

Approach to Build a Soil Information Portal for Europe Based on the PortalU[®] Technology

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Abstract: The access to environmental information has become an important concern in the recent years for both public and private bodies within Europe. Especially the web-based supply of the huge amount of spatial environmental data deserves particularly attention because high organisational efforts and financial expenses are necessary to improve the access to this kind of data. While the INSPIRE Directive and its Implementing Rules (IR) (European Union 2007) give the framework to establish a European spatial data infrastructure, vital obstacles in reference to harmonization and interoperability of data and services as well as in reference to the organisational structure are not removed yet. The project GS Soil aims to make a contribution to remove these obstacles by establishing a European web portal for soil information (GS Soil Portal). The main objectives of the project are to build up the base for an easier reuse of information about soils by improving interoperability of spatial data sets and services. Especially the identification of issues and the implementation of solutions for reducing the barriers to interoperability of spatial data sets and services are focused. GS Soil concentrates thereby on soil and soil related themes enumerated in annexes I to II of the INSPIRE Directive (European Union 2007).

Keywords: Environmental information; Soil data; Spatial data infrastructure.

1. INTRODUCTION

The availability and accessibility of environmental information has become a key concern for public and private bodies within Europe in the recent years. The European Directive 2003/4/EC (European Union 2007) on public access to environmental information, the INSPIRE Directive 2007/2/EC for establishing an Infrastructure for Spatial Information (European Union 2007) as well as the newest initiatives of the European Commission like the Shared Environmental Information System (SEIS) (COM 2008) and the Single Information Space for the Environment (SISE) (O'Flaherty 2008)) emphasizes the European-wide need to improve the access to environmental information. Especially the web-based supply of the huge amount of spatial environmental data deserves particularly attention because high organisational efforts and financial expenses are necessary to improve the access to this kind of data. While the INSPIRE Directive (European Union 2007) and its Implementing Rules (IR) give the framework to establish a European spatial data infrastructure, vital obstacles in reference to harmonization and interoperability of data and services as well as in reference to the organisational structure are not removed yet.

The eContentplus project GS Soil is currently under negotiation and will likely start in May 2009. EContentplus is a multiannual Community programme from the European Commission DG Information Society and Media with the objective to make digital content in Europe more accessible, usable and exploitable (DG Information Society and Media 2008). GS Soil is thereby be allocated to the area of geographic information, where the

focus is set on the aggregation of existing national datasets into cross border datasets, which will serve to underpin new information services and products, in particular with a view to reducing barriers related to one or more of the specific themes mentioned in annexes I-III of the INSPIRE Directive (European Union 2007). The focus of GS Soil is thereby set on soil and soil related data. This paper describes the project structure and the technical base to build up the European GS Soil Portal.

2. THE PROJECT GS SOIL

2.1 Introduction

The project GS Soil aims to make a contribution to remove obstacles referring to harmonization and interoperability of soil related data and services as well as in reference to the organisational structure by establishing a European network to improve the access to spatial soil data for public bodies, private companies and citizens. The project will focus on data organisation, data harmonisation as well as semantic and technical interoperability with the objective to produce seamless spatial information in terms of INSPIRE (European Union 2007). Both the description and harmonisation of European spatial soil data and the the operation of a corresponding spatial data infrastructure will take centre stage. Within the project 34 partners from 18 European Member States are involved. Soil data are thereby provided for all 18 states mainly on national level and partly on regional level. That means 67 % of the 27 European Member States will provide soil data for the project. These data build a sufficient base to analyse and improve the access to the different kinds of digital content.

2.2 Project structure

In order to achieve the aims of the project, GS Soil is structured in seven work packages (WPs): WP1 for project coordination and networking, WP2 for building up the content provision framework, WP3 with focus on metadata, WP4 with focus on harmonisation and semantic interoperability, WP5 for establishing of an integrated network and a soil portal, WP6 for evaluation and sustainability and WP7 with focus on dissemination, awareness and clustering activities with other projects. WP2 to 4 will set up on each other. The soil and soil related data will be analysed, necessary metadata will be identified and provided and specific datasets will be systematically harmonised. The improved access to soil information by the GS Soil Portal is the main objective of WP5, while WP6 focuses on user needs and the long-term perspective of the GS Soil Portal.

At the beginning of the project specific and generic requirements for soil information, services and products have to be identified by a range of user communities and stakeholders. This requirement analysis will result in a soil inventory and theme catalogue, which documents the current state and ability of data providers to meet the goal of data harmonization. Based on this, specific content requirements and characteristics will be defined as fundament for the establishment of harmonized soil data sets.

As a fundament for harmonizing different kinds of soil data, basic information about the data sets have to be made available in the form of methodical metadata, which describe the underlying data models in depth, and which comply with a generic framework for developing application schemata for the relevant data. Therefore a schema for describing spatially linked soil data and database services to comply with the INSPIRE Directive will be developed, which meet the needs of data users for a harmonised, interoperable EU-wide, national and regional soil data infrastructure. A soil oriented metadata structure profile will be developed following the INSPIRE IR for metadata, other international, and national standards, like the ISO 19115:2003, and the needs of the data users.

In the context of data harmonization a framework will be developed that enables existing soil datasets to be linked up from one country to another. Therefore data specifications will be developed and made available as basis for designing and testing of transformations or translations. The level of spatial data consistency depends to a large proportion on user

level harmonization efforts. Such efforts will be thoroughly analysed in order to identify, to which degree pre-harmonization is needed and how it can be implemented. However, particular focus will be given to the development of user level transformation services in the context of the INSPIRE harmonization framework. Exemplary services will be developed with the objective to present comparable and meaningful data portrayal. The focus on soil map legends and soil inventory data is important because attribute and property data are crucial for developing evaluation and transformation services. The results will enter in a best practice guideline for soil data specification development under INSPIRE.

2.3 The GS Soil Portal

InGrid®, the technology of the German Environmental Information Portal PortalU® (Voegelé et al. 2007), will be used as technical base in the project to build up a European GS Soil Portal. The European web portal, GS Soil Portal, is used to bundle the decentralized distributed soil information of the 18 states (Fig. 1).

In the GS Soil Portal all soil related information, web pages, databases as well as data catalogues, can be searched by simple or advanced search queries according to the requirements of the user. The results of a query are displayed in a ranked result list independent from the data source.

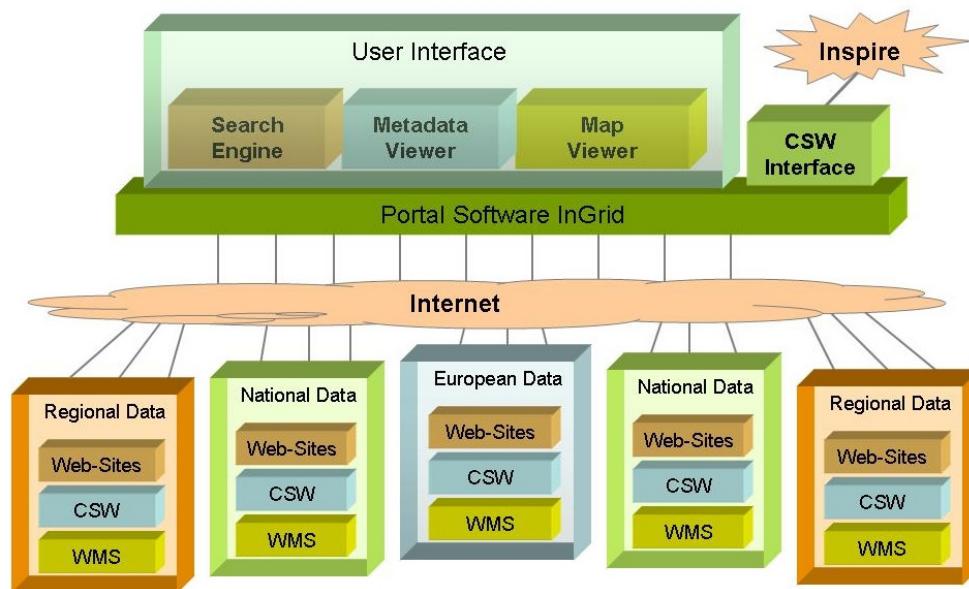


Figure 1. Architecture of the PortalU® technology InGrid®

The technology provides different kinds of interfaces to data sources (iplugs) and also interfaces for the transfer of information to other systems like INSPIRE. The most important iplug / interfaces in reference to the GS Soil project is the CSW-2.0-interface (Fig. 1). The OGC conform CSW-2.0-interface is based on the ISO standards 19115, 19119 and 19139 and the IR metadata of INSPIRE. This interface makes the exchange of spatial metadata in both directions possible. With the CSW-iplug spatial metadata sources (data catalogues) can be connected to the GS Soil Portal, while on the other hand the CSW-interface can be used to transfer spatial metadata from the GS Soil Portal to external systems. In reference to embed the GS Soil in a major spatial data infrastructure like INSPIRE the standardised CSW interface and further standardised interfaces play an important role.

The PortalU® technology provides a hierarchical structure of partners and data providers in order to consider the federal administrative structure in Germany. According to this, the federal government and the states (Bundeslaender) act as partner in PortalU®, the single data providers are accordingly subordinated to the federal government or the referring state. This structure can also be easily used on European level for GS Soil: each state will act as

partner and the data providers are allocated to the referring country. In the GS Soil Portal all soil related information will be made available and accessible. Spatial soil data from OGC compatible Web Mapping Services (WMS) and Web Feature Services (WFS) will be visualized in the map viewer.

The technology has a modular structure and is thereby easily extendible for the specific needs within the project. It is based on open source components and internal developments. Therefore it can be used without external licence costs in the project. For all tasks within the project the GS Soil web Portal will be used as platform for an improved access to the soil data.

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