Engaging Content
Engaging People

Towards Generating Policy-compliant Datasets

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Context and Problem

- Datasets are created and used for a specific purpose, but such data processing is increasingly the subject of various internal and external regulations – e.g., GDPR.
- One particular aspect of GDPR is informed consent, which must by given for these purposes.
- SOTA focuses on compliance analysis of processes; either by analyzing the processes before execution or post-hoc analysis of logs.
- Our hypothesis is that compliance verification can be facilitated by generating datasets "on demand".

Research Question

- Can we generate datasets for a specific purpose "just in time" that complies with informed consent?

Goal

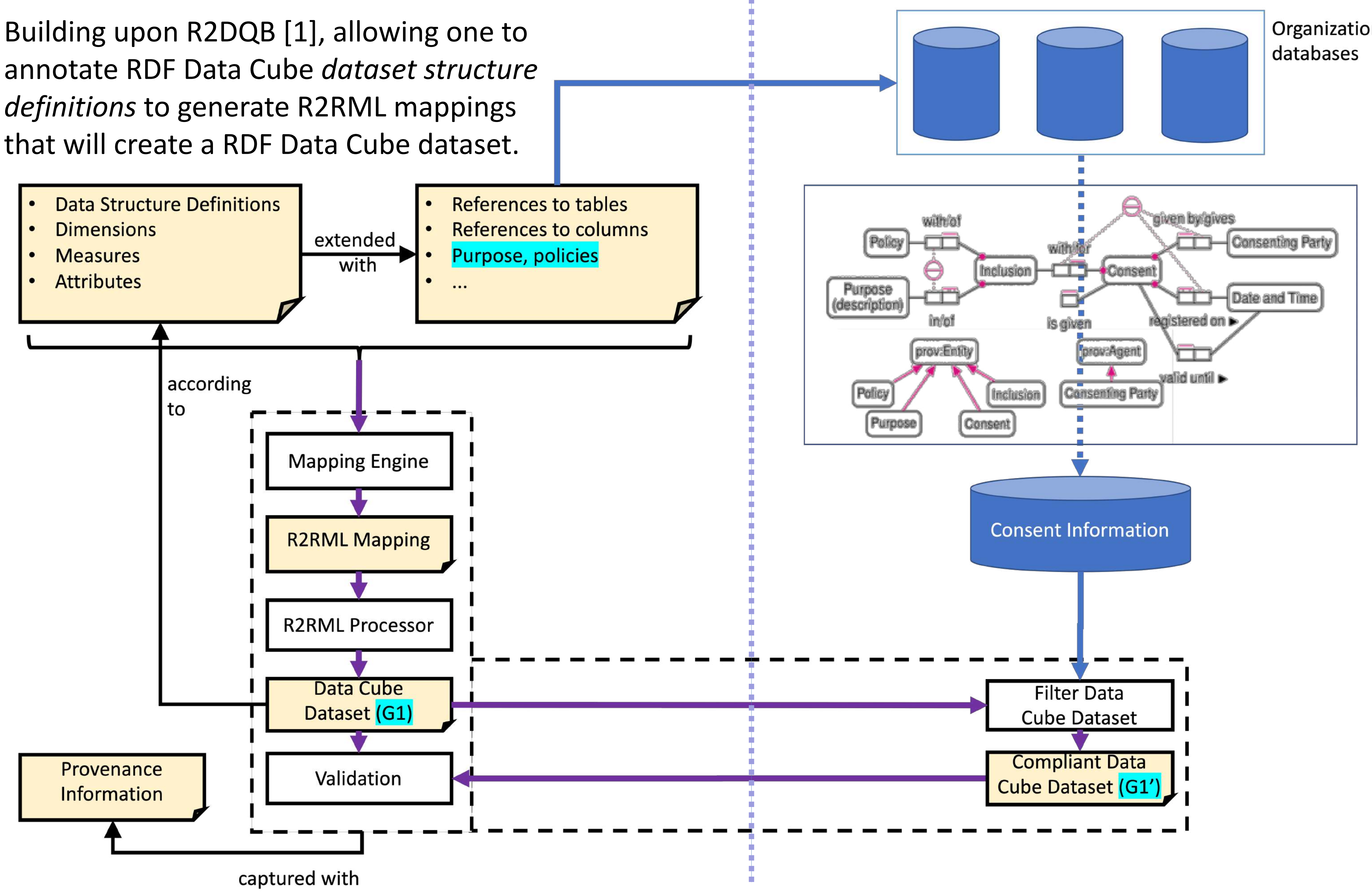
- To propose a method for generating datasets that are fit for a specific purpose and taking into account the ever evolving informed consent of people in a declarative manner, availing of semantic technologies.

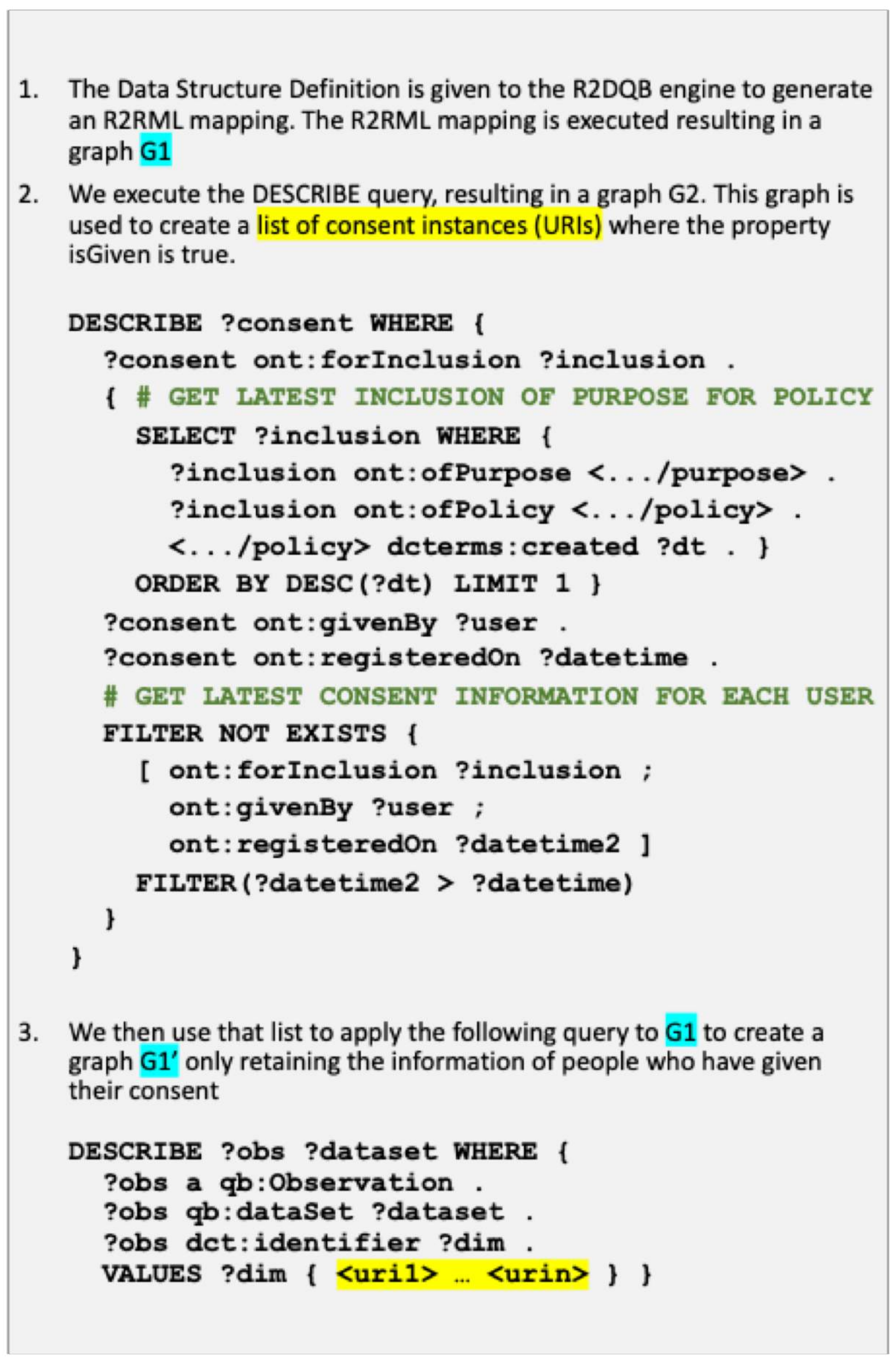
Potential Impact

- *Facilitating* compliance verification as part of data governance best practices within an organization

Approach

Building upon R2DQB [1], allowing one to annotate RDF Data Cube *dataset structure definitions* to generate R2RML mappings that will create a RDF Data Cube dataset.





1. The Data Structure Definition is given to the R2DQB engine to generate an R2RML mapping. The R2RML mapping is executed resulting in a graph G1
2. We execute the DESCRIBE query, resulting in a graph G2. This graph is used to create a list of consent instances (URIs) where the property isGiven is true.

```
DESCRIBE ?consent WHERE {
  ?consent ont:forInclusion ?inclusion .
  { # GET LATEST INCLUSION OF PURPOSE FOR POLICY
    SELECT ?inclusion WHERE {
      ?inclusion ont:ofPurpose <.../purpose> .
      ?inclusion ont:ofPolicy <.../policy> .
      <.../policy> dcterms:created ?dt . }
    ORDER BY DESC(?dt) LIMIT 1 }
  ?consent ont:givenBy ?user .
  ?consent ont:registeredOn ?datetime .
  # GET LATEST CONSENT INFORMATION FOR EACH USER
  FILTER NOT EXISTS {
    [ ont:forInclusion ?inclusion ;
      ont:givenBy ?user ;
      ont:registeredOn ?datetime2 ]
    FILTER(?datetime2 > ?datetime)
  }
}
```

3. We then use that list to apply the following query to G1 to create a graph G1' only retaining the information of people who have given their consent

```
DESCRIBE ?obs ?dataset WHERE {
  ?obs a qb:Observation .
  ?obs qb:dataSet ?dataset .
  ?obs dct:identifier ?dim .
  VALUES ?dim { <uri1> … <urin> } }
```

Demonstration and Results

- We demonstrated the viability of our approach, using a synthetic dataset, though more experiments are called for.
- All intermediate graphs allow one to trace the various steps – traceability and transparency (provenance)

Future Work

- A current limitation is a lack of evaluation beyond the synthetic dataset created for the study.
- We furthermore recognize the opportunities in aligning or integrating our models and approach with related work.

References and Links

1. Christophe Debruyne, Dave Lewis, Declan O'Sullivan: Generating Executable Mappings from RDF Data Cube Data Structure Definitions. OTM Conferences (2) 2018: 333-350

- Ontology: http://openscience.adaptcentre.ie/ontologies/consent-mapping-jit/ontology
- Experiment: https://scss.tcd.ie/~debruync/icsc2019/

See
http://openscience.adaptcentre.ie/
for more of our projects.

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