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**Toponymic data files and gazetteers:
Data services, applications and products
for example, gazetteers and web services)**

Geoportal.DE – providing a search utility for places, addresses and spatial data sets and services in the context of the spatial data infrastructure of Germany (GDI-DE)

Submitted by Germany **

Summary

The Geoportal.DE is a common component of the German Federal Government, the Federal States and the municipalities. It was launched in March 2012 and provides insight into the spatial data infrastructure of Germany (GDI-DE). It comprises a search utility for spatial data sets and services, for places and addresses in the context of the GDI-DE and several thematic maps covering Germany. The thematic maps will be continuously extended - amongst others with a map showing geographical regions of Germany related with touristic information. Geoportal.DE improves transparency and user awareness for GDI-DE. This is likely to reveal potential benefits to decision makers and speed up progress within GDI-DE.

1. Background

The spatial data infrastructure of Germany (GDI-DE) is a common project of the federation, the 16 federal states and the municipalities. The overall goal of which is to make spatial data existing in numerous institutions across different administrative levels available for decision-making processes of all kinds in public administration, business, science and society.

A wide range of different applications (e.g. geoportals) have been built up that provide discovery functionality for spatial data sets and services and generally make use of them. However, they either focus on a given administrative unit (e.g. federal state, municipality) or a specific domain (e.g. environment). A lack of an application that provides insight into the entirety of spatial data sets and services that have already been described and/or made available according to the GDI-DE architecture by numerous institutions across different administrative levels in Germany existed. Thus, there was no way to easily gather which spatial data and services were already available, or, put differently, what GDI-DE consisted of.

This is why a common Geoportal.DE providing insight into GDI-DE has been developed. It utilizes several Web Services from GDI-DE. Users can promptly search within the central search engine of GDI-DE, which currently contains around 87.000 decentrally maintained sets of metadata on spatial data and spatial data services from across all levels of public administration in Germany. Many of the described spatial data sets can be easily added to the Map Viewer, which offers three different background maps based on the official basic spatial data from the surveying authorities of the federal states.

2. Search utility for places and addresses

The Geoportal.DE application is completed by a search utility for places and addresses. This search utility has been developed at GeoDatenZentrum of BKG and is widely used in the portal application. It builds upon the data set 'Georeferenced Address Data Federation' [BKGa 2011] and parts of the dataset 'Geographical Names' [BKGb 2012]. The previous one mainly consists of data from the 'Association for the Distribution of House Coordinates' run by the surveying authorities of the federal states. After processing this dataset provides point coordinates for house addresses and encircling bounding boxes of streets, places and zip codes.
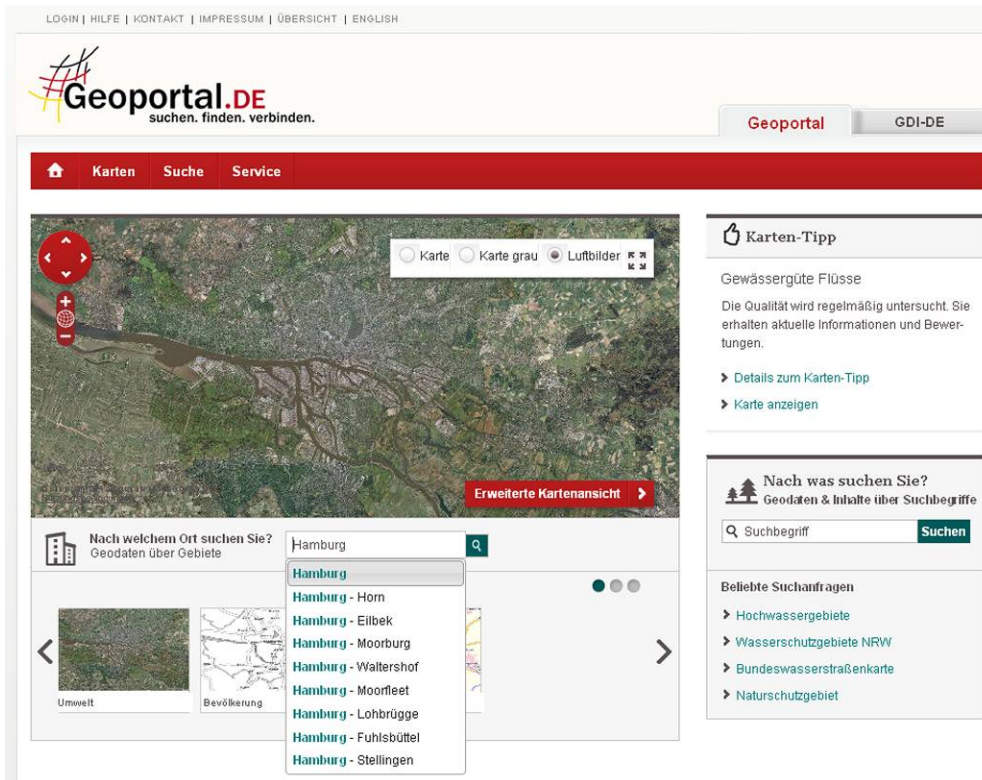
Abb. 1: Geoportal.DE welcome page with the search utility for places and addresses

The search utility implements two search strategies: a high performance live suggest search on the one hand and a fault-tolerant search. The live suggest search can be used for the automatic completion of user input in an application. Words matching the search term are highlighted. While in the results of the live suggest search only the elements of the objects' name respectively address are shown, the fault-tolerant search provides the complete dataset including geometry. If the match between search term(s) and results is weak, a list of similar places or addresses is offered. The search utility is able to handle unstructured input of addresses (cp. Fig, 2).

Abb. 2: The search utility within the Geoportal.DE – live suggest during user input

The search utility has been implemented as Java-Servlet and offers an HTTP/Key-Value Pair interface. For data indexing the Apache Lucene library is used in a pre-release snapshot of version 4 [Apache 2012]. For geometry handling and implementation of OGC-standards the GeoTools library is used [GeoTools 2012]. Overall, there is a total of 23 million indexed datasets with an aggregate data volume of approximately 3 GB. The index is build once before service startup and is loaded into the central memory.

3. Several featured maps covering Germany

Meaningful combinations of map layers available within GDI-DE are placed prominently on the Geoportal.DE Welcome page as featured maps. Especially by overlaying spatial information layers from different institutions the value added through the use of interoperable spatial data services is demonstrated.
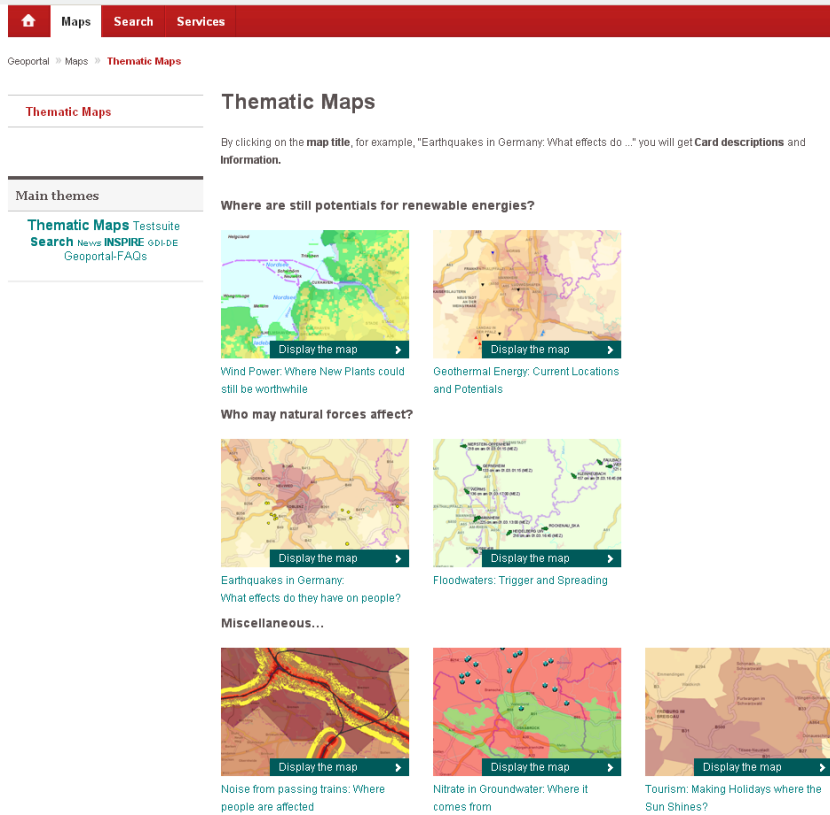

Abb. 3: Geoportal.DE as a showcase for SDI through featured maps

An important criterion for the selection of featured maps in the first phase was their Germany-wide coverage. As of now, seven featured maps are online visualizing spatial data from several federal agencies. An overview of featured maps can be found in Geoportal.DE [Geoportal.DE 2012].

The selection of featured maps will be extended continuously during operation - also to maps covering only municipalities, regions or federal states.

To be independent of the Quality of Service of the institutions providing map layers, a caching mechanism is used. It is realized with the Open Source Software MapProxy [MapProxy 2012]. Featured maps are integrated into the viewer component of Geoportal.DE as Web Mapping Service 1.1.1. Requests for attribute information are passed on to the original services.

4. Future Plans

The dataset Geographical Names [BKGb 2012] is derived from the very comprehensive names dataset Geographical Names of Germany [GN-DE 2012], the latter one providing the unique source for all BKG products and naturally for the national (gazetteer) web feature service, too. Since 2007 this national gazetteer service is providing geographical names in the officially recognized Sorbian and Frisian languages. The integration of

those minority language names in the search utility for places and addresses of the Geoportal.DE is envisaged for 2012.

The selection of thematic maps covering Germany will be extended continuously. In 2012, amongst others, a map showing the geographical regions of Germany [Regions 2008] related with touristic information will be integrated. By that, one important product created by the German Permanent Committee for Geographical Names (StAGN) will be published and disseminated in the broader GDI-DE context.

5. References

[BKGa 2011] *Georeferenzierte Adressdaten Bund*, documentation of the dataset, 2011, online accessible through http://www.geodatenzentrum.de/docpdf/gab.pdf , latest hit 01/2012.

[BKGb 2012] *Geographische Namen 1 : 250.000* (GN250), documentation of the dataset (in German only), online accessible through http://www.bkg.bund.de/nn_147352/DE/Bundesamt/Produkte/Geodaten/Geographische-Namen/GN__node.html__nnn=true , latest hit 01/2012.

[Apache 2012] Apache Lucene: http://lucene.apache.org , latest hit 01/2012.

[GeoTools 2012] http://geotools.org/, latest hit 01/2012.

[MapProxy 2012] http://mapproxy.org, latest hit 01/2012.

[Geoportal.DE 2012] http://www.geoportal.de/EN/Geoportal/Maps/Thematic-Maps/thematic-maps.html?lang=en, latest hit 05/2012.

[GN-DE 2012] *Geographische Namen Deutschland*, the (gazetteer) WFS service (wfs_gnde) is online accessible through http://www.bkg.bund.de/nn_173152/DE/Bundesamt/Geoinformation/Geoinformation-Dienste/GI__DiensteWebAnwendungen__node.html__nnn=true

[Regions 2008] *Bundesrepublik Deutschland 1 : 1 000 000, Landschaften - Namen und Abgrenzungen*, 5th edition (Federal Republic of Germany at 1: 1,000,000 scale, Geographical regions - names and boundaries, 5th edition. Federal Agency for Cartography and Geodesy (BKG)