

## **W3C LBD Community Group**

### **Minutes - Call 17/06/2024**

#### **Attendees**

- Katja Breitenfelder (Fraunhofer IBP, Germany)
- Mathias Bonduel (Neanex Technologies, Belgium)
- Ali Nakhaee (university Stuttgart)
- Diellza Elshani (university Stuttgart)
- Eva Heinlein
- Karim Farghaly
- Fathya Zemmouri
- Gonçal Costa Jutglar (La Salle Campus Barcelona, Ramon Llull University)
- Jan-Iwo Jäkel
- Janakiram Karlapudi
- Melina Rohne
- Nicholas Nisbet
- Hervé Pruvost
- Thomas Krijnen
- Wouter Lubbers
- Zhangcheng Qiang

**Please join the W3C LBD CG and subscribe to the internal mailing list:**

[Linked Building Data Community Group \(w3.org\)](https://www.w3.org/community/lbd/)

#### **Presentation slides**

- Slides:
  - [Google presentation](#)
  - [PDF on GitHub](#)

#### **Date and time**

- Monday 17th of June 2024, 14:00-15:30@UTC/ 16:00-17:30@CEST/ 07:00-08:30@PDT

#### **Moderators**

1. Mathias Bonduel

#### **Agenda**

1. Introduction of new members
2. Nicholas Car (Kurrawong AI) and Timo Homburg (Hochschule Mainz) on “GeoSPARQL and 3D”
3. Discussion
4. Further topics

## Minutes

### 1. Introduction of new members

- Warm welcome to all new members!
- Ali Nakhaee: University of Stuttgart, together with Diellza: geometry representation in SW
- Eva Heinlein: RWTH Aachen civil eng, student assistant, studying ontologies
- Fathya Zemouri: AI inst of University of Stuttgart, collab with Diellza, collab with arch faculty
- Thomas Krijnen: IfcOpenShell author

### 2. Nicholas Car (Kurrawong AI) and Timo Homburg (Hochschule Mainz) on “GeoSPARQL and 3D”

- [Timo] part 1
  - standardize also 3D > different communities want this: AECO, heritage, etc.
  - intro to GeoSPARQL
  - GeoSPARQL v1.0 from 2012
    - Feature vs Geometry
    - props for spatial relations > based on other existing standards
    - functions to work with SimpleFeaturesAccess (SFA)
    - support for 2.5D only
  - GeoSPARQL v1.1
    - is an update of the original v1.0 from 2012 > current practices in Linked Data (new specs eg SPARQL 1.1)
    - support for 2.5D only
    - spatiaObjectl collections (cfr GeoJSON)
    - new literal types: GeoJSON, KML; DGGS
    - measurement properties: unit specific
    - spatial query updates: spatial aggregates, metric functions, coordinate accessors
    - SHACL validations: shapes added to spec to check consistency of graphs > no check of content of geometry literals
    - further updates
      - formal description improved (SPARQL SD)
      - CQL: common query language by OGC
      - official JSON-LD contexts
      - translations (WIP)
      - requirements in RDF
  - GeoSPARQL v1.2
    - ISO-compatible version of GeoSPARQL v1.1 > lift to ISO level. Currently under review (resulting in v1.1.1)
  - GeoSPARQL v1.3
    - planned scope
      - 3D: spatial relations, between different geometry representations
      - semantics for coordinate reference systems (CRS) > not in GeoSPARQL core
        - evolved in a different group: moving forward in sept 2024
      - basic descriptions of geometry visualizations: color, > more complex with 3D (textures, etc)
      - basic geometry roles
      - geometry simplification functions, dealing with accuracies

- current status
      - all functions in SFA
      - Geocode literals (geo hashes)
      - long/lat functions
      - non-SFA functions
  - [Nicholas/Nick] part 2
    - continuing GeoSPARQL v1.3
      - aligning to other ontologies > list them and fix alignments if needed
      - qualifying relations > roles properties. Not in GeoSPARQL core. Learned from other implementations
      - fuzzy/uncertain geometries: e.g., historical maps, hand drawings, etc.
        - link to GeomLD paper
    - general question: how far should GeoSPARQL grow? Separation between GeoSPARQL core and supporting/listing extension ontologies
  - [Timo] CRS ontology
    - three vocs:
      - ISO
      - IGN France
      - Proj4RDF: extraction of CRS library PROJ
      - => consolidate in one core ontology for CRS
    - implementation:
      - convert between conventional formats for CRS
    - timeline already defined
  - [Timo] GeoSPARQL v1.3 and 3D work
    - base investigation
    - contacting target communities > collect requirements
      - which data formats
      - use cases for GeoSPARQL
      - existing ontologies
    - use case
      - Timo's research: 3D meshes from archeological artifacts
      - 3D cadastre
      - soil modelling
      - ...
    - template for 3D use cases will be shared (Nick)
      - OGC has official process for collecting requests
        - done for v1.1 > decided what was in-scope and what not (incl. 3D)

### 3. Discussion

- [Mathias] rather a comment instead of a question: besides the contributions of the GeoSPARQL SWG
  - [Nicholas/Nick] ISO TC 211: Geospatial standards > Nick: focus on ontology adoption in standardization
    - growing from document to data-based standards
    - impact on adopting parties
- [Janakiram] upcoming v1.3 > georeferencing ontology using same prefix "geo": for lang/lat representations
  - [Nick] simple and straightforward ontology. Useful for certain use cases, incl in the alignments. Will update alignments in v1.3 to improve as GeoSPARQL now has Long/lat. GeoSPARQL will allow spatial calculations (functions)
- [Janakiram] access problem with the shapes

- known issue, OGC naming service (large infra changes)
- direct link to GitHub repo:
  - [SHACL shapes graph](#)
  - [examples of \(in\)valid data graphs](#)
- [Wouter] governance question: indication clients if they are applying GeoSPARQL. How can they keep up? Different vendors offering different compliance levels?
  - [Timo] together with Virtuoso made a compliance benchmark > will update, but awaiting for sufficient implementation updates of v1.1
  - [Timo] already in v1.0 not all vendors implement all parts > should expose this through their SPARQL Service Description (SD)
  - [Nick] OGC has a compliance mechanism. In GeoSPARQL v1.1 there's some parts which might be challenging for implementers (DGGS literals).
    - Implementers are expected to update/implement the simple parts.
    - OGC wants to change its approach to standards: from big standards towards smaller building blocks and combinations of building blocks (modularization).
- [Ali Nakhaee] validation of literals is not included in SHACL (eg self intersection, closed, etc). What is the alternative approach? Custom functions?
  - [Nick] you can propose to the OGC GeoSPARQL standardization group to add such validation. Standards for the content of geometry literals are mature standards (eg WKT), with widely used libraries available. There can come a function in GeoSPARQL to state if something is valid, but not going into the content inside GeoSPARQL inside (so not defining why some content is (in)valid in a certain geometry format).
  - [Mathias] with the consideration of 3D in GeoSPARQL, quite a lot of extra geometry formats and spatial functions might come into play (combinations). How do future GeoSPARQL standards expect to deal with this complexity?
    - [Nick] dynamic registers in standards remains a challenge > proposed a dynamic register to OGC. Generic "hasSerialization" property and selection from dynamic register with 100+ formats. Register with info on each format which kind of functions are supported. Fits in idea of building blocks (modularization)
    - [Mathias] versions of geometry formats, each version of geometry formats have parts which deal with different kinds of geometries (NURBS, BREP, CSG, meshes, etc.)
    - [Nick] capability matrix. Differences between formats might be so large for similar looking parts. Core should support certain formats and versions (eg 3D in these 5 formats). Reviewing periodically
- [Mathias] focus on geospatial/GIS use cases historically? Impact on decision taking?
  - [Nick] combinable with other query languages. Not for earth alone (eg could be applied on Mars). Renaming "GeoSPARQL" has been considered.
  - [Timo] all kinds of geometry use cases in my institute. Also colleagues in BIM and cultural heritage (scanning). **Open for people to joining the group**
    - **steps to join:**
      - voting: member of OGC or partner
      - since v1.1 working in the open > [GitHub repo](#) is open. Pull requests allowed! Issues also allowed, but use case and example are preferred
      - guests in GeoSPARQL meetings > reach out via [contact info on GitHub repo](#). Meeting time is 10pm CEST every 2 weeks

- [Diellza] use cases from university of Stuttgart > use SWT in design software: rotation, movement, extrusions, etc. Found limited expressivity in GeoSPARQL for math operators
  - [Timo] many building blocks come together here:
    - CRS ontology (will probably incl typical operations such as rotations, translations, etc.)
    - query functions for this: need to be able to express 3D geometries => spatial functions. Contributions welcomed
  - [Nick] specific manipulation functions (non-topological functions) are currently out-of-scope since it's heading away of core idea of GeoSPARQL.
    - similar to: existing possibility to also load topological relations (insert instead of calculate them through topological spatial queries)
  - [Timo] currently very few functions to transform geometries, eg transform geometries between CRS. PostGIS has functions for this, found interest in GeoLD community
- [Wouter] coming back to earlier discussions: position to IFC > complementary or competing standard?
  - [Nick] not competing, similar to GML and WKT. Lots of parts in IFC will never end up in GeoSPARQL.
  - foundational assumption: spatial things are one part of a knowledge graph (others: temporal, other linking, etc.)
- [Mathias] literals vs link to an external file (or parts of a file)
  - [Nick] web location is easy but steps away from KG idea. URI of the Geometry pointing to a file. Implementers might have challenges with processing these for spatial queries
  - [Timo] experience with meshes (even binary blobs) are troublesome. Link to files and annotate geometry file (want to standardize this as well)
    - [Mathias] standardization of the linking patterns might already be a big step forward
    - [Nick] ontology extension recently proposed. Possible to add in GeoSPARQL specification certain patterns to link to files instead of putting all content in RDF literals
    - [Timo] [web annotation spec](#): similar pattern for selecting parts of geometry files.
    - [Nick] cadastre work > 2D and 3D using local IDs, had to skolemize and turn into universal URIs. No semantics of coordinates (existing standards). Fine line. We don't want to turn all possible content in RDF

#### 4. Further topics

### Next Call

- 19/08/2024, Monday, 14:00-15:30@UTC/ 16:00-17:30@CEST/ 07:00-08:30@PDT

#### Agenda: to be defined

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](mailto: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://github.com/w3c-lbd-cg/lbd/tree/gh-pages/minutes>