

My research data and me: How it can work!

Research Data Management @ Graz University of Technology

Research Data Management

„RDM accompanies the research process from the initial planning stages to the archiving, subsequent use, or deletion of the data.“



Content from: [CC0, https://figshare.com/articles/DTU_Research_Data_Life_Cycle/4258019/1](https://figshare.com/articles/DTU_Research_Data_Life_Cycle/4258019/1)

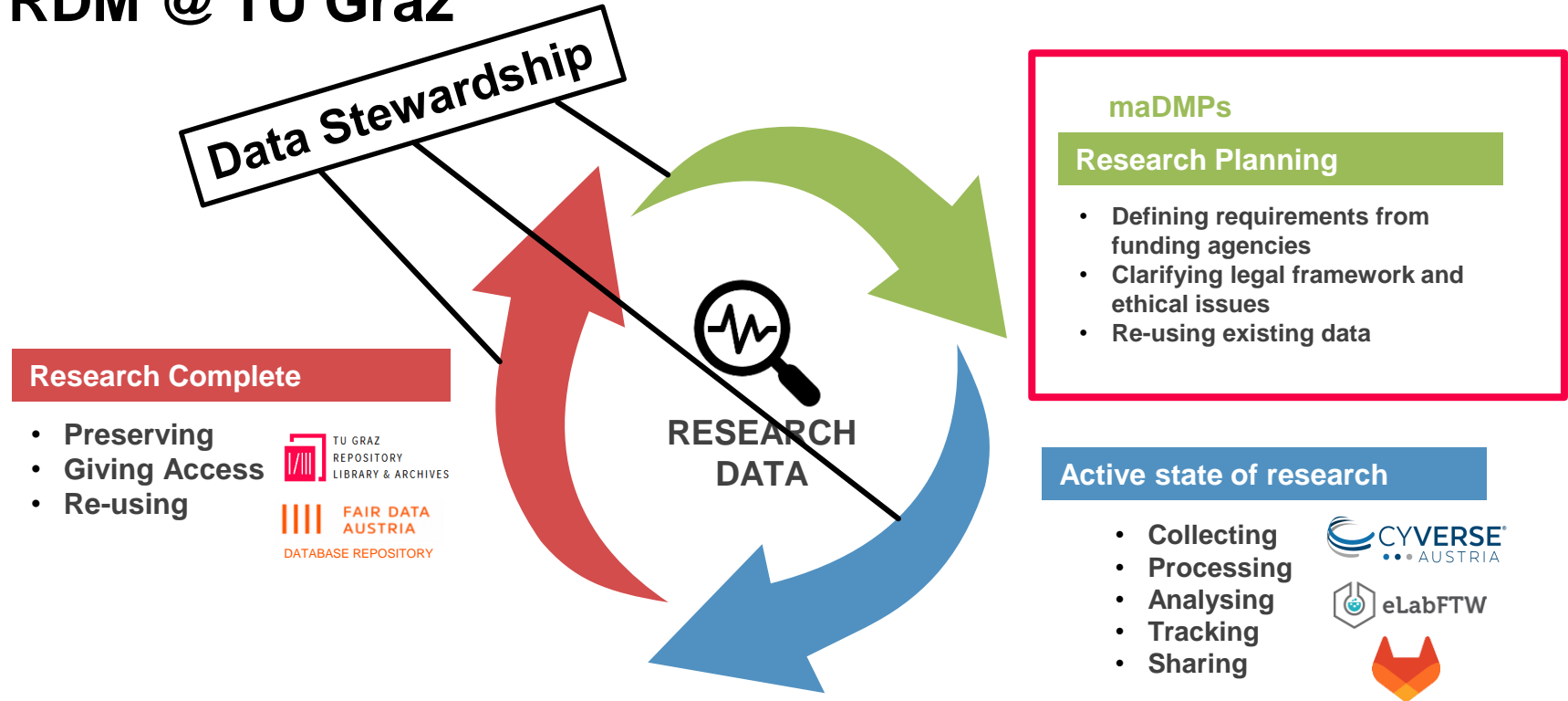
K. Biernacka et al. Train-the-Trainer Concept on Research Data Management, Berlin 2020, DOI:10.5281/zenodo.4071471

RDM Support @ TU Graz

- **Hard'** infrastructure elements
 - Data analysis **platforms**, data **repositories**
- **Soft'** infrastructure elements
 - Policies, **guidelines**, **data stewardship** support & DMPs
- Develop FAIR services led by researchers
 - *“general as possible - subject-specific as necessary”*
 - social & technical solutions
 - between researchers & support



RDM @ TU Graz



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DMP Tools

- Argos: <https://argos.openaire.eu>
- DMPTool: <https://dmptool.org>
- DMPOnline: <https://dmponline.dcc.ac.uk/>
- DS Wizard: <https://ds-wizard.org/>
- **TU Graz DMP Tool** based on DAMAP

Machine actionable DMPs

<https://damap.org/>

DAMAP

- Tool to assist **creating DMPs**
 - Guidance
 - Export
- **Automation**
 - Collecting information from system
 - & Triggering actions in systems
- **Integration** of project/researcher databases, storage, authentication
- TU Graz deployment: <https://dmp.tugraz.at/>




TU Graz DMP Tool

✓ Choose project

2 People involved in data management

This step helps you to provide information on involved persons and their particular roles regarding research data management within this project. Based on the information provided in the Project Database, we have already entered the name of the Project Leader and marked them as the Contact Person for questions related to data management and the DMP (icon with person and envelope). You can change the preset information if needed and add more contributors via the search (start typing the name) and manually. Provide a minimum of one Contact Person as well as a Data Manager (may be the same person).

Search for person...  Search service field
University

No project members available.

[Show manual contributor input](#)

3 Specify research data

4 Documentation and data quality

5 Storage and backup during the research process

6 Legal and ethical aspects

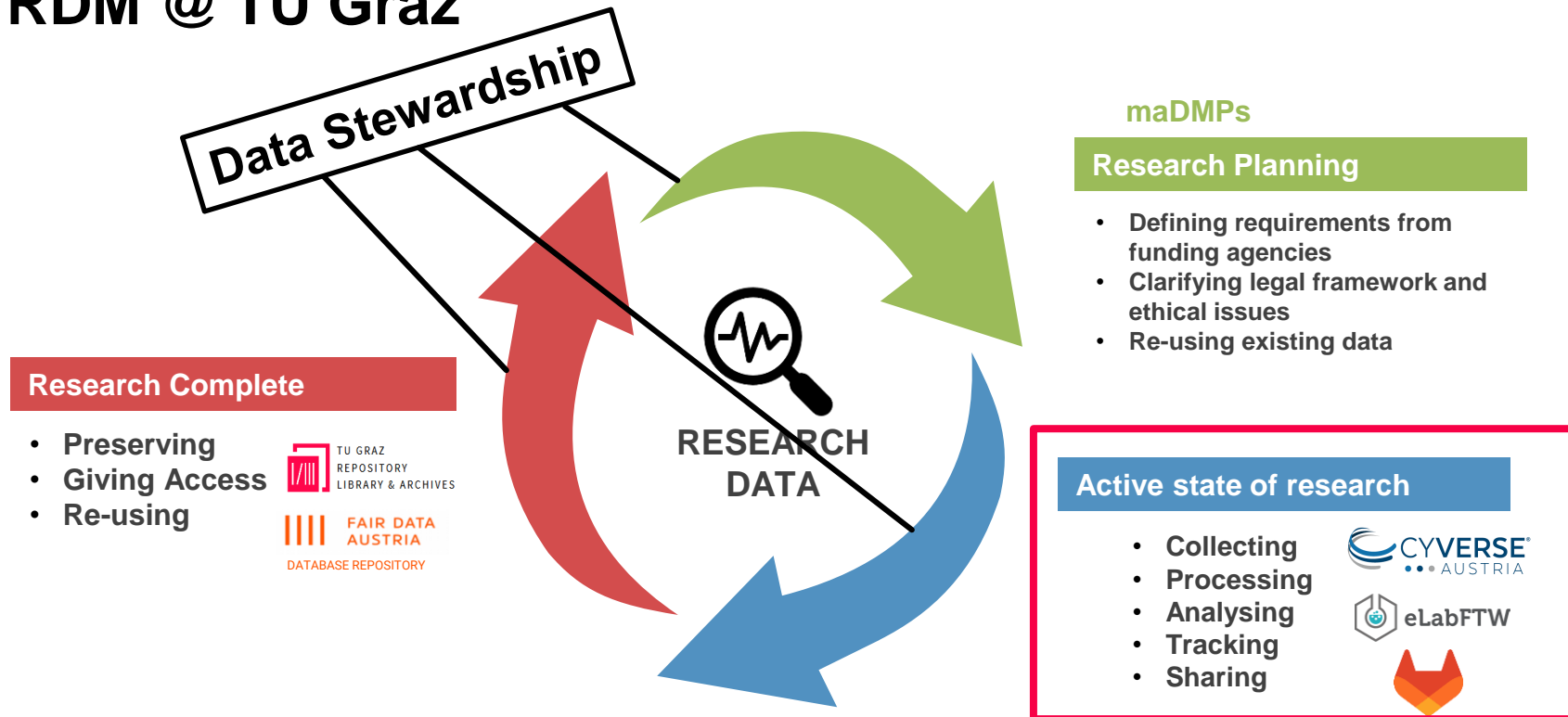
7 Data access and licensing

8 Specify repositories for publication and preservation

✓ All changes have been saved.

[Discard changes](#)[Save changes](#)[Save new version](#)[Export document](#)Source: <https://dmp.tugraz.at/>

8 RDM @ TU Graz



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Electronic Lab Notebook (eLabFTW)



“Documentation increases reproducibility!”

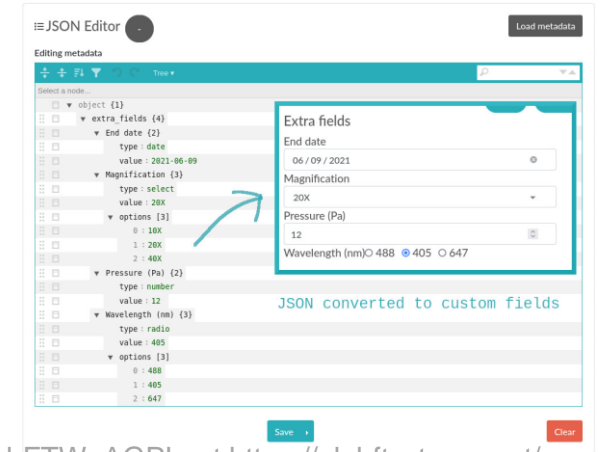
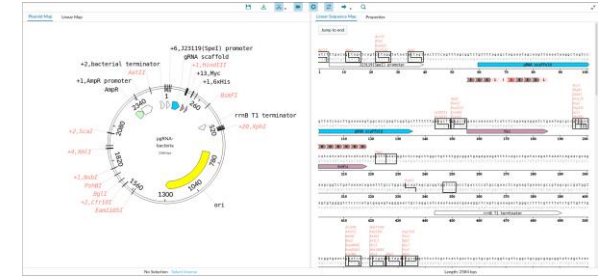
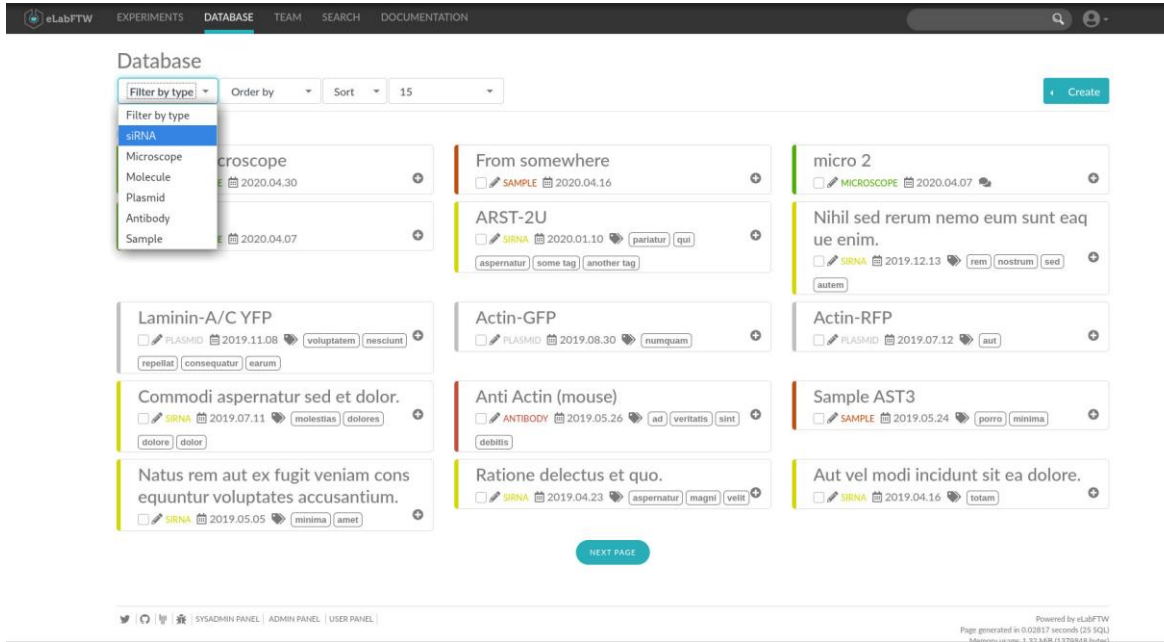
- Purpose: *taking notes, data storage, organization*
- **Replace** paper laboratory notebooks
- **Search** upon, simplify data copying and **backup**
- **Collaboration** amongst many users



eLabFTW.tugraz.at

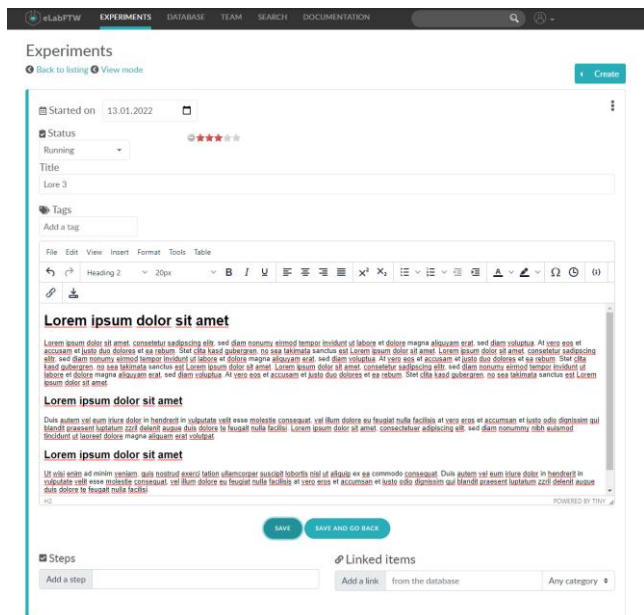
CCO by Mohamed Hassan,
pxhere.com

Electronic Lab Notebook (eLabFTW)



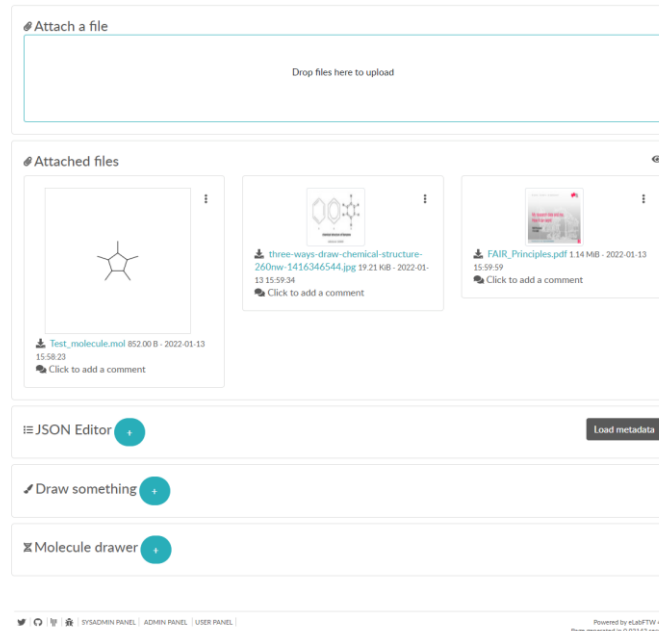
Source: elabFTW, AGPL, at <https://elabftw.tugraz.at/>

Documentation of results & tasks - EXPERIMENTS



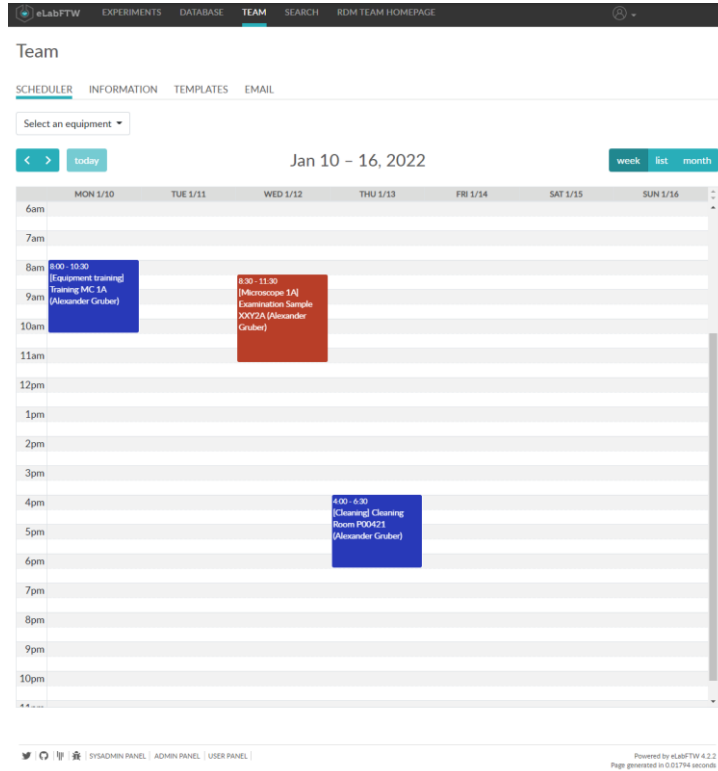
← Modification in the graphical text editor

Attach files with preview →



Source: elabFTW, [AGPL](https://elabftw.tugraz.at/), at <https://elabftw.tugraz.at/>

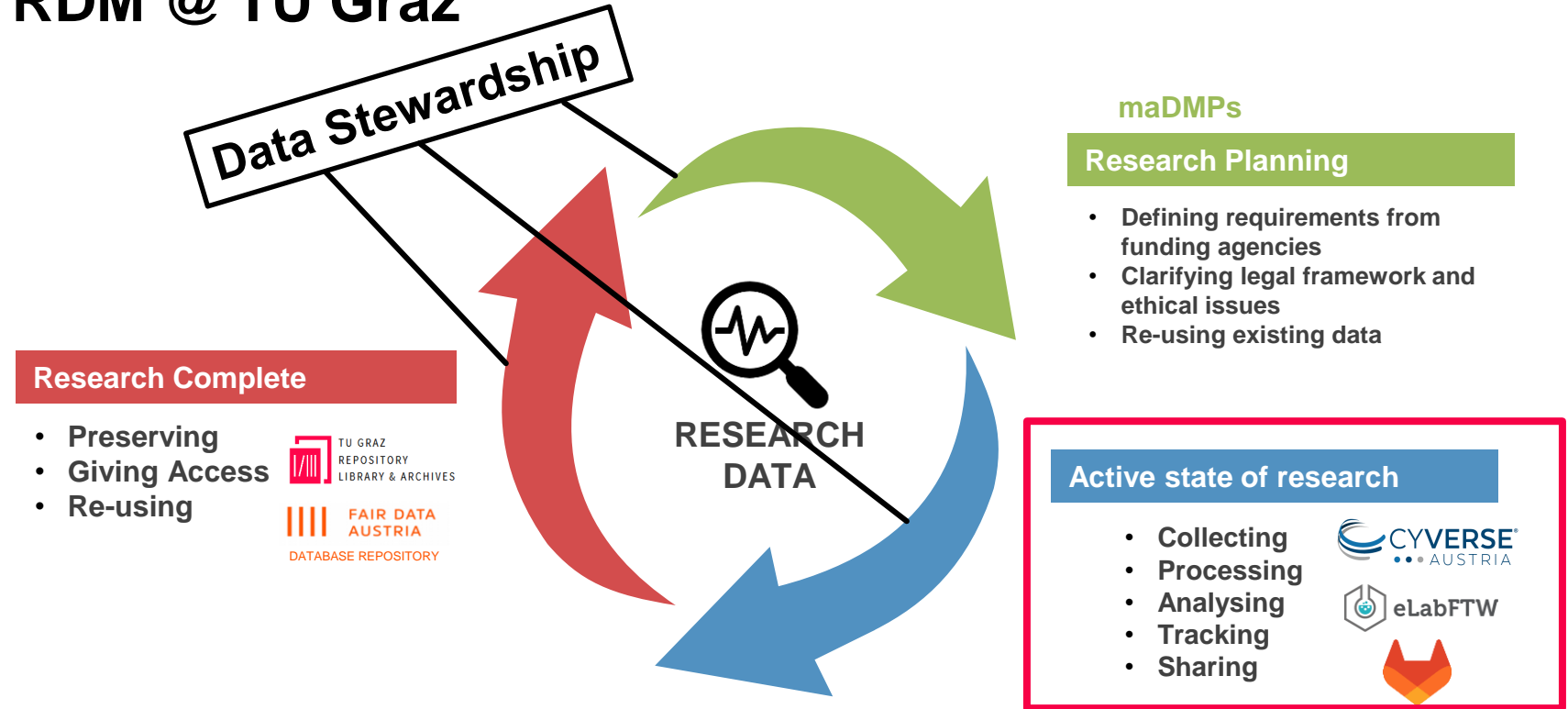
Member overview and item booking options - TEAM



Feature	User	Admin	SysAdmin
Modify Profile Information	X	X	X
Use ToDo-List	X	X	X
Create/Edit/Delete Experiments	X	X	X
Upload to Database	X	X	X
Add Users		X	X
Create Groups		X	X
Add Database item types		X	X
Define Experiment Status		X	X
Create Teams			X
System Settings			X
Security & Email settings			X

Source: elabFTW, [AGPL](https://elabftw.tugraz.at/), at <https://elabftw.tugraz.at/>

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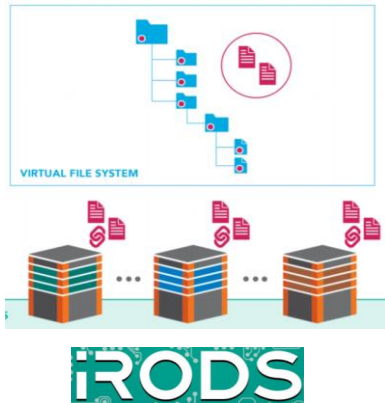
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Platform for RDM & data analysis

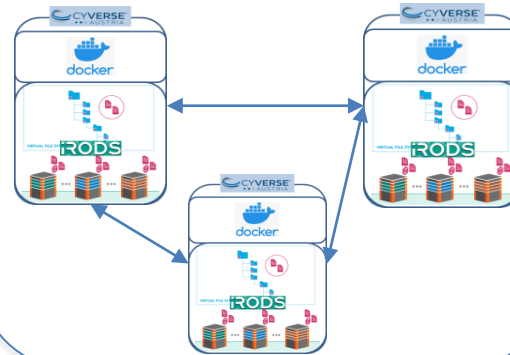


Data storage & analysis infrastructure for huge datasets to enable data-driven discovery

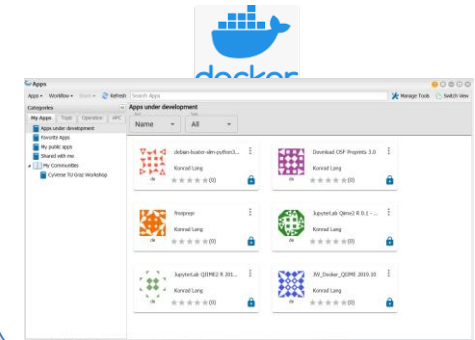
Organize data



Collaborate with other institutions without moving data to the cloud



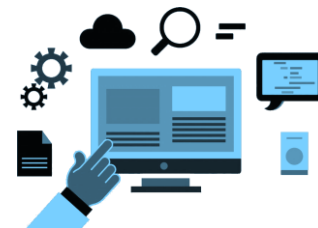
Use containers for reproducible data analytics



This material is based upon work supported by the National Science Foundation under Grant Nos. DBI-0735191, DBI-1265383, and DBI-1743442 URL: www.cyverse.org

Data infrastructures: benefits compared to local working

- No installation on local machines,
Data access from everywhere
- Usage via web browser or command line
- HPC & shared resources
- Container-based applications (reliability)
- Independent from own system (OS, infra)



Adapted (color) from
pxhere.com/de/photo/1571969 by
Mohamed Hassan, [CCO](#)



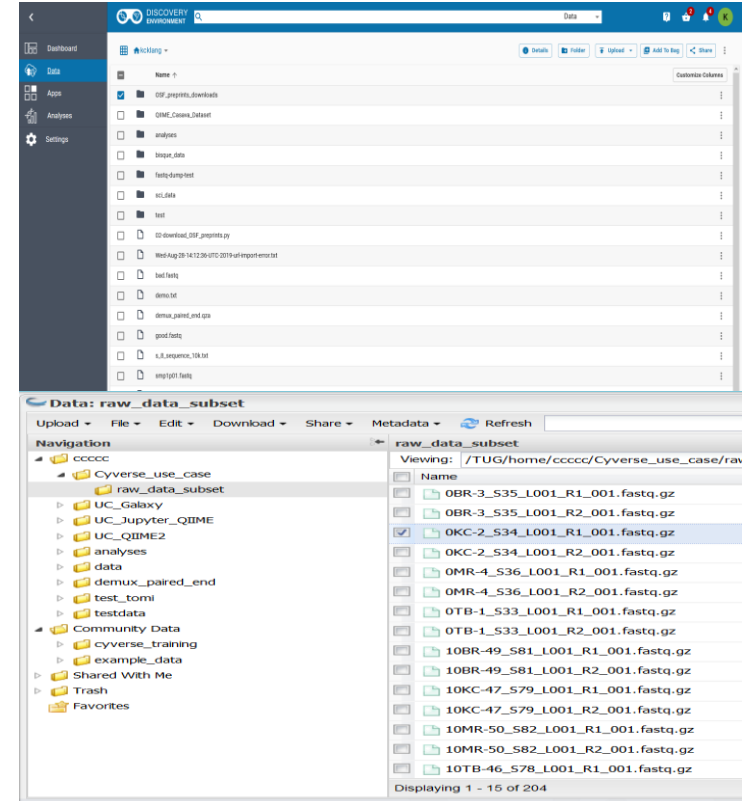
<https://www.docker.com>

CyVerse Austria @ TU Graz

Data Management

- UI & Command-line
- Logfiles of activities
- ElasticSearch
- Link external data via iRODS
- Data exchange with collaborators
- FAIR data management & meta data standards
- Automation of metadata extraction

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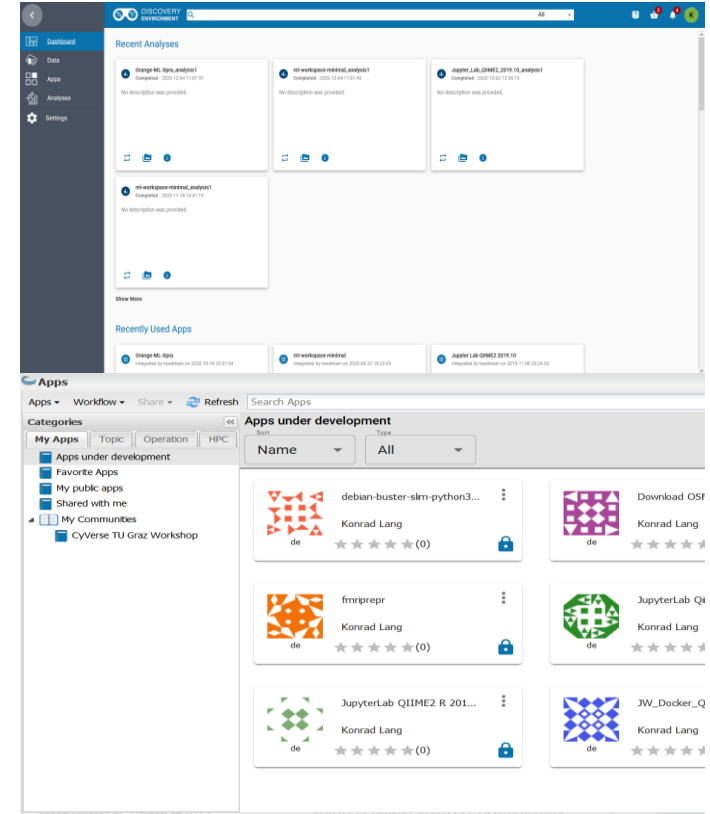


CyVerse Austria @ TU Graz

Analytics

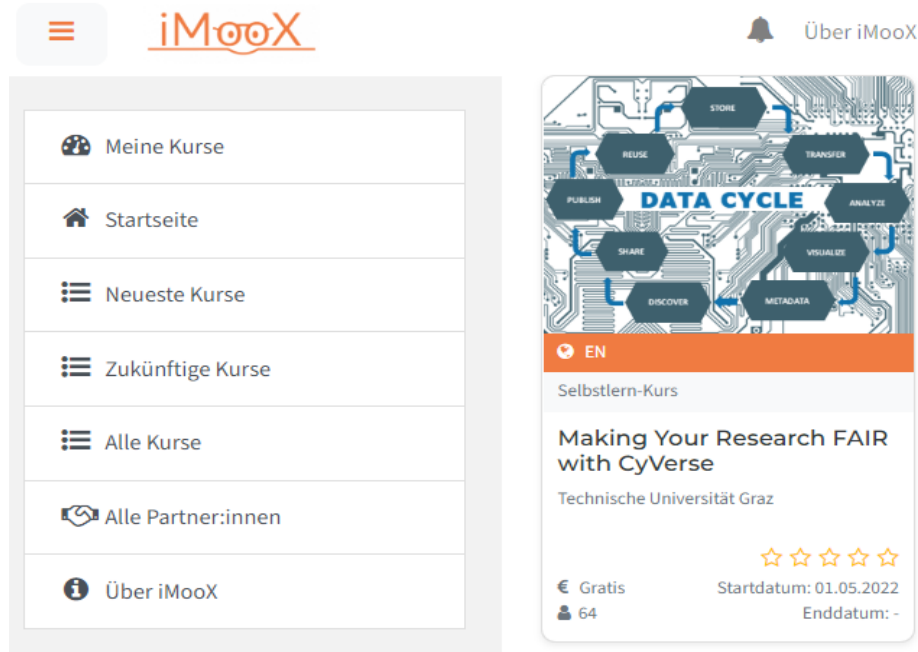
- UI & Command-line
- Interactive Applications & scripts
- Data & apps in-house (VPN Access)
- Life Science community & generic tools
- Integration of own tools
- Logfiles of activities
- Reproducibility (*containerized app versions*)
- Analysis pipelines using workflow engine
- HPC resources

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CyVerse Austria @ TU Graz

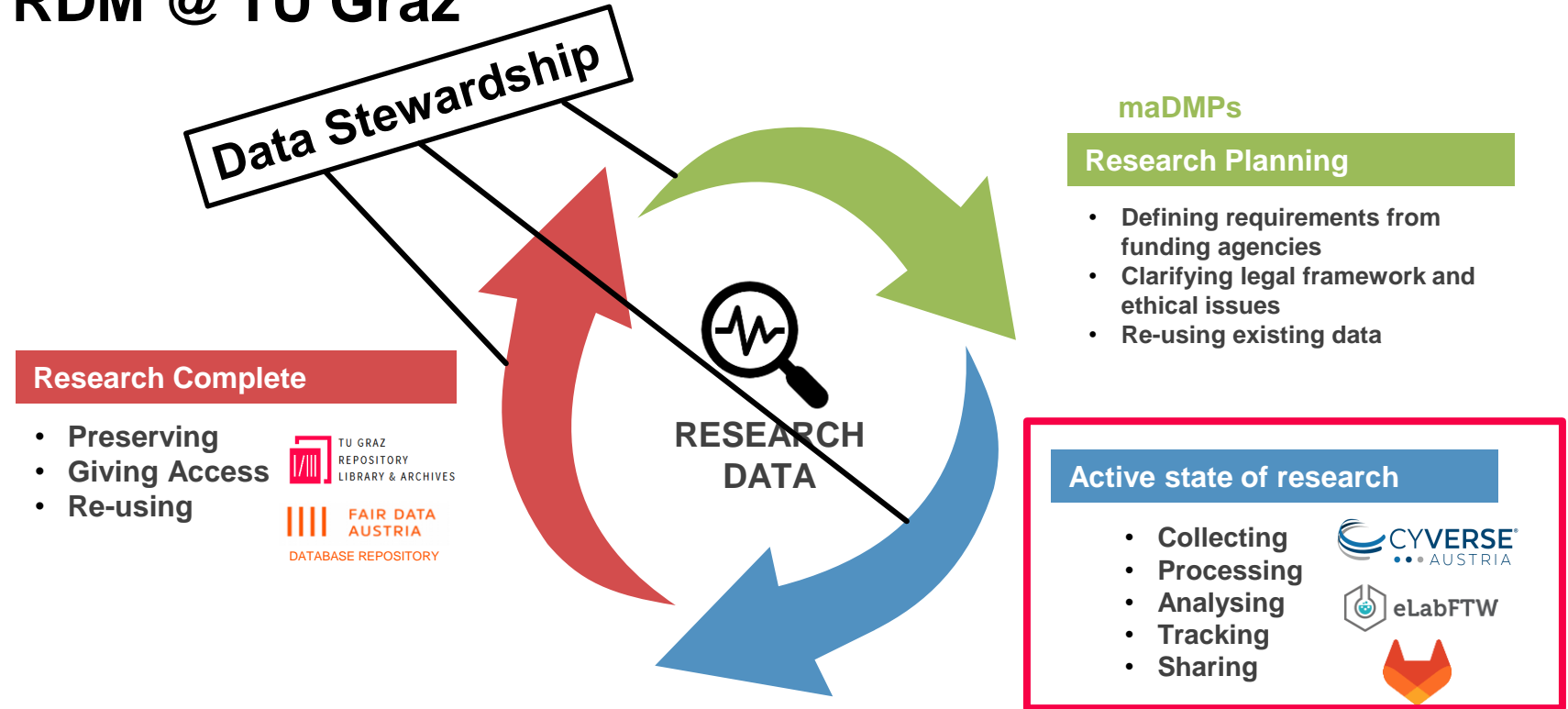
Online Course: <https://imoox.at/course/catmooc>



The screenshot shows the iMooX website interface. On the left is a navigation menu with the following items: "Meine Kurse", "Startseite", "Neueste Kurse", "Zukünftige Kurse", "Alle Kurse", "Alle Partner:innen", and "Über iMooX". The main content area displays a course card for "Making Your Research FAIR with CyVerse" by Technische Universität Graz. The card features a "DATA CYCLE" diagram with steps: PUBLISH, REUSE, TRANSFER, ANALYZE, VISUALIZE, METADATA, DISCOVER, and SHARE. Below the diagram, it indicates the course is "Selbstlern-Kurs" (Self-paced course), "EN" (English), and "Gratis" (Free). It also shows a rating of 5 stars, a start date of 01.05.2022, and 64 participants.

Making Your Research FAIR with CyVerse, TU Graz, [CC BY-SA 4.0](https://creativecommons.org/licenses/by-sa/4.0/)

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Git basics

Manuscript-pre-alpha-CJ-sendout-HJ.docx



Manuscript-Vers-checked-CJ-sendout-HJ-rev-AB.docx

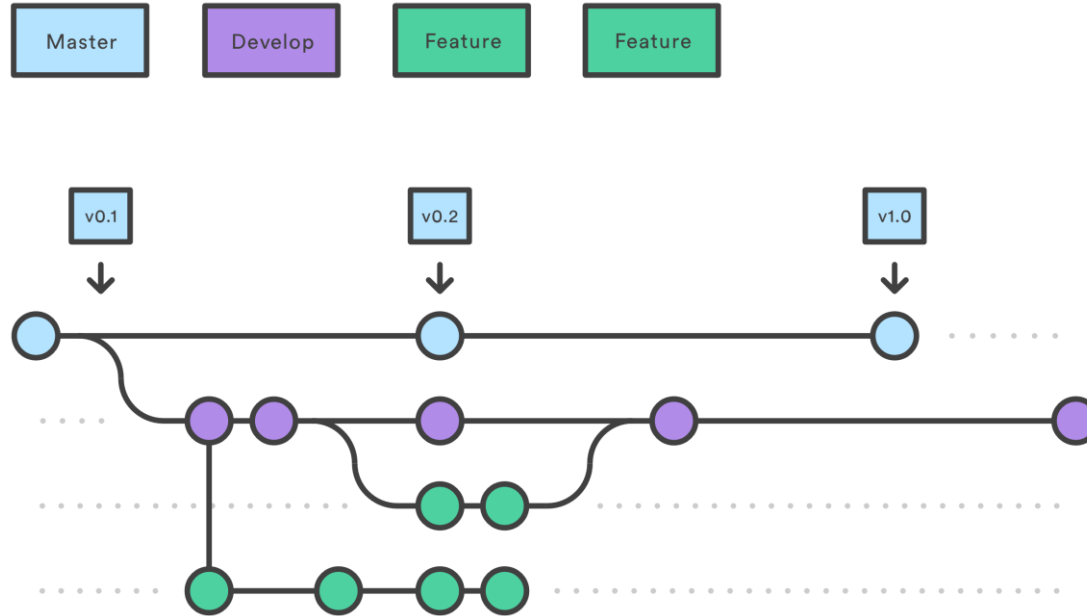


Manuscript-Vers-checked-CJ-sendout-HJ-rev-AB-repeatdcheck-CJ-
rev-HJ-checkedAB-final.docx



Manuscript- Vers-checked-CJ-sendout-HJ-rev-AB-repeatdcheck-CJ-
rev-HJ-checkedAB-final-repeat-HJ-comments-GG-corr-HB-
whatsoever-who-is-that-what-has-been-done-0815-GG-final-final.docx


Git basics - branches



CC0 by gbrown, <https://openclipart.org/detail/278050/1492474981svg>

GitLab

- **Repository Manager** like GitHub
- Accessibility and work via any browser
- Suitable for work-related & commercial projects
- TU Graz instance by **ZID**
- Local cloning
- <https://gitlab.tugraz.at>



GitLab

LDAP AD	Standard
LDAP AD Username	
<input type="text"/>	
Password	
<input type="password"/>	
<input type="checkbox"/> Remember me	
<button>Sign in</button>	



A complete DevOps platform

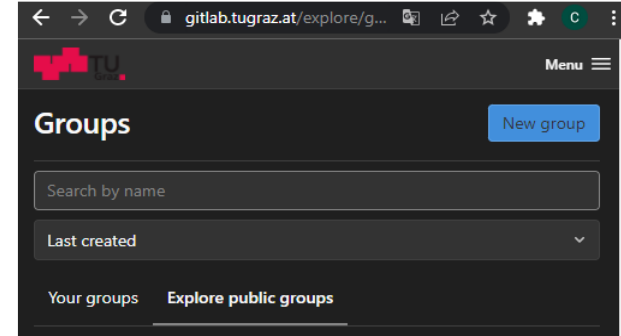
GitLab is a single application for the entire software development lifecycle. From project planning and source code management to CI/CD, monitoring, and security.

This is a self-managed instance of GitLab.

Source: <https://gitlab.tugraz.at/>

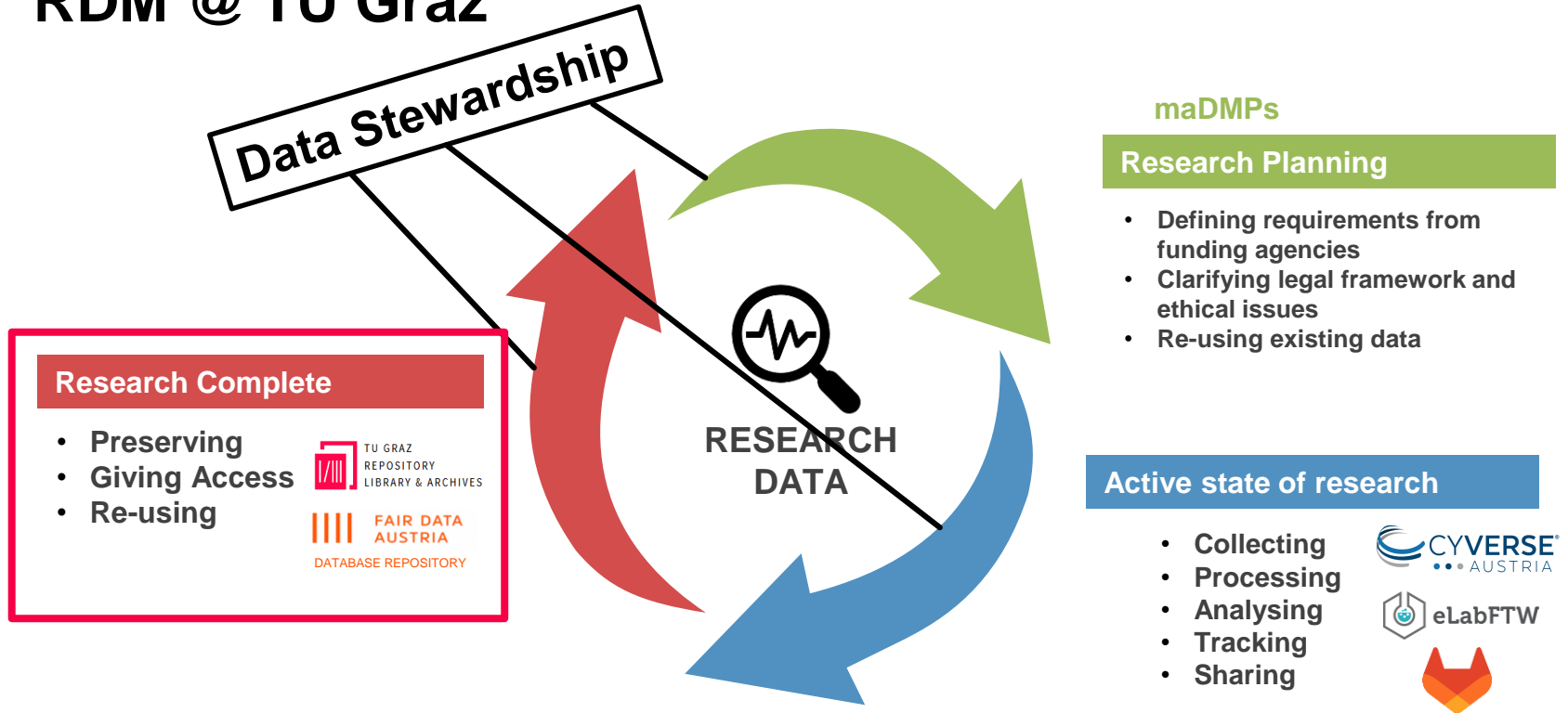
Differences from GitHub

- No registration for **TU Graz members**
- GitHub: Just “private” or “public” option
- Viewable internally, for institution, authentication required
- **Fine-tuned permissions** for different team members
- Advanced **issue tracker** to which attachments can be added
- Worldwide community smaller, rather TU Graz community relevant



Source: <https://gitlab.tugraz.at/>

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Repositories for research output

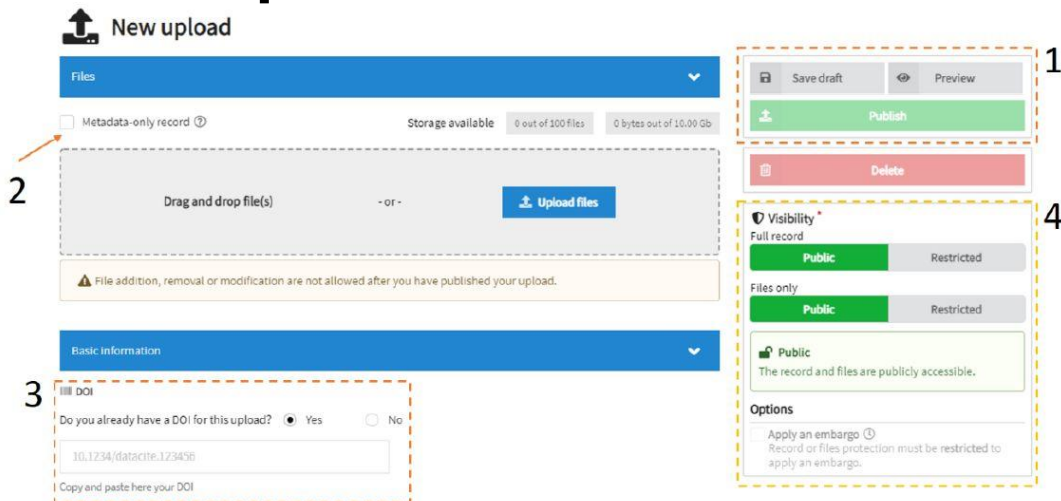


TU GRAZ
REPOSITORY
LIBRARY & ARCHIVES



<https://repository.tugraz.at>

- **Increased citability** via DOIs
- **InvenioRDM** (CERN & TU Graz)
- Continuously new features



The screenshot shows the 'New upload' page in the InvenioRDM repository. It includes a 'Files' section with a 'Drag and drop file(s)' area and an 'Upload files' button. A 'Basic information' section contains a 'DOI' field with a 'Do you already have a DOI for this upload?' question. On the right, there are 'Visibility' options for 'Full record' and 'Files only', both set to 'Public'. The interface is annotated with numbers 1 through 4 in dashed boxes: 1 points to the 'Save draft', 'Preview', 'Publish', and 'Delete' buttons; 2 points to the 'Drag and drop file(s)' area; 3 points to the 'DOI' section; and 4 points to the 'Visibility' options.

RDM encompasses all activities related to preparation, storage, archiving and publication of research data, including outputs as models next to code, scripts, software, images, video, or related materials.*

*C. Strasser. Research data management. National Information Standards Organization, 2015. ISBN: 978-1-937522-65-0

Some useful licences

1) Data

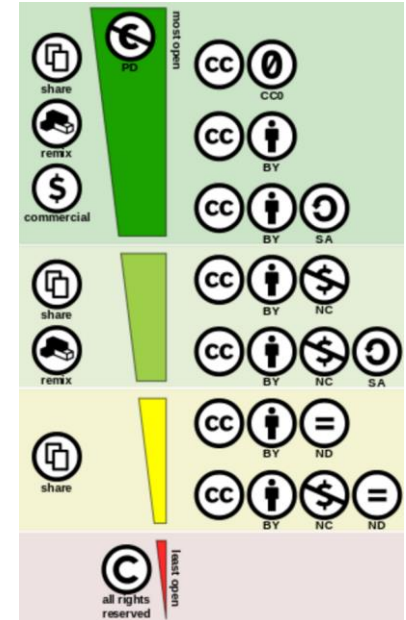
- CC0 No rights reserved
- CC BY Attribution
- CC BY & (SA, ND, NC) ShareAlike, NoChanges, NonCommercial

2) Databases

- Open Data Commons PDDL (corresponds to CC0)
- Open Data Commons ODbL
- Open Data Commons ODC-By

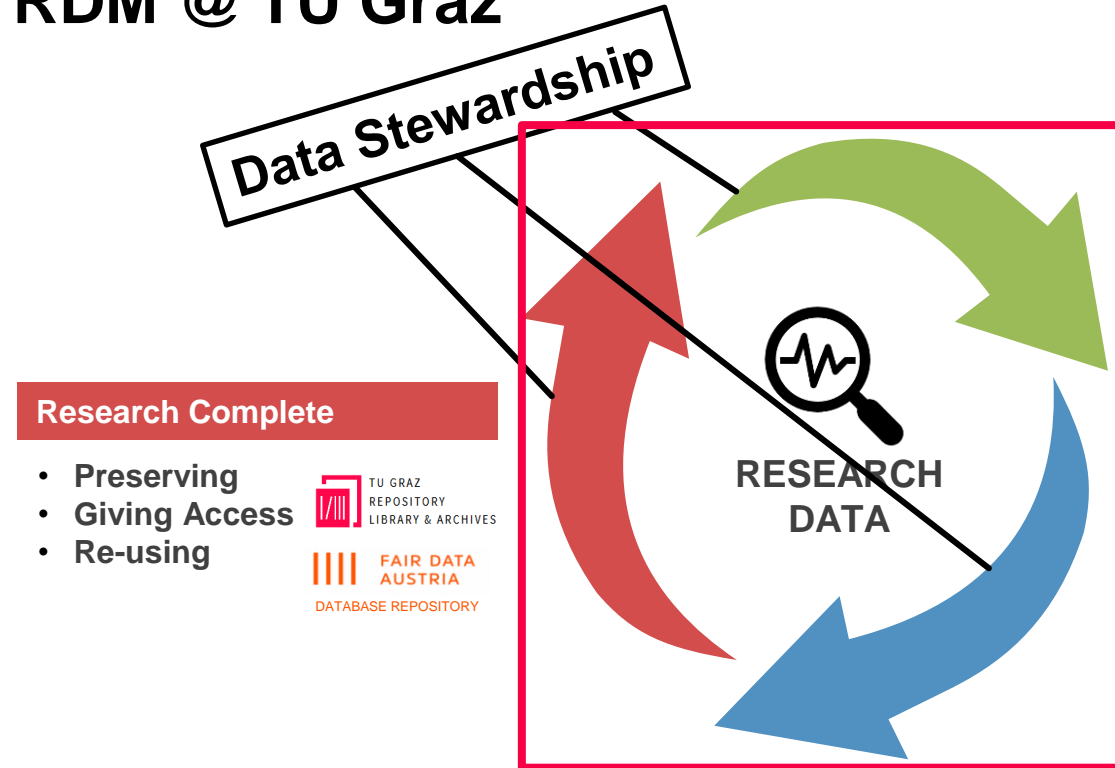
3) Software and Code

- MIT Licence: Software, licence itself modifiable
- Apache Licence: Software, no Copyleft
- GNU General Public Licence: Software, widely used
- 3-Clause BSD License: Software, no Copyleft
- European Union Public License: Software, applies to EU law



„Creative Commons license spectrum“,
created by Shaddim, [CC by 4.0](#)

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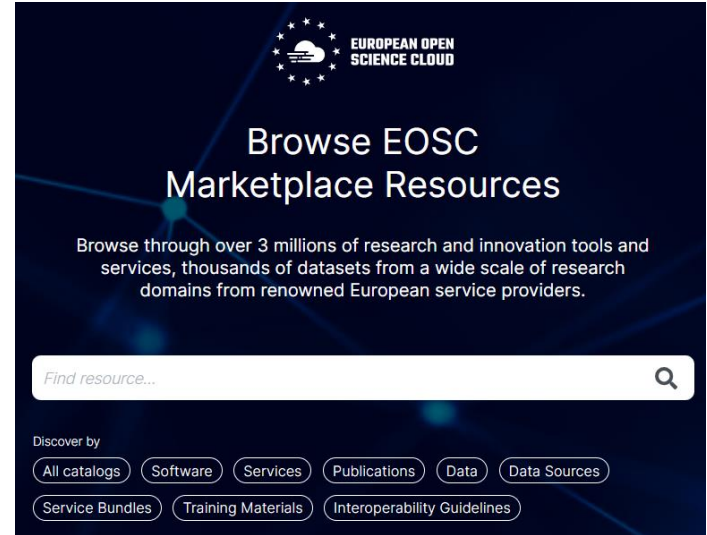
European Open Science Cloud

eOSC

- **Services** to use
- Shared **data**
- Disseminate project/output
- **Connect** to international community
- **Feedback** to implement own ideas or requirements



Austrian EOSC Mandated Organisation
EOSC Support Office Austria



Source: marketplace.eosc-portal.eu

The EOSC Portal is currently operated by the EOSC Future (Grant Agreement no. 101017536) projects funded by the European Union's Horizon 2020 research and innovation programme.

Research Data Management @ TU Graz

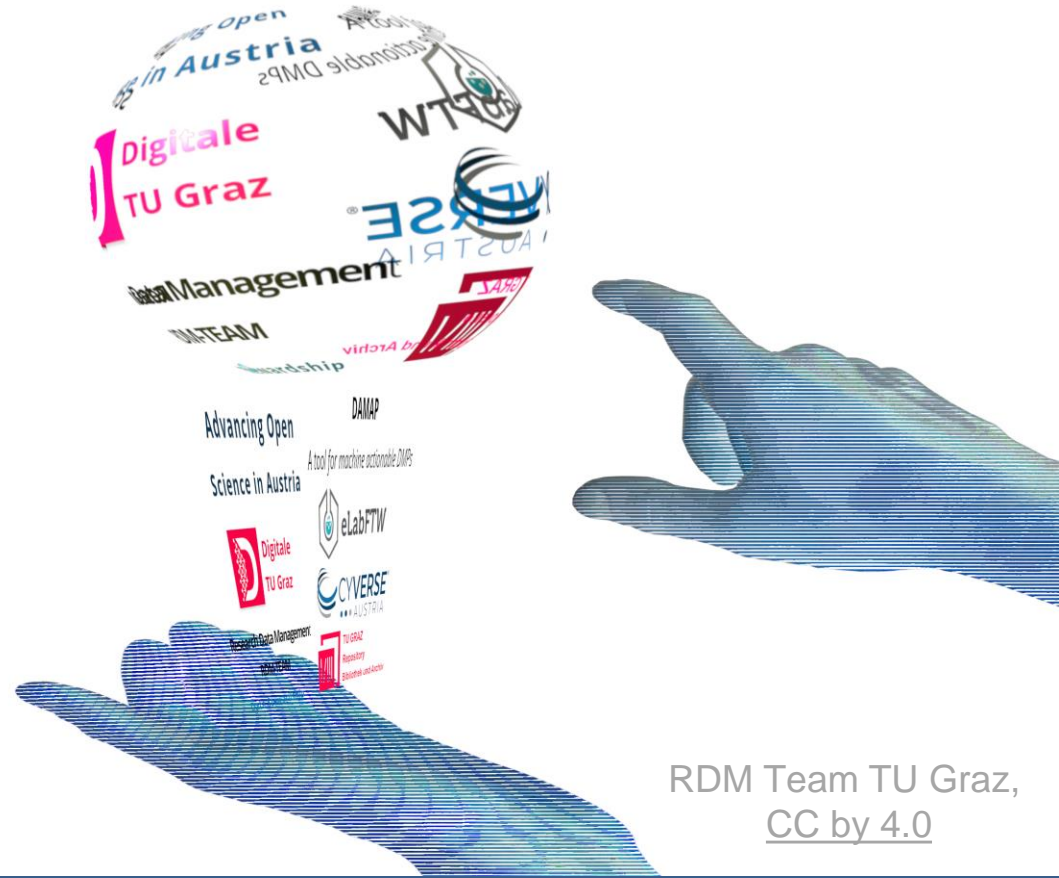
- DMP Support
- RDM Optimization Institute/Group: Workflows/Pipelines, Infrastructure
- RDM Individual support & support in Research Projects (Collaborations)
- RDM guidelines & policies
- Tool-dependent support
(workshops, introduction, training, assistance, development)

Supporting reproducible research

rdmteam@tugraz.at



<https://rdm.tugraz.at>



RDM Team TU Graz,
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