PortalU®, a Tool to Support the Implementation of the Shared Environmental Information System (SEIS) in Germany

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Abstract: The German Environmental Information Portal, PortalU®, provides one-stop access to government-owned environmental information in Germany. PortalU® gives access to more than 2,500,000 webpages and more then 500,000 data and metadata sets from different national, regional and local authorities. Organisationally PortalU® is the result of a cooperation of the federal government and the 16 German states. PortalU® is build up by the software InGrid®. The software is realised very modular. It includes several interfaces including WMS, CSW and OpenSearch. The portal has a set of viewing components for the visualisation of search results, maps and metadata content. A metadata catalogue, the InGrid®Catalog, is integrated in the software. Core component of this catalogue is the ISO- and INSPIRE-compliant InGrid®Editor for collection and maintenance of metadata. A concept for the exchange and visualisation of monitoring data on the basis of the OGC-defined sensor observation service (SOS) is under development. This concept could be a model for the data exchange in a European Shared Environmental Information System (SEIS). The integration of SOS-services for data exchange and visualisation is the next step of advancement of InGrid® and PortalU®. From an organisational as well as from a technical point of view PortalU® could be a prototype for a pan-European shared environmental information system.

Keywords: Environmental information; Environmental data; Environmental information space; Environmental information system.

1. INTRODUCTION

The German Environmental Information Portal, PortalU®, provides one-stop access to government-owned environmental information in Germany. The portal integrates the access to a large number of heterogeneous and geographically distributed information sources organisationally and technically. A user-friendly interface in addition to advanced search and visualization tools enable both experts and non-experts to find and view texts of national, regional and local legislation, information about environmental policies and programmes, environmental reports, monitoring data, digital maps, and many other types of environmental information and data. As an online information portal, PortalU® (www.portalu.de) is freely accessible to all internet users.

The portal features a number of information services, among them up-to-date environmental news, access to environmental monitoring data, chronicles of environmentally relevant events, and links to new publications and events (Figure 1). Most importantly, however, PortalU® maintains an index of environmental information (metadata catalog) held by public authorities in Germany. Today PortalU® gives access to more than

2,500,000 webpages and more then 500,000 data and metadata sets from different national, regional and local authorities. The portal functions as a highly-visible and central access point to this information.
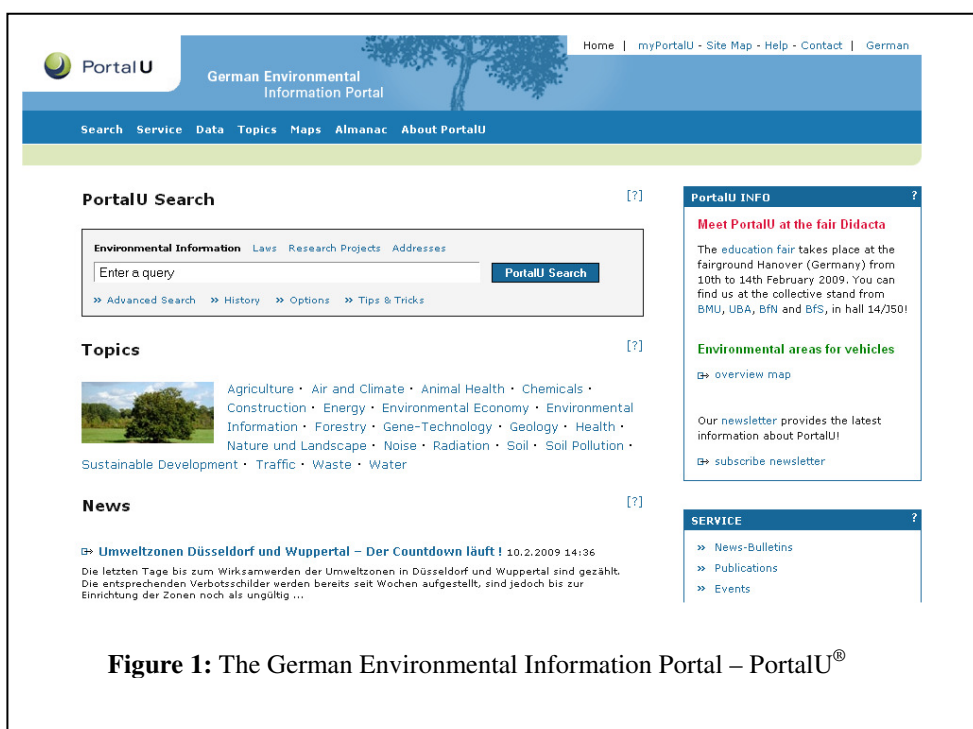

Figure 1: The German Environmental Information Portal – PortalU®

2. ORGANISATIONAL ASPECTS

Organisationally PortalU® is the result of a cooperation of federal and regional environment agencies. Funded through an administrative agreement between the federal government and the 16 German states (Länder), PortalU® could be established as a sustainable long-term project. This is important, because Germany is a federal structured country. Many information and data are collected and maintained by the regional level, the German states. So PortalU® is a national shared environmental information system and could be a model for a pan-European shared environmental information system (SEIS) not only in technical but also in organisational sense.

PortalU® is part of the administration's strategy to comply with the Aarhus-Convention and EU-Directive 2003/4/EC, both calling for better public access to environmental information. Furthermore it is the national information knot for environmental metadata in the context of the INSPIRE Directive. In future it will be the national implementation of the pan-European shared environmental information system (SEIS).

3. THE TECHNICAL STRUCTURE

The modular software of PortalU® is called InGrid®. It bundles the decentralized distributed environmental information. In InGrid® all environmental information web pages, databases as well as data catalogues can be searched by a powerful search engine. If required, spatially, temporally or semantically restrictions can be taken into account. The query results are presented in a main and a secondary result list. The results in the main list are ranked according to the relevance of the query terms for the indexed documents. The secondary list contains results from data bases, which are connected by an open interface. These results are sorted by provider. Besides the full text search, separately prepared

environmental topics from A like "air and climate" over N like "nature and landscape" to W like "water" can be browsed. These thematic web pages are particularly relevant environmental information, selected by experts to improve the understanding of environmental information for non-experts. The 21 environmental topics are subdivided in six functional classes: legislation, concepts, reports, state-of-the-environment, data and maps as well as risk-assessment. Thus in the class "water – legislation" information about waste water legislations or the Water Framework Directive (2000/60/E) should be found. The environmental and functional classes comprehend the topics, which were mentioned in annex B of the EEID (2003/4/EG). Furthermore additional components are available to improve the understanding of environmental information: the rubric "service" provides press releases as well as information about publications and events of the connected public authorities and the rubric "data" provides environmental monitoring data.

Figure 2: InGrid® Architecture
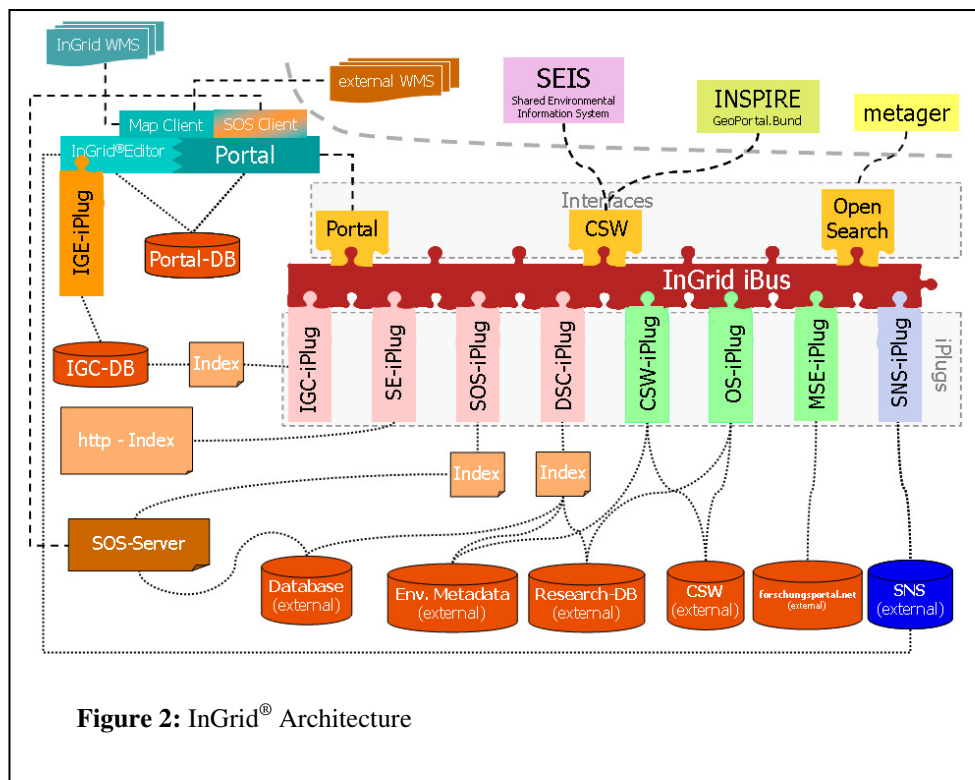
The PortalU® software InGrid® is structured in several components (Figure 2). The information bus (iBus) forms the central component of InGrid®. It receives and processes search queries, which come from the portal surface or from other connected interfaces. The search queries are transferred to the data sources and the query results were bundled and delivered again by the iBus. The information plugs (iPlugs) build a further part of InGrid®. They can be described as generic adapters to connect data sources to the iBus. Different iPlugs are implemented to connect different kinds of data sources. Data bases and expert information systems for instance are connected by the data source client (DSC) iPlug. Thus, an access to parts of the so called hidden web is realised. New data sources are easily integrable by connecting them to existing iPlugs or by adding a new specific iPlugs. The InGrid® database module consists of two parts: the database of the InGrid®Catalogue (IGC) and the portal database. Metadata of the environmental catalogues are stored in the IGC, while internal information like the user administration are stored and managed in the portal DB. Furthermore metadata can be created and managed with the InGrid®Editor (IGE). Further components are an integrated web map service (WMS), a WMS viewer and certainly the websurface of the portal.

4. THE INGRID®CATALOG

One of the core components of PortalU® is a metadata catalogue (InGrid®Catalog) for environmental information. The metadata model of the InGrid®Catalog is compatible to geographical standards like ISO 19115 and 19119 and the INSPIRE implementation rules and beyond these it is quite flexible. It allows storing of meta-information not only for geographic datasets and series and for geographic services but also for all kinds of environmental information such as non-geographic datasets, non-geographic services and documents.
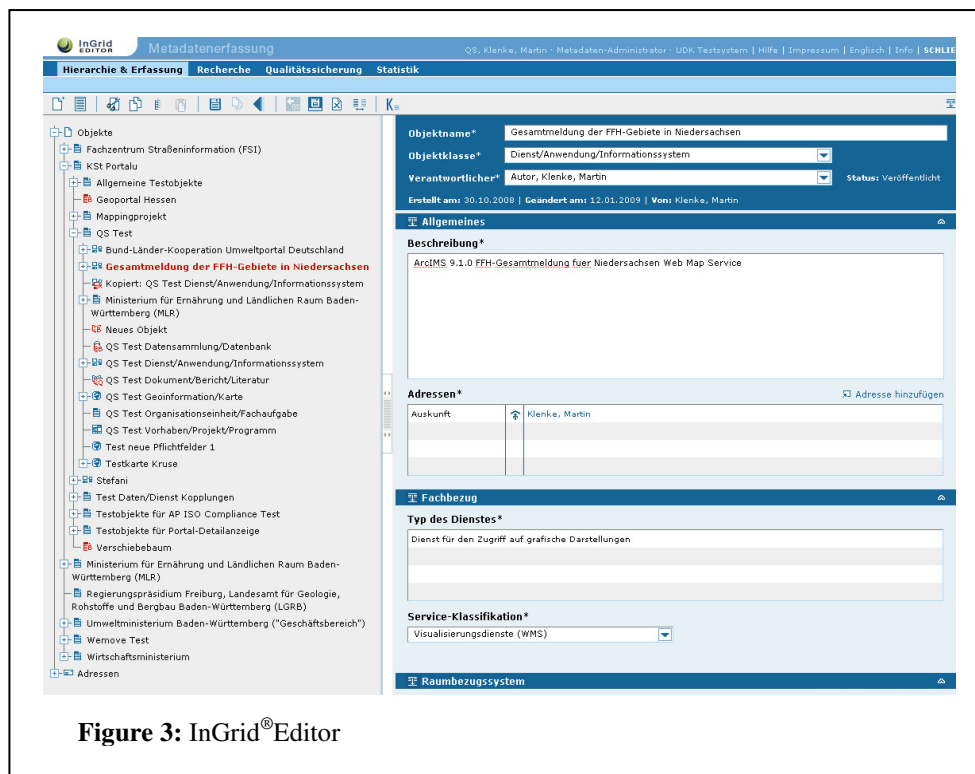

Figure 3: InGrid®Editor

PortalU® is optimized for discovery of geographical and non-geographical data by searching after the describing metadata. For example it is possible to visualise a map in the PortalU® map viewer by one click on a link in the related metadata. Also it is possible to search for example for time series of monitoring data via an internal interface in the original database and visualise the data by use of the original visualisation methods of the database in the web.

A user friendly Editor, the InGrid®Editor (Figure 3), for collection and maintenance of metadata is integrated as a core component of the InGrid®Catalog. It includes some highlights like hierarchically organized metadata for the quick and user oriented access to the metadata objects or separated addresses to minimize time and effort to maintain them. There are different wizards to add the metadata for services, to add information about documents or to generate a list of keyword for a metadata set. Furthermore a workflow management guaranties high quality of the metadata. So the responsible user will be informed about expired metadata sets and a quality manager can control the content of the new or changed metadata sets.

5. TOWARDS SEIS

It is planed to expand PortalU® to fulfil reporting obligations from the regional towards the national authorities as well as the reporting obligations from the federal government to the European commission. For this purpose the direct access to monitoring data shall be integrated into the system. Altogether a basis shall be established to visualize the data and to create reports in form of standardized documents, tables and spreadsheets. In near future a technical concept for these purposes will be developed.

Figure 4: Network of SOS-Services
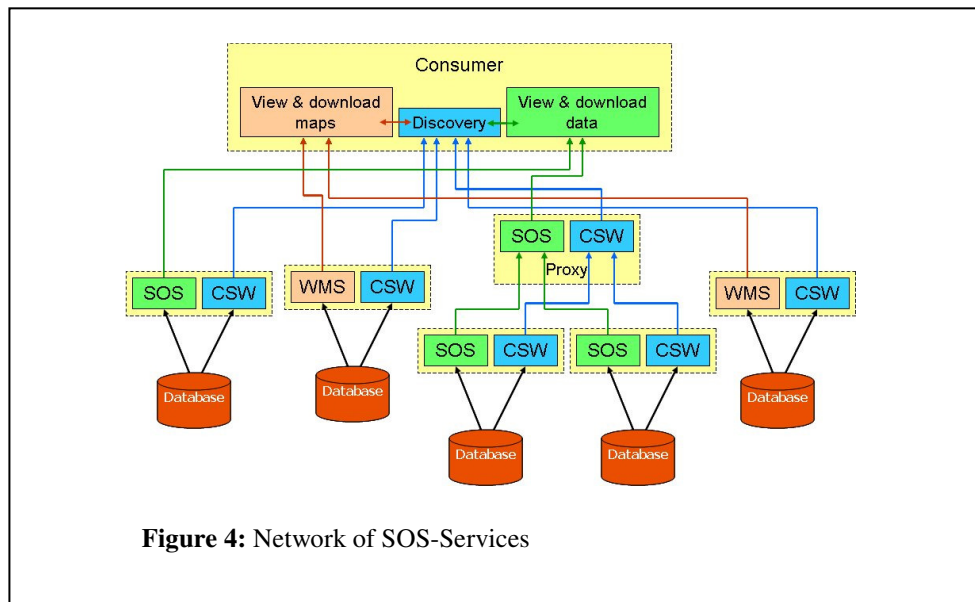
Today the software InGrid®, on which PortalU® is based, integrates standardised interfaces for catalog services (CSW) and for mapping services (WMS). In future the interfaces shall be advanced to support sensor observation services (SOS) for transfer and visualization of monitoring data (Figure 4). The metadata will be automatically generated by using the GetCapabilities and the DescribeSensor operations. It will be indexed and stored in the InGrid®-like way. The metadata can be discovered by the InGrid® portal surface or by the CSW-interface (Figure 2). The exchange of monitoring data will be routed via the SOS-interface. The portal surface of InGrid® will be extended by a SOS-viewer to visualize monitoring data.

6. CONCLUSIONS

Organisationally PortalU® acts on different administrative levels. It integrates the access to a large number of heterogeneous and geographically distributed information of many providers from different administrative levels.

Technically it is a distributed system that leaves the information at the providers but offers a single access point to all information to the users. It supports all interfaces that are in discussion in the scope of environmental or geographical information. It complies with all requirements of the INSPIRE directive and with ISO or OGC standards related to geographical information.

So from an organisational as well as from a technical point of view PortalU® could be a prototype for a pan-European shared environmental information system.

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