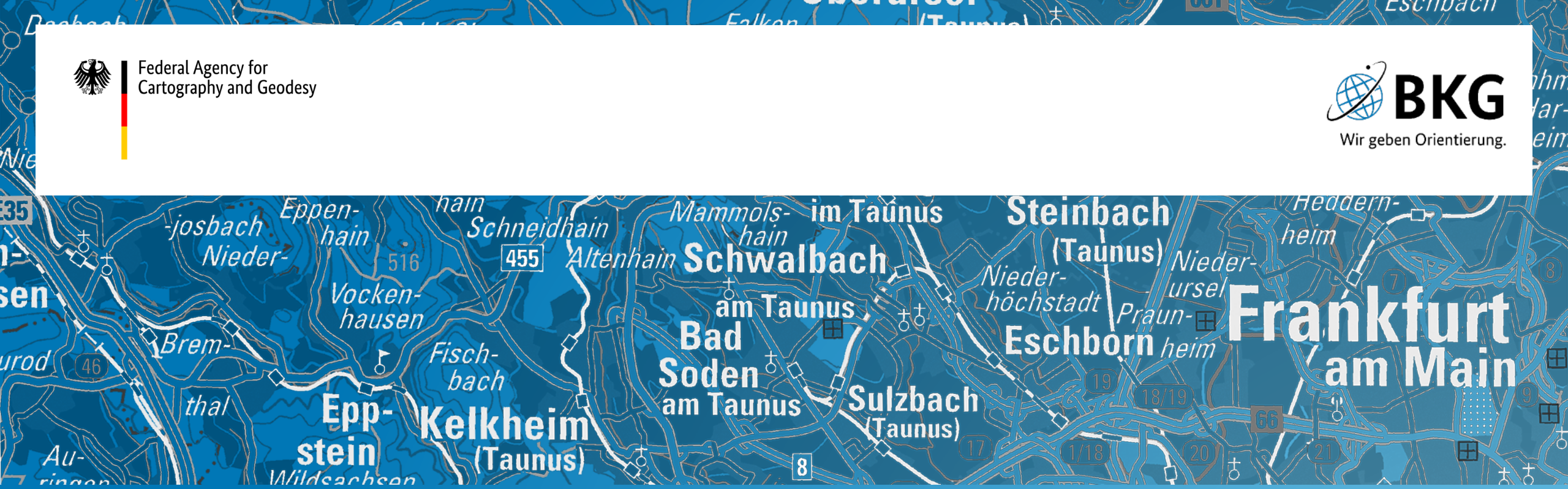
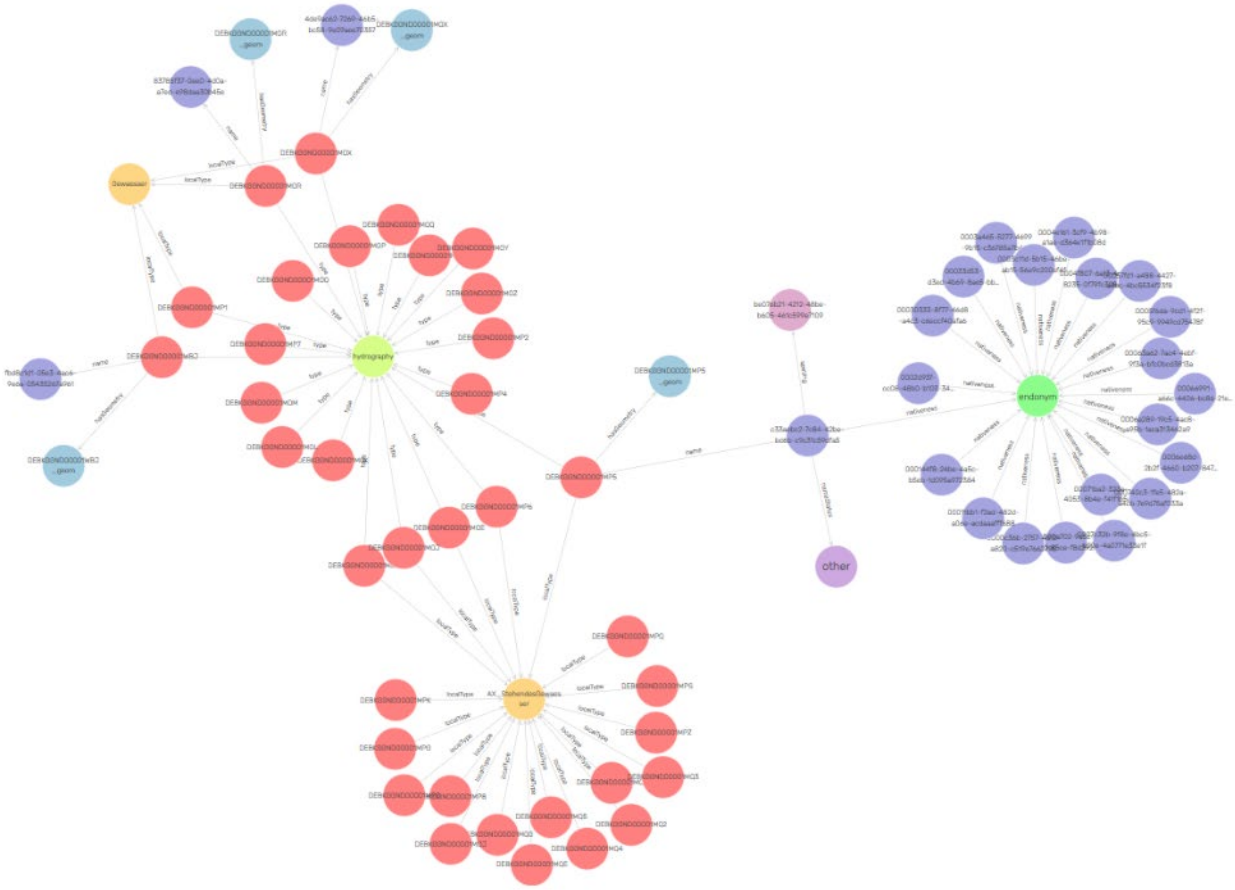


National LOD implementations or projects - Germany -

Dr. Falk Würriehausen

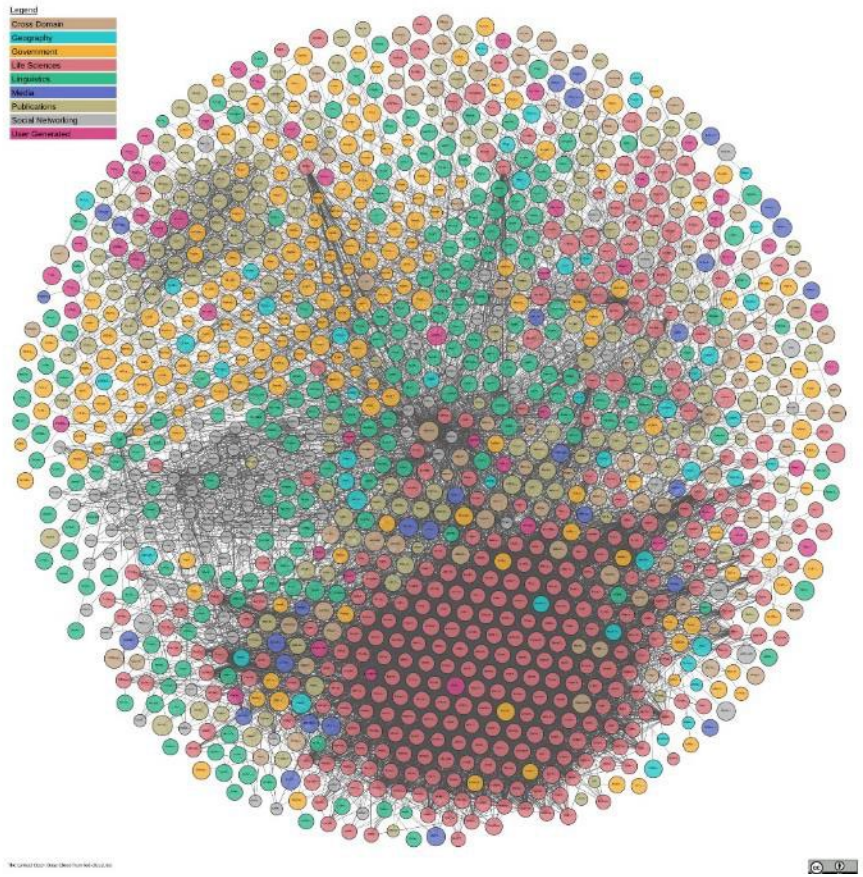
Agenda

1. Linked Open Data – Background and Objectives of the project at the BKG
2. Current Development and Examples (BKG Geographical Names)
   - Data transformation to RDF
   - Data management concepts in TripleStores
   - Questioning methods and networking with other services (e.g. wikidata or geonames)
   - Challenges
3. Conclusion



Linked Open Data – Background and Objectives of the project at the BKG

- **Linked Open Data (LOD)** defines a vision of globaly 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
  - …

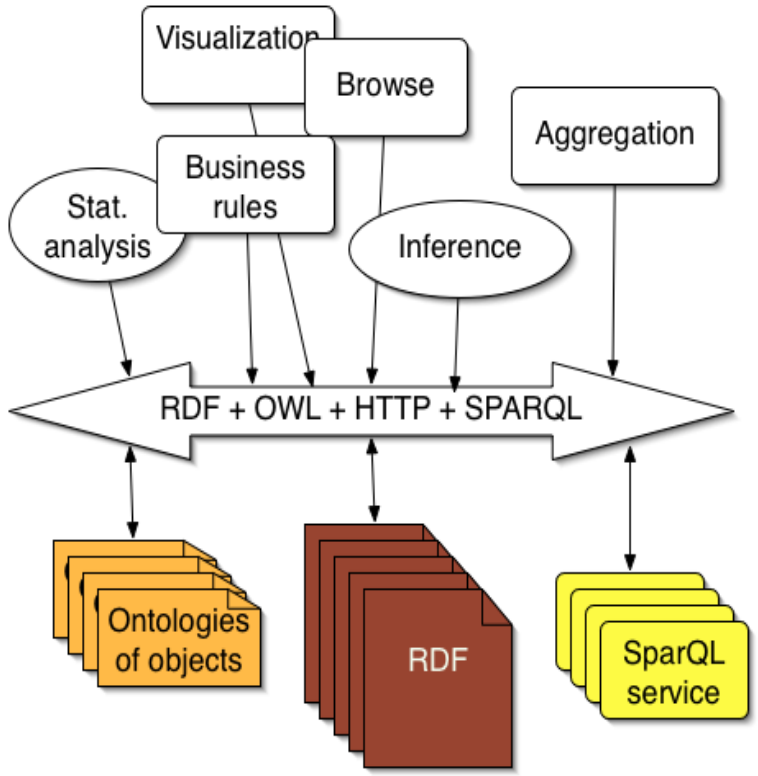


Linked Open Data – Background and Objectives of the project at the BKG

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

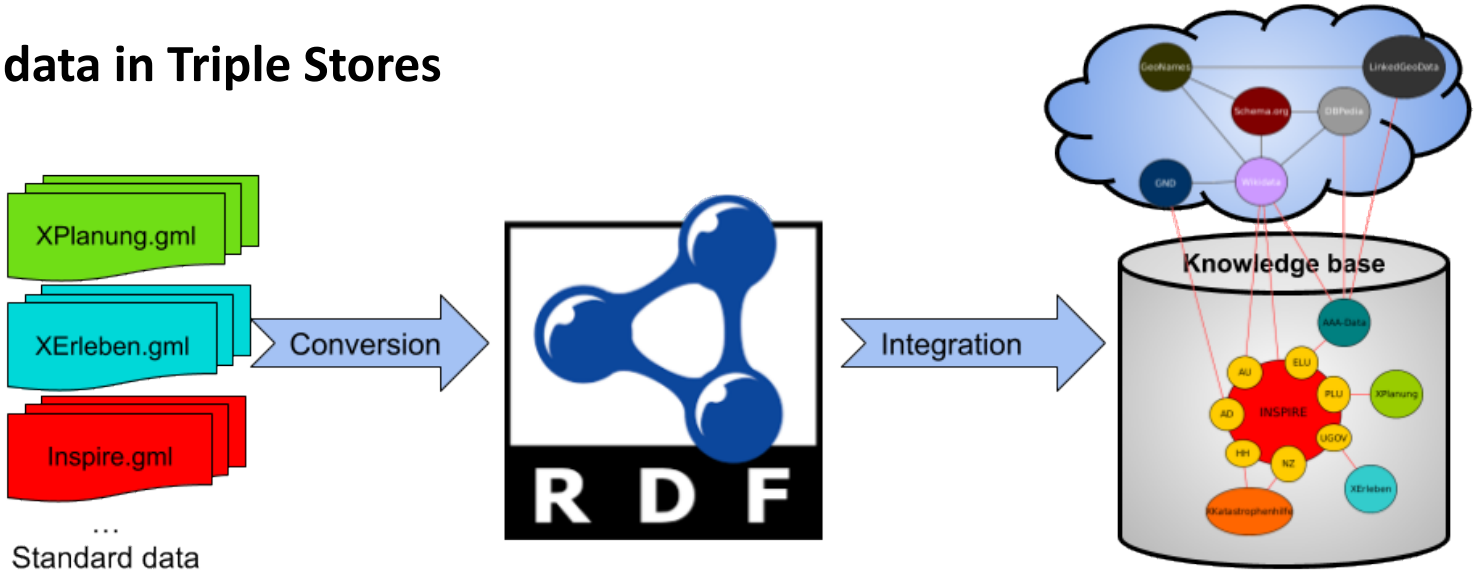
- **In order to provide a prototype** of linked data in the BKG, various components had to be developed that were to enable the provision of linked data (SPARQL Endpoint), the conversion of various geoformats to RDF and the exploration and reconversion of linked data into geoformats for their provision.

- **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.



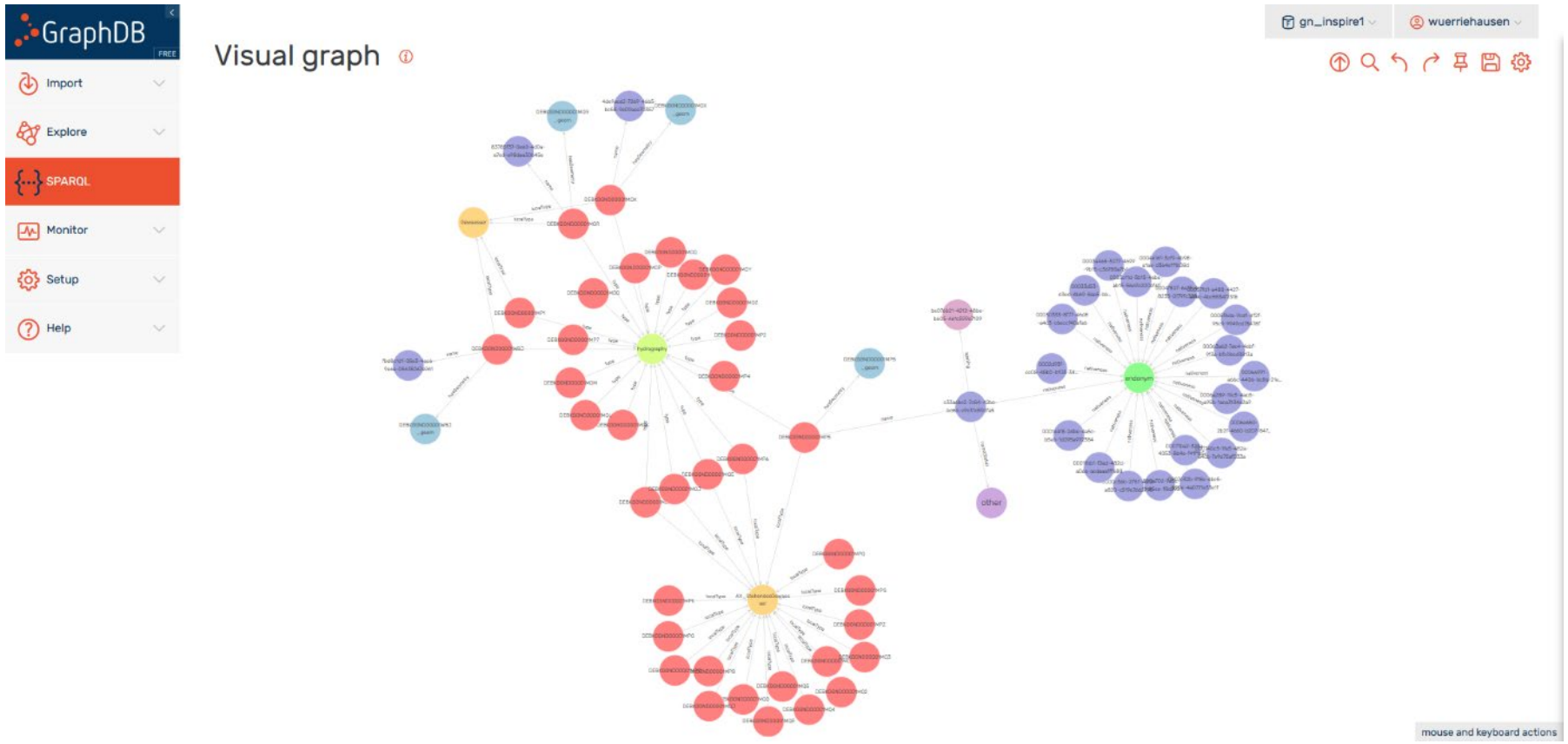
Current Development and Examples

- 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**



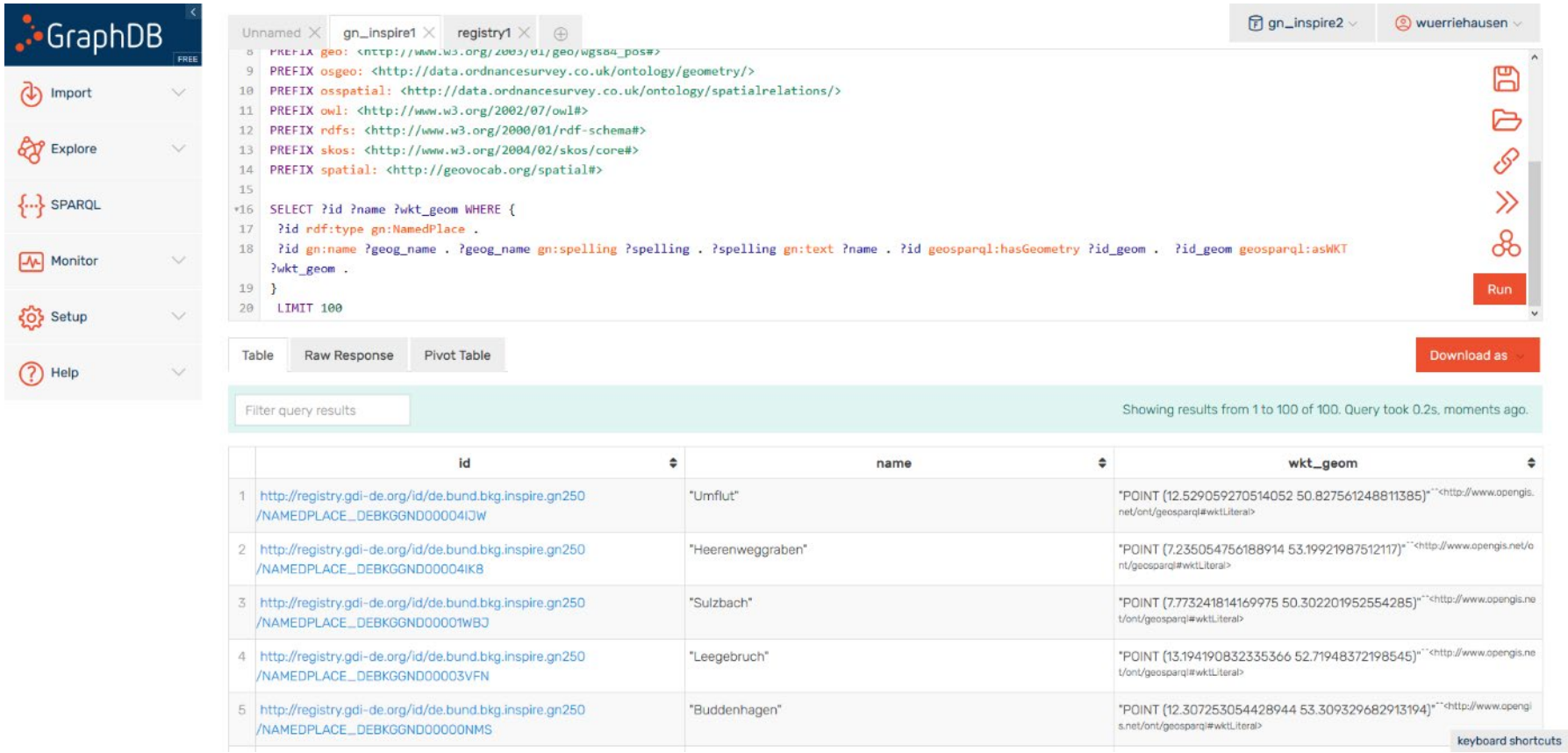
Data management concepts in TripleStores

- **Graph visualization:**



Data management concepts in TripleStores

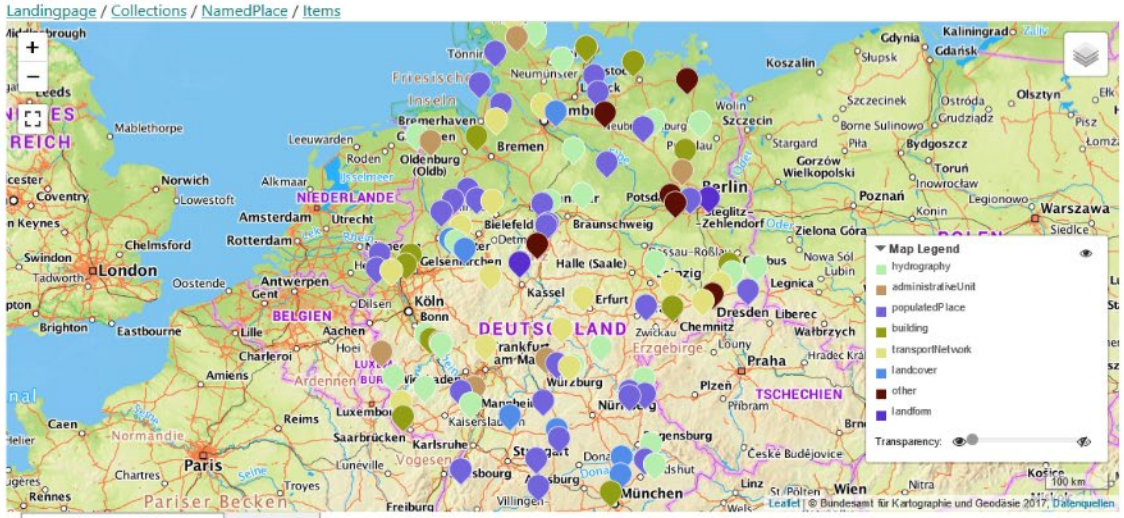
- **GeoSPARQL Query gn:NamedPlace in GraphDB**



Current Development and Examples

NamedPlace

Landingpage / Collections / NamedPlace / Items



namedplace_DefaultStyle | Apply Style

Show 10 entries | Search:

FeatureID	beginLifespanVersion	localType	hasGeometry	name.spelling.text	name.spelling.script	name.nameStatus
NAMEDPLACE_DEBKGGND000000HQ	20150326000000	AX_Ortslage	POINT (12.339065222953076 48.62324616908041) NAMEDPLACE_DEBKGGND000000HQ_geom	WÃ¶rth a.d. Isar,WÃ¶rth an der Isar WÃ¶rth a.d. Isar,WÃ¶rth an der Isar	Latn,Latn Latn,Latn	other official
NAMEDPLACE_DEBKGGND00000012	20150326000000	AX_Ortslage	POINT (8.558452050456001 52.33655792887399) NAMEDPLACE_DEBKGGND00000012_geom	Alswede	Latn	official
			POINT (9.910820957865498			

- Named Place Collections - Frontend

Fig: Named Place Collections - Frontend

Current Development and Examples

Property	Value
geosparql:asWKT	POINT (8.226817299782962 49.61945752795732) (geosparql:wktLiteral)
geosparql:hasGeometry	pubby:de.bund.bkg.inspire.gn250/NAMEDPLACE_DEBKGGND00000NN4_geom
rdfs:label	Hohen-Sülzen (xsd:string)
inspire:schemas/gn/4.0#beginLifespanVersion	20150326000000 (xsd:string)
inspire:schemas/gn/4.0#localType	aaa6:AX_Ortslage
inspire:schemas/gn/4.0#name	pubby:de.bund.bkg.inspire.gn250/0116264e-5d90-4f51-af80-d665e2a0fd73
inspire:schemas/gn/4.0#type	inspire:codelist/NamedPlaceTypeValue/populatedPlace
rdf:type	inspire:schemas/gn/4.0#NamedPlace pubby:de.bund.bkg.inspire.gn250/NamedPlace

- 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.

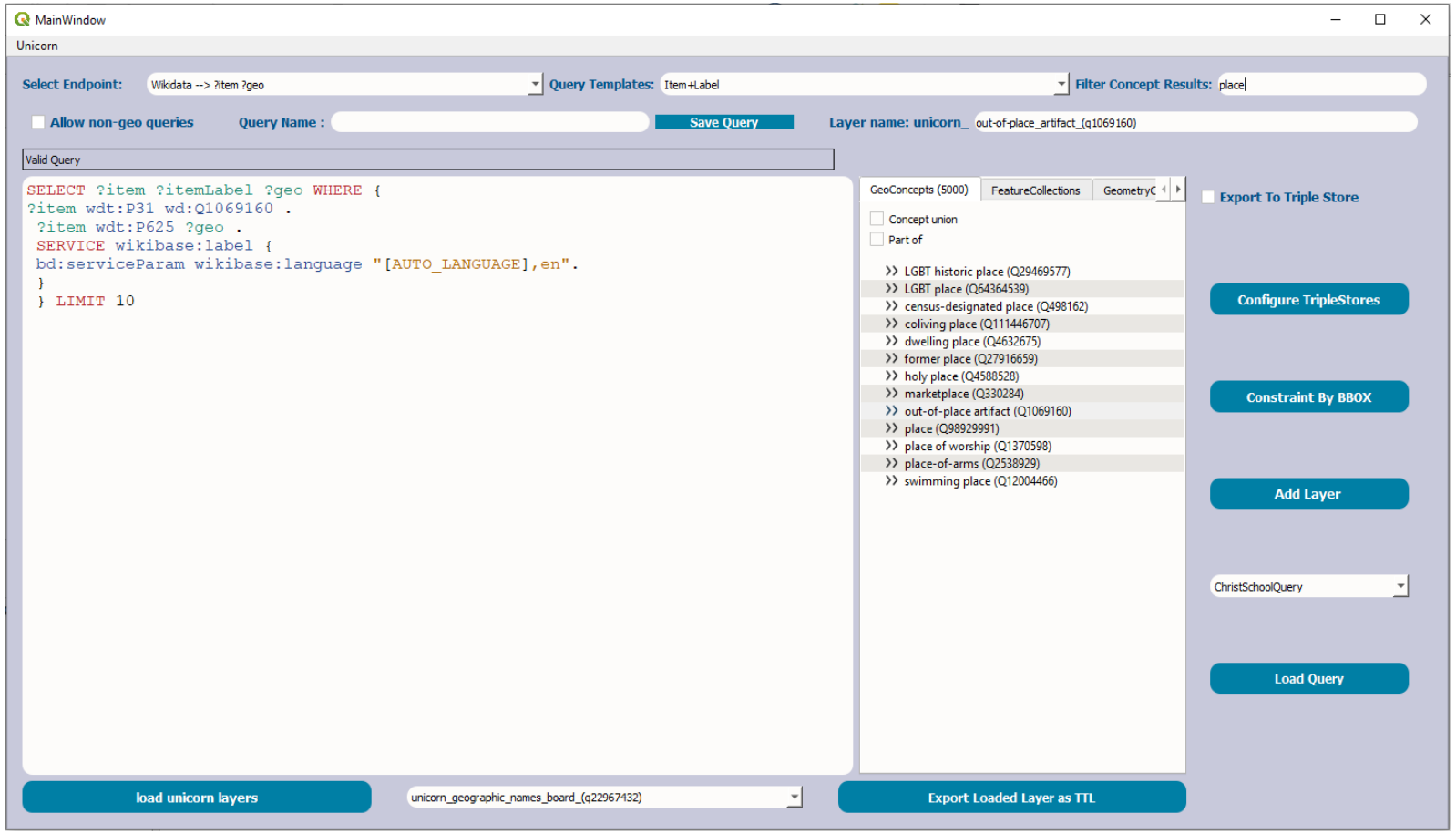
For the town *Embrun* in France we have these two URIs :
[1] https://sws.geonames.org/3020251/
[2] https://sws.geonames.org/3020251/about.rdf

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.

Federal Agency for
Cartography and Geodesy

BKG
Wir geben Orientierung.

Thank you for your kind attention!

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