

Registration of spatial related items from domain perspective.

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Abstract

Paper is addressing potential of spatial related items registration via registries and registers with focus on environmental domain feature catalogue register deployment. Main motivations for overall registers use as well as description of specific case from Slovakia indicated the needs and specific requirements for deployment of this type of register with solutions currently available on the scene. Basic description of two identified registry platforms is provided with focus on potential Feature catalogue registry implementation with outlook for further activities foreseen to be undertaken.

Keywords:

Register, Feature catalogue, INSPIRE, Linked Data, The Re3gistry, UKGovLD Linked Data Registry

Registers & Registries

Potential for easier access and exchange of digital spatial content and functionality is significantly rising with making existing underlying models and ontologies available through the standardised registers or registries¹. Register provide environment for management of the items (containing at least persistent identifiers and their definition) often reused in various applications and domains. Registries are representing information systems maintaining one or more registers. Demand for availability of this type of registers is also increasing in line with initiatives focused on standardisation of spatial data and services sharing (INSPIRE², Linked Data³) ensuring high level of interoperability.

Motivation

Many spatial data and services providers as well as users are facing to two main expectations of these days:

- How to make available spatial content (data) and functionality (services) respecting various legal obligations (e.g.INSPIRE), initiatives (e.g. Open Government Partnership⁴) as well as user expectations.
- How to profit and benefit from the potential of spatial content and services made available through standardised interfaces or their portal hubs (INSPIRE GeoPortal⁵ or Pan European data portal⁶).

¹ISO 19135:2005 Geographic information -- Procedures for item registration

²<http://inspire.jrc.ec.europa.eu/>

³<http://linkeddata.org/>

⁴<http://www.opengovpartnership.org/>

⁵<http://inspire-geoportal.ec.europa.eu/>

⁶<http://publicdata.eu/>

For both expectations, registers plays important role in facilitating controlled access to various reusable registered items. There are various possible implementations of the registers (e.g ontologies, dictionaries, models, code lists, organizations, licences, etc.). This paper is focusing on the area of domain specific spatial data structure definition, where models and ontologies plays important role.

Slovakian environmental domain feature catalogue register

In 2008, Ministry of the environment of the Slovak republic made available Feature catalogue of Integrated Landscape Management (KO IMK⁷), containing the description of spatial objects, attributes and associations. This register was representing domain specific standard for exchange of spatial data within the internal organisations as well as with external parties. Together with the back end (database) and front end (web app for changes request and website allowing simple queries) register contains also associated governance rules⁸.

Justification for Feature catalogue register

There are multiply reasons, why there remains high attention particularly on Feature catalogue:

- Human readable and understandable interface (particularly for domain experts). This plays important role, when data providers are in the process of data schema mapping from local to target schema in order to prepare and execute data structure transformation.
- Possibility to filter and query the content of the register via web graphical user friendly interface (GUI) as well as via application programming interface (API). In this case users can manipulate the content of the register in the desired way, without the need to study very often complex textual documentation or schemas.
- Important tool for analysis of potential domain or national model extensions. In case there are already existing national or domain specific models, or ontologies, this functionality will allow responsible bodies easier analysis and comparison to some reference models or ontologies and identify potential for their extension.

Practical research challenges to be addressed

Currently above mentioned register doesn't fulfil expectations of harmonized and interoperable register and therefore deserves updates in order to:

- Support spatial data exchange according the INSPIRE;
- Identify the possibilities to support INSPIRE model extensions for national and domain specific needs (e.g.integrated landscape management);
- Support LinkedOpenGeoData availability;
- Ensure compliancy with national eGov requirements and recommendations ;
- Establish the connection between INSPIRE and LinkedOpenData content and functionality.
- Investigate the improved possibilities for governance and further reuse (e.g. Management of change requests via web friendly GUI);
- Expose content via machine readable APIs.

⁷ <http://isu.enviroportal.sk/media/ko/index.html>

⁸ http://www.enviroportal.sk/uploads/2012/01/page/informacny-system-zp/kata/Zmeny_KO1.pdf

Possible solutions for investigations

In order to achieve fulfilment of indicated expectations, preferably available outcomes of relevant studies and implementations are foreseen to be used. If none of them will meet the requirements, in house development will have to be considered. As conceptual model behind the KO IMK is not compliant with the modelling rules used in INSPIRE as well as there is no related standardised ontology, re-modelling and ontology development process will have to take a place. For registry deployment available existing platforms will be considered.

Available platforms for registration

Based on preliminary exploration two relevant platforms for registration of spatial related items were identified for further investigation:

The Re3gistry⁹

Represents software allowing management of registers with focus on INSPIRE implementation support. The Re3gistry, has been undertaken by [ISA Action 1.17](#): A Reusable INSPIRE Reference Platform ([ARE3NA](#))¹⁰. Re3gistry platform is deployed for INSPIRE Registry¹¹ currently maintaining three registry instances:

- Theme register
- Application schema register
- Code list register

Registry allows import registry content, export procedure as well as exposing the registry content via web GUI as well as via web service with RESTful API.

Main Pros: System is designed to support the INSPIRE implementation, therefore all the logic and the structure is very closely tight with the fulfillment of requirements and recommendations for all INSPIRE components. In addition very important feature is availability of the registry content via web service with RESTful interface.

Main Cons: From the Feature catalogue needs point of view, despite the fact, there is no this type of register available yet, system model allows also this type of register implementation. There is also missing management of change requests via web friendly GUI, which could even in very simple module form (e.g. changing the status of the item via admin/editor back end) strengthen reuse of system on national or domain levels.

UKGovLD Linked Data Registry¹²

This platform provides solution for managing registers including the definitions of the terms used therein. The software is based on linked data principles & RDF and provides both a web application and RESTful API. This work is run under the auspices of the [UKGovLD](#)¹³ delivery team.

⁹ <https://joinup.ec.europa.eu/software/re3gistry/home>

¹⁰ <https://joinup.ec.europa.eu/community/are3na/description>

¹¹ <http://inspire.ec.europa.eu/registry/>

¹² <https://github.com/UKGovLD/ukl-registry-poc/wiki>

¹³ <http://data.gov.uk/linked-data/UKGovLD>

Solutions have been currently deployed as:

- UKGovLD Registry¹⁴ (An instance of the original proof-of-concept)
- WMO Codes Registry¹⁵ (Reskinned version as a proof-of-concept)¹⁶
- DEFRA Environment Registry¹⁷ (Domain specific registry instance)

System supports management of registers including their content and allows discovery and access of its content through web service API as well as basic GUI.

Main Pros: Tight connection to Linked Data, possibility to update the item status, support for federated registers, web service API.

Main Cons: There is no specific support for Feature catalogues, but in principle after the functional requirements will be properly defined, the register can include anything that can be described in RDF and could be used for Feature catalogue entries. The process and workflow management for submission, review and approval of registry entries is outside the scope of the registry service. The registry service simply provides the technical API through which the results of the process can be recorded and accessed. The registry service MAY provide a web forms interface for management of register entries or may delegate the interface to custom client implementations which access the registry service via the specified API.

Further work

Further activities will be focused on deployment of both Registry platforms and investigation of possibilities to use them as domain specific Feature Catalogue with outlook to search for possibilities to implement also domain specific extensions of INSPIRE UML model as well as environmentally related ontologies, further registers and thesauri. All this work should be foreseen to support the fulfilment of INSPIRE requirements and recommendations as well as expectations from Open Linked Data related initiatives.

¹⁴ <http://ukgovld-registry.dnsalias.net/>

¹⁵ <http://codes.wmo.int/>

¹⁶ <http://data.gov.uk/blog/linked-data-registries-and-talking-about-weather>

¹⁷ <http://environment.data.gov.uk/registry/>