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INSPIRE in Pocket

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ABSTRACT

Massive mobile technology growth during the last few years has brought GIS technologies into another dimension. It is a big challenge for standard GIS technologies. New areas of applications are revealed for wide community of users. The INSPIRE and mobile mapping apps infrastructures differ in many things such as philosophy, application area and technical solution. It is also vital for the successful implementation of INSPIRE. Currently, there exist two worlds:

1) top down managed world of INSPIRE (GMES, GEOSS and similar initiatives) represented by SDI experts and

2) world of smartphones, tablets, world of ordinary people and also world of thousands micro SMEs developing applications.

There are two important issues. On the one hand, Europe and EU invest hundreds of millions of euros in building the INSPIRE infrastructure. On the other hand, most of European SMEs and citizens use for their applications Google maps. National and regional SDIs offer such information which is not available on Google.

The idea of INSPIRE in pocket is to build a bridge between these two worlds. First real step towards INSPIRE in Pocket is HS-CAT. HS-CAT is application for searching, browsing and displaying metadata records.

Keywords: INSPIRE, Smartphones, Metadata,

1. INTRODUCTION

INSPIRE, GEOSS and Copernicus are politically driven top-down initiatives supported by experts from countries and organisations. It is important to see how INSPIRE and related initiatives reflect local, regional and national needs. Currently, there is a low awareness about these initiatives on regional and local level and the benefits for the local level are not clearly defined.

There are different **voluntary or bottom-up initiatives** supporting SDI building. More and more localised information is collected by citizens. "Human observations" can become a part of the future real-time SDIs and serve as an input for spatial decision-making processes.

INSPIRE in Pocket

Massive mobile technologies growth during last few years brings brand new view on GIS technologies. Location based services and spatial information come to everyday Karel Charvat. "INSPIRE in Pocket". EFITA-WCCA-CIGR Conference "Sustainable Agriculture through ICT Innovation", Turin, Italy, 24-27 June 2013. The authors are solely responsible for the content of this technical presentation. The technical presentation does not necessarily reflect the official position of the Internation Commission of Agricultural and Biosystems Engineering (CIGR) and of the EFITA association, and its printing and distribution does not constitute an endorsement of views which may be expressed. Technical presentations are not subject to the formal peer review process by CIGR editorial committees; therefore, they are not to be presented as refereed publications.

life. It is a big challenge for classical GIS technologies. New areas of applications are revealed for wide community of users.

The INSPIRE and mobile mapping apps infrastructures differ in philosophy, application area and technical solution. A comparison of the INSPIRE and current mobile solutions is presented in Table 1.

Features	INSPIRE	Existing mobile map apps
Formats,	Based on heavy formats	Lite formats (JSON, KML,
protocols	(SOAP, GML, WFS, WCS,	GeoSMS)
	CSW,)	
Standardization	Standardized services (OGC,	Proprietary services (Google,
	ISO)	Apple)
Projections	European (LAEA, LCC,)	Universal (Spherical Mercator)
Users	For "experts" - government,	For "ordinary people"
	EU comission	
Application	Environment, administrative	Navigation, entertainment
area		
Difficulty	Difficult to use	Easy to use
Open system	Open possibilities of view	Bind with proprietary (licensed)
	different maps	maps
Typical app	Map portal	Single purpose map app (e.g.
		navigation)
Network traffic	heavy	Optimized for slow networks
On-line / off-	On-line	Mixed, e.g. caching tiles on device
line		
Unsaid purpose	European real estate market	Big brother ? / advertising

Table 1 Comparison of the INSPIRE solutions and current mobile solutions.

The challenge is how to connect both these worlds. On one hand, INSPIRE may bring many useful data for mobile apps (e.g. cadastral maps), on the other hand ease of use and low costs may be challenge for experts for specialized apps, e.g. data capture and other field work. Some bridges for mobile apps to access INSPIRE infrastructure are needed. Social networks and mobile apps may contribute SDI with user collected data (e.g. illegal dumps, water quality monitoring).

Android "Google Maps" application (used in Irish pilot) is limited for use (maps licensing, proprietary formats). HABITATS searched for an alternative that enables users to support more functionality.

For Reference Laboratory we chose popular tourist app Locus. Because of primary application area, it is widespread (500 000 - 1 000 000 installations worldwide) and it has very rich functionality given by log-term development based on user community discussions. It provides published API which enables control of the application from other apps and write own extensions. We developed these extensions to enable work with the INSPIRE infrastructure.

• Catalogue client.

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- Cadaster information.
- Online feature editing (not published yet).

The following user scenarios can be performed using the following workflow:

- 1. User opens a map and zooms into preferable location. Then the catalogue client button is pressed.
- 2. The catalogue client opens, user may edit the coordinates and enter other search criteria.
- 3. After pressing search button the result list is displayed.
- 4. User may see metadata detail on next screen .
- 5. If the corresponding service is available on-line (as WMS), the map button enables to go to Locus app and show it on the map. The GetFeatureInfo and GetLegendInfo operations are also supported.



Figure 1: Locus map app and catalogue client.

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Catalogue Search Results	🔇 🔯 Detail
available in this OGC WMS service for your personal, non-commercial use only and is	Metadata
being served as a contribution to the OneGeology initiative(www.onegeology.org).	Identification
Separate	Title
CGMW Bedrock and Structural geology	Europe BGR Geology by Age
CGMW Bedrock and structural geology of the	(Geochronologic)
Furone BCP Geology by Age	The 1 : 5 Million International Geological Map of Europe
(Geochronologic)	and Adjacent Areas (IGME 5000). Resource type
The 1 : 5 Million International Geological Map	service
of Europe and Adjacent Areas (IGME 5000).	Resource Locator
deegree wms	http://www.bgr.de/Service/OneGeology/ BGR_Geological_Units_IGME5000/? http://www.bgr.de/
wms reference implementation	Service/OneGeology/BGR_Geological_Units_IGME5000/
CubeSERV WMS	Z Bounding box
OGC WMS compliant cascading map server by CubeWerx Inc.	-70.7683, 21.2045, 99.4722, 80.8798
Decision Tools Workspace WMS	
This service is auto generated by Phoenix - www.decisiontools.ca	
Energy - Fossil Fuels	
Figure2: The	catalogue client result list and metadata



Figure 1: WMS displayed in Locus app and map legend.

Cadastral information application is based on cadastral map WMS and WFS provided by the Czech Office for Surveying, Mapping and Cadastre. It enables to view property information and search for cadaster parcels in the map (Figure 36).

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Using KML as common format

KML is another OGC format which is currently not used in INSPIRE. The advantages of KML are:

- Common use in Google Map apps (desktop and mobile).
- Adoption in other software (Geoserver, Mapserver, ESRI, OpenLayers, Locus...).
- Scalability, simple implementing of time series.
- Map legend may be wrapped together with data.
- Using of W3C CSS rather than OGC SLD for symbology.

KML may be used as a common format for mobile apps rather than INSPIRE supported formats. There are two ways how to implement it:

- 1. Direct support of servers as alternative to WFS/WMS (Geoserver)
- 2. Through on-the-fly conversion modules that provide transformation from WFS/WMS/SLD to KML.

When KML is available, it is compelling to register it the same way in catalogue as other services with services metadata. Then it may be searched and displayed in simple way.

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Figure5: Displaying KML in Google Maps and Locus.

Field editing

The advantage of mobile apps is the possibility to capture field data in simple way and low cost. Due to low mobile signal coverage in some areas or no mobile internet access, several alternatives for mobile data capturing should be taken into account:

- Off-line editing. Data are stored on device, posted to server when connection is available or manually at home.
- On-line editing when internet connection is available.
- SMS when no mobile internet is available and quick response is required.

All of these alternatives will be probably combined depending on the real life situation.

		³⁶ 12:36		
B Form				
Title				
My location				
Description				
Some description				
Category				
2				
Position (lon, lat)				
15.2659906	49.9	49.953733		
Actual time				
12:38:24	2012	2-06-21		
Send	SMS	Get time		

Figure6: Simple mobile editing application.



Figure7 : Editing results displayed online in Google Earth as KML.

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https://play.google.com/store/apps/details?id=cz.hsrs.hscat

https://play.google.com/store/apps/details?id=cz.hsrs.parcelinfo&feature=search_result# ?t=W251bGwsMSwxLDEsImN6LmhzcnMucGFyY2VsaW5mbyJd

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