Project IKON
Visualising Potentials for Knowledge Transfer at Research Museums

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I. Project Members & Partner

Jonas Oppenländer

Responsibilities:

Technology, Administration, Controlling

Areas:

Ontology, Data Engineering, Data Integration

+ 2 students

Jesse Benjamin

Responsibilities:

Project Partner Liaison, External Communications

Areas:

Design, Visualisation, Interaction

+ 1 student

Project Partner

museum für
naturkunde
berlin

Part of the BMBF-funded project:
Knowledge Transfer Concept for Research Information, Methods, and Competencies in Research Museums
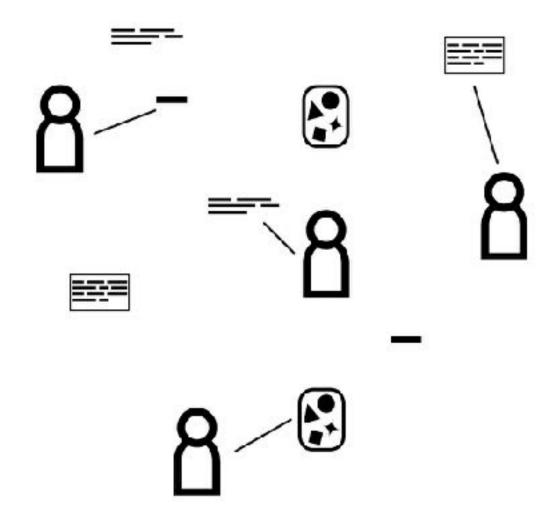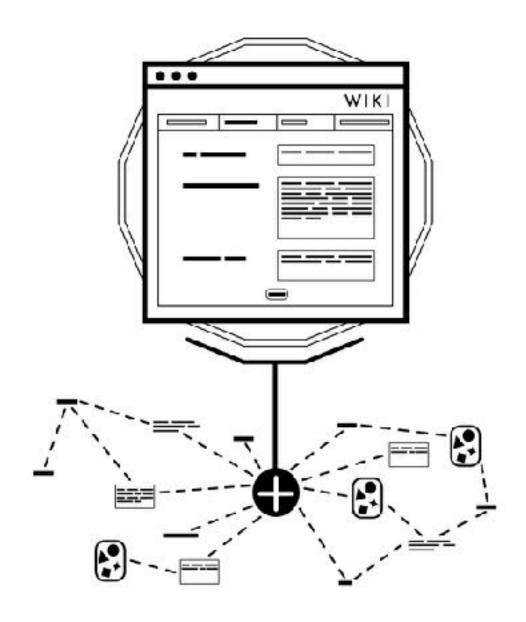
Biodiversitätswand © Museum für Naturkunde

II.   Project Overview

SOCIO-
        TECHNICAL
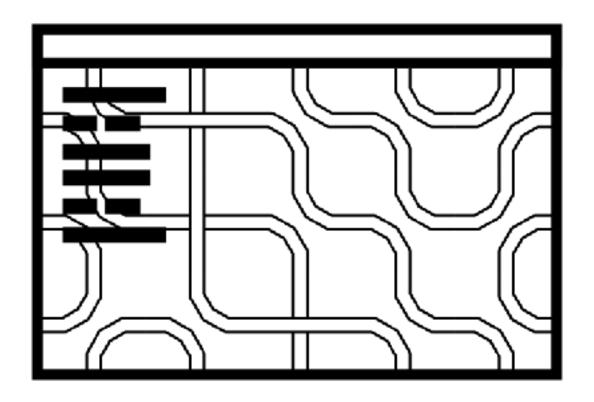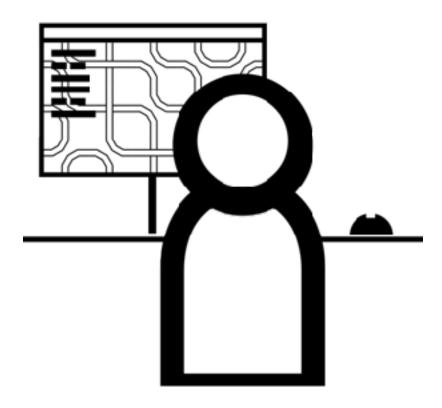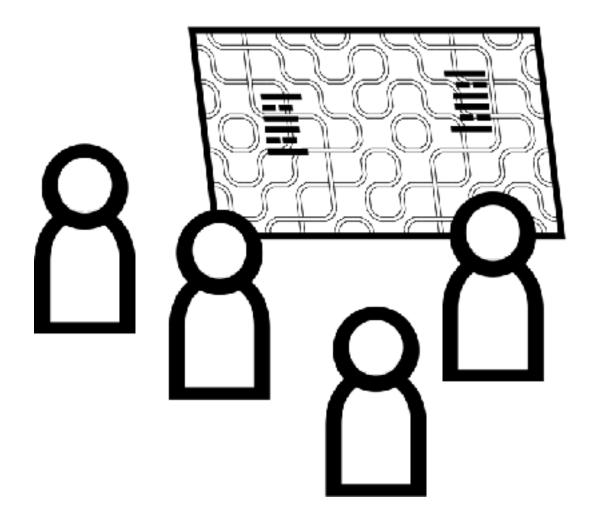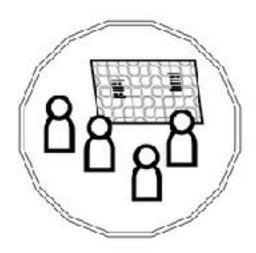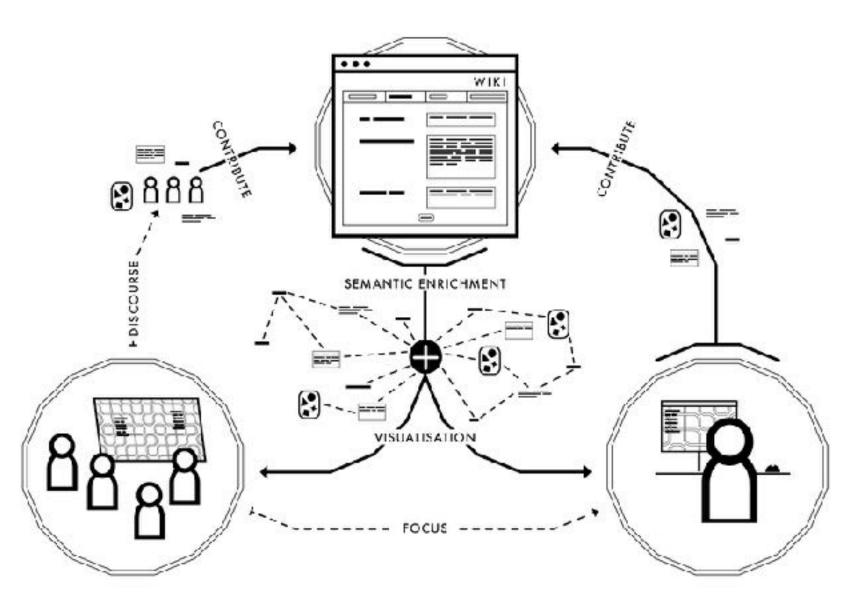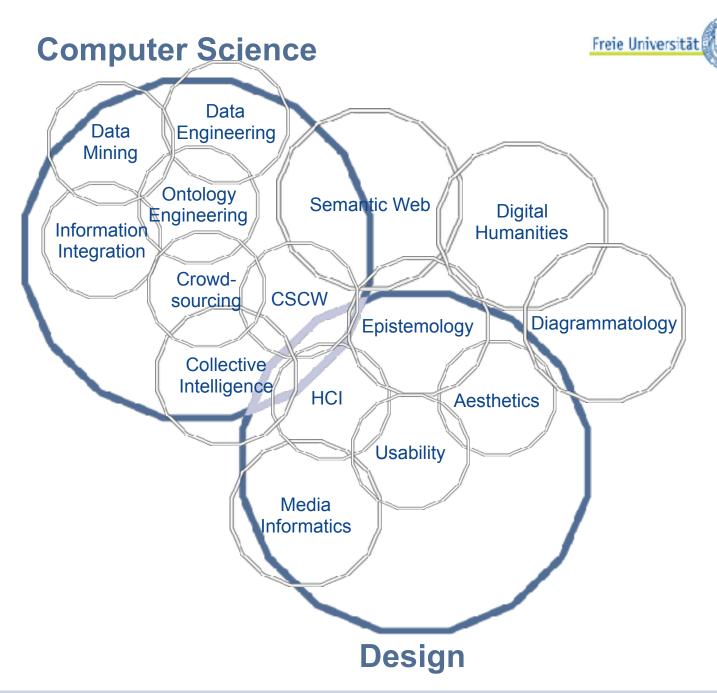
III.   Research Topics

Concepts

Controlled Vocabulary	Glossary	Taxonomy	Thesaurus	Ontology
Finite list of terms	List of terms + informal **definitions** of their meaning	List of terms organised in a **hierarchical** structure	Controlled vocabulary connected via **relations** between terms (e.g. "narrower/broader", "related term", "synonym")	Formal representation of a set of concepts and the relationships between them using **axioms**

Karam, N., Müller-Birn, C. (2016): Workshop "Einbindung von GFBio Terminology Service in naniweb der Uni Göttingen", Göttingen, Nov 3rd, 2016.

Jesse Benjamin

What are the consequences of linked ontologies for the aesthetics of human-machine collaboration?

What can an application of Rheinberger's epistemic objects to linked ontologies contribute to a systematised socio-technical?

What can a diagrammatics of markup languages contribute to a theoretical framework for a coming Social Semantic Web?
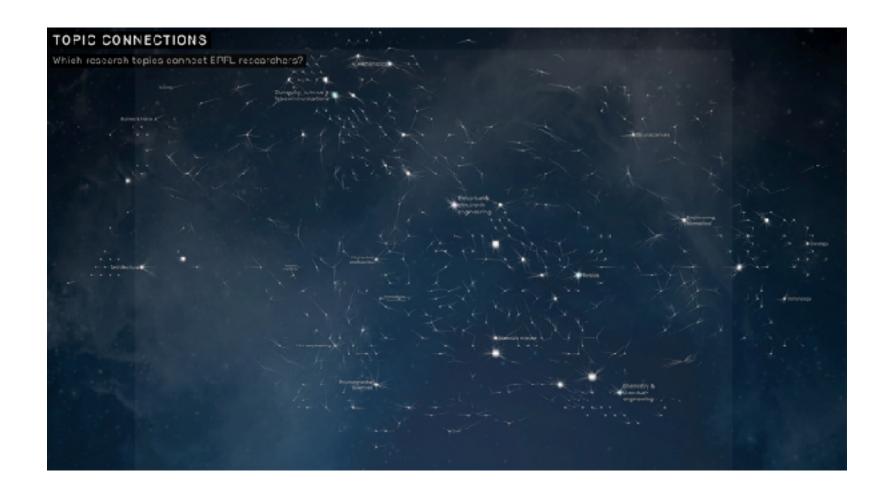
Data Monolith

http://truth-and-beauty.net/projects/epfl-data-monolith

Max Planck Research Networks

http://max-planck-research-networks.net/
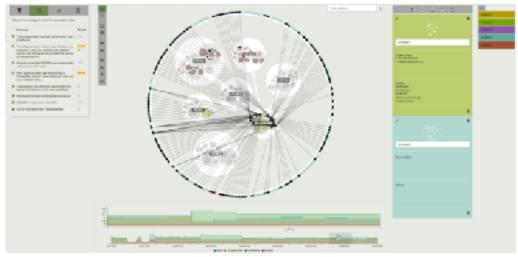
Linked Data Viewers

Ocelot

LODlive

DBpedia Atlas

Jonas Oppenländer

Development of a sustainable knowledge infrastructure
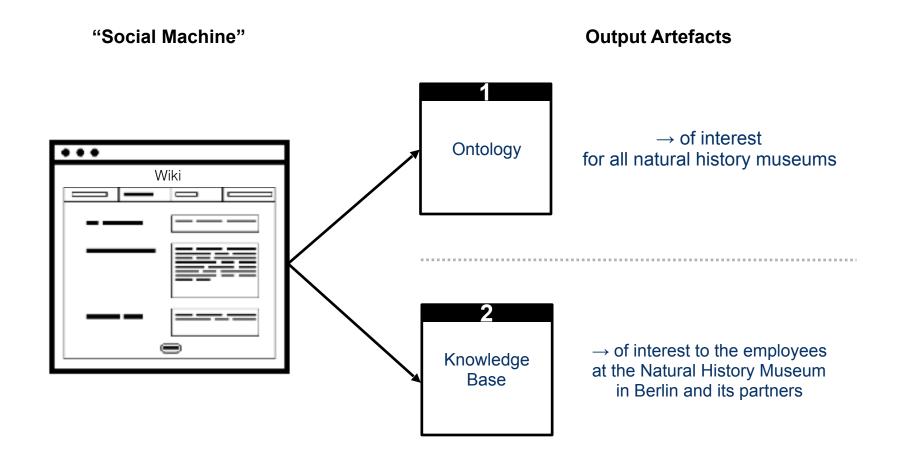
Collaborative and sustainable development and maintenance
of the underlying ontology

Integrate unstructured data with structured knowledge graphs

Implement "visualisation pipeline" and data management tools

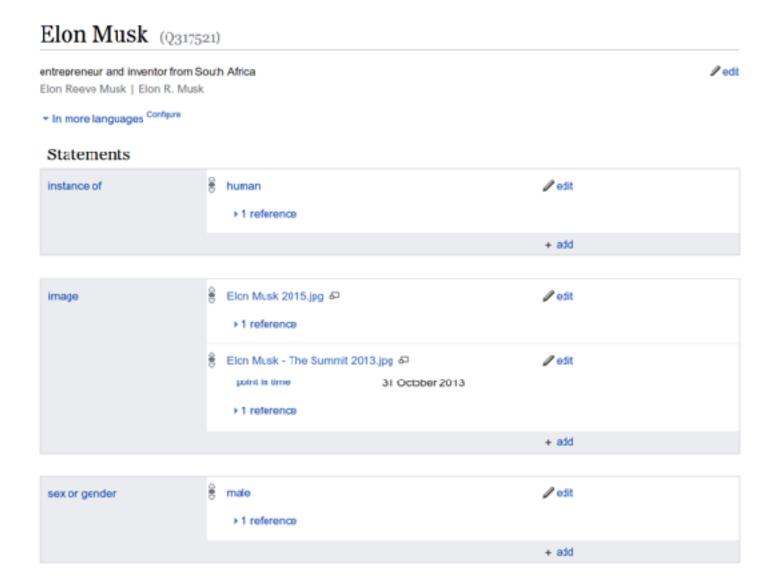# Social Production Machine

"Social Machine"

Output Artefacts

Wiki

1

Ontology

→ of interest
for all natural history museums

2

Knowledge
Base

→ of interest to the employees
at the Natural History Museum
in Berlin and its partners

Semantic MediaWiki

Elon Musk (Q317521)

entrepreneur and inventor from South Africa   ✎ edit
Elon Reeve Musk | Elon R. Musk

▾ In more languages ^Configure

Statements

instance of	human	✎ edit
	▸ 1 reference	
	+ add	

image	Elon Musk 2015.jpg ⤢	✎ edit
	▸ 1 reference	
	Elon Musk - The Summit 2013.jpg ⤢	✎ edit
	point in time 31 October 2013	
	▸ 1 reference	
	+ add	

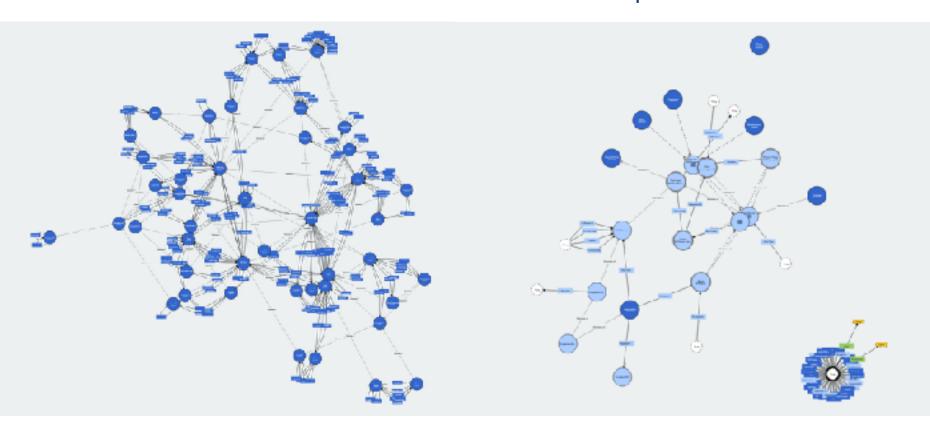| sex or gender | male | ✎ edit |
| | ▸ 1 reference | |
| | + add | |

Wikida
ta.org

Related Ontologies
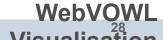
CIDOC-CRM

Europeana Data Model

Class count: 85
Object property count: 275
Data property count: 12
SubClassOf: 98
SubObjectPropertyOf: 151

Class count: 41
Object property count: 51
Data property count: 12
SubClassOf: 13
SubObjectPropertyOf: 40

WebVOWL Visualisation

Semantic MediaWiki Forms

1) Changing or creating the Object
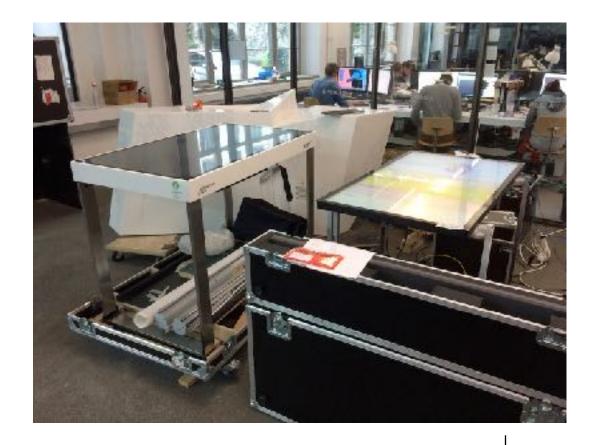
2) Choosing the Predicate

Wikida
ta.org
29

IV. Preliminary Results

Hardware – Factory Visit

interactive scape

TUIO protocol

Analysis of a Typical Research Project:
"Amphibien der Nimbaberge"

1. Potentials for Visualisation
2. Hierarchies
3. Issues

1. Potentials for Visualisation

Title	**Die Amphibien der Nimba Berge**	String
Hyperlink to Wikipage	**www.example.org/page**	String/Icon
Research Object		String/Image
Project Description (short)	**[…]**	String[…]
Project Region		Geolocation/Image
Research Institute	**MfN Forschungsbereich FB1**	String/Icon
Research Field	**Biodiversität, Ökologie**	String/Icon
Timeline	**[…]**	String/Graph
People	**Lead Researchers, Investigators, Funding Applicants**	String

2. Design Significance

Visualisation ——— Interaction	LO	MI	HI
HI		**Institutions Research Fields**	**Titel Wikipage Research Object**
MI	**Projectleader**	**Project Description (long)**	**Project Description Research Region**
LO	**Funding Coordinator Funding Target Audiences Areas of Use**	**Timeline Methods Expertise, Capabilities**	

3. Issues

a. Actual **Scenarios of Use** need to determine hierarchy
b. Basis needs to be **multiple** projects
c. No finalised concept for semantic enrichment **≠ Usable Design Hierarchy**
d. Specialised information needs to be created (*research methods, group members etc.*)

Analysis of Existing Data Visualisations
(W.I.P.)

1. Evaluation Criteria & Design Patterns
2. Frequent Problems
3. Hypotheses for Solutions

1. Evaluation Criteria & Design Patterns

Some Criteria:

✦ Visual Overview

✦ Visual Query

✦ Multiple Perspectives

✦ Detail on Demand

✦ Support for Scalability

✦ Filtering

✦ History

✦ …

Use Patterns:

1. Relations/Patterns/Structures Recognition

2. Generative Visualisations

3. Filtering Data

4. Exploration of Large Datasets

2. Frequent Problems

IsaViz

- High entry threshold for (non-) technical experts as well as lay users

- Awkward balance between facets/graphs (i.e., text & diagram)
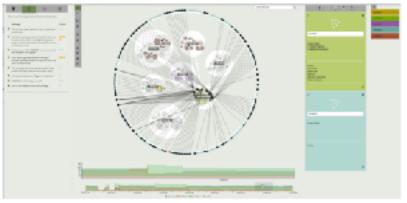
- Crowding & few/no signalling mechanisms

FACETE

2. Frequent Problems

Ocelot

- Rigid overview does not inherently lead to more knowledge

- Network view does not inherently mean network understanding
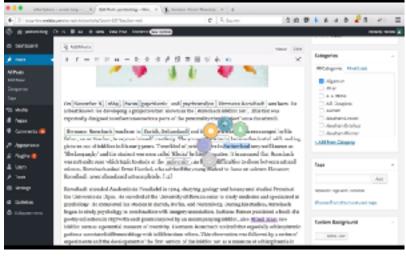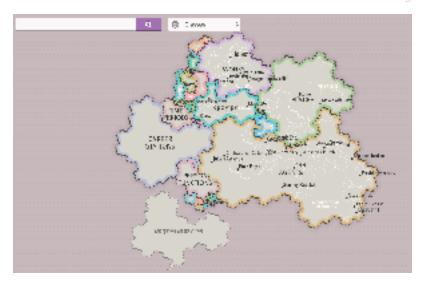
- Cognitive "silofication"

resXplorer

2. Frequent Problems

refer-Plugin

- Purpose-specific implementations rarely allow for reusability

DBpedia Atlas

3. Hypotheses for Solutions
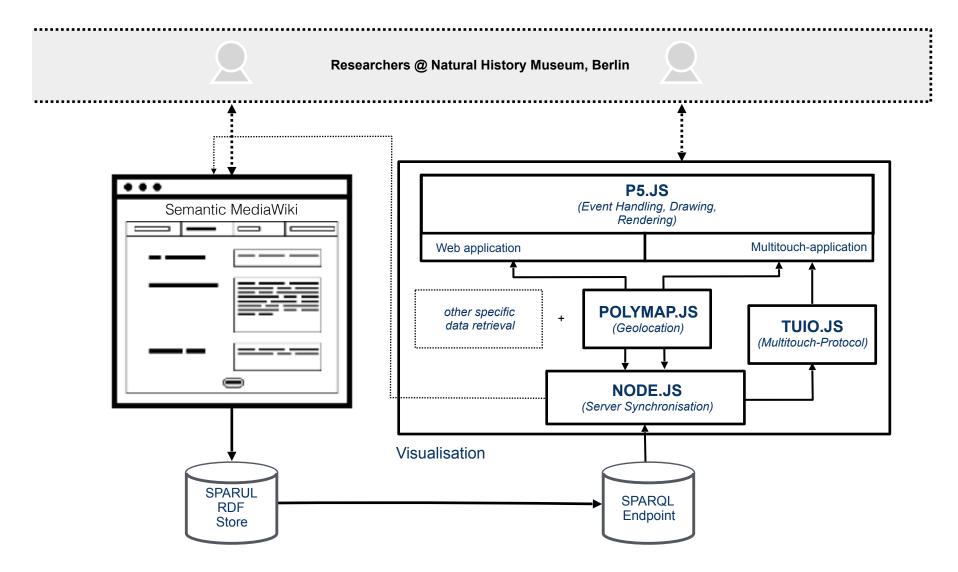
Some suggestions for research & implementation:

- ✦ Allow for multiple perspectives as induced from Scenarios of Use

- ✦ Allow for co-evolution of Visualisation & Ontology where possible

- ✦ Focus on **areas of knowledge** rather than network

- ✦ Examine underlying "grammar" of ontology to inform but not dictate visual approach

Preliminary Frontend Architecture
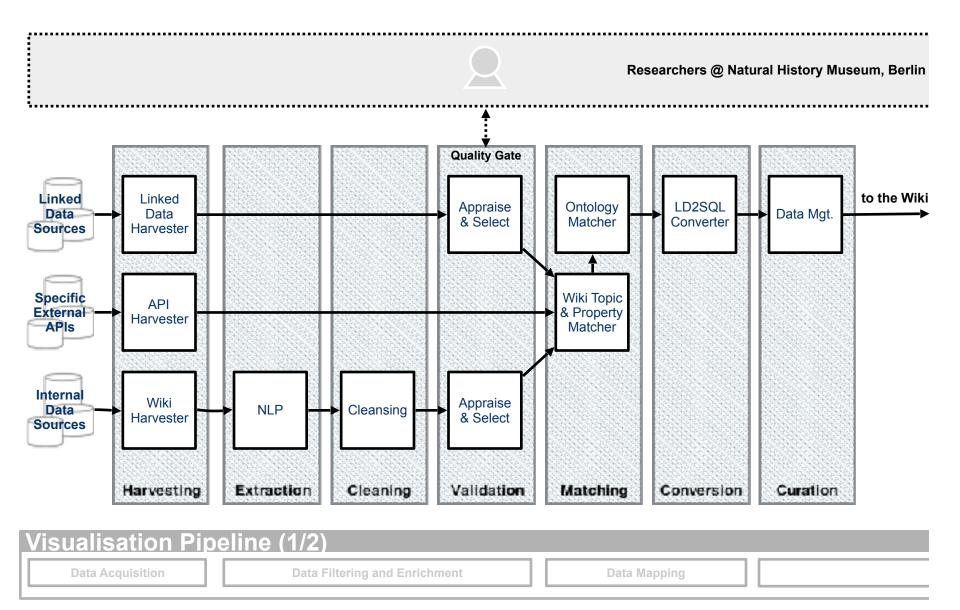(W.I.P.)

Preliminary Frontend Architecture

Researchers @ Natural History Museum, Berlin

Semantic MediaWiki

P5.JS
(Event Handling, Drawing, Rendering)

Web application

Multitouch-application

other specific data retrieval

+

POLYMAP.JS
(Geolocation)

TUIO.JS
(Multitouch-Protocol)

NODE.JS
(Server Synchronisation)

Visualisation

SPARUL RDF Store

SPARQL Endpoint

Analysis and Architecture

1. Backend Infrastructure
2. Related Projects
3. Data Sources
4. Related Ontologies

Researchers @ Natural History Museum, Berlin
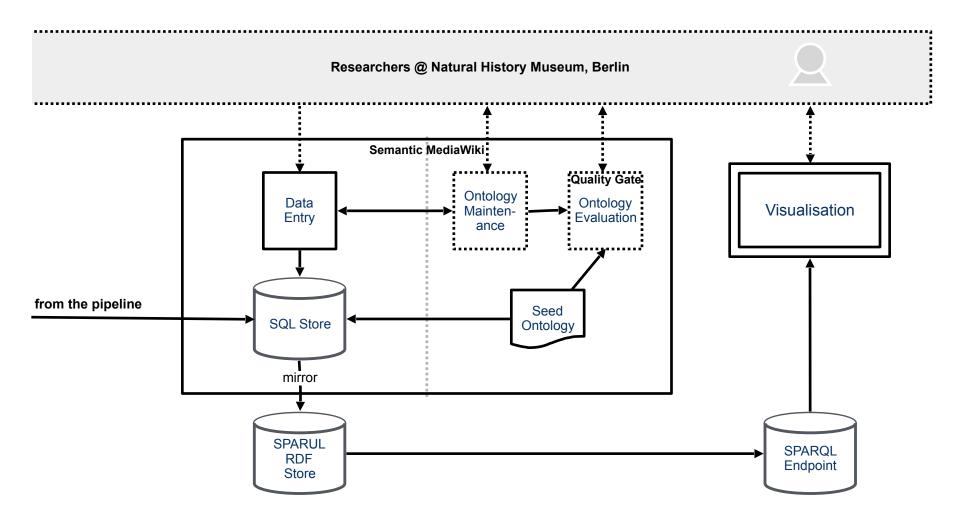
Quality Gate

Linked Data Sources	Linked Data Harvester			Appraise & Select	Ontology Matcher	LD2SQL Converter	Data Mgt.	to the Wiki
Specific External APIs	API Harvester				Wiki Topic & Property Matcher			
Internal Data Sources	Wiki Harvester	NLP	Cleansing	Appraise & Select				
	Harvesting	**Extraction**	**Cleaning**	**Validation**	**Matching**	**Conversion**	**Curation**	

Visualisation Pipeline (1/2)

| Data Acquisition | Data Filtering and Enrichment | Data Mapping | |

Preliminary Backend Architecture (2/2)
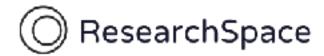
Related Projects

Freie Universität Berlin

ResearchSpace
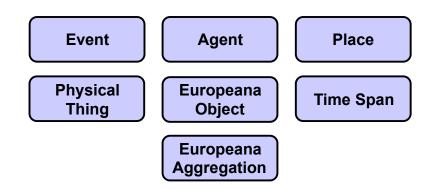
Cultural Heritage
Knowledge Graph

based on CIDOC-CRM

- Thing
- Actor
- Place
- Concept
- Time
- Event

europeana collections

Collaboratively developed data
model (~60 participants)

Cultural Heritage Objects

Semantic layer on top of cultural
heritage objects

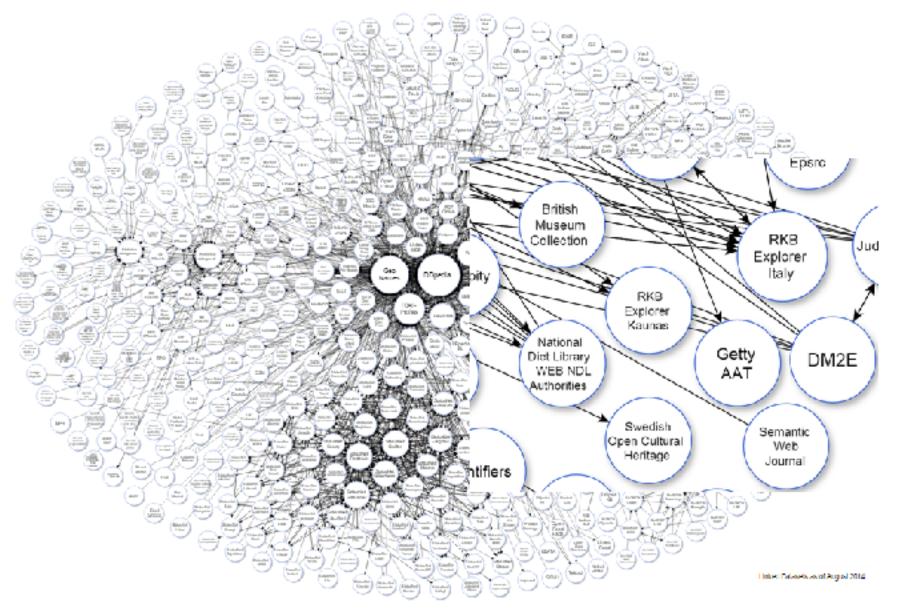| Event | Agent | Place |
| Physical Thing | Europeana Object | Time Span |
| Europeana Aggregation | | |

Sources for Enrichment

Potential Sources for Enrichment

in progress

1) Internal Sources
Website, Wikis, Research Information System, …?...

2) Authority Files

GND   VIAF

3) Linked Data

WIKIDATA

4) Open Data Repositories
?

5) Other APIs and Services
?

Which sources to include depends on
1. scope of project
2. user needs
3. use case
4. available data
5. license compatibility

Related Terminologies

Freie Universität Berlin

Collected 160+ ontologies

Which ontologies to use
depends on
1. scope of project
2. user needs
3. use case

IV. Next Steps

Meetings:

Meeting of Workgroup MfN/HCC - Scenarios of Use (12.5.2017)

First meeting with the whole team (June 2017)

Workgroup meeting „The Ideal Project"

User needs / requirements workshop

Misc:

Fill Student Positions

Project planning / Project Scope / Finance Controlling

Define project vocabulary in shared glossary

Research Avenue Planning

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