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PLAN4BUSINESS

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

FINAL PUBLIC REPORT

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This document is a publishable summary of the Plan4business project.

Project title: A service platform for aggregation, processing and analysis of urban and regional planning data
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Plan4business platform: http://www.whatstheplan.eu

Executive Summary

The current trend in the EU is to open access to public sector information which is provided either for free or for marginal cost, and reuse it for various applications. Next to the EU legislation supporting this process, such as the EU directive on the Re-use of Public Sector Information (PSI directive) or the Infrastructure for Spatial Information in the European Community (INSPIRE directive), other initiatives can be recognised. These include open data, linked open data and big data projects.

All the related legislation and initiatives aim to release information in an interoperable way suitable for reuse. As identified by recent studies, e.g. by Koski (2011)[1], releasing public sector information for reuse has a considerable benefit for economic growth.

An important part of public sector information is spatial data. Spatial or geographic data are defined by the International Organization for Standardisation (ISO) as "data with implicit or explicit reference to a location relative to the Earth."[2]

Recent developments in information technologies enable people to access, process and analyse spatial data from various sources, help to design on-demand maps and provide information for decision makers. However, the provision of data varies across different authorities, and combining heterogeneous data is not an easy task.

The Plan4business project was focused on spatial data used for, or resulting from, spatial planning activities, their integration and reuse. Spatial planning data include land use data as defined by the INSPIRE directive[3], statistical data, hydrography, flood data, protected sites, transport networks, cadastral parcels and other data used for spatial planning purposes. An example of such dataset is shown in Figure 1.

The Plan4business project developed a service platform for aggregating, processing and analysing spatial planning data. This platform enables user to effectively reuse spatial planning data for different purposes in various specialisms.

[1] Koski, H., 2011. Does Marginal Cost Pricing of Public Sector Information Spur Firm Growth?

[2] International Organization for Standardization, 2005. ISO 19109 - Geographic information - Rules for application schema.

[3] "territory characterised according to its current and future planned functional dimension or socio-economic purpose (e.g. residential, industrial, commercial, agricultural, forestry, recreational)." (European Commission 2010a)

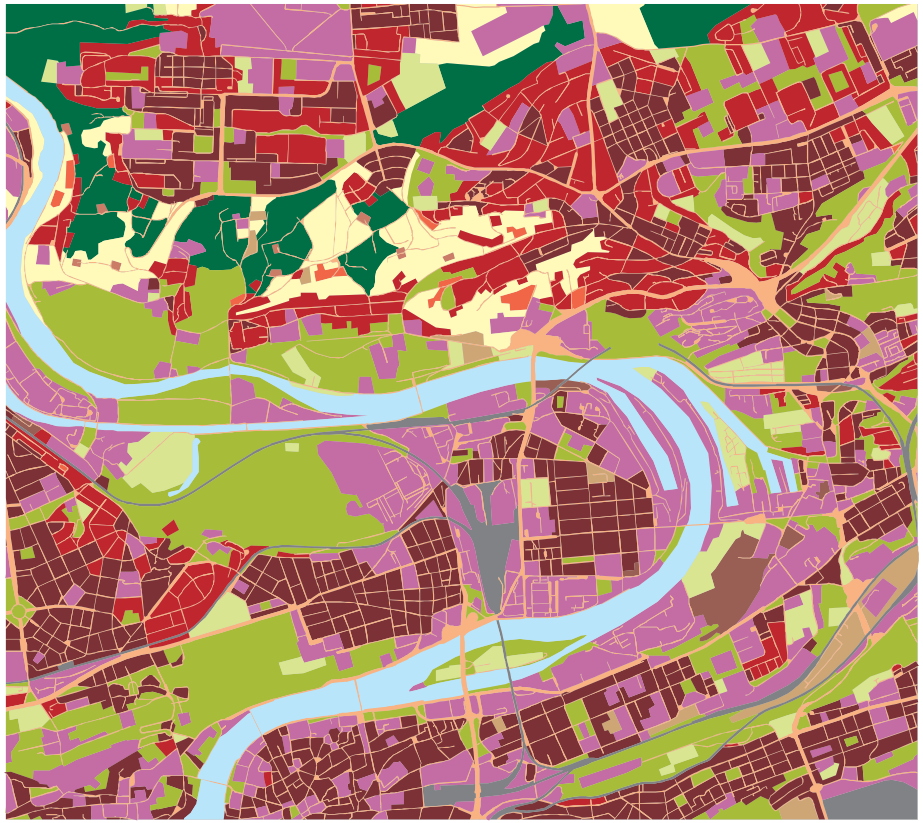

Figure 1 Urban Atlas (European Environmental Agency)

Project Idea

Urban and regional planning data sets are not aggregated so far. Thus, it is very difficult to use them for any other purpose than for printing or simple publishing by the authorities that created them. It is not possible to create time series or comparative analyses on these data sets in cross-regional context. Researchers, spatial planners and professionals from disciplines such as insurance industry, investors, real estate, or market-relevant activities related to urban development have a growing stake in such capabilities.

Plan4business developed a service platform for integration, storing and analysing of spatial planning data. The aggregation platform offers clients data in an integrated, harmonised and thus ready-to-use form. It also provides rich analyses and visualisation services. Such services are offered via several interfaces including application programming interfaces (API) and interactive web frontends (http://www.whatstheplan.eu/, http://askwhere.com.pl/).

Objectives

The main research and development challenges tackled by the project team were the automation of data integration and processing of complex queries over diverse planning data sets. For this purpose Plan4business designed, evaluated and implemented a platform that is:

- SPECIFIC - The developed tools and executable analyses are specific to planning data. This means that they are not applicable to generic data integration problems, but provide a high effectiveness for specific issues.
- PROCESS-ORIENTED - The integration and harmonisation process is divided in clearly defined steps. Each of these steps can be conducted individually. This approach enables users (mainly data experts) various ways of data harmonisation and data sharing.
- DECLARATIVE - Any schema mapping (logical or conceptual) is performed in an atomic, declarative way. Schema mappings thus can be reused.
- COLLABORATIVE - On the basis of the right incentives as well as the process-oriented and declarative/atomic integration approach, the principles of collaborative mapping can be used on the planning data integration issue.

The development of the platform was supported by interaction with users. This included the

- collection and analysis of user requirements,
- interactive workshops with users and creation of the plan4business community,
- analysis of competitive solutions,
- collection and harmonisation of spatial planning data,
- testing and validation of the platform.

Other than research and development objectives, the project developed a business plan to make the platform commercial and self-sustainable.

Concept

The overall concept of the Plan4business project comprises three main aspects, namely the Plan4business platform (1), spatial planning data (2), and a solid business model (3).

The Plan4business platform (1) consists of several technical components, grouped into three layers (Figure 2). The first layer contains human-machine interfaces, specifically for planning data management, integration and conversion as well as for accessing the analytical functions of the platform. The second layer provides two groups of processing engines, again for integration and harmonisation on the one hand and for analytical processing on the other hand. In addition, this layer provides the Plan4business API, which is utilised by AVINET for their own portal solution, which enables their clients the access to pan-European data. The final layer is a storage layer, which contains a storage manager as well as two different data bases, each optimized for different goals.

Spatial planning data (2) aggregated by Plan4business include:

- Urban and regional planning data from several countries,
- Land use data including GMES Urban Atlas data,
- Land use data from Czech Cadastre,
- Land cover data,
- Derived Open Land Use maps,
- Open Street Map data as representative of road network and as a reference layer,
- Natura 2000 data as information about potential restriction coming from environment protection,
- Market information (number of properties, sale transactions, price levels),
- Social and economic data (CSP, Eurostat data),
- Individual property data (legal status, current use) and cadastral parcels,
- Statistical data from several countries.

The business model (3) of the Plan4business project foresees several groups of active stakeholders. The Plan4business platform is connecting data providers with market and society. It has the ability for generation of new commercial and non-commercial applications and services.

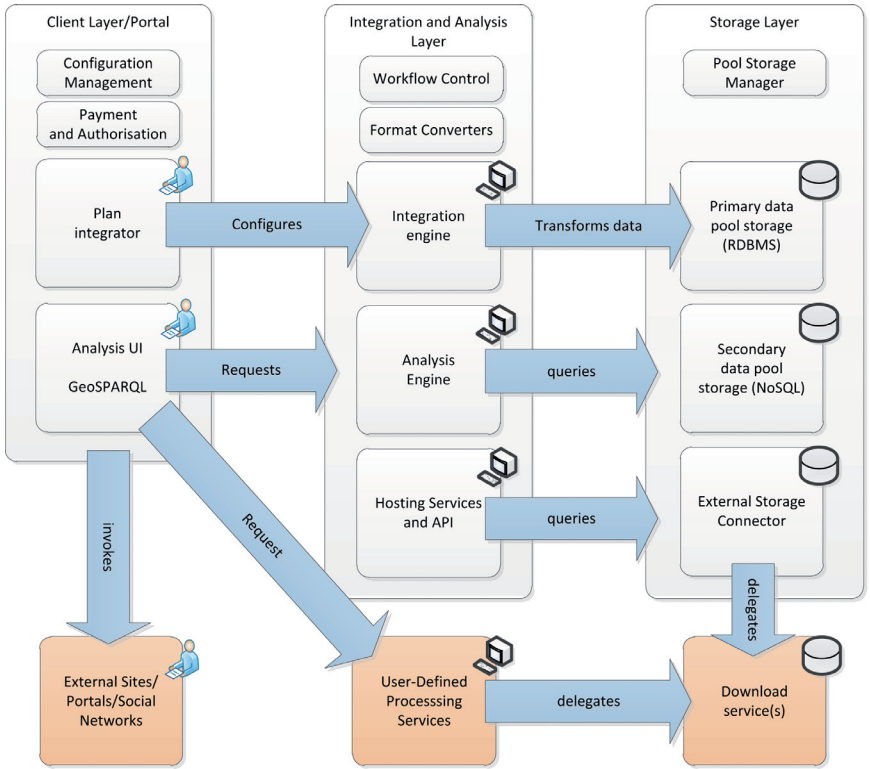

Figure 2 Architecture of the Plan4business platform. The platform is comprised of the three layers client layer, integration and analysis layer, and storage layer.

Project Approach and Results

The user requirements were collected during the first year of the project in order to identify the needs of professionals, who are active in the field of urban and spatial planning. From the requirements analysis the user stories and use cases were identified and further developed as a basis for the realisation of the Plan4business platform. The development infrastructure was elaborated and the system specifications were defined. Following these specification, the platform with its components and the related services was implemented during the second year of the project.

In collaboration of the team members, the business model was developed. Following the discussion and the experiences among the partners and with the active stakeholders the team developed the final business model as schematically depicted in Figure 3.

The business model includes two platforms:

- OPEN DATA PLATFORM with open services, which will be maintained and supported by the Plan4all Association that is currently being set-up under the leadership of the University of West Bohemia in Pilsen.
- COMMERCIAL PLATFORM offering restricted data and commercial services maintained and supported by the Plan4business consortium and under the leadership of Help Service Remote Sensing. The platform is open for additional services provided by partners from the consortium, but also beyond, based on joint business agreements.

To strengthen the approach, the definition of the legal frames for data and services was prepared. Initial actions, such as the customer relationship management, data and service management, and customer cost/benefit analysis, were performed. The communication with future platform users and data providers was established through interactive workshops, social network sites, conferences and other meetings.

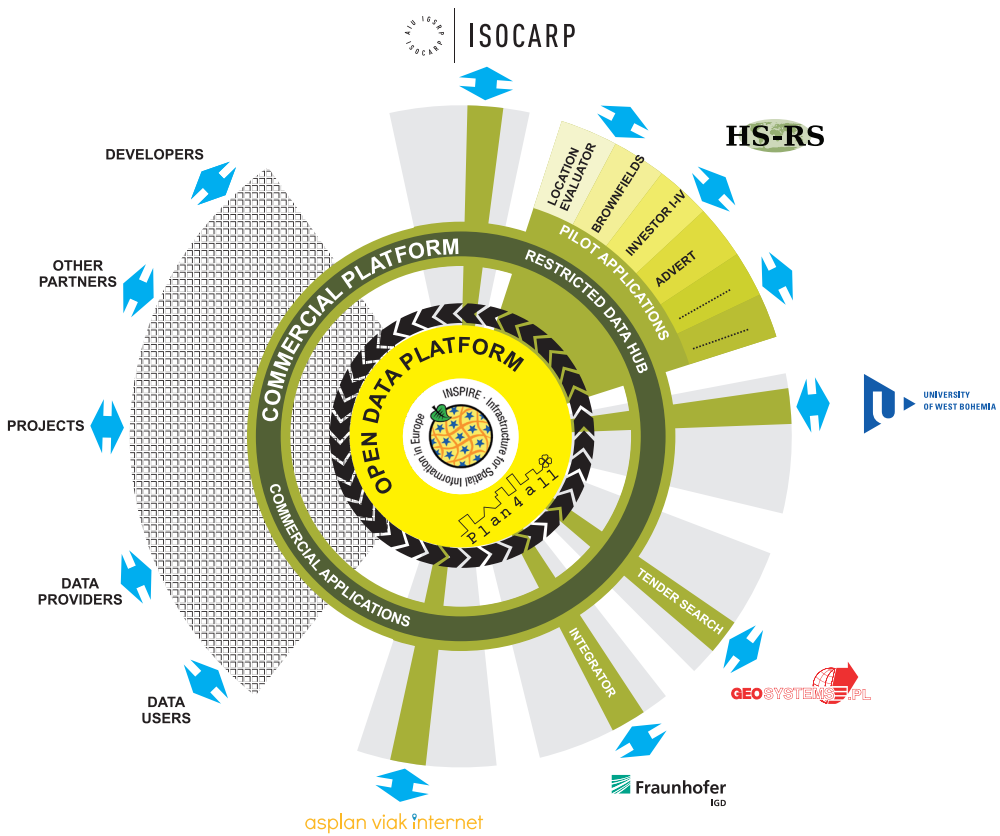

Figure 3 Plan4business business model

The platform development was focused on the system planning and implementation of the client side of the Plan4business portal. An important part was to define and design the overall structure of the portal and its associated apps and services.

In the next step, the client side implementation for the collaborative integration of spatial and non-spatial data into the Plan4business data pool was set up. The work encompassed the design and implementation of the web interface for the data upload and harmonisation workflow.

In parallel, the server part of the Plan4business platform including the integration, storage, and analysis engines was implemented. This includes also the development of API and access control system.

Based on the discussions on planning data and their integration, the integration workflow was created. Schema mapping and data transformation is based on the outcomes of the Humboldt Humboldt, especially the Humboldt Alignment Editor (HALE). Mapping of heterogeneous data into the common Plan4business application schema was analysed. The strategy for possible solutions and further steps were outlined and implemented.

The analysis engine is a component ensuring management of spatial planning data stored in a relational database. It enables access, processing and visualisation of spatial planning data. The analysis engine provides access to all analytical functions of the spatial database. The focus was on analyses that can be performed using available data such as spatial plans or flood areas.

A large data pool was created and is made available in the primary data storage as input for analyses. Those data are for example pan-European data sets extended with more detailed regional or local data sets covering spatial planning related data, for example administrative, transport, environmental and statistical data.

Based on the platform, a set of applications and services was developed and made available. Those are for example Plan Integrator, Layer Manager, Map Creator, Thematic Map Viewer, Location Evaluator (Figure 4), Embed-Map and Tender Searcher. All these apps and services can be accessed at http://www.whatstheplan.eu/.

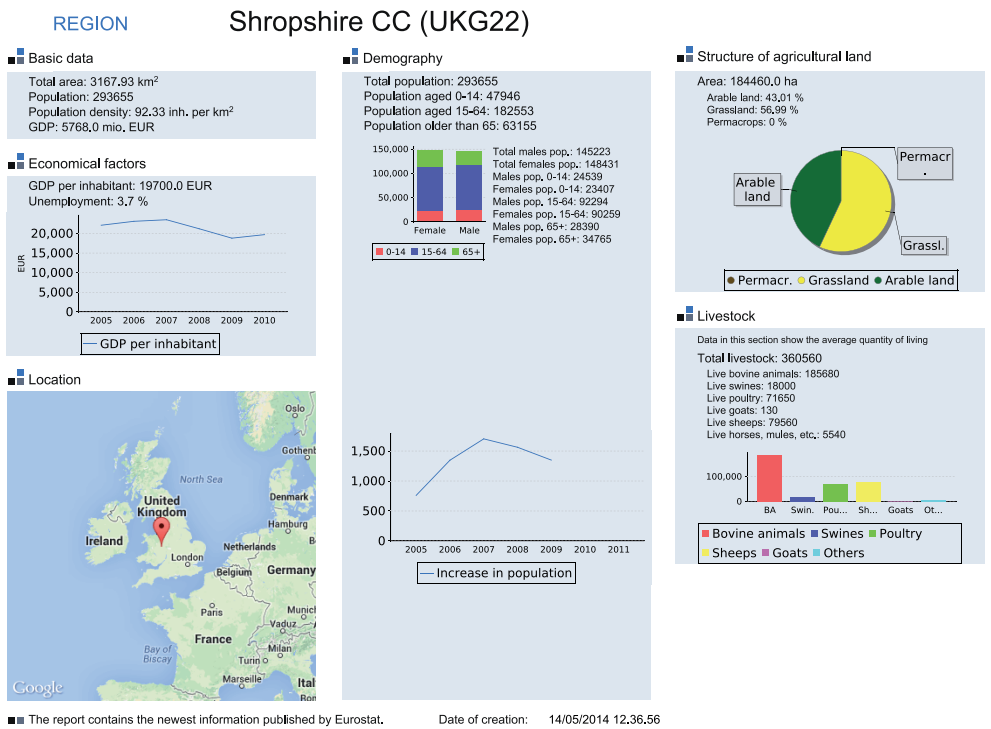

Figure 4 Regional report generated by the Location Evaluator

Impact of the Plan4business Results

The results of the Plan4business project with its ICT platform and data pool will have the following impact in urban and regional planning:

- Overcome the heterogeneous situation of planning information in Europe through data harmonisation.
- Contribute to better cooperation in cross border activities and transparency of spatial planning activities.
- The interactive platform will provide solutions for identification of urban areas and more dynamic models of investment to support the criteria of the Europe 2020 Strategy.
- Impact on European economy and services by integrating current planning data sets from selected European countries and building up an attractive source of information for a wide range of branches.
- Open new service opportunities for public and private sector related to business activities and land development and revitalisation.
- Make the technology and data available for every professional or interested person.
- Support for European Open Data strategy and for Open Data Public Private Partnership.

Conclusion

Plan4business made a crucial step towards interoperability and reuse of spatial planning data and services in Europe. The advantages of the final results can be summarised as follows:

- innovative solution,
- big market potential,
- collection of large amount of data,
- estabilishment of an umbrella organisation for open data sharing – Plan4all,
- clear vision for financing, data collection and technology development,
- interoperable solution,
- uptake by upcoming projects (e.g. Smart Open Data, SDI4Apps, Open Transport Net).

Despite these achievements, there are still remaining challenges the Plan4business team is aware of and that need to be addressed in the future. These include:

- complexity of spatial planning data,
- data liability,
- data update/quality,
- data availability,
- added value,
- legal aspects (licensing issues, privacy, security, ...),
- organisational aspects (capacity building, cultural and social differences, willingness to cooperate, different financial models, ...),
- political background – to open or not to open.

Figure 5 Advantages and remaining challenges

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General Information

Plan4business was a small and medium scale focused research project (STREP) within the Framework Program 7 of the European Commission. The project was accepted to the ICT call FP7-ICT-2011-SME-DCL "SME initiative on Digital Content and Languages" co-funded by the European Commission (Project number 296282).

The project was established by six partners from five European countries to deliver the project goals and objectives. The partners include ISOCARP as a representative of the user community, two research groups from University of West Bohemia in Pilsen and Fraunhofer IGD, and three industrial partners including GEOSYSTEMS Polska, Help Service Remote Sensing, and Asplan Viak Internet as. The project was coordinated by the Fraunhofer Institute for Computer Graphics Research IGD, Darmstadt, Germany. The project commenced on April 1, 2012 and ended in March 2014.

Plan4business established a Stakeholder Board to obtain further inputs from the community, secure evaluation and feedback on project developments and to support the dissemination of the results via user communities.

A general information concerning the project as well as the list of the publicly available results and deliverables can be obtained at the Plan4business website http://www.plan4business.eu. For further information, please, contact the Plan4business Project Office or the Coordinator.

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