Product Reference

1 Why hale»connect?

Many organizations need to **design and implement standards for data exchange** or to **migrate data from legacy systems to new systems**. The hale»connect platform streamlines the workflows required to achieve these goals. It provides an end-to-end solution which addresses the **most important challenges**:

Expensive data harmonization

The conversion and migration of data from existing systems, to new standards and systems, requires specialist knowledge and tools which are often costly. hale»connect reduces the cost and eliminates the need for a patchwork of technologies to achieve full compliance with new standards that require customized data transformation.

Provision and integration of additional infrastructure

The provision of View and Download Services requires IT resources such as servers and operations staff for hosting and application management. hale»connect is a cost-effective SaaS solution that manages customer services in the public could, on-premise or in private cloud deployments, alleviating the need for dedicated, in-house resources to provision services.

Limited data interoperability for internal and external business processes

Data usage in core business processes is often not directly possible with existing tools and systems due to mismatches and technical problems that are not identified early in the process. Wetransform supports a comprehensive assessment of customers' needs and existing infrastructure to develop fully integrated customer solutions.

The vision behind hale»connect

Wetransform makes the design and implementation of standards for data exchange agile. The application of agile principles and highly iterative design has the potential to help our industry become far more efficient.

Standardization itself is, unfortunately, often inefficient. Processes are protracted, and the resulting drafts are subsequently outdated and risky to implement. Thematic experts who design standards typically base their decisions on their intuition – but this only works well when there is immediate feedback to their decisions, and real-world application. When it takes years to get from the start, to the first implementations, designs tend to be mismatched to real business and technology requirements.

Imagine how much easier it would be to define workable standards, if it did not take years to create or update a standard, but rather minutes or even seconds. Wetransform changes how you design and implement a standard: hale»connect enables data-driven design of specifications. You analyze models, test how they will behave when real data is added and when they are implemented on different platforms. hale»connect's tools enable very fast iteration through all phases from analysis, to implementation, making standardization agile.

2 Main Use Cases for hale»connect

As an integrated solution, hale»connect covers a broad functionality. While there are many possible application scenarios, we have built it specifically with the following in mind:

1. Harmonize and publish datasets to comply with standards, such as INSPIRE, 3A, or OGC
2. Share transformation projects to support effective teamwork
3. Develop data models and profiles and make sure they work
4. Assess risks and costs of system and data migrations up front
5. Transform complex and large datasets, e.g. when migrating from one database system to a new one

3 Key Features of hale»connect

hale»connect is a software tool for agile design and implementation of shared specifications. Shared specifications describe APIs and data structures that have multiple stakeholders and that are typically implemented many times. hale»connect supports an agile, data-driven approach to the design and implementation of such shared specifications.

hale»connect also provides the most comprehensive solution that meets the requirements of many different organizations and users. Its key features include:

1. **An integrated workflow** that
   - covers uploading, modelling, transforming, and publishing data
   - can be configured and adapted to different roles and tasks
   - supports the collaboration of different roles and different organizations
   - is fully automated including generation of metadata and manages all data and metadata with low effort, high quality and consistently
   - supports configurable transformation of spatial data sets to INSPIRE GML data specifications
   - validates INSPIRE compliance of all data, metadata and network services
2. **A workflow that automatically creates and publishes**
   - INSPIRE view services as WMS (Web Map Service)
   - simple INSPIRE Predefined Download Services as Atom Feed

- advanced INSPIRE Direct Access Download Services as WFS (Web Feature Service)
- vector data, raster data, and combinations of vector and raster data
- metadata for datasets and network services as files and via Discovery Service (CSW)

3. **Full functional support of all phases** for usage and operations (see also features in chapter 6):

Integrate	Model	Transform	Publish	Operate
» Services » Database » Manual Upload » Batch Upload	» Validation » Modelling Tools » Metadata Profiles » Content Analysis	» Mapping Creation » Validation » Documentation » Share & Collaborate	» Metadata Generation » Service Configuration » Dataset Series	» Multi-tenancy » Monitor » Scale » Failover » Recovery
Configure & Automate Workflow				

4. **Three-Click Integration:** With declarative mapping, integration of existing data into a new specification is as fast as three clicks. Declarative mappings can be re-used and migrated easily.
5. **Data-Driven Design:** You can only improve what you can measure. The product compares the data model under design to similar data models and provides information on how to improve the design.
6. **Built on Open Standards**: hale»connect supports more than 5.000 Open Standards schemas. Users pick elements from these to quickly leverage reference models like INSPIRE, XPlanung or NAS or to create new models faster.
7. **Publish Easily:** Data in files is often not enough, so hale»connect provides different types of APIs and services such as OGC Web Feature Services, which allow you to publish network services with just a few clicks.

EXPLORE
Understand even the most complex data models

DESIGN
Create your information model or start from one of the 5000+ supported schemas

ANALYSE
Learn how data models are used

YOU

TRANSFORM
Author with real-time feedback

MANAGE
Integrated workflow from data modelling to transformation and sharing

PUBLISH
Provide data as services and exchange models with your community

Figure 1: You and your team work together with hale»connect to create specifications and transformation projects and to publish useable data and services

4 Key Benefits of hale»connect

Fully automated Publication and Harmonization processes

Fully automated processes make the provision of harmonized, up-to-date data and services simple. Implementation and training costs can be reduced by as much as 70%.

And make your integrated data available in a new specification within hours: The Declarative Schema Transformation Engine transforms complex data structures up to 200 times faster than other engines.

Effective Teamwork in Complex Harmonization Projects

Sharing transformation projects and data specifications with others leads to collaborative development and maintenance, resulting in faster development times, higher quality, and better documented solutions.

One platform for all your Applications and Reporting Obligations

You can create and publish reports, data and services for INSPIRE, ALKIS, XPlanGML, SOSI, eCH, WFD, FFH, Natura2000, CDDA, ArcGIS and many other applications and standards, so that you don't need separate legacy tools and processes for each of them.

Immediate Availability

As a public or private cloud solution, the platform can be used immediately, making long and expensive projects for custom development unnecessary.

Guaranteed Performance

With a public or private cloud deployment, we guarantee compliance with the INSPIRE Quality of Service requirements. This also reduces your costs for hosting and application management by 50% to 80%.

5 Deployment Options

hale»connect and all derived solutions are available in three deployment modes, which differ in terms of available customization options and features as follows:

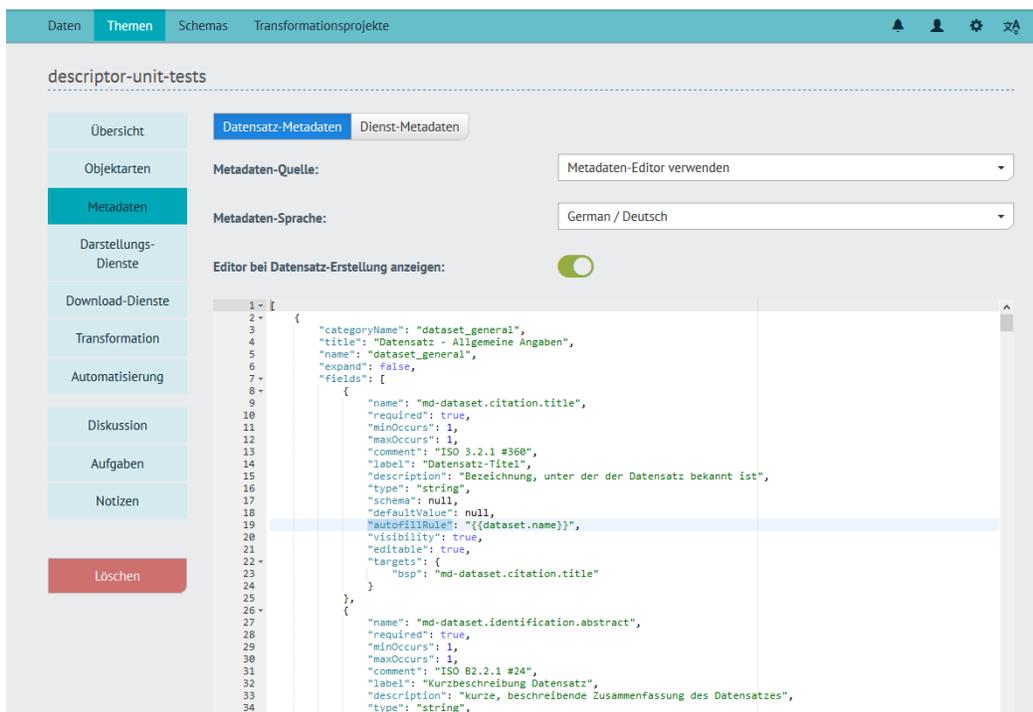| Options	Public Cloud	Private Cloud	On Premise
Hosting provided by wetransform	✓	✓	
Exclusive Server resources		✓	
Service Level Agreement included	✓	✓	
Custom URL + SSL certificate		✓	✓
Single-Sign On (OAuth, CAS)		✓	✓
Custom Roles and Privileges		✓	✓
Custom Styling and Content		✓	✓
Custom Features and Integrations		✓	✓

Figure 2: Customized/Themed Private Cloud Deployment

6 Features

User and Organization Management

hale»connect provides enterprise-grade user and organization management features. Some of the listed features depend on the deployment option and license level you have chosen.

Feature	Description
Manage Users	Create users and assign them to organizations and roles. Track activity for each user. Add a set of custom fields to each user to use as variables throughout the system, e.g. for metadata generation.
Manage Organizations	hale»connect has been developed from the ground up as a multi-tenant solution. You can create organizations and sub-organizations with any nesting depth. Not available in Micro license level.
Fine-grained access control	hale»connect comes with four default roles – data managers, theme managers, organization superusers and system superusers. For each of these roles, you can define exactly who may do what, based on actions and resources.
Single Sign On	Use CAS or OAuth for single sign on to hale»connect.

Datasets

hale»connect is a data-driven platform. Datasets can be analyzed, transformed and published using the following features:

Feature	Description
Upload and Download datasets	Upload files using any of the file formats listed in the section "Supported Data Sources and Formats". Single files may be up to 2.000MB each, and there is no size limit for a dataset.
Upload datasets from remote databases or services	Connect to an existing data base (PostGreSQL, Oracle, SQL Server), a service (WFS, REST-based), or an NetCDF file to create a dataset.
Mass upload	Upload files for up to 1.000 datasets in a batch process
Data Analysis	The system automatically performs file validation when a dataset is uploaded. Data analysis associates the contents of each file to one of the theme's feature types to ensure it matches the schema.
Upload Attachments	Upload attachment files to your dataset that can be referenced in your GML datasets.
Additional Raster Layers	Add a raster layer to your vector dataset, e.g. scans of zoning plans, and see them in the view services
Dataset Series	Group a set of datasets together into a dataset series
Tasks	Create and assign tasks to users of the platform if something needs to be changed in the dataset.
Comments	Start a discussion visible to anybody with access to the dataset.
Notes	Add a private note for yourself to the dataset.

Metadata management

Metadata can often be expensive and hard to create and to maintain. The setup of catalogue services can also require a lot of effort.
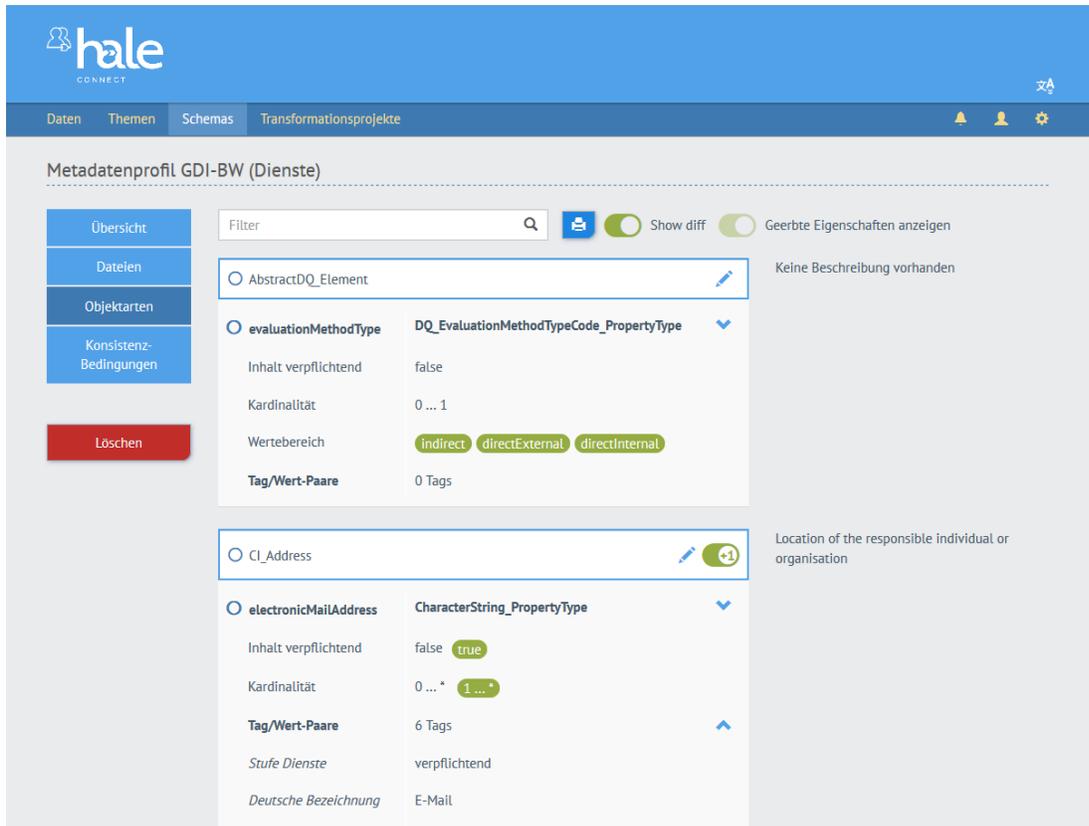

Figure 3: Defining a formal metadata profile for quality assurance and automated generation of metadata

In this platform, you can fully automate all processes related to metadata.

Feature	Description
Automated Generation of Metadata	Use autofill rules to automatically generate metadata based on dataset content, user and organization variables and statistics derived from the data.
Re-Use existing Metadata	Link or republish existing Dataset Metadata
Create a formal profile of a schema	Define property and consistency constraints interactively and export the profile as an Executable Test Suite (ETS), as rich documentation, or as a set of XML examples.
Metadata Entry	Auto-generate up to 100% of your metadata creation using auto-fill rules. Enter remaining metadata with an easy-to-use online interface available during dataset creation.
Harvesting Endpoint	Endpoint per organization with all metadata in an easy-to-harvest ZIP package
Catalogue Service	Full CSW 2.0.2 Interface

Data Models (Schemas)

With hale»connect, you can manage, analyse and edit data models. The solution offers the following features:

Feature	Description
Upload and Download Data Models	Create a data model by uploading its definition from any of the supported data sources. Please check if your edition supports the source you want to work with.
Extend an existing Schema	Create a new schema by extending an existing one through a simple to use wizard.
Schema Explorer and interactive editing	Browse any schema, create new ones or edit existing ones using a fully graphic, touch-first user interface that greatly simplifies modelling and uses key metrics to provide feedback on any design decision.
Understand Schema Usage	See which datasets use this schema, and what part of the schema is actually filled with data.
Analyse schema relationships	See how a schema is related to others via imports, references and inheritance relationships.
Add constraints and aliases	Some schema types don't allow you to define constraints, so you can define required properties, allowed values and more.
Tasks	Create and assign tasks to users of the platform if something needs to be changed in the schema.
Comments	Start a discussion visible to anybody with access to the schema.
Notes	Add a private note for yourself to the schema.

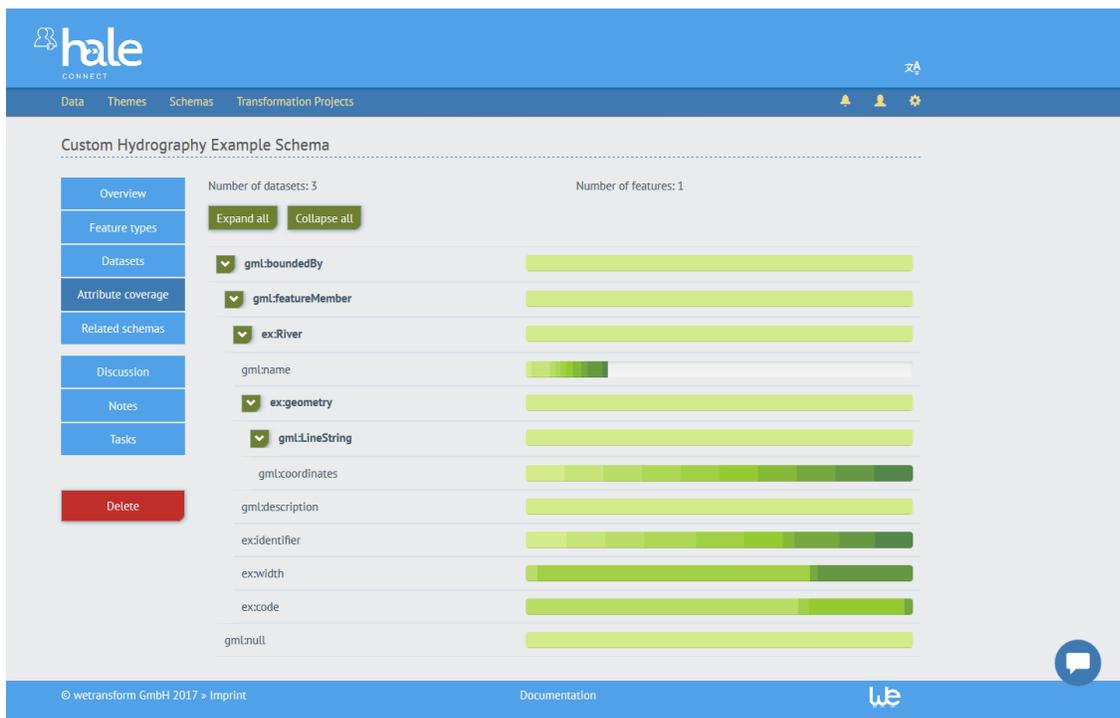*Figure 4: Analyse attribute coverage for a schema*

Transformation Projects

The primary tool to author transformation projects is hale studio[1]. hale»connect complements hale studio with several key features that enable effective teamwork. This is especially important when people with multiple backgrounds need to collaborate to define a high-quality transformation. All editions of hale»connect provide full access to the following features:

| Feature	Description
Upload and Download of hale projects	Upload hale studio 3.1.0+ transformation projects via a simple wizard. Share projects with your organization or the public.
Interactive Documentation	Understand the transformation project by browsing the interactive graphical documentation, including search and filtering of cells. Add your own documentation to every cell to better explain what is happening.
Web Transformation Tools (New!)	Interactive, web-based editing of transformation projects.
Cell Parameter Editing	Edit values of most mapping function parameters online.
Versioning	Use an internal Git Repository or an external Github Repository to work with versioned transformation projects.
Tasks	Create and assign tasks to users of the platform if something needs to be changed in the transformation project.
Comments	Start a discussion visible to anybody with access to the transformation project in scope of a single mapping function or in scope of the entire alignment.
Notes	Add a private note for yourself to the alignment or any single cell.
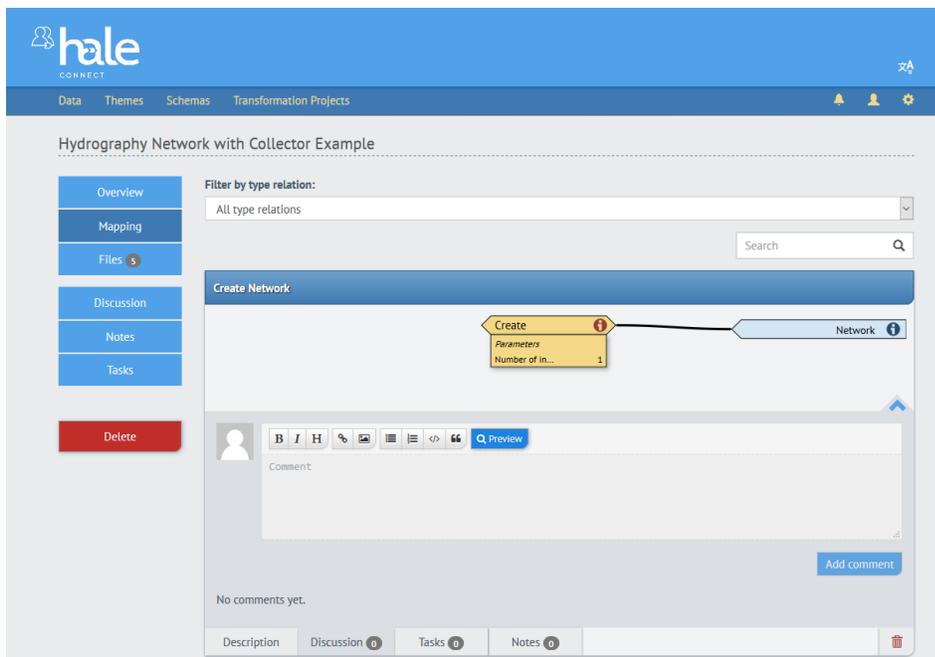
Figure 5: Starting a discussion on a mapping cell

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[1] https://www.wetransform.to/products/halestudio/

Themes

With themes, you can create re-useable configuration objects. A theme allows you to define fully automated workflows, e.g. to run a transformation project, validate the results, publish them as a service and then validate the service on any change of an underlying resource, be it the dataset or the transformation project.

Supported Data Sources and Formats

hale»connect can read from a variety of file formats. Which formats you can use depends on the license level you have purchased.

Data Source	Micro Organization	Basic Organization	Advanced Organization	Enterprise Organization
Shapefiles	✓	✓	✓	✓
CSV	✓	✓	✓	✓
Excel	✓	✓	✓	✓
XML	✓	✓	✓	✓
- ISYBAU	✓	✓	✓	✓
- SOSI	✓	✓	✓	✓
- SDMX	✓	✓	✓	✓
- …	✓	✓	✓	✓
GML	✓	✓	✓	✓
- CityGML	✓	✓	✓	✓
- INSPIRE GML	✓	✓	✓	✓
- XPlanung	✓	✓	✓	✓
- AAA	✓	✓	✓	✓
JSON	✓	✓	✓	✓
- GeoJSON	✓	✓	✓	✓
GeoPackage	✓	✓	✓	✓
NetCDF	✓	✓	✓	✓
Esri FileGDB		✓	✓	✓
MS Access		✓	✓	✓
Spatialite		✓	✓	✓
SQLite		✓	✓	✓
WFS	✓	✓	✓	✓
PostGreSQL		✓	✓	✓
SQL Server		✓	✓	✓
Oracle		✓	✓	✓

Supported Service Types

With hale»connect, you can make original or transformed data available via various service interfaces. Again, which service types you can use depends on the license level you have purchased.

Service Type	Micro Organization	Other Levels
Predefined Download Service (Atom Feed)	✓	✓
Direct Access Download Service (WFS 2.0)	✓	✓
Transactional WFS 2.0		✓
OGC Feature API (1.0) **(Q1/22)**	✓	✓
View Service (Web Map Service 1.3.0)	✓	✓
Sensor Observation Service		✓
Web Coverage Service		✓

It is possible to publish vector and raster data as WMS layers. PDFs and other non-georeferenced resources can be published as Attachments to a dataset. hale»connect provides its own implementation of Feature Info, called the Feature Explorer, that allows for easy browsing of linked features and resources.

Figure 6: Feature Explorer Pop-Up

All published services as well as all metadata are tested after publication for compliance with ISO, INSPIRE and GDI-DE profiles.

7 Integrations and Plug-Ins

hale»connect is an open platform that allows innovative third-party providers to add more capabilities.

Spatineo Service Quality and Performance Monitoring

Available in three different editions, from basic availability monitoring over simple usage analysis to full-blown performance and compliance testing, Spatineo Monitoring provides analytics for the services you create with hale»connect.
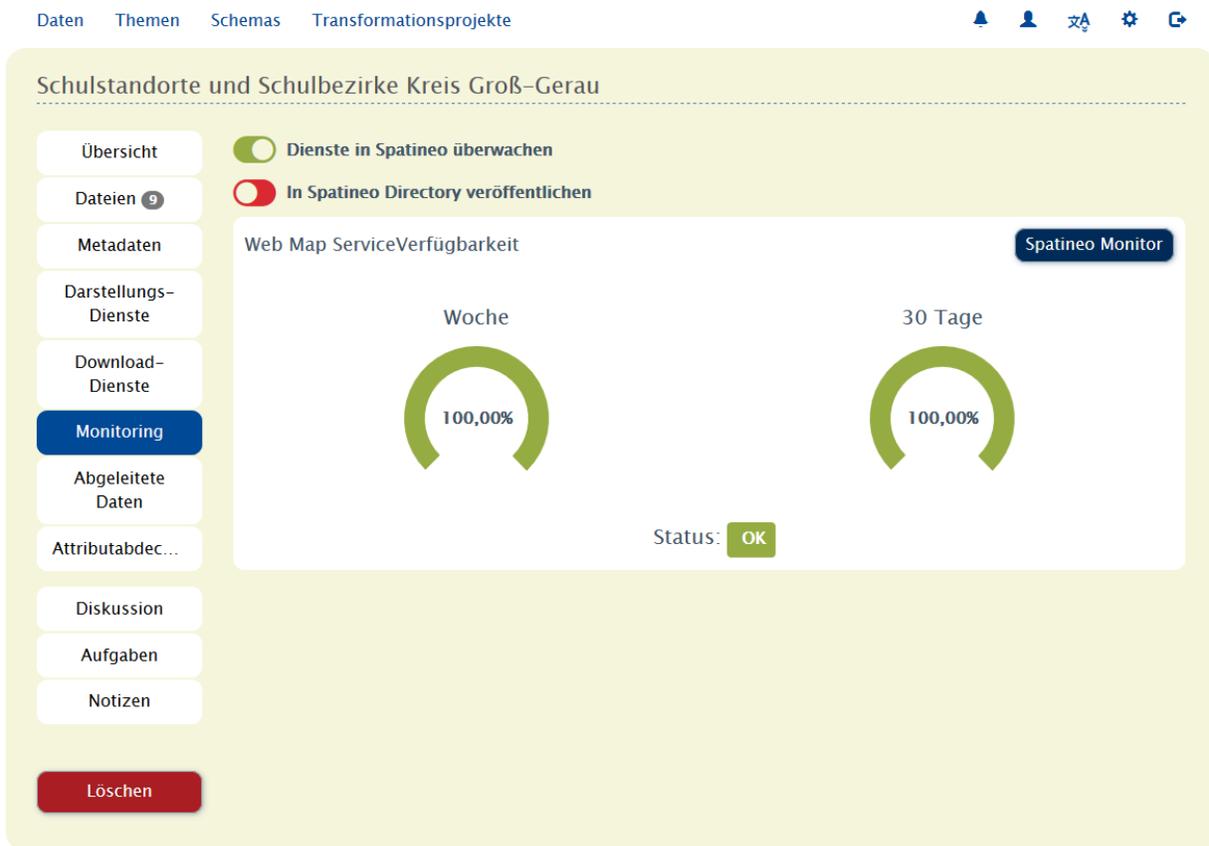

Figure 7: Spatineo Advanced Monitoring Data in hale»connect (with a custom style for GDI-Südhessen)