

Interoperability of (open) geospatial data – INSPIRE and beyond

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For the last 10 years, INSPIRE¹ (Infrastructure for spatial information in Europe) has been developing a legal framework and interoperability guidelines to facilitate pan-European and cross-border access to geospatial data from such diverse domains as addresses, transport networks, geology or natural hazards (see all the INSPIRE spatial data themes in Figure 1).

Annex I <ol style="list-style-type: none">1. Coordinate reference systems2. Geographical grid systems3. Geographical names4. Administrative units5. Addresses6. Cadastral parcels7. Transport networks8. Hydrography9. Protected sites	Annex III <ol style="list-style-type: none">1. Statistical units2. Buildings3. Soil4. Land use5. Human health and safety6. Utility and governmental services7. Environmental monitoring facilities8. Production and industrial facilities9. Agricultural and aquaculture facilities10. Population distribution – demography	<ol style="list-style-type: none">11. Area management/ restriction/regulation zones & reporting units12. Natural risk zones13. Atmospheric conditions14. Meteorological geographical features15. Oceanographic geographical features16. Sea regions17. Bio-geographical regions18. Habitats and biotopes19. Species distribution20. Energy Resources21. Mineral resources
Annex II <ol style="list-style-type: none">1. Elevation2. Land cover3. Ortho-imagery4. Geology		

Figure 1: The 34 spatial data themes defined in the Annexes to the INSPIRE Directive

The INSPIRE legal acts, the accompanying interoperability guidelines and the INSPIRE technical infrastructure already address a number of the aspects to be discussed at the workshop.

- The EU Member States are creating a **comprehensive EU-wide inventory of the data** and related services available for the 34 INSPIRE spatial data themes².
- **Data discovery** is facilitated through **standardised metadata³ and discovery services⁴**.
- **Data sharing** is facilitated by the framework that each Member State should have in place since 2009 to allow public administrations from other Member States to access data with the same rules as those of its own. This is a step towards harmonizing data access rules and Open Data.
- **Data access** is facilitated through **standardised service interfaces** for viewing, downloading and transforming data⁴.
- **Data exchange and interoperability** is facilitated by adopting **common cross-domain data models, controlled vocabularies and open data formats⁵**.

One of the key success factors for INSPIRE has been the active participation of several hundred data practitioners and users from across the EU Member States. As public administrations across Europe are starting the implementation of INSPIRE, there is a growing interest in combining INSPIRE data with other information from the public and private sectors, including data provided

¹ <http://inspire.jrc.ec.europa.eu/>

² Commission Decision as regards INSPIRE monitoring and reporting (2009/442/EC), OJ L 148, 11.6.2009, p.18

³ Commission Regulation (EC) No 1205/2008 as regards INSPIRE metadata, OJ L 326, 4.12.2008, p. 12

⁴ Commission Regulation (EC) No 976/2009 as regards INSPIRE Network Services, OJ L 274, 20.10.2009, p. 9

⁵ Commission Regulation (EU) No 1089/2010 as regards interoperability of spatial data sets and services, OJ L 323, 8.12.2010, p. 11

by citizens to create innovative products and services, adding to data value chains. Example of integrated products started to emerge at the *Powered by INSPIRE* conference⁶ organised by Belgium, the Netherlands, Germany and the UK on 4-5 March 2013. Many presenters observed the opportunities provided by INSPIRE and its methodology for expressing data models to arrive at more harmonized and semantically rich descriptions of datasets.

At the same time, there was also a clear message that INSPIRE data models need to be enriched further to make real progress in aligning different policies and requirements (e.g., in the railway sector, to combine the network topology expressed by the INSPIRE data model with the detailed inventories of railway assets and infrastructures required by the EU Railway Interoperability Directive).

Moreover, initiatives in e-government that are embracing Open Data as a policy and Linked Data as a delivery approach require the development of a number of missing elements to bridge the gaps between INSPIRE and Linked Data. The most important of such elements is an agreed framework for tagging information objects with *Persistent Identifiers*, but others include additional code lists, registries and agreed vocabularies (preferably in RDF).

The emergence of this demand from some countries and the wider move towards Open Data for both scientific and public sector data raises a number of issues, such as:

- What are the **implications of “opening up” data** for the organisations, in terms of governance, long-term commitments and costs and benefits? On one hand, it is the desired policy to publish data so that it can be used without restrictions (Open Data), with the expectation of fostering innovation, growth, jobs and accountability. On the other hand, there is so far limited evidence of these benefits, and high pressure from a very tight financial situation in the public sector that is in fact pushing in the opposite direction to Open Data, i.e. towards seeking economic returns from data sales.
- How to coordinate a **framework for the definition of persistent and resolvable identifiers** that can last for ever independently of organisational change (e.g. change of name of the organisation), technological change, and changing societal and financial circumstances. This challenge need to be addressed within the European Commission (including the EU Publications Office, the Joint Research Centre, and various policy Directorates), between the EC and the Member States at the EU level, and also in a coordinated effort globally. The latter could, for example, be achieved through the W3C, or the new Research Data Alliance⁷ (RDA), which will be launched on 18-20 March in Gothenburg. The RDA, which is a joint initiative from the EC, the NSF and the Australian Research Council, has the ambition to become for data what the IETF is for the Internet, and has set up several working groups, including one on Persistent Identifiers.

The topics above are obviously not the only ones but addressing these would make a significant step forward in opening up and making use of open data on the Web.

The Joint Research Centre of the European Commission, in collaboration with the ISA Programme of the EU⁸, is currently working on activities concerning the integration and re-use of INSPIRE in the broader framework of government data and services. The other aspects will be considered in joint work inside EC around the Open Data Portal of the EU⁹ and on initiatives promoting infrastructures for data-centric science.

⁶ <http://www.poweredbyinspire.eu/>

⁷ <http://rd-alliance.org>

⁸ <http://ec.europa.eu/isa/>

⁹ <http://open-data.europa.eu/>