Application of the Linked Data Visualization Model on Real World Data from the Czech LOD Cloud

Jakub Klímek
klimek@fit.cvut.cz
Faculty of Information Technology
Czech Technical University in Prague

Jiří Helmich
http://xrg.cz | contact@xrg.cz
XML and Web Engineering Research Group
Faculty of Mathematics and Physics
Charles University, Prague
Czech Republic
CzLOD cloud

- OpenData.cz since 2012
- 100M triples
- RUIAN 600M triples
- Virtuoso 7 instance

http://linked.opendata.cz/sparql
CzLOD cloud

- Business entities
  - ARES – Business registry
  - COI.CZ – Czech Trade Inspection Agency
  - Research projects

- Geographical data
  - RUIAN – territorial identification linked to LAU & NUTS
  - Geocoding results
CzLOD cloud

- Governmental datasets
  - OVM – ministries, cities, notaries, ...
    - Agendas (opening hours)
  - Laws - decisions of the Czech Supreme court

- Statistical datasets
  - Demography
  - Budgets
  - Exchange rates – European Central Bank
LDVM

- Abstract process
  - 4 stages
  - 3 transformation types
  - 3 operator types
- Adapted for RDF
  - Input transformed to RDF
  - Internally works with RDF
  - Existing visualizers accept proprietary formats
LDVM stages

- Source RDF and non-RDF data
  - Data transformation

Source RDF and non-RDF Data

Data Transformation

Analytical RDF Abstraction

Analytical SPARQL Operators

Visualization Transformation

Visualization RDF Abstraction

Visualization Operators

Visual Mapping Transformation

View

View Operators
LDVM stages

- Analytical abstraction
  - Relevant data extraction using SPARQL operators
  - Analyzers
  - Reusability
LDVM stages

- Visualization abstraction
  - Transformers
  - Reusing concepts
  - e.g. skos:broader
LDVM stages

- **View**
  - Visualizers
    - User configuration (rotate, scale, zoom, etc.)
  - End-users
LDVM components compatibility

- Components compatibility
  - Input signature
    - SPARQL ASK
  - Output data sample
LDVM Demonstration

- Case: Inspections of COI.CZ
- Input signature of an analyzer:

```sparql
# Q1 of A2
[] a s:CheckAction;
  s:location/s:location ?region;
  s:location/s:geo ?geo;
  s:object ?object;
  dcterms:date ?date ;
  s:result ?result.
?result a coicz:Sanction;
  s:result/gr:hasCurrencyValue [] .
?object gr:legalName [] .
?region a ec:LAUREgion;
  ec:level 2 .
?geo s:latitude [];
  s:longitude [].
FILTER(datatype(?date) = xsd:date)
```
Compatibility Demonstration

Application of LDVM on Real World Data from the CzLOD Cloud
Compatibility demonstration II

```
# D of T1
<ca> a skos:Concept;
    skos:prefLabel "title";
    rdf:value 100;
    skos:broader <region>.
<region> a skos:Concept;
    skos:prefLabel "label";
    skos:broader <lau1>.
<lau1> a skos:Concept;
    skos:prefLabel "label";
    skos:broader <nuts3>.
<nuts3> a skos:Concept;
    skos:prefLabel "label";
    skos:broader <nuts2>.
<nuts2> a skos:Concept;
    skos:prefLabel "label";
    skos:broader <nuts1>.
<nuts1> a skos:Concept;
    skos:prefLabel "label".
```

```
# Q of V1
[] a skos:Concept;
    skos:prefLabel [];
    rdf:value [];
    skos:broader ?b .
?b a skos:Concept;
    skos:prefLabel [] .
```
LDVM Demonstration

- Visualizers (e.g. d3js, jQuery flot, etc.)

Detail of analysis: COI.CZ inspections and sanctions by regions and san
Compatibility demonstration

CzLOD – COI.CZ

Check actions analyzer

Hierarchy transformer

CzLOD – CAFIA

GEO transformer
Implementation: Payola

- Analyzer editor with analytical plugins
- Collaborative features
  - Inner analyzers
- Custom plugins
- One-click solution for non-expert users
  - Caching analyzer results
Links

- http://vis.payola.cz/gmaps-ovm
- http://vis.payola.cz/doi-treemap
- https://github.com/payola/Payola
Thank you for your attention

Jakub Klímek
klimek@fit.cvut.cz
Faculty of Information Technology
Czech Technical University in Prague

Jiří Helmich

Martin Nečaský
http://xrg.cz  |  contact@xrg.cz
XML and Web Engineering Research Group
Faculty of Mathematics and Physics
Charles University, Prague
Czech Republic