The European Commission’s science and knowledge service
Joint Research Centre

Harmonisation of Energy Performance Certificates of buildings according to INSPIRE

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Barcelona, 30 September 2016
INSPIRE Conference
Outline

- Overview of the EULF Energy Pilot
- Overview of Use Case 1
- INSPIRE core schemas extension
- Re3gistry implementation
- Data transformation
- Data validation
- Data publication
- Data use
- Next steps
Overview of the EULF Energy Pilot

• The EU is giving more and more emphasis to its energy policy, whose strategy and actions are included in the Energy Union Package and the 2030 Framework for Climate and Energy.
• Buildings in which people live and work are responsible for an important portion of the energy consumption in Europe.
• Several policies and initiatives aim at improving the energy performance of buildings and to collect data of sufficient quality on the effect of energy efficiency policies on building stock across Europe.
Overview of Use Case 1

• **Name**: INSPIRE Harmonization of existing Energy Performance Certificate datasets and creation of a web application for accessing them.

• **Goal**: To establish an accessible and interoperable common knowledge base for EPC datasets to support local government and private sector involved in energy efficiency policies.

• **Description**: To harmonize according to INSPIRE existing EPC datasets and to create a user friendly web application to make them accessible and re-usable.
Overview of Use Case 1

**Option A - RL**
- Open EPC dataset of RL
- Cadastral vector dataset of RL

**STEP 3**
To georeference the EPC dataset

**Georeferenced EPC dataset**

**STEP 4**
To transform the georeferenced EPC dataset into the common INSPIRE extended target data model

**STEP 5**
To publish the transformed dataset by means of INSPIRE Network Services (WMS + WFS)

**STEP 6**
To use the harmonised dataset into a GIS client desktop application

**Option B - PAT**
- EPC dataset of PAT-APRIE
- Open cadastral vector dataset of PAT
INSPIRE core schemas extension

• Content and structure of INSPIRE application schemas for theme Buildings

Alternative deliveries:
1 = simple semantics + 2D geometry
2 = simple semantics + 3D geometry
3 = extended semantics + 2D geometry
4 = extended semantics + 3D geometry + additional 3D feature types

*Includes Building Base
INSPIRE core schemas extension

- INSPIRE extended data models
- INSPIRE core data models
- Energy Pilot extended data models
- CityGML Energy ADE
INSPIRE core schemas extension

The Purpose of Patterns

In software engineering, a software design pattern is a general reusable solution to a commonly occurring problem. It is a description or template for how to solve a problem that can be used in many different situations. Design patterns are formalized best practices that the designers or programmers can use to solve common problems when building a system.

Software design patterns fall into multiple categories such as structural and behavioural patterns. Structural pattern show relationships between classes that are static. In our extension design context, we define several new categories of design patterns. Based on the information given for each pattern, you will be able to make informed choices about how to design your model extension, and how to make it INSPIRE compatible.

Types of Patterns for INSPIRE Extensions

Model extension design as described in the extension methodology is a hierarchical top-down process, where you first design a wide scope, and then drill down to make individual aspects concrete. We start at the level of the entire model, the proceed with adding classes, and then define these classes in detail by adding properties. For each of these phases, there are different patterns you can apply:

1. **Patterns for Model compliance**: These patterns define restrictions you can apply to ensure compliance of your model to INSPIRE and to other frameworks where you want to comply to.
2. **Patterns for adding classes and properties**: These patterns describe how one or multiple classes are linked to classes in the INSPIRE data specification you’d like to extend. If in another language they describe which language features you use to implement them, and what consequences there are on a conceptual and implementation level.
3. **Patterns for modifying properties**: Property modification patterns describe how you can extend individual properties, e.g. by adding new constraints or by extending code lists. They also include consequences there are on a conceptual and implementation level.
INSPIRE core schemas extension

NEW FEATURE TYPES
A BuildingUnit is a subdivision of Building with its own lockable access from the outside or from a common area (i.e. not from another BuildingUnit), which is atomic, functionally independent, and may be separately sold, rented out, inherited, etc.
Re3gistry implementation

Our ISA solutions for you

- Document exchange
- Semantics
- Security
- Cross border collaboration services
- e-Participation
- Collections of software, standards and specifications
- Interoperable IT architecture & services

Re3gistry
A tool to manage and share reference codes.

When is this solution for you?
You would like to exchange data cross-border and cross-sector using reference codes. These codes are used in data exchange between applications, making sure that the parties involved understand univocally the key concepts to which the data refer. They can be used to define sets of permissible values for a data field, or to provide a reference or context for the data being exchanged. Examples are enumerations, controlled vocabularies, taxonomies, thesauri or, simply, 'lists of things'.

What can we offer you?
Re3gistry provides a central access point that allows labels and descriptions for reference codes to be easily looked up by humans, or retrieved by machines. It supports
**Re3gistry implementation**

### EULF Energy Pilot Code List Register

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<thead>
<tr>
<th>ID:</th>
<th>EULF Energy Pilot code list register</th>
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</thead>
<tbody>
<tr>
<td>Label:</td>
<td>EULF Energy Pilot code list register</td>
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<tr>
<td>Content Summary:</td>
<td>This code list register contains code lists and their values, as defined in the EULF Energy Pilot use cases. NOTE: None of the code lists referred to in this register are contained in any of the code lists referred to in the INSPIRE code list register.</td>
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<tr>
<td>Owner:</td>
<td>European Union</td>
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<td>Register manager:</td>
<td>European Commission, Joint Research Centre</td>
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<td>Control body:</td>
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<td>Submitter:</td>
<td>European Commission, Joint Research Centre (EULF Energy Pilot)</td>
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<tr>
<td>Contact point:</td>
<td>EULF Energy Pilot Registry Team</td>
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<td>Licence:</td>
<td>Europa Legal Notice</td>
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**Other formats:**
- XML
- JSON
- RDF/XML
- Atom
- CSV

### Code Lists

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Data transformation
Data transformation
Data validation
Data publication
Data publication
Data use
## Data use

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<td>PEC</td>
<td>legp.ven.0empec.eu</td>
</tr>
<tr>
<td>fax</td>
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<tr>
<td>phone</td>
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</tr>
<tr>
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Next steps

• Improve Persistent Identifier management in the target schema
• Apply HALE alignment to all dataset
• Deploy WFS on a publicly accessible server
• Enrich code list register content with more detailed description of code list values and translation in English
• Support partner to operationalize the pilot workflow into its organization
• Develop a web application facilitating the access to and use of harmonized data
• Re-use pilot workflow in other Regions/Countries
Stay in touch

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