



Data Ecosystem for Smart Cities

Publish BIM data using
Semantic Web technology

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The Ready4SmartCities project

Objective

- Improve energy-efficiency of cities

Approach

- Provide a data eco-system that enables to re-use and interlink relevant data

Results

- Identify available resources
- Develop guidelines to publish and re-use data sets

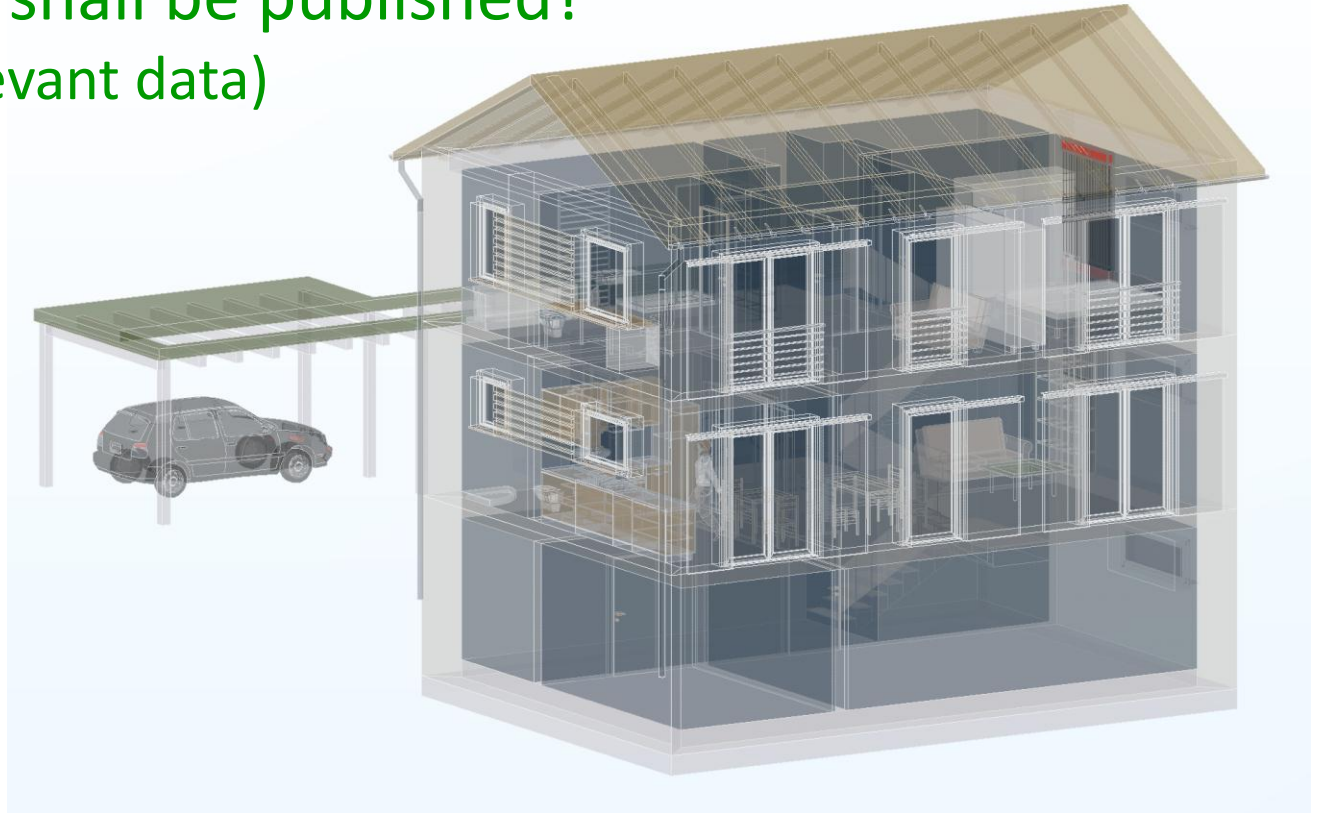
www.ready4smartcities.eu

Issues

1. Agree on an ifcOWL representation
(see presentation from P. Pauwels and W. Terkaj)
2. Publish BIM data
(export to ifcOWL, publish it in the web)
3. Make use of available data
(identify available data sources, link with other data sources, develop new services)

Questions

- What data shall be published?
(identify relevant data)

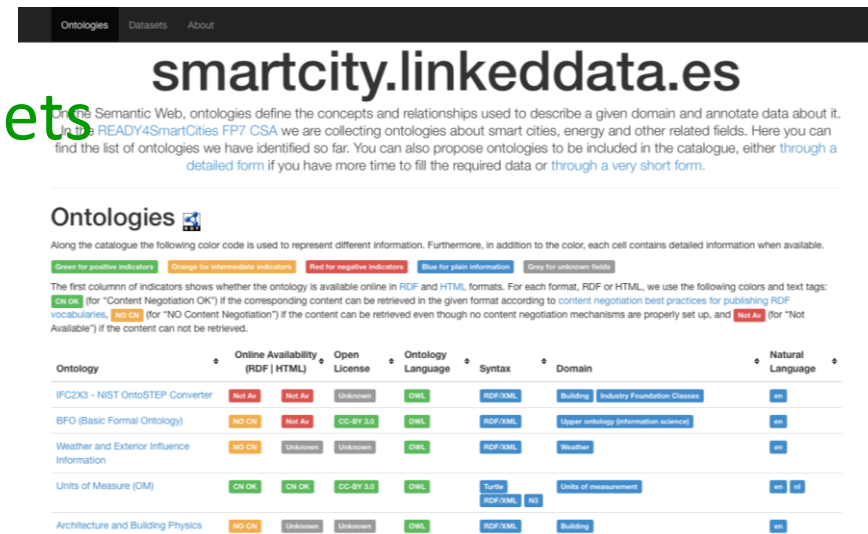


Questions

- What data shall be published?
(identify relevant data)
- How to publish IFC data?
(required specifications, tool chain,
make it visible/accessible to others)

Current situation

- (ifc)OWL is moving from research to industry
- Ongoing discussion about use cases
(see W3C community group)
- Lack of (open) ifcOWL data sets
(catalogue about available ontologies and datasets being developed in R4SC)



smartcity.linkeddata.es

On the Semantic Web, ontologies define the concepts and relationships used to describe a given domain and annotate data about it. In the READY4SmartCities FP7 CSA we are collecting ontologies about smart cities, energy and other related fields. Here you can find the list of ontologies we have identified so far. You can also propose ontologies to be included in the catalogue, either [through a detailed form](#) if you have more time to fill the required data or [through a very short form](#).

Ontologies

Along the catalogue the following color code is used to represent different information. Furthermore, in addition to the color, each cell contains detailed information when available.

Green for positive indicators Orange for intermediate indicators Red for negative indicators Blue for plain information Grey for unknown fields

The first column of indicators shows whether the ontology is available online in RDF and HTML formats. For each format, RDF or HTML, we use the following colors and text tags: [CN OK](#) (for "Content Negotiation OK") if the corresponding content can be retrieved in the given format according to [content negotiation best practices for publishing RDF vocabularies](#), [NO CN](#) (for "NO Content Negotiation") if the content can be retrieved even though no content negotiation mechanisms are properly set up, and [Not Av](#) (for "Not Available") if the content can not be retrieved.

Ontology	Online Availability (RDF HTML)	Open License	Ontology Language	Syntax	Domain	Natural Language
IFC2X3 - NIST OntoSTEP Converter	Not Av Not Av	Unknown	OWL	RDF/XML	Buildings Industry Foundation Classes	en
BFO (Basic Formal Ontology)	NO CN Not Av	CC-BY 3.0	OWL	RDF/XML	Upper ontology (information science)	en
Weather and Exterior Influence Information	NO CN Unknown	Unknown	OWL	RDF/XML	Weather	en
Units of Measure (OM)	CN OK CN OK	CC-BY 3.0	OWL	Turtle RDF/XML NO	Units of measurement	en nl
Architecture and Building Physics	NO CN Unknown	Unknown	OWL	RDF/XML	Building	en

Barriers

- Missing experience
(Advantages compared to IFC-SPF, ifcXML; tools, ...)
- Readiness of data owners to publish BIM data
(concerns about security and privacy, risk of miss use, additional effort in terms of time and costs)

Looking for a “hello ifcOWL world” example

- Should be as simple as possible
(only few, uncritical data)
- Should be realistic
(required data should be supported by the Coordination View)
- Should be clear and compelling

Possible show case: Data for indoor navigation

- Combine BIM and GIS data (IFC + Open Street Map)
- BIM requirements:
 - Building (location/address, orientation, name, entrance)
 - Storey (number of storeys, spaces, access)
 - Spaces (name, access, space geometry, area)

Steps towards that show case

- Extract required data from IFC, may anonymize data (e.g. using mvdXML-based services)
- Transfer selected IFC subset to ifcOWL (e.g. using the tool from P. Pauwels and W. Terkaj)
- Link data with GIS data (automatically through location)
- Publish that data (may provide an example server)
- Make use of that data (beautified SPARQL queries)

Next steps within the ifcOWL group

- Proposals for other show cases
(something more convincing, easier, higher acceptance)
- Interest to contribute

THANK YOU!