



INSPIRE

Infrastructure for Spatial Information in Europe

Member State Report: Germany, 2010

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Abbreviations

GDI-DE	Spatial Data Infrastructure Germany (Geodateninfrastruktur Deutschland)
GEOSS	Global Earth Observation System of Systems
GIS	Geographical Information System
GIW	Commission for Geobusiness (Kommission für Geoinformationswirtschaft)
GMES	Global Monitoring for Environment and Security
IMAGI	Interministerial Committee for Geoinformation (Interministerieller Ausschuss für Geoinformationswesen)
INSPIRE Directive	Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)
ISO	International Organization of Standardisation
KSt GDI-DE	Coordination Office Spatial Data Infrastructure Germany (Kordinierungsstelle GDI-DE)
LG GDI-DE	Steering Committee for Spatial Data Infrastructure Germany (Lenkungsgrremium GDI-DE)
NGDB	National Spatial Data Base (Nationale Geodatenbasis)
OGC	OpenGeospatial Consortium
SIG3D	Special Interest Group 3D
WFS	WebFeatureService
WMC	WebMapContext
WMS	WebMapService

1 Introduction

This report is the first report from Germany in accordance with Article 21(2) of Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE). It is based on the Commission Decision of 5 June 2009 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards monitoring and reporting. The report is based on the template provided by the European Commission for INSPIRE reporting. In essence, the report describes the status quo of the organization and development of Spatial Data Infrastructure Germany (GDIDE) as a national project and Germany's contribution to INSPIRE. It provides information on the coordination structures in Germany, on the tasks and goals of participants and their working methods, and in particular on the actions taken in Germany in response to the INSPIRE Directive.

The report was prepared jointly by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, which is responsible for the implementation in Germany of the INSPIRE Directive, the chair of the Steering Committee of the Spatial Data Infrastructure in Germany (LG GDI-DE), which acts as a national point of contact, and the Coordination Office for Spatial Data Infrastructure in Germany (KSt. GDI-DE) and was coordinated via the LG GDI-DE on a cross-administrative basis.

2 Coordination and Quality Assurance

2.1 Coordination

2.1.1 National Focal Point of Germany and coordination structure 4

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Roles, duties, responsibilities

The LG GDI-DE is the specialised administrative decision-making body for the development of the SDI in Germany (GDI-DE). It is composed of representatives of the federal government, the 16 Länder and the three municipal associations at federal level. The chair of the LG GDI-DE Steering Committee changes

every two years between the Agreement partners, consisting of the federal government and the Länder. The LG GDI-DE Steering Committee controls and coordinates the development of the GDI-DE including the implementation of the INSPIRE Directive. In particular, it has the following strategic and conceptual functions to perform in the context of the INSPIRE Directive:

- 1) Creation of rules and adoption of measures to build and operate the GDI-DE as an integral part of the European spatial data infrastructure,
- 2) Acting as the "National focal point" within the meaning of Article 19 paragraph 2 sentence 1 of the INSPIRE Directive
- 3) Definition of the work program for the Joint Coordination Office (KSt. GDI-DE) including a coordinated annual planning with regard to the tasks to be performed and the use of financial resources;
- 4) Monitoring the implementation of its decisions.

The KSt. GDI-DE coordinates the implementation of the decisions and orders of the LG GDI-DE, and monitors their implementation. It performs the operational tasks of the national focal point and is supported by the contact centres of the federal and state governments. The KSt. GDI-DE is based in the Federal Agency for Cartography and Geodesy (BKG: Bundesamt für Kartographie und Geodäsie) in Frankfurt.

Interaction at federal, state and local levels in the GDI-DE is based on an administrative agreement established in 2005 that regulates the financing of the KSt. GDI-DE. The administrative agreement was updated at 30.10.2008 for INSPIRE implementation in relation to the designation of the LG GDI-DE as the National Focal Point referred to in Article 19, paragraph 2 of the INSPIRE Directive, and in view of the requirements of INSPIRE implementation.

In relation to the INSPIRE Directive, the agreement partners shall take joint responsibility for the following functions:

- 1) Coordination of the deployment and updating of metadata in accordance with Article 5 paragraph 1,
- 2) Notification of the Commission regarding cost-benefit analyses of detailed rules for the purposes of Article 7, paragraph 2,
- 3) Provision of the information required to ensure compliance with the implementation provisions contained in paragraph 7 accordance with Article 10, paragraph 1,
- 4) Coordination to ensure the coherence of cross-border objects in accordance with Article 10, paragraph 2,
- 5) Coordinating the creation and operation of a network in accordance with Article 11, paragraph 1,
- 6) Coordinating the setting of fees under Article 14, paragraph 2 and the development of electronic commerce services in accordance with Article 14, paragraph 4, including related usage rules,
- 7) Creation of appropriate structures and mechanisms for coordinating the contributions at various levels of government in accordance with Article 18,
- 8) Setup and operation of a contact centre and the associated coordination structure in accordance with Article 19, paragraph 2,
- 9) Monitoring the implementation and use of national spatial data infrastructure in accordance with Article 21, paragraph 1,
- 10) Involvement in the production of reports under Article 21, paragraphs 2 and 3 and cooperation in notification of the Commission regarding the main provisions of national legislation pertaining to the INSPIRE Directive under Article 24, paragraph 2.

During setup and operation of the GDI-DE, the agreement partners are jointly responsible for:

- 1) Coordination of plans for partnership-based, open development of a spatial data infrastructure in the Federal Republic of Germany, including as part of a European spatial data infrastructure,
- 2) Assisting in the development, continuation and implementation of international norms and standards, including in relation to the design of European and international spatial data infrastructures,
- 3) Uniform interpretation of international standards for spatial information systems as a contribution to national standardisation requirements in e-government,
- 4) Continuous identification of key data for a national spatial data infrastructure, including the designation of competent authorities and spatial data suppliers,
- 5) Development and coordination of pilot projects on sustainable implementation of cooperation between public and private stakeholders in the area of spatial information,
- 6) Administrative-level coordination of the set up and operation of interoperable spatial services and connection to a jointly operated national Geoportal for Germany,
- 7) Development of usage, pricing and financial settlement plans with the objective of multidisciplinary and multilevel access to spatial data and its use and,
- 8) Support for the awareness level of SDI standards and services and promotion of knowledge transfer and mutual exchange of process solutions.

Organization, network and involvement of third parties

Politically and technically, implementation of the GDI-DE takes place within the context of e-government (Figure 1). Political coordination has been achieved by the federal and state governments in the past via the Working Group of State Secretaries for e-government. In April 2010, this body will be replaced by the IT-Planning Council, which was set up under the treaty between the federal government and the *Länder* pursuant to Article 91 c of the Constitution (as amended on 29 July 2009). In the future, the LG GDI-DE will report to this new body.

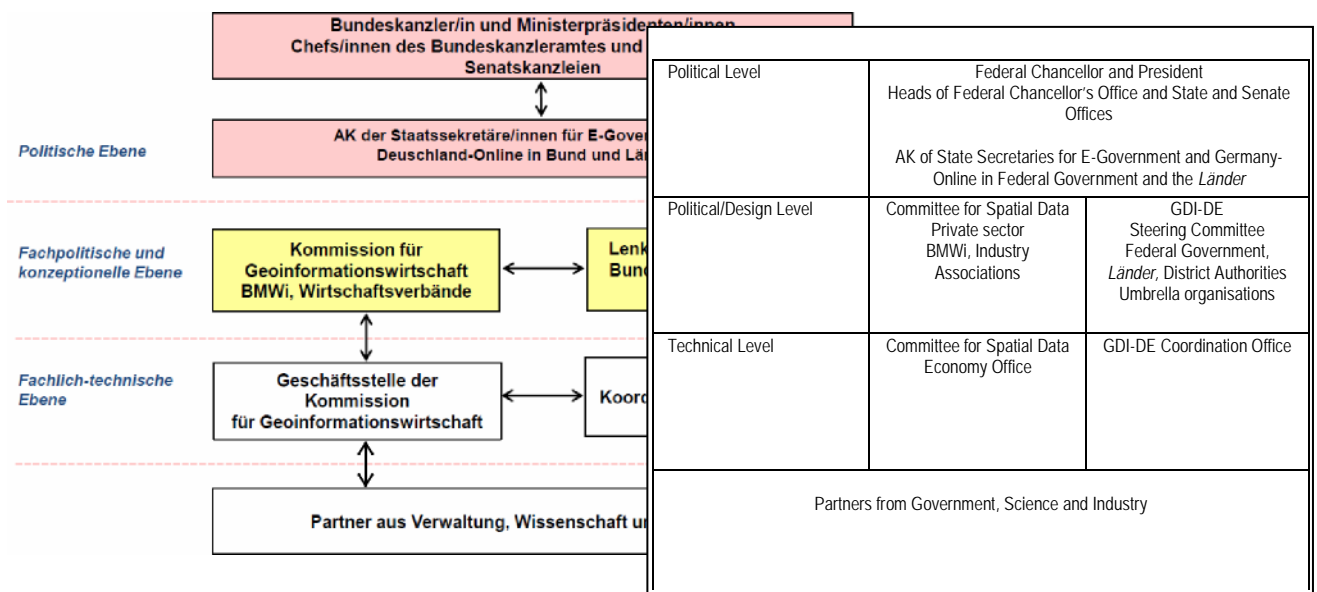


Figure 1: Organisation of the GDI-DE (March 2010)

The GDI-DE is an open process, whereby all documents, agreements, and infrastructure elements of the private sector, science and the public will be made available for general consultation (www.gdi.de.org). Collaboration with industry is concentrated in projects run in cooperation with business associations, and the "Committee for Geobusiness (GIW)" and its office, which is located within the Federal Ministry of Economics and Technology (www.geobusiness.org). In these projects, the requirements of the INSPIRE Directive are taken into account. The GIW is a permanent guest member of the LG GDI-DE contributing additional user requirements to the ongoing development of the GDI-DE.

Cross-administrative GDI-DE cooperation procedures

Decisions of the LG GDI-DE must be carried unanimously – by consensus. This principle provides a guarantee of acceptance for the actions of the GDI-DE. Even before the decisions are taken, consent and coordination processes get underway among a network of contacts in federal, state and national umbrella organizations.

At federal and state levels, cross-departmental coordination structures have been set up, which are in turn responsible for the development of spatial data infrastructures as part of the GDI-DE. Federal, state and municipal associations have appointed points of contact embedded within these structures as direct contacts of the KSt. GDI-DE. They are responsible for

- 1) passing on information to the KSt. GDI-DE, which is necessary for the performance of tasks specified under the GDI-DE Administration Agreement,
- 2) supporting the implementation of measures determined by the LG GDI-DE, with the help of the KSt. GDI-DE, in the respective administrative units; and
- 3) disseminating information on the implementation status of the measures at the request of the KSt. GDI-DE.

Overall, the supporting coordination structure is represented in accordance with Article 19, paragraph 2, sentence 2 of the INSPIRE Directive. A detailed overview of all the partners of the GDI-DE, together with corresponding references corresponding to the coordination structures of federal, provincial and municipal associations can be found on the website of the GDI-DE: www.gdi-de.org.

Workshops and informational events are held by the LG SDI-DE and the KSt. SDI-DE in order to provide the offices maintaining spatial data and the service providers with information about current issues (such as metadata, network services, etc.). A newsletter of the GDI-DE, which has been published at regular intervals since 2006, keeps the network informed about the current structure of the spatial data networks (<http://www.gdi-de.org/deneu/service/navlnewsletter.html>). Brochures on various topics can be ordered and downloaded online at <http://www.gdi-de.org/deneu/service/navlpublikationen.html>

In addition to this, documents created by GDI-DE working groups are published on the GDI-DE website and then subjected to a political consent process via the LG GDI-DE. Currently, there are permanent working groups operating in the fields of architecture, spatial services, metadata and SIG 3D. These working groups are primarily concerned with technical issues, for example, examination and recommendation of standards to the GDI-DE. A core task of the working groups is the development of policies and measures as a consulting and draft resolution for the LG GDI-DE. The Architecture working group's architectural concept provides a technical and strategic basis for the SDI-DE. The Geospatial Services working group is responsible for evaluating service specifications within the GDI-DE, as well as developing and maintaining Germany-wide application profiles for geo-data services. The task of the Metadata working group is to develop specifications (application profiles) for the interoperable, online exchange of metadata on the basis of the standards and norms of the International Organization of Standardization (ISO) and the Open Geospatial Consortium (OGC), as well as monitoring other standardization initiatives that affect the field of metadata and cataloguing services. The SIG 3D group actively works on standardization for the application field of three-dimensional objects.

In order to evaluate and introduce GDI technologies by way of example, GDI-DE pilot projects are being carried out in conjunction with public service partners. Currently, the pilot projects are: a "Registry" (a technical tool for organizing and providing technical and organizational cross disciplinary information), certain "protected areas" (a scheme for digital delivery of protected information, see Section 6.2) and the "Spatial Data Catalogue" (an information system regarding the Spatial Data and spatial data services

of GDI-DE, are being worked on). In these pilot projects, the requirements of the INSPIRE Directive are being taken into account.

The working groups and pilot projects have an important networking function as regards the interaction between governmental experts and experts from industry. All working groups and pilot projects work in cooperation with the KSt. GDI-DE and report regularly to the LG GDI-DE.

2.1.2 Comments on Monitoring and Reporting

General comments

The Basis of INSPIRE Implementation in Germany – as required in recital 5 and Article 1 paragraph 2 of the INSPIRE Directive – is the GDI-DE, which has been operating since 2003 as a joint project of the federal government, states and municipalities. The development and operation of the GDI-DE is based consistently on the INSPIRE process and thus supports the gradual implementation of the INSPIRE Directive and their implementing regulations in Germany. Accordingly, initially the main focus was on development of structures and instruments for the GDI-DE. In parallel with the specific definition of the ancillary topics within the INSPIRE Directive, spatial data is identified that will form the data foundation of the GDI-DE as a National Spatial Data Base (NGDB). For this purpose, the draft of the data specifications contained in Annex I of the INSPIRE Directive and approved by the Comitology Committee in December 2009 was, for the first time, ever a robust document used to structure the national process.

For this reason, the information provided by Germany for monitoring and reporting in 2010 is restricted to the subjects contained in Annex I. As long implementation rules on the subjects contained in Annexes II and III remain unavailable, the authorities will lack a sufficient decision-making basis for identifying the INSPIRE-relevant records. Naming all of the databases that could, in one way or another, be included in the current broad-ranging topics in Annexes II and III would result in an extremely high administrative effort by the offices maintaining spatial data. This effort cannot be justified in light of the fact that such databases, which have not previously been identified on the basis of generally applicable criteria, would be inconsistent and impossible to compare. Indicators calculated on this basis would not provide any reliable information about the status and progress of SDI-DE's development as a part of INSPIRE. In addition, there is a risk that the increased additional effort, combined with the lack of a clear benefit, would lead to a loss of plausibility and acceptance issues with the agencies involved.

Monitoring procedures in Germany 2010

The "INSPIRE monitoring procedure" was prepared within the SDI-DE in 2009, providing a cross-administrative relevance survey of the topics in Annex I. The results reported on spatial databases come from a large number of offices that maintain spatial data on the federal, state and municipal levels. These results have been published at www.gdi-de.org and are updated regularly.

This impact investigation method was carried out in cooperation between central and decentralized coordination entities of the GDI-DE (contact points of KSt. GDI-DE on federal and state level) from 2009 on and served as basis for the survey performed from February to April 2010. In this survey, spatial data holding stakeholders were required, in a first step, to notify the spatial datasets and spatial data departments that relate to the subjects contained in INSPIRE schedule I. In order to improve the understanding of spatial data holding bodies regarding the INSPIRE Directive, both regional and nationwide publicity measures were undertaken. This included numerous workshops, the production of information materials in German and a central inspire information platform featuring downloads and an area for "frequently asked questions".(FAQ) ("http://www.gdi-de.org/deneu/inspire/navlueberinspire_.html"). Another important element here

was the inclusion of German experts in relation to the subjects contained in a Annex I who engaged actively in the preparation of information materials.

The result of the inquiry carried out in 2010 is enclosed with this report and is published at <http://productive.gdi-de.org/monitoring>. The heterogeneity of the messages makes it clear that the identification of affected spatial data sets and related services should not be seen as a closed off process but rather as an ongoing one. It is at the lower administrative levels that the authority awareness and the necessary knowledge about the requirements and stipulations of the INSPIRE Directive have not been disseminated uniformly. The reasons for this, among other things, lie in the widely differing understanding of the benefits of INSPIRE, but also in its very complex body of implementation rules.

For the further development of the GDI-DE and the technical and organizational implementation of INSPIRE, the result of monitoring forms an important basis for future action. In this regard, technical network-related questions together with the use of central components as a common infrastructure of federal, state and local governments are prominently in focus as Germany's contribution in Europe. Based on the monitoring carried out, reporting automated to the maximum extent possible is planned for the information contained in INSPIRE-compliant metadata.

2.2 Quality assurance

Setup of the GDI-DE, which began in 2003, focused from the beginning on the creation of a common understanding regarding system architecture; and it also took into account the specifications of the INSPIRE Directive. The first architecture concept (V1.0) adopted in 2007 by the LG GDI-DE summarized the basic technical functions needed for this purpose on the basis of common standards (for example, search and view services). An initial quality control of the interoperability of data and services was accordingly carried out independently; whereby this was achieved through compliance with the standards contained in the architecture concept.

In 2010, this architecture concept was updated in a new version (V2.0 Beta: [http://www.gdi.de/deneu/download/AK/GDI-DE-Architekturkonzept-V2_\(beta\).pdf](http://www.gdi.de/deneu/download/AK/GDI-DE-Architekturkonzept-V2_(beta).pdf)) and expanded with central components of the GDI-DE and a description of the standards. Among the key components of the GDI-DE are the Geospatial Data Catalogue-DE, the GDI-DE Registry, the Germany Geo-portal and the GDI-DE test suite. The latter is planned as a web based application that would enable agencies and spatial data holding entities to check the conformity of their data and services with the applicable standards and norms automatically. The existing INSPIRE implementing rules are taken into account in this context as if they were specific application situations for the software. The completion of the test suite and its operational use are planned for 2011. Its development will be carried out in cooperation with other Member States and the European Commission. This framework has already been taken into account by the fact that the software's documentation is being implemented in English and the terms of the software license is such that transfer to partners of the GDI-DE outside Germany will be possible. For coordination outside Europe, the INSPIRE Forum will be used.

The qualitative information of the German Geospatial Data Catalogue-DE, fed partly by the results produced by the GDI-DE test suite, which is still at the design phase, are planned to be configured and automated in such a way as to be able to optimise a reliable quality assurance as well as the INSPIRE monitoring process.

3 Interaction of infrastructure components

3.1 General Overview of GDI-DE

The construction of the GDI-DE is aimed at improving the supply and use of spatial data held decentrally by various administrative branches and levels of government (federal, state and municipal governments). This is linked to the demand to simplify information, communication and transaction processes – both within the administrative structures and between administrations and individual

citizens, society, the private sector and scientific stakeholders. The GDI-DE can be seen as a public infrastructure of federal, state and local authorities based on interoperable spatial data and services. Hence, the GDI-DE constitutes an important pillar of the E-Government in Germany. The purpose and scope of the GDI-DE extends beyond implementation of the INSPIRE Directive by taking into account national requirements (see also Section 3.2) for a spatial data infrastructure as well (Figure 2).

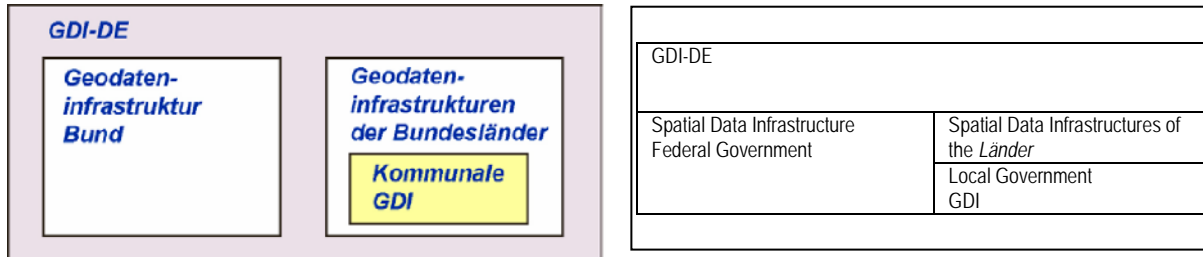


Figure 2: Hierarchy of the GDI-DE in view of the administrative levels of the federal government in Germany

2.3 INSPIRE stakeholders and their roles

In the GDI-DE, there are typically the following participants / roles:

- Spatial data holding entities
- Data and service providers
- data and service users
- Coordinators

Various actors can be assigned to each role in terms of individual processes. These roles are filled by different actors, depending on the particular use required, and may be derived from all levels of government, industry and the general public. An INSPIRE survey of the LG GDI-DE from February to April 2010 was conducted with the aim of identifying organizations based on their INSPIRE data sets (see Section 2.1.2). A description of actors in a particular role is at present neither possible nor useful.

As part of the operation of the GDI-DE, for 2010 and 2011, the coordination of a specific operating model is planned, based on the use case "metadata supply for INSPIRE". In this context, the metadata should be made available to the INSPIRE spatial data portal via the German Geospatial Data Catalogue, which, as a central component of a cascade of services, supplies an INSPIRE-compliant catalogue interface for the European Commission (Figure 3).

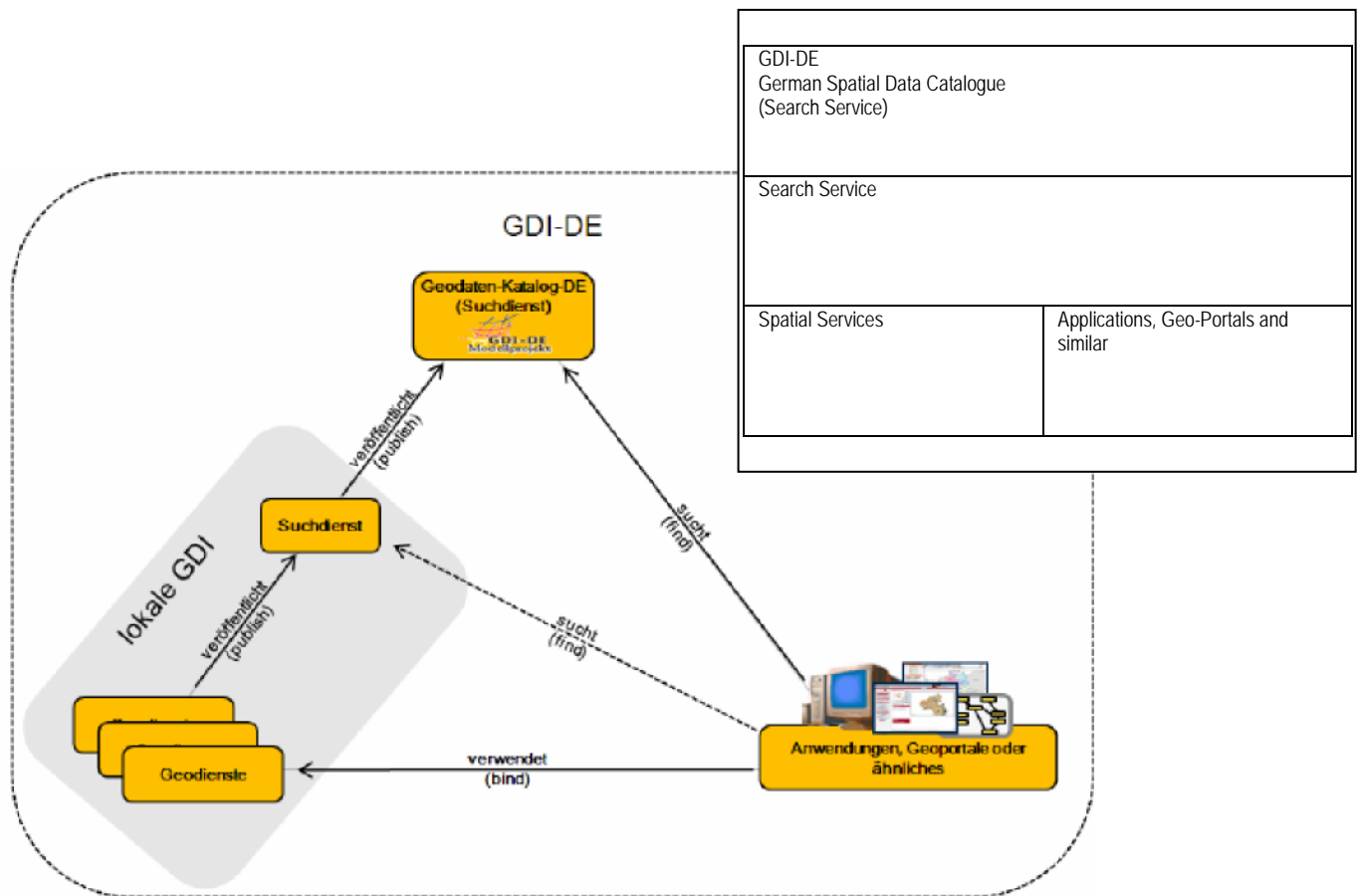


Figure 3: Role model for networking with the local GDI GDI-DE

Various agencies keeping spatial datasets or data and service providers from all levels of government were involved in the design of the German spatial data catalogue. Moreover, this catalogue included selected metadata information from federal and state governments as well as technical catalogues, such as the portal of the environmental agencies of Germany (PortalU[®]). The PortalU[®] is the central point of access to environmental information from the federal and state governments and, within the framework of the German spatial data catalogue, provides metadata on numerous environmental issues. Further access points to the German spatial data catalogue originate, at least in part, from the domain of the Surveying Authorities within federal and state governments (basic spatial data from property cadasters and the state survey department) or the federal administration (spatial data catalogue at GeoPortal.Bund). The current phase of the project includes all the catalogues relevant to Germany and INSPIRE.

The proposed GDI-DE operating model is intended to be expanded gradually beyond spatial data catalogue use, in order to identify the respective roles and actors in a process-related manner.

Cross-sector collaboration with INSPIRE stakeholders

In general, it should also be noted at this point that Chapter 2.1 provides detailed information about the measures and the cooperation with INSPIRE participants. The INSPIRE TaskForce Germany serves as an additional informal body for coordination above and beyond technical and administrative boundaries; its work is focused on the support from experts for the implementation rules. It is composed of representatives of the LG GDI-DE, the KSt. GDI-DE, various federal and state working groups on individual environmental media and is supplemented by the national experts who are/were involved in drawing up the implementation rules for INSPIRE.

In 2009, the KSt. GDI-DE began setting up an additional network of technical experts to deal with the subjects contained in Annexes I to III. The public call for this occurred in parallel with the call of the European Commission for the appointment of experts for the thematic working groups for Annexes II and III. The newly formed German network of experts works jointly on thematic issues arising from the

INSPIRE Directive. This is the case, for example, for interpretation of the Annex I implementation rules as well as monitoring of the implementation rules for Annexes II to III, which are currently being worked on.

In 2011, a joint Geoportal for Germany came into existence as a central component of the GDI-DE. Taking account of existing technology and existing developments at federal and state level, it will ensure access to spatial data and services in Germany and will also function as a central communication and information platform between participants in the GDI-DE.

Based on a decision of the State Secretaries for e-Government, the GDI-DE adopted a plan for a National Spatial Data Base (NGDB). The NGDB is made up of the spatial data, also known as key data, that is needed to carry out legally required tasks for national and international obligations (e.g. the INSPIRE Directive) or that is significant for administration, business and science in Germany. Integration with the NGDB is accomplished by providing spatial data and metadata on spatial data services. By complying with certain criteria and specific quality requirements, the NGDB ensures that spatial data can be used repeatedly and on a cross-disciplinary and cross-regional basis.

3.3 Access to services via the INSPIRE Geo-portal

As shown in chapter 3.2, access to the GDI-DE will be ensured via the German spatial data catalogue. Metadata on spatial data and services will be supplied, standardised on a national German basis, in order to implement the Publish-Find-Bind model (see Figure 3). It contains the quality characteristics laid down in the norms and standards for spatial data and services of the GDI-DE. Among other things, these are needed for INSPIRE monitoring in order to meet the specifications of the INSPIRE Directive.

The German spatial data catalogue is being developed and operated as part of a GDI-DE pilot project. It is provided with a user interface for searching in the proposed Germany Geo-portal and as a service in the European Spatial Data Infrastructure in the context of INSPIRE. In this regard, it can also be used in other infrastructures, e.g. in connection with the Global Earth Observation System of Systems (GEOSS <http://earthobservations.org/>).

The content of the German spatial data is based on EN ISO 19115 and 19119, as well as the requirements of the INSPIRE Directive. Essentially, these include

- Metadata fields in accordance with the above standards,
- A harvesting component for the search and transfer of the relevant metadata content regarding data services contained in the GDI-DE.
- A database component for the caching and optimizing (filter, ranking, et cetera) of metadata content on data and services,
- A catalogue service interface for integration into applications (e.g., the Geoportal INSPIRE, GEOSS...),
- Client software for manually searching for metadata on data content and services in the German GDI and
- Optionally: a metadata editor for creating standards-compliant metadata records GDI-DE Architecture 2.0 (beta).

4 Use of infrastructure for the provision of spatial information

Use of spatial data and services in the infrastructure

Since the initial identification of data and services is as yet incomplete, its usage cannot be quantified at this stage. First results are expected after the creation of INSPIRE network services and their systematic evaluation (monitoring in 2011).

5 Agreement on Data Sharing

The goal of general agreements on data sharing in the GDI-DE is the improvement and facilitation of data exchange between public administrations at all levels of government and the agencies of the European Commission. These principles need to be taken into consideration, so that principle-compliant use is possible in relation to third parties. This applies in particular to the provision of public spatial data and services to the private sector, which requires these both for its own activities and for the development of value-added chains.

5.1 Agreements between public bodies

By way of example, the section below lists and explains some agreements between public bodies.

Under an administration agreement between federal and state governments on data exchange pertaining to the environment, concluded on 25.11.1994, the federal and state governments provide each other with mutual access to the environmental data required to fulfil their official functions. The relevant data is specified by the federal and state governments jointly in terms of the classification of its characteristics, spatial and temporal aggregation, including the transfer method to be used; this is set out in appendices to the Agreement. The data processed in this context consists primarily of data needed to compile an overall picture and to carry out supra-and international reporting obligations of the federal government.

Since 1.9.2006, an administrative agreement has been in place between the Federal Ministry of the Interior (BMI) and the *Länder* on the provision by the Federal Office for Cartography and Geodesy (BKG) of digital cartographic and topographic data of the Surveying Authorities of the *Länder*. Hence, topographic data of the national survey (ATKIS data) is made available to users on a nationwide basis by the Spatial Data Centre of the BKG either by order or by permission, in accordance with the provisions of the agreement provided.

Furthermore, there is a management agreement dated 09.02.2009 between the BMI and the *Länder* on the continuous transmission of official digital spatial data for use in the federal sector. Accordingly, the *Länder* permit the federal government to make non-commercial use of spatial data in the performance of the latter's official national and international functions.

In the Land of Baden-Wuerttemberg, the following arrangements exist between public institutions for the purchase of spatial data for the performance of sovereign functions:

- Framework agreement of 29.01.2007 between the State Office for Spatial Information and Regional Development (LGL) and urban and local districts, represented by the Baden-Wuerttemberg Association of Cities and Towns and the Baden-Wuerttemberg Association of Local Districts. To date, approximately 975 cities and towns have joined this framework agreement. This service is charged on the basis of a flat rate according to municipal area and population with uniform use conditions.
- Cooperation agreement of 01.10.2007 between the LGL and the municipal survey offices, represented by the Association of Cities and Towns in Baden-Württemberg (AG62). The mutual supply and use of spatial data is free of charge.
- General Agreement on Spatial Data of 28.03.2007 between the LGL and the ministries of the State of Baden-Württemberg and all local districts, represented by the Association of District Councils (Landkreistag). In addition to the ministries and the districts, the operational, technical or supervisory departments of subordinate bodies of state administration,

regional planning and other agencies of the federal and provincial districts, also have user rights. This service is charged on the basis of a flat rate with uniform use conditions.

In the Land of Bavaria, the following arrangements exist between public institutions with respect to spatial data and services of the Bavarian Survey Department (Bavarian State Ministry of Finance) for the performance of sovereign functions:

- Departmental agreements with the Bavarian State Ministry for Food, Agriculture and Forestry, 30 October 2008, with the Bavarian Ministry of Interior of 31 October 2008, with the Bavarian State Ministry for Environment and Health, 14 November 2008, with the Bavarian State Ministry for Economic Affairs, Infrastructure, Transport and Technology, 17 November 2008 and with the Bavarian State Ministry for Science, Research and Art, 17 December 2009.
- General agreement with the Bavarian County Association (governing body of the 71 districts in Bavaria) for the use of spatial data and the Bavarian Special Services Survey Department by members, 25 February 2009. This service is charged on the basis of a flat rate with uniform use conditions. Each local district will pay the same amount and join the general agreement by filling out a membership application.
- Framework agreement with the Bavarian *Gemeindetag*, 29 August 2003, framework agreement with the Bavarian Association of Cities, 30 July 2004 for the use of spatial data and spatial services and of the Bavarian Surveying Administration by members. The two framework agreements can be used by the member cities and municipalities to receive special conditions of reciprocity when obtaining land survey data and digital orthophotos. Fees vary, depending on the applicable fee regulations. Existing online services can be used free of charge.

The departmental agreements entitle the departmental offices of state governments to make use of spatial data and services. The departments can choose between two data packets (a "grid data package" or a "premium package" including vector data from the land registry). The available WMS services are included in both cases. This service is charged on the basis of a flat rate with uniform use conditions. It is planned that the framework agreements will be replaced by a new general agreement between the Bavarian State Ministry of Finance and the City and Towns Association on the model of the general *Landkreistag* agreement. This service is charged according to local population and area on the basis of a flat rate with uniform use conditions.

In the Land of Brandenburg, there is an agreement between the National Land Survey Department and Spatial Information Brandenburg and the Central Police Department of 23 November 2006 concerning the provision of basic spatial data in police IT systems.

5.2 Agreements between public institutions and bodies of the Commission

Not yet available.

5.3 Obstacles to joint use and efforts to overcome them

Key barriers to the necessary harmonization of conditions of use are the existing heterogeneous systems of licensing and pricing for spatial data and spatial data services, as have emerged between a number of stakeholders in public administration, including the federal government, the *Länder* and local districts, on the basis of federal structures in Germany and their associated historical development. It has so far not been possible to take into account new web-based technologies that integrate various data sets and services in relation to the majority of licensing and pricing schemes, partly because they have not yet come into existence. Overcoming

these obstacles require a fundamental change to these arrangements as part of a complex set of coordination processes. In part, existing legal and contractual framework conditions will also need to be revised. This requires in turn the involvement of the relevant political decision-makers.

Current approaches in Germany are based mostly on providing useful solutions (licensing models) for spatial data holding bodies, suppliers and users. Hence, co-ordinated model license agreements have successively led to a harmonization of regulations. Other measures include click licenses or schemes involving web services with standard licenses, which, like "Creative Commons", offer straightforward copyright protection for data owners. The results already achieved and concepts already developed in this area have been notified to the commission by the "INSPIRE Drafting Team Data Sharing", so that they can be published in the proposed INSPIRE document "Good practice in data and service" (released at <http://inspire.jrc.ec.europa.eu/>, which is expected in 2010).

Another fundamental obstacle is the lack of solutions for cross-organisational access control in Germany, as in many business processes, authentication and authorization of participants constitutes the necessary precondition for completion of a transaction. In the context of the GDI-DE, the requirements of E-Government in Germany play an essential role in terms of practical implementation. Thus, it is conceivable that, based on e-government standards, cross-organizational access control will become possible in the medium term (authentication and authorization using Security Assertion Markup Language (SAML) and (Geo), eXtensible Access Control Markup Language (XACML); whereby a trust-based community will also be created, using new machine-readable identity cards for authentication, where necessary. A similar test environment involving the network GDI-DE is currently (in 2010) at the planning stage.

6 Cost-benefit aspects

6.1 Costs resulting from the implementation of INSPIRE specifications

Cost figures include only those administrative costs of federal and state governments, which could be validated for the reporting period. Estimates for the production of interoperability and for the harmonization of spatial data sets and spatial data are not included. In these areas, although costs arise in varying amounts for authorities at all levels, these are not currently qualified or quantifiable. Quantification of the financial benefits also currently still lacks a solid basis. Therefore, the presentation is limited to the qualitative benefits, or "added value", instead of a purely monetary assessment of costs. In future, the cost / benefit basis should be possible with the aid of the operating model of the GDI-DE to be developed and any related process cost analysis. This is planned as of 2012.

Cross-sector costs for the operation of the KSt. GDI-DE, according to administrative arrangement between federal and state governments for the joint development and operation of the GDI-DE, currently amount to 800,000 €/ year (since 1.1.2009). The expenses of financial, human and material contributions will be divided between the federal and state governments. With the help of these funds, a central hub will be able to process and supply such items as the information required for implementation of the INSPIRE Directive at all governmental levels. This creates the necessary transparency of rules and policies of the European Commission regarding the INSPIRE Directive and the approach taken in its implementation in Germany. Furthermore, components are created centrally, which enables spatial data holding agencies to make savings on their own investment funds, such as the Geospatial Data Catalogue-DE, whose interface can be used as a single location for fulfilling the high quality standards of Ordinance (EG) No. 976/2009 of the Commission, dated October 19, 2009, for implementing Directive 2007/2/EG of the European Parliament and the Council regarding network services..

6.2 Example Uses

As examples of the benefits brought about by the construction of the GDI-DE, the pilot project "Protected Areas" of the GDI-DE and key project "Spatial Raw Materials" of the GIW can be cited".

Example 1: The "Protected Areas" Pilot Project

As part of the "Protected Areas" pilot project, selected existing protected area data from the federal and state governments is supplied uniformly on WMS on the Geo-Portal.Bund. This is then summarized and visualized in a cascading pattern. In addition, Terms of Use conditions as well as consistent object types and signature lists were prepared. Meanwhile, the goal of consistent and comprehensive provision of protected data for the Federal Republic of Germany has been largely achieved. In addition, plans have been devised for the further development of services, for example in the areas of representation, consistent attribute information, the use of a central registry and the provision of vector data as WFS. At present, the WMS "protected area data" is being prepared technically and organizationally for future operation and adapted to the requirements of the INSPIRE Directive.

Digital protected area data is being increasingly required for a variety of potential uses in different areas of federal, state and local government, by industry and private users. Users currently have access via the GeoPortal.Bund to protected area data originating from federal, state and municipal authorities.

Examples where the WMS can be used, are

- Information duties of environmental departments of federal, state and local authorities,
- National and International reporting obligations
- Town & country planning
- Environmental impact assessments
- Participation of public agencies in design projects
- road planning,
- Statistics on the environment.

Example 2: The GIW "Spatial Raw Materials" key Project

The main objective of the GIW "Spatial Raw Materials" key project is supplying enterprises in the mineral resources industry with a web-based geographic information system (portal <http://www.GisInfoService.de>) It contains public spatial data and services relevant to the commercial acquisition of raw materials (Mining plans and operational development are relevant here). Currently, geographic information is available from the fields of spatial planning, environmental protection and conservation, aerial photographs, Land Registry and monument data. Public data is supplemented by data on planning proceedings which, are currently being heard and are therefore not yet legally binding. Another goal is to cater for the different requirements for geographic information system (GIS) capabilities in commercial enterprises, based on company size or IT skills. To this end, the system is offered in different packages, whereby public data can be also connected with own planning data and / or real estate databases. The system provides authentication mechanisms the purpose of handling paid-for WMS and to protect from misuse services that can only be allocated to particular firms (for example, planning data.

[GisInfoService.de](http://www.GisInfoService.de) for example, has become an integral planning tool for corporate sourcing of raw materials, as part of the extractive industry in Baden-Württemberg. During the twelve months following its activation around 100 of the 300 member companies of the Baden-Wuerttemberg Rock and Soil Industry Association with 600 mining and production sites made use of the system on a regular basis. The German umbrella organizations for the raw material and mining industry pursuing the objective of ensuring the adoption of this system throughout Germany. Meanwhile, Westphalia, Bavaria and North Rhine have also signed up. In addition, planning offices in the rock and soil industry have been enabled by means of training courses to integrate company-specific planning data as a WMS for their customers, namely the raw materials enterprises.

In addition to the expansion of available services, the Web-GIS software is being developed further and additional OGC standards such as WebFeatureService (WFS) and WebMapContext (WMC) are being included in its functionality. The possibility of a data flow return from the industry to the authorities is under discussion.

Summary of added value:

- Current, rapid data on the specifications for spatial planning and environmental protection
- Sustainable planning of operational development processes will be facilitated
- GIS workstation and software companies are not required
- Supplementing of proprietary databases
- Integration of company-specific planning data by planners in the rock and soil industry

7 Outlook

The construction and operation of a cross-administrative spatial data infrastructure in a federal state such as the Federal Republic of Germany requires a high degree of coordination. Of particular importance is the development of structures enabling on the one hand, further development of the GDI-DE for the making of timely decisions and their implementation across all administrative levels and on the other, taking into account of the constitutional division of powers between federal, state and local authorities. These structures, which have been set up since 2005, are now firmly established in Germany and are associated through the LG GDI-DE as a national point of contact for INSPIRE for at European level, also.

In the future, the focus of activity in developing the SDI-DE and implementing the INSPIRE Directive will turn more towards developing and offering technical modalities and tools for providing spatial data and spatial data services, such as a test suite and an operating model for the SDI-DE.

Due to its federal structures the Federal Republic of Germany finds itself engaged in a close dialogue at all levels of government; and, for this reason, it is able to take a holistic approach to the setting up of spatial data infrastructures in the European Union. This advantage will enable the requirements of the INSPIRE Directive – and the requirements of our own GDI – to be fulfilled in a timely manner.

Annex 1: List of Organisations – Names and Contact Details 18

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Annex 2: References in conjunction with the report, 23

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FAQ of the GDI-D E for INSPIRE	http://www.gdi-de.org/deneu/inspire/navlueberinspire.html
Architectural Plan V1.0	http://www.gdi-de.org/deneu/download/AK/GDIArchitekturKonzeptV1.pdf

Architectural Plan V2.0 beta	http://www.gdi-de.org/deneu/download/AK/GDI-DE-Architekturkonzept-V2 (beta). pdf
Interministerial Committee for Spatial Information (I MAG I)	http://www.imagi.de/start.html
Spatial data infrastructure Baden-Württemberg (G DI-BW)	http://www.geoportal-bw.de/
Spatial Data Infrastructure Bavaria (DI-BY)	http://www.gdi.bayern.de/
Spatial Data Infrastructure Berlin	http://gdi.berlin-brandenburg.de/
Spatial data infrastructure Bremen	http://www.geodaten-management.bremen.de/
Spatial data infrastructure Hamburg (G DI-H H)	http://www.hamburg.de/gdi-hh
Spatial data infrastructure Hessen	http://www.geoportal.hessen.de/
Spatial data infrastructure Mecklenburg-Vorpommern (MV-G DI)	http://www.geoportal-mv.de/land-mv/GeoPortalMV_prod/de/Startseite/index.jsp
Spatial Data Infrastructure Lower Saxony (GDI-N I)	http://www.geodaten.niedersachsen.de/live/live.php?navigation_id=8654&psmand=28
Spatial data infrastructure in North Rhine-Westphalia (G DI-NW)	http://www.ima-gdi.nrw.de/
Spatial data infrastructure Rheinland-Pfalz (RP-G DI ®)	http://www.geoportal.rlp.de/portal/informationen.html
Spatial data infrastructure Saarland	http://www.saarland.de/geoportal.htm
Spatial data infrastructure Saxony	http://www.gdi.sachsen.de/
Spatial data infrastructure Saxony-Anhalt	http://www.lvermgeo.sachsen-anhalt.de/de/wir_ueber_uns/aufgaben/geodateninfrastruktur/main.htm
Spatial data infrastructure Schleswig-Holstein (GDI-SH)	http://www.gdi-sh.de/
Spatial data infrastructure Thüringen.	http://www.thueringen.de/ikg-giz/ or http://www.geoportal-th.de/
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