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References:,
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This deliverable includes a documentation of the system based on implemented features. This report describes the client side of the plan4business portal. It includes the design and implementation of version 3 of the portal performed within the 23 months of the project duration.
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Client, Collaborative Schema Integrator, Analysis UI Development, Plan Hosting, Feedback components, plan4business

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List of acronyms

ACID	Atomicity, Consistency, Isolation and Durability
API	Application Programming Interface
AVINET	Asplan Viak Internet
CAS	Central Authentication Service
CDDA	Nationally Designated Areas
CLC	Corine Land Cover
CSV	<i>Comma-Separated Values</i>
FP	Framework Programme
GIS	Geographic Information System
GMES	Global Monitoring for Environment and Security
GML	Geography Markup Language
HALE	HUMBOLDT Alignment Editor
HILICS	Hierarchical INSPIRE Land Use Classification System
HSRS	Help Service Remote Sensing
HTTP	Hypertext Transfer Protocol
INSPIRE	Infrastructure for Spatial Information in the European Community
ISO	International Organisation for Standardization
ISOCARP	International Society of City and Regional Planners
JSON	Javascript Object Notation
KML	Keyhole Markup Language
LDAP	Lightweight Directory Access Protocol
OGC	Open Geospatial Consortium
OSM	OpenStreetMap
OWL	Web Ontology Language
OWS	OGC Web Services
PDF	Portable Document Format
RDBMS	Relational Database Management System
RDF	Resource Description Framework
SDI	Spatial Data Infrastructure
SQL	Structured Query Language
UML	Unified Modelling Language
URL	Uniform Resource Locator
UWB	University of West Bohemia in Pilsen
WKT	Well Known Text
WMS	Web Map Service
WP	Work Package
XML	Extensible Markup Language

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1 Introduction

1.1 Plan4business

Plan4business is a European project running from April 2012 until March 2014 and is co-financed by the 7th Framework Programme of the European Commission. The full title is plan4business – A Service Platform for Aggregation, Processing and Analysing of Urban and Regional Planning Data.

In plan4business a service platform for aggregation, processing and analyses of urban and regional planning data in Europe is developed. Harmonised data will be integrated into seamless, homogenous, constantly growing and updated trans-border dataset. The platform will enable spatial analyses across European datasets. The platform should serve not only as a planning data catalogue but also as a data integrator enabling users to search, view, analyse and download spatial planning data on European and regional levels. The main project objectives are the automation of harmonisation processes and possibilities of complex analyses.

The plan4business consortium comprises six organisations securing the project execution:

- Fraunhofer IGD - Fraunhofer Institute for Computer Graphics Research, Germany
- UWB - University of West Bohemia in Pilsen, Czech Republic
- HSRS - Help Service - Remote Sensing, s. r. o., Czech Republic
- ISOCARP - International Society of City and Regional Planners, The Netherlands
- GEOSYS - GEOSYSTEMS Polska, Poland
- AVINET - Asplan Viak Internet as, Norway

1.2 The Aim of the Report

This deliverable summarises the work performed and progress achieved in Plan Integration & Analysis Clients of the plan4business project.

The main objective of WP4 is the design and development of the client part of the plan4businessplan4business platform, based on existing solutions where applicable, and the design of user interfaces (UI). The objectives specifically include:

- Integration of pilot applications;
- Integration and configuration of authentication, authorisation, digital rights management (DRM);
- Full environment for collaborative clients for integration of planning data;
- Client support for integration of data from distributed resources, which includes clients for data harmonisation and aggregation;

- Clients applications for data analysis supporting integration of analytical services;
- Provision of APIs for access to and hosting of spatial data based on OGC services, such as WMS, WFS and WCS;

WP4 used the results of WP3 Requirements Management and Service Pricing. WP4 runs closely and in parallel with WP5 Storage, Integration & Analysis Engines. The report includes the work performed within 22 months in the following tasks:

- Task 4.1: Collaborative Schema Integrator Development dealing with design and implementation of client side of clients for the collaborative integration of spatial and non-spatial data into the plan4business data pool.
- Task 4.2: Analysis UI Development which includes the design and implementation of client applications for data analysis supporting integration of analytical services based on different interfaces.
- Task 4.3: Plan Hosting and Feedback components, which include design and implementation of clients supporting uploading and downloading services for planning documentation.

The design and implementation are according to the pilot applications as outlined in the extra document requested after the 1st Review - Business Model – Progress Report.

1.3 Structure of the Report

The document is structured in 9 chapters:

- **Chapter 1** contains a brief summary of the project, the main objectives of WP4 and the structure of the document.
- **Chapter 2** contains definition of used terminology.
- **Chapter 3** contains the management tools for the organisation of the development, source code control and issues tracking system.
- **Chapter 4** describes the agile methodology for the design and software development.
- **Chapter 5** describes the overall architecture of all the components and how these components are interlinked. The chapter includes also the implementation approach through pilot applications and description of service levels.
- **Chapter 6** describes the design of the user interface.
- **Chapter 7** describes the management tools of the platform.
- **Chapter 8** describes the pilot applications including Location Evaluator, Integrator, Thematic Map Viewer, Open Land Use, Tender Searcher and Embed-Map.
- **Chapter 9** includes conclusions.

All the literature used for this deliverable is duly referenced. The list of citations is inserted at the end of the document.

2 Terminology

Catalogue - consists of metadata in which definitions of database objects such as base tables, views (virtual tables), synonyms, value ranges, indexes, users, and user groups are stored. (Wikipedia)

Geography Markup Language (GML) - "OGC's XML-based language for describing and encoding geospatial information. An application of XML, a specification developed by members of the Open GIS Consortium. <http://www.opengis.org/techno/specs/00-029/GML.html>". GML is an XML encoding for spatial data. In a sense, it is a schema-writing language for spatial information." (OGC 2012)

Geoportal - "A Web site that provides a view into a universe of spatial content and activity through a variety of links to other sites, communication and collaboration tools, and special features geared toward the community served by the portal." (OGC 2012)

HUMBOLDT Alignment Editor (HALE) – a tool for defining and evaluating conceptual schema mappings.

KML - is an XML notation for expressing geographic annotation and visualization within Internet browsers. (Wikipedia)

Mock-ups - is a scale or full-size model of a design or device, used for design evaluation, promotion, and other purposes. (Wikipedia)

OGC Web Service (OWS) - is the group of service specifications (or protocol standards) created and maintained by the OGC. (Wikipedia)

User interface (UI) - field of human–machine interaction, is the space where interaction between humans and machines occur.

Web Map Context (WMC) - are XML documents that contain all information needed to display a set of maps for a selected area and size. (OGC)

Web Map Service (WMS) - provides a simple HTTP interface for requesting geo-registered map images from one or more distributed geospatial databases. (OGC)

Web Map Tile Service (WMTS) - is an Open Geospatial Consortium (OGC) standard for providing map tiles (small images that are part of a map) via the internet. (OGC)

3 WP Management

WP4 is coordinated by HSRS. WP4 is divided into three tasks with the following responsibilities:

- Task 4.1: Collaborative Schema Integrator Development - Fraunhofer IGD,
- Task 4.2: Analysis UI Development – HSRS,
- Task 4.3: Plan Hosting and Feedback components – HSRS.

In order to secure a smooth design and development of all the platform components, a Redmine¹ management system was set-up by the Project Office (Figure 1). Redmine is a flexible and open source project management web application.

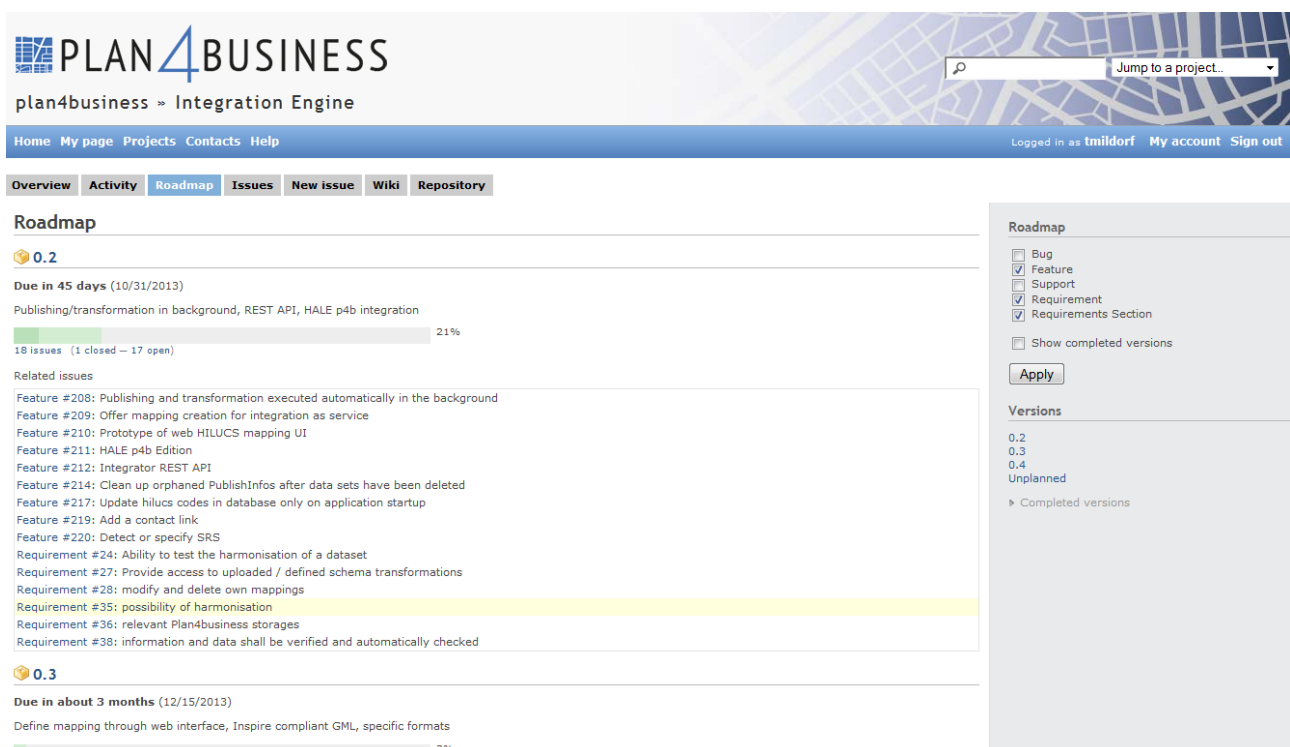


Figure 1 Redmine WP4 Requirements

Redmine serves for the following purposes:

- WIKI based documentation,
- issue tracking – bugs, new features, support issues and system requirements can be managed through issues assigned to a particular person and with specified deadline, priority, status, etc.

¹ <http://www.redmine.org/>

The Redmine system was structured according to the pilot applications which are interpreted as subprojects. For each pilot application a versioning system is applied. For a particular version of a pilot application a number of features and bugs is assigned. This enables to keep track of the progress.

For the management of the source code, source documentation and configuration files, several Git repositories are provided. The repositories can be accessed through a Gerrit² installation and they are integrated in the Redmine system. Gerrit is a web based code review system, facilitating online code reviews for projects using the Git version control system.

Gerrit helps avoiding errors getting into the code base, as code is reviewed by developers and could also be verified automatically by a continuous integration 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 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. Any account can principally be either a committer or a reader account, i.e. not all accounts need to be allowed to commit.

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² <http://code.google.com/p/gerrit/>

4 Overall Methodology

4.1 Agile Methodology

The design and development of the client side for the plan4business platform is conducted in WP4. WP4 should result in the design and development of the client side components of the plan4business service platform including the authorisation, authentication, integration, analysis and plan hosting, API (Application Programming Interface) for integration of the Analysis Engine into other portals.

On the base of previous experiences it was decided to run the development in parallel to collection of user requirements. It enables to receive feedback from users, but also support user demands on the base of existing tools. The agile approach is also taken to software development, and it is a basic requirement for WP3 (Requirements Management and Service Pricing) that results are delivered early and often. The work is running closely with WP5 Storage, Integration & Analysis Engines, where the platform's server side is designed and implemented.

In the design and development of each client component we aimed for a close loop of the team working on WP4, the development team (WP5) and the requirements collection team (WP3). The design and development in WP4 started with a "code camp" workshop held in Pilsen in July 2012. The code camp was highly effective in communicating common coding policies and in actually solving technical issues. The work started with design activities and infrastructure set-up as well as the creation of the initial data model for data integration and proposal of several use-cases.

The client components developed are based on existing tools. These tools are modified and extended on the basis of user requirements. For this purpose, a series of workshops aimed to different groups of stakeholders are being organised and a feedback on the development is tracked using a questionnaire for workshops' participants.

A complete evaluation including formal testing is conducted within WP6 System Integration and Operation. The results of the complete evaluation are then fed back to the design and development team in WP4, who work in the second implementation phase to deliver the final application products.

In July/August 2013 the second code camp was held in Pilsen. The code camp 2013 helped in integration of the system components as well as development of the pilot applications. The last code camp 2014 was organised in Darmstadt in February 2014. These code camps helped to integrate various components developed by different partners and match those with user requirements.

4.2 Implementation Through Pilot Applications

On the basis of the first review results and also the feedback from the Advisory Board and stakeholder workshops, the development was shifted towards more user oriented applications. The plan4business team has realised that it has to go for a quick win in a given region or a country with specific applications. The first

goal was to simplify the access to information for different types of users which are non-GI experts. The Location Evaluator is the first pilot implemented application. The development of the application was focused on the existing data sources' integration. Data integration and building of data repositories was recognised as a key aspect for success of the plan4business platform. This app is continuously updated with new data and new features based on user requirements.

Other pilot applications include Thematic Map Viewer, Integrator (Collaborative Schema Integrator), Embed-Map, Open Land Use and Tender Search. These are detailed in Chapter 8.

4.3 Service Levels

Based on the user requirements coming from WP3, business model developed in WP2 and the agile methodology used for the system design and implementation (research and development in WP4, WP5 and WP6), four Service Levels related Milestones 3 - 6 were defined. These Service Levels represent high level measures for a successful implementation of the user needs and the business model. These Service Levels were revised after the first project review and resulted in definition of Service Level 5.

A specific focus of these Service Levels is on a staged rollout of services to be offered by the *plan4business* platform. By using this staged approach, the platform starts to attract customers with concrete and useable services from the early stage of the development. These early results are valuable in providing feedback and in testing the infrastructure.

The five Service Levels are:

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 24) – 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.

5 Overall Architecture

The plan4business system is a comprehensive and complex system, built on flexible and scalable layers, interacting through a set of defined services, ensuring performance and security.

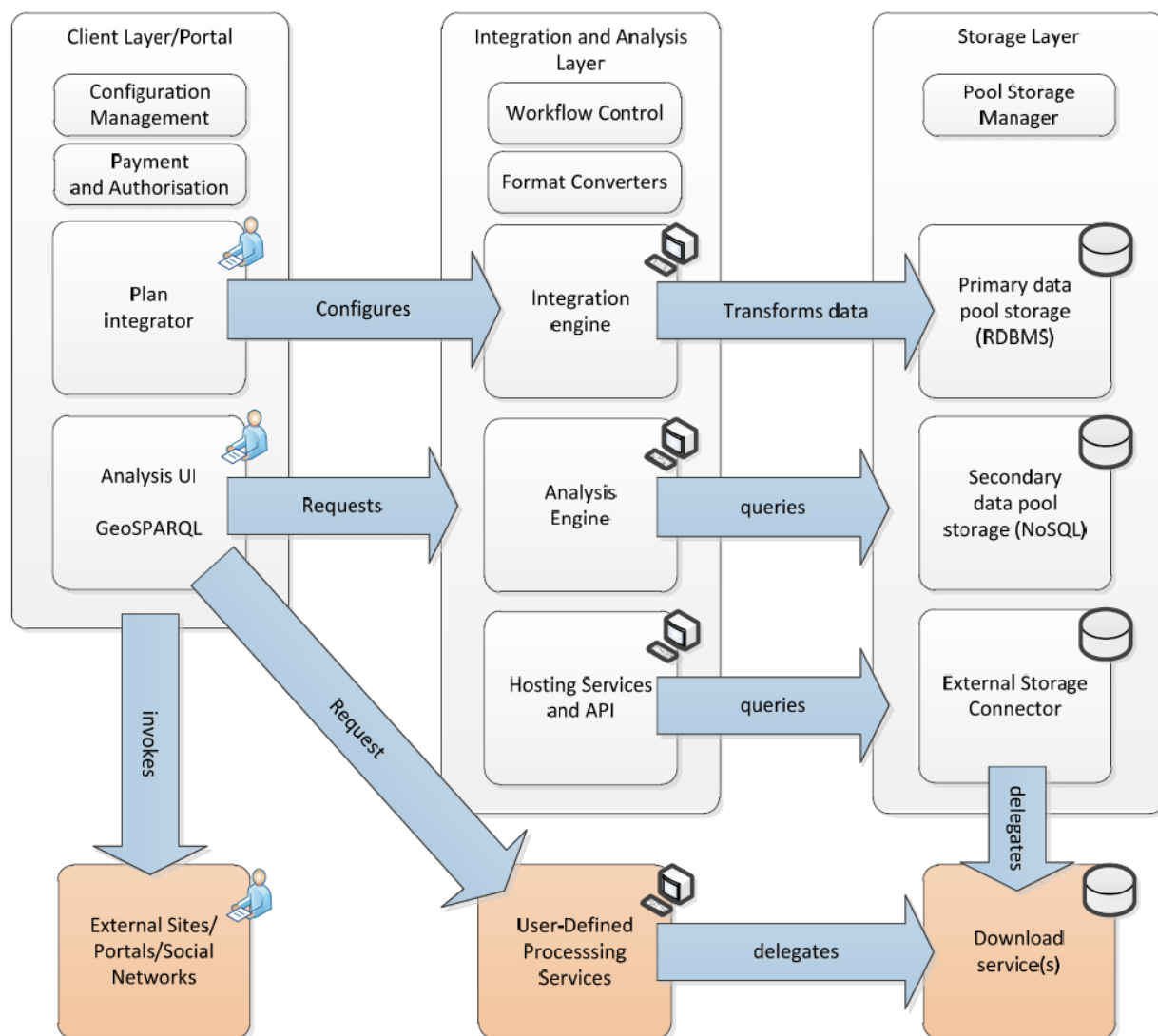


Figure 2 plan4business overall architecture

The three layers are:

- **Application** layer, consisting of user portals and interfaces for handling data, administrating the system and for data access, including analyses and data downloading.
- **Service** layer, with services for data integration, analyses, data access, processing and data hosting.
- **Data** layer, with data storage and download services.

The architecture is inspired by the technical architecture designed through the FP6 project Humboldt and eContentplus project Plan4all (ref. Plan4all D5.1 Data Sharing Requirements, Section 2.2).

6 User Interface

The objective of the plan4business client side is to provide a set of user interfaces enabling the human user to easily interact and utilise the components of plan4business to support user's tasks and objectives in respect of accessing and using data for planning purposes.

6.1 Work Done and Progress Achieved

AVINET with cooperation with HSRS and UWB have designed and implemented the introductory page (crossroad) that is accessible at <http://www.whatstheplan.eu>. This page redirects the user to particular applications and tools. It also incorporates advertisements. The implementation of the ads will be finalised by the end of the project. The basic concept of the introduction page is shown in Figure 3 Structure of the introductory page.

The portal distinguishes registered and not registered users. For non-registered users there are only the applications focused on data visualisation. Logged in users can integrate his/her data into the data pool and use other expert based tools.

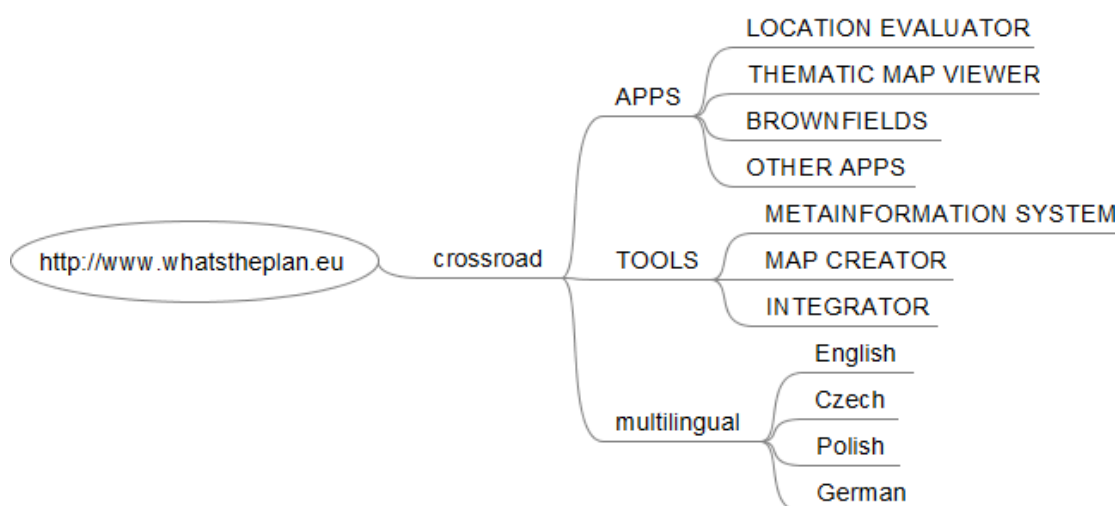


Figure 3 Structure of the introductory page

The graphical design for the introductory page is depicted in Figure 4. The graphical design for the Thematic Map Viewer (one of the pilot applications) is shown in Figure 5. The user interfaces are incorporated into the Liferay solution described in Section 7.1.



Welcome to the planning portal!

Are you interested in:

how your city or region is doing in comparison with others?

areas suitable for investment or for building a house?

locations that can be affected by floods?

the harmonisation of urban (spatial) plans and their publication?

Browse through a number of applications and find out what the plan is!

Register to get full access now

[Log in to existing account](#)

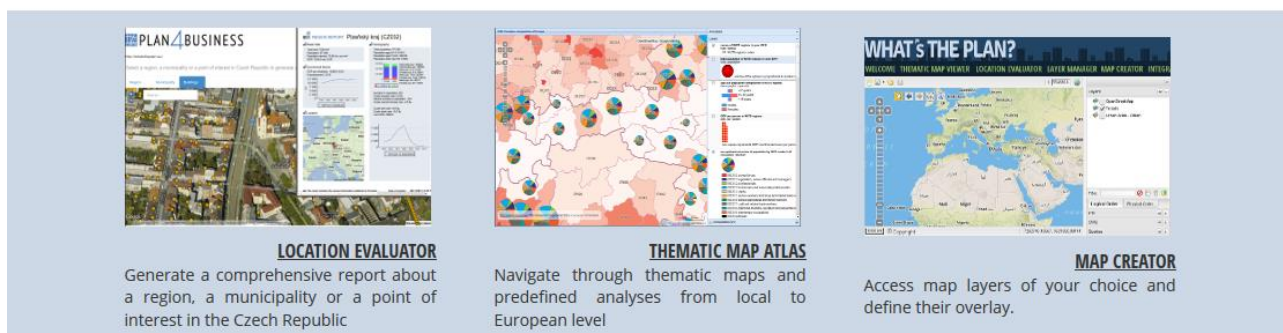


Figure 4 Graphical design of the introductory page (crossroad)

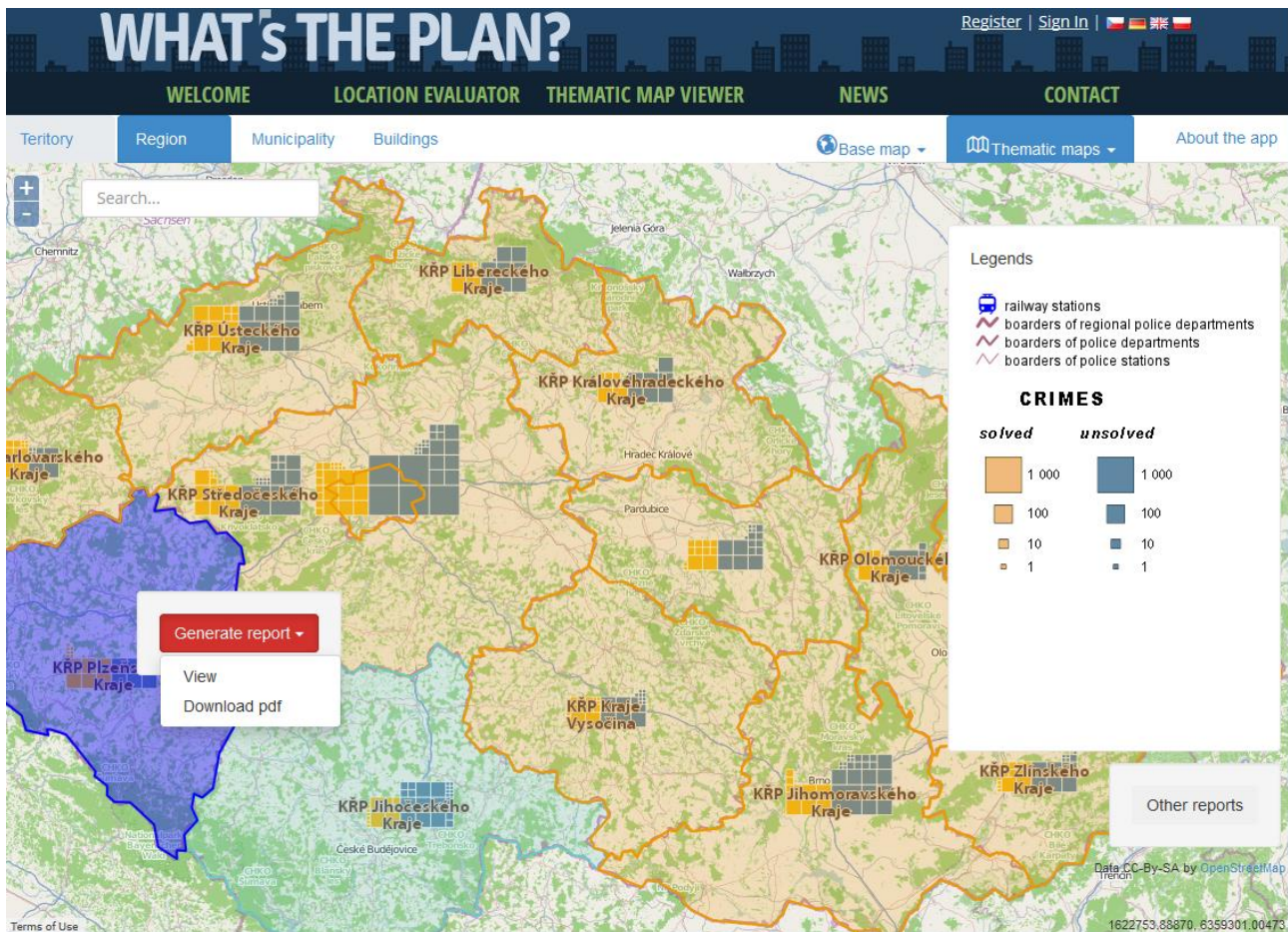


Figure 5 Location evaluator interface

6.2 Next Steps

The user interface is continuously updated based on new apps and tools that are integrated into the platform and user requirements.

7 Management Tools

In this chapter we describe the most important libraries and frameworks that are used for pilot applications and service focused on user management and component integration.

7.1 Liferay

The plan4business platform is based on the Liferay³ solution. It is a web platform orchestrating all the geoportal components and other gadgets, portlets, pages etc. Liferay enables administrators to define the content and the system of the menu, to publish articles, images, links etc., to publish predefined map compositions, to publish RSS channels etc. There are many other functions that can be used and that are described in detail in the manual of Liferay available at <http://www.liferay.com/>. Liferay is focused on usability and simplicity for end users but also on clarity and security of the implementation.

7.2 User Management

The plan4business platform is composed three single components. Two of them are the Integration Engine and the Analysis Engine. The Liferay solution enables to integrate these components. In order to manage user identification and access rights, authorisation and authentication mechanisms were put in place. The authorisation and authentication terms are often used interchangeably. The following definitions should clarify the difference between them:

- **Authentication** is a mechanism that securely identifies user within a system. It verifies the identity of the user by for example a password or a fingerprint.
- **Authorisation** is a mechanism that specifies access rights to the content or other resources.

The plan4business platform enables users to control access to all their resources stored on the portal using the authentication and authorisation mechanisms. Registered users can be authenticated by credentials including the email address and a password.

Unregistered users can create an account using a form depicted in Figure 6 by filling in the name, date of birth, gender, username and email address. The creation of the user account is protected by CAPTCHA⁴ ensuring that the form is filled in by a person.

---

³ <http://www.liferay.com/>

⁴ <http://en.wikipedia.org/wiki/CAPTCHA>

 Create Account

First Name (Required)	Birthday
____	January 1 1970 ____
Middle Name	Gender
____	Male ____
Last Name	
Screen Name (Required)	Text Verification (Required)
____	____
Email Address (Required)	
____	

Figure 6 Registration

The registration of users as well as the provision of permissions (authorisation) can be managed by the system administrator.

7.3 Metadata Catalogue Micka

MICKA is a complex system for metadata management (metadata creation, editing, storing, etc.) used for building SDI or geoportal solutions. It contains tools for editing and management of metadata for spatial information, web services and other sources (documents, web sites, etc.). It includes online metadata search engine, portrayal of spatial information and download of spatial data to local computer.

MICKA is a metadata catalogue that fully complies with the ISO 19115 standard and is fully compliant with the INSPIRE principles. It can be integrated with map applications and it is multilingual. The web catalogue service uses OGC specifications (standards).

MICKA is compatible with obligatory standards for European SDI building (INSPIRE). Therefore it is ready to be connected with other nodes of prepared networked metadata catalogues (its compatibility with pilot European geoportal is continuously being tested).


MICKA


 Logged user: jjeza

Search > Found > Basic metadata

Search
 Found
Basic metadata
 New record
 Help
 About


Arklow Town and Environs 2011-2017

Basic metadata

Identification	Abstract Arklow Town and Environs 2011-2017 Identifier W1019 Keywords GEMET - INSPIRE themes, version 1.0: Land use Language English Temporal extent Spatial Representation Spatial Resolution Resource Locator http://www.whatstheplan.eu/integrator/api/datasets/40.gml http://www.whatstheplan.eu/integrator/api/datasets/40.atom LAYER=view_lu_ds_40 http://www.whatstheplan.eu/integrator/api/datasets/40.json Bounding box -6.20112654418477, 52.7710396756239, -6.12924230026077, 52.8219848925365  Contact Info plan4business email: info@plan4business.eu Role: publisher
Distribution	Use Limitation Conditions unknown Access Constraints otherRestrictions TODO Format GML 3.2.1 Fees Ordering instructions

Figure 7 Micka – metadata catalogue

7.4 LayMan - The Layer Manager

For management, access control and publishing of geodata, the LayMan tool has been developed.

Publishing of geodata starts with uploading the file on the server. The user interface for that purpose is shown in Figure 8 Data upload.

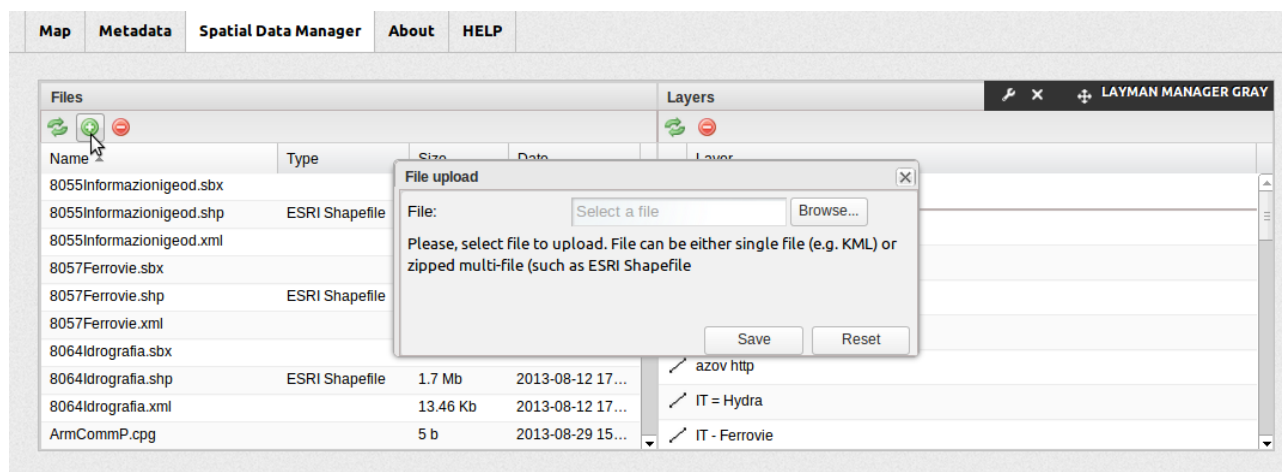


Figure 8 Data upload

After uploading, basic info about the file can be displayed, and several actions are available (see Figure 9 Data management interface) and the publishing can be setup (see Figure 10 Publishing data)

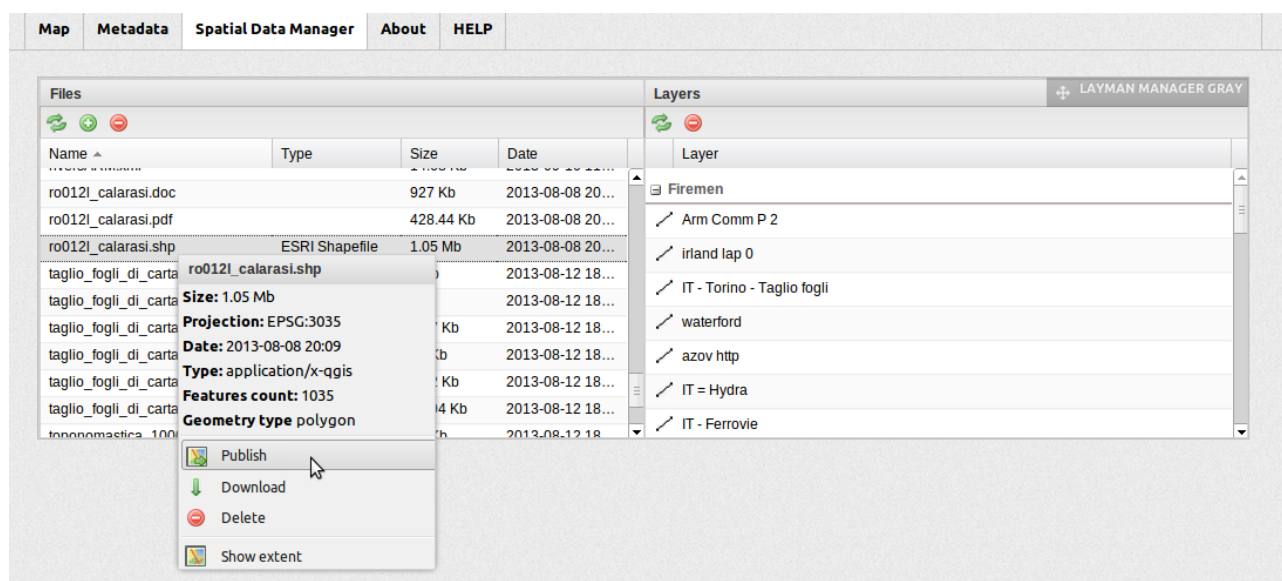
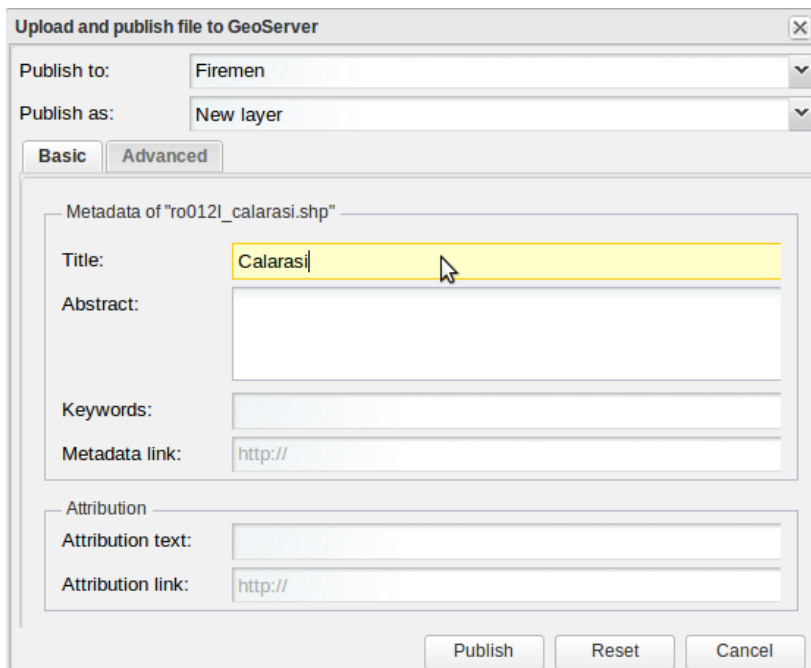


Figure 9 Data management interface



The screenshot shows a dialog box titled "Upload and publish file to GeoServer". It has two tabs: "Basic" and "Advanced". The "Basic" tab is active. At the top, there are two dropdown menus: "Publish to:" with the value "Firemen" and "Publish as:" with the value "New layer". Below these are the "Basic" and "Advanced" tabs. The "Basic" tab contains a section titled "Metadata of 'ro012l_calarasi.shp'". This section has four text input fields: "Title:" with the value "Calarasi", "Abstract:" (empty), "Keywords:" (empty), and "Metadata link:" with the value "http://". Below this is an "Attribution" section with two text input fields: "Attribution text:" (empty) and "Attribution link:" with the value "http://". At the bottom of the dialog are three buttons: "Publish", "Reset", and "Cancel".

Figure 10 Publishing data

Each user can be member of several user groups. In the publish dialog the user needs to select the group he/she wants to publish the file into. (Each group has its own database schema and GeoServer workspace.) Then the choice is made, whether it will be published as a new layer, or if an already existing layer should be overwritten. Then the basic configuration is filled in.

On the Advanced tab, user can adjust the bounding box and detected SRS, if needed. Also, the read access to the layer can be granted to other groups (see Figure 11 Advanced tab for inserting dataset information).

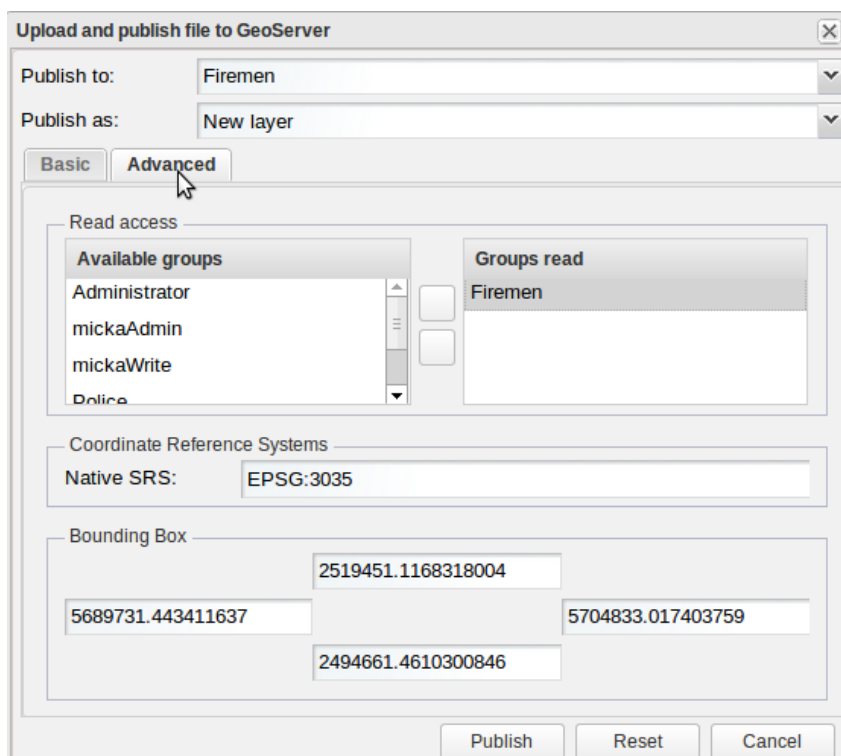


Figure 11 Advanced tab for inserting dataset information

After publishing of the layer, it appears in the right side of the layer manager and several actions are available (see Figure 12). Finally the user can display the layer in the map (Figure 13 Portrayal of the layer in the map).

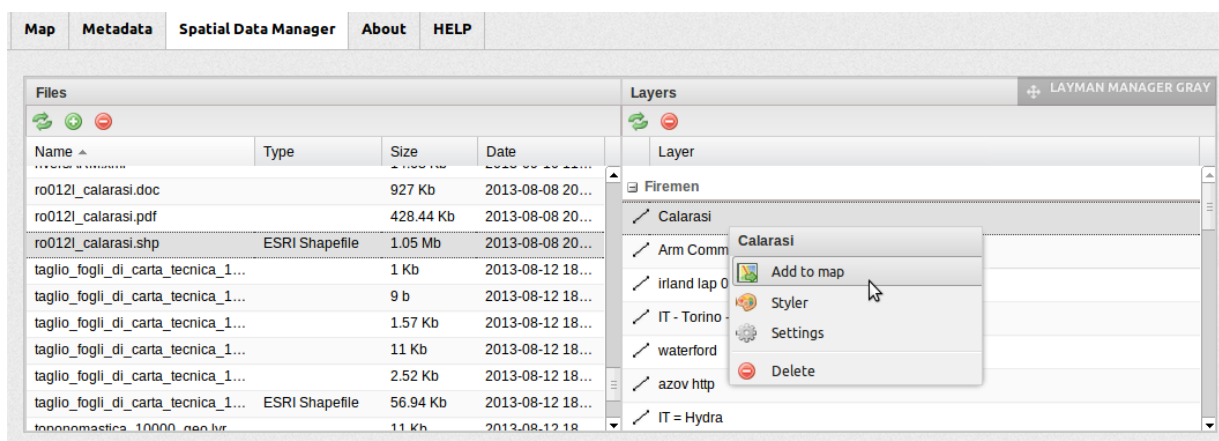


Figure 12 Data manager – published map on the right side

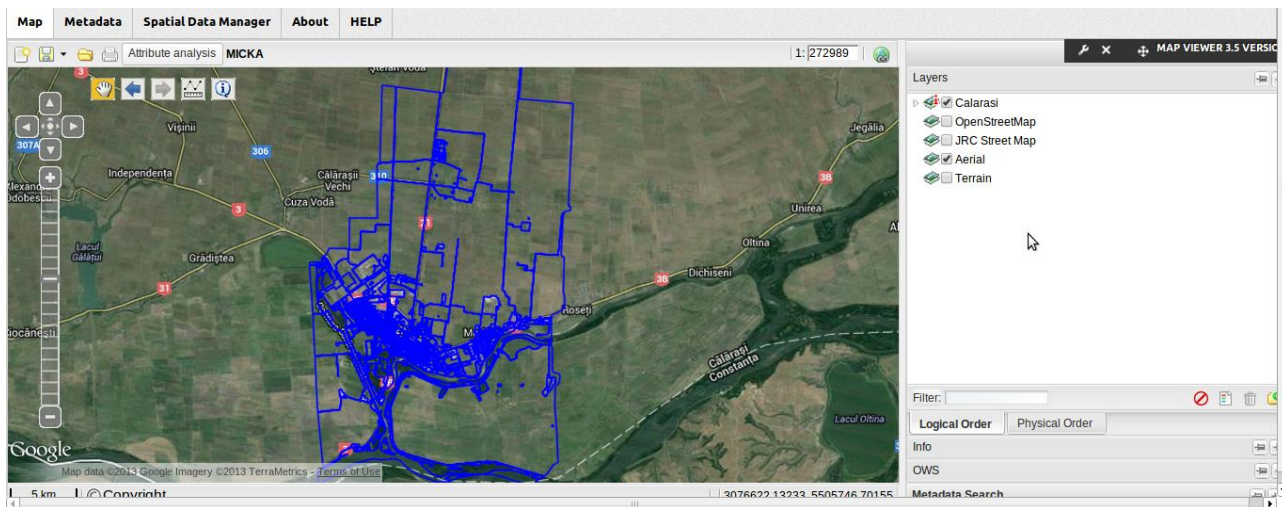


Figure 13 Portrayal of the layer in the map

Going back to Spatial Data Manager, the Styler can be opened:

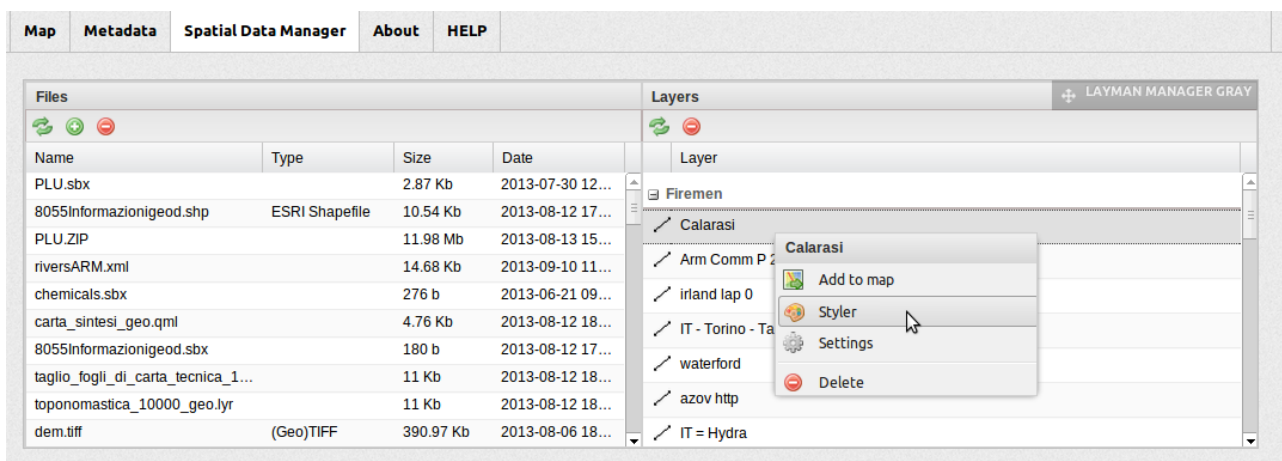


Figure 14 Opening of the Styler

In Styler, the current default style of the layer is shown (Figure 15).

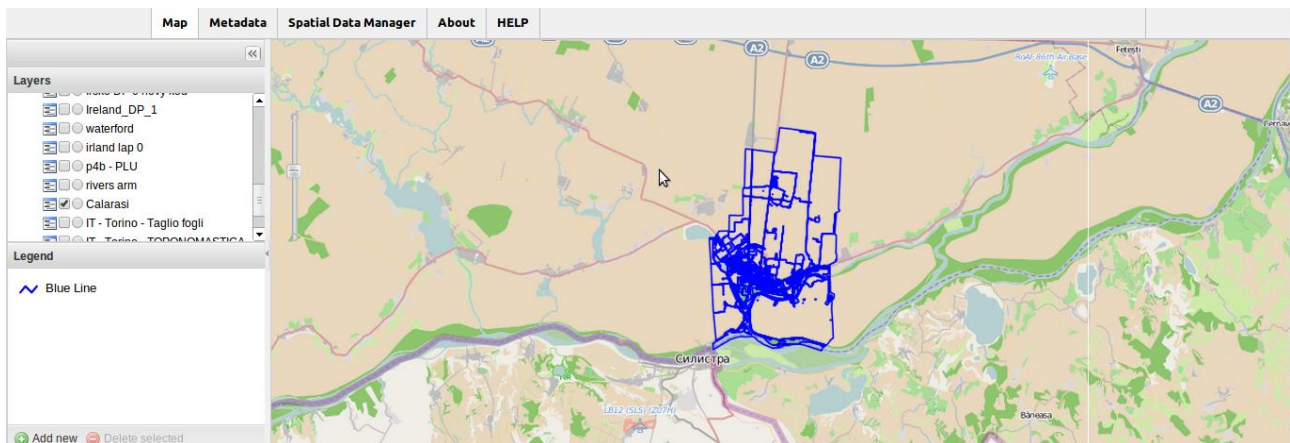


Figure 15 Default style in Styler

To create the new style and add a new legend item there is the appropriate user interface for that. User can specify the basic properties, the colour and such (Figure 16).

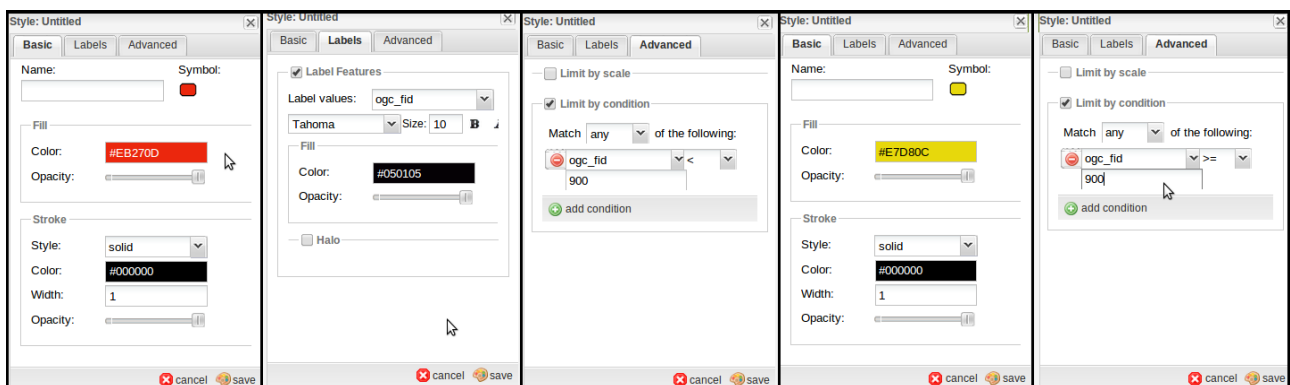


Figure 16 Specifying the style to be applied

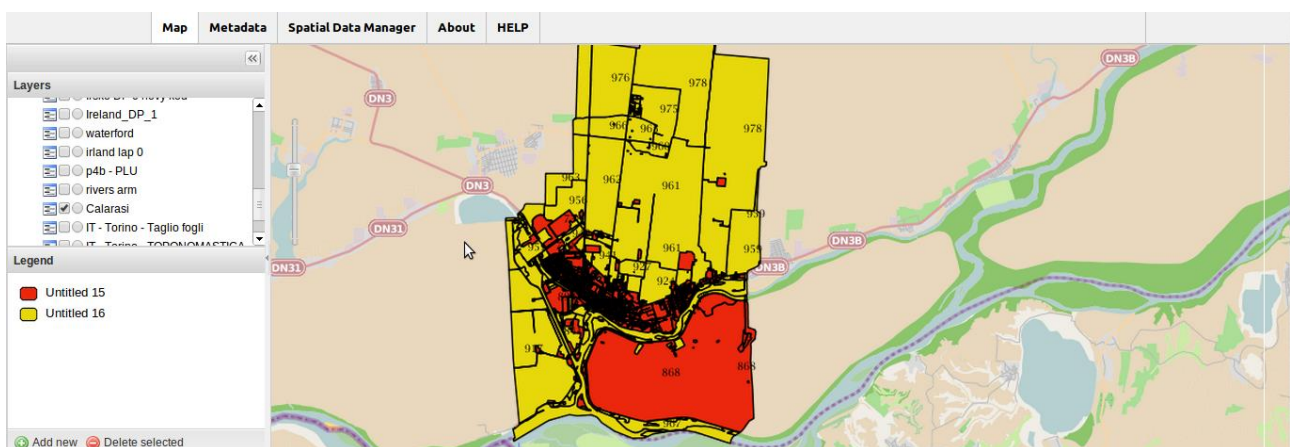


Figure 17 New style applied

When we switch to the map, the layer is shown with the new style (Figure 18)

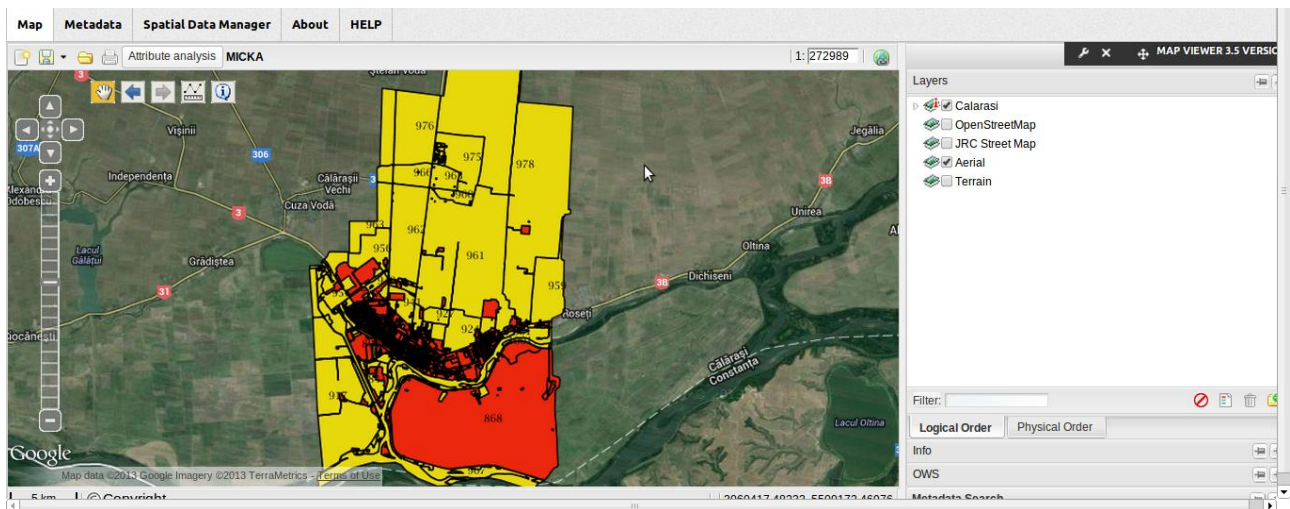


Figure 18 Portrayal of the layer with the new style

8 Pilot Applications

8.1 Location Evaluator

8.1.1 Objectives

The Location Evaluator is an app that aims to provide easy access to data available in data pool. These data should be visualized in human readable and understandable way in the form of *reports* generated in PDF or HTML format. Version 1.0 has been finished 19-Aug-2013 and contains features described below.

Target user group

Target user group of Location Evaluator is general public with interests in publicly available information related to spatial domain.

Main benefits for users are:

- Easy access to different data sources from one application.
- Access to derived information that is composed as a combination (a query) across multiple data sources.
- Visualization of data that helps to understand them better.
- Linking the data between each other as well as linking to third party sources.

8.1.2 Work Done and Progress Achieved

User Interface

User interface consists of these main components:

- **Background map** – Background map is used to support a user to find the place of his interest by browsing the map. Currently there is the possibility to choose Open Street Map and Google Imageries.
- **Territory selection** – The territory selection enables to select a different spatial context as we have different datasets for different countries. There is the context for Europe, Germany and Czech Republic.
- **Overlay map** – This map is used to select particular spatial feature to get a report. The report is provided for a different spatial feature if different territories. The best coverage is provided for Czech Republic where it is possible to get the report for regions, cities and buildings.
- **Thematic Map** – Possibility to visualise particular thematic map as a overlay. Thematic maps are predefined and they are relevant just for selected territory.
- **Search** – textual searching for city, region or municipality. Location evaluator uses the free GeoNames geographical database which covers all countries and contains over 10 million geographical names.
- **Generate report** – component to specify format of report to be prepared. Currently HTML and PDF is supported. Particular report is being generated on the fly by using services from the plan4business Analysis Engine.

- **Analysis** – component that enables to request for comprehensive report that requires various user input.

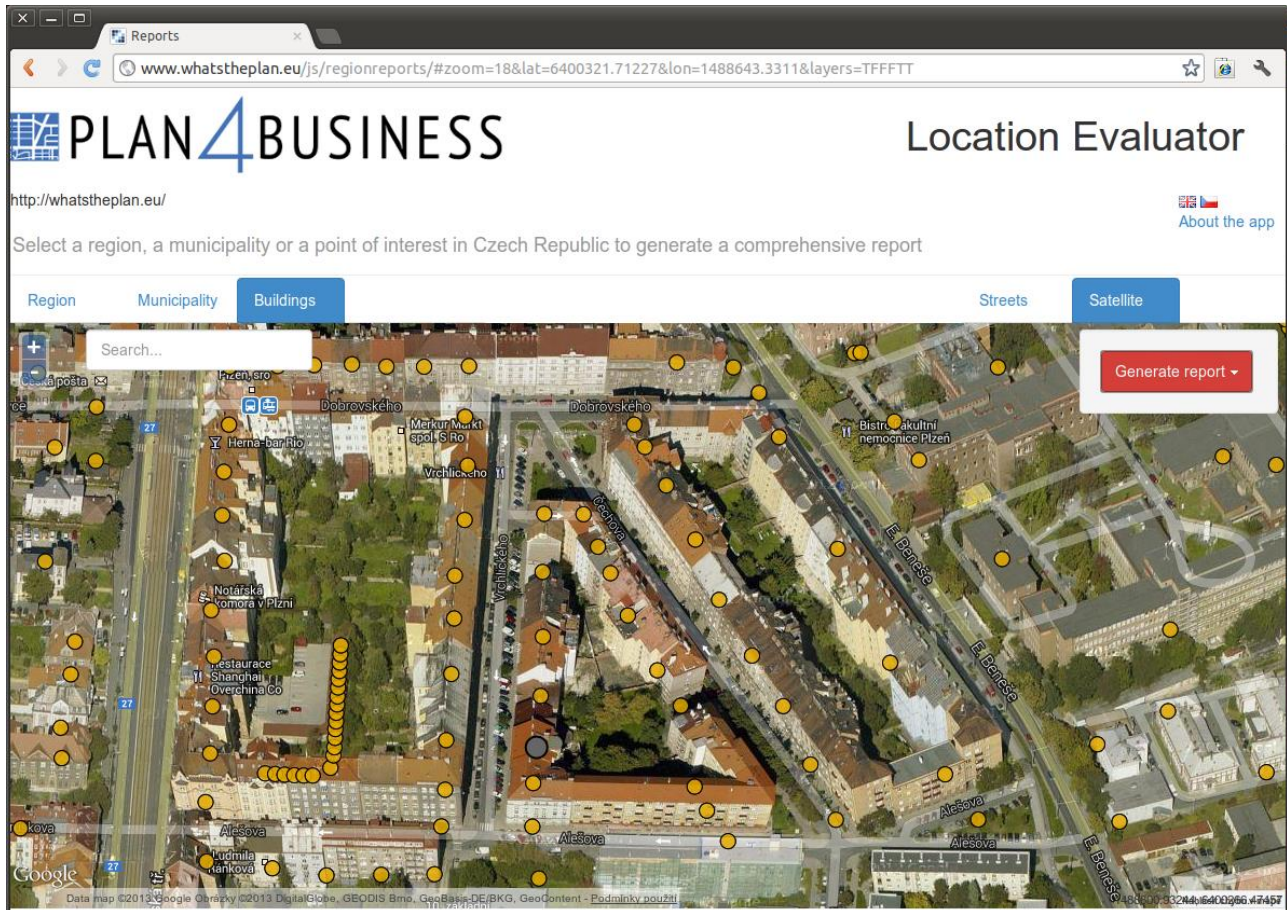


Figure 19 User interface of the Location Evaluator

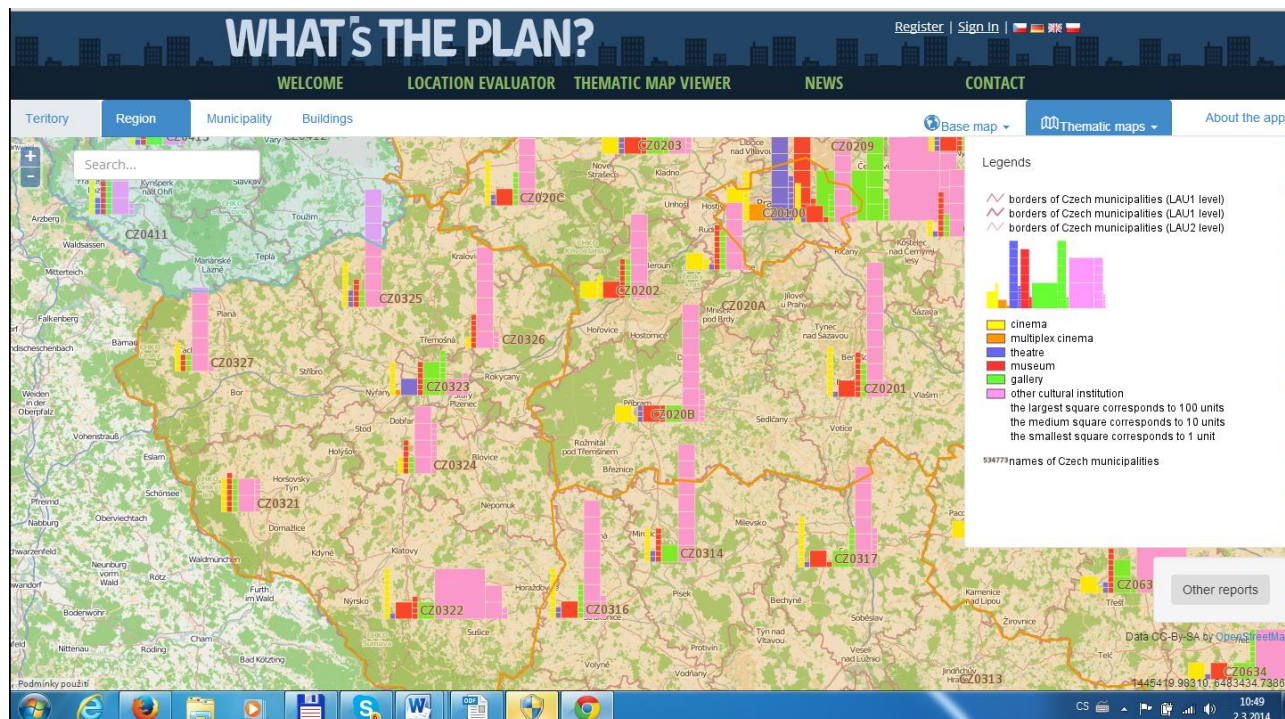


Figure 20 Thematic map overlay

Client side

The client part of the software is developed using JavaScript and HTML with usage of well known open source libraries. These are:

- OpenLayers - used for mapping part
- JQuery - used as controller of workflow
- Bootstrap - used for components of user interface

Server side

The server side of the Location Evaluator is solved by the Analysis Engine (described in deliverable 5.1).

The main concept of reports is to have a possibility to prepare such reports in the form of general template. These templates are then inserted into the database and finally they are connected to user interface. One of the main objectives of such solution was to make the preparation of such templates easy also for no programmers.

From above reasons we have tested and evaluated as good solution the Jasper open source framework (see [11]). This framework provides desktop software that can be used by no programmers to connect to the database and prepare template for report. On other side the Jasper framework also provides libraries that can be used by developers to compile such template and generate the report form it in various format.

For easy access to reports we have designed and implemented the REST API as part of the Analysis Engine. These services are connected and reused in Location Evaluator.

For the location evaluator three main reports have been prepared.

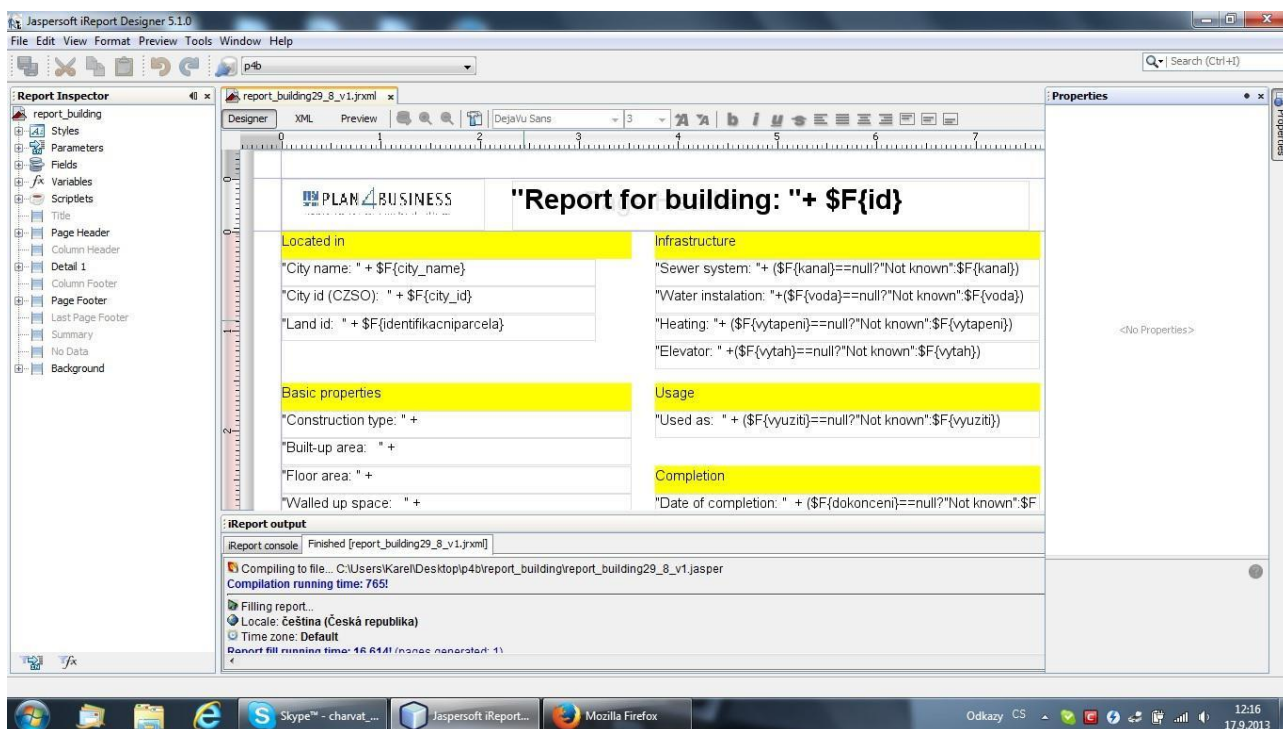


Figure 21 iReport Designer – template preparation

Data and spatial scope

For the pilot application the following datasets were used:

Czech Statistical Office (CZSO)

- **Code list of cities**
- **Territorial analytical data for each municipality.** The selected subset of published dataset involves mainly basic demography statistics and land use.
- **Subset of selected statistical data for individual municipalities.** From this data set, we are using mainly information about number of various kinds of facilities (educational facilities, sport facilities, cultural facilities...) in individual municipalities.
- Data about **number of economic entities by size categories** (number of employees) in each municipality.
- **Local elections** data.

Ministry of Labour and Social Affairs

- **Unemployment** data from individual municipalities.

Czech Office for Surveying, Mapping and Cadastre (COSMC)

- **RUIAN**

T. G. Masaryk Water Research Institute, public research institution.

- **Flood zones** data

Eurostat

- **Regional data** on the NUTS3 level involving demographic indicators, socio-economic data about structure of agricultural land.

The version 1.0 of the pilot application covers currently the area of the Czech Republic. The application offers a possibility to generate on the fly report for:

- 13 regions (Figure 22),
- 6251 Municipalities (Figure 23),
- 4 074 559 Buildings (Figure 24).

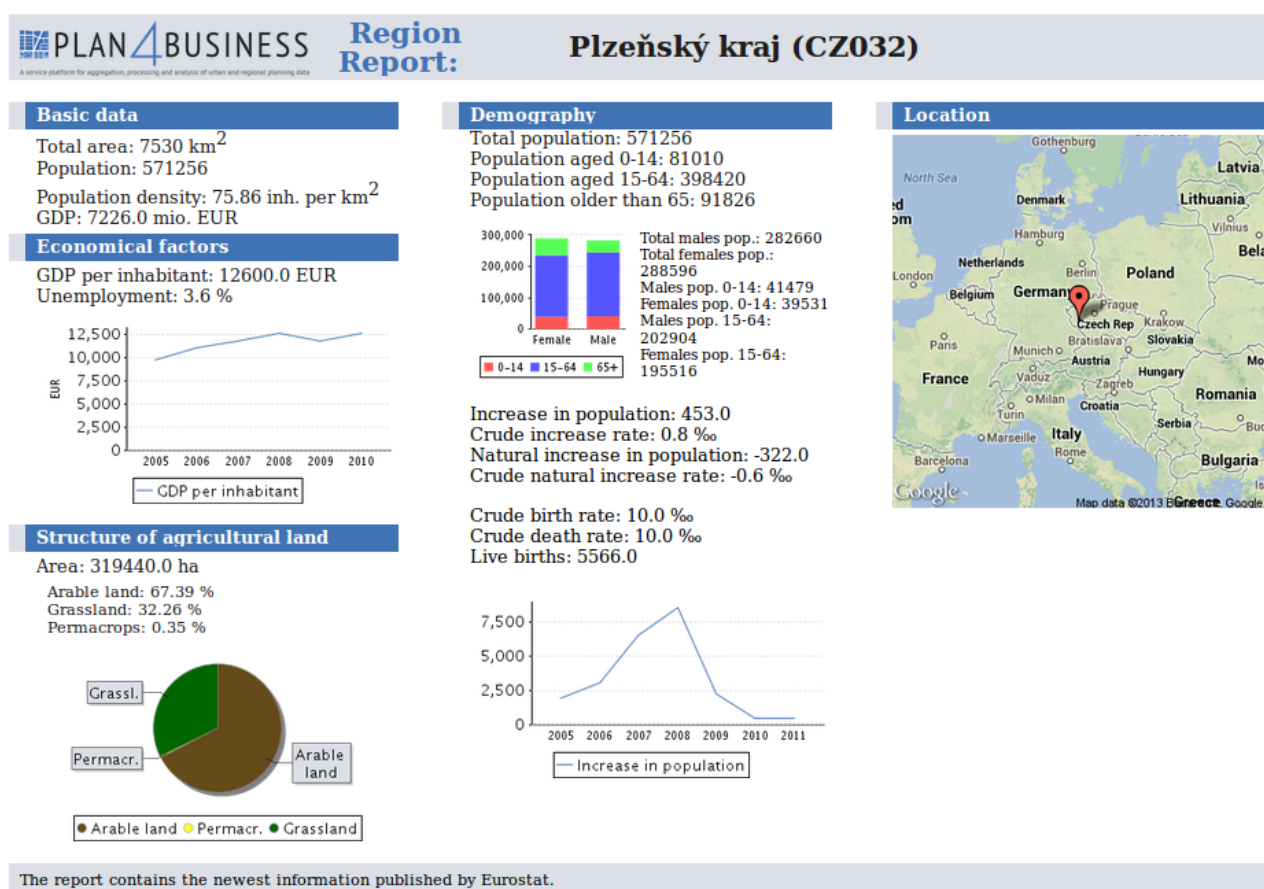


Figure 22 Region report example

Municipality Report: Plzeň (554791)

Administrative divisions

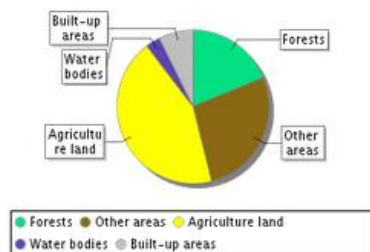
Region (NUTS2): Jihozápad (CZ037)
 Region (NUTS3): Plzeňský kraj (CZ032)
 District (NUTS4, LAU1): Plzeň-město (CZ0323)
 Municipality of 3rd level: Plzeň (3209)
 Municipality of 2nd level: Plzeň (32091)
 Status: S - Statutory town

Linked data

Municipality budget (source: www.rozpočetobce.cz)
 Municipality information (source: www.risy.cz)
 Municipality information (source: www.obce-mesta.info)

Land use

Total area: 13766.641 ha
 Arable land: 4319.4044 ha
 Hop gardens: 0.0 ha
 Vineyards: 0.0 ha
 Gardens: 973.1397 ha
 Orchards: 47.8782 ha
 Permanent grass vegetation: 649.3122 ha
 Forest land: 2560.5613 ha
 Bodies of water: 438.4627 ha
 Built-up areas: 995.1124 ha
 Other areas: 3762.7501 ha
 Agriculture land: 5989.7345000000005 ha



Tourism

Number of lodging units: 46
 Number of spa facilities: 0
 Number of beds in spa facilities: 0

See the original data source to find out metadata and more information.

Economical factors

Economically active population: 87516
 Unemployment rate: 7
 Number of job applicants: 6379
 Number of job applicants (graduates): 217
 Number of job applicants (registered longer than 12 months): 1899
 Job vacancies: 1229

Micro enterprise: 19700
 Small enterprise: 852
 Medium enterprise: 228
 Large enterprise: 56

Housing

Number of completed new flats (in the calendar year): 315
 Number of completed new flats in family houses (in the calendar year): 108

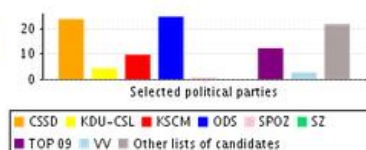
Facilities

Cinema: 6
 Multicinema: 1
 Theatre: 10
 Museum: 6
 Gallery: 25
 Other cultural enterprise: 6
 Swimming pool: 17
 Maintained playground: 25
 Gym: 40
 Stadium: 5
 Ice arena: 2
 Other sport enterprise: 7

See the original data source to find out metadata and more

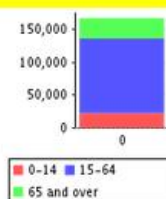
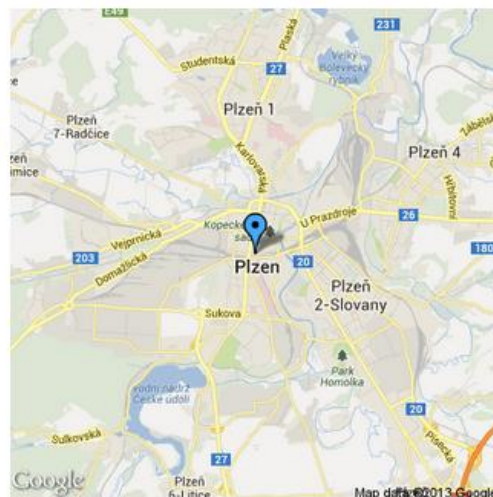
Local elections 2010

KDU-CSL - Christian and Democratic Union - Czechoslovak People's Party: 4.32%
 ODS - Civic Democratic Party: 24.78%
 KSCM - Communist Party of Bohemia and Moravia: 9.7%
 CSSD - Czech Social Democratic Party: 23.61%
 SZ - Green Party: 0%
 SPOZ - Party of Civic Rights - Zemanovci: 0.63%
 VV - Public Affairs: 2.66%
 TOP 09 - Tradition Responsibility Prosperity 09: 12.31%
 Other lists of candidates: 21.789999999999992 %



Demography

Population: 167302
 Increase in population: -103
 Migration balance: -243
 Live births: 1670.0
 Deaths: 1773
 Immigrants: 3112
 Emigrants: 3355
 Average age: 42.53226293744247
 Population aged 0-14: 22134
 Productive age: 114039.0
 Population 65 years and over: 31129



The report contains the newest information published by following providers.

Source: CZSO; Klasifikace, číselníky; Struktura území České republiky; CZSO; Statistics; ČSÚ a územně analytické podklady; Datové vrstvy pro GIS

Figure 23 Municipality report example

Report for building: 21665966

Located in

City name: Praha
City id (CZSO): 554782
Land id: 2384834101

Basic properties

Construction type: Not known
Built-up area: Not known
Floor area: Not known
Walled up space: Not known m
Number of floors: Not known
Number of apartments: 6

Flood risk

Located in zone of largest flood: Yes
Located in zone of 100-year flood: Yes
Located in zone of 20-year flood: No
Located in zone of 5-year flood: No

Linked data and reports

Report for city: Praha

Infrastructure

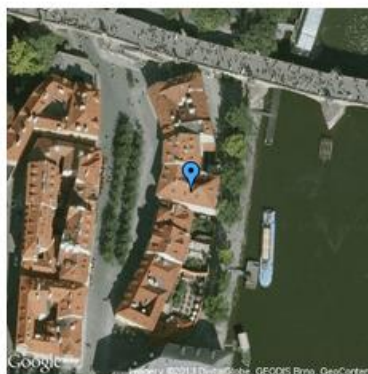
Sewer system: Connection to sewer system
Water instalation: With water pipe
Heating: Other (inlluding without heating)
Elevator: Without elevator

Usage

Used as: Apartment building

Completion

Date of completion: Not known



Report contains information published by following providers.
CZECH OFFICE FOR SURVEYING, MAPPING AND CADASTRE (COSMC); RUIAN;
T. G. Masaryk Water Research Institute, public research institution; DIBAVOD

Report generated at 2013-09-17 13:49:44.0

<http://www.plan4business.eu/>

<http://whatstheplan.eu/>

Figure 24 Building report example

There is also a new report for all European regions (NUTS3) (Figure 26) and for municipalities in Germany (Figure 25).

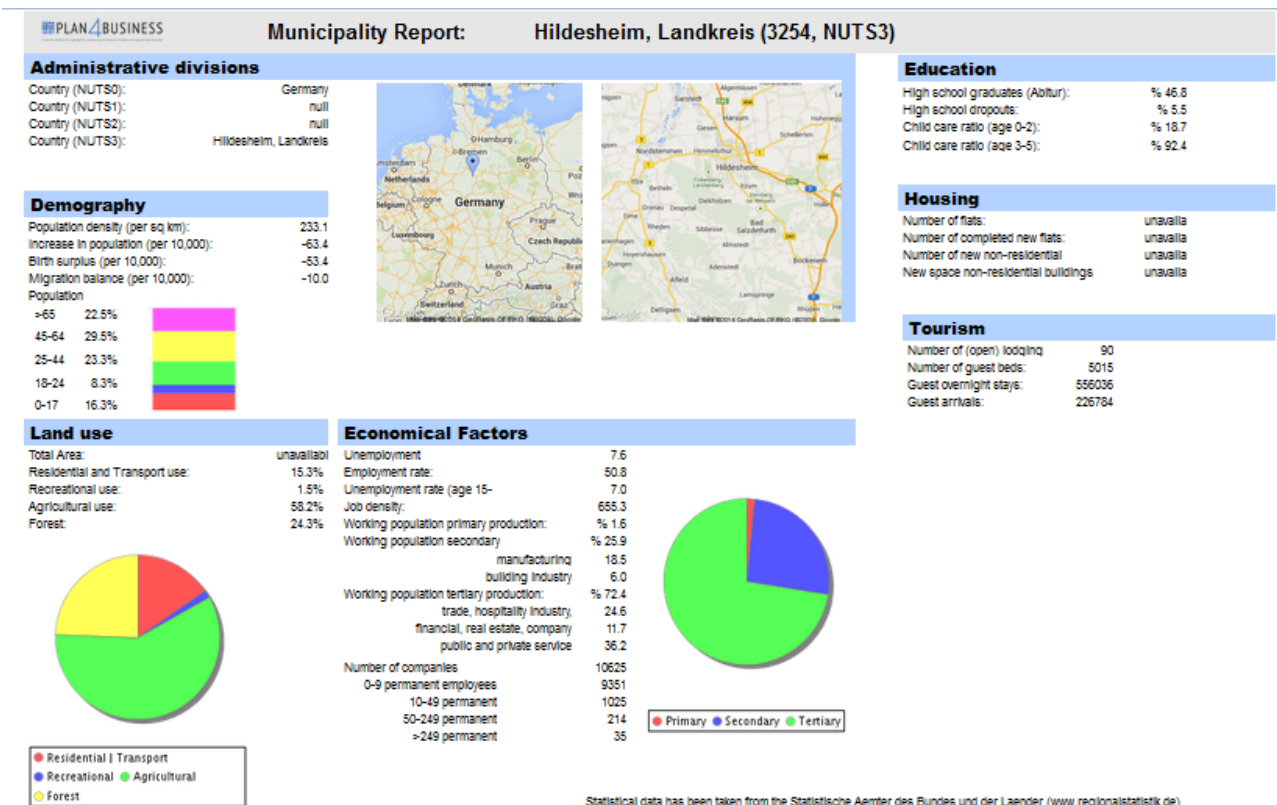


Figure 25 Report for a German municipality

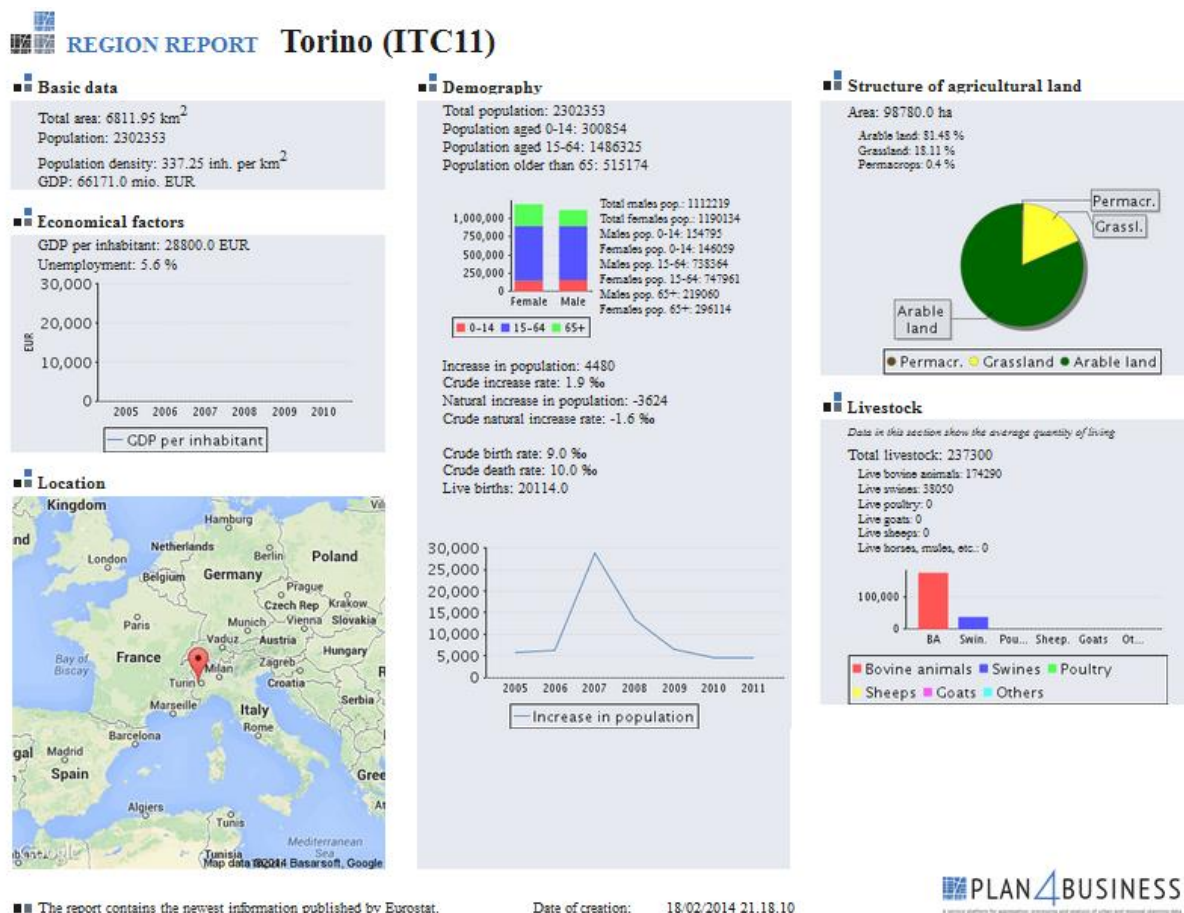


Figure 26 Report for a European region

Advert and Promote

Newly developed feature is the **Advert** and **Promote** modules. These modules enable to integrate a property offer as a part of the report. For the pilot application for the territory of the Czech Republic there are already of about 2000 properties available and updated every day.

Location Evaluator Mobile

Another new progress has been made to enable the report in its mobile version (**Location Evaluator Mobile**). Such a customisation is designed to be integrated into various pilot applications based on different mapping applications. There is a newly developed REST service that will compose the list of available reports for a particular point of interest. Such a list is designed to be easy to visualise on mobile phones and tablets. The list acts as a crossroad where user can choose a particular report in its mobile version to be visualised.

Rest URL:

http://www.whatsheplan.eu/analyst_p4b/report.jsp?rest/report/gethtml/crossroad_report_en/?lon=14.264540&lat=50.033879 (example in Figure 27)

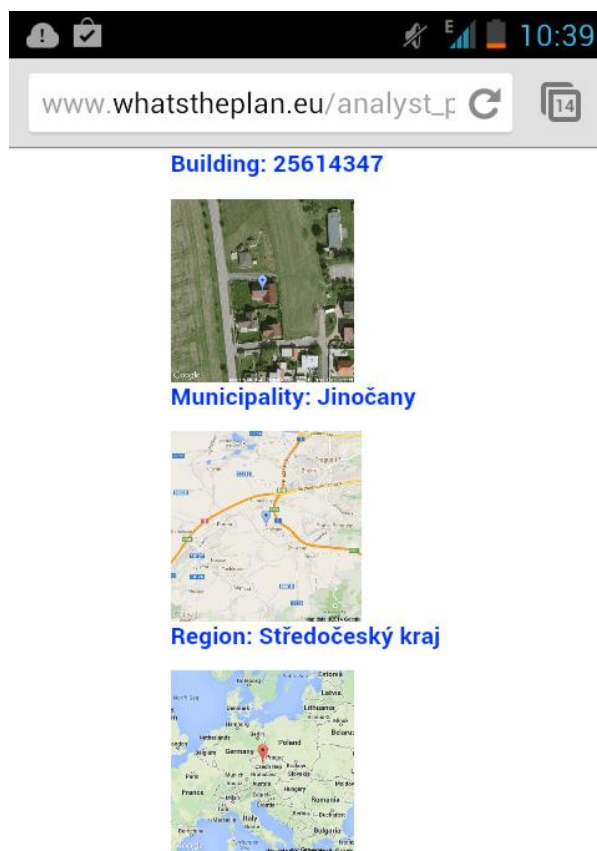


Figure 27 Report Mobile

8.1.3 Next Steps

Further development will be focused on improving the report content. Technically, it is possible to add any results of any analysis based on the datasets available in the data pool. The main focus will be on routing features so that the reports can contain also information about accessibility of most important places in the surrounding (e.g. bus station, train station). Future work is also focused on collecting additional datasets like criminality, air pollution and similar. Utilisation of urban planning data is also under the focus, but is greatly influenced by data availability. The last point is to extend the spatial extent of the application to other countries. This is being done in close cooperation with WP2 and WP3.

8.2 Integrator (Collaborative Schema Integrator)

8.2.1 Objectives

This task includes the design and implementation of the client side for the collaborative integration of spatial and non-spatial data into the plan4business data pool. The work encompasses the **design and implementation of the web interface** for the data upload and harmonisation workflow. The following functionalities and components are foreseen:

- **Data source upload** for all datasets that will be stored in the primary data pool.
- Configuration of the “Integration Engine” component (= Schema Mapping Component + Plan Matcher Component) to do the actual data integration:
  - for vector data: the **Schema Mapping Component** supports data transformation for Existing and Planned Land Use (into a simplified INSPIRE Data model) in HALE;
  - for raster data: the **Plan Matcher Component**.

8.2.2 Work Done and Progress Achieved

Components for Service Levels 1, 2, 3 and 4 were implemented and integrated with the existing infrastructure of the Liferay portal. New tasks for Service Level 5 were identified.

In what follows we first give an overview on the overall workflow that is related to data upload and integration. This workflow describes the interaction of the user (Data Provider) with the system for the data upload as well as the subsequent processing steps required for integration and writing into the database (related to the Integration Engine described in D5.2). This comprehensive workflow description is then followed by a detailed description of the Web Interface developed for organising the data upload and integration workflow.

Concept of Integration Workflow

The following four figures provide an overview of the workflow for integration of vector data sets using the Plan Integrator UI and the Integration Engine (see D5.2).

Figure 28 Top Level Integration Workflow gives an overview on the overall process of data integration. The main activities in the top level integration process are uploading data for integration, storing it in its original form and creating tasks for the integration of the different files/documents into the primary data pool. These tasks serve to decouple the data upload from the actual integration, and later on store the integration configuration. As simplification, the completion of the tasks is displayed in the process model in linear order, with each task being finished completely, but in the implementation later on integration tasks may be completed partial and started or continued independently of each other.

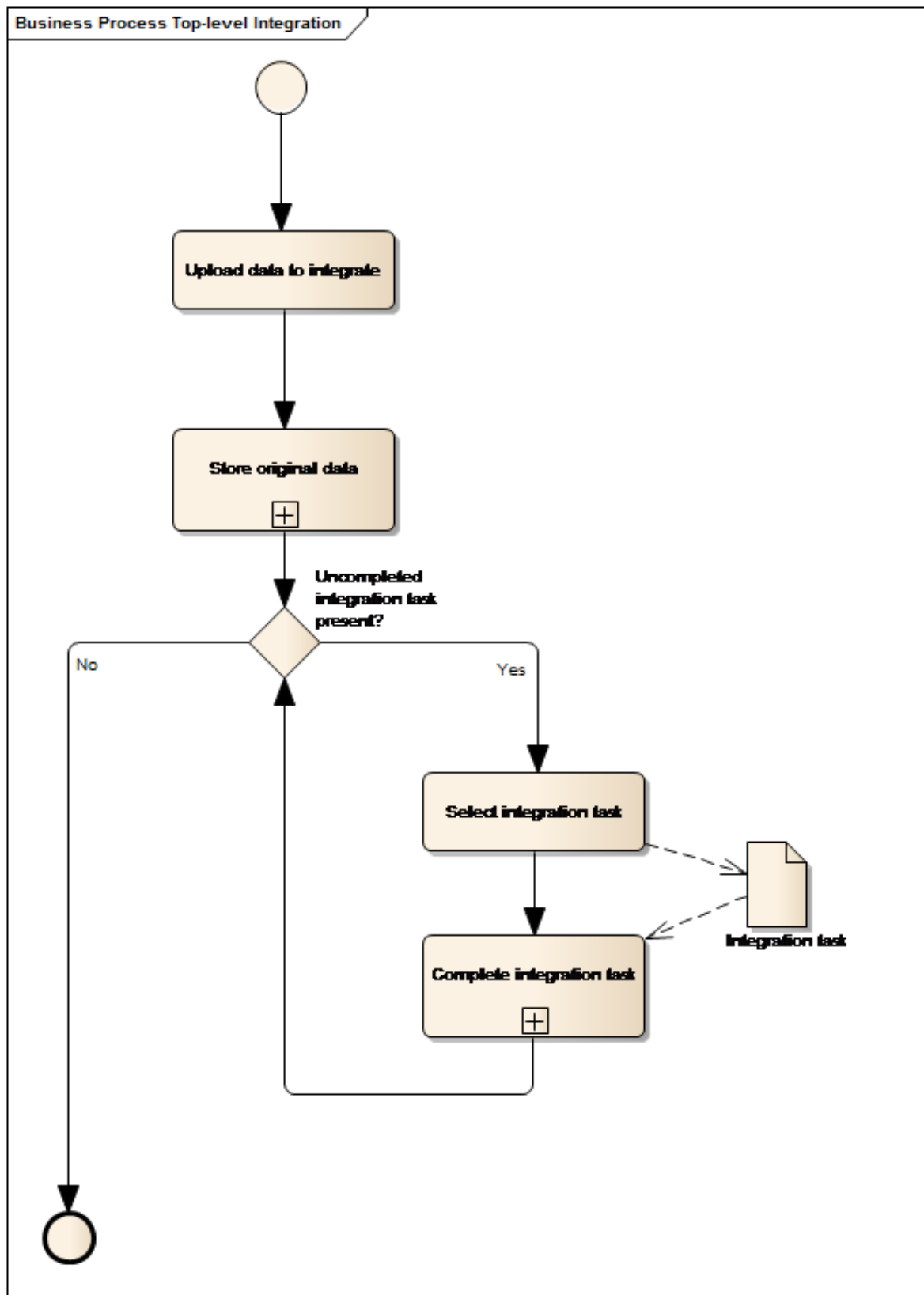


Figure 28 Top Level Integration Workflow

The remaining three figures showcase specific details about the sub-processes of “Store original data”, the complete integration “Store original data”, “Complete integration task” – and more specifically as part of the integration task “Schema Mapping” – are sketched in detail. The proposed workflows are an initial draft and are subject to change in the further progress of the project.

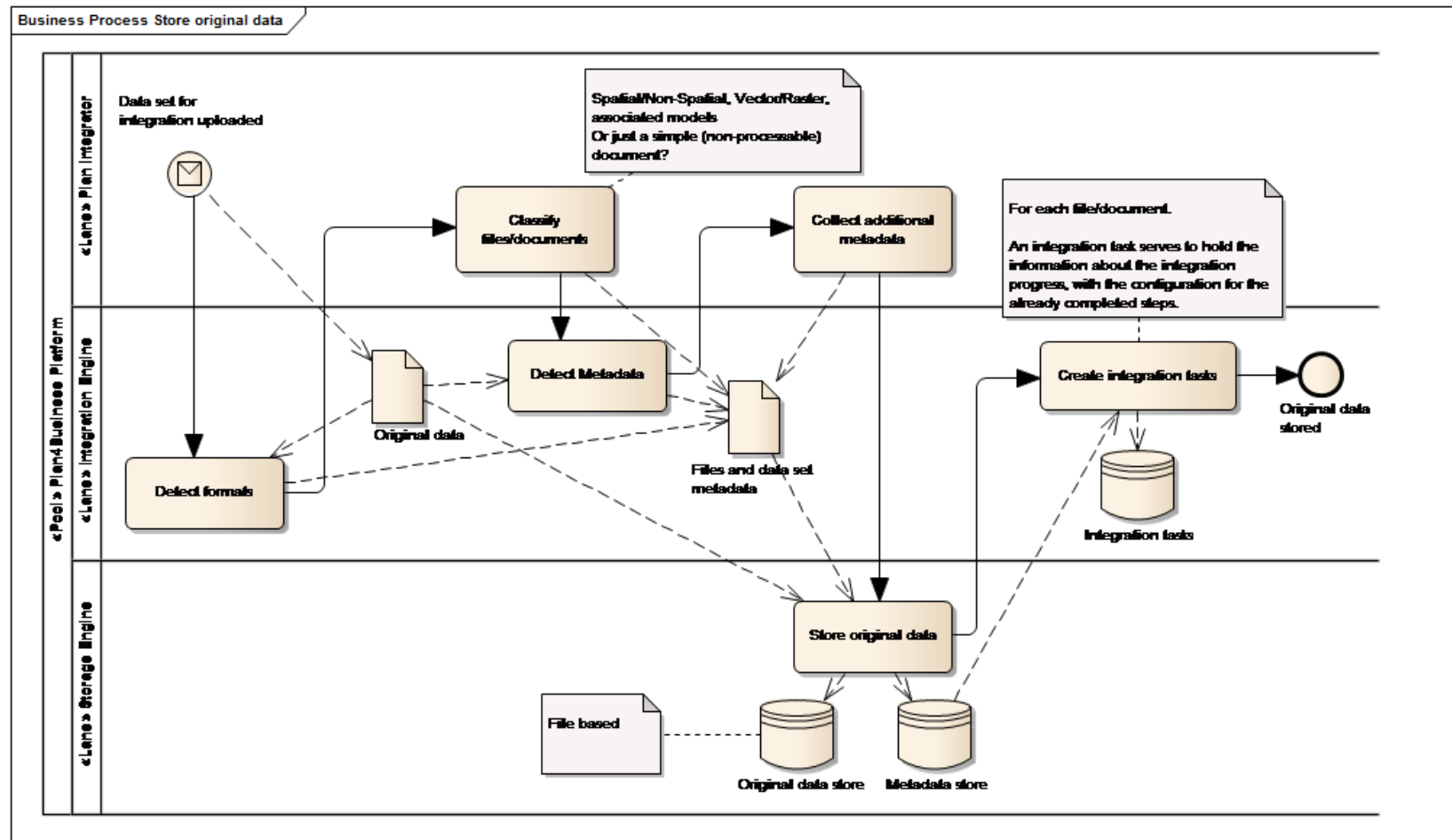


Figure 29 Workflow for storing original planning data sets

In the process “Storing original data” (Figure 29), the uploaded files are processed, classified and metadata is collected. As a result, the original data set and file/document metadata has been stored in the system. For each file/document an integration task is created that controls the further integration into the system to make the data usable for visualization and analysis.

Figure 31 below shows the process of completing an integration task. As a result the data is stored in the primary data pool. During the process, data is handled differently according to its format. One activity necessary for translating vector data to the plan4business models is Schema Mapping. Like many of the other activities in this process it is rather complex by itself, and is not just restricted to the Integration Engine component but involves also the Plan Integrator and through that the data curator.

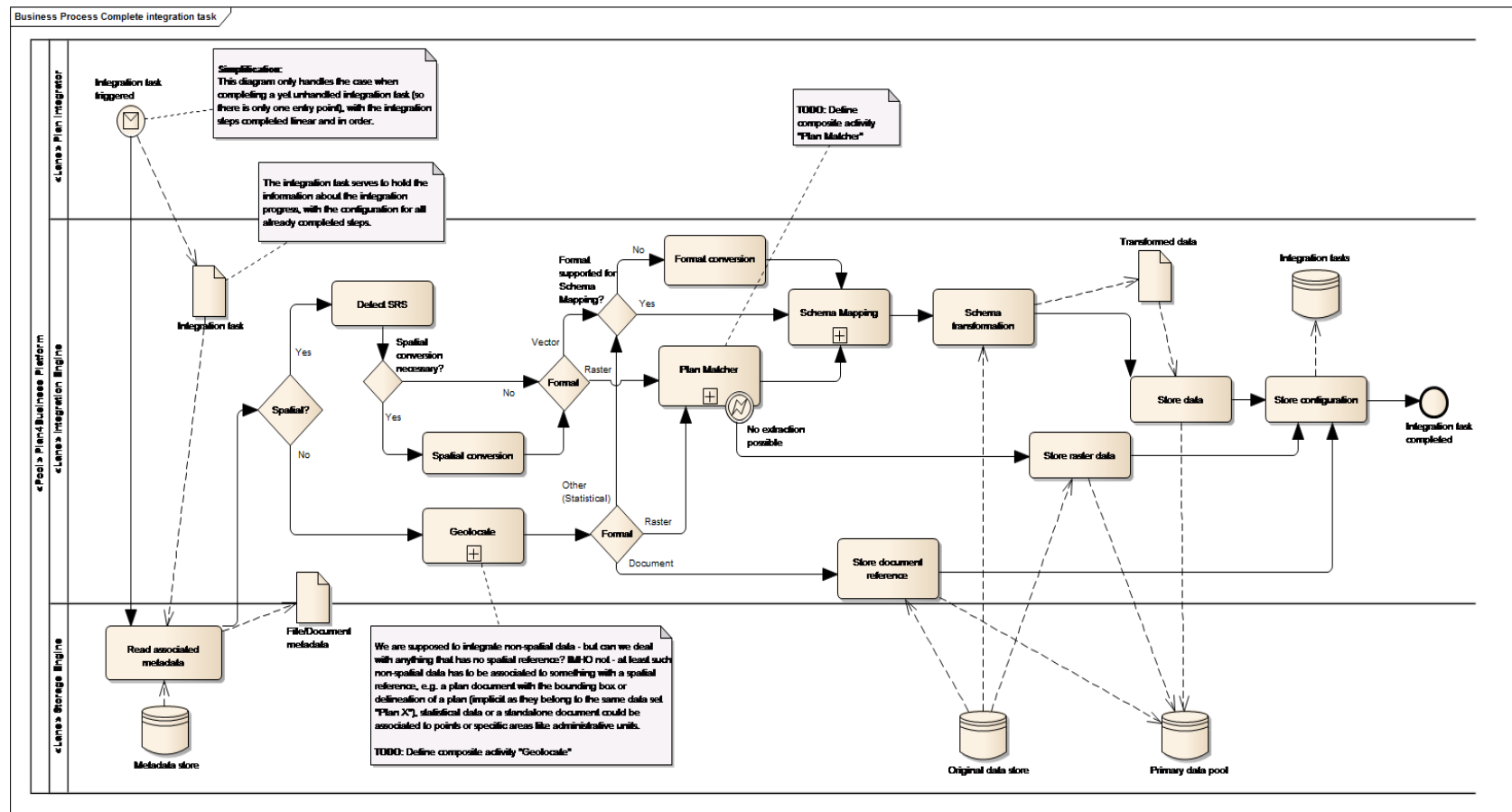


Figure 30 Workflow for the actual schema integration I

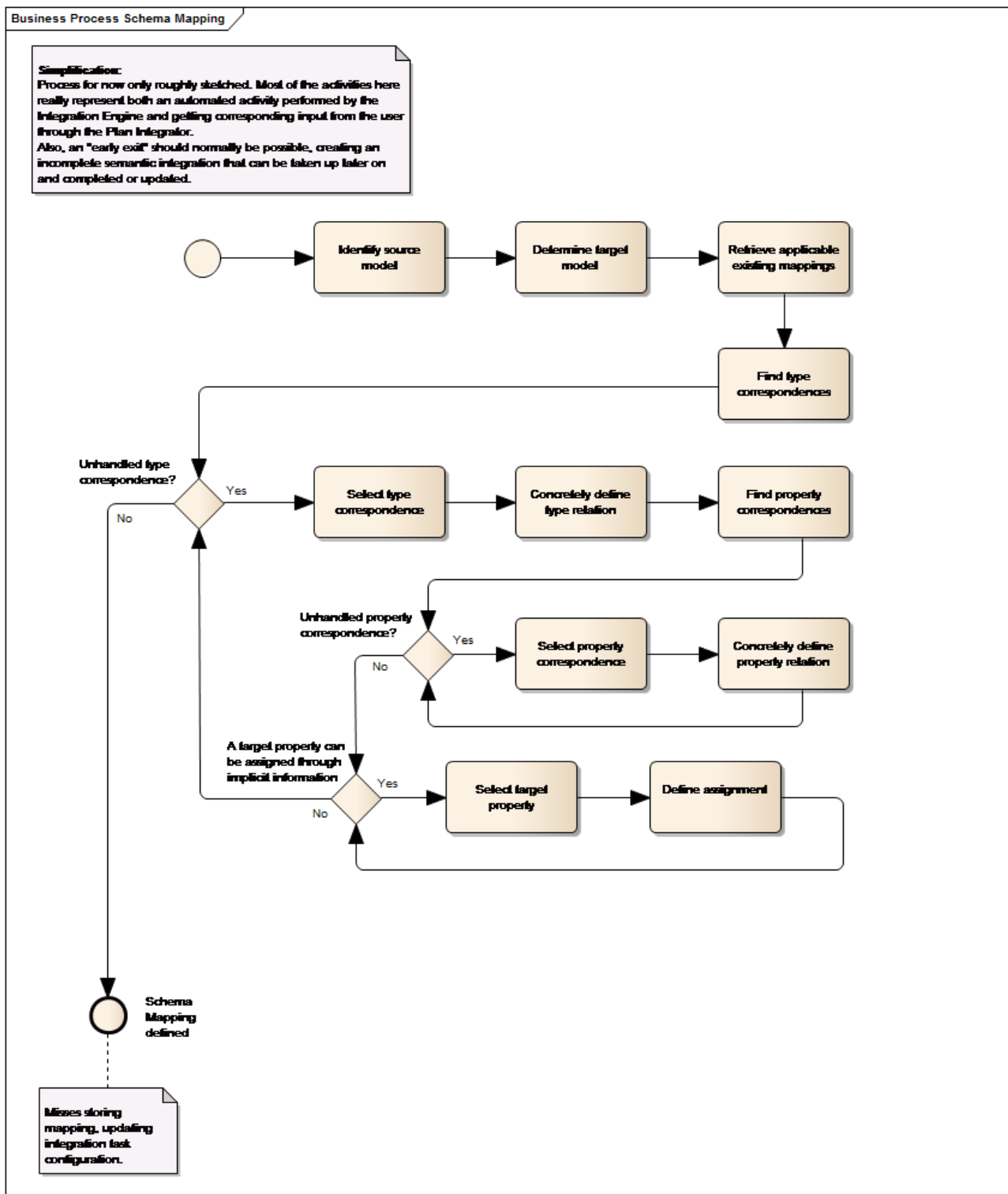


Figure 31 Workflow for the actual schema integration II

Design and Implementation of the Web Interface

The Plan Integrator at its final stage is fully integrated with the Liferay portal. Accessing the Plan Integrator is possible for registered users only. Initially the Plan Integrator presents the users an overview on how they can contribute to the plan4business platform and what services will be available on the data afterwards. The three main steps from the users' points of view are (see also Figure 32):

1. Uploading data or registering a data source
2. Defining the schema mapping for harmonisation with the plan4business data model
3. Publishing the integrated data in various ways

For each step a compact guide explains how it can be performed and the views and settings of the Plan Integrator are explained. As the second step involves creating a Schema Mapping in HALE, a plan4business Edition of HALE is offered for download there as well.

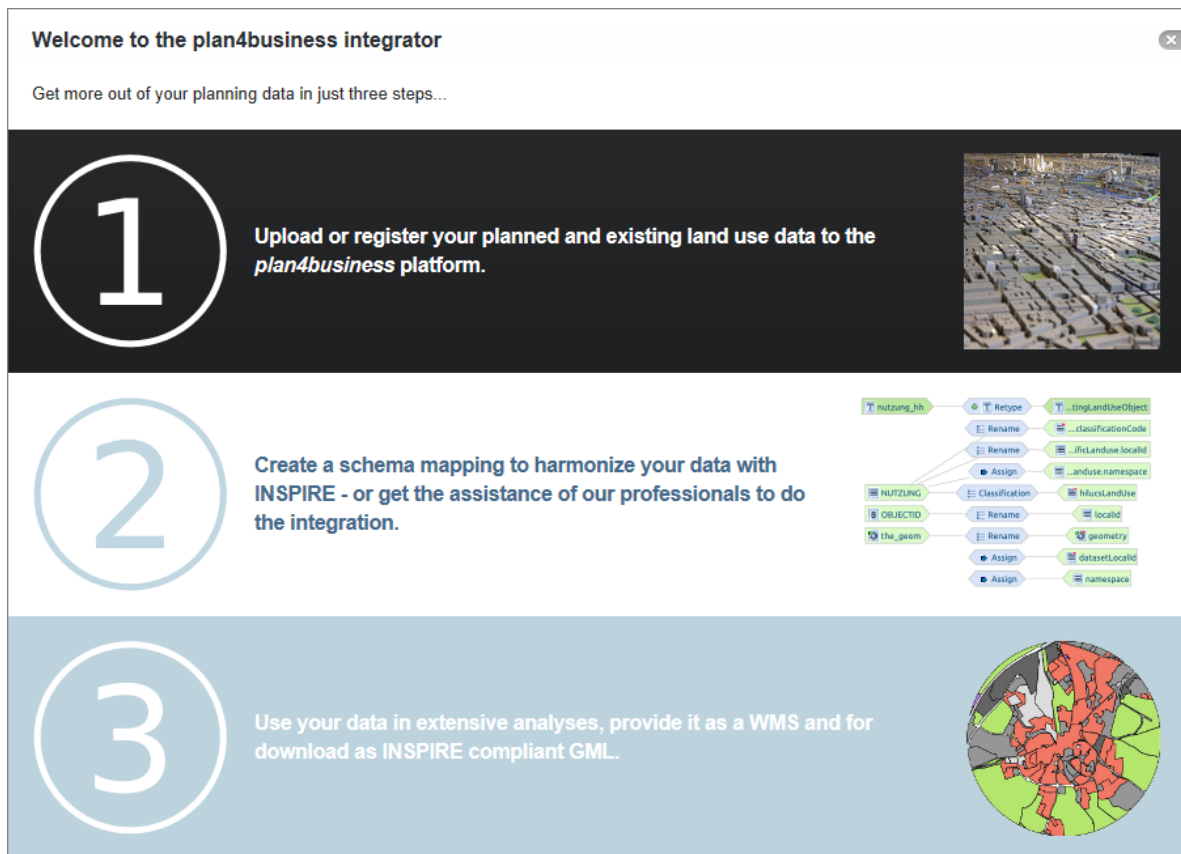


Figure 32 Basic steps for the user in the Plan Integrator

The workflow as currently implemented in the Plan Integrator Interface is the following: Source data is uploaded and stored in the plan4business file system and related metadata is stored in the primary data pool. We have implemented the primary data pool with a PostGIS database, as explained in detail in D5.4. All data formats can be uploaded into the system; but for the schema transformation currently only data

based on Shapefiles is supported. Uploaded files are organised in data sources. A data source may contain multiple files of various kinds, which are classified as vector data, raster data, documents or schemas. This allows that all relevant regulations, plans or other related sources can be grouped together. For example, for all datasets on planned land use it is very important to have also the related regulations uploaded and available for the end users.

For each Data source an explicit spatial reference is stored. This is either automatically extracted from the data files or at latest from the transformed data. While uploading the source data, the user is requested to specify some additional metadata, e.g. a name for the plan or plans, an abstract and the spatial reference system.

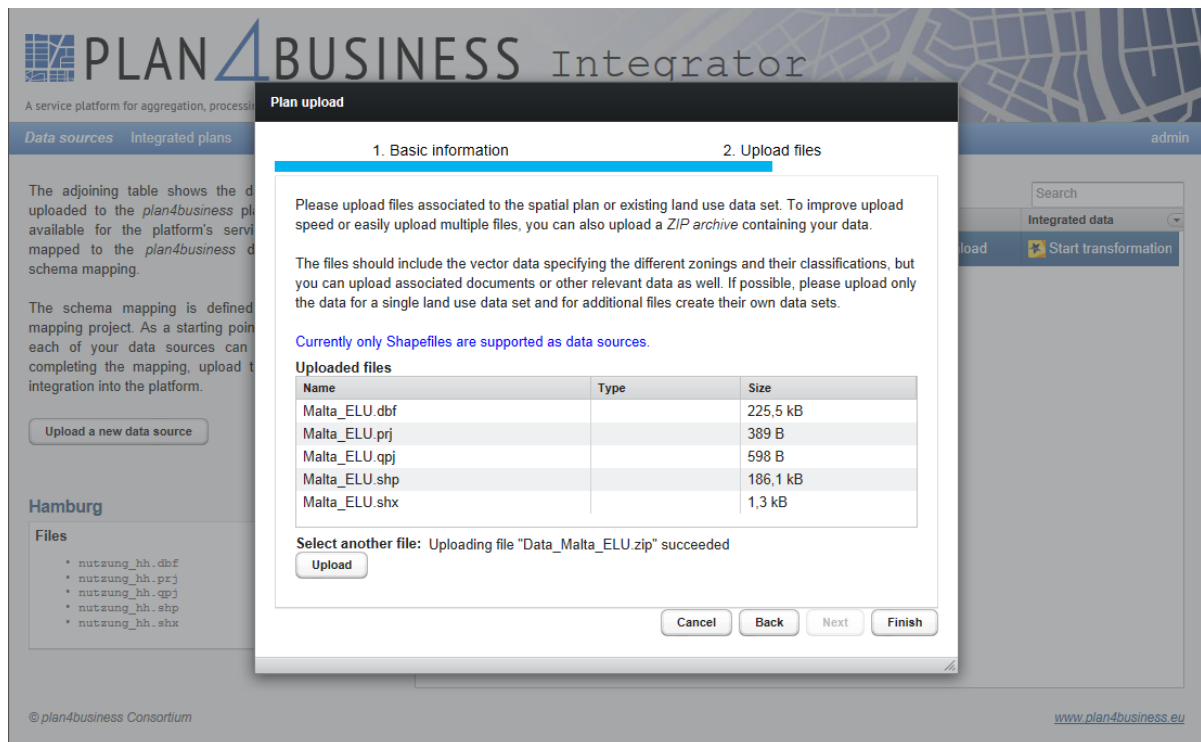


Figure 33: Data upload wizard

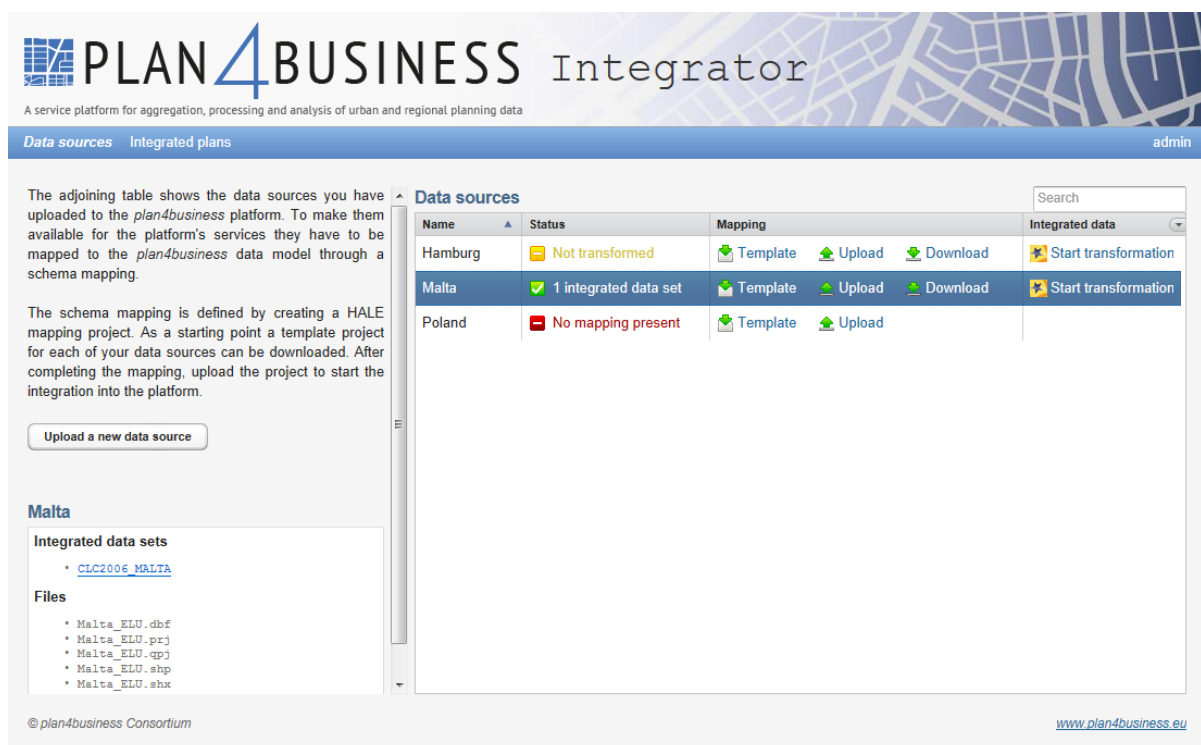
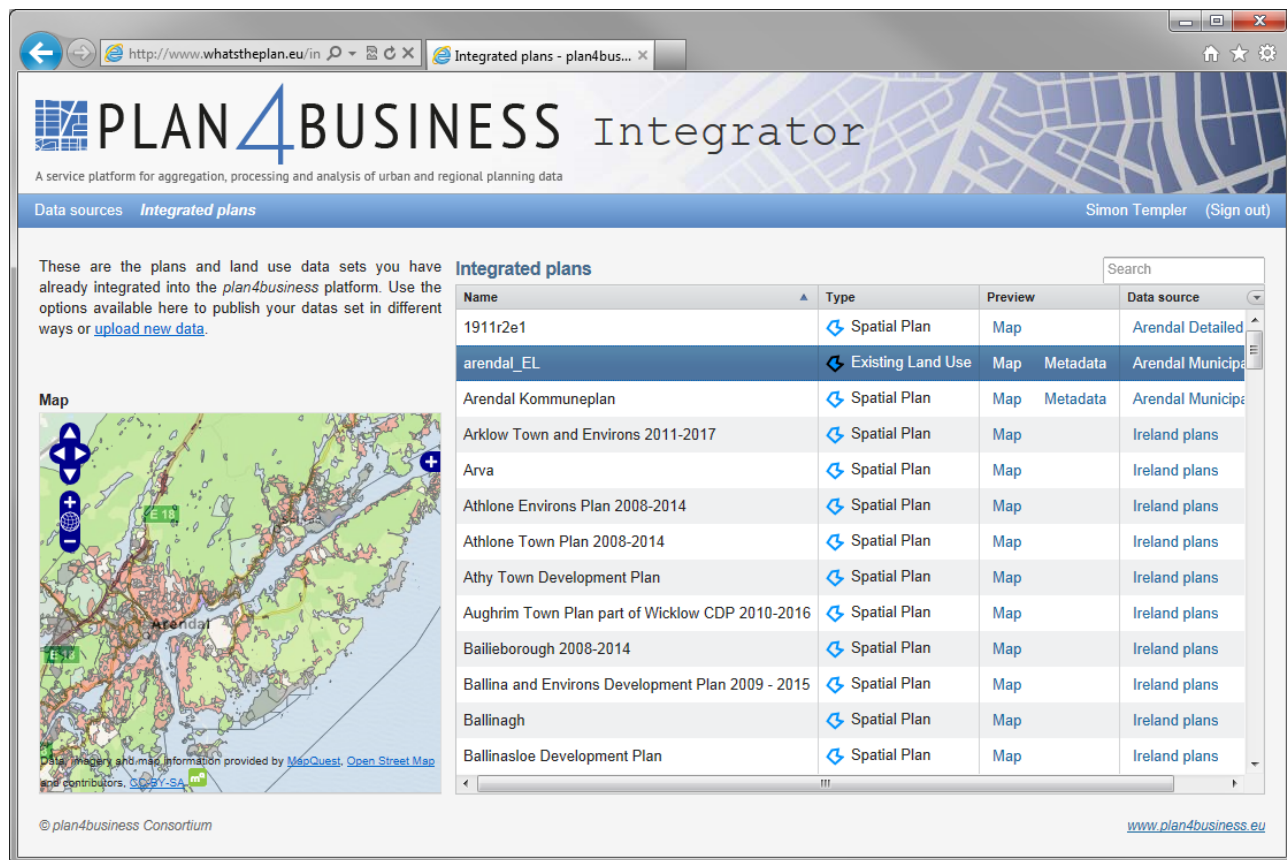


Figure 34 User data source overview with status

After the data source and its metadata have been defined and stored in the database by the users, the next step involves the definition of a HALE mapping project needed for the integration towards the INSPIRE Data Model for Land Use.

The users have the possibility to either choose an existing mapping project from the storage, or to define a new project from scratch. If no mapping projects for the source data exist, a new mapping project will be created. The Plan Integrator provides the user with a download for a template project, which includes the source schema and data that are part of the data source, as well as the target schema, which is the simplified INSPIRE represented by the plan4business intermediate schema.

Once a mapping project is available, the transformation process can be executed on the source data. The transformation runs based on HALE Server components as part of the Integration Engine. The results of the transformation process, the harmonized set of existing or planned land use data is then integrated into the primary database. Once in the database, the plans can be published. Figure 35 shows how the users can inspect their integrated plans in the Plan Integrator.



The screenshot displays the PLAN4BUSINESS Integrator web interface. The header includes the logo and the title "Integrator". Below the header, there is a navigation bar with "Data sources" and "Integrated plans" (selected). The main content area is titled "Integrated plans" and features a search bar. A table lists various plans, including their names, types, preview options, and data sources. A map preview is visible on the left side of the table.

Name	Type	Preview	Data source
1911r2e1	Spatial Plan	Map	Arendal Detailed
arendal_EL	Existing Land Use	Map Metadata	Arendal Municipality
Arendal Kommuneplan	Spatial Plan	Map Metadata	Arendal Municipality
Arklow Town and Environs 2011-2017	Spatial Plan	Map	Ireland plans
Arva	Spatial Plan	Map	Ireland plans
Athlone Environs Plan 2008-2014	Spatial Plan	Map	Ireland plans
Athlone Town Plan 2008-2014	Spatial Plan	Map	Ireland plans
Athy Town Development Plan	Spatial Plan	Map	Ireland plans
Aughrim Town Plan part of Wicklow CDP 2010-2016	Spatial Plan	Map	Ireland plans
Bailieborough 2008-2014	Spatial Plan	Map	Ireland plans
Ballina and Environs Development Plan 2009 - 2015	Spatial Plan	Map	Ireland plans
Ballinagh	Spatial Plan	Map	Ireland plans
Ballinasloe Development Plan	Spatial Plan	Map	Ireland plans

Figure 35 Integrated plans with map preview

In the current workflow, the creation of the mapping in HALE still is the biggest obstacle for the user. By guiding the user through the mapping process and providing contextual help we aim to make using HALE for the schema mapping a task that cannot only be performed by expert users. For this we created a plan4business edition of HALE that includes a number of plan4business specific functionalities and content. Main feature is an interactive step-by-step guide that leads the user through the mapping creation (see Figure 36). Each element of the plan4business model for land use is described, it is specified if such an element is mandatory or optional, and hints are provided on how to map to the element. For complex situations like deciding on which kind of type relations to use, a link to a detailed help topic is provided.

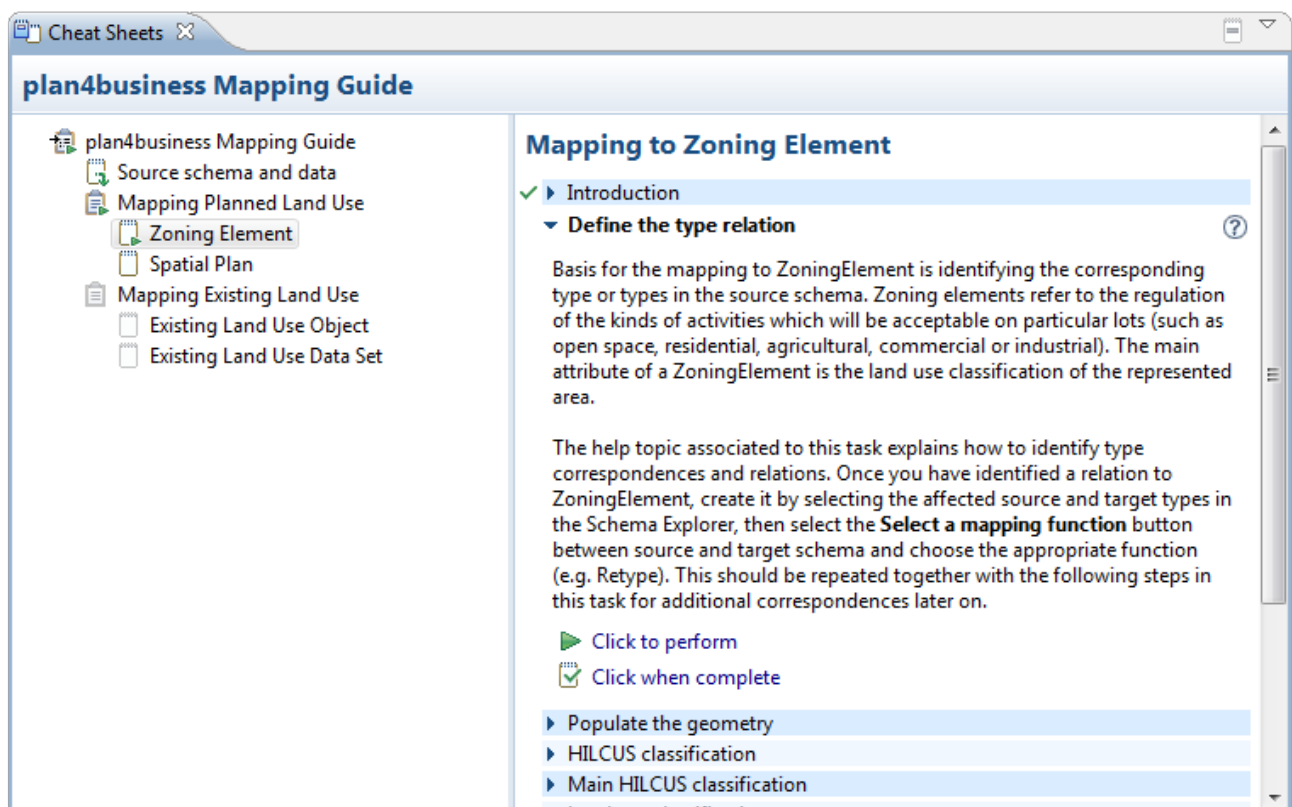


Figure 36 Mapping Guide in the HALE plan4business edition

In addition several features have been implemented in context of plan4business that have been integrated back into the HALE code base as Open Source, for instance:

- Improvements to the UI for defining a reclassification, including the derivation of source values from actual data and the possibility to import and export reclassifications as CSV or Excel file. In context of plan4business this is especially helpful for the reclassification of land use classifications to the common HILUCS classification.

- Support for PostgreSQL and PostGIS databases as source schema. Together with the support to transform data locally to the plan4business model and publish the result directly to the Integration Engine this will enable an integration of data from spatial databases.
- A type transformation *Join* that is essential for creating mappings with a database or a complex XML schema as source. It allows combining information from different object types of the source schema, e.g. spatial plans and zoning elements.
- Support for sampling source data used for live transformation in HALE. This allows working with big data sets without having to abstain from the advantages that the direct feedback based on the live transformation and validation provide during the mapping creation.
- Transformation scripting for advanced users based on the Groovy programming language. An easy-to-use API for creating and accessing complex object structures is provided as well as UI support for syntax highlighting and code proposals (see Figure 37).

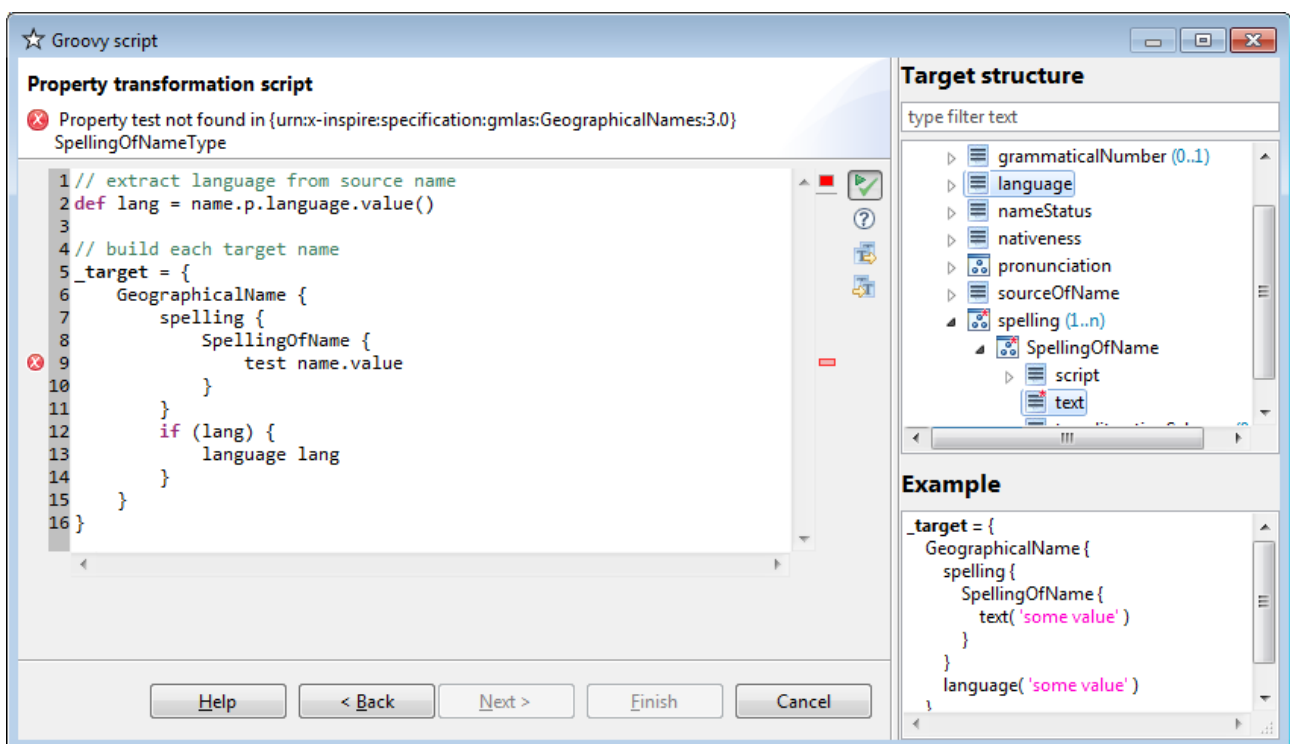
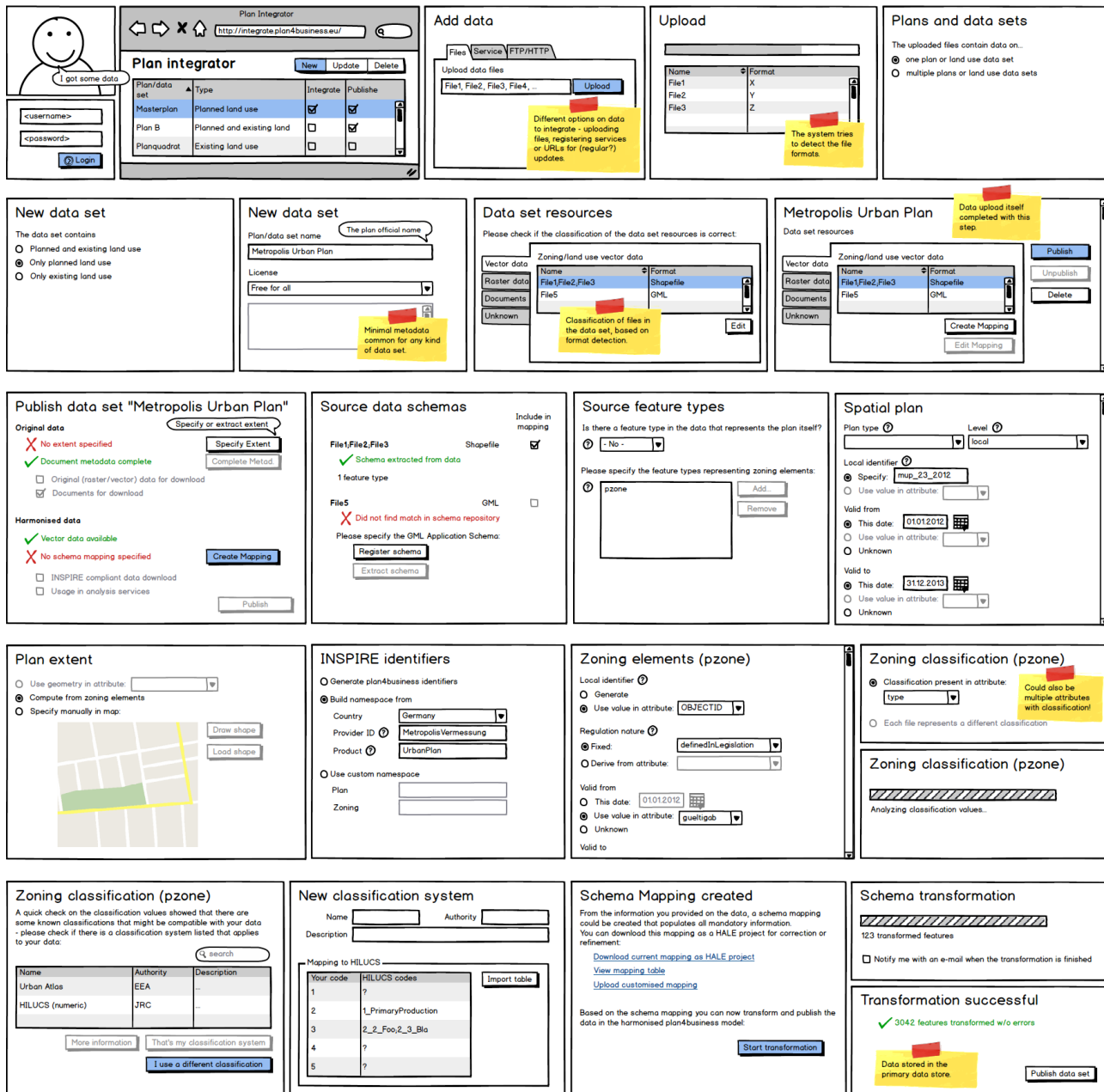


Figure 37 Defining a relation through a Groovy script

Through the Plan Integrator web interface and the Mapping Guide in the plan4business edition of HALE the workflow sketched in Figure 38 has been implemented partly in the web application and partly in HALE as desktop application. The focus has been on this combination to be able to offer a wide range of functionality regarding the schema mapping and thus to be able to deal with complex mapping problems.

Development of a prototype of the whole workflow in the web application has been ongoing, but is only partially implemented and is not ready to be integrated into the platform. Main focus here was a user interface for specifying the reclassification between the original land use classification and HILUCS.

How integrating data into the p4b platform might work - a simple example



The workflow consists of the following steps:

- Plan integrator**: User login and plan management. A table shows plans like 'Masterplan' and 'Planquadrat' with 'Integrate' and 'Publish' actions.
- Add data**: Upload data files (File1, File2, File3, File4, ...).
- Upload**: Select upload options (X, Y, Z) and format (Shapefile, GML).
- Plans and data sets**: Overview of uploaded data sets.
- New data set**: Create a new data set with a name (e.g., 'Metropolis Urban Plan') and license.
- Data set resources**: Check the classification of data set resources (Vector data, Raster data, Documents).
- Metropolis Urban Plan**: Detailed view of the data set resources and mapping options.
- Publish data set "Metropolis Urban Plan"**: Publish the data set with original or harmonised data.
- Source data schemas**: Register or extract schema for the data set.
- Source feature types**: Specify feature types representing zoning elements.
- Spatial plan**: Define the spatial plan with local identifier, valid from/to dates, and level.
- Plan extent**: Define the plan extent using geometry or zoning elements.
- INSPIRE identifiers**: Generate plan4business identifiers for the data set.
- Zoning elements (pzone)**: Define zoning elements with local identifier, regulation nature, and valid from/to dates.
- Zoning classification (pzone)**: Define zoning classification with type and valid from/to dates.
- Zoning classification (pzone)**: Analyzing classification values.
- New classification system**: Create a new classification system with name, authority, and description.
- Schema Mapping created**: Download current mapping as HALE project, view mapping table, or upload customised mapping.
- Schema transformation**: Transform the data set into the new classification system.
- Transformation successful**: 3042 features transformed w/o errors.

Figure 38 Interactive example workflow for integration of Land Use data

8.2.3 Next Steps

The remaining project time will be used to finalise some still ongoing developments that focus on enabling the user to integrate data in more formats:

- Direct upload and integration of specific formats (e.g. INSPIRE GML, plan4business intermediate model XML, XPlanGML)
- Direct upload of locally transformed data from HALE via the Integration Engine API, allowing mapping, transformation and integration without the need to expose the original data and based on all source formats supported by HALE (including data based on arbitrary XML and GML schemas)

We want to follow up on the Plan Integrator development even after the project and further develop the concepts for data integration, especially on aspects regarding the usability and maintainability, as well as on the possibilities for collaborative work on and sharing of schema mappings.

8.3 Thematic Map Viewer

8.3.1 Objectives

One of the major plan4business outcomes is the Thematic Map Viewer. The main objective of this application is to visualise data stored in our database in a user friendly way. Due to the fact that the database contains many data-layers, a grouping of these layers took place - into thematic compositions. By now, we have created about 30 compositions. Most of them are related to socio-economic and demographic indicators such as Gross domestic product (GDP), average monthly salary, unemployment rate, employment structure (by sectors), local human development index (LHDI), population size and density, net migration and natural growth and age dependency ratio. Not all of the compositions are related to human development. Some of them, like structure of agricultural lands, structure of livestock, environment pollution by gases and particulates, are from other areas

8.3.2 Work done and progress achieved

When entering the application you can see bounding boxes of available compositions in the map and also a list of the available compositions on the right. When the user points at a composition in the list on the right, its bounding box is highlighted in the map.

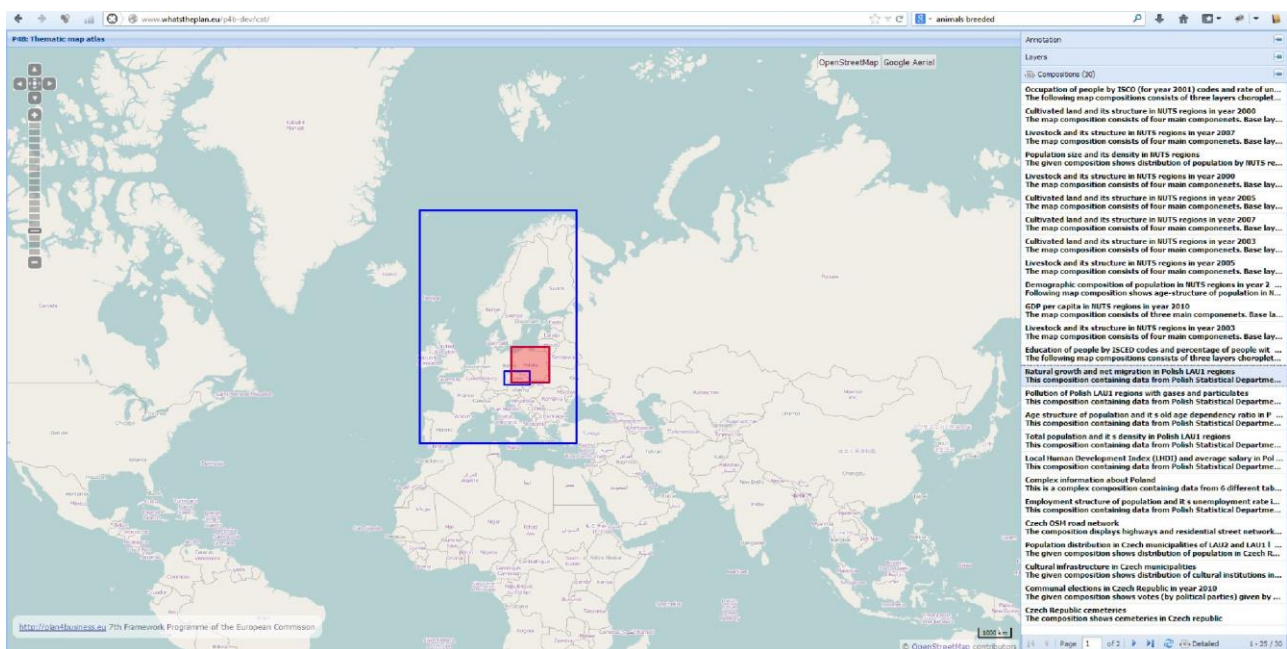


Figure 39 Bounding boxes of map compositions

The main data sources for the map compositions is a public database of Eurostat (compositions covering the entire Europe), then there are local data from the Czech Statistical Office, the Polish Statistical Office and the German Statistical Department and some cities (mostly from Ireland and Poland).

What distinguishes us from another applications that are also visualising statistical data and producing thematic maps is that we use many more techniques of thematic cartography and also that we don't use any commercial software that one needs to pay for.

For instance, if one takes a look on the following applications: Statistical Atlas by Eurostat (<http://ec.europa.eu/eurostat/statistical-atlas/gis/viewer/>) based on commercial ArcGIS, and also at Regional Statistics Illustrated still by Eurostat (<http://epp.eurostat.ec.europa.eu/cache/RSI/>) again based on ArcGIS, one can see that visualisations made are all quite standard (choropleth maps technique). Also all these visualizations are meant for certain level of administrative units i.e., with changing scale user still sees the same administrative units.

The same weaknesses can be seen on the Google initiative (Public Data). The module allows just certain, quite poor selection of methods to visualise spatial data (choropleth maps, also point symbols of varying size).

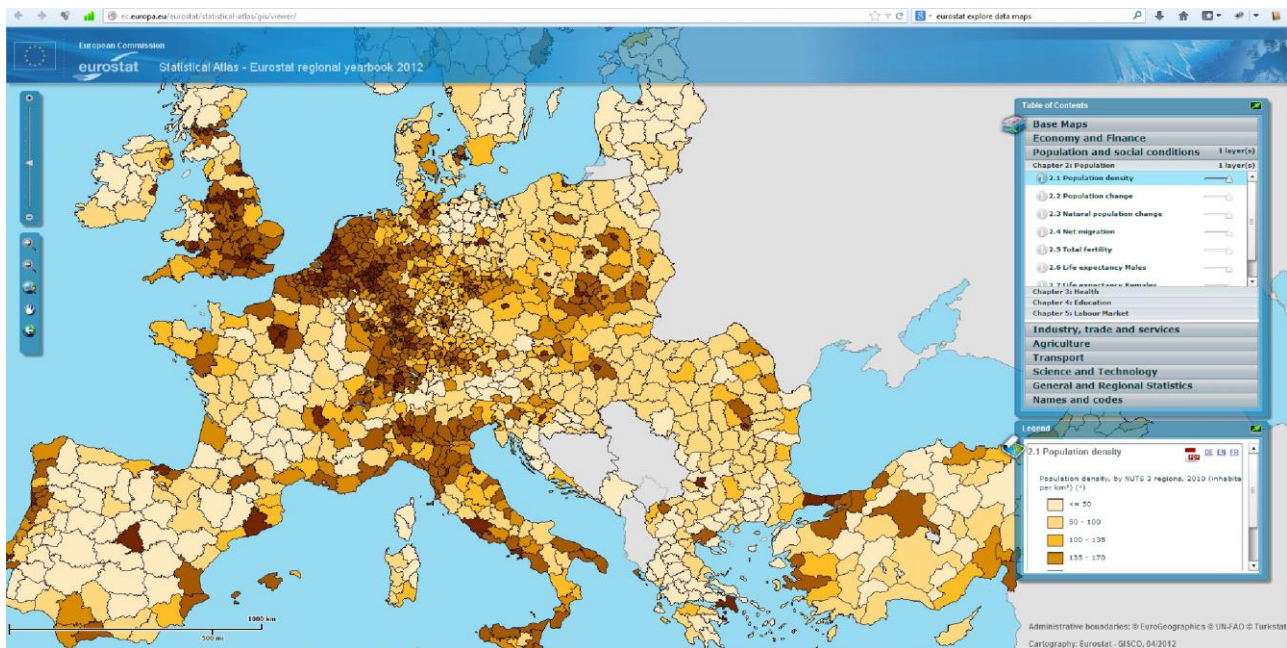


Figure 40 Example of EUROSTAT

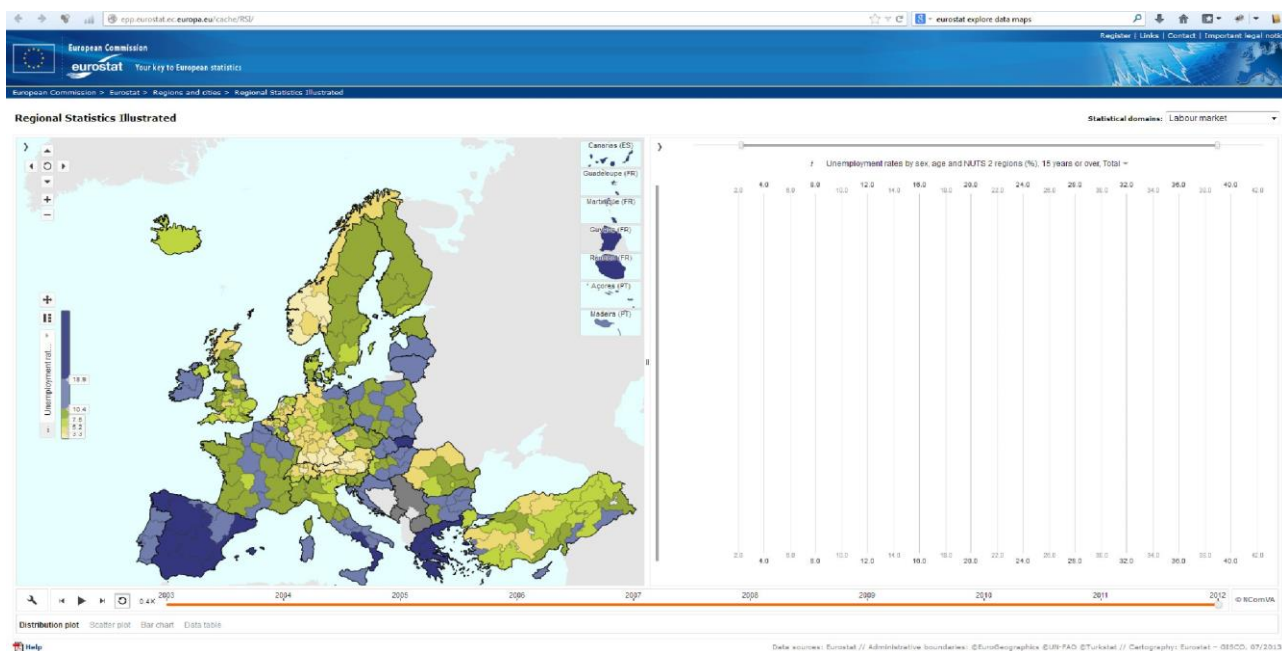


Figure 41 Example of EUROSTAT

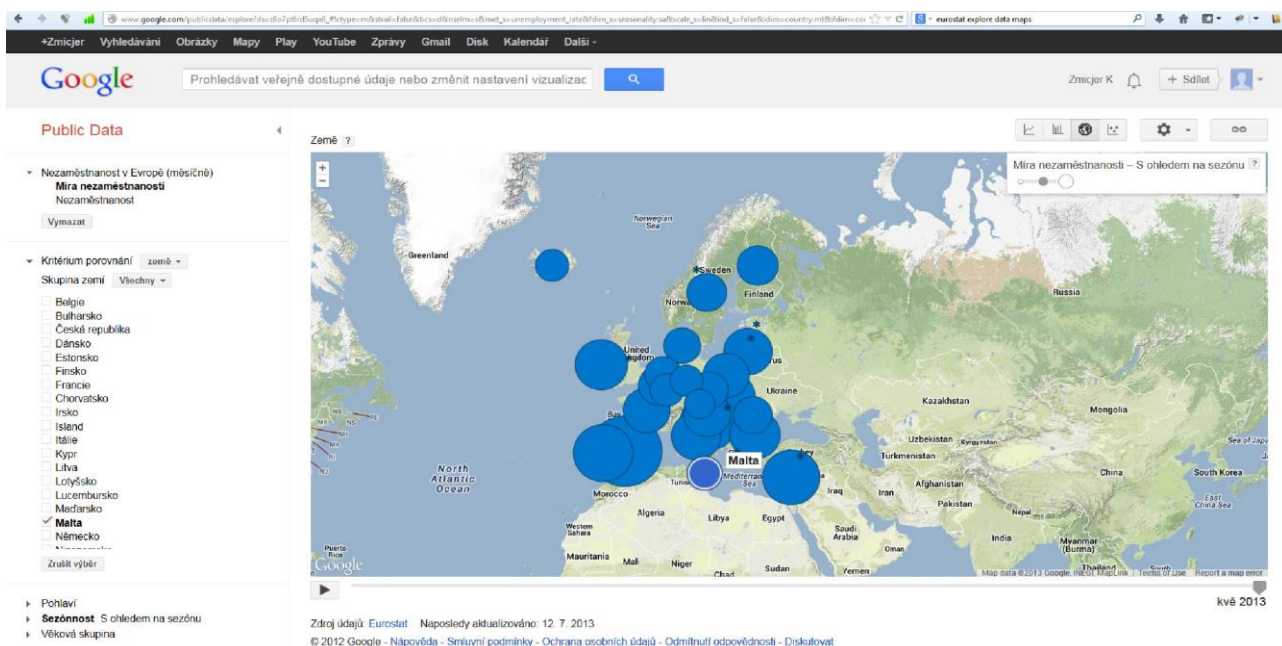


Figure 42 Example of Google

On the contrary, in our Thematic Map Viewer we try to explore all variety of methods of thematic cartography to visualize spatial statistical data. The main results of this initiative are:

- The Thematic Map Viewer;
- Evaluation of suitability of different methods from thematic cartography to visualize certain data;

- Evaluation of data (its quality most of all) taken from multiple sources;
- Scripts (tools) for generating certain diagrams, cartograms and other methods of visualisation.

Here one can see implementations of different methods of thematic cartography that are quite normal (usual) for printed maps, but at the same time are quite untypical for digital cartography.

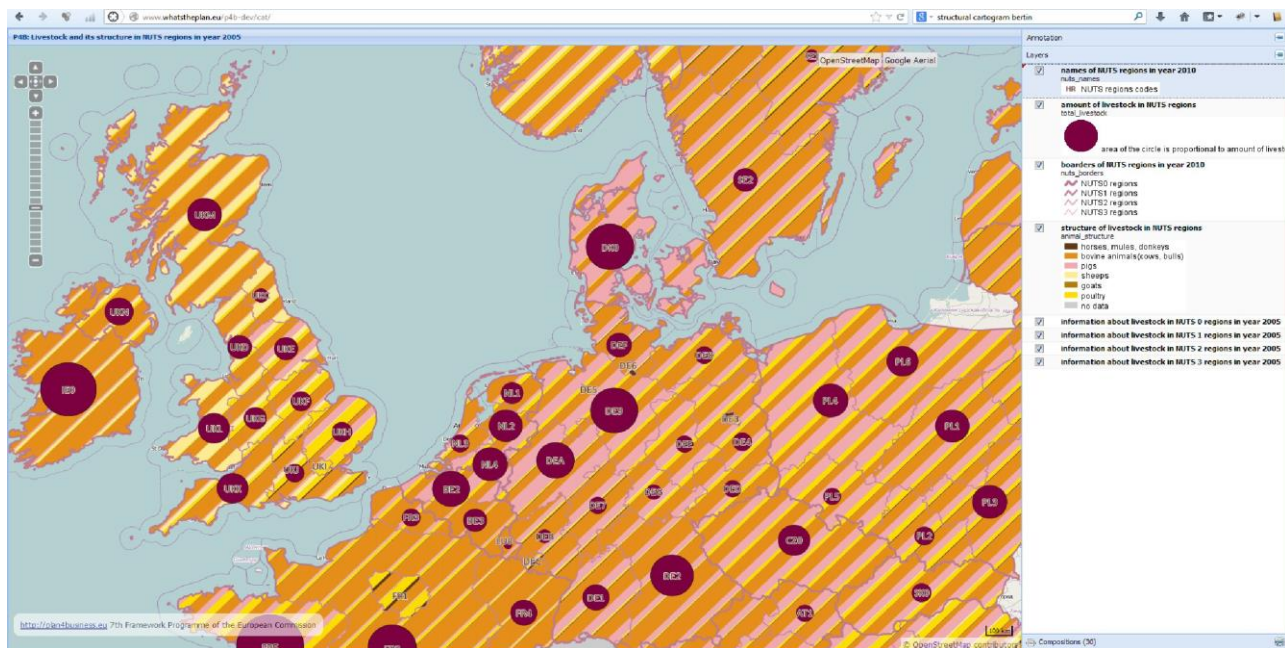


Figure 43 Plan4business maps

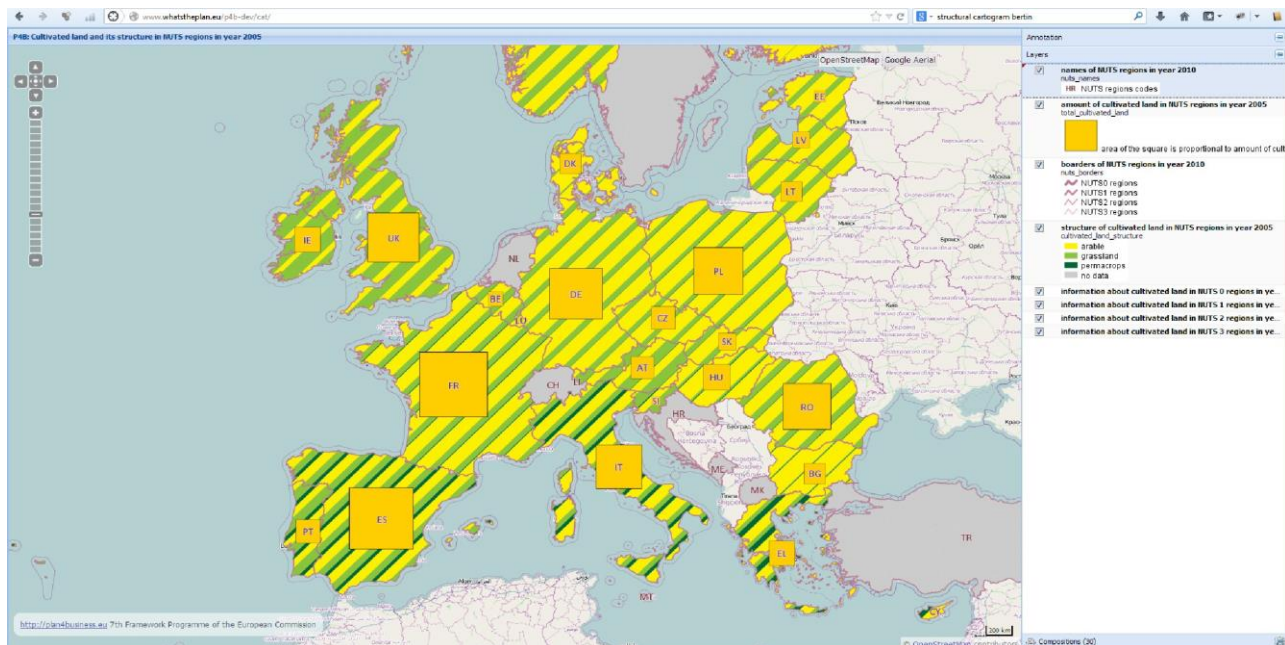


Figure 44 Plan4business maps

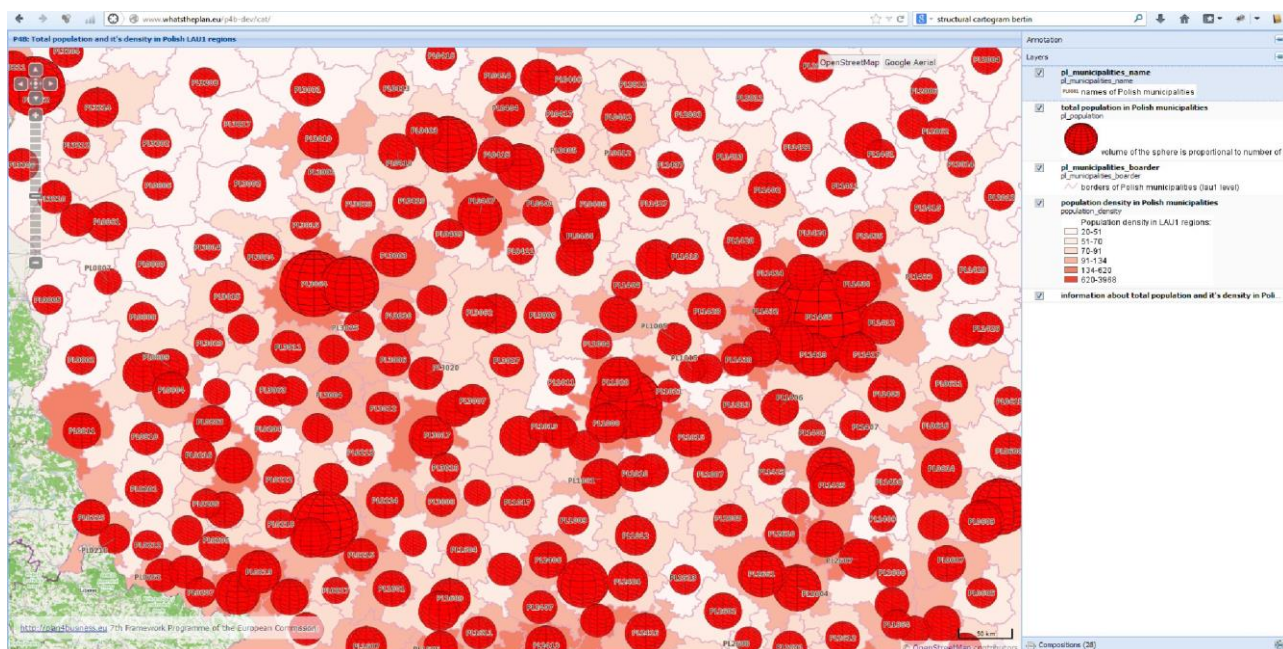


Figure 45 3D symbols.

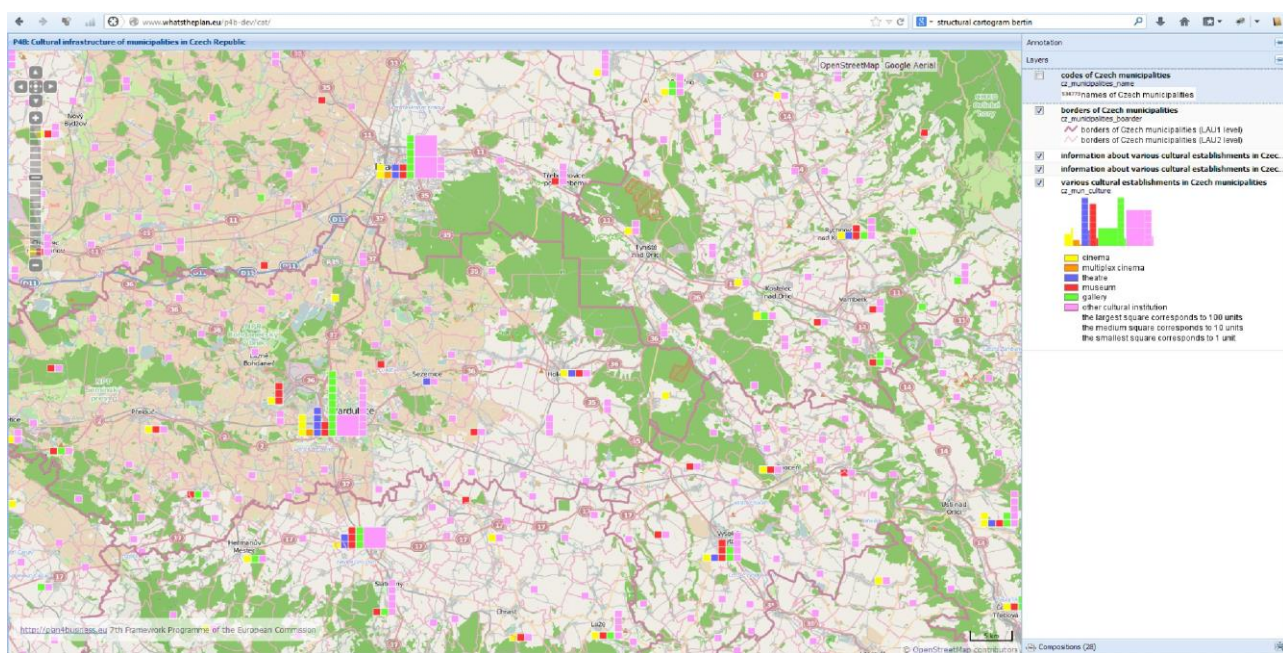


Figure 46 Segmented diagram

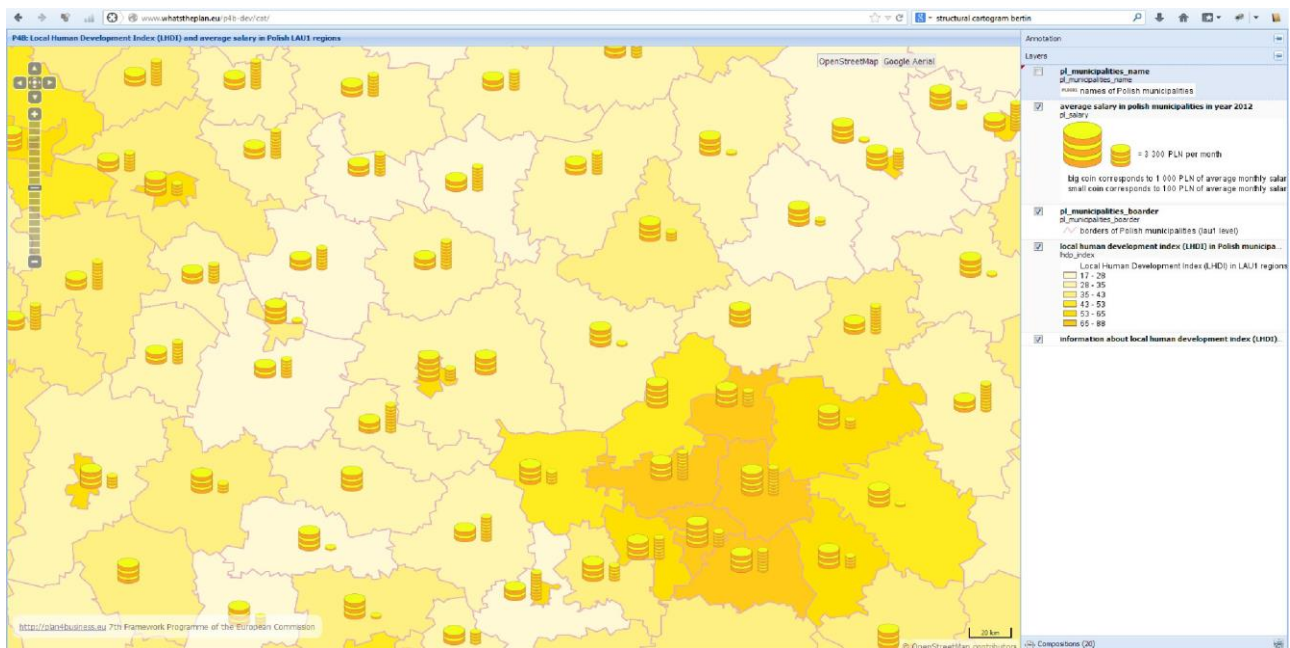


Figure 47 Segmented diagram

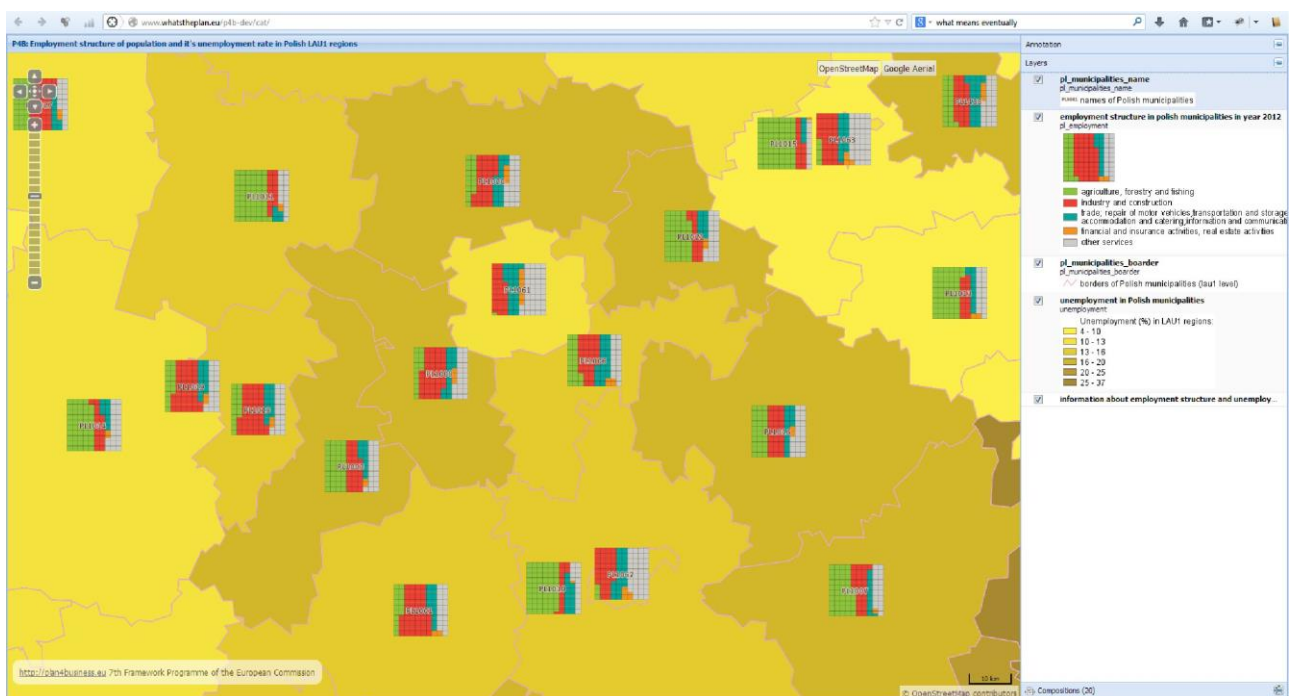


Figure 48 Structural diagram

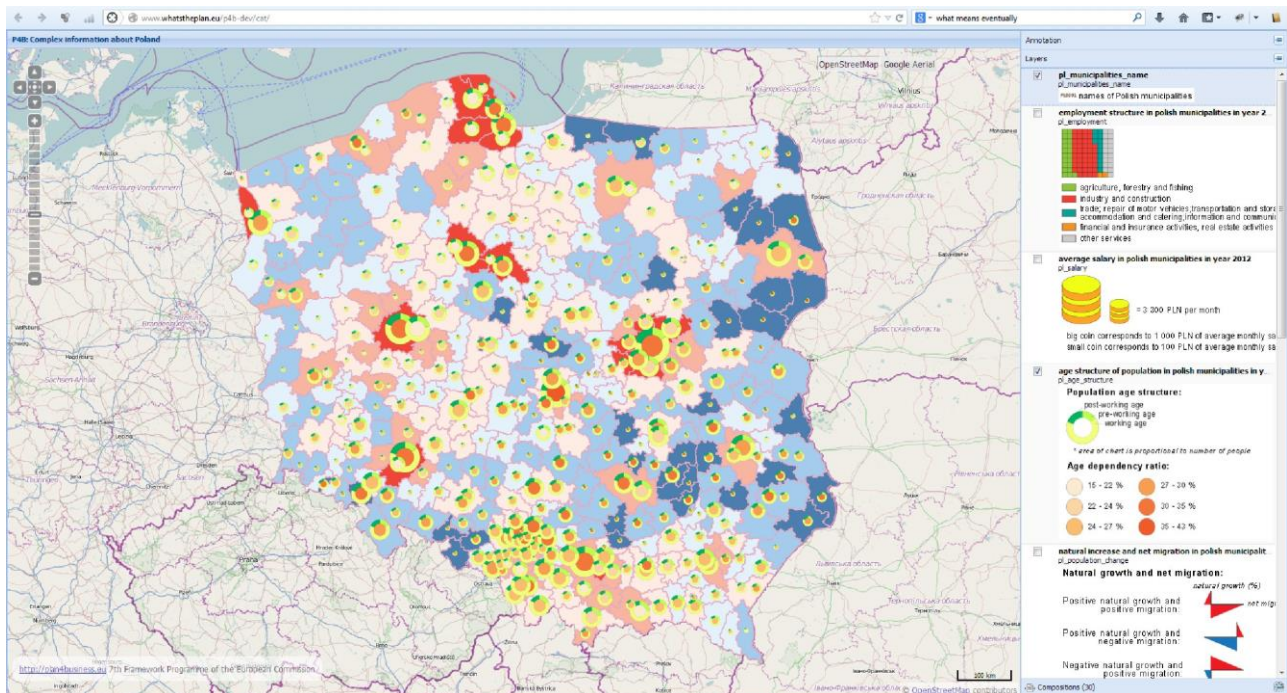


Figure 49 Structural diagram

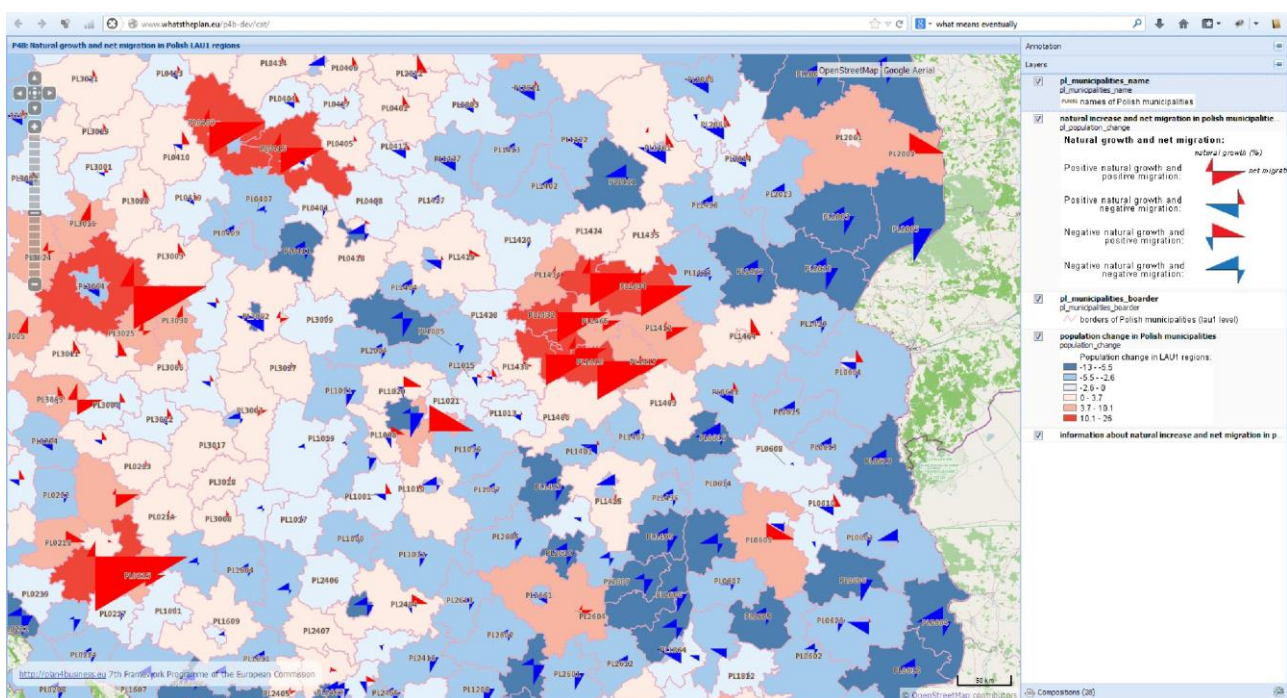


Figure 50 Structural diagram

The whole technical process behind the generation of compositions is as follows:

1. Look through the data and check that it doesn't contain some obvious mistakes (let's say percentages of each category add up more/less than 100% etc.).
2. Upload data to the database depending on the type of data (if it is just table with statistical data (.xls, .csv etc.) or Shapefile: through COPY function of PostgreSQL or using LayMan/shp2pgsql/ogr2ogr.
3. Select an appropriate method of visualization.
4. Create and fill additional attributes by sql scripts if needed (for example attribute 'interval' if we want to classify the data into intervals or attribute size or for instance if we are representing the whole size of population with spheres to calculate the radius of the sphere etc.).
5. If needed generate diagrams and definition of SYMBOLS to paste in mapfile by plr scripts. Create mapfile itself, create WMS services.
6. Using our HSLayers client create and save a composition using certain thematically related compositions that we've just created.
7. Make composition public.

The process as can be seen is just half-automated and it is because in thematic cartography many decisions need to be taken by cartographer himself.

8.4 Embed-Map

8.4.1 Objectives

This pilot application enables user to create a map in the Thematic Map Viewer and insert it as an embedded object into any HTML pages. Users can define parameters which affect how the map will look like in the target HTML page (currently the width and height of the embedded map).

8.4.2 Work done and progress achieved

The application is based on HSLayers, OpenLayers and JQuery js libraries. It allows user to select any composition from Thematic Map Viewer and insert it into any web-page (as data object, iframe etc.) specifying such OpenLayers parameters as zoom level and coordinates of the map center. The resulting link will look similar to following:

<http://dev.ccss.cz/~ovnis/embemap/?&composition=http%3A%2F%2Fwww.whatstheplan.eu%2Fwwwlibs%2Fstatusmanager2%2Findex.php%3Frequest%3Dload%26id%3D78dc39f4-ab10-4624-aa32-fbb2540c0be9#composition=http%3A%2F%2Fwww.whatstheplan.eu%2Fwwwlibs%2Fstatusmanager2%2Findex.php%3Frequest%3Dload%26id%3D78dc39f4-ab10-4624-aa32-fbb2540c0be9&zoom=13&lat=6469045.46808&lon=2117912.95786&layers=TTTT>

Where the last part of the http get url:

'&composition=http%3A%2F%2Fwww.whatstheplan.eu%2Fwwwlibs%2Fstatusmanager2%2Findex.php%3Frequest%3Dload%26id%3D78dc39f4-ab10-4624-aa32-fbb2540c0be9#composition=http%3A%2F%2Fwww.whatstheplan.eu%2Fwwwlibs%2Fstatusmanager2%2Findex.php%3Frequest%3Dload%26id%3D78dc39f4-ab10-4624-aa32-fbb2540c0be9&zoom=13&lat=6469045.46808&lon=2117912.95786'

specifies above mentioned parameters (composition file, zoom level and coordinates of the map centre).

Further parameters that are ready to be used are `kml[]` and `gpx[]` which allow to specify URL of either KML or GPX layer to overlay composition. Example of use:

'`&kml[]=http%3A%2F%2Fdev.ccss.cz%2F~ovnis%2Fembemap%2Fregions_cz.kml`' Here we add polygons of the Czech regions (Figure 51).

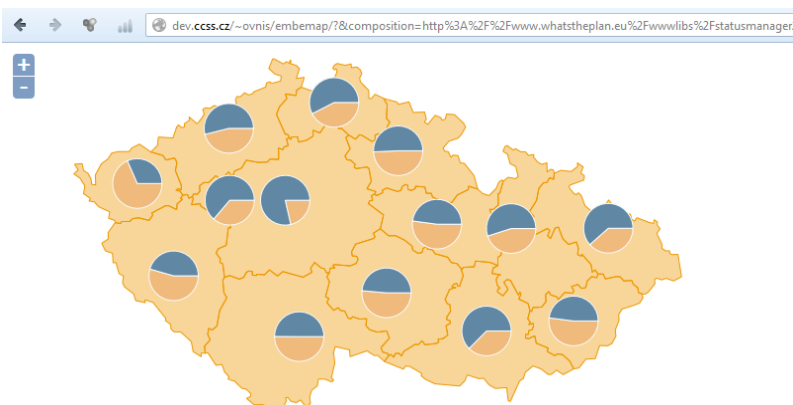


Figure 51 Embedded map with an overlay layer

These parameters are used if user of the portal wants to overlay some of his data above the composition (i.e., real estate agency that wants to overlay the points where they have their real estates (in for of KML file) for sale over criminality map).

An example of Embed-Map (embedded with parameters `width="600"` `height="400"`) in its current development state is shown in Figure 52.

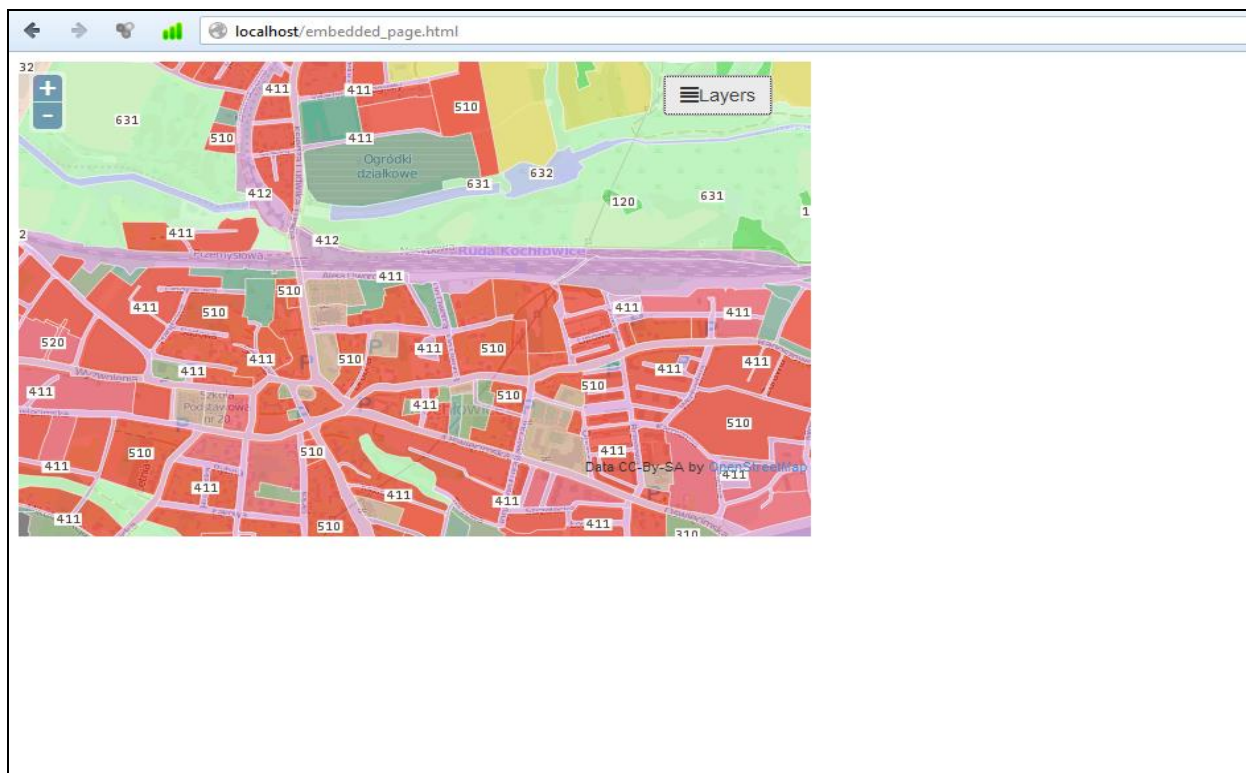


Figure 52 Example of embedded map

The complete table of parameters for http GET is provided:

Parameter	Value example	Description
&composition	http://www.whatsheplan.eu/wwwlibs/statusmanager2/index.php?request=load&id=78dc39f4-ab10-4624-aa32-fbb2540c0be9	Link to composition file that can be found in MICKA catalogue: http://www.whatsheplan.eu/php/metadata/
&zoom	13	Zoom level
&lat	6469045.46808	Coordinates in EPSG:3857 CRS
&lon	2117912.95786	Coordinates in EPSG:3857 CRS
&kml[]	http%3A%2F%2Fdev.ccss.cz%2F~ovnis%2Fembemap%2Fregions_cz.kml	URL of kml file

8.4.3 Next Steps

The composing of the link for Embed-Map can be made manually by filling the necessary parameters (initial centre coordinates, zoom level and links for compositions and KML/GPX files). Also it is planned to integrate it with the Thematic Map Viewer application so that user would select compositions, zoom level and centre of the map and after that the link for the Embed-Map would appear in a pop-up window.

In the near future it is planned to integrate functionality of the Location Evaluator into Embed-Map and also add possibility to add more than one composition to Embed-Map. With these features added for instance real estate agency may add compositions of criminality, spatial plan, infrastructure availability, green areas and risks of natural disasters to embed-map and overlay it with their properties for sale. Draft interface structure is depicted in Figure 53.

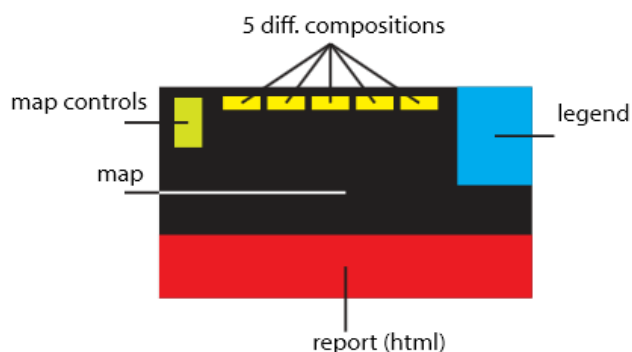


Figure 53 Draft interface structure

8.5 Open Land Use

The Open Land Use (OLU) principles are based on collecting and interconnection of free spatial data sets related to themes land use and land cover (as they are defined in the INSPIRE document “Definition of Annex Themes and Scope”). The target of this activity is to develop an application (or service) providing as much detail and accurate information on land use and land cover as possible. It means that the whole world is covered by a global data set (such as GlobCover), but for selected areas we are able to provide much more detail information or data. For example in Europe there is CORINE Land Cover, urbanized areas are covered by Urban Atlas (that is more detailed than CORINE Land Cover) and in the Czech Republic we are able to use cadastral data which provide the information on land use and land cover on the level of parcels.

The realisation is divided into four main parts:

1. The OLU data model (Figure 54) is different from the Land Use Database Schema published in the report D5.4 Deliverable Storage Engines. The OLU model is optimized for the use case of the European overall data set and leaves out some attributes that are not needed because of the more specific use case of land use data. Both models are transformable to each other and it is also possible to migrate data from these model to or from other data sets that are in harmony with the INSPIRE specification. The main reason for above-mentioned differences is to determine by different use of data and data models, different harmonization issues and also by the fact that the data will be accessed in different way because of different spatial extent. OLU will be used for any land use (and land cover) data, Land Use Database Schema serves only for spatial planning data as a special part of land use data.

Model (LU Object)	Type	Multiplicity
inspireId	Identifier	1
geometry	GM_MultiSurface	1
hilucsLandUse	HILUCSValue	1
regulationNature	RegulationNatureValue	0..1
<<lifeCycleInfo, voidable>>		
beginLifespanVersion	DateTime	1
endLifespanVersion	DateTime	0..1
<<voidable>>		
hilucsPresence	HILUCSPresence	0..*
specificLandUse	LandUseClassificationValue	1..*
specificPresence	SpecificPresence	0
observationData	Date	1
processStepGeneral	ProcessStepGeneralValue	1
	BackgroundMapValue (combination of data of origin, link to the map as a string, optional URI)	1
backgroundMap		
	DimensioningIndicationValue (integer, real or string)	0..1
dimensioningIndication		
validFrom	Date	0..1
validTo	Date	0..1
note	Citation	0..1

Figure 54 Data model (blue attributes are connected only to planning land use, red attributes only to existing land use and black attributes are used in both types of data).

2. Searching and exploitation of existing free and/or open data resources. We used above all own experience, information from our colleagues and clients, metadata catalogues (e.g. GeoNetwork) and advanced ways of searching common search engines. There are for example data from the CORINE land cover, Urban Atlas (Figure 55), Registry of Territorial Identification, Addresses and Real Estate (RUIAN, Czech Republic), but also data from Canada, Catalonia or from global initiatives such as GlobCover.

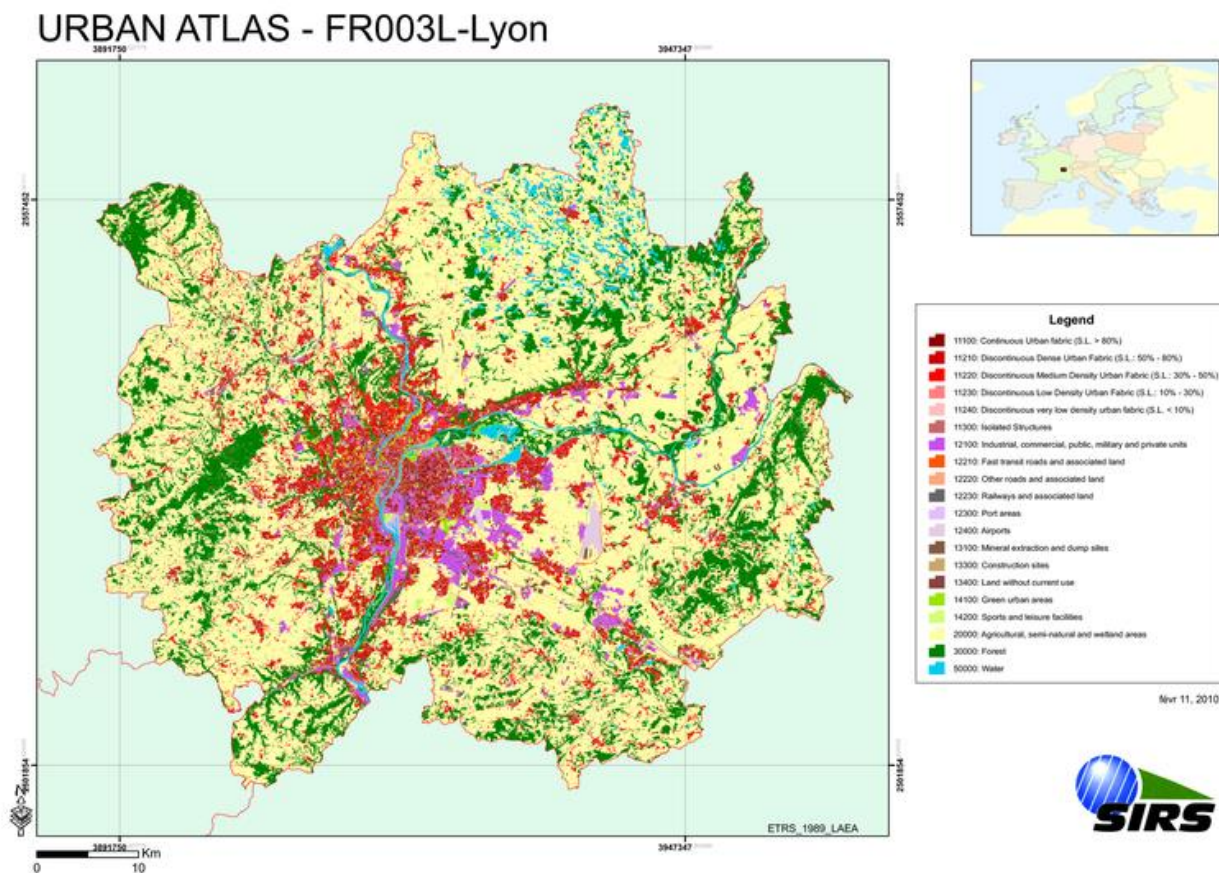


Figure 55 Sample of Urban Atlas data

3. Development of mapping and harmonization rules between common OLU model and models of particular data sets (Figure 56). The harmonization is based above all on mapping of classification systems and nomenclatures. The common data model uses HILUCS (Hierarchical Inspire Land Use Classification System) classification. It is necessary to mention that the OLU data model of integrated data sets is not as detailed as the HILUCS classification. Therefore there are used only the first or second levels of the HILUCS classification. The reclassification uses existing methodologies as well as an empiric experience. In many cases the category is "6_6_NotKnownUse".

Urban Atlas	HILUCS
1.1.1 Continuous urban fabric (S.L. > 80%)	5_ResidentialUse
1.1.2 Discontinuous urban fabric (S.L. 10%-80%)	5_ResidentialUse
1.1.2.1 Discontinuous Dense Urban Fabric (S. L. 50%-80%)	5_ResidentialUse
1.1.2.2 Discontinuous Medium Density Urban Fabric (S. L. 30%-50%)	5_ResidentialUse
1.1.2.3 Discontinuous Low Density Urban Fabric (S. L. 10%-30%)	5_ResidentialUse
1.1.2.4 Discontinuous Very Low Density Urban Fabric (S. L. <10%)	5_ResidentialUse
1.1.3 Isolated structures	5_ResidentialUse
1.2.1 Industrial, commercial, public, military and private units	6_6_NotKnownUse
1.2.2 Road and rail network and associated land	4_1_TransportNetworks
1.2.2.1 Fast transit roads and associated land	4_1_1_RoadTransport
1.2.2.2 Other roads and associated land	4_1_1_RoadTransport
1.2.2.3 Railways and associated land	4_1_2_RailwayTransport
1.2.3 Port areas	4_1_4_WaterTransport
1.2.4 Airports	4_1_3_AirTransport
1.3.1 Mineral extraction and dump sites	6_6_NotKnownUse
1.3.3 Construction sites	6_6_NotKnownUse
1.3.4 Land without current use	6_6_NotKnownUse
1.4.1 Green urban areas	3_4_CulturalEntertainmentAndRecreationalServices
1.4.2 Sport and leisure facilities	3_4_CulturalEntertainmentAndRecreationalServices
2 Agricultural areas, semi-natural areas and wetlands	6_6_NotKnownUse
3 Forests	1_2_Forestry
5 Water	6_6_NotKnownUse

Figure 56 Mapping between Urban Atlas and HILUCS classification system.

4. Development of the final technical solution, which is based relational database. The database tool is storing original as well as processed data. It will also procure transfer of data to a front-end environment, evaluation of data and offering the most fitting data to users.

8.6 Tender Searcher

The idea of the Tenders Searcher is to build a web portal designed for communication between local administration and investors. The portal is expected to create a possibility to reach a well-defined target group of institutions active on the international real estate market and investors from various industries with information about properties offered by self-governments in tender procedures.

The tender's procedure announced and conducted by the property owner or an entity designated for this task assumes submitting written, undisclosed offers, from which this one with the highest price is selected. Typically, asking price is also indicated, which constitutes the minimum acceptable, from the point of view of the owner, transactional price.

Information about real estates offered by the administration in tenders and details of tenders themselves had to be collected in one place and systematized and prepared for searching through by users. Planned scope of search criteria used for properties selection is: desired location, type of real estate, asking price as well as land and usable area.

8.6.1 Objectives

The portal's homepage is designed to attract paying customers: real-estates agencies, investors and their advisors. Above of that it lets them to understand quickly the value offered via the portal (Figure 57). The concept of procedures of real-estate offering in tenders is announced in a frame marked in Figure 57 with the digit 1, and described comprehensively on a website which the frame leads to (*Nieruchomości oferowane w przetargach* – Properties offered in tenders). Similarly, the next frame presents methods used for a location

evaluation, since for each of the offers contained in the datapool a set of analysis are being conducted (5 – *Świadomość przestrzenna* – Spatial awareness). On the left-hand side the frame where news on the situation on the real-estate market is displayed (4 – *Aktualności* – News). Besides encouraging investors to familiarise with the offer of properties, news section, being a dynamic element of the portal, supports the portal positioning in web searchers. The main element of the portal is the searcher of properties offers. Due to its importance it was decided to place the searcher interface (3 – *Wyszukaj ofertę* – Search offers) directly on the homepage. It allows, just after entering the portal, to get familiar with its purpose, including criterions applied to search the tenders database.

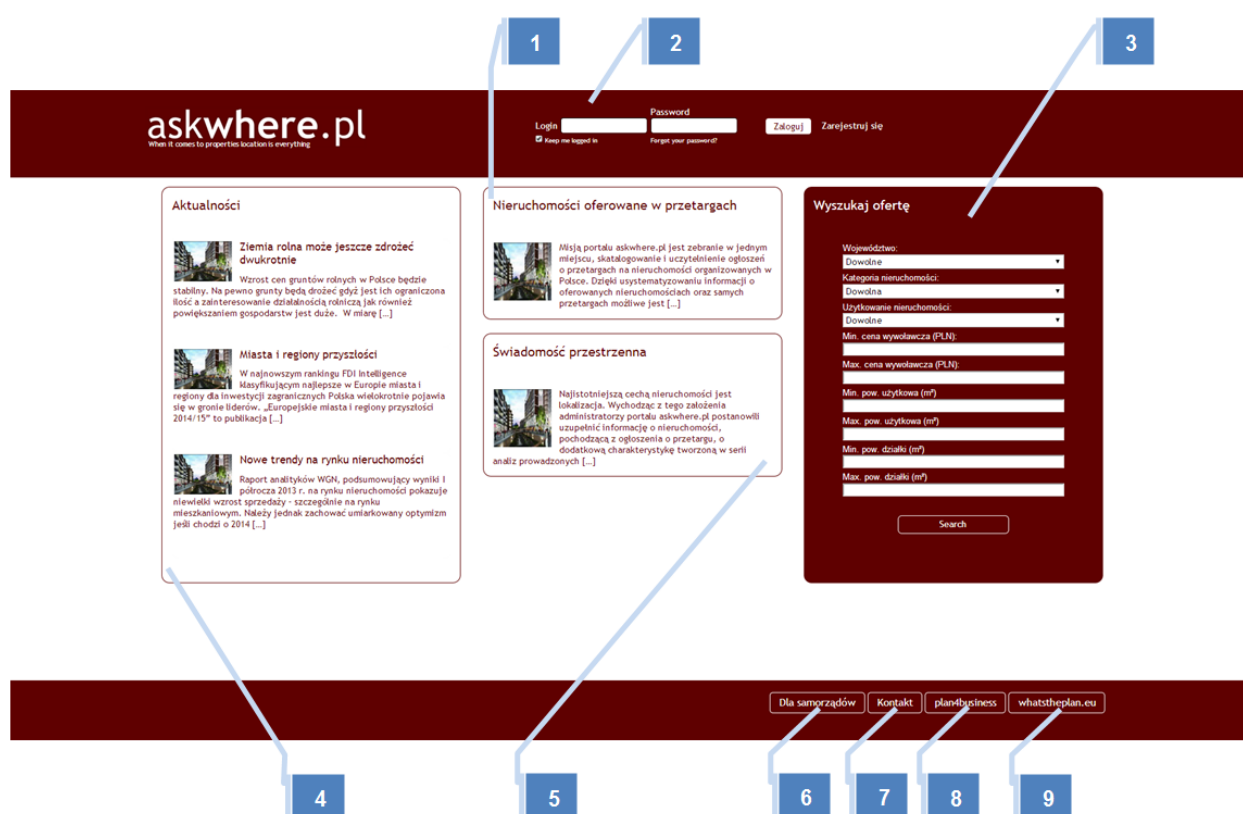


Figure 57 Tenders Searcher's home page, published as the askwhere.pl portal (see the description in the text)

Searching is possible only after logging-in to the portal. Log-in and registration interfaces were placed on the top of the website (2). Bottom menu of the portal contains in the first place a message to self-governments (6 – *Dla samorządów* – For self-governments), introducing the concept of the portal and the attractiveness of close and active cooperation with the portal's administrator. The goal of this message is to support an extension of data and information providers' network. Self-governments are expected in the near future to provide voluntarily their tenders' announcements and spatial plans accelerating this way portals' responsiveness and limiting operational costs. As the next element of the bottom menu the contact details to the portal administrator are provided (7 – *Kontakt* – Contact). Then, respectively, links to the project website (8) and to the whatstheplan.eu portal are provided (9). It is also important from the operational point of view. The whatstheplan.eu portal, inter alia, contains the Integrator tool – designed for spatial plans harmonisation and integration. Spatial plans, integrated with use of this tool, will be displayed by WMS in the map window embedded in reports describing each of real-estate offers.

8.6.2 Work Done and Progress Achieved

The portal

Currently the Tenders Searcher achieved a level of operational prototype. The portal is based on the *WordPress* (<https://wordpress.org/>) technology. For specific functional extensions several plugins are applied (see further description). The *WordPress* environment bases on the *MySQL* database (<http://www.mysql.com/>), where all the information published on the portal are stored.

Time subscription

The portal provides an access to a dataset of tenders for real-states throughout a searcher interface. This tool is planned to be offered in three paid time subscription plans (quarterly, semi-annual and annual). Until now one – 30 days free subscription plan is available for evaluation purposes. On the operational stage this subscription plan will still be offered for as a free tour for new potential customers. The paid time subscription functionality was developed with use of the *Paid Membership Pro* plugin (<http://www.paidmembershipspro.com/>).

Searching Engine

The Tenders database is currently filled with information on 40 tenders published by 4 entities from Poland. The institutions were selected in order to represent the two potential tender organiser groups: local self-governments and agencies acting on national level. Another 130 records will be uploaded in the second step of the dataset extension. This action is treated also as testing of operational procedures of data collection and informational enrichment of tenders announcement realised with use of the off-line analytical element of the system described further.

Besides the dataset of categorised and enriched information on real-estate offers the most important feature of the portal is the searcher. It allows for selection of an offer or offers of real estates on the base of a selection of attributes. Searching of the dataset of tenders is realised with use of the *WP Custom Fields Search* (<http://wordpress.org/plugins/wp-custom-fields-search/>) plugin. Attributes which can be used by user for searching purposed are listed below:

Search criterion (English)	Search criterion (Polish)
Voivodship	Województwo
Property category	Kategoria nieruchomości
Property usage	Użytkowanie nieruchomości
Min. asking price in PLN	Min. cena wywoławcza w PLN
Max. asking price in PLN	Max. cena wywoławcza w PLN
Min. usable area (sqm)	Min. powierzchnia użytkowa (m2)
Max. usable area (sqm)	Max. powierzchnia użytkowa (m2)
Min. ground area (sqm)	Min. powierzchnia działki (m2)
Max. ground area (sqm)	Max. powierzchnia działki (m2)

The search procedure can be conducted with use of all criterions or just a selection of those, which are important for the user.

Single Tender report

The content of the report have been designed to meet the needs of the widest range of users of the portal. The following sections are characterising the environment of the real estate in relation to the following topics:

Information about the tender with the following content: asking price in Polish zlotys (Polish currency with an ISO 4217 code: PLN), category and use of the property, the name of the tender organizer, the tender or the notice of tender ID given by the organizer, the date of its publication, completion date, as well as a link to the notice of tender and additional information published by the organizer.

Feature (English)	Feature (Polish)
Information about the tender	Informacje o przetargu
Asking price in PLN	Cena wywoławcza w PLN
Property category	Kategoria nieruchomości
Property usage	Użytkowanie nieruchomości
Tender organizer	Organizator przetargu
Tender ID	Identyfikator przetargu
Publication date	Data publikacji przetargu
Closing date	Data zakończenia przetargu
Tender announcement	Ogłoszenie o przetargu
Additional information	Informacje dodatkowe

Property localisation including all levels of administrative division, postal address, geodetic precinct and parcel number. The initial resource of tenders was used to design and develop procedures aiming to geocode each real-estate with best possible accuracy. Real-estates are represented by points. Coordinates of the centre point of the real-estate are not displayed in the report, but are stored in the database and are used to center the map displayed in the map window. These coordinates are used also in the off-line procedure to collect information describing basic features of each of the location and enrich each description with analytically derived information (see further sections of the report).

Feature (English)	Feature (Polish)
Property localisation	Lokalizacja nieruchomości
Voivodship	Województwo
Powiat	Powiat

Municipality	Gmina
City	Miejscowość
Street name	Nazwa ulicy
Street number	Numer domu
Post code	Kod pocztowy
Cadastral zone name	Nazwa obrębu
Cadastral zone number	Numer obrębu
Parcel number	Numer działki

Property details including the usable area of ground, the number of the land and mortgage register and information about land utilities.

Feature (English)	Feature (Polish)
Property details	Szczegółowe informacje o nieruchomości
Usable area (sqm)	Powierzchnia użytkowa (m2)
Ground area (sqm)	Powierzchnia działki (m2)
Land and mortgage register number	Numer księgi wieczystej
Water supply	Sieć wodociągowa
Gas supply	Sieć gazownicza
Electric supply	Sieć elektryczna
Heating supply	Sieć ciepłownicza
Telecommunication network	Sieć telekomunikacyjna
Sewage system	Sieć kanalizacyjna
Drainage system	Sieć odwadniająca

Spatial planning provides a link to the spatial plan being in low for a given municipality or city

Feature (English)	Feature (Polish)
Spatial planning	Planowanie przestrzenne
Link to the spatial plans for the city / municipality	Link do MPZP

Natural hazards describe the probability of catastrophic phenomena of nature: floods and droughts.

Feature (English)	Feature (Polish)

Natural hazards	Zagrożenia naturalne
Flood risk	Ryzyko powodzi
Drought risk (%)	Ryzyko suszy

Transportation accessibility - time of travel to (min.) is expressed in minutes travel time to roads of higher order, railway stations (including the ones capable of handling cargo traffic), aerodromes and airports with regular passenger traffic and harbours, including the ones supporting regular ferry connections.

Feature (English)	Feature (Polish)
Transportation accessibility - time of travel to (min.)	Dostępność środków transportu - czas dojazdu (min.)
Highway enter	Wjazd na autostradę
Expressway enter	Wjazd na drogę szybkiego ruchu
Railway station	Stacja kolejowa
Railway cargo station	Stacja kolejowa cargo
Airport / regular passenger traffic	Port lotniczy
Airfield	Lotnisko
Ferry connection	Połączenie promowe
Port	Port wodny

Environmental protection refers to estimated travel time (individual vehicle transportation) to protected areas of various types and the distance to them in a straight line.

Feature (English)	Feature (Polish)
Environmental protection	Ochrona środowiska
National park - time of travel (min.)	Park narodowy - czas dojazdu (min.)
Landscape park - time of travel (min.)	Park krajobrazowy - czas dojazdu (min.)
NATURA2000 - time of travel (min.)	NATURA2000 - czas dojazdu (min.)
National park - distance (km)	Park narodowy - odległość (km)
Landscape park - distance (km)	Park krajobrazowy - odległość (km)
NATURA2000 - distance (km)	NATURA2000 - odległość (km)

The population within travel time shows an analytically determined, estimated number of population related to time limited by the maximum arrival time (up to 10, 20, 30, 45 and 60 min).

Feature (English)	Feature (Polish)

Population in time of travel	Populacja w zasięgu czasu dojazdu
Less than 10min.	Poniżej 10min.
Less than 20min.	Poniżej 20min.
Less than 30min.	Poniżej 30min.
Less than 45min.	Poniżej 45min.
Less than 60min.	Poniżej 60min.

Purchasing power in the range of travel time is household's estimated total disposable income presented in relation to zones limited by the arrival time, also used to estimate the population.

Feature (English)	Feature (Polish)
Purchasing power in time of travel	Siła nabywczą w zasięgu czasu dojazdu
Less than 10min.	Poniżej 10min.
Less than 20min.	Poniżej 20min.
Less than 30min.	Poniżej 30min.
Less than 45min.	Poniżej 45min.
Less than 60min.	Poniżej 60min.

Surroundings - number of entities in time of travel is a section, where an analysis of the real estate environment in relation to the number of commercial buildings (i.e. shops, services, etc.), cultural (i.e. cinemas, libraries, etc.) and public (i.e. offices) is included. The number of objects for each of the three types relates to zones limited by the maximum arrival time (up to 10, 20, 30, 45 and 60 min.).

Feature (English)	Feature (Polish)
Surroundings - number of entities in time of travel	Otoczenie - liczba podmiotów w zasięgu czasu dojazdu
Commercial less than 10min.	Komercyjne pon. 10min.
Commercial less than 20min.	Komercyjne pon. 20min.
Commercial less than 30min.	Komercyjne pon. 30min.
Commercial less than 45min.	Komercyjne pon. 45min.
Commercial less than 60min.	Komercyjne pon. 60min.
Cultural less than 10min.	Kulturalne pon. 10min.
Cultural less than 20min.	Kulturalne pon. 20min.
Cultural less than 30min.	Kulturalne pon. 30min.
Cultural less than 45min.	Kulturalne pon. 45min.

Cultural less than 60min.	Kulturalne pon. 60min.
Public less than 10min.	Publiczne pon. 10min.
Public less than 20min.	Publiczne pon. 20min.
Public less than 30min.	Publiczne pon. 30min.
Public less than 45min.	Publiczne pon. 45min.
Public less than 60min.	Publiczne pon. 60min.

The single report is composed in particular way to allow for easy consumption of the complex content provided (Figure 58). In the upper left side of a report website a map window was embedded (see father text for a description). Each section of the report (introduced previously) was built in as expandable menus to enhance readability of the titles of particular sections.

PL00000022

opis

Informacje o przetargu: [-]

Cena wywoławcza (PLN): 1510000,00

Kategoria nieruchomości: Grunt

Użytkowanie nieruchomości: brak informacji

Organizator przetargu: Urząd m.st. Warszawy

Identyfikator przetargu: Zarządzenie nr 5070/2013

Data publikacji przetargu: 10.10.2013

Data zakończenia przetargu: 11.12.2013

Ogłoszenie o przetargu: http://bp.warszawa.pl/Menu_procedurowe/ogloszenia_i_nieruchomosci/Praga_Poludnie/Praga-Poludnie_Ogloszenie_o_przetargu_uzytkom_nieograniczonym_na_sprzeda_z_nieruchomosci_giutowej_pl.html

Informacje dodatkowe: brak informacji

Lokalizacja nieruchomości: [+]

Szczegółowe informacje o nieruchomości: [+]

Planowanie przestrzenne: [+]

Zagrożenia naturalne: [+]

Dostępność środków transportu - czas dojazdu (min.): [+]

Ochrona środowiska: [+]

Populacja w zasięgu czasu dojazdu: [+]

Siła nabywcza w zasięgu czasu dojazdu: [+]

Otoczenie - liczba dostępnych podmiotów w zasięgu czasu dojazdu: [+]

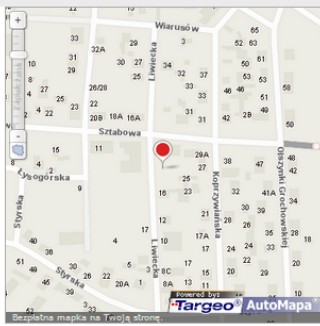


Figure 58 Example report characterising an offer of real-estate.

Map window

Visualisation of the neighbourhood of the offered real-estate is realised in the tender report with use of an embed map window. In the current version the map window is based on the technology of Targeo.pl (Figure

59). This map portal is developed and maintained for seven years by three cooperating companies Indigo Sp. z o.o., Aqurat Sp. z o.o. and GEOSYSTEMS Polska Sp. z o.o., which is responsible for the data component of the portal. The map window is generated with a predefined size and scale, centred with a point representing a location of an offered property, stored in the portal database. The map is dynamic, with panning and zooming capabilities.

The location of the property is marked on the map with a pin icon, pointing on which gives a possibility of choosing two scenarios of using the original Targeo.pl portal. The first option: *Zobacz na Targeo* (See on Targeo) moves the user to the Targeo.pl, where the location of the property is still displayed with a pin icon. Rich informational content of the map allows for extensive continuation of location assessment. The second option: *Dojazd do* (Drive to) gives an access to routing capabilities, where start/end point is in the location of the offered property.



Figure 59 Example embedded map window, based on the Targeo.pl (description in the text).

Information about urban planning will become shortly an important element of reports on real-estate tenders. During a campaign preceding the launch of the Tenders Searcher, many Local Spatial Management Plans (*Miejscowe Plany Zagospodarowania Przestrzennego*) were collected and processed. It was possible only thanks to the cooperation with departments responsible for urban planning of cities and municipalities and only when drawings of plans already existed in the form of GIS or CAD data.

Harmonised plans will be displayed in the map window on topographical background, becoming an integral part of real-estate surroundings assessment procedure. Due to the uniform legend for all Local Spatial Management Plans the user will be able to read it quickly and draw conclusions concerning the local spatial planning related obstacles. The user will be informed that the image published in the map window is a demonstrative material and cannot be a basis for any administrative or business decision making. An access to the original version of planning documents is possible by using a link to a site, where a city or municipality

office shall publish current Local Spatial Management Plans. The link can be found in the Spatial Planning section of the report.

Off-line analytical element

Information contained in sections: Information about the tender, Property localisation and Property details are acquired from a tender announcement. Information stored in the remaining sections are the results of series of spatial analysis. In order to limit the time consumption needed to derive the results those analytical algorithms was automated already in two environments: *Safe Software FME* and *ESRI ArcGIS*. Currently the algorithm is on the stage of migration to spatial database environment of *PostgreSQL/PostGIS*.

Analysis are conducted in respect to coordinates of the central point of each real-estate, defined on the base of a tender announcement. There are three scenarios of using the location coordinates, in order to acquire needed values for the report, on the base of input datasets. In particular cases coordinates of the point representing the location are used in order to generate buffers or isochrones. Elaboration of isochrones is possible thanks to application of deeply processed OSM road network data, enriched with information of expected vehicles velocity. Dataset processed this way covers Poland, Germany and Czech Republic and 100km buffer around these countries (to avoid errors in areas located near to borderlines).

The following list describes the input datasets used in order to collect information being stored in particular sections of tenders' reports:

- **Spatial planning** – dataset for Poland, containing Internet links to all the official websites where cities and municipalities publish their spatial plans (*MPZP* – local spatial management plans). The original dataset contains also contact information for departments responsible for spatial planning issues in each of city and municipality administration. The dataset was elaborated for the needs of the plan4business project on the base of Internet research.
- **Natural hazards** – the layer of flood risks for Poland was integrated out of several different sources acquired from Regional Directorates of Water Management. Information on the drought risk was not collected yet.
- **Transport accessibility - time of travel to (min.)** – datasets of highways and expressways exits were generated on the base of internal GEOSYSTEMS database of roads network resources. Internal GEOSYSTEMS database of railway stations was enriched with information from the operator of the railway infrastructure in Poland – *PKP Polskie Linie Kolejowe*, in order to add an attribute of ability of cargo operation support on railway stations. Spatial dataset of airports and airfields was built on the base on the current AIP Poland Aeronautical Information Publication. Database of ports, including ports with regular passenger traffic was elaborated on the various not structures sources.
- **Natural protection** – European Common Database of Nationally Designated Areas and NATURA 2000 network database.
- **Population in time of travel** – database for Poland built analytically with use of internally developed in GEOSYSTEMS land use map and statistical information on population in municipalities.
- **Purchasing power in time of travel** – data not acquired yet.
- **Surroundings - number of entities in time of travel** – dataset for Poland on the base of selection of internal GEOSYSTEMS database of Points of Interest (POI), aggregated into three basic categories of: commercial, cultural and public entities.

8.6.3 Next Steps

In further development on Tenders Searcher two separate stages can be distinguished. The first development perspective covers the remaining period of the project, and the second one should be understood as strategy for the operational period. For both perspectives respective plans of the solution development was defined.

Goals to be achieved until the end of the project

- displaying WMS services, including those containing layer of harmonised spatial plans,
- functionality of sorting for the searching results,
- evaluation campaign executed in cooperation with potential users,
- embedding the map window based on HR Layers technology to display thematic maps,
- bilingual version implementation (Polish / English),
- application of registration and subscription including elaboration and implementation of business procedures (i.e. automatic invoices generation)
- migrating the portal to European domain (<http://askwhere.eu/>) - suggesting international concept, being a good starting point for international extension planned for operational stage,
- low level integration with the Tenders Searcher
- low level integration with the Integrator
- tenders database update to achieve the current status published announcement for Poland

Strategic directions of the portal development (operation)

- adaptation of the analytical part of reports to various properties usage scenarios (commercial, residential, industrial, tourism and agriculture/forestry),
- developing interfaces for self-governments allowing for information on tenders provision,
- building mechanisms allowing for embedding searching interfaces to real-estates offers database,
- adapting the Integrator and full integration with the portal
- further development of the off-line analytical component basing on the *PostgreSQL/PostGIS* technology, and preparation to turn it to an on-line solution.

9 Conclusions

The implementation of pilot applications (Chapter 8) and management tools (Chapter 7) is a major achievement in the plan4business project implementation. A rapid progress in development has been done and the platform reached a maturity that enabled public testing and validation. This has been done through a series of workshops organised during the course of the project.

The participants of the workshops were informed about the technical developments as well as the business plan (see D2.4.2 Business Model final version for more details). Provided feedback served as an input for the development and many tasks have been assigned to particular apps and tools through the Redmine tools.

The work in WP4 has achieved most of its tasks according to the updated work-plan. There are several tasks that will be finalised by the end of the project. These tasks include:

- tools for utilising feedback from users of spatial planning data – the components have been developed, however need to be integrated into the online portal,
- integration of advertisement into the portal – a progress has been during the last code camp in Darmstadt,
- payment module – using external services.

These are the missing tasks to successfully reach the last Service Level 5 (see Section 4.3 for more details).

The work on the technical development (mainly user interface, apps and services) will be ongoing even after the end of the project. According to the business plan, the Open Data Platform utilising Open Data and freely available apps and tools will be maintained under the umbrella of the Plan4all association. The Commercial Platform utilising the commercial apps will be maintained by all partners under the lead of HSRS. The actions that will be taken in order to sustain the platforms are described in D2.4.2 Business Model final version.

References

1. plan4business Consortium, 2013, Description of the work
2. Open Geospatial Consortium, 2012. Open Geospatial Consortium. Available at: <http://www.opengeospatial.org> [Accessed February 18, 2012].
3. Wikipedia contributors, 2013a. Application programming interface. *Wikipedia, the free encyclopedia*. Available at: http://en.wikipedia.org/w/index.php?title=Application_programming_interface&oldid=542275587 [Accessed March 10, 2013].
4. Wikipedia contributors, 2013b. Unified Modeling Language. *Wikipedia, the free encyclopedia*. Available at: http://en.wikipedia.org/w/index.php?title=Unified_Modeling_Language&oldid=543637865 [Accessed March 17, 2013]
5. <http://www.redmine.org/>
6. www.hsayers.org
7. plan4business Consortium, 2012, D2.4.1 Business Model Interim Version
8. Habitats consortium D4.3.2 CIP 3-250455, D4.3.2, HABITATS networking services and, service toolkit
9. plan4business Consortium, 2013D2.4.1 Business Model interim vision
10. plan4business Consortium, 2013. D5.1 Interim Report on Integration, Analysis and Storage Engines).
11. <http://www.liferay.com/>
12. <http://en.wikipedia.org/wiki/CAPTCHA>
13. <http://en.wikipedia.org/wiki/WYSIWYG>
14. <http://en.wikipedia.org/wiki/Permalink>
15. <http://community.jaspersoft.com/>