Deliverable D300.7

Core Platform GE Assessment Report

WP 300

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The FIspace Project

Leveraging on outcomes of two complementary Phase 1 use case projects (FInest & 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
- IBM; Israel
- KocSistem; Turkey
- Aston University; United Kingdom
- ENoLL; Belgium
- KTBL; Germany
- NKUA; Greece
- Wageningen University; Netherlands
- PlusFresc; Spain
- FloriCode; Netherlands
- Kverneland; Netherlands
- North Sea Container Line; Norway
- LimeTri; Netherlands
- BO-MO; Slovenia
- MOBICS; Greece
- Fraunhofer IML; Germany
- Q-ray; Netherlands
- FINCONS; Italy

- Kühne + Nagel; Switzerland
- University Duisburg Essen; 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
- CIT; Spain
- SDZ; Germany
- Snoopmedia; Germany
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Dissemination Level

PU	Public	X
PP	Restricted to other programme 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)	

Document Summary

This deliverable summarizes the process that the FIspace team followed throughout the course of the project to assess the openness and versatility of the applied FIWARE GEs in FIspace. This means that the deliverable describes (1) the kinds of activities that the FIspace team performed to assess the GEs, as well as (2) the types of activities performed in collaboration and communication with FIWARE in order to feed back the assessment results into GE development.

All technical partners of FIspace were engaged with the assessment of the FIWARE GEs, mainly within WP200 (platform development), WP300 (hosting and experimentation), and – to a lesser degree – within WP400 (apps and trials). Issues concerning the integration, use and bug-fixing of FIWARE GEs within the FIspace platform have been performed as part of the overall FIspace software development process and this have been managed by the FIspace software development manager, technical architects and WP200 task leads.

Feedback (e.g., on key issues faced during GE integration) was provided to FIWARE through different, complementary channels. These included architectural / high-level feedback with the FI PPP Architecture Board, over the use of tool-supported issue reporting through the FIWARE Fusion Forge and JIRA issue trackers, and – mainly – through direct links with FIWARE GE owners. Overall, communication and inter-action with the FIWARE GE owners offering pertinent support to the FIspace developer team was helpful and acceptable. However, in several cases the responses and the solutions offered required several it-erations to understand whether how to incorporate them into the FIspace development path, in particular in those cases in which workarounds have been proposed by the FIWARE GE owners. Adding to that, the consequences of discontinuing some of the GEs and the migration from proprietary to open source GE implementations had to be analyzed and addressed during FIspace development.

Abbreviations

App	Software Application
D	Deliverable
DoW	Description of Work
EC	European Commission
e.g.	Exempli gratia = for example
EU	European Union
FIA	Future Internet Assembly
FI PPP	Future Internet Public Private Partnership
FP7	Framework Programme 7
GA	Grant Agreement
ICT	Information and Communication Technology
i.e.	id est = that is to say
IP	Intellectual Property
IPR	Intellectual Property Rights
KPI	Key Performance Indicator
M	Month
RTD	Research and Technological Development
SME	Small and Medium Sized Enterprise
ST	Sub-Task
T	Task
WP	Work Package

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1   Introduction

1.1   Content and Purpose

This deliverable summarizes the process that the FIspace team followed throughout the course of the project to assess the openness and versatility of the applied FIWARE GEs in FIspace. Accordingly, this deliverable describes the two main types of activities of the assessment process:

- **Internal GE Assessment Activities:** This covers the kinds of activities that the FIspace team performed to (re-)assess the GEs when developing and deploying the FIspace platform. Developing the FIspace platform components by using the features offered by the FIWARE GEs was the main mechanism to assess the GEs. Aiming to integrate and use GEs in the concrete setting of the software system and software development process, showed the opportunities and challenges in GE integration. All technical partners of FIspace were engaged with the assessment of the FIWARE GEs, mainly within WP200 (platform development), WP300 (hosting and experimentation), and (to a lesser degree) within WP400 (apps and trials). Issues concerning the use of FIWARE GEs as part of the FIspace platform have been managed as part of internal software development using establish software project management practices.
- **Feeding GE Assessment Results back to FIWARE:** This covers the types of activities performed in collaboration and communication with FIWARE in order to feedback the assessment results into the GE development process. Feedback was provided to FIWARE through different, complementary channels, including architectural / high-level feedback within the FI PPP Architecture Board, tool-supported issue reporting using the tools provided by FIWARE and CONCORD, and through direct links with FIWARE GE owners.

As reported during the Mo6 review of the FIspace project, FIspace set out to integrate and thus assess the openness, specifications and versatility of 15 FIWARE GEs. Out of these 15 GEs, five GEs have finally found their way into the final release of the FIspace platform and are listed in Table 1 together with their respective instances[1]. In order to keep this document concise and focused, we will discuss the assessment process by mainly referring to these five GEs.

GE	GE Instance (GEi)
Marketplace	WMarket
Repository	Repository RI
CEP	IBM PROactive Technology ONline (PROTON) / IBM
Store	WStore
Application Mashup	Wirecloud

Table 1: *FIWARE GEs integrated into the final release of the FIspace platform.*

1.2   Structure of Deliverable

The remainder of this deliverable is structured along the aforementioned kinds of activities. To this end, the document is divided into three main sections:

- Section 2 reports about internal assessment activities and the process in which they were embedded.
- Section 3 reports about the activities related to providing feedback to FIWARE. Accordingly, it is divided into three subsections:
    - Section 3.1 reports about the FI PPP Architecture Board interactions,
    - Section 3.2 summarizes the interactions through the FIWARE issue trackers,
    - Section 3.3 covers the activities involving direction interactions with GE owners.
- Section 4 concludes and provides key observations.

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[1]   *GEs that have not been integrated into the final FIspace platform are: Security Monitoring, Pub/Sub, Advanced Middleware, Mediator, Revenue Sharing, Registry, Malware Detection, Content Security, Access Control, Identify Management*

2   Internal GE Assessment Activities

As shown in Figure 1, the assessment of the FIWARE GEs was a cross-cutting activity along platform development (WP200), hosting and experimentation (WP300), as well as apps and trials (WP400), involving close cooperation with FIWARE through collaboration channels (WP500).
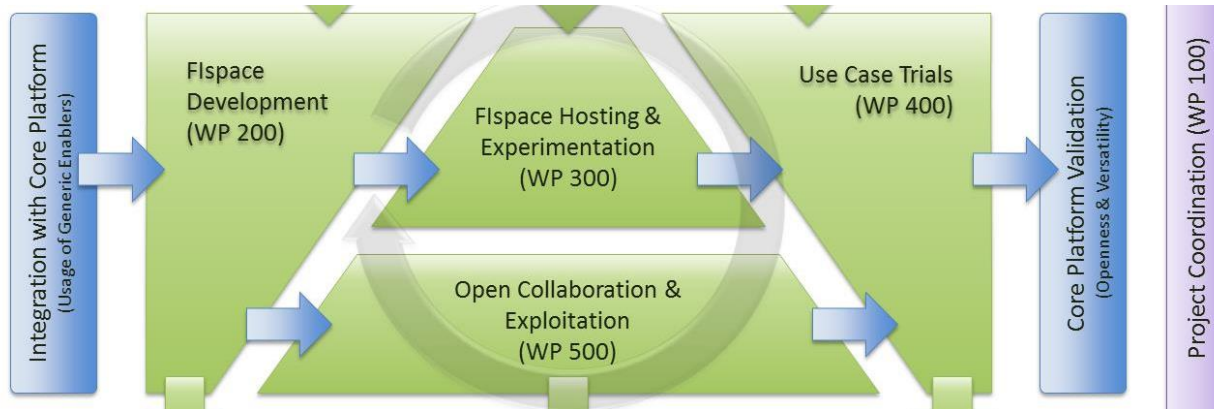

Figure 1: GE Assessment as Cross Cutting Activities

GE assessment involved the **use and integration** undertaken in WP200, WP300 and WP400, which thus served as key means to **validate and assess the versatility and openness** of GEs. Aiming to integrate and use GEs in the concrete setting of the software system and software development process, showed the opportunities and challenges in GE usage and integration, and in particular, uncovered quality concerns, problems, uncertainties and bugs in FIWARE GEs.

As a result, during the course of FIspace development, important tasks as well as bugs concerning the use and integration of GEs have been recorded and managed using the FIspace software development team issue tracking system (see https://bitbucket.org/fispace/core/issues). It should be noted that some of these issues remained (partly) unresolved, thus causing extra efforts and uncertainty.

To give an impression about the scope of our GE assessment activities, we provide the number of issues (which include development tasks and bugs to be addressed) related to each of the GEs in Table 2.

GE	Number of issues
Marketplace	10
Repository	8
CEP	19
Store	21
Application Mashup (Wirecloud)	17
Total Issues related to Integrated GEs	**75**
Other GEs (considered for integration, but not integrated)	92
Total Issues related to GEs	**167**

Table 2: *Number of internal FIspace development issues (tasks and bugs) related to FIWARE GEs*

3   Feeding GE Assessment Results back to FIWARE

3.1   Interactions within the FI PPP Architecture Board

One of the main governance bodies of the FI PPP used to manage the interactions among the use case projects, such as FIspace, and FIWARE/FICORE on technical issues was the Architecture Board. In brief, the Architecture Board

- Brought together participants of the use case projects and the FIWARE project.
- Each of these projects delegated one or more architects to the Architecture Board in order to express their opinions about required GEs and their required properties. In that way a clear shared view on the necessity and use (and generality thereof) was aimed at.
- In particular all kinds of alignment issues (regarding features and properties of GE's) between the use cases and the FIWARE project were addressed and discussed.
- Also, requirements of the use cases beyond the direct offerings of FIWARE were being discussed. This proved to be in particular important related to the genericity of the requirements and features provided by GEs.

The mechanisms employed to foster interactions between the Use case projects in general that also FIspace participated in encompass:

- Direct communication (email or chat) between the architects of the project with the FIWARE technical architect, which covered topics related to architecture, changing specifications, bugs, issues, workarounds, priorities for development and establishing communication channels to GE owners and their development teams.
- Meetings in which participants presented their projects and required features of GEs (their interpretation), which fostered a better understanding of these features by FIWARE on the one hand and on the other hand led to a shared vision on generic features of these GEs. These meetings were scheduled frequently and took about two to three days, thus allowing in depth treatment of technical issues and allowed ample time for detailed discussions.
- Particular subgroups and working groups, during which participants worked together on specifications of GEs or on a particular topic (e.g., big data). The results of these were then presented and discussed during the plenary Architecture Board meetings. Intermediate results were available via internet (shared docs).
- Bringing about a personal relationship between participants fostering better mutual understanding.

Overall, we regard the Architecture Board as an important organizational structure that benefitted the necessary cooperation between projects while it lasted. Concerning these very productive links established within the Architecture Board, unfortunately those links have ceased with the discontinuation of the Architecture Board and its regular meetings in the summer of 2014. We have addressed our feelings about this at several occasions during meetings with other projects and FIWARE/FICORE representatives (partly due to personal relationships), but we admit that FIspace could have been more aggressive in formally insisting on having such a forum continued, at least focussing on having heard the word of the use case and trial projects. As an example, the decision by FIWARE that a GE is only a GE if used by more than one project should have deserved broader and more critical discussion.

As offered in response to the review recommendation #3.8, FIspace would have been happy to join a round of project representatives (which now obviously would have to include FI-CORE and Phase 3 representatives) to form a stronger interest group to express our needs and requirements towards the Future Internet core platform.

3.2   Interactions through FIWARE Issue Trackers

Between the finalization of the Phase 1 use case projects and the start of the Phase 2 trial projects, FIWARE (jointly with CONCORD) revised the decision on which tool to be used for interaction between UC projects and FI-WARE regarding report of bugs/issues as well as request for enhancements and information on FI-WARE GEis. Support was switched from FusionForge (https://forge.fiware.org/) to JIRA (https://jira.fiware.org).

Even though several issue have been reported through these issue trackers (see Table 3), FIspace developers experienced often too long response times as to maintain fruitful communication. Thus, despite

such formal tools being available for interaction with FIWARE, they were not heavily used by FIspace due to the lack of responsiveness. This concern was also raised and discussed during Architecture Board meetings.

As result, in most cases, direct contact with GE owners (e.g., through emails, chat / skype, phone call) have been sought (also see Section 3.3). Developers need an inter personal connection in addition to the tools in order to have a better feeling about what is actually happening and a 'handshake" to establish that people have a shared view on features and priorities.

GE	Number of issues
Marketplace	1
Repository	2
CEP	0
Store	4
Application Mashup (Wirecloud)	5
Total Issues related to Integrated GEs	**12**
Other GEs (considered for integration, but not integrated)	7
Total Issues related to GEs	**19**

Table 3: *Number of issues raised through FIWARE forges[2]*

3.3   Direct Interactions with GE Owners

As mentioned above, the main mechanisms for clarifying open issues, uncertainties and resolving technical problems of GEs was direct contacts between FIspace developers and GE owners. In many cases this allowed faster response cycles and a better way of expressing the specific problems that were faced by FIspace. Admittedly, while serving the purpose of the FIspace project, these direct discussions have not been explicitly shared with other developers beyond FIspace, although they may have contained important information for reusing the FIWARE GEs.

Globally the communication and interaction with the FIWARE GE owners who give the pertinent support to the FIspace developer team was correct and acceptable. Yet, sometimes the responses and the solutions were not easily feasible essentially because it was not supported by the GEs or because it was very difficult to realize in an acceptable timeframe.

One key main strategy offered by FIWARE GE owners during year 2 of FIspace was to find feasible workarounds to FIWARE GE issues. To this end, GE problems and bugs have been defined by the FIspace team (see https://bitbucket.org/fispace/core/wiki/architecture/TechArchWorkAroundsFIWare) and shared with GE owners in order to assess the situation and plan remedial actions. Altogether 17 issues (some of them affecting more than one GE) have been identified. An overview is provided in Table 4.

GE	Number of issues
Marketplace	2
Repository	1
CEP	0
Store	9
Application Mashup (Wirecloud)	7
Total Issues related to Integrated GEs	**19**
Other GEs (considered for integration, but not integrated)	3
Total Issues related to GEs	**22**

Table 4: *Number of key issues and workarounds established through direct communication with FIWARE*

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[2]   *Please note that these figures are indicative, as most FIRA issues reported externally are linked to the anonymous "FW External User" and thus accurately tracing all FIspace related issues among the over 4400 issues tracked is infeasible.*

Issues that have been shared with FIWARE GE owners ranged from blocking security issues to medium priority usability issues. For some a (temporary) workaround has been found and implemented. There has been contact between FIspace components owners and GE owners, but often FIWARE responses did not come with the intention to address an identified issue, let alone a due date until it may have been addressed. This led to challenges in the FIspace development team for what concerns installing, configuring and integrating the FIWARE GEs. Oftentimes, FIspace developers had to modify GE code themselves, dedicating resources working on GEs issues and implementing workarounds and solutions in order to achieve the expected and required behaviour of these GEs.

4   Conclusion

This document summarized the key aspects and insights of the GE assessment process that was followed by FIspace during the course of the project. As reported, FIspace pursued various, complementary activities to assess the GEs and feed back assessment results to FIWARE.

The types of interactions and their intensities fluctuated during the course of FIspace. As an example, the FI PPP Architecture Board offered an extremely productive forum to link with FIWARE and other Use Case projects to discuss and address issues related to GEs and in particular the overall interaction process. Unfortunately, the Architecture Board was abandoned in the summer of 2014, half way during the funding period of the use cases projects.

During the course of FIspace, software development had to deal with risks and problems related to GEs. As an example, the decision by FIWARE only GEs used by more than one project would be sustained led to the need to reconsider FIspace development decisions. Further, abandoning all closed source GEs for open source versions, led to uncertainty as to whether and when some of these open source GEs would be available.

In the case of FIspace, we have anticipated using and integrating 15 FIWARE GEs. However, during the course of the project, we realized that not all of these GEs were indeed viable. While the licensing models (open source vs. proprietary) were of lesser concern, the lack of sufficient quality, residual issues and often plainly the support by GE owners, led to major impact on FIspace software development process, and the spending of implementation effort that did not manifest in the final FIspace platform. As an example, for the specific case of the Revenue Sharing GE (RSS), this GE had to be finally discarded towards the end of the FIspace project, due to the lack of providing features related to purchase items in a consistent way. In several other cases, in particular for the Identify Management GE and Mediator GE, external open source components have been chosen over FIWARE GEs as they have been perceived more mature and with a stronger community and support behind them.

Looking back, the envisioned FIWARE GEs promised to offer significant building blocks for delivering value added platforms and services. Unfortunately, of the 15 GEs envisioned to be used and integrated into FIspace, only five have found their way into the final release of the FIspace platform.