

# SEMANTIC WEB

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REPORT #4 - RDF IN USE

# 1 Semantic vocabularies: Dublin Core

```
<?xml version="1.0" encoding="UTF-8"?>
<rdf:RDF
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns="http://kamola.best.krakow.pl/piw2012/mylibrary#">

  <rdf:Description rdf:about="http://kamola.best.krakow.pl/piw2012/
mylibrary#book-trzeciblizniak">
<dc:creator>Ken Follet</dc:creator>
<dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Trzeci blizniak</dc:title>
<dc:publisher rdf:datatype="http://www.w3.org/2001/
XMLSchema#string">Albatros</dc:publisher>
  </rdf:Description>

  <rdf:Description rdf:about="http://kamola.best.krakow.pl/piw2012/
mylibrary#book-swiatwgclarksona">
<dc:creator>Jeremy Clarkson</dc:creator>
<dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Swiat wedlug
Clarksona</dc:title>
  </rdf:Description>

  <rdf:Description rdf:about="http://kamola.best.krakow.pl/piw2012/
mylibrary#book-swiatlowfotografii">
<dc:creator>Steven Biver</dc:creator>
<dc:creator>Fil Hunter</dc:creator>
<dc:title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Swiatlo w
fotografii</dc:title>
<dc:publisher rdf:datatype="http://www.w3.org/2001/
XMLSchema#string">Galaktyka</dc:publisher>
  </rdf:Description>

  <rdf:Description rdf:about="http://kamola.best.krakow.pl/piw2012/
mylibrary#cd-foals_antidotes">
<dc:creator rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Foals</dc:creator>
<dc:title rdf:datatype="http://www.w3.org/2001/
XMLSchema#string">Antidotes</dc:title>
  </rdf:Description>

  <rdf:Description rdf:about="http://kamola.best.krakow.pl/piw2012/
mylibrary#cd-ma_protection">
<dc:creator rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Massive
Attack</dc:creator>
<dc:title rdf:datatype="http://www.w3.org/2001/
XMLSchema#string">Protection</dc:title>
  </rdf:Description>

  <rdf:Description rdf:about="http://kamola.best.krakow.pl/piw2012/
```

```

mylibrary">
  <MyFavouriteBooks>
    <rdf:Bag>
      <rdf:li rdf:resource="http://kamola.best.krakow.pl/piw2012/
mylibrary#book-trzeciblizniak"/>
<rdf:li rdf:resource="http://kamola.best.krakow.pl/piw2012/
mylibrary#book-swiatwgclarksona"/>   </rdf:Bag>
    </MyFavouriteBooks>
  </rdf:Description>

  <rdf:Description rdf:about="http://kamola.best.krakow.pl/piw2012/
mylibrary#book-wprowadzeniedoalg">
<dc:creators rdf:parseType="Collection">
  <rdf:Description>
    <rdf:first rdf:datatype="http://www.w3.org/2001/
XMLSchema#string">Thomas H. Cormen</rdf:first>
<rdf:rest>
  <rdf:Description>
    <rdf:first rdf:datatype="http://www.w3.org/2001/
XMLSchema#string">Charles E. Leiserson</rdf:first>
<rdf:rest>
  <rdf:Description>
    <rdf:first rdf:datatype="http://www.w3.org/2001/
XMLSchema#string">Ronald L. Rivest</rdf:first>
<rdf:rest>
  <rdf:Description>
    <rdf:first rdf:datatype="http://www.w3.org/2001/
XMLSchema#string">Clifford Stein</rdf:first>
<rdf:rest rdf:resource="http://www.w3.org/1999/02/22-rdfsyntax-ns#nil" />
    </rdf:Description>
  </rdf:rest>
</rdf:Description>
</rdf:rest>
</rdf:Description>
</rdf:rest>
</rdf:Description>
</dc:creators>
<dc:title rdf:datatype="http://www.w3.org/2001/
XMLSchema#string">Wprowadzenie do algorytmow</dc:title>
<dc:publisher rdf:datatype="http://www.w3.org/2001/
XMLSchema#string">Wydawnictwa Naukowo-Techniczne</dc:publisher>
  </rdf:Description>

</rdf:RDF>

```

## 2 RDFSchema

```

<?xml version="1.0" encoding="UTF-8"?>
<rdf:RDF
  xmlns:rdf=http://www.w3.org/1999/02/22-rdf-syntax-ns#

```

```
xmlns:rdfs= "http://www.w3.org/2000/01/rdf-schema#"
xmlns="http://kamola.best.krakow.pl/piw2012/mylibrary#">
```

```
<rdfs:Class rdf:ID="Multimedialtem" />
<rdfs:Class rdf:ID="Literature">
  <rdfs:subClassOf rdf:resource="#Multimedialtem"/>
  <rdfs:label>Books</rdfs:label>
  <rdfs:comment>Class of all books in my library.</rdfs:comment>
</rdfs:Class>
<rdfs:Class rdf:ID="Music">
  <rdfs:subClassOf rdf:resource="#Multimedialtem"/>
  <rdfs:label>Music CDs</rdfs:label>
  <rdfs:comment>Class of all the CDs in my library.</rdfs:comment>
</rdfs:Class>
```

```
<rdf:Description rdf:about="http://kamola.best.krakow.pl/piw2012/
mylibrary#book-trzeciblizniak">
<author rdf:datatype="http://www.w3.org/2001/
XMLSchema#string">Ken Follet</author>
<title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Trzeci blizniak</
title>
<publisher rdf:datatype="http://www.w3.org/2001/
XMLSchema#string">Albatros</publisher>
  <rdf:type rdf:resource="http://kamola.best.krakow.pl/piw2012/mylibrary#Literature"/>
</rdf:Description>
```

```
<rdf:Description rdf:about="http://kamola.best.krakow.pl/piw2012/
mylibrary#book-swiatwgclarksona">
<author rdf:datatype="http://www.w3.org/2001/
XMLSchema#string">Jeremy Clarkson</author>
<title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Swiat wedlug
Clarksona</title>
  <rdf:type rdf:resource="http://kamola.best.krakow.pl/piw2012/mylibrary#Literature"/>
</rdf:Description>
```

```
<rdf:Description rdf:about="http://kamola.best.krakow.pl/piw2012/
mylibrary#book-swiatlowfotografii">
<author rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Steven Biver</
author>
<author rdf:datatype="http://www.w3.org/2001/
XMLSchema#string">Fil Hunter</author>
<title rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Swiatlo w
fotografii</title>
<publisher rdf:datatype="http://www.w3.org/2001/
XMLSchema#string">Galaktyka</publisher>
  <rdf:type rdf:resource="http://kamola.best.krakow.pl/piw2012/mylibrary#Literature"/>
</rdf:Description>
```

```
<rdf:Description rdf:about="http://kamola.best.krakow.pl/piw2012/
mylibrary#cd-foals_antidotes">
```

```
<artist rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Foals</artist>
<title rdf:datatype="http://www.w3.org/2001/
XMLSchema#string">Antidotes</title>
  <rdf:type rdf:resource="http://kamola.best.krakow.pl/piw2012/mylibrary#Music"/>
</rdf:Description>
```

```
<rdf:Description rdf:about="http://kamola.best.krakow.pl/piw2012/
mylibrary#cd-ma_protection">
<artist rdf:datatype="http://www.w3.org/2001/XMLSchema#string">Massive Attack</
artist>
<title rdf:datatype="http://www.w3.org/2001/
XMLSchema#string">Protection</title>
  <rdf:type rdf:resource="http://kamola.best.krakow.pl/piw2012/mylibrary#Music"/>
</rdf:Description>
```

```
<rdf:Description rdf:about="http://kamola.best.krakow.pl/piw2012/
mylibrary">
  <MyFavouriteBooks>
    <rdf:Bag>
      <rdf:li rdf:resource="http://kamola.best.krakow.pl/piw2012/
mylibrary#book-trzeciblizniak"/>
      <rdf:li rdf:resource="http://kamola.best.krakow.pl/piw2012/
mylibrary#book-swiatwgclarksona"/>
    </rdf:Bag>
  </MyFavouriteBooks>
</rdf:Description>
```

```
<rdf:Description rdf:about="http://kamola.best.krakow.pl/piw2012/
mylibrary#book-wprowadzeniedoalg">
<authors rdf:parseType="Collection">
  <rdf:Description>
    <rdf:first rdf:datatype="http://www.w3.org/2001/
XMLSchema#string">Thomas H. Cormen</rdf:first>
    <rdf:rest>
      <rdf:Description>
        <rdf:first rdf:datatype="http://www.w3.org/2001/
XMLSchema#string">Charles E. Leiserson</rdf:first>
        <rdf:rest>
          <rdf:Description>
            <rdf:first rdf:datatype="http://www.w3.org/2001/
XMLSchema#string">Ronald L. Rivest</rdf:first>
            <rdf:rest>
              <rdf:Description>
                <rdf:first rdf:datatype="http://www.w3.org/2001/
XMLSchema#string">Clifford Stein</rdf:first>
                <rdf:rest rdf:resource="http://www.w3.org/1999/02/22-rdfsyntax-ns#nil" />
              </rdf:Description>
            </rdf:rest>
          </rdf:Description>
        </rdf:rest>
      </rdf:Description>
    </rdf:rest>
  </rdf:Description>
```

```
</rdf:rest> </rdf:Description>
</authors>
<title rdf:datatype="http://www.w3.org/2001/
XMLSchema#string">Wprowadzenie do algorytmow</title>
<publisher rdf:datatype="http://www.w3.org/2001/
XMLSchema#string">Wydawnictwa Naukowo-Techniczne</publisher>
</rdf:Description>
<rdf:type rdf:resource="http://kamola.best.krakow.pl/piw2012/mylibrary#Literature"/>
</rdf:RDF>
```

### 3 SPARQL - demo

#### **What semantic vocabularies are used in the queries? What are they for?**

FOAF, Dublin Core, Project Vocabulary, OWL Web Ontology Language  
Dublin Core Metadata Initiative Type, SIOC Vocabulary

#### **What do SELECT queries do?**

Używane są do wyciągnięcia danych spełniających podane kryterium. Wyniki są zwracane w formie tabeli.

#### **What do CONSTRUCT queries do?**

Służą do pobierania informacji i tworzeniu trójek (triples) RDF i transformowaniu ich na graf RDF.

### 4 SPARQL queries – basics

#### **1. friends who have name and e-mail defined**

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
```

```
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
```

```
SELECT DISTINCT ?name ?mbox
```

```
WHERE {
```

```
  ?x rdf:type foaf:Person .
```

```
  ?x foaf:name ?name .
```

```
  ?x foaf:mbox ?mbox
```

```
}
```

#### **2. friends who have name and e-mail defined and optional homepage**

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
```

```
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
```

```

SELECT DISTINCT ?name ?mbox ?page
WHERE {
  ?x rdf:type foaf:Person .
  ?x foaf:name ?name.
  ?x foaf:mbox ?mbox .
  OPTIONAL {?x foaf:homepage ?page}
}

```

- 3. friends who have name and e-mail defined and optional homepage, sorted by name descending***

```

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>

```

```

SELECT DISTINCT ?name ?mbox ?page
WHERE {
  ?x rdf:type foaf:Person .
  ?x foaf:name ?name.
  ?x foaf:mbox ?mbox .
  OPTIONAL {?x foaf:homepage ?page}
}
ORDER BY DESC(?name)

```

## **5 SPARQL queries – options**

- 1. people whose name starts with 'K'***

```

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>

```

```

SELECT DISTINCT ?name
WHERE {
  ?x rdf:type foaf:Person .

```

```
?x foaf:name ?name .
    FILTER regex(?name, "^K")
}
```

## 2. *people who are older than 18 years old*

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
```

```
SELECT DISTINCT ?name ?age
WHERE {
    ?x rdf:type foaf:Person .
    ?x foaf:name ?name .
    ?x foaf:age ?age
    FILTER (?age > '18')
}
```

## 3. *people whose name starts with 'K' or are older than 18 years old, make search caseinsensitive*

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
```

```
SELECT DISTINCT ?name ?age
WHERE {
    ?x rdf:type foaf:Person .
    {?x foaf:name ?name .
    FILTER regex(?name, "^K", "i")}}
UNION
    {?x foaf:age ?age
    FILTER (?age > '18')}}
}
```

## 4. *people having e-mails on student.agh.edu.pl server*

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
```

```

SELECT DISTINCT ?name ?mbox
WHERE {
  ?x rdf:type foaf:Person .
  ?x foaf:name ?name .
  ?x foaf:mbox ?mbox
      FILTER regex(?mbox, "student.agh.edu.pl")
}

```

**5. name of people, who have homepage or e-mail on student.agh.edu.pl server**

```

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>

```

```

SELECT DISTINCT ?name ?mbox ?page
WHERE {
  ?x rdf:type foaf:Person .
  ?x foaf:name ?name .
  {?x foaf:mbox ?mbox
      FILTER regex(?mbox, „.*student.agh.edu.pl$”) }
UNION
  {?x foaf:homepage ?page
      FILTER regex(?page, „^http://student.agh.edu.pl.*”)}
}

```

## 6 Open Data Sets

W związku z dużym rozmiarem dokumentów na których wykonywane są zapytania czas uzyskania wyniku jest bardzo długi. Wydłuża się on również w przypadku wzrostu skomplikowania zapytania.