

InGrid

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The development of a metadata editor in the context of INSPIRE

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Abstract

The software InGrid was developed for creation and operation of the German Environmental Portal, PortalU. Meanwhile it is not only be used to operate this central German portal but also in many German states, in the municipal sector, as research portal or in European projects. The software includes an integrated metadata catalogue the InGrid-Catalog, which offers among other things an OGC- and INSPIRE-compliant interface. The metadata are be maintained via the also integrated InGrid-Editor. This editor provides a usability optimised surface, which allows an OGC- and INSPIRE-compliant creation and maintenance of metadata. The data model as well as the surface of the editor has been made flexible, to support also future INSPIRE data specifications.

1. Introduction

It has been nearly twenty years since the beginning of the development of an editor for environmental metadata for the public administration in Germany. With the environmental catalogue (UDK = Umwelt-DatenKatalog) the German environmental administration designed one of the first catalogues of data sources in Europe.

Over the years the UDK was developed in the context of different technological platforms. Beginning with a desktop software solution which had supported a wide range of operating systems, the software the solution at the beginning of the last decade was a Microsoft Windows based software for editing und maintenance of metadata.

After the cooperation of the public environmental administration was expanded from metadata to all kind of environmental information, the German Environmental Information Portal, PortalU was established. The software which is running in the background of the portal is called InGrid. An important module of this software is the InGrid-Catalog. After the development of version 2.0 of InGrid in 2009, the metadata editor was also included in the software package. Since then the metadata creation and maintenance is done online via a web interface.

Nowadays, the federal government and 14 German states collect and maintain their environmental metadata with the InGrid-Editor, which is the editor module of the InGrid-Catalog.

2. Legal background

The development of environmental information systems in Germany was driven by different forces. One of them was the EU environmental information directive 90/313/EWG in 1990, which was implemented by the environmental information law in Germany in 1994. The directive was replaced by the EU directive

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2003/4/EC on public access to environmental information, which was implemented by the German federal government and the German federal states by environmental information laws on the different levels of administration. These laws give the public the right of information on environmental issues. Thereby the definition of “environmental information” is not limited to the classical environmental resorts but covers also environmental themes like traffic or human health. The German Environmental Information Portal, PortalU covers all these themes not only on the level of highly aggregated information like web-pages but also on the level of environmental data and at least on the level of metadata.

3. The InGrid-Catalog (IGC)

As written above the German Environmental Information Portal PortalU is developed in the spirit of the environmental information directive and the environmental information laws in Germany and is based on the software InGrid. Besides the portal and map components, the most important part of the software is the InGrid-Catalog (IGC), which is the metadata component.

The InGrid-Catalog itself consist of three parts. There is the portal component, which allows for searching the catalogue and displaying the details of the metadata sets in a user-friendly manner. The second component is the Catalog Service Web (CSW) interface. It complies with the standard CSW 2.0.2 AP ISO1.0. The third component is the InGrid-Editor (IGE), which complies with the ISO standards ISO 19115 and ISO 19119.

In 2007, the EU directive 2007/2/EC for establishing an Infrastructure for Spatial Information in the European Community (INSPIRE) entered into force. This directive focuses directly on geographic information and services. As many of the environmental information have geographic relevance, the INSPIRE directive is of great importance to the environmental sector of the public administration. One key aspect of the directive is the regulation of metadata about relevant datasets and services.

After the publication of the INSPIRE implementing directive regarding metadata it was necessary to customise the IGC. The new regulation demanded for further elements or a more specific treatment of existing elements, which made these changes in the IGC software inevitable, as mandatory elements of the ISO and INSPIRE metadata regulations of course have to be mandatory elements in the IGC data model. Furthermore, all core elements of the ISO and the whole set of elements of the INSPIRE regulations for metadata are core elements of the IGC data model.

Besides all technical and thematic needs an attractive surface of the portal module for presenting the metadata is necessary. A clearly arranged and simply understandable presentation of the content of the metadata was an important issue for the development of the components of the InGrid-Catalog.

4. The Catalog Service Web (CSW) module of the IGC

For the purpose of discovery and retrieval of metadata a CSW interface was integrated in the IGC (IGC-CSW). In the regulations of the INSPIRE directive a CSW interface isn't explicit required. However a CSW interface is the de-facto standard to exchange metadata between different metadata catalogues. The interface, which is implemented in the InGrid-Catalog, complies with the standard CSW 2.0.2 AP ISO1.0. So it can be easily used as a data source by the Geoportal.de of the German spatial data infrastructure (GDI.DE) or the European INSPIRE portal.

Thereby the CSW of the IGC works like a broker. It uses not only the different InGrid metadata catalogues of the federal government and the German states as data sources but also integrates external metadata catalogues which works on the basis of a CSW 2.0.2 interface. The IGC-CSW operates the enquired search queries on all connected InGrid-catalogs and on the connected external CSW catalogues too. Thereby the searches will not be executed directly on the metadata database but on an index which was

generated in periodical intervals. The content of the external CSW Services is being cached and indexed periodically too. So all queries on the IGC-CSW can be executed with a high performance and delivered together by a unique ranking mechanism based on the open source technology Lucene.

The CSW of the InGrid-Catalog meets not only the implementing regulations for metadata but also for discovery services.

5. The InGrid-Editor (IGE)

The main concern for the development of the editor is to enable the best user experience possible. So the IGE does not display the hierarchy of the ISO as it is common in many other metadata editors. Rather, the metadata elements are presented in a flat form, grouped by functional categories. Hereby it is possible to guide the user along a logically organized structure through the elements of the form. Furthermore, the number of elements is reduced to a subset of ISO elements. The composition of elements in this subset is the result of nearly 20 years of user experience in the German environmental community. Furthermore, only the mandatory fields are shown whereas the optional elements are hidden, when a user takes a first view on the form. This layout shows the most important elements first and allows for a well-arranged appearance.

The IGE offers some special features, which are not common to most metadata editors. The metadata objects of the catalogues are presented in a hierarchical tree. Thus, it is easy to handle user rights for sub trees of metadata objects. For the users of the editor it is possible to access their metadata easy and fast by just clicking through the hierarchy. Also a separate address management is integrated. So every address has to be created only once and can be maintained on one central point. The addresses are only linked to the points metadata set where they are necessary.

These usability questions are often neglected just from a technical point of view. For the acceptance of an editor and at least for the content quality of a metadata catalogue these questions are of vital importance.

6. Advancement of the IGE in the spirit of INSPIRE

Since 2005 metadata in the environmental community in Germany are maintained in an ISO 19115 and ISO 19119 compatible format. First a desktop software solution, the UDK, was used for this purpose. Since 2009 the IGE is used for creation and maintenance of metadata compatible to the INSPIRE regulation regarding metadata. In 2010 the INSPIRE regulation regarding interoperability of spatial data sets and services entered into force. Additionally, the guidelines for data specifications for the data themes of Annex I of INSPIRE directive was approved. All these documents define or refine specifications for additional metadata elements. In order to comply with all these specifications, in 2010 the InGrid-Editor was upgraded. So the metadata, maintained by the IGE, are compatible to the data specifications for the Annex I themes, too.

This year it is planned to finalize and approve the guidelines for data specifications for data themes of INSPIRE Annex II and III. It is expected that additional metadata elements will be defined in those documents. It is an enormous challenge to adapt a metadata editor to this definition in short term. So the German environmental community decided to introduce a new paradigm into the InGrid-Catalog data model. Now it is possible for an administrator of an InGrid-Catalog to modify the data model by adding or modifying metadata fields. Changes to the software are no longer necessary. This makes it easier to react to new requirements of the data specifications or any other legislative regulation by simply changing the catalog configuration. The user interface of the InGrid-Editor can be configured in the same fashion. It is assured that the flexibly defined metadata elements can also be displayed in the query result in the portal

and the CSW interface. Hereby, a freely configurable mapping mechanism is installed to make sure that additional metadata elements will be supported by retrieval interfaces.

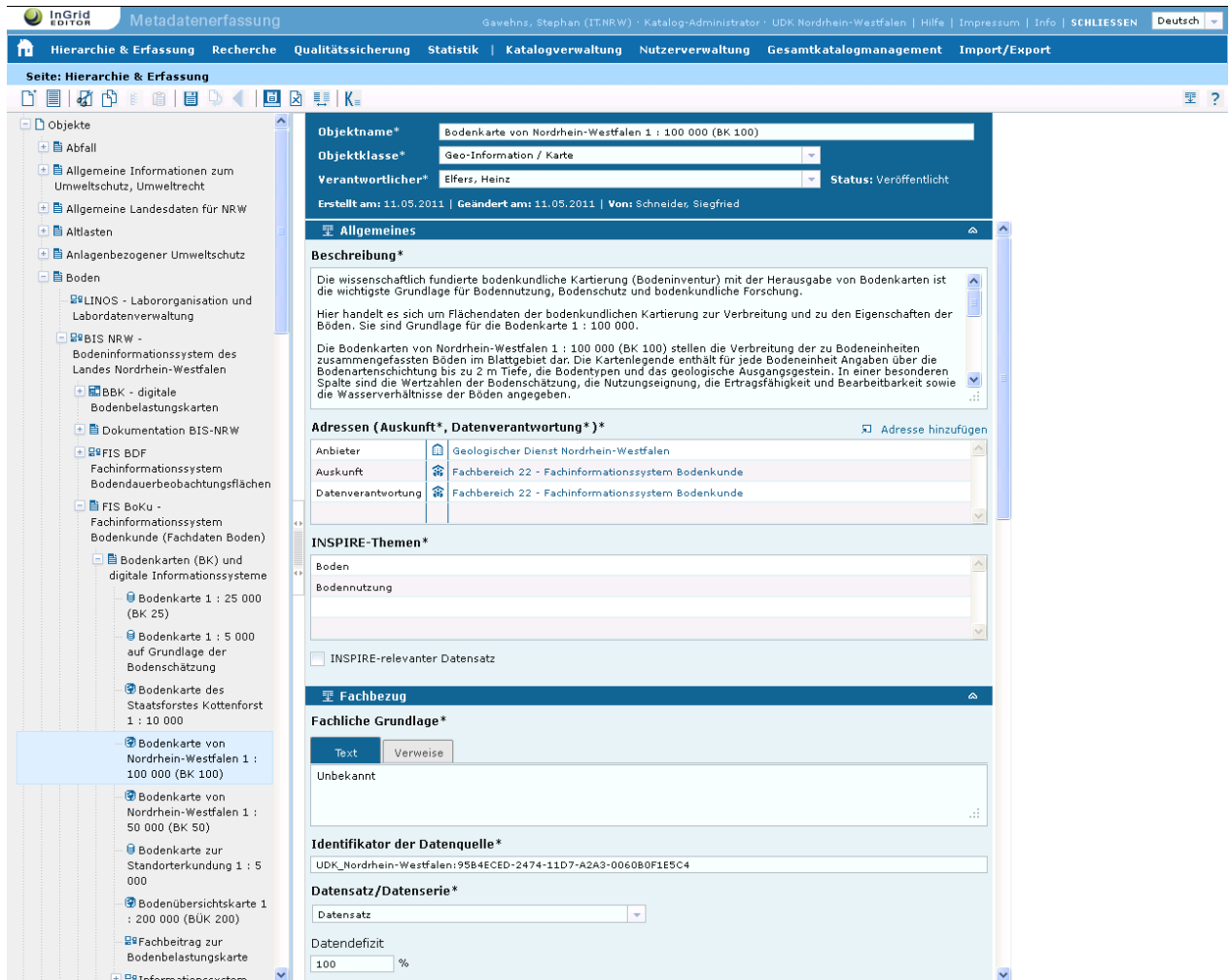


Figure 1: The InGrid-Editor (IGE)

The version 3.0 of the InGrid software now contains the new, flexible version of the editor, which can be adapted easily to the needs of the user and the requirements of legal regulations.

7. Use of the software InGrid

The software InGrid including the IGC and the IGE is not only used to run the German Environmental Portal PortalU, many partner of the cooperation use the software to run their own portals. In the German states Rhineland-Palatinate, Saxony, Saarland and Lower Saxony the software is used to build up their own environmental portals on state level. Furthermore, the Communal Environmental Portal of Lower Saxony is based on InGrid. The research server “Biosphärenreservat Bliesgau“ is also run by InGrid. In addition the InGrid-Catalog is used in the German states Saxony-Anhalt and Hamburg as the default

metadata catalogue for the whole administration. On the European level InGrid is the basic software which runs the portal of the eContentPlus project GS Soil, the GS Soil Portal.

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