PLAN4BUSINESS

A service platform for aggregation, processing and analysis of urban and regional planning data

SEVENTH FRAMEWORK PROGRAMME

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| **Dissemination Level** | | |
| **PU** | Public | PU |
| **PP** | Restricted to other programme participants (including the Commission Services) | |
| **RE** | Restricted to a group specified by the consortium | |
| **CO** | Confidential, only for members of the consortium (including the Commission Services) | |

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**Title:**

System integration plan

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**Working Group:**

WP6

**References:**

Grant Agreement No. 296282, Annex I Description of Work, D3.1 Requirements Analysis and System Specification

**Short Description:**

The system integration plan describes the approach for integrating different components of the plan4business platform into the final infrastructure. The plan should assure efficient work among the project team. The main goal of the project is to design and establish a platform fulfilling the needs of different groups of users. The functionalities of the system are driven by user requirements that were gathered at the beginning of the project and documented in deliverable D3.1. The functional design of the system starts from this input, but it is important to recognize it as a continuous, user-driven process. Under these circumstances, the Agile software development methodology is a proper approach.

**Keywords:**

System integration, development management, agile software development

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# 1 Introduction

Plan4business is focused on developing a service platform for aggregation, processing and analysis of urban and regional planning data. This involves ambitious technical challenges as well as challenges regarding the planned future commercial exploitation of the platform. The project consortium thus has to define carefully the strategies and measures for maximising the likelihood of being successful.

Partners involved in the Work Package 6 (WP6) – System Integration and Operation are responsible for the shape and functionality of the end product. Once operational, WP6 will concentrate on the establishment of a descent IT infrastructure and on starting commercial utilisation of the portal. WP6 requires input from all Work Packages and builds on top of their achievements.

## 1.1 Aim and context of report

This document is delivered in project moths 9. It is based on documents created beforehand and experiences form the work during the project. An important role plays the approach to software development management. The Agile methodology was defined by practitioners as a strategy suitable in case of dealing with changing or evolving requirements and it suits the P4B project environment very well. Further, the document is describing an approach to management issues. The proposal is focused on project team structure simplification and emphasise the role of coordinated information shearing and decision making.

The core part of the report is a review of the system architecture and an overview of the different components that will be integrated into the portal. The initial view presented in D3.1 was enriched with the information referring to the functionality and interactions of system elements.

Further, the report introduces the final system test plan. The test plan is based on the functional requirements defined until the date of the report publication. It is important to be aware that this will then be subject to continuous evolution.

## 1.2 Content

Chapter 1 introduces the report

Chapter 2 describes the role of system integration in the specificity of the P4B project

Chapter 3 describes the Agile software development methodology

Chapter 4 describes the approach to project team organisation for the task of system integration

Chapter 5 refers to assumptions of the Description of Work (DoW) regarding the system architecture, and recaps the refined system specification presented in D3.1. The compilation of these two documents illustrates the iterative manner of approaching the definition of the final system functionality.

Chapter 6 describes the plan4business system components and their interconnection requiring integration works. This chapter also defines, when appropriate, particular technical solutions for the components.

Chapter 7 contains the strategy for system integration and the system testing plan.

# 2 Role of system integration in P4B project

System integration is understood as a connection of system elements into one operating solution, fulfilling efficiently the well-recognized needs of users. In P4B, four main domains of integration were identified:

- integration of software components;
- integration of data;
- integration of hardware infrastructure;

The idea of general functionalities of the P4B system was sketched in the DoW. It allowed smooth building of a working prototype covering some basic functionality.

The development process in the project involves several phases, including the collection and analysis of potential system users groups requirements at the beginning, and constructing a business model on this base. Business oriented works are planned as a parallel process to the development works. Both of these activities will be conducted for the entire project time. System design and integration has to be understood as a constant cooperation between consortium partners in iterative cycles of requirements analysis, design, coding and testing of the created solution.

# 3 Methodology

Since the design and development of the P4B platform requires a flexible and iterative approach the Agile software development methodology is the right choice for implementing this. The Agile methodology is described by the Manifesto for Agile Software Development[1] 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

These principles correspond well to the reality of a heterogeneous and open environment like the P4B project in which entities with different background and experiences have to cooperate.  Management tools are not always applicable, especially in the case of lack of detailed definition of system functionality. Software related documentation provides less information for stakeholders than live presentations or possibility conducting tests personally. Frequent contacts inside project team as well as collection of opinions from the side of stakeholders allows for systematic system development. All requirements couldn't be collected in the beginning of the development cycle. Constantly growing awareness of the project team and changing circumstances requires huge flexibility and ability to adjustment goals and ways of its achievement. Moreover this methodology emphasize, that technical excellence paired with simplicity lead to limitation of unnecessary work.

[1] http://agilemanifesto.org/

# 4 Project team organisation

The responsibilities of each consortium member are defined by their involvement in the particular Work Packages of the project, which reflects the general sets of activities to be accomplished:

WP1 Management and Dissemination

WP2 Business Planning

WP3 Requirements Management and Service Pricing

WP4 Plan Integration & Analysis Clients

WP5 Storage, Integration & Analysis Engines

WP6 System Integration and Operation

A collaborative project like P4B requires close cooperation between the different WPs from the start. In the following section, we describe the roles of cross-WP teams that have been established to better address the need for cooperation between particular work packages. The following three teams are established for this purpose:

- Project Management Board (consisting of individuals involved in WP1)
- Business Planning Team (consisting of individuals involved in WP2, WP3, its work is coordinated by Exploitation Manager)
- Development and Operation Team (consisting of individuals involved in WP4, WP5, WP6, its work is coordinated by Scientific Manager)

The following additional group has only an advisory role:

- Advisory Group (consisting of Stakeholders Board and External Advisors)

System integration is a process of connecting subsystems, developed separately, in order to build a solution fulfilling well recognised needs of future system users. From this perspective, a coordinated communication between the different teams and the efficient cooperation inside them are a prerequisite for success. For this, clear decision making processes have to be applied. The interactions between the teams are shown in Figure 1.

Each team has its own obligations and clear role.

Project Management Board is responsible for formal project management, but the first of all it is a group where decisions are taken. On the base of information, and in reference to the deliverables, this team decides on the further steps of work. Project Management Board communicates decisions to the members of Business Planning Team and/or Development and Operation Team.

Other responsibility of Project Management Board is collection of feedback from Stakeholder Board (SB). Their feedback should be taken into consideration in decision making process. When an important task exceeds the expertise of all consortium and SB members, Project Management Board can identify an External Advisors and ask for respective contribution.

Business Planning Team is responsible for preparing detailed business plans for the commercial enterprise as well as detailed functional specification of the system.

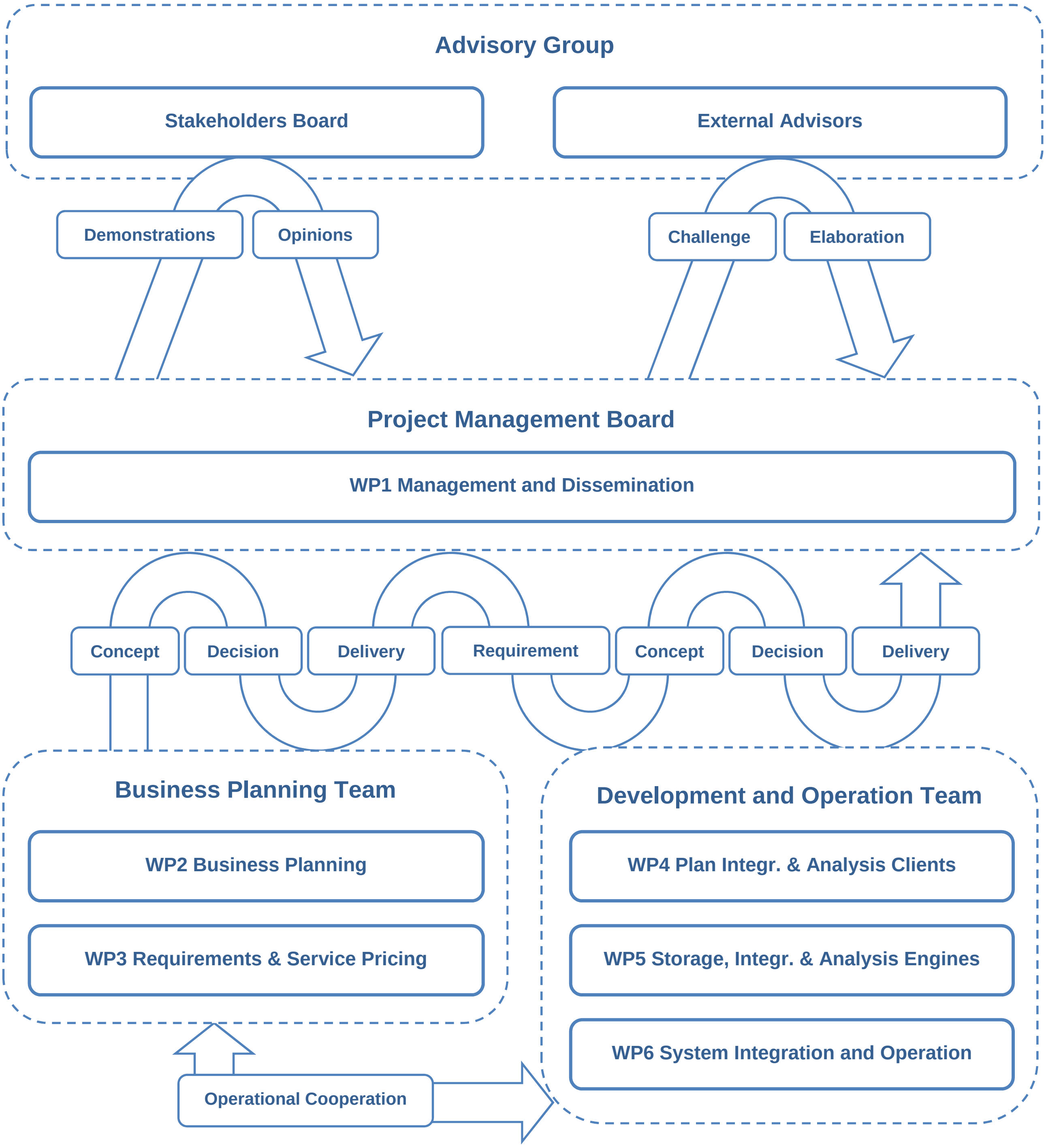

Figure 1. Interaction between actors of the system development process

The Development Team designs and builds working system. It is done in reference to specification elaborated by the Business Planning Team and approved by the Management Team.

# 5 Overall P4B platform architecture

The system architecture is in general manner described in the DoW. The DoW describes the basic elements of the platform to be designed in details and produced during the project. In the first months of the project more detailed functionalities of the system were identified and documented in report D3.1 Requirements Analysis and System Specification based on the previous user requirements analysis. The report also documents requirements collected during a survey conducted between representatives of potential users groups.

## 5.1 Objectives of the DoW

This first overall draft of the system architecture was a simple consequence of the planned domain of future operations. According to the DoW, the platform to be designed in the project is expected to allow harmonization of spatial planning documents. Harmonised data are to be integrated into one seamless, homogenous, constantly growing and updated trans-border dataset.

Besides spatial planning data, which are understood as the integral element of the system, other planning data will be taken into account.. All datasets are planned to build a data pool used as input to various kinds of analyses which can be offered to the market.

**Service Level 1:** Integration, Management and Conversion of planning data (the mentioned above ability of integrating data of various standards into one standard, which is needed to allow trans-border analysis based on data of different origin);

**Service Level 2:** Hosting and Mapping of planning data (this is expected to facilitate publication of planning documents which authorities' obligation, as well as participatory planning processes);

**Service Level 3:** Standard Processing and Analysis of planning data (provides standard geospatial and geostatistical tools, as well as and non-geospatial and multi-time operators);

**Service Level 4:** Advanced and Custom Processing and Analysis of planning data (3D modelling, custom analysis, simulation models based on auxiliary data sources).

All these system goals led to the first draft of the system architecture, covering all basic system elements, grouped into three functional layers:

**Client Layer/Portal:**

- Configuration and Management
- Payment and Authorization
- Plan Integrator
- Analysis UI

**Integration and Analysis Layer:**

- Workflow Control
- Format Converter
- Integration Engine
- Analysis Engine
- Hosting Services and API

**Storage Layer:**

- Pool Storage Manager

- Primary Data Pool Storage (input data storage)
- Secondary data Pool Storage (cache storage)
- External Storage Connector

Besides spatial planning data, which is understood as the integral element of the system, the 4th Service Level suggests usage of additional data sources. All datasets are planned to build a data pool used as input to various kinds of analyses which can be offered to the market.

**Primary Data Pool:**

- Urban and regional planning data from different countries
- Land use data including GMES Urban Atlas data
- Open Street Map
- Natura 2000
- Market information
- Social and economic data
- Individual property data and cadastral parcels data

## 5.2 Contributions of the Deliverable 3.1

The report D3.1 Requirements Analysis and System Specification documents the initial set of costumers' requirements, as well as sample use cases and functional system specification.

This contribution was derived from a survey directed to several groups of potential users of the system. The questionnaire was focused on the identification of costumers' needs in the scope of access to spatial data and spatial planning data in particular, and its application in typical tasks of professional activities. The respondents were asked also about the expected functionality of the proposed platform. The system use-cases derived from this were used to further refine the functional specification of the system.

As it is stated in D3.1, the proposed set of functionality will be iteratively refined and developed based on feedback from tests and demonstrations, as well as on contributions from WP2.

General groups of platform functionality were defined in the first place:

- Configuration of data model
- Data upload and management (maintenance)
- Management of portal and its commercial operation
- Performing of data analysis
- Visualization of planning data and results of analysis
- Downloading data

Detailed system specification was presented in the form of requirements of three specific users groups:

- Data contributors
- Data users
- P4B managers and operators

A separate set of requirement was defined in reference to data which are planned to be integrated in the system. Each particular requirement was described regarding its importance in the final configuration of the system by its specific level of obligation as: MUST, SHOULD and COULD. The system testing plan is described in the reference to this set of requirements in Chapter 7.

# 6 System components

This chapter describes the system components and how they interact in more detail. Since the development cycle is iterative, this may be subject to change, refinement and extension. The components mostly conform to the components as pictured in the system overview in Figure 2. Each component has a specific work package task associated to it.

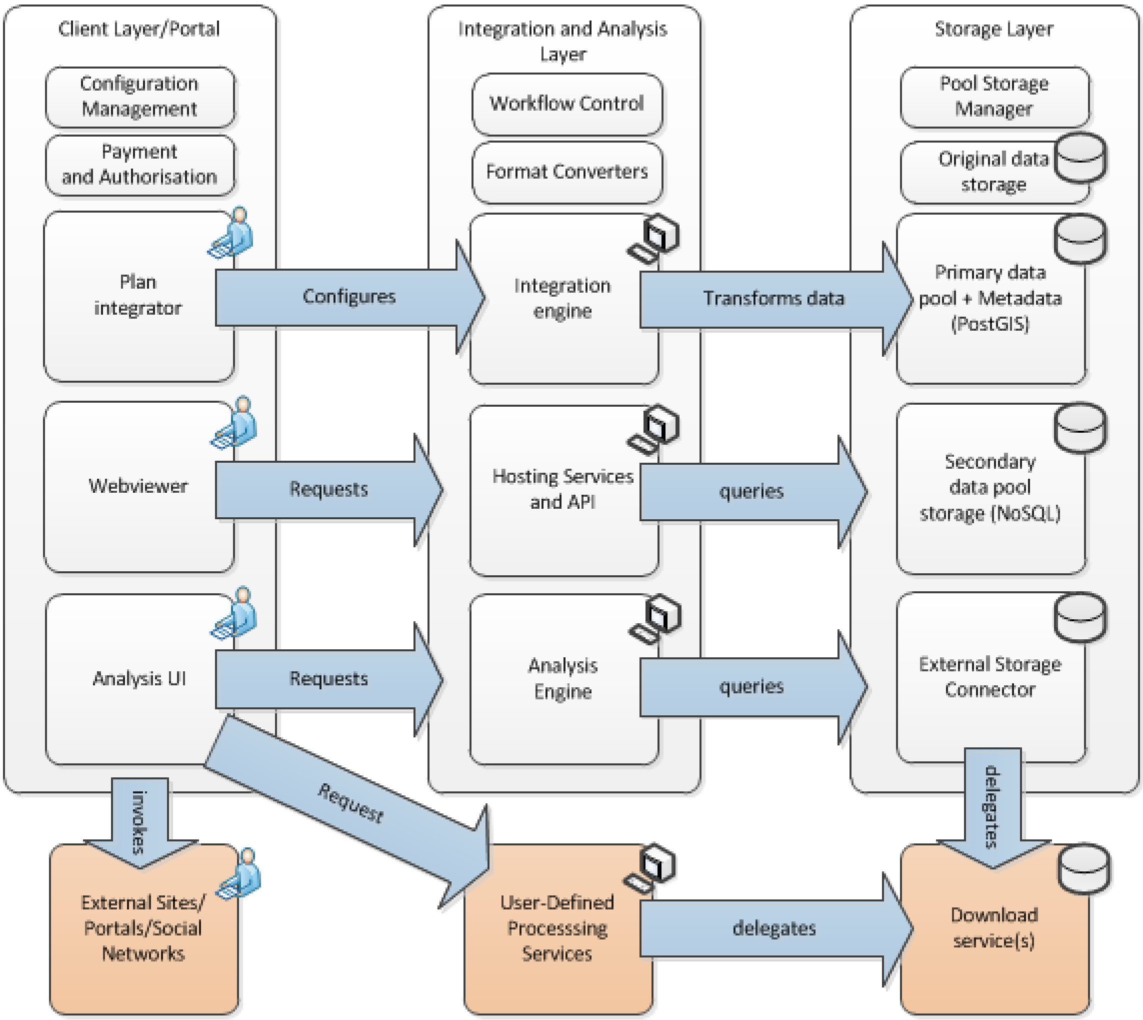

Figure 2. System overview from the DoW.

For each component, the information relevant to the integration is summarized in a table like this:

| | |
|---|---|
| ***Associated task*** | *References the associated task as defined in the DoW.* |
| ***Functionalities/Services provided to other components*** | *Lists the functionalities and services provided that are consumed by other components.* |
| ***Functionalities/Services consumed*** | *Lists the functionalities and services consumed from other components,* |

| | |
|---|---|
| ***from other components*** | *which are needed for this component to function properly.* |
| ***Dependencies*** | *Lists the components that this component depends on – these are the components offering functionalities/services that this component needs. Please note that dependencies may be bidirectional.* |
| ***Technical details*** | *Technical details regarding the component that may be relevant for the integration. May refer both to current and future implementations.* |

## 6.1 Client layer

The client layer consists of those components that provide a web interface as part of the plan4business platform.

### 6.1.1 Portal

The portal is the main point-of-access of the plan4business platform. It includes the functionality for user management and payment options and enables the user to access the different services the platform has to offer.

| | |
|---|---|
| **Associated task** | Portal integration (6.3) |
| **Functionalities/Services provided to other components** | • **User management**<br>• **Data access authorization** |
| **Functionalities/Services consumed from other components** | • Integration of or reference to **Plan integrator web interface**<br>• Integration of or reference to **Analysis UI**<br>• Integration of or reference to **Webviewer** |
| **Dependencies** | • **Plan integrator**<br>• **Analysis UI**<br>• **Webviewer**<br>• **Hosting Services and API** |
| **Technical details** | Portal will integrate access to all users' interfaces of the system elements. It was not decided yet if all user interfaces will be integrated with the system or if portal will be referring to those UIs. The access will be granted based on user identification procedures, supported by user management functionality. User management will be directly connected with customer relationship management system where payment options will be realised. Portal will play a role of final integrator of whole system functionality. Portal will be developed based on technology of Liferay Portal environment. |

A task group with members from all work-packages has been formed to coordinate and ensure the overall integration of all components into a united, modern and simple user interface, supporting all identified requirements and expectations.

### 6.1.2 Plan integrator

The plan integrator is the user interface for integrating data into the platform.

| | |
|---|---|
| **Associated task** | Collaborative Schema Integrator Development (4.1) |
| **Functionalities/Services provided to other components** | • **Plan integrator web interface** |
| **Functionalities/Services consumed from other components** | • **User management** to associate uploaded data with the user ID and to determine if access to administration components should be granted<br>• **Data access authorization** to discern which uploaded data sets the user is allowed to integrate or adapt the integration<br>• **Integration Engine API** to perform integration tasks and store transformed data in the primary data pool |
| **Dependencies** | • **Portal**<br>• **Integration engine** |
| **Technical details** | Plan integrator and Integration engine both run together in the same runtime environment to reduce the communication between both components. They run inside an OSGi runtime based on the HUMBOLDT Alignment Editor (HALE) Server, which includes its own web server. Authentication and authorization can for instance be integrated through Spring Security.<br>Currently the component runs standalone with a dummy user management with fixed users as the user management and authentication component is not available yet. |

### 6.1.3 Analysis UI

| | |
|---|---|
| **Associated task** | Analysis UI Development (4.2) |
| **Functionalities/Services provided to other components** | • **Analysis UI** |
| **Functionalities/Services consumed from other components** | • **Analysis Engine API** to perform analysis tasks<br>• **UI for predefined queries** (wizards) for particular use cases.<br>• **UI for General queries**, where advanced user can put any type of query.<br>• **UI for query tuning**, where user can edit and tune already finished specified queries.<br>• **List of queries** – the list of all queries that has been done by particular user with the information about its status (e.g. processing, finished, error).<br>• **Tips to most popular queries** that has been done so far. |
| **Dependencies** | • **Analysis engine**<br>• **Webviewer** |
| **Technical details** | Analyses UI is client based module that will utilize the capabilities of data Analyses Engine. When considering the Module View Controller pattern then this component is representing the View. Technically this part will be designed as html/JavaScript web page that will access the REST services |

| | |
|---|---|
| | of Analysis engine. |

### 6.1.4 Webviewer

| Associated task | Plan Hosting and Feedback components (4.3) |
|---|---|
| Functionalities/Services provided to other components | • **Webviewer** – map viewer that will show data from data pool and analyses results.<br>• **Definition of Download Web Services properties** |
| Functionalities/Services consumed from other components | • **Primary data pool**<br>• **Analysis UI and Analysis Engine** |
| Dependencies | • **Portal**<br>• **Storage engine**<br>• **Analysis UI and Analysis Engine** |
| Technical details | Webviewer is map-centric application, which makes it easy for the user to visualize background geodata (topographical map, aerial photos, CORINE and other data). It is based on top of HSLayers Mapping Framework (http://hslayers.org). It will incorporate the Analysis Engine UI, so it will also display results of its calculations. It also makes possible to visualize data not only from external services, but also data stored in the Storage engine, visualized via webservices. |

## 6.2 Integration and Analysis layer

The integration and analysis layer is where the business logic of the platform is implemented, which is provided to the user through the client layer.

### 6.2.1 Integration Engine

The Integration Engine performs the task of integrating data sets into the primary data pool. It is configured and controlled through the Plan Integrator.

| Associated task | Integration Engine Development (5.1) |
|---|---|
| Functionalities/Services provided to other components | • **Integration Engine API** |
| Functionalities/Services consumed from other components | • **User management** to determine if access to administration components should be granted<br>• **Data access authorization** to discern which uploaded data sets the user is allowed to integrate or adapt the integration<br>• **Primary data pool** (direct database access) to perform integration tasks and store transformed data in the primary data pool |
| Dependencies | • **Portal**<br>• **Storage engine** |

| | |
|---|---|
| **Technical details** | Plan integrator and Integration engine both run together in the same runtime environment to reduce the communication between both components. They run inside an OSGi runtime based on the HUMBOLDT Alignment Editor (HALE) Server, which includes its own web server. Authentication and authorization can for instance be integrated through Spring Security.<br>Currently the component runs standalone with a dummy user management with fixed users as the Portal component is not available yet. |

### 6.2.2 Analysis Engine

The Analysis Engine performs analyses on the data available in the plan4business platform.

| | |
|---|---|
| **Associated task** | Analysis Engine Development (5.2) |
| **Functionalities/Services provided to other components** | • **Analysis Engine API - REST API** to perform particular Analysis<br>• **REST API** to monitor particular status of analysis and their list<br>• **Cache** of already available results<br>• **Predictor of complexity** of particular analysis<br>• **Results Exporter** that will export the results to particular format so that user can download that |
| **Functionalities/Services consumed from other components** | • **Data access authorization** to discern which data sets the user may access for analysis tasks<br>• **Primary data pool** (direct database access) to perform analysis tasks<br>• **Secondary data pool** |
| **Dependencies** | • **Portal**<br>• **Storage engine** |
| **Technical details** | Analyses Engine is server side component. It represent a basic API that will accept the definition of particular analyses in some common query language (e.g. SQL or SPARQL), provide the prediction how complex such query is and eventually perform such analyses. Analysis will be performed by utilising the functions in primary a secondary data pool. |

### 6.2.3 Hosting services and API

| | |
|---|---|
| **Associated task** | Pool data API development & Access control system (5.4) |
| **Functionalities/Services provided to other components** | • **View** and **Download Web Services**<br>• **API for metadata** about available datasets |
| **Functionalities/Services consumed from other components** | • **User management** for authentication to services<br>• **Data access authorization** to discern which data sets the user may access<br>• **Primary data pool** (direct database access) |
| **Dependencies** | • **Portal** |

| | |
|---|---|
| | - **Storage engine** |
| **Technical details** | Hosting services and API is server side program that provide http GET REST services to basic information about datasets that are available in the database (basic datasets as well as analysis result). API enables to get the data for in particular GIS format (e.g. KML or SHP). |

## 6.3 Storage layer

### 6.3.1 Storage engine

The Storage engine holds and manages the data available in the plan4business platform.

| | |
|---|---|
| **Associated task** | Storage Engine Development (5.3) |
| **Functionalities/Services provided to other components** | - **Primary data pool + Metadata**<br>- **Secondary data pool**<br>- **Original data storage** |
| **Functionalities/Services consumed from other components** | - **Data access authorization** to discern which data sets the user is allowed to access (only applicable if access to data is not directly through database) |
| **Dependencies** | - **Portal** |
| **Technical details** | The primary data pool is represented by a PostgreSQL / PostGIS database, the secondary data pool is planned to be implemented based on a Neo4J database. The access to the original data is to be file based. |

### 6.3.2 Datasets

| | |
|---|---|
| **Associated task** | Data Provider Management (2.2) |
| **Functionalities/Services provided to other components** | - **Input data resources** |
| **Functionalities/Services consumed from other components** | - **Primary data pool + Metadata**<br>- **Original data storage** |
| **Dependencies** | - **Storage engine** |
| **Technical details** | The data sets stored in PostgreSQL / PostGIS database. Datasets are being uploaded to database by Integration engine – procedure of integration of spatial planning data and with use of database management interfaces – auxiliary data. |

# 7 System integration and test plan

The role of the system integration process in P4b system design and development process is to assure satisfying quality and efficiency of all system components and the system as a whole towards user requirements defined in WP3. Like it was underlined before both: system specification and system development are iterative and incremental processes. On the current stage of project the only official source defining system specification is the report D3.1. Requirements Analysis and System Specification. In following months user requirements and system specification will be subject to further refinement.

## 7.1 System integration strategy

Time frame of the system integration plan was defined by milestones of the project. Those milestones were referred to general system functionalities groups – introduced as Service Levels. When maintaining this approach, it has also been concluded to focus on development and delivery of vertical components. In general these are as follows:

- Integration component (involving: Plan integrator, Integration engine, Storage engine and Datasets)
- Analytical component (involving: Analytical UI, Analytical engine, Storage engine and Datasets)
- Webviewer component (involving: Webviewer, Storage engine and Datasets)
- Hosting and API component (involving: Hosting service and APIs, Storage engine and Datasets)
- Portal component (involving: Portal and all other components)

This implies a two-dimensional implementation approach – horizontally related to four service levels and vertically related to components. Utilising an agile-development approach, this will ensure an early functioning complete system, in which more and better functionalities are added continuously.

All the components, excluding the Portal, are integrated internally during elaboration. All of the components are being mutually integrated in the first place by common Storage engine. These integrations are realised by using common run-time environment, standard application interfaces and services. It is worth to stress applications of OGC (Open Geospatial Consortium) standards referring, inter alia, to geospatial web services. It assures a feature of interoperation of system as a whole and its components with INSPIRE(Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community) compliant geospatial infrastructures.

From the Plan4All project, important experiences are recorded and are being utilised under this project. In relation to the System integration plan, particularly Plan4all deliverable D5.1 Data Sharing Requirements is relevant.

The final integration of all the components will be realised by the Plan4business portal. It was not decided yet if all user interfaces, of each component will be integrated with the system or if portal will be referring to those UIs.

Each system element and system component is a subject of constant test during development period, to assure its readiness for further integration.

Task 6.1 System Testing and Integration was planned for the period between PM7 and PM24. It covers in the first place supervision on the development process of each component. All components, excluding Portal, are expected to build System being able to execute all planned procedures. Delivery of system is iterative and is planned to be realised in three phases – systematically refined versions in PM12, PM18 and PM22. After each delivery, System will be tested according to  the test plan described in the next section.

Portal integration will start in PM12 and will last to the end of the project. The first version of System, which will include the Portal is the version planned to be provided by PM18.

## 7.2 Test plan

The test plan is fairly detailed but should be considered as open for future changes.

### 7.2.1 Test programme

Testing is an integrated and critical element of system development and implementation and shall be done on continuous bases.

The following required test program will be utilised;

| Test (name and description) | Documentation | When to be implemented | Responsibility |
|---|---|---|---|
| **Code testing**<br>Test of code, setup, parameters, etc., as they are being written or implemented.<br>These tests are an integrated part of the development itself, and shall be based on e.g. fictious call for services, development software procedures or „build processes“ | No specific documentation required. | Continuously | Each developer. |
| **Component testing**<br>For all components being developed, the related functional requirements shall be identified, and preferable be extended by specific requirements related to the given task.<br>When the component is ready for deployment (not necessarily complete but operational in respect of service level), component testing shall take place.<br>The purpose of the component test is to ensure the component is functioning as per the specification and enable system integration. | The results of component testing shall be documented by commenting and signing of a list of requirements that has been tested (using the relevant requirements identified in 7.2.3). | When a component is ready for deployment | Task manager |
| **Integration testing**<br>When multiple components are ready for deployment and integration, integration | Filled form 7.2.3 | When integration is taking place. | Task 6.1 manager |

| | | | |
|---|---|---|---|
| testing shall take place.<br>Integration testing shall be based on the identified requirements in 7.2.3. | | | |
| **System testing**<br>System testing takes place when a complete system is ready for deployment and operation. Based on the defined service levels, 3 system tests will take place (service level 2, 3 and 4). | Filled form 7.2.3<br>Formal document, to be part of defined deliverables 4.1.1, 4.1.2, 4.1.3. | Deliverable 4.1.1, 4.1.2, 4.1.3. | WP4 leader |
| **Final test**<br>Complete final test of all requirements and operational system | Filled form 7.2.3 | Project completion | Task 6.1 manager |

## 7.2.2 Grading errors

The column “Obligation” describes importance of functionality, so errors referring to the features marked as MUST have to be treated more seriously than for the levels SHOULD and COULD.
The column named “Control” refers to the requirements / solutions and has to be filled with the following values:

- OK (test completed and approved)
- ERROR (test carried out, not approved)
- Other (any notes etc.)

The degree of error will be specified in the column “Level”.

| | | |
|---|---|---|
| **A** | Critical errors | Errors that cause the system to stop, loss of data or other essential functions for Customers are not delivered or are not working properly. |
| **B** | Serious error | Functions that are important to the Customer and that are not working as described in the specification. It is time-consuming or costly to avoid the problems. |
| **C** | Less serious errors | Errors / defects in the delivery not stated in the specification. Error of type C is recorded for future change / update. |

## 7.2.3 Acceptance test

### 7.2.3.1 Data Contributor requirements acceptance test

| **Requirement** | **Obligation** | **Control** | **Level** | **Note** |
|---|---|---|---|---|
| **User management, including access control, authentication and authorization . Further details of functional requirements will be identified.** | MUST | | | |

| A functioning configurator; (Plan Integrator and Integration Engine) interface for defining mapping between a contributor´s structure and plan4business´s data structure. The configured structure shall be the foundation for uploading data to the Plan4business platform. | | | | |
|---|---|---|---|---|
| The configurator shall support all relevant features from the INSPIRE themes.<br>The data model for the identified feature classes may be simplified from the INSPIRE model and it will be the simplified model that will be supported. | MUST | | | |
| The configurator shall support multiple formats for data to be harmonised, as a minimum the following; CityGML, Shapefile, KML / KMZ | MUST | | | |
| The configurator shall utilise a graphical interface for setting up harmonisation and integration rules between original data structure and target data structure (from – to). A tool such as FME can be used a model for the user interface. | SHOULD | | | |
| The target structure (to-model) shall be predefined and available via the user interface. | MUST | | | |
| The configurator shall enable the user to redefine, combine, split and modify features and their attributes (data model harmonisation). | MUST | | | |
| The configurator shall enable the user to define coordinate and datum transformation of the data. | MUST | | | |
| The user shall be able to do a test-harmonisation of a dataset. The results shall be presented through tables (feature with attributes) or via a map. | SHOULD | | | |
| A defined set of example configurations shall be made available. The example configurations shall be prepared by the Plan4business team and be available to all uploading users to copy to his own configurations and modify onward on the copied version. | SHOULD | | | |
| A defined configuration shall belong to a defined user (“my configurations”) | MUST | | | |
| The configurator shall store and make available the defined transformation to be used when the actual dataset is to be uploaded. | MUST | | | |
| The user shall be able to modify and delete his own configurations. | MUST | | | |
| The user shall be able to share his configurations with other users. | SHOULD | | | |
| The configurator shall support defining uploading batch procedures, easing the process of uploading and maintenance of | COULD | | | |

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| the data. | | | | |
| Data uploader: The tool to be used by the data contributor to upload a new dataset or a new version of an existing dataset. | | | | |
| The user shall be provided a wizard oriented interface, assisting him in uploading a new dataset or replacing an old one. | SHOULD | | | |
| The user shall utilise one of his defined configurations. | MUST | | | |
| When uploading the data, the user shall define relevant metadata, catalogue information and licensing / pricing regime (select between pre-defined regimes). | MUST | | | |
| The possibility of harmonisation will differ from dataset to dataset. As a minimum, the following shall be uploaded / defined;<br>- The original dataset (e.g. a scanned image or a DWG file). Original dataset can be in any file-based formats, including scanned raster images, vector data, etc.<br>- The outline of the dataset – or the actual plan<br>- Metadata and licensing information | MUST | | | |
| All uploaded data and defined information shall be included by the system into the relevant Plan4business storages. | MUST | | | |
| A detailed log shall be available, clearly stating what has be done, by whom and when. | MUST | | | |
| All information and data shall be verified and automatically checked before being entered into databases for consistency and security.<br>If the information and data can be uploaded without breaking the integrity of the databases, it shall be uploaded with a warning to the user.<br>If the information and data cannot be uploaded without breaking the integrity of the databases, it shall not be uploaded and the user shall be notified. | MUST | | | |

### 7.2.3.2 Data User requirements acceptance test

| Requirement | Obligation | Control | Level | Note |
|---|---|---|---|---|
| User management, including access control, authentication and authorization . Further details of functional requirements will be identified. | MUST | | | |
| A payment and transaction mechanism. Detailed requirements shall be identified. | MUST | | | |
| The user interface shall be easy to use and find its way through. Through the first page, the user shall easily see what is available | MUST | | | |

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| **for free, what requires log-in and what requires payment. He shall quickly find coverage and information about availability. The first page shall have the following content as minimum;**<br>- **Log in, new user**<br>- **When logged in – see last transactions + possible to see all transactions**<br>- **See a map showing coverage**<br>- **Get a textual description of Plan4business, what is available and how it works**<br>- **By guided by wizards for viewing, analyses or downloading data** | | | | |
| View data: **The interface for viewing planning – and other included data. The interface shall also be the interface for showing results from data analyses.** | MUST | | | |
| **The viewing interface shall have a map as its main focus area, but at the same time be able to present tabular information, e.g. attributes.** | MUST | | | |
| **Standard map navigation tools such as zoom, pan, print, search (by names of places) shall be supported.** | MUST | | | |
| **The map shall visualise relevant and included pan-European datasets, local harmonised (simplified) spatial plan data (seamless) and plan-coverage (layer that shows the extent of every plan included in the system).** | MUST | | | |
| **The user shall be able to select what to be visible on the map, including background and thematic data. The actual content will be further described under Data Requirements.** | MUST | | | |
| **Datasets that requires authorisation or payment for viewing shall, if**<br>**a) the entire layer is restricted: be visible in layer list – but de-activated**<br>**b) part of the dataset / layer is restricted, e.g. one detailed plan (our of all): show the outline of the plan and a polygon fill that indicates there are more data – which is not at that stage available for the user** | SHOULD | | | |
| **Visualise results of analyses.** | MUST | | | |
| **Have a cartography that fits with INSPIRE standards as best as possible, but focus in readability and clarity.** | MUST | | | |
| **The viewer interface shall enable the user to see terrain, and possible buildings in a 3D perspective and navigate through this. On top of the terrain model, background data as well as thematic data (e.g. planning data) shall be draped.** | COULD | | | |

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| **Be an entrance to downloading service and analyses services.** | MUST | | | |
| **Download data: Interface for downloading data** | | | | |
| **The following data shall be available for downloading, depending on license and possible procurement;**<br>- **Uploaded original datasets (in original form and structure as uploaded).**<br>- **Uploaded harmonised datasets**<br>- **Pre-loaded pan-European datasets** | MUST | | | |
| **For original datasets, the user will select the actual dataset via the viewer interface, or via a search based on metadata / catalogues.** | MUST | | | |
| **For uploaded harmonised datasets or pre-loaded pan-European datasets, the user will select the area of interest via the viewer interface – or by giving a given defined area (e.g. a country).** | MUST | | | |
| **The user shall be able to select which format and coordinate system the data shall be downloaded to (not relevant for uploaded original datasets). The following formats shall be supported: KML / KMZ, ESRI Shape and Geodatabase, DWG / DXF** | MUST | | | |
| **Before the order for downloading is executed, price and size of data shall be calculated. The user shall confirm the order.** | MUST | | | |
| **The data to be downloaded shall be compressed and made available for downloading when the order has been confirmed and that necessary permits and financial transactions completed.** | MUST | | | |
| **Perform analyses: The Plan4business shall support analyses of the data, and possible associated data to the portal.** | N/A | | | |
| **The analysis tool shall support both pre-defined analyses (defined by Plan4business administrators) and analyses built by the user.** | MUST | | | |
| **Obtain aggregated (“average”) planning data (what is the average size of a development, what are relative portions in Italy compared to Poland for a given use type…)** | SHOULD | | | |
| **Gain distribution of data property over time** | SHOULD | | | |
| **Gain point-based or area-based statistical measures, such as deviations over a given period)** | SHOULD | | | |
| **Perform simulations based on data pool to determine development of real estate value** | COULD | | | |
| **Glean correlation coefficients between a property of selected plans and external data sets, such as employment time series** | COULD | | | |
| **Enable visual representations and diagrams for the basic functions listed above (as raster or vector graphics, alternatively** | COULD | | | |

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| **as 3D graphics embedded in a WebGL Browser)** | | | | |
| **Data Mining and cluster analysis functions** | COULD | | | |
| **Data API: Interface for access to data, analyses and tools from external applications or services** | MUST | | | |

### 7.2.3.3 Plan4business Management requirements acceptance test

| **Requirement** | **Obligation** | **Control** | **Level** | **Note** |
|---|---|---|---|---|
| **Negotiate and manage data licenses: For the Plan4business portal, all data available in the system must have a valid license for use and possible sale / download.  The model for this will be further designed under the Business model, however, a management solution is required.** | N/A | | | |
| **All datasets shall have a valid license.** | MUST | | | |
| **The acceptance of the license by the data owner shall be documented through the system (e.g. email, signed and scanned document, e-signature, etc.)** | SHOULD | | | |
| **The full conditions off all used licenses shall be available electronically.** | MUST | | | |
| **Plan4business will standardise and limit the number of used licenses. The used licenses shall technically be incorporated into the datasets and how these are available (e.g. if a dataset has a license to only be viewed – and not downloaded, the system shall not allow downloading).** | MUST | | | |
| **Manage Plan4business system:** | N/A | | | |
| **The Plan4business system shall have a manager and administrator interface.** | SHOULD | | | |
| **User support: User support is required for both data contributors and data users.** | | | | |
| **The user support interface should include;**<br>- **Frequently asked questions**<br>- **Newsletters**<br>- **Tutorials**<br>- **Request for assistance**<br>- **Help** | COULD | | | |
| **Transaction dealer: To secure the commercial part of Plan4business, a transaction manager (web shop) is required.** | N/A | | | |
| **The transaction manager shall be an integrated part of the Plan4business system and ensure required payment is received** | MUST | | | |

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| and transferred for all paid transaction via the portal. | | | | |
| Payment shall be received from the Data Users. Normal used payment mechanisms shall be used (credit card, pay pal, etc) | SHOULD | | | |
| The transaction manager shall maintain a full account of all transactions and payments, in accordance with EU regulations. | SHOULD | | | |
| For goods that shall be paid to data contributor, the transaction manager shall do so more or less automatically (based on a standard pricelist incorporated in the system) | COULD | | | |
| Customer relation management (CRM): Customers in this context is both data contributors and data users. The CRM shall ensure authentication, authorisation and contact. | | | | |
| The CRM shall be an integrated part of the Plan4business system and ensure all users of services that require authorisation are identified and authenticated. | MUST | | | |
| The CRM shall enable anyone to register, and edit their information, as a customer, either as contributor or as user, or possible as both. | MUST | | | |

### 7.2.3.4 Data requirements acceptance test

| Requirement | Obligation | Control | Level | Note |
|---|---|---|---|---|
| Urban and regional planning data from different countries, e.g. in ALKIS, DXF/DWG, Shapefile, CityGML, XPlanGML format or in other GML application schemas.<br>The data can and will be in different formats and levels (e.g. from scanned raster images of paper plans to fully digital, topological and logical vector plans).<br>The target of the project is to have as a minimum 300 different planning datasets available. | MUST | | | |
| Land use data including GMES Urban Atlas data. Expected coverage: full Europe. | MUST | | | |
| Open Street Map data as representative of traffic and as a key reference dataset. Expected coverage: full Europe. | MUST | | | |
| Natura 2000 data as information about potential restriction coming from environment protection. Expected coverage: full Europe. | MUST | | | |
| Market information (number of properties, content, etc. and transactions (sale, rental), their number, content, areas of distribution, price levels). | SHOULD | | | |
| Social and economic data (CSP, Eurostat data). Expected coverage: full Europe. | SHOULD | | | |

|  |  |  |  |  |
|---|---|---|---|---|
| **Individual property data (legal status, current use, resources, construction data) and cadastral parcels data, including property types** | COULD |  |  |  |