

Helmholtz Open Science

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Helmholtz Association

Helmholtz Open Science Office

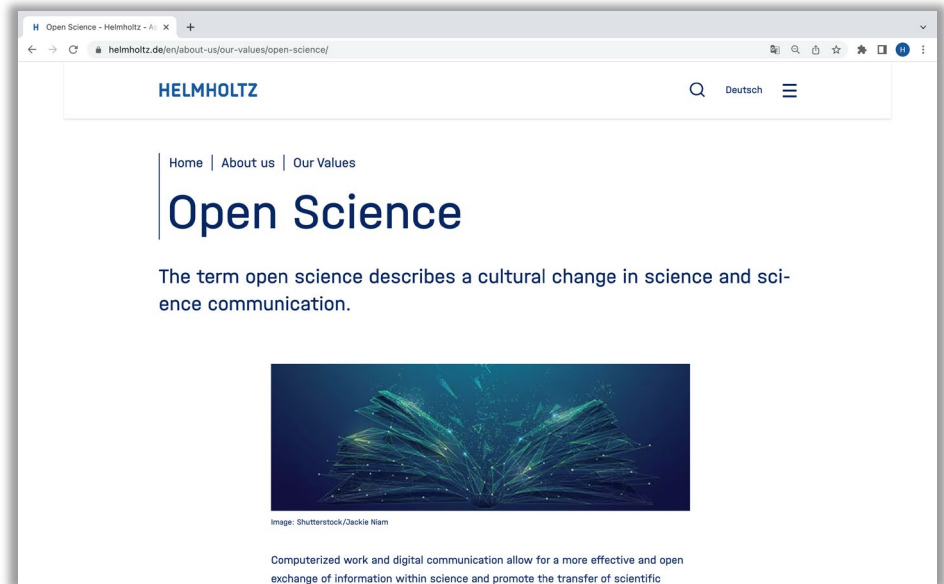
Research Data Management (RDM) workshop at GSI/FAIR,
July 5, 2022

Open Science

- Cultural change in scientific working methods, organization, and communication.
- Consistently employs digitization to make all components of the scientific process (publications, research data, research software, etc.) open, traceable, reusable, and accessible to everyone (in terms of reducing technical, legal, and financial hurdles).
- Expands transparency and the possibilities for quality assurance, increases the performance of science, and promotes innovations based on scientific findings.
- The development of open science differs in levels of extent in the research fields of the Helmholtz Association, depending on the discipline and respective publication culture.

Open Science in Helmholtz

- Open Science is an important cross-cutting topic with numerous points of contact
- In the Centers:
 - digitization, research infrastructures, libraries, data centers, transfer, etc.
- In the entire Association:
 - Digital Transformation, KPIs, incubator platforms, Initiative and Networking Fund, transfer, etc.



Open Science in Helmholtz

- Our core topics
 - **Open Access** – access to and re-use of textual publications
 - **Open Research Data** – access to and re-use of research data
 - **Open Research Software** – access to and re-use of research software
 - National and international **network** concerning open science



Helmholtz Open Science Office: Mission

Enabling Open Science practices in Helmholtz!

- The Helmholtz Open Science Office
 - is a service provider for the Association for the cultural change “from closed to open”.
 - promotes dialogue and provides impulses within the Association.
 - offers training and support concerning all aspects of open science.
 - cooperates with the Centers in the Open Science working group and in joint task groups.
 - delivers a key contribution to the digital transformation.
 - represents Helmholtz positions on open science on a national and international level.

HELMHOLTZ
Open Science

Open Access

Core topic

Open Access

- The Helmholtz Association was one of the initial signatories of the “[Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities](#)” in 2003.
- For open access, one of the Helmholtz Open Science Office's key endeavors is the promotion of the transformation from subscription-based access to open access.
- In 2016, and after preparation by the OS Office, the President signed the “Expression of Interest” of the international OA2020 Initiative.
- In 2016, the Assembly of Members specified the [Open Access Policy](#) in concrete terms, offering a framework of action to the Helmholtz Centers for a coordinated transformation towards open access.

Open Research Data

Core topic

Open Research Data

- The Helmholtz Association is leading in generating, managing and providing access to [research data](#).
- In 2016, the Helmholtz Association adopted a [position paper](#) with the title “[Making information resources more usable](#)” on the handling of research data.
- In 2017, the Helmholtz Association adopted the [Recommendations for guidelines of the Helmholtz centers for handling research data](#) which guides the Centers in the formulation of their respective [Research Data Policies](#).
- The Helmholtz Open Science Office promotes the [coordination of the Centers](#) and supports them in [developing policies and related practices](#) in handling digital research data; esp. concerning the utilization of the [FAIR principles](#) in Helmholtz.
- Open Science thus complements the developments of platforms in the [Helmholtz Incubator](#):
 - Helmholtz AI
 - Helmholtz Imaging (HIP)
 - Helmholtz Metadata Collaboration (HMC)
 - Helmholtz Information & Data Science Academy (HIDA)
 - Helmholtz Federated IT Services (HIFIS)

Position paper

“Making information resources more usable!”

- Position paper “[Making information resources more usable!](#)” (2016):
 - foster focused research in the field of information technology and pursue the development and operation of corresponding information infrastructures;
 - store research data from the Centers within suitable data infrastructures and make them available openly and free of charge for subsequent use by science and society;
 - play an active part in national and international initiatives to coordinate the establishment of the necessary infrastructures;
 - education and training in research data management
- These principles are intended to promote the quality, productivity, sustainability and competitiveness of science, in keeping with the mission of the Helmholtz Association.
 - They also provide a basis for knowledge transfer.

Task Group

for the Implementation of the Guidelines on Research Data

- The [Task Group](#) was founded to create the [Recommendations for guidelines of the Helmholtz centers for handling research data](#).
 - Framework for advancing the conditions for research data management in the Centers.
- The current focus is on **monitoring** the status of the implementation of Research Data Policies by the Centers:
 - To date, 13 Centers have developed their [own guidelines](#) for handling digital research data.
 - The policy for GSI is currently in preparation.
 - Since 2020, the Helmholtz Open Science Office, together with the Task Group, annually presents an **internal report** on the handling of research data and the status of the development or implementation of research data policies at the Helmholtz Centers.

Research Data Repositories and Portals in Helmholtz

- The Helmholtz Centers operate **about 100 data infrastructures** in the Association in which unique and valuable digital research data is curated.
- An overview offers [re3data](#) - Registry of Research Data Repositories
- Repositories with GSI participation in re3data:
 - [Constrained Local Universe Simulations \(CLUES\)](#)
 - [SPECTR-W3](#)



The screenshot shows a web browser window with the URL os.helmholtz.de. The page title is "Liste der Forschungsdatenrepositorien und -Portale mit Helmholtz-Beteiligung". Below the title, a paragraph states: "Folgende Liste dokumentiert die Forschungsdatenrepositorien und -Portale in der Helmholtz-Gemeinschaft. Weitergehende Informationen finden sich im re3data Registry." The main content is a table with three columns: "Name des Forschungsdatenrepositoriums", "Beteiligte Helmholtz-Zentren", and "re3data DOI".

Name des Forschungsdatenrepositoriums	Beteiligte Helmholtz-Zentren	re3data DOI
AIRS/Aqua Observations of Gravity Waves	Forschungszentrum Jülich	https://doi.org/10.17616/R34J42
Aktuelle Wetterwerte deutscher Stationen	Karlsruher Institut für Technologie (KIT)	https://doi.org/10.17616/R37C7D
Arctic Permafrost Geospatial Centre	Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung	https://doi.org/10.17616/R31NJMQK
BZSHARE Server Forschungszentrum Jülich	Forschungszentrum Jülich	https://doi.org/10.17616/R31NJMM6
Baseline Surface Radiation Network (BSRN)	Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung	https://doi.org/10.17616/R3JW60
BonaRes Repository	Helmholtz-Zentrum für Umweltforschung - UFZ	https://doi.org/10.17616/R31NJMVY
CARIBIC	Deutsches Zentrum für Luft- und Raumfahrt (DLR) Helmholtz-Zentrum hereon Karlsruher Institut für Technologie (KIT)	https://doi.org/10.17616/R3N347
CHAMP	Deutsches Zentrum für Luft- und Raumfahrt (DLR) Helmholtz-Zentrum Potsdam - Deutsches GeoForschungsZentrum GFZ	https://doi.org/10.17616/R3GG80
chemotion	Karlsruher Institut für Technologie (KIT)	https://doi.org/10.17616/R34P5T
circbase	Max-Deibüch-Centrum für Molekulare Medizin in der Helmholtz-Gemeinschaft	https://doi.org/10.17616/R3QB7D

[Visit website](#)

Open Research Data

NFDI Participation

- Numerous consortia of the **National Research Data Infrastructure (NFDI)** are being implemented with substantial Helmholtz participation.
- Helmholtz Centers are involved in the following NFDI consortia (as of June 2022):
 - [DAPHNE4NFDI](#) (Participation from Helmholtz: DESY, FZJ, HZB, HZDR, HEREON, KIT)
 - [DataPLANT](#) (Participation from Helmholtz: FZJ)
 - [FAIRmat](#) (Participation from Helmholtz: FZJ, HZB, HZDR, KIT)
 - [GHGA](#) (Participation from Helmholtz: CISPA, DKFZ, DZNE, HMGU, HZI, MDC)
 - [NFDI4BioDiversity](#) (Participation from Helmholtz: AWI, UFZ)
 - [NFDI4Cat](#) (Participation from Helmholtz: KIT)
 - [NFDI4Chem](#) (Participation from Helmholtz: KIT, UFZ)
 - [NFDI4DataScience](#) (Participation from Helmholtz: AWI)
 - [NFDI4Earth](#) (Participation from Helmholtz: AWI, DLR, FZJ, GEOMAR, GFZ, HEREON, KIT, UFZ)
 - [NFDI4Health](#) (Participation from Helmholtz: MDC)
 - [NFDI4Ing](#) (Participation from Helmholtz: FZJ, DLR, KIT)
 - [NFDI4Microbiota](#) (Participation from Helmholtz: DLR, FZJ, GFZ, HMGU, HZI, KIT, MDC, UFZ)
 - [NFDI-MatWerk](#) (Participation from Helmholtz: FZJ, HEREON, KIT)
 - [PUNCH4NFDI](#) (Participation from Helmholtz: DESY, DLR, FZJ, GSI, HZDR, KIT)
 - [Text+](#) (Participation from Helmholtz: FZJ)

Open Research Data

EOSC Participation

- The [European Open Science Cloud](#) (EOSC) has been started in 2015 as a project of the European Commission to make it easier for European researchers to access scientific data, platforms, and services for data processing.
- There are currently 8 Helmholtz Centers involved in a total of 11 on-going EU projects related to EOSC (as of February 2022).
 - These are the following projects: ENVRI-FAIR, ExPaNDS, ESCAPE, EOSC-Pillar, DICE, EOSC Future, EOSC-Life, EOSC-synergy, EGI-ACE, FAIRsFAIR und PaNOSC.

Open Research Software

Core topic

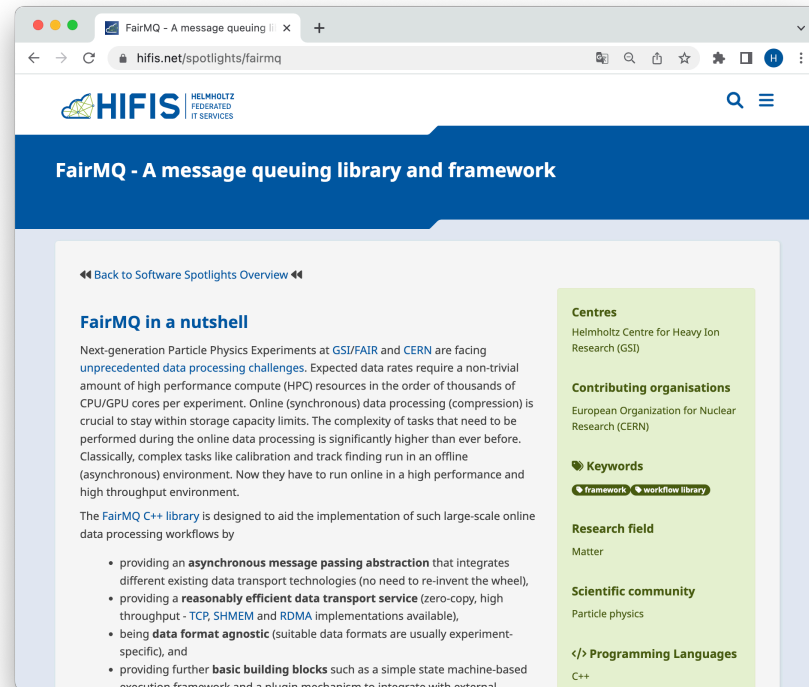
Open Research Software

- The topic of Open Research Software continues to gain importance; while open science calls for reuse and reproducibility of scientific results, in many research areas, this can only be ensured if source code is made openly accessible in addition to the corresponding research data.
- 2017: Position paper [Access to and re-use of research software](#)
- 2019: [Model Policy on Sustainable Software at the Helmholtz Centers](#), covering the following aspects
 - Sustainability
 - Development, Use, and Reuse of Research Software
 - Support and Advice Services
 - Quality Assurance and Archiving
 - Continuing Professional Development, Career Prospects, and Networking
 - Provision, Publication, and Citation
 - Legal Aspects
 - Aspects of Scientific and Economic Exploitation
- 2021: [Checklist for the Implementation of Software Policies at the Helmholtz Centers](#) (German only)

Task Group

Research Software

- Close cooperation with HIFIS
- Current project: "[Helmholtz Software Spotlights](https://hifis.net/spotlights/fairmq)"
- Fora on this topic
- Various links to the work of [de-RSE](https://de-rse.org)



National and International Network

National and International Network

- Selection of current partner organizations:
 - [Alliance of the German Science Organizations: Priority Initiative “Digital Information”](#)
 - [Confederation of Open Access Repositories \(COAR\)](#)
 - [Deutsche Initiative für Netzwerkinformation \(DINI\)](#)
 - [European Association of Research and Technology Organisations \(EARTO\)](#)
 - [German Reproducibility Network \(GRN\)](#)
 - [Network G6](#)
 - [PREMIER](#)
 - [Research Data Alliance \(RDA\)](#)
 - [RDA Deutschland](#)

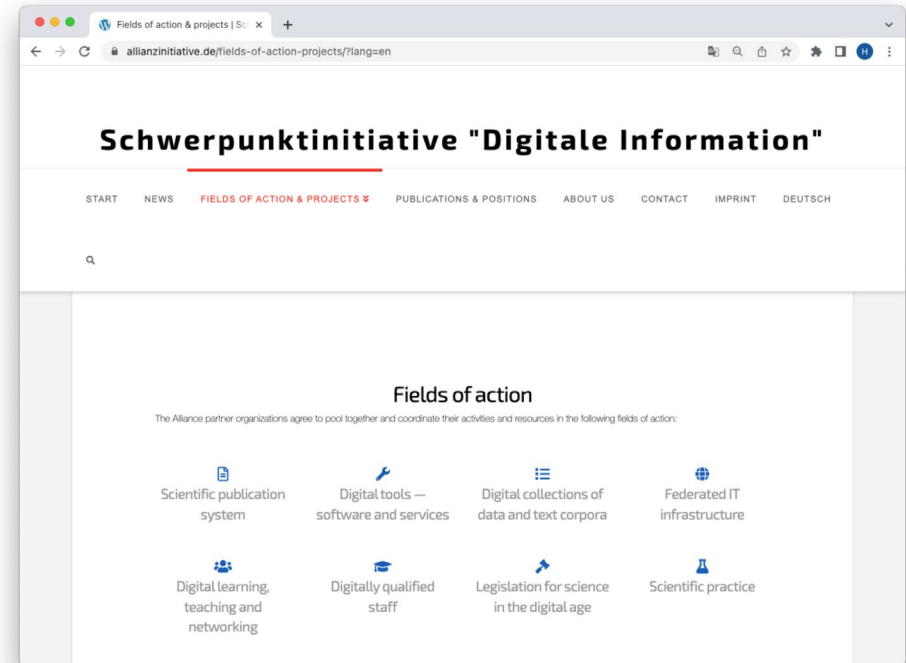
Research Data Alliance (RDA)

- The Helmholtz Open Science Office has been co-organizing the [RDA-DE](#) conference since 2016. Thereby the work of the international [Research Data Alliance](#) (RDA) is promoted in Germany and the networking of actors in the field of research data management at the national level is supported.
- Helmholtz is an organisational member of the RDA.
- In 2018, the 11th [RDA Plenary](#) Meeting in Berlin with over 660 participants from 41 countries was co-organized by the Helmholtz Open Science Office.



Priority Initiative "Digital Information"

- The Helmholtz Association has been cooperating with other science organizations in the context of the Alliance of Science Organizations in Germany in the Priority Initiative "Digital Information" since 2008. The focus is currently on the following topics:
 - Scientific publication system
 - Digital tools - software and services
 - Digital data collections
 - Promotion of IT infrastructures
 - Digital learning, teaching, and networking
 - Digitally qualified staff
 - Law for science in the digital age
 - Research practice



Network G6

- The six European research organizations CNR (Italy), CNRS (France), CSIC (Spain), the Helmholtz Association, the Max Planck Society and the Leibniz Association draw up joint statements on current scientific and research policy issues under the name "G6".
- Within this framework, the Open Science Task Force of the G6 has developed a [statement on the common understanding of open science](https://os.helmholtz.de).



Indicators for Data and Software Products

Core topic

Indicators

- The goal is to develop incentives and indicators to promote open science at Helmholtz.
- The ongoing discussion process to anchor open science in the process of **research evaluation** at Helmholtz needs to be further accompanied in order to develop indicators and incentives for open science in the areas of open access, open research data, and open research software.
- In this context, European and international developments in research assessment are considered and continued; see also [G6 and Open Science Statement](#)

Task Group

Helmholtz Quality Indicators for Data and Software Products

- The Task Group Helmholtz Quality Indicators for Data and Software Products of the Working Group Open Science of the Helmholtz Association is dedicated to the development of Helmholtz Quality Indicators for Data and Software Products.
- Duration: From March 2022 onwards.
- Relevant products and events:
 - (in German) Diskussionspapier „Indikatoren für Open Science“: <https://doi.org/10.2312/os.helmholtz.014>
 - (in German) Report des Helmholtz Open Science Forum zu „Indikatoren für Open Science“: <https://doi.org/10.48440/os.helmholtz.024>

Persistent Identifiers (PID)

Why use PIDs?

- PIDs help solve challenges in publication management in the case of
 - name changes
 - similar names
 - different spellings and abbreviations
- PIDs enable correct and unique identification, naming and linking of authors and contributors, infrastructures, funding agencies and research outputs.
 - PIDs can be used to uniquely link to other PIDs to create PID graphs.
- PIDs are mostly “actionable”: You can convert them into a URL that resolves to the identified source or to a landing page with metadata information.
- PIDs facilitate the comprehensive and correct assignment of research contributions (publications, datasets, conference contributions etc.) to the scientific record.
- PID magic doesn’t emerge from the identifier strings themselves... But from open scholarly infrastructures that provide accompanying metadata and associated services like APIs for getting the metadata.

PID Types

- PIDs can be applied to:
 - Research data
 - Text publications
 - Persons
 - Physical objects / Samples
 - Instruments / Detectors
 - Software
 - Organizations and projects
 - Repositories and publication services
 - Scientific events
 - Cultural objects
 - ...

Examples:

- [DOI](#)
- [Handle](#)
- [ARK](#)
- [ORCID](#) (persons)
- [ROR](#) (organizations)
- [IGSN](#) (physical samples)
- [RRID](#) (biomedical resources)
- [RAiD](#) (projects)
- [ConfiDent](#) (conferences)
- ...

DFG funded project

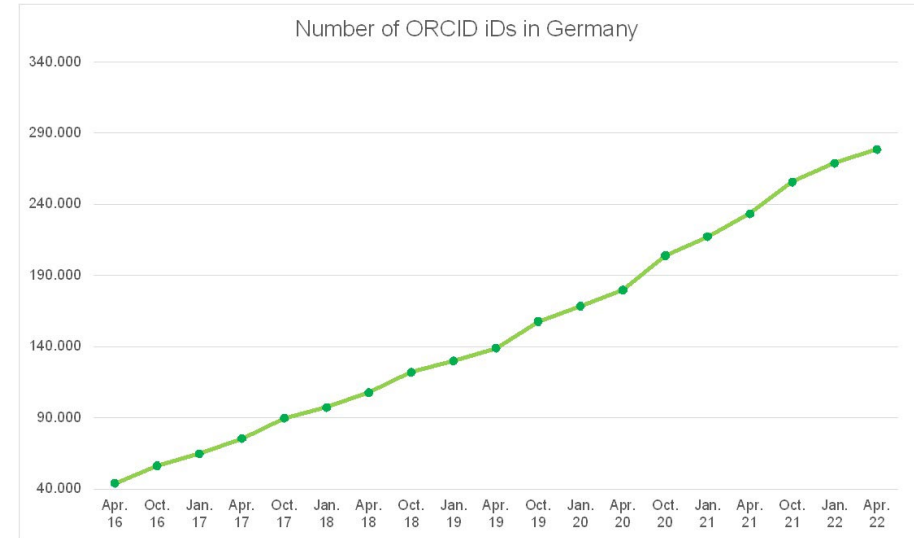
ORCID DE

- Title: ORCID DE 2 - Consolidation of the ORCID Information Infrastructure in Germany
- Projekt partners: DataCite
Deutsche Nationalbibliothek
Universität Bielefeld
Technische Informationsbibliothek (TIB) Hannover
- Approval period: 01/2020 to 11/2022
- Project websites: <https://www.orcid-de.org>
<https://os.helmholtz.de/projekte/orcid-de/>
- Contact persons: Antonia C. Schrader, Heinz Pampel

DFG funded project

ORCID DE

- The Open Researcher and Contributor ID, ORCID, is a **unique identifier for researchers** and enables the networking of those who contribute to the research process with their publications, research data, and other scientific products.
- Around 280,000 registered ORCID iDs in Germany
- Milestones:
 - Development of the dialogue platform orcid-de.org
 - Organization of workshops and online seminars
 - Launch of the [ORCID DE Monitor](#)
 - Publication of the [survey on OrgIDs](#) (soon available in English)
 - Further development of the connection between ORCID-GND linking



re3data – The Registry of Research Data Repositories

DFG funded project

re3data COREF

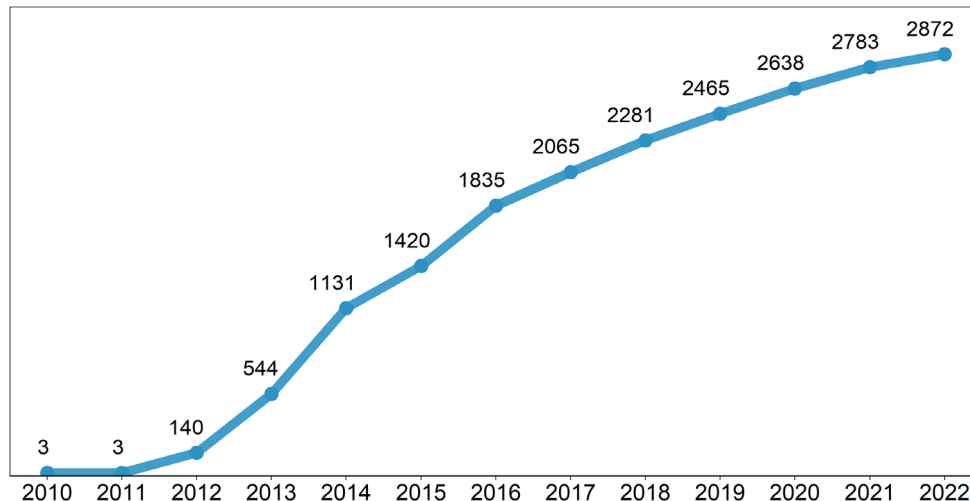


- Title: re3data COREF
(Community-driven Open Reference for Research Data Repositories)
- Project partners: DataCite
Humboldt-Universität zu Berlin
Karlsruher Institut für Technologie (KIT)
- Approval period: 01/2020 to 01/2023
- Project websites: <https://www.re3data.org>
<https://os.helmholtz.de/projekte/re3data-coref/>
- Contact persons: Nina Weisweiler, Lea Maria Ferguson

DFG funded project

re3data COREF

- re3data is an internationally recognized registry for research data repositories.
- The Helmholtz Open Science Office has been actively involved in the operation of re3data since its launch.
- The main goal of the project is the further professionalization of re3data and the provision of reliable and customizable descriptions of research data repositories.
- re3data lists **over 2800** infrastructures as of June 2022.
 - Of these, around 100 are with Helmholtz participation, see [here](#).
- In 2022, re3data celebrates its **10th anniversary!**



Number of research data repositories indexed in re3data per year

The Registry of Research Data Repositories

- Repositories in re3data are defined as “a subtype of a sustainable information infrastructure providing long-term storage of and access to research data.” ([Metadata Schema for the Description of Research Data Repositories, Version 3.1](#))
- The re3data registration policy is intentionally inclusive to cover a broad range of infrastructures for research data. To be registered a repository must
 - be run by a legal entity, such as a sustainable institution;
 - clarify access conditions to the data and repository as well as the terms of use;
 - have a focus on research data.
- Repositories are described according to a comprehensive metadata schema with more than 40 properties.
- Suggestions for new repositories and change requests can be submitted directly via the re3data website.

re3data as a metadata provider

- re3data is a central reference point and data source for other service providers, see for example:
 - [Open Science Observatory](#)
 - [European Open Science Monitor](#)
 - [DataCite Commons](#)
 - [F-UJI Automated FAIR Data Assessment Tool](#)
 - [DARIAH-EU Data Deposit Recommendation Service](#)
- Use case examples for the re3data API:
 - The examples are implemented in [R](#) using [Jupyter Notebooks](#). They outline the use cases as well as each step in the process of data collection, processing and visualization (if applicable).
 - Visit the [re3data GitHub repository](#).

Keep in touch

- Email - open-science@helmholtz.de
- Twitter - [@helmholtz_os](https://twitter.com/helmholtz_os)
- Website - <https://os.helmholtz.de>
- Mailing list for members of Helmholtz - [Helmholtz Open Science Professionals](#)
- [Open Science Newsletter](#)



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