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**Toponymic data files and gazetteers (data processing and tools, database management, data dissemination: products and services) (Working Group on Toponymic Data Files and Gazetteers)**

# Maintaining and publishing the geographical names database within the German spatial data infrastructure

**Submitted by Germany****

Summary:

In Germany, all geographical names-related information on several (topographic) vector data products based on a scale of 1:250,000 and smaller is maintained in a single database entitled "Geographical names of Germany". Through unique identifiers, the name entered in the database are linked unambiguously to all databases and products provided by the Federal Agency for Cartography and Geodesy. At present the database contains about 165,000 entries, including more than 1,700 names in the minority languages Sorbian, Frisian and Danish. Recently, the last remaining geographical names in Sorbian languages were divided into Upper and Lower Sorbian with the help of the Permanent Committee on Geographical Names for the German-speaking area.

The administrative and maintenance tasks for the database are carried out in Frankfurt am Main, while the (Gazetteer) web service is facilitated through the National Geodata Centre at the Federal Agency for Cartography and Geodesy in Leipzig (www.geodatenzentrum.de).

The dataset is currently used for the provision of geographical names data within the German spatial data infrastructure. The database has been brought into conformity with the implementing rules on interoperability of spatial data sets and services (that is, data specification for geographical names (annex I)) of the Infrastructure for Spatial Information in Europe (INSPIRE).

The geographical names dataset of the Federal Agency (in conformity with INSPIRE) is already available through the European data portal (http://www.europeandataportal.eu/de/). The data portal collects metadata from public-sector information that is available in European countries.

In 2017, the physiogeographical regions of Germany, combined with tourist information, were integrated as map layers within the site Geoportal.de. Plans are under way to add geographical names (exonyms)

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Introduction

In Germany, all geographical names information of several (topographic) vector data products based on scale level 1:250.000 and smaller is maintained in a single database called ‘Geographical Names of Germany (GN-DE)’. Through unique identifiers the names entries of the GN-DE are linked unambiguously to all databases and products provided by the Federal Agency for Cartography and Geodesy (BKG). The administration and maintenance tasks of the GN-DE are conducted in Frankfurt am Main at the headquarters of BKG, the German national mapping agency responsible for small to medium scale mapping, whereas the publication of the geographical names data is facilitated through a web (gazetteer-) service by the BKG Central Service and Distribution Center for Geoinformation in Leipzig [1].
Today, GN-DE includes all relevant object/feature types from the digital landscape model scale 1:250.000 (DLM250), which have one or more geographical names (for reasons such as multilingualism).

**Maintaining and publishing the national geographical names database (GN-DE)**

The object/feature themes of the GN-DE geographical names database are: ‚settlement‘, ‚transportation‘, ‚vegetation‘, ‚hydrography‘, ‚relief‘, ‚areas‘ and ‚regions‘ with attributes regarding the administrative hierarchy (administrative code), river system (hydrographic key number in accordance with the German Working Group on water issues (Bund/Länder-Arbeitsgemeinschaft Wasser -LAWA), number of inhabitants, size (area, length), position (geometry data from DLM250 as well as additional attributive geographical coordinates), postcodes, status, language of the geographical name and height data (in meters).
The data model GN-DE was developed and has been evolved continuously by BKG following UNGEGN resolutions. Today, all geographical names entries of the GN-DE are linked unambiguously to all databases and products provided by BKG through unique identifiers (UID).

GNObjekt

| nnid | landescode | beschreibung | geolaenge | geobreite | hoehe | groesse | ewz |
|---|---|---|---|---|---|---|---|
| DEBKGGND00000IUD | 276 | | 14,4276880830704 | 51,1808680587142 | | 67 | 39845 |

Endonym

| nnid | name | geschlecht | sprache_id | status_id |
|---|---|---|---|---|
| DEBKGGND00000IUD | Bautzen | | 1 | 1 |
| DEBKGGND00000IUD | Budyšin | | 13 | 1 |

Status 1 = official

Language 1 = german
Language 13 = upper sorbian

DLMLink

| ui_id | nnid |
|---|---|
| DEBKGDL100000EAQ | DEBKGGND00000IUD |
| DEBKGDL200000WJK | DEBKGGND00000IUD |
| DEBKGDL2000017O7 | DEBKGGND00000IUD |

PLZ

| nnid | plz |
|---|---|
| DEBKGGND00000IUD | 02625 |

*Figure 1 - GN-DE database table showing that one GNObject may be associated to one or more geographical names (endonyms) in different languages. The example shows the GNObject associated with ‘Bautzen’ (in German language) and ‘Budyšin’ (in Sorbian languages)*

At present the GN-DE database contains about 165,000 entries including more than 1700 names in the languages of the national Sorbian (Upper and Lower), Frisian and Danish linguistic minorities. About 27,000 entries indicating the gender of hydrographic features are contained as well. BKG has been providing geographical names to the general public through the Internet since 2006.
Recently the last remaining geographical Names in just Sorbian Languages were divided into Upper and Lower Sorbian with the help of the Permanent Committee on Geographical Names (StAGN) of the German-speaking area.
The gazetteer web service application 'Geographical names' is based on a Web Feature Service (WFS) called 'WFS GN-DE' and is thus compliant with the corresponding Open Geospatial Consortium (OGC) specification [2].
With the web service application you can search the geographical names contained in the dataset GN-DE online. Lately it was relaunched with a new design.

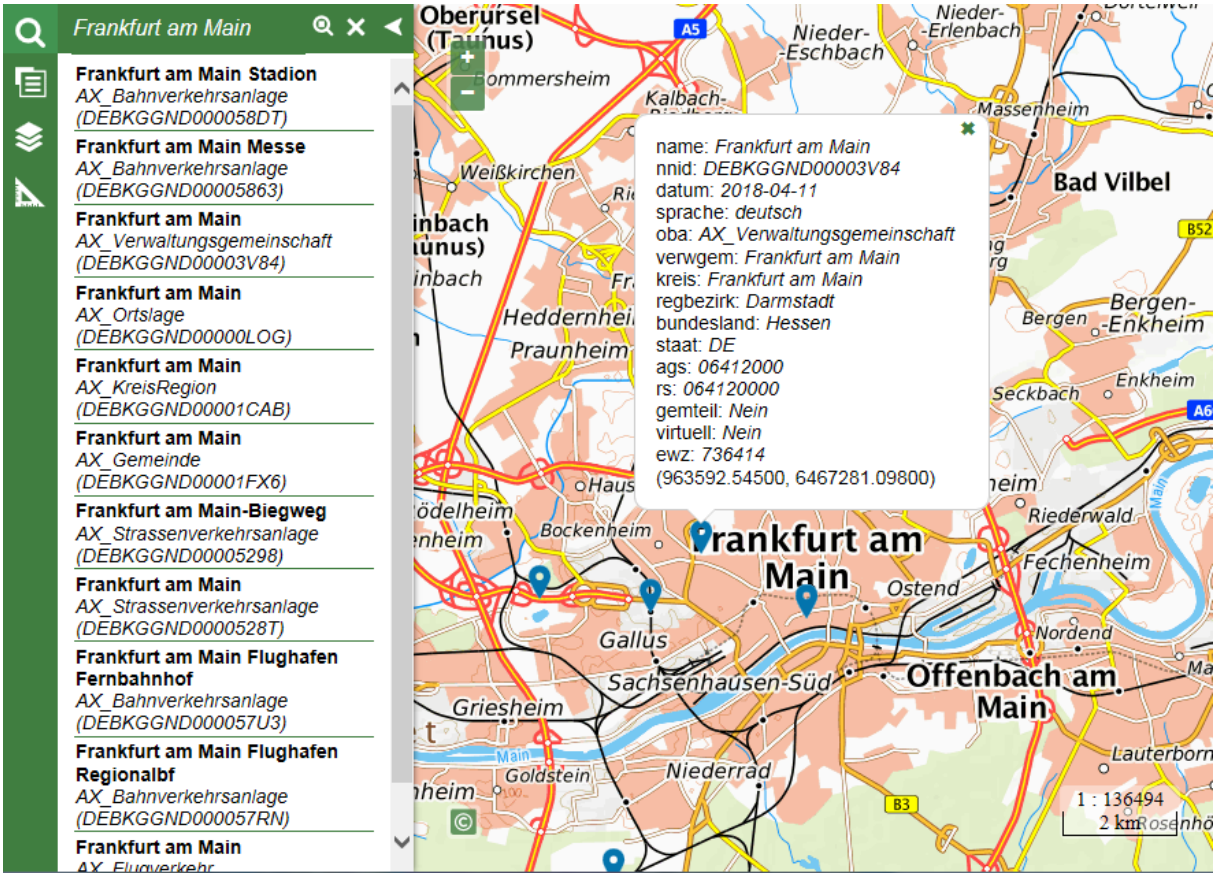

*Figure 2 – Screenshot from the German geographical names application based on a Gazetteer Web Feature Service (WFS)*

**GN-DE within the German Spatial Data Infrastructure (GDI-DE)**

The GN-DE dataset is currently used for the geographical names data provision within the 'German Spatial Data Infrastructure (GDI-DE)'. GN-DE is the rationale for the INSPIRE data provision for European purposes as it is the only dataset in Germany that includes the mandatory and almost all 'voidable' INSPIRE attributes (like language, status, gender, …). A wide range of different applications (e.g. geoportals) has been built up that provides discovery functionality for spatial data sets and

services and generally make use of the functionality. In Germany, the Geoportal.de provides insight into GDI-DE. 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. The Geoportal.de application is completed by a search utility for places and addresses.

This search utility has been developed at the BKG Central Service and Distribution Center for Geoinformation and is widely used in the portal application. It builds upon the 'Georeferenced Address Data Federation' data set and parts of the very comprehensive names dataset 'Geographical Names of Germany' (GN-DE) derived as dataset 'GN250', Geographical Names of Germany (1:250.000) [3]. As mentioned before, GN-DE provides the unique source for all BKG products and naturally for the national (gazetteer) web feature service, too. GN-DE also provides geographical names in the officially recognized Sorbian and Frisian minority languages. The integration of those minority language names in the search utility for places and addresses of the Geoportal.de is envisaged, but not realized as yet (2019).

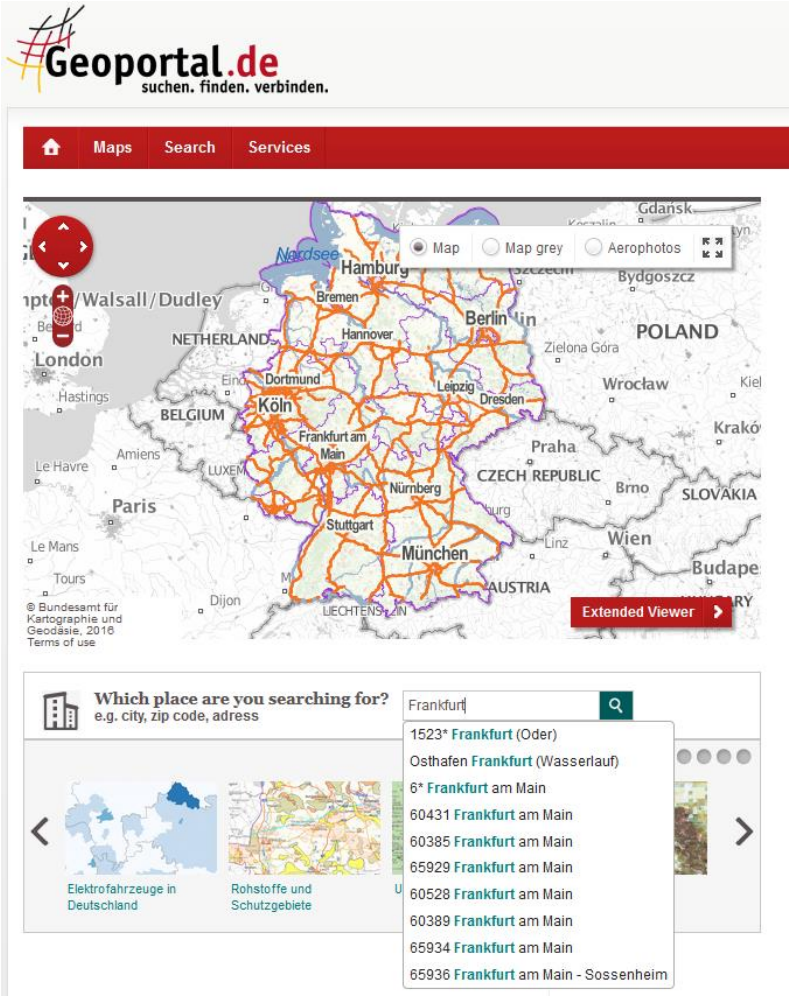


*Figure 3 - The German national geographical names database (GN-DE) published as a web service which is part of the national spatial data infrastructure (GDI-DE) and visualised through the Geoportal application (Geoportal.de)*

The ‘Georeferenced Address Data Federation’ dataset mainly consists of data from the ‘Association for the Distribution of House Coordinates’ run by the surveying authorities of the Länder. After processing, this dataset provides point coordinates for house addresses and encircling bounding boxes of streets, places and zip codes. Overall, there is a total of 23 million indexed address datasets with an aggregate data volume of approximately 3 GB. The index is built once before service start-up and is loaded into the central memory.

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. The selection of thematic maps covering Germany will be extended continually.

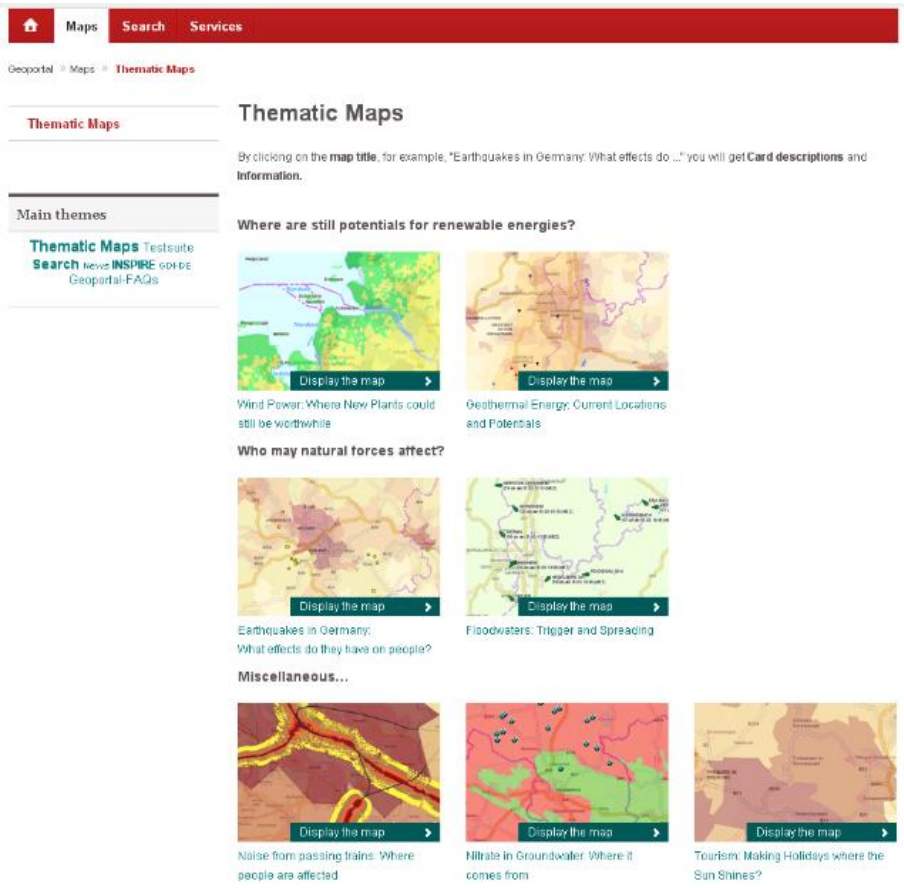


*Figure 4 - Geoportal.de as a showcase for Spatial Data Infrastructure (SDI) through featured maps*

In 2017 the physiogeographic regions of Germany combined with touristic information were integrated into the Geoportal.de [4]. It is planned to add geographical names (exonyms) in languages from the bordering states as additional information. The development of this service is described in another Conference Paper. In this way, one important product created by the German Permanent Committee on Geographical Names (StAGN) will be published and disseminated in the broader GDI-DE context. Considering multilingualism and the cultural heritage in Europe, people often use different spellings and languages when talking about one and the same place. Even within a country more than one (official) spelling is used. These INSPIRE-supported principles also underline the United Nations

resolutions on the standardization of geographical names which are reflected in Germany in the work of the Permanent Committee on Geographical Names (StAGN).

**GN-DE brought into conformity to INSPIRE**

The geographical names database GN-DE and the Implementing Rule for ‚Interoperability of Spatial Data Sets and Services' (this is, data specification of geographical names, Annex I) of the European geospatial data infrastructure (keyword: INSPIRE) have been brought into conformity [5].

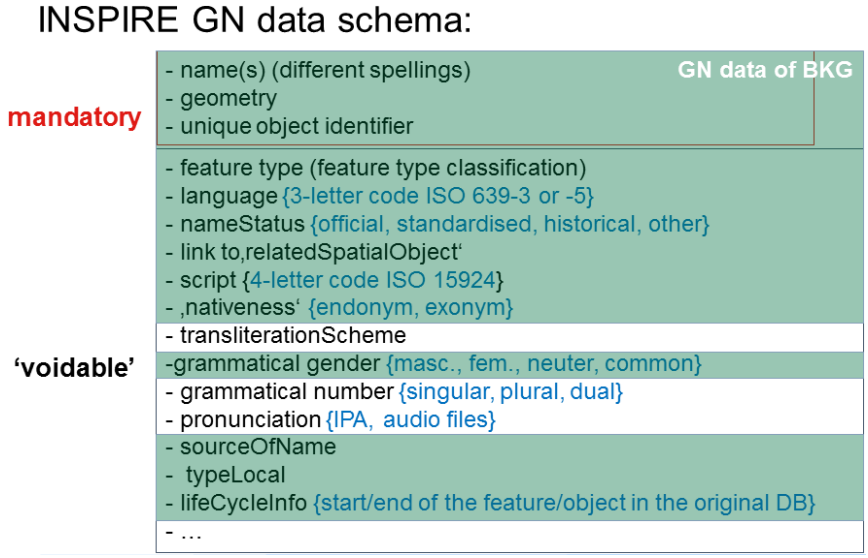


*Figure 5 - INSPIRE Data schema fulfilled by BKG*

Since 2015 the INSPIRE-conform geographical names dataset of BKG is available via the European data portal (http://www.europeandataportal.eu/de/) as well. The European data portal collects metadata from information of the public sector which is available in European countries. This also includes information regarding the provision of data and the advantages of their further use.

Currently the INSPIRE-conform geographical names dataset of BKG provides lifecycle information for every object. For complete new objects it just gets a new date in beginlifespanversion. At a change of the object the date in beginlifespanversion will be updated. Every change in attributes and geometries is taken into account. If an object cease to exist a date in endlifespanversion is set, but no changes in beginlifespanversion.

**References**

[1] Central Service and Distribution Center for Geoinformation at BKG, www.geodatenzentrum.de, last accessed 01/2019
[2] Geographische Namen Deutschland – GN-DE, the (gazetteer) WFS service (wfs_gnde), http://www.geodatenzentrum.de/xml/WFS_gnde.xml, last accessed 01/2019
[3] Geographische Namen 1:250,000 (GN250), documentation of the dataset (in German only), http://www.geodatenzentrum.de/docpdf/gn250.pdf, last accessed 01/2019
[4] Bundesrepublik Deutschland 1:1,000,000, Landschaften - Namen und Abgrenzungen, 6st edition (Federal Republic of Germany at 1:1,000,000 scale, Geographical regions - names and boundaries, 6st edition. Federal Agency for Cartography and Geodesy (BKG)

[5] INSPIRE Implementing Directive (COMMISSION REGULATION - EU - No 1089/2010 of 23 November 2010 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards interoperability of spatial data sets and services), https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:323:0011:0102:EN:PDF, last accessed 01/2019

**Points for discussion**

The Group of Experts is invited to:

a) Take note of the report and progress made by Germany;

b) Comment and provide guidance on the work being carried out