HELMHOLTZ ZENTRUM
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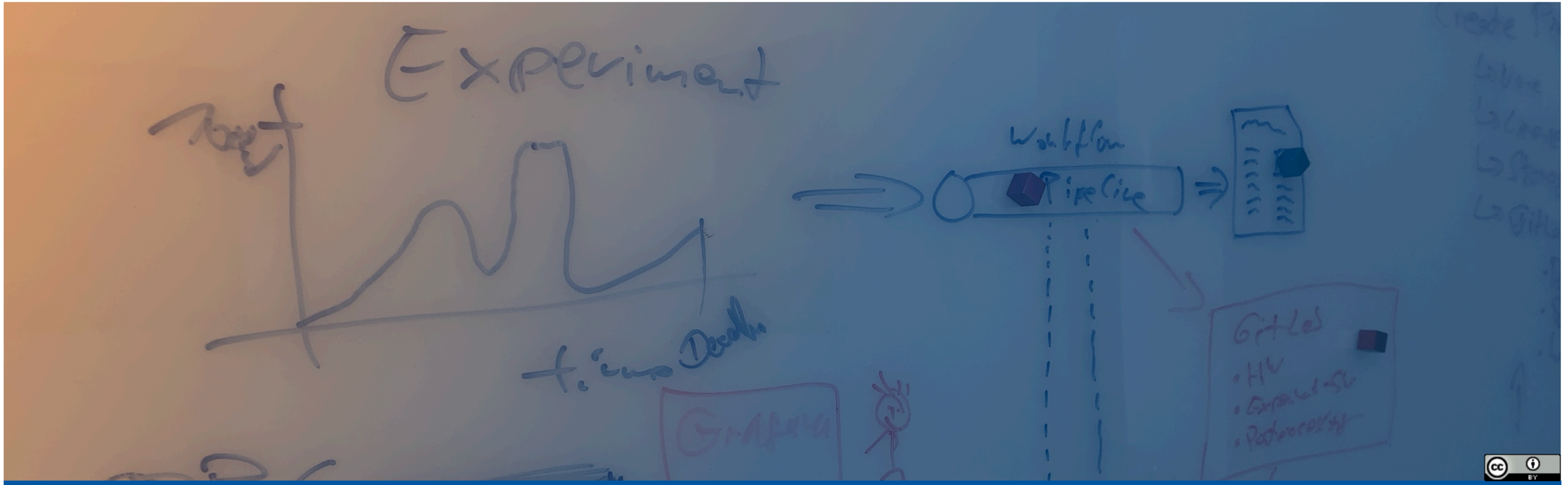

Overarching Data Management Ecosystem HELIPORT

From Small Experiments to Large-Scale Research Facilities

1st Workshop on Open Science at GSI/FAIR, 19. October 2023

Oliver Knodel, Thomas Gruber, Martin Voigt, Jeffrey Kelling, Mani Lokamani, Stefan E. Müller, David Pape and Guido Juckeland // contact: o.knodel@hzdr.de

DRESDEN concept

Our Research Facility and our Large Scale Research Infrastructures

The Helmholtz-Zentrum Dresden - Rossendorf

— Employees approx. 1,470. Thereof 670 scientists.

— HELMHOLTZ
RESEARCH FOR GRAND CHALLENGES

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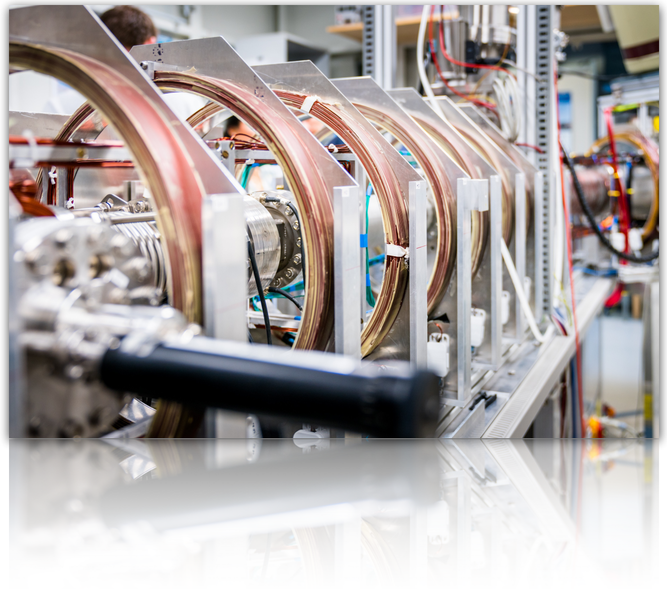

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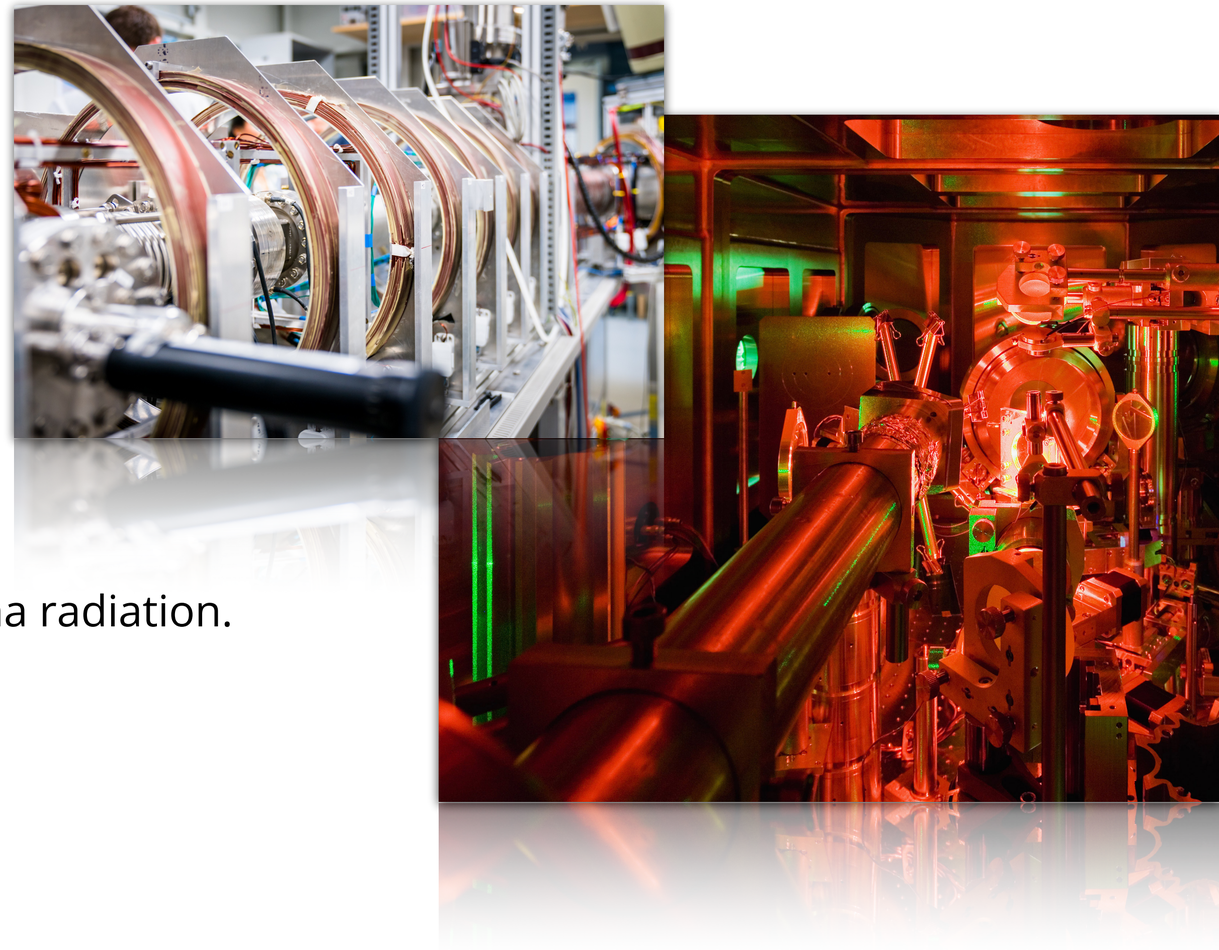

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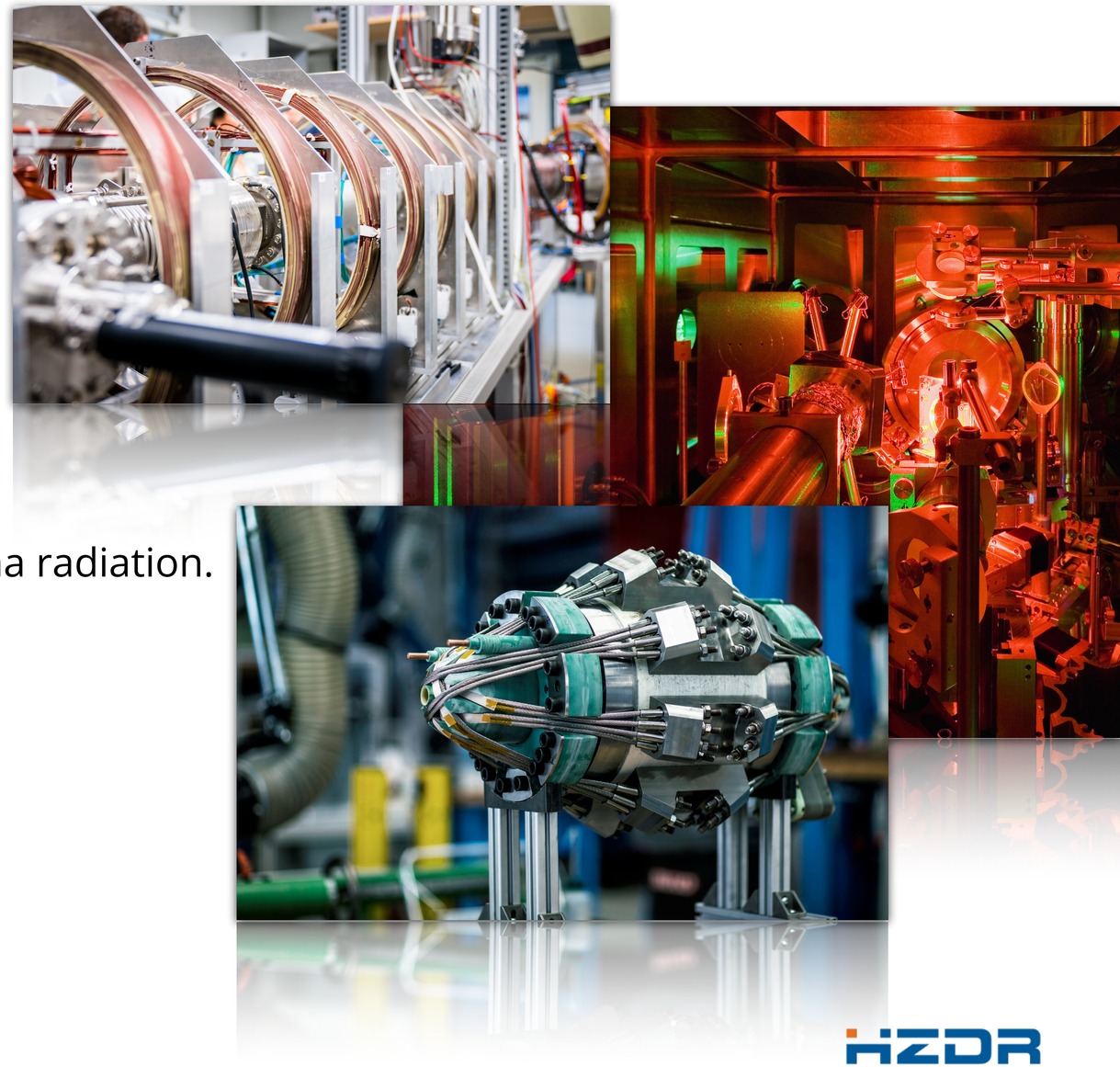

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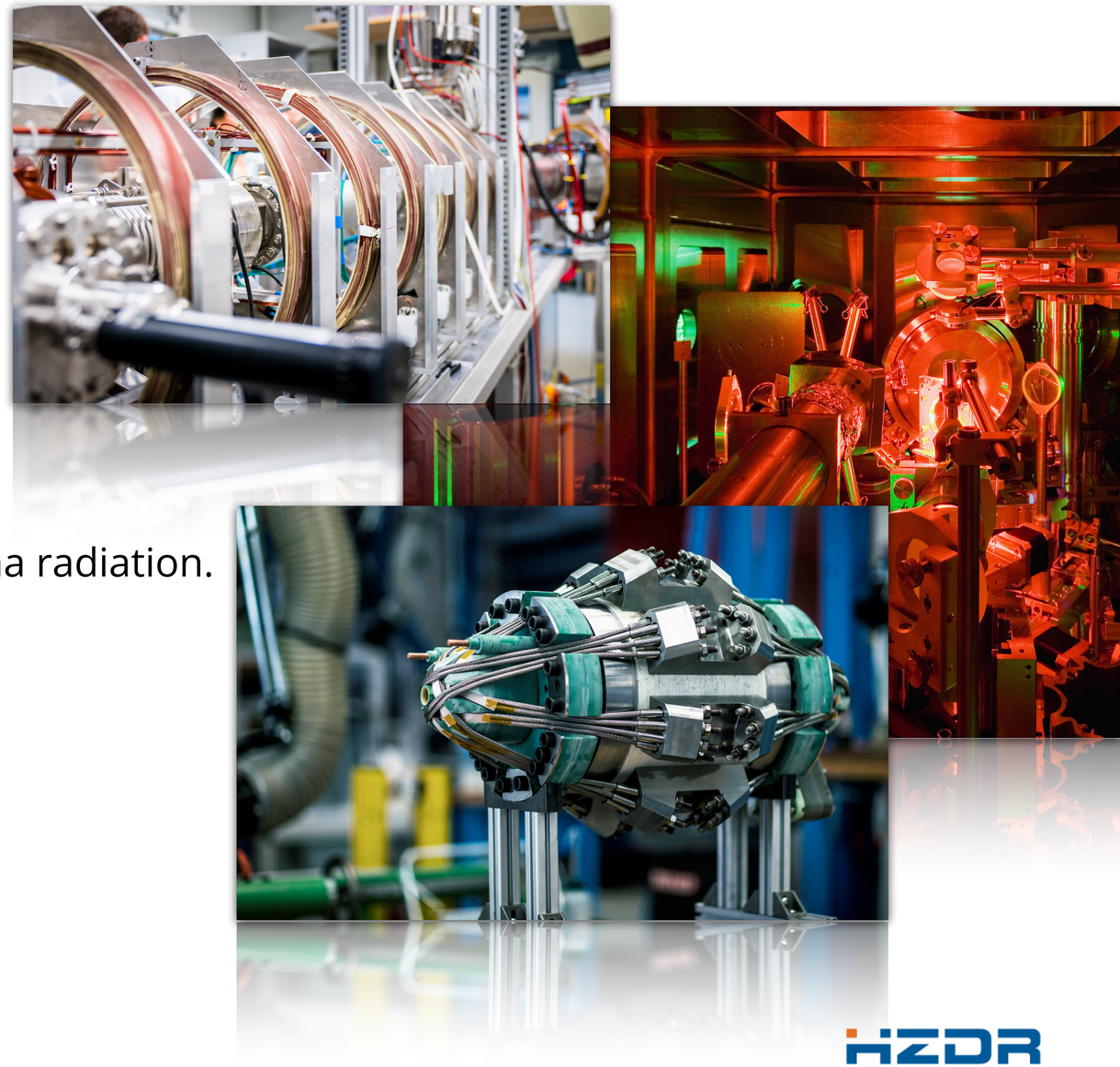

HZDR

Our Challenge: An End-to-End Digital Data Lifecycle

— We support many steps of our different research experiment (matter, energy and health) with tools:
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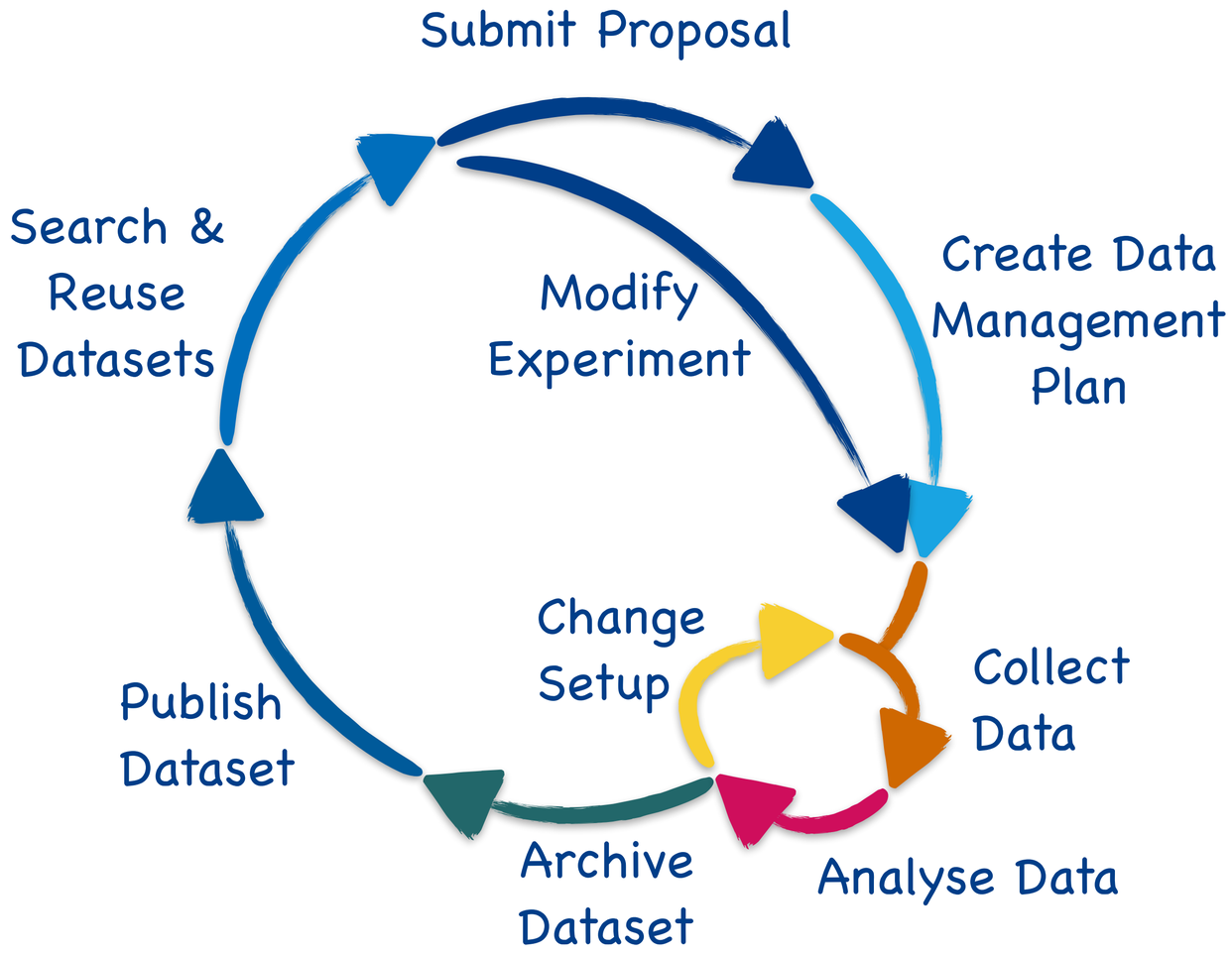

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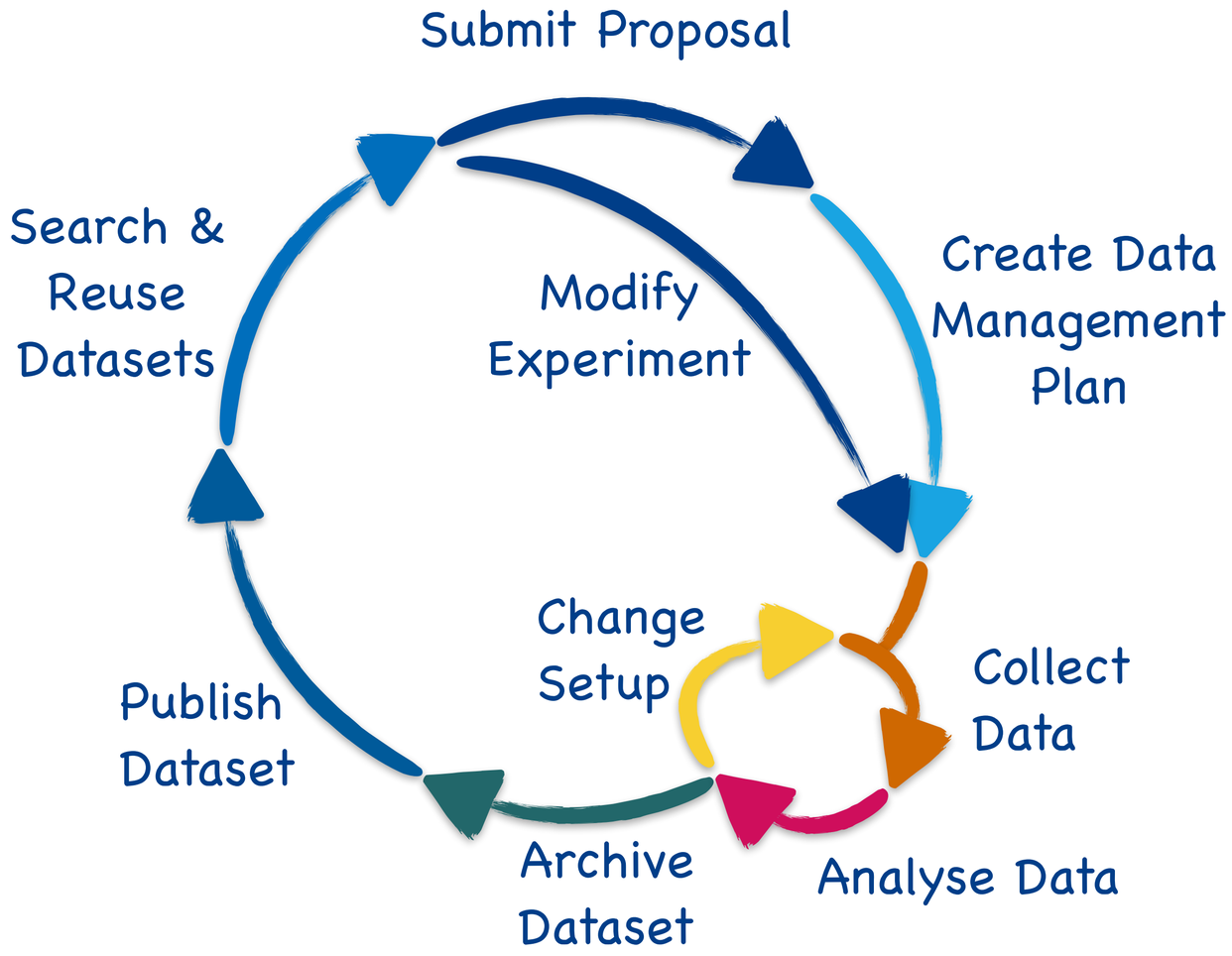

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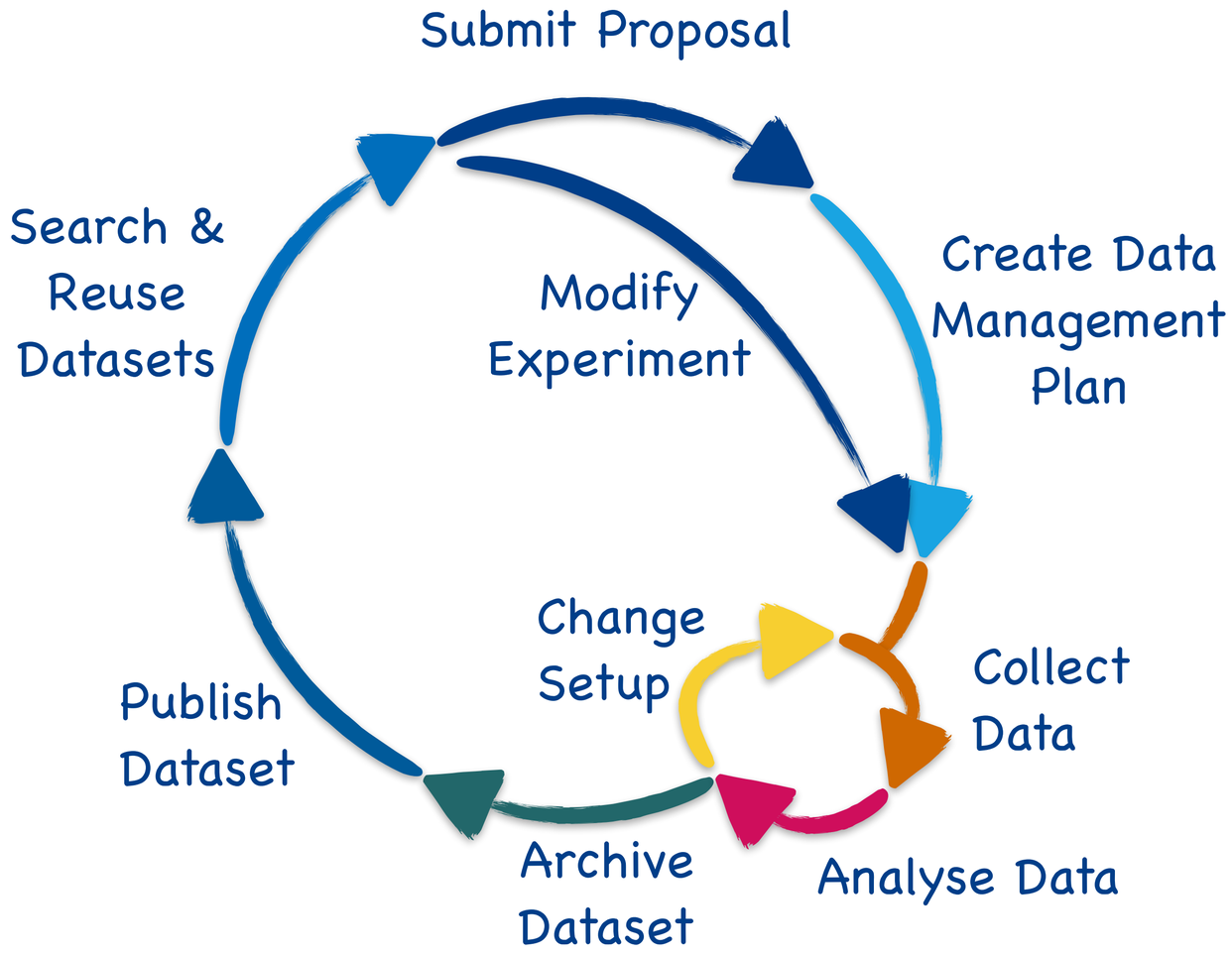

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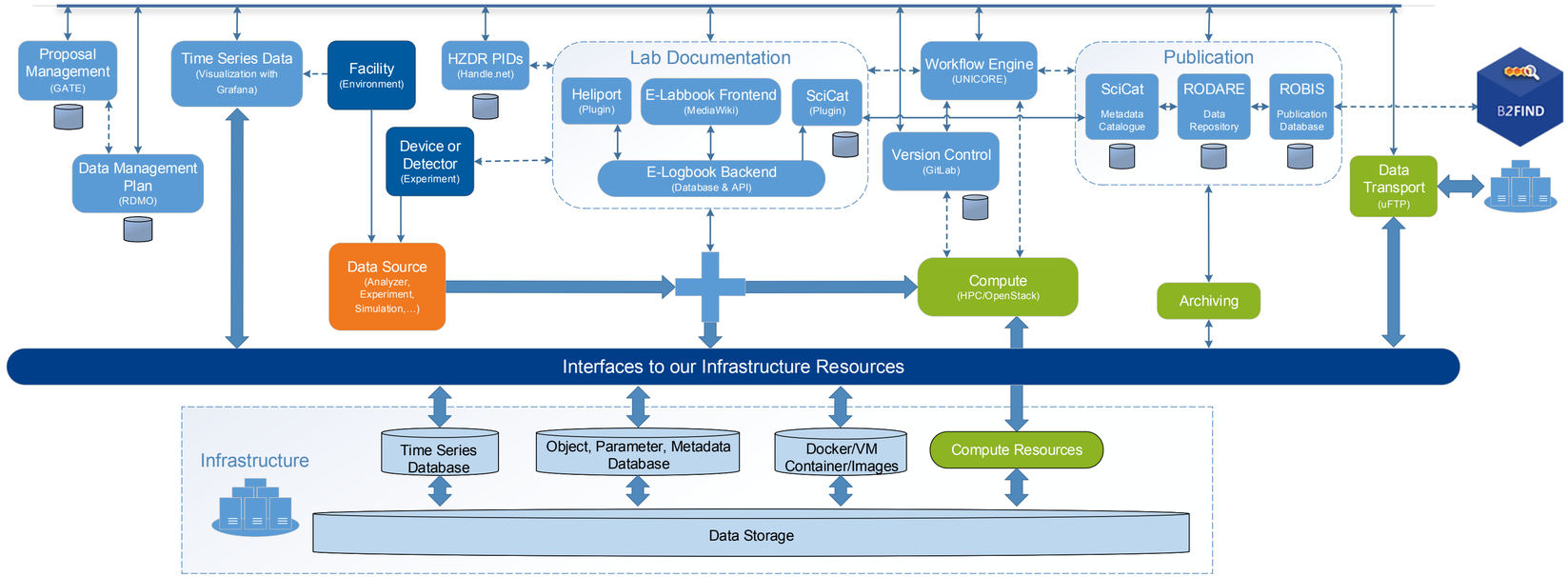

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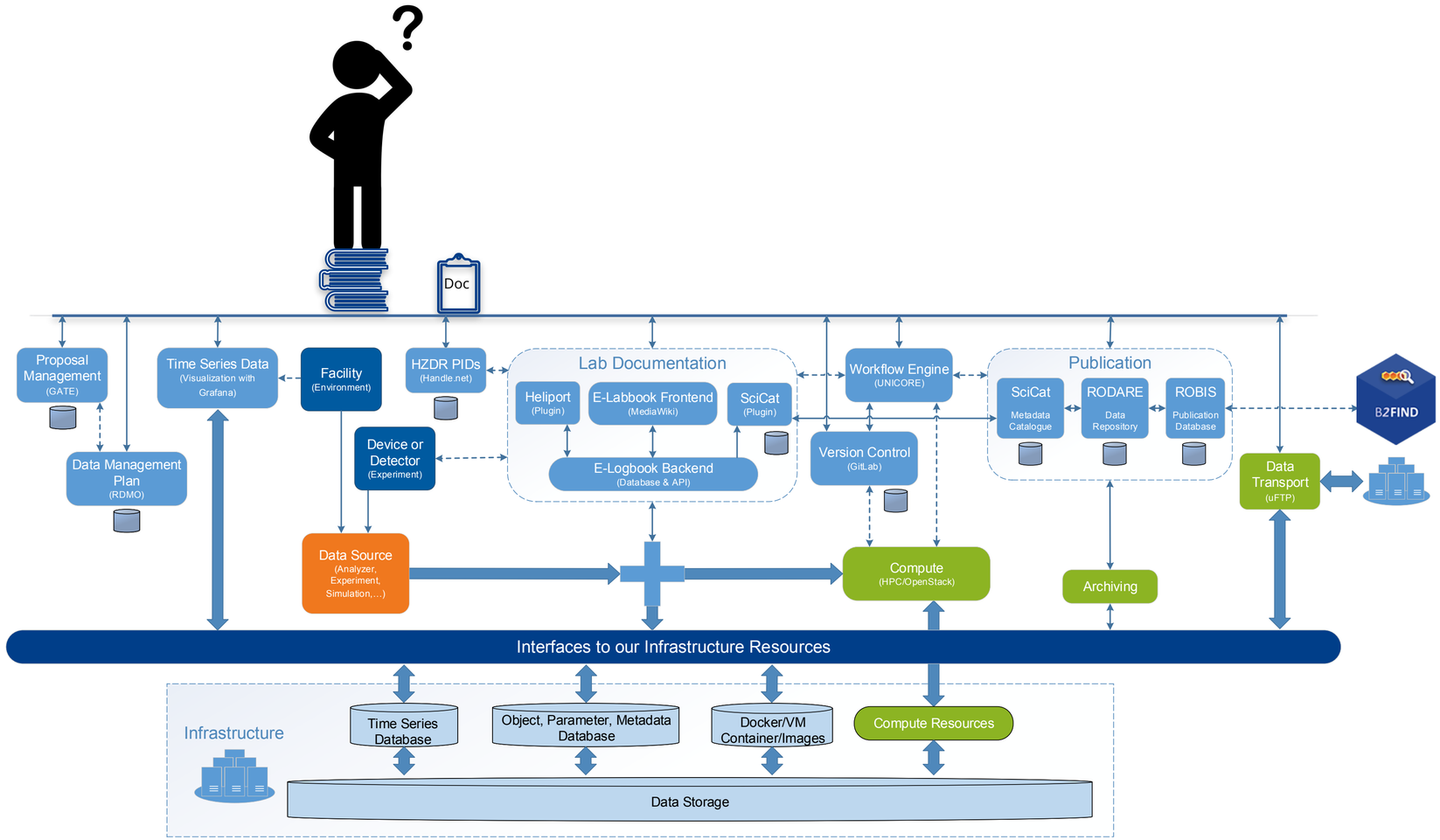

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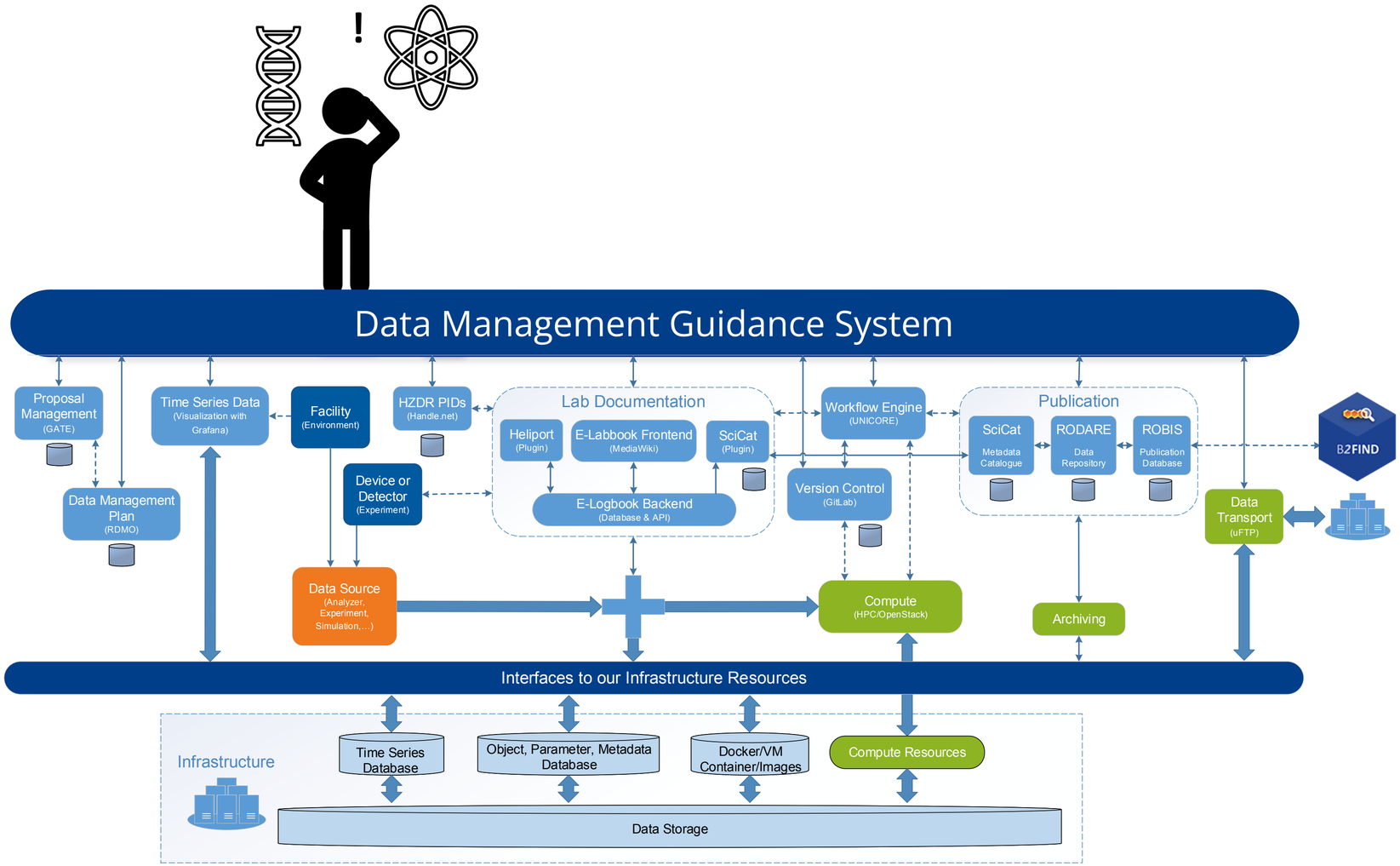

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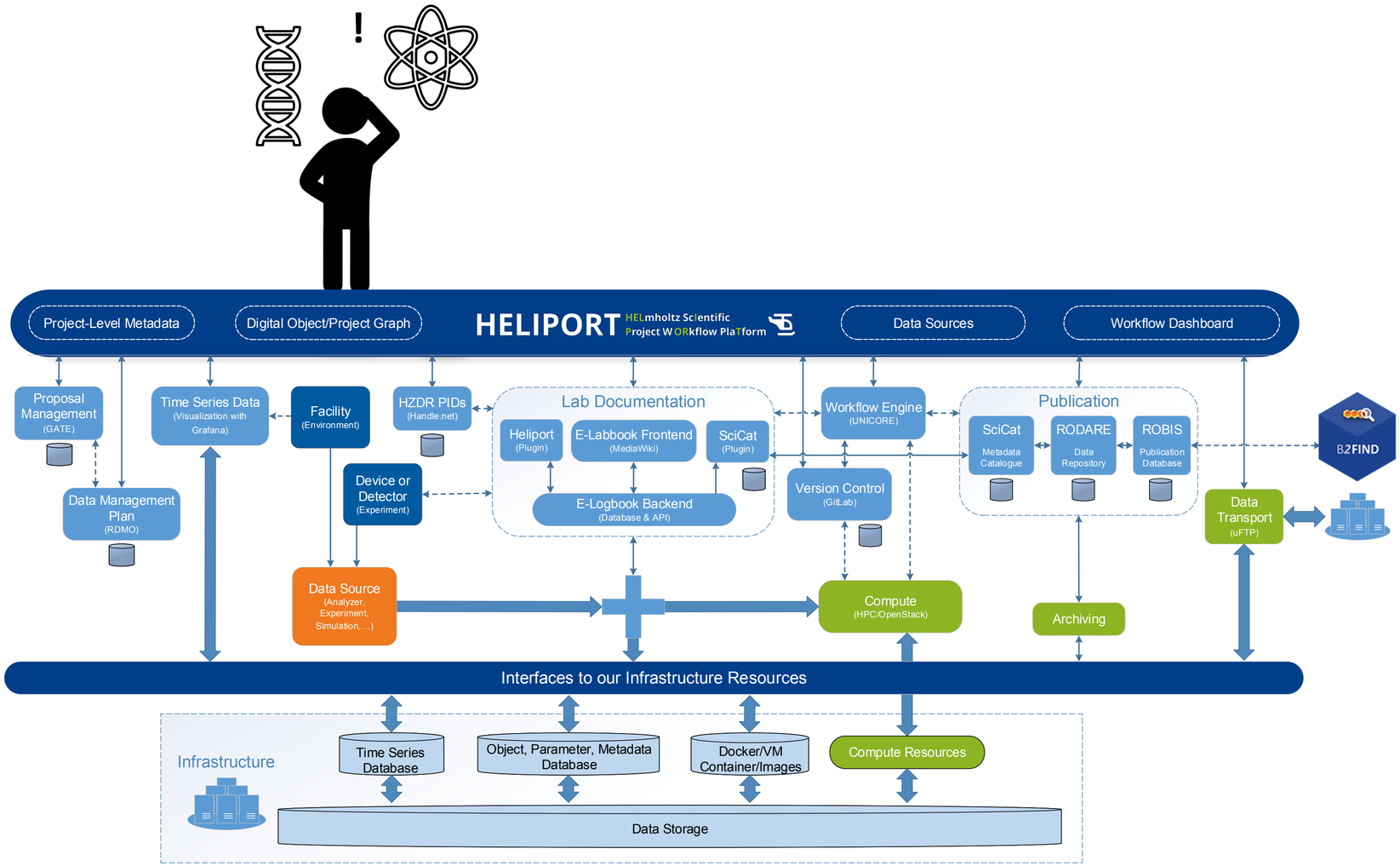

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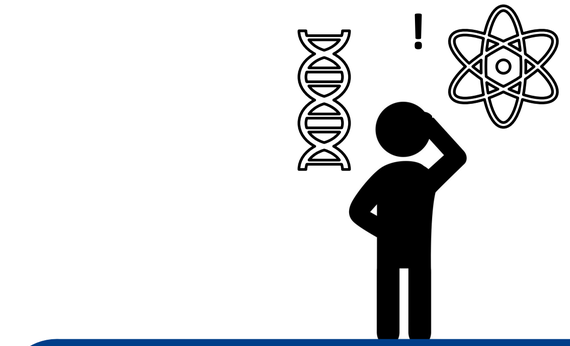
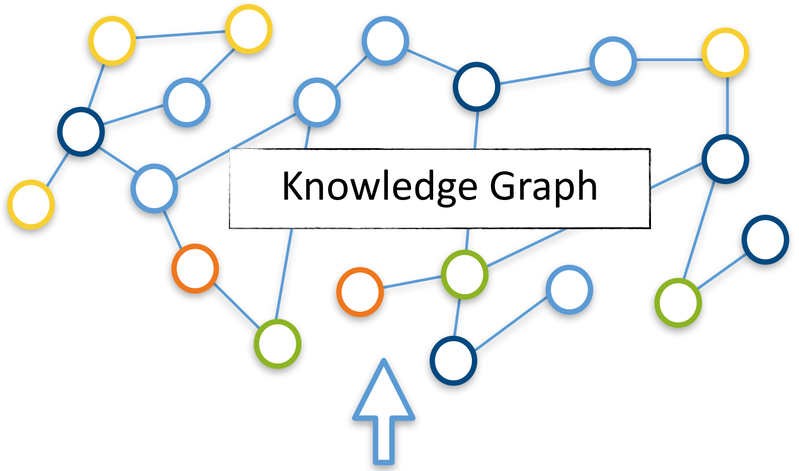
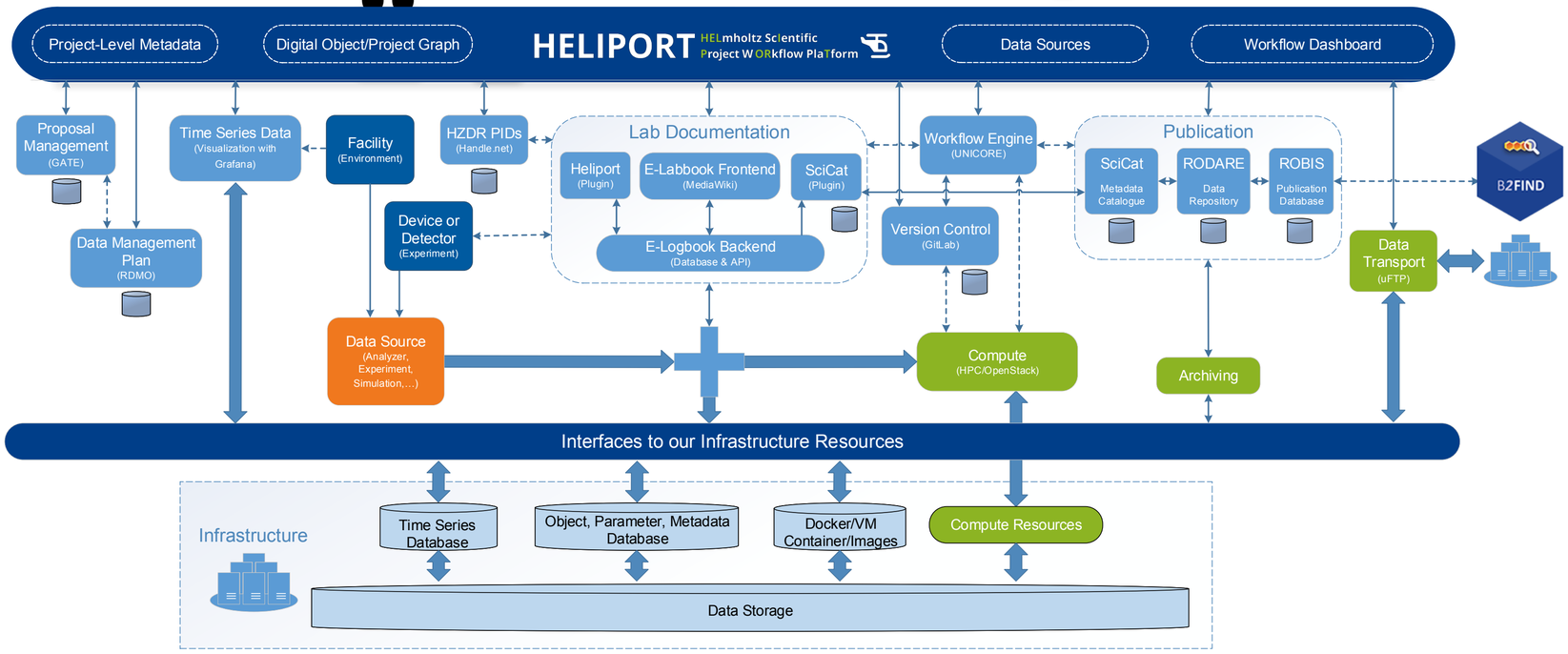
- In next step we can provide an overall knowledge graph!







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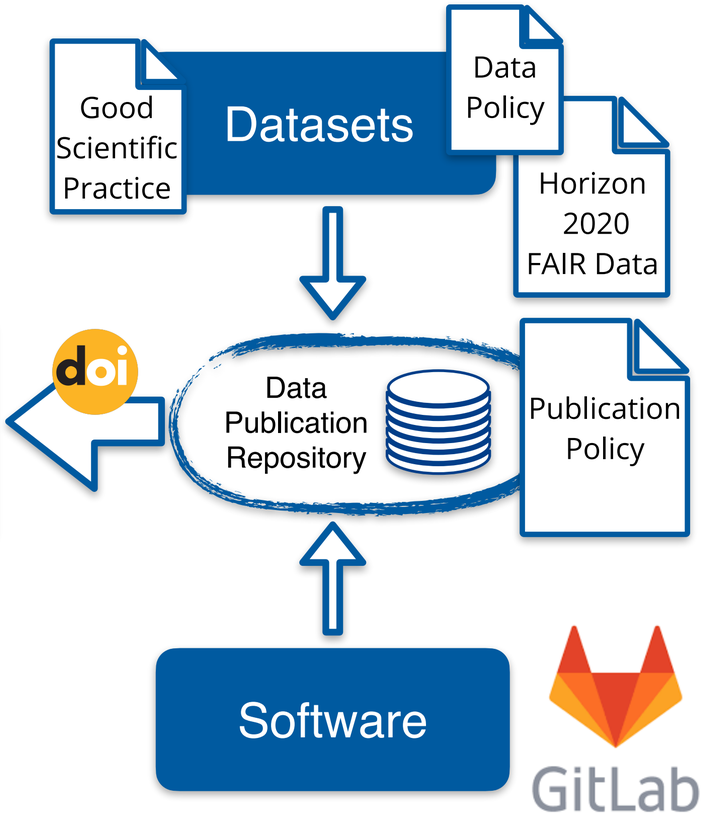

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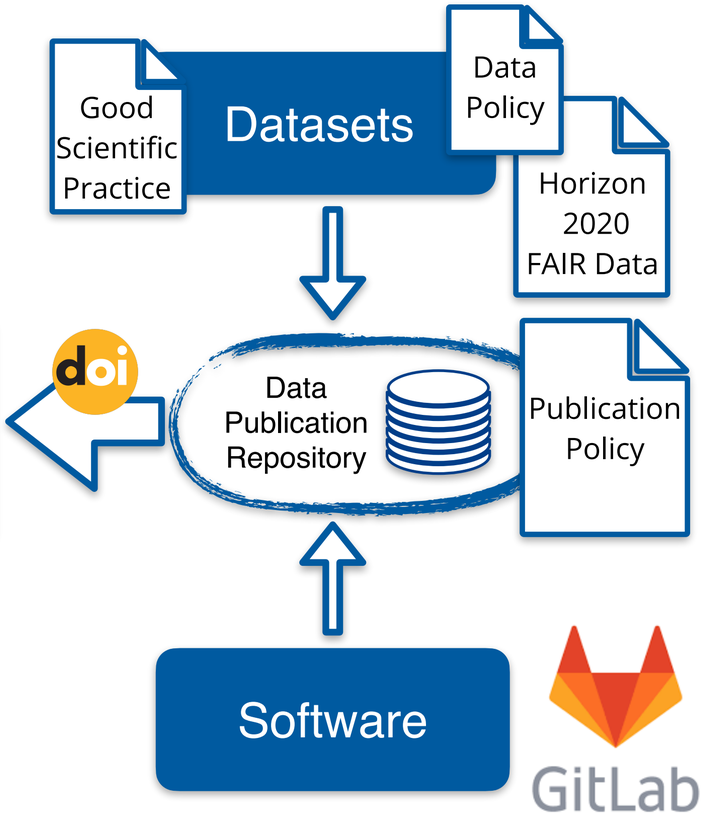

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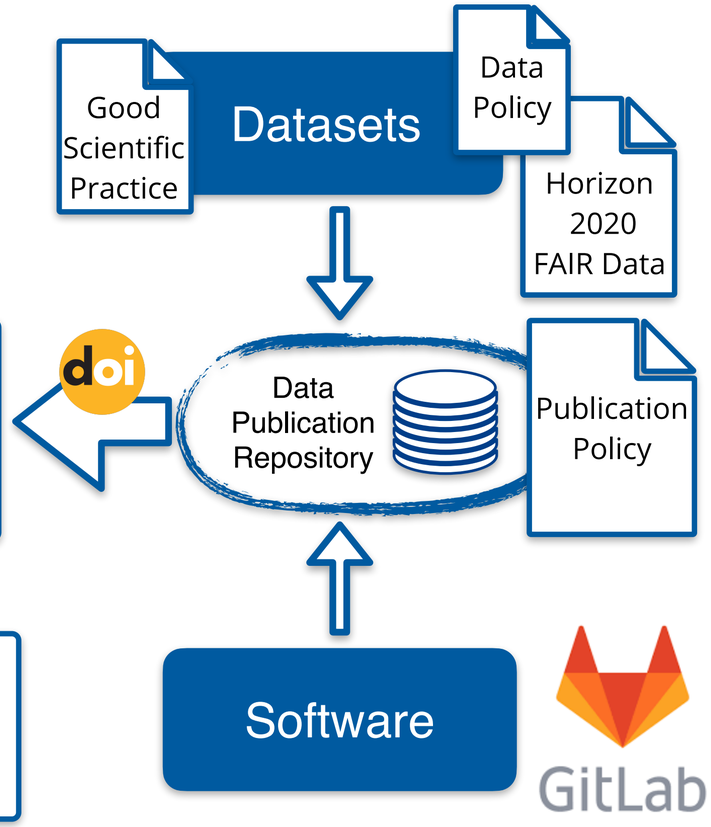

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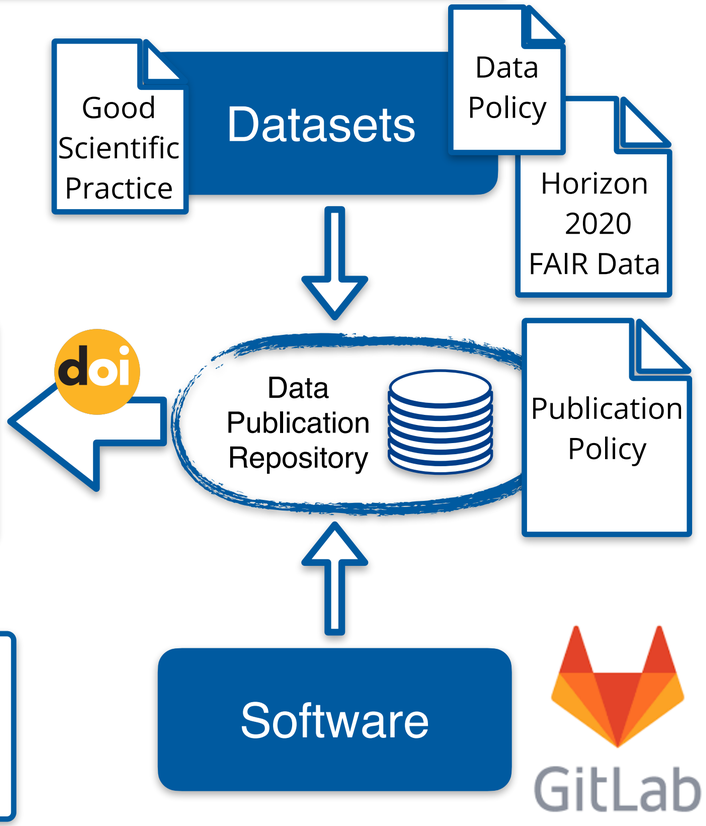

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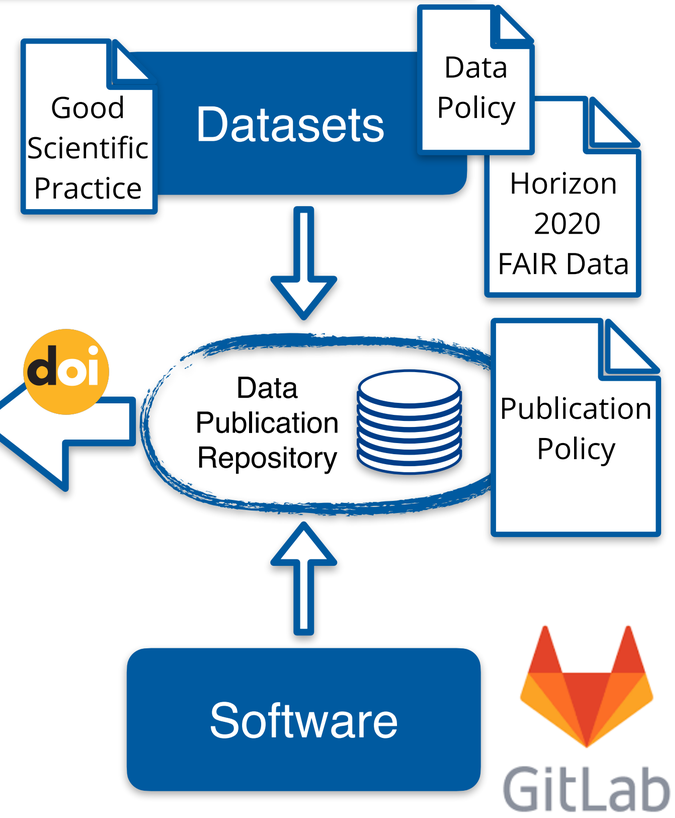
And how we can support them?!



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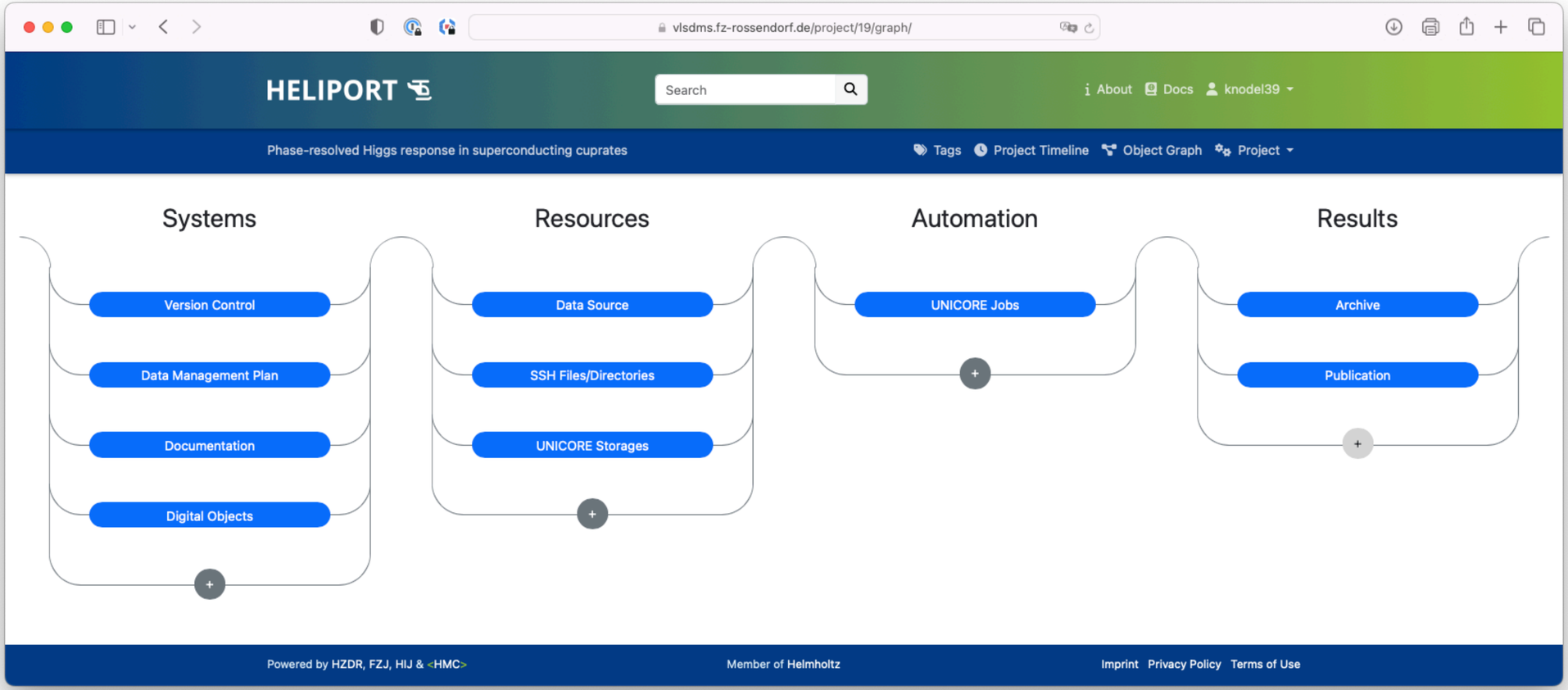

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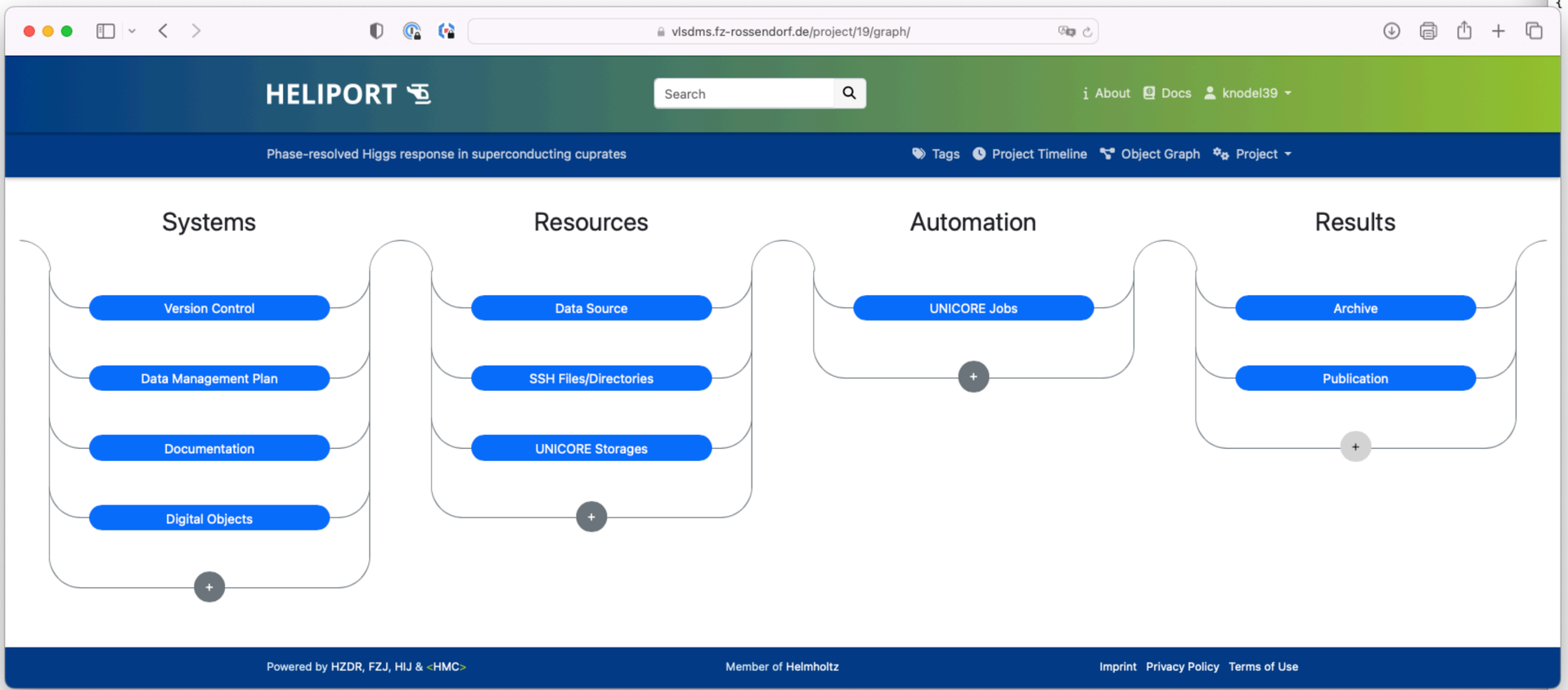

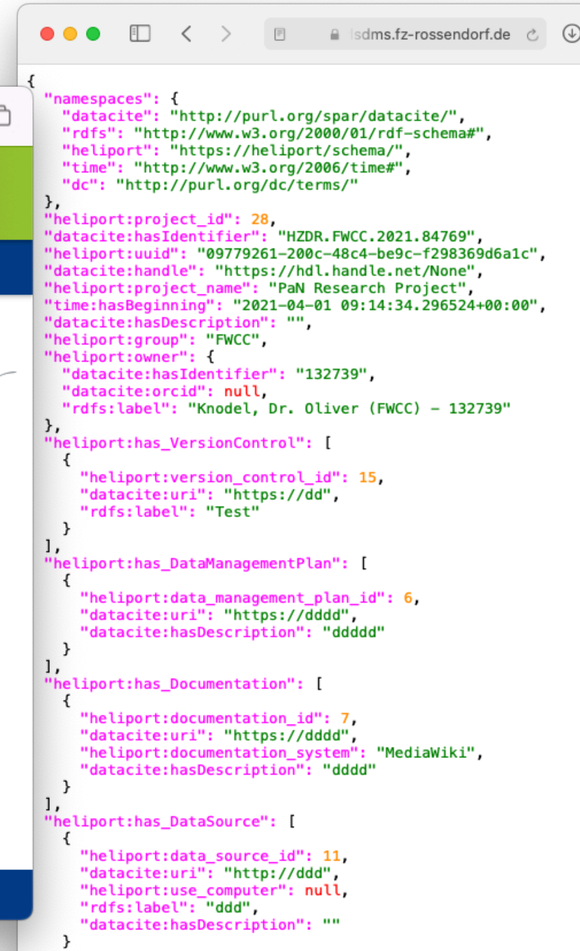

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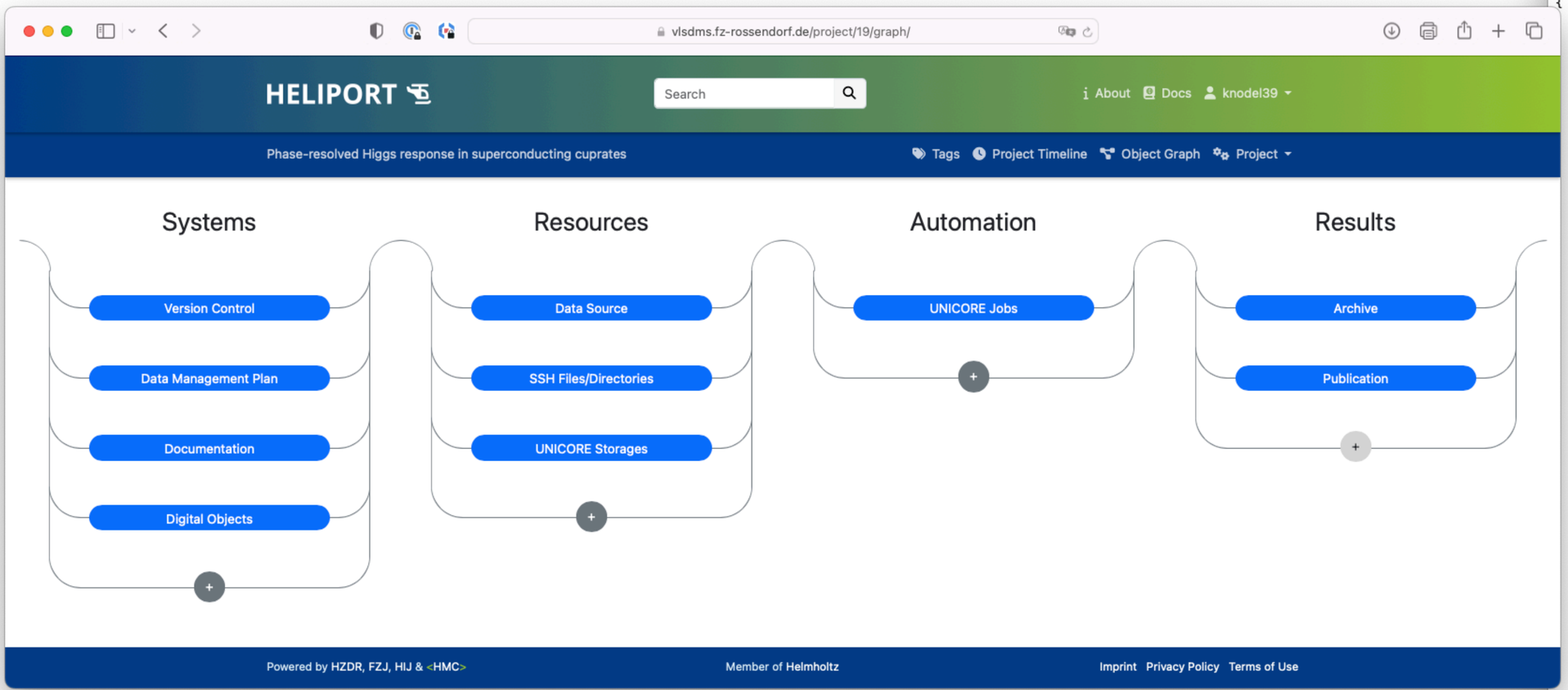

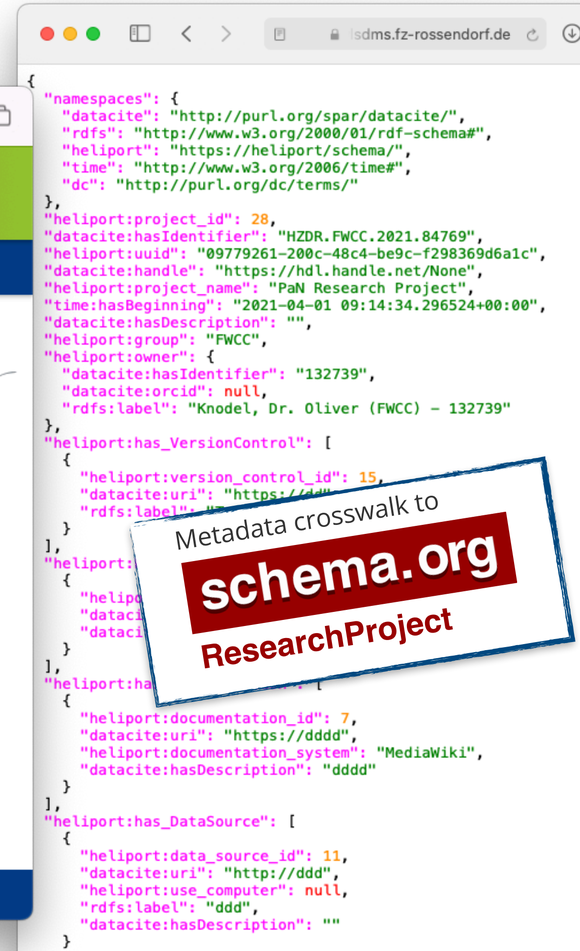

HELIPORT

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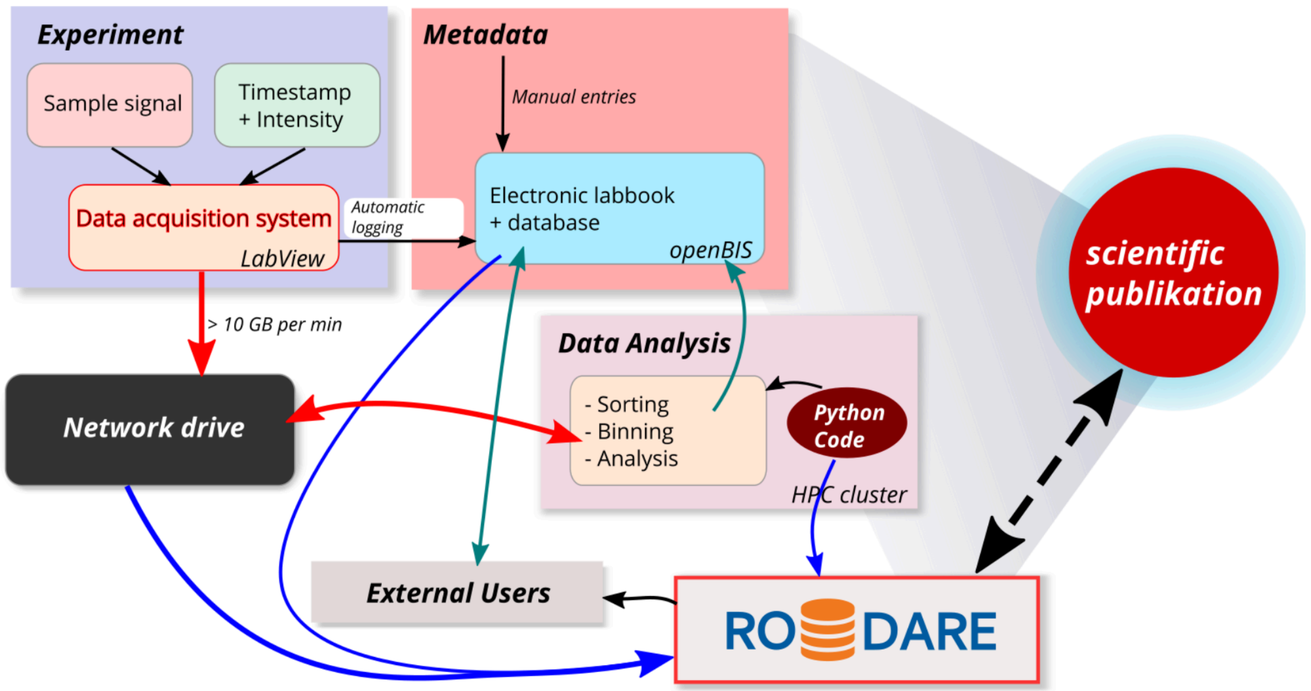
TELBE in HELIPORT

DRESDEN concept

Data Management View of the TELBE Experiment

— Terahertz facility at the ELBE center for High-Power Radiation Sources.



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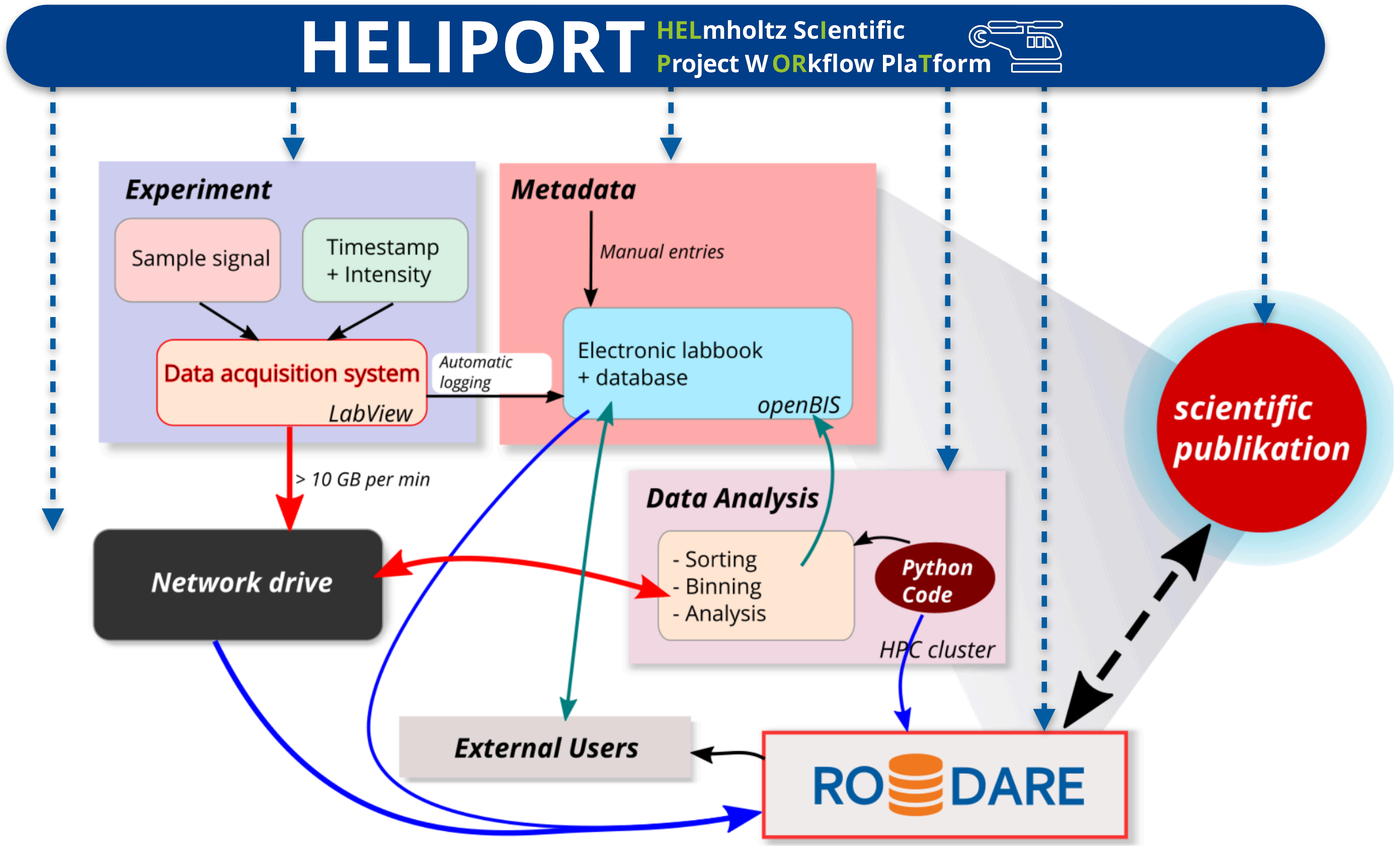

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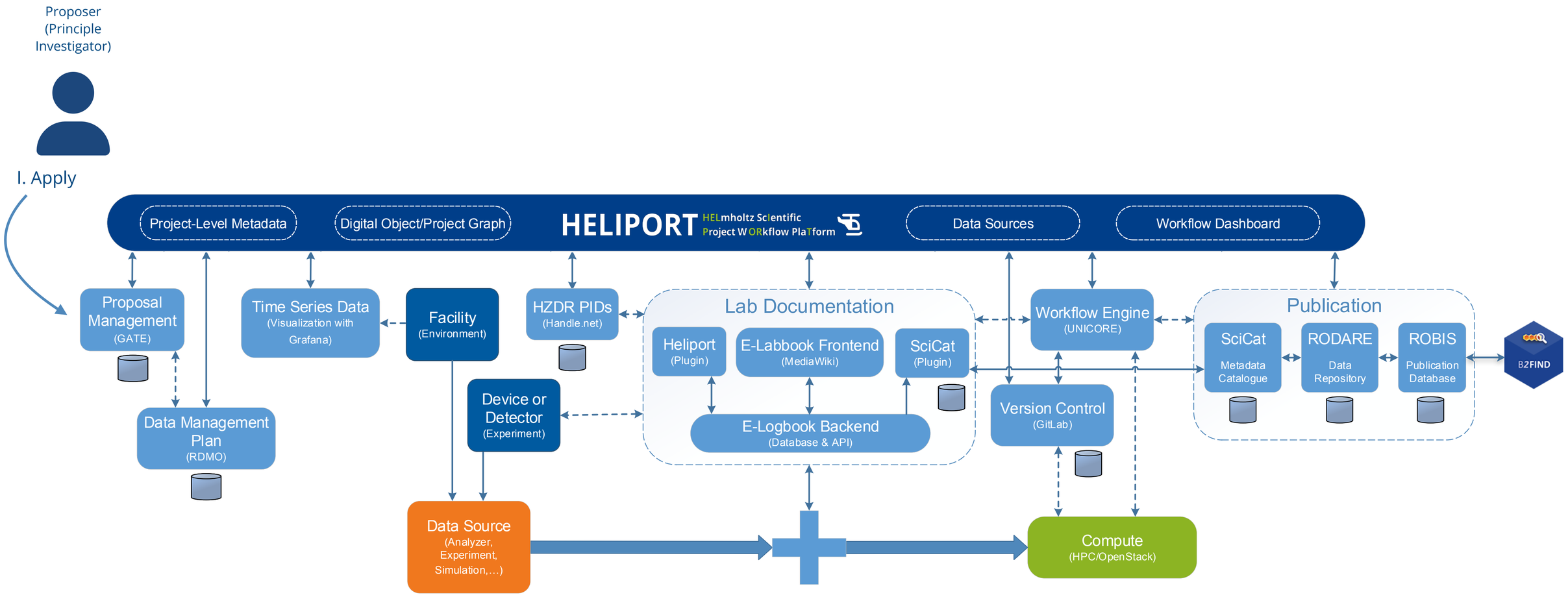

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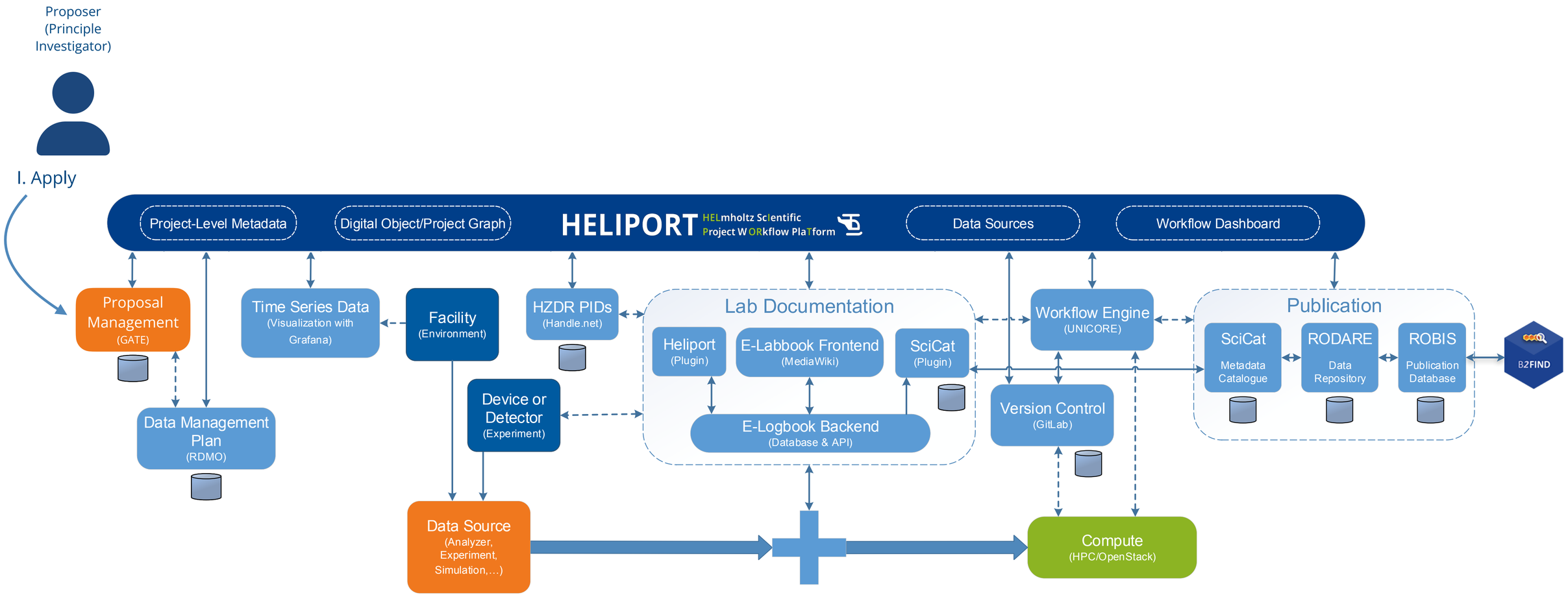

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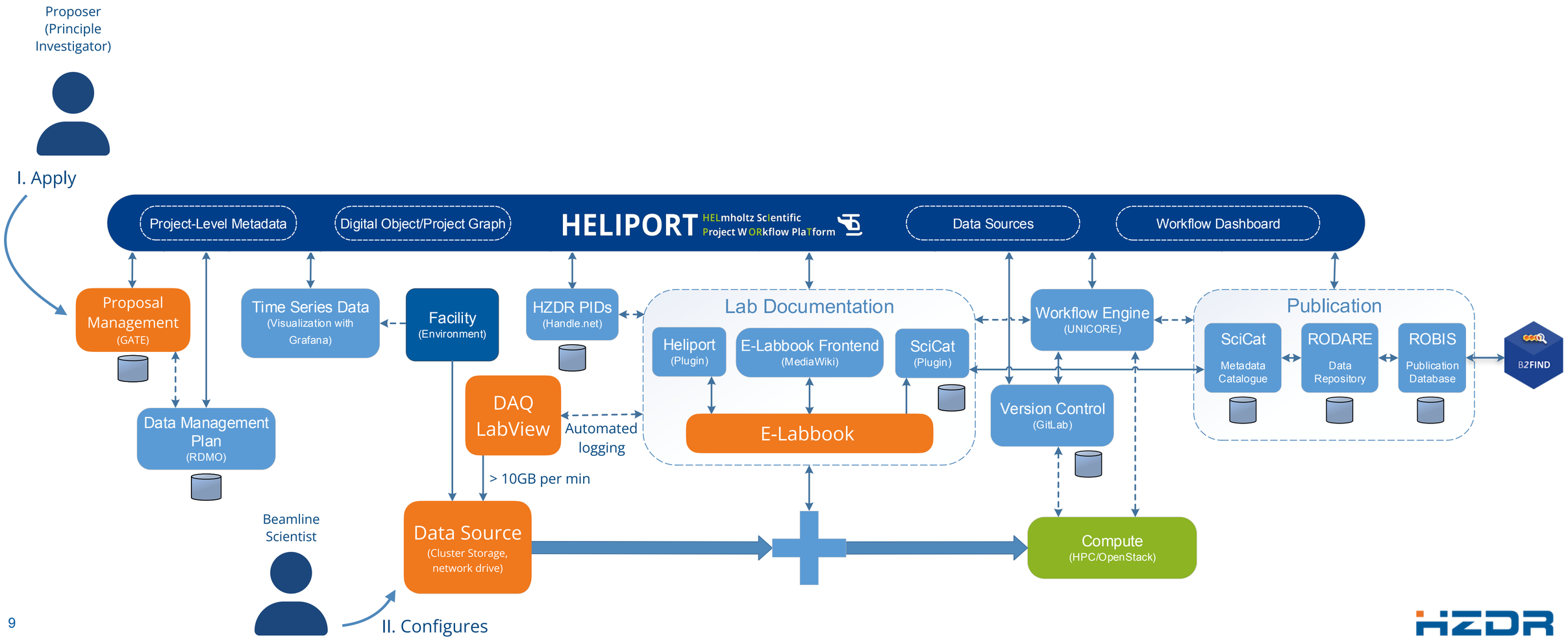

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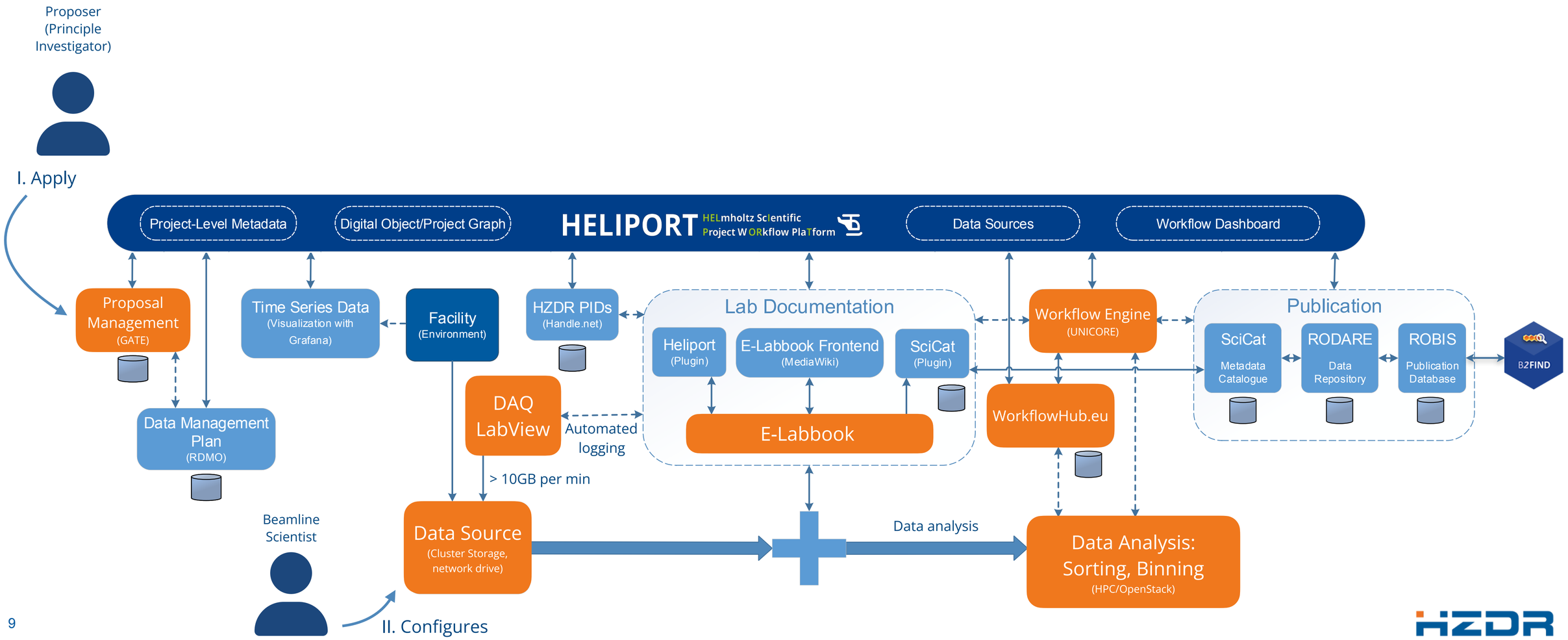

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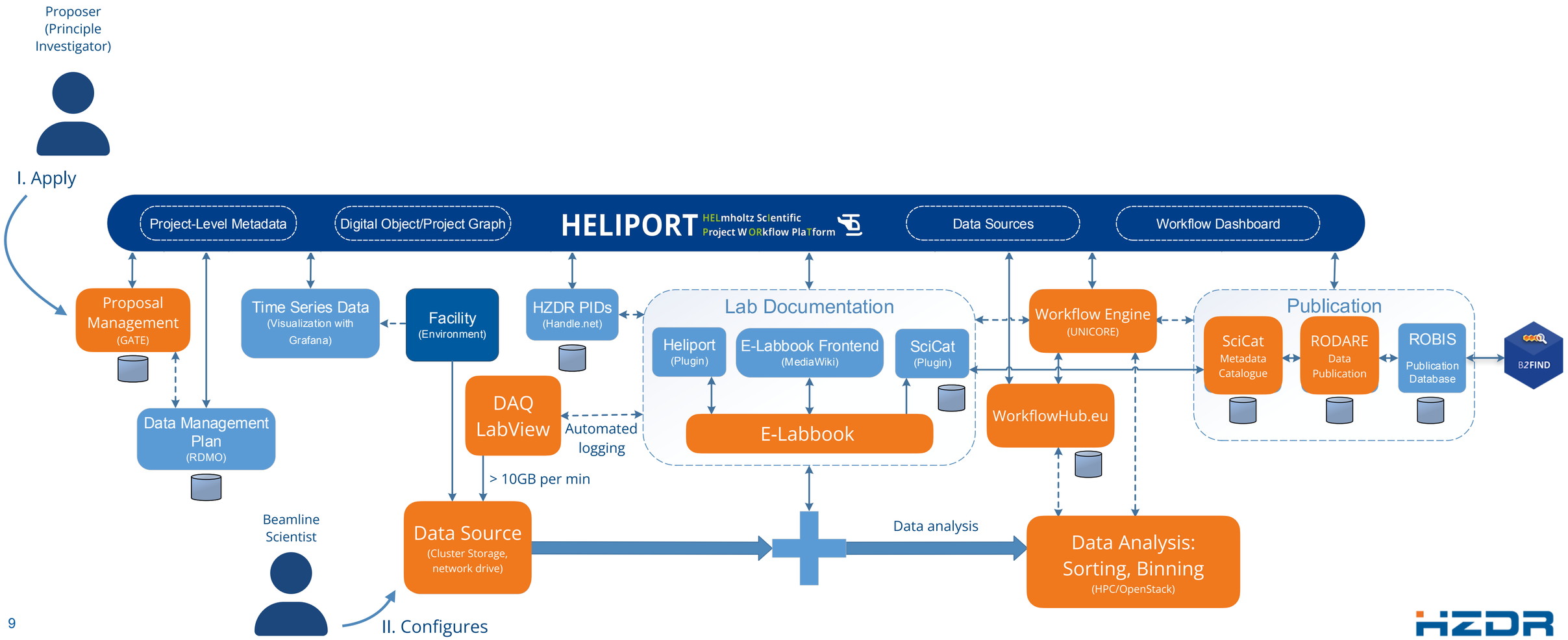

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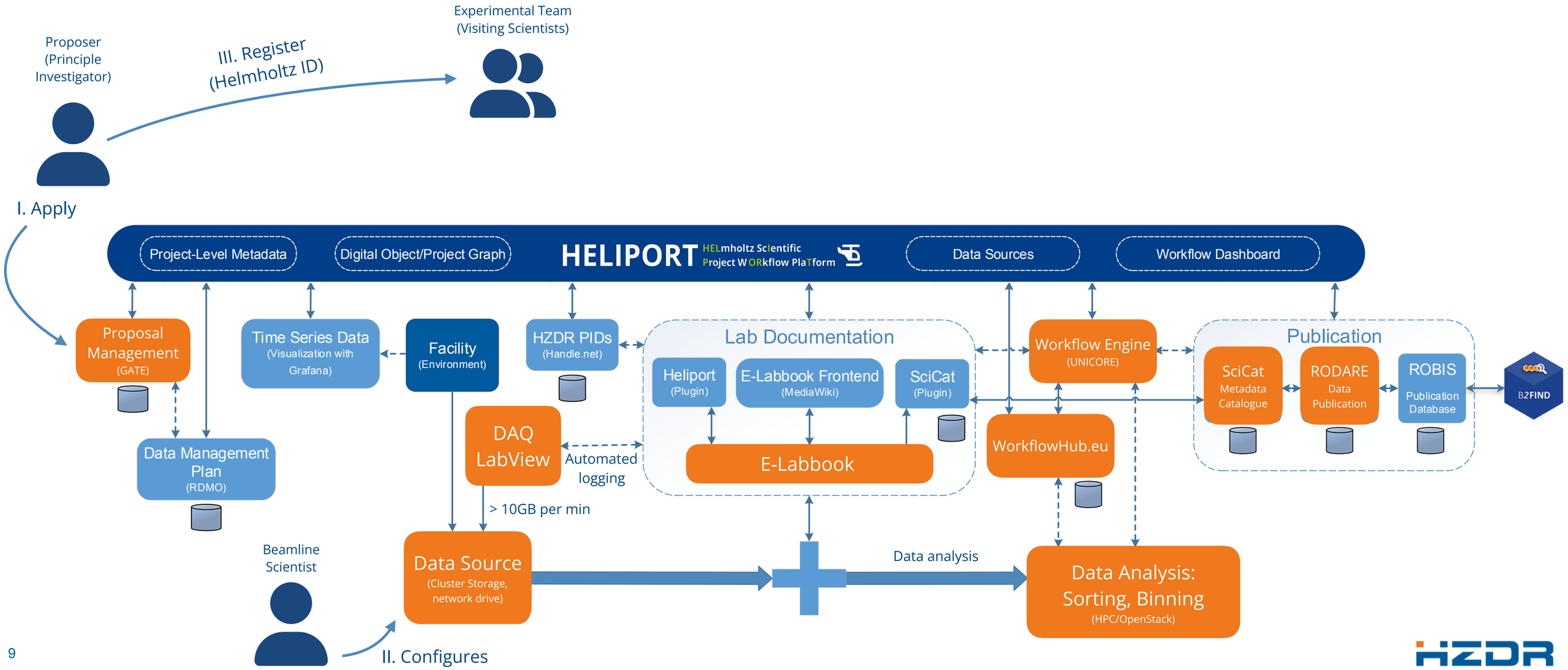

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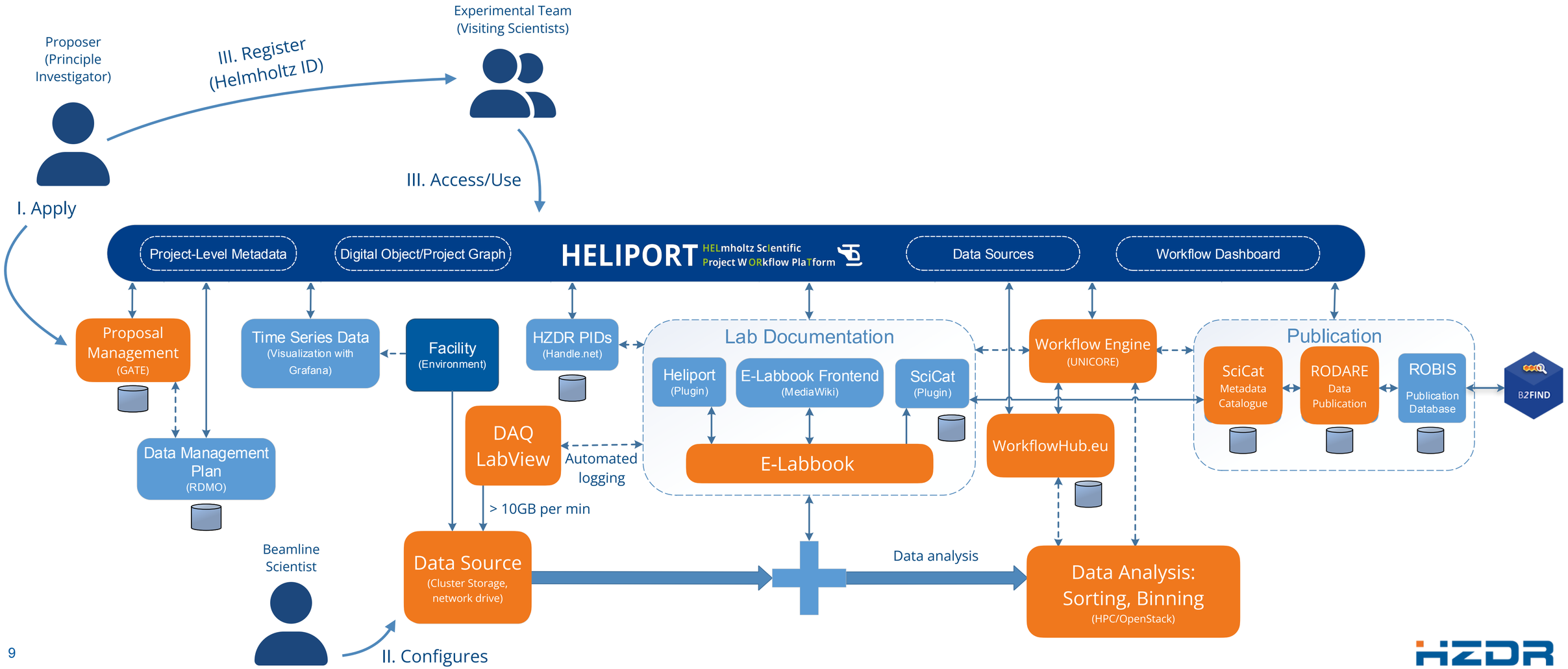

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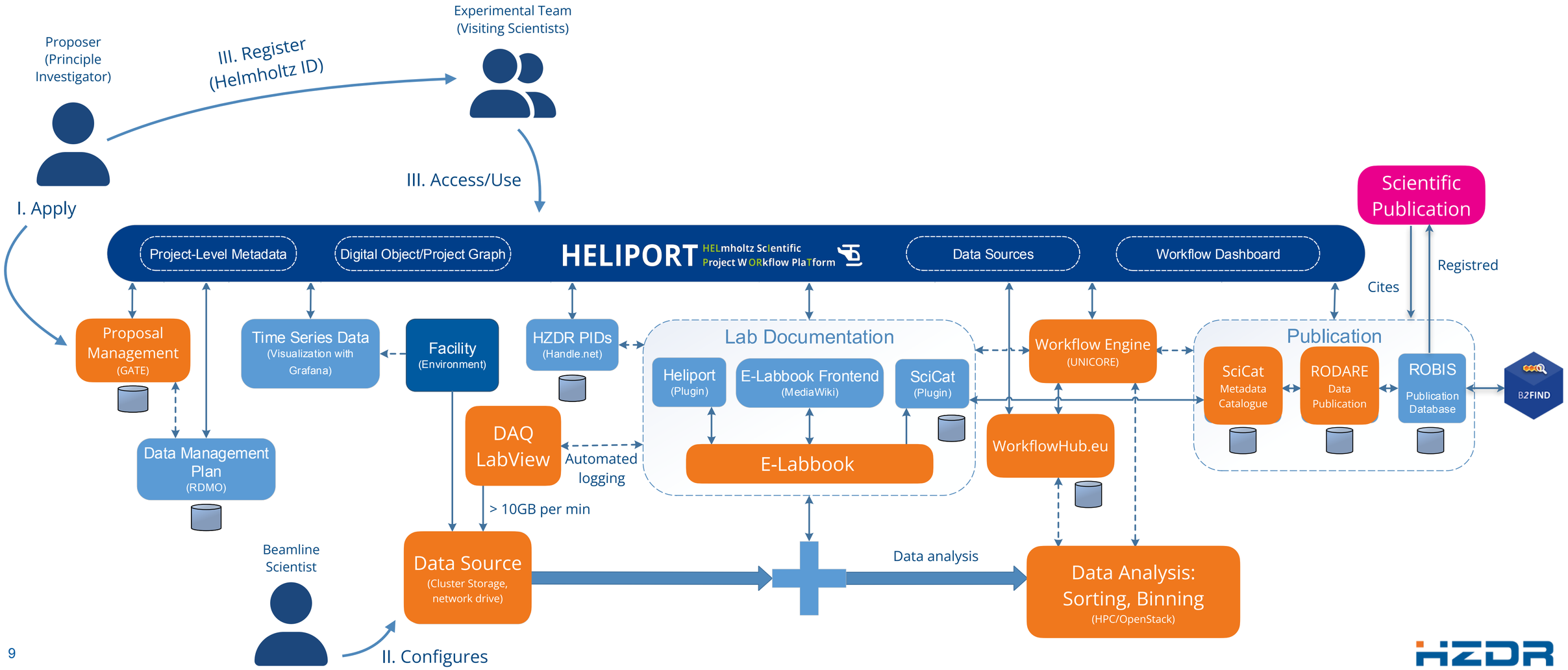

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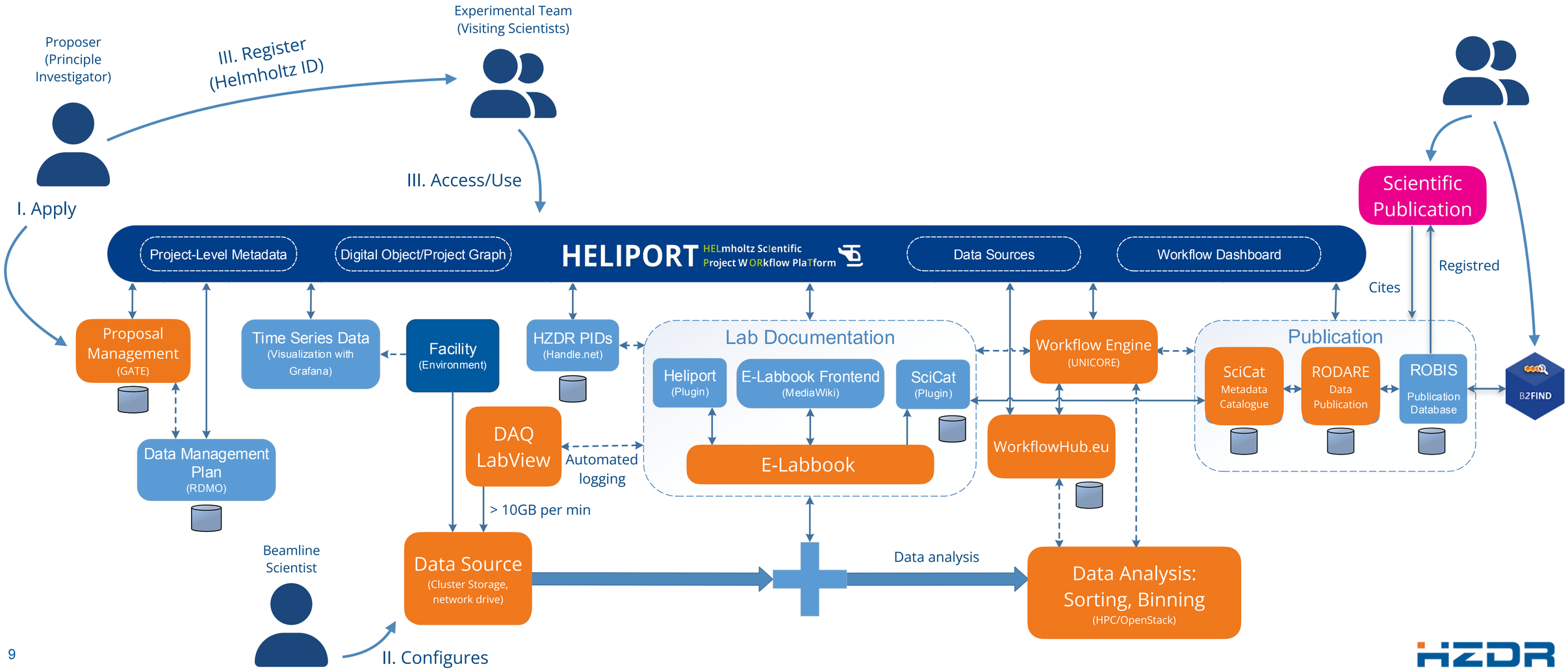

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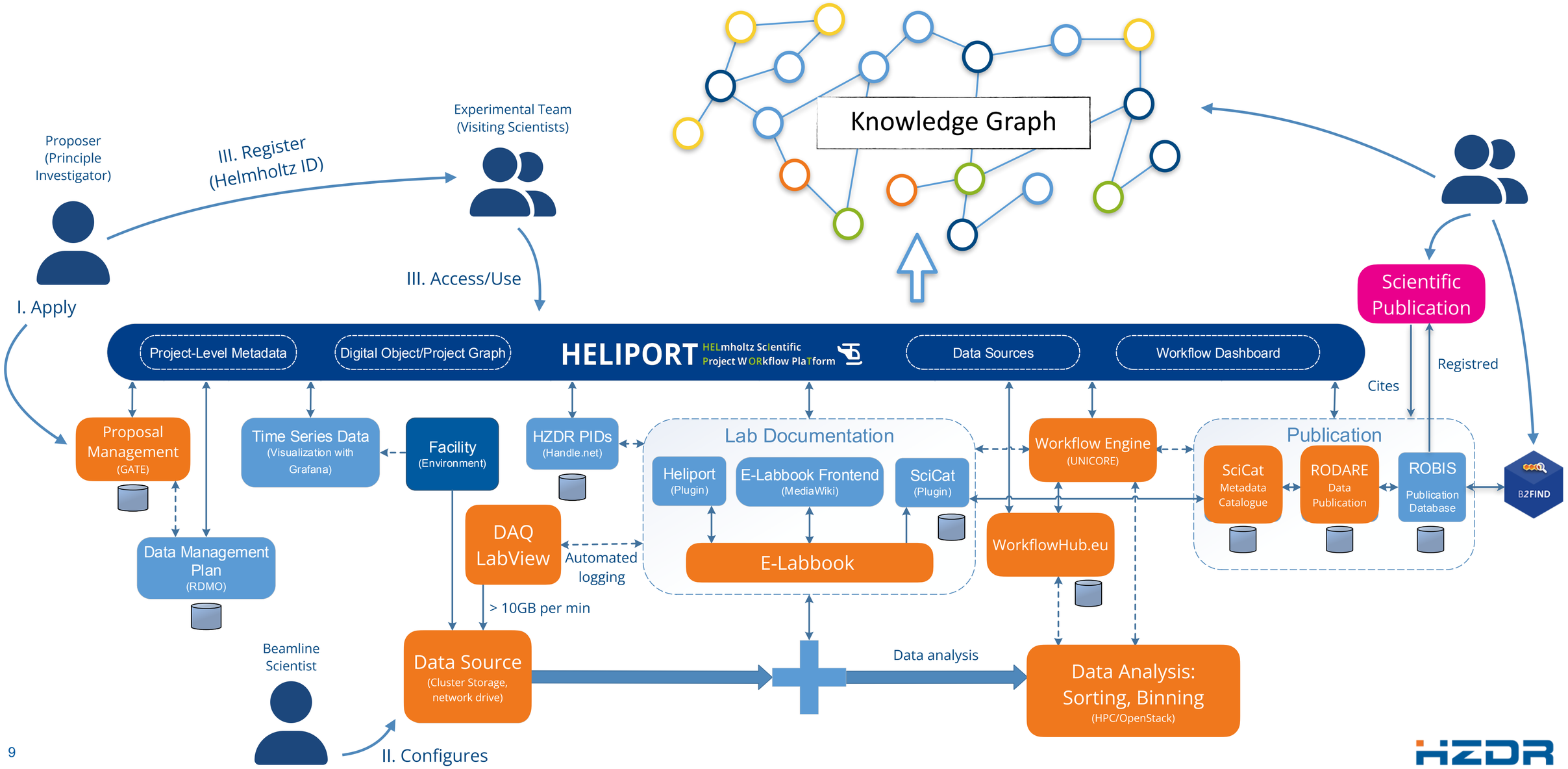
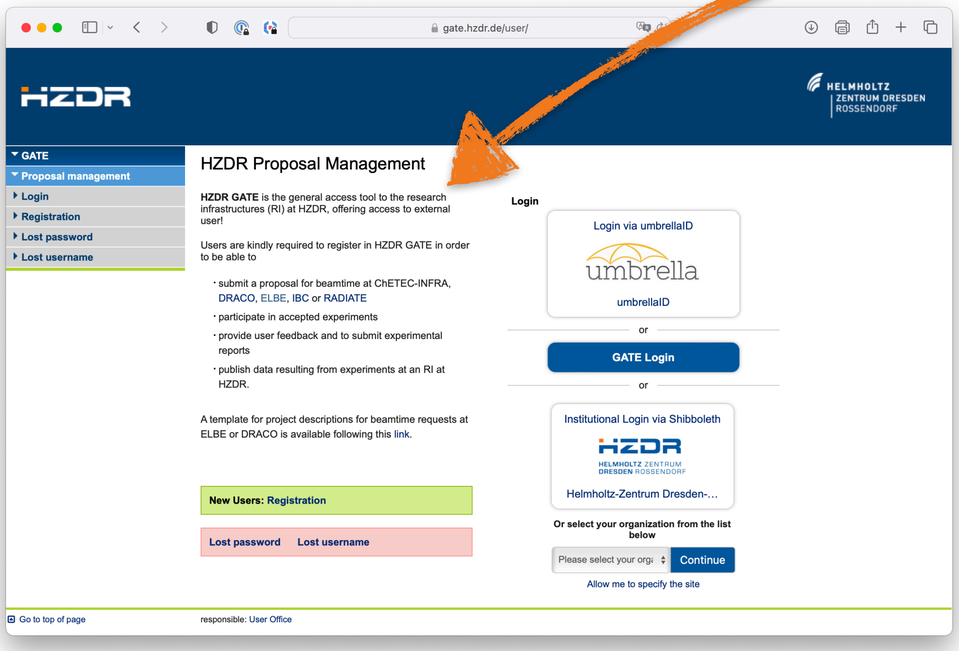
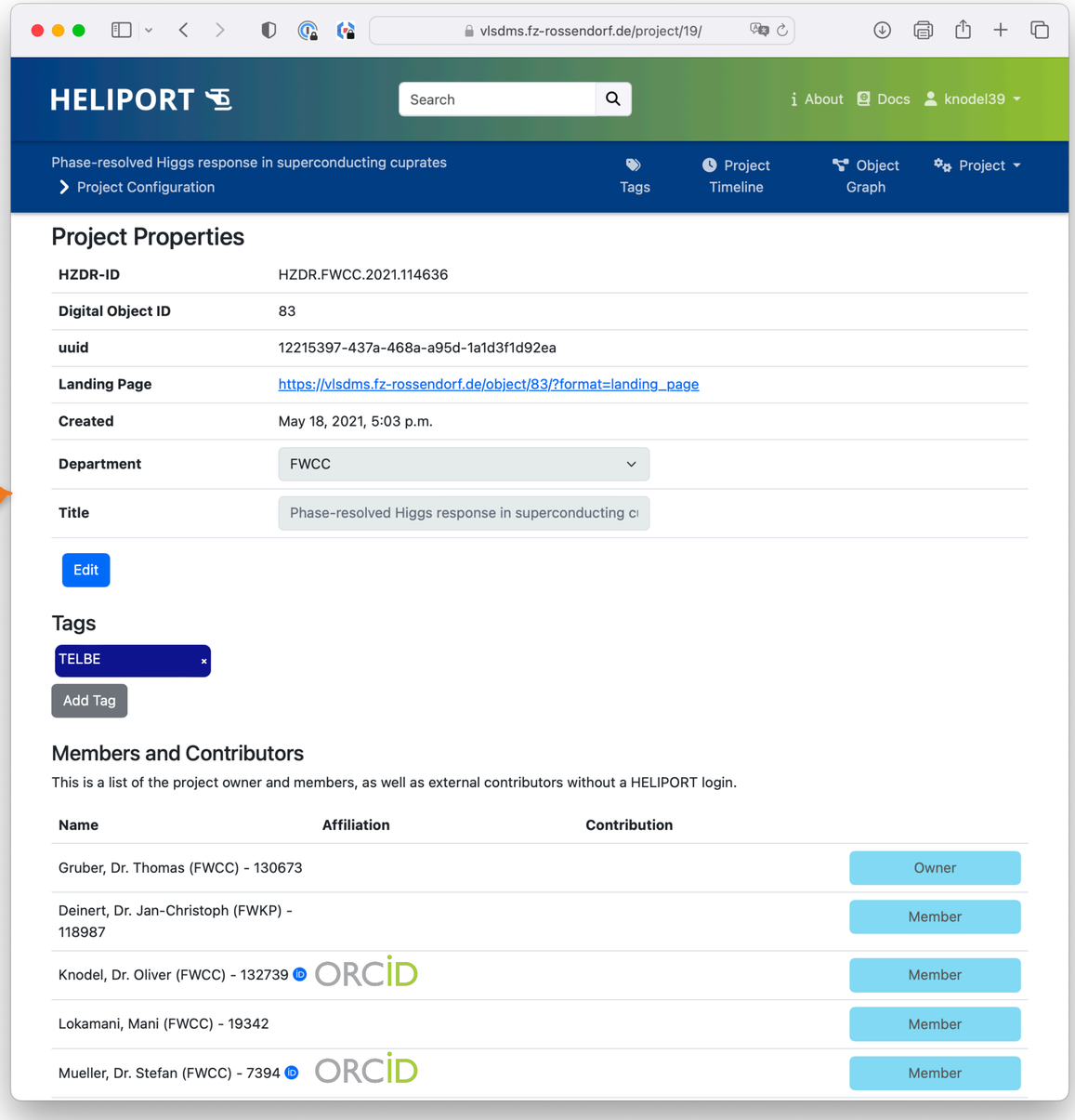


I. Proposal Submission

Automated transfer of project metadata from the proposal system (GATE) into HELIPORT:

- Title, Authors, Description,
- Beamtime schedule,
- Large-scale facility used,
- Scientific method (PaNET)

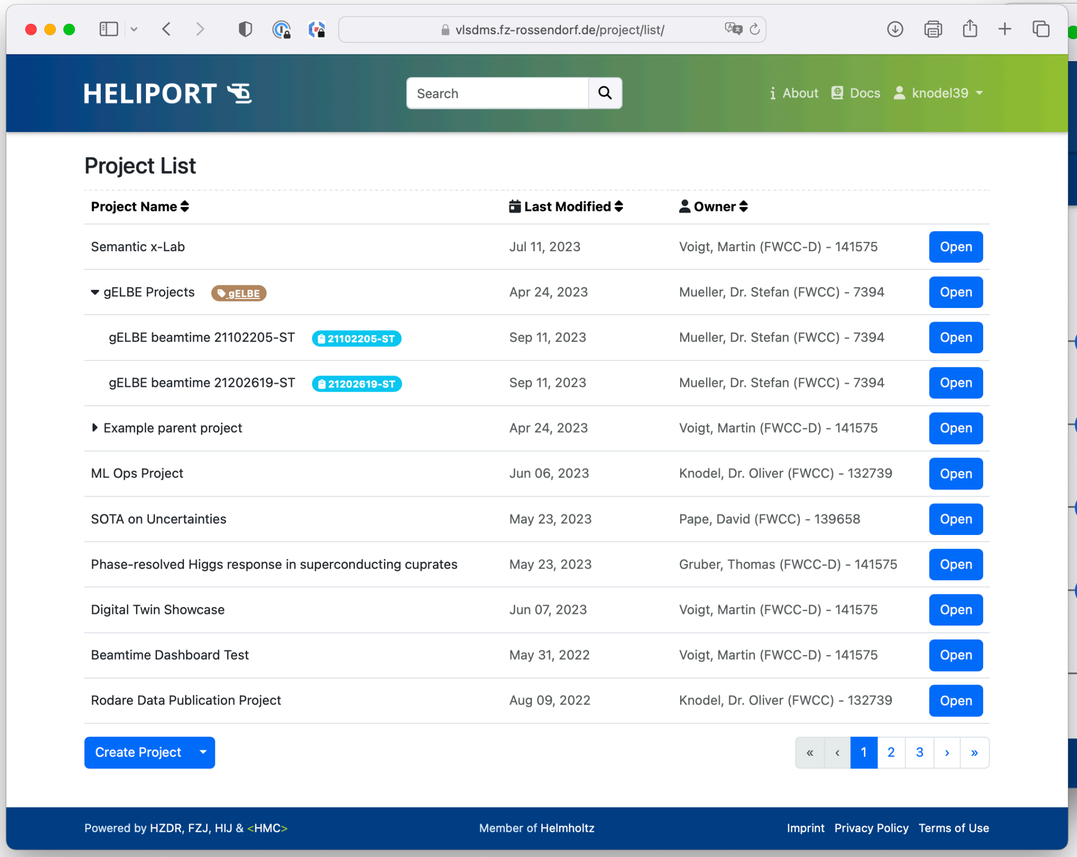


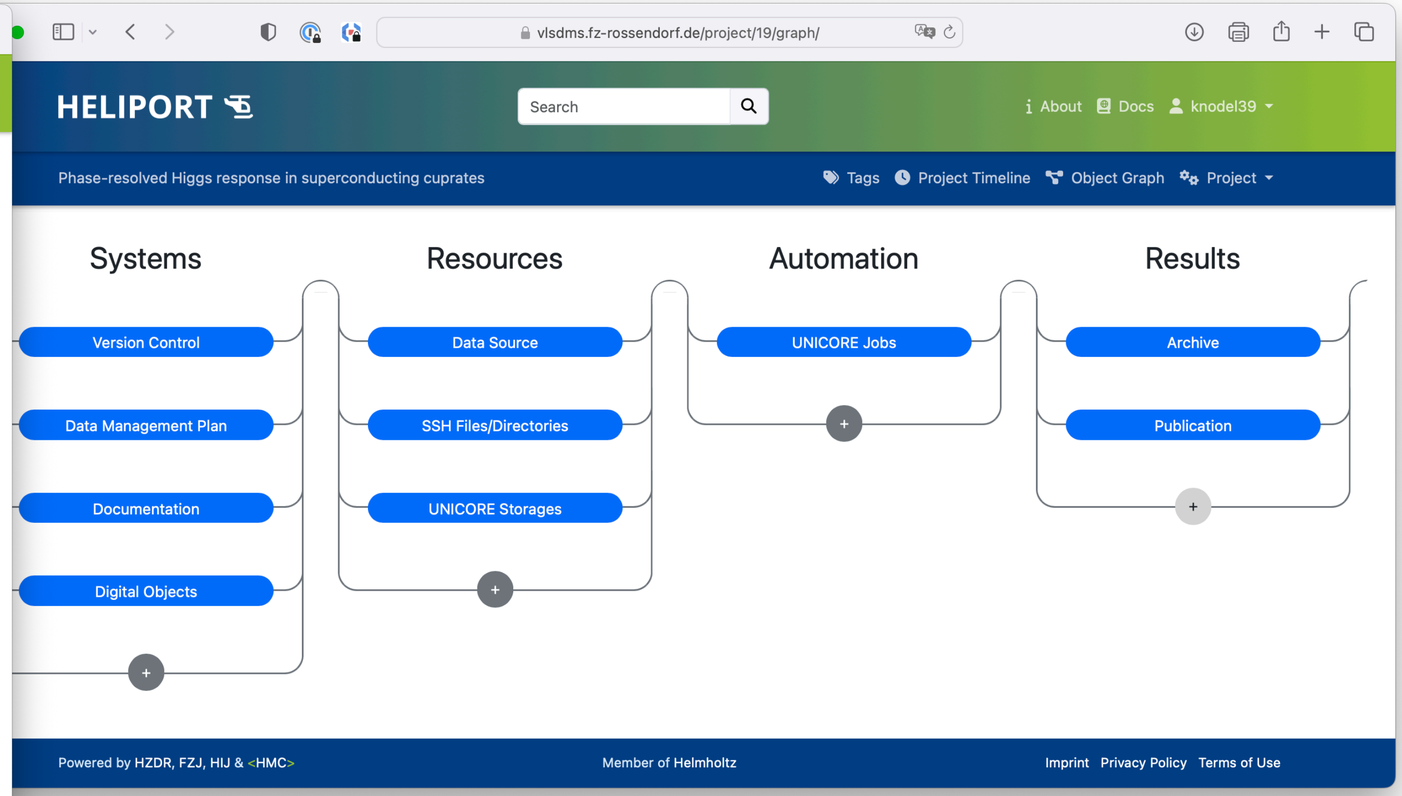


II. Project List and Dashboard

— Typically, a beam line scientist is the owner of a HELIPORT project and the proposer has the role of the manager and can add additional project members.

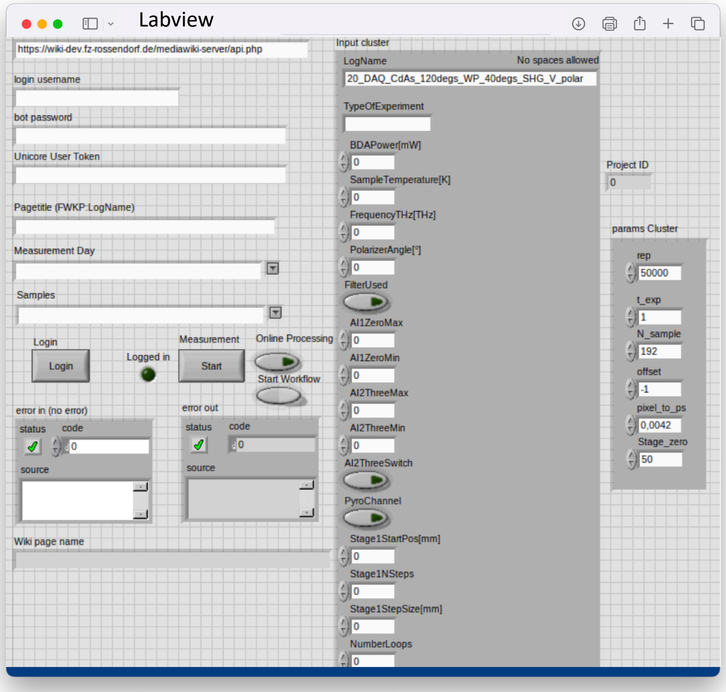
— Tags and sub-projects including inheritance are possible in the project list.





III. Detector Control and Workflows

— The HELIPORT REST-API enables the transfer of metadata between HELIPORT and external systems (e.g. the detector control in LabView).



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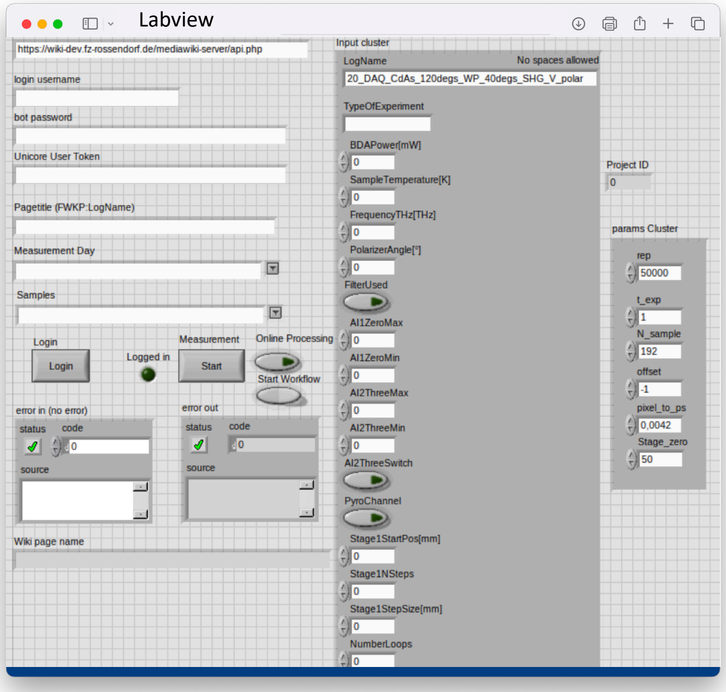

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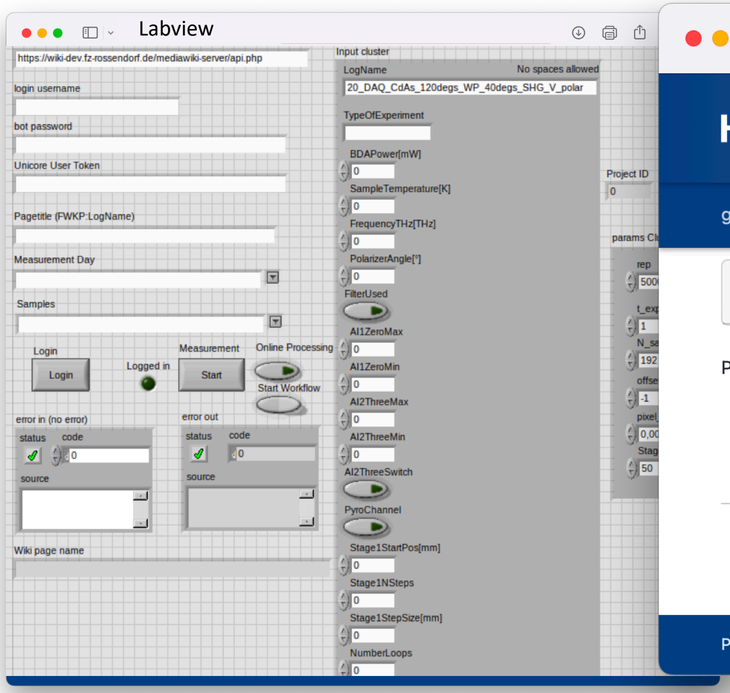
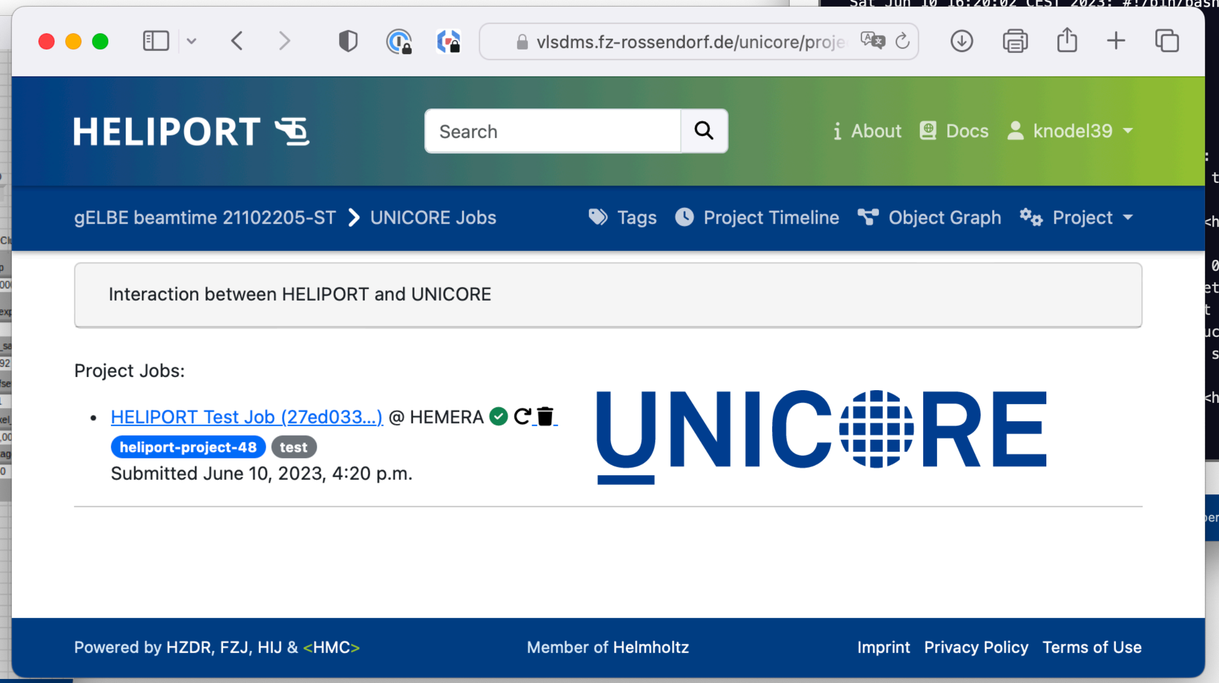
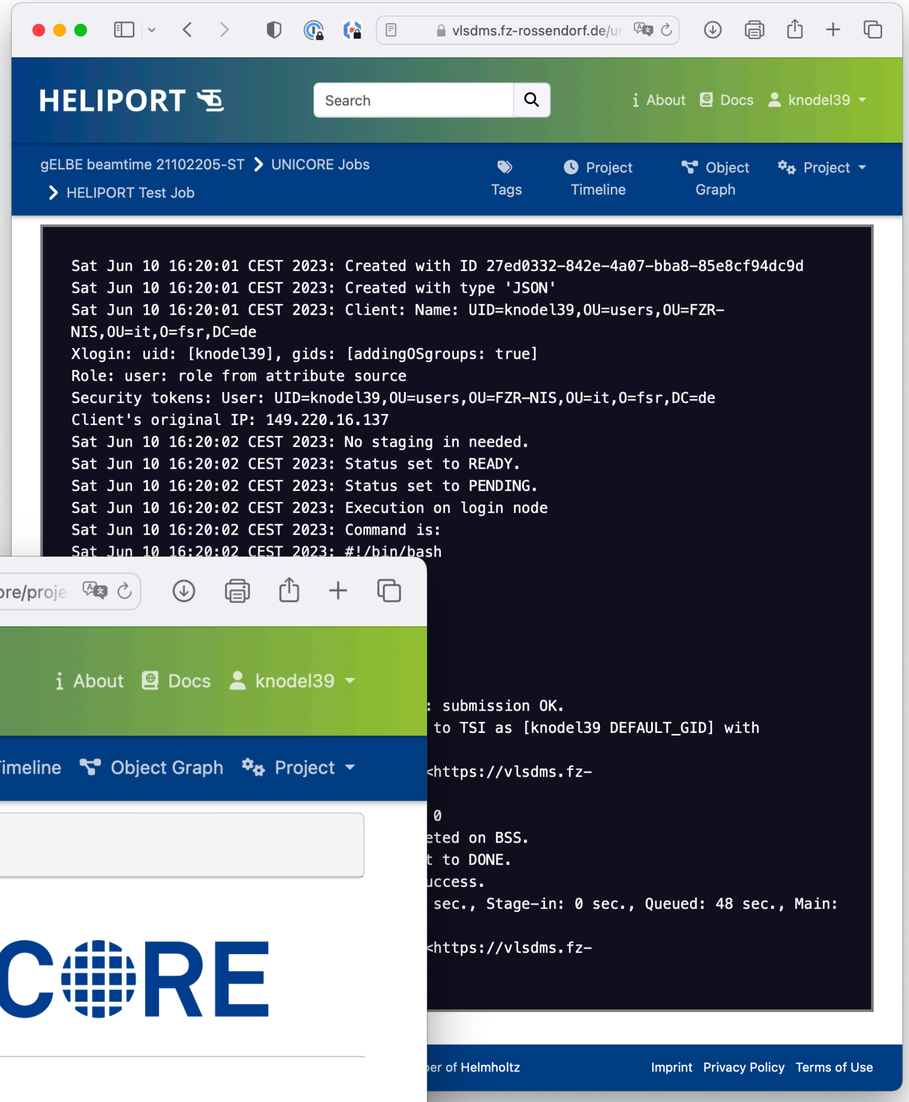
- Via the API, LabView can control the integrated workflow management (e.g. UNICORE), which provides metadata for provenance information.
- The output of workflows (on our HPC cluster) can be accessed by any project member directly in the HELIPORT web frontend.

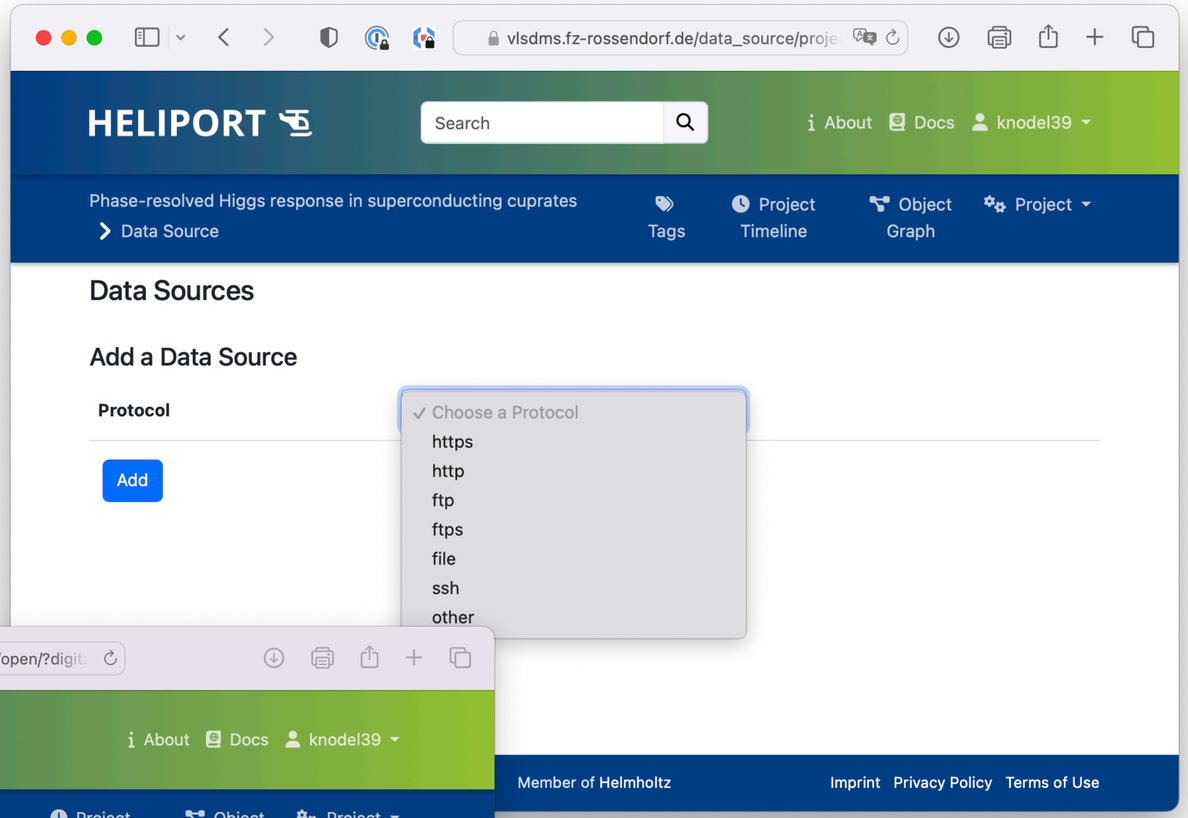


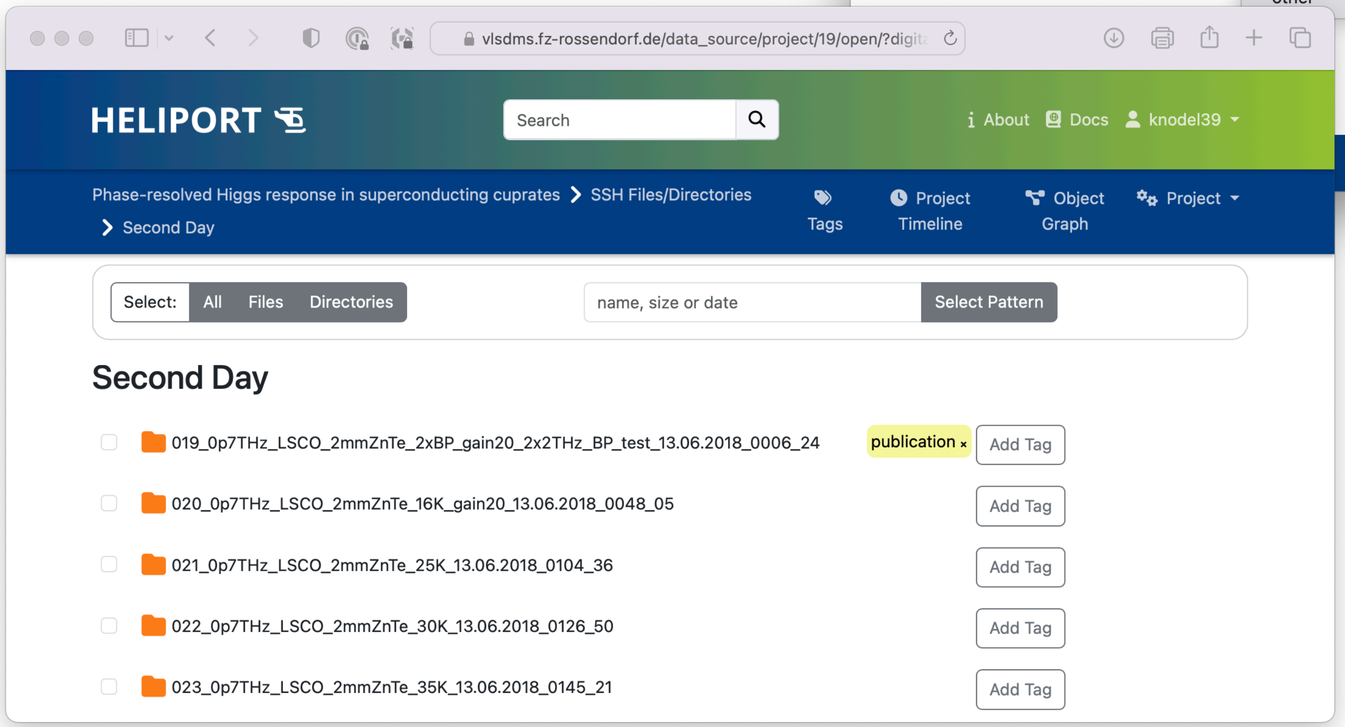




IV. Data Sources

- Folders and Files in our internal filesystem can be registered in HELIPORT as data source.
- Each member of a HELIPORT project (Login via Helmholtz ID) has access to the files and folders.
- The provenance of the data sets generated from an experiment is entirely comprehensible.

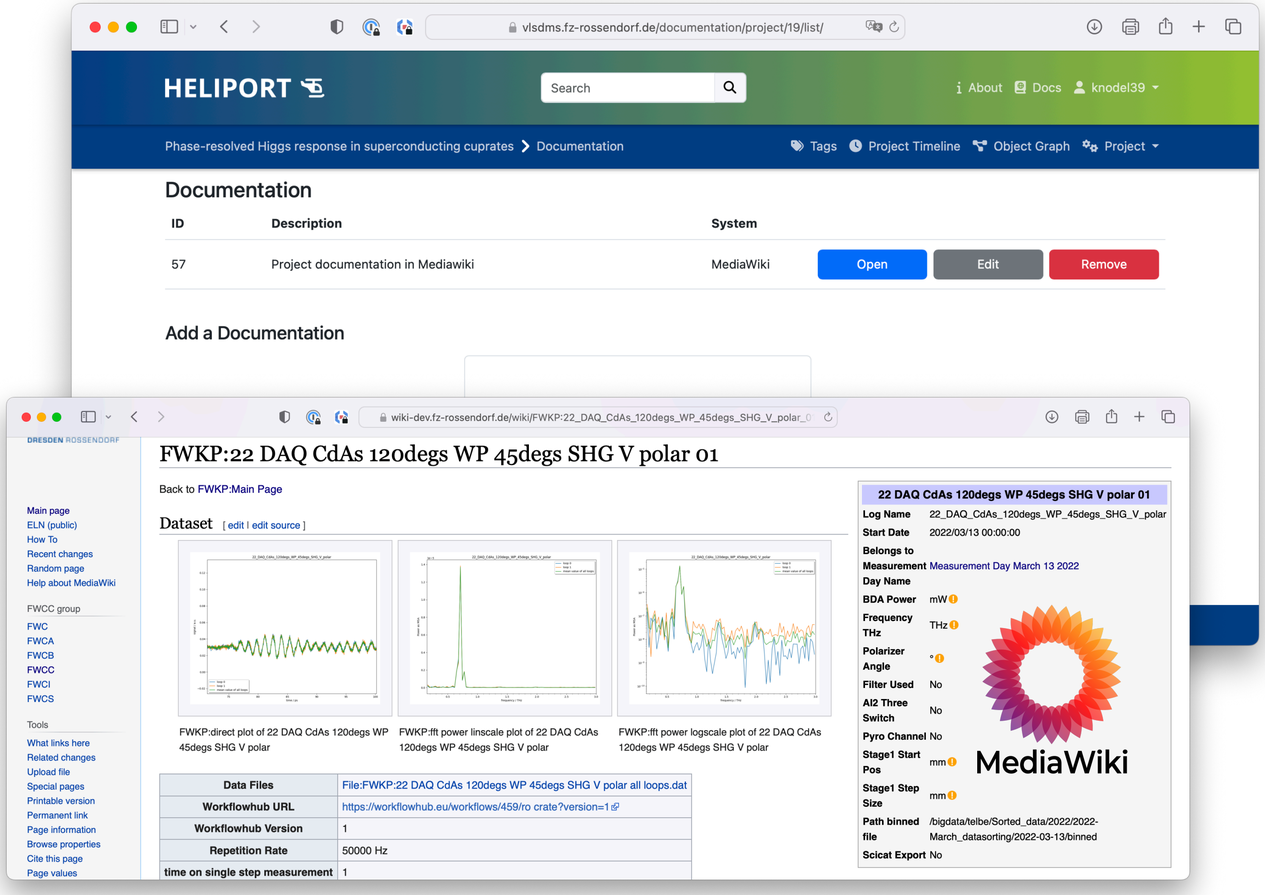




V. Resources: Documentation and Repositories

The documentation section is typically used to refer to all internal and external systems or services used:

— E-Labbook (Mediawiki),



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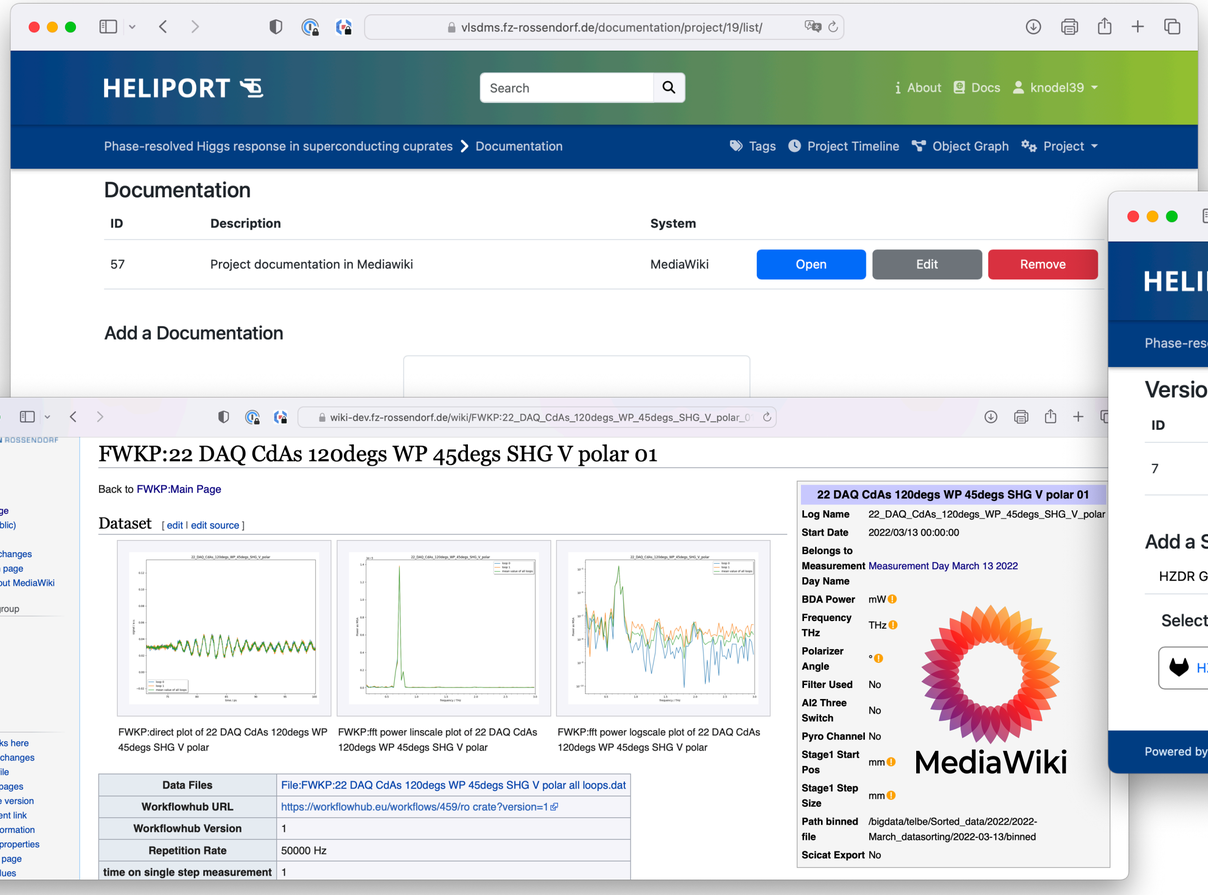
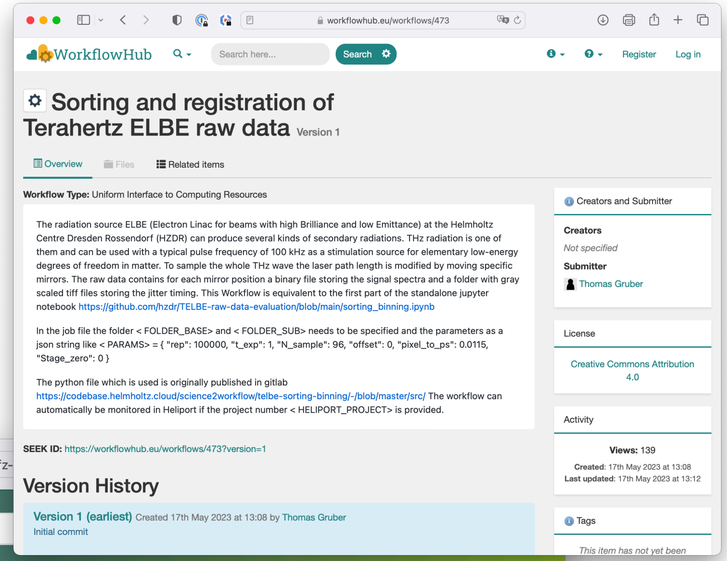
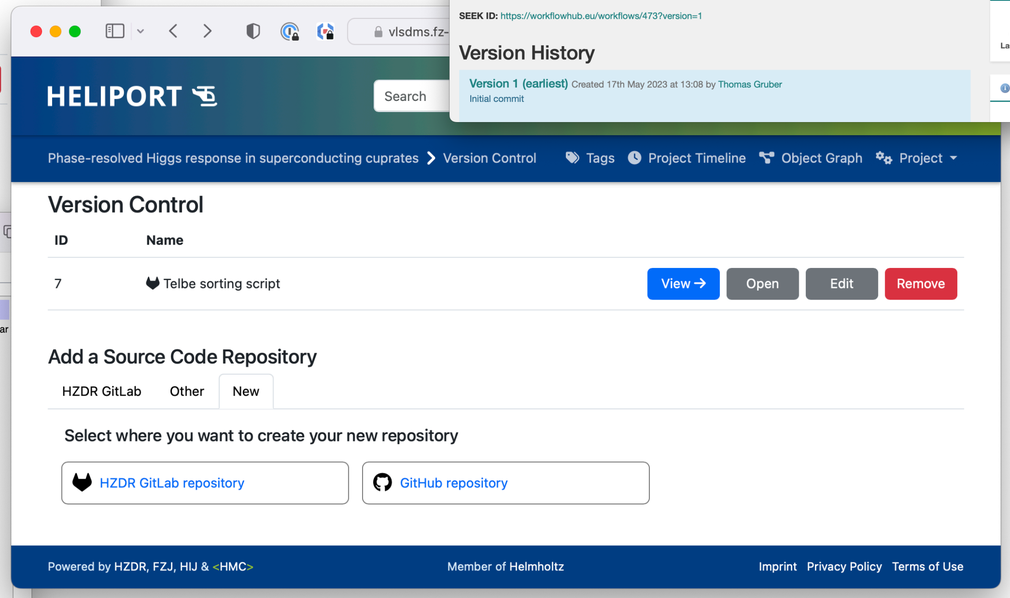
— E-Labbook (Mediawiki),

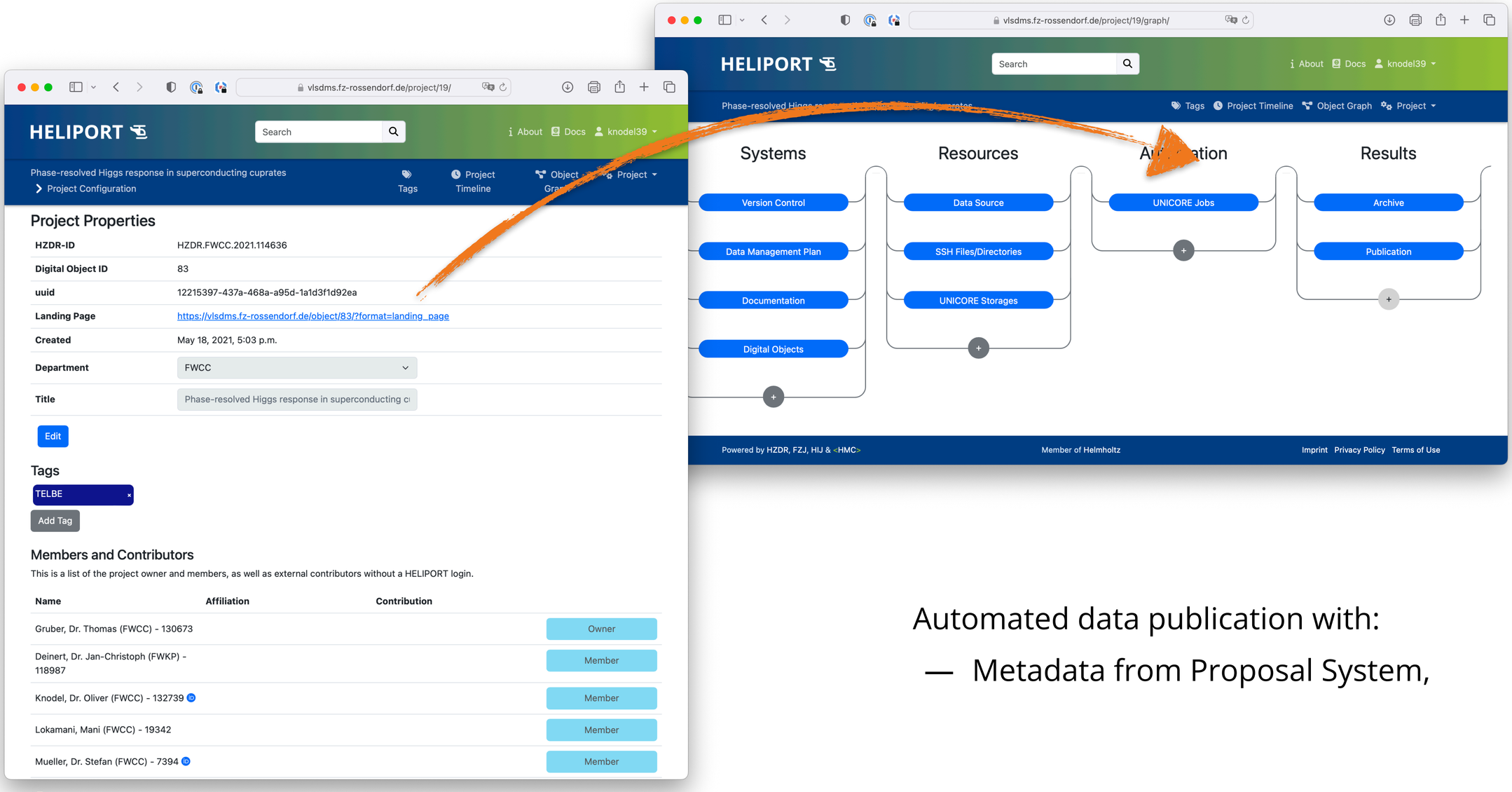
— GitLab, Github, Workflowhub, …







VI. Integration in an Overall Data Publication Workflow



Automated data publication with:

— Metadata from Proposal System,

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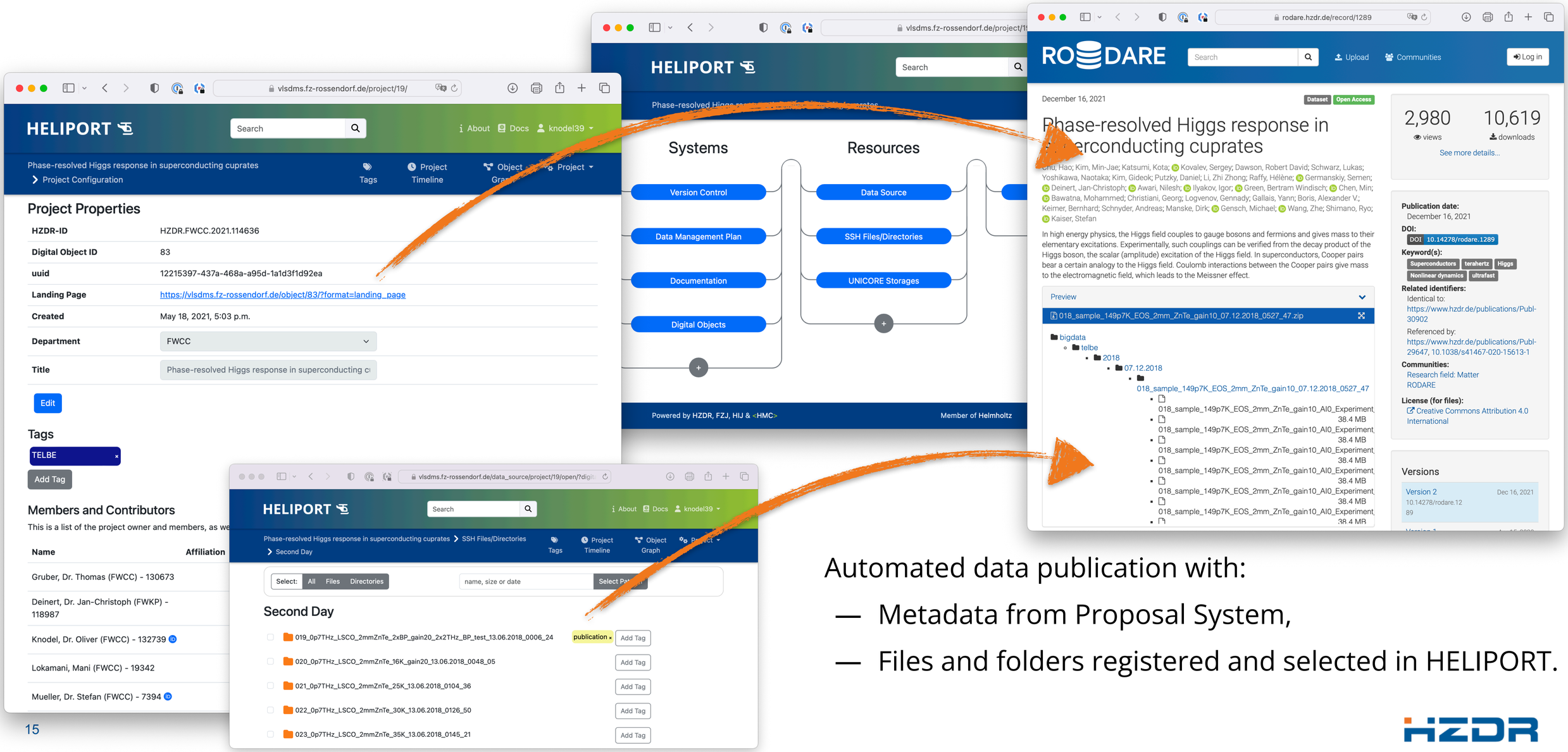
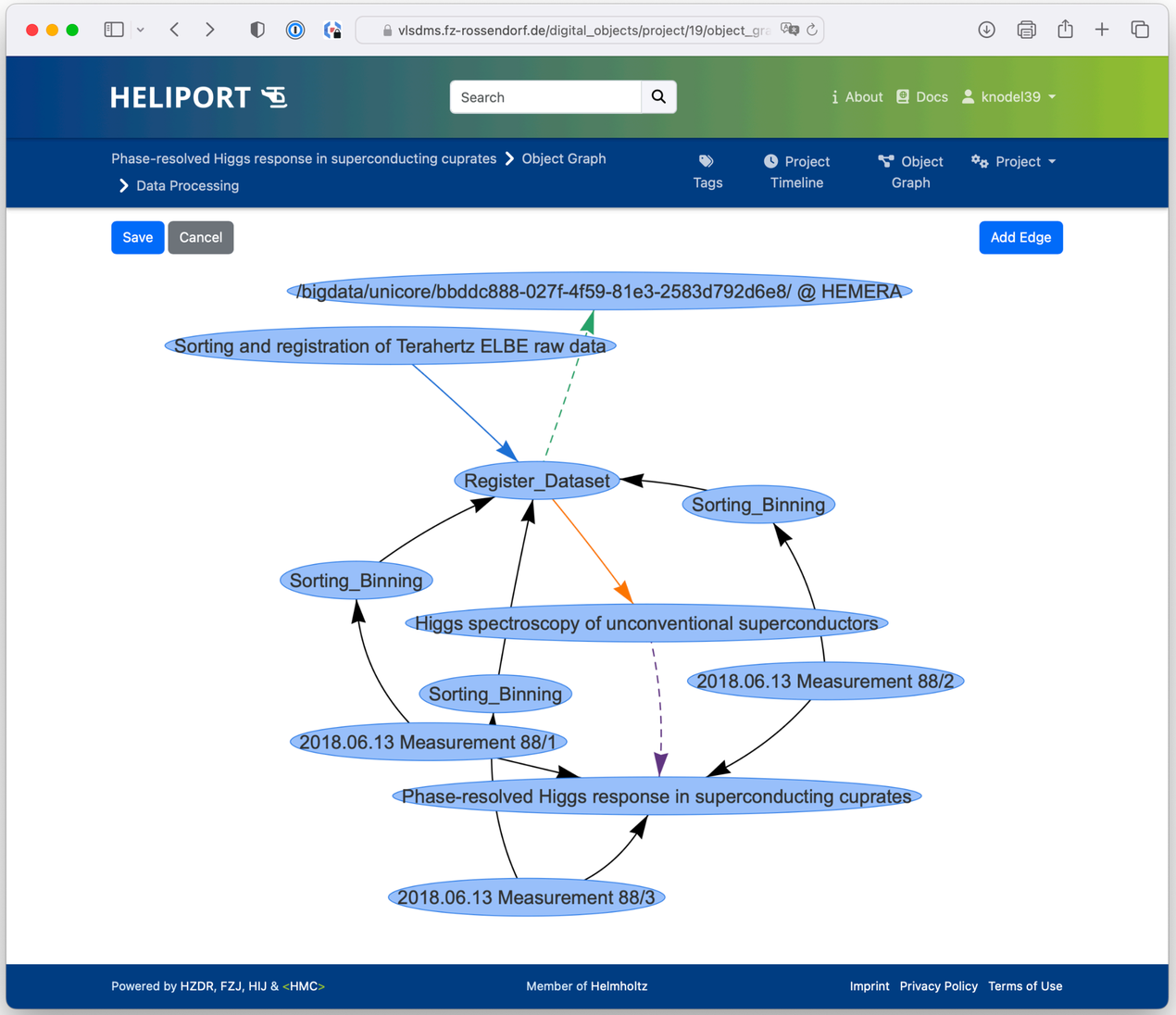


Automated data publication with:

- Metadata from Proposal System,
- Files and folders registered and selected in HELIPORT.

VII. Relations Between Digital Objects and

— Relations between digital objects are visualised to provide a top-level view on the project.



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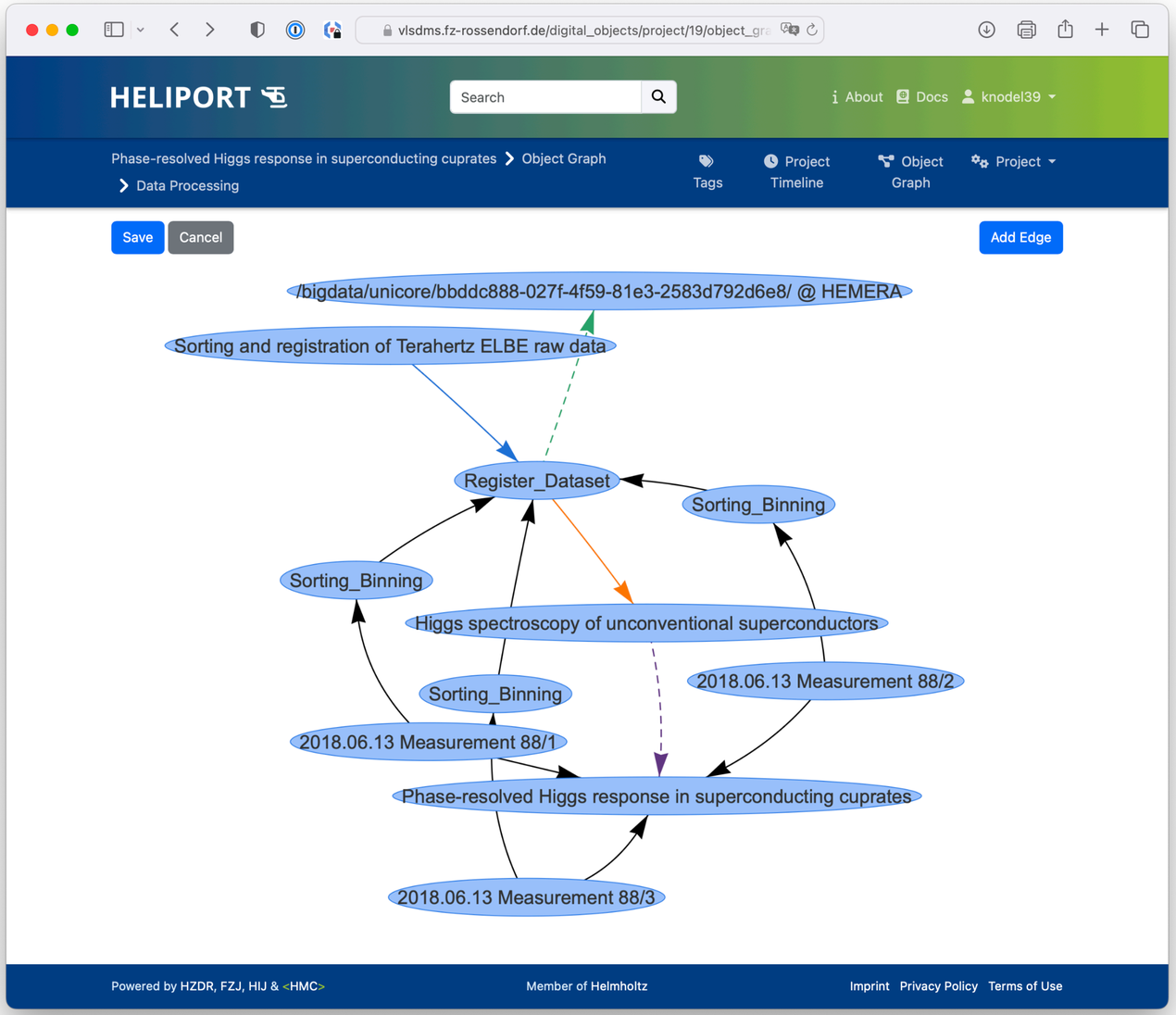
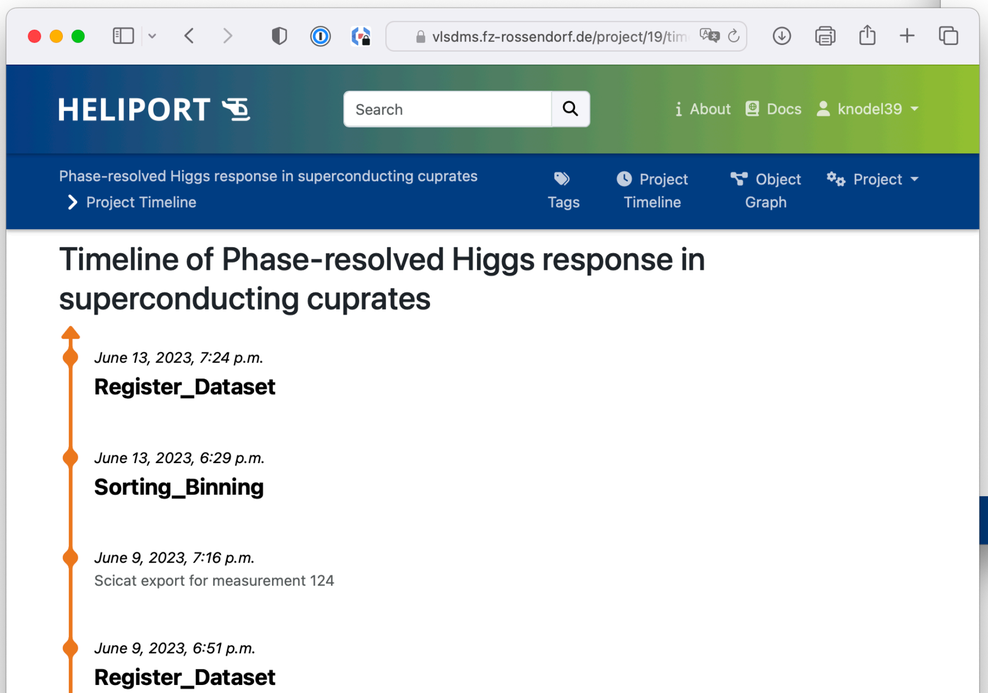
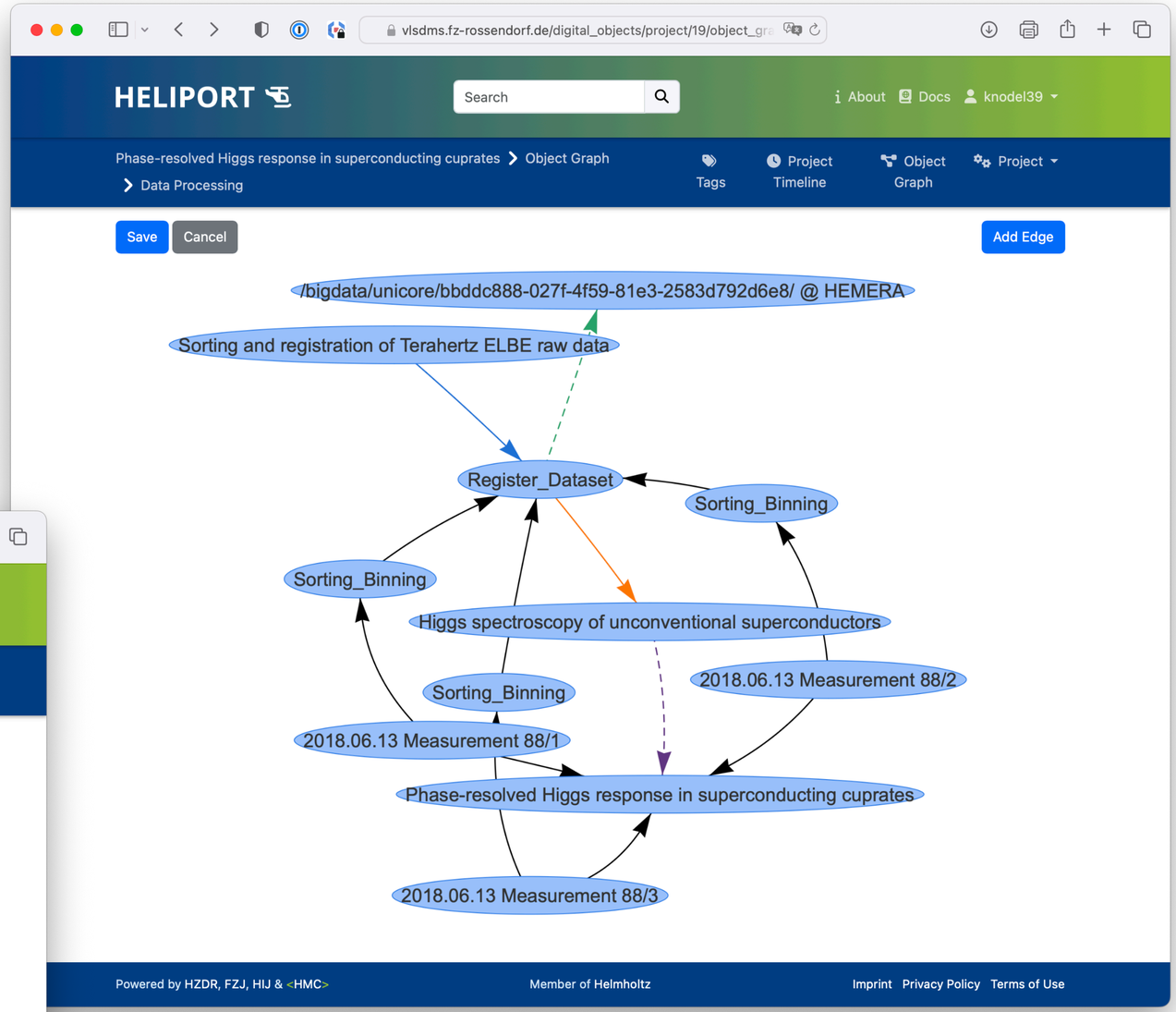


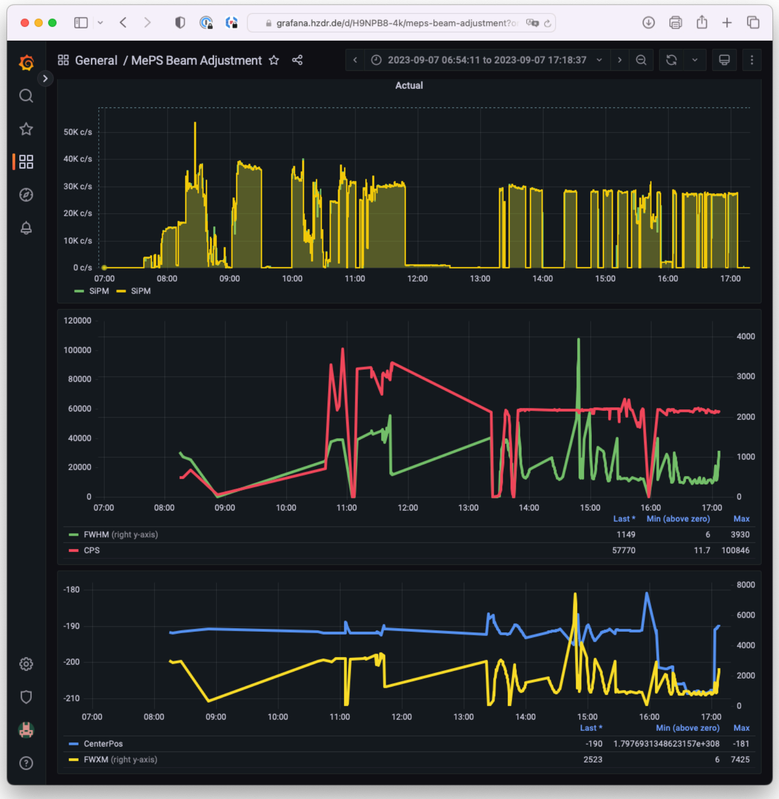
VII. Relations Between Digital Objects and

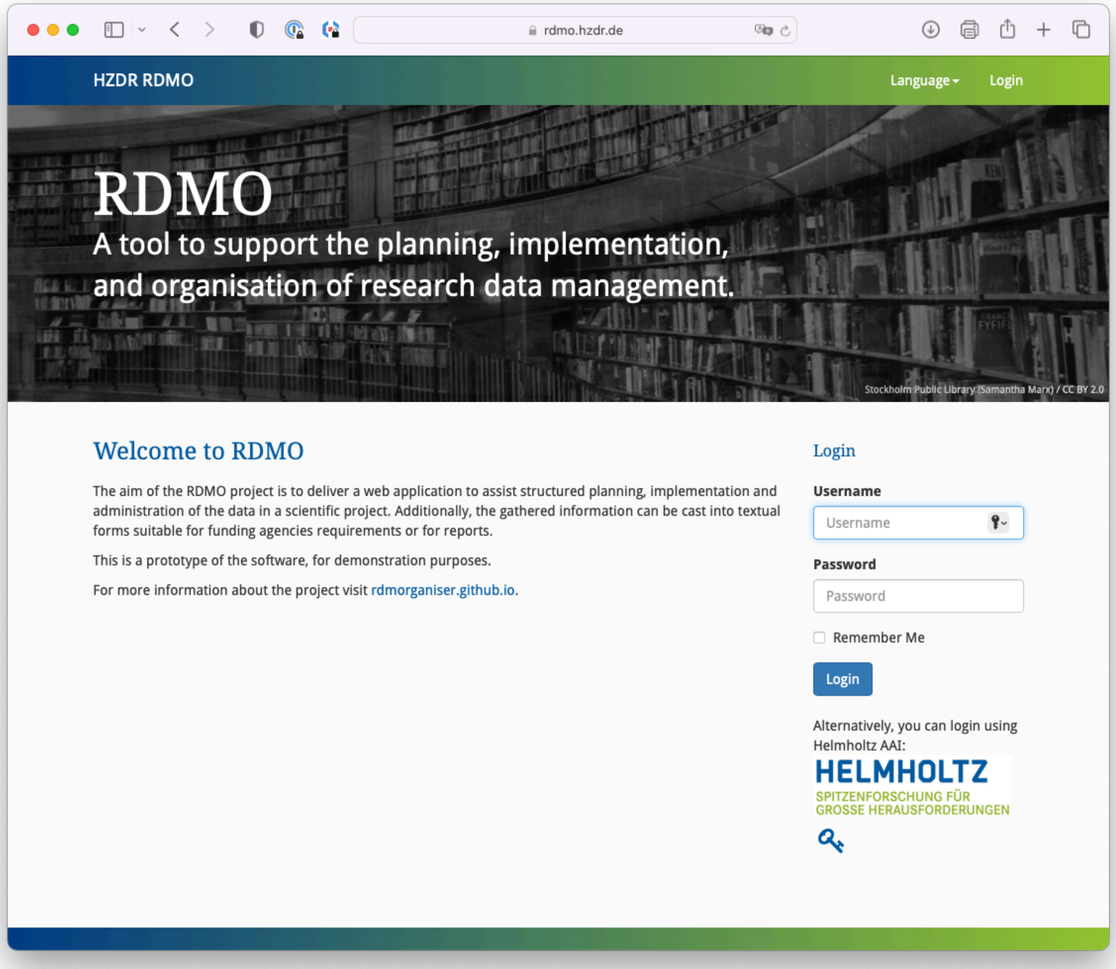
- Relations between digital objects are visualised to provide a top-level view on the project.
- The relationships between simulation (surrogate model) and experiment can also be illustrated.
- The versioning of an experiment is an essential extension, and first approaches via a timeline are being evaluated.





Additional Systems/Services: Grafana & RDMO

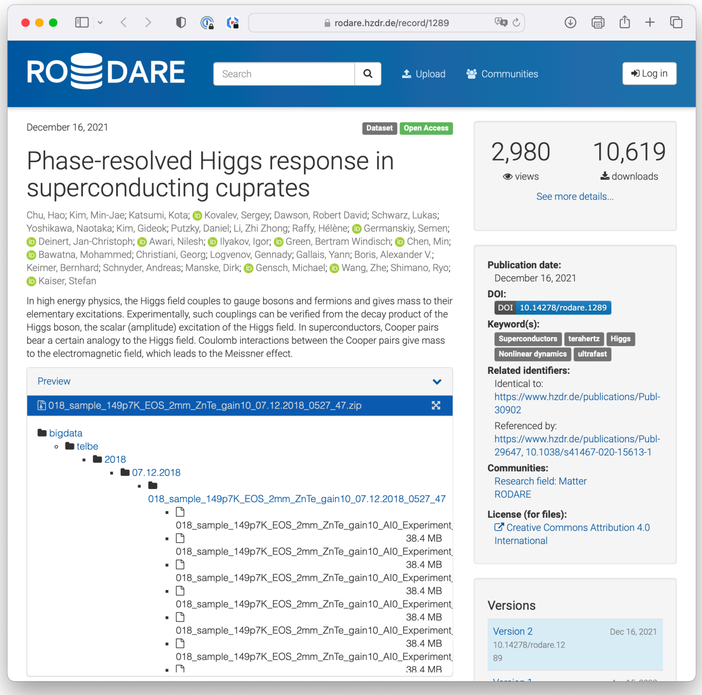




Next Steps: Integration of an Additional Metadata Catalogue

- With our data publication repository RODARE (based on InvenioRDM) we provide a platform for publishing datasets.
- In RODARE, bibliographic metadata is based on DataCite.

RODARE
ROSSENDORF DATA REPOSITORY



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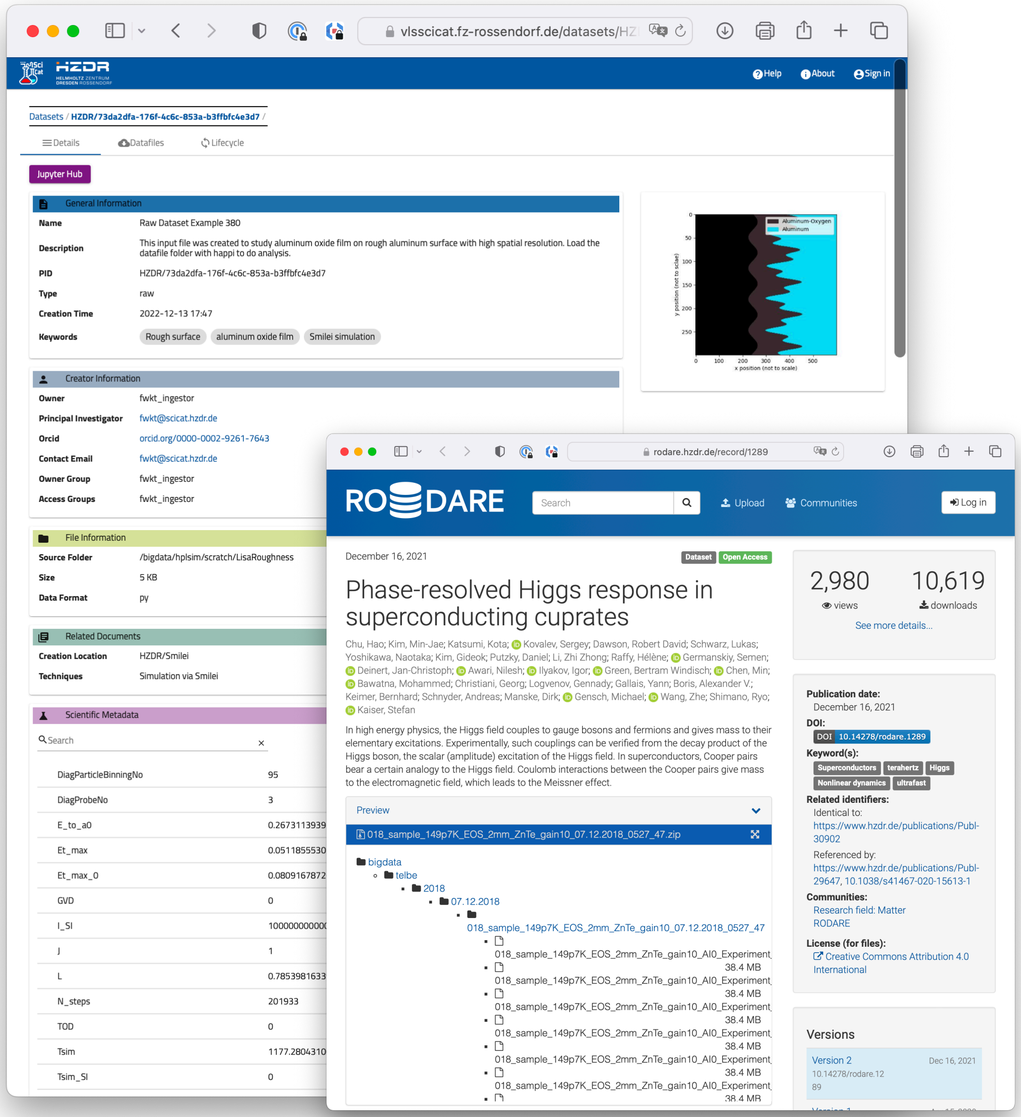

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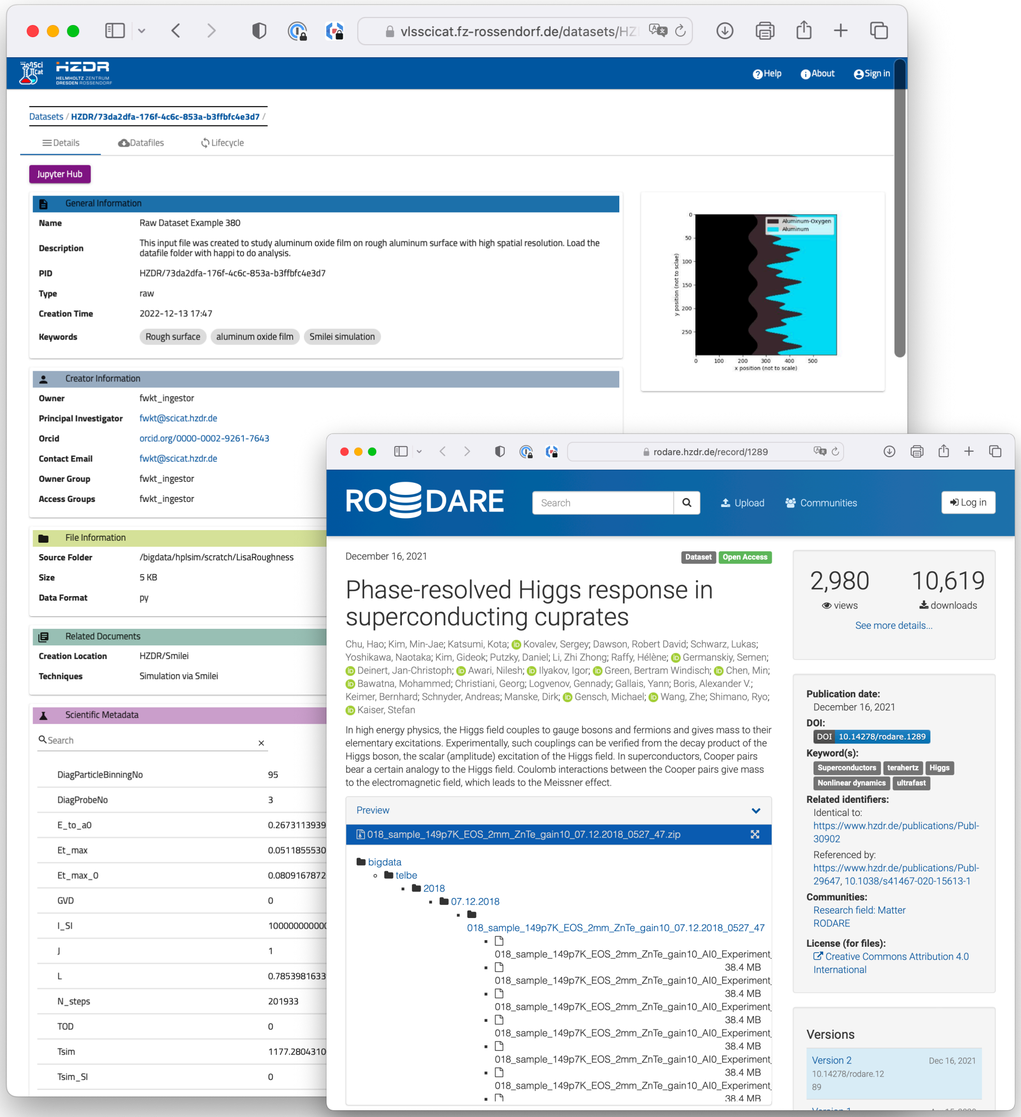
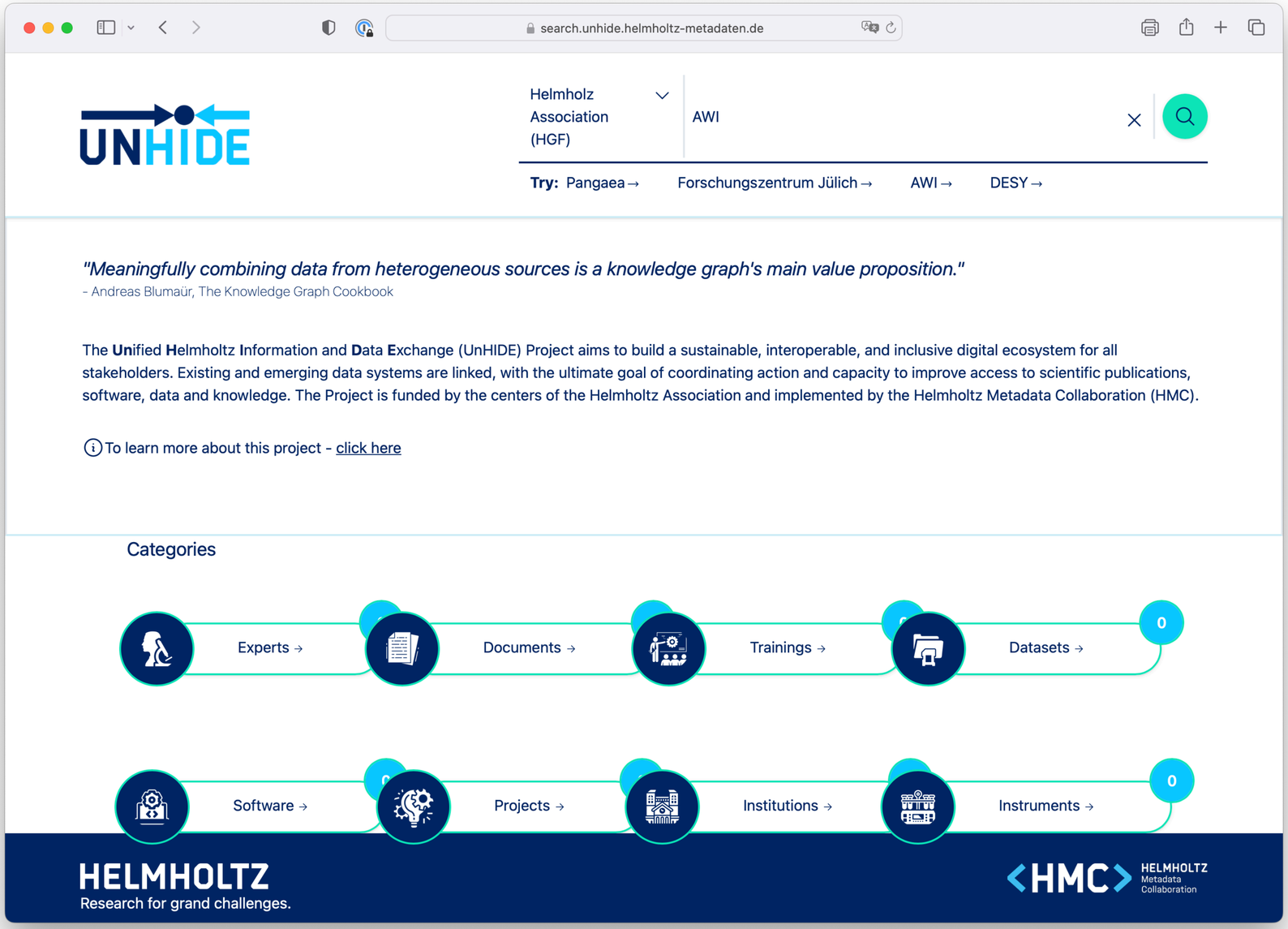
- Within the DAPHNE4NFDI project, we want to establish such an approach for the photon and neutron community.



Future: Providing Metadata for UnHIDE (Unified Helmholtz Information and Data Exchange)



HMC HELMHOLTZ Metadata Collaboration

HZDR HELMHOLTZ ZENTRUM DRESDEN ROSSENDORF

HI JENA Helmholtz Institute Jena

JÜLICH FORSCHUNGSZENTRUM

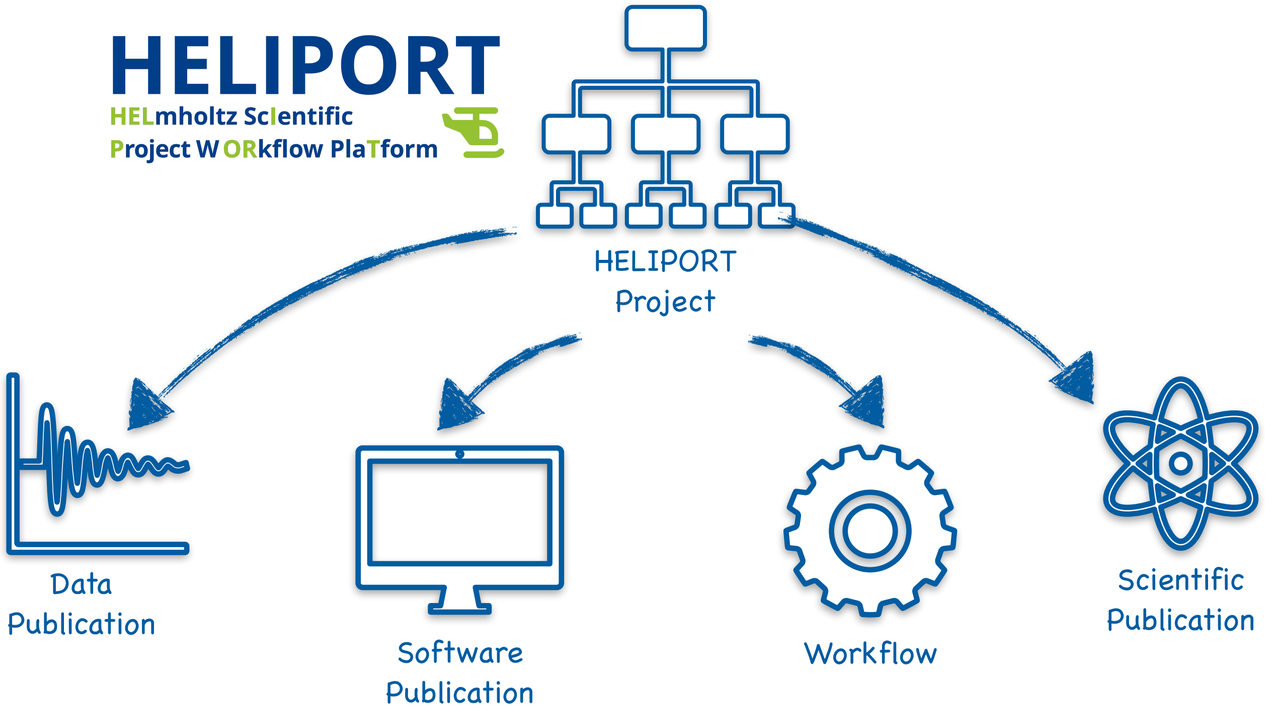
GFZ Helmholtz-Zentrum POTSDAM

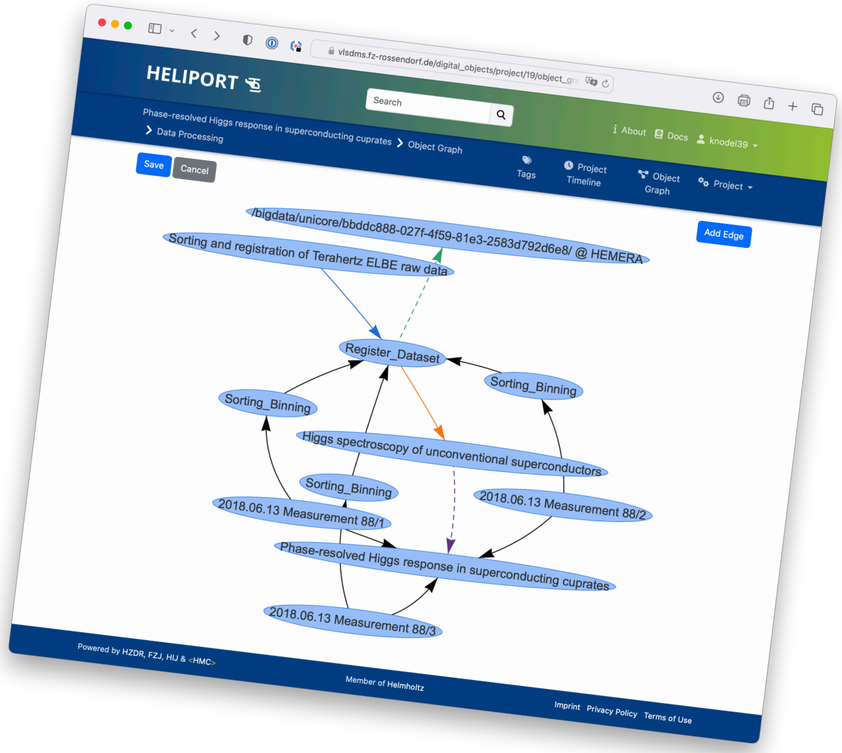
GSI

HZDR

Conclusions

— HELIPORT describes and collects all metadata from all services and systems involved in an scientific experiment.

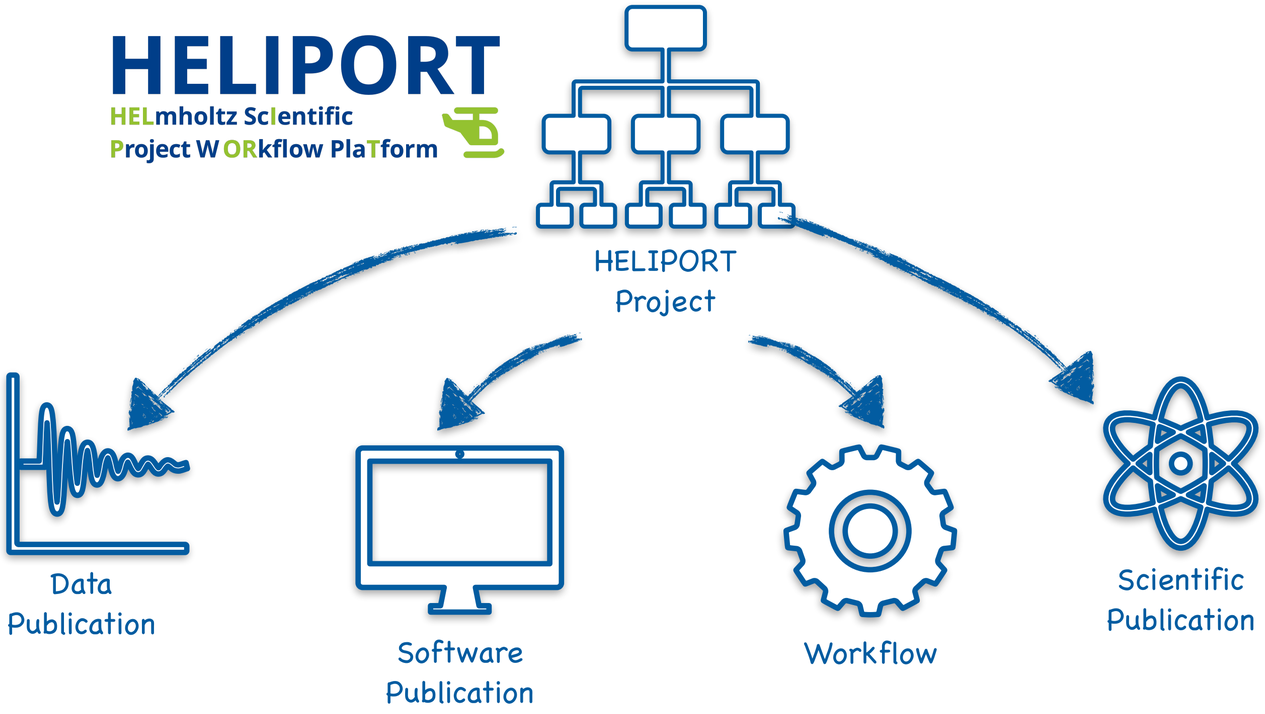


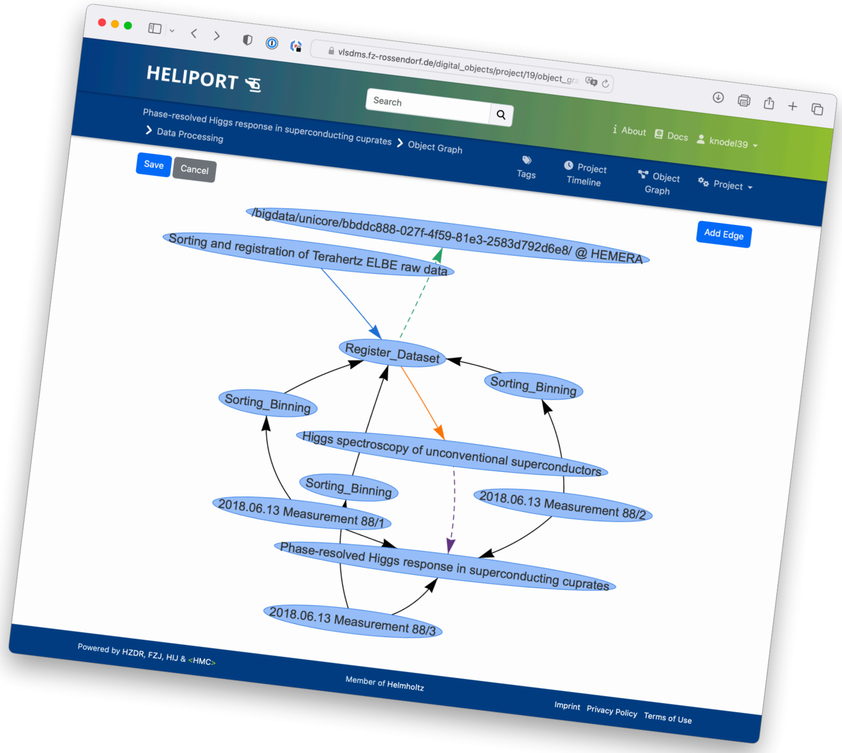


Conclusions

— HELIPORT describes and collects all metadata from all services and systems involved in an scientific experiment.

— Such an approach is desirable and leads us to a fully **FAIR** and **comprehensible** research project.



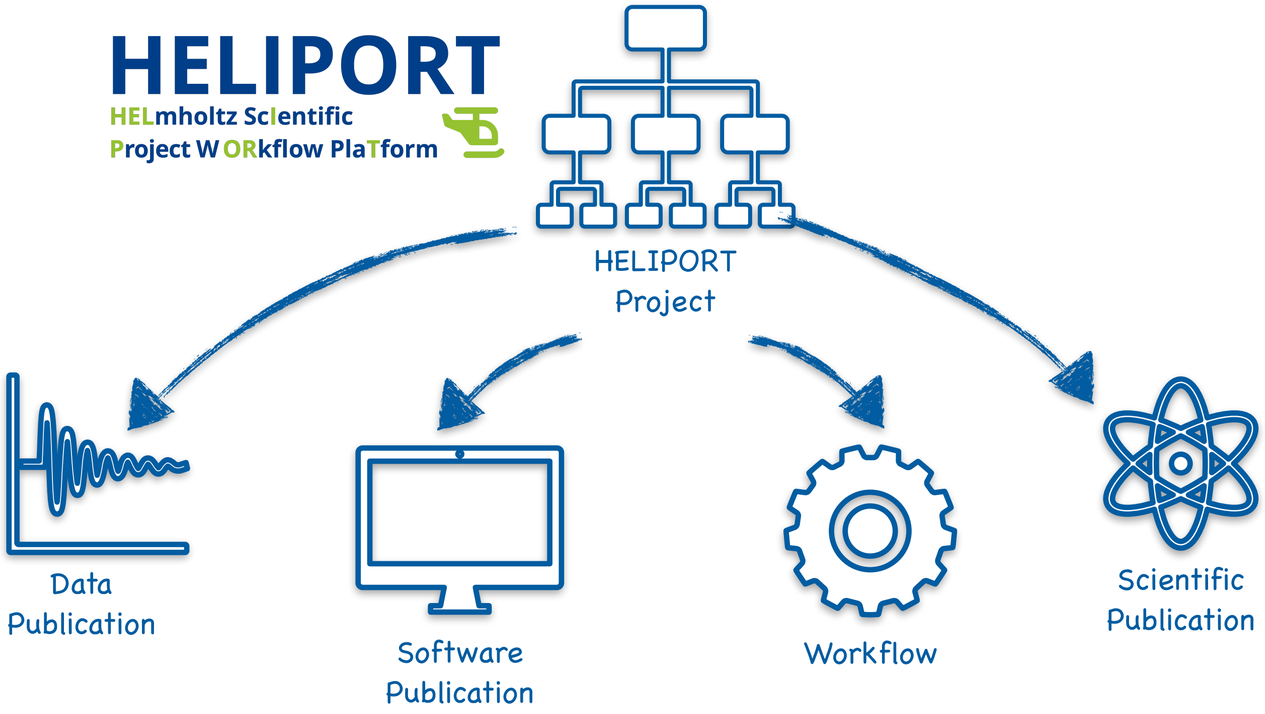


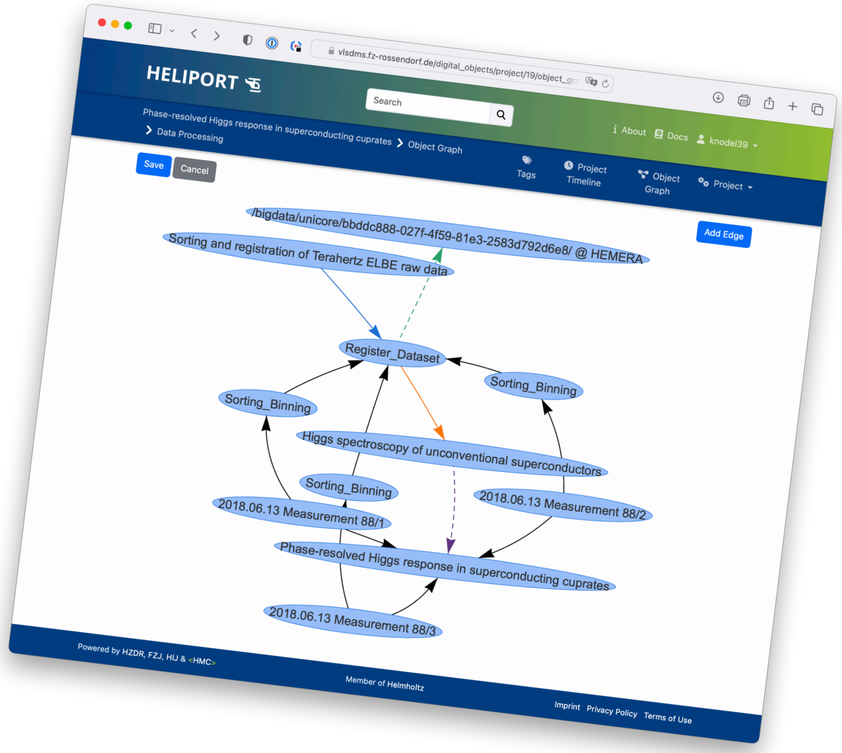
Conclusions

— HELIPORT describes and collects all metadata from all services and systems involved in an scientific experiment.

— Such an approach is desirable and leads us to a fully **FAIR** and **comprehensible** research project.

— The computational workflows are essential to keep track of everything what happened during the experiment.

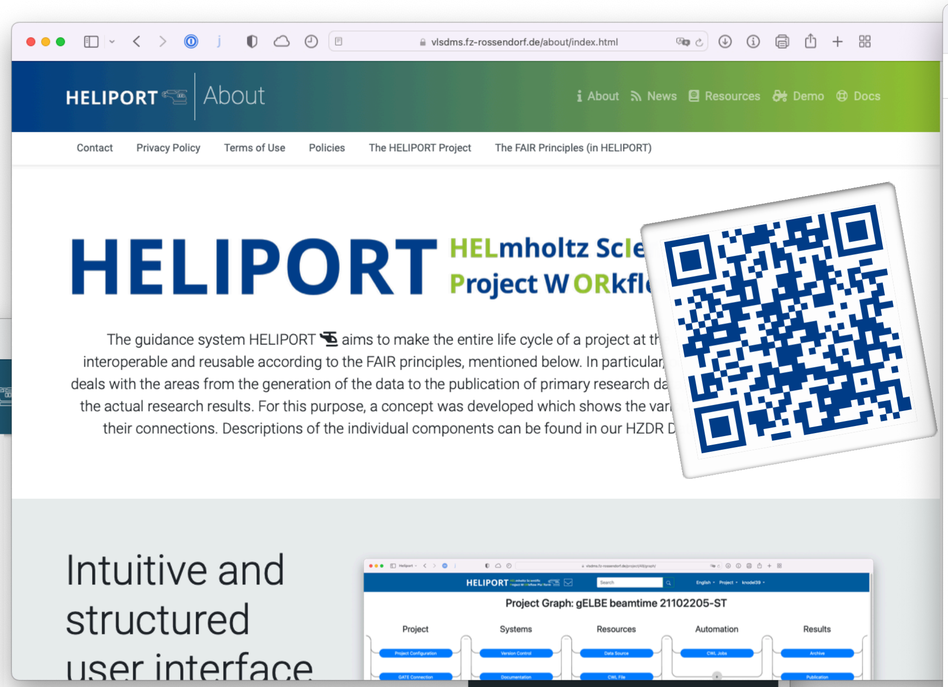


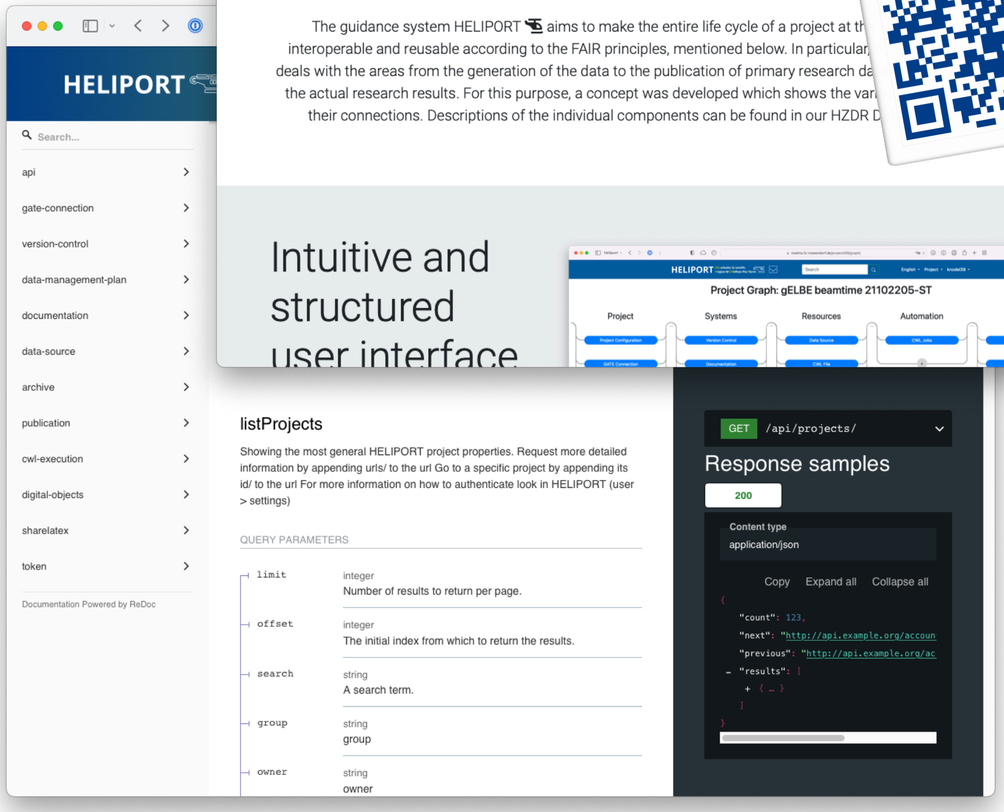


Resources

Website: heliport.hzdr.de

Repository: codebase.helmholtz.cloud/heliport





API Doc: heliport.hzdr.de/redoc/