

A Lightweight Approach to Explore, Enrich and Use Data with a Geospatial Dimension using Semantic Web Technologies

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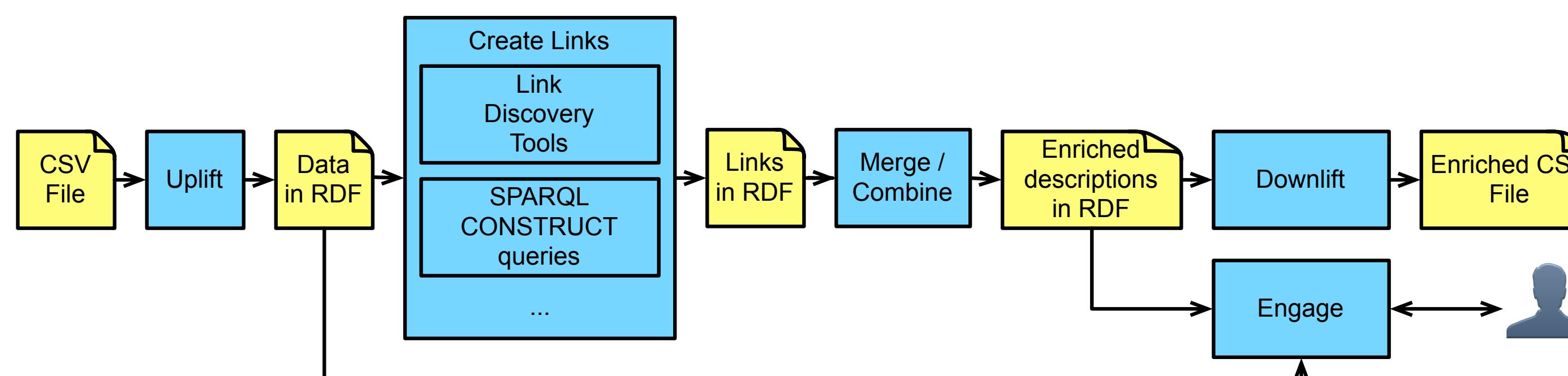
Context

- The Open Data Engagement Fund is an initiative by the Irish public administration to improve the availability and usage of datasets on Ireland's open data portal data.gov.ie.

Problem

- The vast majority of datasets on this portal have an explicit or implicit spatial dimension, which we would like to link with Ordnance Survey Ireland's (OSI – Ireland's national mapping agency) authoritative geospatial datasets published on data.geohive.ie.
- This would allow one to align, analyze and engage with the data with a geospatial dimension.
- But transforming, enriching, analyzing, etc. data often requires a bespoke set of tools that may be difficult to install, configure and to use for merely enriching datasets.

Approach



- Generating RDF from non-RDF**, a process called uplift, by generating an declarative mapping that reflects the CSV files original structure. The mapping language adopted is R2RML, a W3C standard for relating relational databases to RDF datasets. We thus treat CSV files as relational tables.
- Create links and enrich** the RDF with SPARQL CONSTRUCT queries or link discovery tools.
- Transform the enriched RDF back to CSV**, a process called downlift, by taking into account the original CSV file's structure captured in the mapping.
- Engaging** with the data using a Triple Pattern Fragments (Verborgh et al. 2016) allowing us to formulate federated queries. A GeoSPARQL extension for the TPF client was developed to avail of spatial functions (Debruyne et al. 2016).

Results and Discussion

- Demonstrated the viability of our approach
- Method and tool available with accessible licenses
- How do we deal with loss of semantics? Provenance can be a solution (cfr. future work)
- Organization of seminars to inform public and stakeholders

Research Question

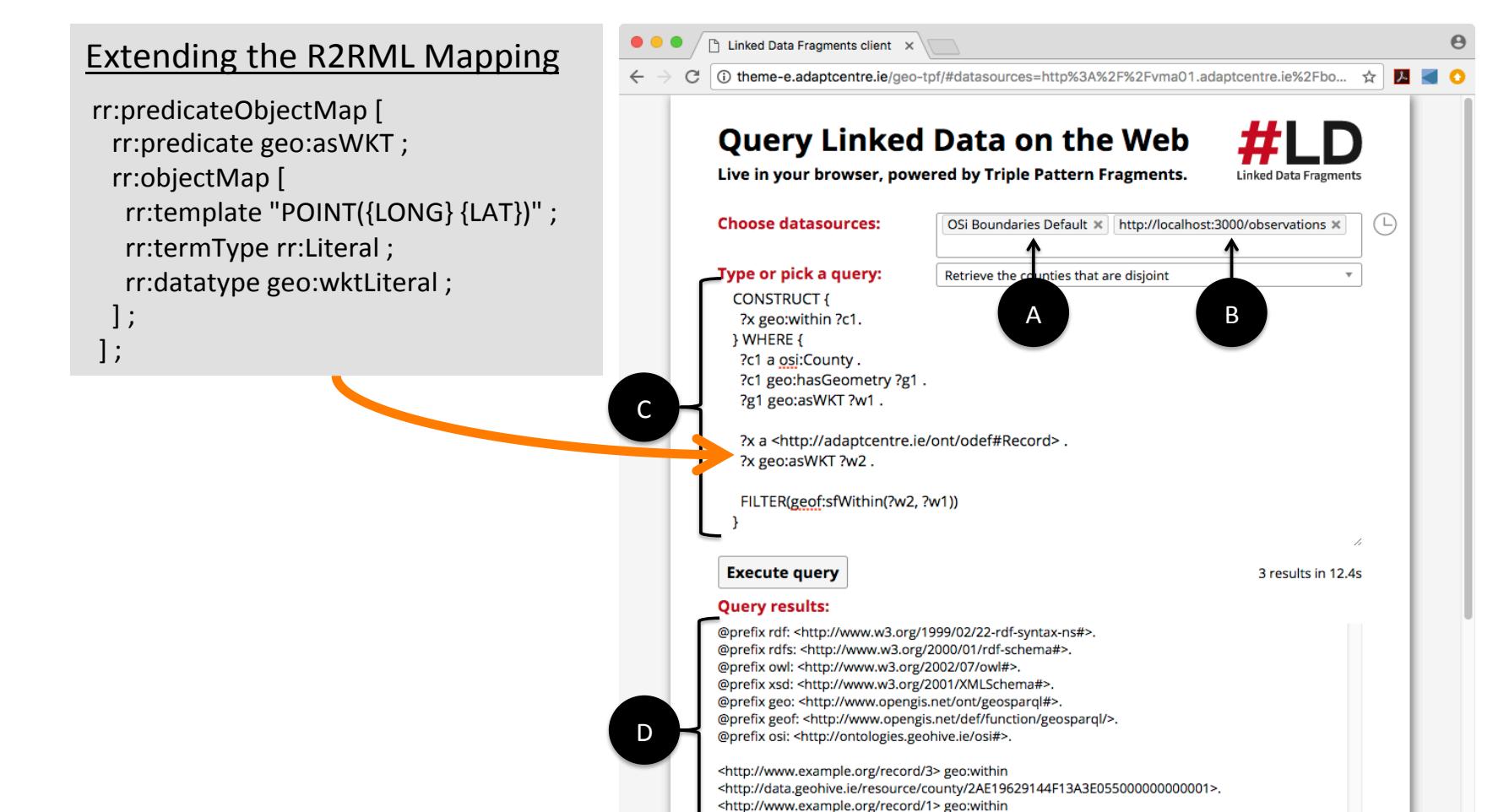
- How can we leverage the process of enriching and engaging with existing datasets and authoritative geospatial data on the data.gov.ie portal?

Goal

- To propose a lightweight method and tools for transforming CSV into RDF (uplift); interlink, enrich, and engage with the data; and transform the enriched RDF back into a CSV containing additional information (downlift).

Potential Impact

- Increase usage and availability of datasets by referring to authoritative geospatial datasets
- RDF representations of datasets, also improving availability
- Go beyond 3★ open data by providing a basis for Linked Data



Future Work

- Apply approach to more and different datasets (**ongoing**)
- Integrate approach with a project and provenance-centric mapping governance framework, which would ...
- Facilitate reuse (of vocabularies), traceability, and transparency of both uplift and enrichment processes.

References

- C. Debruyne, É. Clinton, D. O'Sullivan: Client-side Processing of GeoSPARQL Functions with Triple Pattern Fragments. LDOW@WWW 2017
- R. Verborgh, M. Vander Sande, O. Hartig, J. Van Herwegen, L. De Vocht, B. De Meester, G. Haesendonck, and P. Colpaert. 2016. Triple Pattern Fragments: A low-cost knowledge graph interface for the Web. J. Web Sem. 37-38 (2016), 184–206