# Getting inspired?

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## Introduction

The directive 007/2/EC of the European Parliament and of the Council, which came into force on the 15th of May 2007, obligates all EU member states to contribute to an Infrastructure for Spatial Information in the European Community (INSPIRE) [1]. Existing Spatial Data Infrastructures in the Member States should support the INSPIRE thoughts to share Spatial Data between various spatial databases and users. In order to do so, national data models have to be mapped to INSPIRE Data Specifications. Provided data sets have to be translated accordingly. Tools and architectures supporting such translations are topic to current research [2].

The work described in this abstract is separated into two parts. The first part reports on tests of available translation tools. The second part focuses on the development and implementation of a supporting architecture. Both parts contribute to ongoing efforts of preparing for INSPIRE.

## Background

The directive refers specific INSPIRE Data Specification themes to be shared. Transport Networks is one of these themes [3]. For the remainder of this work, we focus on this theme. Our source data sets are encoded in ATKIS (Official Topographic Cartographic Information System), GDF (Geographic Data Files), and OSM (Open Street Map). We applied the EuroRoads data model [4] as a placeholder of the upcoming INSPIRE Data Specification for Transport Networks. It is part of the reference material, which has been provided to the responsible INSPIRE Thematic Working Group.

## Inspection of existing Data Models and Mapping Tools

OSM is hardly documented. The schema mapping from OSM to EuroRoadS was nearly impossible. The attributes for the form of way in GDF and EuroRoadS are both ordinal scaled, but with different numbers of classes. ATKIS's offers three attributes, which may be mapped to road width, but complete information was provided by none of them. Due to these and similar problems, the schema mappings in both cases were challenging but solvable.

For testing, we translated data sets for roads in Münster (Germany) using four different tools: FME Desktop (Safe Software), GeoXSLT, GoPublisher (Snowflake), and Spatial Data Integrator. Only the commercial software FME was capable of translating the complete data set. The Spatial Data Integrator provides an open-source alternative with similar (if not increased) functionality but suffers serious performance problems. GeoXSLT is hard to use, but was capable doing simple mappings, whereas GoPublisher provided the most intuitive and easy to use interface. Nevertheless, the available transformation functionality was not sufficient for the desired translations. We did not succeed in integrating external processing into GoPublisher.

## Development of a Mapping Architecture

Following the solutions mentioned above, the user always has to be an expert in schema mapping. We want to abstract from this need and target a solution with a thin client and standardized interfaces with loosely coupled Web Services (Figure 1). The basic idea is that the client only communicates with an OGC-compliant Web Feature Service (WFS) shown by step 1. This WFS communicates with an OGC-catalogue and gets the requested data (step 2). Afterwards the WFS fetches the rules corresponding to the feature type from the Rule Repository (step 3). In step 4, the schema translation tool (in our case FME Server) translates the user demanded data by using the appropriated rules and sends the translated data back to the WFS. The WFS is now able to respond to the request of step 1. Notably, the WFS itself does not hold any data; it only holds the connection to the catalogue.

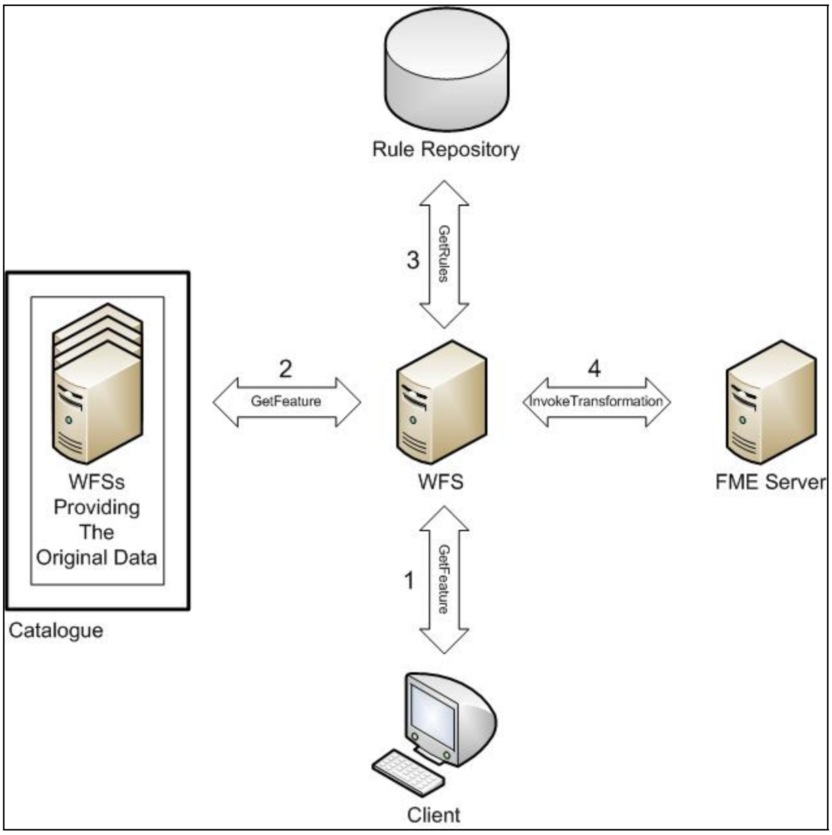


Fig. 1: Mapping Architecture and four steps of interaction.

There are still two challenges to meet: At first, there may be no WFSs registered in the catalogue, which deliver the requested data. Second, the transformation rule for a given feature type may not be available. To lift these issues, the WFS has the possibility to give an error response before starting step 4. If the data is not available, the client can register new WFS via the standard catalogue interface. In case that the rule does not exist, client can also add the rule to the repository using a specific interface.

## Conclusion and Future Work

Currently we set up the implementation plan which consists of a parallel work in different groups. As one part, the client has to be implemented. We will use tools like uDig, which allocate interfaces for developing plug-ins communicating with Web Services like the WFS or the catalogue. The major part is the implementation of the WFS including the interfaces to the catalogue, the rule repository and the FME Server. The communication with the mentioned system parts has to be coordinated. With the proposed solution it is now possible to get access to do a schema mapping in the INSPIRE context also by someone who is not an expert in schema mapping.

## References


1. European Parliament and Council (2007), *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)* Official Journal on the European Parliament and of the Council.

2. INSPIRE (2008), *INSPIRE Networking Services Architecture (Version 3.0)*.

3. INSPIRE (2008), *INSPIRE Data Specification Transport Networks (Version 1.0).*

4. Svard, T. (2006), *EuroRoads Deliverable D6.5 - Final specification of core European road data*.