W3C LBD Community Group
Minutes - Call 12/07/2022

Attendees:

- Mathias Bonduel (KU Leuven and Neanex Technologies)
- Alex Schlachter (NIRAS)
- Karl Hammar (Jönköping University)
- Katja Breitenfelder (acatech / Fraunhofer IBP)
- Jeroen Werbrouck (UGent / RWTH Aachen)
- Philipp Hagedorn (Ruhr-Universität Bochum)
- Alex Donkers (Eindhoven University of Technology)
- Kevin Luwemba Mugumya (University of Nottingham)
- Conor Shaw (University College Dublin)
- Joel Bender (Cornell University)

Presentation slides

- Link to Github repository:
    - PowerPoint slides (video embedded)
    - PDF

Date and time

- 12/07/2022, 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: Alex Schlachter - ‘Using Linked Data to create BIM-based time schedules’
3. Questions
4. Further topics

Minutes

1. **Introduction of new members**
    a. No new members present
2. **Presentation: Alex Schlachter - ‘Digital LBS - Linking BIM and Scheduling’** (‘Using Linked Data to create BIM-based time schedules’)

a. NIRAS approach to linked data:
    i. Integration of and views/reports over various data sources
b. Digital LBS – Location-based scheduling – concept:
    i. Location-based scheduling - an established Lean method for construction project planning
    ii. Together with BIM models -> can create 4D models of construction project
    iii. BIM models divided per work locations, and include the construction elements that need to be placed/constructed at those locations
    iv. Each such construction element can have activities/sub-activities, e.g., creating a wall which in turn depends on pouring of concrete
    v. Each sub-activity can have time, resource, etc requirements and allocations
    vi. Combining all of these work locations, building elements, activities, and sub-activities across a construction project, you can create a combined (large) data model covering the construction project, that can be used as basis for planning and follow-up
c. Linked Data work:
    i. Activities, constructs, etc. already exist/are already known, and do not need to be created anew every time. Linked Data used to integrate these already established data
    ii. Linked data allows for a variety of queries useful for visualization, communication, planning, etc.
d. Implementation
    i. RDFox + Datalog rules, e.g., creating construction activities based on the types of elements in the model
    ii. Examples:
        1. Propagating type properties onto instance properties for simplified querying (e.g., my wall is of type VBES240 that has certain attributes)
        2. Calculating weight of a wall by density and volume on those element instance properties
        3. Calculate number of lifting operations for a crane based on that weight, to get the wall to the construction location
        4. Installation time calculated based on number of lifts needed to calculate how much crane time is needed
e. Solution
    i. Step 0: location splitting and quantity takeoff
    ii. LBS application:
        1. Step 1: quantities
        2. Step 2: activities
        3. Step 3: planning
        4. Step 4: management

iii. Various querying and 3D visualization tooling operating on top of/contributing to the above features/steps in the process
    1. E.g., 3d quality assurance, 4d viewer, location-based quantities and activities, schedule planner integration, etc.
iv. Future features under consideration:
    1. Cost analysis
    2. Reporting of construction progress
    3. Resource planning/management
    4. Parametric planning
v.

f.

3. Questions

a. Mathias: VICO scheduling tool – any challenges in translating data graphs into flat data and back again?
    i. The ontology is designed to cover the needs of that scheduling tool, so this is not a challenge. Only had to translate the Linked Data to an XML format
    ii. Would be interesting to see if the ontology can also be used with other scheduling/planning tools easily
b. Mathias: Is the output of the planning also linked data, or only the input?
    i. Yes, the output of the planning tool is translated to linked data which is continuously used in the data model
c. Mathias: Is the ontology public / will it be?
    i. Not yet open but it might be, depending on NIRAS strategic direction/interests
d. Conor: How were competency questions developed, e.g., using focus groups?
    i. A list of questions were submitted to the scheduling experts, and workshops were held with those colleagues to finalize the list
e. Mathias: What is your experience of using RDFox?
    i. Both Fuseki and RDFox are used. For some inference/rules applications, RDFox is very powerful. Many of the same things could possibly be built using Fuseki, but with a lot more work and complexer queries
f. Conor: Where are the calculations running, in the ontology or in the application?
    i. In the triple store with rule support. RDFox also allows the user to follow the rule applications to explain, e.g., where a certain computed value came from (which rules computed it).
g. Philipp: Were any existing ontologies for, e.g., time scheduling and building projects reused, such as the CTO of Mathias?
    i. No, only BOT and other ontologies from Mads
    ii. Can be interesting to see if a merging/aligning of ontologies is a possibility.
    iii. Mathias: Sometimes also good to have multiple different ontologies, to keep options open

    h. Mathias: What about activities involving multiple building elements, e.g. connecting a steel beam and a steel column?
        i. More work needed regarding the construction order
        ii. Mathias: idea to manually add location-based activities to multiple individual objects, instead of inferring them (not all columns are to be connected to all beams)
4. **Further topics**

Next Call

- 06/09/2022, Tuesday, 15:00-16:30@UTC/ 17:00-18:30@CEST/ 08:00-09:30@PST

  Agenda: TBD

  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/