

# HeFDI Data Talk

Date	Topic	Presenter
26 January 2024	DFG requirements on research data management	Dr. Ortrun Brand, HeFDI Coordination



## Abstract:

When you write a DFG proposal today, you have to comment on research data management. The DFG now expects you to describe and plan how you will handle research data - tailored to your specific project. The management of data can also be in focus, especially during the review and inspection process.

But what needs to be taken into account? What support is available? What questions need to be answered regarding data management - and who can I ask for support?

In this talk, Dr. Ortrun Brand, coordinator of the state initiative HeFDI - Hessian Research Data Infrastructures, presents the key points of the DFG specifications, necessary considerations and practice examples as well as further support opportunities.

## About the HeFDI Data Talks:

The HeFDI Data Talks are a bi-weekly open information and discussion event focused on data management in the context of science, in which relevant NFDI consortia as well as research data management services present themselves. The series discusses current topics and presents numerous – including local and regional – tools and services. The HeFDI Data Talks are an offer of the HeFDI Initiative (Landesinitiative HeFDI), which is funded by Hesse's Ministry for Science and Arts (HMWK).

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# DFG requirements on research data management

## HeFDI Data Talk 26th January 2024

*Dr. Ortrun Brand, HeFDI Coordination*

*Based on a workshop from Dr. Nina Dworschak, Goethe-Universität Frankfurt/HeFDI*

*Similar Talk in German from December 2022: <https://doi.org/10.5281/zenodo.6567185>*

*All published HeFDI Data Talk materials in our HeFDI-Community on Zenodo: <https://zenodo.org/communities/hefdi>*



# Agenda

1. Preliminary remarks
2. Your framework: DFG guidelines & checklist
3. Your DFG proposal for RDM - what do you need to consider?
  1. Data description
  2. Documentation & data quality
  3. Storage and technical backup
  4. Legal aspects
  5. Data exchange/accessibility
  6. Responsibility and resources
4. Bad & good practice
5. Special case of Collaborative Research Centers - INF projects
6. Wrap-Up: Assistance and support services



# 1. Preliminary remarks

- DFG only! - Not all research funding proposals/third-party funding formats
- However, the DFG sets the pace - and many other funding programs are oriented to it, e.g. LOEWE, BMBF
- Subject-specific considerable differences as to what the status quo is in each case, what is considered "professionally appropriate" -> specialist societies, review boards, NFDI consortia (see [nfdi.de](http://nfdi.de))



## 2. Framework: DFG-Guidelines and checklist

- New DFG Code of Conduct from July 2019
- Legally binding implementation at all universities was necessary to maintain eligibility for funding, by mid-2023
- Includes new guidelines for dealing with research
- 19 guidelines, eleven of which relate to the research process
- Research data management relevant in eight of eleven guidelines on the research process



### **Guidelines for Safeguarding Good Research Practice**

Code of Conduct

**DFG**



## 2. Framework: DFG-Guidelines and checklist

### Guidelines with RDM relevance

Guideline 7: Quality across all phases

Guideline 10: Legal and ethical framework conditions, utilization

Guideline 11: Methods and status

Guideline 12: Documentation

Guideline 13: Providing public access to research results

Guideline 14: Authorship

Guideline 15: Publication medium

Guideline 17: Archiving



## 2. Framework: DFG-Guidelines and checklist

### Guideline 12:

- Generally **document** properly, including research data and software

### Guideline 13:

- **Publish the research data** on which the publications are based (whenever possible)
- Compliance with the **FAIR** principles
- Accessibility via **recognized archives and repositories**
- **Software publication**

### Guideline 17:

- Those research data on which published results are based must be stored in an accessible and traceable manner **for a period of at least 10 years**
- At the institution where they were generated or in accredited repositories



## 2. Framework: DFG-Guidelines and checklist

### Data reuse

#### How do I find a suitable repository for my data?

- DFG recommends to contact a suitable research data repository as early as possible, already during the planning phase / when writing your proposal
  - Metadata and costs in your proposal can only be explained on this basis!
- Have a look at 'your' nfdi-consortium
- or contact your local rdm service center
- or see [re3data.org](http://re3data.org)





# 2. Framework: DFG-Guidelines and checklist

## What is a repository?

- A repository is a storage location for digital objects that makes them available to a public or limited circle of users

Repositories can be **distinguished** according to

- **nature of stored digital objects** (publications or research data)
- **discipline** of data (institutional, subject-specific, generic)
- **storage period of data** (e.g. 10 years according to good scientific practice or long term >10 yrs)

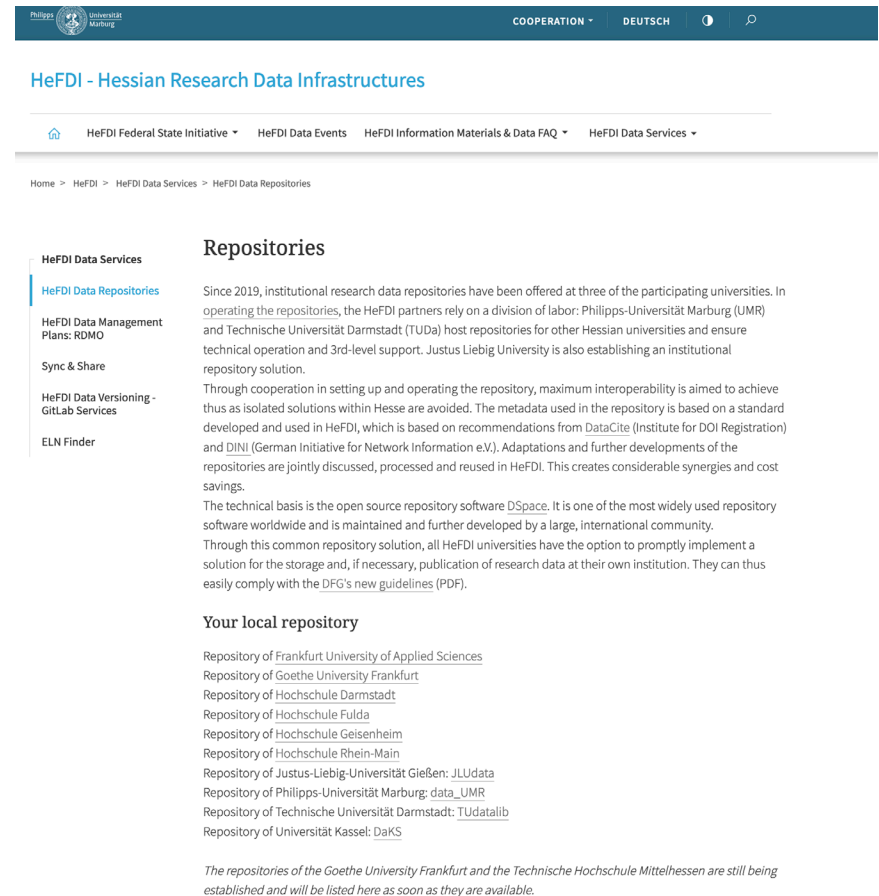
The screenshot shows the homepage of the data\_UMR Research data repository. At the top, there is a dark blue header with the Philipps-Universität Marburg logo on the left, and 'DEUTSCH' and 'LOGIN' on the right. Below the header, the text 'Service Center E-Research' and 'data\_UMR | Research data repository' is displayed. A navigation bar contains a home icon, 'Submit', 'Discover', 'Browse', and 'About'. The main content area is titled 'data\_UMR' and features three sections: 'Submit', 'Search', and 'Browse'. The 'Submit' section includes instructions on how to submit data, mentioning a 'Generic Collection' and a 'user manual (PDF, German)'. The 'Search' section has a search input field with a magnifying glass icon and a search button. The 'Browse' section lists navigation links for 'Submit Date', 'Subject', 'Faculties', 'DFG-Classification', and 'Collections'. The 'Recently Added' section displays three recent uploads with titles and author names, each with a right-pointing arrow.



# 2. Framework: DFG-Guidelines and checklist

## Three types of repositories:

- Generic
  - See e.g. <https://zenodo.org/>
- Subject-specific
  - See <https://www.re3data.org/>
  - See NFDI consortia
- Institutional
  - See e.g. the HeFDI repositories based on DSpace <https://t1p.de/hefdi-repos>



The screenshot shows the HeFDI website with a dark blue header containing the logo of Philipps-Universität Marburg and navigation links for COOPERATION and DEUTSCH. The main content area is titled 'HeFDI - Hessian Research Data Infrastructures' and features a breadcrumb trail: Home > HeFDI > HeFDI Data Services > HeFDI Data Repositories. A left sidebar lists navigation options: HeFDI Data Services, HeFDI Data Repositories (highlighted), HeFDI Data Management Plans: RDMO, Sync & Share, HeFDI Data Versioning - GitLab Services, and ELN Finder. The main content area is titled 'Repositories' and contains the following text:

Since 2019, institutional research data repositories have been offered at three of the participating universities. In operating the repositories, the HeFDI partners rely on a division of labor: Philipps-Universität Marburg (UMR) and Technische Universität Darmstadt (TUDa) host repositories for other Hessian universities and ensure technical operation and 3rd-level support. Justus Liebig University is also establishing an institutional repository solution.

Through cooperation in setting up and operating the repository, maximum interoperability is aimed to achieve thus as isolated solutions within Hesse are avoided. The metadata used in the repository is based on a standard developed and used in HeFDI, which is based on recommendations from DataCite (Institute for DOI Registration) and DINI (German Initiative for Network Information e.V.). Adaptations and further developments of the repositories are jointly discussed, processed and reused in HeFDI. This creates considerable synergies and cost savings.

The technical basis is the open source repository software DSpace. It is one of the most widely used repository software worldwide and is maintained and further developed by a large, international community. Through this common repository solution, all HeFDI universities have the option to promptly implement a solution for the storage and, if necessary, publication of research data at their own institution. They can thus easily comply with the DFG's new guidelines (PDF).

**Your local repository**

- Repository of Frankfurt University of Applied Sciences
- Repository of Goethe University Frankfurt
- Repository of Hochschule Darmstadt
- Repository of Hochschule Fulda
- Repository of Hochschule Geisenheim
- Repository of Hochschule Rhein-Main
- Repository of Justus-Liebig-Universität Gießen: JLUdata
- Repository of Philipps-Universität Marburg: data\_UMR
- Repository of Technische Universität Darmstadt: TUDatalib
- Repository of Universität Kassel: DaKS

*The repositories of the Goethe University Frankfurt and the Technische Hochschule Mittelhessen are still being established and will be listed here as soon as they are available.*



## 2. Framework: DFG-Guidelines and checklist



**mandatory in all proposals!**  
**Contact your local RDM**  
**service center!**

### Checkliste zum Umgang mit Forschungsdaten

#### 1. Datenbeschreibung

Auf welche Weise entstehen in Ihrem Projekt neue Daten? Werden existierende Daten wiederverwendet? Welche Datentypen, im Sinne von Datenformaten (z. B. Bilddaten, Textdaten oder Messdaten) entstehen in Ihrem Projekt und auf welche Weise werden sie weiterverarbeitet? In welchem Umfang fallen diese an bzw. welches Datenvolumen ist zu erwarten?

#### 2. Dokumentation und Datenqualität

Welche Ansätze werden verfolgt, um die Daten nachvollziehbar zu beschreiben (z. B. Nutzung vorhandener Metadaten- bzw. Dokumentationsstandards oder Ontologien)? Welche Maßnahmen werden getroffen, um eine hohe Qualität der Daten zu gewährleisten? Sind Qualitätskontrollen vorgesehen und wenn ja, auf welche Weise? Welche digitalen Methoden und Werkzeuge (z. B. Software) sind zur Nutzung der Daten erforderlich?

#### 3. Speicherung und technische Sicherung während des Projektverlaufs

Auf welche Weise werden die Daten während der Projektlaufzeit gespeichert und gesichert? Wie wird die Sicherheit sensibler Daten während der Projektlaufzeit gewährleistet (Zugriffs- und Nutzungsverwaltung)?

#### 4. Rechtliche Verpflichtungen und Rahmenbedingungen

Welche rechtlichen Besonderheiten bestehen im Zusammenhang mit dem Umgang mit Forschungsdaten in Ihrem Projekt? Sind Auswirkungen oder Einschränkungen in Bezug auf die spätere Veröffentlichung bzw. Zugänglichkeit zu erwarten? Auf welche Weise werden nutzungs- und urheberrechtliche Aspekte sowie Eigentumsfragen berücksichtigt? Existieren wichtige wissenschaftliche Kodizes bzw. fachliche Normen, die Berücksichtigung finden sollten?

#### 5. Datenaustausch und dauerhafte Zugänglichkeit der Daten

Welche Daten bieten sich für die Nachnutzung in anderen Kontexten besonders an? Nach welchen Kriterien werden Forschungsdaten ausgewählt, um diese für die Nachnutzung durch andere zur Verfügung zu stellen? Planen Sie die Archivierung Ihrer Daten in einer geeigneten Infrastruktur? Falls ja, wie und wo? Gibt es Sperrfristen? Wann sind die Forschungsdaten für Dritte nutzbar?

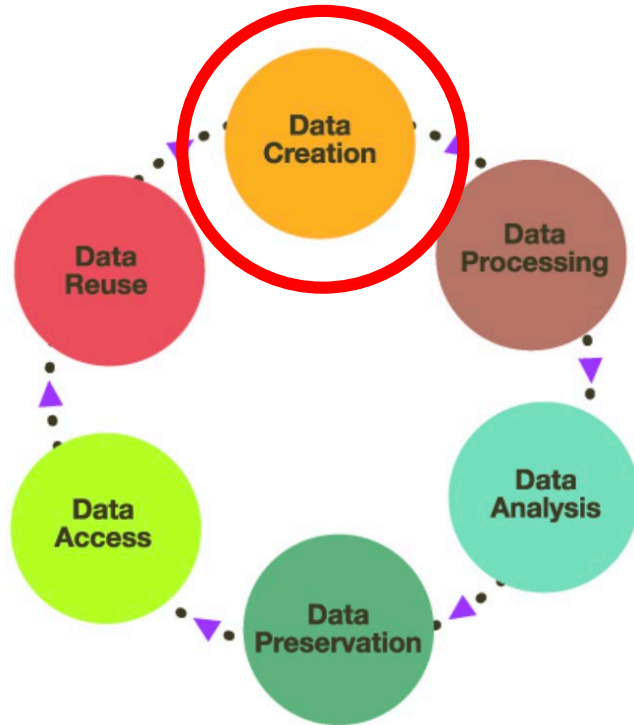
#### 6. Verantwortlichkeiten und Ressourcen

Wer ist verantwortlich für den adäquaten Umgang mit den Forschungsdaten (Beschreibung der Rollen und Verantwortlichkeiten innerhalb des Projekts)? Welche Ressourcen (Kosten; Zeit oder anderes) sind erforderlich, um einen adäquaten Umgang mit Forschungsdaten im Projekt umzusetzen? Wer ist nach Ende der Laufzeit des Projekts für das Kuratieren der Daten verantwortlich?

### 3. Your DFG-proposal: What to look out for?



# 3. Your DFG-proposal: What to look out for?



Data Management Plan!



RDMO

Research Data Management Organiser

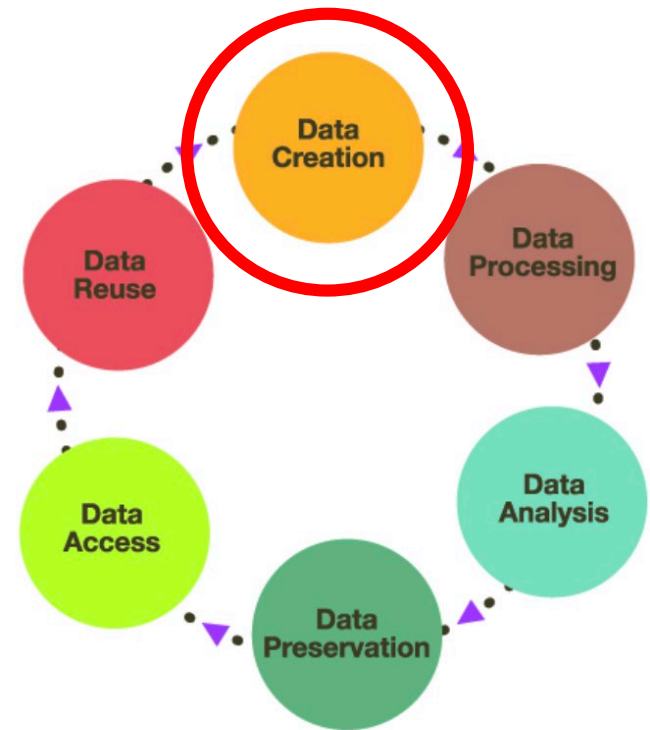
<https://t1p.de/hefdi-rdmo>



# 3. Your DFG-proposal: What to look out for?

## Data Description

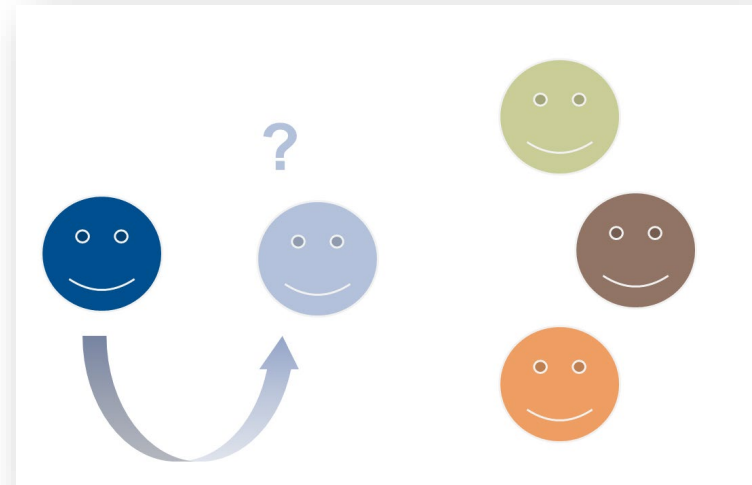
- How does your project generate new data?
- Is existing data reused?
- Which data types (here: FORMATS), e.g. image data, text data, measurement data, are created in your project and how are they processed?
- To what extent is this data generated and what volume is to be expected?



# 3. Your DFG-proposal: What to look out for?

## Documentation and data description

- What approaches are taken to describe the data in a comprehensible manner (e.g. use of existing metadata and documentation standards)?
- What measures are taken to increase data quality?
- Are quality controls planned, and if so, which ones?
- What digital methods and tools are required to use the data?

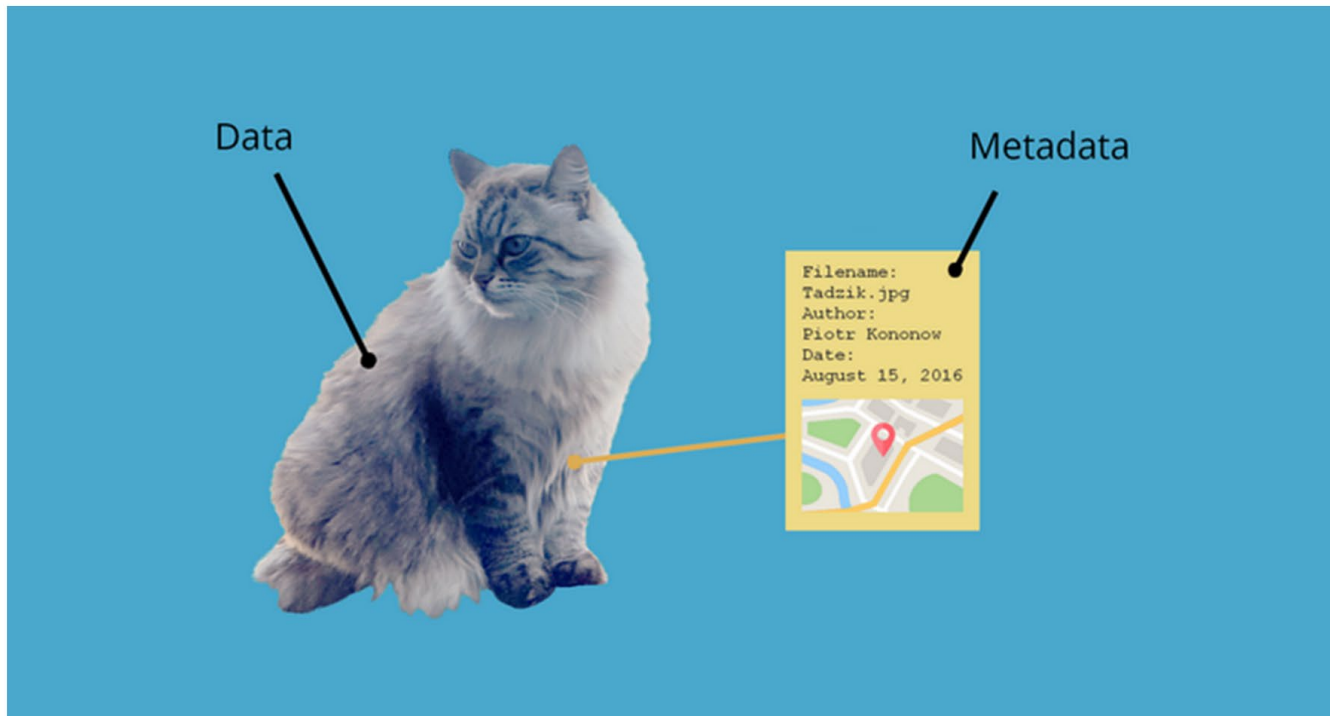


## Data documentation:

- Who can understand my data?
- Who can open and re-use my data?
  - today?
  - in 6 months?
  - in 10 yrs?



# 3. Your DFG-proposal: What to look out for?

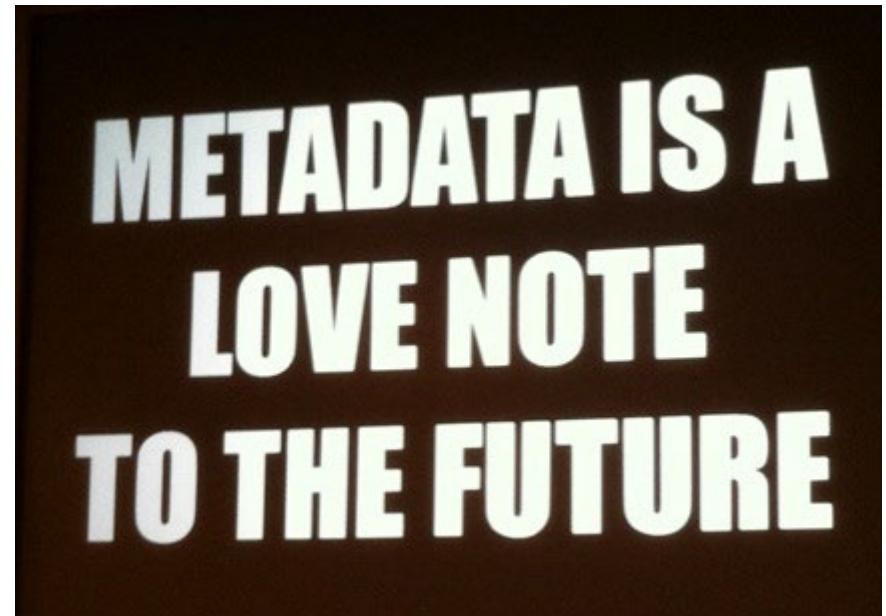




# 3. Your DFG-proposal: What to look out for?

## Data description – metadata

- Metadata help to understand research data
- Structured description of research data
- machine-readable → research data become Findable in data bases
- Without metadata, research data won't be understandable
- Rich and correct metadata are a strong provision to good scientific practice



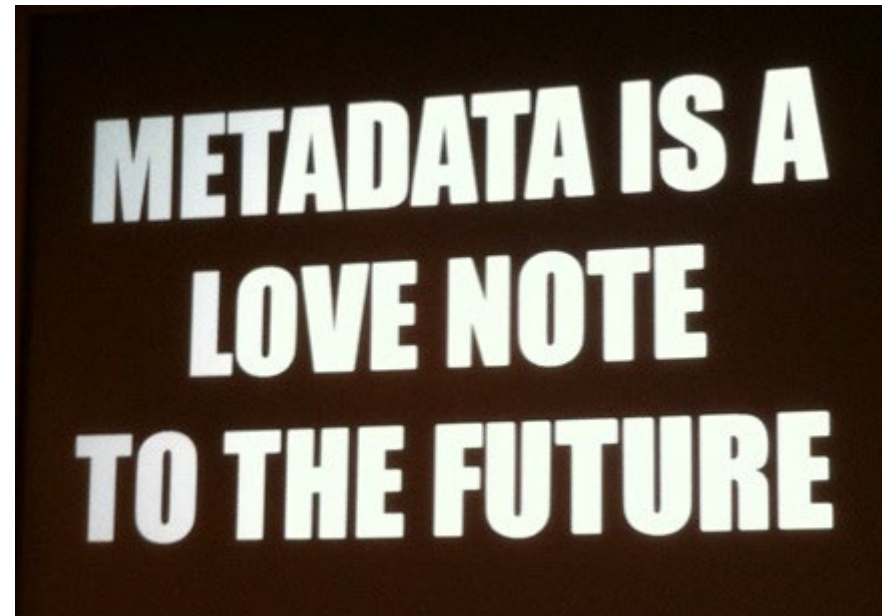
Source: cea + from The Netherlands, CC BY 2.0, Wikimedia Commons, [https://upload.wikimedia.org/wikipedia/commons/d/df/Metadata\\_is\\_a\\_love\\_note\\_to\\_the\\_future\\_%288071729256%29\\_%28cropped%29.jpg](https://upload.wikimedia.org/wikipedia/commons/d/df/Metadata_is_a_love_note_to_the_future_%288071729256%29_%28cropped%29.jpg)



# 3. Your DFG-proposal: What to look out for?

## How do I describe my research data properly with metadata?

- Who (Co-Authors)?
- Where?
- When?
- Why?
- With which tools?
- Which parameters?
- Usage options? (Licenses, DOIs, ...)
- What? (scientific object)



Source: cea + from The Netherlands, CC BY 2.0, Wikimedia Commons, [https://upload.wikimedia.org/wikipedia/commons/d/df/Metadata\\_is\\_a\\_love\\_note\\_to\\_the\\_future\\_%288071729256%29\\_%28cropped%29.jpg](https://upload.wikimedia.org/wikipedia/commons/d/df/Metadata_is_a_love_note_to_the_future_%288071729256%29_%28cropped%29.jpg)



# 3. Your DFG-proposal: What to look out for?

## What metadata standard should I use?

Discipline	Standard
Cross-disciplinary	Dublin Core, MARC21
Natural sciences	ICAT Schema
Geosciences/Geo Data	ISO 19115, Darwin Core, FGDC
Arts, Cultural Sciences	CDWA, LIDO, CIDOC-Framework
Climate, wheather data	Conventions for Climate and Forecast Metadata
Social Sciences, Humanities	Data Documentation Initiative (DDI)
Text data (commenting, annotation)	PS Guideline TEI
Visualization, Exchange of data on neutrons, xrays, myons	NeXus

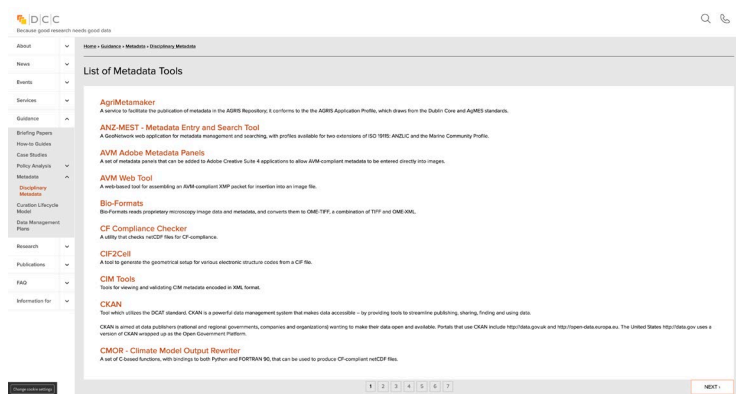
- See <https://forschungsdaten.info/themen/beschreiben-und-dokumentieren/metadaten-und-metadatenstandards/>
- contact your NFDI Consortium
- look at <https://fairsharing.org/search?fairsharingRegistry=Standard>



# 3. Your DFG-proposal: What to look out for?

## Metadata Annotation Tools?

See <https://www.dcc.ac.uk/guidance/standards/metadata/tools>



## FAIR Data Assessment Tools

See <https://forschungsdaten-thueringen.de/entry/fair-assessment-tools-en.html>

### AN OVERVIEW OF FAIR ASSESSMENT TOOLS!



This overview presents a selection of FAIR assessment tools. The categories also use the acronym FAIR but stand for: Fully Configurable Tools, Automatic Tools, Improved Survey Tools and Regular List Tools. The classification of tools into these categories is not always 100% clear, especially when certain properties overlap. In preparation for the poster, an evaluation of all known FAIR assessment tools was carried out between July and August 2022. Each tool was evaluated by three independent people. The categories used included the time taken to carry out the FAIR assessment, the presence of feedback and the required prior knowledge. With regard to the technical specifics, the research revealed that only generic tools are currently on offer.

The poster was created for the '3. Sächsische FDM-Tagung'.

Following tools weren't evaluated:

- » FAIRdat (unfinished, beta version of SATISFYD?)
- » FAIR-Aware (awareness, not evaluation questions for dataset)
- » 5-Star Data Rating Tool (inaccessible)

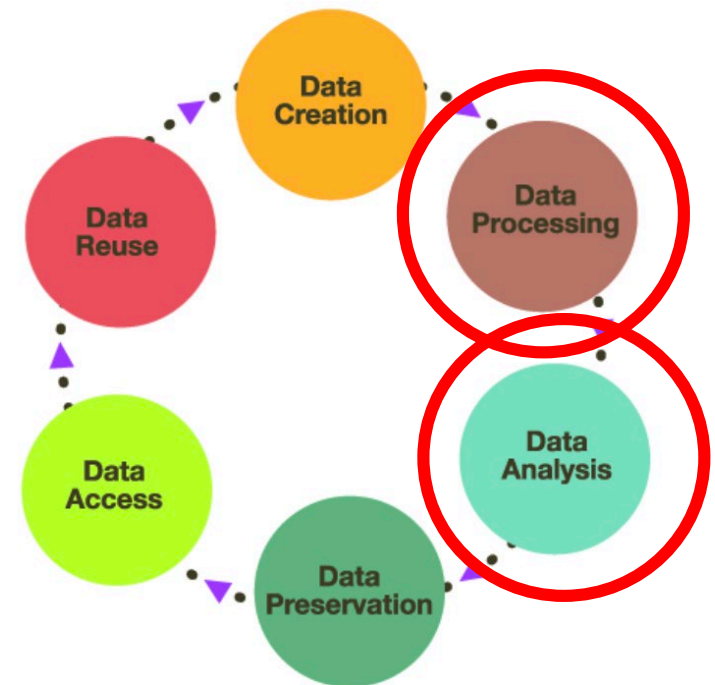
On Zenodo lies the poster and the data table in different formats:  
<https://doi.org/10.5281/zenodo.7022037>



# 3. Your DFG-proposal: What to look out for?

## Storage during the project phase

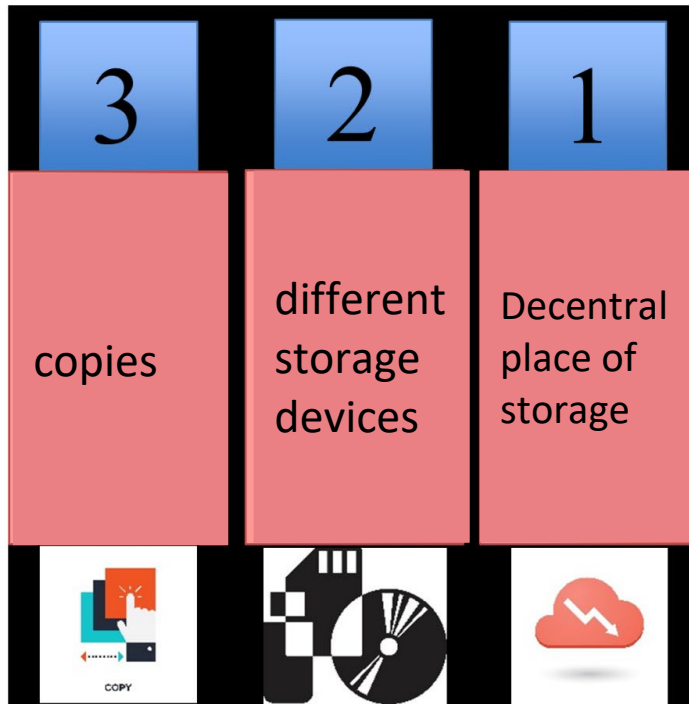
- How is your data stored, and where?
  - use your public infrastructure!
- information security / data protection for sensitive data (rights of access)



# 3. Your DFG-proposal: What to look out for?

Data Storage

3-2-1 Backup rule:



CC-BY SA, Andre Pietsch



www.digitalbevaring.dk

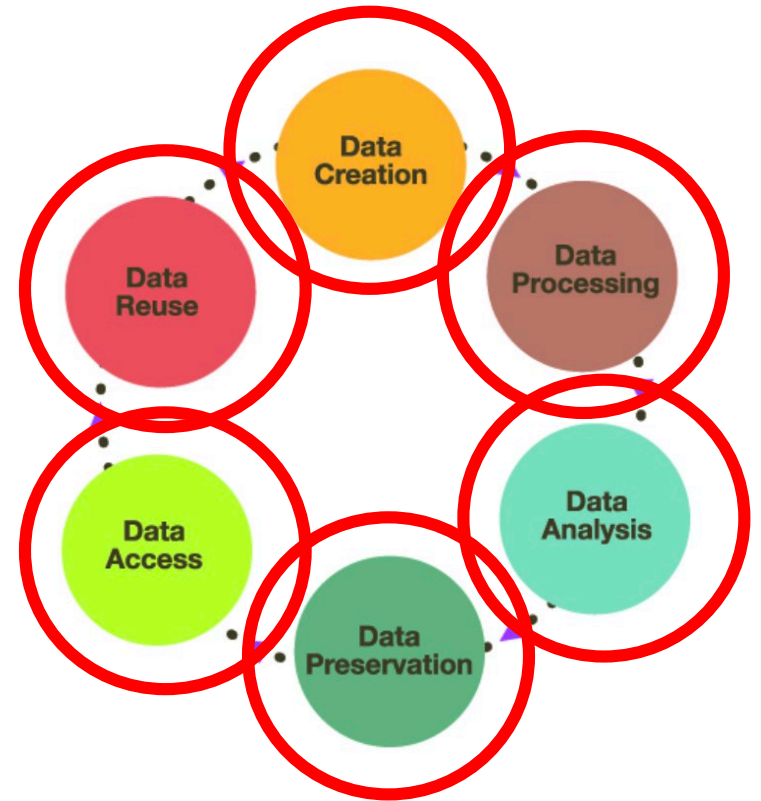
18. Mai 2022



# 3. Your DFG-proposal: What to look out for?

## Legal aspects

- What are the legal conditions with regard to your research data?
- Are there any restrictions concerning re-use and accessibility?
- data & software licensing / copyright, rights of use



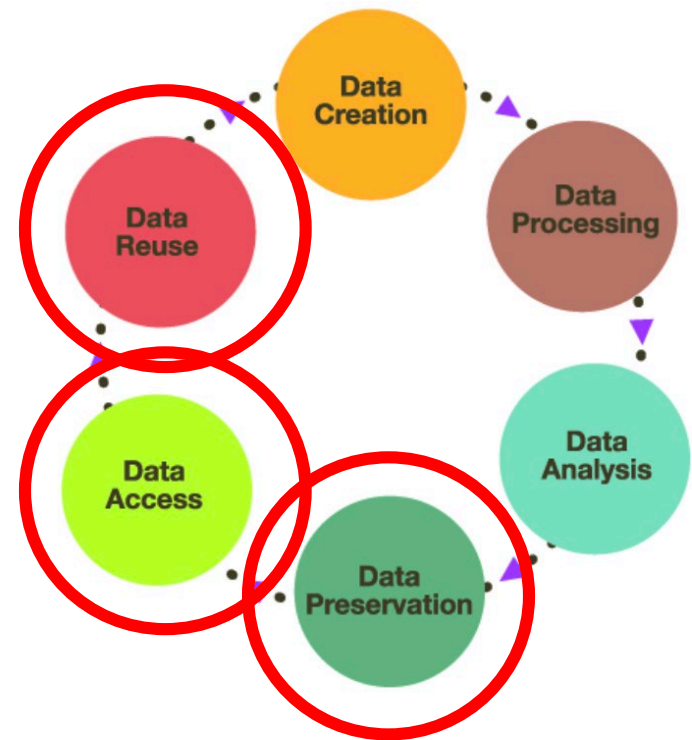
see HeFDI legal aspects on research data  
<https://doi.org/10.5281/zenodo.4625417>



# 3. Your DFG-proposal: What to look out for?

## Data exchange and permanent accessibility

- Which data is **particularly suitable for reuse** in other contexts/by third parties?
- What **criteria** are used to **select** research data in order to make it available for re-use by others?
- Do you plan to **archive** your data in a **suitable infrastructure**? If so, how and where? Are embargo periods in place?





# 3. Your DFG-proposal: What to look out for?

## Data formats suitable for long term archiving

Data type	recommended formats	less or non suitable formats
Audio	<a href="#">.wav</a> / <a href="#">.flac</a>	.mp3
Computer-aided Design (CAD)	<a href="#">.dwg</a> / <a href="#">.dxf</a> / <a href="#">.x3d</a> / <a href="#">.x3db</a> / <a href="#">.x3dv</a> -	
Datenbanken	<a href="#">.sql</a> / <a href="#">.xml</a>	.accdb / .mdb
Rastergrafiken & Bilder	<a href="#">.tif</a> (unkomprimiert) / <a href="#">.jp2</a> / <a href="#">.jpg2</a> / <a href="#">.png</a>	.gif / .jpeg / .jpg / .psd
Statistische Daten	<a href="#">.por</a> / <a href="#">.csv</a>	.sav (SPSS)
Tabellen	<a href="#">.csv</a> / <a href="#">.tsv</a> / <a href="#">.tab</a>	.xls / .xlsx / .xlx
Texte	<a href="#">.odf</a> / <a href="#">.rtf</a> / <a href="#">.txt</a> / PDF/A	.docx / .doc / PDF
Vektorgrafiken	<a href="#">.svg</a> / <a href="#">.svgz</a>	.cdr
Video	<a href="#">.mp4</a> / <a href="#">.mkv</a> / <a href="#">.mj2</a> / <a href="#">.avi</a> (unkomprimiert)	.mov / .wmv

# 3. Your DFG-proposal: What to look out for?

## NFDI – National Research Data Infrastructure

- The NFDI systematically develops structures for sustainably secure and make accessible research data
- driven by the scientific community, in strong cooperation with infrastructures
- 26 consortia, disciplin-specific / data specific
- Previous isolated solutions and parallel developments are to become integrated – Research Data Commons...
- Systematically connect with European Open Science Cloud (EOSC)



**nfdi**  
Nationale  
Forschungsdaten  
Infrastruktur

other 20 discipline-specific NFDI-Konsortia



# 3. Your DFG-proposal: What to look out for?

DFG currently formulates more clearly than ever before that NO singular development is desired, but INTEGRATION in / connection to existing infrastructures

- turn to local service points, local/regional infrastructure, NFDI consortium; recognized data centres/repositories, international specialist/offers
- use existing databases, repositories, tools that are permanently available

**Information infrastructures for Open Science**  
Horizontal and vertical integration

► **Ensure horizontal and vertical integration**

- Cross-connections between subject-specific data repositories, but also between repositories for data, publications, software or CRIS systems – **horizontal integration**
- As mirrored at DFG funding portfolio

- Coordination of offers and services from the local workplace of researchers through regional (state initiatives) and national to European structures – **vertical integration**

6 EOSC-National Tripartite Event Germany, 24 November 2022 - Dr. Kathrin Winkler (DFG) **DFG**

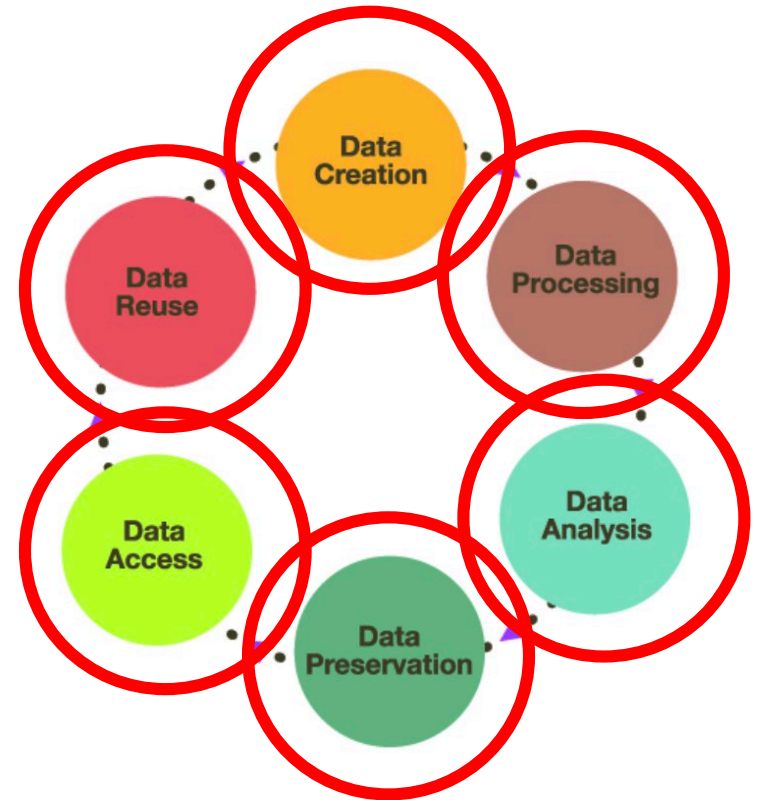
Quelle: Screenshot from Winkler, Kathrin (DFG) (2022): "Funding Strategy in Germany: The Significance of Horizontal and Vertical Integration (Impulse lecture)" EOSC Tripartite Event Germany "NFDI & EOSC – connecting the communities", 24.11.2022, <https://cloud.nfdi.de/f/431deba6771b4f6e8b93/>



# 3. Your DFG-proposal: What to look out for?

## Responsibility and resources

- Who is responsible for the adequate handling of research data (description of roles and responsibilities within the project)?
- What resources (costs, time or other) are required to implement adequate handling of the research data in the project?
- Who is responsible for curating the data after the end of the project?



# 3. Your DFG-proposal: What to look out for?

What costs can researchers **NOT** claim from the DFG for data management?

Specifically, there is an expectation that local data backup and archiving of published results will be guaranteed for the purpose of recall in cases of misconduct.

This includes a modern IT structure that makes it possible to process even extensive data sets, as well as basic services for the local storage and documentation of research data. **Costs that serve these purposes are part of the basic equipment and cannot be approved**

**Proposal not funded**

See also <https://t1p.de/dfg-rdm-funding>



# 3. Your DFG-proposal: What to look out for?

## What costs can researchers claim from the DFG for data management?

- > gain access to research data
- > to process and prepare the research data generated in the project so that it can be used by others
- > costs to transfer the data to a public repository.

The following can be applied for:

- **personnel costs for processing** the data,
- **user fees, membership fees**
- or costs incurred when **using established infrastructures** (other costs).



Source: kschneider2991, CC0, via Wikimedia Commons, [https://upload.wikimedia.org/wikipedia/commons/3/37/Money-2180330\\_1920.jpg](https://upload.wikimedia.org/wikipedia/commons/3/37/Money-2180330_1920.jpg)

## Important!

- The prerequisite for the financing of user fees is the existence of a publicly accessible, transparent cost-performance catalog of the repository.
- The purpose of use and the distinction from basic costs must be clear from the information in the application...



# 3. Your DFG-proposal: What to look out for?

## Bad practice

- Data management = methods
- Backup to local hard disks
- Sharing = passing on via Dropbox or similar.
- No backup in the infrastructure of the university / institution; no explanation of what this is based on (existing offers / service points / contact)
- No reference to NFDI, federal state initiatives, existing RDM-networks...
- If reference to personal data -> no mentioning of data protection
- Equate open access publication with and data management

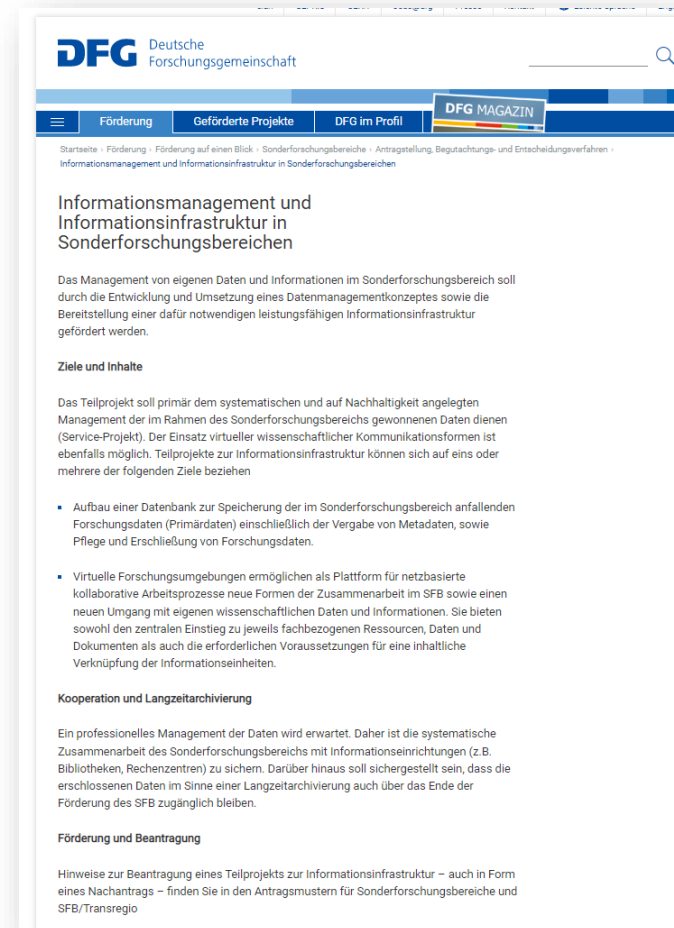
## ... good practice

- ✓ Describe data, name metadata/schemas, ontologies, controlled vocabularie
- ✓ Head for a Data management plan
- ✓ Awareness that RDM is about transparency, replicability and reuse of data collected with public funds (FAIR)
- ✓ Aim for data publication, name repo - contact in advance!
- ✓ Data literacy / training
- ✓ Reference to NFDI, to state initiatives
- ✓ ...



# 4. Collaborative Research Center – INF-Project

- Own sub-project,
- equipment often 1 data manager/steward
- Works for other projects - often Z-project
- Data management in the CRC is to prepare data for subsequent use, internal interoperability
- Project-specific
- Close cooperation with local infrastructure required
- **No hardware - this is basic equipment**
- **No IT specialist for the SFB**



The screenshot shows the DFG (Deutsche Forschungsgemeinschaft) website. The header includes the DFG logo and the text 'Deutsche Forschungsgemeinschaft'. Below the header, there are navigation tabs for 'Förderung', 'Geförderte Projekte', and 'DFG im Profil'. The main content area is titled 'Informationsmanagement und Informationsinfrastruktur in Sonderforschungsbereichen'. The text describes the management of data and information in the SFB, the development of a data management concept, and the provision of a high-performance information infrastructure. It also lists the goals and contents of the project, including the construction of a database and the creation of virtual research environments. The page also mentions cooperation and long-term archiving, and provides information on funding and application procedures.

Siehe auch

[https://www.dfg.de/foerderung/programme/koordinierte\\_programme/sfb/antragsteller/programelement\\_inf/index.html](https://www.dfg.de/foerderung/programme/koordinierte_programme/sfb/antragsteller/programelement_inf/index.html)





# 5. Wrap Up and Support

What	URL
DFG-Website on RDM	<a href="https://t1p.de/dfg-rdm">https://t1p.de/dfg-rdm</a>
Guidelines of professional associations	<a href="https://t1p.de/dfg-rdm-specific">https://t1p.de/dfg-rdm-specific</a>
HeFDI	<a href="http://www.hefdi.de">www.hefdi.de</a>
local Service Centers on RDM	<a href="https://t1p.de/hefdi-local">https://t1p.de/hefdi-local</a>
HeFDI Data Services (Repositories, RDMO, Git, ...)	<a href="https://t1p.de/hefdi-data">https://t1p.de/hefdi-data</a>
HeFDI FAQ	<a href="https://t1p.de/hefdi-faq">https://t1p.de/hefdi-faq</a>
Disciplin-specific information on forschungsdaten.info	<a href="https://www.forschungsdaten.info/wissenschaftsbereiche/">https://www.forschungsdaten.info/wissenschaftsbereiche/</a>





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