



Research Squirrel Engineers



HOCHSCHULE MAINZ
UNIVERSITY OF
APPLIED SCIENCES

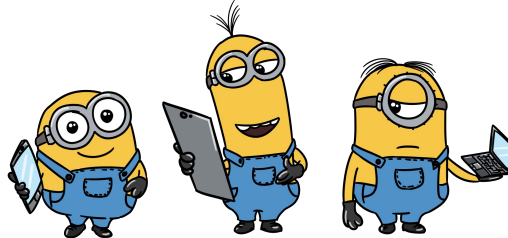


Rheinisch-Germanisches
Zentrum für
digitale Forschungsmethoden
in der Archäologie

R G Z M

mainzed

Timo Homburg M.Sc. & Florian Thiery M.Sc.



Computer Anwendungen & Quantitative Methoden in der Archäologie
Sektion Deutschland



CAA Webcast "Unicorns"





Timo Homburg

@situxxx
0000-0002-9499-5840
i3mainz, Hochschule Mainz,
Germany



Open
Geospatial
Consortium



Florian Thiery

@fthierygeo
0000-0002-3246-3531
<http://fthiery.de>
RGZM, Mainz, Germany



FELLOW
PROGRAMM
FREIES
WISSEN

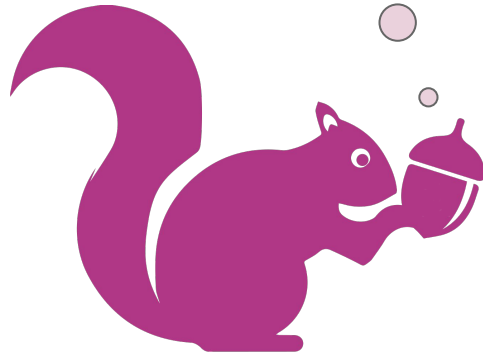
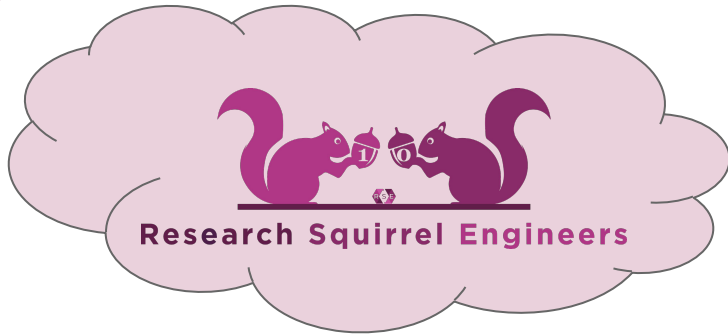
VDV



Data Dragon

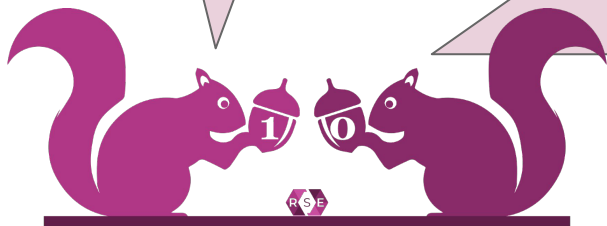


Tapawan Sookruay from the Noun Project (globe + head)
Derivative work by Florian Thiery and Sophie Charlotte Schmidt of Archaeologist by Noun from
the Noun Project. sig by Manthana Chiewong from the Noun Project and archaeology by
Pratchara Buihacharyy TH from the Noun Project under CC BY 3.0 (archaeologist)



Digital Archaeologists
& Research Software
Engineers benötigen eine
Community zur
Vernetzung und
Unterstützung.

We are
Research Squirrels
and interested in
Open Science and
Linked Data.



Research Squirrel Engineers

Wir haben derzeit einen
fachlichen Background in...

**Research Software
Engineering,**

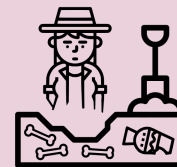


Geoinformatics



und

Cultural Heritage.



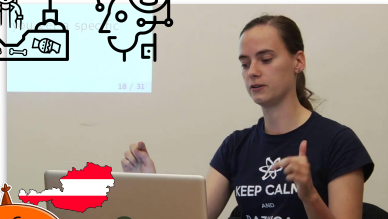
Tippawan Sookruay from the Noun Project (globe + head)
Derivative work by Florian Thiery and Sophie Charlotte Schmidt of
Archaeologist by Nhor from the Noun Project, dig by Manthana
Chaisong from the Noun Project and archaeology by Phatchana
Bunthachary, TH from the Noun Project under CC BY 3.0 (archaeolog&t)



Sophie

@idhrenil

0000-0003-4696-2101



Martina

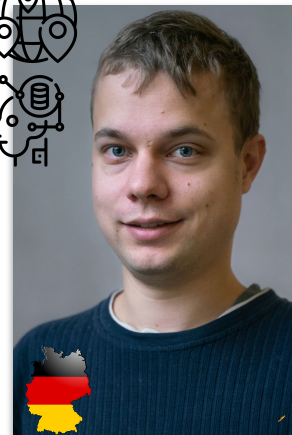
0000-0003-0485-6861



Florian

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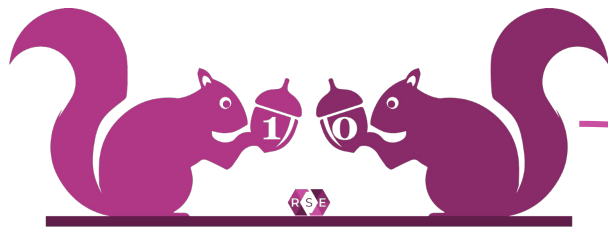


Research Squirrel Engineers

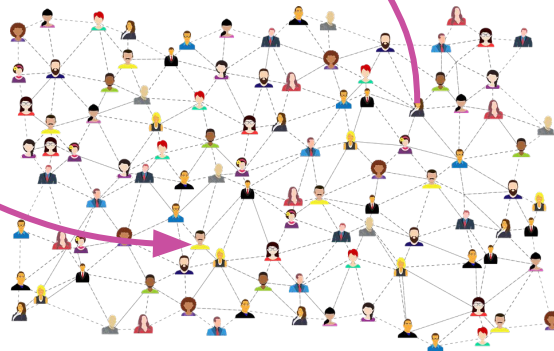
Tippawan Sookruay from the Noun Project (globe + head)
Derivative work by Florian Thiery and Sophie Charlotte Schmidt of
Archaeologist by Nihar from the Noun Project, dig by Manthana
Chaisong from the Noun Project and archaeology by Petchara
Bunkhachary, TH from the Noun Project under CC BY 3.0 (archaeology)



deRSE e.V.
DH-RSE
CAA International & CAA Sektion Deutschland
CAA SIG Data-Dragon & CAA SIG Scientific Scripting Languages
CAA Little Minions Group
ISAAK - Initiative for Statistical Analysis in Archaeology Kiel
Linked Pasts (Linked Pipes Working Group)
Wikimedia Germany (Fellow-Program Freies Wissen Fellows)



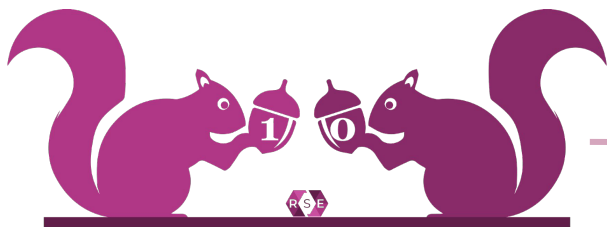
Research Squirrel Engineers



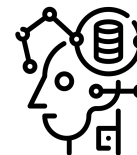


Research Squirrel Working Groups

- * SPARQLing Unicorn QGIS Plugin
- * Linked Open Ogham Data



Research Squirrel Engineers

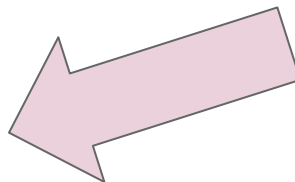
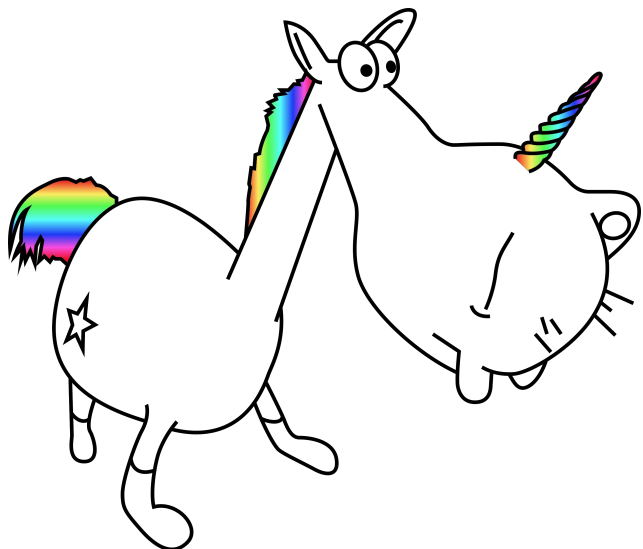


Tipparwan Sookruay from the Noun Project (globe + head)
Derivative work by Florian Thiery and Sophie Charlotte Schmidt of
Archaeologist by Nhor from the Noun Project, dig by Manthana
Chaiwong from the Noun Project and archaeology by Phatchara
Bunhichary, TH from the Noun Project under CC BY 3.0 (archaeologist)

The **SPARQL Unicorn** was born at...



CHECK OBJECT INTEGRITY
CAA 2019
KRAKÓW 23-27 April



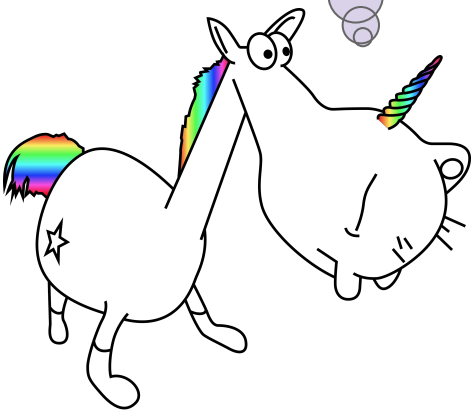
© Stary Port, Kraków



Community



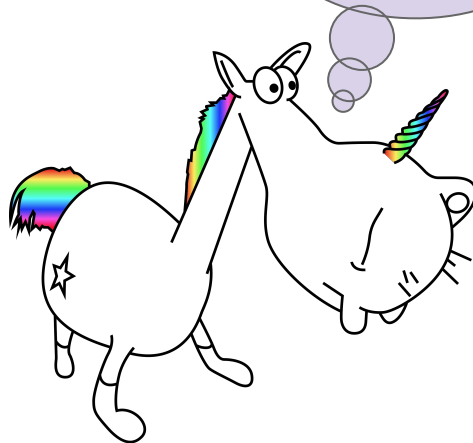
Die meisten LOD-Tools
erfordern Kenntnisse in
SPARQL... Abfragen
können sehr komplex
werden!

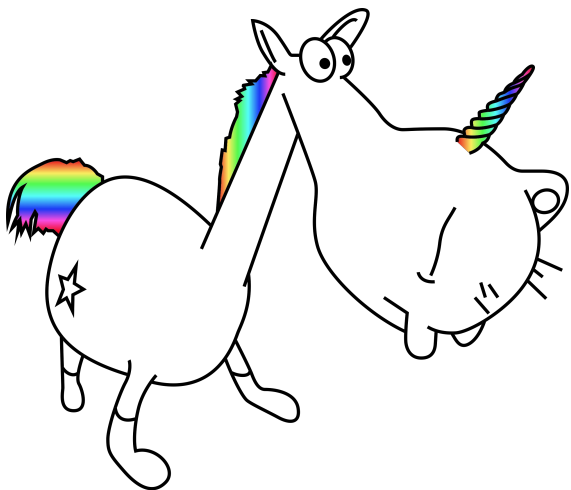


```
1 SELECT ?date ?work ?workLabel ?topics (GROUP_CONCAT(DISTINCT
separator="// " ) AS ?places) (GROUP_CONCAT(?authorLabel; sepa
authorstrings) (GROUP_CONCAT(?editorLabel; separator=" - " )
2 WITH {
3 SELECT DISTINCT ?work WHERE {
?work wdt:P921 / (wdt:P361+ | wdt:P1269+ | (wdt:P31* / wd
4 }
5 } AS %works
6 WITH {
7 SELECT (MIN(?dates) as ?datetime) ?work (GROUP_CONCAT(?topi
8 INCLUDE %works
9 ?work wdt:P921 ?topic .
10 FILTER NOT EXISTS {
?topic wdt:P31 wd:Q839954} .
11 FILTER NOT EXISTS {
12 ?topic wdt:P31 wd:Q220659}
13 OPTIONAL { ?work wdt:P577 ?dates . }
14 ?topic rdfs:label ?topic_label . FILTER (lang(?topic_labe
15 }
16 GROUP BY ?work
17 } AS %result
18 WHERE {
19 INCLUDE %result
20
21 OPTIONAL { ?work wdt:P50 ?author .
22 ?author rdfs:label ?authorLabel . FILTER (lang(?
23 }
24 # no extra label assignment here, because we already have a
25 OPTIONAL { ?work wdt:P2093 ?authorstring . }
26 OPTIONAL { ?work wdt:P98 ?editor .
27 ?editor rdfs:label ?editorLabel . FILTER (lang(?
28 }
29 OPTIONAL { ?work wdt:P123 ?publisher . }
30
31 #collect related places (are in topic list; are instance of
32 OPTIONAL {?work wdt:P921 ?place
```



Wie kann ich Forscher*innen
ohne SPARQL-Kenntnisse bei
der Nutzung von
community-driven data aus
dem Semantic Web helfen?





(1) Describe your data in well documented semantic structured open formats, acc. to the 5 Star data principles.

(2) Model, generate and publish your data as 5 Star Linked Open Data

(3) Publish your data in Wikidata and interlink them to other resources in the Linked Open Data Cloud

(4) Use existing tools to query Wikidata dynamically and to do real time data analysis and support developers or develop new tools to give people without any deeper knowledge in Linked Open Data (SPARQL Unicorn tools) the possibility to also do dynamical real time analysis

(5) Use Wikidata and the SPARQL Unicorn tools in your own research and promote the SPARQL Unicorn principles that other interested researchers in the community may start with principle 1!

SPARQL Unicorn idea and principles

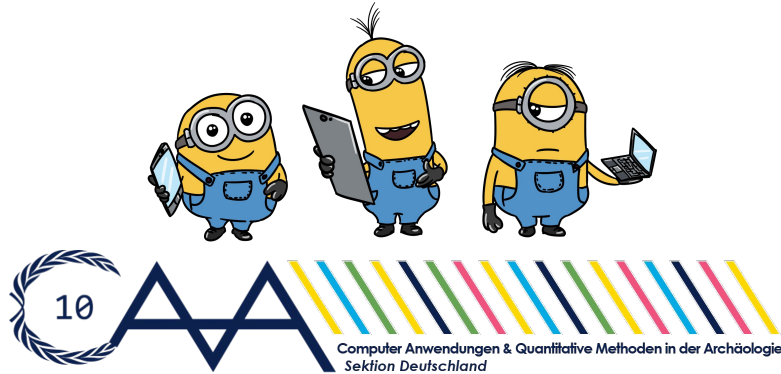


Es gibt einen Mangel an FLOSS GIS Tools für LOD und Archäologie. Das SPARQLing Unicorn QGIS Plugin zeigt eine Lösung für das Problem der mangelnden Verfügbarkeit von Tools für Semantic Web Geodaten.



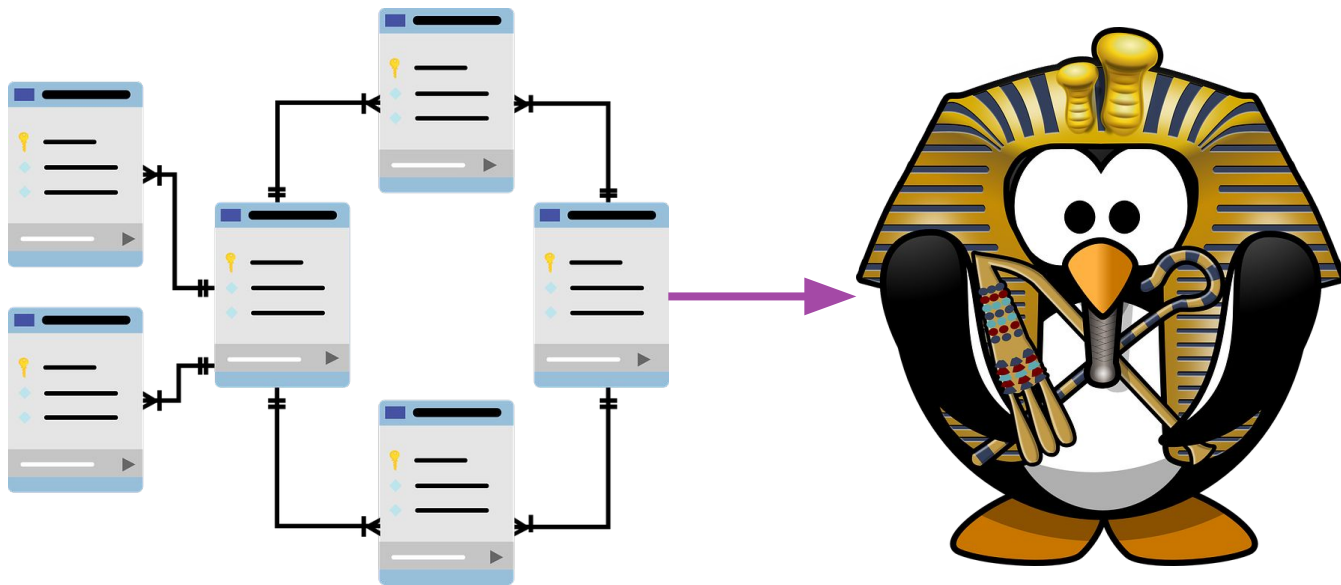
The SPARQLing Unicorn QGIS Plugin - a Linked Data Access Point for QGIS

Timo Homburg M.Sc. & Florian Thiery M.Sc.



Was ist dieses LOD und SPARQL und wozu brauche ich das?

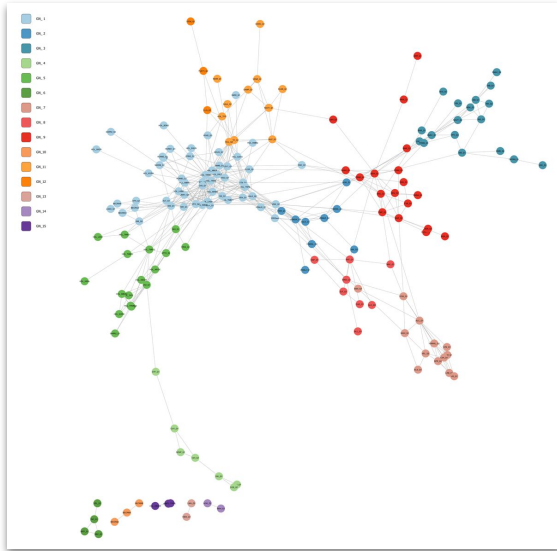




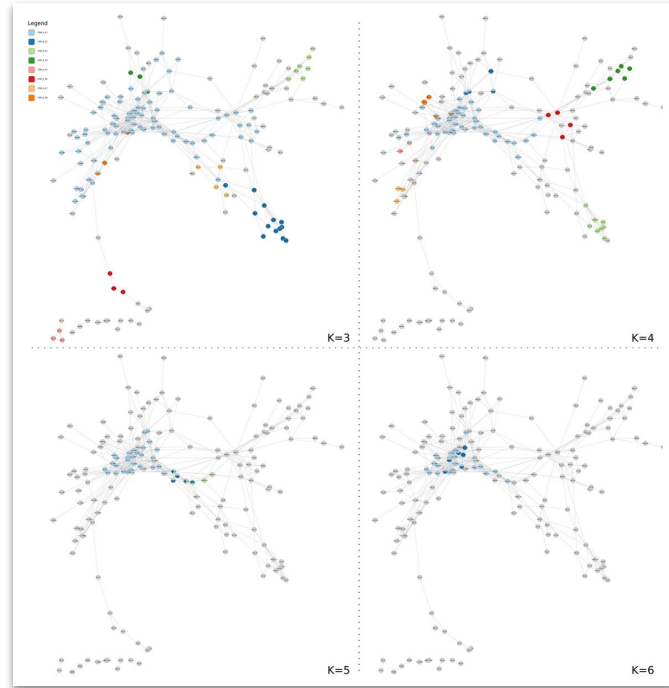
Relationale Datenmodellierung und RDBMS sind in der digitalen Archäologie nicht mehr wegzudenken und die de facto Standard-Datenstruktur für archäologische Daten.



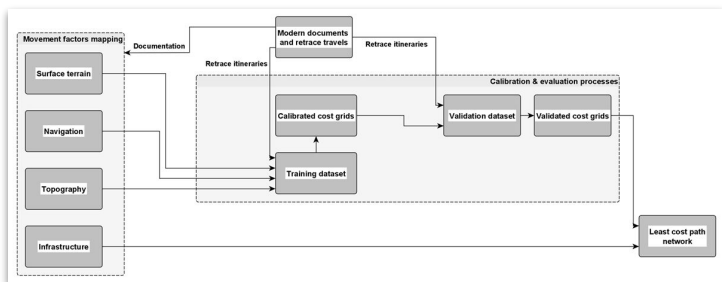
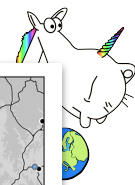
Darüber hinaus gibt es aber auch immer mehr Anwendungen und Datenmodellierungen, die als Grundlage eine Graphstruktur besitzen.



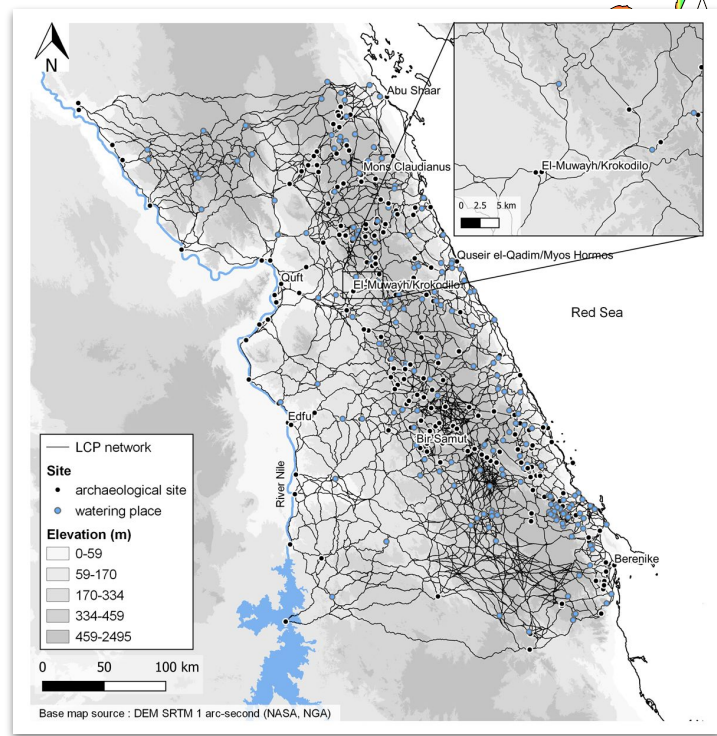
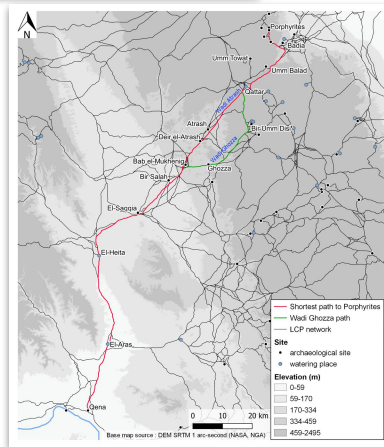
Visser, R.M., 2021. Dendrochronological Provenance Patterns. Network Analysis of Tree-Ring Material Reveals Spatial and Economic Relations of Roman Timber in the Continental North-Western Provinces. *Journal of Computer Applications in Archaeology*, 4(1), pp.230–253. DOI: <http://doi.org/10.5334/jcaa.79>



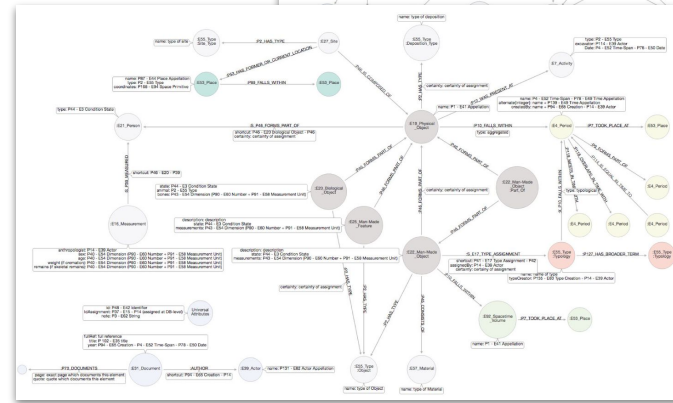
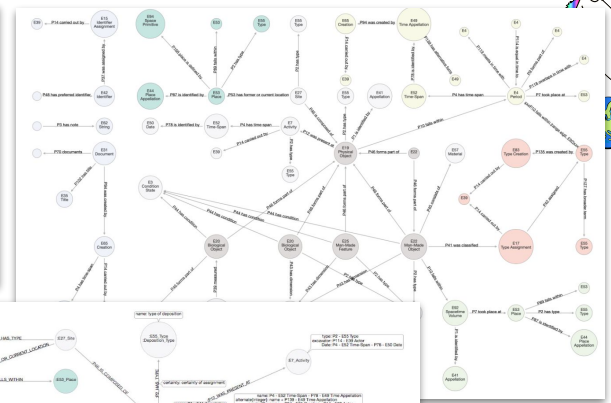
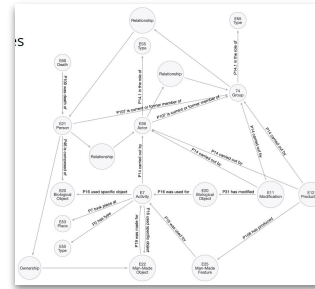
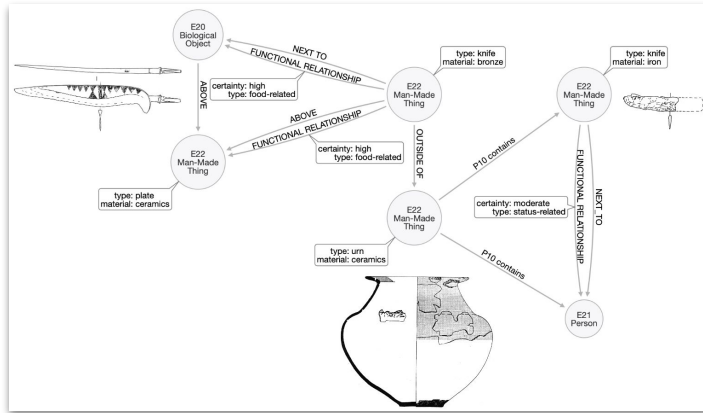
In der Archäologie sind dies z.B. Netzwerkanalysen...



Manière, L., Crépy, M. and Redon, B., 2021. Building a Model to Reconstruct the Hellenistic and Roman Road Networks of the Eastern Desert of Egypt, a Semi-Empirical Approach Based on Modern Travelers' Itineraries. *Journal of Computer Applications in Archaeology*, 4(1), pp.20-46. DOI: <http://doi.org/10.5334/jcaa.67>

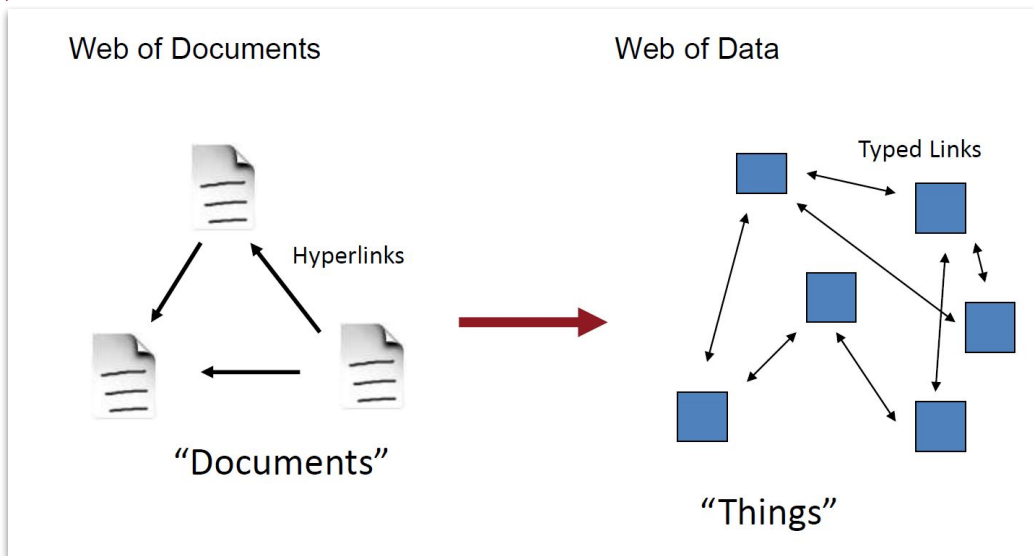


... Least Cost Routing ...

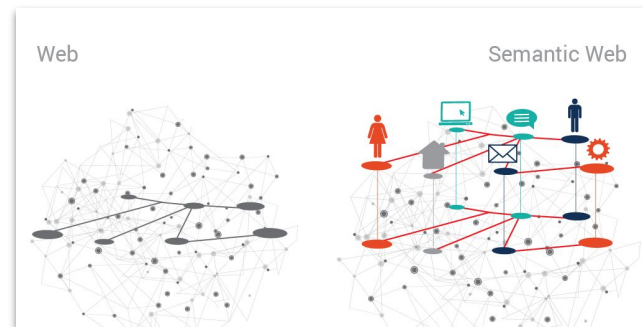


Deicke, Aline. (2020, February 21). Modelling as a scholarly process. The impact of modelling decisions on data-driven research practices. Graph Technologies in the Humanities 2020 – Modelling the Scholarly Process, University of Vienna. Zenodo. <https://doi.org/10.5281/zenodo.3686642>

**... oder semantische Netzwerke,
z.B. auf Basis des CIDOC-CRM Referenzmodells ...**

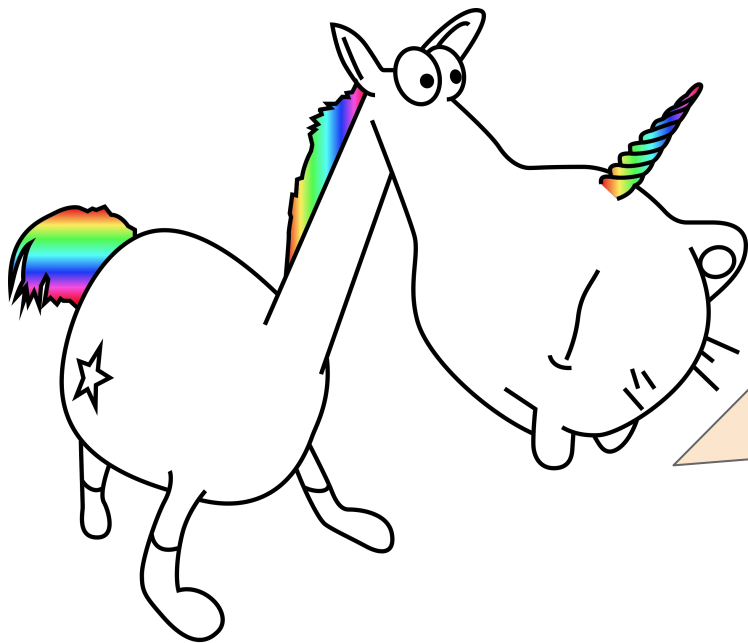


*Semantic Web, from web of documents to web of data. Source: Fensel 2013, slide 15.
more at <https://devopedia.org/semantic-web>*



*Semantic Web adds links data on the web and adds a layer of meaning to data.
Source: Petkova 2016.
more at <https://devopedia.org/semantic-web>*

**... bis hin zum Semantic Web,
vom “Web of Documents” zum “Web of Data”!**



Das **Semantic Web** erweitert das Web, um Daten zwischen Rechnern einfacher austauschbar und für sie einfacher verwertbar zu machen. Zur Realisierung dienen Standards zur Veröffentlichung und Nutzung maschinenlesbarer Daten (insbesondere RDF).

aus https://de.wikipedia.org/wiki/Semantic_Web



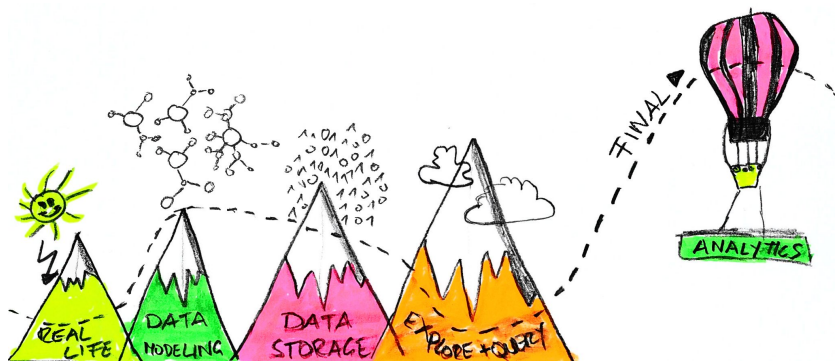
Sir Tim Berners-Lee



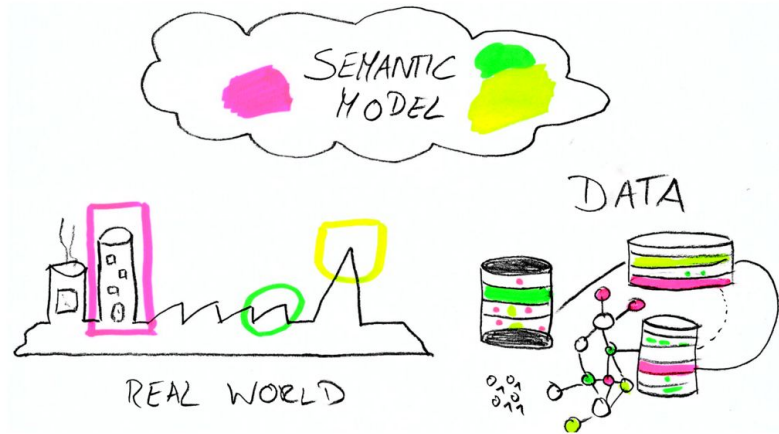
Paul Clarke, CC BY-SA 4.0, via Wikimedia Commons

The Semantic Web isn't just about putting data on the web. It is about making links, so that a person or machine can explore the web of data. With linked data, when you have some of it, you can find other, related, data.

aus <https://www.w3.org/DesignIssues/LinkedData.html>



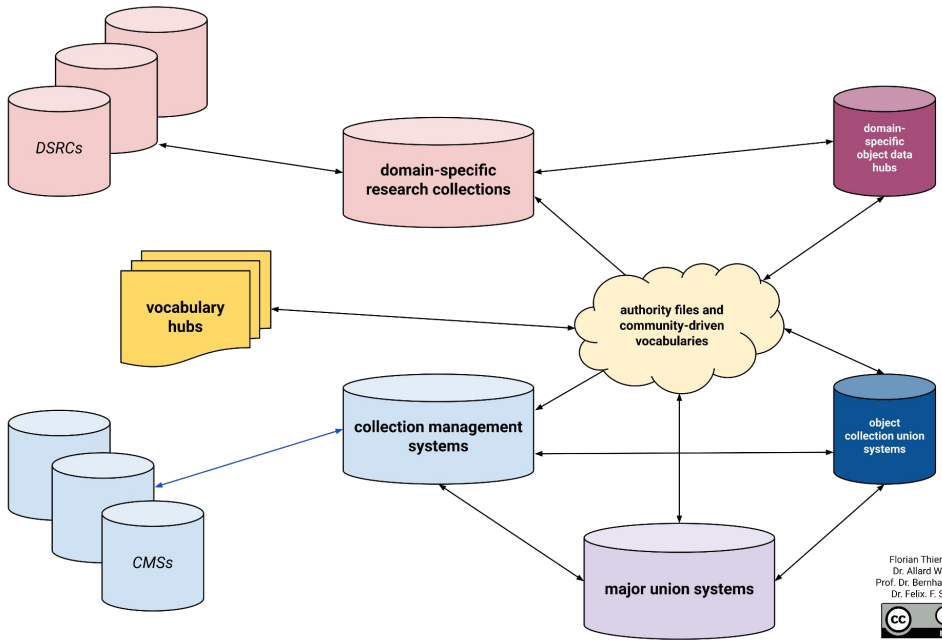
Florian Thiery, CC BY 4.0, via Wikimedia Commons



Florian Thiery, CC BY 4.0, via Wikimedia Commons

Semantic Web in der digitalen Archäologie

Was heißt das?



Florian Thiery M.Sc.
Dr. Allard W. Mees
Prof. Dr. Bernhard Weisser
Dr. Felix F. Schäfer



nfdi Nationale
Forschungsdaten
Infrastruktur



NFDI4Objects
Research Data Infrastructure
for the Material Remains of
Human History

Florian Thiery, Allard W. Mees,
Bernhard Weisser, Felix F.
Schäfer, CC BY 4.0, via
Wikimedia Commons

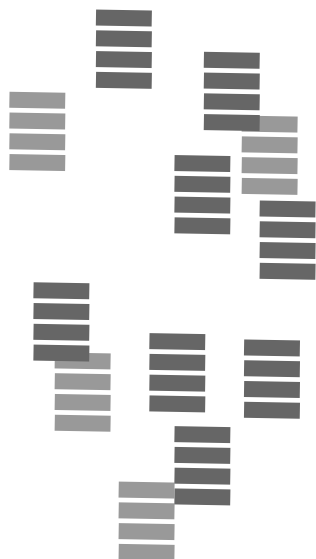
Collection Research Network



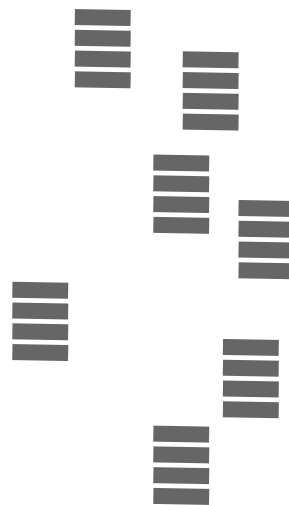
DB local
(offline)



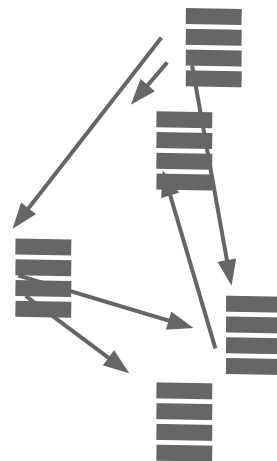
DB online



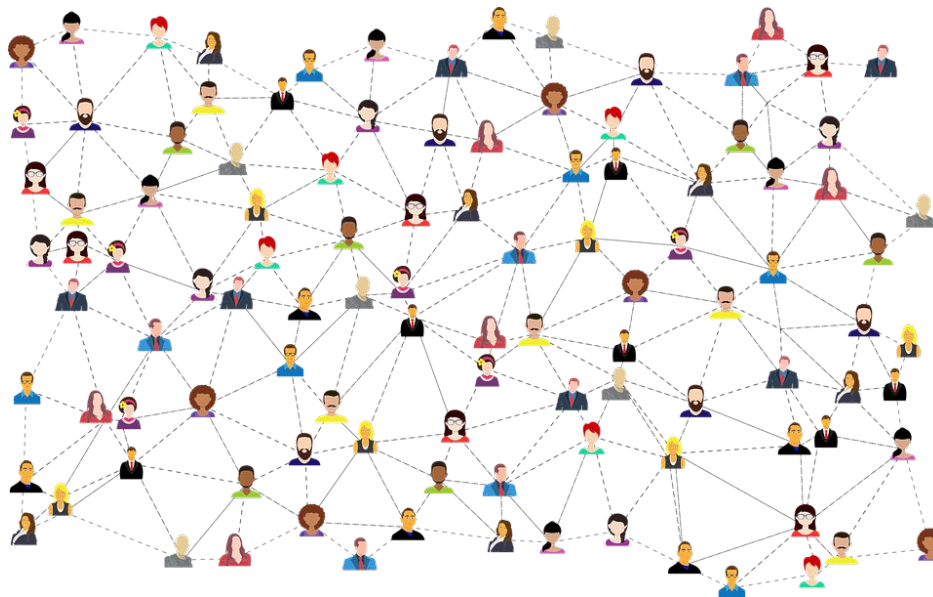
DBs
online & open



DBs as
part of LOD



Linked Open Data führt zu FAIRen Daten!



Linked Open Data läuft nur in menschlichen Netzwerken!
Die Community spielt eine große Rolle!



<http://datadragon.link>



Data Dragon

CAA SIG Data-Dragon

Semantics and LOUD in Archaeology



Data Dragon



geplante CAA LOUD in Archaeology Session
mit Florian, Brigit, Allard & Nicole



LP Network

While not the responsibility of the Linked Pasts Steering Committee, which is limited to the annual symposium, the Linked Pasts Network refers to a growing collection of historical datasets published as Linked Open Data and the community of researchers across the globe whose projects are producing and using them. The nature of this emerging network is discussed at the Linked Pasts series of international symposia.

This site and [repo](#) are just getting under way. This visualization is a partial view of the projects and supporting organizations within the "geospatial region" of the network. Further information about Linked Pasts can be found in a Dec 2017 white paper, "[From Linking Places to a Linked Pasts Network](#)".

The Linked Pasts Network was inspired by work such as the [Pelagios Network and Association](#), the [Linked Ancient World Data Institute](#) (2012–13) and the [LAWD Ontology](#).

The screenshot shows the website for the Ghent Centre for Digital Humanities. The header includes the Ghent University logo and the text "GHENT CENTRE FOR DIGITAL HUMANITIES". A navigation menu contains links for HOME, SERVICES, PROJECTS, ACTIVITIES, LINKED PASTS VII SYMPOSIUM (which is highlighted), and ABOUT THE CENTRE. The main content area features the title "Linked Pasts VII Symposium" and a paragraph describing the annual conference. Below this, it mentions the seventh installment in December 2021, hosted by the Ghent Centre for Digital Humanities and CLARIAH Flanders Open Humanities Service Infrastructure consortium. A "CHANGE IN FORMAT" section states that due to COVID-19, the event will be online from December 13-21, 2021.

<https://www.ghentcdh.ugent.be/linked-pasts-vii-symposium>

Linked Pasts

Linking the Past



AG Graphen & Netzwerke

1. AG-Name

AG Graphen & Netzwerke

2. AG-Arbeitsschwerpunkte

Die **Modellierung von Daten** in einer graphenbasierten Struktur ermöglicht es, Informationen in einer flexiblen Art und Weise in Bezug miteinander zu setzen. Modelliert werden nicht in Dokumenten zusammengesetzte Informationseinheiten (wie etwa Tabellen bei relationalen Datenbanken) sondern distinkte Entitäten, die durch Relationen miteinander verknüpft ein semantisches Netz bilden.

Graphdatenbanken zeigen beim Umgang mit Metadaten eine hohe Performanz und liefern qualitativ hochwertige Suchergebnisse. Die Visualisierung der Daten als Graph, oder auch semantisches Netz, bieten dem Betrachter eine intuitiv-zugängliche Darstellungsform und kann damit auch Ausgangspunkt für weitere Analyseansätze sein.

Graphs and Networks in the Humanities 2022

Technologies, Models, Analyses, and Visualizations

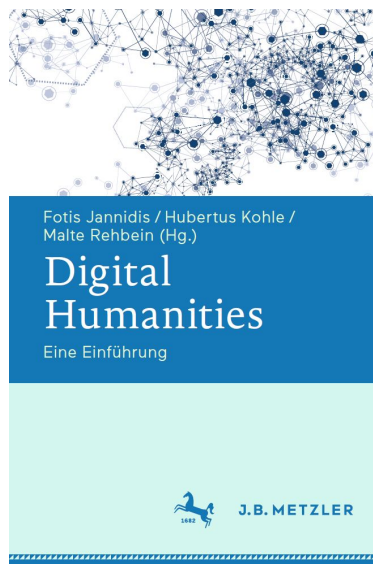
6th International Conference, 3. – 5. February 2022,
Amsterdam

<https://graphentechnologien.hypotheses.org>

DHd AG *Graphen und Netzwerke*



Linked Open Data



Jannidis, Fotis, Hubertus Kohle, and Malte Rehbein, eds. 2017. Digital Humanities. Stuttgart: J.B. Metzler. <https://doi.org/10.1007/978-3-476-05446-3>

Als Einführung zu empfehlen:
“Digital Humanities *Eine Einführung*”
II Datenmodellierung, insb. Kapitel 10+11

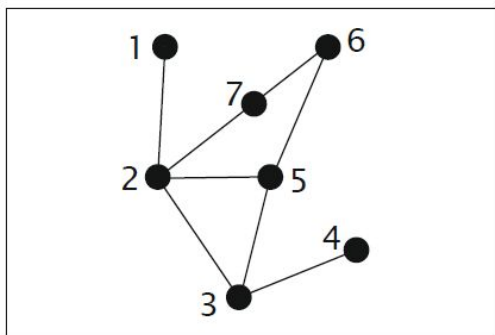
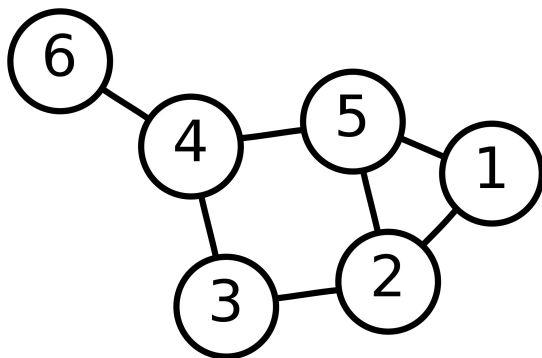


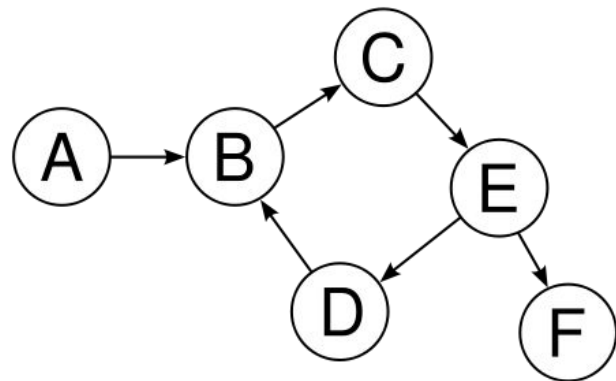
Abb. 29 Ein einfaches Netzwerk mit 7 Knoten und 8 Kanten. Die Länge der Kanten hat keine Bedeutung und verdankt sich nur der gewählten Visualisierung.

Jannidis, Fotis, Hubertus Kohle, and Malte Rehbein, eds. 2017. Digital Humanities. Stuttgart: J.B. Metzler. <https://doi.org/10.1007/978-3-476-05446-3>. Kapitel 10, S. 147 ff.

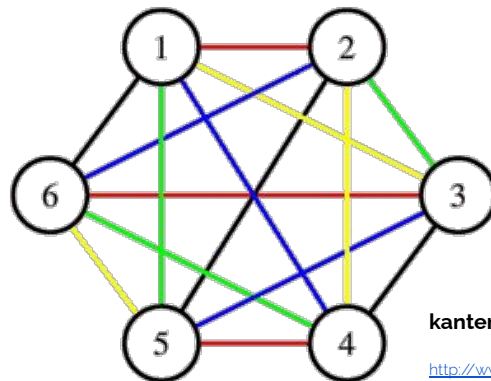
Grundlegende Bausteine der Graphentheorie sind Knoten und Kanten. Ein Graph besteht aus Knoten und Kanten, die einige oder alle Knoten verbinden.



Ungerichteter Graph mit sechs Knoten

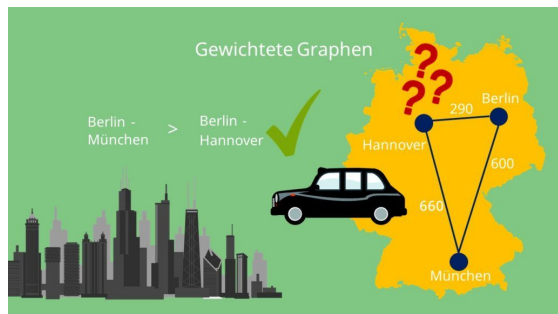


Gerichteter zyklischer Graph



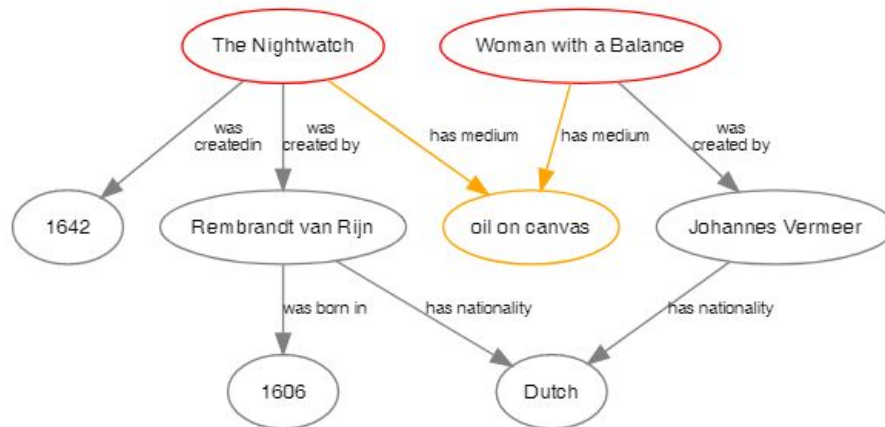
kantengefärbter Graph

<http://www2.informatik.uni-osnabrueck.de/kombopt/lehre/pgai0/>



<https://studyflix.de/informatik/grundbegriffe-der-graphentheorie-1285>

Graphentheorie



<https://programminghistorian.org/en/lessons/retired/graph-databases-and-SPARQL>

LOD besteht aus einem kanten-gefärbten, gerichteten Graphen

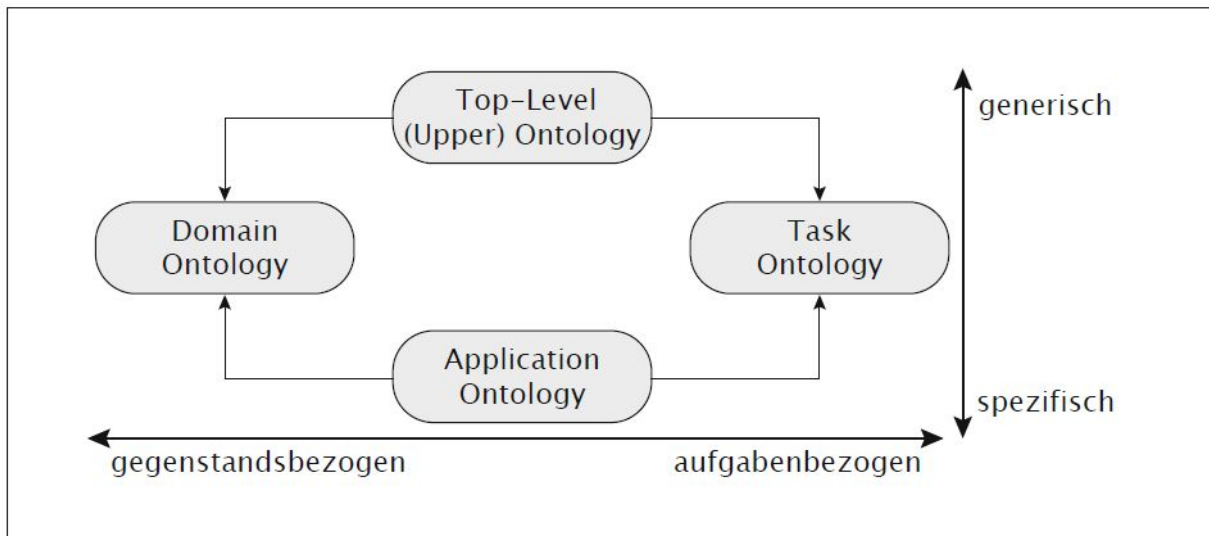


Abb. 38 Klassifizierungsansatz für Ontologien anhand des Grades ihrer Abhängigkeit von einem bestimmten Standpunkt oder einer spezifischen Aufgabestellung (in Anlehnung an Guarino 1998)

Jannidis, Fotis, Hubertus Kohle, and Malte Rehbein, eds. 2017. Digital Humanities. Stuttgart: J.B. Metzler. <https://doi.org/10.1007/978-3-476-05446-3>. Kapitel 11, S. 162 ff.

Semantische Netzwerke mit Regeln können in Ontologien modelliert werden



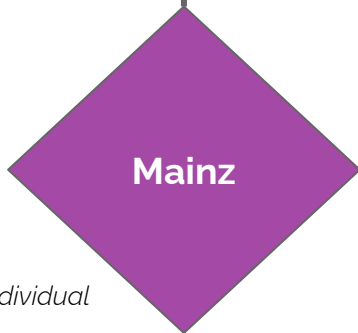
David Rasp, CC BY 4.0,
via Wikimedia Commons



Place

Class

rdf:type

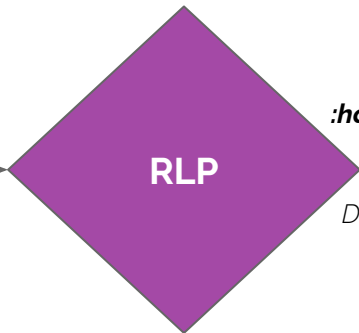


Mainz

Individual

:istTeilVon

ObjectProperty



RLP

:hatEinwohner

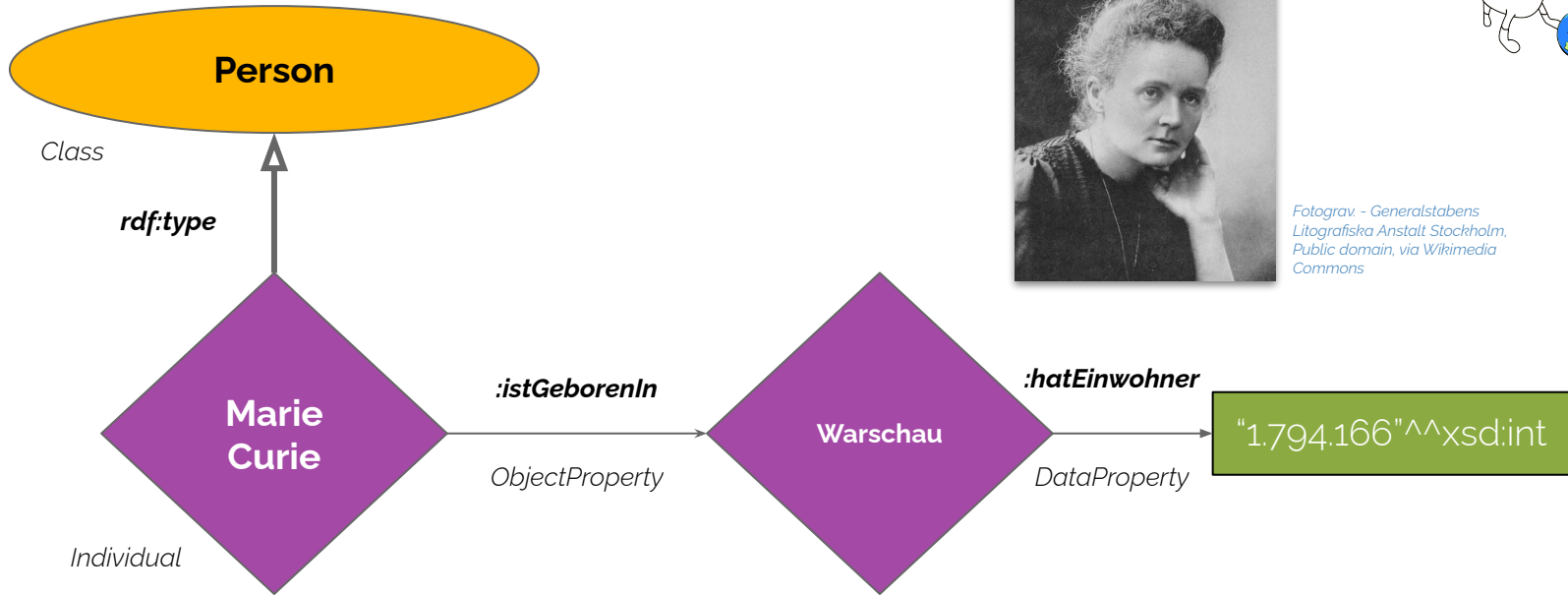
DataProperty

"4.098.391"^^xsd:int

Klassen, Instanzen und Properties



Fotograv. - Generalstabens
Litografiska Anstalt Stockholm,
Public domain, via Wikimedia
Commons



Klassen, Instanzen und Properties

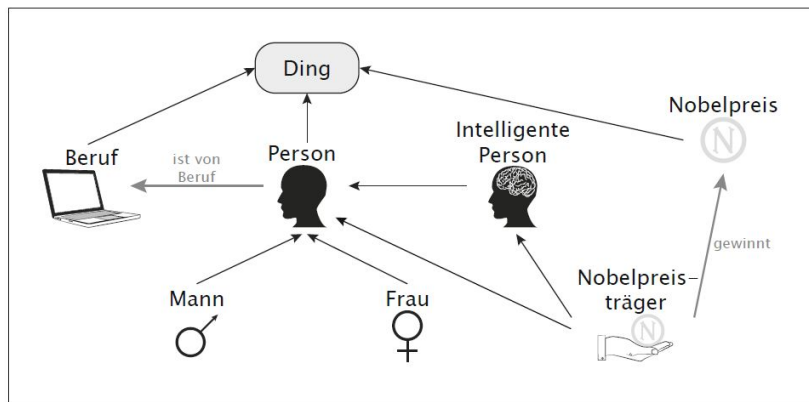


Abb. 39 Beispielmodell ›Welt des Nobelpreises‹. Die unbeschrifteten Relationen sind vom Typ ›ist Unterklasse von‹ und beschreiben die Klassenhierarchie.

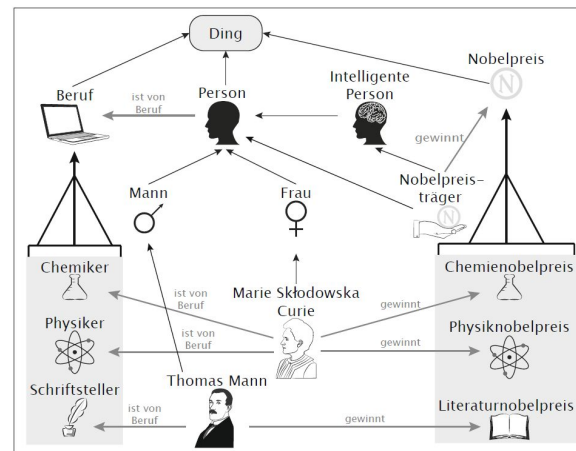


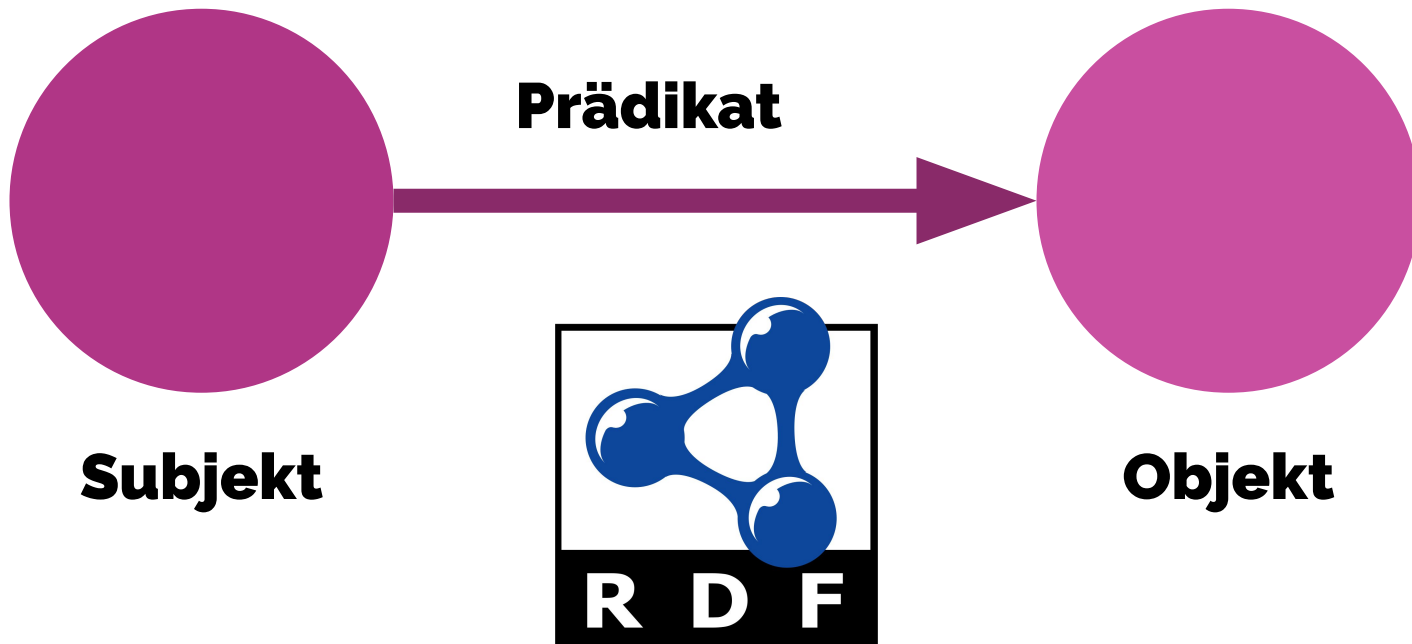
Abb. 40 Instanzen der Beispiel-Ontologie ›Welt des Nobelpreises‹

Jannidis, Fotis, Hubertus Kohle, and Malte Rehbein, eds. 2017. Digital Humanities. Stuttgart: J.B. Metzler. <https://doi.org/10.1007/978-3-476-05446-3>, Kapitel 11, S. 162 ff.

Eine Mini-Beispiel-Ontologie



Linked Data?





Linked Data

The Semantic Web isn't just about putting data on the web. It is about making links, so that a person or machine can explore the web of data. With linked data, when you have some of it, you can find other, related, data.

Like the web of hypertext, the web of data is constructed with documents on the web. However, unlike the web of hypertext, where links are relationships anchors in hypertext documents written in HTML, for data they links between arbitrary things described by RDF. The URIs identify any kind of object or concept. But for HTML or RDF, the same expectations apply to make the web grow:

1. Use URIs as names for things
2. Use HTTP URIs so that people can look up those names.
3. When someone looks up a URI, provide useful information, using the standards (RDF*, SPARQL)
4. Include links to other URIs. so that they can discover more things.



aus

<https://www.w3.org/DesignIssues/LinkedData.html>

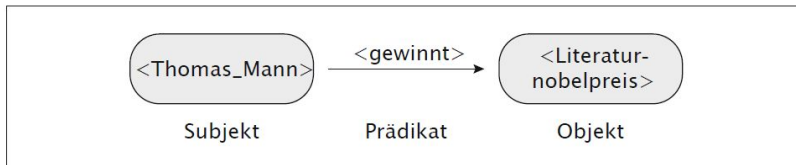


Abb. 41 RDF-Tripel (Beispiel)

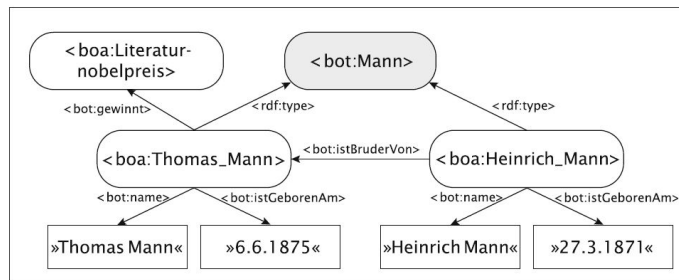


Abb. 42 RDF-Graph zur Beispiel-Ontologie ›Welt des Nobelpreises‹ (Auszug)

Bilder: Jannidis, Fotis, Hubertus Kohle, and Malte Rehbein, eds. 2017. Digital Humanities. Stuttgart: J.B. Metzler. <https://doi.org/10.1007/978-3-476-05446-3>, Kapitel 11, S. 162 ff.

```
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix bot: <http://beispielontologie.de/terminologie#> .
@prefix boa: <http://beispielontologie.de/instanzen#> .
```

```
bot:Ding                rdfs:type                rdfs:Class .
bot:Person              rdfs:subClassOf         bot:Ding .
bot:Mann                rdfs:subClassOf         bot:Person .
bot:Frau                rdfs:subClassOf         bot:Person .
bot:Nobelpreis          rdfs:subClassOf         bot:Ding .
bot:istBruderVon        rdf:type                 rdf:Property ;
                        rdfs:domain                bot:Mann ;
                        rdfs:range                bot:Person .
bot:Nobelpreisträger    rdfs:subClassOf         bot:Person .
bot:gewinnt             rdf:type                 rdf:Property ;
                        rdfs:domain                bot:Person ;
                        rdfs:range                bot:Nobelpreisträger .
```

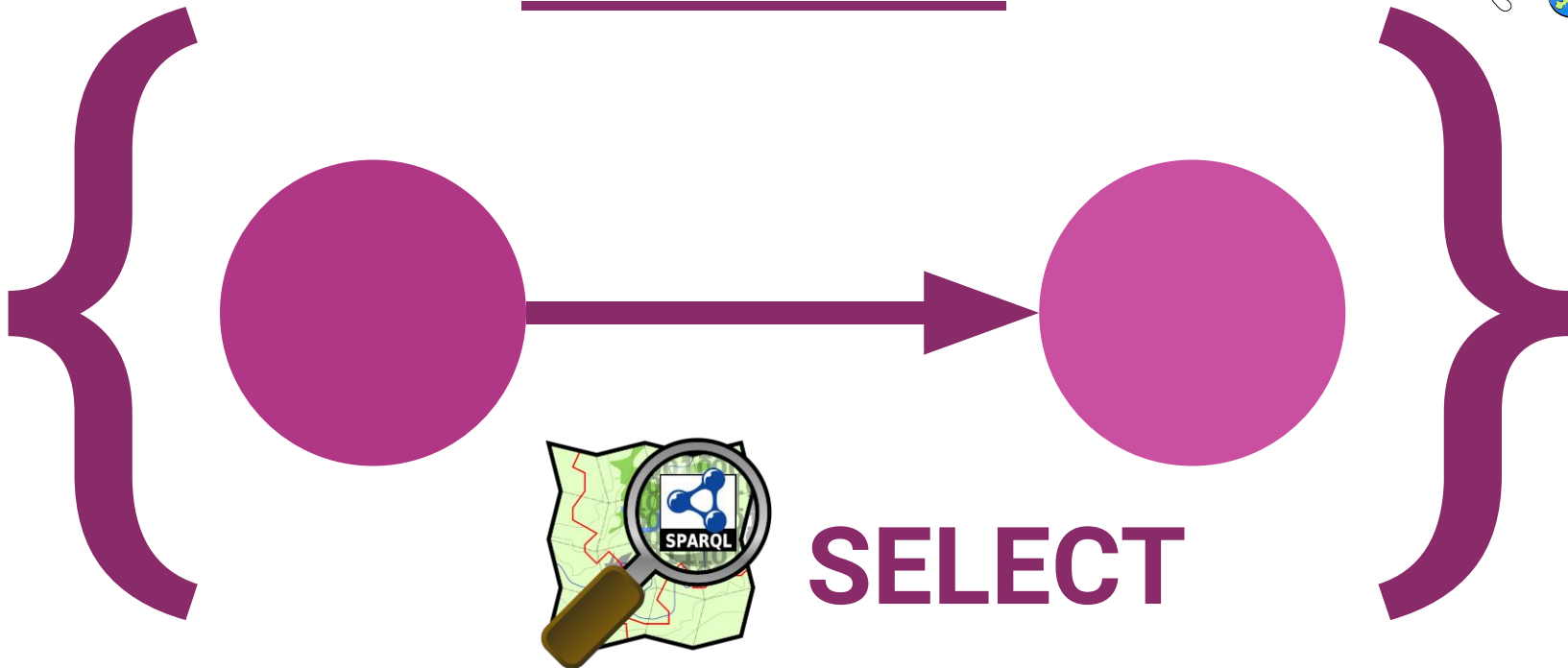
```
...
boa:Literaturnobelpreis  rdf:type                bot:Nobelpreis .
boa:Thomas_Mann          rdf:type                bot:Mann ;
                        bot:gewinnt                boa:Literaturnobelpreis .
boa:Heinrich_Mann        rdf:type                bot:Mann ;
                        bot:istBruderVon           boa:Thomas_Mann .
...

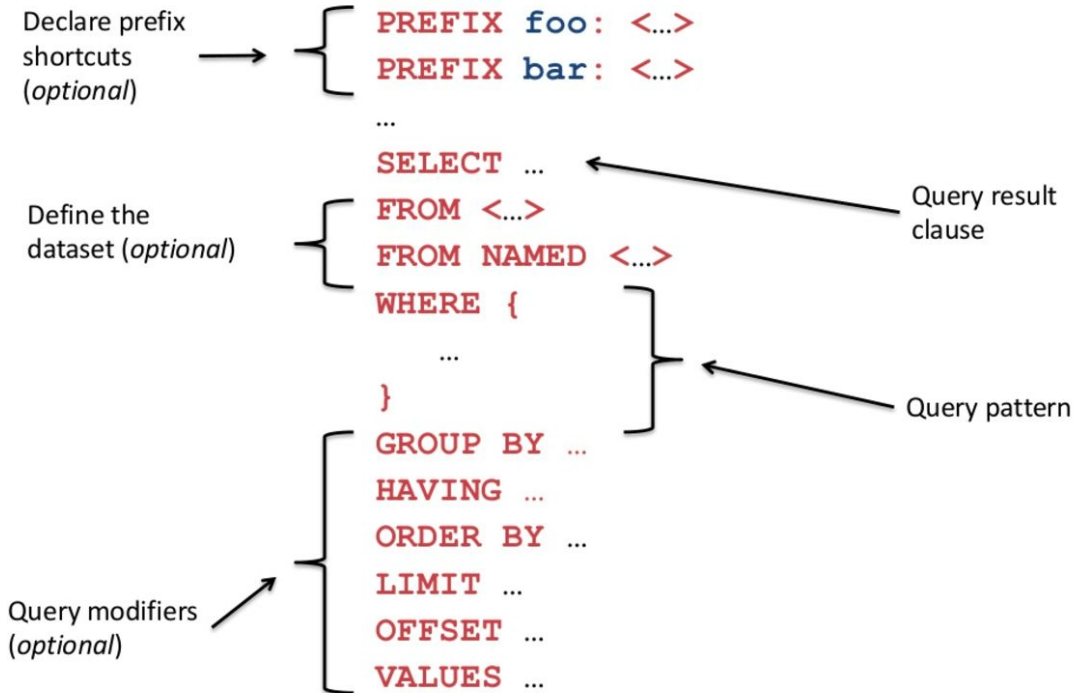
```

Ein LOD Beispiel mit Thomas Mann



SPARQL?!





aus <https://wordlift.io/blog/en/entity/sparql/>

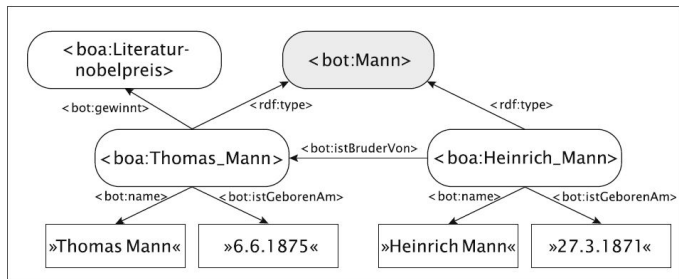


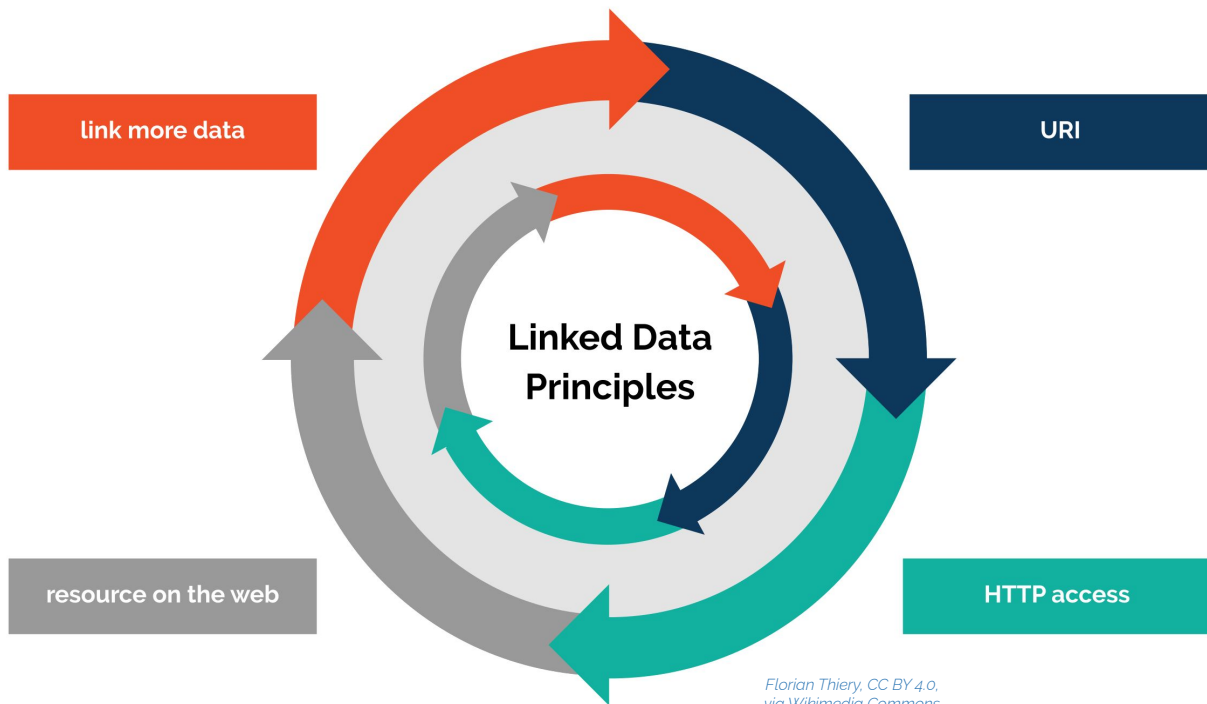
Abb. 42 RDF-Graph zur Beispiel-Ontologie »Welt des Nobelpreises« (Auszug)

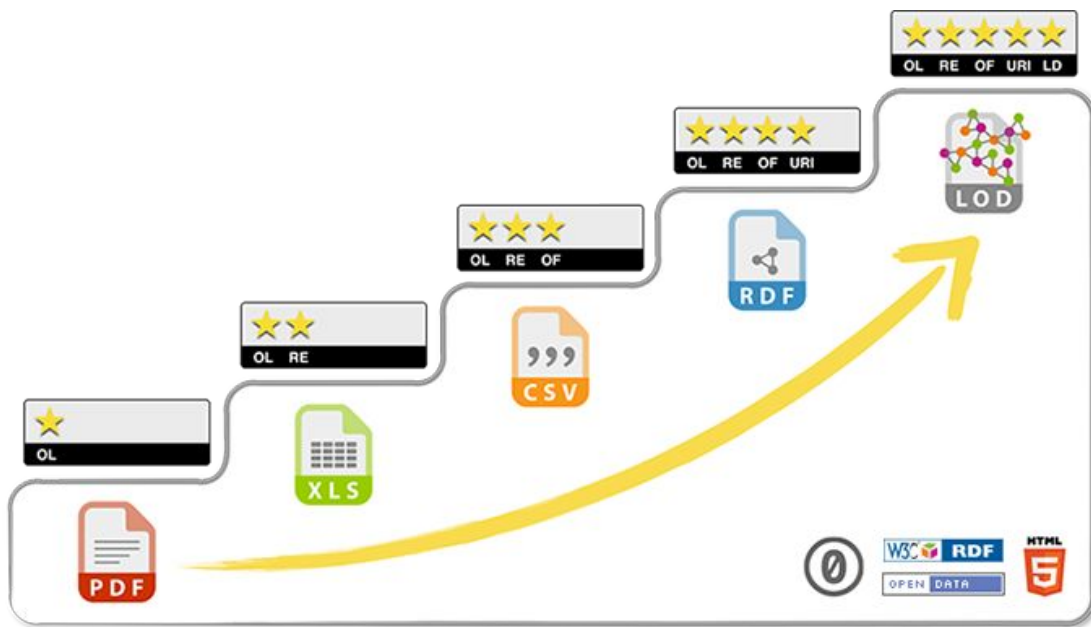
Bilder: Jannidis, Fotis, Hubertus Kohle, and Malte Rehbein, eds. 2017. Digital Humanities. Stuttgart: J.B. Metzler. <https://doi.org/10.1007/978-3-476-05446-3>. Kapitel 11, S. 162 ff.

```
SELECT ?personA ?personB
WHERE {
    ?personB      rdf:type          bot:Person ;
                  bot:gewinnt      bot:Nobelpreis .

    ?personA      bot:istBruderVon  ?personB .
}
```

Ein SPARQL Beispiel mit Thomas Mann





aus <https://5stardata.info/de/>

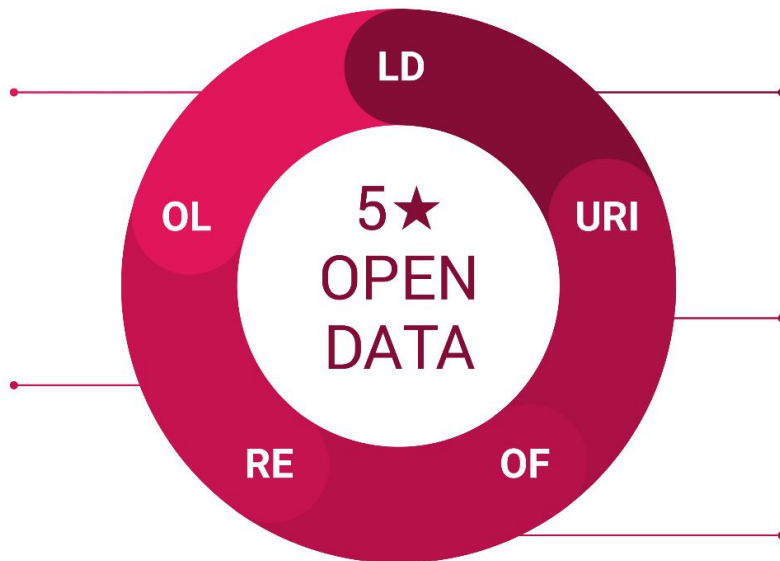


★ open licence [PDF]

available on the web (whatever format) but with an open licence, to be Open Data.

★★ machine readable [XLS]

available as machine-readable structured data.



★★★★★ Linked Open Data

★★★★ plus: link your data to other people's data to provide context.

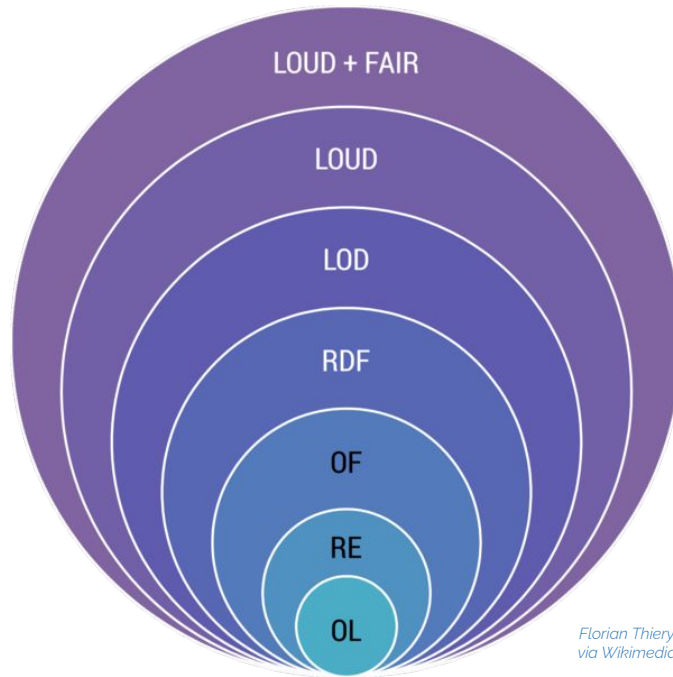
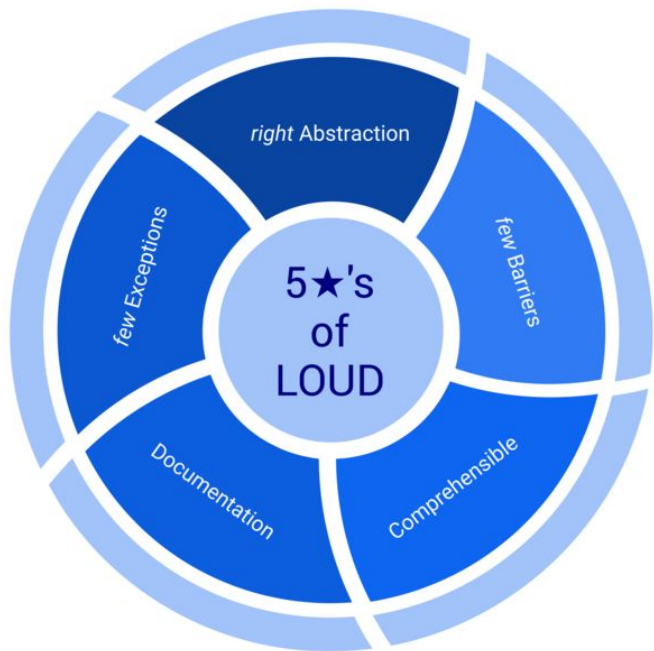
★★★★★ use URIs [RDF]

★★★ plus: use open standards from W3C (RDF and SPARQL) to identify things, so that people can point at your stuff.

★★★ open format [CSV]

★★ plus non-proprietary format.

Florian Thiery, CC BY 4.0,
via Wikimedia Commons

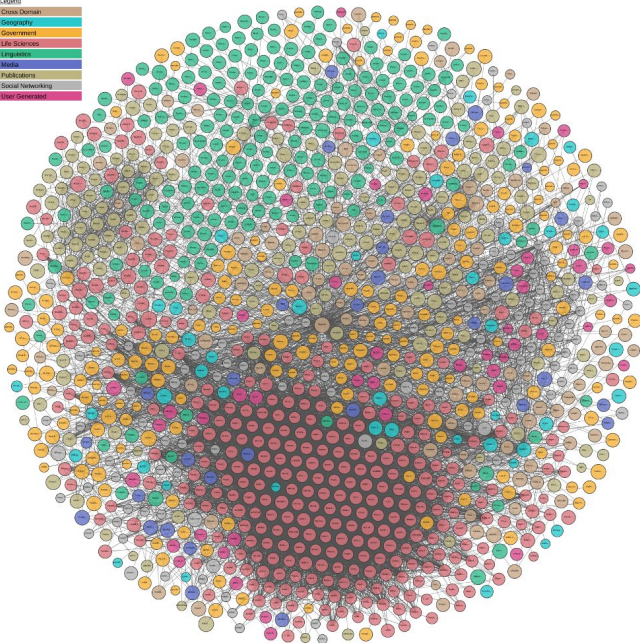


Florian Thiery, CC BY 4.0,
via Wikimedia Commons

Linked Open (Usable) (Geo-)Data *plus FAIR + CARE*

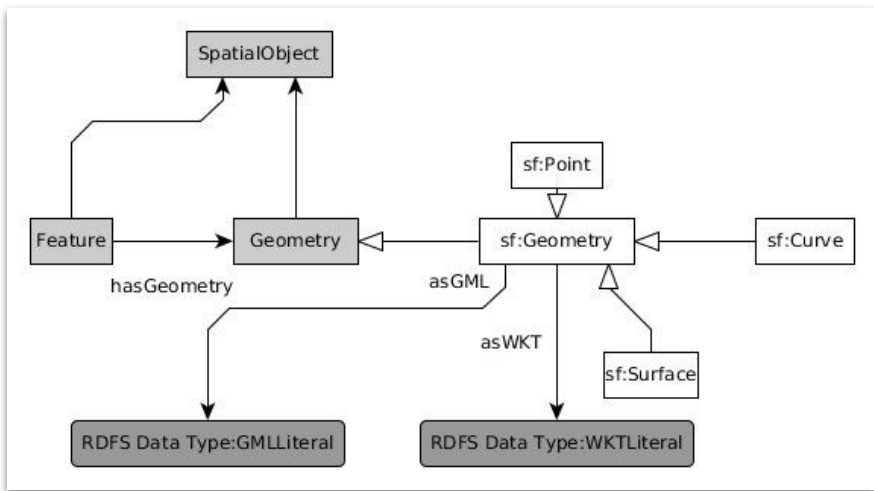


- Legend
- Social Domain
- Geography
- Government
- Life Sciences
- Language
- Media
- Publications
- Social Networking
- User Generated

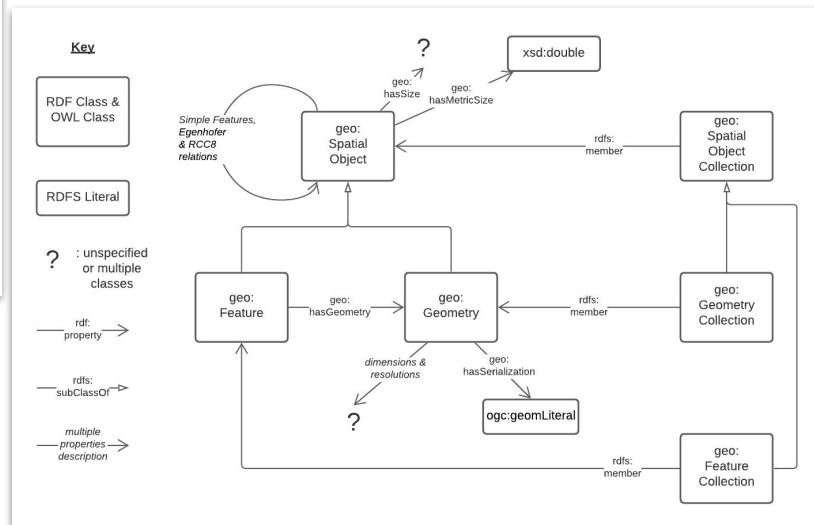


Florian Thiery, CC BY-SA 4.0, via Wikimedia Commons

Linked Open Data Cloud, Giant Global Graph, Knowledge Graph

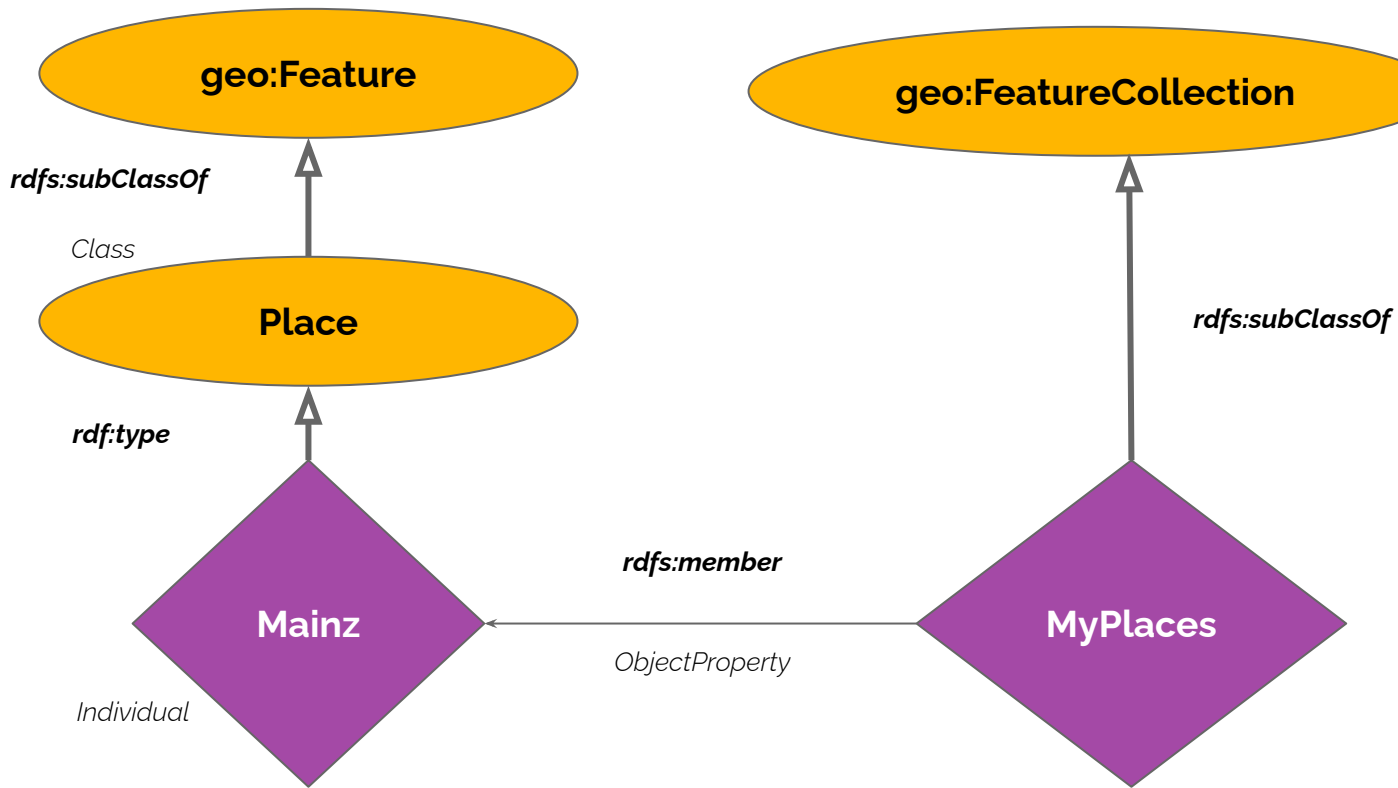


Med, Michal & Kremen, Petr. (2017). Context-based ontology for urban data integration. 457-461. DOI: 10.1145/3151759.3151838.



<https://opengeospatial.github.io/ogc-geosparql/geosparql11/spec.html>

OGC GeoSPARQL Ontologie



Klassen vs. Features vs. FeatureCollections



Es gibt jedoch auch noch mindestens 15 weitere Geo-Vokabulare:

- NeoGeo
- OpenStreetMap RDF/LinkedGeoData
- W3C Geo Vokabular
- Geonames
- Ordnance Survey - Spatial Relations Ontology
- CIDOC CRMgeo
- Schema.org Geometrien
- Wikidata Geovokabularien
- und so weiter.....

Eine ausführliche Liste der Äquivalenzen wird im GeoSPARQL 1.1 Standard veröffentlicht:

https://opengeospatial.github.io/ogc-geosparql/geosparql11/spec.html#_annex_e_alignments_informative



Region Connection Calculus 8

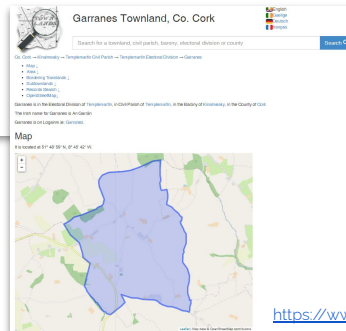
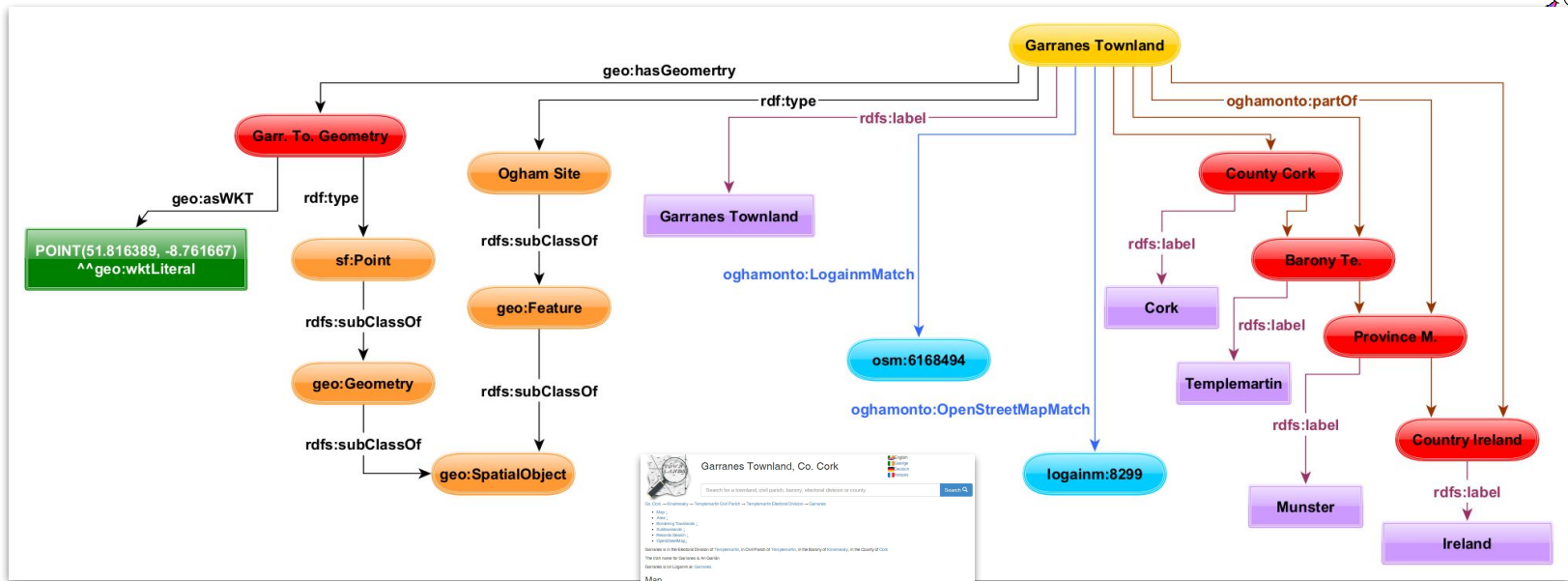
RCC and OGC relationships

| | RCC8 property | RCC8 relation | OGC property | OGC property URI |
|------------|---------------|---------------|--------------|-------------------|
| DC(a,b) | | DC | disjoint | geo:sf-disjoint |
| EC(a,b) | | EC | touches | geo:sf-touches |
| PO(a,b) | | PO | overlaps | geo:sf-overlaps |
| EQ(a,b) | | EQ | equals | geo:sf-equals |
| TPP(a,b) | | TPP | within | geo:sf-within |
| TPPi(b,a) | | TPPi | contains | geo:sf-contains |
| nTPP(a,b) | | nTPP | within | geo:sf-within |
| nTPPi(b,a) | | nTPPi | contains | geo:sf-contains |
| * | | * | intersects | geo:sf-intersects |

* logically represented as $\neg DC$
 (the formal way of writing not(DC))

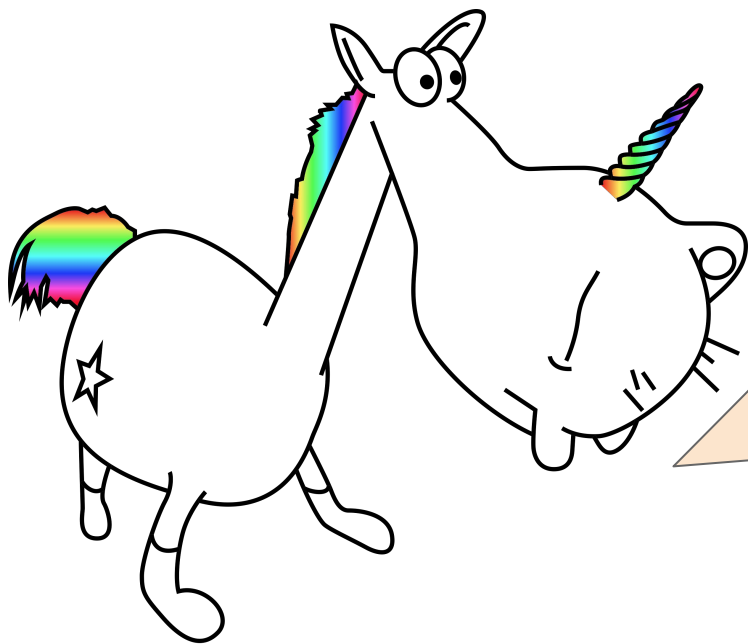
- DC: Disconnected
- EC: Externally Connected
- PO: Partially Overlapping
- EQ: Equal
- TPP: Tangential Proper Part
- TPPi: Tangential Proper Part inverse
- nTPP: non-Tangential Proper Part
- nTPPi: non-Tangential Proper Part inverse

GeoSPARQL Query Language: Eine Erweiterung von SPARQL um Relationen zwischen Geometrien abzubilden



Florian Thieri und Timo Homburg, CC BY 4.0, via Wikimedia Commons

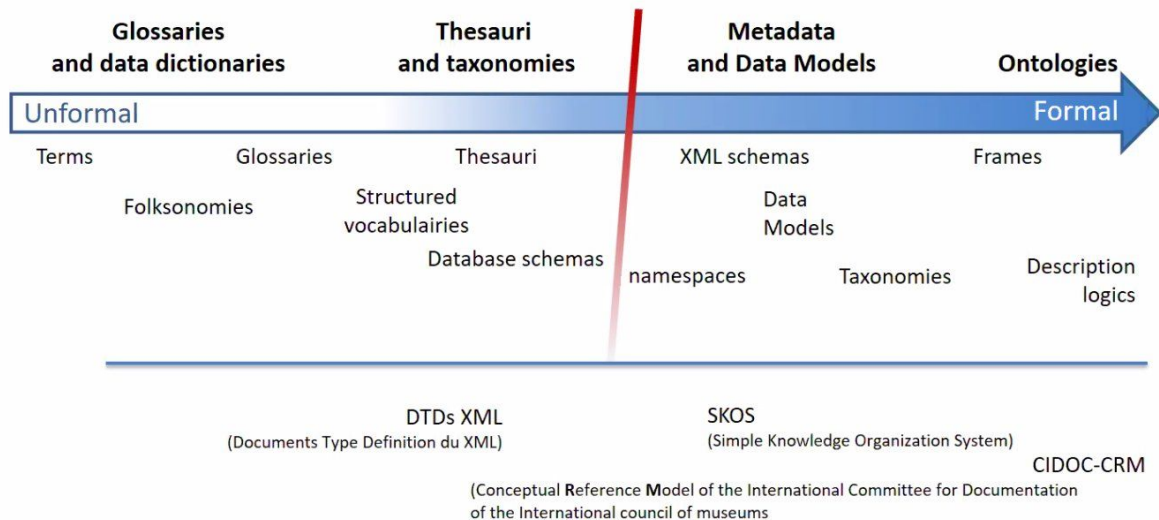
GeoSPARQL Beispiel zur Modellierung des irischen Townlands Garranes



In der Welt der digitalen Archäologie und den Digital Humanities gibt es meistens den Wunsch nach einer **Verschlagwortung** um eindeutige Suchen nach Keywords zu ermöglichen und zu **Standardisieren**.

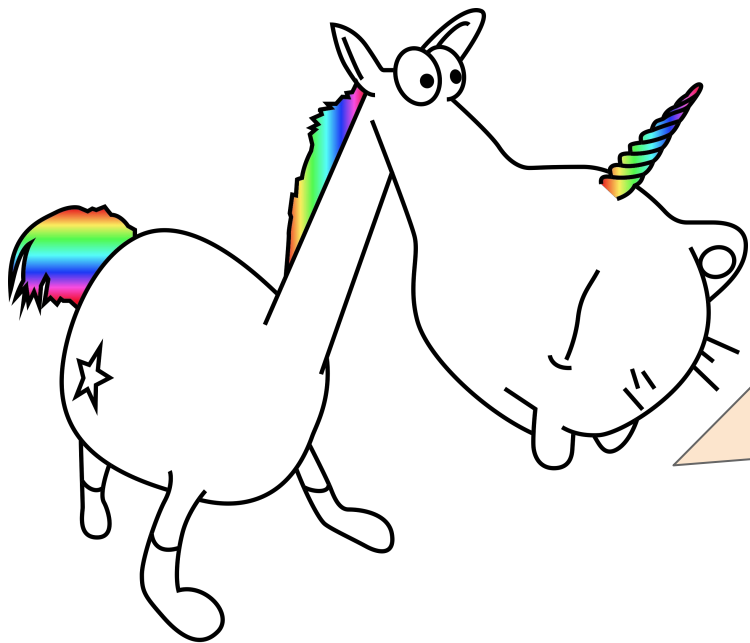


From Term to Ontology



<https://twitter.com/pettulda/status/1323922097232662531>

aus



In verschiedenen
Projekten werden
LOD-Thesauri,
Gazetteers,
Space-Time-Gazetteers
und Fachdaten erstellt.

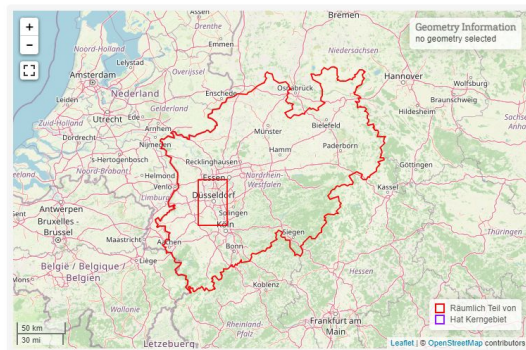
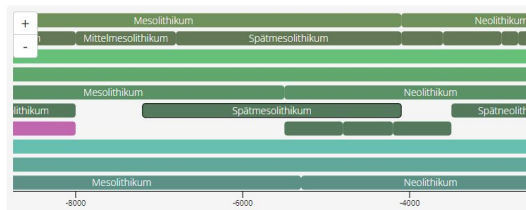


ChronOntology | <http://chronontology.dainst.org/period/YnN3VzXTKGkX>



Spätmesolithikum kein Typ (Westfalen)

<http://chronontology.dainst.org/period/YnN3VzXTKGkX>



Informationen [Download JSON](#)

Informationen zur Epoche

- Namen** Spätmesolithikum (de)
SML (de)
- Epochentyp** kein Typ
- digitale Provenienz** Verband der Landesarchaologen
- Notiz** Ebene 3
- Zeitliche Ausdehnung** Beginn: 7200 BCE (ca.)
Ende: 4100 BCE (ca.)
Text im Original: Beginn: -7200, Ende: -4100
- Hat Kerngebiet** Westfalen
- Räumlich Teil von** Nordrhein-Westfalen (Bundesland)

Beziehungen

- Ist Teil von** Mesolithikum
- Folgt auf** Frühmesolithikum

ChronOntology | <http://chronontology.dainst.org/period/YnN3VzXTKGkX>



PLEIADES

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You are here: Home → Ancient Places → Mogontiacum

Mogontiacum

a Pleiades place resource

Creators: C. Hasegrov, J. Kunow
Contributors: DAFMC, R. Talbert, Brady Kiesling, Sean Gillies, Johan Anders, Jeffrey Becker, Tom Elliott
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Last modified Oct 19, 2021 10:46 PM — History

tags: [date-ancient=1](#), [date-major=1](#), [date-feature=major settlement](#)

The original Roman settlement at Mogontiacum (modern Mainz) was established by Drusus ca. 13/12 BC. The settlement became an important military center throughout Roman times and was the base of operations for numerous Roman legions.

Canonical URI for this page:
<https://pleiades.stoa.org/places/109169>

Representative Point (Latitude, Longitude):
49.998912, 8.273869

Locations:

- Site of the civil town (30 BC - AD 1453)

Names:

- Geographic Names:**
 - Mainz (modern)
 - Mogontiacum (30 BC - AD 640)

Mogontiacum makes connections with:

- Mogontiacum — capital of — Germania Superior (30 BC - AD 300)

Mogontiacum receives connections from:

- Sanctuary of Isis and Magna Mater — located at — Mogontiacum (30 BC - AD 300)
- Unnamed Roman bridge at Mainz — connection — Mogontiacum (unspecified date range)
- Roman city gate, Mainz — located at — Mogontiacum (unspecified date range)
- Roman theater at Mogontiacum — located at — Mogontiacum (unspecified date range)
- Vangiones — connection — Mogontiacum (unspecified date range)
- Drususstein (Drususstone) at Mogontiacum — located at — Mogontiacum (unspecified date range)
- Römersteine im Zahlbachtal — located at — Mogontiacum (unspecified date range)

Search

Search Site

Advanced Search...

Photos

This place has no portrait photo. One from the list of related photos could be suggested for the Pleiades Places group on Flickr.

235 other related photos...

Use this tag in Flickr to mark depictions of this place's site(s):

[pleiades:depicts=109169](#)

or this one to mark objects found here:

[pleiades:findspot=109169](#)

Related Content from Pelagios

Mainz

Epigraphic Database Heidelberg (282);
University of Graz (33);
Nomisma.org Partner Objects (14); Online Coins of the Roman Empire (10);
American Numismatic Society (11); The Sphero: Knowledge System Evolution and the Shared Scientific Identity of Europe (1)

Pelagios Datasets

Show place in AMMO's Antiquity, A4-carib, Google Earth, or Pelagios Periplos.
Show area in GeoNames, Google Maps, or OpenStreetMap.

Pleiades | <https://pleiades.stoa.org/places/109169>



Laodicea ad Mare (Mint, Concept)

Canonical URI: http://nomisma.org/id/laodiceia_ad_mare

Labels

Preferred Label Laodicea ad Mare (en), Λαττακίη (fr), Λατᾶκια (es), Λαοδῖκεια (it), Λατᾶκια (de), Λαττακία (el) Additional labels ▶
 Alternate Label Laodiceia pros Mare (en)

Definitions

en The mint at the ancient site of Laodiceia in Syria.

Geospatial Data

URI: http://nomisma.org/id/laodiceia_ad_mare#this
 Latitude 35.516667
 Longitude 35.783333
 Part Of http://nomisma.org/d/seleucia_and_peria

Relations

- Broader Concept** http://nomisma.org/d/seleucia_and_peria
- Close Match** <http://collection.britishmuseum.org/id/place/x48252>
- Close Match** <http://id-nb.info/gnd/4270543-5>
- Close Match** <http://dbpedia.org/resource/Latakia>
- Close Match** <http://www.geonames.org/173576/>
- Close Match** <http://www.geonames.org/6445122/>
- Close Match** <http://viaf.org/viaf/135413368>
- Close Match** <http://vocab.getty.edu/tn/7002280>
- Close Match** <http://www.wikidata.org/entity/Q200030>
- Close Match** <https://pleiades.stoa.org/places/668290>
- Close Match** <https://www.freebase.com/m/01bamp>
- Concept Scheme** <http://nomisma.org/id/>

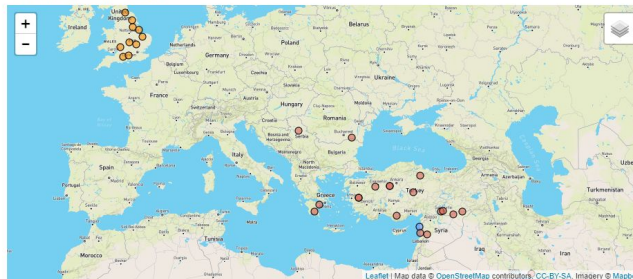
Miscellaneous

- Part Of** http://nomisma.org/d/greek_numismatics
- Part Of** http://nomisma.org/d/roman_numismatics
- Part Of** http://nomisma.org/d/roman_provincial_numismatics

Export

Linked Data [GitHub File](#) [RDF/XML](#) [RDF/JSON](#) [JSON-LD](#)

Geographic Data [KML](#) [GeoJSON](#)



Legend: ■ Mints ■ Hoards ■ Finds

| Type | Authority | Mint | Designation | Date | Example |
|-----------------------|-----------------------|------------------|-------------|-----------------|---------|
| Selecus I Soter | Selecus I Soter | Laodicea ad Mare | Tetradrachm | 300 BCE–280 BCE | |
| Selecus I Soter | Selecus I Soter | Laodicea ad Mare | Diachma | 300 BCE–280 BCE | |
| Antiochus I Soter | Antiochus I Soter | Laodicea ad Mare | Tetradrachm | 281 BCE–261 BCE | |
| Antiochus I Soter | Antiochus I Soter | Laodicea ad Mare | Diachma | 281 BCE–261 BCE | |
| Antiochus I Soter | Antiochus I Soter | Laodicea ad Mare | Tetradrachm | 279 BCE–261 BCE | |
| Antiochus II Theos | Antiochus II Theos | Laodicea ad Mare | Tetradrachm | 261 BCE–246 BCE | |
| Selecus II Callinicus | Selecus II Callinicus | Laodicea ad Mare | Tetradrachm | 236 BCE–211 BCE | |
| Phileas | Phileas | Laodicea ad Mare | Tetradrachm | 205 BCE–201 BCE | |

Nomisma | http://nomisma.org/id/laodiceia_ad_mare



Objects of this Typology | Quantitative Analysis

Bowl (Shape, Concept)

Canonical URI: <http://kerameikos.org/id/bowl>

Labels

Preferred Label Bowl (en), bol (fr), ciotola (it), Schüssel (de), Άστρον (el) Additional labels ▶

Definitions

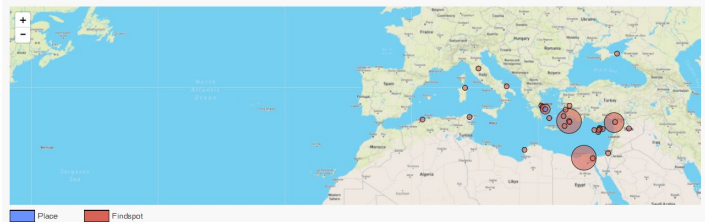
- en The term bowl is used to designate a plain, open shape without handles.
- de Begriff zur Beschreibung einer einfachen, offenen Form ohne Henkel.
- el Ο απός, ησπρωτόν ένα αστό, ανοκτό άστρον χωρίς άσπες.

Relations

- Exact Match <http://vocab.getty.edu/aa/000203996>
- Exact Match <http://www.wikidata.org/entity/Q133988>
- Exact Match <https://www.britishmuseum.org/collocation/term/5597>
- Reference <https://zenon.dainst.org/Record/000926820>

Data Provenance ▶

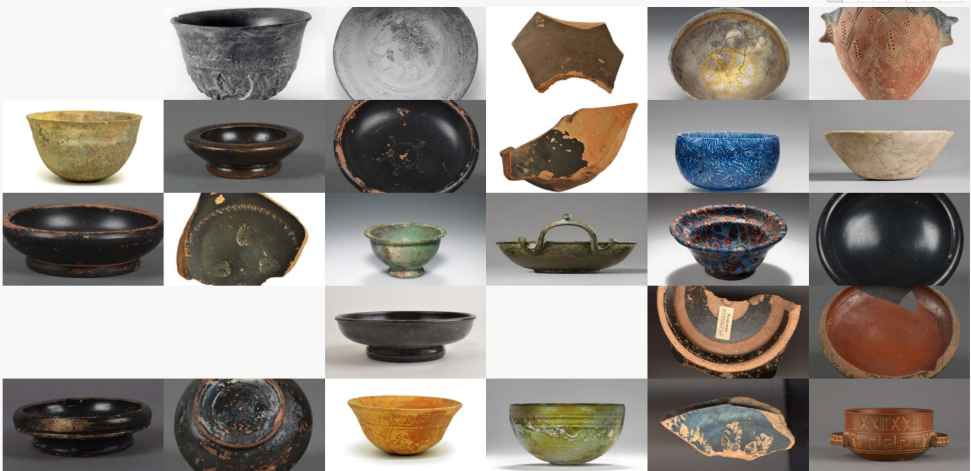
Data Export: RDF/XML TTL JSON-LD



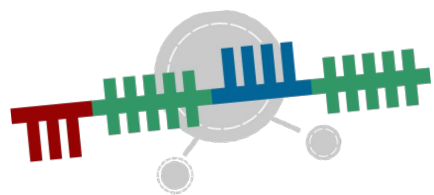
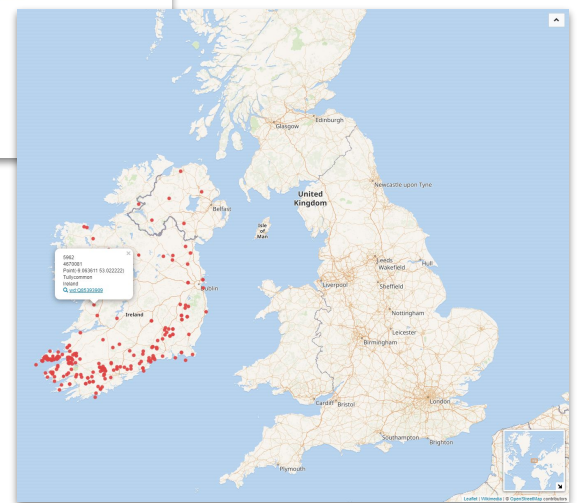
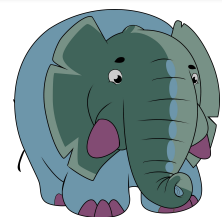
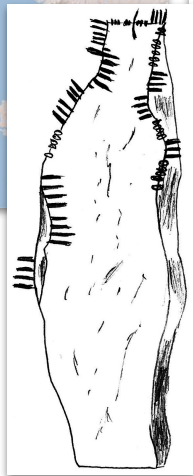
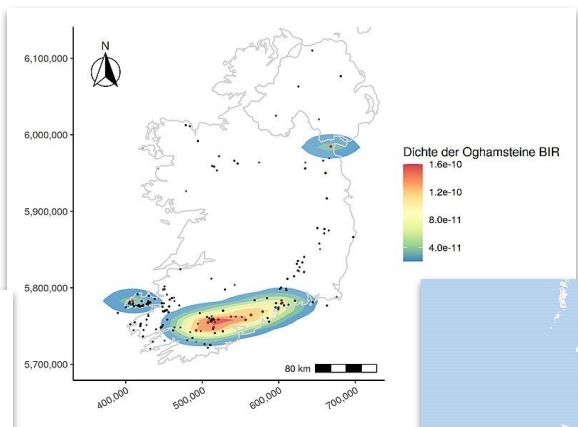
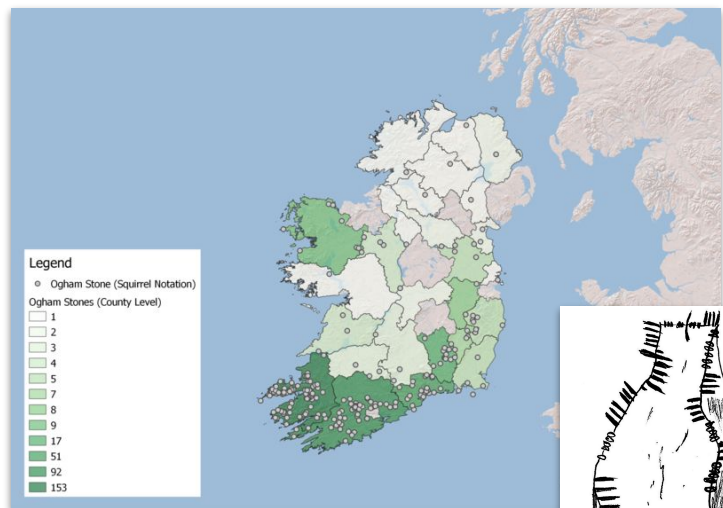
Objects of this Typology ▶

These objects are associated by artist signature or scholarly attribution by analyzing artistic similarities. Only those with images are shown below, but all objects related to the concept are queried for other visualizations and data downloads.

Records: 1 to 48 of 310



Kerameikos | <http://kerameikos.org/id/bowl>



Linked Ogham Data | <http://ogham.link>



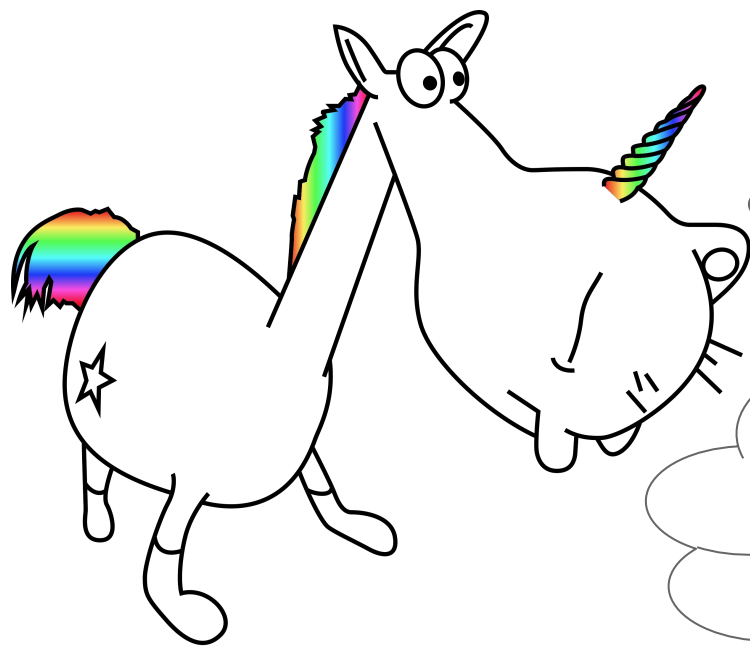
Vocabularies

We have used the [STELLAR](#) tools to convert the data to [SKOS](#) format, and each vocabulary has then undergone validation using the [PoolParty SKOS validator](#) service. There are direct links to the [Linked Data vocabularies](#) below, and the SKOS RDF files are also available for individual download. We have used the [SKOS Play](#) service to create additional downloadable alphabetical and hierarchical listings for each vocabulary.

Historic England

| SCHEME | EXAMPLES | DOWNLOADS |
|--|-------------------|--------------------|
| FISH Archaeological Sciences Thesaurus Terminology used for recording the techniques, recovery methods and materials associated with archaeological sciences. Maintained by Historic England on behalf of the FISH Terminology Working Group. | MINERALOGY | SKOS (RDF) |
| | PEAT HUMIFICATION | Alphabetical (PDF) |
| | DENDROCHRONOLOGY | Hierarchical (PDF) |
| FISH Building Materials Thesaurus Terminology used for recording the main construction materials of monuments, buildings and structures relating to the built and buried heritage of the British Isles. Maintained by Historic England on behalf of the FISH Terminology Working Group. | DOLOMITE | SKOS (RDF) |
| | FELT | Alphabetical (PDF) |
| | LEATHER | Hierarchical (PDF) |

<https://www.heritagedata.org/blog/vocabularies-provided/>





- ❖ **A free and open knowledge base and data hub**
→ **everybody can add and edit**
- ❖ central storage for structured data of **Wikimedia** projects

data in **Wikidata** is:

- ❖ **available** under a free license (CC 0)
- ❖ **multilingual**
- ❖ **accessible** to humans and machines (GUI & API & SPARQL)
- ❖ **exportable** using standard formats (JSON, RDF, XML)
- ❖ **interlinked** to other open data sets on the LOD Cloud



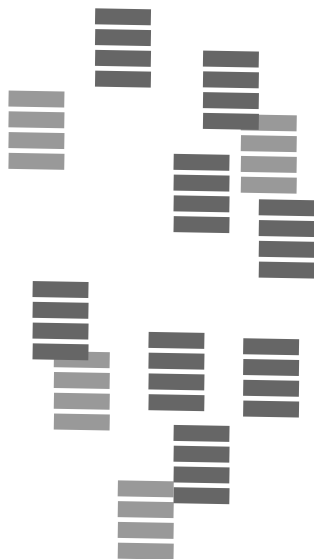
What is Wikidata?



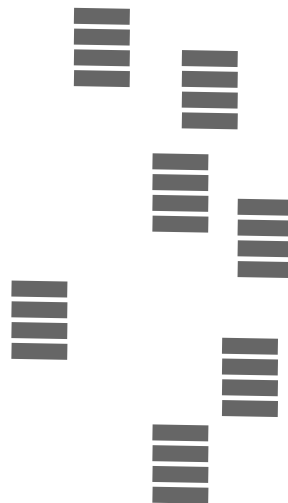
local (offline)



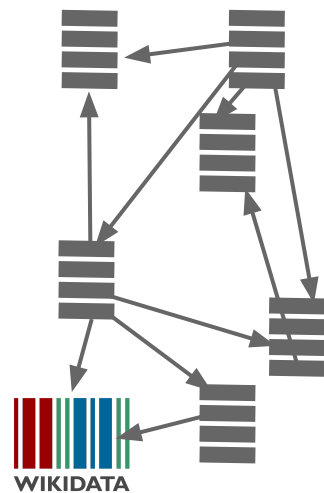
online

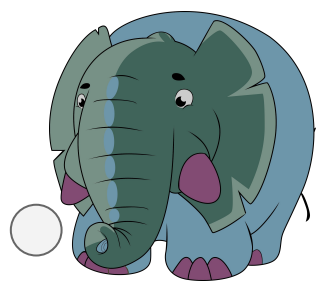
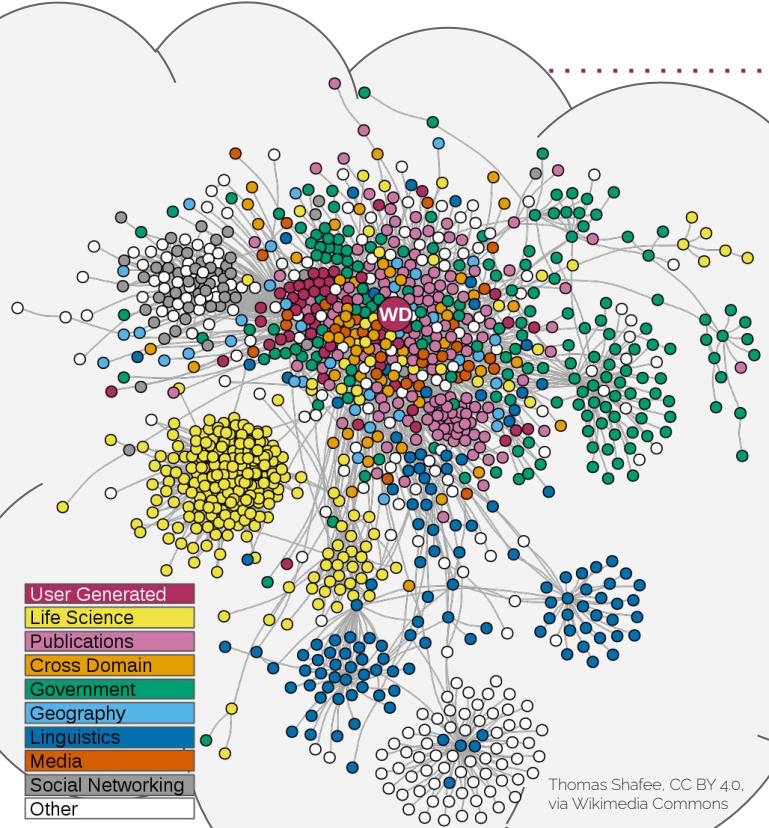


online & open



part of LOD





Wikidata in the Linked Open Data Cloud

- Items
 - Label
 - Description
 - Alias
 - Identifier

- Statements
 - Property
 - Value
 - Qualifier
 - Reference

- In RDF
 - wikidata.org/wiki/Q42.rdf

Wikidata's Data Model

The image shows a Wikidata profile for Douglas Adams (Q42) with several annotations:

- label**: Points to the name "Douglas Adams (Q42)".
- description**: Points to the text "English writer and humorist" and "Douglas Noël Adams | Douglas Noel Adams".
- aliases**: Points to the blue box containing "aliases".
- item identifier**: Points to the blue box containing "item identifier".
- property**: Points to the "educated at" property label.
- value**: Points to the value "St John's College".
- qualifiers**: Points to the table of qualifiers for the "St John's College" statement, including "end time", "academic major", "academic degree", and "start time".
- rank**: Points to the "rank" column in the statements table.
- statement group**: Points to the entire "Statements" section.
- opened references**: Points to the expanded reference for "Encyclopædia Britannica Online".
- collapsed reference**: Points to the collapsed reference for "Brentwood School".
- add reference**: Points to the "+ add reference" button.
- add statement**: Points to the "+ add (statement)" button.

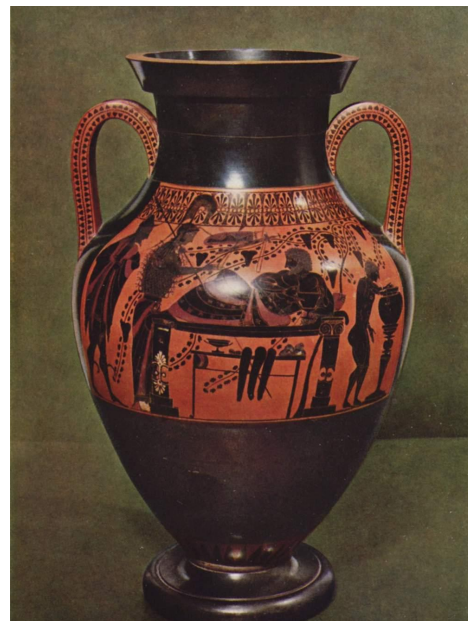
At the bottom right, the text "Charlie Kritschmar (WMDE) [CC0]" is visible.



- ✧ Amphora ([Q178401](#))
- ✧ Shapes and types
 - ✧ **Panathenaic** ([Q1277842](#))
 - ✧ Belly ([Q11077005](#))
 - ✧ ...
- ✧ Individual Objects
 - ✧ [Q1572162](#)
 - ✧ ...

Amphoras in Wikidata

[Antikensammlung Berlin \(2301\) CC 0](#)



panathenaic amphora (Q1277842)

special shape of attic amphoras

<https://www.wikidata.org/wiki/Q170478>



Statements

instance of Q170478 ancient Greek vase-form edit
0 references
[+ add reference](#)
[+ add value](#)

subclass of Q170478 neck amphora edit
0 references
[+ add reference](#)
[+ add value](#)

image Q170478 edit



Panathenaic amphora BM B130.jpg
1,900 × 2,880; 2.95 MB

0 references
[+ add reference](#)
[+ add value](#)

Identifiers

AAT ID


300200366

Research

Research Home • Tools • Art & Architecture Thesaurus • Full Record Display

Art & Architecture Thesaurus® Online Full Record Display

[\[New Search\]](#) [\[Previous Page\]](#) [\[Help\]](#)

Click the  icon to view the hierarchy.

[Semantic View \(JSON, RDF, N3/Turtle, N-Triples\)](#)

ID: 300200366 Record Type: concept

[Panathenaic amphora](#) (link amphorae, amphorae (storage vessels), ... Furnishings and Equipment (hierarchy name))

Note: Refers to amphorae that were filled with olive oil from the sacred trees of Athena, given as prizes in the Panathenaic Games. They were neck amphorae with a large, broad body sharply tapering downward and a relatively thin neck. The standard decoration included images of Athena on one side and the contest at which the prize was won on the other, usually in the Black-figure technique.

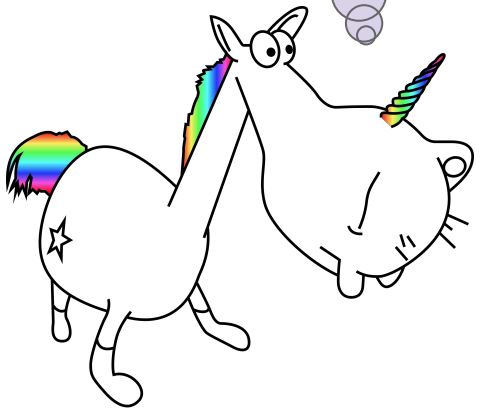
Terms:

- Panathenaic amphorae (preferred, C,U,English-P,D,U,PN)
- Panathenaic amphora (C,U,English-AD,U,SN)
- Panathenaic amphoral (C,U,English-UF,U,N)
- amphorae (Panathenaic amphorae) (C,U,English,UF,U,N)
- amphorae, Panathenaic (C,U,English,UF,U,N)
- amphorae, type c neck (C,U,English,UF,U,N)
- amphorae, type IIc (C,U,English,UF,U,N)
- amphorae type IIc (C,U,English,UF,U,N)
- amphoral type IIc (C,U,English,UF,U,N)
- neck amphorae type c (C,U,English,UF,U,N)
- neck amphoral type c (C,U,English,UF,U,N)
- panathenaic amphorae (C,U,English,UF,U,N)
- Panathenaic amphoras (C,U,English,UF,U,N)
- type c neck amphorae (C,U,English,UF,U,N)
- type IIc amphorae (C,U,English,UF,U,N)
- Panathenische amforen (C,U,Dutch-P,D,U,U)
- Panathenische amfoor (C,U,Dutch-AD,U,U)
- ánforas panatenaica (C,U,Spanish-P,D,U,PN)
- ánfora panatenaica (C,U,Spanish-AD,U,SN)

<http://vocab.getty.edu/aat/300200366>



Which amphoras with images are in Wikidata?



A screenshot of the Wikidata Query Service interface. At the top, there is a header with the Wikidata logo, the text "Wikidata Query Service", and buttons for "Examples", "Help", and "More tools". Below the header is a text input field containing the text "1 (Input a SPARQL query or choose a query example)". To the left of the input field is a vertical toolbar with various icons. In the center of the interface is a 3D rendering of a brown amphora with two handles. To the right of the amphora is a large red question mark. Further to the right is a blue underlined link that reads "w.wiki/8Xh". At the bottom left of the interface is a blue play button icon.

query.wikidata.org



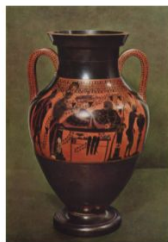
[commons:Dipylon amphora close front...](#)
Q: Dipylon-Amphora



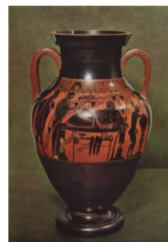
[commons:Great-Amphora-of-Nessos...](#)
Q: Bauchamphora des Nessos-Malers



[commons:Hemionax amphor...](#)
Q: Amphora des Hemionax in W...



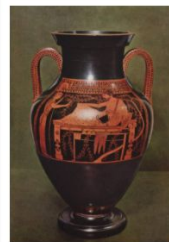
[commons:Athena Herakles Staatlic...](#)
Q: Bauchamphora des Andokides-Mal...



[commons:Athena Herakles Staatlic...](#)
Q: Bauchamphora des Andokides-Mal...



[commons:Athena Herakles Staatlic...](#)
Q: Bauchamphora des Andokides-Ma...



[commons:Athena Herakles Staatlic...](#)
Q: Bauchamphora des Andokides-Ma...



[commons:Panathenaic amphora ...](#)
Q: Burgon-Vase



[commons:Plate Euphorbos BM GR1860.4-4...](#)
Q: Euphorbos-Teller



[commons:Altes Museum - Ant...](#)
Q: Halsamphora des Exekias (Se...



[commons:Altes Museum - Ant...](#)
Q: Halsamphora des Exekias (B...



[commons:Melian Horse a...](#)
Q: Pferde-Amphore



[commons:Nama 912 Mellan RI...](#)
Q: Reiter-Amphore



[commons:Exekias Dionysos Staatlich...](#)
Q: Dionysos-Schale



[commons:Pinax prothesis Louvre MNB906.jpg](#)
Q: Pinax mit Prothesidarstellung des Sappho-Malers



[commons:Panathenaic amphora Louvre MN7...](#)
Q: G9491803



[commons:Panathenaic a...](#)
Q: Louvre MN 705



[commons:Hoplitodoros Louvre MN704.jpg](#)
Q: Louvre MN704



[commons:Panathenaic amphora K...](#)
Q: G9498747



[commons:Louvre-Len...](#)
Q: Q12862780



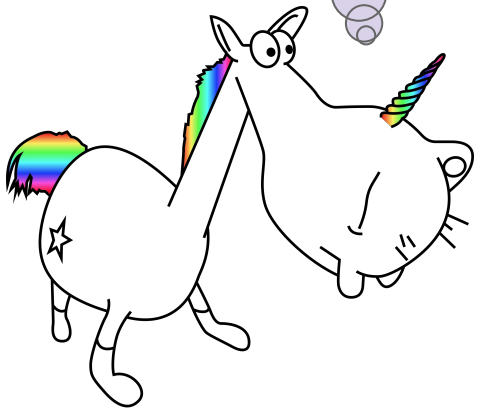
[commons:Louvre-Len...](#)
Q: Q12862780



[commons:Apobates race \(1\) - Getty Villa Collection.jpg](#)
Q: Panathenaic amphora, Getty Villa Collection, Nr.: 79.AE.147




Which amphoras with images are in Wikidata having Getty AAT ID 300200366?



Wikidata Query Service

Examples Help More tools

1 (Input a SPARQL query or choose a query example)



Identifiers

| | |
|--------|--------------|
| AAT ID | 300200366 |
| | 0 references |

[w.wiki/4Tu8](https://www.wikidata.org/wiki/4Tu8)

query.wikidata.org

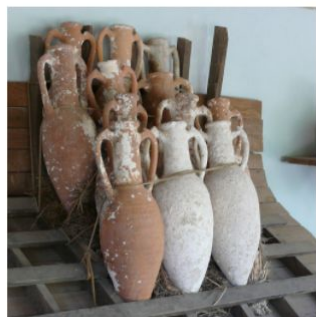


Wikidata Query Service Beispiele Abfragegenerator Hilfe Weitere Werkzeuge

```
1 #Greek Amphoras identified with Getty AAT
2
3 #defaultView:ImageGrid
4 SELECT ?item ?itemLabel ?pic WHERE {
5   ?item wdt:P1014 ?o.
6   VALUES ?item {
7     wd:Q41971267
8     wd:Q19899872
9     wd:Q178401
10    wd:Q11076343
11    wd:Q11077005
12    wd:Q1277842
13  }
14  ?item wdt:P18 ?pic
15  SERVICE wikibase:label { bd:serviceParam wikibase:language "[AUTO_LANGUAGE],en". }
16 }
```

w.wiki/4Tu8

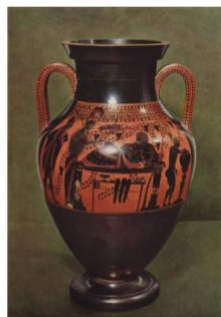
Image grid -



commons:Amphorae stacking.jpg
 Amphore



commons:Panathenaic amphora BM ...
 Panathenäische Preisamphore



commons:Athena Herakles Staatliche A...
 Amphore vom Typ A



commons:Euxine amphora con ac...
 Amphore vom Typ A



AtlantGIS



Faked GIS-Datasets, simulating an island in the Atlantic for educational purposes in using GIS in archaeology.

All AtlantGIS data are published under a CC-BY-SA 4.0 license.

The idea is to create artificial data creatively referring to the story of Atlantis as told by Platon. We believe that simple datasets with a narrative are most qualified to impart knowledge and skills to students.

Whoever likes the idea is invited to contribute data using the repository on GitHub. We ask every contributor to link to documents that put the dataset in context of a special GIS-related task and make the tutorials/workshop documents available under an open licence.

DISCLAIMER: These data are not in any way based on any "identification" of Platon's concept of Atlantis in geographical sense. They should and cannot be used to argue in favour or against any scientific or unscientific hypotheses.



Datenherkunft

Reale Geodaten stammen von der Insel Sokotra im Indischen Ozean und wurden in den Atlantik "verschoben".

Viele Layer, insbesondere thematische Vektordaten, beziehen sich inhaltlich auf die Schilderungen von Plato im [Kritias-Dialog](#)

sites

10 "Hauptstädte" der Söhne von Kleito und Poseidon, gegründet in Periode IIb.



archaeological_sites

123 zufällig auf der Insel verteilte archäologische Fundplätze mit Zuweisung einer Zeitstufe (vgl. \tables\atlantgis_periods.csv)

Hinweis: ID_AR_SITE: 120 ist doppelt vergeben!

| | | | | |
|-----|-----|----|------------------|-------------------|
| 120 | 120 | 5 | 35,6260219999... | -15,1583950000... |
| 121 | 120 | 25 | 35,5329380000... | -15,0150330000... |

Geometrietyp: MultiPoint



archaeological_sites

- ✓ Period: 5
- ✓ Period: 10
- ✓ Period: 13
- ✓ Period: 17
- ✓ Period: 25

Datenstruktur

Das zip-Archiv auf GitHub

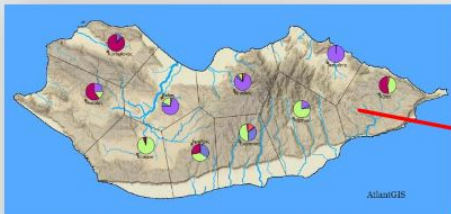
- ✓ AtlantiGIS-master
 - ✓ gettingstarted
 - geophys
 - sqlite
 - ✓ vector
 - dxg
 - shp
 - ✓ linkeddata
 - ✓ ontology
 - index_files
 - pyscripts
 - rdf
 - ✓ project_datasets
 - barrow
 - ✓ raster
 - dem
 - geophys
 - screenshots
 - tables
 - templates
 - ✓ vector
 - db
 - geojson
 - shp

Der AtlantGIS Datensatz

<https://hackmd.io/@KaCeBe/atlantgis-dataset>



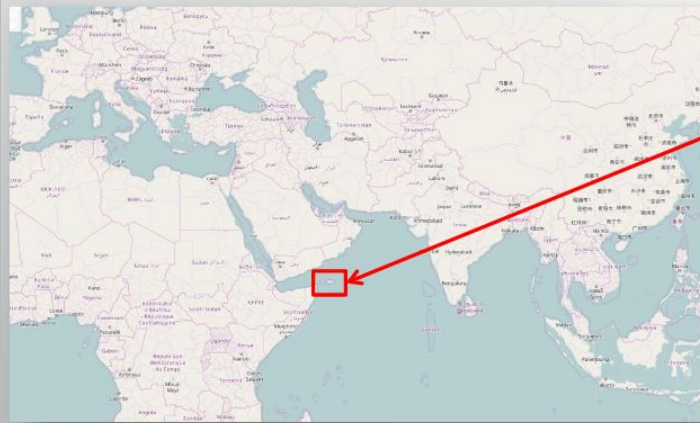
AtlantGIS



Sokotra



<http://osm.org/go/ySIMFR>



Thiery, Florian, & Taani, Rania. (2017, June 23). Avalanches on Atlantis - Real or Fake? The "true" story!. XXX. International Geodetic Student Meeting, Zagreb, Croatia. Zenodo. <https://doi.org/10.5281/zenodo.817495>



LOD und AtlantGIS



- owl:Thing
 - AtlantGIS Classes
 - Findings Entity
 - Find
 - Vessel Type
 - Human Entity
 - archon
 - Archont
 - SpatialObject
 - Feature
 - Coastline
 - coastline
 - landcover
 - Landtype
 - location
 - Resource
 - orichalcum
 - pewter
 - silver
 - resource
 - Site
 - Archaeological Site
 - archaeological site
 - Stream
 - Voronoi
 - voronoi diagram
 - watercourse
 - Geometry
 - MultiLineString
 - MultiPoint
 - MultiPolygon
 - Point
 - Temporal Entity
 - era
 - Period
 - Style
 - Wikidata Classes
 - Archaeological Site
 - archaeological site
 - archon
 - Archont
 - Coastline
 - coastline
 - era
 - landcover
 - Landtype
 - location
 - Period
 - Resource
 - orichalcum
 - pewter
 - silver
 - resource
 - Site
 - Stream
 - Voronoi
 - voronoi diagram

- owl:topObjectProperty
 - belongs to archont
 - hasGeometry
 - period after
 - period before
 - site
 - style
 - time period
 - vessel shape

- owl:topDataProperty
 - archont label
 - asGeoJSON
 - asWKT
 - bodenD
 - class
 - code
 - description
 - feature
 - function
 - groupid
 - gruben
 - identifier
 - keramik 1
 - keramik 2
 - keramik 3
 - maxD
 - maximum diameter height
 - minD
 - minD_H
 - muendungsD
 - muendungsH
 - name
 - object
 - quantity
 - sherd
 - silex
 - size
 - stream category
 - stream discharge
 - stream value
 - temperSize
 - wall
 - weight

Individuals:

- Ampheres
- Atlas
- Autochthon
- Azaes
- CoastLine_Style
- Diaprepes
- Elasippos
- Euaimon
- Eumelos_Gadeiros
- Mestor
- Mneseus

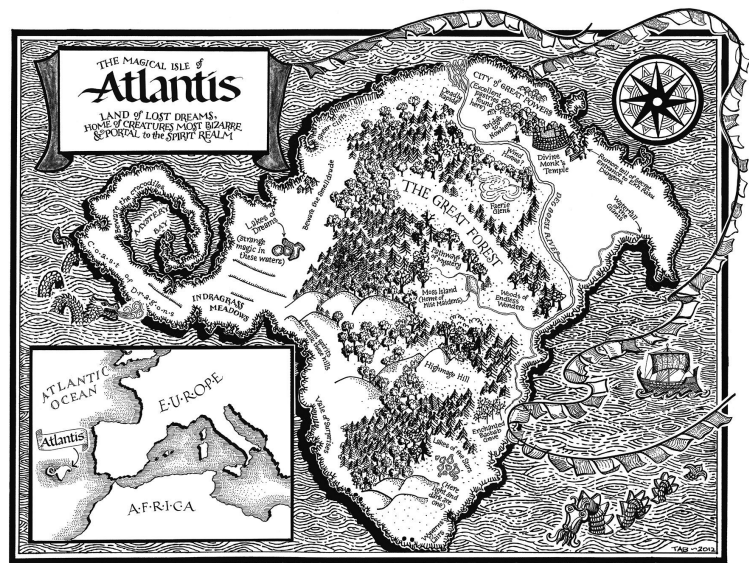
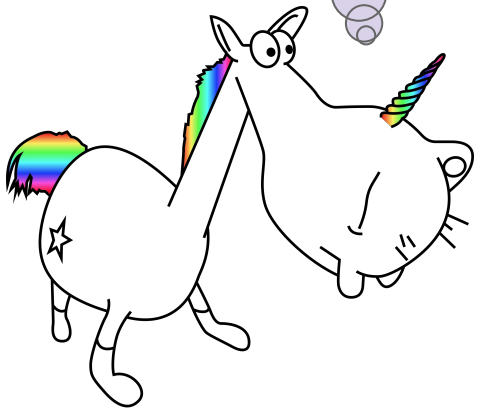


Research Squirrel Engineers

Einblick in die AtlantGIS Ontologie in Protegé



How can I sparql
AtlantGIS?



ATLANTIS LOST: Book 3 from The Atlantis Saga



AtlantGIS Vessel-Types

| vesselShape | vesselName | vesselFunction | vesselDescription |
|-------------|------------|-----------------|--|
| 1 | Amphora | Vorratsgefäß | bauchiges enghalsiges Gefäß mit zwei Henkeln |
| 2 | Lekanis | Vorratsgefäß | flache Schüssel mit horizontalen Henkeln |
| 3 | Stamnos | Vorratsgefäß | dickbauchiges Vorratsgefäß mit kurzem Hals und seitlichen, horizontalen Henkeln |
| 4 | Psykter | Symposionsgefäß | pilzförmiges Gefäß |
| 5 | Nestoris | Kultgefäß | Gefäß mit ovoidem Körper und stark über die Gefäßlippe gezogenen Seitenhenkeln |
| 6 | Kyathos | Symposionsgefäß | Schöpfkelle mit langem Henkel |
| 7 | Kalathos | Vorratsgefäß | Lilienförmiges Vorratsgefäß mit steiler Wandung und ausbiegendem Rand |
| 8 | Kernos | Kultgefäß | Schale, die während der eleusinischen Mysterienkulte als Opfergefäß für Nahrungsmittel benutzt wurde |
| 9 | Rhyton | Kultgefäß | Trinkgefäß oder Spendegefäß zum Ausgießen von Trankopfern |

https://github.com/kacebe/AtlantGIS/blob/master/tables/Finds_VesselTypes.csv



```
1 PREFIX geosparql: <http://www.opengis.net/ont/geosparql#>
2 PREFIX atlantgis: <http://atlantgis.squirrel.link/ontology/>
3
4 SELECT DISTINCT ?item ?geo ?find ?type WHERE {
5   ?type atlantgis:name "Kyathos"@de.
6   ?find atlantgis:vesselShape ?type.
7   ?find atlantgis:site ?item.
8   ?item geosparql:hasGeometry ?geom_obj .
9   ?geom_obj geosparql:asWKT ?geo .
10 }
```

| Item | Geo | Find | Type |
|--------|---|----------|--------------|
| site:F | "<http://www.opengis.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)"^^geosparql:wktLiteral | find:55 | vesseltype:6 |
| site:F | "<http://www.opengis.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)"^^geosparql:wktLiteral | find:56 | vesseltype:6 |
| site:F | "<http://www.opengis.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)"^^geosparql:wktLiteral | find:57 | vesseltype:6 |
| site:F | "<http://www.opengis.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)"^^geosparql:wktLiteral | find:58 | vesseltype:6 |
| site:F | "<http://www.opengis.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)"^^geosparql:wktLiteral | find:61 | vesseltype:6 |
| site:F | "<http://www.opengis.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)"^^geosparql:wktLiteral | find:62 | vesseltype:6 |
| site:F | "<http://www.opengis.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)"^^geosparql:wktLiteral | find:63 | vesseltype:6 |
| site:F | "<http://www.opengis.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)"^^geosparql:wktLiteral | find:64 | vesseltype:6 |
| site:F | "<http://www.opengis.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)"^^geosparql:wktLiteral | find:66 | vesseltype:6 |
| site:F | "<http://www.opengis.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)"^^geosparql:wktLiteral | find:67 | vesseltype:6 |
| site:F | "<http://www.opengis.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)"^^geosparql:wktLiteral | find:79 | vesseltype:6 |
| site:F | "<http://www.opengis.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)"^^geosparql:wktLiteral | find:80 | vesseltype:6 |
| site:F | "<http://www.opengis.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)"^^geosparql:wktLiteral | find:81 | vesseltype:6 |
| site:F | "<http://www.opengis.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)"^^geosparql:wktLiteral | find:82 | vesseltype:6 |
| site:F | "<http://www.opengis.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)"^^geosparql:wktLiteral | find:83 | vesseltype:6 |
| site:F | "<http://www.opengis.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)"^^geosparql:wktLiteral | find:84 | vesseltype:6 |
| site:F | "<http://www.opengis.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)"^^geosparql:wktLiteral | find:85 | vesseltype:6 |
| site:F | "<http://www.opengis.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)"^^geosparql:wktLiteral | find:86 | vesseltype:6 |
| site:F | "<http://www.opengis.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)"^^geosparql:wktLiteral | find:87 | vesseltype:6 |
| site:F | "<http://www.opengis.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)"^^geosparql:wktLiteral | find:88 | vesseltype:6 |
| site:H | "<http://www.opengis.net/def/crs/EPSG/0/4326> POINT (-14.930234892454264 35.553705947902735)"^^geosparql:wktLiteral | find:111 | vesseltype:6 |

AtlantGIS: Funde und Fundorte vom Typ Kyathos



SPARQLing Unicorn QGIS Plugin

Query Interlink Enrich (Experimental) ?

Select endpoint: Atlantgis --> ?item ?geo Or: Quick Add Endpoint Or: Load Graph layer name: unicorn_ q1

Query Templates: 100 Random Geometries Query Limit: 10 Export To Triple Store Allow non-geo queries Constraint By BBOX

Saved Queries: Load Query Query Name: Save Query Convert TTL CRS Configure TripleStores

Valid Query

```
1 SELECT DISTINCT ?item ?geo ?find ?type WHERE {
2 ?shape <http://atlantgis.squirrel.link/ontology/name> "Kyathos"@de.
3 ?find <http://atlantgis.squirrel.link/ontology/vesselShape> ?type.
4 ?find <http://atlantgis.squirrel.link/ontology/site> ?item.
5 ?item geosparql:hasGeometry ?geom_obj .
6 ?geom_obj geosparql:asWKT ?geo .
7 }
```

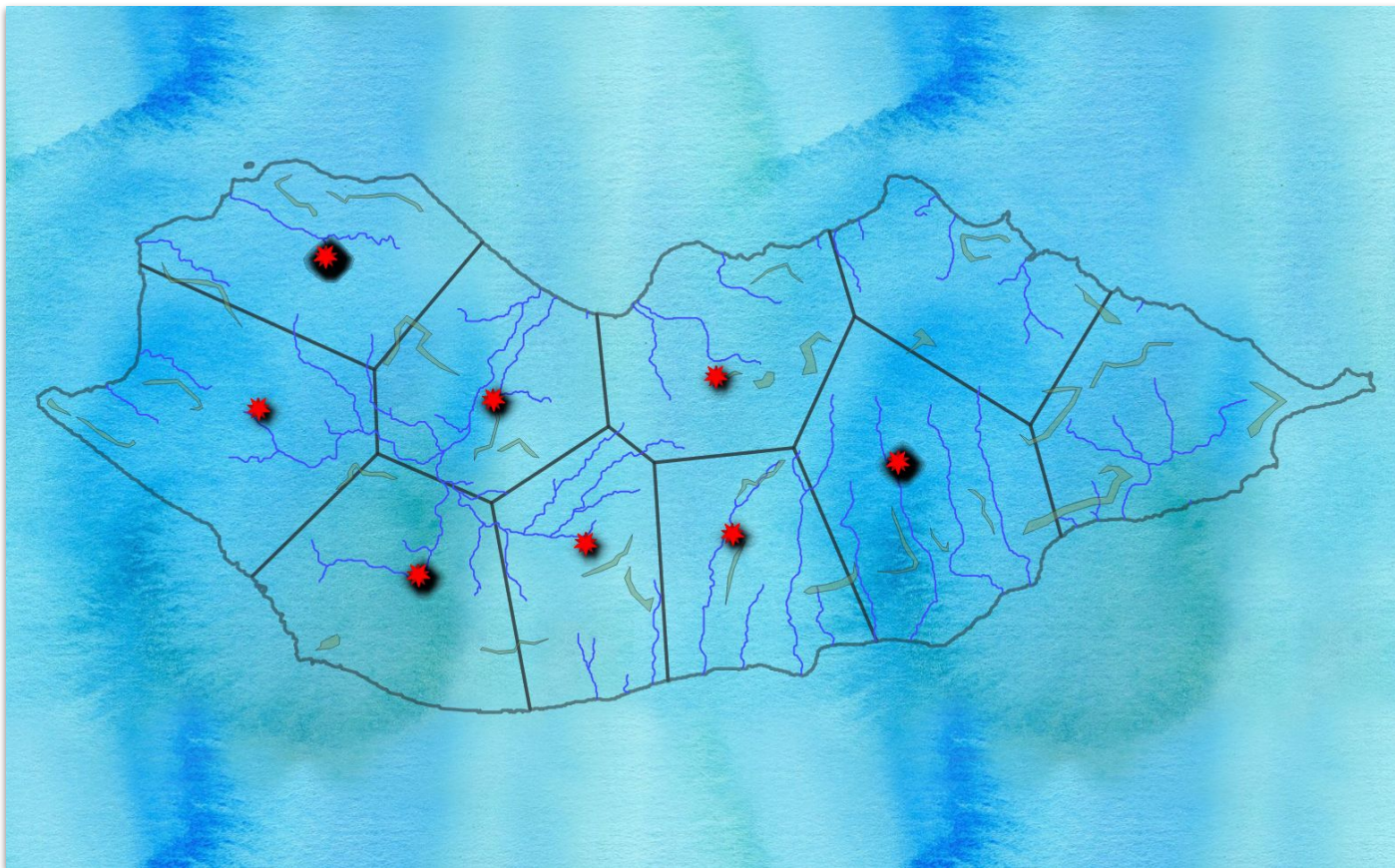
Filter Concept Results:

GeoConcepts (8) FeatureCollections (2) GeometryCollections ()

- atlantgis:ArchaeologicalSite
- atlantgis:CoastLine
- atlantgis:Goldkupfererz
- atlantgis:LandType
- atlantgis:Silber
- atlantgis:Stream
- atlantgis:Voronoi
- atlantgis:Zinn

add layer

load unicorn layers Export Loaded Layer as Graph Schließen





```
1 PREFIX geosparql: <http://www.opengis.net/ont/geosparql#>
2 PREFIX atlantgis: <http://atlantgis.squirrel.link/ontology/>
3
4 SELECT DISTINCT ?item ?geo ?archont ?k1 WHERE {
5   ?item atlantgis:archont ?archont.
6   ?item atlantgis:keramik1 ?k1.
7   ?item geosparql:hasGeometry ?geom_obj .
8   ?geom_obj geosparql:asWKT ?geo .
9   FILTER(?k1>5)
10 }
```

| Item | Geo | Archont | K1 |
|--------|--|----------------------|-----|
| site:C | "<http://www.opengis.net/def/crs/EPSSG/o/4326> POINT (-15.217615254608273.35.492712526968674)"^^geosparql:wktLiteral | atlantgis:Ampheres | 17 |
| site:D | "<http://www.opengis.net/def/crs/EPSSG/o/4326> POINT (-15.371528093603208.35.469127902608804)"^^geosparql:wktLiteral | atlantgis:Euaimon | 6 |
| site:E | "<http://www.opengis.net/def/crs/EPSSG/o/4326> POINT (-15.518729450350849.35.59317541219059)"^^geosparql:wktLiteral | atlantgis:Mneseus | 24 |
| site:F | "<http://www.opengis.net/def/crs/EPSSG/o/4326> POINT (-15.456620280793723.35.706870795205106)"^^geosparql:wktLiteral | atlantgis:Autochthon | 232 |
| site:I | "<http://www.opengis.net/def/crs/EPSSG/o/4326> POINT (-14.68696255799825.35.6089337422779)"^^geosparql:wktLiteral | atlantgis:Azaes | 12 |

AtlantGIS: Site und Archonts keramik1 > 5



SPARQLing Unicorn QGIS Plugin

Query Interlink Enrich (Experimental) ?

Select endpoint: Atlantgis --> ?item ?geo Or: Quick Add Endpoint Or: Load Graph layer name: unicorn_ q1

Query Templates: 100 Random Geometries Query Limit: 10 Export To Triple Store Allow non-geo queries Constraint By BBOX

Saved Queries: Load Query Query Name: Save Query Convert TTL CRS Configure TripleStores

Valid Query

```
1 SELECT DISTINCT ?item ?geo ?archont ?k1 WHERE {
2 ?item <http://atlantgis.squirrel.link/ontology/archont> ?archont.
3 ?item <http://atlantgis.squirrel.link/ontology/keramik1> ?k1.
4 ?item geosparql:hasGeometry ?geom_obj .
5 ?geom_obj geosparql:asWKT ?geo .
6 FILTER(?k1>5)
7 }
```

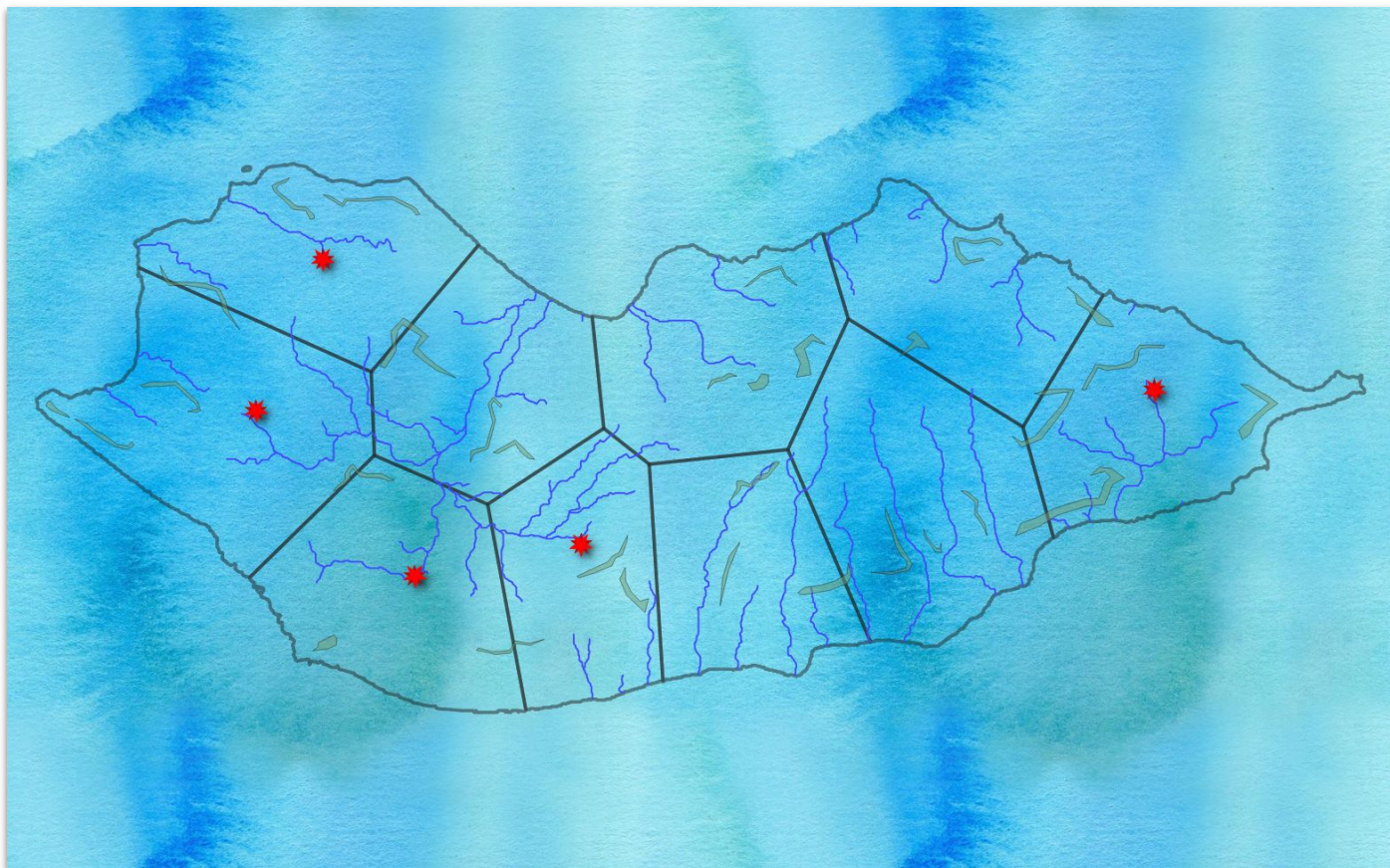
Filter Concept Results:

GeoConcepts (8) FeatureCollections (2) GeometryCollections ()

- atlantgis:ArchaeologicalSite
- atlantgis:CoastLine
- atlantgis:Goldkupfererz
- atlantgis:LandType
- atlantgis:Silber
- atlantgis:Stream
- atlantgis:Voronoi
- atlantgis:Zinn

add layer

load unicorn layers Export Loaded Layer as Graph Schließen





Wikidata Query Service

Beispiele Abfragegenerator Hilfe Weitere Werkzeuge

```
1 #fictive archaeological period from AtlantGIS
2 SELECT ?item ?itemLabel
3 WHERE
4 {
5   ?item wdt:P31 wd:Q109881420.
6   ?item wdt:P361 wd:Q109881478.
7   SERVICE wikibase:label { bd:serviceParam wikibase:language "[AUTO_LANGUAGE],en". }
8 }
```

<https://w.wiki/4VDq>

5 Ergebnisse in 723 ms

| item | itemLabel |
|----------------------------|---------------------|
| Q109881323 | Atlantis Period I |
| Q109881808 | Atlantis Period II |
| Q109881947 | Atlantis Period IIa |
| Q109882050 | Atlantis Period IIb |
| Q109882128 | Atlantis Period III |

“Fiktive Perioden” aus AtlantGIS in Wikidata



```

1 PREFIX geosparql: <http://www.opengis.net/ont/geosparql#>
2 PREFIX atlantgis: <http://atlantgis.squirrel.link/ontology/>
3 PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
4 PREFIX owl: <http://www.w3.org/2002/07/owl#>
5 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
6
7 SELECT DISTINCT ?item ?geo WHERE {
8   ?period owl:sameAs <http://www.wikidata.org/entity/Q109881947>.
9   ?item <http://atlantgis.squirrel.link/ontology/timeperiod> ?period.
10  ?item geosparql:hasGeometry ?geom_obj .
11  ?geom_obj geosparql:asWKT ?geo .
12 }

```



Rudolf Schlichter: Kleito und Poseidon (um 1934)

Item Discussion

Atlantis Period Iia (Q109881947)

Period of Kleito and Poseidon edit

[In more languages](#)

Configure

| Language | Label | Description | Also known as |
|----------|---------------------|-------------------------------|---------------|
| English | Atlantis Period Iia | Period of Kleito and Poseidon | |
| German | No label defined | No description defined | |
| Polish | No label defined | No description defined | |
| French | No label defined | No description defined | |

| Item | Geo |
|---|---|
| <http://atlantis.squirrel.link/data/ar_site/500> | *<http://www.openstreetmap.org/point/4326.0/PPOINT:15.450567548,35.620007200014661?>" geosparql:isLiteral |
| <http://atlantis.squirrel.link/data/ar_site/432> | *<http://www.openstreetmap.org/point/4326.0/PPOINT:15.447527035,35.6243230000034?>" geosparql:isLiteral |
| <http://atlantis.squirrel.link/data/ar_site/542> | *<http://www.openstreetmap.org/point/4326.0/PPOINT:15.447624586,35.6192063000034?>" geosparql:isLiteral |
| <http://atlantis.squirrel.link/data/ar_site/1462> | *<http://www.openstreetmap.org/point/4326.0/PPOINT:15.454511777,35.6180033000032?>" geosparql:isLiteral |
| <http://atlantis.squirrel.link/data/ar_site/502> | *<http://www.openstreetmap.org/point/4326.0/PPOINT:15.454345358000004,35.6180033000034?>" geosparql:isLiteral |
| <http://atlantis.squirrel.link/data/ar_site/800> | *<http://www.openstreetmap.org/point/4326.0/PPOINT:15.454725043000004,35.6180033000034?>" geosparql:isLiteral |
| <http://atlantis.squirrel.link/data/ar_site/466> | *<http://www.openstreetmap.org/point/4326.0/PPOINT:15.454046494,35.6180033000034?>" geosparql:isLiteral |
| <http://atlantis.squirrel.link/data/ar_site/832> | *<http://www.openstreetmap.org/point/4326.0/PPOINT:15.453043402,35.6180033000034?>" geosparql:isLiteral |
| <http://atlantis.squirrel.link/data/ar_site/1440> | *<http://www.openstreetmap.org/point/4326.0/PPOINT:15.457001680000004,35.6180033000034?>" geosparql:isLiteral |
| <http://atlantis.squirrel.link/data/ar_site/992> | *<http://www.openstreetmap.org/point/4326.0/PPOINT:15.454008426,35.6180033000034?>" geosparql:isLiteral |
| <http://atlantis.squirrel.link/data/ar_site/542> | *<http://www.openstreetmap.org/point/4326.0/PPOINT:15.454008426,35.6180033000034?>" geosparql:isLiteral |
| <http://atlantis.squirrel.link/data/ar_site/920> | *<http://www.openstreetmap.org/point/4326.0/PPOINT:15.454008426,35.6180033000034?>" geosparql:isLiteral |
| <http://atlantis.squirrel.link/data/ar_site/265> | *<http://www.openstreetmap.org/point/4326.0/PPOINT:15.454008426,35.6180033000034?>" geosparql:isLiteral |
| <http://atlantis.squirrel.link/data/ar_site/972> | *<http://www.openstreetmap.org/point/4326.0/PPOINT:15.454008426,35.6180033000034?>" geosparql:isLiteral |
| <http://atlantis.squirrel.link/data/ar_site/655> | *<http://www.openstreetmap.org/point/4326.0/PPOINT:15.454008426,35.6180033000034?>" geosparql:isLiteral |
| <http://atlantis.squirrel.link/data/ar_site/550> | *<http://www.openstreetmap.org/point/4326.0/PPOINT:15.454008426,35.6180033000034?>" geosparql:isLiteral |
| <http://atlantis.squirrel.link/data/ar_site/130> | *<http://www.openstreetmap.org/point/4326.0/PPOINT:15.454008426,35.6180033000034?>" geosparql:isLiteral |
| <http://atlantis.squirrel.link/data/ar_site/920> | *<http://www.openstreetmap.org/point/4326.0/PPOINT:15.454008426,35.6180033000034?>" geosparql:isLiteral |
| <http://atlantis.squirrel.link/data/ar_site/1452> | *<http://www.openstreetmap.org/point/4326.0/PPOINT:15.454008426,35.6180033000034?>" geosparql:isLiteral |
| <http://atlantis.squirrel.link/data/ar_site/92> | *<http://www.openstreetmap.org/point/4326.0/PPOINT:15.454008426,35.6180033000034?>" geosparql:isLiteral |
| <http://atlantis.squirrel.link/data/ar_site/666> | *<http://www.openstreetmap.org/point/4326.0/PPOINT:15.454008426,35.6180033000034?>" geosparql:isLiteral |
| <http://atlantis.squirrel.link/data/ar_site/102> | *<http://www.openstreetmap.org/point/4326.0/PPOINT:15.454008426,35.6180033000034?>" geosparql:isLiteral |

AtlantGIS: Arch. Sites der 'Period of Kleito and Poseidon'



SPARQLing Unicorn QGIS Plugin

Query Interlink Enrich (Experimental) ?

Select endpoint: Atlantgis --> ?item ?geo Or: Quick Add Endpoint Or: Load Graph layer name: unicorn_ q1

Query Templates: 100 Random Geometries Query Limit: 10 Export To Triple Store Allow non-geo queries Constraint By BBOX

Saved Queries: Load Query Query Name: Save Query Convert TTL CRS Configure TripleStores

Valid Query

```
1 SELECT DISTINCT ?item ?geo WHERE {
2 ?period owl:sameAs <http://www.wikidata.org/entity/Q109881947>.
3 ?item <http://atlantgis.squirrel.link/ontology/timeperiod> ?period.
4 ?item geosparql:hasGeometry ?geom_obj .
5 ?geom_obj geosparql:asWKT ?geo .
6 }
```

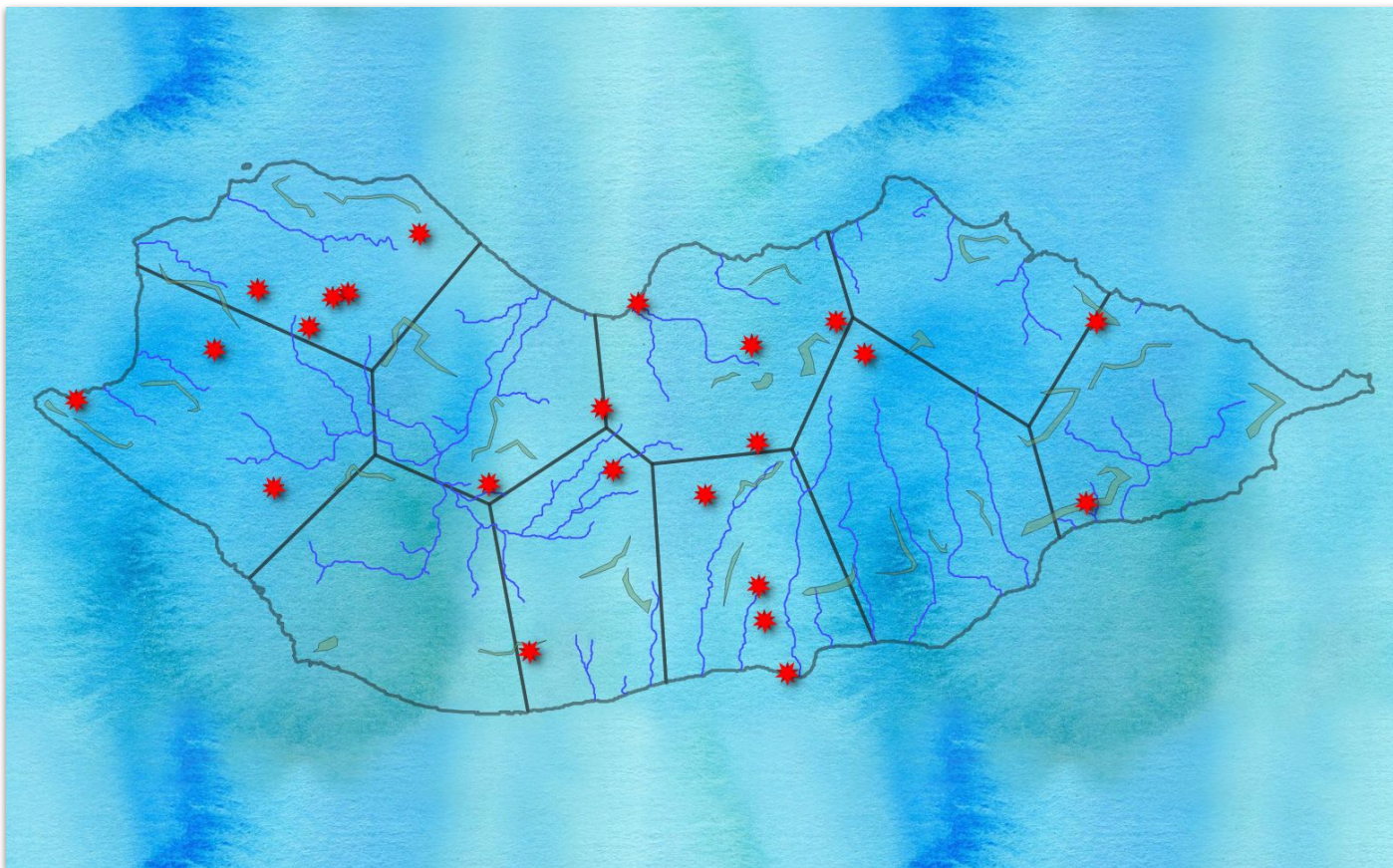
Filter Concept Results:

GeoConcepts (8) FeatureCollections (2) GeometryCollections ()

- atlantgis:ArchaeologicalSite
- atlantgis:CoastLine
- atlantgis:Goldkupererez
- atlantgis:LandType
- atlantgis:Silber
- atlantgis:Stream
- atlantgis:Voronoi
- atlantgis:Zinn

add layer

load unicorn layers Export Loaded Layer as Graph Schließen





Beschreibung des Datensatzes `Finds.csv`

| Spalte | Beschreibung |
|-------------|---|
| site | Fundstelle aus <code>vector/sites.shp</code> |
| feature | Befund |
| object | Individuum |
| class | Fundgattung (K: Keramik) |
| sherd | Art der Scherbe (G: Gefäß, R: Rand, W: Wand, B: Boden) |
| qty | Anzahl |
| wt | Gewicht (g) |
| size | Größenklasse (nach Clist 2004/05: 30: <30x30mm, 70: <70x70mm, 120: <120x120mm, 200: <200x200mm, 500: >200x200mm) |
| wall | Wandungsdicke (mm) |
| muendungsD | Mündungsdurchmesser (cm) |
| muendungsH | Höhe des Mündungsdurchmessers (cm) |
| minD | Minimaler Durchmesser (cm) |
| minD_H | Höhe des minimalen Durchmessers (cm) |
| maxD | Maximaler Durchmesser (cm) |
| maxD_H | Höhe des maximalen Durchmessers (cm) |
| bodenD | Bodendurchmesser (cm) |
| temperSize | Größe nicht-plastischer Martikel (Magerung: nach 'Wentworth grain size classification', VF: Very fine 0.0625-0.125mm, F: Fine 0.125-0.25mm, M: Medium 0.25-0.5mm, C: Coarse 0.5-1mm, VC: Very Coarse 1-2mm) |
| vesselShape | Gefäßform (siehe <code>tables/Finds_VesselTypes.csv</code>) |

<https://github.com/kacebe/AtlantGIS/blob/master/tables/Finds.md>



```
1 PREFIX geosparql: <http://www.opengis.net/ont/geosparql#>
2 PREFIX atlantgis: <http://atlantgis.squirrel.link/ontology/>
3 PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
4 PREFIX owl: <http://www.w3.org/2002/07/owl#>
5 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
6
7 SELECT DISTINCT ?item ?geo ?find ?weight ?size ?shapeLabel ?wd WHERE {
8   OPTIONAL { ?shape owl:sameAs ?wd. FILTER ( !strstarts(str(?wd), "http://vocab.getty.edu/aat/") ) }
9   ?shape rdfs:label ?shapeLabel.
10  ?find atlantgis:vesselShape ?shape.
11  ?find atlantgis:size ?size.
12  ?find atlantgis:weight ?weight.
13  ?find atlantgis:site ?item.
14  ?item geosparql:hasGeometry ?geom_obj .
15  ?geom_obj geosparql:asWKT ?geo .
16  FILTER(xsd:integer(?weight) > 500 && xsd:integer(?size) > 100)
17 } ORDER BY DESC(xsd:integer(?weight))
```

AtlantGIS: Finds mit VesselType und WikidataID + Sites and Koordinaten having weight > 500 & size > 100



| Item | Geo | Find | Weight | Size | ShapeLabel | Wd |
|--------|---|----------|--------|-------|---------------|--------------|
| site:B | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.097823661232666 35.617442563836114)""^geosparql:wktLiteral | find:135 | "4500" | "500" | "Amphora"@de | wik:Q178401 |
| site:F | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)""^geosparql:wktLiteral | find:60 | "3000" | "500" | "Amphora"@de | wik:Q178401 |
| site:E | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.518729450350849 35.59317541219059)""^geosparql:wktLiteral | find:7 | "2046" | "500" | "Kernos"@de | wik:Q180119 |
| site:A | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.302889902401944 35.59993416253471)""^geosparql:wktLiteral | find:127 | "2000" | "500" | "Stamnos"@de | wik:Q1421582 |
| site:A | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.302889902401944 35.59993416253471)""^geosparql:wktLiteral | find:128 | "1997" | "500" | "Kernos"@de | wik:Q180119 |
| site:G | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.082751326646484 35.499733072205636)""^geosparql:wktLiteral | find:89 | "1944" | "500" | "Amphora"@de | wik:Q178401 |
| site:F | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)""^geosparql:wktLiteral | find:38 | "1803" | "500" | "Stamnos"@de | wik:Q1421582 |
| site:F | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)""^geosparql:wktLiteral | find:90 | "1671" | "500" | "Amphora"@de | wik:Q178401 |
| site:A | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.302889902401944 35.59993416253471)""^geosparql:wktLiteral | find:130 | "1672" | "500" | "Amphora"@de | wik:Q178401 |
| site:H | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-14.9320234892454264 35.553705047902733)""^geosparql:wktLiteral | find:107 | "1540" | "200" | "Amphora"@de | wik:Q178401 |
| site:C | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.217615254608273 35.49212526686624)""^geosparql:wktLiteral | find:0 | "1448" | "500" | "Stamnos"@de | wik:Q1421582 |
| site:E | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.518729450350849 35.59317541219059)""^geosparql:wktLiteral | find:4 | "1298" | "500" | "Kernos"@de | wik:Q180119 |
| site:B | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.097823661232666 35.617442563836114)""^geosparql:wktLiteral | find:134 | "1118" | "500" | "Amphora"@de | wik:Q178401 |
| site:A | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.302889902401944 35.59993416253471)""^geosparql:wktLiteral | find:129 | "1012" | "200" | "Amphora"@de | wik:Q178401 |
| site:A | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.302889902401944 35.59993416253471)""^geosparql:wktLiteral | find:126 | "991" | "200" | "Lekania"@de | wik:Q1246179 |
| site:F | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)""^geosparql:wktLiteral | find:12 | "86" | "200" | "Amphora"@de | wik:Q178401 |
| site:F | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)""^geosparql:wktLiteral | find:52 | "829" | "500" | "Amphora"@de | wik:Q178401 |
| site:E | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.518729450350849 35.59317541219059)""^geosparql:wktLiteral | find:6 | "814" | "200" | "Stamnos"@de | wik:Q1421582 |
| site:F | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)""^geosparql:wktLiteral | find:13 | "750" | "500" | "Kernos"@de | wik:Q180119 |
| site:F | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)""^geosparql:wktLiteral | find:27 | "691" | "500" | "Amphora"@de | wik:Q178401 |
| site:F | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)""^geosparql:wktLiteral | find:56 | "684" | "200" | "Nestoris"@de | wik:Q942612 |
| site:F | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)""^geosparql:wktLiteral | find:61 | "670" | "200" | "Kvathos"@de | wik:Q1752627 |
| site:E | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.518729450350849 35.59317541219059)""^geosparql:wktLiteral | find:5 | "66" | "200" | "Amphora"@de | wik:Q178401 |
| site:F | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)""^geosparql:wktLiteral | find:33 | "662" | "200" | "Amphora"@de | wik:Q178401 |
| site:F | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)""^geosparql:wktLiteral | find:16 | "655" | "200" | "Amphora"@de | wik:Q178401 |
| site:A | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.302889902401944 35.59993416253471)""^geosparql:wktLiteral | find:125 | "642" | "500" | "Stamnos"@de | wik:Q1421582 |
| site:B | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.097823661232666 35.617442563836114)""^geosparql:wktLiteral | find:133 | "618" | "200" | "Lekania"@de | wik:Q1246179 |
| site:F | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)""^geosparql:wktLiteral | find:17 | "626" | "200" | "Amphora"@de | wik:Q178401 |
| site:F | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)""^geosparql:wktLiteral | find:28 | "623" | "500" | "Amphora"@de | wik:Q178401 |
| site:G | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.082751326646484 35.499733072205636)""^geosparql:wktLiteral | find:91 | "623" | "200" | "Lekania"@de | wik:Q1246179 |
| site:F | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)""^geosparql:wktLiteral | find:35 | "618" | "500" | "Amphora"@de | wik:Q178401 |
| site:F | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)""^geosparql:wktLiteral | find:50 | "578" | "500" | "Amphora"@de | wik:Q178401 |
| site:G | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.082751326646484 35.499733072205636)""^geosparql:wktLiteral | find:93 | "525" | "500" | "Amphora"@de | wik:Q178401 |
| site:A | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.302889902401944 35.59993416253471)""^geosparql:wktLiteral | find:131 | "524" | "200" | "Amphora"@de | wik:Q178401 |
| site:F | <http://www.opensti.net/def/crs/EPSG/0/4326> POINT (-15.456620280793723 35.706870795205106)""^geosparql:wktLiteral | find:25 | "504" | "200" | "Amphora"@de | wik:Q178401 |

AtlantGIS: Finds mit VesselType und WikidataID + Sites and Koordinaten having weight > 500 & size > 100



SPARQLing Unicorn QGIS Plugin

Query Interlink Enrich (Experimental) ?

Select endpoint: Atlantgis --> ?item ?geo Or: Quick Add Endpoint Or: Load Graph layer name: unicorn_ q1

Query Templates: 100 Random Geometries Query Limit: 10 Export To Triple Store Allow non-geo queries Constraint By BBOX

Saved Queries: Load Query Query Name: Save Query Convert TTL CRS Configure TripleStores

Valid Query

```
1 SELECT DISTINCT ?item ?geo ?find ?weight ?size ?shapeLabel WHERE {
2   OPTIONAL { ?shape owl:sameAs ?wd. }
3   ?shape rdfs:label ?shapeLabel.
4   ?find <http://atlantgis.squirrel.link/ontology/vesselShape> ?shape.
5   ?find <http://atlantgis.squirrel.link/ontology/size> ?size.
6   ?find <http://atlantgis.squirrel.link/ontology/weight> ?weight.
7   ?find <http://atlantgis.squirrel.link/ontology/site> ?item.
8   ?item geosparql:hasGeometry ?geom_obj .
9   ?geom_obj geosparql:asWKT ?geo .
10  FILTER(xsd:integer(?weight) > 500 && xsd:integer(?size) > 100)
11 } ORDER BY DESC(xsd:integer(?weight))
```

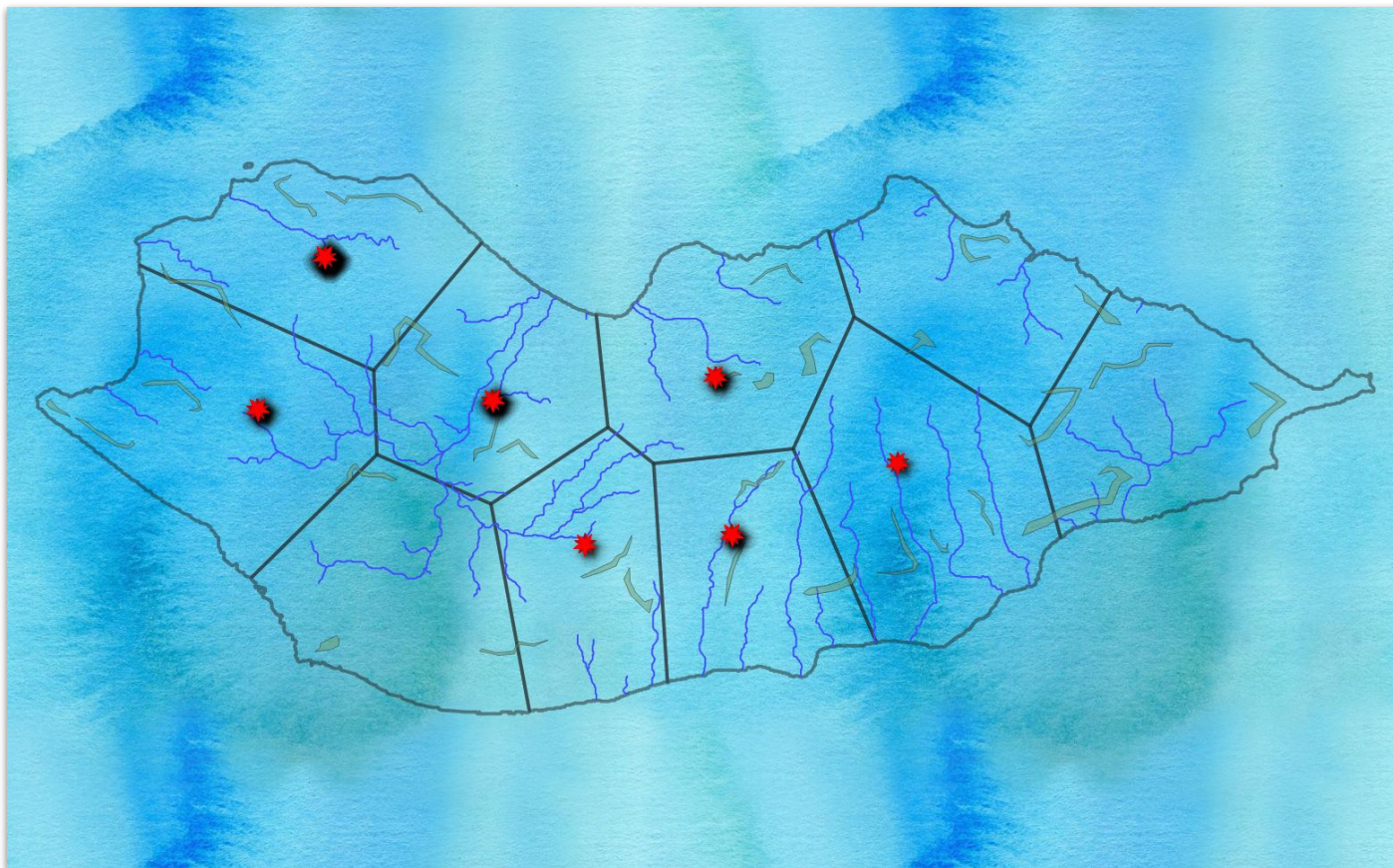
Filter Concept Results:

GeoConcepts (8) FeatureCollections (2) GeometryCollections (1)

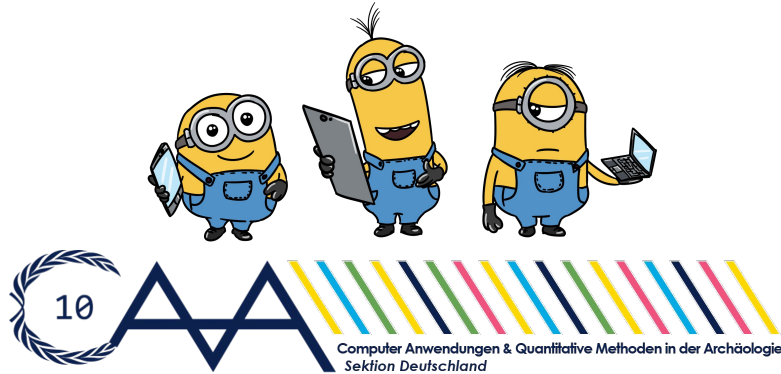
- atlantgis:ArchaeologicalSite
- atlantgis:CoastLine
- atlantgis:Goldkupererez
- atlantgis:LandType
- atlantgis:Silber
- atlantgis:Stream
- atlantgis:Voronoi
- atlantgis:Zinn

add layer

load unicorn layers Export Loaded Layer as Graph Schließen



Timo Homburg M.Sc. & Florian Thiery M.Sc.



QGIS Linked Geo-Data Workshop



“

**Ich bin ein/e Archäolog*in
und habe einen SPARQL
Endpoint gefunden. Was
mache ich jetzt?**



Query Input:

1 Example Queries:

All Geometries ▾

```

1 PREFIX geosparql:
  <http://www.opengis.net/ont/geosparql#>
2 PREFIX geosf:
  <http://www.opengis.net/def/function/geosparql/>
3 PREFIX cito: <http://purl.org/spar/cito/>
4 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
5 PREFIX dcterms:
  <http://purl.org/dc/terms/>
6 PREFIX foaf: <http://xmlns.com/foaf/0.1/>
7 PREFIX geo:
  
```

Explore Triple Store

Note: Query variables ending in "_geom" are rendered in the map view.

Note2: Egenhofer relation functions beginning with ST can take both raster and vector data as input.

Query Query with GeoJSON result

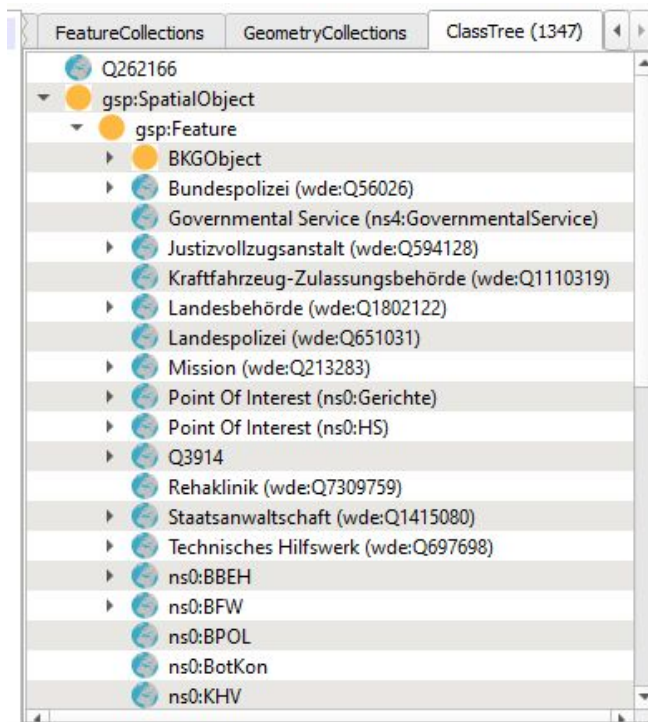
QueryResult:



Der Normalzustand... ein Query Interface... ..ok... aber was kann ich anfragen?

“

aber eigentlich
will ich doch ein:
“user-friendly discovery”

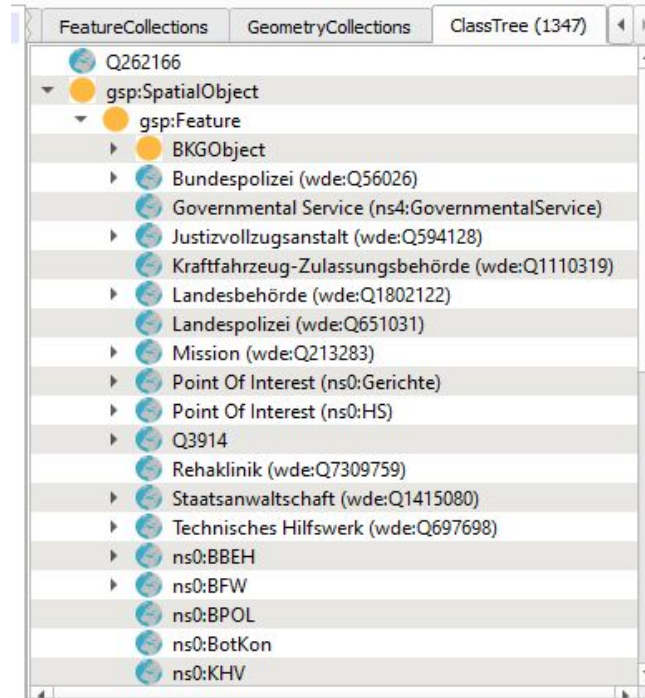


Eine Navigation wäre nett...

“

**und ich will... einfachen
Zugriff auf Dateninhalte!**

Ein LOD-Konzept To Layer Button wäre ganz nett



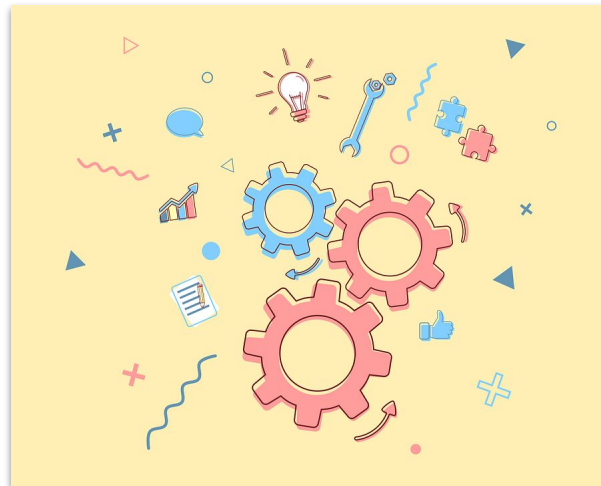
Ähnlich wie ein WFS Service: Lade thematisch gruppierte Layer

“

und ich will...
Intuitive Queries nach
bekanntem Konzepten!



- **Was sind Queries die für die Community interessant sind?**
- **Andere User die diesen Triple Store verwendet haben fragten auch nach....?**
- **Eine Sammlung von Best Practices**





Das SPARQLing Unicorn ...



Das SPARQLing Unicorn QGIS Plugin - ein Linked Data Access Point für QGIS



Das **SPARQL Unicorn** erlaubt es Linked Data queries in (Geo)SPARQL an ausgewählte Triple Stores zu senden und bereitet die Ergebnisse für die Geocommunity in QGIS auf.



Das Plugin bietet aktuell drei Hauptfunktionen: (A) Vereinfachtes Querying von Semantic Web Datenquellen (B) Anreicherung von Geodaten und (C) Transformation von QGIS Vektorlayern nach RDF.



SPARQLing Unicorn QGIS Plugin

Query: Interlink Enrich (Experimental) ?

Select endpoint: Atlantgis --> ?item ?geo Or: Quick Add Endpoint Or: Load Graph layer name: unicorn_ q1

Query Templates: 100 Random Geometries Query Limit: 10 Export To Triple Store Allow non-geo queries Constraint By BBOX

Saved Queries: Load Query Query Name: Save Query Convert TTL CRS Configure TripleStores

Valid Query

```
1 SELECT DISTINCT ?item ?geo WHERE {
2 ?period owl:sameAs <http://www.wikidata.org/entity/Q109881947>.
3 ?item <http://atlantgis.squirrel.link/ontology/timeperiod> ?period.
4 ?item geosparql:hasGeometry ?geom_obj .
5 ?geom_obj geosparql:asWKT ?geo .
6 }
```

Filter Concept Results:

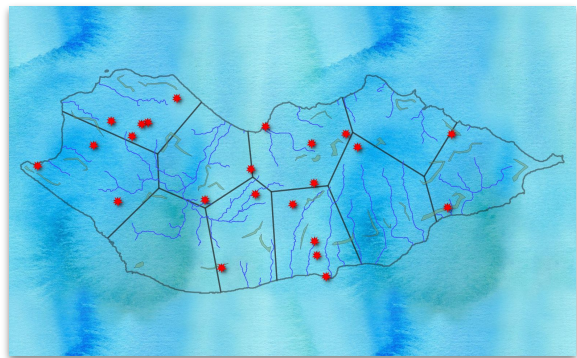
GeoConcepts (8) FeatureCollections (2) GeometryCollections (1)

- atlantgis:ArchaeologicalSite
- atlantgis:CoastLine
- atlantgis:Goldkupfererz
- atlantgis:LandType
- atlantgis:Silber
- atlantgis:Stream
- atlantgis:Voronoi
- atlantgis:Zinn

add layer

load unicorn layers Export Loaded Layer as Graph Schließen

Version v0.13.1



Funktion A: Vereinfachtes Querying von Semantic Web Datenquellen



Funktion B: Anreicherung von Geodaten
Funktion C: Anreicherung und Konvertierung von RDF Daten

Funktion A





Funktion A erlaubt assistiertes SPARQL Querying von einigen archäologisch relevanten Triple Store wie Wikidata, Nomisma, Kerameikos, Pleiades und Roman Open Data. Das Plugin bietet eine Konzeptsuche, Beispielqueries und Templates um dem Benutzer zu assistieren.



SPARQLing Unicorn QGIS Plugin

Query Interlink Enrich (Experimental) ?

Select endpoint: Or: Or:

Layer concept: Query Templates:

Valid Query

```
SELECT ?item ?lat ?lon WHERE {
  ?item a <http://nomisma.org/ontology#Mint>.
  ?item geo:location ?loc .
  ?loc wgs84_pos:lat ?lat .
  ?loc wgs84_pos:long ?lon .
} LIMIT 100
```

vector tiles
XYZ Tiles
OpenStreetMap
WCS
WFS / OGC API - Features
OWS
ArcGIS-Map-Dienst
ArcGIS-Feature-Dienst
GeoNode

Layer

- unicorn mint
- OpenStreetMap

Q Zu suchender Typ (Strg+K)

Koordinate 2552573,4023083 Maßstab 1:1293151 Vergrößerung 100% Drehung 0,0° Zeichnen EPSG:3857

Beispiel: Nomisma (Mints)



Unbenanntes Projekt — QGIS

Projekt Bearbeiten Ansicht Layer Einstellungen Erweiterungen Vektor Raster Datenbank Web Netz Verarbeitung Hilfe

1 SPARQLing Unicorn QGIS Plugin

Query Interlink Enrich (Experimenta) ?

Select endpoint: Pleiades --> ?item ?geo required Or: Own TripleStore Or: Load Graph layer name:

Layer concept: http://pleiades.stoa.org/places/vocab#Place Query Templates: Ran

Valid Query Export To Triples

```
SELECT ?item ?geo WHERE {
  ?item rdf:type pleiades:Place .
  ?item pleiades:hasLocation ?loc .
  ?loc geosparql:asWKT ?geo .
  ?item pleiades:hasFeatureType placetype:port .
  ?loc pleiades:during timeperiod:roman .
}
```

Layer

- unicorn place
- OpenStreetMap

Koordinate 2077201,2767336 Maßstab 1:19438749 Vergrößerung 100% Drehung 0,0° Zeichnen EPSG:3857

Beispiel: Pleiades (Häfen aus der römischen Zeit)



QGIS: Unbenanntes Projekt - QGIS

Projekt Bearbeiten Ansicht Layer Einstellungen Erweiterungen Vektor Raster Datenbank Web Netz Verarbeitung Hilfe

SPARQLing Unicorn QGIS Plugin

Query Interlink Enrich (Experimental) ?

Select endpoint: Roman Open Data --> ?item ?lat ?lon required! Or: Own TripleStore Or: Load G...
Layer concept: http://www.semanticweb.org/ontologies/2015/1/EPNet-ONTOP_Ontology#Place Query

Valid Query

```
SELECT * WHERE {  
  ?item a <http://www.semanticweb.org/ontologies/2015/1/EPNet-ONTOP_Ontology#Place> .  
  ?item ont:hasLatitude ?lat .  
  ?item ont:hasLongitude ?lon .  
  ?item dcterms:title ?title .  
}  
ORDER BY ASC(?title)
```

OpenStreetMap
WCS
WFS / OGC API - Features
OWS
ArcGIS-Map-Dienst
ArcGIS-Feature-Dienst
GeoNode

Layer

- unicorn_place [10000]
- OpenStreetMap

Koordinate: -1450490,-1454074 Maßstab: 1:53853096 Vergrößerung: 100% Drehung: 0,0° Zeichen EPSG:3857

Beispiel: Roman Open Data (places)



Beispielsweise könnten wir den Wikidata triple store für prähistorische Kunst oder den Research Squirrel Triple Store für Militärcamps entlang des Limes anfragen. Die Ergebnisse dieser Anfragen werden als QGIS Layer gespeichert.



QGIS *Unbenanntes Projekt -- QGIS

Projekt Bearbeiten Ansicht Layer Einstellungen Erweiterungen Vektor Raster Datenbank Web Netz Verarbeitung Hilfe

SPARQLing Unicorn QGIS Plugin

Query Interlink Enrich (Experimental) ?

Select endpoint: Wikidata -> ?item ?geo required! Or: Own TripleStore Or:

Layer concept: cave with prehistoric art(Q11269813)

Valid Query

```
SELECT ?item ?itemLabel ?geo WHERE {
?item wdt:P31 wd:Q11269813 .
?item wdt:P625 ?geo .
SERVICE wikibase:label {
bd:serviceParam wikibase:language "[AUTO_LANGUAGE],en".
}
```

WMS/WMTS
Vector Tiles
XYZ Tiles
OpenStreetMap
WCS
WFS / OGC API - Features
OWS
ArcGIS-Map-Dienst
ArcGIS-Feature-Dienst
GeoNode

Layer

- unicorn cave with prehistoric art(Q11269813) [749]
- OpenStreetMap

Koordinate: -96859,4284962 Maßstab: 1:10064488 Vergrößerung: 100% Drehung: 0,0 °

Beispiel: Wikidata Höhlen mit prähistorischer Kunst



The screenshot shows the QGIS interface with a SPARQL query window open. The query is as follows:

```
SELECT ?item ?geo WHERE {  
  ?item a <http://onto.squirrel.link/ontology#MilitaryCamp> .  
  ?item geosparql:hasGeometry ?geom_obj .  
  ?geom_obj geosparql:asWKT ?geo .  
}
```

The map displays a geographical area of Germany, with red dots representing the locations of military camps. The interface includes a toolbar, a layer list on the left, and a status bar at the bottom showing coordinates (410803,6104370) and a scale of 1:2925286.

Beispiel: Limes Militärcamps

Funktion B





Funktion B erlaubt die Anreicherung von einem gegebenen Geodatenset mit Semantic Web Ressourcen aus der LOD Cloud, z.B. Wikidata (elevation levels von Städten entlang des Limes)
Geodaten werden immer in einem gewissen Kontext betrachtet und benötigen daher Wissen aus anderen Domänen. Semantisch beschriebene Daten stellen eine ideale Ressource für eine Anreicherung dar.



Anreicherungsquery mit dem SPARQLing Unicorn

| limestownpard | limestown | limesobject | ID | limescategory |
|------------------|-------------|-------------------|----|---------------|
| Orlen | Taunusstein | Zugmantel | 1 | Kastell |
| Heftrich | Idstein | Alteburg-Heftrich | 2 | Kastell |
| Niederreifenberg | Schmitten | Feldberg | 3 | Kastell |
| | Bad Homburg | Saalburg | 4 | Kastell |
| Ober-Rosbach | Rosbach | Kapersburg | 5 | Kastell |

Search Property or Class

Search Concept: Search Class Property

Triple Store:

Define Own URI: Use Own Class/Property

Search Results

municipality of Germany (Q262166) [the lowest official level of territorial division in Germany]

Apply

Enrichment Search

Search ID Concept: Search Concept

Triple Store: In Area: Search Area Concept

Search Properties

Search Results

- rdf-schema#label (5993.53%)
- description (1052.32%)
- core#altLabel (483.47%)
- located in time zone (209.88%)
- area (162.62%)
- located in the administrative territorial entity (137.39%)
- local dialing code (123.44%)
- coordinate location (123.39%)
- instance of (123.06%)
- elevation above sea level (116.47%)**
- Who's on First ID (112.76%)

Apply



SPARQLing Unicorn QGIS Plugin

Query Interlink Enrich ?

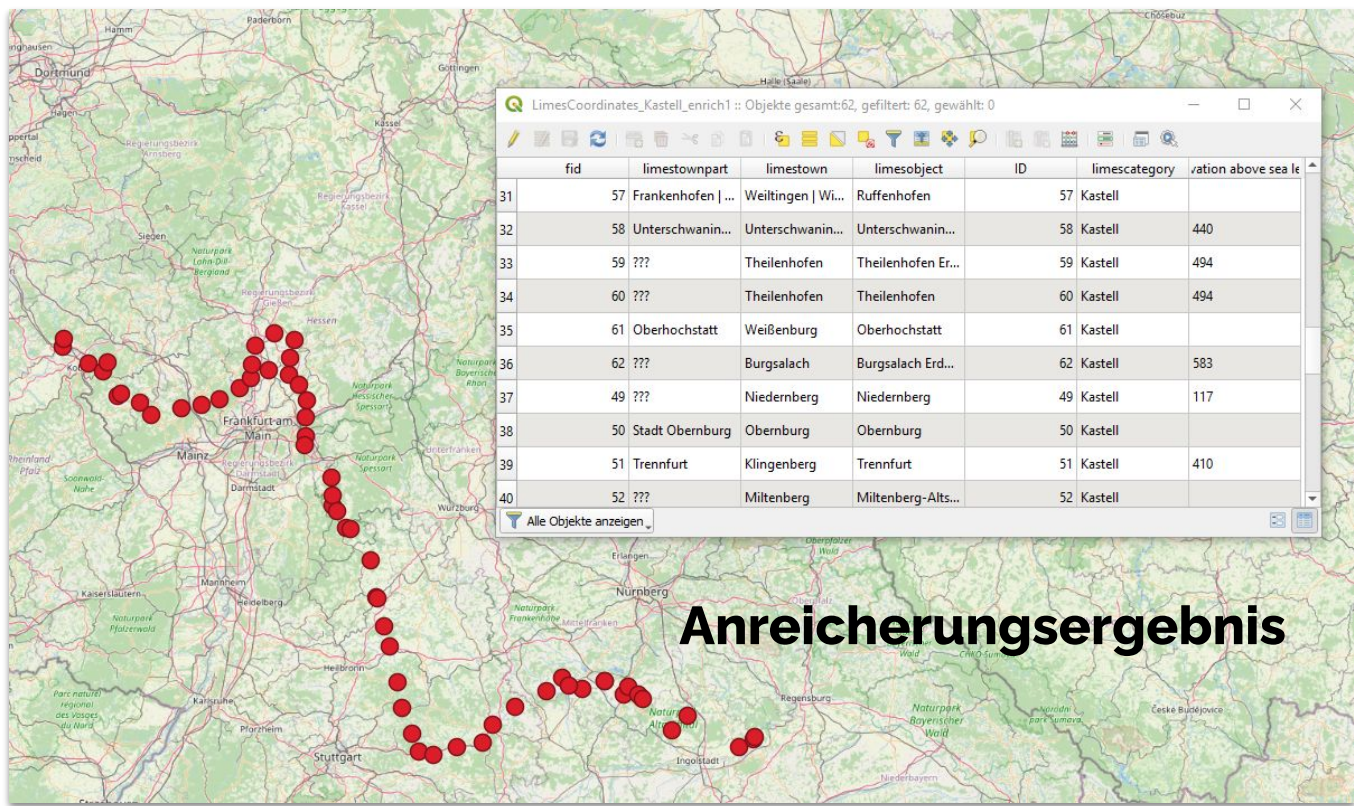
Refresh Layers LimesCoordinates_Kastell Load Layer

Add Row What to enrich?

| Column | EnrichmentConcept | TripleStore | Strategy | content | ID Column | ID Property | ID Domain | La |
|-----------------------------|-------------------------------------|--------------------|---------------|--------------|-----------|------------------|-------------------|----|
| 1 fid | | | No Enrichment | Enrich Value | fid | http://www.w3... | | |
| 2 limestownpart | | | No Enrichment | Enrich Value | fid | http://www.w3... | | |
| 3 limestown | | | No Enrichment | Enrich Value | fid | http://www.w3... | | |
| 4 limesobject | | | No Enrichment | Enrich Value | fid | http://www.w3... | | |
| 5 ID | | | No Enrichment | Enrich Value | fid | http://www.w3... | | |
| 6 limescategory | | | No Enrichment | Enrich Value | fid | http://www.w3... | | |
| 7 elevation above sea level | elevation above sea level (116.47%) | https://query.w... | Get Remote | Enrich Value | limestown | http://www.w3... | http://www.wik... | de |

**Anreicherungsdialog
im SPARQLing Unicorn**

Start Enrichment Add enriched layer



Anreicherungsergebnis

Funktion C





Funktion C konvertiert Geodaten von z.B. GeoJSON nach RDF, sodass diese Informationen in einem Linked Data Repository gespeichert werden können.



SPARQLing Unicorn QGIS Plugin

Query Interlink Enrich ?

Refresh Layers LimesCoordinates_Kastell_enrich1 Load Layer

OWL Class: Search Class

Target Namespace: Import Mapping Export Mapping

Table Cols to Concepts: Export To Triple Store

| | Export? | IDColumn? | GeoColumn? | Column | ColumnProperty | PropertyType | ColumnConcept | ValueConcepts |
|---|-------------------------------------|-------------------------------------|--------------------------|--------------------|----------------|--------------|---------------|---------------|
| 1 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | fid | | Automatic | | |
| 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | limestownpart | | Automatic | | |
| 3 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | limestown | | DataProperty | | |
| 4 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | limesobject | | DataProperty | | |
| 5 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | ID | | DataProperty | | |
| 6 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | limescategory | | SubClass | | |
| 7 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | elevation above... | | DataProperty | | |

Semantic Uplift using the SPARQLing Unicorn

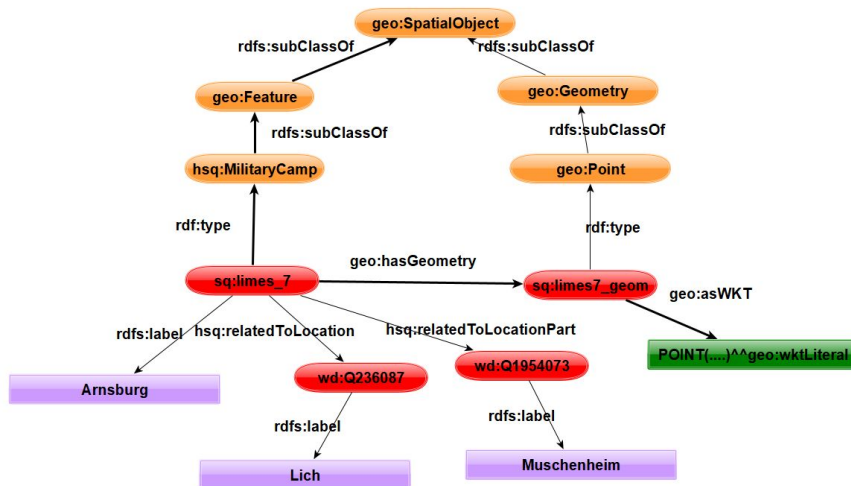
Export Result

```
<?xml version="1.0" ?>
<data>
<file class="http://www.wikidata.org/entity/Q146924" namespace="http://www.github.com/sparqlunicorn#" indid="ID" >
<column name="limestown" prop="data" >
</column>
<column name="limescategory" prop="subclass" >
</column>
<column name="elevation above sea level" prop="data" >
</column>
</file>
</data>
```



| limestownpard | limestown | limesobject | ID | limescategory |
|---------------|-----------------|-------------------|----|---------------|
| | Friedberg | Friedberg | 6 | Kastell |
| Muschenheim | Lich | Arnsburg | 7 | Kastell |
| | Großkrotzenburg | Gross-Krotzenburg | 8 | Kastell |

Semantic Uplift Transformationsprozess





Search:



| Property | Value |
|--------------------------------------|---|
| as WKT (geosparql:asWKT) | <ul style="list-style-type: none"><http://www.opengis.net/def/crs/EPSG/0/4326> POINT (8.784294 50.487393) (geosparql:wktLiteral) |
| has geometry (geosparql:hasGeometry) | <ul style="list-style-type: none">Arnsburg GeometryArnsburg (xsd:string) |
| name (rdfs:label) | <ul style="list-style-type: none">Lich (wd:Q236087)Muschenheim (wd:Q1954073)Arnsburg (wd:Q697359) |
| hsq:relatedToLocation | |
| hsq:relatedToLocationPart | |
| rdfs:seeAlso | |
| list ein(e) (rdf:type) | <ul style="list-style-type: none">Kastell (hsq:MilitaryCamp)Feature (geosparql:Feature) |

as Turtle | as RDF/XML | as JSON-LD | as TriG | as TriX | as (Geo)JSON | as GeoURI | as KML | as GML

Semantic Uplift Ergebnis von einem Teil des Limes



Conclusio

Fazit



- **Linked Data Ressourcen bieten interessante Daten für die Archäologen Community**
- **Aber: Wir brauchen die richtigen Tools um diese einfach nutzbar zu machen**
- **Das SPARQLing Unicorn QGIS Plugin leistet in diesem einen Beitrag für die GIS Community**
- **Weitere Tools könnten Linked Data noch einfach erschließbar machen**
- **Dies ist kein Rocket Science, aber es braucht eine Community von Entwicklern!**
- **Ihr wollt einen Beitrag leisten? Kontaktiert uns!**

Weitere Entwicklungen



- **CRS Repräsentierung in Linked Data (in Review)**
- **Map Style Repräsentierung in Linked Data in QGIS**
- **RDF File Validierung**
- **UI Verbesserungen**
- **Einpfelegen von GeoSPARQL 1.2 Änderungen**
- **Einfache Modifikationen von RDF Geodatensets**
- **Einbindung von Solid Pods als Datenquelle**
- **Support für Multi-Language Triple Stores**
- **Support für Layer welche aus mehreren (Geo)konzepten zusammengesetzt sind**
- **Automatisierungsansätze für Enrichment/Interlinking**

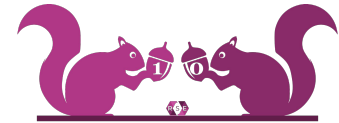
Danke!

Fragen?

timo.homburg@hs-mainz.de
rse@fthiery.de

<http://sparqlunicorn.link>

<https://plugins.qgis.org/plugins/sparqlunicorn/>



Research Squirrel Engineers



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