

# THE SPARQLING UNICORN

A RESEARCH TOOL FOR LINKED OPEN DATA IN QGIS  
AND GIT-ACTION-BASED ONTOLOGY DOCUMENTATION

TIMO HOMBURG & FLORIAN THIERY



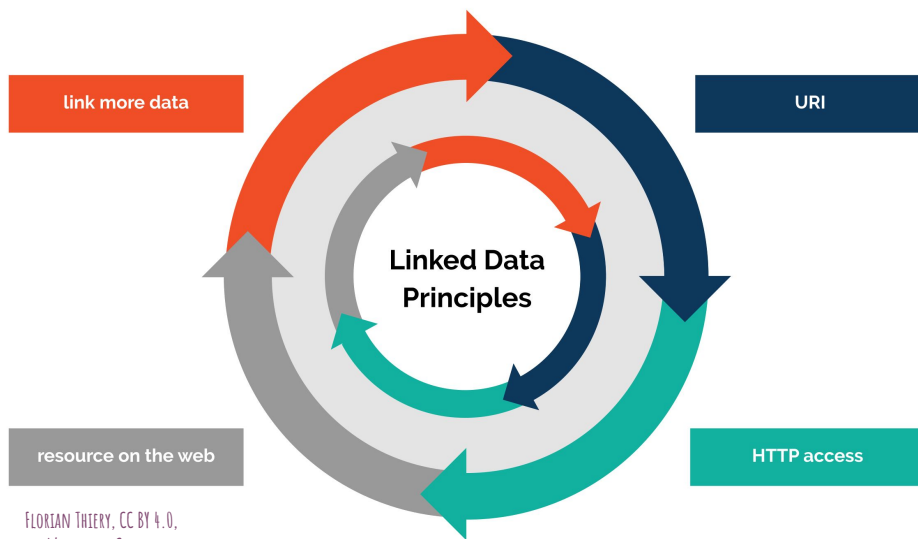
DERSE24 - CONFERENCE FOR RSENG IN GERMANY  
JMU WÜRZBURG / 05. - 07. MARCH 2024

SESSION: METADATA FOR RESEARCH SOFTWARE

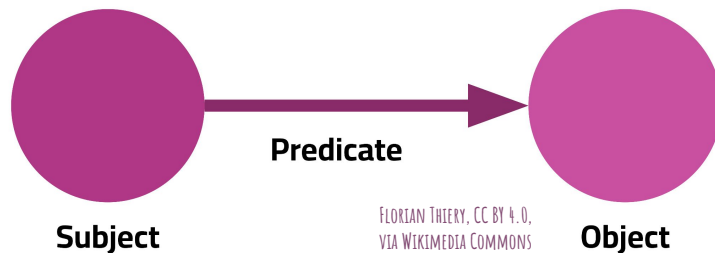
# INTRODUCTION: RESEARCH DATA

- At the end of many research projects stands the publication of research:
  - Research papers
  - **Data publications**
  - Software publications
- The publication of research data comes with many questions:
  - Which data formats?
  - Accessibility of data?
  - Long term storage and hosting?
  - Long term data provision using APIs?
  - Which metadata?
  - FAIR data?
  - Where to publish data?
  - How to generate views on data?
- How can we make research data long term usable with the least possible maintenance?





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VIA WIKIMEDIA COMMONS

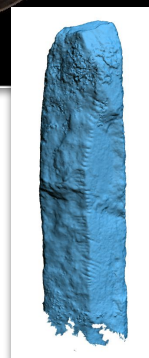
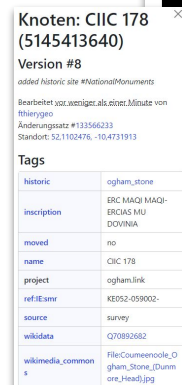
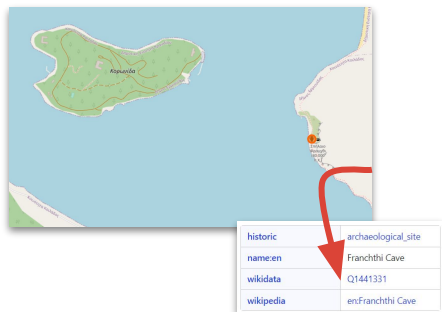


FOR THE LINKING OF DATA AND FAIRIFICATION,  
THE LINKED OPEN DATA (LOD) IS THE METHOD OF CHOICE.

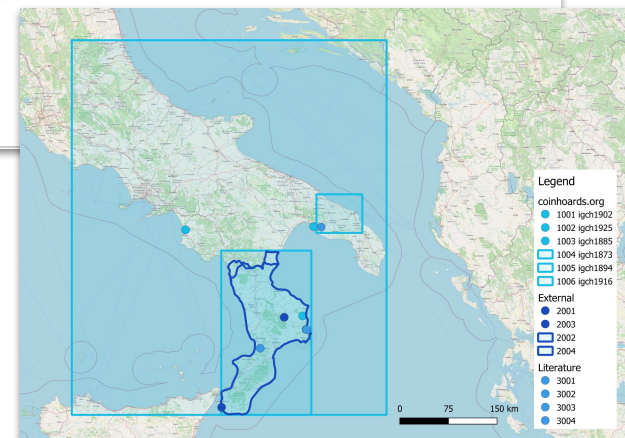
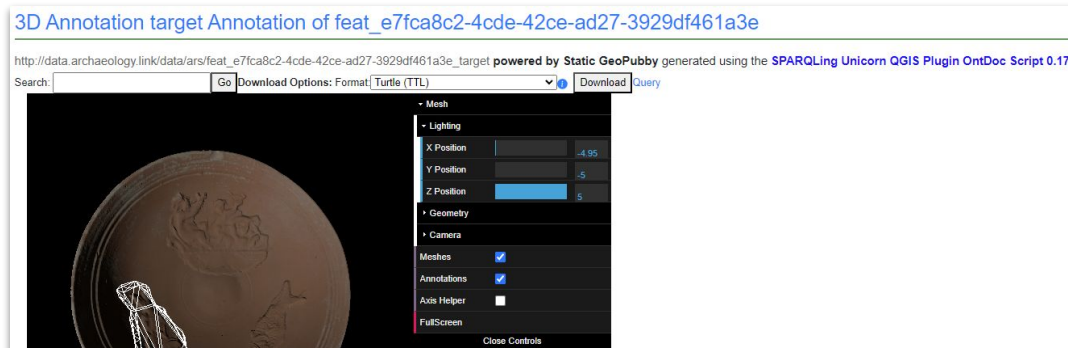
PUBLISHING RESEARCH DATA AS LOD

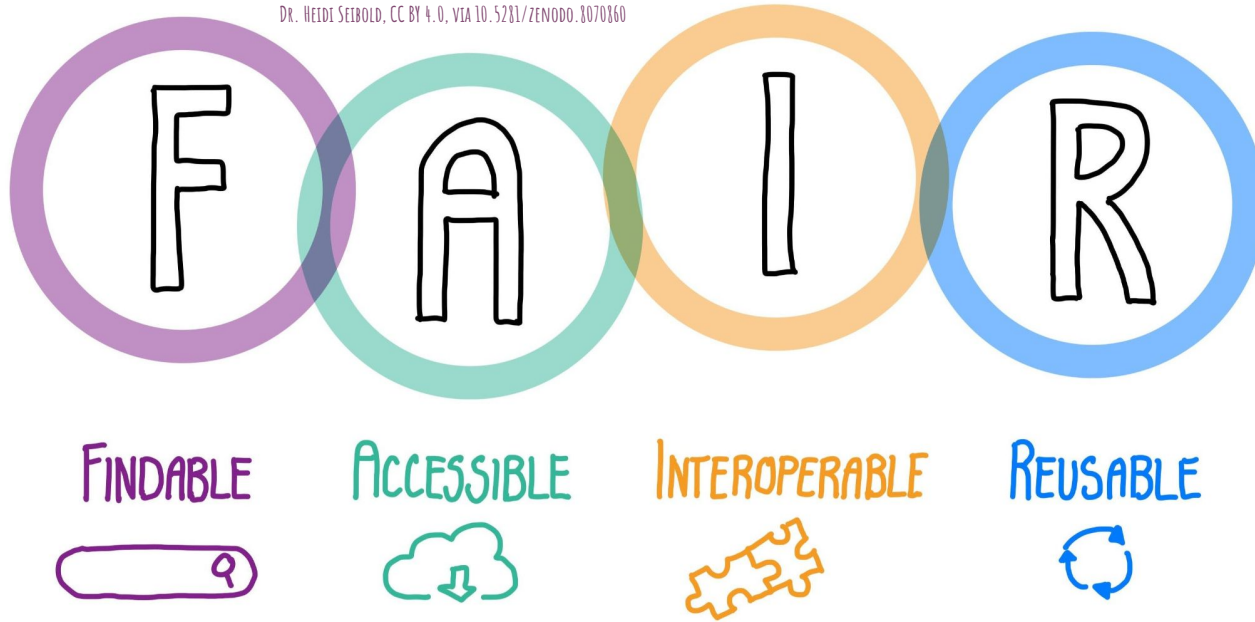
# INTRODUCTION: RESEARCH DATA AS LOD

- Research projects typically yield a variety of different research data as their results
- Data come in different formats and fulfil different functions
- Research data points to further research data
- To capture these relations, people tend to publish research data as linked open data



1 Ogham in 3D Project, DIAS, CC BY-NC-SA 3.0 Ireland





IN ORDER TO CREATE **FAIR**, REPRODUCIBLE AND UNDERSTANDABLE DATA  
FOR RE-USE, LOD MUST BE DOCUMENTED AND PUBLISHED.

# PUBLISHING LINKED OPEN DATA

- When publishing Linked Open Data, we have several expectations:

- 5-star principles of Linked Open Data
- FAIR publication
- Open license
- Reusing common vocabularies
- Long term storage of the dataset, e.g. with a DOI

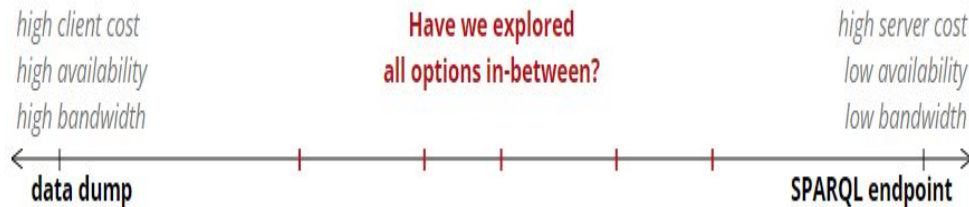
- Publish vocabularies independently of data

- Different ways to publish Linked Open Data:

- Data Dumps
- Linked Data Fragments
- SPARQL Endpoint

- Assumptions for this talk:

- No server resources exist after the research project is over
- The research institute cannot provide long term hosting
- The National Data Infrastructure is
  - Not in place
  - Not suitable for hosting the data
  - Not willing to accept the data



# LINKED DATA DUMPS

- Longterm hosting
- Sustainable
- Not easily discoverable by many research communities
- Experts knowledge is required to
- Linked Data Dumps are not necessarily Linked Open Usable Data
- How can we improve this situation?

## Motivation:

- Create Linked Open Usable Data (LOUD) Dumps
- What can we achieve in hosting data alone?
- How can we improve Linked Data Dump publications to be more user-friendly?

## Files

atos-2016_project.zip		
atos_2016_metadata.zip		
atos_2016_metadata		
includeonlypropswithuri_False		
V03_041_SLP_20200825_meta_atos2016.json		4.2 MB
V03_041_SLP_20200825_meta_atos2016.ttl		10.0 MB
includeonlypropswithuri_True		
V03_041_SLP_20200825_meta_atos2016.json		3.7 MB
V03_041_SLP_20200825_meta_atos2016.ttl		8.8 MB



# SPARQL UNICORN ONTOLOGY DOCUMENTATION TOOL

# DOCUMENTATION TOOL

- An extension of the SPARQLing Unicorn QGIS Plugin
- Idea: Convert an RDF Dump to an enriched HTML Deployment
- The result should be ready to host on platforms such as Github and Gitlab Pages
- The Documentation Process should be usable as Continuous Integration components
- The Deployment should be in such a way that it is useful for a maximum of research communities

SPARQLing Unicorn QGIS Plugin

Layer

Linked Data Processing Queryhelper Einstellungen Hilfe

Abfragen Interaktionen Anreicherung (Experimentelle)

Endpunkt auswählen: Wikidata -> Item Typo (3) Quick Add RDF Resource

Queryvorlagen: Item-Label Layer Name: en\_t\_museum\_(wd:q20769)

Valid Query

```
1 SELECT ?item ?itemLabel ?geo WHERE {
2 ?item wdt:P31 wd:Q20769 .
3 ?item wdt:P625 ?geo .
4 SERVICE wikibase:label {
5 bd:serviceParam wikibase:language "[AUTO_LANGUAGE] en".
6 }
7 } LIMIT 10
```

Gezeichnete Queries: ChristSch Query laden Queryname: Query speichern

Layer hinzufügen

Language for query results: English (en)

Marketplace / Actions / sparqlunicorn-ontdoc

Delist



## SPARQL Unicorn Ontology Documentation

DOI: 10.5281/zenodo.8190763

This repository hosts a standalone version of the HTML documentation feature included in the SPARQLing Unicorn QGIS Plugin.

Rather than initiating the documentation generation within the SPARQLing Unicorn QGIS Plugin, this python script allows the generation of the documentation standalone or as a Github Action.

The standalone script does not rely on QGIS classes and does not provide the full functionality available in the SPARQL Unicorn QGIS Plugin.

Deviations from the SPARQLing Unicorn Plugin are listed as follows:

- Support for less geometry literals: Only WKT and GeoJSON literals are supported for rendering

### Usage Example as Github Action

For a usage example please refer to this repository:  
[https://github.com/sparqlunicorn/sparqlunicornGoesGIS\\_testdoc](https://github.com/sparqlunicorn/sparqlunicornGoesGIS_testdoc)

### Usage Example as Gitlab CI Workflow

For a usage example please refer to this repository:  
[https://gitlab.com/sparqlunicorn/sparqlunicornGoesGIS\\_testdoc](https://gitlab.com/sparqlunicorn/sparqlunicornGoesGIS_testdoc)

### Installation as PIP package

You can install the ontology documentation script as a pip package using the following command:

```
pip install -U git+https://github.com/sparqlunicorn/sparqlunicornGoesGIS-ontdoc@0.17dev
```



### Contributors



### Categories

Deployment Utilities

### Links

[sparqlunicorn/sparqlunicornGoesGIS-ontdoc](https://github.com/sparqlunicorn/sparqlunicornGoesGIS-ontdoc)

Open issues 0

Pull requests 0

Report abuse

sparqlunicorn-ontdoc is not certified by GitHub. It is provided by a third-party and is governed by separate terms of service, privacy policy, and support documentation.



# DOCUMENTATION TOOL: HOW TO USE IT

1. Load an RDF Data Dump File
2. Select one or more data namespaces which should be documented as HTML
3. Select a target folder and customize your export
4. Start HTML Generation to a local folder
5. Optional Deployment to a webpace

## Ontology Documentation Generation

Create ontology documentation for data instances in this dialog

RDF File:

Namespace:

Export Path:

Preferred Language:

Start Concept:

Data License:

☐ Create Additional Collections ☒ Create Index Pages

☐ Create Metadata Table ☐ Create Pages for Non-Namespace URIs

☐ Portable Version

Create Documentation

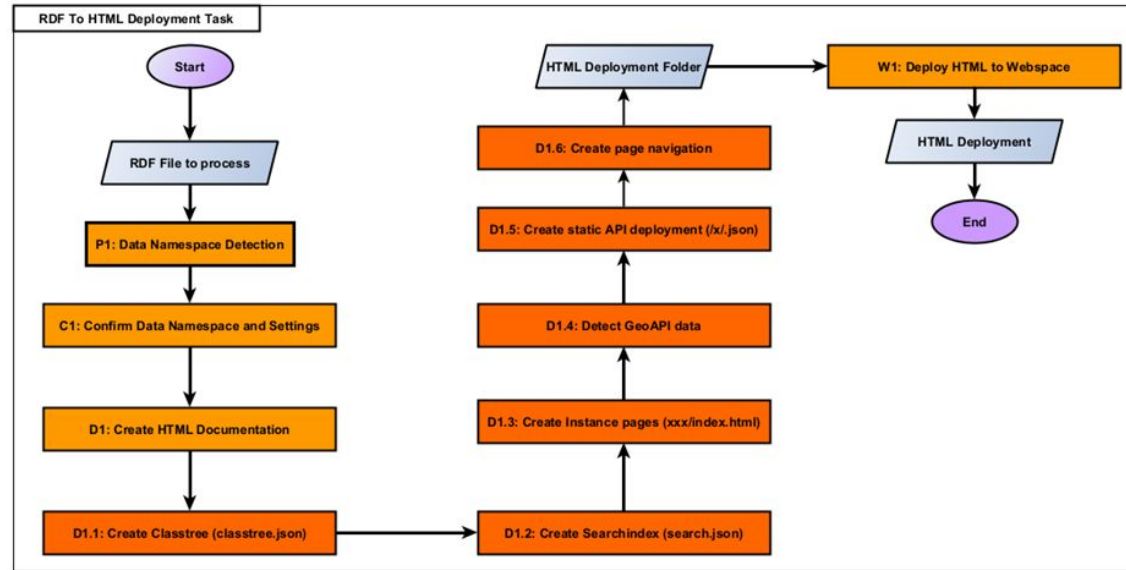


Table Style Color:

Page Logo:

Graph Display: ☐ Create Visual OWL (VOWL) View on index pages

# DOCUMENTATION TOOL: HTML+RDFa RENDERING


- Idea: Create static web pages that mimic already established Linked Open Data Browsers
- Generate a Protégé-inspired class tree for navigation
- Create statistics of the dataset and publish them using VOID files
- Detect a variety of common vocabularies to create customized page widgets and pages:
  - 3D Model Viewer
  - Leaflet View for Geometries
  - Dictionary View for Ontolex-Lemon dictionaries

Example: [ARS-LOD Data](#)

Atlante 32

http://data.archaeology.link/data/ars/ir\_9427cde3-2334-40c2-9a24-da6b1ec29d69 powered by Static GeoPubby generated using the SPARQLing Unicorn QGIS Plugin OntDoc Script 0.17

Search:  Go Download Options: Format:  Turtle (TTL)



Property	Value
hasImage (lido hasImage)	► 18 values
type (rdf type)	Atlante (lido Atlante) [x]
label (rdfs label)	Atlante 32 (rdf langShing) (iso6391 an)
isDepictsReference (lido depictsReference) of	► 18 values
isMember (rdfs member) of	Atlante Instances Collection (ars Atlante_collection)

Metadata

Property	Value
identifier (dcterms identifier)	9427cde3-2334-40c2-9a24-da6b1ec29d69 (xsd string)
isReferencedBy (hermes isReferencedBy)	Atlante (1981). p. 167 (ars ir_9427cde3-2334-40c2-9a24-da6b1ec29d69_ref)
inDataset (void inDataset)	ars_dataset (ars ars_dataset) [7487 lido:Armstrong]
wasAttributedTo (prov1 wasAttributedTo)	ImportPythonScript_ARS3D (ars ImportPythonScript_ARS3D)
wasDerivedFrom (prov1 wasDerivedFrom)	Q195268778 (yde Q195268778) [x]
wasGeneratedBy (prov1 wasGeneratedBy)	activity_ir_9427cde3-2334-40c2-9a24-da6b1ec29d69 (ars activity_ir_9427cde3-2334-40c2-9a24-da6b1ec29d69)

GeoClasses

Search:

- 3DModel (lido 3DModel) [322]
- Activity (prov Activity) [1997]
- Annotation (oa Annotation) [1173]
- BibliographicReference (biro BibliographicReference) [470]
- Book (bibo Book) [1]
- CartesianCS (geocrs CartesianCS) [1]
- CoordinateSystemAxis (geocrs CoordinateSystemAxis) [3]
- Depiction (lido Depiction) [268]
- E17\_TypeAssignment (cm E17\_TypeAssignment) [110]
- E3\_Condition\_State (cm E3\_Condition\_State) [3]
- E57\_Material (cm E57\_Material) [3]
- Feature (lido Feature)
- GenericPattern (lido GenericPattern) [6]
- IconographyType (lido IconographyType)
- Armstrong (lido Armstrong) [298]
- Atlante (lido Atlante) [24]
  - Atlante 125 (ars ir\_d8e77543-0643-4808-b075-1518a)
  - Atlante 13 (ars ir\_bdf3acde-c96f-4048-819b-e0f221d)
  - Atlante 133 (ars ir\_c4d9db03-9105-4064-bc2b-477b4)
  - Atlante 135 (ars ir\_c30c1b2-9c7e-45ec-833b-f734e1)
  - Atlante 14 (ars ir\_9526408c-7d7b-418f-8757-b37adac)
  - Atlante 155 (ars ir\_39123b0c-4331-4911-859a-3b3c3)
  - Atlante 166 (ars ir\_96390c45-b0b8-4d84-8007-61b694)
  - Atlante 181 (ars ir\_59f79782-b5d7-4a76-b1ca-01939)
  - Atlante 182 (ars ir\_718b0de1-c676-4028-b428-9a45b)
  - Atlante 32 (ars ir\_9427cde3-2334-40c2-9a24-da6b1ec29d69)**
  - Atlante 39 (ars ir\_0780223-1d7e-4803-a32a-2c7d4011)
  - Atlante 41 (ars ir\_54f59c4-c458-4c02-a41e-080ca8)
  - Atlante 50 (ars ir\_adc7829-7811-4e11-8211-9548255a)
  - Atlante 8 (ars ir\_852eaa42-5371-4910-a995-cf01385)
  - Atlante 9 (ars ir\_8d5e45de-a0bb-4cfc-9111-863905d8)
  - Atlante 95 (ars ir\_8d080881-5f5b-40ee-ba74-045a271)
  - Atlante C IX (ars ir\_f5dcd133-4e8a-4a03-8977-318ead)
  - Atlante C V (ars ir\_0a734045-b0a3-495c-a0fc-b03395)
  - Atlante D XI (ars ir\_2be77baa-2800-4a9f-b03f-54a6e6)
  - Atlante D XI (ars ir\_c30c1b2-9c7e-45ec-833b-f734e1)
  - Atlante E XVI (ars ir\_430bb126-1043-4343-8001-4d02)
  - Atlante VIII A1b (ars ir\_5a3a9c0c-bc4e-440f-9115-23a)
  - Atlante X B1a (ars ir\_8c37fac1-71e0-4135-8aa3-c715)
  - Atlante a1 (ars ir\_ade138b2-dc2b-41bc-a924-71e606)
- Hayes (lido Hayes) [39]
- Loewenstein (lido Loewenstein) [109]

# DOCUMENTATION TOOL: SPARQLING DATA DUMPS IN JS

- Static Deployments cannot provide SPARQL endpoints
- Data Dumps can be queried in-browser using JavaScript
- Data Dumps can be queried by external tools loading the Linked Data Dump File

## Example

The screenshot displays the SPARQL Query Editor interface. At the top, it states "powered by Static GeoPubby generated using the SPARQLing Unicorn QGIS Plugin OntDoc Script 0.16". Below this is a search bar with a "Go" button and a dropdown menu for "Download Options: Format (Turtle (TTL))". A "Download Query" button is also present. The main query area contains the following SPARQL query:

```
1 SELECT ?sub ?pred ?obj
2 WHERE {
3   BIND(<http://data.archaeology.link/data/spphaefen/Person_collection> AS ?sub)
4   ?sub ?pred ?obj .
5 }
6
```

Below the query area, the results are displayed in a table format. The table has three columns: "Table", "Response", and "Geo". The results show 169 results in 1 second. The results are organized into three sections: "pred", "obj", and "sub". Each section contains a list of URIs and their corresponding values.

Table	Response	Geo
pred		
1	<http://www.w3.org/1999/02/22-rdf-syntax-ns#type>	
2	<http://www.w3.org/1999/02/22-rdf-syntax-ns#type>	
3	<http://www.w3.org/1999/02/22-rdf-syntax-ns#type>	
4	<http://www.w3.org/1999/02/22-rdf-syntax-ns#type>	
5	<http://www.w3.org/2000/01/rdf-schema#label>	
6	<http://rdfs.org/ns/void#inDataset>	
7	<http://www.w3.org/2006/vcard/ns#hasMember>	
8	<http://www.w3.org/2006/vcard/ns#hasMember>	
9	<http://www.w3.org/2006/vcard/ns#hasMember>	
10	<http://www.w3.org/2006/vcard/ns#hasMember>	
11	<http://www.w3.org/2006/vcard/ns#hasMember>	
12	<http://www.w3.org/2006/vcard/ns#hasMember>	
13	<http://www.w3.org/2006/vcard/ns#hasMember>	
14	<http://www.w3.org/2006/vcard/ns#hasMember>	
15	<http://www.w3.org/2006/vcard/ns#hasMember>	
16	<http://www.w3.org/2006/vcard/ns#hasMember>	
17	<http://www.w3.org/2006/vcard/ns#hasMember>	
obj		
1	<http://www.w3.org/2006/vcard/ns#Group>	
2	<http://www.w3.org/ns/ldp#BasicContainer>	
3	<http://www.w3.org/ns/ldp#Container>	
4	<http://www.w3.org/ns/ldp#Resource>	
5	"Person Instances Collection"***<http://www.w3.org/1999/02/22-rdf-syntax-ns#namestring>	
6	<http://data.archaeology.link/data/spphaefen/spp_dataset>	
7	<http://data.archaeology.link/data/spphaefen/author_Alves_Francisco_JS>	
8	<http://data.archaeology.link/data/spphaefen/author_Ammann_Brigitta>	
9	<http://data.archaeology.link/data/spphaefen/author_Amstutz_Marco>	
10	<http://data.archaeology.link/data/spphaefen/author_Andersen_Soren_H>	
11	<http://data.archaeology.link/data/spphaefen/author_Ansieau_Cécile>	
12	<http://data.archaeology.link/data/spphaefen/author_Arnold_Béat>	
13	<http://data.archaeology.link/data/spphaefen/author_Ayala_Grègoire>	
14	<http://data.archaeology.link/data/spphaefen/author_Bartoli_Dante>	
15	<http://data.archaeology.link/data/spphaefen/author_Beaudouin_Francois>	
16	<http://data.archaeology.link/data/spphaefen/author_Becker_D>	
17	<http://data.archaeology.link/data/spphaefen/author_Beltrame_Carlo>	
sub		
1	<http://data.archaeology.link/data/spphaefen/Person_collection>	
2	<http://data.archaeology.link/data/spphaefen/Person_collection>	
3	<http://data.archaeology.link/data/spphaefen/Person_collection>	
4	<http://data.archaeology.link/data/spphaefen/Person_collection>	
5	<http://data.archaeology.link/data/spphaefen/Person_collection>	
6	<http://data.archaeology.link/data/spphaefen/Person_collection>	
7	<http://data.archaeology.link/data/spphaefen/Person_collection>	
8	<http://data.archaeology.link/data/spphaefen/Person_collection>	
9	<http://data.archaeology.link/data/spphaefen/Person_collection>	
10	<http://data.archaeology.link/data/spphaefen/Person_collection>	
11	<http://data.archaeology.link/data/spphaefen/Person_collection>	
12	<http://data.archaeology.link/data/spphaefen/Person_collection>	
13	<http://data.archaeology.link/data/spphaefen/Person_collection>	
14	<http://data.archaeology.link/data/spphaefen/Person_collection>	
15	<http://data.archaeology.link/data/spphaefen/Person_collection>	
16	<http://data.archaeology.link/data/spphaefen/Person_collection>	
17	<http://data.archaeology.link/data/spphaefen/Person_collection>	

# DOCUMENTATION TOOL: DATA EXPORTS

- Different research communities are used to data being provided differently
- The SPARQL Unicorn Ontology Documentation Tool may create data exports for the following communities:
  - Different RDF serializations (.TTL, .JSON-LD, .N3)
  - Graph Analysis Data (.graphml, .gexf among others)
  - GeoExports (GeoJSON, KML, GML)
  - Relational Data Exports (.CSV, .TSV, .JSON)

The screenshot shows the 'Ontology Documentation Generation' dialog box with the 'Data Exports' tab selected. The dialog is titled 'Ontology Documentation Generation' and has a close button in the top right corner. The main area is divided into two sections: configuration on the left and export selection on the right.

**Configuration Section:**

- Create ontology documentation for data instances in this dialog**
- RDF File:** C:\Users\timohamburg\git\CIGS\_RDF\cigs\_result.ttl
- Namespace:** http://data.archaeology.link/data/cigs/
- Export Path:** (empty)
- Preferred Language:** English (en)
- Start Concept:** CuneiformSite
- Data License:** CC BY-SA 4.0
- ☐ Create Additional Collections
- ☒ Create Index Pages
- ☐ Create Metadata Table
- ☐ Create Pages for Non-Namespace URIs
- ☐ Portable Version
- Create Documentation** (button)

**Data Exports Section:**

Select data exports to be generated

Export Type	Selected Exports
RDF Exports:	NT, N3
Graph Exports:	GEXF, GraphML
Geo Exports:	GeoJSON
Miscellaneous Exports:	CSV, TSV

# DATADUMP METADATA - VOID(EXT)

- Machine-readable discovery of the dataset
  - Automatically generated topics from vocabulary usage (e.g. GeoSPARQL: dbp:geodata)
  - Automatically derived topics from vocabulary statements
  - Statistics about the dataset (how many triples, subjects, predicates, objects etc.)
  - Which vocabularies are used?
  - Connections to other datastores

## Example

### ▼ Dataset Statistics [VOID]

Property	Value
<a href="#">classes</a>	7 (xsd:integer)
<a href="#">entities</a>	17159 (xsd:integer)
<a href="#">distinctObjects</a>	53326 (xsd:integer)
<a href="#">distinctSubjects</a>	18678 (xsd:integer)
<a href="#">properties</a>	20 (xsd:integer)
<a href="#">triples</a>	115216 (xsd:integer)
<a href="#">propertyClasses</a>	0 (xsd:integer)
<a href="#">averagePropertyIRILength</a>	38 (xsd:integer)
<a href="#">languages</a>	1 (xsd:integer)
<a href="#">distinctBlankNodes</a>	0 (xsd:integer)
<a href="#">datatypes</a>	0 (xsd:integer)
<a href="#">distinctLiterals</a>	35576 (xsd:integer)
<a href="#">averageSubjectIRILength</a>	77 (xsd:integer)
<a href="#">averageObjectIRILength</a>	62 (xsd:integer)
<a href="#">averageLiteralLength</a>	17 (xsd:integer)
<a href="#">distinctIRIReferences</a>	72024 (xsd:integer)
<a href="#">distinctRDFNodes</a>	107600 (xsd:integer)



# DATADUMP METADATA - CLASSTREE (VOCABULARY)

- Human-readable Discovery
  - Classtree navigation
  - Additional generation of Collection instances for better navigation
  - Data Schema Views on Class Items
  - Views on the position of classified items in the graph
  - Classtree is captured as its own vocabulary

(<https://purl.org/vocab/classtree>)



**Applique (lado:Applique)**

Show 10 entries Search:

Incoming Concept	Incoming Relation	Concept	Outgoing Relation	Outgoing Concept
		Applique (lado:Applique)	depicts	Depiction
		Applique (lado:Applique)	depictsReference	Loewenstein
		Applique (lado:Applique)	depictsReference	Armstrong
		Applique (lado:Applique)	depictsReference	Atlante
		Applique (lado:Applique)	madeBy	ProductionMethod
		Applique (lado:Applique)	inDataset	Dataset
		Applique (lado:Applique)	inDataset	Asset
		Applique (lado:Applique)	wasGeneratedBy	Activity
ARS_Object	carries	Applique (lado:Applique)		
skos.Collection	rdfs.member	Applique (lado:Applique)		

Showing 1 to 10 of 10 entries Previous 1 Next Close

GeoClasses:

Search:

- 3DModel (lado:3DModel) [322]
- Activity (prov:Activity) [1997]
- Annotation (oa:Annotation) [1173]
- BibliographicReference (biro:BibliographicReference) [470]
- Book (bib:Book) [1]
- CartesianCS (geocrs:CartesianCS) [1]
- CoordinateSystemAxis (geocrs:CoordinateSystemAxis) [3]
- Depiction (lado:Depiction) [268]
- E17\_TypeAssignment (crm:E17\_TypeAssignment) [10]
- E3\_Condition\_State (crm:E3\_Condition\_State) [3]
  - fragmented (ars:fragmentedCondition)
  - reconstructed (ars:reconstructedCondition)
  - unknown condition (ars:unknownCondition)
- E57\_Material (crm:E57\_Material) [3]
- Feature (lado:Feature)
  - Applique (lado:Applique) [467]
    - Abraham (ars:feat\_abb8adbd-3a68-471f-aa52-09480-...
    - Abraham (ars:feat\_ac43b3b7-0dd0-4cf4-b618-d628a2-...
    - Achilles and Chiron (ars:feat\_3f356395-4c55-43e3-a1-...
    - Achilles and Hector (ars:feat\_97da8052-ca40-4363-b1-...

**Applique (lado:Applique) [467]**

Show 10 entries Search:

Type	Relation	Value
depicts	depicts [x]	Depiction [2]
depictsReference	depictsReference [x]	Loewenstein [1] Armstrong [1] Atlante [1]
hasTarget	hasTarget [x]	
identifier	identifier [x]	
image	image [x]	
inDataset	inDataset [x]	Dataset [1] Asset [1]
madeBy	madeBy [x]	ProductionMethod [1]
rdf:type	rdf:type [x]	
rdfs:label	rdfs:label [x]	
wasAttributedTo	wasAttributedTo [x]	

Showing 1 to 10 of 12 entries Previous 1 2 Next Close



# STATIC APIS

- *“A collection of flat (JSON?) files that live on a webspace”*
- Static APIs may be used to mimic existing APIs with a sacrifice of features that real APIs provide
- We can use static APIs to provide data in RDF Dumps to research communities in ways they are used to
- Do other (research-)communities provide static API definition that are useful?
  - Do they have to?
  - Can we adopt supposedly non-static APIs and publish them statically?

Which APIs, in their static form, provide enough functionality to be useful?

# STATIC APIS: EXAMPLE QGIS AND OGC API FEATURES

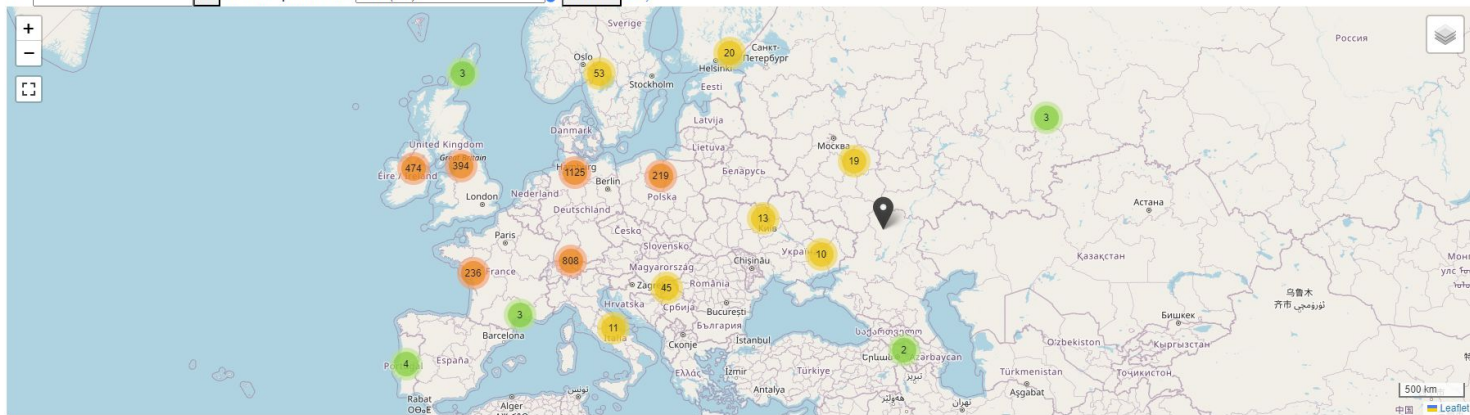
## SPPHarbour Dataset:

### Harbour Instances Collection

- A dataset of medieval Harbours in Europe
- GeoData modeled with the GeoSPARQL vocabulary
- Static Deployment as a Github Page

[http://data.archaeology.link/data/spphaefen/Harbour\\_collection](http://data.archaeology.link/data/spphaefen/Harbour_collection) powered by Static GeoPubby generated using the [SPARQLing Unicorn QGIS Plugin OntDoc Script 0.17](#)

Search:  Go Download Options: Format  Turtle (TTL)



Property	Value
<code>type</code> (rdf:type)	<a href="#">FeatureCollection</a> (gsp:FeatureCollection) [x]
<code>label</code> (rdfs:label)	Harbour Instances Collection (rdf:langString) (iso6391:en)
<code>member</code> (rdfs:member)	► 3450 values
<code>is exampleResource</code> (void:exampleResource) of	<a href="#">spp_dataset</a> (spp:spp_dataset) [99492 frapo:isOutputOf]
<code>is rootResource</code> (void:rootResource) of	<a href="#">spp_dataset</a> (spp:spp_dataset) [99492 frapo:isOutputOf]

#### Metadata

Property	Value
<code>inDataset</code> (void:inDataset)	<a href="#">spp_dataset</a> (spp:spp_dataset) [99492 frapo:isOutputOf]

# STATIC APIS: EXAMPLE QGIS AND OGC API FEATURES

## In QGIS:

- Add static deployment as OGC API Features service
- Classes in RDF graph become FeatureCollection definitions in QGIS
- Only full FeatureCollections can be loaded
- No serverside filtering/searching

The screenshot displays the QGIS desktop environment. On the left, the 'Browser' panel shows a list of layers, including 'Rhine' and 'OpenStreetMap'. The main map area shows a geographical view of Central Europe, with the Rhine river highlighted. On the right, the 'Identifikationsergebnis' (Identification Results) panel shows a table of results for the 'Rhine' layer.

Objekt	Wert
Rhine [1]	Koblenz-Ehrenbreitstein 'Schiff 3'
id	<a href="http://data.archaeology.link/data/spphaefen/1817">http://data.archaeology.link/data/spphaefen/1817</a>
http://purl.org/ceif/fragments/OutputOf	<a href="http://purl.org/dc/elements/1.1/created">http://purl.org/dc/elements/1.1/created</a>
http://purl.org/dc/elements/1.1/creator	<a href="http://data.archaeology.link/data/spphaefen/1_knoeper">http://data.archaeology.link/data/spphaefen/1_knoeper</a>
http://purl.org/dc/terms/alternateBy	NULL
http://purl.org/dc/terms/partOf	<a href="http://data.archaeology.link/data/spphaefen/sib_dkt_mssds_00033241">http://data.archaeology.link/data/spphaefen/sib_dkt_mssds_00033241</a>
http://www.opengis.net/ont/geosparql#hasGeometry	<a href="http://data.archaeology.link/data/spphaefen/1817_gesam">http://data.archaeology.link/data/spphaefen/1817_gesam</a>
http://www.spp-haefen.de/ont#locationSecure	reliable
http://www.spp-haefen.de/ont#place_technique	<a href="http://www.wikidata.org/entity/Q2457900">http://www.wikidata.org/entity/Q2457900</a>
http://www.w3.org/1999/02/22-rdf-syntax-ns#type	<a href="http://www.spp-haefen.de/ont#harbour">http://www.spp-haefen.de/ont#harbour</a>
http://www.w3.org/2000/01/rdf-schema#comment	Not scientifically researched
http://www.w3.org/2000/01/rdf-schema#label	Koblenz-Ehrenbreitstein 'Schiff 3'
http://www.w3.org/2004/02/riks/ont#note	Fehr 1998, Fehr 1998, S. 10; Fehr 2000, S. 11; Kaltenbach 1998, Fehr 2000, Kaltenbach 1998
http://www.w3.org/2006/time#hasTime	<a href="http://data.archaeology.link/data/spphaefen/1817_foundation">http://data.archaeology.link/data/spphaefen/1817_foundation</a>
http://www.wikidata.org/prop/direct/P17	<a href="http://www.wikidata.org/entity/Q1181">http://www.wikidata.org/entity/Q1181</a>
http://www.wikidata.org/prop/direct/P206	<a href="http://www.wikidata.org/entity/Q2584">http://www.wikidata.org/entity/Q2584</a>
begin	1600
end	1700
http://www.w3.org/2000/01/rdf-schema#label	Koblenz-Ehrenbreitstein 'Schiff 2'
http://www.w3.org/2000/01/rdf-schema#label	Koblenz-Ehrenbreitstein 'Schiff 1'

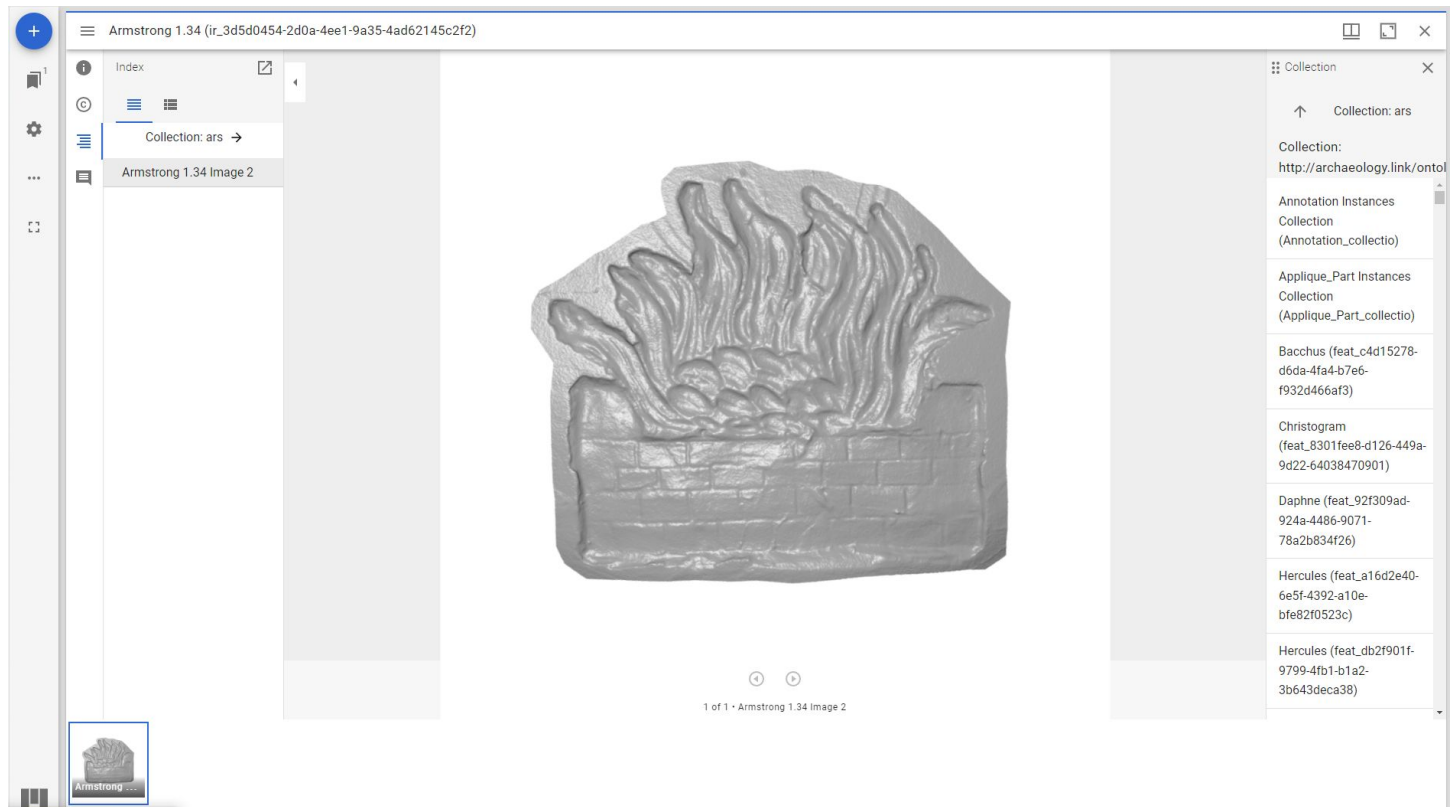
Below the map, a list of layers is shown, including 'SPP' and 'Rhine'. The 'SPP' layer is expanded, showing a list of features: 1, 2, 3, 4, Achterwasser, Adda, Adour, Adria, Aller, Allier, Alster, Alte Elde, Alter See, Altmühl, Amstel, Ancholme, Anfora Canal, Ara, Arendsee, and Arlau.

On the right, a dialog box titled 'WFS-Verbindung ändern' (Change WFS Connection) is open. It shows the connection details for 'SPP' with the URL 'https://archaeolink.github.io/SPP1630Harbours-RDF/index.json'. The authentication is set to 'Keine Authentifizierung' (No authentication). The dialog also includes a section for 'WFS-Optionen' (WFS Options) with a 'Bestimmen' (Determine) button.

# STATIC APIs: EXAMPLE IIIF

- Expose Image data hosted on Zenodo using a static IIIF Deployment
- Use the JS Viewer Mirador (deployed with the HTML Dump) or any other IIIF View to access the data
- Only image loading is supported
- Image resizing, rotating etc. would require a server

## Example



# STATIC APIS: EXAMPLE CKAN

- Expose generated data export formats via the well-known CKAN API
- Datasets become accessible for a variety of CKAN clients without losing their linked open data context
- Searching via CKAN does not work
- Listing all CKAN datasets works

## Example

[https://archaeolink.github.io/CIGS\\_RDF/api/3/](https://archaeolink.github.io/CIGS_RDF/api/3/)

The screenshot shows the 'Open Data (CKAN) Browser' application window. The interface is divided into several sections:

- Suchbegriff:** A search bar with a magnifying glass icon and a 'Suche starten' button.
- Suche nach Kategorie filtern:** A list of categories with checkboxes. 'Feature (gsp:Feature)' is selected.
- Suchergebnis: 698 Datensätze**: A list of dataset identifiers. 'nonns\_94277' is highlighted in blue.
- Beschreibung:** A text area showing 'no author', 'no author\_email', and 'CC BY 4.0'.
- Gefundene Daten:** A section with a 'Datensatz zum Laden auswählen.' button and three radio buttons for output formats: 'TTL: nonns\_94277 (text/ttl)', 'JSON: nonns\_94277 (application/json)', and 'HTML: nonns\_94277 (text/html)'.
- Ressourcen URL:** A text area with a 'Dokument' icon.
- Footer:** Includes 'Aktiver Server: https://archaeolink.github.io/CIGS\_RDF/api/3/', 'Cache Verzeichnis: C:/Users/timohomburg/Documents', 'Plugin Version: 0.4.0', and buttons for 'CKAN Server auswählen', 'Nutzungshinweis', 'Seite 1/14', '<', '>', 'Daten laden', and 'Beenden'.

# SPARQL UNICORN ONTOLOGY DOCUMENTATION IN RDM

- SPARQL Unicorn Ontology Documentation **helps with:**
  - Publishing Research Data
  - Archiving Research Data
- SPARQL Unicorn Ontology Documentation **enables:**
  - Research Data Discovery
  - Research Data Reuse
- SPARQL Unicorn Ontology Documentation **simplifies:**
  - Research Data Analysis
  - Research Data Processing

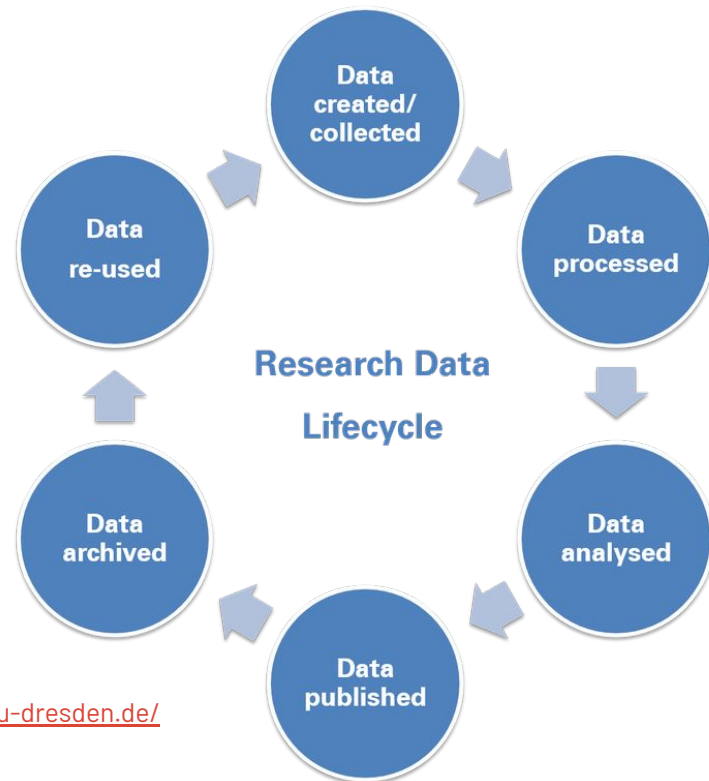


Image by <https://tu-dresden.de/>

# CONCLUSIONS

- Research projects producing linked open data are often constrained to publishing LOD Dumps
- Discoverability of RDF Dumps by different communities can be enhanced by
  - Providing HTML Renderings
  - Additional data exports
  - Data access via static APIs
- We believe that easily generated access to LOUD Dumps can be a way to enhance the exposure and reuse of research data

## FUTURE WORK

- Publishing RDF Dump Contents as Public Solid Pods
- Detection and visualization of further vocabulary contents
- Integration of further common (static) APIs
- HTML Templating



# FINIS!

## QUESTIONS?

