W3C LBD Community Group
Minutes - Call 15/06/2021

Attendees:

- Katja Breitenfelder (Fraunhofer IBP, TU Munich)
- Mathias Bonduel (KU Leuven & Neanex Technologies)
- Karl Hammar (Jönköping University)
- María Poveda-Villalón (Universidad Politécnica de Madrid)
- Jakob Beetz (RWTH Aachen University)
- Jeroen Werbrouck (Ghent University / RWTH Aachen)
- Oliver Schulz (RWTH Aachen University)
- Madhumitha Senthilvel (RWTH Aachen University)
- Jyrki Oraskari (RWTH Aachen University)
- Edlira Vakaj (Birmingham City University)
- Alex Donkers (Eindhoven University of Technology)
- Joel Bender (Cornell University)
- Pierre Bourreau (Nobatek, France)
- Sana Debbech (IRT Railenium, France)
- Conor Shaw (University College Dublin)
- Calin Boje
- Odilo Schoch (Swiss Federal Roads Office)

Presentation slides

- https://drive.google.com/file/d/1e681ARzijGb3movtnPlw7MRDruoa0Zr8/view?usp=sharing

Date and time
- 15/06/2021, Tuesday, 15:00-16:30@UTC/ 17:00-18:30@CEST/ 08:00-09:30@PST

Moderators

1. Mathias Bonduel

Agenda
1. Introduction of new members
2. Presentation by Pierre Bourreau (Nobatek): "BIM4Ren: how web semantics technologies can help using BIM in a renovation context"
3. Q&A
4. Brief overview of past and future steps with Focus Groups initiative
5. Call for elevator pitches and announcement of next meeting

Minutes

1. Introduction of new/returning members
   a. Oliver Schulz -- RWTH Aachen -- active in the BIM4Ren project
   b. Pierre Bourreau -- Nobatek -- France -- active in the BIM4Ren project
   c. Jyrki Oraskari -- Worked with linked building data for some time, IFC to Linked Data converters (ifcOWL and LBD). Active in the BIM4Ren project
   d. Edlira Vakaj -- Lecturer semantic web Birmingham City University
2. Presentation by Pierre Bourreau (Nobatek): "BIM4Ren: how web semantics technologies can help using BIM in a renovation context"
   https://bim4ren.eu/
   a. BIM and Renovation
      i. BIM is mainly used in new projects
      ii. Current IFC is not suitable for renovation projects
      iii. BIM4Ren components/concept covering project phases/tasks:
         1. Data Collection
         2. Data Management
         3. Data-driven Design
      iv. Data is useful for cost analysis, energy performance, etc.
      v. Pipeline:
         1. IFC to ifcOwl (stored in Jena-based triple store)
         2. Alignment w/ BIM4Ren Data Model
         3. Enrichment from LD catalogue
         4. Validation w/ SHACL
   b. The BIM4Ren data model
      i. Requirements: being able to express uncertainty/accuracy of statements, and modularity, e.g., for varying granularity/depth
      ii. https://models.bim4ren.eu
      iii. 3 layers:
         1. Core layer: buildings (extending from BOT), urban, intervention, etc.
         2. Product layer: building elements, building materials, distribution elements (HVAC), etc.
         3. Domain layer (thermal, fluid, electrical, climate, acoustic, damage (DOT), etc., …)
      iv. 1 transversal layer w/ actors, energy, address, etc.
         1. Properties based on SML (from CEN), in turn based on QUDT
      v. Candidate technology for uncertainty: RDF*
      vi. Instantiating a piece of equipment in BIM4Ren consists of typing it to multiple classes spread across the three layers (example: a boiler is an HVAC product, AND a BOT element, AND a thermal domain layer entity, etc.)

      c. The conversion process: IFC to BIM4Ren DM
          i. Two approaches possible:
              1. Static conversion tooling (one-off batch translation, generating a new model/dataset through some set of rules encoded in a program)
                  a. Need to redo when changing those translation rules/alignments
              2. Alignment and dynamic translation at query time
                  a. Easier to update alignments
                  b. So far few alignments fully cover relations (mostly classes)
          ii. BIM4Ren project employs dynamic conversion
          iii. A large set of rules have been developed to translate b/w models, across the layers described above.
          iv. Reflection: many (too many?) ontologies in this space, alignment is important to get integrated data value)
      d. Additional features
          i. Data access APIs: SPARQL, REST APIs, GraphQL-LD, RAMOSE

3. Q&A
      a. [Mathias Bonduel]: What are the key values/benefits of using semantic web technologies in this project context?
          i. A: Project member familiarity
          ii. A: Free tooling quality (thanks to open web standards)
          iii. A: Existing resources to reuse (QUDT, etc)
      b. [Karl Hammar] suggestion: auto generation of REST API generation of ontologies, to support front-end developers to work with ontologies/LD
          i. https://www.springerprofessional.de/en/oba-an-ontology-based-framework-for-creating-rest-apis-for-knowl/18542584
          ii. https://oba.readthedocs.io/en/latest/
          iii. (Karl's own similar but unrelated work: https://github.com/RealEstateCore/OWL2OAS)
          iv. [Maria Poveda] https://github.com/cbadenes/r4r
      c. [Calin Boje] Is the project in the final stage now?
          i. A. Entering final phase
      d. [Calin] Do you need to rewrite the rules (auto generated by Python script) for a new IFC schema version?
          i. A. [post meeting to chairs] The script is based on regular expression pattern matching, so fully independent from the IFC version. It works from first extracting from the ifcOwl all ENUM associated with a class that is a subclass of some specified class (like IfcDistributionElement). This is done through a SPARQL query so uploading the ifcOwl to a triple store is a prerequisite. Once these elements are found, the inference rules are simple to create.

     e. [Calin] We have been doing something similar in our project ([4D Collab](#))
       regarding APIs. Different approach to write SPARQL INSERT queries.
     f. [Mathias] efficiency/cost of rules execution in reasoners?
       i. A. Did quite some work on this in the project. Jena works by
         precalculating all inferences. Tested on Duplex model and crashed
         directly (out of memory). Had to implement some additional features, e.g.
         keep rules in-memory for next iterations. Other example is
         b4r:subClassOf and other relations prepared during to project (different
         from rdfs:subClassOf), to reduce scope of elements queried
     g. [Mathias] modeling materials using properties patterns. Then you can add
       metadata when using level 2 pattern
       i. https://w3id.org/con-tax/properties/cp#hasMaterialPart / schema:value =>
         instances (property values) are to be classified to a taxonomy of materials
         (e.g. this [one extracted from Getty AAT](#))
       ii. Metadata goes on the node where cp:hasMaterialPart points at, while
         extra information on the quantity of materials (e.g. volume, weight, etc) is
         added starting from the material property value (instance of material type)

4. Brief overview of past and future steps with Focus Groups initiative
   a. Chairs want to continue work on this initiative.
   b. But doing so takes a bit of preparation and work, which we don't have time to
     commit before the summer.
   c. Chairs are setting up GitHub repos for sharing of practices relating to datasets,
     ontologies, tools, etc., that group participants can share content in.
   d. This can help share good/best practices, and help build
     standardization/homogenization in the community, and also help attract
     developer attention to existing initiatives rather than reinventing the wheel.
5. Call for elevator pitches and announcement of next meeting

Next Call

- 29/06/2021, Tuesday, 15:00-16:30@UTC/ 17:00-18:30@CEST/ 08:00-09:30@PST

Agenda: Github sprint

We are interested in getting suggestions from the community about potential agenda items and **Elevator Pitches** for the following calls. Please send your suggestions to the chairs or to internal-lbd@w3.org, whether you have a short presentation to bootstrap the discussion, and an approximate duration you think the discussion will last.

Previous minutes

https://www.w3.org/community/lbd/meeting-minutes/
https://github.com/w3c-lbd-cg/lbd/tree/gh-pages/minutes