National LOD implementations or projects - Germany -

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3. Conclusion
Linked Open Data (LOD) defines a vision of globally accessible and linked data on the internet based on the RDF standards of the semantic web.

LOD is often thought of as a virtual data cloud where anyone can access any data they are authorized to see and may also add to any data without disturbing the original data source.

LOD - Sources:
- https://lod-cloud.net/dataset/geonames-semantic-web
- https://lod-cloud.net/dataset/linkedgeodata
- https://lod-cloud.net/dataset/wikidata
- https://lod-cloud.net/dataset/deutsche-nationalbibliografie-dnb
- ...
Linked Open Data – Background and Objectives of the project at the BKG

- **Question:** Is it possible to build up a linked data architecture for the existing spatial datasets in BKG (e.g. GN250 dataset)?

- **In order to provide a prototype** of linked data in the BKG, various components had to be developed that were to enable the provision of linked data (SPARQL Endpoint), the conversion of various geoformats to RDF and the exploration and reconversion of linked data into geoformats for their provision.

- **Objectives**
  1. Conversion of existing spatial data sets
  2. Simplified querying of Semantic Web data sources.
  3. Interlinking of different concepts.
  4. Enrichment and conversion of RDF data.
One requirement was the conversion of existing spatial data sets in BKG to the Linked Data RDF Serializations (e.g. RDF/XML, TTL).

We developed a concept and tools for standard based data (e.g. INSPIRE GML) as well as for other formats (Shp) prototypically.

Integration of RDF data in Triple Stores
Data management concepts in TripleStores

- **Graph visualization:**

![Graph visualization diagram](image-url)
Data management concepts in TripleStores

- GeoSPARQL Query gn:NamedPlace in GraphDB

![GeoSPARQL Query in GraphDB](image-url)
Current Development and Examples

- Named Place Collections - Frontend

Fig: Named Place Collections - Frontend
Current Development and Examples

- Geographical Name, Example „Hohen-Sülzen“ – Frontend
- Persistent ID
- Search Bar
- Named Geometry with BKG TOPPlus Background Map
- Property and Value Table
- GeoSparql and INSPIRE compliance

Fig: Geographical Name „Hohen-Sülzen“ – Frontend
Challenges

The GeoNames Ontology

The GeoNames Ontology makes it possible to add geospatial semantic information to the Word Wide Web. All over 11 million geonames toponyms now have a unique URL with a corresponding RDF web service. Other services describe the relation between toponyms.

The Ontology for GeoNames is available in OWL: https://www.geonames.org/ontology/ontology_v3.3.rdf, mappings.

GeoNames is using 303 (See Other) redirection to distinguish the Concept (thing as is) from the Document about it.

For the town Embrun in France we have these two URIs:
1. https://sws.geonames.org/3020251/
2. https://sws.geonames.org/3020251/about.rdf

The first URI [1] stands for the town in France. You use this URI if you want to refer to the town. The second URI [2] is the document with the information geonames has about Embrun. The geonames web server is configured to redirect requests for [1] to [2]. The redirection tells Semantic Web Agents that Embrun is not residing on the geonames server but that geonames has information about it instead. See our blog posting about "Concept vs. Document" for more information.

- URI-Concepts (not only local IDs) are required to integrate and interlink different concepts
- The Concepts must be described in Ontologies, e.g. like the GeoNames Ontology, see:
  https://www.geonames.org/ontology/documentation.html
- … on local, national or international level?

Fig: Documentation of the GeoNames Ontology,
https://www.geonames.org/ontology/documentation.html
Challenges

- Integration of LOD Sources in Standard GIS Software.
- Future works are, e.g. build up a QGIS Plugin to integrate LOD Sources in QGIS.
- SpaLOD-QGIS Plugin Prototyp
- Query different SPARQL-Endpoint (e.g. Wikidata or Geonames) in QGIS

Fig: SpaLOD-QGIS Plugin Prototyp
Conclusions

- **Linked Open Data (LOD)** provides the possibility to use and interlink existing Geographical Names datasets of BKG in a very easy way.

- **It is possible to set up a linked data compliant architecture**, which has already been implemented as a prototype in the BKG.

- **It is possible to transform** existing (well-known) geospatial standards coming from ISO and OGC – into LOD.

- **GraphDB**: suitable as TripleStore for the provision of Linked Spatial Data and query them via GeoSPARQL.

- **Challenges must be solved**, e.g. build up a QGIS Plugin to integrate LOD Sources in Standard GIS Software.

- ... build up a common Ontology in UNGEGN, like GeoNames?

⇒ **With the examples of BKG Geographical Names dataset** we have shown, how existing spatial datasets can be provided as LOD and benefit to a greater extent and linking to other data in the Semantic Web.
Thank you for your kind attention!