

Web Tools for Geo-spatial Data Management in Czech living Lab

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Abstract: New methods of research and development are currently oriented mainly on end-user involvement into this process. Living Labs establishment is one of the activities supported the collaborative environment and research focused on users' needs. The first Living Lab in Czech Republic and only one till now is Living Lab WIRELESSINFO, which is focused on research and development for geo-data work and geo-data sharing in the Internet. This technology development is based on the principles of collaboration environment, open web services, user involvement, technology platform development and de-centralized data sources.

1. Introduction

The central idea behind open innovation is that in a world of widely distributed knowledge, companies cannot afford to rely entirely on their own research but should instead buy or license processes or inventions from other companies. Living Lab is a research methodology for sensing, prototyping, validating and refining complex solutions in multiple and evolving real life contexts. A confirmation of that is visible in mutual cooperation among the individual partners (often very heterogeneous) within the living lab. Another important idea of Living Lab is to focus on the users and their involvement in the process of submissions and the development of new technologies.

2. Czech Living Lab

Czech Living Lab (CLL) represents a research and development environment in which several research institutions, business companies and regional authorities work with each other in order to develop projects in the area of new technological concepts. The individual CLL members can be either in a user or researcher position. CLL members assign experts into individual teams for each project. The involvement of the CLL members depends on their interests and possible benefits which they will get out of each individual project. Users out of LL are contacted with the purpose of getting the widest amount of relevant suggestions to solutions to any on going existing task.

Users inside the Czech Living Lab define their requirements on Innovation and these requirements create the basis for a definition of the target applications. The target applications are formed from collaborative tools – independent components, which should have some of following characteristics - Open Web Services, Collaborative Environment, User Involvement for technical solution, Technological platform independence, Re-using of existing tools, methods and technologies, De-centralized data sources, Open interfaces.

3. Benefits Implementation of the Living Labs idea

Benefits for groups of users and stakeholders:

- CLL brings together experts in different fields who cooperate together in special ad-hoc teams. These members work in different fields of work (e.g. private and public institutions, government and universities); therefore their special skills can be shared and used by various parties within CLL.
- The collaboration of companies and universities enables a cross-over of various areas - research knowledge can be tested directly by practical testing and again user requirements from private companies can be developed more thoroughly using better equipped university facilities.
- Technical tool sharing brings large cost savings.
- Shared developments in research will help create new processes of geographical data transfer, data management, publishing and improve user-friendly applications. This is the only way to attract a large number of incoming users who don't have a high level of GIS skill.

Benefits for rural environment:

- CLL activities contribute to the availability of public information by regularly updating, expanding and enlarging information bases and data sources.
- CLL enables flexible working environments. (Use of internet resources i.e. Email, video conferencing etc). Therefore highly qualified people (Who maybe restricted by time, family and travel problems) can work flexible hours within a home or non-fixed office environment.
- The technologies developed in CLL are combatable with INSPIRE principles. Implementation of these technologies enables the user to receive subsidies in a more agreeable way (e.g. EAFRD)

4. Collaborative tools in Czech Living Lab

MapMan

The Map Project Manager (MapMan) is a software tool for users who want to create new map projects and compositions. Users can use the tool for work focused on utilizing and displaying GIS data on the Internet.

MapMan is capable of creating various map compositions and users can use different data sources – data on a local server, but also data available through web services, which are stored on external servers. MapMan can be closely linked to other developed components – metadata and catalogue systems and the visualization map clients. Users can use the catalogue function for searching for data on external servers and the visual function for project displaying in DHTML client, GoogleMap, Google Earth or other map tools.

Metadata extractor

Metadata extractor is a tool that gives access, editing and publishing possibilities to metadata directly from different files through URM portals (documents, presentation, etc.) Users can also extract metadata (and then edit) directly from existing URL addresses and store metadata on URM portals. Access to information is available through direct URL addresses.

Moodle

A course management system (CMS).

Moodle is an Open Source software package which helps educators to create effective online learning courses and websites.

The software is used all over the world by universities, schools, companies and independent teachers.

Video lecture

The objective of video lecture modules is to support on-line lectures given by tutors using video streaming. The technology was developed inside a Naturnet-Redime project using VLC library and currently is published under Open Source license. It supports on-line training.

Uniform Resource Management

Uniform Resource Management (URM) provides a simply understood, well designed and user-friendly framework within which communities can easily share information and knowledge. In order to effectively share information and knowledge, there has to be a standardized system, which will enable a uniform description of information.

The basic components, of URM can be divided into the followings topics:

- Metadata scheme, which defines a universal structure, which can be used for the giving of information
- Thesaurus - represents a database or list of semantically orthogonal topical search keys.
- Geospatial thesaurus – The Geospatial thesaurus supported search tool for geospatial objects (for example gazetteers, GeoParcers, Geocoders)
- Catalogue service - defines common interfaces to discover, browse, and query metadata about data, services, and other potential resources.

URM is generally presented in web portal form, which contains the main search functions mentioned above and several supporting tools available for registered users. These tools support direct publishing of information through a URM portal.

5. Tools Integration

Collaboration between SW tools is one of the most important aspects of CLL development. Collaborative tools (i.e. tools, which have the ability to interact with other SW tools and together create new services) can operate independently of each other but also can be integrated into new applications. The decision regarding available tools and utilization possibilities (which and how they will be used) depends on two main factors-

- User requirements for the application and developers agreement regarding the possibility of use.
- The process of designing application covers, analyses of SW architecture and the defining of available data sources, services and other existing components.

An example (Figure 1) presents the system development of data transfer from sensors and the publication of the data on the web through open web services. Independent tools developed in different institutes are integrated into one web applications.

Integration tools into LL application

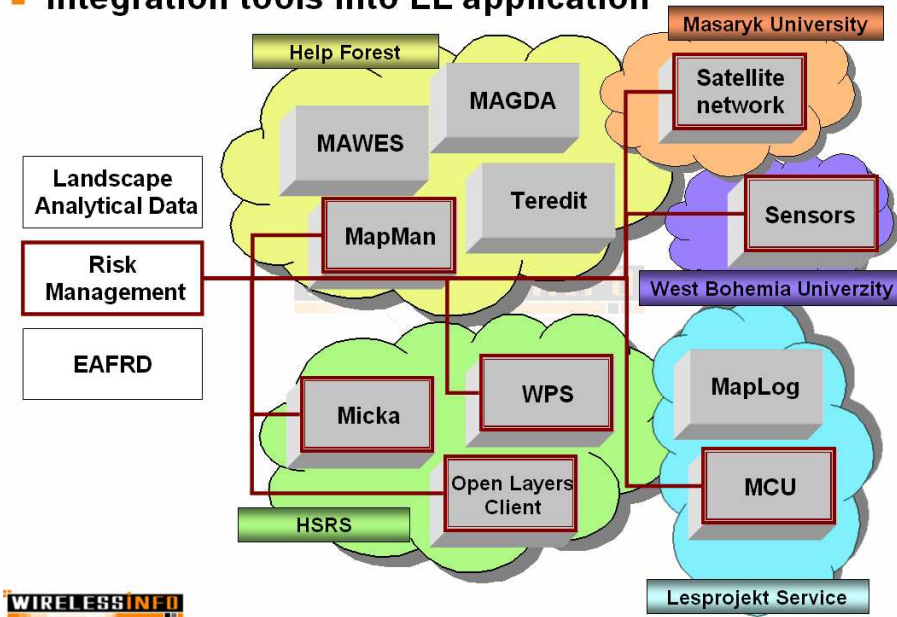


Figure1 The scheme shows tools integration within a Risk Management application. Responsibility of the Czech Living Lab members for tools development is also shown.

Tools used:

- Spatial Data Management tool MapMan
- Metadata catalogue system Micka
- Web Processing Services
- Mobile Communication Unit
- Sensors network
- Satellite Network
- Web visualization and editing environment – Open Layers Client

6. Conclusion

The Czech Living Lab – WIRELESSINFO represents an informal group whose members cooperate together on various research projects and collaborate in the development of new technologies. Software tools development, which comes from user needs, should respect principles of collaboration environment, open web services, user involvement, technology platform development and de-centralized data sources. The application as metadata and catalogue system, spatial data manager, visualization client for geo-data, analytical and processing services and other can be used independently each of them, but they can be also integrated into wide complex solution in the same time and give full functionality to users in the one place. The integration is solved mainly by implementation of the tool into web portal, which way gives better services availability to users and system configuration possibility.

7. References

- [1] Horak P. 080309-C@R-WP3.4-D.3.4.2-M18-3 Cyclic development report for Collaboration at Rural integrated project, March 2008
- [2] Karel Charvat at all Uniform Resource Management, at Naturnet Redime Newsletter vol 6, December 2007, ISSN 1801-6480
- [3] Collaboration@Rural, ONTOLOGIES FOR RURAL ENVIRONMENTS, Madrid 2007
- [4] AMI4FOR project, D3.1 DESIGN OF FORESTRY KNOWLEDGE AND PRECISION FARMING MANAGEMENT SYSTEM
- [5] www.wirelessinfo.cz/czechlivinglab
- [6] www.ami4for.org