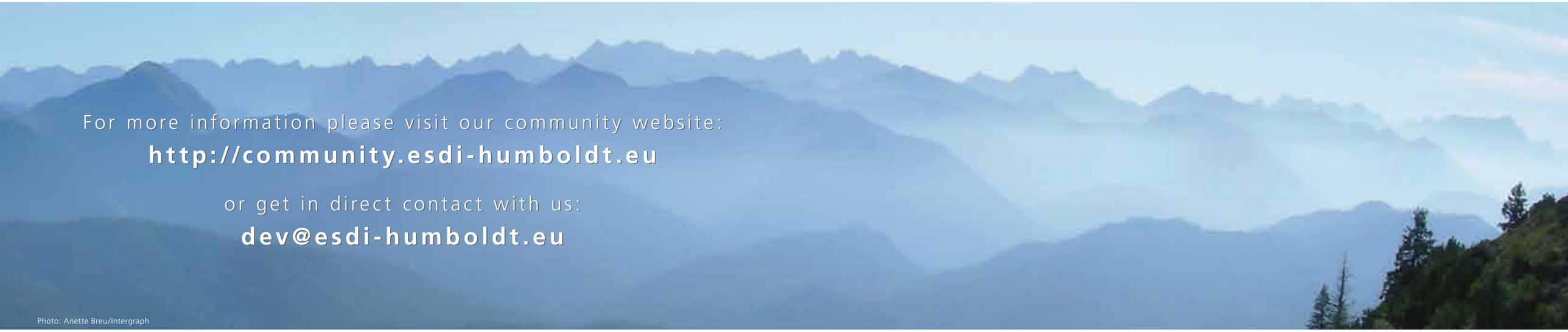
HUMBOLDT
www.esdi-humboldt.eu



For more information please visit our community website:

http://community.esdi-humboldt.eu

or get in direct contact with us:

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Photo: Anette Breu/Intergraph

The four-year EU project HUMBOLDT contributes to the implementation of a European Spatial Data Infrastructure (ESDI) that integrates the diversity of spatial data available for a multitude of European organisations. The main goal of the HUMBOLDT project is to enable organisations to document, publish and harmonise their spatial information. The software tools and processes developed demonstrate the feasibility and advantages of an Infrastructure for Spatial Information in Europe as planned by the INSPIRE initiative, meeting the goals of Global Monitoring for Environment and Security (GMES).

The technical goal of HUMBOLDT is to support Spatial Data Infrastructure (SDI) enablement by providing the functionalities for covering the data hamonisation process as a whole. The HUMBOLDT Tools and Services are built on current state of the art and standards, designed to provide solutions to all types of users, data custodians as well as private end-users. HUMBOLDT enables the use of single functionalities as part of your own infrastructure.

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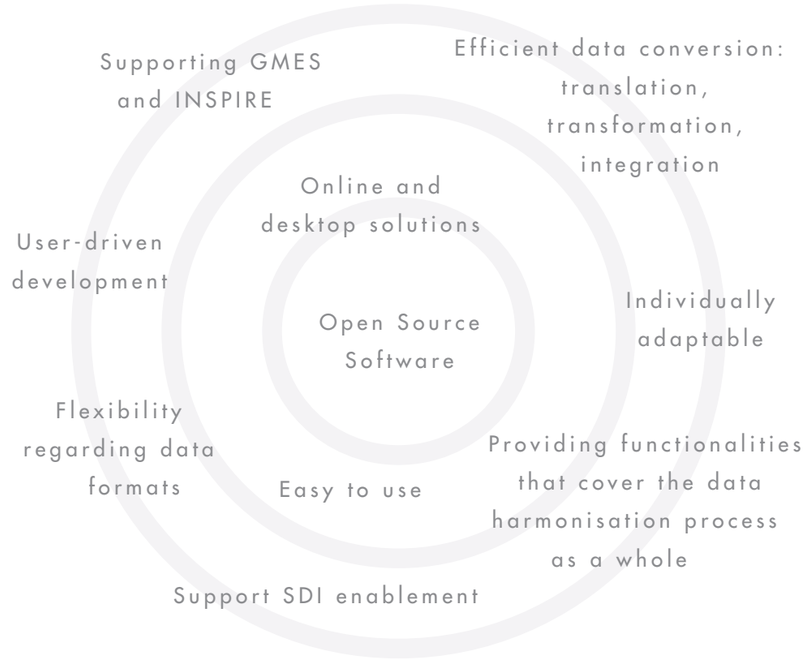
THE HUMBOLDT FRAMEWORK: TOOLS AND SERVICES



TOWARDS THE HARMONISATION OF SPATIAL INFORMATION IN EUROPE

The HUMBOLDT Framework:

HUMBOLDT Tools and Services at a Glance.

The overall aim of the HUMBOLDT Framework is to provide the basis for custom-made software that can be used to integrate data from heterogeneous sources for usage in a local or cross-border Spatial Data Infrastructure (SDI). It provides developers with tools and services to create individually tailored solutions fitted best to their respective requirements and integrated in the existing infrastructure.

The HUMBOLDT Framework is provided as open source under LGPL v3 and consists of the following Tools and Services.

HUMBOLDT GeoModel Editor (GME)

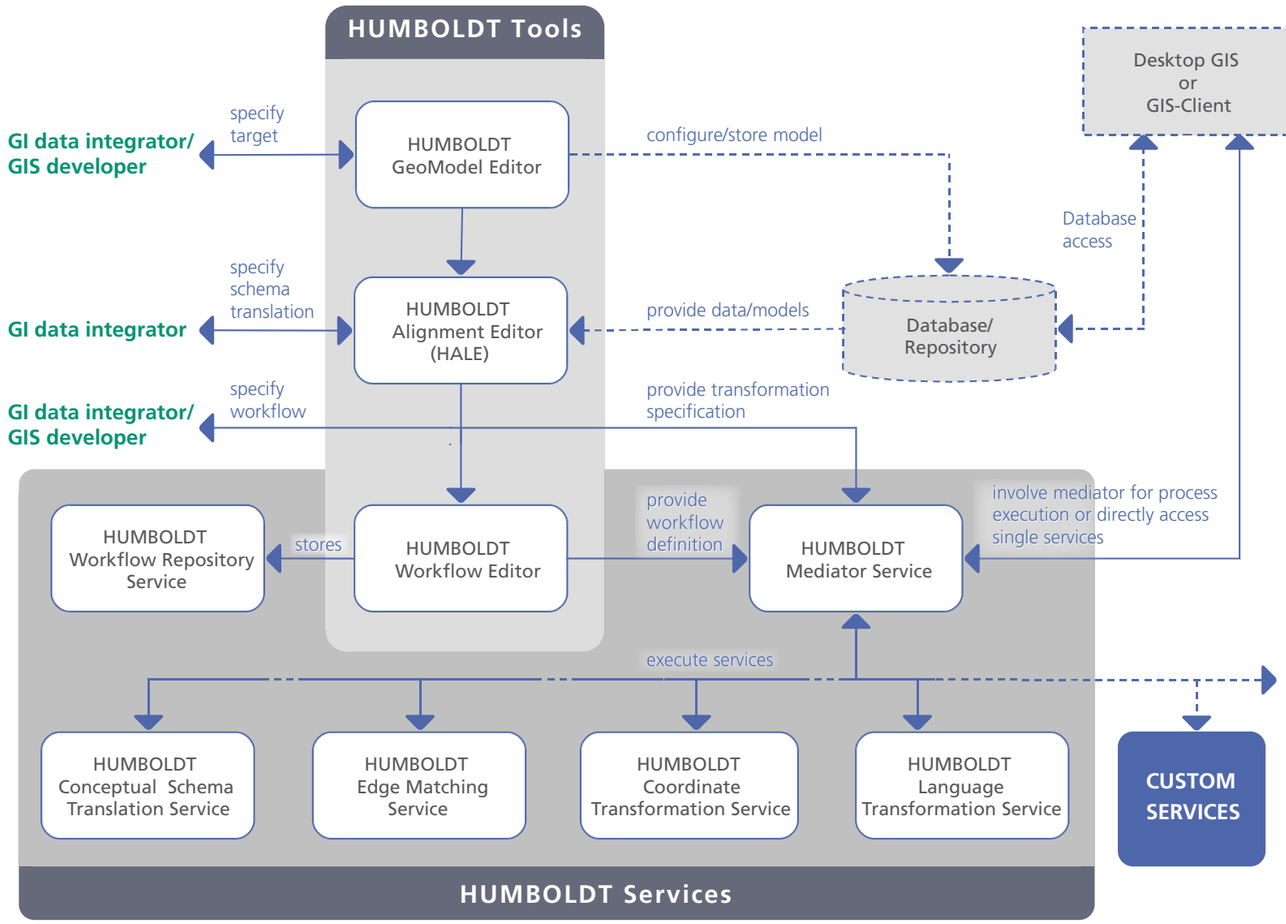
An essential step in data harmonisation is the formal description of the data model to use and of its constraints and rules that apply. The HUMBOLDT GeoModel Editor (GME) is a visual editor that uses an UML profile specifically adapted to the needs of modelling spatial data schemas. It is built on the standards defined within ISO 19100 series and produces models that are in compliance to the INSPIRE implementation rules.

HUMBOLDT Alignment Editor (HALE)

One of the most complex tasks in geodata harmonisation is the conceptual integration of different schemas that are used to model geodata. Based on this conceptual integration, geodata can be transformed from a source schema to target schema, e.g. an INSPIRE GML Application Schema. Such schemas are often highly complex and are only understood by domain experts. Therefore, the HUMBOLDT harmonisation toolkit contains an editor for conceptual schema mappings that allows experts to map schemas interactively and declaratively.

The HUMBOLDT Alignment Editor (HALE) has several properties which make it stand out from other data transformation definition tools. Among these are the following aspects:

- Definition of a mapping that is independent from concrete data sources;
- Continuous quality assurance of the created mapping;
- A task-based user interface that makes a complex mapping process;
- The possibility to use geographic data to interactively visualize and test defined mappings;
- Document limitations and the quality impact that a mapping has.



Workflow Editor (WE) and the Workflow Repository Service (WRS)

Data harmonisation can involve as many as 20 different heterogeneity aspects that need to be resolved. Furthermore, the processing of geospatial data for specific applications often requires complex workflows.

The Workflow Editor (WE) and the Workflow Repository Service (WRS) provide a powerful user interface to create such workflows and to share and to reuse them. Workflows can be set up with different data sources, and the Workflow Editor/Workflow Repository Service can automatically adapt a workflow, e.g. by adding additional format conversions.

HUMBOLDT Mediator Service (MS)

The Mediator Service (MS) simplifies usage of transformation services by making their capabilities accessible via simple, standardized and well-supported interfaces such as the Web Feature Service.

Conceptual Schema Translation Service (CST)

The Conceptual Schema Translation Service (CST) can handle complex schema transformations including type and attribute renaming, joining and aggregation and a set of specific geospatial transformation functions.

At the same time, the CST is able to perform many transformations in real time. The CST documents the transformations applied to the target data set in great detail, allowing users to find out from which data sources using which transformation functions have been applied.

Edge Matching Service (EMS)

Inconsistencies between geometries are one of the most obvious and common issues when harmonising geospatial data sets. The Edge Matching Service (EMS) is a Web Processing Service that can employ various methods to remove geometric inconsistencies from geospatial vector data. An example for one such method is called align-to-reference, where one data set is considered to be of higher accuracy, and the other data set's geometries are modified so that they align to the reference data set's geometries.

Coordinate Transformation Web Processing Service (CTS)

Coordinate Transformation is always a harmonisation issue when integrating data sets, be it horizontally or vertically. The Coordinate Transformation Web Processing Service (CTS) employs a generic re-projection library to provide a wide range of different coordinate reference system transformations in a generic interface.

Thus, the service can be used as part of any harmonisation processing chain. Furthermore, it is possible to plug-in custom re-projection algorithms.

Language Transformation Service (LTS)

The integration and harmonisation of cross-border data sets naturally also means that different natural languages are used. To be able to offer integrated data sets using a single natural language, a Language Transformation Service (LTS) is part of the HUMBOLDT Framework.

This web processing service offers the capability to translate known words in a given data set (from various thesauri) from one language to another.

Your custom service

While the processing services developed within the HUMBOLDT Framework cover some core aspects of data harmonisation, there are always specific processing capabilities that need to be added for a given application.

The HUMBOLDT Framework can easily be extended with additional, custom OGC Web Processing Services that can be implemented using your preferred or requested technology. The integration of such services into the Framework requires no programming skills.