

Web-services for spatial data transformation and exchanges in SDI: a prototypical implementation of the LPIS Test Bed services

Stefan Wiemann¹, Lars Bernard¹
Piotr Wojda², Pavel Milenov², Romuald Franielczyk², Vladimir Knezevic²,
Wim Devos²

¹*Professorship of Geoinformation Systems, Technische Universität Dresden,
Germany*

²*Institute for Environment & Sustainability European Commission Joint Research
Centre, Ispra, Italy*

The Common Agricultural Policy (CAP) of the European Union (EU), since its reform in 2003, aims to provide farmers with a stable income, decoupled from production, within a framework of sustainable development of the rural areas while respecting environmental and societal needs. In order to distribute Community aid, the Member States had to establish a Paying Agency to collect, control and reimburse all farmers' applications, managed through the Integrated Administration and Control System (IACS) with its geographical module: the Land Parcel Identification System (LPIS). The LPIS's main functions are localisation, identification and quantification of the agricultural land.

In order to provide scientific and technical support for the conception, development, implementation and monitoring of EU policies, the European Commission Joint Research Centre (JRC) is developing a quality assurance framework for LPIS (LPIS QA, Commission Regulation 1122/2009). Following an SDI-approach, it shall facilitate interoperability and support partial workflow automation closely linked to current INSPIRE activities.

The framework comprises a set of specifications, containing the LPIS Core Model (LCM, Sagris & Devos, 2009), an abstract test suite (ATS), an executive test suite (ETS) and a LPIS QA GeoPortal for the Member States. It shall be complemented by a set of OGC compliant web services for spatial data visualisation, provision and processing covering parts of the ATS and ETS procedure. Within a first study prototypical LPIS QA services have been realised in a Test Bed manner to allow for schema transformation and data package validation.

The schema mapping and transformation process from national LPIS models towards the LCM specifications is one of the main goals of the ATS. The scope is to ensure compliance with the EU regulations and thus, reducing the effort on data harmonisation among the Member States LPIS implementations. A respective schema transformation service can be offered to the Member States to transform their data based on a previously defined schema mapping. Within this study the OpenGIS Web Processing Service Interface (WPS) has been chosen as the currently most suitable and most utilised solution for realising SDI-based schema transformation for geodata. For prototypical implementation within the LPIS QA framework the Feature Manipulation Engine (FME) technology was used to realise a high performance, scalable and reliable transformation service. The schema mapping describing the transformation rules from the national LPIS schema towards LCM is based on a mapping script written in Python. This enables the

creation of a mapping in a standard text editor. The script can be uploaded to a FME Server. The resulting transformation process is then wrapped by a standardised WPS interface. This solution could possibly also be extended to act as an INSPIRE Transformation Service (European Commission 2010).

A second Web Service has been designed and prototyped for the LPIS QA framework to allow the upload, validation and storage of ETS observations from the Member States. ETS observations are containing several XML (Extensible Markup Language) and GML (Geographic Markup Language) encoded documents. Therefore various package, file, spatial content and thematic content validation processes were implemented and offered via a WPS Interface. Once the uploaded data is considered valid, it is stored in a spatially enabled database which is later used for the ETS screening process. This solution offers the possibility to add new functionality and adjust the service in case of changes of the package structure or underlying requirements. Thus, files for validation can be added or removed and additional conformity checks can be implemented and applied to the package content. Since the service was designed to be highly flexible, it could also be adapted to other applications requiring data validation functionalities.

For further development of the prototyped Test Bed services several aspects such as security, usability and robustness will be taken into consideration. Furthermore attention will be given to advanced service access restrictions, user-role management, failover configurations and continuous service monitoring. Additional effort will be put into the integration of the schema transformation and the package content checking service in the planned LPIS QA GeoPortal. This GeoPortal is intended to offer the LPIS Member States tools and communication mechanisms to check whether their national LPIS implementations are conforming to the respective EU regulations and to conduct related screenings.

References:

- European Commission 2010, Commission Regulations (EU) No 1088/2010 amending Regulation (EC) No 976/2009 as regards download services and transformation services, November 2010
- Sagris, V., Devos, W., (2009). Core Conceptual Model for Land Parcel Identification System (LCM). GoeCap technical specification, v 1.1. EUR- Scientific and Technical Research series.