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Modelling Social and Legal Facts in the Context of the Semantic Data for Humanities and Social Sciences (SDHSS) Ontology Ecosystem

Francesco Beretta

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Modelling social and legal facts
in the context of the
Semantic Data for Humanities
and Social Sciences ontology ecosystem
(SDHSS)

Seminar Legal History Meets Digital Humanities

Max-Planck-Institut für Rechtsgeschichte und Rechtstheorie
16 May 2024

Introduction

Linked Open Data (LOD)
and
FAIR research data in
the humanities and social sciences (HSS)

New dimensions and challenges

Deutsche Forschungsgemeinschaft
(German Research Foundation)

The Digital Turn in the Sciences and Humanities

White Paper 2020

<https://doi.org/10.5281/zenodo.4191345>

- emergence of *new, **digital research practices*** which need to be integrated, *epistemically* and otherwise, in the context of a given *discipline*.
- what is actually decisive for the expansion of knowledge-building possibilities are the associated **scaling effects** (volumes, speed, complexity)

The effects of the digital turn on the sciences and humanities can be divided into three categories:

- **Transformative change** concerns the transfer of analogue information and practices to a digital form
- **Enabling change** is the use of data-intensive technologies to *address [new] research questions* that could not be tackled in another form
- **Substitutive change**, digital technologies are used to support or even replace conceptual parts of the research process

DFG, White Paper 2020

Linked Open Data and the Semantic Web



Tim Berners-Lee, the inventor of the Web and Linked Data initiator, suggested a 5-star deployment scheme for Open Data.

<https://5stardata.info/en/>



- ★ make your stuff available **on the Web** (whatever format) under an open licence
- ★★ make it available as **structured data** (e.g., Excel instead of image scan of a table)
- ★★★ make it available in a non-proprietary **open format** (e.g., CSV instead of Excel)
- ★★★★ use **URIs to denote things**, so that people can point at your stuff
- ★★★★★ **link your data** to other data to provide context

Quoted from : <https://5stardata.info/en/>

Linked Open Data and the Semantic Web

(<https://www.w3.org/TR/rdf11-concepts/>)

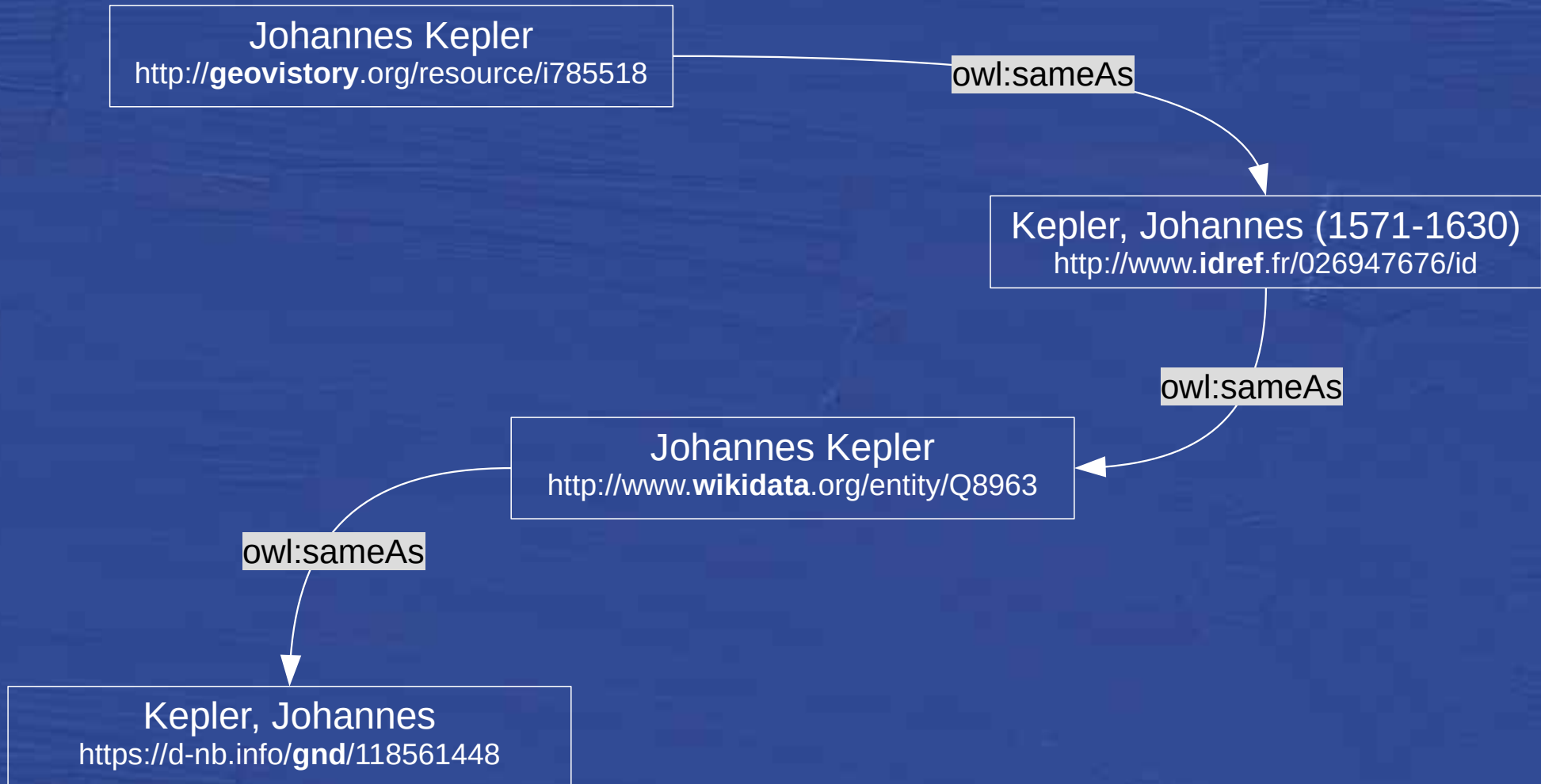
- « The Resource Description Framework (**RDF**) is a framework for **representing information in the Web.** »
- « A graph-based data model »



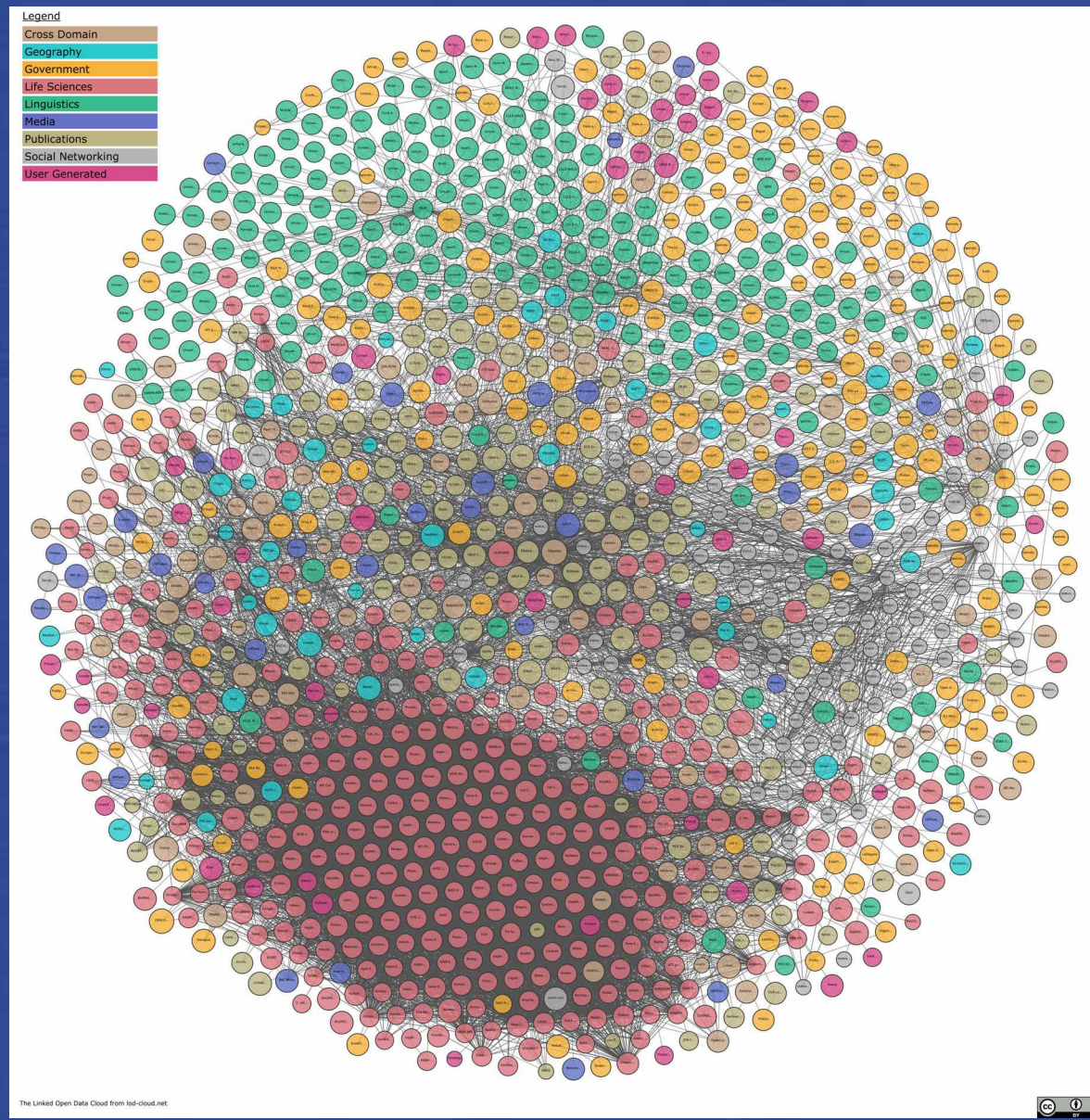
RDF triple

LOD as Links

« URIs to denote things, so that people can point at your stuff »



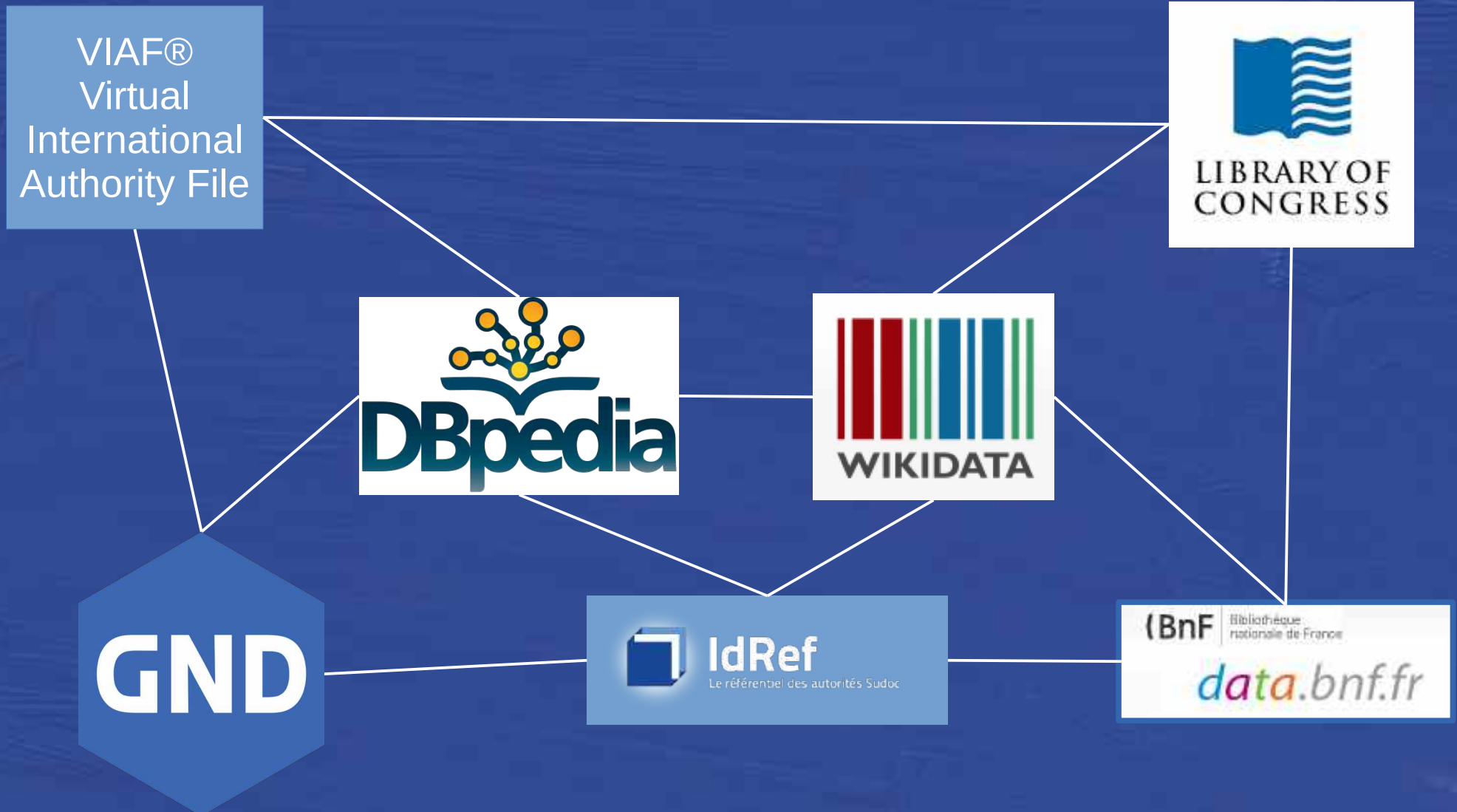
Semantic Web (Wikipedia)



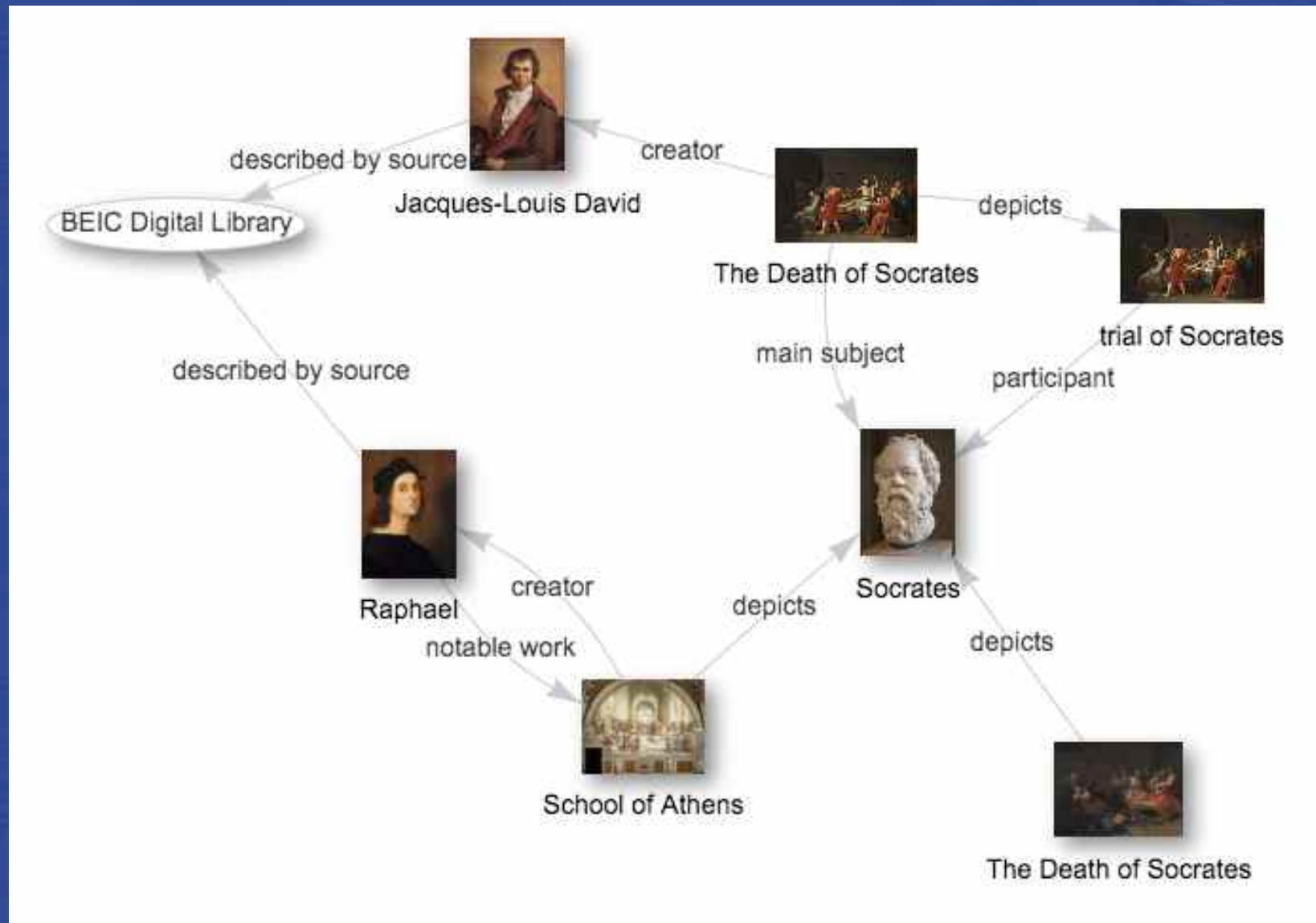
<https://lod-cloud.net/>

LOD as Links

« URIs to denote things, so that people can point at your stuff »



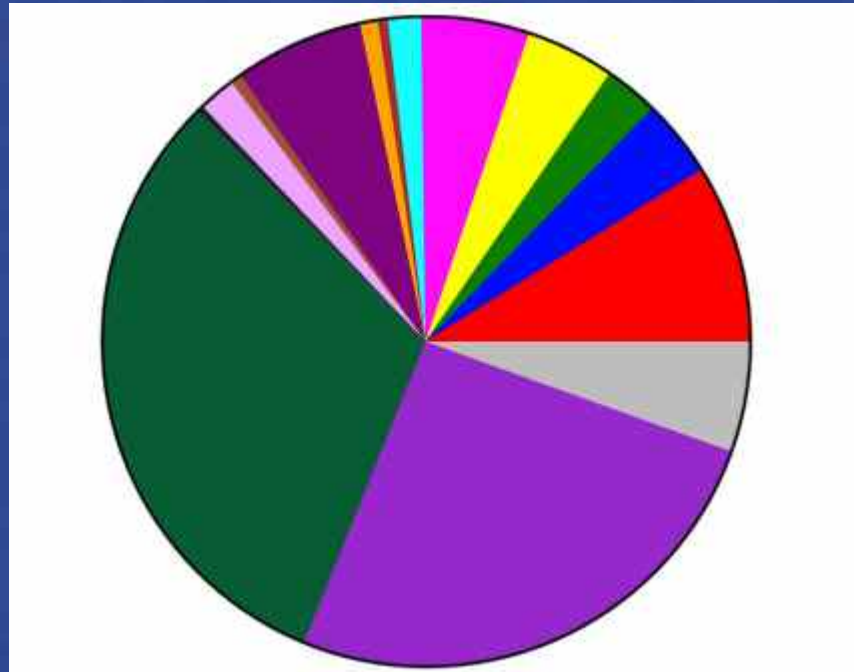
Wikidata : a semantic graph (*knowledge graph*) representing the objects in the world and their relationships



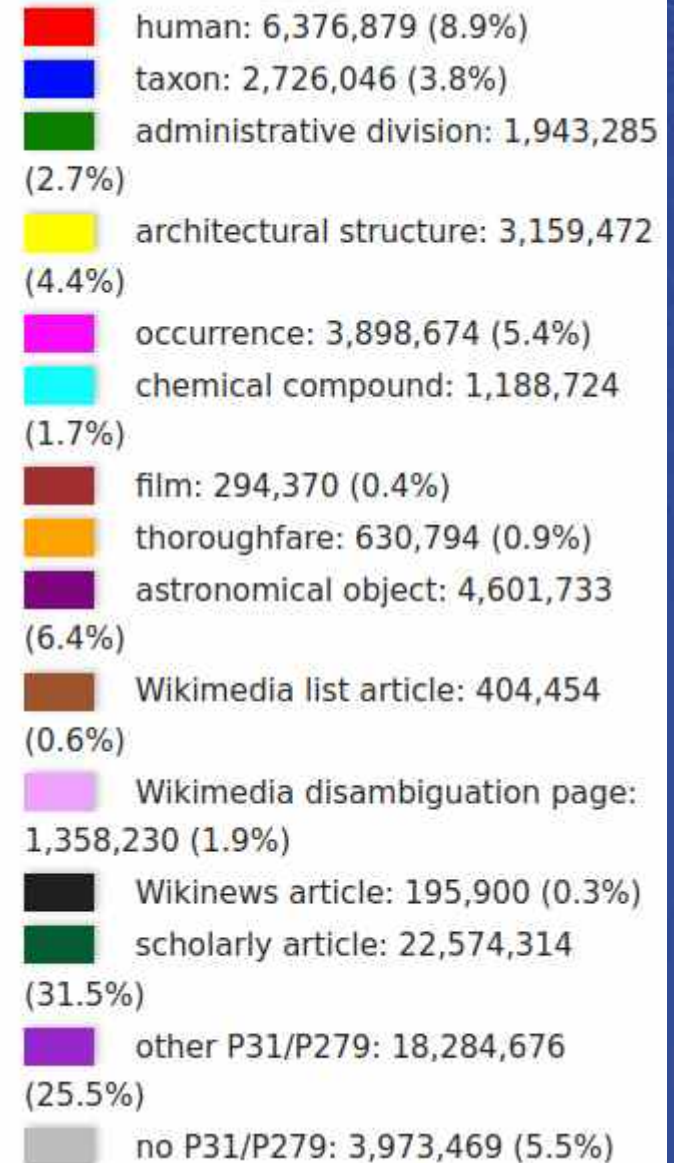
Wikidata

14 November 2023 – 107'588'216 items

1.5 billions statements

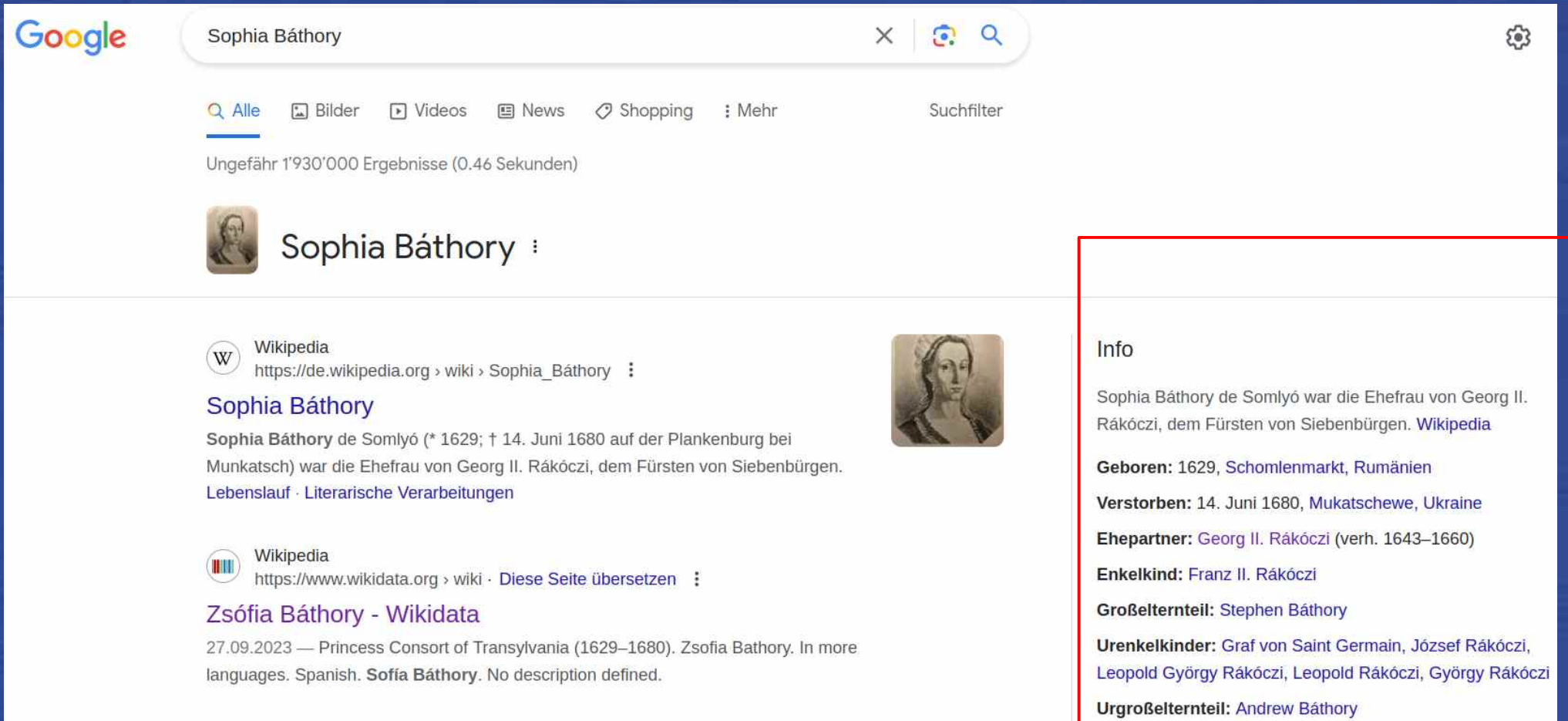


16 February 2020 : 71,611,020 items



Google Knowledge Graph

“By March 2023, it had grown to 800 billion facts on 8 billion entities”
(Wikipedia).



The image shows a Google search interface for "Sophia Báthory". The search bar contains the name, and the results show a Knowledge Graph panel on the right side, which is highlighted with a red border. The panel includes a portrait of Sophia Báthory and a list of biographical facts.

Info

- Sophia Báthory de Somlyó war die Ehefrau von Georg II. Rákóczi, dem Fürsten von Siebenbürgen. [Wikipedia](#)
- Geboren:** 1629, Schomlenmarkt, Rumänien
- Verstorben:** 14. Juni 1680, Mukatschewe, Ukraine
- Ehepartner:** [Georg II. Rákóczi](#) (verh. 1643–1660)
- Enkelkind:** [Franz II. Rákóczi](#)
- Großelternteil:** [Stephen Báthory](#)
- Urenkelkinder:** [Graf von Saint Germain](#), [József Rákóczi](#), [Leopold György Rákóczi](#), [Leopold Rákóczi](#), [György Rákóczi](#)
- Urgroßelternteil:** [Andrew Báthory](#)

Wikidata and Google Knowledge Graph

Item **Discussion**

Zsófia Báthory (Q250942)

Princess Consort of Transylvania (1629–1680) edit
 Zsófia Bathory

In more languages

Configure


Language	Label	Description	Also known as
English	Zsófia Báthory	Princess Consort of Transylvania (1629–1680)	Zsófia Bathory
German	Zsófia Báthory	Ehefrau von Georg II. Rákóczi, des Fürsten von Siebenbürgen (1629–1680)	
Alemannic	No label defined	No description defined	
French	Zsófia Báthory	(1629–1680)	

All entered languages

Statements

Instance of human 1 reference

Image



Báthory Zsófia 1629.jpg
 585 × 779; 155 KB

Google Knowledge Graph ID edit /g/121258kx

0 references

+ add reference

+ add value

Hungarian National Namespace person ID (new) edit 662639

0 references

+ add reference

+ add value

Property **Discussion**

Google Knowledge Graph ID (P2671)

identifier for Google Knowledge Graph API, starting with "/g/". For IDs starting with "/m/", use Freebase ID (P646)

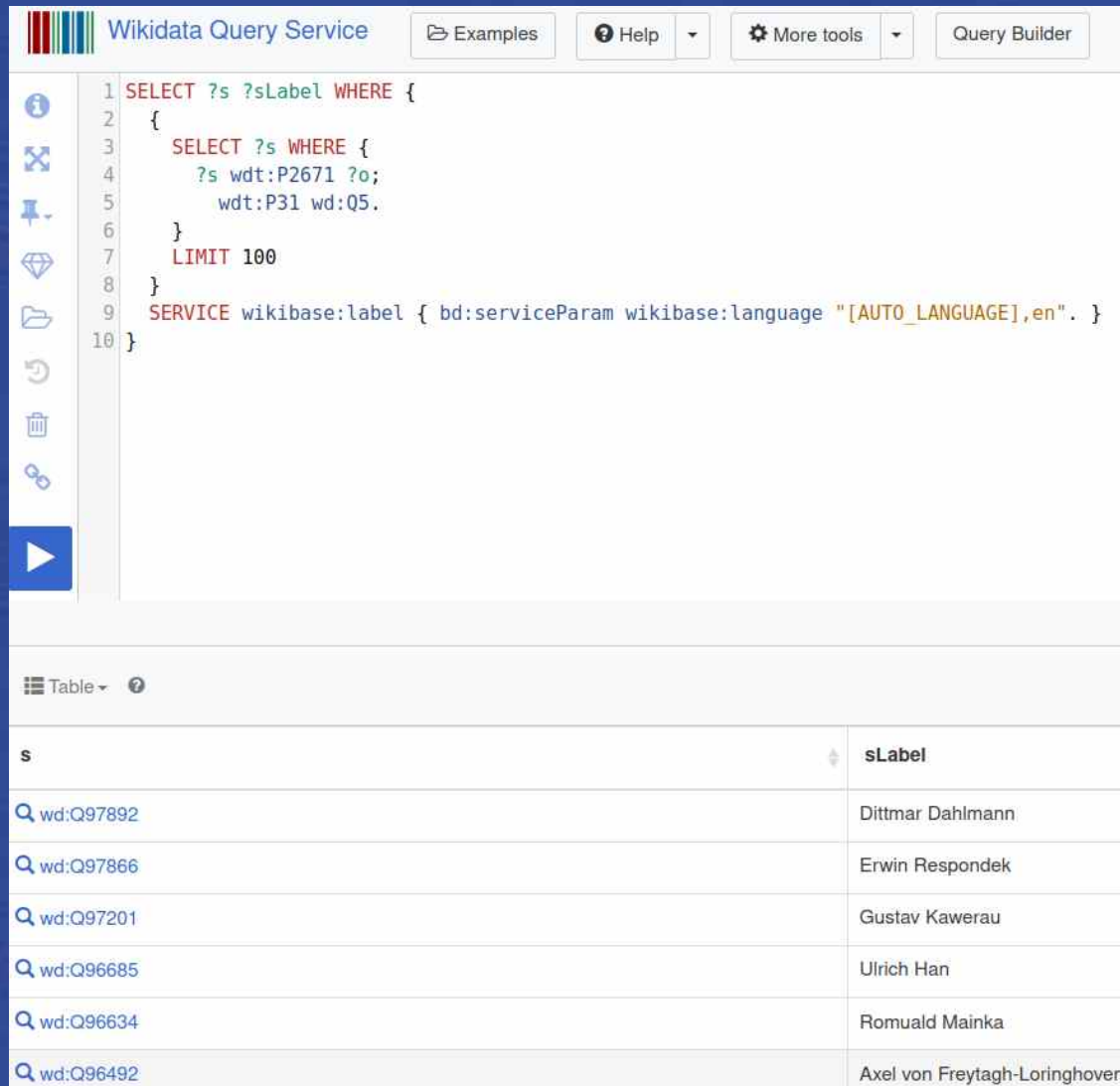
In more languages

Configure

Language	Label	Description	Also known as
English	Google Knowledge Graph ID	identifier for Google Knowledge Graph API, starting with "/g/". For IDs starting with "/m/", use Freebase ID (P646)	

SPARQL :

a query language for exploring LOD and the Semantic Web



The screenshot shows the Wikidata Query Service interface. At the top, there are navigation buttons for 'Examples', 'Help', 'More tools', and 'Query Builder'. The main area contains a SPARQL query editor with the following code:

```
1 SELECT ?s ?sLabel WHERE {
2   {
3     SELECT ?s WHERE {
4       ?s wdt:P2671 ?o;
5       wdt:P31 wd:Q5.
6     }
7     LIMIT 100
8   }
9   SERVICE wikibase:label { bd:serviceParam wikibase:language "[AUTO_LANGUAGE],en". }
10 }
```

Below the query editor, there is a table view showing the results of the query. The table has two columns: 's' and 'sLabel'. The results are as follows:

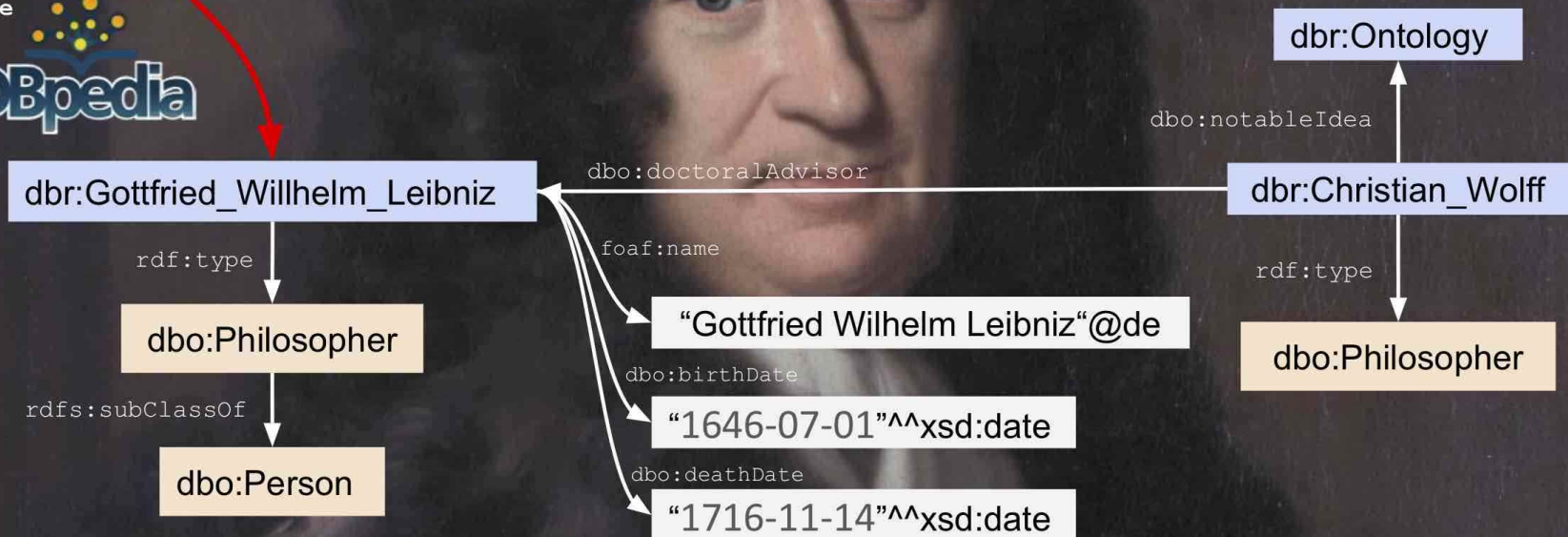
s	sLabel
wd:Q97892	Dittmar Dahlmann
wd:Q97866	Erwin Respondek
wd:Q97201	Gustav Kawerau
wd:Q96685	Ulrich Han
wd:Q96634	Romuald Mainka
wd:Q96492	Axel von Freytag-Loringhoven

Knowledge Graphs for Natural Language Processing

Leibniz wrote to Caroline of Ansbach that Newton's physics was detrimental to natural theology. However, eager to defend the Newtonian view, it was Clarke who responded and the correspondence between both continued until the death of Leibniz.

text

knowledge
base



21

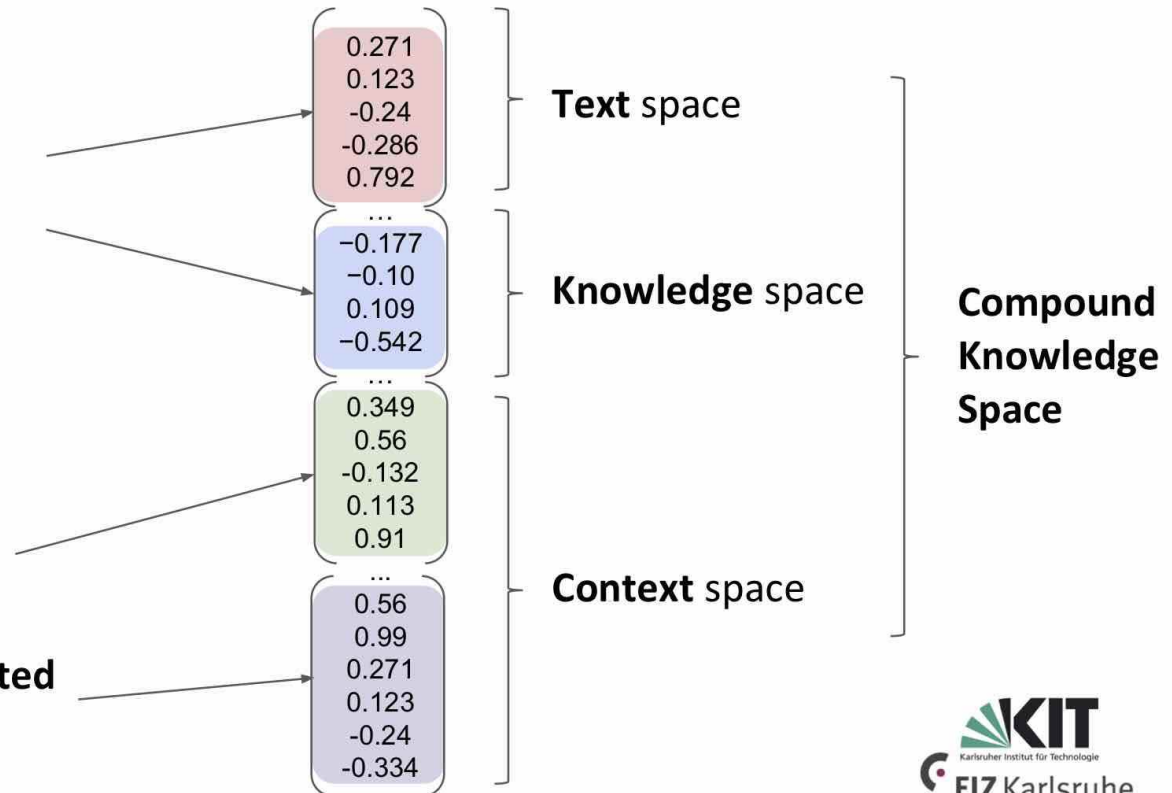
Karlsruher Institut für Technologie (29. Novembre 2017) – Antrittsvorlesung von

Prof. Dr. Harald Sack

Combining Semantics and Deep Learning for Intelligent Information Services

Combined Feature Embeddings for a Compound Knowledge Space

- Various feature vectors
 - **Word embeddings**
 - **Knowledge Graph embeddings**
 - Instances
 - Ontologies
 - Embeddings for **semantically enriched texts**
 - **Metadata and aggregated features**



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DFG, White Paper 2020

Findable

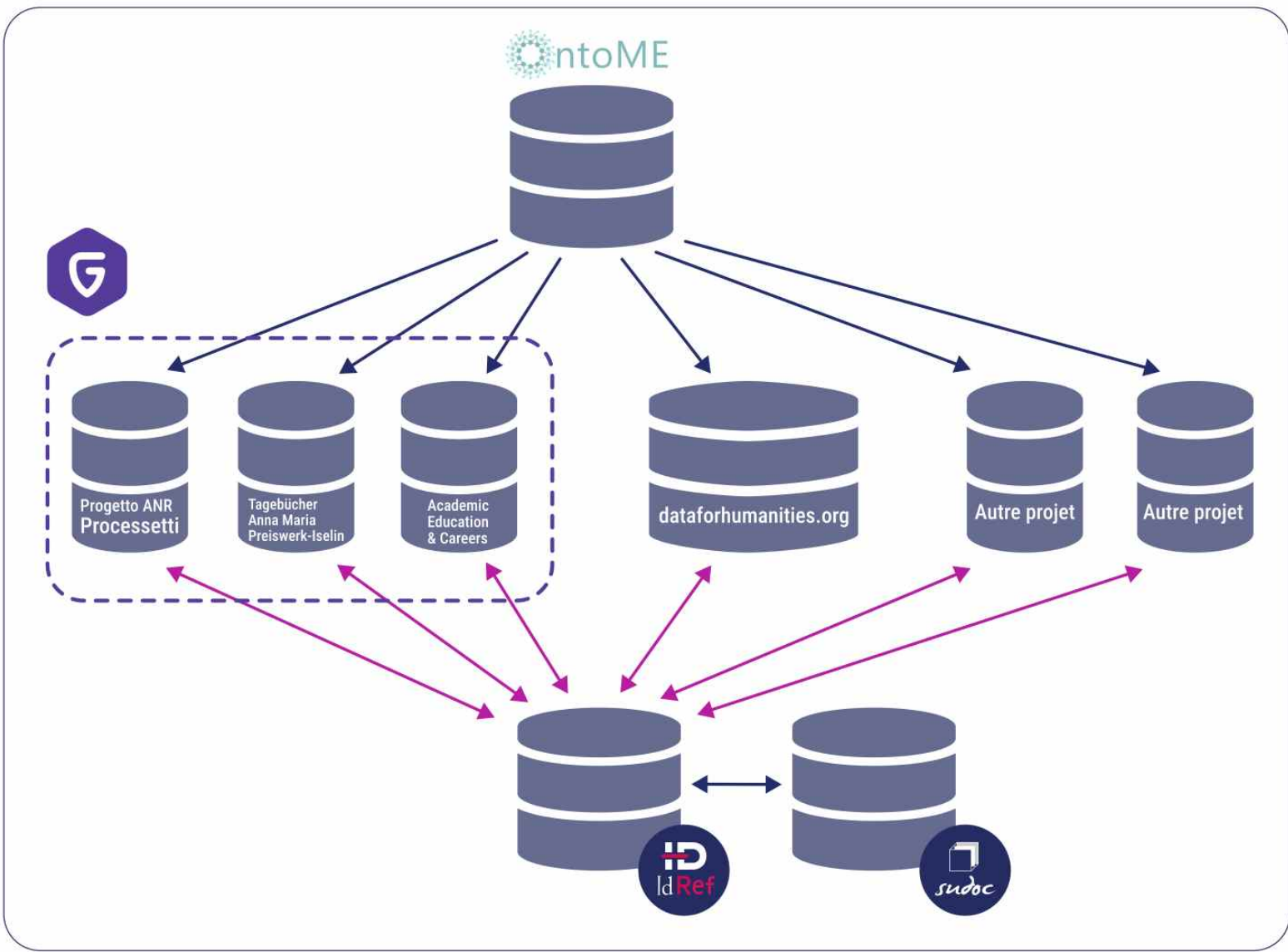
Accessible

Interoperable

Re-usable

«There is an urgent need to improve the infrastructure supporting the *reuse* of scholarly data »

Wilkinson, Mark D., Michel Dumontier, Ijsbrand Jan Aalbersberg, Gabrielle Appleton, Myles Axton, Arie Baak, Niklas Blomberg, et al. “*The FAIR Guiding Principles for Scientific Data Management and Stewardship.*” *Scientific Data* 3 (March 15, 2016): 160018.



sdhss.org – dataforhumanities.org – LOD4HSS

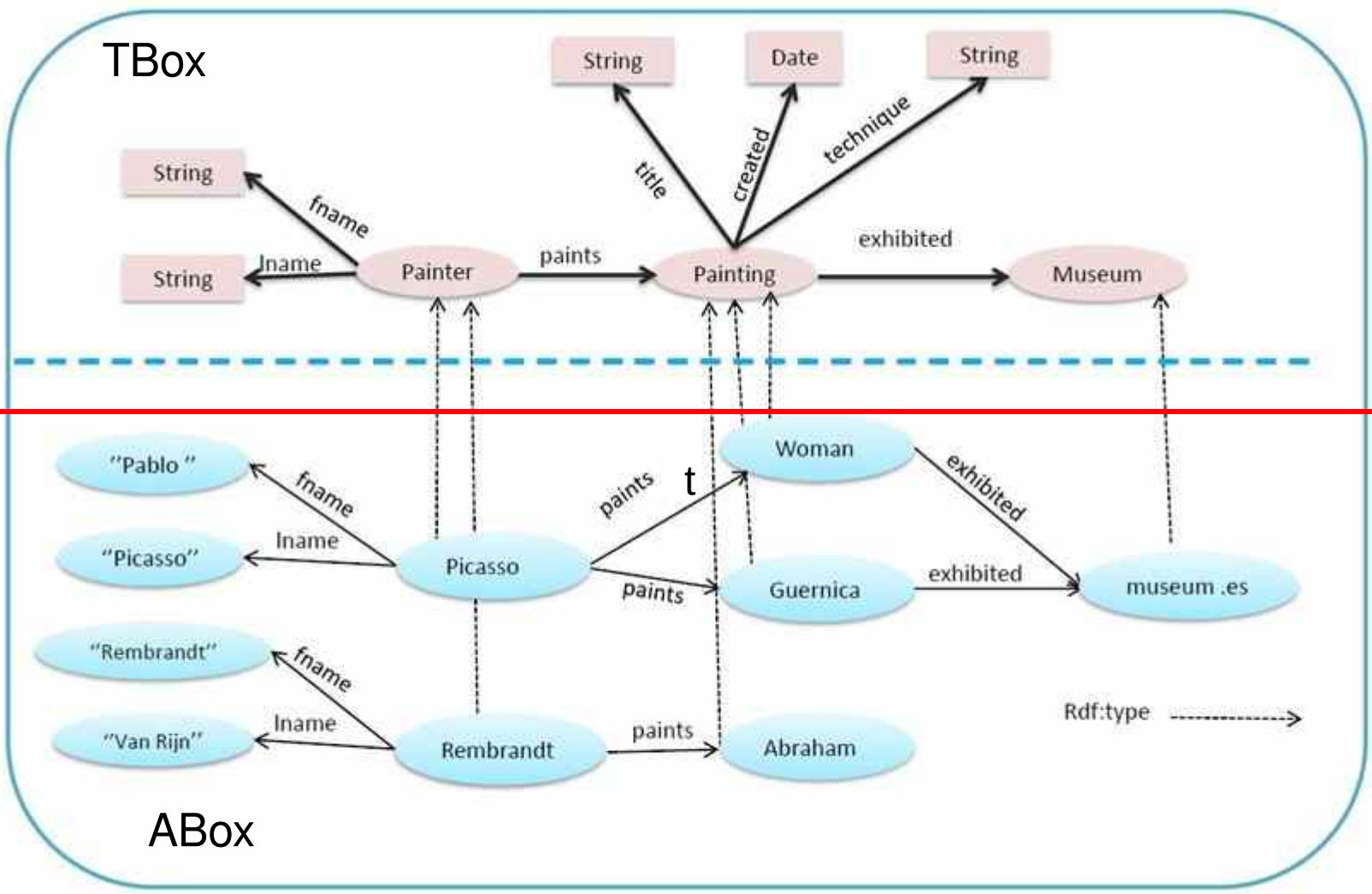
The FAIR Data Principles

To be Interoperable:

- I1. (meta)data use a *formal, accessible, shared, and broadly applicable language for knowledge representation*.
- I2. (meta)data use *vocabularies that follow FAIR principles*.
- I3. (meta)data include qualified references to other (meta)data.

To be Re-usable:

- R1. meta(data) have a plurality of accurate and relevant attributes.
 - R1.1. (meta)data are released with a *clear and accessible data usage license*.
 - R1.2. (meta)data are associated with their *provenance*.
 - R1.3. (meta)data meet *domain-relevant community standards*.



© Dimitris Kotzinos

RDFS – OWL-DL

“An ontology is
a formal explicit specification
of a shared conceptualization
of a domain of interest”

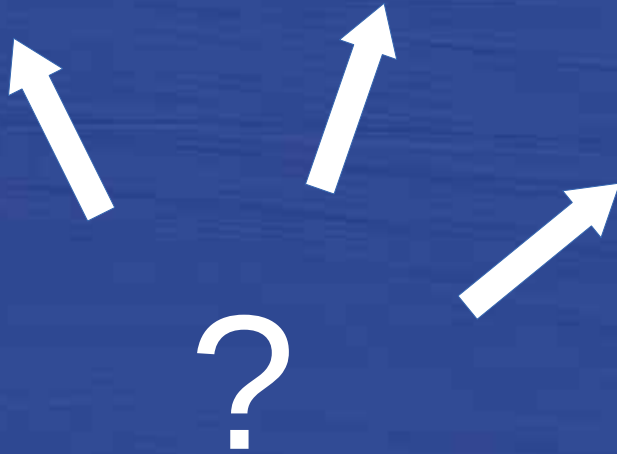
- « Formality – ... a knowledge representation language that is based on the grounds of **formal semantics**. »
- « Consensus – ... an agreement on a domain conceptualization among people in a community. »
- « Conceptuality – ... in terms of conceptual symbols that can be intuitively grasped by humans, as they correspond to the elements in their **mental models**. »
- « Domain Specificity – ... limited to knowledge about a particular **domain of interest**. »

[Domingue et al. 2011, p. 510-511]

CIDOC CRM

DUL
(DOLCE ULTRA LIGHT)

schema.org



Research agenda

Research specific data model

Research data

Epistemological and methodological foundations
of the Semantic Data for Humanities and Social Sciences
(SDHSS) ontology ecosystem

What are scientific disciplines?

- Communities of knowledge that share a **common domain of discourse** and **of scientific interest**.

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- They define **scientific objects** and **research questions** that are considered as valid in a scientific domain.

What are scientific disciplines?

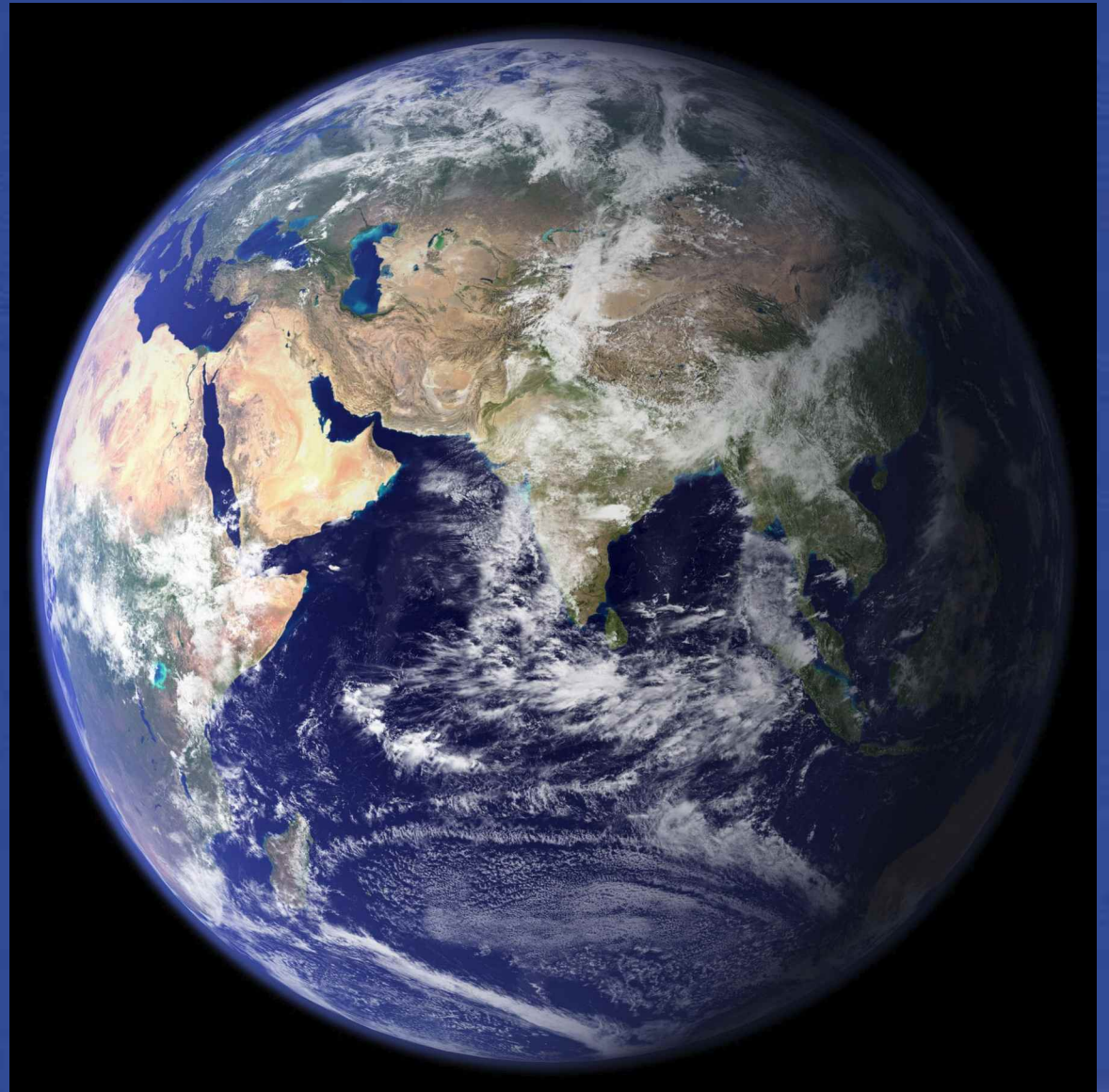
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- Communities of knowledge that share a **common domain of discourse** and **of scientific interest**.
- They define scientific objects and research questions that are considered as valid in a scientific domain.
- They share a specific methodology which must be empirical and provide reproducible results.
- They produce new **knowledge** in their **domain** and this knowledge may have more or less impact on human societies in which they are embedded.

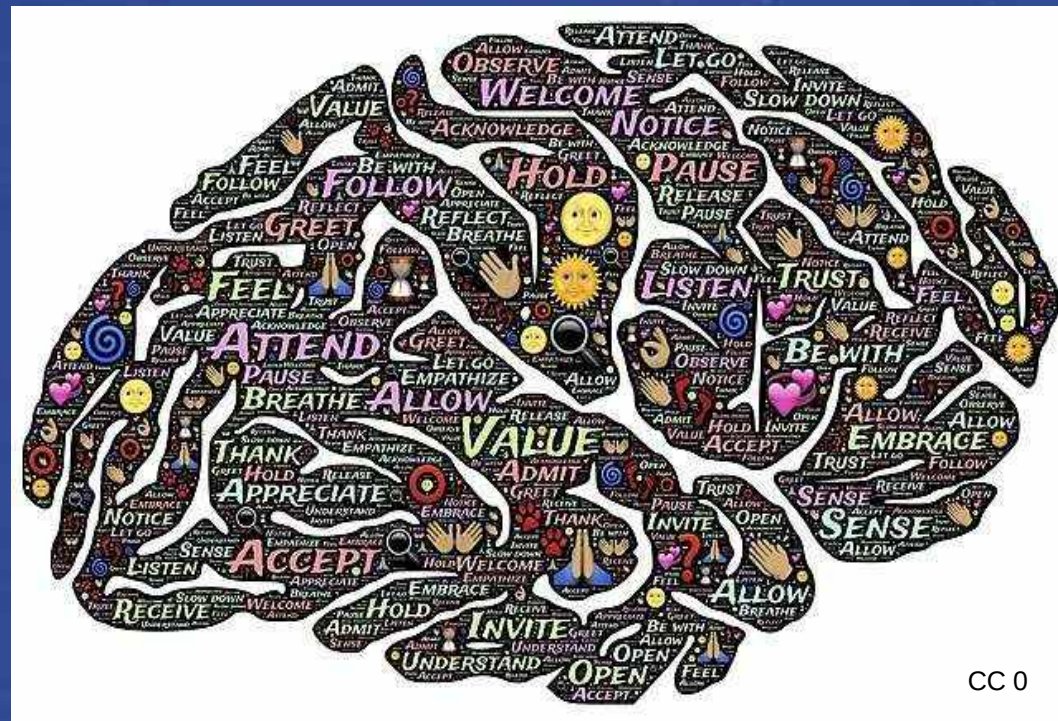
The domain of HSS

**Material
and biological
world**



Mental reality

Material
and biological
world

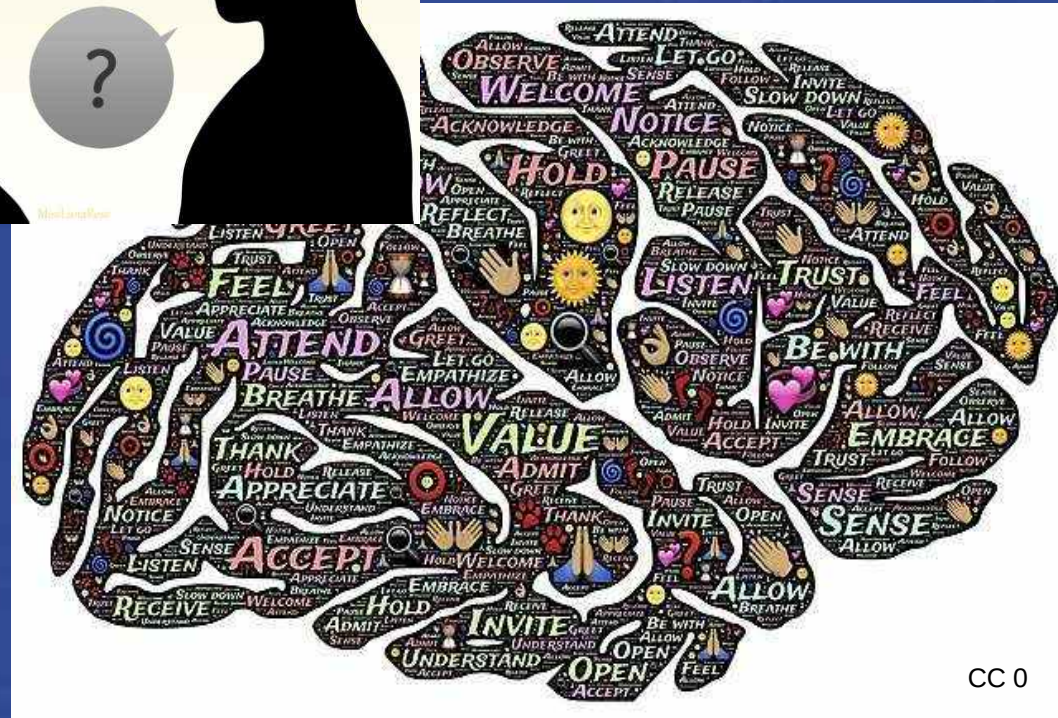
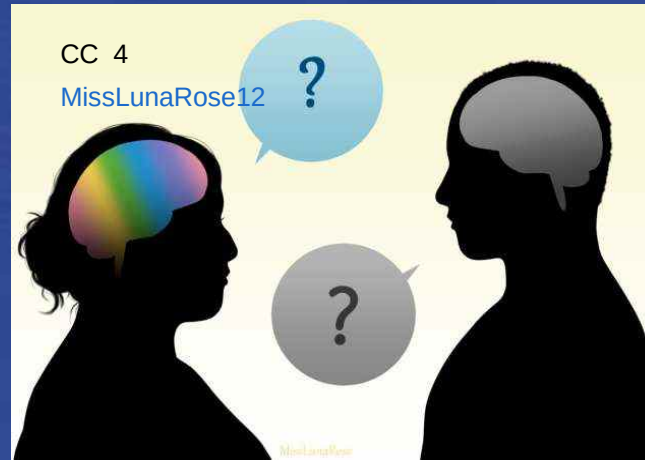


CC 0

Social reality

Mental reality

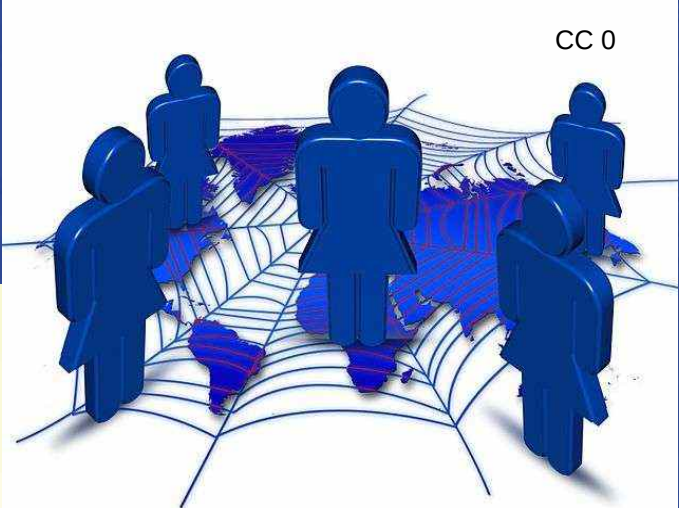
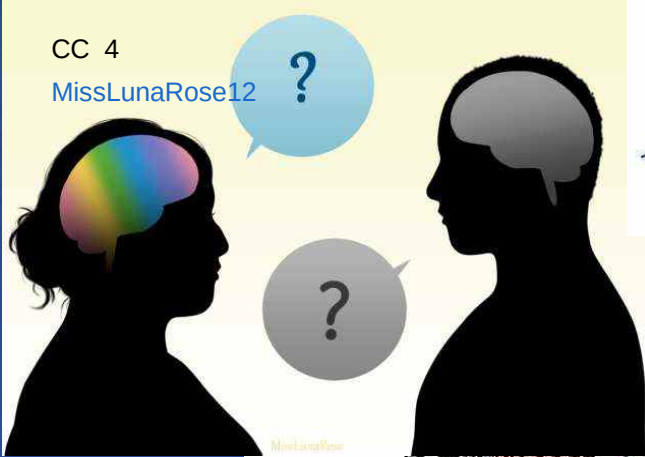
Material
and biological
world

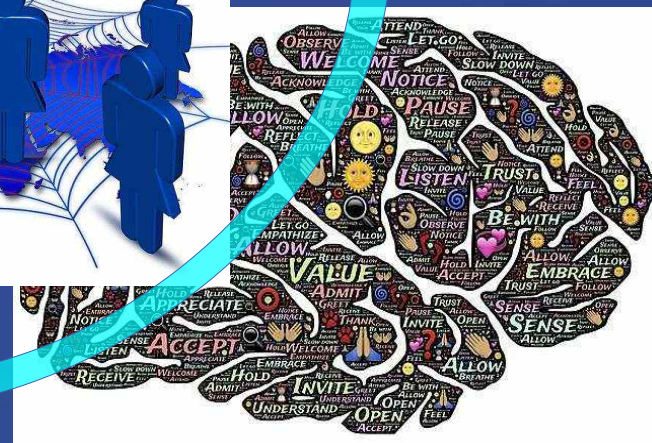
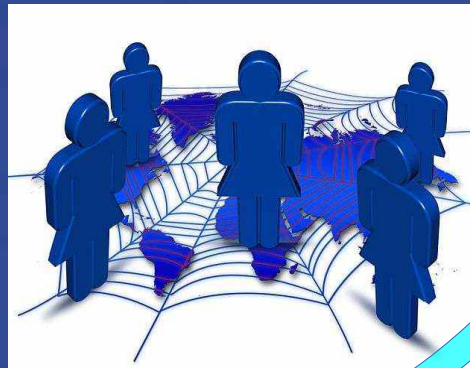
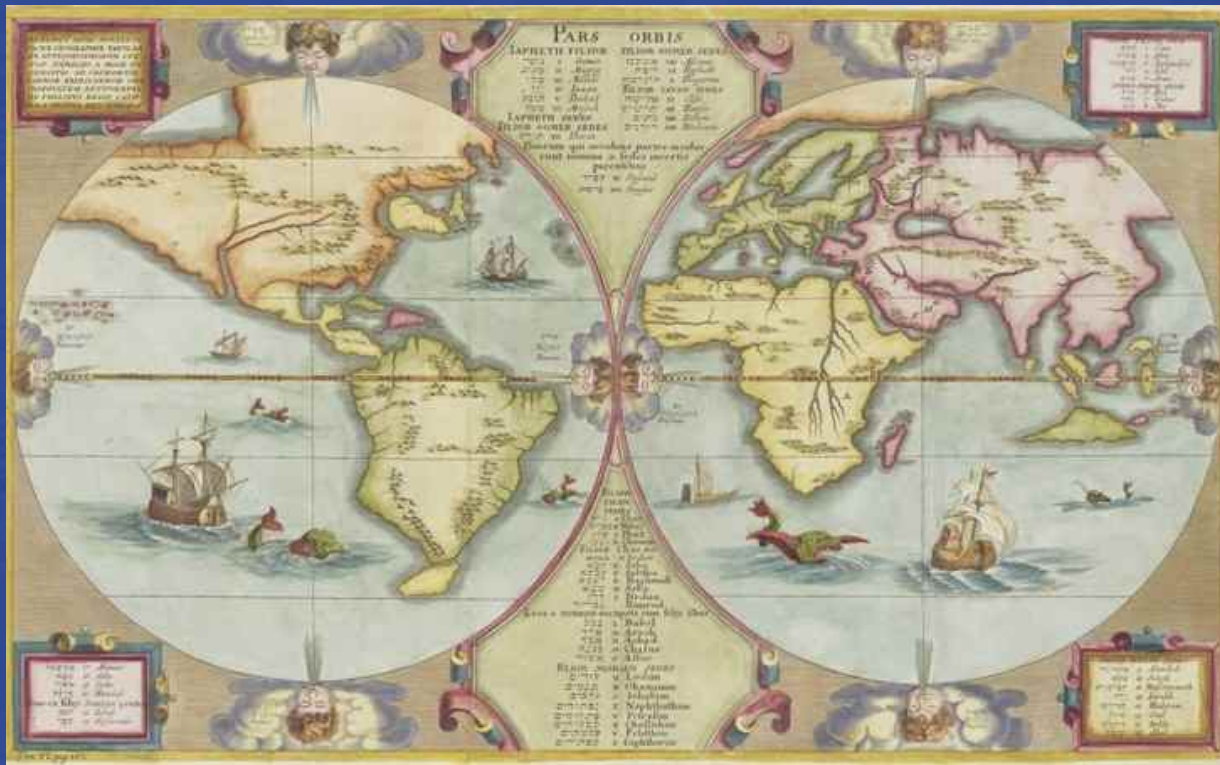


Social reality

Mental reality

Material and biological world





How are conceptualized observable mental and social phenomena in HSS disciplines ?

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- Social representations (social sciences):

«social identity emerges based on social representations ... Identity is a way of organizing meanings, of being constructed as a social subject»

Álvarez Bermúdez, Javier and Juana Juárez-Romero. “Identities, Memory and the Construction of Citizenship.” *Papers on Social Representations* 28, no. 2 (2019).

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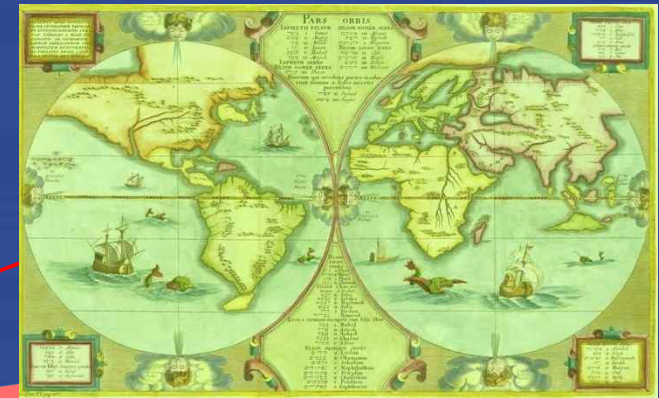
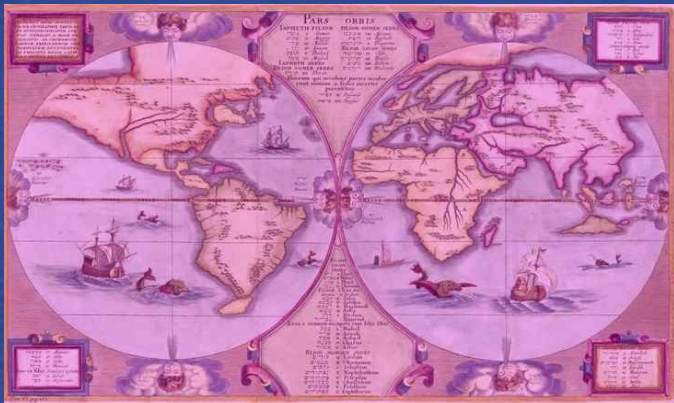
- Collective intentionality (social philosophy):

«Consciousness and intentionality are caused by and realized in neurobiology. Collective intentionality is a type of intentionality, and society is created by collective intentionality. ... language enables the creation and continue existence of status functions that do not require any physical existence beyond the linguistic representations themselves. »

John Searle. *Making the Social World: The Structure of Human Civilization*, Oxford, 2010.

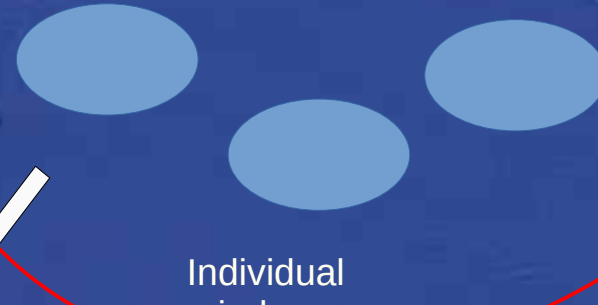
Reference literature (selection):

- Gallotti Mattia and Michael John (éds.), *Perspectives on Social Ontology and Social Cognition*, Dordrecht, Springer Netherlands, 2014.
- Sammut Gordon et al. (éds.), *The Cambridge Handbook of Social Representations*, Cambridge, University Press, 2015.
- *The Stanford Encyclopedia of Philosophy* (Fall 2021 Edition), Edward N. Zalta (ed.) (online) (especially entries: Collective Intentionality, Mental Representation, Consciousness and Intentionality, Social Norms, etc.)
- Thomas T. (ed.), *Encyclopedia of critical psychology* (New York: Springer Reference, 2014) (especially entries: Interobjectivity; Social Constructionism; Social Representations; Socialisation).



Social representations

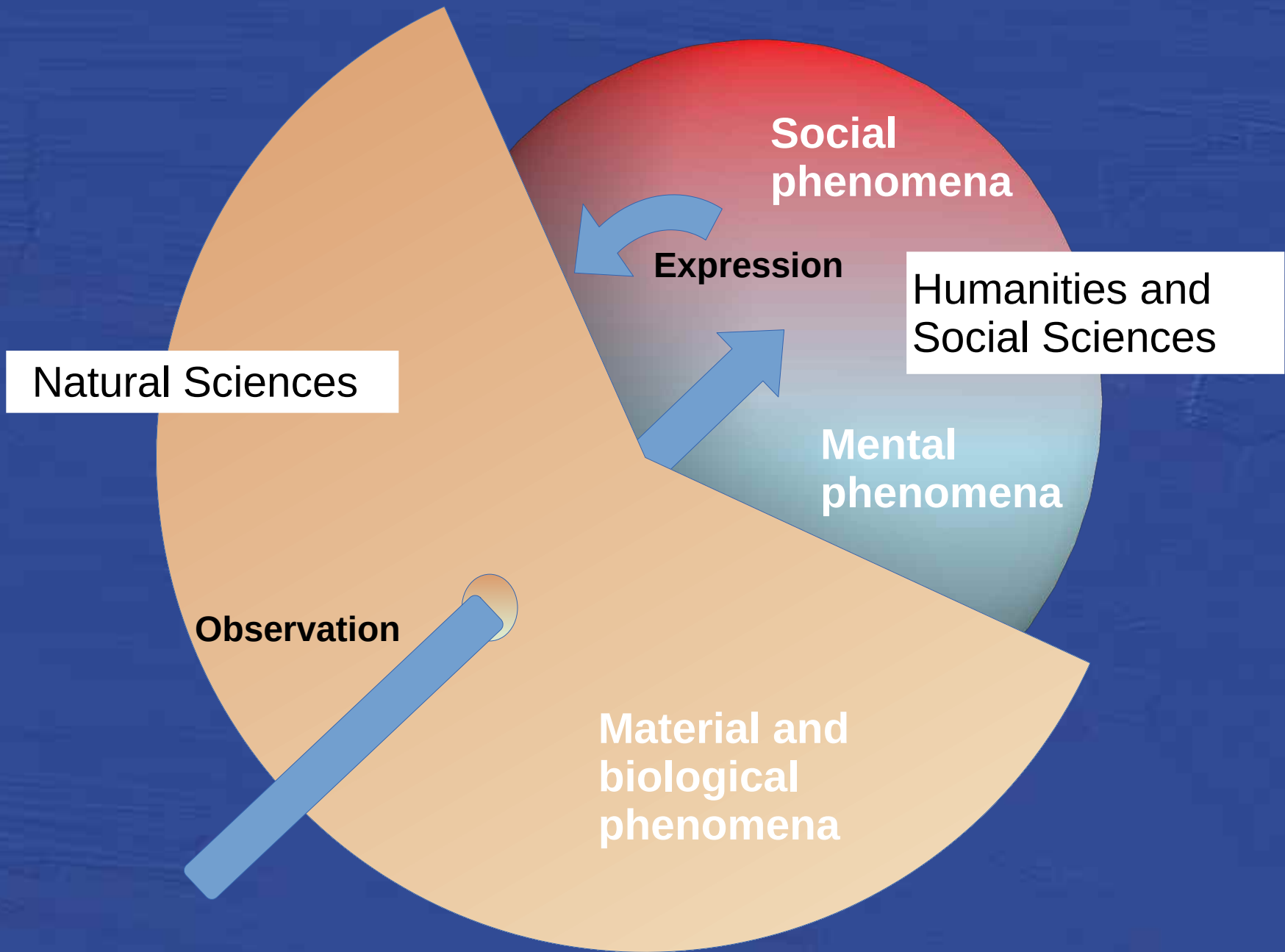
Social representations



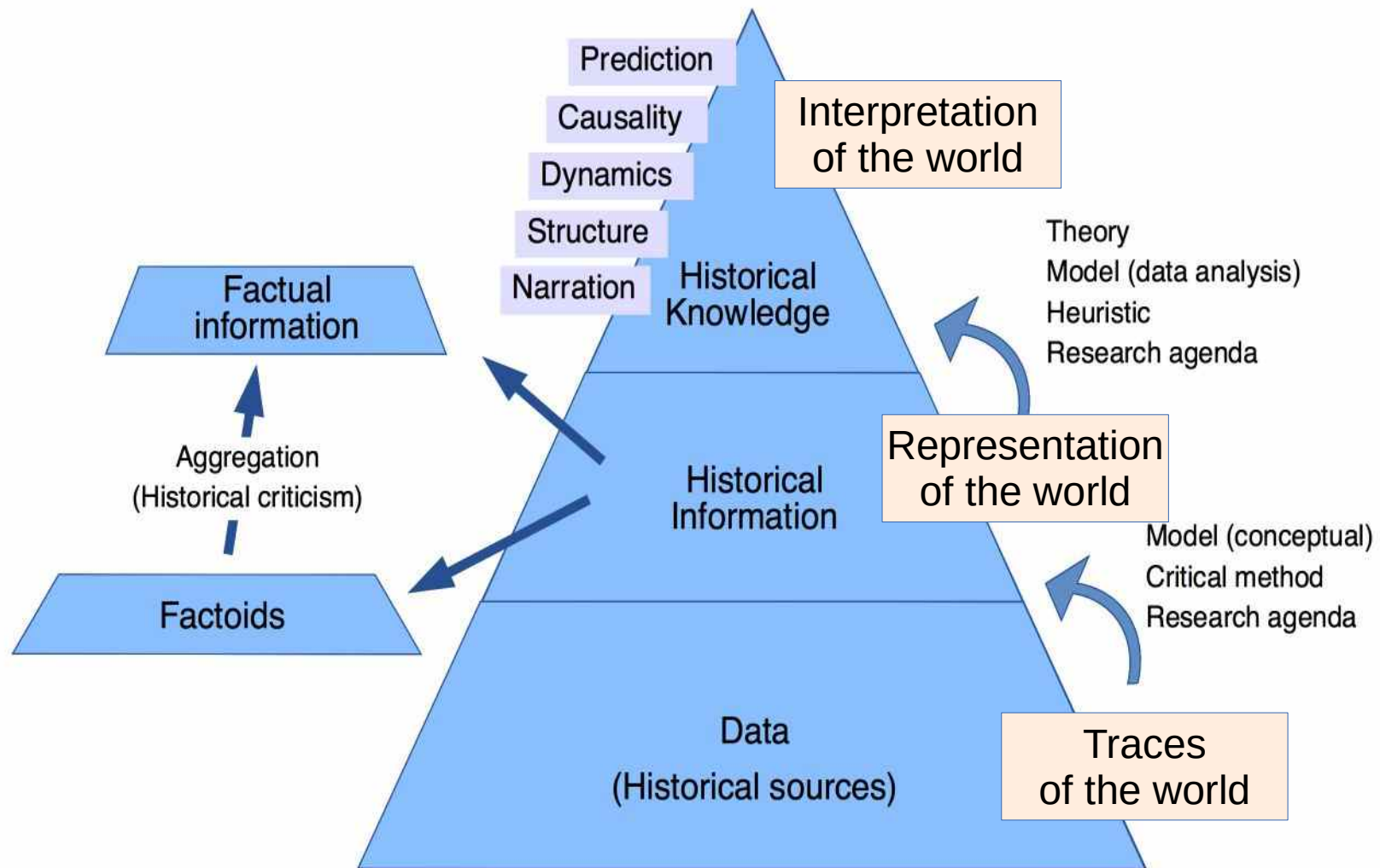
Individual minds

Individual minds





Information is not knowledge ! These are significantly different epistemic levels



Francesco Beretta (CNRS/Université de Lyon), 7 July 2020 CC BY-NC-SA 4.0

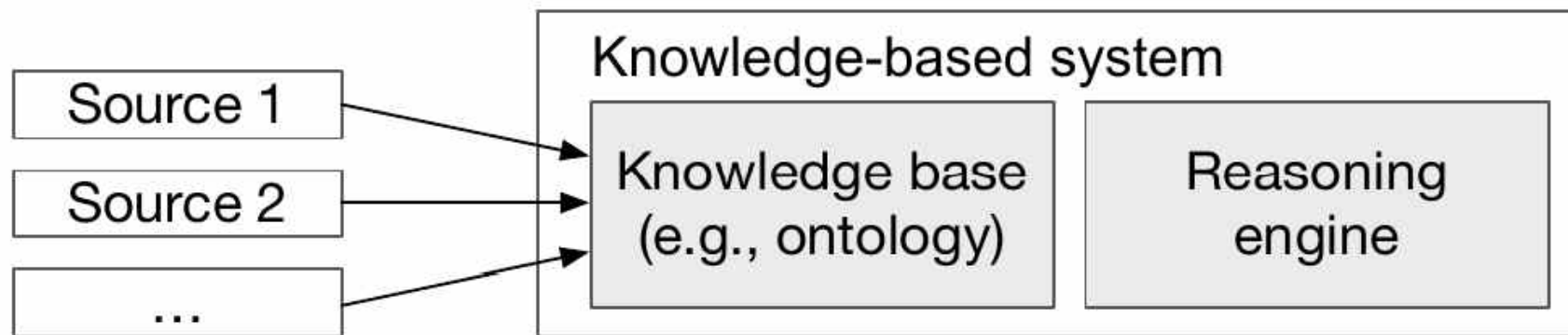
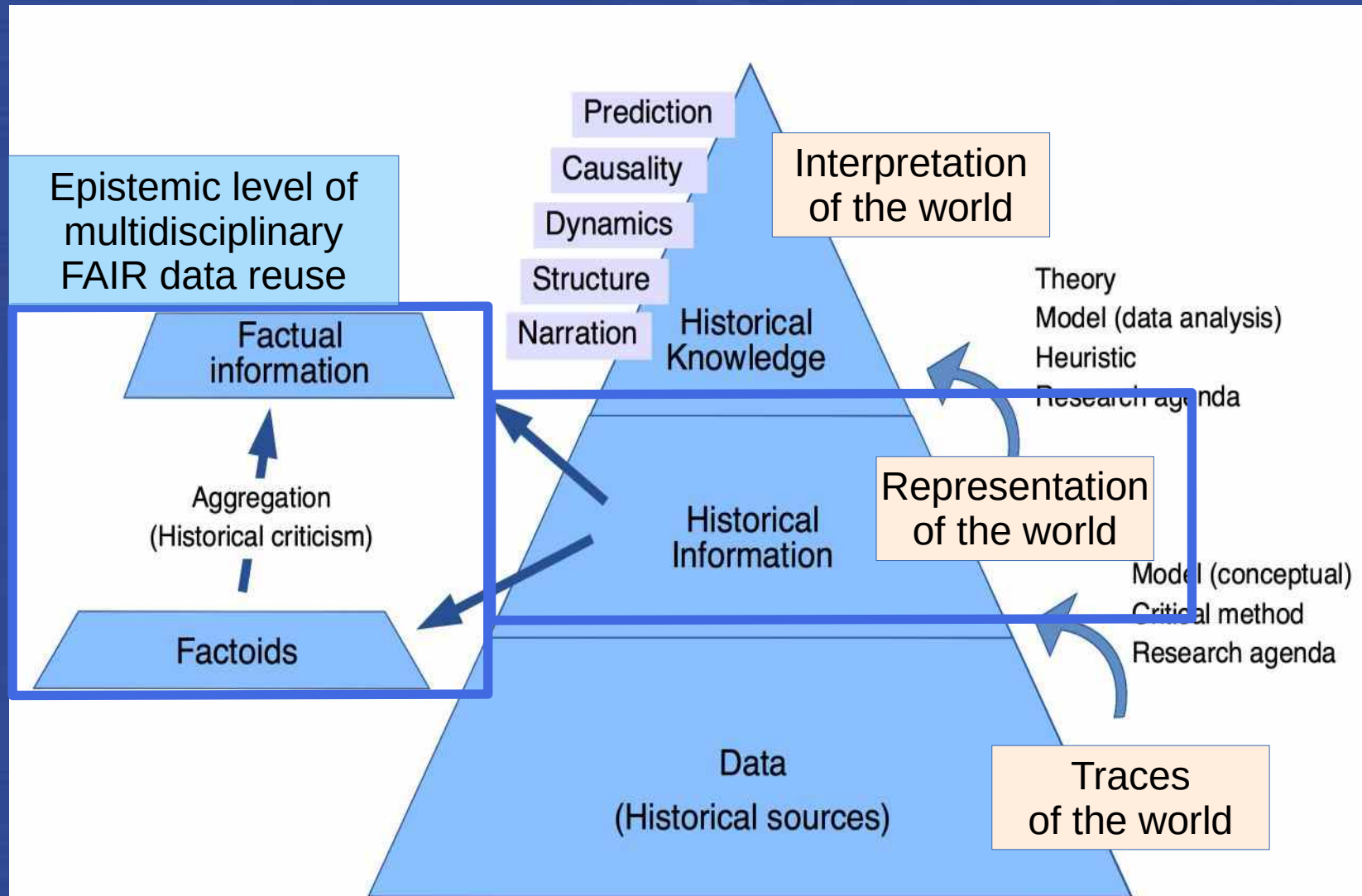


Figure 1: Architecture of a knowledge graph

Ehrlinger, Lisa and Wolfram Wöß, 'Towards a Definition of Knowledge Graphs', *Joint Proceedings of the Posters and Demos Track of the 12th International Conference on Semantic Systems ...*, Leipzig, Germany, September 12-15, 2016, 2016 (<https://ceur-ws.org/Vol-1695/paper4.pdf>)

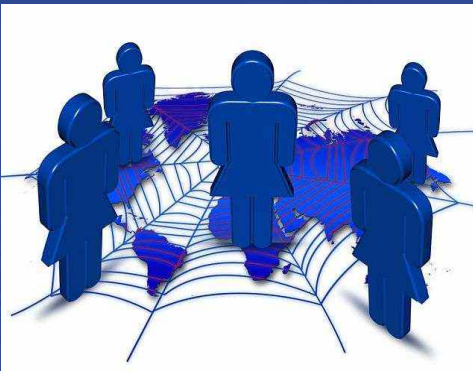
Different epistemic levels: information as representation, knowledge as interpretation



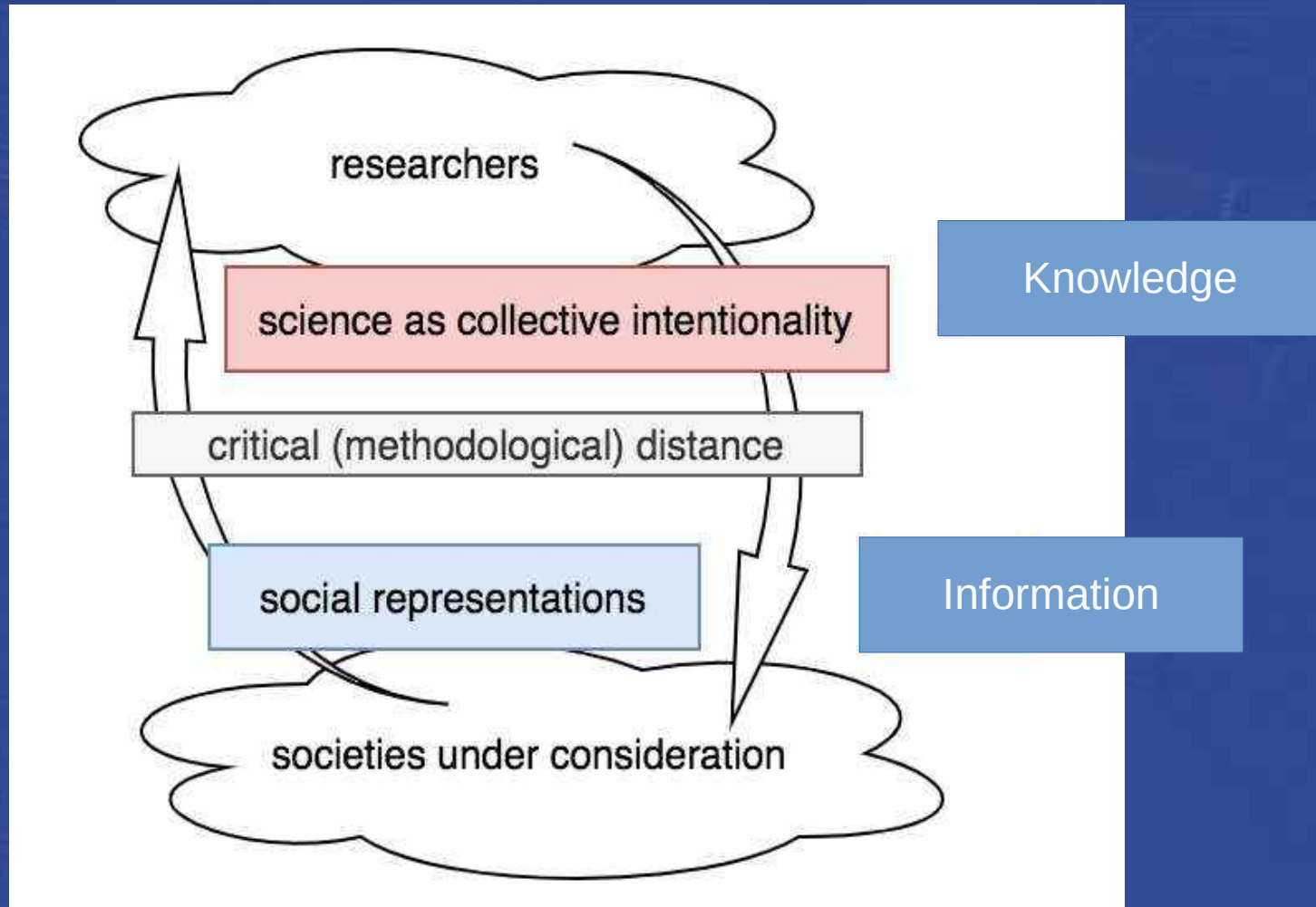
Francesco Beretta (CNRS/Université de Lyon), 7 July 2020 CC BY-NC-SA 4.0

Information as representation of the world

**Social
Representations
(Collective
Intentionality)**



Information as representations of the world
Knowledge as interpretation of the world



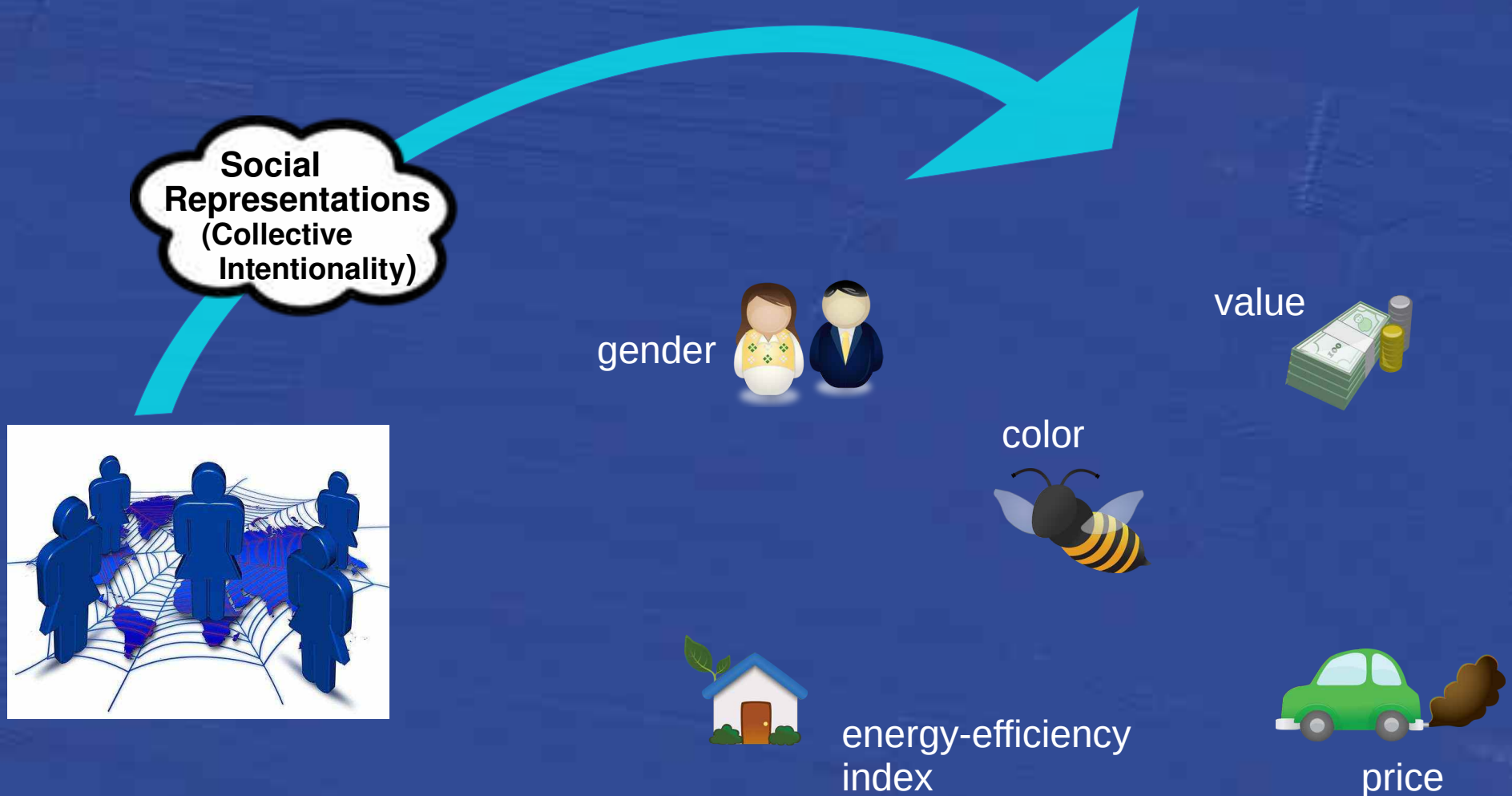
An ontology as a representation of the world :

- representation of the **things** (→ **objects**) in the world



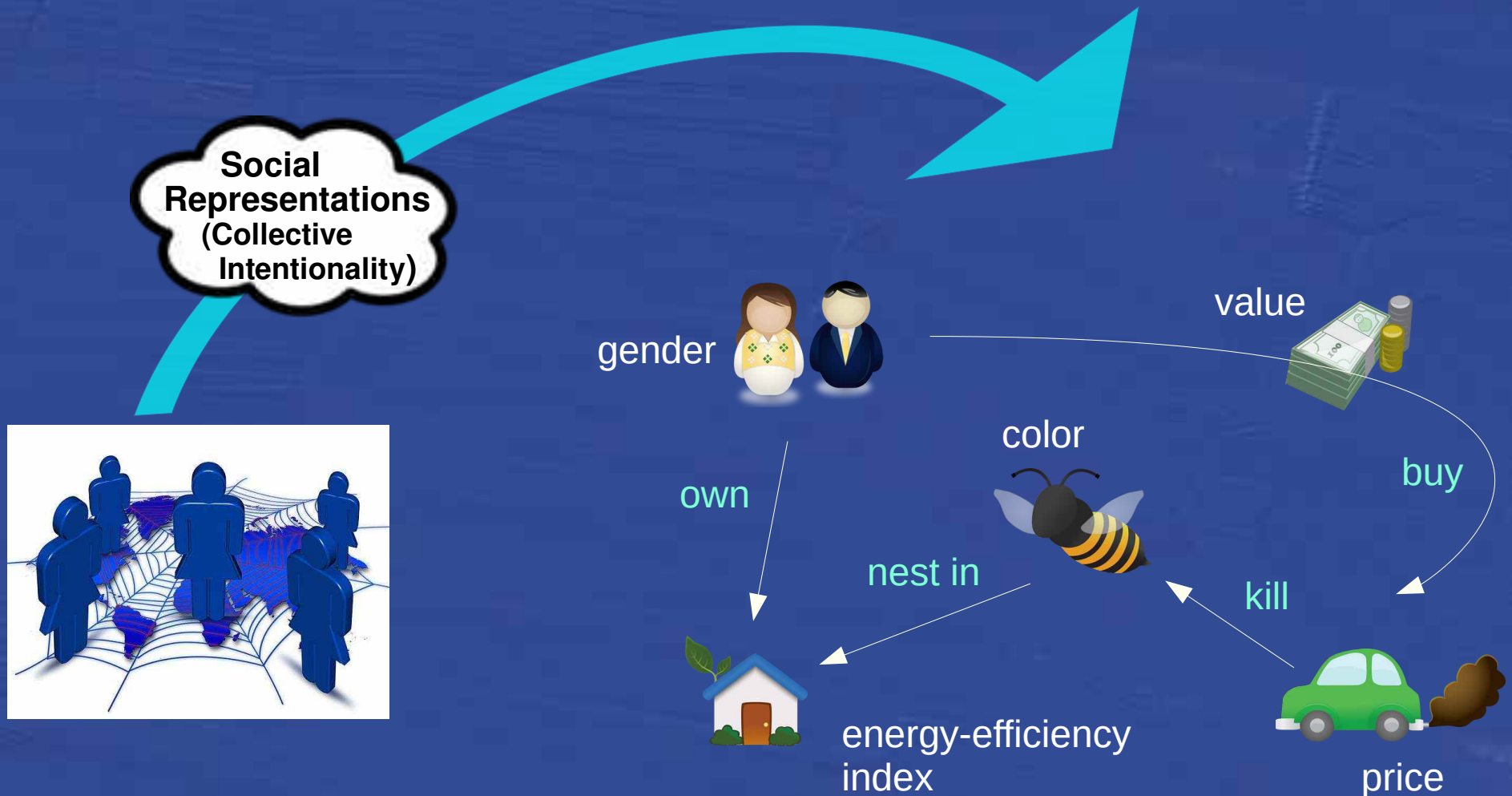
An ontology as a representation of the world :

- representation of the **things** (→ **objects**) in the world
- of their **properties** (qualities)



An ontology as a representation of the world :

- representation of the **things** (→ **objects**) in the world
- of their **properties** (qualities)
- of their **relationships**



Examples of objects and questions in the HSS domain

Artefacts and their social significance: a border stone represents a delineation of a border



Border stone from c. 1280 on the border of the lands of the Wrocław bishops.

In the background the contemporary road sign marking the border between Opole and Wałbrzych voivodships.

Photo: Władysław Łoś (CC By SA 3.0)

The physical object, the notion of border, the symbol of the episcopal crozier, the function of bishop.

The bio-physical world, the social world

Social roles: the rite that establishes the function

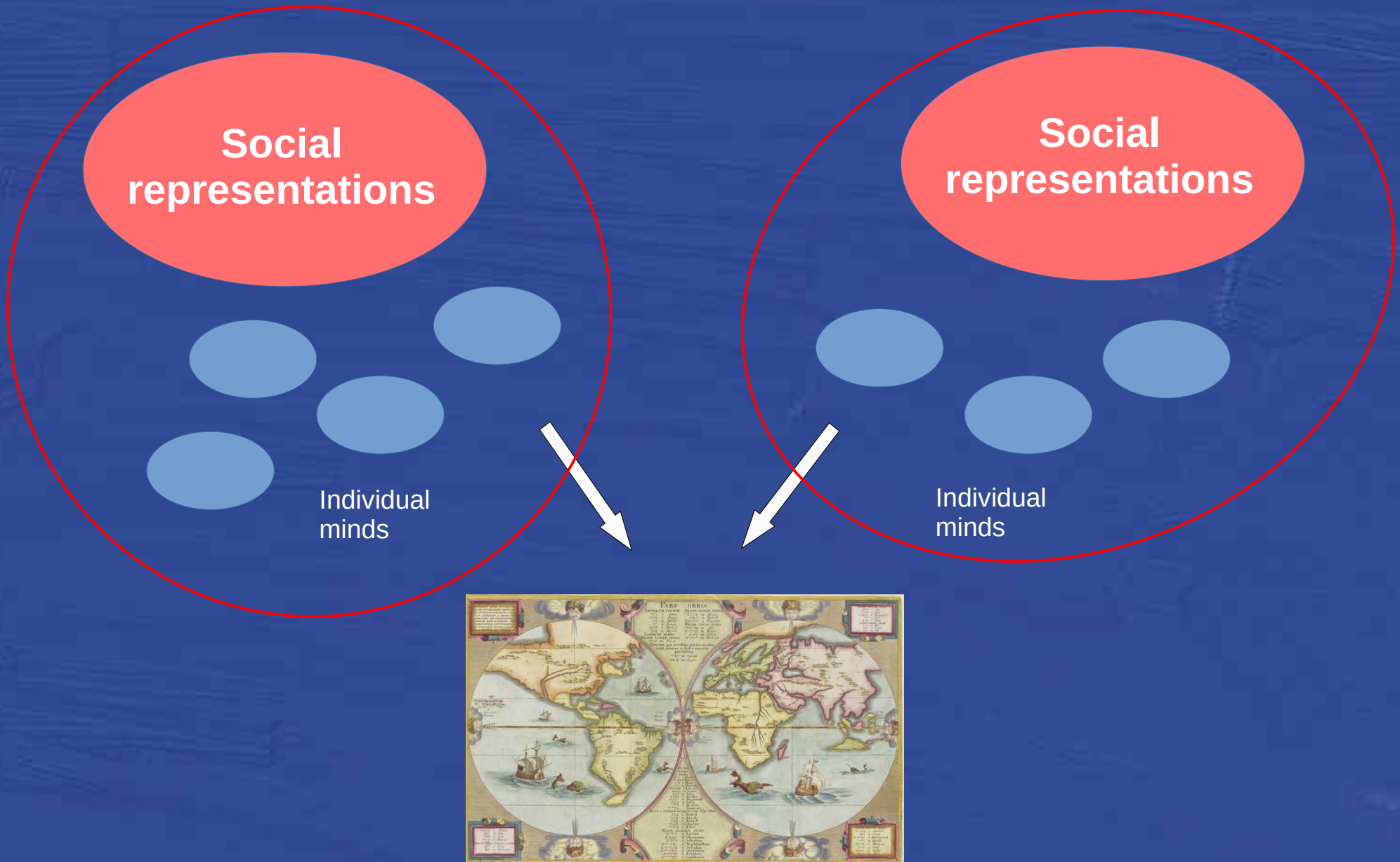


Different perspectives on the same events: interpreting a car race as fun or as a crime



Sports car photo created by azerbaijan_stockers - www.freepik.com

The observed phenomenon:
different mental and social representations
of the same phenomena



Methodology

OntoClean

N. Guarino/C. A. Welty, « An Overview of OntoClean », in Steffen Staab, ed., Handbook on ontologies, 2nd ed. Berlin: Springer, 2009.

Essence (as defined by rigid intensional properties)

- A 'student' : not a class but a time-indexed property of a person

Identity (criteria to clearly distinguish individuals)

- The identity of a building as individual does not depend on its changing use

Unity (parthood)

- A crowd of humans vs a group having a plan

Dependence (one instance implies the existence of another one)

- No human without a birth and no birth without a human

Modelling Best Practices

- Property inheritance, quantifiers, multiple statements on same properties
- Rich controlled vocabularies (researchers) but concise ontology (semantic engineers)

From a resource-centered model...



...to a statement-centered model...

The screenshot shows a Wikidata statement for the date of birth of Johannes Kepler. The statement is highlighted with a red box. It includes the following information:

- date of birth: 27 December 1571
- 2 references:
- stated in: BnF authorities
- retrieved: 10 October 2015
- reference URL: <http://data.bnf.fr/ark:/12148/cb11909597m>

Below this, there is another statement for the date of birth: 21 December 1571 *Gregorian*, with 1 reference.

At the bottom, there is a statement for the place of birth: Weil der Stadt, with a warning icon and a note that it is a free imperial city of Weil der Stadt, located in the administrative territorial entity of Holy Roman Empire.



BNF Authorities

"1571-12-21"

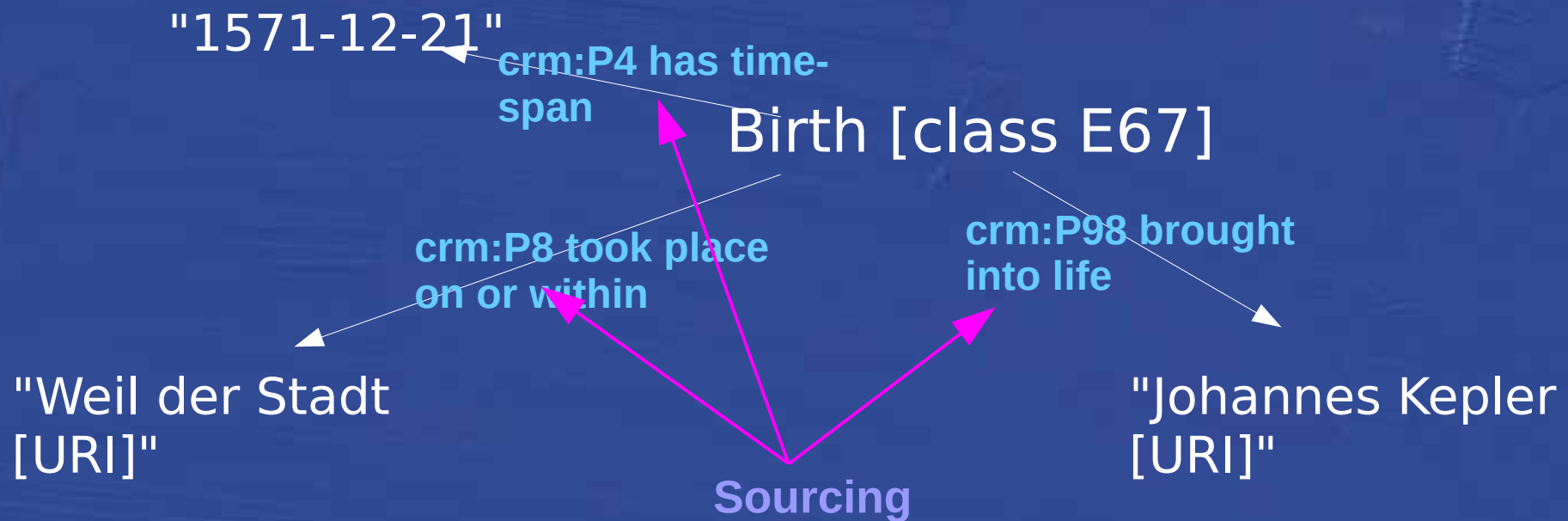
wdt:P569 (date of birth)

Kepler, Johannes (Q8963)

wdt:P19 (place of birth)

Weil der Stadt (Q505147)

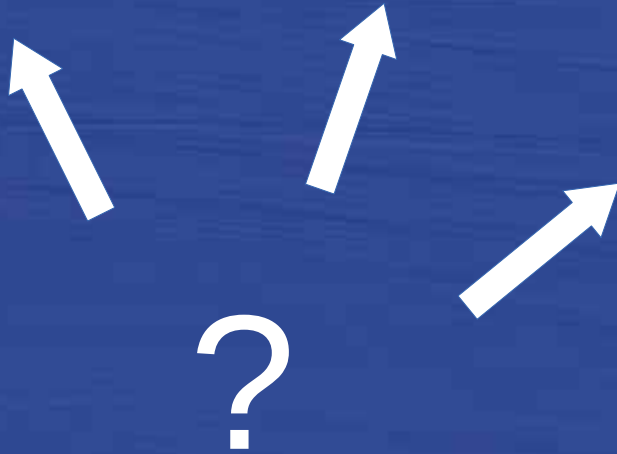
... or prefer a more robust event-centered model !



CIDOC CRM

DUL
(DOLCE ULTRA LIGHT)

schema.org



Research agenda

Research specific data model

Research data

Foundational ontologies
& modelling best practices

DOLCE + Descriptions and Situations
& object-oriented modelling principles

Research agenda

Research specific data model

Research data

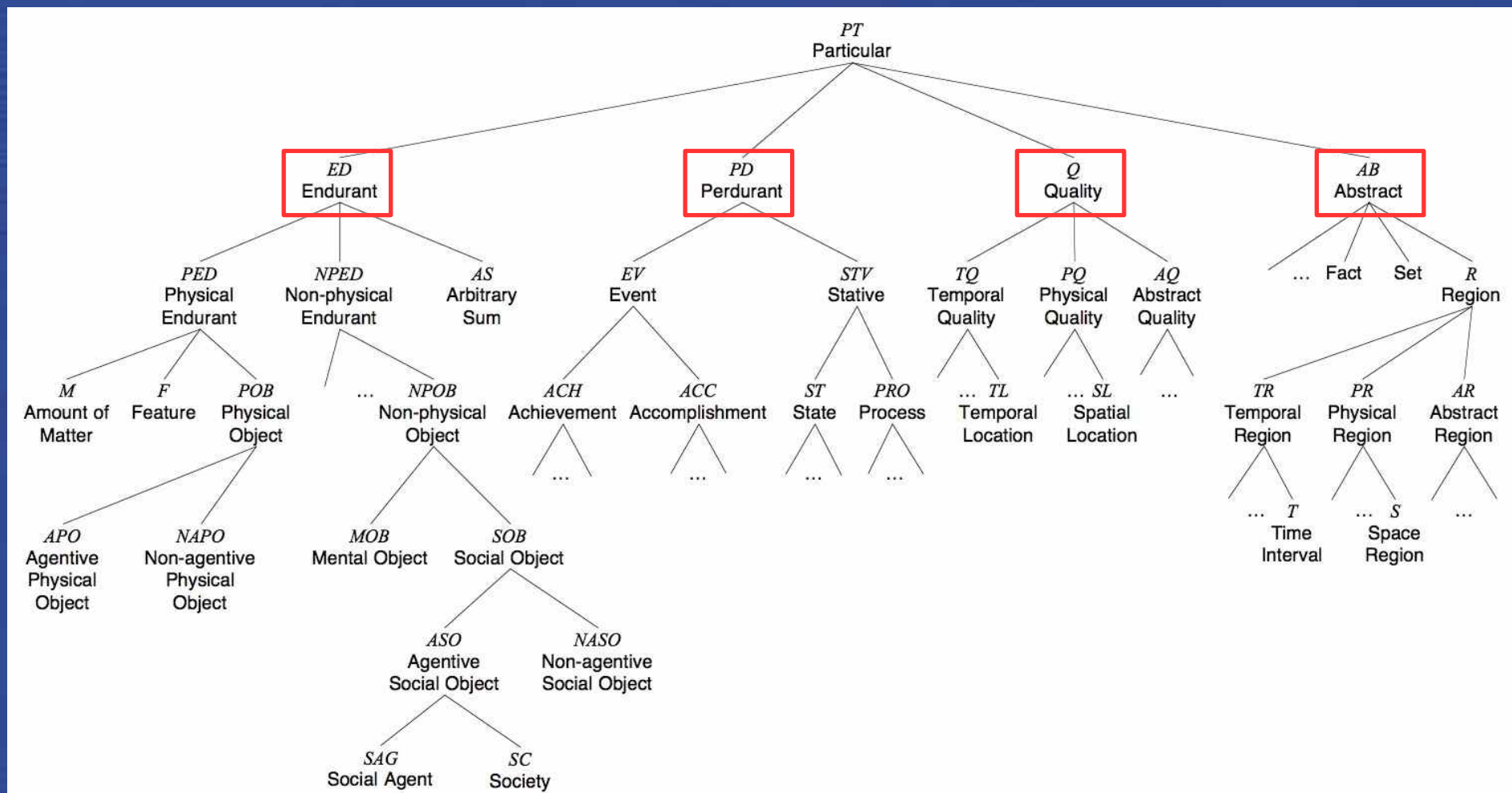
« **Foundational ontologies** are not directly used for applications; rather, they provide **conceptual handles** to solve cases of misunderstandings due to the limitations of expressiveness of the application languages. [...]

DOLCE has remained fixed over the years fulfilling the purpose of top-level ontologies to provide a solid and stable basis for **modeling different domains**, in this way **ensuring interoperability of reference and domain ontologies** that use DOLCE. »

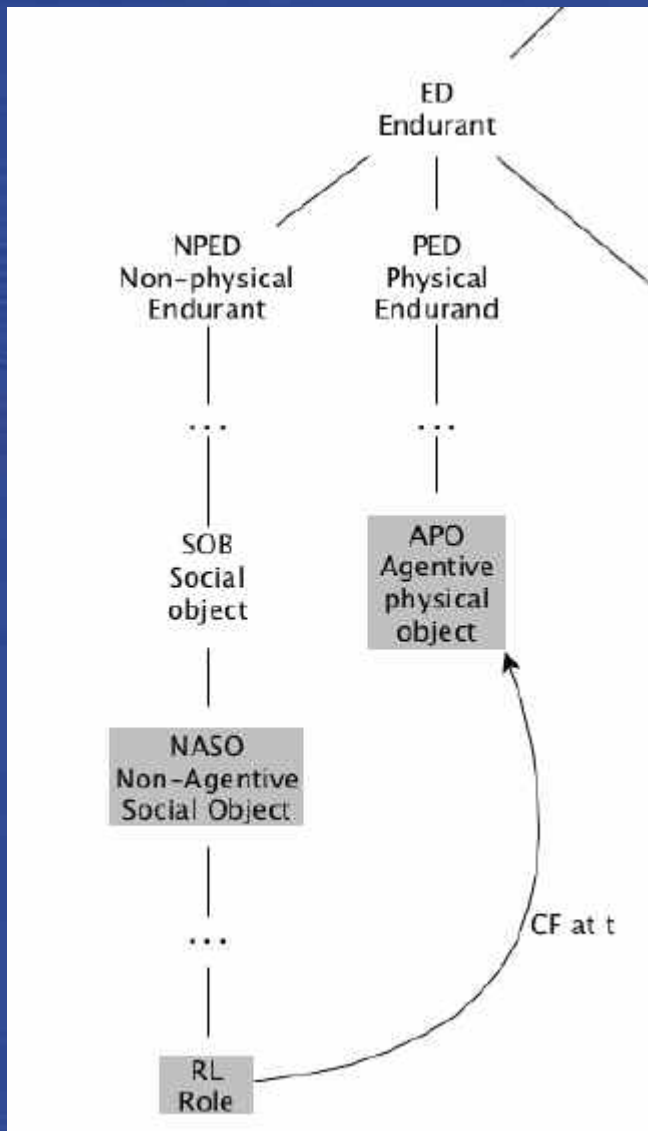
Borgo Stefano et al., « DOLCE: A descriptive ontology for linguistic and cognitive engineering¹ », Applied Ontology, 18.11.2021, pp. 1-25.

Foundational ontologies

were developed to support the verification and improvement of the **conceptualization** of a domain of discourse.



Descriptive Ontology for Linguistic and Cognitive Engineering (DOLCE) – a foundational ontology designed in 2002 in the context of the WonderWeb EU project, developed by Nicola Guarino and his associates at the Laboratory for Applied Ontology (LOA) – WonderWeb Deliverable D18, p.14



$\forall x \neg CF(x, 2 \text{ CT each}, t_2) \wedge$
 $CF(\text{Potter}, 2 \text{ CTeacher}, t_1) \wedge$
 $CF(\text{Bumblebee}, 2 \text{ CTeacher}, t_3)$
 $CF(\text{Mary}, 2 \text{ CStudent}, t_1)$

Borgo Stefano et al., « DOLCE: A descriptive ontology for linguistic and cognitive engineering », Applied Ontology, 18.11.2021, pp. 1-25.

Foundational ontologies
& modelling best practices



Generic, domain related core ontology

DOLCE + Descriptions and Situations
& object-oriented modelling principles



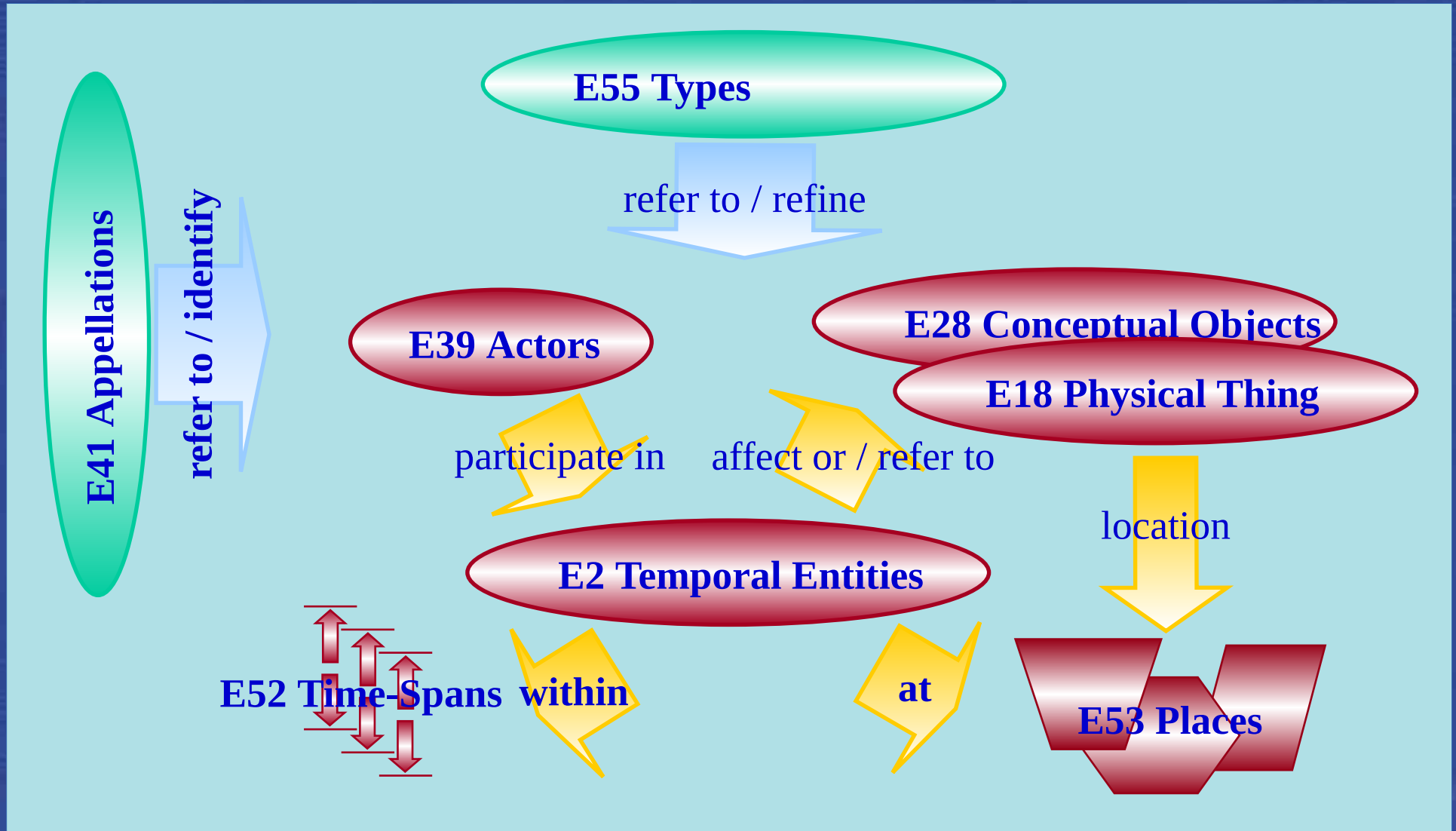
CIDOC CRM

Research agenda

Research specific data model

Research data

The CIDOC CRM (ISO21127:2023 – community edition 7.1.3)
A semantic framework that provides *interoperability*
between different sources of **cultural heritage information**



Foundational ontologies
& modelling best practices



Generic, domain related core ontology

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CIDOC CRM

SDHSS

Research agenda

Research specific data model

Research data

Semantic Data for Humanities and Social Sciences (SDHSS) CIDOC CRM Core Extension

Semantic Data for Humanities and Social Sciences (SDHSS) CIDOC CRM Top-Level Extension

Description:

Published by Francesco Beretta (CNRS/Université de Lyon), 7 December 2020. Last revised on March 30 2021. ([CC BY-SA 4.0](#))

The extension of CIDOC CRM for semantic data for humanities and social sciences (SDHSS) stems from the need to conceptualise the reality in the world, and more specifically factual information, from the point of view of historical research. The [ontological commitment](#) is therefore related to the domain of discourse of history but insofar as history, as a discipline that studies the life of humans and societies in the past, is interested in all the different aspects of social, economic, political, religious, literary and cultural life, the scope of this extension could be defined as the whole of social and human life, apprehended from the descriptive point of view, and global approach to reality, that characterises historical research.

This definition of the scope or domain modelled is based on the conviction that in a [constructivist approach of scientific knowledge](#), a conceptualisation and data model can only be developed from the point of view of a specific discipline because *scientific objects* do not exist in the absolute but depend on the method and research agenda. They depend on the perspective or epistemic context researchers adopt in considering states of affairs: *scientific objects*, and [semantic models modelling them](#), are not declared to be the only appropriate and exclusive representation of *things* in the pre-Kantian sense but defined as *intentional objects* constructed from the point of view of a discipline and methodological approach in relation to things in the world. Scientific objects are not the things in the world themselves, even if they must necessarily refer to them by way of observation or experimentation, if a scientific and therefore realistic approach is to be maintained. This corresponds to the notion of inter-objectivity in social sciences relying on the distinction between things in themselves and things as perceived, experienced and discussed by human subjects, in their [shared intentionality](#) and in relation to their social practices and context.

sdhss.org

DOLCE Lite + DUL

CIDOC CRM

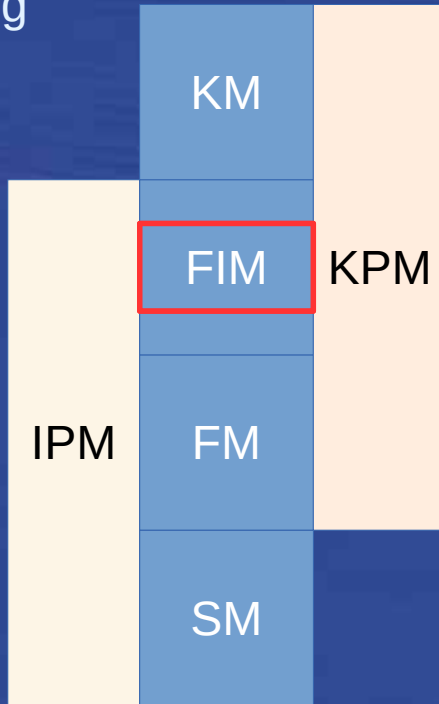
SDHSS

schema.org

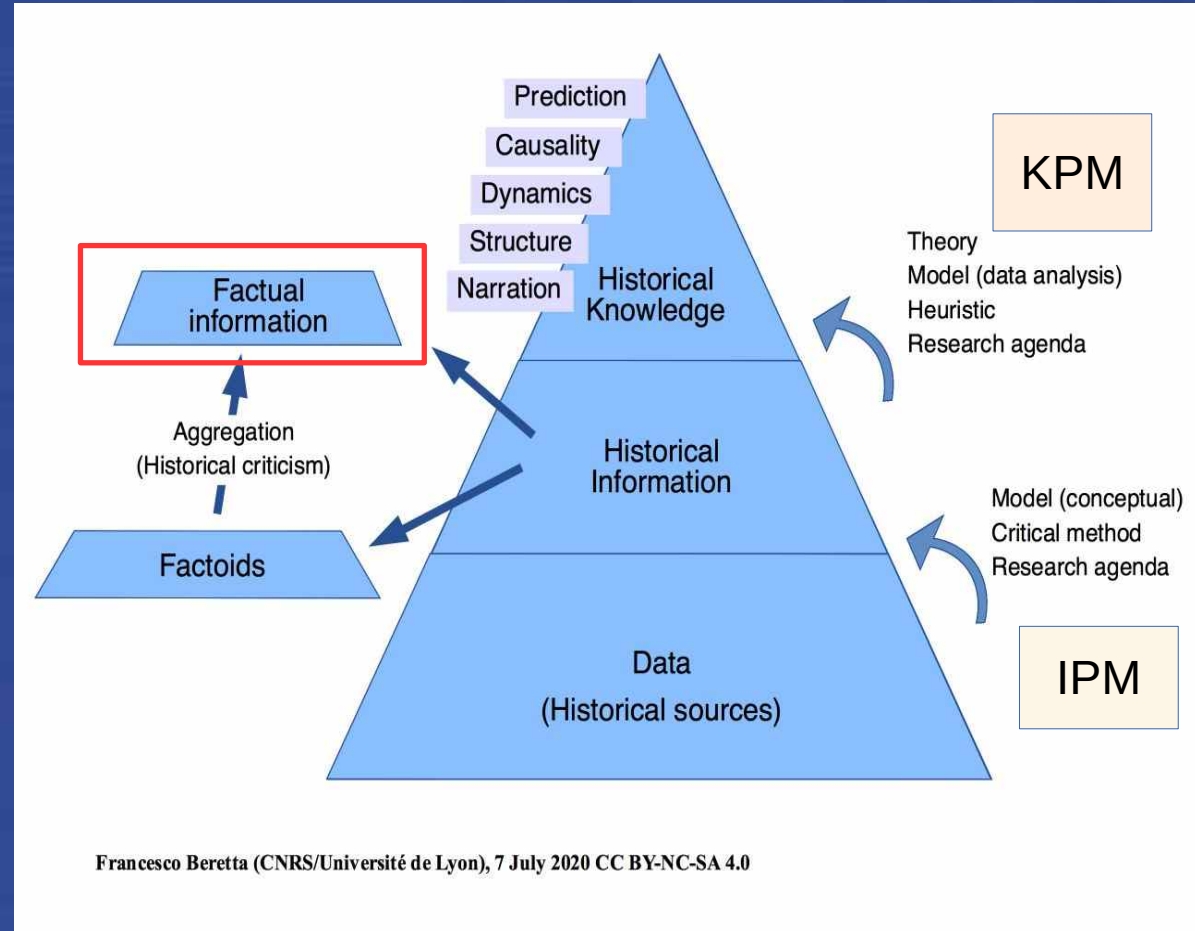
DBpedia
Ontology
Wikidata
Ontology

HiCO
PROV

Web
Annotation
Data Model



FRBR EAD
LRM RiC TEI
DCMI



Foundational ontologies
& modelling best practices

DOLCE + Descriptions and Situations
& object-oriented modelling principles



Generic, domain related core ontology

CIDOC CRM

SDHSS



Domain related extensions

CRM
Archaeo

FRBRoo



CRMsoc

CRMgeo

Research specific data model

Research data

Foundational ontologies
& modelling best practices

DOLCE + Descriptions and Situations
& object-oriented modelling principles



Generic, domain related core ontology

CIDOC CRM

SDHSS



Domain related extensions

CRM
Archaeo

FRBRoo

Society
& Law
(SDHSS)

Literary life
(SDHSS)



CRMsoc

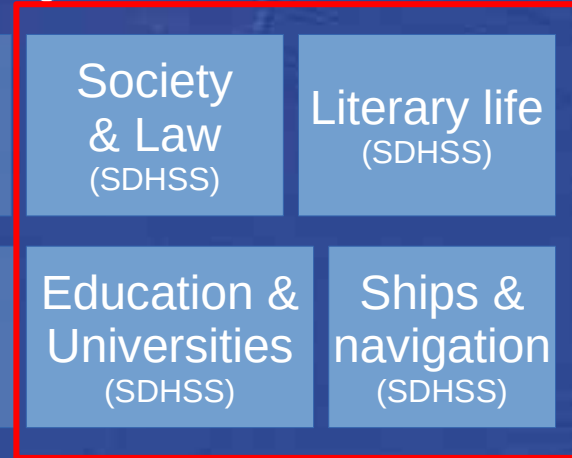
CRMgeo

Education &
Universities
(SDHSS)

Ships &
navigation
(SDHSS)

Research specific data model

Research data



Foundational ontologies & modelling best practices

DOLCE + Descriptions and Situations & object-oriented modelling principles

Generic, domain related core ontology

CIDOC CRM

SDHSS

Domain related extensions

CRM Archaeo

FRBRoo

Society & Law (SDHSS)

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Generic, domain related core ontology

CIDOC CRM

SDHSS



Research agenda



Domain related extensions

CRM Archaeology

FRBRoo

Society & Law (SDHSS)

Literary life (SDHSS)



Research agenda

CRMsoc

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Research data

Interoperable research data

Maritime History:
<https://ontome.net/namespace/66>

Man-Made Object – E22

Ship – C2

C2 Ship

Subclass of: [E22 Man-Made Object](#)

Scope note: Used to denote a watercraft that travels the world's oceans and other sufficiently deep waterways, carrying passengers or goods, or in support of specialized missions, such as defense, research and fishing.

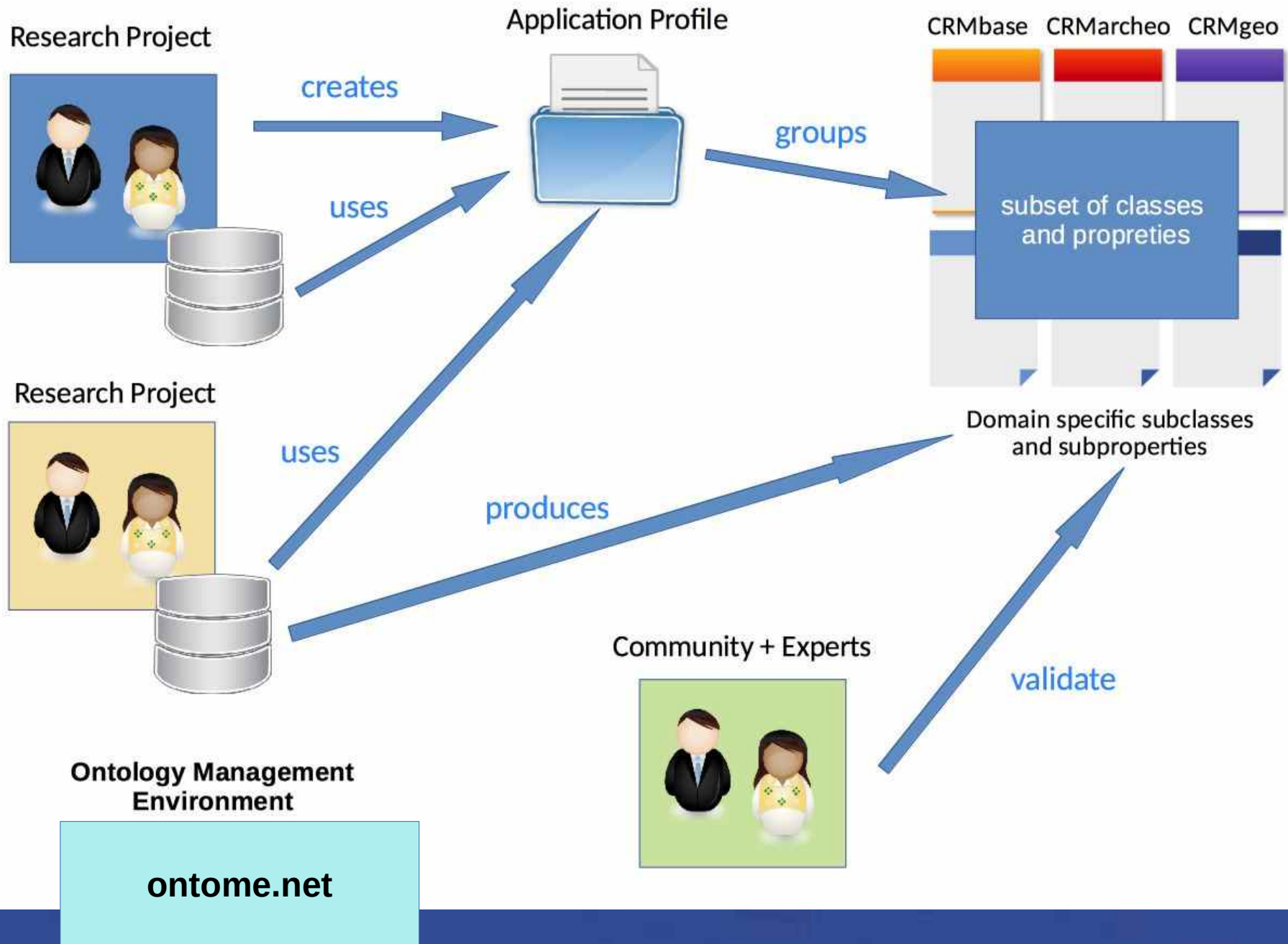
Examples: tba

In First Order Logic: $C2(x) \supset E22(x)$

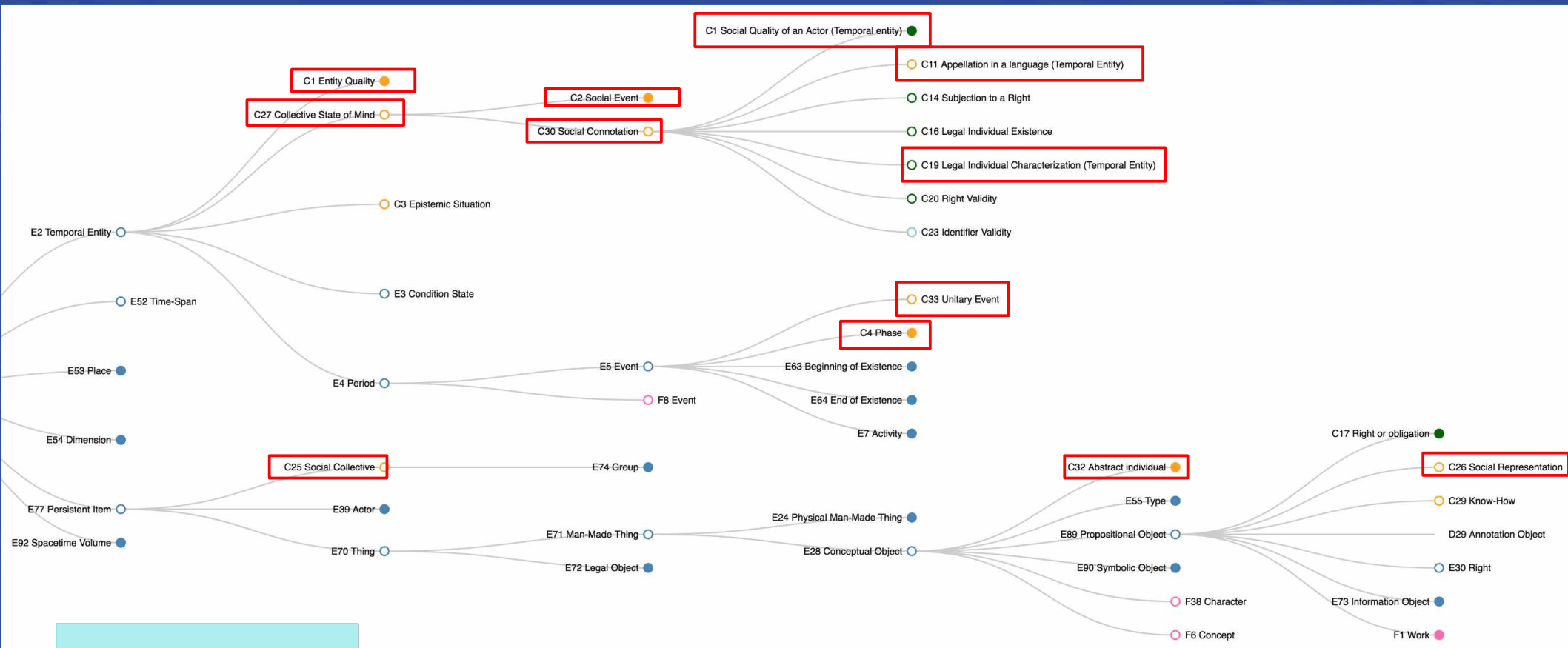
Outgoing properties: [P6 has ship type](#) → [C3 Ship type](#)

Incoming properties: [C1 Ship voyage](#) → [P3 carried out by](#)
[C12 Shipbuilding](#) → [P7 has built](#)





The SDHSS ontology ecosystem



sdhss.org

crm:E2 Temporal Entity

crm:E4 Period

sdh:C2 Entity Quality

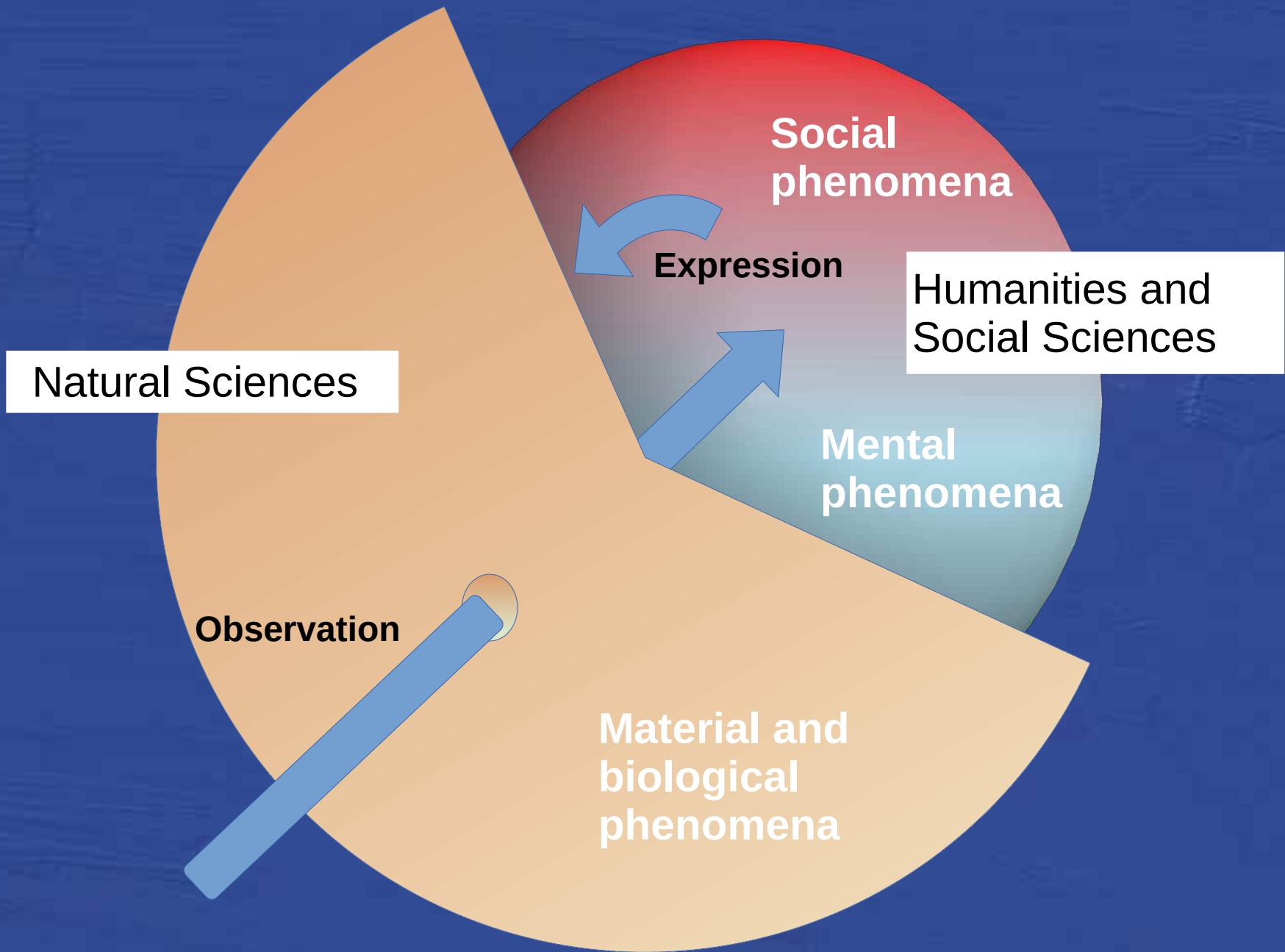
sdh:C2 Epistemic Situation

crm:E5 Event

- Length of a bridge
- Color of a bicycle

- Weather in Paris in March 2024
- Economic activity of France in 2023

crm:E7 Activity



crm:E2 Temporal Entity

crm:E4 Period

sdh:C2 Entity Quality

sdh:C2 Epistemic Situation

crm:E21 Person

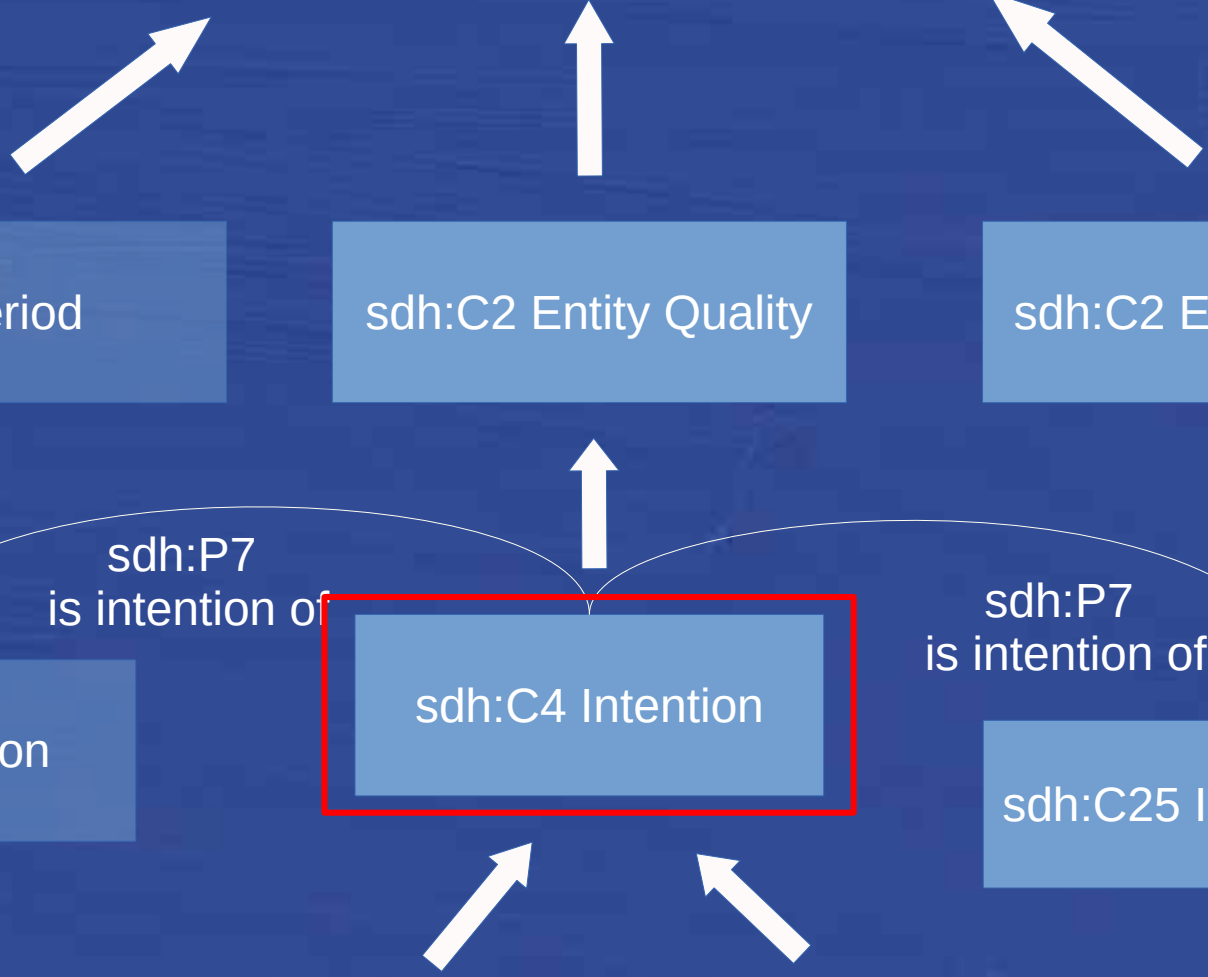
sdh:C4 Intention

sdh:P7
is intention of

sdh:C25 Intentional Collective

sdh:C7 Intentional State

sdh:C10 Intentional Event



How to conceptualize observable mental and social phenomena ?

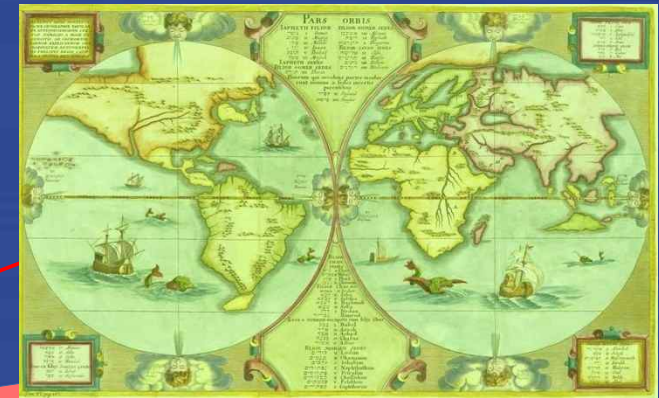
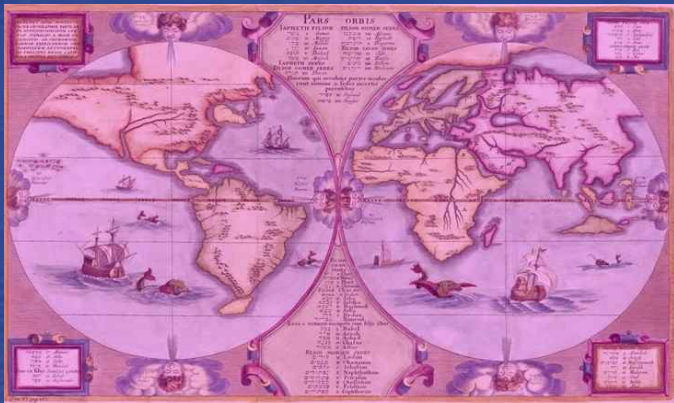
« In philosophy, **intentionality** is the power of minds and mental states to be about, to represent, or to stand for, things, properties and states of affairs. To say of an individual's mental states that they have intentionality is to say that they are mental representations or that they have contents. » <https://plato.stanford.edu/entries/intentionality>

« **Collective intentionality** is the power of minds to be jointly directed at objects, matters of fact, states of affairs, goals, or values. [...] Collective intentional attitudes permeate our everyday lives, for instance when two or more agents look after or raise a child, grieve the loss of a loved one, campaign for a political party, or cheer for a sports team. They are relevant for philosophers and social scientists because they play crucial roles in the constitution of the social world. <https://plato.stanford.edu/entries/collective-intentionality>

Different perspectives on the same events: interpreting a car race as fun or as a crime

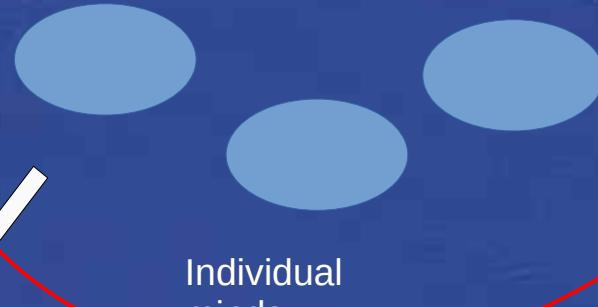


Sports car photo created by azerbaijan_stockers - www.freepik.com



Social representations

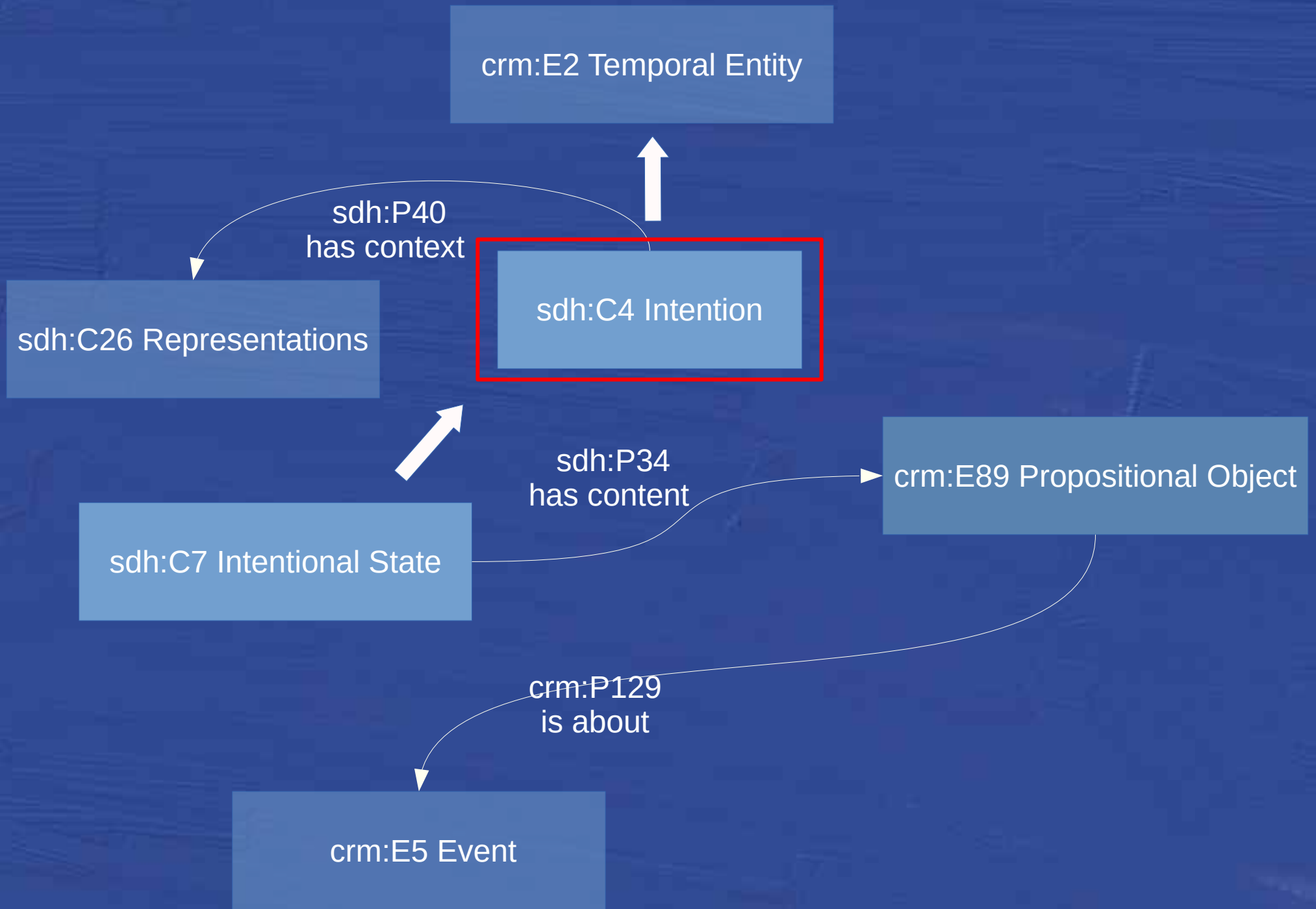
Social representations



Individual minds

Individual minds





Artefacts and their social significance: a bondary stone that defines a boundary



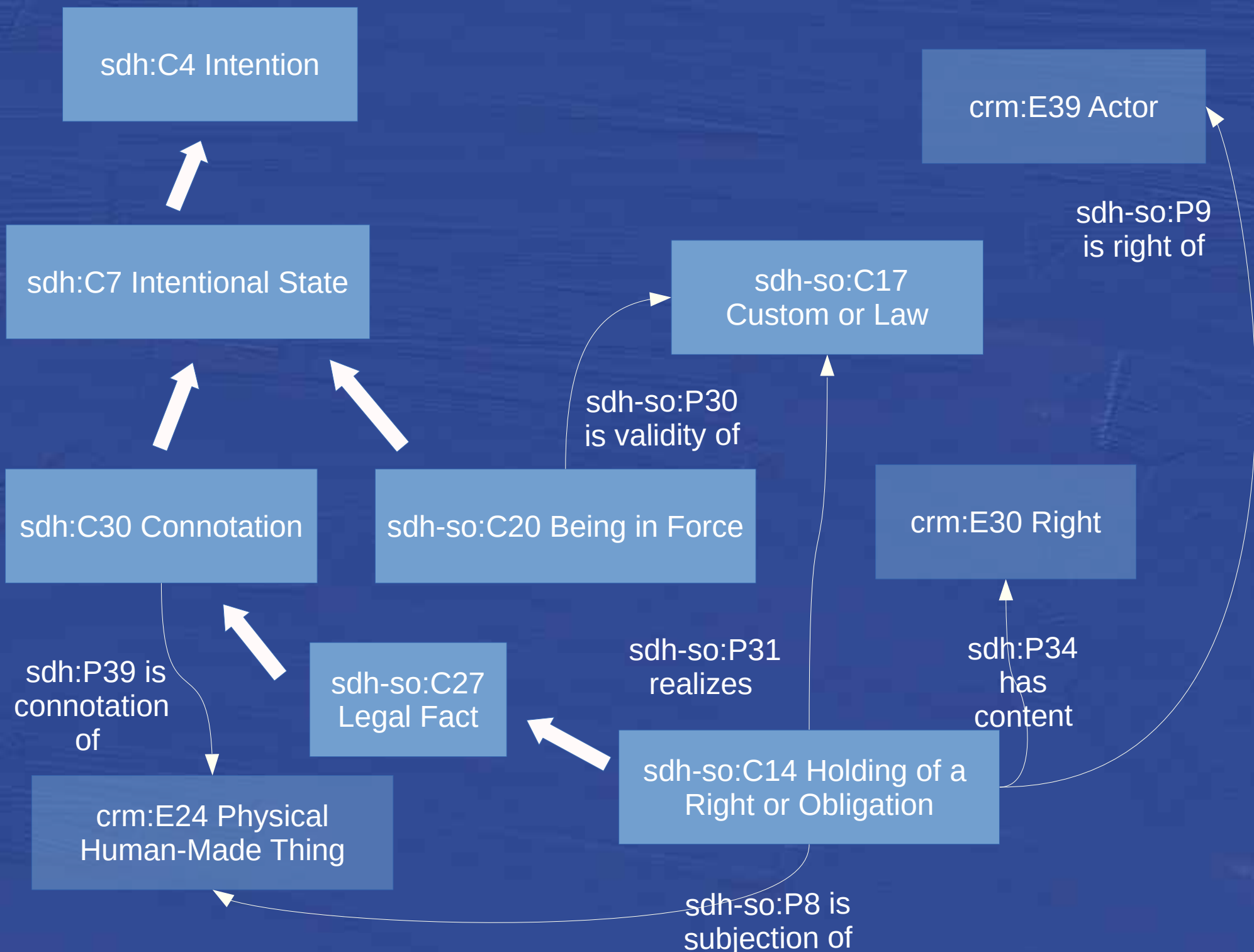
Border stone from c. 1280 on the border of the lands of the Wrocław bishops.

In the background the contemporary road sign marking the border between Opole and Wałbrzych voivodships.

Photo: Władysław Łoś (CC By SA 3.0)

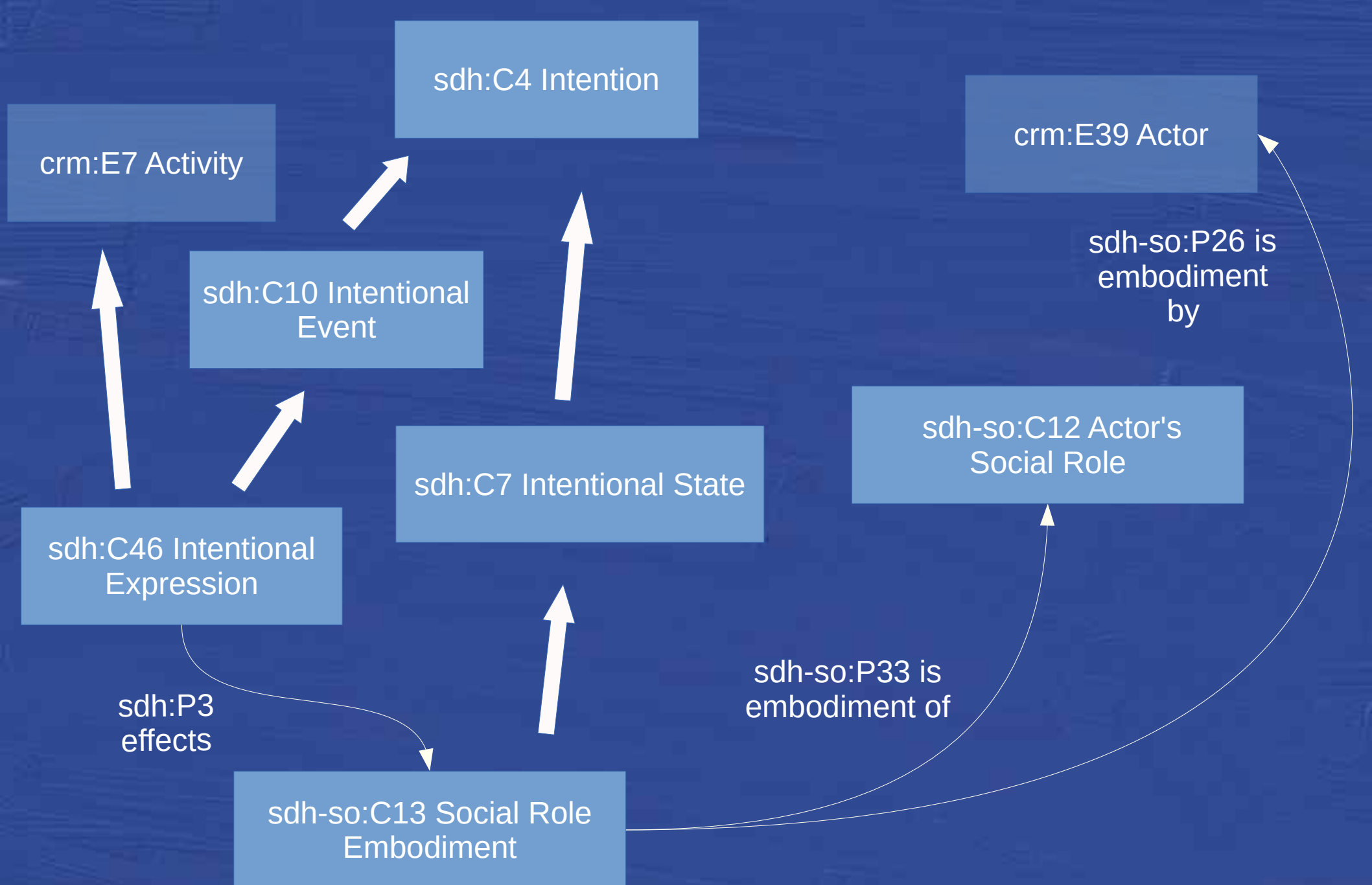
The physical object, the notion of border, the symbol of the episcopal crozier, the function of bishop.

The bio-physical world, the social world



Social roles: the rite that establishes the function





Foundational ontologies
& modelling best practices

DOLCE + Descriptions and Situations
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Generic, domain related core ontology

CIDOC CRM

SDHSS



Domain related extensions

CRM
Archaeo

FRBRoo

Society
& Law
(SDHSS)

Literary life
(SDHSS)



CRMsoc

CRMgeo

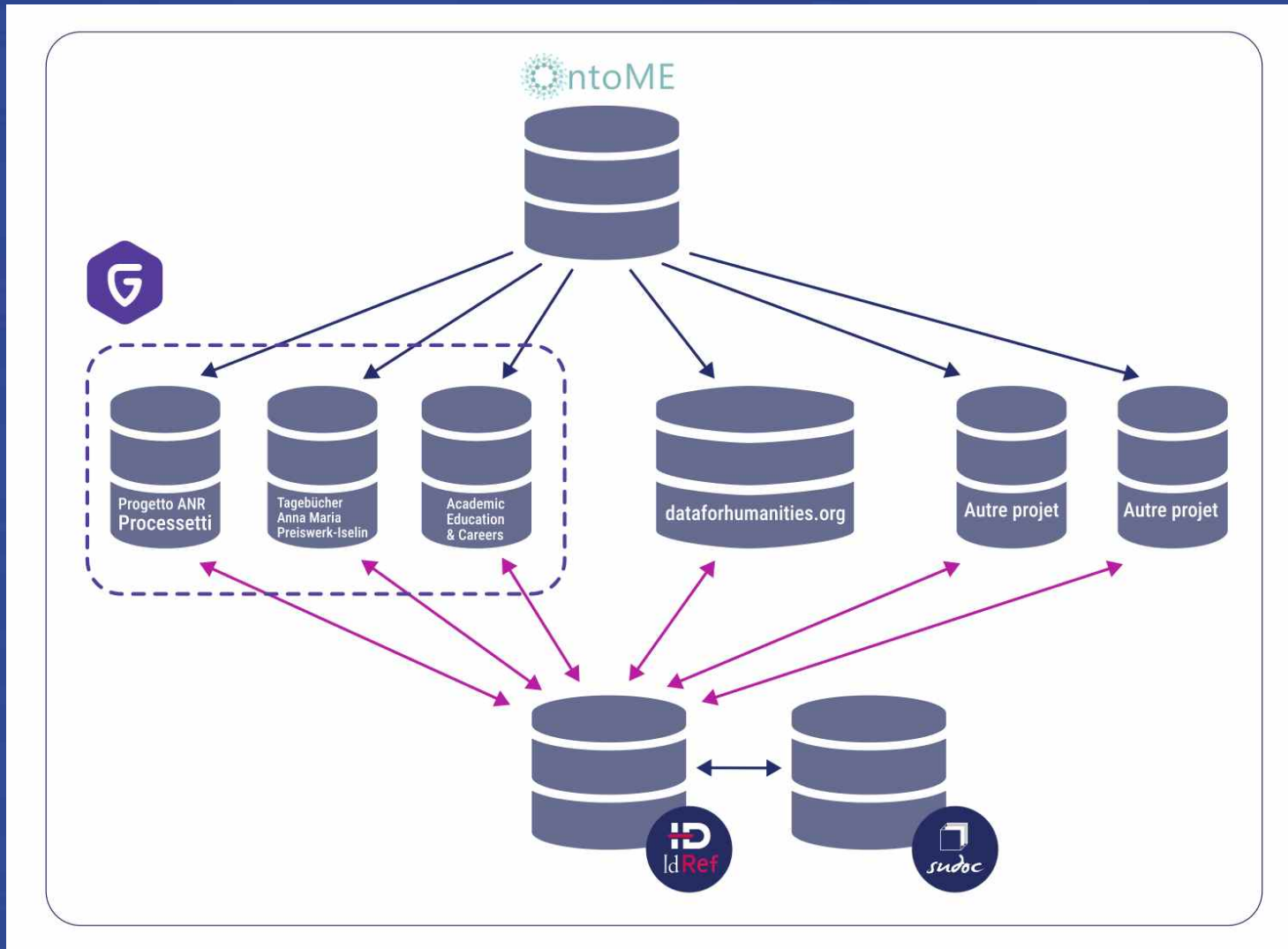
Education &
Universities
(SDHSS)

Ships &
navigation
(SDHSS)

Research specific data model

sdhss.org

Research data



sdhss.org – dataforhumanities.org – LOD4HSS

[Home](#)

All persons

[List additional appellations](#)

Filter persons by corpus

Sphaera Sacrobosco

Ps.Proclus

Theoricae Peurbach

Theoricae Gerard

Filter Results

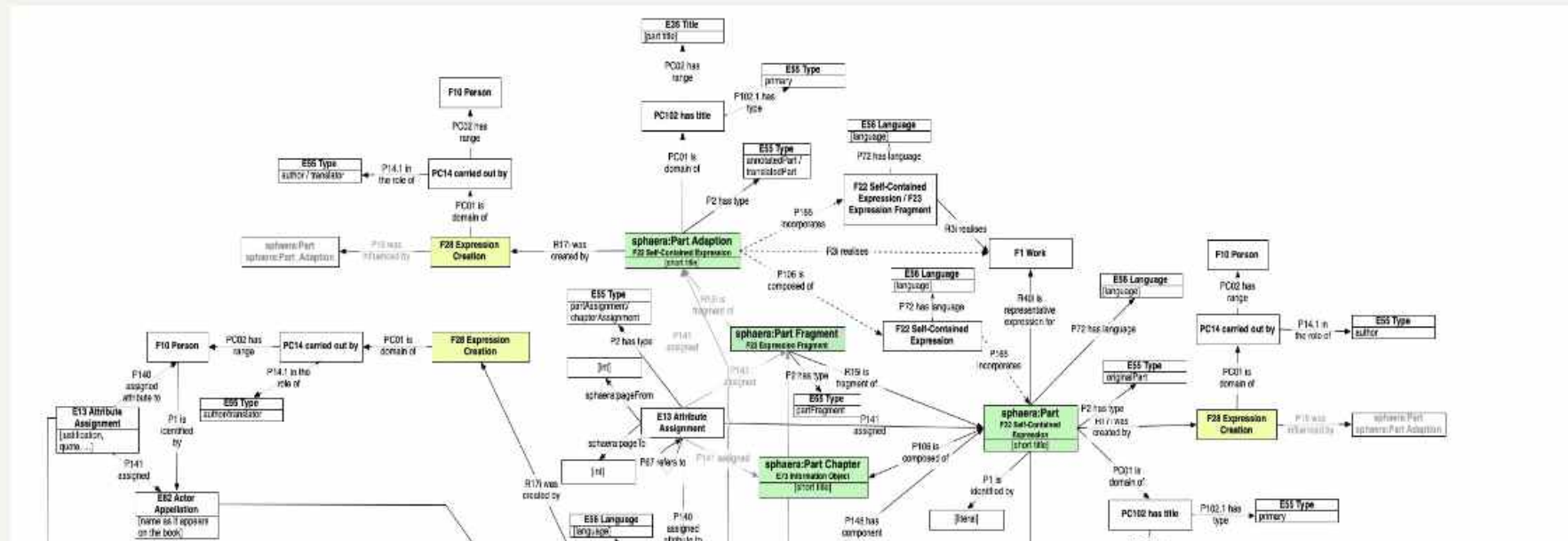
Person	Corpus	Role	Gender	Biography	Num Books
Achillini, Cinzio	Ps.Proclus	Publisher, Printer	Male	(1524 - 1527)	1
Acontius, Melchior	Sphaera Sacrobosco	Author	Male	1515 - 1569	7
Acosta, José de	Sphaera Sacrobosco	Author	Male	1540 - 1600	1
Adam of Rottweil	Theoricae Gerard, Sphaera Sacrobosco	Publisher	Male	(1470 - 1500)	2

Kräutli, Florian, and Matteo Valleriani, 'CorpusTracer: A CIDOC Database for Tracing Knowledge Networks', *Digital Scholarship in the Humanities*, 33.2 (2018), 336-46 <<https://doi.org/10.1093/lc/fqx047>>

Sphaera Corpus Ontology Diagram

We model our data according to the formal ontology CIDOC-CRM and the FRBRoo extension for bibliographic records. This ensures that our data is compatible to other sources and remains usable in the foreseeable future. We use and extend the Erlangen OWL implementation of CIDOC-CRM and FRBRoo.

Book Relations



Sphaera CorpusTracer Corpora Parts Persons Places Terms Search Ontology Visualizations - About

Home / SPARQL

Global Queries Personal Queries Recent Queries

Search for queries ...

```
1 SELECT * WHERE {
2   ?subject ?property <http://sphaera.mpiwg-berlin.mpg.de/resource/Start> .
3 } LIMIT 100
```

Execute

Semantic Data for Humanities

Project for the publication of semantified data by ABES and LARHRA

<https://dataforhumanities.org/sparql-endpoint/prelib-v1>

The screenshot shows the website interface for 'Data For Humanities'. At the top is a teal navigation bar with links: 'Data For Humanities', 'Home', 'Projects', 'Data', 'Guides', and 'About us'. The main content area is white and divided into two columns. The left column contains two sections: 'ABES SPARQL ENDPOINT' with a sub-link 'Endpoint description' and 'PRELIB — Projet de recherche en littérature bretonne', and 'GEOVISTORY SPARQL ENDPOINTS' with a sub-link 'Endpoint description'. The right column features a large heading 'PRELIB — Projet de recherche en littérature bretonne', followed by a section 'Jeu de données converti en RDF' with a bulleted list of links: 'Site original du projet', 'Site de publication de données SQL interrogeable', and 'Documentation de la transformation'. Below this is a section 'Exemples de requêtes' with a sub-section 'Liste des classes avec effectifs' and the text 'Voir les résultats de la requête.'. At the bottom of the right column, a code block contains a SPARQL query:

```
SELECT ?class (COUNT(*) AS ?eff)<br/>WHERE {GRAPH <https://dataforhumanities.org/sparql-endpoint/prelib-v1> {?s a ?class}}<br/><br/>GROUP BY ?class<br/>ORDER BY DESC(?eff)
```

geovistory.org

Geovistory

Virtual Research Environment for Humanities and Social Sciences



Featured Projects

Tagebücher Anna Maria Preiswerk-

Digitale Edition der Tagebücher der Anna Maria Preiswerk-Iselin (1758-1840).

Open →

ANR Processetti

Les Processetti : Migration et mariage à Venise au 16ème/17ème siècle.

Open →

Maritime History

Historical information about the Dutch East India Company, ready to explore and re-use at your hand.

Open →

Roma's deportation

Individual trajectories, and collective fates.

Open →

Geovistory : a new LOD repository and VRE

as a successor to the infrastructure of the *symogih.org* project

The screenshot displays the Geovistory web interface. At the top, the browser address bar shows 'geovistory.com/projects/84760/edit'. The navigation menu includes 'Home / Your Projects / Maritime history'. A sidebar on the left contains icons for 'Sources', 'Entities', 'Analysis', and 'Stories'. A 'Beta' badge is visible in the top right corner.

The main area features a world map with several data points. A pop-up window for 'All ship voyages' is open, showing details for 'Apr 2, 1595 AD' at 'Jakarta ID' (Geographical Place). The 'Value of Place at Date' is 0, with a 'show details' link. The text 'geovistory.org' is overlaid on the map.


Below the map is a time-series chart from 1640 to 1750. The y-axis ranges from 0 to 30. The chart shows a highly volatile data series with a significant peak around 1725. A 'feedback' button is located in the bottom right corner of the chart area.

At the bottom of the interface, there are search and zoom controls, and a dropdown menu showing 'Active: Jakarta ID'.

Geovistory : a VRE for HSS research ...

Project's Open Data SPARQL access

Ship Voyages * Selection of triples * +

 https://sparql.geovistory.org/api_v1_project_84760

```
1 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
2 PREFIX ontome: <https://ontome.net/ontology/>
3 PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
4
5 SELECT *
6 WHERE {
7   {
8     SELECT ?label ?long ?lat (count(?sv) * 0.5 as ?radius) (count(?sv) as ?number) ("Arrival Place" as ?type) ?link
9     WHERE {
10
11      # Geographical Place -had presence-> Presence -was at-> Place (lat/long)
12      ?s ontome:p147i/ontome:p148 ?place.
13
14      # Geographical Place -label-> label
```

 Table  Response  Map Circles 103 results in 0.535 seconds

... open and connected to the Semantic Web.

Some final thoughts

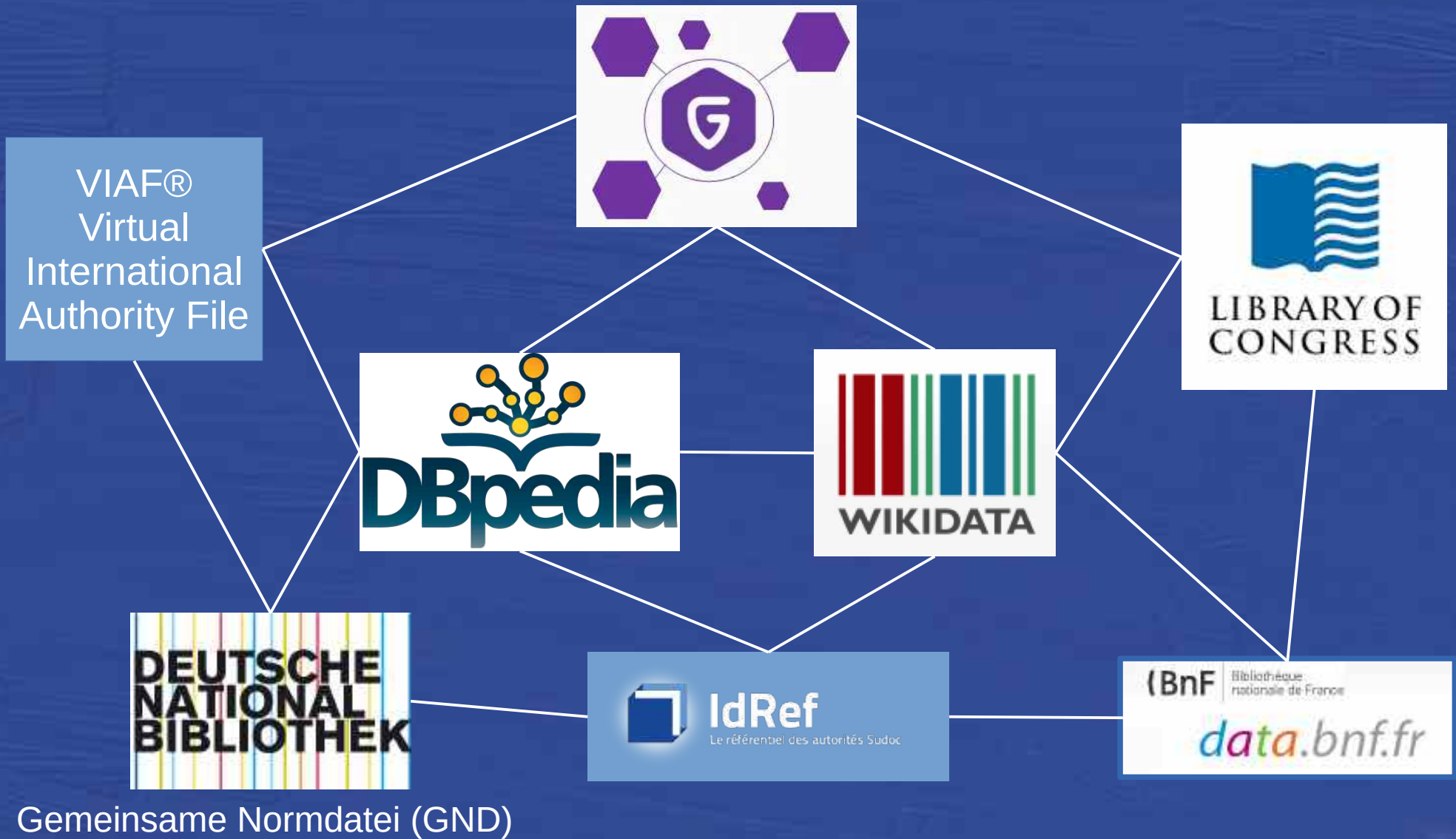
The effects of the digital turn on the sciences and humanities can be divided into three categories:

- **Transformative change** concerns the transfer of analogue information and practices to a digital form
- **Enabling change** is the use of data-intensive technologies to *address [new] research questions* that could not be tackled in another form
- **Substitutive change**, digital technologies are used to support or even replace conceptual parts of the research process

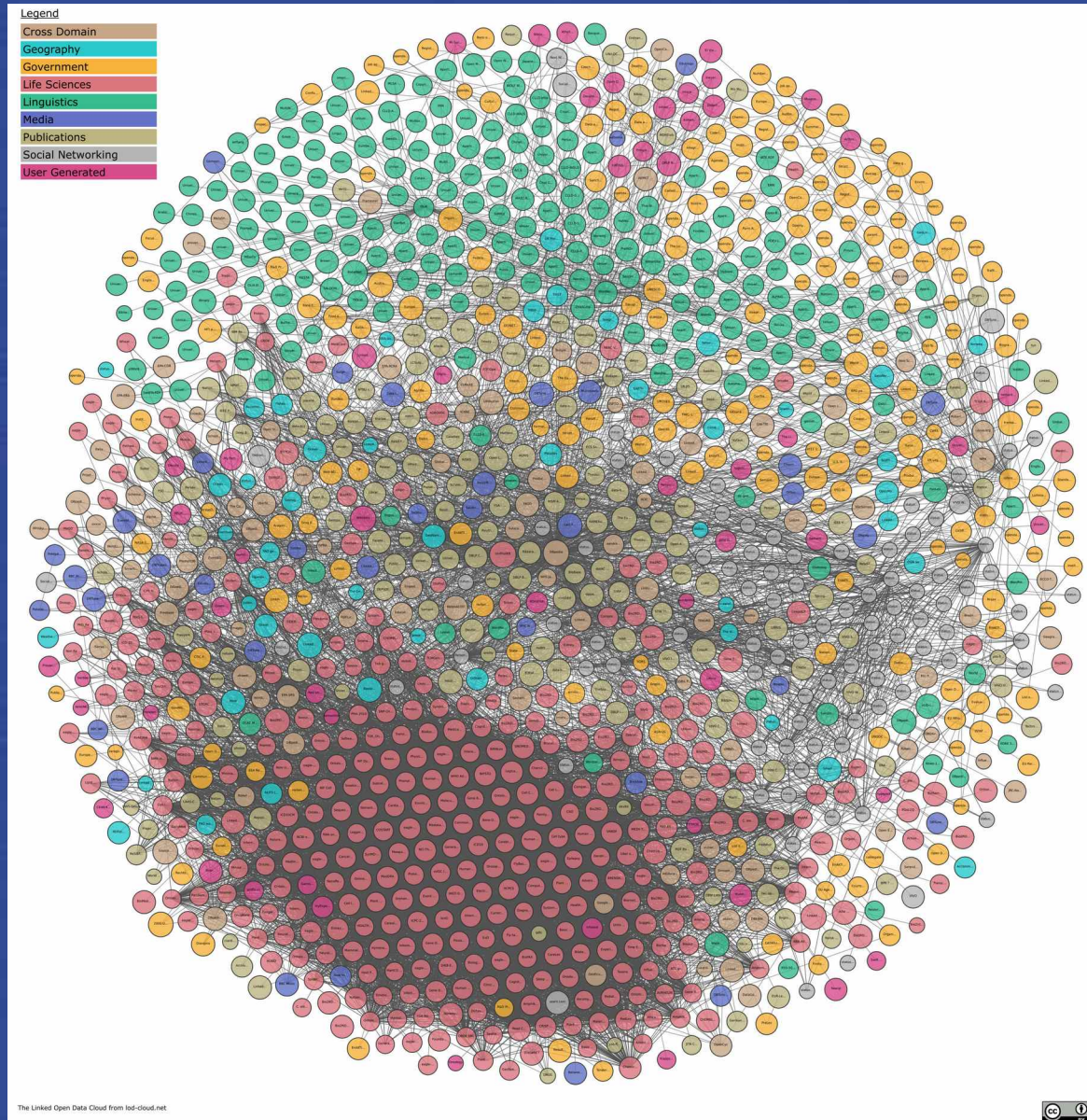
DFG, White Paper 2020

LOD as Links

« URIs to denote things, so that people can point at your stuff »



Web sémantique (Wikipédia)



<https://lod-cloud.net/>

Foundational ontologies
& modelling best practices



Generic, domain related core ontology



Domain related extensions



Research specific data model

Research data

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CIDOC CRM

SDHSS



CRM
Archaeo

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CRMsoc

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Ships &
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Projects' research specific extensions

Application profiles



Interoperable research data

DOLCE Lite + DUL

CIDOC CRM

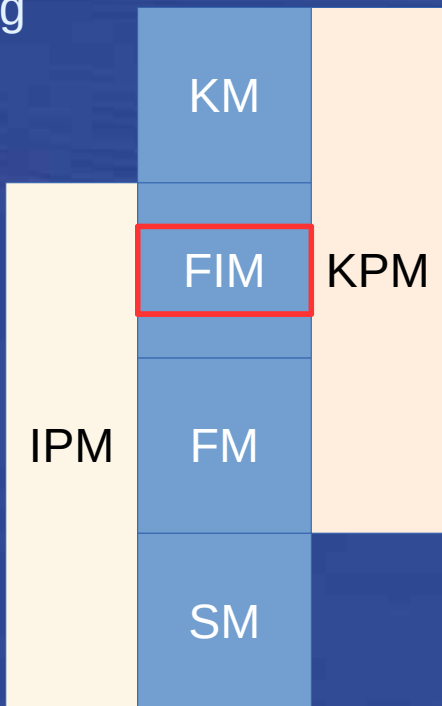
SDHSS

schema.org

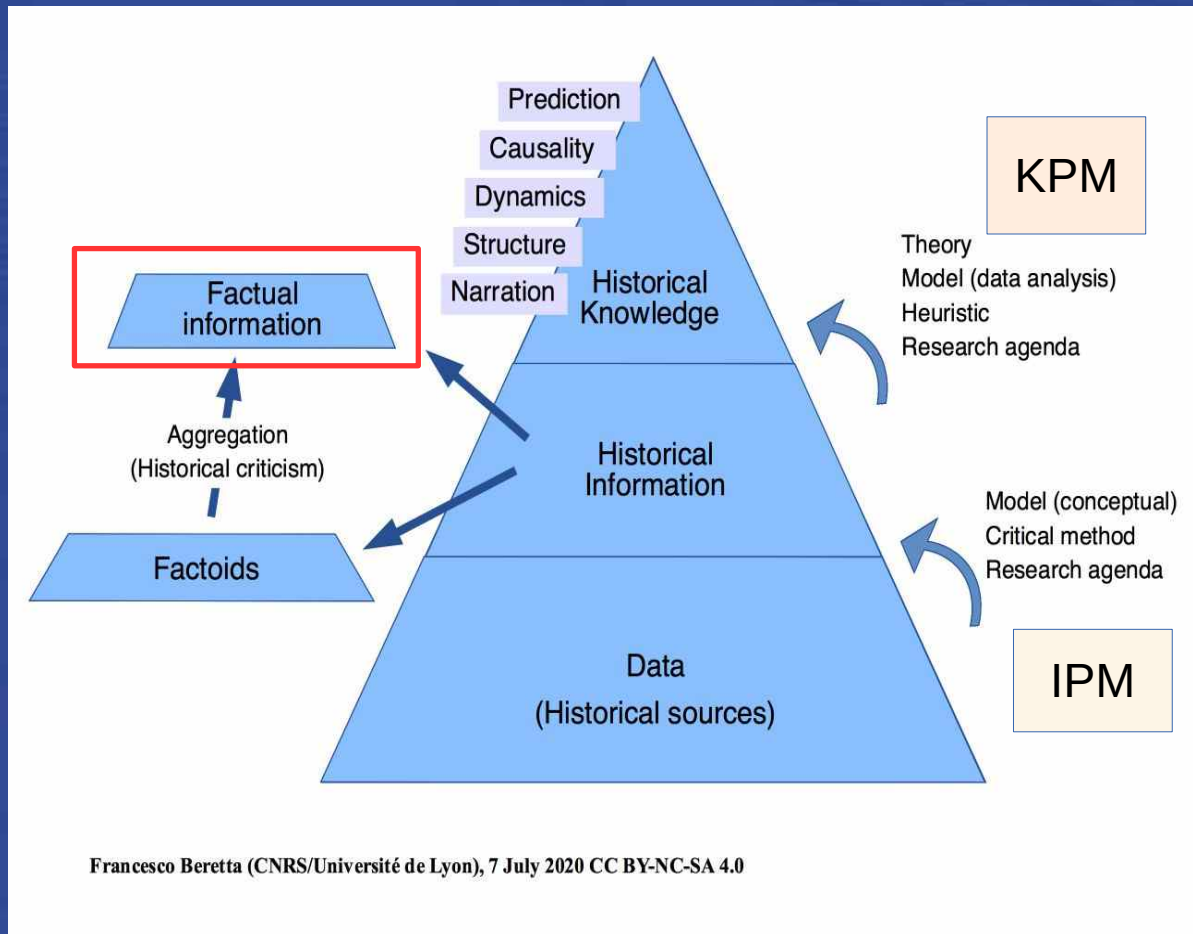
DBpedia
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FRBR EAD
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crm:E2 Temporal Entity

crm:E4 Period

sdh:C2 Entity Quality

sdh:C2 Epistemic Situation



sdh:P7
is intention of

sdh:P7
is intention of

crm:E21 Person

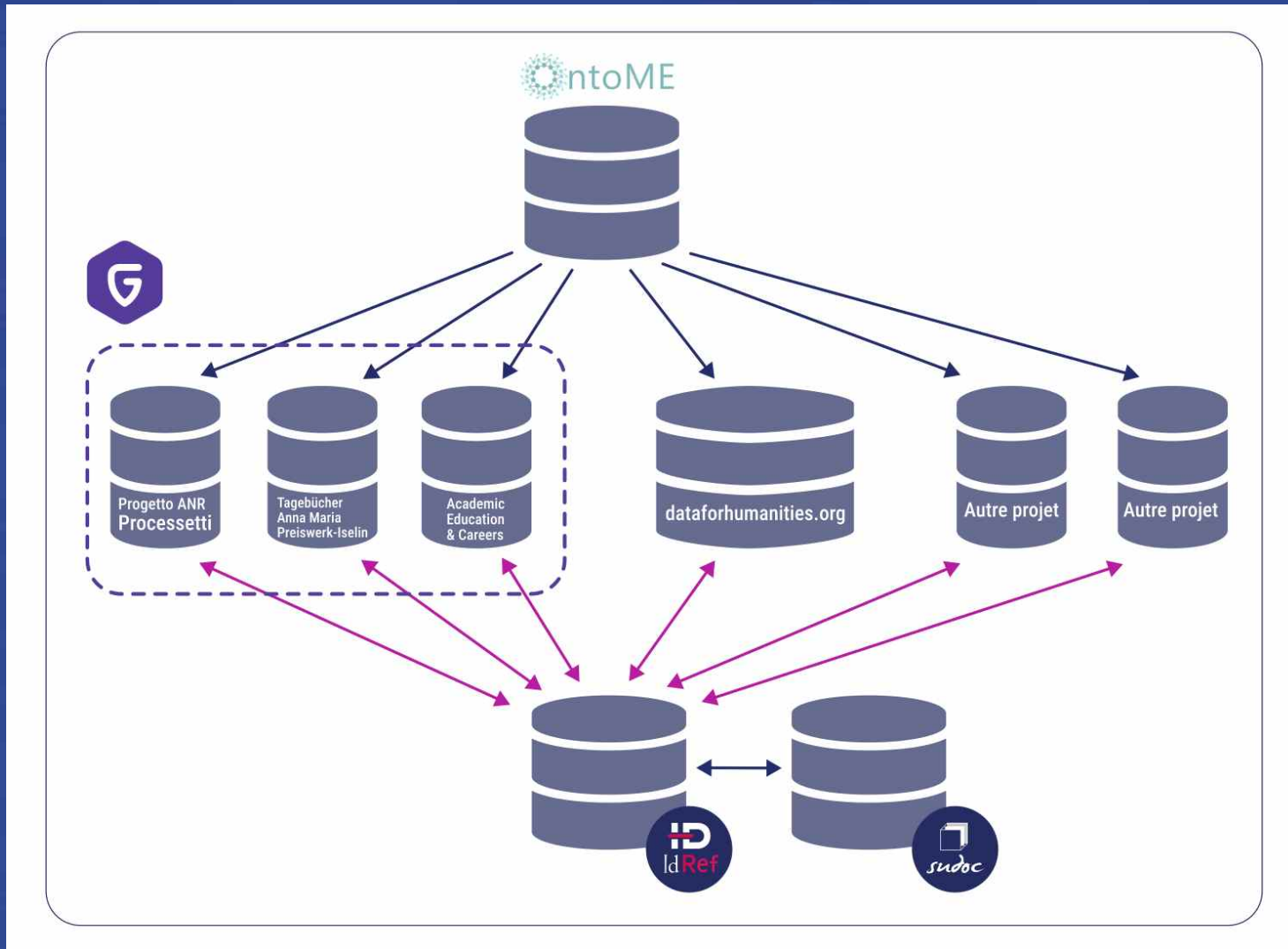
sdh:C4 Intention

sdh:C25 Intentional Collective

sdh:C7 Intentional State

sdh:C10 Intentional Event





sdhss.org – dataforhumanities.org – LOD4HSS

Some of my publications regarding SDHSS and the infrastructure project

- ‘A Challenge for Historical Research: Making Data FAIR Using a Collaborative Ontology Management Environment (OntoME)’. *Semantic Web* 12, no. 2 (1 January 2021): 279–94. <https://doi.org/10.3233/SW-200416>.
- ‘Semantic Data for Humanities and Social Sciences (SDHSS): An Ecosystem of CIDOC CRM Extensions for Research Data Production and Reuse’. In *Professorale Karrieremuster*, 73–102. Leipzig: Open-Access-Hochschulverlag, 2024. <https://doi.org/10.33968/9783966270502-05>.
- ‘Données ouvertes liées et recherche historique : un changement de paradigme’. *Humanités numériques*, no. 7 (1 July 2023). <https://doi.org/10.4000/revuehn.3349>.
- ‘Données Liées Ouvertes et Référentiels Public : Un Changement de Paradigme Pour La Recherche En Sciences Humaines et Sociales’. *Arabesques*, no. 112 (2024): 26–27. <https://doi.org/10.35562/arabesques.3820>.

Join the project,
your contribution matters !

sdhss.org

dataforhumanities.org

geovistory.org

