



Deliverable D500.7.3

Detailed Plan to move into Phase 3 – Third Version

WP 500 – Task 570

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The Fspace Project

As a use case project in Phase 2 of the FI PPP, Fspace 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. Fspace will focus on exploiting, incorporating and validating the Generic Enablers provided by the FI PPP FI-Ware project 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 work in the future. These 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.

The project will lay the foundation for realizing the vision and prepare for large-scale expansion, complying with the objectives and expected results of the Phase 2 use case projects. To achieve these outcomes the project will focus on the following four primary work areas, for which the main concepts and approach are outlined below:

1. **Implement the Fspace as an open and extensible Software-as-a-Service solution** along with an **initial set of cross-domain applications** for future B2B collaboration, **utilizing the Generic Enablers** provided by the FI-Ware
2. **Establish Experimentation Sites across Europe** where **pilot applications** are tested in **early trials** from the **Agri-Food and the Transport and Logistics** domains
3. **Provide a working Experimentation Environment** for conducting **early and large-scale trials** for Future Internet enabled B2B collaboration in several domains, and
4. **Prepare for industrial uptake and innovation enablement by pro-active engagement of stakeholders and associations from relevant industry sectors and the IT industry.**

Project Consortium

- DLO; Netherlands
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- IBM; Israel
- KocSistem; Turkey
- Aston University; United Kingdom
- ENoLL; Belgium
- KTBL; Germany
- NKUA; Greece
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Dissemination Level

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|-----------|---|---|
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| 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) | |

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Document Summary

This report informs the public about the expansion of the FIspace platform in large-scale experimentation that takes place in FI-PPP Phase 3 projects, also known as FIWARE accelerators. It also provides information about the plans for commercialisation of the FIspace platform.

In total there are 16 FIWARE accelerator projects of which 4 are focusing on the agri-food and transport & logistics domain and therefore potential candidates to use the FIspace platform. From that development it is estimated that after the end of Phase 3 in 2016, approximately 150 Apps and related composite applications will be added to the FIspace platform. It is expected that Apps will also be added from other developments, outside the FI-PPP. Altogether this will establish a profound basis for developing FIspace into a commercial product that is viable without any public funding. Expansion of the platform outside the current community is of vital importance for extending the platform after the project.

This document serves as a guideline both for App developers from FIWARE accelerators and App developers that come from outside the FI-PPP community. It includes a description of the current status of technical and commercial aspects of the platform; the support that FIWARE accelerators can expect from FIspace; and opportunities for expansion outside the FI-PPP community. The document is also useful for end-users that consider to use FIspace for B2B collaboration, especially between SMEs, and for ICT companies that consider to exploit an instance of the FIspace platform.

Abbreviations

| | | | |
|-----------|---|-----------|---|
| App | Software Application | IoT | Internet of Things |
| 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 İletişim Hizmetleri A.S. |
| BYOD | Buy Your Own Device | KPI | Key Performance Indicator |
| CentMa | CentMa GmbH | KTBL | Kuratorium fuer Technik und Bauwesen in der Landwirtschaft E.V. |
| D | Deliverable | LSP | Logistics Service Provider |
| DLO | Stichting Dienst Landbouwkundig Onderzoek | M | Month |
| DoW | Description of Work | MRTK | Norsk Marinteknisk Forskningsinstitutt AS |
| EC | European Commission | NKUA | National and Kapodistrian University of Athens |
| e.g. | Exempli gratia = for example | PC | Project Coordinator |
| ENoLL | European Network of Living Labs | PlusFresc | Supermercats pujol S.L. |
| ERP | Enterprise Resource Planning | RTD | Research and Technological Development |
| EU | European Union | SDK | Software Development Kit |
| EuroPool | Euro Pool System International Deutschland GmbH | SME | Small and Medium Sized Enterprise |
| FI-PPP | Future Internet Public Private Partnership | ST | Sub-Task |
| Floricode | Stichting Floricode | T | Task |
| GA | Grant Agreement | TOG | X/OPEN Company Limited |
| GE | Generic Enabler | UDE | Universitaet Duisburg-Essen |
| GPLv3 | General Public License version 3 | UPM | Universidad Politecnica DE Madrid |
| GS1 G | GS 1 GERMANY GMBH | WG | Working Group |
| IBM | IBM Israel - Science and Technology Ltd | WP | Work Package |
| ICT | Information and Communication Technology | WU | Wageningen University |
| IDM | Identity Management | | |
| i.e. | id est = that is to say | | |
| iMinds | IMINDS VZW | | |

Table of Contents

| | | |
|-----------|--|-----------|
| 1. | Introduction..... | 9 |
| 2. | Fspace – the collaborative business platform..... | 10 |
| 2.1. | The concept of Fspace | 10 |
| 2.2. | Agile formation of business networks: finding & binding before facilitating data exchange..... | 11 |
| 2.3. | Seamless collaboration and data exchange | 11 |
| 2.4. | Deployment of apps and services..... | 12 |
| 2.5. | Benefits for app providers | 12 |
| 2.6. | Benefits for governments | 12 |
| 2.7. | How will Fspace be introduced to the market?..... | 13 |
| 2.8. | The future of Fspace | 13 |
| 3. | Technical aspects of the Fspace platform..... | 15 |
| 3.1. | The origin of Fspace..... | 15 |
| 3.2. | The Fspace concept | 16 |
| 4. | The Fspace project and Accelerator projects | 20 |
| 4.1. | The Fspace project..... | 20 |
| 4.2. | Phase-3 Large-scale expansion | 21 |
| 4.3. | Support from Fspace to Phase-3 projects | 22 |
| 4.3.1. | The engagement period..... | 23 |
| 4.3.2. | Knowledge transfer..... | 24 |
| 5. | The Fspace Business Model | 26 |
| 5.1. | What will Fspace offer? | 26 |
| 5.2. | Problems addressed | 27 |
| 5.3. | Positioning | 27 |
| 5.4. | Actors on the Fspace platform | 28 |
| 5.5. | Value proposition | 29 |
| 6. | Organisation of Fspace after the project | 31 |
| 6.1. | Introduction | 31 |
| 6.2. | Fspace Foundation..... | 32 |
| 6.3. | Fspace LAB | 33 |
| 6.4. | Commercial Fspace platform operators..... | 33 |
| 6.4.1. | Platform revenues in commercial Fspace exploitation | 34 |

6.4.2. Costs.....35

6.5. Building the FIspace ecosystem.....35

6.6. Realising the FIspace Platform and related IPR issues36

7. Epilogue.....38

8. References39

9. Annex I Phase 3 Accelerator projects that possibly will use FIspace40

9.1. SmartAgriFood240

9.2. FInish.....40

9.3. Fractals.....41

9.4. SpeedUp_Europe!.....41

10. Annex II Apps developed in the FIspace project’s open call43

List of Figures

Figure 1: The current trials that test and validate Flspace currently.....13

Figure 2: A stylized cross-domain operations framework15

Figure 3: Motivation and impact of Flspace16

Figure 4: The function of Flspace in relation to legacy systems, Internet of Things and Generic enablers (GE)17

Figure 5: The high-level architecture of Flspace.....18

Figure 6: Approach and key results of Flspace (M1 = 1 April 2013)20

Figure 7: Sectors covered by the 16 FIWARE Accelerators. Four projects (red encircled) focus on the Agri-Food domain, including logistics.22

Figure 8: Planning of Flspace to support large-scale experimentation.23

Figure 9: Three main roles that can be addressed in providing B2B solutions to the user.....27

Figure 10: The viability of Flspace lies in the number of end-users from various sectors (at the top) and solutions providers (at the right) that can be engaged through the platform.28

Figure 11: Commercial development of the Flspace platform based on a foundation.....32

Figure 12: Possible revenue streams for various users of a commercial instance of a Flspace platform34

List of Tables

Table 1: Description of use case trials in Flspace.20

Table 2: Intellectual property right issues36

Table 3: GE Licenses.....37

1. Introduction

Fspace 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.

Fspace 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. Fspace 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 Fspace (related to market impact in the food and logistics sector); and
- (3) Delivering a consistent plan to move into the FI-PPP Phase 3.

These 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 twenty months of the Fspace project, mainly to inform projects in the FI-PPP Phase 3 projects - currently known as FIWARE accelerators - and other interested stakeholders. It proceeds from two earlier versions (Poppe & De Smet, 2013; Poppe & De Smet, 2014) that were written after 6 and 12 months in the project mainly to inform proposers of projects in the FI-PPP Phase 3 project.

This report will demonstrate the current ideas from the Fspace project on expansion of its platform in large-scale experimentation and commercial exploitation. Therefore it serves as a guideline both for App developers from FIWARE accelerators and App developers that come from outside the FI-PPP community.

The next chapter starts to provide general information about Fspace and what it wants to achieve. Chapter 3 extends this introduction with more technical and commercial details. Chapter 4 describes the FIWARE accelerators for large-scale experimentation that are expected to use Fspace and provides a description of the support they can expect. Chapter 5 describes the current Fspace business model. Chapter 6 provides an outlook on the future commercialisation of the Fspace platform after the project. Chapter 7 provides the conclusions and gives some reflections.

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 in what is called the Internet of Things (IoT). 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) and can be layered, meaning that apps can use the output of other apps as an input. 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 mention 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.

Fspace 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 Fspace data security and management services.

2.4. Deployment of apps and services

Fspace 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 Fspace reduce transaction costs between business partners. Fspace 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

Fspace 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 for 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 Fspace 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 Fspace within the European Union's Future Internet Public Private Partnership (FI-PPP) programme. The Fspace 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 Fspace 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. Fspace 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, Fspace provides app developers with easy-to-use guides and templates; a software development toolkit; and a testing and certification service for apps. Fspace 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 heavily regulated industries such as logistics and agriculture. This means that governments can also benefit from using Fspace 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 Fspace creates and strengthens markets for IT platforms, for apps and even

for data. It lowers transaction costs in doing business, especially for SMEs. Fspace brings innovation (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 Fspace be introduced to the market?

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

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

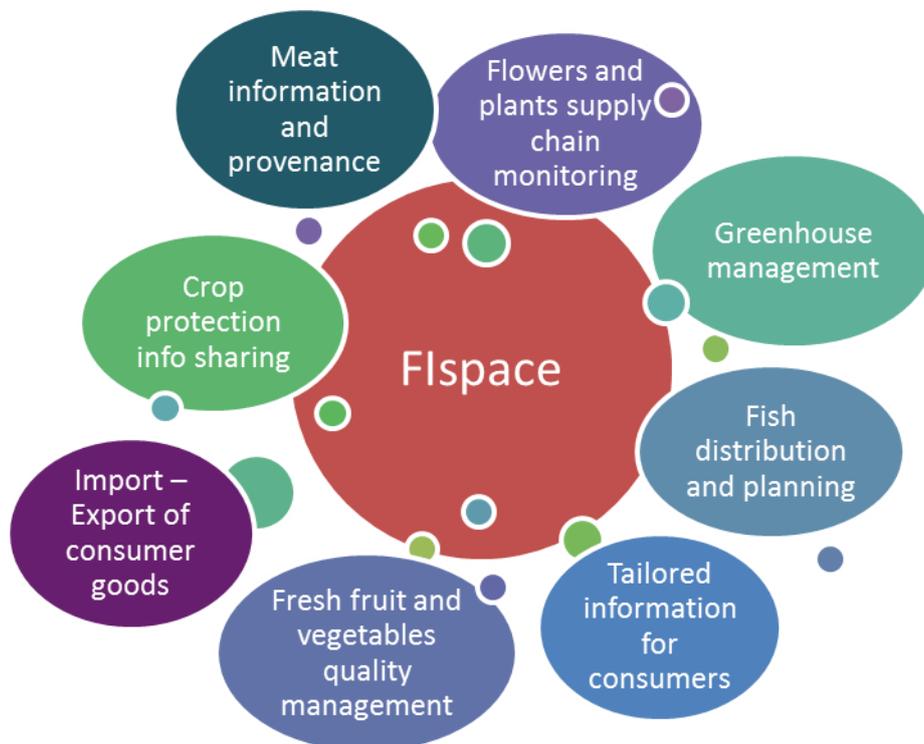


Figure 1: The current trials that test and validate Fspace currently

2.8. The future of Fspace

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

Fspace is open for commercialization strategies once the development phase ends in April 2015. It is planned that the initially released version of the platform will be open source, issued by the Fspace Foundation to protect that open source and promote its use and further development. It is currently anticipated that interested companies will build on this initial release to commercialize the platform. This means that it is possible to have several Fspace instances (or 'platforms'), just like there are several internet browsers (like Chrome, Safari, Internet Explorer etc.) or mail applications.

The partners - representing the end users – that are 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 to one or several commercial software platforms by a technology provider.

To potential investors the FIspace development project offers the open specifications of the FIspace platform as well as open source implementations of most of the FIspace platform building 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 activities 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. More details about the possible future of FIspace can be found in Chapter 6.

3. Technical aspects of the FIspace platform

3.1. The origin of FIspace¹

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 (Figure 2). 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 products to market as efficiently and effectively as possible. Figure 3 summarizes the motivation and impact of FIspace.

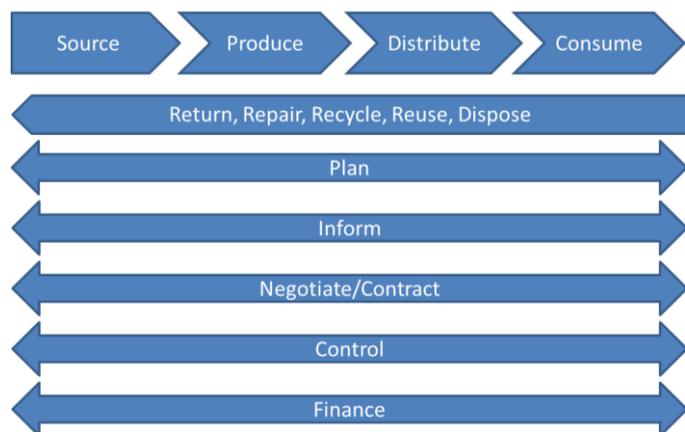


Figure 2: A stylized cross-domain operations framework

¹ Adapted from the FIspace Description of Work

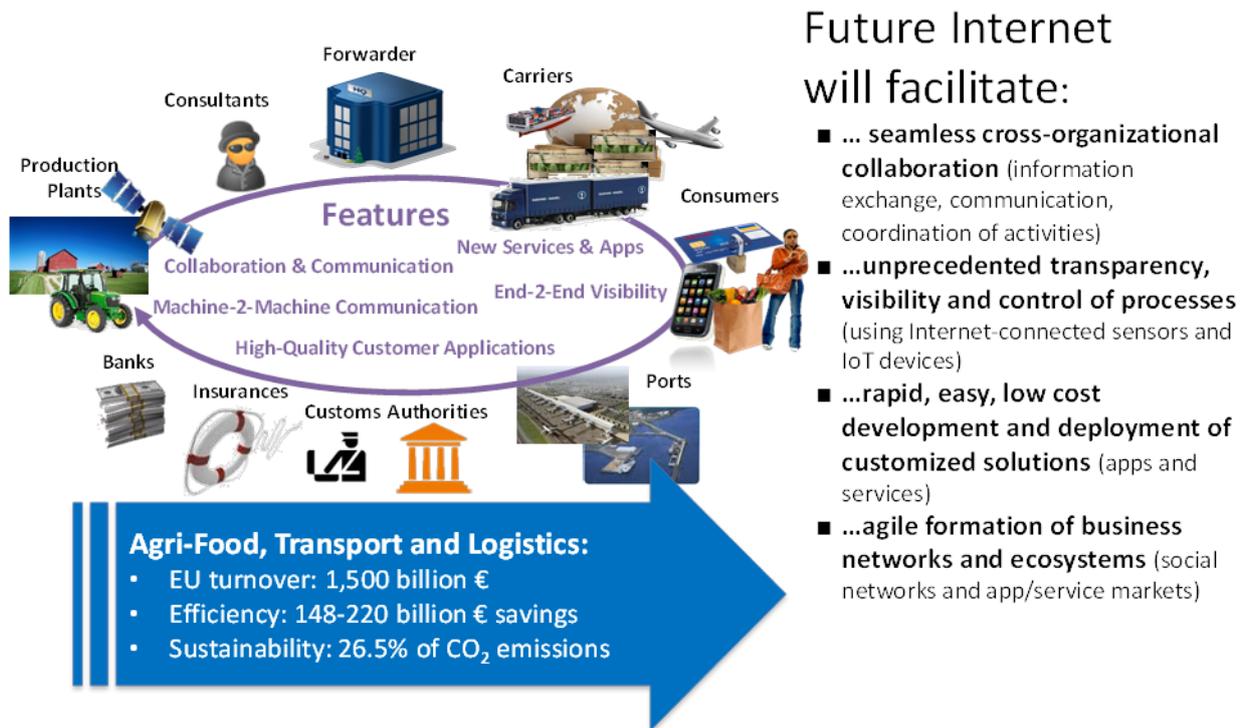


Figure 3: Motivation and impact of FIspace

Using the production metaphor allows one to see how transport and logistics operations integrate and support the operation of agri-food businesses, and how different agri-food operations 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 domains. 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 concept²

FIspace develops a multi-domain collaboration and integration service, based on FIWARE Generic Enablers (GEs) and Future-Internet technologies, enabling new business models that overcome deficiencies, which were mentioned in Chapter 2 (Figure 4).

² Adapted from the FIspace Description of Work

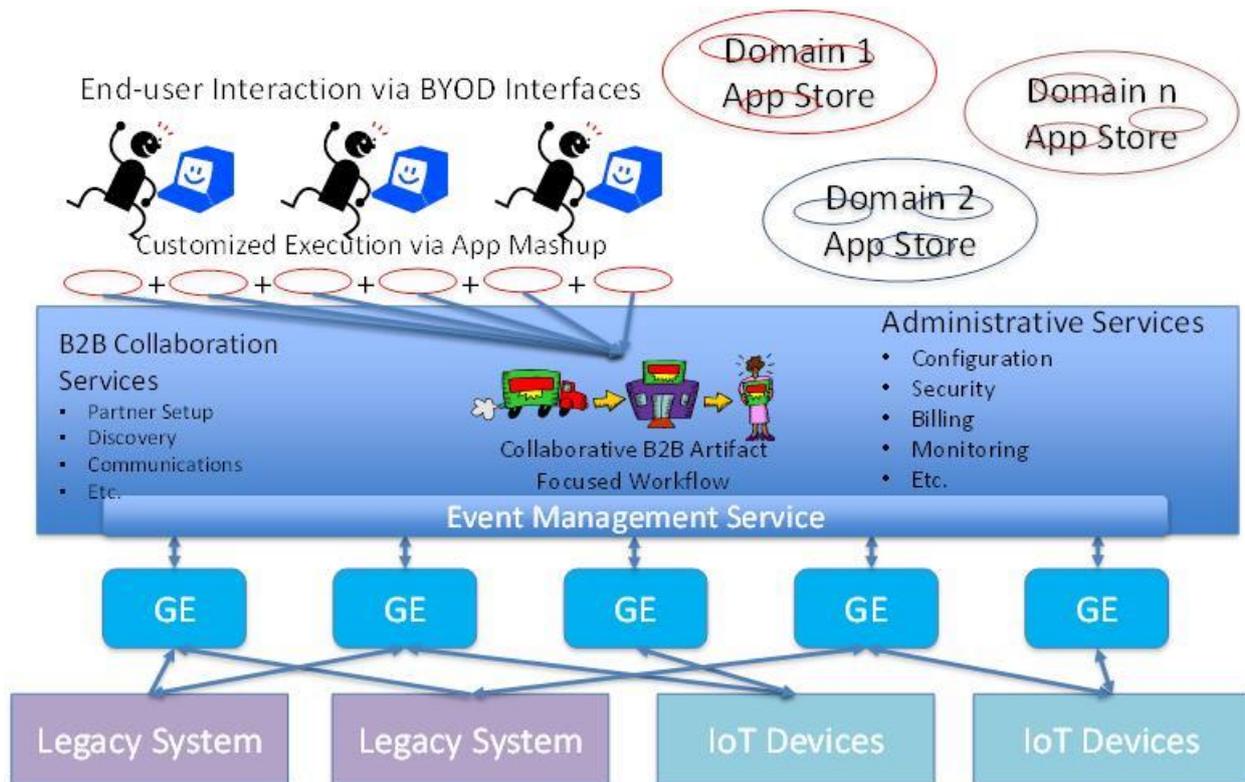


Figure 4: The function of FIspace in relation to legacy systems, Internet of Things and Generic enablers (GE)

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;
- Information integration from legacy and third party systems is enabled through a service-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 integrated security and privacy management offer fine-grained access control to confidential information.

The functional concept of Figure 4 was translated into a coherent FIspace platform architecture. A high-level view of this architecture is provided in Figure 5.

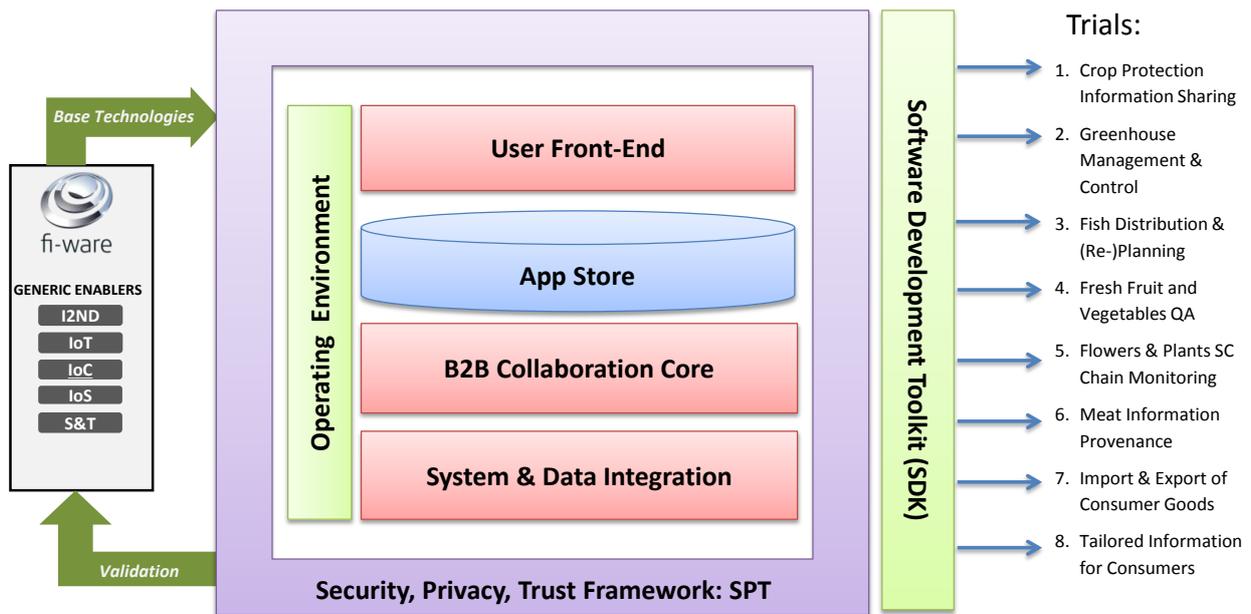


Figure 5: The high-level architecture of FIspace

The *System and Data Integration* module enables the integration of legacy systems and services and includes facilities for data mediation. This module generates and updates the virtual objects by integrating data from AutoID devices, sensors and other sources, based on the requirements from the application service layer. The *App Store* provides a tool-supported infrastructure for publishing, finding, and purchasing Apps, which provide re-usable IT-solutions, supporting business collaboration scenarios and which can be used and combined for the individual needs of users. The Apps are accessed through a *User Front-End* that constitutes of a configurable graphical user interface so that Apps can be located at different points (smartphone, machine terminal, bar code reader, etc.). The *B2B Collaboration Core* module intermediates between the data application services and ensures that all object information and status updates are provided to each involved App and real object (actuation) in real-time. It supports the modelling of customized collaborative workflows in guard-stage-milestone (GSM) models (Richard Hull et al., 2011). These models are based on an entity-centric approach, in which entities (i.e. artifacts or objects) have a central role in guiding business processes. Key elements of such entities are an object lifecycle schema and a data schema that evolves as it moves through a business process. As indicated, all connections with the FIspace platform - as well the data from virtualized objects as user interaction through applications – are managed through the *Security, Privacy and Trust* framework. This framework provides secure and reliable access and, where needed, exchange of confidential business information and transactions using secure authentication and authorization methods that meet required levels of security assurance. The interaction between all modules is handled by an *Operating Environment* which ensures the technical interoperability and communication of (distributed) FIspace components and Apps and the consistent behaviour of FIspace as a whole. A *Software Development Toolkit (SDK)* provides tool-support for the development of Apps. The SDK will ease the work of App developers during the implementation of the Apps, providing specific tools and libraries that hide the more complex aspects of the platform. The whole FIspace platform is based on FI-WARE GEs. A more technical, detailed description of the FIspace platform can be found in deliverable D200.2 and at <http://dev.fispace.eu/doc/wiki/Home>.

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

4. The FIspace project and Accelerator projects

4.1. 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 – i.e. FIWARE accelerators - that have started around the summer of 2014, calling SMEs and web-entrepreneurs 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 FIWARE Accelerators.

Figure 6: Approach and key results of FIspace (M1 = 1 April 2013)

The FIspace project builds the FIspace business collaboration platform in different releases with interaction between the central development (based on FIWARE GEs) and domain-specific applications that come from the use case trials. These trials are building on experiences and products from the previous projects Finest and SmartAgriFood (Table 1).

Table 1: Description of use case trials in FIspace.

| Name | Main topics | Project partners and location |
|---|--|---|
| Crop protection information sharing | Use of field sensor and satellite data to intelligently manage the application of pesticides for maximum crop protection | DLO, Kverneland, LimeTri; The Netherlands |
| Greenhouse management & control | Use of sensors to monitor key growth factors (UV radiation, moisture and humidity, soil conditions, etc.) and to feedback data to control systems to modify the growth environment for maximum yield and optimal quality | NKUA, OPEKEPE, Innov; Greece |
| Fish distribution and planning | Planning of logistics and transport activities, including transport order creation, transport demand (re)planning and distribution (re)scheduling | MRTK, NCL; Germany, Norway |
| Fresh fruit and vegetables quality assurance | Management of deviations that affect the distribution process for fresh fruit and vegetables (transport plan, food quality issues) | CentMa, GS1, Euro Pool Systems; Germany |
| Flowers and plants supply chain monitoring | Tracking and tracing of shipments, assets and products, including monitoring product quality and shelf life prediction | DLO, Florecom, GS1, Mieloo & Alexander; The Netherlands |
| Meat information and provenance | Ensuring accurate information concerning the origin of a meat product and how it was affected by its distribution (quality assurance) | WU, GS1; The Netherlands |

| Name | Main topics | Project partners and location |
|---|--|----------------------------------|
| Import – Export of consumer goods | Intelligent management of inbound materials to a production site and the smart distribution of finished goods to consumers | ARC, K+N; China, Turkey, Germany |
| Tailored information for consumers | Provisioning of personalized information to individual consumer's needs and feedback of this information to the producers | ATOS, UPM, PlusFresc; Spain |

4.2. Phase-3 Large-scale expansion

The FIspace platform is currently tested and filled with apps in the accelerator projects of the FI-PPP. The main objectives of this 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 "FIWARE Accelerators") are running 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 7 shows sectors covered by the FIWARE Accelerators in Phase 3.

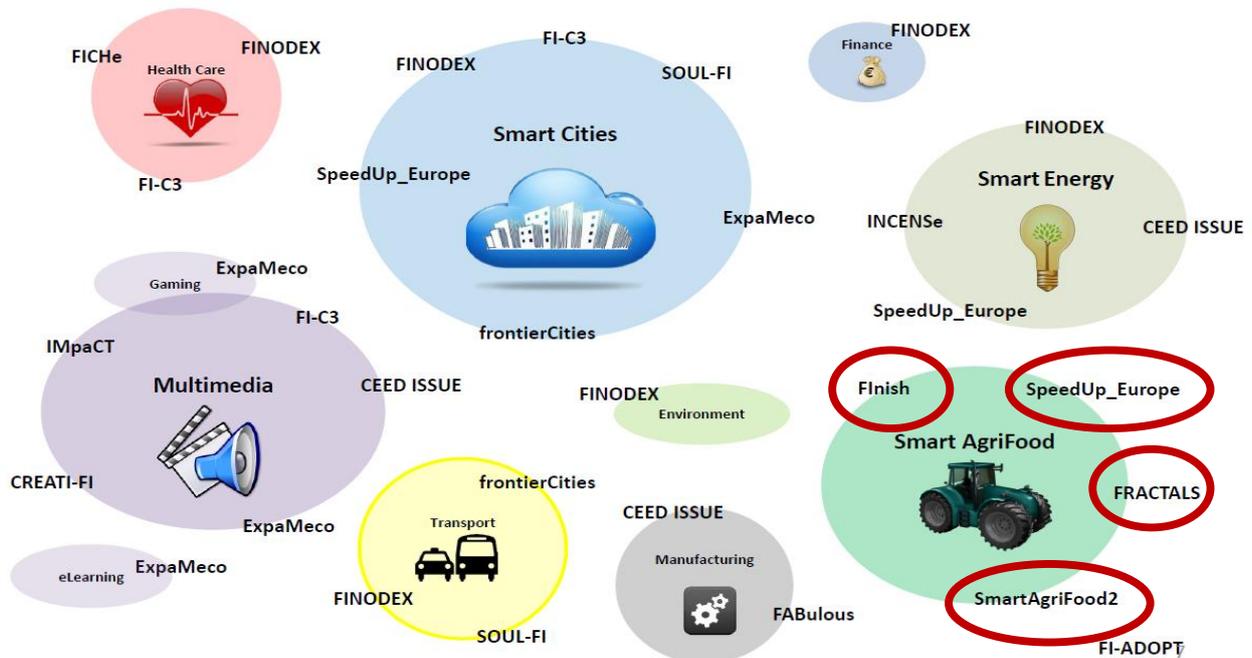


Figure 7: Sectors covered by the 16 FIWARE Accelerators. Four projects (red encircled) focus on the Agri-Food domain, including logistics.

The effort of the Fspace project to have multiple Phase 3 proposals submitted has been successful. Of the 16 proposals that are selected, 4 proposals are focusing on the Agri-Food and Logistics area and are expected to use the Fspace platform to build smart applications. Three projects are SmartAgriFood2, Finish, Fractals and SpeedUP_Europe). All four projects – except SpeedUP_Europe - have a current involvement in Fspace which guarantees a smooth transfer of knowledge. Most projects also include organisations that so far have not been involved in the FI-PPP programme which expands the current FI-PPP programme. In annex I, the four projects are described in more detail.

4.3. Support from Fspace to Phase-3 projects

The Fspace project supports the FI-PPP Phase-3 projects by³:

- 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 8 visualizes, in a three-year view, the plan to support Phase-3 projects in alignment with the different Fspace 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.

³ Input from D500.1.4

4.3.1. The engagement period

The engagement period is defined by the 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 have started, and often already issued calls for apps App developers/SMEs are therefore expected to be on board during Winter / Spring 2015⁴.

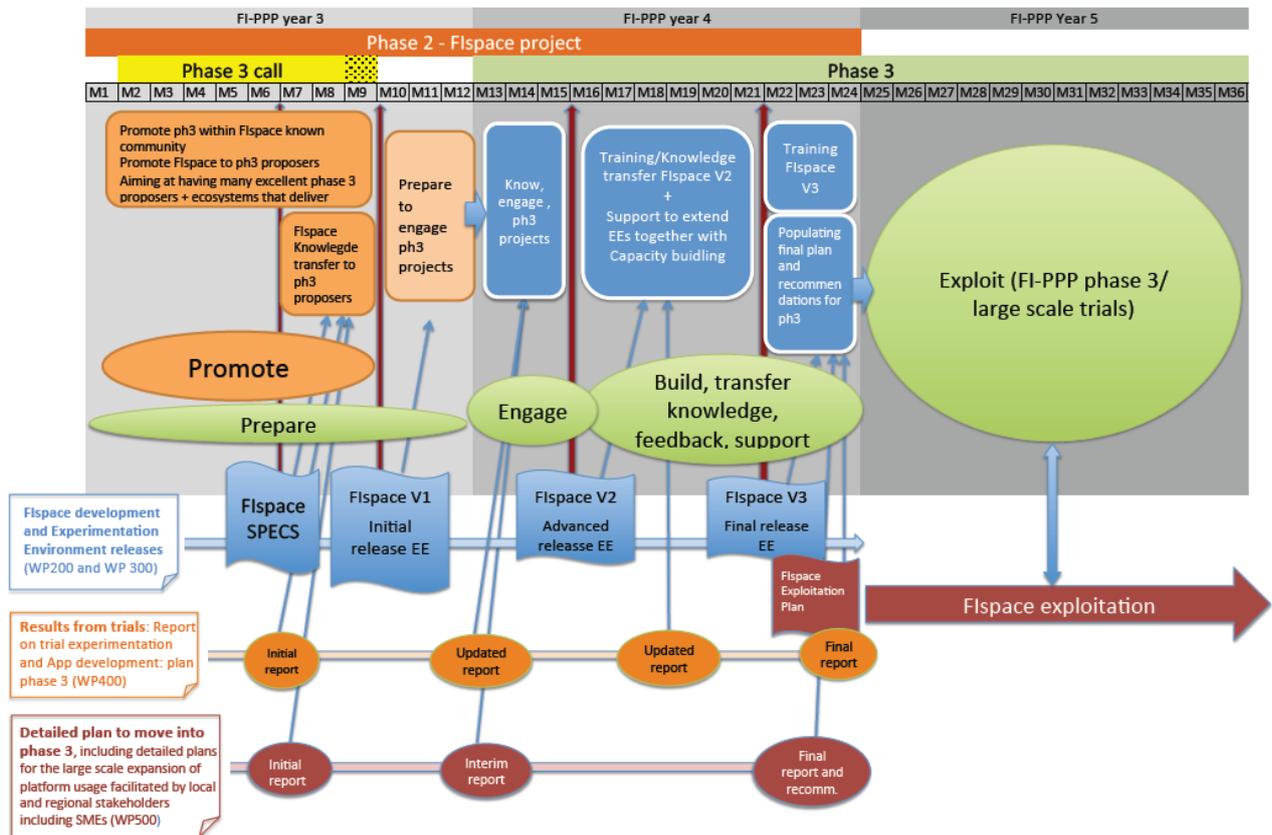


Figure 8: Planning of FIspace to support large-scale experimentation.

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

- Phase 3 projects that consider the FIspace platform, having a certain level of knowledge on the platform capabilities.
- Phase 3 projects that are not considering the 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 offers.

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

⁴ These dates will be reviewed once more specific information from Phase 3 projects is provided to FIspace

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. High level summary of platform features, roadmap and tools for developers
 - e. Basic explanation of the technical roles needed (specifically user, App developer and Business Architect),
 - f. Availability of experimentation environment and documentation
 - g. Some indication in business model and exploitation possibilities, terms and conditions

This welcome package targets 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 of 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 was delivered during Summer 2014 helping accelerators to prepare the launch of their open calls.

2. **Direct support to accelerators:** FIspace has established 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 have been defined and discussed with phase 3 projects during the engagement period.

During the engagement period FIspace has discussed 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 has updated the training and support plan based on that input and the possibilities of FIspace as a project.

4.3.2. Knowledge transfer

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)
3. **Collaborative and online supporting tools:** includes the online version of the welcome package in addition to the guides to FIspace for users and for developers, technical doc-

umentation for all FIspace components and apps. The [FIspace website](#) and bitbucket (linked to the FIspace website) is 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.
 5. **Online educational materials:** extending the information provided in points 1.b to 1.f (section 4.3.1) 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.

Based on the needs and feedback of accelerators supporting Phase 3 developers, webinars are organised with the participation of the FIspace technical team.

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

5. The Fspace 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 Fspace 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. This section can be considered as a brief summary and update from the latest insights of the following Fspace reports:

- D500.5.1 contains a more detailed market analysis;
- D500.2.1 contains a more detailed view on Fspace's business challenges and opportunities;
- D500.2.3 (V030) provides a benchmark of foundations active in software activity and gives recommendations regarding the governance model of Fspace once the project ends.

5.1. What will Fspace offer?

Core to the understanding of Fspace's business features is the fact that Fspace can best be imagined as a business-to-business (B2B) software platform. Fspace 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 FIWARE GEs 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 through an app store (the Fspace 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 (GEs). It should be noted however that this integration happens in the backend. For its business users, the platform will appear as one whole without any of the GEs visible. The platform will accommodate role-based views for the end users, app developers and biz architects (Verdouw et al., 2014) (see Figure 9). End users are the actual (industry) users of the collaboration services and Apps provided by Fspace. They will be supported in their daily business activities, with special focus on their interaction and collaboration with business partners; examples of those users include farmers, shippers, freight forwarders, cargo carrying airlines, and regulatory agencies. App developers are the software and system providers who offer 'packaged', componentized solutions and applications in form of Apps. Biz architects are the experts (internal or external to the user organization) that are in charge of pre-configuring Fspace for their individual business needs (myFspace). Particularly they will design and define customized collaborative workflows and connect those workflows with Fspace Apps and backend systems.

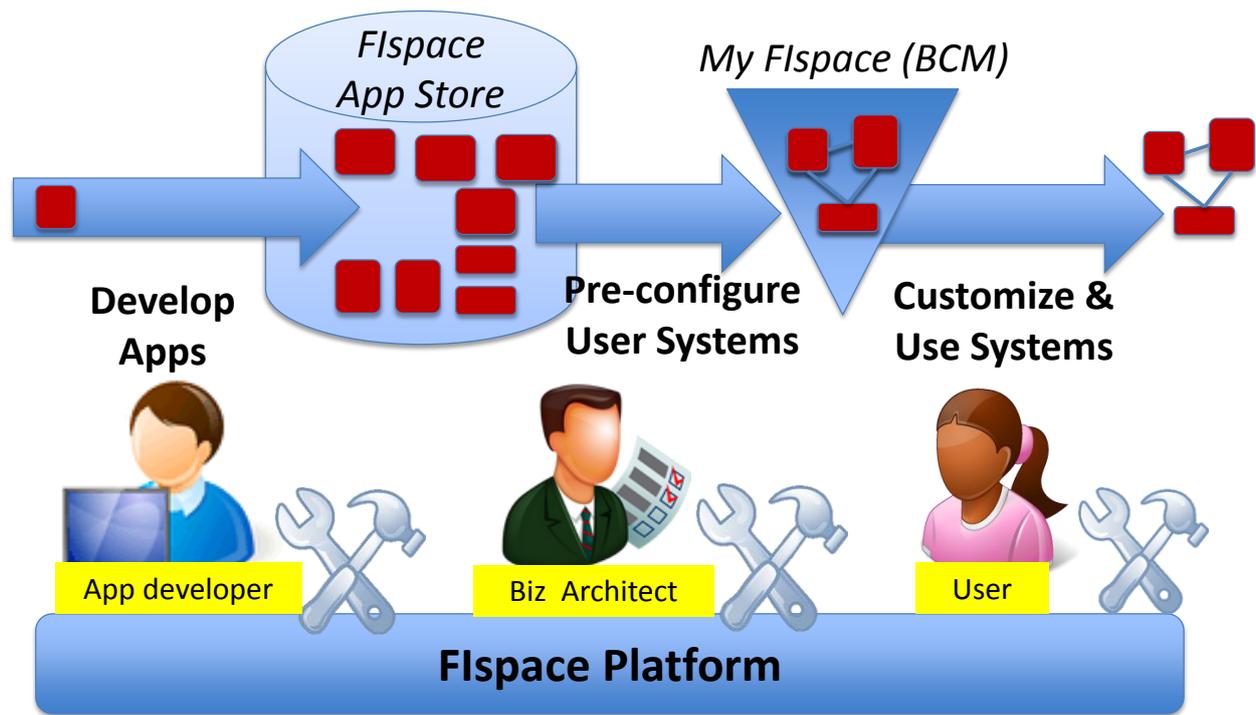


Figure 9: Three main roles that can be addressed in providing B2B solutions to the user.

5.2. Problems addressed

Fspace 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 cumbersome 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.

5.3. Positioning

Fspace 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.

5.4. Actors on the Fspace platform

Fspace 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 Fspace 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.

A platform such as Fspace will only be successful if a critical mass of actors can be involved.

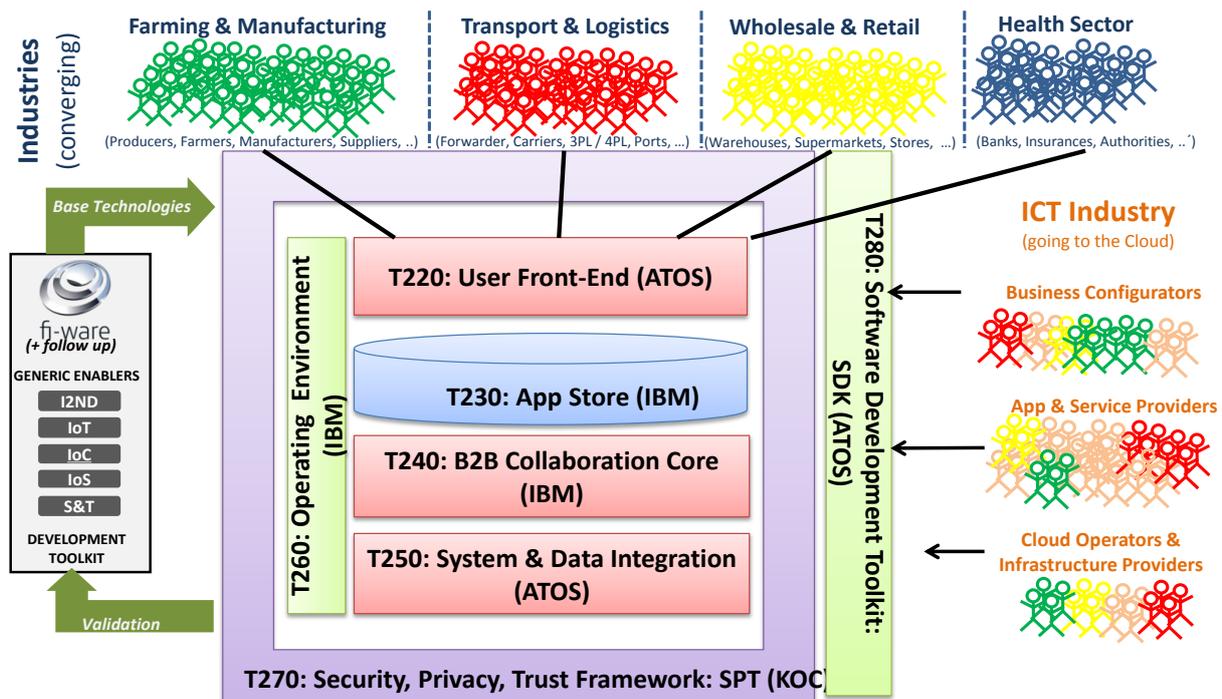


Figure 10: The viability of Fspace lies in the number of end-users from various sectors (at the top) and solutions providers (at the right) that can be engaged through the platform.

The colours in this figure indicate that certain solution providers could focus on a specific domain or others could target at several domains.

From an added value perspective, there are four key actors at the core of the Fspace platform that can be distinguished:

- *Business users - buyers:* 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 users – sellers:* 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 Fspace platform's app development requirements. Apps are provided via the Fspace store, and will often be linked to current services (e.g. spraying advice).
- *Platform Operators/Providers*: A company or other entity that operates the platform, including its maintenance and the Fspace 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.

Additional actors foreseen include consultants (in the role of biz 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.

5.5. Value proposition

Fspace will be commercially viable only if it creates value for its users. In general, Fspace 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, Fspace allows all business users access to a greater variety of sellers as a result of the platform's search capability. One crucial aim for Fspace 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 international market (i.e. the FIspace ecosystem). The benefit is based on the availability of the platform and FIWARE GEs, as well as on the data streams that users of the apps make themselves available.

Platform operators/providers make this all possible by providing the actual infrastructure, through which business collaboration supported by apps takes place. Their main value proposition is to host apps and facilitate matchmaking between end users and solution providers (app developers/biz architects).

6. Organisation of FIspace after the project

6.1. Introduction

In April 2015 FIspace will shift to a more commercial mode. The FIspace project will release an alpha-version (a pre-commercial version) of the software, which means that a considerable investment would 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 commercially developed.

One could imagine that several companies or organisations inside or outside the current consortium would like to pick up commercialisation of 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 sub-contractors, 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. Another aspect of the commercialisation is that end-users (like food or logistic companies and their farmers) do not want to depend for an important part of their business transactions on one commercial offer that does not face competition. A monopolistic solution would lead to a vendor lock-in problem with potentially high costs for the end-users.

Therefore it has been decided that the FIspace project will move its know-how, standards, code and platform into a Foundation that guards its open source character. The Foundation will license the use of its code to commercial companies or others that want to exploit a FIspace instance as platform operator, and will overview the interoperability between those instances. Even if only one company would exploit FIspace in the beginning, this construction guarantees potential competition in case the end-users are depending on FIspace for their business, but not satisfied with the service or price setting by a platform operator.

Figure 11 shows how FIspace could be further commercialised, based on the foundation. The current alpha-release will serve as the FIspace Lab that can be used by the FIWARE accelerator projects. However it could be extended in the future as an experimental environment for development of new apps and services. Several commercial instances of the platform can be established by companies, facilitating an ecosystems of end users and solution providers in a specific domain or region. Figure 11 only provides a few possible directions; there are many other opportunities to be filled in. The next sections will elaborate this development in more detail.

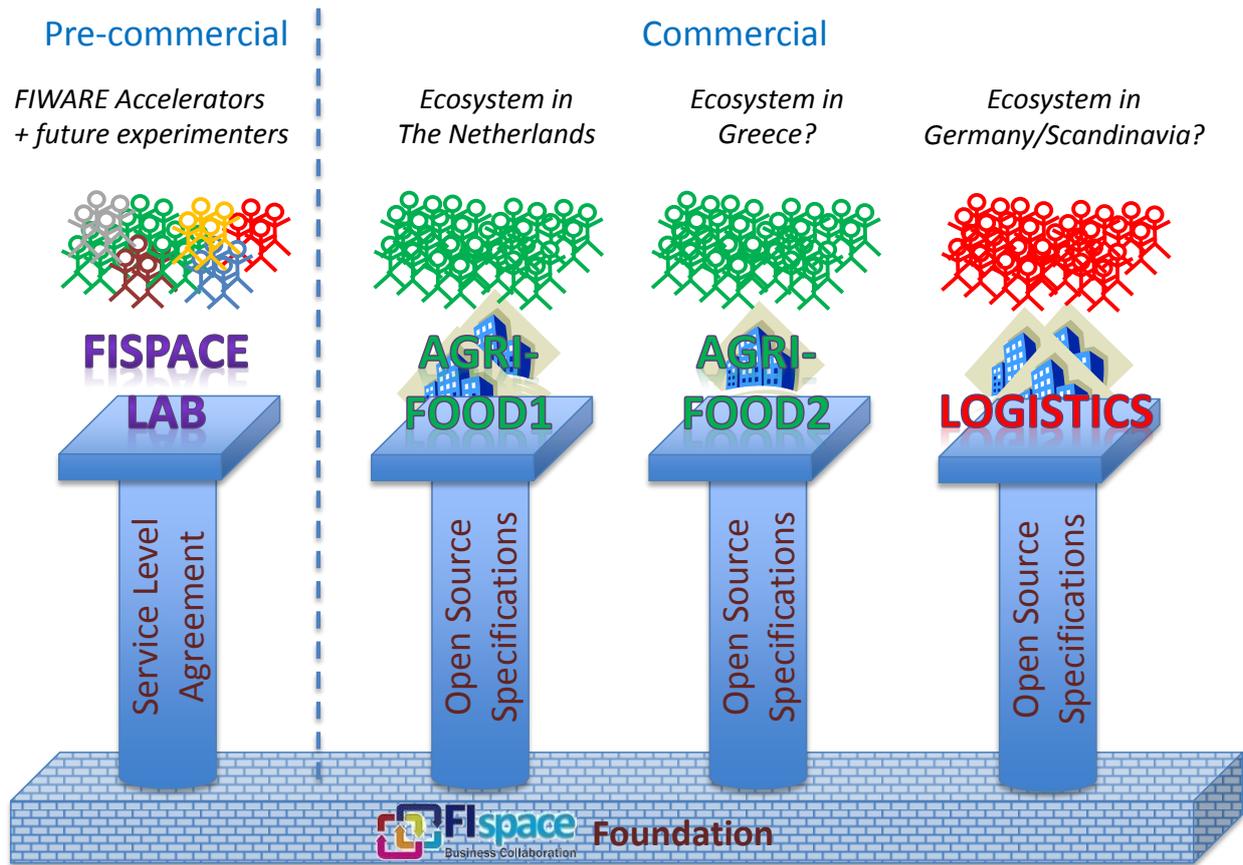


Figure 11: Commercial development of the FIspace platform based on a foundation.

6.2. FIspace Foundation

Partners from the FIspace Consortium will establish a foundation, called the FIspace Foundation, following a decision of the FIspace Consortium in October 2014. The foundation will be created in spring 2015 under the Dutch law. The board of the Foundation will be formed by persons with a different background. It will include people who are employed by FIspace platform operators, app developers, end users and research institutes. They govern the FIspace Foundation and have to guarantee in the activities of the Foundation that the FIspace platform is:

- Forever neutral (and not dominated by any single organisation)
- Structured and standardised globally
- Transparent, trustworthy and secure
- Available to create new ecosystems
- Available to all, inside and outside the European Union.
- Continually growing and evolving to keep up with technological developments and user needs, with a minimum of development patterns that might create restrictions for future exploitation
- Affordable and robust. (High costs for technical services will negate the benefits to many SME’s. Low costs will only happen if there is competition in all development and technical aspects.)
- Commercially attractive for companies that exploit FIspace as a service to end-users, that must earn a rate of return

A situation with several FIspace platform instances 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 requires a standardisation of the FIspace open protocols, comparable to the W3C-consortium that governs the world wide web protocols. The FIspace Foundation will organise a procedure for dispute settlement in case different platforms (instances) are not interoperable.

The **operational processes** of the Foundation will be based on the activities that are listed above. This can be envisaged as follows:

- 2 or 3 board meetings a year, to oversee the work of the Foundation.
- A yearly event for the (potential) FIspace community where the providers of FIspace instances, (potential) app developers and (potential) end users meet for demonstrations, workshops, hackathons, discussions on further development, setting up new innovative research projects etc.

As a result the board meetings will deal mainly with the following topics on its agenda:

- Have the yearly event organised in order to carry out the activities:
 - Support and foster the development of a community of users, developers, testers and other stakeholders related to the FIspace Platform;
 - Support and foster the visibility of the FIspace Platform and community to establish new ecosystems and get new users on board
- Manage contacts and contracts with companies that (want to) offer a commercial instance of FIspace, in order to carry out the FIspace activities:
 - Manages the components and standards that underpin the FIspace platform and trademark
 - Licences the right to use the FIspace trademark to new organisations
- Set up and manage a taskforce of experts from the FIspace community that looks into a next release of FIspace, based on work done or proposed by companies with a commercial instance of FIspace or app developers. This is linked with the activity:
 - Agree on the expansion of the FIspace functionalities and include new standards and components in new releases.
- Set up and manage a panel that deals with a case brought forward regarding disputes on interoperability between different instances. This is linked with the activity:
 - Manage a dispute resolution process to solve interoperability problems between different users of instances of software based on the FIspace platform.

6.3. FIspace LAB

FIspace will support the FIWARE Accelerators in the expansion of the platform via the FIspace LAB. Especially to support the FI-PPP Phase 3 accelerator projects the current technology partners in the FIspace consortium (KoçSistem, IBM, ATOS, LimeTri) have promised to keep the system alive for those app developers that need a test environment and are not yet served by commercial platform operators.

6.4. Commercial FIspace platform operators

Several partners have indicated to work on a commercial FIspace platform for the app developers and end-users. However at the moment of writing no formal commercial announcement is yet available.

6.4.1. Platform revenues in commercial FIspace exploitation

Key to the sustainability of the business model of the platform is that it is able to generate revenues. The overview in D500.2.3 (V030) shows that foundations and related platforms can generate revenues from a variety of sources (Figure 12).

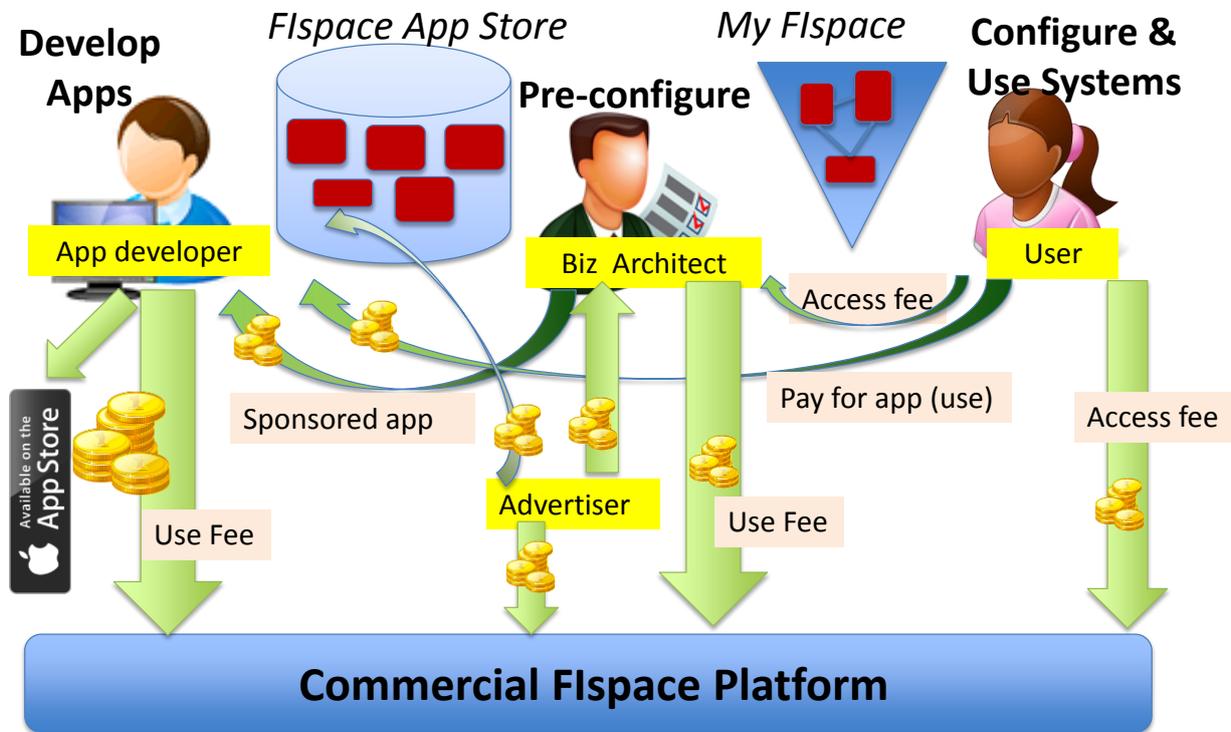


Figure 12: Possible revenue streams for various users of a commercial instance of a FIspace platform

For the platform instances, 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 subsidized 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. Between app providers and the platform operator, the largest share will probably be 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.

6.4.2. 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.

6.5. 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 many participants from all sides of the market. The sustainability of the FIspace ecosystem model rests on the one hand on allowing viable business models for all stakeholders in the value network, allowing them to realise 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.

6.6. Realising the FIspace Platform and related IPR issues

In principle the FIspace Foundation will handle the intellectual property right issues. For the different modules, the current situation is not the final one, but is described in Table 2.

Table 2: Intellectual property right issues

| Component | License | GEs |
|----------------|------------------|---|
| SDK | Apache 2.0 | No GE background |
| Front-End | Apache 2.0 | Wstore, Wirecloud |
| SDI | GNU GPL v3 | Mediator GE |
| EPM | Same as GE | CEF GE |
| BCM | Apache 2.0 | No GE. BizArtifact |
| CSB | Private Software | No GE |
| Store | Apache 2.0 | Wstore, Marketplace – SAP RI, Repository – SAP RI |
| Security Layer | Open Source | KeyCloak, Identity Management Key Rock |

The situation of the FIWARE GEs is described in Table 3.

Table 3: GE Licenses

| GEs | License |
|---|---|
| Publish Subscribe Context Broker GE | AGPL v3 |
| Gateway Data Handling GE - Esper4FastData | GNU GPL v2 |
| Object Storage GE | Apache 2.0 |
| Identity Management KeyRock GE | GNU AGPL v3 |
| Complex Event Processing GE | Apache 2.0 |
| Application Mashup - Wirecloud | AGPL v3 |
| Store - Wstore | EUPL 1.1 |
| <i>Access Control GE – THA Impl</i> | An open source reference implementation of the GE implemented by this product is under development by the end of this year. |
| Monitoring GE – TID Implementation | FI-WARE Global Terms and Definitions |
| Marketplace – SAP RI | BSD License |
| Repository – SAP RI | BSD License |

A number of GEs, that are no longer supported by FIWare, have been substituted by the Identity management KeyRock GE (License: GNU AGPL v3) and by the KeyCloak, an open source specification layer.

7. Epilogue

By the end of Phase 3 (in 2016) the FIspace platform will probably have 150 - 200 apps available, which are developed in the FI-PPP 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 than here described. By that time a Foundation will guard the FIspace standard, promote FIspace and look after its development. Several commercial companies / platform operators will provide FIspace instances.

This report has been written after the first 20 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.

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 and 2014 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. The project websites of the accelerator projects are also a good source of information for e.g. app developers

We realise that end-users and app developers would have preferred a more stable situation with commercial offerings already. 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, Annelise.deSmet@wur.nl or Sjaak.Wolfert@wur.nl.

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9. Annex I Phase 3 Accelerator projects that possibly will use FIspace

9.1. 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.

9.2. 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. 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, competitiveness 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.

9.3. 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.

9.4. 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.

10. Annex II Apps developed in the Fspace project's open call

The accelerator projects in Phase-3 of the FI-PPP will add apps to Fspace and extend the use of Fspace to new business communities. These apps will follow those that are currently developed in the Fspace project itself. Fspace 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 Fspace platform during the second half of the Fspace project.

