Interoperable Registers and Registries in the EU: Perspectives from INSPIRE

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Abstract

INSPIRE is a EU-wide data and service infrastructure for the cross-border sharing of environmental data and for their use in support to policy making. This paper introduces the context, requirements and issues for registers and registries in INSPIRE, including persistent identifiers, versioning, multi-linguality, extensibility, linking and alignment with existing registers and cross-sector interoperability and re-use. In our presentation, besides highlighting open issues relevant not only in the scope of INSPIRE, we will report the results of an INSPIRE workshop on registers/registries taking place on 22-23 January 2014.

Introduction

In 2007, the EU Parliament and the Council approved a Directive meant to set up an infrastructure for spatial information in Europe (INSPIRE) [1] able to ensure cross-border access to and sharing of data of EU Member States covering 34 thematic areas relevant to EU environmental policies.

To achieve this, EU Member States have been collaborating in a long-term effort for the definition of common specifications for metadata, data, network services, as well as data and service sharing, monitoring and reporting. As a whole, such specifications are the "assets" for consistently establishing interoperability at the legal, organisational, semantic and technical levels in the INSPIRE infrastructure.

While the INSPIRE legal specifications (the Directive and the corresponding "Implementing Rules"), like all EU legal acts, are available through EUR-Lex [4], the technical guidelines, data models and code lists have been hosted in document and UML repositories, accessible through the INSPIRE Web site [9], maintained by the Joint Research Centre (JRC) of the European Commission.

With the transition from the development into the implementation phase of INSPIRE (starting around 2010 and aiming at full implementation by 2020), the ability to consistently reference these "interoperability assets" through unique identifiers was identified as a crucial requirement—not only for supporting the implementation of the INSPIRE infrastructure, but also for the underlying specifications themselves.

The INSPIRE Registry [10], launched in June 2013, and first presented at the INSPIRE 2013 conference [14], is meant to provide solutions to address this issue, by taking into account also the requirements gathered from the feedback of the INSPIRE stakeholder community. It is operated according to Linked Data principles, using HTTP URIs as identifiers and implementing content negotiation. Supported registers format are XML, Atom, JSON, and HTML. Moreover, work is under-way to agree on an RDF representation of these registers.

Currently, the INSPIRE Registry hosts registers for INSPIRE themes, application schemas, code lists and feature concepts. Additional functionality and additional registers to be included will be discussed with EU Member State representatives at a workshop on 22-23 January 2014.

Requirements & issues

This section outlines the main INSPIRE requirements for registers and registries. For each of them, we highlight the open issues we would like to discuss at the workshop.

Persistent identifiers and versioning

Data schemas, code lists, vocabularies, and any kind of interoperability assets may evolve over time. This applies also to INSPIRE, especially for specifications not covered by the legal framework. For this reason, the INSPIRE Registry is meant to be used to consistently refer to different versions of the INSPIRE assets, to ensure backward and forward compatibility.

Issues for discussion   How to enforce and maintain versioning of register items? At what level of granularity should versioning be done—at the register level, at the item level or at the level of individual language representations? How to deal with relationships between register items (taxonomic and non-taxonomic) when updating an item?

Multilinguality

This is a key requirement at all levels in INSPIRE. As all the legal acts of the EU, the INSPIRE Directive and Implementing Rules are available in all the EU official languages. These languages can also be legally used in INSPIRE data and metadata, and multilinguality is also supported (the typical case is data from EU Member States having more than one official languages, such as Belgium). However, the INSPIRE technical guidelines are officially available only in English.

Thus, the current content of the INSPIRE registry is partly available in multiple languages (where it is derived from the legal acts)—e.g., most labels and definitions of register items—, and partly only in English (where it is derived from the technical guidelines)—e.g., all descriptions and examples. However, a number of translations in other languages have been carried out at the national level. The INSPIRE Registry may provide a collaborative environment for the sharing and creation of such translations.

Issues for discussion   How to establish multi-lingual registers where all language representations are equally valid (i.e., that do not have a primary and secondary languages)? How to create multilingual versions of reference data, when no official text is available?

The principle of extensibility

The central INSPIRE registers can be extended at national, regional and local levels. There is a need to establish an architecture, register interfaces, as well as data, context, and governance models that support such extensions.

Issues for discussion   How to set up a system of federated registries across Europe? How to model register extensions? How to deal with context?

Alignment and inter-linking of existing registers

A number of registers are already used in different EU Member States, several thematic communities and at the different levels of the public administration. The purpose of INSPIRE is not to replace such existing registers, but to provide links to them. Furthermore, as part of the implementation of the INSPIRE data interoperability requirements, data providers in the EU Member States will need to align their existing registers (e.g., for code lists) to the central INSPIRE registers. It would be useful to be able to publish and share also these alignments between registers.

Issues for discussion   How to support alignment and linking of registers in a sustainable way?

Cross-sector interoperability and re-use

Although focussed on the environmental domain, INSPIRE includes specifications that may have cross-sector relevance (e.g., addresses, buildings, population distribution and demography), and thus they can be used to achieve interoperability across both borders and sectors.

However, effective re-use requires providing users the ability to verify which specifications are more relevant for them and how they can be implemented. This may include information on how they have been used for doing what, and reference to existing supporting documentation.

Notably, such issue is relevant also to INSPIRE and related specifications, which are covering a wide thematic area, and are consistently inter-linked at all interoperability levels, including the legal one (which implies the need to link INSPIRE registers also with those concerning EU legislation). The ability to clearly identify the relevant specifications, as well as their interdependencies, would help ensure a more consistent and cost-effective implementation of INSPIRE.

Some experimental work in this area has already been carried out in collaboration with the EU ISA Programme (Interoperability Solutions for European Public Administrations) [11], by verifying the suitability of the Asset Description Metadata Schema (ADMS) vocabulary [3, 6] for describing some of the

INSPIRE themes. Future work, always carried out in the framework of the EU ISA Programme, would include the extension to the ADMS vocabulary to describe the context of an asset, concerning both their definition and their actual use.

Other relevant activities concern work at the EU Publications Office on European Legislation Identifiers (ELIs) [2] and the Metadata Registry (MDR) [5], which operates URI registers for, e.g., country and language codes, corporate bodies and file formats, that are used not only in EU legal documents, but also in the dataset metadata registered in the EU Open Data Portal [13]. Notably, the MDR hosts also the EuroVoc thesaurus, and its alignments with an increasing number of thesauri used at the EU and international level (as GEMET and AGROVOC).

Issues for discussion   (How) Can registers/registries be used to help discovery and use of relevant "interoperability assets"? More in general, how is the actual use of registers and registries, and the needs of the stakeholder community, taken into account in the features to be supported by such reference data and services?

State of the art and discussion

On 22-23 January 2014, a workshop will be held on registers/registries for INSPIRE, attended by participants from EU Member States as well as EU institutions and bodies working in this field. The workshop is primarily meant to be an opportunity to share experiences and approaches, and, possibly, a starting point to establish a collaboration and coordination at the EU level between interested parties.

Relevant work in this area is carried out not only in the institutional framework of INSPIRE, but also in two INSPIRE-related actions of the ISA Programme, namely EULF (European Union Location Framework) [8] and ARe3NA (Re-usable INSPIRE Reference Platform) [7]. While EULF focusses on the policy and organisational interoperability levels, ARe3NA is addressing more specifically the semantic and technical ones. In particular, besides collaborating with EU and international initiatives on semantic interoperability, it promotes sharing and re-use of semantic and technical "assets" in support to the implementation of INSPIRE and its cross-sector re-use. This includes sharing and re-use of open source software components, as well as the identification of missing ones. Notably, the INSPIRE Registry is implemented by using a re-usable open source software, the Re3gistry [12], which has been developped in the framework of ARe3NA.

Our presentation, besides providing an overview on the context of and requirements for registries and registers in INSPIRE, will report the results of INSPIRE workshop on registers/registries and relevant activities carried out in ARe3NA.

References

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