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PP	Restricted to other programme participants (including the Commission Services)	
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Requirements Management and Development Infrastructure – final
<b>Author(s)/Organisation(s):</b>
Swetlana Fast, Eva Klien, Simon Templer / Fraunhofer IGD Pietro Elisei, Didier Vancutsem / ISOCARP
<b>Working Group:</b>
WP3
<b>References:</b>
<ul style="list-style-type: none"> <li>[1] M. Cohn, <i>User Stories Applied: For Agile Software Development</i>. Addison-Wesley Longman, Amsterdam, 2004</li> <li>[2] S. Robertson und J. C. Robertson, <i>Mastering the Requirements Process</i>, 2<sup>nd</sup> Edition. Addison-Wesley Professional, 2006</li> <li>[3] “User Story And Use Case Comparison.” [Online]. Available: <a href="http://c2.com/cgi/wiki?UserStoryAndUseCaseComparison">http://c2.com/cgi/wiki?UserStoryAndUseCaseComparison</a>. [Accessed: 07-Dec-2012]</li> <li>[4] “Requirements: An introduction,” 16-Apr-2004. [Online]. Available: <a href="http://www.ibm.com/developerworks/rational/library/4166.html">http://www.ibm.com/developerworks/rational/library/4166.html</a>. [Accessed: 07-Dec-2012]</li> <li>[5] Grant Agreement No. 296282, Annex I Description of Work</li> <li>[6] D3.1 Requirements Analysis and System Specification</li> <li>[7] D6.1 System Integration Plan</li> <li>[8] D2.4.1 Business Model Interim Version</li> <li>[9] D2.3 Approach for Data and Services Management</li> <li>[10] D6.2.1 System Test Report No. 1</li> <li>[11] Minutes of the Stakeholder Workshop in London</li> <li>[12] Extra Document requested in 1. Review: Business Model – Progress Report</li> <li>[13] D4.1.2 Operational System V2</li> </ul>

<b>Short Description:</b>
<p>This deliverable describes the infrastructure for managing the requirements and for supporting the collaborative development among the project partners. It illustrates the requirement handling methodology in accordance with the development work packages used for managing the requirements collected in the initial project phase (see deliverable D3.1) and defines the infrastructure related to the requirements. The document reports on setting up the IT infrastructure required for the analysis phase and also later in the development and integration phases. It introduces the issue tracking web system Redmine and its adoption to the methodology. Further it reports on the current status of the requirements gathering and tracking work as well as on the future planning. This document is an updated version of D3.2.1 which was delivered in PM12.</p>
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# 1 Introduction

## 1.1 plan4business

Today, urban and regional planning datasets are not aggregated and not easy to use for business issues: planning data users are confronted to fragmented data sets, unable to create comparative analysis, monitoring and analysing urban statistics, or developing urban inquiries and projects. Researchers, spatial planners and professionals from the real estate world as well as other disciplines, such as insurance industry, investors, or market-relevant activities related to urban development have a growing stake in such capabilities.

Consequently, the plan4business project is aiming to develop a web platform, which will offer urban and regional planning data users a full catalogue of harmonized transport infrastructure, land use and land cover, statistical data, planning data, data relevant for investors and real estate business and services, regional plans, urban plans and zoning plans. To be competitive on the business market, this platform will offer the data itself in integrated, harmonised and thus ready-to-use form, but it will also have to offer rich analysis and visualisation services via an adapted Application Programming Interface (API) and an interactive web frontend. Functions offered will have to range from simple statistical analysis to complex trend detection and to 2D/3D representations.

## 1.2 The aim of the report

This document describes the requirements management approach during the whole project period. It also reports on how the technical infrastructure of the project supports the requirements management. As such this report documents the results of Task 3.1 of the plan4business DoW:

*Task 3.1: Requirements Management and Development Infrastructure (Fraunhofer IGD, Month 1 – Month 24):*

*This task will focus on the management of requirements and the development of the infrastructure. As active stakeholders like data providers, data curators, clients and data brokers have several requirements related to planning data sets, it is necessary to manage those requirements and develop a harmonisation structure to achieve value added services. A full catalogue of planning data cannot function from scratch; it has to be balanced and integrated. For example, a geo business practice needs practice-oriented, simply to use users' rights, pricing models according to the market situation, easy accessible and up-to-date data sets, as well as real net output ratio. Also the infrastructure related to the requirements should be investigated and developed.*

This report is a working document, which will be constantly updated. Two official versions will be generated, the first one in the project month 12 the second in the project month 20. The following document is the second deliverable.

The requirements gathering activities are within the responsibility of WP3, while the subsequent activities of system specification, implementation and validation fall into the responsibility of WP4, WP5 and WP6 respectively. This report bases mainly on the findings described in the deliverable D3.1 Requirements Analysis and System Specification. With the aim to create a web platform offering urban and regional

planning datasets and services, analyses of management requirements as well as user identification and data requirements were performed. The results of this analysis are described in the deliverable D3.1, focusing on user requirements, user typology and user demand on data. Besides D3.1, this report considers also the system implementation and the future business model described in the deliverables D6.1 System Integration Plan and D2.4.1 Business Model Interim Version.

## **1.3 Structure of the report**

Chapter 1 introduces the project and describes the aim of this report.

Chapter 2 describes the requirements gathering methodology applied in plan4business.

Chapter 3 gives details on the technical infrastructure used for requirements management.

Chapter 4 summarizes the activities related to the plan4business stakeholder workshops.

Chapter 5 summarizes and concludes the findings of this report.

## 2 Methodology for Requirements Management and Collaborative Development

As emphasized in the deliverable D3.1, the main questions behind the user requirements management and the development infrastructure are:

- How can we bring together the demand of the users to the market offer and conditions?
- How can we develop from the available data a sustainable business model, attractive for a large range of business activities?
- How can we develop an open platform collecting the datasets and offering a complete and easy-to-use platform, accessible to every type of business?

The design and development of the plan4business platform require a flexible and iterative approach. Thus, the development of the plan4business portal as well as the requirements gathering methodology are mainly based on what is known as agile methodologies for software development. The agile methodology is introduced in the deliverable D6.1 and is determined by the Manifesto for Agile Software Development<sup>1</sup>, which establishes the following 4 core principles:

- Individuals and interactions over processes and tools
- Working software over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to change over following a plan

The common process for gathering requirements for software systems is to gather as many requirements as possible at the beginning of the project, assuming that the more requirements there are, the better the developed software will be. However, as described in [1]: “Extensive upfront requirements gathering and documentation can kill a project in many ways”. Capturing requirements in a few hundred pages documents without a clear prioritization of requirements, references to the tasks and use cases where the requirements are derived from, and explanations of ambiguous terms might result in a situation where it is almost impossible for the developers to start developing the software. Therefore, the agile methodologies, focusing on user tasks at the beginning and refining the high-level requirements in a communication process with the users and stakeholders afterwards seemed to fit quite well to the project. From our point of view, capturing all requirements at the beginning of a project is impossible. Requirements evolve during project runtime, especially when first prototypes are available and given to users. So far the main input for this process was the internal testing and the feedback from the user and stakeholder workshops. Now we go public and ask for further external comments and feedback.

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<sup>1</sup> <http://agilemanifesto.org/>

## 2.1 User Roles and Use Cases

### 2.1.1 User Roles

It is a common mistake in the process of capturing the functional requirements for a software system to lose sight of the type of user that issued a requirement. Often, the assumption is that there is a single type of user of a system and all requirement specifications (let them be IEEE-styled requirements a la “The SYSTEM should...” or user stories) are written for this single type of user, sometimes referred to as “*the user*”. However, in most cases, a software system has multiple types of users with different experiences, backgrounds and goals while using the software. Delivering requirement specifications without a clear reference to the type of user that issued the requirement leads to problems in grouping and especially prioritizing them. Therefore, it is of high importance to clearly identify the types of users (User Roles) and to unambiguously link them to the requirement specifications.

As identified in the task in D3.1, the plan4business system will support three user-groups:

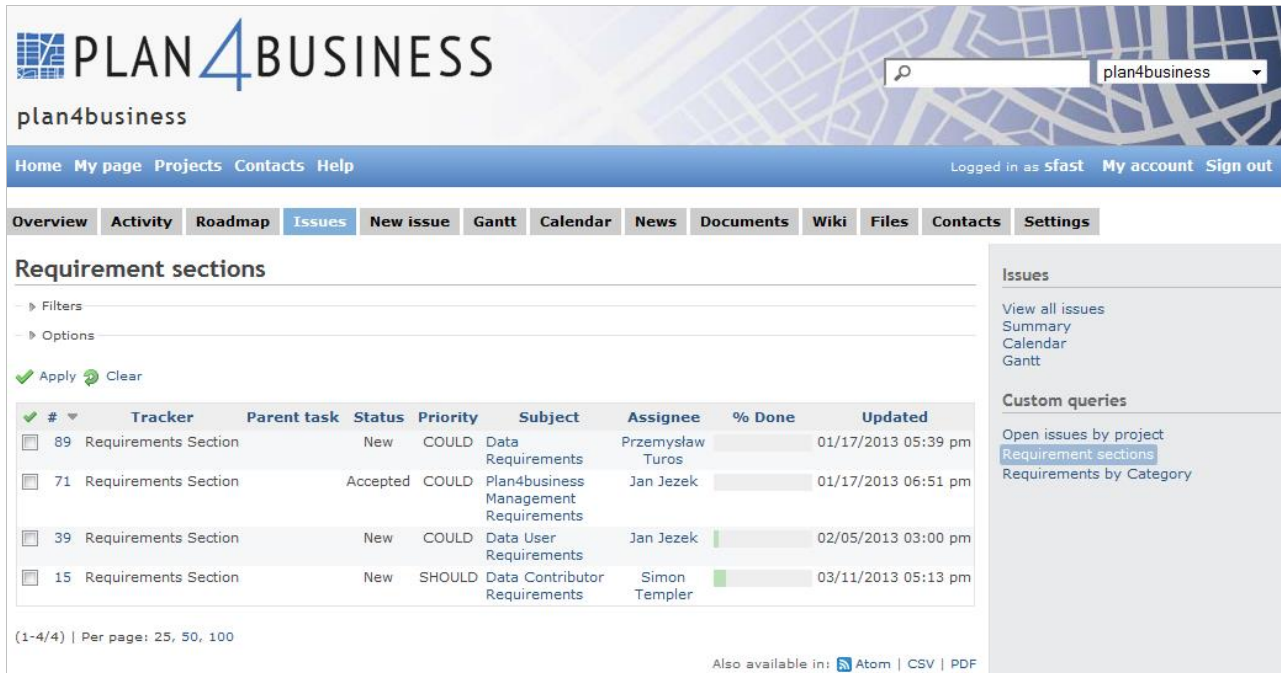
- Data contributors – those that have data and whom possible can share these, either for free or for a fee / cost
- Data users – those whom need access to data for planning, analyses, investment, etc.
- plan4business managers and operators – who are running the plan4business platform.

According to these groups, the specific requirements have been clustered in following main groups (see D3.1, 9.3):

- Data Contributor Requirements (A user under this section is a data contributor.)
- Data User Requirements (A user under this section is an end-user whom will use the system to access planning data.)
- Plan4business Management Requirements (A user under this section is a system manager or administrator within the Plan4business consortium.)
- Data Requirements (Plan4business depends on availability of data)

The requirements are inserted in the Redmine system according to these groups.





#	Tracker	Parent task	Status	Priority	Subject	Assignee	% Done	Updated
89	Requirements Section		New	COULD	Data Requirements	Przemysław Turos		01/17/2013 05:39 pm
71	Requirements Section		Accepted	COULD	Plan4business Management Requirements	Jan Jezek		01/17/2013 06:51 pm
39	Requirements Section		New	COULD	Data User Requirements	Jan Jezek		02/05/2013 03:00 pm
15	Requirements Section		New	SHOULD	Data Contributor Requirements	Simon Templer		03/11/2013 05:13 pm

Figure 1: Requirements grouped by Sections in Redmine

## 2.1.2 Use Cases

According to our methodology, the goal was to identify, clearly and analytically, those use cases that could be developed at operational stage. The use cases are essential in order to develop the functionalities required by a flexible yet practically usable data platform. The objective was to identify the services and functionalities that best comply with the needs of the users and their perceived requirements with regard to their daily activities in using spatial data.

The deliverable D3.1 contains the descriptions of all identified use cases. Each Use Case has been considered as an independent set of actions that logically produce a meaningful output resulting from the interaction among potential user, planning issue, planning needs and business potential connected to exploitation of required geo-data. Use cases are represented using a synoptic table that correlate sensitive information connected to:

- User characterization (sector, type of user, working time, expected honorarium)
- Business definition and description (business activity, business case story)
- Business key domains and critical mass (addressed target groups, client, method used, project governance)
- Business territorial scale (spatial and financial dimension)
- Data requirements

Through the synoptic tables it is possible to connect:

- The available data (especially geo-data, but even other information can be considered) in repositories, with
- The activities that a potential user (business case generator) needs to perform for solving the faced planning issue, and
- The set of services that can be created through the data potentialities and user demand

The use cases follow in their classification a very simple logic of dividing them in the private and/or public realm. This procedure has been adopted in order to facilitate the classification of the potential business activity, but it would be better in the definition of the business plan to re-arrange the use cases following more market oriented classification, as for examples those connected to set of major policies designed and implemented by public administrations (e.g. education, health, transportation...) and private enterprises/investors/developers.

As described in D3.1 Chapter 7.3 Implementation of use cases, it is proposed in the consortium to focus first on the implementation of 2 or 3 simple and easy-to-understand use cases, e.g. for spatial planners, real estate or commercial services; a second step should be the implementation of more complicated use cases, focussing on local issues and high-quality data, such as real estate housing stock, security services, or telecommunication services. The result of this process of use case selection is the definition of services and pilot applications that were documented in Chapter 3 of the Business Model progress report [12].

## 2.2 From Use Cases to Requirements

### 2.2.1 Use Case Specific Requirements

At the beginning of the project, we captured requirements at the level of use cases, known from agile software methodologies and described in several works such as [1]. The user requirement analyses has identified and assessed a broad range of possible functions, tools and data requested by a broad range of users related to spatial planning and the use of spatial planning data. The use cases as collected through questionnaires and at the stakeholder workshop served as the basis for developing the plan4business user requirements, which are described in detail in the deliverable D3.1.

We inserted these requirements in the Redmine system and appointed the persons in charge of the development of features based on these requirements and agreed on the priorities and the timeline. According to the priorities each requirement is marked by the use of the words MUST, SHOULD and COULD. MUST requirements are mandatory and shall be fulfilled, whole SHOULD requirements are given high priority, even though not mandatory. COULD requirements can be fulfilled if the system, the project and its frame allows so.

The requirements gathered can be classified in two groups, functional and non-functional. Functional requirements refer to requirements on what the system is expected to do. Functional requirements “present a complete description of how the system will function from the user perspective. They allow both business stakeholders and technical people to walk through the system and see every aspect of how it should work – before it is built.”[4].

Most of the plan4business requirements captured in the form of use cases are functional requirements. Besides functional requirements, a set of requirement types exists that are usually subsumed by the term non-functional requirements.

### 2.2.2 Overall Requirements

Functional requirements are supported by the overall requirements, also called the non-functional requirements. Functional requirements drive the application architecture of a system, while the non-functional requirements drive the technical architecture of a system.

The non-functional requirements considered by the plan4business project can be grouped into the following categories:

*Performance requirements* typically relate to the response time of a system and the amount of data the system is expected to deal with. For plan4business, initial performance requirements are already indicated in the technical annex of the description of work.

*Reliability requirements* usually relate to the availability and reliability of the system. Typical examples are: The system should be up at least 90% of the time.

*System interface requirements* refer to the software interfaces offered by the system. A typical system interface requirement is “The system should offer all mandatory operations of the OGC Web Feature Service standard version 1.1.0.”

*Security requirements* refer to any requirement related to access restriction to the system.

*Standard requirements* are requirements related to standards (OGC, ISO, etc.).

*Human-Machine Interface requirements* relate to requirements on the user interface offered by the system.

*Documentation requirements* capture those requirements that are related to the software documentation such as “The user manual should be delivered in English and Greek”.

## 2.3 From Requirements to Features

The plan4business developers transfer requirements into features according to the priorities given by the Service Levels. The definition of Service Levels has been refined during the project and a fifth service level was added. The Service Levels as they are defined now were initially documented in D4.1.2 [13] Chapter 4.3. The five Service Levels are summarised as follows:

**Service Level 1** (Milestone 3, month 9): This level includes examples of various components of the future platform which are not necessarily integrated but they show the basic functions that can be further elaborated and extended. This level includes:

- a data storage for disharmonised spatial and non-spatial data,
- a common data model for harmonised data based on the INSPIRE Directive,
- mechanisms for data integration into the common data model,
- features (platform prototype) for data display and simple navigation,
- utilisation of pan-European datasets related to spatial planning from scattered resources.

The developed components are used for showcases during workshops, presentations and other meetings in order to provide potential customers an idea of the future platform and its functions and get feedback from end users.

**Service Level 2** (Milestone 4, month 12): The main goal for this level is to make the platform prototype publicly available and extend it by the following features:

- analysis of harmonised spatial data based on user requirements (this should include not only predefined queries but also a possibility for user defined queries),

- advanced visualisation tools,
- user customised data mining queries,
- retrieval of the data mining and analysis results for display,
- prototype management tools for data upload, download and publication using OGC Web Services,
- catalogue of spatial planning data,
- creation of user defined map compositions.

**Service Level 3** (Milestone 5, month 15): This service level includes improvement of the features from previous service levels and in addition the following features will be utilised:

- mapping functions for maps' customisation based on identified use-cases,
- integration of the harmonisation tools into the platform,
- integrated metadata for analyses, map compositions and integration schemas,
- extended data management tools enabling maintenance of different versions of datasets,
- first releases of pilot applications – Location Evaluator and Thematic Map Viewer.

**Service Level 4** (Milestone 6, month 18): This service level includes improvement of the features from previous service levels, their integration into the platform and in addition the following features will be utilised:

- new design of the user interface,
- advanced portrayal of the analysis result in a form of a table, chart or a report.
- support of most of the data formats defined by the users,
- tools for embedding maps into external applications,
- generation of a report from a selected area including information such as data availability, data quality, data source and non-spatial data that are integrated with spatial data.
- integration of single components into an integrated platform.

**Service Level 5** (month 21) – additionally, the Service Level 5 was designed. It includes:

- data download,
- tools for utilising feedback from users of spatial planning data,
- support of more complex queries by using the primary data storage as well as the secondary data storage,
- additional user applications for investors, design and implementation of a brownfield database,
- integration of advertisement into the portal,
- payment module,

- components' update.

By the time of this deliverable, the first four service levels were completed, and only for service level five open issues remained. During the project the association to service levels in Redmine was disposed in favour of the association of requirements and features to component or application related milestones. This gives developers more freedom as it allows independent releases of individual components and allows tracking the progress on the implementation of the individual pilot applications. The refined service levels are defined as high level requirements, which cannot be directly mapped to the system requirements defined in Redmine.

All activities are listed chronologically:



The screenshot shows the Redmine web interface for the 'plan4business' project. The browser address bar indicates the URL: <https://intranet.plan4business.eu/r/projects/p4b/activity>. The page header includes the 'PLAN4BUSINESS' logo and a search bar. The navigation bar shows 'Home', 'My page', 'Projects', 'Contacts', and 'Help'. The user is logged in as 'sfast' with links for 'My account' and 'Sign out'.

The main content area is titled 'Activity' and shows a chronological list of activities from 03/04/2013 to 04/02/2013. The activities are grouped by date:

- 03/11/2013**
  - 05:13 pm Requirement #19 (In Progress): support multiple formats for data harmonisation. GML, shp and CityGML support are ready for testing. Not yet via web interface. Not yet for XplanGML. Simon Templar
  - 05:08 pm Integration Engine - Support #5 (Closed): SHP from FTP to db. Simon Templar
  - 05:04 pm Requirement #18 (Closed): all relevant features from the INSPIRE themes. Simon Templar
- 03/09/2013**
  - 07:14 am Integration Engine - Revision 1e81b368 (integrate): upated reference to hale repo. Change-Id: I6114803612220b02a9271adda079ce1395a5839b. Reviewed-on: http://intranet.plan4business.eu/gerit/26. Tested-b... Simon Templar
- 03/06/2013**
  - 07:38 pm Document: ISO 19115 Geographic Information - Metadata. Tomas Mildorf
  - 07:38 pm ISO 19115e.pdf. Tomas Mildorf
  - 07:38 pm ISO 19115 Core.pdf. Tomas Mildorf
- 03/05/2013**
  - 10:28 am Integration Engine - Revision 68d8c0c5 (integrate): CRUDLayout / JPAContainer integration + various fixes. Change-Id: I2b29a50678b24e66abb6cf82cab5631c958946a6. Reviewed-on: http://intranet.plan4business.eu/gerit/22. Tested-b... Robert Gregor

At the bottom of the activity list, there is a link '< Previous' and a note 'Also available in: Atom'.

The footer of the page states: 'Powered by Redmine © 2006-2012 Jean-Philippe Lang'.

Figure 2: plan4business activities in chronological order in Redmine

## 2.4 Development and Testing Feedback Cycle

Results from the component, integration and system testing, especially the results from D6.1.2 System test report No.1 are documented in the issue tracking system, either as separate issues (bugs) or directly in the corresponding feature or requirement. Each issue states its status in relation to testing and thus in turn signals if it is ready to be tested – possible states are:

- Not ready for testing
- Not relevant for testing
- Ready for testing
- Tested and accepted
- Tested and partly accepted
- Tested and rejected

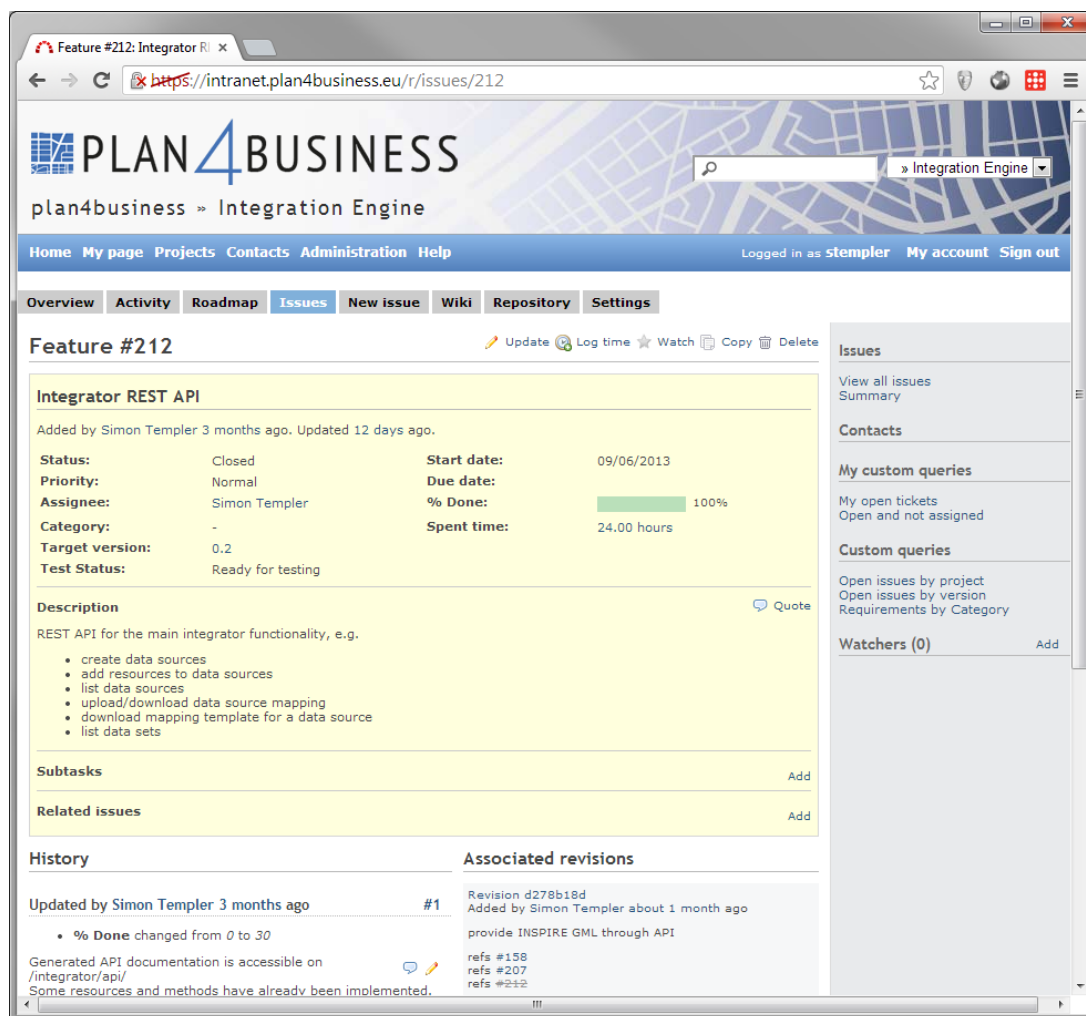


Figure 3: Issue in Redmine that is marked as “Ready for testing”

## 3 Implementation in plan4business

### 3.1 Technical Infrastructure: Redmine

In plan4business, the software will be used for both, managing the requirements and managing the development process across all work packages and project partners. This ensures an agile development cycle where the issue tracking is directly derived from the requirements stored in the system. Several systems are available on the market that can be used for this. At the first technical meeting held in Darmstadt on 23-24 April 2012, different options were discussed. Due to the positive experience that several partners have already gained in previous projects with the software, the decision was taken in favour for the Redmine system<sup>2</sup>.

Redmine is an open source issue tracking system that comes with all required features for creating, managing, maintaining and categorizing issues such as software requirements and for assigning them to people, prioritizing them and setting deadlines for their implementation. The Redmine system is one of the most important communication tools in the project. It is being used for managing and documenting the whole lifecycle of software development work in plan4business, starting with user requirements gathering, ticketing and issues tracking in the development phase up to validation.

#### 3.1.1 Redmine Installation, Access and Status

Fraunhofer has provided an installation of the Redmine system at their premises shortly after the plan4business kick-off meeting in April 2012.

<https://intranet.plan4business.eu/r/>

Partners who have not yet access to the Redmine system can register by sending an e-mail to the project office [po@plan4business.eu](mailto:po@plan4business.eu) informing of the request for the website user. The project office will create a user account for this purpose.

#### 3.1.2 Definition of User Roles in Redmine

We customized the fields in Redmine and added issue categories (in Redmine called *Trackers*) named “*User Roles*”.

#### 3.1.3 Definition of Functional and Non-Functional Requirements in Redmine

Functional and non-functional requirements have been derived from the use cases as well as from other sources such as the DoW. They have been inserted in the Redmine system.

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<sup>2</sup> <http://www.redmine.org/>



### 3.1.4 Traceability in Redmine

Redmine allows specifying relationships between issues that allow an easy navigation. Further, issues in Redmine get unique identifiers that are maintained throughout their whole lifecycle in Redmine and that can therefore be easily referenced. Further, in the development phase of plan4business, Redmine is being used as a requirements monitoring and management system. This means, all requirements developed in the initial phase of the project and later on transfer into the Redmine system and reference, where possible, the user roles currently maintained in the system. Further, for all plan4business developers, accounts have been created, allowing the assignment of requirements / issues to developers and the tracking of the implementation progress, e.g., via Gantt-charts available in Redmine.

## 3.2 Technical Infrastructure: Source Code Management

As described in the plan4business Project Handbook, for management of the source code, source documentation and configuration files that are created within the project, the project office provides several git<sup>3</sup> repositories, which can be accessed through a Gerrit installation. Gerrit is a web based code review system, facilitating online code reviews for projects using the Git version control system.

Basic access to the Gerrit system is restricted to project members, while access to individual underlying git repositories can be further constrained to subsets of project members. Access to Gerrit is available over HTTPS and SSH2 with public key authorization. Accounts for Gerrit and the repositories are managed by the project office and are given on a per-person basis.

### 3.2.1 Code review

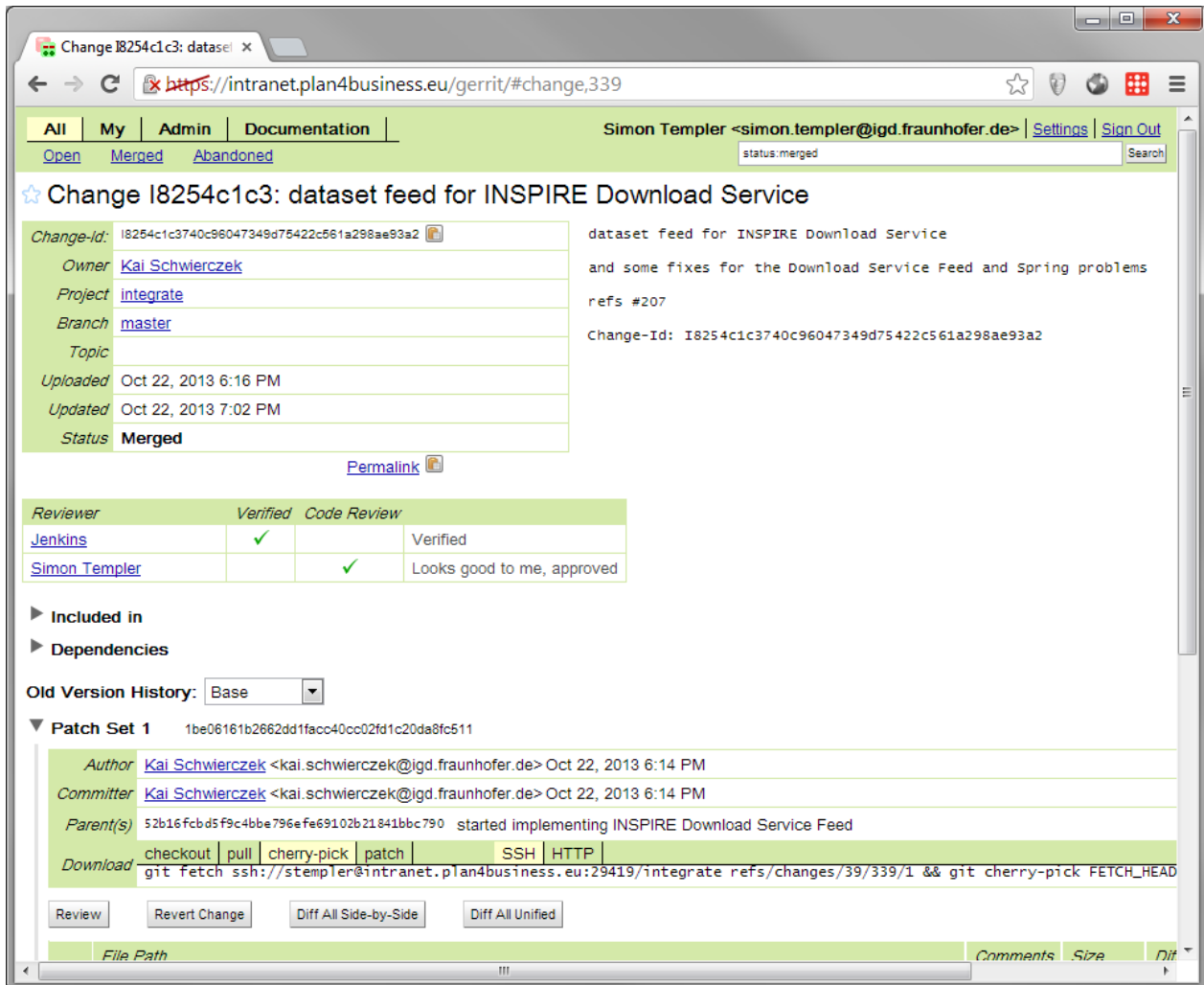
Gerrit helps avoiding errors getting into the code base, as code is reviewed by peers. A commit created by a developer is represented in Gerrit as a so-called Change. In contrast to conventional source code management systems the commit does not directly get into the code base, only once it is verified and accepted. Any project member may read and create Changes for any of the project's repositories, and thus contribute to the different applications. They also can inspect and review any Change created by other project members. There is the possibility to give general comments on a change, or detailed for specific lines of code. For each repository there is a group of specific project members that are the integrators of the repository. They are responsible for the quality of the code and the functioning of the corresponding application and have the last word on approving or rejecting a Change. The integrators for a repository are usually those that are also responsible for the associated tasks in WP4 and WP5.

The code review can be combined with the automated verification and testing performed by a continuous integration or delivery system. This allows for each Change to automatically verify if

- the code can be compiled without errors,
- the automated unit and/or integration tests run successfully and
- if the application can be deployed.

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<sup>3</sup> In software development, Git is a distributed revision control and source code management system.



The screenshot shows a web browser window displaying a Gerrit change page. The URL is <https://intranet.plan4business.eu/gerrit/#change,339>. The page title is "Change I8254c1c3: dataset feed for INSPIRE Download Service". The change is owned by Kai Schwierczek and is in the 'master' branch. It was uploaded on Oct 22, 2013, at 6:16 PM and updated at 7:02 PM. The status is 'Merged'. The change description is "dataset feed for INSPIRE Download Service and some fixes for the Download Service Feed and Spring problems refs #207". The change ID is I8254c1c3740c96047349d75422c561a298ae93a2. A 'Permalink' is provided. Below the change details, there is a table showing reviews from Jenkins and Simon Templer. Jenkins has verified the change, and Simon Templer has approved it. The 'Included in' and 'Dependencies' sections are collapsed. The 'Old Version History' section shows the 'Base' version. The 'Patch Set 1' section shows the commit details, including the author (Kai Schwierczek), committer (Kai Schwierczek), parent(s) (52b16fcb5f9c4bbe796ef69102b21841bbc790), and download links (checkout, pull, cherry-pick, patch, SSH, HTTP). The commit message is "started implementing INSPIRE Download Service Feed". The download command is "git fetch ssh://stempler@intranet.plan4business.eu:29419/integrate refs/changes/39/339/1 && git cherry-pick FETCH\_HEAD". At the bottom, there are buttons for 'Review', 'Revert Change', 'Diff All Side-by-Side', and 'Diff All Unified'. A table with columns 'File Path', 'Comments', 'Size', and 'Diff' is partially visible at the bottom.

Figure 4: Change in Gerrit that was verified by the continuous integration system ("Jenkins") and peer-reviewed, then merged into the code base for the Integration Engine

### 3.2.2 Integration with Redmine

For each repository in Gerrit a corresponding project exists in Redmine. These projects are sub-projects to the main plan4business project and allow easily browsing the repository and providing application specific information and documentation in the Wiki. When creating commits a developer can reference a feature or requirement in Redmine through a special syntax, which links commits to features and requirements and vice versa. This allows to better track the development and the development progress of a feature, especially where different people work on the same issues.

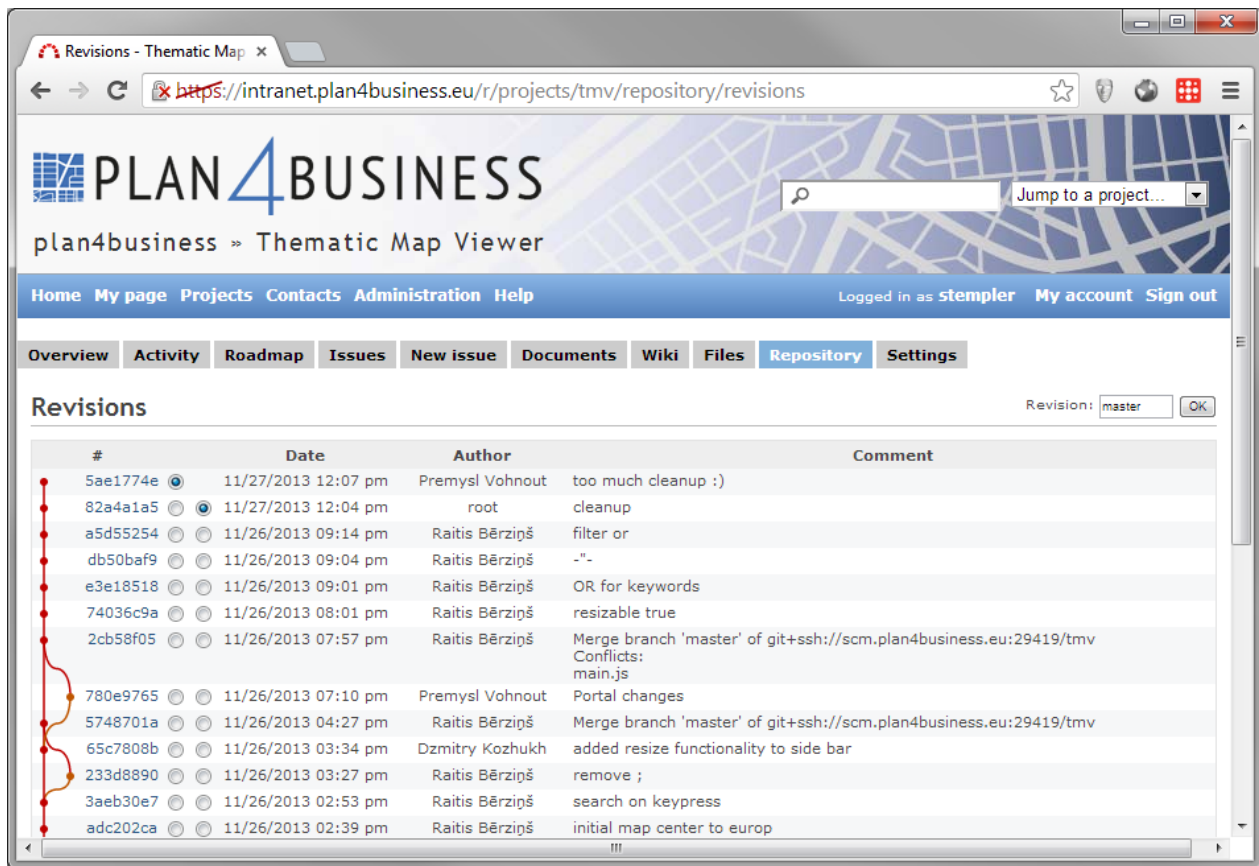


Figure 5: Sub-project for the Thematic Map Viewer in Redmine with the recent commit history

### 3.3 Organisation and Time Plan

During the kick-off meeting in Darmstadt, the following decisions were taken regarding organisational issues, responsibilities and timeline related to Requirements Management.

#### 3.3.1 Task 3.2: Requirements Analysis and System Specification

*Task 3.2: As a basis to management requirements, an analysis of requirements and specification of system should be examined. This analysis should consider the palette of requirements coming from the different stakeholders, considering the data itself but also the services related; this analysis will include the planning instruments and planning issues. Related to this analysis, the involvement of the Stakeholder Board (SB) will have a crucial role, by high-quality inputs and by targeting and identifying specific requirements (see 2.1 Management structure).*

In the first months of the project, the Task Force for Task 3.2 of WP3 (resp.: Didier Vancutsem) has agreed on the strategy and method for requirements gathering in plan4business and has prepared the questionnaire and the strategy for the activities related to Task 3.2. The task force has organised the stakeholder workshops and interviews with the potential users. These activities are described in the chapter 4 of this document. The use cases gathered have been structured and documented. The task force was also

responsible for transferring the use cases into features and user requirements. Finally, all requirements and features relevant in the initial phase of the portal development were inserted into the Redmine system.

### 3.3.2 Stakeholder Board

The Stakeholder Board provides critically important inputs to the key objectives of the project concerning stakeholder engagement and partnership building. It consists of 12 representatives drawn from the pan-European community of stakeholder representative groups. Its members were recruited during the initial phase of the project. Stakeholder Board members fulfil principal requirements for wide stakeholder representation, including representatives from social, economic and environmental partners ensuring EU 27 wide representation. Stakeholder Board membership will also respond to the changing thematic priorities of the project as the project evolves. Commencing with the kick-off meeting and all subsequent events the Stakeholder Board provides stakeholder perspectives on the conceptual frame for the development and delivery of the project.

Specific tasks of the Stakeholder Board include:

- To give advice and technical assessment of the structured dialogue between the stakeholder or end user communities and the ICT developers;
- To involve potential data brokers, such as NGO's and GO's with the goal of a strong user involvement;
- To participate in engagement and workshop events;
- To provide enhanced network links through coordination of programmatic events (e.g., coordinating plan4business events with stakeholder conferences or events).
- To disseminate project outputs as well as build networks and partnerships.

## 3.4 Interrelation to Other plan4business Tasks

The requirements collected in the work package 3 are implemented by the developer teams of the WP4 and WP5, receiving the feedback from the WP6. The work package 3 also collaborates closely with the work package 2 in order to consider the business model related requirements and needs of the future customers. The WP3 provides to the WP2 the necessary pricing information. The WP2 provides the information for the necessary prioritisation of the requirements and defines business related requirements, e.g. requirements for the management of license models for data and services in the plan4business system (see Deliverable D2.3 Approach for Data and Services Management). The figure below illustrates the interdependencies between the work packages in the plan4business project.

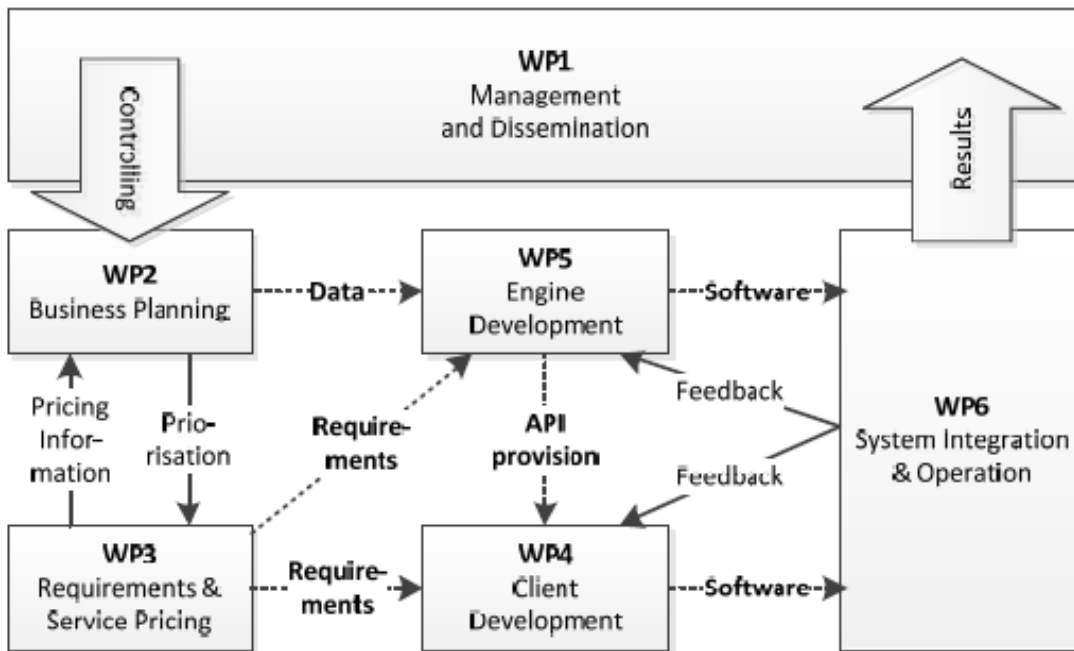


Figure 6: Interdependencies between the work packages in the pan4business project

The figure below illustrates the tasks and responsibilities related to the requirements management:

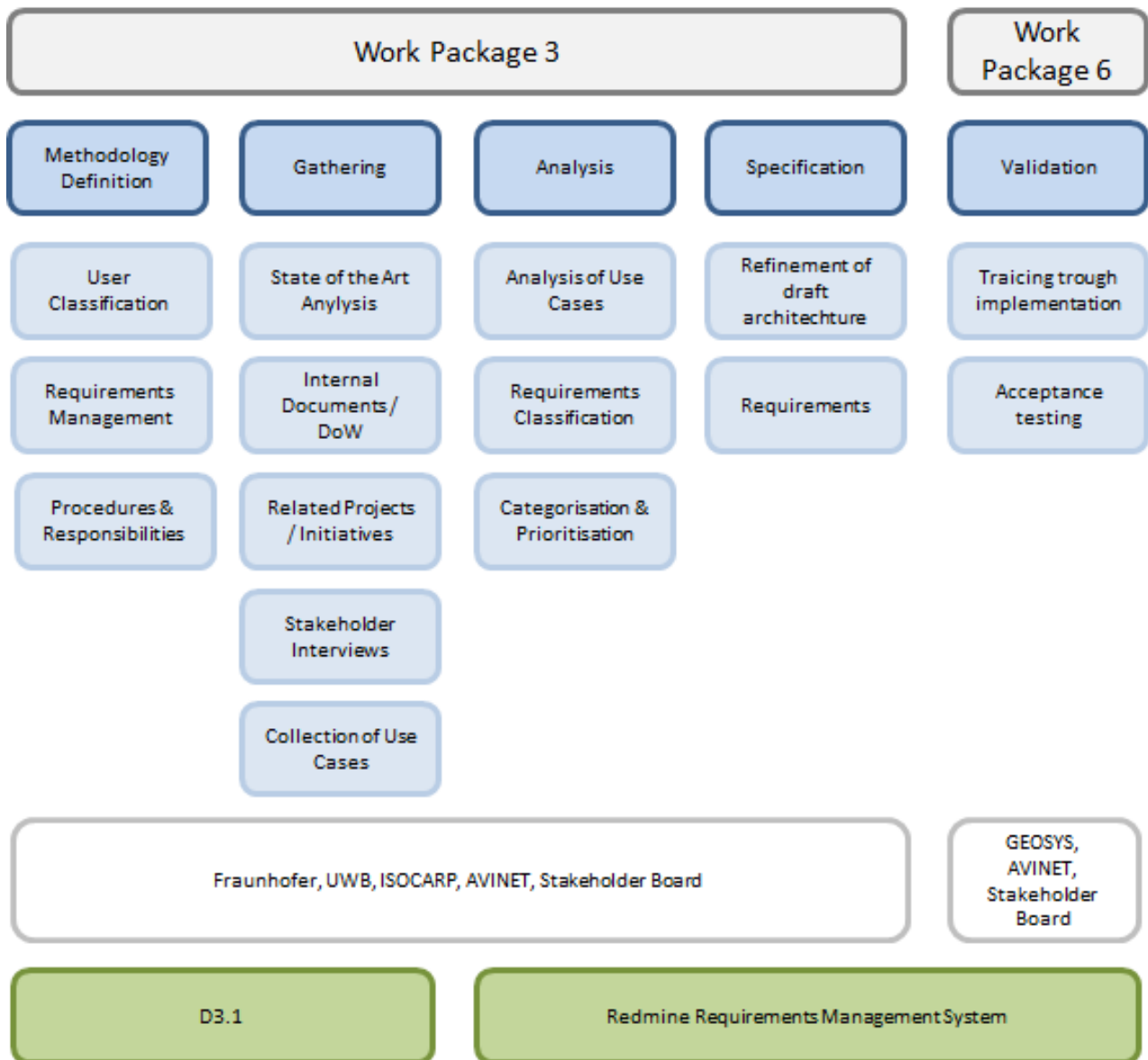


Figure 7: Approach, responsibilities and instruments related to user requirements in the pan4business project

## 4 Status Report

### 4.1 Requirements Gathering and Community Feedback

The gathering of user requirements at the beginning of the project has been implemented by using several methods, as described in detail in the deliverable D3.1:

- Customer questionnaire,
- Feedback from users during workshops and events,
- Referring to user requirements identified during the Plan4all project (see [www.plan4all.eu](http://www.plan4all.eu)).

User and data requirements have been gathered and contextualized for a number of use cases (see D3.1, Chapter 7). These identified use cases base on the results of the questionnaires sent to several professionals, users working with planning datasets and active in the fields of urban and regional planning. The questionnaire focussed on the user needs and their perceived requirements, in terms of functionalities and future plan4business platform services. In addition, the plan4business Stakeholder Board supported the project team with their expertise. In close cooperation with ISOCARP the Stakeholder Board was established. The first Stakeholder Board meeting took place at the CORP Conference in Vienna in May 2012, the second meeting followed on October 2, 2012 in Plzen. A third one followed in Warsaw in March 2013. Further different Stakeholder Board members were involved in the workshops. Additional stakeholders were involved through user workshops in London, Rome and at the INSPIRE conference in Florence.

Additionally to questionnaires a number of strategic information has been gathered in operational project meetings and workshops. This provided us with an overview of the user feedback regarding the plan4business platform. The results of the questionnaires, meetings and workshops cannot be considered as a full representative of the market demand state of the art, but they are deeply anchored to practice and to daily working experience of involved practitioners and researchers.

Essential findings demonstrated that main concerns – for both, public and private actors – regarding the use of planning data are related to:

- Land use
- Technical infrastructure
- Statistics, environmental impact assessment studies,
- Transport,
- Risk management
- Environment protection zoning
- Housing stock.

Users are expecting from the plan4business platform an easy-to-use system, offering wide possibilities of statistical analysis, 2D/3D tools, mapping tools and infrastructure/real estate location analysis. Users are ready to pay for high quality services but expect a certain amount of free data available.

According to our analysis, the planning systems are different in Europe, even if they share a common structure: they all propose a number of normative tools, based on similar/comparable indicators and indexes, for different scale of action; therefore, the platform needs a system adaptable to every administrative level.

The plan4business stakeholders highlighted following aspects:

1. The plan4business platform needs to identify critical use cases, with major interest on market, and use them as test bed;
2. An integrated model is needed for the platform – taking into account the different requirements of governance tiers;
3. A first selection of requirements should be provided as a „starting package“ (selected use cases will start to develop more promising/requested services: testing on main trends of current market demand);
4. The local level is the premium level of intervention, also taking into account the EU and other higher levels as benchmarks;
5. The local level with cadastral information and normative land use plans is the most important if we would like to be successful;
6. The platform should be open to all users;
7. Information and communication to the users is necessary.

The Stakeholder Board members recommended the following:

It might be useful to consider the key participants generating and using this information/data and how they see its benefits/disadvantages. The emphasis at present seems to be on the producer's side. Commercialisation will require demonstrating a clear business case from the user perspective. It should also not be relying on increased regulation to generate demand for the info, which could really begin generating an artificial need.

1. Technocratic Planner – due diligence in decision-making requires the best and most relevant information to address the issues.
2. Political decision maker – decision making is conducted on a very lumpy basis often bearing little relationship to the sophistication of the information relied upon by the technocratic planner.
3. Private sector user – applicants/users can be required to match this extensive/expensive data used in spatial planning only to find that the final political decision may not be entirely based on it.
4. A concern frequently encountered is the increasing volume of information that is being required from the private sector by public bodies engaged in various types of evaluation only to discover that much of the evaluation bears little relation to the scope and volume of information submitted. This relates to EIA's, retail assessments etc. Because of the increasing availability of information part of the risk proofing in the process is to request as much of the available information as possible. Some awareness of proportionality in the collection and employment of data needs to be incorporated into the structuring.



5. The UK government recently cancelled 1,000 pages of planning guidance because it was overcomplicating the process.
6. So the appropriate level of complexity of the platform is important.

#### 4.1.1 Reports from Stakeholder Workshops and Events

##### Stakeholder Workshop in Plzen

A stakeholder meeting took place in Plzen on October the 2nd 2012 in conjunction with the project meeting. The following stakeholders attended the meeting:

- François Salgé, (AFIGÉO), France, EUROGI Vice President
- Tony Mulhall, Administrative Director RICS, UK
- Robin Waters, RSW Geomatics, UK
- Maria Cabello, TRACASA, Spain

The meeting has been moderated by ISOCARP. The participants discussed following:

- Requirements (data and users) presentation and discussion (ISOCARP)
- Data available and planned (UWB)
- Showcase of the plan4business platform with focus on use cases (UWB)
- Approach for the business model (GeoSys)

On this occasion, other previous projects on similar topic (e.g. CROSS-SYS, PLAN4ALL) have been reviewed and discussed in order to build upon outcomes of former research experiences. The different EU planning systems have been analysed, among the different normative tools, as the different planning scales, the local one has been considered as the most suitable for data harmonisation purposes: the zoning plans at municipal level are the easiest to harmonize at EU scale; this is the most important planning scale for business, because it is connected to real estate initiatives and notaries (an emerging activity related to SDI). It seems that the zoning plans at municipal level are the easiest to harmonize at EU scale; this is the most important plan for business, because connected to real estate initiatives and notaries (an emerging activity related to SDI). **There is a huge number of zoning plans, but those are not available by the municipalities: How do we get there and what is our role: What is our message to sell?**

Further remarks / reactions related to the presentations were the following:

- **The Corine Land Cover is not usable at local level** (not adequate for normative zoning plan): Pan European data sets are not usable at municipality level (not sufficient accuracy), higher accuracy might be reached in 2013 through GMES. In taking into account the potential for densification in the city, as a current planners/planning issue, it is to notice that it is important in this system (like the P4B) to have access to good data and keep them up to date (in this way they could be a new effective tool). About data: **good data have to be collected: How to keep the data up to date?**
- **The level of confidence of data is essential in order to start business processes.** There is a need to test the confidence (self-reliance) of the result. The pyramid presented in the slides clearly shows how the data complexity is growing at the base (local level), at higher level, data and their representations are more reliable and easier. **About the use of the data for the smart toolkits (as**

**P4B platform): Do we keep our own storage or get current data online through services from providers?**

- Finally, about open data it is worth considering that **many municipalities do not consider spatial data as open data.**
- A Building Information Modelling (BIM) is necessary, interfacing future data with the platform modelling information. It should be a BIM approach to submitting application. It should be the aim to build a proxy for the city at the macro-level, as it is a very dynamic source of information, and should be maintained up-to-date with the local level. Therefore, **an interface between the Building Information Model and the planning information is “mandatory”.**
- Also the **topic of the value of land is a key issue:** a lot of requirements are related to that today, and this information is difficult to get, maybe via subsidies (offering services related to value of land – properties to be sold at low level - here a business case), or registries services (in the hand of public authorities), or via the real estate people (in this case necessary to pay some fees).
- It seems that the **reliability at the small scale is crucial, and it should be in an up-to-date form.** For example flooding sites are accessible and important information, which should be included. Therefore, identifying the level of information for different services is an important task: real estate needs different data as the information services etc. We have here different levels of aggregation. **What would be the most appropriated level of data?** To what extent, referring to the UWB triangle, building information model and the spatial information is that technically possible? In the UK: 400 planning authorities are on their own.
- **Which level of details is important? The most of the professionals are interested in the site information.** Private companies developed already their own SDI, and have a portfolio of information. It seems that the Key would be the cadastre information, working as a system secured with information added.

### Stakeholder Workshop in London

Further Stakeholder Workshop took place in London on 8.3.2013, organised by ISOCARP and R.I.C.S..

The initial presentations focused on

- the way of collecting, providing quality to data, and elaborating and aggregating them following clients demand and requests;
- evidences how urban layout can influence business potential of urban area;
- use of data in order to understand vacancy information on urban supply sites;
- the Map for England project - an attempt done in England to map policies and territorial actions/initiatives at national scale, cumulative effects are highlighted;
- activities in the field of geo-location and environmental studies.

The discussion started with the summary of the presentations by ISOCARP: The plan4business platform requires data quality, data coverage and added value services connected with willingness to pay for the services.

A set of questions has been arisen during the lively discussion, among them:

- What if the data is not regularly updated?
- Is there an involvement of partners in this initiative?
- What is about attractiveness for cities and administrations? Do they want to update by themselves?
- What's the role of private and public actors in the use of the p4b smart toolkit?
- How does the platform the interaction between public and private actors facilitate?

About collection of data and their use/harmonization:

- Data availability is still limited within the p4b consortium, there is the need to enrich the data pool (is p4b really capable to provide a EU-wide coverage?).
- Data and services need to be regularly revised (C. Lauder), this should happen designing a time-frame regulating data coherence and inclusiveness/integrity.
- Data liability is a crucial question to take into account. If lack of liability, platform will lose attractiveness and reputation (T. Mulhall). These are basic properties if we look for offering services to investors' market.
- Finally, C. Lauder suggested to have as much data as possible in the platform, but it has been contested/integrated that they are not useful if do not have a set of specific properties making them qualitative (data quality vs. data coverage).

Three points emerge as key element to take into consideration in the collection and management of the data:

1. Data coverage
2. Data liability
3. Data quality

Several statements have been made on plan4business future business development:

- If plan4business platform is a business solution for cities: how to make it attractive for providers?
- It is discussed the role of cities as information providers that use the p4b platform services in return (P. Elisei).
- P. Tuross highlighted how the business model has this characteristic of being based on partners, especially cities, which, at the same time, are data providers and have as response services with added values.
- There is a need for interaction with authorities, but maybe public authorities could be not interested in sharing real data about some specific urban area (A. Rose)
- What if municipalities are not providing the data?
- Cities could have interest in using the platform as a way to propose their policies/initiatives in order to address the investor's actions/to attract investments. In this case the p4b smart toolkit consent to territorial partner to use it in a pro-active way and not just as services' clients.

- Map of England (P. Shand, <http://www.idoxgroup.com/mapforengland/>) in a way already realize an online model similar to p4b aims, it is interest the possibility of assessing cumulative effect of policies, the portal did not achieve that detail that consent business and seems to be more indicated for general research purposes.
- It is definitely a potential for cities to get more attractive, quick way to say this to EU channels
  - Partial datasets / lot of data – quick overview is useful
  - Harmonization of datasets: are we going to change the way of planning?
  - Today, impossible to find harmonized datasets, not convinced to have it in the future
- Involving the private is also interesting: IPD and Experian interested in involvement, but definition of new goals and new products

Question of catching the attention of users: what is the concept of plan4business?

- Plan4business should act on inter-regional level – macro level;
- Plan4business should provide catalogue of spatial plans;
- Start with a quick win – quick solution for particular area, level of detail, ... – then extend it and build on it;
- A link to ESPON should be made;
- Plan4business should define the added value of the p4b services;
- Reliability of data – maintaining data up-to-date – needs to be considered.

The workshop participants are listed in the minutes of the event available in the intranet.

### **Customer workshop at the CORP Conference in Rome**

A further plan4business workshop took place during the CORP Conference (20-22 May 2013) in Rome.

The workshop was focussing on the feedback of customers / end-users of the platform. The workshop attracted conference participants from different countries and practice.

Following presentations took place:

- Introduction to Plan4business / User Requirements, Didier Vancutsem (ISOCARP)
- Business Model / Data infrastructure, Przemek Turowski (GEOSYS)
- Data integration / Data Model, Otakar Čerba (UWB)
- Discussion, Moderation ISOCARP

The main results of the discussion can be summarized as following:

- Through the integration process, datasets will lose information: if there is interpretation of the data, there is a danger of losing also freedom and / or identity
- Recommendation: the data should be free and totally accessible, as well as services: this was a central aspect of the discussion and the essential question of business operation with data

- Local plans in Poland, for example, are with a lot of information, not available on the plan, but in text. So: by harmonizing the plan and a simplification taking place, the platform will lose a lot of information and richness, maybe losing also its advantages and attractiveness
- Next question: what is about the text / plan description: could it be interlinked with other documents?
- In general, it was discussed that the platform would be attractive if all planned services are provided.

### **Stakeholder Workshop in Warsaw**

On 12.03.2013 a workshop took place in Warsaw with five members of the stakeholder board. The project partners presented on the following topics:

- Welcome word and plan4business introduction (IGD)
- Requirements Presentation and discussion (ISOCARP)
- Data available and planned (UWB)
- Showcase of the plan4business platform with focus on use cases (UWB)
- Approach for the business model (GeoSys)

Following are the main discussion points summarized:

### **Data acquisition and provision**

- Simulation of the current concrete business model will be necessary in order to clarify what the data will really cost
- What kind of license will there be used: some data will be free, some will need a certain license, some will need to be purchased - How much would we have to charge to pay for the data?
- Because of the necessity to avoid any costs related to data collection, the approach should be towards incorporating it with the main data collectors (local authorities, which should receive some benefits to avoid unpredictable costs)
- Proposal: if someone provides data, which actually can be used, they can be rewarded with credit that they can use to access other data on the platform.
- There is no common price list for this kind of data – most was produced for internal use. Negotiations might have to be tailored to the data producer.
- One proposal / assumption – trying to avoid any financial flows with the administration, because of the complexity of this action
- Another issue – the size of the cities that provide information; in big cities it is easy to find said information, but in smaller ones that could be complicated. One proposal was piggybacking on the information provided in the Urban Atlas, which would mean focusing on the cities covered in the atlas (over 100.000 inhabitants). Another proposal – using the EUROSTAT dataset and national statistics offices. A reference dataset in order to geolocalize all statistical information is in process and will first be aimed at Germany, Poland and Czech Republic.

- How can the system provide the opportunity to access currently restricted data?
- Important – the inconsistency of how the policies at European level end up at the local level. The need for policy consistency across Europe and top-down could be answered by using the same standards at all levels. In terms of efficient application of policy, the project could be useful.

### **Services offered by the platform**

- Achieving of the portal is ambitious and a challenging. It is important to have comparable data at national and European level, which at this point is difficult. Currently there is no capacity to analyze data by comparison.
- In order to encourage potential users to use the platform, the offer should be simple to use and the cost of usage should be predictable and easy to access.
- Try to concentrate on high-level functions instead of trying to provide raw data. The role of platform is that of a specific targeted analysis provider.
- The platform is open to everyone that wants to buy information from all the companies providing the data; all the companies receiving, using and sharing information cost-less
- The implementation period of 2 years could generate a shift of perspective in regard to user requirements. It's important to consider the possibility of their needs changing. Identifying scenarios could help focus on providing some real uses for a certain user pool.

### **Business model**

- The idea is still vague (AR) – cases of cities that have already gotten investments based on a similar idea would be useful.
- Perhaps regional investment promotion agencies could have a use of the project as well and could sustain and promote it not only on city-level but in a wider context.
- The big cities already have a lot of investments in progress; maybe the small cities could be more attracted to the idea and could benefit more from the project.
- The challenge of attracting investors is complicated and place-based, taking into account a lot of factors
- If there is a proposal to invest in a certain city or region, the investors contact advisors on-site rather than a pan-European authority. It is thus difficult to track investments, especially cross-border ones.
- Background information is what people will rely on to make an investment. Important questions: What's the baseline information needed to make something like this work? What is the nature and minimum amount of the information that you could put on a pan-European website in order for it to function properly and address the need to stimulate pan-European investments?
- All the big real-estate companies have networks in Europe. In case of expanding business, they might fall back on their own connections.
- It is very important to have National Partners to endorse and support the project, and also to have all the documents which regard a certain country in its national language, beside English. (MCS)

- The business model has to start from the core use-cases.
- Partner recommendation – the business plan should also collect the user involvement. What do they do now to solve the problem? What do they need to achieve? What are their current problems? Very important – Getting the users’ attention and interest and verifying if the proposed process would cater to their needs.
- There needs to be more attention on how the local governments use data – a broader perspective on the public sector would help, esp. since they will be the main data providers for the project. Using data for spatial planning is pretty general and the specific uses would need to be clarified (proposal – using a flowchart).
- The information is already there, so the added value of the project would stem from the building of services, and being able to identify the customers’ needs and expectations and then building the solution based on the added-value services. There is more and more data, but there are no such services. Try to build an attractive business model, to go into a win-win situation: this is more a critical issue.
- Opportunities for the customers to get involved. Important – being able to negotiate and offer services to different customers. A critical point is that in the end, the user would want to combine the existing data with his/her own. End product has to be relevant.
- Just comparing/analyzing the data isn’t really the best service that could be provided.
- There is still the need to provide something unique, presenting the project to the stakeholders as ‘added value’. If it’s not relevant, it won’t be used, so some time spent talking to core users will be necessary.
- The data is just the part of the program. Assessment of policy and policy impact (e.g. what happened 10 years afterwards) would need not only data but also the policy documents. The data is just a part of the problem, a support for the action. The problem is – what is the policy and what are the reasons for it?
- Priority – the analysis: talking to the customers about their current process and the possible benefits for them.

### **Workshop at the INSPIRE conference in Florence**

In context of the INSPIRE conference 2013 in Florence a workshop was held by Fraunhofer, ISOCARP, HSRS and Avinet on June 24<sup>th</sup> 2013. It featured a general introduction to the project, a view on business cases and stakeholders, a presentation and demonstration of the system, and the roadmap and challenges of the commercialisation of the platform. Interested participants had the possibility to fill out a short questionnaire on their expectations and recommendations for the plan4business platform. These are the main conclusions from questionnaires and discussion:

- Data to be available on local and regional level is deemed more important than national and European scale data – however, the area for which it should be available is Europe as a whole or at least for as much member states as possible.



- Concerning the kind of the data the opinions are pretty evenly split. Some put the focus on specific data like land use, (3D) buildings or statistical data, while others state that many kinds of data are relevant for planning activities and should be part of the platform.
- There are concerns regarding the data availability and the possibilities to keep the data up-to-date.
- Emphasis is put on cross-border use cases, e.g. flood protection.

#### 4.1.2 Future Planning

The following Stakeholder Workshops/Events are planned:

- November 2013: Customer Workshop in Brussels
- March 2013: Final Event

### 4.2 Continuous Requirements Management

During the project the requirements have been subject to continuous refinement and weighing. The requirements defined in the System Specification in D3.1 Chapter 9 built the stable core of the platform requirements. Additional requirements have been added as well – base for this was primarily the selection of core use cases for the platform, which are reflected in the Business model progress report [12] as the services and pilot applications defined in Chapter 3. Other requirements are based on technical issues on the communication between the different components or on specific feedback from stakeholders and community. In D6.2.1 the requirements were grouped by the platform components and acceptance tests performed for each. This is also reflected in Redmine as the requirements were moved to the sub-projects for the individual components. The use case selection and requirements prioritisation brought the necessity to refine the platform Service Levels – this was documented in Chapter 4.3 in D4.1.2. By the time of this deliverable, the first four Service Levels were completed, and only for Service Level five open issues remained.

Concluding the statements of the stakeholders and the Stakeholder Board and analysing the project documentation the following recommendations were made regarding the requirement management in the previous version of this deliverable, D3.2.1 Chapter 5. For each recommendation now follows a statement on if and how this was implemented in the project

1. *The project team needs to identify few critical use cases, with major interest on market, and use them as a „starting package“, using the information described in the chapter 7, D3.1. Reflection of these use cases in the Redmine system might be helpful to be able to prioritize the most important cases for the development.*

As mentioned before, these use cases have been identified and are reflected in the services and pilot applications defined in the Business model progress report [12]. In Redmine they are reflected through the sub-projects (which are roughly equivalent to the pilot applications) and the associated requirements and features.

2. *In order to be able to classify and rank the requirements defined in chapter 9 in D3.1 a mapping to the use cases defined in chapter 7 D3.1 according user types defined in chapter 6.1 D3.1 would be*



*beneficial. Example: Assuming the real estate type user has high financial priority, the related use case 7.1.6-1 in D3.1 and its related requirements would be assigned a higher priority. This would make clear which requirements belong to the same use case and should thus be approached together. Implementing the requirements in relation to the use cases would allow the realisation of demonstrators which highlight the system functionality and help to commercialise the system already in a very early stage of the development. E.g. for a public event with the real estate community a demonstrator could be realised with the simple functionality important for the real estate users.*

Several use cases from D3.1 were selected as primary use cases, mainly those with focus on the real estate sector. These were further developed to pilot applications in the Business model progress report [12]. The prioritisation of requirements was done based on the association of these use cases via services and pilot applications to requirements. One result of this are the refined Service Levels documented in D4.1.2.

3. *Since the local level with cadastral information and normative land use plans is considered to be the most important to be successful, the use cases should involve land use plans.*

The following pilot applications defined in the Business model progress report [12] involve land use data: **CITY-PLAN**, **BROWNFIELD**, **OPEN LAND USE MAP** and **HARMONISE**.

4. *The emphasis at present seems to be on the producer's side. Commercialisation requires demonstrating a clear business case from the user perspective. Thus, direct user involvement on the system development should be intensified. Users should test and approve the software components not only after finalising the whole component but already testing the initial set of features.*

User involvement was done through the Stakeholder board and other users getting involved directly or in User Workshops. A more intensified feedback is expected after now being online with the first services and the user can get directly involved online.

5. *It might be helpful to define acceptance criteria from the user perspective for each of the critical use cases mentioned under no.1 based on the information in the use case tables in the chapter 7, D3.1. They should complement the requirements acceptance tests from the technical perspective, summarised in the deliverable D6.1 System Integration Plan, chapter 7.2.3. It might be helpful to add the field Acceptance Criteria in the Redmine system. These criteria should be able to monitor the status of the development from the user perspective.*

Acceptance tests based on requirements have been performed in the context of D6.2.1, but the Acceptance Criteria have not been explicitly defined. D6.2.2 will include the definition of the Acceptance Criteria and the methodology used to derive them.

6. *Requirements should be approached in order of the assigned Service Levels. For the commercialisation purposes it is important to accomplish Service Level 1 before starting the other levels. The work done should be reflected in the Redmine system in order to provide a reliable monitoring instrument.*

Requirements were approached based on the refined Service Levels defined in D4.1.2 Chapter 4.3. By the time of this deliverable, the first four Service Levels were completed, and only for Service Level five open issues remained.

## 5 Conclusion and perspectives

The deliverable introduced the requirements management and development infrastructure and the requirements management methodology applied in plan4business. Further, the activities at the plan4business stakeholder workshop were summarized and an overview of the workshop results has been given, as well as a summary on the continuous activities related to the requirements management.

The DoW and the initial collection of use cases and user requirements built a solid basis for starting the system development. However, early on it was apparent that the requirements management has to be a continuous process of validation, refinement and prioritisation, as well as the collection of feedback and additional requirements. Key decision was the selection of primary use cases that allowed a proper prioritisation of requirements and resulted in the refinement of the service levels. Achieving this earlier in the project in retrospect is something that would have been even more beneficial. On the other hand the experiences during the project up to that point were significant for the selection process. Together with the selection of use cases it was important to get from the sometimes very abstract description of use cases to the concrete definition that not only a domain expert but also the developers understand. This was achieved by the definition of services and pilot applications related to the use cases.

The Redmine system as main part of the requirements management infrastructure proved to be very valuable for the continuous work and documentation on the requirements management and the communication between the different partners and work packages. The extendibility of Redmine allowed easily integrating requirements management (WP3), development (WP4+5) and testing (WP6), e.g. through the documentation of the test status of requirements. The source code management system Gerrit enabled a close cooperation of developers and supported quality assurance through the possibility for code reviews and pairing with continuous integration mechanisms.

For the remaining project time the requirements management will continue, mainly with the focus on the user feedback from the public applications and the system testing.

## Glossary

**Stakeholders** refer to individuals or organisations who have vested interest in the success of the project. Stakeholders can be individuals who use the plan4business system or who are mainly interested in the outcome of the project. These can include functional, political or financial beneficiaries; operators, developers, public, experts or user community. Stakeholders are represented in plan4business through the partners and the Stakeholder Board.

**Use Case** represents one possible functional process within a scenario. It indicates actions performed by specific actors that are required to achieve a specific goal. A use case can have multiple paths that can be taken by any actor at any one time. Use cases are described using a use case description template including Use Case Nr., Title, Sector, Category, Type of User, Business Activity, Target group addressed, Business Case Story, Client, Product, Dimension/Spatial/Financial, Working Time, Method used, Approx. Honorarium expected, Governance Project, Proposed Data requirement, Other Information (see D3.1).

**plan4business Platform** refers to the web platform that will be designed and developed in the plan4business project to offer urban and regional planning data users a full catalogue of harmonized planning data and services such as transport infrastructure, regional plans, urban plans and zoning plans.

**Requirement** is a characteristic, quality, condition or capability that a system should or must have based on the statement of a customer need or objective to satisfy such a need or objective. Requirements can be classified functional or non-functional.

**Use Cases Specific (Functional) Requirement** specifies a function that the plan4business system must be able to perform and refer to the intended behavior of the system. These include definition of technical aspects such as system calculations, data processing, user interface and interaction with the system.

**Overall (Non-Functional) Requirement** is a statement of how a system must behave, it is a constraint upon the systems behavior and refer to e.g. security, performance, reliability, usability etc.

**Acceptance Criteria** are created by business customers and partners responsible for the stakeholder engagement. They are usually expressed in a business domain language. These criteria are used for high-level tests to verify the completeness of a user story or stories at any development stage. These tests are created through collaboration between the potential customers, partners responsible for the stakeholder engagement, testers, and developers. It's essential that these tests include both business logic tests as well as UI validation elements. The business customers (via partners responsible for the stakeholder engagement) are the primary project stakeholders of these tests. As the user stories pass their acceptance criteria, the partners responsible for the stakeholder engagement can be reassured the developers are progressing in the right direction.