



Developing Central Support Services for the German National Research Data Infrastructure in Earth System Sciences through a Community-Driven Effort

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In Earth System Sciences, the landscape of resources for research data management, ranging from specific datasets to RDM services, is very diverse to tackle the heterogeneous and domain-specific (sub) community needs. Although marketplaces for services and central access points for specific data types exist, researchers need assistance discovering resources for research data management tasks without having to navigate multiple, differently designed and not integrated platforms.

By engaging with the communities, NFDI4Earth aims to address the needs and requirements of the end users and includes the following objectives:

- map the existing landscape of sustainable services and reuse them as data sources or user interface components;
- align strategies across infrastructure providers/across NFDI4Earth community members to curate provided information for data sources with the providers and share compute resources;
- develop metadata harvesters or required adaptations together with the service provider's developers, and share the source code with an open license; and
- reuse open standards and specifications for all (service) interfaces and share own specifications openly.

We apply this strategy for the implementation of our two central support services.

- The Knowledge Hub (<https://knowledgehub.nfdi4earth.de>) is a knowledge graph database and acts as an aggregator. It harvests curated information for relevant resources from various sources and makes it available as semantically enabled open data. The solution builds on an

open-source data management system and a triple store. Fostering the community effort, we encourage and investigate whenever possible the implementation across Knowledge Hub and data source developers, such as with the Helmholtz Data Hub Earth and Environment. By actively collaborating with the original sources on the curation of the harvested information, e.g., with re3data for repository information, we ensure the distribution of high-quality information via the data sources and the NFDI4Earth Knowledge Hub.

- The OneStop4All (<https://onestop4all.nfdi4earth.de>) and the integrated Living Handbook facilitate the discovery of ESS-relevant RDM resources, such as datasets or software, and act as a resource catalog based on the Knowledge Hub data. Through the publication, curation, and integration of related information, such as best practices or showcase articles for published resources, the OneStop4All also acts as a community portal. This approach is implemented by managing Living Handbook articles in an open repository, editing them in an open review process, harvesting them through the Knowledge Hub, and making them visible in a user-friendly presentation. In addition, the OneStop4All offers several search functionalities providing benefits for differently skilled users including RDM novices and experts. In the following steps, we will integrate existing frontend services, e.g., Earth Data Portal map viewers, to facilitate researchers using a single entry point for their RDM tasks.

Our FAIR-by-design services will be iteratively developed with an open and distributed developer team focussing on data access to data publications, with an eye on using the content for advanced data analytics use cases.