



---

CnFdI

---

nationale  
Forschungsdaten  
Infrastruktur

*for CULTURE*

---

29.05.2023 | DaMaLOS Workshop | Crete, Greece

## **From Floppy Disks to 5-Star LOD: FAIR Research Infrastructure for NFDI4Culture**

Tabea Tietz, Oleksandra Bruns, Linnaea Söhn, Julia Tolksdorf,  
Etienne Posthumus, Jonatan Jalle Steller, Heike Fliegl, Ebrahim  
Norouzi, Jörg Waitelonis, Torsten Schrade, Harald Sack

Gefördert durch die  
Deutsche Forschungsgemeinschaft (DFG) - 441958017

**DFG** Deutsche  
Forschungsgemeinschaft

## National Research Data Infrastructure (NFDI)

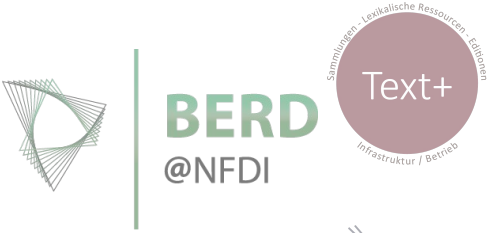
Data resources of science and research are to be made **accessible, interlinked** and made **usable** in a sustainable and qualitative manner for the entire German science system.



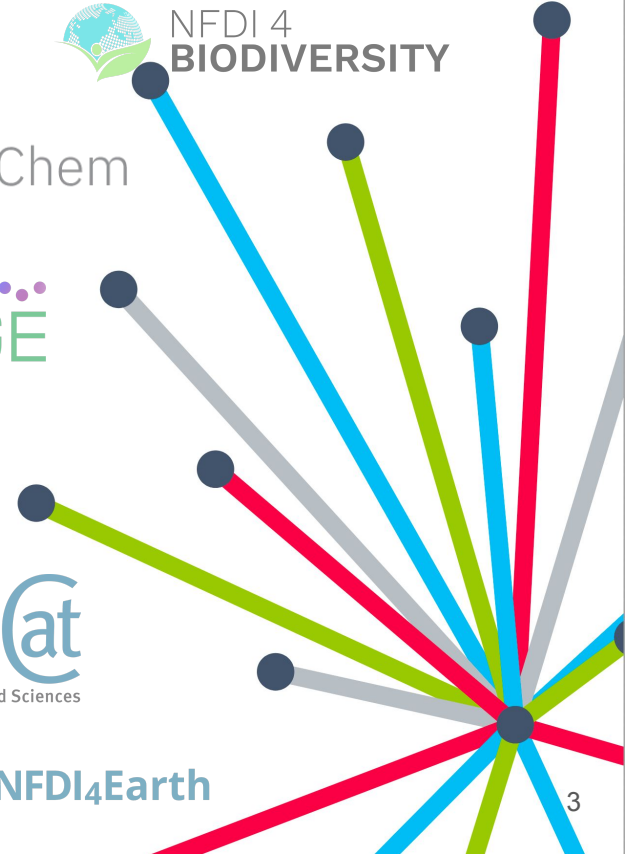
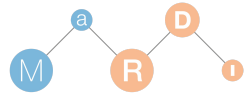
Nationale  
Forschungsdaten  
Infrastruktur



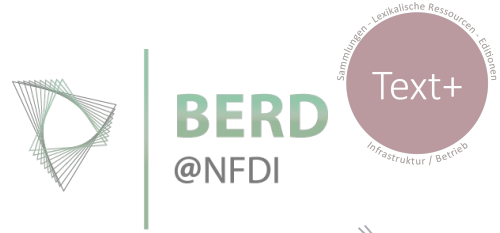
# 27 Consortia



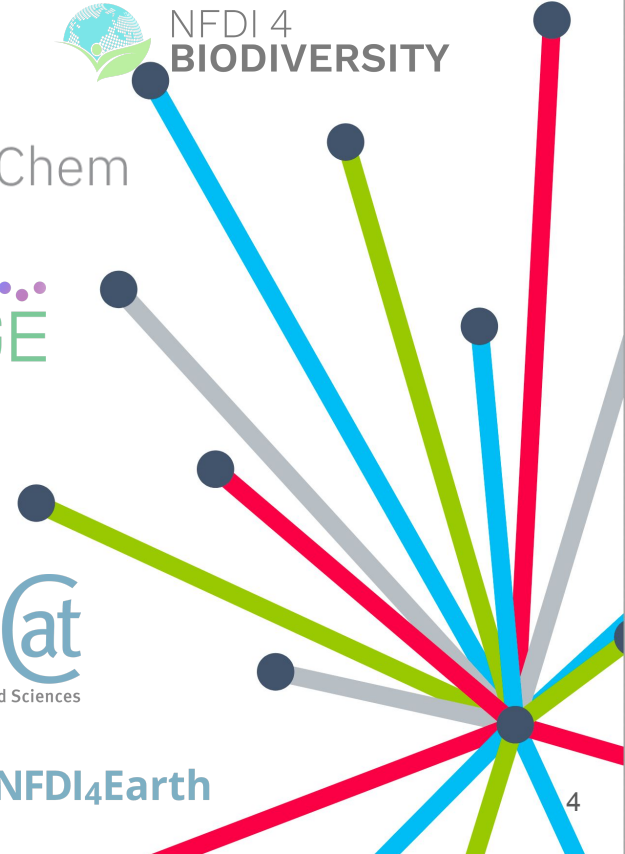
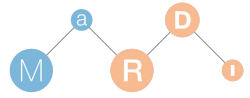
KonsortSWD



# 27 Consortia



KonsortSWD





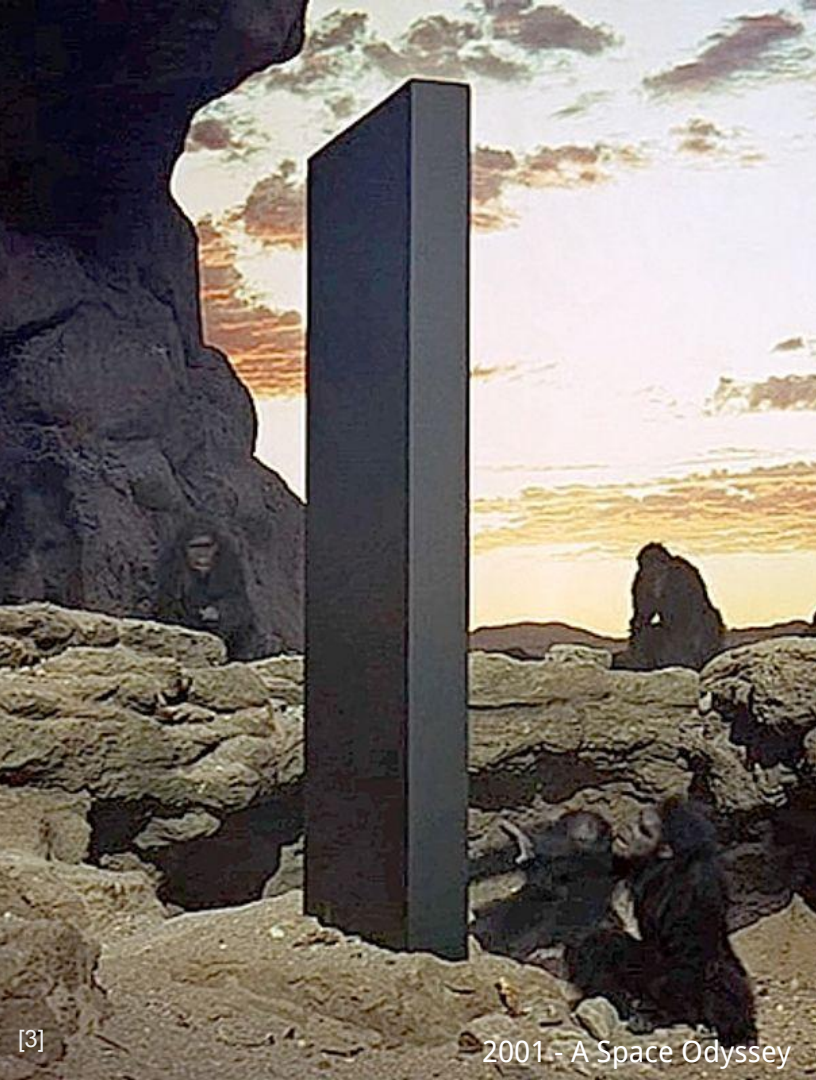
# NFDI4Culture



- **Infrastructure for research data on tangible and intangible cultural assets in compliance with the FAIR principles.**
- **Domains: Architecture, Art History, Musicology, Performing Arts, Media Studies**

# Use Cases

- **Which organizations provide what datasets across performing arts and media studies?**
- **In which 2D/3D/AV repositories can users store their data?**
- **What research software is out there for which types of data?**
- **Which guidelines and/or training offers suit best for which users?**
- **What resources are in which datasets and how are they connected?**



2001 - A Space Odyssey



# Challenges

- **Diversity of the culture research landscape (research disciplines and actors).**
- **Heterogeneous research resources**
  - **Diversity in standards and formats**
  - **Status: from floppy discs to 5-star LOD**
- **Enable means of participation for the culture community.**



# NFDI4Culture Infrastructure

**Requires an infrastructure that allows to curate, extend, connect and access decentralized research resources.**

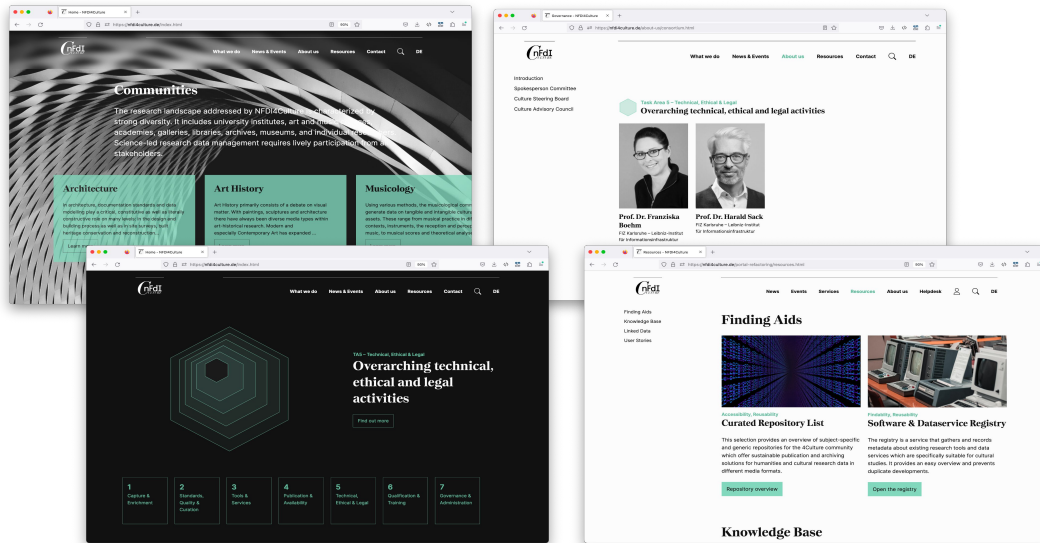
## Infrastructure:

- **Knowledge Graph:**  
research resource metadata
- **Culture Information Portal:**  
unified access to decentralized research resources

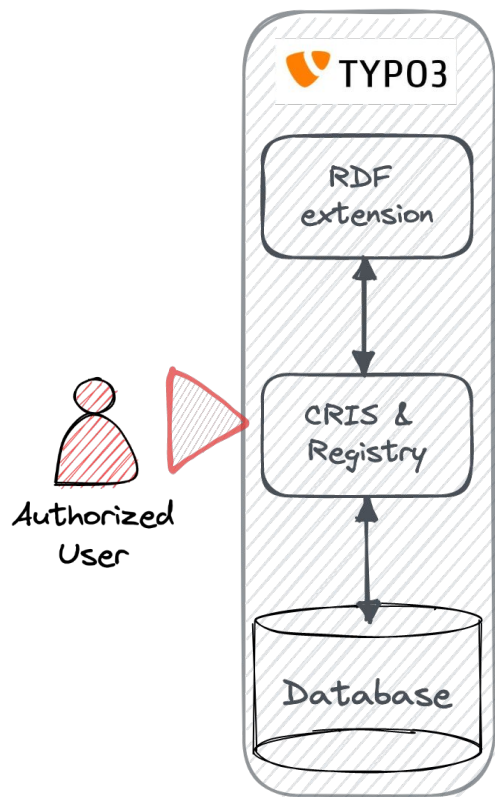


# Culture Portal and Information System

Provision of a unified, intuitive access point to the decentralized research data of the NFDI4Culture research community and all other services of the consortium

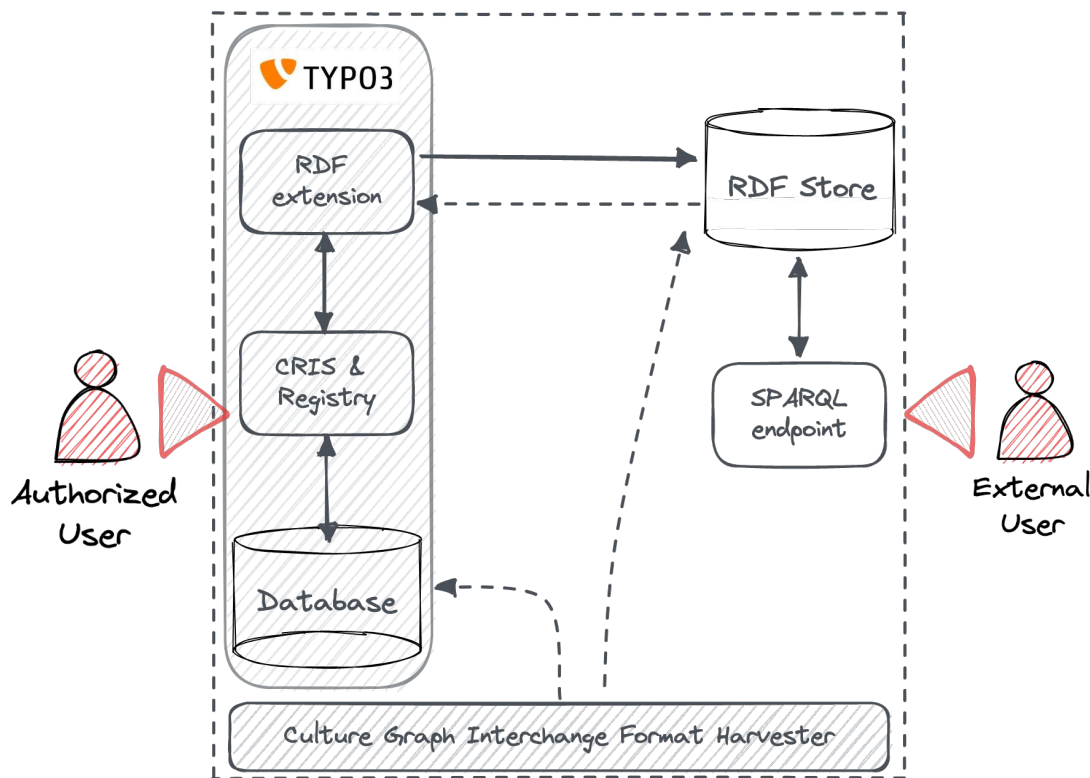


- Consortium-wide identity and access management for collaborative tools
- Helpdesk
- Reusable guidelines for all areas of research data management
- Provision of information on current events and news from the consortium



- **Implementation as a Current Research Information System (CRIS)**
  - **Adheres to international standards for CRIS systems (CERIF standard of euroCRIS)**
  - **CERIF provides a data model for all entities in the domain of NFDI4Culture**
- **CRIS data of the portal is made available as LOD**
  - **TYPO3 LOD extension provides a semantic layer**
  - **Implemented directly on top of the CMS's relational database**

# Culture Portal and Information System



The data published via the CMS is integrated into the Knowledge Graph.

Triple Store: Oxigraph

<https://nfdi4culture.de/>

# NFDI4Culture Knowledge Graph

About: <<https://nfdi4culture.de/id/E3625>>

## Guideline for a FAIR Cultural Studies Research Data Management

### **type**

[Contribution](#)

[Guide](#)

### **name**

Guideline for a FAIR Cultural Studies Research Data Management

### **url**

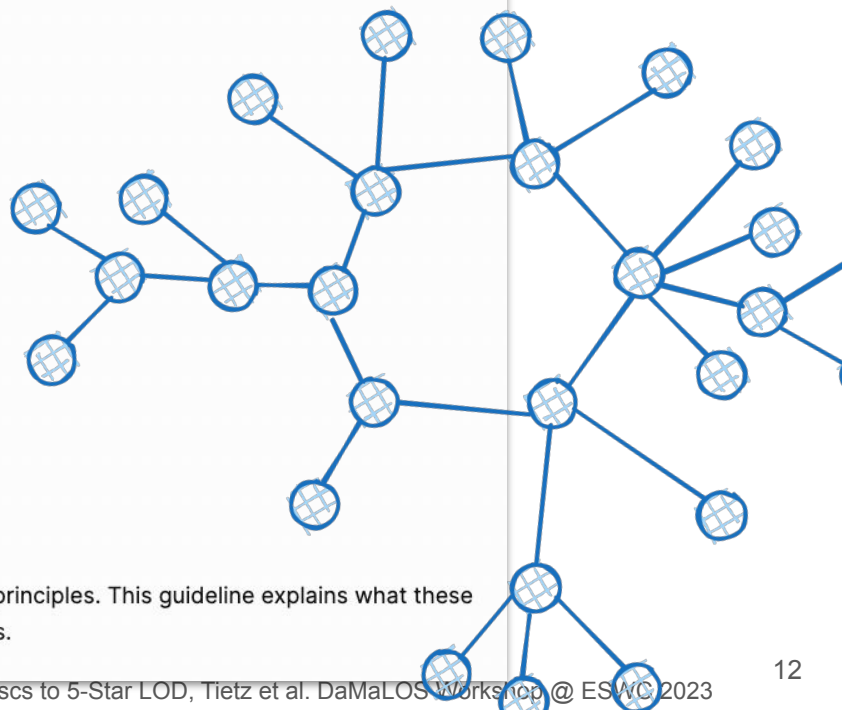
<https://nfdi4culture.de/go/E3625>

### **version**

1.0.1

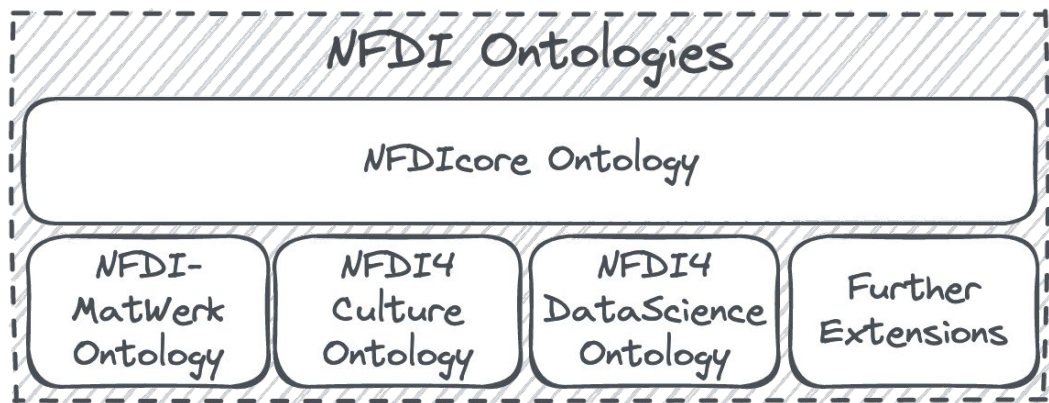
### **description**

In order to be optimally re-usable, research data should be processed according to the FAIR principles. This guideline explains what these principles mean and how they can be implemented in cultural studies and heritage collections.



# NFDI Ontologies

- **NFDI ontologies follow modular approach**
- **NFDIcore v1.1 represents nfdi consortia**
- **NFDI modules represent specific consortia, as e.g. NFDI4Culture, NFDI-MatWerk, NFDI4DataScience**
- **Specific requirements of consortia lead to ontology extension**

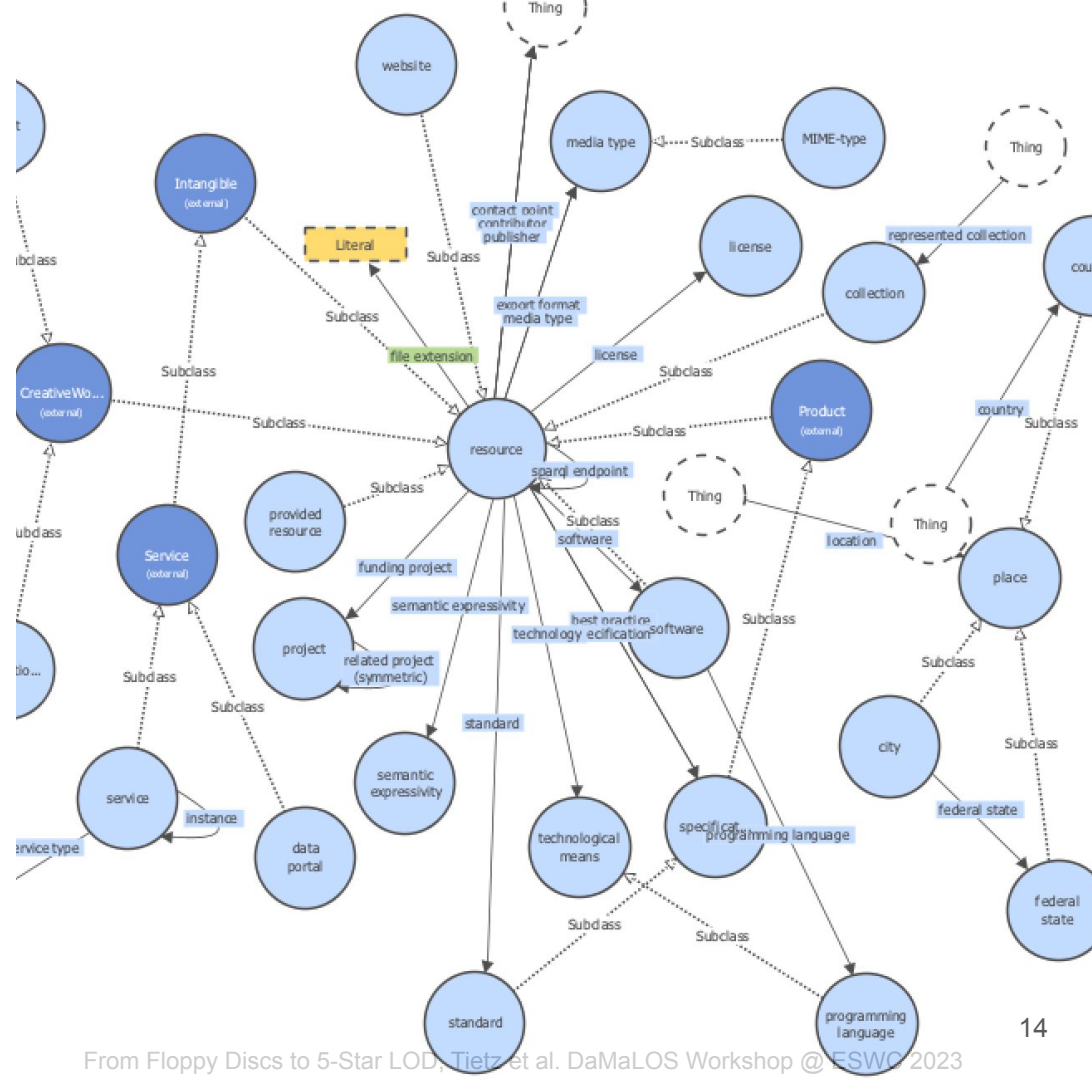


# NFDIcore Ontology

temporary namespace:

<https://nfdi.fiz-karlsruhe.de/ontology>

- Represents resources of NFDI consortia, e.g. services, data sets, guidelines, etc.
- Bottom-up approach and in constant feedback with NFDI4Culture and NFDI-MatWerk consortia → in constant development
- Contains 33 classes and 60 properties



## CONTENT:

- [Index and Metadata for NFDI4Culture Project Resources](#)
  - NFDI4Culture Data Resources
  - NFDI4Culture Data Services
  - Persons and Institutions
  - Expertises

## NFDI4Culture Linked Data Resources

RDF/XML

Turtle

N-Triples

JSON-LD

About: <<https://nfdi4culture.de/id/E3590>>

### Linked Stage Graph

**type**

[DataPortal](#)

**name**

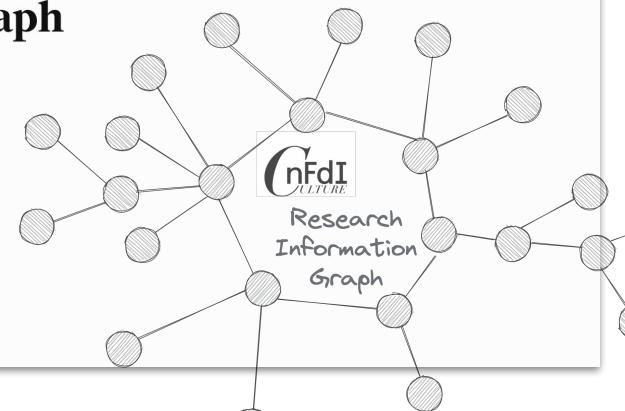
Linked Stage Graph

**mediaType**

JPEG

**subjectArea**

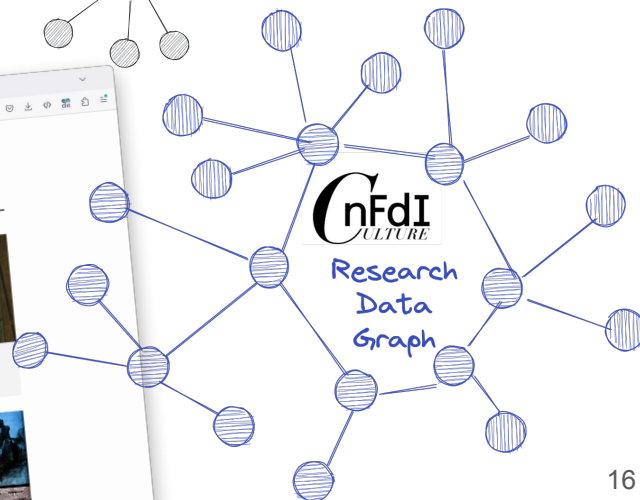
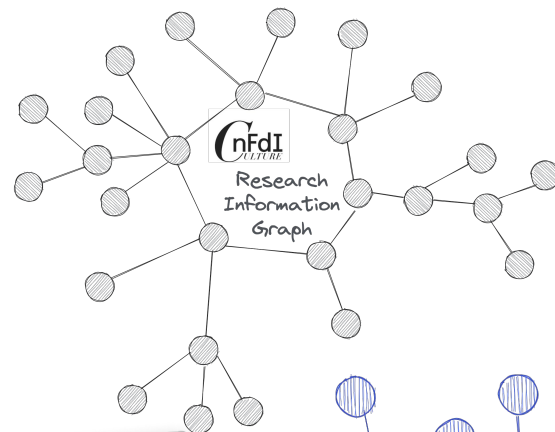
[Dance Studies](#)



# NFDI4Culture Knowledge Graph v2.0

## CONTENT:

- All of NFDI4Culture-KG v1.0
- Plus Metadata for NFDI4Culture content as e.g., from
  - Fully fledged LOD resources
  - Structured Data resources (Legacy Data resources)
  - Wikibase-based resources





# SPARQL Endpoint Data Exploration

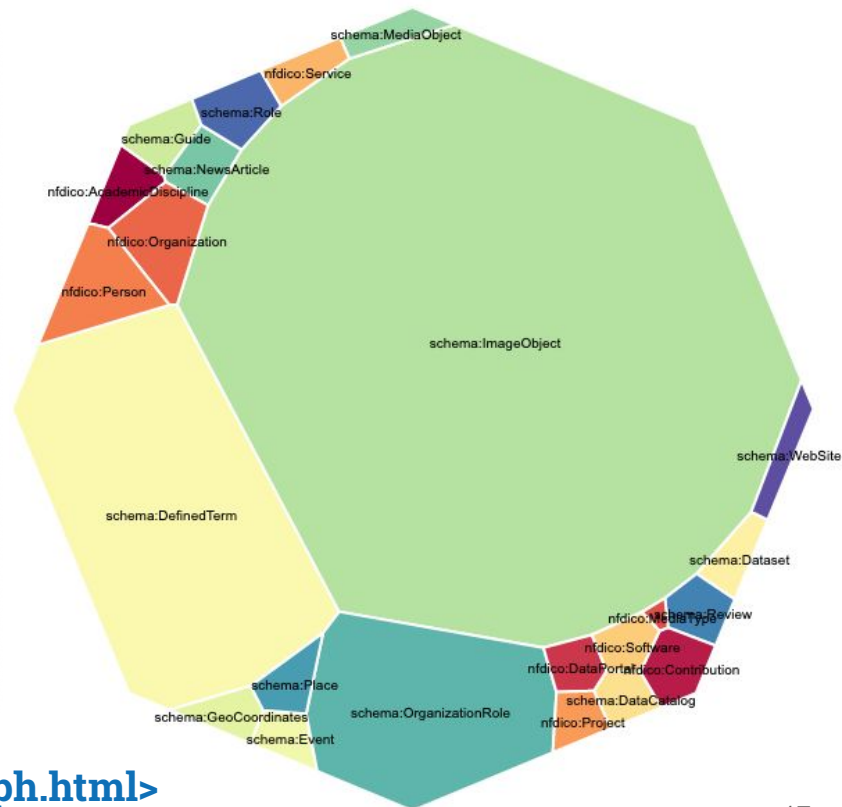


Count triples Show all types Count instances per type Show properties for types

Query 1 Query 2 Query 3 Query 4 Query 5 Query 7

```
1 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
2 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
3 PREFIX schema: <http://schema.org/>
4 PREFIX nfdico: <https://nfdi4culture.de/ontology#>
5 SELECT ?type (COUNT (?s) AS ?instanceCount)
6 WHERE {
7   ?s a ?type .
8 }
9 GROUP BY ?type
10 ORDER BY ?type
```

Table Response 23 results in 0.06 seconds Simple view Ellipse Filter query results Page size: 50



<https://nfdi4culture.de/resources/knowledge-graph.html>



# Conclusion

- **Infrastructure for tangible and intangible cultural heritage research data with regard to the FAIR principles**
- **Intuitive and meaningful interaction with cultural heritage research resources and their metadata**
  - **NFDI4Culture-KG**
  - **Culture Information Portal**
- **All components are publicly available and used by the community.**



# Outlook

- Enable interactive A-Box extension & registration/curation of datasets via portal
- Modular extension of NFDIcore
- Further extension of NFDI4Culture Research Information and Research Data Graph
- Federation of NFDI4Culture KG with Wikidata, DDB, Europeana and other KGs



# Questions? Find us at ESWC



Sasha  
Bruns



Linnaea  
Söhn



Tabea  
Tietz



Torsten  
Schrade



Harald  
Sack



Akademie der Wissenschaften  
und der Literatur | Mainz

Gefördert durch die  
Deutsche Forschungsgemeinschaft (DFG) - 441958020



From Floppy Discs to 5-Star LOD, Tietz et al. D

# Picture References

- [1] Generated with Generated with stable diffusion 2.0 / Dreamstudio AI “A pixel art drawing showing floppy disks turning into stars”
- [2] Harald Sack, *The Creation of Linked Open Data* (2014), remixing Michelangelo, *The Creation of Adam* (1511) [https://commons.wikimedia.org/wiki/File:Michelangelo\\_-\\_Creation\\_of\\_Adam\\_\(cropped\).jpg](https://commons.wikimedia.org/wiki/File:Michelangelo_-_Creation_of_Adam_(cropped).jpg), and *Linking Open Data cloud diagram*, by Richard Cyganiak and Anja Jentzsch. <http://lod-cloud.net/>, [CC-BY-SA 3.0]
- [3] Source: [https://www.salon.com/2020/11/30/mysterious-utah-monolith-evoking-2001-a-space-odyssey-has-vanished\\_partner/](https://www.salon.com/2020/11/30/mysterious-utah-monolith-evoking-2001-a-space-odyssey-has-vanished_partner/)
- [4] Generated with ArtBot “On this historical photograph we see a pensive woman watching a huge collection of floppy disks of different sizes, hard drives, and historical computers. The scenery extends into the vast empty space of the universe to the galaxies and stars.”
- [5] Source: <https://unsplash.com/de/fotos/d0oYF8hm4GI> / Unsplash License
- [6] Generated with Generated with stable diffusion 2.0 / Dreamstudio AI