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Mobility Vocabulary Development & Showcase

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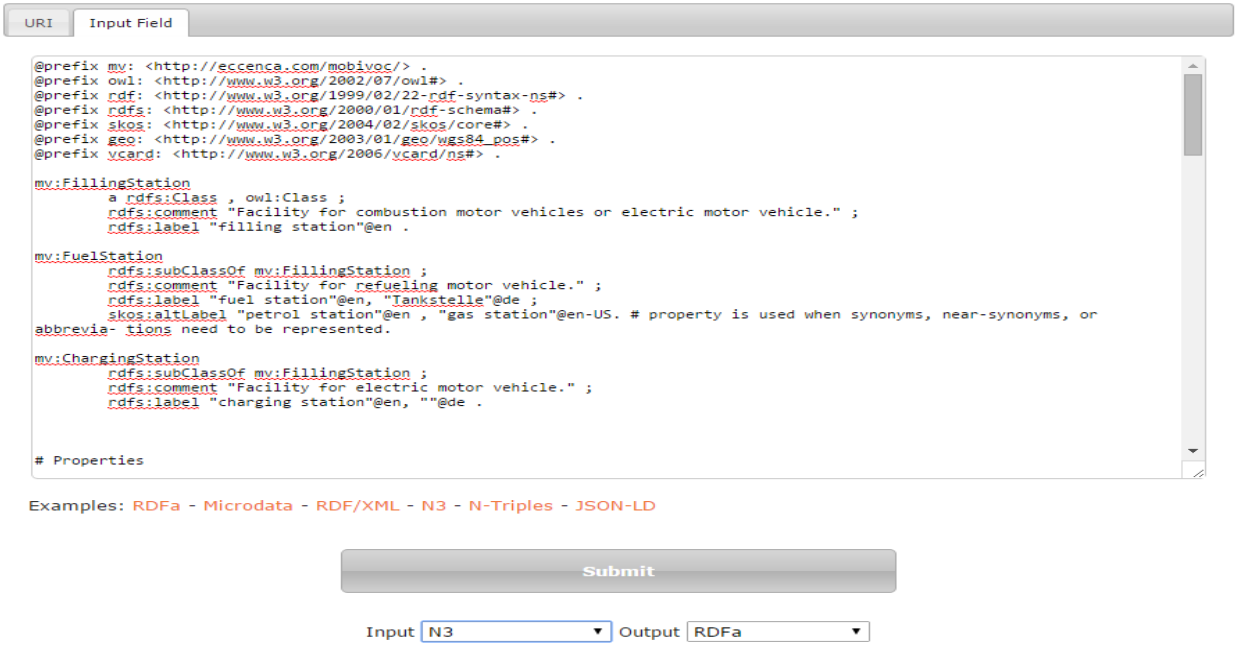
Outline

- Testing
  - ❖ Vocabulary Syntax Testing
  - ❖ Vocabulary Semantic Testing
  - ❖ End-User Application Testing / Test Case

Vocabulary Syntax Testing

RDF Translator Tool: converts the .ttl files into RDF

Input (ttl format):



Vocabulary Syntax Testing

Output (rdf format):

Error message:

```
at line 51 of <>:
Bad syntax (expected '.' or '}' or ']' at end of statement) at ^ in:
"...dfs:label "E85"@en , "E85"@de ;

mv:Ethanol
        rdfs:subClassO^f mv:Fuel;
        rdfs:comment "Liquid fuel used as motor fuel, ma..."
```

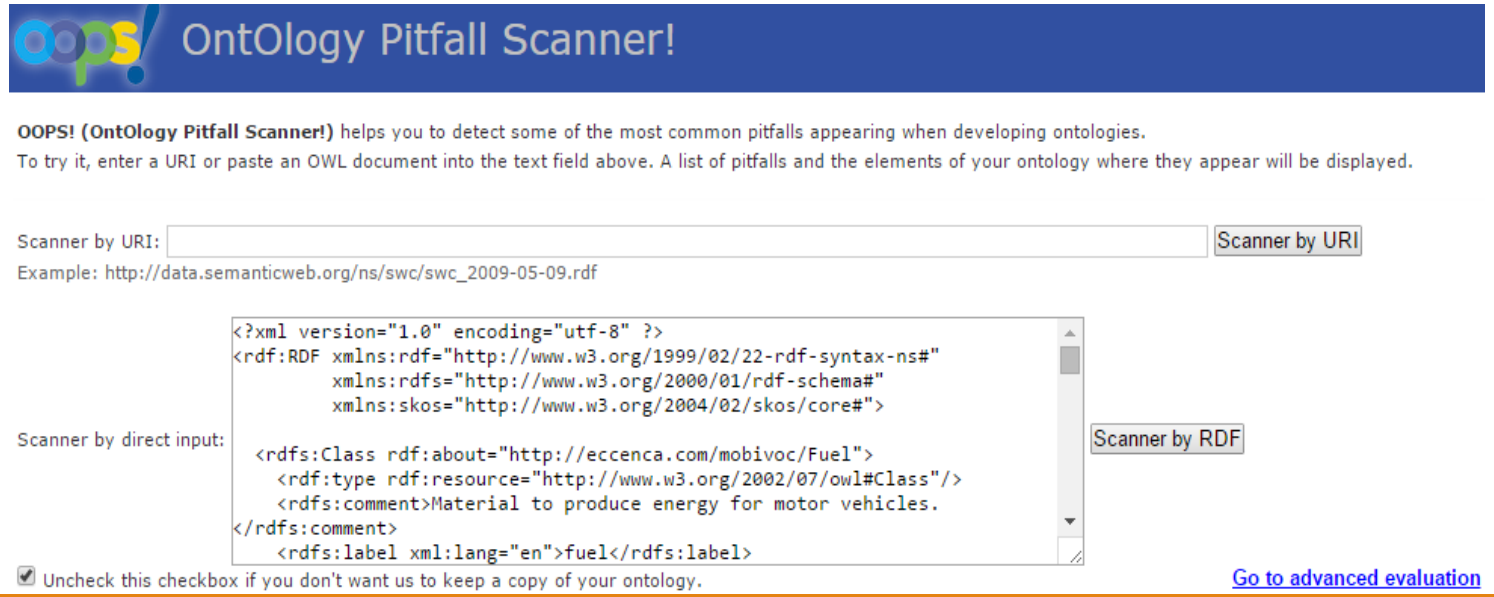
```
<div xmlns="http://www.w3.org/1999/xhtml"
  prefix="
    owl: http://www.w3.org/2002/07/owl#
    rdf: http://www.w3.org/1999/02/22-rdf-syntax-ns#
    skos: http://www.w3.org/2004/02/skos/core#
    rdfs: http://www.w3.org/2000/01/rdf-schema#
    mv: http://eccenca.com/mobivoc/
    geo: http://www.w3.org/2003/01/geo/wgs84_pos#
    vcard: http://www.w3.org/2006/vcard/ns#"
  >
  <div typeof="rdf:Property" about="http://eccenca.com/mobivoc/fillingStationHeight">
    <div property="rdfs:comment" content="Indicates the height of the filling station. This is important especially for trucks">
    <div rel="rdfs:range" resource="http://www.w3.org/2000/01/rdf-schema#Literal"></div>
    <div rel="rdf:type" resource="http://www.w3.org/2002/07/owl#DatatypeProperty"></div>
    <div property="rdfs:label" xml:lang="en" content="filling station height"></div>
    <div rel="rdfs:domain" resource="http://eccenca.com/mobivoc/FillingStation"></div>
    <div property="rdfs:label" xml:lang="de" content=""></div>
  </div>
```

Vocabulary Semantic Testing

OOPS (OntOlogy Pitfall Scanner) tool:

- Detects some of the most common pitfalls appearing when developing ontologies

Input:



Vocabulary Semantic Testing

Output/Evaluation Results:
E.g.

- Creating unconnected ontology elements
- Missing domain or range in properties

Evaluation results

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.

[Expand All] | [Collapse All]

Results for P38: No OWL ontology declaration. — **ontology* | Important**

The owl:Ontology tag aims at gathering metadata about a given ontology as version information, creation date, etc. It is also used to declare the inclusion of other ontologies. Not declaring this tag is consider as a bad practice for owl ontologies as it is a symptom of not providing useful metadata as proposed in LDV2. An example of this pitfall (at 29th June, 2012) could be found at the "Creative Commons Rights Expression Language (cc)" ontology, which URI is http://creativecommons.org/ns, that does not have any owl:Ontology declaration in its RDF file even though there are other OWL elements used as, for example, owl:equivalentProperty.

*This pitfall applies to the ontology in general instead of specific elements.

Results for P39: Ambiguous namespace. — **ontology* | Critical**

In the case of not having defined the ontology URI nor the xml:base namespace, the ontology namespace is matched to the file location. This situation is not desirable as the location of a file might change while the ontology should remain stable as proposed in LDV1. An example of this pitfall (at 29th June, 2012) could be found at the "Basic Access Control ontology (acl)" with URI http://www.w3.org/ns/auth/acl has no owl:Ontology tag nor xml:base def-inition.

*This pitfall applies to the ontology in general instead of specific elements.

End-User Application Testing / Test Case

- Define relationships based on use cases and requirements

- Create test cases with SPARQL

End-User Application Testing / Test Case

- Testing Filling Station Location

```
"PREFIX mv: <http://eccenca.com/mobivoc/> " +
"PREFIX owl: <http://www.w3.org/2002/07/owl#> " +
"PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> " +
"PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#> " +
"PREFIX skos: <http://www.w3.org/2004/02/skos/core#> " +
"PREFIX geo: <http://www.w3.org/2003/01/geo/wgs84_pos#> " +
"PREFIX vcard: <http://www.w3.org/2006/vcard/ns#> " +
"SELECT ?fsNumber ?cName ?locality ?pCode ?region ?sAddress " +
"WHERE { " +
"    ?fuelStation a mv:FuelStation . " +
"    ?fuelStation mv:fillingStationNumber ?fsNumber . " +
"    ?fuelStation vcard:hasAddress  [ vcard:country-name ?cName ;  " +
"                                     vcard:locality ?locality ;  " +
"                                     vcard:postal-code ?pCode ;  " +
"                                     vcard:region ?region ;  " +
"                                     vcard:street-address ?sAddress; ]." +
"}";
```

Output:

```
ID: 4, Country: Germany, City: Bonn , PostCode: 53119 , Region: North Rhine-Westphalia , Street: Potsdamer Platz 7
ID: 3, Country: Germany, City: Bonn , PostCode: 53119 , Region: North Rhine-Westphalia , Street: Lievelingsweg 10
ID: 2, Country: Germany, City: Bonn , PostCode: 53225 , Region: North Rhine-Westphalia , Street: St. Augustiner Str. 145
ID: 1, Country: Germany, City: Bonn , PostCode: 53117 , Region: North Rhine-Westphalia , Street: Kölnstraße 655
```

End-User Application Testing / Test Case

- Testing Geographical Coordinates

```
"PREFIX mv: <http://eccenca.com/mobivoc/> " +
"PREFIX owl: <http://www.w3.org/2002/07/owl#> " +
"PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> " +
"PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#> " +
"PREFIX skos: <http://www.w3.org/2004/02/skos/core#> " +
"PREFIX geo: <http://www.w3.org/2003/01/geo/wgs84_pos#> " +
"PREFIX vcard: <http://www.w3.org/2006/vcard/ns#> " +
"SELECT  ?fsNumber ?longtitute ?latitute " +
"WHERE { " +
"    ?fuelStation a mv:FuelStation . " +
"    ?fuelStation mv:fillingStationNumber ?fsNumber . " +
"    ?fuelStation geo:long ?longtitute . " +
"    ?fuelStation geo:lat  ?latitute ." +
"}";
```

Output:

```
ID: 4, Longitude: 7.077556, Latitude: 50.741982
ID: 3, Longitude: 7.084079, Latitude: 50.745675
ID: 2, Longitude: 7.122874, Latitude: 50.747196
ID: 1, Longitude: 7.057300, Latitude: 50.761966
```

End-User Application Testing / Test Case

- Testing Contact Information

```
"PREFIX mv: <http://eccenca.com/mobivoc/> " +
"PREFIX owl: <http://www.w3.org/2002/07/owl#> " +
"PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> " +
"PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#> " +
"PREFIX skos: <http://www.w3.org/2004/02/skos/core#> " +
"PREFIX geo: <http://www.w3.org/2003/01/geo/wgs84_pos#> " +
"PREFIX vcard: <http://www.w3.org/2006/vcard/ns#> " +
"SELECT ?fsNumber ?tel ?url  " +
"WHERE { " +
"    ?fuelStation a mv:FuelStation . " +
"    ?fuelStation mv:fillingStationNumber ?fsNumber . " +
"    ?fuelStation vcard:tel ?tel . " +
"    ?fuelStation vcard:url ?url . " +
"}";
```

Output:

```
ID: 4, Tel: 0228 654851, URL: svg-nordrhein.de
ID: 3, Tel: 0228 676991, URL: essofuelfinder.com
ID: 2, Tel: 0228 476790, URL: essofuelfinder.com
ID: 1, Tel: 0228 673966, URL: shell.de
```