X-border-GDI NL-NW-NI – A Development from the Exchange of Spatial Data to a Broad and Vital Cross-border Co-operation

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Summary

X-border-GDI has built up a spatial data infrastructure between North Rhine Westfalia, Lower Saxony and the Netherlands in order to enhance and support cross-border co-operations through the availability and use of spatial information. Several cross-border projects have been conducted under the roof of X-border-GDI, a wide range of developments, know-how, experiences, and networks have been created. The national mapping agencies provide their topographic data in a common WebMapService along with a common pricing and licensing model.

In the next period X-border-GDI puts the focus of its activities on securing and expanding the results for the long term and increasing the transfer of solutions, know-how and networks with even more partners, users and regions.

Zusammenfassung

X-border-GDI hat eine gemeinsame Geodateninfrastruktur Nordrhein Westfalen – Niedersachsen – Niederlande aufgebaut, um die grenzüberschreitende Zusammenarbeit durch die Verfügbarkeit und Nutzung von Geoinformationen zu unterstützen und zu fördern.

Eine Reihe von grenzüberschreitenden Projekten wurden unter dem Dach von X-border-GDI durchgeführt, in denen eine große Menge Entwicklungen, Wissen, Erfahrungen und Netzwerke aufgebaut wurde. Die beteiligten Landesvermessungen stellen über einen gemeinsamen WebMapService ihre Basisdaten zur Verfügung, unterstützt durch ein einheitliches Preis- und Lizenzmodell.

In der kommenden Phase von X-border-GDI wird der Fokus auf die nachhaltige Sicherung sowie den breiteren Einsatz der verfügbaren Resultate gelegt. Dies beinhaltet eine Intensivierung des Transfers von Lösungen, Know-how und Netzwerken mit weiteren Partnern, Nutzern und Regionen.

1 X-border-GDI at a glance

Since early 2000, The Netherlands (NL) and the German Federal States of North Rhine-Westphalia (NW) and Lower Saxony (Niedersachsen NI) have been working together in the field of spatial information. Along with the growing possibilities for technology, the need for high quality spatial information has increased. At the same time cross-border co-operations have become stronger and more intense.

A series of three Dutch-German geo conferences was organised in Düsseldorf, Arnhem and Münster. Based on the findings from these conferences at the end 2003, the decision was made to build up a cross-border-spatial data infrastructure to make spatial data digitally available on both sides of the border, and also to develop and provide the technical frameworks and profiles in order to facilitate interoperability and finally, to create a long-term cross-border co-operation along the entire Dutch-German border among the driving geo-forces in Netherlands, North Rhine-Westphalia and Lower Saxony. Until now more than 20 application projects in four European regions have been realised thanks to a European Commission funded project called X-border-GDI. These projects bring together over 250 active people in total.
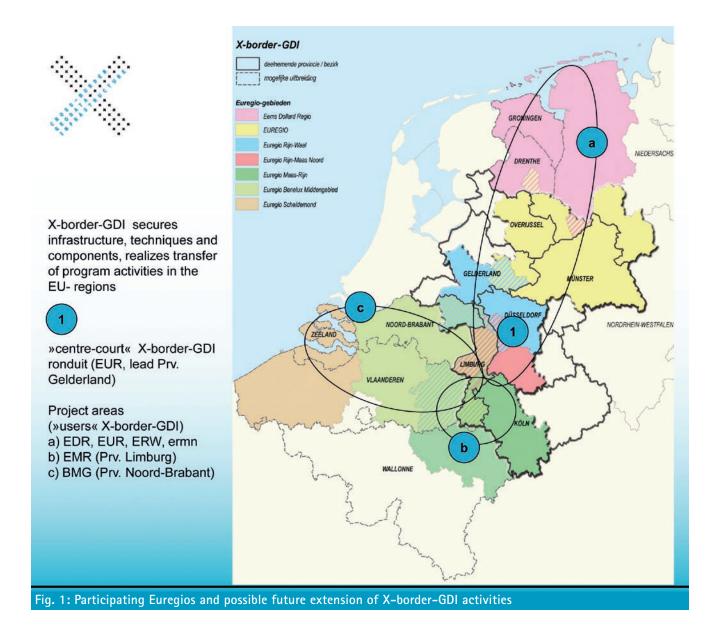
X-border-GDI follows the philosophy of the data-at-the-source-principle (service oriented architectures SOA), the OGC and INSPIRE frameworks and – above all – the transfer and exchange of know-how, experience and technique with partners in the X-border-GDI region and other regions in the European Union in order to capitalise synergies.

2 X-border-GDI 2004 – 2008

As a result the X-border-GDI was established as a common initiative with the task to organise, co-ordinate and facilitate this co-operation. The main goal was actually to develop a cross-border spatial data infrastructure (SDI) based on already existing regional, national and European SDI-activities and to bridge the gap between them. INSPIRE did not yet exist, specifications and solutions for the exchange of spatial and thematic data and metadata were barely available.

Therefore the main issue for X-border-GDI was to provide solutions for cross-border co-operations, bring together GI-specialists and users, inform about the vast possibilities of geographic information and organise activities along the user demands.

Next to these strategic management tasks more than 20 projects were realised in order to develop components contributing to the establishment of a sustainable X-border-GDI. Some of the projects were dedicated to developing necessary technical basic components such as the Cascading WMS NL-NW-NI, the Geoide Viewer, a Metadata Editor, a multilingual thesaurus, profiles for

X-border-GDI secures infrastructure, techniques and components, realizes transfer of program activities in the EU- regions

1

»centre-court« X-border-GDI ronduit (EUR, lead Prv. Gelderland)

Project areas
(»users« X-border-GDI)
a) EDR, EUR, ERW, ermn
b) EMR (Prv. Limburg)
c) BMG (Prv. Noord-Brabant)

Fig. 1: Participating Euregios and possible future extension of X-border-GDI activities

WFS and T-WFS and security solutions. Most of the developments took place in projects which were defined along user requirements coming from several thematic areas. X-border-GDI realised cross-border applications in the field of spatial planning, risk management, agro business, industrial sites, water- and evacuation management, animal diseases, mobility and transport, tourism. Detailed information on these projects is available on the website www.x-border-gdi.org/fileadmin/user_shares/ web_downloads/XGD009_PUBLICATIE_FINAL.pdf

During this period X-border-GDI had its own budget for administration, programme management, technical co-ordination and projects, of approx. 7 Mio Euro, funded by the European Fond for Regional Development (EFRD) in the Euregios (EUREGIO, Euregio Rhein Waal, Euregio Rhein Maas Nord, Euregio Maas Rhein) and the national and regional partners in NL, NW and NI.

3 X-border-GDI today

Since the start, X-border-GDI has been focussed on both technical and organisational issues as well as on requirements for cross border collaboration. User demands are the driving factors. Consequently projects have been staffed from both thematic and geo disciplines and all activities are conducted bi-nationally. X-border-GDI's network still grows steadily in people and working issues.

Nevertheless the use of GI has developed tremendously during the past ten years. The *use* of GI and SDIs has changed from being the aim itself to being a crucial tool in thematic applications. GI is expected to be available in a required format concerning quality, actuality, usability, completeness, scale, reference system, etc. Following these developments the philosophy of X-border-GDI is customised to the user demands. In the earlier period, projects were realised in order to contribute to the development of the cross-border SDI. Today this SDI is available and X-border-GDI exists because projects from

different thematic areas are searching for experience, know-how, solutions and networks related to the core competences »geo«, »cross-border«, and »interdisciplinary networks«.

X-border-GDI has developed from a facilitating and funding initiative to a technical and organisational infrastructure which serves projects and is committed even stronger to user requirements.

The main tasks are defined as »extend and intensify existing know-how, experience and technique«, »support existing and future cross-border activities« and »institutionalise X-border-GDI in order to guarantee long-term sustainability«.

For the time period 2009–2012 a ›small‹ budget of 455.000 Euro is available to strengthen X-border-GDI even more. That is to say: to gain more users and to encourage more applications and to institutionalise X-border-GDI as a viable system. One could say X-border-GDI is arriving at its destination.

3.1 Support existing and future cross-border activities

Currently X-border-GDI supports a number of different issues and projects of cross-border relevance, i.e. flooding & evacuation, risk management, mobility & transport, nature protection, spatial planning, etc. by supplying know-how, networks and technique.

In addition existing networks are extending continuously and new co-operations with other regions are established. Twice a year X-border-GDI organises Project Partner Forums for the partners in order to inform about the latest developments and solutions and bring together experts from different areas of applications. In November 2009 the focus was put on risk management, in June 2010 on nature protection.

3.2 Institutionalisation

According to the philosophy of X-border-GDI and the demand of all users, partners and financing parties, the sustainability and reliability of know-how and technique and X-border-GDI itself is of great importance. Closely related to that is the issue of having legal capacity which is lacking at the moment. Therefore various possibilities from European, Dutch and German law-levels have been analysed in the past months, an institution X-border-GDI will be established until the end of 2010. Intended shareholders are in a first step the existing partners of the programme.

3.3 X-border-GDI GeoLabs

User demand, applications, peer groups and service are the focus of X-border-GDI. In order to be able to provide information, experience and solutions according the different background of the customers »GeoLabs« will be available as a central tool.

The GeoLabs will be implemented in the X-border-GDI website by using web 2.0 elements to enhance interaction and provide access to information according to specific user requirements, i.e. geo specialists can access information directly on technique and thematic users can access the information via demo versions of applications and get information on technique in a second step.

The GeoLabs will provide information on projects and applications, demo versions, components and technical fact sheets, downloads of components (if possible) experiences and know-how, networks and partners, contact to programme office.

4 X-border-GDI tomorrow

X-border-GDI is designed to exist on the long-term as an open organisation (i.e. not a closed shop); new co-operations are intended to be built with new partners and regions. Currently the Dutch partners are preparing a close co-operation with Belgium. A growing number of application areas is starting to work across borders, looking for geospatial support for their activities.

As a first unique step within X-border-GDI the mapping agencies have agreed to an X-border co-operation including a common pricing- and licensing model for cross-border use of their data, which was officially signed by the heads of the mapping agencies on June 30th 2010 (see also article »Kooperation der Landesvermessungen Niederlande und Deutschland«, page 293).

4.1 X-border-GDI reference data web service

State boundaries are fading away more and more. It's very usual to shop across the frontier, or to spend spare time walking, cycling and sporting in a neighbour country. The border regions of the Netherlands and Germany (North Rhine-Westphalia and Lower Saxony) are united in large extensive and dynamic communities. Social-economic, infrastructural and spatial planning issues of the separate regions need an integral cross border approach. It's not explainable to the citizens, when a nature reserve is situated at one side of the state boundary while at the other side is an industrial area.

Measures to solve these social issues need cross border topographic reference datasets. And this is a problem that we have to cope with. National mapping agencies (NMAs) are producing topographic datasets meant for use in a

national context. Geometrically these national map files do not match at the border. For instance, the Netherlands and Germany each use their own national or federal co-ordinate reference and map projection systems. Also map files often have different contents and are presented according their own needs. State boundaries may fade, but the information boundaries are still standing upright!

4.2 Cascade WMS today

As a first step in razing these information boundaries, GEObasis.NRW, LGN Niedersachsen and Kadaster Netherlands, in co-operation with IT.NRW, have implemented a cascade web mapping service (called Cross Border Reference Data Web Mapping Service – X-RDWS). With this service users can view topographic maps over two countries and orthophoto images via a common co-ordinate reference and map projection system (ETRS89-TM32N) – see fig. 2. Data providers make their data sources available by way of a web service (Original WMS) and the X-RDWS service provider connects these national services in a cascade service (Kaskadierender WMS).

Attending to the scale levels TOP25, TOP50, TOP100, TOP250 and TOP500 data providers offer standard raster products, or vector products which are scanned on the
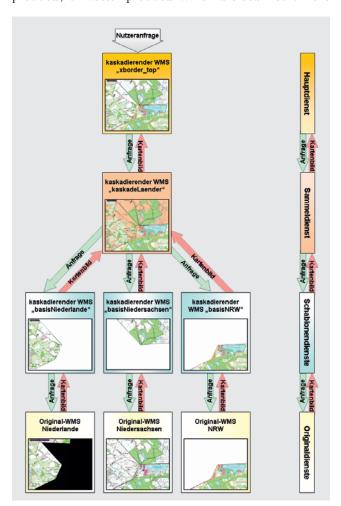

Fig. 2: Process schema Cascade WMS (source IT.NRW)

fly. The viewer marks an area, on which the X-RDWS server approaches the national servers for accessing (partial) source datasets. On the fly these datasets are transformed from national map reference to common reference ETRS89-TM32N – see fig. 3. Because the service is based on web mapping, the map contents are not harmonised but they keep their cartographic presentation according the separate map legendas.
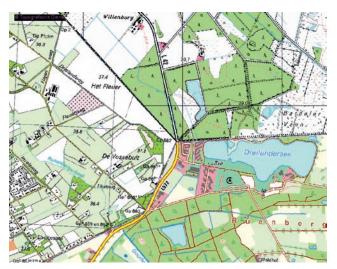

Fig. 3: View of the three countries region of Netherlands, North Rhine–Westphalia and Lower Saxony in ETRS89–TM32N.

For customizing the X-RDWS service a common pricing & licensing model is implemented and will be officially signed at the X-border-GDI Project Partner Forum on 30 June 2010. The exploitation of this cascade web mapping service is based on a business model, of which the data providers LGN, GEObasis.NRW and Kadaster offer this service jointly for use to all of their customers. This tripartite co-operation is adjusted in a contract, of which providers are licensing each other for distribution of the maps. Furthermore, the providers have a common agreement with the service provider for managing X-RDWS.

In order to use the service, customers must take out a subscription to one of the data providers. The tariff is based on uniform rates, composed of components for connection (once-only) and for volume of usage (conform existing AdV Gebührenrichtlinie). For the first year the volume of usage is estimated and for next years the volume of the previous year will be calculated. Income from X-RDWS service is allocated according to a fixed ratio to data and service providers. The service provider registers the yearly use per customer.

In this period Kadaster and the Belgian National Geographic Institute (NGI) consider the establishment of a web mapping service for the Belgian–Netherlands border region. Starting point in this consideration is the reuse of X-RDWS service and pricing & licensing model.

4.3 Regional implementation of INSPIRE tomorrow

The lack of (European) harmonised topographic reference datasets is increasingly seen as a problem. By force, users in cross border projects have to resort to solutions from originally not-cartographic institutes, such as Google and Microsoft, and the free wiki world map OpenStreetMap. It is up to the national mapping agencies to facilitate the need for cross border topography with accessible and qualitative reliable solutions.

The INSPIRE Directive mandates the European member states to establish interoperability services for revealing and accessing defined datasets. According to international ISO standards, specifications are given for meta data, data specifications and network services. This INSPIRE technical framework is an excellent starting point for the implementation of the European Spatial Data Infrastructure (ESDI) in general or regional cross border infrastructures in particular, such as the German-Netherlands border regions.

In the slipstream of INSPIRE, the European Commission has funded some projects, aiming to support the implementation of INSPIRE. One of these projects is ESDIN – European Spatial Data Infrastructure Network. ESDIN aims at helping the national mapping & cadastral agencies with the aggregation of INSPIRE data themes from national source data sets. For this purpose ESDIN works out additional specifications on INSPIRE, such as a common data access and licensing policy, quality guidelines for data maintenance and business processes, ExM data specifications and application model for large and medium/small scale implementations, ExM transformation specifications (including methods for edge matching and generalization) and interoperability services for cross border geodata sets.

The ESDIN project has appointed the X-border-GDI infrastructure as a use case. X-border-GDI has provided ESDIN with user requirements for risk management and mobility & transport. Kadaster has planned a best practice for prototyping a regional cross border web feature service and download service for reference data. This prototype must lead us to a service, that is fully compliant with INSPIRE and ESDIN. Consultations with the German partners are leading to the framework for a test area for this best practice.

5 Let's face the challenge

Cross border engineering projects increases more and more in importance. The national mapping agencies have to facilitate these projects with an adequate service for reference data. At present the X-RDWS cascade web mapping service highly meets the requirements of cross border users. But, the need for international harmonised reference data is booming. Especially the GIS user wants to manipulate data, such as for analyses and for choosing own presentations. INSPIRE and ESDIN enables us to fulfil these requirements.

Let's face the challenge!

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