

IDMB: A TOOL FOR NAVIGATING THE INSPIRE DATA MODEL AND GENERATING AN INSPIRE SQL DATABASE AND WFS CONFIGURATION

The Inspire Data Model Browser (IDMB) is a free tool that performs the following functions:

1. it presents the Inspire UML Data Model as a tree structure, which is complementary to the UML diagrams (see Figure 1);
2. it generates a Postgis SQL Script for creating an INSPIRE compliant SQL database (Inspire Database) and a configuration file for the Deegree tool that enables the access to the Inspire Database through a Web Feature Service (WFS) producing GML according to the Inspire XML Schemas.

The first version of IDMB will be released by the end of March 2014.

The motivations for the development of IDMB have been presented at the Inspire Conference 2013 in Florence. They are related to the following scenario, which is usual in many contexts:

- An organization (data provider) is willing to provide WFS and GML conformant to the INSPIRE specifications (services and data);
- This organization is hosting geodata related to one or more INSPIRE themes on a spatial database, called here Source Database;
- In order to facilitate the implementation of INSPIRE compliant GML data, the organization implements a new "INSPIRE-structured" spatial database;
- A Transformation Procedure is created which extracts data from the Source Database and loads them into the INSPIRE Database;
- The INSPIRE Database is "validated" using topological operators, in order to identify also topological constraints violations.

Therefore, the initial motivations for the development of IDMB were oriented only to the second function listed above, but during the development the importance of having a tree representation of the model is emerged. The presentation of the UML Inspire Data Model as a tree structure is useful under two aspects:

- a. it facilitates non-UML expert users to understand the content of the Inspire Data Model;
- b. it could help maintainers of the Inspire data model in understanding some of the properties of the model.

Both goals are related to the capability of IDMB of “navigating” the UML model by applying inheritance relations, expanding the datatypes of attributes and navigating roles. Some of the “Warnings” produced for goal (b) are: violation of the Inspire rules in using UML constructs (e.g., roles pointing to data types), empty packages and classes with no properties, attributes with not declared types, cycles in datatype use.

The Database produced by IDMB is derived from the UML model and can represent all the contents defined in that model – in this sense it is “Inspire compliant”. However, IDMB allows the user to choose a subset of Feature Types of the model in order to produce a database, which is tailored to specific application domains. Moreover, IDMB allows the user to choose between 3 different “Implementation Models”:

- the “pure data management” implementation model, which is not GML oriented and does not allow to produce a WFS configuration;

- the “read only WFS” database model, which produces the WFS configuration only for a query oriented WFS;
- the “transactional WFS” database model, which produces the WFS configuration for a transactional WFS, thus allowing database updates.

With respect to the database produced by the Degree tool from the XSD files of INSPIRE, the IDMB database has the following differences:

- differences which are intrinsic to the different information content of the UML model with respect to the XSD files that have been derived from the same model:
 - The associations (roles having inverse roles) cannot be recognized in the XSD, but they have a useful meaning for the SQL implementation in particular for inverse roles consistency and foreign key constraints.
 - The hierarchies can be exploited for defining views that represent the population of the superclasses.
 - The classes and data types of ISO packages referenced by INSPIRE application schema elements are considered and the corresponding SQL tables are generated.
- differences which are just dependent on the kind of implementation:
 - additional attributes required by GML elements are added only in the gml oriented implementation models.
 - in the transactional GML implementation model the roles are never absorbed by a feature type table and references to external objects are handled.

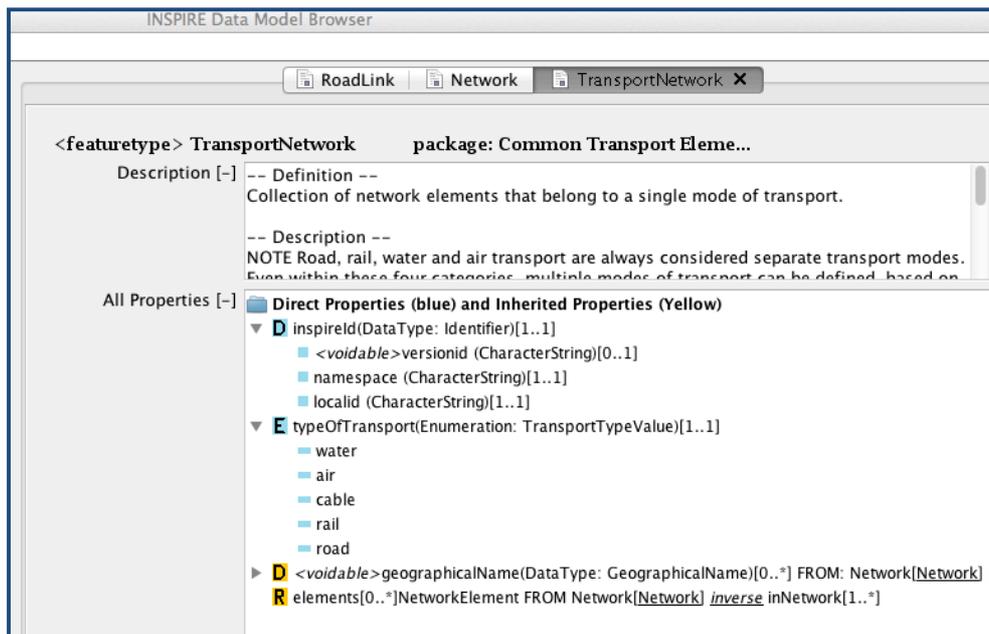


Figure 1. IDMB example screenshot: Class “TransportNetwork” from the INSPIRE Transportation Network. In the window labeled “All properties” the attributes and roles of the class are shown: in yellow the inherited properties and in blue the local properties, the symbol “D” is used to mark data type attributes, symbol “E” is used to mark enumerated attributes and “R” is used for the roles.