

# GIS Data Models for INSPIRE and ELF

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## ABSTRACT

This presentation provides an overview of relevant data models and data services of a modern GIS, and of the processes involved in their creation and use. It concentrates on the models involved in the INSPIRE directive, and the ELF (European Location Framework) project, focussing on the approach used by Esri to generate the template data models of the ArcGIS for INSPIRE product.

It studies the way that geodatabase models are generated from standard UML schemas, and the techniques and trade-offs involved in flattening complex XML schemas into tabular models. The conceptual INSPIRE UML data theme models available for download from the web page at <http://inspire.ec.europa.eu/index.cfm/pageid/2/list/datamodels> are used to develop a UML-based data model which relies on Esri geodatabase stereotypes (e.g. feature class, relationship class, table, and domain).

During the implementation of such models, some design choices can and sometimes must be made, such as relationships between objects, how to implement comments in the original INSPIRE UML, or data attributes which would improve or allow the definition of cartographic rules. Such a model, developed in Enterprise Architect, can be used to automatically generate an Esri geodatabase implementation following the model driven pattern.

Although INSPIRE specifications and compliance with the Implementing Rules can be verified against the conceptual data models, in the real world the focus is often on layers and feature types to be served from a relational database implementation via INSPIRE View and Download services, as specified in the respective technical guidance documents.

In this presentation we assess the benefits and constraints of a specific, optimised implementation of the INSPIRE data models at the geodatabase level. With this geodatabase data model positioned as the main interoperability element, there are benefits which include opportunities for developing and sharing symbology rules, data quality checks, common geoprocessing tasks (e.g. edge matching, generalization) which otherwise would have to be organization specific. Furthermore, the use of such pre-prepared geodatabase templates allows COTS products such as ArcGIS for INSPIRE to deliver compliant View and Download services with minimal configuration.

The long term INSPIRE implementation roadmap (<http://inspire.ec.europa.eu/index.cfm/pageid/44>) requires fluid development and enrichment of INSPIRE elements, as shown by recent efforts on the evolution and maintenance of the data models (<http://inspire.ec.europa.eu/index.cfm/newsid/11586>). Similarly, the European Location Framework project (<http://www.elfproject.eu/>) addresses the needs of harmonization of authoritative data across the National Mapping and Cadastral Agencies. Both these will require data model changes with consequent impact on software using the initial models, which can be minimized by model-driven templates.

The presented approach enables collaboration across multiple stakeholders using the common implementations. Finally, from the technology standpoint, as the derived geodatabase is built on a commodity GIS platform, its implementation can utilize the rich functionality available across desktop, server, mobile and cloud, supplementing INSPIRE together with the typical organization business functions such as data analysis, editing on the web, and developer tools.

*[PGH/RL, 2014-12-10]*