rates
- transaction-based fees (e.g. based on the volume of services or goods).

The platform may also generate revenues from sales of software development kits (SDKs), services supporting the development of applications and the deployment of these applications for specific business users. A general principle is that the business users' willingness-to-pay depends on their perceived value of using the platform.

While several revenue models are possible, the pricing of the platform needs to take the economics of multi-sided markets into consideration. First, there is a need to rapidly build critical mass, by reducing the entry barriers to the platform. Hence, several types of fees likely have to be abandoned initially in order to attract early users. As an example, business partners might restrain from connecting their legacy systems to the platform if the investment is exceeding their assumed benefits. Hence the platform needs to limit their objections by providing subsidizing incentives to attract these entities, especially in the beginning of its operations.

Second, the platform operator needs to choose whether or not to charge both sides of the business collaboration market. Plausibly the business user-sellers will be charged, possibly also the buyers. Within each category of actors price discrimination is possible, e.g. offering discounts to influential (large) business users hoping that their presence will attract other business users. In principle the platform operator could charge for the provision of SDKs and app development support, although this is probably strategically unwise in a build-up phase since it will discourage the app developer community.

A range of other revenue streams is foreseeable, in particular in the case when the roles of developing, operating and hosting the platform are performed by different actors. Should a large software house decide to develop the platform, but not operate it, it could license the software to platform operators along with any professional services fees from the implementation of the platform. A platform host would also charge the operator for hosting the platform. Consultants and systems integrators could generate professional service fees for deploying applications at the user side, performing backend integration services, e.g. resulting from the need to connect

legacy systems or integrating IoT device to the platform. Financial service providers could generate revenue by charging a fee for clearing payment transactions.

Finally, there is the issue of revenue sharing. Thus between app providers and the platform operator, the largest share will probably being kept by the app provider. App providers may also generate revenue if their apps are mashed up with and/or used by other apps.

In the second year the FIspace project will further reflect on the business model scenarios of the platform. Input from business model testing in the trials will contribute to these scenarios.

3.4.7. Costs

The cost structure of the FIspace platform is not fully investigated at this point, but could (as analysed in the FInest project) in principle be divided into development, operating and marketing costs. **Development costs** include all costs associated with building (new features into) the platform, supporting application functionality, upgrading SDKs, and integration costs. **Operating costs** could include licence fees to the platform software developers (if different from platform operator), licence cost for the use of generic enablers, hosting service costs, customer support and maintenance cost. **Marketing costs** include shipper and LSP acquisition costs, developer acquisition costs, marketing events, user group events, advertising, and sales costs. The latter constitutes a critical part of the ecosystem building activities.

3.4.8. Building the FIspace ecosystem

As touched upon earlier in this section, the viability of the FIspace business model depends on its ability to build a sustainable ecosystem, attracting participants from all sides of the market. The sustainability of the FIspace ecosystem rests on the one hand on providing a (statically) viable business model for all stakeholders in the value network, allowing them to realize gains via the platform and on the other hand on igniting a sustainable ecosystem for innovation, through stimulating, providing incentives and reducing barriers (i.e. increasing the innovative opportunities) for development of innovative apps (notably by, but not restricted to, SMEs and web entrepreneurs.

Clearly, FIspace needs to engage in direct marketing to business users as well as app developers through, e.g. the platform operator's internal sales and marketing personnel, online website information, conference demonstrations and discussions, user group events, mailings (electronic and physical), sponsorship of events and other approaches.

FIspace will also need to provide business users with opportunities to evaluate the potential benefits of the platform. This will already happen during the FIspace project, and will be extended into the FI-PPP Phase-3. Potential buyers of products or services would need to know that there are a sufficient number of sellers and apps available to be able to execute for instance an end-to-end shipment. The system should aim to be self-explanatory in the basic but might however require education and support on both sides of that market (e.g. on how they can find business partners and execute the business process). Free apps need to be provided in the early testing phases.

FIspace also needs to provide app developers not only with SDKs but also with training, testing and other support services. Even monetary incentives could be envisioned. Releasing the FIspace Store with an initial set of apps, possibly beyond the existing set of initial apps, will stimulate early usage and demonstrates third party developer how apps are to be developed.

It will also be crucial to incentivize large influential players in the different domains to adopt FIspace. Big brand names may have crucial influence on their own (possibly smaller but more numerous) suppliers to join likewise.

3.5.   Realising the FIspace Platform and related IPR issues

At some point in time, FIspace needs to shift to a more commercial mode. The FIspace project will release an alpha-version (a pre-commercial version) of the software, and that means that a considerable investment could be needed to bring it to a beta-release, which will be a commercial version of the platform, but in a juvenile stage. From this beta-release the platform needs to be further developed commercially. The timing and character of this shift needs to be further specified during the course of the FIspace project. One could also imagine that several companies or organisations inside or outside the current consortium would like to pick up the FIspace platform. A FIspace platform could be owned and run by a strong company in an industry (e.g. a major retail company in food, or a logistic provider to organise data exchange with its subcontractors, or a public service like a paying agency in the Common Agricultural Policy that has to organise data exchange with 100.000+ farmers).

But for the FIspace platform to succeed (and stay close to its rationale of making data of business partners more open) it is more likely to succeed in the hands of a "neutral" party. That could be an ICT company, but also an independent industry organisation (e.g. a standard organisation or a commodity board or an industry organisation that organises e.g. the fish industry in a country). Such organisations could invest in a FIspace platform themselves or host an instance of it with an ICT company, for instance the one that builds a FIspace platform. This ICT company can then earn their development costs back from the license fees.

A situation with several FIspace platforms does not have to be problematic for interoperability. Like there are several web-browsers (Chrome, Internet Explorer, Safari, etc.) and several e-mail programs, there could be several FIspace platforms. That would require a standardisation of the FIspace open protocols and registration of these protocols with a standardization body, comparable to the W3C-consortium that governs the world wide web protocols (Figure 7).

The way the FIspace platform(s) will be realised, not only influences the costs of users and app developers, but also issues of intellectual property rights (IPR). These issues are still under investigation in the FIspace project.
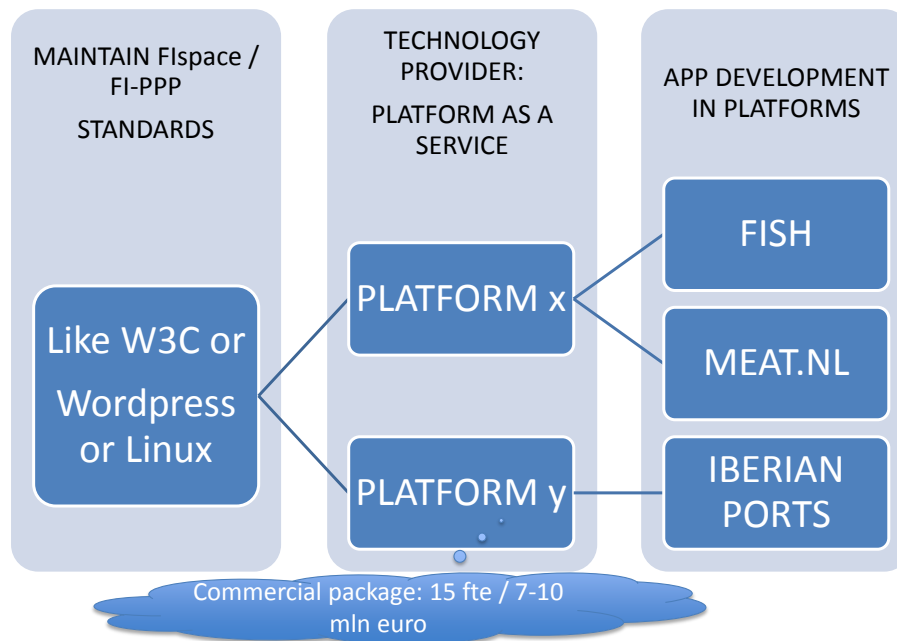
Figure 7:   Potential organisation in case several FIspace instances would be build

There are some IPR issues to be solved around the generic enablers of FI-WARE that are used in FIspace, more specifically regarding the Access Control from Thales and the Identity management (to be determined by KOÇ). For the exploitation phase of FIspace the terms and conditions of the FIspace platform operator (fee for use etc.) are much more important than the IPR as such. The FIspace project is investigating if a free software licensing method (like GPLv3 that is compatible to Apache) can be used. Even a common licensing model has been proposed, each company and each component are having changes and adopting their own licenses. This is the current status of each core component of FIspace (March 2014):

Component	License	GEs
SDK	Apache 2.0	No GE background
Front-End	Apache 2.0	Wstore, Wirecloud
Data & System Integration	Apache 2.0	Mediator GE
EPM	CEP GE License	CEF GE
BCM	Open Source	No GE. BizArtifact
CSB	Private Software	No previous GE : Terms and conditions to be defined
Store	Apache 2.0	Wstore
IDM	Not defined	Content Based Security GE
Content Based Security	Not defined	Identity Management GE, Access Control GE – KOÇ?
Access Control	Not defined	Access Control GE – KOÇ?

Figure 8:   Core FIspace platform components and licenses.

3.6.   Continuation of the platform

After realisation of the platform in the FI-PPP programme the continuation of the platform after ending of the project funding needs to be arranged. That is when commercialisation of the project becomes important. The issues of commercialisation of the platform will be discussed in chapter 6.

4.   Phase-3 Large-Scale Expansion

4.1.   Introduction

This chapter describes the large-scale expansion of the FIspace platform, as currently envisioned by the FIspace project / consortium. The main objectives of the third phase of the FI-PPP is to involve SMEs and web-entrepreneurs as developers of highly innovative, infrastructure based, data-rich services and applications, building on, and extending, the large-scale trials and the core platform functionalities. The aim of the third phase is to set off the use of the innovative Internet services and applications, developed in the first and second phase of the program. The target outcomes of Phase-3 are:

1. development of a large set of innovative and technologically challenging services and applications
2. validation of the concepts developed in previous phases
3. public service infrastructures and business processes that are made significantly smarter

The European Commission has run a call for proposals to select projects for Phase-3 (Call 3 - 1.8 "Expansion of use-case"). In February 2014 the Commission has invited 16 proposing consortia for negotiations. These consortia (now called "Accelerators") will have to run open calls in which bidders (especially SMEs and web entrepreneurs) propose the development of innovative applications on top of FI-Ware and Phase 1 and 2 results.

These accelerators will cover different domains, such as Smart Energy, Health care, Multimedia and Smart AgriFood. Figure 9 shows sectors covered by the Future Internet Accelerators in Phase 3. FIspace based projects are: FInish, SmartAgriFood2, Fractals, SpeedUP_Europe and INCENSe.
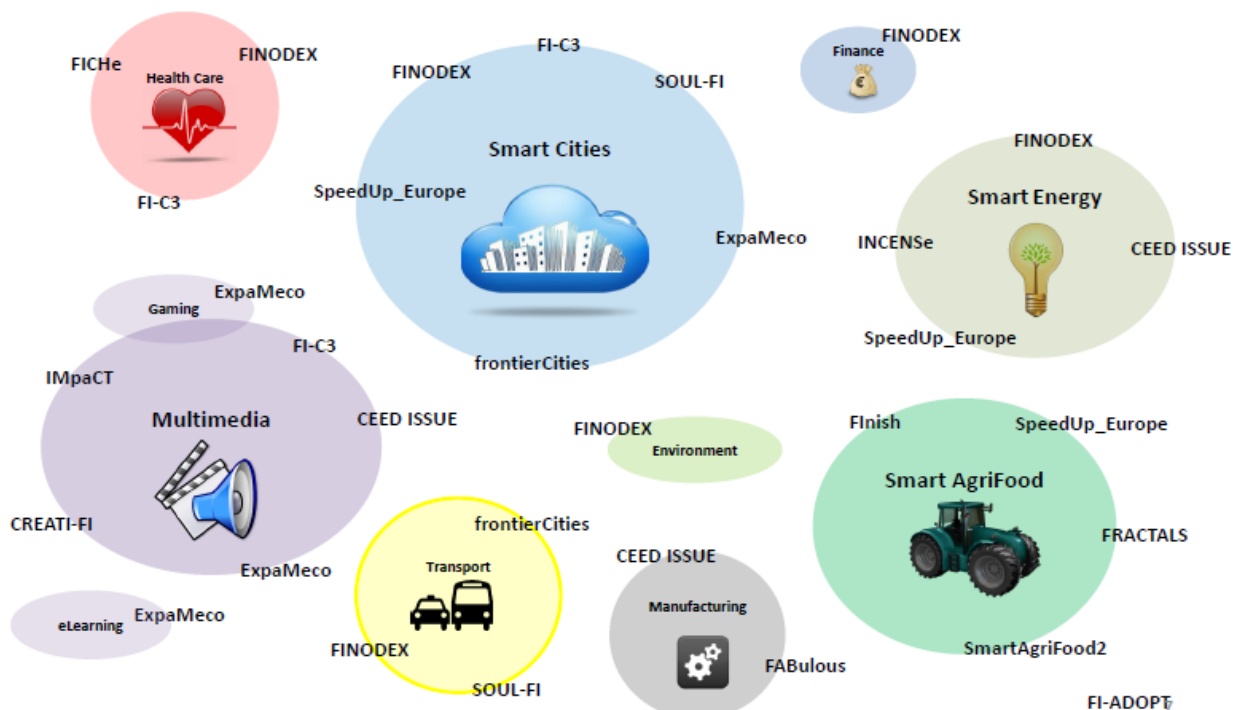

Figure 9:   Sectors covered by Future Internet Accelerators.

4.2.   FI-PPP Phase-3 projects

The effort of the FIspace project to have multiple Phase 3 proposals submitted has been successful. The aim was to have 10 to 15 proposals submitted, which could result in enough new projects to continue build upon the FIspace platform. Although this number of 10 to 15 has most likely not been realised, the aim to have at least 3 – 5 projects that will test, utilize and extend the FIspace platform has been successful.

Of the 16 proposals that are selected, 5 proposals are based on FIspace (SmartAgriFood2, FInish, Fractals, SpeedUP_Europe and INCENSe). Not all of these proposals have involvement of current FIspace partners; FInish, SmartAgriFood2 and Fractals do. Most projects also include organisations that so far have not been involved in the FI-PPP programme. The following sections introduce the FIspace based projects in Phase 3[3].

4.2.1.   SmartAgriFood2

Food security, environmental sustainability and food safety are pressing global challenges. Smart Farming, which intelligently combines sensor-based data services and ICT applications, can contribute significantly to meeting these challenges. However, developments in smart farming are hampered by roadblocks such as lack of data sharing beyond national/regional borders, interoperability issues and lack of infrastructure investment. The FI-PPP phase 1 project SmartAgriFood developed a conceptual, cloud-based architecture for Smart Farming based on FI-Ware Generic Enablers. The Phase 2 project FIspace delivered a fully-functional FI platform for business collaboration with a small number of Apps showcasing how this will work. The aim of SmartAgriFood2 is to further leverage the ecosystem that was established in these projects to support SMEs and web-entrepreneurs in developing a large number of smart farming FI services and applications with high end user take-up. This will be achieved through an open call (4M€) for application development, in particular for the arable, livestock and horticulture farming subsectors. The call will be jointly coordinated with ICT-AGRI ERA-NET through which additional European regional funds will be leveraged (>1.5M€). SMEs and web entrepreneurs will be assisted in the commercialisation and development of European wide end-user markets for their new applications. The focus of the project will be on the implementation of a milestone and mentoring programme involving guidance of SMEs by FI-PPP, Agri-ICT and exploitation experts. This programme consists of three progressive stages, where only the most successfully evaluated SMEs will proceed and secure funding for subsequent stages. Optimal impact will be achieved by utilising partners' expertise in open call management, their networks in the agri-food sector and particularly the EBN network reaching >65.000 innovative start-ups and >250.000 SMEs across Europe.

4.2.2.   FInish

This project will utilise technologies of the Future Internet PPP programme to enable the development and operation of intelligent systems for supply chains of perishable products such as food and flowers. The project includes an ecosystem that brings together: i) business needs of user communities and ii) creative ideas & technological opportunities of software SMEs and web-entrepreneurs. The corner stones of this ecosystem are regional clusters that include close synergies with regional developments and policies that are embedded in European networks.

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[3]   Texts are taken from the abstracts of the submitted proposals for Phase-3.

FInish will use the FIspace platform as a basis and aims to drastically enlarge the number of services/applications available in the FIspace store by involving through open calls SMEs and web-entrepreneurs as developers. As such, the FInish project will enable seamless B2B collaboration and it will empower companies including SMEs and new players to set up and participate in new regional, horizontal and vertical collaboration quickly and at minimal costs. By doing this, FInish wants to give an impulse to the shift from cost-driven to value-based, information-rich supply chains, which will significantly increase the added value, competiveness and sustainability of the domain. More specifically, FInish aims to:

1. Empower small & innovative ICT players to develop high-quality and high-impact solutions for food and flower supply chain networks based on technologies of the FI-PPP programme;
2. Develop a large set of innovative and technologically challenging services and applications for virtualisation, connectivity and intelligence of food and flower supply chain networks;
3. Implement and validate the technologies and concepts developed in the FI-PPP;
4. Support SMEs in creating high-impact apps with Future Internet applications and helping to market their apps cross-border in specialised EU markets and beyond;
5. Ensure business value of services/applications for collaborative business networks in food & flower industry.

4.2.3. Fractals

The purpose of FRACTALS is to support the community of innovative ICT SMEs and Web Entrepreneurs to harvest the benefits of Future Internet Public Private Partnership initiative, by developing applications with high market potential, addressing the needs of the agricultural sector. This support is going to be multi-dimensional in the sense that it aims to span beyond grant assistance to also include:

1. the technical capacity building of ICT SMEs and Web entrepreneurs with respect to developing applications based on FI-PPP infrastructures
2. the testing and validation of applications in an open innovation context (by involving end-users in the testing/validation assignment through a Living Labs environment) and
3. clustering and mentoring services related to entrepreneurship and venture capital finance.

FRACTALS Call will be open to all European SMEs and web entrepreneurs but will additionally focus on areas which are considered as "white spots" with respect to FI-PPP Phase 1 and 2 (Balkans, South East Europe). The Open Call will employ an innovative evaluation method that eliminates personal bias of evaluators, ensuring transparency, equal treatment of all applicants and short time-to-project, tailor-made to the needs of ICT SMEs. FRACTALS is a community-driven project, bringing together 4 ICT SME Associations and linking them with industrial and research partners with leading roles in previous FI-PPP projects. Thus, both participation of SMEs in the Open Call and know-how regarding existing FI-PPP infrastructure (GEs and SEs) are ensured. Last but not least, FRACTALS is coordinated by a funding agency with vast experience in managing Open Calls and monitoring co-funded projects.

4.2.4. SpeedUp_Europe!

SpeedUp Europe! is an end-to-end support programme targeting entrepreneurs in the field of Future Internet and related products and services, covering the entire entrepreneurial journey

from idea inception to prototype development and public-private funding. The project will provide specific coordination and support actions for team formation, seed funding, coaching/mentoring/training and finally access to crowdfunding, EU financing and Risk-Finance.

The project will issue and manage a call to allocate 5.6M Euros of subgrants for projects developing innovative services based on the FI-WARE generic enablers in the areas of Agri-business, Smart City and CleanTech. The project is supported by a combination of virtual tools (online platform for matchmaking, idea generation and call management) and a series of physical workshops organized across Europe, where entrepreneurs can meet, grow their ideas, develop their product and receive feedback from customer, partners and investors.

The consortium assembled for this 24 month project includes leading European start up incubators, business accelerators and other SME support organizations from the Nordics, Benelux and German regions, including crowdfunding and VC funding specialists. The project will also interact closely with key stakeholders such as industry clusters, national innovation agencies and large corporates in the three target domains. The project will reach out to multiple entrepreneurial communities across Europe and organize events with broad coverage, such as an European Entrepreneurship Summit and an inducement prize for the best projects.

The data collected during the project will allow to research new theories about the impact of support programmes on entrepreneurial innovations, based on the type of support consumed by each team and the outcome achieved by each project. These learnings will be used to develop further recommendations toward European policy makers.

4.2.5. INCENSe

The INCENSe project aims to foster innovation and high tech employment in the European energy sector by developing a cross border initiative across Europe which will become the main reference point in the acceleration of innovation in the field of CleanTech and sparking the take-up of the Generic & Specific Enablers related with CleanTech developed by FI-PPP ecosystem, under the umbrella of the FINESCE & FISPACE projects.

INCENSe has been designed to create a strong bridge between FI-PPP and CleanTech stakeholders - especially existing communities of SMEs and WEs. This bridge will be built using technologies in the form of Generic and specific enablers and concepts developed under the previous phases of FI-PPP.

Future Internet technologies offer several opportunities for Smart Energy solutions, including connectivity, management, service enablement, distributed intelligence as well as security and privacy. Future Internet technologies are playing a critical role in the development of Smart Energy infrastructures, enabling new functionality while reducing costs. Namely, within the:

- FINSENY project (Future INternet for Smart ENergY), for instant, consists of 35 key actors from the ICT and energy sectors that will team-up to identify the ICT requirements of Smart Energy Systems. They have led to the definition of new solutions and standards, verified in large scale pan-European Smart Energy trial. Project results will contribute to the emergence of sustainable Smart Energy infrastructure, based on new products and services, to the benefit of all European citizens and the environment.

- FISPACE Project (Phase 2), will also contribute in a transversal way as its objective is driving the development of an integrated and extensible collaboration service, together with an initial set of domain applications, thereby establishing the standard for supporting and opti-

mizing inter-organizational business collaboration in the business sectors of global transport, logistics, and agri-food.

4.3.   Apps developed in the FIspace project's open call

The accelerator projects in Phase-3 of the FI-PPP will add apps to FIspace and extend the use of FIspace to new business communities. These apps will follow those that are currently developed in the FIspace project itself. FIspace has launched an open call for App development in October of 2013. For each use case trial (see chapter 3) in the project two or three apps will be developed in the second year of the project. The following apps will be developed:

- Crop protection information sharing:
    - Formulation of weather scenario's
    - Bad weather alert
    - Hiker app (no partner found)
- Greenhouse management:
    - Greenhouse Crop Monitoring
    - Greenhouse Crop Analyser
- Fish distribution and planning:
    - Booking Probably app (no partner found)
    - Find Cargo Replacement App
    - Pricing Proposal app (no partner found)
- Fresh fruit and vegetable quality management:
    - Inventory Management of RTI Packaging (BOXMAN)
    - Risk Management in the Distribution of FFV (RISKMAN)
- Flowers and plants supply chain monitoring:
    - Botanic Info App
    - Time Temperature Planning App (no partner found)
- Meat Information and provenance:
    - Meat Transparency System App-Query EPCIS repositories
    - Meat Transparency System APP - Discovering data sources (EPICS repositories)
    - Meat Transparency System for aggregating traceability information
- Import-Export of consumer goods:
    - Transport Demand App
    - Shipment Status App
    - Manual Event and Deviation Reporting App
- Tailored information for consumers:
    - Shopping list & Recipes
    - Augmented reality Product Info
    - Push Information

These apps will become available at the FIspace platform during the second half of the FIspace project.

5.   FIspace support for the Large-Scale Experimentation

FIspace will support the expansion of its platform in the large-scale experimentation in two ways. The first one is of course by releasing the FIspace platform according to schedule. This is discussed in the next section. The second way is to collaborate in the period both phases are running.

As the FIspace project is running until the end of March 2015, there is a considerable overlap in time between Phase 2 and Phase-3 of the FI-PPP. This will make it possible to support the projects that start up large-scale experimentation in 2014 and the first months of 2015, when – if everything develops according to plan – the first batch of ICT developers are actively adding functionality to the platform, to make it more attractive for businesses to work with. Our ideas on how this support will be organised are discussed in section 5.2.

5.1.   FIspace releases with Generic Enablers (GE) and Domain Specific Enablers (DSE)

Open technical specification, instrumental to engage with external developer community has been released in September 2013. The release dates for FIspace itself are planned as follows:

- April 2014 (Month 12): Development & Validation Cycle 1: First release of platform, experimental environment & Initial Apps; Working platform for development community to use and build upon;
- September 2014 (Month 18): Development & Validation Cycle 2: Second release of platform including first domain apps;
- April 2015 (Month 24): Development & Validation Cycle 3: Final release of platform with all planned domain apps.

Figure 10 gives an overview of the Generic Enablers used in FIspace. More information can be found on the websites of FI-WARE[4] an XIFI[5].

FIspace Front-End: Cloud Edge GE (Apps & Services Chapter), WireCloud: CompositionExecution GE / CompositionEditor GE (Apps & Services Chapter), Identity Management GE (Security Chapter), Data Handling GE (Security Chapter).

FIspace Store: Repository GE (Apps & Services Chapter), Marketplace GE (Apps & Services Chapter), Registry GE (Apps & Services Chapter), Revenue Sharing System GE (Apps & Services Chapter).

B2B Collaboration Core: Complex-Event-Processing GE (Data Chapter), Publish/Subscribe Broker GE (Data Chapter).

System & Data Integration: Publish/Subscribe GE (Data Chapter), Cloud Edge GE (I2ND Chapter), Data/Context Management GE (Data Chapter), Metadata Preprocessing GE (Data Chapter), Mediator GE (Apps & Services Chapter).

FIspace Operating Environment: DataCenter Resource Management GE (Cloud Chapter), Marketplace GE (Apps & Services Chapter), Mediator GE (Apps & Services Chapter), Things Management GE (IoT Chapter).

SPT Mechanisms: IDM GE, Security Monitoring GE, Data Handling GE, Context Based GE, Anti Malware GE, Secure Storage GE, Role Base Access GE (all within the SPT Chapter).

FIspace Development Toolkit: WireCloud: CompositionExecution GE / CompositionEditor GE (Apps & Services Chapter), CDE (Developer Community & Tools Chapter), Catalogue (Developer Community & Tools Chapter), Testing Validation (Developer Community & Tools Chapter).

Figure 10:   Planned use of Generic Enablers in FIspace

5.2.   Support from FIspace to Phase-3 projects

The FIspace project will support the FI-PPP Phase-3 projects by[6]:

− Transferring knowledge to accelerators and provide them with tools to attract developers.

− Providing tools, training and support for developers.

− Supporting the development of sustainable ecosystems (based on chapter 3 description).

Figure 11 visualizes, in a three-year view, the plan to support Phase-3 projects in alignment with the FIspace different releases. It can be summarized as follows:

− May 2014 – Sep/Oct 2014: Engagement with Phase-3 projects

− Oct 2014 – Apr 2015: Knowledge transfer, educational and training activities. Support to Apps developers community building and ecosystem incubation.

5.2.1.   The engagement period

The engagement period is defined by FIspace project as the period from when the Phase 3 projects get on board until when the SME/App developers get on board through the phase 3 projects Open Calls. At the moment of releasing this report, Phase 3 projects are in negotiation phase with variable starting dates along of Spring-Summer 2014. Phase 3 open calls are planned to be launched and announced on September 16th. App developers/SMEs are therefore expected to be on board during Autumn-Winter 2014[7]

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[6]   Input from D500.1.4

[7]   This dates will be reviewed once more specific information from Phase 3 projects is provided to FIspace
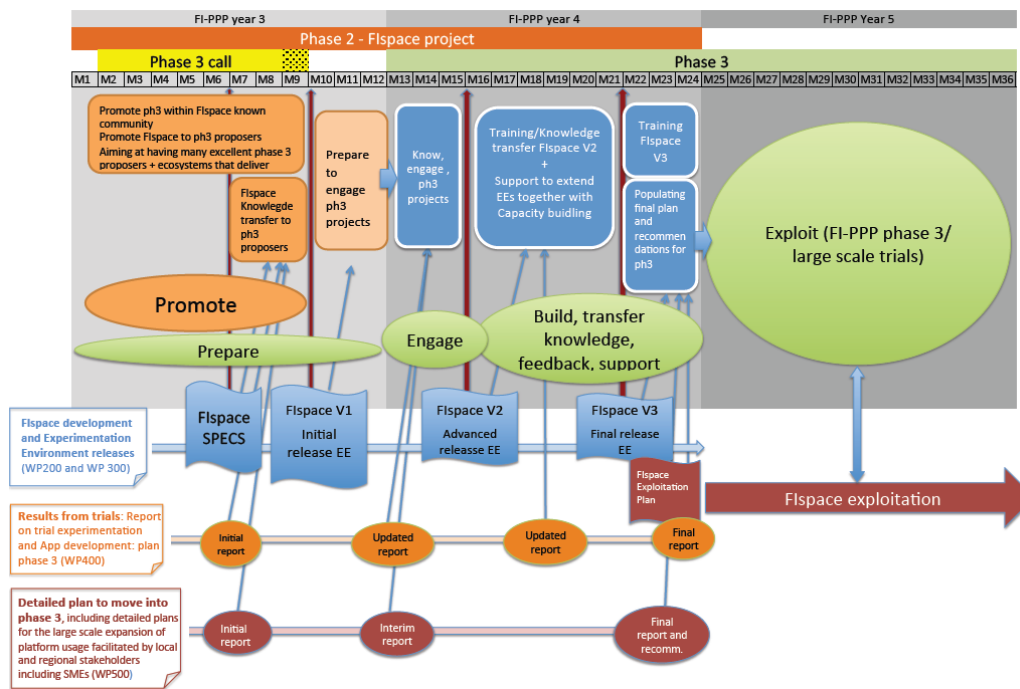
Figure 11:   Planning of FIspace to support large-scale experimentation.

Phase 3 projects will be of a very different nature, and will have a different structure, capabilities and focus. From the engagement point of view, FIspace will differentiate them in two different groups:

  – Phase 3 projects that built their proposals already considering the FIspace platform, and having certain level of knowledge on the platform capabilities.

  – Phase 3 projects that did not build their proposals considering FIspace platform but could be interested in exploring possibilities because they follow a multi-domain approach (e.g. smart city type of proposals, or a health and food type of proposals, etc.), or because they deal with business-to-business collaboration and would profit from the benefits that the FIspace platform will offer.

The only difference in engagement between these two groups might be the speed and dynamics of engagement. During the engagement period FIspace project will offer to the Phase 3 projects:

  1. **FIspace "Welcome package" and welcome face-to-face session(s).** This welcome package consists of information about the FIspace platform capabilities for development, experimentation, and exploitation, support provided and terms and conditions. In particular:

       a. FIspace story including information about the different pilots

       b. Summary and release plan of platform features (what and when)

       c. High level explanation of the 2 extension mechanisms (adding value-add functionality through Apps, and configuration workflows)

       d. Basic explanation of the technical roles needed (specifically user, App developer and Business Architect),

       e. Availability of experimentation environment and documentation

f. Some indication in business model and exploitation possibilities, terms and conditions

This welcome package will target SME umbrella organisations or accelerators (or similar organisations that in the Phase-3 consortia have a role to (technically) support SME/web-entrepreneurs). The welcome package consists in a several electronic resources and a face-to-face session (tailored according to phase 3 starting dates and inputs). The welcome package and face-to-face session will be delivered during Summer 2014 helping accelerators to prepare the launch of their open calls.

2. **Direct support to accelerators:** FIspace is establishing an internal task force to support Accelerators. Monthly virtual meetings will be arranged in between the Accelerators involved and the FIspace task force, to commonly assess challenges and issues and evaluate progress. The task force and dynamics of communication will be defined and discussed with phase 3 projects during the engagement period.

During the engagement period FIspace will discuss with phase 3 projects other needs not envisaged by FIspace at the moment (e.g. creation for a FAQ list to support their Open calls) and will update the training and support plan based on that input and the possibilities of FIspace as a project.

5.2.2.   The development and experimentation period

This is the period where the Accelerator projects bring SME/web-entrepreneurs (developers) into their projects and the FIspace platform. During this period FIspace will provide:

1. **Best practices and examples from some of the FIspace pilots,** in the format of business brochures, for inspirational purposes to Accelerators and app developers.

2. Reference implementation of an App (i.e. a fully-fledged App that uses all / most platform features and that can be used for App developers to learn from and bootstrap their contributions) (Autumn 2014)

3. **Collaborative and online supporting tools**: includes the online version of the welcome package in addition to the guides for the FIspace for users and for developers, technical documentation for all FIspace components and apps. The FIspace website and bitbucket (linked to the FIspace website) will be the entry point to access these materials.

a. https://bitbucket.org/fispace/doc/wiki/Home → Online documentation

b. https://bitbucket.org/fispace/core/issues?status=new&status=open   →   Issues that are discussed by developers; could be used in similar form for getting support to SMEs concerning FIspace

c. http://dev.fispace.eu/ → this is the FIspace repository where documentation on FIspace and API Specifications can be found, using the commercial solution of bitbucket.

4. **Preliminary training for trainers** that consists in an initial face-to-face training session for Accelerators combined with webinars (online educational sessions described in point 5). The timing for the face-to-face training session(s) will depend on the inputs from the phase 3 projects themselves (initial estimation in early autumn 2014).

5. **Online educational materials:** extending the information provided in points 1.b to 1.e (section 5.2.1) including a session about how bitbucket is applied to FIspace.

6. **Direct support to developers:** FIspace is not intended to provide direct support to developers and SMEs but phase 3 projects/accelerators are. However FIspace internal developers and external (phase 3 selected) will work with the same issue tracking system (bitbucket) that will facilitate the peer-to-peer collaboration between developers. Developers will have access to online documentation and training materials

7. **Direct support to accelerators:** as explained in the engagement period.

5.3.   Planning from the view of the user communities

To really involve the end user with FIspace it is necessary that the platform is up and running and several apps are available. The users in FIspace are different of nature (see also D200.1), there are:

1. **End-Users**: the business experts using the FIspace to conduct the daily business activities, with special focus on their interaction and collaboration with business partners;
2. **Business Process Engineers:** the ICT experts (internal or external) that support End-Users in the configuration of the FIspace for their individual business needs, particularly for the definition of customized business processes by using the FIspace Apps and the FIspace's customization support services (on various levels: company / organizational unit / individual);
3. **App Developers**: the software and system providers who offer solutions and applications in form of Apps via the FIspace.

All these user groups are needed to deploy the platform. For the App developer the release of the platform is important to start working on the App development and the end-user would need developed apps to start using the platform.

A first release of the platform is planned in M12 and this will then be further developed and filled with apps from the open call in FIspace until M24 of the project. In 2014 the first open call will be opened by the Phase 3 projects.

FIspace will discuss with the phase 3 projects using FIspace results the scope of their open calls, and in particular in relation not only the development but the deployment, experimentation and testing. The user communities are envisaged to be involved in the idea generation, co-design and experimentation periods. As a project focused on engagement of the user communities (demonstrated by the nature of the pilots and project partners involved in the project) FIspace can provide support to Accelerators in involvement of users, based on both best practices from the pilots and Living Lab methodologies.

By the end of Phase 3 (in 2016) the FIspace will probably have over 150 apps available, which are developed in the programme. However the apps on the platform are not necessarily limited to these, so if the platform is adopted by organisations outside the programme there is a possibility that the development of the platform is much larger then here described. This scenario will be further elaborated in the next chapter.

6.   Large-scale expansion outside the Phase 3 of the FI-PPP

This chapter focusses on the large-scale expansion of the FIspace platform outside the FI-PPP programme.

6.1.   Introduction

The biggest challenge for the FIspace platform is to ensure the existence of the platform after the ending of the FIspace project and FI-PPP programme. If the FIspace consortium succeeds in engaging organisations from outside the FI-PPP community to use the platform, it will be easier to attract more new organisation and also have a better life expectancy of the platform after the ending of the project.

6.2.   Potential areas for expansion

The potential areas for expansion of the platform are not only reserved for FI-PPP partners. It is encouraged that other stakeholders also use the knowledge provided by FIspace in order to start using the platform.

Expanding the FIspace platform outside FI-PPP could be done in several ways:

- The use case trials from Phase 2 in FIspace could be used as a starting point.
  - The trials with the companies involved could be seen as trials in that industry for business collaboration and with a "snow-ball" method, probably involving indus-try organisations, the collaboration could be extended to other business part-ners. These business partners could be attracted as partner by providing more innovative apps.
    - An example would be to roll out the experiences in the flowers and plants trial to the whole flower industry in the Netherlands or Europe, or global (as quite some flowers in Dutch auctions originate from countries like Kenya and Ethiopia).
  - Make connections with other business companies from other FI-PPP projects, which could be interested to expand to the FIspace platform, e.g:
    - tailored information for consumers with results from the Phase 2 project on health (FI-STAR) and further expand the apps in profiling on the handheld device of the consumer.
    - smart spraying and providing content to hikers in the rural area (Phase 2 project FICONTENT2).
    - use insights from the Phase 1 project on the environment (ENVIROFI) that developed methods for plant recognition and use them in business col-laboration concerning precision farming.
- A totally different option to expand the FIspace platform is to look to a certain set of technologies or apps that are of critical importance for uptake of the platform, e.g.:
  - several ICT companies would like to contribute to more innovative solutions for identification management, data-authorisations and security, linked to a certain set of generic enablers.
  - a group of ICT companies that would like to work on the Internet of Things with sensor technology in farming.
  - a group that would like to blend insights from the gaming industry with learning in business collaboration and sustainable consumption (serious gaming).

- Alternatively an expansion is possible in the field of technical integration. FIspace is working with legacy systems like ERP or traditional Farm Management Systems. It could be attractive that a company ecosystem works on expanding FIspace and make the transition from current legacy systems easier. That gives the leaders of such ecosystems (e.g. SAP for its ERP system) a natural stake to take up these developments.
- Another option to expand FIspace is to link it with administrative data.
  - For the agri-food sector: All farmers are registered (at least those that apply for funds under the Common Agricultural Policy), land and animals are registered and food firms are registered at chambers of commerce. In addition there is much data in governments related to land use and food safety that is or could be made available as open data. This provides opportunities for regional development agencies and governments to make data available, develop innovative apps in the FIspace platform that provide advice to farmers and food business and use FIspace to create LinkedIn-like communities for businesses.
  - A port or airport authority could do something similar in tracking the flows of goods in its (air)port and to support the collaboration between the different types of companies and authorities (ship pilots, traffic control, stevedores, ship brokers, logistic service companies etc.)
  - Similarly logistics companies like Kuhne+Nagel could use the platform to organise their interaction with all the small suppliers to which they sometimes outsource activities like last-mile transport, ship brokering etc.

The table in Annex I Examples of large-scale experimentation needs provides some examples of these large-scale experimentation needs. The examples are rather detailed, to give extra insights, in many cases they can easily be combined. These examples can be used as input for industry partners to get ideas on how they can use the FIspace platform to their benefit.

More suggestions on innovative developments in the domain of agriculture and the food chain can be found in a deliverable from SmartAgriFood, published on its website: SAF ICT induced innovation.[8]

6.3.   Involvement of industry partners

The involvement of industry partners (end users) in the platform will first of all be based on a snow-ball method in which end users in the trial cases and Phase-3 projects (apps) will invite business partners to register and start using FIspace.

In addition different actions from the FIspace project and Phase-3 projects can be initiated to involve new end users. These actions involve presentations at industry meetings as well as publications and mailing-campaigns.

6.4.   Public authorities uptake of the FIspace platform

Public authorities could also take up the use of the FIspace platform. Authorities need to receive data from companies and the FIspace platform could be used to streamline these data flows. In these data flows the authorities are acting as a part of the supply chain. FIspace could for instance be used to provide inspection data, requests for subsidies and also to lower the administrative burden for companies with innovative procurement of the FIspace platform.

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[8] www.smartagrifood.eu/sites/default/files/content-files/downloads/SAF%20ICT%20Induced%20Innovation.pdf

Furthermore the FIspace platform can support the development of innovative policy pilots in several regions. FIspace partners could start discussions with the public authorities in their countries to get them interested in the platform.

6.5.   Uptake of the FIspace platform

FIspace will not wait until the end of the project to start with getting these user groups involved with the platform. The 8 trails in FIspace are actively involving stakeholders from outside the project to collaborate in their trials and by doing so they are working on the update of the FIspace platform outside of the project. To make the FIspace concept more tangible to outsiders the trials are also working on concrete business cases, to create a better picture of the benefits for the users by using the FIspace platform.

The discussions with potential FIspace users do not wait until the end of the project. From day 1 of the project the partners are actively working on involving their communities to FIspace.

7.   Epilogue

This report has been written after the first 12 months of the FIspace project, mainly to inform the FI-PPP Phase 3 projects and the SME / web entrepreneurs that will propose innovative applications in the open calls of these projects. The report contains the ideas the FIspace project currently has on expansion of its platform in large-scale experimentation.

Undoubtedly these ideas will evolve. An update of this report will be made at M20 (end of 2014).

We are very interested to come into contact with regional or national innovation projects or industry associations that have an interest in setting up projects to introduce and expand FIspace in their region or industry. We are open to discuss with them other opportunities to contribute to the expansion of the FIspace platform.

More relevant public information can be found in the following documents:

- D200.2 FIspace Technical Architecture and Specification
- D400.2 Progress report on trial experimentation and App development and initial plan for Phase-3 rollout
- D500.2.3 Aggregation and Feedback to Generic Business Model and FI-PPP

These have been published in 2013 at www.FIspace.eu. For ideas on domain specific applications, readers could also have a look at the previous projects' deliverables www.FInest.eu and www.SmartAgriFood.eu.

We realise that end-users and app developers would have preferred a more stable situation with perhaps a first release of FIspace, a clear view on the commercialisation of the FIspace platform including its business model and licensing arrangements. However given the design of the FI-PPP, that is not feasible. We hope to provide that information in the coming 12 months. That means that app developers that join Phase 3 of the FI-PPP will join a journey, just as previous projects did and do in Phase 1, Phase 2 and Phase 3. The journey has a more or less clear destiny, but the roads to be travelled and the weather conditions to be experienced are uncertain. That is something innovation and business development have in common.

For further information the FIspace website: www.fispace.eu is available. Mails can be sent to our info account (Fispaceinfo@fispace.eu). In case you want to contact the coordinating authors of this report, mail to: Krijn.Poppe@wur.nl or Annelise.deSmet@wur.nl

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9.   Annex I Examples of large-scale experimentation needs

Potential Area for Large-scale Experimentation with the FIspace-platform	Short Description of an example in the framework of the EU call Phase-3[9]
Smart Spraying: technical machine / precision farming	Consortium partners (SME-associations, incubators, regional development authorities etc.) introduce FIspace to farmers, spraying contractors, food processing industry, machinery dealers etc. and lure them is as users by providing more (innovative) apps.
B2B tracing and tracking in fish, meat and vegetables	Consortium partners (SME-associations, incubators, regional development authorities etc.) introduce FIspace to all partners in the food chain for business=to-business solutions on tracing and tracking of perishable goods, including the prevention of food identity fraud. This is based on the three use case trials.
Horticulture on the move	Consortium partners (SME-associations, incubators, regional development authorities etc.) introduce FIspace to farmers, spraying contractors, food processing industry, logistic service providers, transport companies, retailers etc. and lure them in as users by providing more (innovative) apps.
Smart Spraying: Connecting farmers and hikers	Consortium partners (SME-associations, Tourism board, regional development authorities etc.) introduce FIspace to farmers, spraying contractors, food processing industry, machinery dealers, but also to hikers, tourists, nature management firms etc. and lure them is as users by providing more (innovative) apps that provide hikers and tourist information on farm management as they pass by (or intend to do so).
Food and health: Profiling and advice on the smartphone of the consumer	Consortium partners (SME- and consumer associations, incubators, regional development authorities etc.) introduce FIspace to retailers, consumers, food processors and health organisations and lure them in as users by providing more (innovative) apps.
Tracking and Tracing towards the consumer and patient	Consortium partners introduce FIspace to retailers, consumers, food processors, but especially also to hospitals, doctors and pharmacies to use FIspace's tracing and tracking options for food, medicines and personal food (with medicines added), and lure them in as users by providing more (innovative) apps in a secure environment with new options to advise and support patients at home. This has a potential mix with wearable technology (gadgets that measure health and sports activities).
(Food) Consumers in urban setting	Consortium partners introduce FIspace to retailers, consumers, food processors and logistic solution providers lure them in as users by providing more (innovative) apps. This is based on the idea that urban farming is a new niche and that innovative solutions could be provided by using FIspace and work in Phase-1 by the use case Instant Mobility on the Last-Mile Delivery issue.
Food and Out of Home	Consortium partners introduce FIspace to retailers, consumers, food processor, food service companies and restaurants; lure them in as users by providing more (innovative) apps based on the FIspace project as well as trials on content (travel guides, restaurant services, recipes) developed in FICONTENT.
Food waste	Consortium partners introduce FIspace to partners in the food chain; lure

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[9]   In the example we assume often three regions, as the EU call requires at least 3 countries to collaborate. However it is not allowed that only SME ICT companies in three regions are targeted. The consortium should target ICT companies all over the EU or the European Research Area. As FIspace has strong network-effects (like telephones, the more businesses are connected, the more attractive it is to join), a regional approach can however be attractive by other criteria or just in practice by building the ecosystem of businesses that use the platform in that region.

Potential Area for Large-scale Experimentation with the FIspace-platform	Short Description of an example in the framework of the EU call Phase-3[9]
	them in as users by providing more (innovative) apps based on the FIspace project to deal with tracing and tracking and reduction of food waste, as well as optimizing its use in the bio-based economy (including energy).
Cows in the Cloud; Sensor data in Livestock	Consortium partners (SME-associations, incubators, regional development authorities etc.) introduce FIspace to farmers, veterinaries, slaughterhouses, machinery dealers (milking robots) etc. and lure them in as users by providing more (innovative) apps for precision livestock farming.
Satellite data	A consortium introduces FIspace to businesses that can innovate in their operations by making extensive use of satellite data that becomes available freely from Europe's Galileo program. Companies (e.g. farmers, food business, logistics) are lured into using the FIspace platform by providing innovative apps that use satellite / remote sensing data.
Privacy consortium	A consortium introduces FIspace to businesses that are attracted to FIspace due to a high level of privacy and security. Companies that provide identity management, solutions with one-(credit)-card for all password protect access, encryption services etc. are targeted to provide FIspace add-ons that make the platform attractive for sectors / businesses with a high demand for such add-ons.
Virtualisation and serious gaming	A consortium introduces FIspace to businesses that can innovate in their business by making extensive use of virtualisation and (serious) gaming. In FIspace the data from a (food) chain becomes available, and this provides opportunities to exploit such techniques. Companies (e.g. farmers, food business, logistics) are lured into using the FIspace platform by providing innovative apps that provide add-ons that virtualise the chain or let one play (serious) games for learning or what-if scenario analysis..
SAP (or Atos or ..) Eco system	A consortium led by a large ICT company (like SAP or ATOS) that has an eco-system of spin-outs, start-ups and add-on suppliers, invites them to create innovative apps, also (but not only) in the area of linking FIspace to its current legacy systems (like ERP systems). At the same time it introduces FIspace to its current clientele.
Start-up communities	A consortium of venture capitalists and business angels or tech park managers offers FIspace to start-up communities in web-and apps development and runs a competition for attractive apps. Having these proposals judged by Chief Information Officers from food businesses and logistic solution providers it promotes the use of the enriched FIspace platform.
"Green" - Eco / Sustainability	A consortium of venture capitalists and business angels offers FIspace to start-up communities in web-and apps-development, as well as current providers of websites that support consumers in 'green' choices of food and transport, and runs a competition for attractive apps in the area of sustainability. Having these proposals judged by Chief Information Officers from food businesses and logistic solution providers in addition to experts from the sustainability organisations it promotes the use of the enriched FIspace platform.
FIspace as LinkedIn for Farmers	A consortium of (semi) governmental organisations (like CAP paying agencies and chambers of agriculture / levy boards) and farmers' organisations organise the take up of FIspace by farmers and their business relations. Farmers and their business relations are lured into using the FIspace platform by providing innovative apps (to be developed by apps developers) that provide add-ons for application for CAP direct payments (with GIS component), register animal movements, records for GlobalGAP, BRC and related private standards, and all other paperwork between farmers on one hand and food producers and gov-

Potential Area for Large-scale Experimentation with the FIspace-platform	Short Description of an example in the framework of the EU call Phase-3[9]
	ernmental agencies on the other hand.
Big/Open data	A consortium of regional development organisations / venture capitalists organise the take up of FIspace by farmers, food chain partners and consumers. They are lured into using the FIspace platform by providing innovative apps (to be developed by apps developers) that are based on exploiting open data sets and harvest data for big data analysis.
Services to Africa or BRIC: 'Broadband Aid'	A consortium of development agencies and content providers (university, international publisher) promotes the take up of FIspace in African (or BRIC) food chains, working for the European market as well as for improving local (African / BRIC) food markets. Many African farmers use smart phones to get advice and there is a starting ICT industry. European content providers might realise that this is an excellent chance to make European expertise available under new business models. Specific innovative apps are to be developed to support this.
Port management	A port or airport authority could set up a FIspace platform for tracking the flows of goods in its (air)port and to support the collaboration between the different types of companies and authorities (ship pilots, traffic control, stevedores, ship brokers, logistic service companies etc.).
Logistic network	In a similar way logistics companies like Kuhne+Nagel could use the platform to organise their interaction with all the small suppliers to which they sometimes outsource activities like last mile transport, ship brokering, container storage, etc.