



# Smart Cities (READY4SmartCities)

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## READY4SmartCities project contributes in creating a **common approach on Smart Cities**.

In co-operation with different stakeholders (engineering specialists, ICT and RES providers, energy companies) the **main goals** are:

- To deliver a new **data ecosystem** that will accommodate cross-domain data and will allow the exploitation of such data at global scale
- To **identify** an holistic and **shared vision**, allowing feasible step-by-step action plans for relevant stakeholder groups to develop and use ICT-based solutions for energy system in urban and rural communities towards future Smart Cities
- To **identify** a set of **ontologies relevant to Smart Cities** and the different **requirements and guidelines** on how to use data described according to those ontologies

- **Facilitate ontology reuse**
  - There are many ontologies (and other resources) useful to describe energy and cross-domain data
- **One place to discover ontologies**
  - It is not trivial to find them
- **Specific for energy efficiency and smart cities**
  - Search engines and ontology registries are too general or off-topic (biology, environment, etc.)
- **Ontology assessment**
  - The quality of ontologies in the Web is unknown

# 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
<a href="#">The W3C PROV Ontology</a>	CN OK	CN OK	W3C	OWL	RDF/XML	provenance	en
<a href="#">eDIANA context awareness ontology</a>	NO CN	CN OK	Unknown	OWL	RDF/XML	devices	en
<a href="#">DOLCE (Descriptive Ontology for Linguistic and Cognitive Engineering)</a>	NO CN	Not Av	Unknown	OWL	RDF/XML	generic ontology	en
<a href="#">CASCADE airport ontology</a>	NO CN	CN OK	Unknown	OWL	RDF/XML	airport facility	en

**Annotations:**

- Link to RDF dump**: Points to the 'Online Availability' column.
- Quality indicators**: Points to the 'Open License' and 'Ontology Language' columns.
- Metadata**: Points to the 'Syntax', 'Domain', and 'Natural Language' columns.
- Detailed description page**: Points to the 'Ontology' column.
- Go to ontology**: Points to the 'Ontology' column.
- Information gathered during the catalogue generation**: Points to the 'Online Availability' and 'Open License' columns.
- Information gathered from the on-line form**: Points to the 'Domain' and 'Natural Language' columns.

# Web application - Details of an ontology

Ontologies Datasets About

## trade

Title	trade
URI	<a href="http://personal.us.es/aparedes/Trade.owl">http://personal.us.es/aparedes/Trade.owl</a>
Description	This ontology defines the classes, properties and individuals that make up the commercial management specially focused to purchase orders, in a company dedicated primarily to trade in electrical, energy and environmental products.
Languages	English
Ontology languages	OWL
Ontology format	RDF/XML
Issued	2012-2-28
Version	2.0

Detailed information

## Evaluation results

The following evaluation results have been generated by the [RESTful web service](#) provided by [OOPS!](#) (Ontology Pitfall Scanner!).



It is obvious that not all the pitfalls are equally important; their impact in the ontology will depend on multiple factors. For this reason, each pitfall has an importance level

attached indicating how important it is. We have identified three levels:

Critical	It is crucial to correct the pitfall. Otherwise, it could affect the ontology consistency, reasoning, applicability, etc.
Important	Though not critical for ontology function, it is important to correct this type of pitfall.
Minor	It is not really a problem, but by correcting it we will make the ontology nicer.

### P04. Creating unconnected ontology elements

2 cases detected. Minor

Ontology elements (classes, relationships or attributes) are created with no relation to the rest of the ontology. An example of this type of pitfall is to create the relationship "memberOfTeam" and to miss the class representing teams; thus, the relationship created is isolated in the ontology.

This pitfall affects to the following ontology elements:

- [http://localhost:8080/trade.owl#Trade\\_Handling](http://localhost:8080/trade.owl#Trade_Handling)
- <http://swrl.stanford.edu/ontologies/built-ins/3.3/temporal.owl#Entity>

### P08. Missing annotations

259 cases detected. Minor

### P11. Missing domain or range in properties

27 cases detected. Important

### P13. Missing inverse relationships

108 cases detected. Minor

### P22. Using different naming criteria in the ontology

ontology \* Minor

### P27. Defining wrong equivalent relationships

1 case detected. Critical

### P36. URI contains file extension

ontology \* Minor

### References

- [1] Gómez-Pérez, A. Ontology Evaluation. Handbook on Ontologies. S. Staab and R. Studer Editors. Springer. International Handbooks on Information Systems. Pp: 251 – 274. 2004.
- [2] Noy, N.F., McGuinness. D. L. Ontology development 101: A guide to creating your first ontology. Technical Report SMI-2001-0880, Stanford Medical Informatics. 2001.
- [3] Rector, A., Drummond, N., Horridge, M., Rogers, J., Knublauch, H., Stevens, R., Wang, H., Wroe, C. "Owl pizzas: Practical experience of teaching owl-dl: Common errors and common patterns". In Proc. of EKAW 2004, pp: 63 – 81. Springer. 2004.
- [4] Hogan, A., Harth, A., Passant, A., Decker, S., Polleres, A. Weaving the Pedantic Web. Linked Data on the Web Workshop LDOW2010 at WWW2010 (2010).
- [5] Archer, P., Goedertier, S., and Loutas, N. D7.1.3 – Study on persistent URIs, with identification of best practices and recommendations on the topic for the MSs and the EC. Deliverable. December 17, 2012.
- [6] Heath, T., Bizer, C.: Linked data: Evolving the Web into a global data space (1st edition). Morgan & Claypool (2011).

Evaluation results generated by



<http://oops.linkeddata.es>