How more than one hundred of districts and municipalities stopped worrying and started loving INSPIRE

hale connect INSPIRE GIS Case Study Whitepaper
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Context overview

GDI-Südhessen is a cooperative at county level, including more than one hundred municipalities in the southern part of the German state of Hessen. The goal of this group is to improve internal cooperation and data sharing and to collaboratively tackle larger challenges, such as the implementation of the INSPIRE initiative.
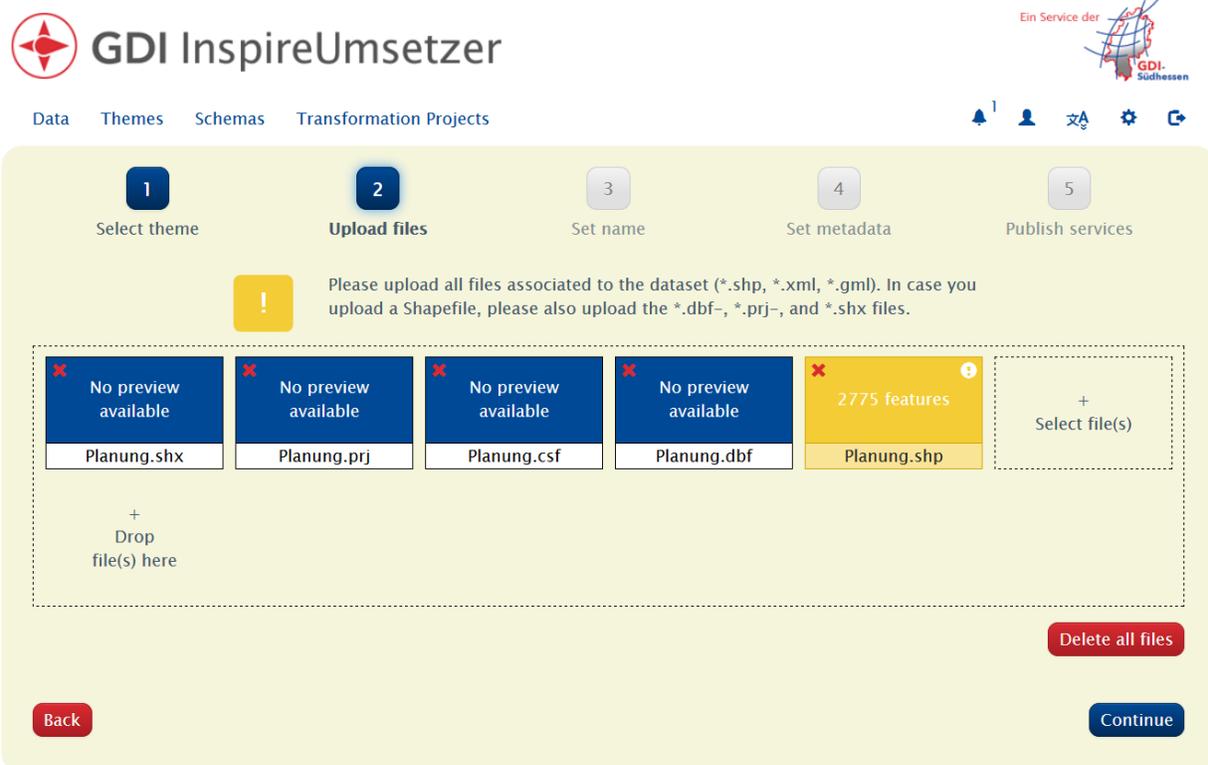
Figure 1: An easy to use dataset creation process with fully automated publishing, transformation, validation and testing lies at the heart of the solution.

Through a partnership with a German SME (wetransform GmbH), GDI-Südhessen can now provide the "GDI InspireUmsetzer" open platform to achieve both goals: Exchange data across all member organisations using shared data models, and fulfill INSPIRE obligations. Especially the latter typically requires significant capacity building, investment in software development and in changes to internal

data production processes. Because of the large amount of expert knowledge that is required, there is significant resistance to implementing the INSPIRE directive.

The platform wetransform and GDI-Südhessen have now built enables data providers without any knowledge of INSPIRE standards to upload data in a very easy process, and the system then transforms the data and provides services in a fully automated workflow. The process also includes publishing in open data catalogues and data and metadata validation. Our intent from the start was to build "GDI InspireUmsetzer" so that the same solution could be offered to all public authorities in Europe that also need to comply with the INSPIRE directive.

In particular, the main developer of the solution, wetransform GmbH, offers the platform to smaller organisations like municipalities that don't have their own IT departments and limited expertise in spatial data infrastructures. This solution is built on wetransfom's hale connect platform and is available in different deployment modes (public cloud, private cloud, on premise).

Solution Stakeholders

Out of the municipalities and districts, a governing panel with seven stakeholders was formed, one from the coordination office and 6 from the districts:

- Kreis Bergstraße
- Landkreis Darmstadt-Dieburg
- Kreis Groß-Gerau
- Hochtaunuskreis
- Odenwaldkreis
- Regionalverband FrankfurtRheinMain

The stakeholders coordinate process improvements and suggest new features to be developed on the platform. They also define new internal data models and let them be implemented on the platform, including creation of the required transformation projects.

Impact and Results

What benefits does your solution bring to its stakeholders and users?

The solution makes it really easy to implement INSPIRE and to benefit from the created spatial data infrastructure. It also reduces effort and cost required to implement and maintain INSPIRE data sets massively.

What was the approximate budget of the project? If you are aware of any savings as a result of using the solution, please provide the information.

Wetransform, the main developer of the platform and the core contractor for GDI-Südhessen's GDI InspireUmsetzer, has invested significantly beyond the initial project budget, and has to date spent upwards of 500.000 EUR on the development of the solution, with the intent of offering a fully integrated product. The GDI InspireUmsetzer platform enables satisfying the INSPIRE regulations at a comparatively low cost with the costs for annual private cloud hosting and licenses for up to 800 data sets and the related view and download services being 26.000 €. Alternative solutions available to the members cost up to five times more.

To what extent is your solution already reused in different organisations or domains?

Through GDI-Südhessen, more than one hundred organisations will use this platform.

The solution is now also used by organisations outside GDI-Südhessen:

- Bundesanstalt für Wasserbau (Hamburg, Germany)
- The national mapping and cadastral office of Ukraine (through contract with the Danube Reference Infrastructure project)
- The national mapping and cadastral agency of Moldova (through contract with the Danube Reference Infrastructure project)
- The city of Hamburg (through the smarticipate Project)
- The SDI coordination point of the Netherlands, Geonovum
- The national mapping agency of Switzerland, Swisstopo

Sustainability

How is the sustainability of your solution guaranteed?

Wetransform commercializes the solution, using an annual subscription business model. The subscription fee depends on the deployment model, the data volume, the number of data sets, and the types of services that need to be published. Fees range from 6.000 to 40.000 EUR per year. The direct cost of alternative solutions typically range from 15.000 EUR to 150.000 EUR per year.

Who provides support for this solution?

GDI-Südhessen provides first-level support to the members of the GDI-Südhessen cooperative. Second-Level Support is provided by the main developer of the solution, wetransform GmbH. Wetransform currently establishes a local partner network in countries like Spain and Italy, so that localisation and local language first level support can be provided.

Detailed solution information, lessons learnt & supporting documentation

Is the solution scalable and extendable?

Yes, the solution is built as a native cloud platform with largely automated horizontal and vertical scalability. It is also built to be extendable with additional containers that only need to fulfill relatively simple integration requirements, e.g. on authentication and health checking. Wetransform works with five other SMEs (Epsilon Italia, Geograma, Geosparc, Spatineo, M.O.S.S. Computer Graphik Systeme GmbH) to include new capabilities, such as usage statistics and data editing.

Does the solution reuse other services, software solutions or standards or open specifications? What license model is used?

The solution heart is to provide data using open standards, in particular the European INSPIRE data specifications, which are built on ISO GML (ISO 191xx series). The system also interfaces with infrastructure using catalogue web standards (CSW) and generated metadata using the European and national ISO 19139 profiles. It also provides access to data via standardised APIs (OGC Web Feature Service 2.0, Web Map Service 1.1.0 and 1.3.0). Other standards are supported as well, such as SKOS, eCH-0118, IFC and many more.

Figure 2: INSPIRE GIS integrates the GDI-DE Testsuite, the Geoportal of the state of Hessen as well as numerous other components.

Several core components of the platform are derived from established open source products, such as the data transformation software hale studio and the publishing framework deegree.

The license for the platform itself is proprietary to allow for a sustainable business model that enables our private partner to continuously invest into the solution.

The INSPIRE GIS solution makes it really easy to implement INSPIRE and to benefit from the created spatial data infrastructure. It also reduced effort and cost required to implement and maintain INSPIRE data sets massively.

What is the architecture of the solution?

Our goal is to build a scalable solution that requires little manual application management, as well as to enable frequent automated deployment. The INSPIRE GIS solution is built from moe than 20 microservices, each of which is managed as a Docker container. Such a microservice handles e.g. user management and authentication, or data conversion from one format to another. Internal communication between the components is managed via an AMQP-based message bus (RabbitMQ). This allows us to easily scale with demand or to do failover if a server has capacity issues or otherwise fails.

What technologies is your solution based on?

We use the following technology stack:

- Jenkins for testing and builds, including end-2-end-testing
- Docker Containers
- Docker Swarm for scalability
- Ansible for deployments
- Java Runtime Environment with a mix of Java, Scala and Groovy languages
- Vert.x framework for java-based backend services
- NodeJS for Javscript serverside components
- MongoDB and PostGreSQL as database backends
- Client-side: AngularJS HTML5 web application, touch-friendly and mobile responsive, SVG

Public cloud deployment is on Amazon Web Services (ECS cluster), private cloud deployment is possible on Azure or on root servers. An On Premise deployment (even on a single server) is also possible.

What Integrations are available?
- Single Sign On with CAS or OAuth
- Service Monitoring and Analytics through Spatineo Monitor
- Geoportal applications through Geosparc SleeveMonkey
- Extended validation through Epsilon Italia's Cloud Validation Service

Contact information

Web

Please visit the following websites to learn more:

https://www.gdi-inspireumsetzer.de/

http://www.inspire-gis.eu/

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